

**2020 Annual Groundwater Monitoring Report  
North Marina Bayside/ABW  
Everett, Washington**

September 8, 2021

Prepared for

Port of Everett  
Everett, Washington



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## 2020 Annual Groundwater Monitoring Report North Marina Bayside/ABW Everett, Washington

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## LIST OF ABBREVIATIONS AND ACRONYMS

°C.....	degrees Celsius
µg/L.....	micrograms per liter
µS/cm.....	microsiemens per centimeter
Bayside/ABW.....	North Marina Bayside Marine/American Boiler Works
Ecology.....	Washington State Department of Ecology
EPA.....	US Environmental Protection Agency
FeAs.....	iron-arsenic
LAI.....	Landau Associates, Inc.
mg/L.....	milligrams per liter
mV.....	millivolt
MTCA.....	Model Toxics Control Act
NFA.....	no further action
ORP.....	oxygen reduction potential
Port.....	Port of Everett
Site.....	North Marina Bayside Marine/American Boiler Works
VCP.....	Ecology's Voluntary Cleanup Program

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## 1.0 INTRODUCTION

This report summarizes the field activities and analytical results for the 2020 annual groundwater quality monitoring events at the Port of Everett's (Port's) North Marina Bayside Marine/American Boiler Works site (Bayside/ABW Site or Site) in Everett, Washington (Figure 1).

### 1.1 Background

Cleanup at the Site was completed through the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP) in 2015 as described in the Investigation and Cleanup Report (LAI 2015). Ecology issued a no further action (NFA) determination in October 2015 (Ecology 2015). The NFA and associated environmental covenant executed in September 2015 (Enclosure B of the NFA; Ecology 2015) required confirmational groundwater monitoring for a period of 5 years in order to demonstrate that concentrations of arsenic in groundwater are above the Model Toxics Control Act (MTCA) Method A cleanup level within the Site only where reducing conditions are present, and that concentrations of arsenic in groundwater meet the cleanup level at the downgradient point of compliance (monitoring well P-27). The 5<sup>th</sup> year of confirmational monitoring, described in this report, was completed in 2020. The four monitoring wells identified for groundwater monitoring consist of wells HWA-MW1, HWA-MW2, P-26, and P-27 (Figure 2). Well P-27 has been replaced twice and is now called P-27C.

The Site has been in the process of development since late 2019 and throughout all of 2020. The Port conducted modifications to monitoring wells HWA-MW1, HWA-MW2, and P-26 in November 2019 in anticipation of paving activities at the Site, which are still in process. The monitoring wells were extended to be above ground surface by approximately 1–3 feet depending on the relative surrounding grade. A temporary protective casing was placed around each of the wells to prevent damage during paving activities. These temporary casings will remain in-place until development is complete, which is anticipated to be in summer of 2021.

### 1.2 Site Description

The Site is located on the eastern portion of the Port's Waterfront Place Central Redevelopment Area and is approximately 3 acres in size. The Site is generally bounded by 13<sup>th</sup> Street/Port Gardner Way followed by a boatyard to the north, West Marine View Drive followed by railroad tracks to the east, 14<sup>th</sup> Street followed by the former Everett Shipyard site to the south, and recently developed land and a hotel to the west. Port Gardner Bay and a marina are located to the southwest of the Site. The eastern portion of the Bayside Marine/ABW VCP Site consists of the former ABW Plant I leasehold, which is now owned by American Classic Homes. The western portion of the Site consists of a portion of the former Everett Bayside Marine Leasehold, which is owned by the Port and leased for redevelopment as a hotel. The Site is currently being constructed as a parking lot for private and public use. Redevelopment is occurring across the Waterfront Place Central Redevelopment Area, including at the Site.

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## 2.0 FIELD ACTIVITIES

Described below are the 2020 annual groundwater monitoring activities were conducted on June 10, 2020, as required by the NFA and environmental covenant.

### 2.1 Groundwater Elevations

Prior to sampling, each of the groundwater wells were inspected to confirm that they had not been damaged. All four monitoring wells were found to be in good condition for sampling, and the depth to groundwater was measured from the top of the well casing at each well. The groundwater elevation at P-27C was calculated and the result is shown in Table 1, along with the cumulative groundwater elevation data for all wells since March 2016. As temporary well extensions were in place at the time of the monitoring event at wells HWA-MW1, HWA-MW2, and P-26, groundwater elevations at these locations were not calculated because the temporary casings were not surveyed. Groundwater contours for 2020 are not included in this annual report; however, groundwater flow direction at the Site has consistently been toward the west, and monitoring well P-27C is an appropriate downgradient well, as documented in previous reports.

### 2.2 Groundwater Sampling

Immediately following the groundwater elevation measurements, groundwater samples were collected from all four groundwater monitoring wells. Groundwater sampling was conducted using low-flow sampling techniques with a peristaltic pump and dedicated sample tubing. The wells were purged and field parameters (temperature in degrees Celsius [°C]; conductivity in microsiemens per centimeter [ $\mu\text{S}/\text{cm}$ ]; dissolved oxygen in milligrams per liter [ $\text{mg}/\text{L}$ ]; pH; and oxygen reduction potential [ORP] in millivolts [mV]) were recorded every 3 minutes until stabilization objectives were achieved. Groundwater was collected into laboratory-supplied containers and submitted to an accredited analytical laboratory under LAI's standard chain-of-custody procedures.

### 2.3 Groundwater Analysis

Groundwater samples were collected and analyzed for dissolved arsenic and natural attenuation parameters (i.e., nitrate, sulfate, and methane) at each monitoring well. Samples for dissolved arsenic analysis were field-filtered using a 0.45-micron single-use groundwater filter. Samples were submitted to ALS Environmental laboratory in Everett, Washington.

### 2.4 Quality Assurance

Field and laboratory control samples were used to evaluate data precision, accuracy, representativeness, completeness, and comparability of the analytical results. The quality control samples included collection and analysis of one field duplicate for each analysis performed and analysis of a laboratory duplicate. The field duplicate was collected from monitoring well HWA-MW1 and identified on the chain-of-custody as "DUP."

Validation of the analytical data was performed by LAI following the guidelines in the appropriate sections of the US Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review (EPA 1999, 2004), and included evaluation of the following:

- Chain-of-custody records
- Holding times
- Laboratory method blanks
- Blank spikes/laboratory control samples
- Field duplicate results
- Completeness
- Overall assessment of data quality.

Based on the validation, all the data were determined to be acceptable for use. No qualification of the data was necessary.



### 3.0 2020 GROUNDWATER MONITORING RESULTS

The cumulative, 5-year confirmational monitoring analytical results required under the environmental covenant, are presented in Table 2; VCP cleanup data from 2014 and 2015 monitoring events are included in Appendix A. Additionally, a calculated average of comparable, spring season ferrous iron results are included on Table 2. The laboratory analytical report is included as Appendix B. All data through 2020 were submitted to Ecology's Environmental Information Management system on October 2, 2020.

Dissolved arsenic was detected at concentrations ranging from 6.5 to 11 micrograms per liter ( $\mu\text{g/L}$ ) at monitoring wells HWA-MW1, HWA-MW2, and P-26, which is above the site cleanup level of 5  $\mu\text{g/L}$ . Dissolved arsenic was also detected at 1.8  $\mu\text{g/L}$  at downgradient well P-27C, which is below the CUL. The detected concentrations of dissolved arsenic at the point of compliance (P-27C) and in the three, upgradient wells were within the range of previously detected concentrations. Arsenic has been detected above the cleanup level once at the point of compliance in May 2015, but the elevated concentration was considered biased high because of active construction in the area. After replacing the well in 2018, arsenic was not detected above the laboratory reporting limit at P-27C for the next two sampling events (June 2018 and 2019) and was well below the cleanup level in 2020.

The 2020 annual sampling natural attenuation parameter results, such as methane, nitrate, and sulfate, in groundwater are summarized below for both the on-parcel monitoring wells and the downgradient point of compliance.

- On-Parcel Wells:
  - **Methane** concentrations in groundwater ranged from 2.1 to 5.6  $\mu\text{g/L}$ .
  - **Nitrate** was not detected at or above the laboratory reporting limit (0.15  $\mu\text{g/L}$ ) in any of the on-parcel wells.
  - **Sulfate** was detected above the laboratory reporting limit (0.26  $\mu\text{g/L}$ ) at two of three on-parcel wells, and concentrations ranged from 0.53 to 8.4  $\mu\text{g/L}$  (HWA-MW1 and HWA-MW2, respectively).
- Downgradient Point of Compliance:
  - **Methane and sulfate** were detected above the laboratory reporting limits at monitoring well P-27C; 0.29  $\mu\text{g/L}$  methane and 34  $\mu\text{g/L}$  sulfate.
  - **Nitrate** was not detected at or above the laboratory reporting limit (0.15  $\mu\text{g/L}$ ) at P-27C.

Conditions that are at least iron-reducing will release arsenic due to reduction (solubilization) of iron-arsenic (FeAs) complexes. Natural attenuation parameter results indicate that groundwater conditions at the Site are naturally reduced and therefore create conditions for naturally occurring arsenic; moreover, arsenic is not persisting at the downgradient point of compliance well P-27C. Cumulative confirmational monitoring data indicate that conditions are not only iron-reducing, based on the

detection of ferrous iron at all monitoring locations, but also indicate that sulfate reduction and methanogenesis are occurring across the Site, as made evident by the presence of methane and sulfate in the on-parcel and downgradient groundwater sampling locations.

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## 4.0 CONCLUSIONS

The fifth annual confirmational groundwater monitoring event was completed at the Site on June 10, 2020. Groundwater samples were analyzed for dissolved arsenic, methane, nitrate, and sulfate at all sample locations. Concentrations of dissolved arsenic detected in groundwater at the Site during routine monitoring completed in 2020 are generally consistent with previous sampling data, with no detection of dissolved arsenic above the established cleanup level at the downgradient well (P-27C). The maximum detected concentration of dissolved arsenic during the 2020 monitoring event (11 µg/L) is below the maximum detected concentrations during previous monitoring events.

Site data continue to support the conclusion that elevated concentrations of arsenic are present due to reducing conditions and are unrelated to Site releases. Nitrate is limited in the Site groundwater, but the presence of ferrous iron, sulfate, and methane support the conclusion that elevated arsenic concentrations at the Site are associated with reducing conditions, and reducing conditions sufficiently dissipate by the time groundwater migrates to the P-27C vicinity for groundwater to achieve the Site cleanup standard for arsenic.

Based on the cumulative confirmational results of groundwater monitoring, Site groundwater does not pose a threat to human health and the environment. Because groundwater at the Site is not used as drinking water, the pathway of concern is a release to marine surface water, and the criteria established in the NFA opinion letter and environmental covenant are satisfied. With the exception of the anomalous result during the 2017 monitoring event, dissolved arsenic was not detected at concentrations greater than the cleanup level in any of the 11 groundwater samples collected from the downgradient monitoring well P-27/P-27B/P-27C between March of 2014 and June of 2020, indicating that there is no complete pathway to marine surface water.

In accordance with the NFA and environmental covenant, and because the requirements of these documents have been satisfied, the Port requests that cessation of annual monitoring be granted by Ecology.

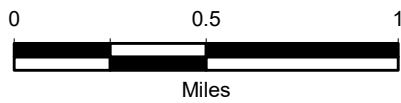
## **5.0 USE OF THIS REPORT**

This document has been prepared for the exclusive use of the Port and Ecology for specific application to the North Marina Bayside/ABW Project. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of the Port and LAI. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by the Port and LAI, shall be at the user's sole risk. LAI warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

## 6.0 REFERENCES

- Ecology. 2015. Letter: Re: No Further Action at the following Site: North Marina Bayside ABW, 1332 West Marine View Drive, Everett, WA 98201. From Washington State Department of Ecology, to Elise Gronewald, Port of Everett. October 1.
- EPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA 540/R-99/008. US Environmental Protection Agency. October.
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- LAI. 2015. Environmental Investigation and Cleanup Documentation, American Boiler Works/Bayside Marine Site, Everett, Washington. Landau Associates, Inc. April 27.

G:\Projects\147\037030\04\F01 VicMap.mxd 7/25/2019 NAD 1983 StatePlane Washington North FIPS 4601 Feet



Data Source: Esri 2012

North Marina  
 ABW/Bayside Marine VCP Site  
 Port of Everett, Washington

### Vicinity Map




Figure  
**1**



Landau Associates | G:\Projects\147\037\030\041\F02-F03 GroundwaterLocations.dwg | 5/14/2021 2:11 PM | ezick



**Legend**

-  Decommissioned May 19, 2017
-  Monitoring Well Network (P-27C replaced P-27B)
-  Snohomish County Parcel Line / Area of Groundwater Use Restriction

**Note**

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Scale in Feet

Source: ©Bing Imagery, 2015; Snohomish County GIS (parcel data);



North Marina  
 ABW/Bayside Marine VCP Site  
 Port of Everett, Washington

**Groundwater Monitoring Locations**

Figure  
**2**

**Table 1**  
**Groundwater Elevation Summary**  
**North Marina Bayside/ABW Site**  
**Everett, Washington**

Well ID	Date	TOC Elevation (ft)	GW Depth (ft)	GW Elevation
HWA-MW1	3/29/2016	17.45	1.82	15.63
	6/13/2016		4.40	13.05
	9/20/2016		4.92	12.53
	11/29/2016		1.02	16.43
	5/16/2017		1.87	15.58
	6/28/2018		4.00	13.45
	6/18/2019		4.66	12.79
	6/10/2020		NM	NA
HWA-MW2	3/29/2016	17.50	1.80	15.70
	6/13/2016		4.13	13.37
	9/20/2016		4.62	12.88
	11/29/2016		2.08	15.42
	5/16/2017		2.00	15.50
	6/28/2018		3.45	14.05
	6/18/2019		4.68	12.82
	6/10/2020		NM	NA
P-26	3/29/2016	17.22	2.78	14.44
	6/13/2016		4.41	12.81
	9/20/2016		5.98	11.24
	11/29/2016		2.08	15.14
	5/16/2017		2.84	14.38
	6/28/2018		4.16	13.06
	6/18/2019		6.00	11.22
	6/10/2020		NM	NA
P-27B	3/29/2016	15.24	4.30	10.94
	6/13/2016		4.97	10.27
	9/20/2016		5.20	10.04
	11/29/2016		3.63	11.61
	5/16/2017		3.95	11.29
P-27C (a)	6/28/2018	15.24	4.95	10.29
	6/18/2019		4.23	11.01
	6/10/2020	18.61	7.07	11.54

**Abbreviations and Acronyms:**

ft = feet  
 GW = groundwater  
 ID = identification  
 TOC = top of casing

NM = not measured  
 NA = not available

**Notes:**

(a) P-27C installed within immediate vicinity of P-27B, which was decommissioned after the 2017 monitoring event. P-27C was installed to replace P-27B as the point of compliance downgradient of the Site. Groundwater elevation was measured after June 2019 modifications.



**Table 2**  
**Groundwater Monitoring Results**  
**North Marina Bayside/ABW Site**  
**Everett, Washington**

Sample Location	Sample Date (a)	Sample Type	Laboratory Sample ID	EPA 200.8 Dissolved Arsenic µg/L	RSK-175 Methane mg/L	EPA 300.0 Nitrate mg/L	Sulfate mg/L	Hach Kit Ferrous Iron mg/L
		<b>Site Cleanup Level:</b>		5	NA	NA	NA	NA
HWA-MW1	03/29/2016	N	EV16030229-03	22	3.0 J	0.15 U	1.8	2.5
HWA-MW1	03/29/2016	FD	EV16030229-02	21	3.9 J	0.15 U	1.8	2.5
HWA-MW1	6/13/2016	N	EV16060085-05	36	3.6	0.15 U	0.26 U	1.8
HWA-MW1	6/13/2016	FD	EV16060085-02	35	3.3	0.15 U	0.26 U	1.8
HWA-MW1	9/20/2016	N	EV16090134-02	35	3.8	0.15 U	13	2.0
HWA-MW1	9/20/2016	FD	EV16090134-01	34	4.0	0.15 U	13	2.0
HWA-MW1	11/29/2016	N	EV16110191-04	24	2.1	0.15 U	2.3	3.2
HWA-MW1	11/29/2016	FD	EV16110191-02	24	1.9	0.15 U	2.7	3.2
HWA-MW1	5/16/2017	N	EV17050101-04	18	0.38	0.15 UJ	3.3	2.0
HWA-MW1	5/16/2017	FD	EV17050101-03	18	0.38	0.54 J	3.3	NM
HWA-MW1	6/28/2018	N	EV18060181-04	18	0.42 J	0.15 U	3.4	3.3
HWA-MW1	6/28/2018	FD	EV18060181-01	18	0.63 J	0.15 U	3.2	3.3
HWA-MW1	6/18/2019	N	EV19060126-05	12	2.0	0.15 U	0.26 U	4.4
HWA-MW1	6/18/2019	FD	EV19060126-01	12	1.7	0.27	0.26 U	4.4
HWA-MW1	6/10/2020	N	EV20060055-03	11	2.3	0.15 U	0.53 J	3.6 (d)
HWA-MW1	6/10/2020	FD	EV20060055-02	11	2.1	0.15 U	0.93 J	3.6 (d)
HWA-MW2	03/29/2016	N	EV16030229-04	9.8	31	0.15 U	0.26 U	1.5
HWA-MW2	6/13/2016	N	EV16060085-03	11	5.1	0.15 U	0.26 U	1.0
HWA-MW2	9/20/2016	N	EV16090134-04	24	4.8	0.15 U	0.26 U	2.6

**Table 2**  
**Groundwater Monitoring Results**  
**North Marina Bayside/ABW Site**  
**Everett, Washington**

Sample Location	Sample Date (a)	Sample Type	Laboratory Sample ID	EPA 200.8 Dissolved Arsenic µg/L	RSK-175 Methane mg/L	EPA 300.0 Nitrate mg/L	Sulfate mg/L	Hach Kit Ferrous Iron mg/L
Site Cleanup Level:				5	NA	NA	NA	NA
HWA-MW2	11/29/2016	N	EV16110191-03	15	8.3	0.15 U	0.26 U	2.4
HWA-MW2	5/16/2017	N	EV17050101-02	10	7.8	0.15 U	0.26 U	0.0
HWA-MW2	6/28/2018	N	EV18060181-03	18	4.7	0.15 U	0.34	2.4
HWA-MW2	6/18/2019	N	EV19060126-03	17	4.3	0.15 U	0.32	4.4
HWA-MW2	6/10/2020	N	EV20060055-04	11	4.6	0.15 U	8.4	2.2 (d)
P-26	03/29/2016	N	EV16030229-01	18	10	0.15 U	0.26 U	2.0
P-26	6/13/2016	N	EV16060085-04	7.2	5.9	0.15 U	0.26 U	1.4
P-26	9/20/2016	N	EV16090134-03	2.8	3.5	0.15 U	0.26 U	1.8
P-26	11/29/2016	N	EV16110191-05	23	2.3	0.15 U	0.26 U	2.0
P-26	5/16/2017	N	EV17050101-05	18	1.6	0.15 U	0.26 U	3.4
P-26	6/28/2018	N	EV18060181-05	18	1.3	0.15 U	0.26 U	4.6
P-26	6/18/2019	N	EV19060126-04	14	3.2	0.15 U	0.26 U	5.0
P-26	6/10/2020	N	EV20060055-01	6.5	5.6	0.15 U	0.26 U	4.2 (d)
P-27B	03/29/2016	N	EV16030229-05	1.2	3.1	0.15 U	17	0.5
P-27B	6/13/2016	N	EV16060085-01	1.3	1.8	0.15 U	2.6	1.2
P-27B	9/20/2016	N	EV16090134-05	1.5	4.3	0.15 U	0.26 U	3.0
P-27B	11/29/2016	N	EV16110191-01	2.2	0.010 U	0.74	16	0.8
P-27B (b)	5/16/2017	N	EV17050101-01	6.2	0.21	8.2	120	0.0

**Table 2**  
**Groundwater Monitoring Results**  
**North Marina Bayside/ABW Site**  
**Everett, Washington**

Sample Location	Sample Date (a)	Sample Type	Laboratory Sample ID	EPA 200.8 Dissolved Arsenic µg/L	RSK-175 Methane mg/L	EPA 300.0 Nitrate mg/L	Sulfate mg/L	Hach Kit Ferrous Iron mg/L
<b>Site Cleanup Level:</b>				5	NA	NA	NA	NA
P-27C (c)	6/28/2018	N	EV18060181-02	4.0 U	<b>0.30</b>	0.15 U	<b>220</b>	<b>4.4</b>
P-27C	6/18/2019	N	EV19060126-02	1.0 U	<b>0.21</b>	<b>0.18</b>	<b>100</b>	<b>3.0</b>
P-27C	6/10/2020	N	EV20060055-05	<b>1.8</b>	<b>0.29</b>	0.15 U	<b>34</b>	<b>1.5 (d)</b>

**Notes:**

U = The compound was not detected at the reported concentration.

UJ = The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

**Bold** = detected compound

**Green Box** = detected concentration is greater than Site Cleanup Level

**Abbreviations and Acronyms:**

-- = not analyzed

µg/L = microgram per liter

EPA = US Environmental Protection Agency

FD = field duplicate

ID = identification

mg/L = milligram per liter

N = primary sample

NA = not applicable

NM = not measured

(a) Sampling frequency changed from quarterly to annually beginning 2017.

(b) The arsenic reporting limit was raised by the laboratory to address background contamination in the associated method blank.

(c) P-27C installed within immediate vicinity of P-27B, which was decommissioned after the 2017 monitoring event. P-27C was installed to replace P-27B as the point of compliance downgradient of the Site.

(d) Ferrous Iron values were estimated by averaging the results from previous spring (May and June) sampling events.

# **2014–2015 Groundwater Monitoring Data**

**GROUNDWATER ANALYTICAL DATA (2014-2015)  
NORTH MARINA ABW/BAYSIDE MARINE VCP SITE  
PORT OF EVERETT, WASHINGTON**

Sample ID Laboratory ID Date Collected	Preliminary Cleanup Level (a)	P-26 7/24/2014	P-26 8/18/2014	P-26 9/3/2014	P-26 ZN28F 12/3/2014	P-26 ZZ75C 3/10/2015	P-27 YC90A 3/13/2014	Dup of P-27 DUP-1 YC90B 3/13/2014	P-27 7/24/2014	P-27 9/3/201	P-27 ZN28A 12/3/2014	Dup of P-27 DUP1 ZN28B 12/3/2014	P-27 AC91A/ZZ75G 3/26/2015	Dup of P-27 DUP-2 ZZ75F 3/10/2015	HWA-MW1 7/24/2014	HWA-MW1 8/18/2014	HWA-MW1 9/3/2014	HWA-MW1 ZN28D 12/3/2014
<b>DISSOLVED METALS (µg/L) Method SW6000-7000</b>																		
Arsenic	5	15	9.8	6.3	18.6	12.8	0.5 U	0.6	1 U	1 U	3.0		1.7	64	77	91	65.1	
Cadmium		1 U		1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U		0.1 U	1 U		1 U	0.1 U	0.1 U
Chromium	240,000	2 U		2 U	2	1			2 U	2 U	1 U		0.5 U	2.1		2.2	3	
Copper	2.4	2 U		2 U	0.5	0.5 U	0.5 U	0.6	2 U	2 U	0.8		0.5	2 U		2 U	0.7	
Lead		1 U		1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U		0.1 U	1 U		1 U	0.1 U	0.1 U
Mercury		0.2 U		0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U		0.1 U	0.2 U		0.2 U	0.1 U	
Silver																		
Zinc	81	2.5 U		5.7	4 U	4 U	4 U	5	2.5 U	8.2	5		4 U	2.5 U		7.6	8	
<b>NWTPH-Dx (mg/L)</b>																		
Diesel-Range	0.5	0.14		0.18	0.10 U	0.10 U	0.13 U	0.11 U	0.13 U	0.13 U	0.10 U		0.10 U	0.15		0.13	0.10 U	
Motor Oil-Range	0.5	0.25 U		0.25 U	0.20 U	0.20 U	0.27 U	0.23 U	0.25 U	0.25 U	0.20 U		0.20 U	0.25 U		0.25 U	0.20 U	
<b>NWTPH-Gx (mg/kg)</b>																		
Gasoline-Range	0.8										0.25 U	0.25 U	0.25 U	0.25 U				
<b>DISSOLVED GASES (µg/L) RSK-175</b>																		
Methane					8980	15100					503	536	5780				15000	
<b>CONVENTIONALS (mg/L) Method EPA300.0</b>																		
Nitrate			0.18	0.19	0.1 U	0.1				0.15 U	0.1 U		0.1 U		0.15 U	0.27	0.1	
Sulfate			0.26 U	0.37	0.1 U	0.2				0.58	9.1		4.1		0.26 U	0.26 U	0.5	
<b>Field Parameters</b>																		
pH		6.42	7.01	7.14	6.71	6.04	6.39	6.33	7.05	7.21	7.3		6.37	6.59	6.87	6.8	6.74	
Conductance (µS/cm)		1112	989	968	4.59	404	856	856	3430	481	460		421	1259	1204	968	736	
Temperature (°C)		18.3	17.6	20.7	13.07	11.94	11.79	11.79	18.5	20.2	10.9		11.54	20.6	17.9	22.7	11.93	
Dissolved Oxygen (mg/l)		3	0.33	0.39	0.49	4.41	1.92	1.92	0.23	0.63	0.95		1.19	0.27	0.54	0.39	0.51	
ORP (mV)			95	120	-92.2	-82	-84.7	-84.7		39	-42.6		-28		50	49	-114.6	
Ferrous Iron (mg/L)			1.2	1	1.2	1.8				0.4	1.5		1.4		1.6	1.5	1.6	
Turbidity (NTU)					87.87	12.3	2.57	2.57			0.27		1.66				1.72	

**GROUNDWATER ANALYTICAL DATA (2014-2015)  
NORTH MARINA ABW/BAYSIDE MARINE VCP SITE  
PORT OF EVERETT, WASHINGTON**

Sample ID Laboratory ID Date Collected	Preliminary Cleanup Level (a)	Dup of HWA-MW1			Dup of HWA-MW1				HWA-MW2		HWA-MW2		HWA-MW2		HWA-MW2		HWA-MW3		HWA-MW3		HWA-MW3		HWA-MW3	
		DUP2 ZN28E 12/3/2014	HWA-MW1 ZZ75B 3/10/2015	DUP-1 ZZ75A 3/10/2015	HWA-MW2 7/24/2014	HWA-MW2 9/3/2014	HWA-MW2 ZN28G 12/3/2014	HWA-MW2 ZZ75D 3/10/2015	HWA-MW3 7/24/2014	HWA-MW3 9/3/2014	HWA-MW3 ZN28C 12/3/2014	HWA-MW3 ZZ75E 3/10/2015												
<b>DISSOLVED METALS (µg/L)</b>																								
<b>Method SW6000-7000</b>																								
Arsenic	5	<b>66.3</b>	<b>51.5</b>	<b>52.5</b>	2.7	<b>8.2</b>	<b>9.6</b>	<b>8.1</b>	2.1	1 U	2.4	3.2												
Cadmium		0.1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U
Chromium	240,000	2	1.8	1.8	2.1	2.8	2	1.4	2 U	2 U	1	1.1												
Copper	2.4	0.7	0.8	0.7	2 U	2 U	0.6	0.5 U	2 U	2 U	0.6	0.5												
Lead		0.2	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	0.1 U
Mercury		0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U
Silver																								
Zinc	81	8	4	4 U	2.5 U	13	4	4 U	2.5 U	10	6	4 U												
<b>NWTPH-Dx (mg/L)</b>																								
Diesel-Range	0.5	0.10 U	0.10 U	0.10 U	0.22	0.14	0.10 U	0.10 U	0.13 U	0.13 U	0.10 U	0.10 U	0.13 U	0.13 U	0.10 U	0.10 U	0.13 U	0.13 U	0.10 U	0.10 U	0.13 U	0.13 U	0.10 U	0.10 U
Motor Oil-Range	0.5	0.20 U	0.20 U	0.20 U	0.25 U	0.25 U	0.20 U	0.20 U	0.25 U	0.25 U	0.20 U	0.20 U	0.25 U	0.25 U	0.20 U	0.20 U	0.25 U	0.25 U	0.20 U	0.20 U	0.25 U	0.25 U	0.20 U	0.20 U
<b>NWTPH-Gx (mg/kg)</b>																								
Gasoline-Range	0.8																							
<b>DISSOLVED GASES (µg/L)</b>																								
<b>RSK-175</b>																								
Methane		14000	17700	16900			13300	25200			3480	9550												
<b>CONVENTIONALS (mg/L)</b>																								
<b>Method EPA300.0</b>																								
Nitrate		0.1	0.1 U	0.1 U		0.61	0.1 U	0.1 U		0.17	0.1 U	0.1 U		0.17	0.1 U	0.1 U		0.17	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Sulfate		0.4	0.2	0.3		0.26 U	0.1 U	0.8		0.26 U	0.1	0.5		0.26 U	0.1	0.5		0.26 U	0.1	0.5	0.5	0.5	0.5	0.5
<b>Field Parameters</b>																								
pH		6.75	6.19		6.42	6.38	6.15	6.22	6.71	7.13	6.82	6.78												
Conductance (µS/cm)		736	663		1400	847	389	326	1031	938	406	334												
Temperature (°C)		11.94	11.95		17.7	20.5	13.23	11.46	15.4	17	11.87	11.09												
Dissolved Oxygen (mg/l)		0.52	5.05		0.21	0.66	0.36	2.37	0.26	0.41	0.54	1.54												
ORP (mV)		-114.6	-105			75	-13.8	-70		143	-63.5	-80												
Ferrous Iron (mg/L)		1.6	1.4			0.6	5	1.8		1.7	1.8	1.4												
Turbidity (NTU)		2.05	8.82				104.2	62.1			26.7	70.9												

Box indicates exceedance of cleanup level.  
 Bold indicates detected value.  
 ND = Not Detected  
 µg/L = micrograms per liter  
 mg/L = milligrams per liter  
 mg/kg = milligrams per kilogram

U = Indicates the compound was undetected  
 UJ = The analyte was not detected in the sample; the reported sample detection limit is an estimate.

# Laboratory Data Reports



June 24, 2020

Ms. Stephanie Renando  
Landau Associates, Inc.  
130 - 2nd Ave. S.  
Edmonds, WA 98020

Dear Ms. Renando,

On June 10th, 5 samples were received by our laboratory and assigned our laboratory project number EV20060055. The project was identified as your ABW Marine - 147037.030.043. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan  
Laboratory Director





CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc. DATE: 6/24/2020  
130 - 2nd Ave. S. ALS JOB#: EV20060055  
Edmonds, WA 98020 ALS SAMPLE#: EV20060055-01  
CLIENT CONTACT: Stephanie Renando DATE RECEIVED: 06/10/2020  
CLIENT PROJECT: ABW Marine - 147037.030.043 COLLECTION DATE: 6/10/2020 8:30:00 AM  
CLIENT SAMPLE ID: P-26-200610 WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	5.6	0.050	5	MG/L	06/23/2020	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	06/10/2020	JNF
Sulfate	EPA-300.0	U	0.26	1	MG/L	06/10/2020	JNF
Arsenic (Dissolved)	EPA-200.8	6.5	1.0	1	UG/L	06/10/2020	RAL

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc. DATE: 6/24/2020  
130 - 2nd Ave. S. ALS JOB#: EV20060055  
Edmonds, WA 98020 ALS SAMPLE#: EV20060055-02  
CLIENT CONTACT: Stephanie Renando DATE RECEIVED: 06/10/2020  
CLIENT PROJECT: ABW Marine - 147037.030.043 COLLECTION DATE: 6/10/2020 8:35:00 AM  
CLIENT SAMPLE ID: DUP WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	2.1	0.050	5	MG/L	06/23/2020	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	06/10/2020	JNF
Sulfate	EPA-300.0	0.93	0.26	1	MG/L	06/10/2020	JNF
Arsenic (Dissolved)	EPA-200.8	11	1.0	1	UG/L	06/10/2020	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

**CERTIFICATE OF ANALYSIS**

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE:	6/24/2020
CLIENT CONTACT:	Stephanie Renando	ALS JOB#:	EV20060055
CLIENT PROJECT:	ABW Marine - 147037.030.043	ALS SAMPLE#:	EV20060055-03
CLIENT SAMPLE ID	HWA-MW1-200610	DATE RECEIVED:	06/10/2020
		COLLECTION DATE:	6/10/2020 9:10:00 AM
		WDOE ACCREDITATION:	C601

**SAMPLE DATA RESULTS**

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS	ANALYSIS
						DATE	BY
Methane	RSK-175	2.3	0.050	5	MG/L	06/23/2020	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	06/10/2020	JNF
Sulfate	EPA-300.0	0.53	0.26	1	MG/L	06/10/2020	JNF
Arsenic (Dissolved)	EPA-200.8	11	1.0	1	UG/L	06/10/2020	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

**CERTIFICATE OF ANALYSIS**

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE:	6/24/2020
CLIENT CONTACT:	Stephanie Renando	ALS JOB#:	EV20060055
CLIENT PROJECT:	ABW Marine - 147037.030.043	ALS SAMPLE#:	EV20060055-04
CLIENT SAMPLE ID	HWA-MW2-200610	DATE RECEIVED:	06/10/2020
		COLLECTION DATE:	6/10/2020 10:10:00 AM
		WDOE ACCREDITATION:	C601

**SAMPLE DATA RESULTS**

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS	ANALYSIS
						DATE	BY
Methane	RSK-175	4.6	0.050	5	MG/L	06/23/2020	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	06/10/2020	JNF
Sulfate	EPA-300.0	8.4	0.26	1	MG/L	06/10/2020	JNF
Arsenic (Dissolved)	EPA-200.8	11	1.0	1	UG/L	06/10/2020	RAL

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc. DATE: 6/24/2020  
130 - 2nd Ave. S. ALS JOB#: EV20060055  
Edmonds, WA 98020 ALS SAMPLE#: EV20060055-05  
CLIENT CONTACT: Stephanie Renando DATE RECEIVED: 06/10/2020  
CLIENT PROJECT: ABW Marine - 147037.030.043 COLLECTION DATE: 6/10/2020 11:45:00 AM  
CLIENT SAMPLE ID: P-27C-200610 WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Methane	RSK-175	0.29	0.050	5	MG/L	06/23/2020	CCN
Nitrate	EPA-300.0	U	0.15	1	MG/L	06/10/2020	JNF
Sulfate	EPA-300.0	34	0.26	1	MG/L	06/10/2020	JNF
Arsenic (Dissolved)	EPA-200.8	1.8	1.0	1	UG/L	06/10/2020	RAL

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc. DATE: 6/24/2020
130 - 2nd Ave. S. ALS SDG#: EV20060055
Edmonds, WA 98020 WDOE ACCREDITATION: C601
CLIENT CONTACT: Stephanie Renando
CLIENT PROJECT: ABW Marine - 147037.030.043

LABORATORY BLANK RESULTS

MBLK-R363780 - Batch R363780 - Water by RSK-175

Table with 7 columns: ANALYTE, METHOD, RESULTS, UNITS, REPORTING LIMITS, ANALYSIS DATE, ANALYSIS BY. Row 1: Methane, RSK-175, U, MG/L, 0.010, 06/23/2020, CCN

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R363832 - Batch R363832 - Water by EPA-300.0

Table with 7 columns: ANALYTE, METHOD, RESULTS, UNITS, REPORTING LIMITS, ANALYSIS DATE, ANALYSIS BY. Rows: Nitrate (EPA-300.0, U, MG/L, 0.15, 06/10/2020, JNF), Sulfate (EPA-300.0, U, MG/L, 0.26, 06/10/2020, JNF)

U - Analyte analyzed for but not detected at level above reporting limit.

MB-061020W - Batch 154339 - Water by EPA-200.8

Table with 7 columns: ANALYTE, METHOD, RESULTS, UNITS, REPORTING LIMITS, ANALYSIS DATE, ANALYSIS BY. Row 1: Arsenic (Dissolved), EPA-200.8, U, UG/L, 1.0, 06/10/2020, RAL

U - Analyte analyzed for but not detected at level above reporting limit.



**CERTIFICATE OF ANALYSIS**

CLIENT:	Landau Associates, Inc. 130 - 2nd Ave. S. Edmonds, WA 98020	DATE:	6/24/2020
CLIENT CONTACT:	Stephanie Renando	ALS SDG#:	EV20060055
CLIENT PROJECT:	ABW Marine - 147037.030.043	WDOE ACCREDITATION:	C601

**LABORATORY CONTROL SAMPLE RESULTS**

**ALS Test Batch ID: R363780 - Water by RSK-175**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Methane - BS	RSK-175	92.8			80	120	06/23/2020	CCN
Methane - BSD	RSK-175	94.8	2		80	120	06/23/2020	CCN

**ALS Test Batch ID: R363832 - Water by EPA-300.0**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Nitrate - BS	EPA-300.0	100			80	120	06/10/2020	JNF
Nitrate - BSD	EPA-300.0	100	0		80	120	06/10/2020	JNF
Sulfate - BS	EPA-300.0	92.5			80	120	06/10/2020	JNF
Sulfate - BSD	EPA-300.0	95.0	3		80	120	06/10/2020	JNF

**ALS Test Batch ID: 154339 - Water by EPA-200.8**

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Arsenic (Dissolved) - BS	EPA-200.8	99.4			89.1	110	06/10/2020	RAL
Arsenic (Dissolved) - BSD	EPA-200.8	98.2	1		89.1	110	06/10/2020	RAL

APPROVED BY

Laboratory Director



EV20060055



# Chain-of-Custody Record

Seattle/Edmonds (425) 778-0907  
 Tacoma (253) 926-2493  
 Spokane (509) 327-9737  
 Portland (503) 542-1080

Date 6/10/20  
 Page 1 of 1

Turnaround Time:  
 Standard \_\_\_\_\_  
 Accelerated

Project Name ABW Marine Project No. 147037.030.043  
 Project Location/Event Everett, WA (POE) / Annual GW June 2020  
 Sampler's Name Devan Brandt  
 Project Contact Stephanie Renando  
 Send Results To Stephanie Renando & Dani Jonjansen

## Testing Parameters

Dissolved As (EPA 200.8)  
 Nitrate/Sulfate (EPA 300.0)  
 Methane (EPA 175)

Sample I.D.	Date	Time	Matrix	No. of Containers	Observations/Comments
1 P26-200610	6/10/20	0830	AQ	4	Allow water samples to settle, collect aliquot from clear portion <input type="checkbox"/> - NWTPH-Dx - Acid wash cleanup <input type="checkbox"/> - Silica gel cleanup <input type="checkbox"/> <b>X</b> Dissolved metal samples were field filtered
2 DUF	6/10/20	0835	AQ	4	
3 HWA-MW1-200610	6/10/20	0910	AQ	4	
4 HWA-MW2-200610	6/10/20	1010	AQ	4	
5 P27C-200610	6/10/20	1145	AQ	4	

Special Handling Requirements:  
Drop off

Shipment Method:  
 Stored on ice:  Yes /  No

Other Bill to POE (Eise Gronewald)  
Nitrates Have Short Hold Time

**Relinquished by**  
 Signature [Signature]  
 Printed Name Devan Brandt  
 Company LAI  
 Date 6/10/20 Time 1247

**Received by**  
 Signature [Signature]  
 Printed Name Rick Bayn  
 Company ALS  
 Date 6/10/20 Time 12:47

**Relinquished by**  
 Signature \_\_\_\_\_  
 Printed Name \_\_\_\_\_  
 Company \_\_\_\_\_  
 Date \_\_\_\_\_ Time \_\_\_\_\_

**Received by**  
 Signature \_\_\_\_\_  
 Printed Name \_\_\_\_\_  
 Company \_\_\_\_\_  
 Date \_\_\_\_\_ Time \_\_\_\_\_



# ALS ENVIRONMENTAL

## Sample Receiving Checklist

Client: Landau Assoc.

ALS Job #: EV20060055

Project: ABW Marine

Received Date: 6/10/20 Received Time: 12:47 By: RB

Type of shipping container: Cooler  Box  Other

Shipped via: FedEx Ground  UPS  Mail  Courier  Hand Delivered   
FedEx Express

Were custody seals on outside of shipping container? 

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
	_____	<input checked="" type="checkbox"/>	_____

If yes, how many? \_\_\_\_\_ Where? \_\_\_\_\_  
Custody seal date: \_\_\_\_\_ Seal name: \_\_\_\_\_

Was Chain of Custody properly filled out (ink, signed, dated, etc.)? 

	<input checked="" type="checkbox"/>	_____	_____
--	-------------------------------------	-------	-------

Did all bottles have labels? 

	<input checked="" type="checkbox"/>	_____	_____
--	-------------------------------------	-------	-------

Did all bottle labels and tags agree with Chain of Custody? 

	<input checked="" type="checkbox"/>	_____	_____
--	-------------------------------------	-------	-------

Were samples received within hold time? 

	<input checked="" type="checkbox"/>	_____	_____
--	-------------------------------------	-------	-------

Did all bottles arrive in good condition (unbroken, etc.)? 

	<input checked="" type="checkbox"/>	_____	_____
--	-------------------------------------	-------	-------

Was sufficient amount of sample sent for the tests indicated? 

	<input checked="" type="checkbox"/>	_____	_____
--	-------------------------------------	-------	-------

Was correct preservation added to samples? 

	<input checked="" type="checkbox"/>	_____	_____
--	-------------------------------------	-------	-------

If no, Sample Control added preservative to the following:

<u>Sample Number</u>	<u>Reagent</u>	<u>Analyte</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

Were VOA vials checked for absence of air bubbles? 

	<input checked="" type="checkbox"/>	_____	_____
--	-------------------------------------	-------	-------

Bubbles present in sample #: none

Temperature of cooler upon receipt: 3.0°C Cold Cool Ambient N/A  
on Ice

Explain any discrepancies: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was client contacted? \_\_\_\_\_ Who was called? \_\_\_\_\_ By whom? \_\_\_\_\_ Date: \_\_\_\_\_

Outcome of call: \_\_\_\_\_  
\_\_\_\_\_