Attachment 1

Table 1 DMMP Parameters (testing parameter, preparation method, analytical method, sediment method detections limit [MDL], DMMP screening levels [SL], maximum levels [ML] and bioaccumulation triggers [BT])

Parameter	Prep Method	Analysis Method	Sediment RL [1]	SL	PSDDA[1] BT	ML
Conventionals						
Total Solids (%)	---	PSEP [2]	0.1	---	---	---
Total Volatile Solids (%)	---	PSEP [2]	0.1	---	---	---
Total Organic Carbon (%)	---	PSEP [2]	0.1	---	---	---
Total Sulfides (mg/kg)	---	PSEP [2]	1	---	---	---
Ammonia (mg/kg)	---	Plumb 1981	1	---	---	---
Grain Size	---	Modified ASTM with Hydrometer	---	---	---	---
Dioxin/Furans Congeners (ng/kg)[3,4,5]						
2,3,7,8-TCDD	---	1613B	1.0	---	---	---
1,2,3,7,8-PeCDD	---	1613B	1.0	---	---	---
1,2,3,4,7,8-HxCDD	---	1613B	2.5	---	---	---
1,2,3,6,7,8-HxCDD	---	1613B	2.5	---	---	---
1,2,3,7,8,9-HxCDD	---	1613B	2.5	---	---	---
1,2,3,4,6,7,8-HpCDD	---	1613B	2.5	---	---	---
OCDD	---	1613B	5.0	---	---	---
2,3,7,8-TCDF	---	1613B	1.0	---	---	---
1,2,3,7,8-PeCDF	---	1613B	2.5	---	---	---
2,3,4,7,8-PeCDF	---	1613B	1.0	---	---	---
1,2,3,4,7,8-HxCDF	---	1613B	2.5	---	---	---
1,2,3,6,7,8-HxCDF	---	1613B	2.5	---	---	---
1,2,3,7,8,9-HxCDF	---	1613B	2.5	---	---	---
2,3,4,6,7,8-HxCDF	---	1613B	2.5	---	---	---
1,2,3,4,6,7,8-HpCDF	---	1613B	2.5	---	---	---
1,2,3,6,7,8,9-HpCDF	---	1613B	2.5	---	---	---
OCDF	---	1613B	5.0	---	---	---

Notes:

1. TDLs and DMMP screening levels are on a dry weight basis.
2. Recommended Protocols for Measuring Metals in Puget Sound Water, Sediment and Tissue Samples, Puget Sound Estuary Program, April 1997.
3. Procedures For Handling and Chemical Analysis of Sediment and Water Samples, Russell H. Plumb, Jr., EPA/Corps of Engineers, May 1981.
3. Dioxin/furan analysis includes the tetra-, penta-, hexa-, hepta-, octa-chlorinated congeners.
4. The TDLs for dioxin/furans are on a dry weight basis in pg/g.
5. Reporting limits and methods for dioxin/furan congeners as provided in 2010 SMARM Update (DMMP 2010).

1.1.1 Detection Limits

The samples collected for dredged material characterization will be analyzed for all the parameters listed in **Table 1**. The contractor will specifically caution the testing laboratory to make certain that it complies with the DMMP detection limit requirements. All reasonable means, including additional cleanup steps and method modifications, will be used to bring all limits-of-detection below DMMP detection limit requirements. In addition, an aliquot (8 oz) of

each sediment sample for analysis will be archived and preserved at -20°C for additional analysis if necessary.

Table 2. QC Acceptance Criteria for PCDD/F

	Test Conc., ng/mL[1]	IPR[2]		OPR[3] (%)	I-CAL[4] %	CAL/VER[5] (%) (Coeff. of Variation)	Labelled Cmpd %Rec. in Sample	
		RSD (%)	Recovery				Warning Limit	Control Limit
Native Compound								
2,3,7,8-TCDD	10	28	83-129	70-130	20	78-129	-	-
2,3,7,8-TCDF	10	20	87-137	75-130	20	84-120	-	-
1,2,3,7,8-PeCDD	50	15	76-132	70-130	20	78-130	-	-
1,2,3,7,8-PeCDF	50	15	86-124	80-130	20	82-120	-	-
2,3,4,7,8-PeCDF	50	17	72-150	70-130	20	82-122	-	-
1,2,3,4,7,8-HxCDD	50	19	78-152	70-130	20	78-128	-	-
1,2,3,6,7,8-HxCDD	50	15	84-124	76-130	20	78-128	-	-
1,2,3,7,8,9-HXCDD	50	22	74-142	70-130	35	82-122	-	-
1,2,3,4,7,8-HxCDF	50	17	82-108	72-130	20	90-112	-	-
1,2,3,6,7,8-HxCDF	50	13	92-120	84-130	20	88-114	-	-
1,2,3,7,8,9-HxCDF	50	13	84-122	78-130	20	90-112	-	-
2,3,4,6,7,8-HxCDF	50	15	74-158	70-130	20	88-114	-	-
1,2,3,4,6,7,8-HpCDD	50	15	76-130	70-130	20	86-116	-	-
1,2,3,4,6,7,8-HpCDF	50	13	90-112	82-122	20	90-110	-	-
1,2,3,4,7,8,9-HpCDF	50	16	86-126	78-130	20	86-116	-	-
OCDD	100	19	86-126	78-130	20	79-126	-	-
OCDF	100	27	74-146	70-130	35	70-130	-	-
Labelled Compounds								
$^{13}C_{12}$-2,3,7,8-TCDD	100	37	28-134	25-130	35	82-121	40-120	25-130
$^{13}C_{12}$-2,3,7,8-TCDF	100	35	31-113	25-130	35	71-130	40-120	24-130
$^{13}C_{12}$-1,2,3,7,8-PeCDD	100	39	27-184	25-150	35	70-130	40-120	25-130
$^{13}C_{12}$-1,2,3,7,8-PeCDF	100	34	27-156	25-130	35	76-130	40-120	24-130
$^{13}C_{12}$-2,3,4,7,8-PeCDF	100	38	16-279	25-130	35	77-130	40-120	21-130
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	100	41	29-147	25-130	35	85-117	40-120	32-130
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	100	38	34-122	25-130	35	85-118	40-120	28-130
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	100	43	27-152	25-130	35	76-130	40-120	26-130
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	100	35	30-122	25-130	35	70-130	40-120	26-123
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	100	40	24-157	25-130	35	74-130	40-120	29-130
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	100	37	29-136	25-130	35	73-130	40-120	28-130
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	100	35	34-129	25-130	35	72-130	40-120	23-130
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	100	41	32-110	25-130	35	78-129	40-120	28-130
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	100	40	28-141	25-130	35	77-129	40-120	26-130
$^{13}C_{12}$-OCDD	200	48	20-138	25-130	35	70-130	25-120	17-130
Cleanup Standard								
$^{37}Cl_4$-2,3,7,8-TCDD	10	36	39-154	31-130	35	79-127	40-120	35-130

[1] QC acceptance criteria for IPR, OPR, and samples based on a 20 µL extract final volume

[2] IPR: Initial Precision and Recovery demonstration

[3] OPR: Ongoing Precision and Recovery test run with every batch of samples.

[4] Initial Calibration

[5] CAL/VER: Calibration Verification test run at least every 12 hours

REPORT

DRAFT SAMPLING AND ANALYSIS PLAN
KENMORE SEDIMENT AND WATER CHARACTERIZATION

Prepared for

Washington State Department of Ecology

Dredged Material Management Program

Washington State Department of Health

On Behalf of

City of Kenmore

18120 68th Avenue NE

Kenmore, Washington 98028

Prepared by

Anchor QEA, LLC

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Seattle, Washington 98101

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Appendix A Sediment Sampling Field Forms and Logs

LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees centigrade
µg/kg	microgram per kilogram
ARI	Analytical Resources, Inc.
ASTM	American Society for Testing and Materials
BT	bioaccumulation trigger
CCV	continuing calibration verification
City	City of Kenmore
cm	centimeter
COC	chain-of-custody
COI	chemical of interest
CSL	Cleanup Screening Level
cy	cubic yards
DDT	dichlorodiphenyltrichloroethane
DGPS	differential global positioning system
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Program
DMMU	dredged material management unit
DOH	Washington State Department of Health
DQO	data quality objective
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management System
FC	field coordinator
GC/MS	gas chromatograph/mass spectrometer
g	gram
HASP	Health and Safety Plan
HDPE	high density polyethylene
HPAH	high-molecular-weight polycyclic aromatic hydrocarbon
ID	identification
LCS	laboratory control sample
LPAH	low-molecular-weight polycyclic aromatic hydrocarbon

m	meter
mg/kg	milligram per kilogram
ml	milliliter
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Model Toxics Control Act
NA	Not Applicable
NAD	North American Datum
ng/kg	nanogram per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCDD/F	polychlorinated dioxins and furans
PSEP	Puget Sound Estuary Program
QA/QC	quality assurance/quality control
QC	quality control
QAPP	Quality Assurance Project Plan
RL	reporting limit
RPD	relative percent difference
SAP	sampling and analysis plan
SL	Screening Level
SQS	Sediment Quality Standard
SQV	Sediment Quality Value
SRM	standard reference material
SAP	sampling analysis plan
SAPA	Ecology's Sediment Sampling Analysis Plan Appendix
SVOC	semivolatile organic compound
SQS	Sediment Quality Standard
TBT	tributyltin
TEQ	toxic equivalency
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

1 INTRODUCTION

This Draft Sampling and Analysis Plan (SAP) has been prepared by the City of Kenmore (City) in partnership with the Washington State Department of Ecology (Ecology) to characterize sediment and water in north Lake Washington and the Sammamish River. The characterization effort supports a number of objectives for the City and Ecology. First, the characterization is intended to support the City's ongoing work with the U.S. Army Corps of Engineers (USACE) to support a request for federal funding for maintenance dredging of the federal Kenmore Navigation Channel (Figure 1). Second, with assistance from a grant from Ecology, the City is conducting additional characterization activities to understand the potential presence of contamination in the area. The characterization has also been designed to support Health Consultations to be developed by Washington State Department of Health (DOH).

1.1 Kenmore Navigation Channel Screening Level Characterization

The Kenmore Navigation Channel was constructed in 1981 as a USACE project authorized in Section 107 of the 1960 River and Harbors Act (Figure 1). Based on a survey conducted by USACE in February 2010, shallow areas are present within the Kenmore Navigation Channel. The most recent maintenance dredging of the Kenmore Navigation Channel was in 1996, prior to the City's 1998 incorporation. King County is the Local Sponsor Authority for the Kenmore Navigation Channel and the Sammamish River Small Boat Navigation Channel; the City of Kenmore, King County and the USACE are presently exploring the possible transfer of the Local Sponsor Authority for the Kenmore Navigation Channel to the City. USACE estimates that maintenance dredging would require removal of 31,700 cubic yards (cy) of sediment within the channel. This SAP describes a screening level sediment characterization to support a request for federal funding for maintenance dredging of the federal Kenmore Navigation Channel in the USACE's maintenance dredging budget.

ANCHOR QEA

DRAFT

Feet
0 200 400 600 800

Figure 1
Existing Information
Sampling and Analysis Plan
Kenmore Sediment Characterization

The Dredged Material Management Office (DMMO) at the USACE has indicated that a screening level characterization will provide information about potential options for disposal of dredged sediment. A full sediment characterization according to Dredged Material Management Program (DMMP) protocols would provide information to determine if sediment is suitable for unconfined open-water disposal. However, these results are only valid for 2 years in areas ranked "High" by DMMP, which includes the Kenmore Navigation Channel. Acquisition of funding and completion of maintenance dredging will not likely occur within the next 2 years. Given the timing of the maintenance dredging, the DMMO agreed that it made sense for the City to conduct a screening level assessment to provide information to support pursuing federal funding for maintenance dredging, and hold off on a full DMMP characterization effort until within two years of the anticipated maintenance dredging event.

The owners of Northlake Marina are also participating in the sediment characterization efforts in order to assess the options for sediment disposal in the event maintenance dredging is conducted within the marina. The marina owners are interested in privately funding the dredging of the marina in conjunction with the dredging of the Kenmore Navigation Channel to save money and share costs (e.g., dredge equipment mobilization fees) with the USACE.

1.2 Additional Characterization Activities

In conjunction with Ecology, the City will be conducting additional characterization activities in areas near the City shoreline to better understand whether potential contamination is present in sediment and surface water. The data is intended to be used by Ecology to conduct additional evaluations, and also to support Health Consultations to be developed by DOH in the vicinity of Log Boom Park and adjacent to Kenmore Industrial Park. Testing parameters and sample locations have been reviewed by Ecology and DOH to support their anticipated evaluations.

1.2 Purpose and Objectives

The sediment and water samples collected for this project are intended to satisfy the following objectives:

- The screening level characterization in the Kenmore Navigation Channel and in North Lake Marina is intended to provide additional information on potential sediment disposal options in order to support pursuing federal funding for maintenance dredging.
- Additional characterization activities are intended to support:
  - An understanding of the presence of potential contamination in sediment and water near the City shoreline.
  - Evaluations to be conducted by Ecology under the Model Toxics Control Act (MTCA), including the need for further testing and whether specific areas serve as sources of potential contamination.
  - Preparation of Health Consultations by DOH in the vicinity of Log Boom Park and adjacent to Kenmore Industrial Park.

This SAP has been developed in accordance with the 2008 DMMP User's Manual (DMMO 2008) and Ecology's Sediment Sampling and Analysis Plan Appendix (2008). For the screening level characterization in the navigation channel, sample density is lower than required for a dredge material suitability determination since this is a screening level investigation.

This SAP identifies specific sampling and analysis protocols for the sediment sampling activities and provides detailed information regarding the field sampling objectives; sample location and frequency, equipment, and procedures to be used during the sampling; and sample handling and analysis. The SAP also provides the basis for planning field activities and describes specific quality assurance protocols. All sample handling and analyses will follow the most recent Puget Sound Estuary Program (PSEP) protocols for collecting and handling sediment and water samples (PSEP 1986; PSEP 1997a, b, and c) and the 2008 DMMP User's Manual and Clarification Papers and updates (DMMO 2008, Hoffman 1998, Kendall 2001, USACE 2010).

A Health and Safety Plan for field sampling activities is also provided under separate cover and presents the guidance for field health and safety procedures and considerations.

1.3 Background Information

1.3.1 Site Setting

The Kenmore Navigation Channel is located in the northern portion of Lake Washington south of the City of Kenmore and west of the mouth of the Sammamish River. Lake Washington is a freshwater lake that is connected to Lake Union by the Lake Washington Ship Canal, which also extends to Puget Sound by way of the Hiram M. Chittenden Locks. Historical activities in the area include lumber shipping and log booming. Current surrounding land includes commercial, industrial and residential properties, parks, recreational marinas, and a commercial float plane facility.

Washington Department of Fish and Wildlife operates a public boat launch west of the Juanita Drive (68th Avenue NE) Bridge in Kenmore. There is also shoreline access at the western portion of Log Boom Park that is used as a hand kayak launch (Figure 1).

One of the few remaining industrial ports on Lake Washington is in Kenmore at the mouth of the Sammamish River. Businesses near the port include:

- Rinker Materials Kenmore plant (cements and asphalts)
- Kenmore Ready-Mix, a division of the CalPortland Company (cements and asphalt)
- Kiewit General Manson (KGM) (temporarily leasing property for the construction of sections for the new State Route 520 bridge at the Kenmore Industrial Park site)
- Kenmore Air Harbor (the nation's largest seaplane-only, commercial air facility)
- North Lake Marina
- Harbour Village Marina

CalPortland, Rinker Materials, and KGM rely on barge access to provide and distribute materials (e.g., sand, gravel, landscape materials, and construction materials) for their operations (ESA Adolfson 2010).

1.3.2 Summary of Previous Sediment Characterization and Dredging

The sediment data and dredging information presented in this section are from readily available information. The sediment data was obtained from Washington State Department of Ecology's (Ecology) Environmental Information Management (EIM) database and from

dredge material evaluations from the DMMO, which also included the dredging information. Previous suitability determinations were accessed from the DMMO website (http://www.nws.usace.army.mil/Missions/CivilWorks/Dredging/SuitabilityDeterminations.aspx).

In 1993, King County characterized and dredged 16,800 cy of sediment from the Sammamish River Small Boat Navigation Channel (Figure 1). Four dredge material management units (DMMUs) were characterized, with the DMMP Screening Level (SL) interpretive criteria for dichlorodiphenyltrichloroethane (DDT) exceeded in one DMMU. This DMMU was subsequently submitted for bioassay testing and passed, resulting in all four DMMUs determined to be suitable for open water disposal. No dioxin testing was performed during this dredge characterization (USACE 1992).

Sediment from the Kenmore Navigation Channel was last characterized and dredged in 1996 (USACE 1996). Fifteen DMMUs were analyzed for DMMP analytes to evaluate 60,000 cy of sediment. Polychlorinated biphenyl (PCB) sediment concentrations from the DMMUs ranged from 17 to 88 microgram per kilogram (µg/kg), which is below the SL of 130 µg/kg (USACE 1996). Three of the DMMUs exceeded DMMP interpretive criteria; one DMMU each exceeded for polycyclic aromatic hydrocarbons (PAHs), tributyltin (TBT) and DDT. However, the one DMMU with PAH exceedences passed biological testing and was determined to be suitable for open-water disposal. The two other DMMUs with TBT and DDT exceedences failed the biological interpretive criteria and were unsuitable for open-water disposal (Figure 1). The unsuitable material (8,000 cy) was not dredged and 52,000 cy of sediment was dredged. No dioxin and furan testing was performed during this dredge characterization.

In 2011, in preparation for proposed maintenance dredging of Harbour Village Marina, the marina owners conducted dredge characterization sediment sampling and analysis. Three DMMUs from the Harbour Village Marina, as shown in Figure 1, were evaluated for disposal options for an anticipated 7,427 cy of sediment. From each DMMU, two or three (depending on the DMMU) cores were composited and submitted for DMMP analytes to evaluate dredge sediment. Additionally, z-samples were collected and composted for each DMMU from the underlying sediment surface that would be exposed after dredging is completed (i.e., z-layer)

to evaluate the new sediment surface. The DMMU samples from Harbour Village Marina had total PCB concentrations of 196, 237, and 277 µg/kg and dioxin/furan toxic equivalency (TEQ) of 43.2, 77.3, and 92.1 nanogram/kilogram (ng/kg), respectively. Additionally, sediment within the underlying sediment surface that would be exposed after dredging is completed (z-layer) had total PCB concentrations of 104, 126, and 237 µg/kg and dioxin/furan TEQ of 0.9, 11.1, and 6 ng/kg. To address the elevated dioxin/furan and PCB concentrations in the sediment that could be exposed by dredging, the DMMP agencies will require the placement of a one-foot cover of clean sand as a special condition to the dredging permit (USACE 2011). Dredging in Harbour Village Marina has not been completed.

In 2005, a surface sediment sample (LW-SS3-010) and field duplicate sample (LW-SS6-010) were collected adjacent to the Kenmore Navigation Channel as part of a regional background investigation. The sediment samples were analyzed for dioxin and PCBs. PCBs were not detected in either sample, however dioxin/furan TEQ, which was reported as an average concentration between the sample and duplicate resulted in an estimated concentration of 13.2 ng/kg (Windward 2010).

In 2000, as part of a lake-wide sediment evaluation investigation, one sample, L18493-1, was collected near Kenmore (King County 2004). PCBs were not detected and no chemicals exceeded DMMP interpretive criteria. Dioxin and furans were not analyzed.

1.3.3 Potential Sediment Loading and Contamination Sources

The principal sediment loading source for the Kenmore Navigation Channel is likely from the Sammamish River. The 14-mile Sammamish River drains from Lake Sammamish and flows through Redmond, Woodinville, Bothell, and Kenmore, before emptying into Lake Washington.

Sediment also enters the lake from a small creek, listed as Tributary 0056 that discharges at the Harbour Village Marina. The creek diverges just before the Lake Washington shoreline, and drains to the central portion and just to the west of Harbour Village Marina. The creek drains approximately 1.85 square miles associated with State Route 522 (Northeast Bothell Way) and other residential and urban areas (Herrera 2007) and has experienced flooding and

sediment loading (ESA Adolfson 2010). The City conducted investigations in 2005 and 2007 to investigate the current and historical sediment production within this creek, develop sediment management strategies, and evaluate sedimentation reduction alternatives (Herrera 2005 and 2007). Other sources of sediments to the area include stormwater outfalls, which are shown on Figure 1.

Areas with historical activities that could have contributed to contamination include the Kenmore Industrial Park (also referred to as the Lakepointe Development site) located adjacent to and north of the mouth of the Sammamish River with the southwestern portion of the property forming the peninsula that extends into Lake Washington; a plywood mill located north of the Kenmore Industrial Park and east of the North Lake Marina; and various commercial and industrial activities at the current location of the CalPortland Company in Kenmore Harbor.

In the late 1970s, at the current location of CalPortland Company, there was a fire on the wharf that burned about half of the decking. The wharf was constructed of old creosote timbers and the burned wharf remained along the Kenmore shoreline for several years before the burned debris was removed (LaFlam 2012).

The Kenmore Industrial Park is currently under and Agreed Order with Ecology for site clean-up and monitoring activities (Ecology 2012a). The 45-acre Kenmore Industrial Park was submerged prior to 1916, when the USACE lowered the level of Lake Washington, and subsequently filled until 1969 to form its present day configuration. The site was operated as a landfill from 1965 to 1981. Fill records indicate that debris from demolition and construction projects, stumps, and restaurant waste were disposed of at the site. No records indicate that this landfill received hazardous waste. The landfill was subsequently graded, covered with soil, and used as an industrial park (AMEC 2001).

Historical operations at the site included assorted small storage and manufacturing industries, sand and gravel staging and support facilities, and associated offices. Currently, the site is operated as an industrial park that includes a sand and gravel stockpile yard and several smaller storage and light industrial operations on the property. KGM is temporarily leasing a portion of the property for the construction of sections for the new State Route 520 bridge

until 2015. In May 2001, a Remedial Investigation was completed that identified the following environmental issues (Ecology 2001):

- Soil: Petroleum hydrocarbons (diesel and heavy oil) and metals (arsenic, lead, barium, and selenium) are present in the soil at low levels throughout the site
- Groundwater: Petroleum hydrocarbons (diesel and heavy oil) and metals (lead, barium, and arsenic) are also present in groundwater in the interior of the site; however, concentrations of these substances are currently below regulatory cleanup standards in groundwater at the site shoreline

Ongoing groundwater monitoring, recently conducted in 2009, 2010, and April 2012 indicate continued compliance with the 2001 Consent Decree. The 2009-2012 groundwater compliance results showed all known chemicals of concern at this site to be below detection level and/or below cleanup action level (Ecology 2012a).

2 PROJECT MANAGEMENT AND RESPONSIBILITIES

This section describes the overall project management strategy for implementing and reporting for the SAP.

2.1 Project Planning and Coordination

Dan Berlin of Anchor QEA will be the overall project manager responsible for developing and completing the SAP. Following SAP approval by DMMP agencies, Mr. Berlin will be responsible for administrative coordination to ensure the timely and successful completion of the screening level characterization. He will provide a copy of the approved SAP, as well as the DMMP agencies' approval letter to all sampling and testing subcontractors. Any significant deviation from the approved sampling plan will be coordinated with the DMMO.

2.2 Field Sample Collection

David Gillingham of Anchor QEA will serve as the field coordinator (FC) and will provide overall direction to the field sampling in logistics, personnel assignments, and field operations. The FC will supervise field collection of the sediment samples and will be responsible for ensuring accurate positioning and recording of sample locations, depths, and identification; ensuring conformity to sampling and handling requirements, including field decontamination procedures; physical evaluation and logging of the samples; and chain-of-custody (COC) of the samples.

The FC will be responsible for documenting sample preparation, observations, and chain-of-custody up until the time the samples are delivered for analysis to the appropriate analytical laboratory for chemical testing. Anchor QEA will ensure that sediment samples are stored under proper conditions until delivery to the lab. The FC will be responsible for summarizing field sampling activities. This summary will include details of the sampling effort, sample preparation, sample storage and transport procedures, and field quality assurance.

The sampling and analysis will be completed with equipment owned or rented by Anchor QEA. All subconsultants will follow the protocols established in this SAP.

2.3 Laboratory Preparation and Analyses

Sue Dunnihoo of Analytical Resources, Inc. (ARI), Tukwila, Washington, will be responsible for physical and chemical analyses. Ms. Dunnihoo will ensure that the submitted samples are handled and analyzed in accordance with DMMP analytical testing protocols, quality assurance/quality control (QA/QC) requirements, and the requirements specified in this SAP (Section 5). ARI will provide certified, pre-cleaned sample containers and sample preservatives as appropriate. ARI will prepare a data package containing all analytical and QA/QC results.

2.4 Quality Assurance/Quality Control Management

Delaney Peterson of Anchor QEA, or her designee, will serve as QA/QC Manager for this project and will be responsible for all coordination with the analytical laboratory. She will perform oversight for both the field sampling and laboratory programs. She will be kept fully informed of field program procedures and progress during sample collection and laboratory activities during sample preparation. She will record and correct any activities that vary from this SAP. Upon completion of the sampling and analytical program, she will review laboratory QA/QC results and incorporate findings into the sampling and analysis Results Memorandum. Any QA/QC problems will be brought to the attention of the DMMO as soon as possible to discuss issues related to the problem and to evaluate potential solutions.

2.5 Sampling and Analysis Results Memorandum

Mr. Berlin, or his designee, will be responsible for preparation of the Results Memorandum to support the suitability determination. The Results Memorandum will summarize the sampling effort; analytical methods; QA/QC narrative; and analytical results with comparison to DMMP interpretive criteria (for screening level characterization sediment samples) and Ecology's proposed freshwater Sediment Quality Values (for all sediment samples). The complete content of the Results Memorandum is described in Section 6.

3 SAMPLE COLLECTION, PROCESSING, AND HANDLING PROCEDURES

This section addresses the sample collection, processing, and handling procedures that will be used to ensure data quality.

3.1 Sampling Schedule

Sampling will occur within two to three weeks after approval of this SAP by DMMP, Ecology, and DOH in the fall of 2012. The Anchor QEA project manager will coordinate with the appropriate City manager. It is anticipated that field sampling activities can be completed within three days.

3.2 Station and Sample Identification and Nomenclature

Figure 2 presents the proposed surface sediment sampling locations. Table 1 presents detailed summaries of the sediment sampling design including sample nomenclature for each station and sample. The sample nomenclature is described below.

Each sample will be assigned a unique alphanumeric identifier according to the following method:

- Each sample identification (ID) will be identified by *Sample Method-Location Number-Matrix-Sample Sponsor*
  - Sample method will be identified by two letters: SG for sediment grab, HT for hand trowel, WS for surface water (back ground location only). (Note: Three of the water sample locations are co-located with hand trowel location and therefore will begin with HT and the same location number to indicate that the sample is co-located.)
  - Sample location number will be in order of sampling locations beginning with -01 (e.g., SG-01-S-C)
  - Sample matrix will be S for sediment and W for water
  - Sample sponsor will C for City and E for Ecology
- A field duplicate collected from a sample will be identified by the addition of "Dup" to the sample number. A duplicate sample of the above example would be SG-01-S-C-Dup.

Table 1
Sample Locations, Collection Methods, and Rationale

Location ID	Sample ID	Sample Location Description	Collection Method	Sample Type	Collection Depth	Coordinate X[a]	Coordinate Y[a]	Ownership	Purpose	Analyses
SEDIMENT										
HT-01	HT-01-S-C	Log Boom Park; west kayak launch pad	Hand trowel	Sediment	0 - 10 cm	1288073	279596	City	Location investigation for site COIs, concentrations, and source(s)	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
HT-02	HT-02-S-C	Log Boom Park; east kayak launch pad	Hand trowel	Sediment	0 - 10 cm	1288199	279600	City	Location investigation for site COIs, concentrations, and source(s)	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
HT-03	HT-03-S-C	Log Boom Park; mid nearshore	Hand trowel	Sediment	0 - 10 cm	1288480	279517	City	Location investigation for site COIs, concentrations, and source(s)	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
HT-04	HT-04-S-C	Log Boom Park; north of northwest corner of pier	Hand trowel	Sediment	0 - 10 cm	1288688	279423	City	Location investigation for site COIs, concentrations, and source(s)	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
HT-05	HT-05-S-C	Log Boom Park; south of pier at northwest corner of pier	Hand trowel	Sediment	0 - 10 cm	1288689	279263	City	Location investigation for site COIs, concentrations, and source(s)	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
HT-06	HT-06-S-E	Harbour Village Marina; Pier 3, confluence Tributary 0056	Hand trowel	Sediment	0 - 10 cm	1288798	279224	WDNR	Further investigation for lateral extent, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
HT-07	HT-07-S-E	Harbour Village Marina; northwest 500-foot upgradient confluence, Creek 0056	Hand trowel	Sediment	0 - 10 cm	1289073	279448	City	Further investigation for lateral extent, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
HT-08	HT-08-S-C	Sammamish River; west boat launch	Hand trowel	Sediment	0 - 10 cm	1291775	278398	WDNR	Preliminary investigation for COIs and concentrations	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
HT-09	HT-09-S-C	Sammamish River; east boat launch	Hand trowel	Sediment	0 - 10 cm	1291926	278362	WDNR	Preliminary investigation for COIs and concentrations	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC

Location ID	Sample ID	Sample Location Description	Collection Method	Sample Type	Collection Depth	Coordinate		Ownership	Purpose	Analyses
						X[a]	Y[a]			
SG-01	SG-01-S-C	Sammamish River; Small Boat Navigation Channel	Grab	Sediment	0 - 10 cm	1289452	277890	WDNR	Preliminary investigation for COIs and concentrations	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
SG-02	SG-02-S-C	North Lake Marina	Grab/ Box Core	Sediment	0 - 25 cm	1289548	279178	private	Pre-dredge screening for COIs and concentrations	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-03	SG-03-S-C	North Lake Marina	Grab/ Box core	Sediment	0 - 25 cm	1289660	279175	Private	Pre-dredge screening for COIs and concentrations	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-04	SG-04-S-C	Kenmore Navigation Channel	Grab/ Box core	Sediment	0 - 25 cm	1290226	279112	Private	Pre-dredge screening for COIs and concentrations	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-05	SG-05-S-C	Kenmore Navigation Channel	Grab/ Box core	Sediment	0 - 25 cm	1289906	278927	WDNR	Pre-dredge screening for COIs and concentrations	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-06	SG-06-S-C	Kenmore Navigation Channel	Grab/ Box core	Sediment	0 - 25 cm	1289555	278710	WDNR	Pre-dredge screening for COIs and concentrations	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC

Location ID	Sample ID	Sample Location Description	Collection Method	Sample Type	Collection Depth	Coordinate		Ownership	Purpose	Analyses
						X[a]	Y[a]			
SG-07	SG-07-S-C	Kenmore Navigation Channel	Grab/ Box core	Sediment	0 - 25 cm	1289070	278254	WDNR	Pre-dredge screening for COIs and concentrations	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
	SG-07-S-C-Dup	Field Duplicate of SG-07	Grab/ Box core	Sediment	0 - 25 cm	1290226	279112	WDNR	Field duplicate	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-08	SG-08-S-C	Kenmore Navigation Channel	Grab/ Box core	Sediment	0 - 25 cm	1288696	277759	WDNR	Pre-dredge screening for COIs and concentrations	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-09	SG-09-S-C	Kenmore Navigation Channel	Grab/ Box core	Sediment	0 - 25 cm	1288458	277396	WDNR	Pre-dredge screening for COIs and concentrations	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-10	SG-10-S-E	Harbour Village Marina; southwest of channel 5, west of slip 501	Grab	Sediment	0 - 10 cm	1288816	279194	WDNR	Further investigation for lateral extent, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-11	SG-11-S-E	Harbour Village Marina; channel 3, between slip 301 and 433	Grab	Sediment	0 - 10 cm	1289047	279149	WDNR	Further investigation for lateral extent, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-12	SG-12-S-E	Harbour Village Marina; southwest of channel 5, west of slip 513	Grab	Sediment	0 - 10 cm	1288782	278974	WDNR	Further investigation for lateral extent, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC

Location ID	Sample ID	Sample Location Description	Collection Method	Sample Type	Collection Depth	Coordinate		Ownership	Purpose	Analyses
						X[a]	Y[a]			
SG-13	SG-13-S-E	Harbour Village Marina; channel 1, between slip 115 and 218	Grab	Sediment	0 - 10 cm	1289314	278856	WDNR	Further investigation for lateral extent, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
	SG-13-S-E-Dup	Field Duplicate of SG-13	Grab	Sediment	0 - 10 cm	1289314	278856	WDNR	Further investigation for lateral extent, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-14	SG-14-S-E	Kenmore Industrial Park; west of northwest corner of site and well AW-04	Grab	Sediment	0 - 10 cm	1290031	278846	WDNR	Location investigation for site COIs, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-15	SG-15-S-E	Kenmore Industrial Park; west of southwest corner of site and well AW-06	Grab	Sediment	0 - 10 cm	1290083	278326	WDNR	Location investigation for site COIs, concentrations, and source(s)	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), D/Fs, DMMP pesticides, grain size, TS, and TOC
SG-16	SG-16-S-E	Kenmore Industrial Park; Sammamish River midway between wells AW-06 and AW-11	Grab	Sediment	0 - 10 cm	1290550	278329	WDNR	Location investigation for site COIs, concentrations, and source(s)	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
SG-17	SG-17-S-E	Kenmore Industrial Park; Sammamish River south of well AW-010	Grab	Sediment	0 - 10 cm	1291541	278637	WDNR	Location investigation for site COIs, concentrations, and source(s)	SMS SVOCs and metals, PCBs, D/Fs, grain size, TS, and TOC
WATER										
HT-01	HT-01-W-C	Log Boom Park; west kayak launch pad	hand dipped or dipper	Water	0.6 in -3 ft below surface	1288073	279596	City	Water column investigation for chemicals of COIs; Co-located with sediment sample location	SVOCs, total and dissolved priority pollutant metals, TSS, TDS, hardness, and in-situ WQM parameters

Location ID	Sample ID	Sample Location Description	Collection Method	Sample Type	Collection Depth	Coordinate		Ownership	Purpose	Analyses
						X[a]	Y[a]			
HT-04	HT-04-W-C	Log Boom Park; north of northwest corner of pier	hand dipped or dipper	Water	0.6 in -3 ft below surface	1288688	279423	City	Water column investigation for chemicals of COIs; Co-located with sediment sample location	SVOCs, total and dissolved priority pollutant metals, TSS, TDS, hardness, and in-situ WQM parameters
	HT-04-W-C-dup	Field Duplicate of HT-04	hand dipped or dipper	Water	0.6 in -3 ft below surface	1288688	279423	City	Field duplicate	SVOCs, total and dissolved priority pollutant metals, TSS, TDS, and hardness
WS-10	WS-10-W-C	Sammamish River; approximately 50 feet upstream of 68th Street bridge	hand dipped or dipper	Water	0.6 in -3 ft below surface	1292106	278347	WDNR	Water column investigation for COIs and concentrations; background	SVOCs, total and dissolved priority pollutant metals, TSS, TDS, hardness, and in-situ WQM parameters

Notes:
a – Washington North Zone, NAD 83 geographic and state plane coordinates - U.S. survey feet
City = City of Kenmore
cm = centimeter
COI = chemical of interest
D/F = dioxin/furan
DMMP = Dredged Material Management Program
m = meter
PCB = polychlorinated biphenyl
SMS = Sediment Management Standards
SVOC = semivolatile organic compound
TOC = total organic carbon
TBT = tributyltin
TS = total solids
TSS = total suspended solids
WDNR = Washington Department of Natural Resources

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Feet
0 200 400 600 800

Figure 2
Draft Proposed Sample Locations
Sampling and Analysis Plan
Kenmore Sediment Characterization

3.3 Station Positioning

Horizontal positioning will be determined by the onboard differential global positioning system (DGPS) based on target coordinates shown in Table 1. Measured station positions will be converted to latitudinal and longitudinal coordinates (North American Datum [NAD] 83) to the nearest 0.01 second. The accuracy of measured and recorded horizontal coordinates is typically less than 1 meter and will be within 2 meters following DMMP guidance. Vertical elevation of each station will be measured using a fathometer or lead line. Lake elevations will be based USACE's monitoring station at the Lake Washington Ship Canal Elevation at the Hiram M. Chittenden Locks.

3.4 Collection Methods

Twenty-eight sediment samples will be collected from the following areas: Kenmore Navigation Channel, Sammamish River, at the shoreline at Log Boom Park, near the Kenmore Industrial Park, at the public motor boat launch in the Sammamish River, from Tributary 0056, and from the Harbor Village Marina and North Lake Marina. Three water samples (including a duplicate) will be collected at Log Boom Park and, one background water sample will be collected upstream of the 68th Avenue NE bridge on the Sammamish River. The sediment and water sampling methods are described in greater detail below. The location ID, sample ID, collection method, and collection depth are presented on Table 1. The sample locations are shown on Figure 2.

3.4.1 Sediment

Samples from the navigation channel are anticipated to be collected using a box core or power grab sampler or similar device to the maximum penetration possible (target 25 centimeter [cm] below mudline) to better represent what could be removed during dredging. Samples from other submerged areas away from the shoreline will be collected from the top 10 cm using a grab sampler (e.g., VanVeen or Ekman sampler). Samples from Log Boom Park, at the public motor boat launch, and in Tributary 0056 will be collected on foot using a hand trowel from shallow submerged areas. Care will be taken to prevent resuspension of sediment prior to sampling.

For all other samples, sampling locations will be approached at slow boat speeds with minimal wake to minimize disturbance of bottom sediments prior to sampling. Sediment samples will be handled carefully to minimize disturbance during collection and transportation to the laboratory. The sampler will be lowered over the side of the boat from a cable wire at an approximate speed of 0.3 feet per second. When the sampler reaches the mudline, the cable will be drawn taut and DGPS measurements recorded.

Each surface grab sample will be retrieved aboard the vessel and evaluated for the following acceptance criteria:

- Overlying water is present and has low turbidity
- Adequate penetration depth is achieved
- Sampler is not overfilled
- Sediment surface is undisturbed
- No signs of winnowing or leaking from sampling device

Samples not meeting these criteria will be rejected near the location of sample collection. The process will be repeated until criteria have been met. Deployments will be repeated within a 20-foot radius of the proposed sample location. If adequate penetration is not achieved after multiple attempts, less volume will be accepted and noted in the sediment sampling or daily log form. Once accepted, overlying water will be siphoned off and a decontaminated stainless steel trowel, spoon, or equivalent will be used to collect the required sediment from inside the sampler without touching the sidewalls. The sampler will be decontaminated between stations and rinsed with site water between grabs.

After sample collection, the following information will be recorded on the Sediment Sampling daily log form:

- Date, time, and name of person logging sample
- Weather conditions
- Sample location number and coordinates
- Project designation
- Depth of water at the location and surface elevation
- Sediment penetration and depth

- Sediment sample interval
- Sample recovery
- Physical observations such as apparent grain size, wood debris, color, odor, density, layering, anoxic contact, and presence of sheen, shells or other debris

3.4.2 Surface Water

Prior to collecting the water sample, water quality parameters will be measured in the field at each surface water sampling location using a multi-probe water quality meter (e.g., YSI). The water quality meter will be lowered 1ft below the surface and allowed to equilibrate before taking measurements of conductivity, temperature, dissolved oxygen, and pH. Results for water quality parameters will be recorded on the water quality and sample collection form (Appendix A).

At each water sample location, water will be collected according to Ecology's Standard Operating Procedure guidance (Ecology 2006) which is consistent with the protocols of the Beach Environmental Assessment, Communication and Health (BEACH) program (Schneider 2004). Water will be collected by hand by dipping the laboratory supplied water bottle or by using a dipper attached to an extension rod to a depth of at least 6 inches below the surface (Ecology 2006). Since the water samples will be collected from a beach, Ecology recommends wading into knee deep water (2.5 ft) and avoid collecting disturbed sediment or coming in contact with the bottom substrate (Ecology 2010).

The actual surface water sample location will be determined in the field, selected as the most representative accessible location to safely sample and achieve the goals of the project.
The total water depth and thermocline depth (if present) will be recorded on the surface water collection form (Appendix A) at each water sample location. Water samples will then immediately be placed in a cooler with ice and shipped or delivered on ice to the lab within 24 hours of collection. Water quality field measurement data, sample collection information, and ancillary information from each collection site and event will be recorded on field data forms (Appendix A). Ancillary information will include:

- Date and time of each sample/measurement collection
- Water sample collection depth and total water column depth

- Weather conditions and general observations (e.g., boating traffic, river flow for the sample in the Sammamish River, sheen, or turbid water)
- Visual observations of water and samples at each sampling location
- Field calibration check and calibration information
- Names of personnel present collecting samples and recording data
- General observations about collection procedures and any deviations from this SAP
- Condition of equipment or meters that might impact water quality data

Generally, all information that might be pertinent to water quality will be recorded on the field data forms. Each water grab sample will be treated as a discrete sample and labeled with a unique sample number. The sample numbering scheme for each sample is provided in Table 1. Each sample collected will be clearly labeled using a waterproof label with an indelible pen. Each sample label will contain the project name and project number, the unique sample identification number, date and time of sample collection, analysis to be performed, preservative (as applicable), and the initials of the person collecting the sample.

3.5 Sample Processing

Surface sediment samples will be submitted for chemical and physical analyses for the full DMMP analyte list (DMMO 2011, DMMO 2010) for the screening level samples, including metals, semi-volatile organic compounds (SVOCs), pesticides, PCBs, TBT (porewater, or bulk if insufficient porewater available), dioxin/furan, , total organic carbon, grain size, and moisture content. Other sediment samples will be tested for parameters included in the Sediment Management Standards (Ecology 1995), but also including dioxin/furan, and compared to Ecology's proposed freshwater Sediment Quality Values (Avocet Consulting 2011, Ecology 2012b). Specific samples will also be tested for pesticides and TBT, as requested by Ecology. Water samples will be submitted for Washington State drinking water primary and secondary metals (246-290 WAC) as total and dissolved metals, SVOCs, hardness, total suspended solids, and total dissolved solids.

Table 2 and Table 3 provide the analyte list and the target laboratory reporting limit (RL) for each analyte for sediment and water, respectively. Table 4 presents the sample handling requirements by matrix.

Table 2
Sediment Analyte List, Interpretive Criteria, Analytical Methods, and Reporting Limits

Parameter	DMMP Interpretive Criteria			Sediment Quality Values		Analytical Method	Reporting Limit
	Screening Level	BT	Maximum Level	SQS/SL1	CSL/SL2		
Conventional Parameters, %							
Gravel	---	---	---	---	---	PSEP	0.1
Sand	---	---	---	---	---	PSEP	0.1
Silt	---	---	---	---	---	PSEP	0.1
Clay	---	---	---	---	---	PSEP	0.1
Fines	---	---	---	---	---	PSEP	0.1
Total solids	---	---	---	---	---	PSEP	0.1
Total volatile solids	---	---	---	---	---	PSEP	0.1
Total organic carbon	---	---	---	---	---	PSEP	0.1
Metals, mg/kg dry weight							
Antimony	150	---	200	---	---	6010B/6020	15
Arsenic	57	507.1	700	14	120	6010B/6020	10
Cadmium	5.1	11.3	14	2.1	5.4	6010B/6020	0.5
Chromium	---	267	---	72	88	6010B/6020	10
Copper	390	1,027	1,300	400	1,200	6010B/6020	10
Lead	450	975	1,200	360	> 1,300	6010B/6020	4
Mercury	0.41	1.5	2.3	0.66	0.8	7471A	0.05
Nickel	---	---	---	26	110	6010B/6020	0.5
Selenium	---	3[a]	---	11	> 20	6010B/6020	0.3
Silver	6.1	6.1	8.4	0.57	1.7	6010B/6020	0.6
Zinc	410	2,783	3,800	3,200	> 4,200	6010B/6020	15
Organometallic Compounds							
Tributyltin (porewater) µg/L	0.15	0.15	---	---	---	GC/MS Krone	0.15
Butyltins (bulk) µg/kg**	73.2[b]	73.2[b]	---	47	320	GC/MS Krone	5
Monobutyltin (bulk) µg/kg **	---	---	---	540	>4800	GC/MS Krone	5
Dibutyltin (bulk) µg/kg **	---	---	---	910	130,000	GC/MS Krone	5

Parameter	DMMP Interpretive Criteria			Sediment Quality Values		Analytical Method	Reporting Limit
	Screening Level	BT	Maximum Level	SQS/SL1	CSL/SL2		
Tributyltin (bulk) µg/kg **	---	---	---	47	320	GC/MS Krone	5
Tetrabutytin (bulk) µg/kg **	---	---	---	97	>97	GC/MS Krone	5
Polycyclic Aromatic Hydrocarbons, µg/kg dry weight							
Total LPAH	5,200	---	29,000	---	---	---	---
Naphthalene	2,100	---	2,400	---	---	8270D SIM	5.0
Acenaphthylene	560	---	1,300	---	---	8270D SIM	5.0
Acenaphthene	500	---	2,000	---	---	8270D SIM	5.0
Fluorene	540	---	3,600	---	---	8270D SIM	5.0
Phenanthrene	1,500	---	21,000	---	---	8270D SIM	5.0
Anthracene	960	---	13,000	---	---	8270D SIM	5.0
2-Methylnaphthalene[c]	670	---	1,900	---	---	8270D SIM	5.0
Total HPAHs	12,000	---	69,000	---	---	---	---
Fluoranthene	1,700	4,600	30,000	---	---	8270D SIM	5.0
Pyrene	2,600	11,980	16,000	---	---	8270D SIM	5.0
Benzo(a)anthracene	1,300	---	5,100	---	---	8270D SIM	5.0
Chrysene	1,400	---	21,000	---	---	8270D SIM	5.0
Total benzo(b+j+k)fluoranthenes	3,200	---	9,900	---	---	8270D SIM	5.0
Benzo(a)pyrene	1,600	---	3,600	---	---	8270D SIM	5.0
Indeno(1,2,3-cd)pyrene	600	---	4,400	---	---	8270D SIM	5.0
Dibenz(a,h)anthracene	230	---	1,900	---	---	8270D SIM	5.0
Benzo(g,h,i)perylene	670	---	3,200	---	---	8270D SIM	5.0
Total PAHs	---	---	---	17,000	30,000	---	---
Chlorinated Hydrocarbons, µg/kg dry weight							
1,4-Dichlorobenzene	110	---	120	---	---	8270D	20
1,2-Dichlorobenzene	35	---	110	---	---	8270D	20
1,2,4-Trichlorobenzene	31	---	64	---	---	8270D	20
Hexachlorobenzene	22	168	230	---	---	8081B	1.0
Phthalates, µg/kg dry weight							
Dimethyl phthalate	71	---	1,400	---	---	8270C	20

Parameter	DMMP Interpretive Criteria			Sediment Quality Values		Analytical Method	Reporting Limit
	Screening Level	BT	Maximum Level	SQS/SL1	CSL/SL2		
Diethyl phthalate	200	---	1,200	---	---	8270C	20
Di-n-butyl phthalate	1,400	---	5,100	380	1,000	8270C	20
Butyl benzyl phthalate	63	---	970	---	---	8270C	20
Bis(2-ethylhexyl) phthalate	1,300	---	8,300	500	22,000	8270C	20
Di-n-octyl phthalate	6,200	---	6,200	39	> 1,100	8270C	20
Phenols, µg/kg dry weight							
Phenol	420	---	1,200	120	210	8270C	20
2-Methylphenol	63	---	77	---	---	8270C	20
4-Methylphenol	670	---	3,600	260	2,000	8270C	20
2,4-Dimethylphenol	29	---	210	---	---	8270C	20
Pentachlorophenol	400	504	690	1,200	> 1,200	8270C	10
Miscellaneous Extractables, µg/kg dry weight							
Benzyl Alcohol	57	---	870	---	---	8270D	20
Benzoic Acid	650	---	760	2,900	3,800	8270D	20
Dibenzofuran	540	---	1,700	200	680	8270D	20
Hexachlorobutadiene	11	---	270	---	---	8081B	1.0
N-Nitrosodiphenylamine	28	---	130	---	---	8270D	20
Beta-Hexachlorocyclohexane	---	---	---	7.2	11	8081B	0.5
Carbazole	---	---	---	900	1100	8270D	20
Pesticides, µg/kg dry weight							
4,4'-DDD	16	---	---	---	---	8081B	6.0
4,4'-DDE	9	---	---	---	---	8081B	6.0
4,4'-DDT	12	---	---	---	---	8081B	6.0
Total DDT[d]	---	50	69	100	8,100	8081B	6.0
Total DDD	---	---	---	310	860	8081B	6.0
Total DDE	---	---	---	21	33	8081B	6.0
Aldrin	9.5	---	---	---	---	8081B	2.0
Chlordane[e]	2.8	37	---	---	---	8081B	2.0
Dieldrin	1.9	---	1,700	4.9	9.3	8081B	2.0

Parameter	DMMP Interpretive Criteria			Sediment Quality Values		Analytical Method	Reporting Limit
	Screening Level	BT	Maximum Level	SQS/SL1	CSL/SL2		
Heptachlor	1.5	---	270	---	---	8081B	2.0
Endrin Ketone	---	---	---	8.5	*	8081B	1.0
Polychlorinated Biphenyls, µg/kg dry weight							
Total PCBs[f]	130	38 (mg/kg OC)	3,100	110	2,500	8082	10
Dioxin/Furans, ng/kg dry weight							
Dioxin Furan TEQ[g]	4	---	10	---	---	---	---
Dioxins							
2,3,7,8-TCDD	---	---	---	---	---	1613B	1.0
1,2,3,7,8-PeCDD	---	---	---	---	---	1613B	1.0
1,2,3,4,7,8-HxCDD	---	---	---	---	---	1613B	2.5
1,2,3,6,7,8-HxCDD	---	---	---	---	---	1613B	2.5
1,2,3,7,8,9-HxCDD	---	---	---	---	---	1613B	2.5
1,2,3,4,6,7,8-HpCDD	---	---	---	---	---	1613B	2.5
OCDD	---	---	---	---	---	1613B	5.0
Furans							
2,3,7,8-TCDF	---	---	---	---	---	1613B	1.0
1,2,3,7,8-PeCDF	---	---	---	---	---	1613B	2.5
2,3,4,7,8,-PeCDF	---	---	---	---	---	1613B	1.0
1,2,3,4,7,8-HxCDF	---	---	---	---	---	1613B	2.5
1,2,3,6,7,8-HxCDF	---	---	---	---	---	1613B	2.5
1,2,3,7,8,9-HxCDF	---	---	---	---	---	1613B	2.5
2,3,4,6,7,8-HxCDF	---	---	---	---	---	1613B	2.5
1,2,3,4,6,7,8-HpCDF	---	---	---	---	---	1613B	2.5
1,2,3,4,7,8,9-HpCDF	---	---	---	---	---	1613B	2.5
OCDF	---	---	---	---	---	1613B	5.0

Notes:
a – Because no SL value exists for toxicity testing, selenium will only be evaluated for its bioaccumulation potential
b – Bulk sediment measurement of TBT is used only when porewater extraction cannot be accomplished
c – 2-Methylnapthalene is not included in the sum of LPAHs
d – Total DDT consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT
e – Chlordane includes all chlordane isomers, including cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, and oxychlordane

f – Total PCBs consists of the sum of all Aroclors
g – The dioxin TEQ is calculated using the methods described in van den Berg et al. 2006. 4 ng/kg TEQ is a volume-weighted average. 10 ng/kg TEQ is a maximum level. Suitability for open water disposal can also be managed on a case-by-case basis by DMMP
*No SQV could be set due to limited data above the SQS/SL1 concentration.
**Bulk TBT will only be tested if insufficient porewater is available.
µg/L = microgram per liter
BT = bioaccumulation trigger
CSL/SL2 = Cleanup Screening Level/Screening Level 2 (as presented in Avocet Consulting 2011 and Ecology 2012b)
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
GC/MS = gas chromatography/mass spectrometry
HPAH = high-molecular-weight polycyclic hydrocarbon
LPAH = low-molecular-weight polycyclic hydrocarbon
mg/kg = milligrams per kilogram
mg-N/kg = milligrams of nitrogen per kilogram
ng/kg = nanograms per liter
PSEP = Puget Sound Estuary Program
SQS/SL1 = Sediment Quality Standards/Screening Level 1 (as presented in Avocet Consulting 2011)

Table 3
Surface Water Analyte List, Analytical Methods, and Reporting Limits

Parameter	Analytical Method	Reporting Limit
Antimony	200.8/6020A	0.2 µg/L
Arsenic	200.8/6020A	0.2 µg/L
Barium	200.8/6020A	0.5 µg/L
Beryllium	200.8/6020A	0.2 µg/L
Cadmium	200.8/6020A	0.1 µg/L
Chromium	200.8/6020A	0.5 µg/L
Copper	200.8/6020A	0.5 µg/L
Iron	200.8/6020A	20 µg/L
Lead	200.8/6020A	0.1 µg/L
Manganese	200.8/6020A	0.5 µg/L
Mercury	7471A	0.10 µg/L
Nickel	200.8/6020A	0.5 µg/L
Selenium	200.8/6020A	0.5 µg/L
Silver	200.8/6020A	0.2 µg/L
Thallium	200.8/6020A	0.2 µg/L
Zinc	200.8/6020A	4.0 µg/L
SVOCs		
Polycyclic Aromatic Hydrocarbons		
Naphthalene	8270D	1.0 µg/L
Acenaphthylene	8270D	1.0 µg/L
Acenaphthene	8270D	1.0 µg/L
Fluorene	8270D	1.0 µg/L
Phenanthrene	8270D	1.0 µg/L
Anthracene	8270D	1.0 µg/L
2-Methylnaphthalene	8270D	1.0 µg/L
Fluoranthene	8270D	1.0 µg/L
Pyrene	8270D	1.0 µg/L
Benz[a]anthracene	8270D	1.0 µg/L
Chrysene	8270D	1.0 µg/L
Total benzofluoranthenes	8270D	1.0 µg/L
Benzo[a]pyrene	8270D	1.0 µg/L
indeno[1,2,3-c,d]pyrene	8270D	1.0 µg/L
Dibenz[a,h]anthracene	8270D	1.0 µg/L
Benzo[g,h,i]perylene	8270D	1.0 µg/L
Chlorinated Benzenes		
1,2-Dichlorobenzene	8270D	1.0 µg/L
1,4-Dichlorobenzene	8270D	1.0 µg/L

Parameter	Analytical Method	Reporting Limit
1,2,4-Trichlorobenzene	8270D	1.0 µg/L
Hexachlorobenzene	8270D	1.0 µg/L
Phthalates		
Dimethyl phthalate	8270D	1.0 µg/L
Diethyl phthalate	8270D	1.0 µg/L
Di-n-butyl phthalate	8270D	1.0 µg/L
Butyl benzyl phthalate	8270D	1.0 µg/L
Bis[2-ethylhexyl]phthalate	8270D	1.0 µg/L
Di-n-octyl phthalate	8270D	1.0 µg/L
Miscellaneous SVOCs		
Dibenzofuran	8270D	1.0 µg/L
Hexachlorobutadiene	8270D	1.0 µg/L
N-nitrosodiphenylamine	8270D	1.0 µg/L
Phenol	8270D	1.0 µg/L
2-Methylphenol	8270D	1.0 µg/L
4-Methylphenol	8270D	1.0 µg/L
2,4-Dimethylphenol	8270D	1.0 µg/L
Pentachlorophenol	8270D	5.0 µg/L
Benzyl alcohol	8270D	5.0 µg/L
Benzoic acid	8270D	10.0 µg/L

Notes:
µg/L = micrograms per liter
SVOC = semivolatile organic compound

Table 4
Guidelines for Sample Handling and Storage

Parameter	Sample Size	Container Size and Type[a]	Holding Time	Preservative
Sediment				
Total metals	50 g	4-oz glass	6 months; 28 days for Hg	Cool/4°C
			3 years; 28 days for Hg	Freeze[b]/-18°C
Tributyltin (porewater)	500 ml	2 32-oz glass	7 days until porewater extraction	Cool/4°C
			14 days until extraction	
			40 days after extraction	
Semivolatile organic compounds/ Pesticides/ Polychlorinated Biphenyls	150 g	16-oz glass	14 days until extraction	Cool/4°C
			1 year until extraction	Freeze/-18°C
			40 days after extraction	Cool/4°C
Dioxins/Furans	150 g	8-oz glass	1 year to extraction	Freeze -18°C
			1 year after extraction	Freeze -18°C
Total solids/total volatile solids	50 g	8-oz glass	14 days	Cool/4°C
			6 months	Freeze -18°C
Total organic carbon	125 g	from TS/TVS container	14 days	Cool/4°C
			6 months	Freeze -18°C
Grain size	500 g	16-oz glass	6 months	Cool/4°C
Archive	---	8 or 16-oz glass[c]	14 days until extraction	Cool/4°C
			1 year until extraction	Freeze/-18°C
Surface Water				
Semivolatile organic compounds	500 ml	2 500 ml amber glass	7 days until extraction	Cool/4°C
			40 days after extraction	
Dissolved metal[d]	100 ml	500 ml HDPE	6 months; 28 days for mercury	Cool/4°C
Total metals	100 ml	500 ml HDPE	6 months; 28 days for mercury	5.0 ml of 1:1 nitric acid

Notes:
a – All sample containers will have lids with Teflon inserts
b – Samples will be analyzed for mercury before freezing
c – Container size dependent on available amount of extra sediment; at a minimum 8 ounces will be archived, but not more than 16 ounces
d –Sample will be filtered in the lab with a0.45-µm filter
°C = degrees Celsius
g = gram
HDPE = high density polyethylene
ml = milliliter
TS/TVS = total solids/total volatile solids
oz = ounce

3.5.1 Sampling for Chemical Analyses

Sediment from the sampler will be placed into a stainless steel bowl and homogenized with a stainless steel spoon. Homogenized surface sediment will be spooned immediately into appropriate pre-cleaned, pre-labeled sample containers, placed in coolers filled with ice or equivalent, and maintained at 4°C. Debris and materials more than 0.5 inch in diameter will be omitted from sample containers.

Water samples will be poured directly from the sampler into appropriate pre-cleaned, pre-labeled sample containers, placed in coolers filled with ice or equivalent, and maintained at 4°C.

3.5.2 Sediment Sample Descriptions

In addition to the location information collected in the field, sample logging of bulk sediment not sampled in containers will involve physical characterization in general accordance with the visual-manual description procedure (ASTM D-2488 modified). The information will be recorded on the sediment sampling forms (Appendix A).

Physical characterization includes the following:

- Grain size distribution
- Density/consistency
- Plasticity
- Color and moisture content
- Biological structures (e.g., shells, tubes, macrophytes, and bioturbation)
- Presence of debris and quantitative estimate (e.g., wood chips or fibers, paint chips, concrete, and metal debris)
- Presence of oily sheen
- Odor (e.g., hydrogen sulfide or petroleum)

Surface sediment samples collected for chemical and physical analysis will be securely packed and hand delivered to ARI in Tukwila, Washington. Archived samples will be held at the laboratory.

3.6 Field Quality Assurance/Quality Control Samples

Field QA/QC samples will be used to evaluate the efficiency of field collection and processing and decontamination procedures. All field QA/QC samples will be documented in the field logs. Two sediment and one water field duplicates will be collected and analyzed for the same chemical parameters as the original sample (Table 2).

3.7 Waste Management

All sediment and water remaining after sampling will be washed overboard at the collection site prior to moving to the next sampling station. Any sediment spilled on the deck of the sampling vessel will be washed into the surface waters at the collection site.

All disposable sampling materials and personnel protective equipment used in sample processing, such as disposable coveralls, gloves, and paper towels, will be placed in heavy-duty garbage bags or other appropriate containers.

4 SAMPLE TRANSPORT AND CHAIN-OF-CUSTODY PROCEDURES

This section addresses the sampling program requirements for maintaining custody of the samples throughout the sample collection and delivery process.

4.1 Sample Custody Procedures

Samples are considered to be in one's custody if they are: 1) in the custodian's possession or view; 2) in a secured location (under lock) with restricted access; or 3) in a container that is secured with an official seal such that the sample cannot be reached without breaking the seal.

COC procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the COC form. Each sample will be represented on a COC form the day it is collected. All data entries will be made using indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, then dating and initialing the change. Blank lines/spaces on the COC form will be lined-out and dated and initialed by the individual maintaining custody.

A COC form will accompany each cooler of samples to the analytical laboratory. Each person who has custody of the samples will sign the COC form and ensure that the samples are not left unattended unless properly secured. Copies of all COC forms will be retained in the project files.

4.2 Sample Delivery and Receipt Requirements

All samples will be hand delivered to the analytical laboratory no later than the day after collection. Upon transfer of sample possession to the analytical laboratory, the persons transferring custody of the sample container will sign the COC form. Upon receipt of samples at the laboratory the receiver will record the condition of the samples on a sample receipt form. COC forms will be used internally in the laboratory to track sample handling and final disposition.

5 CHEMICAL AND PHYSICAL ANALYTICAL TESTING

Ecology's Sediment Sampling Analysis Plan Appendix (SAPA) (Ecology 2008) and the DMMP User's Manual (DMMO 2008) specifies sampling and testing protocols for the chemical characterization of sediment, with the DMMP process designed specifically for dredged material being considered for open-water disposal. Method detection limits will be below the RLs specified in Table 2, if technically feasible. To achieve the required RLs, some modifications to the methods may be necessary. These modifications from the specified analytical methods will be provided by the laboratory at the time of establishing the laboratory contract. The modifications must be approved by DMMO or Ecology prior to implementation.

Chemical and physical testing will be conducted at ARI, which is accredited by the National Environmental Laboratories Accreditation Program. All chemical and physical testing will adhere to the most recent PSEP analysis protocols and QA/QC procedures (PSEP 1997b and c) and follow the 2008 DMMP User's Manual (DMMO 2008) and Clarification Papers (Hoffman 1998; Kendall 2001). For dioxin/furan analysis, the information contained in the Revised Supplemental Information on Polychlorinated Dioxins and Furans (PCDD/F) for Use in Preparing a Quality Assurance Project Plan (QAPP) (USACE 2010) will be followed. Porewater extraction for TBT analysis will not be performed in the field, but rather will be done in the laboratory according to standardized methods and following the most recent DMMP clarification paper (Hoffman 1998).

Surface water samples will be analyzed by ARI for SVOCs and metals. Table 2 provides the sediment analyte list, analytical method, and the target RL for each analyte to support Ecology and DMMP goals, where appropriate. Table 3 provides the water analyte list, analytical method, and the target RL. All sample analyses will be conducted in accordance with Ecology-approved methods.

In completing chemical analyses for this project, the contract laboratory is expected to meet the following minimum requirements:

- Adhere to the methods outlined in this SAP, including methods referenced for each analytical procedure (Table 2)
- Deliver hard copy and electronic data as specified
- Meet reporting requirements for deliverables
- Meet turnaround times for deliverables
- Implement QA/QC procedures including data quality objectives (DQOs), laboratory quality control requirements and performance evaluation testing requirements (Tables 5 and 6)
- Notify the project QA/QC Manager of any QA/QC problems when they are identified to allow for quick resolution
- Allow laboratory and data audits to be performed, if deemed necessary

Laboratory QC procedures, where applicable, include initial and continuing instrument calibrations, standard reference materials, laboratory control samples, matrix replicates, matrix spikes, surrogate spikes (for organic analyses), and method blanks. Table 5 lists the frequency of analysis for laboratory QA/QC samples, and Table 6 summarizes the data quality objectives for precision, accuracy, and completeness.

Results of the QC samples from each sample group will be reviewed by the analyst immediately after a sample group has been analyzed. All samples are diluted and reanalyzed if target compounds are detected at levels that exceed their respective established calibration ranges. Any cleanups will be conducted prior to the dilutions. The QC sample results will be evaluated to determine if control limits have been exceeded. If control limits are exceeded in the sample group, the QA/QC Manager will be contacted immediately, and corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

Table 5
Laboratory Quality Assurance/Quality Control Sample Analysis Summary for Sediment and Water

Analysis Type	Initial Calibration	Ongoing Calibration	Replicates	Matrix Spikes	SRM/LCS	Matrix Spike Duplicates	Method Blanks	Surrogate Spikes
Grain size	Each batch[a]	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total solids	Each batch[b]	NA	1 per 20 samples	NA	NA	NA	NA	NA
Total volatile solids	Each batch[b]	NA	2 per 20 samples	NA	NA	NA	NA	NA
Total organic carbon	Daily or each batch	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
Metals	Daily	1 per 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	NA	1 per 20 samples	NA
Dioxin/Furans	As needed[c]	Every 12 hours	NA[d]	NA	NA	NA	1 per 20 samples	NA[d]
Tributyltin	As needed[c]	Every 12 hours	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Semivolatile organics	As needed[c]	Every 12 hours	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample
Pesticides/Polychlorinated biphenyls[d]	As needed[c]	1 per 10 samples	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample

Notes:
a – calibration and certification of drying ovens and weighing scales are conducted bi-annually
b – initial calibration verification and calibration blank must be analyzed at the beginning of each batch
c – initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed
d – pesticides and PCBs will have all detects confirmed via second column confirmation. The second column must be of a dissimilar stationary phase from the primary column and meet all method requirements for acceptance.
NA = not applicable
SRM = standard reference material
LCS = laboratory control sample

Table 6
Data Quality Objectives for Sediment and Water

Parameter	Precision	Accuracy	Completeness
Grain size	± 20% RPD	NA	95%
Total solids/total volatile solids	± 20% RPD	NA	95%
Total organic carbon	± 20% RPD	65-135% R	95%
Total metals	± 35% RPD	75-125% R	95%
Dioxin/Furans	± 50% RPD	50-140% R	95%
Tributyltin	± 50% RPD	50-150% R	95%
Semivolatile organic compounds	± 50% RPD	50-150% R	95%
Pesticides/Polychlorinated biphenyls	± 50% RPD	50-150% R	95%

Notes:
R = recovery
RPD = relative percent difference

5.1.1 Laboratory Instrument Calibration and Frequency

An initial calibration will be performed on each laboratory instrument to be used prior to the start of the project, after each major interruption to the analytical instrument, and when any ongoing calibration does not meet method control criteria. A calibration verification will be analyzed following each initial calibration and will meet method criteria prior to analysis of samples. Continuing calibration verifications (CCV) will be performed daily prior to any sample analysis to track instrument performance. The frequency of CCVs varies with method. For gas chromatograph/mass spectrometer (GC/MS) methods, one will be analyzed every 12 hours. For GC, metals, and inorganic methods, one will be analyzed for every ten field samples, or daily, whichever is specified in the method. If the ongoing continuing calibration is out of control, the analysis must come to a halt until the source of the control failure is eliminated or reduced to meet control specifications. All project samples analyzed while instrument calibration was out of control will be reanalyzed.

Instrument blanks or continuing calibration blanks provide information on the stability of the baseline established. Continuing calibration blanks will be analyzed immediately prior to, or immediately following, CCV at the instrument for each type of applicable analysis.

5.1.2 Laboratory Duplicates/Replicates

Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates and replicates are subsamples of the original sample that are prepared and analyzed as a separate sample.

5.1.3 Matrix Spikes/Matrix Spike Duplicates

Analysis of MS samples provides information on the extraction efficiency of the method on the sample matrix. By performing duplicate MS analyses, information on the precision of the method is also provided for organic analyses.

5.1.4 Method Blanks

Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. The method blank for all analyses must be less than the MRL of any single target analyte/compound. If a laboratory method blank exceeds this criterion for any analyte/compound, and the concentration of the analyte/compound in any of the samples is less than five times the concentration found in the blank (ten times for common contaminants), analyses must stop and the source of contamination must be eliminated or reduced.

5.1.5 Laboratory Control Samples

Laboratory control samples (LCS) are analyzed to assess possible laboratory bias at all stages of sample preparation and analysis. The LCS is a matrix-dependent spiked sample prepared at the time of sample extraction along with the preparation of sample and the MSs. The LCS will provide information on the precision of the analytical process, and when analyzed in duplicate, will provide accuracy information as well.

5.1.6 Standard Reference Materials

Standard Reference Materials (SRM) are analyzed to assess possible matrix affects at all stages of sample preparation and analysis. The SRM is a matrix-matched sample that is carried through all aspects of preparation and analysis as a field sample and has a known

concentration of target analytes. Performance will be evaluated using the DQOs listed in Table 6 and as outlined in DMMO (2010) and Ecology (2008).

5.2 Laboratory Data Package

ARI will prepare a detailed laboratory data package documenting all activities associated with the sample analyses. The following information will be included in this data package:

- **Project Narrative:** A detailed narrative that describes the samples received, analyses performed, and corrective actions undertaken.
- **Chain-of-Custody Documentation:** Laboratory policy requires that COC documentation be available for all samples received. The COC will document basic sample demographics such as client and project names, sample identification, analyses requested, and special instructions.
- **Data Summary Form:** A tabular listing of concentrations and/or detection limits for all target analytes. The data summary form will also list other pertinent information such as amount of sample analyzed, dilution factors, sample processing dates, extract cleanups, and surrogate recoveries.
- **Quality Control (QC) Summary:** Includes results of all QC analyses, specifically recovery information. LCSs are reported with each batch. Additional QC analyses may include laboratory replicates, MS, and SRMs.
- **Instrument Calibration Forms and Raw Data:** Includes initial and continuing calibration summaries and instrument tuning data, laboratory bench sheets, and logbook pages.

5.3 Data Validation and Verification

Laboratory data will be provided in both PDF and EQuIS electronic format. Once data are received from the laboratory, a number of QC procedures will be followed to provide an accurate evaluation of the data quality. A Stage 2A level (USEPA 2009) data quality review (equivalent to a QA1 review) will be performed by Anchor QEA (or a subconsultant), in accordance with U.S. Environmental Protection Agency (USEPA) National Functional Guidelines (USEPA 2004, 2008) by considering the following:

1. Data completeness

2. Holding times
3. Method blanks
4. Surrogate recoveries
5. Detection limits
6. RLs
7. LCSs
8. MS/MSD samples
9. SRM results

The data will be validated in accordance with the project-specific DQOs (Table 6), analytical method criteria, and the laboratory's internal performance standards based on their Standard Operating Procedures. Dioxin/furan data will be validated at a Stage 4 level (USEPA 2009) by a subconsultant using the DQOs outlined in DMMO (2010) and/or the SAPA (Ecology 2008) . The results of the data quality review, including text assigning qualifiers in accordance with the USEPA National Functional Guidelines and a tabular summary of qualifiers, will be generated by the Database Manager and submitted to the project QA/QC Manager for final review and confirmation of the validity of the data. A copy of the validation report will be submitted by the QA/QC Manager and will be presented as an appendix to the Results Memorandum.

Laboratory data, which will be electronically provided and loaded into the database, will undergo a 10% check against the laboratory hard copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified by a second party. Data tables will be exported from EquIS database to Microsoft Excel tables.

6 SAMPLING AND ANALYSIS RESULTS MEMORANDUM

The Results Memorandum will be prepared by Anchor QEA documenting all activities associated with collecting, compositing, transporting, and chemically analyzing sediment samples. The laboratory data packages will be included as appendices and also submitted in electronic formats. The following will be included in the Results Memorandum:

- Summary of all field activities including a description of any deviations from the approved SAP
- Locations of sediment sampling stations in state plane coordinates to the nearest foot (Washington North Zone), and in latitude and longitude in degrees and minutes to four decimal places (NAD 83); all vertical elevations of mudline and water surface will be reported to the nearest 0.1-foot
- A project map with actual sampling locations
- A QA/QC narrative for laboratory results
- Summary data results tables
- Summary of comparison of chemical results with DMMP interpretive criteria (DMMO 2010 and 2011) and Ecology's freshwater Sediment Quality Values (SQVs; Avocet Consulting 2011, Ecology 2012b) as shown in Table 2

Hard copies of field data will be provided with the Results Memorandum and laboratory analysis results and associated QA/QC data will be available. Results of the laboratory analyses will be submitted to the DMMP in DAIS format and to Ecology in EIM format. The Results Memorandum will be submitted to DMMP, Ecology, and DOH within 12 weeks after completion of the field sampling activities. Ecology and DOH will be responsible for preparing separate reports with additional evaluations and interpretation based on the information included in the Results Memorandum.

7 PROJECT SCHEDULE

The estimated schedule for the sampling, analysis, and reporting activities are summarized in Table 7. Finalization of the SAP is anticipated for late October, with sampling planned for the end of October/early November.

Table 7
Estimated Schedule

Description	Schedule
Approved Sampling and Analysis Plan	late October/early November
Field Sampling and Lab Coordination	1 week; initiated within 2-3 weeks of SAP approval by Ecology and other agencies
Lab Testing	4 weeks for chemistry testing
Data Validation	4 weeks for data validation and QA/QC
Results Memorandum and Submittal of data to EIM	4 weeks after receipt of validated results and completion of QA/QC
Evaluations Conducted by Ecology	4 weeks after submittal of Results Memorandum
Health Consultations Conducted by DOH	4 weeks after submittal of Results Memorandum

Notes:
DOH = Washington State Department of Health
Ecology = Washington State Department of Ecology
EIM = Ecology's Environmental Information Management database
QA/QC = quality assurance/quality control

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APPENDIX A
SEDIMENT SAMPLING INVESTIGATION FIELD FORMS AND LOGS

Chain of Custody Record & Laboratory Analysis Request

COC#

Date:
Laboratory :
Project Name:
Project Number:
Project Manager:
Phone Number:
Shipment Method:

Line	Field Sample ID	Collection Date/Time	Matrix	No. of Containers	Dioxin and Furans	Pesticides[1]	PCB Aroclors	SVOCs[1]	Tributyltin (porewater)	Metals[1]	Ammonia, Sulfide, TOC	Grainsize, TS, TVS	Archive	Tributyltin (bulk)[2]									Comments
1																							
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

1 See SAP Table 2 for analyte lists and test methods

2 Only analyzed if there is insuffcient volume for the porewater analysis

Additional notes/comments:

Relinquished By:	Company: Anchor QEA LLC.	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Relinquished By:	Company:	Received By:	Company:
Signature/Printed Name	Date/Time	Signature/Printed Name	Date/Time

Distribution: A copy will be made for the laboratory and client. The Project file will retain the original.

Daily Log

Anchor QEA L.L.C.
720 Olive Way, Suite 1900
Seattle, WA 98101
Phone 206.287.9130 Fax 206.287.9131

PROJECT NAME: **DATE:**

SITE ADDRESS: **PERSONNEL:**

WEATHER: **WIND FROM:**

N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY

SUNNY	CLOUDY	RAIN	?

TEMPERATURE: ° F . ° C
[Circle appropriate units]

TIME	COMMENTS
See Field Logs for detailed logging and sampling	
Equipment on site:	

Notes: Work performed, Phone calls made, Problems Issues/Resolutions, Visitors on site
Safety infractions, Important comments/instructions to contractors

Signature: _____

Surface Sediment Field Log

Job: Station:

Job No: Date:

Field Staff: Sample Method:

Contractor: Target Coordinates: Lat.

Horizontal Datum: Long.

Water Height

DTM Depth Sounder: _____

DTM Lead Line: _____

Tide Measurements

Time: _____

Height: _____

Sample Acceptability Criteria:

1) Overlying water is present
2) Water has low turbidity
3) Sampler is not overfilled
4) Surface is flat
5) Desired penetration depth

Mudline Elevation (lower low water-large tides): calculated after sampling

Notes:

Grab #	Time	Actual Coordinates		Sample Accept (Y/N)	Recovery Depth (cm)	Comments: jaws close, good seal, winnowing, overlying water, surface intact, etc
		Longitude/Easting	Lattidue/ Northing			

Sample Description: surface cover, (density), moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sample Containers:

Analyses:

ANCHOR QEA

720 Olive Way, Suite 1900
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

Water Quality and Sample Collection Form

Station ID:		**Date:**	**Time:**
Project Name:		**Project Number:**	
Coordinates: Datum**:**			
Lat/Northing		Long/Easting	
Sample Depth:		Total Water Depth:	
Weather Observations:			

Field Parameters					
Temperature	°C	Turbidity	NTU	Others:	
pH		DO	mg/L		
Conductivity					

Sample Description		
Evidence of floating or suspended materials:	Y / N	
Evidence of oil/hydrocarbon sheen:	Y / N	
Describe any discoloration and turbidity:		
Odor	none, slight, moderate, strong H_2S, petroleum, septic	
Comments (e.g., boat activity, river flow rate, stormwater discharges in the vicinity) :		
Recorded by:		

Fw: Joint Response from WSDOE /WSDOT re Water Quality at the Kenmore Industrial Park

Sylvia Kawabata to: Erika Hoffman 10/17/2012 07:06 AM

Here's what I just mentioned to you.

Sylvia Kawabata, Manager
Assessment and Brownfields Unit
Office of Environmental Cleanup
EPA - Region 10
206-553-1078 - desk
206-331-1116 - cell
206-553-0124 - fax
kawabata.sylvia@epa.gov

----- Forwarded by Sylvia Kawabata/R10/USEPA/US on 10/17/2012 07:06 AM -----

From: Joseph Roberto/R10/USEPA/US
To: Jeff Kenknight/R10/USEPA/US@EPA, Lauris Davies/R10/USEPA/US@EPA, Kristine Karlson/R10/USEPA/US@EPA, Sylvia Kawabata/R10/USEPA/US@EPA, Tom Eaton <eaton.thomas@epa.gov>
Date: 10/16/2012 07:07 AM
Subject: Fw: Joint Response from WSDOE/WSDOT re Water Quality at the Kenmore Industrial Park

Info on the Kenmore site.

----- Forwarded by Joseph Roberto/R10/USEPA/US on 10/16/2012 07:03 AM -----

From: "Hammond, Paula" <HammonP@wsdot.wa.gov>
To: <larry.phillips@kingcounty.gov>
Cc: <gwingard@earthlink.net>, "Hanson, Allison" <HansonA@wsdot.wa.gov>, "Meredith, Julie" <MeredJL@wsdot.wa.gov>, "Becher, Dave" <BecherD@wsdot.wa.gov>, "Whalen, Suzanne" <WhalenS@wsdot.wa.gov>, <jiriussellshomes@gmail.com>, <gerry.pollet@leg.wa.gov>, <daveup@comcast.net>, <chris@pugetsoundkeeper.org>, <htrim@pugetsound.org>, <kfit461@ecy.wa.gov>, <rwar461@ecy.wa.gov>, Joseph Roberto/R10/USEPA/US@EPA, "Carpine-Cazzanti, Joy" <CarpinJ@wsdot.wa.gov>, "White, Megan" <WhiteM@wsdot.wa.gov>, "North, Teri" <teno461@ECY.WA.GOV>
Date: 10/15/2012 04:02 PM
Subject: Joint Response from WSDOE/WSDOT re Water Quality at the Kenmore Industrial Park

Dear Councilmember Phillips:

We would first like to extend our personal thanks to you for your long commitment and leadership on issues of clean water in the Puget Sound region. Yours has been a clear and consistent voice in support of clean water, and we appreciate that support.

This email is a joint response from the Washington State Department of Ecology (Ecology) and the Washington State Department of Transportation (WSDOT) on a number of questions and concerns regarding water quality at the Kenmore Industrial Park (KIP)raised in your email of September 27.

As you noted in your email, both agencies are responsible for ensuring that environmental regulations are followed for this project. As you may know, KIP is permitted as an industrial site, and as such was chosen by WSDOT's contractor Kiewit/General/Manson (KGM) to build pre-cast elements for the SR 520 floating bridge replacement project. In particular, KGM is building anchors and roadway deck components. WSDOT and Ecology coordinated two public information sessions prior to the launch of work in February, 2012 as well as another public open house in July. We have worked hard to provide the latest information to interested citizens. A Web page was added to the WSDOT site dedicated to the Kenmore work to ensure that citizens could access information easily in one location: http://www.wsdot.wa.gov/Projects/SR520Bridge/BridgeAndLandings/KenmoreIndPrk.htm. Both WSDOT and Ecology have worked individually and in coordination to address concerns raised by Greg Wingard and others about turbidity from vessel operations at the Kenmore site.

Ecology's dedicated water quality inspector has been to the site approximately 10 times since February 2012 for various inspection purposes. He responded immediately to the two complaint calls we received regarding turbidity and has also gone to the site unannounced. During these 10 inspections, turbidity issues were not observed to warrant formal compliance actions from Ecology. Observed violations and documentation by Ecology inspectors is necessary for the agency to proceed with any formal compliance actions.

However, Ecology and WSDOT have confirmed incidents when tugs have disturbed bottom sediments during vessel operations from the vessel's prop wash resulting in turbidity increases in the water column around the vessel. One of the more obvious incidents occurred in March of this year when vessel operations first commenced in the KIP channel.
WSDOT and Ecology both agree that these operations must be conducted in a way that prevents increases in lake turbidity. Toward this end, both agencies recently met on September 21 to develop a set of additional actions, along with actions already underway, that our agencies will either individually or jointly conduct to prevent increases in lake turbidity from vessel operations. Although there is no current regulatory requirement for WSDOT to conduct turbidity monitoring, Ecology will be conducting periodic turbidity monitoring as needed based on the professional judgment of the water quality inspector the agency has assigned to this project.

As previously mentioned, some of the measures to prevent increases in lake turbidity include Best Management Practices (BMPs) for vessel operators that had already been put in place by WSDOT and its contractor KGM at the time of our recent meeting. Among these BMPs:

- avoiding the use of deep draft tugs in the channel whenever possible,
- anchoring barges for movement out of the channel so that the channel does not get tied up with additional traffic,
- regulating the tempo of vessel operations in the channel so as to minimize traffic by even the smaller and shallow draft tugs,
- employing right-sized barges to move the necessary loads and thereby minimize the use of the larger and over-sized barges.

Additional measures that are now being put in place include:

- KGM will follow the direction of Ecology's WQ inspector provided at a meeting

on Oct 5, 2012. KGM will log their location via GPS associated with any high turbidity events and take digital photos around their vessels and report these incidents to Ecology's Environmental Response Tracking System (ERTS) at Ecology's NW Regional Office in Bellevue, WA (425-649-7000).

- KGM will be reconfirming bathymetry data (a map that shows the depths of the channel) for the portions of the Kenmore channel where their barges need access to ensure they travel through the deepest parts of the channel as possible.

With respect to concerns about vessel operations in the Harbor Village Marina area, KGM's vessels do not travel in close proximity to Harbor Village Marina as that area is not within their travel route to access the SR-520 construction area. WSDOT expects barge traffic at Kenmore to lessen now that the construction of the gravity anchors at the Kenmore site has been completed. In addition, KGM has mobilized land based cranes, reducing the need to bring large vessel mounted barge cranes to the Kenmore area. On-going and future construction operations at Kenmore include construction of fluke anchors and road deck panels which should require fewer vessel movements. In addition, KGM will be able to access the Lake Washington construction areas from the Medina shoreline which will reduce the need to transport materials and equipment from the Kenmore site.

Ecology for its part will continue to monitor these operations closely through our water quality inspector for these operations. This will be done through a series of both announced and unannounced inspections. Should Ecology observe instances of our Washington State's Water Quality Standards (WAC 173-201A) being violated, it will take appropriate enforcement actions to ensure these vessel operations comply with these standards and all other state environmental laws that apply to these vessel operations.

On behalf of both Ecology and WSDOT, we would like to thank you for your continued care and vigilance for the health and safety of Washington State's citizens and its waters. We hope the actions we are taking as outlined above demonstrate that both of our agencies are dedicated to this same mission.

Sincerely,

Paula J. Hammond, Secretary
Department of Transportation

Ted Sturdevant, Director
Department of Ecology

RE: DMMP review comments on Kenmore Sediment and Water Characterization SAP (UNCLASSIFIED)

Kendall, David R NWS to: Dan Berlin (dberlin@anchorqea.com) 10/10/2012 11:26 AM
" (Celia.Barton@dnr.wa.gov)", "Inouye Laura
Cc: (LINO461@ecy.wa.gov)", Erika Hoffman, "Pell, John L NWS" ,
"mobr461@ecy.wa.gov", 'Nancy Ousley'

Classification: UNCLASSIFIED
Caveats: NONE

Hi Dan, after discussing the TBT comment (# 8) with my Ecology counterpart, Laura Inouye, our solution is to do TBT porewater only for the navigation samples, but archive samples from each navigation channel sample location, so that bulk TBT could be analyzed at a later date if needed as part of an overall SMS cleanup assessment. All the Ecology/DOH samples would be analyzed for TBT using the bulk TBT procedure. Hopefully this addresses your question relative to our comment on that issue.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Tuesday, October 09, 2012 4:09 PM
To: 'mobr461@ecy.wa.gov'
Cc: (Celia.Barton@dnr.wa.gov); Inouye Laura (LINO461@ecy.wa.gov); Hoffman, Erika; Pell, John L NWS; Dan Berlin (dberlin@anchorqea.com); 'Nancy Ousley'
Subject: DMMP review comments on Kenmore Sediment and Water Characterization SAP (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Maura: As requested, here are our consolidated review comments. Please let us know if you have any questions. Thanks.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Q:\Jobs\120891-01.01_Harbor_Village_Marina\Maps\2012_09\Fig2_ProposedSampling.mxd nkochie 9/20/2012 2:57:57 PM

ANCHOR QEA

DRAFT

Feet
0 200 400 600 800

Figure 2
Draft Proposed Sediment Sample Locations
Sampling and Analysis Memorandum
Kenmore Sediment Characterization

From: Justine Barton
To: Erika Hoffman
Subject: Fw: Citizen request for information on KIP and WSDOT information
Date: 08/16/2012 08:14 AM

Justine Barton
US EPA Region 10, ms ETPA-088
1200 Sixth Ave. Suite 900
Seattle, WA 98101-3140
barton.justine@epa.gov
phone 206.553.6051
fax 206.553.6984

----- Forwarded by Justine Barton/R10/USEPA/US on 08/16/2012 08:14 AM -----

From: "O'Brien, Maura (ECY)" <MOBR461@ECY.WA.GOV>
To: Justine Barton/R10/USEPA/US@EPA,
Cc: "Lui, Nancy (ECY)" <nlui461@ECY.WA.GOV>, "Wang, Ching-Pi (ECY)" <CWAN461@ECY.WA.GOV>
Date: 08/15/2012 03:32 PM
Subject: Citizen request for information on KIP and WSDOT information

---

Hello,
Here are the webpages for the Kenmore Industrial Park (KIP) site also called Lakepointe at the waterfront in Kenmore where I lot of the 520 bridge reconstruction work is being conducted:

https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=2134

The WSDOT and contractor Kiewit General Manson doing the work at the KIP site for the 520 bridge has a public outreach person named Stacey Howery and you may reach Stacey at:

howerys@wsdot.wa.gov

And the WSDOT webpage is at:

http://www.wsdot.wa.gov/projects/sr520bridge/

Trust this answers your questions.

Maura

Maura S. O'Brien, PG/HG #869
Professional Geologist/Hydrogeologist

Toxics Cleanup Program - NWRO
Department of Ecology
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Tele 425-649-7249
Fax 425-649-7098
Email mobr461@ecy.wa.gov

FW: UPDATE draft sampling plan (UNCLASSIFIED)

Kendall, David R NWS to: (Celia.Barton@dnr.wa.gov), Erika Hoffman, Inouye Laura (LINO461@ecy.wa.gov) 10/18/2012 02:33 PM

Classification: UNCLASSIFIED
Caveats: NONE

Fyi, more communications with Elizabeth Mooney regarding PCB levels at Kenmore.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: O'Brien, Maura (ECY) [mailto:MOBR461@ECY.WA.GOV]
Sent: Thursday, October 18, 2012 2:29 PM
To: Kendall, David R NWS
Subject: RE: UPDATE draft sampling plan (UNCLASSIFIED)

Thank you for a succinct response to this citizen.

Maura

Maura S. O'Brien, PG/HG #869
Professional Geologist/Hydrogeologist
Toxics Cleanup Program - NWRO
Department of Ecology
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Tele 425-649-7249
Fax 425-649-7098
Email mobr461@ecy.wa.gov

-----Original Message-----
From: Kendall, David R NWS [mailto:David.R.Kendall@usace.army.mil]
Sent: Thursday, October 18, 2012 11:28 AM
To: elizabeth.mooney@comcast.net
Cc: dbent@kenmorewa.gov; landerson@kenmorewa.gov; Barney, Phyllis (ATG); happyhaze@msn.com; aaronmsmithlaw@gmail.com; Cleve Steward; Radabaugh, David (ECY); dreitan@insleebest.com; O'Brien, Maura (ECY); Wang, Ching-Pi (ECY); Hardy, Joan (DOH); Ann Hurst; Aaron Smith
Subject: RE: UPDATE draft sampling plan (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Elizabeth: I have been out of office the last several days. Thank you for your observations and response. I want to stress that I do not know the PCB source for the Harbor Village Marina PCB/dioxin contamination, and would look

to Ecology TCP to ultimately evaluate that question and concern.

I also have no doubt that you are observing suspension and redistribution of sediments in the area due to barge traffic in the navigation channel, and that some of these sediments may settle within the Harbor Village Marina.

My reasoning that there is another primary source of the PCBs is based on the ten-fold differences in PCB concentrations in the Harbor Village Marina and in the navigation channel. The PCB concentrations observed in the navigation channel material (detected Aroclor 1254, ranged from 15 - 27 ppb, averaging 21 ppb-dry weight, and TOC normalized concentrations ranged from 0.38 - 0.66 ppm-TOC, averaging 0.5 ppm-TOC) were well below (State Sediment Quality Standards(SQS), where they were quantitated at only 4.2% of the SQS (PCB SQS = 12 ppm-TOC. By comparison, the PCB concentrations in the Harbor Village Marina, ranged from a low of 196 ppb to a high of 277 ppb for Aroclor 1254, averaging 237 ppb, which are greater than ten times the PCB levels observed in the navigation channel based on the average concentrations. At least with the data in hand, it simply does not appear that there are enough PCBs in the navigation channel to have provided the level of contamination seen over time in the marina.

I think we will have to wait until the sediment investigation due to take place in early November provides the data to evaluate the PCB and dioxin concentrations throughout Kenmore. Hopefully that data will provide some answers. I know my interagency colleagues and I in the Dredged Material Management Program are anxious to gather the necessary data to evaluate the extent of the PCB/dioxin contamination at Kenmore, and are confident that the proposed testing strategy will be helpful to that end.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: elizabeth.mooney@comcast.net [mailto:elizabeth.mooney@comcast.net]
Sent: Monday, October 15, 2012 1:08 PM
To: Kendall, David R NWS
Cc: dbent@kenmorewa.gov; landerson@kenmorewa.gov; phyllisb@atg.wa.gov; happyhaze@msn.com; aaronmsmithlaw@gmail.com; Cleve Steward; drad461@ecy.wa.gov; dreitan@insleebest.com; mobr461@ecy.wa.gov; cwan461@ecy.wa.gov; joan hardy; Ann Hurst; Aaron Smith
Subject: Re: UPDATE draft sampling plan (UNCLASSIFIED)

David,

I have read and reread your Oct 5 2012 email to Ann Hurst; unfortunatly, I disagree with your conclusion. I'd like to explain why by sharing my personal observation of tug/barge activity and subsequent brown sediment-laden water drifting into Harbour Village Marina, and ask if you believe you might reconsider your conclusion based on new information.

Before I do that, I want to thank you for correcting the record so we now know the type of PCB in both Harbour Village Marina and in the Federal Navigation Channel are the same, Aroclor 1254. I hope that Dept of Ecology reflects that in their website information. It is important that people understand these details and that they know that the PCB type in Harbour Village Marina is the SAME type as the PCB type in the Federal Navigation Channel. That is what is important, in my opinion. I appreciate your going to the trouble to correct the record in the email attached. It makes sense.

In your Oct 5 email to Ann Hurst, you state (and I added an underline and bold for emphasis for what I believe is most important):

My email clarifying error in letter (6/6/12):

Hi all: I would like to point out that in the fifth paragraph of Attachment 1 to response letter, it states that the Corps of Engineers "determined that the PCB fingerprints were significantly different at the two sites" (Federal navigation channel and Harbor Village Marina). I would like to correct the record that that statement is in error. The Fingerprinting indicates the Aroclor quantified at both sites was the same, Aroclor 1254, as noted in attached Figure. I wanted to correct the record, as there is a lot of misinformation out there regarding the testing at these two locations. Thanks.

David

David R. Kendall, Ph.D.

Chief, Dredged Material Management Office

The reason I disagree with your conclusion:

I have watched the barges numerous times in the navigation channel. I see them stop in front of Harbour VIllage Marina to turn their vessels. Most importantly, I've seen brown water in Harbour Village Marina AFTER the barges have departed Kenmore Navigation Channel, passed Harbour Village Marina and headed out into Lake Washington.

On the same day when Greg Wingard watched from the Hays' condo and noted a Clean Water Act violation in August 2012, I went, afterwards, to the HV Marina and talked to the Harbormaster Mike. Since that was the same day that Greg Wingard had noted the turbidity due to the tug/barge activity in the Kenmore Navigation Channel, I feel confident that what I was seeing at HVM was due to the barge activity. Additionally, the Harbormaster told me it was true. The Harbormaster told me to look out into the marina. I could easily see that brown water was in the Harbour Village Marina. Mike said that brown water enters HVM after the tug/barges pass the marina in the Navigation Channel. According to Mike, it happens all the time. Therefore, your conclusion in the email makes no logical sense to me. You stated that: "The concentrations of PCBs found in Harbor Village Marina were 10 times the concentrations found in the federal navigation channel in the 1996 characterization, and therefore, the navigation channel is not the likely source for the contamination in Harbor Village Marina." On the contrary, David, doesn't it make sense that if

the barges have been churning up the bottom of the sediment in the Federal Navigation Channel, and if the wind or current drive the suspended sediment toward Harbour Village Marina, that the increase in concentrations of PCB's would build up in the Harbour Village Marina? From what I saw, I hypothesize that barge activity translocates the sediment, and that, subsequently, the sediment drifts into the marina where it can't go any further and settles onto the bottom. It builds up in the marina due to the barges churning up sediment in a Federal Navigation channel that has inadequate depth for the barges/tugs using it.

Based on my personal observation, when the barges churn up the sediment at the bottom of the too shallow Federal Navigation Channel with their too deep tugs' activities, the sediment appears to be churned up and the brown water (filled with the sediment) travels right into the Harbour Village Marina, due to wind or current or whatever. That is what I believe I saw happening.

Can you please help me understand? As you know, my goal is to protect our right to having Clean Water. First we need to know where to test to get the answers we need. I am concerned about the method of testing. Perhaps, based on this information, there may be a reason to have Anchor QEA take a different type of sample to determine the extent/source of the dioxin and PCB at HVM. Since the Sediment Sampling draft went out today, I'd like to make sure you know about this brown water in HVM after tug/barge activity in the Navigation Channel.

Thanks very much,

Sincerely,

Elizabeth Mooney
206-979-3999

From: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
To: "Ann Hurst" <annmhurst@msn.com>, "Elizabeth.Mooney" <elizabeth.mooney@comcast.net>
Cc: dbent@kenmorewa.gov, landerson@kenmorewa.gov, phyllisb@atg.wa.gov, happyhaze@msn.com, aaronmsmithlaw@gmail.com, "Cleve Steward" <cleve.steward@amec.com>, drad461@ecy.wa.gov, dreitan@insleebest.com, mobr461@ecy.wa.gov, cwan461@ecy.wa.gov, "joan hardy" <joan.hardy@doh.wa.gov>
Sent: Friday, October 5, 2012 10:40:51 AM
Subject: RE: UPDATE draft sampling plan (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Ann: I have to correct the statement below attributed to me in an earlier Ecology response letter to Representative Pollett. Ecology incorrectly quoted me relative to PCB fingerprinting of the Aroclors at Harbor Village Marina and the Federal Navigation Channel. I have attached my email notifying Ecology (Maura Obrien) of that error. The factual error was later corrected, but apparently the earlier uncorrected transmittal letter is still being circulated.

The concentrations of PCBs found in Harbor Village Marina were 10 times the concentrations found in the federal navigation channel in the 1996 characterization, and therefore, the navigation channel is not the likely source for the contamination in Harbor Village Marina.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

My email clarifying error in letter (6/6/12):

Hi all: I would like to point out that in the fifth paragraph of Attachment 1 to response letter, it states that the Corps of Engineers "determined that the PCB fingerprints were significantly different at the two sites" (Federal navigation channel and Harbor Village Marina). I would like to correct the record that that statement is in error. The Fingerprinting indicates the Aroclor quantified at both sites was the same, Aroclor 1254, as noted in attached Figure. I wanted to correct the record, as there is a lot of misinformation out there regarding the testing at these two locations. Thanks.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Ann Hurst [mailto:annmhurst@msn.com]
Sent: Thursday, October 04, 2012 4:41 PM
To: Elizabeth.Mooney
Cc: dbent@kenmorewa.gov; landerson@kenmorewa.gov; phyllisb@atg.wa.gov; happyhaze@msn.com; aaronmsmithlaw@gmail.com; Steward, Cleve; drad461@ecy.wa.gov; dreitan@insleebest.com; mobr461@ecy.wa.gov; cwan461@ecy.wa.gov; Kendall, David R NWS; joan.hardy@doh.wa.gov
Subject: RE: UPDATE draft sampling plan

Elizabeth and All,
The 1996 sampling is attached, and yes, the channel where the docks reside was tested in 1996, with exceedances, but of the type that dissipate except for the relatively low PCB's. In an Ecology summary on line, Ecology states that Officer Kendall states, the type of PCB's found at Harbour Village Marina last year are not the same as found in 1996. What is off shore of Cal Portland in 2012 will be unknown without testing that area, and now we know with equipment failures and use of fly ash over time at the cement companies, the cement batch plants under various ownership and various controls of fly ash could be a cumulative source of the Dioxins.
As I read the RCW, and with informal info from County, since the docking area is within City Boundary, it is clearly City Responsibility; County responsibility in past.
There was no Dioxin testing in 1996, and we now know that materials containing

PCB's degrade over time, so what was in 1996 would not be a footprint of what is today as I, a lay person, understand various explanations made by various scientists to me. And if there are the 1996 PCB types at Harbour Village Marina, they may be well buried, watching recently all the churning of barges at that corner of the Kenmore Navigation Channel closest to Harbour Village Marina, which may have been going on for years with cement barge traffic, it is not a surprise that the Harbour Village Marina needs dredging.
An Ecology summary also said Officer Kendall made a comment on the types of toxins in the past at Harbour Village Marina, not certain where that material resides; but as I would prefer actual source material, I am again bothering Officer Kendall by cc'ing him and hoping he can clarify. Thank you Officer Kendall.
All in all, if we don't get a good testing pattern and firm execution date, etc., I am not going to be a good sport, Phyllis and Dawn, especially today with the high barge traffic, turbidity, and other likely infractions, waiting for official report/s. Our health and it appears the workers' health is not being protected.
Best, Ann

Date: Thu, 4 Oct 2012 05:58:40 +0000
From: elizabeth.mooney@comcast.net
To: annmhurst@msn.com
CC: dbent@kenmorewa.gov; landerson@kenmorewa.gov; phyllisb@atg.wa.gov; happyhaze@msn.com; aaronmsmithlaw@gmail.com; cleve.steward@amec.com; drad461@ecy.wa.gov; dreitan@insleebest.com
Subject: Re: UPDATE draft sampling plan

Ann,

Isn't it the case that the water area (navigation channel) by Calportland/Lakepointe was tested in 1996? Why would anybody spend city money and Ecology's money to test if they aren't going to test there?

I left a message for our manager, Rob Karlinsey. It certainly was my understanding that city/Ecology money was to be spent looking for the source of the dioxins/PCB's. Would it make any sense to spend all that money on the Anchor QEA sampling if there is no sampling where they found PCB's in 1996? Am I forgetting something here?

Thanks.

Elizabeth

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From:	Kendall, David R NWS
To:	(Celia.Barton@dnr.wa.gov); Hoffman, Erika; Inouye Laura (LINO461@ecy.wa.gov); Barton, Justine; Fox, David F NWS; Warner, Lauran C NWS; Vanderelst, Kelsey NWS
Subject:	FW: CWA pollution violation in Kenmore navigation channel (UNCLASSIFIED)
Date:	Wednesday, February 06, 2013 2:08:06 PM

Classification: UNCLASSIFIED
Caveats: NONE

FYI, issues articulated from Cindy Beckett regarding Kenmore Channel and 520 Bridge construction site at Lakepointe and barge traffic through channel with resulting sediment disturbances.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Wednesday, February 06, 2013 1:36 PM
To: Pell, John L NWS
Cc: Bennett, Matthew J NWS; Hicks, John A NWS; Kendall, David R NWS
Subject: RE: CWA pollution violation in Kenmore navigation channel (UNCLASSIFIED)

Hello John, thank you so much for your timely reply.

I will contact Mr. Bennett, but want to clarify something - this was not done with the intent to dredge the channel, the dredging happened because the barges and tugs used for this stage of the 520 bridge project were too large for the channel, and no one had tested the channel to determine its current depth. The first barge up high centered in the channel, which was then freed by the tug owner via power water blasting under it. There were huge clouds of brown sediment everywhere, and several of the shoreline businesses, marinas and Kenmore Air, were covered in the muck that was thrown up all over the place. There are plenty of witnesses to that.

People from Kenmore called me for help.

I did call the owner of Kenmore Air that morning, who was livid that his planes and tarmac were covered in this muck, to advise him to make sure his staff were wearing hazmat suits and to not touch the muck with bare hands or wear their shoes in their cars or homes. Already aware of the confirmed toxic contamination in the shoreline sediments, he did make sure his staff were wearing hazmat suits.

I then called the Coast Guard to respond, but rather than actually send someone to look at the violation, they merely phoned the tug operator, who said it didn't happen, the CG said OK thanks, and that was the end.

Since that time, the residents there have been valiantly trying to get help with this. They have photographed this operation every day, capturing many shots of great clouds of brown created after each barge/tug trip into and out of the channel, floating out into the lake and great clouds of brown in

the channel, where the tugs have to turn around to manipulate the barges.

The dept of Ecology, who should have been the first responders, instead defended the actions and even denied the violations even happened, since they had permitted the work to be done on the old (already ranked a hazard level 1 contaminated site) Kenmore industrial landfill site for this bridge anchor work. However, they did not do or require any testing of the channel at all, not for sediment depth, not for contamination, not for anything at all, before permitting that project that would require the use of the channel. Instead of dealing with the sediment pollution of an ESA protected 303(d) water, they did not stop the action from continuing - for the entire past year.

They argued back constantly, insisting that a Section 7 was done by FHWA and declared NE, which, after nearly a year of insisting that they just show us a copy, they refused to do. We were finally able to get confirmation that a section 7 was never done for the Kenmore channel, since that use was an afterthought, long after the original EIS was done for Aberdeen and Gray's Harbor, where the work was supposed to be done.

Ecology's water quality department, who at first said take pictures and keep reporting it, failed to do anything at all, claiming it was too confusing of an issue to be able to deal with it.

We contacted Seattle EPA, who said they could not enforce because the pollution contamination did not come from the end of a pipe. F&W could not intervene because the fish were not floating dead in the water - yet. The Inspector General's office said the same thing. NOAA was blocked by FHWA.

They took it to the media, who did a story on it, which at least raised much more public awareness of the serious issue. ECY then did a perfunctory few tests to "ease the minds" of the populace, but they did not actually test the new depth of the sediments in the channel, the surrounding lake end, nor perform true testing of those sediments for toxic contamination.

Frustrated that such a violation as this was simply to be allowed, I finally made it through to EPA - DC, Lisa Jackson's office, who confirmed that sediment pollution is in fact a violation of the CWA, the ESA, and the R&H Act. It was they who directed me to the lawsuit, brought about by the USACE in Florida, for the exact same issue.

Now, I am requesting that the USACE do something about this violation, since it is in fact a violation. The landfill, which was built IN the side of the lake on a 100% peat bog with no liner, the channel sediments, and the shoreline sediments, are contaminated with, at minimum, Dioxin 2,3,7,8 TCDD and PCBs. We will never know the extent of toxic contamination now, since the channel sediments have been scoured out and spread into the lake. However, as you well know, these toxic materials do not just dissipate - ever. They must be incinerated to destroy them.

You also know that Dioxin 2,3,7,8 is confirmed by EPA to cause cancer (among other most serious health effects) and that there is no known safe dose.

All along, it has been a huge smoke screen and delay to act or enforce, solely to keep the bridge project moving.

That is not supposed to be the role of ECY. They are the EPA designated administrator of the CWA in this state - and have failed miserably.

EPA is becoming more aware of this fact as the public in Kenmore are

insisting that someone do something about this issue.

I was so relieved when EPA - DC confirmed that this is in fact a CWA violation, that the court case set a precedent that propeller disturbance and displacement of sediments is pollution and is enforceable, and that the court case was instigated by the USACE.

Now, we need you to enforce and to stop this terrible pollution from continuing. After nearly a full year of disturbing and translocation of this fine silty contaminated sediment, it will have settled over a much larger area of the lake, suffocating all life forms that lived there, and that were a food source for both the migrating Salmon and other anadromous fish.

Thank you so much for attending to this issue.

Best regards

Cindy Beckett

Cindy Beckett
Master Watershed Steward
no water - no life

-----Original Message-----
From: Pell, John L NWS [mailto:John.L.Pell@usace.army.mil]
Sent: Wednesday, February 06, 2013 7:44 AM
To: Cindy Beckett
Cc: Bennett, Matthew J NWS; Hicks, John A NWS; Kendall, David R NWS
Subject: RE: CWA pollution violation in Kenmore navigation channel (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Using a boat propeller to intentionally dredge could be a regulated activity. I'm in charge of overseeing the navigation channel, especially when the Corps receives money to dredge. I'm afraid I'm not the right person here to take care of this issue. This is an issue for our Regulatory Branch. They have the authority to look into this issue for you.

I will take your message to the Regulatory Section Supervisor here at the Corps and discuss your concerns with him. His name is Matt Bennett. His phone number is 206.764.3428 if you want to call him directly.

John Pell

-----Original Message-----
From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Tuesday, February 05, 2013 3:39 PM
To: Pell, John L NWS
Subject: CWA pollution violation in Kenmore navigation channel

Hello John.

I have not spoken with you for a long time and trust that you are well.

I was told you are the lead on this project so want to inform you of the situation there. I enclose a copy of US vs MCC, where it was determined that propeller scouring causing the relocation of sediments is in fact a violation of the CWA.

As you see in the case, the USACE was the lead. I wish that was the situation here in WA.

I am sure you are aware of the terrible time the citizens have had in getting help in the issue of nearly 1 full year of continued violation of propeller scoured and possibly contaminated sediment pollution being spread out over the N end of Lake WA in the Kenmore area. That sediment pollution is aside from the USACE 2011 confirmation of high levels of Dioxin 2,3,7,8TCDD and PCBs in the shoreline sediments. The nav channel was never tested at all for either depth nor contamination prior to ECY project approval, and other issues also apply - including the illegal (unpermitted) dredging of the Haug channel and subsequent dumping of the dredge material on the same property in 2009, right on the landfill site that is now being used for the 520 bridge project anchor construction. There was no oversight at all, and the leachate water was returned back into the lake via the mouth of the Sammamish River.

The people living there have been trying desperately to get help. I finally was able to reach Lisa Jackson's office (EPA-DC), where it was confirmed to me that in fact this is a violation and must be stopped and enforced. It was that office who directed me to the lawsuit as it set a precedent in ruling that propeller scouring and sediment relocation is pollution under the CWA and the Rivers and Harbors Act..

Since the USACE has this authority, I trust you will look into this immediately, stop the violation from continuing, and issue the appropriate fines and penalties.

FHWA, DOT & ECY have outright refused to address nor correct this issue. EPA Seattle was under the mistaken impression that they could not enforce because the pollution was not discharged from the end of a pipe. That is now clarified by EPA-DC to not be correct. However, to date, EPA -Seattle has still failed to attend to this.

So now I am asking you, the USACE, to attend to it.

Thanks very much

Best regards

Cindy Beckett

Cindy Beckett

Master Watershed Steward

no water - no life

253 536-8798

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Jonathan Freedman
To: Justine Barton; Erika Hoffman
Subject: Fw: day 174 of this violation RE: Fw: PDF of DMMP Haug Channel Testing results from first testing done. 1993
Date: 11/20/2012 05:06 PM
Attachments: nov2007.jpg
april 2009.jpg
may 2009 haug open water disposal.jpg
june 2009 algae bloom.jpg
gone by 2010.jpg
july 2012 disposal pond gone.jpg

Second email - received today

Jonathan Freedman (206) 553-0266
USEPA, Region 10
Sediment Management Program
1200 Sixth Avenue, Suite 900
ETPA - 083
Seattle WA 98101
freedman.jonathan@epa.gov
FAX: (206) 553-1775

----- Forwarded by Jonathan Freedman/R10/USEPA/US on 11/20/2012 05:04 PM -----

From: "Cindy Beckett" <cindybeckett@comcast.net>
To: Jonathan Freedman/R10/USEPA/US@EPA
Date: 11/20/2012 03:03 PM
Subject: FW: day 174 of this violation RE: Fw: PDF of DMMP Haug Channel Testing results from first testing done. 1993

Hi Jonathan

FYI – there is even more to this CWA violation issue now. The Haug Channel dredged contaminated material was also dumped on the Kenmore site in the detention pond visible via satellite. There is a clearly seen channel from there into the lake. Then the pond was filled in and dozed out for other uses, it does not remain now. Since that was done only a couple of years ago, there was not enough time to sufficiently deal with the toxic nature of this sediment, which was deemed to be unsuitable for open water disposal.

We don't really know what they did with all of that settled contaminated sediment. It was not incinerated. It would be interesting to see any soil tests done at that exact spot where the disposal pond was. There was no liner in this pond so the contaminated material from Haug was just dumped onto the open ground. I have not found any records yet of monitoring of this pond. It did not exist in 2007, was there in 2009, and was gone by 2010.

See info below on "Haug Chanel (Lake Washington)"

Thanks, and Happy Thanksgiving

Regards

Cindy

Cindy Beckett
Master Watershed Steward
no water - no life

From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Tuesday, November 20, 2012 2:27 PM
To: 'Greg Wingard'
Cc: 'happyhaze@msn.com'; 'Ann Hurst'; 'Elizabeth Mooney'; 'dbain@u.washington.edu'; 'jim halliday'; 'Hitoshi Maruyama'
Subject: day 174 of this violation RE: Fw: PDF of DMMP Haug Channel Testing results from first testing done. 1993

Greg

I was told from a very good source that there were only 2 States that still used a State dept of Ecology. Texas and WA. Texas removed their State ECY and now has EPA overseeing their ecological climate and laws again. I was told this was because there was so much damage to the water resources there under their state ecology office that they replaced them and brought EPA back in.

That is what I was told. I have not personally taken of my time to research this. The person who told me this is not known to be a liar.

In WA, our government decided they wanted their very own in-state department, so formed their own dept of ECY. (this is all documented by the way) EPA granted permission, but there is a legal agreement between EPA and WA with full instructions as to ECY's responsibility to carry out the requirements of EPA and administer the CWA in the same manner as EPA does. There are clearly written RCW's as well addressing ECY's responsibility to represent EPA's interest here.

ECY and our state government have failed to honor this agreement with Federal EPA. Our state government has failed to hold ECY accountable for this. Our water continues to decline both in quantity and quality because our ECY office has not upheld nor enforced these laws nor really any part of the CWA – not then, not now. This recent most flagrant issue is the final example of why ECY needs to be removed for failure to protect and maintain our water resources. If their stand is to make excuses rather than address the actual violation issue, and to push projects forward that should not be allowed. We do not need them taking our tax money for their wages if they are not going to protect our water.

ECY is not supposed to be politically influenced. They are supposed to protect our water and respond when violations against the CWA occur. Period.

Clean Water Act GENERAL DEFINITIONS

SEC. 502. Except as otherwise specifically provided, when used in this Act:

(1) The term ''State water pollution control agency'' means the State agency designated by the Governor having responsibility for enforcing State laws relating to the abatement of pollution.

****If you say that our State laws are stricter than Federal law, why did this happen????

Haug Channel (Lake Washington)
This project was initially characterized in 2001. There were detection limit exceedances of maximum levels
for a number of chemicals. Bioassays could not be performed due to the peaty nature of this material. The
applicant elected in 2006 to retest without prior DMMP review and approval to see if the better detection
limits could be achieved. The testing lab did achieve better detection limits, but the detection limit for
benzoic acid was still above the ML and several other chemicals had detection limits above the SL.
Because the sediments could not undergo toxicity testing, the DMMP agencies determined that these
sediments were unsuitable for unconfined open-water disposal and beneficial-use projects.
(source DMMP 2007)

Now, re the actual issue,

You can defend ECY all you want, the violations are still there and they are responsible for allowing it.

For myself, while I find it interesting to read merit and standing arguments, it is not the area I am working in. This is not a lawsuit issue for me.

My sole interest remains that this is a flagrant and serious CWA violation. WA ECY is responsible due to their permitting the use of this landfill site in defiance of Sec 402 exception for contaminated property. They are responsible for the CWA violation happening in the first place and for not stopping it immediately. If not

for their permitting the 520 bridge project phase to be done on this landfill, this violation would never have happened. I intend to get it stopped the same as any other violation. ECY does not have carte blanche, despite what many here are actually foolish enough to believe, to allow this to continue nor to not stop it. They were supposed to be first on the scene issuing fines and ordering cleanup.

I did already get confirmation from federal EPA that this is true. I also did not find anywhere in the CWA that it says "except for WA". EPA says that's because there is no exception. The CWA is the permanently codified law of the nation, applies in every state, is to be upheld, and is to be enforced by every level of court in every state.

Based on reports and information found by citizens and found on ECY's own website, they should never have issued a permit to do anything in that area of the lake when they already had all of this knowledge of the contamination on the landfill site and of the condition of the sediments in the channel.

In fact, clearly written in the CWA is that even a section 402 stormwater permit, which DOT & FDOT are hiding behind and maintain is the only thing they are legally required to obtain, is only allowed if there is no contamination on the property. Clearly written, no misunderstanding of what it means.

Sec. 402 FEDERAL WATER POLLUTION CONTROL ACT 188 (Clean Water Act)
(k) Compliance with a permit issued pursuant to this section shall be deemed compliance, for purposes of sections 309 and 505, with sections 301, 302, 306, 307, and **403**, <u>except</u> any standard imposed under section 307 <u>for a toxic pollutant injurious to human health.</u>

I'm sure you have read section 307?

There is much contamination of toxic pollutants there – and dioxin 2,3,7,8TCDD is most definitely injurious to human health! There is no known safe dose. That should have immediately cancelled all thoughts of permitting to use this property. Even CWA 402 permits are not allowed if there is contamination on a property – and there is contamination.

Trying to deny this and cover it up to push a bridge project through will not work. We the people are not as stupid as they hope we are.

ECY has full responsibility over the cleanness of the lake water, including in the navigation channel, and the ESA protected habitat there. All along they have been hiding behind "they only processed the app for use of the property" and are not responsible for the channel nor the lake.

They are very wrong.

The violation is huge and can be enforced as one big violation, or can be broken into several separate individual violations. If serious enough, the fines are applied to all responsible parties including government agencies responsible for allowing it to happen.

This is serious enough. I hope to see ECY fined as heavily or more so than the actual violators. Causing or allowing to cause additional pollution in an already degraded (303d) water is a CWA violation. ("d" stands for degraded as you know). That pollution violation begins with the high sediment turbidity (whether contaminated or not) and all of the consequences that result from that violation. That is for the turbidity alone. Here we have proof of toxic contamination on the property, plus this new revelation of the toxic material dumped on there from the Haug channel, plus the USACE report on the contamination in the channel side sediment.

This is a definite violation of the CWA. The word **"POLLUTION"** appears **215** times in the CWA. Additionally and separately, the word **"POLLUTANT"** appears **291** times.

That information is nowhere to be found in the ECY approval report to DOT. Why? ECY certainly had full knowledge from their own 2001 report on this toxic hazard property, their knowledge of the nasty stuff from the Haug channel that was dumped onto this property even after being deemed unsuitable for open water disposal, and the USACE 2011 report on the channel side sediments. While, for the sake of convenience and political will, ECY pretends there is no contamination there, it just is not true. We all know that.

There is the acknowledgement on our government web sites confirming that additional cleanup material from another contaminated area was placed on top of this landfill property in open water detention. The USACE reports do not say this is not contaminated, they said it was contaminated but they couldn't be sure how badly because it's hard to get accurate readings from PEAT. The Kenmore landfill was also built on top of PEAT.

WADOT apparently did their own section 7 review, over-ruling NOAA and NMF, yet have refused to produce that report on how they scientifically base their opinion. They claimed that the action in the channel and in the north end of the lake would not have a negative effect on endangered Salmon migrating through there nor on any life in the lake bed sediments and habitat there. They also claimed that the ESA did not apply under the CWA. The word ESA comes up a multitude of times in the CWA.

What world are they from? I want to see that report. Yet they keep skirting the

issue and not producing that report, only make references to it.

Now, there needs to be additional research into this Haug channel issue. I never heard of it being allowed to place such contaminated sediment material into an open detention pond then walking away and leaving it unmonitored. Or of then being allowed to just drain the water off the top by running it into the river, then taking the bottom contaminated, toxic sediments that settled, mixing it with other soil and selling it to the public as fill. Their report clearly says that the Haug channel material was not suitable for open water disposal, the same as the Kenmore channel sediments. Not suitable for open water disposal has only one meaning that I am aware of. So why did ECY allow it to be put into open water disposal on top of an already contaminated site then walk away and not oversee what happened to the contaminated material – which is supposed to be incinerated, not sold to the unsuspecting public?

And people wonder why I keep saying that no one is actually in charge in this State!!! The proof is all around us. I hope the next governor will actually do something about this. Hope springs eternal.

Take care & happy TD!

Cindy

From: Greg Wingard [mailto:gwingard@earthlink.net]
Sent: Sunday, November 18, 2012 5:45 PM
To: Cindy Beckett
Cc: happyhaze@msn.com; 'Ann Hurst'; 'Elizabeth Mooney'; dbain@u.washington.edu; 'jim halliday'; 'Hitoshi Maruyama'
Subject: Re: Fw: PDF of DMMP Haug Channel Testing results from first testing done. 1993

Cindy:

A few things to keep in mind.

According to the records Janet provided from the DMMP study, the Haug Channel material was not disqualified because it was too contaminated, but because they couldn't prove it met the criteria, due to the data being suspect. This is a very different thing than to say that the material was contaminated enough to be disqualified.

The other thing to keep in mind is that the standards for open water disposal are very strict, much stricter than land based standards. For example the DMMP standard for dioxin is 4 ppt (parts per trillion, TEQ), the most stringent state standard under MTCA for unrestricted residential property soils is 11ppt-TEQ. This state standard in turn is more stringent than EPA's standard, which is why we have been insistent that the EPA Lower Duwamish Waterway Superfund site, meet the Ecology, rather than the EPA standard.

Dredge sediment in terms of disposal only goes to high temperature incineration if it is very contaminated, most of this material that requires upland disposal, rather than open water disposal goes to standard landfills. Only the most contaminated of this material goes to hazardous waste landfills, or incineration. If all dredged material in the US that failed open water disposal standards had to go to high temperature incineration, the cost would bankrupt the country.

I am not sure what you are referring to when you say that "WA state is the only state in the country to use ECY (Ecology I take it), rather than EPA lead", but that simply isn't so.

Whether EPA or the state agency take the lead is dependent on whether the state is an "Agreement State", or not, under the federal laws governing environmental matters such as the Clean Water Act, Clean Air Act, Resource Conservation Recovery Act etc. In essence the EPA requires states to adopt certain laws/regulations, which are equivalent to, or stricter than the federal standards. Once this happens the EPA certifies the state as an "Agreement State".

This means that Ecology is the lead agency for a number of these laws, including NPDES permits, Clean Air Act permits (though many of those are actually issued by local air agencies), and most contaminated sites are MTCA based cleanups under state law, rather than NPL cleanups under the federal Superfund law. Most states are in a similar circumstance. In the northwest for example WA and OR are agreement states, AK and ID are not. EPA has the authority to revoke states "Agreement State" status if they fail to meet or exceed federal requirements. Citizens have the right to petition EPA to revoke the state authority. I have direct knowledge of this as I have been involved in such a petition related to WA State's Clean Water Act authority.

States are never lead agency for dredge projects under the Clean Water Act. That is because Congress kept the authority for dredge and fill with the Army Corps, and did not delegate that authority to EPA, like they did with most environmental regulation. All states however have what is called 401 Certification authority. This allows states to certify that a dredge project will meet state law, or on the other hand require a project to meet additional standards to meet state law. The Corps can overrule a state 401 Certification, but the intent is to allow states to protect their citizens to a higher level than the federal standard. So on dredge permits a state can issue a certification, issue a certification with conditions, or deny a certification, which in essence is certifying that the project will not meet state law. It is the duty of the Governor of the state to make the call as to whether 401 Certification authority will be applied, or not. States are not required to do a 401 Certification.

Ecology should have a copy of the same data that I saw from the dredged material at the old Waterfront Construction site. Maura O'Brien was the Ecology contact for the Waterfront Construction site, so you should check with her for a copy of the dredge pile data. This data was a requirement of leaving that dredge material in place. I would never have gone along with either leaving the material there, or

spreading it around the site if I knew it was contaminated. All evidence available at the time Waterfront Construction ceased their operation was that the dredged material was clean. There were no observations, or any data that showed anything other than that. The reason that this material stayed at the site was due to the cost of relocating it to some other site. The last I saw of the material, prior to it being bulldozed for the SR520 project, it was supporting healthy wetland type vegetation.

Again, we have real, current data on the way. Hopefully it won't be compromised like the Haug Channel data was, which we will be able to tell from the QA/QC package that will be part of the data report we will see in December.

Regards,

Greg

On 11/18/12 2:00 PM, Cindy Beckett wrote:

> There is no way that ECY did not have both records and full knowledge of this, nor that they did not know that this material, that was already confirmed by USACE to be contaminated enough to be disqualified for open water disposal, had been dumped on the Kenmore LakePointe landfill property in an "open water disposal pond".
>
> Prior to its convenient disappearance form the WADOT website, there was the actual environmental report from ECY on the suitability of using LP for the bridge project. I am still searching for that document, which acknowledged that there had been a prior release from the landfill into the channel. I do have parts of it copied, including the info about the companies that ECY had prepare the report for DOT. At that time, I did a full search on these companies and their credentials to make approval recommendations in this State. None of them are from WA. None of them were licensed in WA as hydrologists, hydrogeologists, nor any other ranking that qualified them to make those recommendations. I found no reference to actual on the ground and in the water testing that was done. Everything was taken from other old reports and "info books" on the area. Their statement that there were no fish in the lake was taken from a 1991 book on rivers and estuarine systems and had nothing to do with the lake.
>
> I will find that ECY document. Since it was on the WADOT website as the ECY basis for approval, it cannot have just vanished. Either ECY took it down or WADOT did. Suspicious.
>
> I found no actual documentation of any testing that was done, in consideration of both the hazard ranking of this site (1), nor of the Haug material that was dumped on the site. It is interesting to note that the method used for this Haug material was.....open water disposal. A detention pond. Exactly what USACE said was not a suitable disposal method for this toxic material.

Who oversaw this? If USACE already said it was not suitable for open water, then why did ECY allow it to be disposed of by open water method? And why was that water drained into the mouth of the river? And what happened to the too toxic for open water disposal material that fell to the bottom of the pond?

At this point I will explain to those who may not know, open water disposal does not mean dump it out in the ocean. It means dumping it in a (I thought it was USACE) designated and closely monitored detention pond, where the sediments drop to the bottom from the water over time. Once the water is clear, it is siphoned off and taken to a cleaning facility. The bottom muck, full of deadly contaminants (like PCBs & Dioxins as well as other equally dangerous chemicals) is taken to an incineration location and burned. That is the only known way to deal with these toxins. They must be burned at extremely high temperatures.

***I would like to see the records of incineration for this contaminated soil.

Where is this in the ECY report for approval of the Lakepointe site?

My questions to ECY are,

Why did you allow open water disposal when it was already not recommended by USACE, and why was there no mention at all in the report to WADOT of the Haug contaminated muck that was dumped on the Kenmore site?

Why wasn't full testing of the surface soils prior to dozing a mandatory requirement of ECY?

Why did they allow this material to be dozed across the property, mixed with other soils then stockpiled for sale to the public?

There is a reason that every other State in the union uses EPA not ECY as their lead. WA is the only State to use ECY.

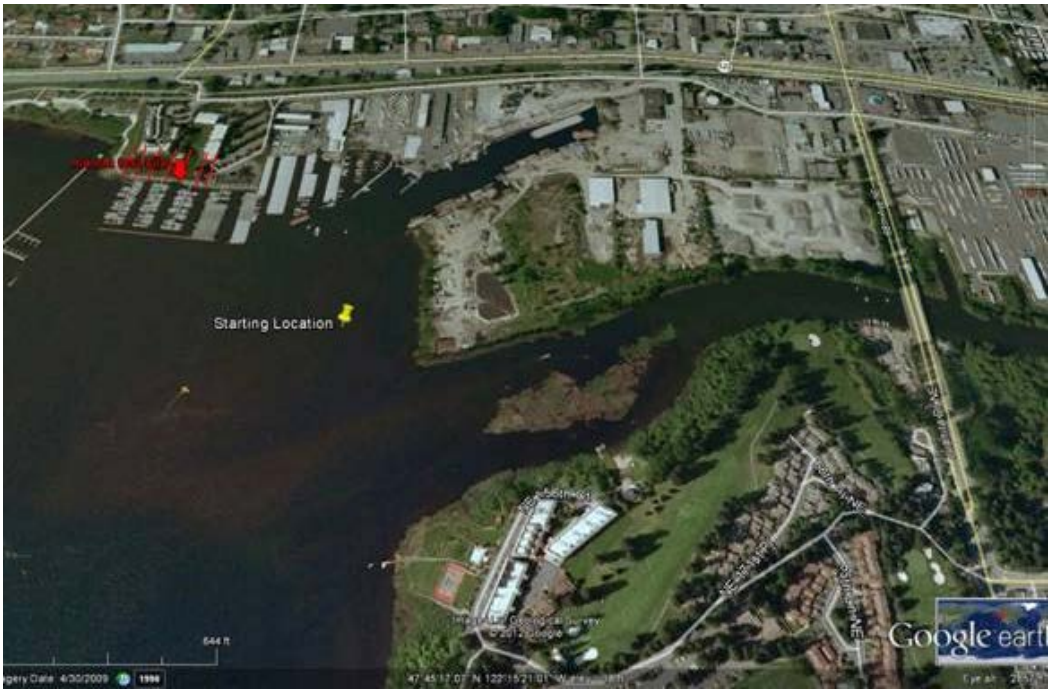
Now we see why.

This explains it all to me – I always wondered about this, now we know the why's of the red bloom in the lake, and the huge algae bloom in the river and at the end of the landfill.

A full investigation is required, and ECY has a lot of answers to make. They should be fired!

I suggest that you enlarge these shots – they really tell the story!

Nov 2007 pre dumping of Haug contaminated material



April 2009 Haug det. pond with drain and channel into the river – island turns red & all vegetation dies, huge red plume in lake

June 2009 huge algae bloom island recovering, disposal pond filled in with growth. Where is the record of removal of the contaminated bottom soil?

July 2012 detention pond completely gone – was collected toxic sediment incinerated or was the bottom of the pond just spread out across the property?

From: Greg Wingard [mailto:gwingard@earthlink.net]
Sent: Sunday, November 18, 2012 12:01 PM
To: happyhaze@msn.com
Cc: Ann Hurst; Elizabeth Mooney; dbain@u.washington.edu; jim halliday; Hitoshi Maruyama; Cindy Beckett
Subject: Re: Fw: PDF of DMMP Haug Channel Testing results from first testing done. 1993

Janet:

I took a look at the report.

The report section on Haug Channel was for a proposed 2003 project. The chemistry reported is fairly consistent with my earlier response on this, with some additions.

The testing did note a number of chemicals of concern, including pentachlorophenol. The presence of pentachlorophenol can be an indicator for the possible presence of dioxin. The relative ratio of dioxin to pentachlorophenol is highly variable, and dependent on the source of the base chemicals used to make the penta, and the manufacture who formulated the final product. For example, penta sourced from China is relatively high in dioxin, while penta sourced from the US is much lower. In the production and refinement of penta, most of the generated dioxin ends up in the waste generated, such as the "still bottoms", which are sent to disposal sites.

That being said, the Corps results for Haug Channel are inconclusive based on the data and qualifications presented.

There were relatively few samples taken. There was laboratory blank contamination for both phenol and benzoic acid. Lab blanks are quality control samples used to determine the degree of confidence in sample data. Specifically they are used to determine the potential for activities in the lab to bias the data by introducing contamination into samples from sources in the lab. In the case of the Haug Channel samples they found this type of contamination, which means potentially the contamination was from a source in the laboratory, not from the Haug Channel sediment.

Phenol is used in a wide array of chemical processes, and can be seen usually in low levels from natural sources as well. Benzoic Acid, as I mentioned previously is a very common chemical, used in many industrial processes, but also found in plant material, and is not an uncommon chemical to see in samples that contain decaying plant matter. The Corps assessment of the data was that based on the lab blank contamination, and the potential for the interference of these contaminants with other detected contaminants reported in the data, there were questions about the data. In other words the data was inconclusive and could not be relied on.

The detections required the samples to be run for bioassays, or tests that provide a relative

indication of the potential for toxicity in the samples. The Corps determined that these tests could not be done for Haug Channel sediments, as they contained too much carbon in the sediment. In other words the samples simply weren't suitable for running toxicity testing on.

They did not report any dioxin detected in the samples. The appendix which provides the guidelines for chemistry values did not list dioxin, which would lead me to suspect they didn't test for it in the samples covered by this report. I do find that a bit odd, as the projects included at least one site long known to be in the vicinity of a site highly contaminated with dioxin in the Olympia area (which includes much of lower Budd Inlet.

Also, the report only includes the summary of the data from the Haug Channel. It does not include the actual data, which would include the QA/QC (Quality Assurance/Quality Control) data pack, which is what you would check to see which specific results were "flagged" by the lab. Flagged means that the results were considered to be unsuitable, unreliable, or biased (either high, or low), in some way that limits how the data can be used, or the extent to which it can be relied on from a confidence, or precision perspective. So the actual data from the lab would have "flags", or letters beside the result, which would indicate what specific QA/QC requirements the result failed to meet. Based on that you could determine whether the data is entirely useless, is biased (high or low), or is an estimated concentration with limited confidence. None of this information is available in the report.

Based on this Corp report, I believe the Corps (DMMP), made the right call in rejecting this material for open water disposal. The reason for doing so however appears to have been based not on known contamination in the samples, but rather a combination of uncertainty in particularly the organic chemistry data, apparently caused by lab blank contamination, and the potential interference of phenol and benzoic acid with the data results, combined with the inability to run toxicity tests due to their being too much carbon in the samples to allow such tests to be run.

I wish I could provide you with a more definitive answer than that, but the data in the report you referenced simply doesn't support a definitive conclusion.

The later sample data I saw, of the actual dredged material on the Waterfront Construction site, did not show the type of contamination implied in the reported data from the earlier Corps report.

Regards,

Greg

(On 11/18/12 2:00 AM, happyhaze@msn.com wrote:

This is another PDF done in 1993,Please search this document for Haug Channel it does give test results of the 10,000 cubic yards to be dredged, that was dredged in 2008.

http://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/BR04final.pdf

If you check the Hunt's Point Council notes the dredging is also discussed as a Hunts Point project, that was then to be privately handled, and the company that would do this privately was Water Front Construction.
http://huntspoint-wa.gov/files/documents/tc_minutes/tc0803.pdf
http://huntspoint-wa.gov/files/documents/tc_minutes/tc0804.pdf
http://huntspoint-wa.gov/files/documents/tc_minutes/tc0807.pdf
http://huntspoint-wa.gov/files/documents/tc_minutes/tc0809.pdf

********** ATTACHMENT NOT DELIVERED **********

This Email message contained an attachment named
image001.jpg
which may be a computer program. This attached computer program could contain a computer virus which could cause harm to EPA's computers, network, and data. The attachment has been deleted.

This was done to limit the distribution of computer viruses introduced
into the EPA network. EPA is deleting all computer program attachments
sent from the Internet into the agency via Email.

If the message sender is known and the attachment was legitimate, you should contact the sender and request that they rename the file name extension and resend the Email with the renamed attachment. After receiving the revised Email, containing the renamed attachment, you can
rename the file extension to its correct name.

For further information, please contact the EPA Call Center at (866) 411-4EPA (4372). The TDD number is (866) 489-4900.

********** ATTACHMENT NOT DELIVERED
****

From: Kendall, David R NWS
To: Celia.Barton@dnr.wa.gov; Erika Hoffman/R10/USEPA/US@EPA; LINO461@ecy.wa.gov; Justine Barton/R10/USEPA/US@EPA; Fox, David F NWS; Warner, Lauran C NWS; Vanderelst, Kelsey NWS
Subject: FW: Documents from Bayside Disposal (UNCLASSIFIED)
Date: 03/30/2012 12:29 PM

Classification: UNCLASSIFIED
Caveats: NONE

Fyi

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Friday, March 30, 2012 12:08 PM
To: 'Ann Hurst'
Subject: RE: Documents from Bayside Disposal (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Ann, it appears there is some confusion here, and I will attempt to briefly summarize some of the history. I believe he is talking about the characterization of proposed maintenance material within the existing Kenmore navigation channel. I have been working with Nancy Ousley (City of Kenmore) based on the Corp's latest condition survey of the navigation channel to help them set up the sampling design that their contractor would use to develop a sampling and analysis plan (SAP) that the DMMP agencies would subsequently review/approve prior to sampling. I have attached a plan view graphic of the Corps condition survey, which highlights areas where the existing depths are above the authorized depth of -15 ft MLLW. As you can see, most of the navigation channel is below -15 ft MLLW and not in need of maintenance dredging, and only about a third of the channel looks like it would need some maintenance dredging to restore navigable depths to -15 ft MLLW.

Therefore, I think he may be confused about exactly where the sampling would take place. I know they have been working to get a contractor in place, and I have talked to several potential contractors bidding on this work. I expect that we (DMMP agencies) will see a SAP from their contractor within the next month or so for review. I think he is talking about the Corps permitting process. The City of Kenmore would have to have a Corps permit authorizing the dredging before actually conducting the dredging. Our interagency process feeds into the Corps permitting and Ecology Water Quality Certification process. After the characterization is completed and the DMMP agencies have completed our suitability determination (similar to previous Kenmore SDM, and the Harbor Village Marina SDM, which you have seen), the City of Kenmore would submit a JARPA application to start the permitting process. As part of the Section 10/404 permit process the Corp Regulatory Project Manager would issue a public notice, that would go to regional stakeholders (including your group), who would be able to weigh in and express any/all concerns before the permit is issued. Our DMMP interagency suitability determination technical review would sort out the potential alternatives available for the proposed maintenance dredged material within the Kenmore Channel (e.g., open-water disposal at the Elliott Bay site for suitable material, and/or beneficial reuse of clean material, and/or upland disposal for unsuitable material). I hope this hasn't confused you, but I am pretty sure this is what the Mayor was talking about. Regards.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Ann Hurst [mailto:annmhurst@msn.com]
Sent: Friday, March 30, 2012 10:42 AM
To: Kendall, David R NWS
Subject: RE: Documents from Bayside Disposal (UNCLASSIFIED)
Importance: High

David, I do have the hard copy, and will try the link. Thank you.
David Baker, who is the Mayor of Kenmore, called me last evening and said the City has an agreement with the Army Corps regarding sediment testing of the three shores of Lakepointe for Dioxin and PCB's and additional toxics. I do not understand. The Mayor explained the agreement included the City hiring a contractor to do the testing. He said that the bids are in, and I gathered in my surprise that the contractor has not been selected. I would oppose Floyd Snider Inc. for the reason that they are often hired by Pioneer Towing and it seems to me that could be a conflict of interest. David Baker would not tell me whether Floyd Snider was being considered. He did say that in this

agreement with the Army Corps, the Army Corps would do the "environmental." I don't know what he meant by that. Do you know of an agreement? Does David Baker understand the process? Why did the City wait until now to start a testing process? One of the flow charts in Ecology shows the workers are the most at risk. Before I pass this information on wholesale, I wanted to check with you in case there is a misunderstanding here. Thank you. Best, Ann Hurst

> Subject: RE: Documents from Bayside Disposal (UNCLASSIFIED)
> Date: Fri, 30 Mar 2012 08:24:51 -0700
> From: David.R.Kendall@usace.army.mil
> To: annmhurst@msn.com
> CC: mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov;
> hoffman.erika@epamail.epa.gov; celia.barton@dnr.wa.gov;
> lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward@lists.riseup.net;
> c4sep@yahoogroups.com; joan.hardy@doh.wa.gov; whitejh@wsdot.wa.gov
>
> Classification: UNCLASSIFIED
> Caveats: NONE
>
> Ann, the hyperlink to the suitability determination is broken, if you
> examine the link. Copy the entire link to your web browser and it should
work.
> Otherwise let me know and I will send hard copy.
>
> Our interagency Dredged Material Management Program (Corps, EPA,
> Ecology,
> DNR) would only be involved in the sediment
> characterization/permitting of the maintenance dredging of the Kenmore
> navigation channel. I assume someone in Ecology Toxics Cleanup Program
> (TCP) would be the appropriate place to discuss dioxin testing along the
Lakepoint shore. Good luck.
>
> David
>
> David R. Kendall, Ph.D.
> Chief, Dredged Material Management Office
>
> Seattle District Corps of Engineers
> Phone: 206/764-3768
> Fax: 206/764-6602
> email: david.r.kendall@usace.army.mil
>
>
> -----Original Message-----
> From: Ann Hurst [mailto:annmhurst@msn.com]
> Sent: Thursday, March 29, 2012 4:58 PM
> To: Kendall, David R NWS
> Cc: mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov;
> hoffman.erika@epamail.epa.gov; celia.barton@dnr.wa.gov;
> lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward; c4sep;
> joan.hardy@doh.wa.gov; whitejh@wsdot.wa.gov
> Subject: RE: Documents from Bayside Disposal (UNCLASSIFIED)
>
> David,
> Thank you, the link does not quite work. I will find the email from
> Ecology that proposed the Navigation Channel as a potential source,
> just cannot remember who at Ecology sent it out. It was not Laura, it
> was a fellow, not Ching Pi. I found today the hard copy of the study
> and the map of the dredged Navigation Channel which runs right by
> Harbor Village Marina, will digitize those tomorrow and send it to you
> all. BTW, there were more than PCB's and in fairness perhaps the
> Harbor Village Marina contributed a bit of the pollution to the
> Navigation Channel with the chemical used to clean the boat hulls --
> that practice with the particular chemical has since stopped, and the
> chemical was expected to dissipate years ago. The 1996 report names a
> certain class of PCB's, I will try to check to see if those are the
> same type as at the Harbor Village Marina. With the new information on
> what Bayside Disposal dumped, and a map that shows where the Bayside
> Dump was, directly under a pond, since moved, I think that is new
> information, so if there is a desire to protect the residents and
> recreational visitors, there should be a way to allow testing of all
> three shores. The Mayor has said the City of Kenmore has money to do
> Dioxin sediment testing for the three shores of Lakepointe, so how can
> we make that happen? Hope I am on point and not talking past your point.
Should the Department of Natural Resources be included? In the past, dredging
was under an umbrella of PSDDA: Ecology, EPA, DNR and Army Corps.
> Very Best, Ann Hurst 206-920-2024
>
>
> > Subject: RE: Documents from Bayside Disposal (UNCLASSIFIED)
> > Date: Thu, 29 Mar 2012 11:43:52 -0700
> > From: David.R.Kendall@usace.army.mil
> > To: annmhurst@msn.com
> > CC: mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov;
> hoffman.erika@epamail.epa.gov; celia.barton@dnr.wa.gov;
> lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward@lists.riseup.net;
> c4sep@yahoogroups.com; joan.hardy@doh.wa.gov; whitejh@wsdot.wa.gov
> >
> > Classification: UNCLASSIFIED
> > Caveats: NONE
> >
> > Also, here is link to the 1996 Kenmore navigation channel
> > characterization suitability determination documenting the chemical
> > analyses and toxicity testing results at fifteen locations along the
channel.
> >
> >
> http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/USACE-Kenmore-
> DY97-SD
> > M_(2).pdf

> >
> > David
> >
> > David R. Kendall, Ph.D.
> > Chief, Dredged Material Management Office
> >
> > Seattle District Corps of Engineers
> > Phone: 206/764-3768
> > Fax: 206/764-6602
> > email: david.r.kendall@usace.army.mil
> >
> >
> > -----Original Message-----
> > From: Kendall, David R NWS
> > Sent: Thursday, March 29, 2012 10:49 AM
> > To: 'Ann Hurst'
> > Cc: mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov;
> > hoffman.erika@epamail.epa.gov; celia.barton@dnr.wa.gov;
> > lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward; c4sep;
> > joan.hardy@doh.wa.gov; whitejh@wsdot.wa.gov
> > Subject: RE: Documents from Bayside Disposal (UNCLASSIFIED)
> >
> > Classification: UNCLASSIFIED
> > Caveats: NONE
> >
> > Hi Ann: I wanted to correct the record and respond to the statement
> > below that says the Kenmore navigation channel is one of the likely
> > sources for
> the
> > PCBs observed in the Harbor Village Marina. I have attached a Table
> depicting
> > the PCB concentrations observed at both locations and a comparative
> > graphic that illustrates the PCBs observed at both locations.
> >
> > It is highly doubtful that the navigation channel is the source for
> > the Harbor Village PCBs, as most of the PCBs observed in the Kenmore
> > channel
> were
> > actually undetected in 9 of the 15 analyses conducted, with the
> > detected concentrations ranging from 15 to 27 ppb, as compared to
> > 196 - 277 ppb
> within
> > the Harbor Village Marina.
> >
> > The proposed characterization within the Kenmore Channel will
> > certainly update the existing data from the Channel for PCBs, and
> > will provide data
> on
> > dioxin/furans, as well as other chemicals of concern (PAHs, metals,
> > TBT, pesticides, etc.).
> >
> > David
> >
> > David R. Kendall, Ph.D.
> > Chief, Dredged Material Management Office
> >
> > Seattle District Corps of Engineers
> > Phone: 206/764-3768
> > Fax: 206/764-6602
> > email: david.r.kendall@usace.army.mil
> >
> >
> > -----Original Message-----
> > From: Ann Hurst [mailto:annmhurst@msn.com]
> > Sent: Thursday, March 29, 2012 8:03 AM
> > To: Kendall, David R NWS
> > Cc: mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov;
> > hoffman.erika@epamail.epa.gov; celia.barton@dnr.wa.gov;
> > lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward; c4sep;
> > joan.hardy@doh.wa.gov; whitejh@wsdot.wa.gov
> > Subject: RE: Documents from Bayside Disposal
> >
> > All,
> >
> > I received information via Elizabeth Mooney that Ecology did not
> > find evidence of WSDOT barge grounding or releasing turbidity, see
> > BasinNews.org for the summary of the report which will be posted on
> > the website as soon
> as
> > Ecology removes me from the caller list at I did not call but
> > emailed my concern to Ecology. WSDOT response was interesting -- you
> > remember the
> photo
> > of the barge taking up the Navigation Channel -- WSDOT will work
> > with surrounding entities to not block Navigation Channel and
> > mentioned that the turbidity was likely the result of winds. Also
> > mentioned is no knowledge of
> a
> > meeting being organized by City of Kenmore for entities emailed
> > above to
> test
> > shores of Lakepointe.
> >
> > The Ecology report removes some justification for testing the shores
> > of Lakepointe for Dioxins and PCB's, but not the obligation to the
> > residential and recreational community's health. Janet Hays and I
> > will request this morning the 1996 report which found PCB's in the
> > Navigation Channel as one Ecology expert emailed this as a potential
> > source of the PCB's at Harbor Village Marina. There are now three
> > potential sources of the PCB's
> including

> > the Sammamish current, and a fourth, the factor of the prevailing
> > winds. A likely potential remains that all three sources and wind
> > contributed to the sediments. The type of contamination at Harbor
> > Village Marina is indicative of a landfill. The Lakepointe shores'
> > sediments should be tested for
> Dioxins
> > in particular as it can take decades for PCB's to break down. If you
> > wish
> to
> > request testing, you can do a respond all to this email or find
> > additional information at BasinNews.org. Please pass this information on.
> >
> > Also interesting and just received via a friend:
> >
> > "The reason the disposal stopped in 1981, was that in 1980,
> > additional restrictions were placed on the disposal of hazardous
> > waste in general purpose landfills. This was in part the result of a
> > King County Health Department survey of waste disposal at landfills,
> > which found that
> municipal
> > landfills were being used wholesale for the disposal of hazardous waste.
> > Having worked on a number of municipal landfills that Bayside
> > disposed of waste at, including two that are Superfund sites, that
> > they disposed of hazardous waste during that time frame at Lake
> > Point is no surprise. In
> fact
> > it would have been a surprise if they hadn't."
> >
> >
> > Best, Ann Hurst
> >
> > BCC: G.W., C.M., E.M., J.H., P.O., M.B., D.M.
> >
> >
> > _____
> >
> > From: annmhurst@msn.com
> > To: david.r.kendall@usace.army.mil
> > CC: mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov;
> > hoffman.erika@epamail.epa.gov; celia.barton@dnr.wa.gov;
> > lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward@lists.riseup.net;
> > c4sep@yahoogroups.com
> > Subject: Documents from Bayside Disposal
> > Date: Wed, 28 Mar 2012 12:55:31 -0700
> >
> >
> > All and especially Maura and Ching Pi of Ecology,
> >
> > (I will be at Ecology tomorrow and bring you the entire EPA file.)
> >
> > As I understood Friday, the Bayside Report attached is new
> > information to Department of Ecology, though the 1984? interview by
> > Ecology attached is
> not.
> > Bayside Disposal dumped hazardous material from 1965 to 1981 in two
> reports,
> > then in a third report, amended the 1965 to 1967 (perhaps when
> > permits were required?). All three reports indicate the dumping of
> > hazardous materials stopped in 1981. It is interesting that the
> > dumping stopped when the 1981
> EPA
> > report was made.
> >
> > If the land was leveled in the 1970's and dumping continued to 1981,
> > and by 1984, the private dump site was not apparent by looking
> > according to the
> DOE
> > 1984 report, where was the waste in 1984? Again leveled with dusting
> > of
> dirt?
> >
> >
> > I know you have tested, but not for Dioxins -- and the PCB's can
> > take years to show up, so decade old testing may no longer be
> > accurate, so where is
> the
> > waste dumped after the 1970's? Floyd Snider testing in 2010 did not
> > find PCB's in the stockpiles, but did they go down to level of
> > 1970's or even to level of 1981? Not by definition if they were
> > testing "stockpiles." Could Bayside Disposal waste have been pushed
> > over the side? One report indicates that happened in 1971 to create
> > the Northwest corner of the landfill. As
> that
> > was the Navigation Channel, further dumping there would be
self-defeating.
> > You have the power with recent turbidity released by barge to test
> sediments
> > in the Navigation Channel for the Dioxins.
> >
> > It seems logical that even if Dioxins are not found in the
> > Navigation Channel, the other two sides of the landfill should be
> > tested, especially
> the
> > Sammamish side where children swim. The Sammamish -- according to
> > 2004 sediment tests by King County, that river that enters Lake
> > Washington does not contain PCB's until it passes under 68th Avenue
> > NE into the Lake -- you can see on a map that is where the Sammamish
> > is adjacent to the Kenmore Landfill as it enters the Lake. Floyd
> > Snider tested the stockpiles in 2010 for PCB's, not down to 1981
> > level -- an important "level" if Bayside Dump
> was

> > not apparent by 1984. Also, the 2010 Snider tests for surface soil
> > contaminants were well West of the area described in the attached
> > DOE interview. Again, to what level did the Snider surface soil
> > tests go? By definition, "surface contaminants" not to 1981 levels.
> > Snider surface
> testing
> > found that high levels of lead had washed towards the West test
> > sites,
> which
> > is understandable with all the truck traffic up grade.
> >
> > Did the County find the the same kind of PCB's as found at Harbor
> > Village Marina? Someone needs to request the County report -- I sent
> > Barbara and Maura the newspaper article which described its
> > existence; I believe they
> are
> > more qualified than I to track that down. It was sediment testing,
> > not fish testing and not just at outflows as I read the article, and
> > the County
> found
> > hotspots for PCB's according to the article. These sediment tests
> > did not include Dioxins. PCB's may yet take years to be fully
> > revealed and I understand that there are many kinds of PCB's.
> >
> > So if adding fill to the Navigation Channel beyond filling out a
> > corner
> would
> > become self-defeating, the Sammamish, which is the South side, or
> > the West side would more likely be contaminated after the 1970's,
> > especially the Sammamish (South) side as on the West side, trees,
> > marshes may not have allowed trucks to pass near the west shore, but
> > this is far too important
> to
> > not test the west shore sediments as well.
> >
> >
> >
> > "Dioxins are one of the causes of chloracne which is a severe skin
> > disease with acne like lesions occuring on the face and upper body.
> > Other skin effects include rashes, discoloration and excessive body
> > hair. Dioxins are now known to be a human carcinogen and are
> > involved in the promotion of
> soft
> > tissue sarcomas (STS = cancer of fat and muscle tissue) and other
cancers.
> > Dioxins are associated with adverse reproductive and developmental
> > effects, birth defects, immune system abnormalities, endometriosis
> > and heart related conditions. Developmental effects have been the
> > key health effect
> determining
> > a tolerable daily intake of dioxin. Dioxin poisoning is long term
> > due to gradual body accumulation."
> > http://www.smfrancis.demon.co.uk/airwolvs/23healthdioxin.html
> >
> >
> > BTW, there are many more documents in the file from EPA. I will be
> > at
> Ecology
> > in Bellevue Thursday to view their documents, though I think they
> > have done
> a
> > good faith effort in looking through their own files! I plan to show
> > Maura O'Brien all the documents that arrived from EPA, how they were
> > presented,
> so
> > she can see what was delivered directly to EPA that may well not
> > have been delivered to Ecology.
> >
> > Best, Ann Hurst BCC: J.H., E.M., P.O. G.W., C.M. (Stedward and C4SEP
> > listserves include those concerned about Saint Edward State Park
> > shores.)
> >
> >
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> 2Fe8sc&
> > Bpub=SDX.SkyDrive&Bsrc=SkyMail> Documents from Bayside Disposal
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> <https://skydrive.live.com/redir.aspx?cid=fcfba59b4dcde258&page=browse
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> > You are invited to view Ann's album. This album has 3 files.
> >
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> <https://skydrive.live.com/redir.aspx?cid=fcfba59b4dcde258&page=self&r
> esid=FC
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> > Classification: UNCLASSIFIED
> > Caveats: NONE
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> Caveats: NONE
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Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Kendall, David R NWS
To: Wakeman, John S NWS; Erika Hoffman/R10/USEPA/US@EPA; Inouye Laura (LINO461@ecy.wa.gov)
Subject: FW: Harbour Village report (UNCLASSIFIED)
Date: 05/14/2012 03:31 PM

Classification: UNCLASSIFIED
Caveats: NONE

Thanks, all. here is my cobbled response to question.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Monday, May 14, 2012 3:29 PM
To: 'Nancy Ousley'
Cc: 'Ron Loewen'
Subject: RE: Harbour Village report (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Nancy, here is the collective response to you last question about DOH notification relative to Harbor Village Marina characterization and dioxin and PCB contamination results.

Observed dioxin levels are below MTCA "industrial upland values", so direct dermal contact is probably not a hazard. However, the levels are above MTCA residential use values, so they should not be discounted either, so either the marina (or the City of Kenmore) may wish to contact DOH directly to further assess health risk issues. The DOH notification requirement is generally outside our expertise and jurisdiction.

Moreover, the Harbor Village Marina sediments are sub-tidal which would significantly limit direct human dermal contact exposure to them. Therefore, we can't imagine how harbor users would easily come in contact with these sediments.

Although dioxin TEQ concentrations in Harbor Village sediments are significantly elevated above our 4/10 disposal guidelines for Unconfined-open-water disposal, they are no where near the concentrations that would be associated with dioxin induced chloracne or other dermal contact risks.

That said, we understand that there is a public concern about the safety of Kenmore sediment values for dioxin/furan and PCB, and that the cited values are, respectively, 94 ng TEQ/kg dioxin and 280 ug/kg Total PCBs. What follows is a brief analysis relative to assessing risks from PCBs and dioxins for the Lower Duwamish Waterway, and the Lower Duwamish preliminary remediation goals (PRG) for these two compounds. It is important to remember that the PRGs are developed using conservative, upper-bound exposure rates which might overestimate concern for the context of the marina in question.

Values for Comparison.

1. Dioxin
- Direct contact PRG (beach play, fishing, net-fishing): 28 ng TEQ/kg in shallow water, applied at a particular beach area, to a child playing in the sediment; and 37 ng TEQ/kg for netfishing Each represents a de-minimus risk (1 in 1 million).

2. PCB
- Direct contact (conditions as above): 1,700 ug/kg for beach play and 1,300 for netfishing. Each represents a de-minimus risk (1 in 1 million).

3. Evaluation.

Of the above, the dioxin number is above the PRG but the PCB numbers are not; the site sediment is 3.4 x the beach play PRG and the 2.5 x the net-fishing scenario. Let's look at the provenance of these key exposure scenarios.

a. Beach play. Beach play RME scenarios were developed to assess the risk to young children (i.e., up to 6 years of age) playing in beaches with public access from shore. The LDW Risk Assessment selected an exposure frequency of 65 days per year was selected from a King County survey of lake beaches (Lake Union, Lake Washington, and Lake Sammamish) (Parametrix 2003). This exposure frequency represents the 95th percentile for children from birth to 6 years of age who engage in playing and digging in sand adjacent to the water. It was assumed that the child consumes 200 mg/d of soil during this period. We can talk about whether this scenario, which drives the selection of the PRG, is reasonable for a marina setting. If it is not reasonable for a child to play at the marina in the mud 65 days per year, this should not be considered further. If a child plays 19 days a year (65/3.4) in the sediment, then the observed value would be equal to the adjusted PRG.

b. Netfishing. This scenario was based upon a tribal fisherman casting nets in the LDW, and having dermal and incidental contact with sediment. Adult tribal fishers were assumed to fish 119 days/year and exposed for a period of 44 years of their life, and to consume 50 mg/d of contaminated sediment. As above, this RME calculation is likely to be an overestimate of a recreational fisherperson. If a fisherman should fish 47 days a year (119/2.5), and if it is assumed he only stays in the marina, then the observed value of 94 would be equal to the adjusted PRG.

4. Therefore, based on this summary analysis conclusion. Our sense is that the observed levels of PCBs and dioxins do not arise to the levels that WDOH would need to be consulted. However, that decision is one for others to make (not the Dredged Material Management Program).

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Monday, May 14, 2012 1:50 PM
To: 'Nancy Ousley'; 'Tom Wang'; Dan Berlin
Cc: Ron Loewen
Subject: RE: Harbour Village report (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Nancy the core depths for the characterization conducted to asses dredged material within the Harbor Village Marina ranged from
1 ft to 4.5 feet. Additional subsamples (0.5 to 1.5 feet in depth) were collected of the underlying z-sample layer to assess compliance with WA antidegradation standard.

The depths (10cm ~ 4 inches) proposed in the reconnaissance survey, are the depths routinely used to assess sediments in cleanup areas by both Department of Ecology and EPA/Superfund. The data collected for the reconnaissance survey would be useful in determining whether Dioxins, PCBs, and/or other contaminants are a source of concern within the proposed surface dredged material within the Kenmore Navigation Channel or within the North Lake Marina and Kenmore Air Harbor sediments.

However, the proposed reconnaissance survey will not fulfill the requirements of the DMMP to assess future alternatives for disposal, which would require characterizing the entire dredged material prism, which would also require assessing the sediment quality of the underlying sediment surface that would be exposed (Z-sample layer) after dredging relative to Washington State's antidegradation compliance standard.

I am seeking input from my risk assessment colleagues at the Corps, EPA, and Ecology, and will provide a separate response back on the Harbor Village Marina dioxin/PCB health risks question.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
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Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Nancy Ousley [mailto:nousley@kenmorewa.gov]
Sent: Monday, May 14, 2012 12:07 PM
To: 'Tom Wang'; Dan Berlin
Cc: Kendall, David R NWS; Ron Loewen
Subject: Harbour Village report

I am sending you the Harbour Village DMMP report from 2011, in case you have not seen it. Can you please confirm the depths of the core samples that were taken? For the reconnaissance level testing, is 4" depth an industry standard?

At what point does the DMMO alert DOH if the tests show elevated toxicity to the point that contact would be hazardous? With the elevated readings from Harbour Village, does it constitute any kind of health danger for users of the marina?

Thanks

NANCY K. OUSLEY

ASSISTANT CITY MANAGER

CITY OF KENMORE

425.398.8900

206.604.6217 cell

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Kendall, David R NWS
To: O'Brien, Maura (ECY); (Celia.Barton@dnr.wa.gov); Erika Hoffman/R10/USEPA/US@EPA; Inouye Laura (LINO461@ecy.wa.gov); Justine Barton/R10/USEPA/US@EPA; Fox, David F NWS; Warner, Lauran C NWS; Vanderelst, Kelsey NWS
Subject: FW: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)
Date: 12/17/2012 08:16 AM
Attachments: Haug Channel_02 SDM.pdf

Classification: UNCLASSIFIED
Caveats: NONE

FYI

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Friday, December 14, 2012 3:29 PM
To: 'Cindy Beckett'
Subject: RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Cindy, I have to correct some of the information you provided below. The Corps sediment characterization within the Kenmore navigation channel conducted in 1996 did not analyze for dioxin/furans, but did analyze PCBs and the routine list of chemicals-of-concern that we normally evaluate for dredging projects(see link to that SDM). (http://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/Suitability%20Determinations/1997/US Kenmore-DY97-SDM%20(2).pdf). At that time dioxin was not on our radar as a chemical-of-concern in Lake Washington, so we did not require it back then.

After my discussion with you I was able to verify with the dredging applicant at Hunt's Point and the dredging contractor (Waterfront Construction) that the Haug Channel project (~9,300 cy) was dredged and transported by barge and subsequently placed at the Lakepointe site as you correctly noted. The sediments from Haug Channel were characterized, and did not demonstrate high concentrations of chemicals-of-concern that were detected. They had some analytical problems (e.g., elevated detection limits due to matrix problems) with the initial characterization, primarily due the high levels of organic matter in the sediments tested (20% Total Organic Carbon). See attached suitability determination, which also includes appended summary of full chemistry for 2001 characterization and follow-up testing in 2006 to reanalyze those chemicals with matrix problems and elevated detection limits. Because of the high TOC and elevated Volatile solids fraction in these sediments, we were not able to conduct toxicity testing (bioassays) to verify that they were not a problem, and the DMMP agencies ultimately concluded that these sediments were unsuitable for open-water disposal(Elliott Bay), and would have to be removed and taken to an Ecology approved upland site. We did not have a mechanism in place back then to require the dredging applicant to report back to us on projects where material is taken upland, so we lost track of what happen until your phone call. We will now require dredging applicants to report that information back to us so we can properly track projects after the evaluation is completed and the permit is issued.

I don't know what the dioxin concentrations are in the navigation channel and look forward to the Kenmore screening level evaluation of Kenmore and vicinity to help shed some light on the dioxin and PCB distribution in the area around Harbor Village Marina, where we found elevated dioxin and PCBs.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Thursday, December 13, 2012 3:02 PM
To: Kendall, David R NWS
Subject: FW: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Thursday, December 13, 2012 2:51 PM
To: 'david.r.kendall@usace.mil'
Subject: FW: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

The first one bounced back apparently wrong email address for you, so am trying again.

Thanks!!

Cindy Beckett

From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Thursday, December 13, 2012 2:50 PM
To: 'David.R.Kendall@usace.mil'
Cc: 'elizabeth.mooney@comcast.net'; 'Gerry Pollett'; 'Janet and Bob Hays'; 'Derek Poon'; 'Cleve Steward'; 'jim halliday'; 'Mamie Bolender'; 'Carol Dahl dahlcv@juno.com'; 'maralyn chase'; 'David Kleweno-PERK'; 'Cathy Garrand'; 'David Bain'; 'Bruce McAlister'; 'Joan Hardy'; 'Jim Myers'; 'Diane Brennon'; 'jari kristensen'; 'Ann Aagaard'; 'Ann Hurst'; 'Clyde Merriwether'; 'Dennis'; 'Jirius Isaac'; 'Kristin Meijer'; 'Hitoshi Maruyama'; 'tim -found perch'; 'Colleen McAleer Coalition Sust'; 'Jeff Burnside'; 'Mike Lindblom'; 'Amy Radil'; 'Ginny Kreimer'; 'Sarah Jane Mooney Rorick'; 'Linda Newton'
Subject: RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Hello David

Regarding our recent conversation about the Haug channel, I find it all seems to fit together when taking all of the considerations into a time line account.

According to USACE tests results, the Kenmore channel showed little PCB and Dioxin in 1997, however, in 2011 it was substantially higher, as was the Dioxin 2,3,7,8 TCDD (most deadly and dangerous to human health).

I did thorough research into the Haug dredging/dumping and found that the town of Hunts Point turned the matter back to private citizens as the cost was too much for the town. In 2009, the channel was dredged and the material was floated 8 miles up the lake to the Evergreen Topsoil property on the side of the mouth of the Sammamish River (ESA Salmon migration run), which directly abuts the Kenmore landfill site. I have an email from a first hand witness who actually climbed up the mound of contaminated Haug muck and did in fact witness the contaminated water flowing back into the river mouth.

This fits with the 5/2009 satellite images of the red plume in the lake, the red in the water under both marinas and Kenmore Air, and the island in the river turning red with all vegetation dying. There is clear evidence of this via satellite, including the red tainted water flowing from the land into the river and subsequently the lake where a huge red plume appeared. Much of that red water also appeared in the Kenmore channel, possibly moved there by water traffic.

I found no reference to any permits nor oversight for either the dredging (which was already deemed unsuitable for open water disposal) and the stockpiling of this contaminated Haug channel dredge material. I did call the company listed in the Hunt's Point records, "Waterfront Construction" and inquired about permits. They hung up on me.

There was no containment of the Haug dredging placed on the Evergreen property, no oversight, no maintenance, and no permits.

This seems to me to be a classic example of the Kenmore channel testing in 1996 where there was little dioxin & PCB to 2009 where the Haug muck was openly dumped onto the ground with no containment, the red water in the river and lake, then the 2011 Kenmore testing showing higher than safe levels for humans of PCB & Dioxin 2,3,7,8TCDD.

I believe that whatever departments of the government are responsible for the health of the lake, the water, the endangered species and the people, needs to put these pieces together. To do some investigation, and find out how the Haug contaminated dredging ended up on the Evergreen Topsoil site with no permits or oversight/monitoring, only to be drained back into the lake, and the contaminated peat/muck soils just dozed around then mixed with other soils on site.

It is too coincidental that these illegal actions tie in with the time frame between less contamination of the Kenmore shoreline in 1996 and the much higher contamination in 2011.

Additionally, I did read through an ECY 520 report on the Kenmore landfill site prior to approving for high barge traffic use for the 520 bridge components. In there they (ECY) acknowledged that

there had been a release into the channel from the landfill site "in the recent past" but they "felt" (no testing to confirm) that the toxins had dissipated enough to make the channel safe to use.

Of course, as you well know, that is not the case when there exists the possibility that toxic material is released, and it was very irresponsible to not take tests prior to permitting huge barges and tugs to run the channel day and night for the past 286 consecutive days. Now this stuff is everywhere at the north end of the lake. How it will be cleaned up I don't know, but certainly someone is responsible for this, and someone must take action.

I have contacted the Dept of Justice and Federal EPA about this, and I urge the USACE to look into these violations, especially the Haug channel violations, perhaps even through the Inspector General's office.

ECY tells me they would not be the department to issue such a permit to dredge the Haug channel, it would have to be the USACE. Since you have no recollection of a permit issued and there was absolutely no oversight into the dredging, transport and dumping of this contaminated muck, no disposal pond created, no monitoring and no testing, I would want to believe that you will in fact investigate this serious violation of draining toxic tainted water into a 303d - ESA protected lake.

Meantime, given all of this information, I would request that your office issue a stop work until all of this can be resolved. There is too much available information to just run on assumptions, and far too much danger to the health of the people there to just shrug it off and allow it to continue.

Thanks very much, David, I really appreciate your attention to this most serious matter.

Respectfully

Cindy Beckett

Cindy Beckett

Master Watershed Steward

no water - no life

From: elizabeth.mooney@comcast.net [mailto:elizabeth.mooney@comcast.net]
Sent: Thursday, December 13, 2012 10:06 AM
To: Gerry Pollett; Derek Poon; Cindy Beckett; Greg Wingard-clyde's friend for Lakepointe issue; Cleve Steward; jim halliday; Mamie Bolender; Carol Dahl dahlcv@juno.com; maralyn chase; David Kleweno-PERK; Cathy Garrand; David Bain; Bruce McAlister; Joan Hardy; Jim Myers; Diane Brennon; jari kristensen; Ann Aagaard; Ann Hurst; Clyde Merriwether; Dennis; Jirius Isaac; Kristin Meijer; Hitoshi Maruyama; tim -found perch; Colleen McAleer Coalition Sust; Jeff Burnside; Mike Lindblom; Amy Radil; Ginny Kreimer; Sarah Jane Mooney Rorick; Linda Newton
Subject: Fwd: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Hi Friends,

FYI-seems like this issue regarding the north shore of Lake Washington should be public knowledge.

Elizabeth

From: "elizabeth mooney" <elizabeth.mooney@comcast.net>
To: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
Cc: "Janet and Bob Hays" <happyhaze@msn.com>, "Ann Hurst" <annmhurst@msn.com>, "John L NWS Pell" <John.L.Pell@usace.army.mil>, "John A NWS Hicks" <John.A.Hicks@usace.army.mil>
Sent: Thursday, December 13, 2012 9:55:43 AM
Subject: Re: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

David

Just so your agency knows that the tugs and barges are churning up turbidity by turning around and backing up, then into the bank, then toward Kenmore Air (they do a 180 degree turn) today twice so far and were doing it on Nov 28, 29, Dec 4, 6, 2012. We have called ERTS and Greg Stegman. DOE is not doing any enforcement.

Elizabeth

From: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
To: "elizabeth mooney" <elizabeth.mooney@comcast.net>
Cc: "Janet and Bob Hays" <happyhaze@msn.com>, "Ann Hurst" <annmhurst@msn.com>, "John L NWS Pell" <John.L.Pell@usace.army.mil>, "John A NWS Hicks" <John.A.Hicks@usace.army.mil>
Sent: Thursday, December 13, 2012 8:59:38 AM
Subject: RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Elizabeth: I think the city must have been aware of the potential need to dredge the navigation channel at Kenmore, based on their discussions with the Corp's Navigation Section, and project manager for the Kenmore Channel, John Pell. In my discussions with Nancy about the characterization, I clarified that the navigation channel would have a high ranking for characterization, based on the earlier characterization (1996). The 1996 characterization did show some areas of the channel as being unsuitable for open-water disposal, but the chemistry associated with those sections of the channel did not show them to be heavily contaminated, and not by PCBs. Since we did not test the channel back then for dioxins, we do not know what levels might be expected in the federal channel. The Corp's navigation channel condition survey estimated a total potential dredging volume of material above the authorized channel depth of approximately 31,679 cy.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: elizabeth.mooney@comcast.net [mailto:elizabeth.mooney@comcast.net]
Sent: Thursday, December 13, 2012 8:41 AM
To: Kendall, David R NWS
Cc: Janet and Bob Hays; Ann Hurst
Subject: Re: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Thank you, David.
By assisting the city in designing a characterization plan for a problem to be addressed, is it reasonable to assume the city knew there was a potential risk of barges and tugs stirring up sediment that could be contaminated?
Elizabeth

From: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
To: "elizabeth mooney" <elizabeth.mooney@comcast.net>
Cc: "Janet and Bob Hays" <happyhaze@msn.com>, "Ann Hurst" <annmhurst@msn.com>
Sent: Thursday, December 13, 2012 8:11:41 AM
Subject: RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Elizabeth: I went through my files and email logs to research your question. They indicated that I talked with Nancy Ousley on November 18, 2011 about assisting the city in designing a characterization plan for the Kenmore Navigation Channel, to conduct a screening level evaluation relative to Dredged Material Management Program (DMMP) requirements for dredging. In my discussions and emails with Nancy there was no mention or discussion about dioxin or PCB issues relative to the Harbor Village Characterization. We were focused on evaluating the basics of what would be included in a sediment characterization plan, which obviously would include chemicals such as dioxin and PCBs in addition to the routine DMMP Chemical of Concern list (http://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/Updates/Nov%202012%20COC%20list.pdf) I can't say whether the City was aware of the dioxin/PCB issues prior to being informed during the city council meeting on Feb 13, 2012, where you informed them on that issue after I had passed that information on to you following my talk at NMFS on Feb 9, 2012.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: elizabeth.mooney@comcast.net [mailto:elizabeth.mooney@comcast.net]
Sent: Wednesday, December 12, 2012 2:50 PM
To: Kendall, David R NWS
Cc: Janet and Bob Hays; Ann Hurst; Elizabeth Mooney
Subject: Re: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

David,

One, I hope, simple question that I hope you may answer:

Do you know if anybody at the City of Kenmore knew about the Oct 2011-reported PCB's and dioxins at Harbour Village Marina before Feb 13, 2012?

A City staff member Laurie Anderson has written an affidavit that she didn't have evidence of the dioxins or PCB's at Harbour Village Marina until I informed the City during a city council meeting on Feb 13, 2012. I informed the council, during public comment, Feb 13 2012 after I heard your talk Feb 9 2012. The city passed their Shoreline Master Plan approval later that evening on Feb 13, 2012. I think they should have considered my information before they passed the Shoreline Master Plan update.

I recall you said Nancy Ousley had been in contact with the Army Corps and was interested in getting the Navigation Channel (portion of it or the federal part?) dredged.

What I'd like to know is if my public comment was the only way the City knew of a potential health hazard. Did any staff or council in Kenmore knew about the dioxins and PCB's at Harbour Village Marina? The City didn't consider whether or not that might be new information they should consider prior to passing the plan which gave special perks to the Calportland facility that wished to widen their pier (a partially burned dilapidated creosote pier in the Kenmore Navigation Channel).

I am perplexed by the City telling me that they didn't know anything about that existence of toxins in the navigation channel or near the navigation channel. The city had told me about dioxins long before, and it's reflected in the minutes of the Shoreline Master Plan Update Process (the fact that I mentioned this to our City Planning Commission). The only reason I knew was that much earlier, in about 2005, Kenmore's Community Development Director had told a group of parents and students that the Kenmore dock couldn't be renovated by removing pilings because disturbing the sediment would be worse than leaving it intact, since the sediment under the dock in North Lake Washington was contaminated. It was during a school Stream Field trip and the staff member was Bob Sokol. The January 21, 2009 Minutes of the City's Planning Commission states:

"Citizen Comments Elizabeth Mooney expressed concern about dioxin levels and their source(s) in Swamp Creek and Lake Washington. Ms. Mooney asked if the City plans to test the sediment and how the Shoreline Update will address the concern....City of Kenmore Master Plan Update...Steve Colwell asked about the imbalance between cleanup and regulations for the Duwamish River and also about water quality data for the waterfront in Kenmore. Mark Johnson noted that clean up is progressing on the Duwamish River. The shoreline inventory is the scientific baseline document which "holds the line" of existing conditions and that restoration over time means the baseline moves up and there is improvement but not every function can be replaced. Mark noted that information on some metal, Ph and temperature is available and Chip Davidson noted that some data from 1988 is available from the Corps of Engineers for testing in Lake Washington....Mark noted he would research the question about agency monitoring of water quality near park areas. Mark clarified the meaning of non-point pollution and "no net loss" in response to Hitoshi Maruyama's questions."

Thanks very much and Happy Holidays.

Elizabeth Mooney
206-979-3999

From: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
To: "Elizabeth Mooney" <elizabeth.mooney@comcast.net>
Sent: Wednesday, March 21, 2012 11:35:15 AM
Subject: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Elizabeth: As I mentioned, the City of Kenmore is working to develop a sampling and analysis plan (SAP) to characterize material proposed for dredging within the navigation channel to restore navigable depths. The Dredged Material Management Program (DMMP) agencies must review/approve any SAP before allowing sampling to proceed. The evaluation of sediments in the navigation channel would require the full chemical-of-concern list as stipulated in our DMMP Users Manual Guide (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/Nov_2009_UM.pdf). When the data from the characterization is submitted to DMMP agencies for review, we would review the data for Quality Assurance/Quality Control (QA/QC) requirements, before writing up a suitability determination that documents the testing outcome relative to potential alternatives for disposal of dredged sediments (open-water disposal at Elliott Bay non-dispersive site, beneficial alternatives, upland disposal of contaminated sediments).
The previous testing outcome summary (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/USACE-Kenmore-DY97-SDM_(2).pdf) for the navigation channel conducted in 1996 found low concentrations of PCBs (most undetected). Concentrations of PAHs measured in one sample, were subjected to toxicity testing and passed our bioassays. Two additional samples, one with TBT and the other with DDT concentrations failed bioassays, and were not dredged. The suitable material dredged was ultimately disposed at the Elliott Bay disposal site, and the unsuitable material was left in place and not dredged.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768

Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Elizabeth Mooney [mailto:elizabeth.mooney@comcast.net]
Sent: Tuesday, March 20, 2012 10:07 AM
To: Kendall, David R NWS
Cc: Jim Myers; Elizabeth Mooney; Patrick E. O'Brien; Joan Hardy; larry.fisher@dfw.wa.gov
Subject: Fwd: ERTS from March 19 call Pioneer Towing Wharf Repair

David
FYI
Thank you for the conference call yesterday.
Elizabeth

Sent from my iPhone

Begin forwarded message:

From: Elizabeth Mooney <elizabeth.mooney@comcast.net>
Date: March 20, 2012 9:40:53 AM PDT
To: "Patrick E. O'Brien" <patrickeobrien@comcast.net>
Cc: JANET + BOB HAYS Across the Street <happyhaze@msn.com>, Ann Hurst <annmhurst@msn.com>, Elizabeth Mooney <elizabeth.mooney@comcast.net>, Diane B <dalaine00@yahoo.com>
Subject: ERTS from March 19 call Pioneer Towing Wharf Repair

Dear all
Thanks, Patrick, for calling attention to the issue.

Will there be water quality or contaminants' redistribution as a result of the planned work? Who is the contractor ?

If there is sediment transport, don't the operators need an HPA from WDFW (Larry Fisher) and the permit from Army Corps if there is sediment disturbance?

Will barges and boat traffic in and out of the navigation channel potentially relocate contaminated lake or stream bottom sediment prior to us knowing the source of the Harbour Village Marina Oct 2011 dioxins and PCB's?

If they drive in the pilings, will that action disturb test well effectiveness due to the depth of the pile driving?

Will the imminent "wharf repair" and building permit , under city-granted building permit and "deferred maintenance" disturb sediment at the shoreline and perhaps cause release of contaminants into Lake Washington? I did not know who could answer questions about public health issues in the face of this city permit, so I left an ERTS call at Ecology and talked to Jenee Colton at King County toxics (she led Lake Washington study of toxic sediments).

From my call to Ecology, there now is an ERTS # 632-759 to look into the potential effect of the pile driving.

I don't know if pile driving on the upland side of the wharf at Kenmore Yard/aka Kenmore Industrial Site/aka Pioneer Towing/aka SR 520 project/aka Lakepointe/aka Gary Sergeant is happening yet; I saw and photographed barges with cranes (presumably for piling pounding into land or landfill) yesterday off Log Boom Park dock.

Tammy at Dept of Ecology, who assigned the ERTS #632759, will be contacting the inspector for this site and I presume that is Greg Stegman. I called Greg yesterday to tell him about the cranes,barges and wharf pilings plans. Clay Keown had said I should call Greg immediately. Our concern, as I understand it, is that piling driving near the shore on the MTCA site could have a significant adverse environmental impact (turbidity or sediment translocation), maybe by boat traffic or maybe by piercing below the depth of the landfill to lower depths possibly changing status quo.

There is no Army corps permit for pilings driving that I know of. David Kendall, after talking to Patrick and me, said he would do what he could to see if the regulatory office knew more.

Thank you!!!!

Elizabeth
Sent from my iPhone

On Mar 20, 2012, at 8:57 AM, "Patrick E. O'Brien" <
<mailto:patrickeobrien@comcast.net> patrickeobrien@comcast.net> wrote:

----- Original Message -----
From: Kate Snider <mailto:Kate.Snider@floydsnider.com>
To: ' <mailto:'patrickeobrien@comcast.net'>
<mailto:patrickeobrien@comcast.net> patrickeobrien@comcast.net'
Sent: Monday, March 19, 2012 7:29 PM
Subject: Pioneer Towing Wharf Repair

Patrick -

I am replying to your phone call received this afternoon regarding the Pioneer Towing permit for pile installation at the Kenmore wharf.

The permit is BLD2001-0610, for restoration of existing wharf - installation of piles and new pile caps.

All permit application materials are here:

<http://www.kenmorewa.gov/Page.aspx?cid=2583>
<http://www.kenmorewa.gov/Page.aspx?cid=2583>
http://www.kenmorewa.gov/Page.aspx?cid=2583

Kate Snider, PE Principal
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www.floydsnider.com

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Jonathan Freedman
To: Justine Barton; Erika Hoffman
Subject: Fw: pollution of lake WA, Kenmore, SR520, and Harbour Village Marina questions- forward to SR520bridge@wsdot.wa.gov
Date: 11/20/2012 05:02 PM

I handled a cold call from Ms. Beckett a few months ago as I mentioned. I am forwarding two messages from her. Since we have a pretty small role and Ecology has the lead it seems like the best thing to do is refer her to them.

Jonathan Freedman (206) 553-0266
USEPA, Region 10
Sediment Management Program
1200 Sixth Avenue, Suite 900
ETPA - 083
Seattle WA 98101
freedman.jonathan@epa.gov
FAX: (206) 553-1775

----- Forwarded by Jonathan Freedman/R10/USEPA/US on 11/20/2012 04:55 PM -----

From: "Cindy Beckett" <cindybeckett@comcast.net>
To: Jonathan Freedman/R10/USEPA/US@EPA
Date: 11/14/2012 12:13 PM
Subject: RE: pollution of lake WA, Kenmore, SR520, and Harbour Village Marina questions- forward to SR520bridge@wsdot.wa.gov

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Hi Jonathan

I'm so sorry – I just found this email now while I was clearing some of my folders. It was in an obscure folder that I never use, have no idea why it went there.

This issue is still not resolved, and I am now trying to get a contact number for the DC EPA administrator's office to formally request clarification as to where in the CWA it says if it doesn't come from the end of a pipe, it is not an enforceable violation. This is what the office in Seattle insists. The CWA says "such as the end of a pipe", not "only from the end of a pipe".

I have read the entire CWA three times now and cannot find anywhere that the pollution of a 303 water is allowed if it is being done on behalf of a government agency.

The violation of the CWA remains and has continued now for 170 straight days. I have been run around by WADOT, State ECY and EPA for months now with no intervention to stop the violation, I suspect because this is a government project, since there is no other reason to allow this illegal toxic sediment turbidity at the north end of Lake WA to continue for so long. It should have been stopped the first day it was reported – which was the first day the work began there.

Every excuse that has been given to me from all of the departments and agencies for not acting on this violation does not match the CWA, including the local EPA offices' claim that they cannot respond because the contamination does not come from the end of a pipe.

What I did find in the CWA is that this has now become a willful violation by all parties since all parties are fully aware of this yet have outright refused to deal with it and stop it.

Whether or not the sediment is contaminated with PCB's and Dioxin 2,3,7,8 TCDD (which the USACE report confirmed at the marina across from the landfill site), the sedimentation of the lake is its' own violation of the CWA as far as I can determine.

No one will answer as to why it's OK to do this as long as it's a government project, and I cannot find that exclusion of responsibility written in the CWA.

If you have a contact # for the DC administrator, I would really appreciate it. I will also try my congressional representative – he may be able to get me a number.

Thanks very much

Regards
Cindy Beckett

Cindy Beckett
Master Watershed Steward
no water - no life

From: Jonathan Freedman [mailto:Freedman.Jonathan@epamail.epa.gov]
Sent: Friday, June 08, 2012 9:58 AM
To: Cindy Beckett
Subject: Fw: Kenmore, SR520, and Harbour Village Marina questions- forward to SR520bridge@wsdot.wa.gov

Cindy: Thank you for all this information. It appears a pretty clear case from what could see that WSDOT did not properly disclose or anticipate the impacts you are reporting. The 520 project reporting email Laura Inouye sent to me is listed in the subject and below as well. Laura told me this reporting contact was set up mainly in response to the observations people were making at Kenmore. It is supposed to serve as a clearinghouse, where WSDOT personnel can get you to the right person. For you, it seems like WDOE's water quality certification program should be where they refer you, since you have observed turbidity. Contaminants in sediment like PCBs of course, have to be confirmed in the lab.

Jonathan Freedman (206) 553-0266
USEPA, Region 10
Sediment Management Program
1200 Sixth Avenue, Suite 900
ETPA - 083
Seattle WA 98101
freedman.jonathan@epa.gov
FAX: (206) 553-1775

----- Forwarded by Jonathan Freedman/R10/USEPA/US on 06/08/2012 09:48 AM -----

From: "Inouye, Laura (ECY)" <Lino461@ECY.WA.GOV>
To: Jonathan Freedman/R10/USEPA/US@EPA
Date: 06/05/2012 04:28 PM
Subject: Kenmore, SR520, and Harbour Village Marina questions- forward to SR520bridge@wsdot.wa.gov

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SR520bridge@wsdot.wa.gov

This is the mailbox people should submit concerns about- WA-DOT will send concerns to the appropriate Agency Staff- in addition to the WA-DOT staff and contractors, the group inludes Corps, Coast Guard, DOT, Ecology (TCP, SEA, and WQ programs), City of Kenmore, DFW, DOH, and King County.

Laura

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

Ecology Announcement

"Sampling and Analysis Results Memorandum for Kenmore Area Sediment and Water Characterization" by Anchor QEA - March 2013

The "Kenmore Area Sediment and Water Characterization Results Memorandum" presents the sampling results and laboratory documentation for the sediment and water samples collected from Lake Washington in November 2012. Anchor QEA prepared the Memorandum, dated March 2013. It is available for your review, including field measurements, laboratory data sheets, and a quality assurance report.

This project was sponsored by the City of Kenmore, in partnership with the Washington Department of Ecology, City of Lake Forest Park, and owners of North Lake Marina. Other property owners and Washington Department of Natural Resources provided access for sample collection. The sampling plan and study were designed in consultation with Ecology, Department of Health, and the Dredged Material Management Program (DMMP) with the US Army Corps of Engineers.

Paper copies may be reviewed at Kenmore City Hall, Kenmore library and the Lake Forest Park library at the library information desk. Paper copies also may be reviewed at Ecology's Northwest Regional Office, by appointment: 425-649-7239. To request a paper copy from Ecology, which includes a copying fee, please call 425-649-7239.

The memorandum is available on line at:

ftp://www.ecy.wa.gov/Kenmore%20Area%20Sediment%20&%20Water%20Characterization%20Results%20Memo%20by%20Anchor%20QEA%203-13-13/

Ecology is preparing a draft Environmental Evaluation Report that will be available for public review and comment this spring. The Washington Department of Health is preparing a Health Consultation Report, which will also be available later this spring. When these documents are available, a public meeting will be scheduled to share them with the community.

SUMMARY OF RESULTS

The Memorandum reports that dioxin concentrations in the sediments and surface water in public access areas along northeast Lake Washington and the lower reaches of the Sammamish River

are within dioxin cleanup standards for sites on land. This includes Lyon Creek Park in Lake Forest Park, and Log Boom Park and Sammamish River boat launch area in Kenmore.

The sediment and water characterization results do not represent a risk to human health, aquatic life and the environment. Elevated concentrations of dioxins were detected at two nearby private marinas. The test results at the marinas show three or four chemicals at or above screening criteria. Ecology will meet with the marina owners to discuss dredging plans and next steps for further evaluation.

The Kenmore Navigation Channel results show three chemicals above DMMP screening level one. Note these screening results are for planning to evaluate options for disposal of the dredge solids and further testing will be part of the dredge application process.

Sediment Management Standards for Freshwater criteria for dioxin/furans are not available at this time. The Navigation Channel dioxin sediment concentration ranged from 1.6 to 10.1 TEQ parts per trillion (Toxicity Equivalency value) and the median is 4.6 TEQ parts per trillion. For general comparison, the state soil cleanup level is 11 parts per trillion and although soil is a different medium compared to sediment, all the Navigation Channel sediment results are below the dioxin soil cleanup level. The Navigation Channel sediment results show that the Channel would not be classified as polluted and all chemicals tested are below the Freshwater Cleanup Screening Level (CSL).

Likewise, the Lakepointe aka Kenmore Industrial Park (KIP) site sediment results showed no contamination in the sediment adjacent to the KIP site, at the north, west, or south waterfront. All sediments tested adjacent to the site are very low detection and significantly below the Freshwater Cleanup Screening Level. So the KIP site is not the source of any sediment contamination.

Dioxin for the 30 overall sediment sample results range from 0.25 to 71.0 TEQ parts per trillion and the median is 3.1 TEQ parts per trillion. The state soil cleanup standard for dioxin is 11 parts per trillion. Six of the study's samples were above 10 parts per trillion and 80 percent of the samples were below 10 parts per trillion and below the state soil cleanup standard for dioxin.

The source or sources of dioxin in this area are unknown at this time. The dioxin results suggest that this chemical does not originate from the Kenmore Navigation Channel, the Lakepointe aka Kenmore Industrial Park site, nor the Sammamish River, due to the low concentrations encountered at these locations. These results also suggest that the source of dioxin is not ongoing and continuous, and may have been a historic release. More testing will be necessary to identify the dioxin source or sources. Ecology will follow up on possible future testing when funds become available.

The study provided an important and successful step in the screening process, and the results indicate no significant environmental or health issue. Additional evaluations are recommended for the sediments beneath the two private marinas.

March 21, 2013

From:	Kendall, David R NWS
To:	Erika Hoffman/R10/USEPA/US@EPA
Subject:	Kenmore background information (UNCLASSIFIED)
Date:	06/12/2012 10:05 AM
Attachments:	Kenmore Brief.pdf Kenmore summary.pdf Kenmore-O&M-vs-Lakeside.pdf

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Classification: UNCLASSIFIED
Caveats: NONE

Erika: Here is background for our briefing of DE several weeks ago, along with some information I exchanged with Ann Hurst, one of the concerned citizens, and the updated background evaluation I mentioned. Let me know if you need more explanation.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	Kendall, David R NWS
To:	Celia.Barton@dnr.wa.gov; Erika Hoffman/R10/USEPA/US@EPA; LINO461@ecy.wa.gov; Warner, Lauran C NWS; Fox, David F NWS; Justine Barton/R10/USEPA/US@EPA
Subject:	Kenmore issues- related to 520 bridge construction: FW: HOLD THE PRESSES. More news and help on Mauras questions (UNCLASSIFIED)
Date:	02/22/2012 12:40 PM

Classification: UNCLASSIFIED
Caveats: NONE

I am on email routing on info related to this, so just in case you haven't seen this, I wanted to pass this on fyi.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: happyhaze@msn.com [mailto:happyhaze@msn.com]
Sent: Wednesday, February 22, 2012 12:27 PM
To: undisclosed-recipients
Subject: HOLD THE PRESSES. More news and help on Mauras questions

Hi Ann and all visiting at web site BasinNews.org,

The answers I believe are in red . If you know they are incorrect please correct. I am also asking Greg to please help and what price is his retainer now. I believe this is urgent. I also know he has helped us immensely already. I would like to ask him so we can save time, this ball is rolling. They are working as fast a they can to cover any of the dirty track and soil disturbance.

Please all, if you care about this issue, please start e-mailing all council and Bryan Hampson at City of Kenmore and DOE Maura O'Brien any of your responses we are interested in.

Thanks,
Janet

-------Original Message-------
From: Greg Wingard <mailto:gwingard@earthlink.net>
Date: 2/21/2012 10:53:19 PM
To: happyhaze@msn.com
Cc: patrickeobrien@comcast.net; Elizabeth Mooney <mailto:elizabeth.mooney@comcast.net> ; Ann Hurst <mailto:annmhurst@msn.com> ; Diane Brennan <mailto:dalaine00@yahoo.com> ; todd227@aol.com
Subject: Re: Fw: RE: Yes its me with another Pioneer(LakePointe) inquiry from the man in charge

Janet:

See my chime in black below.

Regards,

Greg

-------Original Message-------

From: O'Brien, Maura (ECY) <mailto:MOBR461@ECY.WA.GOV>
Date: 2/21/2012 1:46:39 PM
To: happyhaze@msn.com
Cc: Wang, Ching-Pi (ECY) <mailto:CWAN461@ECY.WA.GOV>
Subject: RE: Yes its me with another Pioneer(LakePointe) inquiry from the man in charge

Hello Janet,

Reading your questions to the City and Ecology need some correction and clarification.

The Lakepointe aka Kenmore Industrial Park (KIP) site Consent Decree does NOT limit the depth of work at the KIP site. The Consent Decree and Cleanup Action Plan state that the 1 to 2 feet of clean fill was placed on the former landfill.That has been removed and about 3-4'more My understanding is that garbage has been exposed, and may have been incorporated into berms on site. Is it Ecology's position that the Consent Decree allows for MTCA site waste material to be disturbed, without triggering the requirment for implementation of the remedial action? If so, my opinion of the Consent Decree is even lower than it previously was, and it was never high to start with.

The “deferred industrial maintenance” work will grade and contour and install three storm water sediment traps at the 14-acre western portion of the KIP site. Attached figure shows location of the 3 sediment traps. This work will minimize surface storm water runoff from flowing into the adjacent waterways –Lake Washington and the Sammamish River and the storm water traps will add environmental protection to these waterways.How can they protect these waterways Lake Washington and the Samammish River if they are NOT lined. This "deferred industrial maintenance", is a fig leaf, or pretense, which is actually a new industrial development for a specific industrial project, which is to support the 520 bridge. By definition maintenance is to maintain, or service an existing facility or activity on the site. The permits issued and activity under way do not fit any rational definition of maintenance, but are clearly for the specific purpose of enabling and siting a specific new industrial use on the site, which is to stage and enable operations related to the 520 project. This tortured missuse of the English language is just beyond understanding.

The “deferred maintenance” work will add one more foot of clean gravel to the surface. Of what?, of the 5-6' pits they have dug, or the berms they have put the contaminated soil (soil from these pits)on. Much deeper than the 1 to 2 feet used to cover them 10 years (?)ago. Further the limited groundwater tests, which is what Ecology has repeatedly relied on to "prove" that there isn't a problem at the site, are not even the right, or the solely relevant impacted media. The equipment at the site is moving dirt, not groundwater. Thus the impacted media is surface soil, not groundwater, and the more relevant and appropriate end point is surface water, not groundwater. Under the very limited testing required in the CSGP, any number of constituents in the solid waste, and potentially hazardous waste or spills on the site would never be detected. You will never find what you aren't looking for. Again, this points out that it was totally inappropriate and outside the regulatory scheme of the state adopted Clean Water

Act/Water Quality Program to issue CSGP coverage for a listed contaminated site.

To evaluate if the “deferred maintenance” work will modify or change the subsurface and possible migration of chemicals of concern from the KIP site into the adjacent waterways, the KIP owner has volunteered to conduct groundwater monitoring in March and again in summer –dry season. This monitoring is for the known chemicals of concern at this site for petroleum and three metals –arsenic, barium and lead. The owner has agreed to expand the monitoring to include semi-volatile organic compounds and at the request of the City add three metals –chromium, copper and zinc. I believe that because legally this "deferred maintenance" would require much more than simple ground water testing, because in fact they are digging pits the size of football fields and 5-6feet deep, and going deeper than the cover 1 to 2 feet of clean fill over 10-15 feet of contaminates. As per above, this ignores the actual activity. They are moving dirt. Any number of contaminants of concern do not lend themselves to dissolving into water and leaching into the groundwater, but rather are particulate dependent and of low solubility. Trying to pretend that groundwater monitoring is protective of the impacts of moving dirt at a contaminated site, simply doesn't make any sense, especially where the disturbed area is either in or imediately adjacent to critical areas such as wetlands, shoreline buffers, and waters of the state, and the best management practices under the CSGP are based on an assumption that the disturbed soils are clean, not contaminated, which is a completely unwarranted assumption at this site.

This monitoring was volunteered by the site owner to confirm that the deferred maintenance has not caused any subsurface changes to groundwater flow and transport of chemicals of concern. If monitoring results show any issue of concern, then Ecology will promptly require further action.You will not know them to correct them if you do not test for them. Again calling development for a new industrial activity, and individual defined project "defered maintenance" is both inaccurate and insulting. This is not deferred maintenance. The monitoring selected is not the right monitoring for the activity supposedly being monitored, and in fact seems to have been more selected for having the least potential to identify any problems related to the onstie activities. While selecting groundwater as part of a multi-media site sampling program would be logical and fall within the reasonable scope of monitoring to detect any problems, selecting it as the only media to be sampled, while ignoring soil sampling, when the permit and associated activity is for moving dirt is inexplicable. MTCA requires Ecology to address the full range of impacted media, and end points at contaminated sites. I am unaware of any determination by Ecology in or outside of the Consent Decree for this site that determined that only groundwater is impacted. Further, Ecology's own files, as well as those of other regulatory agencies indicate that there are multiple historic industrial uses, impacts and spills on the site, which have not been addressed by sampling to date. Further most of the non-groundwater data on the site is so far out of date at this point, it no longer meets Ecology's own standards for data that can be relied on to make contemporary decisions. In addition, recent information, which Ecology played a role in developing and approving, indicates that there is major dioxin contamination in the near vicinity of the Lake Pointe site. While there was some previous historic sampling for PCB's, I am unaware of any sampling done at the Lake Point site for dioxin. Given that Ecology has been aware of the dioxin results in the sediments of North Lake Washington since at least last July, in the vicinity of the "defered maintenance", which in any real world scenario would be called grade and fill for industrial site development, the very least that should have been done is to take some composite samples to determine if there is a potential for dioxin contamination at this site

Or you could just continue the approach you are taking and figure that out years from now. We are currently experiencing this at another Ecology approved cleanup site, the Lora Lake Apartments. At least at this site the clean up was pre-MTCA, but it is a cautionary tale that applies to Lake Point none the less. The site was cleaned up in the 1980's, with dioxin not being among the contaminants selected for analysis at that time. Even though the site was known to be immediately upstream of Lora Lake (hence the apartment's name), site stormwater discharges to the lake were not sampled or restricted, or treated in any way. Today, rather than a contaminated industrial site, where conversion to apartment building was allowed, we have a substantial area of the apartment property contaminated, the stormwater system installed when the apartments were built were contaminated, they were cleaned out, and shortly after that became recontaminated, sampling has shown the entirety of the shallow

sediments of the lake are contaminated at a couple orders of magnitude over the likely dioxin limit, and as the county dredged 16,000 cubic yards of sediment out of the lake and deposited it in an unconfined "fill" on airport property, some portion of that area is now (according to the data) contaminated with dioxin as well. It seems to me that Ecology would want to go to some lengths to prevent a similar set of mistakes at the Lake Pointe property, but I see no signs of any precuationary practice being implemented to date.

I trust this answers your questions.

Maura

Maura S. O'Brien, PG/HG #869

Professional Geologist/Hydrogeologist

Toxics Cleanup Program - NWRO

Department of Ecology

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From: happyhaze@msn.com [mailto:happyhaze@msn.com]
Sent: Tuesday, February 21, 2012 10:17 AM
To: O'Brien, Maura (ECY)
Subject: Fw: Yes its me with another Pioneer(LakePointe) inquiry from the man in charge

Hi Maura,

I just wanted to keep you updated on my questions, with no response from the City.

Thanks,

Janet

-------Original Message-------

From: happyhaze@msn.com

Date: 2/20/2012 2:03:04 PM

To: bhampson@kenmorewa.gov

Cc: bhensel@kenmorewa.gov; grogers@kenmorewa.gov; mcurtis@kenmorewa.gov; lsperry@kenmorewa.gov; avanness@kenmorewa.gov; bsmith@kenmorewa.gov

Subject: Yes its me with another Pioneer(LakePointe) inquiry from the man in charge

Dear Bryan,

I have another question regarding the grading and clearing permit. Is there any code violation if Pioneer Towing digs below the 1' depth tha <<ATT1.gif>> t the consent decree limits them to. Maura had told me to call you regarding that part of the permit, because it had to do with grading.

Could you please let me know if going deeper than the consent decree allows, is acceptable with a clearing and grading permit. And if not what kind of violation and fine will be given to Pioneer Towing.

Also could you please respond to the 2 other very detrimental inquiries that I sent on Friday and Sunday as they could be harmful to our shoreline. You may use this e-mail address happyhaze@msn.com. I am in and out and that would be helpful.

Thank You,

Janet Hays

Classification: UNCLASSIFIED
Caveats: NONE

Table 1
Sediment Results Compared to DMMP Criteria from Kenmore Navigation Channel and North Lake Marina

			Location ID	SG-02	SG-03	SG-04	SG-05	SG-06	SG-07	SG-07	SG-08	SG-09
			Location	North Lake Marina		Kenmore Navigation Channel						
			Sample ID	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108
			Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
			Sample Interval	0 - 22 cm	0 - 25 cm	0 - 15 cm	0 - 23 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm
	DMMP SL	DMMP BT	DMMP ML									
Conventional Parameters (pct)												
Total organic carbon	--	--	--	**7.12**	**6.60**	**2.73**	**5.43**	**4.89**	**4.95**	**7.07**	**3.30**	**5.22**
Total solids	--	--	--	**25.7**	**25.6**	**80.8**	**35.0**	**29.9**	**33.7**	**34.3**	**42.0**	**35.7**
Total volatile solids	--	--	--	**13.51**	**15.15**	**1.72**	**11.13**	**13.89**	**13.40**	**14.11**	**9.10**	**10.58**
Gravel	--	--	--	**0.4**	**11.8**	**71.4**	**3.1**	0.1 U	**0.5**	**2.6**	**0.3**	**0.1**
Sand, Very Coarse	--	--	--	**6.5**	**9.2**	**7.6**	**2.9**	**7.4**	**2.7**	**2.7**	**1.5**	**2.1**
Sand, Coarse	--	--	--	**5.5**	**7.2**	**6.9**	**5.3**	**6.6**	**3.1**	**2.8**	**1.5**	**1.7**
Sand, Medium	--	--	--	**5.5**	**7.2**	**7.6**	**11.1**	**6.2**	**6.3**	**6.0**	**3.9**	**6.9**
Sand, Fine	--	--	--	**7.2**	**7.8**	**2.9**	**14.3**	**8.6**	**24.4**	**21.9**	**22.2**	**15.9**
Sand, Very Fine	--	--	--	**9.1**	**10.1**	**1.0**	**15.2**	**15.9**	**18.9**	**18.6**	**21.2**	**13.4**
Fines (silt + clay)	--	--	--	**65.8**	**46.7**	**2.5**	**48.1**	**55.2**	**44.1**	**45.4**	**49.3**	**59.7**
Silt, Coarse	--	--	--	**10**	**13.1**	**--**	**7.7**	**8.6**	**11**	**13.7**	**13.0**	**19.7**
Silt, Medium	--	--	--	**19.3**	**8.4**	**--**	**16**	**15.5**	**12.1**	**11.0**	**13.7**	**12.9**
Silt, Fine	--	--	--	**15.2**	**10.9**	**--**	**9.9**	**12.1**	**7.9**	**7.6**	**8.4**	**10.9**
Silt, Very Fine	--	--	--	**11.1**	**7.0**	**--**	**7.1**	**7.8**	**5.9**	**6.1**	**6.3**	**7.6**
Clay, Coarse	--	--	--	**5.6**	**4.5**	**--**	**4.3**	**6.3**	**3.8**	**3.9**	**3.9**	**4.7**
Clay, Medium	--	--	--	**3.2**	**1.8**	**--**	**1.9**	**3.2**	**2.5**	**2.1**	**2.6**	**2.6**
Clay, Fine	--	--	--	**1.4**	**1.1**	**--**	**1.3**	**1.6**	**0.9**	**0.9**	**1.4**	**1.3**
Metals (mg/kg)												
Antimony	150	--	200	20 U	20 U	6 U	10 U	20 U	10 U	10 U	10 U	10 U
Arsenic	57	507.1	700	20 U	20 U	6 U	10 U	20 U	10 U	10 U	10 U	10 U
Cadmium	5.1	11.3	14	**1.3**	**1.2**	**0.3**	**0.7**	**0.8**	**0.6**	**0.6**	**0.6**	**0.6**
Chromium	260	260	--	**56**	**55**	**35**	**43**	**57**	**41**	**44**	**44**	**48**
Copper	390	1027	1300	**92.4**	**88.1**	**14.6**	**35.6**	**43.6**	**30**	**28.7**	**28**	**31.1**
Lead	450	975	1200	**62**	**42**	**5**	**28**	**31**	**21**	**21**	**21**	**24**
Mercury	0.41	1.5	2.3	**0.18**	**0.1**	0.02 U	**0.08**	**0.1**	**0.11**	**0.08**	**0.07**	**0.08**
Nickel	--	--	--	**48**	**45**	**30**	**39**	**46**	**41**	**42**	**40**	**43**
Selenium	--	3	--	2 U	2 U	0.6 U	1 U	2 U	1 U	1 U	1 U	1 U
Silver	6.1	6.1	8.4	1 U	1 U	0.4 U	0.9 U	1 U	0.9 U	0.8 U	0.7 U	0.9 U
Zinc	410	2783	3800	**231**	**267**	**49**	**143**	**164**	**126**	**123**	**113**	**130**
Organometallic Compounds (porewater) (µg/L)												
Tributyltin (ion)	0.15	0.15	--	**0.67**	**0.058**	**0.049**	**0.0080**	**0.023**	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Polycyclic Aromatic Hydrocarbons (µg/kg)												
1-Methylnaphthalene	--	--	--	**21**	**9.8 J**	20 U	**13 J**	20 U	20 U	19 U	**9.6 J**	20 U
2-Methylnaphthalene	670	--	1900	**31**	**25**	20 U	**26**	**14 J**	20 U	19 U	19 U	20 U
Acenaphthene	500	--	2000	**320**	**33**	**14 J**	**26**	**17 J**	20 U	19 U	19 U	20 U
Acenaphthylene	560	--	1300	**22**	**16 J**	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Anthracene	960	--	13000	**66**	**68**	**26**	**39**	**28**	**18 J**	19 U	19 U	20 U
Benzo(a)anthracene	1300	--	5100	**210**	**190**	**81**	**110**	**110**	**110**	**52**	**42**	**40**
Benzo(a)pyrene	1600	--	3600	**190**	**160**	**62**	**76**	**120**	**63**	**55**	**50**	**45**
Benzo(g,h,i)perylene	670	--	3200	**170**	**130**	**43**	**63**	**93**	**36**	**41**	**41**	**36**
Chrysene	1400	--	21000	**440**	**340**	**110**	**190**	**190**	**140**	**82**	**73**	**72**
Dibenzo(a,h)anthracene	230	--	1900	**67**	**55**	**15 J**	**21**	**37**	**17 J**	**12 J**	**11 J**	**13 J**
Fluoranthene	1700	4600	30000	**480**	**410**	**220**	**310**	**290**	**150**	**140**	**130**	**120**
Fluorene	540	--	3600	**98**	**46**	**14 J**	**37**	**28**	**12 J**	**9.7 J**	19 U	20 U
Indeno(1,2,3-c,d)pyrene	600	--	4400	**140**	**110**	**39**	**51**	**81**	**33**	**38**	**36**	**33**
Naphthalene	2100	--	2400	**83**	**58**	20 U	**50**	**38**	**18 J**	**25**	**14 J**	**24**
Phenanthrene	1500	--	21000	**170**	**190**	**140**	**180**	**140**	**72**	**68**	**64**	**59**
Pyrene	2600	11980	16000	**590**	**440**	**190**	**300**	**290**	**140**	**130**	**120**	**120**

Table 1
Sediment Results Compared to DMMP Criteria from Kenmore Navigation Channel and North Lake Marina

			Location ID	SG-02	SG-03	SG-04	SG-05	SG-06	SG-07	SG-07	SG-08	SG-09
			Location	North Lake Marina		Kenmore Navigation Channel						
			Sample ID	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108
			Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
			Sample Interval	0 - 22 cm	0 - 25 cm	0 - 15 cm	0 - 23 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm
	DMMP SL	DMMP BT	DMMP ML									
Total Benzofluoranthenes (b,j,k) (U = 0)	3200	--	9900	**530**	**420**	**140**	**220**	**300**	**170**	**140**	**120**	**120**
Total HPAH (DMMP) (U = 0)	12000	--	69000	**2817**	**2255**	**900 J**	**1341**	**1511**	**859 J**	**690 J**	**623 J**	**599 J**
Total LPAH (DMMP) (U = 0)	5200	--	29000	**759**	**411 J**	**194 J**	**332**	**251 J**	**120 J**	**103 J**	**78 J**	**83**
Chlorinated Hydrocarbons (µg/kg)												
1,2,4-Trichlorobenzene	31	--	64	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
1,2-Dichlorobenzene	35	--	110	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
1,3-Dichlorobenzene	--	--	--	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
1,4-Dichlorobenzene	110	--	120	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Hexachlorobenzene	22	168	230	4.9 U	4.9 U	4.9 U	5.0 U	4.8 U	4.9 U	4.8 U	4.8 U	4.8 U
Hexachloroethane	--	--	--	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Phthalates (µg/kg)												
Bis(2-ethylhexyl)phthalate	1300	--	8300	**680**	**510**	62 U	**260**	**540**	**330**	**300**	**240**	**240**
Butylbenzyl phthalate	63	--	970	**32**	**32**	20 U	20 U	**57**	**28**	19 U	**36**	**29**
Diethyl phthalate	200	--	1200	49 U	**38 J**	49 U	49 U	**58**	49 U	48 U	48 U	49 U
Dimethyl phthalate	71	--	1400	**28**	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Di-n-butyl phthalate	1400	--	5100	19 U	**9.8 J**	20 U	20 U	20 U	20 U	**12 J**	19 U	20 U
Di-n-octyl phthalate	6200	--	6200	19 U	**58 J**	20 U	**22 J**	**41 J**	**22 J**	19 U	19 U	20 U
Phenols (µg/kg)												
2,4-Dimethylphenol	29	--	210	19 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	19 UJ	19 UJ	20 UJ
2-Methylphenol (o-Cresol)	63	--	77	19 U	20 U	20 UJ	20 U	20 U	20 U	19 U	19 U	20 U
4-Methylphenol (p-Cresol)	670	--	3600	**74**	**76**	39 U	**74**	**91**	**54**	**31 J**	**22 J**	**36 J**
Pentachlorophenol	400	504	690	190 U	200 U	200 U	200 U	200 U	200 U	190 U	190 U	200 U
Phenol	420	--	1200	19 U	**110**	20 U	**180**	**80**	**42**	**42**	**19**	**39**
Miscellaneous Extractables (µg/kg)												
Benzoic acid	650	--	760	**960**	**1300**	390 U	**1300**	**1100**	**430**	**480**	**300 J**	**510**
Benzyl alcohol	57	--	870	**82**	**130**	20 U	**160**	**190**	**120**	**100**	**61**	**110**
Dibenzofuran	540	--	1700	**30**	**35**	20 U	**28**	20 U	20 U	19 U	19 U	20 U
N-Nitrosodiphenylamine	28	--	130	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Pesticides (µg/kg)												
4,4'-DDD (p,p'-DDD)	16	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
4,4'-DDE (p,p'-DDE)	9	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U	1.7 U	1.6 U	1.6 U	1.6 U
4,4'-DDT (p,p'-DDT)	12	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
Aldrin	9.5	--	--	0.64 U	0.64 U	0.64 U	0.65 U	0.63 U	0.64 U	0.63 U	0.63 U	0.63 U
Chlordane, alpha- (cis-Chlordane)	--	--	--	0.83 U	0.83 U	0.83 U	0.84 U	0.82 U	0.83 U	0.81 U	0.81 U	0.81 U
Chlordane, beta- (trans-Chlordane)	--	--	--	0.78 U	0.78 U	0.77 U	0.79 U	0.77 U	0.78 U	0.76 U	0.76 U	0.76 U
Dieldrin	1.9	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U	1.7 U	1.6 U	1.6 U	1.6 U
Heptachlor	1.5	--	--	0.64 U	0.64 U	0.64 U	0.65 U	0.63 U	0.64 U	0.63 U	0.63 UJ	0.63 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	11	--	270	4.9 U	4.9 U	4.9 U	5.0 U	4.8 U	4.9 U	4.8 U	4.8 U	4.8 U
Nonachlor, cis-	--	--	--	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Nonachlor, trans-	--	--	--	4.7 U	4.7 U	4.7 U	4.8 U	4.7 U	4.7 U	4.6 U	4.6 U	4.6 U
Oxychlordane	--	--	--	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.2 U	2.2 U	2.2 U
Sum 4,4' DDT, DDE, DDD (U = 0)	--	50	69	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
Total DMMP Chlordane (U = 0)	2.8	37	--	4.7 U	4.7 U	4.7 U	4.8 U	4.7 U	4.7 U	4.6 U	4.6 U	4.6 U
PCB Aroclors (µg/kg)												
Aroclor 1016	--	--	--	19 U	19 U	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1221	--	--	--	19 U	19 U	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1232	--	--	--	19 U	19 U	20 U	29 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1242	--	--	--	19 U	19 U	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1248	--	--	--	58 U	38 U	20 U	19 U	19 U	19 U	19 U	18 U	20 U

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			Sample ID	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108
			Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
			Sample Interval	0 - 22 cm	0 - 25 cm	0 - 15 cm	0 - 23 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm
	DMMP SL	DMMP BT	DMMP ML									
Aroclor 1254	--	--	--	**88**	48 U	20 U	29 U	28 U	19 U	**22**	18 U	20 U
Aroclor 1260	--	--	--	**33**	**22**	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Total DMMP PCB Aroclors (U = 0)	130	--	3100	**121**	**22**	20 U	29 U	28 U	19 U	**22**	18 U	20 U
PCB Aroclors (mg/kg-OC)												
Total DMMP PCB Aroclors (U = 0)	--	38	--	**1.70**	**0.33**	0.73 U	0.53 U	0.57 U	0.38 U	**0.31**	0.55 U	0.38 U
Dioxin Furans (ng/kg)												
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**0.975 J**	**0.599 J**	**0.15 J**	**0.322 J**	**0.478 J**	**0.306 J**	**0.341 J**	**0.293 J**	**0.372 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**7.83**	**3.75**	**0.381 J**	**1.33**	**1.58**	**1.18**	**1.03**	**0.870 J**	**1.24**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**14.5**	**6.97**	**0.491 J**	**2.18**	**2.65**	**1.42 J**	**1.38 J**	**1.36 J**	**1.71 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**53.1**	**28.0**	**1.62 J**	**8.58**	**9.51**	**4.38**	**4.21**	**3.85**	**5.03**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**29.5**	**14.5**	**0.897 J**	**4.84**	**5.68**	**2.85**	**2.95**	**2.99**	**3.54**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**1020**	**610**	**40.5**	**184**	**237**	**85.5**	**82.7**	**88.5**	**103**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**7420**	**4760**	**307**	**1540**	**2520**	**652**	**613**	**684**	**798**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**14.9 J**	**9.77 J**	**1.13 J**	**4.22 J**	**4.89 J**	**4.25 J**	**3.82 J**	**3.33 J**	**4.12 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**43.9**	**26.5**	**2.51 J**	**9.38 J**	**9.24 J**	**8.33 J**	**7.29 J**	**6.12 J**	**7.92 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**334**	**206**	**16.1**	**60.4**	**70.1**	**31.4 J**	**30.2 J**	**27.2 J**	**35.0 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**2260**	**1620**	**134**	**473**	**803**	**167**	**155**	**160**	**191**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**3.37**	**2.13**	**0.173 J**	**0.841 J**	**0.967 J**	**0.643 J**	**0.579 J**	**0.553 J**	**0.784 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**3.04**	**1.71 J**	**0.164 J**	**0.684 J**	**0.746 J**	**0.442 J**	**0.466 J**	**0.409 J**	**0.577 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**3.27**	**1.86**	**0.128 J**	**0.785 J**	**0.826 J**	**0.452 J**	**0.556 J**	**0.540 J**	**0.573 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**8.04**	**4.83**	**0.289 J**	**1.74 J**	**1.90 J**	**1.20 J**	**1.05 J**	**1.30 J**	**1.43 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**8.28**	**4.02**	**0.261 J**	**1.45 J**	**1.64 J**	**0.989 J**	**0.958 J**	**0.964 J**	**1.23 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	**3.12**	**1.8 J**	**0.185 J**	**0.751 J**	**0.846 J**	**0.386 J**	**0.411 J**	**0.366 J**	**0.497 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**11.7**	**6.21**	**0.361 J**	**2.14**	**2.55**	**1.40 J**	**1.34 J**	**1.37 J**	**1.74 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**137**	**84.1**	**4.39**	**25.4**	**31.3**	**14.6**	**14.6**	**18.7**	**17.7**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	**7.34**	**4.63**	**0.315 J**	**1.63 J**	**1.98 J**	**1.06 J**	**1.14 J**	**1.83 J**	**1.33 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	--	**366**	**272**	**10.8**	**71.9**	**108**	**40.9**	**39.5**	**66.0**	**46.6**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	**55.5 J**	**32.2 J**	**2.12 J**	**13.8 J**	**15.5 J**	**11.1 J**	**10.3 J**	**9.21 J**	**12.2 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	**119**	**59.4 J**	**3.51 J**	**22.5 J**	**24.5 J**	**14.8 J**	**14.2 J**	**12.8 J**	**17.1 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	**240**	**136 J**	**7.38 J**	**45.2**	**51.1 J**	**25.8 J**	**25.6**	**25.7 J**	**30.6 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	**404**	**273**	**13.1 J**	**79.2**	**104**	**43.8**	**43.3**	**57.2 J**	**52.8 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	4	--	--	**37.0 J**	**20.3 J**	**1.5 J**	**6.8 J**	**8.4 J**	**4.2 J**	**4.0 J**	**3.9 J**	**4.9 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	4	--	--	**37.0 J**	**20.3 J**	**1.5 J**	**6.8 J**	**8.4 J**	**4.2 J**	**4.0 J**	**3.9 J**	**4.9 J**

Notes:
Detected concentration is greater than DMMP Marine SL (screening level)
Detected concentration is greater than DMMP Marine BT (bioaccumulation trigger)
Detected concentration is greater than DMMP Marine ML (maximum level)
Bold = Detected result
-- = results not reported or not applicable

FD = field duplicate
J = estimated value
mg/kg = milligrams per kilogram
mg/kg-OC = milligrams per kilogram, organic carbon normalized
N = normal field sample
ng/kg = nanograms per kilogram
µg/kg = micrograms per kilogram
µg/L = micrograms per liter

Table 1
Sediment Results Compared to DMMP Criteria from Kenmore Navigation Channel and North Lake Marina

			Location ID	SG-02	SG-03	SG-04	SG-05	SG-06	SG-07	SG-07	SG-08	SG-09
			Location	North Lake Marina		Kenmore Navigation Channel						
			Sample ID	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108
			Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
			Sample Interval	0 - 22 cm	0 - 25 cm	0 - 15 cm	0 - 23 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm
	DMMP SL	DMMP BT	DMMP ML									

pct = percent
U = compound analyzed, but not detected above detection limit
UJ = compound analyzed, but not detected above estimated detection limit

All non-detect pesticides and dioxin/furan data were reported at the **method detection limit**; all other non-detect data were reported at the **reporting limit**. Non-detect exceedances are not highlighted.
Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest reporting limit value is reported as the sum.
Totals are calculated as the sum of all detected results and 1/2 the undetected reporting limit (U=1/2). If all results are not detected, the highest reporting limit value is reported as the sum.
Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs.
Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene.
Sum 4,4' DDT, DDE, DDD consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
Total Chlordane includes alpha-chlordane (cis-chlordane), beta-chlordane (trans-chlordane), cis-nonaclor, trans-nonaclor, and oxychlordane.
Total DMMP PCB Aroclors is the total of all PCB Aroclors listed in this table.
Dioxin/Furan Toxicity Equivalency (TEQ) values as of 2005, World Health Organization.
USEPA Stage 2A validation was performed by Anchor QEA on all compounds, except dioxin/furans.
USEPA Stage 4 validation was performed by LDC on dioxin/furans.

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07	HT-08	HT-09
		Location	Log Boom Park Shoreline					Tributary 0056		Motor Boat Launch	
		Sample ID	HT-01-S-C-121106	HT-02-S-C-121106	HT-03-S-C-121106	HT-04-S-C-121106	HT-05-S-C-121106	HT-06-S-E-121106	HT-07-S-E-121106	HT-08-S-C-121106	HT-09-S-C-121106
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2									
Conventional Parameters (pct)											
Total organic carbon	--	--	**0.240**	**0.484**	**0.77**	**6.20**	**0.531**	**1.25**	**1.72**	**3.08**	**2.13**
Total solids	--	--	**77.3**	**78.8**	**65.7**	**50.9**	**80.4**	**74.8**	**80.5**	**77.2**	**67.5**
Total volatile solids	--	--	**0.67**	**1.46**	**7.06**	**19.69**	**2.05**	**1.54**	**1.72**	**1.49**	**2.57**
Gravel	--	--	**12.1**	**29.8**	**5.6**	**0.4**	**62.9**	**8.3**	**41.1**	**38**	**19.1**
Sand, Very Coarse	--	--	**3.5**	**1.6**	**1.6**	**0.5**	**8.6**	**2.5**	**10.4**	**2.2**	**2.0**
Sand, Coarse	--	--	**6.3**	**2.4**	**2.0**	**0.8**	**8.1**	**6.9**	**12.7**	**1.8**	**1.9**
Sand, Medium	--	--	**23.8**	**11.3**	**13**	**4.3**	**12.7**	**35.8**	**18.4**	**20.5**	**15.2**
Sand, Fine	--	--	**45.2**	**35.2**	**22.6**	**26.2**	**4.8**	**32.2**	**11.1**	**28.5**	**37.3**
Sand, Very Fine	--	--	**6.1**	**17.7**	**48.7**	**54.2**	**0.9**	**8.3**	**3.6**	**5.8**	**13.6**
Fines (silt + clay)	--	--	**3.0**	**2.0**	**6.3**	**13.6**	**2.0**	**6.1**	**2.7**	**3.2**	**10.8**
Silt, Coarse	--	--	3.0 U	2.0 U	**6.3**	**13.6**	2.0 U	**3.7**	2.7 U	3.2 U	**6.0**
Silt, Medium	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.7**	2.7 U	3.2 U	**1.3**
Silt, Fine	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.6**	2.7 U	3.2 U	**1.1**
Silt, Very Fine	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.4**	2.7 U	3.2 U	**1.1**
Clay, Coarse	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.4**	2.7 U	3.2 U	**0.6**
Clay, Medium	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.2**	2.7 U	3.2 U	**0.5**
Clay, Fine	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.1**	2.7 U	3.2 U	**0.3**
Metals (mg/kg)											
Antimony	--	--	6 UJ	6 UJ	7 UJ	10 UJ	6 UJ	7 UJ	6 UJ	6 UJ	7 UJ
Arsenic	20	51	6 U	6 U	7 U	10 U	6 U	7 U	6 U	6 U	7 U
Cadmium	1.1	1.5	0.2 U	0.3 U	**0.3**	**0.5**	**0.4**	**0.3**	**0.3**	**0.3**	**0.4**
Chromium	95	100	**17.8 J**	**23.3 J**	**23 J**	**27 J**	**20.3 J**	**25.5 J**	**30.1 J**	**29.6 J**	**28.8 J**
Copper	80	830	**4.3**	**5.6**	**7.6**	**15.2**	**220**	**9.9**	**11.4**	**38.2**	**21.9**
Lead	340	430	**4**	**4**	**10**	**16**	**3**	**6**	**10**	**7**	**11**
Mercury	0.28	0.75	0.03 U	0.02 U	0.03 U	**0.23**	0.02 U	0.02 U	0.03 U	0.02 U	0.03 U
Nickel	60	70	**20**	**24**	**25**	**27**	**36**	**30**	**34**	**28**	**26**
Selenium	--	--	0.6 U	0.6 U	0.7 U	1 U	0.6 U	0.6 U	0.6 U	0.6 U	0.7 U
Silver	2.0	2.5	0.4 U	0.4 U	0.4 U	0.6 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Zinc	130	400	**34**	**41**	**58**	**117**	**69**	**53**	**90**	**54**	**64**
Organometallic Compounds											
Tributyltin (porewater) µg/L	--	--	--	--	--	--	--	--	--	--	--
Tributyltin (bulk) µg/kg	--	--	--	--	--	--	--	3.4 U	3.7 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)											
1-Methylnaphthalene	--	--	4.6 U	**2.5 J**	**27**	**83**	4.6 U	4.7 U	**4.4 J**	4.6 U	**3.0 J**
2-Methylnaphthalene	470	560	4.6 U	**4.0 J**	**51**	**190**	4.6 U	**6.1**	**6.7**	**3.5 J**	**5.8**
Acenaphthene	1100	1300	4.6 U	**3.1 J**	**55**	**120**	4.6 U	**3.4 J**	4.9 U	4.6 U	4.8 U
Acenaphthylene	470	640	4.6 U	4.9 U	**3.4 J**	**20**	4.6 U	4.7 U	4.9 U	4.6 U	4.8 U
Anthracene	1200	1600	4.6 U	**4.6 J**	**54**	**190**	**3.8 J**	**7.8**	4.9 U	4.6 U	**3.7 J**
Benzo(a)anthracene	4300	5800	4.6 U	**6.0**	**75**	**330**	**10**	**38**	**18 J**	**9.6**	**24**

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07	HT-08	HT-09
		Location	Log Boom Park Shoreline					Tributary 0056		Motor Boat Launch	
		Sample ID	HT-01-S-C-121106	HT-02-S-C-121106	HT-03-S-C-121106	HT-04-S-C-121106	HT-05-S-C-121106	HT-06-S-E-121106	HT-07-S-E-121106	HT-08-S-C-121106	HT-09-S-C-121106
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2									
Benzo(a)pyrene	3300	4800	4.6 U	**3.3 J**	**57**	**210**	**5.7**	**42**	**24**	**10**	**25**
Benzo(g,h,i)perylene	4000	5200	4.6 U	4.9 U	**34**	**74**	**3.2 J**	**21**	**26**	**6.9**	**24**
Chrysene	5900	6400	4.6 U	**8.0**	**110**	**480**	**18**	**50**	**29**	**15**	**35**
Dibenzo(a,h)anthracene	800	840	4.6 U	4.9 U	**7.0**	**23**	4.6 U	**5.8**	4.9 U	4.6 U	**3.8 J**
Fluoranthene	11000	15000	**4.3 J**	**24**	**260**	**1100**	**22**	**100**	**50**	**28**	**63**
Fluorene	1000	3000	4.6 U	**5.8**	**72**	**230**	**2.4 J**	**6.1**	4.9 U	**3.2 J**	**4.2 J**
Indeno(1,2,3-c,d)pyrene	4100	5300	4.6 U	4.9 U	**25**	**69**	4.6 U	**19**	**20**	**5.7**	**19**
Naphthalene	500	1300	4.6 U	**6.8**	**97**	**380**	**2.6 J**	**5.8**	**2.8 J**	**3.3 J**	**4.2 J**
Phenanthrene	6100	7600	**3.1 J**	**20**	**260**	**860**	**8.0**	**51**	**20**	**11**	**48**
Pyrene	8800	16000	**3.0 J**	**19**	**170**	**740**	**18**	**85**	**39**	**26**	**68**
Total Benzo(b,j,k)fluoranthenes	600	4000	4.6 U	**9.0**	**120**	**550**	**16**	**88**	**50**	**25**	**64**
Total HPAH (SEF) (U = 1/2)	31000	55000	**23.4 J**	**76.7 J**	**858**	**3576**	**97.5 J**	**448.8**	**258.4 J**	**128.5**	**325.8 J**
Total LPAH (SEF) (U = 1/2)	6600	9200	**16.9 J**	**46.8 J**	**592.4 J**	**1990**	**23.7 J**	**82.6 J**	**39.3 J**	**27.9 J**	**70.7 J**
Chlorinated Hydrocarbons (µg/kg)											
1,2,4-Trichlorobenzene	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U	19 U
1,2-Dichlorobenzene	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U	19 U
1,3-Dichlorobenzene	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U	19 U
1,4-Dichlorobenzene	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U	19 U
Hexachlorobenzene	--	--	19 U	20 U	19 U	**23**	18 U	4.9 U	4.9 U	18 U	19 U
Hexachloroethane	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U	19 U
Phthalates (µg/kg)											
Bis(2-ethylhexyl)phthalate	220	320	**16 J**	**18 J**	**66**	**460**	**23**	**110**	**79**	**72**	**130**
Butylbenzyl phthalate	260	370	19 U	20 U	**16 J**	**65**	18 U	19 U	20 U	**19**	19 U
Diethyl phthalate	--	--	**67**	49 U	48 U	49 U	46 U	48 U	50 U	46 U	48 U
Dimethyl phthalate	46	440	19 U	20 U	19 U	20 U	18 U	19 U	20 U	**97**	**970**
Di-n-butyl phthalate	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	**28**	**17 J**
Di-n-octyl phthalate	26	45	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U	**15 J**
Phenols (µg/kg)											
2,4-Dimethylphenol	--	--	19 UJ	20 UJ	19 UJ	20 UJ	18 UJ	19 UJ	20 UJ	18 UJ	19 UJ
2-Methylphenol (o-Cresol)	--	--	19 U	20 U	19 U	**16 J**	18 U	19 U	20 U	18 U	19 U
4-Methylphenol (p-Cresol)	--	--	38 U	39 U	**36 J**	**150**	**24 J**	38 U	40 U	37 U	38 U
Pentachlorophenol	--	--	190 U	200 U	190 U	200 U	180 U	190 U	200 U	180 U	190 U
Phenol	--	--	19 U	20 U	**18 J**	**180**	**10 J**	19 U	20 U	18 U	**11 J**
Miscellaneous Extractables (µg/kg)											
Benzoic acid	--	--	380 U	390 U	390 U	**390 J**	370 U	380 U	400 U	370 U	**140 J**
Benzyl alcohol	--	--	19 U	20 U	**20**	**210**	18 U	**37**	**19 J**	18 U	**23**
Dibenzofuran	400	440	4.6 U	**5.5**	**78**	**280**	4.6 U	**5.6**	4.9 U	4.6 U	4.8 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	--	--	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	4.9 U	4.9 U	10 UJ	10 UJ
N-Nitrosodiphenylamine	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U	19 U
Pesticides (µg/kg)											

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07	HT-08	HT-09
		Location	Log Boom Park Shoreline					Tributary 0056		Motor Boat Launch	
		Sample ID	HT-01-S-C-121106	HT-02-S-C-121106	HT-03-S-C-121106	HT-04-S-C-121106	HT-05-S-C-121106	HT-06-S-E-121106	HT-07-S-E-121106	HT-08-S-C-121106	HT-09-S-C-121106
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2									
4,4'-DDD (p,p'-DDD)	--	--	--	--	--	--	--	0.66 U	0.66 U	--	--
4,4'-DDE (p,p'-DDE)	--	--	--	--	--	--	--	0.60 U	0.61 U	--	--
4,4'-DDT (p,p'-DDT)	--	--	--	--	--	--	--	0.93 U	0.94 U	--	--
Aldrin	--	--	--	--	--	--	--	0.27 U	0.27 U	--	--
Chlordane, alpha- (cis-Chlordane)	--	--	--	--	--	--	--	0.25 U	0.25 U	--	--
Chlordane, beta- (trans-Chlordane)	--	--	--	--	--	--	--	0.37 U	0.38 U	--	--
Dieldrin	--	--	--	--	--	--	--	0.49 U	0.49 U	--	--
Heptachlor	--	--	--	--	--	--	--	0.64 U	0.65 U	--	--
Nonachlor, cis-	--	--	--	--	--	--	--	2.6 U	2.6 U	--	--
Nonachlor, trans-	--	--	--	--	--	--	--	2.6 U	2.6 U	--	--
Oxychlordane	--	--	--	--	--	--	--	4.0 U	4.0 U	--	--
PCB Aroclors (µg/kg)											
Aroclor 1016	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U	19 U
Aroclor 1221	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U	19 U
Aroclor 1232	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U	19 U
Aroclor 1242	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U	19 U
Aroclor 1248	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U	19 U
Aroclor 1254	--	--	18 U	19 U	19 U	**28 J**	17 U	17 U	20 U	17 U	19 U
Aroclor 1260	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U	19 U
Total 7 PCB Aroclors (U = 0)	60	120	18 U	19 U	19 U	**28 J**	17 U	17 U	20 U	17 U	19 U
Dioxin Furans (ng/kg)											
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.134 J**	**0.168 J**	**0.239 J**	**0.546 J**	**0.151 J**	**0.176 J**	**0.156 J**	**0.148 J**	**0.183 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	0.0671 U	**0.158 J**	**0.64 J**	**2.14**	**0.420 J**	**0.274 J**	**0.243 J**	**0.144 J**	**0.305 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	0.209 U	**0.137 J**	**0.654 J**	**2.18**	**0.340 J**	**0.374 J**	**0.347 J**	**0.120 J**	**0.414 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.193 J**	**0.434 J**	**2.25**	**8.69**	**0.884 J**	**1.5 J**	**0.911 J**	**0.387 J**	**1.25 J**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.103 J**	**0.275 J**	**1.29 J**	**4.33**	**0.790 J**	**0.785 J**	**0.66 J**	**0.289 J**	**0.825 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	--	--	**3.79**	**9.30**	**38.7**	**178**	**18.4**	**25.4**	**17.1**	**8.06**	**24.8**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**31.4**	**101**	**272**	**1460**	**136**	**188**	**136**	**59.8**	**169**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.132 J**	**0.362 J**	**2.56 J**	**7.22 J**	**0.667 J**	**1.26 J**	**1.27 J**	**0.601 J**	**1.7 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**0.17 J**	**0.78 J**	**4.21 J**	**14.3 J**	**2.79 J**	**1.77 J**	**1.68 J**	**0.735 J**	**2.15 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**1.20 J**	**3.17 J**	**16.3 J**	**65.1 J**	**8.55 J**	**9.16 J**	**6.05**	**2.53 J**	**8.76**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**7.37**	**21.4**	**83.9**	**423**	**40.0**	**47.3**	**30.4**	**14.5**	**47.3**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	0.0355 U	**0.135 J**	**0.397 J**	**1.41**	0.086 U	**0.252 J**	0.116 U	0.0818 U	**0.175 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	0.0611 U	0.099 U	**0.303 J**	**0.871 J**	0.115 U	**0.204 J**	0.142 U	0.0818 UJ	**0.159 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.0454 J**	**0.0812 J**	**0.317 J**	**1.05**	**0.117 J**	**0.252 J**	**0.156 J**	**0.0758 J**	**0.165 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.0375 J**	**0.105 J**	**0.459 J**	**1.79 J**	**0.205 J**	**0.559 J**	**0.261 J**	**0.124 J**	**0.556 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.0493 J**	**0.115 J**	**0.518 J**	**1.78 J**	**0.219 J**	**0.32 J**	**0.221 J**	**0.13 J**	**0.373 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**0.0335 J**	0.145 U	**0.185 J**	**0.618 J**	**0.127 J**	**0.18 J**	**0.0917 J**	**0.0539 J**	**0.265 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.0572 J**	**0.129 J**	**0.754 J**	**2.65**	**0.270 J**	**0.503 J**	**0.355 J**	**0.0858 J**	**0.534 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**0.643 J**	**1.21 J**	**5.68**	**26.8**	**2.44**	**3.93**	**3.43**	**1.59 J**	**6.28**

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07	HT-08	HT-09
		Location	Log Boom Park Shoreline					Tributary 0056		Motor Boat Launch	
		Sample ID	HT-01-S-C-121106	HT-02-S-C-121106	HT-03-S-C-121106	HT-04-S-C-121106	HT-05-S-C-121106	HT-06-S-E-121106	HT-07-S-E-121106	HT-08-S-C-121106	HT-09-S-C-121106
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2									
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	0.414 U	**0.0495 J**	**0.349 J**	**1.77 J**	**0.233 J**	**0.302 J**	**0.215 J**	**0.134 J**	**0.574 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**1.91 J**	**3.44 J**	**11.8**	**71.5**	**7.39**	**8.8**	**9.54**	**3.89 J**	**14.0**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**0.444 J**	**1.46 J**	**6.63 J**	**25.6 J**	**1.25 J**	**4.09 J**	**4.03 J**	**1.15 J**	**2.79 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**0.876 J**	**1.84 J**	**9.79 J**	**31.3 J**	**3.87 J**	**6.10 J**	**5.70 J**	**1.56 J**	**4.39 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	**1.18 J**	**2.42 J**	**13.6 J**	**50.5 J**	**4.60 J**	**8.75 J**	**6.85 J**	**2.41 J**	**11.2 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	**1.88**	**3.61 J**	**18.4 J**	**79.5 J**	**6.91 J**	**11.6**	**10.2**	**4.22**	**19.5**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**0.298 J**	**0.629 J**	**2.17 J**	**7.90 J**	**1.15 J**	**1.33 J**	**0.990 J**	**0.556 J**	**1.35 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**0.249 J**	**0.620 J**	**2.17 J**	**7.90 J**	**1.14 J**	**1.33 J**	**0.982 J**	**0.551 J**	**1.35 J**

Notes:

Detected concentration is greater than Freshwater SL1 screening level

Detected concentration is greater than Freshwater SL2 screening level

Bold = Detected result

-- = results not reported or not applicable

FD = field duplicate

J = estimated value

mg/kg = milligrams per kilogram

N = normal field sample

ng/kg = nanograms per kilogram

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

pct = percent

SEF = Sediment Evaluation Framwork (RSET 2006)

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

** Arsenic result of 30UJ was verified to be between the MDL and the RL and below the screening level.

All non-detect pesticides and dioxin/furan data were reported at the **method detection limit**; all other non-detect data were reported at the **reporting limit**.

Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest reporting limit value is reported as the sum.

Totals are calculated as the sum of all detected results and 1/2 the undetected reporting limit (U=1/2). If all results are not detected, the highest reporting limit value is reported as the sum.

Total LPAH (Low PAH) SEF is the total of 2-Methylnapthalene, Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene.

Total HPAH (High PAH) SEF is the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b,j,k)fluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene.

Total 7 PCB Aroclors is the total of all PCB Aroclors listed in this table.

Dioxin/Furan Toxicity Equivalency (TEQ) values as of 2005, World Health Organization.

USEPA Stage 2A validation was performed by Anchor QEA on all compounds, except dioxin/furans.

USEPA Stage 4 validation was performed by LDC on dioxin/furans.

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	HT-10	HT-11	SG-01	SG-02	SG-03	SG-04	SG-05	SG-06
		Location	Lake Forest Park	Lyon Creek Park	Sammamish River	North Lake Marina		Kenmore Navigation Channel		
		Sample ID	HT-10-S-LFP-121106	HT-11-S-LFP-121106	SG-01-S-C-121107	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108
		Sample Date	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 22 cm	0 - 25 cm	0 - 15 cm	0 - 23 cm	0 - 25 cm
	Freshwater SL1	Freshwater SL2								
Conventional Parameters (pct)										
Total organic carbon	--	--	**1.91**	**0.456**	**1.33**	**7.12**	**6.60**	**2.73**	**5.43**	**4.89**
Total solids	--	--	**80.2**	**83.9**	**72.9**	**25.7**	**25.6**	**80.8**	**35.0**	**29.9**
Total volatile solids	--	--	**1.18**	**0.910**	**1.19**	**13.51**	**15.15**	**1.72**	**11.13**	**13.89**
Gravel	--	--	**33.3**	**51.4**	0.1 U	**0.4**	**11.8**	**71.4**	**3.1**	0.1 U
Sand, Very Coarse	--	--	**11.0**	**8.1**	**0.2**	**6.5**	**9.2**	**7.6**	**2.9**	**7.4**
Sand, Coarse	--	--	**22.2**	**15.6**	**2.1**	**5.5**	**7.2**	**6.9**	**5.3**	**6.6**
Sand, Medium	--	--	**25.8**	**19.3**	**47.4**	**5.5**	**7.2**	**7.6**	**11.1**	**6.2**
Sand, Fine	--	--	**5.9**	**4.7**	**44.2**	**7.2**	**7.8**	**2.9**	**14.3**	**8.6**
Sand, Very Fine	--	--	**1.2**	**0.4**	**4.0**	**9.1**	**10.1**	**1.0**	**15.2**	**15.9**
Fines (silt + clay)	--	--	**0.5**	**0.4**	**2.2**	**65.8**	**46.7**	**2.5**	**48.1**	**55.2**
Silt, Coarse	--	--	0.5 U	0.4 U	--	**10**	**13.1**	--	**7.7**	**8.6**
Silt, Medium	--	--	0.5 U	0.4 U	--	**19.3**	**8.4**	--	**16**	**15.5**
Silt, Fine	--	--	0.5 U	0.4 U	--	**15.2**	**10.9**	--	**9.9**	**12.1**
Silt, Very Fine	--	--	0.5 U	0.4 U	--	**11.1**	**7.0**	--	**7.1**	**7.8**
Clay, Coarse	--	--	0.5 U	0.4 U	--	**5.6**	**4.5**	--	**4.3**	**6.3**
Clay, Medium	--	--	0.5 U	0.4 U	--	**3.2**	**1.8**	--	**1.9**	**3.2**
Clay, Fine	--	--	0.5 U	0.4 U	--	**1.4**	**1.1**	--	**1.3**	**1.6**
Metals (mg/kg)										
Antimony	--	--	6 UJ	6 UJ	6 UJ	20 U	20 U	6 U	10 U	20 U
Arsenic	20	51	6 U	6 U	6 UJ	20 U	20 U	6 U	10 U	20 U
Cadmium	1.1	1.5	**0.3**	**0.3**	0.2 U	**1.3**	**1.2**	**0.3**	**0.7**	**0.8**
Chromium	95	100	**24.3 J**	**22.6 J**	**29.3**	**56**	**55**	**35**	**43**	**57**
Copper	80	830	**8.9**	**8.9**	**5.9 J**	**92.4**	**88.1**	**14.6**	**35.6**	**43.6**
Lead	340	430	**9**	**7**	**4 J**	**62**	**42**	**5**	**28**	**31**
Mercury	0.28	0.75	0.02 U	0.02 U	0.03 U	**0.18**	**0.1**	0.02 U	**0.08**	**0.1**
Nickel	60	70	**27**	**30**	**23**	**48**	**45**	**30**	**39**	**46**
Selenium	--	--	0.6 U	0.6 U	0.6 U	2 U	2 U	0.6 U	1 U	2 U
Silver	2.0	2.5	0.3 U	0.4 U	0.4 U	1 U	1 U	0.4 U	0.9 U	1 U
Zinc	130	400	**59**	**55**	**43 J**	**231**	**267**	**49**	**143**	**164**
Organometallic Compounds										
Tributyltin (porewater) µg/L	--	--	--	--	--	**0.67**	**0.058**	**0.049**	**0.0080**	**0.023**
Tributyltin (bulk) µg/kg	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)										
1-Methylnaphthalene	--	--	4.8 U	4.8 U	4.8 U	**21**	**9.8 J**	20 U	**13 J**	20 U
2-Methylnaphthalene	470	560	4.8 U	4.8 U	4.8 U	**31**	**25**	20 U	**26**	**14 J**
Acenaphthene	1100	1300	4.8 U	4.8 U	4.8 U	**320**	**33**	**14 J**	**26**	**17 J**
Acenaphthylene	470	640	4.8 U	4.8 U	4.8 U	**22**	**16 J**	20 U	20 U	20 U
Anthracene	1200	1600	4.8 U	4.8 U	4.8 U	**66**	**68**	**26**	**39**	**28**
Benzo(a)anthracene	4300	5800	**18 J**	4.8 U	**15 J**	**210**	**190**	**81**	**110**	**110**

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	HT-10	HT-11	SG-01	SG-02	SG-03	SG-04	SG-05	SG-06
		Location	Lake Forest Park	Lyon Creek Park	Sammamish River	North Lake Marina		Kenmore Navigation Channel		
		Sample ID	HT-10-S-LFP-121106	HT-11-S-LFP-121106	SG-01-S-C-121107	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108
		Sample Date	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 22 cm	0 - 25 cm	0 - 15 cm	0 - 23 cm	0 - 25 cm
	Freshwater SL1	Freshwater SL2								
Benzo(a)pyrene	3300	4800	**21**	4.8 U	**15 J**	**190**	**160**	**62**	**76**	**120**
Benzo(g,h,i)perylene	4000	5200	**19**	4.8 U	**3.2 J**	**170**	**130**	**43**	**63**	**93**
Chrysene	5900	6400	**26**	**2.4 J**	**20**	**440**	**340**	**110**	**190**	**190**
Dibenzo(a,h)anthracene	800	840	4.8 U	4.8 U	4.8 U	**67**	**55**	**15 J**	**21**	**37**
Fluoranthene	11000	15000	**56**	**3.0 J**	**51**	**480**	**410**	**220**	**310**	**290**
Fluorene	1000	3000	4.8 U	4.8 U	4.8 U	**98**	**46**	**14 J**	**37**	**28**
Indeno(1,2,3-c,d)pyrene	4100	5300	**16 J**	4.8 U	**3.6 J**	**140**	**110**	**39**	**51**	**81**
Naphthalene	500	1300	4.8 U	4.8 U	4.8 U	**83**	**58**	20 U	**50**	**38**
Phenanthrene	6100	7600	**29**	4.8 U	**26**	**170**	**190**	**140**	**180**	**140**
Pyrene	8800	16000	**41**	20 U	**39**	**590**	**440**	**190**	**300**	**290**
Total Benzo(b,j,k)fluoranthenes	600	4000	**44**	**2.5 J**	**35 J**	**530**	**420**	**140**	**220**	**300**
Total HPAH (SEF) (U = 1/2)	31000	55000	**243.4 J**	**29.9 J**	**184.2 J**	**2817**	**2255**	**900 J**	**1341**	**1511**
Total LPAH (SEF) (U = 1/2)	6600	9200	**43.4**	4.8 U	**40.4**	**790**	**436 J**	**224 J**	**368**	**275 J**
Chlorinated Hydrocarbons (µg/kg)										
1,2,4-Trichlorobenzene	--	--	19 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
1,2-Dichlorobenzene	--	--	19 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
1,3-Dichlorobenzene	--	--	19 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
1,4-Dichlorobenzene	--	--	19 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
Hexachlorobenzene	--	--	19 U	20 U	19 U	4.9 U	4.9 U	4.9 U	5.0 U	4.8 U
Hexachloroethane	--	--	19 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
Phthalates (µg/kg)										
Bis(2-ethylhexyl)phthalate	220	320	**31**	**21 J**	**28**	**680**	**510**	62 U	**260**	**540**
Butylbenzyl phthalate	260	370	19 U	20 U	19 U	**32**	**32**	20 U	20 U	**57**
Diethyl phthalate	--	--	48 U	49 U	48 U	49 U	**38 J**	49 U	49 U	**58**
Dimethyl phthalate	46	440	19 U	20 U	19 U	**28**	20 U	20 U	20 U	20 U
Di-n-butyl phthalate	--	--	19 U	20 U	19 U	19 U	**9.8 J**	20 U	20 U	20 U
Di-n-octyl phthalate	26	45	19 U	20 U	19 U	19 U	**58 J**	20 U	**22 J**	**41 J**
Phenols (µg/kg)										
2,4-Dimethylphenol	--	--	19 UJ	20 UJ	19 UJ	19 UJ	20 UJ	20 UJ	20 UJ	20 UJ
2-Methylphenol (o-Cresol)	--	--	19 U	20 U	19 UJ	19 U	20 U	20 UJ	20 U	20 U
4-Methylphenol (p-Cresol)	--	--	39 U	39 U	38 U	**74**	**76**	39 U	**74**	**91**
Pentachlorophenol	--	--	190 U	200 U	190 U	190 U	200 U	200 U	200 U	200 U
Phenol	--	--	19 U	20 U	19 U	19 U	**110**	20 U	**180**	**80**
Miscellaneous Extractables (µg/kg)										
Benzoic acid	--	--	390 U	390 U	380 U	**960**	**1300**	390 U	**1300**	**1100**
Benzyl alcohol	--	--	19 U	20 U	19 U	**82**	**130**	20 U	**160**	**190**
Dibenzofuran	400	440	4.8 U	4.8 U	4.8 U	**30**	**35**	20 U	**28**	20 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	--	--	10 UJ	10 UJ	10 UJ	4.9 U	4.9 U	4.9 U	5.0 U	4.8 U
N-Nitrosodiphenylamine	--	--	19 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
Pesticides (µg/kg)										

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	HT-10	HT-11	SG-01	SG-02	SG-03	SG-04	SG-05	SG-06
		Location	Lake Forest Park	Lyon Creek Park	Sammamish River	North Lake Marina		Kenmore Navigation Channel		
		Sample ID	HT-10-S-LFP-121106	HT-11-S-LFP-121106	SG-01-S-C-121107	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108
		Sample Date	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 22 cm	0 - 25 cm	0 - 15 cm	0 - 23 cm	0 - 25 cm
	Freshwater SL1	Freshwater SL2								
4,4'-DDD (p,p'-DDD)	--	--	--	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
4,4'-DDE (p,p'-DDE)	--	--	--	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
4,4'-DDT (p,p'-DDT)	--	--	--	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
Aldrin	--	--	--	--	--	0.64 U	0.64 U	0.64 U	0.65 U	0.63 U
Chlordane, alpha- (cis-Chlordane)	--	--	--	--	--	0.83 U	0.83 U	0.83 U	0.84 U	0.82 U
Chlordane, beta- (trans-Chlordane)	--	--	--	--	--	0.78 U	0.78 U	0.77 U	0.79 U	0.77 U
Dieldrin	--	--	--	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
Heptachlor	--	--	--	--	--	0.64 U	0.64 U	0.64 U	0.65 U	0.63 U
Nonachlor, cis-	--	--	--	--	--	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U
Nonachlor, trans-	--	--	--	--	--	4.7 U	4.7 U	4.7 U	4.8 U	4.7 U
Oxychlordane	--	--	--	--	--	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U
PCB Aroclors (µg/kg)										
Aroclor 1016	--	--	19 U	19 U	17 U	19 U	19 U	20 U	19 U	19 U
Aroclor 1221	--	--	19 U	19 U	17 U	19 U	19 U	20 U	19 U	19 U
Aroclor 1232	--	--	19 U	19 U	17 U	19 U	19 U	20 U	29 U	19 U
Aroclor 1242	--	--	19 U	19 U	17 U	19 U	19 U	20 U	19 U	19 U
Aroclor 1248	--	--	19 U	19 U	17 U	58 U	38 U	20 U	19 U	19 U
Aroclor 1254	--	--	19 U	19 U	17 U	**88**	48 U	20 U	29 U	28 U
Aroclor 1260	--	--	19 U	19 U	17 U	**33**	**22**	20 U	19 U	19 U
Total 7 PCB Aroclors (U = 0)	60	120	19 U	19 U	17 U	**121**	**22**	20 U	29 U	28 U
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.168 J**	**0.153 J**	**0.164 J**	**0.975 J**	**0.599 J**	**0.15 J**	**0.322 J**	**0.478 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**0.117 J**	0.066 U	**0.107 J**	**7.83**	**3.75**	**0.381 J**	**1.33**	**1.58**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	0.303 U	**0.0718 J**	**0.0809 J**	**14.5**	**6.97**	**0.491 J**	**2.18**	**2.65**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.377 J**	**0.312 J**	**0.31 J**	**53.1**	**28.0**	**1.62 J**	**8.58**	**9.51**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.245 J**	**0.103 J**	**0.219 J**	**29.5**	**14.5**	**0.897 J**	**4.84**	**5.68**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	--	--	**6.32**	**5.45**	**5.70**	**1020**	**610**	**40.5**	**184**	**237**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**40.1**	**44.9**	**40.5**	**7420**	**4760**	**307**	**1540**	**2520**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.338 J**	**0.341 J**	**0.395 J**	**14.9 J**	**9.77 J**	**1.13 J**	**4.22 J**	**4.89 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**0.617 J**	**0.293 J**	**0.391 J**	**43.9**	**26.5**	**2.51 J**	**9.38 J**	**9.24 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**2.3 J**	**1.76 J**	**2.07 J**	**334**	**206**	**16.1**	**60.4**	**70.1**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**11.0**	**14.0**	**10.9**	**2260**	**1620**	**134**	**473**	**803**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	0.0751 U	0.153 U	0.0691 U	**3.37**	**2.13**	**0.173 J**	**0.841 J**	**0.967 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	0.0909 U	0.0563 U	**0.077 J**	**3.04**	**1.71 J**	**0.164 J**	**0.684 J**	**0.746 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.146 J**	**0.0466 J**	**0.0592 J**	**3.27**	**1.86**	**0.128 J**	**0.785 J**	**0.826 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.136 J**	**0.0834 J**	**0.154 J**	**8.04**	**4.83**	**0.289 J**	**1.74 J**	**1.90 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.119 J**	**0.066 J**	**0.0573 J**	**8.28**	**4.02**	**0.261 J**	**1.45 J**	**1.64 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	0.14 U	0.162 U	0.0573 U	**3.12**	**1.8 J**	**0.185 J**	**0.751 J**	**0.846 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.128 J**	**0.134 J**	**0.0553 J**	**11.7**	**6.21**	**0.361 J**	**2.14**	**2.55**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**1.05 J**	**0.840 J**	**1.19 J**	**137**	**84.1**	**4.39**	**25.4**	**31.3**

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	HT-10	HT-11	SG-01	SG-02	SG-03	SG-04	SG-05	SG-06
		Location	Lake Forest Park Lyon Creek Park		Sammamish River	North Lake Marina		Kenmore Navigation Channel		
		Sample ID	HT-10-S-LFP-121106	HT-11-S-LFP-121106	SG-01-S-C-121107	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108
		Sample Date	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 22 cm	0 - 25 cm	0 - 15 cm	0 - 23 cm	0 - 25 cm
	Freshwater SL1	Freshwater SL2								
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**0.0652 J**	**0.0272 J**	**0.0454 J**	**7.34**	**4.63**	**0.315 J**	**1.63 J**	**1.98 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**2.38 J**	**1.61 J**	**2.67 J**	**366**	**272**	**10.8**	**71.9**	**108**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**2.82 J**	**0.72 J**	**0.679 J**	**55.5 J**	**32.2 J**	**2.12 J**	**13.8 J**	**15.5 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**2.74 J**	**2.97 J**	**1.28 J**	**119**	**59.4 J**	**3.51 J**	**22.5 J**	**24.5 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	**2.46 J**	**2.49 J**	**2.43 J**	**240**	**136 J**	**7.38 J**	**45.2**	**51.1 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	**2.73 J**	**2.23 J**	**3.28 J**	**404**	**273**	**13.1 J**	**79.2**	**104**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**0.544 J**	**0.371 J**	**0.467 J**	**37.0 J**	**20.3 J**	**1.5 J**	**6.8 J**	**8.4 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**0.516 J**	**0.321 J**	**0.461 J**	**37.0 J**	**20.3 J**	**1.5 J**	**6.8 J**	**8.4 J**

Notes:

Detected concentration is greater than Freshwater SL1 screening level

Detected concentration is greater than Freshwater SL2 screening level

Bold = Detected result

-- = results not reported or not applicable

FD = field duplicate

J = estimated value

mg/kg = milligrams per kilogram

N = normal field sample

ng/kg = nanograms per kilogram

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

pct = percent

SEF = Sediment Evaluation Framwork (RSET 2006)

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

** Arsenic result of 30UJ was verified to be between the MDL and the RL and below the scree

All non-detect pesticides and dioxin/furan data were reported at the **method detection limit**;

Totals are calculated as the sum of all detected results (U=0). If all results are not detected, th

Totals are calculated as the sum of all detected results and 1/2 the undetected reporting limit

Total LPAH (Low PAH) SEF is the total of 2-Methylnapthalene, Naphthalene, Acenaphthylene,

Total HPAH (High PAH) SEF is the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysen

Total 7 PCB Aroclors is the total of all PCB Aroclors listed in this table.

Dioxin/Furan Toxicity Equivalency (TEQ) values as of 2005, World Health Organization.

USEPA Stage 2A validation was performed by Anchor QEA on all compounds, except dioxin/fu

USEPA Stage 4 validation was performed by LDC on dioxin/furans.

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	SG-07	SG-07	SG-08	SG-09	SG-10	SG-11	SG-12	SG-13
		Location	Kenmore Navigation Channel				Harbor Village Marina			
		Sample ID	SG-07-S-C-121108	G-07-S-C-DUP-12110	SG-08-S-C-121108	SG-09-S-C-121108	SG-10-S-E-121107	SG-11-S-E-121107	SG-12-S-E-121107	SG-13-S-E-121107
		Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2								
Conventional Parameters (pct)										
Total organic carbon	--	--	**4.95**	**7.07**	**3.30**	**5.22**	**3.14**	**10.8**	**4.65**	**5.45**
Total solids	--	--	**33.7**	**34.3**	**42.0**	**35.7**	**56.1**	**16.9**	**27.4**	**23.2**
Total volatile solids	--	--	**13.40**	**14.11**	**9.10**	**10.58**	**6.51**	**24.10**	**13.67**	**15.02**
Gravel	--	--	**0.5**	**2.6**	**0.3**	**0.1**	**5.3**	0.1 U	**0.6**	0.1 U
Sand, Very Coarse	--	--	**2.7**	**2.7**	**1.5**	**2.1**	**3.0**	**5.3**	**4.2**	**4.3**
Sand, Coarse	--	--	**3.1**	**2.8**	**1.5**	**1.7**	**3.9**	**4.6**	**3.8**	**3.2**
Sand, Medium	--	--	**6.3**	**6.0**	**3.9**	**6.9**	**13.2**	**4.4**	**3.5**	**2.8**
Sand, Fine	--	--	**24.4**	**21.9**	**22.2**	**15.9**	**26.5**	**5.6**	**5.2**	**5.1**
Sand, Very Fine	--	--	**18.9**	**18.6**	**21.2**	**13.4**	**21.9**	**7.4**	**11.6**	**10.1**
Fines (silt + clay)	--	--	**44.1**	**45.4**	**49.3**	**59.7**	**26.4**	**72.7**	**71.1**	**74.6**
Silt, Coarse	--	--	**11**	**13.7**	**13.0**	**19.7**	**17.2**	**18.6**	**22.9**	**11.5**
Silt, Medium	--	--	**12.1**	**11.0**	**13.7**	**12.9**	**3.9**	**20.2**	**22.9**	**21.2**
Silt, Fine	--	--	**7.9**	**7.6**	**8.4**	**10.9**	**1.9**	**14.3**	**12.5**	**16.9**
Silt, Very Fine	--	--	**5.9**	**6.1**	**6.3**	**7.6**	**1.4**	**10.9**	**6.2**	**13.3**
Clay, Coarse	--	--	**3.8**	**3.9**	**3.9**	**4.7**	**1.0**	**5.1**	**3.4**	**6.4**
Clay, Medium	--	--	**2.5**	**2.1**	**2.6**	**2.6**	**0.5**	**2.6**	**2.0**	**3.3**
Clay, Fine	--	--	**0.9**	**0.9**	**1.4**	**1.3**	**0.5**	**1.1**	**1.0**	**1.9**
Metals (mg/kg)										
Antimony	--	--	10 U	10 U	10 U	10 U	9 UJ	30 UJ	20 UJ	20 UJ
Arsenic	20	51	10 U	10 U	10 U	10 U	9 UJ	30 UJ **	20 UJ	20 UJ
Cadmium	1.1	1.5	**0.6**	**0.6**	**0.6**	**0.6**	**0.4**	1 U	0.7 U	0.9 U
Chromium	95	100	**41**	**44**	**44**	**48**	**29.8**	**52**	**44**	**54**
Copper	80	830	**30**	**28.7**	**28**	**31.1**	**18.8 J**	**97 J**	**47.5 J**	**62.1 J**
Lead	340	430	**21**	**21**	**21**	**24**	**19 J**	**50 J**	**27 J**	**32 J**
Mercury	0.28	0.75	**0.11**	**0.08**	**0.07**	**0.08**	**0.04**	**0.1**	**0.1**	**0.1**
Nickel	60	70	**41**	**42**	**40**	**43**	**33**	**47**	**41**	**46**
Selenium	--	--	1 U	1 U	1 U	1 U	0.9 U	3 U	2 U	2 U
Silver	2.0	2.5	0.9 U	0.8 U	0.7 U	0.9 U	0.5 U	2 U	1 U	1 U
Zinc	130	400	**126**	**123**	**113**	**130**	**97 J**	**377 J**	**185 J**	**205 J**
Organometallic Compounds										
Tributyltin (porewater) µg/L	--	--	0.0050 U	0.0050 U	0.0050 U	0.0050 U	--	--	--	--
Tributyltin (bulk) µg/kg	--	--	--	--	--	--	3.6 U	**9.8**	**6.8**	**12**
Polycyclic Aromatic Hydrocarbons (µg/kg)										
1-Methylnaphthalene	--	--	20 U	19 U	**9.6 J**	20 U	**5.5**	**13 J**	**5.2**	**18 J**
2-Methylnaphthalene	470	560	20 U	19 U	19 U	20 U	**12**	**47**	**13**	**24**
Acenaphthene	1100	1300	20 U	19 U	19 U	20 U	**14**	**32**	**18 J**	**17 J**
Acenaphthylene	470	640	20 U	19 U	19 U	20 U	**3.5 J**	**19 J**	**5.7**	**26**
Anthracene	1200	1600	**18 J**	19 U	19 U	20 U	**57**	**66**	**41**	**48**
Benzo(a)anthracene	4300	5800	**110**	**52**	**42**	**40**	**200**	**200**	**120**	**150**

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	SG-07	SG-07	SG-08	SG-09	SG-10	SG-11	SG-12	SG-13
		Location	Kenmore Navigation Channel				Harbor Village Marina			
		Sample ID	SG-07-S-C-121108	G-07-S-C-DUP-12110	SG-08-S-C-121108	SG-09-S-C-121108	SG-10-S-E-121107	SG-11-S-E-121107	SG-12-S-E-121107	SG-13-S-E-121107
		Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2								
Benzo(a)pyrene	3300	4800	**63**	**55**	**50**	**45**	**190**	**210**	**110**	**140**
Benzo(g,h,i)perylene	4000	5200	**36**	**41**	**41**	**36**	**140**	**110**	**85**	**120**
Chrysene	5900	6400	**140**	**82**	**73**	**72**	**290**	**370**	**210**	**300**
Dibenzo(a,h)anthracene	800	840	**17 J**	**12 J**	**11 J**	**13 J**	**34**	**45**	**36**	**40**
Fluoranthene	11000	15000	**150**	**140**	**130**	**120**	**480**	**430**	**300**	**260**
Fluorene	1000	3000	**12 J**	**9.7 J**	19 U	20 U	**28**	**38**	**59**	**46**
Indeno(1,2,3-c,d)pyrene	4100	5300	**33**	**38**	**36**	**33**	**110**	**90**	**77**	**100**
Naphthalene	500	1300	**18 J**	**25**	**14 J**	**24**	**38**	**39**	**39**	**39**
Phenanthrene	6100	7600	**72**	**68**	**64**	**59**	**260**	**210**	**170**	**190**
Pyrene	8800	16000	**140**	**130**	**120**	**120**	**800**	**470**	**230**	**290**
Total Benzo(b,j,k)fluoranthenes	600	4000	**170**	**140**	**120**	**120**	**400**	**570**	**290**	**380**
Total HPAH (SEF) (U = 1/2)	31000	55000	**859 J**	**690 J**	**623 J**	**599 J**	**2644**	**2495**	**1458**	**1780**
Total LPAH (SEF) (U = 1/2)	6600	9200	**150 J**	**140.7 J**	**125.5 J**	**133**	**412.5 J**	**451 J**	**345.7 J**	**390 J**
Chlorinated Hydrocarbons (µg/kg)										
1,2,4-Trichlorobenzene	--	--	20 U	19 U	19 U	20 U	20 U	20 U	20 U	20 U
1,2-Dichlorobenzene	--	--	20 U	19 U	19 U	20 U	20 U	20 U	20 U	20 U
1,3-Dichlorobenzene	--	--	20 U	19 U	19 U	20 U	20 U	20 U	20 U	20 U
1,4-Dichlorobenzene	--	--	20 U	19 U	19 U	20 U	20 U	20 U	20 U	20 U
Hexachlorobenzene	--	--	4.9 U	4.8 U	4.8 U	4.8 U	4.8 U	3.9 U	4.9 U	4.9 U
Hexachloroethane	--	--	20 U	19 U	19 U	20 U	20 U	20 U	20 U	20 U
Phthalates (µg/kg)										
Bis(2-ethylhexyl)phthalate	220	320	**330**	**300**	**240**	**240**	**480**	**740**	**360**	**560**
Butylbenzyl phthalate	260	370	**28**	19 U	**36**	**29**	20 U	**24**	**71**	**82**
Diethyl phthalate	--	--	49 U	48 U	48 U	49 U	50 U	**44 J**	**100**	**55**
Dimethyl phthalate	46	440	20 U	19 U	19 U	20 U	20 U	20 U	20 U	20 U
Di-n-butyl phthalate	--	--	20 U	**12 J**	19 U	20 U	20 U	20 U	**26**	20 U
Di-n-octyl phthalate	26	45	**22 J**	19 U	19 U	20 U	20 U	**87**	20 U	**73 J**
Phenols (µg/kg)										
2,4-Dimethylphenol	--	--	20 UJ	19 UJ	19 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ
2-Methylphenol (o-Cresol)	--	--	20 U	19 U	19 U	20 U	20 U	**11 J**	**12 J**	**12 J**
4-Methylphenol (p-Cresol)	--	--	**54**	**31 J**	**22 J**	**36 J**	**160**	**150**	**74**	**110**
Pentachlorophenol	--	--	200 U	190 U	190 U	200 U	200 U	**55 J**	200 U	**52 J**
Phenol	--	--	**42**	**42**	**19**	**39**	**55**	**140**	**300**	**200**
Miscellaneous Extractables (µg/kg)										
Benzoic acid	--	--	**430**	**480**	**300 J**	**510**	**520**	**1400**	**1500**	**1600**
Benzyl alcohol	--	--	**120**	**100**	**61**	**110**	**200**	**530**	**300**	**360**
Dibenzofuran	400	440	20 U	19 U	19 U	20 U	**19**	**24**	**13**	**12**
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	--	--	4.9 U	4.8 U	4.8 U	4.8 U	4.8 U	3.9 U	10 UJ	4.9 U
N-Nitrosodiphenylamine	--	--	20 U	19 U	19 U	20 U	20 U	20 U	20 U	20 U
Pesticides (µg/kg)										

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	SG-07	SG-07	SG-08	SG-09	SG-10	SG-11	SG-12	SG-13
		Location	Kenmore Navigation Channel				Harbor Village Marina			
		Sample ID	SG-07-S-C-121108	G-07-S-C-DUP-12110	SG-08-S-C-121108	SG-09-S-C-121108	SG-10-S-E-121107	SG-11-S-E-121107	SG-12-S-E-121107	SG-13-S-E-121107
		Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2								
4,4'-DDD (p,p'-DDD)	--	--	1.7 U	1.7 U	1.7 U	1.6 U	1.6 U	1.3 U	1.7 U	1.7 U
4,4'-DDE (p,p'-DDE)	--	--	1.7 U	1.6 U	1.6 U	1.6 U	1.6 U	**7.2 J**	**4.0 J**	1.7 U
4,4'-DDT (p,p'-DDT)	--	--	1.7 U	1.7 U	1.7 U	1.6 U	1.6 U	1.3 U	1.7 U	1.7 U
Aldrin	--	--	0.64 U	0.63 U	0.63 U	0.63 U	0.62 U	0.51 U	0.64 U	0.64 U
Chlordane, alpha- (cis-Chlordane)	--	--	0.83 U	0.81 U	0.81 U	0.81 U	0.8 U	0.66 U	0.83 U	0.83 U
Chlordane, beta- (trans-Chlordane)	--	--	0.78 U	0.76 U	0.76 U	0.76 U	0.75 U	0.62 U	0.78 U	0.78 U
Dieldrin	--	--	1.7 U	1.6 U	1.6 U	1.6 U	1.6 U	1.3 U	1.7 U	1.7 U
Heptachlor	--	--	0.64 U	0.63 U	0.63 UJ	0.63 U	0.62 U	0.51 U	0.64 U	0.64 U
Nonachlor, cis-	--	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.3 U	1.6 U	1.6 U
Nonachlor, trans-	--	--	4.7 U	4.6 U	4.6 U	4.6 U	4.6 U	3.8 U	4.7 U	**4.1 J**
Oxychlordane	--	--	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U	1.8 U	2.3 U	2.3 U
PCB Aroclors (µg/kg)										
Aroclor 1016	--	--	19 U	19 U	18 U	20 U	18 U	19 U	19 U	20 U
Aroclor 1221	--	--	19 U	19 U	18 U	20 U	18 U	19 U	19 U	20 U
Aroclor 1232	--	--	19 U	19 U	18 U	20 U	18 U	19 U	19 U	25 U
Aroclor 1242	--	--	19 U	19 U	18 U	20 U	18 U	19 U	19 U	20 U
Aroclor 1248	--	--	19 U	19 U	18 U	20 U	18 U	39 U	24 U	20 U
Aroclor 1254	--	--	19 U	**22**	18 U	20 U	32 U	48 U	49 U	50 U
Aroclor 1260	--	--	19 U	19 U	18 U	20 U	18 U	**29 J**	19 U	20 U
Total 7 PCB Aroclors (U = 0)	60	120	19 U	**22**	18 U	20 U	32 U	**29 J**	49 U	50 U
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.306 J**	**0.341 J**	**0.293 J**	**0.372 J**	**0.388 J**	**1.32**	**0.804 J**	**0.719 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**1.18**	**1.03**	**0.870 J**	**1.24**	**1.47**	**12.8**	**5.1**	**5.66**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**1.42 J**	**1.38 J**	**1.36 J**	**1.71 J**	**2.26**	**25.8**	**8.29**	**11.8**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**4.38**	**4.21**	**3.85**	**5.03**	**8.32**	**119**	**38.8**	**97.4**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**2.85**	**2.95**	**2.99**	**3.54**	**4.73**	**52.3**	**18.0**	**25.6**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	--	--	**85.5**	**82.7**	**88.5**	**103**	**168**	**2120**	**769**	**1730**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**652**	**613**	**684**	**798**	**1290**	**16500**	**6410**	**14400**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**4.25 J**	**3.82 J**	**3.33 J**	**4.12 J**	**3.27 J**	**14.7 J**	**9.33 J**	**10.5 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**8.33 J**	**7.29 J**	**6.12 J**	**7.92 J**	**8.56 J**	**60.3**	**27.8**	**31.5**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**31.4 J**	**30.2 J**	**27.2 J**	**35.0 J**	**50.6 J**	**563**	**199**	**353**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**167**	**155**	**160**	**191**	**332**	**4150**	**1470**	**3200**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**0.643 J**	**0.579 J**	**0.553 J**	**0.784 J**	**0.759 J**	**3.38**	**2.15**	**2.84 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.442 J**	**0.466 J**	**0.409 J**	**0.577 J**	**0.675 J**	**5.37 J**	**2.87**	**5.3 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.452 J**	**0.556 J**	**0.540 J**	**0.573 J**	**0.725 J**	**5.19**	**2.57 J**	**4.71**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**1.20 J**	**1.05 J**	**1.30 J**	**1.43 J**	**1.49 J**	**15.3**	**6.40**	**13.2**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.989 J**	**0.958 J**	**0.964 J**	**1.23 J**	**1.26 J**	**13.6**	**5.15**	**8.24**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**0.386 J**	**0.411 J**	**0.366 J**	**0.497 J**	**0.692 J**	**7.11**	**2.96**	**7.63**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**1.40 J**	**1.34 J**	**1.37 J**	**1.74 J**	**1.96**	**21.1**	**8.02**	**15.4**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**14.6**	**14.6**	**18.7**	**17.7**	**22.3**	**282**	**104**	**230**

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	SG-07	SG-07	SG-08	SG-09	SG-10	SG-11	SG-12	SG-13
		Location	Kenmore Navigation Channel				Harbor Village Marina			
		Sample ID	SG-07-S-C-121108	G-07-S-C-DUP-12110	SG-08-S-C-121108	SG-09-S-C-121108	SG-10-S-E-121107	SG-11-S-E-121107	SG-12-S-E-121107	SG-13-S-E-121107
		Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2								
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**1.06 J**	**1.14 J**	**1.83 J**	**1.33 J**	**1.59 J**	**15.3**	**6.00**	**10.6**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**40.9**	**39.5**	**66.0**	**46.6**	**77.5**	**871**	**356**	**837**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**11.1 J**	**10.3 J**	**9.21 J**	**12.2 J**	**11.3 J**	**51.2 J**	**29.7 J**	**32.4 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**14.8 J**	**14.2 J**	**12.8 J**	**17.1 J**	**19.7 J**	**157 J**	**75.2 J**	**129 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	**25.8 J**	**25.6**	**25.7 J**	**30.6 J**	**39.1**	**472**	**193 J**	**438 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	**43.8**	**43.3**	**57.2 J**	**52.8 J**	**73.3**	**879**	**347**	**809**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**4.2 J**	**4.0 J**	**3.9 J**	**4.9 J**	**6.57 J**	**70.98 J**	**26.56 J**	**50.439 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**4.2 J**	**4.0 J**	**3.9 J**	**4.9 J**	**6.57 J**	**70.98 J**	**26.56 J**	**50.439 J**

Notes:

Detected concentration is greater than Freshwater SL1 screening level

Detected concentration is greater than Freshwater SL2 screening level

Bold = Detected result

-- = results not reported or not applicable

FD = field duplicate

J = estimated value

mg/kg = milligrams per kilogram

N = normal field sample

ng/kg = nanograms per kilogram

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

pct = percent

SEF = Sediment Evaluation Framwork (RSET 2006)

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

** Arsenic result of 30UJ was verified to be between the MDL and the RL and below the scree

All non-detect pesticides and dioxin/furan data were reported at the **method detection limit**;

Totals are calculated as the sum of all detected results (U=0). If all results are not detected, th

Totals are calculated as the sum of all detected results and 1/2 the undetected reporting limit

Total LPAH (Low PAH) SEF is the total of 2-Methylnapthalene, Naphthalene, Acenaphthylene,

Total HPAH (High PAH) SEF is the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysen

Total 7 PCB Aroclors is the total of all PCB Aroclors listed in this table.

Dioxin/Furan Toxicity Equivalency (TEQ) values as of 2005, World Health Organization.

USEPA Stage 2A validation was performed by Anchor QEA on all compounds, except dioxin/fu

USEPA Stage 4 validation was performed by LDC on dioxin/furans.

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	SG-13	SG-14	SG-15	SG-16	SG-17
		Location	Harbor Village Marina	Kenmore Harbor	Kemore Industrial Park Shoreline		
		Sample ID	SG-13-S-E-DUP-121107	SG-14-S-E-121107	SG-15-S-E-121107	SG-16-S-E-121107	SG-17-S-E-121107
		Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2					
Conventional Parameters (pct)							
Total organic carbon	--	--	**3.82**	**4.33**	**1.87**	**0.724**	**2.98**
Total solids	--	--	**22.7**	**51**	**82.4**	**77.7**	**46.9**
Total volatile solids	--	--	**14.56**	**7.61**	**1.24**	**0.98**	**6.70**
Gravel	--	--	0.1 U	**22.6**	**0.4**	**0.1**	**0.3**
Sand, Very Coarse	--	--	**3.4**	**6.0**	**1.5**	**0.4**	**3.3**
Sand, Coarse	--	--	**3.0**	**7.6**	**3.9**	**5.5**	**3.9**
Sand, Medium	--	--	**2.9**	**14.6**	**22.3**	**77.5**	**5.5**
Sand, Fine	--	--	**4.6**	**11.4**	**62.7**	**14.6**	**6.0**
Sand, Very Fine	--	--	**9.3**	**7.3**	**6.8**	**1.2**	**11.7**
Fines (silt + clay)	--	--	**76.7**	**30.6**	**2.4**	**0.8**	**69.1**
Silt, Coarse	--	--	**11.6**	**7.5**	--	--	**12.0**
Silt, Medium	--	--	**22.4**	**7.9**	--	--	**17.3**
Silt, Fine	--	--	**17.4**	**5.3**	--	--	**13**
Silt, Very Fine	--	--	**13.7**	**4.9**	--	--	**9.2**
Clay, Coarse	--	--	**6.1**	**2.0**	--	--	**6.1**
Clay, Medium	--	--	**3.0**	**1.2**	--	--	**4.3**
Clay, Fine	--	--	**2.5**	**1.7**	--	--	**7.2**
Metals (mg/kg)							
Antimony	--	--	20 UJ	10 UJ	6 UJ	6 UJ	10 UJ
Arsenic	20	51	20 UJ	10 UJ	6 UJ	6 UJ	10 UJ
Cadmium	1.1	1.5	0.9 U	**0.7**	0.3 U	0.2 U	0.4 U
Chromium	95	100	**55**	**36**	**20.9**	**29.9**	**54**
Copper	80	830	**62.8 J**	**111 J**	**5.5 J**	**5.4 J**	**13.5 J**
Lead	340	430	**32 J**	**26 J**	**7 J**	**4 J**	**7 J**
Mercury	0.28	0.75	**0.1**	**0.24**	0.03 U	0.03 U	**0.04**
Nickel	60	70	**45**	**35**	**20**	**26**	**34**
Selenium	--	--	2 U	1 U	0.7 U	0.6 U	1 U
Silver	2.0	2.5	1 U	0.7 U	0.4 U	0.4 U	0.6 U
Zinc	130	400	**205 J**	**182 J**	**57 J**	**43 J**	**64 J**
Organometallic Compounds							
Tributyltin (porewater) µg/L	--	--	--	**0.010**	--	--	--
Tributyltin (bulk) µg/kg	--	--	**12**	--	3.6 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)							
1-Methylnaphthalene	--	--	**7.2**	**34**	4.7 U	4.8 U	4.9 U
2-Methylnaphthalene	470	560	**19**	**59**	4.7 U	4.8 U	**7.4**
Acenaphthene	1100	1300	**16 J**	**130**	**3.8 J**	4.8 U	4.9 U
Acenaphthylene	470	640	**7.5**	**26**	4.7 U	4.8 U	4.9 U
Anthracene	1200	1600	**44**	**150**	4.7 U	4.8 U	**11 J**
Benzo(a)anthracene	4300	5800	**160**	**360**	**4.6 J**	4.8 U	**42**

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	SG-13	SG-14	SG-15	SG-16	SG-17
		Location	Harbor Village Marina	Kenmore Harbor	Kemore Industrial Park Shoreline		
		Sample ID	SG-13-S-E-DUP-121107	SG-14-S-E-121107	SG-15-S-E-121107	SG-16-S-E-121107	SG-17-S-E-121107
		Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2					
Benzo(a)pyrene	3300	4800	**120**	**250**	**4.1 J**	**2.9 J**	**41**
Benzo(g,h,i)perylene	4000	5200	**85**	**95**	4.7 U	4.8 UJ	**27**
Chrysene	5900	6400	**240**	**550**	**4.9**	**3.0 J**	**64**
Dibenzo(a,h)anthracene	800	840	**26**	**42**	4.7 U	4.8 UJ	4.9 U
Fluoranthene	11000	15000	**220**	**1200**	**12 J**	**11 J**	**130**
Fluorene	1000	3000	**32**	**150**	**5.5**	4.8 U	**2.5 J**
Indeno(1,2,3-c,d)pyrene	4100	5300	**79**	**97**	4.7 U	4.8 UJ	**24**
Naphthalene	500	1300	**40**	**170**	4.7 U	4.8 UJ	**4.0 J**
Phenanthrene	6100	7600	**160**	**830**	**16 J**	**2.6 J**	**93**
Pyrene	8800	16000	**230**	**920**	**11 J**	**9.7 J**	**120**
Total Benzo(b,j,k)fluoranthenes	600	4000	**320**	**720**	**12**	**8.2**	**91**
Total HPAH (SEF) (U = 1/2)	31000	55000	**1480**	**4234**	**55.6 J**	**44.4 J**	**541.5**
Total LPAH (SEF) (U = 1/2)	6600	9200	**318.5 J**	**1515**	**34.7 J**	**17 J**	**122.8 J**
Chlorinated Hydrocarbons (µg/kg)							
1,2,4-Trichlorobenzene	--	--	20 U	19 U	19 U	19 U	19 U
1,2-Dichlorobenzene	--	--	20 U	19 U	19 U	19 U	19 U
1,3-Dichlorobenzene	--	--	20 U	19 U	19 U	19 U	19 U
1,4-Dichlorobenzene	--	--	20 U	19 U	19 U	19 U	19 U
Hexachlorobenzene	--	--	4.9 U	4.9 U	0.97 U	19 U	19 U
Hexachloroethane	--	--	20 U	19 U	19 U	19 U	19 U
Phthalates (µg/kg)							
Bis(2-ethylhexyl)phthalate	220	320	**430**	**280**	**21 J**	**19 J**	**150**
Butylbenzyl phthalate	260	370	**56**	**43**	19 U	19 U	19 U
Diethyl phthalate	--	--	50 U	**68**	47 U	48 U	48 U
Dimethyl phthalate	46	440	20 U	19 U	19 U	19 U	**38**
Di-n-butyl phthalate	--	--	20 U	19 U	19 U	19 U	19 U
Di-n-octyl phthalate	26	45	**42**	**24**	19 U	19 U	**11 J**
Phenols (µg/kg)							
2,4-Dimethylphenol	--	--	20 UJ	19 UJ	19 UJ	19 UJ	19 UJ
2-Methylphenol (o-Cresol)	--	--	**14 J**	19 U	19 U	19 U	19 U
4-Methylphenol (p-Cresol)	--	--	**110**	**59**	**10 J**	39 U	**270**
Pentachlorophenol	--	--	200 U	190 U	190 U	190 U	190 U
Phenol	--	--	**350**	**80**	19 U	19 U	**82**
Miscellaneous Extractables (µg/kg)							
Benzoic acid	--	--	**1700**	**610**	370 U	390 U	**430**
Benzyl alcohol	--	--	**380**	**100**	19 U	19 U	**62**
Dibenzofuran	400	440	**17**	**90**	**4.7**	4.8 U	4.9 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	--	--	4.9 U	4.9 U	0.97 U	10 UJ	10 UJ
N-Nitrosodiphenylamine	--	--	20 U	19 U	19 U	19 U	19 U
Pesticides (µg/kg)							

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	SG-13	SG-14	SG-15	SG-16	SG-17
		Location	Harbor Village Marina	Kenmore Harbor	Kemore Industrial Park Shoreline		
		Sample ID	SG-13-S-E-DUP-121107	SG-14-S-E-121107	SG-15-S-E-121107	SG-16-S-E-121107	SG-17-S-E-121107
		Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2					
4,4'-DDD (p,p'-DDD)	--	--	1.7 U	1.7 U	0.33 U	--	--
4,4'-DDE (p,p'-DDE)	--	--	**4.4 J**	1.7 U	0.33 U	--	--
4,4'-DDT (p,p'-DDT)	--	--	1.7 U	1.7 U	0.33 UJ	--	--
Aldrin	--	--	0.64 U	0.64 U	0.13 U	--	--
Chlordane, alpha- (cis-Chlordane)	--	--	0.83 U	0.82 U	0.16 U	--	--
Chlordane, beta- (trans-Chlordane)	--	--	0.78 U	0.77 U	0.15 U	--	--
Dieldrin	--	--	1.7 U	1.6 U	0.33 U	--	--
Heptachlor	--	--	0.64 U	0.64 U	0.13 U	--	--
Nonachlor, cis-	--	--	1.6 U	1.6 U	0.32 U	--	--
Nonachlor, trans-	--	--	4.7 U	4.7 U	0.94 U	--	--
Oxychlordane	--	--	2.3 U	2.3 U	0.45 U	--	--
PCB Aroclors (µg/kg)							
Aroclor 1016	--	--	20 U	19 U	18 U	18 U	19 U
Aroclor 1221	--	--	20 U	19 U	18 U	18 U	19 U
Aroclor 1232	--	--	35 U	28 U	18 U	18 U	19 U
Aroclor 1242	--	--	20 U	19 U	18 U	18 U	19 U
Aroclor 1248	--	--	20 U	19 U	18 U	18 U	19 U
Aroclor 1254	--	--	25 U	**20**	18 U	18 U	19 U
Aroclor 1260	--	--	20 U	19 U	18 U	18 U	19 U
Total 7 PCB Aroclors (U = 0)	60	120	35 U	**20**	18 U	18 U	19 U
Dioxin Furans (ng/kg)							
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.521 J**	**0.404 J**	**0.154 J**	**0.144 J**	**0.226 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**2.51**	**1.99**	**0.0891 J**	**0.0758 J**	**0.491 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**5.28**	**3.06**	**0.143 J**	**0.0679 J**	**1.03 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**32.5**	**12.5**	**0.818 J**	**0.202 J**	**2.12**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**10.8**	**6.86**	**0.35 J**	**0.168 J**	**2.33**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	--	--	**600**	**304**	**13.9**	**4.24**	**50.3**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**4830**	**2490**	**105**	**32.0**	**252**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**4.89 J**	**5.27 J**	**0.446 J**	**0.481 J**	**1.11 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**13.1 J**	**13.5 J**	**0.632 J**	**0.441 J**	**2.03 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**136**	**102**	**4.11 J**	**1.86 J**	**14.9 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**1120**	**877**	**27.3**	**8.18**	**82.0**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**1.22**	**1.09**	0.103 U	0.022 U	0.136 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**2.06 J**	**0.796 J**	**0.0911 J**	**0.0758 J**	**0.126 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**1.82**	**0.957 J**	**0.0752 J**	0.0439 U	**0.136 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**4.94**	**2.26**	**0.176 J**	**0.0918 J**	**0.625 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**3.39**	**2.08**	**0.103 J**	**0.0739 J**	**0.725 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**2.82**	**0.816 J**	0.0653 U	0.0259 U	0.11 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**5.77**	**2.90**	**0.19 J**	**0.0559 J**	**1.06 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**93.1**	**36.2**	**2.05**	**0.888 J**	**14.4**

Table 2

Kenmore Area Sediment Results Compared to Interim 2006 Sediment Evaluation Framework

		Location ID	SG-13	SG-14	SG-15	SG-16	SG-17
		Location	Harbor Village Marina	Kenmore Harbor	Kemore Industrial Park Shoreline		
		Sample ID	SG-13-S-E-DUP-121107	SG-14-S-E-121107	SG-15-S-E-121107	SG-16-S-E-121107	SG-17-S-E-121107
		Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2					
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**4.97**	**2.54 J**	**0.0713 J**	**0.0639 J**	**0.95 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**379**	**106**	**5.88**	**1.75 J**	**24.5**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**15.9 J**	**15.4 J**	**1.06 J**	**0.681 J**	**2.50 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**51.6 J**	**28.9 J**	**3.73 J**	**0.95 J**	**5.21 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	**161**	**64.1 J**	**3.85 J**	**1.56 J**	**17.8 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	**314 J**	**115 J**	**6.17 J**	**2.41 J**	**31.5**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	--	--	**18.85 J**	**10.07 J**	**0.648 J**	**0.359 J**	**2.30 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	--	--	**18.85 J**	**10.07 J**	**0.640 J**	**0.350 J**	**2.29 J**

Notes:

Detected concentration is greater than Freshwater SL1 screening level

Detected concentration is greater than Freshwater SL2 screening level

Bold = Detected result

-- = results not reported or not applicable

FD = field duplicate

J = estimated value

mg/kg = milligrams per kilogram

N = normal field sample

ng/kg = nanograms per kilogram

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

pct = percent

SEF = Sediment Evaluation Framwork (RSET 2006)

U = Compound analyzed, but not detected above detection limit

UJ = Compound analyzed, but not detected above estimated detection limit

** Arsenic result of 30UJ was verified to be between the MDL and the RL and below the scree

All non-detect pesticides and dioxin/furan data were reported at the **method detection limit**;

Totals are calculated as the sum of all detected results (U=0). If all results are not detected, th

Totals are calculated as the sum of all detected results and 1/2 the undetected reporting limit

Total LPAH (Low PAH) SEF is the total of 2-Methylnapthalene, Naphthalene, Acenaphthylene,

Total HPAH (High PAH) SEF is the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysen

Total 7 PCB Aroclors is the total of all PCB Aroclors listed in this table.

Dioxin/Furan Toxicity Equivalency (TEQ) values as of 2005, World Health Organization.

USEPA Stage 2A validation was performed by Anchor QEA on all compounds, except dioxin/fu

USEPA Stage 4 validation was performed by LDC on dioxin/furans.

Table 3
Surface Water Results from Log Boom Park Shoreline and Lake Washington Reference Location

Location ID	HT-01	HT-04	HT-04	WS-10
Location	Log Boom Park Shoreline			Reference
Sample ID	HT-01-W-C-121107	HT-04-W-C-121107	HT-04-W-C-DUP-121107	WS-10-W-C-121107
Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012
Conventional Parameters (mg/L)				
Hardness as CaCO3	**48**	**50**	**49**	**43**
Total suspended solids	**13.8**	**3.7**	**3.4**	**2**
Total dissolved solids	**76**	**78**	**74**	**59**
Metals (µg/L)				
Antimony	1 U	1 U	0.2 U	0.2 U
Arsenic	**2**	**2**	**1.2**	**0.9**
Barium	**11**	**9**	**8.7**	**6.2**
Beryllium	0.5 U	0.5 U	0.2 U	0.2 U
Cadmium	0.5 U	0.5 U	0.1 U	0.1 U
Calcium	**11100**	**11500**	**11400**	**10200**
Chromium	2 U	2 U	0.5 U	1 U
Copper	**2.8**	**2.6**	**3.2**	**1.6**
Iron	**480**	**330**	**330**	**160**
Lead	**0.5**	0.5 U	**0.3**	0.1 U
Magnesium	**4830**	**5060**	**4970**	**4210**
Manganese	**111**	**32**	**12.4**	**21**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**2**	**1**	**1.2**	**0.7**
Selenium	2 U	2 U	0.5 U	0.5 U
Silver	1 U	1 U	0.2 U	0.2 U
Thallium	1 U	1 U	0.2 U	0.2 U
Zinc	20 U	20 U	4 U	4 U
Metals, Dissolved (µg/L)				
Antimony	0.2 U	0.2 U	0.2 U	0.2 U
Arsenic	**0.8**	**1**	**1**	**0.8**
Barium	**7.4**	**7.8**	**7.7**	**6**
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	1 U	1 U	1 U	1 U
Copper	**1.9**	**2.1**	**2**	**1.2**
Iron	**110**	**150**	**150**	**90**
Lead	**0.1**	**0.1**	0.1 U	0.1 U
Manganese	**2.8**	**4.6**	**5.1**	**13.8**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**1.1**	**1.1**	**1**	**0.8**
Selenium	0.5 U	0.5 U	0.5 U	0.5 U
Silver	0.2 U	0.2 U	0.2 U	0.2 U
Thallium	0.2 U	0.2 U	0.2 U	0.2 U
Zinc	**6**	4 U	4 U	4 U
Polycyclic Aromatic Hydrocarbons (µg/L)				
1-Methylnaphthalene	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	0.1 U	0.1 U	0.1 U	0.1 U
Acenaphthene	0.1 U	0.1 U	0.1 U	0.1 U
Acenaphthylene	0.1 U	0.1 U	0.1 U	0.1 U
Anthracene	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(a)anthracene	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(a)pyrene	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(b,j,k)fluoranthenes	0.2 U	0.2 U	0.2 U	0.2 U
Benzo(g,h,i)perylene	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(j)fluoranthene	0.1 U	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	0.1 U	0.1 U	0.1 U	0.1 U
Chrysene	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzo(a,h)anthracene	0.1 U	0.1 U	0.1 U	0.1 U
Fluoranthene	0.1 U	0.1 U	0.1 U	0.1 U
Fluorene	0.1 U	0.1 U	0.1 U	0.1 U
Indeno(1,2,3-c,d)pyrene	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	0.1 U	0.1 U	0.1 U	0.1 U
Phenanthrene	0.1 U	0.1 U	0.1 U	0.1 U
Pyrene	0.1 U	0.1 U	0.1 U	0.1 U
Chlorinated Hydrocarbons (µg/L)				
1,2,4-Trichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U
Hexachlorobenzene	1 U	1 U	1 U	1 U
Hexachloroethane	2 U	2 U	2 U	2 U
Phthalates (µg/L)				
Bis(2-ethylhexyl)phthalate	3 U	3 U	3 U	3 U

Table 3
Surface Water Results from Log Boom Park Shoreline and Lake Washington Reference Location

Location ID	HT-01	HT-04	HT-04	WS-10
Location	Log Boom Park Shoreline			Reference
Sample ID	HT-01-W-C-121107	HT-04-W-C-121107	HT-04-W-C-DUP-121107	WS-10-W-C-121107
Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012
Butylbenzyl phthalate	1 U	1 U	1 U	1 U
Diethyl phthalate	1 U	1 U	1 U	1 U
Dimethyl phthalate	1 U	1 U	1 U	1 U
Di-n-butyl phthalate	1 U	1 U	1 U	1 U
Di-n-octyl phthalate	1 U	1 U	1 U	1 U
Phenols (µg/L)				
2,4-Dimethylphenol	3 U	3 U	3 U	3 U
2-Methylphenol (o-Cresol)	1 U	1 U	1 U	1 U
4-Methylphenol (p-Cresol)	2 U	2 U	2 U	2 U
Pentachlorophenol	**0.024 J**	**0.022 J**	**0.02 J**	0.025 U
Phenol	1 U	1 U	1 U	1 U
Miscellaneous Extractables (µg/L)				
Benzoic acid	20 U	20 U	20 U	20 U
Benzyl alcohol	2 U	2 U	2 U	2 U
Dibenzofuran	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobutadiene (Hexachloro-1,3-butadiene)	0.05 U	0.05 U	0.05 U	0.05 U
N-Nitrosodiphenylamine	1 U	1 U	1 U	1 U

Notes:
Bold = Detected result
-- = results not reported or not applicable
FD = field duplicate
J = estimated value
mg/L = milligrams per liter
N = normal field sample
µg/L = micrograms per liter
U = Compound analyzed, but not detected above detection limit
All non-detect data were reported at the **reporting limit**.

USEPA Stage 2A validation was performed by Anchor QEA on all compounds, except dioxin/furans.
USEPA Stage 4 validation was performed by LDC on dioxin/furans.

Table 1. Kenmore Lakefront Northeast Sampling Locations for City and Ecology

Sponsor	Location ID	Sample ID	Sample Location Descrption	Collection Method	Sample Type	Collection Depth (cm)	Ownership	Purpose	Analyses
SEDIMENT									
Ecology	HT-06	HT-06-S-E	Harbour Village Marina pier 3 confluence Creek 0056	Hand Trowel	Sediment	0-10	WDNR	Further investigation for lateral extent, concentrations and source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	HT-07	HT-07-S-E	HVM NW 500 ft up-gradient confluence Creek 0056	Hand Trowel	Sediment	0-10	City	Further investigation for lateral extent, concentrations and source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-10	SG-10-S-E	HVM SW channel 5 west of slip 501	Grab	Sediment	0-10	WDNR	Further investigation for lateral extent, concentrations and source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-11	SG-11-S-E	HVM SW channel 5 west of slip 513	Grab	Sediment	0-10	WDNR	Further investigation for lateral extent, concentrations and source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-12	SG-12-S-E	HVM channel 3 between slip 301 and 433	Grab	Sediment	0-10	WDNR	Further investigation for lateral extent, concentrations and source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-13	SG-13-S-E	HVM channel 1 between slip 115 and 218	Grab	Sediment	0-10	WDNR	Further investigation for lateral extent, concentrations and source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-13	SG-15-S-E-Dup	Field Duplicate	Grab	Sediment	0-10	WDNR	Further investigation for lateral extent, concentrations and source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-14	SG-14-S-E	KIP lake west of NW corner & well AW-04	Grab	Sediment	0-10	WDNR	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-15	SG-15-S-E	KIP lake west of SW corner & well AW-06	Grab	Sediment	0-10	WDNR	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-16	SG-16-S-E	KIP Sammamish R midway between AW-06 & AW-11	Grab	Sediment	0-10	WDNR	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
Ecology	SG-17	SG-17-S-E	KIP Sammamish R south well AW-010	Grab	Sediment	0-10	WDNR	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	HT-01	HT-01-S-C	Log Boom Park west kayak launch pad	Hand Trowel	Sediment	0-10	City	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	HT-02	HT-02-S-C	Log Boom Park east kayak launch pad	Hand Trowel	Sediment	0-10	City	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	HT-03	HT-03-S-C	Log Boom Park mid near shore	Hand Trowel	Sediment	0-10	City	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	HT-04	HT-04-S-C	Log Boom Park north of NW corner of pier	Hand Trowel	Sediment	0-10	City	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	HT-05	HT-05-S-C	Log Boom Park south of pier at NW corner of pier	Hand Trowel	Sediment	0-10	City	Location investigation for chemicals of concern, concentrations & source(s).	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	HT-08	HT-08-S-C	Samm R Nav Chan west boat launch	Hand Trowel	Sediment	0-10	WDNR	Preliminary investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	HT-09	HT-09-S-C	Samm R Nav Chan east boat launch	Hand Trowel	Sediment	0-10	WDNR	Preliminary investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-01	SG-01-S-C	Sammamish R Navigation Chan ~2650 ft w 68th bridge	Grab	Sediment	0-10	WDNR	Preliminary investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-02	SG-02-S-C	North Lake Marina XX	Grab/ Box Core	Sediment	0-25	private	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-03	SG-03-S-C	North Lake Marina YY	Grab/ Box Core	Sediment	0-25	private	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-04	SG-04-S-C	Kenmore Navigation Channel-move west if needed	Grab/ Box Core	Sediment	0-25	WDNR	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-04	SG-04-S-C-Dup	Field Duplicate	Grab/ Box Core	Sediment	0-25	WDNR	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-05	SG-05-S-C	Kenmore Navigation Channel	Grab/ Box Core	Sediment	0-25	WDNR	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-06	SG-06-S-C	Kenmore Navigation Channel	Grab/ Box Core	Sediment	0-25	WDNR	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-07	SG-07-S-C	Kenmore Navigation Channel	Grab/ Box Core	Sediment	0-25	WDNR	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-08	SG-08-S-C	Kenmore Navigation Channel	Grab/ Box Core	Sediment	0-25	WDNR	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
City	SG-09	SG-09-S-C	Kenmore Navigation Channel	Grab/ Box Core	Sediment	0-25	WDNR	Pre-dredge prelim investigation for chemicals of concern & concentrations.	SMS and DMMP SVOCs and metals, PCBs, TBT (porewater), dioxin/furan, DMMP pesticides, grain size, TS, and TOC
WATER									
City	HT-01	HT-01-W-C	Log Bm Pk lake water sample west kayak launch pad	VanDorn	Water	1 m below surface	City	Water column investigation for chemicals of concern & concentrations, Co-located with sediment sample location	SVOCs, and dissolved priority polluntant metals, TSS, TDS, in-situ WQM parameters
City	HT-03	HT-02-W-C	Log Bm Pk lake water sample mid near shore	VanDorn	Water	1 m below surface	City	Water column investigation for chemicals of concern & concentrations, Co-located with sediment sample location	SVOCs, and dissolved priority polluntant metals, TSS, TDS, in-situ WQM parameters
City	HT-03	HT-03-W-C-dup	Field Duplicate	VanDorn	Water	1 m below surface	City	Water column investigation for chemicals of concern & concentrations, Co-located with sediment sample location	SVOCs, and dissolved priority polluntant metals, TSS, TDS, in-situ WQM parameters
City	HT-08	HT-08-W-C	Samm R surface water north boat launch	VanDorn	Water	1 m below surface	WDNR	Water column investigation for chemicals of concern & concentrations, Co-located with sediment sample location	SVOCs, and dissolved priority polluntant metals, TSS, TDS, in-situ WQM parameters
City	HT-09	HT-09-W-C	Samm R surface water at 68th bridge-background	VanDorn	Water	1 m below surface	WDNR	Water column investigation for chemicals of concern & concentrations, Co-located with sediment sample location	SVOCs, and dissolved priority polluntant metals, TSS, TDS, in-situ WQM parameters

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

January 17, 2013

Citizens of Kenmore and Lake Forest Park

Subject: Kenmore Area Sediment Sampling Results and Open House January 23, 2013

Dear Kenmore and Lake Forest Park Citizens:

The City of Kenmore (City) and Washington Department of Ecology (Ecology) conducted sediment sampling in northeast Lake Washington and the Sammamish River in November 2012. Now, the resulting data are available for public review, and you are invited to an open house to informally discuss these results and ask questions on Wednesday, January 23, 5-7 p.m., at Kenmore City Hall.

In general, the results represent an important and successful step in evaluating the current conditions of the near shore Lake Washington sediments in the Kenmore area. The sampling effort was successful and a worthwhile investment to the region. From Ecology's cleanup action perspective, the results show no immediate threat to human health and the environment.

Kenmore and Ecology funded the evaluation of lake-bottom sediment and water samples from 30 locations at Kenmore Harbor, Log Boom Park, Kenmore Navigation Channel, the lower reach of the Sammamish River and at Lake Forest Parks's Lyon Creek Waterfront Park. The study provided follow-up to a 2011 report of dioxin in the lake sediment at a private moorage in Kenmore.

Dioxin levels in the lake-bottom sediment in most areas at the northern tip of Lake Washington are consistent with background soil and sediment concentrations found in the Seattle-area, according to these results and a Washington state study in 2011.

Sediment samples taken in areas where people and pets may have contact with the lake bottom showed dioxins below the levels Ecology uses to determine if health risks are present from contact with dioxin in soils. Dioxins in sediment at two private marinas exceeded those levels, and Ecology will pursue further investigation of those areas in cooperation with the property owners. Those sediments are in areas not readily accessible to people or pets.

One of the study's goals was to determine potential sediment disposal options for the future maintenance dredging of the Kenmore Navigation Channel for better vessel access to maritime businesses. The channel's sediments contain dioxin similar to other areas outside the two marinas. The Channel is a U.S. Army Corps of Engineers facility.

Federal funding for dredging is an important goal for the City of Kenmore for economic development of the Lakepointe/Kenmore Industrial Park and for existing water dependent Kenmore businesses.

The surface water column is clean and showed no exceedance of state water quality standards. The sediment results from the public parks and boat launch locations show no detection of concern and all chemicals below the state cleanup level with one exception, a phthalate often found as part of urban background.

Ecology and the City are planning an open house to meet and answer questions about these sediment results. You are cordially invited to the open house on Wednesday, January 23 at Kenmore City Hall from 5 to 7 pm. The open house will be an opportunity to pick up a copy of the results and to meet with the city and Ecology staff. No formal presentation is planned, rather it will be a time to talk informally and discuss the sampling results and next steps and answer questions.

The City and Ecology will host an information meeting in April after Ecology completes the sediment study report. Also, Washington Department of Health will prepare a Health Consultation for Log Boom Park and the Lakepointe/Kenmore Industrial Park later this spring.

If you need additional information, please check the Ecology webpages at:

https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=2134

https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=9197

If you need additional information, please contact Maura O'Brien at the Ecology's Northwest Regional Office by email at mobr461@ecy.wa.gov or by telephone at 425-649-7249.

CENWS-OD-TS-DMMO

MEMORANDUM FOR: RECORD May 16, 2013

SUBJECT: SCREENING LEVEL EVALUATION OF SURFACE SEDIMENTS WITHIN THE KENMORE NAVIGATION CHANNEL AND SURROUNDING AREAS IN VICINITY IN KENMORE, WASHINGTON RELATIVE TO DREDGED MATERIAL MANAGEMENT PROGRAM (DMMP) GUIDELINES EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR OPEN-WATER DISPOSAL

1. The following memorandum documents the DMMP agencies review of the screening level sediment characterization of Kenmore Navigation channel surface sediments (top 25 cm) relative to their potential suitability for open-water disposal by the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency).

Table 1. Project DMMP Tracking Details

JARPA APPLICATION NO.	N/A
SAP submitted:	October 2, 2012
SAP approved	October 9, 2012
Sampling dates: Power Grab (25 cm depth target): Kenmore Navigation Channel (6 stations) North Lake Marina (2 station) Harbor Village Marinas (4 stations) Northeast Kenmore Industrial Park (1 station) Kenmore Industrial Park Shoreline (2 stations) Sammamish River (1 station)	November 7-8, 2012 All sediment quality samples collected with Power Grab Sampler
Data characterization report submitted:	March 25, 2013
Recency Determination: High Concern (2 years)	November 2014
DAIS reference number:	KNCSC-1-A-O-333

2. Background. The testing summarized below is part of a characterization effort supported by the City of Kenmore and Ecology to assess sediment quality in the northeastern portion of Lake Washington in and near the City of Kenmore. One objective of this effort was to provide information from the existing navigation channel to support a funding request to the USACE budget for maintenance dredging of the federal Kenmore Navigation Channel (Figure 1). Another objective of the sampling was to evaluate the potential presence of contamination along the shoreline outside of the navigation channel. Data from outside the navigation channel was collected by Ecology and the City of Kenmore (funded through a grant from Ecology) to support Ecology's Model Toxics Control Act (MTCA) cleanup action requirements, as well as the Health Consultations to be developed by Washington State Department of Health (DOH). Sediment quality data from locations outside the Kenmore Navigation Channel are also briefly summarized in this screening level summary analysis of the Kenmore navigation channel sediment quality data. Ecology is currently preparing a report evaluating the data collected within Kenmore outside the navigation channel (https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=2134).

3. Sampling and Analysis Plan. The sampling and analysis plan (SAP) was submitted for DMMP review on October 2, 2012 and approved by the DMMP agencies with revisions on October 9, 2012.

4. Sampling. Six samples were collected within the Kenmore Navigation Channel, two samples were collected from the North Lake Marina, four samples were collected from the Harbor Village Marina, one sample was collected northeast of the Kenmore Industrial Park, two samples were collected from the shoreline adjacent to the Kenmore Industrial Park, and one sample was collected from the Sammamish River between November 7-

8, 2012, with a Power Grab sampler (Table 2). Figure 1 depicts the navigation channel and North Lake Marina stations as well as the broader set of stations collected as part of the Kenmore sediment quality evaluation. The data characterization report was submitted to the DMMP agencies for review and data quality assurance/control review on March 25, 2013. The DMMP agencies concluded, after reviewing the data validation report, that the data met QC requirements.

Table 2. Summary of Sediment Grab Collection for Kenmore Navigation Channel Stations.

Location / Grab Station ID:		Latitude (°N)	Longitude (°W)	Water depth to Mudline Elevation (feet OHW*)	Power Grab Sample collection depth from sediment surface (cm)
Kenmore Navigation Channel	SG-04	47°756370036	122°256930518	20.4	20
	SG-05	47°755716315	122°258339786	17.4	23.5
	SG-06	47°755160846	122°259784249	17.7	25
	SG-07	47°753883497	122°261725195	16.9	27
	SG-08	47°752520909	122°263244913	16.1	26
	SG-09	47°751500349	122°264164119	18.4	26.5
North Lake Marina	SG-02	47°756443177	122°259856097	4.5	22
	SG-03	47°756435163	122°259400466	4.6	25
Harbor Village Marina	SG-10	47°756394876	122°262839333	4.6	10
	SG-11	47°756362881	122°261891036	4.8	10
	SG-12	47°755842153	122°262966420	8.1	10
	SG-13	47°755825064	122°260827172	8.1	10
NE of Kenmore Ind. Park	SG-14	47°753102903	122°260341630	8.1	10
Kenmore Industrial Park Shoreline (Lakepoint Development)	SG-15	47°755000303	122°257710216	1.9	10
	SG-16	47°754104225	122°255908785	10.4	10
	SG-17	47°755071890	122°251743214	4.4	10
Sammamish River	SG-01	47°753102903	122°260341630	3.0	10

*OHW = Ordinary High Water

Chemical Testing Summary. The Agencies' approved sampling and analysis plan was generally followed and quality assurance/quality control guidelines specified by PSEP and DMMP were generally complied with. The results of chemical analysis were compared with DMMP Marine and SMS Freshwater Guidelines (2006 Interim and 2013). A summary of chemical analysis results for all COC is provided in Table 3.

Kenmore Navigation Channel. Results for the navigation channel indicated that DMMP marine screening level (SL) guidelines were exceeded for Benzyl alcohol at five of six stations, and the maximum level (ML) was exceeded for Benzoic Acid at two of six stations. Under a full DMMP characterization, exceedances of SL or ML would require biological toxicity testing to complete the suitability determination.

North Lake Marina. Testing results from the vicinity of the North Lake Marina had one DMMP SL/BT exceedance for TBT (0.67 ppb) and two BT exceedances for dioxin/furans (20.3 and 37 pptr-TEQ). Moreover, there were two SL exceedances for Benzyl Alcohol, and two ML exceedances for Benzoic Acid.

Harbor Village Marina. Testing results from the vicinity of Harbor Village Marina outside the dredged material footprint previously characterized (http://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/Suitability%20Determinations/2012/Harbor-Village-Marina-DY12-errata-SDM.pdf) had DMMP SL exceedances from all four sampling stations for Benzyl Alcohol, three ML exceedances for Benzoic Acid. Testing for dioxin/furans confirmed the earlier high concentrations from within the marina with three of four stations exceeding the DMMP BT (26.6 to 71 pptr-TEQ).

Kenmore Industrial Park Shoreline and NE Station. There were no DMMP SL exceedances at two of Kenmore Industrial shoreline stations, although the Northeast station exhibited an SL exeedance for Benzyl Alcohol, and a BT exccedance for dioxin/furans (10.1 pptr-TEQ).

Sammamish River. The Sammamish River station had no DMMP guideline exceedances.

5. Freshwater SMS SL1 Guidelines. 2006 Interim Guidelines were exceeded in the Kenmore Navigation Channel for Bis(2-ethylhexyl)phthalate at 4 stations and two SL2 exceedances at two stations, whereas Zinc exceeded SL1 at two of six stations (2006 FW Guidelines). Phenol exceeded the SL1 at a single station (2013 FW Guidelines).

6. Within the Northlake marina, 2006 FW SL1 guidelines were exceeded for copper and zinc at two stations. Within Harbor Village Marina, copper SL1 guideline exceedances were noted at one of four stations, and zinc exceeded SL1 guidelines at all four stations. At Northlake marina 2006 FW SL2 guidelines were exceeded for Bis(2-ethylhexyl)phthalate whereas, the SL2 guideline was exceeded for this chemical at Harbor Village marina at all four stations sampled. Benzoic Acid SL2 exceedances (2006 FWG) were exceeded at Harbor Village marina at three of four stations. Phenol exceeded 2013 FW SL1 guidelines at one Harbor Village marina station and SL2 guidelines were exceeded at two stations. At the northeast Kenmore Industrial Park station 2006 FW SL1 guidelines for copper, zinc and for Bis(2-ethylhexyl)phthalate were exceeded. There were no guideline exceedances for FWG (2006 or 2013) at the Sammamish River station.

7. Dioxin Testing Results Summary. Table 4 provides the full results of dioxin/furan testing for all sampling locations. Within the navigation channel total dioxin/furan concentrations in sediments ranged from 1.5 – 8.4 pptr -TEQ (U = ½ detection limit). Dioxin concentrations were elevated within the Northlake marina and within the Harbor Village marina, ranging from 20.3 – 37 pptr-TEQ within the former, and, ranging from 6.57 to 71 pptr-TEQ within the later, respectively. The single northeast Kenmore Industrial Park station exhibited a dioxin concentration of 10.1 pptr-TEQ. Dioxin concentrations at the remaining Kenmore Industrial Park stations were generally low ranging from 0.359 to 0.648 pptr-TEQ, and the Sammamish River station exhibited a dioxin concentration of 2.3 pptr-TEQ.

8. Dioxin Interim Interpretative Framework. The DMMP implemented new interim guidelines for interpreting dioxin data implemented on December 6, 2010, and are summarized below for non-dispersive disposal sites (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/New_Interim_Guidelines_for_Dioxins.pdf):

    a. Nondispersive Screening Levels. DMMUs with dioxin concentrations below 10 pptr TEQ will be allowed for open-water disposal as long as the volume-weighted average concentration of dioxins in material from the entire dredging project does not exceed the Disposal Site Management Objective of 4 pptr TEQ.

9. Dioxin Interpretation relative to DMMP site management. As summarized in paragraph 7 above, within the Kenmore navigation channel all six stations were quantified below 10 pptr-TEQ, but only two stations were quantified below 4 pptr-TEQ. Because this was a screening level assessment of sediment quality and did not collect samples representing the full dredging prism, a volume weighted average was not calculated. These data suggest, however, that dioxin concentrations may pose an impediment to open-water disposal. The elevated dioxin results for the Northlake Marina and the Harbor Village Marina indicate these sediments are not likely to be suitable for open-water disposal. The dioxin results from the northeast Kenmore Industrial Park station are elevated and likely problematic for open-water disposal. Dioxin results for the remaining Kenmore Industrial Park shoreline stations and Sammamish River station were below DMMP new interim dioxin guidelines.

10. Antidegradation Evaluation. The Benzyl Alcohol SL and Benzoic Acid ML exceedances as well as the exceedances of the Freshwater Guidelines (especially for phenol) observed in the navigation channel samples indicate that it will be necessary to fully assess the newly-exposed sediment surface prior to dredging using z-sample analyses. A full antidegradation z-sample analysis assessment would also be required at the Northlake Marina and at the Harbor Village marina prior to any proposed dredging action.

11. The results of the screening-level evaluation of sediments from the Kenmore navigation channel and surrounding areas indicate that to determine suitability of this material for open-water disposal at the Elliott Bay disposal site, will require a full DMMP characterization including dioxin analysis, z-sample characterization and likely bioassay testing and bioaccumulation testing, where BT exceedances were observed.

Concur:

_____	_____
Date	David R. Kendall, Ph.D., Seattle District Corps of Engineers
_____	_____
Date	Erika Hoffman, Environmental Protection Agency
_____	_____
Date	Laura Inouye, Ph.D., Washington Department of Ecology
_____	_____
Date	Celia Barton, Washington Department of Natural Resources

Copied furnished:
John Peel, Corps Navigation Project Manager
Erika Hoffman, EPA
Laura Inouye, Ph.D. Department of Ecology
Celia Barton, DNR
DMMO file

CENWS-OD-TS-DMMO

MEMORANDUM FOR: RECORD May 17, 2013

SUBJECT: SCREENING LEVEL EVALUATION OF SURFACE SEDIMENTS WITHIN THE KENMORE NAVIGATION CHANNEL AND SURROUNDING AREAS IN VICINITY IN KENMORE, WASHINGTON RELATIVE TO DREDGED MATERIAL MANAGEMENT PROGRAM (DMMP) GUIDELINES EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR OPEN-WATER DISPOSAL

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Kenmore Industrial Park NE Station. The Northeast station located northeast of the Kenmore navigation channel exhibited an SL exeedance for Benzyl Alcohol, and a BT exccedance for dioxin/furans (10.1 pptr-TEQ).

Sammamish River Navigation Channel. The Sammamish River stations had no DMMP guideline exceedances.

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8. Dioxin Interim Interpretative Framework. The DMMP implemented new interim guidelines for interpreting dioxin data implemented on December 6, 2010, and are summarized below for non-dispersive disposal sites (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/New_Interim_Guidelines_for_Dioxins.pdf):

    a. Nondispersive Screening Levels. DMMUs with dioxin concentrations below 10 pptr TEQ will be allowed for open-water disposal as long as the volume-weighted average concentration of dioxins in material from the entire dredging project does not exceed the Disposal Site Management Objective of 4 pptr TEQ.

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10. **Antidegradation Evaluation.** The Benzyl Alcohol SL and Benzoic Acid ML exceedances as well as the exceedances of the Freshwater Guidelines (especially for phenol) observed in the navigation channel samples indicate that it will be necessary to fully assess the newly-exposed sediment surface prior to dredging using z-sample analyses. A full antidegradation z-sample analysis assessment would also be required at the Northlake Marina and at the Harbor Village marina prior to any proposed dredging action.

11. The results of the screening-level evaluation of sediments from the Kenmore navigation channel and surrounding areas indicate that to determine suitability of this material for open-water disposal at the Elliott Bay disposal site, will require a full DMMP characterization including dioxin analysis, z-sample characterization and likely bioassay testing and bioaccumulation testing, where BT exceedances were observed.

Concur:

5/17/13
Date

David R. Kendall, Ph.D., Seattle District Corps of Engineers

5/17/13
Date

Erika Hoffman, Environmental Protection Agency

05/17/2013
Date

Laura Inouye, Ph.D., Washington Department of Ecology

5/23/13
Date

Celia Barton, Washington Department of Natural Resources

Copied furnished:
John Peel, Corps Navigation Project Manager
Erika Hoffman, EPA
Laura Inouye, Ph.D. Department of Ecology
Celia Barton, DNR
DMMO file

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Feet
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NOTE:
WDFW = Washington State Department of Fish and Wildlife

Figure 1
Sample Locations
Sampling and Analysis Results Memorandum
Kenmore Sediment Characterization

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

											KENMORE NAVIGATION CHANNEL											
						Sample ID:					KNC-SG-04			KNC-SG-05			KNC-SG-06			KNC-SG-07		
						DMMU ID:					S4			S5			S6			S7		
						sample Interval					0-20 cm			0-23.5 cm			0-25 cm			0-27 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW		DMMP	FW	
Antimony	mg/kg	150		200	mg/kg	--	--	mg/kg	--	--	6.0		U	10.0		U	20.0		U	10.0		U
Arsenic	mg/kg	57	507.1	700	mg/kg	20	51	mg/kg	14	120	6.0		U	10.0		U	20.0		U	10.0		U
Cadmium	mg/kg	5.1	11.3	14	mg/kg	1.1	1.5	mg/kg	2.1	5.4	**0.3**			**0.7**			**0.8**			**0.6**		
Chromium	mg/kg	260	260	(2)	mg/kg	95	100	mg/kg	72	88	**35.0**			**43.0**			**57.0**			**41.0**		
Copper	mg/kg	390	1,027	1,300	mg/kg	80	830	mg/kg	400	1,200	**14.6**			**35.6**			**43.6**			**30.0**		
Lead	mg/kg	450	975	1,200	mg/kg	340	430	mg/kg	360	>1300	**5.0**			**28.0**			**31.0**			**21.0**		
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.28	0.75	mg/kg	0.66	0.80	0.02		U	**0.08**			**0.1**			**0.11**		
Nickel	mg/kg	--	--	--	mg/kg	--	--	mg/kg	--	--	**30**			**39**			**46**			**41**		
Selenium	mg/kg	(2)	**3**	(2)	mg/kg	--	--	mg/kg	11	>20	0.6		U	1		U	2		U	1		U
Silver	mg/kg	6.1	6.1	8.4	mg/kg	2.0	2.5	mg/kg	0.57	1.7	0.4		U	0.9		U	1		U	0.9		U
Zinc	mg/kg	410	2,783	3,800	mg/kg	130	400	mg/kg	3,200	>4200	**49**			**143**	**143**		**164**	**164**		**126**		
Tetrabutyltin								µg/L	97	>97	--			--			--			--		
Tributyltin (porewater)	µg/L	0.15	0.15		µg/L	--	--	µg/L	--	--	**0.049**			**0.008**			**0.023**			0.005		U
Tributyltin (bulk/sediment)	µg/kg	73.2	73.2		µg/kg	--	--	µg/kg	47	320	--			--			--			--		
Dibutyltin								µg/kg	910	130,000	--			--			--			--		
Monobutyltin								µg/kg	540	>4800	--			--			--			--		
ORGANIC CHEMICALS																						
Total LPAH	µg/kg	5,200		29,000	µg/kg	6,600	9,200	µg/kg	--	--	**194**		J	**332**			**251**		J	**120**		J
Naphthalene	µg/kg	2,100		2,400	µg/kg	500	1,300	µg/kg	--	--	20		U	**50**			**38**			**18**		J
Acenaphthylene	µg/kg	560		2,000	µg/kg	470	640	µg/kg	--	--	20		U	20		U	20		U	20		U
Acenaphthene	µg/kg	500		2,000	µg/kg	1,100	1,300	µg/kg	--	--	**14**		J	**26**			**17**		J	20		U
Fluorene	µg/kg	540		3,600	µg/kg	1,000	3,000	µg/kg	--	--	**14**		J	**37**			**28**			**12**		J
Phenanthrene	µg/kg	1,500		2,100	µg/kg	6,100	7,600	µg/kg	--	--	**140**			**180**			**140**			**72**		
Anthracene	µg/kg	560		13,000	µg/kg	1,200	1,600	µg/kg	--	--	**26**			**39**			**28**			**18**		J
2-Methylnapthalene	µg/kg	670		1,900	µg/kg	470	560	µg/kg	--	--	20		U	**26**			**14**		J	20		U
Total HPAH	µg/kg	12,000		69,000	µg/kg	31,000	55,000	µg/kg	--	--	**900**		J	**1341**			**1511**			**859**		J
Fluoranthene	µg/kg	1,700	4,600	30,000	µg/kg	11,000	15,000	µg/kg	--	--	**220**			**310**			**290**			**150**		
Pyrene	µg/kg	2,600	11,980	16,000	µg/kg	8,800	16,000	µg/kg	--	--	**190**			**300**			**290**			**140**		
Benzo(a)anthracene	µg/kg	1,300		5,100	µg/kg	4,300	5,800	µg/kg	--	--	**81**			**110**			**110**			**110**		
Chrysene	µg/kg	1,400		21,000	µg/kg	5,900	6,400	µg/kg	--	--	**110**			**190**			**190**			**140**		
Total Benzo(b+k)fluoranthenes	µg/kg	3,200		9,900	µg/kg	600	4,000	µg/kg	--	--	**140**			**220**			**300**			**140**		
Benzo(a)pyrene	µg/kg	1,600		3,600	µg/kg	3,300	4,800	µg/kg	--	--	**62**			**76**			**120**			**63**		
Indeno(1,2,3-cd)pyrene	µg/kg	600		4,400	µg/kg	4,100	5,300	µg/kg	--	--	**39**			**51**			**81**			**33**		
Dibenzo(a,h)anthracene	µg/kg	230		1,900	µg/kg	800	840	µg/kg	--	--	**220**			**21**			**37**			**17**		J
Benzo(g,h,I)perylene	µg/kg	670		3,200	µg/kg	4,000	5,200	µg/kg	--	--	**43**			**63**			**93**			**36**		
Total PAH								µg/kg	17,000	30,000	--			--			--			--		
Bulk Petroleum Hydrocarbons (TPH) Diesel								mg/kg	340	510	--			--			--			--		
Bulk Petroleum Hydrocarbons (TPH) Residual								mg/kg	3,600	4,400	--			--			--			--		
1,4-Dichlorobenzene	µg/kg	110		120	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	20		U
1,2-Dichlorobenzene	µg/kg	35		110	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	20		U
1,3-Dichlorobenzene	µg/kg	--		--	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	20		U
1,2,4-Trichlorobenzene	µg/kg	31		64	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	20		U
Hexachlorobenzne (HCB)	µg/kg	22	168	230	µg/kg	--	--	µg/kg	--	--	4.9		U	5		U	4.8		U	4.9		U
Dimethylphthalate	µg/kg	71		1,400	µg/kg	46.0	440	µg/kg	--	--	20		U	20		U	20		U	20		U
Diethylphthalate	µg/kg	200		1,200	µg/kg	--	--	µg/kg	--	--	49		U	49		U	58			49		U
Di-n-butylphthalate	µg/kg	1,400		5,100	µg/kg	--	--	µg/kg	380	1,000	20		U	20		U	20		U	20		U
Butylbenzylphthalate	µg/kg	63		970	µg/kg	260	370	µg/kg	--	--	20		U	20		U	**57**			**28**		
Bis(2-ethylhexyl)phthalate	µg/kg	1,300		8,300	µg/kg	220	320	µg/kg	--	--	62		U	**260**	**260**		**540**	**540**		**330**	**330**	
Di-n-octylphthalate	µg/kg	6,200		6,200	µg/kg	26	45	µg/kg	39	>1100	20		U	**22.0**		J	**41**	**41**	J	**22**		J
Phenol	µg/kg	420		1,200	µg/kg	--	--	µg/kg	120	210	20		U	**180**	**180**		**80**			**42**		
2-Methylphenol	µg/kg	63		77	ug/kg	--	--	ug/kg	--	--	20		U	20.0		UJ	20		UJ	20		UJ
4-Methylphenol	µg/kg	670		3,600	ug/kg	--	--	ug/kg	260	2,000	39		U	**74.0**			**91**			**54**		
2,4-Dimethylphenol	µg/kg	29		210	ug/kg	--	--	ug/kg	--	--	20		UJ	20.0		UJ	20		UJ	20		UJ
Pentachlorophenol	µg/kg	400	504	690	ug/kg	--	--	ug/kg	1,200	>1200	200		U	200		U	200		U	200		U
Benzyl alcohol	µg/kg	57		870	ug/kg	--	--	ug/kg			20.0		U	**160**			**190**			**120**		
Benzoic acid	µg/kg	650		760	µg/kg	--	--	µg/kg	2,900	3,800	390		U	**1300**			**1100**			**430**		
Dibenzofuran	µg/kg	540		1,700	µg/kg	400	440	µg/kg	--	--	20		U	**28.0**			20		U	20		U
Hexachlorobutadiene	µg/kg	29		270	µg/kg	--	--	µg/kg	--	--	4.9		U	5.0		U	4.8		U	4.9		U
N-Nitrosodiphenylamine	µg/kg	28		130	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	20		U

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

						Sample ID:					KNC-SG-04			KNC-SG-05			KNC-SG-06			KNC-SG-07		
						DMMU ID:					S4			S5			S6			S7		
						sample Interval					0-20 cm			0-23.5 cm			0-25 cm			0-27 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW		DMMP	FW	
Beta-Hexachlorocyclohexane								µg/kg	7.2	1,100	--			--			--			--		
Carbazole								µg/kg	900	1,100	--			--			--			--		
p,p-DDD	µg/kg	16						µg/kg	310	860	1.7		U	1.7		U	1.7		U	1.7		U
p,p-DDE	µg/kg	9						µg/kg	21	33	1.7		U	1.7		U	1.7		U	1.7		U
p,p-DDT	µg/kg	12						µg/kg	--	--	1.7		U	1.7		U	1.7		U	1.7		U
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	µg/kg		50	69	µg/kg	--	--	µg/kg	100	8100	1.7		U	1.7		U	1.7		U			
Endrin Ketone					µg/kg			µg/kg	8.5	>8.5												
Aldrin	µg/kg	9.5			µg/kg	--	--	µg/kg	--	--	0.64		U	0.65		U	0.63		U	0.64		U
Chlordane (sum of cis, trans, cis-nonachlor, trans-nonachlor, oxy)	µg/kg	2.8			µg/kg	--	--	µg/kg	--	--	0.83		U	0.84		U	0.82		U	0.83		U
Dieldrin	µg/kg	1.9	37		µg/kg	--	--	µg/kg	4.9	9.3	1.7		U	1.7		U	1.6		U	1.7		U
Heptachlor	µg/kg	1.5			µg/kg	--	--	µg/kg	--	--	0.64		U	0.65		U	0.63		U	0.64		U
Aroclor 1016	µg/kg										20		U	19		U	19		U	19		U
Aroclor 1221	µg/kg										20		U	19		U	19		U	19		U
Aroclor 1232	µg/kg										20		U	19		U	19		U	19		U
Aroclor 1242	µg/kg										20		U	19		U	19		U	19		U
Aroclor 1248	µg/kg										20		U	19		U	19		U	19		U
Aroclor 1254	µg/kg										20		U	29		U	28		U	19		U
Aroclor 1260	µg/kg										20		U	19		U	19		U	19		U
Total PCBs (Aroclors)	µg/kg	130		3,100	µg/kg	**60**	**120**	µg/kg	**110**	**2,500**	20		U	29		U	28		U	19		U
Total PCBs (TOC-normalized)	**µg/kg**		38***																			
Dioxin (TEQ: see Table 4 for detailed results)	**ng/kg**	4	10								**1.55**		**J**	**6.75**		J	**8.39**		**J**	**4.18**		**J**
Total Solids	%										**80.8**			**35.0**			**29.9**			**33.7**		
Total Volatile Solids	%										**1.72**			**11.13**			**13.89**			**13.4**		
Total Organic Carbon	%										**2.73**			**5.43**			**4.89**			**4.95**		
Ammonia (NH3)	mg/kg							mg/kg	230	300	**--**			**--**			**--**			**--**		
Total Sulfides	mg/kg							mg/kg	39	61	**--**			**--**			**--**			**--**		
Gravel	%										**71.4**			**3.1**			0.10		u	**0.50**		
Sand	%										**26.0**			**48.8**			**44.7**			**55.4**		
Silt	%										**2.5**			**40.7**			**44.0**			**36.9**		
Clay	%										**0.0**			**7.5**			**11.1**			**7.2**		
Fines (percent silt + clay)	%										**2.5**			**48.1**			**55.2**			**44.1**		
Bioassay Determination: **(P/F)**	%										**NA**			**NA**			**NA**			**NA**		
BTs exceeded:											**No**			**No**			**No**			**No**		
Bioaccumulation conducted:											**No**			**No**			**No**			**No**		
Bioaccumulation Determination: **(P/F)**																						
ML Rule exceeded:											**No**			**No**			**No**			**No**		
DMMP Determination:											**ND**			**ND**			**ND**			**ND**		
DMMU Volume:											**NA**			**NA**			**NA**			**NA**		
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)											**H**			**H**			**H**			**H**		
Mean grab sampling depth (cm)	CM										**20**			**23.5**			**25**			**27**		
DMMU ID:											KNC-SG-04			KNC-SG-05			KNC-SG-06			KNC-SG-07		

*** 2006 Interim Fresh Water Guidelines**

****Newly adopted Fresh Water Guidelines through SMS Rulemaking: to be implemented in September 2013**

SL/BT = exceeds DMMP SL/BT

SL/SL1 = exceeds DMMP Screening Level or SMS FW SL1 Guidelines

ML/SL2 = exceeds DMMP Maximum Level or SMS FW SL2 Guidelines

VQ = Validation Qualifier

UCOWD = Unconfined open-water disposal

NA = Not Analyzed

ND = Not Determined

U = undetected at the reporting limit (method detection limit)

J = Estimated Concentration, at the reporting limit

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

											KENMORE NAVIGATION CHANNEL								
						Sample ID:					KNC-SG-07 (duplicate)			KNC-SG-08			KNC-SG-09		
						DMMU ID:					S7 (dup)			S8			S9		
						sample Interval					0-27 cm			0-26 cm			0-26.5 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW	
Antimony	mg/kg	150		200	mg/kg	--	--	mg/kg	--	--	10.0		U	10.0		U	10.0		U
Arsenic	mg/kg	57	507.1	700	mg/kg	20	51	mg/kg	14	120	10.0		U	10.0		U	10.0		U
Cadmium	mg/kg	5.1	11.3	14	mg/kg	1.1	1.5	mg/kg	2.1	5.4	**0.6**			**0.6**			**0.6**		
Chromium	mg/kg	260	260	(2)	mg/kg	95	100	mg/kg	72	88	**44.0**			**44.0**			**48.0**		
Copper	mg/kg	390	1,027	1,300	mg/kg	80	830	mg/kg	400	1,200	**28.0**			**28.7**			**31.1**		
Lead	mg/kg	450	975	1,200	mg/kg	340	430	mg/kg	360	>1300	**21.0**			**21.0**			**24.0**		
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.28	0.75	mg/kg	0.66	0.80	**0.08**			**0.07**			**0.08**		
Nickel	mg/kg	--	--	--	mg/kg	--	--	mg/kg	--	--	**42**			**40**			**43**		
Selenium	mg/kg	(2)	**3**	(2)	mg/kg	--	--	mg/kg	11	>20	1		U	1		U	1		U
Silver	mg/kg	6.1	6.1	8.4	mg/kg	2.0	2.5	mg/kg	0.57	1.7	0.8		U	0.7		U	0.9		U
Zinc	mg/kg	410	2,783	3,800	mg/kg	130	400	mg/kg	3,200	>4200	**123**			**113**			**130**	**130**	
Tetrabutyltin								µg/L	97	>97	--			--			--		
Tributyltin (porewater)	µg/L	0.15	0.15		µg/L	--	--	µg/L	--	--	0.005		U	0.005		U	0.005		U
Tributyltin (bulk/sediment)	µg/kg	73.2	73.2		µg/kg	--	--	µg/kg	47	320	--			--			--		
Dibutyltin								µg/kg	910	130,000	--			--			--		
Monobutyltin								µg/kg	540	>4800	--			--			--		
ORGANIC CHEMICALS																			
Total LPAH	µg/kg	5,200		29,000	µg/kg	6,600	9,200	µg/kg	--	--	**103**		J	**78**		J	**83**		
Naphthalene	µg/kg	2,100		2,400	µg/kg	500	1,300	µg/kg	--	--	**25**			**14**		J	**24**		
Acenaphthylene	µg/kg	560		2,000	µg/kg	470	640	µg/kg	--	--	19		U	19		U	20		U
Acenaphthene	µg/kg	500		2,000	µg/kg	1,100	1,300	µg/kg	--	--	19		U	19		U	20		U
Fluorene	µg/kg	540		3,600	µg/kg	1,000	3,000	µg/kg	--	--	**9.7**		J	19		U	20		U
Phenanthrene	µg/kg	1,500		2,100	µg/kg	6,100	7,600	µg/kg	--	--	**68**			**64**			**59**		
Anthracene	µg/kg	560		13,000	µg/kg	1,200	1,600	µg/kg	--	--	19		U	19		U	20		U
2-Methylnapthalene	µg/kg	670		1,900	µg/kg	470	560	µg/kg	--	--	19		U	19		U	20		U
Total HPAH	µg/kg	12,000		69,000	µg/kg	31,000	55,000	µg/kg	--	--	**690**		J	**623**		J	**599**		J
Fluoranthene	µg/kg	1,700	4,600	30,000	µg/kg	11,000	15,000	µg/kg	--	--	**140**			**130**			**120**		
Pyrene	µg/kg	2,600	11,980	16,000	µg/kg	8,800	16,000	µg/kg	--	--	**130**			**120**			**120**		
Benzo(a)anthracene	µg/kg	1,300		5,100	µg/kg	4,300	5,800	µg/kg	--	--	**12**		J	**11**		J	**13**		J
Chrysene	µg/kg	1,400		21,000	µg/kg	5,900	6,400	µg/kg	--	--	**82**			**73**			**72**		
Total Benzo(b+k)fluoranthenes	µg/kg	3,200		9,900	µg/kg	600	4,000	µg/kg	--	--	**140**			**120**			**120**		
Benzo(a)pyrene	µg/kg	1,600		3,600	µg/kg	3,300	4,800	µg/kg	--	--	**55**			**50**			**45**		
Indeno(1,2,3-cd)pyrene	µg/kg	600		4,400	µg/kg	4,100	5,300	µg/kg	--	--	**38**			**36**			**33**		
Dibenzo(a,h)anthracene	µg/kg	230		1,900	µg/kg	800	840	µg/kg	--	--	**12**		J	**11**		J	**13**		J
Benzo(g,h,I)perylene	µg/kg	670		3,200	µg/kg	4,000	5,200	µg/kg	--	--	**41**			**41**			**36**		
Total PAH								µg/kg	17,000	30,000	--			--			--		
Bulk Petroleum Hydrocarbons (TPH) Diesel								mg/kg	340	510	--			--			--		
Bulk Petroleum Hydrocarbons (TPH) Residual								mg/kg	3,600	4,400	--			--			--		
1,4-Dichlorobenzene	µg/kg	110		120	µg/kg	--	--	µg/kg	--	--	19		U	19		U	20		U
1,2-Dichlorobenzene	µg/kg	35		110	µg/kg	--	--	µg/kg	--	--	19		U	19		U	20		U
1,3-Dichlorobenzene	µg/kg	--		--	µg/kg	--	--	µg/kg	--	--	19		U	19		U	20		U
1,2,4-Trichlorobenzene	µg/kg	31		64	µg/kg	--	--	µg/kg	--	--	19		U	19		U	20		U
Hexachlorobenzne (HCB)	µg/kg	22	168	230	µg/kg	--	--	µg/kg	--	--	4.8		U	4.8		U			
Dimethylphthalate	µg/kg	71		1,400	µg/kg	46.0	440	µg/kg	--	--	19		U	19		U	20		U
Diethylphthalate	µg/kg	200		1,200	µg/kg	--	--	µg/kg	--	--	48		U	48		U	49		U
Di-n-butylphthalate	µg/kg	1,400		5,100	µg/kg	--	--	µg/kg	380	1,000	**12**		J	19		U	20		U
Butylbenzylphthalate	µg/kg	63		970	µg/kg	260	370	µg/kg	--	--	19		U	**36**			**29**		
Bis(2-ethylhexyl)phthalate	µg/kg	1,300		8,300	µg/kg	220	320	µg/kg	--	--	**300**	**300**		**240**	**240**		**240**	**240**	
Di-n-octylphthalate	µg/kg	6,200		6,200	µg/kg	26	45	µg/kg	39	>1100	19		U	19		U	20		U
Phenol	µg/kg	420		1,200	µg/kg	--	--	µg/kg	120	210	**42**			**19**			**39**		
2-Methylphenol	µg/kg	63		77	ug/kg	--	--	ug/kg	--	--	19		U	19		U	20		U
4-Methylphenol	µg/kg	670		3,600	ug/kg	--	--	ug/kg	260	2,000	**31**		J	**22**		J	**36**		J
2,4-Dimethylphenol	µg/kg	29		210	ug/kg	--	--	ug/kg	--	--	19		UJ	19		UJ	20		UJ
Pentachlorophenol	µg/kg	400	504	690	ug/kg	--	--	ug/kg	1,200	>1200	190		U	190		U	200		U
Benzyl alcohol	µg/kg	57		870	ug/kg	--	--	ug/kg			**100**			**61**			**110**		
Benzoic acid	µg/kg	650		760	µg/kg	--	--	µg/kg	2,900	3,800	**480**			**300**		J	**510**		
Dibenzofuran	µg/kg	540		1,700	µg/kg	400	440	µg/kg	--	--	19		U	19		U	20		U
Hexachlorobutadiene	µg/kg	29		270	µg/kg	--	--	µg/kg	--	--	4.8		U	4.8		U	4.8		U
N-Nitrosodiphenylamine	µg/kg	28		130	µg/kg	--	--	µg/kg	--	--	19		U	19		U	20		U

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

						Sample ID:					KNC-SG-07 (duplicate)			KNC-SG-08			KNC-SG-09		
						DMMU ID:					S7 (dup)			S8			S9		
						sample Interval					0-27 cm			0-26 cm			0-26.5 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW	
Beta-Hexachlorocyclohexane								µg/kg	7.2	1,100	--			--			--		
Carbazole								µg/kg	900	1,100	--			--			--		
p,p-DDD	µg/kg	16						µg/kg	310	860	1.7		U	1.7		U	1.6		U
p,p-DDE	µg/kg	9						µg/kg	21	33	1.6		U	1.6		U	1.6		U
p,p-DDT	µg/kg	12						µg/kg	--	--	1.7		U	1.7		U	1.6		U
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	µg/kg		50	69	µg/kg	--	--	µg/kg	100	8100				1.7		U	1.6		U
Endrin Ketone					µg/kg			µg/kg	8.5	>8.5							--		
Aldrin	µg/kg	9.5			µg/kg	--	--	µg/kg	--	--	0.63		U	0.63		U	0.63		U
Chlordane (sum of cis, trans, cis-nonachlor, trans-nonachlor, oxy)	µg/kg	2.8			µg/kg	--	--	µg/kg	--	--	0.81		U	0.81		U	0.81		U
Dieldrin	µg/kg	1.9	37		µg/kg	--	--	µg/kg	4.9	9.3	1.6		U	1.6		U	1.6		U
Heptachlor	µg/kg	1.5			µg/kg	--	--	µg/kg	--	--	0.63		U	0.63		UJ	0.63		U
Aroclor 1016	µg/kg										19		U	18		U	20		U
Aroclor 1221	µg/kg										19		U	18		U	20		U
Aroclor 1232	µg/kg										19		U	18		U	20		U
Aroclor 1242	µg/kg										19		U	18		U	20		U
Aroclor 1248	µg/kg										19		U	18		U	20		U
Aroclor 1254	µg/kg										**22**			18		U	20		U
Aroclor 1260	µg/kg										19		U	18		U	20		U
Total PCBs (Aroclors)	µg/kg	130		3,100	µg/kg	**60**	**120**	µg/kg	**110**	**2,500**	**22**			18		U	20		U
Total PCBs (TOC-normalized)	**µg/kg**		38***																
Dioxin (TEQ: see Table 4 for detailed results)	**ng/kg**	4	10								**4.02**		**J**	**3.93**		**J**	**4.87**		**J**
Total Solids	%										**34.3**			**42.0**			**35.7**		]
Total Volatile Solids	%										**14.11**			**9.1**			**10.58**		
Total Organic Carbon	%										**7.07**			**3.3**			**5.22**		
Ammonia (NH3)	mg/kg							mg/kg	230	300	**--**			**--**			**--**		
Total Sulfides	mg/kg							mg/kg	39	61	**--**			**--**			**--**		
Gravel	%										**2.60**			**0.30**			**0.10**		
Sand	%										**52.0**			**50.3**			**40.0**		
Silt	%										**38.4**			**41.4**			**51.1**		
Clay	%										**6.9**			**7.9**			**8.6**		
Fines (percent silt + clay)	%										**45.4**			**49.3**			**59.7**		
Bioassay Determination: **(P/F)**	%										**NA**			**NA**			**NA**		
BTs exceeded:											**No**			**No**			**No**		
Bioaccumulation conducted:											**No**			**No**			**No**		
Bioaccumulation Determination: **(P/F)**																			
ML Rule exceeded:											**No**			**No**			**No**		
DMMP Determination:											**ND**			**ND**			**ND**		
DMMU Volume:											**NA**			**NA**			**NA**		
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)											**H**			**H**			**H**		
Mean grab sampling depth (cm)	CM										**27**			**26**			**26.5**		
DMMU ID:											**KNC-SG-07 (duplicate)**			**KNC-SG-08**			**KNC-SG-09**		

*** 2006 Interim Fresh Water Guidelines**

****Newly adopted Fresh Water Guidelines through SMS Rulemaking: to be implemented in September 2013**

SL/BT = exceeds DMMP SL/BT

SL/SL1 = exceeds DMMP Screening Level or SMS FW SL1 Guidelines

ML/SL2 = exceeds DMMP Maximum Level or SMS FW SL2 Guidelines

VQ = Validation Qualifier

UCOWD = Unconfined open-water disposal

NA = Not Analyzed

ND = Not Determined

U = undetected at the reporting limit (method detection limit)

J = Estimated Concentration, at the reporting limit

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

											NORTH LAKE MARINA						Harbor Village Marina					
					Sample ID:						NLM-SG-02			NLM-SG-03			HVM-SG-10			HVM-SG-11		
					DMMU ID:						S2			S3			S10			S11		
					sample Interval						0-22 cm			0-25 cm			0-26 cm			0-28.5 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	**Units**	**SL**	**BT**	**ML**	**Units**	**SL1**	**SL2**	**Units**	**SL1/SCO**	**SL2/CSL**	**DMMP**	**FW**		**DMMP**	**FW**		**DMMP**	**FW**		**DMMP**	**FW**	
Antimony	mg/kg	150		200	mg/kg	--	--	mg/kg	--	--	20		U	20		U	9		UJ	30		UJ
Arsenic	mg/kg	57	507.1	700	mg/kg	20	51	mg/kg	14	120	20		U	20		U	9		UJ	30		UJ
Cadmium	mg/kg	5.1	11.3	14	mg/kg	1.1	1.5	mg/kg	2.1	5.4	**1.3**			**1.2**			**0.4**			1		U
Chromium	mg/kg	260	260	(2)	mg/kg	95	100	mg/kg	72	88	**56**			**55**			**29.8**			**52**		
Copper	mg/kg	390	1,027	1,300	mg/kg	80	830	mg/kg	400	1,200	**92.4**	**92.4**		**88.1**	**88.1**		**18.8**		**J**	**97**	**97**	J
Lead	mg/kg	450	975	1,200	mg/kg	340	430	mg/kg	360	>1300	**62**			**42**			**19**		**J**	**50**		J
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.28	0.75	mg/kg	0.66	0.80	**0.18**			**0.1**			**0.04**			**0.1**		
Nickel	mg/kg	--	--	--	mg/kg	--	--	mg/kg	--	--	**48**			**45**			**33**			**47**		
Selenium	mg/kg	(2)	**3**	(2)	mg/kg	--	--	mg/kg	11	>20	2		U	2		U	0.9		U	3		U
Silver	mg/kg	6.1	6.1	8.4	mg/kg	2.0	2.5	mg/kg	0.57	1.7	1		U	1		U	0.5		U	2		U
Zinc	mg/kg	410	2,783	3,800	mg/kg	130	400	mg/kg	3,200	>4200	**231**	**231**		**267**	**267**		**97**		**J**	**377**	**377**	J
Tetrabutyltin								µg/L	97	>97	--			--			--			--		
Tributyltin (porewater)	µg/L	0.15	0.15		µg/L	--	--	µg/L	--	--	**0.67**			**0.058**			--			--		
Tributyltin (bulk/sediment)	µg/kg	73.2	73.2		µg/kg	--	--	µg/kg	47	320	--			--			**3.6**		**U**	**9.8**		
Dibutyltin								µg/kg	910	130,000	--			--			--			--		
Monobutyltin								µg/kg	540	>4800	--			--			--			--		
ORGANIC CHEMICALS																						
Total LPAH	µg/kg	5,200		29,000	µg/kg	6,600	9,200	µg/kg	--	--	**760**			**410**		J	**410**		**J**	**450**		J
Naphthalene	µg/kg	2,100		2,400	µg/kg	500	1,300	µg/kg	--	--	83			58			38			39		
Acenaphthylene	µg/kg	560		2,000	µg/kg	470	640	µg/kg	--	--	22			16		J	3.5		J	19		J
Acenaphthene	µg/kg	500		2,000	µg/kg	1,100	1,300	µg/kg	--	--	**320**			**33**			**14**			**32**		
Fluorene	µg/kg	540		3,600	µg/kg	1,000	3,000	µg/kg	--	--	**98**			**46**			**28**			**38**		
Phenanthrene	µg/kg	1,500		2,100	µg/kg	6,100	7,600	µg/kg	--	--	**170**			**190**			**260**			**210**		
Anthracene	µg/kg	560		13,000	µg/kg	1,200	1,600	µg/kg	--	--	**66**			**68**			**57**			**66**		
2-Methylnapthalene	µg/kg	670		1,900	µg/kg	470	560	µg/kg	--	--	**31**			**25**			**12**			**47**		
Total HPAH	µg/kg	12,000		69,000	µg/kg	31,000	55,000	µg/kg	--	--	**2820**			**2260**			**2600**			**2500**		
Fluoranthene	µg/kg	1,700	4,600	30,000	µg/kg	11,000	15,000	µg/kg	--	--	**480**			**410**			**480**			**430**		
Pyrene	µg/kg	2,600	11,980	16,000	µg/kg	8,800	16,000	µg/kg	--	--	**590**			**440**			**800**			**470**		
Benzo(a)anthracene	µg/kg	1,300		5,100	µg/kg	4,300	5,800	µg/kg	--	--	**210**			**190**			**190**			**210**		
Chrysene	µg/kg	1,400		21,000	µg/kg	5,900	6,400	µg/kg	--	--	**440**			**410**			**290**			**370**		
Total Benzo(b+k)fluoranthenes	µg/kg	3,200		9,900	µg/kg	600	4,000	µg/kg	--	--	**530**			**420**			**400**			**570**		
Benzo(a)pyrene	µg/kg	1,600		3,600	µg/kg	3,300	4,800	µg/kg	--	--	**190**			**160**			**190**			**210**		
Indeno(1,2,3-cd)pyrene	µg/kg	600		4,400	µg/kg	4,100	5,300	µg/kg	--	--	**140**			**110**			**110**			**90**		
Dibenzo(a,h)anthracene	µg/kg	230		1,900	µg/kg	800	840	µg/kg	--	--	**67**			**55**			**34**			**45**		
Benzo(g,h,I)perylene	µg/kg	670		3,200	µg/kg	4,000	5,200	µg/kg	--	--	**170**			**130**			**140**			**110**		
Total PAH								µg/kg	17,000	30,000	**--**			**--**			**--**			**--**		
Bulk Petroleum Hydrocarbons (TPH) Diesel								mg/kg	340	510	**--**			**--**			**--**			**--**		
Bulk Petroleum Hydrocarbons (TPH) Residual								mg/kg	3,600	4,400	**--**			**--**			**--**			**--**		
1,4-Dichlorobenzene	µg/kg	110		120	µg/kg	--	--	µg/kg	--	--	19		U	20		U	20		U	20		U
1,2-Dichlorobenzene	µg/kg	35		110	µg/kg	--	--	µg/kg	--	--	19		U	20		U	20		U	20		U
1,3-Dichlorobenzene	µg/kg	--		--	µg/kg	--	--	µg/kg	--	--	19		U	20		U	20		U	20		U
1,2,4-Trichlorobenzene	µg/kg	31		64	µg/kg	--	--	µg/kg	--	--	19		U	20		U	20		U	20		U
Hexachlorobenzne (HCB)	µg/kg	22	168	230	µg/kg	--	--	µg/kg	--	--	4.9		U	4.9		U	4.8		U	3.9		U
Dimethylphthalate	µg/kg	71		1,400	µg/kg	46.0	440	µg/kg	--	--	**28**			20		U	20		U	20		U
Diethylphthalate	µg/kg	200		1,200	µg/kg	--	--	µg/kg	--	--	49		U	**38**		J	50		U	**44**		J
Di-n-butylphthalate	µg/kg	1,400		5,100	µg/kg	--	--	µg/kg	380	1,000	19		U	**9.8**		J	20		U	**20**		U
Butylbenzylphthalate	µg/kg	63		970	µg/kg	260	370	µg/kg	--	--	**32**			**32**			20		U	**24**		
Bis(2-ethylhexyl)phthalate	µg/kg	1,300		8,300	µg/kg	220	320	µg/kg	--	--	**680**	**680**		**510**	**510**		**480**	**480**		**740**	**740**	
Di-n-octylphthalate	µg/kg	6,200		6,200	µg/kg	26	45	µg/kg	39	>1100	19		U	**58**	**58**	J	20		U	**87**	**87**	
Phenol	µg/kg	420		1,200	µg/kg	--	--	µg/kg	120	210	19		U	**110**			**55**			**140**	**140**	
2-Methylphenol	µg/kg	63		77	ug/kg	--	--	ug/kg	--	--	19		U	20		U	20		U	**11**		J
4-Methylphenol	µg/kg	670		3,600	ug/kg	--	--	ug/kg	260	2,000	**74**			**76**			**160**			**150**		
2,4-Dimethylphenol	µg/kg	29		210	ug/kg	--	--	ug/kg	--	--	19		U	20		UJ	20		UJ	20		UJ
Pentachlorophenol	µg/kg	400	504	690	ug/kg	--	--	ug/kg	1,200	>1200	190		U	200		UJ	200		U	**55**		J
Benzyl alcohol	µg/kg	57		870	ug/kg	--	--	ug/kg			**82**			**130**			**200**			**530**		
Benzoic acid	µg/kg	650		760	µg/kg	--	--	µg/kg	2,900	3,800	**960**			**1300**			**520**			**1400**		
Dibenzofuran	µg/kg	540		1,700	µg/kg	400	440	µg/kg	--	--	30			35			19			24		
Hexachlorobutadiene	µg/kg	29		270	µg/kg	--	--	µg/kg	--	--	4.9		U	4.9		U	4.8		U	3.9		U
N-Nitrosodiphenylamine	µg/kg	28		130	µg/kg	--	--	µg/kg	--	--	19		U	20		U	20		U	20		U

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

						Sample ID:					NLM-SG-02			NLM-SG-03			HVM-SG-10			HVM-SG-11		
						DMMU ID:					S2			S3			S10			S11		
						sample Interval					0-22 cm			0-25 cm			0-26 cm			0-28.5 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW		DMMP	FW	
Beta-Hexachlorocyclohexane								µg/kg	7.2	1,100	--			--			--			--		
Carbazole								µg/kg	900	1,100	--			--			--			--		
p,p-DDD	µg/kg	16						µg/kg	310	860	1.7		U	1.7		U	1.6		U	1.3		U
p,p-DDE	µg/kg	9						µg/kg	21	33	1.7		U	1.7		U	1.6		U	**7.2**		J
p,p-DDT	µg/kg	12						µg/kg	--	--	1.7		U	1.7		U	1.6		U	1.3		U
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	µg/kg		50	69	µg/kg	--	--	µg/kg	100	8100	1.7		U	1.7		U	1.6		U	**7.2**		J
Endrin Ketone					µg/kg			µg/kg	8.5	>8.5	--			--								
Aldrin	µg/kg	9.5			µg/kg	--	--	µg/kg	--	--	0.64		U	0.64		U	0.62		U	0.51		U
Chlordane (sum of cis, trans, cis-nonachlor, trans-nonachlor, oxy)	µg/kg	2.8			µg/kg	--	--	µg/kg	--	--	4.7		U	4.7		U	0.8		U	0.66		U
Dieldrin	µg/kg	1.9	37		µg/kg	--	--	µg/kg	4.9	9.3	1.7		U	1.7		U	1.6		U	1.3		U
Heptachlor	µg/kg	1.5			µg/kg	--	--	µg/kg	--	--	0.64		U	0.64		U	0.62		U	0.51		U
Aroclor 1016	µg/kg										19		U	19		U	18		U	19		U
Aroclor 1221	µg/kg										19		U	19		U	18		U	19		U
Aroclor 1232	µg/kg										19		U	19		U	18		U	19		U
Aroclor 1242	µg/kg										19		U	19		U	18		U	19		U
Aroclor 1248	µg/kg										58		U	38		U	18		U	39		U
Aroclor 1254	µg/kg										**88**			48		U	32		U	48		U
Aroclor 1260	µg/kg										**33**			**22**			32		U	**29**		J
Total PCBs (Aroclors)	µg/kg	130		3,100	µg/kg	**60**	**120**	µg/kg	**110**	**2,500**	**121**			**22**			32		U	**29**		J
Total PCBs (TOC-normalized)	**µg/kg**		38***																			
Dioxin (TEQ: see Table 4 for detailed results)	**ng/kg**	4	10								**37**			**20.3**			**6.57**			**71**		
Total Solids	%										**25.7**			**25.6**			**56.1**			**16.9**		
Total Volatile Solids	%										**13.5**			**15.2**			**6.5**			**24.1**		
Total Organic Carbon	%										**7.1**			**6.6**			**3.1**			**10.8**		
Ammonia (NH3)	mg/kg							mg/kg	230	300	--			--			--			--		
Total Sulfides	mg/kg							mg/kg	39	61	--			--			--			--		
Gravel	%										**0.4**			**11.8**			**5.3**			**0.1**		U
Sand	%										**33.8**			**41.5**			**68.5**			**27.3**		
Silt	%										**55.6**			**39.4**			**24.4**			**64**		
Clay	%										**10.2**			**7.4**			**2**			**8.8**		
Fines (percent silt + clay)	%										**65.8**			**46.7**			**26.4**			**72.7**		
Bioassay Determination: **(P/F)**	%										**NA**			**NA**			**NA**			**NA**		
BTs exceeded:											**yes**			**yes**			**No**			**yes**		
Bioaccumulation conducted:											**No**			**No**			**No**			**No**		
Bioaccumulation Determination: **(P/F)**																						
ML Rule exceeded:											**No**			**No**			**No**			**No**		
DMMP Determination:											**ND**			**ND**			**ND**			**ND**		
DMMU Volume:											**NA**			**NA**			**NA**			**NA**		
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)											**H**			**H**			**H**			**H**		
Mean grab sampling depth (cm)	CM										**22**			**25**			**10**			**10**		
DMMU ID:											**NLM-SG-02**			**NLM-SG-03**			**HVM-SG-10**			**HVM-SG-11**		

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NA = Not Analyzed

ND = Not Determined

U = undetected at the reporting limit (method detection limit)

J = Estimated Concentration, at the reporting limit

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

											Harbor Village Marina									NE of KIP		
						Sample ID:					HVM-SG-12			HVM-SG-13			HVM-SG-13 (DUP)			NE-KIP-SG-14		
						DMMU ID:					S12			S13			S13 (dup)			S14		
						sample Interval					0-19 cm			0-24 cm			0-24 cm			0-26 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW		DMMP	FW	
Antimony	mg/kg	150		200	mg/kg	--	--	mg/kg	--	--	20		UJ	20		UJ	20		UJ	10		UJ
Arsenic	mg/kg	57	507.1	700	mg/kg	20	51	mg/kg	14	120	20		UJ	20		UJ	20		UJ	10		UJ
Cadmium	mg/kg	5.1	11.3	14	mg/kg	1.1	1.5	mg/kg	2.1	5.4	**0.7**		UJ	**0.9**		U	**0.9**		U	**0.7**		
Chromium	mg/kg	260	260	(2)	mg/kg	95	100	mg/kg	72	88	**44**			**54**			**55**			**36**		
Copper	mg/kg	390	1,027	1,300	mg/kg	80	830	mg/kg	400	1,200	**47.5**		**J**	**62.1**		J	**62.8**		J	**111**	**111**	**J**
Lead	mg/kg	450	975	1,200	mg/kg	340	430	mg/kg	360	>1300	**27**		**J**	**32**		J	**32**		J	**26**		**J**
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.28	0.75	mg/kg	0.66	0.80	**0.1**			**0.1**			**0.1**			**0.24**		
Nickel	mg/kg	--	--	--	mg/kg	--	--	mg/kg	--	--	**41**			**46**			**45**			**35**		
Selenium	mg/kg	(2)	**3**	(2)	mg/kg	--	--	mg/kg	11	>20	2		U	2		U	2		U	1		UJ
Silver	mg/kg	6.1	6.1	8.4	mg/kg	2.0	2.5	mg/kg	0.57	1.7	1		U	1		U	1		U	0.7		UJ
Zinc	mg/kg	410	2,783	3,800	mg/kg	130	400	mg/kg	3,200	>4200	**185**	**185**	**J**	**205**	**205**	J	**205**	**205**	**J**	**182**	**182**	J
Tetrabutyltin								µg/L	97	>97	--			--			--			--		
Tributyltin (porewater)	µg/L	0.15	0.15		µg/L	--	--	µg/L	--	--	--			--			--			--		
Tributyltin (bulk/sediment)	µg/kg	73.2	73.2		µg/kg	--	--	µg/kg	47	320	**6.8**			12			12			--		
Dibutyltin								µg/kg	910	130,000	--			--			--			--		
Monobutyltin								µg/kg	540	>4800	--			--			--			--		
ORGANIC CHEMICALS																						
Total LPAH	µg/kg	5,200		29,000	µg/kg	6,600	9,200	µg/kg	--	--	**350**		**J**	**390**		**J**	**320**		**J**	**1500**		
Naphthalene	µg/kg	2,100		2,400	µg/kg	500	1,300	µg/kg	--	--	39			**39**			**40**			**170**		
Acenaphthylene	µg/kg	560		2,000	µg/kg	470	640	µg/kg	--	--	5.7			**26**			**7.5**			**26**		
Acenaphthene	µg/kg	500		2,000	µg/kg	1,100	1,300	µg/kg	--	--	**18**		**J**	**17**		J	**16**		**J**	**130**		
Fluorene	µg/kg	540		3,600	µg/kg	1,000	3,000	µg/kg	--	--	**59**			**46**			**32**			**150**		
Phenanthrene	µg/kg	1,500		2,100	µg/kg	6,100	7,600	µg/kg	--	--	**170**			**190**			**160**			**830**		
Anthracene	µg/kg	560		13,000	µg/kg	1,200	1,600	µg/kg	--	--	**41**			**48**			**44**			**150**		
2-Methylnapthalene	µg/kg	670		1,900	µg/kg	470	560	µg/kg	--	--	**13**			**24**			**19**			**59**		
Total HPAH	µg/kg	12,000		69,000	µg/kg	31,000	55,000	µg/kg	--	--	**1500**			**1800**			**1500**			**4200**		
Fluoranthene	µg/kg	1,700	4,600	30,000	µg/kg	11,000	15,000	µg/kg	--	--	**300**			**260**			**220**			**1200**		
Pyrene	µg/kg	2,600	11,980	16,000	µg/kg	8,800	16,000	µg/kg	--	--	**230**			**290**			**230**			**9202**		
Benzo(a)anthracene	µg/kg	1,300		5,100	µg/kg	4,300	5,800	µg/kg	--	--	**110**			**150**			**160**			**360**		
Chrysene	µg/kg	1,400		21,000	µg/kg	5,900	6,400	µg/kg	--	--	**210**			**300**			**240**			**550**		
Total Benzo(b+k)fluoranthenes	µg/kg	3,200		9,900	µg/kg	600	4,000	µg/kg	--	--	**290**			**380**			**320**			**720**		
Benzo(a)pyrene	µg/kg	1,600		3,600	µg/kg	3,300	4,800	µg/kg	--	--	**110**			**140**			**120**			**250**		
Indeno(1,2,3-cd)pyrene	µg/kg	600		4,400	µg/kg	4,100	5,300	µg/kg	--	--	**77**			**100**			**79**			**97**		
Dibenzo(a,h)anthracene	µg/kg	230		1,900	µg/kg	800	840	µg/kg	--	--	**36**			**40**			**26**			**42**		
Benzo(g,h,I)perylene	µg/kg	670		3,200	µg/kg	4,000	5,200	µg/kg	--	--	**85**			**120**			**85**			**95**		
Total PAH								µg/kg	17,000	30,000	--			--			--			--		
Bulk Petroleum Hydrocarbons (TPH) Diesel								mg/kg	340	510	--			--			--			--		
Bulk Petroleum Hydrocarbons (TPH) Residual								mg/kg	3,600	4,400	--			--			--			--		
1,4-Dichlorobenzene	µg/kg	110		120	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	19		U
1,2-Dichlorobenzene	µg/kg	35		110	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	19		U
1,3-Dichlorobenzene	µg/kg	--		--	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	19		U
1,2,4-Trichlorobenzene	µg/kg	31		64	µg/kg	--	--	µg/kg	--	--	20		U	20		U	20		U	19		U
Hexachlorobenzne (HCB)	µg/kg	22	168	230	µg/kg	--	--	µg/kg	--	--	4.9		U	4.9		U	4.9		U	4.9		U
Dimethylphthalate	µg/kg	71		1,400	µg/kg	46.0	440	µg/kg	--	--	20		U	20		U	20		U	19		U
Diethylphthalate	µg/kg	200		1,200	µg/kg	--	--	µg/kg	--	--	**100**			**55**			50		U	**68**		
Di-n-butylphthalate	µg/kg	1,400		5,100	µg/kg	--	--	µg/kg	380	1,000	**26**			20		U	20		U	19		U
Butylbenzylphthalate	µg/kg	63		970	µg/kg	260	370	µg/kg	--	--	**71**			**82**			**56**			**43**		
Bis(2-ethylhexyl)phthalate	µg/kg	1,300		8,300	µg/kg	220	320	µg/kg	--	--	**360**	**360**		**560**	**560**		**430**	**430**		**280**	**280**	
Di-n-octylphthalate	µg/kg	6,200		6,200	µg/kg	26	45	µg/kg	39	>1100	20		U	**73**	**73**	J	**42**	**42**		**24**		
Phenol	µg/kg	420		1,200	µg/kg	--	--	µg/kg	120	210	**300**	**300**		**200**	**200**		**350**	**350**		**80**		
2-Methylphenol	µg/kg	63		77	ug/kg	--	--	ug/kg	--	--	**12**		J	**12**		J	**14**		J	19		U
4-Methylphenol	µg/kg	670		3,600	ug/kg	--	--	ug/kg	260	2,000	**74**			**110**			**110**			**59**		
2,4-Dimethylphenol	µg/kg	29		210	ug/kg	--	--	ug/kg	--	--	20		UJ	20		UJ	20		UJ	19		UJ
Pentachlorophenol	µg/kg	400	504	690	ug/kg	--	--	ug/kg	1,200	>1200	200		U	52		J	200		U	190		U
Benzyl alcohol	µg/kg	57		870	ug/kg	--	--	ug/kg			**300**			**360**			**380**			**100**		
Benzoic acid	µg/kg	650		760	µg/kg	--	--	µg/kg	2,900	3,800	**1500**			**1600**			**1700**			**610**		
Dibenzofuran	µg/kg	540		1,700	µg/kg	400	440	µg/kg	--	--	13			**12**			**17**			**90**		
Hexachlorobutadiene	µg/kg	29		270	µg/kg	--	--	µg/kg	--	--	10		UJ	**4.9**		**U**	**4.9**		**U**	**4.9**		**U**
N-Nitrosodiphenylamine	µg/kg	28		130	µg/kg	--	--	µg/kg	--	--	20		UJ	20		U	20		U	19		U

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

						Sample ID:					HVM-SG-12			HVM-SG-13			HVM-SG-13 (DUP)			NE-KIP-SG-14		
						DMMU ID:					S12			S13			S13 (dup)			S14		
						sample Interval					0-19 cm			0-24 cm			0-24 cm			0-26 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW		DMMP	FW	
Beta-Hexachlorocyclohexane								µg/kg	7.2	1,100	--			--			--			--		
Carbazole								µg/kg	900	1,100	--			--			--			--		
p,p-DDD	µg/kg	16						µg/kg	310	860	1.7		U	1.7		U	1.7		U	1.7		U
p,p-DDE	µg/kg	9						µg/kg	21	33	**4**		J	1.7		U	**4.4**		J	1.7		U
p,p-DDT	µg/kg	12						µg/kg	--	--	1.7		U	1.7		U	1.7		U	1.7		U
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	µg/kg		50	69	µg/kg	--	--	µg/kg	100	8100	**4**		J	1.7		U	**4.4**		J	1.7		U
Endrin Ketone					µg/kg			µg/kg	8.5	>8.5												
Aldrin	µg/kg	9.5			µg/kg	--	--	µg/kg	--	--	0.64		U	0.64		U	0.64		U	0.64		U
Chlordane (sum of cis, trans, cis-nonachlor, trans-nonachlor, oxy)	µg/kg	2.8			µg/kg	--	--	µg/kg	--	--	0.83		U	0.83		U	0.83		U	0.82		U
Dieldrin	µg/kg	1.9	37		µg/kg	--	--	µg/kg	4.9	9.3	1.7		U	1.7		U	1.7		U	1.6		U
Heptachlor	µg/kg	1.5			µg/kg	--	--	µg/kg	--	--	0.64		U	0.64		U	0.64		U	0.64		U
Aroclor 1016	µg/kg										19		U	20		U	20		U	19		U
Aroclor 1221	µg/kg										19		U	20		U	20		U	19		U
Aroclor 1232	µg/kg										19		U	25		U	35		U	28		U
Aroclor 1242	µg/kg										19		U	20		U	20		U	19		U
Aroclor 1248	µg/kg										24		U	20		U	20		U	19		U
Aroclor 1254	µg/kg										49		U	50		U	25		U	**20**		
Aroclor 1260	µg/kg										49		U	20		U	20		U	19		U
Total PCBs (Aroclors)	µg/kg	130		3,100	µg/kg	**60**	**120**	µg/kg	**110**	**2,500**	49		U	50		U	35		U	**20**		
Total PCBs (TOC-normalized)	**µg/kg**		38***																			
Dioxin (TEQ: see Table 4 for detailed results)	**ng/kg**	4	10								**26.6**			**50.4**			**18.9**			**10.1**		
Total Solids	%										**27.4**			**23.2**			**22.7**			**51**		
Total Volatile Solids	%										**13.7**			**15.0**			**14.6**			**7.6**		
Total Organic Carbon	%										**4.7**			**5.45**			**3.8**			**4.33**		
Ammonia (NH3)	mg/kg							mg/kg	230	300	--			--			--			--		
Total Sulfides	mg/kg							mg/kg	39	61	--			--			--			--		
Gravel	%										**0.6**			**0.1**		U	**0.1**		**U**	**22.6**		
Sand	%										**64.5**			**25.5**			**23.2**			**46.9**		
Silt	%										**64.5**			**62.9**			**65.1**			**25.6**		
Clay	%										**6.4**			**11.6**			**11.6**			**4.9**		
Fines (percent silt + clay)	%										**71.1**			**74.6**			**76.7**			**30.6**		
Bioassay Determination: **(P/F)**	%										**NA**			**NA**			**NA**			**NA**		
BTs exceeded:											**yes**			**yes**			**yes**			**yes**		
Bioaccumulation conducted:											**No**			**No**			**No**			**No**		
Bioaccumulation Determination: **(P/F)**																						
ML Rule exceeded:											**No**			**No**			**No**			**No**		
DMMP Determination:											**ND**			**ND**			**ND**			**ND**		
DMMU Volume:											**NA**			**NA**			**NA**			**NA**		
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)											**H**			**H**			**H**			**H**		
Mean grab sampling depth (cm)	CM										**10**			**10**			**10**			**10**		
DMMU ID:											**HVM-SG-12**			**HNM-SG-13**			**HNM-SG-13 (DUP)**			**NE-KIP-SG-14**		

*** 2006 Interim Fresh Water Guidelines**

****Newly adopted Fresh Water Guidelines through SMS Rulemaking: to be implemented in September 2013**

SL/BT = exceeds DMMP SL/BT

SL/SL1 = exceeds DMMP Screening Level or SMS FW SL1 Guidelines

ML/SL2 = exceeds DMMP Maximum Level or SMS FW SL2 Guidelines

VQ = Validation Qualifier

UCOWD = Unconfined open-water disposal

NA = Not Analyzed

ND = Not Determined

U = undetected at the reporting limit (method detection limit)

J = Estimated Concentration, at the reporting limit

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

											Sammamish River Navigation Channel								
						Sample ID:					KIP-SG-16			KIP-SG-17			SAM-SG-01		
						DMMU ID:					S16			S17			S01		
						sample Interval					0-21			0-23.5 cm			0-10 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW	
Antimony	mg/kg	150		200	mg/kg	--	--	mg/kg	--	--	6		UJ	10		UJ	6		UJ
Arsenic	mg/kg	57	507.1	700	mg/kg	20	51	mg/kg	14	120	6		UJ	10		UJ	6		UJ
Cadmium	mg/kg	5.1	11.3	14	mg/kg	1.1	1.5	mg/kg	2.1	5.4	**0.2**		U	**0.4**		U	0.2		UJ
Chromium	mg/kg	260	260	(2)	mg/kg	95	100	mg/kg	72	88	**29.9**			**54**			**29.3**		
Copper	mg/kg	390	1,027	1,300	mg/kg	80	830	mg/kg	400	1,200	**5.4**		**J**	**13.5**		J	**5.9**		**J**
Lead	mg/kg	450	975	1,200	mg/kg	340	430	mg/kg	360	>1300	**4**		**J**	**7**		J	**4**		**J**
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.28	0.75	mg/kg	0.66	0.80	0.03		U	**0.04**			0.03		U
Nickel	mg/kg	--	--	--	mg/kg	--	--	mg/kg	--	--	**26**			**34**			**23**		
Selenium	mg/kg	(2)	**3**	(2)	mg/kg	--	--	mg/kg	11	>20	0.6		U	1		U	0.6		U
Silver	mg/kg	6.1	6.1	8.4	mg/kg	2.0	2.5	mg/kg	0.57	1.7	0.4		U	0.6		U	0.4		U
Zinc	mg/kg	410	2,783	3,800	mg/kg	130	400	mg/kg	3,200	>4200	**43**		J	**64**		**J**	**43**		**J**
Tetrabutyltin								µg/L	97	>97	--			--			--		
Tributyltin (porewater)	µg/L	0.15	0.15		µg/L	--	--	µg/L	--	--	--			--			--		
Tributyltin (bulk/sediment)	µg/kg	73.2	73.2		µg/kg	--	--	µg/kg	47	320	--			--			--		
Dibutyltin								µg/kg	910	130,000	--			--			--		
Monobutyltin								µg/kg	540	>4800	--			--			--		
ORGANIC CHEMICALS																			
Total LPAH	µg/kg	5,200		29,000	µg/kg	6,600	9,200	µg/kg	--	--	**2.6**		**J**	**120**		**J**	**26**		
Naphthalene	µg/kg	2,100		2,400	µg/kg	500	1,300	µg/kg	--	--	4.8		UJ	**4**		J	4.8		U
Acenaphthylene	µg/kg	560		2,000	µg/kg	470	640	µg/kg	--	--	4.8		UJ		4.9		4.8		U
Acenaphthene	µg/kg	500		2,000	µg/kg	1,100	1,300	µg/kg	--	--	**4.8**		UJ	**4.9**		**U**	4.8		U
Fluorene	µg/kg	540		3,600	µg/kg	1,000	3,000	µg/kg	--	--	**4.8**		U	**2.5**		**J**	4.8		U
Phenanthrene	µg/kg	1,500		2,100	µg/kg	6,100	7,600	µg/kg	--	--	**2.6**		J	**93**			**26**		
Anthracene	µg/kg	560		13,000	µg/kg	1,200	1,600	µg/kg	--	--	**4.8**		U	**11**		**J**	4.8		U
2-Methylnapthalene	µg/kg	670		1,900	µg/kg	470	560	µg/kg	--	--	**4.8**		U	**7.4**			4.8		U
Total HPAH	µg/kg	12,000		69,000	µg/kg	31,000	55,000	µg/kg	--	--	**35**		J	**540**					
Fluoranthene	µg/kg	1,700	4,600	30,000	µg/kg	11,000	15,000	µg/kg	--	--	**11**		J	**130**			4.8		U
Pyrene	µg/kg	2,600	11,980	16,000	µg/kg	8,800	16,000	µg/kg	--	--	**9.7**		J	**120**			**39**		
Benzo(a)anthracene	µg/kg	1,300		5,100	µg/kg	4,300	5,800	µg/kg	--	--	**4.8**		U	**42**			**15**		**J**
Chrysene	µg/kg	1,400		21,000	µg/kg	5,900	6,400	µg/kg	--	--	**3**		J	**64**			**20**		
Total Benzo(b+k)fluoranthenes	µg/kg	3,200		9,900	µg/kg	600	4,000	µg/kg	--	--	**8.2**			**91**			**35**		**J**
Benzo(a)pyrene	µg/kg	1,600		3,600	µg/kg	3,300	4,800	µg/kg	--	--	**2.9**		J	**41**			**15**		**J**
Indeno(1,2,3-cd)pyrene	µg/kg	600		4,400	µg/kg	4,100	5,300	µg/kg	--	--	**4.8**		UJ	**24**			**3.6**		**J**
Dibenzo(a,h)anthracene	µg/kg	230		1,900	µg/kg	800	840	µg/kg	--	--	**4.8**		UJ	**4.9**		**U**	4.8		U
Benzo(g,h,I)perylene	µg/kg	670		3,200	µg/kg	4,000	5,200	µg/kg	--	--	**4.8**		UJ	**27**			**3.2**		**J**
Total PAH								µg/kg	17,000	30,000	**--**			**--**			**39.0**		
Bulk Petroleum Hydrocarbons (TPH) Diesel								mg/kg	340	510	**--**			**--**					
Bulk Petroleum Hydrocarbons (TPH) Residual								mg/kg	3,600	4,400	**--**			**--**					
1,4-Dichlorobenzene	µg/kg	110		120	µg/kg	--	--	µg/kg	--	--	19		U	19		U	19		U
1,2-Dichlorobenzene	µg/kg	35		110	µg/kg	--	--	µg/kg	--	--	19		U	19		U	19		U
1,3-Dichlorobenzene	µg/kg	--		--	µg/kg	--	--	µg/kg	--	--	19		U	19		U	19		U
1,2,4-Trichlorobenzene	µg/kg	31		64	µg/kg	--	--	µg/kg	--	--	19		U	19		U	19		U
Hexachlorobenzne (HCB)	µg/kg	22	168	230	µg/kg	--	--	µg/kg	--	--	19		U	19		U	19		U
Dimethylphthalate	µg/kg	71		1,400	µg/kg	46.0	440	µg/kg	--	--	19		U	**38**			19		U
Diethylphthalate	µg/kg	200		1,200	µg/kg	--	--	µg/kg	--	--	48		U	48		U	48		U
Di-n-butylphthalate	µg/kg	1,400		5,100	µg/kg	--	--	µg/kg	380	1,000	19		U	19		U	19		U
Butylbenzylphthalate	µg/kg	63		970	µg/kg	260	370	µg/kg	--	--	19		U	19		U	19		U
Bis(2-ethylhexyl)phthalate	µg/kg	1,300		8,300	µg/kg	220	320	µg/kg	--	--	19		J	**150**			**28**		
Di-n-octylphthalate	µg/kg	6,200		6,200	µg/kg	26	45	µg/kg	39	>1100	19		U	**11**		J	19		U
Phenol	µg/kg	420		1,200	µg/kg	--	--	µg/kg	120	210	19		U	**82**			19		UJ
2-Methylphenol	µg/kg	63		77	ug/kg	--	--	ug/kg	--	--	19		U	19		U	19		UJ
4-Methylphenol	µg/kg	670		3,600	ug/kg	--	--	ug/kg	260	2,000	39		U	**270**			38		U
2,4-Dimethylphenol	µg/kg	29		210	ug/kg	--	--	ug/kg	--	--	19		UJ	19		UJ	19		UJ
Pentachlorophenol	µg/kg	400	504	690	ug/kg	--	--	ug/kg	1,200	>1200	190		U	190		UJ	190		U
Benzyl alcohol	µg/kg	57		870	ug/kg	--	--	ug/kg			19		U	**62**			19		U
Benzoic acid	µg/kg	650		760	µg/kg	--	--	µg/kg	2,900	3,800	390		U	**430**			380		U
Dibenzofuran	µg/kg	540		1,700	µg/kg	400	440	µg/kg	--	--	4.8		U	4.9		U	4.8		U
Hexachlorobutadiene	µg/kg	29		270	µg/kg	--	--	µg/kg	--	--	10		UJ	10		UJ	10		UJ
N-Nitrosodiphenylamine	µg/kg	28		130	µg/kg	--	--	µg/kg	--	--	19		U	19		U	19		U

Table 3. Kenmore Navigation Channel Screening Level Evaluation Summary Relative to DMMP Guidelines

						Sample ID:					KIP-SG-16			KIP-SG-17			SAM-SG-01		
						DMMU ID:					S16			S17			S01		
						sample Interval					0-21			0-23.5 cm			0-10 cm		
		DMMP (Marine-DW)			SMS (freshwater-DW-2006)*			SMS (freshwater-DW-2013)**			mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ	mg/kg-DW	mg/kg-DW	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SL1	SL2	Units	SL1/SCO	SL2/CSL	DMMP	FW		DMMP	FW		DMMP	FW	
Beta-Hexachlorocyclohexane								µg/kg	7.2	1,100	--			--			--		
Carbazole								µg/kg	900	1,100	--			--			--		
p,p-DDD	µg/kg	16						µg/kg	310	860	--			--			--		
p,p-DDE	µg/kg	9						µg/kg	21	33									
p,p-DDT	µg/kg	12						µg/kg	--	--	--			--			--		
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	µg/kg		50	69	µg/kg	--	--	µg/kg	100	8100									
Endrin Ketone					µg/kg			µg/kg	8.5	>8.5									
Aldrin	µg/kg	9.5			µg/kg	--	--	µg/kg	--	--	--			--			--		
Chlordane (sum of cis, trans, cis-nonachlor, trans-nonachlor, oxy)	µg/kg	2.8			µg/kg	--	--	µg/kg	--	--	--			--			--		
Dieldrin	µg/kg	1.9	37		µg/kg	--	--	µg/kg	4.9	9.3	--			--			--		
Heptachlor	µg/kg	1.5			µg/kg	--	--	µg/kg	--	--	--			--			--		
Aroclor 1016	µg/kg										18		U	19		U	17		U
Aroclor 1221	µg/kg										18		U	19		U	17		U
Aroclor 1232	µg/kg										18		U	18		U	17		U
Aroclor 1242	µg/kg										18		U	19		U	17		U
Aroclor 1248	µg/kg										18		U	19		U	17		U
Aroclor 1254	µg/kg										18		U	19		U	17		U
Aroclor 1260	µg/kg										18		U	19		U	17		U
Total PCBs (Aroclors)	µg/kg	130		3,100	µg/kg	**60**	**120**	µg/kg	**110**	**2,500**	18		U	19		U	17		U
Total PCBs (TOC-normalized)	**µg/kg**		38***																
Dioxin (TEQ: see Table 4 for detailed results)	**ng/kg**	4	10								**0.359**			**2.3**			**0.467**		
Total Solids	%										**77.7**			**46.9**			**72.9**		
Total Volatile Solids	%										**1.0**			**6.7**			**1.2**		
Total Organic Carbon	%										**0.724**			**3.0**			**1.3**		
Ammonia (NH3)	mg/kg							mg/kg	230	300	--			--			--		
Total Sulfides	mg/kg							mg/kg	39	61	--			--			--		
Gravel	%										**0.1**			**0.3**			0.1		U
Sand	%										**99.2**			**30.4**			**93.9**		
Silt	%													**51.5**			--		
Clay	%													**17.6**			--		
Fines (percent silt + clay)	%										**0.8**			**69.1**			**2.2**		
Bioassay Determination: **(P/F)**	%										**NA**			**NA**			**NA**		
BTs exceeded:											**No**			**No**			**No**		
Bioaccumulation conducted:											**No**			**No**			**No**		
Bioaccumulation Determination: **(P/F)**																			
ML Rule exceeded:											**No**			**No**			**No**		
DMMP Determination:											**ND**			**ND**			**ND**		
DMMU Volume:											**NA**			**NA**			**NA**		
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)											**H**			**H**			**H**		
Mean grab sampling depth (cm)	CM										**10**			**10**			**10**		
DMMU ID:											**KIP-SG-16**			**KIP-SG-17**			**SAM-SG-01**		

*** 2006 Interim Fresh Water Guidelines**

****Newly adopted Fresh Water Guidelines through SMS Rulemaking: to be implemented in September 2013**

SL/BT = exceeds DMMP SL/BT

SL/SL1 = exceeds DMMP Screening Level or SMS FW SL1 Guidelines

ML/SL2 = exceeds DMMP Maximum Level or SMS FW SL2 Guidelines

VQ = Validation Qualifier

UCOWD = Unconfined open-water disposal

NA = Not Analyzed

ND = Not Determined

U = undetected at the reporting limit (method detection limit)

J = Estimated Concentration, at the reporting limit

Table 4. Dioxin/furan Testing Summary for Kenmore Navigation Channel Screening Level Assessment.

		Kenmore Navigation Channel (KNC)														
	WHO (05)	KNC-SG-04			KNC-SG-05			KNC-SG-06			KNC-SG-07			KNC-SG-07 (dup)		
Analyte	**TEF**	**ng/kg-dw**	**LQ**	**TEQ**	**ng/kg-dw**	**LQ**	**TEQ**	**ng/kg-dw**	**LQ**	**TEQ**	**ng/kg-dw**	**LQ**	**TEQ**	**ng/kg-dw**	**LQ**	**TEQ**
2,3,7,8-TCDD	1	0.15	J	0.15	0.322	J	0.322	0.478	J	0.478	0.306	J	0.306	0.341	J	0.341
1,2,3,7,8-PeCDD	1	0.381	J	0.381	1.33		1.33	1.58		1.58	1.18		1.18	1.03		1.03
1,2,3,4,7,8-HxCDD	0.1	0.491	J	0.0491	2.18		0.218	2.65		0.265	1.42	J	0.142	1.38	J	0.138
1,2,3,6,7,8-HxCDD	0.1	1.62	J	0.162	8.58		0.858	9.51		0.951	4.38		0.438	4.21		0.421
1,2,3,7,8,9-HxCDD	0.1	0.897	J	0.0897	4.84		0.484	5.68		0.568	2.85		0.285	2.95		0.295
1,2,3,4,6,7,8-HpCDD	0.01	40.5		0.405	184		1.84	237		2.37	85.5		0.855	82.7		0.827
OCDD	0.0003	307		0.0921	1540		0.462	2520		0.756	652		0.1956	613		0.1839
2,3,7,8-TCDF	0.1	0.173	J	0.0173	0.841	J	0.0841	0.967	J	0.0967	0.643	J	0.0643	0.579	J	0.0579
1,2,3,7,8-PeCDF	0.03	0.164	J	0.00492	0.684	J	0.02052	0.746	J	0.02238	0.442	J	0.01326	0.466	J	0.01398
2,3,4,7,8-PeCDF	0.3	0.128	J	0.0384	0.785	J	0.2355	0.826	J	0.2478	0.452	J	0.1356	0.556	J	0.1668
1,2,3,4,7,8-HxCDF	0.1	0.289	J	0.0289	1.74	J	0.174	1.9	J	0.19	1.2	J	0.12	1.05	J	0.105
1,2,3,6,7,8-HxCDF	0.1	0.261	J	0.0261	1.45	J	0.145	1.64	J	0.164	0.989	J	0.0989	0.958	J	0.0958
2,3,4,6,7,8-HxCDF	0.1	0.185	J	0.0185	0.751	J	0.0751	0.846	J	0.0846	0.386	J	0.0386	0.411	J	0.0411
1,2,3,7,8,9-HxCDF	0.1	0.361	J	0.0361	2.14		0.214	2.55		0.255	1.4	J	0.14	1.34	J	0.134
1,2,3,4,6,7,8-HpCDF	0.01	4.39		0.0439	25.4		0.254	31.3		0.313	14.6		0.146	14.6		0.146
1,2,3,4,7,8,9-HpCDF	0.01	0.315	J	0.00315	1.63	J	0.0163	1.98	J	0.0198	1.06	J	0.0106	1.14	J	0.0114
OCDF	0.0003	10.8		0.00324	71.9		0.02157	108		0.0324	40.9		0.01227	39.5		0.01185
Total TEQ (u = 1/2):				1.55			6.75			8.39			4.18			4.02
Total TEQ (u=0):				1.55			6.75			8.39			4.18			4.02
TOC (%)				2.7			5.4			4.9			5.0			7.1

Legend:
KNC = Kenmore Navigation Channel
NLM = North Lake Marina
HVM = Harbor Village Marina
KIP = Kenmore Industrial Park
J = Estimated concentration, reported at reporting limit
U = Anayte not detected at or above the reported concentation

Table 4. Dioxin/furan Testing Summary for Kenmore Navigation Channel Screening Level Assessment.

		Kenmore Navigation Channel						North Lake Marina					
	WHO (05)	KNC-SG-08			KNC-SG-09			NLM-SG-02			NLM-SG-03		
Analyte	TEF	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ
2,3,7,8-TCDD	1	0.293	J	0.293	0.372	J	0.372	0.975		0.975	0.599	J	0.599
1,2,3,7,8-PeCDD	1	0.87	J	0.87	1.24		1.24	7.83		7.83	3.75		3.75
1,2,3,4,7,8-HxCDD	0.1	1.36	J	0.136	1.71	J	0.171	14.5		1.45	6.97		0.697
1,2,3,6,7,8-HxCDD	0.1	3.85		0.385	5.03		0.503	53.1		5.31	28		2.8
1,2,3,7,8,9-HxCDD	0.1	2.99		0.299	3.54		0.354	29.5		2.95	14.5		1.45
1,2,3,4,6,7,8-HpCDD	0.01	88.5		0.885	103		1.03	1020		10.2	610		6.1
OCDD	0.0003	684		0.2052	798		0.2394	7420		2.226	4760		1.428
2,3,7,8-TCDF	0.1	0.553	J	0.0553	0.784	J	0.0784	3.37		0.337	2.13		0.213
1,2,3,7,8-PeCDF	0.03	0.409	J	0.01227	0.577	J	0.01731	3.04		0.0912	1.71	J	0.0513
2,3,4,7,8-PeCDF	0.3	0.54	J	0.162	0.573	J	0.1719	3.27		0.981	1.86		0.558
1,2,3,4,7,8-HxCDF	0.1	1.3	J	0.13	1.43	J	0.143	8.04		0.804	4.83		0.483
1,2,3,6,7,8-HxCDF	0.1	0.964	J	0.0964	1.23	J	0.123	8.28		0.828	4.02		0.402
2,3,4,6,7,8-HxCDF	0.1	0.366	J	0.0366	0.497	J	0.0497	3.12		0.312	1.8	J	0.18
1,2,3,7,8,9-HxCDF	0.1	1.37	J	0.137	1.74	J	0.174	11.7		1.17	6.21		0.621
1,2,3,4,6,7,8-HpCDF	0.01	18.7		0.187	17.7		0.177	137		1.37	84.1		0.841
1,2,3,4,7,8,9-HpCDF	0.01	1.83	J	0.0183	1.33	J	0.0133	7.34		0.0734	4.63		0.0463
OCDF	0.0003	66		0.0198	46.6		0.01398	366		0.1098	272		0.0816
Total TEQ (u = 1/2):				3.93			4.87			37.0			20.3
Total TEQ (u=0):				3.93			4.87			37.0			20.3
TOC (%)				3.3			5.2			7.1			6.6

Table 4. Dioxin/furan Testing Summary for Kenmore Navigation Channel Screening Level Assessment.

		Harbor Village Marina														
	WHO (05)	HVM-SG-10			HVM-SG-11			HVM-SG-12			HVM-SG-13			HVM-SG-13 (dup)		
Analyte	TEF	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ
2,3,7,8-TCDD	1	0.388		0.388	1.32	J	1.32	0.804	J	0.804	0.719	J	0.719	0.521	J	0.521
1,2,3,7,8-PeCDD	1	1.47		1.47	12.8		12.8	5.1		5.1	5.66		5.66	2.51		2.51
1,2,3,4,7,8-HxCDD	0.1	2.26		0.226	25.8		2.58	8.29		0.829	11.8		1.18	5.28		0.528
1,2,3,6,7,8-HxCDD	0.1	8.32		0.832	119		11.9	38.8		3.88	97.4		9.74	32.5		3.25
1,2,3,7,8,9-HxCDD	0.1	4.73		0.473	52.3		5.23	18		1.8	25.6		2.56	10.8		1.08
1,2,3,4,6,7,8-HpCDD	0.01	168		1.68	2120		21.2	769		7.69	1730		17.3	600		6
OCDD	0.0003	1290		0.387	16500		4.95	6410		1.923	14400		4.32	4830		1.449
2,3,7,8-TCDF	0.1	0.759	J	0.0759	3.38		0.338	2.15		0.215	2.84	J	0.284	1.22		0.122
1,2,3,7,8-PeCDF	0.03	0.675	J	0.02025	5.37	J	0.1611	2.87		0.0861	5.3	J	0.159	2.06	J	0.0618
2,3,4,7,8-PeCDF	0.3	0.725	J	0.2175	5.19		1.557	2.57	J	0.771	4.71		1.413	1.82		0.546
1,2,3,4,7,8-HxCDF	0.1	1.49	J	0.149	15.3		1.53	6.4		0.64	13.2		1.32	4.94		0.494
1,2,3,6,7,8-HxCDF	0.1	1.26	J	0.126	13.6		1.36	5.15		0.515	8.24		0.824	3.39		0.339
2,3,4,6,7,8-HxCDF	0.1	0.692	J	0.0692	7.11		0.711	2.96		0.296	7.63		0.763	2.82		0.282
1,2,3,7,8,9-HxCDF	0.1	1.96		0.196	21.1		2.11	8.02		0.802	15.4		1.54	5.77		0.577
1,2,3,4,6,7,8-HpCDF	0.01	22.3		0.223	282		2.82	104		1.04	230		2.3	93.1		0.931
1,2,3,4,7,8,9-HpCDF	0.01	1.59	J	0.0159	15.3		0.153	6		0.06	10.6		0.106	4.97		0.0497
OCDF	0.0003	77.5		0.02325	871		0.2613	356		0.1068	837		0.2511	379		0.1137
Total TEQ (u = 1/2):				6.57			71.0			26.6			50.4			18.9
Total TEQ (u=0):				6.57			71.0			26.6			50.4			18.9
TOC (%)				3.1			10.8			4.7			5.5			3.8

Table 4. Dioxin/furan Testing Summary for Kenmore Navigation Channel Screening Level Assessment.

		NE of KIP			Sammamish River Navigation Channel								
	WHO (05)	NE-KIP-SG-14			KIP-SG-16			KIP-SG-17			SAM-SG-01		
Analyte	TEF	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ
2,3,7,8-TCDD	1	0.404	J	0.404	0.144	J	0.144	0.226	J	0.226	0.164	J	0.164
1,2,3,7,8-PeCDD	1	1.99		1.99	0.0758	J	0.0758	0.491	J	0.491	0.107	J	0.107
1,2,3,4,7,8-HxCDD	0.1	3.06		0.306	0.0679	J	0.00679	1.03	J	0.103	0.0809	J	0.00809
1,2,3,6,7,8-HxCDD	0.1	12.5		1.25	0.202	J	0.0202	2.12		0.212	0.31	J	0.031
1,2,3,7,8,9-HxCDD	0.1	6.86		0.686	0.168	J	0.0168	2.33		0.233	0.219	J	0.0219
1,2,3,4,6,7,8-HpCDD	0.01	304		3.04	4.24		0.0424	50.3		0.503	5.7		0.057
OCDD	0.0003	2490		0.747	32		0.0096	252		0.0756	40.5		0.01215
2,3,7,8-TCDF	0.1	1.09		0.109	0.022	U	0.0011	0.136	U	0.0068	0.0691	U	0.003455
1,2,3,7,8-PeCDF	0.03	0.796	J	0.02388	0.0758	J	0.002274	0.126	J	0.00378	0.077	J	0.00231
2,3,4,7,8-PeCDF	0.3	0.957	J	0.2871	0.0439	U	0.006585	0.136	J	0.0408	0.0592	J	0.01776
1,2,3,4,7,8-HxCDF	0.1	2.26		0.226	0.0918	J	0.00918	0.625	J	0.0625	0.154	J	0.0154
1,2,3,6,7,8-HxCDF	0.1	2.08		0.208	0.0739	J	0.00739	0.725	J	0.0725	0.0573	J	0.00573
2,3,4,6,7,8-HxCDF	0.1	0.816	J	0.0816	0.0259	U	0.001295	0.11	U	0.0055	0.0573	U	0.002865
1,2,3,7,8,9-HxCDF	0.1	2.9		0.29	0.0559	J	0.00559	1.06	J	0.106	0.0553	J	0.00553
1,2,3,4,6,7,8-HpCDF	0.01	36.2		0.362	0.888	J	0.00888	14.4		0.144	1.19	J	0.0119
1,2,3,4,7,8,9-HpCDF	0.01	2.54	J	0.0254	0.0639	J	0.000639	0.95	J	0.0095	0.0454	J	0.000454
OCDF	0.0003	106		0.0318	1.75	J	0.000525	24.5		0.00735	2.67	J	0.000801
Total TEQ (u = 1/2):				10.1			0.359			2.30			0.467
Total TEQ (u=0):				10.1			0.359			2.30			0.461
TOC (%)				4.3			0.7			3.0			1.3

Table 4. Dioxin/furan Testing Summary for Kenmore Navigation Channel Screening Level Assessment.

		SRM Performance					
	WHO (05)	Puget Sound SRM-111412			SRM Acceptance Limits		
Analyte	**TEF**	**ng/kg-dw**	**LQ**	**TEQ**	ng/kg-dw (AVG)	**TEQ**	In/Out (Low/High)
2,3,7,8-TCDD	1	**1.08**		**1.08000**	**1.05**	**1.05**	In (.525/1.57)
1,2,3,7,8-PeCDD	1	**1.22**		**1.22000**	**1.08**	**1.08**	In (.542/1.63)
1,2,3,4,7,8-HxCDD	0.1	**1.53**	J	**0.15300**	**1.59**	**0.159**	In (0.797/2.39)
1,2,3,6,7,8-HxCDD	0.1	**4.15**		**0.41500**	**3.88**	**0.388**	In (1.94/5.82)
1,2,3,7,8,9-HxCDD	0.1	**2.96**		**0.29600**	**3.04**	**0.304**	In (1.52/4.55)
1,2,3,4,6,7,8-HpCDD	0.01	**106**		**1.06000**	**90.6**	**0.906**	In (45.3/136)
OCDD	0.0003	**892**		**0.26760**	**811**	**0.2433**	In (406/1217)
2,3,7,8-TCDF	0.1	**0.918**	J	**0.09180**	**1.11**	**0.111**	In (0.557/1.67)
1,2,3,7,8-PeCDF	0.03	1.05	JEMPC	0.01575	**1.23**	**0.0369**	In (0.613/1.84)
2,3,4,7,8-PeCDF	0.3	**0.898**	J	**0.26940**	**1.07**	**0.321**	In (0.533/1.60)
1,2,3,4,7,8-HxCDF	0.1	**3.27**		**0.32700**	**3.02**	**0.302**	In (1.51/4.53)
1,2,3,6,7,8-HxCDF	0.1	**1.12**	J	**0.11200**	**1.09**	**0.109**	In (.545/1.64)
2,3,4,6,7,8-HxCDF	0.1	**2.12**	J	**0.21200**	**1.83**	**0.183**	In (.917/2.75)
1,2,3,7,8,9-HxCDF	0.1	**0.667**	J	**0.06670**	**0.511**	**0.0511**	In (.255/0.77)
1,2,3,4,6,7,8-HpCDF	0.01	**20**		**0.20000**	**18.7**	**0.187**	In (9.36/28.1)
1,2,3,4,7,8,9-HpCDF	0.01	**1.87**	J	**0.01870**	**1.63**	**0.0163**	In (.815/2.44)
OCDF	0.0003	**58.3**		**0.01749**	**58.4**	**0.01752**	In (29.2/87.6)
Total TEQ (u = 1/2):				**5.822**		**5.465**	
Total TEQ (u=0):				**5.789**		**5.465**	
TOC (%)							

Legend:
JEMPC = Estimated maximum potential concentration (treated as undetected)
All Congerers in reported acceptance ranges

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

October,9, 2012

Operations Division/Technical Support Branch
Dredged Material Management Office

Maura O'Brien
Washington Department of Ecology
Toxics Cleanup Program NWRO
3190 - 160th Avenue SE
Bellevue, WA 98008-5452

Re: DMMP Review of Draft Sampling and Analysis Plan, Draft Sampling and Analysis Plan, Kenmore Sediment and Water Characterization

Dear Ms. O'Brien:
This letter responds to the draft sampling and analysis plan (SAP) submitted to the Dredged Material Management Program (DMMP) for review on October 2, 2012. After reviewing the proposed sampling and analysis plan, the DMMP agencies approve the SAP subject to making the following changes.

1. Page 4. Please note that the 2008 DMMP User's Manual, was updated in November 2009.

2. Page 4, next to last paragraph. References cited for updating DMMP Users Manual should also include 2011 clarification paper by Laura Inouye, Ph.D. and David Fox, entitled : Marine Sediment Quality Screening Levels: Adopting RSET Marine SLs for Use in DMMP

3. Page 6, third paragraph. Text should clarify testing history for PAHs. The summary of 1996 characterization results from navigation channel results relative to the observed PAH exceedances, noted that the established 1996 SLs for Acenaphthene (68 ppb, now 960 ppb), Anthracene (170 ppb, now 500 ppb), Fluorane (64 ppb, now 540 ppb), and Phenanthrene (320 ppb, now 1,500 ppb) would not have been exceedances based on the existing DMMP guidance. It is noteworthy that because of these SL exceedances this DMMU (DMMU-1) was subjected to DMMP toxicity testing and passed nondispersive interpretation guidelines.

4. Page 7, first paragraph. Please mention that the one foot sand cover approach was approved by TCP (Grant Yang).

5. Page 7, last paragraph describes Tributary 0056. Is this the one that was recently re-routed (discussed on Kenmore biweekly call)? If so, that information should be included, and a sample at the new mouth/point of entry into the lake should be considered.

6. Page 11, last paragraph. In coordination with Chance Asher, lead for the sediment rule revision, the Sediment Quality Values currently undergoing Rule Revision should not be used- please use the interim 2006 values (based on 2003 Ecology Report) (http://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/DMMP%20COCs%20-%20marine%20and%2006%20freshwater%20values.pdf).

7. Page 11, second paragraph, last sentence. QA/QC problems should be brought to the attention of both the DMMO and Ecology TCP lead (Maura O'Brien) for this sampling effort.

8. Page 13, Table 1. Note that marine SLs for TBT are porewater, while freshwater interim (and proposed) SLs are in dry weight. Both analyses will be required, not just porewater as currently stated in Table 1 and throughout analytical sections.

9. Page 20, first paragraph "For all other sampling locations…". What other samples? Above paragraph described approach for on shore, in channel, and away from shoreline... what other sediment samples are there?

10. Page 23, Table 2. Table Header should denote the DMMP Interpretive Guidelines are Marine Guidelines, and the Sediment Quality Values depicted are proposed Freshwater Criteria, not yet promulgated. See comment 6 above. The proposed freshwater values should be removed and replaced with the 2006 values (values based on 2003 Ecology report).

11. Page 23, Table 2. Note DMMP marine guidelines for Chromium were changed in 2011 from 267 to 260 ppm (2011 Clarification Paper: Inouye and Fox, see comment 2 above).

12. Page 26, Table 2, Dioxin/Furans. Make sure SAP includes the info from and references to the latest guidance on dioxin and for use of the Puget Sound SRM (dioxins, PCB Aroclors), which should be required for this sampling effort. Also, the revised SAP should provide detailed dioxin QAQC requirements in order to clarify to the testing laboratory the appropriate detection limits and performance objectives required by the DMMP (see **Attachment 1**).

13. Ecology HQ strongly suggested using the lowest available RLs for dioxins. The package is a bit more expensive, but will provide more usable data. These reporting limits often end up with a lot of non-detects which complicates analysis. While it may not be needed for areas where higher dioxins are encountered, if any of these samples are in background ranges (4 pptr TEQ), many of the congeners will not be detected..

14. Section 6.7. The revised SAP should mention Stage 4 validation for dioxin, and use of the Puget Sound SRM. Regarding the Puget Sound SRM, aliquots of the Puget Sound SRM will be furnished to testing laboratories (for the cost of shipping only) on request to the Environmental Protection Agency. In order to receive the SRM, Please provide the Corps/DMMO a completed request form which will be forwarded to the EPA Region 10 SRM Manager. Please contact DMMO for a copy of this form.

15. Section 10. References -- make sure the references include the latest guidance for dioxins, and the Puget Sound SRM. Also the User's Manual received minor updates in November 2009. Include citation for 2011 clarification paper (see comment 2 above).

16. Please fill out the sampling and analysis cost data sheet provided (**Attachment 2**) and submit it with your sediment characterization report to the Dredged Material Management Office.

Please call me (206-764-3768) if you have any questions about our SAP review comments.

Sincerely,

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Attachment
Copies Furnished:
John Pell, Kenmore Navigation Channel PM
Erika Hoffman, EPA
Laura Inouye, Ph.D., Ecology
Celia Barton, DNR
DMMO file

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David R. Kendall, Ph.D.
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DMMO file

Attachment 1

Table 1 DMMP Parameters (testing parameter, preparation method, analytical method, sediment method detections limit [MDL], DMMP screening levels [SL], maximum levels [ML] and bioaccumulation triggers [BT])

Parameter	Prep Method	Analysis Method	Sediment RL [1]	SL	PSDDA[1] BT	ML
Conventionals						
Total Solids (%)	---	PSEP [2]	0.1	---	---	---
Total Volatile Solids (%)	---	PSEP [2]	0.1	---	---	---
Total Organic Carbon (%)	---	PSEP [2]	0.1	---	---	---
Total Sulfides (mg/kg)	---	PSEP [2]	1	---	---	---
Ammonia (mg/kg)	---	Plumb 1981	1	---	---	---
Grain Size	---	Modified ASTM with Hydrometer	---	---	---	---
Dioxin/Furans Congeners (ng/kg)[3,4,5]						
2,3,7,8-TCDD	---	1613B	1.0	---	---	---
1,2,3,7,8-PeCDD	---	1613B	1.0	---	---	---
1,2,3,4,7,8-HxCDD	---	1613B	2.5	---	---	---
1,2,3,6,7,8-HxCDD	---	1613B	2.5	---	---	---
1,2,3,7,8,9-HxCDD	---	1613B	2.5	---	---	---
1,2,3,4,6,7,8-HpCDD	---	1613B	2.5	---	---	---
OCDD	---	1613B	5.0	---	---	---
2,3,7,8-TCDF	---	1613B	1.0	---	---	---
1,2,3,7,8-PeCDF	---	1613B	2.5	---	---	---
2,3,4,7,8-PeCDF	---	1613B	1.0	---	---	---
1,2,3,4,7,8-HxCDF	---	1613B	2.5	---	---	---
1,2,3,6,7,8-HxCDF	---	1613B	2.5	---	---	---
1,2,3,7,8,9-HxCDF	---	1613B	2.5	---	---	---
2,3,4,6,7,8-HxCDF	---	1613B	2.5	---	---	---
1,2,3,4,6,7,8-HpCDF	---	1613B	2.5	---	---	---
1,2,3,6,7,8,9-HpCDF	---	1613B	2.5	---	---	---
OCDF	---	1613B	5.0	---	---	---

Notes:

1. TDLs and DMMP screening levels are on a dry weight basis.
2. Recommended Protocols for Measuring Metals in Puget Sound Water, Sediment and Tissue Samples, Puget Sound Estuary Program, April 1997.
3. Procedures For Handling and Chemical Analysis of Sediment and Water Samples, Russell H. Plumb, Jr., EPA/Corps of Engineers, May 1981.
3. Dioxin/furan analysis includes the tetra-, penta-, hexa-, hepta-, octa-chlorinated congeners.
4. The TDLs for dioxin/furans are on a dry weight basis in pg/g.
5. Reporting limits and methods for dioxin/furan congeners as provided in 2010 SMARM Update (DMMP 2010).

1.1.1 Detection Limits

The samples collected for dredged material characterization will be analyzed for all the parameters listed in **Table 1**. The contractor will specifically caution the testing laboratory to make certain that it complies with the DMMP detection limit requirements. All reasonable means, including additional cleanup steps and method modifications, will be used to bring all limits-of-detection below DMMP detection limit requirements. In addition, an aliquot (8 oz) of

each sediment sample for analysis will be archived and preserved at -20°C for additional analysis if necessary.

Table 2. QC Acceptance Criteria for PCDD/F

	Test Conc., ng/mL[1]	IPR[2]		OPR[3] (%)	I-CAL[4] %	CAL/VER[5] (%) (Coeff. of Variation)	Labelled Cmpd %Rec. in Sample	
		RSD (%)	Recovery				Warning Limit	Control Limit
Native Compound								
2,3,7,8-TCDD	10	28	83-129	70-130	20	78-129	-	-
2,3,7,8-TCDF	10	20	87-137	75-130	20	84-120	-	-
1,2,3,7,8-PeCDD	50	15	76-132	70-130	20	78-130	-	-
1,2,3,7,8-PeCDF	50	15	86-124	80-130	20	82-120	-	-
2,3,4,7,8-PeCDF	50	17	72-150	70-130	20	82-122	-	-
1,2,3,4,7,8-HxCDD	50	19	78-152	70-130	20	78-128	-	-
1,2,3,6,7,8-HxCDD	50	15	84-124	76-130	20	78-128	-	-
1,2,3,7,8,9-HXCDD	50	22	74-142	70-130	35	82-122	-	-
1,2,3,4,7,8-HxCDF	50	17	82-108	72-130	20	90-112	-	-
1,2,3,6,7,8-HxCDF	50	13	92-120	84-130	20	88-114	-	-
1,2,3,7,8,9-HxCDF	50	13	84-122	78-130	20	90-112	-	-
2,3,4,6,7,8-HxCDF	50	15	74-158	70-130	20	88-114	-	-
1,2,3,4,6,7,8-HpCDD	50	15	76-130	70-130	20	86-116	-	-
1,2,3,4,6,7,8-HpCDF	50	13	90-112	82-122	20	90-110	-	-
1,2,3,4,7,8,9-HpCDF	50	16	86-126	78-130	20	86-116	-	-
OCDD	100	19	86-126	78-130	20	79-126	-	-
OCDF	100	27	74-146	70-130	35	70-130	-	-
Labelled Compounds								
$^{13}C_{12}$-2,3,7,8-TCDD	100	37	28-134	25-130	35	82-121	40-120	25-130
$^{13}C_{12}$-2,3,7,8-TCDF	100	35	31-113	25-130	35	71-130	40-120	24-130
$^{13}C_{12}$-1,2,3,7,8-PeCDD	100	39	27-184	25-150	35	70-130	40-120	25-130
$^{13}C_{12}$-1,2,3,7,8-PeCDF	100	34	27-156	25-130	35	76-130	40-120	24-130
$^{13}C_{12}$-2,3,4,7,8-PeCDF	100	38	16-279	25-130	35	77-130	40-120	21-130
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	100	41	29-147	25-130	35	85-117	40-120	32-130
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	100	38	34-122	25-130	35	85-118	40-120	28-130
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	100	43	27-152	25-130	35	76-130	40-120	26-130
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	100	35	30-122	25-130	35	70-130	40-120	26-123
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	100	40	24-157	25-130	35	74-130	40-120	29-130
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	100	37	29-136	25-130	35	73-130	40-120	28-130
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	100	35	34-129	25-130	35	72-130	40-120	23-130
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	100	41	32-110	25-130	35	78-129	40-120	28-130
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	100	40	28-141	25-130	35	77-129	40-120	26-130
$^{13}C_{12}$-OCDD	200	48	20-138	25-130	35	70-130	25-120	17-130
Cleanup Standard								
$^{37}Cl_4$-2,3,7,8-TCDD	10	36	39-154	31-130	35	79-127	40-120	35-130

[1] QC acceptance criteria for IPR, OPR, and samples based on a 20 µL extract final volume

[2] IPR: Initial Precision and Recovery demonstration

[3] OPR: Ongoing Precision and Recovery test run with every batch of samples.

[4] Initial Calibration

[5] CAL/VER: Calibration Verification test run at least every 12 hours

Attachment 2

PROJECT SAMPLING AND TESTING COST SUMMARY: (Required fields shaded)		
Project Name:		
Total Project Volume Tested: (cubic yards)		
SAMPLING COSTS: (includes: bathymetric survey, SAP development, sample positioning, project sediment sampling costs, reference/control sediment sampling costs)		$
CHEMICAL TESTING COSTS: (PSDDA or Grays Harbor-Willapa Bay DMMP chemicals of concern)		
Number of DMMU analyzed:		
Conventionals: (unit cost)		$
Metals: (unit cost)		$
Organics: (unit cost)		$
Special Chemicals: (unit cost) (if any, specify which chemicals, e.g., TBT, Dioxin)		$
Total Chemical Testing Costs: (includes cumulative chemical testing costs, chemistry report, QA/QC report including QA2 data)		$
BIOLOGICAL TESTING COSTS:		
Number of DMMU analyzed:		
Amphipod: (specify species and unit cost)		$
Sediment Larval: (specify species and unit cost)		$
Neanthes Growth: (unit cost)		$
Bioaccumulation test: (2 species) (specify species, total cost)	*Macoma nasuta*	$
	Nephtys caecoides	$
Reference sample collection (location)		$
Total Biological Testing Costs: (includes total bioassay testing cost, QA/QC costs, and bioaccumulation costs if any)		$
MISCELLANEOUS COSTS: (includes any costs not covered such as administrative overhead, final report Cost)		$
GRAND TOTAL COSTS: (summary of sampling + testing costs + miscellaneous costs)		$

This brief background summary compares/contrasts the sediment quality issues exhibited within the Federal Navigation Channel relative (see attached SDM) to the recent characterization conducted at the Harbor Village Marina for maintenance dredging, which identified elevated concentrations of dioxins and PCBs.

Sources of Contamination:

- Based on discussions with Ecology's Toxics Cleanup Program, we believe the principal sediment loading source for the Kenmore Navigation Channel is from the Samammish River.

- In contrast, the most likely source for the sediments to the Harbor Village Marina is a small creek (listed as River 0056) that flows directly into the marina. This creek may be the source of contaminants observed in the marina sediments (e.g., dioxins, PCBs). Another likely source of contaminants to the marina is a historical plywood site located north of the Lakepoint/Kenmore site, and east of the marina.

- If the historic plywood site is the source of the contamination observed in Harbor Village sediments, it's influence may be limited to the north shore and not extend to the Kenmore navigation channel and the Lakepoint/Kenmore Industrial Park site. However, we have no test data to confirm/refute this hypothesis at this time.

Contaminants of Concern in Sediments:

- Sediments from the Federal Channel were last characterized in 1996 (**see Enclosure 1: 1996 suitability determination**), and exhibited relatively low concentrations of PCB (17 - 88 ppb) as compared to the PCB Screening guideline (130 ppb).

- In contrast, sediments from Harbor Village Marina had PCB levels which ranged from 190 - 280 ppb (**see Enclosure 2: 2011 suitability determination**).

- In the 1996 testing, some sediments from the Federal Channel exceeded screening guidelines for PAHs, TBT and DDT. Some of these sediments passed biological testing based on PAH exceedances, and were determined to be suitable for open-water disposal. Other sediments with TBT and DDT exceedances failed biological testing guidelines and were unsuitable for open-water

disposal. The unsuitable material was not dredged. No dioxin testing was performed on Federal Channel sediments at that time.

- The Harbor Village Marina maintenance dredging project exhibited elevated Dioxin concentrations with total TEQ's ranging from 43.2 to 92.1 pptr-TEQ within the potential dredged material prism, and concentrations from 0.9 to 64.3 pptr-TEQ within the underlying sediment surface that would be exposed after dredging is completed. To address the elevated dioxins and PCBs in the sediment that would be exposed by dredging, the DMMP agencies will require the placement of a one-foot clean sand cover as a special condition to the Corps permit.

Future Planned Maintenance Dredging of the Navigation Channel will require testing at a High Concern rank, and will include testing of the full DMMP chemical-of-concern (COC) list, including TBT, and Dioxin/Furans.

`

Enclosure 1

CENPS-OP-TS 8 July 1996

MEMORANDUM FOR RECORD

SUBJECT: DETERMINATION OF THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER PSDDA EVALUATION PROCEDURES FOR USACE KENMORE MAINTENANCE DREDGING FOR DISPOSAL AT THE PSDDA ELLIOTT BAY OPEN WATER DISPOSAL SITE.

1. The Corps of Engineers proposes to clamshell maintenance dredge approximately 60,000 cubic yards of sediment in the Kenmore Navigation Channel in Lake Washington. The federal Kenmore Navigation Channel project is sponsored by King County. The following summary reflects the PSDDA agencies' (Corps of Engineers, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) consensus decision on the acceptability of the sampling plan and all relevant test data to make a determination of suitability for the disposal of the material at the Elliott Bay open-water disposal site.

2. This project was ranked "high," based on guidance provided in the Management Plan Report, Phase II, Page A-10. This project is located in an area of known sources of contamination.

3. A sampling and analysis plan was completed for this project and approved by the PSDDA agencies on 18 January 1996. Sampling for this project was initiated on 21 February 1996. Recency for this project will expire 21 February 1998. Due to the limited dredging periods available in Lake Washington, the PSDDA agencies have agreed that this deadline may be extended to July 1998, barring any changes in conditions at the site.

SAP Approval Date	18 January 1996
Sampling dates	21-22 February 1996
Data Report submittal date	24 May 1996
Recency determination dates	21 February 1998

4. Fifteen Dredged Material Management Units were characterized. All DMMUs were surface units. Each sample represented one DMMU and approximately 4,000 cubic yards. Because this maintenance project is near the entrance to Kenmore Marina, one sample, S-4, was analyzed for tributyltin in addition to the standard PSDDA chemicals of concern.

5. For three DMMU the chemistry data indicated exceedances of the Dredging Year 1996 PSDDA screening levels. For sample S-1, the screening level was exceeded for acenapthene, anthracene, fluorene, and phenanthrene. (Chemical values are listed in Table 1.) For sample S-4,

the screening level for tributyltin was exceeded. For sample S-10, the screening level for DDT and DDE were exceeded. No bioaccumulation triggers or maximum levels were exceeded.

6. Due to the exceedance of chemical screening levels, biological testing was required for samples S-1, S-4, and S-10. The amphipod 10-day acute toxicity test, and the bivalve sediment larval combined mortality and abnormality (effective mortality) test, and the *Neanthes* 20-day growth test were conducted. In addition, both the saline extract and solid phase Microtox tests were performed. Use of the Microtox test has been suspended for regulatory decision-making, and the results of these tests are provided for information. Tests were conducted according to the guidelines specified by PSEP (1995), as modified by the PSDDA program.

7. Reference sediment for use in the bioassays was collected from Carr Inlet. Control sediment was collected from West Beach. *Eohaustorius estuarius* was used for the amphipod test due to the freshwater sediments. *Dendraster excentricus* was used for the sediment larval test.

8. Bioassay results are listed in Table 4. No DMMU showed hits in the amphipod test. For the echinoderm test, hits were exhibited for samples S-4 and S-10. These same two samples had hits on the Neanthes and saline microtox tests.

9. Two reference sediments were used, Carr4 and Carr20, to represent the grain-size distribution in the test sediments. Both echinoderm reference sediments failed to meet the quality control limit of 35%. In addition, there was high within replicate variability, especially for Carr4. In these cases a statistical power analysis is required to determine the acceptability of reference sediment results. The power analysis, using Borenstein and Cohen's statistical program, showed that a comparison of S4 to Carr4 had a power of 0.2. In contrast, a comparison of S4 to Carr20 had a power of 0.99. The PSDDA program requires statistical power of 0.6 for the reference sediment value to be considered valid. Therefore, Carr4 was rejected for the echinoderm test, and Carr20 was used for comparison.

10. In summary, PSDDA approved protocols and procedures were followed, and quality assurance/quality control guidelines specified in PSDDA were generally complied with. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the PSDDA program. Based on the results of the chemical and biological testing, both DMMUs S-4 and S-10 (8,000 cubic yards) are not suitable for open-water disposal. The remaining volume (52,000 cubic yards) is suitable for disposal at the Elliott Bay open-water disposal site.

10. This memorandum documents the suitability of proposed dredged sediments for disposal at a PSDDA open-water disposal site. This determination of suitability does not preclude the consideration of this material for an appropriate beneficial use. It does not constitute final agency approval of the project. A dredging plan for this project must be completed as part of the final projet approval process. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404 (b)1 of the Clean Water Act.

Re: DY97 Kenmore O&M Dredging

Concur:

7/23/96
Date

David Kendall, Ph.D
Seattle District Corps of Engineers

7/23/96
Date

Stephanie Stirling
Seattle District Corps of Engineers

8/5/96
Date

Justine Barton
Environmental Protection Agency, Region 10

7/25/96
Date

Tom Luster
Washington Department of Ecology

24 JUL 96
Date

Ted Benson
Washington Department of Natural Resources

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DMMO file

Table 2. Sediment Conventional Parameters

DMMU	Volume	Grain-Size				Total Solids (%)	Total Volatile Solids(%)	Total Organic Carbon (%)	Bulk Ammonia (mg/kg)	Total Sulfides (mg/kg)
		Gravel	Sand	Silt	Clay					
S-1	4000	15	45.6	33.6	5.8	59	5.5	3.7	64	12
S-2	4000	21.1	61.0	16.3	1.6	70.7	2.9	1.5	24	4.4
S-3	4000	18.1	35.8	36.6	9.5	73	3.0	1.2	42	9.6
S-4	4000	3.6	57.8	32.3	6.3	64.2	4.4	2.1	75	9.8
S-5	4000	1	77.6	21.2	1.2	55.3	5.5	3.5	8.3	4.9
S-6	4000	1.7	62.5	34.1	1.7	43.8	7.9	3.6	87	66
S-7	4000	0.6	37.3	48.3	13.8	52.4	5.4	2.6	130	44
S-8	4000	1.4	42.4	45.5	10,7	35.4	13.1	4.1	130	82
S-9	4000	1.1	59.0	36.9	3.0	45.6	9.4	4.0	220	68
S-10	4000	0	29.5	65.1	5.4	34.2	13	5.3	280	91
S-11	4000	0.4	43.5	46.3	9.8	44	11.3	4.4	270	86
S-12	4000	0.9	46.4	48.3	4.4	31.5	12.1	6.2	100	67
S-13	4000	0	28.9	53.7	17.4	45	7.0	3.7	200	58
S-14	4000	0.6	41.3	48.1	10	56.8	5.0	4.4	130	13
S-15	4000	1.0	39.6	49.2	10.2	59.2	4.0	1.6	73	49

Table 3. Screening Level Exceedances

Parameters	Chemical Guidelines			S-1	S-4	S-10
	SL	BT	ML			
tributyltin (μg/kg)	30	228			74	
anthracene (μg/kg)	130		1300	170		
acenaphthene (μg/kg)	63		630	68		
fluorene (μg/kg)	64		640	86		
phenanthrene (μg/kg)	320		3200	330		
total DDT (μg/kg)	6.9	50	69			9.8

*Note the SL exceedances in S-1: Anthracene: 1996 SL = 130 ppb, existing SL/SQS = 960 ppb
Acenaphene: 1996 SL = 63 ppb, existing SL/SQS = 500 ppb
Fluorene: 1996 SL = 64 ppb, existing SL/SQS = 540 ppb
Phenanthrene: 1996 SL = 320 ppb, existing SL/SQS = 1,500 ppb
Full COC testing summary at Attachment 1

Table 4. Bioassay Results

DMMU	Amphipod *(E. Estuarius)* Mortality (%)	Sediment Larval Test *(Dendraster excentricus)* (Effective mortality %)	20 Day *Neanthes* Mean Growth Rate	Suitability for Non-Dispersive Disposal
Control	0		0.92	NA
Carr4	3.0	31.7[+]	0.88	NA
Carr20	2.0	17.9	1.04	NA
S-1	13	35.1	0.71	Pass
S-4	9.0	61.8*	0.47*	Fail
S-10	3.0	82.1*	0.70*	Fail
Positive Control (EC50/LC50)	Cd (mg/L) 2.2	CdCl (mg/L) 5.78	Cd (mg/L) 7.22	NA
Lab Performance			6.18 ± 1.95 mg/L Cd	
DAIS mean		10.1 ± 6.5 mg/L Cd	12.5 ± 5.4 mg/L Cd	

[+]rejected
* two-hit failure

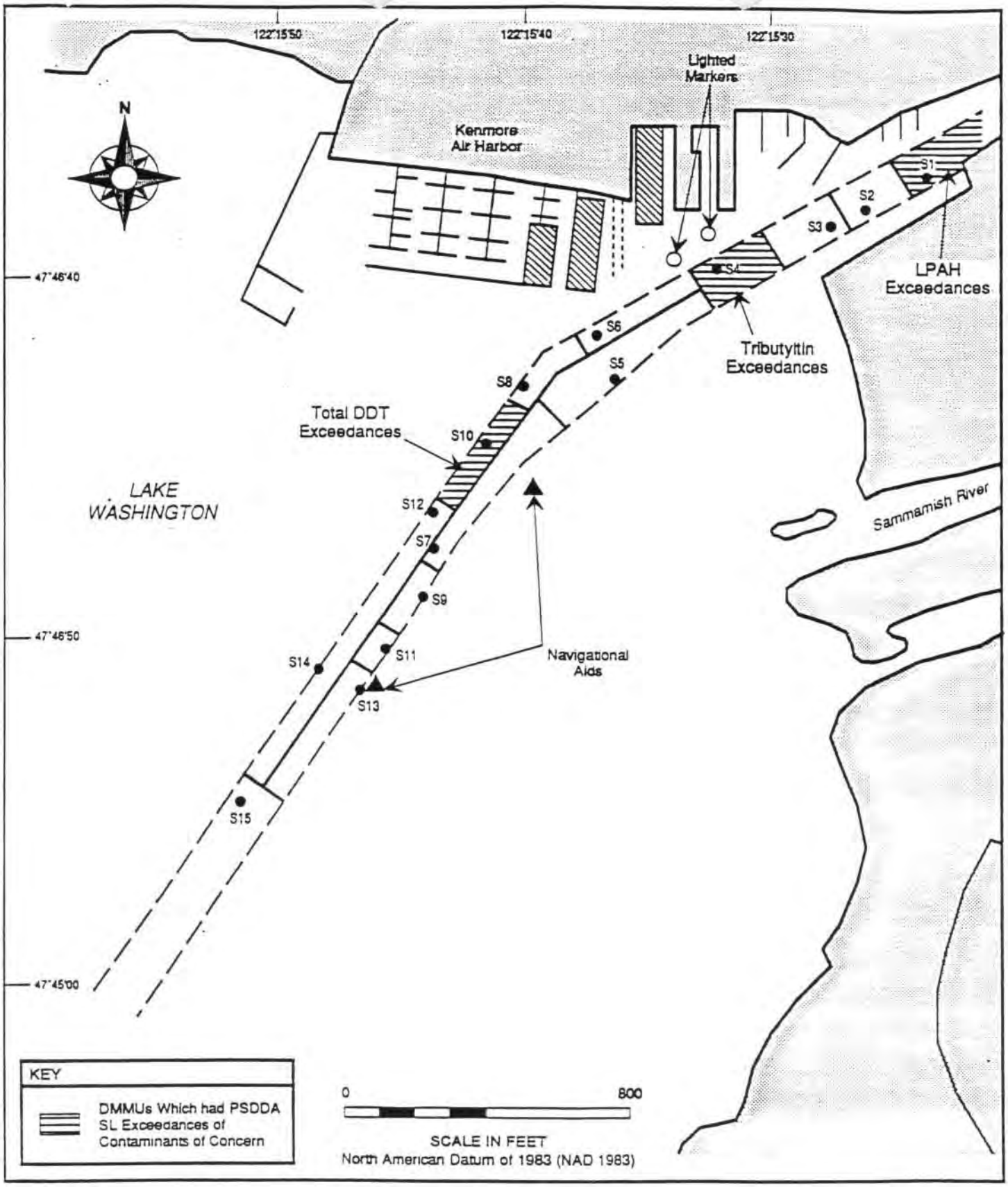
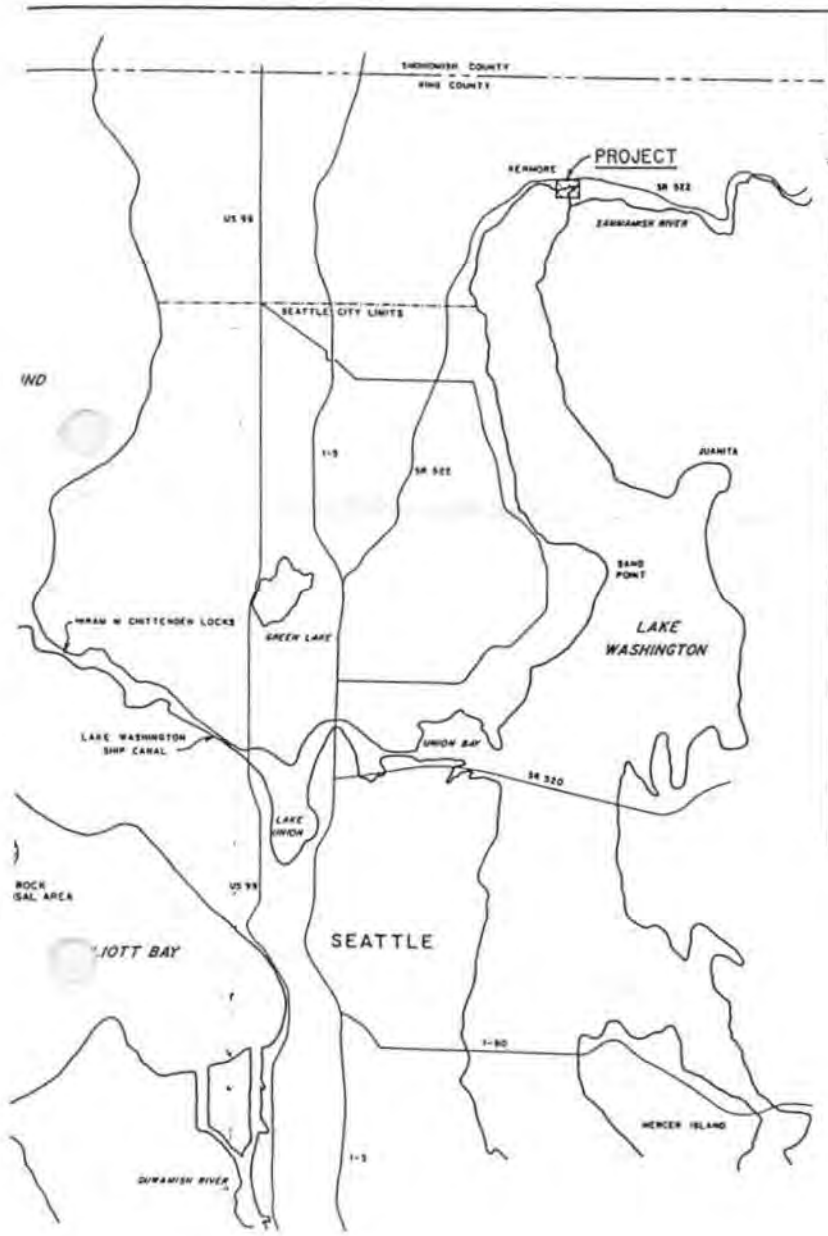


Figure 3-1. Locations of stations and corresponding DMMUs for which one or more contaminants exceeded PSDDA screening levels.



PROJECT AREA

SCALE IN MILES

LOCATION MAP

SCALE IN MILES

VICINITY MAP

SCALE IN MILES

from SAP

FIGURE 1

KENMORE NAVIGATION CHANNEL

VICINITY MAP

LAKE WASHINGTON

WASHINGTON

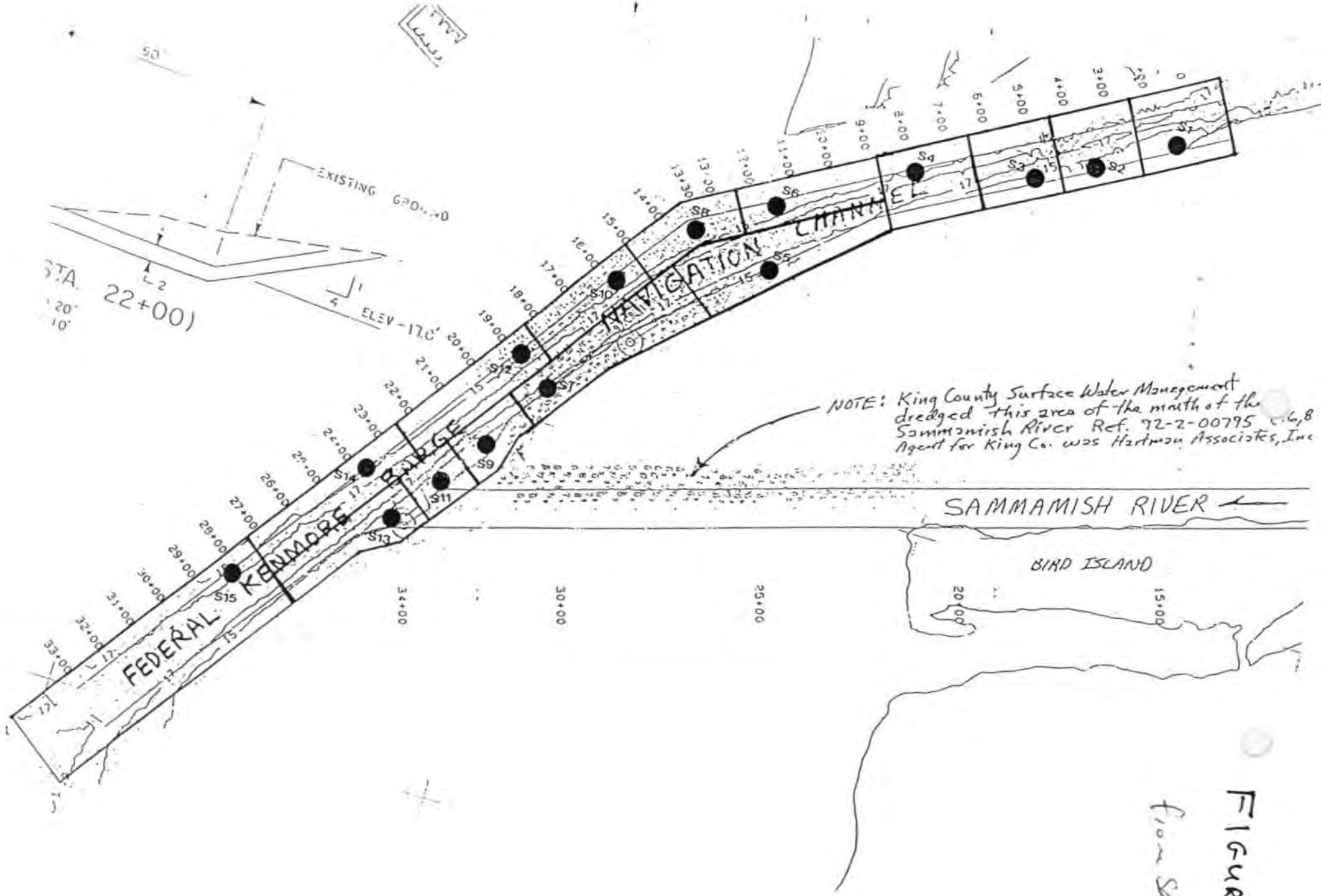


FIGURE 2

from SAP

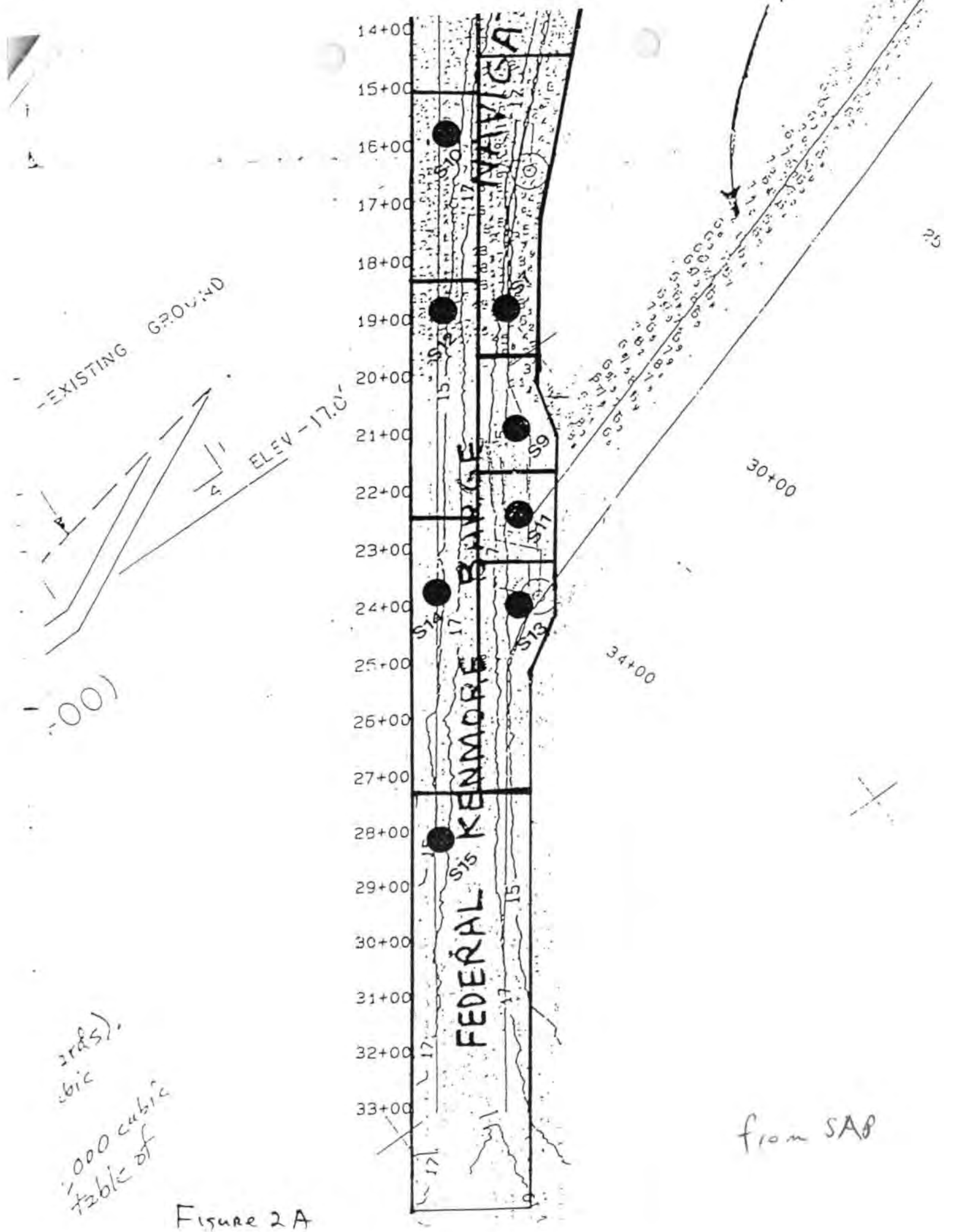
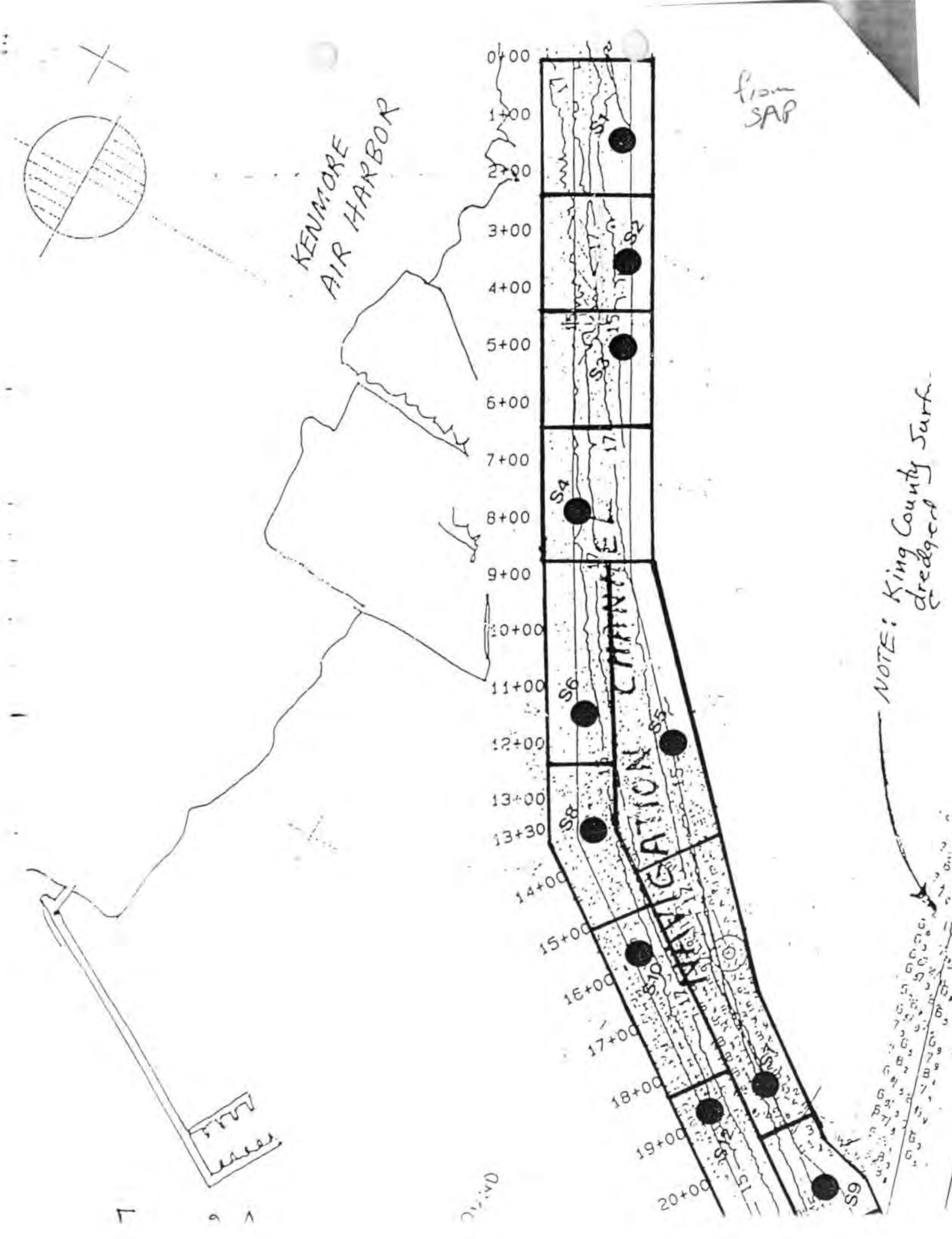

14+00
15+00
16+00
17+00
18+00
19+00
20+00
21+00
22+00
23+00
24+00
25+00
26+00
27+00
28+00
29+00
30+00
31+00
32+00
33+00
30+00
34+00
EXISTING GROUND
ELEV - 17.0'
4
1
S10
S12
S9
S11
S14
S13
S15
FEDERAL BRIDGE
KENMORE
from SAB

Figure 2A


KENMORE AIR HARBOR
from SAP
NOTE: King County Surf dredged
NAVIGATION CHANNEL
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
12+00
13+00
13+30
14+00
15+00
16+00
17+00
18+00
19+00
20+00
S1
S2
S3
S4
S5
S6
S8
S9
S10
S11
S12

Attachment 1. Chemical Testing Summary

DAIS Value Table - Dry Weight Basis

Project: Kenmore Navigation Channel (KENMO1BF108) DY 1997

	units	S1		S2		S3		S4		S5	
SEDIMENT CONVENTIONALS											
Total Solids	%	59		70.7		73		64.2		55.3	
Volatile Solids	%	5.5		2.9		3		4.4		5.5	
Total Organic Carbon	%	3.7		1.5		1.25		2.1		3.5	
Ammonia	MG/KG	64		24		42		75		8.3	
Total Sulfides	MG/KG	12		4.4		9.6		9.8		4.9	
METALS											
Antimony (1)	MG/KG	1.1		1.2		0.6		1		0.6	
Arsenic	MG/KG	9.3		7.4		4.6		4.7		7.5	
Cadmium	MG/KG	0.3		0.18		0.13		0.18		0.12	
Chromium (4)	MG/KG	-		-		-		-		-	
Copper	MG/KG	26		12		16		16		7.1	
Lead	MG/KG	30		21		21		25		22	
Mercury	MG/KG	0.04		0.03	u	0.03		0.03		0.04	u
Nickel	MG/KG	46		38		46		43		26	
Selenium (4)	MG/KG	-		-		-		-		-	
Silver	MG/KG	0.12		0.1	u	0.1	u	0.1	u	0.1	u
Zinc	MG/KG	89		54		53		55		41	
LPAH											
2-Methylnaphthalene (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
Acenaphthene (1)	UG/KG	68		24	u	20	u	23	u	26	u
Acenaphthylene (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
Anthracene (1)	UG/KG	170		24	u	20	u	23	u	26	u
Fluorene (1)	UG/KG	86		24	u	20	u	23	u	26	u
Naphthalene (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
Phenanthrene (1)	UG/KG	330		99		44		63		26	u
Total LPAH (1)	UG/KG	654		99		44		63		26	u
HPAH											
Benzo(a)anthracene (1)	UG/KG	200		63		29		47		26	u
Benzo(a)pyrene (1)	UG/KG	120		24	u	21		24		26	u
Benzo(g,h,i)perylene (1)	UG/KG	63		24	u	20	u	23	u	26	u
Benzofluoranthenes (1)	UG/KG	320		99		44		74		26	u
Chrysene (1)	UG/KG	320		81		36		63		26	u
Dibenzo(a,h)anthracene (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
Fluoranthene	UG/KG	500		160		64		140		32	
Indeno(1,2,3-c,d)pyrene (1)	UG/KG	66		24	u	20	u	23	u	26	u
Pyrene	UG/KG	390		110		86		120		40	
Total HPAH (1)	UG/KG	1979		513		280		468		72	
CHLORINATED HYDROCARBONS											
1,2,4-Trichlorobenzene (1)	UG/KG	7	u	7	u	6	u	7	u	8	u
1,2-Dichlorobenzene (1)	UG/KG	4	u	5	u	4	u	4	u	5	u
1,3-Dichlorobenzene (3)	UG/KG	4	u	5	u	4	u	4	u	5	u
1,4-Dichlorobenzene (1)	UG/KG	4	u	5	u	4	u	4	u	5	u
Hexachlorobenzene	UG/KG	14	u	15	u	12	u	14	u	16	u
PHTHALATES											
Bis(2-ethylhexyl)phthalate (1)	UG/KG	240		140		87		180		94	
Butyl benzyl phthalate (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
Di-n-butyl phthalate (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
Di-n-octyl phthalate (1)	UG/KG	24	u	24	u	20	u	23	u	26	u

*Anthracene: 1996 SL = 130 ppb, existing SL/SQS = 960 ppb
Acenaphene: 1996 SL = 63 ppb, existing SL/SQS = 500 ppb
Fluorene: 1996 SL = 64 ppb, existing SL/SQS = 540 ppb
Phenanthrene: 1996 SL = 320 ppb, existing SL/SQS = 1,500 ppb

	units	S1		S2		S3		S4		S5	
Diethyl phthalate (1)	UG/KG	74		24	u	20	u	23	u	26	u
Dimethyl phthalate (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
PHENOLS											
2 Methylphenol (1)	UG/KG	12	u	12	u	10	u	12	u	13	u
2,4-Dimethylphenol (1)	UG/KG	12	u	12	u	10	u	12	u	13	u
4 Methylphenol (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
Pentachlorophenol	UG/KG	59	u	61	u	49	u	59	u	66	u
Phenol (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
MISCELLANEOUS EXTRACTABLES											
Benzoic acid (1)	UG/KG	120	u	120	u	99	u	120	u	130	u
Benzyl alcohol (1)	UG/KG	14	u	15	u	12	u	14	u	16	u
Dibenzofuran (1)	UG/KG	33		24	u	20	u	23	u	26	u
Hexachlorobutadiene (1)	UG/KG	19	u	20	u	16	u	19	u	21	u
Hexachloroethane (1)	UG/KG	24	u	24	u	20	u	23	u	26	u
N-Nitrosodiphenylamine (1)	UG/KG	14	u	15	u	12	u	14	u	16	u
VOLATILE ORGANICS											
Ethylbenzene (1)	UG/KG	4	u	5	u	4	u	4	u	5	u
Tetrachloroethene (1)	UG/KG	4	u	5	u	4	u	4	u	5	u
Total Xylene (1)	UG/KG	4	u	5	u	4	u	4	u	5	u
Trichloroethene (1)	UG/KG	4	u	5	u	4	u	4	u	5	u
PESTICIDES AND PCBs											
Aldrin (3)	UG/KG	0.7	u	0.74	u	0.6	u	0.7	u	0.8	u
Chlordane (2)	UG/KG	0.7	u	0.74	u	0.6	u	0.7	u	0.8	u
Dieldrin (3)	UG/KG	1	u	1	u	0.8	u	1	u	1	u
Heptachlor (3)	UG/KG	0.7	u	0.74	u	0.6	u	0.7	u	0.8	u
Lindane (3)	UG/KG	0.7	u	0.74	u	0.6	u	0.7	u	0.8	u
Total DDT	UG/KG	2.4	u	2.5	u	2	u	2.3	u	2.6	u
Total PCBs	UG/KG	17		49	u	40	u	46	u	52	u
PCB (TOC normalized)	MG/KG	0.46		3.3		3.2		2.2		1.5	
ORGANOMETALLICS											
Tributyltin (porewater) (2)	UG/L	-		-		-		-		-	
TBT (bulk: ug/kg)	UG/KG							74			

A dash indicates that no data exists for this analyte in DAIS

(1) = No BT exists (2) = No ML exists (3) = No BT or ML exists (4) = No SL or ML exists

DAIS Value Table - Dry Weight Basis

Project: Kenmore Navigation Channel

	S6		S7		S8		S9		S10		S11	
SEDIMENT CONVENTIONALS												
Total Solids	43.8		52.4		35.4		45.6		34.2		44	
Volatile Solids	7.9		5.4		13.1		9.4		13		11.3	
Total Organic Carbon	3.6		2.6		4.1		4		5.3		4.41	
Ammonia	87		130		130		220		280		270	
Total Sulfides	66		44		82		68		91		86	
METALS												
Antimony (1)	1		0.9		1		1.2		1.5		1.3	
Arsenic	9.8		8.7		9.7		9.8		11		10	
Cadmium	0.28		0.17		0.22		0.37		0.53		0.36	
Chromium (4)	-		-		-		-		-		-	
Copper	14		12		14		18		23		19	
Lead	28		24		27		36		45		35	
Mercury	0.05		0.05		0.07		0.05		0.1		0.07	
Nickel	34		41		44		42		47		43	
Selenium (4)	-		-		-		-		-		-	
Silver	0.11		0.11		0.1	u	0.1		0.19		0.1	u
Zinc	64		58		63		81		93		81	
LPAH												
2-Methylnaphthalene (1)	33	u	27	u	39	u	28	u	43	u	33	u
Acenaphthene (1)	33	u	27	u	39	u	28	u	43	u	33	u
Acenaphthylene (1)	33	u	27	u	39	u	28	u	43	u	33	u
Anthracene (1)	33	u	27	u	39	u	28	u	43	u	33	u
Fluorene (1)	33	u	27	u	39	u	28	u	43	u	33	u
Naphthalene (1)	33	u	27	u	39	u	28	u	43	u	33	u
Phenanthrene (1)	70		34		45		74		76		110	
Total LPAH (1)	70		34		45		74		76		110	
HPAH												
Benzo(a)anthracene (1)	66		32		39	u	57		48		78	
Benzo(a)pyrene (1)	60		33		39	u	61		50		96	
Benzo(g,h,i)perylene (1)	40		27	u	39	u	49		45		75	
Benzofluoranthenes (1)	133		80		47		142		119		183	
Chrysene (1)	97		46		47		86		77		120	
Dibenzo(a,h)anthracene (1)	33	u	27	u	39	u	28	u	43	u	33	u
Fluoranthene	160		86		87		170		150		210	
Indeno(1,2,3-c,d)pyrene (1)	41		27	u	39	u	51		43	u	68	
Pyrene	140		70		93		150		150		200	
Total HPAH (1)	737		347		274		766		639		1030	
CHLORINATED HYDROCARBONS												
1,2,4-Trichlorobenzene (1)	10	u	8	u	12	u	9	u	13	u	10	u
1,2-Dichlorobenzene (1)	7	u	5	u	9	u	7	u	10	u	8	u
1,3-Dichlorobenzene (3)	7	u	5	u	9	u	7	u	10	u	8	u
1,4-Dichlorobenzene (1)	7	u	5	u	9	u	7	u	10	u	8	u
Hexachlorobenzene	20	u	16	u	12	u	17	u	12	u	20	u
PHTHALATES												
Bis(2-ethylhexyl)phthalate (1)	420		290		350		850		680		1000	
Butyl benzyl phthalate (1)	33	u	27	u	39	u	28	u	43	u	33	u
Di-n-butyl phthalate (1)	33	u	27	u	39	u	28	u	43	u	33	u
Di-n-octyl phthalate (1)	33	u	27	u	39	u	28	u	43	u	33	u

	S6		S7		S8		S9		S10		S11	
Diethyl phthalate (1)	33	u	27	u	46		28	u	43	u	33	u
Dimethyl phthalate (1)	33	u	27	u	39	u	28	u	43	u	33	u
PHENOLS												
2 Methylphenol (1)	17	u	14	u	20	u	14	u	17	u	17	u
2,4-Dimethylphenol (1)	17	u	14	u	20	u	14	u	22	u	17	u
4 Methylphenol (1)	33	u	27	u	39	u	28	u	43	u	33	u
Pentachlorophenol	83	u	68	u	98	u	71	u	87	u	83	u
Phenol (1)	33	u	27	u	39	u	28	u	43	u	33	u
MISCELLANEOUS EXTRACTABLES												
Benzoic acid (1)	170	u	140	u	200	u	140	u	220	u	170	u
Benzyl alcohol (1)	20	u	16	u	24	u	17	u	21	u	20	u
Dibenzofuran (1)	33	u	27	u	39	u	28	u	43	u	33	u
Hexachlorobutadiene (1)	27	u	22	u	20	u	23	u	20	u	27	u
Hexachloroethane (1)	33	u	27	u	39	u	28	u	43	u	33	u
N-Nitrosodiphenylamine (1)	20	u	16	u	24	u	17	u	26	u	20	u
VOLATILE ORGANICS												
Ethylbenzene (1)	7	u	5	u	9	u	7	u	10	u	8	u
Tetrachloroethene (1)	7	u	5	u	9	u	7	u	10	u	8	u
Total Xylene (1)	7	u	5	u	9	u	7	u	10	u	8	u
Trichloroethene (1)	7	u	5	u	9	u	7	u	10	u	8	u
PESTICIDES AND PCBs												
Aldrin (3)	1.3		1.6		1.2	u	1.7		1.3	u	3	ud
Chlordane (2)	1	u	0.8	u	1.2	u	1.4	u	1.3	u	3	ud
Dieldrin (3)	1.6	u	1	u	1.6	u	1.1	u	1.7	u	4	ud
Heptachlor (3)	1	u	0.8	u	1.2	u	0.9	u	1.3	u	3	ud
Lindane (3)	1	u	0.8	u	1.2	u	0.9	u	1.3	u	3	ud
Total DDT	4.6		2.7	u	3.9		6.4		9.8		6.9	ud
Total PCBs	18		54	u	27		15		26		23	
PCB (TOC normalized)	0.5		2.1		0.66		0.38		0.49		0.52	
ORGANOMETALLICS												
Tributyltin (porewater) (2)	-		-		-		-		-		-	
TBT (bulk: ug/kg)												

A dash indicates that no data exists for this a

(1) = No BT exists (2) = No ML exists (3) =

DAIS Value Table - Dry Weight Basis

Project: Kenmore Navigation Channel

	S12		S13		S14		S15	
SEDIMENT CONVENTIONALS								
Total Solids	31.5		45		56.8		59.2	
Volatile Solids	12.1		7		5		4	
Total Organic Carbon	6.2		3.7		4.4		1.6	
Ammonia	100		200		130		73	
Total Sulfides	67		58		13		49	
METALS								
Antimony (1)	1.2		1.2		1.1		1	
Arsenic	7.6		9.4		5.6		7.2	
Cadmium	0.3		0.37		0.13		0.11	
Chromium (4)	-		-		-		-	
Copper	15		18		12		10	
Lead	26		33		24		23	
Mercury	0.06	u	0.08		0.05		0.03	u
Nickel	37		43		40		39	
Selenium (4)	-		-		-		-	
Silver	0.1	u	0.1	u	0.1	u	0.1	u
Zinc	61		79		55		50	
LPAH								
2-Methylnaphthalene (1)	44	u	32	u	25	u	24	u
Acenaphthene (1)	44	u	32	u	25	u	24	u
Acenaphthylene (1)	44	u	32	u	25	u	24	u
Anthracene (1)	44	u	32	u	26		24	u
Fluorene (1)	44	u	32	u	25	u	24	u
Naphthalene (1)	44	u	32	u	25	u	24	u
Phenanthrene (1)	47		62		26		24	u
Total LPAH (1)	47		62		52		24	u
HPAH								
Benzo(a)anthracene (1)	44	u	48		25	u	24	u
Benzo(a)pyrene (1)	44	u	55		25	u	24	u
Benzo(g,h,i)perylene (1)	44	u	47		25	u	24	u
Benzofluoranthenes (1)	58		113		25	u	24	u
Chrysene (1)	55		73		31		24	u
Dibenzo(a,h)anthracene (1)	44	u	32	u	25	u	24	u
Fluoranthene	110		120		50		34	
Indeno(1,2,3-c,d)pyrene (1)	44	u	43		25	u	24	u
Pyrene	89		130		51		32	
Total HPAH (1)	312		629		132		66	
CHLORINATED HYDROCARBONS								
1,2,4-Trichlorobenzene (1)	13	u	10	u	8	u	7	u
1,2-Dichlorobenzene (1)	10	u	8	u	6	u	5	u
1,3-Dichlorobenzene (3)	10	u	8	u	6	u	5	u
1,4-Dichlorobenzene (1)	10	u	8	u	6	u	5	u
Hexachlorobenzene	12	u	19	u	15	u	14	u
PHTHALATES								
Bis(2-ethylhexyl)phthalate (1)	410		700		380		98	
Butyl benzyl phthalate (1)	55		40		25	u	24	u
Di-n-butyl phthalate (1)	44	u	32	u	25	u	24	u
Di-n-octyl phthalate (1)	44	u	32	u	25	u	24	u

	S12		S13		S14		S15	
Diethyl phthalate (1)	44	u	32	u	25	u	24	u
Dimethyl phthalate (1)	44	u	32	u	25	u	24	u
PHENOLS								
2 Methylphenol (1)	17	u	16	u	13	u	12	u
2,4-Dimethylphenol (1)	22	u	16	u	13	u	12	u
4 Methylphenol (1)	44	u	32	u	25	u	24	u
Pentachlorophenol	87	u	81	u	63	u	60	u
Phenol (1)	44	u	32	u	25	u	24	u
MISCELLANEOUS EXTRACTABLES								
Benzoic acid (1)	220	u	160	u	130	u	120	u
Benzyl alcohol (1)	21	u	19	u	15	u	14	u
Dibenzofuran (1)	44	u	32	u	25	u	24	u
Hexachlorobutadiene (1)	20	u	26	u	20	u	19	u
Hexachloroethane (1)	44	u	32	u	25	u	24	u
N-Nitrosodiphenylamine (1)	26	u	19	u	15	u	14	u
VOLATILE ORGANICS								
Ethylbenzene (1)	10	u	8	u	6	u	5	u
Tetrachloroethene (1)	10	u	8	u	6	u	5	u
Total Xylene (1)	10	u	8	u	6	u	5	u
Trichloroethene (1)	10	u	8	u	6	u	5	u
PESTICIDES AND PCBs								
Aldrin (3)	4	ud	3	ud	2.3	ud	2	ud
Chlordane (2)	4	ud	3	ud	2.3	ud	2	ud
Dieldrin (3)	5.3	ud	3	ud	3	ud	3	ud
Heptachlor (3)	4	ud	3	ud	2.3	ud	2	ud
Lindane (3)	4	ud	3	ud	2.3	ud	2	ud
Total DDT	6.9	ud	6.9	ud	6.9	ud	6.9	ud
Total PCBs	88	u	65	u	50	u	47	u
PCB (TOC normalized)	1.4		1.8		1.1		2.9	
ORGANOMETALLICS								
Tributyltin (porewater) (2)	-		-		-		-	
TBT (bulk: ug/kg)								

A dash indicates that no data exists for this a

(1) = No BT exists (2) = No ML exists (3) =

Enclosure 2

CENWS-OD-TS-DMMO

MEMORANDUM FOR: RECORD October 6, 2011

SUBJECT: DETERMINATION ON THE SUITABILITY OF SUPPLEMENTAL CHARACTERIZATION OF PROPOSED MAINTENANCE DREDGED MATERIAL FROM HARBOUR VILLAGE MARINA DREDGING PROJECT IN LAKE WASHINGTON EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR OPEN-WATER DISPOSAL AT A DMMP NON-DISPERSIVE OPEN-WATER DISPOSAL SITE

1. The following summary reflects the suitability determination memorandum on the characterization conducted at the Harbour Village Marina, and consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) on the suitability of an estimated 7,427 cy of maintenance material at Harbour Village Marina evaluated for open-water unconfined disposal at the Elliott Bay non-dispersive open-water disposal site in Seattle, Washington.

Table 1. Project DMMP Tracking Details

JARPA APPLICATION NO.	
Initial SAP submitted: Revised SAP submitted:	October 22, 2010 April 28, 2011
Revised SAP approved	May 16, 2011
Sampling dates: modified California sampler (3-inch, outside-diameter)	June 7, 2011 (3-DMMUs, 7 stations)
Initial data characterization report submitted: Revised data characterization report submitted:	September 23, 2011 October 6, 2011
Recency Determination: High Concern (2 years)	June 2013
DAIS reference number:	HVMLW-1-A-F-313

2. Background. This project is located in a High Concern area along the northern shoreline of Lake Washington in Kenmore, King County, Washington. The Harbour Village Marina is bounded by the open waters of Lake Washington to the south, by covered docks belonging to the North Lake Marina on the east, by office and condominium buildings with associated paved parking lots on the north, and by Tracy Owen Station (Log Boom) Park on the west. The marina is located approximately 1,200 feet northwest of the mouth of the Sammamish River flowing into Lake Washington (see Figure 1, site vicinity). The elevation within the topographically flatter portion of the Marina ranges from approximately -6 to –10 feet Ordinary High Water (OHW) along the north side and approximately -10 to -11 feet OHW along the south side. The currently proposed project includes the dredging of the existing marina slips and channels to a depth of -9 or -10 feet below OHW, which would include dredging approximately 7,500 cy of dredged material within the marina.

3. Sampling and Analysis Plan. The initial sampling and analysis plan (SAP) was submitted for DMMP review on October 22, 2010. The initial SAP was revised and resubmitted to the DMMP agencies on April 28, 2011. The DMMP approved the SAP with revisions on May 16, 2011.

4. Sampling. The sampling commenced on June 7, 2011 and initially planned to use a small Acker drill (with 4.25-inch, outside-diameter, hollow-stem auger), but an alternative coring device, a modified California sampler (3-inch, outside-diameter) was utilized for sampling due to the extremely soft sediments observed throughout the marina. Table 2 and Figure 2 depicts the stations, and Dredged Material Management Unit (DMMU) compositing strategy for the three DMMUs, which consisted of three composited samples for DMMU-C1, and two stations composited for DMMU's C2 and C3, respectively. The data characterization report was submitted to

the DMMP agencies for review and data quality assurance/control review on October 6, 2011. The DMMP agencies concluded, after reviewing the data validation report, that the data was acceptable for decision-making using best professional judgment.

Table 2. Summary of DMMU Sampling Stations at Harbour Village Marina

DMMU ID	Approximate Design Elevation of base of dredge prism, feet OHW[1]	Exploration ID#	Latitude	Longitude	Approximate Mudline Elevation, feet OHW [2]	Approximate depth of exploration, end of design depth to end of core = Z-samples, feet OHW	DMMU design dredge volume, cubic yards
C1	-12.8	EB-1A	47.75624	-122.26048	-14.8	0.5 (-12.8 to -12.3)	2,461
		EB-1B	47.75629	-122.26111	-13.8	1.5 (-12.8 to -11.3)	
		EB-1C	47.75619	-122.26167	-15.3	1.0 (-12.8 to -11.8)	
C2	-12.8	EB-2A	47.75640	-122.26220	-15.8	1.5 (-12.8 to -11.3)	2,023
		EB-2B	47.75616	-122.26225	-15.3	1.5 (-12.8 to -11.3)	
C3	-11.8	EB-3A	47.75646	-122.26262	-16.3	0.5 (-11.8 to -11.3)	2,943
		EB-3B	47.75615	-122.26270	-14.3	1.5 (-11.8 to -10.3)	

Notes: [1] Based on Harbour Village Marina dredge plans dated March 2010; [2] Elevations based on records available at www.nwd-wc.usace.army.mil for station at Kenmore, WA on June 7, 2011

5. Standard Chemicals of Concern Testing Summary. The Agencies' approved sampling and analysis plan was followed and quality assurance/quality control guidelines specified by PSEP and DMMP were generally complied with. A summary of standard list of CoCs analysis results is provided in Table 3, and demonstrates that PCBs which exceeded the SL in all three DMMUs, with concentrations of total PCBs ranging from 196 ppb (C2), 237 ppb (C3), and 277 ppb (C1). For all three DMMUs, no other detected or undetected chemicals were found to exceed DMMP Marine guidelines.

6. Dioxin Testing Results Summary. Table 4 provides the results of dioxin/furan testing results for the three DMMUs, as follows: DMMU-C1 = 92.1 pptr-TEQ, and DMMU-C2 = 77.3 pptr-TEQ, and DMMU-C3 = 43.2 pptr-TEQ (U = ½ detection limit).

7. Dioxin Interim Interpretative Framework. The DMMP implemented new interim guidelines for interpreting dioxin data implemented on December 6, 2010, and are summarized below for non-dispersive disposal sites (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/New_Interim_Guidelines_for_Dioxins.pdf):

    a. Nondispersive Screening Levels. DMMUs with dioxin concentrations below 10 pptr TEQ will be allowed for open-water disposal as long as the volume-weighted average concentration of dioxins in material from the entire dredging project does not exceed the Disposal Site Management Objective of 4 pptr TEQ.

8. Dioxin Interpretation on Suitability for Unconfined-Open-Water Disposal. As summarized in paragraph 6 above, DMMU's C1, C2, and C3 were all quantitated above the 10 pptr-TEQ upper dioxin guideline limit. Moreover, the volume-weighted average for the three DMMUs (C1, C2, and C3) totaling 7,427 cy of characterized material is 68.7 pptr-TEQ, which is well above the 4-pptr-TEQ site management objective

(Table 5). Therefore, these dioxin testing results demonstrate that all three DMMUs are unsuitable for open-water disposal at the Elliott Bay disposal site.

9. Antidegradation Evaluation of DMMU's C1, C2, C3: Based on the PCB and dioxin guideline exceedances, the DMMP required the analysis of all three z-samples underlying the three DMMUs. The results of these z-sample analyses are summarized in Tables 3 and 4. Because the project is located in a freshwater system, the antidegradation evaluation is based on the SEF 2007 Freshwater guidelines, not the DMMP Marine guidelines. For PCBs, the z-samples were all quantitated above the SEF 2007 Freshwater guidelines for PCBs, where DMMU-C1Z (126 ppb) and DMMU-C3Z (237 ppb) both exceed the PCB SL2 criteria (120 ppb) and DMMU-2Z (104 ppb) exceeds the SL1 criteria (60 ppb).

   The results of the z-sample analyses for dioxin are summarized in Table 3, and congener specific summaries are found in Table 4. The z-sample results for dioxin in C1 are 64.3 pptr TEQ which is lower than that seen in the dredge prism but still significantly elevated relative to the 4/10 pptr TEQ guidelines. Likewise, dioxin in the exposed surface at DMMU C3 (11.1 pptr-TEQ) was lower than that seen in the dredge prisms and higher than the threshold set by the dioxin guidelines. Only for z-sample,C2 (0.9 pptr-TEQ) were dioxin concentrations below the guidelines.

   Based on the PCBs for all three DMMUs and the Dioxin results for C1Z and C3Z, the DMMP has concluded that the z-sample results for all three DMMUs are not in compliance with the antidegradation standard. The following actions will be required to remedy the exposed surface after maintenance dredging is completed:

   a. Dredge an additional one-foot of material beyond the required maintenance depth (-12.8 ft to -11.8 ft OHW @ DMMU's C1 and C2; and -11.8 ft to -10.8 ft OHW @ DMMU-C3).
   b. Place a one-foot clean sand cover over the exposed surface.

10. Suitability for Unconfined-Open Water Disposal. Based on the testing results for the three DMMUs summarized in Table 3, all 7,427 cy of proposed dredged material is unsuitable for unconfined open-water disposal, and will have to be dredged and placed at an Ecology approved upland confined disposal site.

11. This memorandum documents the suitability determination for the characterized dredged material at the Harbour Village Marina maintenance dredging area for unconfined-open-water disposal at the Elliott Bay non-dispersive disposal site. It also documents the requirements to evaluate the exposed post-dredge surface to assess antidegradation compliance, and proposed remedy to address this concern. However, this suitability determination does not constitute final agency approval of the project. A dredging plan for this project must be completed as part of the final project approval process. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under Section 404(b)(1) of the Clean Water Act.

SUBJECT: DETERMINATION ON THE SUITABILITY OF SUPPLEMENTAL CHARACTERIZATION OF PROPOSED MAINTENANCE DREDGED MATERIAL FROM HARBOUR VILLAGE MARINA DREDGING PROJECT IN LAKE WASHINGTON EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR OPEN-WATER DISPOSAL AT A DMMP NON-DISPERSIVE OPEN-WATER DISPOSAL SITE

Concur:

6 Oct 2011
Date

David R. Kendall, Ph.D., Seattle District Corps of Engineers

Oct 6, 2011
Date

Erika Hoffman, Environmental Protection Agency

10/06/2011
Date

Laura Inouye, Ph.D., Washington Department of Ecology

10/6/11
Date

Celia Barton, Washington Department of Natural Resources

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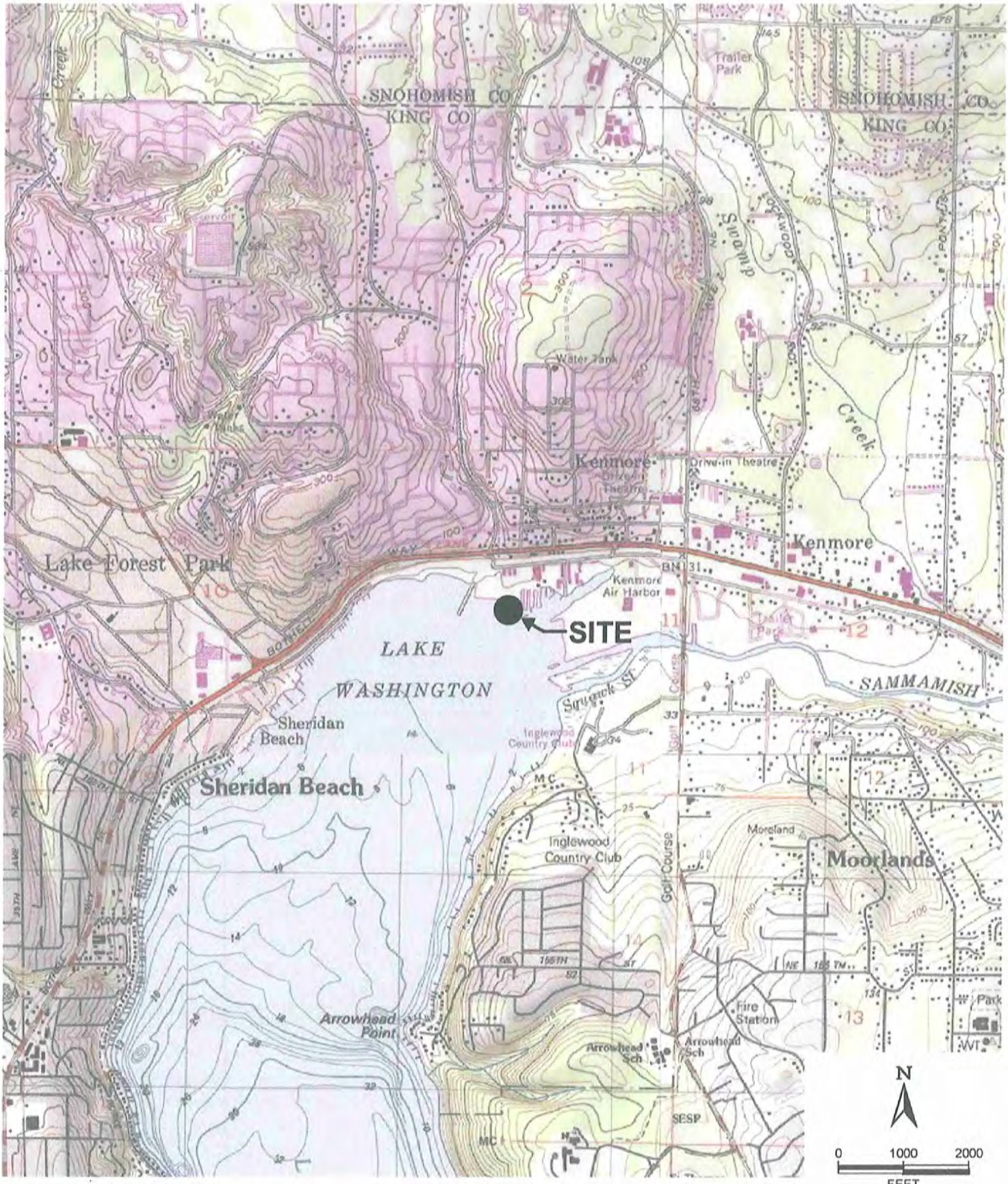
Celia Barton, DNR
DMMO file



REFERENCE: USGS TOPO!

Associated Earth Sciences, Inc.

VICINITY MAP

HARBOUR VILLAGE MARINA DREDGING

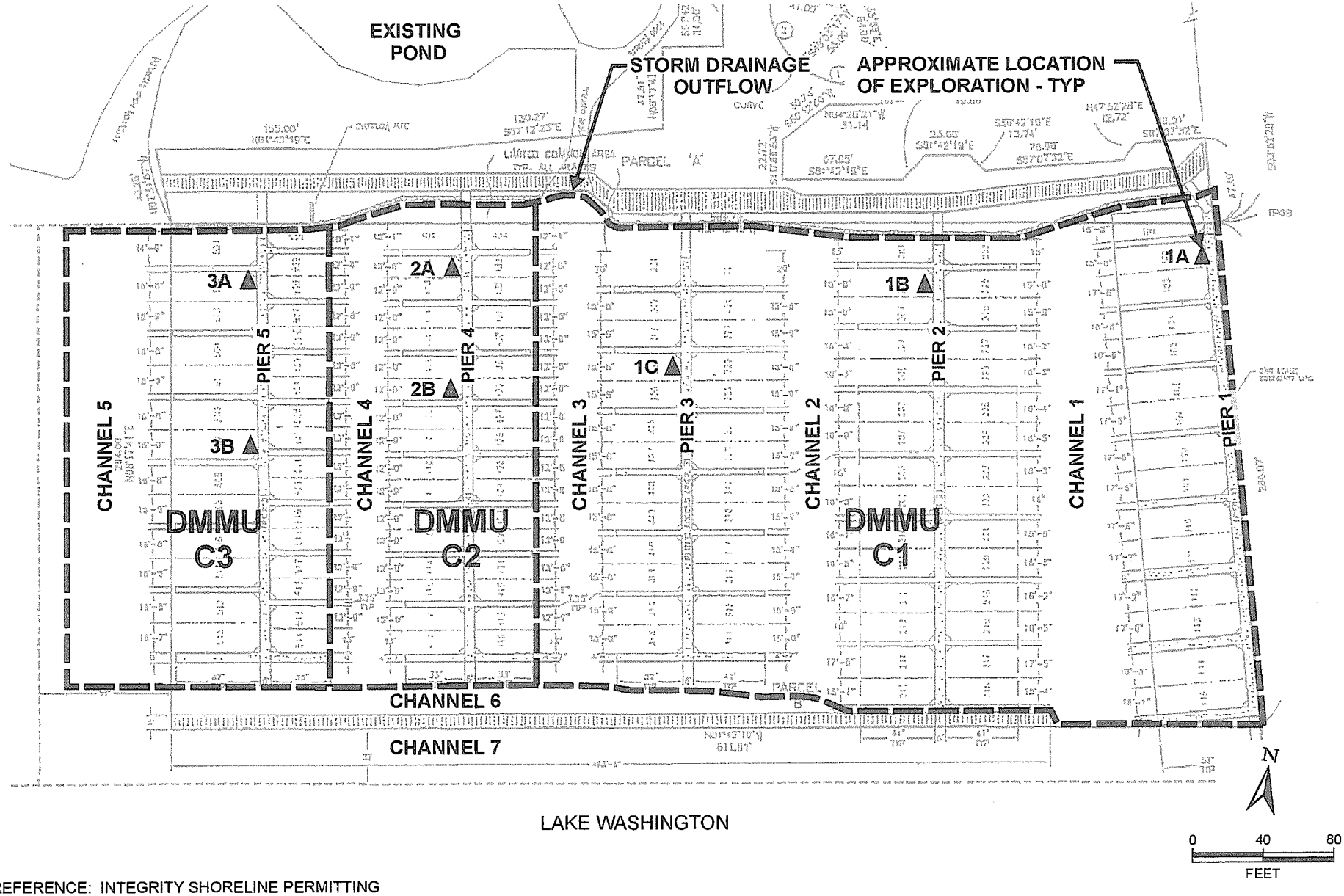
SEATTLE, WASHINGTON

FIGURE 1

DATE 6/11

PROJ. NO. KV090373A

090373 Harbour Village Marina Dredging \ 090373 Vicinity.cdr



REFERENCE: INTEGRITY SHORELINE PERMITTING

Associated Earth Sciences, Inc.

SITE AND EXPLORATION PLAN

HARBOUR VILLAGE MARINA DREDGING
KENMORE, WASHINGTON

FIGURE 2

DATE 9/11

PROJ. NO. KE090373A

090373 Harbour Village Marina Dredging \ 090373 Site and Expl Rev 9-11 cdr

Table 3. Harbor Village Marina DMMP Characterization Summary

								Sample ID:		DMMU-1			DMMU-2			DMMU-3		
								DMMU ID:		C1			C2			C3		
								Depth (ft MLLW)										
		DMMP (Marine-DW)			SEF (Freshwater - DW)			SMS		mg/kg-DW	mg/kg-OC	VQ	mg/kg-DW	mg/kg-OC	VQ	mg/kg-DW	mg/kg-OC	VQ
CHEMICAL NAME	Units	SL	BT	ML	SL1	SL2	Units	SQS	CSL	DMMP	SMS		DMMP	SMS		DMMP	SMS	
Antimony		150		200	--	--				**7.8**			**7.3**			**6.7**		
Arsenic	mg/kg	57	507.1	700	20	51	mg/kg	57	93	**10.5**			**10.2**			**9.2**		
Cadmium	mg/kg	5.1	11.3	14	1.1	1.5	mg/kg	5.1	6.7	**1.99**			**1.69**			**1.52**		
Chromium	mg/kg	260	260	(2)	95	100	mg/kg	260	270	**62.1**			**54.5**			**49.8**		
Copper	mg/kg	390	1,027	1,300	80	830	mg/kg	390	390	**88.1**			**64.5**			**47.0**		
Lead	mg/kg	450	975	1,200	340	430	mg/kg	450	530	**51.0**			**44.2**			**34.4**		
Mercury	mg/kg	0.41	1.5	2.3	0.28	0.75	mg/kg	0.41	0.59	**0.077**			**0.069**			**0.018**		
Nickel	mg/kg	--	--	--	60	70	mg/kg	--	--	**47.1**			**43.4**			**40.6**		
Selenium	mg/kg	(2)	**3**	(2)	--	--	mg/kg	--	--	0.80	u		0.80		U	0.7		U
Silver	mg/kg	6.1	6.1	8.4	2.0	2.5	mg/kg	6.1	6.1	**0.05**			**0.154**			**0.127**		
Zinc	mg/kg	410	2,783	3,800	130	400	mg/kg	410	960	**359.0**			**187**			**153**		
Tributyltin (porewater)	ug/L	0.15	0.15							**0.046**			**0.038**			**0.037**		
Tributyltin (bulk/sediment)	ug/kg	73.2	73.2		75	75												
ORGANIC CHEMICALS																		
Total LPAH	ug/kg	5,200		29,000	6,600	9,200	mg/kg-OC	370	780	**54.2**	**0.83**		**15.1**	**0.21**		**25.0**	**0.42**	
Naphthalene	ug/kg	2,100		2,400	500	1,300	mg/kg-OC	99	170	3.3	0.05	U	3.6	0.05		3.1	0.05	U
Acenaphthylene	ug/kg	560		2,000	470	640	mg/kg-OC	66	66	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
Acenaphthene	ug/kg	500		2,000	1,100	1,300	mg/kg-OC	16	57	**17.4**	**0.27**		3.6	0.05	U	**3.2**	0.05	
Fluorene	ug/kg	540		3,600	1,000	3,000	mg/kg-OC	23	79	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
Phenanthrene	ug/kg	1,500		2,100	6,100	7,600	mg/kg-OC	100	480	**18.9**	**0.29**		**8.1**	**0.11**		**10.9**	**0.18**	
Anthracene	ug/kg	560		13,000	1,200	1,600	mg/kg-OC	220	1,200	**17.9**	**0.28**		**7.0**	**0.10**		**10.9**	**0.18**	
2-Methylnapthalene	ug/kg	670		1,900	470	560	mg/kg-OC	38	64	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
Total HPAH	ug/kg	12,000		69,000	31,000	55,000	mg/kg-OC	960	5,300	**255.0**	**3.92**		**119.0**	**1.65**		**83.3**	**1.39**	
Fluoranthene	ug/kg	1,700	4,600	30,000	11,000	15,000	mg/kg-OC	160	1,200	**66.9**	**1.03**		**25.1**	**0.35**		**25.9**	**0.43**	
Pyrene	ug/kg	2,600	11,980	16,000	8,800	16,000	mg/kg-OC	1,000	1,400	**48.8**	**0.75**		**17.4**	**0.24**		**15.7**	**0.26**	
Benzo(a)anthracene	ug/kg	1,300		5,100	4,300	5,800	mg/kg-OC	110	270	**27.5**	**0.42**		**17.1**	**0.24**		**10.6**	**0.18**	
Chrysene	ug/kg	1,400		21,000	5,900	6,400	mg/kg-OC	110	460	**44.9**	**0.69**		**27.1**	**0.38**		**16.0**	**0.27**	
Total Benzo(b+k)fluoranthenes	ug/kg	3,200		9,900	600	4,000	mg/kg/OC	230	450	**15.9**	**0.24**		**8.1**	**0.11**		**5.4**	**0.09**	
Benzo(a)pyrene	ug/kg	1,600		3,600	3,300	4,800	mg/kg-OC	99	210	**15.6**	**0.24**		**8.3**	**0.12**	**J**	**5.4**	**0.09**	
Indeno(1,2,3-cd)pyrene	ug/kg	600		4,400	4,100	5,300	mg/kg-OC	34	88	**8.9**	**0.14**		**5.0**	**0.07**		3.1	0.05	U
Dibenzo(a,h)anthracene	ug/kg	230		1,900	800	840	mg/kg-OC	12	33	**3.3**	**0.05**		3.6	0.05	U	3.1	0.05	U
Benzo(g,h,I)perylene	ug/kg	670		3,200	4,000	5,200	mg/kg-OC	31	78	**6.6**	**0.10**		**4.0**	**0.06**		3.1	0.05	U
1,3-Dichlorobenzene	ug/kg	170			--	--	mg/kg-OC	--	--	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
1,4-Dichlorobenzene	ug/kg	110		120	--	--	mg/kg-OC	3.1	9.0	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
1,2-Dichlorobenzene	ug/kg	35		110	--	--	mg/kg-OC	2.3	2.3	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
1,2,4-Trichlorobenzene	ug/kg	31		64	--	--	mg/kg-OC	0.81	1.8	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
Hexachlorobenzne (HCB)	ug/kg	22	168	230	--	--	mg/kg-OC	0.38	2.3	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
Dimethylphthalate	ug/kg	71		1,400	46	440	mg/kg-OC	53.0	53.0	**13.4**	**0.21**		**4.7**	**0.07**		**3.1**	**0.05**	
Diethylphthalate	ug/kg	200		1,200	--	--	mg/kg-OC	61	110	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
Di-n-butylphthalate	ug/kg	1,400		5,100	--	--	mg/kg-OC	220	1,700	**3.3**	0.05		3.6	0.05	U	**7.1**	**0.12**	
Butylbenzylphthalate	ug/kg	63		970	260	370	mg/kg-OC	4.9	64	**6.5**	**0.10**		**4.1**	**0.06**		3.1	0.05	U
Bis(2-ethylhexyl)phthalate	ug/kg	1,300		8,300	220	320	mg/kg-OC	47	78	**84.6**	**1.30**		**52.1**	**0.72**		**30.3**	**0.51**	
Di-n-octylphthalate	ug/kg	6,200		6,200	26	45	mg/kg-OC	58	4,500	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
Phenol	ug/kg	420		1,200	--	--	ug/kg	420	1,200	**3.3**			3.6		U	3.1		U
2-Methylphenol	ug/kg	63		77	--	--	ug/kg	63	63	3.3		U	3.6		U	3.1		U
4-Methylphenol	ug/kg	670		3,600	--	--	ug/kg	670	670	3.3		U	3.6		U	3.1		U
2,4-Dimethylphenol	ug/kg	29		210	--	--	ug/kg	29	29	3.3		U	3.6		U	3.1		U
Pentachlorophenol	ug/kg	400		690	--	--	ug/kg	360	690	**48.0**			3.6		U	3.1		U
Benzyl alcohol	ug/kg	57		87	--	--	ug/kg	57	73	**3.3**			3.6		U	3.1		U
Benzoic acid	ug/kg	650		760	--	--	ug/kg	650	650	**6.0**			3.6		U	3.1		U
Dibenzofuran	ug/kg	540		1,700	400	440	mg/kg-OC	15	58	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
Hexachloroethane	ug/kg	600		1,600	--	--	mg/kg-OC	--	--	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U

Table 3. Harbor Village Marina DMMP Characterization Summary

								Sample ID:		DMMU-1			DMMU-2			DMMU-3		
								DMMU ID:		C1			C2			C3		
								Depth (ft MLLW)										
		DMMP (Marine-DW)			SEF (Freshwater - DW)			SMS		mg/kg-DW	mg/kg-OC	VQ	mg/kg-DW	mg/kg-OC	VQ	mg/kg-DW	mg/kg-OC	VQ
CHEMICAL NAME	Units	SL	BT	ML	SL1	SL2	Units	SQS	CSL	DMMP	SMS		DMMP	SMS		DMMP	SMS	
Hexachlorobutadiene	ug/kg	29		270	--	--	mg/kg-OC	3.9	6.2	3.3		U	3.6	0.05	U	3.1	0.05	U
N-Nitrosodiphenylamine	ug/kg	28		130	--	--	mg/kg-OC	11	11	3.3	0.05	U	3.6	0.05	U	3.1	0.05	U
p,p-DDE	ug/kg	9								0.76		U	0.8		U	0.69		U
p,p-DDD	ug/kg	16								0.76		U	0.8		U	0.69		U
p,p-DDT	ug/kg	12								0.76		U	0.8		U	0.69		U
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	ug/kg		50	69	--	--		--	--	0.76		U	0.8		U	0.69		U
Aldrin	ug/kg	9.5			--	--		--	--	0.76		U	0.8		U	0.69		U
Chlordane	ug/kg	2.8			--	--		--	--	0.76		U	0.8		U	0.69		U
Dieldrin	ug/kg	1.9	37		--	--		--	--	0.76		U	0.8		U	0.69		U
Heptachlor	ug/kg	1.5			--	--		--	--	0.76		U	0.8		U	0.69		U
Alpha-BHC	ug/kg	10			--	--		--	--									
Gamma-BHC (Lindane)	ug/kg	10	10		--	--		--	--	0.76		U	0.8		U	0.69		U
Total PCBs	ug/kg	130		3,100	60	120		--	--	**277**	**4.3**		**196**			**237**		
Total PCBs (TOC-normalized)	**ug/kg**		38***				**mg/kg/OC**	**12.0**	**65.0**	4.3			**2.72**		U	**3.95**		U
Total PCBs (Z-samples)	**ug/kg**									**126**			**104**			**237.0**		
Dioxin (TEQ: see Table 4 for detailed results)	**mg/kg**									**92.1**			**77.3**			**43.2**		
Dioxin (Z-samples)	**mg/kg**									**64.3**			**0.9**			**11.1**		
Total Solids	ng/kg									**26.1**			**24.2**			**28.3**		
Total Volatile Solids	%									**16.0**			**18.1**			**16.70**		
Total Organic Carbon	%									**6.5**			**7.2**			**6.0**		
Total Ammonia	%									**30.0**			**150.0**			**110.0**		
Total Sulfides	mg/kg									**44.8**			**<36.4**			**<35.7**		
Gravel	mg/kg									**10.6**			**0.4**			**3.5**		
Sand	%												**26.9**			**37.2**		
Silt	%									**49.6**			**66.5**			**57.5**		
Clay	%									**10.8**			**6.9**			**1.7**		
Fines (percent silt + clay)	%									**60.4**			**73.4**			**59.2**		
Bioassay Determination: **(P/F)**	%									**NA**			**NA**			**NA**		
BTs exceeded:										**No**			**No**			**No**		
Bioaccumulation conducted:										**No**			**No**			**No**		
Bioaccumulation Determination: **(P/F)**										NA			NA			NA		
ML Rule exceeded:										**No**			**No**			**No**		
PSDDA Determination:										**Fail UCOWD/AD**			**Fail UCOWD/AD**			**Fail UCOWD/AD**		
DMMU Volume:										**2,461**			**2,023**			**2,943**		
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)										**H**			**H**			**H**		
Mean core sampling depth (ft)	ft									**1.8**			**2.8**			**3.5**		
Maximum sampling depth (mudline) (with Z-sample)	ft									**2.5**			**3.0**			**4.5**		
DMMU ID:										**DMMU-C1**			**DMMU-C2**			**DMMU-C3**		

P = Pass (BPJ: Suitable for Beneficial Use)
Fail = exceeds DMMP suitability guidelines/antidegradation
SL = exceeds DMMP SL guidelines
SL1 = exceeds Freshwater SL1 Guidelines (antidegradation)
SL2 = exceeds Freshwater SL2 Guidelines (antidegradation)
VQ = Validation Qualifier
UCOWD = Unconfined open-water disposal
AD = antidegradation
NA = Not applicable
U = undetected at the reporting limit (method detection limit)

Table 4. Dioxin/furan Testing Summary for Harbor Village Marina Project

Analyte	WHO (05) TEF	C1 (HVM) ng/kg-dw	LQ	TEQ	C2 (HVM) ng/kg-dw	LQ	TEQ	C3 (HVM) ng/kg-dw	LQ	TEQ
2,3,7,8-TCDD	1	1.8		1.8	1.9		1.9	1.2		1.2
1,2,3,7,8-PeCDD	1	17		17	14		14	7.8		7.8
1,2,3,4,7,8-HxCDD	0.1	36		3.6	25		2.5	10		1
1,2,3,6,7,8-HxCDD	0.1	150		15	120		12	66		6.6
1,2,3,7,8,9-HxCDD	0.1	66		6.6	46		4.6	25		2.5
1,2,3,4,6,7,8-HpCDD	0.01	2700		27	2500		25	1300		13
OCDD	0.0003	22000		6.6	22000		6.6	12000		3.6
2.3.7.8-TCDF	0.1	6.8		0.68	5.9		0.59	4.4		0.44
1,2,3,7,8-PeCDF	0.03	0.36	u	0.0054	6.4		0.192	3.7		0.111
2,3,4,7,8-PeCDF	0.3	13		3.9	0.32	u	0.048	8.2		2.46
1,2,3,4,7,8-HxCDF	0.1	19		1.9	17		1.7	16		1.6
1,2,3,6,7,8-HxCDF	0.1	16		1.6	16		1.6	0.34	u	0.017
2,3,4,6,7,8-HxCDF	0.1	17		1.7	24		2.4	7.1		0.71
1,2,3,7,8,9-HxCDF	0.1	10		1	10		1	5.4		0.54
1,2,3,4,6,7,8-HpCDF	0.01	320		3.2	280		2.8	140		1.4
1,2,3,4,7,8,9-HpCDF	0.01	14		0.14	15		0.15	7.9		0.079
OCDF	0.0003	1200		0.36	880		0.264	570		0.171
Total TEQ (u = 1/2):				92.1			77.3			43.2
Total TEQ (u=0):				92.1			77.3			43.2
TOC (%)				6.5			7.2			6.0

Analyte	WHO (05) TEF	C1-Z (HVM) ng/kg-dw	LQ	TEQ	C2-Z (HVM) ng/kg-dw	LQ	TEQ	C3-Z (HVM) ng/kg-dw	LQ	TEQ
2,3,7,8-TCDD	1	0.34	u	0.17	0.35	u	0.175	0.57		0.57
1,2,3,7,8-PeCDD	1	7.4		7.4	0.55	u	0.275	0.73	u	0.365
1,2,3,4,7,8-HxCDD	0.1	20		2	0.5	u	0.025	3.7		0.37
1,2,3,6,7,8-HxCDD	0.1	120		12	0.92		0.092	15		1.5
1,2,3,7,8,9-HxCDD	0.1	36		3.6	0.62	u	0.031	6.7		0.67
1,2,3,4,6,7,8-HpCDD	0.01	2100		21	0.56		0.0056	320		3.2
OCDD	0.0003	20000		6	100		0.03	3400		1.02
2.3.7.8-TCDF	0.1	0.22	u	0.011	0.72		0.072	2.9		0.29
1,2,3,7,8-PeCDF	0.03	0.85	u	0.01275	0.43	u	0.00645	0.98	u	0.0147
2,3,4,7,8-PeCDF	0.3	14		4.2	0.42	u	0.063	5		1.5
1,2,3,4,7,8-HxCDF	0.1	16		1.6	0.63	u	0.0315	3.7		0.37
1,2,3,6,7,8-HxCDF	0.1	9.4		0.94	0.66	u	0.033	2.8		0.28
2,3,4,6,7,8-HxCDF	0.1	11		1.1	0.56	u	0.028	3.9		0.39
1,2,3,7,8,9-HxCDF	0.1	8.1		0.81	0.57	u	0.0285	1.8		0.18
1,2,3,4,6,7,8-HpCDF	0.01	280		2.8	2		0.02	33		0.33
1,2,3,4,7,8,9-HpCDF	0.01	13		0.13	0.47	u	0.00235	2.2		0.022
OCDF	0.0003	1600		0.48	0.75	u	0.000113	130		0.039
Total TEQ (u = 1/2):				64.3			0.9			11.1
Total TEQ (u=0):				64.1			0.2			10.7
TOC (%)				6.5			7.2			6.0

Table 5. Volume Weighted Average (VWA) Dioxin Concentrations for Harbor Village Marina Dredging Projec

DMMU ID:	Volume (CY)	TCDD/F TEQ	ng/kg-dw	Product (Vol x TEQ)	ng x cy/kg x DMMU	Prod./total	Proportional contribution/Suitable DMMU
C1	2,461	92.1	ng/kg-dw	226,658	ng x cy/kg	44.4%	% of Total DMMU
C2	2,023	77.3	ng/kg-dw	156,378	ng x cy/kg	30.7%	% of Total DMMU
C3	2,943	43.2	ng/kg-dw	127,138	ng x cy/kg	24.9%	% of Total DMMU
Totals (Volume):	7,427	70.87	ng/kg-dw	510,174	ng x cy/kg	68.69	ng/kg-dw/Project (VWA)
Totals (Suitable):	0						

SMITH & LOWNEY, P.L.L.C.
2317 EAST JOHN STREET
SEATTLE, WASHINGTON 98112
(206) 860-2883, FAX (206) 860-4187

April 26, 2013

Via Certified Mail - Return Receipt Requested
Managing Agent
Kiewit/General/Manson, a Joint Venture
3015 112th Ave. NE, Ste. 100
Bellevue, WA 98004

Via Certified Mail - Return Receipt Requested
Managing Agent
Kiewit Corporation
33455 6th Ave. S.
Federal Way, WA 98003

Via Certified Mail - Return Receipt Requested
Managing Agent
General Construction Company
33455 6th Ave. S.
Federal Way, WA 98003

Via Certified Mail - Return Receipt Requested
Managing Agent
Manson Construction Co.
P.O. Box 24067
Seattle, WA 98124

Re: **NOTICE OF INTENT TO FILE SUIT UNDER THE CLEAN WATER ACT**

Dear Managing Agents:

This sixty day notice of intent to file a citizen suit against Kiewit/General/Manson, a Joint Venture, Kiewit Corporation, General Construction Company, and Manson Construction Co. (collectively, "K/G/M") under Section 505 of the Clean Water Act ("CWA"), 33 USC § 1365, for the violations described below is served on behalf of Waste Action Project, P.O. Box 4832, Seattle, WA 98194, (253) 639-7245. Any response to this letter should be addressed to the undersigned counsel for Waste Action Project at the letterhead address.

K/G/M has violated and continues to violate Sections 301(a) and 404 of the CWA, 33 U.S.C. §§ 1311(a) and 1344, by discharging dredged material to the waters of the United States without the required permit from the United States Army Corps of Engineers. This dredged material has been discharged in the course of tugboat operations in Lake Washington

in and near the Kenmore Navigation Channel, including the areas of Lake Washington in front of the Kenmore Air and Northlake Marina facilities. The tugboat operations support K/G/M activities at the Kenmore Yard, 6423 NE 175th St., Kenmore, WA 98028. Some of the tugboat activities at issue were the subject of notice of violation no. 9652 issued by the Washington Department of Ecology to Kiewit/General/Manson, a Joint Partnership, on December 28, 2012. Specifically, K/G/M operates tugboats in and near the Kenmore Navigation Channel in a manner that results in the disturbance, suspension, and redeposit of lake bottom sediments by tugboat propellers, propeller wash, and hull movement. These tugboat operations are effectively dredging the Kenmore Navigation Channel and surrounding waters, which are not always deep enough for tugboat navigation without sediment disturbance. The disturbance and redeposition of sediment causes significant water quality impacts and degradation, including violation of turbidity water quality criteria. See WAC 173-201A-200(e).

The tugboat operations result in the excavation of sediment from the lake bottom and its redeposit in surrounding locations. This constitutes the discharge of dredged material. See 33 C.F.R. § 323.2(d). A permit from the United States Army Corps of Engineers is required for this discharge. See 33 C.F.R. § 323.3(a) and 33 U.S.C. § 1344. K/G/M has no such permit for this discharge, so it violates the Clean Water Act. See 33 U.S.C. § 1311(a).

K/G/M's violation of the Clean Water Act by the unpermitted discharge of dredged material has taken place on a daily basis since approximately March 2012, including on the following particular dates:

March 3, 2012	June 4, 2012	Sept. 26, 2012
March 4, 2012	June 7, 2012	Sept. 29, 2012
March 8, 2012	June 18, 2012	October 2, 2012
March 19, 2012	June 19, 2012	October 3, 2012
March 21, 2012	June 20, 2012	October 14, 2012
March 25, 2012	June 22, 2012	Nov. 12, 2012
March 28, 2012	June 28, 2012	Nov. 28, 2012
March 29, 2012	June 29, 2012	Nov. 29, 2012
April 2, 2012	July 1, 2012	Dec. 6, 2012
April 8, 2012	July 10, 2012	Dec. 13, 2012
April 9, 2012	July 20, 2012	Dec. 14, 2012
April 10, 2012	July 23, 2012	Dec. 18, 2012
April 11, 2012	July 24, 2012	Dec. 19, 2012
April 12, 2012	July 26, 2012	Dec. 20, 2012
April 13, 2012	August 1, 2012	January 2, 2013
April 16, 2012	August 2, 2012	January 3, 2013
April 18, 2012	August 14, 2012	January 4, 2013
April 21, 2012	August 16, 2012	January 7, 2013
April 25, 2012	Sept. 12, 2012	January 8, 2013
April 30, 2012	Sept. 18, 2012	January 9, 2013
May 3, 2012	Sept. 19, 2012	January 10, 2013
May 25, 2012	Sept. 20, 2012	January 14, 2013

January 22, 2013	February 19, 2013	March 17, 2013
January 24, 2013	February 27, 2013	March 18, 2013
January 25, 2013	February 28, 2013	April 6, 2013
February 7, 2013	March 1, 2013	April 12, 2013
February 11, 2013	March 6, 2013	April 15, 2013
February 13, 2013	March 7, 2013	April 16, 2013
February 15, 2013	March 14, 2013	
February 18, 2013	March 16, 2013	

The above-described violations reflect only what information currently available to us indicates. These violations are ongoing both because the tugboat operations resulting in the unpermitted discharges are likely to continue and because the discharged dredged material remains in the locations where it has been redeposited while K/G/M continues to have no permit issued under 33 U.S.C. § 1344. We intend to sue for all violations, including those yet to be uncovered and those committed after the date of this notice of intent to sue.

Under Section 309(d) of the CWA, 33 USC § 1319(d), and 40 C.F.R. 19, each of the above-described violations subjects the violator to a penalty of up to $37,500 per day. In addition to civil penalties, we will seek injunctive relief under Sections 505(a) and (d) of the CWA, 33 USC § 1365(a) and (d), and such other relief as is permitted by law. Also, Section 505(d) of the CWA, 33 USC § 1365(d), permits prevailing parties to recover costs including attorney's fees.

Waste Action Project believes that this NOTICE OF INTENT TO SUE sufficiently states grounds for filing suit. We intend, at the close of the 60-day notice period, or shortly thereafter, to file a citizen suit against Kiewit/General/Manson, a Joint Venture, Kiewit Corporation, General Construction Company, and Manson Construction Co. under Section 505(a) of the Clean Water Act for violations.

During the 60-day notice period, we would be willing to discuss effective remedies for the violations in this letter and settlement terms. If you wish to pursue such discussions in the absence of litigation, we suggest that you initiate those discussions within 10 days of receiving this notice so that a meeting can be arranged and so that negotiations may be completed before the end of the 60-day notice period. We do not intend to delay the filing of a complaint if discussions are continuing when the notice period ends.

Very truly yours,

SMITH & LOWNEY, P.L.L.C.

By: _____
Richard A. Smith
Elizabeth Zultoski

Cc (via certified mail, return receipt requested):

Bob Perciasepe, Acting Administrator, U.S. EPA
Dennis McLerran, Region 10 Administrator, U.S. EPA
Ted Sturdevant, Director, Washington Department of Ecology
CT Corporation System, 505 Union Ave. SE, Ste. 120, Olympia, WA 98501
Richard L. Dolmseth, 5209 E. Marginal Way S., Seattle, WA 98134

From: Justine Barton
To: O'Brien, Maura (ECY)
Cc: Erika Hoffman; Kendall, David R NWS
Subject: Re: Citizen request for information on KIP and WSDOT information
Date: 08/16/2012 02:49 PM

Thanks again for the info Maura. I had a good conversation with Cindy Becket 253-536-8798 cindybecket@gmail.com, the citizen that called, and she was very aware of all the websites, etc. LOTS of concerns on her part which I'm sure you are also very aware of...

I understand there is a combined effort to take sediment grab samples in the vicinity, with data due in November. Hopefully this will answer some of the citizen concerns...is there a draft SAP & will it be circulated for review? If the SAP goes to the Corps DMMO for review as part of that process, David Kendall will review for the Corps and & our EPA reviewer would be Erika Hoffman. Can you share the time frame? Thanks! JB

Justine Barton
US EPA Region 10, ms ETPA-088
1200 Sixth Ave. Suite 900
Seattle, WA 98101-3140
barton.justine@epa.gov
phone 206.553.6051
fax 206.553.6984

▼ "O'Brien, Maura (ECY)" ---08/15/2012 03:32:46 PM---Hello, Here are the webpages for the Kenmore Industrial Park (KIP) site also called Lakepointe at th

From: "O'Brien, Maura (ECY)" <MOBR461@ECY.WA.GOV>
To: Justine Barton/R10/USEPA/US@EPA,
Cc: "Lui, Nancy (ECY)" <nlui461@ECY.WA.GOV>, "Wang, Ching-Pi (ECY)" <CWAN461@ECY.WA.GOV>
Date: 08/15/2012 03:32 PM
Subject: Citizen request for information on KIP and WSDOT information

---

Hello,
Here are the webpages for the Kenmore Industrial Park (KIP) site also called Lakepointe at the waterfront in Kenmore where I lot of the 520 bridge reconstruction work is being conducted:

https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=2134

The WSDOT and contractor Kiewit General Manson doing the work at the KIP site for the 520 bridge has a public outreach person named Stacey Howery and you may reach Stacey at:

howerys@wsdot.wa.gov

And the WSDOT webpage is at:

http://www.wsdot.wa.gov/projects/sr520bridge/

Trust this answers your questions.

Maura

Maura S. O'Brien, PG/HG #869
Professional Geologist/Hydrogeologist
Toxics Cleanup Program - NWRO
Department of Ecology
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Tele 425-649-7249
Fax 425-649-7098
Email mobr461@ecy.wa.gov

From: Kendall, David R NWS
To: (Celia.Barton@dnr.wa.gov); Erika Hoffman/R10/USEPA/US@EPA; Inouye Laura (LINO461@ecy.wa.gov); Justine Barton/R10/USEPA/US@EPA; Fox, David F NWS; Warner, Lauran C NWS; Vanderelst, Kelsey NWS
Subject: RE: DMMP Haug Channel Testing results (UNCLASSIFIED)
Date: 11/29/2012 02:05 PM

Classification: UNCLASSIFIED
Caveats: NONE

More info: I received a call from Waterfront Construction, and they indicated that ~9,300 cy of material dredged at Haug Channel was subsequently disposed at Kenmore Yard, at the Lakepoint site, and was used as landfill cover. I am still waiting on additional information regarding dates of dredging and disposal, and will pass that on when Waterfront Construction provides it to me.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Wednesday, November 28, 2012 2:49 PM
To: (Celia.Barton@dnr.wa.gov); Hoffman, Erika; Inouye Laura (LINO461@ecy.wa.gov); Barton.Justine@epamail.epa.gov; Fox, David F NWS; Warner, Lauran C NWS; Vanderelst, Kelsey NWS
Subject: FW: DMMP Haug Channel Testing results (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Fyi, info on the likely placement of the ~10,000 cy of material dredged at Haug Channel. Looks like it ended up at the worst possible location. I have been taking calls on this from concerned citizens at Kenmore. WSDT has tasked Ecology (Maura O'Brien) with providing a response back on this issue, which is likely to further inflame the concerned citizens in Kenmore. This project was not tested for dioxin/furans, but PCBs were below SLs, and the only other exceedances were Benzoic acid (830 ppb) and DDT (8.2 ppb). Because of the high TOC (20%) they were unable to conduct toxicity testing, and we deemed all the material unsuitable for open-water disposal.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Wednesday, November 28, 2012 2:36 PM
To: 'O'Brien, Maura (ECY)'
Cc: Wang, Ching-Pi (ECY)
Subject: RE: DMMP Haug Channel Testing results (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

I talked to the Corps permitee, Mr. Bill Boettcher (Homeowners Association, Hunts Point), who confirmed that the material from Haug Channel Project (2001-2-00677) was dredged in late 2008/early 2009 and barged to Kenmore, where I presume it was offloaded and placed at the Lakepointe Landfill site. I called the contractor for the dredging, Waterfront Construction, to confirm the dates of dredging, volume and placement location. I am still waiting on their call back with that information.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: O'Brien, Maura (ECY) [mailto:MOBR461@ECY.WA.GOV]
Sent: Wednesday, November 28, 2012 1:20 PM
To: Kendall, David R NWS; David Kendall
Cc: Wang, Ching-Pi (ECY)
Subject: RE: DMMP Haug Channel Testing results (UNCLASSIFIED)

Thanks David and I look forward to learning more about the Haug dredge and if it was dredged.

To my knowledge, Haug Channel was proposed for dredging in 2009 - 2010 and Waterfront Marine Construction was going to do the work, and I asked for more sampling results and Waterfront did not go forward with the job and later Waterfront moved from the Kenmore Industrial Park site in Kenmore.

Maura

Maura S. O'Brien, PG/HG #869
Professional Geologist/Hydrogeologist
Toxics Cleanup Program - NWRO
Department of Ecology
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Tele 425-649-7249
Fax 425-649-7098
Email mobr461@ecy.wa.gov

-----Original Message-----
From: Kendall, David R NWS [mailto:David.R.Kendall@usace.army.mil]
Sent: Wednesday, November 28, 2012 1:12 PM
To: O'Brien, Maura (ECY); David Kendall
Cc: Wang, Ching-Pi (ECY)
Subject: RE: DMMP Haug Channel Testing results (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

I have contacted the Regulatory PM (Susan Powel) for this permit (2001-2-00677) to have her pull the records for this project to ascertain it's dredging and disposal status. I understand that the permit was issued, but have no information on dredging status. As soon as I ascertain when and where the material was dredged and disposed and the amount disposed, I will pass that information directly on to you. Understand, that we are in the middle of moving to our new headquarters building so things are very chaotic right now, so I am not sure when I will be able to get you this information.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Monday, November 19, 2012 9:53 AM
To: 'O'Brien, Maura (ECY)'; David Kendall
Cc: Wang, Ching-Pi (ECY)
Subject: RE: DMMP Haug Channel Testing results (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

The short answer is no, this project as far as I can ascertain was never dredged. I have attached the initial suitability determination for characterization conducted in 2001, which had a number of chemical problems with hight TOC (20%) and TVS (55%). This project went through an extensive DMMP and Ecology review after attempts to reanalyze sediments also confirmed sediment quality issues (see emails attached)

http://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/Suitability%20Determinations/2003/Hau

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: O'Brien, Maura (ECY) [mailto:MOBR461@ECY.WA.GOV]
Sent: Monday, November 19, 2012 9:15 AM
To: David Kendall
Cc: Wang, Ching-Pi (ECY)
Subject: DMMP Haug Channel Testing results

Hello,

In 2009 a former tenant at Kenmore Industrial Park site, Waterfront Marine Construction discussed a proposal to dredge at the Haug site at Hunts Point at Lake Washington.

Did the proposal to dredge at Haug site go forward and was dredged? Does the USACE have any records for dredging at Haug site?

Maura

Maura S. O'Brien, PG/HG #869

Professional Geologist/Hydrogeologist

Toxics Cleanup Program - NWRO

Department of Ecology

3190 - 160th Avenue SE

Bellevue, WA 98008-5452

Tele 425-649-7249

Fax 425-649-7098

Email mobr461@ecy.wa.gov

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From:	Kendall, David R NWS
To:	Ann Hurst
Cc:	mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov; Erika Hoffman/R10/USEPA/US@EPA; celia.barton@dnr.wa.gov; lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward; c4sep; joan.hardy@doh.wa.gov; whitejh@wsdot.wa.gov
Subject:	RE: Documents from Bayside Disposal (UNCLASSIFIED)
Date:	03/29/2012 10:49 AM
Attachments:	Kenmore-HVM-PCBs.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Hi Ann: I wanted to correct the record and respond to the statement below that says the Kenmore navigation channel is one of the likely sources for the PCBs observed in the Harbor Village Marina. I have attached a Table depicting the PCB concentrations observed at both locations and a comparative graphic that illustrates the PCBs observed at both locations.

It is highly doubtful that the navigation channel is the source for the Harbor Village PCBs, as most of the PCBs observed in the Kenmore channel were actually undetected in 9 of the 15 analyses conducted, with the detected concentrations ranging from 15 to 27 ppb, as compared to 196 - 277 ppb within the Harbor Village Marina.

The proposed characterization within the Kenmore Channel will certainly update the existing data from the Channel for PCBs, and will provide data on dioxin/furans, as well as other chemicals of concern (PAHs, metals, TBT, pesticides, etc.).

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Ann Hurst [mailto:annmhurst@msn.com]
Sent: Thursday, March 29, 2012 8:03 AM
To: Kendall, David R NWS
Cc: mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov; hoffman.erika@epamail.epa.gov; celia.barton@dnr.wa.gov; lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward; c4sep; joan.hardy@doh.wa.gov; whitejh@wsdot.wa.gov
Subject: RE: Documents from Bayside Disposal

All,

I received information via Elizabeth Mooney that Ecology did not find evidence of WSDOT barge grounding or releasing turbidity, see BasinNews.org for the summary of the report which will be posted on the website as soon as Ecology removes me from the caller list at I did not call but emailed my concern to Ecology. WSDOT response was interesting -- you remember the photo of the barge taking up the Navigation Channel -- WSDOT will work with surrounding entities to not block Navigation Channel and mentioned that the turbidity was likely the result of winds. Also mentioned is no knowledge of a meeting being organized by City of Kenmore for entities emailed above to test shores of Lakepointe.

The Ecology report removes some justification for testing the shores of Lakepointe for Dioxins and PCB's, but not the obligation to the residential and recreational community's health. Janet Hays and I will request this morning the 1996 report which found PCB's in the Navigation Channel as one Ecology expert emailed this as a potential source of the PCB's at Harbor Village Marina. There are now three potential sources of the PCB's including the Sammamish current, and a fourth, the factor of the prevailing winds. A likely potential remains that all three sources and wind contributed to the sediments. The type of contamination at Harbor Village Marina is indicative of a landfill. The Lakepointe shores' sediments should be tested for Dioxins in particular as it can take decades for PCB's to break down. If you wish to request testing, you can do a respond all to this email or find additional information at BasinNews.org. Please pass this information on.

Also interesting and just received via a friend:

"The reason the disposal stopped in 1981, was that in 1980, additional restrictions were placed on the disposal of hazardous waste in general purpose landfills. This was in part the result of a King County Health Department survey of waste disposal at landfills, which found that municipal landfills were being used wholesale for the disposal of hazardous waste. Having worked on a number of municipal landfills that Bayside disposed of waste at, including two that are Superfund sites, that they disposed of hazardous waste during that time frame at Lake Point is no surprise. In fact it would have been a surprise if they hadn't."

Best, Ann Hurst

BCC: G.W., C.M., E.M., J.H., P.O., M.B., D.M.

From: annmhurst@msn.com
To: david.r.kendall@usace.army.mil
CC: mobr461@ecy.wa.gov; barbara.trejo@doh.wa.gov; hoffman.erika@epamail.epa.gov; celia.barton@dnr.wa.gov; lino461@ecy.wa.gov; cwan461@ecy.wa.gov; stedward@lists.riseup.net; c4sep@yahoogroups.com
Subject: Documents from Bayside Disposal
Date: Wed, 28 Mar 2012 12:55:31 -0700

All and especially Maura and Ching Pi of Ecology,

(I will be at Ecology tomorrow and bring you the entire EPA file.)

As I understood Friday, the Bayside Report attached is new information to Department of Ecology, though the 1984? interview by Ecology attached is not. Bayside Disposal dumped hazardous material from 1965 to 1981 in two reports, then in a third report, amended the 1965 to 1967 (perhaps when permits were required?). All three reports indicate the dumping of hazardous materials stopped in 1981. It is interesting that the dumping stopped when the 1981 EPA report was made.

If the land was leveled in the 1970's and dumping continued to 1981, and by 1984, the private dump site was not apparent by looking according to the DOE 1984 report, where was the waste in 1984? Again leveled with dusting of dirt?

I know you have tested, but not for Dioxins -- and the PCB's can take years to show up, so decade old testing may no longer be accurate, so where is the waste dumped after the 1970's? Floyd Snider testing in 2010 did not find PCB's in the stockpiles, but did they go down to level of 1970's or even to level of 1981? Not by definition if they were testing "stockpiles." Could Bayside Disposal waste have been pushed over the side? One report indicates that happened in 1971 to create the Northwest corner of the landfill. As that was the Navigation Channel, further dumping there would be self-defeating. You have the power with recent turbidity released by barge to test sediments in the Navigation Channel for the Dioxins.

It seems logical that even if Dioxins are not found in the Navigation Channel, the other two sides of the landfill should be tested, especially the Sammamish side where children swim. The Sammamish -- according to 2004 sediment tests by King County, that river that enters Lake Washington does not contain PCB's until it passes under 68th Avenue NE into the Lake -- you can see on a map that is where the Sammamish is adjacent to the Kenmore Landfill as it enters the Lake. Floyd Snider tested the stockpiles in 2010 for PCB's, not down to 1981 level -- an important "level" if Bayside Dump was not apparent by 1984. Also, the 2010 Snider tests for surface soil contaminants were well West of the area described in the attached DOE interview. Again, to what level did the Snider surface soil tests go? By definition, "surface contaminants" not to 1981 levels. Snider surface testing found that high levels of lead had washed towards the West test sites, which is understandable with all the truck traffic up grade.

Did the County find the the same kind of PCB's as found at Harbor Village Marina? Someone needs to request the County report -- I sent Barbara and Maura the newspaper article which described its existence; I believe they are more qualified than I to track that down. It was sediment testing, not fish testing and not just at outflows as I read the article, and the County found hotspots for PCB's according to the article. These sediment tests did not include Dioxins. PCB's may yet take years to be fully revealed and I understand that there are many kinds of PCB's.

So if adding fill to the Navigation Channel beyond filling out a corner would become self-defeating, the Sammamish, which is the South side, or the West side would more likely be contaminated after the 1970's, especially the Sammamish (South) side as on the West side, trees, marshes may not have allowed trucks to pass near the west shore, but this is far too important to not test the west shore sediments as well.

"Dioxins are one of the causes of chloracne which is a severe skin disease with acne like lesions occuring on the face and upper body. Other skin effects include rashes, discoloration and excessive body hair. Dioxins are now known to be a human carcinogen and are involved in the promotion of soft tissue sarcomas (STS = cancer of fat and muscle tissue) and other cancers. Dioxins are associated with adverse reproductive and developmental effects, birth defects, immune system abnormalities, endometriosis and heart related conditions. Developmental effects have been the key health effect determining a tolerable daily intake of dioxin. Dioxin poisoning is long term due to gradual body accumulation."
http://www.smfrancis.demon.co.uk/airwolvs/23healthdioxin.html

BTW, there are many more documents in the file from EPA. I will be at Ecology in Bellevue Thursday to view their documents, though I think they have done a good faith effort in looking through their own files! I plan to show Maura O'Brien all the documents that arrived from EPA, how they were presented, so she can see what was delivered directly to EPA that may well not have been delivered to Ecology.

Best, Ann Hurst BCC: J.H., E.M., P.O. G.W., C.M. (Stedward and C4SEP listserves include those concerned about Saint Edward State Park shores.)

<https://skydrive.live.com/redir.aspx?cid=fcfba59b4dcde258&page=self&resid=FCFBA59B4DCDE258%21162&parid=FCFBA59B4DCDE258%21160&authkey=%21AOvp4nK0h2Fe8sc&Bpub=SDX.SkyDrive&Bsrc=SkyMail> Documents from Bayside Disposal
<https://skydrive.live.com/redir.aspx?cid=fcfba59b4dcde258&page=browse&resid=

FCFBA59B4DCDE258%21160&sc=Photos&authkey=%21AOvp4nK0h2Fe8sc&Bpub=SDX.SkyDrive
&Bsrc=SkyMail>
View photos
<https://skydrive.live.com/redir.aspx?cid=fcfba59b4dcde258&page=browse&resid=
FCFBA59B4DCDE258%21160&sc=Photos&authkey=%21AOvp4nK0h2Fe8sc&Bpub=SDX.SkyDrive
&Bsrc=SkyMail> Download all
<https://skydrive.live.com/redir.aspx?cid=fcfba59b4dcde258&page=downloadaszip
&resid=FCFBA59B4DCDE258%21160&authkey=%21AOvp4nK0h2Fe8sc&Bpub=SDX.SkyDrive&Bs
rc=SkyMail>
You are invited to view Ann's album. This album has 3 files.

<https://skydrive.live.com/redir.aspx?cid=fcfba59b4dcde258&page=self&resid=FC
FBA59B4DCDE258%21161&parid=FCFBA59B4DCDE258%21160&authkey=%21AOvp4nK0h2Fe8sc&
Bpub=SDX.SkyDrive&Bsrc=SkyMail>
<https://skydrive.live.com/redir.aspx?cid=fcfba59b4dcde258&page=self&resid=FC
FBA59B4DCDE258%21163&parid=FCFBA59B4DCDE258%21160&authkey=%21AOvp4nK0h2Fe8sc&
Bpub=SDX.SkyDrive&Bsrc=SkyMail>
_____

Classification: UNCLASSIFIED
Caveats: NONE

From: Kendall, David R NWS
To: Greg Wingard
Cc: gerry@hoanw.org; Ann Hurst; Elizabeth.Mooney; Pollet, Rep. Gerry; mobr461@ecy.wa.gov; david.radabaugh@ecy.wa.gov; cwan461@ecy.wa.gov; clay.keown@ecy.wa.gov; lino461@ecy.wa.gov; patrickeobrien@comcast.net; happyhaze@msn.com; SnoKing WatershedCouncil; mhito0421@comcast.net; cib9193@hotmail.com; dkleweno@comcast.net; achae01@aol.com; kellyk@sbcglobal.net; Bruce McAlister; jimh@clearwire.net; david.brock@dfw.wa.gov; sarah.rorick@gmail.com; waterite@myuw.net; Erika Hoffman/R10/USEPA/US@EPA; Celia.Barton@dnr.wa.gov
Subject: RE: Link not working RE: Kenmore Dioxin and PCB's (UNCLASSIFIED)
Date: 02/16/2012 12:54 PM

Classification: UNCLASSIFIED
Caveats: NONE

Greg, as part of our DMMP evaluation of sediment quality issues, we fully address the antidegradation issue up front as part of the corps permit, as you can see from the Harbor Village SDM (see paragraph 9 of SDM).

My Ecology counterpart would also coordinate with TCP regarding contaminated sediment concerns highlighted within any given project, and EPA would do likewise relative to CERCLA concerns. DNR would also notify the appropriate people tracking sediment quality issues relative to State owned aquatic lands. I am sure my colleagues may have additional comments to add to this brief response.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Greg Wingard [mailto:gwingard@earthlink.net]
Sent: Thursday, February 16, 2012 11:31 AM
To: Kendall, David R NWS
Cc: gerry@hoanw.org; Ann Hurst; Elizabeth.Mooney; Pollet, Rep. Gerry; mobr461@ecy.wa.gov; david.radabaugh@ecy.wa.gov; cwan461@ecy.wa.gov; clay.keown@ecy.wa.gov; lino461@ecy.wa.gov; patrickeobrien@comcast.net; happyhaze@msn.com; SnoKing WatershedCouncil; mhito0421@comcast.net; cib9193@hotmail.com; dkleweno@comcast.net; achae01@aol.com; kellyk@sbcglobal.net; Bruce McAlister; jimh@clearwire.net; david.brock@dfw.wa.gov; sarah.rorick@gmail.com; waterite@myuw.net
Subject: Re: Link not working RE: Kenmore Dioxin and PCB's (UNCLASSIFIED)

David:

When the Army Corps of Engineers finds unanticipated dioxin and PCB contamination at a dredging site like Harbor Village Marina, who is responsible for following up on addressing the nature and extent of the contamination, if it is not confined to the dredging prism, and what steps does the Corps take to assure those steps are implemented?

Regards,

Greg

On 2/16/12 8:38 AM, Kendall, David R NWS wrote:
> Classification: UNCLASSIFIED
> Caveats: NONE
>
> If you examine the entire link at the bottom of this email you will
> see that the last part has been delinked. Copy the entire web address
> and past it into internet address area, and you will access paper.
>
> Otherwise follow the link below to our website (Dredged Material
> Management Office), and access "Suitability Determination" link on
> left side and then select 2012, which will access all the suitability
> determinations for Dredging Year 2012, including Harbor Village Marina.
>
> http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=dmmo&pagena
> me=home
>
> David
>
> David R. Kendall, Ph.D.
> Chief, Dredged Material Management Office
>
> Seattle District Corps of Engineers
> Phone: 206/764-3768
> Fax: 206/764-6602
> email: david.r.kendall@usace.army.mil
>
>
> -----Original Message-----
> From: Gerry Pollet [mailto:gerry@hoanw.org]
> Sent: Wednesday, February 15, 2012 11:11 PM
> To: Kendall, David R NWS; Ann Hurst; gwingard@earthlink.net;
> Elizabeth.Mooney; Pollet, Rep. Gerry
> Cc: mobr461@ecy.wa.gov; david.radabaugh@ecy.wa.gov;

> cwan461@ecy.wa.gov; clay.keown@ecy.wa.gov; lino461@ecy.wa.gov;
> patrickeobrien@comcast.net; happyhaze@msn.com; SnoKing
> WatershedCouncil; mhito0421@comcast.net; cib9193@hotmail.com;
> dkleweno@comcast.net; achae01@aol.com; kellyk@sbcglobal.net; Bruce
> McAlister; jimh@clearwire.net; david.brock@dfw.wa.gov;
> sarah.rorick@gmail.com; waterite@myuw.net; gerry@hoanw.org
> Subject: Link not working RE: Kenmore Dioxin and PCB's (UNCLASSIFIED)
>
> Please provide the correct link. The link below gives a sorry, error
message.
>
> Thank you,
>
>
> Gerry Pollet, JD;
> Executive Director,
> Heart of America Northwest
> "The Public's Voice for Hanford Clean-Up"
> (206)382-1014
> gerry@hoanw.org
>
>
> _____
>
> From: "Kendall, David R NWS"<David.R.Kendall@usace.army.mil>
> Sent: Wednesday, February 15, 2012 9:39 AM
> To: "Ann Hurst"<annmhurst@msn.com>, gwingard@earthlink.net,
> "Elizabeth.Mooney"<elizabeth.mooney@comcast.net>
> Subject: RE: Kenmore Dioxin and PCB's (UNCLASSIFIED)
>
> Classification: UNCLASSIFIED
> Caveats: NONE
>
> I assume you are talking about the Harbour Village Marina suitability
> determination (SDM). I have provided the direct link to this SDM
> below. I would like to clarify that this is not a Corps of Engineers
> document, but is an interagency document signed by the four
> cooperating agencies of the Dredged Material Management Program (Corps,
EPA, Ecology, DNR).
>
> http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/Harbor-Village
> -Marina
> -DY12-SDM.pdf
>
> David
>
> David R. Kendall, Ph.D.
> Chief, Dredged Material Management Office
>
> Seattle District Corps of Engineers
> Phone: 206/764-3768
> Fax: 206/764-6602
> email: david.r.kendall@usace.army.mil
>
>
> -----Original Message-----
> From: Ann Hurst [mailto:annmhurst@msn.com]
> Sent: Wednesday, February 15, 2012 9:32 AM
> To: gwingard@earthlink.net; Elizabeth.Mooney
> Cc: mobr461@ecy.wa.gov; david.radabaugh@ecy.wa.gov;
> cwan461@ecy.wa.gov; clay.keown@ecy.wa.gov; lino461@ecy.wa.gov;
> patrickeobrien@comcast.net; happyhaze@msn.com; SnoKing
> WatershedCouncil; mhito0421@comcast.net; cib9193@hotmail.com;
> dkleweno@comcast.net; achae01@aol.com; kellyk@sbcglobal.net; Bruce
> McAlister; jimh@clearwire.net; david.brock@dfw.wa.gov; Kendall, David
> R NWS; sarah.rorick@gmail.com; waterite@myuw.net; gerry@hoanw.org
> Subject: RE: Kenmore Dioxin and PCB's
>
> Thank you, Greg. May I add the below to BasinNews.org, in DOCUMENTS,
> titled "Army Corps of Engineers' Review for PCB AND Dioxin
> Concentrations"? If the actual Army Corps of Engineer' review dated
> October 6, 2011 is available, I can also upload that if the file is
> not huge. I am having trouble uploading some important documents as
> the files are huge and thus not accessible to the public. Do you have a
link to the file? Thank you.
> Best, Ann Hurst
>
>
>> Date: Mon, 13 Feb 2012 14:12:21 -0800
>> From: gwingard@earthlink.net
>> To: elizabeth.mooney@comcast.net
>> CC: MOBR461@ECY.WA.GOV; david.radabaugh@ecy.wa.gov;
>> cwan461@ecy.wa.gov; clay.keown@ecy.wa.gov; Lino461@ecy.wa.gov;
>> patrickeobrien@comcast.net; happyhaze@msn.com; annmhurst@msn.com;
>> snokingwatershedcouncil@gmail.com; mhito0421@comcast.net;
>> cib9193@hotmail.com; dkleweno@comcast.net; Achae01@aol.com;
>> kellyk@sbcglobal.net; brucemcal@msn.com; jimh@clearwire.net;
>> david.brock@dfw.wa.gov; David.R.Kendall@usace.army.mil;
>> sarah.rorick@gmail.com; waterite@myuw.net; gerry@hoanw.org
>> Subject: Re: Kenmore Dioxin and PCB's
>>
>> All:
>>
>> I have briefly reviewed the proposed dredging contamination results
>> from the Army Corps of Engineers review dated October 6, 2011. Both
>> PCB's and dioxin concentrations in the sampled sediments are
>> substantially elevated. The numbers can be compared to the data for
>> the Lower Duwamish Waterway Superfund site, for nearby nearby river,
>> or river influenced freshwater sediment data set.
>>
>> The limited data from the October 6th, 2011 data for the Harbor

>> Village Marina, are comparable to, or exceed levels of PCB's and
>> dioxins detected in the Superfund site in the Duwamish River.
>>
>> I did not have time to do any detailed comparisons, but the numbers
>> are elevated enough to be a significant cause for concern, in terms
>> of shoreline, or near-shore work in the vicinity of these elevated
>> (in particular), dioxin and PCB results. This includes work at the
>> nearby Lake Pointe site, which is also a Model Toxics Control Act
>> contaminated site documented as having a number of contaminated hot
>> spots, and/or historic disposal sites associated with it.
>>
>> This is of specific concern as there has been no source
>> identification/source control work done associated with this
>> contamination, to determine what the source is. The sample results
>> are elevated well beyond regional, or non-source specific
>> contamination levels. In addition, the sampling was only designed to
>> identify contaminant levels within the proposed dredge prism, and was
>> not designed, and provides no information on the extent of
>> contamination (the edge of sediments where the numbers drop off to
>> regional levels), or the trending direction of the contamination (the
>> numbers should increase closer to the source, and decrease as the
>> samples are further from the source). This is of concern releated to
>> work, and proposed regulation or zoning changes in the Lake Pointe area as
the "upstream"
>> direction for the marina sediments would tend to be toward Lake
>> Pointe, and the Sammish River. While there are also stormwater inputs
>> from the north of the marina, which should be investigated, the known
>> current and historic industrial operations on Lake Washington in this
>> vicinity in combination with the sediment loading influence related
>> to the Sammish, make it likely the source is to the east, rather than
>> the north of the marina.
>>
>> This is also additional reason to bring up a previous issue. The
>> Department of Ecology issued Construction Stormwater General Permit
>> coverage for recent construction work at the MTCA site, also known as
>> Lake Pointe. At the time I was notified of this, I pointed out that
>> such general coverage for a MTCA contaminated site is not legal, as
>> MTCA sites are not in the class for which CSGP coverage can be issued.
>>
>> In a meeting with Ecology regional and headquarters staff and
>> management, this very issue was covered in depth for a proposed
>> construction project at the Port of Olympia. At that site, Ecology
>> had provided public notice of the intent to issue CSGP coverage for a
>> MTCA site. In the meeting referred to above, the issue was squarely
>> put to Ecology that was not appropriate, or even legal, and that the
>> only way Ecology could legally issue any general permit coverage for
>> a MTCA site, would be to draft a MTCA Stormwater General Permit. Both
>> staff and management, regional and headquarters agreed with this
>> assessment, pulled the notice of CSGP coverage and wrote a individual
>> NPDES permit for the site in question. In a followup to this meeting,
>> Ecology assured me and others that permit coverage at MTCA site with
>> stormwater discharges were under individual NPDES permits, not
>> general
> permit coverage.
>> Ecology has not since issued, or to my knowledge worked on a MTCA
>> Stormwater General Permit. The elevated levels of dioxin and PCB
>> contamination down stream of the MTCA site where current
>> grading/construction activities have or are being carried out, while
>> operating under CSGP coverage is simply not appropriate.
>>
>> Immediate work on source control/source identification for the
>> elevated levels of PCB's and dioxin now known to be in the vicinity
>> of the Harbor Village Marina, should be a priority.
>>
>> Regards,
>>
>> Greg
>
> Classification: UNCLASSIFIED
> Caveats: NONE
>
>
>
>
>
> Classification: UNCLASSIFIED
> Caveats: NONE
>
>
>

Classification: UNCLASSIFIED
Caveats: NONE

From:	O'Brien, Maura (ECY)
To:	Kendall, David R NWS; BARTON, CELIA (DNR); Erika Hoffman/R10/USEPA/US@EPA; Inouye, Laura (ECY); Justine Barton/R10/USEPA/US@EPA; Fox, David F NWS; Warner, Lauran C NWS; Vanderelst, Kelsey NWS
Cc:	Warren, Bob (ECY); Wang, Ching-Pi (ECY); Altose, Larry (ECY); Nancy Lui
Subject:	RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)
Date:	12/17/2012 01:38 PM
Attachments:	Kenmore Indust Park Stockpile and Surface Soil Samples.pdf

---

Thank you for the response about the Haug Channel dredging.

Note, Floyd Snider conducted soil sampling at the Kenmore Industrial Park aka Lakepointe site in December 2010 and reported in January 2011 including 8 soil samples (B1-B8) at the "dredge soil de-watering area" at the former Waterfront Construction area. The purpose of this soil sampling was to evaluate surface soils and background conditions prior to beginning the "deferred industrial maintenance work" at the west area of the KIP site.

The Floyd Snider results (see attachment above) showed no detection or very low levels for all chemicals tested and specifically no detection for PCBs at KIP site.

Maura

Maura S. O'Brien, PG/HG #869
Professional Geologist/Hydrogeologist
Toxics Cleanup Program - NWRO
Department of Ecology
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Tele 425-649-7249
Fax 425-649-7098
Email mobr461@ecy.wa.gov

-----Original Message-----
From: Kendall, David R NWS [mailto:David.R.Kendall@usace.army.mil]
Sent: Monday, December 17, 2012 8:00 AM
To: O'Brien, Maura (ECY); BARTON, CELIA (DNR); Hoffman, Erika; Inouye, Laura (ECY); Barton.Justine@epamail.epa.gov; Fox, David F NWS; Warner, Lauran C NWS; Vanderelst, Kelsey NWS
Subject: FW: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

FYI

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Kendall, David R NWS
Sent: Friday, December 14, 2012 3:29 PM
To: 'Cindy Beckett'
Subject: RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Cindy, I have to correct some of the information you provided below. The Corps sediment characterization within the Kenmore navigation channel conducted in 1996 did not analyze for dioxin/furans, but did analyze PCBs and the routine list of chemicals-of-concern that we normally evaluate for dredging projects(see link to that SDM). (http://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/Suitability%20Determinations/1997/US Kenmore-DY97-SDM%20(2).pdf). At that time dioxin was not on our radar as a chemical-of-concern in Lake Washington, so we did not require it back then.

After my discussion with you I was able to verify with the dredging applicant at Hunt's Point and the dredging contractor (Waterfront Construction) that the Haug Channel project (~9,300 cy) was dredged and transported by barge and subsequently placed at the Lakepointe site as you correctly noted. The sediments from Haug Channel were characterized, and did not demonstrate high concentrations of chemicals-of-concern that were detected. They had some analytical problems (e.g., elevated detection limits due to matrix problems) with the initial characterization, primarily due the high levels of organic matter in the sediments tested (20% Total Organic Carbon). See attached suitability determination, which also includes appended summary of full chemistry for 2001 characterization and follow-up testing in 2006 to reanalyze those chemicals with matrix problems and elevated detection limits. Because of the high TOC and elevated Volatile solids fraction in these sediments, we were not able to conduct toxicity testing (bioassays) to verify that they were not a problem, and the DMMP agencies ultimately concluded that these sediments were unsuitable for open-water disposal(Elliott Bay), and would have to be removed and taken to an Ecology approved upland site. We did not have a mechanism in place back then to require the dredging applicant to report back to us on projects where material is taken upland, so we lost track of what happen until your phone call. We will now require dredging applicants to report that information back to us so we can properly track projects after the evaluation is completed and the permit is issued.

I don't know what the dioxin concentrations are in the navigation channel and look forward to the Kenmore screening level evaluation of Kenmore and vicinity to help shed some light on the dioxin and PCB distribution in the area around Harbor Village Marina, where we found elevated dioxin and PCBs.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Thursday, December 13, 2012 3:02 PM
To: Kendall, David R NWS
Subject: FW: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Thursday, December 13, 2012 2:51 PM
To: 'david.r.kendall@usace.mil'
Subject: FW: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

The first one bounced back apparently wrong email address for you, so am trying again.

Thanks!!

Cindy Beckett

From: Cindy Beckett [mailto:cindybeckett@comcast.net]
Sent: Thursday, December 13, 2012 2:50 PM
To: 'David.R.Kendall@usace.mil'
Cc: 'elizabeth.mooney@comcast.net'; 'Gerry Pollett'; 'Janet and Bob Hays'; 'Derek Poon'; 'Cleve Steward'; 'jim halliday'; 'Mamie Bolender'; 'Carol Dahl dahlcv@juno.com'; 'maralyn chase'; 'David Kleweno-PERK'; 'Cathy Garrand'; 'David Bain'; 'Bruce McAlister'; 'Joan Hardy'; 'Jim Myers'; 'Diane Brennon'; 'jari kristensen'; 'Ann Aagaard'; 'Ann Hurst'; 'Clyde Merriwether'; 'Dennis'; 'Jirius Isaac'; 'Kristin Meijer'; 'Hitoshi Maruyama'; 'tim -found perch'; 'Colleen McAleer Coalition Sust'; 'Jeff Burnside'; 'Mike Lindblom'; 'Amy Radil'; 'Ginny Kreimer'; 'Sarah Jane Mooney Rorick'; 'Linda Newton'
Subject: RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Hello David

Regarding our recent conversation about the Haug channel, I find it all seems to fit together when taking all of the considerations into a time line account.

According to USACE tests results, the Kenmore channel showed little PCB and Dioxin in 1997, however, in 2011 it was substantially higher, as was the Dioxin 2,3,7,8 TCDD (most deadly and dangerous to human health).

I did thorough research into the Haug dredging/dumping and found that the town of Hunts Point turned the matter back to private citizens as the cost was too much for the town. In 2009, the channel was dredged and the material was floated 8 miles up the lake to the Evergreen Topsoil property on the side of the mouth of the Sammamish River (ESA Salmon migration run), which directly abuts the Kenmore landfill site. I have an email from a first hand witness who actually climbed up the mound of contaminated Haug muck and did in fact witness the contaminated water flowing back into the river mouth.

This fits with the 5/2009 satellite images of the red plume in the lake, the red in the water under both marinas and Kenmore Air, and the island in the river turning red with all vegetation dying. There is clear evidence of this via satellite, including the red tainted water flowing from the land into the river and subsequently the lake where a huge red plume appeared. Much of that red water also appeared in the Kenmore channel, possibly moved there by water traffic.

I found no reference to any permits nor oversight for either the dredging (which was already deemed unsuitable for open water disposal) and the stockpiling of this contaminated Haug channel

dredge material. I did call the company listed in the Hunt's Point records, "Waterfront Construction" and inquired about permits. They hung up on me.

There was no containment of the Haug dredging placed on the Evergreen property, no oversight, no maintenance, and no permits.

This seems to me to be a classic example of the Kenmore channel testing in 1996 where there was little dioxin & PCB to 2009 where the Haug muck was openly dumped onto the ground with no containment, the red water in the river and lake, then the 2011 Kenmore testing showing higher than safe levels for humans of PCB & Dioxin 2,3,7,8TCDD.

I believe that whatever departments of the government are responsible for the health of the lake, the water, the endangered species and the people, needs to put these pieces together. To do some investigation, and find out how the Haug contaminated dredging ended up on the Evergreen Topsoil site with no permits or oversight/monitoring, only to be drained back into the lake, and the contaminated peat/muck soils just dozed around then mixed with other soils on site.

It is too coincidental that these illegal actions tie in with the time frame between less contamination of the Kenmore shoreline in 1996 and the much higher contamination in 2011.

Additionally, I did read through an ECY 520 report on the Kenmore landfill site prior to approving for high barge traffic use for the 520 bridge components. In there they (ECY) acknowledged that there had been a release into the channel from the landfill site "in the recent past" but they "felt" (no testing to confirm) that the toxins had dissipated enough to make the channel safe to use.

Of course, as you well know, that is not the case when there exists the possibility that toxic material is released, and it was very irresponsible to not take tests prior to permitting huge barges and tugs to run the channel day and night for the past 286 consecutive days. Now this stuff is everywhere at the north end of the lake. How it will be cleaned up I don't know, but certainly someone is responsible for this, and someone must take action.

I have contacted the Dept of Justice and Federal EPA about this, and I urge the USACE to look into these violations, especially the Haug channel violations, perhaps even through the Inspector General's office.

ECY tells me they would not be the department to issue such a permit to dredge the Haug channel, it would have to be the USACE. Since you have no recollection of a permit issued and there was absolutely no oversight into the dredging, transport and dumping of this contaminated muck, no disposal pond created, no monitoring and no testing, I would want to believe that you will in fact investigate this serious violation of draining toxic tainted water into a 303d - ESA protected lake.

Meantime, given all of this information, I would request that your office issue a stop work until all of this can be resolved. There is too much available information to just run on assumptions, and far too much danger to the health of the people there to just shrug it off and allow it to continue.

Thanks very much, David, I really appreciate your attention to this most serious matter.

Respectfully

Cindy Beckett

Cindy Beckett

Master Watershed Steward

no water - no life

From: elizabeth.mooney@comcast.net [mailto:elizabeth.mooney@comcast.net]
Sent: Thursday, December 13, 2012 10:06 AM
To: Gerry Pollett; Derek Poon; Cindy Beckett; Greg Wingard-clyde's friend for Lakepointe issue; Cleve Steward; jim halliday; Mamie Bolender; Carol Dahl dahlcv@juno.com; maralyn chase; David Kleweno-PERK; Cathy Garrand; David Bain; Bruce McAlister; Joan Hardy; Jim Myers; Diane Brennon; jari kristensen; Ann Aagaard; Ann Hurst; Clyde Merriwether; Dennis; Jirius Isaac; Kristin Meijer; Hitoshi Maruyama; tim -found perch; Colleen McAleer Coalition Sust; Jeff Burnside; Mike Lindblom; Amy Radil; Ginny Kreimer; Sarah Jane Mooney Rorick; Linda Newton
Subject: Fwd: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Hi Friends,

FYI-seems like this issue regarding the north shore of Lake Washington should be public knowledge.

Elizabeth

From: "elizabeth mooney" <elizabeth.mooney@comcast.net>
To: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
Cc: "Janet and Bob Hays" <happyhaze@msn.com>, "Ann Hurst" <annmhurst@msn.com>, "John L NWS Pell" <John.L.Pell@usace.army.mil>, "John A NWS Hicks" <John.A.Hicks@usace.army.mil>
Sent: Thursday, December 13, 2012 9:55:43 AM
Subject: Re: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

David

Just so your agency knows that the tugs and barges are churning up turbidity by turning around and backing up, then into the bank, then toward Kenmore Air (they do a 180 degree turn) today twice so far and were doing it on Nov 28, 29, Dec 4, 6, 2012. We have called ERTS and Greg Stegman. DOE is not doing any enforcement.

Elizabeth

From: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
To: "elizabeth mooney" <elizabeth.mooney@comcast.net>
Cc: "Janet and Bob Hays" <happyhaze@msn.com>, "Ann Hurst" <annmhurst@msn.com>, "John L NWS Pell" <John.L.Pell@usace.army.mil>, "John A NWS Hicks" <John.A.Hicks@usace.army.mil>
Sent: Thursday, December 13, 2012 8:59:38 AM
Subject: RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Elizabeth: I think the city must have been aware of the potential need to dredge the navigation channel at Kenmore, based on their discussions with the Corp's Navigation Section, and project manager for the Kenmore Channel, John Pell. In my discussions with Nancy about the characterization, I clarified that the navigation channel would have a high ranking for characterization, based on the earlier characterization (1996). The 1996 characterization did show some areas of the channel as being unsuitable for open-water disposal, but the chemistry associated with those sections of the channel did not show them to be heavily contaminated, and not by PCBs. Since we did not test the channel back then for dioxins, we do not know what levels might be expected in the federal channel. The Corp's navigation channel condition survey estimated a total potential dredging volume of material above the authorized channel depth of approximately 31,679 cy.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: elizabeth.mooney@comcast.net [mailto:elizabeth.mooney@comcast.net]
Sent: Thursday, December 13, 2012 8:41 AM
To: Kendall, David R NWS
Cc: Janet and Bob Hays; Ann Hurst
Subject: Re: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Thank you, David.
By assisting the city in designing a characterization plan for a problem to be addressed, is it reasonable to assume the city knew there was a potential risk of barges and tugs stirring up sediment that could be contaminated?
Elizabeth

From: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
To: "elizabeth mooney" <elizabeth.mooney@comcast.net>
Cc: "Janet and Bob Hays" <happyhaze@msn.com>, "Ann Hurst" <annmhurst@msn.com>
Sent: Thursday, December 13, 2012 8:11:41 AM
Subject: RE: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Elizabeth: I went through my files and email logs to research your question. They indicated

that I talked with Nancy Ousley on November 18, 2011 about assisting the city in designing a characterization plan for the Kenmore Navigation Channel, to conduct a screening level evaluation relative to Dredged Material Management Program (DMMP) requirements for dredging. In my discussions and emails with Nancy there was no mention or discussion about dioxin or PCB issues relative to the Harbor Village Characterization. We were focused on evaluating the basics of what would be included in a sediment characterization plan, which obviously would include chemicals such as dioxin and PCBs in addition to the routine DMMP Chemical of Concern list (http://www.nws.usace.army.mil/Portals/27/docs/civilworks/dredging/Updates/Nov%202012%20COC%20list.pdf) I can't say whether the City was aware of the dioxin/PCB issues prior to being informed during the city council meeting on Feb 13, 2012, where you informed them on that issue after I had passed that information on to you following my talk at NMFS on Feb 9, 2012.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Managment Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: elizabeth.mooney@comcast.net [mailto:elizabeth.mooney@comcast.net]
Sent: Wednesday, December 12, 2012 2:50 PM
To: Kendall, David R NWS
Cc: Janet and Bob Hays; Ann Hurst; Elizabeth Mooney
Subject: Re: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

David,

One, I hope, simple question that I hope you may answer:

Do you know if anybody at the City of Kenmore knew about the Oct 2011-reported PCB's and dioxins at Harbour Village Marina before Feb 13, 2012?

A City staff member Laurie Anderson has written an affidavit that she didn't have evidence of the dioxins or PCB's at Harbour Village Marina until I informed the City during a city council meeting on Feb 13, 2012. I informed the council, during public comment, Feb 13 2012 after I heard your talk Feb 9 2012. The city passed their Shoreline Master Plan approval later that evening on Feb 13, 2012. I think they should have considered my information before they passed the Shoreline Master Plan update.

I recall you said Nancy Ousley had been in contact with the Army Corps and was interested in getting the Navigation Channel (portion of it or the federal part?) dredged.

What I'd like to know is if my public comment was the only way the City knew of a potential health hazard. Did any staff or council in Kenmore knew about the dioxins and PCB's at Harbour Village Marina? The City didn't consider whether or not that might be new information they should consider prior to passing the plan which gave special perks to the Calportland facility that wished to widen their pier (a partially burned dilapidated creosote pier in the Kenmore Navigation Channel).

I am perplexed by the City telling me that they didn't know anything about that existence of toxins in the navigation channel or near the navigation channel. The city had told me about dioxins long before, and it's reflected in the minutes of the Shoreline Master Plan Update Process (the fact that I mentioned this to our City Planning Commission). The only reason I knew was that much earlier, in about 2005, Kenmore's Community Development Director had told a group of parents and students that the Kenmore dock couldn't be renovated by removing pilings because disturbing the sediment would be worse than leaving it intact, since the sediment under the dock in North Lake Washington was contaminated. It was during a school Stream Field trip and the staff member was Bob Sokol. The January 21, 2009 Minutes of the City's Planning Commission states:

"Citizen Comments Elizabeth Mooney expressed concern about dioxin levels and their source(s) in Swamp Creek and Lake Washington. Ms. Mooney asked if the City plans to test the sediment and how the Shoreline Update will address the concern....City of Kenmore Master Plan Update...Steve Colwell asked about the imbalance between cleanup and regulations for the Duwamish River and also about water quality data for the waterfront in Kenmore. Mark Johnson noted that clean up is progressing on the Duwamish River. The shoreline inventory is the scientific baseline document which "holds the line" of existing conditions and that restoration over time means the baseline moves up and there is improvement but not every function can be replaced. Mark noted that information on some metal, Ph and temperature is available and Chip Davidson noted that some data from 1988 is available from the Corps of Engineers for testing in Lake Washington....Mark noted he would research the question about agency monitoring of water quality near park areas. Mark clarified the meaning of non-point pollution and "no net loss" in response to Hitoshi Maruyama's questions."

Thanks very much and Happy Holidays.

Elizabeth Mooney
206-979-3999

From: "David R NWS Kendall" <David.R.Kendall@usace.army.mil>
To: "Elizabeth Mooney" <elizabeth.mooney@comcast.net>
Sent: Wednesday, March 21, 2012 11:35:15 AM
Subject: Link to Kenmore Navigation characterization 1996 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Elizabeth: As I mentioned, the City of Kenmore is working to develop a sampling and analysis plan (SAP) to characterize material proposed for dredging within the navigation channel to restore navigable depths. The Dredged Material Management Program (DMMP) agencies must review/approve any SAP before allowing sampling to proceed. The evaluation of sediments in the navigation channel would require the full chemical-of-concern list as stipulated in our DMMP Users Manual Guide (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/Nov_2009_UM.pdf).
When the data from the characterization is submitted to DMMP agencies for review, we would review the data for Quality Assurance/Quality Control
(QA/QC) requirements, before writing up a suitability determination that documents the testing outcome relative to potential alternatives for disposal of dredged sediments (open-water disposal at Elliott Bay non-dispersive site, beneficial alternatives, upland disposal of contaminated sediments).
The previous testing outcome summary
(http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/USACE-Kenmore-DY97-S
DM_(2).pdf) for the navigation channel conducted in 1996 found low concentrations of PCBs (most undetected). Concentrations of PAHs measured in one sample, were subjected to toxicity testing and passed our bioassays. Two additional samples, one with TBT and the other with DDT concentrations failed bioassays, and were not dredged. The suitable material dredged was ultimately disposed at the Elliott Bay disposal site, and the unsuitable material was left in place and not dredged.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
Fax: 206/764-6602
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Elizabeth Mooney [mailto:elizabeth.mooney@comcast.net]
Sent: Tuesday, March 20, 2012 10:07 AM
To: Kendall, David R NWS
Cc: Jim Myers; Elizabeth Mooney; Patrick E. O'Brien; Joan Hardy; larry.fisher@dfw.wa.gov
Subject: Fwd: ERTS from March 19 call Pioneer Towing Wharf Repair

David
FYI
Thank you for the conference call yesterday.
Elizabeth

Sent from my iPhone

Begin forwarded message:

From: Elizabeth Mooney <elizabeth.mooney@comcast.net>
Date: March 20, 2012 9:40:53 AM PDT
To: "Patrick E. O'Brien" <patrickeobrien@comcast.net>
Cc: JANET + BOB HAYS Across the Street <happyhaze@msn.com>, Ann Hurst <annmhurst@msn.com>, Elizabeth Mooney <elizabeth.mooney@comcast.net>, Diane B <dalaine00@yahoo.com>
Subject: ERTS from March 19 call Pioneer Towing Wharf Repair

Dear all
Thanks, Patrick, for calling attention to the issue.

Will there be water quality or contaminants' redistribution as a result of the planned work? Who is the contractor ?

If there is sediment transport, don't the operators need an HPA from WDFW (Larry Fisher) and the permit from Army Corps if
there is sediment disturbance?

Will barges and boat traffic in and out of the navigation channel potentially relocate contaminated lake or stream bottom sediment prior to us knowing the source of the Harbour Village Marina Oct 2011 dioxins and PCB's?

If they drive in the pilings, will that action disturb test well effectiveness due to the depth of the pile driving?

Will the imminent "wharf repair" and building permit , under city-granted building permit and "deferred maintenance" disturb sediment at the shoreline and perhaps cause release of contaminants into Lake Washington?
I did not know who could answer questions about public health issues in the face of this city permit, so I left an ERTS call at Ecology and talked to Jenee Colton at King County toxics (she led Lake Washington study of toxic sediments).

From my call to Ecology, there now is an ERTS # 632-759 to look into the potential effect of the pile driving.

I don't know if pile driving on the upland side of the wharf at Kenmore Yard/aka Kenmore Industrial Site/aka Pioneer Towing/aka SR 520 project/aka Lakepointe/aka Gary Sergeant is happening yet; I saw and photographed barges with cranes (presumably for piling pounding into land or landfill) yesterday off Log Boom Park dock.

Tammy at Dept of Ecology, who assigned the ERTS #632759, will be contacting the inspector for this site and I presume that is Greg Stegman. I called Greg yesterday to tell him about the cranes,barges and wharf pilings plans. Clay Keown had said I should call Greg immediately. Our concern, as I understand it, is that piling driving near the shore on the MTCA site could have a significant adverse environmental impact (turbidity or sediment translocation), maybe by boat traffic or maybe by piercing below the depth of the landfill to lower depths possibly changing status quo.

There is no Army corps permit for pilings driving that I know of.
David Kendall, after talking to Patrick and me, said he would do what he could to see if the

regulatory office knew more.

Thank you!!!!

Elizabeth
Sent from my iPhone

On Mar 20, 2012, at 8:57 AM, "Patrick E. O'Brien" < <mailto:patrickeobrien@comcast.net> patrickeobrien@comcast.net> wrote:

----- Original Message -----
From: Kate Snider <mailto:Kate.Snider@floydsnider.com>
To: ' <mailto:'patrickeobrien@comcast.net'> <mailto:patrickeobrien@comcast.net> patrickeobrien@comcast.net'
Sent: Monday, March 19, 2012 7:29 PM
Subject: Pioneer Towing Wharf Repair

Patrick -

I am replying to your phone call received this afternoon regarding the Pioneer Towing permit for pile installation at the Kenmore wharf.

The permit is BLD2001-0610, for restoration of existing wharf - installation of piles and new pile caps.

All permit application materials are here:

<http://www.kenmorewa.gov/Page.aspx?cid=2583> <http://www.kenmorewa.gov/Page.aspx?cid=2583> http://www.kenmorewa.gov/Page.aspx?cid=2583

Kate Snider, PE Principal
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601 Union Street, Suite 600
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Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From:	Kendall, David R NWS
To:	BARTON, CELIA (DNR); Hoffman, Erika
Cc:	Inouye, Laura (ECY)
Subject:	RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)
Date:	Tuesday, May 14, 2013 11:00:33 AM
Attachments:	Kenmore-Navigation-channel-screening level-DY13-MFR_4-29.docx Chem-summary-Kenmore-O&M-Screen-DY13-SDM.pdf Dioxin-Kenmore-O&M-Screen-DY13-SDM.pdf Figure 1-Kenmore study area and sampling stations-1.pdf

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Classification: UNCLASSIFIED
Caveats: NONE

Hi Erika and Celia: Do you have any edits to redrafted MFR? I would like to move to finalize this if there are no more edits. Thanks.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Inouye, Laura (ECY) [mailto:Lino461@ECY.WA.GOV]
Sent: Tuesday, May 14, 2013 10:29 AM
To: Kendall, David R NWS; BARTON, CELIA (DNR); Hoffman, Erika
Subject: RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

OK, that is fine.

-----Original Message-----
From: Kendall, David R NWS [mailto:David.R.Kendall@usace.army.mil]
Sent: Monday, May 13, 2013 8:10 AM
To: Inouye, Laura (ECY); BARTON, CELIA (DNR); Hoffman, Erika
Subject: RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Laura, regarding your question/comment about the Grant from Ecology/City of Kenmore to fund additional studies, the source for that comment came directly out of the characterization report (page 1, second paragraph, third sentence).

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Inouye, Laura (ECY) [mailto:Lino461@ECY.WA.GOV]

Sent: Saturday, May 11, 2013 5:50 PM
To: Kendall, David R NWS; BARTON, CELIA (DNR); Hoffman, Erika
Subject: RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

My comments.

-----Original Message-----
From: Kendall, David R NWS [mailto:David.R.Kendall@usace.army.mil]
Sent: Thursday, May 09, 2013 3:23 PM
To: Inouye, Laura (ECY); BARTON, CELIA (DNR); Hoffman, Erika
Subject: RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Here is slightly altered version, cleaning up a few conclusions regarding testing results.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Inouye, Laura (ECY) [mailto:Lino461@ECY.WA.GOV]
Sent: Thursday, May 09, 2013 3:19 PM
To: Kendall, David R NWS; BARTON, CELIA (DNR); Hoffman, Erika
Subject: RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

Celia and Erika- any comments?

-----Original Message-----
From: Kendall, David R NWS [mailto:David.R.Kendall@usace.army.mil]
Sent: Friday, May 03, 2013 2:57 PM
To: Inouye, Laura (ECY); BARTON, CELIA (DNR); Hoffman, Erika
Subject: RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Because the 2013 FWG are not yet implemented but certainly publically accessible, I included them for comparison along with the 2006 FWG. I didn't really say much about both FWG exceedances except to note them within each sample. Since any future dredging evaluation would require a stand alone characterization, these data are only yellow, red flags to advise the characterizations that would have precedent and standing for SDM.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: Inouye, Laura (ECY) [mailto:Lino461@ECY.WA.GOV]
Sent: Tuesday, April 30, 2013 2:50 PM
To: Kendall, David R NWS; BARTON, CELIA (DNR); Hoffman, Erika
Subject: RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

The SDM looks fine, although I'd like to take the time to go over the tables.

One thing, though. Do we want to compare to the 2013 FW values, even though Ecology is not implementing them until Sept and RSET is still working on how they fit into a framework for protection of other species?

Laura

-----Original Message-----
From: Kendall, David R NWS [mailto:David.R.Kendall@usace.army.mil]
Sent: Monday, April 29, 2013 2:29 PM
To: BARTON, CELIA (DNR); Inouye, Laura (ECY); Hoffman, Erika
Subject: RE: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Pleasue use this version for review/editing.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
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-----Original Message-----
From: Kendall, David R NWS
Sent: Monday, April 29, 2013 2:12 PM
To: (Celia.Barton@dnr.wa.gov); Inouye Laura (LINO461@ecy.wa.gov); Hoffman, Erika
Subject: Revised Kenmore & vicinity screening level MFR (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi all: Here is revised MFR adding in data from Northlake Marina, Harbor Village Marina, Kenmore Industrial Park Shoreline, and Sammamish River. Please review and edit as necessary. Thanks.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

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Classification: UNCLASSIFIED
Caveats: NONE

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Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Inouye, Laura (ECY)
To: Kendall, David R NWS; BARTON, CELIA (DNR); Hoffman, Erika
Subject: RE: SSAP memorandum (UNCLASSIFIED)
Date: Tuesday, February 19, 2013 4:19:04 PM

I think one thing that comes out of this is that for North Lake Marina and the Nav Channel, Z-layer testing should just go forward without tiering when it gets around to the full testing. Given the area has a likely historical contamination issue, I'd also say that is should be conducted for all CoCs that have been shown to be elevated in this area regardless of whether the upper layer squeaks past SLs or not... this would be for PCBs, phthalates, etc...

And FYI, here are the comments I sent back to Maura on the report, since she wants them COB tomorrow:

1. Tables and text are not consistent with the number of significant digits... in some areas dioxins are report out to the second decimal place, others to the first. Probably best not to report beyond the first decimal place for sum TEQ...
2. Table 2, add column with general locations as done for table 3.
3. I would add to conclusions (and probably the data discussion) that the DMMP screening values are for MARINE open water disposal (at the MARINE DMMP disposal sites)- otherwise there will be a question of why the screening values are different, and what purposes are they for- I think the report does state that it is used for evaluation for open water disposal, but doesn't make it clear that those sites are marine. For DMMP evaluation, the FW values would be used to determine whether or not leave surface (sediments exposed by dredging) would meet state antidegradation. Since the cores did not go the entire dredge depth, the comparison to FW values only give an idea of what analyses would be required for "Z-layer" during full evaluation. This doesn't really need to be mentioned in this report, since that analysis cannot be made with the data that was collected.

Laura

-----Original Message-----
From: Kendall, David R NWS [mailto:David.R.Kendall@usace.army.mil]
Sent: Tuesday, February 19, 2013 10:29 AM
To: BARTON, CELIA (DNR); Hoffman, Erika; Inouye, Laura (ECY)
Subject: FW: SSAP memorandum (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Fyi, here is the Anchor report. I will start working on the testing MFR SDM or whatever we decide to call this thing.

David

David R. Kendall, Ph.D.
Chief, Dredged Material Management Office

Seattle District Corps of Engineers
Phone: 206/764-3768
email: david.r.kendall@usace.army.mil

-----Original Message-----
From: O'Brien, Maura (ECY) [mailto:MOBR461@ECY.WA.GOV]
Sent: Tuesday, February 19, 2013 10:04 AM
To: Inouye, Laura (ECY); David Kendall
Cc: Wang, Ching-Pi (ECY)
Subject: FW: SSAP memorandum

Here is Anchor QEA's draft SSAP Results Memorandum for the Kenmore Area.

This is for internal use only and I appreciate your review and if you have comments to please forward them to me and by close of business Wed, Feb 20 or let me know when you will be able to review.

Thank you immensely.

Maura

Maura S. O'Brien, PG/HG #869

Professional Geologist/Hydrogeologist

Toxics Cleanup Program - NWRO

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From: Dan Berlin [mailto:dberlin@anchorqea.com]
Sent: Thursday, February 14, 2013 5:01 PM
To: O'Brien, Maura (ECY); Nancy Ousley
Cc: William Joyce (wjoyce@jzplaw.com); Tom Wang; Joanna Florer
Subject: RE: SSAP memorandum

Maura,

Attached is the draft Sampling and Analysis Results Memorandum for the Kenmore Sediment and Water Characterization effort. Please let me know if you have any questions or comments. I am happy to coordinate with you to finalize the report prior to making it available to the public, including providing a complete pdf of the appendices.

Thanks

Dan

Dan Berlin

ANCHOR QEA, LLC
dberlin@anchorqea.com

From: O'Brien, Maura (ECY) [mailto:MOBR461@ECY.WA.GOV]
Sent: Tuesday, February 12, 2013 9:24 AM
To: Nancy Ousley; Dan Berlin
Cc: Wang, Ching-Pi (ECY)
Subject: SSAP memorandum

Hello,

I would like to request for Ecology to have a day or two to review the draft Anchor QEA SSAP results memorandum. Let me know approximately when it will be coming to say the time.

Maura

Maura S. O'Brien, PG/HG #869

Professional Geologist/Hydrogeologist

Toxics Cleanup Program - NWRO

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Classification: UNCLASSIFIED
Caveats: NONE

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Figure 2
Sample Locations
Sampling and Analysis Plan
Kenmore Sediment Characterization

SAMPLING AND ANALYSIS RESULTS MEMORANDUM
KENMORE SEDIMENT AND WATER CHARACTERIZATION

Prepared for

Washington State Department of Ecology

Dredged Material Management Program

Washington State Department of Health

On Behalf of

City of Kenmore

18120 68th Avenue NE

Kenmore, Washington 98028

Prepared by

Anchor QEA, LLC

720 Olive Way, Suite 1900

Seattle, Washington 98101

March 2013

SAMPLING AND ANALYSIS RESULTS MEMORANDUM

KENMORE SEDIMENT AND WATER CHARACTERIZATION

Prepared for

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18120 68th Avenue NE

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March 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
°C	degrees Celsius
µg/kg	micrograms per kilogram
ARI	Analytical Resources, Inc.
BEACH	Beach Environmental Assessment, Communication and Health
City	City of Kenmore
cm	centimeter
DGPS	differential global positioning system
dioxin/furan TEQ	total dioxin and furan toxic equivalency
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Program
DO	dissolved oxygen
DOH	Washington State Department of Health
DVR	Data Validation Report
Ecology	Washington State Department of Ecology
J	sample results qualified as "estimated"
KIP	Kenmore Industrial Park
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LDC	Laboratory Data Consultants
ML	DMMP Maximum Level
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Model Toxics Control Act
ng/kg	nanograms per kilogram or parts per trillion
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PSEP	Puget Sound Estuary Program
QA	quality assurance
Results Memorandum	Sampling and Analysis Results Memorandum
SAP	*Sampling and Analysis Plan; Kenmore Area Sediment and Water Characterization*

Abbreviation	Definition
SAPA	*Sediment Sampling Analysis Plan Appendix*
SL	DMMP Screening Level
SL1	interim freshwater Screening Level 1
SL2	interim freshwater Screening Level 2
SQV	Sediment Quality Value
SVOC	Semi-volatile organic compound
TBT	tributyltin
TEQ	toxic equivalency
TOC	total organic carbon
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WDFW	Washington Department of Fish and Wildlife

1 INTRODUCTION

This Sampling and Analysis Results Memorandum (Results Memorandum) summarizes the results of the sediment and water characterization conducted in the northeastern portion of Lake Washington in and near the City of Kenmore (City). Anchor QEA, LLC (Anchor QEA), prepared this memorandum on behalf of the City, in partnership with the Washington State Department of Ecology (Ecology), and in accordance with the procedures described in the Ecology-approved *Sampling and Analysis Plan; Kenmore Area Sediment and Water Characterization* (SAP) (Anchor QEA 2012).

The characterization effort supports a number of objectives for the City and Ecology. First, the characterization is intended to support the City's ongoing work with the U.S. Army Corps of Engineers (USACE) to support a request for funding in the USACE budget for maintenance dredging of the federal Kenmore Navigation Channel (Figure 1). Second, with financial assistance from Ecology's Clean Sites Initiative fund, the City and Ecology are conducting additional characterization activities to evaluate the potential presence of chemicals of concern along the shoreline. The characterization has been designed to support Ecology's Model Toxics Control Act (MTCA) cleanup action requirements, as well as the Health Consultations to be developed by Washington State Department of Health (DOH). Health Consultations are anticipated to be prepared by DOH for public health, safety, and environmental concerns in human-use areas along Log Boom Park, at the Washington Department of Fish and Wildlife (WDFW) public motor boat launch along the Sammamish River, and Kenmore Industrial Park (KIP; also known as Lakepointe). Additionally, at the request of the City of Lake Forest Park, two sediment samples were collected along the northwestern shoreline of Lake Washington adjacent to Lyon Creek Park.

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NOTE:
WDFW = Washington State Department of Fish and Wildlife

Figure 1
Sample Locations
Sampling and Analysis Results Memorandum
Kenmore Sediment Characterization

1.1 Kenmore Navigation Channel Screening Level Characterization

The Kenmore Navigation Channel (Figure 1) was constructed in 1981, as a USACE project authorized in Section 107 of the 1960 River and Harbors Act, to a depth of 15 feet below lake level. The Kenmore Navigation Channel is approximately 100 to 120 feet wide and 2,900 feet long, and primarily serves barge and other marine traffic for industrial and commercial uses. The Kenmore Navigation Channel was last sampled in 1996 for dredge characterization, dredged in 1997, and last surveyed in 2010, which showed areas shallower than 15 feet below lake level. The most recent maintenance dredging of the Kenmore Navigation Channel was prior to the City's 1998 incorporation. Currently, King County is the Local Sponsor Authority for the Kenmore Navigation Channel and the Sammamish River Small Boat Navigation Channel. The City, King County, and the USACE are presently exploring the possible transfer of the Local Sponsor Authority for the Kenmore Navigation Channel to the City. The USACE estimates that maintenance dredging would require removal of 31,700 cubic yards of sediment within the channel.

The Dredged Material Management Office (DMMO) at the USACE has indicated that a screening level characterization will provide information about potential options for disposal of dredged sediment. According to Dredged Material Management Program (DMMP) protocols, a full sediment characterization would provide information to determine if sediment is suitable for unconfined open-water disposal. However, these characterization results are only valid for 2 years in areas ranked "High" by DMMP, which includes the Kenmore Navigation Channel. Acquisition of funding and completion of maintenance dredging is not likely to occur within 2 years of the commencement date of this project. Given the timing of the maintenance dredging, the DMMO agreed that it made sense for the City to conduct a screening level assessment to provide information to support pursuing federal funding for maintenance dredging. The DMMO also agreed that the timing for a full DMMP characterization effort should be within 2 years of the anticipated maintenance dredging event.

The owners of the North Lake Marina are also participating parties in the sediment characterization efforts to assess the options for sediment disposal in the event that maintenance dredging is conducted within the marina. The marina owners are interested in privately funding the dredging of the marina, in conjunction with the dredging of the

Kenmore Navigation Channel, to save money and share costs (e.g., dredge equipment mobilization fees) with the USACE.

Any future proposed dredging plans for Kenmore Navigation Channel, Harbour Village Marina, or North Lake Marina will be determined by each party based on navigational needs, cost, and other considerations. A summary of previous sediment characterization and dredging is provided in the SAP (Anchor QEA 2012).

1.2 Additional Nearshore Sediment and Surface Water Characterization

The City and Ecology requested additional characterization activities to evaluate the current condition of nearshore sediment and surface water in the Kenmore area waterfront. The purpose of the additional characterization activities is to determine sediment and water quality and possible health and environmental risks. This information will provide a better understand whether potential contamination is present in sediment and surface water. The surface water and sediment results are intended to be used by Ecology for characterization activities to evaluate the presence and concentration of chemicals and possible contamination in the lake and river waterfront areas, as well as to continue the MTCA evaluation of nearshore sediments. The results will also be used to support the Health Consultations in the vicinity of Log Boom Park and adjacent to KIP that will be developed by DOH. Ecology will determine if additional testing will be required to further characterize potential sources of contamination.

1.3 Sediment Investigation Overview

This section provides a brief overview of the sediment investigation conducted in November 2012. Specific sampling and analysis protocols for the sediment sampling activities, sample location and frequency, equipment, procedures to be used during the sampling, and sample handling and analysis are described in the SAP (Anchor QEA 2012).

Sample collection and analyses were performed and prepared consistent with the multi-agency reviewed and approved SAP (Anchor QEA 2012). The SAP was developed in accordance with the 2008 DMMP User's Manual (DMMO 2009) and Ecology's *Sediment Sampling and Analysis Plan Appendix* (Ecology 2008). All sample handling and analyses

followed the most recent Puget Sound Estuary Program (PSEP) protocols for collecting and handling sediment and water samples (PSEP 1986, 1997a, 1997b, 1997c) and the 2008 DMMP User's Manual (including the 2009 update) and Clarification Papers and updates (DMMO 2009; Hoffman 1998; Kendall 2001; USACE 2010; Inouye and Fox 2011).

Between November 6 and November 8, 2012, Anchor QEA collected 30 sediment samples (including two field duplicates) from 28 locations. Ecology staff supported sample collection on November 6 and 7, 2012. Three water samples (including one duplicate) were collected at Log Boom Park, and one background water sample was collected offshore in Lake Washington on November 7, 2012. Sediment collection information and sample descriptions are provided in Table 1. Surface water collection information is provided in Table 2. Sediment and water sampling locations are shown in Figure 1.

Sediment samples for the DMMP screening level characterization were collected on November 8, 2012, and included samples SG-02 and SG-03 from North Lake Marina and SG-04 through SG-09 from the Kenmore Navigation Channel. These sediment samples were analyzed for the full DMMP analyte list (DMMO 2010, 2011) for the screening level characterization, including metals, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), dioxins and furans, and tributyltin (TBT) in porewater, as well as total organic carbon (TOC), grain size, and moisture content. The chemistry data were compared to the DMMP interpretive criteria for marine open-water disposal (at the marine DMMP disposal sites) in Section 3.2.1 (DMMO 2010, 2011). Results are presented in Table 3.

Sediment samples HT-01 through HT-11 were collected with a hand trowel in nearshore areas at Log Boom Park, Tributary 0056, the WDFW boat launch, and Lyon Creek Park on November 7, 2012. Sediment samples SG-01, and SG-10 through SG-17 were collected using a grab sampler deployed from a sampling vessel on November 9, 2012, from the Harbour Village Marina, north and offshore of KIP, and the lower reaches of the Sammamish River. These samples were tested in accordance with the *Sediment Management Standards* (Ecology 1995) for metals, SVOCs, pesticides, PCBs, and dioxin and furans, as well as physical parameters, including TOC, grain size, and moisture content. TBT analysis was also conducted on bulk sediment at these locations. Data from these samples were compared to

the interim freshwater Sediment Quality Values (SQVs) in Section 3.22. These interim freshwater SQVs were developed by Ecology in 2003 (Ecology 2003) and adopted by the Regional Sediment Evaluation Team[1] in 2006 (USACE et al. 2006). The data and screening results are presented in Table 4.

Surface water samples, HT-01 and HT-04, and the background sample, WS-10, were collected on November 7, 2012. Water quality field parameters were measured on site (Table 2). Water samples were analyzed for total metals, dissolved metals, SVOCs, polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), total suspended solids (TSS), total dissolved solids, and hardness. The surface water results are summarized in Section 3.3. Surface water data are presented in Table 5.

[1] Consists of the USACE Northwestern Division (Portland, Seattle and Walla Walla Districts), National Marine Fisheries Service, U. S. Fish and Wildlife Service, U.S. Environmental Protection Agency Region 10, Oregon Department of Environmental Quality, Ecology, Washington Department of Natural Resources, and the Idaho Department of Environmental Quality.

2 SAMPLE COLLECTION AND HANDLING

This section provides an overview of the sample collection and handling procedures. The methods and procedures described herein were followed by Anchor QEA and their subcontractors during the November 2012 data collection activities. Detailed descriptions are found in the SAP (Anchor QEA 2012).

2.1 Sediment Collection Procedures

Sediment samples SG-02 through SG-17 were collected from the Kenmore Navigation Channel and other submerged areas (Harbour Village Marina, North Lake Marina, etc.) using a power grab sampler from a vessel equipped with differential global positioning system (DGPS) and a depth sounder. Samples from the navigation channel and in North Lake Marina were collected to the maximum penetration possible (target 25 centimeter [cm] below mudline) to better represent deeper sediment that could be removed during dredging. Samples from other submerged areas were collected from the top 10 cm to represent the biologically active zone, consistent with guidance in Ecology's *Sediment Sampling and Analysis Plan Appendix* (SAPA; Ecology 2008). Prior to deployment at each station, the power grab sampler was decontaminated, and upon retrieval, samples were evaluated for compliance with the acceptance criteria described in the SAP (Anchor QEA 2012). If an acceptable sample was collected, sediment from the appropriate interval was collected and homogenized in a stainless steel bowl prior to being placed into sample containers.

Sediment samples HT-01 through HT-11 were collected from Log Boom Park, Tributary 0056, the WDFW boat launch, and Lyon Creek Park using a hand trowel from shallow submerged sediment areas. Sediments were collected as close as possible to the target coordinates in order to collect fine-grained material (to the extent available) that represent areas where people are likely to come in contact with the sediment. Sample HT-10 at Lake Forest Park was collected from an exposed area due to the low lake level. During collection with the hand trowel, care was taken to prevent resuspension of sediment prior to and during sampling. Hand collected samples were homogenized in a stainless steel bowl prior to being placed into sample containers.

Sediment collection information recorded in the field, including water depth, recovery depth, coordinates, and sample interval, are shown in Table 1. Sediment samples were placed in a cooler with ice and delivered to ARI within 24 hours of collection. Chain-of-custody forms and daily logs are provided in Appendix A.

2.2 Surface Water Collection Procedures

Water quality parameters were measured in the field using a multi-probe water quality meter (e.g., YSI) prior to collecting a water sample. The water quality meter was lowered approximately 1 foot below the surface and was allowed to equilibrate before taking measurements of turbidity, conductivity, temperature, dissolved oxygen, and pH. Water quality field parameters, including temperature, pH, conductivity, turbidity, and dissolved oxygen (DO), that were recorded in the field are provided in Table 2. Chain-of-custody forms are provided in Appendix A.

Water samples were collected according to Ecology's Standard Operating Procedure guidance (Ecology 2006), which is consistent with the protocols of the Beach Environmental Assessment, Communication, and Health (BEACH) program (Schneider 2004). Field personnel waded into knee-deep water (approximately 2.5 feet) and collected a water sample by hand with a dipper attached to an extension rod. Samples were collected to a depth of at least 6 inches below the surface (Ecology 2006). The background location sample was collected from the boat on the same day as the shoreline water samples, using the same methods. Water samples were placed in a cooler with ice and were shipped or delivered to the laboratory within 24 hours of collection.

2.3 Deviation from the Sampling and Analysis Plan

Deviations from the SAP (Anchor QEA 2012) were limited to the movement of several target sample stations. These changes are summarized below:

- Station HT-07 was moved upstream, above the weir within tributary 0056, as directed by Maura O'Brien (Ecology).
- Station SG-01 was moved 85 feet to the northwest of the target location to locate the sample within the middle of the navigation channel.

- Station SG-04 was moved 50 feet to the northeast of the target location due to refusal encountered at the target location.
- Station SG-16 was moved 50 feet to the southwest of the target location at the request of Maura O'Brien (Ecology) to be closer to the former KIP outfall.

3 CHEMICAL TESTING RESULTS

Chemical analysis requirements for sediment and surface water samples are summarized in the Ecology-approved SAP (Anchor QEA 2012). As described in the SAP, all chemical analyses were performed by Analytical Resources, Inc. (ARI), in Tukwila, Washington. All samples were preserved in accordance with the analytical method and stored at a temperature of 4 degrees Celsius (°C).

3.1 Summary of Data Quality/Validation Results

The following section describes the assessment and validation of analytical data reported by ARI. Complete data packages are presented in Appendix B. Data validation was performed by Anchor QEA and Laboratory Data Consultants (LDC). Validation reports are presented in Appendix C.

Chemical data were validated in accordance with the analytical methods and the following U.S. Environmental Protection Agency (USEPA) guidance:

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2004)
- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA 1999)
- *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA 2008)

As described in the SAP, Anchor QEA performed a Stage 2A level (USEPA 2009) data quality review (equivalent to a QA1 review), in accordance with USEPA National Functional Guidelines (Anchor QEA 2012; USEPA 2004, 2008) on all data except for dioxin and furans. Dioxin and furan data were validated at a Stage 4 level (USEPA 2009) by LDC, a third party validator, using the DQOs outlined by the DMMO (2010) and the SAPA (Ecology 2008). The data were validated in accordance with the project-specific DQOs, analytical method criteria, and the laboratory's internal performance standards based on their Standard Operating Procedures.

Anchor QEA determined that accuracy was acceptable as demonstrated by the surrogate, laboratory control sample (LCS)/laboratory control sample duplicate (LCSD), and matrix spike (MS)/matrix spike duplicate (MSD) percent recovery values, with the exceptions noted in the Data Validation Report (DVR; Appendix C). Precision was also acceptable as demonstrated by the laboratory duplicates, MS/MSD, and LCS/LCSD relative percent difference values, with the exceptions noted in the DVR (Appendix C). Most data were deemed acceptable as reported; all other data are acceptable as qualified.

LDC determined that dioxin and furan analysis was conducted within all specifications of the methods, and no results were rejected. Sample results were qualified as appropriate, based on the results of the LDC validation report (Appendix C). Sample results qualified as "estimated" (J) are usable as qualified. Based on the Stage 4 data validation, results are considered valid and useable for all purposes.

3.2 Sediment Chemistry Results

The remainder of this section summarizes the results of the chemical testing of sediment samples and the comparison of the data to DMMP interpretive criteria (DMMO 2010, 2011) or the interim freshwater SQVs (Ecology 2003; USACE et al. 2006). Ecology is currently in the process of amending the freshwater SQVs. Once they are approved and published, the SQVs will be applied to these results by Ecology. Sediment data results are presented in Tables 3 and 4.

3.2.1 DMMP Screening Level Characterization

This section summarizes the comparison of chemical results from the North Lake Marina and Kenmore Navigation Channel samples with the DMMP interpretive criteria for marine open-water disposal sites (DMMO 2010, 2011). The results for the full DMMP analyte list for sediment samples from stations SG-02 to SG-09 are presented in Table 3 and are summarized below.

In North Lake Marina, four chemicals exceeded one or two DMMP screening levels. The concentrations of benzoic acid, benzyl alcohol, and total dioxin and furan toxic equivalency (dioxin/furan TEQ) exceeded the DMMP Screening Level (SL) in both samples. Benzoic acid

was also above the DMMP Maximum Level (ML) in both samples. One sample exceeded the SL for TBT. Dioxin/furan was 20.3 and 37.0 nanograms per kilogram or parts per trillion (ng/kg) toxic equivalency (TEQ) for samples SG-02 and SG-03, respectively, which is above the ML.

In Kenmore Navigation Channel three chemicals exceeded DMMP screening levels. Specifically, benzyl alcohol exceeded the SL at five of the six locations. Two of those locations exceeded the ML for benzoic acid. Dioxin/furan ranged from 1.5 to 8.4 ng/kg TEQ and was above the SL in four of the six locations.

In general, chlorinated hydrocarbons and pesticides were not detected in any of the samples, and the frequency of detection of phthalates, phenols, and PCB Aroclors was relatively low. Concentrations of PAHs and metals were below the DMMP criteria.

These preliminary screening results will inform future dredge planning. A full dredge material characterization will be required to evaluate for suitability of open-water disposal. This testing will be based on collection and testing of sediment cores and may include bioassay testing, if required.

3.2.2 Sediment Comparison to the Interim Freshwater Screening Levels

This section summarizes the results of the comparison of sediment data with the interim freshwater SQVs (Ecology 2003; USACE et al. 2006). Table 4 presents the results for shoreline sediment samples from stations HT-01 through HT-11, grab samples from stations SG-01 and SG-10 through SG-17, as well as the DMMP screening level characterization samples from stations SG-02 through SG-09, compared to the SQVs[2].

3.2.2.1 Shoreline Sediment Samples

Shoreline sediment samples were collected by hand trowel from 11 stations at Log Boom Park (five locations), Tributary 0056 (two locations), the WDFW boat launch (two locations), and at Lyon Creek Park (two locations). Concentrations were measured above SQVs for copper, bis(2ethylhexyl)phthalate, and dimethyl phthalate in individual samples. PAHs were detected

[2] SQVs are established for most parameters tested as part of this investigation, but not all.

at all of the shoreline stations, but were below the freshwater SQVs. The frequency of detection was low for chlorinated hydrocarbons, phenols, the miscellaneous extractables, and PCB Aroclors. Pesticides were not detected, where analyzed. Specific results for each location are described below.

3.2.2.1.1 Log Boom Park

In the five samples collected at Log Boom Park, concentrations exceeded the interim freshwater Screening Level 2 (SL2) for bis(2ethylhexyl)phthalate in HT-04 and for the interim freshwater Screening Level 1 (SL1) for copper in HT-05. No other concentrations exceeded SQVs in any other Log Boom Park samples. PCBs were non-detect in samples HT-01, HT-02, HG-03, and HT-05, and were below SQVs in HT-04. The dioxin/furan concentration was highest in sample HT-04, at 7.9 ng/kg TEQ, with samples HT-01, HT-02, HT-03, and HT-05 below 2.17 ng/kg TEQ.

3.2.2.1.2 Tributary 0056

Of the two samples collected at Tributary 0056, located north of Log Boom Park, no concentrations exceeded SQVs. PCBs were non-detect in each sample. The dioxin/furan concentration was less than 1.33 ng/kg TEQ in each sample.

3.2.2.1.3 WDFW Boat Launch

Of the two samples collected at the WDFW boat launch, dimethyl phthalate exceeded SQVs in both samples (above SL1 for HT-08 and SL2 for HT-09). PCBs were non-detect, and the dioxin/furan concentration was less than 1.35 ng/kg TEQ in each sample.

3.2.2.1.4 Lyon Creek Park

Of the two samples collected at Lyon Creek Park, no concentrations exceeded SQVs. PCBs were non-detect, and the dioxin/furan concentration was less than 0.52 ng/kg TEQ in each sample.

3.2.2.2 Surface Sediment Grab Samples

Surface sediment samples (0 to 10 cm) were collected at nine stations from the Sammamish River, Harbour Village Marina, north of KIP, and KIP shoreline. Concentrations were measured above SQVs for lead, zinc, bis(2ethylhexyl)phthalate, di-n-octyl phthalate, and benzo(b,j,k)fluoranthenes in individual samples. The frequency of detection was low for miscellaneous extractables, pesticides, and PCB Aroclors. Chlorinated hydrocarbons were not detected. Specific results for each location are described below.

3.2.2.2.1 Sammamish River

Three samples were collected from the lower reaches of the Sammamish River, two of which are located adjacent to KIP. No concentrations exceeded SQVs in sample locations SG-01, SG-16, and SG-17. PCBs were non-detect, and the dioxin/furan concentration ranged from 0.35 to 2.30 ng/kg TEQ.

3.2.2.2.2 Harbour Village Marina

Of the four samples and a duplicate sample collected at the Harbour Village Marina, five chemicals exceeded one or more screening levels: copper, zinc, two phthalates, and dioxin/furans. The SL1 was exceeded for lead and zinc in sample SG-11, and for zinc in SG-12 and SG-13. Bis(2ethylhexyl) phthalate exceeded SL2 in each sample, and di-n-octyl phthalate exceeded SL2 in SG-11 and SG-13. PCBs and pesticides were low or non-detect in each sample. The dioxin/furan concentration was lowest in sample SG-10 (6.6 ng/kg TEQ), but higher in sample SG-12 (26.6 ng/kg TEQ), SG-13 (50 ng/kg TEQ and 19 ng/kg TEQ in duplicate samples), and SG-11 (71 ng/kg TEQ).

3.2.2.2.3 North of Kenmore Industrial Park

One sample was collected north of KIP, beyond the end of the navigation channel. Copper, zinc, benzo(b,j,k)fluoranthenes, and bis(2ethylhexyl)phthalate exceeded the SL1 in sample SG-14. PCBs were detected slightly above the detection limit (20 micrograms per kilogram [µg/kg]). The dioxin/furan concentration was 10.1 ng/kg TEQ.

3.2.2.2.4 Kenmore Industrial Park Shoreline

Three samples were collected along KIP: one along the west shoreline and two along the south side. No concentrations exceeded SQVs in samples SG-15, SG-16, or SG-17 collected along the KIP shoreline. PCBs were non-detect, and the dioxin/furan concentration was below 2.3 ng/kg TEQ.

3.2.2.3 DMMP Screening Level Characterization Samples

Results of DMMP screening level sediment samples are presented in Section 3.2.1 and the DMMP interpretive criteria in Table 3. These results are compared to SQVs in Table 4.

Two samples were collected in North Lake Marina, and concentrations of cadmium, chromium, and zinc exceeded SL1 in both samples (SG-02 and SG-03). Concentrations exceeded SL2 for bis(2ethylhexyl)phthalate in both samples, for di-n-octyl phthalate in SG-03, and for total PCBs in SG-02. Dioxin/furan concentrations were 20.3 and 37 ng/kg TEQ.

In the Kenmore Navigation Channel, six samples were collected for DMMP characterization from 20 to 25 cm depth. Five chemicals were detected above one or more screening levels. Zinc exceeded SL1 in samples SG-05 and SG-06. Bis(2ethylhexyl)phthalate exceeded SL1 in samples SG-05, SG-08, and SG-09 and SL2 in samples SG-06 and SG-07. Di-n-octyl phthalate also exceeded SL1 in sample SG-06. Dioxin/furan concentrations ranged from 1.5 to 8.4 ng/kg TEQ. Concentrations of all other chemicals were below SQV criteria.

3.3 Surface Water Results

Chemical concentrations in surface water samples were low in the two Log Boom Park samples and in the reference sample. Results for PAHs, chlorinated hydrocarbons, phthalates, and miscellaneous extractables were all non-detect. Chemical concentrations in the Log Boom Park samples were similar to the reference sample concentrations.

4 CONCLUSIONS

The conclusions of the comparison of the sediment data to the DMMP interpretive criteria (DMMO 2010, 2011) or the interim freshwater SQVs (Ecology 2003; USACE et al. 2006) are summarized below.

4.1 DMMP Screening Level Characterization Samples

4.1.1 Kenmore Navigation Channel

Concentrations of benzoic acid and benzyl alcohol were above DMMP criteria for marine open water disposal. However, as allowed according to DMMP guidance, bioassay testing could be conducted on site sediment as part of a full DMMP characterization to determine if dredged sediment is suitable for open-water disposal.

The dioxin/furan TEQ exceeded the DMMP criteria in some samples. However, suitability for open-water disposal would be determined based on the volume-weighted average of dredged sediment using data collected as part of a full DMMP characterization.

A full DMMP characterization would be necessary to determine suitability for marine open-water disposal closer to when dredging would occur.

4.1.2 North Lake Marina

Concentrations of benzoic acid and benzyl alcohol were above DMMP criteria. However, as allowed according to DMMP guidance, bioassay testing could be conducted on site sediment as part of a full DMMP characterization to determine if dredged sediment is suitable for open-water disposal.

The dioxin/furan TEQ exceeded the ML DMMP criteria in both samples, which could influence suitability of open-water disposal, pending completion of a full DMMP characterization.

A full DMMP characterization would be necessary to determine suitability for open-water disposal closer to when dredging would occur.

4.2 Shoreline Areas

4.2.1 Log Boom Park

Sediment concentrations were below all SQVs in most samples, with bis(2ethylhexyl)phthalate above SL2 in HT-04 and copper above SL1 in HT-05. Water concentrations were similar to background concentrations. These results will be evaluated as part of future work to be conducted by DOH to develop a health consultation.

4.2.2 Kenmore Industrial Park

No concentrations exceeded SQVs along both the Lake Washington and the Sammamish River KIP shorelines. PCBs were non-detect, and the dioxin/furan concentration was below 2.3 ng/kg TEQ. These results will be evaluated as part of future work to be conducted by DOH to develop a health consultation.

4.3 Other Areas

Concentrations exceeded SQVs for total PCBs, benzo(b,j,k)fluoranthenes, bis(2ethylhexyl)phthalate, di-n-octyl phthalate, cadmium, copper, zinc, at one or more locations at Harbour Village Marina, the WDFW boat launch, and north of KIP. Dioxin/furan concentrations were higher at Harbour Village Marina and North Lake Marina than testing results from other areas, which will be evaluated by Ecology along with other results to determine next steps for further evaluation, if needed.

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TABLES

Table 1
Sediment Grab Observation Summary

Station ID	Date Collected	Water Depth (feet)	Recovery Depth (cm)	Coordinates		Sample Interval (cm)	Sediment Observations					Grab Quality Notes, Number of Attempts
				Northing	Easting		Sediment Type	Biota	Organic Matter/Debris	Odor	Sheen	
HT-01	11/6/2012	0.5	10	279602	1288090	0-10	Gravely SAND	Trace shells	Trace surface organic matter	None	None	Hand collected
HT-02	11/6/2012	0.8	10	279590	1288199	0-10	Fine-SAND, trace silt	Trace shells	Trace organic matter, with woody debris streaking	None	None	Hand collected
HT-03	11/6/2012	0.8	10	279505	1288473	0-10	Silty fine-SAND	None	Woody streak at 2 inches	Slight H_2S	None	Hand collected
HT-04	11/6/2012	0.5	10	279422	1288684	0-10	Clayey SILT	None	Substantial loose woody debris	None	None	Hand collected
HT-05	11/6/2012	1 -1.5	10	279265	1288694	0-10	Gravely SAND	Trace clams and worms	Trace woody debris	None	None	Hand collected
HT-06	11/6/2012	0.2	10	279241	1288812	0-10	Silty fine-SAND with trace clay	None	Trace aquatic plant roots and leaves and woody debris	None	None	Hand collected
HT-07	11/6/2012	0.2	10	279734	1289089	0-10	Pebbly, medium-coarse silty SAND	None	Trace woody debris and organic matter	None	None	Hand collected near edges of stream
HT-08	11/6/2012	0.5	10	278405	1291778	0-10	Gray silty fine-SAND	Trace shells	Trace organic woody debris	None	None	Hand collected
HT-09	11/6/2012	0.5	10	278377	1291935	0-10	Fine-sandy SILT, few pebbles and trace clay	None	None	None	None	Hand collected
HT-10	11/6/2012	Dry	10	277892	1285959	0-10	Gray medium-SAND, trace fines and gravel	Trace shells	None	None	None	Hand collected
HT-11	11/6/2012	1-1.5	10	277815	1286028	0-10	Gray medium-coarse-SAND, with gravel and trace fines	Trace shells	None	None	None	Hand collected
SG-01	11/7/2012	3.0	20.5	277963	1289407	0-10	Gray fine-SAND with trace medium-sand and silt	Trace clams	None	None	None	Good grab, station moved to navigation channel
SG-02	11/8/2012	4.5	22	279179	1289549	0-22	Very soft SILT	40% plant cover	Trace organic matter	None	Trace	First grab accepted
SG-03	11/8/2012	4.6	25	279174	1289661	0-25	Soft SILT, trace fine sand at bottom 5 cm	Trace shells	Trace leaves and sticks	None	Trace	First grab accepted
SG-04	11/8/2012	20.4	20	279139	1290268	0-15	Gravely SAND to 15 cm with large gravel below	None	Trace organic matter, sticks, roots	None	None	First grab with rocks in jaw, second grab accepted
SG-05	11/8/2012	17.4	23.5	278907	1289917	0-23	Soft SILT, trace fine sand	None	Moderate organic matter	None	None	First grab overpenetrated, second grab accepted
SG-06	11/8/2012	17.7	25	278711	1289558	0-25	Moderately stiff SILT with trace clay	Trace worms	Moderate organic matter, with 20% woody debris in bottom 3 cm	None	None	First grab insufficient recovery, second grab accepted
SG-07	11/8/2012	16.9	27	278254	1289072	0-25	Soft SILT with lenses of sand	None	15% surface wood, High pulp-like organic matter at 20 to 25 cm	None	None	First grab accepted
SG-08	11/8/2012	16.1	26	277764	1288689	0-25	Silty fine-SAND	None	Substantial organics	None	None	First grab accepted
SG-09	11/8/2012	18.4	26.5	277396	1288456	0-25	SILT and trace silty fine-sand	None	Trace organic debris	None	None	First grab accepted
SG-10	11/7/2012	4.6	26	279175	1288815	0-10	Fine sandy SILT with coarse-sand below 10 cm	None	Aquatic plants at surface, moderate arganic matter with streaks of woody debris	None	None	First grab accepted
SG-11	11/7/2012	4.8	28.5	279159	1289048	0-10	Soft SILT	None	Trace macrophytes on surface, trace organic matter	None	Slight	First grab overpenetrated, second grab accepted

Table 1
Sediment Grab Observation Summary

Station ID	Date Collected	Water Depth (feet)	Recovery Depth (cm)	Coordinates		Sample Interval (cm)	Sediment Observations					Grab Quality Notes, Number of Attempts
				Northing	Easting		Sediment Type	Biota	Organic Matter/Debris	Odor	Sheen	
SG-12	11/7/2012	8.1	19	278974	1288780	0-10	Soft SILT	Worms	Moderate organic matter, with lens of woody material	None	None	First grab accepted
SG-13	11/7/2012	8.1	24	278858	1289306	0-10	SILT	None	Trace organics and woody debris	None	None	First grab accepted
SG-14	11/7/2012	17.2	19	279416	1290608	0-10	Slightly sandy SILT	None	Moderate organic matter	None	Slight	First grab accepted
SG-15	11/7/2012	1.9	23	278643	1290067	0-10	Slighty silty fine-SAND	Trace shells and worms	Trace woody debris	None	None	First grab accepted
SG-16	11/7/2012	10.4	21	278308	1290504	0-10	Fine-SAND	None	Trace wood fragments	None	None	First grab accepted
SG-17	11/7/2012	4.4	23.5	278642	1291535	0-10	SILT to 6 cm with soft clay below	Trace clams	Surface with abundant leaves, organic matter	None	None	First grab accepted

Notes:
Predominant sediment type displayed in ALL CAPS.
cm = centimeter
H_2S = hydrogen sulfide
ID = identification

Table 2
Water Quality Sample Collection Summary

Station ID	Location	Date Collected	Time	Water Depth (feet)	Coordinates		Sample Depth (feet)	Field Parameters					Comments
					Northing	Easting		Temperature (°C)	pH	Conductivity (mS/cm)	Turbidity (NTU)	DO (mg/L)	
HT-01	Log Boom Park Shoreline	11/7/2012	15:46	1.8	279602	1288090	1	12.5	7.69	0.148	5.78	9.06	Tannin color, moderately turbid
HT-04	Log Boom Park Shoreline	11/7/2012	16:15	2.0	279590	1288199	0.5-1	12.39	7.51	0.142	5.46	8.28	Tannin color, water sample collected from shoreward end of dock
WS-10	Reference	11/7/2012	14:50	9.6	278267	1287851	3	12.68	7.91	0.145	0.78	11.63	Moderately turbid, few floating macrophytes

Notes:
°C = degrees Celsius
DO = dissolved oxygen
ID = identification
mg/L = milligrams per liter
mS/cm = millisiemens per centimeter
NTU = Nephelometric Turbidity Unit

Table 3
Sediment Results Compared to DMMP Criteria from Kenmore Navigation Channel and North Lake Marina

			Location ID	SG-02	SG-03	SG-04	SG-05	SG-06	SG-07	SG-07	SG-08	SG-09
			Location	North Lake Marina		Kenmore Navigation Channel						
			Sample ID	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108
			Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
			Sample Interval	0-22 cm	0-25 cm	0-15 cm	0-23 cm	0-25 cm	0-25 cm	0-25 cm	0-25 cm	0-25 cm
	DMMP SL	DMMP BT	DMMP ML									
Conventional Parameters (%)												
Total organic carbon	--	--	--	**7.12**	**6.60**	**2.73**	**5.43**	**4.89**	**4.95**	**7.07**	**3.30**	**5.22**
Total solids	--	--	--	**25.7**	**25.6**	**80.8**	**35.0**	**29.9**	**33.7**	**34.3**	**42.0**	**35.7**
Total volatile solids	--	--	--	**13.51**	**15.15**	**1.72**	**11.13**	**13.89**	**13.40**	**14.11**	**9.10**	**10.58**
Gravel	--	--	--	**0.4**	**11.8**	**71.4**	**3.1**	0.1 U	**0.5**	**2.6**	**0.3**	**0.1**
Sand, Very Coarse	--	--	--	**6.5**	**9.2**	**7.6**	**2.9**	**7.4**	**2.7**	**2.7**	**1.5**	**2.1**
Sand, Coarse	--	--	--	**5.5**	**7.2**	**6.9**	**5.3**	**6.6**	**3.1**	**2.8**	**1.5**	**1.7**
Sand, Medium	--	--	--	**5.5**	**7.2**	**7.6**	**11.1**	**6.2**	**6.3**	**6.0**	**3.9**	**6.9**
Sand, Fine	--	--	--	**7.2**	**7.8**	**2.9**	**14.3**	**8.6**	**24.4**	**21.9**	**22.2**	**15.9**
Sand, Very Fine	--	--	--	**9.1**	**10.1**	**1.0**	**15.2**	**15.9**	**18.9**	**18.6**	**21.2**	**13.4**
Fines (silt + clay)	--	--	--	**65.8**	**46.7**	**2.5**	**48.1**	**55.2**	**44.1**	**45.4**	**49.3**	**59.7**
Silt, Coarse	--	--	--	**10.0**	**13.1**	**--**	**7.7**	**8.6**	**11.0**	**13.7**	**13.0**	**19.7**
Silt, Medium	--	--	--	**19.3**	**8.4**	**--**	**16.0**	**15.5**	**12.1**	**11.0**	**13.7**	**12.9**
Silt, Fine	--	--	--	**15.2**	**10.9**	**--**	**9.9**	**12.1**	**7.9**	**7.6**	**8.4**	**10.9**
Silt, Very Fine	--	--	--	**11.1**	**7.0**	**--**	**7.1**	**7.8**	**5.9**	**6.1**	**6.3**	**7.6**
Clay, Coarse	--	--	--	**5.6**	**4.5**	**--**	**4.3**	**6.3**	**3.8**	**3.9**	**3.9**	**4.7**
Clay, Medium	--	--	--	**3.2**	**1.8**	**--**	**1.9**	**3.2**	**2.5**	**2.1**	**2.6**	**2.6**
Clay, Fine	--	--	--	**1.4**	**1.1**	**--**	**1.3**	**1.6**	**0.9**	**0.9**	**1.4**	**1.3**
Metals (mg/kg)												
Antimony	150	--	200	20 U	20 U	6 U	10 U	20 U	10 U	10 U	10 U	10 U
Arsenic	57	507.1	700	20 U	20 U	6 U	10 U	20 U	10 U	10 U	10 U	10 U
Cadmium	5.1	11.3	14	**1.3**	**1.2**	**0.3**	**0.7**	**0.8**	**0.6**	**0.6**	**0.6**	**0.6**
Chromium	260	260	--	**56**	**55**	**35**	**43**	**57**	**41**	**44**	**44**	**48**
Copper	390	1027	1300	**92.4**	**88.1**	**14.6**	**35.6**	**43.6**	**30**	**28.7**	**28**	**31.1**
Lead	450	975	1200	**62**	**42**	**5**	**28**	**31**	**21**	**21**	**21**	**24**
Mercury	0.41	1.5	2.3	**0.18**	**0.1**	0.02 U	**0.08**	**0.1**	**0.11**	**0.08**	**0.07**	**0.08**
Nickel	--	--	--	**48**	**45**	**30**	**39**	**46**	**41**	**42**	**40**	**43**
Selenium	--	3	--	2 U	2 U	0.6 U	1 U	2 U	1 U	1 U	1 U	1 U
Silver	6.1	6.1	8.4	1 U	1 U	0.4 U	0.9 U	1 U	0.9 U	0.8 U	0.7 U	0.9 U
Zinc	410	2783	3800	**231**	**267**	**49**	**143**	**164**	**126**	**123**	**113**	**130**
Organometallic Compounds (µg/L)												
Tributyltin (porewater)	0.15	0.15	--	**0.67**	**0.058**	**0.049**	**0.008**	**0.023**	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Polycyclic Aromatic Hydrocarbons (µg/kg)												
1-Methylnaphthalene	--	--	--	**21**	**9.8 J**	20 U	**13 J**	20 U	20 U	19 U	**9.6 J**	20 U
2-Methylnaphthalene	670	--	1900	**31**	**25**	20 U	**26**	**14 J**	20 U	19 U	19 U	20 U
Acenaphthene	500	--	2000	**320**	**33**	**14 J**	**26**	**17 J**	20 U	19 U	19 U	20 U
Acenaphthylene	560	--	1300	**22**	**16 J**	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Anthracene	960	--	13000	**66**	**68**	**26**	**39**	**28**	**18 J**	19 U	19 U	20 U
Benzo(a)anthracene	1300	--	5100	**210**	**190**	**81**	**110**	**110**	**110**	**52**	**42**	**40**
Benzo(a)pyrene	1600	--	3600	**190**	**160**	**62**	**76**	**120**	**63**	**55**	**50**	**45**
Benzo(g,h,i)perylene	670	--	3200	**170**	**130**	**43**	**63**	**93**	**36**	**41**	**41**	**36**
Chrysene	1400	--	21000	**440**	**340**	**110**	**190**	**190**	**140**	**82**	**73**	**72**
Dibenzo(a,h)anthracene	230	--	1900	**67**	**55**	**15 J**	**21**	**37**	**17 J**	**12 J**	**11 J**	**13 J**
Fluoranthene	1700	4600	30000	**480**	**410**	**220**	**310**	**290**	**150**	**140**	**130**	**120**
Fluorene	540	--	3600	**98**	**46**	**14 J**	**37**	**28**	**12 J**	**9.7 J**	19 U	20 U
Indeno(1,2,3-c,d)pyrene	600	--	4400	**140**	**110**	**39**	**51**	**81**	**33**	**38**	**36**	**33**
Naphthalene	2100	--	2400	**83**	**58**	20 U	**50**	**38**	**18 J**	**25**	**14 J**	**24**
Phenanthrene	1500	--	21000	**170**	**190**	**140**	**180**	**140**	**72**	**68**	**64**	**59**
Pyrene	2600	11980	16000	**590**	**440**	**190**	**300**	**290**	**140**	**130**	**120**	**120**
Total Benzofluoranthenes (b,j,k) (U = 0)	3200	--	9900	**530**	**420**	**140**	**220**	**300**	**170**	**140**	**120**	**120**
Total LPAH (DMMP) (U = 0)	5200	--	29000	**760**	**410 J**	**190 J**	**330**	**250 J**	**120 J**	**103 J**	**78 J**	**83**

Table 3
Sediment Results Compared to DMMP Criteria from Kenmore Navigation Channel and North Lake Marina

			Location ID	SG-02	SG-03	SG-04	SG-05	SG-06	SG-07	SG-07	SG-08	SG-09
			Location	North Lake Marina		Kenmore Navigation Channel						
			Sample ID	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108
			Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
			Sample Interval	0-22 cm	0-25 cm	0-15 cm	0-23 cm	0-25 cm	0-25 cm	0-25 cm	0-25 cm	0-25 cm
	DMMP SL	DMMP BT	DMMP ML									
Total HPAH (DMMP) (U = 0)	12000	--	69000	**2820**	**2260**	**900 J**	**1340**	**1510**	**860 J**	**690 J**	**620 J**	**600 J**
Chlorinated Hydrocarbons (µg/kg)												
1,2,4-Trichlorobenzene	31	--	64	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
1,2-Dichlorobenzene	35	--	110	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
1,3-Dichlorobenzene	--	--	--	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
1,4-Dichlorobenzene	110	--	120	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Hexachlorobenzene	22	168	230	4.9 U	4.9 U	4.9 U	5.0 U	4.8 U	4.9 U	4.8 U	4.8 U	4.8 U
Hexachloroethane	--	--	--	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Phthalates (µg/kg)												
Bis(2-ethylhexyl)phthalate	1300	--	8300	**680**	**510**	62 U	**260**	**540**	**330**	**300**	**240**	**240**
Butylbenzyl phthalate	63	--	970	**32**	**32**	20 U	20 U	**57**	**28**	19 U	**36**	**29**
Diethyl phthalate	200	--	1200	49 U	**38 J**	49 U	49 U	**58**	49 U	48 U	48 U	49 U
Dimethyl phthalate	71	--	1400	**28**	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Di-n-butyl phthalate	1400	--	5100	19 U	**9.8 J**	20 U	20 U	20 U	20 U	**12 J**	19 U	20 U
Di-n-octyl phthalate	6200	--	6200	19 U	**58 J**	20 U	**22 J**	**41 J**	**22 J**	19 U	19 U	20 U
Phenols (µg/kg)												
2,4-Dimethylphenol	29	--	210	19 UJ	20 UJ	20 UJ	20 UJ	20 UJ	20 UJ	19 UJ	19 UJ	20 UJ
2-Methylphenol (o-Cresol)	63	--	77	19 U	20 U	20 UJ	20 U	20 U	20 U	19 U	19 U	20 U
4-Methylphenol (p-Cresol)	670	--	3600	**74**	**76**	39 U	**74**	**91**	**54**	**31 J**	**22 J**	**36 J**
Pentachlorophenol	400	504	690	190 U	200 U	200 U	200 U	200 U	200 U	190 U	190 U	200 U
Phenol	420	--	1200	19 U	**110**	20 U	**180**	**80**	**42**	**42**	**19**	**39**
Miscellaneous Extractables (µg/kg)												
Benzoic acid	650	--	760	**960**	**1300**	390 U	**1300**	**1100**	**430**	**480**	**300 J**	**510**
Benzyl alcohol	57	--	870	**82**	**130**	20 U	**160**	**190**	**120**	**100**	**61**	**110**
Dibenzofuran	540	--	1700	**30**	**35**	20 U	**28**	20 U	20 U	19 U	19 U	20 U
N-Nitrosodiphenylamine	28	--	130	19 U	20 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U
Pesticides (µg/kg)												
4,4'-DDD (p,p'-DDD)	16	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
4,4'-DDE (p,p'-DDE)	9	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U	1.7 U	1.6 U	1.6 U	1.6 U
4,4'-DDT (p,p'-DDT)	12	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
Aldrin	9.5	--	--	0.64 U	0.64 U	0.64 U	0.65 U	0.63 U	0.64 U	0.63 U	0.63 U	0.63 U
Chlordane, alpha- (cis-Chlordane)	--	--	--	0.83 U	0.83 U	0.83 U	0.84 U	0.82 U	0.83 U	0.81 U	0.81 U	0.81 U
Chlordane, beta- (trans-Chlordane)	--	--	--	0.78 U	0.78 U	0.77 U	0.79 U	0.77 U	0.78 U	0.76 U	0.76 U	0.76 U
Dieldrin	1.9	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U	1.7 U	1.6 U	1.6 U	1.6 U
Heptachlor	1.5	--	--	0.64 U	0.64 U	0.64 U	0.65 U	0.63 U	0.64 U	0.63 U	0.63 UJ	0.63 U
Hexachlorobutadiene	11	--	270	4.9 U	4.9 U	4.9 U	5.0 U	4.8 U	4.9 U	4.8 U	4.8 U	4.8 U
Nonachlor, cis-	--	--	--	1.6 U	1.6 U	1.6 U	1.7 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Nonachlor, trans-	--	--	--	4.7 U	4.7 U	4.7 U	4.8 U	4.7 U	4.7 U	4.6 U	4.6 U	4.6 U
Oxychlordane	--	--	--	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.2 U	2.2 U	2.2 U
Sum 4,4' DDT, DDE, DDD (U = 0)	--	50	69	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U
Total Chlordane (U = 0)	2.8	37	--	4.7 U	4.7 U	4.7 U	4.8 U	4.7 U	4.7 U	4.6 U	4.6 U	4.6 U
PCB Aroclors (µg/kg)												
Aroclor 1016	--	--	--	19 U	19 U	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1221	--	--	--	19 U	19 U	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1232	--	--	--	19 U	19 U	20 U	29 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1242	--	--	--	19 U	19 U	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1248	--	--	--	58 U	38 U	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Aroclor 1254	--	--	--	**88**	48 U	20 U	29 U	28 U	19 U	**22**	18 U	20 U
Aroclor 1260	--	--	--	**33**	**22**	20 U	19 U	19 U	19 U	19 U	18 U	20 U
Total PCB Aroclors (U = 0)	130	--	3100	**121**	**22**	20 U	29 U	28 U	19 U	**22**	18 U	20 U

Table 3
Sediment Results Compared to DMMP Criteria from Kenmore Navigation Channel and North Lake Marina

			Location ID	SG-02	SG-03	SG-04	SG-05	SG-06	SG-07	SG-07	SG-08	SG-09
			Location	North Lake Marina		Kenmore Navigation Channel						
			Sample ID	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108
			Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
			Sample Interval	0-22 cm	0-25 cm	0-15 cm	0-23 cm	0-25 cm	0-25 cm	0-25 cm	0-25 cm	0-25 cm
	DMMP SL	DMMP BT	DMMP ML									
PCB Aroclors (mg/kg-OC)												
Total PCB Aroclors (U = 0)	--	38	--	**1.7**	**0.33**	0.73 U	0.53 U	0.57 U	0.38 U	**0.31**	0.55 U	0.38 U
Dioxin Furans (ng/kg)												
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**0.975 J**	**0.599 J**	**0.15 J**	**0.322 J**	**0.478 J**	**0.306 J**	**0.341 J**	**0.293 J**	**0.372 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**7.83**	**3.75**	**0.381 J**	**1.33**	**1.58**	**1.18**	**1.03**	**0.870 J**	**1.24**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**14.5**	**6.97**	**0.491 J**	**2.18**	**2.65**	**1.42 J**	**1.38 J**	**1.36 J**	**1.71 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**53.1**	**28.0**	**1.62 J**	**8.58**	**9.51**	**4.38**	**4.21**	**3.85**	**5.03**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**29.5**	**14.5**	**0.897 J**	**4.84**	**5.68**	**2.85**	**2.95**	**2.99**	**3.54**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**1020**	**610**	**40.5**	**184**	**237**	**85.5**	**82.7**	**88.5**	**103**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	--	**7420**	**4760**	**307**	**1540**	**2520**	**652**	**613**	**684**	**798**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	--	**14.9 J**	**9.77 J**	**1.13 J**	**4.22 J**	**4.89 J**	**4.25 J**	**3.82 J**	**3.33 J**	**4.12 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	--	**43.9**	**26.5**	**2.51 J**	**9.38 J**	**9.24 J**	**8.33 J**	**7.29 J**	**6.12 J**	**7.92 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	--	**334**	**206**	**16.1**	**60.4**	**70.1**	**31.4 J**	**30.2 J**	**27.2 J**	**35.0 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	--	**2260**	**1620**	**134**	**473**	**803**	**167**	**155**	**160**	**191**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	--	**3.37**	**2.13**	**0.173 J**	**0.841 J**	**0.967 J**	**0.643 J**	**0.579 J**	**0.553 J**	**0.784 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**3.04**	**1.71 J**	**0.164 J**	**0.684 J**	**0.746 J**	**0.442 J**	**0.466 J**	**0.409 J**	**0.577 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	--	**3.27**	**1.86**	**0.128 J**	**0.785 J**	**0.826 J**	**0.452 J**	**0.556 J**	**0.540 J**	**0.573 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**8.04**	**4.83**	**0.289 J**	**1.74 J**	**1.90 J**	**1.20 J**	**1.05 J**	**1.30 J**	**1.43 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**8.28**	**4.02**	**0.261 J**	**1.45 J**	**1.64 J**	**0.989 J**	**0.958 J**	**0.964 J**	**1.23 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	--	**3.12**	**1.8 J**	**0.185 J**	**0.751 J**	**0.846 J**	**0.386 J**	**0.411 J**	**0.366 J**	**0.497 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	--	**11.7**	**6.21**	**0.361 J**	**2.14**	**2.55**	**1.40 J**	**1.34 J**	**1.37 J**	**1.74 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	--	**137**	**84.1**	**4.39**	**25.4**	**31.3**	**14.6**	**14.6**	**18.7**	**17.7**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	--	**7.34**	**4.63**	**0.315 J**	**1.63 J**	**1.98 J**	**1.06 J**	**1.14 J**	**1.83 J**	**1.33 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	--	**366**	**272**	**10.8**	**71.9**	**108**	**40.9**	**39.5**	**66.0**	**46.6**
Total Tetrachlorodibenzofuran (TCDF)	--	--	--	**55.5 J**	**32.2 J**	**2.12 J**	**13.8 J**	**15.5 J**	**11.1 J**	**10.3 J**	**9.21 J**	**12.2 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	--	**119**	**59.4 J**	**3.51 J**	**22.5 J**	**24.5 J**	**14.8 J**	**14.2 J**	**12.8 J**	**17.1 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	--	**240**	**136 J**	**7.38 J**	**45.2**	**51.1 J**	**25.8 J**	**25.6**	**25.7 J**	**30.6 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	--	**404**	**273**	**13.1 J**	**79.2**	**104**	**43.8**	**43.3**	**57.2 J**	**52.8 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	4 - 10[a]	--	10	**37.0 J**	**20.3 J**	**1.6 J**	**6.8 J**	**8.4 J**	**4.2 J**	**4.0 J**	**3.9 J**	**4.9 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	4 - 10[a]	--	10	**37.0 J**	**20.3 J**	**1.6 J**	**6.8 J**	**8.4 J**	**4.2 J**	**4.0 J**	**3.9 J**	**4.9 J**

Notes:

a Non-dispersive Screening Levels. DMMUs with dioxin concentrations below 10 ng/kg TEQ will be allowed for open-water disposal as long as the volume-weighted average concentration of dioxins in material from the entire dredging project does not exceed the Disposal Site Management Objective of 4 ng/kg TEQ

Detected concentration is greater than DMMP Marine SL (screening level)

Detected concentration is greater than DMMP Marine BT (bioaccumulation trigger)

Detected concentration is greater than DMMP Marine ML (maximum level)

All non-detect pesticides and dioxin/furan data were reported at the **method detection limit**; all other non-detect data were reported at the **reporting limit**. Non-detect exceedances are not highlighted.

Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest reporting limit value is reported as the sum.

Totals are calculated as the sum of all detected results and 1/2 the undetected reporting limit (U=1/2). If all results are not detected, the highest reporting limit value is reported as the sum.

Total LPAH (Low PAH) are the total of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, and Anthracene. 2-Methylnapthalene is not included in the sum of LPAHs.

Total HPAH (High PAH) are the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene.

Sum 4,4' DDT, DDE, DDD consists of the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.

Total Chlordane includes alpha-chlordane (cis-chlordane), beta-chlordane (trans-chlordane), cis-nonaclor, trans-nonaclor, and oxychlordane.

Total DMMP PCB Aroclors is the total of all PCB Aroclors listed in this table.

Dioxin/Furan Toxicity Equivalency (TEQ) values as of 2005, World Health Organization.

USEPA Stage 2A validation was performed by Anchor QEA on all compounds, except dioxin/furans.

USEPA Stage 4 validation was performed by LDC on dioxin/furans.

Bold = Detected result

-- = results not reported or not applicable

% = percent
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
BT = bioaccumulation trigger
cm = centimeter
DMMP = Dredged Material Management Program
HPAH = high polycyclic aromatic hydrocarbons
ID = identification
J = estimated value
LPAH = low polycyclic aromatic hydrocarbons
mg/kg = milligrams per kilogram
mg/kg-OC = milligrams per kilogram, organic carbon normalized
ML = maximum level
ng/kg = nanograms per kilogram
PCB = polychlorinated biphenyl
SL = screening level
TEQ = toxic equivalency
U = compound analyzed, but not detected above detection limit
UJ = compound analyzed, but not detected above estimated detection limit
USEPA = U.S. Environmental Protection Agency

Table 4

Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07	HT-08
		Location	Log Boom Park Shoreline					Tributary 0056		WDFW Boat Launch
		Sample ID	HT-01-S-C-121106	HT-02-S-C-121106	HT-03-S-C-121106	HT-04-S-C-121106	HT-05-S-C-121106	HT-06-S-E-121106	HT-07-S-E-121106	HT-08-S-C-121106
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
		Sample Interval	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
	Freshwater SL1	Freshwater SL2								
Conventional Parameters (%)										
Total organic carbon	--	--	**0.240**	**0.484**	**0.770**	**6.20**	**0.531**	**1.25**	**1.72**	**3.08**
Total solids	--	--	**77.3**	**78.8**	**65.7**	**50.9**	**80.4**	**74.8**	**80.5**	**77.2**
Total volatile solids	--	--	**0.67**	**1.46**	**7.06**	**19.69**	**2.05**	**1.54**	**1.72**	**1.49**
Gravel	--	--	**12.1**	**29.8**	**5.6**	**0.4**	**62.9**	**8.3**	**41.1**	**38.0**
Sand, Very Coarse	--	--	**3.5**	**1.6**	**1.6**	**0.5**	**8.6**	**2.5**	**10.4**	**2.2**
Sand, Coarse	--	--	**6.3**	**2.4**	**2.0**	**0.8**	**8.1**	**6.9**	**12.7**	**1.8**
Sand, Medium	--	--	**23.8**	**11.3**	**13.0**	**4.3**	**12.7**	**35.8**	**18.4**	**20.5**
Sand, Fine	--	--	**45.2**	**35.2**	**22.6**	**26.2**	**4.8**	**32.2**	**11.1**	**28.5**
Sand, Very Fine	--	--	**6.1**	**17.7**	**48.7**	**54.2**	**0.9**	**8.3**	**3.6**	**5.8**
Fines (silt + clay)	--	--	**3.0**	**2.0**	**6.3**	**13.6**	**2.0**	**6.1**	**2.7**	**3.2**
Silt, Coarse	--	--	3.0 U	2.0 U	**6.3**	**13.6**	2.0 U	**3.7**	2.7 U	3.2 U
Silt, Medium	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.7**	2.7 U	3.2 U
Silt, Fine	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.6**	2.7 U	3.2 U
Silt, Very Fine	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.4**	2.7 U	3.2 U
Clay, Coarse	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.4**	2.7 U	3.2 U
Clay, Medium	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.2**	2.7 U	3.2 U
Clay, Fine	--	--	3.0 U	2.0 U	0.1 U	0.1 U	2.0 U	**0.1**	2.7 U	3.2 U
Metals (mg/kg)										
Antimony	--	--	6 UJ	6 UJ	7 UJ	10 UJ	6 UJ	7 UJ	6 UJ	6 UJ
Arsenic	20	51	6 U	6 U	7 U	10 U	6 U	7 U	6 U	6 U
Cadmium	1.1	1.5	0.2 U	0.3 U	**0.3**	**0.5**	**0.4**	**0.3**	**0.3**	**0.3**
Chromium	95	100	**17.8 J**	**23.3 J**	**23.0 J**	**27 J**	**20.3 J**	**25.5 J**	**30.1 J**	**29.6 J**
Copper	80	830	**4.3**	**5.6**	**7.6**	**15.2**	**220**	**9.9**	**11.4**	**38.2**
Lead	340	430	**4**	**4**	**10**	**16**	**3**	**6**	**10**	**7**
Mercury	0.28	0.75	0.03 U	0.02 U	0.03 U	**0.23**	0.02 U	0.02 U	0.03 U	0.02 U
Nickel	60	70	**20**	**24**	**25**	**27**	**36**	**30**	**34**	**28**
Selenium	--	--	0.6 U	0.6 U	0.7 U	1 U	0.6 U	0.6 U	0.6 U	0.6 U
Silver	2	2.5	0.4 U	0.4 U	0.4 U	0.6 U	0.4 U	0.4 U	0.4 U	0.4 U
Zinc	130	400	**34**	**41**	**58**	**117**	**69**	**53**	**90**	**54**
Organometallic Compounds										
Tributyltin (porewater) µg/L	--	--	--	--	--	--	--	--	--	--
Tributyltin (bulk) µg/kg	--	--	--	--	--	--	--	3.4 U	3.7 U	--
Polycyclic Aromatic Hydrocarbons (µg/kg)										
1-Methylnaphthalene	--	--	4.6 U	**2.5 J**	**27**	**83**	4.6 U	4.7 U	**4.4 J**	4.6 U
2-Methylnaphthalene	470	560	4.6 U	**4.0 J**	**51**	**190**	4.6 U	**6.1**	**6.7**	**3.5 J**
Acenaphthene	1100	1300	4.6 U	**3.1 J**	**55**	**120**	4.6 U	**3.4 J**	4.9 U	4.6 U
Acenaphthylene	470	640	4.6 U	4.9 U	**3.4 J**	**20**	4.6 U	4.7 U	4.9 U	4.6 U
Anthracene	1200	1600	4.6 U	**4.6 J**	**54**	**190**	**3.8 J**	**7.8**	4.9 U	4.6 U

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07	HT-08
		Location	Log Boom Park Shoreline					Tributary 0056		WDFW Boat Launch
		Sample ID	HT-01-S-C-121106	HT-02-S-C-121106	HT-03-S-C-121106	HT-04-S-C-121106	HT-05-S-C-121106	HT-06-S-E-121106	HT-07-S-E-121106	HT-08-S-C-121106
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
		Sample Interval	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
	Freshwater SL1	Freshwater SL2								
Benzo(a)anthracene	4300	5800	4.6 U	**6.0**	**75**	**330**	**10**	**38**	**18 J**	**9.6**
Benzo(a)pyrene	3300	4800	4.6 U	**3.3 J**	**57**	**210**	**5.7**	**42**	**24**	**10**
Benzo(b,j,k)fluoranthenes	600	4000	4.6 U	**9.0**	**120**	**550**	**16**	**88**	**50**	**25**
Benzo(g,h,i)perylene	4000	5200	4.6 U	4.9 U	**34**	**74**	**3.2 J**	**21**	**26**	**6.9**
Chrysene	5900	6400	4.6 U	**8.0**	**110**	**480**	**18**	**50**	**29**	**15**
Dibenzo(a,h)anthracene	800	840	4.6 U	4.9 U	**7.0**	**23**	4.6 U	**5.8**	4.9 U	4.6 U
Fluoranthene	11000	15000	**4.3 J**	**24**	**260**	**1100**	**22**	**100**	**50**	**28**
Fluorene	1000	3000	4.6 U	**5.8**	**72**	**230**	**2.4 J**	**6.1**	4.9 U	**3.2 J**
Indeno(1,2,3-c,d)pyrene	4100	5300	4.6 U	4.9 U	**25**	**69**	4.6 U	**19**	**20**	**5.7**
Naphthalene	500	1300	4.6 U	**6.8**	**97**	**380**	**2.6 J**	**5.8**	**2.8 J**	**3.3 J**
Phenanthrene	6100	7600	**3.1 J**	**20**	**260**	**860**	**8.0**	**51**	**20**	**11**
Pyrene	8800	16000	**3.0 J**	**19**	**170**	**740**	**18**	**85**	**39**	**26**
Total LPAH (SEF) (U = 0)	6600	9200	**3.1 J**	**44 J**	**590 J**	**2000**	**17 J**	**80 J**	**30 J**	**21 J**
Total LPAH (SEF) (U = 1/2)	6600	9200	**17 J**	**47 J**	**590 J**	**2000**	**24 J**	**83 J**	**39 J**	**28 J**
Total HPAH (SEF) (U = 0)	31000	55000	**7.3 J**	**69 J**	**860**	**3600**	**93 J**	**450**	**260 J**	**130**
Total HPAH (SEF) (U = 1/2)	31000	55000	**23 J**	**77 J**	**860**	**3600**	**98 J**	**450**	**260 J**	**130**
Chlorinated Hydrocarbons (µg/kg)										
1,2,4-Trichlorobenzene	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U
1,2-Dichlorobenzene	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U
1,3-Dichlorobenzene	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U
1,4-Dichlorobenzene	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U
Hexachlorobenzene	--	--	19 U	20 U	19 U	**23**	18 U	4.9 U	4.9 U	18 U
Hexachloroethane	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U
Phthalates (µg/kg)										
Bis(2-ethylhexyl)phthalate	220	320	**16 J**	**18 J**	**66**	**460**	**23**	**110**	**79**	**72**
Butylbenzyl phthalate	260	370	19 U	20 U	**16 J**	**65**	18 U	19 U	20 U	**19**
Diethyl phthalate	--	--	**67**	49 U	48 U	49 U	46 U	48 U	50 U	46 U
Dimethyl phthalate	46	440	19 U	20 U	19 U	20 U	18 U	19 U	20 U	**97**
Di-n-butyl phthalate	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	**28**
Di-n-octyl phthalate	26	45	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U
Phenols (µg/kg)										
2,4-Dimethylphenol	--	--	19 UJ	20 UJ	19 UJ	20 UJ	18 UJ	19 UJ	20 UJ	18 UJ
2-Methylphenol (o-Cresol)	--	--	19 U	20 U	19 U	**16 J**	18 U	19 U	20 U	18 U
4-Methylphenol (p-Cresol)	--	--	38 U	39 U	**36 J**	**150**	**24 J**	38 U	40 U	37 U
Pentachlorophenol	--	--	190 U	200 U	190 U	200 U	180 U	190 U	200 U	180 U
Phenol	--	--	19 U	20 U	**18 J**	**180**	**10 J**	19 U	20 U	18 U
Miscellaneous Extractables (µg/kg)										
Benzoic acid	--	--	380 U	390 U	390 U	**390 J**	370 U	380 U	400 U	370 U
Benzyl alcohol	--	--	19 U	20 U	**20**	**210**	18 U	**37**	**19 J**	18 U
Dibenzofuran	400	440	4.6 U	**5.5**	**78**	**280**	4.6 U	**5.6**	4.9 U	4.6 U

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07	HT-08
		Location	Log Boom Park Shoreline					Tributary 0056		WDFW Boat Launch
		Sample ID	HT-01-S-C-121106	HT-02-S-C-121106	HT-03-S-C-121106	HT-04-S-C-121106	HT-05-S-C-121106	HT-06-S-E-121106	HT-07-S-E-121106	HT-08-S-C-121106
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
		Sample Interval	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
	Freshwater SL1	Freshwater SL2								
Hexachlorobutadiene	--	--	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	4.9 U	4.9 U	10 UJ
N-Nitrosodiphenylamine	--	--	19 U	20 U	19 U	20 U	18 U	19 U	20 U	18 U
Pesticides (µg/kg)										
4,4'-DDD (p,p'-DDD)	--	--	--	--	--	--	--	0.66 U	0.66 U	--
4,4'-DDE (p,p'-DDE)	--	--	--	--	--	--	--	0.60 U	0.61 U	--
4,4'-DDT (p,p'-DDT)	--	--	--	--	--	--	--	0.93 U	0.94 U	--
Aldrin	--	--	--	--	--	--	--	0.27 U	0.27 U	--
Chlordane, alpha- (cis-Chlordane)	--	--	--	--	--	--	--	0.25 U	0.25 U	--
Chlordane, beta- (trans-Chlordane)	--	--	--	--	--	--	--	0.37 U	0.38 U	--
Dieldrin	--	--	--	--	--	--	--	0.49 U	0.49 U	--
Heptachlor	--	--	--	--	--	--	--	0.64 U	0.65 U	--
Nonachlor, cis-	--	--	--	--	--	--	--	2.6 U	2.6 U	--
Nonachlor, trans-	--	--	--	--	--	--	--	2.6 U	2.6 U	--
Oxychlordane	--	--	--	--	--	--	--	4.0 U	4.0 U	--
PCB Aroclors (µg/kg)										
Aroclor 1016	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U
Aroclor 1221	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U
Aroclor 1232	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U
Aroclor 1242	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U
Aroclor 1248	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U
Aroclor 1254	--	--	18 U	19 U	19 U	**28 J**	17 U	17 U	20 U	17 U
Aroclor 1260	--	--	18 U	19 U	19 U	18 U	17 U	17 U	20 U	17 U
Total PCB Aroclors (U = 0)	60	120	18 U	19 U	19 U	**28 J**	17 U	17 U	20 U	17 U
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.134 J**	**0.168 J**	**0.239 J**	**0.546 J**	**0.151 J**	**0.176 J**	**0.156 J**	**0.148 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	0.0671 U	**0.158 J**	**0.640 J**	**2.14**	**0.420 J**	**0.274 J**	**0.243 J**	**0.144 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	0.209 U	**0.137 J**	**0.654 J**	**2.18**	**0.340 J**	**0.374 J**	**0.347 J**	**0.120 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.193 J**	**0.434 J**	**2.25**	**8.69**	**0.884 J**	**1.50 J**	**0.911 J**	**0.387 J**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.103 J**	**0.275 J**	**1.29 J**	**4.33**	**0.790 J**	**0.785 J**	**0.660 J**	**0.289 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**3.79**	**9.30**	**38.7**	**178**	**18.4**	**25.4**	**17.1**	**8.06**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**31.4**	**101**	**272**	**1460**	**136**	**188**	**136**	**59.8**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.132 J**	**0.362 J**	**2.56 J**	**7.22 J**	**0.667 J**	**1.26 J**	**1.27 J**	**0.601 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**0.170 J**	**0.780 J**	**4.21 J**	**14.3 J**	**2.79 J**	**1.77 J**	**1.68 J**	**0.735 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**1.20 J**	**3.17 J**	**16.3 J**	**65.1 J**	**8.55 J**	**9.16 J**	**6.05**	**2.53 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**7.37**	**21.4**	**83.9**	**423**	**40.0**	**47.3**	**30.4**	**14.5**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	0.0355 U	**0.135 J**	**0.397 J**	**1.41**	0.0860 U	**0.252 J**	0.116 U	0.0818 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	0.0611 U	0.0990 U	**0.303 J**	**0.871 J**	0.115 U	**0.204 J**	0.142 U	0.0818 UJ
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.0454 J**	**0.0812 J**	**0.317 J**	**1.05**	**0.117 J**	**0.252 J**	**0.156 J**	**0.0758 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.0375 J**	**0.105 J**	**0.459 J**	**1.79 J**	**0.205 J**	**0.559 J**	**0.261 J**	**0.124 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.0493 J**	**0.115 J**	**0.518 J**	**1.78 J**	**0.219 J**	**0.320 J**	**0.221 J**	**0.130 J**

Table 4

Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	HT-01	HT-02	HT-03	HT-04	HT-05	HT-06	HT-07	HT-08
		Location	Log Boom Park Shoreline					Tributary 0056		WDFW Boat Launch
		Sample ID	HT-01-S-C-121106	HT-02-S-C-121106	HT-03-S-C-121106	HT-04-S-C-121106	HT-05-S-C-121106	HT-06-S-E-121106	HT-07-S-E-121106	HT-08-S-C-121106
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012	11/6/2012
		Sample Interval	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm
	Freshwater SL1	Freshwater SL2								
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**0.0335 J**	0.145 U	**0.185 J**	**0.618 J**	**0.127 J**	**0.180 J**	**0.0917 J**	**0.0539 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.0572 J**	**0.129 J**	**0.754 J**	**2.65**	**0.270 J**	**0.503 J**	**0.355 J**	**0.0858 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**0.643 J**	**1.21 J**	**5.68**	**26.8**	**2.44**	**3.93**	**3.43**	**1.59 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	0.414 U	**0.0495 J**	**0.349 J**	**1.77 J**	**0.233 J**	**0.302 J**	**0.215 J**	**0.134 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**1.91 J**	**3.44 J**	**11.8**	**71.5**	**7.39**	**8.80**	**9.54**	**3.89 J**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**0.444 J**	**1.46 J**	**6.63 J**	**25.6 J**	**1.25 J**	**4.09 J**	**4.03 J**	**1.15 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**0.876 J**	**1.84 J**	**9.79 J**	**31.3 J**	**3.87 J**	**6.10 J**	**5.70 J**	**1.56 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	**1.18 J**	**2.42 J**	**13.6 J**	**50.5 J**	**4.60 J**	**8.75 J**	**6.85 J**	**2.41 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	**1.88**	**3.61 J**	**18.4 J**	**79.5 J**	**6.91 J**	**11.6**	**10.2**	**4.22**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)			**0.25 J**	**0.62 J**	**2.2 J**	**7.9 J**	**1.1 J**	**1.3 J**	**0.98 J**	**0.55 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)			**0.30 J**	**0.63 J**	**2.2 J**	**7.9 J**	**1.2 J**	**1.3 J**	**0.99 J**	**0.56 J**

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	HT-09	HT-10	HT-11	SG-01	SG-02	SG-03	SG-04	SG-05
		Location	WDFW Boat Launch	Lyon Creek Park		Sammamish River	North Lake Marina		Kenmore Navigation Channel	
		Sample ID	HT-09-S-C-121106	HT-10-S-LFP-121106	HT-11-S-LFP-121106	SG-01-S-C-121107	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
		Sample Interval	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-22 cm	0-25 cm	0-15 cm	0-23 cm
	Freshwater SL1	Freshwater SL2								
Conventional Parameters (%)										
Total organic carbon	--	--	**2.13**	**1.91**	**0.456**	**1.33**	**7.12**	**6.60**	**2.73**	**5.43**
Total solids	--	--	**67.5**	**80.2**	**83.9**	**72.9**	**25.7**	**25.6**	**80.8**	**35.0**
Total volatile solids	--	--	**2.57**	**1.18**	**0.91**	**1.19**	**13.51**	**15.15**	**1.72**	**11.13**
Gravel	--	--	**19.1**	**33.3**	**51.4**	0.1 U	**0.4**	**11.8**	**71.4**	**3.1**
Sand, Very Coarse	--	--	**2.0**	**11.0**	**8.1**	**0.2**	**6.5**	**9.2**	**7.6**	**2.9**
Sand, Coarse	--	--	**1.9**	**22.2**	**15.6**	**2.1**	**5.5**	**7.2**	**6.9**	**5.3**
Sand, Medium	--	--	**15.2**	**25.8**	**19.3**	**47.4**	**5.5**	**7.2**	**7.6**	**11.1**
Sand, Fine	--	--	**37.3**	**5.9**	**4.7**	**44.2**	**7.2**	**7.8**	**2.9**	**14.3**
Sand, Very Fine	--	--	**13.6**	**1.2**	**0.4**	**4.0**	**9.1**	**10.1**	**1.0**	**15.2**
Fines (silt + clay)	--	--	**10.8**	**0.5**	**0.4**	**2.2**	**65.8**	**46.7**	**2.5**	**48.1**
Silt, Coarse	--	--	**6.0**	0.5 U	0.4 U	--	**10.0**	**13.1**	--	**7.7**
Silt, Medium	--	--	**1.3**	0.5 U	0.4 U	--	**19.3**	**8.4**	--	**16.0**
Silt, Fine	--	--	**1.1**	0.5 U	0.4 U	--	**15.2**	**10.9**	--	**9.9**
Silt, Very Fine	--	--	**1.1**	0.5 U	0.4 U	--	**11.1**	**7.0**	--	**7.1**
Clay, Coarse	--	--	**0.6**	0.5 U	0.4 U	--	**5.6**	**4.5**	--	**4.3**
Clay, Medium	--	--	**0.5**	0.5 U	0.4 U	--	**3.2**	**1.8**	--	**1.9**
Clay, Fine	--	--	**0.3**	0.5 U	0.4 U	--	**1.4**	**1.1**	--	**1.3**
Metals (mg/kg)										
Antimony	--	--	7 UJ	6 UJ	6 UJ	6 UJ	20 U	20 U	6 U	10 U
Arsenic	20	51	7 U	6 U	6 U	6 UJ	20 U	20 U	6 U	10 U
Cadmium	1.1	1.5	**0.4**	**0.3**	**0.3**	0.2 U	**1.3**	**1.2**	**0.3**	**0.7**
Chromium	95	100	**28.8 J**	**24.3 J**	**22.6 J**	**29.3**	**56**	**55**	**35.0**	**43**
Copper	80	830	**21.9**	**8.9**	**8.9**	**5.9 J**	**92.4**	**88.1**	**14.6**	**35.6**
Lead	340	430	**11**	**9**	**7**	**4 J**	**62**	**42**	**5**	**28**
Mercury	0.28	0.75	0.03 U	0.02 U	0.02 U	0.03 U	**0.18**	**0.1**	0.02 U	**0.08**
Nickel	60	70	**26**	**27**	**30**	**23**	**48**	**45**	**30**	**39**
Selenium	--	--	0.7 U	0.6 U	0.6 U	0.6 U	2 U	2 U	0.6 U	1 U
Silver	2	2.5	0.4 U	0.3 U	0.4 U	0.4 U	1 U	1 U	0.4 U	0.9 U
Zinc	130	400	**64**	**59**	**55**	**43 J**	**231**	**267**	**49**	**143**
Organometallic Compounds										
Tributyltin (porewater) µg/L	--	--	--	--	--	--	**0.67**	**0.058**	**0.049**	**0.008**
Tributyltin (bulk) µg/kg	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)										
1-Methylnaphthalene	--	--	**3.0 J**	4.8 U	4.8 U	4.8 U	**21**	**9.8 J**	20 U	**13 J**
2-Methylnaphthalene	470	560	**5.8**	4.8 U	4.8 U	4.8 U	**31**	**25**	20 U	**26**
Acenaphthene	1100	1300	4.8 U	4.8 U	4.8 U	4.8 U	**320**	**33**	**14 J**	**26**
Acenaphthylene	470	640	4.8 U	4.8 U	4.8 U	4.8 U	**22**	**16 J**	20 U	20 U
Anthracene	1200	1600	**3.7 J**	4.8 U	4.8 U	4.8 U	**66**	**68**	**26**	**39**

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	HT-09	HT-10	HT-11	SG-01	SG-02	SG-03	SG-04	SG-05
		Location	WDFW Boat Launch	Lyon Creek Park		Sammamish River	North Lake Marina		Kenmore Navigation Channel	
		Sample ID	HT-09-S-C-121106	HT-10-S-LFP-121106	HT-11-S-LFP-121106	SG-01-S-C-121107	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
		Sample Interval	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-22 cm	0-25 cm	0-15 cm	0-23 cm
	Freshwater SL1	Freshwater SL2								
Benzo(a)anthracene	4300	5800	**24**	**18 J**	4.8 U	**15 J**	**210**	**190**	**81**	**110**
Benzo(a)pyrene	3300	4800	**25**	**21**	4.8 U	**15 J**	**190**	**160**	**62**	**76**
Benzo(b,j,k)fluoranthenes	600	4000	**64**	**44**	**2.5 J**	**35 J**	**530**	**420**	**140**	**220**
Benzo(g,h,i)perylene	4000	5200	**24**	**19**	4.8 U	**3.2 J**	**170**	**130**	**43**	**63**
Chrysene	5900	6400	**35**	**26**	**2.4 J**	**20**	**440**	**340**	**110**	**190**
Dibenzo(a,h)anthracene	800	840	**3.8 J**	4.8 U	4.8 U	4.8 U	**67**	**55**	**15 J**	**21**
Fluoranthene	11000	15000	**63**	**56**	**3.0 J**	**51**	**480**	**410**	**220**	**310**
Fluorene	1000	3000	**4.2 J**	4.8 U	4.8 U	4.8 U	**98**	**46**	**14 J**	**37**
Indeno(1,2,3-c,d)pyrene	4100	5300	**19**	**16 J**	4.8 U	**3.6 J**	**140**	**110**	**39**	**51**
Naphthalene	500	1300	**4.2 J**	4.8 U	4.8 U	4.8 U	**83**	**58**	20 U	**50**
Phenanthrene	6100	7600	**48**	**29**	4.8 U	**26**	**170**	**190**	**140**	**180**
Pyrene	8800	16000	**68**	**41**	20 U	**39**	**590**	**440**	**190**	**300**
Total LPAH (SEF) (U = 0)	6600	9200	**66 J**	**29**	4.8 U	**26**	**790**	**440 J**	**190 J**	**360**
Total LPAH (SEF) (U = 1/2)	6600	9200	**71 J**	**43**	4.8 U	**40**	**790**	**440 J**	**220 J**	**370**
Total HPAH (SEF) (U = 0)	31000	55000	**330 J**	**240 J**	**7.9 J**	**180 J**	**2800**	**2300**	**900 J**	**1300**
Total HPAH (SEF) (U = 1/2)	31000	55000	**330 J**	**240 J**	**30 J**	**180 J**	**2800**	**2300**	**900 J**	**1300**
Chlorinated Hydrocarbons (µg/kg)										
1,2,4-Trichlorobenzene	--	--	19 U	19 U	20 U	19 U	19 U	20 U	20 U	20 U
1,2-Dichlorobenzene	--	--	19 U	19 U	20 U	19 U	19 U	20 U	20 U	20 U
1,3-Dichlorobenzene	--	--	19 U	19 U	20 U	19 U	19 U	20 U	20 U	20 U
1,4-Dichlorobenzene	--	--	19 U	19 U	20 U	19 U	19 U	20 U	20 U	20 U
Hexachlorobenzene	--	--	19 U	19 U	20 U	19 U	4.9 U	4.9 U	4.9 U	5.0 U
Hexachloroethane	--	--	19 U	19 U	20 U	19 U	19 U	20 U	20 U	20 U
Phthalates (µg/kg)										
Bis(2-ethylhexyl)phthalate	220	320	**130**	**31**	**21 J**	**28**	**680**	**510**	62 U	**260**
Butylbenzyl phthalate	260	370	19 U	19 U	20 U	19 U	**32**	**32**	20 U	20 U
Diethyl phthalate	--	--	48 U	48 U	49 U	48 U	49 U	**38 J**	49 U	49 U
Dimethyl phthalate	46	440	**970**	19 U	20 U	19 U	**28**	20 U	20 U	20 U
Di-n-butyl phthalate	--	--	**17 J**	19 U	20 U	19 U	19 U	**9.8 J**	20 U	20 U
Di-n-octyl phthalate	26	45	**15 J**	19 U	20 U	19 U	19 U	**58 J**	20 U	**22 J**
Phenols (µg/kg)										
2,4-Dimethylphenol	--	--	19 UJ	19 UJ	20 UJ	19 UJ	19 UJ	20 UJ	20 UJ	20 UJ
2-Methylphenol (o-Cresol)	--	--	19 U	19 U	20 U	19 UJ	19 U	20 U	20 UJ	20 U
4-Methylphenol (p-Cresol)	--	--	38 U	39 U	39 U	38 U	**74**	**76**	39 U	**74**
Pentachlorophenol	--	--	190 U	190 U	200 U	190 U	190 U	200 U	200 U	200 U
Phenol	--	--	**11 J**	19 U	20 U	19 U	19 U	**110**	20 U	**180**
Miscellaneous Extractables (µg/kg)										
Benzoic acid	--	--	**140 J**	390 U	390 U	380 U	**960**	**1300**	390 U	**1300**
Benzyl alcohol	--	--	**23**	19 U	20 U	19 U	**82**	**130**	20 U	**160**
Dibenzofuran	400	440	4.8 U	4.8 U	4.8 U	4.8 U	**30**	**35**	20 U	**28**

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	HT-09	HT-10	HT-11	SG-01	SG-02	SG-03	SG-04	SG-05
		Location	WDFW Boat Launch	Lyon Creek Park		Sammamish River	North Lake Marina		Kenmore Navigation Channel	
		Sample ID	HT-09-S-C-121106	HT-10-S-LFP-121106	HT-11-S-LFP-121106	SG-01-S-C-121107	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
		Sample Interval	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-22 cm	0-25 cm	0-15 cm	0-23 cm
	Freshwater SL1	Freshwater SL2								
Hexachlorobutadiene	--	--	10 UJ	10 UJ	10 UJ	10 UJ	4.9 U	4.9 U	4.9 U	5.0 U
N-Nitrosodiphenylamine	--	--	19 U	19 U	20 U	19 U	19 U	20 U	20 U	20 U
Pesticides (µg/kg)										
4,4'-DDD (p,p'-DDD)	--	--	--	--	--	--	1.7 U	1.7 U	1.7 U	1.7 U
4,4'-DDE (p,p'-DDE)	--	--	--	--	--	--	1.7 U	1.7 U	1.7 U	1.7 U
4,4'-DDT (p,p'-DDT)	--	--	--	--	--	--	1.7 U	1.7 U	1.7 U	1.7 U
Aldrin	--	--	--	--	--	--	0.64 U	0.64 U	0.64 U	0.65 U
Chlordane, alpha- (cis-Chlordane)	--	--	--	--	--	--	0.83 U	0.83 U	0.83 U	0.84 U
Chlordane, beta- (trans-Chlordane)	--	--	--	--	--	--	0.78 U	0.78 U	0.77 U	0.79 U
Dieldrin	--	--	--	--	--	--	1.7 U	1.7 U	1.7 U	1.7 U
Heptachlor	--	--	--	--	--	--	0.64 U	0.64 U	0.64 U	0.65 U
Nonachlor, cis-	--	--	--	--	--	--	1.6 U	1.6 U	1.6 U	1.7 U
Nonachlor, trans-	--	--	--	--	--	--	4.7 U	4.7 U	4.7 U	4.8 U
Oxychlordane	--	--	--	--	--	--	2.3 U	2.3 U	2.3 U	2.3 U
PCB Aroclors (µg/kg)										
Aroclor 1016	--	--	19 U	19 U	19 U	17 U	19 U	19 U	20 U	19 U
Aroclor 1221	--	--	19 U	19 U	19 U	17 U	19 U	19 U	20 U	19 U
Aroclor 1232	--	--	19 U	19 U	19 U	17 U	19 U	19 U	20 U	29 U
Aroclor 1242	--	--	19 U	19 U	19 U	17 U	19 U	19 U	20 U	19 U
Aroclor 1248	--	--	19 U	19 U	19 U	17 U	58 U	38 U	20 U	19 U
Aroclor 1254	--	--	19 U	19 U	19 U	17 U	**88**	48 U	20 U	29 U
Aroclor 1260	--	--	19 U	19 U	19 U	17 U	**33**	**22**	20 U	19 U
Total PCB Aroclors (U = 0)	60	120	19 U	19 U	19 U	17 U	**121**	**22**	20 U	29 U
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.183 J**	**0.168 J**	**0.153 J**	**0.164 J**	**0.975 J**	**0.599 J**	**0.150 J**	**0.322 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**0.305 J**	**0.117 J**	0.0660 U	**0.107 J**	**7.83**	**3.75**	**0.381 J**	**1.33**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.414 J**	0.303 U	**0.0718 J**	**0.0809 J**	**14.5**	**6.97**	**0.491 J**	**2.18**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**1.25 J**	**0.377 J**	**0.312 J**	**0.310 J**	**53.1**	**28.0**	**1.62 J**	**8.58**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**0.825 J**	**0.245 J**	**0.103 J**	**0.219 J**	**29.5**	**14.5**	**0.897 J**	**4.84**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**24.8**	**6.32**	**5.45**	**5.70**	**1020**	**610**	**40.5**	**184**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**169**	**40.1**	**44.9**	**40.5**	**7420**	**4760**	**307**	**1540**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**1.70 J**	**0.338 J**	**0.341 J**	**0.395 J**	**14.9 J**	**9.77 J**	**1.13 J**	**4.22 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**2.15 J**	**0.617 J**	**0.293 J**	**0.391 J**	**43.9**	**26.5**	**2.51 J**	**9.38 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**8.76**	**2.30 J**	**1.76 J**	**2.07 J**	**334**	**206**	**16.1**	**60.4**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**47.3**	**11.0**	**14.0**	**10.9**	**2260**	**1620**	**134**	**473**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**0.175 J**	0.0751 U	0.153 U	0.0691 U	**3.37**	**2.13**	**0.173 J**	**0.841 J**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.159 J**	0.0909 U	0.0563 U	**0.0770 J**	**3.04**	**1.71 J**	**0.164 J**	**0.684 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.165 J**	**0.146 J**	**0.0466 J**	**0.0592 J**	**3.27**	**1.86**	**0.128 J**	**0.785 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.556 J**	**0.136 J**	**0.0834 J**	**0.154 J**	**8.04**	**4.83**	**0.289 J**	**1.74 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.373 J**	**0.119 J**	**0.0660 J**	**0.0573 J**	**8.28**	**4.02**	**0.261 J**	**1.45 J**

Table 4

Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	HT-09	HT-10	HT-11	SG-01	SG-02	SG-03	SG-04	SG-05
		Location	WDFW Boat Launch	Lyon Creek Park		Sammamish River	North Lake Marina		Kenmore Navigation Channel	
		Sample ID	HT-09-S-C-121106	HT-10-S-LFP-121106	HT-11-S-LFP-121106	SG-01-S-C-121107	SG-02-S-C-121108	SG-03-S-C-121108	SG-04-S-C-121108	SG-05-S-C-121108
		Sample Date	11/6/2012	11/6/2012	11/6/2012	11/7/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012
		Sample Interval	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-22 cm	0-25 cm	0-15 cm	0-23 cm
	Freshwater SL1	Freshwater SL2								
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**0.265 J**	0.140 U	0.162 U	0.0573 U	**3.12**	**1.80 J**	**0.185 J**	**0.751 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**0.534 J**	**0.128 J**	**0.134 J**	**0.0553 J**	**11.7**	**6.21**	**0.361 J**	**2.14**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**6.28**	**1.05 J**	**0.840 J**	**1.19 J**	**137**	**84.1**	**4.39**	**25.4**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**0.574 J**	**0.0652 J**	**0.0272 J**	**0.0454 J**	**7.34**	**4.63**	**0.315 J**	**1.63 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**14.0**	**2.38 J**	**1.61 J**	**2.67 J**	**366**	**272**	**10.8**	**71.9**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**2.79 J**	**2.82 J**	**0.720 J**	**0.679 J**	**55.5 J**	**32.2 J**	**2.12 J**	**13.8 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**4.39 J**	**2.74 J**	**2.97 J**	**1.28 J**	**119**	**59.4 J**	**3.51 J**	**22.5 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	**11.2 J**	**2.46 J**	**2.49 J**	**2.43 J**	**240**	**136 J**	**7.38 J**	**45.2**
Total Heptachlorodibenzofuran (HpCDF)	--	--	**19.5**	**2.73 J**	**2.23 J**	**3.28 J**	**404**	**273**	**13.1 J**	**79.2**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)			**1.4 J**	**0.52 J**	**0.32 J**	**0.46 J**	**37.0 J**	**20.3 J**	**1.6 J**	**6.8 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)			**1.4 J**	**0.54 J**	**0.37 J**	**0.47 J**	**37.0 J**	**20.3 J**	**1.6 J**	**6.8 J**

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	SG-06	SG-07	SG-07	SG-08	SG-09	SG-10	SG-11	SG-12
		Location	Kenmore Navigation Channel					Harbour Village Marina		
		Sample ID	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108	SG-10-S-E-121107	SG-11-S-E-121107	SG-12-S-E-121107
		Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2								
Conventional Parameters (%)										
Total organic carbon	--	--	**4.89**	**4.95**	**7.07**	**3.30**	**5.22**	**3.14**	**10.8**	**4.65**
Total solids	--	--	**29.9**	**33.7**	**34.3**	**42.0**	**35.7**	**56.1**	**16.9**	**27.4**
Total volatile solids	--	--	**13.89**	**13.40**	**14.11**	**9.10**	**10.58**	**6.51**	**24.10**	**13.67**
Gravel	--	--	0.1 U	**0.5**	**2.6**	**0.3**	**0.1**	**5.3**	0.1 U	**0.6**
Sand, Very Coarse	--	--	**7.4**	**2.7**	**2.7**	**1.5**	**2.1**	**3.0**	**5.3**	**4.2**
Sand, Coarse	--	--	**6.6**	**3.1**	**2.8**	**1.5**	**1.7**	**3.9**	**4.6**	**3.8**
Sand, Medium	--	--	**6.2**	**6.3**	**6.0**	**3.9**	**6.9**	**13.2**	**4.4**	**3.5**
Sand, Fine	--	--	**8.6**	**24.4**	**21.9**	**22.2**	**15.9**	**26.5**	**5.6**	**5.2**
Sand, Very Fine	--	--	**15.9**	**18.9**	**18.6**	**21.2**	**13.4**	**21.9**	**7.4**	**11.6**
Fines (silt + clay)	--	--	**55.2**	**44.1**	**45.4**	**49.3**	**59.7**	**26.4**	**72.7**	**71.1**
Silt, Coarse	--	--	**8.6**	**11.0**	**13.7**	**13.0**	**19.7**	**17.2**	**18.6**	**22.9**
Silt, Medium	--	--	**15.5**	**12.1**	**11.0**	**13.7**	**12.9**	**3.9**	**20.2**	**22.9**
Silt, Fine	--	--	**12.1**	**7.9**	**7.6**	**8.4**	**10.9**	**1.9**	**14.3**	**12.5**
Silt, Very Fine	--	--	**7.8**	**5.9**	**6.1**	**6.3**	**7.6**	**1.4**	**10.9**	**6.2**
Clay, Coarse	--	--	**6.3**	**3.8**	**3.9**	**3.9**	**4.7**	**1.0**	**5.1**	**3.4**
Clay, Medium	--	--	**3.2**	**2.5**	**2.1**	**2.6**	**2.6**	**0.5**	**2.6**	**2.0**
Clay, Fine	--	--	**1.6**	**0.9**	**0.9**	**1.4**	**1.3**	**0.5**	**1.1**	**1.0**
Metals (mg/kg)										
Antimony	--	--	20 U	10 U	10 U	10 U	10 U	9 UJ	30 UJ	20 UJ
Arsenic	20	51	20 U	10 U	10 U	10 U	10 U	9 UJ	30 UJ[a]	20 UJ
Cadmium	1.1	1.5	**0.8**	**0.6**	**0.6**	**0.6**	**0.6**	**0.4**	1 U	0.7 U
Chromium	95	100	**57**	**41**	**44**	**44**	**48**	**29.8**	**52**	**44**
Copper	80	830	**43.6**	**30.0**	**28.7**	**28.0**	**31.1**	**18.8 J**	**97 J**	**47.5 J**
Lead	340	430	**31**	**21**	**21**	**21**	**24**	**19 J**	**50 J**	**27 J**
Mercury	0.28	0.75	**0.10**	**0.11**	**0.08**	**0.07**	**0.08**	**0.04**	**0.1**	**0.1**
Nickel	60	70	**46**	**41**	**42**	**40**	**43**	**33**	**47**	**41**
Selenium	--	--	2 U	1 U	1 U	1 U	1 U	0.9 U	3 U	2 U
Silver	2	2.5	1 U	0.9 U	0.8 U	0.7 U	0.9 U	0.5 U	2 U	1 U
Zinc	130	400	**164**	**126**	**123**	**113**	**130**	**97 J**	**377 J**	**185 J**
Organometallic Compounds										
Tributyltin (porewater) µg/L	--	--	**0.023**	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--
Tributyltin (bulk) µg/kg	--	--	--	--	--	--	--	3.6 U	**9.8**	**6.8**
Polycyclic Aromatic Hydrocarbons (µg/kg)										
1-Methylnaphthalene	--	--	20 U	20 U	19 U	**9.6 J**	20 U	**5.5**	**13 J**	**5.2**
2-Methylnaphthalene	470	560	**14 J**	20 U	19 U	19 U	20 U	**12**	**47**	**13**
Acenaphthene	1100	1300	**17 J**	20 U	19 U	19 U	20 U	**14**	**32**	**18 J**
Acenaphthylene	470	640	20 U	20 U	19 U	19 U	20 U	**3.5 J**	**19 J**	**5.7**
Anthracene	1200	1600	**28**	**18 J**	19 U	19 U	20 U	**57**	**66**	**41**

Table 4

Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	SG-06	SG-07	SG-07	SG-08	SG-09	SG-10	SG-11	SG-12
		Location	Kenmore Navigation Channel					Harbour Village Marina		
		Sample ID	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108	SG-10-S-E-121107	SG-11-S-E-121107	SG-12-S-E-121107
		Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2								
Benzo(a)anthracene	4300	5800	**110**	**110**	**52**	**42**	**40**	**200**	**200**	**120**
Benzo(a)pyrene	3300	4800	**120**	**63**	**55**	**50**	**45**	**190**	**210**	**110**
Benzo(b,j,k)fluoranthenes	600	4000	**300**	**170**	**140**	**120**	**120**	**400**	**570**	**290**
Benzo(g,h,i)perylene	4000	5200	**93**	**36**	**41**	**41**	**36**	**140**	**110**	**85**
Chrysene	5900	6400	**190**	**140**	**82**	**73**	**72**	**290**	**370**	**210**
Dibenzo(a,h)anthracene	800	840	**37**	**17 J**	**12 J**	**11 J**	**13 J**	**34**	**45**	**36**
Fluoranthene	11000	15000	**290**	**150**	**140**	**130**	**120**	**480**	**430**	**300**
Fluorene	1000	3000	**28**	**12 J**	**9.7 J**	19 U	20 U	**28**	**38**	**59**
Indeno(1,2,3-c,d)pyrene	4100	5300	**81**	**33**	**38**	**36**	**33**	**110**	**90**	**77**
Naphthalene	500	1300	**38**	**18 J**	**25**	**14 J**	**24**	**38**	**39**	**39**
Phenanthrene	6100	7600	**140**	**72**	**68**	**64**	**59**	**260**	**210**	**170**
Pyrene	8800	16000	**290**	**140**	**130**	**120**	**120**	**800**	**470**	**230**
Total LPAH (SEF) (U = 0)	6600	9200	**260 J**	**120 J**	**100 J**	**78 J**	**83**	**410 J**	**450 J**	**350 J**
Total LPAH (SEF) (U = 1/2)	6600	9200	**270 J**	**150 J**	**140 J**	**130 J**	**130**	**410 J**	**450 J**	**350 J**
Total HPAH (SEF) (U = 0)	31000	55000	**1500**	**860 J**	**690 J**	**620 J**	**600 J**	**2600**	**2500**	**1500**
Total HPAH (SEF) (U = 1/2)	31000	55000	**1500**	**860 J**	**690 J**	**620 J**	**600 J**	**2600**	**2500**	**1500**
Chlorinated Hydrocarbons (µg/kg)										
1,2,4-Trichlorobenzene	--	--	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
1,2-Dichlorobenzene	--	--	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
1,3-Dichlorobenzene	--	--	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
1,4-Dichlorobenzene	--	--	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
Hexachlorobenzene	--	--	4.8 U	4.9 U	4.8 U	4.8 U	4.8 U	4.8 U	3.9 U	4.9 U
Hexachloroethane	--	--	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
Phthalates (µg/kg)										
Bis(2-ethylhexyl)phthalate	220	320	**540**	**330**	**300**	**240**	**240**	**480**	**740**	**360**
Butylbenzyl phthalate	260	370	**57**	**28**	19 U	**36**	**29**	20 U	**24**	**71**
Diethyl phthalate	--	--	**58**	49 U	48 U	48 U	49 U	50 U	**44 J**	**100**
Dimethyl phthalate	46	440	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
Di-n-butyl phthalate	--	--	20 U	20 U	**12 J**	19 U	20 U	20 U	20 U	**26**
Di-n-octyl phthalate	26	45	**41 J**	**22 J**	19 U	19 U	20 U	20 U	**87**	20 U
Phenols (µg/kg)										
2,4-Dimethylphenol	--	--	20 UJ	20 UJ	19 UJ	19 UJ	20 UJ	20 UJ	20 UJ	20 UJ
2-Methylphenol (o-Cresol)	--	--	20 U	20 U	19 U	19 U	20 U	20 U	**11 J**	**12 J**
4-Methylphenol (p-Cresol)	--	--	**91**	**54**	**31 J**	**22 J**	**36 J**	**160**	**150**	**74**
Pentachlorophenol	--	--	200 U	200 U	190 U	190 U	200 U	200 U	**55 J**	200 U
Phenol	--	--	**80**	**42**	**42**	**19**	**39**	**55**	**140**	**300**
Miscellaneous Extractables (µg/kg)										
Benzoic acid	--	--	**1100**	**430**	**480**	**300 J**	**510**	**520**	**1400**	**1500**
Benzyl alcohol	--	--	**190**	**120**	**100**	**61**	**110**	**200**	**530**	**300**
Dibenzofuran	400	440	20 U	20 U	19 U	19 U	20 U	**19**	**24**	**13**

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	SG-06	SG-07	SG-07	SG-08	SG-09	SG-10	SG-11	SG-12
		Location	Kenmore Navigation Channel					Harbour Village Marina		
		Sample ID	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108	SG-10-S-E-121107	SG-11-S-E-121107	SG-12-S-E-121107
		Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2								
Hexachlorobutadiene	--	--	4.8 U	4.9 U	4.8 U	4.8 U	4.8 U	4.8 U	3.9 U	10 UJ
N-Nitrosodiphenylamine	--	--	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U
Pesticides (µg/kg)										
4,4'-DDD (p,p'-DDD)	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U	1.6 U	1.3 U	1.7 U
4,4'-DDE (p,p'-DDE)	--	--	1.6 U	1.7 U	1.6 U	1.6 U	1.6 U	1.6 U	**7.2 J**	**4.0 J**
4,4'-DDT (p,p'-DDT)	--	--	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U	1.6 U	1.3 U	1.7 U
Aldrin	--	--	0.63 U	0.64 U	0.63 U	0.63 U	0.63 U	0.62 U	0.51 U	0.64 U
Chlordane, alpha- (cis-Chlordane)	--	--	0.82 U	0.83 U	0.81 U	0.81 U	0.81 U	0.80 U	0.66 U	0.83 U
Chlordane, beta- (trans-Chlordane)	--	--	0.77 U	0.78 U	0.76 U	0.76 U	0.76 U	0.75 U	0.62 U	0.78 U
Dieldrin	--	--	1.6 U	1.7 U	1.6 U	1.6 U	1.6 U	1.6 U	1.3 U	1.7 U
Heptachlor	--	--	0.63 U	0.64 U	0.63 U	0.63 UJ	0.63 U	0.62 U	0.51 U	0.64 U
Nonachlor, cis-	--	--	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.3 U	1.6 U
Nonachlor, trans-	--	--	4.7 U	4.7 U	4.6 U	4.6 U	4.6 U	4.6 U	3.8 U	4.7 U
Oxychlordane	--	--	2.3 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U	1.8 U	2.3 U
PCB Aroclors (µg/kg)										
Aroclor 1016	--	--	19 U	19 U	19 U	18 U	20 U	18 U	19 U	19 U
Aroclor 1221	--	--	19 U	19 U	19 U	18 U	20 U	18 U	19 U	19 U
Aroclor 1232	--	--	19 U	19 U	19 U	18 U	20 U	18 U	19 U	19 U
Aroclor 1242	--	--	19 U	19 U	19 U	18 U	20 U	18 U	19 U	19 U
Aroclor 1248	--	--	19 U	19 U	19 U	18 U	20 U	18 U	39 U	24 U
Aroclor 1254	--	--	28 U	19 U	**22**	18 U	20 U	32 U	48 U	49 U
Aroclor 1260	--	--	19 U	19 U	19 U	18 U	20 U	18 U	**29 J**	19 U
Total PCB Aroclors (U = 0)	60	120	28 U	19 U	**22**	18 U	20 U	32 U	**29 J**	49 U
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.478 J**	**0.306 J**	**0.341 J**	**0.293 J**	**0.372 J**	**0.388 J**	**1.32**	**0.804 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**1.58**	**1.18**	**1.03**	**0.870 J**	**1.24**	**1.47**	**12.8**	**5.10**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**2.65**	**1.42 J**	**1.38 J**	**1.36 J**	**1.71 J**	**2.26**	**25.8**	**8.29**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**9.51**	**4.38**	**4.21**	**3.85**	**5.03**	**8.32**	**119**	**38.8**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**5.68**	**2.85**	**2.95**	**2.99**	**3.54**	**4.73**	**52.3**	**18.0**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**237**	**85.5**	**82.7**	**88.5**	**103**	**168**	**2120**	**769**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**2520**	**652**	**613**	**684**	**798**	**1290**	**16500**	**6410**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**4.89 J**	**4.25 J**	**3.82 J**	**3.33 J**	**4.12 J**	**3.27 J**	**14.7 J**	**9.33 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**9.24 J**	**8.33 J**	**7.29 J**	**6.12 J**	**7.92 J**	**8.56 J**	**60.3**	**27.8**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**70.1**	**31.4 J**	**30.2 J**	**27.2 J**	**35.0 J**	**50.6 J**	**563**	**199**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**803**	**167**	**155**	**160**	**191**	**332**	**4150**	**1470**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**0.967 J**	**0.643 J**	**0.579 J**	**0.553 J**	**0.784 J**	**0.759 J**	**3.38**	**2.15**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.746 J**	**0.442 J**	**0.466 J**	**0.409 J**	**0.577 J**	**0.675 J**	**5.37 J**	**2.87**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**0.826 J**	**0.452 J**	**0.556 J**	**0.540 J**	**0.573 J**	**0.725 J**	**5.19**	**2.57 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**1.90 J**	**1.20 J**	**1.05 J**	**1.30 J**	**1.43 J**	**1.49 J**	**15.3**	**6.40**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**1.64 J**	**0.989 J**	**0.958 J**	**0.964 J**	**1.23 J**	**1.26 J**	**13.6**	**5.15**

Table 4

Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	SG-06	SG-07	SG-07	SG-08	SG-09	SG-10	SG-11	SG-12
		Location	Kenmore Navigation Channel					Harbour Village Marina		
		Sample ID	SG-06-S-C-121108	SG-07-S-C-121108	SG-07-S-C-DUP-121108	SG-08-S-C-121108	SG-09-S-C-121108	SG-10-S-E-121107	SG-11-S-E-121107	SG-12-S-E-121107
		Sample Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/8/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 25 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2								
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	0.846 J	0.386 J	0.411 J	0.366 J	0.497 J	0.692 J	7.11	2.96
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	2.55	1.40 J	1.34 J	1.37 J	1.74 J	1.96	21.1	8.02
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	31.3	14.6	14.6	18.7	17.7	22.3	282	104
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	1.98 J	1.06 J	1.14 J	1.83 J	1.33 J	1.59 J	15.3	6.00
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	108	40.9	39.5	66.0	46.6	77.5	871	356
Total Tetrachlorodibenzofuran (TCDF)	--	--	15.5 J	11.1 J	10.3 J	9.21 J	12.2 J	11.3 J	51.2 J	29.7 J
Total Pentachlorodibenzofuran (PeCDF)	--	--	24.5 J	14.8 J	14.2 J	12.8 J	17.1 J	19.7 J	157 J	75.2 J
Total Hexachlorodibenzofuran (HxCDF)	--	--	51.1 J	25.8 J	25.6	25.7 J	30.6 J	39.1	472	193 J
Total Heptachlorodibenzofuran (HpCDF)	--	--	104	43.8	43.3	57.2 J	52.8 J	73.3	879	347
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)			8.4 J	4.2 J	4.0 J	3.9 J	4.9 J	6.6 J	71.0 J	26.6 J
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)			8.5 J	4.2 J	4.0 J	3.9 J	4.9 J	6.6 J	71.0 J	26.6 J

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	SG-13	SG-13	SG-14	SG-15	SG-16	SG-17
		Location	Harbour Village Marina		North of KIP	Kenmore Industrial Park Shoreline		
		Sample ID	SG-13-S-E-121107	SG-13-S-E-DUP-121107	SG-14-S-E-121107	SG-15-S-E-121107	SG-16-S-E-121107	SG-17-S-E-121107
		Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2						
Conventional Parameters (%)								
Total organic carbon	--	--	**5.45**	**3.82**	**4.33**	**1.87**	**0.724**	**2.98**
Total solids	--	--	**23.2**	**22.7**	**51.0**	**82.4**	**77.7**	**46.9**
Total volatile solids	--	--	**15.02**	**14.56**	**7.61**	**1.24**	**0.98**	**6.70**
Gravel	--	--	0.1 U	0.1 U	**22.6**	**0.4**	**0.1**	**0.3**
Sand, Very Coarse	--	--	**4.3**	**3.4**	**6.0**	**1.5**	**0.4**	**3.3**
Sand, Coarse	--	--	**3.2**	**3.0**	**7.6**	**3.9**	**5.5**	**3.9**
Sand, Medium	--	--	**2.8**	**2.9**	**14.6**	**22.3**	**77.5**	**5.5**
Sand, Fine	--	--	**5.1**	**4.6**	**11.4**	**62.7**	**14.6**	**6.0**
Sand, Very Fine	--	--	**10.1**	**9.3**	**7.3**	**6.8**	**1.2**	**11.7**
Fines (silt + clay)	--	--	**74.6**	**76.7**	**30.6**	**2.4**	**0.8**	**69.1**
Silt, Coarse	--	--	**11.5**	**11.6**	**7.5**	--	--	**12**
Silt, Medium	--	--	**21.2**	**22.4**	**7.9**	--	--	**17.3**
Silt, Fine	--	--	**16.9**	**17.4**	**5.3**	--	--	**13.0**
Silt, Very Fine	--	--	**13.3**	**13.7**	**4.9**	--	--	**9.2**
Clay, Coarse	--	--	**6.4**	**6.1**	**2.0**	--	--	**6.1**
Clay, Medium	--	--	**3.3**	**3.0**	**1.2**	--	--	**4.3**
Clay, Fine	--	--	**1.9**	**2.5**	**1.7**	--	--	**7.2**
Metals (mg/kg)								
Antimony	--	--	20 UJ	20 UJ	10 UJ	6 UJ	6 UJ	10 UJ
Arsenic	20	51	20 UJ	20 UJ	10 UJ	6 UJ	6 UJ	10 UJ
Cadmium	1.1	1.5	0.9 U	0.9 U	**0.7**	0.3 U	0.2 U	0.4 U
Chromium	95	100	**54**	**55**	**36**	**20.9**	**29.9**	**54**
Copper	80	830	**62.1 J**	**62.8 J**	**111 J**	**5.5 J**	**5.4 J**	**13.5 J**
Lead	340	430	**32 J**	**32 J**	**26 J**	**7 J**	**4 J**	**7 J**
Mercury	0.28	0.75	**0.1**	**0.1**	**0.24**	0.03 U	0.03 U	**0.04**
Nickel	60	70	**46**	**45**	**35**	**20**	**26**	**34**
Selenium	--	--	2 U	2 U	1 U	0.7 U	0.6 U	1 U
Silver	2	2.5	1 U	1 U	0.7 U	0.4 U	0.4 U	0.6 U
Zinc	130	400	**205 J**	**205 J**	**182 J**	**57 J**	**43 J**	**64 J**
Organometallic Compounds								
Tributyltin (porewater) µg/L	--	--	--	--	**0.010**	--	--	--
Tributyltin (bulk) µg/kg	--	--	**12**	**12**	--	3.6 U	--	--
Polycyclic Aromatic Hydrocarbons (µg/kg)								
1-Methylnaphthalene	--	--	**18 J**	**7.2**	**34**	4.7 U	4.8 U	4.9 U
2-Methylnaphthalene	470	560	**24**	**19**	**59**	4.7 U	4.8 U	**7.4**
Acenaphthene	1100	1300	**17 J**	**16 J**	**130**	**3.8 J**	4.8 U	4.9 U
Acenaphthylene	470	640	**26**	**7.5**	**26**	4.7 U	4.8 U	4.9 U
Anthracene	1200	1600	**48**	**44**	**150**	4.7 U	4.8 U	**11 J**

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	SG-13	SG-13	SG-14	SG-15	SG-16	SG-17
		Location	Harbour Village Marina		North of KIP	Kenmore Industrial Park Shoreline		
		Sample ID	SG-13-S-E-121107	SG-13-S-E-DUP-121107	SG-14-S-E-121107	SG-15-S-E-121107	SG-16-S-E-121107	SG-17-S-E-121107
		Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2						
Benzo(a)anthracene	4300	5800	**150**	**160**	**360**	**4.6 J**	4.8 U	**42**
Benzo(a)pyrene	3300	4800	**140**	**120**	**250**	**4.1 J**	**2.9 J**	**41**
Benzo(b,j,k)fluoranthenes	600	4000	**380**	**320**	**720**	**12**	**8.2**	**91**
Benzo(g,h,i)perylene	4000	5200	**120**	**85**	**95**	4.7 U	4.8 UJ	**27**
Chrysene	5900	6400	**300**	**240**	**550**	**4.9**	**3.0 J**	**64**
Dibenzo(a,h)anthracene	800	840	**40**	**26**	**42**	4.7 U	4.8 UJ	4.9 U
Fluoranthene	11000	15000	**260**	**220**	**1200**	**12 J**	**11 J**	**130**
Fluorene	1000	3000	**46**	**32**	**150**	**5.5**	4.8 U	**2.5 J**
Indeno(1,2,3-c,d)pyrene	4100	5300	**100**	**79**	**97**	4.7 U	4.8 UJ	**24**
Naphthalene	500	1300	**39**	**40**	**170**	4.7 U	4.8 UJ	**4.0 J**
Phenanthrene	6100	7600	**190**	**160**	**830**	**16 J**	**2.6 J**	**93**
Pyrene	8800	16000	**290**	**230**	**920**	**11 J**	**9.7 J**	**120**
Total LPAH (SEF) (U = 0)	6600	9200	**390 J**	**320 J**	**1500**	**25 J**	**2.6 J**	**120 J**
Total LPAH (SEF) (U = 1/2)	6600	9200	**390 J**	**320 J**	**1500**	**35 J**	**17 J**	**120 J**
Total HPAH (SEF) (U = 0)	31000	55000	**1800**	**1500**	**4200**	**49 J**	**35 J**	**540**
Total HPAH (SEF) (U = 1/2)	31000	55000	**1800**	**1500**	**4200**	**56 J**	**44 J**	**540**
Chlorinated Hydrocarbons (µg/kg)								
1,2,4-Trichlorobenzene	--	--	20 U	20 U	19 U	19 U	19 U	19 U
1,2-Dichlorobenzene	--	--	20 U	20 U	19 U	19 U	19 U	19 U
1,3-Dichlorobenzene	--	--	20 U	20 U	19 U	19 U	19 U	19 U
1,4-Dichlorobenzene	--	--	20 U	20 U	19 U	19 U	19 U	19 U
Hexachlorobenzene	--	--	4.9 U	4.9 U	4.9 U	0.97 U	19 U	19 U
Hexachloroethane	--	--	20 U	20 U	19 U	19 U	19 U	19 U
Phthalates (µg/kg)								
Bis(2-ethylhexyl)phthalate	220	320	**560**	**430**	**280**	**21 J**	**19 J**	**150**
Butylbenzyl phthalate	260	370	**82**	**56**	**43**	19 U	19 U	19 U
Diethyl phthalate	--	--	**55**	50 U	**68**	47 U	48 U	48 U
Dimethyl phthalate	46	440	20 U	20 U	19 U	19 U	19 U	**38**
Di-n-butyl phthalate	--	--	20 U	20 U	19 U	19 U	19 U	19 U
Di-n-octyl phthalate	26	45	**73 J**	**42**	**24**	19 U	19 U	**11 J**
Phenols (µg/kg)								
2,4-Dimethylphenol	--	--	20 UJ	20 UJ	19 UJ	19 UJ	19 UJ	19 UJ
2-Methylphenol (o-Cresol)	--	--	**12 J**	**14 J**	19 U	19 U	19 U	19 U
4-Methylphenol (p-Cresol)	--	--	**110**	**110**	**59**	**10 J**	39 U	**270**
Pentachlorophenol	--	--	**52 J**	200 U	190 U	190 U	190 U	190 U
Phenol	--	--	**200**	**350**	**80**	19 U	19 U	**82**
Miscellaneous Extractables (µg/kg)								
Benzoic acid	--	--	**1600**	**1700**	**610**	370 U	390 U	**430**
Benzyl alcohol	--	--	**360**	**380**	**100**	19 U	19 U	**62**
Dibenzofuran	400	440	**12**	**17**	**90**	**4.7**	4.8 U	4.9 U

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	SG-13	SG-13	SG-14	SG-15	SG-16	SG-17
		Location	Harbour Village Marina		North of KIP	Kenmore Industrial Park Shoreline		
		Sample ID	SG-13-S-E-121107	SG-13-S-E-DUP-121107	SG-14-S-E-121107	SG-15-S-E-121107	SG-16-S-E-121107	SG-17-S-E-121107
		Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2						
Hexachlorobutadiene	--	--	4.9 U	4.9 U	4.9 U	0.97 U	10 UJ	10 UJ
N-Nitrosodiphenylamine	--	--	20 U	20 U	19 U	19 U	19 U	19 U
Pesticides (µg/kg)								
4,4'-DDD (p,p'-DDD)	--	--	1.7 U	1.7 U	1.7 U	0.33 U	--	--
4,4'-DDE (p,p'-DDE)	--	--	1.7 U	**4.4 J**	1.7 U	0.33 U	--	--
4,4'-DDT (p,p'-DDT)	--	--	1.7 U	1.7 U	1.7 U	0.33 UJ	--	--
Aldrin	--	--	0.64 U	0.64 U	0.64 U	0.13 U	--	--
Chlordane, alpha- (cis-Chlordane)	--	--	0.83 U	0.83 U	0.82 U	0.16 U	--	--
Chlordane, beta- (trans-Chlordane)	--	--	0.78 U	0.78 U	0.77 U	0.15 U	--	--
Dieldrin	--	--	1.7 U	1.7 U	1.6 U	0.33 U	--	--
Heptachlor	--	--	0.64 U	0.64 U	0.64 U	0.13 U	--	--
Nonachlor, cis-	--	--	1.6 U	1.6 U	1.6 U	0.32 U	--	--
Nonachlor, trans-	--	--	**4.1 J**	4.7 U	4.7 U	0.94 U	--	--
Oxychlordane	--	--	2.3 U	2.3 U	2.3 U	0.45 U	--	--
PCB Aroclors (µg/kg)								
Aroclor 1016	--	--	20 U	20 U	19 U	18 U	18 U	19 U
Aroclor 1221	--	--	20 U	20 U	19 U	18 U	18 U	19 U
Aroclor 1232	--	--	25 U	35 U	28 U	18 U	18 U	19 U
Aroclor 1242	--	--	20 U	20 U	19 U	18 U	18 U	19 U
Aroclor 1248	--	--	20 U	20 U	19 U	18 U	18 U	19 U
Aroclor 1254	--	--	50 U	25 U	**20**	18 U	18 U	19 U
Aroclor 1260	--	--	20 U	20 U	19 U	18 U	18 U	19 U
Total PCB Aroclors (U = 0)	60	120	50 U	35 U	**20**	18 U	18 U	19 U
Dioxin Furans (ng/kg)								
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**0.719 J**	**0.521 J**	**0.404 J**	**0.154 J**	**0.144 J**	**0.226 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**5.66**	**2.51**	**1.99**	**0.0891 J**	**0.0758 J**	**0.491 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**11.8**	**5.28**	**3.06**	**0.143 J**	**0.0679 J**	**1.03 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**97.4**	**32.5**	**12.5**	**0.818 J**	**0.202 J**	**2.12**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**25.6**	**10.8**	**6.86**	**0.350 J**	**0.168 J**	**2.33**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**1730**	**600**	**304**	**13.9**	**4.24**	**50.3**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	--	--	**14400**	**4830**	**2490**	**105**	**32.0**	**252**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	--	--	**10.5 J**	**4.89 J**	**5.27 J**	**0.446 J**	**0.481 J**	**1.11 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	--	--	**31.5**	**13.1 J**	**13.5 J**	**0.632 J**	**0.441 J**	**2.03 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	--	--	**353**	**136**	**102**	**4.11 J**	**1.86 J**	**14.9 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	--	--	**3200**	**1120**	**877**	**27.3**	**8.18**	**82.0**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	--	--	**2.84 J**	**1.22**	**1.09**	0.103 U	0.0220 U	0.136 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**5.30 J**	**2.06 J**	**0.796 J**	**0.0911 J**	**0.0758 J**	**0.126 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	--	--	**4.71**	**1.82**	**0.957 J**	**0.0752 J**	0.0439 U	**0.136 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**13.2**	**4.94**	**2.26**	**0.176 J**	**0.0918 J**	**0.625 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**8.24**	**3.39**	**2.08**	**0.103 J**	**0.0739 J**	**0.725 J**

Table 4

Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

		Location ID	SG-13	SG-13	SG-14	SG-15	SG-16	SG-17
		Location	Harbour Village Marina		North of KIP	Kenmore Industrial Park Shoreline		
		Sample ID	SG-13-S-E-121107	SG-13-S-E-DUP-121107	SG-14-S-E-121107	SG-15-S-E-121107	SG-16-S-E-121107	SG-17-S-E-121107
		Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012	11/7/2012
		Sample Interval	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
	Freshwater SL1	Freshwater SL2						
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	--	--	**7.63**	**2.82**	**0.816 J**	0.0653 U	0.0259 U	0.110 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	--	--	**15.4**	**5.77**	**2.90**	**0.190 J**	**0.0559 J**	**1.06 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	--	--	**230**	**93.1**	**36.2**	**2.05**	**0.888 J**	**14.4**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	--	--	**10.6**	**4.97**	**2.54 J**	**0.0713 J**	**0.0639 J**	**0.950 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	--	--	**837**	**379**	**106**	**5.88**	**1.75 J**	**24.5**
Total Tetrachlorodibenzofuran (TCDF)	--	--	**32.4 J**	**15.9 J**	**15.4 J**	**1.06 J**	**0.681 J**	**2.50 J**
Total Pentachlorodibenzofuran (PeCDF)	--	--	**129 J**	**51.6 J**	**28.9 J**	**3.73 J**	**0.950 J**	**5.21 J**
Total Hexachlorodibenzofuran (HxCDF)	--	--	**438 J**	**161**	**64.1 J**	**3.85 J**	**1.56 J**	**17.8 J**
Total Heptachlorodibenzofuran (HpCDF)	--	--	**809**	**314 J**	**115 J**	**6.17 J**	**2.41 J**	**31.5**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)			**50.0 J**	**19.0 J**	**10.1 J**	**0.64 J**	**0.35 J**	**2.3 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)			**50.0 J**	**19.0 J**	**10.1 J**	**0.65 J**	**0.36 J**	**2.3 J**

Table 4
Kenmore Area Sediment Results Compared to Interim Freshwater Sediment Quality Values

Notes:
Detected concentration is greater than Freshwater SL1 screening level
Detected concentration is greater than Freshwater SL2 screening level
a Arsenic result of 30UJ was verified to be between the MDL and the RL and below the screening level.

All non-detect pesticides and dioxin/furan data were reported at the **MDL**; all other non-detect data were reported at the **RL**.
Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest reporting limit value is reported as the sum.
Totals are calculated as the sum of all detected results and 1/2 the undetected reporting limit (U=1/2). If all results are not detected, the highest reporting limit value is reported as the sum.
Total LPAH (Low PAH) SEF is the total of 2-Methylnapthalene, Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene and Anthracene.
Total HPAH (High PAH) SEF is the total of Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b,j,k)fluoranthenes, Benzo(a)pyrene, Indeno(1,2,3-c,d)pyrene, Dibenzo(a,h)anthracene and Benzo(g,h,i)perylene.
Total PCB Aroclors is the total of all PCB Aroclors listed in this table.
Dioxin/Furan TEQ values as of 2005, World Health Organization.

USEPA Stage 2A validation was performed by Anchor QEA on all compounds, except dioxin/furans.
USEPA Stage 4 validation was performed by LDC on dioxin/furans.

Bold = Detected result
-- = results not reported or not applicable
% = percent
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
HPAH = high polycyclic aromatic hydrocarbons
J = estimated value
KIP = Kenmore Industrial Park
LPAH = low polycyclic aromatic hydrocarbons
MDL = method detection limit
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
PCB = polychlorinated biphenyl
TEQ = toxic equivalency
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
USEPA = U.S. Environmental Protection Agency
WDFW = Washington State Department of Fish and Wildlife

Table 5
Surface Water Results from Log Boom Park Shoreline and Lake Washington Reference Area

Location ID	HT-01	HT-04	HT-04	WS-10
Location Description	Log Boom Park Shoreline			Reference
Sample ID	HT-01-W-C-121107	HT-04-W-C-121107	HT-04-W-C-DUP-121107	WS-10-W-C-121107
Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012
Sample Depth	1 ft	0.5-1 ft	0.5-1 ft	3 ft
Conventional Parameters (mg/L)				
Hardness as CaCO3	**48**	**50**	**49**	**43**
Total suspended solids	**13.8**	**3.7**	**3.4**	**2.0**
Total dissolved solids	**76.0**	**78.0**	**74.0**	**59.0**
Metals (µg/L)				
Antimony	1 U	1 U	0.2 U	0.2 U
Arsenic	**2**	**2**	**1.2**	**0.9**
Barium	**11**	**9**	**8.7**	**6.2**
Beryllium	0.5 U	0.5 U	0.2 U	0.2 U
Cadmium	0.5 U	0.5 U	0.1 U	0.1 U
Calcium	**11100**	**11500**	**11400**	**10200**
Chromium	2 U	2 U	0.5 U	1 U
Copper	**2.8**	**2.6**	**3.2**	**1.6**
Iron	**480**	**330**	**330**	**160**
Lead	**0.5**	0.5 U	**0.3**	0.1 U
Magnesium	**4830**	**5060**	**4970**	**4210**
Manganese	**111**	**32**	**12.4**	**21**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**2**	**1**	**1.2**	**0.7**
Selenium	2 U	2 U	0.5 U	0.5 U
Silver	1 U	1 U	0.2 U	0.2 U
Thallium	1 U	1 U	0.2 U	0.2 U
Zinc	20 U	20 U	4 U	4 U
Metals, Dissolved (µg/L)				
Antimony	0.2 U	0.2 U	0.2 U	0.2 U
Arsenic	**0.8**	**1.0**	**1.0**	**0.8**
Barium	**7.4**	**7.8**	**7.7**	**6.0**
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U
Cadmium	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	1 U	1 U	1 U	1 U
Copper	**1.9**	**2.1**	**2.0**	**1.2**
Iron	**110**	**150**	**150**	**90**
Lead	**0.1**	**0.1**	0.1 U	0.1 U
Manganese	**2.8**	**4.6**	**5.1**	**13.8**
Mercury	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	**1.1**	**1.1**	**1.0**	**0.8**
Selenium	0.5 U	0.5 U	0.5 U	0.5 U
Silver	0.2 U	0.2 U	0.2 U	0.2 U
Thallium	0.2 U	0.2 U	0.2 U	0.2 U
Zinc	**6**	4 U	4 U	4 U

Table 5
Surface Water Results from Log Boom Park Shoreline and Lake Washington Reference Area

Location ID	HT-01	HT-04	HT-04	WS-10
Location Description	Log Boom Park Shoreline			Reference
Sample ID	HT-01-W-C-121107	HT-04-W-C-121107	HT-04-W-C-DUP-121107	WS-10-W-C-121107
Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012
Sample Depth	1 ft	0.5-1 ft	0.5-1 ft	3 ft
Polycyclic Aromatic Hydrocarbons (µg/L)				
1-Methylnaphthalene	0.10 U	0.10 U	0.10 U	0.10 U
2-Methylnaphthalene	0.10 U	0.10 U	0.10 U	0.10 U
Acenaphthene	0.10 U	0.10 U	0.10 U	0.10 U
Acenaphthylene	0.10 U	0.10 U	0.10 U	0.10 U
Anthracene	0.10 U	0.10 U	0.10 U	0.10 U
Benzo(a)anthracene	0.10 U	0.10 U	0.10 U	0.10 U
Benzo(a)pyrene	0.10 U	0.10 U	0.10 U	0.10 U
Benzo(b,j,k)fluoranthenes	0.20 U	0.20 U	0.20 U	0.20 U
Benzo(g,h,i)perylene	0.10 U	0.10 U	0.10 U	0.10 U
Chrysene	0.10 U	0.10 U	0.10 U	0.10 U
Dibenzo(a,h)anthracene	0.10 U	0.10 U	0.10 U	0.10 U
Fluoranthene	0.10 U	0.10 U	0.10 U	0.10 U
Fluorene	0.10 U	0.10 U	0.10 U	0.10 U
Indeno(1,2,3-c,d)pyrene	0.10 U	0.10 U	0.10 U	0.10 U
Naphthalene	0.10 U	0.10 U	0.10 U	0.10 U
Phenanthrene	0.10 U	0.10 U	0.10 U	0.10 U
Pyrene	0.10 U	0.10 U	0.10 U	0.10 U
Chlorinated Hydrocarbons (µg/L)				
1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
Hexachlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U
Hexachloroethane	2.0 U	2.0 U	2.0 U	2.0 U
Phthalates (µg/L)				
Bis(2-ethylhexyl)phthalate	3.0 U	3.0 U	3.0 U	3.0 U
Butylbenzyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U
Diethyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U
Dimethyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-butyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U
Di-n-octyl phthalate	1.0 U	1.0 U	1.0 U	1.0 U
Phenols (µg/L)				
2,4-Dimethylphenol	3.0 U	3.0 U	3.0 U	3.0 U
2-Methylphenol (o-Cresol)	1.0 U	1.0 U	1.0 U	1.0 U
4-Methylphenol (p-Cresol)	2.0 U	2.0 U	2.0 U	2.0 U
Pentachlorophenol	**0.024 J**	**0.022 J**	**0.020 J**	0.025 U
Phenol	1.0 U	1.0 U	1.0 U	1.0 U
Miscellaneous Extractables (µg/L)				
Benzoic acid	20 U	20 U	20 U	20 U
Benzyl alcohol	2.0 U	2.0 U	2.0 U	2.0 U
Dibenzofuran	0.10 U	0.10 U	0.10 U	0.10 U

Table 5
Surface Water Results from Log Boom Park Shoreline and Lake Washington Reference Area

Location ID	HT-01	HT-04	HT-04	WS-10
Location Description	Log Boom Park Shoreline			Reference
Sample ID	HT-01-W-C-121107	HT-04-W-C-121107	HT-04-W-C-DUP-121107	WS-10-W-C-121107
Sample Date	11/7/2012	11/7/2012	11/7/2012	11/7/2012
Sample Depth	1 ft	0.5-1 ft	0.5-1 ft	3 ft
Hexachlorobutadiene	0.050 U	0.050 U	0.050 U	0.050 U
N-Nitrosodiphenylamine	1.0 U	1.0 U	1.0 U	1.0 U

Notes:
All non-detect data were reported at the **reporting limit**.

USEPA Stage 2A validation was performed by Anchor QEA on all compounds

Bold = Detected result
-- = results not reported or not applicable

ft = feet
ID = identification
J = estimated value
mg/L = milligrams per liter
µg/L = micrograms per liter
U = Compound analyzed, but not detected above detection limit

APPENDIX A
CHAIN-OF-CUSTODY FORMS AND DAILY LOGS (ON CD)

APPENDIX B
LAB DATA (ON CD)

APPENDIX C
DATA VALIDATION REPORT (ON CD)