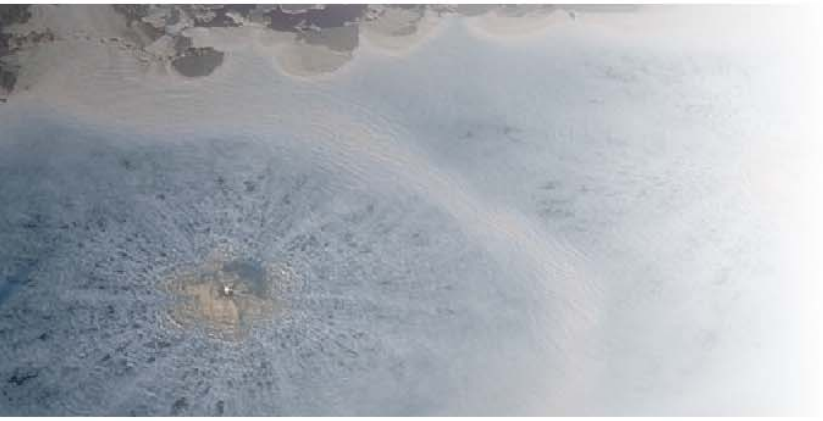

Remedial Investigation Addendum
Westbay Marina
2100 West Bay Drive NW
Olympia, Washington

Prepared for
Washington State
Department of Ecology

May 31, 2012
17800-25

HARTCROWSER

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Remedial Investigation Addendum
Westbay Marina
2100 West Bay Drive NW
Olympia, Washington

Prepared for
Washington State
Department of Ecology

May 31, 2012
17800-25

Prepared by
Hart Crowser, Inc.

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WESTBAY MARINA
OLYMPIA, WASHINGTON

ACRONYMS AND ABBREVIATIONS

AO	Agreed Order
ARI	Analytical Resources, Inc.
bgs	below ground surface
CCV	continuing calibration verification
DNR	Department of Natural Resources
DQO	data quality objective
Ecology	Washington State Department of Ecology
EDL	estimated detection limit
EMPC	estimated maximum possible concentration
EPA	US Environmental Protection Agency
GPS	global positioning system
MTCA	Model Toxics Control Act
OCDD	octachlorodibenzodioxin
OPR	ongoing precision and accuracy sample recoveries
pg/g	picograms per gram
PSEP	Puget Sound Estuary Program
QA/QC	quality assurance/quality control
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
RL	reporting limit
SAP	Sampling and Analysis Plan
SAPA	Sediment Sampling and Analysis Plan Appendix
Site	Westbay Marina
SMS	Sediment Management Standards
TCDD	tetrachlorodibenzodioxin
TEF	toxic equivalency factors
TEQ	toxics equivalent
UST	underground storage tank
UW	urban waterfront
WAC	Washington Administrative Code
WBMA	Westbay Marina Association
WHO	World Health Organization

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REMEDIAL INVESTIGATION ADDENDUM
WESTBAY MARINA
2100 WEST BAY DRIVE NW
OLYMPIA, WASHINGTON

EXECUTIVE SUMMARY

The Westbay Marina property (the Site) was first developed as a lumber mill by Buchanan Lumber Company in 1919. Subsequent activities at the Site include a sawmill, veneer plant, stud mill, boatyard, and marina. A hog fuel burner was located along the northern property line and most of the lumber mill operations were located off site to the north. Available information indicates that lumber was not treated at this location, and the closest lumber treating operation is approximately one mile southeast of the Site at the foot of Budd Inlet.

Formerly, small boat maintenance activities on the site included hydroblasting, scraping, sanding, and painting boats. A restaurant was constructed on the Site in the mid-1980s, was destroyed by fire in 1993, and was rebuilt in 1995. Westbay Marina currently operates solely as a marina with a 30-year Aquatic Land Lease (No. 2618) from the Washington State Department of Natural Resources (DNR) for state-owned tidelands, effective January 1, 1984, through January 1, 2014.

This supplemental soil study characterizes upland soil on the Dunlap Towing property located adjacent to Westbay Marina. This study supplements the work conducted by Hart Crowser in the 2011 remedial investigation (RI) and serves as an addendum to the 2011 RI Report (Hart Crowser 2011b).

Soil samples were collected from the south end of the Dunlap Towing property, near the Westbay Marina property boundary, to assess surface soil for dioxins/furans. Soil sample collection, handling, and analysis were performed in general accordance with the 2012 Revised Sampling and Analysis Plan (SAP) (Hart Crowser 2012), and all samples collected were acceptable for chemical and physical analysis as qualified.

Dioxins/furans were detected in the seven upland soil samples for which these constituents were analyzed. Soil samples were located at or near the location of a historical hog fuel burner suspected of having created dioxins/furans. Concentrations in five of the upland soil samples exceeded the MTCA Method B unrestricted land use criterion. These five sample locations are not covered by clean fill or impervious surfaces that would limit human exposure or erosion into surface water or the marine environment. One of these five samples was a deeper sample, indicating that dioxins are also present in lower soil layers.

However, all of the sample concentrations were well below the MTCA Method C industrial land use criterion.

1.0 INTRODUCTION

This report presents the results of a supplemental soil investigation performed for the Washington State Department of Ecology (Ecology) at the Westbay Marina Site (the Site) in Olympia, Washington (Figure 1). This report summarizes the characterization of upland soil within the Dunlap Towing property, located north of and adjacent to the Westbay Marina property.

The work for this report supplements the previous work conducted by Anchor QEA for Westbay Marina Associates (WBMA) under an existing Remedial Investigation/Feasibility Study (RI/FS) Work Plan (Anchor 2009a) and supplements work conducted by Hart Crowser in 2011 (Hart Crowser 2011b). Hart Crowser's investigation was conducted under contract to the Washington State Department of Ecology (Ecology) in partial fulfillment of the requirements of an Agreed Order (No. DE_5272) between Ecology and WBMA. The results presented are based on field and laboratory work completed for Ecology by Hart Crowser between February and March 2012.

Specific tasks conducted by Hart Crowser for this supplemental study include collecting additional data to characterize upland soil for dioxins/furans near the historical hog fuel burner.

1.1 Historical Remedial Investigation Approach

The WBMA entered into Agreed Order (AO) No. DE_5272 with Ecology effective on March 4, 2008. As required by the AO, WBMA retained a consultant (Anchor QEA) to develop an RI/FS Work Plan to provide for remedial action and present an evaluation process to address the potential that a "release" or "threatened release" of "hazardous substance(s)" has occurred at Westbay Marina (Anchor 2009a). The RI/FS Work Plan provided steps to "determine the nature and extent of any potential Site soil and/or groundwater contamination, assess the potential for impacts from the Site to sediment on adjacent Washington State Department of Natural Resources (DNR)-owned aquatic lands, and lay out the framework for potential future remedial action if required" (Anchor 2009a).

Anchor subsequently conducted soil, groundwater, seep, and intertidal sediment sampling and analysis, in partial fulfillment of the Work Plan. Analytical results from this investigation were provided to Ecology in two letters (Anchor 2009b

and Anchor 2010). No further work was performed at Westbay Marina by Anchor QEA, and Ecology retained Hart Crowser to perform additional work presented in the Work Plan but not completed by WBMA, in support of the RI.

Hart Crowser collected additional upland soil, groundwater, and intertidal sediment samples to further characterize the Site and address data gaps. Additionally, subtidal surface sediment grab samples were collected at selected locations for chemical testing to evaluate sediment chemical properties. Sediment core samples were collected to visually determine the extent and amount of wood debris in the DNR aquatic lease area. Benthic organisms were collected to characterize diversity along the intertidal shoreline and subtidal areas of the DNR aquatic lease area. Sampling and testing protocols are discussed further in the March 2011 SAP for the project (Hart Crowser 2011a), as approved by Ecology.

This supplemental study included collecting additional upland soil samples on the Dunlap Towing property located adjacent to Westbay Marina. Sampling and testing protocols are discussed further in the February 2012 Revised SAP for the project (Hart Crowser 2012), as approved by Ecology.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Location and Land Use

The Site is located at 2100 West Bay Drive NW in Olympia, Washington. The Site is the location of a marina, boatyard, and a restaurant. The Site encompasses just over 3 acres of upland, which is predominantly paved and is used for parking and storage. The marina has about 400 slips that can accommodate boats up to 70 feet long, and is located on Budd Inlet under an Aquatic Land Lease (Lease No. 2618) from the Washington State Department of Natural Resources (DNR) (Figure 1).

The Site is bounded by a log sorting yard to the north (Dunlap Towing Company), Puget Sound (Budd Inlet) to the east, an abandoned lumber storage yard (Delson Lumber Company) to the south, and a steep hill and residences to the west (Figure 2). West Bay Drive NW and abandoned railroad tracks divide the property from north to south.

Currently, the harbor area leased by WBMA lies in front of Olympia Tidelands Blocks 385 to 388, inclusive, and comprises 13.6 acres of water-dependent use and 0.0495 acres of non-water-dependent use (Tugboat Annie's Restaurant

building). The aquatic lands to the north are currently leased by Dunlap Towing, and those to the south are leased by the Delson Lumber Company.

The Dunlap Towing Company property abuts the Site immediately to the north, located at 2003 NW West Bay Drive. The Dunlap Towing property (Thurston County parcel no. 09750016000) is zoned as industrial (I), urban waterfront (UW), and residential (R-4-8), according to the Thurston GeoData Center database (Thurston 2012). The land use for the Site is similarly zoned as urban waterfront (UW) and residential (R-4-8).

The supplemental soil investigation described in this report was conducted in the portion of the Dunlap Towing property that is zoned as industrial and urban waterfront. This portion of the property is currently used for industrial activities. In accordance with WAC 173-340-745(1)(a), Ecology has determined that industrial land use represents the reasonable maximum exposure on the Dunlap Towing property.

2.2 Historical Summary

The Site was first developed as a lumber mill by Buchanan Lumber Company in 1919 (Hart Crowser 1993). Between 1919 and 1966, the Site was used for various activities including a sawmill, veneer plant, and stud mill. These timber-related facilities also included a hog fuel burner along the northern property line. Historical maps and aerial photos show that most of the lumber mill operations were located off site to the north. The planing shed, mill office, and some lumber sheds were located on the Site east of the Northern Pacific Railroad tracks. Additional lumber storage, motor vehicle parking, and an oil shed were located west of the tracks adjacent to the bluff. According to an interview with the former property owner, Mr. Buchanan, the Site was filled with soil that sloughed off the steep bank to the west and wood debris from mill operations. Mr. Buchanan also indicated that lumber was never treated at this location, and the closest lumber treating operation was located approximately one mile southeast of the Site on the opposite side of Budd Inlet.

Between 1966 and 2002, the Site was a boatyard and marina. Westbay Marina Associates (WBMA) has owned the Westbay Marina since 1990. In 2002, boat maintenance and repair activities ceased at the Site and it has operated solely as a marina since that time (Anchor 2009). Before 2002, small boat maintenance activities included hydroblasting (using water jets to remove loose paint and marine growth from boat bottoms prior to scraping), scraping, sanding, and painting boats.

Tugs Restaurant was built on the Site in 1984 or 1985. The restaurant was destroyed in a fire in 1993. Tugboat Annie's restaurant was built in 1995 at the same location.

2.3 Previous Environmental Characterizations/Sampling Investigations

2.3.1 Summary of Existing Investigations

Previous upland soil, groundwater, sediment, and seep investigations were conducted in 1993, 1999, 2009, and 2010. These studies are listed below and details can be found in the 2011 RI report (Hart Crowser 2011b).

- Preliminary Environmental Assessment and Soil Remediation (Hart Crowser 1993)
- UST Removal (Stemen Environmental 1999a and 1999b)
- Remedial Investigation (Anchor QEA 2009 and 2010)

2.4 Summary of Previous Cleanup Actions

Two cleanup actions have been conducted on the Site. In 1993, Hart Crowser conducted cleanup of the southern ditch and the area around an aboveground waste oil storage tank. In 1999, Stemen Environmental removed three underground storage tanks (USTs) from the Site.

3.0 SOIL SAMPLING

Upland soil samples were collected by Hart Crowser in 2011, under the 2011 SAP. Additional soil sampling was recommended in the RI. Accordingly, information in this section of the report applies to the February 28, 2012, soil sampling by Hart Crowser.

Soil sample collection, handling, and analysis were performed in general accordance with the revised 2012 project SAP (Hart Crowser 2012). The samples collected were acceptable for chemical and physical analysis.

The soil samples and associated analyses are summarized in Table 1. The soil sample locations are presented on Figures 2 and 3.

3.1 Deviations from the 2011 SAP

The original SAP (Hart Crowser 2011a) was modified in February 2012 to incorporate additional upland soil sampling for dioxin/dibenzofuran analysis (Hart Crowser 2012). The purpose of this additional investigation work is to fill a data gap identified in the Remedial Investigation Report for Westbay Marina (Hart Crowser 2011b). The only modifications to the original SAP were necessary to document procedures for this additional sampling. All other areas of the March 2011 SAP remain unchanged.

Minor deviations from the revised SAP were made to adapt to the field conditions and to deal with minor equipment malfunctions. Deviations from the Ecology-approved revised SAP for the Westbay Marina investigation are summarized below and are discussed in more detail in the applicable report sections:

- Two upland soil sampling locations were moved from the proposed locations on the Dunlap Towing property. The sample locations were shifted slightly to find appropriate soil conditions.

- The sample collection depth varied slightly because of vegetation and debris in the sampling area.

3.2 Sample Location Control

A handheld Trimble GPS unit was used to mark locations for the upland soil samples. Sample location coordinates are presented in Table A-1 in Appendix A.

3.3 Upland Soil Sampling

During this sampling event, seven soil samples (HC-WB-US-005, -006, -007, -008, -009, -010, and -011) were collected on the adjoining Dunlap Towing property, near the historical hog fuel burner (Figure 2). Per the revised SAP, five samples were to be collected near ground surface and two samples were to be collected at greater depth, below two of the surface samples. Samples HC-WB-US-008 and -010 were designated as the deep samples, which were co-located with surface samples HC-WB-US-007 and -009, respectively. Final sample depths are summarized in Table 2.

Upland soil sample collection generally followed the procedure described in the revised SAP. The entire sampling area was covered with blackberry brambles and large amounts of debris, making sampling very difficult. After locating the sample station, a square measuring approximately 1 meter was marked using pin

flags. At the four corners of the square, blackberries, twigs, roots, pine needles, wood chunks, foam blocks, carpet, and PVC pipe were removed.

In three of the five surface soil sample locations, roughly equal volumes of the upper 0 to 3 inches of soil were collected from each corner using a pre-cleaned stainless steel spoon and placed in a pre-cleaned stainless steel bowl. Separate, dedicated stainless steel spoon and bowl sets were used to collect each sample. The remaining two surface soil samples were collected approximately 0.8 to 1.5 feet below ground surface (bgs) because of difficult sampling conditions and debris. The two deep samples were collected from about 1.5 to 2.0 feet bgs.

Each sample was homogenized until the soil appeared uniform in color and texture. The soil was then placed into a pre-labeled glass container provided by the laboratory and placed on ice following chain-of–custody protocol until delivery to the laboratory. No field duplicates or equipment rinse blanks were collected for analysis.

The samples were submitted to Analytical Resources, Inc., (ARI) and analyzed for dioxins/furans by United States Environmental Protection Agency (EPA) Method 1613B and for total solids by EPA Method 160.3 modified. Sample analytical results are presented in Table 2. Observations regarding the sample location, groundcover, and soil characteristics are recorded in Table A-2 in Appendix A. Selected representative photographs of soil sampling locations are presented in Appendix C.

4.0 UPLAND SOIL CHEMICAL ANALYSIS RESULTS

The upland soil sample locations and associated analyses are summarized in Table 1, and sample analytical results are summarized in Table 2. The data were reviewed to ensure that they met data quality objectives for the project.

4.1 Data Quality Review Summary

All analyses were performed in a manner consistent with the methods stated in the revised SAP/QAPP (Hart Crowser 2012). The chemistry data from samples collected in 2012 were reviewed and validated by Hart Crowser chemists. Overall, the data quality objectives (DQOs), as set forth in the revised SAP, were achieved, and the data for this project are acceptable for use, as qualified. Results for several analytes were qualified as estimated concentrations that fell below the method reporting limit. A few analytes did not meet identification criteria and were qualified as not detected. A detailed chemical data quality

review is presented in Appendix B, and the analytical laboratory report is provided on the attached CD-ROM.

4.2 Dioxins/Furans

Analytical results for dioxins/furans in soil expressed as 2,3,7,8-TCDD (tetrachlorodibenzodioxin) toxic equivalents (TEQs) are presented in Table 2. TEQs were calculated using the World Health Organization (WHO) 2005 toxic equivalency factors (TEF) for mammals. Total dioxin TEQs are reported using two conventions: adding only detected congeners, and using 1/2 of the detection limit for non-detected congeners. There was no significant difference in reported totals since the majority of the congeners were present in the samples.

Dioxin/furan congeners were detected in all samples. The total TEQ concentrations range from 2.90 to 69.7 pg/g (picograms per gram or parts per trillion). The highest concentration is in sample HC-WB-US-009, the northernmost sample collected on the Dunlap Towing property.

Dioxin/furan TEQ concentrations were compared to the MTCA Method B unrestricted land use criterion of 11 pg/g for 2,3,7,8-TCDD TEQ. Five samples, HC-WB-US-006, -007, -008, -009, and HC-WB-US-010, exceed this criterion, ranging from 13.5 to 69.7 pg/g. Samples HC-WB-US-005 and HC-WB-US-011 have significantly lower concentrations at 3.56 and 2.90 pg/g, respectively. The detected dioxin/furan TEQ concentrations for all of the samples were well below the MTCA Method C direct contact, industrial land use criterion of 1,500 pg/g for 2,3,7,8-TCDD TEQ.

4.3 Total Solids

Five of the upland soil samples have similar values for total solids, ranging from 72.4 to 79.4 percent (Table 2). Samples HC-WB-US-009 and HC-WB-US-010 have lower total solids values, at 61.8 and 58.8 percent, respectively. However, unlike samples collected in 2011, this difference in total solids does not appear to be affecting the dioxin/furan concentration in a consistent way. HC-WB-US-009 has the highest dioxin/furan concentration; however, HC-WB-US-010 has one of the lowest.

5.0 SUMMARY AND CONCLUSIONS OF SUPPLEMENTARY SAMPLING

Dioxins/furans were detected in the seven upland soil samples for which these constituents were analyzed. Soil samples were collected at or near the location

of a historical hog fuel burner suspected of creating dioxins/furans. Concentrations in five of the upland soil samples exceeded the MTCA Method B unrestricted land use criterion. These sample locations are not covered by clean fill or impervious surfaces that would limit human exposure or erosion into surface water or the marine environment. Four of these five samples with MTCA Method B exceedances (HC-WB-US-006, -008, -009, and -010) were deeper samples collected from approximately 0.8 to 2.0 feet below ground surface, indicating that dioxins are also present in lower soil layers.

6.0 LIMITATIONS

Work for this project was performed, and this report prepared, in general accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of the Washington State Department of Ecology for specific application to the Westbay Marina Site. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

7.0 REFERENCES

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Table 1 - Soil Sample Testing Summary

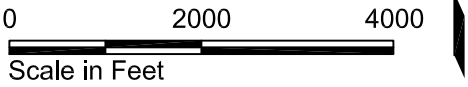
Sample Number	ARI Job No.	Dioxins/Furans	Total Solids
Upland Surface Soil Samples			
HC-WB-US-005	UK-05	X	X
HC-WB-US-006	UK-05	X	X
HC-WB-US-007	UK-05	X	X
HC-WB-US-008	UK-05	X	X
HC-WB-US-009	UK-05	X	X
HC-WB-US-010	UK-05	X	X
HC-WB-US-011	UK-05	X	X

Table 2 - Analytical Results and TCDD TEQs for Soil Samples

Sample ID	MTCA	HC-WB-US-005	HC-WB-US-006	HC-WB-US-007	HC-WB-US-008	HC-WB-US-009	HC-WB-US-010	HC-WB-US-011
Sampling Date	Method B	2/28/2012	2/28/2012	2/28/2012	2/28/2012	2/28/2012	2/28/2012	2/28/2012
Sample Depth in Feet	Criteria	0 - 0.25	1.3 - 1.5	0 - 0.25	1.5 - 1.7	0.8 - 1.0	2.0	0 - 0.25
Total Solids in %		77.3	72.4	76.8	79.4	61.8	58.8	75.6
Dioxins in pg/g								
2,3,7,8-TCDD		0.163 UK	0.855 T	0.917 UK	0.942 UK	0.213 UK	0.243 UK	0.194 UK
1,2,3,7,8-PeCDD		0.968 UK	4.49	3.92	4.62	3.52	2.10	0.775 UK
1,2,3,4,7,8-HxCDD		1.27 T	4.81	4.66	5.00	8.83	2.83	0.821 UK
1,2,3,6,7,8-HxCDD		5.67	19.5	14.4	17.4	102	20.6	3.72
1,2,3,7,8,9-HxCDD		2.46	10.6	7.78	8.69	21.8	7.40	1.91 T
1,2,3,4,6,7,8-HpCDD		118	382	388	421	2940	440	110
OCDD		1410	2830	2810	3080	29200	3670	1270
2,3,7,8-TCDF		0.481 UK	4.50	4.38	5.62	3.88	1.70	0.913 T
1,2,3,7,8-PeCDF		0.392 T	3.67	4.10	4.51	8.36	2.00 J	0.605 JT
2,3,4,7,8-PeCDF		0.471 T	3.59	3.75	4.30	13.6	2.13	0.679 T
1,2,3,6,7,8-HxCDF		1.35 T	3.85	4.10	4.79	10.5	2.76	0.897 UK
1,2,3,7,8,9-HxCDF		0.511 UK	1.47 T	1.60 T	1.77 T	13.3	1.88 T	0.569 T
1,2,3,4,7,8-HxCDF		1.46 T	6.46	5.13	5.91	43.0	5.08	1.51 T
2,3,4,6,7,8-HxCDF		1.92 T	3.97	3.97	5.54	15.6	3.70	1.27 T
1,2,3,4,6,7,8-HpCDF		37.4	44.8	43.9	57.8	167	51.8	19.6
1,2,3,4,7,8,9-HpCDF		2.44 UK	3.26	3.32	4.33	9.22	2.93	1.02 UK
OCDF		63.7	53.4	54.1	73.8	81.2	61.1	27.5
Total TCDD		4.34	66.8	56.8	83.7	4.51	9.74	15.0
Total PeCDD		11.3	80.7	60.1	78.8	25.5	27.0	8.60
Total HxCDD		56.2	286	227	249	620	181	51.3
Total HpCDD		261	939	1210	1150	7310	1040	382
Total TCDF		4.65	62.1	82.8	82.1	14.3	17.0	12.9
Total PeCDF		15.1	65.8	81.7	81.4	210	53.3	12.6
Total HxCDF		52.1	98.0	99.2	122	568	121	35.2
Total HpCDF		125	134	133	174	533	162	60.6
TEQ (Detects only)	11	3.56	17.2	15.0	17.3	69.7	13.5	2.90
TEQ (1/2 ND)	11	4.19	17.2	15.4	17.8	69.8	13.6	3.47

U = Not detected (ND) at the reporting limit indicated.
J = Estimated value.
K = Ion ratios do not meet identification criteria acceptance limits for positive identification.
T = Value is between the MDL and MRL.
Boxed value exceeds MTCA Method B Direct Contact, Unrestricted Land Use criterion.

Source: Base map prepared from DeLorme Topo 7.0, 2007.



Westbay Marina
Olympia, Washington

Vicinity Map

17800-25 5/12

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Figure
1

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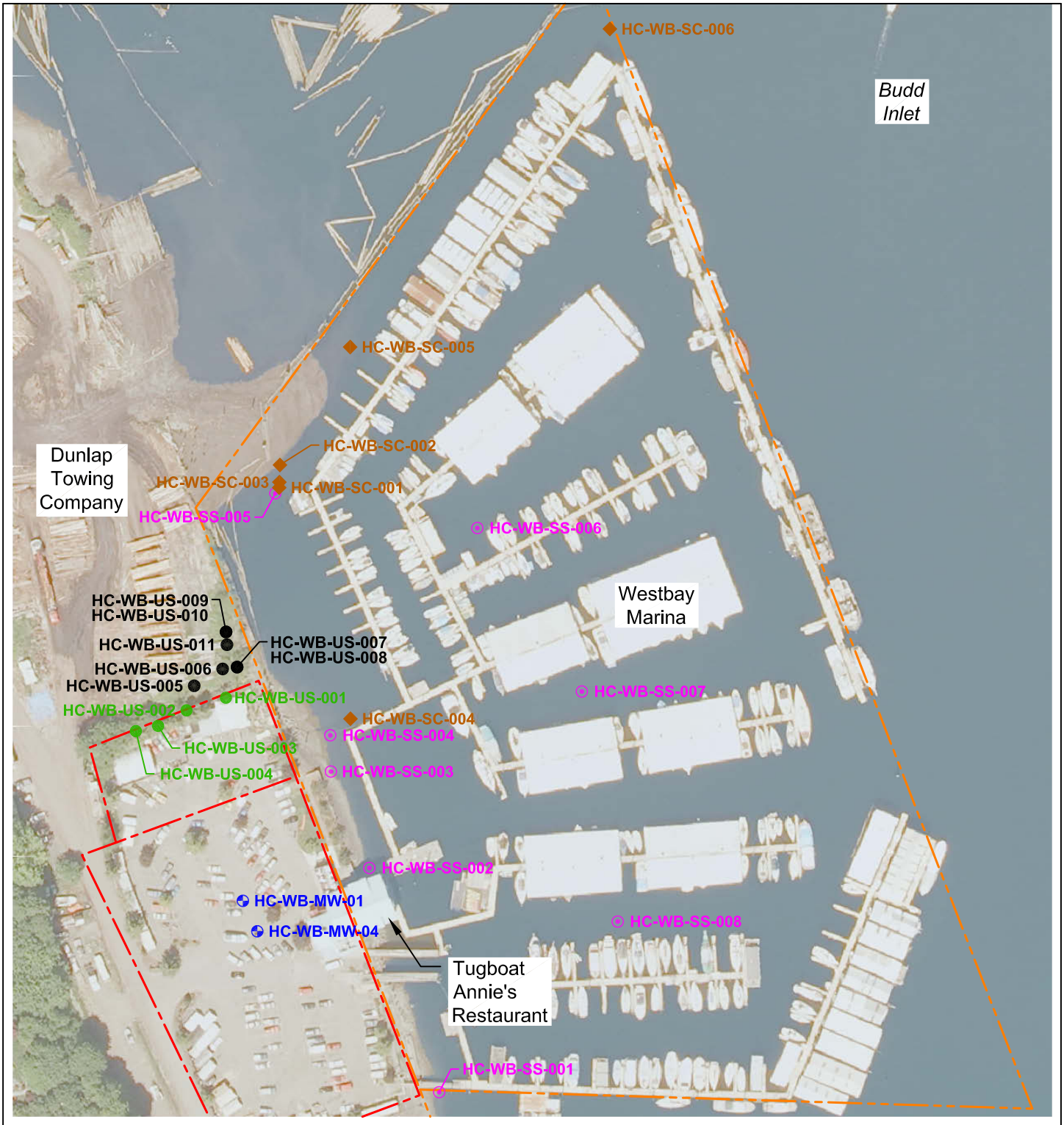

Sample Location and Number

HC-WB-US-005	Upland Soil Sample (2012)
HC-WB-SS-001	Sediment Sample (2011)
HC-WB-US-001	Upland Soil Sample (2011)
HC-WB-MW-01	Groundwater Sample (2011)
HC-WB-SC-001	Vibracore Sample (2011)

Site Boundary

DNR Aquatic Lease Boundary No. 2618

N

0 150 300

Scale in Feet

Source: Aerial photograph from USGS Seamless Server, 2010.

Westbay Marina
Olympia, Washington

Site and Exploration Plan

17800-25 5/12

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Figure **2**

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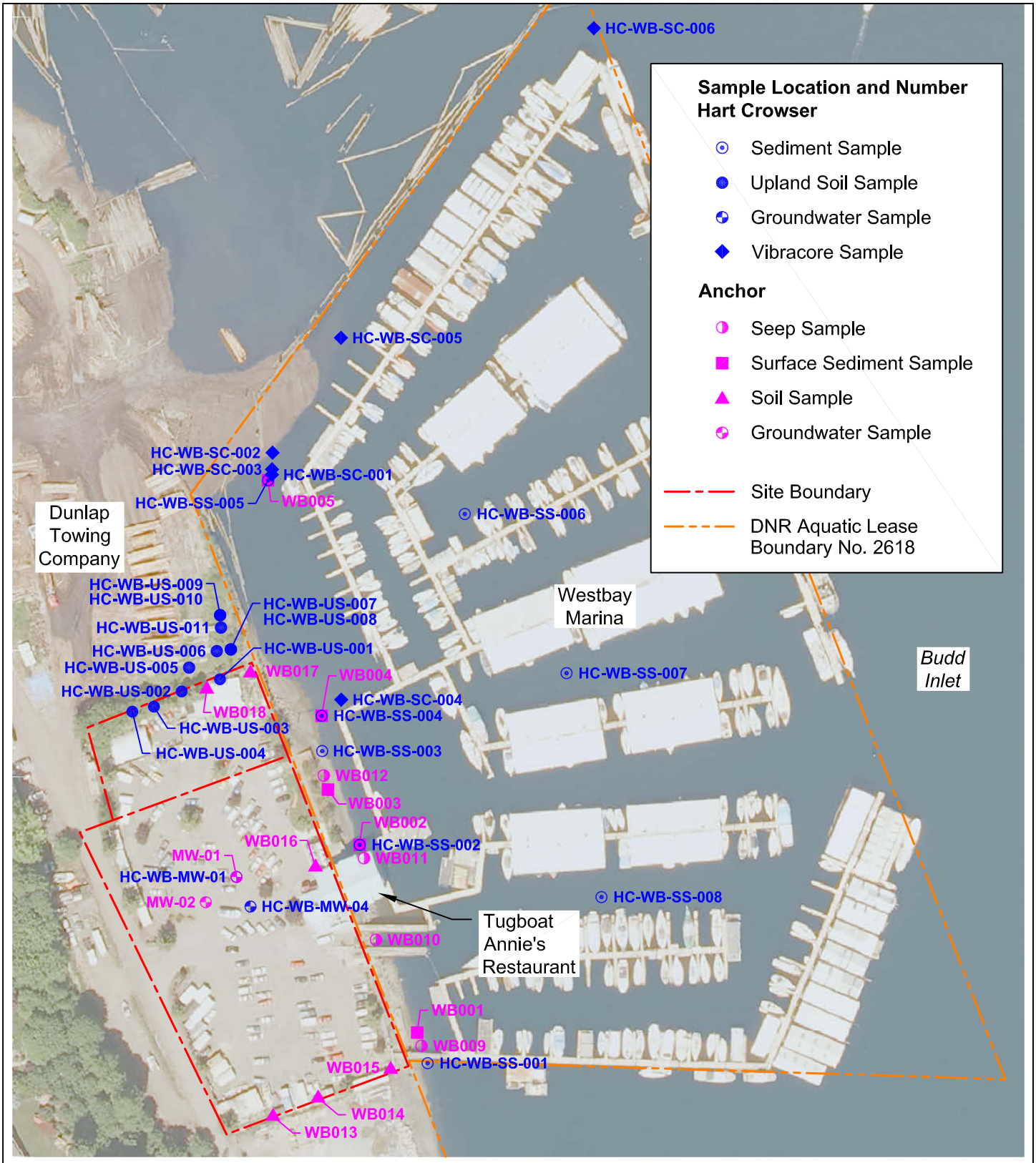

Source: Aerial photograph from USGS Seamless Server, 2010.

Westbay Marina
Olympia, Washington

2009 to 2012 Sample Location Plan

17800-25 5/12

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Figure
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APPENDIX A
FIELD DOCUMENTATION

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Table A-1 - Sample Location Coordinates

Sample Name	Location Coordinates			
	Northing	Easting	Latitude	Longitude
Upland Surface Soil Samples (US)				
HC-WB-US-005	640802.381	1038217.617	47.06523° N	122.91680° W
HC-WB-US-006	640820.341	1038247.905	47.06528° N	122.91668° W
HC-WB-US-007	640822.249	1038263.240	47.06529° N	122.91662° W
HC-WB-US-008	640822.249	1038263.240	47.06529° N	122.91662° W
HC-WB-US-009	640859.641	1038251.558	47.06539° N	122.91667° W
HC-WB-US-010	640859.641	1038251.558	47.06539° N	122.91667° W
HC-WB-US-011	640846.048	1038252.484	47.06535° N	122.91667° W

Note: Northing and Easting coordinates in NAD83 State Plane South, in U.S. feet.

Table A-2 - Soil Sample Descriptions

Sample Number	Collection Date	Visual Description	Comments
HC-WB-US-005	2/28/2012	(Medium dense), moist-damp, dark brown, silty gravelly SAND with frequent organic material (roots, twigs, pine needles).	Surface soil sample. Located below a deciduous tree on north side of creek between slopes and pile of timbers.
HC-WB-US-006	2/28/2012	(Medium dense), moist, dark brown, gravelly silty SAND with frequent organic material (roots).	Surface soil sample. Cleared wood chunks, quarry spalls, garbage, and blackberry debris prior to sampling. Samples collected 1.3 to 1.5 feet bgs due to debris.
HC-WB-US-007	2/28/2012	(Loose), damp, dark brown, silty gravelly SAND with frequent organic material (roots, twigs, blackberry debris).	Surface soil sample. Surface clear and free of debris.
HC-WB-US-008	2/28/2012	(Medium dense), moist, dark brown, silty gravelly SAND with frequent organic material (roots).	Deep soil sample. Debris encountered (quarry spalls, trash, and blackberries). Samples collected 1.5 to 1.7 feet bgs.
HC-WB-US-009	2/28/2012	(Loose), moist, dark brown, silty gravelly SAND with frequent organic material.	Surface soil sample. Sample collected from approx. 0.8 to 1.0 feet bgs due to presence of wood debris.
HC-WB-US-010	2/28/2012	(Loose-medium dense), damp to moist, brown to dark brown silty SAND with frequent organic material (mainly roots and bark).	Deep soil sample. Sample collected approx. 2.0 feet bgs due to presence of wood debris, carpet, and PVC pipe. Likely not native soil.
HC-WB-US-011	2/28/2012	(Loose), damp-moist, gray and brown slightly gravelly silty SAND with frequent organic material (mainly roots, twigs, and plant debris).	Surface soil sample. Blackberries removed from surface. Located above culvert discharing to Budd Inlet. Likely fill material.

APPENDIX B
CHEMICAL DATA QUALITY REVIEW AND LABORATORY REPORTS

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APPENDIX B
CHEMICAL DATA QUALITY REVIEW AND LABORATORY REPORTS

Chemical Data Quality Review for Upland Soil Samples

Seven upland soil samples were collected from the Dunlap Towing property, north of adjacent to the Westbay Marina property, on February 28, 2012. The samples were submitted to Analytical Resources, Inc., (ARI), in Tukwila, Washington, for analysis. The sample results were reported as ARI Job UK05. The soil samples were analyzed for the following:

- Dioxins/Furans by EPA Method 1613B; and
- Total solids by EPA Method 160.3 modified.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. Hart Crowser performed the data review, using laboratory quality control results summary sheets and raw data, as required, to ensure they met data quality objectives for the project. Data review followed the format outlined in the National Functional Guidelines for Organic Data Review (EPA 2008) and the National Functional Guidelines for Dioxins/Furans Data Review (EPA 2005) modified to include the specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Labeled compound recoveries;
- Ongoing precision and recovery sample (OPR) recoveries;
- Calibration criteria; and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data review follow.

Sample Receiving Discrepancies

There were no sample receiving discrepancies. The samples were received at the laboratory within the recommended temperature range of less than 6°C.

Dioxins/Furans

Analytical Methods

Soil samples for dioxins/furans analysis were prepared and analyzed by EPA Method 1613B.

Sample Holding Times

The samples were prepared and analyzed within holding time limits.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. Samples were reported to the laboratory reporting limit, but calculated to the estimated detection limit (EDL). Detections that fell between the reporting limit and the EDL were qualified by the laboratory as "J." The laboratory "J" qualifier was changed to "T" to be consistent with Ecology's EIM database.

Blank Contamination

The method blank had detections for multiple analytes between the EDL and the RL. Method blank results that did not meet ion ratio criteria (EMPC results qualified as "K") were treated as non-detected. The detections in the associated samples were evaluated and results modified as follows:

- MB-030712: The method blank had the following detection, which met ion identification criteria, between the EDL and the RL.
    - OCDD – 0.334 pg/g

Results for OCDD in the associated samples were detected above the RL and greater than ten times the amount in the method blank, and were not qualified.

Detections for 2,3,4,7,8-PeCDF and 1,2,3,4,6,7,8-HpCDF did not meet the ion identification criteria in the method blank. Results for those congeners in the associated samples were not qualified due to method blank contamination.

Labeled Compound Recovery

Labeled compound recoveries were within method control limits.

Ongoing Precision and Accuracy Sample Recovery

OPR recoveries were within advisory laboratory control limits.

Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)

The initial calibration curves and CCVs were within acceptance criteria.

Sample Qualifiers

Multiple compounds in the samples were qualified by the laboratory with EMPC (estimated maximum possible concentration) due to failure to meet identification criteria. EMPC is defined in the EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and/or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria." Results for those analytes were reported as non-detect and qualified as "UK."

Some congeners were qualified by the laboratory with "X" due to interference from polychlorinated diphenyl ethers. The "X" qualifiers were changed to "J" (estimated) in the following samples:

- HC-WB-US-010: 1,2,3,7,8-PeCDF; and
- HC-WB-US-011: 1,2,3,7,8-PeCDF.

Total Solids

Analytical Methods

Total solids were determined by modified EPA Method 160.3.

Sample Holding Times

The samples met holding time limits.

Laboratory Detection Limits

Reported detection limits were acceptable.

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APPENDIX B
LABORATORY REPORTS
(SEE ATTACHED CD-ROM)

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APPENDIX C
FIELD INVESTIGATION PHOTOGRAPHS
WESTBAY MARINA
OLYMPIA, WASHINGTON

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Photograph 1. Upland soil sample location HC-WB-US-005. (←UP)

Photograph 2. Upland soil sample location HC-WB-US-006.

Photograph 3. Upland soil sample location HC-WB-US-007.

Photograph 4. Upland soil sample location HC-WB-US-008. (←UP)

Photograph 5. Upland soil sample location HC-WB-US-009.

Photograph 6. Upland soil sample location HC-WB-US-010.

Photograph 7. Upland soil sample location HC-WB-US-011. (←UP)