

2019 ANNUAL MONITORING REPORT

OLALLA LANDFILL
KITSAP COUNTY, WASHINGTON
MARCH 2020



Prepared by
Environmental Partners, Inc. (a TRC Company),
on behalf of
Kitsap County Department of Public Works
Port Orchard, Washington



DOUGLAS C. KUNKEL

A handwritten signature in blue ink that reads "Douglas C. Kunkel".

Douglas C. Kunkel LG, LHG
Principal Hydrogeologist



CHECKLIST FOR GROUNDWATER REPORTING
Municipal Solid Waste Landfills
WAC 173-351-415

Include a signed, completed copy of this checklist with each quarterly and annual report.

Quarterly groundwater reports shall be submitted to the jurisdictional health department and Ecology within 60 days of receipt of analytical data. Annual groundwater reports shall be submitted to the jurisdictional health department and Ecology by April 1 of each year.

1 st _____ 2 nd _____ 3 rd _____ 4 th <u>X</u> YEAR <u>2019</u>	Reference (section, subsection)	Included in this report	Location – page # or appendix #
Quarterly Groundwater Reports: 173-351-415 (2) plus the referenced section			
Statistical calculations and summaries			
Descriptive statistics	420, (1)	<input checked="" type="checkbox"/>	Pages 11-21
Statistical tests	420, (2)	<input checked="" type="checkbox"/>	Pages 11-21
Notification of statistical increase (if applicable)	420, (4)	<input checked="" type="checkbox"/>	Page 19
Notification of concentrations above Chapter 173-200 WAC criteria (if any)	430, (4)	<input checked="" type="checkbox"/>	Pages 9-10
Static water level readings	415, (2)	<input checked="" type="checkbox"/>	Appendix A
Potentiometric surface elevation maps depicting flow direction	415, (2)	<input checked="" type="checkbox"/>	Page 7
Flow rate – calculated	415, (2)	<input checked="" type="checkbox"/>	Table 1
Cation-anion balances	430, (5a)	<input type="checkbox"/>	
Explanation of greater than 5% (or 10%) difference if needed	430, (5a)	<input type="checkbox"/>	
Trilinear diagrams	430, (5b)	<input type="checkbox"/>	
Leachate analyses (if sampled and tested)	415, (2)	<input type="checkbox"/>	
Data entered into EIM database (date entered: February 19, 2020)	415, (3)	<input checked="" type="checkbox"/>	Yes
Complete copy of the lab report with chain of custody record.		<input checked="" type="checkbox"/>	Attachment 2
Annual Groundwater Reports: 173-351-415 (1) YEAR 2019			
Summary of statistical results and trends	415, (1)	<input checked="" type="checkbox"/>	Appendix B
Summary of groundwater flow rate and direction for the year	415, (1)	<input checked="" type="checkbox"/>	Table 1
Copy of all potentiometric maps for the year	415, (1)	<input checked="" type="checkbox"/>	Appendix A
Summary geochemical evaluation	415, (1)	<input type="checkbox"/>	
For Quarterly and Annual Reports			
Stamped by a licensed professional	RCW 18.220	<input checked="" type="checkbox"/>	Cover


 Signature of Report Author

March 31, 2020
 Date

Olalla
 Landfill

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INTRODUCTION

The Olalla Landfill (Landfill) is located approximately 0.75 miles east of Highway 16 on Burley-Olalla Road in Kitsap County, Washington. The Landfill was closed in 1989 in accordance with the Olalla Final Closure Plan (Parametrix 1988). Post-closure activities have consisted primarily of quarterly monitoring and maintenance per WAC 173-304-407 (Minimum Functional Standards for Solid Waste Handling [MFS]), “General Closure and Post Closure Requirements” Kitsap County Board of Health Ordinance 2010-01 “Solid Waste Regulations” and Solid Waste Handling Permits (SWHP) issued annually by the Kitsap Public Health District (KPHD).

A Remedial Investigation/Feasibility Study (RI/FS; Parametrix 2014a) was performed at the Landfill starting in May 2010 and ending May 2014 when the RI/FS was submitted to the Washington State Department of Ecology (Ecology) and KPHD. Upon approval of the RI/FS the Kitsap County Solid Waste Division (SWD) prepared a Cleanup Action Plan (CAP; Parametrix 2014b) to summarize the RI/FS activities and present the preferred cleanup action, which was selected based on the results of the RI/FS. Ecology and KPHD approved the CAP in December 2014.

The preferred cleanup action, monitored natural attenuation (MNA) and land use controls, is based on a continuation of ongoing groundwater, surface water, and landfill gas monitoring in accordance with the SWHP. Quarterly monitoring results will be used to evaluate the effectiveness of the cleanup action and to verify that natural attenuation continues to occur at the Landfill. The overall effectiveness of the cleanup action will be evaluated at 5-year intervals as part of the periodic review process.

Specific groundwater, surface water, and landfill gas monitoring methods and procedures that are performed under the requirements of MFS, the SWHP, and the CAP are documented in a Compliance Monitoring Plan (CMP; EPI 2015). The CMP integrates all the previously noted monitoring program requirements into one document that contains a site-specific Sampling and Analysis Plan (SAP), Quality Assurance Plan (QAP), and Health and Safety Plan (HASP).

Results of the December 2019 quarterly groundwater and landfill gas monitoring event performed under the SWHP, CAP, and CMP are documented in this report. December 2019 analytical and field data were uploaded to Ecology’s Electronic Information Management (EIM) system on February 19, 2020.

This Annual Report documents the results of the fourth quarter 2019 groundwater, surface water, and landfill gas monitoring event and summarizes the results of the previous quarterly monitoring and reporting events completed at the Landfill in 2019, in accordance with WAC 173-304-405(4), CAP, CMP, and the 2016-2020 SWHP issued by KPHD on February 18, 2016.

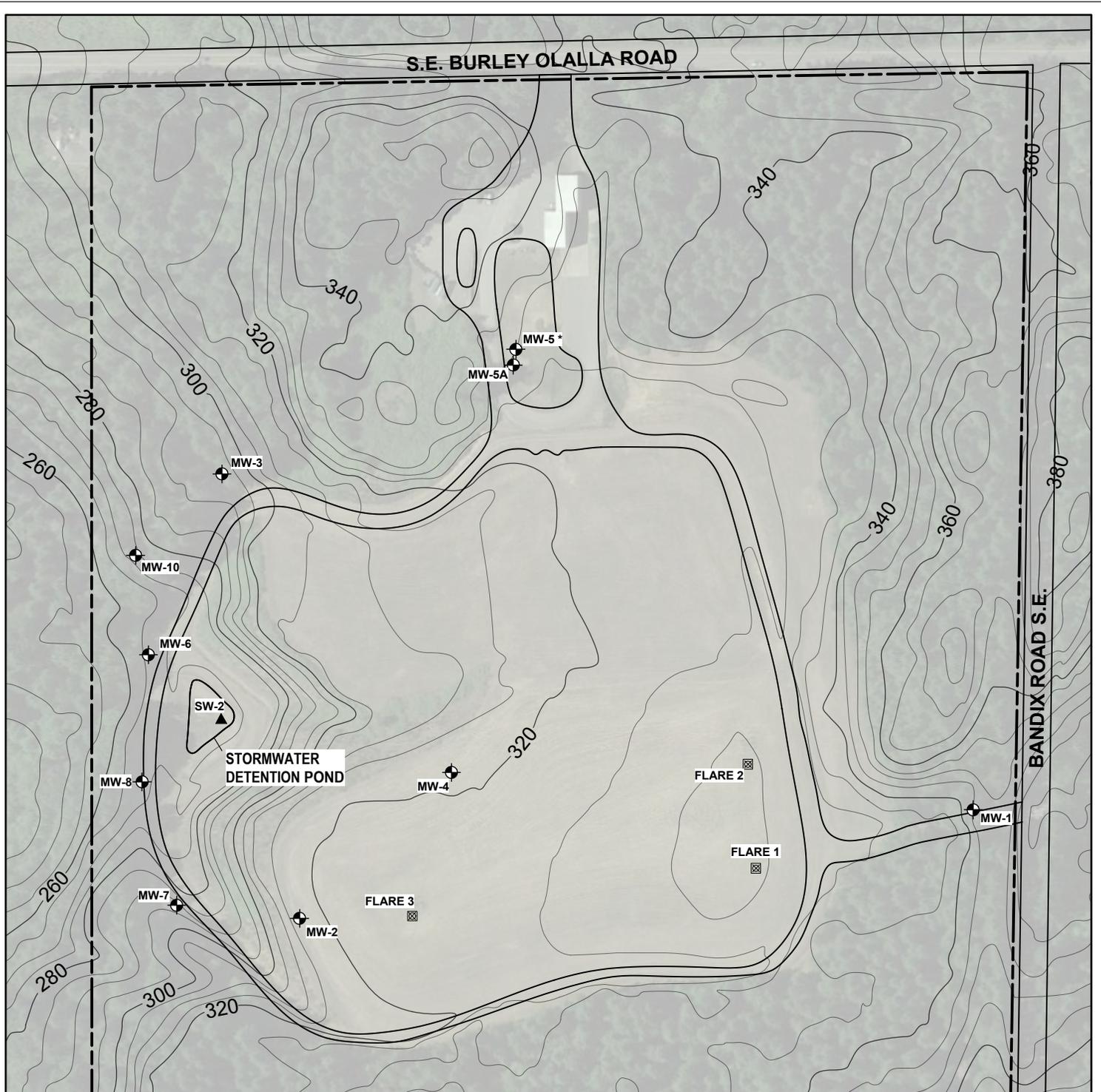
In addition to this Introduction, the 2019 Annual Monitoring Report consists of four main sections: Monitoring Program Description, Monitoring Results, Statistical Analysis, and Conclusions. The Monitoring Program Description summarizes the monitoring well network and laboratory analyses. Landfill gas field measurement data, groundwater elevations, and groundwater analytical results are presented in the Monitoring Results section. The statistical data evaluation methods used in this report are consistent with recommended methods found in the 2009 *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* (Unified Guidance; USEPA 2009). Results of statistical and non-statistical evaluations of the 2019 monitoring data are summarized in the Conclusions section.

MONITORING PROGRAM DESCRIPTION

The sampling locations, analytical parameters, and frequency of sample collection for groundwater, surface water, and landfill gas monitoring at the Landfill are specified in the 2016-2020 Permit issued by KPHD and dated February 18, 2016, the 2014 CAP, and the 2015 CMP. Monitoring well, landfill gas flare locations, and the surface water sampling location (SW-2) are shown on Figure 1. Specific information pertaining to the December 2019 monitoring event is summarized in the following bullets:

- Environmental Partners, Inc. (EPI), a TRC Company¹, performed groundwater sampling activities and measured landfill gas parameters at each of the three on-site passive landfill gas flares on December 17, 2019.
- Depth-to-water measurements were performed at all on-site monitoring wells on December 17, 2019. EPI field staff also measured the depth to water in well MW-5, which is screened in a discontinuous shallow perched groundwater zone that is not hydraulically connected to the uppermost aquifer beneath the Landfill.
- One set of field duplicate samples was collected from monitoring well MW-10 and was given the sample identifier OL-MW-13.
- Groundwater samples were hand-delivered to Analytical Resources, Inc. in Tukwila, Washington, for sample analysis on December 18, 2019.
- The surface water sample location, SW-2, was dry during the December 17, 2019 monitoring event. A surface water sample was collected on January 3, 2020 following several days of consistent rainfall events.
- Samples were analyzed within their respective holding times except laboratory-measured pH samples and vinyl chloride by Selective Ion Monitoring (SIM) analyses for samples from wells MW-1, MW-3, MW-6, MW-8, MW-10, and MW-13 (field duplicate of MW-10). These instances of missed holding times are described below:
 - The pH holding time is 15 minutes, which cannot be achieved at the laboratory but is achieved by the field-measured pH data, which are used for the statistical evaluations.
 - The vinyl chloride analyses were initially performed by United States Environmental Protection Agency (USEPA) Method 8260 without SIM due to a misinterpretation of the chain-of-custody form. This oversight was identified, and the samples were analyzed by USEPA Method 8260 with SIM out of holding time.
- Data evaluations, statistical tests, and data reporting were performed by EPI in accordance with methods described in the Unified Guidance (USEPA 2009) and developed with input and direction from KPHD and Ecology and in accordance with procedures documented in the CAP and CMP.

¹ NOTE: The work described in this report was performed by EPI prior to acquisition by TRC Environmental Corporation (TRC) on December 27, 2019. For the purposes of this report EPI and TRC are used synonymously.



NOTES:

BASE MAP SOURCE:
GOOGLE EARTH

TOPOGRAPHIC CONTOUR SOURCE:
KITSAP COUNTY PARCEL VIEWER

*MW-5 IS COMPLETED IN A SHALLOW PERCHED
GROUNDWATER ZONE

MW-2  MONITORING WELL LOCATION

SW-2  SURFACE WATER SAMPLING
LOCATION

 LANDFILL GAS FLARE

 300 TOPOGRAPHIC ELEVATION CONTOURS

 APPROXIMATE PROPERTY BOUNDARY

 PERIMETER ACCESS ROAD



0 50 100 200

SCALE: 1" = 200'

FIGURE 1			
OLALLA LANDFILL MONITORING WELL LOCATIONS KITSAP COUNTY, WASHINGTON			
PREPARED BY	 ENVIRONMENTAL PARTNERS INC		
REPORT	2019 ANNUAL GROUNDWATER MONITORING REPORT		
LOCATION	OLALLA LANDFILL KITSAP COUNTY, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
1/7/20	VPB	DCK	45407.0

MONITORING RESULTS

Results for 2019 quarterly monitoring events consist of landfill gas composition, groundwater elevations, calculated groundwater gradients and velocities, and groundwater quality data. A surface water sample was obtained during a separate mobilization following the December 2019 sampling event. The surface water sampling was performed on January 3, 2020 following several days of heavy precipitation. These data are summarized in this section and in Appendix A. Monitoring field notes associated with the four quarterly monitoring events and laboratory analytical data reports for 2019 are provided in electronic format in Attachments 1 and 2, respectively on the CD-ROM included with this report.

Landfill Gas Data

Field measurements of landfill gas were taken from the three passive flares at the Landfill on March 27, June 20, September 26, and December 17, 2019. Landfill gas field measurement data summary tables are included in Appendix A. Data from the four quarterly landfill gas monitoring events performed in 2019 are summarized in the following sections.

March 27, 2019 – First Quarter

- Methane was not detected in Flare 1 but was detected at a concentration of 3.4% in Flare 2 and at fluctuating concentrations ranging from 0-2% by volume in Flare 3. Instrument-measured Lower Explosive Limit (LEL) values were 0%, 69%, and 2% for Flares 1, 2, and 3, respectively.
- Oxygen concentrations were 19.8%, 4.2%, and 19.9% by volume in Flares 1, 2, and 3, respectively.
- Carbon dioxide concentrations were 0.1%, 9.1%, and 0.1% by volume in Flares 1, 2, and 3, respectively.
- Gas pressure measurements were 0.01 inches of water in all three flares.

June 20, 2019 – Second Quarter

- Methane was not detected in Flare 1 or Flare 2 but was detected at a concentration of 2.0% by volume in Flare 3. Instrument-measured LEL values were 0%, 0%, and 14% for Flares 1, 2, and 3, respectively.
- Oxygen concentrations were 5.9%, 12.2%, and 4.8% by volume in Flares 1, 2, and 3, respectively.
- Carbon dioxide concentrations were 7.6%, 4.1%, and 8.9% by volume in Flares 1, 2, and 3, respectively.
- Gas pressure measurements were 0.01, 0.02, and 0.01 inches of water in Flares 1, 2, and 3, respectively.

September 26, 2019 – Third Quarter

- Methane was not detected in Flare 3 but was detected at concentrations of 3.8% and 0.4% by volume in Flares 1 and 2, respectively. Instrument-measured LEL values were 44%, 8%, and 0% for Flares 1, 2, and 3, respectively.
- Oxygen concentration were 14.6%, 18.8%, and 19.6% by volume in Flares 1, 2, and 3, respectively.
- Carbon dioxide concentrations were 4.5%, 6.1%, and 0.4% by volume in Flares 1, 2, and 3, respectively.
- Gas pressure measurements were 0.01 inches of water in all three flares.

December 17, 2019 – Fourth Quarter

- Methane was detected in all three flares at concentrations of 1.2%, 3.0% and 2.6% by volume in Flares 1, 2, and 3, respectively. Instrument-measured LEL values were 19%, 59%, and 52% for Flares 1, 2, and 3, respectively.
- Oxygen concentrations were 4.0%, 1.6%, and 2.4% by volume in Flares 1, 2, and 3, respectively.
- Carbon dioxide concentrations were 9.7%, 9.2%, and 10.7% by volume in Flares 1, 2, and 3, respectively.
- Pressure measurements were 0.01, 0.02, and 0.01 inches of water in Flares 1, 2, and 3, respectively.

Groundwater Elevation, Flow Direction, Gradient, and Velocity

All monitoring wells installed at the Landfill, except for MW-5, are screened in a laterally continuous sand and gravel unit that has been interpreted as belonging to the same aquifer unit (Parametrix 1988). Monitoring well MW-5 is screened in a shallow perched groundwater zone. Replacement monitoring well MW-5A was drilled at a nearby location to MW-5 and is screened in the same aquifer as the other monitoring wells at the Landfill.

The Permit and CAP do not require water level or water quality data to be collected from MW-5 as part of the monitoring program for the Landfill because the shallow perched groundwater zone that MW-5 is completed in is not hydraulically connected to the uppermost continuous aquifer in which the other Landfill monitoring wells are completed. However, SWD has elected to measure the depth to water in MW-5 as additional information. Depth-to-water measurements for MW-5 are included in the field notes presented in Attachment 1.

The Permit and CAP specify annual monitoring of cross-gradient monitoring wells MW-5A and MW-7. As requested by the SWD, quarterly groundwater level measurements are made at MW-5A and MW-7 to provide a more comprehensive dataset for the groundwater elevation contour map and the groundwater elevation hydrograph.

The groundwater flow direction beneath the Landfill during the December 2019 monitoring event was generally toward the northwest as depicted on Figure 2. Based on the groundwater elevation contours the groundwater flow direction at the Landfill is toward the northwest, with potentially a western component near MW-3 and MW-10, as demonstrated by the quarterly groundwater elevation contour maps for all four quarters of 2019, which are presented in Appendix A.

Groundwater elevation contour pattern and flow directions have been consistent throughout all four seasons and over many years of water level measurements. The groundwater flow direction maps demonstrate that well MW-1 is consistently upgradient of the Landfill, wells MW-3, MW-6, MW-8, and MW-10 are downgradient of the Landfill, and wells MW-5A and MW-7 are consistently cross-gradient to the Landfill.

Groundwater elevation data from 1991 through the fourth quarter of 2019 for each of the on-site MFS monitoring wells (except MW-5) are plotted and shown on the water level elevation time-series graph in Appendix A. December 2019 groundwater elevation data were consistently lower than the December 2018 groundwater elevation data for all nine wells. The lower 2019 water level elevations range in magnitude from 2.8 feet lower in downgradient well MW-8 to 4.22 feet lower in downgradient well MW-6.

Precipitation data from the Seattle-Tacoma International Airport Weather Station (KSEA) indicate that during the 2019 water year (November 2018 to October 2019) the area near the Landfill received 35.72 inches of precipitation, which is less than the 39.77 inches of precipitation for the 2018 water year (Weather Underground 2020).

Groundwater flow rates based on the quarterly groundwater elevation contour maps have been calculated based on a modified form of Darcy's Law:

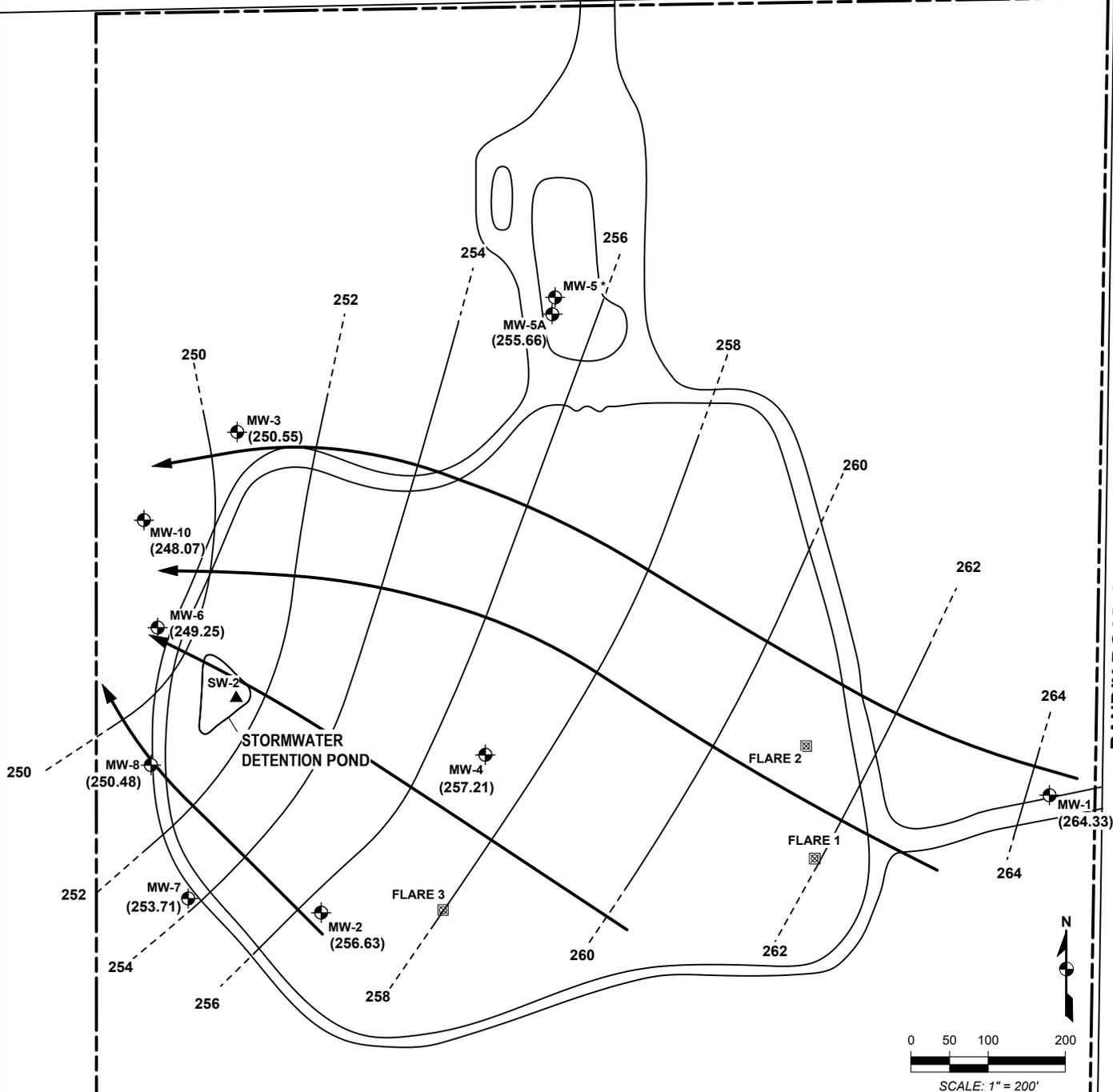
$$V = KI/n$$

Where: V = average linear velocity (L/T)
 K = hydraulic conductivity (L/T)
 I = hydraulic gradient (L/L [dimensionless])
 n = effective porosity (percent expressed as a decimal)

The hydraulic conductivity "K" of the aquifer was calculated from the results of single well aquifer tests performed in monitoring wells MW-1, MW-2, MW-3, and MW-4. The range of values obtained from these tests indicated that the hydraulic conductivity of the uppermost aquifer at the Landfill is approximately 7×10^{-3} to 3×10^{-2} centimeters per second (cm/sec), with a mean value of 2.2×10^{-2} cm/sec (62.4 feet/day) (Parametrix, Inc. 1988). This mean value correlates with the hydraulic conductivity values calculated using the Hazen equation for soil samples collected from the screened intervals from the boreholes for MW-8 and MW-10. Hazen equation calculated hydraulic conductivity values for soil at MW-8 and MW-10 are 1.2×10^{-2} cm/sec (34 feet/day) and 1.4×10^{-2} cm/sec (40 feet/day), respectively. The mean hydraulic conductivity value from the single well aquifer tests of 2.2×10^{-2} cm/sec is used for groundwater velocity calculations presented below.

S.E. BURLEY OLALLA ROAD

BANDIX ROAD S.E.



- NOTES:**
- * MW-5 IS COMPLETED IN A SHALLOW PERCHED GROUNDWATER ZONE.
 - MW-2 MONITORING WELL LOCATION
 - SW-2 SURFACE WATER SAMPLING LOCATION
 - LANDFILL GAS FLARE
 - GROUNDWATER ELEVATION CONTOUR
 - INFERRED GROUNDWATER FLOW PATH
 - APPROXIMATE PROPERTY BOUNDARY
 - PERIMETER ACCESS ROAD

FIGURE 2 OLALLA LANDFILL GROUNDWATER ELEVATION CONTOUR MAP - DECEMBER 17, 2019			
PREPARED BY			
REPORT	2019 ANNUAL MONITORING REPORT		
LOCATION	OLALLA LANDFILL KITSAP COUNTY, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE 1/7/20	DRAWN BY VPB	REVIEWED BY DCK	PROJECT NUMBER 45407.0

The hydraulic gradients “I” of the aquifer for each monitoring event are calculated from quarterly groundwater elevation contour maps presented in Appendix A. Average hydraulic gradients calculated for the four 2019 quarterly events at the Landfill range from 0.0150 in March to 0.0165 in September. The effective porosity “n” of the aquifer is estimated to be 0.40, which is a typical value for fine to medium-grained sand (Freeze and Cherry 1979).

The resulting groundwater flow velocities “V” calculated from 2019 quarterly data range from 2.34 feet/day in March to 2.57 feet/day in September. The calculated groundwater gradients and flow velocities are summarized in Table 1.

Table 1		
2019 Olalla Landfill Calculated Groundwater Flow Velocities		
Measurement Date	Calculated Hydraulic Gradient (L/L)	Calculated Groundwater Flow Velocity (feet/day)
March 27, 2019	0.0150	2.34
June 20, 2019	0.0153	2.39
September 26, 2019	0.0165	2.57
December 17, 2019	0.0151	2.36

Surface Water Quality Data

Section IV.D.3.a of the KPHD-issued 2016-2020 SWHP for the Landfill states that surface water samples shall be collected at location SW-2 (see Figure 1) between January and March or between November and December if there is enough water for a sample. Surface water station SW-2 was dry during the December 17, 2019 sampling event. The sampling crew returned to the landfill on January 3, 2020, after several days of heavy rain, and collected a surface water sample from SW-2. A summary of surface water quality data is presented in Appendix A. Analytical results (laboratory data sheets) are presented as an electronic file (a PDF file) in Attachment 1 on the CD-ROM for this report to reduce the amount of paper required to produce this report.

Groundwater Quality Data

A summary of the groundwater quality data for the four quarterly events of 2019 is presented in Appendix A. Laboratory data sheets for all field samples, duplicates, and laboratory quality control samples reported by ARI are presented as an electronic file in Attachment 2 of the CD-ROM for this report.

Exceedances of Primary Regulatory Standards

Constituent concentrations in groundwater that exceeded Washington State Drinking Water Primary Standards (WAC 246-290-310) or Washington State Groundwater Primary Standards (WAC 173-300-040) are summarized in Table 2.

Table 2 2019 Water Quality Constituent Concentrations Exceeding Washington State Primary Standards							
Constituent	Drinking Water Standards ^a	Groundwater Quality Standards ^b	Site-Specific CUL ^c	March	June	Sept.	Dec.
MW-1 (upgradient)							
Arsenic	10 µg/L	0.05 µg/L	1.29 µg/L	0.11	0.10	0.09	0.11
MW-3 (downgradient)							
Arsenic	10 µg/L	0.05 µg/L	1.29 µg/L	0.13	0.11	0.10	0.12
Arsenic FD	10 µg/L	0.05 µg/L	1.29 µg/L	0.13	NA	NA	NA
MW-5A (cross-gradient)							
Arsenic	10 µg/L	0.05 µg/L	1.29 µg/L	NA	NA	NA	0.20
MW-6 (downgradient)							
Arsenic	10 µg/L	0.05 µg/L	1.29 µg/L	1.05	1.06	1.00	0.91
Arsenic FD	10 µg/L	0.05 µg/L	1.29 µg/L	NA	1.08	NA	NA
Vinyl Chloride	2 µg/L	0.02 µg/L	0.29 µg/L	0.11	--	--	--
Vinyl Chloride FD	2 µg/L	0.02 µg/L	0.29 µg/L	NA	--	NA	NA
MW-7 (cross-gradient)							
Arsenic	10 µg/L	0.05 µg/L	1.29 µg/L	NA	NA	NA	0.28
MW-8 (downgradient)							
Arsenic	10 µg/L	0.05 µg/L	1.29 µg/L	1.75	1.25	0.87	0.90
Arsenic FD	10 µg/L	0.05 µg/L	1.29 µg/L	NA	NA	0.80	NA
Vinyl Chloride	2 µg/L	0.02 µg/L	0.29 µg/L	0.10	0.03	--	--
Vinyl Chloride FD	2 µg/L	0.02 µg/L	0.29 µg/L	NA	NA	--	NA
MW-10 (downgradient)							
Arsenic	10 µg/L	0.05 µg/L	1.29 µg/L	1.62	1.66	1.66	2.33
Arsenic FD	10 µg/L	0.05 µg/L	1.29 µg/L	NA	NA	NA	2.41
Vinyl Chloride	2 µg/L	0.02 µg/L	0.29 µg/L	0.11	--	--	--
Vinyl Chloride FD	2 µg/L	0.02 µg/L	0.29 µg/L	NA	NA	NA	--
Notes: Values are reported in the same units as the regulatory standards. µg/L = Micrograms per liter. FD = Field Duplicate NA = Not Applicable or Not Analyzed per the SWHP -- = Analyzed with no regulatory exceedance ^a WAC 246-290-310 ^b WAC 173-200-040 ^c Site-Specific Cleanup Level							

Exceedances of Secondary Regulatory Standards

Constituent concentrations in groundwater that exceeded Washington State Drinking Water Secondary Standards (WAC 246-290-310) and Washington State Groundwater Secondary Standards (WAC 173-300-040) are summarized in Table 3.

Table 3 2019 Water Quality Constituent Concentrations Exceeding Washington State Secondary Standards						
Constituent	Drinking Water Standards ^a	Groundwater Quality Standards ^b	March	June	Sept.	Dec.
MW-1 (upgradient)						
pH (field)	NA	6.5 – 8.5	--	6.4	6.2	--
pH (lab)	NA	6.5 – 8.5	6.2	6.3	6.1	--
MW-3 (downgradient)						
Manganese	50 µg/L	50 µg/L	6,670	5,980	6,130	5,380
Manganese FD	50 µg/L	50 µg/L	6,630	NA	NA	NA
pH (field)	NA	6.5 – 8.5	6.4	6.2	6.2	6.3
pH (lab)	NA	6.5 – 8.5	6.2	6.2	6.1	--
pH (lab) FD	NA	6.5 – 8.5	6.2	NA	NA	NA
MW-5A (cross-gradient)						
--	NA	NA	NA	NA	NA	--
MW-6 (downgradient)						
Iron	300 µg/L	300 µg/L	1,090	724	946	839
Iron FD	300 µg/L	300 µg/L	NA	703	NA	NA
Manganese	50 µg/L	50 µg/L	1,030	798	859	721
Manganese FD	50 µg/L	50 µg/L	NA	818	NA	NA
pH (field)	NA	6.5 – 8.5	--	--	6.4	--
pH (lab)	NA	6.5 – 8.5	6.3	--	--	--
MW-7 (cross-gradient)						
--	NA	NA	NA	NA	NA	--
MW-8 (downgradient)						
Iron	300 µg/L	300 µg/L	1,040	--	--	341
Iron FD	300 µg/L	300 µg/L	NA	NA	--	NA
Manganese	50 µg/L	50 µg/L	2,530	2,280	2,650	2,610
Manganese FD	50 µg/L	50 µg/L	NA	NA	2,690	NA
pH (lab)	NA	6.5 – 8.5	--	6.4	6.3	--
pH (lab) FD	NA	6.5 – 8.5	--	6.4	6.3	--
MW-10 (downgradient)						
Manganese	50 µg/L	50 µg/L	4,350	3,750	3,870	4,380
Manganese FD	50 µg/L	50 µg/L	NA	NA	NA	4,480
Notes: Values are reported in the same units as the regulatory standards FD = Field Duplicate NA = Not Applicable or Not Analyzed per the SWHP -- = Analyzed with no regulatory exceedance ^a WAC 246-290-310 and Site-Specific Cleanup Level ^b WAC 173-200-040						

STATISTICAL ANALYSIS

SWD and EPI developed the current statistical evaluation process used in this report with input and direction from KPHD and Ecology. KPHD and Ecology referenced the EPA 2004 Unified Guidance as the basis for evaluating appropriate statistical methods for Landfill groundwater data. The statistical methods used in this report are consistent with recommended methods found in the Unified Guidance, which was updated in 2009 (USEPA 2009).

Statistical analysis of groundwater data for the Landfill uses four tools: time-series plots, Mann-Kendall test for trend, Shapiro-Wilk test for normality, and confidence intervals (parametric and non-parametric). Application of these tools is based on statistical methods identified in the Unified Guidance and is documented in the CAP. These four statistical tools, along with non-statistical data evaluation tools, are applied to the data following the process shown on Figure 3.

Statistical analyses are performed on a dataset consisting of a moving window of the 20 most recent sampling events (as one new data point is added the oldest data point is dropped). For most wells, this is a 5-year moving window of data. Wells MW-5A and MW-7 are on an annual sampling schedule and SWD has defined the window of data used for the Mann-Kendall, Shapiro-Wilk and 95% Confidence Interval statistical analyses as 20 sampling events rather than 5 years of data. The moving window of 20 sampling events provides enough data points for adequate statistical power while focusing the statistical evaluations on the most recent and most relevant data. Statistical analyses for the Landfill groundwater monitoring data are performed using the following criteria:

- Dissolved metals, volatile organic compounds (VOCs), conventional water quality parameters, and field parameters required for groundwater analysis under the current Section IV.D.2 Solid Waste Handling Permit for Olalla Landfill are presented in time-series plots (Appendix B), and tables showing summary results of the Mann-Kendall trend test, Shapiro-Wilk test for normality, and 95% confidence intervals.
- Statistical tests are not automatically performed for every constituent or parameter measured. Some constituents have not been detected in samples collected during the past 5 years (20 events) or do not have enough detections to support one or more of the statistical analysis. Datasets that are all non-detects, or do not have enough detections, are temporarily dropped from the specific statistical evaluations that are not amenable to those datasets.
- VOC and metals detections include values at concentrations less than laboratory specified reporting limits (i.e., J-qualified), but do not include values where the constituent was also detected in the method blank (i.e., values qualified with a "B").
- Beginning in 2012, wells MW-5A and MW-7 are sampled at a reduced (annual) frequency and for a reduced list of constituents relative to the other Olalla Landfill monitoring wells. Thus, the statistical evaluations at MW-5A and MW-7 ended in 2012 for some constituents that were no longer analyzed but will continue at a reduced frequency for other constituents that are analyzed annual in samples from these two wells.

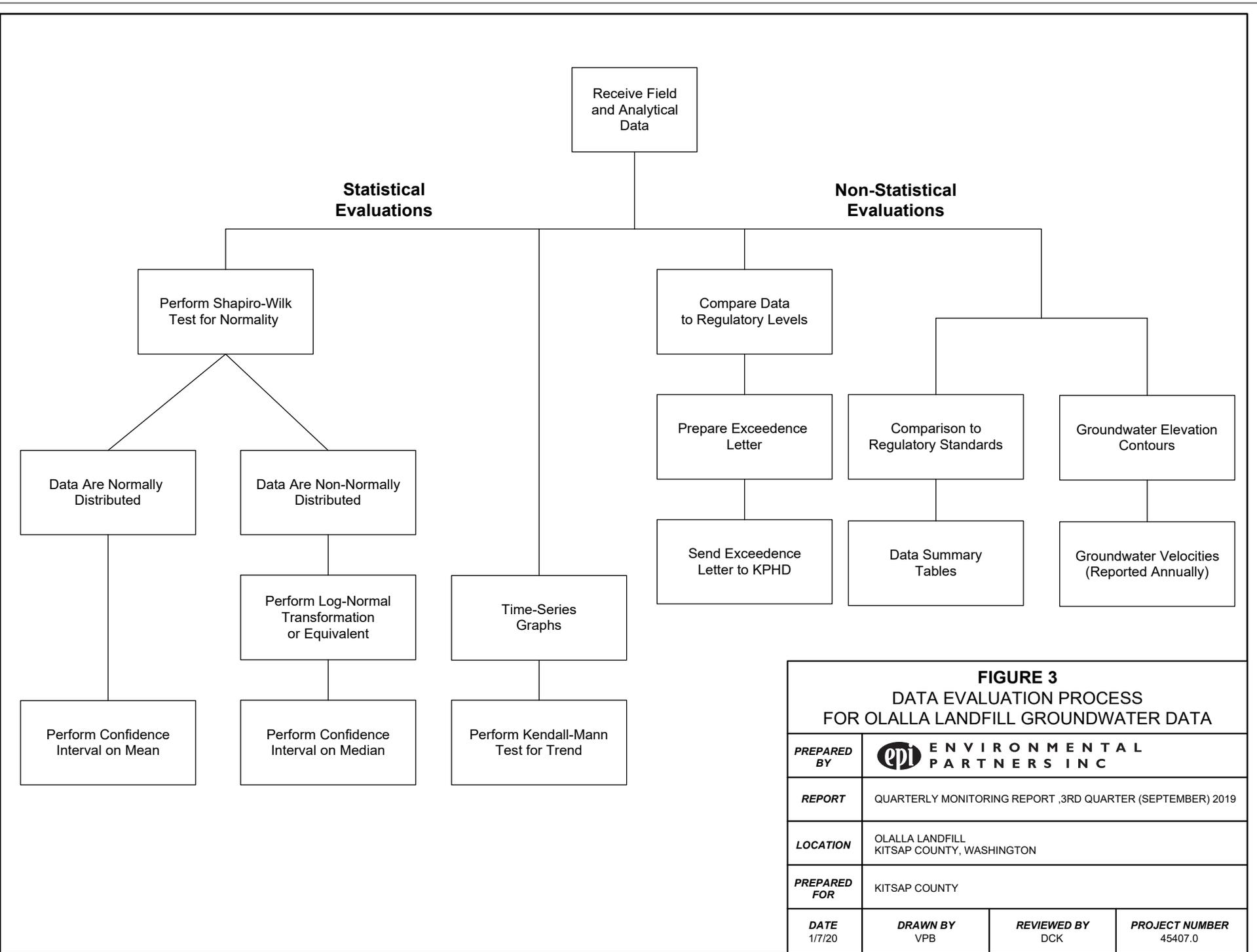


FIGURE 3
DATA EVALUATION PROCESS
FOR OLALLA LANDFILL GROUNDWATER DATA

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	QUARTERLY MONITORING REPORT ,3RD QUARTER (SEPTEMBER) 2019		
LOCATION	OLALLA LANDFILL KITSAP COUNTY, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE 1/7/20	DRAWN BY VPB	REVIEWED BY DCK	PROJECT NUMBER 45407.0

- Non-detections are managed by assigning them a uniform value that is less than the reporting limit for that constituent as prescribed in Section 14.4.2.2 of the Unified Guidance. Guidance from the United States Geological Survey (USGS 2008) suggests that censoring values that are less than the detection limit (non-detects) provides more accurate statistical results compared to substituting a value, commonly one half of the reporting limit. The SWD assigns a value of zero to non-detected results as recommended by the USGS and KPHD. J-qualified analytical results are reported as individual detected values as recommended by the USGS guidance.

The following subsections briefly describe the tools used in the statistical evaluation and summarize analytical results for the current year.

Time-Series Plots

Time-series plots are used to compare field measurements or analytical results from a well or a set of wells over time. The plots provide a convenient graphical means of delineating seasonal trends and large differences in concentration between upgradient and downgradient wells and can be used to readily identify data that exceed regulatory levels. Time-series plots are presented by constituent for upgradient well MW-1, cross-gradient wells MW-5A and MW-7, and downgradient wells MW-3, MW-6, MW-8, and MW-10.

Historical data are presented as two time-series plots for each constituent. The first time-series plot for each constituent presents all quarterly data from 1992, when groundwater monitoring was initiated at the Landfill, to the present quarter. This time-series plot is useful to graphically demonstrate that groundwater quality has improved over time. Because MW-8 and MW-10 were installed in 2010, their datasets are smaller than for other wells in the full time-series plots. The second time-series plot for each constituent presents a moving 5-year window of data providing a greater level of detail for more recent data that might not be readily seen at the scale required for time-series plots that graph all historical results.

The moving 20-event window of data adds new data with each successive quarter and drops data from the oldest quarter to maintain a consistent sample population of the most current 20 data points. Using the 20 most current data points corresponds to the same dataset used in the other statistical analyses. Full and recent (20-event window) time-series plots are presented in Appendix B.

Applicable Washington State drinking water and groundwater regulatory levels are shown graphically on each time-series plot when possible. Some constituents have regulatory levels that are significantly greater than concentrations detected in groundwater samples from the Landfill and those regulatory levels might not be visible at the scale of the time-series plots. Increasing the Y-axis scale to accommodate the applicable regulatory level would compress the analytical data resulting in a loss of detail on the time-series plots.

Mann-Kendall Trend Test

The Mann-Kendall trend test is a non-parametric statistical method recommended in the Unified Guidance for sites in the compliance assessment and corrective action monitoring phases and is appropriately paired with time-series plots. For this report, the Mann-Kendall trend test is used to determine if upward or downward data trends graphically presented in time-series plots are statistically significant. The Mann-Kendall test is applied to the same five-year moving window of data described in the Time-Series Plots section. December 2019 Mann-Kendall Trend Test results are presented in Table 4 and are summarized

in the following bullets. Tabulated Mann-Kendall trend test results for all four quarters of 2019 are presented in Appendix B.

As described in the 2016-2020 SWHP, cross-gradient wells MW-5A and MW-7 are sampled annually, during the fourth quarter, for a reduced list of constituents relative to the other Olalla Landfill monitoring wells.

- Fifteen (15) well-constituent combinations have statistically significant downward concentration trends. The downward well-constituent combination trends are:
 - Arsenic: MW-8 and MW-10
 - Bicarbonate: MW-1
 - Calcium: MW-1
 - Chloride: MW-1 and MW-3
 - pH (laboratory): MW-1, MW-6, and MW-8
 - Sodium: MW-1
 - Specific Conductance: MW-1 and MW-5A
 - Temperature: MW-7
 - Total Organic Carbon: MW-6 and MW-8

- Two (2) of the well-constituent combinations with statistically significant downward concentration trends also have regulatory standard exceedances in December 2019 data. The well-constituent combinations with downward trends and current regulatory exceedances are:
 - Arsenic: MW-8 and MW-10

- Twenty-six (26) well-constituent combinations have statistically significant upward concentration trends. The upward well-constituent combination trends are:
 - Arsenic: MW-1 and MW-3
 - Barium: MW-6
 - Chloride: MW-6, MW-8, and MW-10
 - Dissolved Oxygen: MW-5A and MW-6
 - Iron: MW-10
 - Manganese: MW-3 and MW-6
 - Nitrate: MW-1
 - Oxidation Reduction Potential: MW-1, MW-3, MW-5A, MW-6, MW-7, MW-8, and MW-10
 - pH (field): MW-5A
 - Potassium: MW-1, MW-3, MW-6, MW-8, and MW-10
 - Vinyl Chloride: MW-6

- Four (4) of the well-constituent combinations with statistically significant upward concentration trends also have regulatory standard exceedances in December 2019 data. The well-constituent combinations with upward trends and current regulatory exceedances are:
 - Arsenic: MW-1 and MW-3
 - Manganese: MW-3 and MW-6

**Table 4: December 2019 Mann-Kendall Statistically Significant Trend
Test Results**

Constituent or Parameter	MW-1	MW-3	MW-5A	MW-6	MW-7	MW-8	MW-10
Ammonia (N)	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Arsenic - Dissolved	UP	UP	NO TREND	NO TREND	NO TREND	DOWN	DOWN
Barium - Dissolved	NO TREND	NO TREND	NA	UP	NA	NO TREND	NO TREND
Bicarbonate	DOWN	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Calcium	DOWN	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Carbonate	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
COD	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Chloride	DOWN	DOWN	NA	UP	NA	UP	UP
Dissolved Oxygen	NO TREND	NO TREND	UP	UP	NA	NO TREND	NO TREND
Iron - Dissolved	NO TREND	NO TREND	NO TREND	NO TREND	NO TREND	NO TREND	UP
Manganese - Dissolved	NO TREND	UP	NO TREND	UP	NO TREND	NO TREND	NO TREND
Nitrate	UP	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Nitrite	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Oxidation Reduction Potential	UP	UP	UP	UP	UP	UP	UP
pH - Field	NO TREND	NO TREND	UP	NO TREND	NO TREND	NO TREND	NO TREND
pH - Laboratory	DOWN	NO TREND	NO TREND	DOWN	NO TREND	DOWN	NO TREND
Potassium	UP	UP	NA	UP	NA	UP	UP
Sodium	DOWN	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Specific Conductance	DOWN	NO TREND	DOWN	NO TREND	NO TREND	NO TREND	NO TREND
Sulfate	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Temperature	NO TREND	NO TREND	NO TREND	NO TREND	DOWN	NO TREND	NO TREND
Total Coliform	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
TOC	NO TREND	NO TREND	NA	DOWN	NA	DOWN	NO TREND
Vinyl Chloride	NO TREND	NO TREND	NO TREND	UP	NO TREND	NO TREND	NO TREND
Zinc - Dissolved	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND

NO TREND = No statistically significant trend.
UP = Statistically significant upward trend.
DOWN = Statistically significant downward trend.
NA = Not analyzed per the SWHP

- There are 134 well-constituent combinations that have no statistically significant concentration trend, or the constituents are no longer analyzed in wells MW-5A and MW-7 per the SWHP. Of the well-constituent combinations with no statistically significant trends, the following eight well-constituent combinations exceed regulatory levels.
 - Arsenic: MW-5A, MW-6, and MW-7
 - Iron: MW-6 and MW-8
 - Manganese: MW-8 and MW-10
 - pH (field): MW-3

Shapiro-Wilk Test for Normality

The Shapiro-Wilk Test for Normality is a method recommended in the Unified Guidance for evaluating if datasets are normally distributed. The Shapiro-Wilk Test for Normality is applied annually to the 5-year moving window of analytical data for each well-constituent pair that has enough data points to apply this statistical method. Shapiro-Wilk results for the current monitoring event are summarized in Table 5 and in the following bullets. Shapiro-Wilk result summary tables for all four quarters of 2019 are presented in Appendix B.

As described in the Mann-Kendall Trend Test section, MW-5A and MW-7 are sampled annually and for a reduced list of constituents relative to the other Olalla Landfill monitoring wells and the Shapiro-Wilk statistical evaluations of the reduced list of constituents are included in Table 5.

- There are 175 well-constituent combinations presented in Table 5 and 63 well-constituent combinations had fewer than four detections and could not be tested for normality or the constituents are no longer analyzed in wells MW-5A and MW-7 per the SWHP; the remaining 112 well-constituent combinations were tested for normality.
- Normal data distributions were noted in 54 of the well-constituent combinations that were tested for normality.
- Non-normal data distributions were noted in 58 of the well-constituent combinations tested for normality.

Data that are normally distributed are evaluated using the 95% confidence interval around the mean (a parametric statistical test). Data that are not normally distributed are adjusted by log-normal transformation prior to being evaluated using the 95% confidence interval around the median (a non-parametric statistical test).

Confidence Interval

The statistical test for confidence interval is recommended in the Unified Guidance and is appropriate for compliance assessment and corrective action monitoring phases. In addition, evaluation of the confidence interval is appropriate when analytical data are compared to a fixed limit such as a regulatory standard. Confidence intervals are a common and statistically defensible way to assess compliance with a fixed numerical limit.

Table 5: December 2019 Shapiro-Wilk Test for Normality Results

Constituent or Parameter	MW-1	MW-3	MW-5A	MW-6	MW-7	MW-8	MW-10
Ammonia (N)	Non-normal	ND	NA	Non-normal	NA	Non-normal	Non-normal
Arsenic - Dissolved	Non-normal	Non-normal	Non-normal	Normal	Normal	Normal	Normal
Barium - Dissolved	Non-normal	Normal	NA	Normal	NA	Normal	Normal
Bicarbonate	Non-normal	Non-normal	NA	Non-normal	NA	Non-normal	Non-normal
Calcium	Normal	Normal	NA	Normal	NA	Normal	Non-normal
Carbonate	ND	ND	NA	ND	NA	ND	ND
COD	ND	Non-normal	NA	ND	NA	ND	Non-Normal
Chloride	Normal	Non-normal	NA	Non-normal	NA	Non-normal	Normal
Dissolved Oxygen	Normal	Non-normal	Normal	Non-normal	Normal	Normal	Non-normal
Iron - Dissolved	ND	ND	ND	Normal	ND	Non-normal	Non-normal
Manganese - Dissolved	ND	Normal	ND	Normal	ND	Non-normal	Non-normal
Nitrate	Normal	Non-normal	NA	Non-normal	NA	Non-normal	Non-normal
Nitrite	Non-normal	ND	NA	Non-normal	NA	Non-normal	ND
Oxidation-Reduction Potential	Normal	Non-normal	Normal	Non-normal	Normal	Non-normal	Non-normal
pH - Field	Non-normal	Normal	Normal	Non-normal	Normal	Normal	Normal
pH - Laboratory	Normal	Non-normal	Normal	Non-normal	Normal	Normal	Non-normal
Potassium	Non-normal	Non-normal	NA	Non-normal	NA	Non-normal	Non-normal
Sodium	Normal	Normal	NA	Normal	NA	Normal	Normal
Specific Conductance	Normal	Non-normal	Normal	Normal	Normal	Normal	Normal
Sulfate	Non-normal	Normal	NA	Non-normal	NA	Normal	Non-normal
Temperature	Non-normal	Normal	Normal	Normal	Normal	Normal	Non-normal
Total Coliform	ND	ND	NA	ND	NA	ND	ND
TOC	ND	Normal	NA	Non-normal	NA	Normal	Non-normal
Vinyl Chloride	ND	ND	ND	Non-normal	ND	Non-normal	Non-normal
Zinc - Dissolved	ND	ND	NA	ND	NA	ND	ND

Notes:

ND = Data set has four or fewer quarters with detects and statistical tests cannot be performed.

NA = Not analyzed per the SWHP

The moving window of 20 data points was evaluated for the 95% confidence interval for each well-constituent pair that had enough data points to apply this statistical method. The moving window of 20 data points adds new data with each successive sampling event and drops data from the oldest sampling event to maintain a consistent sample population of the most current 20 data points.

Confidence intervals for December 2019 are compared to Washington State Drinking Water Standards, Groundwater Quality Standards, and, in the case of arsenic and vinyl chloride, to Site-Specific Cleanup Levels. The results of these comparisons are summarized in Table 6. Confidence interval summary tables for all four quarters of 2019 are presented in Appendix B.

Exceedance of a regulatory standard is triggered when the lower 95% confidence interval is greater than the regulatory standard; these cases are highlighted in red on Table 6. Successful remediation is attained if the upper 95% confidence limit does not exceed the regulatory standard, which is highlighted in green. In some cases, the upper 95% confidence interval exceeds the regulatory standard, but the lower 95% confidence interval does not. This condition is not an exceedance but should be monitored for changes and these cases are highlighted in yellow.

Observations regarding the 95% confidence interval results are summarized in the following bullets:

- There are 27 constituents and parameters in samples from 7 wells that are tracked in Table 6 for a total of 189 well-constituent combinations. Arsenic and vinyl chloride are presented twice on Table 6 to allow comparisons of their confidence intervals to Washington State Primary Groundwater Standards and to their Site-Specific Cleanup Levels.
- Sixty-seven (67) of the well-constituent combinations evaluated had an insufficient number of detections in the moving 5-year window of data to perform the statistical analysis or the constituents were not analyzed in samples from wells MW-5A and MW-7 per the SWHP. These well-constituent combinations were not evaluated statistically and are represented as ND (not detected) or NA (not analyzed) in Table 6. Confidence intervals were evaluated for remaining well-constituent combinations.
- One hundred two (102) of the well-constituent combinations that were statistically evaluated had 95% confidence intervals that did not exceed applicable regulatory standards or have no applicable regulatory standards.
- Sixteen (16) of the well-constituent combinations that were statistically evaluated had lower 95% confidence intervals that were greater than applicable regulatory levels (are exceedances). The exceedances are highlighted red in Table 6 and are summarized in the following bullets:
 - Arsenic: MW-1, MW-3, MW-5A, MW-6, MW-7, MW-8, and MW-10 (WA State Primary Groundwater Standard)
 - Arsenic: MW-8 and MW-10 (Site-Specific Cleanup Level)
 - Iron: MW-6
 - Manganese: MW-3, MW-6, MW-8, and MW-10
 - pH (field): MW-3
 - pH (laboratory): MW-3

Table 6: December 2019 Results of 95% Confidence Interval Evaluations

Constituent or Parameter	MW-1	MW-3	MW-5A	MW-6	MW-7	MW-8	MW-10	Regulatory Level	Basis for Comparison
Ammonia (N)	40 to 40	ND	NA	40 to 42	NA	40 to 43	77 to 94	None	
Arsenic - Dissolved	0.09 to 0.11	0.099 to 0.122	0.140 to 0.589	0.945 to 1.14	0.257 to 0.490	1.35 to 1.84	1.71 to 2.06	0.05 µg/L	Primary GW Standard
Arsenic - Dissolved	0.09 to 0.11	0.099 to 0.122	0.140 to 0.589	0.945 to 1.14	0.257 to 0.490	1.35 to 1.84	1.71 to 2.06	1.29	Site-Specific Cleanup Level
Barium - Dissolved	3.5 to 5.0	13.4 to 15.9	NA	10.4 to 13.7	NA	5.68 to 7.85	13.02 to 15.56	1000 µg/L	Primary GW Standard
Bicarbonate (mg of CaCO ₃ /L)	38.5 to 51.0	133 to 223	NA	114 to 180	NA	96.4 to 160	160 to 199	None	
Calcium	10,190 to 11,066	39,140 to 47,910	NA	28,362 to 34,763	NA	20,451 to 25,724	35,500 to 41,200	None	
Carbonate (mg of CaCO ₃ /L)	ND	ND	NA	ND	NA	ND	ND	None	
COD	ND	ND to 10	NA	ND	NA	ND	ND to 12.6	None	
Chloride	3,623 to 4,282	2,440 to 3,300	NA	1,940 to 3,180	NA	2,180 to 2,659	5,113 to 8,442	250,000 µg/L	Secondary GW and DW Standard
Dissolved Oxygen (mg/L)	9.83 to 10.3	0.29 to 0.94	8.89 to 10.8	0.22 to 0.49	7.14 to 8.47	11.1 to 20.6	0.22 to 0.59	None	
Iron - Dissolved	ND	ND	ND	725 to 1,043	ND	280 to 799	20 to 23.9	300 µg/L	Secondary GW and DW Standard
Manganese - Dissolved	ND	4,868 to 6,143	ND	651 to 800	ND	2,350 to 3,020	4,000 to 4,870	50 µg/L	Secondary GW and DW Standard
Nitrate	518 to 910	20.0 to 28.0	NA	ND to 24.0	NA	34.0 to 132	ND to 20	10,000 µg/L	Primary GW and DW Standard
Nitrite	ND to 10	ND	NA	ND to 10	NA	ND to 10	ND	1,000 µg/L	Primary DW Standard
Oxidation-Reduction Potential	174 to 236	177 to 234	111 to 270	15.0 to 35.8	70.0 to 276	42.7 to 67.0	94.6 to 137	None	
pH - Field	6.2 to 6.5	6.1 to 6.2	6.5 to 6.8	6.5 to 6.7	6.6 to 6.7	6.5 to 6.7	6.5 to 6.6	6.5 - 8.5	Secondary GW Standard
pH - Laboratory	6.3 to 6.5	6.2 to 6.3	6.5 to 6.9	6.5 to 6.7	6.5 to 6.8	6.5 to 6.8	6.5 to 6.7	6.5 - 8.5	Secondary GW Standard
Potassium	577 to 681	767 to 979	NA	1,170 to 1,490	NA	939 to 1,060	1,070 to 1,310	None	
Sodium	4,282 to 4,564	8,560 to 9,672	NA	7,209 to 8,296	NA	7,431 to 8,409	9,604 to 10,961	20,000 µg/L	Secondary DW Standard
Specific Conductance (µmhos/cm)	114 to 121	325 to 443	99.0 to 114	252 to 309	90.4 to 108	209 to 262	114 to 121	700 µmhos/cm	Secondary DW Standard
Sulfate	3,620 to 4,200	14,131 to 18,116	NA	6,400 to 8,470	NA	4,064 to 4,713	7,650 to 8,500	250,000 µg/L	Secondary GW and DW Standard
Temperature (°C)	10.8 to 11.0	11.7 to 12.2	10.8 to 12.3	11.1 to 11.6	9.7 to 11.5	10.5 to 11.0	11.2 to 11.6	None	
Total Coliform (colony forming units per 100 mL)	ND	ND	NA	ND	NA	ND	ND	1/100mL	Primary GW and DW Standard
TOC	ND	2,442 to 2,992	NA	1,860 to 2,190	NA	733 to 1,100	2,870 to 3,460	None	
Vinyl Chloride	ND	ND	ND	ND to 0.02	ND	0.02 to 0.06	ND to 0.02	0.02 µg/L	Primary GW Standard
Vinyl Chloride	ND	ND	ND	ND to 0.02	ND	0.02 to 0.06	ND to 0.02	0.29 µg/L	Site-Specific Cleanup Level
Zinc - Dissolved	ND	ND	NA	ND	NA	ND	ND	5,000 µg/L	Secondary GW and DW Standard

Notes:

All concentrations reported as µg/L unless otherwise noted.

NA = Not analyzed per the SWHP

ND = Data all non-detects or 4 or fewer detections

 = 95% Lower CI Exceeds Regulatory Level (Exceedence)

 = 95% Upper CI Exceeds Regulatory Level but Lower CI Does Not (No Exceedence, No Compliance)

 = 95% Upper CI Does not Exceed Regulatory Level (No Exceedence)

 = No Regulatory Level

Normally Distributed Data - Parametric Confidence Interval - Data not Transformed

Non-Normally Distributed Data - Non-Parametric Confidence Interval - Log Base-10 Transformed Data

Non-Detects treated as 0

- Four (4) well-constituent combinations have upper 95% confidence intervals that were greater than (less than in the case of pH) applicable regulatory levels but have lower 95% confidence intervals that are less than applicable regulatory levels. These are not statistical exceedances, but they should be monitored for changes. The well-constituent combinations are highlighted yellow in Table 6 and are summarized in the following bullets:
 - Iron: MW-8
 - pH (field): MW-1, MW-5A, MW-6, and MW-10
 - pH (laboratory): MW-1
 - Vinyl chloride: MW-8

CONCLUSIONS

Quarterly monitoring data collected during 2019 at the Olalla Landfill are summarized in the following sections.

Landfill Gas Data

Landfill gas field measurements were performed at the three on-site passive flares during the four quarterly monitoring events in 2019. Landfill gas data for all four quarterly monitoring events are included in Appendix A and are summarized in the following sections.

March 27, 2019 – First Quarter

Landfill gas indicator parameters, specifically measurable concentrations of carbon dioxide and methane, combined with depressed oxygen concentrations suggest that landfill gas was present in Flare 2 and to a lesser degree in Flare 3 at the time of measurement.

Gas pressure measurements were 0.01 inches of water in all three flares. The low gas pressure readings indicate limited potential for landfill gas flow from the flares.

Weather station data from the Bremerton Airport indicate that barometric pressure decreased from 30.0 inches of mercury on March 26, 2019, the day before the monitoring event, to 29.8 inches of mercury on March 27, 2019, the day the flares were measured (Weather Underground 2019). This decreasing trend in barometric pressure likely contributed to the measurable concentrations of landfill gas indicators at Flares 2 and 3. All three flares had low gas pressure measurements, which indicates a low potential for the flow of landfill gas from the flares.

June 20, 2019 – Second Quarter

Flares 1 and 2 had no detectable methane. These data indicate that landfill gas was not present at measurable concentrations in Flares 1 and 2. However, measured concentrations of oxygen were depressed relative to ambient air and carbon dioxide was elevated in Flares 1 and 2 possibly indicating aerobic decay of subsurface organics, which produces carbon dioxide rather than methane.

Methane was detected in Flare 3. In addition, the oxygen concentration in Flare 3 was depressed and carbon dioxide was elevated relative to ambient conditions indicating the presence of landfill gas in Flare 3.

Gas pressure measurements were 0.01 inches of water in Flares 1 and 3 and 0.02 inches of water in Flare 2. The consistently low gas pressure readings indicate a low potential for landfill gas flow from the flares.

Weather station data from the SeaTac Airport indicate that barometric pressure decreased slightly from 29.7 inches of mercury on June 19, 2019, the day before the monitoring event, to 29.6 inches of mercury on June 20, 2019, the day the flares were measured (Weather Underground 2019). This slight decreasing trend in barometric pressure likely contributed to the measurable concentrations of landfill gas indicators

at Flare 3. All three flares had low gas pressure measurements, which indicates a low potential for the flow of landfill gas from the flares.

September 26, 2019 – Third Quarter

Flare 3 had no detectable methane, indicating that landfill gas was not present at measurable concentrations in Flare 3. However, the concentration of oxygen was slightly depressed relative to ambient air and the carbon dioxide concentration was low but measurable. These conditions possibly indicate aerobic decay of subsurface organics, which depletes oxygen and produces carbon dioxide rather than methane.

Landfill gas indicator parameters, specifically measurable concentrations of carbon dioxide and methane, combined with depressed oxygen concentrations in flares 1 and 2 suggest that landfill gas was present at Flares 1 and 2 at the time of measurement. Flare 3 had no, detectable methane, near-ambient oxygen, and a trace level of measurable carbon dioxide potentially indicating aerobic decomposition products.

Gas pressure measurements were 0.01 inches of water in all three flares. The consistently low gas pressure readings indicate a low potential for landfill gas flow from the flares.

Weather station data from the SeaTac Airport indicate that barometric pressure decreased from 29.85 inches of mercury on September 25, 2019, the day before the monitoring event, to 29.54 inches of mercury on September 26, 2019, the day the flares were measured (Weather Underground 2019). This decreasing trend in barometric pressure likely contributed to the measurable concentrations of landfill gas indicators at Flares 1 and 2. All three flares had low gas pressure measurements, which indicates a low potential for the flow of landfill gas from the flares.

December 17, 2019 – Fourth Quarter

Landfill gas indicator parameters, specifically measurable concentrations of carbon dioxide and methane, combined with significantly depressed oxygen concentrations suggest that landfill gas was present in all three flares at the time of measurement.

Gas pressure measurements were 0.01 inches of water in Flares 1 and 3 and 0.02 inches of water in Flare 2. The consistently low gas pressure readings indicate a low potential for landfill gas flow from the flares.

Weather station data from the SeaTac Airport indicate that barometric pressure decreased from 29.88 inches of mercury on December 16, 2019, the day before the monitoring event, to 29.74 inches of mercury on December 17, 2019, the day the flares were measured (Weather Underground 2019). This decreasing trend in barometric pressure likely contributed to the measurable concentrations of landfill gas indicators in all three flares. All three flares had low gas pressure measurements, which indicates a low potential for the flow of landfill gas from the flares.

Groundwater Elevation and Flow Direction Data

The groundwater flow direction beneath the Landfill is generally toward the northwest, with groundwater from beneath the Landfill flowing toward downgradient wells MW-3, MW-6, MW-8, and MW-10 as depicted in the quarterly groundwater elevation contour and flow direction figures presented in Appendix A. The groundwater flow directions and elevation contour patterns are consistent with historical groundwater elevation data from the Landfill.

The lowest calculated groundwater gradient among the four quarters of 2019 occurred in March with a mean horizontal gradient of 0.0150. The resulting calculated groundwater flow velocity is 2.34 feet/day. Groundwater gradients and calculated groundwater velocities were greatest during September, which had a mean horizontal gradient of 0.0165 and calculated flow velocity of 2.57 feet/day.

Exceedances of Primary Regulatory Standards

Upgradient Well (MW-1)

Arsenic

- Groundwater samples collected from MW-1 had arsenic concentrations of 0.11 µg/L, 0.10 µg/L, 0.09 µg/L, and 0.11 µg/L in March, June, September, and December, respectively. All four arsenic concentrations exceed the Washington State Groundwater Primary Standard of 0.05 µg/L but are significantly less than both the Washington State Drinking Water Primary Standard of 10 µg/L and the site-specific CUL of 1.29 µg/L.
- The upper and lower 95% confidence intervals for arsenic in samples from MW-1 exceed the Washington State Primary Groundwater Standard of 0.05 µg/L, which represents a statistically significant exceedance of that standard.
- The upper and lower 95% confidence intervals for arsenic in samples from MW-1 are less than the Site-Specific CUL of 1.29 µg/L, which represents statistically significant compliance with the Site-Specific CUL.
- The presence of arsenic at concentrations greater than the Washington State Groundwater Primary Standard in samples from upgradient well MW-1 is an indication that dissolution of naturally occurring arsenic in soil contributes to the arsenic concentrations noted in groundwater data from other wells at the Landfill.

Cross-Gradient Wells (MW-5A and MW-7)

Arsenic

MW-5A and MW-7

- Per the SWHP and CMP, cross-gradient wells MW-5A and MW-7 are sampled only during the fourth quarter monitoring event. Groundwater samples collected from MW-5A and MW-7 had arsenic concentrations of 0.20 µg/L and 0.28 µg/L, respectively. Both concentrations exceed the Washington State Groundwater Primary Standard of 0.05 µg/L but are less than both the Washington State Drinking Water Primary Standard of 10 µg/L and the Site-Specific CUL of 1.29 µg/L.

- The upper and lower 95% confidence intervals for arsenic in samples from MW-5A and MW-7 exceed the Washington State Primary Groundwater Standard of 0.05 µg/L, which represents a statistically significant exceedance of that standard.
- The upper and lower 95% confidence intervals for arsenic in samples from MW-5A and MW-7 are less than the Site-Specific CUL of 1.29 µg/L, which represents statistically significant compliance with the Site-Specific CUL.
- The presence of arsenic at concentrations greater than the Washington State Groundwater Primary Standard in samples from cross-gradient wells MW-5A and MW-7 is an indication that dissolution of naturally occurring arsenic in soil contributes to the arsenic concentrations noted in groundwater data from other wells at the Landfill.

Downgradient Wells (MW-3, MW-6, MW-8, and MW-10)

Arsenic

MW-3, MW-6, MW-8, and MW-10

- Groundwater samples from downgradient monitoring wells had arsenic concentrations exceeding the Washington State Groundwater Primary Standard of 0.05 µg/L during the four quarterly events in 2019. None of the arsenic concentrations exceed the Washington State Drinking Water Primary Standard of 10 µg/L. Samples from MW-8 and MW-10 exceeded the site-specific CUL of 1.29 µg/L during at least one quarterly event in 2019. Arsenic concentrations for downgradient wells are summarized in the following bullets:
 - MW-3 had arsenic concentrations of 0.13 µg/L, 0.11 µg/L, 0.10 µg/L, and 0.12 µg/L in March, June, September, and December, respectively.
 - MW-6 had arsenic concentrations of 1.05 µg/L, 1.36 µg/L, 1.00 µg/L, and 0.91 µg/L in March, June, September, and December, respectively.
 - MW-8 had arsenic concentrations of 1.75 µg/L, 1.25 µg/L, 0.87 µg/L, and 0.90 µg/L in March, June, September, and December, respectively.
 - MW-10 had arsenic concentrations of 1.62 µg/L, 1.66 µg/L, 1.72 µg/L, and 2.33 µg/L in March, June, September, and December, respectively.
- Upper and lower 95% confidence intervals for arsenic in samples from the four downgradient wells exceed the Washington State Primary Groundwater Standard of 0.05 µg/L. This represents statistically significant exceedances of that standard in the downgradient wells. The upper and lower 95% confidence intervals for MW-8 and MW-10 also exceed the Site-Specific CUL of 1.29 µg/L, indicating statistically significant exceedance of the CUL for MW-8 and MW-10.
- Upper and lower 95% confidence intervals for arsenic in samples from MW-3 and MW-6 are less than the Site-Specific CUL of 1.29 µg/L, which represents statistically significant compliance with the Site-Specific CUL.

Vinyl Chloride

MW-6, MW-8, and MW-10

- Vinyl chloride was detected at concentrations greater than the Washington State Groundwater Primary Standard of 0.02 µg/L in samples from MW-6, MW-8, and MW-10 in at least one quarter of 2019. However, none of the detected concentrations of vinyl chloride exceeded the Washington State Drinking Water Primary Standard of 2.0 µg/L or the Site-Specific CUL of 0.29 µg/L. Vinyl chloride concentrations exceeding the Washington State Groundwater Primary Standard for specific wells are summarized in the following bullets:
 - MW-6 had a vinyl chloride concentration of 0.11 µg/L in March.
 - MW-8 had vinyl chloride concentrations of 0.10 µg/L and 0.03 µg/L in March and June, respectively.
 - MW-10 had a vinyl chloride concentration of 0.11 µg/L in March.
- Upper and lower 95% confidence intervals for vinyl chloride in samples from MW-6 and MW-10 are lower than the Washington State Primary Groundwater Standard of 0.02 µg/L. This represents statistically significant compliance with the standard in samples from those wells.
- The lower 95% confidence limit for vinyl chloride in samples from MW-8 is less than and the upper 95% confidence is greater than the Washington State Primary Groundwater Standard of 0.02 µg/L. This is not a statistical exceedance or compliance but indicates that continued monitoring and evaluation is warranted.
- Upper and lower 95% confidence intervals for vinyl chloride in samples from MW-6, MW-8, and MW-10 are lower than the Site-Specific CUL of 0.29 µg/L. This represents statistically significant compliance with the Site-Specific CUL in samples from those wells.

Exceedances of Secondary Regulatory Standards

Upgradient Well (MW-1)

pH (field-measured)

- Groundwater purged from well MW-1 had field-measured pH values of 6.4 and 6.2 during the June and September monitoring events. These values are lower than the lower limit of the 6.5 for the Washington State Groundwater Secondary Standard.
- The lower 95% confidence limit for field-measured pH in purge water from MW-1 is less than but the upper 95% confidence is equal to the Washington State Secondary Groundwater Standard range of 6.5 to 8.5. This is not a statistical exceedance or compliance but indicates that continued monitoring and evaluation is warranted.

pH (laboratory-measured)

- Groundwater samples from well MW-1 had laboratory-measured pH values of 6.2, 6.3, and 6.1 during the March, June, and September monitoring events, respectively. These values are less than the lower limit of 6.5 for the Washington State Groundwater Secondary Standard.

- The lower 95% confidence limit for laboratory-measured pH in samples from MW-1 is less than but the upper 95% confidence is equal to the Washington State Secondary Groundwater Standard range of 6.5 to 8.5. This is not a statistical exceedance or compliance but indicates that continued monitoring and evaluation is warranted.

Downgradient Wells (MW-3, MW-6, MW-8, and MW-10)

Iron

MW-6 and MW-8

- Iron is a common constituent in landfill leachate and iron concentrations in groundwater samples from downgradient wells MW-6 and MW-8 exceeded the Washington State Drinking Water Secondary Standard and Groundwater Secondary Standard of 300 µg/L during at least one of the quarterly monitoring events as summarized below.
 - MW-6 had iron concentrations of 1,090 µg/L, 724 µg/L, 946 µg/L, and 839 µg/L for the March, June, September, and December sampling events, respectively.
 - MW-8 had iron concentrations of 1,040 µg/L and 341 µg/L for the March and December sampling events, respectively.
- Upper and lower 95% confidence intervals for iron in samples from MW-6 exceed the Washington State Secondary Groundwater Standard of 300 µg/L. This represents a statistically significant exceedance for iron.
- The upper 95% confidence interval for iron in samples from MW-8 exceeds the Washington State Secondary Groundwater Standard of 300 µg/L but the lower 95% confidence limit does not. This is not a statistical exceedance or compliance but indicates that continued monitoring and evaluation is warranted.

Manganese

MW-3, MW-6, MW-8, and MW-10

- Manganese is a common constituent of landfill leachate and manganese concentrations in groundwater samples from downgradient wells MW-3, MW-6, MW-8, and MW-10 exceeded the Washington State Drinking Water Secondary Standard and Groundwater Secondary Standard of 50 µg/L during all four quarterly monitoring events as summarized below.
 - MW-3 had manganese concentrations of 6,670 µg/L, 5,980 µg/L, 6,130 µg/L, and 5,380 µg/L for the March, June, September, and December sampling events, respectively.
 - MW-6 had manganese concentrations of 1,030 µg/L, 798 µg/L, 859 µg/L, and 721 µg/L for the March, June, September, and December sampling events, respectively.
 - MW-8 had manganese concentrations of 2,530 µg/L, 2,280 µg/L, 2,650 µg/L, and 2,610 µg/L for the March, June, September, and December sampling events, respectively.
 - MW-10 had manganese concentrations of 4,350 µg/L, 3,750 µg/L, 3,870 µg/L, and 4,380 µg/L for the March, June, September, and December sampling events, respectively.

- Upper and lower 95% confidence limits for manganese in samples from all four downgradient wells exceed the Washington State Secondary Groundwater Standard of 50 µg/L indicating statistically significant exceedances for manganese in downgradient wells.

pH (field-measured)

MW-3 and MW-6

- Purge water from downgradient monitoring wells MW-3 and MW-6 had at least one field-measured pH value that was less than the lower limit of the 6.5 to 8.5 range of the Washington State Groundwater Secondary Standard as summarized below.
 - MW-3 had field-measured pH values of 6.4, 6.2, 6.2, and 6.3 in March, June, September, and December, respectively.
 - MW-6 had a field-measured pH value of 6.4 in September.
- Both the upper and lower 95% confidence limits for field-measured pH in purge water from MW-3 are outside of (less than) the Washington State Secondary Groundwater Standard range of 6.5 to 8.5, indicating a statistically significant exceedance of that standard.
- Both the upper and lower 95% confidence limits for field-measured pH in purge water from MW-6 are within the Washington State Secondary Groundwater Standard range of 6.5 to 8.5, indicating statistically significant compliance with that standard.

pH (laboratory-measured)

MW-3, MW-6, and MW-8

- Purge water from downgradient monitoring wells MW-3, MW-6, and MW-8 had at least one laboratory-measured pH value that was less than the lower limit of the 6.5 to 8.5 range of the Washington State Groundwater Secondary Standard as summarized below.
 - MW-3 had laboratory-measured pH values of 6.2, 6.2, and 6.1 in March, June, and September, respectively.
 - MW-6 had a laboratory-measured pH value of 6.3 in March.
 - MW-8 had laboratory-measured pH values of 6.4 in June and 6.3 in September.
- Both the upper and lower 95% confidence limits for laboratory-measured pH in samples from MW-3 are lower than the Washington State Secondary Groundwater Standard range of 6.5 to 8.5, indicating a statistically significant exceedance of that standard.
- Both the upper and lower 95% confidence limits for laboratory-measured pH in samples from MW-6 and MW-8 are within the Washington State Secondary Groundwater Standard range of 6.5 to 8.5, indicating statistically significant compliance with that standard.

Analytical Tests for Volatile Organic Compounds

This section lists and describes detections of additional VOC constituents in groundwater samples from the Landfill monitoring well network. The VOC detections listed in this section are at concentrations less than applicable Washington State Drinking Water Standards or Washington State Groundwater Quality Standards or are for VOCs that do not have applicable groundwater standards.

- Acetone, a common laboratory solvent, was detected in samples from MW-1, MW-6, MW-8, and MW-10 at concentrations of 18.6 µg/L, 27.9 µg/L, 12.6 µg/L, and 11.5 µg/L, respectively during the June sampling event. Because acetone was detected in multiple samples, including the sample from upgradient well MW-1, its presence is likely due to laboratory contamination. There are no Washington State Drinking Water or Groundwater Standards for acetone.
- Chlorobenzene was detected in samples from MW-6 at concentrations of 2.95 µg/L, 2.24 µg/L, 2.80 µg/L, and 2.56 µg/L in March, June, September, and December, respectively. These concentrations are significantly less than the Washington State Primary Drinking Water Standard of 100 µg/L. There is no Washington State Groundwater Standard for chlorobenzene.
- cis-1,2-Dichloroethene was detected in samples from MW-8 at concentrations of 0.27 µg/L in March and 0.29 µg/L in June. These concentrations are less than the Washington State Primary Drinking Water Standard of 70 µg/L.

Inspection and Maintenance Summary for 2019 and Activities Planned for 2020

A summary of the inspection, maintenance, and engineering work performed at the Olalla Landfill in 2019 is presented in Appendix C. Activities planned for 2020 are summarized in Appendix D.

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Appendix A:
2019 Quarterly Monitoring Data

Landfill Gas Data
Groundwater Elevations and Contour Maps
Groundwater Quality Data

**Olalla Landfill
2019 Landfill Gas Data**

March 27, 2019	Flare #1	Flare #2	Flare #3
METHANE, (% LEL) ^a	0	69	2
METHANE, (% Volume)	0.0	3.4	0-2
OXYGEN, (% Volume)	19.8	4.2	19.9
CARBON DIOXIDE, (% Volume)	0.1	9.1	0.1
PRESSURE (inches of water column)	0.01	0.01	0.01
AMBIENT TEMPERATURE, (°F)	52		

June 20, 2019	Flare #1	Flare #2	Flare #3
METHANE, (% LEL) ^a	0	0	14
METHANE, (% Volume)	0.0	0.0	2.0
OXYGEN, (% Volume)	5.9	12.2	4.8
CARBON DIOXIDE, (% Volume)	7.6	4.1	8.9
PRESSURE (inches of water column)	0.01	0.02	0.01
AMBIENT TEMPERATURE, (°F)	66		

September 26, 2019	Flare #1	Flare #2	Flare #3
METHANE, (% LEL) ^a	44	8	0
METHANE, (% Volume)	3.8	0.4	0.0
OXYGEN, (% Volume)	14.6	18.8	19.6
CARBON DIOXIDE, (% Volume)	4.5	6.1	0.4
PRESSURE (inches of water column)	0.01	0.01	0.01
AMBIENT TEMPERATURE, (°F)	60		

December 17, 2019	Flare #1	Flare #2	Flare #3
METHANE, (% LEL) ^a	19	59	52
METHANE, (% Volume)	1.2	3.0	2.6
OXYGEN, (% Volume)	4.0	1.6	2.4
CARBON DIOXIDE, (% Volume)	9.7	9.2	10.7
PRESSURE (inches of water column)	0.01	0.02	0.01
AMBIENT TEMPERATURE, (°F)	39		

Notes:

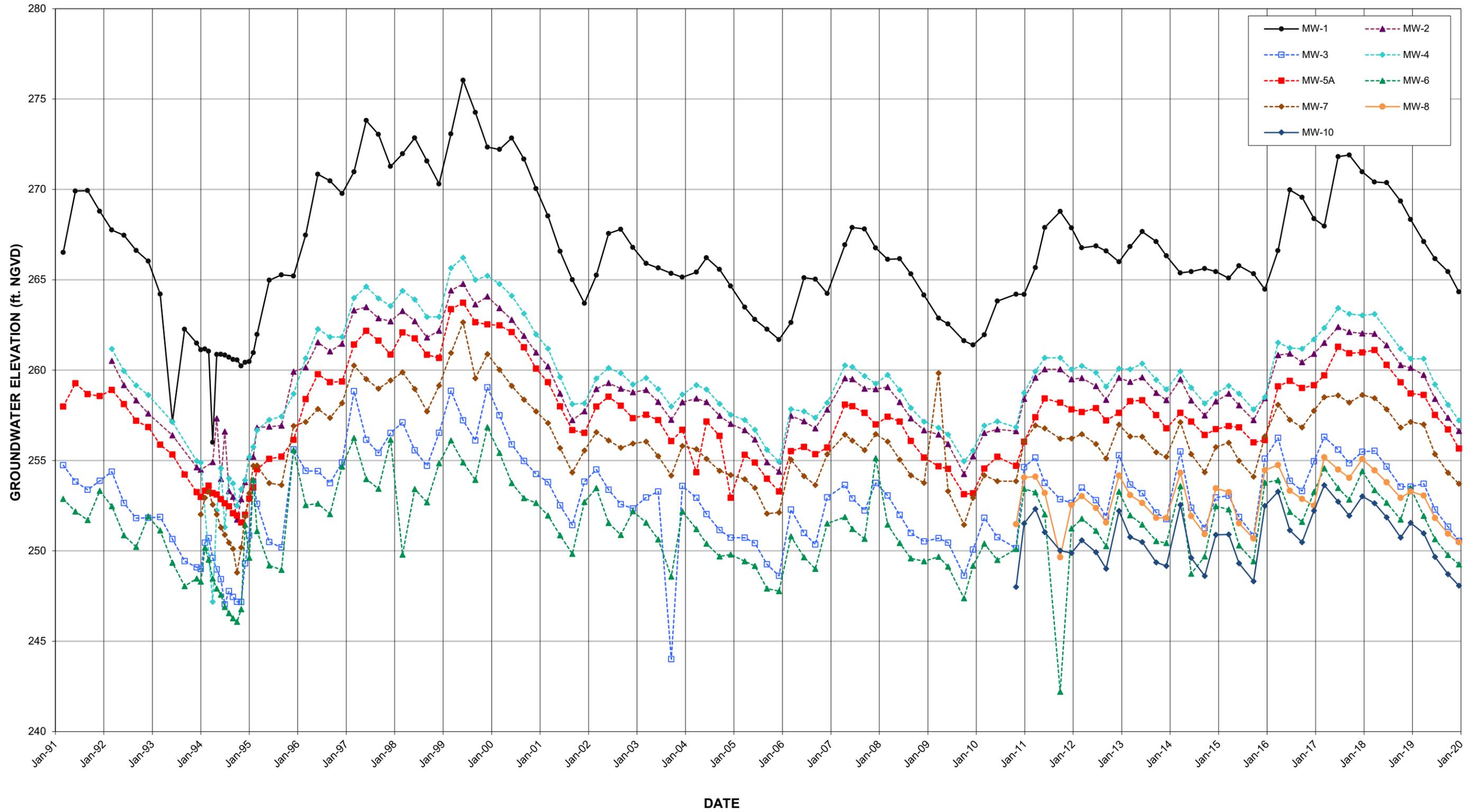
^a LEL is the GEM 2000 instrument reading, not a calculated value from the methane % volume measurement.

**Olalla Landfill
2019 Groundwater Elevations**

Station	Reference Elevation ¹	Depth to Water (feet)	Groundwater Elevation ¹
March 27, 2019			
MW-1	343.79	76.68	267.11
MW-2	323.25	63.52	259.73
MW-3	296.95	43.24	253.71
MW-4	320.93	60.30	260.63
MW-5A	332.53	73.90	258.63
MW-6	271.17	19.24	251.93
MW-7	280.43	23.44	256.99
MW-8	272.85	19.79	253.06
MW-10	279.21	28.24	250.97
June 20, 2019			
MW-1	343.79	77.63	266.16
MW-2	323.25	64.84	258.41
MW-3	296.95	44.67	252.28
MW-4	320.93	61.72	259.21
MW-5A	332.53	75.01	257.52
MW-6	271.17	20.52	250.65
MW-7	280.43	25.08	255.35
MW-8	272.85	21.03	251.82
MW-10	279.21	29.55	249.66
September 26, 2019			
MW-1	343.79	78.34	265.45
MW-2	323.25	65.88	257.37
MW-3	296.95	45.62	251.33
MW-4	320.93	62.85	258.08
MW-5A	332.53	75.82	256.71
MW-6	271.17	21.40	249.77
MW-7	280.43	26.11	254.32
MW-8	272.85	21.90	250.95
MW-10	279.21	30.50	248.71
December 17, 2019			
MW-1	343.79	79.46	264.33
MW-2	323.25	66.62	256.63
MW-3	296.95	46.40	250.55
MW-4	320.93	63.72	257.21
MW-5A	332.53	76.87	255.66
MW-6	271.17	21.92	249.25
MW-7	280.43	26.72	253.71
MW-8	272.85	22.37	250.48
MW-10	279.21	31.14	248.07

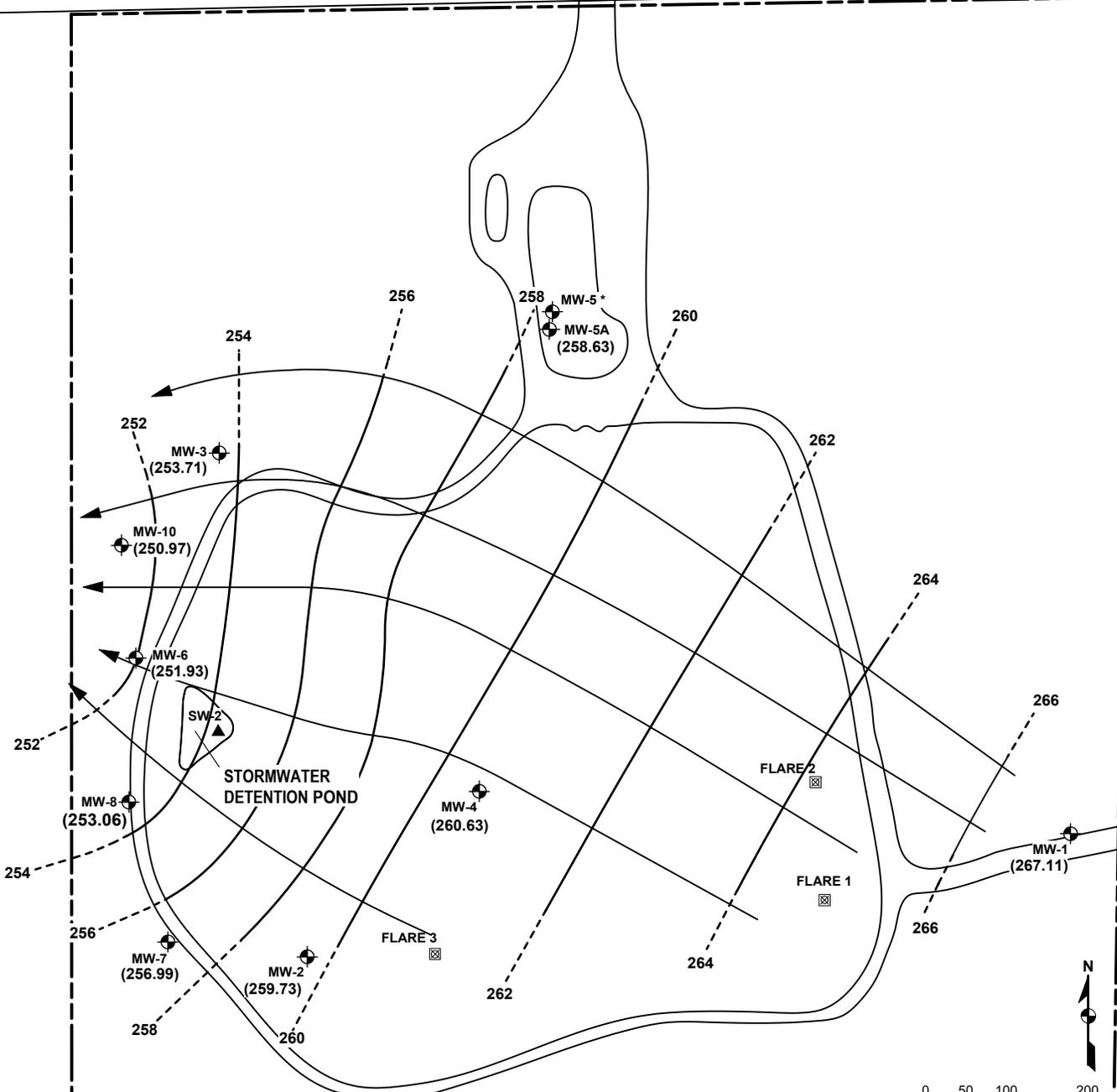
¹Elevations in Feet NGVD, 29

OLALLA LANDFILL Groundwater Elevations



S.E. BURLEY OLALLA ROAD

BANDIX ROAD S.E.

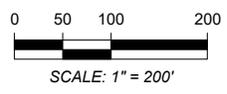
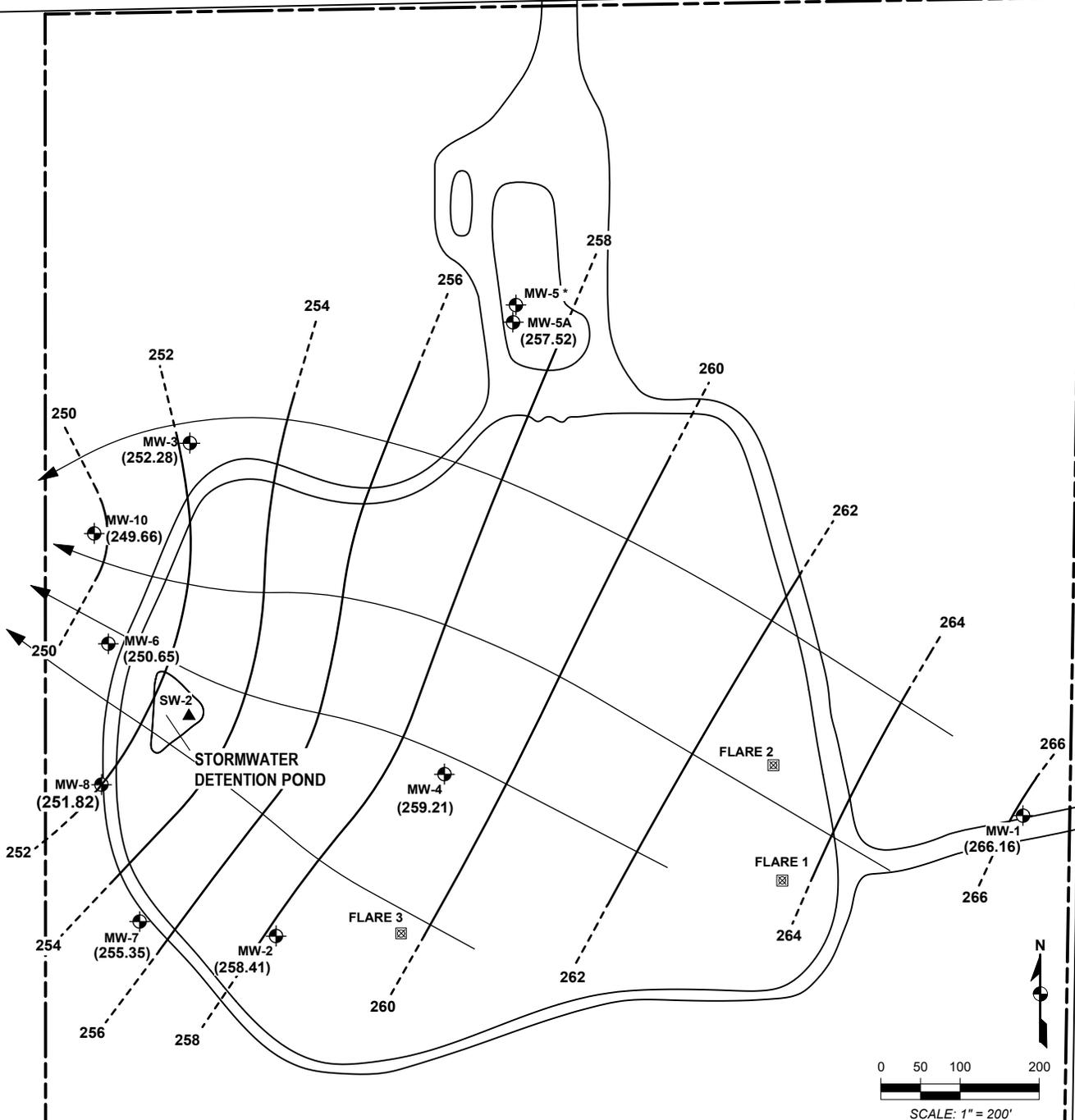


- NOTES:**
- * MW-5 IS COMPLETED IN A SHALLOW PERCHED GROUNDWATER ZONE.
 - MW-2 MONITORING WELL LOCATION
 - SW-2 SURFACE WATER SAMPLING LOCATION
 - LANDFILL GAS FLARE
 - GROUNDWATER ELEVATION CONTOUR
 - INFERRED GROUNDWATER FLOW PATH
 - APPROXIMATE PROPERTY BOUNDARY
 - PERIMETER ACCESS ROAD

OLALLA LANDFILL GROUNDWATER ELEVATION CONTOUR MAP - MARCH 27, 2019			
PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	2019 ANNUAL MONITORING REPORT		
LOCATION	OLALLA LANDFILL KITSAP COUNTY, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
4/15/19	VPB	DCK	45407.0

S.E. BURLEY OLALLA ROAD

BANDIX ROAD S.E.



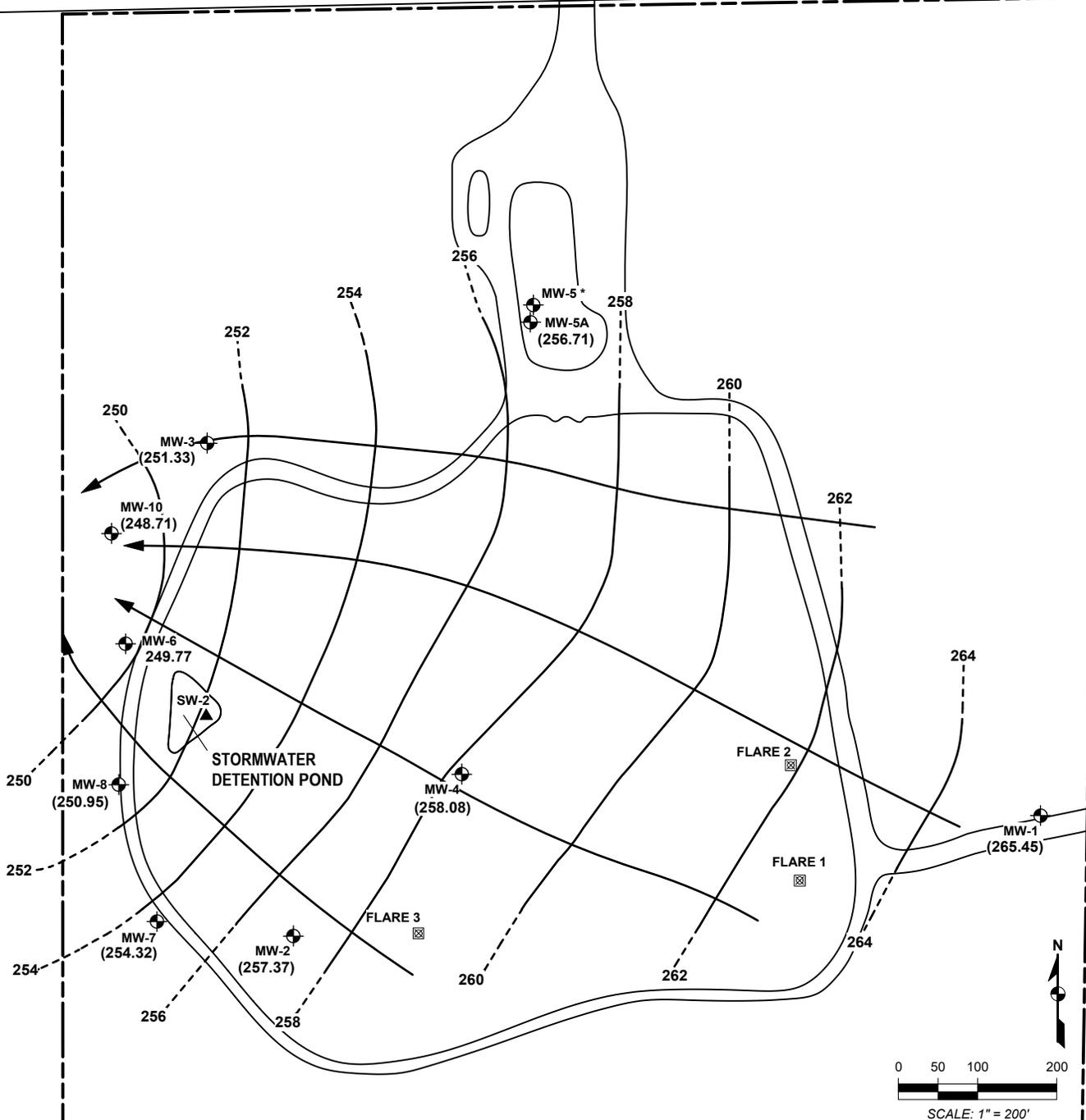
OLALLA LANDFILL GROUNDWATER ELEVATION
CONTOUR MAP - JUNE 20, 2019

PREPARED BY			
REPORT	2019 ANNUAL MONITORING REPORT		
LOCATION	OLALLA LANDFILL KITSAP COUNTY, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
6/27/19	VPB	DCK	45407.0

- NOTES:**
- * MW-5 IS COMPLETED IN A SHALLOW PERCHED GROUNDWATER ZONE.
 - MW-2 MONITORING WELL LOCATION
 - SW-2 SURFACE WATER SAMPLING LOCATION
 - LANDFILL GAS FLARE
 - GROUNDWATER ELEVATION CONTOUR
 - INFERRED GROUNDWATER FLOW PATH
 - APPROXIMATE PROPERTY BOUNDARY
 - PERIMETER ACCESS ROAD

S.E. BURLEY OLALLA ROAD

BANDIX ROAD S.E.



NOTES:

* MW-5 IS COMPLETED IN A SHALLOW PERCHED GROUNDWATER ZONE.

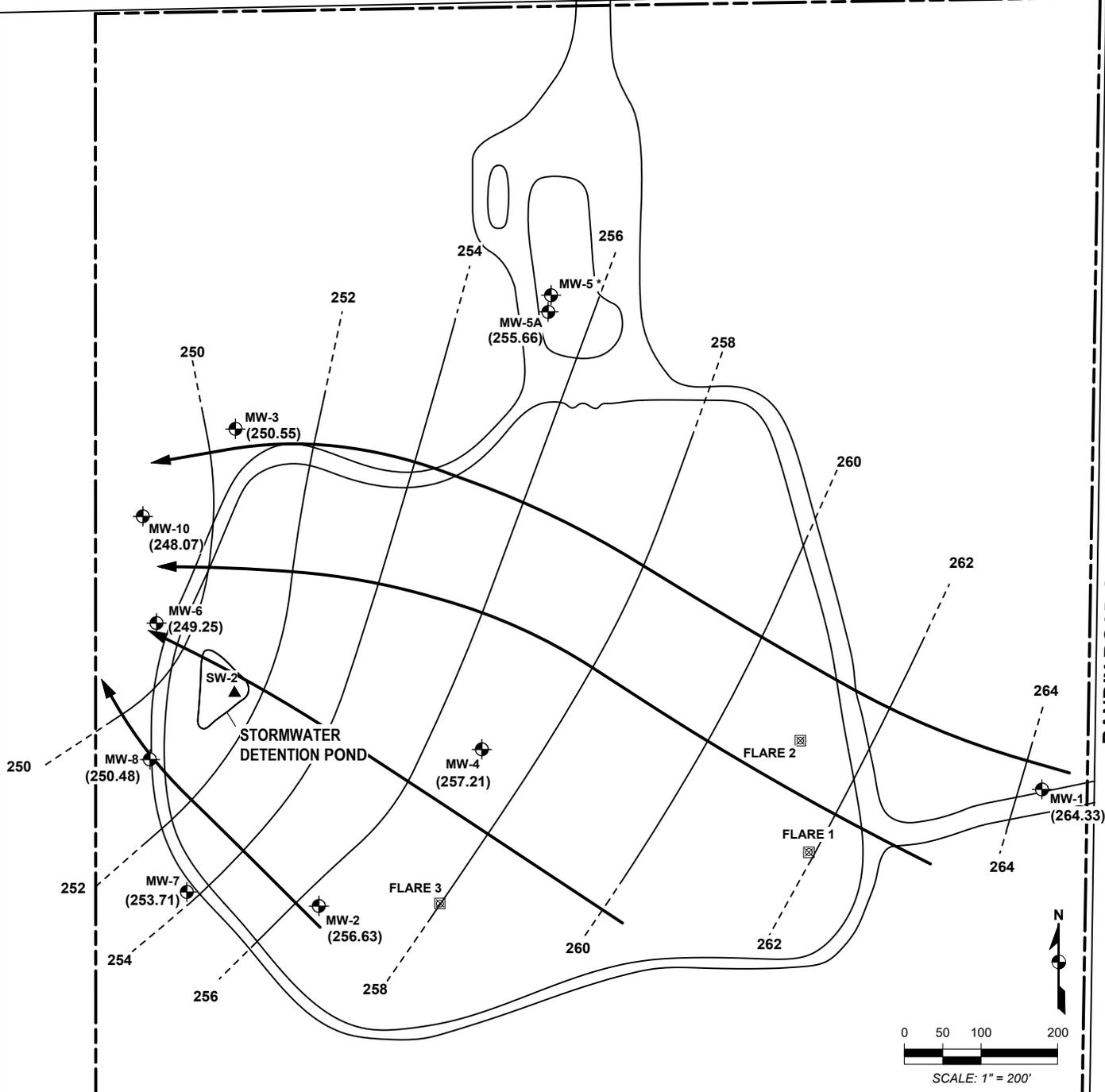
- MW-2 MONITORING WELL LOCATION
- SW-2 SURFACE WATER SAMPLING LOCATION
- LANDFILL GAS FLARE
- GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER FLOW PATH
- APPROXIMATE PROPERTY BOUNDARY
- PERIMETER ACCESS ROAD

OLALLA LANDFILL GROUNDWATER ELEVATION CONTOUR MAP - SEPTEMBER 26, 2019

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	2019 ANNUAL MONITORING REPORT		
LOCATION	OLALLA LANDFILL KITSAP COUNTY, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
10/28/19	JYT	DCK	45407.0

S.E. BURLEY OLALLA ROAD

BANDIX ROAD S.E.



NOTES:

* MW-5 IS COMPLETED IN A SHALLOW PERCHED GROUNDWATER ZONE.

- MW-2 MONITORING WELL LOCATION
- SW-2 SURFACE WATER SAMPLING LOCATION
- LANDFILL GAS FLARE
- GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER FLOW PATH
- APPROXIMATE PROPERTY BOUNDARY
- PERIMETER ACCESS ROAD

OLALLA LANDFILL GROUNDWATER ELEVATION CONTOUR MAP - DECEMBER 17, 2019

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	2019 ANNUAL MONITORING REPORT		
LOCATION	OLALLA LANDFILL KITSAP COUNTY, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
1/7/20	VPB	DCK	45407.0

Groundwater Quality Data
March 2019 Quarterly Monitoring Event
Page 1 of 3

	State Drinking Water Standards (a)	State Ground- water Standards (b)	Site- Specific Cleanup Level (c)	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-9 (FD)
CONVENTIONALS										
ALKALINITY	----	----	----	mg/L	41.2	219	188	128	192	216
AMMONIA NITROGEN	----	----	----	mg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.083	0.040 U
BICARBONATE	----	----	----	mg/L	41.2	219	188	128	192	216
CARBONATE	----	----	----	mg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CHEMICAL OXYGEN DEMAND	----	----	----	mg/L	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
CHLORIDE	250**	250**	----	mg/L	3.11	1.93	5.83	2.66	12.0	1.86
DISSOLVED OXYGEN	----	----	----	mg/L	10.41	1.49	1.18	2.48	1.28	NA
NITRATE NITROGEN	10*	10*	----	mg/L	1.19	0.02 U	0.02 U	0.11	0.02 U	0.02 U
NITRITE NITROGEN	1*	----	----	mg/L	0.01 U	0.01 U	0.01 U	0.10 U	0.01 U	0.01 U
ORP	----	----	----	mV	268.0	230.7	22.6	67.0	87.1	NA
pH (field)	----	6.5-8.5**	----	-log H+	6.7	6.4	6.6	6.8	6.8	NA
pH (laboratory)	----	6.5-8.5**	----	-log H+	6.2 H	6.2 H	6.3 H	6.5 H	6.5 H	6.2 H
SPECIFIC CONDUCTANCE	700**	----	----	umhos/cm	105	428	371	246	394	NA
SULFATE	250**	250**	----	mg/L	5.17	19.1	7.99	3.54	8.05	19.5
TEMPERATURE	----	----	----	°C	10.7	11.8	10.9	10.5	11.8	NA
TOTAL COLIFORM	1/100 mL*	1/100 mL*	----	cfu/100 mL	1 UH	1 UH	1 UH	1 UH	1 UH	1 UH
TOTAL ORGANIC CARBON	----	----	----	mg/L	0.5 U	2.68	2.14	0.82	3.12	2.69
TURBIDITY	----	----	----	NTU	0.6	1.8	1.5	5.3	1.8	NA
DISSOLVED METALS										
ARSENIC	10*	0.05*	1.29	µg/L	0.11	0.13	1.05	1.75	1.62	0.13
BARIUM	2,000*	1,000*	----	µg/L	3.5	15.3	16.1	7.8	14.0	16.0
CALCIUM	----	----	----	mg/L	9.42	49.1	38.9	24.1	39.0	47.0
IRON	300**	300**	300	µg/L	20 U	20 U	1,090	1,040	22.5	20 U
MANGANESE	50**	50**	50	µg/L	1.0 U	6,670	1,030	2,530	4,350	6,630
POTASSIUM	----	----	----	mg/L	0.64	1.02	1.53	1.14	1.31	0.95
SODIUM	20***	----	----	mg/L	4.19	10.0	8.97	9.20	11.5	9.47
ZINC	5,000**	5,000**	----	µg/L	4.0 U	4.0 U	4.0 U	6.83	4.0 U	4.0 U
VOLATILE ORGANIC COMPOUNDS										
VINYL CHLORIDE	2*	0.02*	0.29	µg/L	0.02 U	0.02 U	0.11	0.10	0.11	0.02 U

Notes:

█ Concentration exceeds Washington State Drinking Water or Groundwater Standards

FD = Field Duplicate of MW-3 was labeled MW-9.

NA = Not Analyzed

Regulatory Standards:

(a) WAC 246-290-310

(b) WAC 173-200-040

* Primary Standard

** Secondary Standard

*** Recommended level of concern for consumers with restricted daily sodium intake.

Data Qualifiers:

H = Hold time was exceeded.

NA = Not Analyzed

U = Indicates compound was analyzed for, but not detected at the specified detection limit.

Groundwater Quality Data
March 2019 Quarterly Monitoring Event

Page 2 of 3

VOLATILE ORGANIC COMPOUNDS	State Drinking Water Standards	State Ground- water Standards	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-9 (FD)
	(a)	(b)							
1,1,1,2-TETRACHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-TRICHLOROETHANE	200	200	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-TETRACHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-TRICHLOROETHANE	5	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHANE	----	1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHENE	7	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROPROPENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-TRICHLOROBENZENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-TRICHLOROPROPANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	70	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRIMETHYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DIBROMO-3-CHLOROPROPANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	600	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROETHANE	5	0.5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROPROPANE	5	0.6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-TRIMETHYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROPROPANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-DICHLOROBENZENE	75	4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-DICHLOROPROPANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-BUTANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYLVINYLETHER	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
2-CHLOROTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-HEXANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-ISOPROPYLTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-METHYL-2-PANTANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACROLEIN	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACRYLONITRILE	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
BENZENE	5	1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOCHLOROMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOFORM	----	5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOMETHANE	----	----	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CARBON DISULFIDE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CARBON TETRACHLORIDE	5	0.3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CFC-113	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROBENZENE	100	----	µg/L	0.2 U	0.2 U	2.95	0.2 U	0.2 U	0.2 U
CHLOROBROMOMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLORODIBROMOMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROFORM	----	7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROMETHANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	70	----	µg/L	0.2 U	0.2 U	0.2 U	0.27	0.2 U	0.2 U

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VOLATILE ORGANIC COMPOUNDS	State Drinking Water Standards	State Ground- water Standards	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-9 (FD)
	(a)	(b)							
CIS-1,3-DICHLOROPROPENE	----	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DIBROMOETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DICHLOROBROMOMETHANE	----	0.5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
ETHYLBENZENE	700	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
ETHYLENE DIBROMIDE	----	0.001	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HEXACHLOROBUTADIENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
IODOMETHANE	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
ISOPROPYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
METHYLENE CHLORIDE	5	5	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
M & P-XYLENE	10	----	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NAPHTHALENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
N-PROPYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
O-XYLENE	10	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
SEC-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
STYRENE	100	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TERT-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TETRACHLOROETHENE	5	0.8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOLUENE	1000	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,2-DICHLOROETHENE	100	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,3-DICHLOROPROPENE	----	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,4-DICHLORO-2-BUTENE			µg/L	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5	3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRICHLOROFLUOROMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL ACETATE			µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL CHLORIDE	2	0.02	µg/L	0.02 U	0.02 U	0.11	0.10	0.11	0.02 U

Notes: [Redacted] Concentration exceeds State Drinking Water Standards or Groundwater Standards

FD = Field Duplicate of MW-3 was labeled MW-9.

Regulatory Standards:

All regulatory standards listed for VOCs are Primary Regulatory Standards

(a) WAC 246-290-310

(b) WAC 173-200-040

Data Qualifiers:

U = Indicates compound was analyzed for but was not detected at the specified detection limit.

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	State Drinking Water Standards (a)	State Ground- water Standards (b)	Site- Specific Cleanup Level (c)	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-17 (FD)
CONVENTIONALS										
ALKALINITY	----	----	----	mg/L	43.4	186	145	97	178	146
AMMONIA NITROGEN	----	----	----	mg/L	0.040 U	0.040 U	0.047	0.040 U	0.079	0.043
BICARBONATE	----	----	----	mg/L	43.4	186	145	97	178	146
CARBONATE	----	----	----	mg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CHEMICAL OXYGEN DEMAND	----	----	----	mg/L	10.0 U	14.6	11.9	10.0 U	12.6	10.0 U
CHLORIDE	250**	250**	----	mg/L	3.63	2.69	3.18	6.85	10.2	3.13
DISSOLVED OXYGEN	----	----	----	mg/L	9.90	1.45	1.45	1.54	1.45	NA
NITRATE NITROGEN	10*	10*	----	mg/L	0.97	0.02	0.02 U	0.03	0.02 U	0.02 U
NITRITE NITROGEN	1*	----	----	mg/L	0.01 U	0.01 U	0.01 U	0.10 U	0.01 U	0.01 U
ORP	----	----	----	mV	229.1	226.8	31.8	63.8	88.9	NA
pH (field)	----	6.5-8.5**	----	-log H+	6.4	6.2	6.5	6.5	6.6	NA
pH (laboratory)	----	6.5-8.5**	----	-log H+	6.3 HJ	6.2 HJ	6.5 HJ	6.4 HJ	6.6 HJ	6.4 HJ
SPECIFIC CONDUCTANCE	700**	----	----	umhos/cm	107	379	280	199	358	NA
SULFATE	250**	250**	----	mg/L	3.43	15.2	6.83	3.40	6.76	5.81
TEMPERATURE	----	----	----	°C	11.0	11.8	10.9	10.3	11.1	NA
TOTAL COLIFORM	1/100 mL*	1/100 mL*	----	cfu/100 mL	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
TOTAL ORGANIC CARBON	----	----	----	mg/L	0.5 U	2.38	1.73	0.69	2.79	1.74
TURBIDITY	----	----	----	NTU	0.30	0.29	1.9	4.7	0.27	NA
DISSOLVED METALS										
ARSENIC	10*	0.05*	1.29	µg/L	0.10	0.11	1.06	1.25	1.66	1.08
BARIUM	2,000*	1,000*	----	µg/L	6.0 U	14.5	12.4	6.0 U	11.0	12.3
CALCIUM	----	----	----	mg/L	9.65	43.0	28.6	19.3	33.1	28.8
IRON	300**	300**	300	µg/L	20 U	20 U	724	272	22.1	703
MANGANESE	50**	50**	50	µg/L	2.0 U	5,980	798	2,280	3,750	818
POTASSIUM	----	----	----	mg/L	0.65	1.00 U	1.22	1.00 U	1.07	1.29
SODIUM	20***	----	----	mg/L	4.55	9.35	8.41	7.45	11.9	8.41
ZINC	5,000**	5,000**	----	µg/L	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
VOLATILE ORGANIC COMPOUNDS										
VINYL CHLORIDE	2*	0.02*	0.29	µg/L	0.02 U	0.02 U	0.02 U	0.03	0.02 U	0.02 U

Notes:

Concentration exceeds Washington State Drinking Water or Groundwater Standards

FD = Field Duplicate of MW-6 was labeled MW-17.

NA = Not Analyzed

Regulatory Standards:

(a) WAC 246-290-310

(b) WAC 173-200-040

* Primary Standard

** Secondary Standard

*** Recommended level of concern for consumers with restricted daily sodium intake.

Data Qualifiers:

H = Analyzed outside of holding time.

J = Estimated Value

NA = Not Analyzed

U = Indicates compound was analyzed for, but not detected at the specified detection limit.

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VOLATILE ORGANIC COMPOUNDS	State Drinking Water Standards	State Ground- water Standards	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-17 (FD)
	(a)	(b)							
1,1,1,2-TETRACHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-TRICHLOROETHANE	200	200	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-TETRACHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-TRICHLOROETHANE	5	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHANE	----	1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHENE	7	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROPROPENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-TRICHLOROBENZENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-TRICHLOROPROPANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	70	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRIMETHYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DIBROMO-3-CHLOROPROPANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	600	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROETHANE	5	0.5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROPROPANE	5	0.6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-TRIMETHYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROPROPANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-DICHLOROBENZENE	75	4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-DICHLOROPROPANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-BUTANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYLVINYLETHER	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
2-CHLOROTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-HEXANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-ISOPROPYLTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-METHYL-2-PANTANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	----	----	µg/L	18.6	5 U	27.9	12.6	11.5	5 U
ACROLEIN	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACRYLONITRILE	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
BENZENE	5	1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOCHLOROMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOFORM	----	5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOMETHANE	----	----	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CARBON DISULFIDE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CARBON TETRACHLORIDE	5	0.3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CFC-113	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROBENZENE	100	----	µg/L	0.2 U	0.2 U	2.24	0.2 U	0.2 U	2.82
CHLOROBROMOMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLORODIBROMOMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROFORM	----	7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROMETHANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	70	----	µg/L	0.2 U	0.2 U	0.2 U	0.29	0.2 U	0.2 U

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VOLATILE ORGANIC COMPOUNDS	State	State	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-17 (FD)
	Drinking Water Standards (a)	Ground-water Standards (b)							
CIS-1,3-DICHLOROPROPENE	----	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DIBROMOETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DICHLOROBROMOMETHANE	----	0.5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
ETHYLBENZENE	700	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
ETHYLENE DIBROMIDE	----	0.001	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HEXACHLOROBUTADIENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
IODOMETHANE	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
ISOPROPYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
METHYLENE CHLORIDE	5	5	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
M & P-XYLENE	10	----	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NAPHTHALENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
N-PROPYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
O-XYLENE	10	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
SEC-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
STYRENE	100	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TERT-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TETRACHLOROETHENE	5	0.8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOLUENE	1000	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,2-DICHLOROETHENE	100	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,3-DICHLOROPROPENE	----	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,4-DICHLORO-2-BUTENE			µg/L	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5	3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRICHLOROFLUOROMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL ACETATE			µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL CHLORIDE	2	0.02	µg/L	0.02 U	0.02 U	0.02 U	0.03	0.2 U	0.02 U

Notes: [Redacted] Concentration exceeds State Drinking Water Standards or Groundwater Standards

FD = Field Duplicate of MW-6 was labeled MW-17.

Regulatory Standards:

All regulatory standards listed for VOCs are Primary Regulatory Standards

(a) WAC 246-290-310

(b) WAC 173-200-040

Data Qualifiers:

U = Indicates compound was analyzed for but was not detected at the specified detection limit.

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	State Drinking Water Standards (a)	State Ground- water Standards (b)	Site- Specific Cleanup Level (c)	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-12 (FD)
CONVENTIONALS										
ALKALINITY	----	----	----	mg/L	46.9	188	193	87.0	186	88.4
AMMONIA NITROGEN	----	----	----	mg/L	0.040 U	0.040 U	0.056	0.040 U	0.076	0.040 U
BICARBONATE	----	----	----	mg/L	46.9	188	193	87.0	186	88.4
CARBONATE	----	----	----	mg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CHEMICAL OXYGEN DEMAND	----	----	----	mg/L	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
CHLORIDE	250**	250**	----	mg/L	3.78	2.26	2.84	2.53	6.35	2.55
DISSOLVED OXYGEN	----	----	----	mg/L	9.63	0.49	0.40	0.59	0.42	NA
NITRATE NITROGEN	10*	10*	----	mg/L	0.33	0.02 U	0.02 U	0.03	0.02 U	0.03
NITRITE NITROGEN	1*	----	----	mg/L	0.01 U	0.01 U	0.01 U	0.10 U	0.01 U	0.01 U
ORP	----	----	----	mV	203.2	158.2	34.1	51.8	126	NA
pH (field)	----	6.5-8.5**	----	-log H+	6.2	6.2	6.4	6.5	6.6	NA
pH (laboratory)	----	6.5-8.5**	----	-log H+	6.1 J	6.1 J	6.5 J	6.3 J	6.7 J	6.3 J
SPECIFIC CONDUCTANCE	700**	----	----	umhos/cm	111	381	373	171	370	NA
SULFATE	250**	250**	----	mg/L	4.86	21.0	8.47	4.53	8.05	4.87
TEMPERATURE	----	----	----	°C	11.1	12.2	11.2	10.8	11.4	NA
TOTAL COLIFORM	1/100 mL*	1/100 mL*	----	cfu/100 mL	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
TOTAL ORGANIC CARBON	----	----	----	mg/L	0.5 U	2.36	2.10	0.56	2.84	0.55
TURBIDITY	----	----	----	NTU	0.65	0.37	0.5	5.9	0.16	NA
DISSOLVED METALS										
ARSENIC	10*	0.05*	1.29	µg/L	0.09	0.10	1.00	0.87	1.72	0.80
BARIUM	2,000*	1,000*	----	µg/L	4.0	15.5	18.3	6.0	14.1	6.6
CALCIUM	----	----	----	mg/L	9.8	40.1	36.9	14.9	33.3	15.4
IRON	300**	300**	300	µg/L	40 U	20 U	946	197	40 U	191
MANGANESE	50**	50**	50	µg/L	1.0 U	6,130	859	2,650	3,870	2,690
POTASSIUM	----	----	----	mg/L	0.68	0.92	1.58	0.99	1.23	0.99
SODIUM	20***	----	----	mg/L	4.23	8.77	11.1	6.87	12.7	7.03
ZINC	5,000**	5,000**	----	µg/L	4.0 U	4.0 U	6.23	18.0	19.0	4.0 U
VOLATILE ORGANIC COMPOUNDS										
VINYL CHLORIDE	2*	0.02*	0.29	µg/L	0.02 U	0.02 U	0.02	0.02 U	0.02 U	0.02 U

Notes:

█ Concentration exceeds Washington State Drinking Water or Groundwater Standards

FD = Field Duplicate of MW-8 was labeled MW-12.

NA = Not Analyzed

Regulatory Standards:

(a) WAC 246-290-310

(b) WAC 173-200-040

* Primary Standard

** Secondary Standard

*** Recommended level of concern for consumers with restricted daily sodium intake.

Data Qualifiers:

J = Estimated Value. Laboratory-measured pH exceeded its 15-minute holding time.

NA = Not Analyzed

U = Indicates compound was analyzed for, but not detected at the specified detection limit.

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VOLATILE ORGANIC COMPOUNDS	State Drinking Water Standards	State Ground- water Standards	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-12 (FD)
	(a)	(b)							
1,1,1,2-TETRACHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-TRICHLOROETHANE	200	200	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-TETRACHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-TRICHLOROETHANE	5	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHANE	----	1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHENE	7	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROPROPENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-TRICHLOROBENZENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-TRICHLOROPROPANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	70	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRIMETHYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DIBROMO-3-CHLOROPROPANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	600	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROETHANE	5	0.5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROPROPANE	5	0.6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-TRIMETHYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROPROPANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-DICHLOROBENZENE	75	4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-DICHLOROPROPANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-BUTANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYLVINYLETHER	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
2-CHLOROTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-HEXANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-ISOPROPYLTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-METHYL-2-PANTANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACROLEIN	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACRYLONITRILE	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
BENZENE	5	1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOCHLOROMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOFORM	----	5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOMETHANE	----	----	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CARBON DISULFIDE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CARBON TETRACHLORIDE	5	0.3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CFC-113	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROBENZENE	100	----	µg/L	0.2 U	0.2 U	2.8	0.2 U	0.2 U	0.2 U
CHLOROBROMOMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLORODIBROMOMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROFORM	----	7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROMETHANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	70	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

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VOLATILE ORGANIC COMPOUNDS	State Drinking Water Standards	State Ground- water Standards	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-12 (FD)
	(a)	(b)							
CIS-1,3-DICHLOROPROPENE	----	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DIBROMOETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
DICHLOROBROMOMETHANE	----	0.5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
ETHYLBENZENE	700	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
ETHYLENE DIBROMIDE	----	0.001	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HEXACHLOROBUTADIENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
IODOMETHANE	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
ISOPROPYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
METHYLENE CHLORIDE	5	5	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
M & P-XYLENE	10	----	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
NAPHTHALENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
N-PROPYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
O-XYLENE	10	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
SEC-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
STYRENE	100	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TERT-BUTYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TETRACHLOROETHENE	5	0.8	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TOLUENE	1000	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,2-DICHLOROETHENE	100	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,3-DICHLOROPROPENE	----	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRANS-1,4-DICHLORO-2-BUTENE			µg/L	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5	3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
TRICHLOROFLUOROMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL ACETATE			µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VINYL CHLORIDE	2	0.02	µg/L	0.02 U	0.02 U	0.02	0.02 U	0.2 U	0.02 U

Notes: [Redacted] Concentration exceeds State Drinking Water Standards or Groundwater Standards

FD = Field Duplicate of MW-8 was labeled MW-12.

Regulatory Standards:

All regulatory standards listed for VOCs are Primary Regulatory Standards

(a) WAC 246-290-310

(b) WAC 173-200-040

Data Qualifiers:

U = Indicates compound was analyzed for but was not detected at the specified detection limit.

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	State Drinking Water Standards (a)	State Ground- water Standards (b)	Site- Specific Cleanup Level (c)	Units	MW-1	MW-3	MW-5A	MW-6	MW-7	MW-8	MW-10	SW-2	MW-13 (FD)
CONVENTIONALS													
ALKALINITY	----	----	----	mg/L	49.3	175	NA	178	NA	96.4	217	NA	216
AMMONIA NITROGEN	----	----	----	mg/L	0.040 U	0.040 U	NA	0.070	NA	0.040 U	0.083	NA	0.085
BICARBONATE	----	----	----	mg/L	49.3	175	NA	178	NA	96.4	217	NA	216
CARBONATE	----	----	----	mg/L	1.0 U	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U
CHEMICAL OXYGEN DEMAND	----	----	----	mg/L	10.0 U	10.0 U	NA	10.0 U	NA	10.0 U	10.0 U	NA	10.0 U
CHLORIDE	250**	250**	----	mg/L	3.92	2.39	NA	3.71	NA	2.44	12.8	NA	12.8
DISSOLVED OXYGEN	----	----	----	mg/L	9.54	0.65	10.31	0.58	7.84	0.69	0.59	NA	NA
NITRATE NITROGEN	10*	10*	----	mg/L	0.23	0.06	NA	0.02 U	NA	0.03	0.02 U	0.02 U	0.02 U
NITRITE NITROGEN	1*	----	----	mg/L	0.01 U	0.01 U	NA	0.01 U	NA	0.10 U	0.01 U	0.01 U	0.01 U
ORP	----	----	----	mV	346.2	309.2	324.1	59.1	351.1	111.3	135.2	NA	NA
pH (field)	----	6.5-8.5**	----	-log H+	6.5	6.3	7.0	6.7	6.8	6.8	6.8	8.1	NA
pH (laboratory)	----	6.5-8.5**	----	-log H+	7.1 H	7.2 H	6.7 H	7.5 H	6.7 H	7.4 H	7.5 H	6.5 H	7.4 H
SPECIFIC CONDUCTANCE	700**	----	----	umhos/cm	111	340	92	333	94	175	403	30	NA
SULFATE	250**	250**	----	mg/L	4.83	13.8	NA	6.69	NA	4.76	8.21	NA	8.01
TEMPERATURE	----	----	----	°C	10.9	12.3	11.7	11.5	10.7	11.0	11.3	8.5	NA
FECAL COLIFORM	----	----	----	cfu/100 mL	NA	NA	NA	NA	NA	NA	NA	6	NA
TOTAL COLIFORM	1/100 mL*	1/100 mL*	----	cfu/100 mL	1 HU	1 HU	NA	1 HU	NA	1 HU	1 HU	NA	1 HU
TOTAL ORGANIC CARBON	----	----	----	mg/L	0.5 U	2.27	NA	2.03	NA	0.66	3.61	NA	3.57
TURBIDITY	----	----	----	NTU	4.56	4.91	5.89	1.28	2.9	8.23	5.12	NA	NA
DISSOLVED METALS													
ARSENIC	10*	0.05*	1.29	µg/L	0.11	0.12	0.20	0.91	0.28	0.90	2.33	NA	2.41
BARIUM	2,000*	1,000*	----	µg/L	5.3	17.9	NA	19.5	NA	9.2	18.8	NA	18.8
CALCIUM	----	----	----	mg/L	9.5	34.2	NA	31.8	NA	15.8	39.2	NA	38.2
IRON	300**	300**	300	µg/L	20 U	20 U	20 U	839	20 U	341	23.9	NA	27.9
MANGANESE	50**	50**	50	µg/L	1.0 U	5,380	1.0 U	721	1.0 U	2,610	4,380	NA	4,480
POTASSIUM	----	----	----	mg/L	0.58	0.71	NA	1.40	NA	0.98	1.32	NA	1.24
SODIUM	20***	----	----	mg/L	4.39	8.38	NA	10.3	NA	7.64	13.3	NA	12.9
ZINC	5,000**	5,000**	----	µg/L	4.0 U	4.0 U	NA	5.8	NA	4.0 U	4.0 U	NA	12.0
VOLATILE ORGANIC COMPOUNDS													
VINYL CHLORIDE	2*	0.02*	0.29	µg/L	0.02 U,J	0.02 U,J	0.02 U	0.02 U,J	0.02 U	0.02 U,J	0.02 U,J	NA	0.02 U,J

Notes:

█ Concentration exceeds Washington State Drinking Water or Groundwater Standards

FD = Field Duplicate of MW-10 was labeled MW-13.

NA = Not Analyzed

Regulatory Standards:

(a) WAC 246-290-310

(b) WAC 173-200-040

* Primary Standard

** Secondary Standard

*** Recommended level of concern for consumers with restricted daily sodium intake.

Data Qualifiers:

H = Analyzed outside of holding time.

J = Estimated Value. Laboratory-measured pH exceeded its 15-minute holding time.

NA = Not Analyzed

U = Indicates compound was analyzed for, but not detected at the specified detection limit.

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VOLATILE ORGANIC COMPOUNDS	State Drinking Water Standards	State Ground- water Standards	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-13 (FD)
	(a)	(b)							
1,1,1,2-TETRACHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-TRICHLOROETHANE	200	200	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-TETRACHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-TRICHLOROETHANE	5	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHANE	----	1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROETHENE	7	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-DICHLOROPROPENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-TRICHLOROBENZENE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-TRICHLOROPROPANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	70	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRIMETHYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DIBROMO-3-CHLOROPROPANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROBENZENE	600	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROETHANE	5	0.5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-DICHLOROPROPANE	5	0.6	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-TRIMETHYLBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-DICHLOROPROPANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-DICHLOROBENZENE	75	4	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-DICHLOROPROPANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-BUTANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLOROETHYLVINYLETHER	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
2-CHLOROTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-HEXANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-ISOPROPYLTOLUENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-METHYL-2-PANTANONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACROLEIN	----	----	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACRYLONITRILE	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
BENZENE	5	1	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOBENZENE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOCHLOROMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOFORM	----	5	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
BROMOMETHANE	----	----	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CARBON DISULFIDE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CARBON TETRACHLORIDE	5	0.3	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CFC-113	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROBENZENE	100	----	µg/L	0.2 U	0.2 U	2.56	0.2 U	0.2 U	0.2 U
CHLOROBROMOMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLORODIBROMOMETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROETHANE	----	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROFORM	----	7	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CHLOROMETHANE	----	----	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHENE	70	----	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Groundwater Quality Data
December 2019 Quarterly Monitoring Event
Page 3 of 3

VOLATILE ORGANIC COMPOUNDS	State	State	Units	MW-1	MW-3	MW-6	MW-8	MW-10	MW-13 (FD)
	Drinking Water Standards (a)	Ground-water Standards (b)							
CIS-1,3-DICHLOROPROPENE	----	0.2	µg/L	0.2 U					
DIBROMOETHANE	----	----	µg/L	0.2 U					
DICHLOROBROMOMETHANE	----	0.5	µg/L	0.2 U					
ETHYLBENZENE	700	----	µg/L	0.2 U					
ETHYLENE DIBROMIDE	----	0.001	µg/L	0.2 U					
HEXACHLOROBUTADIENE	----	----	µg/L	0.5 U					
IODOMETHANE	----	----	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
ISOPROPYLBENZENE	----	----	µg/L	0.2 U					
METHYLENE CHLORIDE	5	5	µg/L	1 U	1 U	1 U	1 U	1 U	1 U
M & P-XYLENE	10	----	µg/L	0.4 U					
NAPHTHALENE	----	----	µg/L	0.5 U					
N-BUTYLBENZENE	----	----	µg/L	0.2 U					
N-PROPYLBENZENE	----	----	µg/L	0.2 U					
O-XYLENE	10	----	µg/L	0.2 U					
SEC-BUTYLBENZENE	----	----	µg/L	0.2 U					
STYRENE	100	----	µg/L	0.2 U					
TERT-BUTYLBENZENE	----	----	µg/L	0.2 U					
TETRACHLOROETHENE	5	0.8	µg/L	0.2 U					
TOLUENE	1000	----	µg/L	0.2 U					
TRANS-1,2-DICHLOROETHENE	100	----	µg/L	0.2 U					
TRANS-1,3-DICHLOROPROPENE	----	0.2	µg/L	0.2 U					
TRANS-1,4-DICHLORO-2-BUTENE			µg/L	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5	3	µg/L	0.2 U					
TRICHLOROFLUOROMETHANE	----	----	µg/L	0.2 U					
VINYL ACETATE			µg/L	0.2 U					
VINYL CHLORIDE	2	0.02	µg/L	0.02 U,J					

Notes: [Redacted] Concentration exceeds State Drinking Water Standards or Groundwater Standards

FD = Field Duplicate of MW-10 was labeled MW-13.

Regulatory Standards:

All regulatory standards listed for VOCs are Primary Regulatory Standards

(a) WAC 246-290-310

(b) WAC 173-200-040

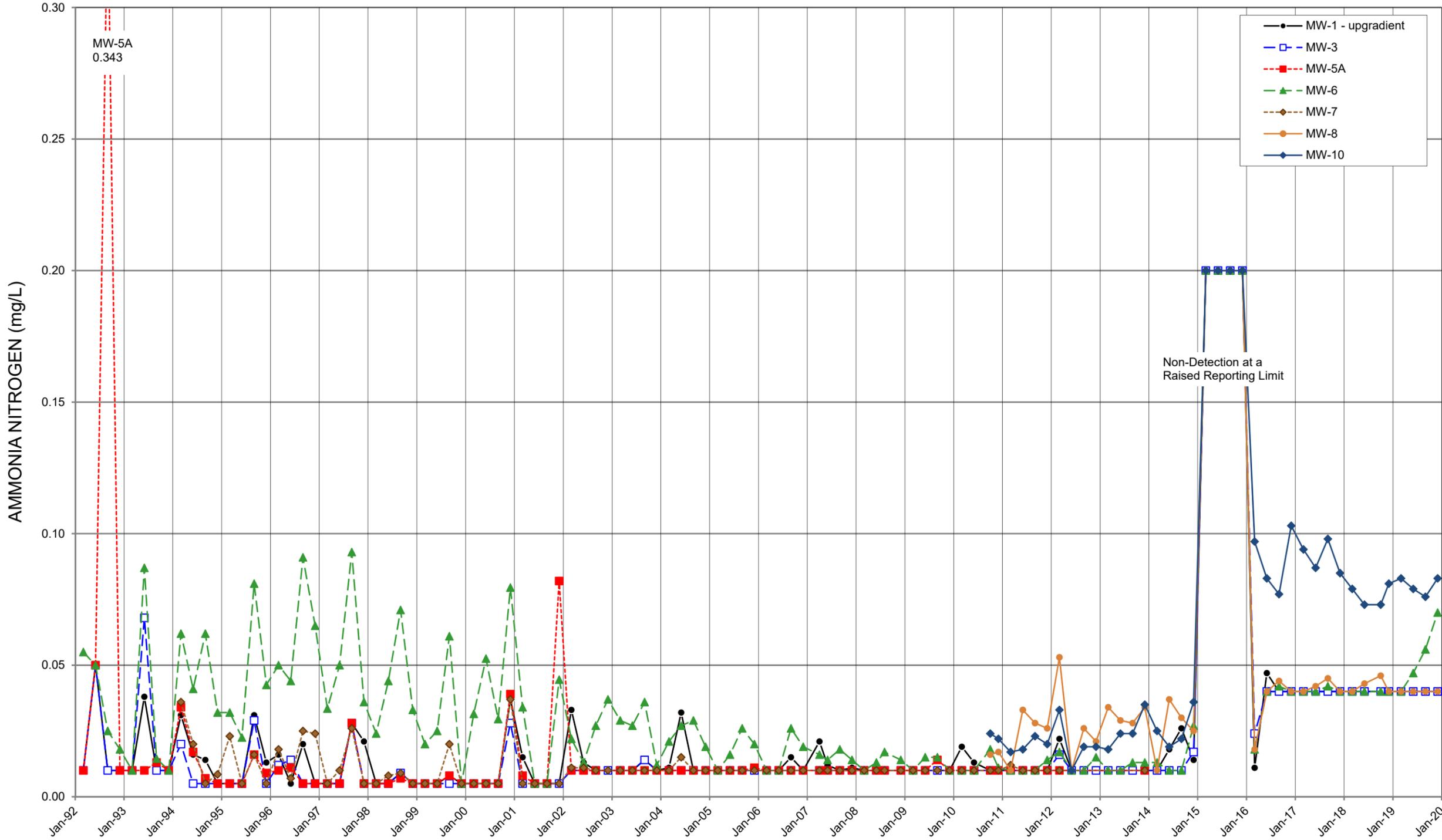
Data Qualifiers:

U = Indicates compound was analyzed for but was not detected at the specified detection limit.

Appendix B:
2019 Statistical Summaries

Time-Series Plots through December 2019
Mann-Kendall Statistically Significant Trend Test Summary Tables
Shapiro-Wilk Test for Normality Summary Tables
Confidence Interval Summary Tables

OLALLA LANDFILL Quarterly Monitoring Data



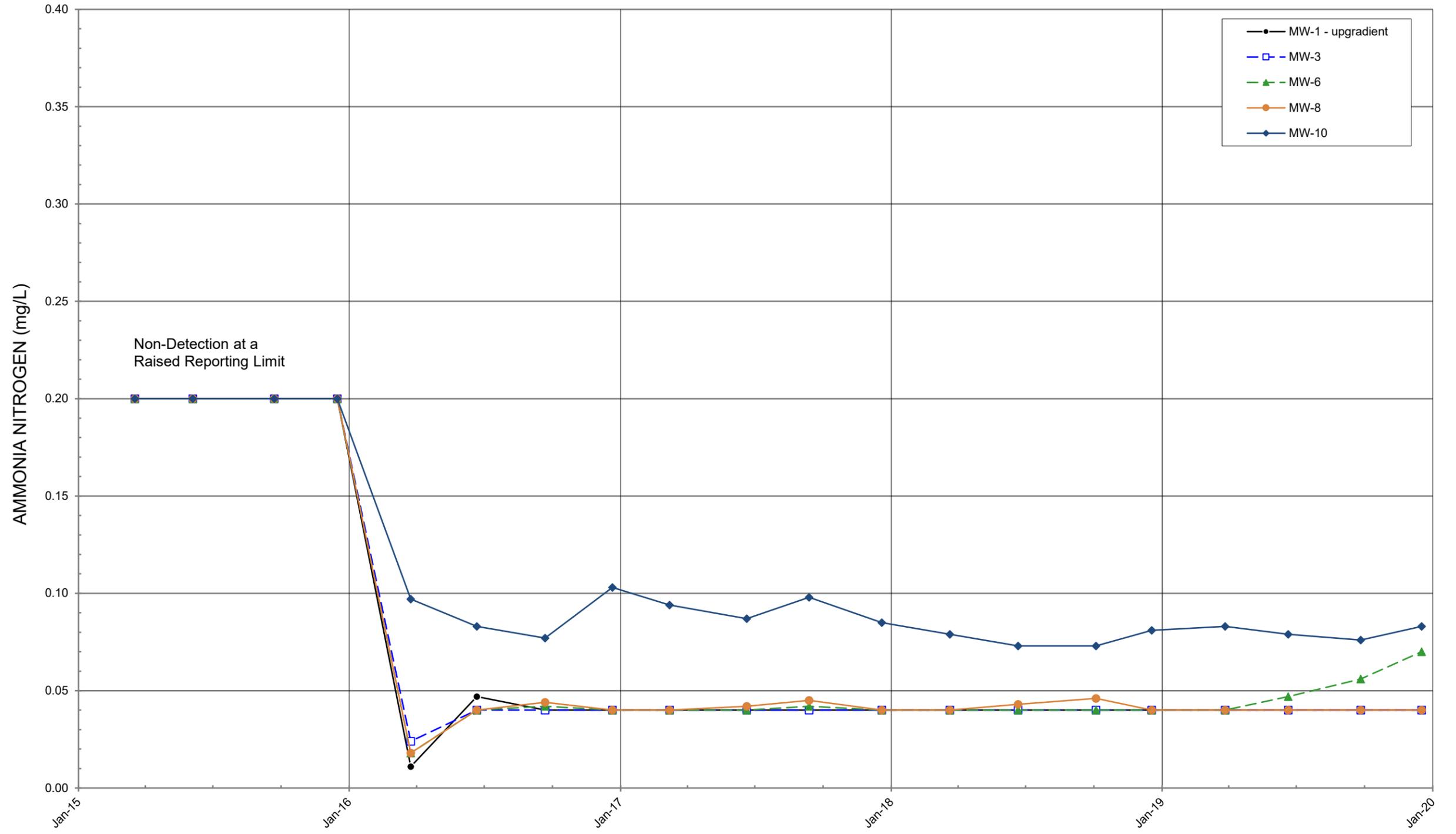
No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

AMMONIA NITROGEN

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

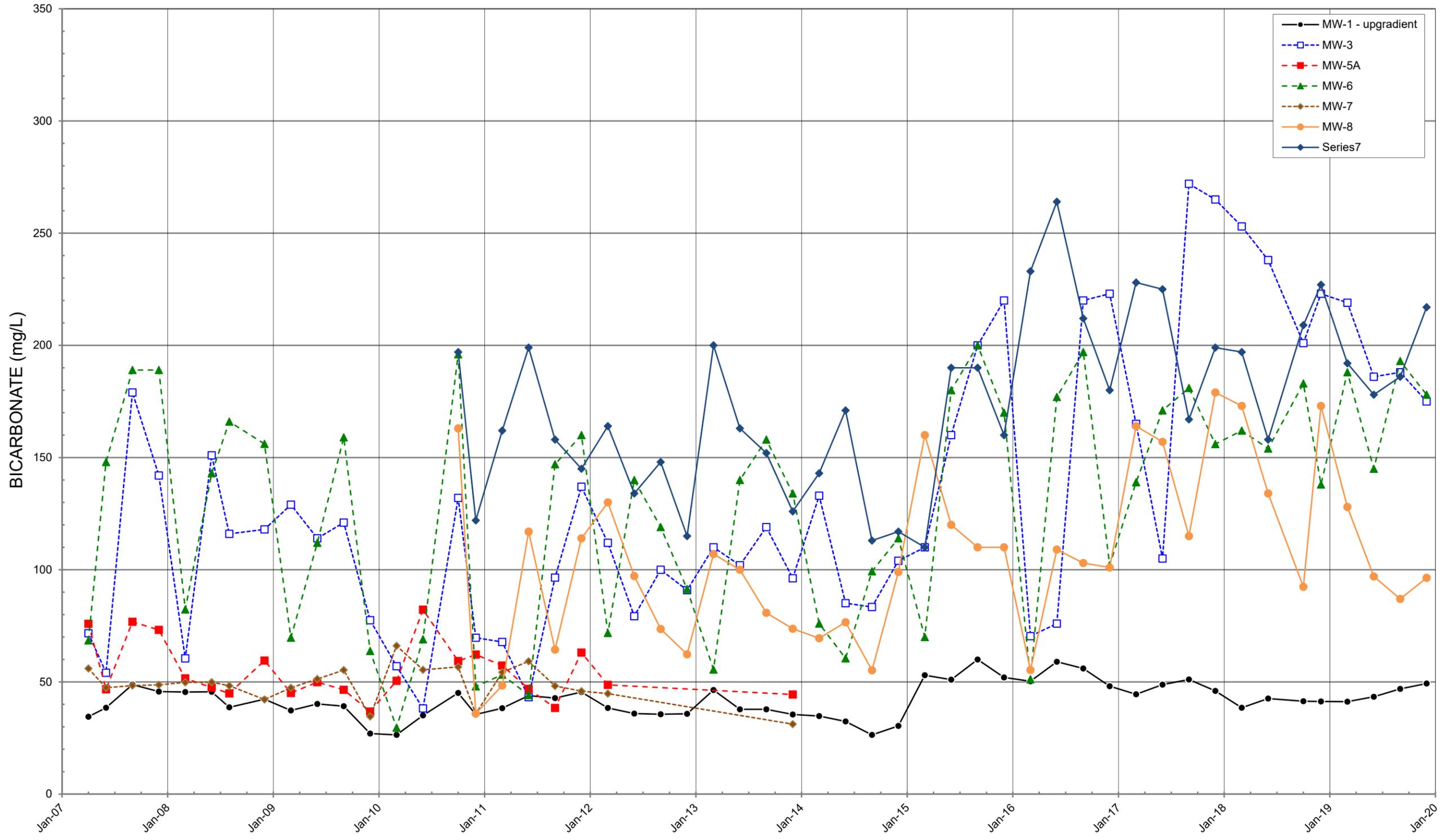


No Primary or Secondary Drinking Water Standard (DWS) Exists
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

AMMONIA NITROGEN
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



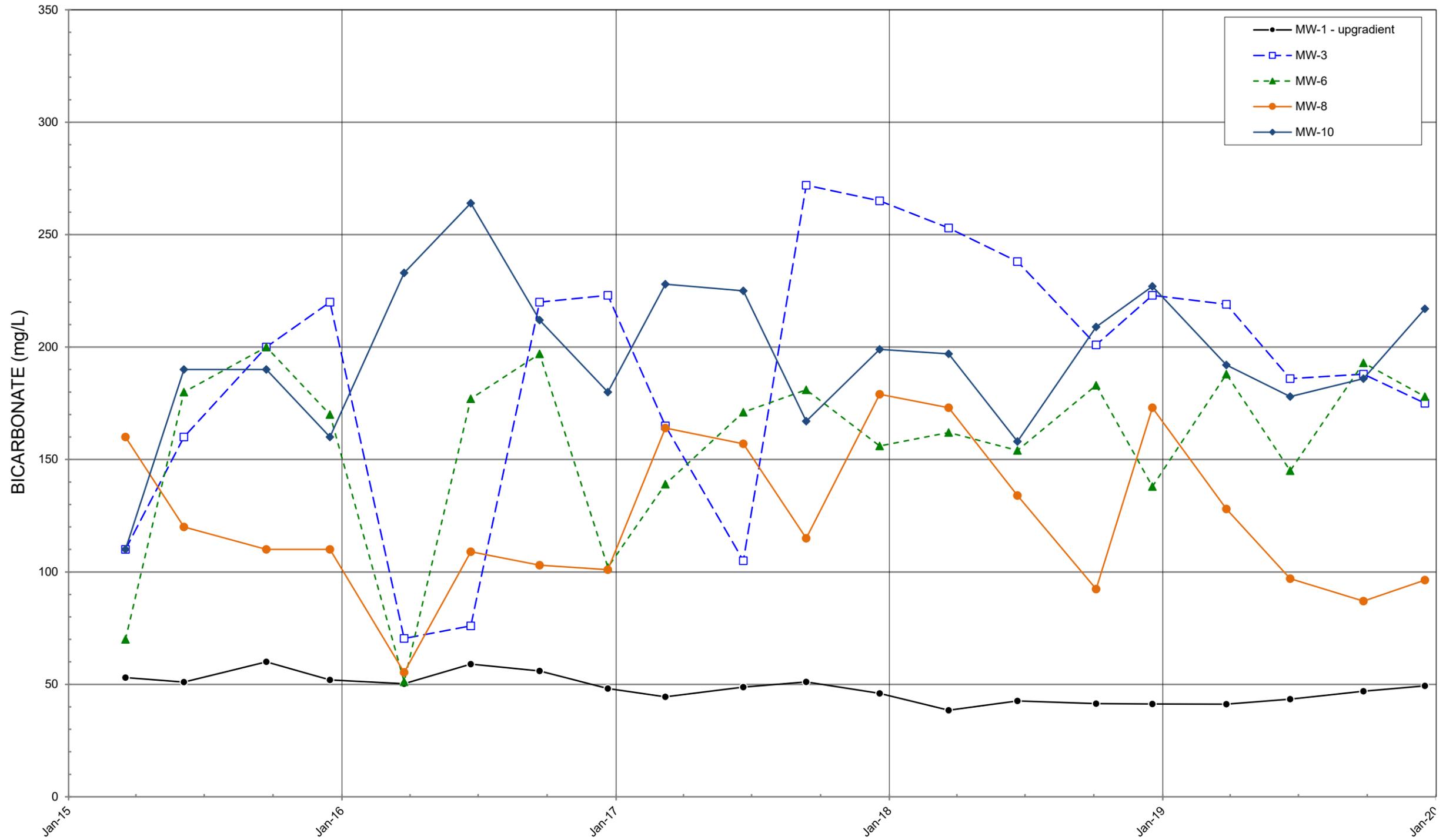
No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

BICARBONATE
 (Analysis started in 2007)

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

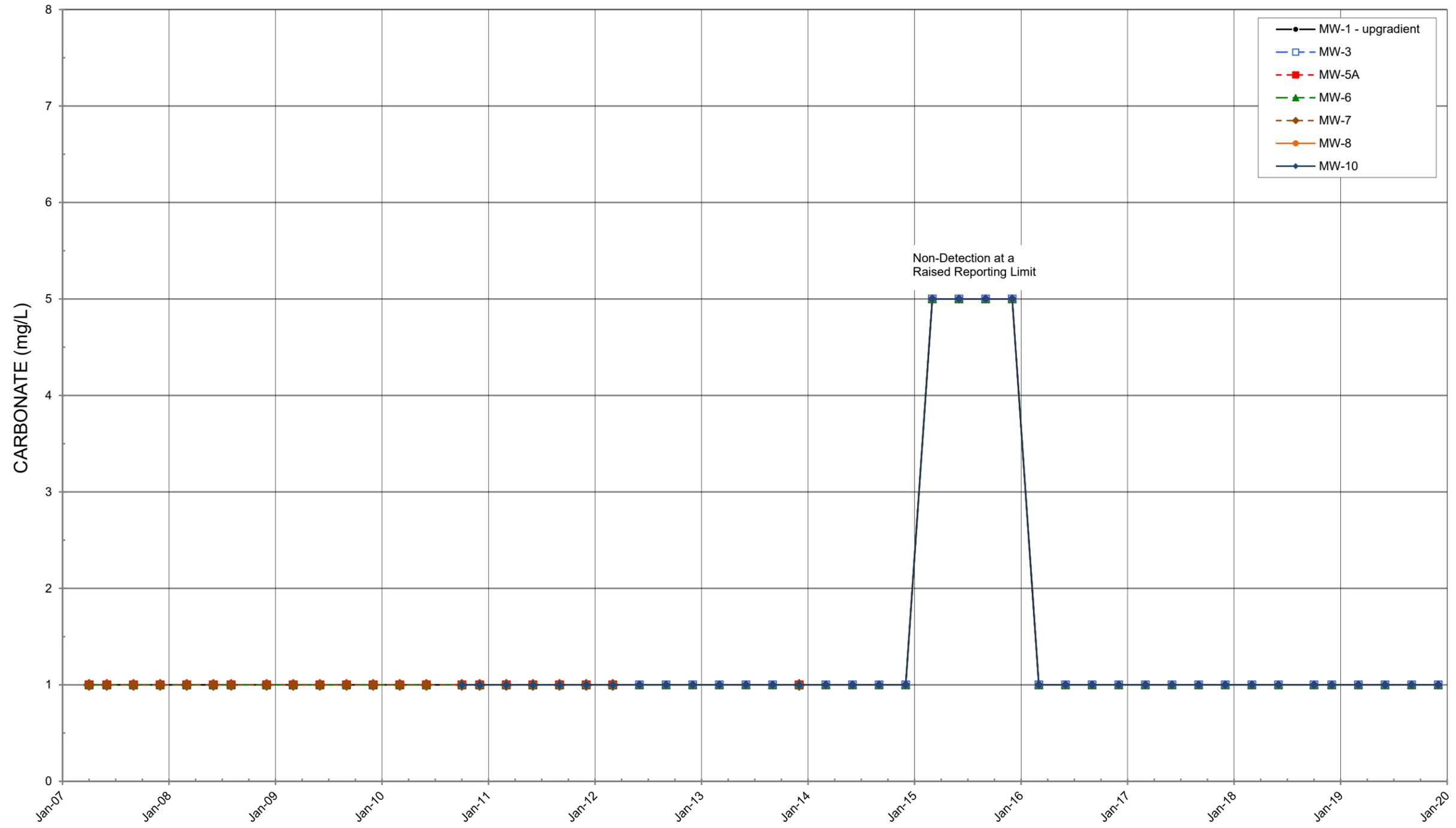


No Primary or Secondary Drinking Water Standard (DWS) Exists
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

BICARBONATE
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



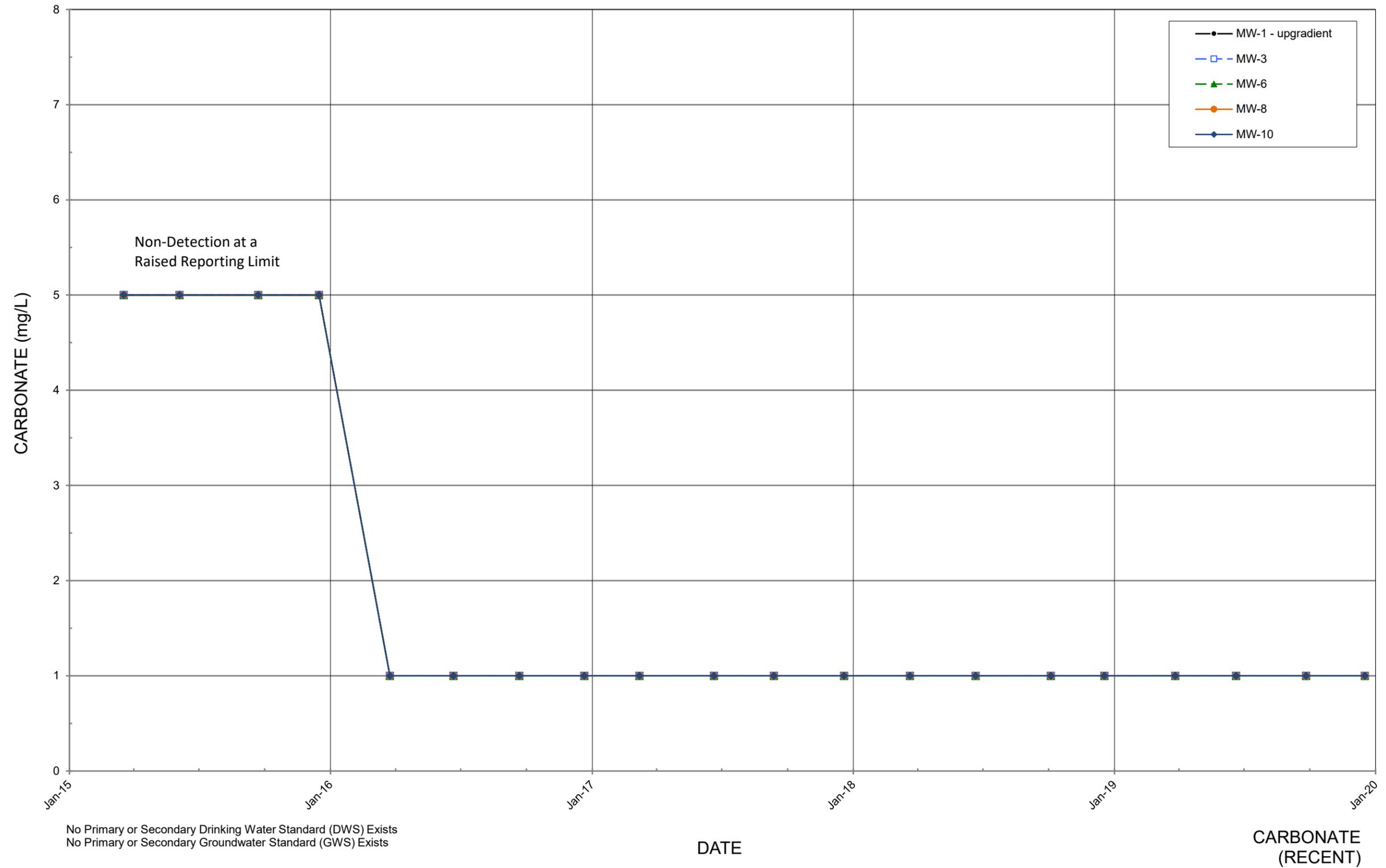
No Primary or Secondary Drinking Water Standard (DWS) Exists
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

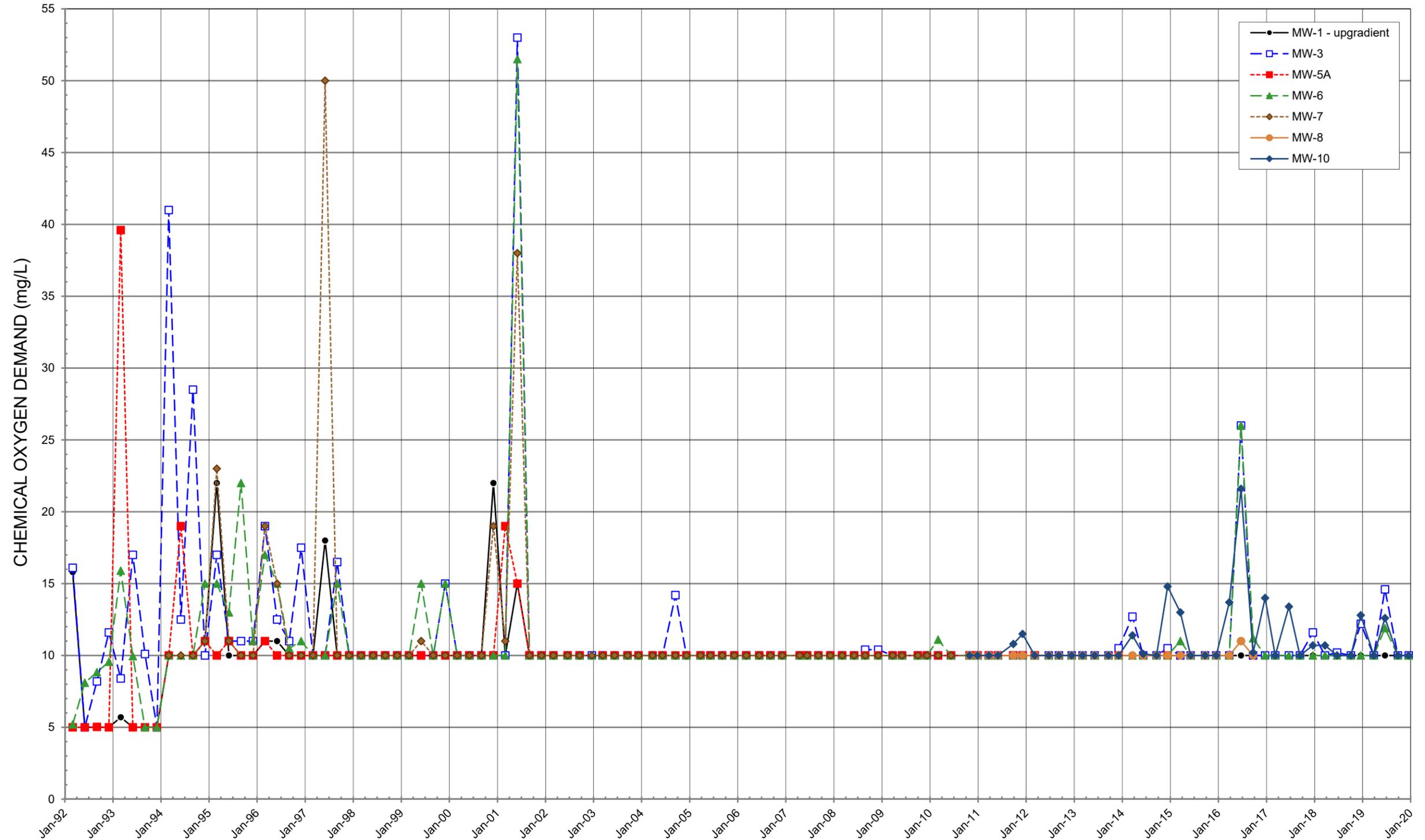
CARBONATE
(Analysis started in 2007)

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



OLALLA LANDFILL Quarterly Monitoring Data



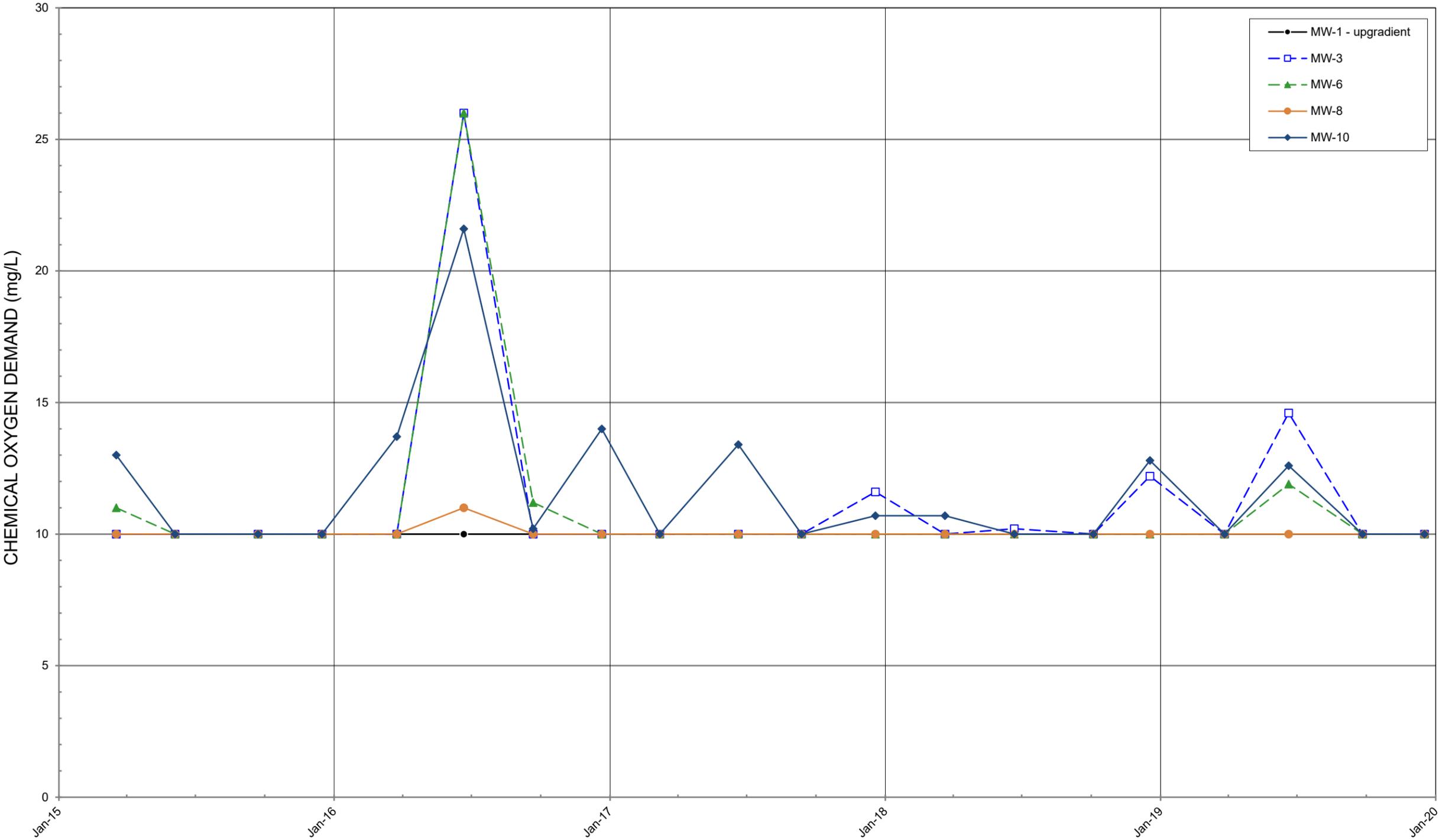
No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

CHEMICAL OXYGEN DEMAND

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

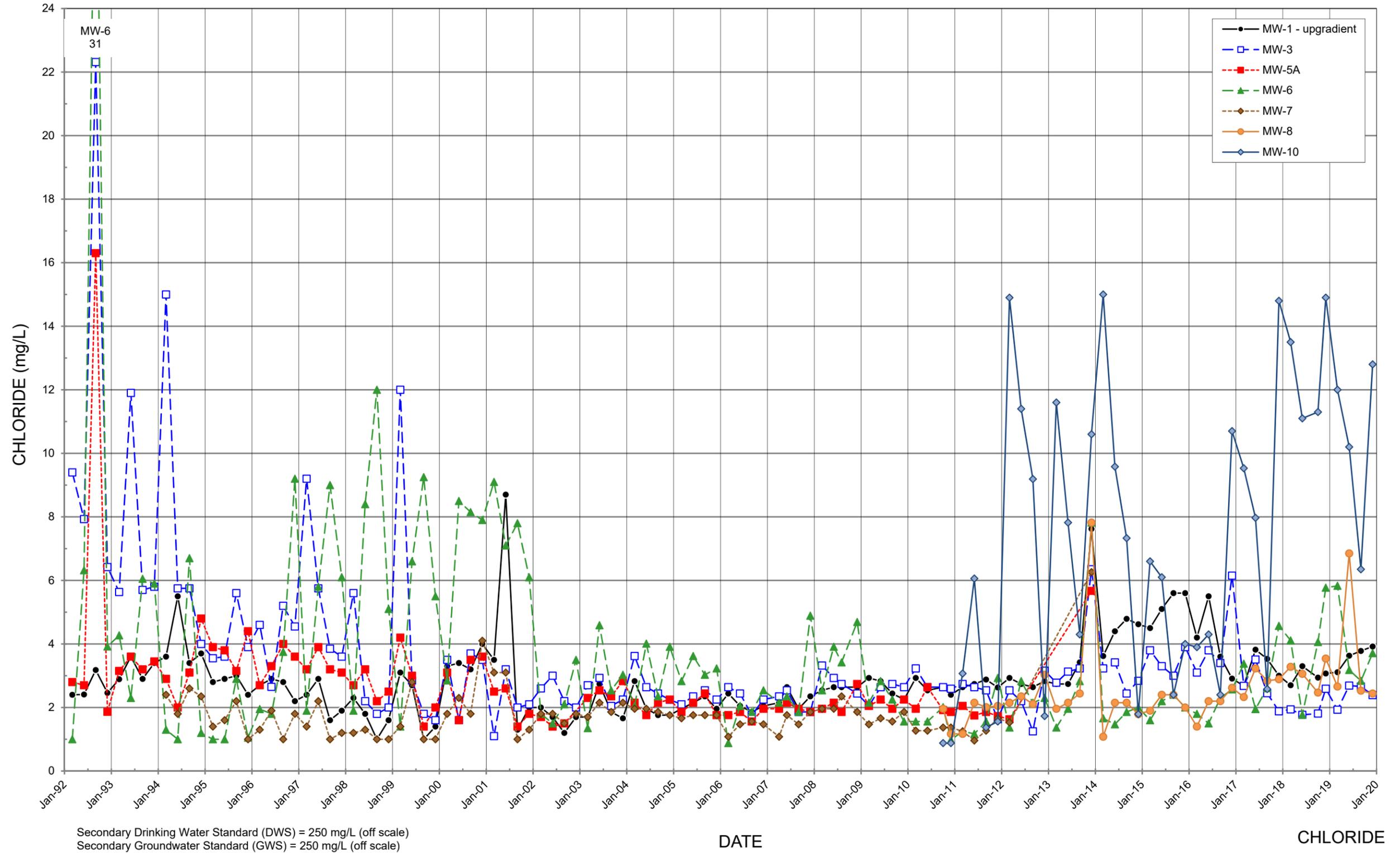


No Primary or Secondary Drinking Water Standard (DWS) Exists
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

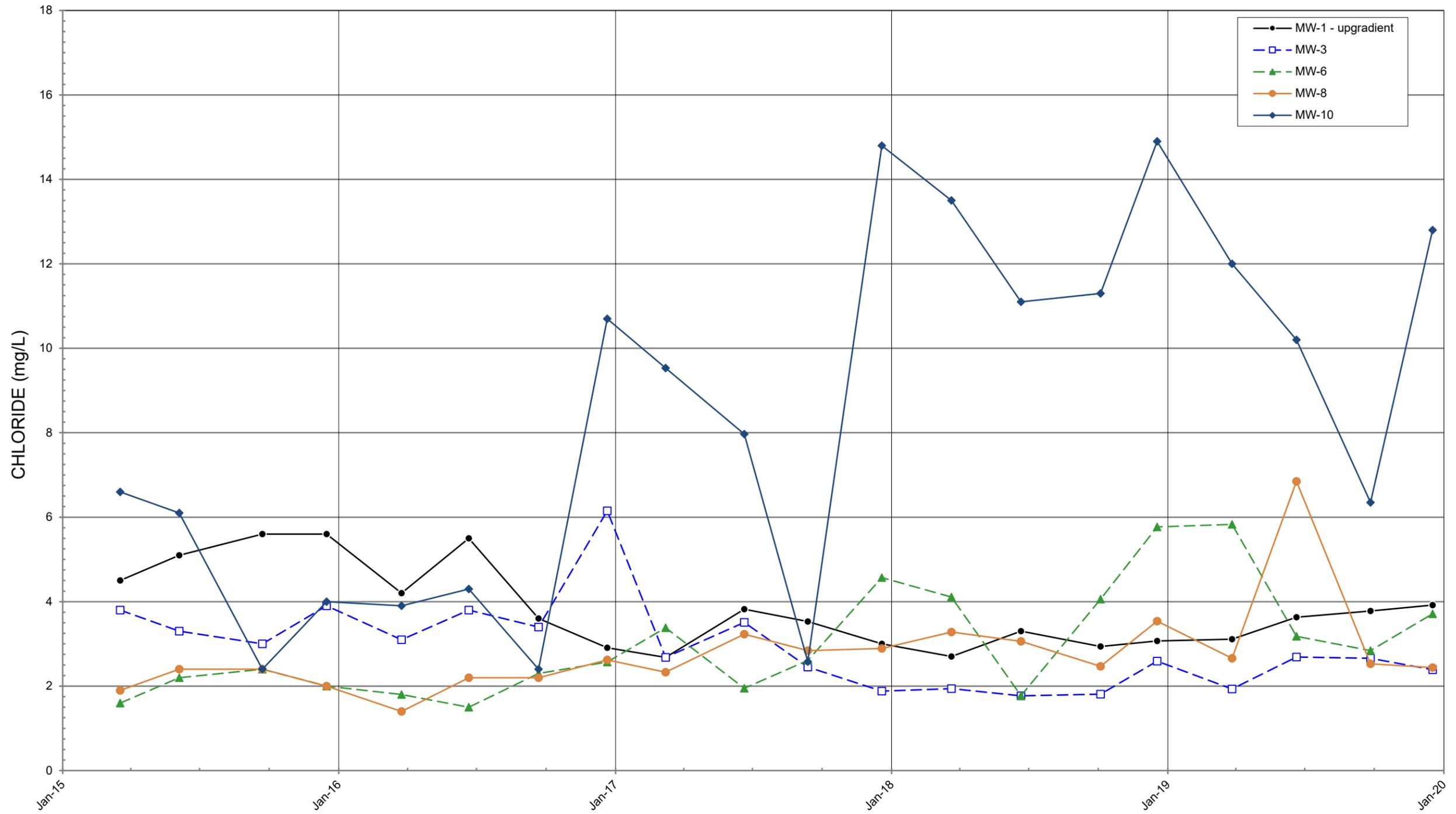
CHEMICAL OXYGEN DEMAND (RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



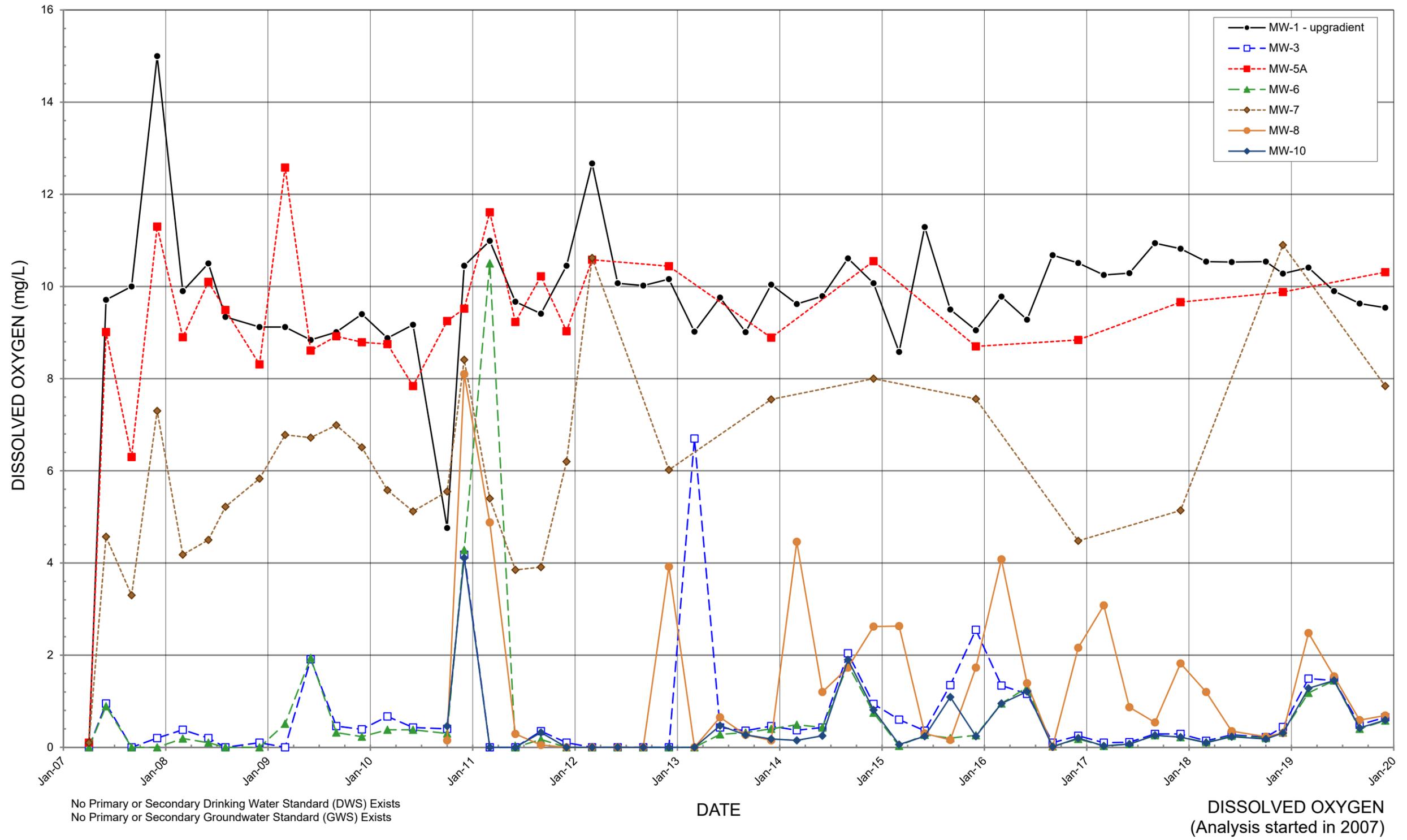
Secondary Drinking Water Standard (DWS) = 250 mg/L (off scale)
 Secondary Groundwater Standard (GWS) = 250 mg/L (off scale)

DATE

CHLORIDE
(RECENT)

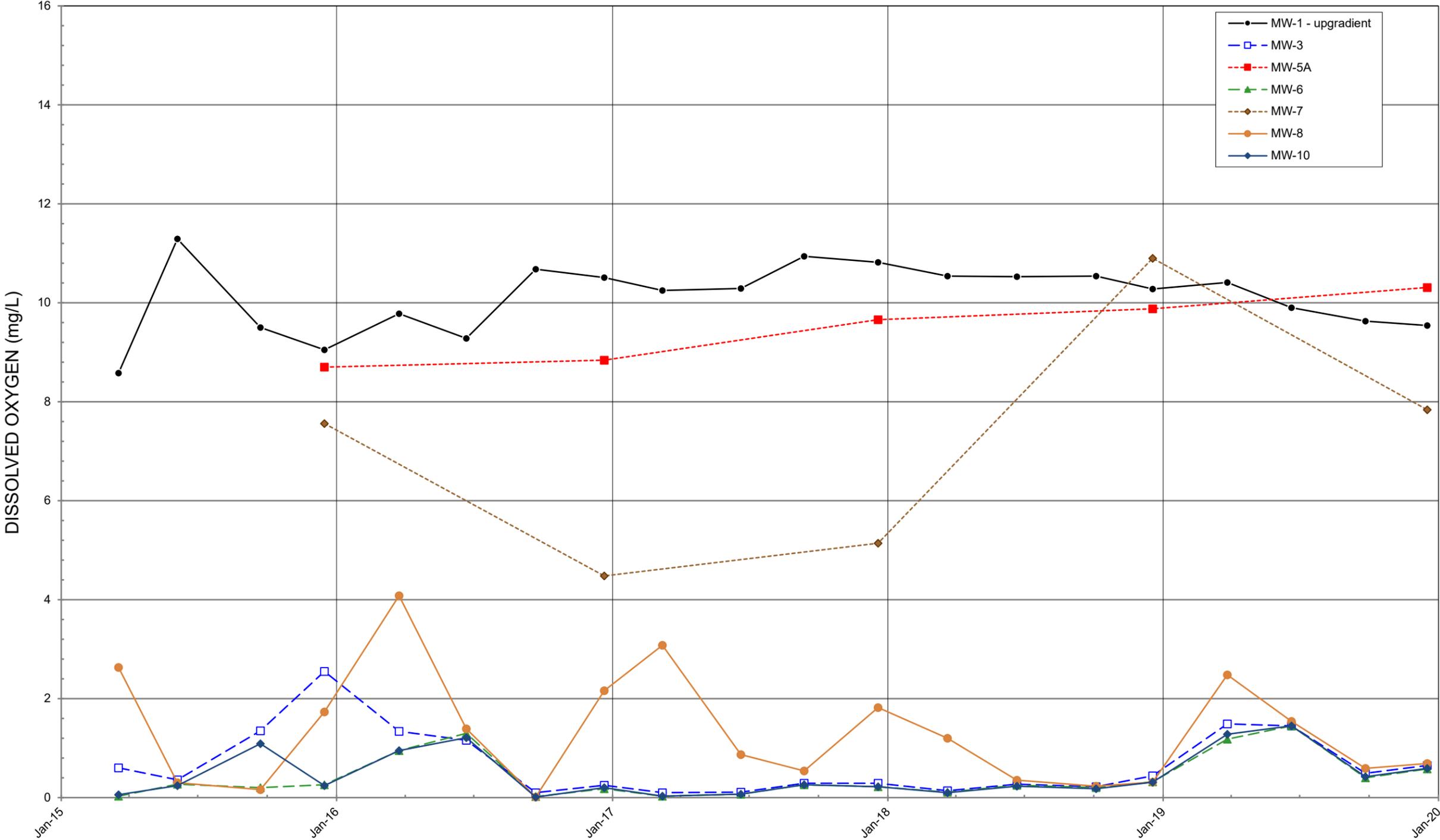
OLALLA LANDFILL

Quarterly Monitoring Data



OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

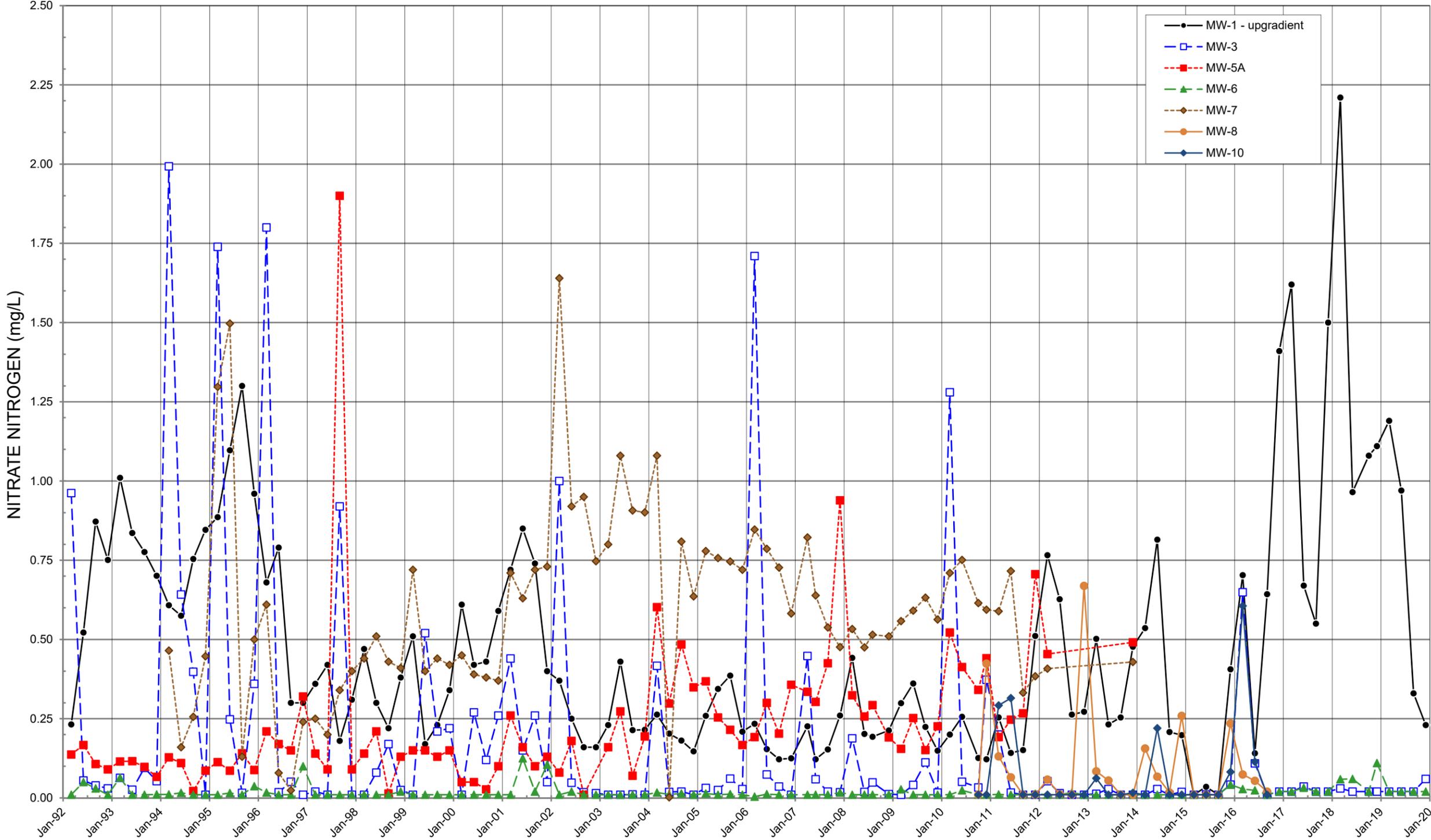


No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

DISSOLVED OXYGEN
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data

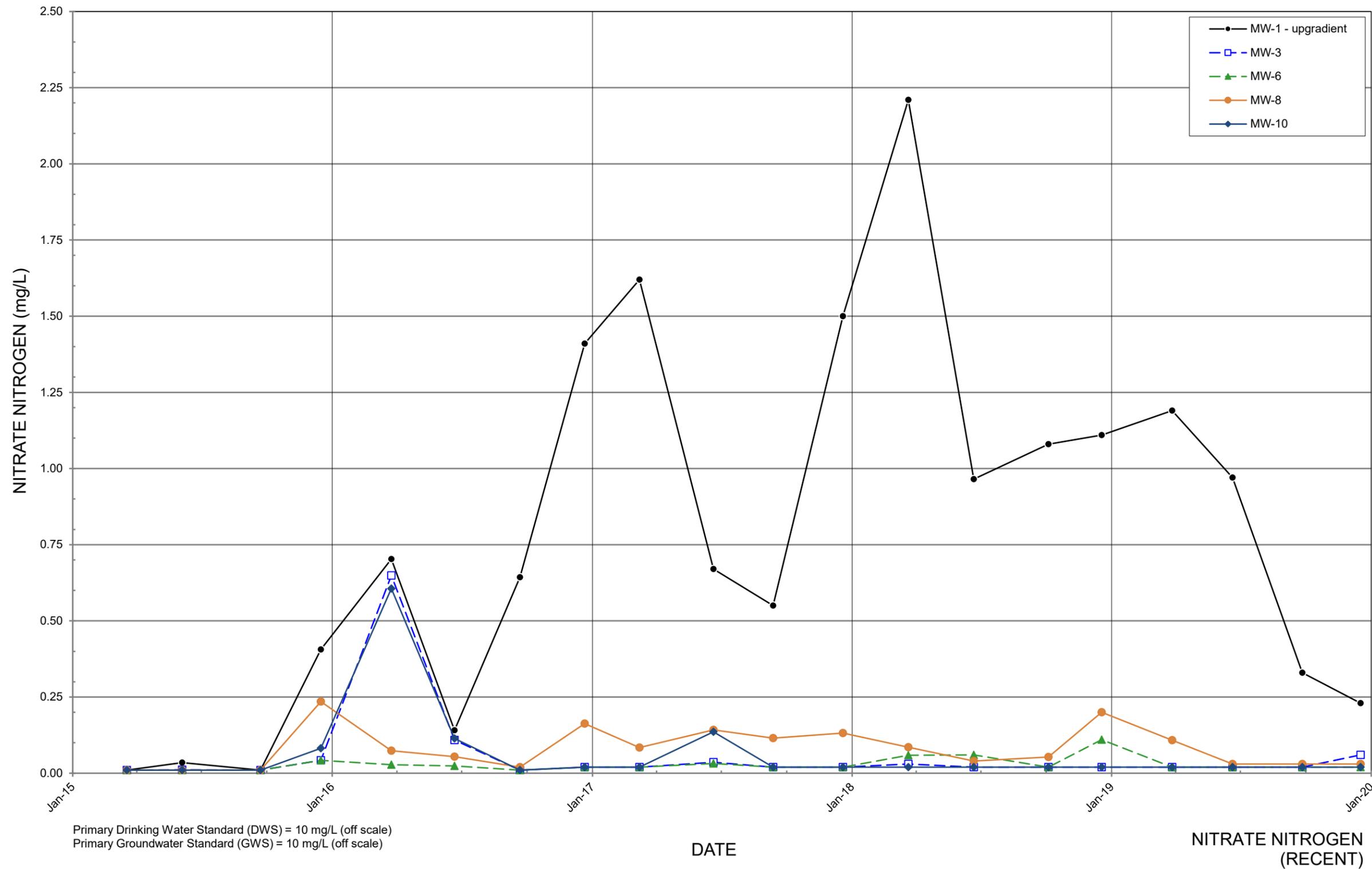


DATE

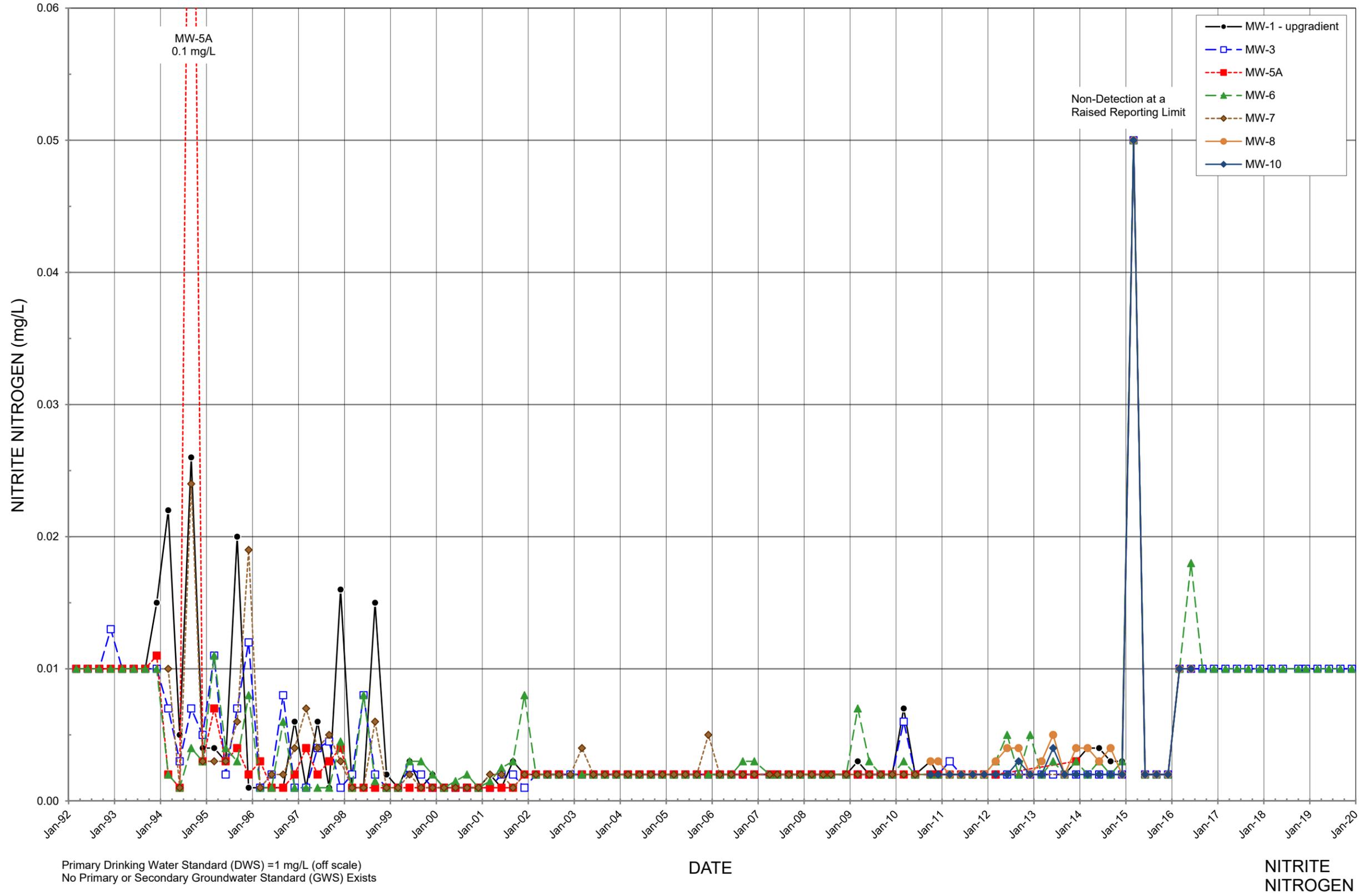
NITRATE
NITROGEN

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

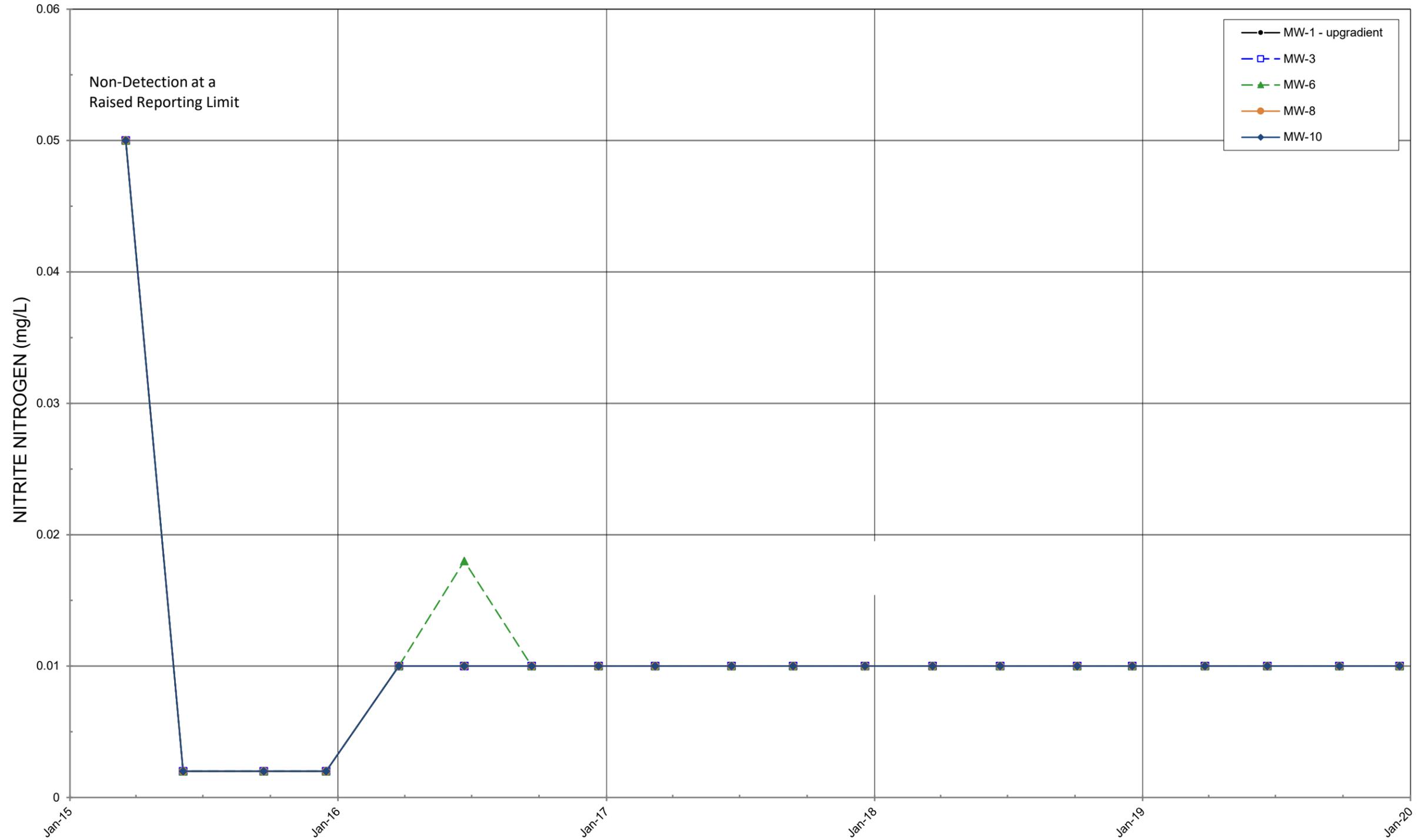


OLALLA LANDFILL Quarterly Monitoring Data



OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

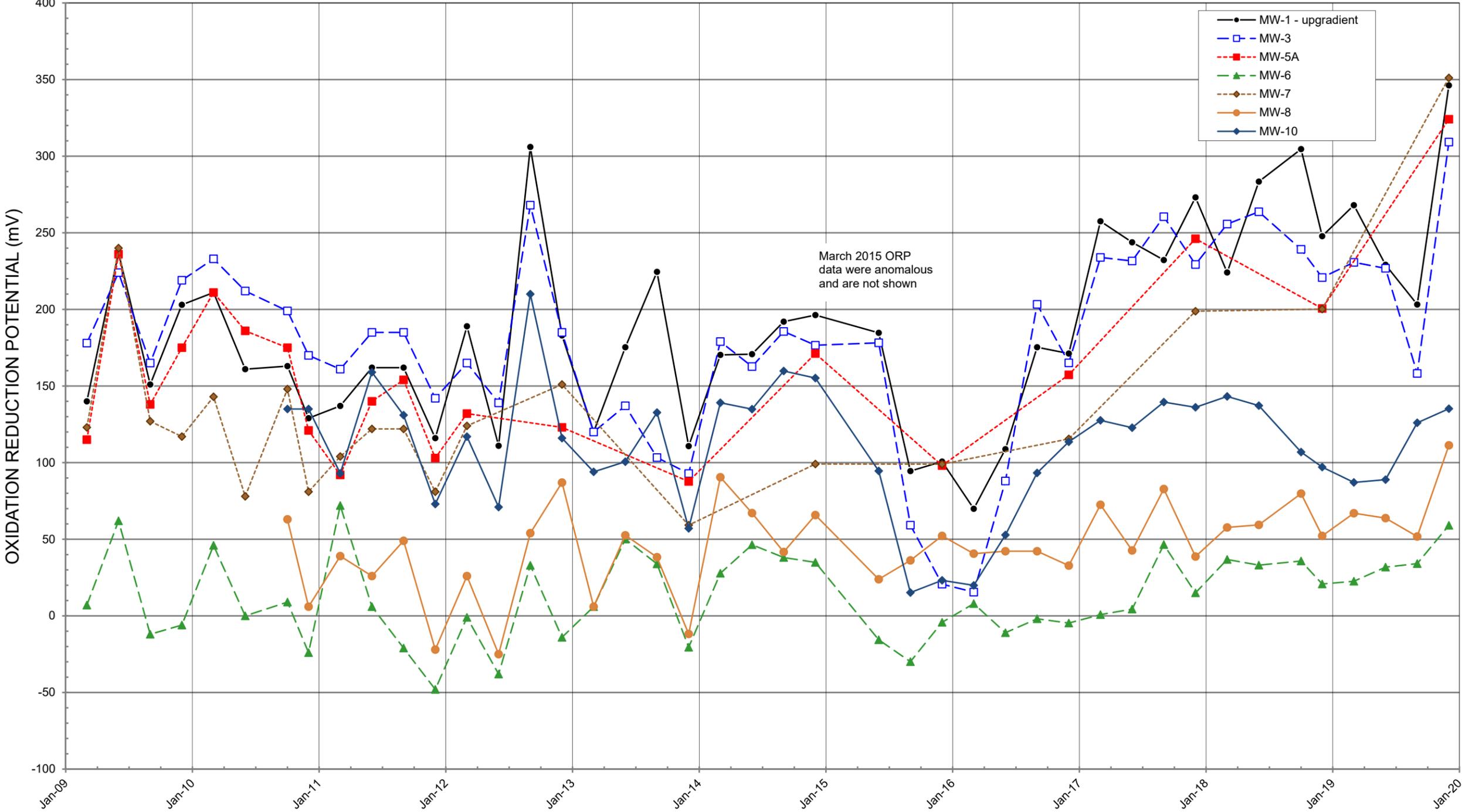


Primary Drinking Water Standard (DWS) = 1 mg/L (off scale)
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

NITRITE NITROGEN
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



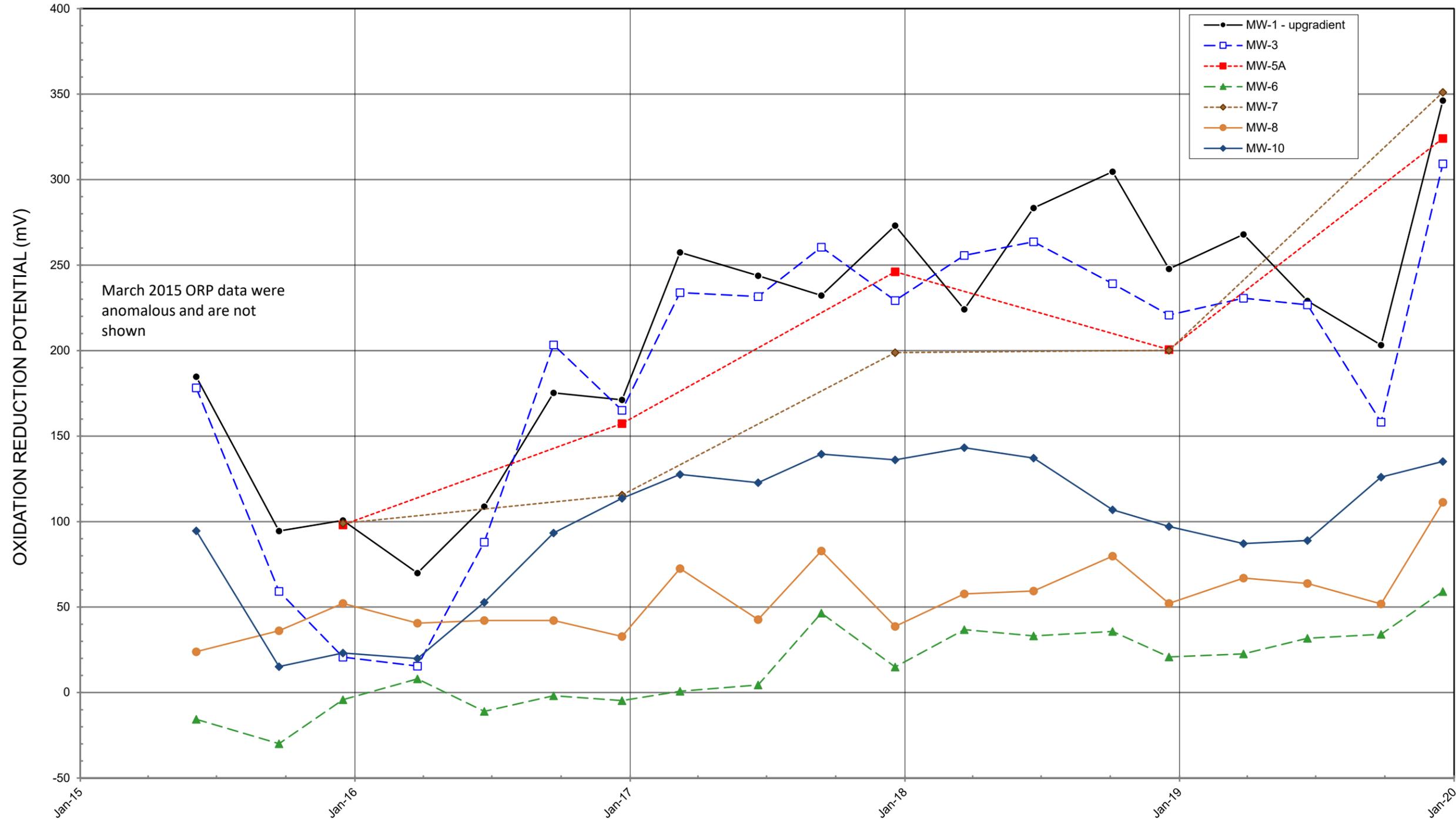
No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

OXIDATION REDUCTION POTENTIAL
 (Analysis started in 2009)

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



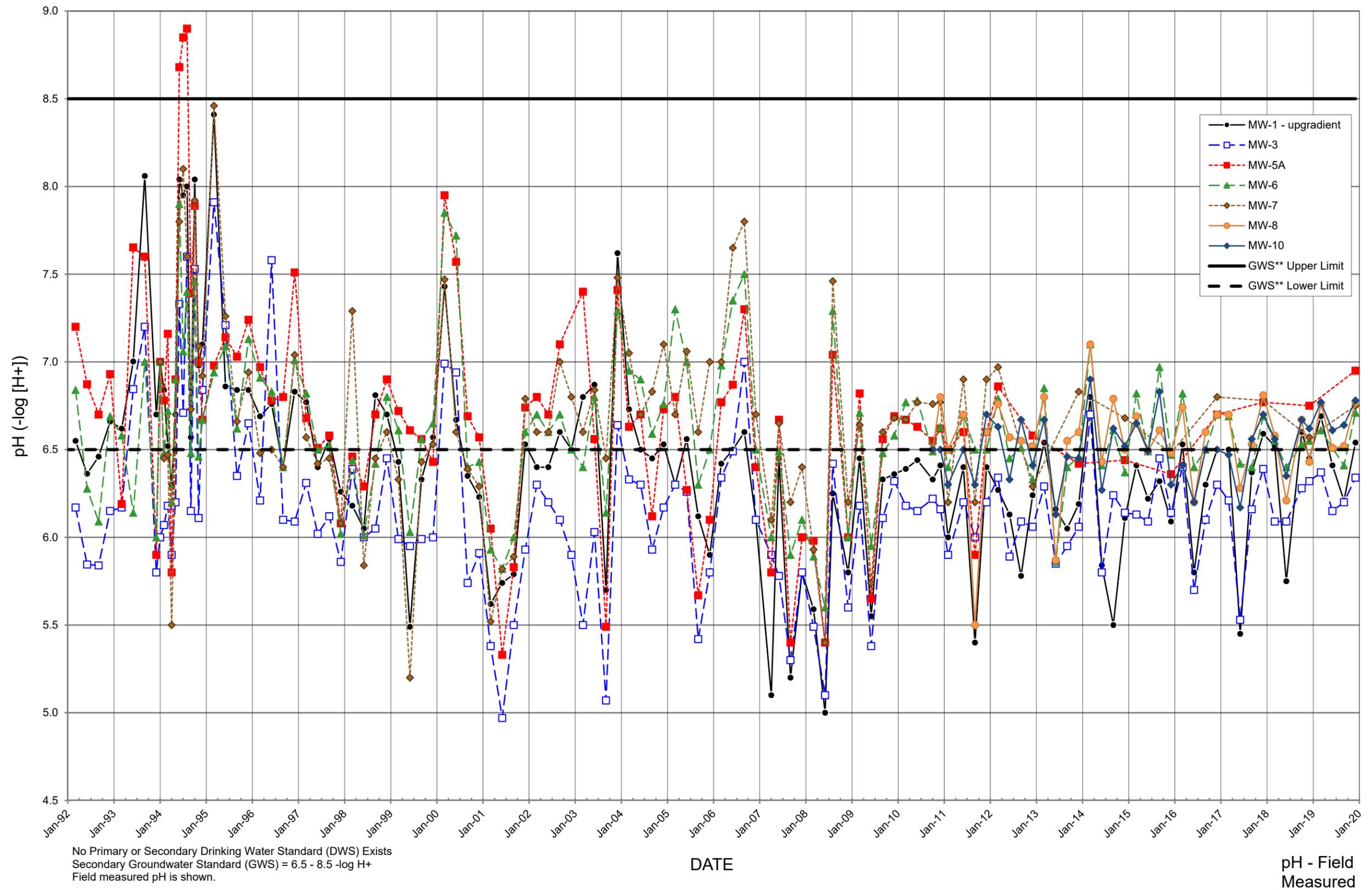
March 2015 ORP data were anomalous and are not shown

No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

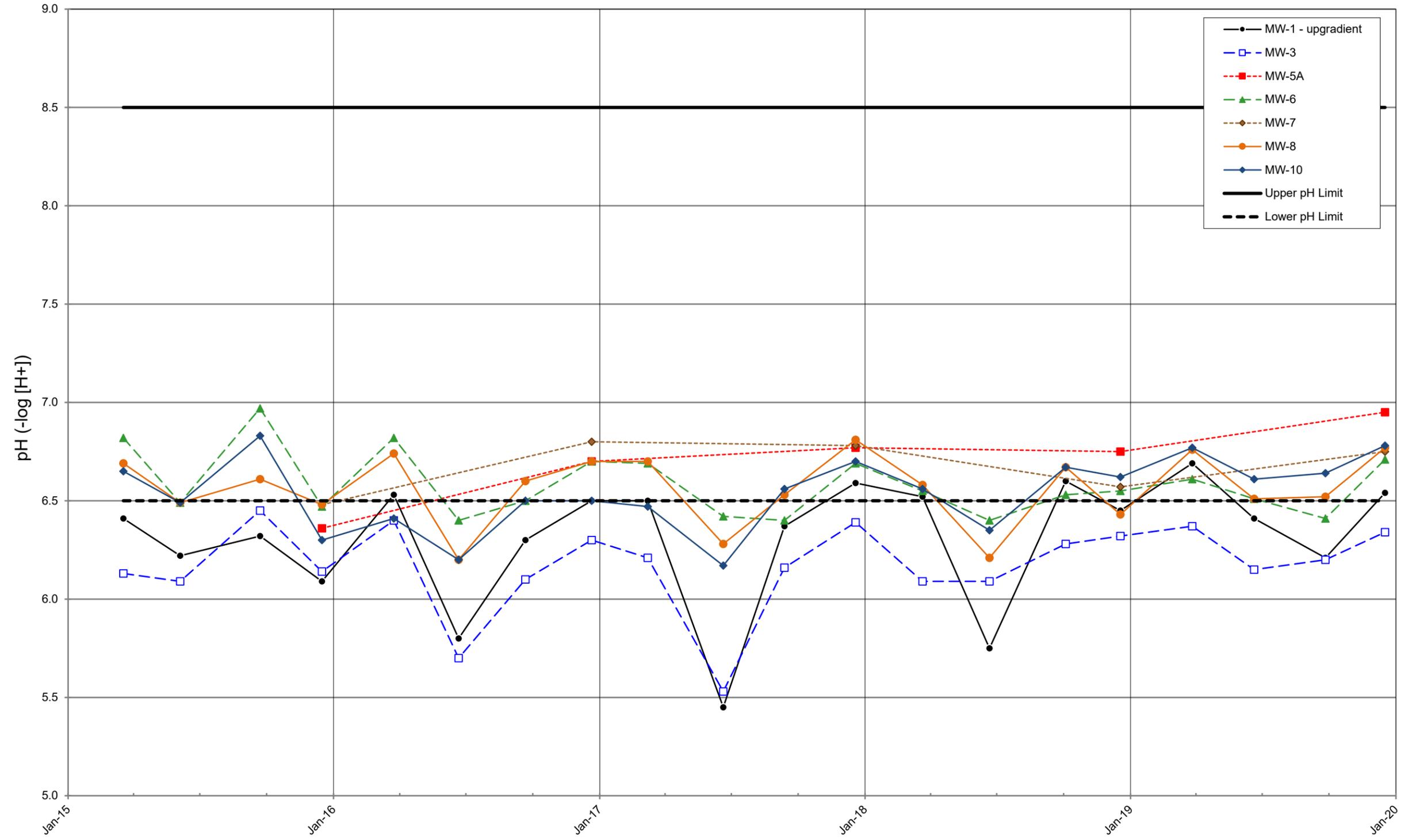
OXIDATION REDUCTION POTENTIAL (RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

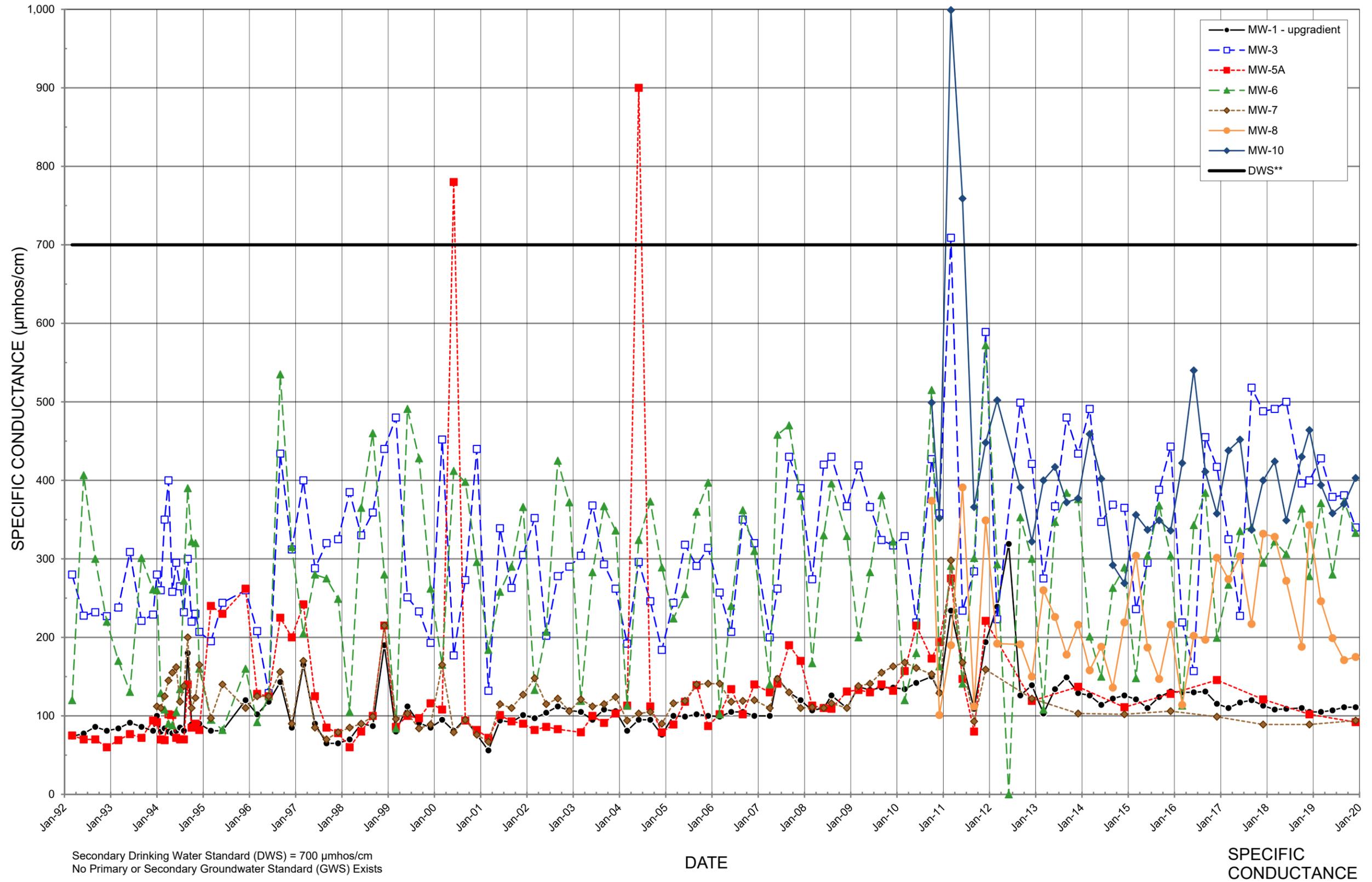


No Primary or Secondary Drinking Water Standard (DWS) Exists
 Secondary Groundwater Standard (GWS) = 6.5 - 8.5 -log H+
 Field measured pH is shown.

DATE

pH - Field Measured
 (RECENT)

OLALLA LANDFILL Quarterly Monitoring Data

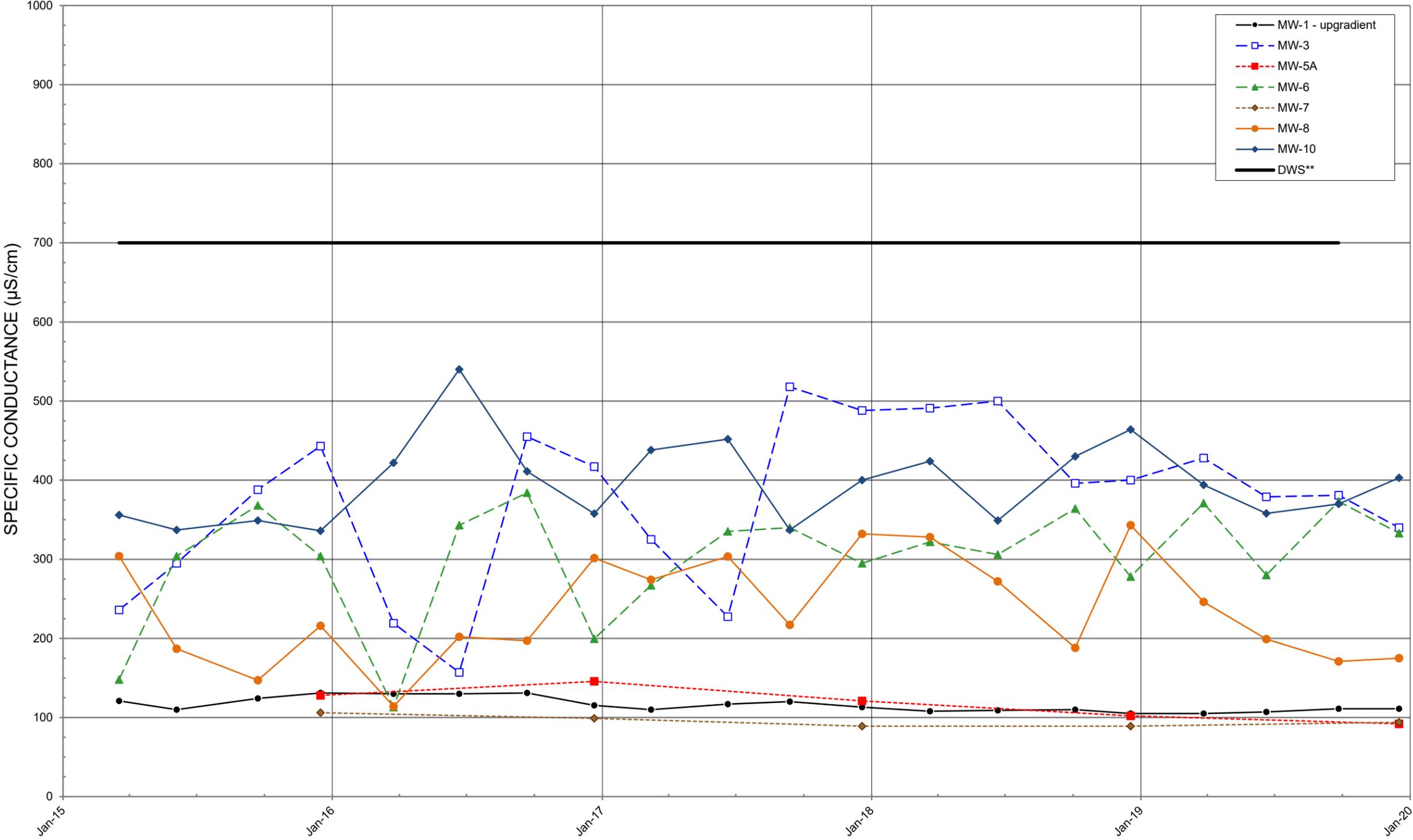


Secondary Drinking Water Standard (DWS) = 700 $\mu\text{mhos/cm}$
No Primary or Secondary Groundwater Standard (GWS) Exists

SPECIFIC
CONDUCTANCE

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

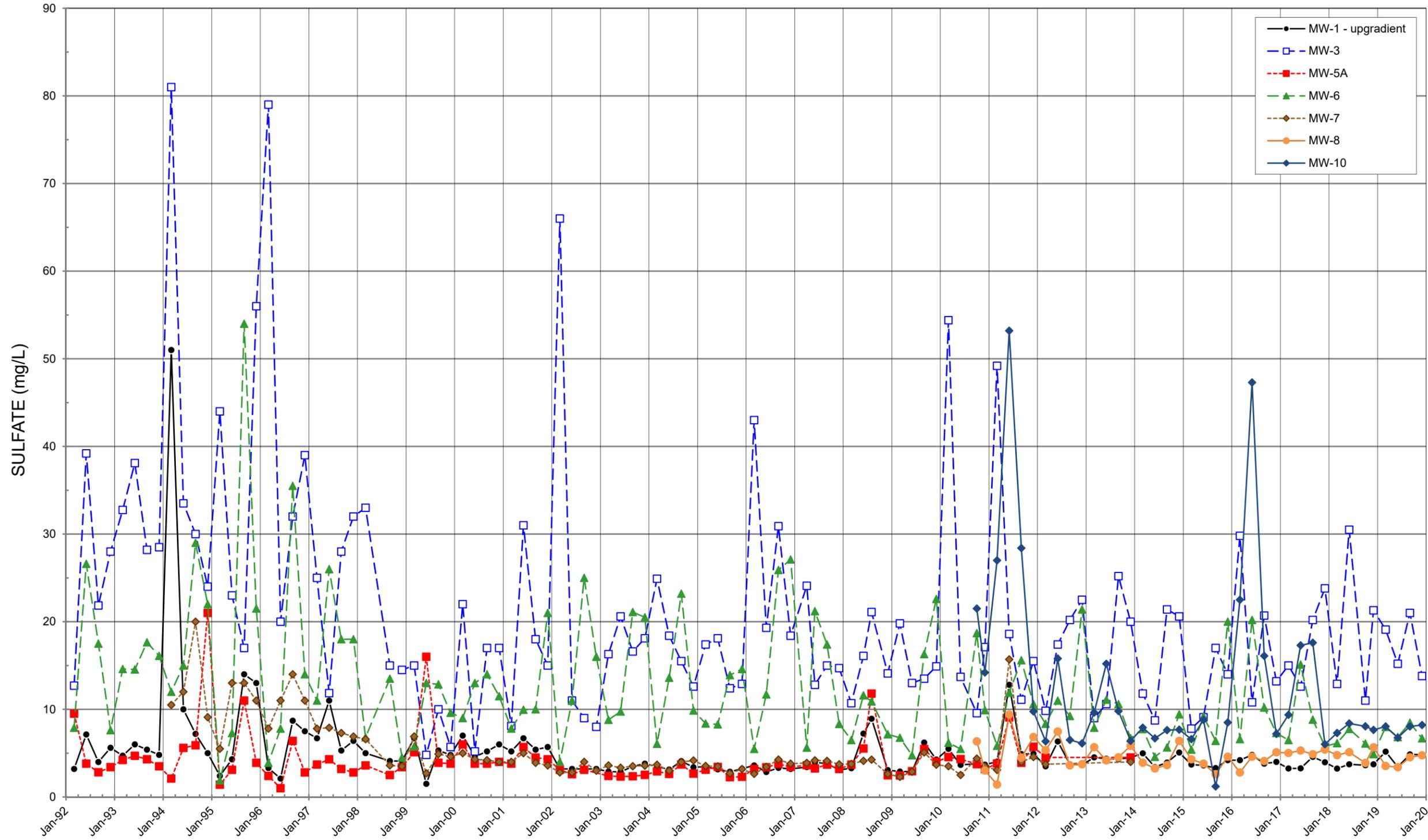


Secondary Drinking Water Standard (DWS) = 700 $\mu\text{S}/\text{cm}$
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

SPECIFIC CONDUCTANCE (RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



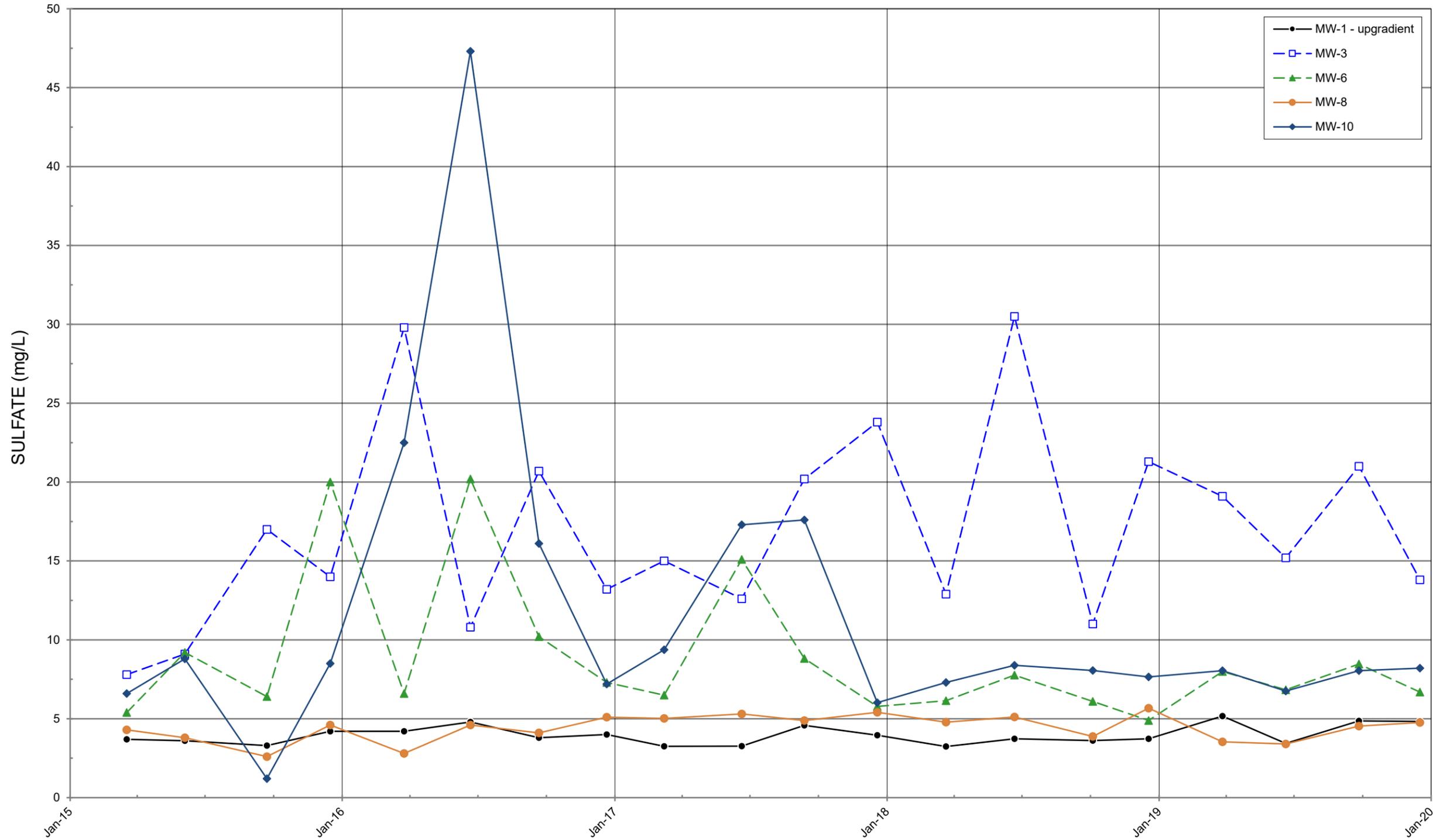
Secondary Drinking Water Standard (DWS) = 250 mg/L (off scale)
Secondary Groundwater Standard (GWS) = 250 mg/L (off scale)

DATE

SULFATE

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

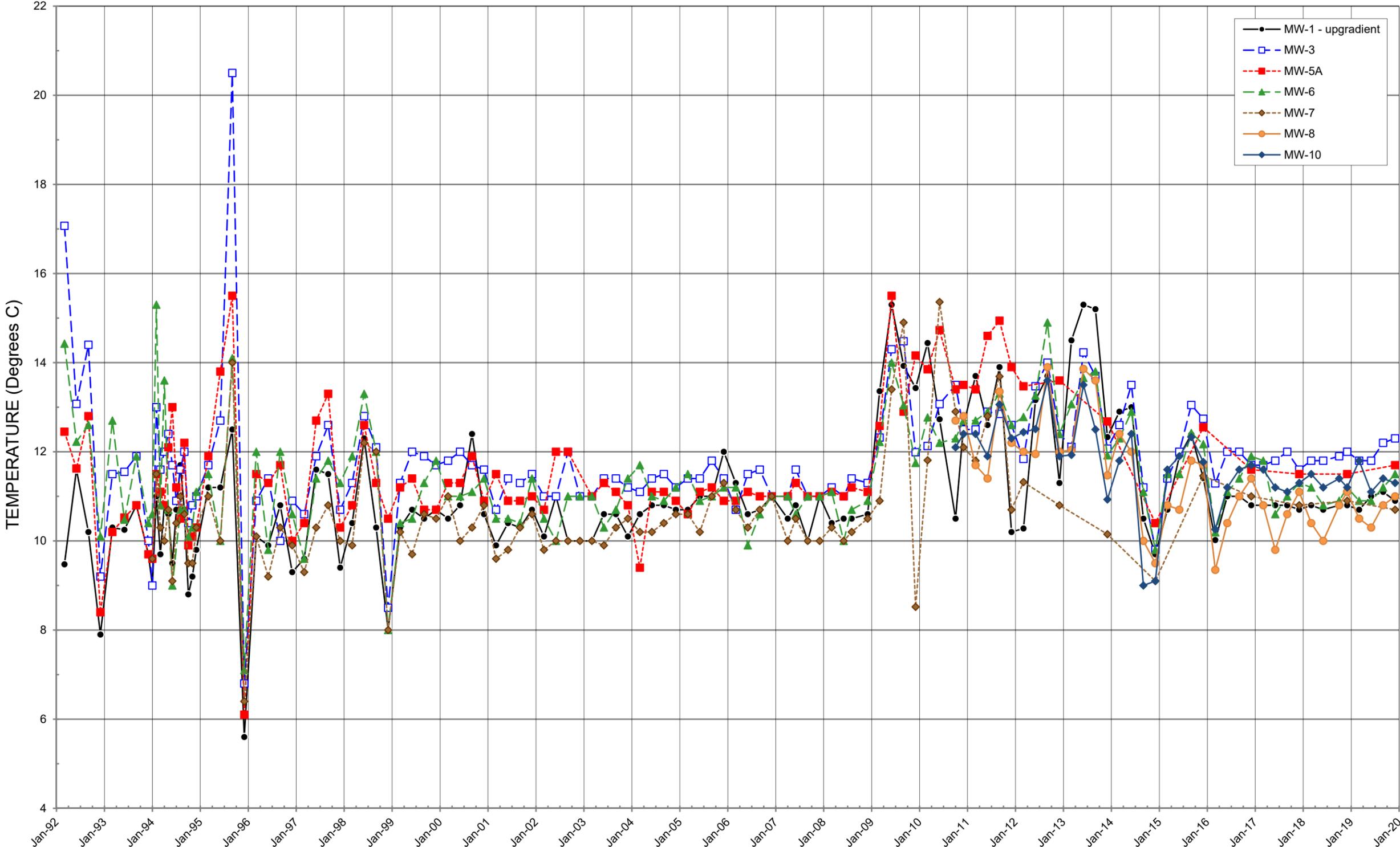


Secondary Drinking Water Standard (DWS) = 250 mg/L (off scale)
Secondary Groundwater Standard (GWS) = 250 mg/L (off scale)

DATE

SULFATE
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



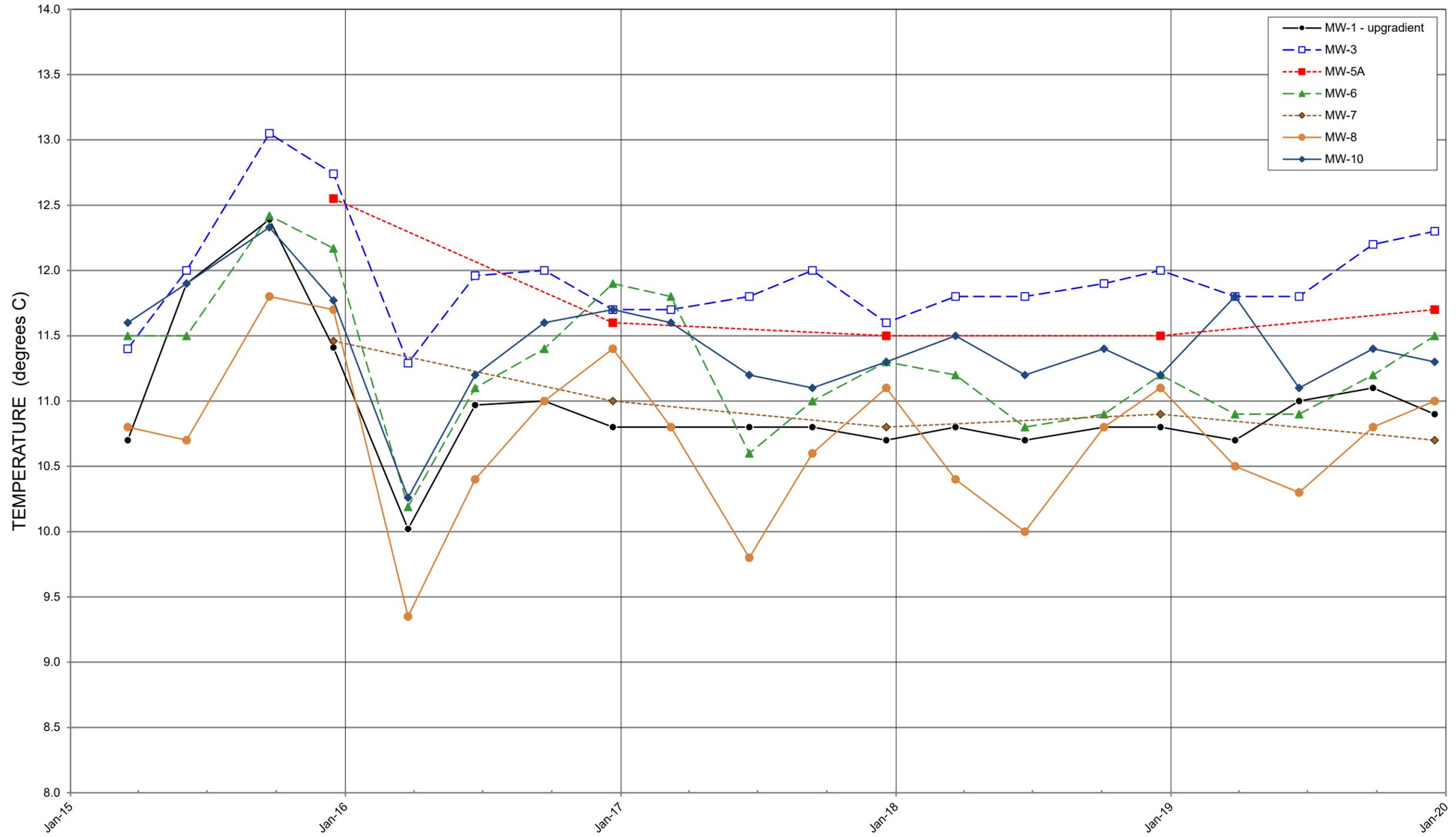
No Primary or Secondary Drinking Water Standard (DWS) Exists
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

TEMPERATURE

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

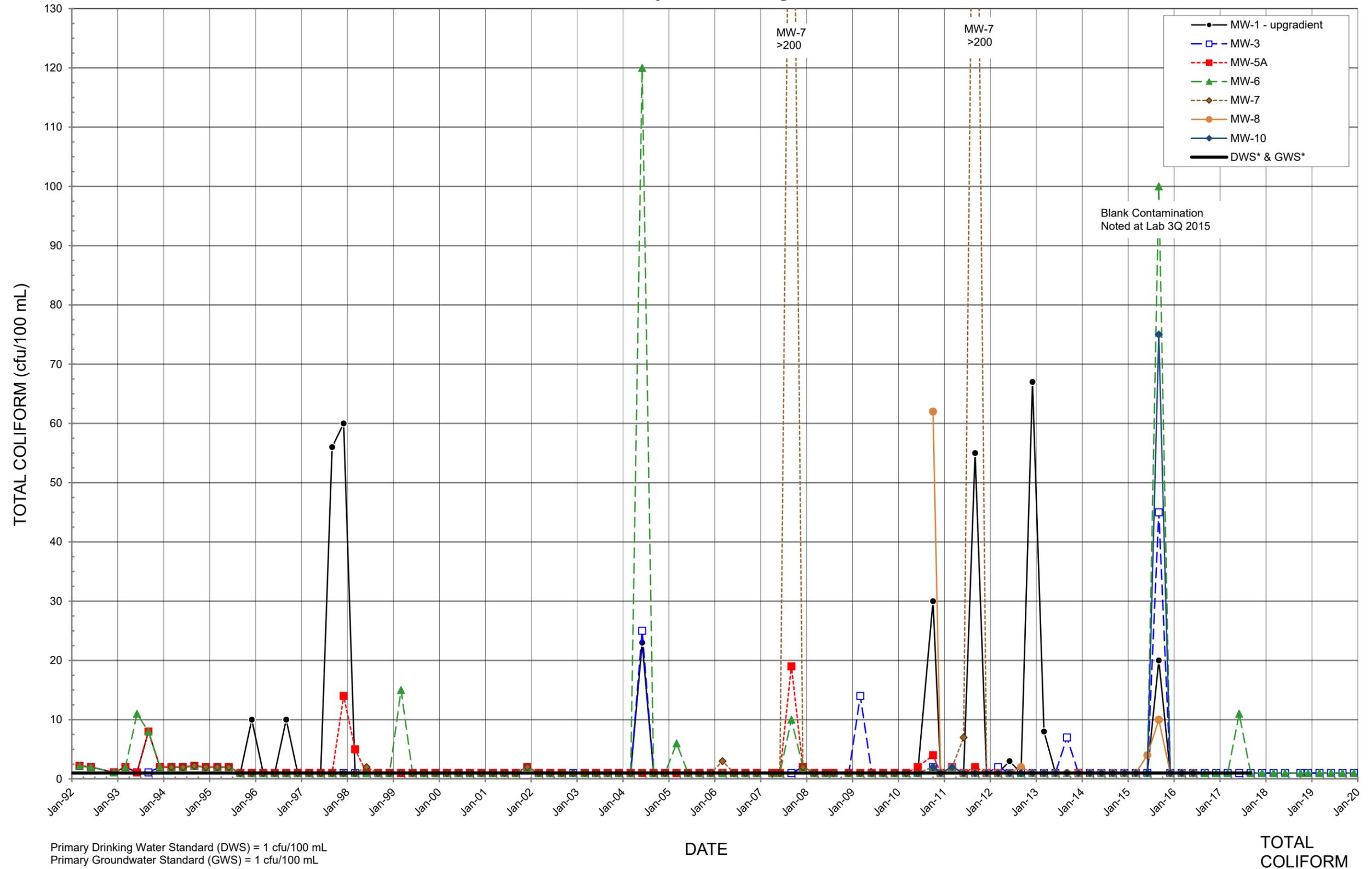


No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

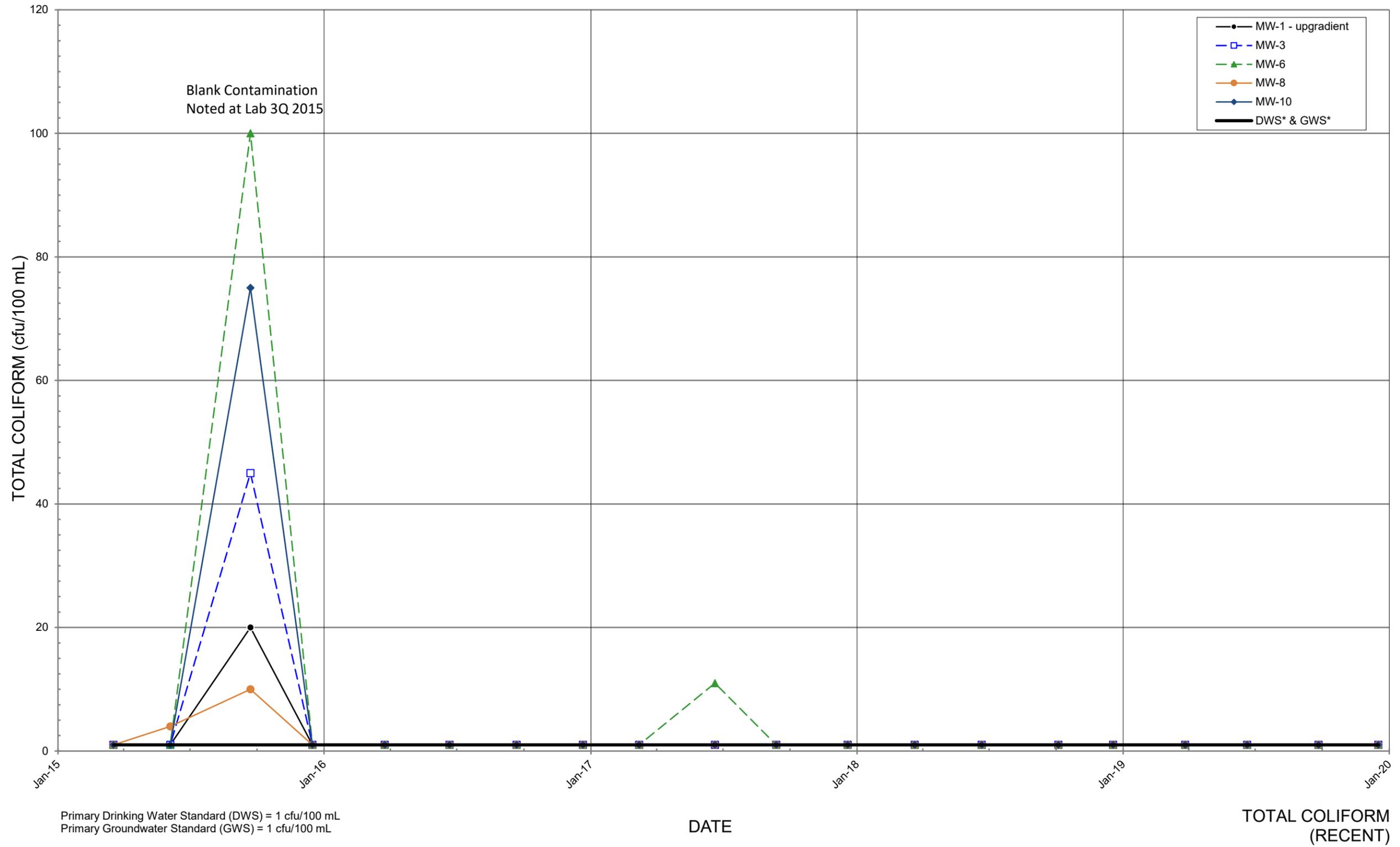
TEMPERATURE
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data

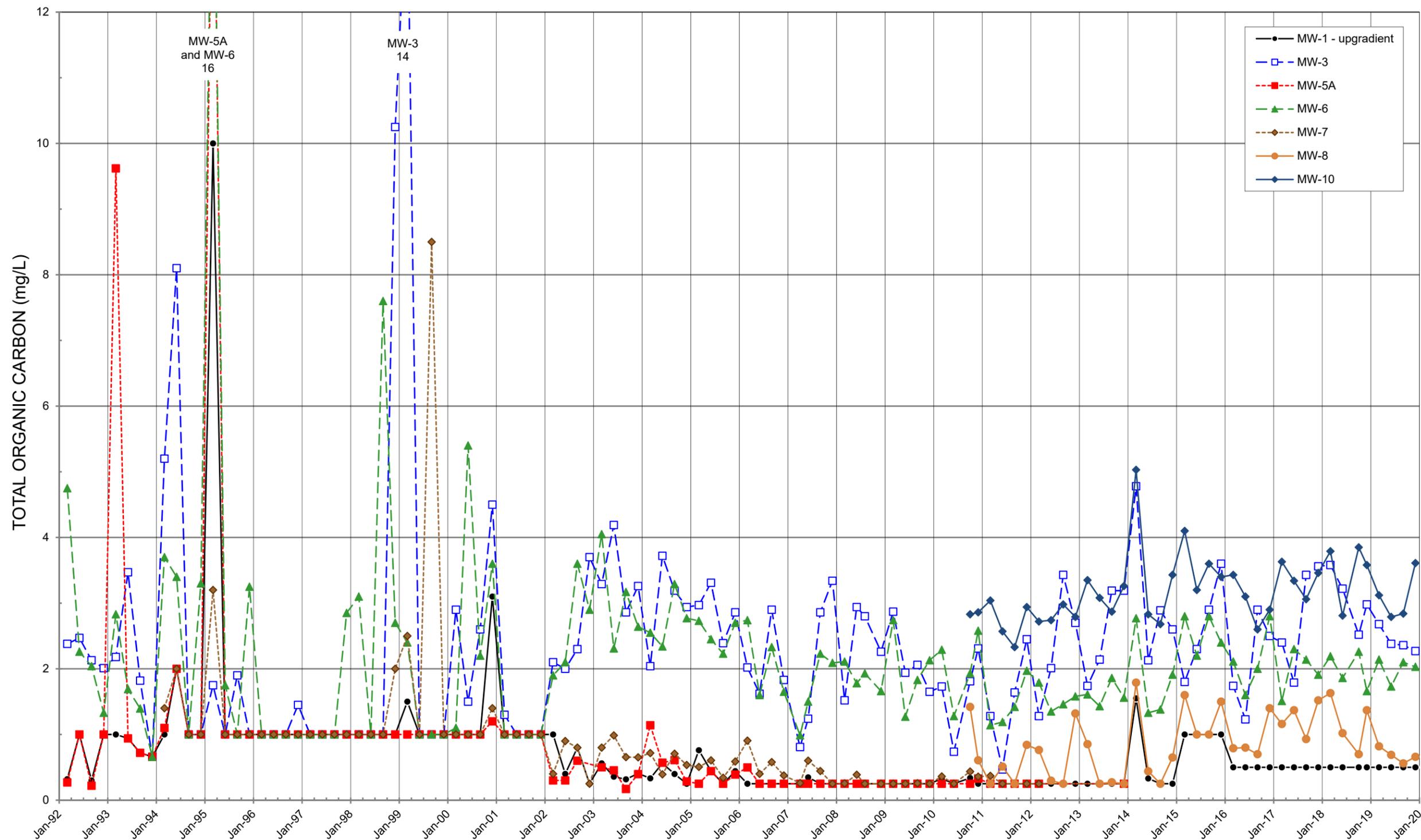


OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



OLALLA LANDFILL Quarterly Monitoring Data



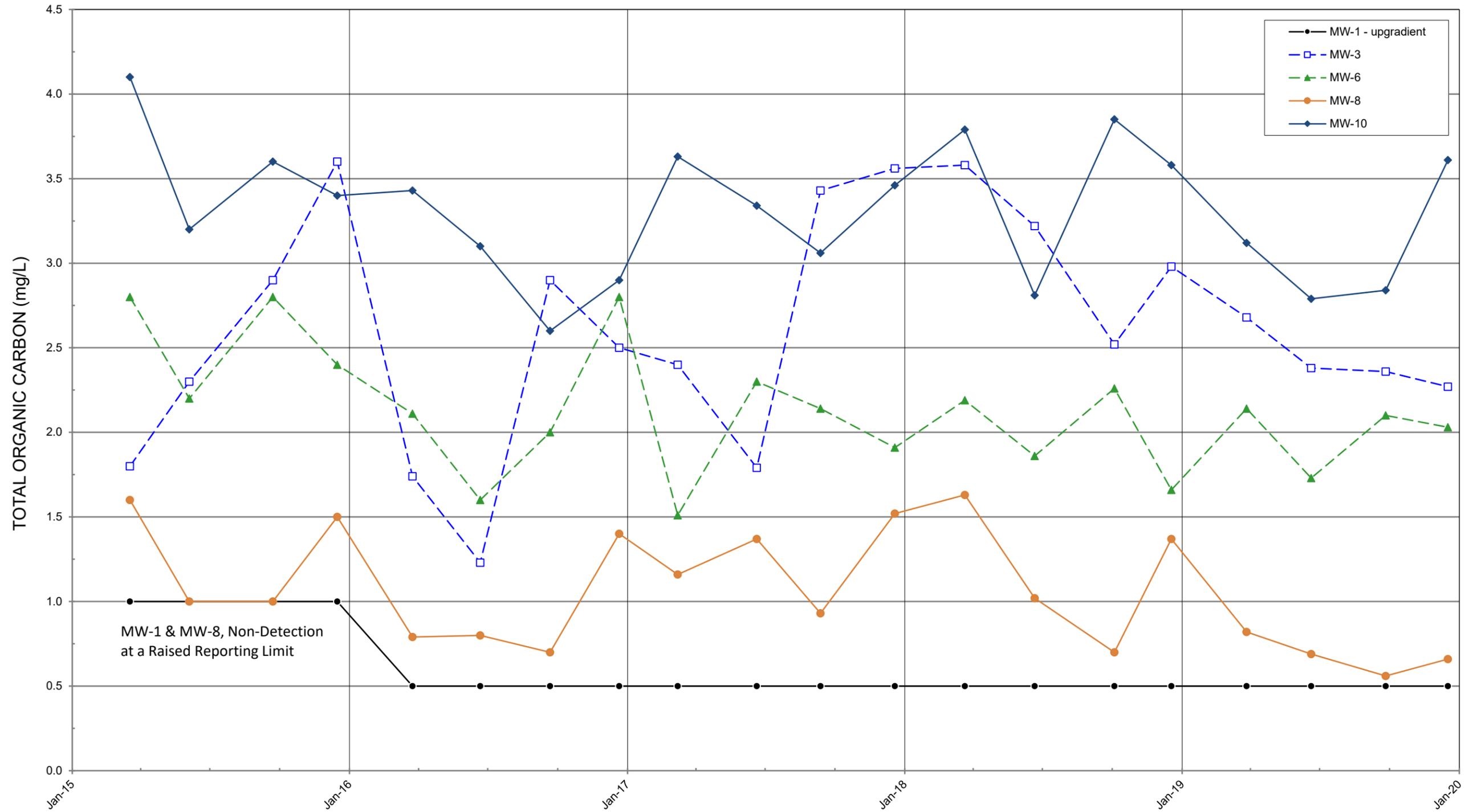
Data split (beginning 12/01) is due to a change in the Method Detection Limit
 No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

TOTAL ORGANIC CARBON

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



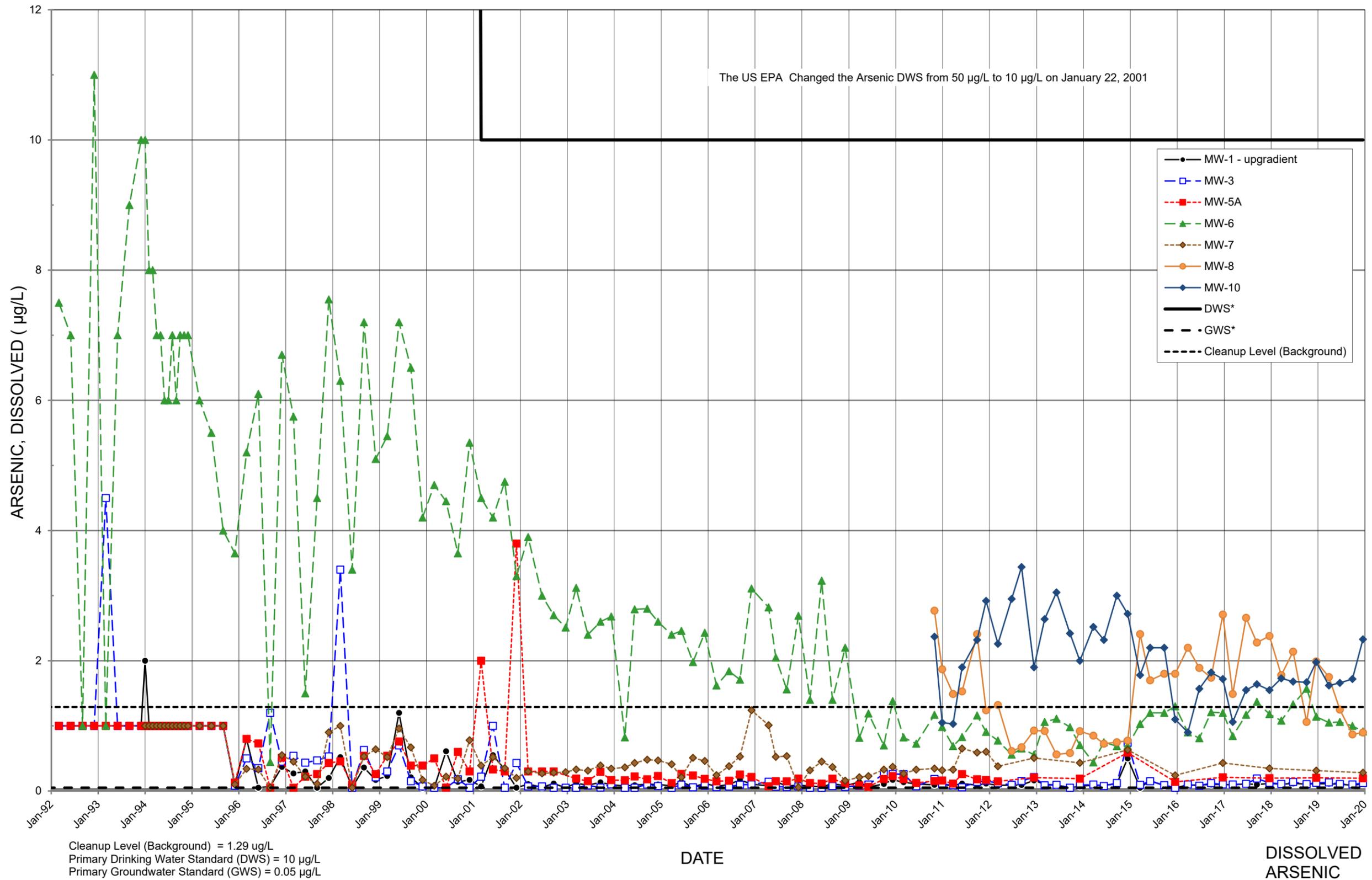
No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

TOTAL ORGANIC CARBON (RECENT)

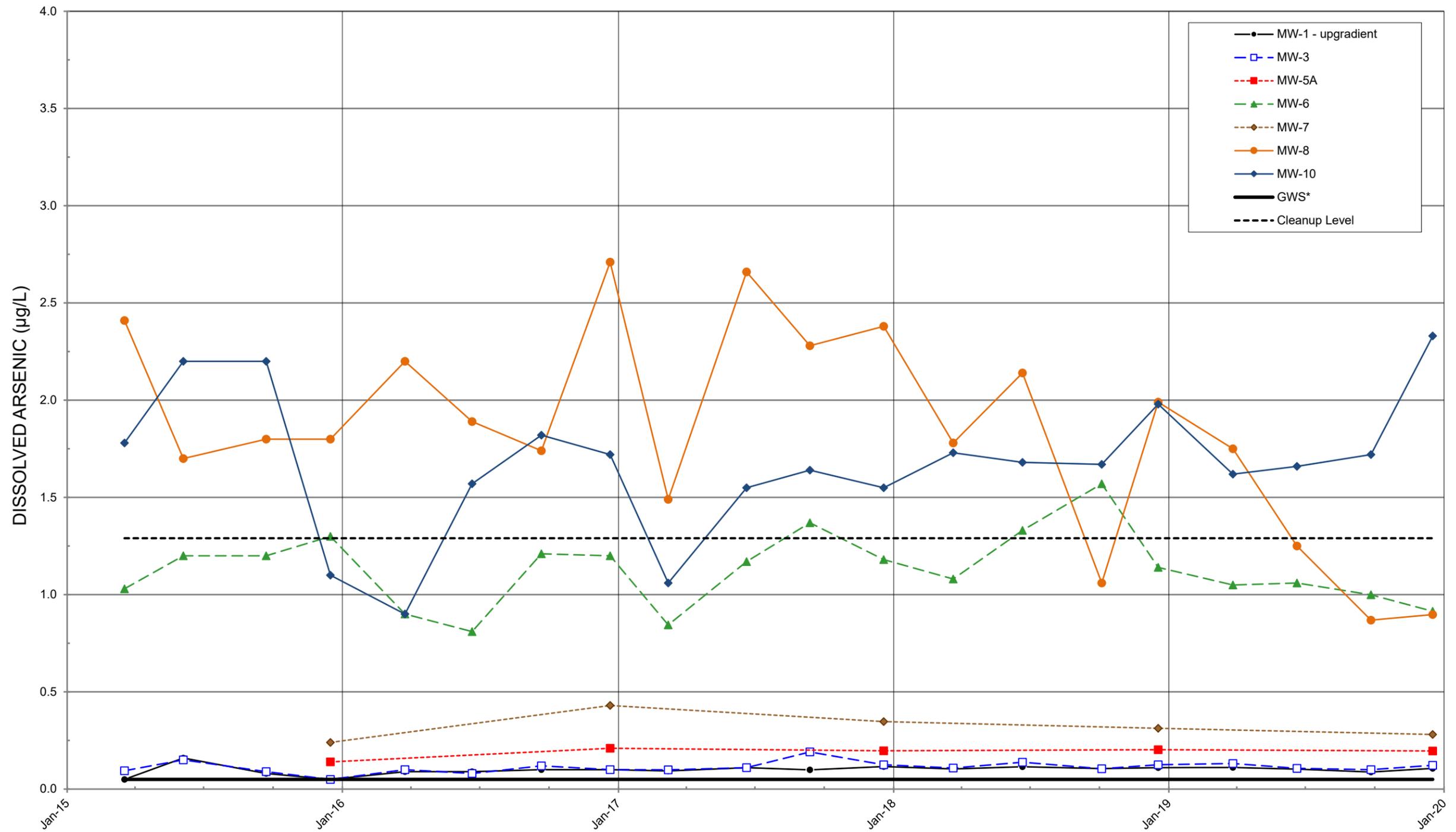
OLALLA LANDFILL

Quarterly Monitoring Data



OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



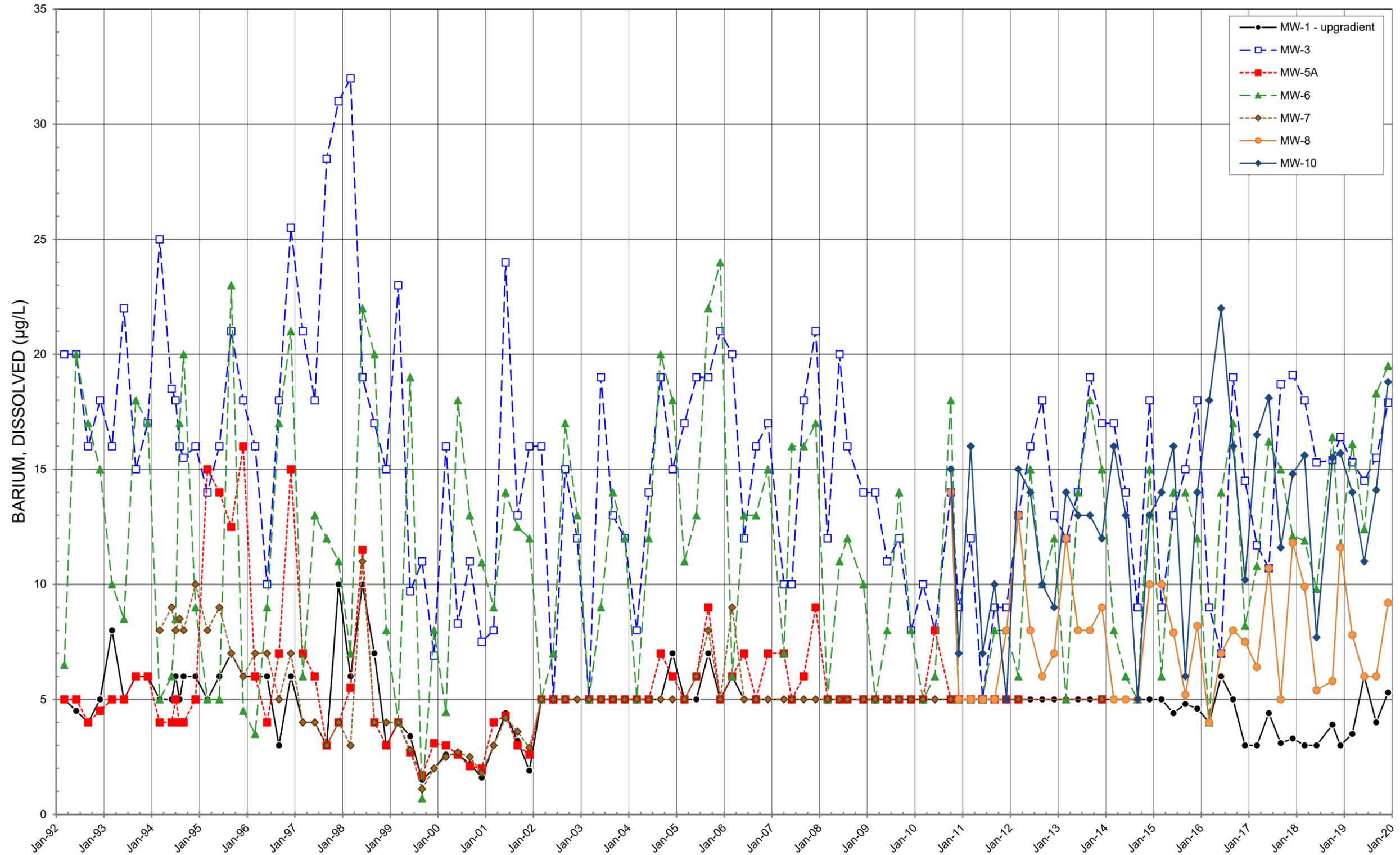
Site Specific Cleanup Level (background) = 1.29 µg/L
 Primary Drinking Water Standard (DWS) = 10 µg/L (off scale)
 Primary Groundwater Standard (GWS) = 0.05 µg/L

DATE

DISSOLVED ARSENIC
(RECENT)

OLALLA LANDFILL

Quarterly Monitoring Data



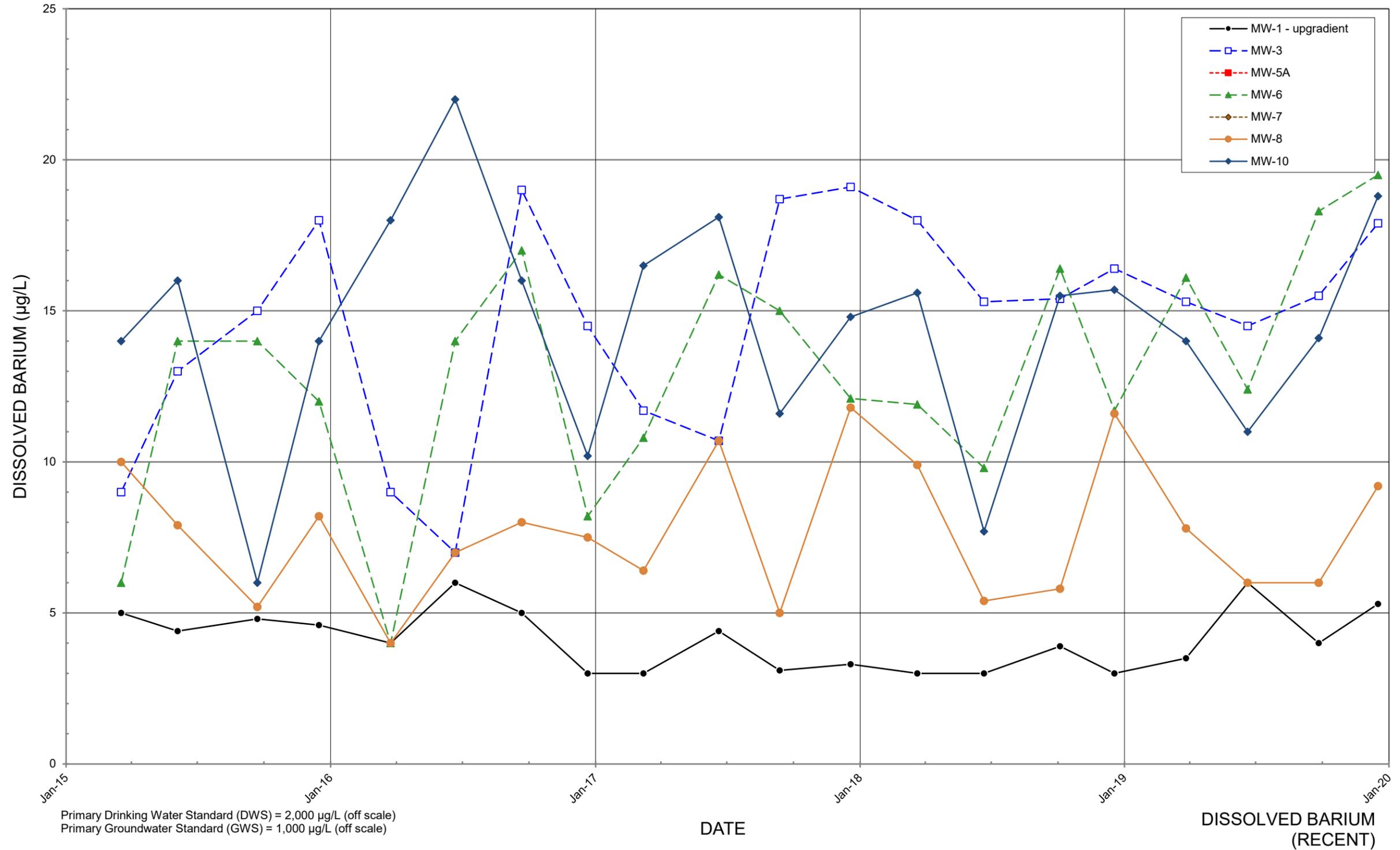
Primary Drinking Water Standard (DWS) = 2000 µg/L (off scale)
 Primary Groundwater Standard (GWS) = 1000 µg/L (off scale)

DATE

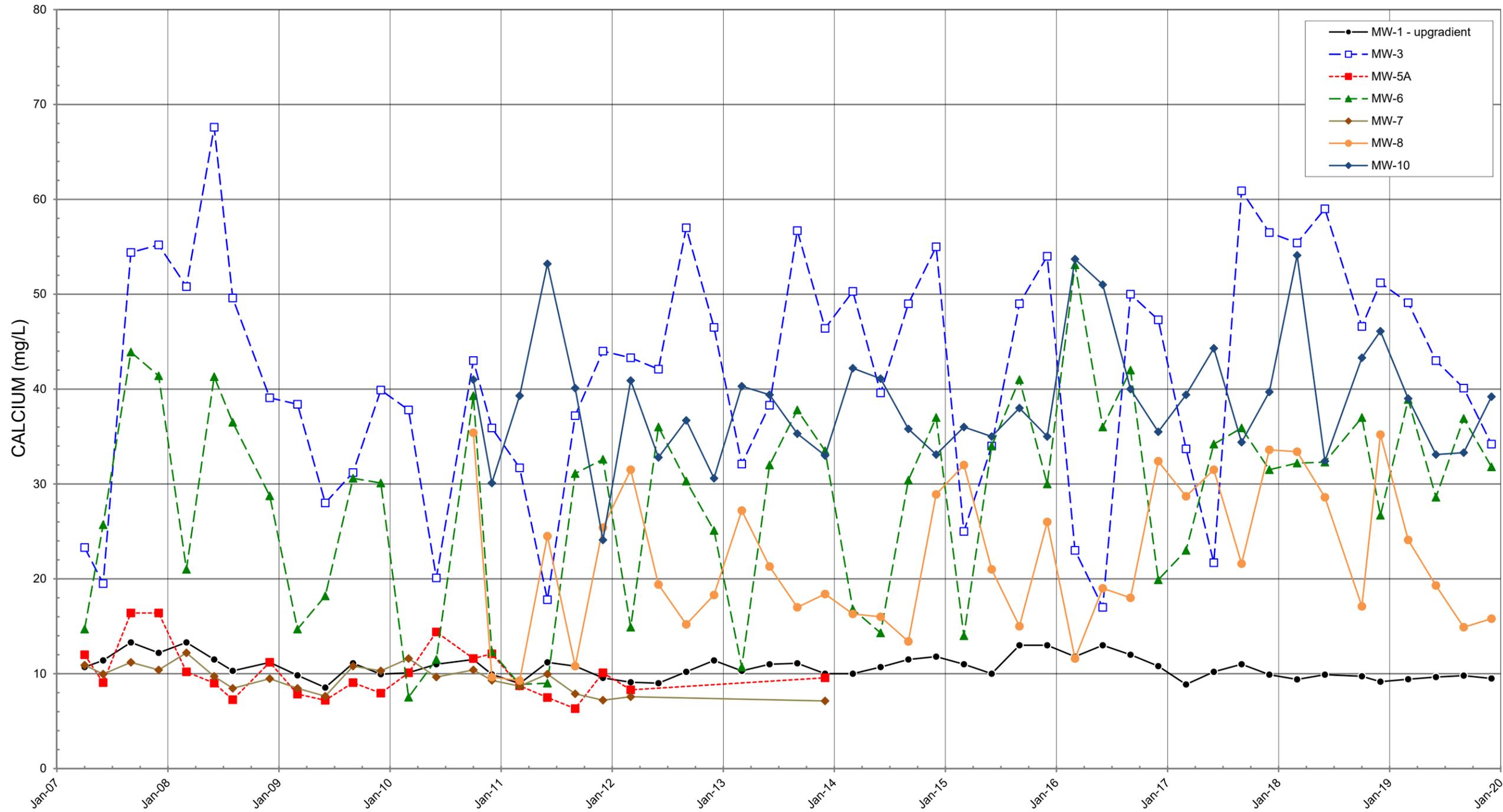
DISSOLVED
BARIUM

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



OLALLA LANDFILL Quarterly Monitoring Data



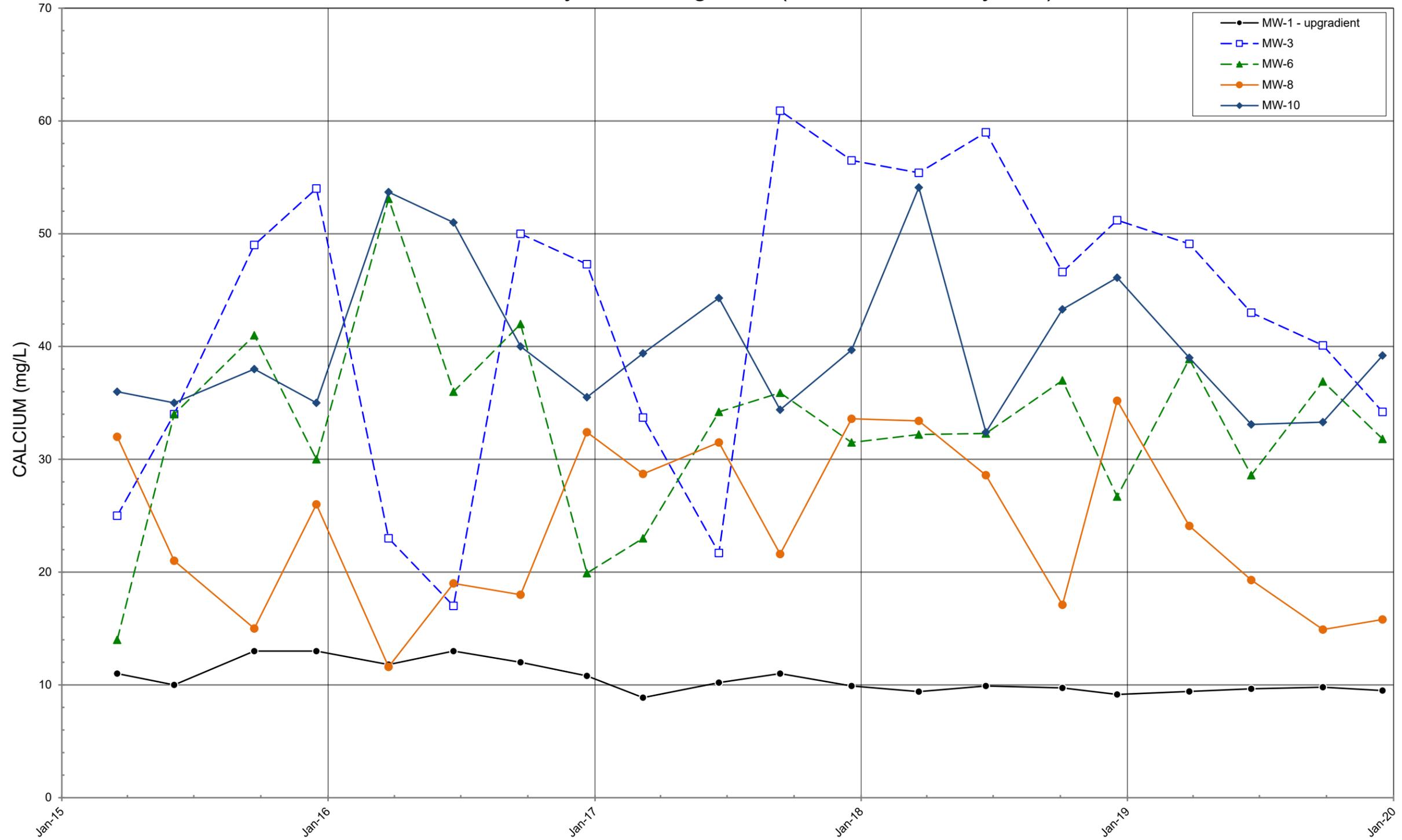
No Primary or Secondary Drinking Water Standard (DWS) Exists
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

CALCIUM
(Analysis started in 2007)

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

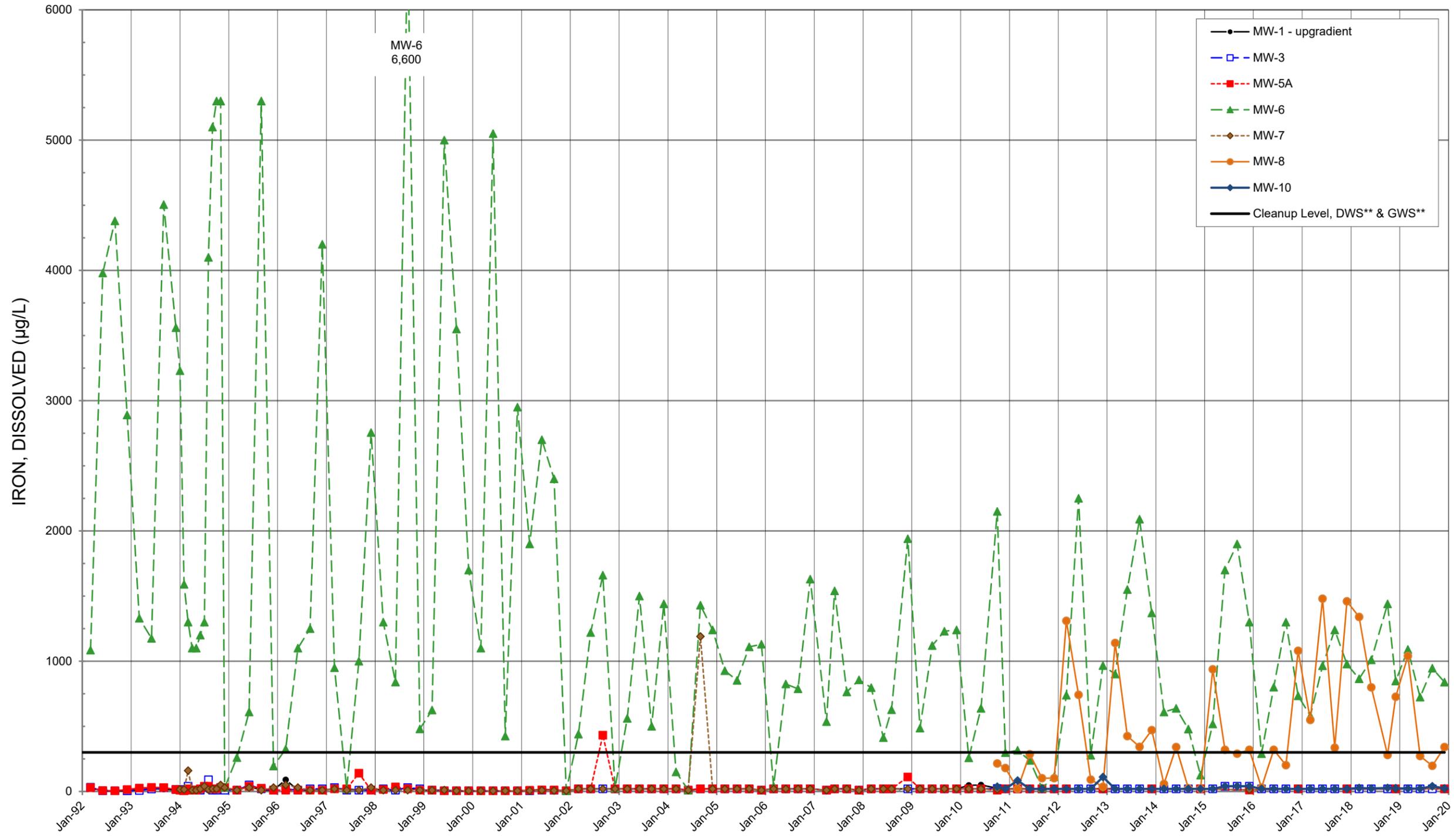


No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

CALCIUM
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



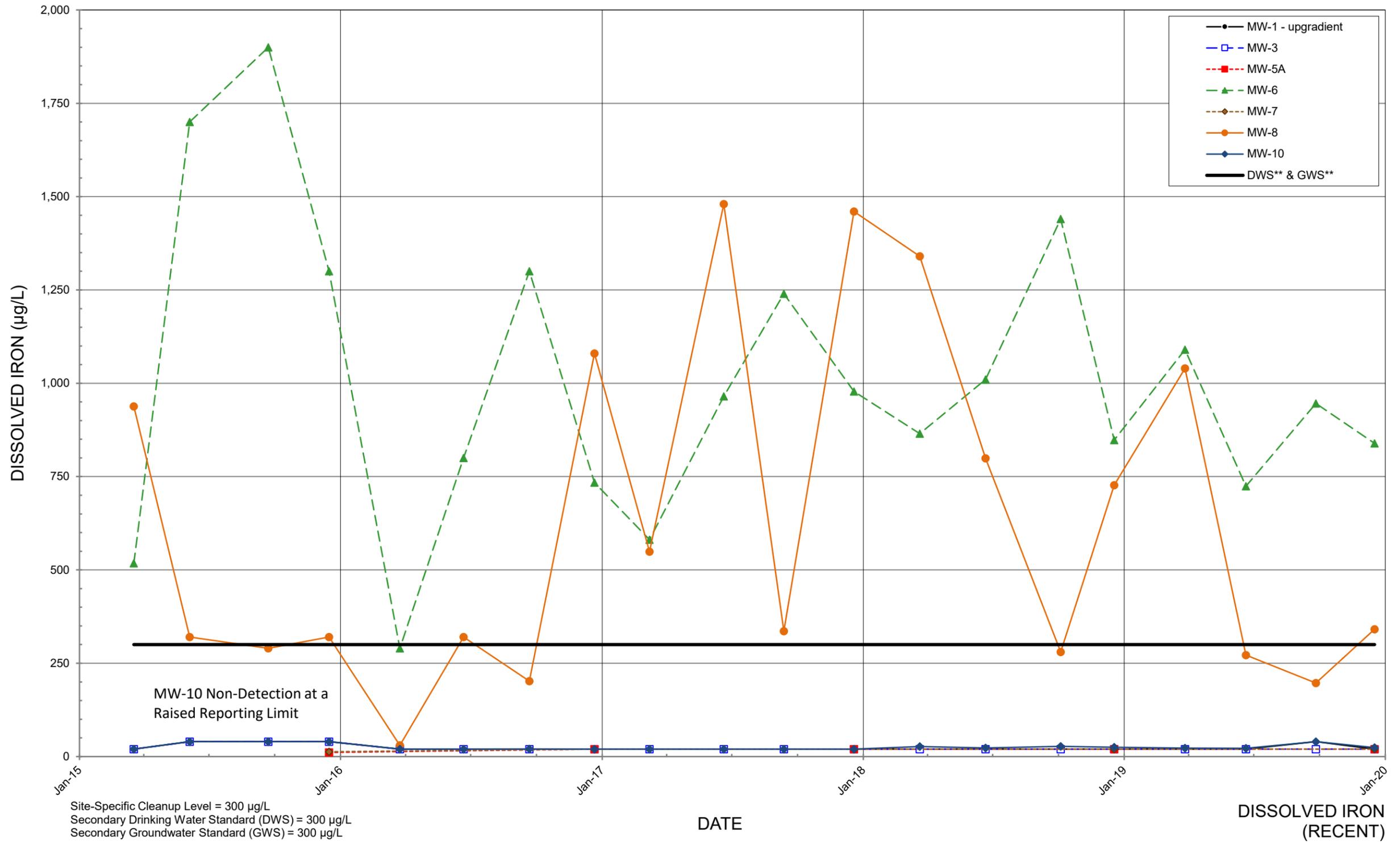
Cleanup Level = 300 µg/L
 Secondary Drinking Water Standard (DWS) = 300 µg/L
 Secondary Groundwater Standard (GWS) = 300 µg/L

DATE

DISSOLVED
IRON

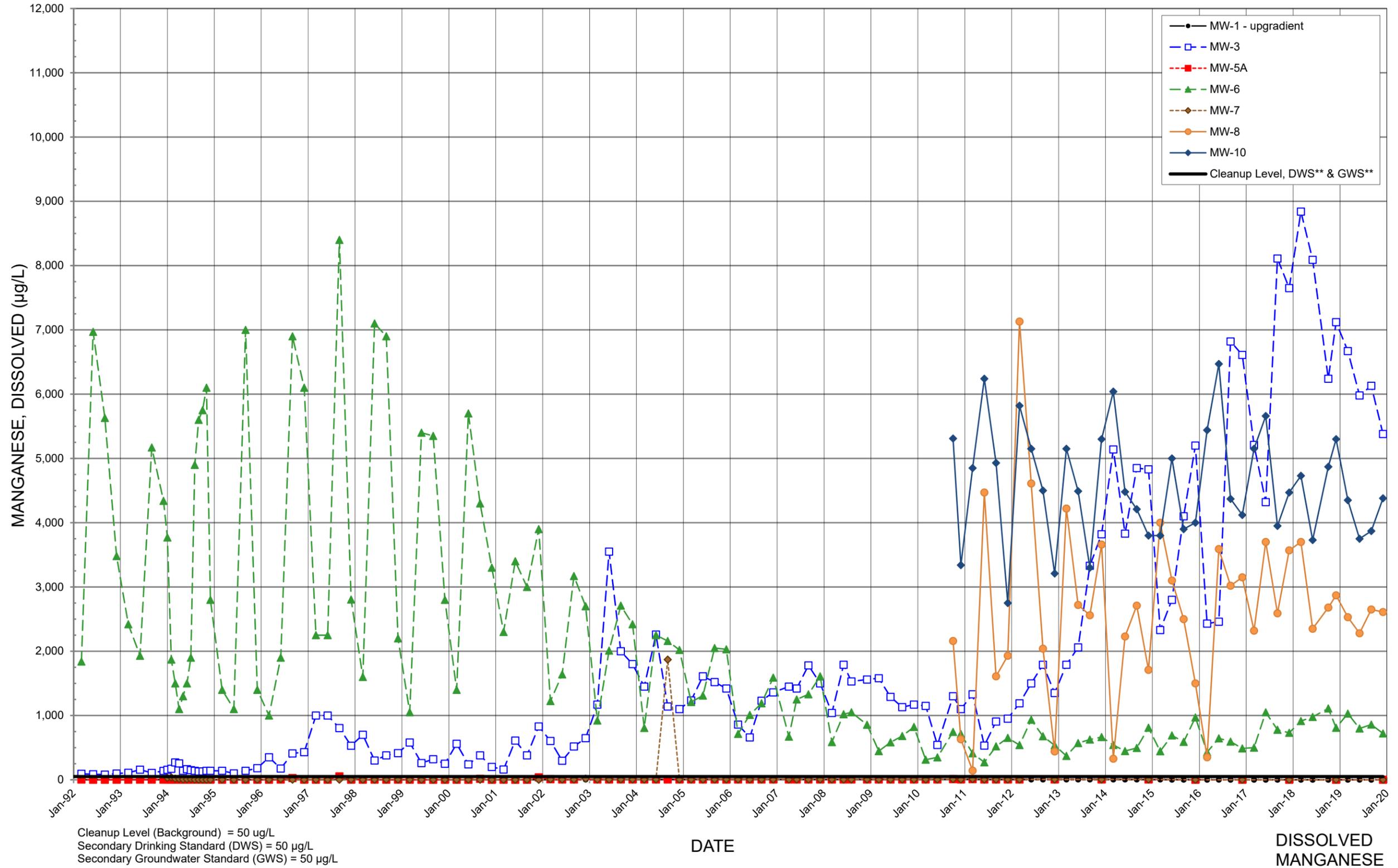
OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



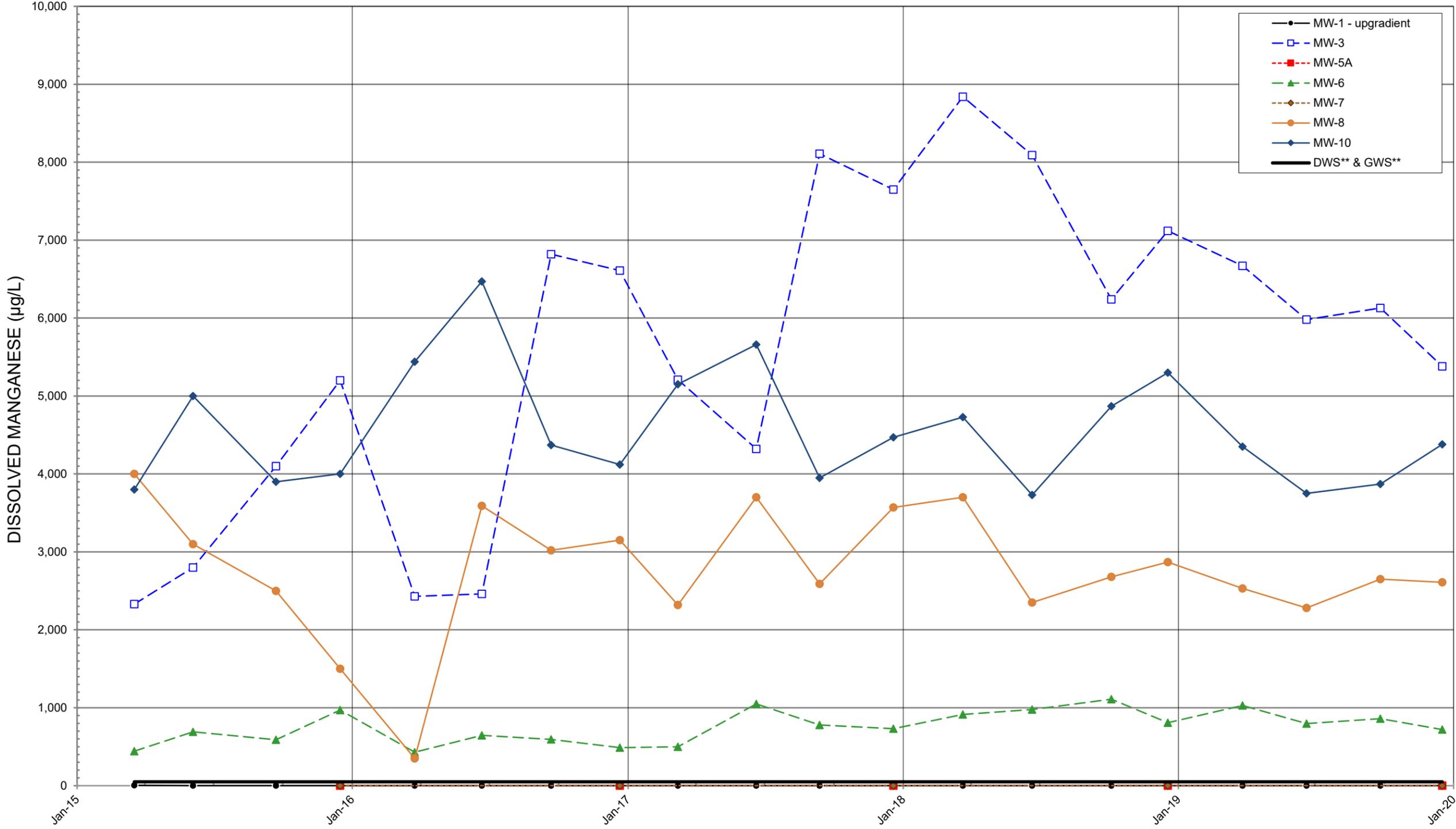
OLALLA LANDFILL

Quarterly Monitoring Data



OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

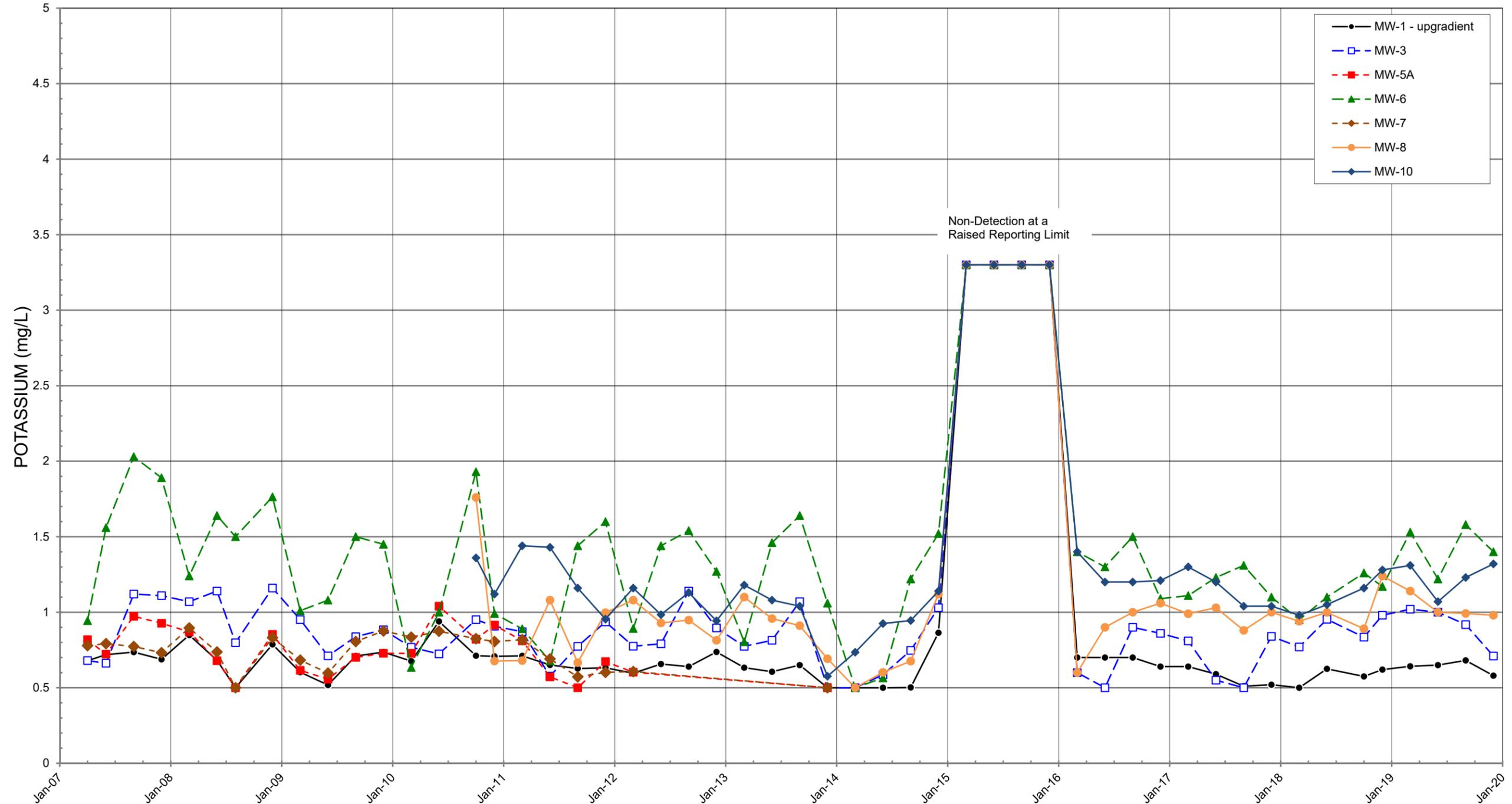


Site-specific Cleanup Level = 50 µg/L
 Secondary Drinking Standard (DWS) = 50 µg/L
 Secondary Groundwater Standard (GWS) = 50 µg/L

DATE

DISSOLVED MANGANESE (RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



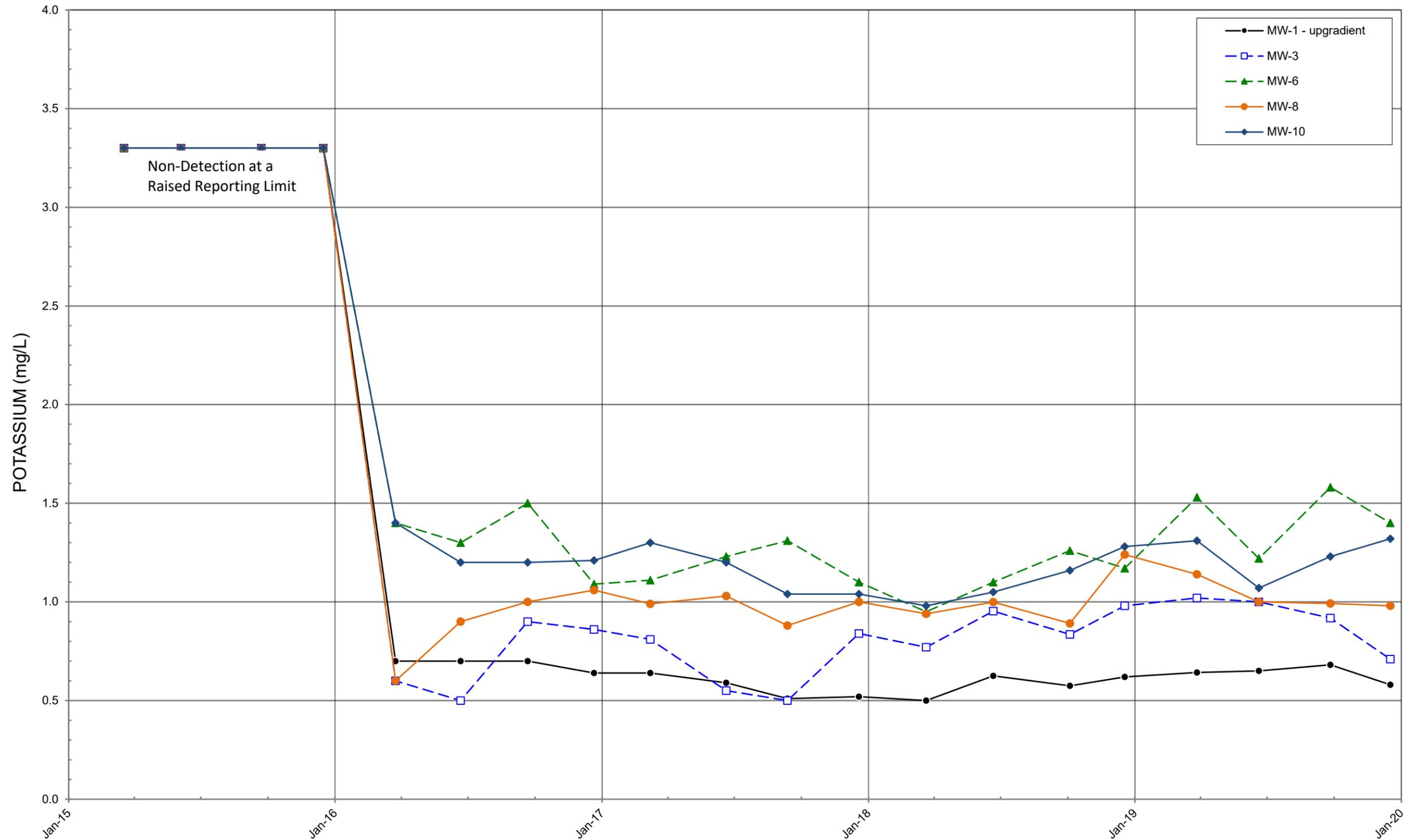
No Primary or Secondary Drinking Water Standard (DWS) Exists
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

POTASSIUM
 (Analysis started in 2007)

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

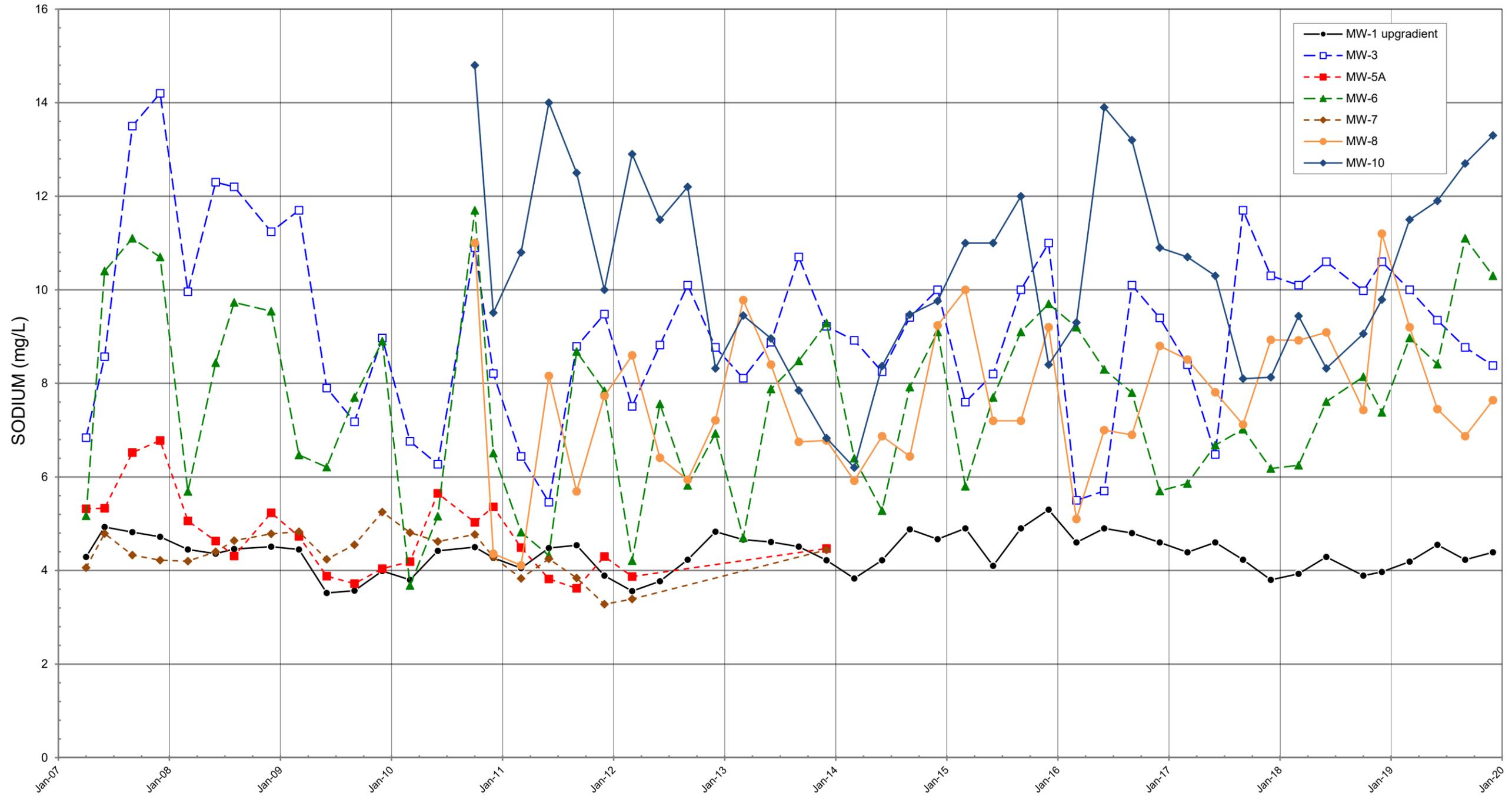


No Primary or Secondary Drinking Water Standard (DWS) Exists
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

POTASSIUM
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



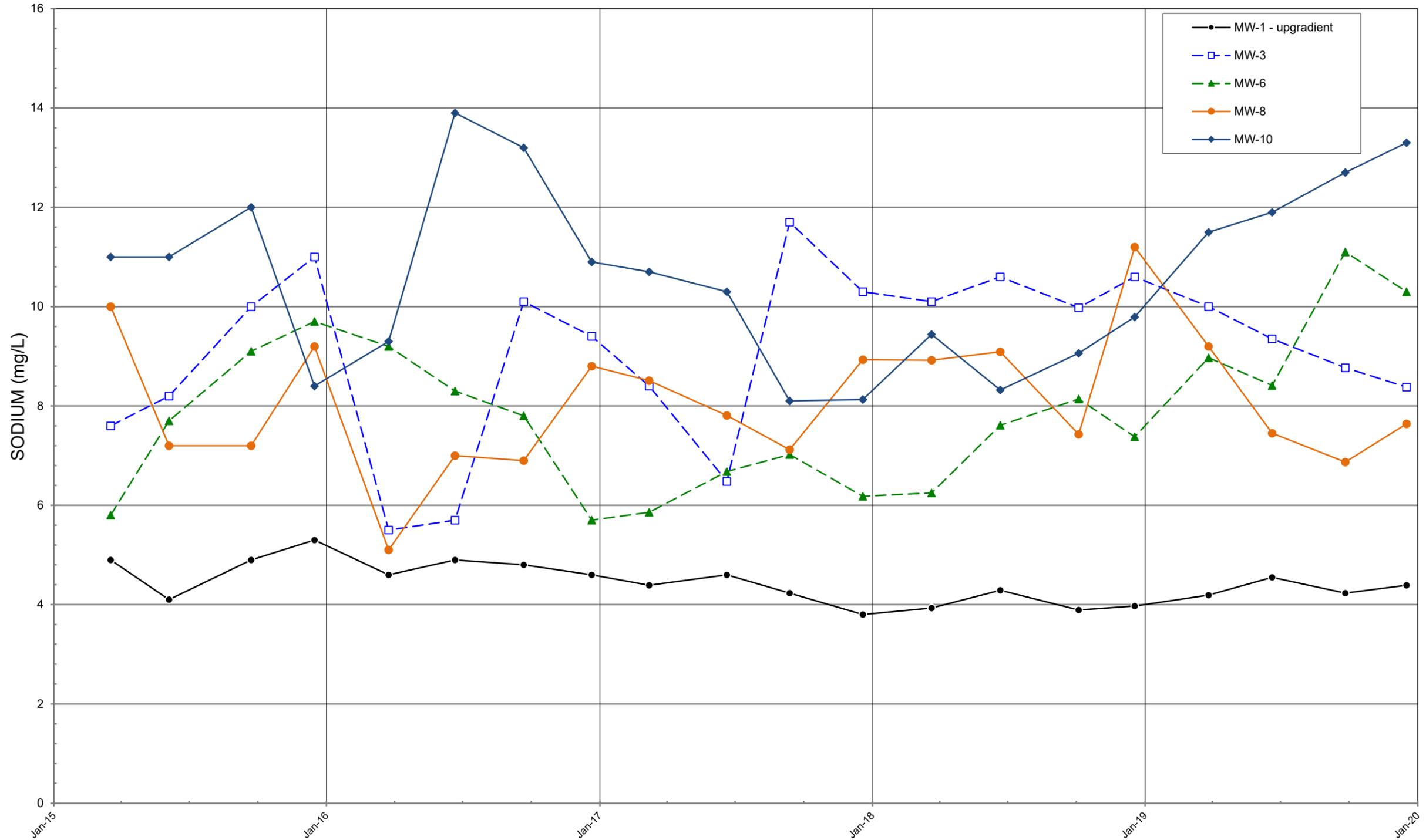
No Primary or Secondary Drinking Water Standard (DWS) Exists. Recommended level of concern for consumers with restricted daily sodium intake is 20 mg/L (off scale)
No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

SODIUM
(Analysis started in 2007)

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

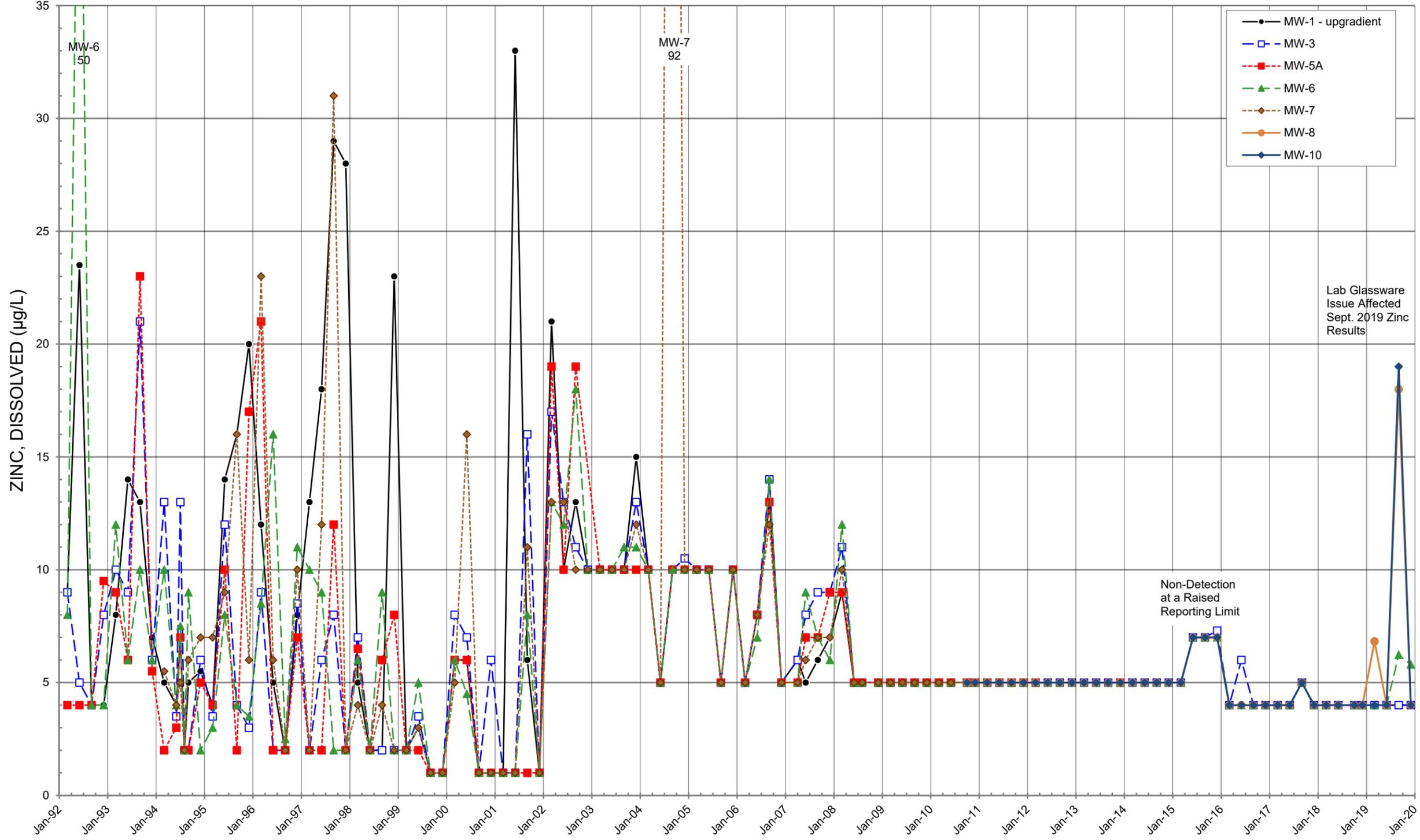


No Primary or Secondary Drinking Water Standard (DWS) Exists. Recommended level of concern for consumers with restricted daily sodium intake is 20 mg/L (off scale)
 No Primary or Secondary Groundwater Standard (GWS) Exists

DATE

SODIUM
(RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



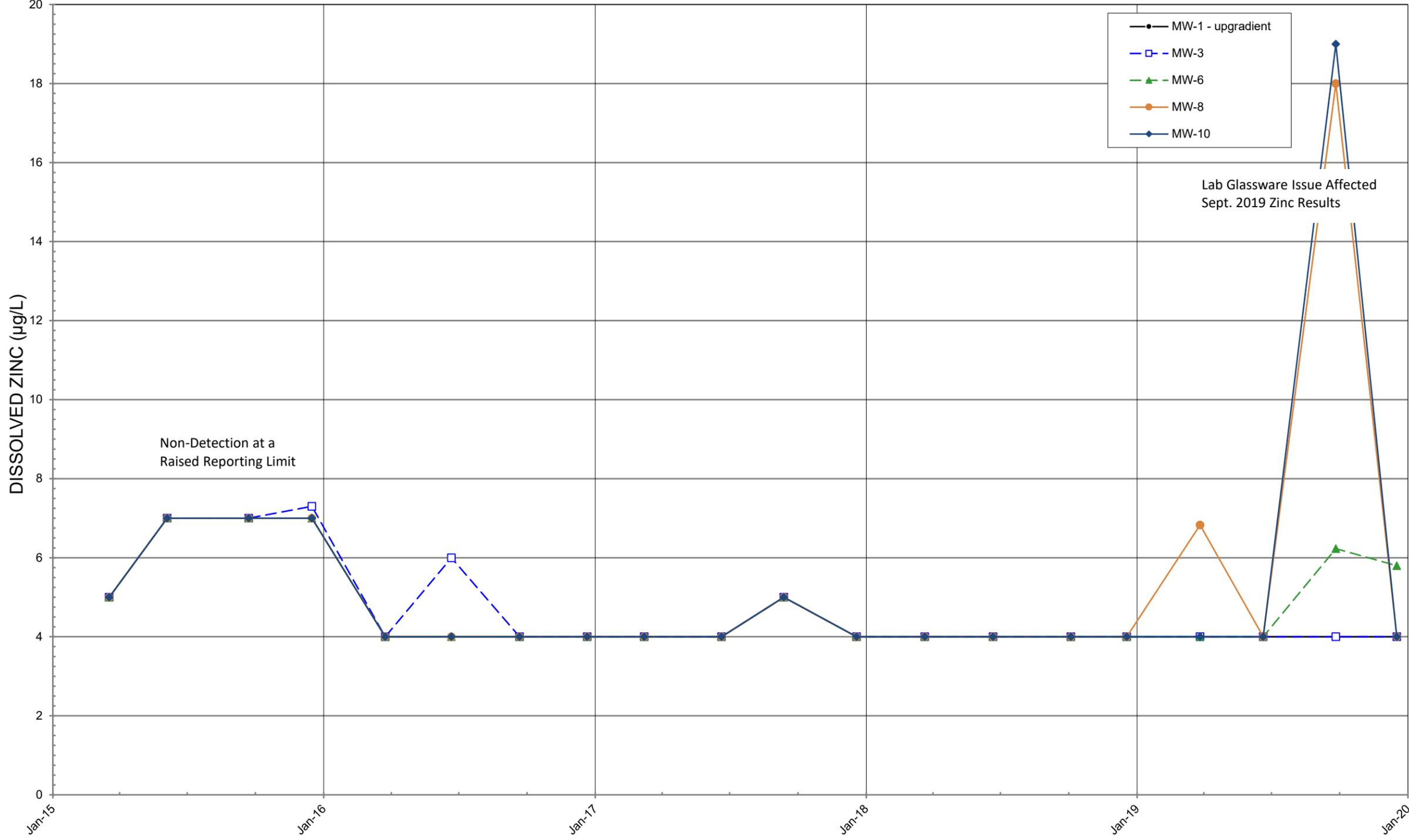
Secondary Drinking Water Standard (DWS) = 5000 µg/L (off scale)
Secondary Groundwater Standard (GWS) = 5000 µg/L (off scale)

DATE

DISSOLVED
ZINC

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)

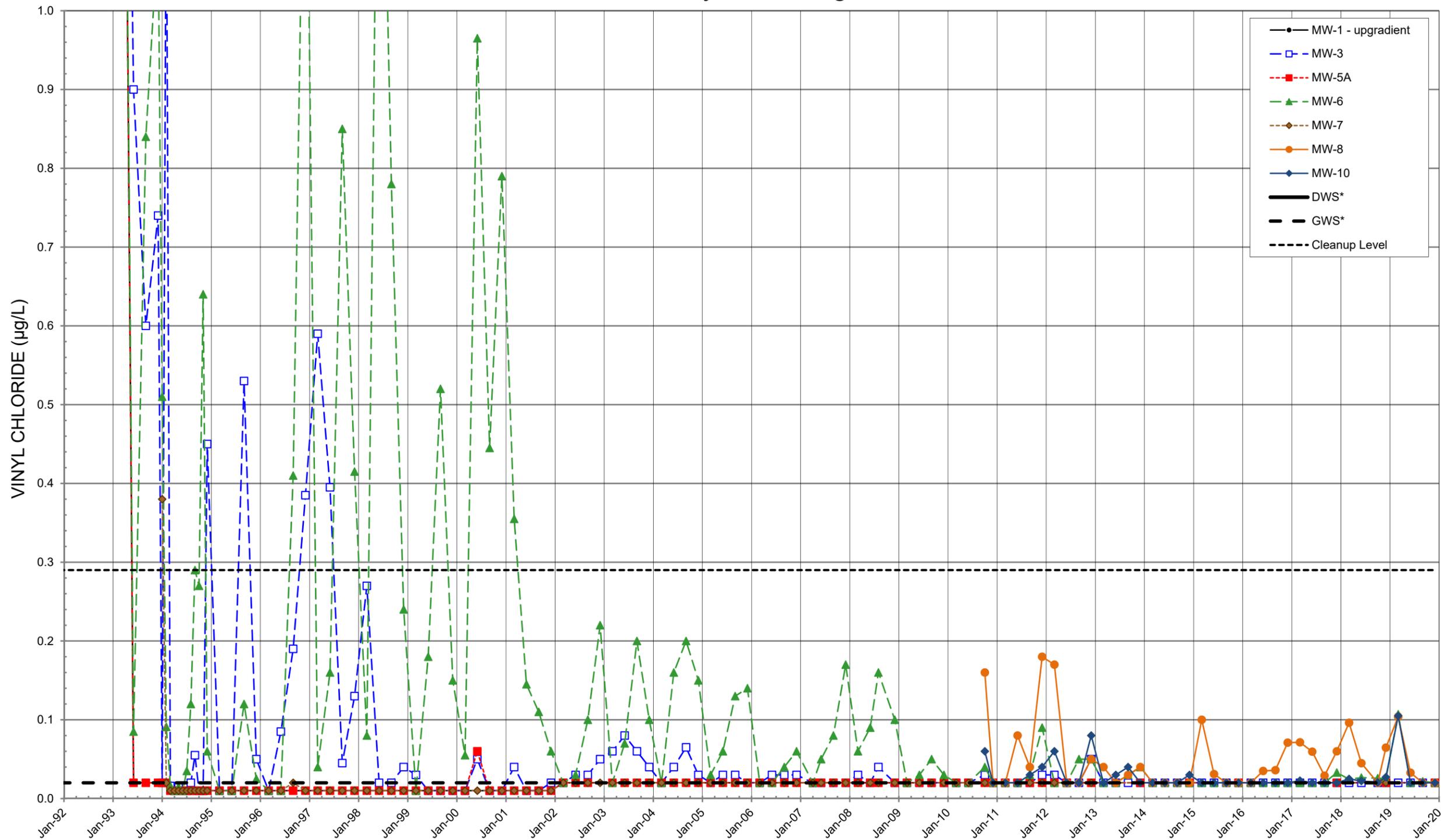


Secondary Drinking Water Standard (DWS) = 5000 µg/L (off scale)
 Secondary Groundwater Standard (GWS) = 5000 µg/L (off scale)

DATE

DISSOLVED ZINC (RECENT)

OLALLA LANDFILL Quarterly Monitoring Data



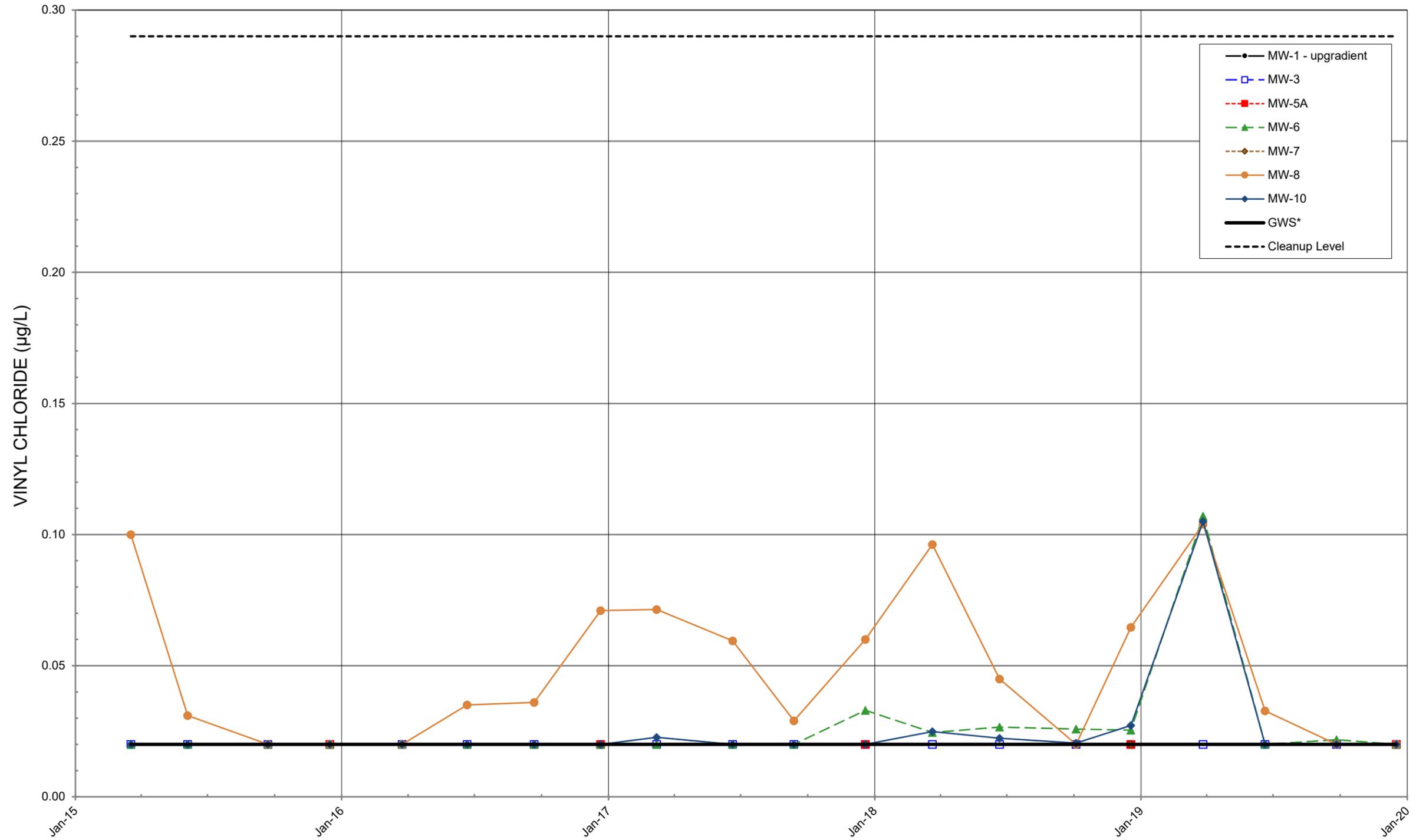
Site-Specific Cleanup Level = 0.29 ug/L
 Primary Drinking Water Standard (DWS) = 2 µg/L (off scale)
 Primary Groundwater Standard (GWS) = 0.02 µg/L

DATE

VINYL
CHLORIDE

OLALLA LANDFILL

Quarterly Monitoring Data (most recent five years)



Site-Specific Cleanup Level = 0.29 µg/L
 Primary Drinking Water Standard (DWS) = 2 µg/L (off scale)
 Primary Groundwater Standard (GWS) = 0.02 µg/L

DATE

VINYL CHLORIDE (RECENT)

**March 2019 Mann-Kendall Statistically Significant Trend
Test Results**

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10
Ammonia (N)	NO TREND	NO TREND	NO TREND	NO TREND	UP
Arsenic - Dissolved	UP	NO TREND	UP	NO TREND	DOWN
Barium - Dissolved	NO TREND				
Bicarbonate	NO TREND	UP	NO TREND	UP	NO TREND
Calcium	DOWN	NO TREND	NO TREND	UP	NO TREND
Carbonate	NO TREND				
Chemical Oxygen Demand	NO TREND				
Chloride	DOWN	DOWN	UP	UP	UP
Dissolved Oxygen	NO TREND				
Iron - Dissolved	NO TREND	NO TREND	NO TREND	UP	UP
Manganese - Dissolved	NO TREND	UP	UP	NO TREND	NO TREND
Nitrate	UP	NO TREND	NO TREND	NO TREND	NO TREND
Nitrite	DOWN	NO TREND	NO TREND	DOWN	NO TREND
Oxidation Reduction Potential	UP	UP	NO TREND	NO TREND	NO TREND
pH - Field	UP	NO TREND	NO TREND	NO TREND	NO TREND
pH - Laboratory	DOWN	NO TREND	DOWN	DOWN	NO TREND
Potassium	NO TREND	UP	NO TREND	UP	UP
Sodium	DOWN	UP	NO TREND	UP	NO TREND
Specific Conductance	DOWN	UP	UP	UP	UP
Sulfate	NO TREND	NO TREND	NO TREND	UP	NO TREND
Temperature	NO TREND				
Total Coliform	NO TREND				
TOC	NO TREND				
Vinyl Chloride	NO TREND	NO TREND	UP	UP	UP
Zinc - Dissolved	NO TREND				

NO TREND = No statistically significant trend.

UP = Statistically significant upward trend.

DOWN = Statistically significant downward trend.

**June 2019 Mann-Kendall Statistically Significant Trend
Test Results**

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10
Ammonia (N)	NO TREND				
Arsenic - Dissolved	NO TREND				
Barium - Dissolved	NO TREND				
Bicarbonate	DOWN	UP	NO TREND	NO TREND	NO TREND
Calcium	DOWN	NO TREND	NO TREND	NO TREND	NO TREND
Carbonate	NO TREND				
COD	NO TREND				
Chloride	DOWN	DOWN	UP	UP	UP
Dissolved Oxygen	NO TREND				
Iron - Dissolved	NO TREND	NO TREND	NO TREND	UP	UP
Manganese - Dissolved	NO TREND	UP	UP	NO TREND	NO TREND
Nitrate	UP	NO TREND	NO TREND	NO TREND	NO TREND
Nitrite	NO TREND	NO TREND	NO TREND	DOWN	NO TREND
Oxidation Reduction Potential	UP	UP	UP	UP	NO TREND
pH - Field	NO TREND				
pH - Laboratory	DOWN	NO TREND	DOWN	DOWN	NO TREND
Potassium	NO TREND	UP	NO TREND	UP	UP
Sodium	DOWN	NO TREND	NO TREND	NO TREND	NO TREND
Specific Conductance	DOWN	UP	NO TREND	UP	UP
Sulfate	NO TREND				
Temperature	NO TREND				
Total Coliform	NO TREND				
TOC	NO TREND				
Vinyl Chloride	NO TREND	NO TREND	UP	UP	UP
Zinc - Dissolved	NO TREND				

NO TREND = No statistically significant trend.

UP = Statistically significant upward trend.

DOWN = Statistically significant downward trend.

**September 2019 Mann-Kendall Statistically Significant Trend
Test Results**

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10
Ammonia (N)	NO TREND				
Arsenic - Dissolved	NO TREND				
Barium - Dissolved	NO TREND				
Bicarbonate	DOWN	UP	NO TREND	NO TREND	NO TREND
Calcium	DOWN	NO TREND	NO TREND	NO TREND	NO TREND
Carbonate	NO TREND				
COD	NO TREND				
Chloride	DOWN	DOWN	UP	UP	UP
Dissolved Oxygen	NO TREND				
Iron - Dissolved	NO TREND	NO TREND	NO TREND	NO TREND	UP
Manganese - Dissolved	NO TREND	UP	UP	NO TREND	NO TREND
Nitrate	UP	NO TREND	NO TREND	NO TREND	NO TREND
Nitrite	NO TREND				
Oxidation Reduction Potential	UP	UP	UP	UP	NO TREND
pH - Field	NO TREND				
pH - Laboratory	DOWN	NO TREND	DOWN	DOWN	NO TREND
Potassium	NO TREND	UP	NO TREND	NO TREND	UP
Sodium	DOWN	NO TREND	NO TREND	NO TREND	NO TREND
Specific Conductance	DOWN	NO TREND	NO TREND	NO TREND	NO TREND
Sulfate	NO TREND				
Temperature	NO TREND				
Total Coliform	NO TREND				
TOC	NO TREND				
Vinyl Chloride	NO TREND	NO TREND	UP	NO TREND	UP
Zinc - Dissolved	NO TREND				

NO TREND = No statistically significant trend or data set has four or fewer detections and cannot be evaluated.

UP = Statistically significant upward trend.

DOWN = Statistically significant downward trend.

**December 2019 Mann-Kendall Statistically Significant Trend
Test Results**

Constituent or Parameter	MW-1	MW-3	MW-5A	MW-6	MW-7	MW-8	MW-10
Ammonia (N)	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Arsenic - Dissolved	UP	UP	NO TREND	NO TREND	NO TREND	DOWN	DOWN
Barium - Dissolved	NO TREND	NO TREND	NA	UP	NA	NO TREND	NO TREND
Bicarbonate	DOWN	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Calcium	DOWN	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Carbonate	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
COD	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Chloride	DOWN	DOWN	NA	UP	NA	UP	UP
Dissolved Oxygen	NO TREND	NO TREND	UP	UP	NA	NO TREND	NO TREND
Iron - Dissolved	NO TREND	NO TREND	NO TREND	NO TREND	NO TREND	NO TREND	UP
Manganese - Dissolved	NO TREND	UP	NO TREND	UP	NO TREND	NO TREND	NO TREND
Nitrate	UP	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Nitrite	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Oxidation Reduction Potential	UP	UP	UP	UP	UP	UP	UP
pH - Field	NO TREND	NO TREND	UP	NO TREND	NO TREND	NO TREND	NO TREND
pH - Laboratory	DOWN	NO TREND	NO TREND	DOWN	NO TREND	DOWN	NO TREND
Potassium	UP	UP	NA	UP	NA	UP	UP
Sodium	DOWN	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Specific Conductance	DOWN	NO TREND	DOWN	NO TREND	NO TREND	NO TREND	NO TREND
Sulfate	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
Temperature	NO TREND	NO TREND	NO TREND	NO TREND	DOWN	NO TREND	NO TREND
Total Coliform	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND
TOC	NO TREND	NO TREND	NA	DOWN	NA	DOWN	NO TREND
Vinyl Chloride	NO TREND	NO TREND	NO TREND	UP	NO TREND	NO TREND	NO TREND
Zinc - Dissolved	NO TREND	NO TREND	NA	NO TREND	NA	NO TREND	NO TREND

NO TREND = No statistically significant trend.
UP = Statistically significant upward trend.
DOWN = Statistically significant downward trend.
NA = Not analyzed per the SWHP

March 2019 Shapiro-Wilk Test for Normality Results

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10
Ammonia (N)	Non-Normal	ND	Non-Normal	Non-Normal	Non-Normal
Arsenic - Dissolved	Non-Normal	Non-Normal	Normal	Normal	Normal
Barium - Dissolved	Non-Normal	Normal	Normal	Normal	Normal
Bicarbonate	Normal	Normal	Normal	Normal	Normal
Calcium - Dissolved	Normal	Non-Normal	Normal	Normal	Normal
Carbonate	ND	ND	ND	ND	ND
Chemical Oxygen Demand	ND	Non-Normal	ND	ND	Non-Normal
Chloride	Normal	Non-Normal	Non-Normal	Normal	Normal
Dissolved Oxygen	Normal	Non-Normal	Non-Normal	Normal	Non-Normal
Iron - Dissolved	ND	ND	Normal	Non-Normal	Non-Normal
Manganese - Dissolved	ND	Normal	Normal	Normal	Normal
Nitrate	Normal	Non-Normal	Non-Normal	Normal	Non-Normal
Nitrite	Non-Normal	ND	Non-Normal	Non-Normal	ND
Oxidation Reduction Potential	Normal	Normal	Non-Normal	Non-Normal	Non-Normal
pH - Field	Non-Normal	Non-Normal	Normal	Normal	Normal
pH - Laboratory	Normal	Non-Normal	Normal	Normal	Normal
Potassium	Non-Normal	Non-Normal	Non-Normal	Non-Normal	Non-Normal
Sodium	Normal	Non-Normal	Normal	Normal	Normal
Specific Conductance	Normal	Normal	Non-Normal	Normal	Normal
Sulfate	Normal	Normal	Non-Normal	Normal	Non-Normal
Temperature	Non-Normal	Non-Normal	Normal	Normal	Non-Normal
Total Coliform	ND	ND	ND	ND	ND
TOC	ND	Normal	Non-Normal	Normal	Non-Normal
Vinyl Chloride	ND	ND	Non-Normal	Non-Normal	Non-Normal
Zinc - Dissolved	ND	ND	ND	ND	ND

Notes:

ND = Data set has four or fewer quarters with detects and statistical tests cannot be performed.

NA = Not analyzed per the SWHP

June 2019 Shapiro-Wilk Test for Normality Results

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10
Ammonia (N)	ND	ND	Non-normal	Non-normal	Non-normal
Arsenic - Dissolved	Non-normal	Non-normal	Normal	Normal	Non-normal
Barium - Dissolved	Non-normal	Normal	Non-normal	Normal	Normal
Bicarbonate	Normal	Normal	Normal	Normal	Normal
Calcium	Normal	Non-normal	Normal	Normal	Non-normal
Carbonate	ND	ND	ND	ND	ND
COD	ND	Non-normal	ND	ND	Non-Normal
Chloride	Normal	Non-normal	Non-normal	Non-Normal	Normal
Dissolved Oxygen	Normal	Non-normal	Non-normal	Normal	Non-normal
Iron - Dissolved	ND	ND	Normal	Non-normal	Non-normal
Manganese - Dissolved	ND	Normal	Normal	Normal	Normal
Nitrate	Normal	Non-normal	Non-normal	Non-normal	Non-normal
Nitrite	Non-normal	ND	ND	ND	ND
Oxidation-Reduction Potential	Normal	Non-normal	Non-normal	Non-normal	Non-normal
pH - Field	Non-normal	Non-normal	Normal	Normal	Normal
pH - Laboratory	Normal	Non-normal	Normal	Normal	Normal
Potassium	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal
Sodium	Normal	Non-normal	Normal	Normal	Normal
Specific Conductance	Non-normal	Normal	Normal	Normal	Normal
Sulfate	Normal	Normal	Non-normal	Normal	Non-normal
Temperature	Non-normal	Non-normal	Normal	Normal	Non-normal
Total Coliform	ND	ND	ND	ND	ND
TOC	ND	Normal	Non-normal	Normal	Normal
Vinyl Chloride	ND	ND	Non-normal	Non-normal	Non-normal
Zinc - Dissolved	ND	ND	ND	ND	ND

Notes:

ND = Data set has four or fewer quarters with detects and statistical tests cannot be performed.

September 2019 Shapiro-Wilk Test for Normality Results

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10
Ammonia (N)	ND	ND	Non-normal	Non-normal	Non-normal
Arsenic - Dissolved	Non-normal	Non-normal	Normal	Normal	Non-normal
Barium - Dissolved	Non-normal	Normal	Normal	Normal	Normal
Bicarbonate	Normal	Normal	Normal	Normal	Normal
Calcium	Normal	Non-normal	Normal	Normal	Non-normal
Carbonate	ND	ND	ND	ND	ND
COD	ND	Non-normal	ND	ND	Non-Normal
Chloride	Normal	Non-normal	Non-normal	Non-Normal	Normal
Dissolved Oxygen	Normal	Non-normal	Non-normal	Normal	Non-normal
Iron - Dissolved	ND	ND	Normal	Non-normal	Non-normal
Manganese - Dissolved	ND	Normal	Normal	Normal	Non-normal
Nitrate	Normal	Non-normal	Non-normal	Non-normal	Non-normal
Nitrite	Non-normal	ND	ND	ND	ND
Oxidation-Reduction Potential	Normal	Non-normal	Non-normal	Non-normal	Non-normal
pH - Field	Non-normal	Non-normal	Non-normal	Normal	Normal
pH - Laboratory	Normal	Non-normal	Normal	Normal	Normal
Potassium	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal
Sodium	Normal	Non-normal	Normal	Normal	Normal
Specific Conductance	Normal	Normal	Normal	Normal	Normal
Sulfate	Normal	Normal	Non-normal	Normal	Non-normal
Temperature	Non-normal	Non-normal	Normal	Normal	Non-normal
Total Coliform	ND	ND	ND	ND	ND
TOC	ND	Normal	Non-normal	Normal	Normal
Vinyl Chloride	ND	ND	Non-normal	Non-normal	Non-normal
Zinc - Dissolved	ND	ND	ND	ND	ND

Notes:

ND = Data set has four or fewer quarters with detects and statistical tests cannot be performed.

December 2019 Shapiro-Wilk Test for Normality Results

Constituent or Parameter	MW-1	MW-3	MW-5A	MW-6	MW-7	MW-8	MW-10
Ammonia (N)	Non-normal	ND	NA	Non-normal	NA	Non-normal	Non-normal
Arsenic - Dissolved	Non-normal	Non-normal	Non-normal	Normal	Normal	Normal	Normal
Barium - Dissolved	Non-normal	Normal	NA	Normal	NA	Normal	Normal
Bicarbonate	Non-normal	Non-normal	NA	Non-normal	NA	Non-normal	Non-normal
Calcium	Normal	Normal	NA	Normal	NA	Normal	Non-normal
Carbonate	ND	ND	NA	ND	NA	ND	ND
COD	ND	Non-normal	NA	ND	NA	ND	Non-Normal
Chloride	Normal	Non-normal	NA	Non-normal	NA	Non-normal	Normal
Dissolved Oxygen	Normal	Non-normal	Normal	Non-normal	Normal	Normal	Non-normal
Iron - Dissolved	ND	ND	ND	Normal	ND	Non-normal	Non-normal
Manganese - Dissolved	ND	Normal	ND	Normal	ND	Non-normal	Non-normal
Nitrate	Normal	Non-normal	NA	Non-normal	NA	Non-normal	Non-normal
Nitrite	Non-normal	ND	NA	Non-normal	NA	Non-normal	ND
Oxidation-Reduction Potential	Normal	Non-normal	Normal	Non-normal	Normal	Non-normal	Non-normal
pH - Field	Non-normal	Normal	Normal	Non-normal	Normal	Normal	Normal
pH - Laboratory	Normal	Non-normal	Normal	Non-normal	Normal	Normal	Non-normal
Potassium	Non-normal	Non-normal	NA	Non-normal	NA	Non-normal	Non-normal
Sodium	Normal	Normal	NA	Normal	NA	Normal	Normal
Specific Conductance	Normal	Non-normal	Normal	Normal	Normal	Normal	Normal
Sulfate	Non-normal	Normal	NA	Non-normal	NA	Normal	Non-normal
Temperature	Non-normal	Normal	Normal	Normal	Normal	Normal	Non-normal
Total Coliform	ND	ND	NA	ND	NA	ND	ND
TOC	ND	Normal	NA	Non-normal	NA	Normal	Non-normal
Vinyl Chloride	ND	ND	ND	Non-normal	ND	Non-normal	Non-normal
Zinc - Dissolved	ND	ND	NA	ND	NA	ND	ND

Notes:

ND = Data set has four or fewer quarters with detects and statistical tests cannot be performed.

NA = Not analyzed per the SWHP

March 2019 Results of 95% Confidence Interval Evaluations

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10	Regulatory Level	Basis for Comparison
Ammonia (N)	ND	ND	ND to 42	ND to 45	79 to 98	None	
Arsenic - Dissolved	ND to 0.111	ND to 0.125	0.983 to 1.18	1.48 to 2.02	1.64 to 2.05	0.05 µg/L	Primary GW Standard
Arsenic - Dissolved	ND to 0.111	ND to 0.125	0.983 to 1.18	1.48 to 2.02	1.64 to 2.05	1.29 µg/L	Site-Specific Cleanup Level
Barium - Dissolved	ND to 4.8	12.7 to 15.6	9.73 to 13.3	6.00 to 8.22	12.7 to 15.6	1000 µg/L	Primary GW Standard
Bicarbonate	38.1 to 47.6	149.4 to 213.9	121.9 to 166.6	104.6 to 143.1	160.7 to 193.7	None	
Calcium	10,303 to 11,308	34,000 to 54,000	28,554 to 35,786	21,459 to 27,321	37,485 to 41,905	None	
Carbonate	ND	ND	ND	ND	ND	None	
COD	ND	ND	ND	ND	ND to 13,000	None	
Chloride	3,596 to 4,400	2,440 to 3,420	1,860 to 3,380	2,264 to 2,685	4,296 to 7,284	250,000 µg/L	Secondary GW and DW Standard
Dissolved Oxygen	9.9 to 10.5	0.27 to 1.16	0.20 to 0.43	0.099 to 0.204	0.18 to 0.81	None	
Iron - Dissolved	ND	ND	713 to 1,098	320 to 938	ND to 25	300 µg/L	Secondary GW and DW Standard
Manganese - Dissolved	ND	4,704 to 6,247	638 to 813	2,346 to 3,054	4,306 to 4,873	50 µg/L	Secondary GW and DW Standard
Nitrate	536 to 1,010	ND to 30	ND to 32	53 to 111	ND to 82	10,000 µg/L	Primary GW and DW Standard
Nitrite	ND to 10	ND	3 to 10	4 to 10	ND	1,000 µg/L	Primary DW Standard
Oxidation-Reduction Potential	160.4 to 231.3	140.9 to 218.2	10.8 to 36.8	42.2 to 67.0	93.9 to 139.5	None	
pH - Field	6.1 to 6.5	6.1 to 6.2	6.5 to 6.6	6.5 to 6.6	6.4 to 6.6	6.5 - 8.5	Secondary GW Standard
pH - Laboratory	6.3 to 6.5	6.2 to 6.3	6.5 to 6.7	6.5 to 6.7	6.5 to 6.7	6.5 - 8.5	Secondary GW Standard
Potassium	575 to 710	767 to 1,020	1,120 to 1,520	900 to 1,140	1,050 to 1,310	None	
Sodium	4,297 to 4,619	8,250 to 10,100	6,972 to 8,012	7,557 to 8,663	9,460 to 10,772	20,000 µg/L	Secondary DW Standard
Specific Conductance	114 to 121	293 to 396	292 to 340	208 to 265	362 to 414	700 µmhos/cm	Secondary DW Standard
Sulfate	3,753 to 4,205	13,914 to 18,650	6,100 to 9,200	4,107 to 4,826	7,630 to 9,370	250,000 µg/L	Secondary GW and DW Standard
Temperature	10.7 to 11.0	11.7 to 12.0	11.0 to 11.6	10.3 to 11.0	11.2 to 11.6	None	
Total Coliform	ND	ND	ND	ND	ND	1cfu/100mL	Primary GW and DW Standard
TOC	ND	2,399 to 2,943	1,660 to 2,200	710 to 1,120	2,870 to 3,460	None	
Vinyl Chloride	ND	ND	ND to 0.03	ND to 0.07	ND to 0.02	0.02 µg/L	Primary GW Standard
Vinyl Chloride	ND	ND	ND to 0.03	ND to 0.07	ND to 0.02	0.29 µg/L	Site-Specific Cleanup Level
Zinc - Dissolved	ND	ND	ND	ND	ND	5,000 µg/L	Secondary GW and DW Standard

Notes:

All concentrations reported as µg/L unless otherwise noted.

NA	= Not analyzed per the SWHP
ND	= Data all non-detects or fewer than 5 detections
	= 95% Lower CI Exceeds Regulatory Level (Exceedence)
	= 95% Upper CI Exceeds Regulatory Level but Lower CI Does Not (No Exceedence, No Compliance)
	= 95% Upper CI Does not Exceed Regulatory Level (Compliance)
	= No Regulatory Level

Normally Distributed Data - Parametric Confidence Interval - Data not Transformed

Non-Normally Distributed Data - Non-Parametric Confidence Interval - Log Base-10 Transformed Data

Non-Detects treated as 0

June 2019 Results of 95% Confidence Interval Evaluations

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10	Regulatory Level	Basis for Comparison
Ammonia (N)	ND	ND	ND to 18	ND to 40	36 to 85	None	
Arsenic - Dissolved	0.10 to 0.11	0.103 to .125	1.01 to 1.19	1.53 to 2.03	1.62 to 1.82	0.05 µg/L	Primary GW Standard
Arsenic - Dissolved	0.10 to 0.11	0.103 to 0.125	1.01 to 1.19	1.53 to 2.03	1.62 to 1.82	1.29 µg/L	Site-Specific Cleanup Level
Barium - Dissolved	ND to 4.40	12.2 to 15.8	10.8 to 15.0	5.57 to 8.12	12.7 to 15.5	1000 µg/L	Primary GW Standard
Bicarbonate	39.2 to 48.2	160.5 to 218.3	132.1 to 169.3	107.1 to 143.9	161.2 to 194.2	None	
Calcium	10,242 to 11,255	34,000 to 54,000	29,632 to 36,138	21,685 to 27,425	35,000 to 41,200	None	
Carbonate	ND	ND	ND	ND	ND	None	
COD (mg/L)	ND	ND to 10.2	ND	ND	ND to 13.0	None	
Chloride	3,556 to 4,358	2,440 to 3,380	1,940 to 3,380	2,180 to 2,890	3,975 to 7,022	250,000 µg/L	Secondary GW and DW Standard
Dissolved Oxygen (mg/L)	9.9 to 10.5	0.24 to 1.34	0.20 to 0.75	1.06 to 2.04	0.18 to 0.95	None	
Iron - Dissolved	ND	ND	719 to 1,101	290 to 938	ND to 22	300 µg/L	Secondary GW and DW Standard
Manganese - Dissolved	ND	4,826 to 6,340	659 to 826	2,348 to 3,056	4,261 to 4,846	50 µg/L	Secondary GW and DW Standard
Nitrate	543 to 1,018	ND to 19	ND to 20	20 to 115	ND	10,000 µg/L	Primary GW and DW Standard
Nitrite	ND	ND	ND	ND	ND	1,000 µg/L	Primary DW Standard
Oxidation-Reduction Potential	168 to 236	177 to 232	ND to 33.1	41.7 to 63.8	88.9 to 136	None	
pH - Field	6.2 to 6.5	6.1 to 6.3	6.5 to 6.6	6.5 to 6.6	6.5 to 6.6	6.5 - 8.5	Secondary GW Standard
pH - Laboratory	6.3 to 6.5	6.2 to 6.3	6.5 to 6.6	6.5 to 6.7	6.5 to 6.6	6.5 - 8.5	Secondary GW Standard
Potassium	502 to 642	500 to 930	1,090 to 1,300	600 to 100	976 to 1,210	None	
Sodium	4,314 to 4,634	8,400 to 10,100	8,557 to 9,889	7,166 to 8,132	9,675 to 10,945	20,000 µg/L	Secondary DW Standard
Specific Conductance (µmhos/cm)	109 to 124	303 to 403	263 to 319	214 to 270	359 to 411	700 µmhos/cm	Secondary DW Standard
Sulfate	3,692 to 4,171	14,358 to 18,853	6,140 to 9,200	4,067 to 4,820	7,630 to 9,370	250,000 µg/L	Secondary GW and DW Standard
Temperature (°C)	10.7 to 11.0	11.7 to 12.0	10.9 to 11.4	10.3 to 10.8	11.2 to 11.6	None	
Total Coliform (Colony Forming Units/100 mL)	ND	ND	ND	ND	ND	1/100mL	Primary GW and DW Standard
TOC	ND	2,414 to 2,953	1,730 to 2,200	726 to 1,129	3,092 to 3,415	None	
Vinyl Chloride	ND	ND	ND to 0.02	ND to 0.06	ND to 0.02	0.02 µg/L	Primary GW Standard
Vinyl Chloride	ND	ND	ND to 0.02	ND to 0.06	ND to 0.02	0.29 µg/L	Site-Specific Cleanup Level
Zinc - Dissolved	ND	ND	ND	ND	ND	5,000 µg/L	Secondary GW and DW Standard

Notes:

All concentrations reported as µg/L unless otherwise noted.

ND	= Data all non-detects or 4 or fewer detections
	= 95% Lower CI Exceeds Regulatory Level (Exceedence)
	= 95% Upper CI Exceeds Regulatory Level but Lower CI Does Not (No Exceedence, No Compliance)
	= 95% Upper CI Does not Exceed Regulatory Level (No Exceedence)
	= No Regulatory Level

Normally Distributed Data - Parametric Confidence Interval - Data not Transformed

Non-Normally Distributed Data - Non-Parametric Confidence Interval - Log Base-10 Transformed Data

Non-Detects treated as 0

September 2019 Results of 95% Confidence Interval Evaluations

Constituent or Parameter	MW-1	MW-3	MW-6	MW-8	MW-10	Regulatory Level	Basis for Comparison
Ammonia (N)	ND	ND	ND to 18	ND to 30	73 to 83	None	
Arsenic - Dissolved	0.09 to 0.11	0.10 to 0.12	1.01 to 1.18	1.47 to 1.98	1.62 to 1.82	0.05 µg/L	Primary GW Standard
Arsenic - Dissolved	0.09 to 0.11	0.10 to 0.12	1.01 to 1.18	1.47 to 1.98	1.62 to 1.82	1.29 µg/L	Site-Specific Cleanup Level
Barium - Dissolved	ND to 4.00	12.9 to 15.8	10.4 to 13.9	5.60 to 8.01	12.7 to 15.5	1000 µg/L	Primary GW Standard
Bicarbonate	39.6 to 48.0	162.7 to 215.9	135.8 to 171.6	105.0 to 140.3	163.1 to 193.4	None	
Calcium	10,216 to 11,200	40,099 to 51,200	29,972 to 35,180	21,259 to 26,931	35,000 to 39,700	None	
Carbonate	ND	ND	ND	ND	ND	None	
COD (mg/L)	ND	ND	ND	ND	ND to 12.8	None	
Chloride	3,569 to 4,328	2,440 to 3,300	2,000 to 3,180	2,200 to 2,839	4,153 to 6,965	250,000 µg/L	Secondary GW and DW Standard
Dissolved Oxygen (mg/L)	9.87 to 10.4	0.24 to 1.34	0.20 to 0.40	1.03 to 1.97	0.18 to 0.95	None	
Iron - Dissolved	ND	ND	731 to 1,093	280 to 938	ND to 22	300 µg/L	Secondary GW and DW Standard
Manganese - Dissolved	ND	4,889 to 6,329	668 to 828	2,366 to 3,034	3,950 to 4,870	50 µg/L	Secondary GW and DW Standard
Nitrate	520 to 959	ND to 11	ND	30 to 108	ND	10,000 µg/L	Primary GW and DW Standard
Nitrite	ND	ND	ND	ND	ND	1,000 µg/L	Primary DW Standard
Oxidation-Reduction Potential	170 to 235	165 to 232	ND to 34.1	41.7 to 63.8	88.9 to 136	None	
pH - Field	6.2 to 6.5	6.1 to 6.2	6.5 to 6.6	6.5 to 6.6	6.1 to 6.2	6.5 - 8.5	Secondary GW Standard
pH - Laboratory	6.3 to 6.5	6.1 to 6.3	6.5 to 6.6	6.5 to 6.7	6.5 to 6.6	6.5 - 8.5	Secondary GW Standard
Potassium	511 to 642	550 to 918	1,110 to 1,300	676 to 1,000	1,040 to 1,210	None	
Sodium	4,310 to 4,616	8,770 to 10,100	7,274 to 8,352	7,551 to 8,606	9,791 to 11,058	20,000 µg/L	Secondary DW Standard
Specific Conductance (µmhos/cm)	114 to 121	303 to 403	263 to 319	214 to 270	361 to 411	700 µmhos/cm	Secondary DW Standard
Sulfate	3,737 to 4,219	14,665 to 18,985	6,400 to 8,820	4,090 to 4,805	7,650 to 8,800	250,000 µg/L	Secondary GW and DW Standard
Temperature (°C)	10.7 to 11.0	11.7 to 12.0	11.0 to 11.4	10.3 to 10.8	10.7 to 11.0	None	
Total Coliform (Colony Forming Units/100 mL)	ND	ND	ND	ND	ND	1/100mL	Primary GW and DW Standard
TOC	ND	2,411 to 2,925	1,860 to 2,190	717 to 1,103	3,077 to 3,391	None	
Vinyl Chloride	ND	ND	ND to 0.02	ND to 0.06	ND to 0.02	0.02 µg/L	Primary GW Standard
Vinyl Chloride	ND	ND	ND to 0.02	ND to 0.06	ND	0.29 µg/L	Site-Specific Cleanup Level
Zinc - Dissolved	ND	ND	ND	ND	ND	5,000 µg/L	Secondary GW and DW Standard

Notes:

All concentrations reported as µg/L unless otherwise noted.

ND	= Data all non-detects or 4 or fewer detections
	= 95% Lower CI Exceeds Regulatory Level (Exceedence)
	= 95% Upper CI Exceeds Regulatory Level but Lower CI Does Not (No Exceedence, No Compliance)
	= 95% Upper CI Does not Exceed Regulatory Level (No Exceedence)
	= No Regulatory Level

Normally Distributed Data - Parametric Confidence Interval - Data not Transformed

Non-Normally Distributed Data - Non-Parametric Confidence Interval - Log Base-10 Transformed Data

Non-Detects treated as 0

December 2019 Results of 95% Confidence Interval Evaluations

Constituent or Parameter	MW-1	MW-3	MW-5A	MW-6	MW-7	MW-8	MW-10	Regulatory Level	Basis for Comparison
Ammonia (N)	40 to 40	ND	NA	40 to 42	NA	40 to 43	77 to 94	None	
Arsenic - Dissolved	0.09 to 0.11	0.099 to 0.122	0.140 to 0.589	0.945 to 1.14	0.257 to 0.490	1.35 to 1.84	1.71 to 2.06	0.05 µg/L	Primary GW Standard
Arsenic - Dissolved	0.09 to 0.11	0.099 to 0.122	0.140 to 0.589	0.945 to 1.14	0.257 to 0.490	1.35 to 1.84	1.71 to 2.06	1.29	Site-Specific Cleanup Level
Barium - Dissolved	3.5 to 5.0	13.4 to 15.9	NA	10.4 to 13.7	NA	5.68 to 7.85	13.02 to 15.56	1000 µg/L	Primary GW Standard
Bicarbonate (mg of CaCO ₃ /L)	38.5 to 51.0	133 to 223	NA	114 to 180	NA	96.4 to 160	160 to 199	None	
Calcium	10,190 to 11,066	39,140 to 47,910	NA	28,362 to 34,763	NA	20,451 to 25,724	35,500 to 41,200	None	
Carbonate (mg of CaCO ₃ /L)	ND	ND	NA	ND	NA	ND	ND	None	
COD	ND	ND to 10	NA	ND	NA	ND	ND to 12.6	None	
Chloride	3,623 to 4,282	2,440 to 3,300	NA	1,940 to 3,180	NA	2,180 to 2,659	5,113 to 8,442	250,000 µg/L	Secondary GW and DW Standard
Dissolved Oxygen (mg/L)	9.83 to 10.3	0.29 to 0.94	8.89 to 10.8	0.22 to 0.49	7.14 to 8.47	11.1 to 20.6	0.22 to 0.59	None	
Iron - Dissolved	ND	ND	ND	725 to 1,043	ND	280 to 799	20 to 23.9	300 µg/L	Secondary GW and DW Standard
Manganese - Dissolved	ND	4,868 to 6,143	ND	651 to 800	ND	2,350 to 3,020	4,000 to 4,870	50 µg/L	Secondary GW and DW Standard
Nitrate	518 to 910	20.0 to 28.0	NA	ND to 24.0	NA	34.0 to 132	ND to 20	10,000 µg/L	Primary GW and DW Standard
Nitrite	ND to 10	ND	NA	ND to 10	NA	ND to 10	ND	1,000 µg/L	Primary DW Standard
Oxidation-Reduction Potential	174 to 236	177 to 234	111 to 270	15.0 to 35.8	70.0 to 276	42.7 to 67.0	94.6 to 137	None	
pH - Field	6.2 to 6.5	6.1 to 6.2	6.5 to 6.8	6.5 to 6.7	6.6 to 6.7	6.5 to 6.7	6.5 to 6.6	6.5 - 8.5	Secondary GW Standard
pH - Laboratory	6.3 to 6.5	6.2 to 6.3	6.5 to 6.9	6.5 to 6.7	6.5 to 6.8	6.5 to 6.8	6.5 to 6.7	6.5 - 8.5	Secondary GW Standard
Potassium	577 to 681	767 to 979	NA	1,170 to 1,490	NA	939 to 1,060	1,070 to 1,310	None	
Sodium	4,282 to 4,564	8,560 to 9,672	NA	7,209 to 8,296	NA	7,431 to 8,409	9,604 to 10,961	20,000 µg/L	Secondary DW Standard
Specific Conductance (µmhos/cm)	114 to 121	325 to 443	99.0 to 114	252 to 309	90.4 to 108	209 to 262	114 to 121	700 µmhos/cm	Secondary DW Standard
Sulfate	3,620 to 4,200	14,131 to 18,116	NA	6,400 to 8,470	NA	4,064 to 4,713	7,650 to 8,500	250,000 µg/L	Secondary GW and DW Standard
Temperature (°C)	10.8 to 11.0	11.7 to 12.2	10.8 to 12.3	11.1 to 11.6	9.7 to 11.5	10.5 to 11.0	11.2 to 11.6	None	
Total Coliform (colony forming units per 100 mL)	ND	ND	NA	ND	NA	ND	ND	1/100mL	Primary GW and DW Standard
TOC	ND	2,442 to 2,992	NA	1,860 to 2,190	NA	733 to 1,100	2,870 to 3,460	None	
Vinyl Chloride	ND	ND	ND	ND to 0.02	ND	0.02 to 0.06	ND to 0.02	0.02 µg/L	Primary GW Standard
Vinyl Chloride	ND	ND	ND	ND to 0.02	ND	0.02 to 0.06	ND to 0.02	0.29 µg/L	Site-Specific Cleanup Level
Zinc - Dissolved	ND	ND	NA	ND	NA	ND	ND	5,000 µg/L	Secondary GW and DW Standard

Notes:

All concentrations reported as µg/L unless otherwise noted.

NA = Not analyzed per the SWHP

ND = Data all non-detects or 4 or fewer detections

 = 95% Lower CI Exceeds Regulatory Level (Exceedence)

 = 95% Upper CI Exceeds Regulatory Level but Lower CI Does Not (No Exceedence, No Compliance)

 = 95% Upper CI Does not Exceed Regulatory Level (No Exceedence)

 = No Regulatory Level

Normally Distributed Data - Parametric Confidence Interval - Data not Transformed

Non-Normally Distributed Data - Non-Parametric Confidence Interval - Log Base-10 Transformed Data

Non-Detects treated as 0

Appendix C:
Inspection, Maintenance, and Engineering Summary for 2019

Inspection, Maintenance, and Engineering Summary for 2019

The bulleted items below present a summary of the inspection, maintenance, and engineering tasks that were performed by SWD during 2018 at the Olalla Landfill.

- EPI conducted groundwater and landfill gas monitoring activities in all four quarters of 2019. The results are discussed in this report.
- EPI continued reporting and data analysis in accordance with Section IV of the SWHP and the CAP. The results are discussed in this report.
- SWD supported KPHD in quarterly inspections conducted at the Landfill. After the inspections, KPHD stated that no problems were noted during the inspections.
- SWD conducted regular inspections of the Landfill and its engineered systems including evaluation of the drainage systems and potential erosion areas. During 2018, all systems were operating as designed.
- SWD worked with other divisions in KCPW to maintain the systems at the Landfill including maintenance of the cap, stormwater drainage systems, and the stormwater detention pond. During 2019, routine maintenance was required including mowing of the cap and removal of vegetation.

**Appendix D:
Activities Planned for 2020**

Activities Planned for 2020

The bulleted items below present a summary of the planned inspections, maintenance and engineering activities planned for 2020 by SWD at the Olalla Landfill.

- Quarterly monitoring, sampling, and reporting will continue in accordance with Section IV of the SWHP and the CAP. SWD will continue to contract with TRC Environmental Corporation (TRC; formerly EPI) for monitoring and sampling activities for 2020.
- TRC will continue to conduct the reporting and data analysis in accordance with Section IV of the SWHP and the CAP.
- Regular inspections of the Landfill and its engineered systems will be conducted.
- SWD will continue to support KPHD in their quarterly inspections of the Landfill.
- SWD will continue to work with other divisions in the KCPW to maintain the systems at the Landfill including maintenance of the cap, stormwater drainage systems and the stormwater detention pond.

Attachment 1:
2019 Quarterly Monitoring Field Data Sheets

Olalla Landfill Quarterly Monitoring Field Book March 2019



**Olalla Landfill
Kitsap County, Washington
Project Number: 45407.0**

**Environmental Partners, Inc.
1180 NW Maple Street, Suite 310
Issaquah, Washington 98027
(425) 395-0010**



- NOTES:**
- - - APPROXIMATE PROPERTY BOUNDARY
 - ~ PERIMETER ACCESS ROAD
 - MW-6 ● MONITORING WELL
 - SW-2 ▲ SURFACE WATER SAMPLING LOCATION
 - ☒ LANDFILL GAS FLARE



FIGURE 1-2			
OLALLA LANDFILL MONITORING WELL, FLARE, AND SURFACE WATER SAMPLING LOCATIONS KITSAP COUNTY, WASHINGTON			
PREPARED BY	ENVIRONMENTAL PARTNERS INC		
PROJECT	OLALLA LANDFILL QAPP/45403.0		
LOCATION	2850 SE BURLEY-OLALLA ROAD OLALLA, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
2/25/15	ALW/CLM	ALW/CLM	45403.0

**Table 2-1: CAP and SWHP Monitoring Schedule
Olalla Landfill, Kitsap County, WA**

Sample Location	First Quarter								Second and Third Quarters								Fourth Quarter													
	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Fecal Coliform	Geochemical	TOC / COD	Landfill Gas Parameters	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Geochemical	TOC / COD	Landfill Gas Parameters	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Fecal Coliform	Geochemical	TOC / COD	D. Metals - COC list	pH (field and lab)	Vinyl Chloride	Landfill Gas Parameters	
MW-1	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
MW-2	■								■									■												
MW-3	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
MW-4	■								■									■												
MW-5	■								■									■												
MW-5A	■								■									■	■							■	■	■		
MW-6	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
MW-7	■								■									■	■							■	■	■		
MW-8	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
MW-10	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
SW-2 ¹		■				■	■												■				■	■						
Flares 1, 2, 3								■									■													■

Notes:

¹ Surface water sample from SW-2 collected during first quarter or fourth quarter, not both quarters.

Field Parameters = pH, specific conductance, temperature, ORP, and DO

VOCs = Volatile organic compounds by EPA Method 8260C standard list, vinyl chloride by selective ion monitoring (SIM)

T (total) Metals = calcium, potassium, sodium

D (dissolved) Metals = arsenic, barium, iron, manganese, zinc

Geochemical = alkalinity, ammonia, bicarbonate, carbonate, chloride, sulfate, nitrate, nitrite, pH

TOC / COD = total organic carbon / chemical oxygen demand

Dissolved Metals - COC list = arsenic, iron, manganese

Landfill gas parameters = methane (%LEL), oxygen(% vol), carbon dioxide (% vol), and gas pressure

Instrument Calibration Log - Olalla Landfill Monitoring

Calibrated By: _____

Date: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
pH					
pH Electrode					

Calibrated: _____ to 4.00 buffer _____ to 7.00 buffer _____ to 10.00 buffer at _____ °C

Slope = _____ Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
Specific Cond.					

Specific Conductance: Calibrated _____ μS/cm to _____ μS/cm calibration standa

Electrical Conductivity: Calibrated _____ μS/cm to _____ μS/cm calibration standard at _____ °C

Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
ORP Meter					
ORP Electrode					

Electrode measured _____ millivolts at _____ °C using Zobell prepared on ____ / ____ / ____

Table value for Zobell solution at this temperature is _____ mV.

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
Turbidity					

Meter reads _____ NTUs using _____ NTUs standa Comments: _____

Meter reads _____ NTUs using _____ NTUs standa

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
DO Meter					

Air-Calibration: Measured temperature _____ °C corresponds to _____ mg/L DO (from Table I)

Atmospheric pressure / elevation correction factor _____ (from Table II)

Corrected calibration value _____ mg/L DO (Table I value multiplied by Table II value)

Comments: _____

Multiparameter Probe Calibration Log - Olalla Landfill Groundwater Monitoring

Meter Type	Manufacturer	Model Number	Mfg. Serial#	Rental Co. Serial #	Date	Time
multi meter	YSI	PRODS	16F10482	PRODS10	3/27/19	

Calibrated to Autocal Solution

Calibration Solution Manufacturer _____ Lot Number _____ Exp. Date _____

pH = _____ Turbidity = _____ Temperature = _____

Conductivity = _____ Dissolved Oxygen = _____ ORP = _____

Comments: Calibrated by Equipco, see attached certification of calibration

Meter Type	Manufacturer	Model Number	Mfg. Serial#	Rental Co. Serial #	Date	Time

Calibrated to Autocal Solution

Calibration Solution Manufacturer _____ Lot Number _____ Exp. Date _____

pH = _____ Turbidity = _____ Temperature = _____

Conductivity = _____ Dissolved Oxygen = _____ ORP = _____

Comments:

Depth to Water Measurement Field Data - Olalla Landfill Monitoring

Well	Time	Measuring Point Elevation (ft. NGVD ¹)	Depth to Water (ft.)	Comments and Well Inspection ² Notes
MW-1	08:33	343.79	76.68	No changes since last quarter
MW-2	15:37	323.25	63.52	
MW-3	09:55	296.95	43.24	
MW-4	15:43	320.93	60.30	
MW-5	09:37	334.17	9.40	
MW-5A	09:40	332.53	73.90	
MW-6	13:00	271.17	19.27	
MW-7	15:26	280.43	23.44	
MW-8	14:15	272.85	19.79	
MW-10	11:13	279.21	28.24	

Notes:

¹NGVD = National Geodetic Vertical Datum (1929)

²Observations regarding the condition of the well and surrounding area (e.g., protective casing, surface seal, cap, lock, bollards, soil conditions near the well such as depressions, ponded surface water, or other subsidence features, and any installed sampling equipment).

Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-1</u>	Date	27-Mar-19
Sample ID	<u>MW1-6w-3/2019</u>	Field Team: (Initials)	ELC
Field Conditions	<u> Sunny, 40°F</u>		

Purge Information

Well Diameter (in.)	<u>2"</u>	Purge Method	<u>Submersible pump</u>
Well Depth (ft.)	<u>57</u>		Peristaltic Pump
Initial Depth to Water (ft.)	<u>76.68</u>		Bladder Pump
Depth of Water Column	<u>10.32</u>		Other: :
1 Casing Volume	<u>1.65</u>	Start Time	<u>0854</u>
Controller Setting (Hz)	<u>208</u>	End Time	<u>0920</u>
		Total Gallons Purged	<u>18</u>

Time	Gallons	pH	Conductivity <i>ns/cm</i>	NTU	DO <i>Mg/L</i>	Temp.	ORP <i>mV</i>	Appearance
0857	2.5	6.72	0.105		10.75	10.5	232.8	clear
0902	6.5	6.64	0.105		11.54	10.7	251.1	"
0905	10	6.68	0.105		10.45	10.7	258.2	"
0908	11.5	6.68	0.105		10.45	10.7	261.2	"
0911	13.5	6.64	0.105		10.43	10.7	264.7	"
0914	15	6.64	0.105		10.42	10.7	267.2	"
0917	16.5	6.64	0.105	0.6	10.41	10.7	268.0	"

Sample Information

Sample Method(s) Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	<u>0918</u>	<u>348</u> 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 0918

Comments / Exceptions:

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	MW-3	Date	27-Mar-19
Sample ID	MW3-GW-3/19 47d	Field Team: (Initials)	ELC
Field Conditions	Sunny, 45°F Duplicate MW9-GW-3/19		

Purge Information

Well Diameter (in.)	2"	Purge Method	Submersible pump
Well Depth (ft.)	55.5		Peristaltic Pump
Initial Depth to Water (ft.)	43.24		Bladder Pump
Depth of Water Column	12.26		Other: :
1 Casing Volume	1.96	Start Time	10:13
Controller Setting (Hz)	143	End Time	10:41
		Total Gallons Purged	12.5

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
10:16	1.5	6.37	0.43		4.26	11.4	274.6	cloud
10:19	3	6.36	0.425		2.88	11.6	264.1	"
10:22	4.5	6.36	0.427		2.31	11.7	255.8	"
10:25	5.25	6.37	0.426		1.95	11.8	247.4	"
10:28	6.5	6.37	0.424		1.73	11.7	241.1	"
10:31	8	6.37	0.425		1.60	11.7	236.5	"
10:34	9.5	6.37	0.425		1.55	11.8	234.1	"
10:37	11	6.37	0.425	1.8	1.49	11.8	230.7	"

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	10:38	3 (4) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 10:40

Comments / Exceptions:

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	MW-10	Date	27-Mar-19
Sample ID	MW10-GW-3/19	Field Team: (Initials)	ELC
Field Conditions	Sunny, 50°F		

Purge Information

Well Diameter (in.)	2	Purge Method	Submersible pump
Well Depth (ft.)	47		Peristaltic Pump
Initial Depth to Water (ft.)	28.24		Bladder Pump
Depth of Water Column	18.76	Other: :	
1 Casing Volume	2.00	Start Time	11:24
Controller Setting (Hz)	123	End Time	11:51
		Total Gallons Purged	13

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
11:27	1	6.79	0.395		4.20	11.0	143.4	cloudy
11:30	3	6.77	0.394		2.69	11.2	124.1	"
11:33	5	6.77	0.394		2.14	11.2	114.3	"
11:36	6	6.76	0.394		1.77	11.2	105.2	"
11:39	7.5	6.76	0.394		1.58	11.3	99.2	"
11:42	9	6.77	0.395		1.45	11.3	97.7	"
11:45	10.25	6.77	0.394		1.35	11.3	89.2	"
11:48	12	6.77	0.394	1.8	1.28	11.3	87.1	"

Sample Information

Sample Method(s) Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	11:49	347 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 11:52

Comments / Exceptions:

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-6</u>	Date	27-Mar-19
Sample ID	<u>MW6-GW-3/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>Partly cloudy, 51°F</u>		

Purge Information

Well Diameter (in.)	<u>2"</u>	Purge Method	Submersible pump
Well Depth (ft.)	<u>35</u>		Peristaltic Pump
Initial Depth to Water (ft.)	<u>14.27</u>		Bladder Pump
Depth of Water Column	<u>15.73</u>		Other: :
1 Casing Volume	<u>2.51</u>	Start Time	<u>13:23</u>
Controller Setting (Hz)	<u>107</u>	End Time	<u>13:55</u>
		Total Gallons Purged	<u>22</u>

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
13:27	2.5	6.61	0.396		3.42	10.9	52.6	Slightly cloudy
13:30	5	6.61	0.390		2.58	10.9	44.2	"
13:33	6	6.61	0.386		2.00	10.9	37.1	clearing up
13:37	8	6.61	0.382		1.68	10.9	32.0	clear
13:40	11	6.61	0.380		1.52	10.9	24.6	"
13:42	13	6.61	0.377		1.41	10.9	27.4	"
13:45	18	6.61	0.373		1.23	10.9	27.8	"
13:53	20.5	6.61	0.371	1.5	1.18	10.9	22.6	"

Sample Information

Sample Method(s): Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	<u>13:54</u>	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 13:55

Comments / Exceptions:

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-8</u>	Date	27-Mar-19
Sample ID	<u>MW8-GW-3/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>Partly Cloudy, 50°F</u>		

Purge Information

Well Diameter (in.)	2	Purge Method	Submersible pump
Well Depth (ft.)	38		Peristaltic Pump
Initial Depth to Water (ft.)	19.79		Bladder Pump
Depth of Water Column	18.21	Other:	
1 Casing Volume	2.21	Start Time	14:58
Controller Setting (Hz)	1.08	End Time	14:0
		Total Gallons Purged	12

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
1440	1	6.83	0.202		4.61	10.2	69.7	Slightly cloudy ✓
1444	2.5	6.79	0.227		3.27	10.4	66.1	"
1447	4	6.78	0.232		2.90	10.5	69.3	"
1450	5.5	6.77	0.237		2.78	10.5	72.0	"
1456	8	6.76	0.244		2.55	10.5	67.3	"
1459	9.5	6.76	0.246		2.49	10.5	67.2	"
1402	11	6.76	0.246	5.32	2.48	10.5	67.0	"

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	1404	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 1406

Comments / Exceptions:

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Landfill Gas Monitoring Field Data - Olalla Landfill Monitoring

Instrument Used:	LanTec Gem 2000	Date and Time:	3/27/19
Ambient Temperature:	≈ 52°F	Field Team:	F. Cuddy
Field Conditions:	Partly cloudy, light breeze		

Landfill Gas Data

Flare #	Time	Methane (% vol.)	% LEL	Oxygen (% vol.)	Carbon Dioxide (% vol.)	Temperatur e (°C)	Gas Pressure ("H ₂ O)
3	15:52	0-2	2	19.9	0.1		0.01
1	16:01	0	0	19.8	0.1		0.01
2	16:05	3.4	69	4.2	9.1		0.01

Comments / Inspection Results¹

¹Inspect the following: lock and gate operation, tightness of bolts and clamps, differential settlement, valve operation, debris or breaks in hose barb.



RENTALS

YSI ProDSS RENTAL CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: *[Signature]*

DATE: *3/26/19*

RENTAL CUSTOMER: *EPT*

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSIPRODSS. *10*

SERIAL NUMBER: *16F104828*

CALIBRATION INFORMATION

PARAMETER:	STANDARD:	PASS ()	LOT #
1. CONDUCTIVITY	1,000 µMhos	<i>X</i>	<i>S5029</i>
2. pH ZERO	pH 7	<i>X</i>	<i>S3906</i>
pH SLOPE	pH 4	<i>X</i>	<i>S3605</i>
pH SLOPE	pH 10	<i>X</i>	<i>S4049</i>
3. DISSOLVED OXYGEN	Air Calibration Barometric pressure = 760mmHg	<i>X</i>	N/A
4. TURBIDITY ZERO	0.0 NTU's	—	N/A
TURBIDITY SPAN	20 NTU's	—	—
5. REDOX (ORP)	231mV (YSI Zobell solution)	<i>X</i>	<i>012616</i>

EQUIPCO

CES LANDTECH MODEL: GEM 2000 CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: VM

DATE: 3/26/19

INSTRUMENT INFORMATION

RENTAL ID: GEM2000. 11

SERIAL NUMBER: G107638/01

CALIBRATION INFORMATION

1..CALIBRATION GAS: 35 % CO₂

LOT #: 573162

GAS RESPONSE: 35 % CO₂ +2%

2. CALIBRATION GAS: 50 % Vol. Methane

LOT #: 573162

GAS RESPONSE: 50 % Vol. Methane +2%

OXYGEN RESPONSE IN FRESH AIR ENVIRONMENT: 20.9%

OXYGEN DOWNSCALE RESPONSE CHECKED: 0% WITH 99.9% Nitrogen

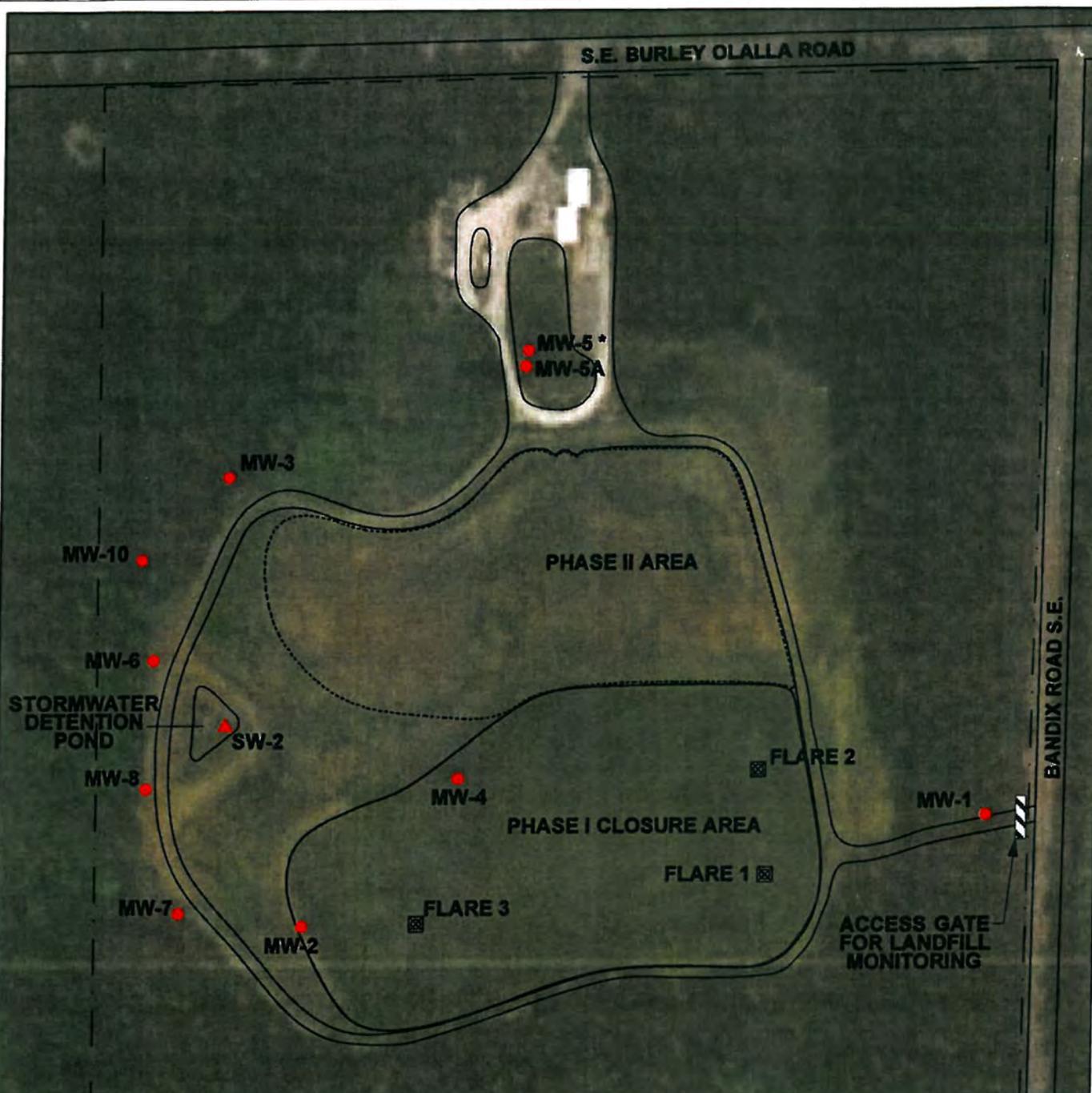
THIS INSTRUMENT HAS BEEN CALIBRATED TO STANDARDS SET FORTH BY THE
MANUFACTURER

Olalla Landfill Quarterly Monitoring Field Book June 2019



**Olalla Landfill
Kitsap County, Washington
Project Number: 45407.0**

**Environmental Partners, Inc.
1180 NW Maple Street, Suite 310
Issaquah, Washington 98027
(425) 395-0010**



S.E. BURLEY OLALLA ROAD

BANDIX ROAD S.E.

PHASE II AREA

PHASE I CLOSURE AREA

STORMWATER DETENTION POND

ACCESS GATE FOR LANDFILL MONITORING

FIGURE 1-2

OLALLA LANDFILL
MONITORING WELL, FLARE, AND SURFACE WATER SAMPLING LOCATIONS
KITSAP COUNTY, WASHINGTON

BASE MAP SOURCE
- Google Earth

TOPOGRAPHIC CONTOUR SOURCE
- KITSAP COUNTY PARCEL VIEWER

MW-4 is completed in a shallow perched groundwater zone.

- NOTES:**
- - - APPROXIMATE PROPERTY BOUNDARY
 - ~ PERIMETER ACCESS ROAD
 - MW-6 ● MONITORING WELL
 - SW-2 ▲ SURFACE WATER SAMPLING LOCATION
 - ☒ LANDFILL GAS FLARE



PREPARED BY	 ENVIRONMENTAL PARTNERS INC		
PROJECT	OLALLA LANDFILL QAPP/45403.0		
LOCATION	2850 SE BURLEY-OLALLA ROAD OLALLA, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
2/25/15	ALW/CLM	ALW/CLM	45403.0

Instrument Calibration Log - Olalla Landfill Monitoring

Calibrated By: Equipco - See calibration cert Date: 6/18/19

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
MULTIMETER pH	YSI	PROBUS	16J104005	17	
pH Electrode					

Calibrated: to 4.00 buffer to 7.00 buffer to 10.00 buffer at _____ °C

Slope = _____ Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
Specific Cond.					

Specific Conductance: Calibrated _____ μS/cm to _____ μS/cm calibration standa

Electrical Conductivity: Calibrated _____ μS/cm to _____ μS/cm calibration standard at _____ °C

Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
ORP Meter					
ORP Electrode					

Electrode measured _____ millivolts at _____ °C using Zobell prepared on / /

Table value for Zobell solution at this temperature is _____ mV.

*Equipco
cal day*

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
Turbidity	Hanna	HI 98703	FO055292		

Meter reads 100 NTUs using 100 NTUs standa Comments: Under grant

Meter reads 15 NTUs using 15 NTUs standa

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
DO Meter					

Air-Calibration: Measured temperature _____ °C corresponds to _____ mg/L DO (from Table I)

Atmospheric pressure / elevation correction factor _____ (from Table II)

Corrected calibration value _____ mg/L DO (Table I value multiplied by Table II value)

Comments: _____

Attachment B: Olalla Landfill MFS Monitoring Recommended Equipment List

Field Instruments Provided by Consultant:	Example
Multi-parameter meter or individual meters as noted:	YSI 556
pH meter	Orion 250A
Specific conductance meter	YSI Pro 30
Dissolved oxygen meter	YSI Model 50B
ORP meter	YSI ORP15
Turbidity meter	LaMott 2020 ✓
Flow-through cell for field parameter instruments	
Landfill gas meter (rented)	Landtech GEM 5000, or equivalent ✓
Water Level Indicator	Solinst, Heron, Slope Indicator ✓
Equipment to Obtain from the County:	
Keys to Bandix Road Gate, wells, and gates to flares	✓
Grundfos Rediflow II pump controller and electrical cables	✓
Equipment Provided by Consultant:	
Appropriate gas powered generator (Honda eu2000i or equivalent)	✓ <i>rent</i>
Power cord for generator	✓
Extra fuel for generator in DOT-approved container(s)	✓ <i>hoses</i>
Field logbook with appropriate field data forms	✓
Pens	✓
Sample bottles and coolers	✓
Spray bottles	✓
Appropriate PPE (see HASP)	✓
5-gallon purge water buckets	✓ <i>hoses</i>
Watch or phone for sample times	✓
Utility knife or equivalent	✓
Cell Phone	✓
Expendible Supplies:	
0.45 micron in-line filters for dissolved metals samples	✓ <i>shod</i>
Nitrile gloves	✓
Garbage bags	✓
Ziploc-type bags	✓ <i>shod</i>
Paper towels	✓
Ice	✓ <i>bag</i>
Distilled or deionized water	
Liquinox™ or equivalent non-phosphate detergent	
Chain of custody forms	✓
Strapping tape (if shipping sample coolers)	
Clear packing tape (if shipping sample coolers)	
Calibration fluids for pH, specific conductance, DO, and ORP	
Calibration gases (methane, oxygen, CO ₂) and appropriate regulators and hoses	
Extra batteries or charging cords for meters and water level indicator	

Notes:

- DOT = Department of Transportation
- CO₂ = Carbon dioxide
- HASP = Health and safety plan
- ORP = Oxidation reduction potential
- PPE = Personal protective equipment
- YSI = Yellow Springs Instruments

**Table 2-1: CAP and SWHP Monitoring Schedule
Olalla Landfill, Kitsap County, WA**

Sample Location	First Quarter								Second and Third Quarters								Fourth Quarter												
	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Fecal Coliform	Geochemical	TOC / COD	Landfill Gas Parameters	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Geochemical	TOC / COD	Landfill Gas Parameters	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Fecal Coliform	Geochemical	TOC / COD	D. Metals - COC list	pH (field and lab)	Vinyl Chloride	Landfill Gas Parameters
MW-1	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■				
MW-2	■									■								■											
MW-3	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■				
MW-4	■									■								■											
MW-5	■									■								■											
MW-5A	■									■								■	■							■	■	■	
MW-6	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■				
MW-7	■									■								■	■							■	■	■	
MW-8	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■				
MW-10	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■				
SW-2 ¹		■				■	■												■				■	■					
Flares 1, 2, 3								■									■												■

Notes:

¹ Surface water sample from SW-2 collected during first quarter or fourth quarter, not both quarters.

Field Parameters = pH, specific conductance, temperature, ORP, and DO

VOCs = Volatile organic compounds by EPA Method 8260C standard list, vinyl chloride by selective ion monitoring (SIM)

T (total) Metals = calcium, potassium, sodium

D (dissolved) Metals = arsenic, barium, iron, manganese, zinc

Geochemical = alkalinity, ammonia, bicarbonate, carbonate, chloride, sulfate, nitrate, nitrite, pH

TOC / COD = total organic carbon / chemical oxygen demand

Dissolved Metals - COC list = arsenic, iron, manganese

Landfill gas parameters = methane (%LEL), oxygen(% vol), carbon dioxide (% vol), and gas pressure

Table 3-1: Monitoring Well Construction Data Summary
Olalla Landfill, Kitsap County, WA

Well	Total Well Depth (ft bgs)	Measuring Point Elevation (ft NGVD 29)	Surface Elevation (ft NGVD 29)	Screened Interval (ft bgs)	Northing	Easting	Measuring Point Description
MW-1	87	343.79	342.53	82-87	161858.133	560525.840	Pump wellhead
MW-2	73	323.25	318.95	68-73	161704.534	559572.839	Top of PVC casing
MW-3	55.5	296.95	294.95	50.5-55.5	162333.903	559463.060	Pump wellhead
MW-4	68	320.93	317.35	63-68	161911.192	559787.735	Top of PVC casing
MW-5	35.5	334.17	332.78	25-35	162510.115	559878.901	Top of PVC casing
MW-5A	98	332.53	331.43	86-96	162487.878	559875.742	Pump wellhead
MW-6	35	271.17	269.14	28-33	162077.699	559358.970	Pump wellhead
MW-7	33	280.43	278.21	21-31	161723.016	559398.979	Pump wellhead
MW-8	38	272.85	270.73	25-35	161897.813	559350.147	Pump wellhead
MW-10	47	279.21	276.84	37-47	162218.490	559340.899	Pump wellhead

Notes:

NGVD 29 = National Geodetic Vertical Datum (1929)

bgs = below ground surface

Depth to Water Measurement Field Data - Olalla Landfill Monitoring

Well	Time	Measuring Point Elevation (ft. NGVD ¹)	Depth to Water (ft.)	Comments and Well Inspection ² Notes
MW-1	08:18	343.79	77.63	
MW-2	15:04	323.25	64.84	-same issues as before
MW-3	09:39	296.95	44.67	
MW-4	15:11	320.93	61.72	no boes same issues as before - can't lock, casing sticks out
MW-5	09:23	334.17	11.02	
MW-5A	09:25	332.53	75.01	
MW-6	12:25	271.17	20.52	
MW-7	14:47	280.43	25.08	
MW-8	13:38	272.85	21.03	
MW-10	10:55	279.21	24.55	

Notes:

¹NGVD = National Geodetic Vertical Datum (1929)

²Observations regarding the condition of the well and surrounding area (e.g., protective casing, surface seal, cap, lock, bollards, soil conditions near the well such as depressions, ponded surface water, or other subsidence features, and any installed sampling equipment).

Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-1</u>	Date	20-Jun-19
Sample ID	<u>Olalla-GW-MW1-6/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>Partly cloudy, 60°F</u>		

Purge Information

Well Diameter (in.)	<u>2.1</u>	Purge Method :	<u>Submersible pump</u>
Well Depth (ft.)	<u>281</u>		Peristaltic Pump
Initial Depth to Water (ft.)	<u>77.63</u>		Bladder Pump
Depth of Water Column	<u>9.37</u>		Other: :
1 Casing Volume	<u>1.5</u>	Start Time	<u>8:57</u>
Controller Setting (Hz)	<u>206.6</u>	End Time	<u>9:00</u>
	<i>ms/cm</i>	Total Gallons Purged	<u>16</u>

Time	Gallons	pH	Conductivity	NTU	DO ^{mg/L}	Temp. ^{°C}	ORP ^{mV}	Appearance
0840	2.5	6.41	0.107		9.91	10.8	200.9	Clear
0843	5	6.40	0.107		9.91	10.9	210.5	"
0846	7.5	6.41	0.107		9.90	10.9	217.2	"
0849	9	6.41	0.107		9.90	11.0	225.7	"
0852	11.5	6.41	0.107		9.89	11.0	225.9	"
0855	13	6.41	0.107		9.90	11.0	228.2	"
0858	15	6.41	0.107	0.30	9.90	11.0	229.1	"

*Alexis write
Alexis write*

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	0858	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	
End Time	<u>09:00</u>			

Comments / Exceptions:

- tube broken on gate - needs welding

Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MLW-3</u>	Date	20-Jun-19
Sample ID	<u>Olalla-GW-MLW3-6/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>Partly cloudy, 60°F</u>		

Purge Information

Well Diameter (in.)	<u>3</u>	Purge Method	<u>Submersible pump</u>
Well Depth (ft.)	<u>55.5</u>		Peristaltic Pump
Initial Depth to Water (ft.)	<u>44.67</u>		Bladder Pump
Depth of Water Column	<u>10.83</u>		Other: _____
1 Casing Volume	<u>1.7</u>	Start Time	<u>0945</u>
Controller Setting (Hz)	<u>148.0</u>	End Time	<u>1012</u>
		Total Gallons Purged	<u>13.5</u>

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
0951	1.5	11.6	0.384		1.74	11.6	245.2	cloudy
0954	3.5	6.15	0.380		1.61	11.8	240.6	"
0957	5	6.16	0.378		1.55	11.8	230.8	"
10:00	7	6.15	0.384		1.52	11.8	237.7	"
10:03	9	6.15	0.380		1.49	11.8	230.7	"
10:06	11	6.16	0.381		1.47	11.8	228.0	"
10:09	12.5	6.15	0.379	0.29	1.45	11.8	226.8	"

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	10:10	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 10:10

Comments / Exceptions:

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	MW-10	Date	20-Jun-19
Sample ID	Olalla-GW-MW10-6/19	Field Team: (Initials)	ELC
Field Conditions	Partly Cloudy, 60°F		

Purge Information

Well Diameter (in.)	2	Purge Method	<u>Submersible pump</u>
Well Depth (ft.)	47		Peristaltic Pump
Initial Depth to Water (ft.)	29.55		Bladder Pump
Depth of Water Column	17.45	Other: :	
1 Casing Volume	2.79	Start Time	11:03
Controller Setting (Hz)	127.0	End Time	11:28
		Total Gallons Purged	9.5

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
11:06	1	6.61	0.359		1.79	10.8	140.3	Clear
11:09	2.25	6.60	0.362		1.60	11.0	119.9	"
11:12	3.5	6.61	0.359		1.54	11.1	108.5	"
11:15	5	6.61	0.357		1.50	11.2	99.2	"
11:18	5.75	6.60	0.361		1.47	11.1	95.4	"
11:21	7	6.60	0.359		1.46	11.1	90.1	"
11:24	8.5	6.61	0.358	0.27	1.45	11.1	88.9	"

Sample Information

Sample Method(s) Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	11:26	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 11:28

Comments / Exceptions:

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	Mw-6	Date	20-Jun-19
Sample ID	Olalla MW6-6/19	Field Team: (Initials)	ELC
Field Conditions	Gw Partly cloudy 60°F		

Purge Information

Well Diameter (in.)	2	Purge Method	Submersible pump
Well Depth (ft.)	35		Peristaltic Pump
Initial Depth to Water (ft.)	20.52		Bladder Pump
Depth of Water Column	14.48	Other:.	
1 Casing Volume	2.3	Start Time	12:42
Controller Setting (Hz)	107	End Time	13:14
		Total Gallons Purged	14

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
12:45	1.5	6.49	0.270		1.82	10.9	50.9	Clear
12:48	3.25	6.49	0.274		1.61	11.0	45.2	"
12:51	5	6.50	0.276		1.55	11.0	41.8	"
12:54	6.5	6.51	0.278		1.51	10.8	36.5	"
12:57	8	6.51	0.279		1.48	10.9	35.4	"
13:00	9.75	6.51	0.280		1.47	11.0	33.9	"
13:03	11	6.51	0.280		1.46	10.9	32.2	"
13:06	12.75	6.51	0.280	1.89	1.45	10.9	31.8	"

Sample Information

Sample Method(s) Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	13:08	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 13:14

Comments / Exceptions:

Duplicate: Olalla - Gw - MW17-6/19

Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	Mw-8	Date	20-Jun-19
Sample ID	Olalla-GW-MW8-6/19	Field Team: (Initials)	ELC
Field Conditions	Partly cloudy, 65°F		

Purge Information

Well Diameter (in.)	2"	Purge Method : Submersible pump
Well Depth (ft.)	38	Peristaltic Pump
Initial Depth to Water (ft.)	21.03	Bladder Pump
Depth of Water Column		Other: :
1 Casing Volume		Start Time
Controller Setting (Hz)	105	End Time
		Total Gallons Purged

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
1353	1.5	6.64	0.129		1.68	10.2	75.8	Partly cloudy
1356	2.75	6.55	0.152		1.56	10.3	76.4	"
1359	4	6.52	0.175		1.52	10.3	73.9	clearing up
1402	5.5	6.51	0.192		1.48	10.3	69.8	"
1406	6.5	6.51	0.193		1.48	10.3	66.5	"
1409	8	6.51	0.197		1.51	10.3	65.3	"
1412	4.25	6.51	0.198	4.83	1.53	10.3	64.4	"
1415	10.5	6.51	0.199	4.72	1.54	10.3	63.8	"

some sand
filter

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	1417	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		250-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time

Comments / Exceptions:

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.....

.....

Landfill Gas Monitoring Field Data - Olalla Landfill Monitoring

Instrument Used:	LandTec GEM 2000	Date and Time:	6/20/19
Ambient Temperature:	66° F	Field Team:	EC
Field Conditions:	Cool, partly cloudy 66° F, slight breeze		

Landfill Gas Data

Flare #	Time	Methane (% vol.)	% LEL	Oxygen (% vol.)	Carbon Dioxide (% vol.)	Temperatur e (°C)	Gas Pressure ("H ₂ O)
3	15:28	2	14	4.8	8.9		0.01
1	15:50	0.	0	5.9	7.6		0.01
2	16:01	0	0	12.2	4.1		0.02

Comments / Inspection Results¹

- GEM 2000 rented from Equipce - S66 Calibration certificate in back

Flare #3 - LEL hold steady at 11% for 5 minutes

Flare #1 - Overgrown w/ blackberry bushes, had to cut back to get to flare

Flare #2 " " " " " "

¹Inspect the following: lock and gate operation, tightness of bolts and clamps, differential settlement, valve operation, debris or breaks in hose barb.



RENTALS

YSI ProDSS RENTAL CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: JM

DATE: 6/18/19

RENTAL CUSTOMER: EPT

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSIPRODSS.19

SERIAL NUMBER: 16J104005

CALIBRATION INFORMATION

PARAMETER:	STANDARD:	PASS ()	LOT #
1. CONDUCTIVITY	1,000 µMhos	X	55029
2. pH ZERO	pH 7	X	53906
pH SLOPE	pH 4	X	51238
pH SLOPE	pH 10	X	44934
3. DISSOLVED OXYGEN	Air Calibration Barometric pressure = 760mmHg	X	N/A
4. TURBIDITY ZERO	0.0 NTU's	—	N/A
TURBIDITY SPAN	20 NTU's	—	—
5. REDOX (ORP)	231mV (YSI Zobell solution)	X	012616

EQUIPCO

CES LANDTECH MODEL: GEM 2000 CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: DM

DATE: 6/18/19

INSTRUMENT INFORMATION

RENTAL ID: GEM2000.08

SERIAL NUMBER: GM07210/03

CALIBRATION INFORMATION

1..CALIBRATION GAS: 35 % CO₂

LOT #: 573162

GAS RESPONSE: 35 % CO₂ +2%

2. CALIBRATION GAS: 50 % Vol. Methane

LOT #: 573162

GAS RESPONSE: 50 % Vol. Methane +2%

OXYGEN RESPONSE IN FRESH AIR ENVIRONMENT: 20.9% ✓

OXYGEN DOWNSCALE RESPONSE CHECKED: 0% WITH 99.9% Nitrogen ✓

THIS INSTRUMENT HAS BEEN CALIBRATED TO STANDARDS SET FORTH BY THE
MANUFACTURER

Olalla Landfill Quarterly Monitoring Field Book September 2019



**Olalla Landfill
Kitsap County, Washington
Project Number: 45407.0**

**Environmental Partners, Inc.
1180 NW Maple Street, Suite 310
Issaquah, Washington 98027
(425) 395-0010**



- NOTES:**
- - - APPROXIMATE PROPERTY BOUNDARY
 - PERIMETER ACCESS ROAD
 - MW-8 ● MONITORING WELL
 - SW-2 ▲ SURFACE WATER SAMPLING LOCATION
 - ☐ LANDFILL GAS FLARE



FIGURE 1-2 OLALLA LANDFILL MONITORING WELL, FLARE, AND SURFACE WATER SAMPLING LOCATIONS KITSAP COUNTY, WASHINGTON			
PREPARED BY	ENVIRONMENTAL PARTNERS INC		
PROJECT	OLALLA LANDFILL QAPP/45403.0		
LOCATION	2850 SE BURLEY-OLALLA ROAD OLALLA, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
2/25/15	ALW/CLM	ALW/CLM	45403.0

Multiparameter Probe Calibration Log - Olalla Landfill Groundwater Monitorin

Meter Type	Manufacturer	Model Number	Mfg. Serial#	Rental Co. Serial #	Date	Time
Turbidity	Hanna	HT 18703	0308005691	—	9/26/9	0855

Calibrated to Autocal Solution

Calibration Solution Manufacturer Hanna Lot Number _____ Exp. Date _____

pH = _____ Turbidity = 15, and 2.1 Temperature = _____

Conductivity = _____ Dissolved Oxygen = _____ ORP = _____

Comments: 15 NTA road 14.8, 2.5 road 0

Meter Type	Manufacturer	Model Number	Mfg. Serial#	Rental Co. Serial #	Date	Time

Calibrated to Autocal Solution

Calibration Solution Manufacturer _____ Lot Number _____ Exp. Date _____

pH = _____ Turbidity = _____ Temperature = _____

Conductivity = _____ Dissolved Oxygen = _____ ORP = _____

Comments:

See attached Calibration Certificate from Equipco

Instrument Calibration Log - Olalla Landfill Monitoring

Calibrated By: Equipco

Date: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
pH					
pH Electrode					

Calibrated: _____ to 4.00 buffer _____ to 7.00 buffer _____ to 10.00 buffer at _____ °C

Slope = _____ Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
Specific Cond.					

Specific Conductance: Calibrated _____ μS/cm to _____ μS/cm calibration standa

Electrical Conductivity: Calibrated _____ μS/cm to _____ μS/cm calibration standard at _____ °C

Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
ORP Meter					
ORP Electrode					

Electrode measured _____ millivolts at _____ °C using Zobell prepared on ____ / ____ / ____

Table value for Zobell solution at this temperature is _____ mV.

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
Turbidity					

Meter reads _____ NTUs using _____ NTUs standa Comments: _____

Meter reads _____ NTUs using _____ NTUs standa

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
DO Meter					

Air-Calibration: Measured temperature _____ °C corresponds to _____ mg/L DO (from Table I)

Atmospheric pressure / elevation correction factor _____ (from Table II)

Corrected calibration value _____ mg/L DO (Table I value multiplied by Table II value)

Comments: _____

Depth to Water Measurement Field Data - Olalla Landfill Monitoring

Well	Time	Measuring Point Elevation (ft. NGVD ¹)	Depth to Water (ft.)	Comments and Well Inspection ² Notes
MW-1	09:04	343.79	78.34	
MW-2	15:17	323.25	65.88	same issues as before
MW-3	10:27	296.95	45.62	
MW-4	15:02	320.93	62.85	same issues as before
MW-5	10:07	334.17	12.10	
MW-5A	10:08	332.53	75.82	
MW-6	13:00	271.17	21.40	
MW-7	15:00	280.43	26.11	
MW-8	13:51	272.85	21.90	
MW-10	11:40	279.21	30.50	

Notes:

¹NGVD = National Geodetic Vertical Datum (1929)

²Observations regarding the condition of the well and surrounding area (e.g., protective casing, surface seal, cap, lock, bollards, soil conditions near the well such as depressions, ponded surface water, or other subsidence features, and any installed sampling equipment).

Groundwater Sampling Field Data - Olalla Landfill Monitoring

Station	MW 13	Date	9/26/19
Sample: ID	Olalla-GW, MW13-9/19	Field Team: (Initials)	EC
Field Conditions	1st of 5 visits		

Low-Flow Purge Information

Well Diameter (in.)	2"	Purge Method : Submersible pump	Other: :
Well Depth (ft.)	55.5	Start Time	10:38
Initial Depth to Water (ft.)	45.62	End Time	11:05
Depth of Water Column	9.88	Total Gallons Purged	10.5
1 Casing Volume (gal.)	1.58		
Controller setting (Hz)	146.5		

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
10:41	6.5	6.28	0.386		1.45	11.9	237.8	clear
10:44	3	6.24	0.382		0.92	12.1	218.0	"
10:47	4	6.22	0.383		0.71	12.2	200.2	"
10:50	5	6.21	0.380		0.62	12.2	188.7	"
10:53	6.5	6.20	0.381		0.56	12.1	179.0	"
10:56	7.5	6.20	0.382		0.51	12.2	169.3	"
10:59	9	6.20	0.382		0.47	12.2	160.0	"
11:02	10	6.20	0.381	0.37	0.47	12.2	158.2	"

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	11:03	(3) 40-mL VOA	HCl, cool to <4°C	
Total Coliform		300-mL sterile AG or poly	Cool to <4°C	
Geochemical Parameters		500-mL HDPE	Cool to <4°C	
Nitrate/Nitrite		500-mL HDPE	Cool to <4°C	
TOC		250-mL AG	H ₂ SO ₄ to pH <2, cool to <4°C	
COD		250-mL HDPE	H ₂ SO ₄ to pH <2, cool to <4°C	
Total Metals		250-mL HDPE	HNO ₃ to pH <2, cool to <4°C	
Dissolved Metals		250-mL HDPE	Field filter, HNO ₃ to pH <2, cool to <4°C	

Sample End Time 11:05

Comments / Exceptions:

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Groundwater Sampling Field Data - Olalla Landfill Monitoring

Station	ML-18	Date	9/26/19
Sample: ID	Olalla-LW-MW18-9/26	Field Team: (Initials)	EC
Field Conditions	Partly Cloudy 60°F		

Low-Flow Purge Information

Well Diameter (in.)	2"	Purge Method : Submersible pump
Well Depth (ft.)	47	Other: :
Initial Depth to Water (ft.)	30.5	Start Time
Depth of Water Column	16.5	End Time
1 Casing Volume (gal.)	2.64	Total Gallons Purged
Controller setting (Hz)	126.7	10

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
11:48	1	6.74	0.372		1.40	11.7	198.5	Clear
11:52	2	6.72	0.370		0.71	11.5	176.8	"
11:55	3.5	6.69	0.370		0.57	11.4	163.0	"
11:58	5	6.67	0.370		0.50	11.4	151.2	"
12:01	6.5	6.65	0.362		0.30	11.3	144.1	1) air bubbles
12:04	7	6.65	0.365		0.54	11.3	135.3	1) air bubbles
12:07	8	6.65	0.367		0.45	11.3	130.6	1) no air bubbles
12:10	9.5	6.64	0.370	0.16	0.42	11.4	125.5	"
								bubbles started when sampling

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	12:11	(3) 40-mL VOA	HCl, cool to <4°C	
Total Coliform		300-mL sterile AG or poly	Cool to <4°C	
Geochemical Parameters		500-mL HDPE	Cool to <4°C	
Nitrate/Nitrite		500-mL HDPE	Cool to <4°C	
TOC		250-mL AG	H ₂ SO ₄ to pH <2, cool to <4°C	
COD		250-mL HDPE	H ₂ SO ₄ to pH <2, cool to <4°C	
Total Metals		250-mL HDPE	HNO ₃ to pH <2, cool to <4°C	
Dissolved Metals		250-mL HDPE	Field filter, HNO ₃ to pH <2, cool to <4°C	

Sample End Time 12:13

Comments / Exceptions:

After 5 gallons purged, started water started getting a lot of bubbles as if it is quite dry. Bubbles would stop, for a bit and then start again.

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Groundwater Sampling Field Data - Olalla Landfill Monitoring

Station	Cloudy, 62° F	Date	9/26/19
Sample: ID	MW-6	Field Team: (Initials)	EC
Field Conditions	Olalla - GWR-MW6 - 9/19		

Low-Flow Purge Information

Well Diameter (in.)	2"	Purge Method : Submersible pump
Well Depth (ft.)	35	Other: :
Initial Depth to Water (ft.)	21.40	Start Time
Depth of Water Column	13.60	End Time
1 Casing Volume (gal.)	2.17	Total Gallons Purged
Controller setting (Hz)	105	

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
1310	1.5	6.92	0.366		1.54	11.0	149.8	slightly cloudy
1313	2.5	6.64	0.368		0.92	11.1	116.0	"
1316	4	6.54	0.370		0.70	11.2	83.8	"
1319	5	6.49	0.370		0.60	11.2	64.6	"
1322	6.5	6.45	0.371		0.51	11.1	48.7	"
1325	8	6.43	0.372		0.46	11.1	40.1	→ clearing
1328	9.5	6.42	0.372		0.43	11.2	36.2	→
1331	10.5	6.41	0.373	0.54	0.40	11.2	34.1	✓ clear

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	1332	(3) 40-mL VOA	HCl, cool to <4°C	
Total Coliform		300-mL sterile AG or poly	Cool to <4°C	
Geochemical Parameters		500-mL HDPE	Cool to <4°C	
Nitrate/Nitrite		500-mL HDPE	Cool to <4°C	
TOC		250-mL AG	H ₂ SO ₄ to pH <2, cool to <4°C	
COD		250-mL HDPE	H ₂ SO ₄ to pH <2, cool to <4°C	
Total Metals		250-mL HDPE	HNO ₃ to pH <2, cool to <4°C	
Dissolved Metals		250-mL HDPE	Field filter, HNO ₃ to pH <2, cool to <4°C	

Sample End Time 1335

Comments / Exceptions:

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Groundwater Sampling Field Data - Olalla Landfill Monitoring

Station	MLW-8	Date	9/26/19
Sample: ID	Olalla-GW-MWS-9/19 and	Field Team: (Initials)	EC
Field Conditions	Partly cloudy, 62°F duplicate Olalla-GW-MW2-9/19		

Low-Flow Purge Information

Well Diameter (in.)	2"	Purge Method : Submersible pump
Well Depth (ft.)	38	Other: :
Initial Depth to Water (ft.)	21.90	Start Time
Depth of Water Column	16.10	End Time
1 Casing Volume (gal.)	257	Total Gallons Purged
Controller setting (Hz)	106	11

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
14:09	1	7.33	0.107		1.43	10.6	62.9	Cloudy
14:12	2.5	6.98	0.135		0.86	10.7	58.8	"
14:15	4.5	6.78	0.152		0.70	10.8	55.7	cloudy w/ sp
14:18	5.5	6.65	0.164		0.64	10.7	54.3	"
14:21	7	6.60	0.169		0.62	10.7	53.7	"
14:24	8.5	6.55	0.170		0.61	10.8	52.5	Clear
14:27	10	6.52	0.171	5.86	0.59	10.8	51.8	"

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	14:28	(3) 40-mL VOA	HCl, cool to <4°C	
Total Coliform		300-mL sterile AG or poly	Cool to <4°C	
Geochemical Parameters		500-mL HDPE	Cool to <4°C	
Nitrate/Nitrite		500-mL HDPE	Cool to <4°C	
TOC		250-mL AG	H ₂ SO ₄ to pH <2, cool to <4°C	
COD		250-mL HDPE	H ₂ SO ₄ to pH <2, cool to <4°C	
Total Metals		250-mL HDPE	HNO ₃ to pH <2, cool to <4°C	
Dissolved Metals		250-mL HDPE	Field filter, HNO ₃ to pH <2, cool to <4°C	

Sample End Time 14:38

Comments / Exceptions:

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Landfill Gas Monitoring Field Data - Olalla Landfill Monitoring

Instrument Used:	GEM 2000	Date and Time:	9/26/19
Ambient Temperature:	60°F	Field Team:	E. Caddey
Field Conditions:	Cloudy 60°F, very slight breeze		

Landfill Gas Data

Flare #	Time	Methane (% vol.)	% LEL	Oxygen (% vol.)	Carbon Dioxide (% vol.)	Temperatur e (°C)	Gas Pressure ("H ₂ O)
3	15:35	0.0	0.0	19.6	0.4		0.01
1	15:47	3.8	44	19.6	4.5		0.01
2	16:00	0.4	8	18.8	6.1		0.01

Comments / Inspection Results¹

¹Inspect the following: lock and gate operation, tightness of bolts and clamps, differential settlement, valve operation, debris or breaks in hose barb.

YSI ProDSS RENTAL CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: OM

DATE: 9/25/19

RENTAL CUSTOMER: EPI

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSIPRODSS. 07

SERIAL NUMBER: 16F104825

CALIBRATION INFORMATION

PARAMETER:	STANDARD:	PASS ()	LOT #
1. CONDUCTIVITY	1,000 μ Mhos	<u>X</u>	<u>55029</u>
2. pH ZERO	pH 7	<u>X</u>	<u>53906</u>
pH SLOPE	pH 4	<u>X</u>	<u>53605</u>
pH SLOPE	pH 10	<u>X</u>	<u>44934</u>
3. DISSOLVED OXYGEN	Air Calibration Barometric pressure = 760mmHg	<u>X</u>	N/A
4. TURBIDITY ZERO	0.0 NTU's		N/A
TURBIDITY SPAN	20 NTU's		
5. REDOX (ORP)	231mV (YSI Zobell solution)	<u>X</u>	<u>012616</u>

EQUIPCO

CES LANDTECH MODEL: GEM 2000 CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: QM

DATE: 9/25/19

INSTRUMENT INFORMATION

RENTAL ID: GEM2000. 08

SERIAL NUMBER: GM07210/03

CALIBRATION INFORMATION

1..CALIBRATION GAS: 35 % CO₂

LOT #: 573162

GAS RESPONSE: 35 % CO₂ +2%

2. CALIBRATION GAS: 50 % Vol. Methane

LOT #: 573162

GAS RESPONSE: 50 % Vol. Methane +2%

OXYGEN RESPONSE IN FRESH AIR ENVIRONMENT: 20.9% ✓

OXYGEN DOWNSCALE RESPONSE CHECKED: 0% WITH 99.9% Nitrogen ✓

THIS INSTRUMENT HAS BEEN CALIBRATED TO STANDARDS SET FORTH BY THE
MANUFACTURER

Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Environmental Partner, Inc.	Phone: 425-395-0010	Date: 9/27/19
Client Contact: Doug Kunkel		Ice Present? Yes
Client Project Name: Olalla Landfill		No. of Coolers: 1
		Cooler Temps: 0.1°C

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested								Notes/Comments
					VOCs and VC	Distilled and Total Anions	Nitrate, Nitrite, Chloride, Sulfate, Ammonia, Nitrogen	Conductivity	Carbonate, Bicarbonate, Ammonia	COD	TUC	Total Coliform	
Olalla-GW-MW1-9/19	9/26/19	09:33	water	9	X	X	X	X	X	X	X	X	See email with a complete list of analytes.
Olalla-GW-MW3-9/19	9/26/19	11:03	"	"	X	X	X	X	X	X	X		
Olalla-GW-MW10-9/19	9/26/19	12:11	"	"	X	X	X	X	X	X	X		
Olalla-GW-MW6-9/19	9/26/19	13:32	"	"	X	X	X	X	X	X	X		
Olalla-GW-MW8-9/19	9/26/19	14:28	"	"	X	X	X	X	X	X	X		
Olalla-GW-MW12-9/19	9/26/19	-	"	"	X	X	X	X	X	X	X		
Trip blank	-	-	"	2	X								

Comments/Special Instructions	Relinquished by: (Signature) <i>EC</i>	Received by: (Signature) <i>Jacob Walter</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Eric Caddoy	Printed Name: Jacob Walter	Printed Name:	Printed Name:
	Company: EPI	Company: ARI	Company:	Company:
	Date & Time: 9/27/19 0850	Date & Time: 09/27/19 0850	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Olalla Landfill Quarterly Monitoring Field Book December 2019



**Olalla Landfill
Kitsap County, Washington
Project Number: 45407.0**

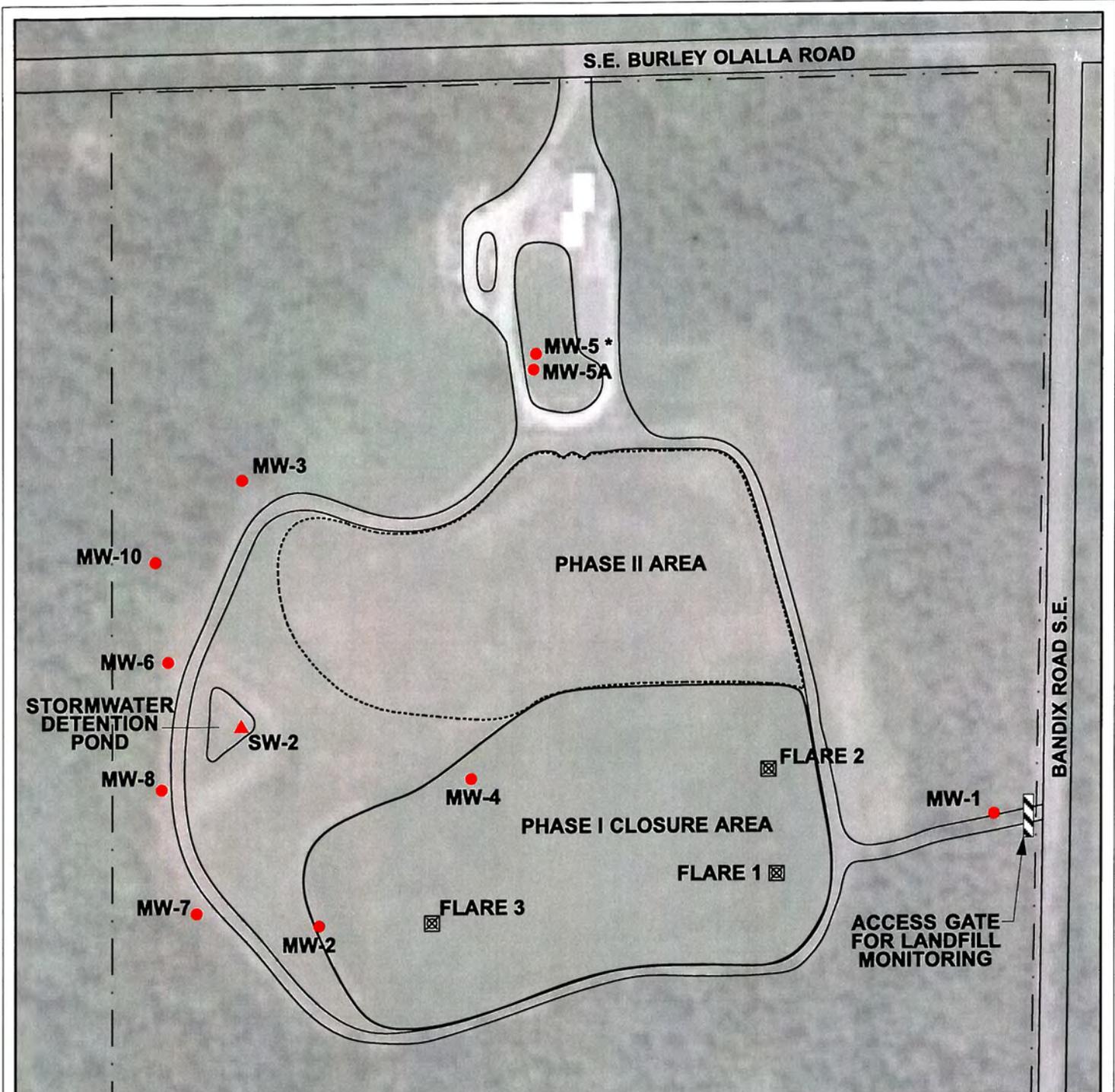
**Environmental Partners, Inc.
1180 NW Maple Street, Suite 310
Issaquah, Washington 98027
(425) 395-0010**

**Table 2-1: CAP and SWHP Monitoring Schedule
Olalla Landfill, Kitsap County, WA**

Sample Location	First Quarter								Second and Third Quarters							Fourth Quarter														
	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Fecal Coliform	Geochemical	TOC / COD	Landfill Gas Parameters	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Geochemical	TOC / COD	Landfill Gas Parameters	Water Level	Field Parameters	VOCs	T & D Metals	Total Coliform	Fecal Coliform	Geochemical	TOC / COD	D. Metals - COC list	pH (field and lab)	Vinyl Chloride	Landfill Gas Parameters	
MW-1	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■					
MW-2	■									■								■												
MW-3	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■					
MW-4	■									■								■												
MW-5	■									■								■												
MW-5A	■									■								■	■											
MW-6	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■		■	■	■	
MW-7	■									■								■	■											
MW-8	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■		■	■	■	
MW-10	■	■	■	■	■		■	■		■	■	■	■	■	■	■		■	■	■	■	■		■	■					
SW-2 ¹		■				■	■												■					■	■					
Flares 1, 2, 3								■									■													■

Notes:
¹ Surface water sample from SW-2 collected during first quarter or fourth quarter, not both quarters.
 Field Parameters = pH, specific conductance, temperature, ORP, and DO
 VOCs = Volatile organic compounds by EPA Method 8260C standard list, vinyl chloride by selective ion monitoring (SIM)
 T (total) Metals = calcium, potassium, sodium
 D (dissolved) Metals = arsenic, barium, iron, manganese, zinc
 Geochemical = alkalinity, ammonia, bicarbonate, carbonate, chloride, sulfate, nitrate, nitrite, pH
 TOC / COD = total organic carbon / chemical oxygen demand
 Dissolved Metals - COC list = arsenic, iron, manganese
 Landfill gas parameters = methane (%LEL), oxygen(% vol), carbon dioxide (% vol), and gas pressure

7 Filters / 2 vva
 Filtrod poly w/ NO₃
 poly



BASE MAP SOURCE:
- Google Earth

TOPOGRAPHIC CONTOUR SOURCE:
- KITSAP COUNTY PARCEL VIEWER

MW-5 is completed in a shallow perched groundwater zone.

NOTES:

---	APPROXIMATE PROPERTY BOUNDARY
---	PERIMETER ACCESS ROAD
MW-8 ●	MONITORING WELL
SW-2 ▲	SURFACE WATER SAMPLING LOCATION
☒	LANDFILL GAS FLARE

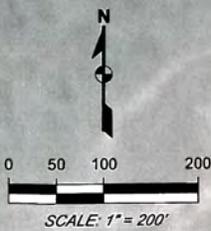


FIGURE 1-2 OLALLA LANDFILL MONITORING WELL, FLARE, AND SURFACE WATER SAMPLING LOCATIONS KITSAP COUNTY, WASHINGTON			
PREPARED BY	ENVIRONMENTAL PARTNERS INC		
PROJECT	OLALLA LANDFILL QAPP/45403.0		
LOCATION	2850 SE BURLEY-OLALLA ROAD OLALLA, WASHINGTON		
PREPARED FOR	KITSAP COUNTY		
DATE	DRAWN BY	REVIEWED BY	PROJECT NUMBER
2/25/15	ALW/CLM	ALW/CLM	45403.0

Depth to Water Measurement Field Data - Olalla Landfill Monitoring

Well	Time	Measuring Point Elevation (ft. NGVD ¹)	Depth to Water (ft.)	Comments and Well Inspection ² Notes
MW-1	0828	343.79	79.46	
MW-2	15:25	323.25	66.62	
MW-3	10:31	296.95	46.40	
MW-4	1534	320.93	63.72	
MW-5	0932	334.17	11.32	
MW-5A	0935	332.53	76.87	
MW-6	1300	271.17	21.92	
MW-7	1434	280.43	26.72	
MW-8	1349	272.85	22.37	
MW-10	11:33	279.21	31.14	

Notes:

¹NGVD = National Geodetic Vertical Datum (1929)

²Observations regarding the condition of the well and surrounding area (e.g., protective casing, surface seal, cap, lock, bollards, soil conditions near the well such as depressions, ponded surface water, or other subsidence features, and any installed sampling equipment).

**Table 3-1: Monitoring Well Construction Data Summary
Olalla Landfill, Kitsap County, WA**

Well	Total Well Depth (ft bgs)	Measuring Point Elevation (ft NGVD 29)	Surface Elevation (ft NGVD 29)	Screened Interval (ft bgs)	Northing	Easting	Measuring Point Description
MW-1	87	343.79	342.53	82-87	161858.133	560525.840	Pump wellhead
MW-2	73	323.25	318.95	68-73	161704.534	559572.839	Top of PVC casing
MW-3	55.5	296.95	294.95	50.5-55.5	162333.903	559463.060	Pump wellhead
MW-4	68	320.93	317.35	63-68	161911.192	559787.735	Top of PVC casing
MW-5	35.5	334.17	332.78	25-35	162510.115	559878.901	Top of PVC casing
MW-5A	98	332.53	331.43	86-96	162487.878	559875.742	Pump wellhead
MW-6	35	271.17	269.14	28-33	162077.699	559358.970	Pump wellhead
MW-7	33	280.43	278.21	21-31	161723.016	559398.979	Pump wellhead
MW-8	38	272.85	270.73	25-35	161897.813	559350.147	Pump wellhead
MW-10	47	279.21	276.84	37-47	162218.490	559340.899	Pump wellhead

Notes:

NGVD 29 = National Geodetic Vertical Datum (1929)

bgs = below ground surface

Instrument Calibration Log - Olalla Landfill Monitoring

Calibrated By: _____

Date: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
pH					
pH Electrode					

Calibrated: _____ to 4.00 buffer _____ to 7.00 buffer _____ to 10.00 buffer at _____ °C

Slope = _____ Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
Specific Cond.					

Specific Conductance: Calibrated _____ μS/cm to _____ μS/cm calibration standard

Electrical Conductivity: Calibrated _____ μS/cm to _____ μS/cm calibration standard at _____ °C

Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
ORP Meter					
ORP Electrode					

Electrode measured _____ millivolts at _____ °C using Zobell prepared on ____ / ____ / ____

Table value for Zobell solution at this temperature is _____ mV.

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
Turbidity					

Meter reads _____ NTUs using _____ NTUs standard

Meter reads _____ NTUs using _____ NTUs standard

Comments: _____

Meter Type	Manufacturer	Model Number	Manufacturer Serial #	Rental Co. Serial #	Time
DO Meter					

Air-Calibration: Measured temperature _____ °C corresponds to _____ mg/L DO (from Table I)

Atmospheric pressure / elevation correction factor _____ (from Table II)

Corrected calibration value _____ mg/L DO (Table I value multiplied by Table II value)

Multiparameter Probe Calibration Log - Olalla Landfill Groundwater Monitoring

Meter Type	Manufacturer	Model Number	Mfg. Serial#	Rental Co. Serial #	Date	Time

Calibrated to Autocal Solution

Calibration Solution Manufacturer _____ Lot Number _____ Exp. Date _____

pH = _____ Turbidity = _____ Temperature = _____

Conductivity = _____ Dissolved Oxygen = _____ ORP = _____

Comments:

Meter Type	Manufacturer	Model Number	Mfg. Serial#	Rental Co. Serial #	Date	Time

Calibrated to Autocal Solution

Calibration Solution Manufacturer _____ Lot Number _____ Exp. Date _____

pH = _____ Turbidity = _____ Temperature = _____

Conductivity = _____ Dissolved Oxygen = _____ ORP = _____

Comments:

Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-1</u>	Date	17-Dec-19
Sample ID	<u>Olalla-MW1-12/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>Cool, 36°F, Foggy</u>		

Purge Information

Well Diameter (in.)	2"	Purge Method	Submersible pump
Well Depth (ft.)	87		Peristaltic Pump
Initial Depth to Water (ft.)	79.46		Bladder Pump
Depth of Water Column	7.54		Other: :
1 Casing Volume	1.2	Start Time	0847
Controller Setting (Hz)	310	End Time	0905
		Total Gallons Purged	15

Time	Gallons	pH	ms/cm Conductivity	NTU	DO mg/L	Temp °C	ORP mV	Appearance
0850	2.5	6.57	0.111		9.58	10.6	257.4	Clear
0853	5	6.57	0.111		9.57	10.8	315.8	"
0856	7	6.55	0.111		9.56	10.8	321.4	"
0857	10	6.54	0.111		9.55	10.9	342.2	"
09:00	12	6.53	0.111		9.54	10.8	343.1	"
09:03	14	6.54	0.111	4.56	9.54	10.9	346.2	"

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	<u>0903</u>	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		500-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 0905

Comments / Exceptions:

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(Signature)

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-5A</u>	Date	17-Dec-19
Sample ID	<u>Olalla-MW5A-12/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>40° F, Furry</u>		

Purge Information

Well Diameter (in.)	<u>2"</u>	Purge Method :	<u>Submersible pump</u>
Well Depth (ft.)	<u>98</u>		Peristaltic Pump
Initial Depth to Water (ft.)	<u>76.87</u>		Bladder Pump
Depth of Water Column	<u>21.13</u>		Other: :
1 Casing Volume	<u>3.38</u>	Start Time	<u>0946</u>
Controller Setting (Hz)	<u>201</u>	End Time	<u>1004</u>
		Total Gallons Purged	<u>8</u>

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
<u>0944</u>	<u>2</u>	<u>6.94</u>	<u>0.090</u>		<u>10.24</u>	<u>11.5</u>	<u>306.8</u>	<u>C1694</u>
<u>0952</u>	<u>4</u>	<u>6.95</u>	<u>0.091</u>		<u>10.30</u>	<u>11.7</u>	<u>309.8</u>	<u>"</u>
<u>0955</u>	<u>5.5</u>	<u>6.96</u>	<u>0.092</u>		<u>10.33</u>	<u>11.7</u>	<u>317.1</u>	<u>"</u>
<u>0958</u>	<u>7</u>	<u>6.95</u>	<u>0.092</u>		<u>10.32</u>	<u>11.7</u>	<u>322.2</u>	<u>"</u>
<u>10:01</u>	<u>8.5</u>	<u>6.95</u>	<u>0.092</u>	<u>5.89</u>	<u>10.31</u>	<u>11.7</u>	<u>324.1</u>	<u>"</u>

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	<u>10:02</u>	45 40-ml VOA	HCL, ice	
Total Coliform		300 ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		5m OJ	ice	
Nitrate / Ammonia / EC / pH		<u>1</u> Lg OJ	ice	
TOC/COD/NH3		500 ml AG	H2SO4	
Total Metals		<u>500</u> ml HDPE	HNO3 to pH<2, ice.	
Dissolved Metals		<u>500</u> ml HDPE	HNO3 to pH<2, ice. <u>Field filter</u>	<u>As, Fe, Mn only</u>

End Time 1004

Comments / Exceptions:

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-3</u>	Date	17-Dec-19
Sample ID	<u>Olalla - MW3 - 12/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>30° Partly Cloudy</u>		

Purge Information

Well Diameter (in.)	2"	Purge Method	Submersible pump
Well Depth (ft.)	55.5		Peristaltic Pump
Initial Depth to Water (ft.)	46.40		Bladder Pump
Depth of Water Column	9.1	Other: :	
1 Casing Volume	1.46	Start Time	10:45
Controller Setting (Hz)	143	End Time	11:07
	145	Total Gallons Purged	6.5

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
10:48	1	6.34	0.340		0.85	11.5	351.4	black/brown debris
10:51	2	6.34	0.340		0.75	12.0	341.3	clear
10:54	3	6.34	0.340		0.71	12.1	333.1	"
10:57	4	6.34	0.339		0.67	12.2	323.5	"
11:00	4.75	6.34	0.340		0.65	12.3	316.1	"
11:03	5.5	6.34	0.340	4.91	0.65	12.3	309.2	more debris

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	11:05	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		500-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 11:07

Comments / Exceptions:

a lot of black/brown pieces coming out of well the first pullup and then stopped - have not seen that before - appear to be wood

Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>one duplicate</u> Mw-10	Date	17-Dec-19
Sample ID	Olalla - MW10 - 12/19	Field Team: (Initials)	ELC
Field Conditions	Olalla - MW13 - 12/19	28°F, partly cloudy	

Purge Information

Well Diameter (in.)	2"	Purge Method	Submersible pump
Well Depth (ft.)	47		Peristaltic Pump
Initial Depth to Water (ft.)	31.14		Bladder Pump
Depth of Water Column	15.86	Other: :	
1 Casing Volume	2.53	Start Time	11:51
Controller Setting (Hz)	139	End Time	12:09
	127	Total Gallons Purged	7

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
11:54	1.5	6.78	0.421		0.95	11.1	140.2	clear
11:57	2.75	6.78	0.421		0.67	11.2	152.0	
12:00	4	6.78	0.423		0.61	11.3	140.9	
12:03	5	6.78	0.403	5.12	0.59	11.3	135.2	started quizz

dry, bubbly
Turned down to
124

Sample Information

Sample Method(s) Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	12:05	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		500-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 12:09

Comments / Exceptions:

- lots of air bubbles during sample collection.

Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-6</u>	Date	17-Dec-19
Sample ID	<u>Olalla-MW6-12/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>40 F shower</u>		

Purge Information

Well Diameter (in.)	<u>2"</u>	Purge Method	<u>Submersible pump</u>
Well Depth (ft.)	<u>35</u>		Peristaltic Pump
Initial Depth to Water (ft.)	<u>21.92</u>		Bladder Pump
Depth of Water Column	<u>13.08</u>		Other: :
1 Casing Volume	<u>2.1</u>	Start Time	<u>1310</u>
Controller Setting (Hz)	<u>07</u>	End Time	<u>1329</u>
		Total Gallons Purged	<u>7</u>

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
<u>1315</u>	<u>1.25</u>	<u>6.73</u>	<u>0.326</u>		<u>0.84</u>	<u>11.2</u>	<u>75.3</u>	<u>Clear</u>
<u>1316</u>	<u>2.25</u>	<u>6.72</u>	<u>0.329</u>		<u>0.70</u>	<u>11.3</u>	<u>68.5</u>	<u>"</u>
<u>1319</u>	<u>4</u>	<u>6.71</u>	<u>0.331</u>		<u>0.63</u>	<u>11.4</u>	<u>64.2</u>	<u>"</u>
<u>1322</u>	<u>5</u>	<u>6.71</u>	<u>0.332</u>		<u>0.60</u>	<u>11.4</u>	<u>61.3</u>	<u>"</u>
<u>1325</u>	<u>6</u>	<u>6.71</u>	<u>0.333</u>	<u>1.28</u>	<u>0.58</u>	<u>11.5</u>	<u>59.1</u>	<u>"</u>

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	<u>1327</u>	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		500-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 1329

Comments / Exceptions:

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Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	Olalla - MW-8	Date	17-Dec-19
Sample ID	Olalla - MW-8 - 12/19	Field Team: (Initials)	ELC
Field Conditions	Partly cloudy, cool 40°F		

Purge Information

Well Diameter (in.)	2"	Purge Method	Submersible pump
Well Depth (ft.)	78		Peristaltic Pump
Initial Depth to Water (ft.)	22.37		Bladder Pump
Depth of Water Column	55.63		Other: :
1 Casing Volume	2.5	Start Time	1356
Controller Setting (Hz)	104	End Time	1417
	106	Total Gallons Purged	8.5

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
1354	1.5	6.83	0.112		0.80	10.8	112.1	Slightly cloudy
1402	3	6.78	0.148		0.68	11.0	104.2	"
1405	4	6.76	0.170		0.67	11.0	106.4	"
1408	5	6.76	0.178		0.68	11.1	110.1	"
1413	7	6.77	0.175	8.23	0.69	11.0	111.3	"

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	1415	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		500-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. Field filter	

End Time 1417

Comments / Exceptions:

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ELC

Groundwater Sampling Field Data

EPI Project No./Site: 45407.0/Kitsap County - Olalla Landfill

Station	<u>MW-7</u>	Date	17-Dec-19
Sample ID	<u>014119-MW7-12/19</u>	Field Team: (Initials)	ELC
Field Conditions	<u>40°F, Overcast</u>		

Purge Information

Well Diameter (in.)	<u>2"</u>	Purge Method	<u>Submersible pump</u>
Well Depth (ft.)	<u>33</u>		Peristaltic Pump
Initial Depth to Water (ft.)	<u>26.72</u>		Bladder Pump
Depth of Water Column	<u>6.28</u>		Other: :
1 Casing Volume	<u>1.00</u>	Start Time	<u>1443</u>
Controller Setting (Hz)	<u>122</u>	End Time	<u>1504</u>
		Total Gallons Purged	<u>7</u>

Time	Gallons	pH	Conductivity	NTU	DO	Temp.	ORP	Appearance
<u>1447</u>	<u>1.5</u>	<u>6.75</u>	<u>0.094</u>		<u>7.92</u>	<u>10.6</u>	<u>313.6</u>	<u>Slightly cloudy</u>
<u>1450</u>	<u>2.5</u>	<u>6.75</u>	<u>0.094</u>		<u>7.87</u>	<u>10.7</u>	<u>333.3</u>	<u>"</u>
<u>1453</u>	<u>4</u>	<u>6.75</u>	<u>0.094</u>		<u>7.86</u>	<u>10.7</u>	<u>342.9</u>	<u>clearing up</u>
<u>1456</u>	<u>5</u>	<u>6.75</u>	<u>0.094</u>		<u>7.85</u>	<u>10.8</u>	<u>344.9</u>	<u>"</u>
<u>1459</u>	<u>6</u>	<u>6.75</u>	<u>0.094</u>	<u>2.85</u>	<u>7.84</u>	<u>10.7</u>	<u>351.1</u>	<u>"</u>

Sample Information

Sample Method(s) : Submersible pump / Peristaltic pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Volatiles and VC	<u>15:02</u>	(5) 40-ml VOA	HCL, ice	
Total Coliform		300-ml sterile AG or poly	Na2S2O3	
Geochemical Parameters		Sm OJ	ice	
Nitrate/Cl/Nitrite/SO4/pH		Lg OJ	ice	
TOC/COD/NH3		500-ml AG	H2SO4	
Total Metals		500-ml HDPE	HNO3 to pH<2, ice	
Dissolved Metals		500-ml HDPE	HNO3 to pH<2, ice. <u>Field filter</u>	

End Time 1504

Comments / Exceptions:

.....

.....

.....

.....



Landfill Gas Monitoring Field Data - Olalla Landfill Monitoring

Instrument Used:	GEM 2000	Date and Time:	12/17/19 15:40
Ambient Temperature:	39° F	Field Team:	E. Caddey
Field Conditions:	Overcast, cool, calm		

Landfill Gas Data

Flare #	Time	Methane (% vol.)	% LEL	Oxygen (% vol.)	Carbon Dioxide (% vol.)	Temperatur e (°C)	Gas Pressure ("H ₂ O)
3	1540	2.6	52	2.4	10.7		0.010
1	1552	1.2	19	4.0	9.7		0.010
2	16:00	3.0 2.8	59 55 ^{high} 57%	1.6 5.0 6.1	9.2		0.020

Comments / Inspection Results¹

readings stayed constant for at least 5 minutes

¹Inspect the following: lock and gate operation, tightness of bolts and clamps, differential settlement, valve operation, debris or breaks in hose barb.

Surface Water Sampling Field Data - Olalla Landfill Monitoring

Station	SW-2	Date	1/3/20
Sample: ID	Olalla-SW2-1/20	Field Team: (Initials)	ELC
Field Conditions	Overcast, $\approx 45^{\circ}\text{F}$, rained hard over night		

Field Parameter Data

Time	pH	Specific Conductance	Temperature ($^{\circ}\text{C}$)	Appearance and Flow Rate
0835	8.1	0.03 m/S	8.5 10.1	light amber color, ≈ 32 gpm

Sample Information

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Fecal Coliform	0831	300-mL sterile AG or poly	Cool to $<4^{\circ}\text{C}$	
Nitrate-Nitrogen		500-mL HDPE	Cool to $<4^{\circ}\text{C}$	
pH		125-mL AG	Cool to $<4^{\circ}\text{C}$	

Sample End Time 0831

Comments / Exceptions:

12/17/19. dry

1/3/20 - $\approx 2'$ of standing water in pond.

- measured flow rate w/ 5-gallon bucket for 1 minute

Calibrated Hanna field meter w/ calibration packets.

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.



RENTALS

YSI ProDSS RENTAL CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: OM

DATE: 12/16/19

RENTAL CUSTOMER: EPI

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSIPRODSS. 02

SERIAL NUMBER: 16F102613

CALIBRATION INFORMATION

PARAMETER:	STANDARD:	PASS ()	LOT #
1. CONDUCTIVITY	1,000 µMhos	<u>✓</u>	<u>S5029</u>
2. pH ZERO	pH 7	<u>✓</u>	<u>S3906</u>
pH SLOPE	pH 4	<u>✓</u>	<u>S3605</u>
pH SLOPE	pH 10	<u>✓</u>	<u>44934</u>
3. DISSOLVED OXYGEN	Air Calibration Barometric pressure = 760mmHg	<u>✓</u>	N/A
4. TURBIDITY ZERO	0.0 NTU's	✓	N/A
TURBIDITY SPAN	20 NTU's	✓	N/A
5. REDOX (ORP)	231mV (YSI Zobell solution)	<u>✓</u>	<u>012616</u>

EQUIPCO

CES LANDTECH MODEL: GEM 2000 CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: JA

DATE: 12/16/19

INSTRUMENT INFORMATION

RENTAL ID: GEM2000. 11

SERIAL NUMBER: 6M07638/04

CALIBRATION INFORMATION

1..CALIBRATION GAS: 35 % CO₂

LOT #: 573162

GAS RESPONSE: 35 % CO₂ +2%

2. CALIBRATION GAS: 50 % Vol. Methane

LOT #: 573162

GAS RESPONSE: 50 % Vol. Methane +2%

OXYGEN RESPONSE IN FRESH AIR ENVIRONMENT: 20.9% ✓

OXYGEN DOWNSCALE RESPONSE CHECKED: 0% WITH 99.9% Nitrogen ✓

THIS INSTRUMENT HAS BEEN CALIBRATED TO STANDARDS SET FORTH BY THE
MANUFACTURER



177191503-001

BRANCH 808
12500 132ND AVE NE
KIRKLAND WA 98034
425-823-1777
425-820-7542 FAX

Job Site

OLALLA LANDFILL
2890 SE BURLEY OLALLA RD
X:SE BURLEY-OLLA@BANDIX RD SE
OLALLA WA 98359
Office: 425-395-0010 Cell: 425-281-3629

Customer # : 1332846
Invoice Date : 12/17/19
Rental Out : 12/16/19 12:38 PM
Rental In : 12/17/19 04:40 PM
UR Job Loc : 2890 SE BURLEY OLALL
UR Job # : 3
Customer Job ID:
P.O. # : 45407
Ordered By : ERIC CADDEY
Reserved By : SARA BROWN
Salesperson : HOUSE ACCOUNT

ENVIRONMENTAL PARTNERS
1180 NW MAPLE ST STE 310
1180 NW MAPLE ST
ISSAQUAH WA 98027-8106

Invoice Amount: \$124.98

Terms: Due Upon Receipt
Payment options: Contact our credit office 212-333-6600 Ext. 84858
REMIT TO: UNITED RENTALS (NORTH AMERICA),INC.
FILE 51122
LOS ANGELES CA 90074-1122

RENTAL ITEMS:

Qty	Equipment	Description	Minimum	Day	Week	4 Week	Amount
1	10508489	GENERATOR 2.0-2.4 KW Make: HONDA Model: EU2000I Serial: EACT-1521430	24.00	49.00	149.00	353.00	98.00

SALES/MISCELLANEOUS ITEMS:

Qty	Item	Price	Unit of Measure	Extended Amt.
1	ENVIRONMENTAL SERVICE CHARGE	[ENV/MCI] 1.960	EACH	1.96
Rental Subtotal:				98.00
Sales/Misc Subtotal:				1.96
Agreement Subtotal:				99.96
Rental Protection:				14.70
Tax:				10.32
Total:				124.98

COMMENTS/NOTES:

CONTACT: ERIC CADDEY
CELL#: 425-281-3629

Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Environmental Partners, Inc	Phone: 425-895-0010	Date: 12/18/19
Client Contact: Doug Kinkad		Ice Present? Yes
Client Project Name: Olalla Landfill		No. of Coolers: 2
Client Project #: 45407.0	Samplers: E. Caddey	Cooler Temps: 0.31 0.70

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested								Notes/Comments
					VOCs	Vinyl chloride	Disolved Metals full list	Disolved metals As, Fe, Mn	Total Metals K, Na, Ca	Nitrate, Nitrite and other. See list	COD + TOC	Total Col form	
Olalla-MW1-12/19	12/17/19	09:05	water	9	X		X		X	X	X	X	
Olalla-MW5A-12/19	"	10:02	"	3		X		X					X
Olalla-MW3-12/19	"	11:05	"	9	X		X		X	X	X	X	
Olalla-MW10-12/19	"	12:05	"	9	X		X		X	X	X	X	
Olalla-MW6-12/19	"	13:27	"	9	X		X		X	X	X	X	
Olalla-MW8-12/19	"	14:15	"	9	X		X		X	X	X	X	
Olalla-MW7-12/19	"	15:02	"	3		X		X					X
Olalla-MW13-12/19	"	-	"	9	X		X		X	X	X	X	
Trip Blank	"	-	"	2	X	X							

Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Eric Caddey	Printed Name: Jacob [unclear]	Printed Name:	Printed Name:
	Company: EPI	Company: ARI	Company:	Company:
	Date & Time: 12/18/19 09:20	Date & Time: 12/18/19 09:00	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number:	Turn-around Requested: <i>Standard</i>	Page: <i>1</i> of <i>1</i>
ARI Client Company: <i>EPI</i>	Phone: <i>425-395-0010</i>	Date: <i>11/3/20</i> Ice Present? <i>Yes</i>
Client Contact: <i>Doug Kunke</i>		No. of Coolers: <i>1</i> Cooler Temps: <i>4.5°C</i>

Client Project Name: <i>Olalla Landfill</i>	Analysis Requested	Notes/Comments
Client Project #: <i>45407.0</i> Samplers: <i>E. Caddy</i>		

Sample ID	Date	Time	Matrix	No. Containers	Fecal coliform	N-N	PH							
<i>Olalla Swa-1/20</i>	<i>11/3/20</i>	<i>0831</i>	<i>water</i>	<i>3</i>	<i>X</i>	<i>X</i>	<i>X</i>							

Comments/Special Instructions	Relinquished by: <i>[Signature]</i> (Signature)	Received by: <i>[Signature]</i> (Signature)	Relinquished by: <i>[Signature]</i> (Signature)	Received by: <i>[Signature]</i> (Signature)
	Printed Name: <i>Eric Caddy</i>	Printed Name: <i>J. Jambro</i>	Printed Name:	Printed Name:
	Company: <i>EPI</i>	Company: <i>ARI</i>	Company:	Company:
	Date & Time: <i>11/3/20 09:53</i>	Date & Time: <i>11/03/2020 0953</i>	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

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Attachment 2:
2019 Quarterly Monitoring Analytical Data Sheets



12 April 2019

Doug Kunkel
Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah, WA 98027

RE: Olalla Landfill

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>
19C0449	N/A

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 enclosed 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.



Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number: 19C0449	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Environmental Partners, Inc.	Phone: 425-395-0010	Date: 3/28/19
Client Contact: Doug Kunkel	No. of Coolers:	Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested								Notes/Comments
					VOCs	VC by SIM	Dissolved metals	Total Metals	Nitrate, Nitrite, Chloride, Fluoride, Alkalinity	Carb, bicarb, pH, ammonia	COD + TOC	Total Coliform	
MW1-GW-3/19	3/27/19	0918	water	9	X	X	X	X	X	X	X	X	
MW3-GW-3/19		1038			X	X	X	X	X	X	X	X	
MW10-GW-3/19		1149			X	X	X	X	X	X	X	X	
MW6-GW-3/19		1354			X	X	X	X	X	X	X	X	
MW8-GW-3/19		1404			X	X	X	X	X	X	X	X	
MW9-GW-3/19					X	X	X	X	X	X	X	X	
Trip Blank				2	X								
Comments/Special Instructions					Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>			Relinquished by: (Signature)			Received by: (Signature)	
					Printed Name: Eric Caddy	Printed Name: Erin Sallee			Printed Name:			Printed Name:	
					Company: EPI	Company: ARI			Company:			Company:	
					Date & Time: 3/28/19 0820	Date & Time: 3/28/19 0820			Date & Time:			Date & Time:	

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW1-GW-3/19	19C0449-01	Water	27-Mar-2019 09:18	28-Mar-2019 08:20
MW1-GW-3/19	19C0449-02	Water	27-Mar-2019 09:18	28-Mar-2019 08:20
MW3-GW-3/19	19C0449-03	Water	27-Mar-2019 10:38	28-Mar-2019 08:20
MW3-GW-3/19	19C0449-04	Water	27-Mar-2019 10:38	28-Mar-2019 08:20
MW10-GW-3/19	19C0449-05	Water	27-Mar-2019 11:49	28-Mar-2019 08:20
MW10-GW-3/19	19C0449-06	Water	27-Mar-2019 11:49	28-Mar-2019 08:20
MW6-GW-3/19	19C0449-07	Water	27-Mar-2019 13:54	28-Mar-2019 08:20
MW6-GW-3/19	19C0449-08	Water	27-Mar-2019 13:54	28-Mar-2019 08:20
MW8-GW-3/19	19C0449-09	Water	27-Mar-2019 14:04	28-Mar-2019 08:20
MW8-GW-3/19	19C0449-10	Water	27-Mar-2019 14:04	28-Mar-2019 08:20
MW9-GW-3/19	19C0449-11	Water	27-Mar-2019 00:00	28-Mar-2019 08:20
MW9-GW-3/19	19C0449-12	Water	27-Mar-2019 00:00	28-Mar-2019 08:20
Trip Blank	19C0449-13	Water	27-Mar-2019 09:18	28-Mar-2019 08:20



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Work Order Case Narrative

Volatiles - EPA Method SW8260C

The sample(s) were run within the recommended holding times.

Initial and continuing calibrations were within method requirements with the exception of all associated "Q" flagged analytes which are out of control low in the CCAL. All associated samples that contain analyte have been flagged with a "Q" qualifier.

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/LCSD percent recoveries and RPD were within control limits.

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were run 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.

Total and Dissolved Metals - EPA Method 200.8 and 6010C

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.



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times with the exception of pH which was sent to the lab outside of the holding time.

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.



WORK ORDER

19C0449

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Report To:
Environmental Partners, Inc.
Doug Kunkel
1180 NW Maple St., Suite 310
Issaquah, WA 98027
Phone: 425-395-0010
Fax: -

Invoice To:
Environmental Partners, Inc.
Doug Kunkel
1180 NW Maple St., Suite 310
Issaquah, WA 98027
Phone :425-395-0010
Fax: -

Date Due:	11-Apr-2019 18:00 (10 day TAT)	Date Received:	28-Mar-2019 08:20
Received By:	Erin I. Salle	Date Logged In:	28-Mar-2019 09:25
Logged In By:	Erin I. Salle		

Samples Received at: 0.1°C			
Intact, properly signed and dated custody seals attached to outside of cooler(s).....	No	Custody papers included with the cooler.....	Yes
Custody papers properly filled out (in, signed, analyses requested, etc).....	Yes	Was a temperature blank included in the cooler.....	No
Was sufficient ice used (if appropriate).....	Yes	All bottles sealed in individual plastic bags.....	No
All bottles arrived in good condition (unbroken).....	Yes	All bottle labels complete and legible.....	Yes
Number of containers listed on COC match number received.....	Yes	Bottle labels and tags agree with COC.....	Yes
Correct bottles used for the requested analyses.....	Yes	All VOC vials free of air bubbles.....	No
Analyses/bottles require preservation (attach preservation sheet excluding VOC).Yes	Yes	Sufficient amount of sample sent in each bottle.....	Yes
Sample split at ARI.....	No		



WORK ORDER

19C0449

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
19C0449-01 MW1-GW-3/19 [Water] Sampled 27-Mar-2019 09:18				
Ammonia-N, FIA SM 4500-NH3 H-97	04/11/2019	10	4/24/2019	
Alkalinity, Hydroxide SM 2320 B-97	04/11/2019	10	4/10/2019	
Met 6010C - Ca	04/11/2019	10	9/23/2019	
Nitrate + Nitrite-N, EPA 353.2	04/11/2019	10	4/24/2019	
Coliform, Total (MF) SM 9222B	04/11/2019	10	3/27/2019	
Coliform, Fecal (MF) SM 9222D	04/11/2019	10	3/27/2019	
Chemical Oxygen Demand (COD), EPA 410.	04/11/2019	10	4/24/2019	
Met 6010C - Na	04/11/2019	10	9/23/2019	
Carbon, Organic Total, 9060A	04/11/2019	10	4/24/2019	
Alkalinity, Total SM 2320 B-97	04/11/2019	10	4/10/2019	
Nitrate-N Calc EPA 353.2	04/11/2019	10	3/29/2019	
Nitrite-N, EPA 353.2	04/11/2019	10	3/29/2019	
pH, SM 4500-H	04/11/2019	10	3/27/2019	
Chloride, EPA 325.2	04/11/2019	10	4/24/2019	
Alkalinity, Carbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Alkalinity, Bicarbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Filter 0.45 micron	04/11/2019	10	3/29/2019	
8260C-SIM VOC	04/11/2019	10	4/10/2019	
Sulfate, EPA 375.2	04/11/2019	10	4/24/2019	
8260C VOA	04/11/2019	10	4/10/2019	
Met 6010C - K	04/11/2019	10	9/23/2019	
19C0449-02 MW1-GW-3/19 [Water] Sampled 27-Mar-2019 09:18				
Filter 0.45 micron	04/11/2019	10	3/29/2019	Field Filtered
Met Diss 200.8 - As UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 6010C - Mn	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Zn UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Fe	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 6010C - Ba	04/11/2019	10	9/23/2019	Field Filtered
19C0449-03 MW3-GW-3/19 [Water] Sampled 27-Mar-2019 10:38				
Chemical Oxygen Demand (COD), EPA 410.	04/11/2019	10	4/24/2019	
8260C-SIM VOC	04/11/2019	10	4/10/2019	
Alkalinity, Bicarbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Sulfate, EPA 375.2	04/11/2019	10	4/24/2019	
pH, SM 4500-H	04/11/2019	10	3/27/2019	
Nitrite-N, EPA 353.2	04/11/2019	10	3/29/2019	
Coliform, Fecal (MF) SM 9222D	04/11/2019	10	3/27/2019	
Coliform, Total (MF) SM 9222B	04/11/2019	10	3/27/2019	
Alkalinity, Carbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Met 6010C - Ca	04/11/2019	10	9/23/2019	



WORK ORDER

19C0449

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Filter 0.45 micron	04/11/2019	10	3/29/2019	
Met 6010C - K	04/11/2019	10	9/23/2019	
8260C VOA	04/11/2019	10	4/10/2019	
Nitrate + Nitrite-N, EPA 353.2	04/11/2019	10	4/24/2019	
Alkalinity, Hydroxide SM 2320 B-97	04/11/2019	10	4/10/2019	
Chloride, EPA 325.2	04/11/2019	10	4/24/2019	
Nitrate-N Calc EPA 353.2	04/11/2019	10	3/29/2019	
Met 6010C - Na	04/11/2019	10	9/23/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	04/11/2019	10	4/24/2019	
Carbon, Organic Total, 9060A	04/11/2019	10	4/24/2019	
Alkalinity, Total SM 2320 B-97	04/11/2019	10	4/10/2019	

19C0449-04 MW3-GW-3/19 [Water] Sampled 27-Mar-2019 10:38

Filter 0.45 micron	04/11/2019	10	3/29/2019	Field Filtered
Met Diss 200.8 - Fe	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Zn UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 6010C - Ba	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - As UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 6010C - Mn	04/11/2019	10	9/23/2019	Field Filtered

19C0449-05 MW10-GW-3/19 [Water] Sampled 27-Mar-2019 11:49

Sulfate, EPA 375.2	04/11/2019	10	4/24/2019	
Coliform, Fecal (MF) SM 9222D	04/11/2019	10	3/27/2019	
Coliform, Total (MF) SM 9222B	04/11/2019	10	3/27/2019	
Alkalinity, Carbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Nitrite-N, EPA 353.2	04/11/2019	10	3/29/2019	
Met 6010C - Ca	04/11/2019	10	9/23/2019	
pH, SM 4500-H	04/11/2019	10	3/27/2019	
Met 6010C - K	04/11/2019	10	9/23/2019	
Carbon, Organic Total, 9060A	04/11/2019	10	4/24/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	04/11/2019	10	4/24/2019	
Alkalinity, Total SM 2320 B-97	04/11/2019	10	4/10/2019	
8260C-SIM VOC	04/11/2019	10	4/10/2019	
Nitrate-N Calc EPA 353.2	04/11/2019	10	3/29/2019	
Met 6010C - Na	04/11/2019	10	9/23/2019	
Filter 0.45 micron	04/11/2019	10	3/29/2019	
Chloride, EPA 325.2	04/11/2019	10	4/24/2019	
Chemical Oxygen Demand (COD), EPA 410.	04/11/2019	10	4/24/2019	
8260C VOA	04/11/2019	10	4/10/2019	
Alkalinity, Bicarbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Alkalinity, Hydroxide SM 2320 B-97	04/11/2019	10	4/10/2019	
Nitrate + Nitrite-N, EPA 353.2	04/11/2019	10	4/24/2019	



WORK ORDER

19C0449

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
19C0449-06 MW10-GW-3/19 [Water] Sampled 27-Mar-2019 11:49				
Met Diss 6010C - Mn	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 6010C - Ba	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Zn UCT	04/11/2019	10	9/23/2019	Field Filtered
Filter 0.45 micron	04/11/2019	10	3/29/2019	Field Filtered
Met Diss 200.8 - As UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Fe	04/11/2019	10	9/23/2019	Field Filtered

19C0449-07 MW6-GW-3/19 [Water] Sampled 27-Mar-2019 13:54				
pH, SM 4500-H	04/11/2019	10	3/27/2019	
Sulfate, EPA 375.2	04/11/2019	10	4/24/2019	
8260C-SIM VOC	04/11/2019	10	4/10/2019	
Nitrite-N, EPA 353.2	04/11/2019	10	3/29/2019	
Nitrate-N Calc EPA 353.2	04/11/2019	10	3/29/2019	
Nitrate + Nitrite-N, EPA 353.2	04/11/2019	10	4/24/2019	
Met 6010C - Na	04/11/2019	10	9/23/2019	
Met 6010C - K	04/11/2019	10	9/23/2019	
Met 6010C - Ca	04/11/2019	10	9/23/2019	
Alkalinity, Carbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Alkalinity, Bicarbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Coliform, Total (MF) SM 9222B	04/11/2019	10	3/27/2019	
8260C VOA	04/11/2019	10	4/10/2019	
Coliform, Fecal (MF) SM 9222D	04/11/2019	10	3/27/2019	
Chemical Oxygen Demand (COD), EPA 410.	04/11/2019	10	4/24/2019	
Carbon, Organic Total, 9060A	04/11/2019	10	4/24/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	04/11/2019	10	4/24/2019	
Alkalinity, Total SM 2320 B-97	04/11/2019	10	4/10/2019	
Chloride, EPA 325.2	04/11/2019	10	4/24/2019	
Alkalinity, Hydroxide SM 2320 B-97	04/11/2019	10	4/10/2019	
Filter 0.45 micron	04/11/2019	10	3/29/2019	

19C0449-08 MW6-GW-3/19 [Water] Sampled 27-Mar-2019 13:54				
Met Diss 6010C - Mn	04/11/2019	10	9/23/2019	Field Filtered
Filter 0.45 micron	04/11/2019	10	3/29/2019	Field Filtered
Met Diss 6010C - Ba	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Zn UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Fe	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - As UCT	04/11/2019	10	9/23/2019	Field Filtered

19C0449-09 MW8-GW-3/19 [Water] Sampled 27-Mar-2019 14:04				
Nitrate-N Calc EPA 353.2	04/11/2019	10	3/29/2019	
Met 6010C - Ca	04/11/2019	10	9/23/2019	



WORK ORDER

19C0449

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Sulfate, EPA 375.2	04/11/2019	10	4/24/2019	
Met 6010C - Na	04/11/2019	10	9/23/2019	
Alkalinity, Bicarbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Filter 0.45 micron	04/11/2019	10	3/29/2019	
Coliform, Total (MF) SM 9222B	04/11/2019	10	3/27/2019	
Coliform, Fecal (MF) SM 9222D	04/11/2019	10	3/27/2019	
Chloride, EPA 325.2	04/11/2019	10	4/24/2019	
Chemical Oxygen Demand (COD), EPA 410.	04/11/2019	10	4/24/2019	
Nitrate + Nitrite-N, EPA 353.2	04/11/2019	10	4/24/2019	
Nitrite-N, EPA 353.2	04/11/2019	10	3/29/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	04/11/2019	10	4/24/2019	
Alkalinity, Hydroxide SM 2320 B-97	04/11/2019	10	4/10/2019	
8260C VOA	04/11/2019	10	4/10/2019	
8260C-SIM VOC	04/11/2019	10	4/10/2019	
Alkalinity, Carbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
Alkalinity, Total SM 2320 B-97	04/11/2019	10	4/10/2019	
pH, SM 4500-H	04/11/2019	10	3/27/2019	
Met 6010C - K	04/11/2019	10	9/23/2019	
Carbon, Organic Total, 9060A	04/11/2019	10	4/24/2019	

19C0449-10 MW8-GW-3/19 [Water] Sampled 27-Mar-2019 14:04

Filter 0.45 micron	04/11/2019	10	3/29/2019	Field Filtered
Met Diss 200.8 - As UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Fe	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Zn UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 6010C - Ba	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 6010C - Mn	04/11/2019	10	9/23/2019	Field Filtered

19C0449-11 MW9-GW-3/19 [Water] Sampled 27-Mar-2019 00:00

Filter 0.45 micron	04/11/2019	10	3/29/2019	
Sulfate, EPA 375.2	04/11/2019	10	4/24/2019	
Nitrite-N, EPA 353.2	04/11/2019	10	3/29/2019	
Chloride, EPA 325.2	04/11/2019	10	4/24/2019	
Coliform, Fecal (MF) SM 9222D	04/11/2019	10	3/27/2019	
Coliform, Total (MF) SM 9222B	04/11/2019	10	3/27/2019	
Alkalinity, Hydroxide SM 2320 B-97	04/11/2019	10	4/10/2019	
Nitrate + Nitrite-N, EPA 353.2	04/11/2019	10	4/24/2019	
8260C VOA	04/11/2019	10	4/10/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	04/11/2019	10	4/24/2019	
8260C-SIM VOC	04/11/2019	10	4/10/2019	
Met 6010C - Ca	04/11/2019	10	9/23/2019	
Chemical Oxygen Demand (COD), EPA 410.	04/11/2019	10	4/24/2019	



WORK ORDER

19C0449

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Alkalinity, Carbonate SM 2320 B-97	04/11/2019	10	4/10/2019	
pH, SM 4500-H	04/11/2019	10	3/27/2019	
Alkalinity, Total SM 2320 B-97	04/11/2019	10	4/10/2019	
Nitrate-N Calc EPA 353.2	04/11/2019	10	3/29/2019	
Carbon, Organic Total, 9060A	04/11/2019	10	4/24/2019	
Met 6010C - Na	04/11/2019	10	9/23/2019	
Met 6010C - K	04/11/2019	10	9/23/2019	
Alkalinity, Bicarbonate SM 2320 B-97	04/11/2019	10	4/10/2019	

19C0449-12 MW9-GW-3/19 [Water] Sampled 27-Mar-2019 00:00

Met Diss 200.8 - Fe	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 6010C - Mn	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - Zn UCT	04/11/2019	10	9/23/2019	Field Filtered
Met Diss 200.8 - As UCT	04/11/2019	10	9/23/2019	Field Filtered
Filter 0.45 micron	04/11/2019	10	3/29/2019	Field Filtered
Met Diss 6010C - Ba	04/11/2019	10	9/23/2019	Field Filtered

19C0449-13 Trip Blank [Water] Sampled 27-Mar-2019 00:00

8260C VOA	04/11/2019	10	4/10/2019	
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Analysis groups included in this work order

Nitrate-N Calc EPA 353.2

Nitrite-N, EPA 353.2 Nitrate + Nitrite-N, EPA 353.2



WORK ORDER

19C0449

Client: Environmental Partners, Inc.

Project Manager: Kelly Bottem

Project: Olalla Landfill

Project Number: [none]

Preservation Confirmation

Container ID	Container Type	pH	
19C0449-01 A	HDPE NM, 500 mL		
19C0449-01 B	Miscellaneous Container	<2	pass
19C0449-01 C	Miscellaneous Container	<2	pass
19C0449-01 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2	pass
19C0449-01 E	Corning Plastic, 125 mL, Na2S2O3		
19C0449-01 F	VOA Vial, Clear, 40 mL, HCL		
19C0449-01 G	VOA Vial, Clear, 40 mL, HCL		
19C0449-01 H	VOA Vial, Clear, 40 mL, HCL		
19C0449-02 A	Miscellaneous Container	<2	pass
19C0449-03 A	HDPE NM, 500 mL		
19C0449-03 B	Miscellaneous Container	<2	pass
19C0449-03 C	Miscellaneous Container	<2	pass
19C0449-03 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2	pass
19C0449-03 E	Corning Plastic, 125 mL, Na2S2O3		
19C0449-03 F	VOA Vial, Clear, 40 mL, HCL		
19C0449-03 G	VOA Vial, Clear, 40 mL, HCL		
19C0449-03 H	VOA Vial, Clear, 40 mL, HCL		
19C0449-04 A	Miscellaneous Container	<2	pass
19C0449-05 A	HDPE NM, 500 mL		
19C0449-05 B	Miscellaneous Container	<2	pass
19C0449-05 C	Miscellaneous Container	>2	pass fail
19C0449-05 D	Glass NM, Amber, 250 mL, 9N H2SO4		
19C0449-05 E	Corning Plastic, 125 mL, Na2S2O3		
19C0449-05 F	VOA Vial, Clear, 40 mL, HCL		
19C0449-05 G	VOA Vial, Clear, 40 mL, HCL		
19C0449-05 H	VOA Vial, Clear, 40 mL, HCL		
19C0449-06 A	Miscellaneous Container	<2	pass
19C0449-07 A	HDPE NM, 500 mL		
19C0449-07 B	Miscellaneous Container	<2	pass
19C0449-07 C	Miscellaneous Container	<2	pass
19C0449-07 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2	pass
19C0449-07 E	Corning Plastic, 125 mL, Na2S2O3		
19C0449-07 F	VOA Vial, Clear, 40 mL, HCL		
19C0449-07 G	VOA Vial, Clear, 40 mL, HCL		
19C0449-07 H	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

19C0449

Client: Environmental Partners, Inc.		Project Manager: Kelly Bottem	
Project: Olalla Landfill		Project Number: [none]	
19C0449-08 A	Miscellaneous Container	LZ	PASS
19C0449-09 A	HDPE NM, 500 mL		
19C0449-09 B	Miscellaneous Container	LZ	PASS
19C0449-09 C	Miscellaneous Container	LZ	PASS
19C0449-09 D	Glass NM, Amber, 250 mL, 9N H2SO4	LZ	PASS
19C0449-09 E	Corning Plastic, 125 mL, Na2S2O3		
19C0449-09 F	VOA Vial, Clear, 40 mL, HCL		
19C0449-09 G	VOA Vial, Clear, 40 mL, HCL		
19C0449-09 H	VOA Vial, Clear, 40 mL, HCL		
19C0449-10 A	Miscellaneous Container	LZ	PASS
19C0449-11 A	HDPE NM, 500 mL		
19C0449-11 B	Miscellaneous Container	LZ	PASS
19C0449-11 C	Miscellaneous Container	LZ	PASS
19C0449-11 D	Glass NM, Amber, 250 mL, 9N H2SO4	LZ	PASS
19C0449-11 E	Corning Plastic, 125 mL, Na2S2O3		
19C0449-11 F	VOA Vial, Clear, 40 mL, HCL		
19C0449-11 G	VOA Vial, Clear, 40 mL, HCL		
19C0449-11 H	VOA Vial, Clear, 40 mL, HCL		
19C0449-12 A	Miscellaneous Container	LZ	PASS
19C0449-13 A	VOA Vial, Clear, 40 mL, HCL		
19C0449-13 B	VOA Vial, Clear, 40 mL, HCL		


Preservation Confirmed By

3/28/19
Date



Cooler Receipt Form

ARI Client: EPI

Project Name: Olalla Landfill

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 19C0449

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to 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 0820 0.1

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 5005206

Cooler Accepted by: [Signature] Date: 3/28/19 Time: 0820

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

Were all bottles sealed in individual plastic bags? _____ YES NO

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 3/28/19

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: [Signature] Date: 3/28/19 Time: 0925 Labels checked by: [Signature]

**** 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:

Trip Blank A had an air bubble

By: [Signature] Date: 3/28/19



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW1-GW-3/19
19C0449-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C Sampled: 03/27/2019 09:18
Instrument: NT2 Analyst: PKC Analyzed: 03/28/2019 12:25

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-01 F
Preparation Batch: BHC0779 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW1-GW-3/19
19C0449-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 09:18

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 12:25

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW1-GW-3/19
19C0449-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 09:18

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 12:25

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	102	%	
Surrogate: Toluene-d8		80-120 %	99.9	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	98.1	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	101	%	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW1-GW-3/19
19C0449-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 03/27/2019 09:18
Instrument: NT16 Analyst: PB	Analyzed: 04/01/2019 18:48
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-01 G
	Preparation Batch: BHD0043 Sample Size: 10 mL
	Prepared: 01-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>102</i>	<i>%</i>	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW1-GW-3/19
19C0449-01 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 03/27/2019 09:18
Instrument: ICP2 Analyst: TCH Analyzed: 04/02/2019 18:39

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19C0449-01 C 01
Preparation Batch: BHD0033 Sample Size: 25 mL
Prepared: 01-Apr-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	9.42	mg/L	
Potassium	7440-09-7	1	0.500	0.642	mg/L	
Sodium	7440-23-5	1	0.500	4.19	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW1-GW-3/19
19C0449-01 (Water)

Wet Chemistry

Method: EPA 325.2

Sampled: 03/27/2019 09:18

Instrument: LACHAT1 Analyst: BF

Analyzed: 04/05/2019 15:42

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19C0449-01 A

Preparation Batch: BHD0163

Sample Size: 10 mL

Prepared: 05-Apr-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	3.11	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW1-GW-3/19
19C0449-01 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 03/27/2019 09:18
Instrument: [CALC] Analyst: AGW Analyzed: 04/06/2019 23:37

Sample Preparation: Preparation Method: [CALC] Extract ID: 19C0449-01
Preparation Batch: [CALC]
Prepared: 04-Apr-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	2	0.0300	1.19	mg/L	

Instrument: LCHAT1 Analyst: BF Analyzed: 03/28/2019 17:05

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-01 A
Preparation Batch: BHC0798 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW1-GW-3/19
19C0449-01 (Water)

Wet Chemistry

Method: EPA 375.2	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Sampled: 03/27/2019 09:18
Instrument: LCHAT1 Analyst: BF	Preparation Batch: BHD0152	Final Volume: 10 mL	Analyzed: 04/05/2019 11:34
Sample Preparation:	Prepared: 05-Apr-2019		Extract ID: 19C0449-01 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	5.17	mg/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW1-GW-3/19
19C0449-01 (Water)

Wet Chemistry

Method: EPA 410.4 Sampled: 03/27/2019 09:18
Instrument: UV1800-1 Analyst: WCW Analyzed: 03/29/2019 09:49

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-01 D
Preparation Batch: BHC0789 Sample Size: 2 mL
Prepared: 28-Mar-2019 Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW1-GW-3/19
19C0449-01 (Water)

Wet Chemistry

Method: EPA 9060A	Sampled: 03/27/2019 09:18	
Instrument: TOC-LCSH Analyst: BF	Analyzed: 04/06/2019 04:45	
Sample Preparation:	Preparation Method: No Prep Wet Chem	Extract ID: 19C0449-01 D
	Preparation Batch: BHD0132	Sample Size: 20 mL
	Prepared: 04-Apr-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	ND	mg/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW1-GW-3/19
19C0449-01 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 03/27/2019 09:18
Instrument: Accumet AR60 Analyst: UW Analyzed: 03/28/2019 12:55

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-01 A
Preparation Batch: BHC0788 Sample Size: 100 mL
Prepared: 28-Mar-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	41.2	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	41.2	mg/L CaCO3	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW1-GW-3/19
19C0449-01 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00 Sampled: 03/27/2019 09:18
Instrument: Accumet AR60 Analyst: UW Analyzed: 03/28/2019 12:25

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-01 A
Preparation Batch: BHC0787 Sample Size: 50 mL
Prepared: 28-Mar-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.21	pH Units	H



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MW1-GW-3/19
19C0449-01 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 03/27/2019 09:18
Instrument: LACHAT2 Analyst: BF	Analyzed: 04/11/2019 15:37
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHD0144
	Prepared: 11-Apr-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19C0449-01 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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MW1-GW-3/19
19C0449-01 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 03/27/2019 09:18
Instrument: N/A Analyst: UW	Preparation Batch: BHC0785	Final Volume: 100 mL	Analyzed: 03/29/2019 10:02
Sample Preparation:	Prepared: 28-Mar-2019		Extract ID: 19C0449-01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Project Manager: Doug Kunkel

Reported:
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MW1-GW-3/19
19C0449-01RE1 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 03/27/2019 09:18
Instrument: LACHAT2 Analyst: AGW Analyzed: 04/06/2019 23:37

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-01RE1 A
Preparation Batch: BHD0141 Sample Size: 10 mL
Prepared: 04-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		2	0.020	0.020	1.19	mg/L	D



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MW1-GW-3/19
19C0449-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 03/27/2019 09:18
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/09/2019 14:41
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-02 A 02
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW1-GW-3/19
19C0449-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 03/27/2019 09:18
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/08/2019 20:41
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-02 A 02
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19C0449-02 A 03
Preparation Batch: BHD0195	Sample Size: 100 mL
Prepared: 08-Apr-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.111	ug/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW1-GW-3/19
19C0449-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 03/27/2019 09:18
Instrument: ICP2 Analyst: TCH Analyzed: 04/03/2019 15:34
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19C0449-02 A 01
Preparation Batch: BHC0811 Sample Size: 25 mL
Prepared: 29-Mar-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0035	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	ND	mg/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW3-GW-3/19
19C0449-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 10:38

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 12:46

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19C0449-03 F

Preparation Batch: BHC0779

Sample Size: 10 mL

Prepared: 28-Mar-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW3-GW-3/19
19C0449-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 10:38

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 12:46

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW3-GW-3/19
19C0449-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 10:38

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 12:46

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	100	%	
Surrogate: Toluene-d8		80-120 %	99.8	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	98.0	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	101	%	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW3-GW-3/19
19C0449-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 03/27/2019 10:38
Instrument: NT16 Analyst: PB	Analyzed: 04/01/2019 19:08
Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)	Extract ID: 19C0449-03 G
Preparation Batch: BHD0043	Sample Size: 10 mL
Prepared: 01-Apr-2019	Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>103</i>	<i>%</i>	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW3-GW-3/19
19C0449-03 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 03/27/2019 10:38
Instrument: ICP2 Analyst: TCH Analyzed: 04/02/2019 18:43

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19C0449-03 C 01
Preparation Batch: BHD0033 Sample Size: 25 mL
Prepared: 01-Apr-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	49.1	mg/L	
Potassium	7440-09-7	1	0.500	1.02	mg/L	
Sodium	7440-23-5	1	0.500	10.0	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW3-GW-3/19
19C0449-03 (Water)

Wet Chemistry

Method: EPA 325.2	Preparation Method: No Prep Wet Chem		Sampled: 03/27/2019 10:38
Instrument: LACHAT1 Analyst: BF	Preparation Batch: BHD0163	Sample Size: 10 mL	Analyzed: 04/05/2019 15:46
Sample Preparation:	Prepared: 05-Apr-2019	Final Volume: 10 mL	Extract ID: 19C0449-03 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	1.93	mg/L	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW3-GW-3/19
19C0449-03 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 03/27/2019 10:38
Instrument: [CALC] Analyst: BF Analyzed: 04/06/2019 23:03

Sample Preparation: Preparation Method: [CALC] Extract ID: 19C0449-03
Preparation Batch: [CALC]
Prepared: 04-Apr-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: BF Analyzed: 03/28/2019 17:09

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-03 A
Preparation Batch: BHC0798 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: AGW Analyzed: 04/06/2019 23:03

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-03 A
Preparation Batch: BHD0141 Sample Size: 10 mL
Prepared: 04-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW3-GW-3/19
19C0449-03 (Water)

Wet Chemistry

Method: EPA 375.2 Sampled: 03/27/2019 10:38
Instrument: LACHAT1 Analyst: BF Analyzed: 04/05/2019 11:39

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-03 A
Preparation Batch: BHD0152 Sample Size: 10 mL
Prepared: 05-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	19.1	mg/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW3-GW-3/19
19C0449-03 (Water)

Wet Chemistry

Method: EPA 410.4 Sampled: 03/27/2019 10:38
Instrument: UV1800-1 Analyst: WCW Analyzed: 03/29/2019 09:52

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-03 D
Preparation Batch: BHC0789 Sample Size: 2 mL
Prepared: 28-Mar-2019 Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW3-GW-3/19
19C0449-03 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 03/27/2019 10:38
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHD0132	Analyzed: 04/06/2019 06:44
Sample Preparation:	Prepared: 04-Apr-2019	Extract ID: 19C0449-03 D
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.68	mg/L	



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Reported:
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MW3-GW-3/19
19C0449-03 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 03/27/2019 10:38
Instrument: Accumet AR60 Analyst: UW Analyzed: 03/28/2019 12:55

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-03 A
Preparation Batch: BHC0788 Sample Size: 50 mL
Prepared: 28-Mar-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	219	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	219	mg/L CaCO3	



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MW3-GW-3/19
19C0449-03 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sampled: 03/27/2019 10:38
Instrument: Accumet AR60 Analyst: UW	Preparation Batch: BHC0787	Analyzed: 03/28/2019 12:25
Sample Preparation:	Prepared: 28-Mar-2019	Extract ID: 19C0449-03 A
	Sample Size: 50 mL	
	Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.23	pH Units	H



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW3-GW-3/19
19C0449-03 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97 Sampled: 03/27/2019 10:38
Instrument: LACHAT2 Analyst: BF Analyzed: 04/11/2019 15:42

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-03 D
Preparation Batch: BHD0144 Sample Size: 10 mL
Prepared: 11-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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MW3-GW-3/19
19C0449-03 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 03/27/2019 10:38
Instrument: N/A Analyst: UW	Preparation Batch: BHC0785	Final Volume: 100 mL	Analyzed: 03/29/2019 10:02
Sample Preparation:	Prepared: 28-Mar-2019		Extract ID: 19C0449-03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Project Manager: Doug Kunkel

Reported:
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MW3-GW-3/19
19C0449-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 03/27/2019 10:38
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/09/2019 14:44
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BHD0194
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19C0449-04 A 02

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW3-GW-3/19
19C0449-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 03/27/2019 10:38
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/08/2019 20:46
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-04 A 02
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19C0449-04 A 03
Preparation Batch: BHD0195	Sample Size: 100 mL
Prepared: 08-Apr-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.132	ug/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW3-GW-3/19
19C0449-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 03/27/2019 10:38
Instrument: ICP2 Analyst: TCH Analyzed: 04/03/2019 15:38

Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19C0449-04 A 01
Preparation Batch: BHC0811 Sample Size: 25 mL
Prepared: 29-Mar-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0153	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	6.67	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW10-GW-3/19
19C0449-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 11:49

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 13:06

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19C0449-05 F

Preparation Batch: BHC0779

Sample Size: 10 mL

Prepared: 28-Mar-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW10-GW-3/19
19C0449-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 11:49

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 13:06

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW10-GW-3/19
19C0449-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 11:49

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 13:06

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	101	%	
Surrogate: Toluene-d8		80-120 %	98.9	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	98.6	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	100	%	



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Project Number: [none]
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Reported:
12-Apr-2019 16:26

MW10-GW-3/19
19C0449-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM Sampled: 03/27/2019 11:49
Instrument: NT16 Analyst: PB Analyzed: 04/01/2019 19:28
Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-05 G
Preparation Batch: BHD0043 Sample Size: 10 mL
Prepared: 01-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	105	ng/L	
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>102</i>	<i>%</i>	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW10-GW-3/19
19C0449-05 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 03/27/2019 11:49
Instrument: ICP2 Analyst: TCH Analyzed: 04/02/2019 18:47

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19C0449-05 C 01
Preparation Batch: BHD0033 Sample Size: 25 mL
Prepared: 01-Apr-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	39.0	mg/L	
Potassium	7440-09-7	1	0.500	1.31	mg/L	
Sodium	7440-23-5	1	0.500	11.5	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW10-GW-3/19
19C0449-05 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 03/27/2019 11:49
Instrument: [CALC] Analyst: BF Analyzed: 04/06/2019 23:04

Sample Preparation: Preparation Method: [CALC] Extract ID: 19C0449-05
Preparation Batch: [CALC]
Prepared: 04-Apr-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: BF Analyzed: 03/28/2019 17:10

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-05 A
Preparation Batch: BHC0798 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: AGW Analyzed: 04/06/2019 23:04

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-05 A
Preparation Batch: BHD0141 Sample Size: 10 mL
Prepared: 04-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW10-GW-3/19
19C0449-05 (Water)

Wet Chemistry

Method: EPA 375.2

Sampled: 03/27/2019 11:49

Instrument: LACHAT1 Analyst: BF

Analyzed: 04/05/2019 11:40

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19C0449-05 A

Preparation Batch: BHD0152

Sample Size: 10 mL

Prepared: 05-Apr-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	8.05	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW10-GW-3/19
19C0449-05 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem		Sampled: 03/27/2019 11:49
Instrument: UV1800-1 Analyst: WCW	Preparation Batch: BHC0789	Sample Size: 2 mL	Analyzed: 03/29/2019 09:53
Sample Preparation:	Prepared: 28-Mar-2019	Final Volume: 2 mL	Extract ID: 19C0449-05 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

MW10-GW-3/19
19C0449-05 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sample Size: 20 mL	Sampled: 03/27/2019 11:49
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHD0132	Final Volume: 20 mL	Analyzed: 04/06/2019 07:03
Sample Preparation:	Prepared: 04-Apr-2019		Extract ID: 19C0449-05 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	3.12	mg/L	



Environmental Partners, Inc.
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Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW10-GW-3/19
19C0449-05 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 03/27/2019 11:49
Instrument: Accumet AR60 Analyst: UW Analyzed: 03/28/2019 12:55

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-05 A
Preparation Batch: BHC0788 Sample Size: 50 mL
Prepared: 28-Mar-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	192	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	192	mg/L CaCO3	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW10-GW-3/19
19C0449-05 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sample Size: 50 mL	Sampled: 03/27/2019 11:49
Instrument: Accumet AR60 Analyst: UW	Preparation Batch: BHC0787	Final Volume: 50 mL	Analyzed: 03/28/2019 12:25
Sample Preparation:	Prepared: 28-Mar-2019	Extract ID: 19C0449-05 A	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.50	pH Units	H



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MW10-GW-3/19
19C0449-05 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 03/27/2019 11:49	
Instrument: LACHAT2 Analyst: BF	Analyzed: 04/11/2019 15:43	
Sample Preparation:	Preparation Method: No Prep Wet Chem	Extract ID: 19C0449-05 D
	Preparation Batch: BHD0144	Sample Size: 10 mL
	Prepared: 11-Apr-2019	Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.083	mg/L	



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MW10-GW-3/19
19C0449-05 (Water)

Microbiology

Method: SM 9222B Sampled: 03/27/2019 11:49
Instrument: N/A Analyst: UW Analyzed: 03/29/2019 10:02
Sample Preparation: Extract ID: 19C0449-05

Preparation Method: No Prep Wet Chem
Preparation Batch: BHC0785 Sample Size: 100 mL
Prepared: 28-Mar-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW10-GW-3/19
19C0449-05RE1 (Water)

Wet Chemistry

Method: EPA 325.2

Sampled: 03/27/2019 11:49

Instrument: LACHAT1 Analyst: BF

Analyzed: 04/05/2019 16:53

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19C0449-05RE1 A

Preparation Batch: BHD0163

Sample Size: 10 mL

Prepared: 05-Apr-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	2	2.00	2.00	12.0	mg/L	D



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Project Manager: Doug Kunkel

Reported:
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MW10-GW-3/19
19C0449-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8		Sampled: 03/27/2019 11:49
Instrument: ICPMS2 Analyst: MCB		Analyzed: 04/09/2019 14:47
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-06 A 02
	Preparation Batch: BHD0194	Sample Size: 25 mL
	Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	22.5	ug/L	



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MW10-GW-3/19
19C0449-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 03/27/2019 11:49
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/08/2019 20:51
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-06 A 02
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19C0449-06 A 03
Preparation Batch: BHD0195	Sample Size: 100 mL
Prepared: 08-Apr-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	1.62	ug/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW10-GW-3/19
19C0449-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 03/27/2019 11:49
Instrument: ICP2 Analyst: TCH Analyzed: 04/03/2019 15:42
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19C0449-06 A 01
Preparation Batch: BHC0811 Sample Size: 25 mL
Prepared: 29-Mar-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0140	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	4.35	mg/L	



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Project: Olalla Landfill
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Project Manager: Doug Kunkel

Reported:
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MW6-GW-3/19
19C0449-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C Sampled: 03/27/2019 13:54
Instrument: NT2 Analyst: PKC Analyzed: 03/28/2019 13:26

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-07 F
Preparation Batch: BHC0779 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project Manager: Doug Kunkel

Reported:
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MW6-GW-3/19
19C0449-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 13:54

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 13:26

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	2.95	ug/L	
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW6-GW-3/19
19C0449-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 13:54

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 13:26

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	104	%	
Surrogate: Toluene-d8		80-120 %	99.7	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	98.2	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	101	%	



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MW6-GW-3/19
19C0449-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 03/27/2019 13:54
Instrument: NT16 Analyst: PB	Analyzed: 04/01/2019 19:48
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-07 G
	Preparation Batch: BHD0043 Sample Size: 10 mL
	Prepared: 01-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	107	ng/L	
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>102</i>	<i>%</i>	



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Project: Olalla Landfill
Project Number: [none]
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Reported:
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MW6-GW-3/19
19C0449-07 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 03/27/2019 13:54
Instrument: ICP2 Analyst: TCH Analyzed: 04/02/2019 18:51

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19C0449-07 C 01
Preparation Batch: BHD0033 Sample Size: 25 mL
Prepared: 01-Apr-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	38.9	mg/L	
Potassium	7440-09-7	1	0.500	1.53	mg/L	
Sodium	7440-23-5	1	0.500	8.97	mg/L	



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Project Manager: Doug Kunkel

Reported:
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MW6-GW-3/19
19C0449-07 (Water)

Wet Chemistry

Method: EPA 325.2 Sampled: 03/27/2019 13:54
Instrument: LACHAT1 Analyst: BF Analyzed: 04/05/2019 15:49

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-07 A
Preparation Batch: BHD0163 Sample Size: 10 mL
Prepared: 05-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	5.83	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW6-GW-3/19
19C0449-07 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 03/27/2019 13:54
Instrument: [CALC] Analyst: BF Analyzed: 04/06/2019 23:11

Sample Preparation: Preparation Method: [CALC] Extract ID: 19C0449-07
Preparation Batch: [CALC]
Prepared: 04-Apr-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: BF Analyzed: 03/28/2019 17:11

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-07 A
Preparation Batch: BHC0798 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: AGW Analyzed: 04/06/2019 23:11

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-07 A
Preparation Batch: BHD0141 Sample Size: 10 mL
Prepared: 04-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U



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MW6-GW-3/19
19C0449-07 (Water)

Wet Chemistry

Method: EPA 375.2	Preparation Method: No Prep Wet Chem		Sampled: 03/27/2019 13:54
Instrument: LACHAT1 Analyst: BF	Preparation Batch: BHD0152	Sample Size: 10 mL	Analyzed: 04/05/2019 11:41
Sample Preparation:	Prepared: 05-Apr-2019	Final Volume: 10 mL	Extract ID: 19C0449-07 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	7.99	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW6-GW-3/19
19C0449-07 (Water)

Wet Chemistry

Method: EPA 410.4 Sampled: 03/27/2019 13:54
Instrument: UV1800-1 Analyst: WCW Analyzed: 03/29/2019 09:53

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-07 D
Preparation Batch: BHC0789 Sample Size: 2 mL
Prepared: 28-Mar-2019 Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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MW6-GW-3/19
19C0449-07 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sample Size: 20 mL	Sampled: 03/27/2019 13:54
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHD0132	Final Volume: 20 mL	Analyzed: 04/06/2019 07:22
Sample Preparation:	Prepared: 04-Apr-2019		Extract ID: 19C0449-07 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.14	mg/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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MW6-GW-3/19
19C0449-07 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 03/27/2019 13:54
Instrument: Accumet AR60 Analyst: UW Analyzed: 03/28/2019 12:55

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-07 A
Preparation Batch: BHC0788 Sample Size: 50 mL
Prepared: 28-Mar-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	188	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	188	mg/L CaCO3	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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MW6-GW-3/19
19C0449-07 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem		Sampled: 03/27/2019 13:54
Instrument: Accumet AR60 Analyst: UW	Preparation Batch: BHC0787	Sample Size: 50 mL	Analyzed: 03/28/2019 12:25
Sample Preparation:	Prepared: 28-Mar-2019	Final Volume: 50 mL	Extract ID: 19C0449-07 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.33	pH Units	H



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MW6-GW-3/19
19C0449-07 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 03/27/2019 13:54
Instrument: LACHAT2 Analyst: BF	Analyzed: 04/11/2019 15:44
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHD0144
	Prepared: 11-Apr-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19C0449-07 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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MW6-GW-3/19
19C0449-07 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 03/27/2019 13:54
Instrument: N/A Analyst: UW	Preparation Batch: BHC0785	Final Volume: 100 mL	Analyzed: 03/29/2019 10:02
Sample Preparation:	Prepared: 28-Mar-2019		Extract ID: 19C0449-07

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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MW6-GW-3/19
19C0449-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 03/27/2019 13:54
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/09/2019 14:50
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-08 A 02
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	1090	ug/L	



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MW6-GW-3/19
19C0449-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 03/27/2019 13:54
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/08/2019 20:56
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-08 A 02
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19C0449-08 A 03
Preparation Batch: BHD0195	Sample Size: 100 mL
Prepared: 08-Apr-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	1.05	ug/L	



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Project Manager: Doug Kunkel

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MW6-GW-3/19
19C0449-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 03/27/2019 13:54
Instrument: ICP2 Analyst: TCH Analyzed: 04/03/2019 15:47
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19C0449-08 A 01
Preparation Batch: BHC0811 Sample Size: 25 mL
Prepared: 29-Mar-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0161	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	1.03	mg/L	



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MW8-GW-3/19
19C0449-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C Sampled: 03/27/2019 14:04
Instrument: NT2 Analyst: PKC Analyzed: 03/28/2019 13:47

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-09 F
Preparation Batch: BHC0779 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.27	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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MW8-GW-3/19
19C0449-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 14:04

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 13:47

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project Manager: Doug Kunkel

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MW8-GW-3/19
19C0449-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 14:04

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 13:47

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	102	%	
Surrogate: Toluene-d8		80-120 %	99.6	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	97.9	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	103	%	



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MW8-GW-3/19
19C0449-09 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 03/27/2019 14:04
Instrument: NT16 Analyst: PB	Analyzed: 04/01/2019 20:09
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-09 H
	Preparation Batch: BHD0043 Sample Size: 10 mL
	Prepared: 01-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	104	ng/L	
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>103</i>	<i>%</i>	



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MW8-GW-3/19
19C0449-09 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 03/27/2019 14:04
Instrument: ICP2 Analyst: TCH Analyzed: 04/02/2019 18:56

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19C0449-09 C 01
Preparation Batch: BHD0033 Sample Size: 25 mL
Prepared: 01-Apr-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	24.1	mg/L	
Potassium	7440-09-7	1	0.500	1.14	mg/L	
Sodium	7440-23-5	1	0.500	9.20	mg/L	



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MW8-GW-3/19
19C0449-09 (Water)

Wet Chemistry

Method: EPA 325.2 Sampled: 03/27/2019 14:04
Instrument: LACHAT1 Analyst: BF Analyzed: 04/05/2019 15:56

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-09 A
Preparation Batch: BHD0163 Sample Size: 10 mL
Prepared: 05-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	2.66	mg/L	



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MW8-GW-3/19
19C0449-09 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 03/27/2019 14:04
Instrument: [CALC] Analyst: BF Analyzed: 04/06/2019 23:12

Sample Preparation: Preparation Method: [CALC] Extract ID: 19C0449-09
Preparation Batch: [CALC]
Prepared: 04-Apr-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.108	mg/L	

Instrument: LACHAT1 Analyst: BF Analyzed: 03/28/2019 17:12

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-09 A
Preparation Batch: BHC0798 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: AGW Analyzed: 04/06/2019 23:12

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-09 A
Preparation Batch: BHD0141 Sample Size: 10 mL
Prepared: 04-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.108	mg/L	



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MW8-GW-3/19
19C0449-09 (Water)

Wet Chemistry

Method: EPA 375.2	Preparation Method: No Prep Wet Chem		Sampled: 03/27/2019 14:04
Instrument: LACHAT1 Analyst: BF	Preparation Batch: BHD0152	Sample Size: 10 mL	Analyzed: 04/05/2019 11:49
Sample Preparation:	Prepared: 05-Apr-2019	Final Volume: 10 mL	Extract ID: 19C0449-09 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	3.54	mg/L	



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MW8-GW-3/19
19C0449-09 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem		Sampled: 03/27/2019 14:04
Instrument: UV1800-1 Analyst: WCW	Preparation Batch: BHC0789	Sample Size: 2 mL	Analyzed: 03/29/2019 09:54
Sample Preparation:	Prepared: 28-Mar-2019	Final Volume: 2 mL	Extract ID: 19C0449-09 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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MW8-GW-3/19
19C0449-09 (Water)

Wet Chemistry

Method: EPA 9060A	Sampled: 03/27/2019 14:04
Instrument: TOC-LCSH Analyst: BF	Analyzed: 04/06/2019 07:47
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHD0132
	Prepared: 04-Apr-2019
	Sample Size: 20 mL
	Final Volume: 20 mL
	Extract ID: 19C0449-09 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.82	mg/L	



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MW8-GW-3/19
19C0449-09 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 03/27/2019 14:04
Instrument: Accumet AR60 Analyst: UW Analyzed: 03/28/2019 12:55
Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-09 A
Preparation Batch: BHC0788 Sample Size: 50 mL
Prepared: 28-Mar-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	128	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	128	mg/L CaCO3	



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MW8-GW-3/19
19C0449-09 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sampled: 03/27/2019 14:04
Instrument: Accumet AR60 Analyst: UW	Preparation Batch: BHC0787	Analyzed: 03/28/2019 12:25
Sample Preparation:	Prepared: 28-Mar-2019	Extract ID: 19C0449-09 A
	Sample Size: 50 mL	
	Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.45	pH Units	H



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MW8-GW-3/19
19C0449-09 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97 Sampled: 03/27/2019 14:04
Instrument: LCHAT2 Analyst: BF Analyzed: 04/11/2019 15:45

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-09 D
Preparation Batch: BHD0144 Sample Size: 10 mL
Prepared: 11-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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MW8-GW-3/19
19C0449-09 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 03/27/2019 14:04
Instrument: N/A Analyst: UW	Preparation Batch: BHC0785	Final Volume: 100 mL	Analyzed: 03/29/2019 10:02
Sample Preparation:	Prepared: 28-Mar-2019		Extract ID: 19C0449-09

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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MW8-GW-3/19
19C0449-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 03/27/2019 14:04
Instrument: ICPMS2 Analyst: MCB	Preparation Batch: BHD0194	Analyzed: 04/09/2019 14:53
Sample Preparation:	Prepared: 08-Apr-2019	Extract ID: 19C0449-10 A 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	1040	ug/L	



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MW8-GW-3/19
19C0449-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 03/27/2019 14:04
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/08/2019 21:01
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-10 A 02
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	6.83	ug/L	

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19C0449-10 A 03
Preparation Batch: BHD0195	Sample Size: 100 mL
Prepared: 08-Apr-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	1.75	ug/L	



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MW8-GW-3/19
19C0449-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Sampled: 03/27/2019 14:04
Instrument: ICP2 Analyst: TCH	Analyzed: 04/03/2019 15:51
Sample Preparation:	Preparation Method: WMN (No Prep)
	Preparation Batch: BHC0811
	Prepared: 29-Mar-2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19C0449-10 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0078	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	2.53	mg/L	



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MW9-GW-3/19
19C0449-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C Sampled: 03/27/2019 00:00
Instrument: NT2 Analyst: PKC Analyzed: 03/28/2019 14:07

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-11 F
Preparation Batch: BHC0779 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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MW9-GW-3/19
19C0449-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 00:00

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 14:07

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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MW9-GW-3/19
19C0449-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 00:00

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 14:07

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	101	%	
Surrogate: Toluene-d8		80-120 %	99.6	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	97.8	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.1	%	



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MW9-GW-3/19
19C0449-11 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 03/27/2019 00:00
Instrument: NT16 Analyst: PB	Analyzed: 04/01/2019 20:29
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19C0449-11 G
	Preparation Batch: BHD0043 Sample Size: 10 mL
	Prepared: 01-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>101</i>	<i>%</i>	



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MW9-GW-3/19
19C0449-11 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 03/27/2019 00:00
Instrument: ICP2 Analyst: TCH Analyzed: 04/02/2019 19:00

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19C0449-11 C 01
Preparation Batch: BHD0033 Sample Size: 25 mL
Prepared: 01-Apr-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	47.0	mg/L	
Potassium	7440-09-7	1	0.500	0.946	mg/L	
Sodium	7440-23-5	1	0.500	9.47	mg/L	



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MW9-GW-3/19
19C0449-11 (Water)

Wet Chemistry

Method: EPA 325.2 Sampled: 03/27/2019 00:00
Instrument: LACHAT1 Analyst: BF Analyzed: 04/05/2019 15:57

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-11 A
Preparation Batch: BHD0163 Sample Size: 10 mL
Prepared: 05-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	1.86	mg/L	



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MW9-GW-3/19
19C0449-11 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 03/27/2019 00:00
Instrument: [CALC] Analyst: BF Analyzed: 04/06/2019 23:13

Sample Preparation: Preparation Method: [CALC] Extract ID: 19C0449-11
Preparation Batch: [CALC]
Prepared: 04-Apr-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: BF Analyzed: 03/28/2019 17:18

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-11 A
Preparation Batch: BHC0798 Sample Size: 10 mL
Prepared: 28-Mar-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: AGW Analyzed: 04/06/2019 23:13

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-11 A
Preparation Batch: BHD0141 Sample Size: 10 mL
Prepared: 04-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U



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MW9-GW-3/19
19C0449-11 (Water)

Wet Chemistry

Method: EPA 375.2

Sampled: 03/27/2019 00:00

Instrument: LACHAT1 Analyst: BF

Analyzed: 04/05/2019 11:50

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19C0449-11 A

Preparation Batch: BHD0152

Sample Size: 10 mL

Prepared: 05-Apr-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	19.5	mg/L	



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MW9-GW-3/19
19C0449-11 (Water)

Wet Chemistry

Method: EPA 410.4 Sampled: 03/27/2019 00:00
Instrument: UV1800-1 Analyst: WCW Analyzed: 03/29/2019 09:55

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-11 D
Preparation Batch: BHC0789 Sample Size: 2 mL
Prepared: 28-Mar-2019 Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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MW9-GW-3/19
19C0449-11 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sample Size: 20 mL	Sampled: 03/27/2019 00:00
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHD0132	Final Volume: 20 mL	Analyzed: 04/06/2019 08:06
Sample Preparation:	Prepared: 04-Apr-2019		Extract ID: 19C0449-11 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.69	mg/L	



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MW9-GW-3/19
19C0449-11 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 03/27/2019 00:00
Instrument: Accumet AR60 Analyst: UW Analyzed: 03/28/2019 12:55

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-11 A
Preparation Batch: BHC0788 Sample Size: 50 mL
Prepared: 28-Mar-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	216	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	216	mg/L CaCO3	



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MW9-GW-3/19
19C0449-11 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00 Sampled: 03/27/2019 00:00
Instrument: Accumet AR60 Analyst: UW Analyzed: 03/28/2019 12:25

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-11 A
Preparation Batch: BHC0787 Sample Size: 50 mL
Prepared: 28-Mar-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.22	pH Units	H



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MW9-GW-3/19
19C0449-11 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97 Sampled: 03/27/2019 00:00
Instrument: LACHAT2 Analyst: BF Analyzed: 04/11/2019 15:47

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19C0449-11 D
Preparation Batch: BHD0144 Sample Size: 10 mL
Prepared: 11-Apr-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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MW9-GW-3/19
19C0449-11 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 03/27/2019 00:00
Instrument: N/A Analyst: UW	Preparation Batch: BHC0785	Final Volume: 100 mL	Analyzed: 03/29/2019 10:02
Sample Preparation:	Prepared: 28-Mar-2019		Extract ID: 19C0449-11

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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MW9-GW-3/19
19C0449-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 03/27/2019 00:00
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/09/2019 15:23
Sample Preparation:	Extract ID: 19C0449-12 A 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



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MW9-GW-3/19
19C0449-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 03/27/2019 00:00
Instrument: ICPMS2 Analyst: MCB	Analyzed: 04/08/2019 21:06
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19C0449-12 A 02
Preparation Batch: BHD0194	Sample Size: 25 mL
Prepared: 08-Apr-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19C0449-12 A 03
Preparation Batch: BHD0195	Sample Size: 100 mL
Prepared: 08-Apr-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.125	ug/L	



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MW9-GW-3/19
19C0449-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Sampled: 03/27/2019 00:00
Instrument: ICP2 Analyst: TCH	Analyzed: 04/03/2019 15:55
Sample Preparation:	Preparation Method: WMN (No Prep)
	Preparation Batch: BHC0811
	Prepared: 29-Mar-2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19C0449-12 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0160	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	6.63	mg/L	



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Trip Blank
19C0449-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 09:18

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 12:05

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19C0449-13 A

Preparation Batch: BHC0779

Sample Size: 10 mL

Prepared: 28-Mar-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Trip Blank
19C0449-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 09:18

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 12:05

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Trip Blank
19C0449-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 03/27/2019 09:18

Instrument: NT2 Analyst: PKC

Analyzed: 03/28/2019 12:05

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-120 %	97.3	%	
Surrogate: Toluene-d8		80-120 %	99.3	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	97.5	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.0	%	



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Project: Olalla Landfill
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Reported:
12-Apr-2019 16:26

Volatile Organic Compounds - Quality Control

Batch BHC0779 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0779-BLK1)		Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 09:51								
Chloromethane	ND	0.50	ug/L							U
Vinyl Chloride	ND	0.20	ug/L							U
Bromomethane	ND	1.00	ug/L							U
Chloroethane	ND	0.20	ug/L							U
Trichlorofluoromethane	ND	0.20	ug/L							U
Acrolein	ND	5.00	ug/L							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.20	ug/L							U
Acetone	ND	5.00	ug/L							U
1,1-Dichloroethene	ND	0.20	ug/L							U
Bromoethane	ND	0.20	ug/L							U
Iodomethane	ND	1.00	ug/L							U
Methylene Chloride	ND	1.00	ug/L							U
Acrylonitrile	ND	1.00	ug/L							U
Carbon Disulfide	ND	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.20	ug/L							U
Vinyl Acetate	ND	0.20	ug/L							U
1,1-Dichloroethane	ND	0.20	ug/L							U
2-Butanone	ND	5.00	ug/L							U
2,2-Dichloropropane	ND	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Chloroform	ND	0.20	ug/L							U
Bromochloromethane	ND	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.20	ug/L							U
1,1-Dichloropropene	ND	0.20	ug/L							U
Carbon tetrachloride	ND	0.20	ug/L							U
1,2-Dichloroethane	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
1,2-Dichloropropane	ND	0.20	ug/L							U
Bromodichloromethane	ND	0.20	ug/L							U
Dibromomethane	ND	0.20	ug/L							U
2-Chloroethyl vinyl ether	ND	1.00	ug/L							U
4-Methyl-2-Pentanone	ND	5.00	ug/L							U
cis-1,3-Dichloropropene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Volatile Organic Compounds - Quality Control

Batch BHC0779 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0779-BLK1)						Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 09:51				
trans-1,3-Dichloropropene	ND	0.20	ug/L							U
2-Hexanone	ND	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.20	ug/L							U
1,3-Dichloropropane	ND	0.20	ug/L							U
Tetrachloroethene	ND	0.20	ug/L							U
Dibromochloromethane	ND	0.20	ug/L							U
1,2-Dibromoethane	ND	0.20	ug/L							U
Chlorobenzene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
Xylenes, total	ND	0.60	ug/L							U
Styrene	ND	0.20	ug/L							U
Bromoform	ND	0.20	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.20	ug/L							U
1,2,3-Trichloropropane	ND	0.50	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	1.00	ug/L							U
n-Propylbenzene	ND	0.20	ug/L							U
Bromobenzene	ND	0.20	ug/L							U
Isopropyl Benzene	ND	0.20	ug/L							U
2-Chlorotoluene	ND	0.20	ug/L							U
4-Chlorotoluene	ND	0.20	ug/L							U
t-Butylbenzene	ND	0.20	ug/L							U
1,3,5-Trimethylbenzene	ND	0.20	ug/L							U
1,2,4-Trimethylbenzene	ND	0.20	ug/L							U
s-Butylbenzene	ND	0.20	ug/L							U
4-Isopropyl Toluene	ND	0.20	ug/L							U
1,3-Dichlorobenzene	ND	0.20	ug/L							U
1,4-Dichlorobenzene	ND	0.20	ug/L							U
n-Butylbenzene	ND	0.20	ug/L							U
1,2-Dichlorobenzene	ND	0.20	ug/L							U
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L							U
1,2,4-Trichlorobenzene	ND	0.50	ug/L							U
Hexachloro-1,3-Butadiene	ND	0.50	ug/L							U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Volatile Organic Compounds - Quality Control

Batch BHC0779 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0779-BLK1)										
					Prepared: 28-Mar-2019		Analyzed: 28-Mar-2019 09:51			
Naphthalene	ND	0.50	ug/L							U
1,2,3-Trichlorobenzene	ND	0.50	ug/L							U
Dichlorodifluoromethane	ND	0.20	ug/L							U
Methyl tert-butyl Ether	ND	0.50	ug/L							U
2-Pentanone	ND	5.00	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.05		ug/L	5.00		101	80-129			
Surrogate: Toluene-d8	5.00		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	4.95		ug/L	5.00		99.0	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.04		ug/L	5.00		101	80-120			
LCS (BHC0779-BS1)										
					Prepared: 28-Mar-2019		Analyzed: 28-Mar-2019 08:10			
Chloromethane	9.96	0.50	ug/L	10.0		99.6	60-138			
Vinyl Chloride	10.4	0.20	ug/L	10.0		104	66-133			
Bromomethane	10.3	1.00	ug/L	10.0		103	72-131			
Chloroethane	11.9	0.20	ug/L	10.0		119	60-155			
Trichlorofluoromethane	9.85	0.20	ug/L	10.0		98.5	80-129			
Acrolein	47.7	5.00	ug/L	50.0		95.5	52-144			
1,1,2-Trichloro-1,2,2-Trifluoroethane	10.3	0.20	ug/L	10.0		103	76-129			
Acetone	48.6	5.00	ug/L	50.0		97.2	58-142			
1,1-Dichloroethene	10.4	0.20	ug/L	10.0		104	69-135			
Bromoethane	10.0	0.20	ug/L	10.0		100	78-128			
Iodomethane	10.0	1.00	ug/L	10.0		100	56-147			
Methylene Chloride	9.43	1.00	ug/L	10.0		94.3	65-135			
Acrylonitrile	9.56	1.00	ug/L	10.0		95.6	64-134			
Carbon Disulfide	10.2	0.20	ug/L	10.0		102	78-125			
trans-1,2-Dichloroethene	10.7	0.20	ug/L	10.0		107	78-128			
Vinyl Acetate	10.1	0.20	ug/L	10.0		101	55-138			
1,1-Dichloroethane	10.5	0.20	ug/L	10.0		105	76-124			
2-Butanone	49.2	5.00	ug/L	50.0		98.3	61-140			
2,2-Dichloropropane	10.8	0.20	ug/L	10.0		108	78-125			
cis-1,2-Dichloroethene	10.5	0.20	ug/L	10.0		105	80-121			
Chloroform	10.7	0.20	ug/L	10.0		107	80-122			
Bromochloromethane	10.9	0.20	ug/L	10.0		109	80-121			
1,1,1-Trichloroethane	10.8	0.20	ug/L	10.0		108	79-123			
1,1-Dichloropropene	10.6	0.20	ug/L	10.0		106	80-120			



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Volatile Organic Compounds - Quality Control

Batch BHC0779 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHC0779-BS1)				Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 08:10						
Carbon tetrachloride	8.67	0.20	ug/L	10.0		86.7	53-137			
1,2-Dichloroethane	10.5	0.20	ug/L	10.0		105	75-123			
Benzene	10.7	0.20	ug/L	10.0		107	80-120			
Trichloroethene	10.9	0.20	ug/L	10.0		109	80-120			
1,2-Dichloropropane	10.5	0.20	ug/L	10.0		105	80-120			
Bromodichloromethane	9.12	0.20	ug/L	10.0		91.2	80-121			
Dibromomethane	10.5	0.20	ug/L	10.0		105	80-120			
2-Chloroethyl vinyl ether	9.96	1.00	ug/L	10.0		99.6	74-127			
4-Methyl-2-Pentanone	49.6	5.00	ug/L	50.0		99.2	67-133			
cis-1,3-Dichloropropene	9.82	0.20	ug/L	10.0		98.2	80-124			
Toluene	10.7	0.20	ug/L	10.0		107	80-120			
trans-1,3-Dichloropropene	9.57	0.20	ug/L	10.0		95.7	71-127			
2-Hexanone	50.1	5.00	ug/L	50.0		100	69-133			
1,1,2-Trichloroethane	10.5	0.20	ug/L	10.0		105	80-121			
1,3-Dichloropropane	10.7	0.20	ug/L	10.0		107	80-120			
Tetrachloroethene	11.0	0.20	ug/L	10.0		110	80-120			
Dibromochloromethane	8.09	0.20	ug/L	10.0		80.9	65-135			
1,2-Dibromoethane	9.92	0.20	ug/L	10.0		99.2	80-121			
Chlorobenzene	10.9	0.20	ug/L	10.0		109	80-120			
Ethylbenzene	10.8	0.20	ug/L	10.0		108	80-120			
1,1,1,2-Tetrachloroethane	9.10	0.20	ug/L	10.0		91.0	80-120			
m,p-Xylene	22.4	0.40	ug/L	20.0		112	80-121			
o-Xylene	10.9	0.20	ug/L	10.0		109	80-121			
Xylenes, total	33.3	0.60	ug/L	30.0		111	76-127			
Styrene	11.1	0.20	ug/L	10.0		111	80-124			
Bromoform	6.92	0.20	ug/L	10.0		69.2	51-134			Q
1,1,1,2,2-Tetrachloroethane	10.4	0.20	ug/L	10.0		104	77-123			
1,2,3-Trichloropropane	10.4	0.50	ug/L	10.0		104	76-125			
trans-1,4-Dichloro 2-Butene	9.44	1.00	ug/L	10.0		94.4	55-129			
n-Propylbenzene	11.2	0.20	ug/L	10.0		112	78-130			
Bromobenzene	10.8	0.20	ug/L	10.0		108	80-120			
Isopropyl Benzene	11.1	0.20	ug/L	10.0		111	80-128			
2-Chlorotoluene	10.6	0.20	ug/L	10.0		106	78-122			
4-Chlorotoluene	10.8	0.20	ug/L	10.0		108	80-121			
t-Butylbenzene	10.9	0.20	ug/L	10.0		109	78-125			



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Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Volatile Organic Compounds - Quality Control

Batch BHC0779 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHC0779-BS1)										
					Prepared: 28-Mar-2019	Analyzed: 28-Mar-2019 08:10				
1,3,5-Trimethylbenzene	11.2	0.20	ug/L	10.0		112	80-129			
1,2,4-Trimethylbenzene	11.2	0.20	ug/L	10.0		112	80-127			
s-Butylbenzene	11.1	0.20	ug/L	10.0		111	78-129			
4-Isopropyl Toluene	11.3	0.20	ug/L	10.0		113	79-130			
1,3-Dichlorobenzene	10.9	0.20	ug/L	10.0		109	80-120			
1,4-Dichlorobenzene	10.9	0.20	ug/L	10.0		109	80-120			
n-Butylbenzene	11.3	0.20	ug/L	10.0		113	74-129			
1,2-Dichlorobenzene	10.8	0.20	ug/L	10.0		108	80-120			
1,2-Dibromo-3-chloropropane	7.81	0.50	ug/L	10.0		78.1	62-123			Q
1,2,4-Trichlorobenzene	11.1	0.50	ug/L	10.0		111	64-124			
Hexachloro-1,3-Butadiene	11.2	0.50	ug/L	10.0		112	58-123			
Naphthalene	11.0	0.50	ug/L	10.0		110	50-134			
1,2,3-Trichlorobenzene	10.8	0.50	ug/L	10.0		108	49-133			
Dichlorodifluoromethane	9.30	0.20	ug/L	10.0		93.0	48-147			
Methyl tert-butyl Ether	10.4	0.50	ug/L	10.0		104	71-132			
2-Pentanone	49.1	5.00	ug/L	50.0		98.2	69-134			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.05		ug/L	5.00		101	80-129			
<i>Surrogate: Toluene-d8</i>	5.01		ug/L	5.00		100	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.92		ug/L	5.00		98.3	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.06		ug/L	5.00		101	80-120			
LCS Dup (BHC0779-BS1)										
					Prepared: 28-Mar-2019	Analyzed: 28-Mar-2019 08:50				
Chloromethane	10.0	0.50	ug/L	10.0		100	60-138	0.53	30	
Vinyl Chloride	10.3	0.20	ug/L	10.0		103	66-133	1.16	30	
Bromomethane	10.1	1.00	ug/L	10.0		101	72-131	2.24	30	
Chloroethane	11.6	0.20	ug/L	10.0		116	60-155	1.81	30	
Trichlorofluoromethane	9.99	0.20	ug/L	10.0		99.9	80-129	1.38	30	
Acrolein	46.8	5.00	ug/L	50.0		93.7	52-144	1.90	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	10.1	0.20	ug/L	10.0		101	76-129	1.68	30	
Acetone	47.9	5.00	ug/L	50.0		95.8	58-142	1.39	30	
1,1-Dichloroethene	10.2	0.20	ug/L	10.0		102	69-135	1.21	30	
Bromoethane	9.98	0.20	ug/L	10.0		99.8	78-128	0.64	30	
Iodomethane	9.94	1.00	ug/L	10.0		99.4	56-147	0.64	30	
Methylene Chloride	9.33	1.00	ug/L	10.0		93.3	65-135	1.00	30	
Acrylonitrile	9.72	1.00	ug/L	10.0		97.2	64-134	1.62	30	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Volatile Organic Compounds - Quality Control

Batch BHC0779 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BHC0779-BSD1)										
					Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 08:50					
Carbon Disulfide	10.1	0.20	ug/L	10.0		101	78-125	0.79	30	
trans-1,2-Dichloroethene	10.6	0.20	ug/L	10.0		106	78-128	0.79	30	
Vinyl Acetate	10.1	0.20	ug/L	10.0		101	55-138	0.21	30	
1,1-Dichloroethane	10.4	0.20	ug/L	10.0		104	76-124	1.04	30	
2-Butanone	49.0	5.00	ug/L	50.0		98.0	61-140	0.32	30	
2,2-Dichloropropane	10.5	0.20	ug/L	10.0		105	78-125	3.18	30	
cis-1,2-Dichloroethene	10.4	0.20	ug/L	10.0		104	80-121	1.06	30	
Chloroform	10.6	0.20	ug/L	10.0		106	80-122	1.50	30	
Bromochloromethane	10.7	0.20	ug/L	10.0		107	80-121	1.99	30	
1,1,1-Trichloroethane	10.7	0.20	ug/L	10.0		107	79-123	1.77	30	
1,1-Dichloropropene	10.5	0.20	ug/L	10.0		105	80-120	1.13	30	
Carbon tetrachloride	8.75	0.20	ug/L	10.0		87.5	53-137	1.00	30	
1,2-Dichloroethane	10.3	0.20	ug/L	10.0		103	75-123	1.39	30	
Benzene	10.7	0.20	ug/L	10.0		107	80-120	0.60	30	
Trichloroethene	10.6	0.20	ug/L	10.0		106	80-120	2.23	30	
1,2-Dichloropropane	10.4	0.20	ug/L	10.0		104	80-120	0.89	30	
Bromodichloromethane	9.00	0.20	ug/L	10.0		90.0	80-121	1.35	30	
Dibromomethane	10.5	0.20	ug/L	10.0		105	80-120	0.66	30	
2-Chloroethyl vinyl ether	9.75	1.00	ug/L	10.0		97.5	74-127	2.12	30	
4-Methyl-2-Pentanone	49.8	5.00	ug/L	50.0		99.5	67-133	0.31	30	
cis-1,3-Dichloropropene	9.83	0.20	ug/L	10.0		98.3	80-124	0.09	30	
Toluene	10.6	0.20	ug/L	10.0		106	80-120	0.87	30	
trans-1,3-Dichloropropene	9.45	0.20	ug/L	10.0		94.5	71-127	1.29	30	
2-Hexanone	50.2	5.00	ug/L	50.0		100	69-133	0.18	30	
1,1,2-Trichloroethane	10.4	0.20	ug/L	10.0		104	80-121	0.68	30	
1,3-Dichloropropane	10.6	0.20	ug/L	10.0		106	80-120	0.75	30	
Tetrachloroethene	10.8	0.20	ug/L	10.0		108	80-120	1.67	30	
Dibromochloromethane	8.25	0.20	ug/L	10.0		82.5	65-135	1.97	30	
1,2-Dibromoethane	9.79	0.20	ug/L	10.0		97.9	80-121	1.33	30	
Chlorobenzene	10.8	0.20	ug/L	10.0		108	80-120	0.15	30	
Ethylbenzene	10.7	0.20	ug/L	10.0		107	80-120	1.06	30	
1,1,1,2-Tetrachloroethane	9.02	0.20	ug/L	10.0		90.2	80-120	0.86	30	
m,p-Xylene	22.1	0.40	ug/L	20.0		111	80-121	1.32	30	
o-Xylene	10.8	0.20	ug/L	10.0		108	80-121	0.68	30	
Xylenes, total	32.9	0.60	ug/L	30.0		110	76-127	1.11	30	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Volatile Organic Compounds - Quality Control

Batch BHC0779 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 08:50										
LCS Dup (BHC0779-BSD1)										
Styrene	11.1	0.20	ug/L	10.0		111	80-124	0.28	30	
Bromoform	7.20	0.20	ug/L	10.0		72.0	51-134	4.00	30	Q
1,1,2,2-Tetrachloroethane	10.4	0.20	ug/L	10.0		104	77-123	0.20	30	
1,2,3-Trichloropropane	10.2	0.50	ug/L	10.0		102	76-125	2.16	30	
trans-1,4-Dichloro 2-Butene	9.13	1.00	ug/L	10.0		91.3	55-129	3.34	30	
n-Propylbenzene	11.1	0.20	ug/L	10.0		111	78-130	1.07	30	
Bromobenzene	10.7	0.20	ug/L	10.0		107	80-120	1.08	30	
Isopropyl Benzene	11.0	0.20	ug/L	10.0		110	80-128	1.35	30	
2-Chlorotoluene	10.6	0.20	ug/L	10.0		106	78-122	0.58	30	
4-Chlorotoluene	10.7	0.20	ug/L	10.0		107	80-121	1.01	30	
t-Butylbenzene	10.9	0.20	ug/L	10.0		109	78-125	0.03	30	
1,3,5-Trimethylbenzene	11.0	0.20	ug/L	10.0		110	80-129	1.05	30	
1,2,4-Trimethylbenzene	11.1	0.20	ug/L	10.0		111	80-127	0.49	30	
s-Butylbenzene	11.1	0.20	ug/L	10.0		111	78-129	0.64	30	
4-Isopropyl Toluene	11.2	0.20	ug/L	10.0		112	79-130	1.08	30	
1,3-Dichlorobenzene	10.8	0.20	ug/L	10.0		108	80-120	0.84	30	
1,4-Dichlorobenzene	10.8	0.20	ug/L	10.0		108	80-120	0.70	30	
n-Butylbenzene	11.1	0.20	ug/L	10.0		111	74-129	2.25	30	
1,2-Dichlorobenzene	10.8	0.20	ug/L	10.0		108	80-120	0.30	30	
1,2-Dibromo-3-chloropropane	7.86	0.50	ug/L	10.0		78.6	62-123	0.71	30	Q
1,2,4-Trichlorobenzene	10.7	0.50	ug/L	10.0		107	64-124	3.43	30	
Hexachloro-1,3-Butadiene	11.0	0.50	ug/L	10.0		110	58-123	1.28	30	
Naphthalene	10.7	0.50	ug/L	10.0		107	50-134	2.22	30	
1,2,3-Trichlorobenzene	10.7	0.50	ug/L	10.0		107	49-133	0.49	30	
Dichlorodifluoromethane	9.52	0.20	ug/L	10.0		95.2	48-147	2.31	30	
Methyl tert-butyl Ether	10.3	0.50	ug/L	10.0		103	71-132	1.09	30	
2-Pentanone	49.3	5.00	ug/L	50.0		98.6	69-134	0.41	30	
Surrogate: 1,2-Dichloroethane-d4	5.01		ug/L	5.00		100	80-129			
Surrogate: Toluene-d8	5.00		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.00		ug/L	5.00		100	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.10		ug/L	5.00		102	80-120			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Volatile Organic Compounds - SIM - Quality Control

Batch BHD0043 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0043-BLK1)				Prepared: 01-Apr-2019 Analyzed: 01-Apr-2019 15:19						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	4940		ng/L	5000		98.8	80-129			
LCS (BHD0043-BS1)				Prepared: 01-Apr-2019 Analyzed: 01-Apr-2019 14:26						
Vinyl chloride	1790	20.0	ng/L	2000		89.7	76-120			
Surrogate: 1,2-Dichloroethane-d4	4600		ng/L	5000		92.0	80-129			
LCS Dup (BHD0043-BSD1)				Prepared: 01-Apr-2019 Analyzed: 01-Apr-2019 14:59						
Vinyl chloride	1620	20.0	ng/L	2000		81.2	76-120	9.98	30	
Surrogate: 1,2-Dichloroethane-d4	4770		ng/L	5000		95.4	80-129			



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Metals and Metallic Compounds - Quality Control

Batch BHD0033 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0033-BLK1)		Prepared: 01-Apr-2019 Analyzed: 02-Apr-2019 17:48								
Calcium	ND	0.0500	mg/L							U
Potassium	ND	0.500	mg/L							U
Sodium	ND	0.500	mg/L							U
Sodium	ND	50.0	mg/L							U
LCS (BHD0033-BS1)		Prepared: 01-Apr-2019 Analyzed: 02-Apr-2019 18:26								
Calcium	10.4	0.0500	mg/L	10.0		104	80-120			
Potassium	10.2	0.500	mg/L	10.0		102	80-120			
Sodium	10.5	0.500	mg/L	10.0		105	80-120			
Sodium	ND	50.0	mg/L	10.0		90.0	80-120			U



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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHC0811 - WMN (No Prep)

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0811-BLK1)		Prepared: 29-Mar-2019 Analyzed: 02-Apr-2019 14:05								
Manganese, Dissolved	ND	0.0010	mg/L							U
Blank (BHC0811-BLK2)		Prepared: 29-Mar-2019 Analyzed: 03-Apr-2019 14:41								
Barium, Dissolved	ND	0.0030	mg/L							U
LCS (BHC0811-BS1)		Prepared: 29-Mar-2019 Analyzed: 02-Apr-2019 14:41								
Manganese, Dissolved	0.507	0.0010	mg/L	0.500		101	80-120			
LCS (BHC0811-BS2)		Prepared: 29-Mar-2019 Analyzed: 03-Apr-2019 15:01								
Barium, Dissolved	2.02	0.0030	mg/L	2.00		101	80-120			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHD0194 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0194-BLK1)			Prepared: 08-Apr-2019 Analyzed: 08-Apr-2019 16:47								
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
Blank (BHD0194-BLK2)			Prepared: 08-Apr-2019 Analyzed: 09-Apr-2019 14:35								
Iron, Dissolved	54	ND	20.0	ug/L							U
Iron, Dissolved	57	ND	20.0	ug/L							U
LCS (BHD0194-BS1)			Prepared: 08-Apr-2019 Analyzed: 08-Apr-2019 16:53								
Zinc, Dissolved	66	74.0	4.00	ug/L	80.0		92.5	80-120			
Zinc, Dissolved	67	71.9	4.00	ug/L	80.0		89.9	80-120			
LCS (BHD0194-BS2)			Prepared: 08-Apr-2019 Analyzed: 09-Apr-2019 14:38								
Iron, Dissolved	54	4800	20.0	ug/L	5000		96.1	80-120			
Iron, Dissolved	57	4990	20.0	ug/L	5000		99.9	80-120			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHD0195 - RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0195-BLK1)						Prepared: 08-Apr-2019 Analyzed: 08-Apr-2019 18:12					
Arsenic, Dissolved	75a	ND	0.0400	ug/L							U
LCS (BHD0195-BS1)						Prepared: 08-Apr-2019 Analyzed: 08-Apr-2019 18:17					
Arsenic, Dissolved	75a	4.47	0.0400	ug/L	5.00		89.4	80-120			
Duplicate (BHD0195-DUP1)						Source: 19C0449-12 Prepared: 08-Apr-2019 Analyzed: 08-Apr-2019 18:43					
Arsenic, Dissolved	75a	0.122	0.0400	ug/L		0.125			2.26	20	
Matrix Spike (BHD0195-MS1)						Source: 19C0449-12 Prepared: 08-Apr-2019 Analyzed: 08-Apr-2019 18:49					
Arsenic, Dissolved	75a	4.91	0.0400	ug/L	5.00	0.125	95.7	75-125			

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



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Wet Chemistry - Quality Control

Batch BHC0787 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHC0787-BS1)						Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 12:25					
pH	6.97	0.01	0.01	pH Units	7.00		99.6	99.27-100.73			



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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Wet Chemistry - Quality Control

Batch BHC0788 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0788-BLK1)						Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 12:55					
Alkalinity, Total	ND	1.00	1.00	mg/L CaCO3							U
Reference (BHC0788-SRM1)						Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 12:55					
Alkalinity, Total	114	1.00	1.00	mg/L CaCO3	116		98.6	85-114.66			



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Wet Chemistry - Quality Control

Batch BHC0789 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: WCW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0789-BLK1)						Prepared: 28-Mar-2019 Analyzed: 29-Mar-2019 09:46					
COD	ND	10.0	10.0	mg/L							U
LCS (BHC0789-BS1)						Prepared: 28-Mar-2019 Analyzed: 29-Mar-2019 09:47					
COD	98.9	10.0	10.0	mg/L	100		98.9	90-110			
Duplicate (BHC0789-DUP1)						Source: 19C0449-01 Prepared: 28-Mar-2019 Analyzed: 29-Mar-2019 09:50					
COD	ND	10.0	10.0	mg/L		ND					U
Matrix Spike (BHC0789-MS1)						Source: 19C0449-01 Prepared: 28-Mar-2019 Analyzed: 29-Mar-2019 09:50					
COD	103	20.0	20.0	mg/L	100	ND	103	90-110			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHC0789-MSD1)						Source: 19C0449-01 Prepared: 28-Mar-2019 Analyzed: 29-Mar-2019 09:51					
COD	99.5	20.0	20.0	mg/L	100	ND	99.6	90-110	3.25	10	

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



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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Wet Chemistry - Quality Control

Batch BHC0798 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0798-BLK1)						Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 17:03					
Nitrite-N	ND	0.010	0.010	mg/L							U
LCS (BHC0798-BS1)						Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 17:04					
Nitrite-N	0.503	0.010	0.010	mg/L	0.500		101	75-125			
Duplicate (BHC0798-DUP1)						Source: 19C0449-01 Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 17:07					
Nitrite-N	ND	0.010	0.010	mg/L		ND					U
Matrix Spike (BHC0798-MS1)						Source: 19C0449-01 Prepared: 28-Mar-2019 Analyzed: 28-Mar-2019 17:08					
Nitrite-N	0.521	0.010	0.010	mg/L	0.500	ND	104	75-125			

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



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Wet Chemistry - Quality Control

Batch BHD0132 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0132-BLK1)						Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 04:01					
Total Organic Carbon	ND	0.50	0.50	mg/L							U
LCS (BHD0132-BS1)						Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 04:20					
Total Organic Carbon	19.26	0.50	0.50	mg/L	20.00		96.3	90-110			
Duplicate (BHD0132-DUP1)						Source: 19C0449-01 Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 05:50					
Total Organic Carbon	ND	0.50	0.50	mg/L		ND					U
Matrix Spike (BHD0132-MS1)						Source: 19C0449-01 Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 06:08					
Total Organic Carbon	16.05	0.50	0.50	mg/L	20.05	ND	80.1	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHD0132-MSD1)						Source: 19C0449-01 Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 06:26					
Total Organic Carbon	16.18	0.50	0.50	mg/L	20.05	ND	80.7	75-125	0.81	20	

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



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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Wet Chemistry - Quality Control

Batch BHD0141 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: AGW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0141-BLK1)						Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 22:55					
Nitrate + Nitrite as N	ND	0.010	0.010	mg/L							U
LCS (BHD0141-BS1)						Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 22:57					
Nitrate + Nitrite as N	0.521	0.010	0.010	mg/L	0.500		104	90-110			
Duplicate (BHD0141-DUP2)						Source: 19C0449-01RE1 Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 23:38					
Nitrate + Nitrite as N	1.18	0.020	0.020	mg/L		1.19			1.02	20	D
Matrix Spike (BHD0141-MS2)						Source: 19C0449-01RE1 Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 23:39					
Nitrate + Nitrite as N	1.73	0.020	0.020	mg/L	0.500	1.19	108	75-125			D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHD0141-MSD2)						Source: 19C0449-01RE1 Prepared: 04-Apr-2019 Analyzed: 06-Apr-2019 23:46					
Nitrate + Nitrite as N	1.71	0.020	0.020	mg/L	0.500	1.19	104	75-125	1.16	200	D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



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Wet Chemistry - Quality Control

Batch BHD0144 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0144-BLK1)						Prepared: 11-Apr-2019 Analyzed: 11-Apr-2019 15:20					
Ammonia-N	ND	0.040	0.040	mg/L							U
LCS (BHD0144-BS1)						Prepared: 04-Apr-2019 Analyzed: 11-Apr-2019 15:21					
Ammonia-N	0.495	0.040	0.040	mg/L	0.500		99.0	90-110			
Duplicate (BHD0144-DUP1)						Source: 19C0449-01 Prepared: 04-Apr-2019 Analyzed: 11-Apr-2019 15:38					
Ammonia-N	ND	0.040	0.040	mg/L		ND					U
Matrix Spike (BHD0144-MS1)						Source: 19C0449-01 Prepared: 04-Apr-2019 Analyzed: 11-Apr-2019 15:39					
Ammonia-N	0.496	0.040	0.040	mg/L	0.500	ND	99.2	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHD0144-MSD1)						Source: 19C0449-01 Prepared: 04-Apr-2019 Analyzed: 11-Apr-2019 15:41					
Ammonia-N	0.496	0.040	0.040	mg/L	0.500	ND	99.2	75-125	0.00		
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Wet Chemistry - Quality Control

Batch BHD0152 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0152-BLK1)						Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 11:32					
Sulfate	ND	2.00	2.00	mg/L							U
LCS (BHD0152-BS1)						Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 11:33					
Sulfate	16.5	2.00	2.00	mg/L	15.0		110	90-110			
Duplicate (BHD0152-DUP1)						Source: 19C0449-01 Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 11:35					
Sulfate	5.21	2.00	2.00	mg/L		5.17			0.77	20	
Matrix Spike (BHD0152-MS1)						Source: 19C0449-01 Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 11:37					
Sulfate	18.8	2.00	2.00	mg/L	15.0	5.17	90.9	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHD0152-MSD1)						Source: 19C0449-01 Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 11:38					
Sulfate	18.8	2.00	2.00	mg/L	15.0	5.17	90.9	75-125	0.00		

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



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Wet Chemistry - Quality Control

Batch BHD0163 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHD0163-BLK1)						Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 15:39					
Chloride	ND	1.00	1.00	mg/L							U
LCS (BHD0163-BS1)						Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 15:40					
Chloride	5.03	1.00	1.00	mg/L	5.00		101	90-110			
Duplicate (BHD0163-DUP1)						Source: 19C0449-01 Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 15:43					
Chloride	3.47	1.00	1.00	mg/L		3.11			10.90	20	
Matrix Spike (BHD0163-MS1)						Source: 19C0449-01 Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 15:44					
Chloride	8.28	1.00	1.00	mg/L	5.00	3.11	103	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHD0163-MSD1)						Source: 19C0449-01 Prepared: 05-Apr-2019 Analyzed: 05-Apr-2019 15:45					
Chloride	8.74	1.00	1.00	mg/L	5.00	3.11	113	75-125	5.41	20	

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



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Apr-2019 16:26
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Microbiology - Quality Control

Batch BHC0785 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHC0785-BLK1)						Prepared: 28-Mar-2019 Analyzed: 29-Mar-2019 10:02					
Total Coliforms	ND	1	1	CFU/100 ml							U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
EPA 200.8 UCT-KED in Water	
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 353.2 in Water	
Nitrate + Nitrite as N	NELAP,DoD-ELAP,WADOE
Nitrite-N	WADOE,NELAP,DoD-ELAP
EPA 375.2 in Water	
Sulfate	WADOE,NELAP
EPA 410.4 in Water	
COD	DoD-ELAP,NELAP,WADOE
EPA 6010C in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Sodium	WADOE,NELAP,DoD-ELAP
Sodium-1	DoD-ELAP
Barium	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



Environmental Partners, Inc.
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Project: Olalla Landfill

Project Number: [none]
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Reported:
12-Apr-2019 16:26

n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260C-SIM in Water

Acrylonitrile	NELAP,CALAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE

EPA 9060A in Water

Total Organic Carbon	DoD-ELAP,WADOE,NELAP
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SM 2320 B-97 in Water

Alkalinity, Bicarbonate	NELAP,WADOE,WA-DW,DoD-ELAP
Alkalinity, Carbonate	WADOE,WA-DW,DoD-ELAP,NELAP



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill

Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Alkalinity, Hydroxide WADOE,WA-DW,DoD-ELAP,NELAP
Alkalinity, Total DoD-ELAP,WADOE,WA-DW,NELAP

SM 4500-H+ B-00 in Water

pH WADOE,NELAP,WA-DW

SM 4500-NH3 H-97 in Water

Ammonia-N WADOE,DoD-ELAP,NELAP

SM 9222B in Water

Total Coliforms WADOE

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	WA100006-011	05/12/2019
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019



Environmental Partners, Inc.
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Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Apr-2019 16:26

Notes and Definitions

- * Flagged value is not within established control limits.
- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- H Hold time violation - Hold time was exceeded.
- J Estimated concentration value detected below the reporting limit.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- 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.



09 July 2019

Doug Kunkel
Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah, WA 98027

RE: Olalla Landfill

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.

Associated Work Order(s)
19F0300

Associated SDG ID(s)
N/A

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 enclosed 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.



Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number: 19F0300	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Environmental Partners, Inc.	Phone: 425-395-0010	Date: 6/21/19
Client Contact: Doug Kunkel	No. of Coolers: 1	Ice Present?
Client Project Name: Olalla Landfill	Cooler Temps: 3.9	

Client Project #: 45407.0	Samplers: E Caddley	Analysis Requested							Notes/Comments
		Volatiles + VC	Dissolved Metals	Total Metals	Asbestos, MMR Chl...	COD	TOC	Total Coliform	See email for Total Analyte list

Sample ID	Date	Time	Matrix	No. Containers	Volatiles + VC	Dissolved Metals	Total Metals	Asbestos, MMR Chl...	COD	TOC	Total Coliform	Notes/Comments
Olalla-GW-MW1-6/19	6/20/19	0858	water	9	X	X	X	X	X	X	X	
Olalla-GW-MW3-6/19	"	10:10	"	9	X	X	X	X	X	X	X	
Olalla-GW-MW10-6/19	"	11:26	"	9	X	X	X	X	X	X	X	
Olalla-GW-MW6-6/19	"	1308	"	9	X	X	X	X	X	X	X	
Olalla-GW-MW8-6/19	"	1417	"	9	X	X	X	X	X	X	X	
Olalla-GW-MW17-6/19	"	—	"	9	X	X	X	X	X	X	X	
Trip blank		—	"	2	X							

Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Eric Caddley	Printed Name: Erin Sallee	Printed Name:	Printed Name:
	Company: EPI	Company: ARI	Company:	Company:
	Date & Time: 6/21/19 0833	Date & Time: 6/21/19 0833	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Olalla-GW-MW1-6/19	19F0300-01	Water	20-Jun-2019 08:58	21-Jun-2019 08:33
Olalla-GW-MW1-6/19	19F0300-02	Water	20-Jun-2019 08:58	21-Jun-2019 08:33
Olalla-GW-MW3-6/19	19F0300-03	Water	20-Jun-2019 10:10	21-Jun-2019 08:33
Olalla-GW-MW3-6/19	19F0300-04	Water	20-Jun-2019 10:10	21-Jun-2019 08:33
Olalla-GW-MW10-6/19	19F0300-05	Water	20-Jun-2019 11:26	21-Jun-2019 08:33
Olalla-GW-MW10-6/19	19F0300-06	Water	20-Jun-2019 11:26	21-Jun-2019 08:33
Olalla-GW-MW6-6/19	19F0300-07	Water	20-Jun-2019 13:08	21-Jun-2019 08:33
Olalla-GW-MW6-6/19	19F0300-08	Water	20-Jun-2019 13:08	21-Jun-2019 08:33
Olalla-GW-MW8-6/19	19F0300-09	Water	20-Jun-2019 14:17	21-Jun-2019 08:33
Olalla-GW-MW8-6/19	19F0300-10	Water	20-Jun-2019 14:17	21-Jun-2019 08:33
Olalla-GW-MW17-6/19	19F0300-11	Water	20-Jun-2019 00:00	21-Jun-2019 08:33
Olalla-GW-MW17-6/19	19F0300-12	Water	20-Jun-2019 00:00	21-Jun-2019 08:33
Trip Blank	19F0300-13	Water	20-Jun-2019 08:58	21-Jun-2019 08:33



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Work Order Case Narrative

Volatiles - EPA Method SW8260C

The sample(s) were run within the recommended holding times.

Initial and continuing calibrations were within method requirements with the exception of all associated "Q" flagged analytes which are out of control low in the CCAL. All associated samples that contain analyte have been flagged with a "Q" qualifier.

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/LCSD percent recoveries and RPD were within control limits.

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were run 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.

Total Metals and Dissolved - EPA Method 200.8 and 6010C

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.



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

The Matrix Spike/Matrix Spike duplicate recoveries and RPD were within limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times with the exception of pH and coliform which were submitted outside of the holding time.

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.

The Matrix Spike/Matrix Spike duplicate recoveries and RPD were within limits.



WORK ORDER

19F0300

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

<p>Report To: Environmental Partners, Inc. Doug Kunkel 1180 NW Maple St., Suite 310 Issaquah, WA 98027 Phone: 425-395-0010 Fax: -</p>	<p>Invoice To: Environmental Partners, Inc. Doug Kunkel 1180 NW Maple St., Suite 310 Issaquah, WA 98027 Phone :425-395-0010 Fax: -</p>
--	---

Date Due:	08-Jul-2019 18:00 (10 day TAT)	Date Received:	21-Jun-2019 08:33
Received By:	Erin I. Salle	Date Logged In:	21-Jun-2019 09:10
Logged In By:	Erin I. Salle		

Samples Received at: 3.9°C			
Intact, properly signed and dated custody seals attached to outside of cooler(s).....	No	Custody papers included with the cooler.....	Yes
Custody papers properly filled out (in, signed, analyses requested, etc).....	Yes	Was a temperature blank included in the cooler.....	No
Was sufficient ice used (if appropriate).....	Yes	All bottles sealed in individual plastic bags.....	No
All bottles arrived in good condition (unbroken).....	Yes	All bottle labels complete and legible.....	Yes
Number of containers listed on COC match number received.....	Yes	Bottle labels and tags agree with COC.....	Yes
Correct bottles used for the requested analyses.....	Yes	All VOC vials free of air bubbles.....	Yes
Analyses/bottles require preservation (attach preservation sheet excluding VOC).....	Yes	Sufficient amount of sample sent in each bottle.....	Yes
Sample split at ARI.....	No		



WORK ORDER

19F0300

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
19F0300-01 Olalla-GW-MW1-6/19 [Water] Sampled 20-Jun-2019 08:58				
Met 6010C - K	07/08/2019	10	12/17/2019	
Alkalinity, Total SM 2320 B-97	07/08/2019	10	7/4/2019	
Carbon, Organic Total, 9060A	07/08/2019	10	7/18/2019	
Chemical Oxygen Demand (COD), EPA 410.	07/08/2019	10	7/18/2019	
Sulfate, EPA 375.2	07/08/2019	10	7/18/2019	
Coliform, Total (MF) SM 9222B	07/08/2019	10	6/20/2019	
8260C VOA	07/08/2019	10	7/4/2019	
pH, SM 4500-H	07/08/2019	10	6/20/2019	
Met 6010C - Ca	07/08/2019	10	12/17/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	07/08/2019	10	7/18/2019	
Met 6010C - Na	07/08/2019	10	12/17/2019	
Nitrate + Nitrite-N, EPA 353.2	07/08/2019	10	7/18/2019	
Nitrate-N Calc EPA 353.2	07/08/2019	10	6/22/2019	
Chloride, EPA 325.2	07/08/2019	10	7/18/2019	
Alkalinity, Hydroxide SM 2320 B-97	07/08/2019	10	7/4/2019	
Filter 0.45 micron	07/08/2019	10	6/22/2019	
8260C-SIM VOC	07/08/2019	10	7/4/2019	
Alkalinity, Bicarbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Alkalinity, Carbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Nitrite-N, EPA 353.2	07/08/2019	10	6/22/2019	
19F0300-02 Olalla-GW-MW1-6/19 [Water] Sampled 20-Jun-2019 08:58				
Met Diss 200.8 - Fe	07/08/2019	10	12/17/2019	
Met Diss 6010C - Ba	07/08/2019	10	12/17/2019	
Met Diss 200.8 - As UCT	07/08/2019	10	12/17/2019	
Met Diss 200.8 - Zn UCT	07/08/2019	10	12/17/2019	
Met Diss 6010C - Mn	07/08/2019	10	12/17/2019	
19F0300-03 Olalla-GW-MW3-6/19 [Water] Sampled 20-Jun-2019 10:10				
Nitrite-N, EPA 353.2	07/08/2019	10	6/22/2019	
Alkalinity, Bicarbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Filter 0.45 micron	07/08/2019	10	6/22/2019	
Alkalinity, Hydroxide SM 2320 B-97	07/08/2019	10	7/4/2019	
Met 6010C - K	07/08/2019	10	12/17/2019	
Coliform, Total (MF) SM 9222B	07/08/2019	10	6/20/2019	
Chloride, EPA 325.2	07/08/2019	10	7/18/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	07/08/2019	10	7/18/2019	
Alkalinity, Total SM 2320 B-97	07/08/2019	10	7/4/2019	
Met 6010C - Na	07/08/2019	10	12/17/2019	
Nitrate-N Calc EPA 353.2	07/08/2019	10	6/22/2019	
Chemical Oxygen Demand (COD), EPA 410.	07/08/2019	10	7/18/2019	



WORK ORDER

19F0300

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Met 6010C - Ca	07/08/2019	10	12/17/2019	
8260C VOA	07/08/2019	10	7/4/2019	
8260C-SIM VOC	07/08/2019	10	7/4/2019	
Nitrate + Nitrite-N, EPA 353.2	07/08/2019	10	7/18/2019	
Sulfate, EPA 375.2	07/08/2019	10	7/18/2019	
pH, SM 4500-H	07/08/2019	10	6/20/2019	
Alkalinity, Carbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Carbon, Organic Total, 9060A	07/08/2019	10	7/18/2019	

19F0300-04 Olalla-GW-MW3-6/19 [Water] Sampled 20-Jun-2019 10:10

Met Diss 6010C - Ba	07/08/2019	10	12/17/2019	
Met Diss 200.8 - Zn UCT	07/08/2019	10	12/17/2019	
Met Diss 200.8 - Fe	07/08/2019	10	12/17/2019	
Met Diss 6010C - Mn	07/08/2019	10	12/17/2019	
Met Diss 200.8 - As UCT	07/08/2019	10	12/17/2019	

19F0300-05 Olalla-GW-MW10-6/19 [Water] Sampled 20-Jun-2019 11:26

Nitrate-N Calc EPA 353.2	07/08/2019	10	6/22/2019	
Nitrite-N, EPA 353.2	07/08/2019	10	6/22/2019	
Alkalinity, Bicarbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Nitrate + Nitrite-N, EPA 353.2	07/08/2019	10	7/18/2019	
Filter 0.45 micron	07/08/2019	10	6/22/2019	
Sulfate, EPA 375.2	07/08/2019	10	7/18/2019	
pH, SM 4500-H	07/08/2019	10	6/20/2019	
Met 6010C - Na	07/08/2019	10	12/17/2019	
8260C VOA	07/08/2019	10	7/4/2019	
8260C-SIM VOC	07/08/2019	10	7/4/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	07/08/2019	10	7/18/2019	
Met 6010C - Ca	07/08/2019	10	12/17/2019	
Coliform, Total (MF) SM 9222B	07/08/2019	10	6/20/2019	
Alkalinity, Total SM 2320 B-97	07/08/2019	10	7/4/2019	
Met 6010C - K	07/08/2019	10	12/17/2019	
Alkalinity, Carbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Chemical Oxygen Demand (COD), EPA 410	07/08/2019	10	7/18/2019	
Chloride, EPA 325.2	07/08/2019	10	7/18/2019	
Alkalinity, Hydroxide SM 2320 B-97	07/08/2019	10	7/4/2019	
Carbon, Organic Total, 9060A	07/08/2019	10	7/18/2019	

19F0300-06 Olalla-GW-MW10-6/19 [Water] Sampled 20-Jun-2019 11:26

Dissolved arsenic: 5x concentration!

Met Diss 200.8 - As UCT	07/08/2019	10	12/17/2019	
Met Diss 6010C - Ba	07/08/2019	10	12/17/2019	
Met Diss 6010C - Mn	07/08/2019	10	12/17/2019	



WORK ORDER

19F0300

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Met Diss 200.8 - Zn UCT	07/08/2019	10	12/17/2019	
Met Diss 200.8 - Fe	07/08/2019	10	12/17/2019	

19F0300-07 Olalla-GW-MW6-6/19 [Water] Sampled 20-Jun-2019 13:08

Chloride, EPA 325.2	07/08/2019	10	7/18/2019	
Nitrate-N Calc EPA 353.2	07/08/2019	10	6/22/2019	
8260C VOA	07/08/2019	10	7/4/2019	
Chemical Oxygen Demand (COD), EPA 410.	07/08/2019	10	7/18/2019	
Sulfate, EPA 375.2	07/08/2019	10	7/18/2019	
Nitrate + Nitrite-N, EPA 353.2	07/08/2019	10	7/18/2019	
Alkalinity, Total SM 2320 B-97	07/08/2019	10	7/4/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	07/08/2019	10	7/18/2019	
Alkalinity, Bicarbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Alkalinity, Carbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
8260C-SIM VOC	07/08/2019	10	7/4/2019	
Met 6010C - Na	07/08/2019	10	12/17/2019	
Met 6010C - K	07/08/2019	10	12/17/2019	
Met 6010C - Ca	07/08/2019	10	12/17/2019	
Filter 0.45 micron	07/08/2019	10	6/22/2019	
Coliform, Total (MF) SM 9222B	07/08/2019	10	6/20/2019	
Nitrite-N, EPA 353.2	07/08/2019	10	6/22/2019	
pH, SM 4500-H	07/08/2019	10	6/20/2019	
Carbon, Organic Total, 9060A	07/08/2019	10	7/18/2019	
Alkalinity, Hydroxide SM 2320 B-97	07/08/2019	10	7/4/2019	

19F0300-08 Olalla-GW-MW6-6/19 [Water] Sampled 20-Jun-2019 13:08

Met Diss 6010C - Mn	07/08/2019	10	12/17/2019	
Met Diss 6010C - Ba	07/08/2019	10	12/17/2019	
Met Diss 200.8 - Zn UCT	07/08/2019	10	12/17/2019	
Met Diss 200.8 - Fe	07/08/2019	10	12/17/2019	
Met Diss 200.8 - As UCT	07/08/2019	10	12/17/2019	

19F0300-09 Olalla-GW-MW8-6/19 [Water] Sampled 20-Jun-2019 14:17

Alkalinity, Bicarbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Chloride, EPA 325.2	07/08/2019	10	7/18/2019	
Coliform, Total (MF) SM 9222B	07/08/2019	10	6/20/2019	
8260C-SIM VOC	07/08/2019	10	7/4/2019	
Carbon, Organic Total, 9060A	07/08/2019	10	7/18/2019	
Met 6010C - K	07/08/2019	10	12/17/2019	
Filter 0.45 micron	07/08/2019	10	6/22/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	07/08/2019	10	7/18/2019	
Met 6010C - Ca	07/08/2019	10	12/17/2019	



WORK ORDER

19F0300

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Chemical Oxygen Demand (COD), EPA 410.	07/08/2019	10	7/18/2019	
Alkalinity, Hydroxide SM 2320 B-97	07/08/2019	10	7/4/2019	
8260C VOA	07/08/2019	10	7/4/2019	
Met 6010C - Na	07/08/2019	10	12/17/2019	
Nitrate + Nitrite-N, EPA 353.2	07/08/2019	10	7/18/2019	
Nitrite-N, EPA 353.2	07/08/2019	10	6/22/2019	
pH, SM 4500-H	07/08/2019	10	6/20/2019	
Alkalinity, Carbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Sulfate, EPA 375.2	07/08/2019	10	7/18/2019	
Alkalinity, Total SM 2320 B-97	07/08/2019	10	7/4/2019	
Nitrate-N Calc EPA 353.2	07/08/2019	10	6/22/2019	

19F0300-10 Olalla-GW-MW8-6/19 [Water] Sampled 20-Jun-2019 14:17

Met Diss 200.8 - Zn UCT	07/08/2019	10	12/17/2019	
Met Diss 6010C - Ba	07/08/2019	10	12/17/2019	
Met Diss 200.8 - As UCT	07/08/2019	10	12/17/2019	
Met Diss 6010C - Mn	07/08/2019	10	12/17/2019	
Met Diss 200.8 - Fe	07/08/2019	10	12/17/2019	

19F0300-11 Olalla-GW-MW17-6/19 [Water] Sampled 20-Jun-2019 00:00

Chloride, EPA 325.2	07/08/2019	10	7/18/2019	
Chemical Oxygen Demand (COD), EPA 410.	07/08/2019	10	7/18/2019	
pH, SM 4500-H	07/08/2019	10	6/20/2019	
Coliform, Total (MF) SM 9222B	07/08/2019	10	6/20/2019	
Alkalinity, Bicarbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Alkalinity, Carbonate SM 2320 B-97	07/08/2019	10	7/4/2019	
Alkalinity, Hydroxide SM 2320 B-97	07/08/2019	10	7/4/2019	
8260C-SIM VOC	07/08/2019	10	7/4/2019	
Met 6010C - Ca	07/08/2019	10	12/17/2019	
Met 6010C - K	07/08/2019	10	12/17/2019	
Met 6010C - Na	07/08/2019	10	12/17/2019	
Nitrite-N, EPA 353.2	07/08/2019	10	6/22/2019	
Alkalinity, Total SM 2320 B-97	07/08/2019	10	7/4/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	07/08/2019	10	7/18/2019	
Carbon, Organic Total, 9060A	07/08/2019	10	7/18/2019	
Sulfate, EPA 375.2	07/08/2019	10	7/18/2019	
Nitrate-N Calc EPA 353.2	07/08/2019	10	6/22/2019	
8260C VOA	07/08/2019	10	7/4/2019	
Nitrate + Nitrite-N, EPA 353.2	07/08/2019	10	7/18/2019	

19F0300-12 Olalla-GW-MW17-6/19 [Water] Sampled 20-Jun-2019 00:00

Met Diss 200.8 - Fe	07/08/2019	10	12/17/2019	
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WORK ORDER

19F0300

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Met Diss 200.8 - Zn UCT	07/08/2019	10	12/17/2019	
Met Diss 6010C - Ba	07/08/2019	10	12/17/2019	
Met Diss 6010C - Mn	07/08/2019	10	12/17/2019	
Met Diss 200.8 - As UCT	07/08/2019	10	12/17/2019	

19F0300-13 Trip Blank [Water] Sampled 20-Jun-2019 08:58

8260C-SIM VOC	07/08/2019	10	7/4/2019	
8260C VOA	07/08/2019	10	7/4/2019	

Analysis groups included in this work order

Nitrate-N Calc EPA 353.2

Nitrite-N, EPA 353.2 Nitrate + Nitrite-N, EPA 353.2



WORK ORDER

19F0300

Client: Environmental Partners, Inc.

Project Manager: Kelly Bottem

Project: Olalla Landfill

Project Number: [none]

Preservation Confirmation

Container ID	Container Type	pH	
19F0300-01 A	Small OJ, 500 mL		
19F0300-01 B	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-01 C	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-01 D	HDPE NM, 250mL HNO3	LL	PASS
19F0300-01 E	Corning Plastic, 125 mL, Na2S2O3		
19F0300-01 F	VOA Vial, Clear, 40 mL, HCL		
19F0300-01 G	VOA Vial, Clear, 40 mL, HCL		
19F0300-01 H	VOA Vial, Clear, 40 mL, HCL		
19F0300-02 A	HDPE NM, 250mL HNO3 (FF)	LL	PASS
19F0300-03 A	Small OJ, 500 mL		
19F0300-03 B	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-03 C	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-03 D	HDPE NM, 250mL HNO3	LL	PASS
19F0300-03 E	Corning Plastic, 125 mL, Na2S2O3		
19F0300-03 F	VOA Vial, Clear, 40 mL, HCL		
19F0300-03 G	VOA Vial, Clear, 40 mL, HCL		
19F0300-03 H	VOA Vial, Clear, 40 mL, HCL		
19F0300-04 A	HDPE NM, 250mL HNO3 (FF)	LL	PASS
19F0300-05 A	Small OJ, 500 mL		
19F0300-05 B	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-05 C	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-05 D	HDPE NM, 250mL HNO3	LL	PASS
19F0300-05 E	Corning Plastic, 125 mL, Na2S2O3		
19F0300-05 F	VOA Vial, Clear, 40 mL, HCL		
19F0300-05 G	VOA Vial, Clear, 40 mL, HCL		
19F0300-05 H	VOA Vial, Clear, 40 mL, HCL		
19F0300-06 A	HDPE NM, 250mL HNO3 (FF)	LL	PASS
19F0300-07 A	Small OJ, 500 mL		
19F0300-07 B	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-07 C	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-07 D	HDPE NM, 250mL HNO3	LL	PASS
19F0300-07 E	Corning Plastic, 125 mL, Na2S2O3		
19F0300-07 F	VOA Vial, Clear, 40 mL, HCL		
19F0300-07 G	VOA Vial, Clear, 40 mL, HCL		
19F0300-07 H	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

19F0300

Client: Environmental Partners, Inc.		Project Manager: Kelly Bottem	
Project: Olalla Landfill		Project Number: [none]	
19F0300-08 A	HDPE NM, 250mL HNO3 (FF)	LL	PASS
19F0300-09 A	Small OJ, 500 mL		
19F0300-09 B	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-09 C	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-09 D	HDPE NM, 250mL HNO3	LL	PASS
19F0300-09 E	Corning Plastic, 125 mL, Na2S2O3		
19F0300-09 F	VOA Vial, Clear, 40 mL, HCL		
19F0300-09 G	VOA Vial, Clear, 40 mL, HCL		
19F0300-09 H	VOA Vial, Clear, 40 mL, HCL		
19F0300-10 A	HDPE NM, 250mL HNO3 (FF)	LL	PASS
19F0300-11 A	Small OJ, 500 mL		
19F0300-11 B	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-11 C	Glass NM, Amber, 250 mL, 9N H2SO4	LL	PASS
19F0300-11 D	HDPE NM, 250mL HNO3	LL	PASS
19F0300-11 E	Corning Plastic, 125 mL, Na2S2O3		
19F0300-11 F	VOA Vial, Clear, 40 mL, HCL		
19F0300-11 G	VOA Vial, Clear, 40 mL, HCL		
19F0300-11 H	VOA Vial, Clear, 40 mL, HCL		
19F0300-12 A	HDPE NM, 250mL HNO3 (FF)	LL	PASS
19F0300-13 A	VOA Vial, Clear, 40 mL, HCL		
19F0300-13 B	VOA Vial, Clear, 40 mL, HCL		


Preservation Confirmed By

6/21/19
Date



Cooler Receipt Form

ARI Client: EPI

Project Name: Olaia Landfill

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 19F0300

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 0833 3.9

If cooler temperature is out of compliance, fill out form 00070F Temp Gun ID#: DOO 2565

Cooler Accepted by: [Signature] Date: 6/21/19 Time: 0833

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 6/21/19

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: [Signature] Date: 6/21/19 Time: 0910 Labels checked by: al

**** 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:

By: _____ Date: _____



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW1-6/19
19F0300-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 08:58

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 14:53

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19F0300-01 G

Preparation Batch: BHF0610

Sample Size: 10 mL

Prepared: 25-Jun-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	18.6	ug/L	
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW1-6/19
19F0300-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 08:58

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 14:53

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW1-6/19
19F0300-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 08:58

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 14:53

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	100	%	
Surrogate: Toluene-d8		80-120 %	99.2	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	99.0	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	100	%	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW1-6/19
19F0300-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM

Sampled: 06/20/2019 08:58

Instrument: NT7 Analyst: PB

Analyzed: 06/24/2019 22:29

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19F0300-01 F

Preparation Batch: BHF0579

Sample Size: 10 mL

Prepared: 24-Jun-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>85.1</i>	<i>%</i>	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Metals and Metallic Compounds

Method: EPA 6010C	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/20/2019 08:58
Instrument: ICP2 Analyst: TCH	Preparation Batch: BHG0012	Final Volume: 25 mL	Analyzed: 07/05/2019 17:47
Sample Preparation:	Prepared: 01-Jul-2019		Extract ID: 19F0300-01 D 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	9.65	mg/L	
Potassium	7440-09-7	1	0.500	0.650	mg/L	
Sodium	7440-23-5	1	0.500	4.55	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Wet Chemistry

Method: EPA 325.2			Sampled: 06/20/2019 08:58
Instrument: LACHAT1 Analyst: BF			Analyzed: 07/02/2019 13:55
Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Extract ID: 19F0300-01 A
	Preparation Batch: BHG0059	Final Volume: 10 mL	
	Prepared: 02-Jul-2019		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	3.63	mg/L	



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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 06/20/2019 08:58
Instrument: [CALC] Analyst: BF Analyzed: 07/03/2019 15:25

Sample Preparation: Preparation Method: [CALC] Extract ID: 19F0300-01
Preparation Batch: [CALC]
Prepared: 27-Jun-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.967	mg/L	

Instrument: LACHAT1 Analyst: BF Analyzed: 07/03/2019 15:25

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-01 B
Preparation Batch: BHF0718 Sample Size: 10 mL
Prepared: 27-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.967	mg/L	

Instrument: LACHAT2 Analyst: BF Analyzed: 06/21/2019 16:06

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-01 A
Preparation Batch: BHF0545 Sample Size: 10 mL
Prepared: 21-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Wet Chemistry

Method: EPA 375.2	Instrument: LACHAT1	Analyst: BF	Sampled: 06/20/2019 08:58	Analyzed: 06/25/2019 15:00
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHF0595	Sample Size: 10 mL	Final Volume: 10 mL
	Prepared: 25-Jun-2019			Extract ID: 19F0300-01 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	3.43	mg/L	



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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem	Sample Size: 2 mL	Sampled: 06/20/2019 08:58
Instrument: UV1800-1 Analyst: YK	Preparation Batch: BHG0156	Final Volume: 2 mL	Analyzed: 07/08/2019 14:42
Sample Preparation:	Prepared: 08-Jul-2019		Extract ID: 19F0300-01 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Wet Chemistry

Method: EPA 9060A	Instrument: TOC-LCSH	Analyst: CDE	Sampled: 06/20/2019 08:58	Analyzed: 07/06/2019 03:39
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHF0719	Sample Size: 20 mL	Extract ID: 19F0300-01 C
	Prepared: 27-Jun-2019		Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 06/20/2019 08:58
Instrument: Accumet AR60 Analyst: UW Analyzed: 06/21/2019 12:16
Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-01 A
Preparation Batch: BHF0526 Sample Size: 100 mL
Prepared: 21-Jun-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	43.4	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	43.4	mg/L CaCO3	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Sampled: 06/20/2019 08:58
Instrument: Accumet AR60 Analyst: UW	Analyzed: 06/21/2019 12:20
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHF0524
	Prepared: 21-Jun-2019
	Sample Size: 50 mL
	Final Volume: 50 mL
	Extract ID: 19F0300-01 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.32	pH Units	H



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 06/20/2019 08:58
Instrument: LCHAT1 Analyst: BF	Analyzed: 07/05/2019 18:27
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHG0136
	Prepared: 05-Jul-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19F0300-01 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-01 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sampled: 06/20/2019 08:58
Instrument: N/A Analyst: UW	Preparation Batch: BHF0518	Analyzed: 06/22/2019 10:45
Sample Preparation:	Prepared: 21-Jun-2019	Extract ID: 19F0300-01
	Sample Size: 100 mL	
	Final Volume: 100 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 06/20/2019 08:58
Instrument: ICPMS1 Analyst: TCH	Analyzed: 07/08/2019 11:34
Sample Preparation:	Extract ID: 19F0300-02 A 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BHG0132	Sample Size: 25 mL
Prepared: 05-Jul-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED Sampled: 06/20/2019 08:58
Instrument: ICPMS2 Analyst: MCB Analyzed: 07/08/2019 20:12

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x Extract ID: 19F0300-02 A 02
Preparation Batch: BHG0079 Sample Size: 100 mL
Prepared: 03-Jul-2019 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.103	ug/L	

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Extract ID: 19F0300-02 A 01
Preparation Batch: BHG0132 Sample Size: 25 mL
Prepared: 05-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW1-6/19
19F0300-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Preparation Method: WMN (No Prep)	Sample Size: 25 mL	Reported: 06/20/2019 08:58
Instrument: ICP2 Analyst: TCH	Preparation Batch: BHG0134	Final Volume: 25 mL	Analyzed: 07/08/2019 13:41
Sample Preparation:	Prepared: 05-Jul-2019		Extract ID: 19F0300-02 A 03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	2	0.0060	ND	mg/L	U
Manganese, Dissolved	7439-96-5	2	0.0020	ND	mg/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW3-6/19
19F0300-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C Sampled: 06/20/2019 10:10
Instrument: NT3 Analyst: PKC Analyzed: 06/25/2019 15:19

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19F0300-03 G
Preparation Batch: BHF0610 Sample Size: 10 mL
Prepared: 25-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW3-6/19
19F0300-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 10:10

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 15:19

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW3-6/19
19F0300-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 10:10

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 15:19

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-120 %	99.4	%	
Surrogate: Toluene-d8		80-120 %	100	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	99.0	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.4	%	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW3-6/19
19F0300-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM

Sampled: 06/20/2019 10:10

Instrument: NT7 Analyst: PB

Analyzed: 06/24/2019 22:54

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19F0300-03 F

Preparation Batch: BHF0579

Sample Size: 10 mL

Prepared: 24-Jun-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>94.1</i>	<i>%</i>	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW3-6/19
19F0300-03 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 06/20/2019 10:10
Instrument: ICP2 Analyst: TCH Analyzed: 07/08/2019 14:26

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19F0300-03 D 01
Preparation Batch: BHG0012 Sample Size: 25 mL
Prepared: 01-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	2	0.100	43.0	mg/L	D
Potassium	7440-09-7	2	1.00	ND	mg/L	U
Sodium	7440-23-5	2	1.00	9.35	mg/L	D



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW3-6/19
19F0300-03 (Water)

Wet Chemistry

Method: EPA 325.2

Sampled: 06/20/2019 10:10

Instrument: LACHAT1 Analyst: BF

Analyzed: 07/02/2019 14:06

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19F0300-03 A

Preparation Batch: BHG0059

Sample Size: 10 mL

Prepared: 02-Jul-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	2.69	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW3-6/19
19F0300-03 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 06/20/2019 10:10
Instrument: [CALC] Analyst: BF Analyzed: 07/03/2019 15:26

Sample Preparation: Preparation Method: [CALC] Extract ID: 19F0300-03
Preparation Batch: [CALC]
Prepared: 27-Jun-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.0238	mg/L	

Instrument: LACHAT1 Analyst: BF Analyzed: 07/03/2019 15:26

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-03 B
Preparation Batch: BHF0718 Sample Size: 10 mL
Prepared: 27-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.024	mg/L	

Instrument: LACHAT2 Analyst: BF Analyzed: 06/21/2019 16:09

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-03 A
Preparation Batch: BHF0545 Sample Size: 10 mL
Prepared: 21-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW3-6/19
19F0300-03 (Water)

Wet Chemistry

Method: EPA 375.2	Instrument: LACHAT1	Analyst: BF	Sampled: 06/20/2019 10:10	Analyzed: 06/25/2019 15:05
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHF0595	Sample Size: 10 mL	Final Volume: 10 mL
	Prepared: 25-Jun-2019			Extract ID: 19F0300-03 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	15.2	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW3-6/19
19F0300-03 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem	Sample Size: 2 mL	Sampld: 06/20/2019 10:10
Instrument: UV1800-1 Analyst: YK	Preparation Batch: BHG0156	Final Volume: 2 mL	Analyzed: 07/08/2019 14:49
Sample Preparation:	Prepared: 08-Jul-2019		Extract ID: 19F0300-03 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	14.6	mg/L	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW3-6/19
19F0300-03 (Water)

Wet Chemistry

Method: EPA 9060A Sampled: 06/20/2019 10:10
Instrument: TOC-LCSH Analyst: CDE Analyzed: 07/06/2019 04:01

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-03 C
Preparation Batch: BHF0719 Sample Size: 20 mL
Prepared: 27-Jun-2019 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.38	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW3-6/19
19F0300-03 (Water)

Wet Chemistry

Method: SM 2320 B-97	Sampled: 06/20/2019 10:10
Instrument: Accumet AR60 Analyst: UW	Analyzed: 06/21/2019 14:06
Sample Preparation: Preparation Method: No Prep Wet Chem	Extract ID: 19F0300-03 A
Preparation Batch: BHF0526	Sample Size: 100 mL
Prepared: 21-Jun-2019	Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	186	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	186	mg/L CaCO3	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW3-6/19
19F0300-03 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Instrument: Accumet AR60	Analyst: UW	Sampled: 06/20/2019 10:10
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHF0524	Analyzed: 06/21/2019 12:20
	Prepared: 21-Jun-2019	Sample Size: 50 mL	Extract ID: 19F0300-03 A
		Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.16	pH Units	H



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Olalla-GW-MW3-6/19
19F0300-03 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Instrument: LACHAT1 Analyst: BF	Sampled: 06/20/2019 10:10	Analyzed: 07/05/2019 18:28
Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Extract ID: 19F0300-03 B
	Preparation Batch: BHG0136	Final Volume: 10 mL	
	Prepared: 05-Jul-2019		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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Olalla-GW-MW3-6/19
19F0300-03 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sampled: 06/20/2019 10:10
Instrument: N/A Analyst: UW	Preparation Batch: BHF0518	Analyzed: 06/22/2019 10:45
Sample Preparation:	Prepared: 21-Jun-2019	Extract ID: 19F0300-03
	Sample Size: 100 mL	
	Final Volume: 100 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW3-6/19
19F0300-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 Sampled: 06/20/2019 10:10
Instrument: ICPMS2 Analyst: MCB Analyzed: 07/05/2019 20:35
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Extract ID: 19F0300-04 A 01
Preparation Batch: BHG0132 Sample Size: 25 mL
Prepared: 05-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW3-6/19
19F0300-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 06/20/2019 10:10
Instrument: ICPMS2 Analyst: MCB	Analyzed: 07/08/2019 20:17
Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x Preparation Batch: BHG0079 Prepared: 03-Jul-2019	Extract ID: 19F0300-04 A 02 Sample Size: 100 mL Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.107	ug/L	

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Preparation Batch: BHG0132 Prepared: 05-Jul-2019	Extract ID: 19F0300-04 A 01 Sample Size: 25 mL Final Volume: 25 mL
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Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW3-6/19
19F0300-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Sampled: 06/20/2019 10:10
Instrument: ICP2 Analyst: TCH	Analyzed: 07/08/2019 11:40
Sample Preparation: Preparation Method: WMN (No Prep)	Extract ID: 19F0300-04 A 03
Preparation Batch: BHG0134	Sample Size: 25 mL
Prepared: 05-Jul-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0145	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	5.98	mg/L	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW10-6/19
19F0300-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C Sampled: 06/20/2019 11:26
Instrument: NT3 Analyst: PKC Analyzed: 06/25/2019 15:46

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19F0300-05 F
Preparation Batch: BHF0610 Sample Size: 10 mL
Prepared: 25-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	11.5	ug/L	
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW10-6/19
19F0300-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 11:26

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 15:46

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW10-6/19
19F0300-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 11:26

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 15:46

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-120 %	98.6	%	
Surrogate: Toluene-d8		80-120 %	99.4	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	97.5	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	96.8	%	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW10-6/19
19F0300-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM Sampled: 06/20/2019 11:26
Instrument: NT7 Analyst: PB Analyzed: 06/24/2019 23:20

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19F0300-05 G
Preparation Batch: BHF0579 Sample Size: 10 mL
Prepared: 24-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>97.0</i>	<i>%</i>	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW10-6/19
19F0300-05 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 06/20/2019 11:26
Instrument: ICP2 Analyst: TCH Analyzed: 07/08/2019 14:30

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19F0300-05 D 01
Preparation Batch: BHG0012 Sample Size: 25 mL
Prepared: 01-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	2	0.100	33.1	mg/L	D
Potassium	7440-09-7	2	1.00	1.07	mg/L	D
Sodium	7440-23-5	2	1.00	11.9	mg/L	D



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW10-6/19
19F0300-05 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 06/20/2019 11:26
Instrument: [CALC] Analyst: BF Analyzed: 07/03/2019 15:27

Sample Preparation: Preparation Method: [CALC] Extract ID: 19F0300-05
Preparation Batch: [CALC]
Prepared: 27-Jun-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: BF Analyzed: 07/03/2019 15:27

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-05 B
Preparation Batch: BHF0718 Sample Size: 10 mL
Prepared: 27-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: BF Analyzed: 06/21/2019 16:10

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-05 A
Preparation Batch: BHF0545 Sample Size: 10 mL
Prepared: 21-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



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Olalla-GW-MW10-6/19
19F0300-05 (Water)

Wet Chemistry

Method: EPA 375.2	Preparation Method: No Prep Wet Chem		Sampled: 06/20/2019 11:26
Instrument: LACHAT1 Analyst: BF	Preparation Batch: BHF0595	Sample Size: 10 mL	Analyzed: 06/25/2019 15:06
Sample Preparation:	Prepared: 25-Jun-2019	Final Volume: 10 mL	Extract ID: 19F0300-05 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	6.76	mg/L	



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Olalla-GW-MW10-6/19
19F0300-05 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem	Sample Size: 2 mL	Sampled: 06/20/2019 11:26
Instrument: UV1800-1 Analyst: YK	Preparation Batch: BHG0156	Final Volume: 2 mL	Analyzed: 07/08/2019 14:49
Sample Preparation:	Prepared: 08-Jul-2019		Extract ID: 19F0300-05 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	12.6	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW10-6/19
19F0300-05 (Water)

Wet Chemistry

Method: EPA 9060A Sampled: 06/20/2019 11:26
Instrument: TOC-LCSH Analyst: CDE Analyzed: 07/06/2019 04:21

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-05 C
Preparation Batch: BHF0719 Sample Size: 20 mL
Prepared: 27-Jun-2019 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.79	mg/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW10-6/19
19F0300-05 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 06/20/2019 11:26
Instrument: Accumet AR60 Analyst: UW Analyzed: 06/21/2019 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-05 A
Preparation Batch: BHF0526 Sample Size: 100 mL
Prepared: 21-Jun-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	178	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	178	mg/L CaCO3	



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Olalla-GW-MW10-6/19
19F0300-05 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sampled: 06/20/2019 11:26
Instrument: Accumet AR60 Analyst: UW	Preparation Batch: BHF0524	Analyzed: 06/21/2019 12:20
Sample Preparation:	Prepared: 21-Jun-2019	Extract ID: 19F0300-05 A
	Sample Size: 50 mL	
	Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.57	pH Units	H



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW10-6/19
19F0300-05 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97 Sampled: 06/20/2019 11:26
Instrument: LCHAT1 Analyst: BF Analyzed: 07/05/2019 18:29

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-05 B
Preparation Batch: BHG0136 Sample Size: 10 mL
Prepared: 05-Jul-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.079	mg/L	



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Olalla-GW-MW10-6/19
19F0300-05 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 06/20/2019 11:26
Instrument: N/A Analyst: UW	Preparation Batch: BHF0518	Final Volume: 100 mL	Analyzed: 06/22/2019 10:45
Sample Preparation:	Prepared: 21-Jun-2019		Extract ID: 19F0300-05

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW10-6/19
19F0300-05RE1 (Water)

Wet Chemistry

Method: EPA 325.2

Sampled: 06/20/2019 11:26

Instrument: LACHAT1 Analyst: BF

Analyzed: 07/02/2019 16:05

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19F0300-05RE1 A

Preparation Batch: BHG0059

Sample Size: 10 mL

Prepared: 02-Jul-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	2	2.00	2.00	10.2	mg/L	D



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Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW10-6/19
19F0300-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 06/20/2019 11:26
Instrument: ICPMS2 Analyst: MCB	Analyzed: 07/05/2019 20:40
Sample Preparation:	Extract ID: 19F0300-06 A 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BHG0132	Sample Size: 25 mL
Prepared: 05-Jul-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	22.1	ug/L	



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Olalla-GW-MW10-6/19
19F0300-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED Sampled: 06/20/2019 11:26
Instrument: ICPMS2 Analyst: MCB Analyzed: 07/08/2019 20:22

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x Extract ID: 19F0300-06 A 02
Preparation Batch: BHG0079 Sample Size: 100 mL
Prepared: 03-Jul-2019 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	1.66	ug/L	

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Extract ID: 19F0300-06 A 01
Preparation Batch: BHG0132 Sample Size: 25 mL
Prepared: 05-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW10-6/19
19F0300-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 06/20/2019 11:26
Instrument: ICP2 Analyst: TCH Analyzed: 07/08/2019 13:45
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19F0300-06 A 03
Preparation Batch: BHG0134 Sample Size: 25 mL
Prepared: 05-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	2	0.0060	0.0110	mg/L	D
Manganese, Dissolved	7439-96-5	2	0.0020	3.75	mg/L	D



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 13:08

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 16:12

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19F0300-07 F

Preparation Batch: BHF0610

Sample Size: 10 mL

Prepared: 25-Jun-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	27.9	ug/L	
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 13:08

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 16:12

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	2.24	ug/L	
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
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Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 13:08

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 16:12

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	104	%	
Surrogate: Toluene-d8		80-120 %	102	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	98.1	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.8	%	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM Sampled: 06/20/2019 13:08
Instrument: NT7 Analyst: PB Analyzed: 06/24/2019 23:45
Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19F0300-07 H
Preparation Batch: BHF0579 Sample Size: 10 mL
Prepared: 24-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>98.5</i>	<i>%</i>	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 06/20/2019 13:08
Instrument: ICP2 Analyst: TCH Analyzed: 07/08/2019 12:35

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19F0300-07 D 01
Preparation Batch: BHG0012 Sample Size: 25 mL
Prepared: 01-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	28.6	mg/L	
Potassium	7440-09-7	1	0.500	1.22	mg/L	
Sodium	7440-23-5	1	0.500	8.41	mg/L	



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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Wet Chemistry

Method: EPA 325.2	Instrument: LACHAT1	Analyst: BF	Sampled: 06/20/2019 13:08
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHG0059	Analyzed: 07/02/2019 14:09
	Prepared: 02-Jul-2019	Sample Size: 10 mL	Extract ID: 19F0300-07 A
		Final Volume: 10 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	3.18	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 06/20/2019 13:08
Instrument: [CALC] Analyst: BF Analyzed: 07/03/2019 15:28

Sample Preparation: Preparation Method: [CALC] Extract ID: 19F0300-07
Preparation Batch: [CALC]
Prepared: 27-Jun-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: BF Analyzed: 07/03/2019 15:28

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-07 B
Preparation Batch: BHF0718 Sample Size: 10 mL
Prepared: 27-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: BF Analyzed: 06/21/2019 16:12

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-07 A
Preparation Batch: BHF0545 Sample Size: 10 mL
Prepared: 21-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Wet Chemistry

Method: EPA 375.2	Instrument: LACHAT1	Analyst: BF	Sampled: 06/20/2019 13:08	Analyzed: 06/25/2019 15:07
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHF0595	Sample Size: 10 mL	Final Volume: 10 mL
	Prepared: 25-Jun-2019		Extract ID: 19F0300-07 A	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	6.83	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem		Sampled: 06/20/2019 13:08
Instrument: UV1800-1 Analyst: YK	Preparation Batch: BHG0156	Sample Size: 2 mL	Analyzed: 07/08/2019 14:49
Sample Preparation:	Prepared: 08-Jul-2019	Final Volume: 2 mL	Extract ID: 19F0300-07 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	11.9	mg/L	



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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 06/20/2019 13:08
Instrument: TOC-LCSH Analyst: CDE	Preparation Batch: BHF0719	Analyzed: 07/06/2019 04:44
Sample Preparation:	Prepared: 27-Jun-2019	Extract ID: 19F0300-07 C
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	1.73	mg/L	



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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 06/20/2019 13:08
Instrument: Accumet AR60 Analyst: UW Analyzed: 06/21/2019 14:06
Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-07 A
Preparation Batch: BHF0526 Sample Size: 100 mL
Prepared: 21-Jun-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	145	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	145	mg/L CaCO3	



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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sampled: 06/20/2019 13:08
Instrument: Accumet AR60 Analyst: UW	Preparation Batch: BHF0524	Analyzed: 06/21/2019 12:20
Sample Preparation:	Prepared: 21-Jun-2019	Extract ID: 19F0300-07 A
	Sample Size: 50 mL	
	Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.46	pH Units	H



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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 06/20/2019 13:08
Instrument: LCHAT1 Analyst: BF	Analyzed: 07/05/2019 18:30
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHG0136
	Prepared: 05-Jul-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19F0300-07 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.047	mg/L	



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Olalla-GW-MW6-6/19
19F0300-07 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampld: 06/20/2019 13:08
Instrument: N/A Analyst: UW	Preparation Batch: BHF0518	Final Volume: 100 mL	Analyzed: 06/22/2019 10:45
Sample Preparation:	Prepared: 21-Jun-2019		Extract ID: 19F0300-07

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-GW-MW6-6/19
19F0300-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 06/20/2019 13:08
Instrument: ICPMS2 Analyst: MCB	Analyzed: 07/05/2019 20:44
Sample Preparation:	Extract ID: 19F0300-08 A 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BHG0132	Sample Size: 25 mL
Prepared: 05-Jul-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	724	ug/L	



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Olalla-GW-MW6-6/19
19F0300-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED Sampled: 06/20/2019 13:08
Instrument: ICPMS2 Analyst: MCB Analyzed: 07/08/2019 20:27

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x Extract ID: 19F0300-08 A 02
Preparation Batch: BHG0079 Sample Size: 100 mL
Prepared: 03-Jul-2019 Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	1.06	ug/L	

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Extract ID: 19F0300-08 A 01
Preparation Batch: BHG0132 Sample Size: 25 mL
Prepared: 05-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW6-6/19
19F0300-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 06/20/2019 13:08
Instrument: ICP2 Analyst: TCH Analyzed: 07/08/2019 11:48
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19F0300-08 A 03
Preparation Batch: BHG0134 Sample Size: 25 mL
Prepared: 05-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0124	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	0.798	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 14:17

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 16:39

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19F0300-09 G

Preparation Batch: BHF0610

Sample Size: 10 mL

Prepared: 25-Jun-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	12.6	ug/L	
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	0.29	ug/L	
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 14:17

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 16:39

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 14:17

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 16:39

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-120 %	99.2	%	
Surrogate: Toluene-d8		80-120 %	97.1	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	100	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	98.2	%	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM Sampled: 06/20/2019 14:17
Instrument: NT7 Analyst: PB Analyzed: 06/25/2019 00:10

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19F0300-09 F
Preparation Batch: BHF0579 Sample Size: 10 mL
Prepared: 24-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	32.8	ng/L	
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>103</i>	<i>%</i>	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 06/20/2019 14:17
Instrument: ICP2 Analyst: TCH Analyzed: 07/08/2019 14:34

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19F0300-09 D 01
Preparation Batch: BHG0012 Sample Size: 25 mL
Prepared: 01-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	2	0.100	19.3	mg/L	D
Potassium	7440-09-7	2	1.00	ND	mg/L	U
Sodium	7440-23-5	2	1.00	7.45	mg/L	D



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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Wet Chemistry

Method: EPA 325.2			Sampled: 06/20/2019 14:17
Instrument: LACHAT1 Analyst: BF			Analyzed: 07/02/2019 14:10
Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Extract ID: 19F0300-09 A
	Preparation Batch: BHG0059	Final Volume: 10 mL	
	Prepared: 02-Jul-2019		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	6.85	mg/L	



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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 06/20/2019 14:17
Instrument: [CALC] Analyst: BF Analyzed: 07/03/2019 15:29

Sample Preparation: Preparation Method: [CALC] Extract ID: 19F0300-09
Preparation Batch: [CALC]
Prepared: 27-Jun-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.0302	mg/L	

Instrument: LACHAT1 Analyst: BF Analyzed: 07/03/2019 15:29

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-09 B
Preparation Batch: BHF0718 Sample Size: 10 mL
Prepared: 27-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.030	mg/L	

Instrument: LACHAT2 Analyst: BF Analyzed: 06/21/2019 16:13

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-09 A
Preparation Batch: BHF0545 Sample Size: 10 mL
Prepared: 21-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Wet Chemistry

Method: EPA 375.2

Sampled: 06/20/2019 14:17

Instrument: LACHAT1 Analyst: BF

Analyzed: 06/25/2019 15:08

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19F0300-09 A

Preparation Batch: BHF0595

Sample Size: 10 mL

Prepared: 25-Jun-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	3.40	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem	Sample Size: 2 mL	Sampled: 06/20/2019 14:17
Instrument: UV1800-1 Analyst: YK	Preparation Batch: BHG0156	Final Volume: 2 mL	Analyzed: 07/08/2019 14:51
Sample Preparation:	Prepared: 08-Jul-2019		Extract ID: 19F0300-09 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Wet Chemistry

Method: EPA 9060A	Instrument: TOC-LCSH	Analyst: CDE	Sampled: 06/20/2019 14:17	Analyzed: 07/06/2019 05:51
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHF0719	Sample Size: 20 mL	Final Volume: 20 mL
	Prepared: 27-Jun-2019		Extract ID: 19F0300-09 C	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.69	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 06/20/2019 14:17
Instrument: Accumet AR60 Analyst: UW Analyzed: 06/21/2019 12:16
Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-09 A
Preparation Batch: BHF0526 Sample Size: 100 mL
Prepared: 21-Jun-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	97.0	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	97.0	mg/L CaCO3	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sampled: 06/20/2019 14:17
Instrument: Accumet AR60 Analyst: UW	Preparation Batch: BHF0524	Analyzed: 06/21/2019 12:20
Sample Preparation:	Prepared: 21-Jun-2019	Extract ID: 19F0300-09 A
	Sample Size: 50 mL	
	Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.40	pH Units	H



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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 06/20/2019 14:17
Instrument: LCHAT1 Analyst: BF	Analyzed: 07/05/2019 18:32
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHG0136
	Prepared: 05-Jul-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19F0300-09 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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Olalla-GW-MW8-6/19
19F0300-09 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampld: 06/20/2019 14:17
Instrument: N/A Analyst: UW	Preparation Batch: BHF0518	Final Volume: 100 mL	Analyzed: 06/22/2019 10:45
Sample Preparation:	Prepared: 21-Jun-2019		Extract ID: 19F0300-09

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-GW-MW8-6/19
19F0300-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/20/2019 14:17
Instrument: ICPMS2 Analyst: MCB	Preparation Batch: BHG0132	Analyzed: 07/05/2019 20:49
Sample Preparation:	Prepared: 05-Jul-2019	Extract ID: 19F0300-10 A 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	272	ug/L	



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Olalla-GW-MW8-6/19
19F0300-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 06/20/2019 14:17
Instrument: ICPMS2 Analyst: MCB	Analyzed: 07/08/2019 20:31
Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x Preparation Batch: BHG0079 Prepared: 03-Jul-2019	Extract ID: 19F0300-10 A 02 Sample Size: 100 mL Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	1.25	ug/L	

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Preparation Batch: BHG0132 Prepared: 05-Jul-2019	Extract ID: 19F0300-10 A 01 Sample Size: 25 mL Final Volume: 25 mL
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Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



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Olalla-GW-MW8-6/19
19F0300-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Preparation Method: WMN (No Prep)	Sample Size: 25 mL	Reported: 06/20/2019 14:17
Instrument: ICP2 Analyst: TCH	Preparation Batch: BHG0134	Final Volume: 25 mL	Analyzed: 07/08/2019 13:49
Sample Preparation:	Prepared: 05-Jul-2019		Extract ID: 19F0300-10 A 03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	2	0.0060	ND	mg/L	U
Manganese, Dissolved	7439-96-5	2	0.0020	2.28	mg/L	D



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 00:00

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 17:05

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19F0300-11 G

Preparation Batch: BHF0610

Sample Size: 10 mL

Prepared: 25-Jun-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW17-6/19
19F0300-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 00:00

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 17:05

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	2.82	ug/L	
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW17-6/19
19F0300-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 00:00

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 17:05

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	103	%	
Surrogate: Toluene-d8		80-120 %	102	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	97.8	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	97.3	%	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM Sampled: 06/20/2019 00:00
Instrument: NT7 Analyst: PB Analyzed: 06/25/2019 00:35
Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19F0300-11 F
Preparation Batch: BHF0579 Sample Size: 10 mL
Prepared: 24-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>104</i>	<i>%</i>	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 06/20/2019 00:00
Instrument: ICP2 Analyst: TCH Analyzed: 07/08/2019 12:43

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19F0300-11 D 01
Preparation Batch: BHG0012 Sample Size: 25 mL
Prepared: 01-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	28.8	mg/L	
Potassium	7440-09-7	1	0.500	1.29	mg/L	
Sodium	7440-23-5	1	0.500	8.41	mg/L	



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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Wet Chemistry

Method: EPA 325.2			Sampled: 06/20/2019 00:00
Instrument: LACHAT1 Analyst: BF			Analyzed: 07/02/2019 14:11
Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Extract ID: 19F0300-11 A
	Preparation Batch: BHG0059	Final Volume: 10 mL	
	Prepared: 02-Jul-2019		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	3.13	mg/L	



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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 06/20/2019 00:00
Instrument: [CALC] Analyst: BF Analyzed: 07/03/2019 15:31

Sample Preparation: Preparation Method: [CALC] Extract ID: 19F0300-11
Preparation Batch: [CALC]
Prepared: 27-Jun-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: BF Analyzed: 07/03/2019 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-11 B
Preparation Batch: BHF0718 Sample Size: 10 mL
Prepared: 27-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.013	mg/L	

Instrument: LACHAT2 Analyst: BF Analyzed: 06/21/2019 16:20

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-11 A
Preparation Batch: BHF0545 Sample Size: 10 mL
Prepared: 21-Jun-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Wet Chemistry

Method: EPA 375.2	Instrument: LACHAT1	Analyst: BF	Sampled: 06/20/2019 00:00	Analyzed: 06/25/2019 15:17
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHF0595	Sample Size: 10 mL	Final Volume: 10 mL
	Prepared: 25-Jun-2019			Extract ID: 19F0300-11 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	5.81	mg/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Wet Chemistry

Method: EPA 410.4 Sampled: 06/20/2019 00:00
Instrument: UV1800-1 Analyst: YK Analyzed: 07/08/2019 14:51

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-11 B
Preparation Batch: BHG0156 Sample Size: 2 mL
Prepared: 08-Jul-2019 Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 06/20/2019 00:00
Instrument: TOC-LCSH Analyst: CDE	Preparation Batch: BHF0719	Analyzed: 07/06/2019 06:10
Sample Preparation:	Prepared: 27-Jun-2019	Extract ID: 19F0300-11 C
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	1.74	mg/L	



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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 06/20/2019 00:00
 Instrument: Accumet AR60 Analyst: UW Analyzed: 06/21/2019 14:06
 Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-11 A
 Preparation Batch: BHF0526 Sample Size: 100 mL
 Prepared: 21-Jun-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	146	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	146	mg/L CaCO3	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Instrument: Accumet AR60	Analyst: UW	Sampled: 06/20/2019 00:00
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHF0524	Analyzed: 06/21/2019 12:20
	Prepared: 21-Jun-2019	Sample Size: 50 mL	Extract ID: 19F0300-11 A
		Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.44	pH Units	H



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW17-6/19
19F0300-11 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97 Sampled: 06/20/2019 00:00
Instrument: LCHAT1 Analyst: BF Analyzed: 07/05/2019 18:33

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19F0300-11 B
Preparation Batch: BHG0136 Sample Size: 10 mL
Prepared: 05-Jul-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.043	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW17-6/19
19F0300-11 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sampled: 06/20/2019 00:00
Instrument: N/A Analyst: UW	Preparation Batch: BHF0518	Analyzed: 06/22/2019 10:45
Sample Preparation:	Prepared: 21-Jun-2019	Extract ID: 19F0300-11
	Sample Size: 100 mL	
	Final Volume: 100 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-GW-MW17-6/19
19F0300-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 06/20/2019 00:00
Instrument: ICPMS2 Analyst: MCB	Analyzed: 07/05/2019 20:54
Sample Preparation:	Extract ID: 19F0300-12 A 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BHG0132	Sample Size: 25 mL
Prepared: 05-Jul-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	703	ug/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Olalla-GW-MW17-6/19
19F0300-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 06/20/2019 00:00
Instrument: ICPMS2 Analyst: MCB	Analyzed: 07/08/2019 20:36
Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x Preparation Batch: BHG0079 Prepared: 03-Jul-2019	Extract ID: 19F0300-12 A 02 Sample Size: 100 mL Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	1.08	ug/L	

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Preparation Batch: BHG0132 Prepared: 05-Jul-2019	Extract ID: 19F0300-12 A 01 Sample Size: 25 mL Final Volume: 25 mL
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Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Olalla-GW-MW17-6/19
19F0300-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 06/20/2019 00:00
Instrument: ICP2 Analyst: TCH Analyzed: 07/08/2019 14:22

Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19F0300-12 A 03
Preparation Batch: BHG0134 Sample Size: 25 mL
Prepared: 05-Jul-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	2	0.0060	0.0123	mg/L	D
Manganese, Dissolved	7439-96-5	2	0.0020	0.818	mg/L	D



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Trip Blank
19F0300-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 08:58

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 13:07

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19F0300-13 A

Preparation Batch: BHF0610

Sample Size: 10 mL

Prepared: 25-Jun-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Trip Blank
19F0300-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 08:58

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 13:07

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Trip Blank
19F0300-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 06/20/2019 08:58

Instrument: NT3 Analyst: PKC

Analyzed: 06/25/2019 13:07

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	91.1	%	
Surrogate: Toluene-d8		80-120 %	99.4	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	102	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	97.5	%	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Trip Blank
19F0300-13 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 06/20/2019 08:58
Instrument: NT7 Analyst: PB	Analyzed: 06/24/2019 17:50
Sample Preparation:	Extract ID: 19F0300-13 B
Preparation Method: EPA 5030 (Purge and Trap)	
Preparation Batch: BHF0579	Sample Size: 10 mL
Prepared: 24-Jun-2019	Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>102</i>	<i>%</i>	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Volatile Organic Compounds - Quality Control

Batch BHF0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0610-BLK1)		Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 12:40								
Chloromethane	ND	0.50	ug/L							U
Vinyl Chloride	ND	0.20	ug/L							U
Bromomethane	ND	1.00	ug/L							U
Chloroethane	ND	0.20	ug/L							U
Trichlorofluoromethane	ND	0.20	ug/L							U
Acrolein	ND	5.00	ug/L							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.20	ug/L							U
Acetone	ND	5.00	ug/L							U
1,1-Dichloroethene	ND	0.20	ug/L							U
Bromoethane	ND	0.20	ug/L							U
Iodomethane	ND	1.00	ug/L							U
Methylene Chloride	ND	1.00	ug/L							U
Acrylonitrile	ND	1.00	ug/L							U
Carbon Disulfide	ND	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.20	ug/L							U
Vinyl Acetate	ND	0.20	ug/L							U
1,1-Dichloroethane	ND	0.20	ug/L							U
2-Butanone	ND	5.00	ug/L							U
2,2-Dichloropropane	ND	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Chloroform	ND	0.20	ug/L							U
Bromochloromethane	ND	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.20	ug/L							U
1,1-Dichloropropene	ND	0.20	ug/L							U
Carbon tetrachloride	ND	0.20	ug/L							U
1,2-Dichloroethane	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
1,2-Dichloropropane	ND	0.20	ug/L							U
Bromodichloromethane	ND	0.20	ug/L							U
Dibromomethane	ND	0.20	ug/L							U
2-Chloroethyl vinyl ether	ND	1.00	ug/L							U
4-Methyl-2-Pentanone	ND	5.00	ug/L							U
cis-1,3-Dichloropropene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Volatile Organic Compounds - Quality Control

Batch BHF0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0610-BLK1)										
Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 12:40										
trans-1,3-Dichloropropene	ND	0.20	ug/L							U
2-Hexanone	ND	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.20	ug/L							U
1,3-Dichloropropane	ND	0.20	ug/L							U
Tetrachloroethene	ND	0.20	ug/L							U
Dibromochloromethane	ND	0.20	ug/L							U
1,2-Dibromoethane	ND	0.20	ug/L							U
Chlorobenzene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
Xylenes, total	ND	0.60	ug/L							U
Styrene	ND	0.20	ug/L							U
Bromoform	ND	0.20	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.20	ug/L							U
1,2,3-Trichloropropane	ND	0.50	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	1.00	ug/L							U
n-Propylbenzene	ND	0.20	ug/L							U
Bromobenzene	ND	0.20	ug/L							U
Isopropyl Benzene	ND	0.20	ug/L							U
2-Chlorotoluene	ND	0.20	ug/L							U
4-Chlorotoluene	ND	0.20	ug/L							U
t-Butylbenzene	ND	0.20	ug/L							U
1,3,5-Trimethylbenzene	ND	0.20	ug/L							U
1,2,4-Trimethylbenzene	ND	0.20	ug/L							U
s-Butylbenzene	ND	0.20	ug/L							U
4-Isopropyl Toluene	ND	0.20	ug/L							U
1,3-Dichlorobenzene	ND	0.20	ug/L							U
1,4-Dichlorobenzene	ND	0.20	ug/L							U
n-Butylbenzene	ND	0.20	ug/L							U
1,2-Dichlorobenzene	ND	0.20	ug/L							U
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L							U
1,2,4-Trichlorobenzene	ND	0.50	ug/L							U
Hexachloro-1,3-Butadiene	ND	0.50	ug/L							U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Volatile Organic Compounds - Quality Control

Batch BHF0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0610-BLK1)										
Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 12:40										
Naphthalene	ND	0.50	ug/L							U
1,2,3-Trichlorobenzene	ND	0.50	ug/L							U
Dichlorodifluoromethane	ND	0.20	ug/L							U
Methyl tert-butyl Ether	ND	0.50	ug/L							U
2-Pentanone	ND	5.00	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.01		ug/L	5.00		100	80-129			
Surrogate: Toluene-d8	4.85		ug/L	5.00		97.0	80-120			
Surrogate: 4-Bromofluorobenzene	5.01		ug/L	5.00		100	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.10		ug/L	5.00		102	80-120			

LCS (BHF0610-BS1)										
Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 10:26										
Chloromethane	10.0	0.50	ug/L	10.0		100	60-138			
Vinyl Chloride	10.1	0.20	ug/L	10.0		101	66-133			
Bromomethane	10.5	1.00	ug/L	10.0		105	72-131			
Chloroethane	9.83	0.20	ug/L	10.0		98.3	60-155			
Trichlorofluoromethane	10.3	0.20	ug/L	10.0		103	80-129			
Acrolein	48.1	5.00	ug/L	50.0		96.1	52-144			
1,1,2-Trichloro-1,2,2-Trifluoroethane	10.6	0.20	ug/L	10.0		106	76-129			
Acetone	48.4	5.00	ug/L	50.0		96.8	58-142			
1,1-Dichloroethene	10.1	0.20	ug/L	10.0		101	69-135			
Bromoethane	10.5	0.20	ug/L	10.0		105	78-128			
Iodomethane	10.2	1.00	ug/L	10.0		102	56-147			
Methylene Chloride	9.35	1.00	ug/L	10.0		93.5	65-135			
Acrylonitrile	8.49	1.00	ug/L	10.0		84.9	64-134			
Carbon Disulfide	10.2	0.20	ug/L	10.0		102	78-125			
trans-1,2-Dichloroethene	10.4	0.20	ug/L	10.0		104	78-128			
Vinyl Acetate	9.47	0.20	ug/L	10.0		94.7	55-138			
1,1-Dichloroethane	10.4	0.20	ug/L	10.0		104	76-124			
2-Butanone	42.0	5.00	ug/L	50.0		84.0	61-140			
2,2-Dichloropropane	10.8	0.20	ug/L	10.0		108	78-125			
cis-1,2-Dichloroethene	10.1	0.20	ug/L	10.0		101	80-121			
Chloroform	10.0	0.20	ug/L	10.0		100	80-122			
Bromochloromethane	10.5	0.20	ug/L	10.0		105	80-121			
1,1,1-Trichloroethane	10.5	0.20	ug/L	10.0		105	79-123			
1,1-Dichloropropene	9.87	0.20	ug/L	10.0		98.7	80-120			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Volatile Organic Compounds - Quality Control

Batch BHF0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHF0610-BS1) Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 10:26										
Carbon tetrachloride	12.0	0.20	ug/L	10.0		120	53-137			
1,2-Dichloroethane	9.52	0.20	ug/L	10.0		95.2	75-123			
Benzene	9.90	0.20	ug/L	10.0		99.0	80-120			
Trichloroethene	10.0	0.20	ug/L	10.0		100	80-120			
1,2-Dichloropropane	9.95	0.20	ug/L	10.0		99.5	80-120			
Bromodichloromethane	9.81	0.20	ug/L	10.0		98.1	80-121			
Dibromomethane	9.91	0.20	ug/L	10.0		99.1	80-120			
2-Chloroethyl vinyl ether	9.63	1.00	ug/L	10.0		96.3	74-127			
4-Methyl-2-Pentanone	43.7	5.00	ug/L	50.0		87.4	67-133			
cis-1,3-Dichloropropene	10.4	0.20	ug/L	10.0		104	80-124			
Toluene	10.3	0.20	ug/L	10.0		103	80-120			
trans-1,3-Dichloropropene	10.2	0.20	ug/L	10.0		102	71-127			
2-Hexanone	41.4	5.00	ug/L	50.0		82.7	69-133			
1,1,2-Trichloroethane	9.59	0.20	ug/L	10.0		95.9	80-121			
1,3-Dichloropropane	9.14	0.20	ug/L	10.0		91.4	80-120			
Tetrachloroethene	9.91	0.20	ug/L	10.0		99.1	80-120			
Dibromochloromethane	9.15	0.20	ug/L	10.0		91.5	65-135			
1,2-Dibromoethane	9.54	0.20	ug/L	10.0		95.4	80-121			
Chlorobenzene	9.43	0.20	ug/L	10.0		94.3	80-120			
Ethylbenzene	9.92	0.20	ug/L	10.0		99.2	80-120			
1,1,1,2-Tetrachloroethane	9.99	0.20	ug/L	10.0		99.9	80-120			
m,p-Xylene	19.8	0.40	ug/L	20.0		99.2	80-121			
o-Xylene	10.0	0.20	ug/L	10.0		100	80-121			
Xylenes, total	29.8	0.60	ug/L	30.0		99.5	76-127			
Styrene	10.5	0.20	ug/L	10.0		105	80-124			
Bromoform	8.90	0.20	ug/L	10.0		89.0	51-134			
1,1,1,2-Tetrachloroethane	8.29	0.20	ug/L	10.0		82.9	77-123			
1,2,3-Trichloropropane	8.68	0.50	ug/L	10.0		86.8	76-125			
trans-1,4-Dichloro 2-Butene	7.39	1.00	ug/L	10.0		73.9	55-129			Q
n-Propylbenzene	9.97	0.20	ug/L	10.0		99.7	78-130			
Bromobenzene	9.40	0.20	ug/L	10.0		94.0	80-120			
Isopropyl Benzene	9.75	0.20	ug/L	10.0		97.5	80-128			
2-Chlorotoluene	9.56	0.20	ug/L	10.0		95.6	78-122			
4-Chlorotoluene	9.74	0.20	ug/L	10.0		97.4	80-121			
t-Butylbenzene	9.74	0.20	ug/L	10.0		97.4	78-125			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Volatile Organic Compounds - Quality Control

Batch BHF0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHF0610-BS1)										
					Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 10:26					
1,3,5-Trimethylbenzene	9.92	0.20	ug/L	10.0		99.2	80-129			
1,2,4-Trimethylbenzene	10.0	0.20	ug/L	10.0		100	80-127			
s-Butylbenzene	9.83	0.20	ug/L	10.0		98.3	78-129			
4-Isopropyl Toluene	9.96	0.20	ug/L	10.0		99.6	79-130			
1,3-Dichlorobenzene	9.52	0.20	ug/L	10.0		95.2	80-120			
1,4-Dichlorobenzene	9.28	0.20	ug/L	10.0		92.8	80-120			
n-Butylbenzene	10.1	0.20	ug/L	10.0		101	74-129			
1,2-Dichlorobenzene	9.36	0.20	ug/L	10.0		93.6	80-120			
1,2-Dibromo-3-chloropropane	8.89	0.50	ug/L	10.0		88.9	62-123			
1,2,4-Trichlorobenzene	9.02	0.50	ug/L	10.0		90.2	64-124			
Hexachloro-1,3-Butadiene	10.5	0.50	ug/L	10.0		105	58-123			
Naphthalene	10.3	0.50	ug/L	10.0		103	50-134			
1,2,3-Trichlorobenzene	8.68	0.50	ug/L	10.0		86.8	49-133			
Dichlorodifluoromethane	9.68	0.20	ug/L	10.0		96.8	48-147			
Methyl tert-butyl Ether	9.51	0.50	ug/L	10.0		95.1	71-132			
2-Pentanone	42.9	5.00	ug/L	50.0		85.8	69-134			
Surrogate: 1,2-Dichloroethane-d4	4.90		ug/L	5.00		97.9	80-129			
Surrogate: Toluene-d8	5.21		ug/L	5.00		104	80-120			
Surrogate: 4-Bromofluorobenzene	5.17		ug/L	5.00		103	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.92		ug/L	5.00		98.4	80-120			
LCS Dup (BHF0610-BS1)										
					Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 10:53					
Chloromethane	10.2	0.50	ug/L	10.0		102	60-138	1.99	30	
Vinyl Chloride	11.0	0.20	ug/L	10.0		110	66-133	8.84	30	
Bromomethane	10.5	1.00	ug/L	10.0		105	72-131	0.68	30	
Chloroethane	9.96	0.20	ug/L	10.0		99.6	60-155	1.30	30	
Trichlorofluoromethane	10.7	0.20	ug/L	10.0		107	80-129	3.41	30	
Acrolein	50.3	5.00	ug/L	50.0		101	52-144	4.58	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	10.9	0.20	ug/L	10.0		109	76-129	2.22	30	
Acetone	52.9	5.00	ug/L	50.0		106	58-142	8.76	30	
1,1-Dichloroethene	10.6	0.20	ug/L	10.0		106	69-135	4.81	30	
Bromoethane	10.9	0.20	ug/L	10.0		109	78-128	3.87	30	
Iodomethane	10.9	1.00	ug/L	10.0		109	56-147	6.62	30	
Methylene Chloride	9.81	1.00	ug/L	10.0		98.1	65-135	4.81	30	
Acrylonitrile	10.1	1.00	ug/L	10.0		101	64-134	17.20	30	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Volatile Organic Compounds - Quality Control

Batch BHF0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BHF0610-BSD1)										
					Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 10:53					
Carbon Disulfide	10.7	0.20	ug/L	10.0		107	78-125	5.22	30	
trans-1,2-Dichloroethene	10.7	0.20	ug/L	10.0		107	78-128	3.25	30	
Vinyl Acetate	10.7	0.20	ug/L	10.0		107	55-138	12.00	30	
1,1-Dichloroethane	11.0	0.20	ug/L	10.0		110	76-124	5.53	30	
2-Butanone	47.5	5.00	ug/L	50.0		95.1	61-140	12.40	30	
2,2-Dichloropropane	11.4	0.20	ug/L	10.0		114	78-125	5.57	30	
cis-1,2-Dichloroethene	10.8	0.20	ug/L	10.0		108	80-121	6.10	30	
Chloroform	10.3	0.20	ug/L	10.0		103	80-122	2.91	30	
Bromochloromethane	10.9	0.20	ug/L	10.0		109	80-121	3.54	30	
1,1,1-Trichloroethane	10.7	0.20	ug/L	10.0		107	79-123	1.60	30	
1,1-Dichloropropene	10.5	0.20	ug/L	10.0		105	80-120	6.32	30	
Carbon tetrachloride	12.3	0.20	ug/L	10.0		123	53-137	2.59	30	
1,2-Dichloroethane	10.3	0.20	ug/L	10.0		103	75-123	8.02	30	
Benzene	10.3	0.20	ug/L	10.0		103	80-120	4.36	30	
Trichloroethene	10.5	0.20	ug/L	10.0		105	80-120	4.60	30	
1,2-Dichloropropane	10.2	0.20	ug/L	10.0		102	80-120	2.82	30	
Bromodichloromethane	10.2	0.20	ug/L	10.0		102	80-121	4.27	30	
Dibromomethane	10.7	0.20	ug/L	10.0		107	80-120	7.63	30	
2-Chloroethyl vinyl ether	10.7	1.00	ug/L	10.0		107	74-127	10.80	30	
4-Methyl-2-Pentanone	48.8	5.00	ug/L	50.0		97.7	67-133	11.10	30	
cis-1,3-Dichloropropene	10.9	0.20	ug/L	10.0		109	80-124	4.39	30	
Toluene	10.5	0.20	ug/L	10.0		105	80-120	2.48	30	
trans-1,3-Dichloropropene	11.1	0.20	ug/L	10.0		111	71-127	8.79	30	
2-Hexanone	45.9	5.00	ug/L	50.0		91.9	69-133	10.50	30	
1,1,2-Trichloroethane	10.5	0.20	ug/L	10.0		105	80-121	9.44	30	
1,3-Dichloropropane	9.78	0.20	ug/L	10.0		97.8	80-120	6.74	30	
Tetrachloroethene	10.1	0.20	ug/L	10.0		101	80-120	1.58	30	
Dibromochloromethane	9.76	0.20	ug/L	10.0		97.6	65-135	6.49	30	
1,2-Dibromoethane	10.3	0.20	ug/L	10.0		103	80-121	7.34	30	
Chlorobenzene	9.95	0.20	ug/L	10.0		99.5	80-120	5.40	30	
Ethylbenzene	10.2	0.20	ug/L	10.0		102	80-120	2.62	30	
1,1,1,2-Tetrachloroethane	10.3	0.20	ug/L	10.0		103	80-120	3.46	30	
m,p-Xylene	20.3	0.40	ug/L	20.0		102	80-121	2.48	30	
o-Xylene	10.2	0.20	ug/L	10.0		102	80-121	1.97	30	
Xylenes, total	30.5	0.60	ug/L	30.0		102	76-127	2.31	30	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Volatile Organic Compounds - Quality Control

Batch BHF0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 10:53										
LCS Dup (BHF0610-BSD1)										
Styrene	10.6	0.20	ug/L	10.0		106	80-124	1.60	30	
Bromoform	10.2	0.20	ug/L	10.0		102	51-134	13.50	30	
1,1,2,2-Tetrachloroethane	8.89	0.20	ug/L	10.0		88.9	77-123	6.99	30	
1,2,3-Trichloropropane	9.21	0.50	ug/L	10.0		92.1	76-125	5.93	30	
trans-1,4-Dichloro 2-Butene	7.84	1.00	ug/L	10.0		78.4	55-129	5.79	30	Q
n-Propylbenzene	10.2	0.20	ug/L	10.0		102	78-130	2.28	30	
Bromobenzene	9.87	0.20	ug/L	10.0		98.7	80-120	4.83	30	
Isopropyl Benzene	9.97	0.20	ug/L	10.0		99.7	80-128	2.26	30	
2-Chlorotoluene	9.98	0.20	ug/L	10.0		99.8	78-122	4.30	30	
4-Chlorotoluene	9.93	0.20	ug/L	10.0		99.3	80-121	1.94	30	
t-Butylbenzene	10.0	0.20	ug/L	10.0		100	78-125	2.81	30	
1,3,5-Trimethylbenzene	10.1	0.20	ug/L	10.0		101	80-129	1.51	30	
1,2,4-Trimethylbenzene	10.2	0.20	ug/L	10.0		102	80-127	1.27	30	
s-Butylbenzene	10.1	0.20	ug/L	10.0		101	78-129	3.08	30	
4-Isopropyl Toluene	10.1	0.20	ug/L	10.0		101	79-130	1.83	30	
1,3-Dichlorobenzene	9.92	0.20	ug/L	10.0		99.2	80-120	4.20	30	
1,4-Dichlorobenzene	9.80	0.20	ug/L	10.0		98.0	80-120	5.39	30	
n-Butylbenzene	10.5	0.20	ug/L	10.0		105	74-129	3.47	30	
1,2-Dichlorobenzene	9.80	0.20	ug/L	10.0		98.0	80-120	4.56	30	
1,2-Dibromo-3-chloropropane	11.1	0.50	ug/L	10.0		111	62-123	22.30	30	
1,2,4-Trichlorobenzene	10.1	0.50	ug/L	10.0		101	64-124	11.50	30	
Hexachloro-1,3-Butadiene	11.7	0.50	ug/L	10.0		117	58-123	10.70	30	
Naphthalene	11.7	0.50	ug/L	10.0		117	50-134	12.60	30	
1,2,3-Trichlorobenzene	10.3	0.50	ug/L	10.0		103	49-133	16.70	30	
Dichlorodifluoromethane	9.96	0.20	ug/L	10.0		99.6	48-147	2.85	30	
Methyl tert-butyl Ether	10.3	0.50	ug/L	10.0		103	71-132	8.43	30	
2-Pentanone	46.4	5.00	ug/L	50.0		92.8	69-134	7.82	30	
Surrogate: 1,2-Dichloroethane-d4	5.07		ug/L	5.00		101	80-129			
Surrogate: Toluene-d8	5.00		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.15		ug/L	5.00		103	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.99		ug/L	5.00		99.8	80-120			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Volatile Organic Compounds - SIM - Quality Control

Batch BHF0579 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0579-BLK1)				Prepared: 24-Jun-2019 Analyzed: 24-Jun-2019 17:16						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5160		ng/L	5000	103		80-129			
LCS (BHF0579-BS1)				Prepared: 24-Jun-2019 Analyzed: 24-Jun-2019 16:18						
Vinyl chloride	2130	20.0	ng/L	2000		107	76-120			
Surrogate: 1,2-Dichloroethane-d4	4760		ng/L	5000		95.3	80-129			
LCS Dup (BHF0579-BSD1)				Prepared: 24-Jun-2019 Analyzed: 24-Jun-2019 16:51						
Vinyl chloride	1940	20.0	ng/L	2000		97.2	76-120	9.22	30	
Surrogate: 1,2-Dichloroethane-d4	4780		ng/L	5000		95.6	80-129			



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Metals and Metallic Compounds - Quality Control

Batch BHG0012 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHG0012-BLK1)		Prepared: 01-Jul-2019 Analyzed: 02-Jul-2019 15:38								
Calcium	ND	0.0500	mg/L							U
Potassium	ND	0.500	mg/L							U
Sodium	ND	0.500	mg/L							U
Sodium	ND	50.0	mg/L							U
LCS (BHG0012-BS1)		Prepared: 01-Jul-2019 Analyzed: 02-Jul-2019 16:10								
Calcium	9.47	0.0500	mg/L	10.0		94.7	80-120			
Potassium	9.52	0.500	mg/L	10.0		95.2	80-120			
Sodium	9.83	0.500	mg/L	10.0		98.3	80-120			
Sodium	ND	50.0	mg/L	10.0		104	80-120			U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHG0079 - RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHG0079-BLK1)						Prepared: 03-Jul-2019 Analyzed: 08-Jul-2019 18:10					
Arsenic, Dissolved	75a	ND	0.0400	ug/L							U
LCS (BHG0079-BS1)						Prepared: 03-Jul-2019 Analyzed: 08-Jul-2019 18:14					
Arsenic, Dissolved	75a	4.89	0.0400	ug/L	5.00		97.8	80-120			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHG0132 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHG0132-BLK2)			Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 11:30								
Iron, Dissolved	54	ND	20.0	ug/L							U
Iron, Dissolved	57	ND	20.0	ug/L							U
LCS (BHG0132-BS2)			Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 11:40								
Iron, Dissolved	54	4960	20.0	ug/L	5000		99.2	80-120			
Iron, Dissolved	57	5010	20.0	ug/L	5000		100	80-120			
Duplicate (BHG0132-DUP2)			Source: 19F0300-02		Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 11:32						
Iron, Dissolved	54	ND	20.0	ug/L		ND					L, U
Matrix Spike (BHG0132-MS2)			Source: 19F0300-02		Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 11:36						
Iron, Dissolved	54	4780	20.0	ug/L	5000	ND	95.5	75-125			

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

Matrix Spike Dup (BHG0132-MSD2)			Source: 19F0300-02		Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 11:38						
Iron, Dissolved	54	4490	20.0	ug/L	5000	ND	89.6	75-125	6.36	20	

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

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHG0132-BLK1)			Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 15:14								
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
LCS (BHG0132-BS1)			Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 15:19								
Zinc, Dissolved	66	77.3	4.00	ug/L	80.0		96.7	80-120			
Zinc, Dissolved	67	76.2	4.00	ug/L	80.0		95.2	80-120			
Duplicate (BHG0132-DUP1)			Source: 19F0300-02		Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 17:40						
Zinc, Dissolved	66	ND	4.00	ug/L		ND					U
Matrix Spike (BHG0132-MS1)			Source: 19F0300-02		Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 17:45						
Zinc, Dissolved	66	80.5	4.00	ug/L	80.0	ND	98.5	75-125			

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



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHG0132 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BHG0132-MSD1)		Source: 19F0300-02		Prepared: 05-Jul-2019		Analyzed: 08-Jul-2019 17:49					
Zinc, Dissolved	66	79.2	4.00	ug/L	80.0	ND	96.9	75-125	1.55	20	

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



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHG0134 - WMN (No Prep)

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHG0134-BLK2)		Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 13:33								
Barium, Dissolved	ND	0.0030	mg/L							U
Manganese, Dissolved	ND	0.0010	mg/L							U
LCS (BHG0134-BS2)		Prepared: 05-Jul-2019 Analyzed: 08-Jul-2019 15:47								
Barium, Dissolved	2.04	0.0030	mg/L	2.00		102	80-120			
Manganese, Dissolved	0.497	0.0010	mg/L	0.500		99.4	80-120			



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Wet Chemistry - Quality Control

Batch BHF0524 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHF0524-BS1)						Prepared: 21-Jun-2019 Analyzed: 21-Jun-2019 12:20					
pH	6.97	0.01	0.01	pH Units	7.00		99.6	99.2-100.8			
Duplicate (BHF0524-DUP1)						Source: 19F0300-01 Prepared: 21-Jun-2019 Analyzed: 21-Jun-2019 12:20					
pH	6.33	0.01	0.01	pH Units		6.32			0.16	20	H



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Wet Chemistry - Quality Control

Batch BHF0526 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0526-BLK1)						Prepared: 21-Jun-2019 Analyzed: 21-Jun-2019 12:16					
Alkalinity, Total	ND	1.00	1.00	mg/L CaCO3							U
Reference (BHF0526-SRM1)						Prepared: 21-Jun-2019 Analyzed: 21-Jun-2019 14:06					
Alkalinity, Total	111	1.00	1.00	mg/L CaCO3	116		95.4	85-114.66			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Wet Chemistry - Quality Control

Batch BHF0545 - No Prep Wet Chem

Instrument: LCHAT2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0545-BLK1)						Prepared: 21-Jun-2019 Analyzed: 21-Jun-2019 16:03					
Nitrite-N	ND	0.010	0.010	mg/L							U
LCS (BHF0545-BS1)						Prepared: 21-Jun-2019 Analyzed: 21-Jun-2019 16:04					
Nitrite-N	0.505	0.010	0.010	mg/L	0.500		101	75-125			
Duplicate (BHF0545-DUP1)						Source: 19F0300-01 Prepared: 21-Jun-2019 Analyzed: 21-Jun-2019 16:07					
Nitrite-N	ND	0.010	0.010	mg/L		ND					U
Matrix Spike (BHF0545-MS1)						Source: 19F0300-01 Prepared: 21-Jun-2019 Analyzed: 21-Jun-2019 16:08					
Nitrite-N	0.509	0.010	0.010	mg/L	0.500	ND	102	75-125			

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



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Wet Chemistry - Quality Control

Batch BHF0595 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0595-BLK1)						Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 14:40					
Sulfate	ND	2.00	2.00	mg/L							U
LCS (BHF0595-BS1)						Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 14:41					
Sulfate	15.2	2.00	2.00	mg/L	15.0		101	90-110			
Duplicate (BHF0595-DUP1)						Source: 19F0300-01 Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 15:01					
Sulfate	2.68	2.00	2.00	mg/L		3.43			24.50	20	*
Matrix Spike (BHF0595-MS1)						Source: 19F0300-01 Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 15:03					
Sulfate	18.6	2.00	2.00	mg/L	15.0	3.43	101	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHF0595-MSD1)						Source: 19F0300-01 Prepared: 25-Jun-2019 Analyzed: 25-Jun-2019 15:04					
Sulfate	18.4	2.00	2.00	mg/L	15.0	3.43	99.8	75-125	1.08	20	

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



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Wet Chemistry - Quality Control

Batch BHF0718 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0718-BLK1)						Prepared: 27-Jun-2019 Analyzed: 03-Jul-2019 15:08					
Nitrate + Nitrite as N	ND	0.010	0.010	mg/L							U
LCS (BHF0718-BS1)						Prepared: 27-Jun-2019 Analyzed: 03-Jul-2019 15:09					
Nitrate + Nitrite as N	0.518	0.010	0.010	mg/L	0.500		104	90-110			



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Wet Chemistry - Quality Control

Batch BHF0719 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0719-BLK1)						Prepared: 27-Jun-2019 Analyzed: 06-Jul-2019 02:49					
Total Organic Carbon	ND	0.50	0.50	mg/L							U
LCS (BHF0719-BS1)						Prepared: 27-Jun-2019 Analyzed: 06-Jul-2019 03:14					
Total Organic Carbon	19.05	0.50	0.50	mg/L	20.00		95.3	90-110			



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Wet Chemistry - Quality Control

Batch BHG0059 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHG0059-BLK1)						Prepared: 02-Jul-2019 Analyzed: 02-Jul-2019 13:29					
Chloride	ND	1.00	1.00	mg/L							U
LCS (BHG0059-BS1)						Prepared: 02-Jul-2019 Analyzed: 02-Jul-2019 13:30					
Chloride	5.30	1.00	1.00	mg/L	5.00		106	90-110			
Duplicate (BHG0059-DUP1)						Source: 19F0300-01 Prepared: 02-Jul-2019 Analyzed: 02-Jul-2019 13:56					
Chloride	3.57	1.00	1.00	mg/L		3.63			1.67	20	
Matrix Spike (BHG0059-MS1)						Source: 19F0300-01 Prepared: 02-Jul-2019 Analyzed: 02-Jul-2019 14:04					
Chloride	8.93	1.00	1.00	mg/L	5.00	3.63	106	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHG0059-MSD1)						Source: 19F0300-01 Prepared: 02-Jul-2019 Analyzed: 02-Jul-2019 14:05					
Chloride	8.95	1.00	1.00	mg/L	5.00	3.63	106	75-125	0.22	20	

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



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Wet Chemistry - Quality Control

Batch BHG0136 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHG0136-BLK1)						Prepared: 05-Jul-2019 Analyzed: 05-Jul-2019 17:16					
Ammonia-N	ND	0.040	0.040	mg/L							U
LCS (BHG0136-BS1)						Prepared: 05-Jul-2019 Analyzed: 05-Jul-2019 17:17					
Ammonia-N	0.520	0.040	0.040	mg/L	0.500		104	90-110			



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Wet Chemistry - Quality Control

Batch BHG0156 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: YK

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHG0156-BLK1)						Prepared: 08-Jul-2019 Analyzed: 08-Jul-2019 14:42					
COD	ND	10.0	10.0	mg/L							U
LCS (BHG0156-BS1)						Prepared: 08-Jul-2019 Analyzed: 08-Jul-2019 14:42					
COD	101	10.0	10.0	mg/L	100		101	90-110			
Duplicate (BHG0156-DUP1)						Source: 19F0300-01 Prepared: 08-Jul-2019 Analyzed: 08-Jul-2019 14:43					
COD	ND	10.0	10.0	mg/L		ND					U
Matrix Spike (BHG0156-MS1)						Source: 19F0300-01 Prepared: 08-Jul-2019 Analyzed: 08-Jul-2019 14:44					
COD	108	20.0	20.0	mg/L	100	ND	108	90-110			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHG0156-MSD1)						Source: 19F0300-01 Prepared: 08-Jul-2019 Analyzed: 08-Jul-2019 14:45					
COD	103	20.0	20.0	mg/L	100	ND	103	90-110	5.11	10	

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



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Microbiology - Quality Control

Batch BHF0518 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHF0518-BLK1)						Prepared: 21-Jun-2019 Analyzed: 22-Jun-2019 10:45					
Total Coliforms	ND	1	1	CFU/100 ml							U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
EPA 200.8 UCT-KED in Water	
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 353.2 in Water	
Nitrate + Nitrite as N	NELAP,DoD-ELAP,WADOE
Nitrite-N	WADOE,NELAP,DoD-ELAP
EPA 375.2 in Water	
Sulfate	WADOE,NELAP
EPA 410.4 in Water	
COD	DoD-ELAP,NELAP,WADOE
EPA 6010C in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Sodium	DoD-ELAP,WADOE,NELAP
Sodium-1	DoD-ELAP
Barium	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



Environmental Partners, Inc.
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Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260C-SIM in Water

Acrylonitrile	NELAP,CALAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE

EPA 9060A in Water

Total Organic Carbon	DoD-ELAP,WADOE,NELAP
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SM 2320 B-97 in Water

Alkalinity, Bicarbonate	NELAP,WADOE,WA-DW,DoD-ELAP
Alkalinity, Carbonate	WADOE,WA-DW,DoD-ELAP,NELAP



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 09-Jul-2019 19:00
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Alkalinity, Hydroxide WADOE,WA-DW,DoD-ELAP,NELAP
Alkalinity, Total DoD-ELAP,WADOE,WA-DW,NELAP

SM 4500-H+ B-00 in Water

pH WADOE,NELAP,WA-DW

SM 4500-NH3 H-97 in Water

Ammonia-N WADOE,DoD-ELAP,NELAP

SM 9222B in Water

Total Coliforms WADOE

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



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
09-Jul-2019 19:00

Notes and Definitions

- * Flagged value is not within established control limits.
- B This analyte was detected in the method blank.
- 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)
- H Hold time violation - Hold time was exceeded.
- J Estimated concentration value detected below the reporting limit.
- L Analyte concentration is ≤ 5 times the reporting limit and the replicate control limit defaults to \pm RL instead of 20% RPD
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($< 20\%$ RSD, $< 20\%$ drift or minimum RRF)
- 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.



04 November 2019

Doug Kunkel
Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah, WA 98027

RE: Olalla Landfill

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>
19I0438	N/A

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.



Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number: 1910438	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Environmental Partner, Inc.	Phone: 425-395-0010	Date: 9/27/19
Client Contact: Doug Kunkel	No. of Coolers: 1	Ice Present? Yes Cooler Temps: 0.1°C

Client Project Name: Olalla Landfill	Analysis Requested	Notes/Comments
Client Project #: 45407.0	Samplers: Eric Caddy	

Sample ID	Date	Time	Matrix	No. Containers	VOCs and VC	Distilled and Total Metals	Metals with Chl Sul for alkalinity	Conductivity, pH, bicarbonate, ammonia	COD	TOC	Total Coliform	
Olalla-GW-MW1-9/19	9/26/19	09:33	water	9	X	X	X	X	X	X	X	See email with a complete list of analytes.
Olalla-GW-MW3-9/19	9/26/19	11:03	"	"	X	X	X	X	X	X		
Olalla-GW-MW10-9/19	9/26/19	12:11	"	"	X	X	X	X	X	X		
Olalla-GW-MW6-9/19	9/26/19	13:32	"	"	X	X	X	X	X	X		
Olalla-GW-MW8-9/19	9/26/19	14:28	"	"	X	X	X	X	X	X		
Olalla-GW-MW12-9/19	9/26/19	-	"	"	X	X	X	X	X	X		
Trip blank	-	-	"	2	X							

Comments/Special Instructions	Relinquished by: (Signature) [Signature]	Received by: (Signature) [Signature]	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Eric Caddy	Printed Name: Jacob Walter	Printed Name:	Printed Name:
	Company: EPI	Company: ARZ	Company:	Company:
	Date & Time: 9/27/19 0850	Date & Time: 09/27/19 0850	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Olalla-GW-MW1-9/19	19I0438-01	Water	26-Sep-2019 09:33	27-Sep-2019 08:50
Olalla-GW-MW1-9/19	19I0438-02	Water	26-Sep-2019 09:33	27-Sep-2019 08:50
Olalla-GW-MW3-9/19	19I0438-03	Water	26-Sep-2019 11:03	27-Sep-2019 08:50
Olalla-GW-MW3-9/19	19I0438-04	Water	26-Sep-2019 11:03	27-Sep-2019 08:50
Olalla-GW-MW10-9/19	19I0438-05	Water	26-Sep-2019 12:11	27-Sep-2019 08:50
Olalla-GW-MW10-9/19	19I0438-06	Water	26-Sep-2019 12:11	27-Sep-2019 08:50
Olalla-GW-MW6-9/19	19I0438-07	Water	26-Sep-2019 13:32	27-Sep-2019 08:50
Olalla-GW-MW6-9/19	19I0438-08	Water	26-Sep-2019 13:32	27-Sep-2019 08:50
Olalla-GW-MW8-9/19	19I0438-09	Water	26-Sep-2019 14:28	27-Sep-2019 08:50
Olalla-GW-MW8-9/19	19I0438-10	Water	26-Sep-2019 14:28	27-Sep-2019 08:50
Olalla-GW-MW12-9/19	19I0438-11	Water	26-Sep-2019 00:00	27-Sep-2019 08:50
Olalla-GW-MW12-9/19	19I0438-12	Water	26-Sep-2019 00:00	27-Sep-2019 08:50
Trip Blank	19I0438-13	Water	26-Sep-2019 09:33	27-Sep-2019 08:50



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Work Order Case Narrative

Volatiles - EPA Method SW8260C

The sample(s) were run within the recommended holding times.

Initial and continuing calibrations were within method requirements except Iodomethane and trans-1,4-Dichloro 2-Butene which were out of control high. All samples which contain analyte have been flagged with a "Q" qualifier.

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/LCSD percent recoveries and RPD were within control limits except Iodomethane and trans-1,4-Dichloro 2-Butene which were out of control high and are flagged within the QC section of this report.

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were run 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.

Dissolved Metals - EPA Method 200.8

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.

Total and Dissolved Metals - EPA Method 6010C

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



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

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.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times except pH and Total Coliform . The holding time was exceeded upon sample receipt.

Initial and continuing calibrations were within method requirements.

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

The LCS and SRM percent recoveries were within control limits.

The Duplicate RPD and Matrix Spike percent recovery were within control limits.



WORK ORDER

19I0438

Client: Environmental Partners, Inc.

Project Manager: Kelly Bottem

Project: Olalla Landfill

Project Number: [none]

Report To:

Environmental Partners, Inc.
Doug Kunkel
1180 NW Maple St., Suite 310
Issaquah, WA 98027
Phone: 425-395-0010
Fax: -

Invoice To:

Environmental Partners, Inc.
Doug Kunkel
1180 NW Maple St., Suite 310
Issaquah, WA 98027
Phone :425-395-0010
Fax: -

Date Due: 11-Oct-2019 18:00 (10 day TAT)

Received By: Jacob Walter

Date Received: 27-Sep-2019 08:50

Logged In By: Jacob Walter

Date Logged In: 27-Sep-2019 09:09

Samples Received at 0.1°C

Intact, properly signed and dated custody seals attached to outside of cooler(s).....	No	Custody papers included with the cooler.....	Yes
Custody papers properly filled out (in, signed, analyses requested, etc).....	Yes	Was a temperature blank included in the cooler.....	No
Was sufficient ice used (if appropriate).....	Yes	All bottles sealed in individual plastic bags.....	No
All bottles arrived in good condition (unbroken).....	Yes	All bottle labels complete and legible.....	Yes
Number of containers listed on COC match number received.....	Yes	Bottle labels and tags agree with COC.....	Yes
Correct bottles used for the requested analyses.....	Yes	All VOC vials free of air bubbles.....	Yes
Analyses/bottles require preservation (attach preservation sheet excluding VOC).....	Yes	Sufficient amount of sample sent in each bottle.....	Yes
Sample split at ARI.....	No		



WORK ORDER

19I0438

Client: Environmental Partners, Inc. Project Manager: Kelly Bottem
Project: Olalla Landfill Project Number: [none]

Analysis	Due	TAT	Expires	Comments
19I0438-01 Olalla-GW-MW1-9/19 [Water] Sampled 26-Sep-2019 09:33				
Alkalinity, Total SM 2320 B-97	10/11/2019	10	10/10/2019	
Sulfate, EPA 375.2	10/11/2019	10	10/24/2019	
pH, SM 4500-H	10/11/2019	10	9/26/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	10/11/2019	10	10/24/2019	
8260C-SIM VOC	10/11/2019	10	10/10/2019	
Alkalinity, Bicarbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Alkalinity, Hydroxide SM 2320 B-97	10/11/2019	10	10/10/2019	
Coliform, Total (MF) SM 9222B	10/11/2019	10	9/26/2019	
Met 6010C - Ca	10/11/2019	10	3/24/2020	
Met 6010C - Na	10/11/2019	10	3/24/2020	
Carbon, Organic Total, 9060A	10/11/2019	10	10/24/2019	
Chemical Oxygen Demand (COD), EPA 410.	10/11/2019	10	10/24/2019	
8260C VOA	10/11/2019	10	10/10/2019	
Nitrate + Nitrite-N, EPA 353.2	10/11/2019	10	10/24/2019	
Nitrate-N Calc EPA 353.2	10/11/2019	10	9/28/2019	
Alkalinity, Carbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Nitrite-N, EPA 353.2	10/11/2019	10	9/28/2019	
Chloride, EPA 325.2	10/11/2019	10	10/24/2019	
Met 6010C - K	10/11/2019	10	3/24/2020	
19I0438-02 Olalla-GW-MW1-9/19 [Water] Sampled 26-Sep-2019 09:33				
Met Diss 6010C - Ba	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Zn UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - As UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Fe	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Mn	10/11/2019	10	3/24/2020	Field Filtered
19I0438-03 Olalla-GW-MW3-9/19 [Water] Sampled 26-Sep-2019 11:03				
Alkalinity, Bicarbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Alkalinity, Total SM 2320 B-97	10/11/2019	10	10/10/2019	
8260C VOA	10/11/2019	10	10/10/2019	
8260C-SIM VOC	10/11/2019	10	10/10/2019	
Sulfate, EPA 375.2	10/11/2019	10	10/24/2019	
Alkalinity, Carbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Nitrite-N, EPA 353.2	10/11/2019	10	9/28/2019	
pH, SM 4500-H	10/11/2019	10	9/26/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	10/11/2019	10	10/24/2019	
Carbon, Organic Total, 9060A	10/11/2019	10	10/24/2019	
Chloride, EPA 325.2	10/11/2019	10	10/24/2019	
Nitrate-N Calc EPA 353.2	10/11/2019	10	9/28/2019	
Nitrate + Nitrite-N, EPA 353.2	10/11/2019	10	10/24/2019	



WORK ORDER

19I0438

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Met 6010C - Na	10/11/2019	10	3/24/2020	
Met 6010C - Ca	10/11/2019	10	3/24/2020	
Alkalinity, Hydroxide SM 2320 B-97	10/11/2019	10	10/10/2019	
Coliform, Total (MF) SM 9222B	10/11/2019	10	9/26/2019	
Met 6010C - K	10/11/2019	10	3/24/2020	
Chemical Oxygen Demand (COD), EPA 410.	10/11/2019	10	10/24/2019	

19I0438-04 Olalla-GW-MW3-9/19 [Water] Sampled 26-Sep-2019 11:03

Met Diss 200.8 - Fe	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Zn UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - As UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Ba	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Mn	10/11/2019	10	3/24/2020	Field Filtered

19I0438-05 Olalla-GW-MW10-9/19 [Water] Sampled 26-Sep-2019 12:11

Alkalinity, Hydroxide SM 2320 B-97	10/11/2019	10	10/10/2019	
Alkalinity, Total SM 2320 B-97	10/11/2019	10	10/10/2019	
Nitrate + Nitrite-N, EPA 353.2	10/11/2019	10	10/24/2019	
Met 6010C - Na	10/11/2019	10	3/24/2020	
Carbon, Organic Total, 9060A	10/11/2019	10	10/24/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	10/11/2019	10	10/24/2019	
Nitrate-N Calc EPA 353.2	10/11/2019	10	9/28/2019	
Nitrite-N, EPA 353.2	10/11/2019	10	9/28/2019	
Chloride, EPA 325.2	10/11/2019	10	10/24/2019	
Alkalinity, Bicarbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Chemical Oxygen Demand (COD), EPA 410.	10/11/2019	10	10/24/2019	
pH, SM 4500-H	10/11/2019	10	9/26/2019	
Met 6010C - Ca	10/11/2019	10	3/24/2020	
Alkalinity, Carbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Coliform, Total (MF) SM 9222B	10/11/2019	10	9/26/2019	
8260C VOA	10/11/2019	10	10/10/2019	
8260C-SIM VOC	10/11/2019	10	10/10/2019	
Sulfate, EPA 375.2	10/11/2019	10	10/24/2019	
Met 6010C - K	10/11/2019	10	3/24/2020	

19I0438-06 Olalla-GW-MW10-9/19 [Water] Sampled 26-Sep-2019 12:11

Met Diss 200.8 - Fe	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Zn UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Ba	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - As UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Mn	10/11/2019	10	3/24/2020	Field Filtered

19I0438-07 Olalla-GW-MW6-9/19 [Water] Sampled 26-Sep-2019 13:32



WORK ORDER

19I0438

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
8260C VOA	10/11/2019	10	10/10/2019	
8260C-SIM VOC	10/11/2019	10	10/10/2019	
Alkalinity, Bicarbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Alkalinity, Total SM 2320 B-97	10/11/2019	10	10/10/2019	
Carbon, Organic Total, 9060A	10/11/2019	10	10/24/2019	
Alkalinity, Hydroxide SM 2320 B-97	10/11/2019	10	10/10/2019	
Sulfate, EPA 375.2	10/11/2019	10	10/24/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	10/11/2019	10	10/24/2019	
Chloride, EPA 325.2	10/11/2019	10	10/24/2019	
Chemical Oxygen Demand (COD), EPA 410.	10/11/2019	10	10/24/2019	
Nitrate-N Calc EPA 353.2	10/11/2019	10	9/28/2019	
pH, SM 4500-H	10/11/2019	10	9/26/2019	
Met 6010C - Ca	10/11/2019	10	3/24/2020	
Met 6010C - K	10/11/2019	10	3/24/2020	
Met 6010C - Na	10/11/2019	10	3/24/2020	
Nitrate + Nitrite-N, EPA 353.2	10/11/2019	10	10/24/2019	
Alkalinity, Carbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Coliform, Total (MF) SM 9222B	10/11/2019	10	9/26/2019	
Nitrite-N, EPA 353.2	10/11/2019	10	9/28/2019	

19I0438-08 Olalla-GW-MW6-9/19 [Water] Sampled 26-Sep-2019 13:32 Dissolved arsenic: 5x concentration!

Met Diss 200.8 - As UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Zn UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Ba	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Mn	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Fe	10/11/2019	10	3/24/2020	Field Filtered

19I0438-09 Olalla-GW-MW8-9/19 [Water] Sampled 26-Sep-2019 14:28

8260C VOA	10/11/2019	10	10/10/2019	
Nitrate-N Calc EPA 353.2	10/11/2019	10	9/28/2019	
Met 6010C - Na	10/11/2019	10	3/24/2020	
Nitrite-N, EPA 353.2	10/11/2019	10	9/28/2019	
pH, SM 4500-H	10/11/2019	10	9/26/2019	
Sulfate, EPA 375.2	10/11/2019	10	10/24/2019	
Met 6010C - K	10/11/2019	10	3/24/2020	
8260C-SIM VOC	10/11/2019	10	10/10/2019	
Alkalinity, Hydroxide SM 2320 B-97	10/11/2019	10	10/10/2019	
Alkalinity, Bicarbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Ammonia-N, FIA SM 4500-NH3 H-97	10/11/2019	10	10/24/2019	
Chemical Oxygen Demand (COD), EPA 410.	10/11/2019	10	10/24/2019	
Chloride, EPA 325.2	10/11/2019	10	10/24/2019	
Coliform, Total (MF) SM 9222B	10/11/2019	10	9/26/2019	



WORK ORDER

19I0438

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
Met 6010C - Ca	10/11/2019	10	3/24/2020	
Carbon, Organic Total, 9060A	10/11/2019	10	10/24/2019	
Alkalinity, Carbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Nitrate + Nitrite-N, EPA 353.2	10/11/2019	10	10/24/2019	
Alkalinity, Total SM 2320 B-97	10/11/2019	10	10/10/2019	

19I0438-10 Olalla-GW-MW8-9/19 [Water] Sampled 26-Sep-2019 14:28

Met Diss 6010C - Ba	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Mn	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Zn UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Fe	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - As UCT	10/11/2019	10	3/24/2020	Field Filtered

19I0438-11 Olalla-GW-MW12-9/19 [Water] Sampled 26-Sep-2019 00:00

Met 6010C - Ca	10/11/2019	10	3/24/2020	
Ammonia-N, FIA SM 4500-NH3 H-97	10/11/2019	10	10/24/2019	
Nitrite-N, EPA 353.2	10/11/2019	10	9/28/2019	
Alkalinity, Carbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Alkalinity, Hydroxide SM 2320 B-97	10/11/2019	10	10/10/2019	
Alkalinity, Bicarbonate SM 2320 B-97	10/11/2019	10	10/10/2019	
Alkalinity, Total SM 2320 B-97	10/11/2019	10	10/10/2019	
Nitrate-N Calc EPA 353.2	10/11/2019	10	9/28/2019	
pH, SM 4500-H	10/11/2019	10	9/26/2019	
8260C VOA	10/11/2019	10	10/10/2019	
Met 6010C - K	10/11/2019	10	3/24/2020	
Coliform, Total (MF) SM 9222B	10/11/2019	10	9/26/2019	
Chloride, EPA 325.2	10/11/2019	10	10/24/2019	
Sulfate, EPA 375.2	10/11/2019	10	10/24/2019	
8260C-SIM VOC	10/11/2019	10	10/10/2019	
Met 6010C - Na	10/11/2019	10	3/24/2020	
Nitrate + Nitrite-N, EPA 353.2	10/11/2019	10	10/24/2019	
Carbon, Organic Total, 9060A	10/11/2019	10	10/24/2019	
Chemical Oxygen Demand (COD), EPA 410.	10/11/2019	10	10/24/2019	

19I0438-12 Olalla-GW-MW12-9/19 [Water] Sampled 26-Sep-2019 00:00

Met Diss 6010C - Mn	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - As UCT	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Fe	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 6010C - Ba	10/11/2019	10	3/24/2020	Field Filtered
Met Diss 200.8 - Zn UCT	10/11/2019	10	3/24/2020	Field Filtered

19I0438-13 Trip Blank [Water] Sampled 26-Sep-2019 09:33

8260C-SIM VOC	10/11/2019	10	10/10/2019	
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WORK ORDER

19I0438

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Analysis	Due	TAT	Expires	Comments
8260C VOA	10/11/2019	10	10/10/2019	

Analysis groups included in this work order

<u>Nitrate-N Calc EPA 353.2</u>	
Nitrite-N, EPA 353.2	Nitrate + Nitrite-N, EPA 353.2

Reviewed By _____

Date _____



WORK ORDER

19I0438

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Preservation Confirmation

Container ID	Container Type	pH	
19I0438-01 A	Small OJ, 500 mL		
19I0438-01 B	Corning Plastic, 125 mL, Na2S2O3		
19I0438-01 C	HDPE NM, 250mL H2SO4	<2	Pass (P)
19I0438-01 D	HDPE NM, 250mL HNO3	<2	P
19I0438-01 E	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19I0438-01 F	VOA Vial, Clear, 40 mL, HCL		
19I0438-01 G	VOA Vial, Clear, 40 mL, HCL		
19I0438-01 H	VOA Vial, Clear, 40 mL, HCL		
19I0438-02 A	HDPE NM, 250mL HNO3 (FF)	<2	P
19I0438-03 A	Small OJ, 500 mL		
19I0438-03 B	Corning Plastic, 125 mL, Na2S2O3		
19I0438-03 C	HDPE NM, 250mL H2SO4	<2	P
19I0438-03 D	HDPE NM, 250mL HNO3	<2	P
19I0438-03 E	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19I0438-03 F	VOA Vial, Clear, 40 mL, HCL		
19I0438-03 G	VOA Vial, Clear, 40 mL, HCL		
19I0438-03 H	VOA Vial, Clear, 40 mL, HCL		
19I0438-04 A	HDPE NM, 250mL HNO3 (FF)	<2	P
19I0438-05 A	Small OJ, 500 mL		
19I0438-05 B	Corning Plastic, 125 mL, Na2S2O3		
19I0438-05 C	HDPE NM, 250mL H2SO4	<2	P
19I0438-05 D	HDPE NM, 250mL HNO3	<2	P
19I0438-05 E	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19I0438-05 F	VOA Vial, Clear, 40 mL, HCL		
19I0438-05 G	VOA Vial, Clear, 40 mL, HCL		
19I0438-05 H	VOA Vial, Clear, 40 mL, HCL		
19I0438-06 A	HDPE NM, 250mL HNO3 (FF)	<2	P
19I0438-07 A	Small OJ, 500 mL		
19I0438-07 B	Corning Plastic, 125 mL, Na2S2O3		
19I0438-07 C	HDPE NM, 250mL H2SO4	<2	P
19I0438-07 D	HDPE NM, 250mL HNO3	<2	P
19I0438-07 E	Glass NM, Amber, 250 mL, 9N H2SO4	<2	P
19I0438-07 F	VOA Vial, Clear, 40 mL, HCL		
19I0438-07 G	VOA Vial, Clear, 40 mL, HCL		
19I0438-07 H	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

19I0438

Client: Environmental Partners, Inc.		Project Manager: Kelly Bottem	
Project: Olalla Landfill		Project Number: [none]	
19I0438-08 A	HDPE NM, 250mL HNO3 (FF)	LD	P
19I0438-09 A	Small OJ, 500 mL		
19I0438-09 B	Corning Plastic, 125 mL, Na2S2O3		
19I0438-09 C	HDPE NM, 250mL H2SO4	LD	P
19I0438-09 D	HDPE NM, 250mL HNO3	LD	P
19I0438-09 E	Glass NM, Amber, 250 mL, 9N H2SO4	LD	P
19I0438-09 F	VOA Vial, Clear, 40 mL, HCL		
19I0438-09 G	VOA Vial, Clear, 40 mL, HCL		
19I0438-09 H	VOA Vial, Clear, 40 mL, HCL		
19I0438-10 A	HDPE NM, 250mL HNO3 (FF)	LD	P
19I0438-11 A	Small OJ, 500 mL		
19I0438-11 B	Corning Plastic, 125 mL, Na2S2O3		
19I0438-11 C	HDPE NM, 250mL H2SO4	LD	P
19I0438-11 D	HDPE NM, 250mL HNO3	LD	P
19I0438-11 E	Glass NM, Amber, 250 mL, 9N H2SO4	LD	P
19I0438-11 F	VOA Vial, Clear, 40 mL, HCL		
19I0438-11 G	VOA Vial, Clear, 40 mL, HCL		
19I0438-11 H	VOA Vial, Clear, 40 mL, HCL		
19I0438-12 A	HDPE NM, 250mL HNO3 (FF)	LD	P
19I0438-13 A	VOA Vial, Clear, 40 mL, HCL		
19I0438-13 B	VOA Vial, Clear, 40 mL, HCL		

JBW

Preservation Confirmed By

09/27/19

Date



Cooler Receipt Form

ARI Client: EPI

Project Name: Olalla Landfill

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 19I0438

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 0850 0.1°C

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO5206

Cooler Accepted by: JSC Date: 09/27/19 Time: 0850

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 9/25/19

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JSC Date: 09/27/19 Time: 0909 Labels checked by: JSC

**** 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:

By: _____ Date: _____



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW1-9/19
19I0438-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 09:33

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 18:48

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19I0438-01 F

Preparation Batch: BHI0836

Sample Size: 10 mL

Prepared: 27-Sep-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW1-9/19
19I0438-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 09:33

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 18:48

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW1-9/19
19I0438-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 09:33

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 18:48

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-120 %	113	%	
Surrogate: Toluene-d8		80-120 %	95.8	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	89.0	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.9	%	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 09/26/2019 09:33
Instrument: NT16 Analyst: PB	Analyzed: 10/02/2019 15:01
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19I0438-01 G
	Preparation Batch: BHJ0061 Sample Size: 10 mL
	Prepared: 02-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>114</i>	<i>%</i>	



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Reported:
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 09/26/2019 09:33
Instrument: ICP2 Analyst: TCH Analyzed: 10/10/2019 10:24
Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19I0438-01 D 01
Preparation Batch: BHJ0265 Sample Size: 25 mL
Prepared: 09-Oct-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	9.80	mg/L	
Potassium	7440-09-7	1	0.500	0.681	mg/L	
Sodium	7440-23-5	1	0.500	4.23	mg/L	



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Reported:
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Wet Chemistry

Method: EPA 325.2 Sampled: 09/26/2019 09:33
Instrument: TURB1 Analyst: DJM Analyzed: 10/08/2019 16:38

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-01 A
Preparation Batch: BHJ0220 Sample Size: 10 mL
Prepared: 08-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	3.78	mg/L	



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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 09/26/2019 09:33
Instrument: [CALC] Analyst: BF Analyzed: 10/07/2019 16:03

Sample Preparation: Preparation Method: [CALC] Extract ID: 19I0438-01
Preparation Batch: [CALC]
Prepared: 07-Oct-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.332	mg/L	

Instrument: LACHAT2 Analyst: BF Analyzed: 09/27/2019 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-01 A
Preparation Batch: BHI0844 Sample Size: 10 mL
Prepared: 27-Sep-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-01 E
Preparation Batch: BHJ0173 Sample Size: 10 mL
Prepared: 07-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.332	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Wet Chemistry

Method: EPA 375.2	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 09:33
Instrument: LACHAT1 Analyst: DJM	Preparation Batch: BHJ0007	Analyzed: 10/02/2019 13:03
Sample Preparation:	Prepared: 01-Oct-2019	Extract ID: 19I0438-01 A
	Sample Size: 10 mL	
	Final Volume: 10 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	4.86	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Wet Chemistry

Method: EPA 410.4	Instrument: UV1800-2	Analyst: WCW	Sampled: 09/26/2019 09:33	Analyzed: 10/03/2019 12:55
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHJ0090	Sample Size: 2 mL	Extract ID: 19I0438-01 E
	Prepared: 03-Oct-2019		Final Volume: 2 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 09:33
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHI0843	Analyzed: 09/28/2019 14:24
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-01 E
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	ND	mg/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 09/26/2019 09:33
Instrument: TURB1 Analyst: UW Analyzed: 09/27/2019 11:29

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-01 A
Preparation Batch: BHI0828 Sample Size: 100 mL
Prepared: 27-Sep-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	46.9	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	46.9	mg/L CaCO3	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Sampled: 09/26/2019 09:33
Instrument: TURB1 Analyst: UW	Analyzed: 09/27/2019 11:15
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHI0831
	Prepared: 27-Sep-2019
	Sample Size: 50 mL
	Final Volume: 50 mL
	Extract ID: 19I0438-01 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.14	pH Units	H



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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 09/26/2019 09:33
Instrument: LACHAT2 Analyst: BF	Analyzed: 10/04/2019 15:12
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHJ0135
	Prepared: 04-Oct-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19I0438-01 E

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-01 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 09:33
Instrument: N/A Analyst: UW	Preparation Batch: BHI0823	Analyzed: 09/28/2019 09:40
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-01
	Sample Size: 100 mL	
	Final Volume: 100 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 09/26/2019 09:33
Instrument: ICPMS1 Analyst: TCH	Analyzed: 10/10/2019 11:26
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19I0438-02 A 02
Preparation Batch: BHJ0217	Sample Size: 25 mL
Prepared: 08-Oct-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	2	40.0	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 09:33
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/09/2019 23:40
Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19I0438-02 A 03
Preparation Batch: BHJ0256	Sample Size: 100 mL
Prepared: 09-Oct-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.0876	ug/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Preparation Method: WMN (No Prep)	Sample Size: 25 mL	Sampled: 09/26/2019 09:33
Instrument: ICP2 Analyst: TCH	Preparation Batch: BHJ0192	Final Volume: 25 mL	Analyzed: 10/08/2019 09:25
Sample Preparation:	Prepared: 07-Oct-2019	Extract ID: 19I0438-02 A 01	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0040	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW1-9/19
19I0438-02RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 09:33
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/23/2019 17:56
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BHJ0654
	Prepared: 22-Oct-2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19I0438-02RE1 A 04

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW3-9/19
19I0438-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 11:03

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 19:13

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19I0438-03 F

Preparation Batch: BHI0836

Sample Size: 10 mL

Prepared: 27-Sep-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW3-9/19
19I0438-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 11:03

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 19:13

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
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Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW3-9/19
19I0438-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 11:03

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 19:13

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-120 %	113	%	
Surrogate: Toluene-d8		80-120 %	95.7	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	89.6	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	100	%	



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Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW3-9/19
19I0438-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 09/26/2019 11:03
Instrument: NT16 Analyst: PB	Analyzed: 10/02/2019 15:22
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19I0438-03 G
	Preparation Batch: BHJ0061 Sample Size: 10 mL
	Prepared: 02-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>117</i>	<i>%</i>	



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1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW3-9/19
19I0438-03 (Water)

Metals and Metallic Compounds

Method: EPA 6010C

Sampled: 09/26/2019 11:03

Instrument: ICP2 Analyst: TCH

Analyzed: 10/10/2019 10:29

Sample Preparation:

Preparation Method: TWC EPA 3010A

Extract ID: 19I0438-03 D 01

Preparation Batch: BHJ0265

Sample Size: 25 mL

Prepared: 09-Oct-2019

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	40.1	mg/L	
Potassium	7440-09-7	1	0.500	0.918	mg/L	
Sodium	7440-23-5	1	0.500	8.77	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW3-9/19
19I0438-03 (Water)

Wet Chemistry

Method: EPA 325.2	Instrument: TURB1	Analyst: DJM	Sampled: 09/26/2019 11:03	Analyzed: 10/08/2019 16:41
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHJ0220	Sample Size: 10 mL	Final Volume: 10 mL
	Prepared: 08-Oct-2019			Extract ID: 19I0438-03 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	2.26	mg/L	



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Olalla-GW-MW3-9/19
19I0438-03 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 09/26/2019 11:03
Instrument: [CALC] Analyst: BF Analyzed: 10/07/2019 16:04

Sample Preparation: Preparation Method: [CALC] Extract ID: 19I0438-03
Preparation Batch: [CALC]
Prepared: 07-Oct-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT2 Analyst: BF Analyzed: 09/27/2019 15:59

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-03 A
Preparation Batch: BHI0844 Sample Size: 10 mL
Prepared: 27-Sep-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-03 E
Preparation Batch: BHJ0173 Sample Size: 10 mL
Prepared: 07-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW3-9/19
19I0438-03 (Water)

Wet Chemistry

Method: EPA 375.2

Sampled: 09/26/2019 11:03

Instrument: LACHAT1 Analyst: DJM

Analyzed: 10/02/2019 13:04

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19I0438-03 A

Preparation Batch: BHJ0007

Sample Size: 10 mL

Prepared: 01-Oct-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	21.0	mg/L	



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Olalla-GW-MW3-9/19
19I0438-03 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem		Sampled: 09/26/2019 11:03
Instrument: UV1800-2 Analyst: WCW	Preparation Batch: BHJ0090	Sample Size: 2 mL	Analyzed: 10/03/2019 12:56
Sample Preparation:	Prepared: 03-Oct-2019	Final Volume: 2 mL	Extract ID: 19I0438-03 E

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Olalla-GW-MW3-9/19
19I0438-03 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 11:03
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHI0843	Analyzed: 09/28/2019 14:46
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-03 E
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.36	mg/L	



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Olalla-GW-MW3-9/19
19I0438-03 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 09/26/2019 11:03
Instrument: TURB1 Analyst: UW Analyzed: 09/27/2019 11:29
Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-03 A
Preparation Batch: BHI0828 Sample Size: 100 mL
Prepared: 27-Sep-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	188	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	188	mg/L CaCO3	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW3-9/19
19I0438-03 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 11:03
Instrument: TURB1 Analyst: UW	Preparation Batch: BHI0831	Analyzed: 09/27/2019 11:15
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-03 A
	Sample Size: 50 mL	
	Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.14	pH Units	H



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW3-9/19
19I0438-03 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 09/26/2019 11:03
Instrument: LACHAT2 Analyst: BF	Analyzed: 10/04/2019 15:13
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHJ0135
	Prepared: 04-Oct-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19I0438-03 E

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW3-9/19
19I0438-03 (Water)

Microbiology

Method: SM 9222B Sampled: 09/26/2019 11:03
Instrument: N/A Analyst: UW Analyzed: 09/28/2019 09:40

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-03
Preparation Batch: BHI0823 Sample Size: 100 mL
Prepared: 27-Sep-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW3-9/19
19I0438-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 09/26/2019 11:03
Instrument: ICPMS1 Analyst: TCH	Analyzed: 10/10/2019 10:45
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19I0438-04 A 02
Preparation Batch: BHJ0217	Sample Size: 25 mL
Prepared: 08-Oct-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW3-9/19
19I0438-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 11:03
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/09/2019 23:46
Sample Preparation:	Extract ID: 19I0438-04 A 03
Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	
Preparation Batch: BHJ0256	Sample Size: 100 mL
Prepared: 09-Oct-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.100	ug/L	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW3-9/19
19I0438-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 09/26/2019 11:03
Instrument: ICP2 Analyst: TCH Analyzed: 10/08/2019 09:32
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19I0438-04 A 01
Preparation Batch: BHJ0192 Sample Size: 25 mL
Prepared: 07-Oct-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0155	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	6.13	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW3-9/19
19I0438-04RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 11:03
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/28/2019 15:21
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BHJ0654
	Prepared: 22-Oct-2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19I0438-04RE1 A 04

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW10-9/19
19I0438-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 12:11

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 19:39

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19I0438-05 G

Preparation Batch: BHI0836

Sample Size: 10 mL

Prepared: 27-Sep-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW10-9/19
19I0438-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 12:11

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 19:39

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW10-9/19
19I0438-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 12:11

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 19:39

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	115	%	
Surrogate: Toluene-d8		80-120 %	95.1	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	89.6	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	97.6	%	



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Reported:
04-Nov-2019 14:50

Olalla-GW-MW10-9/19
19I0438-05 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM

Sampled: 09/26/2019 12:11

Instrument: NT16 Analyst: PB

Analyzed: 10/02/2019 15:42

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19I0438-05 H

Preparation Batch: BHJ0061

Sample Size: 10 mL

Prepared: 02-Oct-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>115</i>	<i>%</i>	



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Reported:
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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Metals and Metallic Compounds

Method: EPA 6010C

Sampled: 09/26/2019 12:11

Instrument: ICP2 Analyst: TCH

Analyzed: 10/10/2019 10:34

Sample Preparation:

Preparation Method: TWC EPA 3010A

Extract ID: 19I0438-05 D 01

Preparation Batch: BHJ0265

Sample Size: 25 mL

Prepared: 09-Oct-2019

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	33.3	mg/L	
Potassium	7440-09-7	1	0.500	1.23	mg/L	
Sodium	7440-23-5	1	0.500	12.7	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Wet Chemistry

Method: EPA 325.2	Preparation Method: No Prep Wet Chem		Sampled: 09/26/2019 12:11
Instrument: TURB1 Analyst: DJM	Preparation Batch: BHJ0220	Sample Size: 10 mL	Analyzed: 10/08/2019 16:43
Sample Preparation:	Prepared: 08-Oct-2019	Final Volume: 10 mL	Extract ID: 19I0438-05 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	6.35	mg/L	



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Reported:
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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 09/26/2019 12:11
Instrument: [CALC] Analyst: BF Analyzed: 10/07/2019 16:05

Sample Preparation: Preparation Method: [CALC] Extract ID: 19I0438-05
Preparation Batch: [CALC]
Prepared: 07-Oct-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LCHAT2 Analyst: BF Analyzed: 09/27/2019 16:00

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-05 A
Preparation Batch: BHI0844 Sample Size: 10 mL
Prepared: 27-Sep-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-05 E
Preparation Batch: BHJ0173 Sample Size: 10 mL
Prepared: 07-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Wet Chemistry

Method: EPA 375.2	Instrument: LACHAT1	Analyst: DJM	Sampled: 09/26/2019 12:11	Analyzed: 10/02/2019 13:05
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHJ0007	Sample Size: 10 mL	Final Volume: 10 mL
	Prepared: 01-Oct-2019		Extract ID: 19I0438-05 A	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	8.05	mg/L	



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Reported:
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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Wet Chemistry

Method: EPA 410.4

Sampled: 09/26/2019 12:11

Instrument: UV1800-2 Analyst: WCW

Analyzed: 10/03/2019 12:56

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19I0438-05 E

Preparation Batch: BHJ0090

Sample Size: 2 mL

Prepared: 03-Oct-2019

Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 12:11
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHI0843	Analyzed: 09/28/2019 15:05
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-05 E
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.84	mg/L	



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Reported:
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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 09/26/2019 12:11
Instrument: TURB1 Analyst: UW Analyzed: 09/27/2019 11:29

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-05 A
Preparation Batch: BHI0828 Sample Size: 50 mL
Prepared: 27-Sep-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	186	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	186	mg/L CaCO3	



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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sample Size: 50 mL	Sampled: 09/26/2019 12:11
Instrument: TURB1 Analyst: UW	Preparation Batch: BHI0831	Final Volume: 50 mL	Analyzed: 09/27/2019 11:15
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-05 A	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.69	pH Units	H



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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Instrument: LACHAT2 Analyst: BF	Sampled: 09/26/2019 12:11	Analyzed: 10/04/2019 15:14
Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Extract ID: 19I0438-05 E
	Preparation Batch: BHJ0135	Final Volume: 10 mL	
	Prepared: 04-Oct-2019		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.076	mg/L	



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Olalla-GW-MW10-9/19
19I0438-05 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 09/26/2019 12:11
Instrument: N/A Analyst: UW	Preparation Batch: BHI0823	Final Volume: 100 mL	Analyzed: 09/28/2019 09:40
Sample Preparation:	Prepared: 27-Sep-2019		Extract ID: 19I0438-05

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-GW-MW10-9/19
19I0438-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 09/26/2019 12:11
Instrument: ICPMS1 Analyst: TCH	Analyzed: 10/10/2019 11:28
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19I0438-06 A 02
Preparation Batch: BHJ0217	Sample Size: 25 mL
Prepared: 08-Oct-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	2	40.0	ND	ug/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW10-9/19
19I0438-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 12:11
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/09/2019 23:52
Sample Preparation:	Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x
	Preparation Batch: BHJ0256
	Sample Size: 100 mL
	Prepared: 09-Oct-2019
	Final Volume: 20 mL
	Extract ID: 19I0438-06 A 03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	1.72	ug/L	



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1180 NW Maple St., Suite 310
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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW10-9/19
19I0438-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 09/26/2019 12:11
Instrument: ICP2 Analyst: TCH Analyzed: 10/08/2019 09:38
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19I0438-06 A 01
Preparation Batch: BHJ0192 Sample Size: 25 mL
Prepared: 07-Oct-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0141	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	3.87	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW10-9/19
19I0438-06RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 12:11
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/23/2019 18:04
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BHJ0654
	Prepared: 22-Oct-2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19I0438-06RE1 A 04

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	19.0	ug/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 13:32

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:05

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19I0438-07 G

Preparation Batch: BHI0836

Sample Size: 10 mL

Prepared: 27-Sep-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW6-9/19
19I0438-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 13:32

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:05

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	2.80	ug/L	
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW6-9/19
19I0438-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 13:32

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:05

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	116	%	
Surrogate: Toluene-d8		80-120 %	94.1	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	90.3	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.9	%	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 09/26/2019 13:32
Instrument: NT16 Analyst: PB	Analyzed: 10/02/2019 16:02
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19I0438-07 H
	Preparation Batch: BHJ0061 Sample Size: 10 mL
	Prepared: 02-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	21.8	ng/L	
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>116</i>	<i>%</i>	



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 09/26/2019 13:32
Instrument: ICP2 Analyst: TCH Analyzed: 10/10/2019 10:39

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19I0438-07 D 01
Preparation Batch: BHJ0265 Sample Size: 25 mL
Prepared: 09-Oct-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	36.9	mg/L	
Potassium	7440-09-7	1	0.500	1.58	mg/L	
Sodium	7440-23-5	1	0.500	11.1	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW6-9/19
19I0438-07 (Water)

Wet Chemistry

Method: EPA 325.2 Sampled: 09/26/2019 13:32
Instrument: TURB1 Analyst: DJM Analyzed: 10/08/2019 16:50

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-07 A
Preparation Batch: BHJ0220 Sample Size: 10 mL
Prepared: 08-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	2.84	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 09/26/2019 13:32
Instrument: [CALC] Analyst: BF Analyzed: 10/07/2019 16:06

Sample Preparation: Preparation Method: [CALC] Extract ID: 19I0438-07
Preparation Batch: [CALC]
Prepared: 07-Oct-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT2 Analyst: BF Analyzed: 09/27/2019 16:02

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-07 A
Preparation Batch: BHI0844 Sample Size: 10 mL
Prepared: 27-Sep-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-07 E
Preparation Batch: BHJ0173 Sample Size: 10 mL
Prepared: 07-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Wet Chemistry

Method: EPA 375.2	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 13:32
Instrument: LACHAT1 Analyst: DJM	Preparation Batch: BHJ0007	Analyzed: 10/02/2019 13:06
Sample Preparation:	Prepared: 01-Oct-2019	Extract ID: 19I0438-07 A
	Sample Size: 10 mL	
	Final Volume: 10 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	8.47	mg/L	



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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Wet Chemistry

Method: EPA 410.4	Sampled: 09/26/2019 13:32
Instrument: UV1800-2 Analyst: WCW	Analyzed: 10/03/2019 12:56
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHJ0090
	Prepared: 03-Oct-2019
	Sample Size: 2 mL
	Final Volume: 2 mL
	Extract ID: 19I0438-07 E

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Wet Chemistry

Method: EPA 9060A	Sampled: 09/26/2019 13:32
Instrument: TOC-LCSH Analyst: BF	Analyzed: 09/28/2019 15:23
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHI0843
	Prepared: 27-Sep-2019
	Sample Size: 20 mL
	Final Volume: 20 mL
	Extract ID: 19I0438-07 E

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.10	mg/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW6-9/19
19I0438-07 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 09/26/2019 13:32
Instrument: TURB1 Analyst: UW Analyzed: 09/27/2019 11:29

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-07 A
Preparation Batch: BHI0828 Sample Size: 50 mL
Prepared: 27-Sep-2019 Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	193	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	193	mg/L CaCO3	



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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 13:32
Instrument: TURB1 Analyst: UW	Preparation Batch: BHI0831	Analyzed: 09/27/2019 11:15
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-07 A
	Sample Size: 50 mL	
	Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.45	pH Units	H



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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 09/26/2019 13:32
Instrument: LACHAT2 Analyst: BF	Analyzed: 10/04/2019 15:16
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHJ0135
	Prepared: 04-Oct-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19I0438-07 E

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.056	mg/L	



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Olalla-GW-MW6-9/19
19I0438-07 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 09/26/2019 13:32
Instrument: N/A Analyst: UW	Preparation Batch: BHI0823	Final Volume: 100 mL	Analyzed: 09/28/2019 09:40
Sample Preparation:	Prepared: 27-Sep-2019		Extract ID: 19I0438-07

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-GW-MW6-9/19
19I0438-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 09/26/2019 13:32
Instrument: ICPMS1 Analyst: TCH	Analyzed: 10/10/2019 11:30
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19I0438-08 A 02
Preparation Batch: BHJ0217	Sample Size: 25 mL
Prepared: 08-Oct-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	2	40.0	946	ug/L	D



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Olalla-GW-MW6-9/19
19I0438-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 13:32
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/09/2019 23:58
Sample Preparation:	Extract ID: 19I0438-08 A 03
Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	
Preparation Batch: BHJ0256	Sample Size: 100 mL
Prepared: 09-Oct-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.999	ug/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW6-9/19
19I0438-08 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Preparation Method: WMN (No Prep)	Sample Size: 25 mL	Sampled: 09/26/2019 13:32
Instrument: ICP2 Analyst: TCH	Preparation Batch: BHJ0192	Final Volume: 25 mL	Analyzed: 10/08/2019 09:45
Sample Preparation:	Prepared: 07-Oct-2019	Extract ID: 19I0438-08 A 01	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0183	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	0.859	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW6-9/19
19I0438-08RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 13:32
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/23/2019 18:08
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BHJ0654
	Prepared: 22-Oct-2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19I0438-08RE1 A 04

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	6.23	ug/L	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW8-9/19
19I0438-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 14:28

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:30

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19I0438-09 F

Preparation Batch: BHI0836

Sample Size: 10 mL

Prepared: 27-Sep-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW8-9/19
19I0438-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 14:28

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:30

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW8-9/19
19I0438-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 14:28

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:30

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	113	%	
Surrogate: Toluene-d8		80-120 %	95.3	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	88.1	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	100	%	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW8-9/19
19I0438-09 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM Sampled: 09/26/2019 14:28
Instrument: NT16 Analyst: PB Analyzed: 10/02/2019 16:22
Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19I0438-09 G
Preparation Batch: BHJ0061 Sample Size: 10 mL
Prepared: 02-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>116</i>	<i>%</i>	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Olalla-GW-MW8-9/19
19I0438-09 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 09/26/2019 14:28
Instrument: ICP2 Analyst: TCH Analyzed: 10/10/2019 10:44
Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19I0438-09 D 01
Preparation Batch: BHJ0265 Sample Size: 25 mL
Prepared: 09-Oct-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	14.9	mg/L	
Potassium	7440-09-7	1	0.500	0.992	mg/L	
Sodium	7440-23-5	1	0.500	6.87	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Wet Chemistry

Method: EPA 325.2	Instrument: TURB1	Analyst: DJM	Sampled: 09/26/2019 14:28	Analyzed: 10/08/2019 16:51
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHJ0220	Sample Size: 10 mL	Final Volume: 10 mL
	Prepared: 08-Oct-2019		Extract ID: 19I0438-09 A	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	2.53	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 09/26/2019 14:28
Instrument: [CALC] Analyst: BF Analyzed: 10/07/2019 16:08

Sample Preparation: Preparation Method: [CALC] Extract ID: 19I0438-09
Preparation Batch: [CALC]
Prepared: 07-Oct-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.0339	mg/L	

Instrument: LACHAT2 Analyst: BF Analyzed: 09/27/2019 16:09

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-09 A
Preparation Batch: BHI0844 Sample Size: 10 mL
Prepared: 27-Sep-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-09 E
Preparation Batch: BHJ0173 Sample Size: 10 mL
Prepared: 07-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.034	mg/L	



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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Wet Chemistry

Method: EPA 375.2	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 14:28
Instrument: LACHAT1 Analyst: DJM	Preparation Batch: BHJ0007	Analyzed: 10/02/2019 13:08
Sample Preparation:	Prepared: 01-Oct-2019	Extract ID: 19I0438-09 A
	Sample Size: 10 mL	
	Final Volume: 10 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	4.53	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Wet Chemistry

Method: EPA 410.4 Sampled: 09/26/2019 14:28
Instrument: UV1800-2 Analyst: WCW Analyzed: 10/03/2019 12:56

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-09 E
Preparation Batch: BHJ0090 Sample Size: 2 mL
Prepared: 03-Oct-2019 Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Wet Chemistry

Method: EPA 9060A	Sampled: 09/26/2019 14:28
Instrument: TOC-LCSH Analyst: BF	Analyzed: 09/28/2019 15:49
Sample Preparation: Preparation Method: No Prep Wet Chem	Extract ID: 19I0438-09 E
Preparation Batch: BHI0843	Sample Size: 20 mL
Prepared: 27-Sep-2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.56	mg/L	



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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Wet Chemistry

Method: SM 2320 B-97	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 14:28
Instrument: TURB1 Analyst: UW	Preparation Batch: BHI0828	Analyzed: 09/27/2019 11:29
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-09 A
	Sample Size: 100 mL	
	Final Volume: 100 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	87.0	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	87.0	mg/L CaCO3	



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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Sampled: 09/26/2019 14:28
Instrument: TURB1 Analyst: UW	Analyzed: 09/27/2019 11:15
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHI0831
	Prepared: 27-Sep-2019
	Sample Size: 50 mL
	Final Volume: 50 mL
	Extract ID: 19I0438-09 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.30	pH Units	H



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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 09/26/2019 14:28
Instrument: LACHAT2 Analyst: BF	Analyzed: 10/04/2019 15:17
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHJ0135
	Prepared: 04-Oct-2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19I0438-09 E

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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Olalla-GW-MW8-9/19
19I0438-09 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 09/26/2019 14:28
Instrument: N/A Analyst: UW	Preparation Batch: BHI0823	Final Volume: 100 mL	Analyzed: 09/28/2019 09:40
Sample Preparation:	Prepared: 27-Sep-2019		Extract ID: 19I0438-09

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-GW-MW8-9/19
19I0438-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 09/26/2019 14:28
Instrument: ICPMS1 Analyst: TCH	Analyzed: 10/10/2019 11:32
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19I0438-10 A 02
Preparation Batch: BHJ0217	Sample Size: 25 mL
Prepared: 08-Oct-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	2	40.0	197	ug/L	D



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW8-9/19
19I0438-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 14:28
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/10/2019 00:04
Sample Preparation:	Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x
	Preparation Batch: BHJ0256
	Sample Size: 100 mL
	Prepared: 09-Oct-2019
	Final Volume: 20 mL
	Extract ID: 19I0438-10 A 03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.869	ug/L	



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Olalla-GW-MW8-9/19
19I0438-10 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Preparation Method: WMN (No Prep)		Sampled: 09/26/2019 14:28
Instrument: ICP2 Analyst: TCH	Preparation Batch: BHJ0192	Sample Size: 25 mL	Analyzed: 10/08/2019 09:51
Sample Preparation:	Prepared: 07-Oct-2019	Final Volume: 25 mL	Extract ID: 19I0438-10 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0060	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	2.65	mg/L	



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Olalla-GW-MW8-9/19
19I0438-10RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 14:28
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/23/2019 18:12
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BHJ0654
	Prepared: 22-Oct-2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19I0438-10RE1 A 04

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	18.0	ug/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 00:00

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:55

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19I0438-11 F

Preparation Batch: BHI0836

Sample Size: 10 mL

Prepared: 27-Sep-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 00:00

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:55

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 00:00

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 20:55

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-120 %	113	%	
Surrogate: Toluene-d8		80-120 %	92.6	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	89.5	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	96.8	%	



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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 09/26/2019 00:00
Instrument: NT16 Analyst: PB	Analyzed: 10/02/2019 16:43
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19I0438-11 G
	Preparation Batch: BHJ0061 Sample Size: 10 mL
	Prepared: 02-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>115</i>	<i>%</i>	



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 09/26/2019 00:00
Instrument: ICP2 Analyst: TCH Analyzed: 10/10/2019 10:49
Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19I0438-11 D 01
Preparation Batch: BHJ0265 Sample Size: 25 mL
Prepared: 09-Oct-2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	15.4	mg/L	
Potassium	7440-09-7	1	0.500	0.987	mg/L	
Sodium	7440-23-5	1	0.500	7.03	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Wet Chemistry

Method: EPA 325.2	Preparation Method: No Prep Wet Chem		Sampled: 09/26/2019 00:00
Instrument: TURB1 Analyst: DJM	Preparation Batch: BHJ0220	Sample Size: 10 mL	Analyzed: 10/08/2019 16:53
Sample Preparation:	Prepared: 08-Oct-2019	Final Volume: 10 mL	Extract ID: 19I0438-11 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	2.55	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 09/26/2019 00:00
Instrument: [CALC] Analyst: BF Analyzed: 10/07/2019 16:09

Sample Preparation: Preparation Method: [CALC] Extract ID: 19I0438-11
Preparation Batch: [CALC]
Prepared: 07-Oct-2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.0307	mg/L	

Instrument: LACHAT2 Analyst: BF Analyzed: 09/27/2019 16:11

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-11 A
Preparation Batch: BHI0844 Sample Size: 10 mL
Prepared: 27-Sep-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-11 E
Preparation Batch: BHJ0173 Sample Size: 10 mL
Prepared: 07-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.031	mg/L	



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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Wet Chemistry

Method: EPA 375.2	Instrument: LACHAT1	Analyst: DJM	Sampled: 09/26/2019 00:00	Analyzed: 10/02/2019 13:09
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHJ0007	Sample Size: 10 mL	Final Volume: 10 mL
	Prepared: 01-Oct-2019			Extract ID: 19I0438-11 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	4.87	mg/L	



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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem		Sampled: 09/26/2019 00:00
Instrument: UV1800-2 Analyst: WCW	Preparation Batch: BHJ0090	Sample Size: 2 mL	Analyzed: 10/03/2019 12:57
Sample Preparation:	Prepared: 03-Oct-2019	Final Volume: 2 mL	Extract ID: 19I0438-11 E

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 00:00
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHI0843	Analyzed: 09/28/2019 16:10
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-11 E
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.55	mg/L	



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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 09/26/2019 00:00
Instrument: TURB1 Analyst: UW Analyzed: 09/27/2019 11:29

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19I0438-11 A
Preparation Batch: BHI0828 Sample Size: 100 mL
Prepared: 27-Sep-2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	88.4	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	88.4	mg/L CaCO3	



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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Sampled: 09/26/2019 00:00
Instrument: TURB1 Analyst: UW	Analyzed: 09/27/2019 11:15
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHI0831
	Prepared: 27-Sep-2019
	Sample Size: 50 mL
	Final Volume: 50 mL
	Extract ID: 19I0438-11 A

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.33	pH Units	H



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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Instrument: LACHAT2 Analyst: BF	Sampled: 09/26/2019 00:00	Analyzed: 10/04/2019 15:18
Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Extract ID: 19I0438-11 E
	Preparation Batch: BHJ0135	Final Volume: 10 mL	
	Prepared: 04-Oct-2019		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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Olalla-GW-MW12-9/19
19I0438-11 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sampled: 09/26/2019 00:00
Instrument: N/A Analyst: UW	Preparation Batch: BHI0823	Analyzed: 09/28/2019 09:40
Sample Preparation:	Prepared: 27-Sep-2019	Extract ID: 19I0438-11
	Sample Size: 100 mL	
	Final Volume: 100 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-GW-MW12-9/19
19I0438-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 09/26/2019 00:00
Instrument: ICPMS1 Analyst: TCH	Analyzed: 10/10/2019 11:33
Sample Preparation:	Extract ID: 19I0438-12 A 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BHJ0217	Sample Size: 25 mL
Prepared: 08-Oct-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	2	40.0	191	ug/L	D



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Olalla-GW-MW12-9/19
19I0438-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 00:00
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/10/2019 00:10
Sample Preparation:	Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x
	Preparation Batch: BHJ0256
	Sample Size: 100 mL
	Prepared: 09-Oct-2019
	Final Volume: 20 mL
	Extract ID: 19I0438-12 A 03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.803	ug/L	



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Olalla-GW-MW12-9/19
19I0438-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Sampled: 09/26/2019 00:00
Instrument: ICP2 Analyst: TCH	Analyzed: 10/08/2019 09:58
Sample Preparation: Preparation Method: WMN (No Prep)	Extract ID: 19I0438-12 A 01
Preparation Batch: BHJ0192	Sample Size: 25 mL
Prepared: 07-Oct-2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0066	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	2.69	mg/L	



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Olalla-GW-MW12-9/19
19I0438-12RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 09/26/2019 00:00
Instrument: ICPMS2 Analyst: MCB	Analyzed: 10/23/2019 18:16
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BHJ0654
	Prepared: 22-Oct-2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19I0438-12RE1 A 04

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U



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Project Manager: Doug Kunkel

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Trip Blank
19I0438-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 09:33

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 14:08

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19I0438-13 A

Preparation Batch: BHI0836

Sample Size: 10 mL

Prepared: 27-Sep-2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project Manager: Doug Kunkel

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Trip Blank
19I0438-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 09:33

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 14:08

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Trip Blank
19I0438-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 09/26/2019 09:33

Instrument: NT7 Analyst: PKC

Analyzed: 09/27/2019 14:08

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	105	%	
Surrogate: Toluene-d8		80-120 %	95.9	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	90.1	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	97.4	%	



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Project Number: [none]
Project Manager: Doug Kunkel

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Trip Blank
19I0438-13 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM Sampled: 09/26/2019 09:33
Instrument: NT16 Analyst: PB Analyzed: 10/02/2019 17:03
Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19I0438-13 B
Preparation Batch: BHJ0061 Sample Size: 10 mL
Prepared: 02-Oct-2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>117</i>	<i>%</i>	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHI0836 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0836-BLK1)		Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 13:17								
Chloromethane	ND	0.50	ug/L							U
Vinyl Chloride	ND	0.20	ug/L							U
Bromomethane	ND	1.00	ug/L							U
Chloroethane	ND	0.20	ug/L							U
Trichlorofluoromethane	ND	0.20	ug/L							U
Acrolein	ND	5.00	ug/L							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.20	ug/L							U
Acetone	ND	5.00	ug/L							U
1,1-Dichloroethene	ND	0.20	ug/L							U
Bromoethane	ND	0.20	ug/L							U
Iodomethane	ND	1.00	ug/L							U
Methylene Chloride	ND	1.00	ug/L							U
Acrylonitrile	ND	1.00	ug/L							U
Carbon Disulfide	ND	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.20	ug/L							U
Vinyl Acetate	ND	0.20	ug/L							U
1,1-Dichloroethane	ND	0.20	ug/L							U
2-Butanone	ND	5.00	ug/L							U
2,2-Dichloropropane	ND	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Chloroform	ND	0.20	ug/L							U
Bromochloromethane	ND	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.20	ug/L							U
1,1-Dichloropropene	ND	0.20	ug/L							U
Carbon tetrachloride	ND	0.20	ug/L							U
1,2-Dichloroethane	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
1,2-Dichloropropane	ND	0.20	ug/L							U
Bromodichloromethane	ND	0.20	ug/L							U
Dibromomethane	ND	0.20	ug/L							U
2-Chloroethyl vinyl ether	ND	1.00	ug/L							U
4-Methyl-2-Pentanone	ND	5.00	ug/L							U
cis-1,3-Dichloropropene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHI0836 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0836-BLK1)		Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 13:17								
trans-1,3-Dichloropropene	ND	0.20	ug/L							U
2-Hexanone	ND	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.20	ug/L							U
1,3-Dichloropropane	ND	0.20	ug/L							U
Tetrachloroethene	ND	0.20	ug/L							U
Dibromochloromethane	ND	0.20	ug/L							U
1,2-Dibromoethane	ND	0.20	ug/L							U
Chlorobenzene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
Xylenes, total	ND	0.60	ug/L							U
Styrene	ND	0.20	ug/L							U
Bromoform	ND	0.20	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.20	ug/L							U
1,2,3-Trichloropropane	ND	0.50	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	1.00	ug/L							U
n-Propylbenzene	ND	0.20	ug/L							U
Bromobenzene	ND	0.20	ug/L							U
Isopropyl Benzene	ND	0.20	ug/L							U
2-Chlorotoluene	ND	0.20	ug/L							U
4-Chlorotoluene	ND	0.20	ug/L							U
t-Butylbenzene	ND	0.20	ug/L							U
1,3,5-Trimethylbenzene	ND	0.20	ug/L							U
1,2,4-Trimethylbenzene	ND	0.20	ug/L							U
s-Butylbenzene	ND	0.20	ug/L							U
4-Isopropyl Toluene	ND	0.20	ug/L							U
1,3-Dichlorobenzene	ND	0.20	ug/L							U
1,4-Dichlorobenzene	ND	0.20	ug/L							U
n-Butylbenzene	ND	0.20	ug/L							U
1,2-Dichlorobenzene	ND	0.20	ug/L							U
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L							U
1,2,4-Trichlorobenzene	ND	0.50	ug/L							U
Hexachloro-1,3-Butadiene	ND	0.50	ug/L							U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Volatile Organic Compounds - Quality Control

Batch BHI0836 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0836-BLK1)										
					Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 13:17					
Naphthalene	ND	0.50	ug/L							U
1,2,3-Trichlorobenzene	ND	0.50	ug/L							U
Dichlorodifluoromethane	ND	0.20	ug/L							U
Methyl tert-butyl Ether	ND	0.50	ug/L							U
2-Pentanone	ND	5.00	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.25		ug/L	5.00		105	80-129			
<i>Surrogate: Toluene-d8</i>	4.75		ug/L	5.00		95.0	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.59		ug/L	5.00		91.9	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.93		ug/L	5.00		98.5	80-120			
LCS (BHI0836-BS1)										
					Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 12:26					
Chloromethane	11.4	0.50	ug/L	10.0		114	60-138			
Vinyl Chloride	9.95	0.20	ug/L	10.0		99.5	66-133			
Bromomethane	9.53	1.00	ug/L	10.0		95.3	72-131			
Chloroethane	10.4	0.20	ug/L	10.0		104	60-155			
Trichlorofluoromethane	10.2	0.20	ug/L	10.0		102	80-129			
Acrolein	42.3	5.00	ug/L	50.0		84.5	52-144			
1,1,2-Trichloro-1,2,2-Trifluoroethane	10.7	0.20	ug/L	10.0		107	76-129			
Acetone	49.7	5.00	ug/L	50.0		99.3	58-142			
1,1-Dichloroethene	10.7	0.20	ug/L	10.0		107	69-135			
Bromoethane	11.0	0.20	ug/L	10.0		110	78-128			
Iodomethane	18.0	1.00	ug/L	10.0		180	56-147			*, Q
Methylene Chloride	11.6	1.00	ug/L	10.0		116	65-135			
Acrylonitrile	9.79	1.00	ug/L	10.0		97.9	64-134			
Carbon Disulfide	10.8	0.20	ug/L	10.0		108	78-125			
trans-1,2-Dichloroethene	10.2	0.20	ug/L	10.0		102	78-128			
Vinyl Acetate	10.5	0.20	ug/L	10.0		105	55-138			
1,1-Dichloroethane	10.6	0.20	ug/L	10.0		106	76-124			
2-Butanone	48.5	5.00	ug/L	50.0		97.0	61-140			
2,2-Dichloropropane	10.8	0.20	ug/L	10.0		108	78-125			
cis-1,2-Dichloroethene	10.5	0.20	ug/L	10.0		105	80-121			
Chloroform	9.59	0.20	ug/L	10.0		95.9	80-122			
Bromochloromethane	8.32	0.20	ug/L	10.0		83.2	80-121			
1,1,1-Trichloroethane	10.7	0.20	ug/L	10.0		107	79-123			
1,1-Dichloropropene	10.2	0.20	ug/L	10.0		102	80-120			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Volatile Organic Compounds - Quality Control

Batch BHI0836 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHI0836-BS1)		Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 12:26								
Carbon tetrachloride	10.1	0.20	ug/L	10.0		101	53-137			
1,2-Dichloroethane	9.80	0.20	ug/L	10.0		98.0	75-123			
Benzene	10.4	0.20	ug/L	10.0		104	80-120			
Trichloroethene	9.84	0.20	ug/L	10.0		98.4	80-120			
1,2-Dichloropropane	10.1	0.20	ug/L	10.0		101	80-120			
Bromodichloromethane	10.7	0.20	ug/L	10.0		107	80-121			
Dibromomethane	9.72	0.20	ug/L	10.0		97.2	80-120			
2-Chloroethyl vinyl ether	10.5	1.00	ug/L	10.0		105	74-127			
4-Methyl-2-Pentanone	47.1	5.00	ug/L	50.0		94.3	67-133			
cis-1,3-Dichloropropene	11.4	0.20	ug/L	10.0		114	80-124			
Toluene	9.99	0.20	ug/L	10.0		99.9	80-120			
trans-1,3-Dichloropropene	11.5	0.20	ug/L	10.0		115	71-127			
2-Hexanone	50.1	5.00	ug/L	50.0		100	69-133			
1,1,2-Trichloroethane	9.54	0.20	ug/L	10.0		95.4	80-121			
1,3-Dichloropropane	10.1	0.20	ug/L	10.0		101	80-120			
Tetrachloroethene	9.88	0.20	ug/L	10.0		98.8	80-120			
Dibromochloromethane	8.99	0.20	ug/L	10.0		89.9	65-135			
1,2-Dibromoethane	10.3	0.20	ug/L	10.0		103	80-121			
Chlorobenzene	9.81	0.20	ug/L	10.0		98.1	80-120			
Ethylbenzene	10.2	0.20	ug/L	10.0		102	80-120			
1,1,1,2-Tetrachloroethane	11.6	0.20	ug/L	10.0		116	80-120			
m,p-Xylene	21.1	0.40	ug/L	20.0		106	80-121			
o-Xylene	10.6	0.20	ug/L	10.0		106	80-121			
Xylenes, total	31.7	0.60	ug/L	30.0		106	76-127			
Styrene	10.9	0.20	ug/L	10.0		109	80-124			
Bromoform	8.55	0.20	ug/L	10.0		85.5	51-134			
1,1,1,2-Tetrachloroethane	10.4	0.20	ug/L	10.0		104	77-123			
1,2,3-Trichloropropane	9.75	0.50	ug/L	10.0		97.5	76-125			
trans-1,4-Dichloro 2-Butene	12.2	1.00	ug/L	10.0		122	55-129			Q
n-Propylbenzene	11.1	0.20	ug/L	10.0		111	78-130			
Bromobenzene	9.95	0.20	ug/L	10.0		99.5	80-120			
Isopropyl Benzene	11.2	0.20	ug/L	10.0		112	80-128			
2-Chlorotoluene	10.7	0.20	ug/L	10.0		107	78-122			
4-Chlorotoluene	10.6	0.20	ug/L	10.0		106	80-121			
t-Butylbenzene	11.0	0.20	ug/L	10.0		110	78-125			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Volatile Organic Compounds - Quality Control

Batch BHI0836 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHI0836-BS1)										
					Prepared: 27-Sep-2019	Analyzed: 27-Sep-2019 12:26				
1,3,5-Trimethylbenzene	11.1	0.20	ug/L	10.0		111	80-129			
1,2,4-Trimethylbenzene	11.2	0.20	ug/L	10.0		112	80-127			
s-Butylbenzene	11.2	0.20	ug/L	10.0		112	78-129			
4-Isopropyl Toluene	11.7	0.20	ug/L	10.0		117	79-130			
1,3-Dichlorobenzene	10.3	0.20	ug/L	10.0		103	80-120			
1,4-Dichlorobenzene	10.0	0.20	ug/L	10.0		100	80-120			
n-Butylbenzene	11.4	0.20	ug/L	10.0		114	74-129			
1,2-Dichlorobenzene	9.94	0.20	ug/L	10.0		99.4	80-120			
1,2-Dibromo-3-chloropropane	9.14	0.50	ug/L	10.0		91.4	62-123			
1,2,4-Trichlorobenzene	10.8	0.50	ug/L	10.0		108	64-124			
Hexachloro-1,3-Butadiene	10.9	0.50	ug/L	10.0		109	58-123			
Naphthalene	10.5	0.50	ug/L	10.0		105	50-134			
1,2,3-Trichlorobenzene	10.3	0.50	ug/L	10.0		103	49-133			
Dichlorodifluoromethane	9.83	0.20	ug/L	10.0		98.3	48-147			
Methyl tert-butyl Ether	10.2	0.50	ug/L	10.0		102	71-132			
2-Pentanone	46.3	5.00	ug/L	50.0		92.6	69-134			
Surrogate: 1,2-Dichloroethane-d4	5.10		ug/L	5.00		102	80-129			
Surrogate: Toluene-d8	4.96		ug/L	5.00		99.1	80-120			
Surrogate: 4-Bromofluorobenzene	4.95		ug/L	5.00		99.0	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.80		ug/L	5.00		96.0	80-120			
LCS Dup (BHI0836-BSD1)										
					Prepared: 27-Sep-2019	Analyzed: 27-Sep-2019 12:52				
Chloromethane	11.3	0.50	ug/L	10.0		113	60-138	0.94	30	
Vinyl Chloride	10.2	0.20	ug/L	10.0		102	66-133	2.55	30	
Bromomethane	10.0	1.00	ug/L	10.0		100	72-131	5.17	30	
Chloroethane	10.5	0.20	ug/L	10.0		105	60-155	0.61	30	
Trichlorofluoromethane	10.1	0.20	ug/L	10.0		101	80-129	1.20	30	
Acrolein	47.4	5.00	ug/L	50.0		94.7	52-144	11.40	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	10.5	0.20	ug/L	10.0		105	76-129	2.29	30	
Acetone	52.5	5.00	ug/L	50.0		105	58-142	5.52	30	
1,1-Dichloroethene	10.6	0.20	ug/L	10.0		106	69-135	1.05	30	
Bromoethane	10.6	0.20	ug/L	10.0		106	78-128	4.28	30	
Iodomethane	19.3	1.00	ug/L	10.0		193	56-147	7.08	30	* , Q
Methylene Chloride	11.5	1.00	ug/L	10.0		115	65-135	0.48	30	
Acrylonitrile	10.4	1.00	ug/L	10.0		104	64-134	6.44	30	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Volatile Organic Compounds - Quality Control

Batch BHI0836 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BHI0836-BSD1)										
					Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 12:52					
Carbon Disulfide	10.7	0.20	ug/L	10.0		107	78-125	0.70	30	
trans-1,2-Dichloroethene	10.3	0.20	ug/L	10.0		103	78-128	0.44	30	
Vinyl Acetate	11.0	0.20	ug/L	10.0		110	55-138	4.63	30	
1,1-Dichloroethane	10.5	0.20	ug/L	10.0		105	76-124	1.23	30	
2-Butanone	52.6	5.00	ug/L	50.0		105	61-140	8.13	30	
2,2-Dichloropropane	10.8	0.20	ug/L	10.0		108	78-125	0.82	30	
cis-1,2-Dichloroethene	10.4	0.20	ug/L	10.0		104	80-121	0.59	30	
Chloroform	9.46	0.20	ug/L	10.0		94.6	80-122	1.36	30	
Bromochloromethane	8.33	0.20	ug/L	10.0		83.3	80-121	0.02	30	
1,1,1-Trichloroethane	10.8	0.20	ug/L	10.0		108	79-123	0.25	30	
1,1-Dichloropropene	10.5	0.20	ug/L	10.0		105	80-120	3.24	30	
Carbon tetrachloride	10.2	0.20	ug/L	10.0		102	53-137	0.74	30	
1,2-Dichloroethane	10.1	0.20	ug/L	10.0		101	75-123	3.52	30	
Benzene	10.5	0.20	ug/L	10.0		105	80-120	1.03	30	
Trichloroethene	9.97	0.20	ug/L	10.0		99.7	80-120	1.26	30	
1,2-Dichloropropane	10.2	0.20	ug/L	10.0		102	80-120	0.82	30	
Bromodichloromethane	10.9	0.20	ug/L	10.0		109	80-121	1.65	30	
Dibromomethane	10.2	0.20	ug/L	10.0		102	80-120	4.78	30	
2-Chloroethyl vinyl ether	11.3	1.00	ug/L	10.0		113	74-127	7.36	30	
4-Methyl-2-Pentanone	52.4	5.00	ug/L	50.0		105	67-133	10.60	30	
cis-1,3-Dichloropropene	11.7	0.20	ug/L	10.0		117	80-124	2.62	30	
Toluene	10.2	0.20	ug/L	10.0		102	80-120	1.92	30	
trans-1,3-Dichloropropene	11.9	0.20	ug/L	10.0		119	71-127	4.10	30	
2-Hexanone	57.0	5.00	ug/L	50.0		114	69-133	12.90	30	
1,1,2-Trichloroethane	9.90	0.20	ug/L	10.0		99.0	80-121	3.69	30	
1,3-Dichloropropane	10.7	0.20	ug/L	10.0		107	80-120	5.98	30	
Tetrachloroethene	10.3	0.20	ug/L	10.0		103	80-120	4.17	30	
Dibromochloromethane	9.71	0.20	ug/L	10.0		97.1	65-135	7.66	30	
1,2-Dibromoethane	11.0	0.20	ug/L	10.0		110	80-121	6.38	30	
Chlorobenzene	10.1	0.20	ug/L	10.0		101	80-120	3.38	30	
Ethylbenzene	10.5	0.20	ug/L	10.0		105	80-120	3.15	30	
1,1,1,2-Tetrachloroethane	11.9	0.20	ug/L	10.0		119	80-120	2.54	30	
m,p-Xylene	21.8	0.40	ug/L	20.0		109	80-121	3.02	30	
o-Xylene	10.9	0.20	ug/L	10.0		109	80-121	2.73	30	
Xylenes, total	32.6	0.60	ug/L	30.0		109	76-127	2.93	30	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Volatile Organic Compounds - Quality Control

Batch BHI0836 - EPA 5030 (Purge and Trap)

Instrument: NT7 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BHI0836-BSD1)										
					Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 12:52					
Styrene	11.3	0.20	ug/L	10.0		113	80-124	4.21	30	
Bromoform	9.30	0.20	ug/L	10.0		93.0	51-134	8.42	30	
1,1,2,2-Tetrachloroethane	11.2	0.20	ug/L	10.0		112	77-123	7.12	30	
1,2,3-Trichloropropane	10.8	0.50	ug/L	10.0		108	76-125	10.50	30	
trans-1,4-Dichloro 2-Butene	13.5	1.00	ug/L	10.0		135	55-129	9.57	30	*, Q
n-Propylbenzene	11.3	0.20	ug/L	10.0		113	78-130	1.36	30	
Bromobenzene	10.2	0.20	ug/L	10.0		102	80-120	2.46	30	
Isopropyl Benzene	11.5	0.20	ug/L	10.0		115	80-128	2.20	30	
2-Chlorotoluene	10.8	0.20	ug/L	10.0		108	78-122	0.77	30	
4-Chlorotoluene	10.9	0.20	ug/L	10.0		109	80-121	2.39	30	
t-Butylbenzene	11.1	0.20	ug/L	10.0		111	78-125	1.04	30	
1,3,5-Trimethylbenzene	11.3	0.20	ug/L	10.0		113	80-129	1.72	30	
1,2,4-Trimethylbenzene	11.4	0.20	ug/L	10.0		114	80-127	1.19	30	
s-Butylbenzene	11.2	0.20	ug/L	10.0		112	78-129	0.15	30	
4-Isopropyl Toluene	11.6	0.20	ug/L	10.0		116	79-130	0.94	30	
1,3-Dichlorobenzene	10.4	0.20	ug/L	10.0		104	80-120	0.75	30	
1,4-Dichlorobenzene	10.2	0.20	ug/L	10.0		102	80-120	1.36	30	
n-Butylbenzene	11.3	0.20	ug/L	10.0		113	74-129	1.48	30	
1,2-Dichlorobenzene	10.1	0.20	ug/L	10.0		101	80-120	1.85	30	
1,2-Dibromo-3-chloropropane	9.64	0.50	ug/L	10.0		96.4	62-123	5.31	30	
1,2,4-Trichlorobenzene	10.7	0.50	ug/L	10.0		107	64-124	0.80	30	
Hexachloro-1,3-Butadiene	9.90	0.50	ug/L	10.0		99.0	58-123	9.26	30	
Naphthalene	11.1	0.50	ug/L	10.0		111	50-134	6.06	30	
1,2,3-Trichlorobenzene	10.4	0.50	ug/L	10.0		104	49-133	1.26	30	
Dichlorodifluoromethane	9.86	0.20	ug/L	10.0		98.6	48-147	0.29	30	
Methyl tert-butyl Ether	10.6	0.50	ug/L	10.0		106	71-132	3.98	30	
2-Pentanone	52.3	5.00	ug/L	50.0		105	69-134	12.20	30	
Surrogate: 1,2-Dichloroethane-d4	4.98		ug/L	5.00		99.7	80-129			
Surrogate: Toluene-d8	4.96		ug/L	5.00		99.2	80-120			
Surrogate: 4-Bromofluorobenzene	4.99		ug/L	5.00		99.8	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.93		ug/L	5.00		98.6	80-120			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Volatile Organic Compounds - SIM - Quality Control

Batch BHJ0061 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0061-BLK1)				Prepared: 02-Oct-2019 Analyzed: 02-Oct-2019 12:00						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5490		ng/L	5000		110	80-129			
LCS (BHJ0061-BS1)				Prepared: 02-Oct-2019 Analyzed: 02-Oct-2019 10:53						
Vinyl chloride	1960	20.0	ng/L	2000		98.2	76-120			
Surrogate: 1,2-Dichloroethane-d4	5320		ng/L	5000		106	80-129			
LCS Dup (BHJ0061-BSD1)				Prepared: 02-Oct-2019 Analyzed: 02-Oct-2019 11:40						
Vinyl chloride	2190	20.0	ng/L	2000		109	76-120	10.70	30	
Surrogate: 1,2-Dichloroethane-d4	5330		ng/L	5000		107	80-129			



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Metals and Metallic Compounds - Quality Control

Batch BHJ0265 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0265-BLK1)										
					Prepared: 09-Oct-2019 Analyzed: 10-Oct-2019 09:16					
Calcium	ND	0.0500	mg/L							U
Potassium	ND	0.500	mg/L							U
Sodium	ND	0.500	mg/L							U
LCS (BHJ0265-BS1)										
					Prepared: 09-Oct-2019 Analyzed: 10-Oct-2019 10:00					
Calcium	9.93	0.0500	mg/L	10.0		99.3	80-120			
Potassium	10.1	0.500	mg/L	10.0		101	80-120			
Sodium	10.0	0.500	mg/L	10.0		100	80-120			



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHJ0192 - WMN (No Prep)

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0192-BLK1)										
					Prepared: 07-Oct-2019 Analyzed: 08-Oct-2019 01:37					
Barium, Dissolved	ND	0.0030	mg/L							U
Manganese, Dissolved	ND	0.0010	mg/L							U
LCS (BHJ0192-BS1)										
					Prepared: 07-Oct-2019 Analyzed: 08-Oct-2019 02:28					
Barium, Dissolved	2.05	0.0030	mg/L	2.00		103	80-120			
Manganese, Dissolved	0.510	0.0010	mg/L	0.500		102	80-120			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHJ0217 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0217-BLK2)											
						Prepared: 08-Oct-2019 Analyzed: 10-Oct-2019 08:52					
Iron, Dissolved	54	ND	20.0	ug/L							U
Iron, Dissolved	57	ND	20.0	ug/L							U

LCS (BHJ0217-BS2)

Prepared: 08-Oct-2019 Analyzed: 10-Oct-2019 09:06

Iron, Dissolved	54	4930	20.0	ug/L	5000		98.6	80-120			
Iron, Dissolved	57	4950	20.0	ug/L	5000		99.0	80-120			

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0217-BLK1)											
						Prepared: 08-Oct-2019 Analyzed: 09-Oct-2019 15:21					
Zinc, Dissolved	66	ND	4.00	ug/L							U
LCS (BHJ0217-BS1)											
						Prepared: 08-Oct-2019 Analyzed: 09-Oct-2019 15:26					
Zinc, Dissolved	66	83.7	4.00	ug/L	80.0		105	80-120			



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1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHJ0256 - RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0256-BLK1)						Prepared: 09-Oct-2019 Analyzed: 09-Oct-2019 23:30					
Arsenic, Dissolved	75a	ND	0.0400	ug/L							U
LCS (BHJ0256-BS1)						Prepared: 09-Oct-2019 Analyzed: 09-Oct-2019 23:35					
Arsenic, Dissolved	75a	4.49	0.0400	ug/L	5.00		89.8	80-120			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHJ0654 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0654-BLK1)						Prepared: 22-Oct-2019 Analyzed: 23-Oct-2019 15:42					
Zinc, Dissolved	66	ND	4.00	ug/L							U
LCS (BHJ0654-BS1)						Prepared: 22-Oct-2019 Analyzed: 23-Oct-2019 15:45					
Zinc, Dissolved	66	84.4	4.00	ug/L	80.0		105	80-120			



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Wet Chemistry - Quality Control

Batch BHI0828 - No Prep Wet Chem

Instrument: TURB1 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0828-BLK1)						Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 11:29					
Alkalinity, Total	ND	1.00	1.00	mg/L CaCO3							U
Duplicate (BHI0828-DUP1)						Source: 19I0438-01 Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 11:29					
Alkalinity, Total	47.1	1.00	1.00	mg/L CaCO3		46.9			0.43	20	
Reference (BHI0828-SRM1)						Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 11:29					
Alkalinity, Total	112	1.00	1.00	mg/L CaCO3	116		96.8	85-114.66			



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Wet Chemistry - Quality Control

Batch BHI0831 - No Prep Wet Chem

Instrument: TURB1 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHI0831-BS1)						Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 11:15					
pH	6.97	0.01	0.01	pH Units	7.00		99.6	99.2-100.8			
Duplicate (BHI0831-DUP1)						Source: 19I0438-01 Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 11:15					
pH	6.13	0.01	0.01	pH Units		6.14			0.16	20	H



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Wet Chemistry - Quality Control

Batch BHI0843 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0843-BLK1)						Prepared: 27-Sep-2019 Analyzed: 28-Sep-2019 06:58					
Total Organic Carbon	ND	0.50	0.50	mg/L							U
LCS (BHI0843-BS1)						Prepared: 27-Sep-2019 Analyzed: 28-Sep-2019 07:17					
Total Organic Carbon	19.09	0.50	0.50	mg/L	20.00		95.5	90-110			
LCS Dup (BHI0843-BSD1)						Prepared: 27-Sep-2019 Analyzed: 28-Sep-2019 08:21					
Total Organic Carbon	19.21	0.50	0.50	mg/L	20.00		96.1	90-110	0.63	20	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Wet Chemistry - Quality Control

Batch BHI0844 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0844-BLK1)						Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 15:52					
Nitrite-N	ND	0.010	0.010	mg/L							U
LCS (BHI0844-BS1)						Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 15:53					
Nitrite-N	0.501	0.010	0.010	mg/L	0.500		100	75-125			
Duplicate (BHI0844-DUP1)						Source: 1910438-01 Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 15:56					
Nitrite-N	ND	0.010	0.010	mg/L		ND					U
Matrix Spike (BHI0844-MS1)						Source: 1910438-01 Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 15:57					
Nitrite-N	0.518	0.010	0.010	mg/L	0.500	ND	104	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BHI0844-MSD1)						Source: 1910438-01 Prepared: 27-Sep-2019 Analyzed: 27-Sep-2019 15:58					
Nitrite-N	0.518	0.010	0.010	mg/L	0.500	ND	104	75-125	0.00		

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



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Wet Chemistry - Quality Control

Batch BHJ0007 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: DJM

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0007-BLK1)						Prepared: 01-Oct-2019 Analyzed: 02-Oct-2019 12:43					
Sulfate	ND	2.00	2.00	mg/L							U
LCS (BHJ0007-BS1)						Prepared: 01-Oct-2019 Analyzed: 02-Oct-2019 12:44					
Sulfate	15.0	2.00	2.00	mg/L	15.0		100	90-110			



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Wet Chemistry - Quality Control

Batch BHJ0090 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: WCW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0090-BLK1)						Prepared: 03-Oct-2019 Analyzed: 03-Oct-2019 12:34					
COD	ND	10.0	10.0	mg/L							U
LCS (BHJ0090-BS1)						Prepared: 03-Oct-2019 Analyzed: 03-Oct-2019 12:34					
COD	102	10.0	10.0	mg/L	100		102	90-110			



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Wet Chemistry - Quality Control

Batch BHJ0135 - No Prep Wet Chem

Instrument: LCHAT2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0135-BLK1)						Prepared: 04-Oct-2019 Analyzed: 04-Oct-2019 14:56					
Ammonia-N	ND	0.040	0.040	mg/L							U
LCS (BHJ0135-BS2)						Prepared: 04-Oct-2019 Analyzed: 04-Oct-2019 15:05					
Ammonia-N	0.474	0.040	0.040	mg/L	0.500		94.8	90-110			



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Wet Chemistry - Quality Control

Batch BHJ0173 - No Prep Wet Chem

Instrument: LCHAT2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0173-BLK1)						Prepared: 07-Oct-2019 Analyzed: 07-Oct-2019 15:53					
Nitrate + Nitrite as N	ND	0.010	0.010	mg/L							U
LCS (BHJ0173-BS1)						Prepared: 07-Oct-2019 Analyzed: 07-Oct-2019 15:54					
Nitrate + Nitrite as N	0.515	0.010	0.010	mg/L	0.500		103	90-110			



Environmental Partners, Inc.
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Project: Olalla Landfill
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Project Manager: Doug Kunkel

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Wet Chemistry - Quality Control

Batch BHJ0220 - No Prep Wet Chem

Instrument: TURB1 Analyst: DJM

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHJ0220-BLK1)						Prepared: 08-Oct-2019 Analyzed: 08-Oct-2019 16:35					
Chloride	ND	1.00	1.00	mg/L							U
LCS (BHJ0220-BS1)						Prepared: 08-Oct-2019 Analyzed: 08-Oct-2019 16:37					
Chloride	4.77	1.00	1.00	mg/L	5.00		95.4	90-110			
Duplicate (BHJ0220-DUP1)						Source: 19I0438-01 Prepared: 08-Oct-2019 Analyzed: 08-Oct-2019 16:39					
Chloride	3.75	1.00	1.00	mg/L		3.78			0.80	20	
Matrix Spike (BHJ0220-MS1)						Source: 19I0438-01 Prepared: 08-Oct-2019 Analyzed: 08-Oct-2019 16:40					
Chloride	8.77	1.00	1.00	mg/L	5.00	3.78	99.8	75-125			

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



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Microbiology - Quality Control

Batch BHI0823 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHI0823-BLK1)						Prepared: 27-Sep-2019 Analyzed: 28-Sep-2019 09:40					
Total Coliforms	ND	1	1	CFU/100 ml							U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
EPA 200.8 UCT-KED in Water	
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 353.2 in Water	
Nitrate + Nitrite as N	NELAP,DoD-ELAP,WADOE
Nitrite-N	WADOE,NELAP,DoD-ELAP
EPA 375.2 in Water	
Sulfate	WADOE,NELAP
EPA 410.4 in Water	
COD	DoD-ELAP,NELAP,WADOE
EPA 6010C in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Sodium	DoD-ELAP,WADOE,NELAP
Sodium-1	DoD-ELAP
Barium	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



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Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



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n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260C-SIM in Water

Acrylonitrile	NELAP,CALAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE

EPA 9060A in Water

Total Organic Carbon	DoD-ELAP,WADOE,NELAP
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SM 2320 B-97 in Water

Alkalinity, Bicarbonate	NELAP,WADOE,WA-DW,DoD-ELAP
Alkalinity, Carbonate	WADOE,WA-DW,DoD-ELAP,NELAP



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 04-Nov-2019 14:50
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Alkalinity, Hydroxide WADOE,WA-DW,DoD-ELAP,NELAP
Alkalinity, Total DoD-ELAP,WADOE,WA-DW,NELAP

SM 4500-H+ B-00 in Water

pH WADOE,NELAP,WA-DW

SM 4500-NH3 H-97 in Water

Ammonia-N WADOE,DoD-ELAP,NELAP

SM 9222B in Water

Total Coliforms WADOE

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



Environmental Partners, Inc.
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Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
04-Nov-2019 14:50

Notes and Definitions

- * Flagged value is not within established control limits.
- B This analyte was detected in the method blank.
- 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)
- H Hold time violation - Hold time was exceeded.
- J Estimated concentration value detected below the reporting limit.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- 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.



Analytical Resources, Incorporated
Analytical Chemists and Consultants

12 February 2020

Doug Kunkel
Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah, WA 98027

RE: Olalla Landfill

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>
19L0319	N/A

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 enclosed 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.



Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number: 190319	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Environmental Partners, Inc.	Phone: 425-395-0010	Date: 12/18/19
Client Contact: Doug Kunkel		Ice Present? Yes
Client Project Name: Olalla Landfill		No. of Coolers: 2
Client Project #: 45407.0	Samplers: E. Caddey	Cooler Temps: 0.32 0.9°C

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested								Notes/Comments
					VOCs	Vinyl Chloride	Disolved Metals Full list	Disolved metals Al, Fe, Mn	Total METALS K, Na, Ca	Nitrate, Nitrite and other - see list	COD + TOC	Total Coliform	
Olalla-MW1-12/19	12/17/19	09:03	water	9	X		X		X	X	X	X	
Olalla-MW5A-12/19	11	10:02	"	3		X		X					X
Olalla-MW3-12/19	11	11:05	"	9	X		X		X	X	X	X	
Olalla-MW10-12/19	11	12:05	"	9	X		X		X	X	X	X	
Olalla-MW6-12/19	11	13:27	"	9	X		X		X	X	X	X	
Olalla-MW8-12/19	11	14:15	"	9	X		X		X	X	X	X	
Olalla-MW7-12/19	11	15:02	"	3		X		X					X
Olalla-MW13-12/19	11	-	"	9	X		X		X	X	X	X	
Trip Blank	11	-	"	2	X	X							

Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Eric Caddey	Printed Name: Jacob Walter	Printed Name:	Printed Name:
	Company: EPI	Company: ARI	Company:	Company:
	Date & Time: 12/18/19 09:20	Date & Time: 12/18/19 09:20	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

RE: [EXTERNAL] Re: Olalla Landfill missing sample analysis Vinyl Chloride by SIM

Kunkel, Douglas <DKunkel@trccompanies.com>

Tue 2/4/2020 10:46 AM

To: Amanda Volgardsen Johnson <amanda.volgardsen@arilabs.com>**Cc:** Caddey, Eric <ECaddey@trccompanies.com>

That's fantastic news Amanda.

Please run the samples from MW-1, MW-3, MW-6, MW-8, MW-10, and MW-13 for vinyl chloride by SIM.

Thanks!

Best Regards,
Doug**Doug Kunkel, LG, LHG**

Principal Hydrogeologist



1180 NW Maple Street, Suite 310, Issaquah, WA 98027

T 425.395.0016 | **C** 425.241.8170 | dkunkel@trccompanies.com[LinkedIn](#) | [Twitter](#) | [Blog](#) | TRCcompanies.com

Please note that our domain name and email addresses have changed As of December 27, 2019, EPI became a part of TRC Companies. Please rest assured that the EPI team remains intact and there are no changes to your project team or contacts. Please update our contact information in your database. Emails to our old addresses will be forwarded until Feb 29, 2020.

From: Amanda Volgardsen Johnson <amanda.volgardsen@arilabs.com>**Sent:** Tuesday, February 4, 2020 10:36 AM**To:** Kunkel, Douglas <DKunkel@trccompanies.com>**Cc:** Caddey, Eric <ECaddey@trccompanies.com>**Subject:** [EXTERNAL] Re: Olalla Landfill missing sample analysis Vinyl Chloride by SIM

This is an **EXTERNAL** email. Do not click links or open attachments unless you validate the sender and know the content is safe.

Hello,

Sorry I was out of the office yesterday. We still have remaining volume and can run for the SIM VC.

Regards,

Amanda Volgardsen Johnson

Analytical Resources, Inc.

Project Manager

206-695-6220

I will be out of the office the afternoon of Thursday February 13th.<https://www.arilabs.com>*Version changes coming this year to SW-846 8260 and 8270 organic and 6010 and 6020 metals analysis methods.**"Humor is the universal solvent against the abrasive elements of life." - Alan Simpson*

From: Kunkel, Douglas <DKunkel@trccompanies.com>
Sent: Monday, February 3, 2020 7:15 AM
To: Amanda Volgardsen Johnson <amanda.volgardsen@arilabs.com>
Cc: Caddey, Eric <ECaddey@trccompanies.com>
Subject: Olalla Landfill missing sample analysis Vinyl Chloride by SIM

Amanda, Looks like Kelly is out of the office today.

Does the lab still have the VOC samples from Olalla's December sampling. We might want to run the samples for VC SIM out of hold time if they're available. Please let me know so I can advise the client regarding our options. Thanks.

Best Regards,
Doug

Doug Kunkel, LG, LHG
Principal Hydrogeologist



1180 NW Maple Street, Suite 310, Issaquah, WA 98027
T 425.395.0016 | C 425.241.8170 | dkunkel@trccompanies.com
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Please note that our domain name and email addresses have changed As of December 27, 2019, EPI became a part of TRC Companies. Please rest assured that the EPI team remains intact and there are no changes to your project team or contacts. Please update our contact information in your database. Emails to our old addresses will be forwarded until Feb 29, 2020.

How was your customer experience?
Please take our 5 minute [Online Customer Survey](#).

Analytical Resources, Incorporated

Analytical Chemists and Consultants

This correspondence contains confidential information from Analytical Resources, Inc. (ARI) The information contained herein is intended solely for the use of the individual(s) named above. If you are not the intended recipient, any copying, distribution, disclosure, or use of the text and/or attached document(s) is strictly prohibited.

If you have received this correspondence in error, please notify sender and delete this message from your computer immediately. Thank you.

[ARI Labs, Inc.](#)



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Olalla-MW1-12/19	19L0319-01	Water	17-Dec-2019 09:03	18-Dec-2019 09:20
Olalla-MW1-12/19	19L0319-02	Water	17-Dec-2019 09:03	18-Dec-2019 09:20
Olalla-MW-5A-12/19	19L0319-03	Water	17-Dec-2019 10:02	18-Dec-2019 09:20
Olalla-MW3-12/19	19L0319-04	Water	17-Dec-2019 11:05	18-Dec-2019 09:20
Olalla-MW3-12/19	19L0319-05	Water	17-Dec-2019 11:05	18-Dec-2019 09:20
Olalla-MW10-12/19	19L0319-06	Water	17-Dec-2019 12:05	18-Dec-2019 09:20
Olalla-MW10-12/19	19L0319-07	Water	17-Dec-2019 12:05	18-Dec-2019 09:20
Olalla-MW6-12/19	19L0319-08	Water	17-Dec-2019 13:27	18-Dec-2019 09:20
Olalla-MW6-12/19	19L0319-09	Water	17-Dec-2019 13:27	18-Dec-2019 09:20
Olalla-MW8-12/19	19L0319-10	Water	17-Dec-2019 14:15	18-Dec-2019 09:20
Olalla-MW8-12/19	19L0319-11	Water	17-Dec-2019 14:15	18-Dec-2019 09:20
Olalla-MW7-12/19	19L0319-12	Water	17-Dec-2019 15:02	18-Dec-2019 09:20
Olalla-MW13-12/19	19L0319-13	Water	17-Dec-2019 00:00	18-Dec-2019 09:20
Olalla-MW13-12/19	19L0319-14	Water	17-Dec-2019 00:00	18-Dec-2019 09:20
Trip Blank	19L0319-15	Water	17-Dec-2019 15:02	18-Dec-2019 09:20



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Work Order Case Narrative

Volatiles - EPA Method SW8260C

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

Initial and continuing calibrations were within method requirements with the exception of all associated "Q" flagged analytes which are out of control low in the CCAL and 1,2-Dibromo-3-chloropropane is out of control high. All associated samples that contain analyte have been flagged with a "Q" qualifier.

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/LCSD percent recoveries and RPD were within control limits with the exception of analytes flagged on the associated forms.

Volatiles - EPA Method 8260C-SIM (Selected Ion Monitoring)

The sample(s) were analyzed within the recommended holding times with the exception of samples flagged with an "H" qualifier.

Several 8260C Sim samples were analyzed outside of the holding time as the COC did not request SIM VOCs analysis on every sample.

Per the client review ARI was contacted and requested to analyze SIM VOCs outside of the holding time .

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.

Total and Dissolved Metals - EPA Method 6010C and 200.8

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

Initial and continuing calibrations were within method requirements.



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

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

The LCS percent recoveries were within control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times with the exception of pH and coliform which was sent to the lab outside of the method holding time.

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.



WORK ORDER

19L0319

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

Preservation Confirmation

Container ID	Container Type	pH
19L0319-01 A	HDPE NM, 500 mL, 1:1 HNO3	<2 Pass (P)
19L0319-01 B	Small OJ, 500 mL	
19L0319-01 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2 (P)
19L0319-01 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2 (P)
19L0319-01 E	Corning Plastic, 125 mL, Na2S2O3	
19L0319-01 F	VOA Vial, Clear, 40 mL, HCL	
19L0319-01 G	VOA Vial, Clear, 40 mL, HCL	
19L0319-01 H	VOA Vial, Clear, 40 mL, HCL	
19L0319-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 (P)
19L0319-03 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 (P)
19L0319-03 B	Small OJ, 500 mL	
19L0319-03 C	VOA Vial, Clear, 40 mL, HCL	
19L0319-04 A	HDPE NM, 500 mL, 1:1 HNO3	<2 (P)
19L0319-04 B	Small OJ, 500 mL	
19L0319-04 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2 (P)
19L0319-04 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2 (P)
19L0319-04 E	Corning Plastic, 125 mL, Na2S2O3	
19L0319-04 F	VOA Vial, Clear, 40 mL, HCL	
19L0319-04 G	VOA Vial, Clear, 40 mL, HCL	
19L0319-04 H	VOA Vial, Clear, 40 mL, HCL	
19L0319-05 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 (P)
19L0319-06 A	HDPE NM, 500 mL, 1:1 HNO3	<2 (P)
19L0319-06 B	Small OJ, 500 mL	
19L0319-06 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2 (P)
19L0319-06 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2 (P)
19L0319-06 E	Corning Plastic, 125 mL, Na2S2O3	
19L0319-06 F	VOA Vial, Clear, 40 mL, HCL	
19L0319-06 G	VOA Vial, Clear, 40 mL, HCL	
19L0319-06 H	VOA Vial, Clear, 40 mL, HCL	
19L0319-07 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2 (P)
19L0319-08 A	HDPE NM, 500 mL, 1:1 HNO3	<2 (P)
19L0319-08 B	Small OJ, 500 mL	
19L0319-08 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2 (P)
19L0319-08 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2 (P)
19L0319-08 E	Corning Plastic, 125 mL, Na2S2O3	



WORK ORDER

19L0319

Client: Environmental Partners, Inc.	Project Manager: Kelly Bottem
Project: Olalla Landfill	Project Number: [none]

19L0319-08 F	VOA Vial, Clear, 40 mL, HCL		
19L0319-08 G	VOA Vial, Clear, 40 mL, HCL		
19L0319-08 H	VOA Vial, Clear, 40 mL, HCL		
19L0319-09 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	(P)
19L0319-10 A	HDPE NM, 500 mL, 1:1 HNO3	<2	(P)
19L0319-10 B	Small OJ, 500 mL		(P) KD 12/18/19
19L0319-10 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	(P)
19L0319-10 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2	(P)
19L0319-10 E	Corning Plastic, 125 mL, Na2S2O3		
19L0319-10 F	VOA Vial, Clear, 40 mL, HCL		
19L0319-10 G	VOA Vial, Clear, 40 mL, HCL		
19L0319-10 H	VOA Vial, Clear, 40 mL, HCL		
19L0319-11 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	(P)
19L0319-12 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	(P)
19L0319-12 B	Small OJ, 500 mL		
19L0319-12 C	VOA Vial, Clear, 40 mL, HCL		
19L0319-13 A	HDPE NM, 500 mL, 1:1 HNO3	<2	(P)
19L0319-13 B	Small OJ, 500 mL		
19L0319-13 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	(P)
19L0319-13 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2	(P)
19L0319-13 E	Corning Plastic, 125 mL, Na2S2O3		
19L0319-13 F	VOA Vial, Clear, 40 mL, HCL		
19L0319-13 G	VOA Vial, Clear, 40 mL, HCL		
19L0319-13 H	VOA Vial, Clear, 40 mL, HCL		
19L0319-14 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	(P)
19L0319-15 A	VOA Vial, Clear, 40 mL, HCL		
19L0319-15 B	VOA Vial, Clear, 40 mL, HCL		

Preservation Confirmed By _____

Date _____



Cooler Receipt Form

ARI Client: Environmental Partners

Project Name: Olalla Landfill

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 1960319

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 0920

0.3c 0.9c

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 5206

Cooler Accepted by: JG Date: 12/18/19 Time: 0920

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 12/12/19

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: KD Date: 12/18/19 Time: 1015 Labels checked by: KD

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

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
<u>olalla-MW6-12/19</u>	<u>olalla-MW8-12/19</u>		

Additional Notes, Discrepancies, & Resolutions:

-All bottles from 'olalla-MW8-12/19' says 'olalla-MW6-12/19' on labels. Used COC sample time to figure out where bottles belong.

By: KD Date: 12/18/19



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW1-12/19
19L0319-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 09:03

Instrument: NT3 Analyst: PKC

Analyzed: 12/19/2019 18:08

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-01 F

Preparation Batch: BHL0586

Sample Size: 10 mL

Prepared: 12/19/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW1-12/19
19L0319-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 09:03

Instrument: NT3 Analyst: PKC

Analyzed: 12/19/2019 18:08

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW1-12/19
19L0319-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 09:03

Instrument: NT3 Analyst: PKC

Analyzed: 12/19/2019 18:08

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	98.7	%	
Surrogate: Toluene-d8		80-120 %	98.7	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	98.0	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	104	%	



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Project Manager: Doug Kunkel

Reported:
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Olalla-MW1-12/19
19L0319-01 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 12/17/2019 09:03
Instrument: NT16 Analyst: PB	Analyzed: 02/10/2020 19:02
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19L0319-01 H
	Preparation Batch: BIB0243 Sample Size: 10 mL
	Prepared: 02/10/2020 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	H, U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>97.3</i>	<i>%</i>	<i>H</i>



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW1-12/19
19L0319-01 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/17/2019 09:03
Instrument: ICP2 Analyst: TCH Analyzed: 12/24/2019 15:12
Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19L0319-01 A 02
Preparation Batch: BHL0676 Sample Size: 25 mL
Prepared: 12/23/2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	9.50	mg/L	
Potassium	7440-09-7	1	0.500	0.577	mg/L	
Sodium	7440-23-5	1	0.500	4.39	mg/L	



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW1-12/19
19L0319-01 (Water)

Wet Chemistry

Method: EPA 325.2

Sampled: 12/17/2019 09:03

Instrument: LACHAT1 Analyst: EP

Analyzed: 12/27/2019 13:16

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19L0319-01 B

Preparation Batch: BHL0766

Sample Size: 10 mL

Prepared: 12/27/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	3.92	mg/L	



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Olalla-MW1-12/19
19L0319-01 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 12/17/2019 09:03
Instrument: [CALC] Analyst: EP Analyzed: 12/31/2019 10:58

Sample Preparation: Preparation Method: [CALC] Extract ID: 19L0319-01
Preparation Batch: [CALC]
Prepared: 12/30/2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.231	mg/L	

Instrument: LACHAT1 Analyst: EP Analyzed: 12/31/2019 10:58

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-01 C
Preparation Batch: BHL0796 Sample Size: 10 mL
Prepared: 12/30/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.231	mg/L	

Instrument: LACHAT2 Analyst: EP Analyzed: 12/18/2019 15:26

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-01 B
Preparation Batch: BHL0535 Sample Size: 10 mL
Prepared: 12/18/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW1-12/19
19L0319-01 (Water)

Wet Chemistry

Method: EPA 410.4

Sampled: 12/17/2019 09:03

Instrument: UV1800-1 Analyst: JM

Analyzed: 12/19/2019 10:52

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19L0319-01 D

Preparation Batch: BHL0518

Sample Size: 2 mL

Prepared: 12/18/2019

Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Olalla-MW1-12/19
19L0319-01 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 12/17/2019 09:03
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHL0732	Analyzed: 12/26/2019 18:49
Sample Preparation:	Prepared: 12/26/2019	Extract ID: 19L0319-01 C
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	ND	mg/L	U



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Olalla-MW1-12/19
19L0319-01 (Water)

Wet Chemistry

Method: SM 2320 B-97	Instrument: Accumet AB150	Analyst: UW	Sampled: 12/17/2019 09:03	Analyzed: 12/19/2019 16:03
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHL0600	Sample Size: 100 mL	Extract ID: 19L0319-01 B
	Prepared: 12/19/2019		Final Volume: 100 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	49.3	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	49.3	mg/L CaCO3	



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Olalla-MW1-12/19
19L0319-01 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Instrument: Accumet AB150	Analyst: JM	Sampled: 12/17/2019 09:03
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BIA0331	Analyzed: 01/16/2020 16:52
	Prepared: 01/16/2020	Sample Size: 50 mL	Extract ID: 19L0319-01 B
		Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.05	pH Units	H



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Reported:
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Olalla-MW1-12/19
19L0319-01 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97 Sampled: 12/17/2019 09:03
Instrument: LCHAT2 Analyst: EP Analyzed: 01/02/2020 12:56

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-01 -
Preparation Batch: BHL0840 Sample Size: 10 mL
Prepared: 12/31/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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Olalla-MW1-12/19
19L0319-01 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/17/2019 09:03
Instrument: N/A Analyst: UW	Preparation Batch: BHL0524	Final Volume: 100 mL	Analyzed: 12/19/2019 10:05
Sample Preparation:	Prepared: 12/18/2019	Extract ID: 19L0319-01	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-MW1-12/19
19L0319-01RE1 (Water)

Wet Chemistry

Method: EPA 375.2	Preparation Method: No Prep Wet Chem		Sampled: 12/17/2019 09:03
Instrument: LACHAT1 Analyst: BF	Preparation Batch: BHL0808	Sample Size: 10 mL	Analyzed: 12/30/2019 14:41
Sample Preparation:	Prepared: 12/30/2019	Final Volume: 10 mL	Extract ID: 19L0319-01RE1 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	4.83	mg/L	



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Project Manager: Doug Kunkel

Reported:
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Olalla-MW1-12/19
19L0319-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8		Sampled: 12/17/2019 09:03
Instrument: ICPMS1 Analyst: TCH		Analyzed: 12/27/2019 11:55
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19L0319-02 A 01
	Preparation Batch: BHL0723	Sample Size: 25 mL
	Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



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Olalla-MW1-12/19
19L0319-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 12/17/2019 09:03
Instrument: ICPMS2 Analyst: TCH	Analyzed: 12/31/2019 18:02
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BHL0723
	Prepared: 12/26/2019
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 19L0319-02 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation:	Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19L0319-02 A 02
	Preparation Batch: BHL0819	
	Prepared: 12/31/2019	
	Sample Size: 100 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.107	ug/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW1-12/19
19L0319-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 12/17/2019 09:03
Instrument: ICP2 Analyst: TCH Analyzed: 01/02/2020 12:23
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19L0319-02 A 03
Preparation Batch: BHL0842 Sample Size: 25 mL
Prepared: 12/31/2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0053	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	ND	mg/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW-5A-12/19
19L0319-03 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM

Sampled: 12/17/2019 10:02

Instrument: NT16 Analyst: PB

Analyzed: 12/20/2019 16:01

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-03 C

Preparation Batch: BHL0627

Sample Size: 10 mL

Prepared: 12/20/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			80-129 %	102	%	



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Olalla-MW-5A-12/19
19L0319-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 12/17/2019 10:02
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/27/2019 11:57
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19L0319-03 A 01
Preparation Batch: BHL0723	Sample Size: 25 mL
Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW-5A-12/19
19L0319-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 12/17/2019 10:02
Instrument: ICPMS2 Analyst: TCH	Analyzed: 12/31/2019 20:41
Sample Preparation:	Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x
	Preparation Batch: BHL0819
	Sample Size: 100 mL
	Final Volume: 20 mL
	Extract ID: 19L0319-03 A 02

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.196	ug/L	



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Olalla-MW-5A-12/19
19L0319-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Preparation Method: WMN (No Prep)		Sampled: 12/17/2019 10:02
Instrument: ICP2 Analyst: TCH	Preparation Batch: BHL0842	Sample Size: 25 mL	Analyzed: 01/02/2020 12:27
Sample Preparation:	Prepared: 12/31/2019	Final Volume: 25 mL	Extract ID: 19L0319-03 A 03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese, Dissolved	7439-96-5	1	0.0010	ND	mg/L	U



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Olalla-MW-5A-12/19
19L0319-03 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00			Sampled: 12/17/2019 10:02
Instrument: Accumet AB150	Analyst: JM	Analyzed: 12/18/2019 14:26	
Sample Preparation:	Preparation Method: No Prep Wet Chem	Extract ID: 19L0319-03 B	
	Preparation Batch: BHL0533	Sample Size: 50 mL	
	Prepared: 12/18/2019	Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.68	pH Units	H



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW3-12/19
19L0319-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 11:05

Instrument: NT3 Analyst: PKC

Analyzed: 12/19/2019 18:36

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-04 F

Preparation Batch: BHL0586

Sample Size: 10 mL

Prepared: 12/19/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW3-12/19
19L0319-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 11:05

Instrument: NT3 Analyst: PKC

Analyzed: 12/19/2019 18:36

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW3-12/19
19L0319-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 11:05

Instrument: NT3 Analyst: PKC

Analyzed: 12/19/2019 18:36

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	95.0	%	
Surrogate: Toluene-d8		80-120 %	97.5	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	99.3	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.8	%	



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Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW3-12/19
19L0319-04 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 12/17/2019 11:05
Instrument: NT16 Analyst: PB	Analyzed: 02/10/2020 19:22
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19L0319-04 G
	Preparation Batch: BIB0243 Sample Size: 10 mL
	Prepared: 02/10/2020 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	H, U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>103</i>	<i>%</i>	<i>H</i>



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW3-12/19
19L0319-04 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/17/2019 11:05
Instrument: ICP2 Analyst: TCH Analyzed: 12/24/2019 15:17

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19L0319-04 A 02
Preparation Batch: BHL0676 Sample Size: 25 mL
Prepared: 12/23/2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	34.2	mg/L	
Potassium	7440-09-7	1	0.500	0.713	mg/L	
Sodium	7440-23-5	1	0.500	8.38	mg/L	



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Olalla-MW3-12/19
19L0319-04 (Water)

Wet Chemistry

Method: EPA 325.2	Preparation Method: No Prep Wet Chem		Sampled: 12/17/2019 11:05
Instrument: LACHAT1 Analyst: EP	Preparation Batch: BHL0766	Sample Size: 10 mL	Analyzed: 12/27/2019 13:24
Sample Preparation:	Prepared: 12/27/2019	Final Volume: 10 mL	Extract ID: 19L0319-04 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	2.39	mg/L	



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Reported:
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Olalla-MW3-12/19
19L0319-04 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 12/17/2019 11:05
Instrument: [CALC] Analyst: EP Analyzed: 12/31/2019 11:00

Sample Preparation: Preparation Method: [CALC] Extract ID: 19L0319-04
Preparation Batch: [CALC]
Prepared: 12/30/2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.0577	mg/L	

Instrument: LACHAT1 Analyst: EP Analyzed: 12/31/2019 11:00

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-04 C
Preparation Batch: BHL0796 Sample Size: 10 mL
Prepared: 12/30/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.058	mg/L	

Instrument: LACHAT2 Analyst: EP Analyzed: 12/18/2019 15:30

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-04 B
Preparation Batch: BHL0535 Sample Size: 10 mL
Prepared: 12/18/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



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Reported:
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Olalla-MW3-12/19
19L0319-04 (Water)

Wet Chemistry

Method: EPA 375.2

Sampled: 12/17/2019 11:05

Instrument: LACHAT1 Analyst: BF

Analyzed: 12/30/2019 14:20

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19L0319-04 B

Preparation Batch: BHL0808

Sample Size: 10 mL

Prepared: 12/30/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	13.8	mg/L	



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Reported:
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Olalla-MW3-12/19
19L0319-04 (Water)

Wet Chemistry

Method: EPA 410.4

Sampled: 12/17/2019 11:05

Instrument: UV1800-1 Analyst: JM

Analyzed: 12/19/2019 10:54

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19L0319-04 D

Preparation Batch: BHL0518

Sample Size: 2 mL

Prepared: 12/18/2019

Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	*, U



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Reported:
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Olalla-MW3-12/19
19L0319-04 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 12/17/2019 11:05
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHL0732	Analyzed: 12/26/2019 19:52
Sample Preparation:	Prepared: 12/26/2019	Extract ID: 19L0319-04 C
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.27	mg/L	



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Reported:
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Olalla-MW3-12/19
19L0319-04 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 12/17/2019 11:05
Instrument: Accumet AB150 Analyst: UW Analyzed: 12/19/2019 16:03

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-04 B
Preparation Batch: BHL0600 Sample Size: 100 mL
Prepared: 12/19/2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	175	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	175	mg/L CaCO3	



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Olalla-MW3-12/19
19L0319-04 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Sampled: 12/17/2019 11:05	
Instrument: Accumet AB150 Analyst: JM	Analyzed: 01/16/2020 16:52	
Sample Preparation:	Preparation Method: No Prep Wet Chem	Extract ID: 19L0319-04 B
	Preparation Batch: BIA0331	Sample Size: 50 mL
	Prepared: 01/16/2020	Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.23	pH Units	H



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Olalla-MW3-12/19
19L0319-04 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Instrument: LACHAT2 Analyst: EP	Sampled: 12/17/2019 11:05
Sample Preparation:	Preparation Method: No Prep Wet Chem Preparation Batch: BHL0840 Prepared: 12/31/2019	Analyzed: 01/02/2020 12:57
	Sample Size: 10 mL Final Volume: 10 mL	Extract ID: 19L0319-04 -

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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Olalla-MW3-12/19
19L0319-04 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/17/2019 11:05
Instrument: N/A Analyst: UW	Preparation Batch: BHL0524	Final Volume: 100 mL	Analyzed: 12/19/2019 10:05
Sample Preparation:	Prepared: 12/18/2019		Extract ID: 19L0319-04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-MW3-12/19
19L0319-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 12/17/2019 11:05
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/27/2019 11:59
Sample Preparation:	Extract ID: 19L0319-05 A 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BHL0723	Sample Size: 25 mL
Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



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Olalla-MW3-12/19
19L0319-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 12/17/2019 11:05
Instrument: ICPMS2 Analyst: TCH	Analyzed: 12/31/2019 19:10
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19L0319-05 A 01
Preparation Batch: BHL0723	Sample Size: 25 mL
Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19L0319-05 A 02
Preparation Batch: BHL0819	Sample Size: 100 mL
Prepared: 12/31/2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.122	ug/L	



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Reported:
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Olalla-MW3-12/19
19L0319-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C

Sampled: 12/17/2019 11:05

Instrument: ICP2 Analyst: TCH

Analyzed: 01/02/2020 16:08

Sample Preparation:

Preparation Method: WMN (No Prep)

Extract ID: 19L0319-05 A

Preparation Batch: BHL0842

Sample Size: 25 mL

Prepared: 12/31/2019

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	2	0.0060	0.0179	mg/L	D
Manganese, Dissolved	7439-96-5	2	0.0020	5.38	mg/L	D



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Reported:
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Olalla-MW10-12/19
19L0319-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 12:05

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 14:54

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-06 G

Preparation Batch: BHL0610

Sample Size: 10 mL

Prepared: 12/20/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Olalla-MW10-12/19
19L0319-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 12:05

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 14:54

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW10-12/19
19L0319-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 12:05

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 14:54

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	102	%	
Surrogate: Toluene-d8		80-120 %	98.7	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	97.7	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	103	%	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW10-12/19
19L0319-06 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM

Sampled: 12/17/2019 12:05

Instrument: NT16 Analyst: PB

Analyzed: 02/10/2020 19:43

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-06 H

Preparation Batch: BIB0243

Sample Size: 10 mL

Prepared: 02/10/2020

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	H, U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>105</i>	<i>%</i>	<i>H</i>



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW10-12/19
19L0319-06 (Water)

Metals and Metallic Compounds

Method: EPA 6010C

Sampled: 12/17/2019 12:05

Instrument: ICP2 Analyst: TCH

Analyzed: 12/24/2019 15:21

Sample Preparation:

Preparation Method: TWC EPA 3010A

Extract ID: 19L0319-06 A 02

Preparation Batch: BHL0676

Sample Size: 25 mL

Prepared: 12/23/2019

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	39.2	mg/L	
Potassium	7440-09-7	1	0.500	1.32	mg/L	
Sodium	7440-23-5	1	0.500	13.3	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Feb-2020 11:39
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Olalla-MW10-12/19
19L0319-06 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 12/17/2019 12:05
Instrument: [CALC] Analyst: EP Analyzed: 12/31/2019 11:01

Sample Preparation: Preparation Method: [CALC] Extract ID: 19L0319-06
Preparation Batch: [CALC]
Prepared: 12/30/2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: EP Analyzed: 12/31/2019 11:01

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-06 C
Preparation Batch: BHL0796 Sample Size: 10 mL
Prepared: 12/30/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: EP Analyzed: 12/18/2019 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-06 B
Preparation Batch: BHL0535 Sample Size: 10 mL
Prepared: 12/18/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW10-12/19
19L0319-06 (Water)

Wet Chemistry

Method: EPA 375.2

Sampled: 12/17/2019 12:05

Instrument: LACHAT1 Analyst: BF

Analyzed: 12/30/2019 14:21

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19L0319-06 B

Preparation Batch: BHL0808

Sample Size: 10 mL

Prepared: 12/30/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	8.21	mg/L	



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Olalla-MW10-12/19
19L0319-06 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem		Sampled: 12/17/2019 12:05
Instrument: UV1800-1 Analyst: JM	Preparation Batch: BHL0518	Sample Size: 2 mL	Analyzed: 12/19/2019 11:02
Sample Preparation:	Prepared: 12/18/2019	Final Volume: 2 mL	Extract ID: 19L0319-06 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Olalla-MW10-12/19
19L0319-06 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem		Sampled: 12/17/2019 12:05
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHL0732	Sample Size: 20 mL	Analyzed: 12/26/2019 20:11
Sample Preparation:	Prepared: 12/26/2019	Final Volume: 20 mL	Extract ID: 19L0319-06 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	3.61	mg/L	



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Project Manager: Doug Kunkel

Reported:
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Olalla-MW10-12/19
19L0319-06 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 12/17/2019 12:05
Instrument: Accumet AB150 Analyst: UW Analyzed: 12/19/2019 16:03

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-06 B
Preparation Batch: BHL0600 Sample Size: 100 mL
Prepared: 12/19/2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	217	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	217	mg/L CaCO3	



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Olalla-MW10-12/19
19L0319-06 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Sampled: 12/17/2019 12:05	
Instrument: Accumet AB150 Analyst: JM	Analyzed: 01/16/2020 16:52	
Sample Preparation:	Preparation Method: No Prep Wet Chem	Extract ID: 19L0319-06 B
	Preparation Batch: BIA0331	Sample Size: 50 mL
	Prepared: 01/16/2020	Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.45	pH Units	H



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Project: Olalla Landfill
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Reported:
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Olalla-MW10-12/19
19L0319-06 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97 Sampled: 12/17/2019 12:05
Instrument: LCHAT2 Analyst: EP Analyzed: 01/02/2020 12:58

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-06 -
Preparation Batch: BHL0840 Sample Size: 10 mL
Prepared: 12/31/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.083	mg/L	



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Project Manager: Doug Kunkel

Reported:
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Olalla-MW10-12/19
19L0319-06 (Water)

Microbiology

Method: SM 9222B Sampled: 12/17/2019 12:05
Instrument: N/A Analyst: UW Analyzed: 12/19/2019 10:05

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-06
Preparation Batch: BHL0524 Sample Size: 100 mL
Prepared: 12/18/2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-MW10-12/19
19L0319-06RE1 (Water)

Wet Chemistry

Method: EPA 325.2			Sampled: 12/17/2019 12:05
Instrument: LACHAT1 Analyst: EP			Analyzed: 12/27/2019 13:44
Sample Preparation:	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Extract ID: 19L0319-06RE1 B
	Preparation Batch: BHL0766	Final Volume: 10 mL	
	Prepared: 12/27/2019		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	2	2.00	2.00	12.8	mg/L	D



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW10-12/19
19L0319-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8		Sampled: 12/17/2019 12:05
Instrument: ICPMS1 Analyst: TCH		Analyzed: 12/27/2019 12:01
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19L0319-07 A 01
	Preparation Batch: BHL0723	Sample Size: 25 mL
	Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	23.9	ug/L	



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Olalla-MW10-12/19
19L0319-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 12/17/2019 12:05
Instrument: ICPMS2 Analyst: TCH	Analyzed: 12/31/2019 19:15
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Preparation Batch: BHL0723 Prepared: 12/26/2019	Extract ID: 19L0319-07 A 01 Sample Size: 25 mL Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x Preparation Batch: BHL0819 Prepared: 12/31/2019	Extract ID: 19L0319-07 A 02 Sample Size: 100 mL Final Volume: 20 mL
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Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	2.33	ug/L	



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Project Manager: Doug Kunkel

Reported:
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Olalla-MW10-12/19
19L0319-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 12/17/2019 12:05
Instrument: ICP2 Analyst: TCH Analyzed: 01/02/2020 12:36
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19L0319-07 A 03
Preparation Batch: BHL0842 Sample Size: 25 mL
Prepared: 12/31/2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0188	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	4.38	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW6-12/19
19L0319-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 13:27

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 15:22

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-08 G

Preparation Batch: BHL0610

Sample Size: 10 mL

Prepared: 12/20/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW6-12/19
19L0319-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 13:27

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 15:22

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	2.56	ug/L	
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW6-12/19
19L0319-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 13:27

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 15:22

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	103	%	
Surrogate: Toluene-d8		80-120 %	98.1	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	99.7	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	100	%	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW6-12/19
19L0319-08 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM

Sampled: 12/17/2019 13:27

Instrument: NT16 Analyst: PB

Analyzed: 02/10/2020 20:03

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-08 H

Preparation Batch: BIB0243

Sample Size: 10 mL

Prepared: 02/10/2020

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	H, U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>106</i>	<i>%</i>	<i>H</i>



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW6-12/19
19L0319-08 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/17/2019 13:27
Instrument: ICP2 Analyst: TCH Analyzed: 12/24/2019 15:25

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19L0319-08 A 02
Preparation Batch: BHL0676 Sample Size: 25 mL
Prepared: 12/23/2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	31.8	mg/L	
Potassium	7440-09-7	1	0.500	1.40	mg/L	
Sodium	7440-23-5	1	0.500	10.3	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Feb-2020 11:39
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Olalla-MW6-12/19
19L0319-08 (Water)

Wet Chemistry

Method: EPA 325.2	Instrument: LACHAT1	Analyst: EP	Sampled: 12/17/2019 13:27
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHL0766	Analyzed: 12/27/2019 13:27
	Prepared: 12/27/2019	Sample Size: 10 mL	Extract ID: 19L0319-08 B
		Final Volume: 10 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	3.71	mg/L	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW6-12/19
19L0319-08 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 12/17/2019 13:27
Instrument: [CALC] Analyst: EP Analyzed: 12/31/2019 11:02

Sample Preparation: Preparation Method: [CALC] Extract ID: 19L0319-08
Preparation Batch: [CALC]
Prepared: 12/30/2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: EP Analyzed: 12/31/2019 11:02

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-08 C
Preparation Batch: BHL0796 Sample Size: 10 mL
Prepared: 12/30/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: EP Analyzed: 12/18/2019 15:32

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-08 B
Preparation Batch: BHL0535 Sample Size: 10 mL
Prepared: 12/18/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW6-12/19
19L0319-08 (Water)

Wet Chemistry

Method: EPA 375.2		Sampled: 12/17/2019 13:27
Instrument: LACHAT1 Analyst: BF		Analyzed: 12/30/2019 14:23
Sample Preparation:	Preparation Method: No Prep Wet Chem	Extract ID: 19L0319-08 B
	Preparation Batch: BHL0808	
	Prepared: 12/30/2019	
	Sample Size: 10 mL	
	Final Volume: 10 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	6.69	mg/L	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW6-12/19
19L0319-08 (Water)

Wet Chemistry

Method: EPA 410.4

Sampled: 12/17/2019 13:27

Instrument: UV1800-1 Analyst: JM

Analyzed: 12/19/2019 11:02

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19L0319-08 D

Preparation Batch: BHL0518

Sample Size: 2 mL

Prepared: 12/18/2019

Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW6-12/19
19L0319-08 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 12/17/2019 13:27
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHL0732	Analyzed: 12/26/2019 20:38
Sample Preparation:	Prepared: 12/26/2019	Extract ID: 19L0319-08 C
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	2.03	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Feb-2020 11:39
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Olalla-MW6-12/19
19L0319-08 (Water)

Wet Chemistry

Method: SM 2320 B-97	Sampled: 12/17/2019 13:27
Instrument: Accumet AB150 Analyst: UW	Analyzed: 12/19/2019 16:03
Sample Preparation: Preparation Method: No Prep Wet Chem	Extract ID: 19L0319-08 B
Preparation Batch: BHL0600	Sample Size: 100 mL
Prepared: 12/19/2019	Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	178	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	178	mg/L CaCO3	



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Olalla-MW6-12/19
19L0319-08 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Instrument: Accumet AB150	Analyst: JM	Sampled: 12/17/2019 13:27
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BIA0331	Analyzed: 01/16/2020 16:52
	Prepared: 01/16/2020	Sample Size: 50 mL	Extract ID: 19L0319-08 B
		Final Volume: 50 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.52	pH Units	H



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Olalla-MW6-12/19
19L0319-08 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Preparation Method: No Prep Wet Chem	Sample Size: 10 mL	Sampled: 12/17/2019 13:27
Instrument: LCHAT2 Analyst: EP	Preparation Batch: BHL0840	Final Volume: 10 mL	Analyzed: 01/02/2020 12:59
Sample Preparation:	Prepared: 12/31/2019		Extract ID: 19L0319-08 -

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.070	mg/L	



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Olalla-MW6-12/19
19L0319-08 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/17/2019 13:27
Instrument: N/A Analyst: UW	Preparation Batch: BHL0524	Final Volume: 100 mL	Analyzed: 12/19/2019 10:05
Sample Preparation:	Prepared: 12/18/2019		Extract ID: 19L0319-08

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-MW6-12/19
19L0319-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Sampled: 12/17/2019 13:27
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/27/2019 12:22
Sample Preparation:	Extract ID: 19L0319-09 A 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BHL0723	Sample Size: 25 mL
Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	839	ug/L	



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Olalla-MW6-12/19
19L0319-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 12/17/2019 13:27
Instrument: ICPMS2 Analyst: TCH	Analyzed: 12/31/2019 19:20
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Preparation Batch: BHL0723 Prepared: 12/26/2019	Extract ID: 19L0319-09 A 01 Sample Size: 25 mL Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	5.77	ug/L	

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x Preparation Batch: BHL0819 Prepared: 12/31/2019	Extract ID: 19L0319-09 A 02 Sample Size: 100 mL Final Volume: 20 mL
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Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.914	ug/L	



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Olalla-MW6-12/19
19L0319-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Preparation Method: WMN (No Prep)	Sample Size: 25 mL	Sampld: 12/17/2019 13:27
Instrument: ICP2 Analyst: TCH	Preparation Batch: BHL0842	Final Volume: 25 mL	Analyzed: 01/02/2020 12:40
Sample Preparation:	Prepared: 12/31/2019		Extract ID: 19L0319-09 A 03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0195	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	0.721	mg/L	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW8-12/19
19L0319-10 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 14:15

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 15:50

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-10 F

Preparation Batch: BHL0610

Sample Size: 10 mL

Prepared: 12/20/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW8-12/19
19L0319-10 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 14:15

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 15:50

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW8-12/19
19L0319-10 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 14:15

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 15:50

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	99.6	%	
Surrogate: Toluene-d8		80-120 %	100	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	100	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	96.8	%	



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Project: Olalla Landfill
Project Number: [none]
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Reported:
12-Feb-2020 11:39

Olalla-MW8-12/19
19L0319-10 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM

Sampled: 12/17/2019 14:15

Instrument: NT16 Analyst: PB

Analyzed: 02/10/2020 20:23

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-10 H

Preparation Batch: BIB0243

Sample Size: 10 mL

Prepared: 02/10/2020

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	H, U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>106</i>	<i>%</i>	<i>H</i>



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW8-12/19
19L0319-10 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/17/2019 14:15
Instrument: ICP2 Analyst: TCH Analyzed: 12/24/2019 15:30
Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 19L0319-10 A 02
Preparation Batch: BHL0676 Sample Size: 25 mL
Prepared: 12/23/2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	15.8	mg/L	
Potassium	7440-09-7	1	0.500	0.984	mg/L	
Sodium	7440-23-5	1	0.500	7.64	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Feb-2020 11:39
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Olalla-MW8-12/19
19L0319-10 (Water)

Wet Chemistry

Method: EPA 325.2	Instrument: LACHAT1	Analyst: EP	Sampled: 12/17/2019 14:15
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHL0766	Analyzed: 12/27/2019 13:28
	Prepared: 12/27/2019	Sample Size: 10 mL	Extract ID: 19L0319-10 B
		Final Volume: 10 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	1.00	1.00	2.44	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Feb-2020 11:39
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Olalla-MW8-12/19
19L0319-10 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 12/17/2019 14:15
Instrument: [CALC] Analyst: EP Analyzed: 12/31/2019 11:03

Sample Preparation: Preparation Method: [CALC] Extract ID: 19L0319-10
Preparation Batch: [CALC]
Prepared: 12/30/2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.0320	mg/L	

Instrument: LACHAT1 Analyst: EP Analyzed: 12/31/2019 11:03

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-10 C
Preparation Batch: BHL0796 Sample Size: 10 mL
Prepared: 12/30/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	0.032	mg/L	

Instrument: LACHAT2 Analyst: EP Analyzed: 12/18/2019 15:33

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-10 B
Preparation Batch: BHL0535 Sample Size: 10 mL
Prepared: 12/18/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Olalla-MW8-12/19
19L0319-10 (Water)

Wet Chemistry

Method: EPA 375.2

Sampled: 12/17/2019 14:15

Instrument: LACHAT1 Analyst: BF

Analyzed: 12/30/2019 14:24

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19L0319-10 B

Preparation Batch: BHL0808

Sample Size: 10 mL

Prepared: 12/30/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	4.76	mg/L	



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Feb-2020 11:39
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Olalla-MW8-12/19
19L0319-10 (Water)

Wet Chemistry

Method: EPA 410.4	Preparation Method: No Prep Wet Chem		Sampled: 12/17/2019 14:15
Instrument: UV1800-1 Analyst: JM	Preparation Batch: BHL0518	Sample Size: 2 mL	Analyzed: 12/19/2019 11:03
Sample Preparation:	Prepared: 12/18/2019	Final Volume: 2 mL	Extract ID: 19L0319-10 D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Olalla-MW8-12/19
19L0319-10 (Water)

Wet Chemistry

Method: EPA 9060A	Preparation Method: No Prep Wet Chem	Sampled: 12/17/2019 14:15
Instrument: TOC-LCSH Analyst: BF	Preparation Batch: BHL0732	Analyzed: 12/26/2019 21:00
Sample Preparation:	Prepared: 12/26/2019	Extract ID: 19L0319-10 C
	Sample Size: 20 mL	
	Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	0.66	mg/L	



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Olalla-MW8-12/19
19L0319-10 (Water)

Wet Chemistry

Method: SM 2320 B-97	Sampled: 12/17/2019 14:15
Instrument: Accumet AB150 Analyst: UW	Analyzed: 12/19/2019 16:03
Sample Preparation: Preparation Method: No Prep Wet Chem	Extract ID: 19L0319-10 B
Preparation Batch: BHL0600	Sample Size: 100 mL
Prepared: 12/19/2019	Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	96.4	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	96.4	mg/L CaCO3	



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Olalla-MW8-12/19
19L0319-10 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Sampled: 12/17/2019 14:15	
Instrument: Accumet AB150 Analyst: JM	Analyzed: 01/16/2020 16:52	
Sample Preparation:	Preparation Method: No Prep Wet Chem	Extract ID: 19L0319-10 B
	Preparation Batch: BIA0331	Sample Size: 50 mL
	Prepared: 01/16/2020	Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.44	pH Units	H



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Olalla-MW8-12/19
19L0319-10 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 12/17/2019 14:15
Instrument: LACHAT2 Analyst: EP	Analyzed: 01/02/2020 13:01
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHL0840
	Prepared: 12/31/2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19L0319-10 -

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	ND	mg/L	U



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Olalla-MW8-12/19
19L0319-10 (Water)

Microbiology

Method: SM 9222B	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/17/2019 14:15
Instrument: N/A Analyst: UW	Preparation Batch: BHL0524	Final Volume: 100 mL	Analyzed: 12/19/2019 10:05
Sample Preparation:	Prepared: 12/18/2019		Extract ID: 19L0319-10

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Project Manager: Doug Kunkel

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Olalla-MW8-12/19
19L0319-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8		Sampled: 12/17/2019 14:15
Instrument: ICPMS1 Analyst: TCH		Analyzed: 12/27/2019 12:23
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19L0319-11 A 01
	Preparation Batch: BHL0723	Sample Size: 25 mL
	Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	341	ug/L	



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Olalla-MW8-12/19
19L0319-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 12/17/2019 14:15
Instrument: ICPMS2 Analyst: TCH	Analyzed: 12/31/2019 19:24
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19L0319-11 A 01
Preparation Batch: BHL0723	Sample Size: 25 mL
Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	ND	ug/L	U

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19L0319-11 A 02
Preparation Batch: BHL0819	Sample Size: 100 mL
Prepared: 12/31/2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.898	ug/L	



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Project Number: [none]
Project Manager: Doug Kunkel

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Olalla-MW8-12/19
19L0319-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 12/17/2019 14:15
Instrument: ICP2 Analyst: TCH Analyzed: 01/02/2020 12:45
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19L0319-11 A 03
Preparation Batch: BHL0842 Sample Size: 25 mL
Prepared: 12/31/2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0092	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	2.61	mg/L	



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Project Number: [none]
Project Manager: Doug Kunkel

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Olalla-MW7-12/19
19L0319-12 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 12/17/2019 15:02
Instrument: NT16 Analyst: PB	Analyzed: 12/20/2019 16:22
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19L0319-12 C
	Preparation Batch: BHL0627 Sample Size: 10 mL
	Prepared: 12/20/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			80-129 %	102	%	



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Project Number: [none]
Project Manager: Doug Kunkel

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Olalla-MW7-12/19
19L0319-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8		Sampled: 12/17/2019 15:02
Instrument: ICPMS1 Analyst: TCH		Analyzed: 12/27/2019 12:25
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19L0319-12 A 01
	Preparation Batch: BHL0723	Sample Size: 25 mL
	Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	ND	ug/L	U



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Olalla-MW7-12/19
19L0319-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 12/17/2019 15:02
Instrument: ICPMS2 Analyst: TCH	Analyzed: 12/31/2019 21:19
Sample Preparation:	Extract ID: 19L0319-12 A 02
Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	
Preparation Batch: BHL0819	Sample Size: 100 mL
Prepared: 12/31/2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	0.281	ug/L	



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Olalla-MW7-12/19
19L0319-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C	Sampled: 12/17/2019 15:02	
Instrument: ICP2 Analyst: SKM	Analyzed: 01/07/2020 11:49	
Sample Preparation:	Preparation Method: WMN (No Prep)	Extract ID: 19L0319-12 A 03
	Preparation Batch: BHL0842	Sample Size: 25 mL
	Prepared: 12/31/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Manganese, Dissolved	7439-96-5	1	0.0010	ND	mg/L	U



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Olalla-MW7-12/19
19L0319-12 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Instrument: Accumet AB150	Analyst: JM	Sampled: 12/17/2019 15:02	Analyzed: 12/18/2019 14:26
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHL0533	Sample Size: 50 mL	Final Volume: 50 mL
	Prepared: 12/18/2019			Extract ID: 19L0319-12 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.66	pH Units	H



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Olalla-MW13-12/19
19L0319-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 00:00

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 16:17

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-13 H

Preparation Batch: BHL0610

Sample Size: 10 mL

Prepared: 12/20/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Project Manager: Doug Kunkel

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Olalla-MW13-12/19
19L0319-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 00:00

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 16:17

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

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Olalla-MW13-12/19
19L0319-13 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 00:00

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 16:17

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	105	%	
Surrogate: Toluene-d8		80-120 %	100	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	95.2	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.3	%	



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Olalla-MW13-12/19
19L0319-13 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM Sampled: 12/17/2019 00:00
Instrument: NT16 Analyst: PB Analyzed: 02/10/2020 20:43
Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19L0319-13 G
Preparation Batch: BIB0243 Sample Size: 10 mL
Prepared: 02/10/2020 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	H, U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>106</i>	<i>%</i>	<i>H</i>



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Olalla-MW13-12/19
19L0319-13 (Water)

Metals and Metallic Compounds

Method: EPA 6010C

Sampled: 12/17/2019 00:00

Instrument: ICP2 Analyst: TCH

Analyzed: 12/24/2019 15:34

Sample Preparation:

Preparation Method: TWC EPA 3010A

Extract ID: 19L0319-13 A 02

Preparation Batch: BHL0676

Sample Size: 25 mL

Prepared: 12/23/2019

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0500	38.2	mg/L	
Potassium	7440-09-7	1	0.500	1.24	mg/L	
Sodium	7440-23-5	1	0.500	12.9	mg/L	



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Olalla-MW13-12/19
19L0319-13 (Water)

Wet Chemistry

Method: EPA 353.2 Sampled: 12/17/2019 00:00
Instrument: [CALC] Analyst: EP Analyzed: 12/31/2019 11:04

Sample Preparation: Preparation Method: [CALC] Extract ID: 19L0319-13
Preparation Batch: [CALC]
Prepared: 12/30/2019 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	ND	mg/L	U

Instrument: LACHAT1 Analyst: EP Analyzed: 12/31/2019 11:04

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-13 C
Preparation Batch: BHL0796 Sample Size: 10 mL
Prepared: 12/30/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.010	ND	mg/L	U

Instrument: LACHAT2 Analyst: EP Analyzed: 12/18/2019 15:41

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-13 B
Preparation Batch: BHL0535 Sample Size: 10 mL
Prepared: 12/18/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.010	ND	mg/L	U



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Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Olalla-MW13-12/19
19L0319-13 (Water)

Wet Chemistry

Method: EPA 375.2		Sampled: 12/17/2019 00:00
Instrument: LACHAT1 Analyst: BF		Analyzed: 12/30/2019 14:25
Sample Preparation:	Preparation Method: No Prep Wet Chem	Extract ID: 19L0319-13 B
	Preparation Batch: BHL0808	Sample Size: 10 mL
	Prepared: 12/30/2019	Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	2.00	2.00	8.01	mg/L	



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Olalla-MW13-12/19
19L0319-13 (Water)

Wet Chemistry

Method: EPA 410.4

Sampled: 12/17/2019 00:00

Instrument: UV1800-1 Analyst: JM

Analyzed: 12/19/2019 11:04

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 19L0319-13 D

Preparation Batch: BHL0518

Sample Size: 2 mL

Prepared: 12/18/2019

Final Volume: 2 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
COD		1	10.0	10.0	ND	mg/L	U



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Olalla-MW13-12/19
19L0319-13 (Water)

Wet Chemistry

Method: EPA 9060A	Instrument: TOC-LCSH	Analyst: BF	Sampled: 12/17/2019 00:00
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHL0732	Analyzed: 12/26/2019 21:22
	Prepared: 12/26/2019	Sample Size: 20 mL	Extract ID: 19L0319-13 C
		Final Volume: 20 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.50	0.50	3.57	mg/L	



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Project Manager: Doug Kunkel

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Olalla-MW13-12/19
19L0319-13 (Water)

Wet Chemistry

Method: SM 2320 B-97 Sampled: 12/17/2019 00:00
Instrument: Accumet AB150 Analyst: UW Analyzed: 12/19/2019 16:03

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-13 B
Preparation Batch: BHL0600 Sample Size: 100 mL
Prepared: 12/19/2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Bicarbonate		1	1.00	1.00	216	mg/L CaCO3	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Carbonate		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Hydroxide		1	1.00	1.00	ND	mg/L CaCO3	U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Alkalinity, Total		1	1.00	1.00	216	mg/L CaCO3	



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Olalla-MW13-12/19
19L0319-13 (Water)

Wet Chemistry

Method: SM 4500-H+ B-00	Sampled: 12/17/2019 00:00
Instrument: Accumet AB150 Analyst: JM	Analyzed: 01/16/2020 16:52
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BIA0331
	Prepared: 01/16/2020
	Sample Size: 50 mL
	Final Volume: 50 mL
	Extract ID: 19L0319-13 B

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.43	pH Units	H



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Olalla-MW13-12/19
19L0319-13 (Water)

Wet Chemistry

Method: SM 4500-NH3 H-97	Sampled: 12/17/2019 00:00
Instrument: LACHAT2 Analyst: EP	Analyzed: 01/02/2020 13:02
Sample Preparation:	Preparation Method: No Prep Wet Chem
	Preparation Batch: BHL0840
	Prepared: 12/31/2019
	Sample Size: 10 mL
	Final Volume: 10 mL
	Extract ID: 19L0319-13 -

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.040	0.085	mg/L	



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Olalla-MW13-12/19
19L0319-13 (Water)

Microbiology

Method: SM 9222B Sampled: 12/17/2019 00:00
Instrument: N/A Analyst: UW Analyzed: 12/19/2019 10:05

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 19L0319-13
Preparation Batch: BHL0524 Sample Size: 100 mL
Prepared: 12/18/2019 Final Volume: 100 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Total Coliforms		1	1	1	ND	CFU/100 ml	H, U



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Olalla-MW13-12/19
19L0319-13RE1 (Water)

Wet Chemistry

Method: EPA 325.2	Instrument: LACHAT1	Analyst: EP	Sampled: 12/17/2019 00:00
Sample Preparation:	Preparation Method: No Prep Wet Chem	Preparation Batch: BHL0766	Analyzed: 12/27/2019 13:46
	Prepared: 12/27/2019	Sample Size: 10 mL	Extract ID: 19L0319-13RE1 B
		Final Volume: 10 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	2	2.00	2.00	12.8	mg/L	D



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Olalla-MW13-12/19
19L0319-14 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8	Instrument: ICPMS1	Analyst: TCH	Sampled: 12/17/2019 00:00
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Preparation Batch: BHL0723	Analyzed: 12/27/2019 12:27
	Prepared: 12/26/2019	Sample Size: 25 mL	Extract ID: 19L0319-14 A 01
		Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Iron, Dissolved	7439-89-6	1	20.0	27.9	ug/L	



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Olalla-MW13-12/19
19L0319-14 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED	Sampled: 12/17/2019 00:00
Instrument: ICPMS2 Analyst: TCH	Analyzed: 12/31/2019 20:17
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 19L0319-14 A 01
Preparation Batch: BHL0723	Sample Size: 25 mL
Prepared: 12/26/2019	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Zinc, Dissolved	7440-66-6	1	4.00	12.0	ug/L	

Sample Preparation: Preparation Method: RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x	Extract ID: 19L0319-14 A 02
Preparation Batch: BHL0819	Sample Size: 100 mL
Prepared: 12/31/2019	Final Volume: 20 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0400	2.41	ug/L	



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Olalla-MW13-12/19
19L0319-14 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010C Sampled: 12/17/2019 00:00
Instrument: ICP2 Analyst: TCH Analyzed: 01/02/2020 12:53
Sample Preparation: Preparation Method: WMN (No Prep) Extract ID: 19L0319-14 A 03
Preparation Batch: BHL0842 Sample Size: 25 mL
Prepared: 12/31/2019 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.0030	0.0188	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0010	4.48	mg/L	



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Project Manager: Doug Kunkel

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Trip Blank
19L0319-15 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 15:02

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 13:01

Sample Preparation:

Preparation Method: EPA 5030 (Purge and Trap)

Extract ID: 19L0319-15 A

Preparation Batch: BHL0610

Sample Size: 10 mL

Prepared: 12/20/2019

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.20	ND	ug/L	U
Bromomethane	74-83-9	1	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.20	ND	ug/L	U
Acrolein	107-02-8	1	5.00	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.20	ND	ug/L	U
Acetone	67-64-1	1	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	1.00	ND	ug/L	U
Methylene Chloride	75-09-2	1	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.20	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	1.00	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	5.00	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.20	ND	ug/L	U



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Trip Blank
19L0319-15 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 15:02

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 13:01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.20	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.20	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.50	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.20	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.50	ND	ug/L	U
Naphthalene	91-20-3	1	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.50	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.20	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.50	ND	ug/L	U
2-Pentanone	107-87-9	1	5.00	ND	ug/L	U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

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Trip Blank
19L0319-15 (Water)

Volatile Organic Compounds

Method: EPA 8260C

Sampled: 12/17/2019 15:02

Instrument: NT3 Analyst: PKC

Analyzed: 12/20/2019 13:01

Analyte	CAS Number	Recovery		Units	Notes
		Limits	Recovery		
Surrogate: 1,2-Dichloroethane-d4		80-129 %	95.3	%	
Surrogate: Toluene-d8		80-120 %	100	%	
Surrogate: 4-Bromofluorobenzene		80-120 %	98.1	%	
Surrogate: 1,2-Dichlorobenzene-d4		80-120 %	99.9	%	



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Trip Blank
19L0319-15 (Water)

Volatile Organic Compounds - SIM

Method: EPA 8260C-SIM	Sampled: 12/17/2019 15:02
Instrument: NT16 Analyst: PB	Analyzed: 12/20/2019 16:42
Sample Preparation:	Preparation Method: EPA 5030 (Purge and Trap) Extract ID: 19L0319-15 B
	Preparation Batch: BHL0627 Sample Size: 10 mL
	Prepared: 12/20/2019 Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Vinyl chloride	75-01-4	1	20.0	ND	ng/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>			<i>80-129 %</i>	<i>102</i>	<i>%</i>	



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0586 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0586-BLK1)		Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 12:05								
Chloromethane	ND	0.50	ug/L							U
Vinyl Chloride	ND	0.20	ug/L							U
Bromomethane	ND	1.00	ug/L							U
Chloroethane	ND	0.20	ug/L							U
Trichlorofluoromethane	ND	0.20	ug/L							U
Acrolein	ND	5.00	ug/L							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.20	ug/L							U
Acetone	ND	5.00	ug/L							U
1,1-Dichloroethene	ND	0.20	ug/L							U
Bromoethane	ND	0.20	ug/L							U
Iodomethane	ND	1.00	ug/L							U
Methylene Chloride	ND	1.00	ug/L							U
Acrylonitrile	ND	1.00	ug/L							U
Carbon Disulfide	ND	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.20	ug/L							U
Vinyl Acetate	ND	0.20	ug/L							U
1,1-Dichloroethane	ND	0.20	ug/L							U
2-Butanone	ND	5.00	ug/L							U
2,2-Dichloropropane	ND	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Chloroform	ND	0.20	ug/L							U
Bromochloromethane	ND	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.20	ug/L							U
1,1-Dichloropropene	ND	0.20	ug/L							U
Carbon tetrachloride	ND	0.20	ug/L							U
1,2-Dichloroethane	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
1,2-Dichloropropane	ND	0.20	ug/L							U
Bromodichloromethane	ND	0.20	ug/L							U
Dibromomethane	ND	0.20	ug/L							U
2-Chloroethyl vinyl ether	ND	1.00	ug/L							U
4-Methyl-2-Pentanone	ND	5.00	ug/L							U
cis-1,3-Dichloropropene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0586 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0586-BLK1)		Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 12:05								
trans-1,3-Dichloropropene	ND	0.20	ug/L							U
2-Hexanone	ND	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.20	ug/L							U
1,3-Dichloropropane	ND	0.20	ug/L							U
Tetrachloroethene	ND	0.20	ug/L							U
Dibromochloromethane	ND	0.20	ug/L							U
1,2-Dibromoethane	ND	0.20	ug/L							U
Chlorobenzene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
Xylenes, total	ND	0.60	ug/L							U
Styrene	ND	0.20	ug/L							U
Bromoform	ND	0.20	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.20	ug/L							U
1,2,3-Trichloropropane	ND	0.50	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	1.00	ug/L							U
n-Propylbenzene	ND	0.20	ug/L							U
Bromobenzene	ND	0.20	ug/L							U
Isopropyl Benzene	ND	0.20	ug/L							U
2-Chlorotoluene	ND	0.20	ug/L							U
4-Chlorotoluene	ND	0.20	ug/L							U
t-Butylbenzene	ND	0.20	ug/L							U
1,3,5-Trimethylbenzene	ND	0.20	ug/L							U
1,2,4-Trimethylbenzene	ND	0.20	ug/L							U
s-Butylbenzene	ND	0.20	ug/L							U
4-Isopropyl Toluene	ND	0.20	ug/L							U
1,3-Dichlorobenzene	ND	0.20	ug/L							U
1,4-Dichlorobenzene	ND	0.20	ug/L							U
n-Butylbenzene	ND	0.20	ug/L							U
1,2-Dichlorobenzene	ND	0.20	ug/L							U
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L							U
1,2,4-Trichlorobenzene	ND	0.50	ug/L							U
Hexachloro-1,3-Butadiene	ND	0.50	ug/L							U



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0586 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0586-BLK1)										
Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 12:05										
Naphthalene	ND	0.50	ug/L							U
1,2,3-Trichlorobenzene	ND	0.50	ug/L							U
Dichlorodifluoromethane	ND	0.20	ug/L							U
Methyl tert-butyl Ether	ND	0.50	ug/L							U
2-Pentanone	ND	5.00	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.17		ug/L	5.00		103	80-129			
<i>Surrogate: Toluene-d8</i>	4.99		ug/L	5.00		99.9	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.85		ug/L	5.00		96.9	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.08		ug/L	5.00		102	80-120			
LCS (BHL0586-BS1)										
Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 09:46										
Chloromethane	8.78	0.50	ug/L	10.0		87.8	60-138			
Vinyl Chloride	11.3	0.20	ug/L	10.0		113	66-133			
Bromomethane	10.7	1.00	ug/L	10.0		107	72-131			
Chloroethane	10.9	0.20	ug/L	10.0		109	60-155			
Trichlorofluoromethane	10.7	0.20	ug/L	10.0		107	80-129			
Acrolein	55.3	5.00	ug/L	50.0		111	52-144			
1,1,2-Trichloro-1,2,2-Trifluoroethane	11.1	0.20	ug/L	10.0		111	76-129			
Acetone	47.5	5.00	ug/L	50.0		95.1	58-142			
1,1-Dichloroethene	10.6	0.20	ug/L	10.0		106	69-135			
Bromoethane	10.7	0.20	ug/L	10.0		107	78-128			
Iodomethane	10.4	1.00	ug/L	10.0		104	56-147			
Methylene Chloride	10.1	1.00	ug/L	10.0		101	65-135			
Acrylonitrile	9.87	1.00	ug/L	10.0		98.7	64-134			
Carbon Disulfide	10.9	0.20	ug/L	10.0		109	78-125			
trans-1,2-Dichloroethene	10.2	0.20	ug/L	10.0		102	78-128			
Vinyl Acetate	10.0	0.20	ug/L	10.0		100	55-138			
1,1-Dichloroethane	10.2	0.20	ug/L	10.0		102	76-124			
2-Butanone	48.3	5.00	ug/L	50.0		96.6	61-140			
2,2-Dichloropropane	10.4	0.20	ug/L	10.0		104	78-125			
cis-1,2-Dichloroethene	10.3	0.20	ug/L	10.0		103	80-121			
Chloroform	10.3	0.20	ug/L	10.0		103	80-122			
Bromochloromethane	9.88	0.20	ug/L	10.0		98.8	80-121			
1,1,1-Trichloroethane	10.4	0.20	ug/L	10.0		104	79-123			
1,1-Dichloropropene	10.2	0.20	ug/L	10.0		102	80-120			



Environmental Partners, Inc.
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Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0586 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHL0586-BS1)				Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 09:46						
Carbon tetrachloride	10.3	0.20	ug/L	10.0		103	53-137			
1,2-Dichloroethane	9.97	0.20	ug/L	10.0		99.7	75-123			
Benzene	10.3	0.20	ug/L	10.0		103	80-120			
Trichloroethene	10.3	0.20	ug/L	10.0		103	80-120			
1,2-Dichloropropane	9.99	0.20	ug/L	10.0		99.9	80-120			
Bromodichloromethane	10.1	0.20	ug/L	10.0		101	80-121			
Dibromomethane	9.84	0.20	ug/L	10.0		98.4	80-120			
2-Chloroethyl vinyl ether	9.30	1.00	ug/L	10.0		93.0	74-127			
4-Methyl-2-Pentanone	49.1	5.00	ug/L	50.0		98.1	67-133			
cis-1,3-Dichloropropene	10.5	0.20	ug/L	10.0		105	80-124			
Toluene	10.2	0.20	ug/L	10.0		102	80-120			
trans-1,3-Dichloropropene	10.1	0.20	ug/L	10.0		101	71-127			
2-Hexanone	46.7	5.00	ug/L	50.0		93.4	69-133			
1,1,2-Trichloroethane	10.2	0.20	ug/L	10.0		102	80-121			
1,3-Dichloropropane	9.61	0.20	ug/L	10.0		96.1	80-120			
Tetrachloroethene	10.0	0.20	ug/L	10.0		100	80-120			
Dibromochloromethane	9.73	0.20	ug/L	10.0		97.3	65-135			
1,2-Dibromoethane	9.76	0.20	ug/L	10.0		97.6	80-121			
Chlorobenzene	9.75	0.20	ug/L	10.0		97.5	80-120			
Ethylbenzene	9.97	0.20	ug/L	10.0		99.7	80-120			
1,1,1,2-Tetrachloroethane	9.99	0.20	ug/L	10.0		99.9	80-120			
m,p-Xylene	20.0	0.40	ug/L	20.0		100	80-121			
o-Xylene	10.4	0.20	ug/L	10.0		104	80-121			
Xylenes, total	30.4	0.60	ug/L	30.0		101	76-127			
Styrene	10.3	0.20	ug/L	10.0		103	80-124			
Bromoform	8.39	0.20	ug/L	10.0		83.9	51-134			
1,1,1,2,2-Tetrachloroethane	9.16	0.20	ug/L	10.0		91.6	77-123			
1,2,3-Trichloropropane	8.74	0.50	ug/L	10.0		87.4	76-125			
trans-1,4-Dichloro 2-Butene	9.58	1.00	ug/L	10.0		95.8	55-129			
n-Propylbenzene	10.3	0.20	ug/L	10.0		103	78-130			
Bromobenzene	9.50	0.20	ug/L	10.0		95.0	80-120			
Isopropyl Benzene	10.3	0.20	ug/L	10.0		103	80-128			
2-Chlorotoluene	10.1	0.20	ug/L	10.0		101	78-122			
4-Chlorotoluene	9.79	0.20	ug/L	10.0		97.9	80-121			
t-Butylbenzene	10.5	0.20	ug/L	10.0		105	78-125			



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0586 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHL0586-BS1)										
					Prepared: 19-Dec-2019	Analyzed: 19-Dec-2019 09:46				
1,3,5-Trimethylbenzene	10.3	0.20	ug/L	10.0		103	80-129			
1,2,4-Trimethylbenzene	10.3	0.20	ug/L	10.0		103	80-127			
s-Butylbenzene	10.7	0.20	ug/L	10.0		107	78-129			
4-Isopropyl Toluene	10.6	0.20	ug/L	10.0		106	79-130			
1,3-Dichlorobenzene	9.72	0.20	ug/L	10.0		97.2	80-120			
1,4-Dichlorobenzene	9.75	0.20	ug/L	10.0		97.5	80-120			
n-Butylbenzene	10.7	0.20	ug/L	10.0		107	74-129			
1,2-Dichlorobenzene	9.75	0.20	ug/L	10.0		97.5	80-120			
1,2-Dibromo-3-chloropropane	7.77	0.50	ug/L	10.0		77.7	62-123			Q
1,2,4-Trichlorobenzene	9.72	0.50	ug/L	10.0		97.2	64-124			
Hexachloro-1,3-Butadiene	13.1	0.50	ug/L	10.0		131	58-123			*, Q
Naphthalene	8.84	0.50	ug/L	10.0		88.4	50-134			
1,2,3-Trichlorobenzene	9.19	0.50	ug/L	10.0		91.9	49-133			
Dichlorodifluoromethane	12.5	0.20	ug/L	10.0		125	48-147			Q
Methyl tert-butyl Ether	9.72	0.50	ug/L	10.0		97.2	71-132			
2-Pentanone	45.4	5.00	ug/L	50.0		90.7	69-134			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.89		ug/L	5.00		97.8	80-129			
<i>Surrogate: Toluene-d8</i>	5.02		ug/L	5.00		100	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.98		ug/L	5.00		99.7	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.03		ug/L	5.00		101	80-120			
LCS Dup (BHL0586-BS1)										
					Prepared: 19-Dec-2019	Analyzed: 19-Dec-2019 10:14				
Chloromethane	10.2	0.50	ug/L	10.0		102	60-138	15.20	30	
Vinyl Chloride	12.3	0.20	ug/L	10.0		123	66-133	7.94	30	
Bromomethane	11.4	1.00	ug/L	10.0		114	72-131	5.74	30	
Chloroethane	11.7	0.20	ug/L	10.0		117	60-155	7.32	30	
Trichlorofluoromethane	11.6	0.20	ug/L	10.0		116	80-129	7.95	30	
Acrolein	59.7	5.00	ug/L	50.0		119	52-144	7.68	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	11.8	0.20	ug/L	10.0		118	76-129	6.16	30	
Acetone	55.3	5.00	ug/L	50.0		111	58-142	15.20	30	
1,1-Dichloroethene	11.2	0.20	ug/L	10.0		112	69-135	5.06	30	
Bromoethane	11.6	0.20	ug/L	10.0		116	78-128	8.49	30	
Iodomethane	11.3	1.00	ug/L	10.0		113	56-147	7.69	30	
Methylene Chloride	7.94	1.00	ug/L	10.0		79.4	65-135	24.40	30	
Acrylonitrile	11.2	1.00	ug/L	10.0		112	64-134	12.30	30	



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0586 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BHL0586-BSD1)										
					Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 10:14					
Carbon Disulfide	11.7	0.20	ug/L	10.0		117	78-125	7.51	30	
trans-1,2-Dichloroethene	11.0	0.20	ug/L	10.0		110	78-128	7.14	30	
Vinyl Acetate	11.1	0.20	ug/L	10.0		111	55-138	10.00	30	
1,1-Dichloroethane	11.0	0.20	ug/L	10.0		110	76-124	7.12	30	
2-Butanone	54.8	5.00	ug/L	50.0		110	61-140	12.60	30	
2,2-Dichloropropane	11.1	0.20	ug/L	10.0		111	78-125	6.99	30	
cis-1,2-Dichloroethene	10.9	0.20	ug/L	10.0		109	80-121	5.30	30	
Chloroform	11.0	0.20	ug/L	10.0		110	80-122	5.99	30	
Bromochloromethane	11.1	0.20	ug/L	10.0		111	80-121	11.60	30	
1,1,1-Trichloroethane	11.1	0.20	ug/L	10.0		111	79-123	6.37	30	
1,1-Dichloropropene	10.9	0.20	ug/L	10.0		109	80-120	6.64	30	
Carbon tetrachloride	10.9	0.20	ug/L	10.0		109	53-137	6.15	30	
1,2-Dichloroethane	10.6	0.20	ug/L	10.0		106	75-123	6.52	30	
Benzene	10.9	0.20	ug/L	10.0		109	80-120	5.65	30	
Trichloroethene	10.7	0.20	ug/L	10.0		107	80-120	3.24	30	
1,2-Dichloropropane	10.6	0.20	ug/L	10.0		106	80-120	6.02	30	
Bromodichloromethane	10.4	0.20	ug/L	10.0		104	80-121	2.60	30	
Dibromomethane	10.7	0.20	ug/L	10.0		107	80-120	8.23	30	
2-Chloroethyl vinyl ether	10.3	1.00	ug/L	10.0		103	74-127	10.50	30	
4-Methyl-2-Pentanone	55.0	5.00	ug/L	50.0		110	67-133	11.40	30	
cis-1,3-Dichloropropene	11.1	0.20	ug/L	10.0		111	80-124	5.45	30	
Toluene	10.8	0.20	ug/L	10.0		108	80-120	5.99	30	
trans-1,3-Dichloropropene	11.1	0.20	ug/L	10.0		111	71-127	9.27	30	
2-Hexanone	53.5	5.00	ug/L	50.0		107	69-133	13.60	30	
1,1,2-Trichloroethane	11.1	0.20	ug/L	10.0		111	80-121	8.78	30	
1,3-Dichloropropane	10.7	0.20	ug/L	10.0		107	80-120	11.00	30	
Tetrachloroethene	10.9	0.20	ug/L	10.0		109	80-120	8.71	30	
Dibromochloromethane	10.8	0.20	ug/L	10.0		108	65-135	10.30	30	
1,2-Dibromoethane	11.0	0.20	ug/L	10.0		110	80-121	11.60	30	
Chlorobenzene	10.5	0.20	ug/L	10.0		105	80-120	7.70	30	
Ethylbenzene	10.9	0.20	ug/L	10.0		109	80-120	8.43	30	
1,1,1,2-Tetrachloroethane	11.0	0.20	ug/L	10.0		110	80-120	9.62	30	
m,p-Xylene	21.5	0.40	ug/L	20.0		108	80-121	7.23	30	
o-Xylene	10.9	0.20	ug/L	10.0		109	80-121	4.84	30	
Xylenes, total	32.4	0.60	ug/L	30.0		108	76-127	6.42	30	



Environmental Partners, Inc.
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Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0586 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BHL0586-bsd1)				Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 10:14						
Styrene	11.0	0.20	ug/L	10.0		110	80-124	6.65	30	
Bromoform	10.0	0.20	ug/L	10.0		100	51-134	17.70	30	
1,1,2,2-Tetrachloroethane	10.5	0.20	ug/L	10.0		105	77-123	13.30	30	
1,2,3-Trichloropropane	9.84	0.50	ug/L	10.0		98.4	76-125	11.80	30	
trans-1,4-Dichloro 2-Butene	10.8	1.00	ug/L	10.0		108	55-129	11.70	30	
n-Propylbenzene	11.3	0.20	ug/L	10.0		113	78-130	9.85	30	
Bromobenzene	10.5	0.20	ug/L	10.0		105	80-120	10.50	30	
Isopropyl Benzene	11.3	0.20	ug/L	10.0		113	80-128	9.25	30	
2-Chlorotoluene	11.0	0.20	ug/L	10.0		110	78-122	8.46	30	
4-Chlorotoluene	10.8	0.20	ug/L	10.0		108	80-121	9.65	30	
t-Butylbenzene	11.4	0.20	ug/L	10.0		114	78-125	8.78	30	
1,3,5-Trimethylbenzene	11.5	0.20	ug/L	10.0		115	80-129	11.60	30	
1,2,4-Trimethylbenzene	11.5	0.20	ug/L	10.0		115	80-127	11.00	30	
s-Butylbenzene	11.8	0.20	ug/L	10.0		118	78-129	9.54	30	
4-Isopropyl Toluene	11.7	0.20	ug/L	10.0		117	79-130	10.50	30	
1,3-Dichlorobenzene	10.8	0.20	ug/L	10.0		108	80-120	10.20	30	
1,4-Dichlorobenzene	10.9	0.20	ug/L	10.0		109	80-120	11.20	30	
n-Butylbenzene	11.6	0.20	ug/L	10.0		116	74-129	8.19	30	
1,2-Dichlorobenzene	10.9	0.20	ug/L	10.0		109	80-120	10.90	30	
1,2-Dibromo-3-chloropropane	9.85	0.50	ug/L	10.0		98.5	62-123	23.60	30	Q
1,2,4-Trichlorobenzene	10.8	0.50	ug/L	10.0		108	64-124	10.80	30	
Hexachloro-1,3-Butadiene	14.3	0.50	ug/L	10.0		143	58-123	8.90	30	*, Q
Naphthalene	10.2	0.50	ug/L	10.0		102	50-134	14.60	30	
1,2,3-Trichlorobenzene	10.7	0.50	ug/L	10.0		107	49-133	14.90	30	
Dichlorodifluoromethane	13.5	0.20	ug/L	10.0		135	48-147	7.45	30	Q
Methyl tert-butyl Ether	10.9	0.50	ug/L	10.0		109	71-132	11.00	30	
2-Pentanone	52.6	5.00	ug/L	50.0		105	69-134	14.80	30	
Surrogate: 1,2-Dichloroethane-d4	5.03		ug/L	5.00		101	80-129			
Surrogate: Toluene-d8	5.04		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	4.97		ug/L	5.00		99.3	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.13		ug/L	5.00		103	80-120			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0610-BLK1)		Prepared: 20-Dec-2019 Analyzed: 20-Dec-2019 12:33								
Chloromethane	ND	0.50	ug/L							U
Vinyl Chloride	ND	0.20	ug/L							U
Bromomethane	ND	1.00	ug/L							U
Chloroethane	ND	0.20	ug/L							U
Trichlorofluoromethane	ND	0.20	ug/L							U
Acrolein	ND	5.00	ug/L							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.20	ug/L							U
Acetone	ND	5.00	ug/L							U
1,1-Dichloroethene	ND	0.20	ug/L							U
Bromoethane	ND	0.20	ug/L							U
Iodomethane	ND	1.00	ug/L							U
Methylene Chloride	ND	1.00	ug/L							U
Acrylonitrile	ND	1.00	ug/L							U
Carbon Disulfide	ND	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.20	ug/L							U
Vinyl Acetate	ND	0.20	ug/L							U
1,1-Dichloroethane	ND	0.20	ug/L							U
2-Butanone	ND	5.00	ug/L							U
2,2-Dichloropropane	ND	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.20	ug/L							U
Chloroform	ND	0.20	ug/L							U
Bromochloromethane	ND	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.20	ug/L							U
1,1-Dichloropropene	ND	0.20	ug/L							U
Carbon tetrachloride	ND	0.20	ug/L							U
1,2-Dichloroethane	ND	0.20	ug/L							U
Benzene	ND	0.20	ug/L							U
Trichloroethene	ND	0.20	ug/L							U
1,2-Dichloropropane	ND	0.20	ug/L							U
Bromodichloromethane	ND	0.20	ug/L							U
Dibromomethane	ND	0.20	ug/L							U
2-Chloroethyl vinyl ether	ND	1.00	ug/L							U
4-Methyl-2-Pentanone	ND	5.00	ug/L							U
cis-1,3-Dichloropropene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0610-BLK1)		Prepared: 20-Dec-2019 Analyzed: 20-Dec-2019 12:33								
trans-1,3-Dichloropropene	ND	0.20	ug/L							U
2-Hexanone	ND	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.20	ug/L							U
1,3-Dichloropropane	ND	0.20	ug/L							U
Tetrachloroethene	ND	0.20	ug/L							U
Dibromochloromethane	ND	0.20	ug/L							U
1,2-Dibromoethane	ND	0.20	ug/L							U
Chlorobenzene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
Xylenes, total	ND	0.60	ug/L							U
Styrene	ND	0.20	ug/L							U
Bromoform	ND	0.20	ug/L							U
1,1,1,2,2-Tetrachloroethane	ND	0.20	ug/L							U
1,2,3-Trichloropropane	ND	0.50	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	1.00	ug/L							U
n-Propylbenzene	ND	0.20	ug/L							U
Bromobenzene	ND	0.20	ug/L							U
Isopropyl Benzene	ND	0.20	ug/L							U
2-Chlorotoluene	ND	0.20	ug/L							U
4-Chlorotoluene	ND	0.20	ug/L							U
t-Butylbenzene	ND	0.20	ug/L							U
1,3,5-Trimethylbenzene	ND	0.20	ug/L							U
1,2,4-Trimethylbenzene	ND	0.20	ug/L							U
s-Butylbenzene	ND	0.20	ug/L							U
4-Isopropyl Toluene	ND	0.20	ug/L							U
1,3-Dichlorobenzene	ND	0.20	ug/L							U
1,4-Dichlorobenzene	ND	0.20	ug/L							U
n-Butylbenzene	ND	0.20	ug/L							U
1,2-Dichlorobenzene	ND	0.20	ug/L							U
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L							U
1,2,4-Trichlorobenzene	ND	0.50	ug/L							U
Hexachloro-1,3-Butadiene	ND	0.50	ug/L							U



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Volatile Organic Compounds - Quality Control

Batch BHL0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0610-BLK1)										
					Prepared: 20-Dec-2019		Analyzed: 20-Dec-2019 12:33			
Naphthalene	ND	0.50	ug/L							U
1,2,3-Trichlorobenzene	ND	0.50	ug/L							U
Dichlorodifluoromethane	ND	0.20	ug/L							U
Methyl tert-butyl Ether	ND	0.50	ug/L							U
2-Pentanone	ND	5.00	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.05		ug/L	5.00		101	80-129			
<i>Surrogate: Toluene-d8</i>	4.98		ug/L	5.00		99.6	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.02		ug/L	5.00		100	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.09		ug/L	5.00		102	80-120			

LCS (BHL0610-BS1)

					Prepared: 20-Dec-2019		Analyzed: 20-Dec-2019 10:41			
Chloromethane	9.97	0.50	ug/L	10.0		99.7	60-138			
Vinyl Chloride	11.6	0.20	ug/L	10.0		116	66-133			
Bromomethane	11.0	1.00	ug/L	10.0		110	72-131			
Chloroethane	10.8	0.20	ug/L	10.0		108	60-155			
Trichlorofluoromethane	11.1	0.20	ug/L	10.0		111	80-129			
Acrolein	55.4	5.00	ug/L	50.0		111	52-144			
1,1,2-Trichloro-1,2,2-Trifluoroethane	11.7	0.20	ug/L	10.0		117	76-129			
Acetone	47.2	5.00	ug/L	50.0		94.4	58-142			
1,1-Dichloroethene	10.8	0.20	ug/L	10.0		108	69-135			
Bromoethane	11.2	0.20	ug/L	10.0		112	78-128			
Iodomethane	10.6	1.00	ug/L	10.0		106	56-147			
Methylene Chloride	10.4	1.00	ug/L	10.0		104	65-135			
Acrylonitrile	10.4	1.00	ug/L	10.0		104	64-134			
Carbon Disulfide	11.1	0.20	ug/L	10.0		111	78-125			
trans-1,2-Dichloroethene	10.7	0.20	ug/L	10.0		107	78-128			
Vinyl Acetate	10.5	0.20	ug/L	10.0		105	55-138			
1,1-Dichloroethane	10.6	0.20	ug/L	10.0		106	76-124			
2-Butanone	49.0	5.00	ug/L	50.0		98.1	61-140			
2,2-Dichloropropane	10.9	0.20	ug/L	10.0		109	78-125			
cis-1,2-Dichloroethene	10.2	0.20	ug/L	10.0		102	80-121			
Chloroform	10.6	0.20	ug/L	10.0		106	80-122			
Bromochloromethane	10.5	0.20	ug/L	10.0		105	80-121			
1,1,1-Trichloroethane	10.8	0.20	ug/L	10.0		108	79-123			
1,1-Dichloropropene	11.0	0.20	ug/L	10.0		110	80-120			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Volatile Organic Compounds - Quality Control

Batch BHL0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHL0610-BS1)				Prepared: 20-Dec-2019 Analyzed: 20-Dec-2019 10:41						
Carbon tetrachloride	11.1	0.20	ug/L	10.0		111	53-137			
1,2-Dichloroethane	10.6	0.20	ug/L	10.0		106	75-123			
Benzene	11.0	0.20	ug/L	10.0		110	80-120			
Trichloroethene	10.8	0.20	ug/L	10.0		108	80-120			
1,2-Dichloropropane	10.8	0.20	ug/L	10.0		108	80-120			
Bromodichloromethane	10.5	0.20	ug/L	10.0		105	80-121			
Dibromomethane	10.3	0.20	ug/L	10.0		103	80-120			
2-Chloroethyl vinyl ether	9.56	1.00	ug/L	10.0		95.6	74-127			
4-Methyl-2-Pentanone	50.5	5.00	ug/L	50.0		101	67-133			
cis-1,3-Dichloropropene	11.1	0.20	ug/L	10.0		111	80-124			
Toluene	10.8	0.20	ug/L	10.0		108	80-120			
trans-1,3-Dichloropropene	11.0	0.20	ug/L	10.0		110	71-127			
2-Hexanone	47.7	5.00	ug/L	50.0		95.5	69-133			
1,1,2-Trichloroethane	11.0	0.20	ug/L	10.0		110	80-121			
1,3-Dichloropropane	10.1	0.20	ug/L	10.0		101	80-120			
Tetrachloroethene	10.6	0.20	ug/L	10.0		106	80-120			
Dibromochloromethane	10.6	0.20	ug/L	10.0		106	65-135			
1,2-Dibromoethane	10.5	0.20	ug/L	10.0		105	80-121			
Chlorobenzene	10.3	0.20	ug/L	10.0		103	80-120			
Ethylbenzene	10.6	0.20	ug/L	10.0		106	80-120			
1,1,1,2-Tetrachloroethane	10.9	0.20	ug/L	10.0		109	80-120			
m,p-Xylene	21.3	0.40	ug/L	20.0		106	80-121			
o-Xylene	10.6	0.20	ug/L	10.0		106	80-121			
Xylenes, total	31.9	0.60	ug/L	30.0		106	76-127			
Styrene	11.0	0.20	ug/L	10.0		110	80-124			
Bromoform	8.87	0.20	ug/L	10.0		88.7	51-134			
1,1,1,2-Tetrachloroethane	9.64	0.20	ug/L	10.0		96.4	77-123			
1,2,3-Trichloropropane	9.03	0.50	ug/L	10.0		90.3	76-125			
trans-1,4-Dichloro 2-Butene	9.61	1.00	ug/L	10.0		96.1	55-129			
n-Propylbenzene	10.9	0.20	ug/L	10.0		109	78-130			
Bromobenzene	10.1	0.20	ug/L	10.0		101	80-120			
Isopropyl Benzene	10.9	0.20	ug/L	10.0		109	80-128			
2-Chlorotoluene	10.6	0.20	ug/L	10.0		106	78-122			
4-Chlorotoluene	10.3	0.20	ug/L	10.0		103	80-121			
t-Butylbenzene	11.0	0.20	ug/L	10.0		110	78-125			



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Volatile Organic Compounds - Quality Control

Batch BHL0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHL0610-BS1)										
					Prepared: 20-Dec-2019	Analyzed: 20-Dec-2019 10:41				
1,3,5-Trimethylbenzene	11.1	0.20	ug/L	10.0		111	80-129			
1,2,4-Trimethylbenzene	11.0	0.20	ug/L	10.0		110	80-127			
s-Butylbenzene	11.4	0.20	ug/L	10.0		114	78-129			
4-Isopropyl Toluene	11.3	0.20	ug/L	10.0		113	79-130			
1,3-Dichlorobenzene	10.3	0.20	ug/L	10.0		103	80-120			
1,4-Dichlorobenzene	10.3	0.20	ug/L	10.0		103	80-120			
n-Butylbenzene	11.2	0.20	ug/L	10.0		112	74-129			
1,2-Dichlorobenzene	10.2	0.20	ug/L	10.0		102	80-120			
1,2-Dibromo-3-chloropropane	8.69	0.50	ug/L	10.0		86.9	62-123			
1,2,4-Trichlorobenzene	10.5	0.50	ug/L	10.0		105	64-124			
Hexachloro-1,3-Butadiene	13.9	0.50	ug/L	10.0		139	58-123			*, Q
Naphthalene	9.63	0.50	ug/L	10.0		96.3	50-134			
1,2,3-Trichlorobenzene	9.92	0.50	ug/L	10.0		99.2	49-133			
Dichlorodifluoromethane	12.5	0.20	ug/L	10.0		125	48-147			Q
Methyl tert-butyl Ether	10.2	0.50	ug/L	10.0		102	71-132			
2-Pentanone	48.9	5.00	ug/L	50.0		97.7	69-134			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.71		ug/L	5.00		94.2	80-129			
<i>Surrogate: Toluene-d8</i>	4.93		ug/L	5.00		98.6	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.14		ug/L	5.00		103	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.02		ug/L	5.00		100	80-120			
LCS Dup (BHL0610-BSD1)										
					Prepared: 20-Dec-2019	Analyzed: 20-Dec-2019 11:09				
Chloromethane	9.57	0.50	ug/L	10.0		95.7	60-138	4.09	30	
Vinyl Chloride	11.2	0.20	ug/L	10.0		112	66-133	3.43	30	
Bromomethane	10.9	1.00	ug/L	10.0		109	72-131	0.30	30	
Chloroethane	10.9	0.20	ug/L	10.0		109	60-155	0.80	30	
Trichlorofluoromethane	11.0	0.20	ug/L	10.0		110	80-129	1.30	30	
Acrolein	56.9	5.00	ug/L	50.0		114	52-144	2.65	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	10.8	0.20	ug/L	10.0		108	76-129	7.59	30	
Acetone	52.5	5.00	ug/L	50.0		105	58-142	10.60	30	
1,1-Dichloroethene	10.5	0.20	ug/L	10.0		105	69-135	2.71	30	
Bromoethane	11.1	0.20	ug/L	10.0		111	78-128	0.63	30	
Iodomethane	10.6	1.00	ug/L	10.0		106	56-147	0.29	30	
Methylene Chloride	10.3	1.00	ug/L	10.0		103	65-135	0.76	30	
Acrylonitrile	11.4	1.00	ug/L	10.0		114	64-134	9.17	30	



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Volatile Organic Compounds - Quality Control

Batch BHL0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BHL0610-BSD1)										
					Prepared: 20-Dec-2019 Analyzed: 20-Dec-2019 11:09					
Carbon Disulfide	11.0	0.20	ug/L	10.0		110	78-125	1.45	30	
trans-1,2-Dichloroethene	10.3	0.20	ug/L	10.0		103	78-128	3.36	30	
Vinyl Acetate	10.7	0.20	ug/L	10.0		107	55-138	1.55	30	
1,1-Dichloroethane	10.4	0.20	ug/L	10.0		104	76-124	1.41	30	
2-Butanone	52.5	5.00	ug/L	50.0		105	61-140	6.84	30	
2,2-Dichloropropane	10.9	0.20	ug/L	10.0		109	78-125	0.45	30	
cis-1,2-Dichloroethene	10.1	0.20	ug/L	10.0		101	80-121	0.89	30	
Chloroform	10.5	0.20	ug/L	10.0		105	80-122	0.26	30	
Bromochloromethane	10.5	0.20	ug/L	10.0		105	80-121	0.05	30	
1,1,1-Trichloroethane	10.6	0.20	ug/L	10.0		106	79-123	1.13	30	
1,1-Dichloropropene	10.4	0.20	ug/L	10.0		104	80-120	5.57	30	
Carbon tetrachloride	10.5	0.20	ug/L	10.0		105	53-137	5.41	30	
1,2-Dichloroethane	10.2	0.20	ug/L	10.0		102	75-123	4.46	30	
Benzene	10.2	0.20	ug/L	10.0		102	80-120	7.75	30	
Trichloroethene	10.3	0.20	ug/L	10.0		103	80-120	4.83	30	
1,2-Dichloropropane	10.3	0.20	ug/L	10.0		103	80-120	4.62	30	
Bromodichloromethane	10.2	0.20	ug/L	10.0		102	80-121	3.40	30	
Dibromomethane	9.92	0.20	ug/L	10.0		99.2	80-120	4.24	30	
2-Chloroethyl vinyl ether	10.1	1.00	ug/L	10.0		101	74-127	5.82	30	
4-Methyl-2-Pentanone	52.7	5.00	ug/L	50.0		105	67-133	4.26	30	
cis-1,3-Dichloropropene	10.7	0.20	ug/L	10.0		107	80-124	3.16	30	
Toluene	10.2	0.20	ug/L	10.0		102	80-120	5.81	30	
trans-1,3-Dichloropropene	10.6	0.20	ug/L	10.0		106	71-127	3.99	30	
2-Hexanone	50.4	5.00	ug/L	50.0		101	69-133	5.42	30	
1,1,2-Trichloroethane	10.4	0.20	ug/L	10.0		104	80-121	5.41	30	
1,3-Dichloropropane	9.75	0.20	ug/L	10.0		97.5	80-120	3.41	30	
Tetrachloroethene	10.0	0.20	ug/L	10.0		100	80-120	5.65	30	
Dibromochloromethane	10.2	0.20	ug/L	10.0		102	65-135	3.88	30	
1,2-Dibromoethane	10.4	0.20	ug/L	10.0		104	80-121	1.15	30	
Chlorobenzene	9.72	0.20	ug/L	10.0		97.2	80-120	5.89	30	
Ethylbenzene	9.87	0.20	ug/L	10.0		98.7	80-120	6.99	30	
1,1,1,2-Tetrachloroethane	10.0	0.20	ug/L	10.0		100	80-120	8.15	30	
m,p-Xylene	19.7	0.40	ug/L	20.0		98.5	80-121	7.70	30	
o-Xylene	10.2	0.20	ug/L	10.0		102	80-121	3.84	30	
Xylenes, total	29.9	0.60	ug/L	30.0		99.6	76-127	6.40	30	



Environmental Partners, Inc.
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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Volatile Organic Compounds - Quality Control

Batch BHL0610 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BHL0610-BSD1)				Prepared: 20-Dec-2019 Analyzed: 20-Dec-2019 11:09						
Styrene	10.3	0.20	ug/L	10.0	103	80-124	6.14	30		
Bromoform	8.78	0.20	ug/L	10.0	87.8	51-134	1.05	30		
1,1,2,2-Tetrachloroethane	10.0	0.20	ug/L	10.0	100	77-123	4.11	30		
1,2,3-Trichloropropane	9.03	0.50	ug/L	10.0	90.3	76-125	0.02	30		
trans-1,4-Dichloro 2-Butene	9.72	1.00	ug/L	10.0	97.2	55-129	1.12	30		
n-Propylbenzene	10.2	0.20	ug/L	10.0	102	78-130	6.18	30		
Bromobenzene	9.54	0.20	ug/L	10.0	95.4	80-120	5.62	30		
Isopropyl Benzene	10.4	0.20	ug/L	10.0	104	80-128	4.81	30		
2-Chlorotoluene	9.90	0.20	ug/L	10.0	99.0	78-122	6.49	30		
4-Chlorotoluene	9.67	0.20	ug/L	10.0	96.7	80-121	6.09	30		
t-Butylbenzene	10.4	0.20	ug/L	10.0	104	78-125	6.15	30		
1,3,5-Trimethylbenzene	10.5	0.20	ug/L	10.0	105	80-129	6.05	30		
1,2,4-Trimethylbenzene	10.4	0.20	ug/L	10.0	104	80-127	6.07	30		
s-Butylbenzene	10.7	0.20	ug/L	10.0	107	78-129	6.00	30		
4-Isopropyl Toluene	10.8	0.20	ug/L	10.0	108	79-130	4.74	30		
1,3-Dichlorobenzene	9.61	0.20	ug/L	10.0	96.1	80-120	6.61	30		
1,4-Dichlorobenzene	9.73	0.20	ug/L	10.0	97.3	80-120	6.03	30		
n-Butylbenzene	10.5	0.20	ug/L	10.0	105	74-129	6.12	30		
1,2-Dichlorobenzene	9.68	0.20	ug/L	10.0	96.8	80-120	5.11	30		
1,2-Dibromo-3-chloropropane	9.58	0.50	ug/L	10.0	95.8	62-123	9.73	30		
1,2,4-Trichlorobenzene	9.88	0.50	ug/L	10.0	98.8	64-124	6.22	30		
Hexachloro-1,3-Butadiene	13.0	0.50	ug/L	10.0	130	58-123	6.65	30		*, Q
Naphthalene	9.60	0.50	ug/L	10.0	96.0	50-134	0.35	30		
1,2,3-Trichlorobenzene	9.74	0.50	ug/L	10.0	97.4	49-133	1.76	30		
Dichlorodifluoromethane	12.2	0.20	ug/L	10.0	122	48-147	2.44	30		Q
Methyl tert-butyl Ether	10.3	0.50	ug/L	10.0	103	71-132	0.94	30		
2-Pentanone	51.8	5.00	ug/L	50.0	104	69-134	5.78	30		
Surrogate: 1,2-Dichloroethane-d4	4.85		ug/L	5.00	97.1	80-129				
Surrogate: Toluene-d8	4.99		ug/L	5.00	99.8	80-120				
Surrogate: 4-Bromofluorobenzene	4.94		ug/L	5.00	98.8	80-120				
Surrogate: 1,2-Dichlorobenzene-d4	4.99		ug/L	5.00	99.9	80-120				



Environmental Partners, Inc.
1180 NW Maple St., Suite 310
Issaquah WA, 98027

Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Volatile Organic Compounds - SIM - Quality Control

Batch BHL0627 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0627-BLK1)				Prepared: 20-Dec-2019 Analyzed: 20-Dec-2019 12:47						
Vinyl chloride	ND	20.0	ng/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4770		ng/L	5000		95.4	80-129			
LCS (BHL0627-BS1)				Prepared: 20-Dec-2019 Analyzed: 20-Dec-2019 11:26						
Vinyl chloride	1800	20.0	ng/L	2000		90.2	76-120			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4610		ng/L	5000		92.2	80-129			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Volatile Organic Compounds - SIM - Quality Control

Batch BIB0243 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIB0243-BLK1)				Prepared: 10-Feb-2020 Analyzed: 10-Feb-2020 18:13						
Vinyl chloride	ND	20.0	ng/L							U
Surrogate: 1,2-Dichloroethane-d4	5050		ng/L	5000	101		80-129			
LCS (BIB0243-BS1)				Prepared: 10-Feb-2020 Analyzed: 10-Feb-2020 17:19						
Vinyl chloride	2190		ng/L	2000		110	76-120			
Surrogate: 1,2-Dichloroethane-d4	4940		ng/L	5000	98.8		80-129			
LCS Dup (BIB0243-BSD1)				Prepared: 10-Feb-2020 Analyzed: 10-Feb-2020 17:53						
Vinyl chloride	2020		ng/L	2000		101	76-120	8.32	30	
Surrogate: 1,2-Dichloroethane-d4	4980		ng/L	5000	99.5		80-129			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Metals and Metallic Compounds - Quality Control

Batch BHL0676 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0676-BLK1)		Prepared: 23-Dec-2019 Analyzed: 24-Dec-2019 14:19								
Calcium	ND	0.0500	mg/L							U
Potassium	ND	0.500	mg/L							U
Sodium	ND	0.500	mg/L							U
LCS (BHL0676-BS1)		Prepared: 23-Dec-2019 Analyzed: 24-Dec-2019 14:58								
Calcium	9.60	0.0500	mg/L	10.0		96.0	80-120			
Potassium	9.59	0.500	mg/L	10.0		95.9	80-120			
Sodium	9.25	0.500	mg/L	10.0		92.5	80-120			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHL0723 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0723-BLK2)			Prepared: 26-Dec-2019 Analyzed: 27-Dec-2019 11:53								
Iron, Dissolved	54	ND	20.0	ug/L							U
Iron, Dissolved	57	ND	20.0	ug/L							U

LCS (BHL0723-BS2)

Prepared: 26-Dec-2019 Analyzed: 27-Dec-2019 12:08

Iron, Dissolved	54	4980	20.0	ug/L	5000		99.7	80-120			
Iron, Dissolved	57	4920	20.0	ug/L	5000		98.4	80-120			

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0723-BLK1)			Prepared: 26-Dec-2019 Analyzed: 26-Dec-2019 17:12								
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U

LCS (BHL0723-BS1)

Prepared: 26-Dec-2019 Analyzed: 26-Dec-2019 17:56

Zinc, Dissolved	66	79.7	4.00	ug/L	80.0		99.6	80-120			
Zinc, Dissolved	67	78.4	4.00	ug/L	80.0		98.0	80-120			



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Project: Olalla Landfill
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Project Manager: Doug Kunkel

Reported:
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHL0819 - RHN EPA 600/4-79-020 4.1.4 HNO3 matrix 5x

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0819-BLK1)						Prepared: 31-Dec-2019 Analyzed: 31-Dec-2019 20:02					
Arsenic, Dissolved	75a	ND	0.0400	ug/L							U
LCS (BHL0819-BS1)						Prepared: 31-Dec-2019 Analyzed: 31-Dec-2019 20:46					
Arsenic, Dissolved	75a	4.85	0.0400	ug/L	5.00		97.0	80-120			
Duplicate (BHL0819-DUP1)						Source: 19L0319-07 Prepared: 31-Dec-2019 Analyzed: 31-Dec-2019 21:29					
Arsenic, Dissolved	75a	2.31	0.0400	ug/L		2.33			1.15	20	
Matrix Spike (BHL0819-MS1)						Source: 19L0319-07 Prepared: 31-Dec-2019 Analyzed: 31-Dec-2019 21:39					
Arsenic, Dissolved	75a	7.09	0.0400	ug/L	5.00	2.33	95.2	75-125			

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

Matrix Spike Dup (BHL0819-MSD1)						Source: 19L0319-07 Prepared: 31-Dec-2019 Analyzed: 31-Dec-2019 21:44					
Arsenic, Dissolved	75a	6.79	0.0400	ug/L	5.00	2.33	89.1	75-125	4.39	20	

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



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Metals and Metallic Compounds (dissolved) - Quality Control

Batch BHL0842 - WMN (No Prep)

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0842-BLK1)		Prepared: 31-Dec-2019 Analyzed: 02-Jan-2020 12:19								
Barium, Dissolved	ND	0.0030	mg/L							U
Manganese, Dissolved	ND	0.0010	mg/L							U
LCS (BHL0842-BS1)		Prepared: 31-Dec-2019 Analyzed: 02-Jan-2020 12:57								
Barium, Dissolved	2.02	0.0030	mg/L	2.00		101	80-120			
Manganese, Dissolved	0.486	0.0010	mg/L	0.500		97.1	80-120			



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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
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Wet Chemistry - Quality Control

Batch BHL0518 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: JM

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0518-BLK1)						Prepared: 18-Dec-2019 Analyzed: 19-Dec-2019 10:51					
COD	ND	10.0	10.0	mg/L							U
LCS (BHL0518-BS1)						Prepared: 18-Dec-2019 Analyzed: 19-Dec-2019 10:51					
COD	102	10.0	10.0	mg/L	100		102	90-110			
Duplicate (BHL0518-DUP1)						Source: 19L0319-01 Prepared: 18-Dec-2019 Analyzed: 19-Dec-2019 10:53					
COD	ND	10.0	10.0	mg/L		ND					U
Matrix Spike (BHL0518-MS1)						Source: 19L0319-01 Prepared: 18-Dec-2019 Analyzed: 19-Dec-2019 10:53					
COD	104	20.0	20.0	mg/L	100	ND	104	90-110			

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



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Wet Chemistry - Quality Control

Batch BHL0533 - No Prep Wet Chem

Instrument: Accumet AB150 Analyst: JM

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BHL0533-BS1)						Prepared: 18-Dec-2019 Analyzed: 18-Dec-2019 14:26					
pH	6.98	0.01	0.01	pH Units	7.00		99.7	99.2-100.8			
Duplicate (BHL0533-DUP1)						Source: 19L0319-03 Prepared: 18-Dec-2019 Analyzed: 18-Dec-2019 14:26					
pH	6.68	0.01	0.01	pH Units		6.68			0.00		H



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Wet Chemistry - Quality Control

Batch BHL0535 - No Prep Wet Chem

Instrument: LCHAT2 Analyst: EP

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0535-BLK1)						Prepared: 18-Dec-2019 Analyzed: 18-Dec-2019 15:24					
Nitrite-N	ND	0.010	0.010	mg/L							U
LCS (BHL0535-BS1)						Prepared: 18-Dec-2019 Analyzed: 18-Dec-2019 15:25					
Nitrite-N	0.508	0.010	0.010	mg/L	0.500		102	75-125			
Duplicate (BHL0535-DUP1)						Source: 19L0319-01 Prepared: 18-Dec-2019 Analyzed: 18-Dec-2019 15:27					
Nitrite-N	ND	0.010	0.010	mg/L		ND					U
Matrix Spike (BHL0535-MS1)						Source: 19L0319-01 Prepared: 18-Dec-2019 Analyzed: 18-Dec-2019 15:29					
Nitrite-N	0.508	0.010	0.010	mg/L	0.500	ND	102	75-125			

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



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Wet Chemistry - Quality Control

Batch BHL0600 - No Prep Wet Chem

Instrument: Accumet AB150 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0600-BLK1)						Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 16:03					
Alkalinity, Total	ND	1.00	1.00	mg/L CaCO3							U
Reference (BHL0600-SRM1)						Prepared: 19-Dec-2019 Analyzed: 19-Dec-2019 16:03					
Alkalinity, Total	111	1.00	1.00	mg/L CaCO3	116		95.5	85-114.66			



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Wet Chemistry - Quality Control

Batch BHL0732 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0732-BLK1)						Prepared: 26-Dec-2019 Analyzed: 26-Dec-2019 16:05					
Total Organic Carbon	ND	0.50	0.50	mg/L							U
LCS (BHL0732-BS1)						Prepared: 26-Dec-2019 Analyzed: 26-Dec-2019 16:28					
Total Organic Carbon	20.34	0.50	0.50	mg/L	20.00		102	90-110			



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Reported:
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Wet Chemistry - Quality Control

Batch BHL0766 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: EP

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0766-BLK1)						Prepared: 27-Dec-2019 Analyzed: 27-Dec-2019 12:48					
Chloride	ND	1.00	1.00	mg/L							U
LCS (BHL0766-BS1)						Prepared: 27-Dec-2019 Analyzed: 27-Dec-2019 12:49					
Chloride	5.08	1.00	1.00	mg/L	5.00		102	90-110			



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Reported:
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Wet Chemistry - Quality Control

Batch BHL0796 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: EP

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0796-BLK1)						Prepared: 30-Dec-2019 Analyzed: 31-Dec-2019 10:42					
Nitrate + Nitrite as N	ND	0.010	0.010	mg/L							U
LCS (BHL0796-BS1)						Prepared: 30-Dec-2019 Analyzed: 31-Dec-2019 10:43					
Nitrate + Nitrite as N	0.507	0.010	0.010	mg/L	0.500		101	90-110			



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Wet Chemistry - Quality Control

Batch BHL0808 - No Prep Wet Chem

Instrument: LCHAT1 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0808-BLK1)						Prepared: 30-Dec-2019 Analyzed: 30-Dec-2019 14:01					
Sulfate	ND	2.00	2.00	mg/L							U
LCS (BHL0808-BS1)						Prepared: 30-Dec-2019 Analyzed: 30-Dec-2019 14:02					
Sulfate	15.1	2.00	2.00	mg/L	15.0		101	90-110			



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Wet Chemistry - Quality Control

Batch BHL0840 - No Prep Wet Chem

Instrument: LCHAT2 Analyst: EP

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0840-BLK1)						Prepared: 31-Dec-2019 Analyzed: 02-Jan-2020 12:35					
Ammonia-N	ND	0.040	0.040	mg/L							U
LCS (BHL0840-BS2)						Prepared: 31-Dec-2019 Analyzed: 02-Jan-2020 13:04					
Ammonia-N	0.505	0.040	0.040	mg/L	0.500		101	90-110			



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Wet Chemistry - Quality Control

Batch BIA0331 - No Prep Wet Chem

Instrument: Accumet AB150 Analyst: JM

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BIA0331-BS1)						Prepared: 16-Jan-2020 Analyzed: 16-Jan-2020 16:52					
pH	6.95	0.01	0.01	pH Units	7.00		99.3	99.2-100.8			
Duplicate (BIA0331-DUP1)						Source: 19L0319-01 Prepared: 16-Jan-2020 Analyzed: 16-Jan-2020 16:52					
pH	7.02	0.01	0.01	pH Units		7.05			0.43	20	H



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Microbiology - Quality Control

Batch BHL0524 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BHL0524-BLK1)						Prepared: 18-Dec-2019 Analyzed: 19-Dec-2019 10:05					
Total Coliforms	ND	1	1	CFU/100 ml							U



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Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
EPA 200.8 UCT-KED in Water	
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 353.2 in Water	
Nitrate + Nitrite as N	NELAP,DoD-ELAP,WADOE
Nitrite-N	WADOE,NELAP,DoD-ELAP
EPA 375.2 in Water	
Sulfate	WADOE,NELAP
EPA 410.4 in Water	
COD	DoD-ELAP,NELAP,WADOE
EPA 6010C in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Sodium	DoD-ELAP,WADOE,NELAP
Sodium-1	DoD-ELAP
Barium	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



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Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE



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n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8260C-SIM in Water

Acrylonitrile	NELAP,CALAP,WADOE
Vinyl chloride	NELAP,CALAP,WADOE
1,1-Dichloroethene	NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	NELAP,CALAP,WADOE
Trichloroethene	NELAP,CALAP,WADOE
Tetrachloroethene	NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	NELAP,CALAP,WADOE
1,2-Dichloroethane	NELAP,CALAP,WADOE
Benzene	NELAP,CALAP,WADOE

EPA 9060A in Water

Total Organic Carbon	DoD-ELAP,WADOE,NELAP
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SM 2320 B-97 in Water

Alkalinity, Bicarbonate	NELAP,WADOE,WA-DW,DoD-ELAP
Alkalinity, Carbonate	WADOE,WA-DW,DoD-ELAP,NELAP



Environmental Partners, Inc. 1180 NW Maple St., Suite 310 Issaquah WA, 98027	Project: Olalla Landfill Project Number: [none] Project Manager: Doug Kunkel	Reported: 12-Feb-2020 11:39
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Alkalinity, Hydroxide WADOE,WA-DW,DoD-ELAP,NELAP
Alkalinity, Total DoD-ELAP,WADOE,WA-DW,NELAP

SM 4500-H+ B-00 in Water

pH WADOE,NELAP,WA-DW

SM 4500-NH3 H-97 in Water

Ammonia-N WADOE,DoD-ELAP,NELAP

SM 9222B in Water

Total Coliforms WADOE

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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Project: Olalla Landfill
Project Number: [none]
Project Manager: Doug Kunkel

Reported:
12-Feb-2020 11:39

Notes and Definitions

- * Flagged value is not within established control limits.
- B This analyte was detected in the method blank.
- 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)
- H Hold time violation - Hold time was exceeded.
- J Estimated concentration value detected below the reporting limit.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- 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.