

# Technical Memorandum

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**TO:** Matthew Morris, PE, Washington State Department of Ecology  
**CC:** Amy Sikora, Washington State Department of Natural Resources  
**FROM:** Sierra Mott and Eric Weber, LHG, CWRE  
**DATE:** January 13, 2020  
**RE:** **Fourth Quarter 2019 Groundwater Monitoring Results  
Webster Nursery Site, Site ID 3380  
Tumwater, Washington  
Project No. 0774006.040.045**

## Introduction

This technical memorandum summarizes the results of quarterly groundwater monitoring completed by Landau Associates, Inc. (LAI) at the Washington State Department of Natural Resources (DNR) Webster Nursery site, a former pesticide-storage warehouse in Tumwater, Washington (site; Figure 1). The site is associated with past releases of organochlorine pesticides to soil and groundwater. Constituents of concern include the organochlorine pesticides heptachlor epoxide (HE; breakdown product of heptachlor) and technical chlordane.

Remedial action excavation and disposal of HE-contaminated soil were completed in August 2018. A summary of the remedial action is provided in a draft Cleanup Action Completion Report (LAI 2018).

## Groundwater Monitoring Summary

Fourth quarter 2019 (4Q19) groundwater monitoring was completed on November 19, 2019. Groundwater monitoring was completed in accordance with the framework established by Washington State Department of Ecology (Ecology) Agreed Order No. DE 00TCP-SR295, the Remedial Action Work Plan (LAI 2017), and the Compliance Monitoring Plan (LAI 2019). Groundwater samples were collected from two wells (SW-10R and SW-11R). Analytical Resources, Inc. of Tukwila, Washington analyzed groundwater samples for organochlorine pesticides using U.S. Environmental Protection Agency Method 8081A low-level.

Groundwater samples were collected with a peristaltic pump and dedicated tubing using low-flow groundwater sampling procedures. Low-flow groundwater monitoring consists of measuring the depth-to-water with an electronic groundwater level indicator, monitoring field parameters with a YSI 554 multi-parameter probe, and measuring turbidity with a handheld meter. One duplicate sample (SW-99 at SW-11R) was collected for quality control purposes.

## Groundwater Monitoring Results

Groundwater monitoring results are summarized below:

- HE was detected in SW-10R at a concentration of 0.346 micrograms per liter ( $\mu\text{g/L}$ ). This concentration exceeds the cleanup level (CUL; 0.0048  $\mu\text{g/L}$ )
- HE was detected in SW-11R at a concentration of 0.0027  $\mu\text{g/L}$ , below the CUL. HE was detected in the SW-11R duplicate sample at a concentration of 0.0022  $\mu\text{g/L}$ , also below the CUL
- Cis-chlordane, endosulfan II, and trans-chlordane were detected in SW-10R at concentrations of 0.0335  $\mu\text{g/L}$ , 0.0046  $\mu\text{g/L}$ , and 0.0605  $\mu\text{g/L}$ , respectively. These analytes are not generally detected above the laboratory reporting limit at this site, and there are no CULs.

November 2019 organochlorine pesticide data are provided in Table 1, and the laboratory data package is provided in Attachment 1. Time series data of recent HE concentrations in groundwater at SW-10R and SW-11R (dating back to January 2010) are presented on Figure 3.

Groundwater elevations at SW-10R and SW-11R were 180.96 and 180.62 feet mean sea level, respectively. This represents an approximate 0.2 foot variation from the previous monitoring event, completed in August 2019. Depth-to-water and groundwater elevation data are provided in Table 2 and SW-10R groundwater elevation data collected since the remedial action is shown on Figure 3.

## Environmental Information Management Submittal

An Environmental Information Management submittal is required. The submittal will be completed in winter 2020, after this technical memorandum has been submitted to Ecology.

LANDAU ASSOCIATES, INC.



Sierra Mott  
Senior Project Scientist



Eric Weber, LHG, CWRE  
Principal

SMM/EFW/kjg

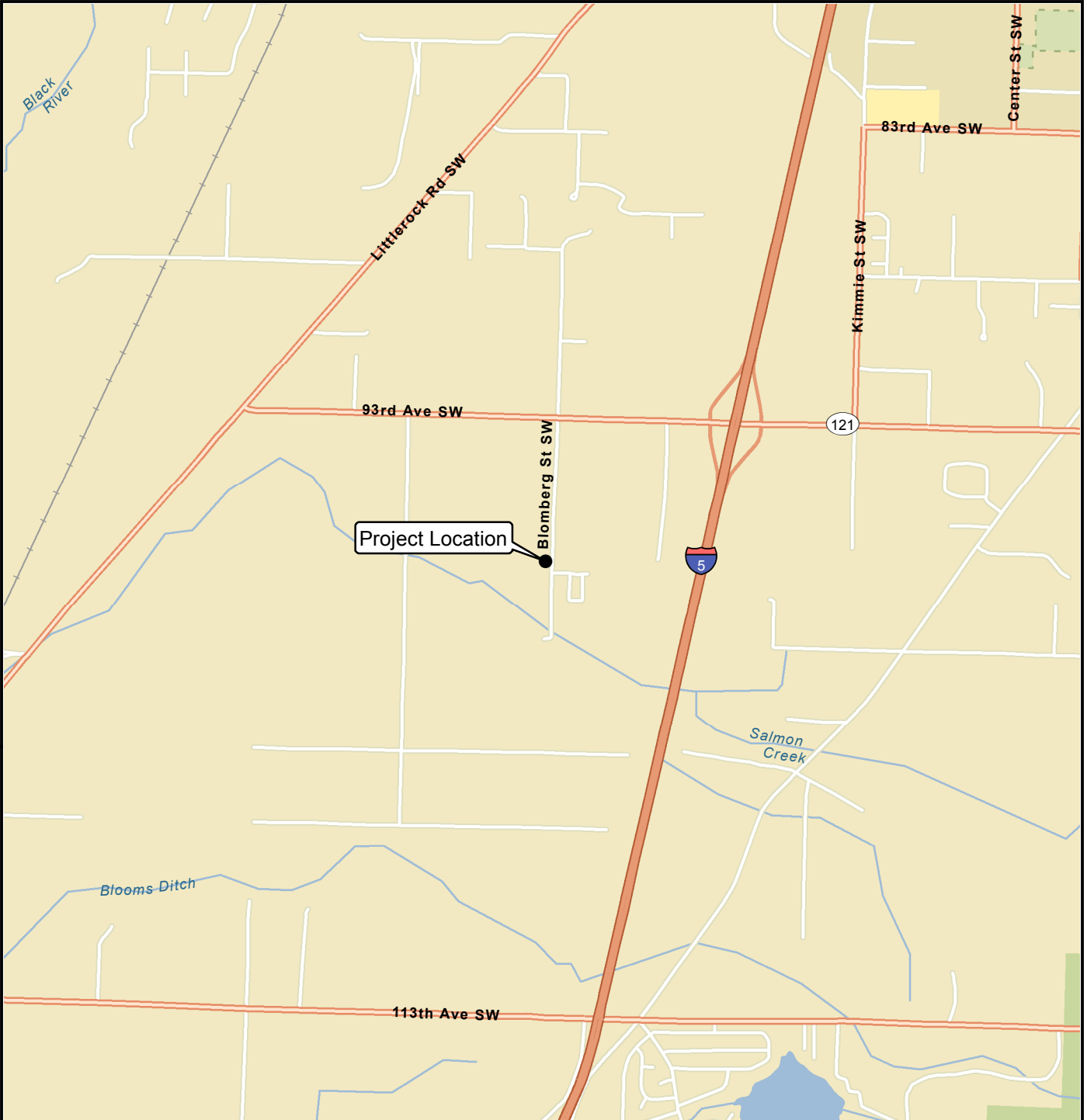
[Y:\774\006\R\QUARTERLY GW MONITORING REPORTS\4Q19\WEBSTER NURSERY 4Q19 GW MONITORING TECHNICAL MEMORANDUM.DOCX]

Attachments: Figure 1. Vicinity Map  
Figure 2. Monitoring Well Network  
Figure 3. Heptachlor Epoxide and Groundwater Elevation Time Series, SW-10(R) and SW-11(R)  
Table 1. Groundwater Analytical Results  
Table 2. Groundwater Level Measurements  
Attachment 1. November 2019 Laboratory Data Package

## References

- LAI. 2019. Compliance Monitoring Plan, Washington State Department of Natural Resources Webster Nursery, Tumwater, Washington. Landau Associates, Inc. July 24.
- LAI. 2018. Draft Cleanup Action Completion Report, Washington State Department of Natural Resources Webster Nursery, Tumwater, Washington. Landau Associates, Inc. October 12.
- LAI. 2017. Remedial Action Work Plan, Webster Nursery, 9805 Blomberg Street SW, Tumwater, Washington. Landau Associates, Inc. October 31.

G:\Projects\774\006\020\026\FIS\F01\_VicinityMap.mxd 5/16/2016 NAD 1983 StatePlane Washington North FIPS 4601 Feet



Data Source: Esri 2012

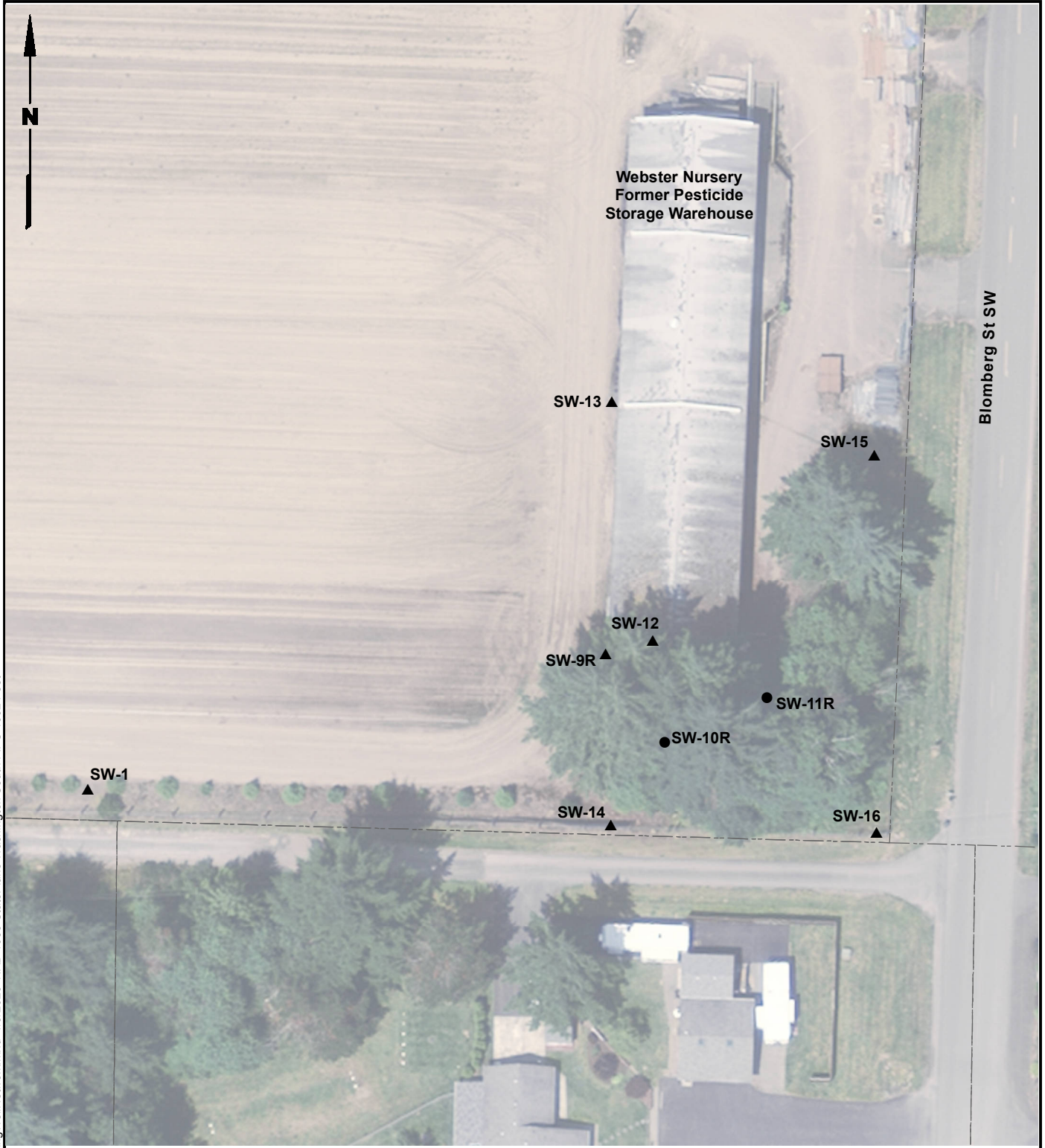


Webster Nursery Site  
Tumwater, Washington

Vicinity Map

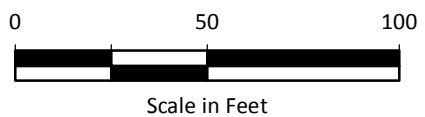
Figure  
**1**

G:\Projects\7741006\0401045\F02MonitoringWellNetwork.mxd 1/9/2020 NAD 1983 StatePlane Washington South FIPS 4602 Feet



**Legend**

- Pesticide Monitoring Well
- ▲ Other Monitoring Well
- Tax Parcels



**Notes**

1. SW-9R, SW-10R, and SW-11R are new (replacement) wells.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

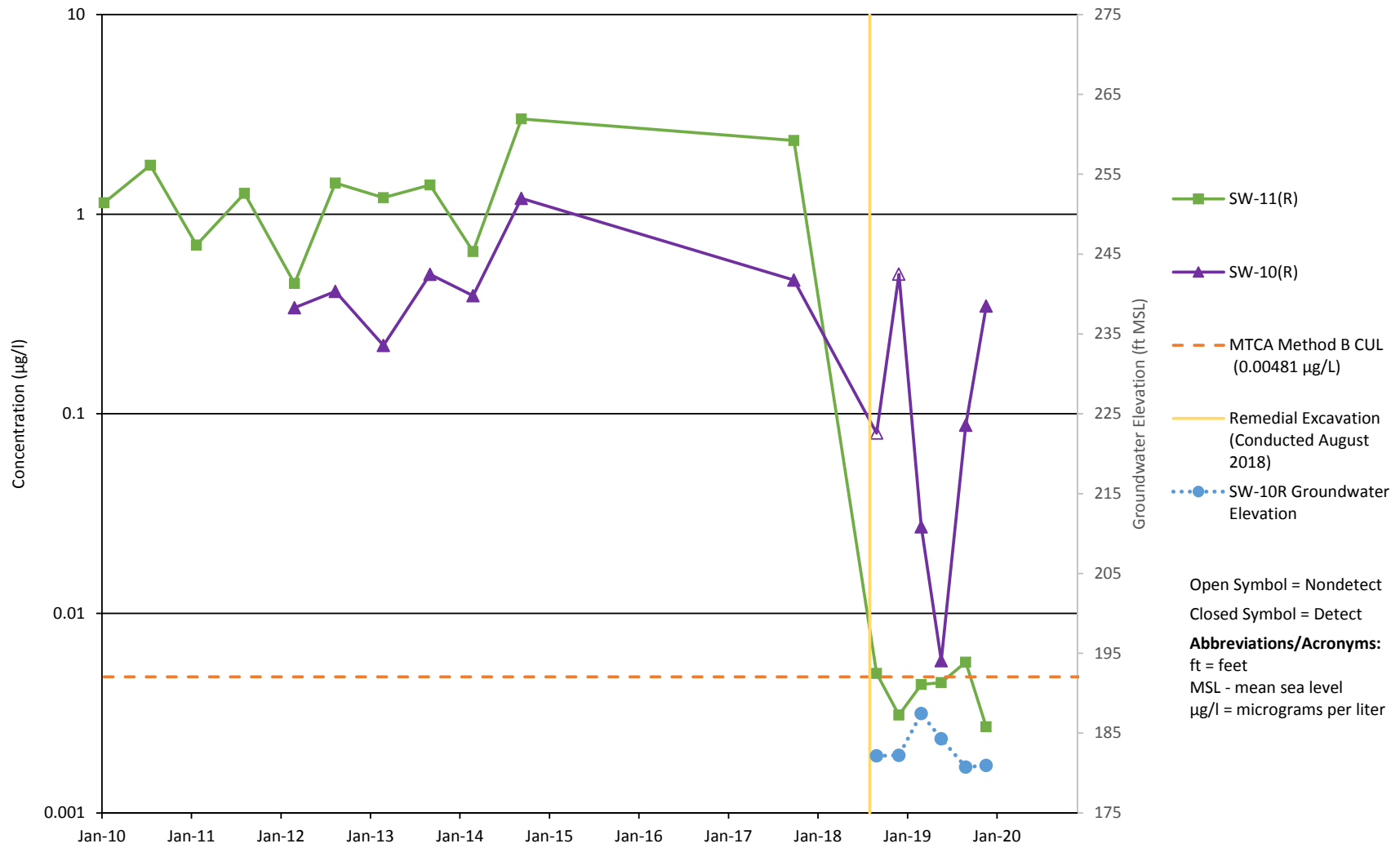
Data Sources: Thurston County GIS; WA DNR Survey, 2018.



Webster Nursery Site  
Tumwater, Washington

**Monitoring Well Network**

Figure  
**2**



Webster Nursery Site  
Tumwater, Washington

**Heptachlor Epoxide and Groundwater  
Elevation Time Series  
SW-10(R) and SW-11(R)**

Figure  
**3**

**Table 1**  
**Groundwater Analytical Results**  
**Webster Nursery**  
**Tumwater, Washington**

Analyte	MTCA Method B Cleanup Levels	Sample Location, Sample ID, Laboratory SDG, Sample Date, and Sample Type		
		SW-10R SW-10R-20191119 19K0305 11/19/2019 N	SW-11R SW-11R-20191119 19K0305 11/19/2019 N	SW-11R SW-99-20191119 19K0305 11/19/2019 FD
<b>Pesticides (µg/L; SW-846 8081B)</b>				
4,4'-DDD	--	0.0013 U	0.0013 U	0.0013 U
4,4'-DDE	--	0.0013 U	0.0013 U	0.0013 U
4,4'-DDT	--	0.0013 U	0.0013 U	0.0013 U
Aldrin	--	0.0006 U	0.0006 U	0.0006 U
alpha-BHC	--	0.0006 U	0.0006 U	0.0006 U
beta-BHC	--	0.0006 U	0.0006 U	0.0006 U
Chlordane	0.25	0.0050 U	0.0050 U	0.0050 U
cis-Chlordane	--	<b>0.0335</b>	0.0006 U	0.0006 U
delta-BHC	--	0.0006 U	0.0006 U	0.0006 U
Dieldrin	--	0.0013 U	0.0013 U	0.0013 U
Endosulfan I	--	0.0006 U	0.0006 U	0.0006 U
Endosulfan II	--	<b>0.0046</b>	0.0013 U	0.0013 U
Endosulfan Sulfate	--	0.0013 U	0.0013 U	0.0013 U
Endrin	--	0.0013 U	0.0013 U	0.0013 U
Endrin Aldehyde	--	0.0013 U	0.0013 U	0.0013 U
Endrin Ketone	--	0.0013 U	0.0013 U	0.0013 U
gamma-BHC	--	0.0006 U	0.0006 U	0.0006 U
Heptachlor	0.0194	0.0006 U	0.0006 U	0.0006 U
Heptachlor Epoxide	0.00481	<b>0.346</b>	<b>0.0027</b>	<b>0.0022</b>
Methoxychlor	--	0.0063 U	0.0063 U	0.0063 U
Toxaphene	--	0.0625 U	0.0625 U	0.0625 U
trans-Chlordane	--	<b>0.0605</b>	0.0006 U	0.0006 U

**Notes:**

-- = cleanup level not applicable

**Bold text** = Indicates detected analyte.

Green Box = Detected concentration is greater than the cleanup level

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

**Abbreviations and Acronyms:**

FD = field duplicate

ID = identification

µg/L = micrograms per liter

MTCA = Model Toxics Control Act

N = primary sample

SDG = sample delivery group

**Table 2**  
**Groundwater Level Measurements**  
**Webster Nursery**  
**Tumwater, Washington**

Well ID	Top of Casing Elevation (ft)	Depth to Water (ft bgs)	Groundwater Elevation (ft)
SW-10R	193.41	12.45	180.96
SW-11R	192.50	11.88	180.62

**Notes:**

Groundwater elevation data was collected November 19, 2019

**Abbreviations:**

bgs = below ground surface

ft = feet

ID = identification



# **November 2019 Laboratory Data Package**



16 December 2019

Sierra Mott  
Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma, WA 98402

RE: Webster Nursery

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

<u>Associated Work Order(s)</u>	<u>Associated SDG ID(s)</u>
19K0305	N/A

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I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





AK0305

# Chain-of-Custody Record

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

Date 11/19/2019  
 Page 1 of 1

Turnaround Time:  
 Standard  
 Accelerated

Project Name Webster Nursery Project No. 774006.0+0.045

Project Location/Event Olympia, WA/Quarterly Sampling

Sampler's Name Katie Gauglitz

Project Contact Eric Weber, Sierra Mott.

Send Results To E. Weber, S. Mott, D. Jorgensen

Testing Parameters

Special Handling Requirements:

Shipment Method:

Stored on ice:  Yes /  No

4.5, 1.5

Observations/Comments

Sample I.D.	Date	Time	Matrix	No. of Containers	Pesticides - organochlorine	Pesticides - organophosphate	RCRA 8 Metals - total												
SW-10R-20191119		1025	Aq	2	X														
SW-11R-20191119		1125	Aq	2	X														
SW-99-20191119		1130	Aq	2	X														
IDW-20191119		1200	Aq	3	X	X													

Allow water samples to settle, collect aliquot from clear portion  
 NWTPH-DX - Acid wash cleanup  
 - Silica gel cleanup  
 Dissolved metal samples were field filtered

Other \_\_\_\_\_

**Relinquished by**  
 Signature Katie Gauglitz  
 Printed Name Katie Gauglitz  
 Company Landau Associates  
 Date 11/20/19 Time 9:10

**Received by**  
 Signature [Signature]  
 Printed Name Kenny Dang  
 Company ARI  
 Date 11/20/19 Time 0910

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

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



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
16-Dec-2019 15:57

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW-10R-20191119	19K0305-01	Water	19-Nov-2019 10:25	20-Nov-2019 09:10
SW-11R-20191119	19K0305-02	Water	19-Nov-2019 11:25	20-Nov-2019 09:10
SW-99-20191119	19K0305-03	Water	19-Nov-2019 11:30	20-Nov-2019 09:10
IDW-20191119	19K0305-04	Water	19-Nov-2019 12:00	20-Nov-2019 09:10



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
16-Dec-2019 15:57

## Work Order Case Narrative

### **Total Metals - EPA Method 6020A**

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

### **Pesticides - EPA Method SW8081B**

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

Sample 19K0305-01 was analyzed at a dilution due to matrix effects.





# Cooler Receipt Form

ARI Client: Landau Tacoma

Project Name: Webster Nursery

COC No(s): \_\_\_\_\_ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 19K0305

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

- Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES  NO
- Were custody papers included with the cooler? ..... YES  NO
- Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO
- Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1000 4.5 1.5 \_\_\_\_\_  
If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 5206

Cooler Accepted by: KD Date: 11/20/19 Time: 0910

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

- Was a temperature blank included in the cooler? ..... YES  NO
- What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_
- Was sufficient ice used (if appropriate)? ..... NA  YES  NO
- How were bottles sealed in plastic bags? ..... Individually  Grouped  Not
- Did all bottles arrive in good condition (unbroken)? ..... YES  NO
- Were all bottle labels complete and legible? ..... YES  NO
- Did the number of containers listed on COC match with the number of containers received? ..... YES  NO
- Did all bottle labels and tags agree with custody papers? ..... YES  NO
- Were all bottles used correct for the requested analyses? ..... YES  NO
- Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA  YES  NO
- Were all VOC vials free of air bubbles? ..... NA  YES  NO
- Was sufficient amount of sample sent in each bottle? ..... YES  NO
- Date VOC Trip Blank was made at ARI..... NA
- Were the sample(s) split by ARI? NA  YES  Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: AS Date: 11/20/19 Time: 1124 Labels checked by: WS

**\*\* Notify Project Manager of discrepancies or concerns \*\***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

**Additional Notes, Discrepancies, & Resolutions:**

Sampling date not on COC, listed as 11/19/19 on container labels

By: AS Date: 11/20/19



WORK ORDER

19K0305

Client: Landau Associates, Inc. - Tacoma	Project Manager: Kelly Bottem
Project: Webster Nursery	Project Number: Webster Nursery

Preservation Confirmation

Container ID	Container Type	pH
19K0305-01 A	Glass NM, Amber, 1000 mL	
19K0305-01 B	Glass NM, Amber, 1000 mL	
19K0305-02 A	Glass NM, Amber, 1000 mL	
19K0305-02 B	Glass NM, Amber, 1000 mL	
19K0305-03 A	Glass NM, Amber, 1000 mL	
19K0305-03 B	Glass NM, Amber, 1000 mL	
19K0305-04 A	Glass NM, Amber, 1000 mL	
19K0305-04 B	Glass NM, Amber, 1000 mL	
19K0305-04 C	HDPE NM, 500 mL, 1:1 HNO3	LL

PASS

  
Preservation Confirmed By

11/20/19  
Date



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
16-Dec-2019 15:57

**SW-10R-20191119**  
**19K0305-01 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B		Sampled: 11/19/2019 10:25
Instrument: ECD6 Analyst: YZ		Analyzed: 12/03/2019 16:43
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHK0698 Prepared: 26-Nov-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19K0305-01 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHL0008 Cleaned: 02-Dec-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19K0305-01 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHL0007 Cleaned: 02-Dec-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19K0305-01 B 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	<b>0.469</b>	ug/L	P1, E
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	<b>0.0782</b>	ug/L	P1, E
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	<b>0.0335</b>	ug/L	P1
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	<b>0.0046</b>	ug/L	Y1
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	112	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %		NRS	NRS
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	64.6	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %		NRS	NRS





Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
16-Dec-2019 15:57

**SW-10R-20191119**  
**19K0305-01RE1 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B Sampled: 11/19/2019 10:25  
Instrument: ECD6 Analyst: YZ Analyzed: 12/13/2019 11:08

Sample Preparation: Preparation Method: EPA 3510C SepF Extract ID: 19K0305-01RE1 B 01  
Preparation Batch: BHK0698 Sample Size: 1000 mL  
Prepared: 26-Nov-2019 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel Extract ID: 19K0305-01RE1 B 01  
Cleanup Batch: CHL0008 Initial Volume: 0.5 mL  
Cleaned: 02-Dec-2019 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur Extract ID: 19K0305-01RE1 B 01  
Cleanup Batch: CHL0007 Initial Volume: 0.5 mL  
Cleaned: 02-Dec-2019 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	10	0.0063	ND	ug/L	U
beta-BHC	319-85-7	10	0.0063	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	10	0.0063	ND	ug/L	U
delta-BHC	319-86-8	10	0.0063	ND	ug/L	U
Heptachlor	76-44-8	10	0.0063	ND	ug/L	U
Aldrin	309-00-2	10	0.0063	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	10	0.0063	<b>0.346</b>	ug/L	P1, D
trans-Chlordane (beta-Chlordane)	5103-74-2	10	0.0063	<b>0.0605</b>	ug/L	D
cis-Chlordane (alpha-chlordane)	5103-71-9	10	0.0063	<b>0.0186</b>	ug/L	P1, D
Endosulfan I	959-98-8	10	0.0063	ND	ug/L	U
4,4'-DDE	72-55-9	10	0.0125	ND	ug/L	U
Dieldrin	60-57-1	10	0.0125	ND	ug/L	U
Endrin	72-20-8	10	0.0125	ND	ug/L	U
Endosulfan II	33213-65-9	10	0.0125	ND	ug/L	U
4,4'-DDD	72-54-8	10	0.0125	ND	ug/L	U
Endrin Aldehyde	7421-93-4	10	0.0125	ND	ug/L	U
4,4'-DDT	50-29-3	10	0.0125	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	10	0.0125	ND	ug/L	U
Endrin Ketone	53494-70-5	10	0.0125	ND	ug/L	U
Methoxychlor	72-43-5	10	0.0625	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	64.5	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	89.4	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	53.2	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	44.4	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
16-Dec-2019 15:57

**SW-11R-20191119**  
**19K0305-02 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B		Sampled: 11/19/2019 11:25
Instrument: ECD6 Analyst: YZ		Analyzed: 12/03/2019 17:01
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHK0698 Prepared: 26-Nov-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19K0305-02 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHL0008 Cleaned: 02-Dec-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19K0305-02 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHL0007 Cleaned: 02-Dec-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19K0305-02 B 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	<b>0.0027</b>	ug/L	
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	123	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	144	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	70.1	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	47.8	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
16-Dec-2019 15:57

**SW-99-20191119**  
**19K0305-03 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B		Sampled: 11/19/2019 11:30
Instrument: ECD6 Analyst: YZ		Analyzed: 12/03/2019 17:19
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHK0698 Prepared: 26-Nov-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19K0305-03 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHL0008 Cleaned: 02-Dec-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19K0305-03 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHL0007 Cleaned: 02-Dec-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19K0305-03 B 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	0.0022	ug/L	P1
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	109	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %		NRS	NRS
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	67.0	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %		NRS	NRS



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**IDW-20191119**  
**19K0305-04 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B		Sampled: 11/19/2019 12:00
Instrument: ECD6 Analyst: YZ		Analyzed: 12/03/2019 17:37
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHK0698 Prepared: 26-Nov-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19K0305-04 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHL0008 Cleaned: 02-Dec-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19K0305-04 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHL0007 Cleaned: 02-Dec-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19K0305-04 B 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	<b>0.0103</b>	ug/L	P1
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	105	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	142	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	72.3	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	66.5	%	



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**IDW-20191119**  
**19K0305-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A Sampled: 11/19/2019 12:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 11/25/2019 21:37  
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Extract ID: 19K0305-04 C 01  
Preparation Batch: BHK0599 Sample Size: 25 mL  
Prepared: 21-Nov-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	1	0.0560	0.500	7.22	ug/L	
Chromium	7440-47-3	1	0.130	0.500	0.481	ug/L	J
Lead	7439-92-1	1	0.0680	0.100	ND	ug/L	U
Silver	7440-22-4	1	0.0170	0.200	ND	ug/L	U



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**IDW-20191119**  
**19K0305-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED

Sampled: 11/19/2019 12:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 11/23/2019 01:45

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 19K0305-04 C 01

Preparation Batch: BHK0599

Sample Size: 25 mL

Prepared: 21-Nov-2019

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	<b>0.0870</b>	ug/L	J
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Selenium	7782-49-2	1	0.440	0.500	ND	ug/L	U



Landau Associates, Inc. - Tacoma 2107 South C Street Tacoma WA, 98402	Project: Webster Nursery Project Number: Webster Nursery Project Manager: Sierra Mott	Reported: 16-Dec-2019 15:57
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**IDW-20191119**  
**19K0305-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A	Preparation Method: TWM EPA 7470A	Sampled: 11/19/2019 12:00
Instrument: CVAA Analyst: SKM	Preparation Batch: BHK0639	Analyzed: 11/25/2019 13:13
Sample Preparation:	Prepared: 22-Nov-2019	Extract ID: 19K0305-04 C
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



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Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sierra Mott

Reported:  
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### Chlorinated Pesticides - Quality Control

#### Batch BHK0698 - EPA 3510C SepF

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BHK0698-BLK1)</b>										
Prepared: 26-Nov-2019 Analyzed: 03-Dec-2019 14:55										
alpha-BHC	ND	0.0006	ug/L							U
beta-BHC	ND	0.0006	ug/L							U
gamma-BHC (Lindane)	ND	0.0006	ug/L							U
delta-BHC	ND	0.0006	ug/L							U
Heptachlor	ND	0.0006	ug/L							U
Aldrin	ND	0.0006	ug/L							U
Heptachlor Epoxide	ND	0.0006	ug/L							U
trans-Chlordane (beta-Chlordane)	ND	0.0006	ug/L							U
cis-Chlordane (alpha-chlordane)	ND	0.0006	ug/L							U
Endosulfan I	ND	0.0006	ug/L							U
4,4'-DDE	ND	0.0013	ug/L							U
Dieldrin	ND	0.0013	ug/L							U
Endrin	ND	0.0013	ug/L							U
Endosulfan II	ND	0.0013	ug/L							U
4,4'-DDD	ND	0.0013	ug/L							U
Endrin Aldehyde	ND	0.0013	ug/L							U
4,4'-DDT	ND	0.0013	ug/L							U
Endosulfan Sulfate	ND	0.0013	ug/L							U
Endrin Ketone	ND	0.0013	ug/L							U
Methoxychlor	ND	0.0063	ug/L							U
Toxaphene	ND	0.0625	ug/L							U
Chlordane (NOS)	ND	0.0050	ug/L							U
Surrogate: Decachlorobiphenyl	0.0214		ug/L	0.0200	107		30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0274		ug/L	0.0200	137		30-160			
Surrogate: Tetrachlorometaxylene	0.0118		ug/L	0.0200	59.1		30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0151		ug/L	0.0200	75.7		30-160			

#### LCS (BHK0698-BS1)

Prepared: 26-Nov-2019 Analyzed: 03-Dec-2019 15:13

alpha-BHC	0.0086	0.0006	ug/L	0.0100		85.6	30-160			
beta-BHC	0.0088	0.0006	ug/L	0.0100		87.5	30-160			
gamma-BHC (Lindane)	0.0093	0.0006	ug/L	0.0100		93.2	30-160			
delta-BHC	0.0097	0.0006	ug/L	0.0100		96.8	30-160			
Heptachlor	0.0087	0.0006	ug/L	0.0100		86.8	30-160			
Aldrin	0.0083	0.0006	ug/L	0.0100		82.5	30-160			
Heptachlor Epoxide	0.0106	0.0006	ug/L	0.0100		106	30-160			





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### Chlorinated Pesticides - Quality Control

#### Batch BHK0698 - EPA 3510C SepF

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>LCS (BHK0698-BS1)</b>		Prepared: 26-Nov-2019 Analyzed: 03-Dec-2019 15:13								
trans-Chlordane (beta-Chlordane)	0.0104	0.0006	ug/L	0.0100		104	30-160			
cis-Chlordane (alpha-chlordane)	0.0103	0.0006	ug/L	0.0100		103	30-160			
Endosulfan I	0.0105	0.0006	ug/L	0.0100		105	30-160			
4,4'-DDE	0.0213	0.0013	ug/L	0.0200		106	30-160			
Dieldrin	0.0209	0.0013	ug/L	0.0200		104	30-160			
Endrin	0.0269	0.0013	ug/L	0.0200		135	30-160			
Endosulfan II	0.0264	0.0013	ug/L	0.0200		132	30-160			
4,4'-DDD	0.0281	0.0013	ug/L	0.0200		141	30-160			P1
Endrin Aldehyde	0.0199	0.0013	ug/L	0.0200		99.5	30-160			
4,4'-DDT	0.0287	0.0013	ug/L	0.0200		143	30-160			
Endosulfan Sulfate	0.0296	0.0013	ug/L	0.0200		148	30-160			P1
Endrin Ketone	0.0249	0.0013	ug/L	0.0200		125	30-160			
Methoxychlor	0.143	0.0063	ug/L	0.100		143	30-160			
Surrogate: Decachlorobiphenyl	0.0238		ug/L	0.0200		119	30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0292		ug/L	0.0200		146	30-160			
Surrogate: Tetrachlorometaxylene	0.0130		ug/L	0.0200		65.0	30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0159		ug/L	0.0200		79.6	30-160			
<b>LCS (BHK0698-BS2)</b>		Prepared: 26-Nov-2019 Analyzed: 03-Dec-2019 15:49								
Toxaphene	0.134	0.0625	ug/L	0.100		134	30-160			
Surrogate: Decachlorobiphenyl	0.0218		ug/L	0.0200		109	30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0243		ug/L	0.0200		122	30-160			
Surrogate: Tetrachlorometaxylene	0.0124		ug/L	0.0200		62.0	30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0139		ug/L	0.0200		69.7	30-160			
<b>LCS Dup (BHK0698-BS1)</b>		Prepared: 26-Nov-2019 Analyzed: 03-Dec-2019 15:31								
alpha-BHC	0.0080	0.0006	ug/L	0.0100		80.0	30-160	6.68	30	
beta-BHC	0.0087	0.0006	ug/L	0.0100		87.0	30-160	0.59	30	
gamma-BHC (Lindane)	0.0087	0.0006	ug/L	0.0100		87.5	30-160	6.35	30	
delta-BHC	0.0094	0.0006	ug/L	0.0100		94.4	30-160	2.56	30	
Heptachlor	0.0081	0.0006	ug/L	0.0100		81.0	30-160	6.85	30	
Aldrin	0.0077	0.0006	ug/L	0.0100		77.0	30-160	6.94	30	
Heptachlor Epoxide	0.0100	0.0006	ug/L	0.0100		100	30-160	5.96	30	
trans-Chlordane (beta-Chlordane)	0.0098	0.0006	ug/L	0.0100		98.1	30-160	6.12	30	
cis-Chlordane (alpha-chlordane)	0.0098	0.0006	ug/L	0.0100		97.8	30-160	5.10	30	



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Project: Webster Nursery  
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Reported:  
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**Chlorinated Pesticides - Quality Control**

**Batch BHK0698 - EPA 3510C SepF**

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>LCS Dup (BHK0698-BSD1)</b>		Prepared: 26-Nov-2019 Analyzed: 03-Dec-2019 15:31								
Endosulfan I	0.0099	0.0006	ug/L	0.0100		99.2	30-160	5.53	30	
4,4'-DDE	0.0201	0.0013	ug/L	0.0200		101	30-160	5.46	30	
Dieldrin	0.0199	0.0013	ug/L	0.0200		99.3	30-160	4.90	30	
Endrin	0.0264	0.0013	ug/L	0.0200		132	30-160	2.06	30	
Endosulfan II	0.0238	0.0013	ug/L	0.0200		119	30-160	10.30	30	
4,4'-DDD	0.0255	0.0013	ug/L	0.0200		127	30-160	9.92	30	
Endrin Aldehyde	0.0187	0.0013	ug/L	0.0200		93.4	30-160	6.22	30	
4,4'-DDT	0.0261	0.0013	ug/L	0.0200		131	30-160	9.31	30	
Endosulfan Sulfate	0.0272	0.0013	ug/L	0.0200		136	30-160	8.23	30	
Endrin Ketone	0.0224	0.0013	ug/L	0.0200		112	30-160	10.50	30	
Methoxychlor	0.130	0.0063	ug/L	0.100		130	30-160	9.42	30	
Surrogate: Decachlorobiphenyl	0.0216		ug/L	0.0200	108		30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0263		ug/L	0.0200	132		30-160			
Surrogate: Tetrachlorometaxylene	0.0115		ug/L	0.0200	57.3		30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0145		ug/L	0.0200	72.4		30-160			
<b>LCS Dup (BHK0698-BSD2)</b>		Prepared: 26-Nov-2019 Analyzed: 03-Dec-2019 16:07								
Toxaphene	0.133	0.0625	ug/L	0.100		133	30-160	0.80	200	
Surrogate: Decachlorobiphenyl	0.0225		ug/L	0.0200	113		30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0254		ug/L	0.0200	127		30-160			
Surrogate: Tetrachlorometaxylene	0.0125		ug/L	0.0200	62.7		30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0145		ug/L	0.0200	72.3		30-160			



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**Metals and Metallic Compounds - Quality Control**

**Batch BHK0599 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BHK0599-BLK1)</b>						Prepared: 21-Nov-2019 Analyzed: 22-Nov-2019 17:00						
Chromium	52	ND	0.130	0.500	ug/L							U
Chromium	53	ND	0.0700	0.500	ug/L							U
Lead	208	ND	0.0680	0.100	ug/L							U
Silver	107	ND	0.0170	0.200	ug/L							U
Arsenic	75a	ND	0.0220	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
<b>Blank (BHK0599-BLK2)</b>						Prepared: 21-Nov-2019 Analyzed: 12-Dec-2019 14:41						
Barium	135	ND	0.0560	0.500	ug/L							U
Barium	137	ND	0.0530	0.500	ug/L							U
Selenium	78	ND	0.440	0.500	ug/L							U
<b>LCS (BHK0599-BS1)</b>						Prepared: 21-Nov-2019 Analyzed: 22-Nov-2019 17:53						
Chromium	52	25.0	0.130	0.500	ug/L	25.0		100	80-120			
Chromium	53	24.1	0.0700	0.500	ug/L	25.0		96.3	80-120			
Lead	208	26.9	0.0680	0.100	ug/L	25.0		108	80-120			
Silver	107	25.5	0.0170	0.200	ug/L	25.0		102	80-120			
Arsenic	75a	24.6	0.0220	0.200	ug/L	25.0		98.4	80-120			
Cadmium	111	25.0	0.0300	0.100	ug/L	25.0		100	80-120			
Cadmium	114	25.6	0.0400	0.100	ug/L	25.0		102	80-120			
<b>LCS (BHK0599-BS2)</b>						Prepared: 21-Nov-2019 Analyzed: 12-Dec-2019 14:45						
Barium	135	25.1	0.0560	0.500	ug/L	25.0		100	80-120			
Barium	137	25.0	0.0530	0.500	ug/L	25.0		100	80-120			
Selenium	78	79.2	0.440	0.500	ug/L	80.0		99.0	80-120			



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Project: Webster Nursery  
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Reported:  
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**Metals and Metallic Compounds - Quality Control**

**Batch BHK0639 - TWM EPA 7470A**

Instrument: CVAA Analyst: SKM

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BHK0639-BLK1)</b>						Prepared: 22-Nov-2019 Analyzed: 25-Nov-2019 12:59					
Mercury	ND	0.000013	0.000100	mg/L							U
<b>LCS (BHK0639-BS1)</b>						Prepared: 22-Nov-2019 Analyzed: 25-Nov-2019 13:01					
Mercury	0.00209	0.000013	0.000100	mg/L	0.00200		104	80-120			
<b>Duplicate (BHK0639-DUP1)</b>						Source: 19K0305-04 Prepared: 22-Nov-2019 Analyzed: 25-Nov-2019 13:06					
Mercury	ND	0.000013	0.000100	mg/L		ND					U
<b>Matrix Spike (BHK0639-MS1)</b>						Source: 19K0305-04 Prepared: 22-Nov-2019 Analyzed: 25-Nov-2019 13:08					
Mercury	0.00101	0.000013	0.000100	mg/L	0.00100	ND	101	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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**Certified Analyses included in this Report**

Analyte	Certifications
<b>EPA 6020A in Water</b>	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
<b>EPA 6020A UCT-KED in Water</b>	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
<b>EPA 7470A in Water</b>	
Mercury	WADOE,NELAP,DoD-ELAP,CALAP
<b>EPA 8081B in Water</b>	
alpha-BHC	WADOE,DoD-ELAP,NELAP,CALAP
alpha-BHC [2C]	WADOE,DoD-ELAP,NELAP,CALAP
beta-BHC	WADOE,DoD-ELAP,NELAP,CALAP
beta-BHC [2C]	WADOE,DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane)	WADOE,DoD-ELAP,NELAP,CALAP
gamma-BHC (Lindane) [2C]	WADOE,DoD-ELAP,NELAP,CALAP
delta-BHC	WADOE,DoD-ELAP,NELAP,CALAP
delta-BHC [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Heptachlor	WADOE,DoD-ELAP,NELAP,CALAP
Heptachlor [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Aldrin	WADOE,DoD-ELAP,NELAP,CALAP
Aldrin [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Heptachlor Epoxide	WADOE,DoD-ELAP,NELAP,CALAP
Heptachlor Epoxide [2C]	WADOE,DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane)	WADOE,DoD-ELAP,NELAP,CALAP
trans-Chlordane (beta-Chlordane) [2C]	WADOE,DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane)	WADOE,DoD-ELAP,NELAP,CALAP
cis-Chlordane (alpha-chlordane) [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Endosulfan I	WADOE,DoD-ELAP,NELAP,CALAP
Endosulfan I [2C]	WADOE,DoD-ELAP,NELAP,CALAP



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4,4'-DDE	WADOE,DoD-ELAP,NELAP,CALAP
4,4'-DDE [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Dieldrin	WADOE,DoD-ELAP,NELAP,CALAP
Dieldrin [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Endrin	WADOE,DoD-ELAP,NELAP,CALAP
Endrin [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Endosulfan II	WADOE,DoD-ELAP,NELAP,CALAP
Endosulfan II [2C]	WADOE,DoD-ELAP,NELAP,CALAP
4,4'-DDD	WADOE,DoD-ELAP,NELAP,CALAP
4,4'-DDD [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Endrin Aldehyde	WADOE,DoD-ELAP,NELAP,CALAP
Endrin Aldehyde [2C]	WADOE,DoD-ELAP,NELAP,CALAP
4,4'-DDT	WADOE,DoD-ELAP,NELAP,CALAP
4,4'-DDT [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Endosulfan Sulfate	WADOE,DoD-ELAP,NELAP,CALAP
Endosulfan Sulfate [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Endrin Ketone	WADOE,DoD-ELAP,NELAP,CALAP
Endrin Ketone [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Methoxychlor	WADOE,DoD-ELAP,NELAP,CALAP
Methoxychlor [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Hexachlorobutadiene	WADOE,DoD-ELAP,NELAP,CALAP
Hexachlorobutadiene [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Hexachlorobenzene	WADOE,DoD-ELAP,NELAP,CALAP
Hexachlorobenzene [2C]	WADOE,DoD-ELAP,NELAP,CALAP
2,4'-DDE	DoD-ELAP
2,4'-DDE [2C]	DoD-ELAP
2,4'-DDD	DoD-ELAP
2,4'-DDD [2C]	DoD-ELAP
2,4'-DDT	DoD-ELAP
2,4'-DDT [2C]	DoD-ELAP
Oxychlorane	DoD-ELAP
Oxychlorane [2C]	DoD-ELAP
cis-Nonachlor	DoD-ELAP
cis-Nonachlor [2C]	DoD-ELAP
trans-Nonachlor	DoD-ELAP
trans-Nonachlor [2C]	DoD-ELAP
Mirex	DoD-ELAP
Mirex [2C]	DoD-ELAP
Toxaphene	DoD-ELAP
Toxaphene [2C]	DoD-ELAP



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Chlordane, technical DoD-ELAP  
Chlordane, technical [2C] DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2020
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019



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### Notes and Definitions

- \* Flagged value is not within established control limits.
- D The reported value is from a dilution
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- J Estimated concentration value detected below the reporting limit.
- NRS This surrogate not reported due to chromatographic interference
- P1 The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- Y1 Raised reporting limit due to interference
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.