# 2016 Annual Groundwater Monitoring Report
# North Marina Bayside/ABW
# Everett, Washington

July 6, 2017

Prepared for

Port of Everett
Everett, Washington

LANDAU ASSOCIATES

130 2nd Avenue South
Edmonds, WA 98020
(425) 778-0907

# 2016 Annual Groundwater Monitoring Report
# North Marina Bayside/ABW
# Everett, Washington

This document was prepared by, or under the direct supervision of, the technical professionals noted below.

Document prepared by: Kathryn Hartley — Project Manager

Document reviewed by: Lawrence D. Beard — Principal; Quality Reviewer

| | |
|---|---|
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| Project No.: | 0124037.030 |
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| Project Coordinator: | tam |

LANDAU ASSOCIATES

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# LIST OF ABBREVIATIONS AND ACRONYMS

Bayside/ABW.....North Marina Bayside Marine/American Boiler Works
°C..... degrees Celsius
Ecology.....Washington State Department of Ecology
EPA..... US Environmental Protection Agency
FeAs.....iron-arsenic
ft.....foot/feet
LAI .....Landau Associates, Inc.
µg/L..... micrograms per liter
µS/cm.....microsiemens per centimeter
mg/L.....milligrams per liter
mV.....millivolt
MTCA.....Model Toxics Control Act
NFA .....no further action
Port ..... Port of Everett
PVC..... polyvinylchloride
Site .....North Marina Bayside Marine/American Boiler Works
TOC.....top of casing
VCP.....voluntary cleanup program

# 1.0 INTRODUCTION

This report summarizes the field activities and analytical results for the four quarterly groundwater quality monitoring events completed in 2016 at the North Marina Bayside Marine/American Boiler Works site (Bayside/ABW Site or Site) in Everett, Washington.

## 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 require 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 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 four monitoring wells identified for groundwater monitoring consist of wells HWA-MW1, HWA-MW2, P-26, and P-27. Monitoring well P-27 was inadvertently paved over during construction activities associated with the adjacent Everett Shipyard Site. With approval from Ecology, monitoring well P-27 was replaced with P-27B, which was installed in mid-March 2016 in the immediate vicinity of monitoring well P-27. The well locations are shown on Figure 2.

## 1.2 Site Description

The Site is located on the eastern portion of the Port of Everett (Port) Waterfront Place Central Redevelopment Area and is approximately 3 acres in size. The Site is generally bounded by 13th Street/ Port Gardner Way followed by a boatyard to the north, West Marine View Drive followed by railroad tracks to the east, 14th Street followed by the former Everett Shipyard Site to the south, and undeveloped land and a boat storage yard 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. The western portion of the Site consists of a portion of the former Everett Bayside Marine Leasehold. The Port owns the property within the Site.

# 2.0 GROUNDWATER MONITORING ACTIVITIES

This section describes water level measurements, groundwater sampling, and groundwater analyses associated with the quarterly groundwater monitoring events conducted on March 29, June 13, September 20 and November 29 of 2016.

## 2.1 Water Level Measurements

Static water levels were measured prior to groundwater sampling at each of the four wells (HWA-MW1, HWA-MW2, P-26, and P-27B). The depth to groundwater was measured to the nearest 0.01 foot (ft) from the top of the north side of the polyvinylchloride (PVC) casing to groundwater using an electric water level indicator. Depth to water measurements at each well were converted to groundwater elevations using surveyed elevations for the top of the PVC casing. The surveyed top of casing (TOC) elevation for P-27 was used to generate groundwater elevations for P-27B as the TOC elevation for P-27B was not surveyed.

## 2.2 Groundwater Sampling

The groundwater samples were collected with a peristaltic pump using low-flow groundwater sampling procedures. Prior to collecting samples, depth to groundwater was measured at each location. The wells were then purged and field parameters (temperature in degrees Celsius [°C]; conductivity [microsiemens per centimeter {µS/cm}]; dissolved oxygen [milligrams per liter {mg/L}]; pH; and oxygen reduction potential [millivolts {mV}]) were recorded every 3 minutes until stabilization objectives were achieved.

## 2.3 Groundwater Analysis

In accordance with the Confirmational Monitoring Plan (Ecology 2015), samples were collected and analyzed for dissolved arsenic, 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. Samples were also tested for ferrous iron in the field.

## 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 Landau Associates, Inc. (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 of the data were determined to be acceptable for use. No qualification of the data was necessary, with the exception of methane concentrations for two samples (HWA-MW1 and duplicate) during the first quarter sampling event, which were flagged as estimated values due to high relative percent difference between the parent and duplicate samples.

# 3.0 4Q16 GROUNDWATER MONITORING RESULTS

This section presents the results of the fourth quarter 2016 (4Q16) quarterly groundwater monitoring event, which consists of groundwater level data and groundwater quality data. The results of the first (1Q16), second (2Q16), and third (3Q16) quarterly events were previously reported in separate technical memorandums (LAI 2016a,b,c).

## 3.1 Groundwater Levels

Groundwater elevations calculated using water level measurements collected from each monitoring well were used to evaluate groundwater flow direction at the Site. The calculated groundwater elevations are presented in Table 1. Groundwater elevation contours were plotted using the calculated groundwater elevations and are shown on Figures 3, 4, 5, and 6. The contours indicate the groundwater at the site has a generally southwesterly flow.

## 3.2 Groundwater Quality

The 4Q16 monitoring event was completed on November 29, 2016. The analytical results are summarized in Table 2 and the laboratory analytical report is included in Appendix A. Groundwater samples were analyzed for dissolved arsenic, methane, nitrate, and sulfate at all sample locations. In addition, samples were tested for ferrous iron using a field test kit.

Arsenic was detected in all of the samples at concentrations ranging from 2.2 micrograms per liter (µg/L; P-27B) to 24 µg/L (HWA-MW1). Consistent with Site groundwater monitoring data from previous sampling events, detected concentrations of arsenic exceeded the cleanup level (5 µg/L) in the samples from monitoring wells HWA-MW1, HWA-MW2 and P-26, but were below the cleanup level at downgradient well P-27B.

Also consistent with previous Site data, the 4Q16 groundwater data indicate that conditions are naturally reduced at the Site. Conditions that are at least iron-reducing will release arsenic due to reduction (solubilization) of iron-arsenic (FeAs) complexes. Site data indicate that Site conditions are not only iron-reducing, based on the detection of ferrous iron at all sample locations, but also indicate sulfate reduction (i.e., conditions are more strongly reducing than required for solubilization of FeAs), based on the low detected concentrations of sulfate (less than 0.26 mg/L to 16 mg/L). In addition, methane was detected in all but one sample in 4Q16 (P-27B), indicating that conditions are also methanogenic (methane producing), which is also indicative of highly reducing conditions.

# 4.0 SUMMARY OF 2016 MONITORING RESULTS

Concentrations of dissolved arsenic detected in groundwater at the Site during quarterly monitoring completed in 2016 are consistent with previous sampling data. Arsenic concentrations at the downgradient well (P-27B) continue to be below the cleanup level (5 µg/L). The maximum detected concentration of dissolved arsenic during the 2016 monitoring events (36 µg/L at MW-1 in 2Q16) is lower than the maximum detected concentrations during monitoring completed in 2015 (52.5 µg/L at MW-1) and 2014 (91 µg/L at MW-1). Concentrations of dissolved arsenic are stable and generally decreasing.

Site data continue to support the conclusion that elevated concentrations of arsenic are present due to reducing conditions and are unrelated to Site releases. Ferrous iron was detected at all sampling locations, methane was detected in all samples except in the samples from P-27B during the 4Q2016 event, nitrate was generally not detected, and low concentrations of sulfate were detected. Sulfate concentrations were generally highest at P-27B. This trend, in conjunction with the low dissolved arsenic concentration at P-27B, supports 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-27B vicinity for groundwater to achieve the Site cleanup standard for arsenic. Groundwater elevation monitoring (Table 1) confirms that monitoring well P-27B is representative of groundwater conditions downgradient of the Site.

# 5.0 CONCLUSIONS

Based on the results of 2016 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. Arsenic has not been detected at concentrations greater than the cleanup level in any of the nine groundwater samples collected from the downgradient monitoring well P-27/P-27B between March of 2014 and November of 2016, indicating that there is no complete pathway to surface water.

In accordance with the NFA and environmental covenant, quarterly compliance monitoring is considered complete. Compliance monitoring and reporting will be conducted on an annual basis until 2020.

# 6.0 USE OF THIS REPORT

This document has been prepared for the exclusive use of the Port of Everett 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 Landau Associates. 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 Landau Associates, shall be at the user's sole risk. Landau Associates 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.

# 7.0 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. edited by Office of Emergency and Remedial Response. Washington, DC: US Environmental Protection Agency.

EPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. Edited by Office of Superfund Remediation and Technology Innovation: US Environmental Protection Agency.

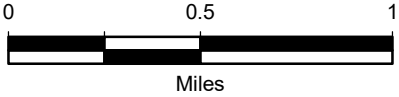
LAI. 2015. Environmental Investigation and Cleanup Documentation, American Boiler Works/Bayside Marine Site, Everett, Washington. Landau Associates, Inc. April 27.

LAI. 2016a. Technical Memorandum: First Quarter 2016 Compliance Monitoring Results, North Marina Bayside ABW, Everett, Washington. Landau Associates, Inc. June 8.

LAI. 2016b. Technical Memorandum: Second Quarter 2016 Compliance Monitoring Results, North Marina Bayside ABW, Everett, Washington. Landau Associates, Inc. September 14.

LAI. 2016c. Technical Memorandum: Third Quarter 2016 Compliance Monitoring Results, North Marina Bayside ABW, Everett, Washington. Landau Associates, Inc. December 20.







Data Source: Esri 2012

G:\Projects\147\037\030038\2016 Annual Monitoring Report\F01 VicMap.mxd 4/12/2017 NAD 1983 StatePlane Washington North FIPS 4601 Feet

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| | | |
|---|---|---|
| North Marina<br>ABW/Bayside Marine VCP Site<br>Port of Everett, Washington | **Vicinity Map** | Figure<br>1 |


## Legend

- Monitoring Well Location
- Monitoring Well to be Included in Monitoring Network (P-27B replaced P-27)
- 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.

0 80 160

Scale in Feet

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

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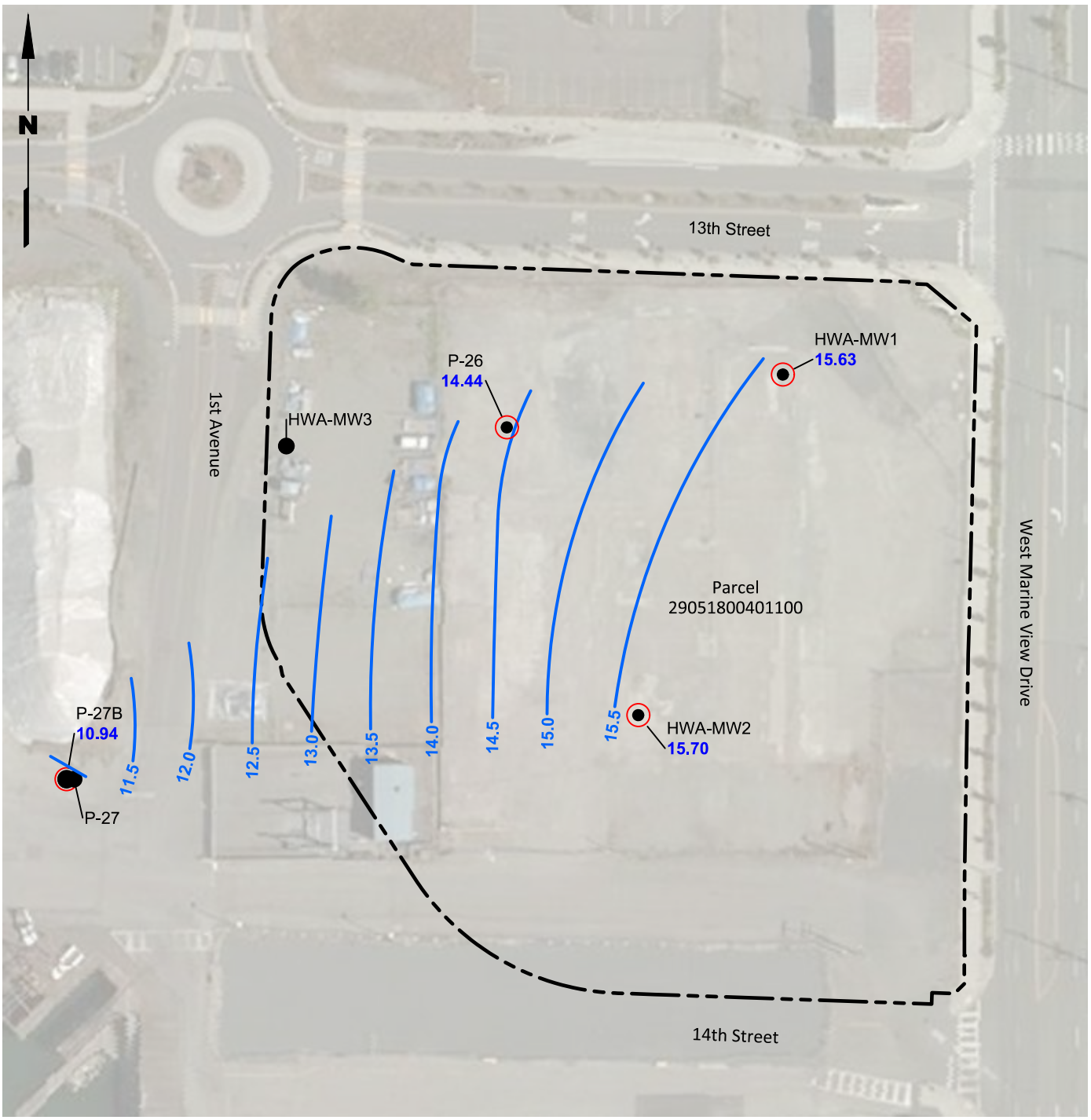
North Marina
ABW/Bayside Marine VCP Site
Port of Everett, Washington

**Groundwater Monitoring Locations**

Figure 2




## Legend

- Monitoring Well Location
- Monitoring Well to be Included in Monitoring Network (P-27B replaced P-27)
- **10.94** Groundwater Elevation (feet, MLLW)
- 11.0 Approximate Groundwater Elevation Contour
- Snohomish County Parcel Line / Area of Groundwater Use Restriction

## Notes

1. Groundwater data was collected March 29, 2016.
2. MLLW = Mean Lower Low Water
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 80 160
Scale in Feet

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

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North Marina
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Port of Everett, Washington

**Groundwater Flow Contours**
**March 29, 2016**

Figure
3


## Legend

- Monitoring Well Location
- Monitoring Well to be Included in Monitoring Network (P-27B replaced P-27)
- 10.27 Groundwater Elevation (feet, MLLW)
- 11.0 Approximate Groundwater Elevation Contour
- Snohomish County Parcel Line / Area of Groundwater Use Restriction

## Notes

1. Groundwater data was collected June 13, 2016.
2. MLLW = Mean Lower Low Water
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 80 160
Scale in Feet

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

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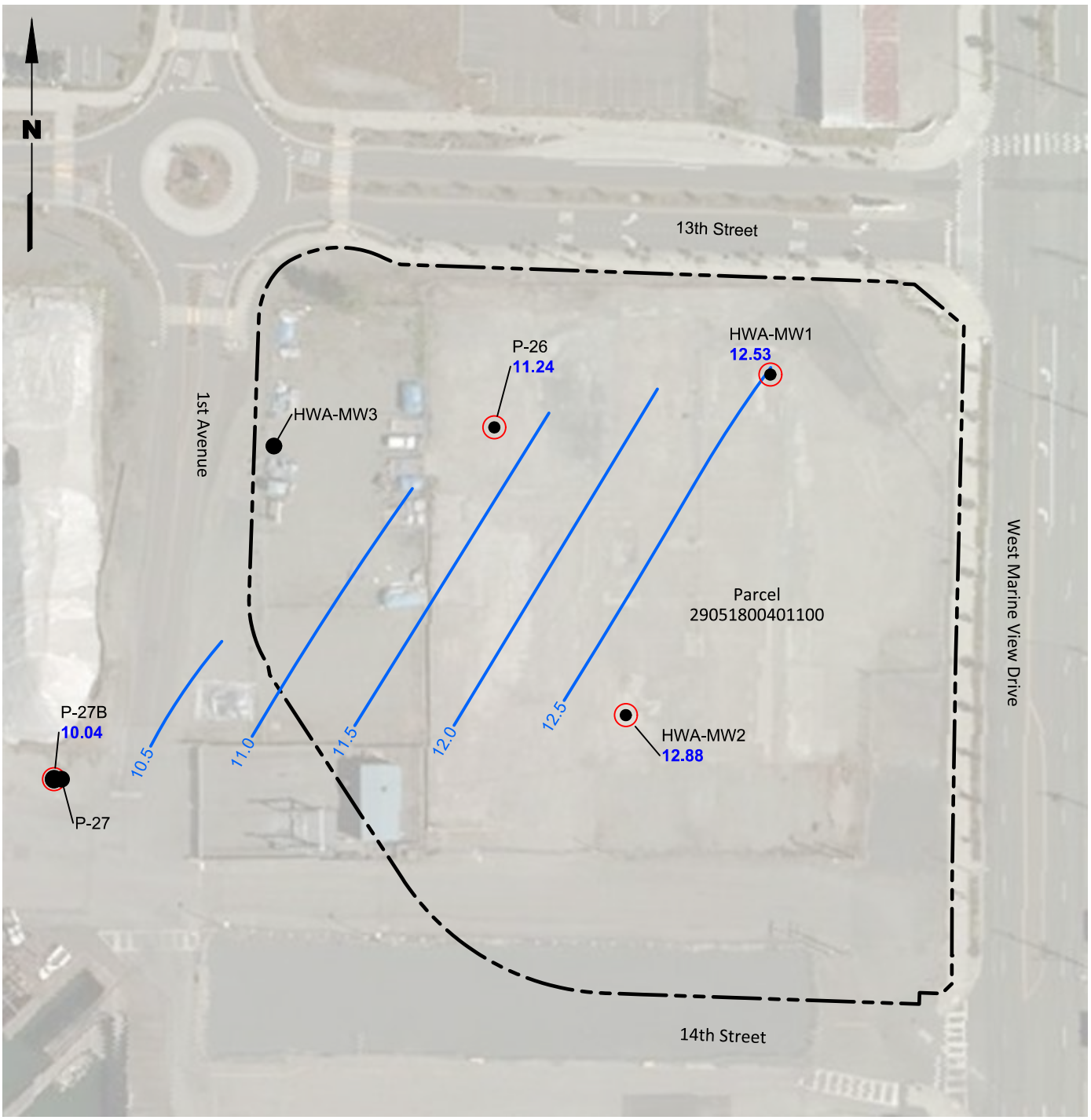
North Marina
ABW/Bayside Marine VCP Site
Port of Everett, Washington

**Groundwater Flow Contours**
**June 13, 2016**

Figure
4




## Legend

- Monitoring Well Location
- Monitoring Well to be Included in Monitoring Network (P-27B replaced P-27)
- 10.04 Groundwater Elevation (feet, MLLW)
- 11.0 Approximate Groundwater Elevation Contour
- Snohomish County Parcel Line / Area of Groundwater Use Restriction

## Notes

1. Groundwater data was collected September 20, 2016.
2. MLLW = Mean Lower Low Water
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 80 160
Scale in Feet

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

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

**Groundwater Flow Contours**
**September 20, 2016**

Figure
5


## Legend

- Monitoring Well Location
- Monitoring Well to be Included in Monitoring Network (P-27B replaced P-27)
- 11.61 Groundwater Elevation (feet, MLLW)
- 12.0 Approximate Groundwater Elevation Contour
- Snohomish County Parcel Line / Area of Groundwater Use Restriction

## Notes

1. Groundwater data was collected November 29, 2016.
2. MLLW = Mean Lower Low Water
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 80 160
Scale in Feet

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

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

**Groundwater Flow Contours**
**November 29, 2016**

Figure
6

# 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 |
| 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 |
| P26 | 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 |
| P27B | 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 |

**Abbreviations and Acronyms:**

ft = foot/feet
GW = groundwater
ID = identification
TOC = Top of Casing

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

| Sample Location | Sample Date | Sample Type | Laboratory Sample ID | EPA 200.8 | RSK-175 | EPA 300.0 | | Hach Kit |
|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Arsenic | Methane | Nitrate | Sulfate | Ferrous Iron |
| | | | | µg/L | mg/L | | | |
| | | | **Site Cleanup Level:** | 5 | NA | NA | NA | NA |
| HWA-MW1 | 03/29/2016 | FD | EV16030229-02 | **21** | **3.9 J** | 0.15 U | **1.8** | **2.5** |
| HWA-MW1 | 03/29/2016 | N | EV16030229-03 | **22** | **3.0 J** | 0.15 U | **1.8** | **2.5** |
| HWA-MW1 | 6/13/2016 | FD | EV16060085-02 | **35** | **3.3** | 0.15 U | 0.26 U | **1.8** |
| HWA-MW1 | 6/13/2016 | N | EV16060085-05 | **36** | **3.6** | 0.15 U | 0.26 U | **1.8** |
| HWA-MW1 | 9/20/2016 | FD | EV16090134-01 | **34** | **4.0** | 0.15 U | **13** | **2.0** |
| HWA-MW1 | 9/20/2016 | N | EV16090134-02 | **35** | **3.8** | 0.15 U | **13** | **2.0** |
| HWA-MW1 | 11/29/2016 | FD | EV16110191-02 | **24** | **1.9** | 0.15 U | **2.7** | **3.2** |
| HWA-MW1 | 11/29/2016 | N | EV16110191-04 | **24** | **2.1** | 0.15 U | **2.3** | **3.2** |
| 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** |
| HWA-MW2 | 11/29/2016 | N | EV16110191-03 | **15** | **8.3** | 0.15 U | 0.26 U | **2.4** |
| 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-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** |

**Notes:**

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

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:**

EPA = United States Environmental Protection Agency

FD = field duplicate

ID = identifcation

µg/L = microgram per liter

mg/L = milligram per liter

NA = not applicable

N = primary sample

APPENDIX A

# Laboratory Data Reports

April 12, 2016

Ms. Kathryn Hartley
Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

Dear Ms. Hartley,

On March 29th, 5 samples were received by our laboratory and assigned our laboratory project number EV16030229. The project was identified as your ABW Quarterly Groundwater. 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



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 4/12/2016<br>EV16030229<br>EV16030229-01 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 03/29/2016 |
| CLIENT PROJECT: | ABW Quarterly Groundwater | COLLECTION DATE: | 3/29/2016 10:50:00 AM |
| CLIENT SAMPLE ID | P-26 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **10** | 0.010 | 1 | MG/L | 04/12/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 03/30/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 03/30/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **18** | 1.0 | 1 | UG/L | 04/04/2016 | RAL |

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



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 4/12/2016<br>EV16030229<br>EV16030229-02 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 03/29/2016 |
| CLIENT PROJECT: | ABW Quarterly Groundwater | COLLECTION DATE: | 3/29/2016 10:00:00 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 | **3.9** | 0.010 | 1 | MG/L | 04/12/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 03/30/2016 | DNT |
| Sulfate | EPA-300.0 | **1.8** | 0.26 | 1 | MG/L | 03/30/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **21** | 1.0 | 1 | UG/L | 04/04/2016 | RAL |

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



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 4/12/2016<br>EV16030229<br>EV16030229-03 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 03/29/2016 |
| CLIENT PROJECT: | ABW Quarterly Groundwater | COLLECTION DATE: | 3/29/2016 11:30:00 AM |
| CLIENT SAMPLE ID | HWA-MW1 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **3.0** | 0.010 | 1 | MG/L | 04/12/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 03/30/2016 | DNT |
| Sulfate | EPA-300.0 | **1.8** | 0.26 | 1 | MG/L | 03/30/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **22** | 1.0 | 1 | UG/L | 04/04/2016 | RAL |

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



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 4/12/2016<br>EV16030229<br>EV16030229-04 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 03/29/2016 |
| CLIENT PROJECT: | ABW Quarterly Groundwater | COLLECTION DATE: | 3/29/2016 12:15:00 PM |
| CLIENT SAMPLE ID | HWA-MW2 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **31** | 0.010 | 1 | MG/L | 04/12/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 03/30/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 03/30/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **9.8** | 1.0 | 1 | UG/L | 04/04/2016 | RAL |

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



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ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 4/12/2016<br>EV16030229<br>EV16030229-05 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 03/29/2016 |
| CLIENT PROJECT: | ABW Quarterly Groundwater | COLLECTION DATE: | 3/29/2016 1:10:00 PM |
| CLIENT SAMPLE ID | P-27B | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **3.1** | 0.010 | 1 | MG/L | 04/12/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 03/30/2016 | DNT |
| Sulfate | EPA-300.0 | **17** | 0.26 | 1 | MG/L | 03/30/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **1.2** | 1.0 | 1 | UG/L | 04/04/2016 | RAL |

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## CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

CLIENT CONTACT: Kathryn Hartley
CLIENT PROJECT: ABW Quarterly Groundwater

DATE: 4/12/2016
ALS SDG#: EV16030229
WDOE ACCREDITATION: C601

## LABORATORY BLANK RESULTS

### MBLK-4122016 - Batch R272447 - Water by RSK-175

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Methane | RSK-175 | U | MG/L | 0.010 | 04/12/2016 | CCN |

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

### MBLK-3302016 - Batch R272006 - Water by EPA-300.0

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Nitrate | EPA-300.0 | U | MG/L | 0.15 | 03/30/2016 | DNT |
| Sulfate | EPA-300.0 | U | MG/L | 0.26 | 03/30/2016 | DNT |

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

### MB-040116W - Batch 102909 - Water by EPA-200.8

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Arsenic (Dissolved) | EPA-200.8 | U | UG/L | 1.0 | 04/04/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020
CLIENT CONTACT: Kathryn Hartley
CLIENT PROJECT: ABW Quarterly Groundwater

DATE: 4/12/2016
ALS SDG#: EV16030229
WDOE ACCREDITATION: C601

## LABORATORY CONTROL SAMPLE RESULTS

### ALS Test Batch ID: R272447 - Water by RSK-175

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Methane - BS | RSK-175 | **90.5** | | | 04/12/2016 | CCN |
| Methane - BSD | RSK-175 | **92.4** | **2** | | 04/12/2016 | CCN |

### ALS Test Batch ID: R272006 - Water by EPA-300.0

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Nitrate - BS | EPA-300.0 | **102** | | | 03/30/2016 | DNT |
| Nitrate - BSD | EPA-300.0 | **101** | **1** | | 03/30/2016 | DNT |
| Sulfate - BS | EPA-300.0 | **101** | | | 03/30/2016 | DNT |
| Sulfate - BSD | EPA-300.0 | **104** | **3** | | 03/30/2016 | DNT |

### ALS Test Batch ID: 102909 - Water by EPA-200.8

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Arsenic (Dissolved) - BS | EPA-200.8 | **98.2** | | | 04/04/2016 | RAL |
| Arsenic (Dissolved) - BSD | EPA-200.8 | **100** | **2** | | 04/04/2016 | RAL |

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Laboratory Director



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# ALS ENVIRONMENTAL

Sample Receiving Checklist

Client: Landau Associates ALS Job #: EV1603 0229

Project: ABW Quarterly Groundwater

Received Date: 3/29/16 Received Time: 14:43 By: Sa

Type of shipping container: Cooler X Box ___ Other ___

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

| | Yes | No | N/A |
|---|---|---|---|
| Were custody seals on outside of sample? | X | | |
| If yes, how many? 1 Where? Top of Cooler | | | |
| Custody seal date: 3/29/16 Seal name: Landau | | | |
| Was Chain of Custody properly filled out (ink, signed, dated, etc.)? | X | | |
| Did all bottles have labels? | X | | |
| Did all bottle labels and tags agree with Chain of Custody? | X | | |
| Were samples received within hold time? | X | | |
| Did all bottles arrive in good condition (unbroken, etc.)? | X | | |
| Was sufficient amount of sample sent for the tests indicated? | X | | |
| Was correct preservation added to samples? | X | | |

If no, Sample Control added preservative to the following:

| Sample Number | Reagent | Analyte |
|---|---|---|
| | | |
| | | |
| | | |

| | | | |
|---|---|---|---|
| Were VOA vials checked for absence of air bubbles? | X | | |
| Bubbles present in sample #: None | | | |

Temperature of cooler upon receipt: 1.8°C on ice (Cold) Cool Ambient N/A

Explain any discrepancies: ___

Was client contacted? ___ Who was called? ___ By whom? ___ Date: ___

Outcome of call: ___

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# Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV1603022 9

Date 3/29/16 Page 1 Of 1

PROJECT ID: ABW Quarterly Groundwater
REPORT TO COMPANY: Landau Associates
PROJECT MANAGER: Kathryn Hartley
ADDRESS: 130 2nd Ave S
Edmonds, WA 98020
PHONE: (425) 778-0907 FAX: —
P.O. #: Bill To Port of Everett E-MAIL: KHartley@landauinc.com
INVOICE TO COMPANY: Port of Everett
ATTENTION: Elise Gronewald
ADDRESS: —

| SAMPLE I.D. | DATE | TIME | TYPE | LAB# | NWTPH-HCID | NWTPH-DX | NWTPH-GX | BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐ | MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐ | Halogenated Volatiles by EPA 8260 | Volatile Organic Compounds by EPA 8260 | EDB / EDC by EPA 8260 SIM (water) | EDB / EDC by EPA 8260 (soil) | Semivolatile Organic Compounds by EPA 8270 | Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM | PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐ | Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐ | Metals Other (Specify) As (Dissolved) | TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐ | OTHER (Specify) Methane | Nitrates/Sulfate | NUMBER OF CONTAINERS | RECEIVED IN GOOD CONDITION? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. P-26 | 3/29/16 | 1050 | GW | 1 | | | | | | | | | | | | | | X | | X | X | 4 | |
| 2. DUP | 3/29/16 | 1000 | GW | 2 | | | | | | | | | | | | | | X | | X | X | 4 | |
| 3. HWA-MW1 | 3/29/16 | 1130 | GW | 3 | | | | | | | | | | | | | | X | | X | X | 4 | |
| 4. HWA-MW2 | 3/29/16 | 1215 | GW | 4 | | | | | | | | | | | | | | X | | X | X | 4 | |
| 5. P-27B | 3/29/16 | 1310 | GW | 5 | | | | | | | | | | | | | | X | | X | X | 4 | |
| 6. | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | | | | | | | | | | | | | | | | | | | | | | | |

SPECIAL INSTRUCTIONS Bill Port of Everett directly. Dissolved Metals have been field filtered.

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Stephanie Renando, Landau Associates, 3/29/16@1443
   Received By: Shawn Robuck ACS 3/29/16 14:43
2. Relinquished By: _____
   Received By: _____

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: (10 Standard) 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard 3 1 SAME DAY

OTHER: Specify: _____

*Turnaround request less than standard may incur Rush Charges

June 27, 2016

Ms. Kathryn Hartley
Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

Dear Ms. Hartley,

On June 13th, 5 samples were received by our laboratory and assigned our laboratory project number EV16060085. The project was identified as your ABW Marine Groundwater. 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



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ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 6/27/2016<br>EV16060085<br>EV16060085-01 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 06/13/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 6/13/2016 11:00:00 AM |
| CLIENT SAMPLE ID | P-27B | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **1.8** | 0.010 | 1 | MG/L | 06/21/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 06/14/2016 | DNT |
| Sulfate | EPA-300.0 | **2.6** | 0.26 | 1 | MG/L | 06/14/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **1.3** | 1.0 | 1 | UG/L | 06/14/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 6/27/2016<br>EV16060085<br>EV16060085-02 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 06/13/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 6/13/2016 11:20:00 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 | **3.3** | 0.020 | 2 | MG/L | 06/21/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 06/14/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 06/14/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **35** | 1.0 | 1 | UG/L | 06/14/2016 | RAL |

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## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 6/27/2016<br>EV16060085<br>EV16060085-03 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 06/13/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 6/13/2016 11:50:00 AM |
| CLIENT SAMPLE ID | HWA-MW2 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **5.1** | 0.050 | 5 | MG/L | 06/21/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 06/14/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 06/14/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **11** | 1.0 | 1 | UG/L | 06/14/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 6/27/2016<br>EV16060085<br>EV16060085-04 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 06/13/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 6/13/2016 12:50:00 PM |
| CLIENT SAMPLE ID | P-26 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **5.9** | 0.050 | 5 | MG/L | 06/21/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 06/14/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 06/14/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **7.2** | 1.0 | 1 | UG/L | 06/14/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 6/27/2016<br>EV16060085<br>EV16060085-05 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 06/13/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 6/13/2016 1:45:00 PM |
| CLIENT SAMPLE ID | HWA-MW1 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **3.6** | 0.020 | 2 | MG/L | 06/21/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 06/14/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 06/14/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **36** | 1.0 | 1 | UG/L | 06/14/2016 | RAL |

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## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS SDG#:<br>WDOE ACCREDITATION: | 6/27/2016<br>EV16060085<br>C601 |
| CLIENT CONTACT: | Kathryn Hartley | | |
| CLIENT PROJECT: | ABW Marine Groundwater | | |

## LABORATORY BLANK RESULTS

### MBLK-276872 - Batch R276872 - Water by RSK-175

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Methane | RSK-175 | U | MG/L | 0.010 | 06/21/2016 | CCN |

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

### MBLK-277053 - Batch R277053 - Water by EPA-300.0

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Nitrate | EPA-300.0 | U | MG/L | 0.15 | 06/14/2016 | DNT |
| Sulfate | EPA-300.0 | U | MG/L | 0.26 | 06/14/2016 | DNT |

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

### MB-061416W - Batch 105398 - Water by EPA-200.8

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Arsenic (Dissolved) | EPA-200.8 | U | UG/L | 1.0 | 06/14/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020
CLIENT CONTACT: Kathryn Hartley
CLIENT PROJECT: ABW Marine Groundwater

DATE: 6/27/2016
ALS SDG#: EV16060085
WDOE ACCREDITATION: C601

## LABORATORY CONTROL SAMPLE RESULTS

### ALS Test Batch ID: R276872 - Water by RSK-175

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Methane - BS | RSK-175 | **92.7** | | | 80 | 120 | 06/21/2016 | CCN |
| Methane - BSD | RSK-175 | **92.5** | **0** | | 80 | 120 | 06/21/2016 | CCN |

### ALS Test Batch ID: R277053 - Water by EPA-300.0

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Nitrate - BS | EPA-300.0 | **97.0** | | | 80 | 120 | 06/14/2016 | DNT |
| Nitrate - BSD | EPA-300.0 | **96.0** | **1** | | 80 | 120 | 06/14/2016 | DNT |
| Sulfate - BS | EPA-300.0 | **92.0** | | | 80 | 120 | 06/14/2016 | DNT |
| Sulfate - BSD | EPA-300.0 | **103** | **11** | | 80 | 120 | 06/14/2016 | DNT |

### ALS Test Batch ID: 105398 - Water by EPA-200.8

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Arsenic (Dissolved) - BS | EPA-200.8 | **96.2** | | | 89.1 | 110 | 06/14/2016 | RAL |
| Arsenic (Dissolved) - BSD | EPA-200.8 | **94.4** | **2** | | 89.1 | 110 | 06/14/2016 | RAL |

APPROVED BY

Laboratory Director



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# ALS ENVIRONMENTAL

Sample Receiving Checklist

Client: Landau Associates ALS Job #: EV1606005

Project: ABW Marine Groundwater

Received Date: 6/13/16 Received Time: 14:45 By: RB

Type of shipping container: Cooler X Box ____ Other ____

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

| | Yes | No | N/A |
|---|---|---|---|
| Were custody seals on outside of shipping container? | X | | |
| If yes, how many? 1 Where? Top | | | |
| Custody seal date: 6/13 Seal name: Landau | | | |
| Was Chain of Custody properly filled out (ink, signed, dated, etc.)? | X | | |
| Did all bottles have labels? | X | | |
| Did all bottle labels and tags agree with Chain of Custody? | X | | |
| Were samples received within hold time? | X | | |
| Did all bottles arrive in good condition (unbroken, etc.)? | X | | |
| Was sufficient amount of sample sent for the tests indicated? | X | | |
| Was correct preservation added to samples? | X | | |

If no, Sample Control added preservative to the following:

| Sample Number | Reagent | Analyte |
|---|---|---|
| | | |
| | | |
| | | |

Were VOA vials checked for absence of air bubbles? X

Bubbles present in sample #: None

Temperature of cooler upon receipt: 8.2°C on Ice (Cold) Cool Ambient N/A

Explain any discrepancies: ____

Was client contacted? ____ Who was called? ____ By whom? ____ Date: ____

Outcome of call: ____

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# Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV1606085

Date 6/13/16 Page 1 Of 1

PROJECT ID: ABW Marine Groundwater
REPORT TO COMPANY: LANDAU ASSOCIATES
PROJECT MANAGER: Kathryn Hartley
ADDRESS: 130 2nd Avenue S.
Edmonds, WA 98020
PHONE: (425) 778-0907 FAX:
P.O. #: 147037.030 E-MAIL: khartley@landauinc.com
INVOICE TO COMPANY: Port of Everett
ATTENTION: Elise Gronewald
ADDRESS:
eliseg@portofeverett.com

ANALYSIS REQUESTED

| SAMPLE I.D. | DATE | TIME | TYPE | LAB# | NWTPH-HCID | NWTPH-DX | NWTPH-GX | BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐ | MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐ | Halogenated Volatiles by EPA 8260 | Volatile Organic Compounds by EPA 8260 | EDB / EDC by EPA 8260 SIM (water) | EDB / EDC by EPA 8260 (soil) | Semivolatile Organic Compounds by EPA 8270 | Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM | PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐ | Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐ | Metals Other (Specify) | TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐ | OTHER (Specify) | | | | | | NUMBER OF CONTAINERS | RECEIVED IN GOOD CONDITION? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | Arsenic (D,S) | | Methane | Sulfate | Nitrate ** | | | | | |
| 1. P-27B | 6/13/16 | 1100 | AQ | 1 | | | | | | | | | | | | | | X | | X | X | X | | | | 4 | |
| 2. DUP | 6/13/16 | 1120 | AQ | 2 | | | | | | | | | | | | | | X | | X | X | X | | | | 4 | |
| 3. HWA-MW2 | 6/13/16 | 1150 | AQ | 3 | | | | | | | | | | | | | | X | | X | X | X | | | | 4 | |
| 4. P-26 | 6/13/16 | 1250 | AQ | 4 | | | | | | | | | | | | | | X | | X | X | X | | | | 4 | |
| 5. HWA-MW1 | 6/13/16 | 1345 | AQ | 5 | | | | | | | | | | | | | | X | | X | X | X | | | | 4 | |
| 6. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | | | | | | | | | | | | | | | | | | | | | | | | | | | |

SPECIAL INSTRUCTIONS: * Dissolved As samples were field filtered ** Short HOLD Nitrate *

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Stephanie Renando, LAI, 6/13/16 @ 1445
Received By: ALS 6/13/16 14:45
2. Relinquished By:
Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: (10 Standard) 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard 3 1 SAME DAY

OTHER:
Specify:

*Turnaround request less than standard may incur Rush Charges

September 30, 2016

Ms. Kathryn Hartley
Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

Dear Ms. Hartley,

On September 20th, 5 samples were received by our laboratory and assigned our laboratory project number EV16090134. The project was identified as your ABW Marine Groundwater. 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



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 9/30/2016<br>EV16090134<br>EV16090134-01 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 09/20/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 9/20/2016 10:00:00 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 | **4.0** | 0.050 | 5 | MG/L | 09/23/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 09/22/2016 | DNT |
| Sulfate | EPA-300.0 | **13** | 0.26 | 1 | MG/L | 09/22/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **34** | 1.0 | 1 | UG/L | 09/29/2016 | RAL |

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



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ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 9/30/2016<br>EV16090134<br>EV16090134-02 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 09/20/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 9/20/2016 11:00:00 AM |
| CLIENT SAMPLE ID | HWA-MW1 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **3.8** | 0.050 | 5 | MG/L | 09/23/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 09/22/2016 | DNT |
| Sulfate | EPA-300.0 | **13** | 0.26 | 1 | MG/L | 09/22/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **35** | 1.0 | 1 | UG/L | 09/29/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 9/30/2016<br>EV16090134<br>EV16090134-03 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 09/20/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 9/20/2016 12:45:00 PM |
| CLIENT SAMPLE ID | P-26 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **3.5** | 0.050 | 5 | MG/L | 09/23/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 09/22/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 09/23/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **2.8** | 1.0 | 1 | UG/L | 09/29/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 9/30/2016<br>EV16090134<br>EV16090134-04 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 09/20/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 9/20/2016 1:30:00 PM |
| CLIENT SAMPLE ID | HWA-MW2 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **4.8** | 0.050 | 5 | MG/L | 09/23/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 09/22/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 09/22/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **24** | 1.0 | 1 | UG/L | 09/29/2016 | RAL |

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



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ALS Group USA, Corp dba ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 9/30/2016<br>EV16090134<br>EV16090134-05 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 09/20/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 9/20/2016 2:30:00 PM |
| CLIENT SAMPLE ID | P-27B | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **4.3** | 0.050 | 5 | MG/L | 09/23/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 09/22/2016 | DNT |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 09/22/2016 | DNT |
| Arsenic (Dissolved) | EPA-200.8 | **1.5** | 1.0 | 1 | UG/L | 09/29/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS SDG#:<br>WDOE ACCREDITATION: | 9/30/2016<br>EV16090134<br>C601 |
| CLIENT CONTACT: | Kathryn Hartley | | |
| CLIENT PROJECT: | ABW Marine Groundwater | | |

## LABORATORY BLANK RESULTS

### MBLK-281850 - Batch R281850 - Water by RSK-175

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Methane | RSK-175 | U | MG/L | 0.010 | 09/23/2016 | CCN |

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

### MBLK-282051 - Batch R282051 - Water by EPA-300.0

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Nitrate | EPA-300.0 | U | MG/L | 0.15 | 09/22/2016 | DNT |
| Sulfate | EPA-300.0 | U | MG/L | 0.26 | 09/22/2016 | DNT |

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

### MB-092916W - Batch 108482 - Water by EPA-200.8

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Arsenic (Dissolved) | EPA-200.8 | U | UG/L | 1.0 | 09/29/2016 | RAL |

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



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## CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

CLIENT CONTACT: Kathryn Hartley
CLIENT PROJECT: ABW Marine Groundwater

DATE: 9/30/2016
ALS SDG#: EV16090134
WDOE ACCREDITATION: C601

## LABORATORY CONTROL SAMPLE RESULTS

### ALS Test Batch ID: R281850 - Water by RSK-175

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Methane - BS | RSK-175 | **96.9** | | | 80 | 120 | 09/23/2016 | CCN |
| Methane - BSD | RSK-175 | **98.0** | **1** | | 80 | 120 | 09/23/2016 | CCN |

### ALS Test Batch ID: R282051 - Water by EPA-300.0

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Nitrate - BS | EPA-300.0 | **101** | | | 80 | 120 | 09/22/2016 | DNT |
| Nitrate - BSD | EPA-300.0 | **102** | **1** | | 80 | 120 | 09/22/2016 | DNT |
| Sulfate - BS | EPA-300.0 | **99.0** | | | 80 | 120 | 09/22/2016 | DNT |
| Sulfate - BSD | EPA-300.0 | **104** | **5** | | 80 | 120 | 09/22/2016 | DNT |

### ALS Test Batch ID: 108482 - Water by EPA-200.8

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Arsenic (Dissolved) - BS | EPA-200.8 | **97.4** | | | 89.1 | 110 | 09/29/2016 | RAL |
| Arsenic (Dissolved) - BSD | EPA-200.8 | **98.7** | **1** | | 89.1 | 110 | 09/29/2016 | RAL |

APPROVED BY

Laboratory Director



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

**ALS Environmental**
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

# Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV16090134

Date 9/20/16 Page 1 Of 1

PROJECT ID: ABW Marine Groundwater
REPORT TO COMPANY: LANDAU ASSOCIATES
PROJECT MANAGER: Kathryn Hartley
ADDRESS: 130 2nd Avenue South
Edmonds, WA 98020
PHONE: (425) 778-0907 FAX: —
P.O. #: 147037.030.03(e E-MAIL: khartley@landauinc.com
INVOICE TO COMPANY: Port of Everett
ATTENTION: Elise Gronewald
ADDRESS:
elises@portofeverett.com

ANALYSIS REQUESTED

| SAMPLE I.D. | DATE | TIME | TYPE | LAB# | NWTPH-HCID | NWTPH-DX | NWTPH-GX | BTEX by EPA 8021 ☐ BTEX by EPA 8260 ☐ | MTBE by EPA 8021 ☐ MTBE by EPA 8260 ☐ | Halogenated Volatiles by EPA 8260 | Volatile Organic Compounds by EPA 8260 | EDB / EDC by EPA 8260 SIM (water) | EDB / EDC by EPA 8260 (soil) | Semivolatile Organic Compounds by EPA 8270 | Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM | PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐ | Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐ | Metals Other (Specify) Dissolved As by EPA 200.8 | TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐ | OTHER (Specify): Methane (RSK-175) | Sulfate (EPA 300.0) | Nitrate (EPA 300.0) | NUMBER OF CONTAINERS | RECEIVED IN GOOD CONDITION? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. DUP | 9/20/16 | 1000 | AQ | 1 | | | | | | | | | | | | | X | | X | X | X | | 4 | |
| 2. HWA-MW1 | 9/20/16 | 1100 | AQ | 2 | | | | | | | | | | | | | X | | X | X | X | | 4 | |
| 3. P-26 | 9/20/16 | 1245 | AQ | 3 | | | | | | | | | | | | | X | | X | X | X | | 4 | |
| 4. HWA-MW2 | 9/20/16 | 1330 | AQ | 4 | | | | | | | | | | | | | X | | X | X | X | | 4 | |
| 5. P-27B | 9/20/16 | 1430 | AQ | 5 | | | | | | | | | | | | | X | | X | X | X | | 4 | |
| 6. | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | | | | | | | | | | | | | | | | | | | | | | | | |

SPECIAL INSTRUCTIONS: * Metals samples were field filtered. / ** Short hold NITRATES.

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: SA Lund, LAI, 9/20/16, 1521
   Received By: ALS 9/20/16 1521
2. Relinquished By:
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: (10 Standard) 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis: 5 Standard 3 1 SAME DAY

OTHER: Specify:

*Turnaround request less than standard may incur Rush Charges

# ALS ENVIRONMENTAL

Sample Receiving Checklist

Client: Landau Associates ALS Job #: EV1609013 4

Project: ABW Marine Groundwater

Received Date: 9/20/16 Received Time: 1521 By: RB

Type of shipping container: Cooler X Box ___ Other ___

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

| | Yes | No | N/A |
|---|---|---|---|
| Were custody seals on outside of shipping container? | ___ | X | ___ |
| If yes, how many? ___ Where? ___ | | | |
| Custody seal date: ___ Seal name: ___ | | | |
| Was Chain of Custody properly filled out (ink, signed, dated, etc.)? | X | ___ | ___ |
| Did all bottles have labels? | X | ___ | ___ |
| Did all bottle labels and tags agree with Chain of Custody? | X | ___ | ___ |
| Were samples received within hold time? | X | ___ | ___ |
| Did all bottles arrive in good condition (unbroken, etc.)? | X | ___ | ___ |
| Was sufficient amount of sample sent for the tests indicated? | X | ___ | ___ |
| Was correct preservation added to samples? | X | ___ | ___ |

If no, Sample Control added preservative to the following:

| Sample Number | Reagent | Analyte |
|---|---|---|
| | | |
| | | |
| | | |

| | | | |
|---|---|---|---|
| Were VOA vials checked for absence of air bubbles? | X | ___ | ___ |
| Bubbles present in sample #: None | | | |

Temperature of cooler upon receipt: 4.7°C on Ice (Cold) Cool Ambient N/A

Explain any discrepancies: ___

Was client contacted? ___ Who was called? ___ By whom? ___ Date: ___

Outcome of call: ___

December 6, 2016

Ms. Kathryn Hartley
Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020

Dear Ms. Hartley,

On November 29th, 5 samples were received by our laboratory and assigned our laboratory project number EV16110191. The project was identified as your ABW Marine Groundwater. 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



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 12/6/2016<br>EV16110191<br>EV16110191-01 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 11/29/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 11/29/2016 9:45:00 AM |
| CLIENT SAMPLE ID | P-27B | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | U | 0.010 | 1 | MG/L | 12/05/2016 | CCN |
| Nitrate | EPA-300.0 | **0.74** | 0.15 | 1 | MG/L | 11/30/2016 | GAP |
| Sulfate | EPA-300.0 | **16** | 0.26 | 1 | MG/L | 11/30/2016 | GAP |
| Arsenic (Dissolved) | EPA-200.8 | **2.2** | 1.0 | 1 | UG/L | 12/01/2016 | RAL |

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



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 12/6/2016<br>EV16110191<br>EV16110191-02 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 11/29/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 11/29/2016 10:11:00 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 | **1.9** | 0.010 | 1 | MG/L | 12/05/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 11/30/2016 | GAP |
| Sulfate | EPA-300.0 | **2.7** | 0.26 | 1 | MG/L | 11/30/2016 | GAP |
| Arsenic (Dissolved) | EPA-200.8 | **24** | 1.0 | 1 | UG/L | 12/01/2016 | RAL |

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



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ALS Group USA, Corp dba ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 12/6/2016<br>EV16110191<br>EV16110191-03 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 11/29/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 11/29/2016 10:55:00 AM |
| CLIENT SAMPLE ID | HWA-MW2 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **8.3** | 0.10 | 10 | MG/L | 12/05/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 11/30/2016 | GAP |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 11/30/2016 | GAP |
| Arsenic (Dissolved) | EPA-200.8 | **15** | 1.0 | 1 | UG/L | 12/01/2016 | RAL |

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



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ALS Group USA, Corp dba ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 12/6/2016<br>EV16110191<br>EV16110191-04 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 11/29/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 11/29/2016 12:10:00 PM |
| CLIENT SAMPLE ID | HWA-MW1 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **2.1** | 0.010 | 1 | MG/L | 12/05/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 11/30/2016 | GAP |
| Sulfate | EPA-300.0 | **2.3** | 0.26 | 1 | MG/L | 11/30/2016 | GAP |
| Arsenic (Dissolved) | EPA-200.8 | **24** | 1.0 | 1 | UG/L | 12/01/2016 | RAL |

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



ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE:<br>ALS JOB#:<br>ALS SAMPLE#: | 12/6/2016<br>EV16110191<br>EV16110191-05 |
| CLIENT CONTACT: | Kathryn Hartley | DATE RECEIVED: | 11/29/2016 |
| CLIENT PROJECT: | ABW Marine Groundwater | COLLECTION DATE: | 11/29/2016 1:25:00 PM |
| CLIENT SAMPLE ID | P-26 | WDOE ACCREDITATION: | C601 |

## SAMPLE DATA RESULTS

| ANALYTE | METHOD | RESULTS | REPORTING LIMITS | DILUTION FACTOR | UNITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|
| Methane | RSK-175 | **2.3** | 0.010 | 1 | MG/L | 12/05/2016 | CCN |
| Nitrate | EPA-300.0 | U | 0.15 | 1 | MG/L | 11/30/2016 | GAP |
| Sulfate | EPA-300.0 | U | 0.26 | 1 | MG/L | 11/30/2016 | GAP |
| Arsenic (Dissolved) | EPA-200.8 | **23** | 1.0 | 1 | UG/L | 12/01/2016 | RAL |

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



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ALS Group USA, Corp dba ALS Environmental

ALS Environmental

## CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| CLIENT: | Landau Associates, Inc.<br>130 - 2nd Ave. S.<br>Edmonds, WA 98020 | DATE: | 12/6/2016 |
| | | ALS SDG#: | EV16110191 |
| | | WDOE ACCREDITATION: | C601 |
| CLIENT CONTACT: | Kathryn Hartley | | |
| CLIENT PROJECT: | ABW Marine Groundwater | | |

## LABORATORY BLANK RESULTS

### MBLK-R286025 - Batch R286025 - Water by RSK-175

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Methane | RSK-175 | U | MG/L | 0.010 | 12/05/2016 | CCN |

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

### MBLK-285992 - Batch R285992 - Water by EPA-300.0

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Nitrate | EPA-300.0 | U | MG/L | 0.15 | 11/30/2016 | GAP |
| Sulfate | EPA-300.0 | U | MG/L | 0.26 | 11/30/2016 | GAP |

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

### MB-113016W - Batch 110315 - Water by EPA-200.8

| ANALYTE | METHOD | RESULTS | UNITS | REPORTING LIMITS | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|
| Arsenic (Dissolved) | EPA-200.8 | U | UG/L | 1.0 | 11/30/2016 | RAL |

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



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ALS Environmental

## CERTIFICATE OF ANALYSIS

CLIENT: Landau Associates, Inc.
130 - 2nd Ave. S.
Edmonds, WA 98020
CLIENT CONTACT: Kathryn Hartley
CLIENT PROJECT: ABW Marine Groundwater

DATE: 12/6/2016
ALS SDG#: EV16110191
WDOE ACCREDITATION: C601

## LABORATORY CONTROL SAMPLE RESULTS

### ALS Test Batch ID: R286025 - Water by RSK-175

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Methane - BS | RSK-175 | **95.8** | | | 80 | 120 | 12/05/2016 | CCN |
| Methane - BSD | RSK-175 | **94.1** | **2** | | 80 | 120 | 12/05/2016 | CCN |

### ALS Test Batch ID: R285992 - Water by EPA-300.0

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Nitrate - BS | EPA-300.0 | **96.0** | | | 80 | 120 | 11/30/2016 | GAP |
| Nitrate - BSD | EPA-300.0 | **94.0** | **2** | | 80 | 120 | 11/30/2016 | GAP |
| Sulfate - BS | EPA-300.0 | **98.0** | | | 80 | 120 | 11/30/2016 | GAP |
| Sulfate - BSD | EPA-300.0 | **100** | **2** | | 80 | 120 | 11/30/2016 | GAP |

### ALS Test Batch ID: 110315 - Water by EPA-200.8

| SPIKED COMPOUND | METHOD | %REC | RPD | QUAL | LIMITS MIN | LIMITS MAX | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|---|---|---|
| Arsenic (Dissolved) - BS | EPA-200.8 | **95.8** | | | 89.1 | 110 | 11/30/2016 | RAL |
| Arsenic (Dissolved) - BSD | EPA-200.8 | **97.0** | **1** | | 89.1 | 110 | 11/30/2016 | RAL |

APPROVED BY

Laboratory Director



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ALS Group USA, Corp dba ALS Environmental

EV1611019 1

LANDAU ASSOCIATES

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

# Chain-of-Custody Record

Date 11/29/16
Page 1 of 1

Project Name ABW Marine GW  Project No. 0147037.030.036
Project Location/Event Port of Everett/Quarterly Groundwater
Sampler's Name Stephanie Renando
Project Contact Kathryn Hartley
Send Results To K. Hartley, D. Jorgensen, S. Renando

Turnaround Time
~~☐ Standard~~
☐ Accelerated
☐ _____

| | Sample I.D. | Date | Time | Matrix | No. of Containers | Testing Parameters: Dissolved As (EPA 200.8) | Nitrate Sulfate (SM 4500) | Methane (RSK-175) | Observations/Comments |
|---|---|---|---|---|---|---|---|---|---|
| 1 | P-27B | 11/29/16 | 945 | AQ | 4 | X | X | X | |
| 2 | DUP | 11/29/16 | 1011 | AQ | 4 | X | X | X | |
| 3 | HWA-MW2 | 11/29/16 | 1055 | AQ | 4 | X | X | X | |
| 4 | HWA-MW1 | 11/29/16 | 1210 | AQ | 4 | X | X | X | |
| 5 | P-26 | 11/29/16 | 1325 | AQ | 4 | X | X | X | |

~~* Allow water samples to settle, collect aliquot from clear portion~~

___ NWTPH-Dx - run acid wash silica gel cleanup

___ Analyze for EPH if no specific product identified

VOC/BTEX/VPH (soil):
___ non-preserved
___ preserved w/methanol
___ preserved w/sodium bisulfate
___ Freeze upon receipt

X Dissolved metal water samples field filtered

Other

Notes: - Short Hold Nitrates
- Bill To: POE (Elise Gronewald)

Special Shipment/Handling or Storage Requirements: On wet ice

Method of Shipment: Deliver to ALS

| Relinquished by | Received by | Relinquished by | Received by |
|---|---|---|---|
| Signature | Signature | Signature | Signature |
| Printed Name Stephanie Renando | Printed Name Glen Perry | Printed Name | Printed Name |
| Company Landau Associates | Company ALS | Company | Company |
| Date 11/29/16 Time 1357 | Date 11/29/16 Time 13:57 | Date Time | Date Time |

WHITE COPY - Project File  YELLOW COPY - Laboratory  PINK COPY - Client Representative

12/2014

# ALS ENVIRONMENTAL

Sample Receiving Checklist

Client: Landau Associates ALS Job #: EV1611091

Project: Port of Everett/Quarterly Groundwater

Received Date: 11/29/16 Received Time: 13:57 By: BAP

Type of shipping container: Cooler X Box ___ Other ___

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

| | Yes | No | N/A |
|---|---|---|---|
| Were custody seals on outside of shipping container? | ___ | X | ___ |
| If yes, how many? ___ Where? ___ | | | |
| Custody seal date: ___ Seal name: ___ | | | |
| Was Chain of Custody properly filled out (ink, signed, dated, etc.)? | X | ___ | ___ |
| Did all bottles have labels? | X | ___ | ___ |
| Did all bottle labels and tags agree with Chain of Custody? | X | ___ | ___ |
| Were samples received within hold time? | X | ___ | ___ |
| Did all bottles arrive in good condition (unbroken, etc.)? | X | ___ | ___ |
| Was sufficient amount of sample sent for the tests indicated? | X | ___ | ___ |
| Was correct preservation added to samples? | X | ___ | ___ |

If no, Sample Control added preservative to the following:

| Sample Number | Reagent | Analyte |
|---|---|---|
| | | |
| | | |
| | | |

| | | | |
|---|---|---|---|
| Were VOA vials checked for absence of air bubbles? | ✓ | ___ | ___ |
| Bubbles present in sample #: ___ | | | |

Temperature of cooler upon receipt: 2.8°C on ice (Cold) Cool Ambient N/A

Explain any discrepancies: ___

Was client contacted? ___ Who was called? ___ By whom? ___ Date: ___

Outcome of call: ___

APPENDIX B

# Groundwater Monitoring Data 2014-2015

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

| Sample ID<br>Laboratory ID<br>Date Collected | Preliminary Cleanup Level (a) | P-26<br>7/24/2014 | P-26<br>8/18/2014 | P-26<br>9/3/2014 | P-26<br>ZN28F<br>12/3/2014 | P-26<br>ZZ75C<br>3/10/2015 | P-27<br>YC90A<br>3/13/2014 | Dup of P-27<br>DUP-1<br>YC90B<br>3/13/2014 | P-27<br>7/24/2014 | P-27<br>9/3/201 | P-27<br>ZN28A<br>12/3/2014 | Dup of P-27<br>DUP1<br>ZN28B<br>12/3/2014 | P-27<br>AC91A/ZZ75G<br>3/26/2015 | Dup of P-27<br>DUP-2<br>ZZ75F<br>3/10/2015 | HWA-MW1<br>7/24/2014 | HWA-MW1<br>8/18/2014 | HWA-MW1<br>9/3/2014 | HWA-MW1<br>ZN28D<br>12/3/2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | | | | | | |
| **Method SW6000-7000** | | | | | | | | | | | | | | | | | | |
| 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 |
| 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 |
| 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** |
| **NWTPH-Dx (mg/L)** | | | | | | | | | | | | | | | | | | |
| 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 |
| **NWTPH-Gx (mg/kg)** | | | | | | | | | | | | | | | | | | |
| Gasoline-Range | 0.8 | | | | | | | | | | 0.25 U | 0.25 U | 0.25 U | 0.25 U | | | | |
| **DISSOLVED GASES (µg/L)** | | | | | | | | | | | | | | | | | | |
| **RSK-175** | | | | | | | | | | | | | | | | | | |
| Methane | | | | | **8980** | **15100** | | | | | **503** | **536** | **5780** | | | | | **15000** |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | | | | | | |
| **Method EPA300.0** | | | | | | | | | | | | | | | | | | |
| 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** |
| **Field Parameters** | | | | | | | | | | | | | | | | | | |
| 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<br>Laboratory ID<br>Date Collected | Preliminary Cleanup Level (a) | Dup of HWA-MW1<br>DUP2<br>ZN28E<br>12/3/2014 | HWA-MW1<br>ZZ75B<br>3/10/2015 | Dup of HWA-MW1<br>DUP-1<br>ZZ75A<br>3/10/2015 | HWA-MW2<br>7/24/2014 | HWA-MW2<br>9/3/2014 | HWA-MW2<br>ZN28G<br>12/3/2014 | HWA-MW2<br>ZZ75D<br>3/10/2015 | HWA-MW3<br>7/24/2014 | HWA-MW3<br>9/3/2014 | HWA-MW3<br>ZN28C<br>12/3/2014 | HWA-MW3<br>ZZ75E<br>3/10/2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | |
| **Method SW6000-7000** | | | | | | | | | | | | |
| Arsenic | 5 | **66.3** | **51.5** | **52.5** | **2.7** | **8.2** | **9.6** | **8.1** | **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 |
| 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 |
| 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 |
| Silver | | | | | | | | | | | | |
| Zinc | 81 | **8** | **4** | 4 U | 2.5 U | **13** | **4** | 4 U | 2.5 U | **10** | **6** | 4 U |
| **NWTPH-Dx (mg/L)** | | | | | | | | | | | | |
| 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 |
| 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 |
| **NWTPH-Gx (mg/kg)** | | | | | | | | | | | | |
| Gasoline-Range | 0.8 | | | | | | | | | | | |
| **DISSOLVED GASES (µg/L)** | | | | | | | | | | | | |
| **RSK-175** | | | | | | | | | | | | |
| Methane | | **14000** | **17700** | **16900** | | | **13300** | **25200** | | | **3480** | **9550** |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | |
| **Method EPA300.0** | | | | | | | | | | | | |
| 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 |
| Sulfate | | **0.4** | **0.2** | **0.3** | | 0.26 U | 0.1 U | **0.8** | | 0.26 U | **0.1** | **0.5** |
| **Field Parameters** | | | | | | | | | | | | |
| 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.