STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

October 23, 2017

Mr. Marvin Dykman
9123 169th Street East
Puyallup, WA 98375

Re: No Further Action at the following Site:

- **Site Name:** Sound (Allied) Battery Co. Inc.
- **Site Address:** 2310 East 11th Street, Tacoma, Pierce County, WA
- **Facility/Site No.:** 1247
- **Cleanup Site ID:** 3646
- **VCP Project No.:** SW1208

Dear Mr. Dykman:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your proposed independent cleanup of the Allied Battery Co. Inc. facility (Site). This letter provides Ecology's opinion of that cleanup and is presented under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Determination

Ecology has determined that no further remedial action is necessary to clean up contamination at the Site. This determination is dependent on the continued performance and effectiveness of the post-cleanup controls and monitoring specified below.

This determination is based on Ecology's analysis of the Site documentation noted below and subsequent conclusion that the remedial actions implemented at the Site meet the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). This analysis is provided below.

Description of the Site

This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following release:

- Lead into the soil and groundwater.

Please note a parcel of real property can be affected by multiple sites. At this time, we have no information that the parcel(s) associated with this Site are affected by other sites.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. *Environmental Covenant,* Allied Battery Company, Inc. Tacoma, dated February 3, 2017.

2. *Long-Term Groundwater Monitoring Plan*, Sound Battery Property, 2310 East 11th Street, Tacoma, WA by Farallon Consulting, LLC., dated June 1 2016.

3. *Closure Report,* Sound Battery Property, 2310 East 11th Street, Tacoma, WA by Farallon Consulting, LLC., dated July 27, 2015.

4. *Cleanup Action Plan,* Sound Battery Property, 2310 East 11th Street, Tacoma, WA by Farallon Consulting, LLC., dated July 24, 2014.

5. *Remedial Investigation and Focused Feasibility Study Report,* Sound Battery Property, 2310 East 11th Street, Tacoma, WA by Farallon Consulting, LLC, dated November 2013.

These documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

Ecology has concluded that **no further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

1. Characterization of the Site.

Ecology has determined your characterization of the Site is sufficient to establish cleanup standards and select a cleanup action.

Investigations have been conducted at the Site between 1991 and 2011 to characterize the nature and extent of lead in soil and groundwater both inside and outside of the building footprint.

A Cleanup Action was conducted around the building by Geo Systems Analysis, Inc. in 2002 under terms of Agreed Order No. DE 01TCPSR-3130 between Ecology and Sound Battery and under Enforcement Order No. DE97TC-S137. Soils were excavated, treated, and disposed of at a Subtitle D Landfill. Groundwater samples collected at that time did not detect lead (either total or dissolved) in any of the four wells sampled. Following this cleanup action, the Site was removed from the Hazardous Sites List and received a No Further Action status (2003).

EnCo Environmental Corporation (EnCo) conducted an investigation in 2011. Lead was detected at concentrations greater than the MTCA Method A Cleanup Levels (Industrial Use) in soils beneath and adjacent to the building footprint. A sample of standing water near a drain was also sampled and found to have concentrations of dissolved lead greater than the MTCA Method A Cleanup Level. The Site was re-opened in 2012 and enrolled in the VCP program.

A Remedial Action and Focused Feasibility Study (RI/FFS) was conducted by Farallon in 2013 followed by a Cleanup Action Plan in 2014. The findings of the RI/FFS noted that the building should be removed and any impacted soils greater than the MTCA Method A Cleanup Levels (Industrial Use) for lead should be removed and disposed of off-Site. A Closure Report was prepared by Farallon in 2015 and documented the soil removal activities and confirmation sampling program. Laboratory analytical results from the confirmation samples from the final excavation limits confirmed that soils with exceedances of the MTCA Method A cleanup levels (Industrial Use) have been removed from the Site.

2. Establishment of cleanup standards.

Ecology has determined the cleanup levels and points of compliance you established for the Site meet the substantive requirements of MTCA.

MTCA Method A Cleanup Levels for soil (Industrial Land Uses) and groundwater were used to characterize and determine compliance for the Site.

Standard Points of Compliance have been proposed for the property and include:

- **Soil -Direct Contact**: For soil cleanup levels based on human exposure via direct contact, the point of compliance is: "*...throughout the Site from ground surface to 15 feet below the ground surface.*"

- **Groundwater:** For groundwater, the standard point of compliance as established under WAC 173-340-720(8) is: "*throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site.*"

b. Action and location-specific requirements.

Please note that other requirements apply to the cleanup action based on the type of the action or location of the Site. Those requirements are specified in attached Environmental Covenant received February 3, 2017.

3. Selection of cleanup action.

Ecology has determined the cleanup action you selected for the Site meets the substantive requirements of MTCA.

Cleanup actions conducted at the Site to date have included excavation and off-property disposal of soils impacted with lead greater than the MTCA Method A Cleanup Level (Industrial Use).

The selected cleanup action included placing an Environmental Covenant to restrict the property to industrial land use and conducting long-term monitoring of the groundwater utilizing the four monitoring wells MW's 1 through 4 at the Site.

4. Cleanup.

Ecology has determined the cleanup you performed sufficiently achieved cleanup standards established for the Site.

From 2000 to 2015, a total of approximately 1,200 tons of soils impacted with lead [greater than the MTCA Method A Cleanup Level (Industrial Land Use) 1,000 mg/kg] have been removed and disposed off-property. Excavation confirmation soil samples confirm that the soils remaining on the Site are less than the MTCA Method A Cleanup Level (Industrial Land Use).

Groundwater monitoring conducted prior to and following the excavation activities did not detected total lead greater than the MTCA Method A Cleanup Level (15µg/L) with the exception of one sample collected from standing water near an abandoned drain outlet within the building footprint.

Post-Cleanup Controls and Monitoring

Post-cleanup controls and monitoring are remedial actions performed after the cleanup to maintain compliance with cleanup standards. This opinion is dependent on the continued performance and effectiveness of the following:

1. **Compliance with institutional controls.**

   Institutional controls prohibit or limit activities that may interfere with the integrity of engineered controls or result in exposure to hazardous substances. The following institutional controls are necessary at the Site:

   - Restrictions on land.
   - Restrictions on groundwater use.

   To implement those controls, an Environmental Covenant has been recorded on the following parcel of real property in Pierce County:

   - 227 5200770

   Ecology approved the recorded Covenant, a copy of which is included in **Enclosure A**.

2. **Performance of confirmational monitoring.**

   Confirmational monitoring is necessary at the Site to confirm the long-term effectiveness of the cleanup action. These monitoring data will be used by Ecology during periodic reviews of post-cleanup conditions, as described below.

Periodic Review of Post-Cleanup Conditions

Ecology will conduct periodic reviews of post-cleanup conditions at the Site to ensure that they remain protective of human health and the environment. **Based on these periodic reviews, Ecology may determine that further remedial action is necessary at the Site. If such a determination is made, Ecology will withdraw this opinion.**

Listing of the Site

Based on this opinion, Ecology will remove the Site from our Hazardous Sites List.

That process includes public notice and opportunity to comment. Based on the comments received, Ecology will either remove the Site from the applicable lists or withdraw this opinion.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

Termination of Agreement

Thank you for cleaning up the Site under the Voluntary Cleanup Program (VCP). This opinion terminates the VCP Agreement governing this project (SW1208).

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion or the termination of the Agreement, please contact me by phone at (360)407-7263 or e-mail at thomas.middleton@ecy.wa.gov.

Sincerely,

Thomas Middleton
SWRO Toxics Cleanup Program

TMM: kb

By Certified Mail: [91 7199 9991 7037 1758 8983]

Enclosures ([2]): A – Environmental Covenant for Institutional Controls
B – Long-term Groundwater Monitoring Plan

cc: Tad Cline, Farallon Consulting, LLC
Rob Healy, Senior Manager, Port of Tacoma
Matt Alexander, Ecology
Megan MacClellan, Ecology
Panjini Balaraju, Ecology

201702030329 KEISENB 11 PGS
02/03/2017 12:11:17 PM $83.00
AUDITOR, Pierce County, WASHINGTON

Name & Return Address:

Mr. Marvin Dykman c/o MR. Clark Davis
Davis law office, PLLC
7525 Pioneer Way, suite 101
Gig Harbor, WAshington 98335

Washington State Recorder's Cover Sheet (RCW 65.04) Please print legibly or type information.

Document Title(s)
Environmental covenant

Grantor(s)
Marvin Dykman
____ Additional Names on Page __1__ of Document

Grantee(s)
State of Washington, Department of Ecology
____ Additional Names on Page __1__ of Document

Legal Description
(Abbreviated: i.e., lot, block & subdivision name or number OR section/township/range and quarter/quarter section)
Township 21 North, Range 3 East, Section 34, Tacoma, Washington
Complete Legal Description on Page __1__ of Document

Auditor's Reference Number(s)

Assessor's Property Tax Parcel/Account Number(s)
227-5200770

Non Standard Fee $50.00

By signing below, you agree to pay the $50.00 non standard fee.

I am requesting an emergency non standard recording for an additional fee as provided in RCW 36.18.010. I understand that the recording processing requirements may cover up or otherwise obscure some part of the text of the original document.

_____

Signature of Party Requesting Non Standard Recording

NOTE: Do not sign above or pay additional $50.00 fee if document meets margin/formatting requirements.

The Auditor/Recorder will rely on the information provided on this cover sheet.
Staff will not read the document to verify the accuracy or completeness of the indexing information provided herein.

After Recording Return
Original Signed Covenant
to:
Thomas Middleton, L.HG.
Toxics Cleanup Program
Department of Ecology
SW Regional Office
PO Box 47775
Olympia, Washington 98504

Environmental Covenant

Grantor: Marvin Dykman
Grantee: State of Washington, Department of Ecology (hereafter "Ecology")
Brief Legal Description: Township 21 North, Range 3 East, Section 34, Tacoma, Washington
Tax Parcel Nos.: 227 5200770

RECITALS

a. This document is an environmental (restrictive) covenant (hereafter "Covenant") executed pursuant to the Model Toxics Control Act ("MTCA"), chapter 70.105D RCW, and Uniform Environmental Covenants Act ("UECA"), chapter 64.70 RCW.

b. The Property that is the subject of this Covenant is part or all of a site commonly known as ALLIED BATTERY COMPANY, INC. TACOMA OR SOUND BATTERY COMPANY, INC.; WASHINGTON STATE DEPARTMENT OF ECOLOGY FACILITY SITE IDENTIFICATION NO. 1247. The Property is legally described in Exhibit A, and illustrated in Exhibit B, both of which are attached (hereafter "Property"). If there are differences between these two Exhibits, the legal description in Exhibit A shall prevail.

c. The Property is the subject of remedial action conducted under MTCA. This Covenant is required because residual contamination remains on the Property after completion of remedial actions. Specifically, the following principal contaminants remain on the Property:

Medium	Principal Contaminants Present
Groundwater	Lead

d. It is the purpose of this Covenant to restrict certain activities and uses of the Property to protect human health and the environment and the integrity of remedial actions conducted at the site. Records describing the extent of residual contamination and remedial actions conducted are available through Ecology.

e. This Covenant grants Ecology certain rights under UECA and as specified in this Covenant. As a Holder of this Covenant under UECA, Ecology has an interest in real property, however, this is not an ownership interest which equates to liability under MTCA or the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 *et*

seq. The rights of Ecology as an "agency" under UECA, other than its' right as a holder, are not an interest in real property.

COVENANT

Marvin Dykman, as Grantor and fee simple owner of the Property hereby grants to the Washington State Department of Ecology, and its successors and assignees, the following covenants. Furthermore, it is the intent of the Grantor that such covenants shall supersede any prior interests the GRANTOR has in the property and run with the land and be binding on all current and future owners of any portion of, or interest in, the Property.

Section 1. General Restrictions and Requirements.

The following general restrictions and requirements shall apply to the Property:

a. Interference with Remedial Action. The Grantor shall not engage in any activity on the Property that may impact or interfere with the remedial action and any operation, maintenance, inspection or monitoring of that remedial action without prior written approval from Ecology.

b. Protection of Human Health and the Environment. The Grantor shall not engage in any activity on the Property that may threaten continued protection of human health or the environment without prior written approval from Ecology. This includes, but is not limited to, any activity that results in the release of residual contamination that was contained as a part of the remedial action or that exacerbates or creates a new exposure to residual contamination remaining on the Property.

c. Continued Compliance Required. Grantor shall not convey any interest in any portion of the Property without providing for the continued adequate and complete operation, maintenance and monitoring of remedial actions and continued compliance with this Covenant.

d. Leases. Grantor shall restrict any lease for any portion of the Property to uses and activities consistent with this Covenant and notify all lessees of the restrictions on the use of the Property.

e. Preservation of Reference Monuments. Grantor shall make a good faith effort to preserve any reference monuments and boundary markers used to define the areal extent of coverage of this Covenant. Should a monument or marker be damaged or destroyed, Grantor shall have it replaced by a licensed professional surveyor within 30 days of discovery of the damage or destruction.

Section 2. Specific Prohibitions and Requirements.

In addition to the general restrictions in Section 1 of this Covenant, the following additional specific restrictions and requirements shall apply to the Property.

a. Industrial Land Use. The remedial action for the Property is based on a cleanup designed for industrial property. As such, the Property shall be used in perpetuity only for industrial uses, as that term is defined in the rules promulgated under Chapter 70.105D RCW. Prohibited uses on the Property include but are not limited to residential uses, childcare facilities, K-12 public or private schools, parks, grazing of animals, growing of food crops, and non-industrial commercial uses.

b. Groundwater Use. The groundwater beneath the Property shall not be extracted for any purpose other than temporary construction dewatering, investigation, monitoring or remediation. Drilling of a well for any water supply purpose is strictly prohibited. Groundwater extracted [from

the Property/within this area] for any purpose shall be considered potentially contaminated and any discharge of this water shall be done in accordance with state and federal law.

c. Monitoring. Several groundwater monitoring wells are located on the Property to monitor the performance of the remedial action. The Grantor shall maintain clear access to these devices and protect them from damage. The Grantor shall report to Ecology within forty-eight (48) hours of the discovery of any damage to any monitoring device. Unless Ecology approves of an alternative plan in writing, the Grantor shall promptly repair the damage and submit a report documenting this work to Ecology within thirty (30) days of completing the repairs.

Groundwater shall be monitored by the Grantor per the *Long-term Groundwater Monitoring Plan, Sound Battery Property, 2310 East 11th Street, Tacoma, Washington, Washington State Department of Ecology Facility Site No. 1247, Voluntary Cleanup Program No. SW1208,* dated May 19, 2016, prepared by Farallon Consulting, LLC.

Section 3. Access.

a. The Grantor shall maintain clear access to all remedial action components necessary to construct, operate, inspect, monitor and maintain the remedial action.

b. The Grantor freely and voluntarily grants Ecology and its authorized representatives, upon reasonable notice, the right to enter the Property at reasonable times to evaluate the effectiveness of this Covenant and associated remedial actions, and enforce compliance with this Covenant and those actions, including the right to take samples, inspect any remedial actions conducted on the Property, and to inspect related records.

c. No right of access or use by a third party to any portion of the Property is conveyed by this instrument.

Section 4. Notice Requirements.

a. Conveyance of Any Interest. The Grantor, when conveying any interest in any part of the Property, including but not limited to title, easement, leases, and security or other interests, must:

i. Provide written notice to Ecology of the intended conveyance at least thirty (30) days in advance of the conveyance.

ii. Include in the conveying document a notice in substantially the following form, as well as a complete copy of this Covenant:

NOTICE: THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL COVENANT GRANTED TO THE WASHINGTON STATE DEPARTMENT OF ECOLOGY ON _____ AND RECORDED WITH THE PIERCE COUNTY AUDITOR UNDER RECORDING NUMBER _____. USES AND ACTIVITIES ON THIS PROPERTY MUST COMPLY WITH THAT COVENANT, A COMPLETE COPY OF WHICH IS ATTACHED TO THIS DOCUMENT.

iii. Unless otherwise agreed to in writing by Ecology, provide Ecology with a complete copy of the executed document within thirty (30) days of the date of execution of such document.

b. Reporting Violations. Should the Grantor become aware of any violation of this Covenant, Grantor shall promptly report such violation in writing to Ecology.

c. Emergencies. For any emergency or significant change in site conditions due to Acts of Nature (for example, flood or fire) resulting in a violation of this Covenant, the Grantor is authorized to respond to such an event in accordance with state and federal law. The Grantor must notify Ecology in writing of the event and response actions planned or taken as soon as practical but no later than within 24 hours of the discovery of the event.

d. Notification procedure. Any required written notice, approval, reporting or other communication shall be personally delivered or sent by first class mail to the following persons. Any change in this contact information shall be submitted in writing to all parties to this Covenant. Upon mutual agreement of the parties to this Covenant, an alternative to personal delivery or first class mail, such as e-mail or other electronic means, may be used for these communications.

Marvin Dykman 9223 169th St E Puyallup, WA 98375-2293 (253) 446-0322 papacows@msn.com	Environmental Covenants Coordinator Washington State Department of Ecology Toxics Cleanup Program P.O. Box 47600 Olympia, WA 98504 – 7600 (360) 407-6000 ToxicsCleanupProgramHQ@ecy.wa.gov

Section 5. Modification or Termination.

a. Grantor must provide written notice and obtain approval from Ecology at least sixty (60) days in advance of any proposed activity or use of the Property in a manner that is inconsistent with this Covenant. For any proposal that is inconsistent with this Covenant and permanently modifies an activity or use restriction at the site:

i. Ecology must issue a public notice and provide an opportunity for the public to comment on the proposal; and

ii. If Ecology approves of the proposal, the Covenant must be amended to reflect the change before the activity or use can proceed.

b. If the conditions at the site requiring a Covenant have changed or no longer exist, then the Grantor may submit a request to Ecology that this Covenant be amended or terminated. Any amendment or termination of this Covenant must follow the procedures in MTCA and UECA and any rules promulgated under these chapters.

Section 6. Enforcement and Construction.

a. This Covenant is being freely and voluntarily granted by the Grantor.

b. Within ten (10) days of execution of this Covenant, Grantor shall provide Ecology with an original signed Covenant and proof of recording and a copy of the Covenant and proof of recording to others required by RCW 64.70.070.

c. Ecology shall be entitled to enforce the terms of this Covenant by resort to specific performance or legal process. All remedies available in this Covenant shall be in addition to any and all remedies at law or in equity, including MTCA and UECA. Enforcement of the terms of this Covenant shall be at the discretion of Ecology, and any forbearance, delay or omission to

exercise its rights under this Covenant in the event of a breach of any term of this Covenant is not a waiver by Ecology of that term or of any subsequent breach of that term, or any other term in this Covenant, or of any rights of Ecology under this Covenant.

d. The Grantor shall be responsible for all costs associated with implementation of this Covenant. Furthermore, the Grantor, upon request by Ecology, shall be obligated to pay for Ecology's costs to process a request for any modification or termination of this Covenant and any approval required by this Covenant.

e. This Covenant shall be liberally construed to meet the intent of MTCA and UECA.

f. The provisions of this Covenant shall be severable. If any provision in this Covenant or its application to any person or circumstance is held invalid, the remainder of this Covenant or its application to any person or circumstance is not affected and shall continue in full force and effect as though such void provision had not been contained herein.

g. A heading used at the beginning of any section or paragraph or exhibit of this Covenant may be used to aid in the interpretation of that section or paragraph or exhibit but does not override the specific requirements in that section or paragraph.

The undersigned Grantor warrants he/she holds the title to the Property and has authority to execute this Covenant.

EXECUTED this 8 day of September, 2016.

Marvin Dykman

Marvin Dykman
Signature

RECEIVED
SEP 29 2016
WA State Department
of Ecology (SWRO)

INDIVIDUAL ACKNOWLEDGMENT

STATE OF WA
COUNTY OF Pierce

On this 8th day of Sept, 2016 I certify that Marvin Dykman personally appeared before me, acknowledged that he is the individual described herein and who executed the within and foregoing instrument and signed the same at his free and voluntary act and deed for the uses and purposes therein mentioned.

C. A. ROACH
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
DECEMBER 9, 2016

Notary Public in and for the State of Washington [1]
Residing at Puy
My appointment expires 12-9-16

The Department of Ecology, hereby accepts the status as GRANTEE and HOLDER of the above Environmental Covenant.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

by: Rebecca S. Lawson

Title: SWRO-TCP Section Manager

Dated: 1/10/2017

RECEIVED
SEP 29 2016
WA State Department of Ecology (SWRO)

[1] Where landowner is located out of state, replace with appropriate out-of-state title and location.

STATE ACKNOWLEDGMENT

STATE OF Washington

COUNTY OF Thurston

On this 10th day of January, 2017, I certify that Rebecca Lawson personally appeared before me, acknowledged that **he/she** is the Toxics Cleanup Section Mgr. of the state agency that executed the within and foregoing instrument, and signed said instrument by free and voluntary act and deed, for the uses and purposes therein mentioned, and on oath stated that **he/she** was authorized to execute said instrument for said state agency.

Lorna L. Gadwa

Notary Public in and for the State of Washington

LORNA L. GADWA NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES SEPTEMBER 17, 2019

Residing at Olympia, WA 98502

My appointment expires 9-17-19

Exhibit A

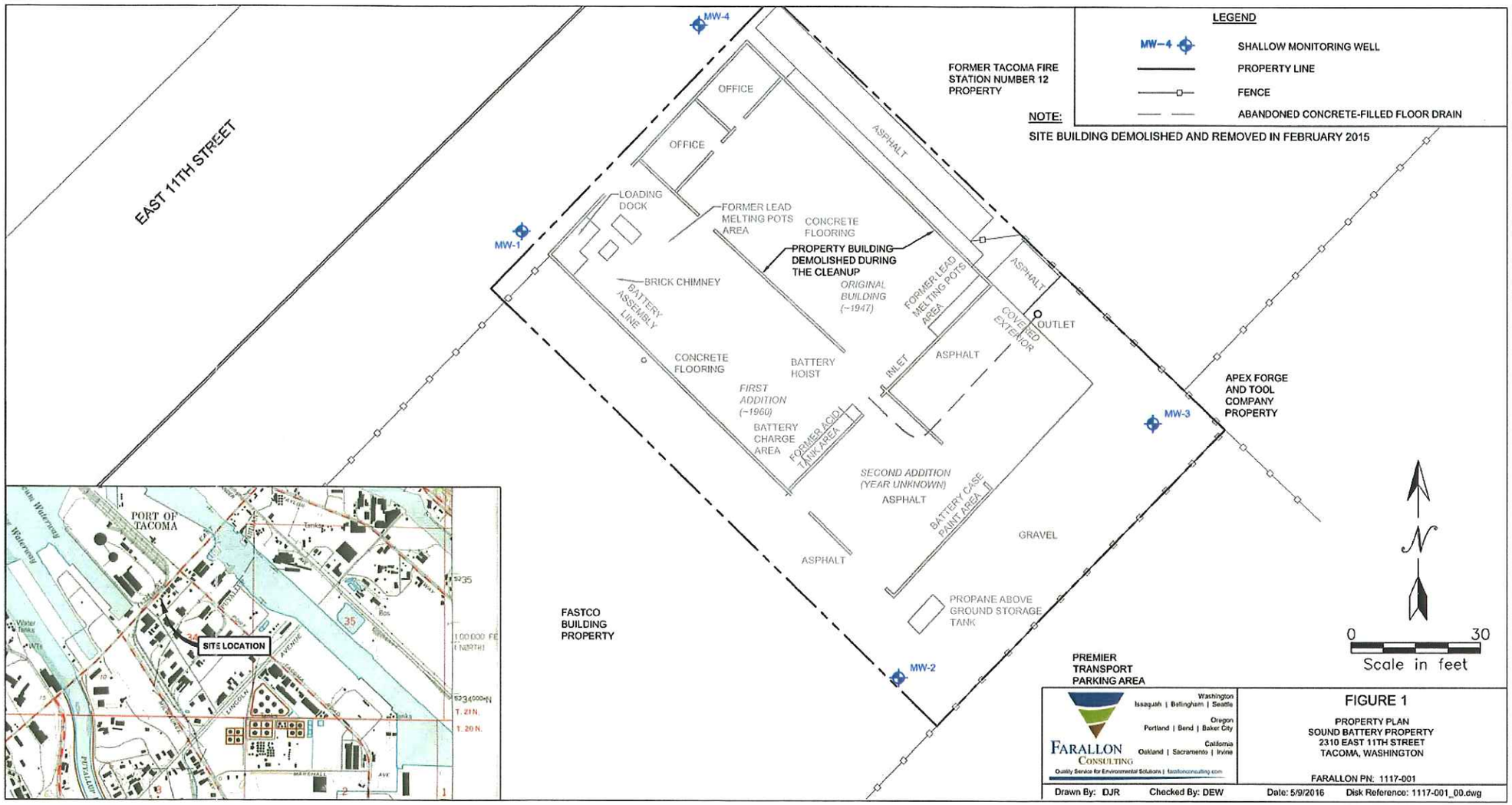
LEGAL DESCRIPTION

THAT PART OF BLOCK 18, AS THE SAME IS DESIGNATED ON THE REPLAT OF BLOCKS 13 TO 48, TACOMA TIDELANDS. KING COUNTY ANNEX, AS "ASHTON REPLAT," WHICH PLAT WAS FILED FOR RECORD IN THE OFFICE OF THE AUDITOR OF SAID COUNTY DECEMBER 23, 1918 IN SECTION 34, TOWNSHIP 21 NORTH, RANGE 3 EAST OF THE W.M ., IN PIERCE COUNTY, WASHINGTON, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE SOUTHEASTERLY LINE OF EAST 11TH STREET IN SAID BLOCK, WHICH POINT İS 583 FEET SOUTHWESTERLY FROM THE LINE COMMON TO SAID BLOCK 18 ANO BLOCK 19 OF SAID REPLAT; THENCE CONTINUING ALONG SAID SOUTHEASTERLY LINE OF EAST 11TH STREET, 100 FEET; THENCE SOUTHEASTERLY AT RIGHT ANGLES TO SAID LINE OF EAST 11TH STREET, 150 FEET; THENCE NORTHEASTERLY AND PARALLEL TO SAID LINE OF EAST 11TH STREET, 100 FEET; THENCE NORTHWESTERLY 150 FEET TO THE POINT OF BEGINNING.

Exhibit B

PROPERTY MAP



FARALLON CONSULTING
Washington: Issaquah | Bellingham | Seattle
Oregon: Portland | Bend | Baker City
California: Oakland | Sacramento | Irvine
Quality Service for Environmental Solutions | farallonconsulting.com

FIGURE 1

PROPERTY PLAN
SOUND BATTERY PROPERTY
2310 EAST 11TH STREET
TACOMA, WASHINGTON

FARALLON PN: 1117-001

Drawn By: DJR | Checked By: DEW | Date: 5/9/2016 | Disk Reference: 1117-001_00.dwg

FARALLON CONSULTING

Washington
Issaquah | Bellingham | Seattle
Oregon
Portland | Bend | Baker City
California
Oakland | Sacramento | Irvine

LONG-TERM GROUNDWATER MONITORING PLAN

SOUND BATTERY PROPERTY
2310 EAST 11TH STREET
TACOMA, WASHINGTON
WASHINGTON STATE DEPARTMENT OF ECOLOGY
FACILITY SITE NO. 1247
VOLUNTARY CLEANUP PROGRAM NO. SW1208

Submitted by:
Farallon Consulting, L.L.C.
975 5th Avenue Northwest
Issaquah, Washington 98027

Farallon PN: 1117-001

For:
Mr. Marvin Dykman
c/o Mr. Clark Davis
Davis Law Office, PLLC
7525 Pioneer Way, Suite 101
Gig Harbor, Washington 98335

June 1, 2016

Prepared by:

Jennifer L. Moore
Associate Scientist

Reviewed by:

Thaddeus Cline, P.E., L.G., L.H.G.
Principal Civil Engineer/Hydrogeologist

Peter Jewett, L.G., L.E.G.
Principal Engineering Geologist

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This Long-Term Groundwater Monitoring Plan provides the scope of work for groundwater monitoring at the Sound Battery Company property at 2310 East 11th Street in Tacoma, Washington (herein referred to as the Site) (Figures 1 and 2). Long-term groundwater monitoring is required by the Washington State Department of Ecology (Ecology) as part of the institutional controls required by the Environmental Covenant for regulatory closure for the Site. The Site is known as Facility Site No. 1247 by Ecology and is enrolled in the Ecology Voluntary Cleanup Program (VCP) under Identification No. SW1208.

1.1 BACKGROUND

A cleanup action was completed in February 2015, which included demolition of the Site building and removal of sections of the floor slab, excavation of 277 tons of soil containing lead at concentrations exceeding the Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A cleanup level for industrial land use as established in Chapter 173-340 of the Washington Administrative Code (WAC 173-340), off-Site stabilization of lead in the excavated soil, and disposal of stabilized soil at a Subtitle D waste disposal facility in accordance with the Ecology-reviewed and -approved *Cleanup Action Plan, Sound Battery Property, 2310 East 11th Street, Tacoma, Washington* dated July 24, 2014, prepared by Farallon Consulting, L.L.C. (Farallon) (2014). An earlier cleanup action was completed in April 2002, which included excavation of 880 tons of soil containing lead at concentrations exceeding the MTCA Method A cleanup level for unrestricted land use from around the exterior of the Site building and from adjacent areas of the surrounding three parcels. The 2002 cleanup action included on-Site stabilization of lead in the excavated soil and disposal of stabilized soil at a Subtitle D waste disposal facility. The 2002 cleanup action is documented in *Final Cleanup Action Report* dated July 22, 2002, prepared by GeoSystems Analysis, Inc. (2002).

The laboratory analytical results for confirmation soil samples collected from the bottom and sidewalls of the final excavation limits and from prior sample locations confirm that soil with concentrations of lead exceeding the MTCA Method A cleanup level for industrial land use has been excavated and removed from the Site. Lead has not been detected at concentrations exceeding the MTCA Method A cleanup level in groundwater samples collected from monitoring wells MW-1 through MW-4 (Farallon 2013).

The cleanup action completed to date is documented in the *Closure Report, Sound Battery Property, 2310 East 11th Street, Tacoma, Washington* dated July 27, 2015, prepared by Farallon (Closure Report) (2015). The cleanup action includes implementation of an Environmental Covenant with Site-specific restrictions and requirements, including industrial land use, limitations on groundwater use, and a groundwater monitoring program as defined herein.

1.2 PURPOSE

The purpose of this Long-Term Groundwater Monitoring Plan is to provide the specifications and schedule for collection and analysis of groundwater samples from the existing monitoring well network at the Site over the course of the next 5 years. The Long-Term Groundwater Monitoring Plan will be attached to an Environmental Covenant recorded on the property deed. Groundwater analytical results will be used during an Ecology 5-year review to evaluate whether the cleanup implemented at the Site was effective and protective of human health and the environment, and if the groundwater monitoring program can be terminated (Ecology 2015).

1.3 ORGANIZATION

This Long-Term Groundwater Monitoring Plan has been organized into the following sections:

- **Section 2—Groundwater Monitoring Program**: This section provides a description of the Long-Term Groundwater Monitoring Plan, including schedule, personnel health and safety, standard operating procedures (SOPs) for groundwater level gauging and sampling, laboratory analysis, waste management, field documentation, and reporting.
- **Section 3—References:** This section lists documents cited in this Long-Term Groundwater Monitoring Plan.
- **Section 4—Limitations:** This section presents Farallon standard limitations for work products and use by third parties.

2.0 GROUNDWATER MONITORING PROGRAM

This section provides the scope of work for the groundwater monitoring program, including schedule, personnel health and safety, SOPs for groundwater level gauging and sampling, laboratory analysis, waste management, field documentation, and reporting. The groundwater monitoring program consists of measuring the depth to groundwater and collection and analysis of groundwater samples for total and dissolved lead from monitoring wells MW-1 through MW-4 (Figure 2). SOPs for components of the groundwater monitoring program are contained in Appendix A, Standard Operating Procedures. Examples of field forms for use during the groundwater monitoring program are provided in Appendix B, Field Forms.

2.1 SCHEDULE

Three groundwater monitoring and sampling events will be performed on an 18-month frequency over 5 years according to the following schedule:

- Event 1, Year 1: Third quarter 2016;
- Event 2, Year 3: First quarter 2018, approximately 18 months after Event 1; and
- Event 3, Year 4: Third quarter 2019, approximately 18 months after Event 2.

After groundwater monitoring through Event 3, the Site will undergo an Ecology review to determine if the Site cleanup action is protective and the groundwater monitoring program can be terminated.

2.2 HEALTH AND SAFETY

Field work will be conducted in compliance with health and safety requirements of WAC 296-843, Hazardous Waste Operations, which presents requirements for a Site-specific health and safety plan relevant to the work and anticipated Site conditions in accordance with WAC 296-843-120. A current Site-specific health and safety plan will be prepared for the work, will be updated as needed for each sampling event, and will accompany field personnel during field work.

2.3 STANDARD OPERATING PROCEDURES

SOPs to be employed during the groundwater monitoring program are contained in Appendix A. Examples of field forms for data collected in the field are included in Appendix B. The methodologies for measuring the depth to groundwater and for sampling groundwater are described below.

2.3.1 Depth to Groundwater Measurement

The locking well caps will be removed from monitoring wells MW-1 through MW-4 and groundwater will equilibrate for at least 15 minutes prior to measuring depth to groundwater. The depth to groundwater will be measured in the monitoring wells to the nearest 0.01 foot using an

electronic water-level indicator. The depth to the monitoring well bottom will be measured to evaluate siltation of the monitoring well. Specific methods are provided in SOP GW-01, Groundwater Level Measurements in Monitoring Wells provided in Appendix A. Table 1, *Groundwater Elevations*, summarizes the depth to groundwater measurements collected in August 2012.

2.3.2 Groundwater Sampling

The monitoring wells will be sampled in accordance with the U.S. Environmental Protection Agency (EPA) guidance document *Low Flow (Minimal Drawdown) Ground-Water Sampling Procedures* (EPA 1996). Before the monitoring wells are purged, the intake of the dedicated polyethylene tubing will be placed approximately 2 to 3 feet below the measured depth to water. Groundwater will be purged from each well using a peristaltic pump at a flow rate of 100 to 300 milliliters per minute. During the purging of groundwater, field measurements for pH, temperature, specific conductivity, dissolved oxygen, and oxidation-reduction potential will be measured approximately every 3 minutes using a water-quality analyzer equipped with a flow-through cell. Field measurements will include periodic water level measurements and pump flow rates. Field measurements will be recorded on a Low Flow Well Purging and Sampling Data form such as the one contained in Appendix B. Nondisposable equipment will be decontaminated between uses.

Groundwater samples will be collected after the field measurements are completed and the rate of groundwater drawdown has stabilized to within the parameters established by EPA (1996) and in accordance with the sample handling procedures described below. Groundwater samples for total lead analysis will be collected directly from dedicated tubing into laboratory-supplied 250-milliliter sample containers with nitric acid preservative sufficient to lower pH to less than 2. Groundwater samples for dissolved lead analysis will be collected from the discharge of a 0.45-micron field filter fitted onto the dedicated tubing. Care will be taken to minimize exposure of sampled water to air and to not handle the lid of the container when the sample is being collected.

Each container will be filled completely to limit headspace, and the lid will be tightened securely. Each sample container will be labeled with the date and time sampled, well identification and number, project number, and preservative(s). Sample collection information will be documented on a Chain of Custody form and the sample will be placed into a cooler at approximately 4 degrees Celsius. Properly preserved, the holding time for groundwater samples collected for lead analysis is 6 months.

Specific methods are provided in SOP GW-02, Groundwater Sampling Procedures provided in Appendix A. Table 2, *Summary of Groundwater Lead Analytical Results*, contains analytical results for groundwater samples collected in August 2012.

2.4 LABORATORY ANALYSIS

Groundwater samples will be transported to an accredited environmental analytical laboratory such as OnSite Environmental Inc. of Redmond, Washington. Groundwater samples will be analyzed

for total and dissolved lead by EPA Method 200.8 with a maximum practical quantitation limit of 1.0 microgram per liter.

2.5 WASTE MANAGEMENT

Investigation-derived wastewater generated by groundwater sampling activities will be placed into labeled Washington State Department of Transportation-approved steel drums. The drums will be temporarily stored on the Site pending receipt of laboratory analytical data for waste profiling. Investigation-derived wastes will be disposed of at an authorized disposal facility within 90 days of generation.

2.6 FIELD DOCUMENTATION

Documentation of field activities will be provided on Field Report forms, Groundwater Level Measurement Summary forms, Low Flow Well Purging and Sampling Data forms, sample labels, Chain-of-Custody forms, waste material container labels, and Waste Inventory Tracking Sheets. Field forms for use during field activities are summarized below.

2.6.1 Field Report Form

Field personnel will be required to keep a daily field log on a Field Report form. Field notes will be as descriptive and inclusive as possible, enabling independent parties to reconstruct the sampling situation from the recorded information. Language will be objective, factual, and free of inappropriate terminology. A summary of each day's events will be provided on the Field Report form. At a minimum, field documentation will include the date, job number, project identification and location, weather conditions, sample collection data, personnel present and responsibilities, field equipment used, and any activities performed in a manner other than as specified. Field personnel will sign the completed Field Report form. An example Field Report form is included in Appendix B.

2.6.2 Groundwater Level Measurement Summary Form

A Groundwater Level Measurement Summary form will be used by the Field Scientist to document the water level measurements for monitoring wells MW-1 through MW-4 for each groundwater monitoring event. Information to be recorded on the Groundwater Level Measurement Summary form includes: date, monitoring well identification number, time of gauging, depth to water, total well depth, and notes pertaining to the gauging information for each monitoring well. An example Groundwater Level Measurement Summary form is included in Appendix B.

2.6.3 Low Flow Well Purging and Sampling Data

A Low Flow Well Purging and Sampling Data form will be used by the Field Scientist during groundwater sampling activities to record information pertaining to the groundwater samples being collected. This form documents field measurements made during purging and groundwater sampling. An example Low Flow Well Purging and Sampling Data form is included in Appendix B.

2.6.4 Sample Label

A sample label will be filled out and affixed to each sample container immediately prior to sample collection. The label will be filled out in indelible ink and include the medium, date, time sampled, sample identification and number, project name, project number, sampler's initials, and analyte preservative(s), if any. An example sample label is included in Appendix B.

2.6.5 Chain of Custody Form

The Chain of Custody form records the procedures followed whenever samples are collected, transferred, stored, analyzed, or destroyed, and is intended to create an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis and reporting of analytical values. The Chain of Custody form will be filled out by field sampling personnel at the time a sample is collected.

All samples submitted to the laboratory are accompanied by the Chain of Custody form. This form is checked for accuracy and completeness, signed, and dated by the laboratory sample custodian accepting the sample. At the laboratory, each sample is assigned a unique sequential laboratory identification number that is stamped or written on the Chain of Custody form.

The Chain of Custody form includes the client name, project name and number, date and time sampled, sample identifier, sampler's initials, analysis, and analyte preservative(s). An example Chain of Custody form is included in Appendix B.

2.6.6 Waste Material Container Label

A waste material container label will be filled out and affixed to the waste container immediately upon filling. The label will be filled out in indelible ink and include the job number and name, the address where the waste was generated, container contents, date, consultant's name and telephone number, and sampler's initials. An example waste material container label is included in Appendix B.

2.6.7 Waste Inventory Tracking Sheet

A Waste Inventory Tracking Sheet will be used to document and track the wastes generated during the groundwater monitoring program. The form will include information on the waste container, origin of the waste, type of waste, date generated, date removed from the Site, transporter, and disposal location. An example Waste Inventory Tracking Sheet is included in Appendix B.

2.7 REPORTING

Following completion of each groundwater monitoring and sampling event, a brief Groundwater Monitoring Report will be prepared to summarize the groundwater monitoring activities and present the analytical results. The report will include the following:

- A description of the activities performed, including groundwater monitoring and sampling;
- A summary table of groundwater elevation data;

- Summary tables of the analytical results and water quality data for groundwater samples collected during the monitoring well sampling activities;
- Figures depicting the monitoring well locations, groundwater elevation contours, and analytical results; and
- Farallon's conclusions pertaining to the groundwater monitoring results.

Groundwater monitoring and sampling data will be submitted to the Ecology Electronic Information Management database as data are generated.

3.0 REFERENCES

Farallon Consulting, L.L.C. (Farallon). 2013. *Remedial Investigation and Focused Feasibility Study Report, Sound Battery, 2310 East 11th Street, Tacoma, Washington.* Prepared for Clark Davis, Davis Law Office, PLLC, Gig Harbor, Washington. November 19.

———. 2014. *Cleanup Action Plan, Sound Battery Property, 2310 East 11th Street, Tacoma, Washington.* Prepared for Marvin Dykman c/o Clark Davis, Davis Law Office, PLLC, Gig Harbor, Washington. July 24.

_____. 2015. *Closure Report, Sound Battery Property, 2310 East 11th Street, Tacoma, Washington.* Prepared for Marvin Dykman c/o Clark Davis, Davis Law Office, PLLC, Gig Harbor, Washington. July 27.

GeoSystems Analysis, Inc. 2002. *Final Cleanup Action Report.* Prepared for Sound Battery. July 22.

U.S. Environmental Protection Agency (EPA). 1996. *Low-Flow, (Minimal Drawdown) Ground-Water Sampling Procedures.* Prepared by Robert W. Puls and Michael J. Barcelona. Publication No. EPA/540/S-95/504. April.

Washington State Department of Ecology (Ecology). 2015. E-mail Communication Regarding Sound Battery Property Closure Report. From Thomas Middleton. To Tad Cline, Farallon. December 22.

4.0 LIMITATIONS

4.1 GENERAL LIMITATIONS

The conclusions contained in this report/assessment are based on professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted hydrogeologic and engineering standards and practices applicable to this location. The conclusions contained herein are subject to the following inherent limitations:

- **Accuracy of Information.** Farallon obtained, reviewed, and evaluated certain information used in this report/assessment from sources that were believed to be reliable. Farallon's conclusions, opinions, and recommendations are based in part on such information. Farallon's services did not include verification of its accuracy or authenticity. Should the information upon which Farallon relied prove to be inaccurate or unreliable, Farallon reserves the right to amend or revise its conclusions, opinions, and/or recommendations.
- **Reconnaissance and/or Characterization.** Farallon performed a reconnaissance and/or characterization of the Site that is the subject of this report/assessment to document current conditions. Farallon focused on areas deemed more likely to exhibit hazardous materials conditions. Contamination may exist in other areas of the Site that were not investigated or were inaccessible. Site activities beyond Farallon's control could change at any time after the completion of this report/assessment.

For the foregoing reasons, Farallon cannot and does not warrant or guarantee that the Site is free of hazardous or potentially hazardous substances or conditions, or that latent or undiscovered conditions will not become evident in the future. Farallon's observations, findings, and opinions can be considered valid only as of the date of the report hereof.

This report/assessment has been prepared in accordance with the contract for services between Farallon and Client, and currently accepted industry standards. No other warranties, representations, or certifications are made.

4.2 LIMITATION ON RELIANCE BY THIRD PARTIES

Reliance by third parties is prohibited. This report/assessment has been prepared for the exclusive use of Client to address the unique needs of Client at the Site at a specific point in time. Services have been provided to Client in accordance with a contract for services between Farallon and Client, and generally accepted environmental practices for the subject matter at the time this report was prepared.

No other party may rely on this report unless Farallon agrees in advance to such reliance in writing. Any use, interpretation, or reliance upon this report/assessment by anyone other than Client is at the sole risk of that party, and Farallon will have no liability for such unauthorized use, interpretation, or reliance.

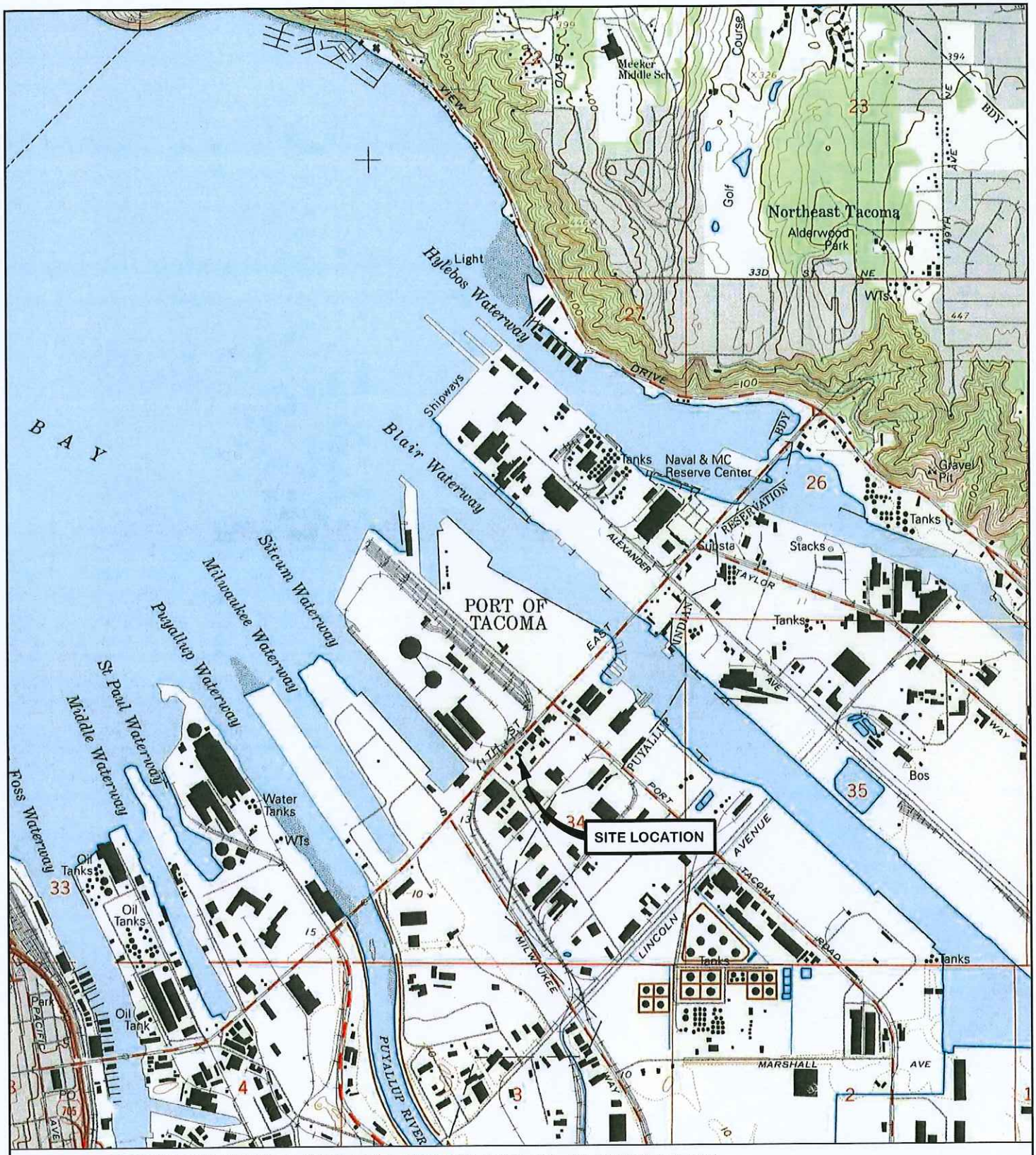
Do not rely on this report/assessment if:

- It was not prepared for you;
- It was not prepared for your project;
- It was not prepared for your specific Site; or
- It was not prepared under an approved scope of work for which you are under contract with Farallon.

FIGURES

LONG-TERM GROUNDWATER MONITORING PLAN
Sound Battery Property
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001



REFERENCE: 7.5 MINUTE USGS QUADRANGLE TACOMA NORTH, WASHINGTON. DATED 1953 AND PHOTOREVISED 1981

FARALLON CONSULTING
Quality Service for Environmental Solutions | farallonconsulting.com

Washington
Issaquah | Bellingham | Seattle

Oregon
Portland | Bend | Baker City

California
Oakland | Sacramento | Irvine

FIGURE 1

VICINITY MAP
SOUND BATTERY PROPERTY
2310 EAST 11TH STREET
TACOMA, WASHINGTON

FARALLON PN: 1117-001

Drawn By: DJR | Checked By: DEW | Date: 5/5/2016 | Disk Reference: 1117-001_00

EAST 11TH STREET

MW-4

GROUNDWATER ug/L		
DATE	DISSOLVED LEAD	TOTAL LEAD
08/07/2012	<1.0	<1.1

FORMER TACOMA FIRE STATION NUMBER 12 PROPERTY

OFFICE

OFFICE

ASPHALT

GROUNDWATER ug/L		
DATE	DISSOLVED LEAD	TOTAL LEAD
08/07/2012	<1.0	<1.1

MW-1

LOADING DOCK

FORMER LEAD MELTING POTS AREA

CONCRETE FLOORING

PROPERTY BUILDING DEMOLISHED DURING THE CLEANUP

ORIGINAL BUILDING (~1947)

BRICK CHIMNEY

BATTERY ASSEMBLY LINE

FORMER LEAD MELTING POTS AREA

ASPHA

OUTLET

CONCRETE FLOORING

BATTERY HOIST

INLET

ASPHALT

FIRST ADDITION (~1960)

BATTERY CHARGE AREA

FORMER ACID TANK AREA

SECOND ADDITION (YEAR UNKNOWN)

ASPHALT

APPROXIMATE GROUNDWATER FLOW DIRECTION

APEX FORGE AND TOOL COMPANY PROPERTY

MW-3

GROUNDWATER ug/L		
DATE	DISSOLVED LEAD	TOTAL LEAD
08/07/2012	<1.0	1.3

GRAVEL

PROPANE ABOVE GROUND STORAGE TANK

FASTCO BUILDING PROPERTY

MW-2

PREMIER TRANSPORT PARKING AREA

GROUNDWATER ug/L		
DATE	DISSOLVED LEAD	TOTAL LEAD
08/07/2012	<1.0	<1.1

LEGEND

- PROPERTY LINE
- FENCE
- FORMER ABANDONED CONCRETE-FILLED FLOOR DRAIN
- MW-3 SHALLOW MONITORING WELL
- APPROXIMATE EXTENT OF 2002 SHALLOW SOIL EXCAVATION
- APPROXIMATE EXTENT OF 2015 SHALLOW SOIL EXCAVATION

GROUNDWATER ANALYTICAL RESULTS IN MICROGRAMS PER LITER (ug/L)

< = INDICATES CONCENTRATION NOT DETECTED AT OR ABOV STATED LABORATORY PRACTICAL QUANTITATION LIMIT

ALL LOCATIONS ARE APPROXIMATE

NOTE:
SITE BUILDING DEMOLISHED AND REMOVED FROM SITE IN FEBRUARY 2015

N

0 20
Scale in feet

FARALLON CONSULTING
Quality Service for Environmental Solutions | farallonconsulting.com

Washington
Issaquah | Bellingham | Seattle

Oregon
Portland | Bend | Baker City

California
Oakland | Sacramento | Irvine

FIGURE 2

SITE MAP
SOUND BATTERY PROPERTY
2310 EAST 11TH STREET
TACOMA, WASHINGTON

FARALLON PN: 1117-001

Drawn By: DJR Checked By: TC Date: 5/5/2016 Disk Reference: 1117-001_00

TABLES

LONG-TERM GROUNDWATER MONITORING PLAN
Sound Battery Property
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001

Table 1
Groundwater Elevations
Sound Battery Property
2310 East 11th Street
Tacoma, Washington
Farallon PN: 1117-001

Monitoring Well	Date Measured	Well Head Elevation (feet)[1]	Depth to Water (feet)[2]	Groundwater Elevation (feet)[1]
MW-1	8/7/2012	10.48	6.34	4.14
MW-2	8/7/2012	15.25	10.66	4.59
MW-3	8/7/2012	13.83	9.50	4.33
MW-4	8/7/2012	10.34	6.21	4.13

NOTES:

[1] Elevations based on an arbitrary 100-foot datum established at the Site.

[2] In feet below measuring point on top of well casing.

Table 2
Summary of Groundwater Lead Analytical Results
Sound Battery Property
2310 East 11th Street
Tacoma, Washington
Farallon PN: 1117-001

Sample Location	Sample Identification	Sample Date	Analytical Results (micrograms per liter)[2]	
			Dissolved[3] Lead	Total Lead
MW-1	MW-1-080712	08/07/2012	< 1.0	1.3
MW-2	MW-2-080712	08/07/2012	< 1.0	< 1.1
MW-3	MW-3-080712	08/07/2012	< 1.0	< 1.1
MW-4	MW-4-080712	08/07/2012	< 1.0	< 1.1
MTCA Method A Cleanup Levels for Groundwater[1]			**15**	**15**

NOTES:

Results in **bold** denote that sample results exceed applicable screening level.

< denotes analyte not detected at or exceeding the laboratory practical quantitation limit listed.

[1] Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A Groundwater Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, as revised 2013.

[2] Analyzed by U.S. Environmental Protection Agency Method 200.8/7470A

[3] Dissolved denotes field- or lab-filtered with 0.45-micron filter.

APPENDIX A
STANDARD OPERATING PROCEDURES

LONG-TERM GROUNDWATER MONITORING PLAN
Sound Battery Property
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001

FARALLON CONSULTING

Washington
Issaquah | Bellingham | Seattle
Oregon
Portland | Bend | Baker City
California
Oakland | Sacramento | Irvine

STANDARD OPERATING PROCEDURE GW-01
GROUNDWATER LEVEL MEASUREMENTS IN MONITORING WELLS

PURPOSE AND APPLICATION

The purpose of this standard operating procedure is to provide field personnel with an outline of the specific information needed to measure and document the depth to groundwater in monitoring wells.

The step-by-step guidelines provided in this standard operating procedure are to be followed by the field crew to ensure consistent and representative measurements of depth to groundwater in monitoring wells.

EQUIPMENT AND SUPPLIES

The following equipment is necessary to properly measure the depth to groundwater in monitoring wells:

- A well key, hand drill, socket set, allen wrench, speed wrench, padlock key, or other well-access equipment specific to the well monument cover plate;
- An electric water meter with down-hole equipment narrow enough to fit within the monitoring well, calibrated to 0.01 foot, with sufficient line to reach the bottom of the monitoring well;
- Materials necessary to provide required documentation, including field books and field forms;
- Personal protective equipment (PPE) as described in the site Health and Safety Plan;
- Decontamination equipment; and
- Field forms for recording data.

DECONTAMINATION

Equipment that will come into contact with well water is to be decontaminated before arrival at the site, upon relocation at the site, and upon exit from the site.

PROCEDURES

The instructions below are to be followed for measuring water levels at each monitoring well:

- Don appropriate PPE as described in the site Health and Safety Plan.
- Remove soil or vegetation from the well site.
- Open the wellhead enclosure and remove standing water inside the well monument using a bilge pump or cup prior to opening the well cap. Standing water can be disposed of to the ground surface.

- Open the well cap.
- Allow the water level to equilibrate for approximately 15 minutes before measuring depth to groundwater. Measure and record the depth to groundwater using a pre-decontaminated water-level meter. With the water-level meter turned on to a medium level of sensitivity, slowly lower the meter into the well casing until it reaches the water table. When the probe reaches the interface of the water table, it will beep. If the monitoring well does not have a dedicated pump, lower the water-level indicator probe to the bottom of the well to measure the total depth of the well. Gently bounce the probe on the well bottom and pull the slack in the cord to read the total depth.
- Read the measurements from a surveyed notch or marking in the polyvinyl chloride well riser or, in the event there is no notch, record the measurement from the north side of the well casing. Conduct all measurements three times to ensure that the readings are accurate and represent true depths. Take the measurements to the nearest 0.01 foot, and record on the Low Flow Well Purging and Sampling Data form and the Groundwater Level Measurement Summary form. The additional 2 to 3 inches from the zero point of the sonde to the tip of the sonde will be discounted for all total depth measurements.
- Decontaminate the water-level meter before re-use.
- Close the well appropriately and record any well-integrity concerns on the Field Report form.

DOCUMENTATION

Document monitoring well water-level measurements on the Groundwater Level Measurement Summary form.

REFERENCES

U.S. Environmental Protection Agency. 1992. *RCRA Ground-Water Monitoring: Draft Technical Guidance.* Office of Solid Waste. November.

FARALLON CONSULTING

Washington
Issaquah | Bellingham | Seattle
Oregon
Portland | Bend | Baker City
California
Oakland | Sacramento | Irvine

STANDARD OPERATING PROCEDURE GW-02
GROUNDWATER SAMPLING PROCEDURES

PURPOSE AND APPLICATION

The purpose of this standard operating procedure is to provide groundwater sampling personnel with the information needed to collect and document groundwater samples from monitoring wells using U.S. Environmental Protection Agency (EPA) (1996) low-flow groundwater sampling procedures for chemical analysis to ensure consistent and representative sampling.

The step-by-step guidelines provided in this standard operating procedure are to be followed by the field crew conducting low-flow groundwater sampling.

EQUIPMENT AND SUPPLIES

The following equipment is necessary to properly purge and sample a groundwater monitoring well:

- A well key, hand drill, socket set, padlock key, or other well-access equipment;
- An electric water-meter sufficiently long to reach the bottom of the well, calibrated to 0.01 foot;
- Well-purging equipment (e.g., pump, tubing, power supply, extension cord);
- A sufficient number of waste containers, including lids, gaskets, and fasteners, to contain all purge water unless other water-handling arrangements have been made;
- A flow-through water-quality meter to measure temperature, pH, specific conductivity, dissolved oxygen, oxidation/reduction potential, and turbidity;
- Materials necessary to provide required documentation, (e.g., sample labels, Field Report forms, Low Flow Well Purging and Sampling Data form, and Chain of Custody forms);
- Sample containers with the chemical preservatives appropriate for the samples, as required by the analytical laboratory;
- Personal protective equipment (PPE) as described in the site-specific Health and Safety Plan; and
- Sampling support equipment (e.g., sample coolers, ice and/or blue ice, bubble wrap, clear tape, duct tape, re-sealable plastic bags, razor knives, garbage bags, paper towels, distilled water, and nitrile gloves).

DECONTAMINATION

Reusable equipment that will come into contact with the well and/or be used to acquire samples is to be decontaminated before arrival at the site, upon relocation at the site, and upon exit from the site.

PROCEDURES FOR LOW-FLOW SAMPLING

Well sampling procedures have been developed for monitoring wells without a dedicated pump (non-dedicated wells). The sections below present the procedures for setup, purging, sample collection, and post-sampling activities for non-dedicated wells.

Set-Up

- Don appropriate PPE as described in the site-specific Health and Safety Plan.
- Brush away soil and/or vegetation, and pump standing water away from the well opening.
- Open the well cap.
- Measure and record the depth to water using a decontaminated water-level meter in accordance with Standard Operating Procedure No. GW-01. Take all measurements from the north point on or at the hatch mark on the well riser. Measure to the nearest 0.01 foot and record the measurements on the Groundwater Level Measurement Summary Form and the Low Flow Sampling and Purging Data form.
- Connect the silicon tubing to the peristaltic pump. Place tubing intake at the midpoint of the screen or set the pump intake to the pre-determined depth according to the Project Manager. If using a bladder pump, insert the bladder pump and attach the dedicated polyethylene tubing so that the pump intake is approximately at the midpoint of the screened interval, or set the pump intake to the pre-determined depth according to the Project Manager.
- Set up the pump and the flow-through cell in preparation for purging. Turn the pump to its lowest setting, set the memory in the flow-through cell to record readings every 3 minutes, and turn on the pump. Begin purging slowly to prevent drawing down the water table.

Purging

- Begin purging, and initiate water-quality testing for temperature, pH, specific conductivity, dissolved oxygen, oxidation/reduction potential, and turbidity. Purge all monitoring wells using a peristaltic or bladder pump and dedicated polyethylene and silicon tubing. Record water-quality parameters every 3 minutes.
- Record water levels every 3 minutes, as possible. It is imperative that the water level not drop by more than 0.33 foot during the low-flow purging process. If the water level continues to drop during purging, reduce the flow rate on the pump.
- Record flow rates every 3 minutes. Ensure that the flow rate does not exceed 500 milliliters per minute (ml/min) during the low-flow purging process.

Purging Requirements

Purging should continue until water-quality parameters have stabilized according to the stability criteria specified below:

Water-Quality Parameter	Stability Criterion
Turbidity	{X} <5 NTU **or** RPD <10% for values {X}>5 NTU
Dissolved oxygen	$\Delta \leq 10\%$
Specific conductivity	RPD ≤ 3%
Oxidation/Reduction potential	Δ <10 mV
pH	$\Delta \leq 0.1$ unit

NOTES:
Δ = maximum reading minus minimum
mg/l = milligrams per liter
mV = millivolt
NTU=nephelometric turbidity unit
RPD – relative percent difference

Where: {X}= the last three water-quality readings
RPD = $\frac{\Delta}{}$ x 100%
Δ = Maximum {X} – Minimum {X}

Although a well may not stabilize according to the above criteria under some circumstances, the well can still be sampled if one of the following conditions exists:

- If the well does not meet stability criteria due to an instrument accuracy issue. Instrument accuracy sometimes limits the ability to achieve stabilization on a percentage basis. For example, if redox potential consistently fluctuates between 1 and 15 mV, a change in concentrations of greater than 10 mV does not meet the stability criterion. However, because the accuracy of the instrument is ±20 mV, the stability criterion would be considered satisfied within the range of accuracy for the instrument. This consideration is particularly important when water-quality parameter values are low. Field personnel must consult the instrument's manual to determine its accuracy range.
- If the water level drops below the minimum value using low-flow sampling procedures during purging. If a minimum of two tubing volumes have been removed from the well, the well should be sampled as soon as the water level has recovered sufficiently to allow collection of the volume of groundwater necessary for all samples. Use the following equation to determine the minimum volume of groundwater to remove before sampling:
  - Minimum purge volume = 2[500 milliliters + M(length of tubing in feet)]
    Where: M is the volume (in milliliters) contained in a 1-foot length of tubing

    The value of M is provided below for the inner diameters of tubing listed:

Inner Diameter (Inches)	M (Milliliters)
0.125	2.4
0.25	9.7
0.5	39

Record on the Field Report form and the Low Flow Well Purging and Sampling Data form if any well did not meet the stabilization and drawdown criteria, and explain the rationale for sampling the well at the time it was sampled.

Sample Collection

During low-flow sampling, do not stop pumping once the purging requirements have been met. Disconnect the sampling tube from the flow-through cell. It is imperative not to lower the water table or disturb the water column. Fill pre-cleaned sample containers using flexible silicon hose or polyethylene tubing on the discharge side of pump.

Post-Sampling

Record the depth to water to determine whether the water level changed from the original reading, as possible.

Close the well appropriately and record any well integrity concerns on the Field Report form and the Low Flow Well Purging and Sampling Data form.

DOCUMENTATION

Document the well purging and sampling activities on the Low Flow Well Purging and Sampling Data form.

REFERENCES

U.S. Environmental Protection Agency (EPA). 1996. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*. EPA/540/5-95/504. April.

APPENDIX B
FIELD FORMS

LONG-TERM GROUNDWATER MONITORING PLAN
Sound Battery Property
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001

FARALLON CONSULTING

Washington
Issaquah | Bellingham | Seattle
Oregon
Portland | Bend | Baker City
California
Oakland | Sacramento | Irvine

FIELD REPORT

Page ___ of ___

Date: _____ **Project #:** _____ **Task #:**_____

Project: _____ **Site Address:** _____

Client: _____ **Contractor:** _____

Weather: _____ **Temp:** _____

Equipment Used: _____

Hours: _____ _____ **Mileage:** _____ **Project Manager:** _____

Contractor *Staff*

Prepared By: _____ **Reviewed By:** _____

Comments:

FIELD REPORT (continued)

Page ___ of ___

Project: _____ **Date:** _____ **Project #:** _____ **Task #:**_____

FARALLON
CONSULTING

Groundwater Level Measurement Summary Form

Date:		**Project Name:**
Project Number:	**Task:**	**Project Location:**
Equipment Used:		**Project Manager:**

Well Number	Time	Depth to NAPL (feet)	Depth to Water (feet)	NAPL Thickness (feet)	Total Well Depth (feet)	Comments
				Prepared By:		

LOW FLOW WELL PURGING AND SAMPLING DATA

		WELL NO:
DATE:	PROJECT NAME:	PROJECT NO:
WEATHER CONDITIONS:		
WELL DIAMETER (IN.) ☐ 1 ☐ 2 ☐ 4 ☐ 6 ☐ OTHER _____		
SAMPLE TYPE: ☐ GROUNDWATER ☐ WASTEWATER ☐ SURFACE WATER ☐ OTHER		
WELL DEPTH (TOC) FT.	DEPTH TO WATER BEFORE PURGING (TOC) FT.	
LENGTH OF WATER FT.	CALCULATED ONE WELL VOLUME[1]: GAL.	
DEPTH OF SAMPLE POINT FT.	ESTIMATED VOLUME PURGED GAL.	
EQUIP. DECON. ☐ ALCONOX WASH ☐ LIQUINOX WASH ☐ DIST/DEION 1 RINSE ☐ DIST/DEION 2 RINSE ☐ OTHER		
CONTAINER PRESERVATION: ☐ LAB PRESERVED ☐ FIELD PRESERVED		
WATER ANALYZER:	PUMP TYPE:	TUBING:

ACTUAL TIME (min)	FLOW RATE (ml/min)	DEPTH TO WATER (feet)	TEMP ☐ °F ☐ °C	SPECIFIC CONDUCT.	pH	DISS. OXYGEN (mg/l)	TURBIDITY (NTU)	ORP (mV)	REMARKS
			(+/- 0.1°)	(+/- 3%)	(+/- 0.1)	(+/- 10%)	(NA)	(+/- 10 mV)	(EVIDENT ODOR, COLOR, PID)
	INITIAL		--	--	--	--	--	--	

DEPTH TO WATER AFTER PURGING (TOC) FT.	SAMPLE FILTERED ☐ YES ☐ NO SIZE _____
NOTES:	SAMPLE TIME: ID#
	DUPLICATE ☐ TIME: ID#:
	EQUIP. BLANK: ☐ TIME: ID#:
	PREPARED BY:

[1] A 1 FOOT LENGTH OF WATER = 0.05 GAL IN 1" DIA. PIPE 0.17 GAL IN 2" DIA PIPE 0.65 GAL IN 4" DIA PIPE 1.5 GAL IN 6" DIA PIPE

14648 NE 95th Street
Redmond, WA 98052
(425) 883-3881

OnSite Environmental Inc.

Client _____

Project _____

Sample ID _____

Date _____ Time _____

Analysis _____ Preservative _____

Chain of Custody

Page _____ of _____

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Company:

Project Number:

Project Name:

Project Manager:

Sampled by:

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Day ☐ 3 Day

☐ Standard (7 working days)

☐ _____ (other)

Laboratory Number:

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	VPH	EPH					% Moisture

	Signature	Company	Date	Time	Comments/Special Instructions:
Relinquished by					
Received by					
Relinquished by					
Received by					
Relinquished by					
Received by					
Reviewed by/Date		Reviewed by/Date			Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

NON-HAZARDOUS WASTE

OPTIONAL INFORMATION

Shipper _____

Address _____

City, State, Zip _____

Contents _____

NON-HAZARDOUS WASTE

WASTE INVENTORY TRACKING SHEET

Project Number: _____ **Page:** _____ **of**

Project Name: _____ **Generation Date:** _____

Project Address: _____ **Prepared By:** _____

Field Work Description: _____ **Date Waste Removed:** _____

Project Manager: _____ **Waste Transporter:** _____

Waste Disposal Location:

Unique Container ID	Container Size	% Capacity Used	Contents (Soil/GW/Decon Water)/ Origin (Boring or Well ID)	Date(s) Accumulated	Labeling (Contents Under Test/ Haz/Non-Haz/Other-Specify)	Sampled (Y/N)	Comments

NOTES: Contents should be specified and include identification of well/boring, media, source, depth of soil (if applicable), and any other helpful information.

Container ID should be unique when compared against other nearby containers. Special waste labels may include flammable, corrosive, dangerous when wet, and/or oxidizer.

Location of Drums (sketch or describe):

FARALLON CONSULTING