

SCS ENGINEERS

July 3, 2018
File No. 04218001.02

Mr. Keith Johnston
Tacoma-Pierce County Health Department
3629 South D Street
Tacoma, Washington 98418-6813

**Subject: First Quarter 2018 Monitoring Report
LRI Landfill, Pierce County, Washington**

Dear Keith:

Please find enclosed the First Quarter 2018 Monitoring Report for the LRI Landfill. Activities this quarter included monitoring the volume and specific conductance of water pumped from the leak detection/collection system, quarterly groundwater monitoring, monthly landfill gas monitoring, and weekly surface water monitoring.

If you have any questions regarding the monitoring results, please call me at (425) 289-5447.

Sincerely,



Kevin Lakey, PE, LHG
Vice President / Project Director
SCS ENGINEERS



Samuel Graber
Staff Scientist
SCS ENGINEERS



Attachments: Attachment A: Groundwater Flow Map
Attachment B: Groundwater Data Summary Tables
Attachment C: Field Sampling Documentation
Attachment D: Statistical Calculations
Attachment E: Trilinear Diagrams
Attachment F: Analytical Data Validation Report
Attachment G: Groundwater and LDCS Time Trend Plots
Attachment H: LDCS Pumping Records and Conductivity Measurements
Attachment I: Surface Water Data
Attachment J: Landfill Gas Data

cc: Andy Comstock, TPCHD (email only)
Peter Lyon, Ecology (email only)
Eugene Radcliff, Ecology (email and hard copy)
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First Quarter 2018 Monitoring Report **LRI Landfill** **Pierce County, Washington**

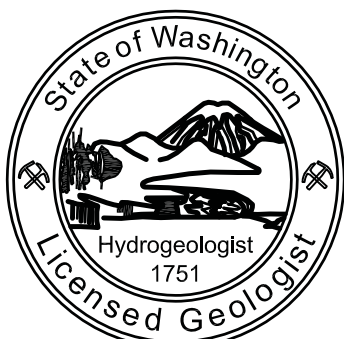
Presented to:

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Kevin G. Lakey

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GROUNDWATER MONITORING

First Quarter 2018 groundwater samples were collected on March 19 through 22, 2018. Water level elevations were measured on March 21, 2018. Nine monitoring wells (MW-1A, MW-2A, MW-3, MW-4, MW-5A, MW-6, MW-7, MW-9, and MW-10) were sampled this monitoring period. Field quality control samples consisted of one field blank and one duplicate sample collected at MW-7. Sampling procedures followed the LRI Landfill Groundwater Monitoring Plan (GWMP), dated March 10, 2014.

Groundwater samples were obtained using low-flow purging and sampling techniques with dedicated pumps at all monitoring wells with the exception of MW-4, where a non-dedicated QED Sample Pro pump was deployed. Samples for laboratory analyses were submitted to TestAmerica, Inc. of Denver, Colorado for the parameters listed in Appendix I and II of WAC 173-351-990. The groundwater sampling locations are shown on Figure 1.

A groundwater surface elevation map for the First Quarter monitoring event is included as Figure 1 in Attachment A. The average groundwater gradients and flow directions calculated for the quarter remain similar to those previously reported at the facility, with a flow rate of about 45 feet per year towards the northwest for horizontal groundwater movement within the uppermost aquifer (assuming a horizontal hydraulic conductivity of 1×10^{-3} centimeters per second and an effective porosity of 30 percent).

Field measurements and analytical results for groundwater, leak detection/collection system (LDCS), and quality control samples are summarized on the following tables included in Attachment B: Groundwater Level Elevations, Field Parameters, Inorganic Parameters, Appendix I Metals, Appendix II Metals, Volatile Organic Compounds, Cation-Anion Balance, and Duplicate Sample Results.

Copies of the Field Sampling Data Sheets are included in Attachment C. Statistical calculations, including summary tables for indicator parameters, are included in Attachment D. Trilinear (Piper) plots of groundwater and LDCS sample results are included in Attachment E. Data validation results are summarized in Attachment F. Copies of the laboratory reports were submitted to the TPCHD under separate cover.

A nonparametric inter-well prediction limit approach was used to evaluate the water quality results for Appendix I parameters listed in WAC 173-351-990 (15 metals and nitrate). Prediction limits were generated using background data for nitrate and eight rounds of quarterly sampling conducted in 2014 and 2015 for the fifteen metals. Using this procedure, the highest concentration of each parameter in the data set was selected as the prediction limit for that parameter. In addition, the prediction limit data set includes ongoing water quality results from background (upgradient) wells MW-9 and MW-10. Appendix I total metal and nitrate concentrations measured at the downgradient monitoring wells were less than or equal to prediction limit values at all of the wells monitored this quarter.

Groundwater time-trend plots for inorganic parameters and metals are included in Attachment G. The following four plots are provided for each monitoring well:

- Plot 1 — ammonia, nitrate, chloride, TOC
- Plot 2 — alkalinity, sulfate, TDS
- Plot 3 — calcium, magnesium, sodium, potassium
- Plot 4 — iron, manganese, zinc, arsenic

Time trend plots show that concentrations of metals and inorganic parameters remained generally consistent with previously measured values during the First Quarter. The highest concentrations of chloride and nitrate in the uppermost aquifer continue to be observed in background well MW-10.

Reported detections of inorganic parameters and metals measured at downgradient monitoring wells were less than or equal to the ground water quality criteria listed in WAC 173-200-040, with the exceptions shown in Table 1.

Table 1. Groundwater Results Greater Than WAC 173-200-040 Criteria

Groundwater Results Greater Than WAC 173-200-040 Criteria (mg/L) LRI Landfill, Pierce County, Washington								
Parameter	Groundwater Quality Criteria	MW-1A	MW-2A	MW-3	MW-4	MW-5A	MW-6	MW-7
Arsenic, Total	0.00005	**	**	**	0.0090	0.0065	0.0075	**
Iron, Dissolved	0.30	1.10	0.62	*	*	*	*	*
Manganese, Dissolved	0.05	0.22	0.31	0.35	0.21	0.23	0.16	0.25
Notes:								
mg/L = milligrams per liter								
** = Not detected above the method reporting limit (MRL), but the MRL exceeded WAC 173-200-040 GW Quality Criteria								
* = Reported value was less than WAC 173-200-040 Groundwater Quality Criteria								

Results for arsenic, iron, and manganese are typical of previous results (see time-trend plots in Appendix G), are interpreted to be within natural background variation, and are less than or equal to the background levels used to establish prediction limits. The method reporting limit (MRL) for arsenic is 0.005 milligrams per liter (mg/L), which is greater than the WAC 173-200-040 criteria of 0.00005 mg/L. Therefore, arsenic results reported as non-detect are considered to be greater than the WAC 173-200-040 criterion.

The cation-anion balance evaluates the difference in the sum of cations and anions (in milliequivalents per liter [meq/L]) within a water sample to determine if it is electroneutral (balanced cation and anion charges). Consistent with WAC 173-350-430(5), a threshold of ten percent difference is used if the total cation-anion sum is less than 5.0 meq/L, and a threshold of five percent difference is used if the total cation-anion sum is greater than or equal to 5.0 meq/L.

The cation-anion balance evaluations did not exceed the appropriate threshold at any of the monitoring wells this quarter (see Table 7 in Attachment B).

Graphical plots of the First Quarter water quality results are presented on trilinear (piper) diagrams in Attachment E. These plots demonstrate the inherent water quality differences between groundwater from the monitoring wells, shallow groundwater from the LDCS, and leachate (collected annually in December).

Low-level detections of acetone (12 µg/L) and 2-butanone (MEK) (10 µg/L) and were reported in the sample from monitoring well MW-4. Acetone and 2-butanone are primary leachate indicator parameters as defined in Section 12.5 of the LRI GWMP. However, acetone and 2-butanone were also detected in the laboratory provided deionized water trip blank at concentrations of 11 µg/L and 14 µg/L, respectively. In addition, secondary leachate indicator parameters of ammonia and chloride remained low in the sample from MW-4 at concentrations of 0.14 mg/L and 3.4 mg/L, respectively. Therefore, since acetone and 2-butanone were detected in the trip blank, and the secondary leachate indicator parameters remained low, the source of these low-level volatile organic compound (VOC) detections appears to be the result of laboratory contamination.

No other VOC's were reported present in the groundwater samples this quarter.

LEAK DETECTION/COLLECTION SYSTEM (LDCS) MONITORING

LDCS Daily Monitoring. Daily monitoring of the LDCS sumps for volume of water pumped, liquid level, and specific conductance (conductivity) was performed by using a programmable logic controller (PLC) and through direct measurements by LRI site personnel. Rainfall data were recorded manually using an on-site rain gauge. The combined field and PLC data, as well as time series plots of the data, are included in Attachment H.

Flow meters at LDCS-1 and LDCS-4B operated intermittently this quarter. LRI is currently in the process of cleaning the vaults, checking electrical connections, and replacing the flow meters as needed.

Conductivity levels at LDCS-4B trended higher beginning in early February. Site investigation found that the water level transducer that activates the dewatering pump at LDCS-4B had malfunctioned, which caused the pump to stop operating. Consequently, groundwater within the LDCS came in contact with the overlying clay liner, which in turn, caused the conductivity of the groundwater to rise. The transducer was replaced on February 1, 2018, and since then conductivity levels have returned to typical historical levels.

Conductivity data from the remaining LDCS sumps trended within typical historical levels during the First Quarter.

LDCS Quarterly Monitoring. LDCS samples were collected from the leak detection sumps with disposable bailers at LDCS-1, LDCS-2A, and LDCS-2B, and with dedicated QED Sleeper Pumps at LDCS-3A, LDCS-4A, LDCS-4B, LDCS-5, and LDCS-6. Samples for laboratory

testing were submitted to TestAmerica of Denver, Colorado. Field and laboratory data results are included on the groundwater summary tables (see Attachment B).

LDCS time trend plots for inorganic parameters and dissolved metals are included in Attachment G. The following four plots are provided for each leak detection sump:

- Plot 1 — ammonia, nitrate, chloride, TOC
- Plot 2 — alkalinity, sulfate, TDS
- Plot 3 — calcium, magnesium, sodium, potassium
- Plot 4 — iron, manganese, zinc, arsenic

Time trend plots show that concentrations of metals and inorganic parameters remained generally consistent with previously measured values during the First Quarter.

A low-level detection of ammonia (0.93 mg/L) was reported at LDCS-5. In addition, the chloride concentration at LDCS-5 increased to 34 mg/L, compared to 20 mg/L in December 2017.

Ammonia and chloride are secondary leachate indicator parameters as discussed in Section 12.5 of the LRI Landfill GWMP. Primary leachate indicator parameters acetone and 2-butanone were non-detect, and associated leachate indicator parameters of total organic carbon (TOC), calcium, and potassium did not display increases in concentration. Therefore, the ammonia and chloride results do not appear to be due to leachate. However, groundwater withdrawn from LDCS-5 continues to be directed to the leachate collection system as a precautionary measure.

Chloride concentrations at LDCS-4A and LDCS-4B display slightly increasing trends. However, leachate indicator parameters acetone, 2-butanone and ammonia were non-detect. Therefore, the chloride levels do not appear to be related to leachate.

Concentrations of alkalinity, total dissolved solids (TDS), sulfate, calcium, magnesium, and sodium displayed increases at LDCS-6. Primary leachate indicator parameters acetone and 2-butanone were non-detect, and secondary leachate indicator parameters ammonia and chloride were non-detect and low (12.0 mg/L), respectively. Therefore, the parameter increases noted above are likely the result of construction water being released (squeezed) from the clay liner as Cell 6 is loaded with refuse, and not related to leachate or landfill gas.

Water quality results from LDCS-2A included a low-level detection of 1,4-dichlorobenzene (0.56 µg/L). Primary leachate indicator parameters acetone and 2-butanone were non-detect, and secondary leachate indicator parameters ammonia and chloride were non-detect and low (3.5 mg/L), respectively. Previous studies at the LRI Landfill have shown that 1,4-dichlorobenzene was not present in landfill gas. Therefore, this detection does not appear to be related to leachate or landfill gas.

No other VOC detections were reported present in the LCDS samples this quarter.

SURFACE WATER MONITORING

Surface water inspections were performed on a weekly basis consistent with NPDES Construction General Permit WAR-00263C. A surface water sample was collected on January 8, 2018 consistent with NPDES Industrial General Permit WAR-002557. Surface water monitoring results were reported to Ecology on a monthly (Construction Permit) and quarterly (Industrial Permit) basis using Discharge Monitoring Reports (DMRs). Copies of the First Quarter DMR's are included in Attachment I. No benchmark values or effluent limits were exceeded this quarter.

LEACHATE MONITORING

Leachate samples are collected for all Cells annually in December. In addition, a leachate sample was collected from Cell 6 during the current monitoring period. Field and laboratory data results for the sample are included on the groundwater summary tables (see Attachment B).

Leachate volumes were monitored using the automated PLC system and through direct measurements by LRI site personnel. Collected leachate was truck-hauled to the pretreatment facility at the Hidden Valley Landfill where it was discharged to the Pierce County sewer system in accordance with Pierce County Utilities Department Industrial Discharge Permit Number PC03096, and to the City of Tacoma Wastewater Treatment Plant for proper disposal. Table 2 provides a summary of year to date leachate volume data based on volumes truck-hauled off site.

Table 2. 2018 Leachate Volume Data

2018 Leachate Volume Data LRI Landfill, Pierce County, Washington		
Month	Leachate Trucked Offsite for Proper Disposal (gallons)	Monthly Rainfall (inches)
January	2,821,282	7.62
February	2,443,589	3.47
March	2,878,127	2.25
Totals:	8,142,998	13.34

LANDFILL GAS MONITORING

Monthly monitoring of the landfill gas performance probes was conducted on January 29, February 27, and March 20 using a Landtec GEM2000 portable gas monitor. Methane measurements were less than the lower explosive limit (LEL) of five percent by volume during the First Quarter except at performance probes GP-2, GP-10P, and GP-12 (see Table 3). Previous barhole monitoring surveys have shown that similar methane levels at these probes does not result in the migration of landfill gas to the property line.

Indoor air was tested for the presence of methane on March 21. The office, maintenance building, scale house, and work shed located next to the stormwater treatment ponds were tested with a portable flame ionization detector (MicroFID). No detectible methane was recorded.

Field records for gas probe and indoor air monitoring are included in Attachment J.

Table 3. 2018 Landfill Gas Probe Monitoring Summary

2018 Landfill Gas Probe Monitoring Summary (percent methane) LRI Landfill, Pierce County, Washington												
Monitoring Date	GP-1	GP-2	GP-3	GP-4	GP-9	GP-10	GP-10P	GP-11	GP-12	GP-13	GP-14	GP-15
January 29	1.4	14.4	0.0	0.0	0.0	0.0	19.6	0.0	--	2.0	0.0	0.0
February 27	1.0	16.2	0.0	0.0	0.0	0.1	21.9	0.0	34.0	2.2	0.0	0.0
March 20	1.6	16.4	0.0	0.0	0.0	0.9	16.1	0.0	35.9	2.3	0.0	0.0
Notes: All values are reported as percent methane by volume. -- : Unable to monitor GP-12 during January event due to presence of water and sediment in probe casing. Methane measurements at or above the lower explosive limit of 5.0% by volume are shown in bold .												

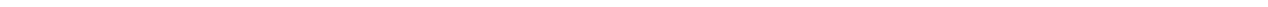
LANDFILL GAS EXTRACTION WELL CONSTRUCTION

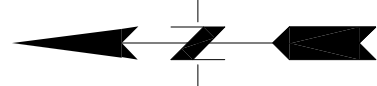
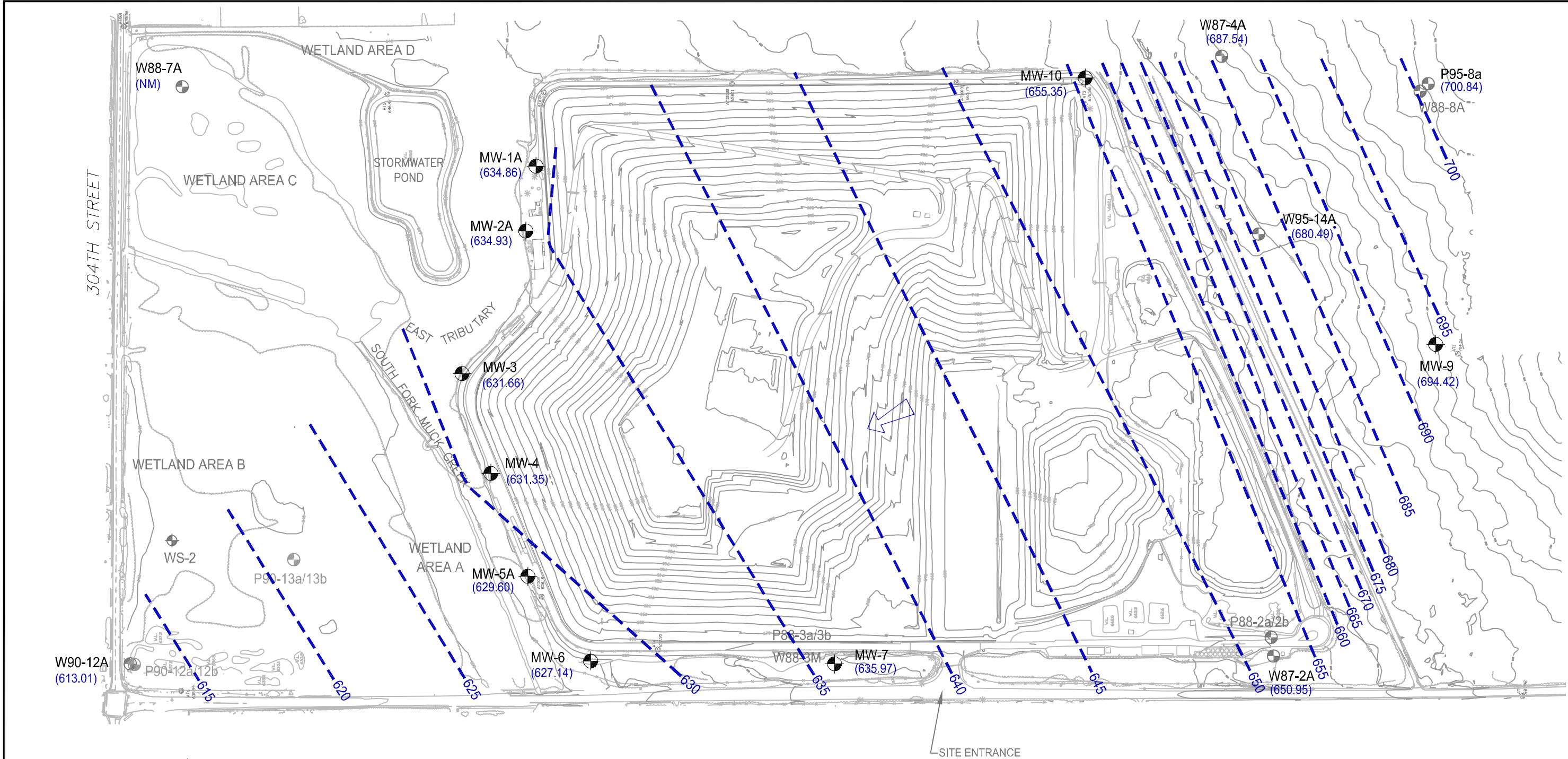
No new landfill gas extraction wells were installed this quarter.

GROUNDWATER MONITORING WELL CONSTRUCTION AND MAINTENANCE

Three piezometers were installed within the Cell 7 excavation area between March 13 and March 27, 2018. The piezometers were drilled to depths of 30 to 50 feet below ground surface. Additional details, including boring logs, will be provided in a separate report.

Appendix A
Groundwater Flow Map





NOTES:

VERTICAL DATUM - BASED ON
PIERCE COUNTY BENCH NO. 112-28,
ELEVATION 660.29 NGVD29

LEGEND:

-  MW-1A MONITORING WELL
-  W87-2A CHARACTERIZATION WELL/ PIEZOMETER
-  (650.95) GROUNDWATER ELEVATION (IN FEET ABOVE MSL)
-  INFERRED GROUNDWATER FLOW DIRECTION
-  * WATER LEVEL ELEVATION NOT USED IN CONTOURING



SCALE (ft)

SCS ENGINEERS Environmental Consultants and Contractors 2405 140th Avenue NE, Suite 107 Bellevue, Washington 98005 (425) 746-4600 FAX: (425) 746-6747			PROJECT NO.	04218001.02	DES BY	SG	POTENTIOMETRIC SURFACE CONTOUR MAP MARCH 21, 2018 LRI LANDFILL 30919 MERIDIAN STREET E. GRAHAM, WASHINGTON	DATE	MAY 2018
			SCALE	AS SHOWN	CHK BY	KGL		FIGURE	1
			CAD FILE	FIGURE 1	APP BY	KGL			

Appendix B
Groundwater Data Summary Tables

Table 1. Groundwater Level Elevations
March 21, 2018
LRI Landfill, Pierce County, Washington

Location	Well Casing Elevation (ft)	Depth to Water (ft)	Water Level Elevation (ft, NGVD29)
Wells			
W87-2A	664.01	13.06	650.95
W87-4A	693.29	5.75	687.54
W88-3M	658.11	11.17	646.94
W88-7A	632.51	NM	--
W88-8M	721.05	38.58	682.47
W90-12A	640.84	27.83	613.01
W95-14A	680.49	0.00	680.49
MW-1A	652.57	17.71	634.86
MW-2A	651.93	17.00	634.93
MW-3	637.41	5.75	631.66
MW-4	652.37	21.02	631.35
MW-5A	655.55	25.95	629.60
MW-6	635.71	8.57	627.14
MW-7	656.03	20.06	635.97
MW-9	701.77	7.35	694.42
MW-10	673.87	18.52	655.35
Piezometers			
P13-14A	665.96	19.18	646.78
P88-2A	663.96	NM	--
P88-2B	663.48	NM	--
P88-3A	656.20	10.00	646.20
P88-3B	655.98	13.85	642.13
P95-8A	722.07	21.23	700.84
P90-12A	640.79	2.84	637.95
P90-12B	640.73	4.04	636.69
P90-13A	645.19	NM	--
P90-13B	643.63	NM	--
GP-1P ^a	652.00	16.76	635.24
GP-2P ^a	658.61	15.79	642.82
GP-3P ^a	658.51	11.32	647.19
GP-4P ^a	662.01	9.27	652.74
GP-9P ^a	674.03	11.81	662.22
South Creek			
SWSC-1	632.68	0.45	632.23
SWSC-2	629.98	6.87	623.11
Leak Detection System			
LDCS-1	657.26	25.85	631.41
LDCS-2A	659.24	24.60	634.64
LDCS-2B	661.70	25.86	635.84

Notes:

NM= not measured

-- = not applicable

Measurements taken on 3/21/2018 unless otherwise noted

a = Measurement taken on 3/20/2018

Table 2. Field Parameters
First Quarter 2018
LRI Landfill, Pierce County, Washington

Location	Sample Number	Sample Date	Sampling Method	pH	Conductivity (µS/cm)	Temperature (°C)
Monitoring Wells						
MW-1A	304-031918-01	3/19/2018	DP	7.05	197	13.3
MW-2A	304-031918-03	3/19/2018	DP	7.19	245	12.4
MW-3	304-031918-05	3/19/2018	DP	6.88	390	10.4
MW-4	304-032218-20	3/22/2018	SP	7.66	311	12.1
MW-5A	304-032018-11	3/20/2018	DP	7.44	420	11.7
MW-6	304-032018-13	3/20/2018	DP	8.38	284	10.8
MW-7	304-031918-07	3/19/2018	DP	7.56	377	10.2
MW-9	304-032118-19	3/21/2018	DP	6.71	137	9.7
MW-10	304-032018-16	3/20/2018	DP	6.52	266	10.6
Leak Detection System						
LDCS-1	304-031918-08	3/19/2018	DB	6.01	352	21.5
LDCS-2A	304-031918-06	3/19/2018	DB	6.30	742	19.0
LDCS-2B	304-031918-04	3/19/2018	DB	7.59	697	19.6
LDCS-3A	304-031918-02	3/19/2018	DP	6.29	762	21.2
LDCS-4A	304-031918-10	3/19/2018	DP	6.10	782	22.6
LDCS-4B	304-032018-14	3/20/2018	DP	6.54	1,090	24.6
LDCS-5	304-032018-12	3/20/2018	DP	6.44	864	18.7
LDCS-6	304-032018-15	3/20/2018	DP	6.81	1,213	14.8
Leachate Collection System						
Leachate, Cell 6	304-032118-18	3/21/2018	GB	7.80	18,448	13.1

Notes:

DB = disposable bailer

DP = dedicated pump

GB = grab sample

SP = submersible pump

µS/cm = microsiemens per centimeter

°C = degrees celcius

**Table 3. Inorganic Parameters
First Quarter 2018
LRI Landfill, Pierce County, Washington**

Parameter	Alkalinity, Total	Ammonia	Chloride	Nitrate	Nitrate- Nitrite as N	Sulfate	Total Dissolved Solids	Total Organic Carbon	Total Suspended Solids
MRL	5.0	0.1-4.4	0.2-120	0.50	0.50	0.2-1.0	10-47	1.0	4.0
WAC 173-200 Criteria	—	—	250	10	—	250	500	—	—
Prediction Limit	—	—	—	6.4	—	—	—	—	—
Monitoring Wells									
MW-1A	93	*	2.2	*	*	3.1	110	*	5.2
MW-2A	120	*	3.0	*	*	6.1	160	*	*
MW-3	170	*	3.3	*	*	26	240	1.1	*
MW-4	140	0.14	3.4	*	—	11	190	1.1	*
MW-5A	190	0.14	3.5	*	—	24	240	*	*
MW-6	140	*	4.8	*	—	6.8	170	*	*
MW-7	200	0.16	2.9	*	*	3.1	210	*	*
MW-9	68	*	1.7	*	—	1.7	120	*	*
MW-10	91	*	8.9	5.3	—	7.4	180	*	*
Leak Detection System									
LDCS-1	170	*	3.9	*	*	7.2	220	2.5	—
LDCS-2A	400	*	3.5	*	*	23	460	2.2	—
LDCS-2B	310	*	3.4	*	*	70	450	1.7	—
LDCS-3A	360	*	4.2	*	*	71	450	1.5	—
LDCS-4A	340	*	25	1.1	1.3	57	480	5.1	—
LDCS-4B	450	*	21	*	—	140	670	4.0	—
LDCS-5	370	0.93	34	*	—	57	510	4.5	—
LDCS-6	420	*	12	*	—	260	810	5.9	—
Leachate Collection System									
Leachate, Cell 6	7,400	730	2,000	*	—	7.4	7,100	1,600	—

Notes:

All sample units are milligrams per liter (mg/L).

Groundwater (monitoring well) concentrations greater than prediction limits or WAC 173-200 criteria are shown in **bold**.

Analyses performed by TestAmerica of Denver, Colorado.

Method Reporting Limit (MRL) is typical and may be elevated for some samples.

* indicates the sample result was not reported at or above the MRL

— = not applicable or not performed

Table 4. WAC 173-351 Appendix I Metals
First Quarter 2018
LRI Landfill, Pierce County, Washington

Parameter	Antimony-D	Antimony-T	Arsenic-D	Arsenic-T	Barium-D	Barium-T	Beryllium-D	Beryllium-T	Cadmium-D	Cadmium-T	Chromium-D	Chromium-T	Cobalt-D	Cobalt-T	Copper-D	Copper-T	Lead-D	Lead-T	Nickel-D	Nickel-T	Selenium-D	Selenium-T	Silver-D	Silver-T	Thallium-D	Thallium-T	Vanadium-D	Vanadium-T	Zinc-D	Zinc-T
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MRL	0.05	0.05	0.005	0.005	0.005	0.005	0.001	0.001	0.001	0.001	0.005	0.005	0.001	0.001	0.01	0.01	0.002	0.002	0.02	0.02	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01
WAC 173-200 Criteria	—	—	—	0.00005	—	1.0	—	—	—	0.01	—	0.05	—	—	—	1.0	—	0.05	—	—	—	0.01	—	0.05	—	—	—	—	—	5.0
Prediction Limit	—	0.05	—	0.011	—	0.091	—	0.005	—	0.005	—	0.011	—	0.01	—	0.063	—	0.042	—	0.020	—	0.005	—	0.01	—	0.005	—	0.016	—	0.290
Monitoring Wells																														
MW-1A	—	*	—	*	—	0.023	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	0.010
MW-2A	—	*	—	*	—	0.012	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*
MW-3	—	*	—	*	—	0.015	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*
MW-4	—	*	—	0.0090	—	0.016	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	0.014
MW-5A	—	*	—	0.0065	—	0.016	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*
MW-6	—	*	—	0.0075	—	0.021	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*
MW-7	—	*	—	*	—	0.016	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*
(BG) MW-9	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	0.016	—	*
(BG) MW-10	—	*	—	*	—	0.013	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*
Leak Detection System																														
LDCS-1	*	—	0.0069	—	0.017	—	—	—	—	—	*	—	*	—	*	—	*	—	*	—	—	—	—	—	—	—	*	—	*	—
LDCS-2A	*	—	0.0085	—	0.026	—	—	—	—	—	*	—	*	—	*	—	*	—	*	—	—	—	—	—	—	—	*	—	*	—
LDCS-2B	*	—	0.0057	—	0.018	—	—	—	—	—	*	—	*	—	*	—	*	—	*	—	—	—	—	—	—	—	*	—	*	—
LDCS-3A	*	—	*	—	0.013	—	—	—	—	—	*	—	*	—	*	—	*	—	*	—	—	—	—	—	—	—	*	—	*	—
LDCS-4A	*	—	*	—	0.028	—	—	—	—	—	*	—	0.0012	—	0.016	—	*	—	*	—	—	—	—	—	—	—	*	—	*	—
LDCS-4B	*	—	*	—	0.031	—	—	—	—	—	*	—	0.0017	—	*	—	*	—	*	—	—	—	—	—	—	—	*	—	*	—
LDCS-5	*	—	0.0072	—	0.047	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—
LDCS-6	*	—	*	—	0.030	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	*	—	0.012	—
Leachate Collection System																														
Leachate, Cell 6	—	*	—	0.13	—	0.53	—	*	—	*	—	0.38	—	0.035	—	0.084	—	0.058	—	0.33	—	0.017	—	*	—	*	—	0.081	—	3.0

Notes:
All sample units are milligrams per liter (mg/L).
WAC 173-200-040 Table 1 Groundwater Quality Criteria are for total metals.
Groundwater (monitoring well) concentrations greater than prediction limits or WAC 173-200 criteria are shown in **bold**.
Parameter concentrations for monitoring wells are total (T) metals.
Parameter concentrations for LDCS sumps are dissolved (D) metals.
Analyses performed by TestAmerica of Denver, Colorado.
Method Reporting Limit (MRL) is typical and may be elevated for some samples.
* indicates result was not reported at or above the MRL
— = not applicable or not performed
BG = Background

Table 5. WAC 173-351 Appendix II Metals (Dissolved)
First Quarter 2018
LRI Landfill, Pierce County, Washington

Parameter	Calcium	Iron	Magnesium	Manganese	Potassium	Sodium
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MRL	0.20	0.10	0.10	0.005	2.0	1.0
WAC 173-200 Criteria	—	0.30	—	0.050	—	—
Monitoring Wells						
MW-1A	12	1.1	7	0.22	2.8	9.2
MW-2A	19	0.62	11	0.31	3.0	15
MW-3	38	*	17	0.35	4.1	15
MW-4	27	*	15	0.21	5.6	14
MW-5A	29	0.13	12	0.23	4.6	46
MW-6	27	*	13	0.16	4.5	11
MW-7	31	0.17	22	0.25	5.5	15
(BG) MW-9	9.8	*	6.7	*	2.3	8
(BG) MW-10	23	*	10	*	2.1	13
Leak Detection System						
LDCS-1	33	0.26	13	1.3	5.1	18
LDCS-2A	83	*	31	1.8	9.8	33
LDCS-2B	89	*	28	0.014	7.5	23
LDCS-3A	93	*	33	0.74	4.8	22
LDCS-4A	75	0.13	40	0.62	6.7	30
LDCS-4B	120	*	58	1.5	7.1	29
LDCS-5	77	0.22	42	1.5	8.4	38
LDCS-6	130	*	58	0.51	4.3	53
Leachate Collection System[^]						
Leachate, Cell 6	300	20	250	4.0	730	1900

Notes:

All sample units are milligrams per liter (mg/L).

WAC 173-200-040 Table 1 Groundwater Quality Criteria are for total metals.

Groundwater (monitoring well) concentrations greater than WAC 173-200 criteria are shown in **bold**.

Analyses performed by TestAmerica of Denver, Colorado.

Method Reporting Limit (MRL) is typical and may be elevated for some samples.

* indicates result was not reported at or above the MRL.

[^] Leachate reported concentrations are total metals.

— = not applicable or not performed

BG = Background

Table 6. Volatile Organic Compounds (µg/L)
First Quarter 2018
LRI Landfill, Pierce County, Washington

Parameter	1,4-Dichlorobenzene	2-Butanone (MEK)	Acetone	Toluene
Units	µg/L	µg/L	µg/L	µg/L
MRL	0.5	6.0-400	10-380	34
WAC 173-200 Criteria	4.0	—	—	—
Monitoring Wells				
MW-1A	*	*	*	*
MW-2A	*	*	*	*
MW-3	*	*	*	*
MW-4	*	10	12	*
MW-5A	*	*	*	*
MW-6	*	*	*	*
MW-7	*	*	*	*
(BG) MW-9	*	*	*	*
(BG) MW-10	*	*	*	*
Leak Detection System				
LDCS-1	*	*	*	*
LDCS-2A	0.56	*	*	*
LDCS-2B	*	*	*	*
LDCS-3A	*	*	*	*
LDCS-4A	*	*	*	*
LDCS-4B	*	*	*	*
LDCS-5	*	*	*	*
LDCS-6	*	*	*	*
Field Blank	*	*	*	*
Leachate Collection System				
Leachate, Cell 6	*	18,000	15,000	80

Notes:

Analyses performed by TestAmerica of Denver, Colorado.

MRL is typical and may be elevated for some samples.

* = not reported at or above the MRL

— = not applicable or not performed

BG = Background

Table 7. Cation-Anion Balance
First Quarter 2018
LRI Landfill, Pierce County, Washington

Cations	mg/L				meq/L				% of Total			
	Ca	Mg	K	Na	Total	Ca	Mg	K	Na	Total	Na+K	Ca
MW-1A	12	7	2.8	9.2	31	0.60	0.58	0.06	0.40	1.64	28	37
MW-2A	19	11	3.0	15	48	0.95	0.91	0.07	0.65	2.57	28	37
MW-3	38	17	4.1	15	74.1	1.90	1.40	0.09	0.65	4.04	18	47
MW-4	27	15	5.6	14	61.6	1.35	1.23	0.13	0.61	3.32	22	41
MW-5A	29	12	4.6	46	91.6	1.45	0.99	0.10	2.00	4.54	46	32
MW-6	27	13	4.5	11	55.5	1.35	1.07	0.10	0.48	3.00	19	45
MW-7	31	22	5.5	15	73.5	1.55	1.81	0.12	0.65	4.13	19	37
MW-9	9.8	6.7	2.3	8	26.8	0.49	0.55	0.05	0.35	1.44	28	34
MW-10	23	10	2.1	13	48.1	1.15	0.82	0.05	0.57	2.58	24	44
LDCS-1	33	13	5.1	18	69.1	1.65	1.07	0.12	0.78	3.61	25	46
LDCS-2A	83	31	9.8	33	156.8	4.14	2.55	0.22	1.44	8.35	20	50
LDCS-2B	89	28	7.5	23	147.5	4.44	2.30	0.17	1.00	7.92	15	56
LDCS-3A	93	33	4.8	22	152.8	4.64	2.72	0.11	0.96	8.42	13	55
LDCS-4A	75	40	6.7	30	151.7	3.74	3.29	0.15	1.31	8.49	17	44
LDCS-4B	120	58	7.1	29	214.1	5.99	4.77	0.16	1.26	12.18	12	49
LDCS-5	77	42	8.4	38	165.4	3.84	3.46	0.19	1.65	9.14	20	42
LDCS-6	130	58	4.3	53	245.3	6.49	4.77	0.10	2.31	13.66	18	47
Leadate Cell 6	300	250	730	1900	3180	14.97	20.58	16.48	82.65	134.68	74	11

Anions	mg/L				meq/L				% of Total				Total Ions (meq/L)	Cation - Anion Balance	Applicable Ratio (%)	Ratio Exceedance
	Alk	Cl	NO ₃	SO ₄	Total	Alk	Cl	NO ₃	SO ₄	Total	Cl	Alk				
MW-1A	111.6	2.2	0.5	3.1	117.4	1.83	0.06	0.008	0.06	1.96	3	93	3.60	9.1	10	O
MW-2A	144	3.0	0.5	6.1	153.6	2.36	0.08	0.008	0.13	2.58	3	91	5.15	0.1	5	O
MW-3	204	3.3	0.5	26	233.8	3.35	0.09	0.008	0.54	3.99	2	84	8.03	0.7	5	O
MW-4	168	3.4	0.5	11	182.9	2.76	0.10	0.008	0.23	3.09	3	89	6.41	3.6	5	O
MW-5A	228	3.5	0.5	24	256	3.74	0.10	0.008	0.50	4.35	2	86	8.88	2.2	5	O
MW-6	168	4.8	0.5	6.8	180.1	2.76	0.14	0.008	0.14	3.04	4	91	6.04	0.7	5	O
MW-7	240	2.9	0.5	3.1	246.5	3.94	0.08	0.008	0.06	4.09	2	96	8.22	0.5	5	O
MW-9	81.6	1.7	0.5	1.7	85.5	1.34	0.05	0.008	0.04	1.43	3	94	2.87	0.4	10	O
MW-10	109.2	8.9	5.3	7.4	130.8	1.79	0.25	0.085	0.15	2.28	11	79	4.86	6.2	10	O
LDCS-1	204	3.9	0.5	7.2	215.6	3.35	0.11	0.008	0.15	3.61	3	93	7.23	0.0	5	O
LDCS-2A	480	3.5	0.5	23	507	7.87	0.10	0.008	0.48	8.46	1	93	16.81	0.6	5	O
LDCS-2B	372	3.4	0.5	70	445.9	6.10	0.10	0.008	1.46	7.66	1	80	15.58	1.6	5	O
LDCS-3A	432	4.2	0.5	71	507.7	7.08	0.12	0.008	1.48	8.69	1	82	17.11	1.6	5	O
LDCS-4A	408	25	1.3	57	491.3	6.69	0.71	0.021	1.19	8.60	8	78	17.09	0.7	5	O
LDCS-4B	540	21	0.5	140	701.5	8.86	0.59	0.008	2.91	12.37	5	72	24.55	0.8	5	O
LDCS-5	444	34	0.5	57	535.5	7.28	0.96	0.008	1.19	9.43	10	77	18.58	1.6	5	O
LDCS-6	504	12	0.5	260	777	8.27	0.34	0.008	5.41	14.02	2	59	27.68	1.3	5	O
Leadate, Cell 6	8,880	2,000	2.1	7.4	10890	145.63	56.40	0.034	0.15	202.22	28	72	336.90	20.0	5	Exceeds

Notes:
Method 353.2 Nitrate/Nitrite combined data used for LDCS-4A
mg/L = milligrams per liter
meq/L = milliequivalents per liter
Total alkalinity concentration, reported as calcium carbonate (CaCO₃), is converted to the bicarbonate (HCO₃⁻) ion by multiplying by a factor of 1.2.
Cation / anion balance equation is the equivalent percent difference in cations minus anions divided by the sum of cations and anions [(cations-anions)/(anions+cations)*100].
The MRL was used for analytes that were non-detect
A 10% difference threshold is used if the total cation-anion sums are < 5.0 meq/liter.
A 5% difference threshold is used if the total cation-anion sums are > or = to 5.0 meq/liter.

Table 8. Duplicate Sample Results
First Quarter 2018 Monitoring Report
LRI Landfill, Pierce County, Washington

Parameter	MRL	MW-7	MW-7 (Duplicate)	RPD (%)
Volatile Organic Compounds (µg/L) No Detections	-	-	-	-
Inorganic Parameters (mg/L)				
Alkalinity, Bicarbonate (as CaCO ₃)	5.0	200	200	0.0%
Ammonia	0.10	0.16	0.19	17.1%
Chloride	0.20	2.9	2.8	3.5%
Sulfate	0.20	3.1	3.1	0.0%
Total Dissolved Solids	10	210	210	0.0%
Dissolved Metals (mg/L)				
Calcium	0.20	31	30	3.3%
Iron	0.10	0.17	0.18	5.7%
Magnesium	0.10	22	21	4.7%
Manganese	0.005	0.25	0.24	4.1%
Potassium	2.0	5.5	5.5	0.0%
Sodium	1.0	15	15	0.0%
Total Metals (mg/L)				
Arsenic	0.005	*	0.0053	5.8%
Barium	0.005	0.016	0.016	0.0%

Notes:

Analyses performed by TestAmerica of Denver, Colorado.

VOCs not listed were not present at concentrations exceeding the Method Reporting Limit (MRL).

RPD = relative percent difference.

µg/L = micrograms per liter.

mg/L = milligrams per liter.

* = the sample results were not reported at or above the MRL

The MRL was used to calculate the RPD for analytes where one sample was non-detect.

Appendix C
Field Sampling Documentation

SCS ENGINEERS

March 26, 2018
File No. 04218001.02

**Subject: First Quarter 2018 Groundwater Monitoring Event
LRI Landfill, Pierce County, Washington**

NOTES/SAMPLE DECODING:

Event Dates: March 19-22, 2018

Field Staff: Sam Graber

- Dedicated pumps were used for purging and sampling wells MW-1A, MW-2A, MW-3, MW-5A, MW-6, MW-7, MW-9, MW-10, and leak detection/collection system points LDCS-3A, LDCS-4A, LDCS-4B, LDCS-5, and LDCS-6.
- Disposable bailers were used to sample leak detection/collection system points LDCS-1, LDCS-2A, and LDCS-2B.
- A non-dedicated Sample Pro pump was used for purging and sampling well MW-4.
- A round of water level measurements was completed on March 21st, 2018.
- Multiparameter field meters were calibrated daily, prior to sampling.
- Source water for the field blank was lab-grade deionized water (VOC-free) provided by TestAmerica in Tacoma, Washington.

Sample Number	Well Number
304-031918-01	MW-1A
304-031918-02	LDCS-3A
304-031918-03	MW-2A
304-031918-04	LDCS-2B
304-031918-05	MW-3
304-031918-06	LDCS-2A
304-031918-07	MW-7
304-031918-08	LDCS-1
304-031918-09	MW-7 (Duplicate)
304-031918-10	LDCS-4A
304-032018-11	MW-5A
304-032018-12	LDCS-5
304-032018-13	MW-6
304-032018-14	LDCS-4B
304-032018-15	LDCS-6
304-032018-16	MW-10
304-032018-17	Field Blank
304-032118-18	Leachate, Cell 6
304-032118-19	MW-9
304-032218-20	MW-4

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

17.89

Groundwater Sampling Data Sheet

Project #: 0428001.02 Site: CR1 50412 Well ID: MW-1 Sample ID: 304-031918-01 Date: 3/19/2018 Weather: Sunny

Filtered? ☒ Y ☐ N Locked? ☒ Y ☐ N Water in Protector? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml HNO3 x2 125 ml NaOH 500 ml Poly 500 ml H2SO4 x2 40 ml VOA x3 x6 125 ml Poly 1000 ml Amber

Sampling Method: DTW TOS Intake BOS Total Depth Damage? Y ☒ N

Meter: MP-20 YSI

CONTROL SETTINGS: 1.75" QED SamplePro Bail 1 ft water = 0.62L One Well Volume (liters) 10 Discharge 5 Pressure 35 Flow 300 mL/min

Peristaltic Grab Other

1L = 0.24 gallons

One Well Volume (liters) 10

Total Volume Bailed (liters) 35

Flow Setting: 300 mL/min

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
10:36	17.89	13.23	170	2.85	6.42	220.6		
10:41		12.78	50	1.78	6.12	241.5		
10:44		13.05	77	1.33	6.41	223.1		
10:47		12.71	100	1.33	6.33	219.9		
10:50		13.39	130	0.99	6.51	160.4		
10:53		13.27	189	0.41	6.78	31.3	5.5	
10:56		12.99	193	0.40	6.94	-13.7	4.0	
10:59		13.20	194	0.29	7.01	-35.2		
11:02	2155	13.28	197	0.26	7.05	-48.4	4.16	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

ALDO DEEP

Printed Name

Signature

Signature

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04219001.02

Site: LRI 304 m

Well ID: LDLS-3A

Sample ID: 304-D31918-02

Date: 3/19/18

Weather: sunny

Filtered? ☒ N

Locked? ☒ Y

Sample Containers: 1000 ml Poly

Water in Protector? ☒ N

500 ml HNO3 x2

500 ml H2SO4 x2

125 ml NaOH

DTW 250 ml Poly

TOS 40 ml VOA

Intake x3

BOS x6

Total Depth 125 ml Poly

Meter: MP-20

YSI

CONTROL SETTINGS:

Refill 11.5

Discharge 3.5

Pressure 35

Flow 200 mL/min

1.75" QED SamplePro

Bail

Peristaltic

Grab

Other

1L = 0.24 gallons

One Well Volume (liters)

Total Volume Bailed (liters)

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1025		19.06	762	6.54	6.41	145		
1030		18.11	724	0.29	6.34	131		
1033		19.14	690	0.94	6.32	115		
1040		20.61	758	0.31	6.29	104		
1039		20.65	758	0.26	6.30	104		
1042		20.78	758	0.21	6.30	104		
1045		21.18	762	0.20	6.29	107	3.10	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Sam braker

Printed Name

Signature

[Signature]

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 042600102 Site: LR1 304th Well ID: MW-2A Sample ID: 304-031918-03 Date: 3/19/2018 Weather: overcast

DTW: 17.22 TOS: 18.00 Intake: 18.00 BOS: 18.00 Total Depth: 18.00

Method: DTW Meter: MP-20 YSI

CONTROL SETTINGS: Dedicated: 1.75" QED SamplePro Bail: 1L = 0.24 gallons Peristaltic: Grab Other: Flow Setting:

One Well Volume (liters): 9 Total Volume Bailed (liters): 30 mL/min

Refill: 6 Discharge: 30 Pressure: 30 Flow: 30

Water in Protector? Y N Damage? Y N

Sample Containers: 1000 ml Poly 125 ml Poly 500 ml HNO3 x2 500 ml H2SO4 x2 40 ml VOA x3 1000 ml Amber x6 125 ml NaOH

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
11:35	17.22	13.14	255	2.55	7.06	89.2		
11:40	18.00	12.58	248	0.40	7.14	-13.2		
11:43		12.49	245	0.30	7.17	-31.7		
11:46		12.45	246	0.23	7.18	-43.7		
11:49		12.44	245	0.22	7.19	-49.8		
11:52		12.39	244	0.20	7.19	-55.0		
11:55	18.00	12.42	245	0.21	7.19	-57.5	4.73	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER: Alexa Deep

Printed Name

Alexa Deep Signature

Bellevue, WA 98005

Groundwater Sampling Data Sheet

Notes / Observations (color, odor, anomalies, etc):

Brown particulates in sample

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1145		19.61	697	3.86	7.59	-18	17.62	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Printed Name

Signature

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04218001-02

Site: UR 30410

Well ID: MW-3

Sample ID: 304-031918-05

Date: 3/19/2018

Weather: overcast

Filtered? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml HNO3 500 ml H2SO4 125 ml NaOH

Locked? ☒ Y ☐ N

Water in Protector? ☒ Y ☐ N

500 ml Poly

500 ml H2SO4

125 ml NaOH

Sampling Method: DTW

Meter: MP-20

YSI

CONTROL SETTINGS:

Refill

Discharge

Pressure

Flow

Dedicated

1.75" QED SamplePro

Bail

Peristaltic

Grab

Other

1 ft water = 0.62L

One Well Volume (liters)

Other:

Flow

Setting:

Total Volume Bailed (liters)

35

35 ml/min

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
12:40	587	10.70	392	5.82	6.82	133.3		
12:45		9.88	393	1.30	6.39	162.8		
12:48		10.04	391	1.44	6.55	160.5		
12:51		9.70	392	1.68	6.65	159.6		
12:54		9.68	390	1.46	6.70	158.6		
12:57		10.39	389	1.40	6.80	150.2		
13:00	623	10.42	390	1.20	6.88	141.6	3.89	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Alexa Deep

Printed Name

Signature

Alexa Deep

Bellevue, WA 98005

Groundwater Sampling Data Sheet

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

Printed Name

Signature: _____

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 0421800102

Site: 621 304th

Well ID: 19W-7

Sample ID: 3021-031918-07

Date: 3/19/2018

Weather: overcast

Filtered? ☒ Y ☐ N

Locked? ☒ Y ☐ N

Water in Protector? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml Poly 500 ml HNO3 x2 125 ml NaOH

Sampling Method: DTW

Meter: MP-20

CONTROL SETTINGS: Refill 9 Discharge 6 Pressure 30 Flow 350 ml/min

Dedicated 1.75" QED SamplePro Bail 1L = 0.24 gallons

One Well Volume (liters) Other: Flow

Total Volume Bailed (liters) Setting:

Notes / Observations (color, odor, anomalies, etc):

DUP taken @ 14:32

304-031918-09

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
14:02	20.03	10.47	377	4.09	6.80	175.4		
14:07		10.17	379	0.33	7.33	69.6		
14:10		10.17	377	0.34	7.49	-5.9		
14:13		10.19	376	0.64	7.52	-35.3		
14:16		10.16	376	0.40	7.54	-44.5		
14:19		10.16	377	0.38	7.54	-48.3		
14:22	21.85	10.16	377	0.35	7.56	-54.9	1.07	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Alexa Deep

Printed Name

Alexa Deep

Signature

Bellevue, WA 98005

Groundwater Sampling Data Sheet

Notes / Observations (color, odor, anomalies, etc):Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

Printed Name

Signature

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04219001.02

Site: LRI 304th

Well ID: LOS-4A

Sample ID: 304-031918-10

Date: 3/19/18

Weather: partly cloudy

Filtered? ☒ N

Locked? ☒ N

Sample Containers: 1000 ml Poly, 500 ml HNO3, 500 ml NaOH

Water in Protector? ☒ N

500 ml Poly, 500 ml H2SO4, 125 ml NaOH

Sampling Method: DTW, TOS, Intake, BOS, Total Depth

Meter: MP-20, YSI

CONTROL SETTINGS: Refill, Discharge, Pressure, Flow

Dedicated: 1.75" QED SamplePro, Bail, Peristaltic, Grab, Other

1 ft water = 0.62L, 1L = 0.24 gallons

One Well Volume (liters), Total Volume Bailed (liters)

Other: Flow Setting:

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1405		15.08	708	4.92	6.52	132		
1410		20.53	777	0.76	6.67	-134		
1413		20.42	780	0.68	6.42	-102		
1416		20.38	781	0.59	6.28	-45		
1419		22.31	783	0.52	6.20	30		
1422		22.46	780	0.48	6.13	54		
1425		22.63	782	0.46	6.10	71	2.32	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Sam Baber

Printed Name

Signature

Signature

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 748-4600

Groundwater Sampling Data Sheet

Project #: 04213001.02

Site: LRI 304th

Well ID: MW-5A

Sample ID: 304-032018-11

Date: 3/20/18

Weather: Sunny

Filtered? ☒ Y ☐ N

Locked? ☒ Y ☐ N

Sample Containers: 1000 ml Poly

Water in Protector? ☒ Y ☐ N

500 ml HNO₃ x2

500 ml H₂SO₄ x2

125 ml NaOH

Sampling Method: DTW

Meter: MP-20

CONTROL SETTINGS: 9

Refill 6

Discharge 40

Pressure 300

Flow 400

One Well Volume (liters) 1L = 0.24 gallons

Total Volume Bailed (liters) 40

Peristaltic 1L = 0.24 gallons

Grab Other

Other Flow Setting

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
935		11.93	397	4.98	5.43	256.9		
940		11.99	432	0.57	6.91	211.2		
943		11.98	427	0.45	7.02	143.6		
946		11.98	422	0.34	7.18	71.2		
949		11.98	418	0.27	7.35	21.7		
952		11.75	419	0.26	7.39	3.4		
955		11.71	420	0.23	7.44	-15.7	2.57	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Sam Baker

Printed Name

Signature

[Signature]

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4800

Groundwater Sampling Data Sheet

Project #: 01210001.02

Site: US 30th

Well ID: LD65-5

Sample ID: 304-032018-12

Date: 3/20/18

Weather: Sunny

Filtered? ☒ N Locked? ☒ N

Sample Containers: 1000 ml Poly 500 ml HNO₃ x2 125 ml NaOH

Water in Protector? ☒ N 500 ml Poly 500 ml H₂SO₄ x2 40 ml VOA x3 x6 125 ml Poly 1000 ml Amber

Sampling Method: DTW TOS Intake BOS Total Depth

Meter: MP-20 YSD

CONTROL SETTINGS: Refill 12 Discharge 3 Pressure 40 Flow 80 mL/min

1.75" QED SamplePro Bail 1 ft water = 0.62L One Well Volume (liters) Total Volume Bailed (liters)

Peristaltic Grab Other

1L = 0.24 gallons

Notes / Observations (color, odor, anomalies, etc):

some orange particulates in sample

TIME	DTW	Temp.	Sp Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1046		12.99	789	4.75	6.79	166.5		
1050		15.13	788	2.49	6.66	170.4		
1053		16.21	799	1.83	6.57	174.1		
1056		17.01	798	1.52	6.45	180.3		
1059		17.45	799	0.94	6.44	185.3		
1102		17.38	806	0.98	6.46	188.8		
1105		18.36	860	0.33	6.43	176.9	21.22	
1108		18.52	862	0.25	6.44	156.8		
1111		18.71	864	0.21	6.44	148.2	17.03	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Sam Grab

Printed Name

Signature



SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04218001-07 Site: LR1 304th Well ID: MW-6 Sample ID: 000 304-33018-13 Date: 3/23/2018 Weather: Sunny

Filtered? ☒ Y ☐ N Locked? ☒ Y ☐ N Water in Protector? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml Poly 500 ml H2SO4 x2 125 ml NaOH

Sampling Method: Dedicated ☒ 1.75" QED SamplePro Bail ☐ Peristaltic ☐ Grab ☐ Other ☐

CONTROL SETTINGS: Refill 9 Discharge 0 Pressure 30 Flow 300 mL/min

1 ft water = 0.62L One Well Volume (liters) 300 mL/min Total Volume Bailed (liters) 300 mL/min

1L = 0.24 gallons

TIME	DTW	Temp.	Sp. Cond.	DO	pH	En	Turbidity	Q / Vol.
1245		11.03	294	2.39	7.34	0.14		-171
1250		10.45	286	0.70	8.11	0.13		-151
1253		10.51	285	0.49	8.19	0.13		-129
1256		10.55	286	0.36	8.27	0.13		-113
1259		10.62	283	0.29	8.34	0.14		-105
1302		10.66	283	0.26	8.38	0.13		-98
1305	8.64	10.78	284	0.22	8.38	0.13	1.70	-83

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER: Alexo Deep

Printed Name

Alexo Deep
Signature

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04218000102

Site: LRI South

Well ID: LDGS-4B

Sample ID: 304-032013-14

Date: 7/20/18

Weather: Sunny

Filtered? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml Poly 500 ml HNO3 125 ml NaOH

Locked? ☒ Y ☐ N

Water in Protector? ☒ Y ☐ N

Water in Poly: 500 ml Poly 250 ml Poly 125 ml Poly

DTW: 15

TOS: 5

Intake: 40

BOS: 150 mL/2.4

Total Depth: 150 mL/2.4

Meter: MP-20 YSI

CONTROL SETTINGS: Refill: 15 Discharge: 5 Pressure: 40 Flow: 150 mL/2.4

1.75" QED SamplePro: 15 Bail: 15 Peristaltic: 15 Grab: 15 Other: 15

1 ft water = 0.62L One Well Volume (liters): 15 Other: 15

Total Volume Bailed (liters): 150 Flow Setting: 150

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1215		23.73	1096	0.58	6.57	178.9		
1220		24.12	1094	0.33	6.57	177.2		
1223		24.31	1094	0.29	6.57	174.7		
1226		24.30	1092	0.28	6.56	173.8		
1229		24.54	1091	0.28	6.55	172.4		
1232		24.51	1091	0.27	6.54	171.5		
1235		24.56	1090	0.26	6.54	170.5	2.30	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Sam Gaber

Printed Name

Signature



SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 04218001.02

Site: CRF 304th

Well ID: 0065-6

Sample ID: 304-032018-15

Date: 3/20/18

Weather: sunny

Filtered? ☒ N

Locked? ☒ N

Water in Protector? ☒ N

Sample Containers:

1000 ml Poly	500 ml Poly	500 ml HNO3	x2	500 ml H2SO4	x2	40 ml VOA	x3	x6	125 ml Poly	1000 ml Amber
--------------	-------------	-------------	----	--------------	----	-----------	----	----	-------------	---------------

125 ml NaOH

Sampling Method:

Dedicated ☒ 1.75" QED SamplePro Bail

CONTROL SETTINGS:

Meter: MP-20 ☒ SI

DTW ☒ TOS ☒ Intake ☒ BOS

Refill 16 One Well Volume (liters)

Discharge 4

Pressure 40 Total Volume Bailed (liters)

Flow 12.5 mL/min

Peristaltic ☐ Grab ☐ Other ☐

1L = 0.24 gallons

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1325		11.42	941	8.33	7.58	192.2		
1330		12.20	988	6.90	7.35	193.0		
1333		12.87	985	5.58	7.14	193.5		
1336		14.11	985	5.12	7.08	192.1		
1341		14.36	990	4.27	7.01	192.8		
1342		14.60	1124	3.00	6.87	196.7		
1345		14.64	1191	2.00	6.82	198.4		
1348		14.80	1213	1.83	6.81	198.4	1.00	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Sam brater

Printed Name

Signature

Sam Brater

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 2428001-04

Site: LRI 304E

Well ID: MW-10

Sample ID: 3021-032018-116

Date: 3/20/2018

Weather: Sunny

Filtered? ☒ Y ☐ N

Locked? ☒ Y ☐ N

Sample Containers: 1000 ml Poly

500 ml HNO3 x2

125 ml NaOH

Sampling Method: DTW

Meter: MP-20

CONTROL SETTINGS: 9

Refill 6

Discharge 30

Pressure 300 mL/min

Flow 300 mL/min

Dedicated ☒ 1.75" QED SamplePro

Peristaltic ☐ 1L = 0.24 gallons

Grab ☐ 1 ft water = 0.62L

Other ☐ One Well Volume (liters)

Other ☐ Total Volume Bailed (liters)

Other ☐ Flow Setting

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1425	10.91	10.00	2.61	2.40	6.81	133		
1430		10.72	2.62	1.41	6.52	134		
1433		10.67	2.63	1.23	6.51	134		
1436		10.66	2.64	1.08	6.52	136		
1439		10.63	2.65	1.01	6.53	134		
1442		10.65	2.65	0.93	6.51	133		
1445		10.61	2.66	0.88	6.52	133	0.75	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER: Alexa Deep

Printed Name

Alexa Deep

Signature

Bellevue, WA 98005

Groundwater Sampling Data Sheet

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

Printed Name _____

Signature _____

Bellevue, WA 98005

Groundwater Sampling Data Sheet

Notes / Observations (color, odor, anomalies, etc):

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb $\pm 10\%$ or ≤ 5

Signature

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #:	DV218001.02	Site:	LF 10th	Well ID:	MW-9	Sample ID:	309-032118-19	Date:	3/21/18	Weather:	cloudy	Filtered? ☒ N	Locked? ☒ N	1000 ml Poly	500 ml HNO ₃	x2	500 ml H ₂ SO ₄	x2	40 ml VOA	x3	x6	125 ml Poly	1000 ml Amber	125 ml NaOH	

SCS ENGINEERS

2405 140th ave NE #107

Bellevue, WA 98005

(425) 746-4600

Groundwater Sampling Data Sheet

Project #: 00215004102

Site: 205 30th

Well ID: HW-4

Sample ID: 204-03018-20

Date: 3/22/13

Weather: partly

Filtered? ☒ Y ☐ N

Sample Containers: 1000 ml Poly 500 ml HNO3 500 ml H2SO4 125 ml NaOH

Locked? ☒ Y ☐ N

Water in Protector? ☒ Y ☐ N

500 ml Poly 250 ml Poly 40 ml VOA x3 x6 125 ml Poly 1000 ml Amber

Sampling Method: 1.75" QED SamplePro 1 ft water = 0.62L 1L = 0.24 gallons

Dedicated CONTROL SETTINGS: Refill Discharge Pressure Flow

Meter: MP-20 YSI

One Well Volume (liters) 7 40

Total Volume Bailed (liters) 400 gal/m/14

Peristaltic Grab Other

Notes / Observations (color, odor, anomalies, etc):

TIME	DTW	Temp.	Sp. Cond.	DO	pH	Eh	Turbidity	Q / Vol.
1020		11.90	259	4.24	6.56	224.3		
1025		12.17	294	6.84	7.21	213.6		
1028		12.13	246	6.66	7.30	212.6	30.53	
1037		12.02	279	6.50	7.42	202.6	22.26	
1050		12.12	304	0.25	7.56	143.5	17.05	
1058		12.07	307	0.20	7.60	103.3		
1057		12.04	310	0.16	7.63	75.3		
1101		12.06	311	0.16	7.66	35.6	5.05	

Stabilization Parameters: pH/DO ± 0.2 , SpC $\pm 10\%$, Temp $\pm 0.5^\circ\text{C}$, Turb. $\pm 10\%$ or ≤ 5

SAMPLER:

Printed Name

Signature

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	3/19/19				
Time	930				
Weather (sky or precip. temp)	partly cloudy				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1411	4.05	7.13		
Post Cal Reading	1413	4.01	7.00	792, 95.6, 18.5, 0.95	
Discrepancy	No				
Calib. Successful?	yes				
Calibration by	SEB				
Instrument Type, ID	MP20 / YSI 556			MicoTPW HACH2000	
Calibration Location	304th				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

	Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	3/19/18					
Time	0930					
Weather (sky or precip, temp)	overcast					
Type of Calibration	Standard	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	100% or ~8.5	1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1421	4.22	6.92			
Post Cal Reading	1413	4.01	7.00	6.86	952.2, 13.53, 0.0	
Discrepancy	No					
Calib. Successful?	Yes					
Calibration by	SEL					
Instrument Type, ID	MP20		/ SI 556		MicoTPW / HACH2000	
Calibration Location	304th					

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	3/20/18				
Time	830				
Weather (sky or precip. temp)	sunny				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1411	3.70	6.85		
Post Cal Reading	1413	4.01	7.00	1011, 9.30, 0.0	
Discrepancy	No				
Calib. Successful?	yes				
Calibration by	SEB				
Instrument Type, ID	MP20 / YSI 556		MicroTPW / HACH2000		
Calibration Location	LRI South				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	3/20/18				
Time	830				
Weather (sky or precip, temp)	sunny				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1408	4.11	6.91		
Post Cal Reading	1413	4.01	7.00	783, 94.2, 18.1, 0.22	
Discrepancy	No				
Calib. Successful?	yes				
Calibration by	SEL				
Instrument Type, ID	MP20	/	YSI 556	MicoTPW / HACH2000	
Calibration Location	LRI 304th				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	3/21/18				
Time	1045				
Weather (sky or precip, temp)	partly cloudy				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1396	4.05	7.05	8.64	
Post Cal Reading	1413	4.01	7.00	1083, 8.96, 0.0	
Discrepancy	No				
Calib. Successful?	yes				
Calibration by	JEB				
Instrument Type, ID	MP20	/	YSI 556	MicoTPW / HACH2000	
Calibration Location	8 LPT 304th				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

GROUNDWATER SAMPLING INSTRUMENT CALIBRATION DOCUMENTATION FORM

Conductivity	pH4	pH 7	DO	Turbidity	Comments/Exceptions
Date	3/22/19				
Time	800				
Weather (sky or precip, temp)	sunny				
Type of Calibration	Standard	Standard	Standard	Standard	
Standard Value	1413	4.01	7.00	100% or ~8.5 1000, 10, 0.2 800, 100, 20, <0.1	
Pre-Cal Reading	1430	4.02	6.94		
Post Cal Reading	1413	4.01	7.00	1072, 7.49, 0.0	
Discrepancy	No				
Calib. Successful?	Yes				
Calibration by	SEB				
Instrument Type, ID	MP20 / YSI 556		MicoTPW / HACH2000		
Calibration Location	LRT 704th				

* If Direct Reading is Unavailable, Assume pressure = 760 mm - 2.5 (altitude in ft/100)

Appendix D

Statistical Calculations

Groundwater Prediction Limits (mg/L)
Appendix I Parameters, First Quarter 2018
LRI Landfill, Pierce County, Washington

	MRL (typical)	Prediction Limit	MW-1/ MW-1A	MW-2/ MW-2A	MW-3	MW-4	MW-5/ MW-5A	MW-6	MW-7	MW-9	MW-10
Antimony	0.050	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L	0.050 L
Arsenic	0.005	0.011	0.005 L	0.005 L	0.005 L	0.011	0.008	0.008	0.006	0.005 L	0.005 L
Barium	0.005	0.091	0.030	0.018	0.015	0.091	0.036	0.014	0.016	0.0057	0.015
Beryllium	0.005	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.001 L	0.005 L	0.001 L	0.005 L
Cadmium	0.005	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L
Chromium	0.005	0.011	0.005 L	0.005 L	0.005 L	0.011	0.005	0.005 L	0.005 L	0.005 L	0.005 L
Cobalt	0.010	0.010 L	0.010 L	0.010 L	0.010 L	0.004	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L
Copper	0.010	0.063	0.010 L	0.010 L	0.010 L	0.063	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L
Lead	0.002	0.042	0.002 L	0.002 L	0.002 L	0.042	0.002 L	0.002 L	0.002 L	0.002 L	0.002 L
Nickel	0.020	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L	0.020 L
Selenium	0.005	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L
Silver	0.010	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L	0.010 L
Thallium	0.005	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L	0.005 L
Vanadium	0.010	0.016	0.010 L	0.010 L	0.010 L	0.014	0.010 L	0.010 L	0.010 L	0.016	0.010 L
Zinc	0.01	0.290	0.032	0.010 L	0.010 L	0.290	0.010	0.010 L	0.010 L	0.043	0.011
Nitrate as Nitrogen	0.50	6.40	0.500 L	0.500 L	0.500 L	0.500 L	0.500 L	0.500 L	0.500 L	0.500 L	6.40

Notes:

Prediction Limits are shown in bold.

Prediction Limits for metals are for total metals.

L = not reported at or above the MRL (Method Reporting Limit).

mg/L = milligrams per liter.

Statistical Summary of Total Metals Groundwater Data
Appendix I Parameters, First Quarter 2018
LRI Landfill, Pierce County, Washington

Location ID	Antimony (Sb)			Arsenic (As)			Barium (Ba)		Beryllium (Be)		Cadmium (Cd)		Chromium (Cr)		Cobalt (Co)		Copper (Cu)		Lead (Pb)		Nickel (Ni)		Selenium (Se)		Silver (Ag)		Thallium (Tl)		Vanadium (V)		Zinc (Zn)		Nitrate (NO ₃)																	
Monitoring Date	Result		Conc.	Result		Conc.	Result	Conc.	Result		Conc.	Result		Conc.	Result		Conc.	Result		Conc.	Result		Conc.	Result		Conc.	Result		Conc.	Result		Conc.	Result		Conc.															
MW-1																																																		
3/24/2014	0.002	L	0.001	0.005	L	0.0025	0.022	0.022	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25
6/24/2014	0.002	L	0.001	0.005	L	0.0025	0.02	0.02	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
9/17/2014	0.05	L	0.025	0.005	L	0.0025	0.024	0.024	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.01	L	0.005	0.005	L	0.0025	0.01	L	0.005	0.02		0.2	0.5	L	0.25			
12/16/2014	0.05	L	0.025	0.005	L	0.0025	0.03	0.03	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.032	0.032	0.5	L	0.25				
3/23/2015	0.05	L	0.025	0.005	L	0.0025	0.02	0.02	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.01	L	0.005	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
6/8/2015	0.05	L	0.025	0.005	L	0.0025	0.022	0.022	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
9/16/2015	0.05	L	0.025	0.005	L	0.0025	0.021	0.021	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
12/14/2015	0.05	L	0.025	0.005	L	0.0025	0.024	0.024	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
Number Analyzed	8			8			8		8			8			8			8			8			8			8			8			8			8			8			8			8					
Number Detected	0			0			8		0			0			0			0			0			0			0			0			0			2			0			0			0					
Minimum Concentration			0.001			0.0025		0.02			0.0005			0.0005			0.001			0.0005			0.001			0.0005			0.001			0.0025			0.0025			0.0005			0.005			0.25						
Maximum Concentration			0.025			0.0025		0.03			0.0025			0.0025			0.0025			0.005			0.005			0.001			0.01			0.0025			0.005			0.032			0.25			0.25						
Average Concentration			NC			NC		0.022875			NC			NC			NC			NC			NC			NC			0.01			0.0025			0.005			0.005			0.032			0.25						
Variance			NC			NC		1.07E-05			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC						
Standard Deviation			NC			NC		0.003271			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC						
Coefficient of Variation (%)			NC			NC		14.29744			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC						
Standard Error			NC			NC		0.001156			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC			NC						
MW-2																																																		
3/24/2014	0.002	L	0.001	0.005	L	0.0025	0.014	0.014	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
6/26/2014	0.002	L	0.001	0.005	L	0.0025	0.015	0.015	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.0005	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
9/16/2014	0.05	L	0.025	0.005	L	0.0025	0.018	0.018	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.01	L	0.005	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25			
12/16/2014	0.05	L	0.025	0.005	L	0.0025	0.014	0.014	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25
3/23/2015	0.05	L	0.025	0.005	L	0.0025	0.012	0.012	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25
6/8/2015	0.05	L	0.025	0.005	L	0.0025	0.013	0.013	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25
9/16/2015	0.05	L	0.025	0.005	L	0.0025	0.013	0.013	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25
12/14/2015	0.05	L	0.025	0.005	L	0.0025	0.014	0.014	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.002	L	0.001	0																							

Statistical Summary of Total Metals Groundwater Data
Appendix I Parameters, First Quarter 2018
LRI Landfill, Pierce County, Washington

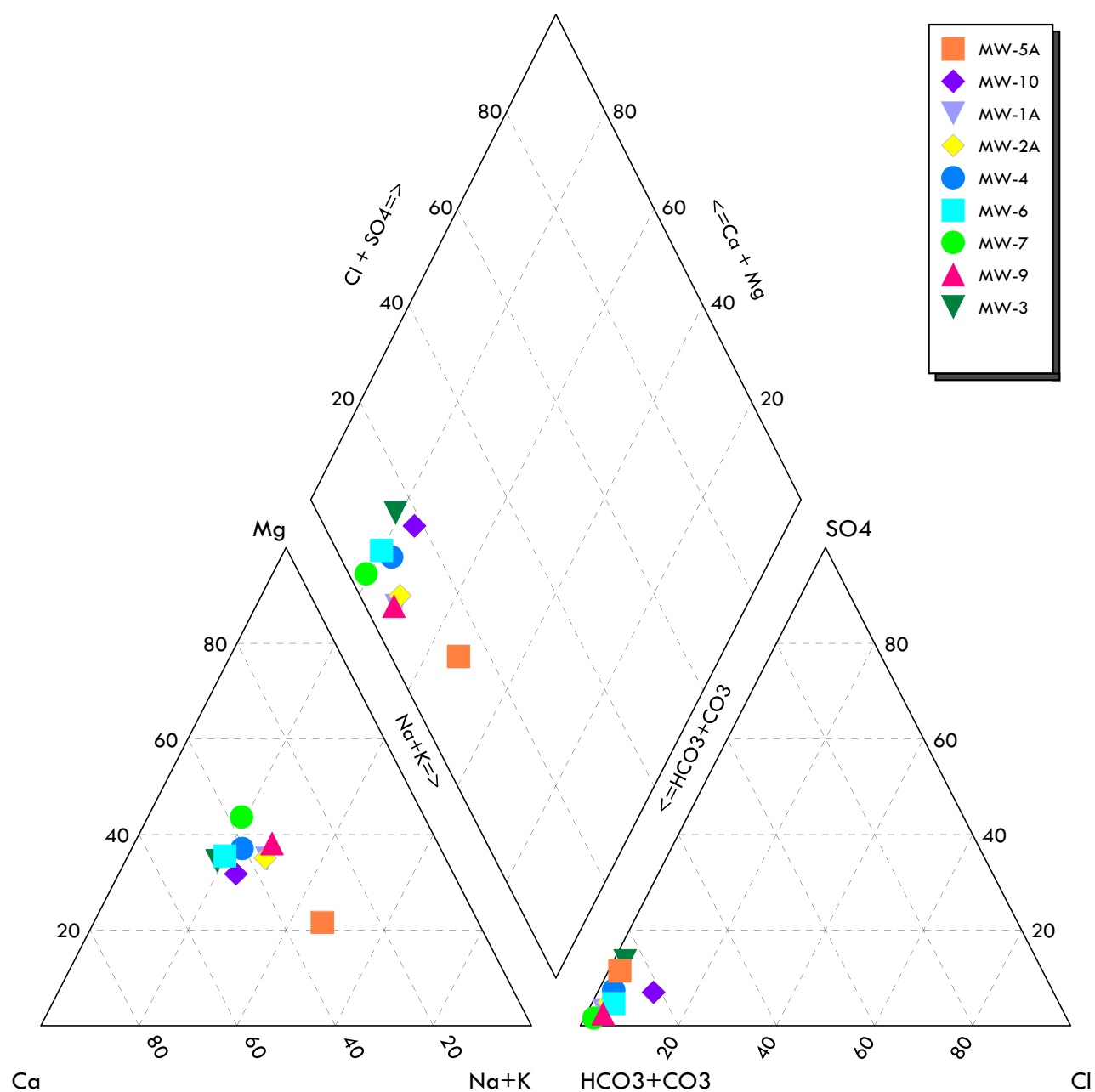
Location ID	Antimony (Sb)			Arsenic (As)		Barium (Ba)		Beryllium (Be)		Cadmium (Cd)		Chromium (Cr)		Cobalt (Co)		Copper (Cu)		Lead (Pb)		Nickel (Ni)		Selenium (Se)		Silver (Ag)		Thallium (Tl)		Vanadium (V)		Zinc (Zn)		Nitrate (NO ₃)			
Monitoring Date	Result	Conc.		Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.	Result	Conc.		
MW-4	3/24/2014	0.002	L 0.001	0.0074	0.0074	0.012	0.012	0.001	L 0.0005	0.005	L 0.0025	0.002	L 0.001	0.01	L 0.005	0.002	L 0.001	0.001	L 0.0005	0.002	L 0.001	0.005	L 0.0025	0.01	L 0.005	0.001	L 0.0005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25		
	6/25/2014	0.002	L 0.001	0.0086	0.0086	0.012	0.012	0.001	L 0.0005	0.005	L 0.0025	0.002	L 0.001	0.01	L 0.005	0.002	L 0.001	0.001	L 0.0005	0.002	L 0.001	0.005	L 0.0025	0.01	L 0.005	0.001	L 0.0005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25		
	9/17/2014	0.05	L 0.025	0.0099	0.0099	0.013	0.013	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.01	L 0.005	0.005	L 0.0025	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25		
	12/16/2014	0.05	L 0.025	0.0076	0.0076	0.011	0.011	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
	3/24/2015	0.05	L 0.025	0.0079	0.0079	0.013	0.013	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
	6/9/2015	0.05	L 0.025	0.0094	0.0094	0.013	0.013	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
	9/18/2015	0.05	L 0.025	0.0094	0.0094	0.017	0.017	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.014	0.014	0.5	L 0.25		
	12/15/2015	0.05	L 0.025	0.011	0.011	0.091	0.091	0.001	L 0.0005	0.001	L 0.0005	0.011	0.011	0.0039	0.0039	0.063	0.063	0.042	0.042	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.014	0.014	0.29	0.29	0.5	L 0.25		
	Number Analyzed	8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		8			
	Number Detected	0		8		8		0		0		1		1		1		1		1		0		0		0		0		1		2		0	
	Minimum Concentration		0.001		0.0074		0.011		0.0005		0.0005		0.001		0.0005		0.001		0.0005		0.001		0.0025		0.0025		0.0005		0.0025		0.005		0.25		
	Maximum Concentration		0.025		0.011		0.091		0.0025		0.0025		0.011		0.005		0.063		0.042		0.01		0.0025		0.005		0.0025		0.014		0.29		0.25		
	Average Concentration		NC		0.0089		0.02275		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
	Variance		NC		1.56E-06		0.000764		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
	Standard Deviation		NC		0.00125		0.027634		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
	Coefficient of Variation (%)		NC		14.04655		121.4685		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
	Standard Error		NC		0.000442		0.00977		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
MW-5	3/24/2014	0.002	L 0.001	0.0072	0.0072	0.032	0.032	0.001	L 0.0005	0.005	L 0.0025	0.002	L 0.001	0.01	L 0.005	0.002	L 0.001	0.001	L 0.0005	0.002	L 0.001	0.005	L 0.0025	0.01	L 0.005	0.001	L 0.0005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25		
	6/25/2014	0.002	L 0.001	0.0067	0.0067	0.033	0.033	0.001	L 0.0005	0.005	L 0.0025	0.0036	0.0036	0.01	L 0.005	0.0061	0.0061	0.001	L 0.0005	0.0043	0.0043	0.005	L 0.0025	0.01	L 0.005	0.001	L 0.0005	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25		
	9/16/2014	0.05	L 0.025	0.0059	0.0059	0.036	0.036	0.005	L 0.0025	0.005	L 0.0025	0.0051	0.0051	0.01	L 0.005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.01	L 0.005	0.005	L 0.0025	0.01	L 0.005	0.01	L 0.005	0.5	L 0.25		
	12/16/2014	0.05	L 0.025	0.0055	0.0055	0.022	0.022	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
	3/23/2015	0.05	L 0.025	0.008	0.008	0.03	0.03	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
	6/8/2015	0.05	L 0.025	0.0075	0.0075	0.02	0.02	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
	9/18/2015	0.05	L 0.025	0.005	L 0.0025	0.014	0.014	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
	12/14/2015	0.05	L 0.025	0.0072	0.0072	0.021	0.021	0.001	L 0.0005	0.001	L 0.0005	0.005	L 0.0025	0.001	L 0.0005	0.01	L 0.005	0.002	L 0.001	0.02	L 0.01	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.005	L 0.0025	0.01	L 0.005	0.5	L 0.25		
	Number Analyzed	8		8		8		8		8		8		8		8		8		8		8		8		8		8		8		8			
	Number Detected	0		7		8		0		0		2		0		1		0		1		0		0		0		0		1		0			
	Minimum Concentration		0.001		0.0025		0.014		0.0005		0.0005		0.001		0.0005		0.001		0.0005		0.001		0.0025		0.0025		0.0005		0.0025		0.005		0.25		
	Maximum Concentration		0.025		0.008		0.036		0.0025		0.0025		0.0051		0.005		0.0061		0.001		0.01		0.0025		0.005		0.0025		0.005		0.01		0.25		
	Average Concentration		NC		0.006313		0.026		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
	Variance		NC		3.05E-06		6.03E-05		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
	Standard Deviation		NC		0.001746		0.007764		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		
	Coefficient of Variation (%)		NC		27.66533		29.86303		NC		NC		NC		NC		NC																		

Statistical Summary of Total Metals Groundwater Data
Appendix I Parameters, First Quarter 2018
LRI Landfill, Pierce County, Washington

Location ID	Antimony (Sb)			Arsenic (As)		Barium (Ba)		Beryllium (Be)		Cadmium (Cd)		Chromium (Cr)		Cobalt (Co)		Copper (Cu)		Lead (Pb)		Nickel (Ni)		Selenium (Se)		Silver (Ag)		Thallium (Tl)		Vanadium (V)		Zinc (Zn)		Nitrate (NO ₃)												
Monitoring Date	Result	Conc.		Result	Conc.	Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.		Result	Conc.										
MW-7																																												
3/26/2014	0.002	L	0.001	0.0054	0.0054	0.016	0.016	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0005	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25				
6/26/2014	0.002	L	0.001	0.0053	0.0053	0.016	0.016	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0005	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25				
9/17/2014	0.05	L	0.025	0.0052	0.0052	0.015	0.015	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.005	0.002	L	0.001	0.005	L	0.0025	0.005	L	0.0005	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25				
12/16/2014	0.05	L	0.025	0.005	0.005	0.014	0.014	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.005	0.002	L	0.001	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.01	L	0.005	0.5	L	0.25	
3/24/2015	0.05	L	0.025	0.005	L	0.0025	0.015	0.015	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25
6/9/2015	0.05	L	0.025	0.0054	0.0054	0.015	0.015	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25	
9/17/2015	0.05	L	0.025	0.005	L	0.0025	0.012	0.012	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25
12/15/2015	0.05	L	0.025	0.0055	0.0055	0.016	0.016	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.005	0.002	L	0.001	0.02	L	0.01	0.005	L	0.0025	0.005	L	0.0025	0.005	L	0.0025	0.01	L	0.005	0.5	L	0.25	
Number Analyzed	8			8		8		8			8			8			8			8			8			8			8			8			8			8						
Number Detected	0			6		8		0			0			0			0			0			0			0			0			0			0			0						
Minimum Concentration		0.001			0.0025		0.012		0.0005		0.0005		0.001		0.0005		0.001		0.0005		0.0005		0.001		0.0005		0.001		0.0005		0.0025		0.0005		0.0005		0.005		0.25					
Maximum Concentration		0.025			0.0055		0.016		0.0025		0.0025		0.0025		0.0025		0.005		0.005		0.001		0.001		0.005		0.001		0.005		0.005		0.0025		0.005		0.005		0.25					
Average Concentration		NC			0.0046		0.014875		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC			
Variance		NC			1.7E-06		1.84E-06		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC			
Standard Deviation		NC			0.001305		0.001356		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC			
Coefficient of Variation (%)		NC			28.36817		9.117329		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC			
Standard Error		NC			0.000461		0.000479		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC		NC			
MW-9																																												
3/25/2014	0.002	L	0.001	0.005	L	0.0025	0.0047	0.0047	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.01	0.5	L	0.25			
6/24/2014	0.002	L	0.001	0.005	L	0.0025	0.0045	0.0045	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.005	0.5	L	0.25			
9/18/2014	0.002	L	0.001	0.005	L	0.0025	0.0057	0.0057	0.001	L	0.0005	0.005	L	0.0025	0.002	L	0.001	0.01	L	0.005	0.002	L	0.001	0.001	L	0.0005	0.002	L	0.001	0.005	L	0.0025	0.01	L	0.005	0.001	L	0.005	0.5	L	0.25			
12/17/2014	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	0.25
3/24/2015	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.005	L	0.0025	0.005	L	0.0025	0.013	0.013	0.01	L	0.005	0.5	L	0.25
6/9/2015	0.05	L	0.025	0.005	L	0.0025	0.005	L	0.0025	0.001	L	0.0005	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.005	L	0.0025	0.001	L	0.0005	0.01	L	0.005	0.005	L	0.0025	0.005	L	0.0025	0.014	0.014	0.01	L	0.005	0.5	L	

Appendix E
Trilinear Diagrams

LRI Landfill First Quarter 2018 Monitoring Wells



DESCRIPTION: LRILF Groundwater 1Q18 Trilinear Diagram

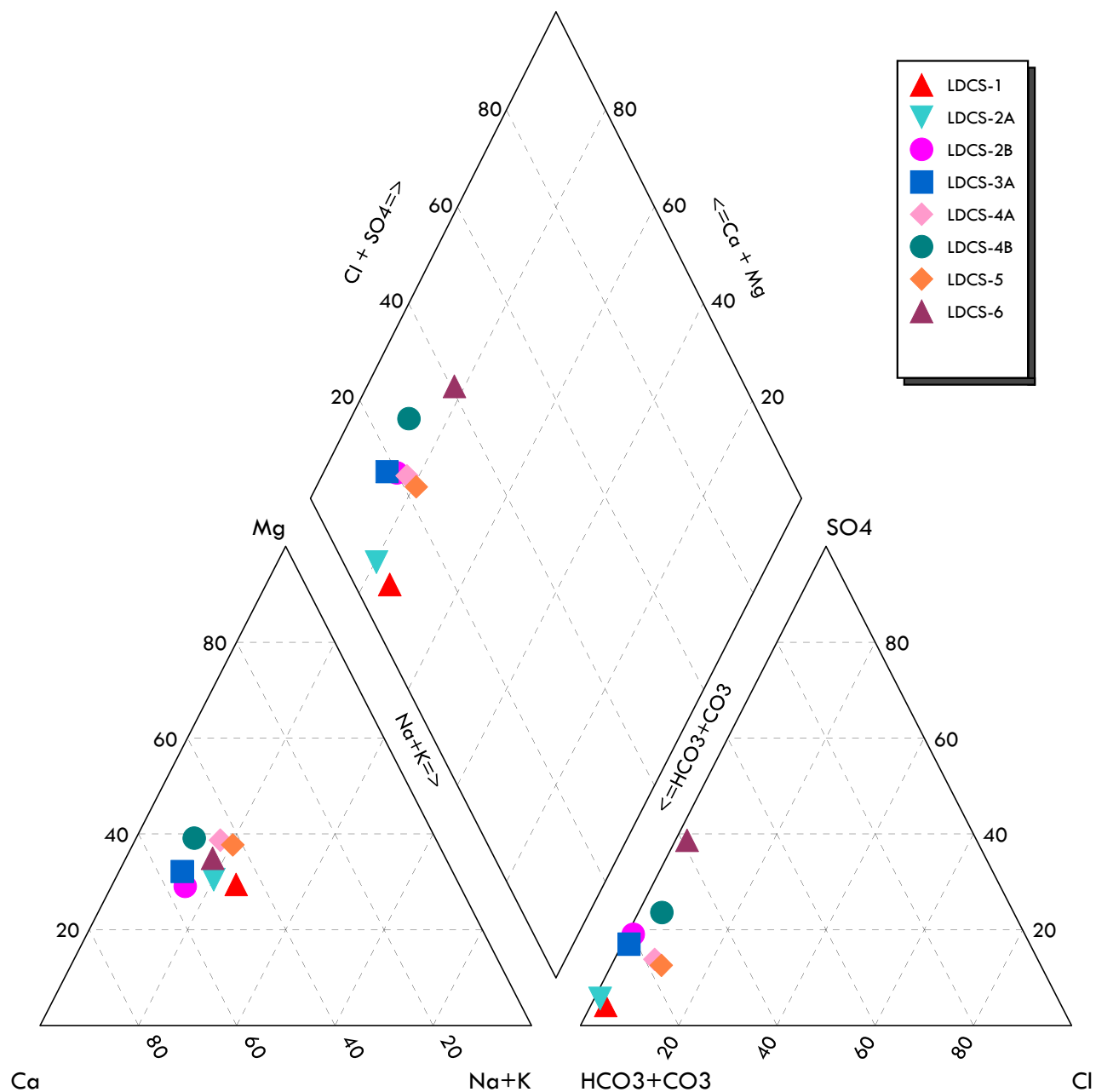
PROJECT: LRI Landfill

PROJECT NO: 04218001.02

CLIENT: LRI, Inc.

DATE: May 2018

LRI Landfill First Quarter 2018 Leak Detection Collection Recovery System



DESCRIPTION: LRI LDCRS 1Q18 Trilinear Diagram

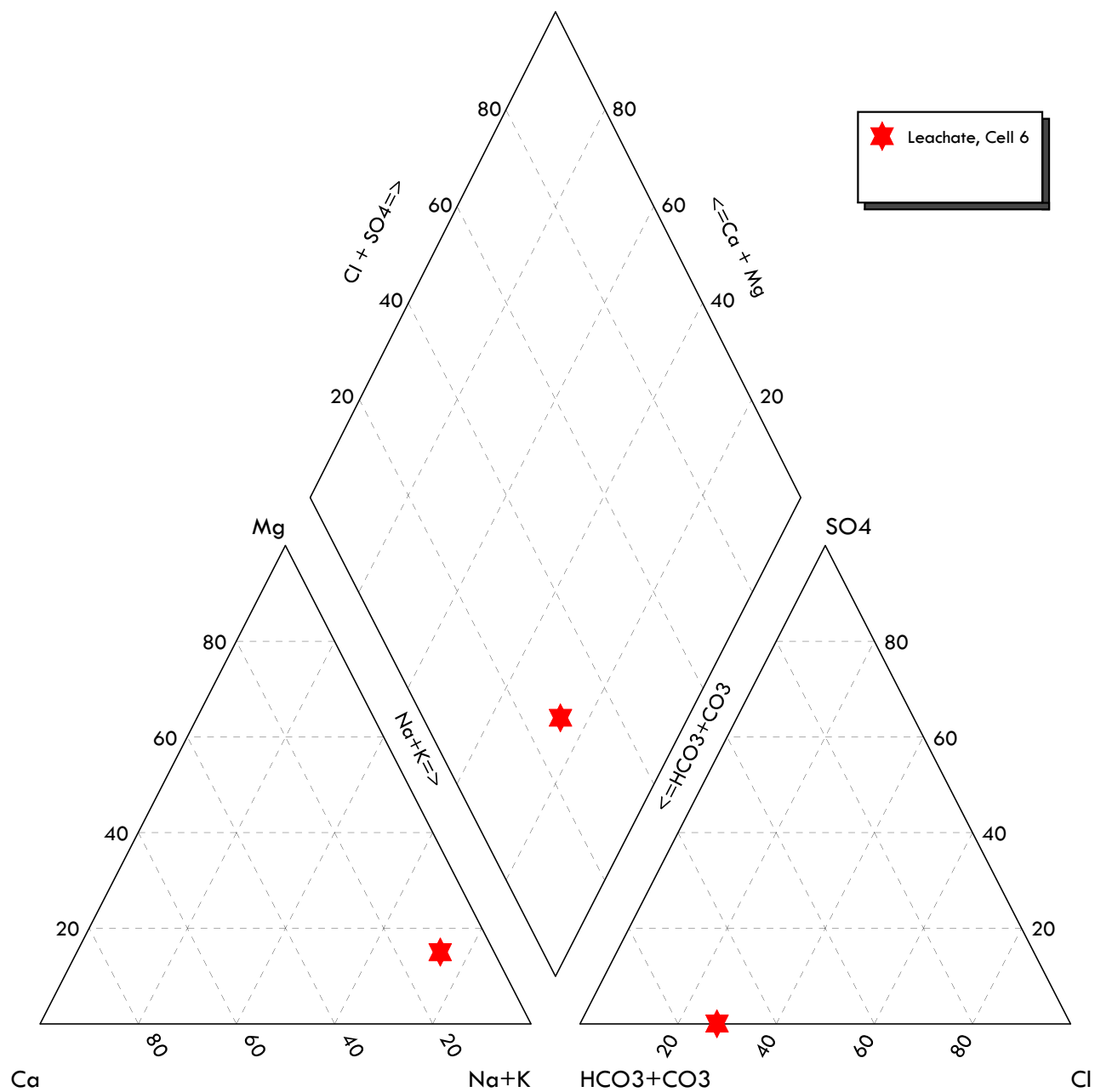
PROJECT: LRI Landfill

PROJECT NO: 04218001.02

CLIENT: LRI, Inc.

DATE: May 2018

LRI Landfill First Quarter 2018 Leachate



DESCRIPTION: LRILF Leachate 1Q18 Trilinear Diagram

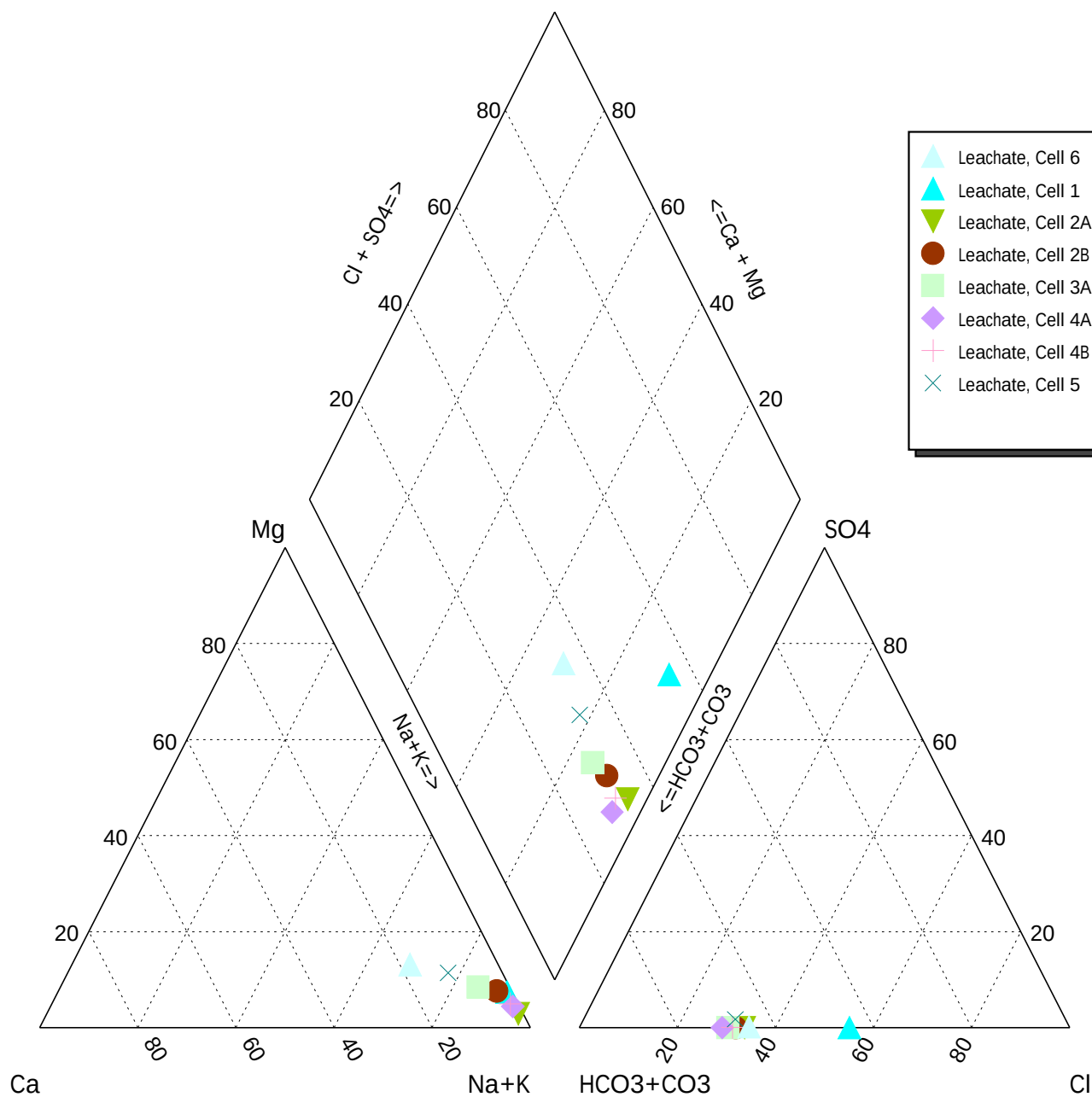
PROJECT: LRI Landfill

PROJECT NO: 04218001.02

CLIENT: LRI, Inc.

DATE: May 2018

LRI Landfill Fourth Quarter 2017 Leachate



DESCRIPTION: LRILF Leachate Fourth Quarter 2017 Trilinear Diagram

PROJECT: LRI Landfill

PROJECT NO: 04218001.02

CLIENT: LRI, Inc.

DATE: March 2018

Appendix F
Analytical Data Validation Report

FIRST QTR. 2018 DATA VALIDATION REPORT – LRI LANDFILL

Project Details

Project No.	04218001.02	Site Name	LRI 304 th Street LF
Data Validator	Alexa Deep & Sam Graber	Data Level	Level 2
Date	4/16/2018	DV Tier	Tier 1
QA Document	LRI Landfill Groundwater Monitoring Plan, March 10, 2014		

Sample Login Summary

Sample Group	Sample Login Comments	Analytical Lab (Primary)
280-107610-1	Hold time for Nitrate Method 300.0 expired on samples “-01”, “-03”, “-05”, “-07” and “-09” due to FedEx delay. SCS instructed TA to run Nitrite/Nitrate Combined Method 353.2 to extend hold time.	TestAmerica, Denver, CO
280-107614-1	Hold time for Nitrate Method 300.0 expired on samples “-02”, “-04”, “-06”, “-08” and “-10” due to FedEx delay. SCS instructed TA to run Nitrite/Nitrate Combined Method 353.2 to extend hold time.	TestAmerica, Denver, CO
280-107678-1	No comments.	TestAmerica, Denver, CO
280-107689-1	No comments.	TestAmerica, Denver, CO
280-107740-1	No comments.	TestAmerica, Denver, CO

Analytical Summary

Sample Group	Analyses					
	TDS/Alk/NO3	Metals	NH4/TOC	VOCs	Anions	TSS
280-107610-1	X	X ²	X	X	X	X
280-107614-1	X	X ²	X	X	X	--
280-107678-1	X	X ¹	X	X	X	X
280-107689-1	X	X ³	X	X	X	--
280-107740-1	X	X ²	X	X	X	X

Notes:

1. Dissolved metals analysis performed (field filtered)
2. Dissolved and Total metals analysis performed
3. Total Metals analysis performed

Laboratory Quality Assurance Samples

Lab QA Samples	Results	Comments
Method Blank	Acceptable.	See case narrative (280-107610-1, 280-107614-1, 280-107678-1, 280-107689-1, 280-107740-1).
LCS/LCSD	Acceptable.	See case narrative (280-107610-1, 280-107614-1, 280-107678-1, 280-107689-1, 280-107740-1).
Duplicates	N/A	No comments.
MS/MSD	Possible matrix interferences.	See case narrative (280-107610-1, 280-107614-1, 280-107678-1, 280-107689-1, 280-107740-1).
Surrogates	N/A	No comments.
Organics	See case narrative.	Samples -05, -09, -11, and -16 were analyzed with significant headspace (280-107610-1). Sample -18 was analyzed at a dilution for Method 8260B due to high

Lab QA Samples	Results	Comments
		concentrations of target compounds, so elevated RLs were provided (280-107689-1). Sample -18 VOAs exhibited pH values greater than 2, which is noncompliant with Method 8260B, as the samples must be preserved with hydrochloric acid to a pH of less than 2 (280-107689-1).
General Chemistry	N/A	No comments.
Metals	N/A	No comments.

Field Quality Assurance Samples

Field QA Samples	Sample Group	Analytes	Notes
QC-FB	280-107610-1	Calcium.	
QC-TB	280-107610-1	No detections.	
QC-TB	280-107614-1	No detections.	
QC-TB	280-107689-1	2-Butanone (MEK) and Acetone.	See case narrative.

Lab Quality Flags

Flag	Sample Groups	Comments
J	280-107610-1, 280-107614-1, 280-107678-1, 280-107689-1, 280-107740-1	Result is <RL, >MDL and concentration is approximate value.
F1	280-107610-1, 280-107614-1, 280-107678-1, 280-107689-1, 280-107740-1	MS and/or MSD recovery exceeds the control limits.
E	280-107610-1, 280-107678-1, 280-107740-1	Result exceeds calibration range.
4	280-107610-1, 280-107614-1, 280-107678-1, 280-107689-1, 280-107740-1	MD, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration. Therefore the control limits are not applicable.
*	280-107678-1, 280-107689-1, 280-107740-1	LCS or LCSD is outside acceptance limits. Or RPD of the LCS and LCSD exceeds the control limits.
H	280-107610-1, 280-107614-1,	Sample was prepped or analyzed beyond the specified holding time.

Duplicate Evaluation

Analyte	Units	MW-7 (304-031918-07)	MW-7 (DUP) (305-031918-09)	RPD (%)
Alkalinity, Total	mg/L	200	200	0.00
Ammonia	mg/L	0.16	0.19	17.14
Arsenic, Total	mg/L	0.005 U	0.0053	5.83
Barium, Total	mg/L	0.016	0.016	0.00
Calcium, Dissolved	mg/L	31	30	3.28
Chloride	mg/L	2.9	2.8	3.51
Iron, Dissolved	mg/L	0.17	0.18	5.71
Magnesium, Dissolved	mg/L	22	21	4.65
Manganese, Dissolved	mg/L	0.25	0.24	4.08
Potassium, Dissolved	mg/L	5.5	5.5	0.00
Sodium, Dissolved	mg/L	15	15	0.00
Sulfate	mg/L	3.1	3.1	0.00
Total Dissolved Solids	mg/L	210	210	0.00

U = Non-detection. Reporting limit (RL) used for calculation of RPD.

Additional Data Flags

Flag	Description
U	Not detected above the method reporting limit.
B	Compound was found in a laboratory or field blank and the sample.
H	Sample was prepped or analyzed beyond the specified holding time.

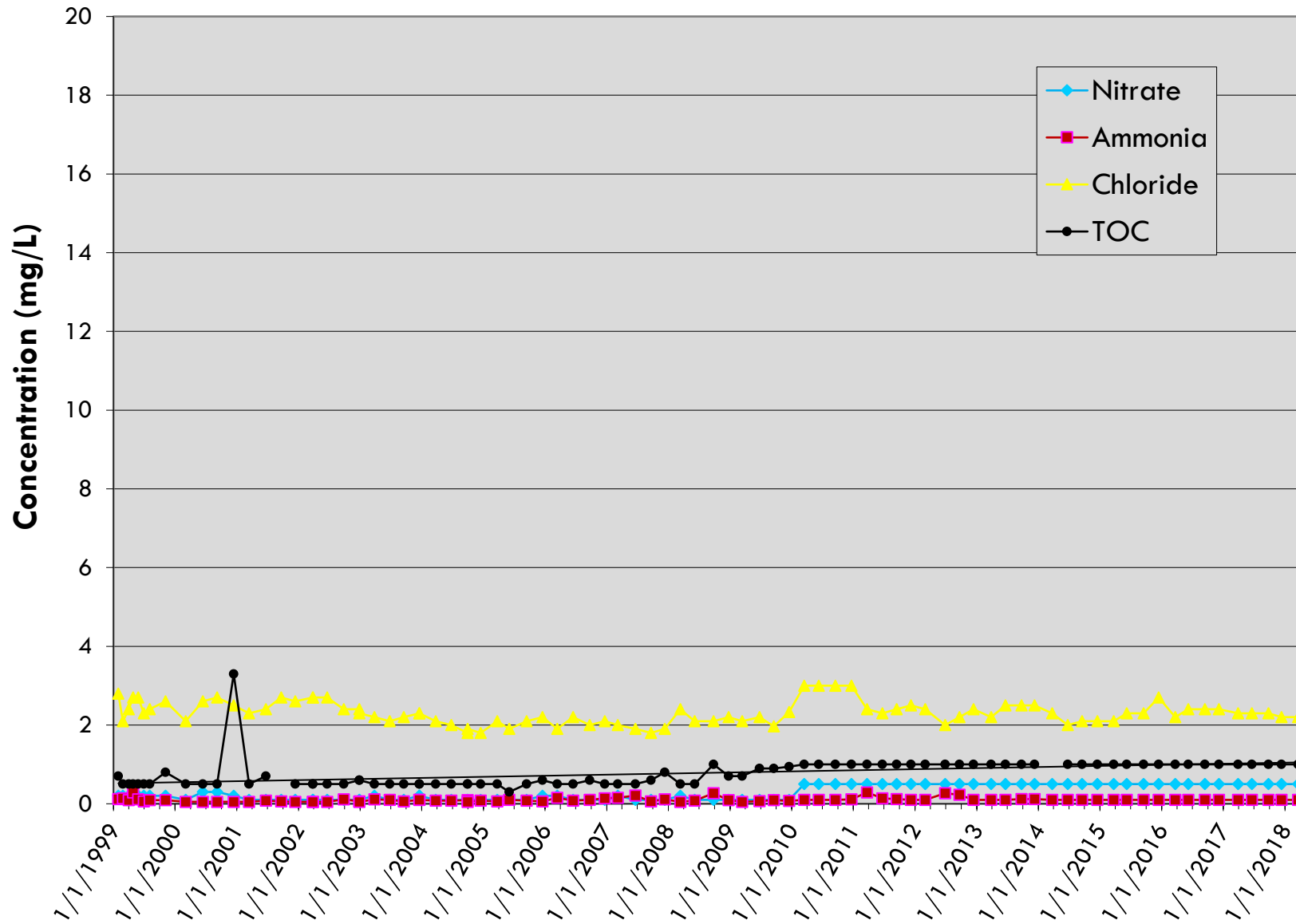
Qualified Data and Usability

Lab qualifiers are noted. All data, as qualified, are acceptable for use.

Appendix G
Groundwater and LDCS Time Trend Plots

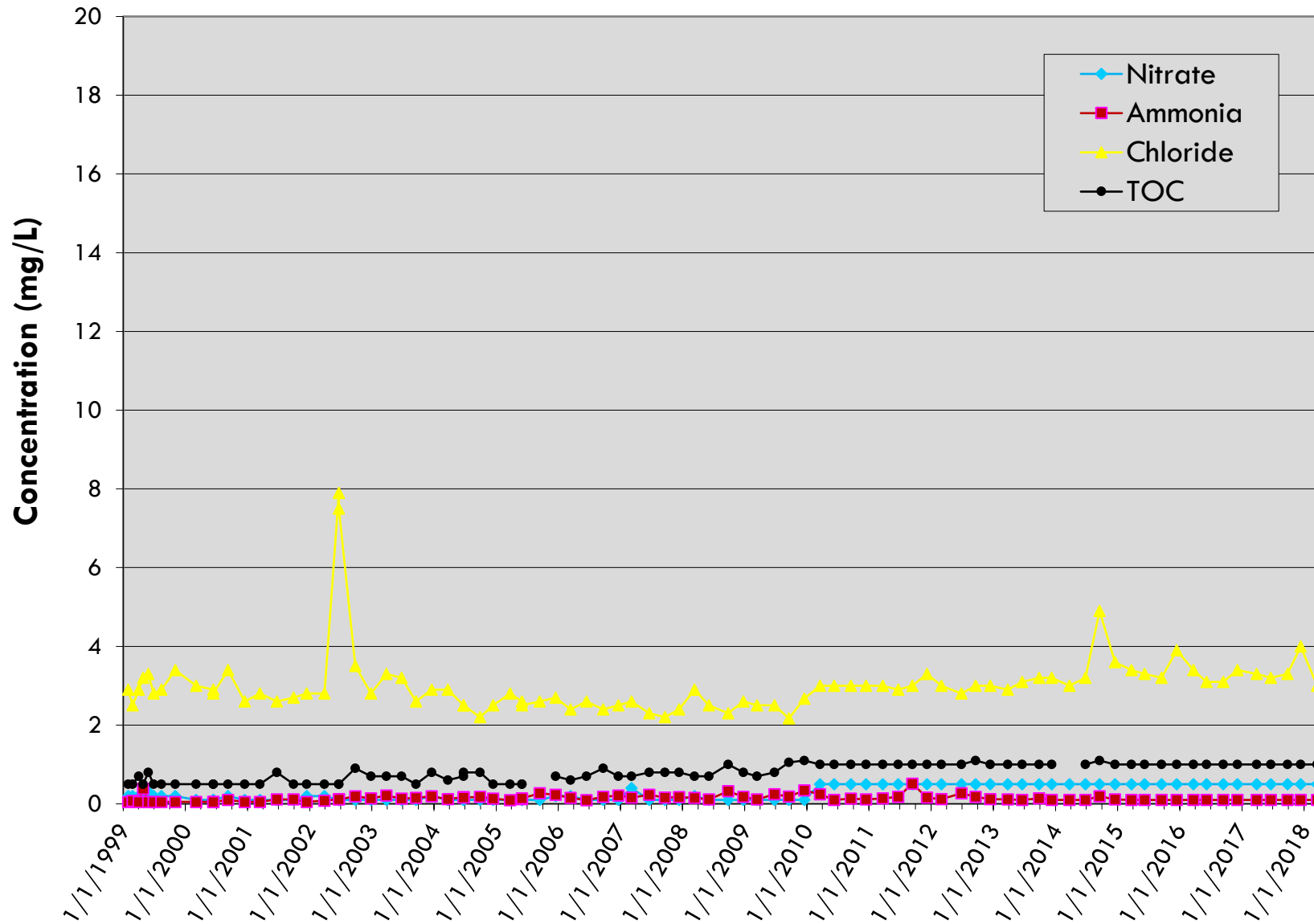
MW-1A

LRI Landfill, Pierce County, Washington



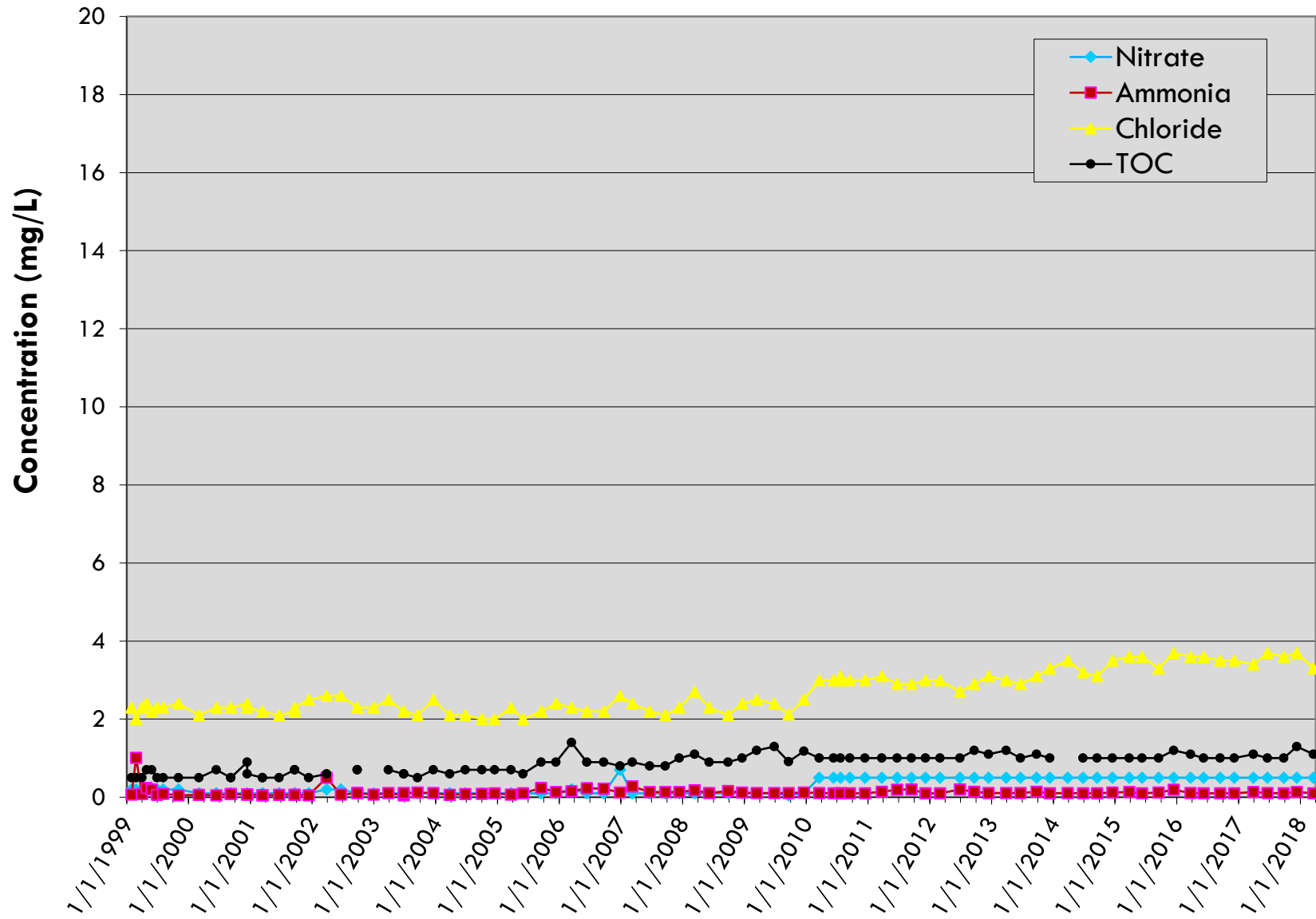
MW-2A

LRI Landfill, Pierce County, Washington



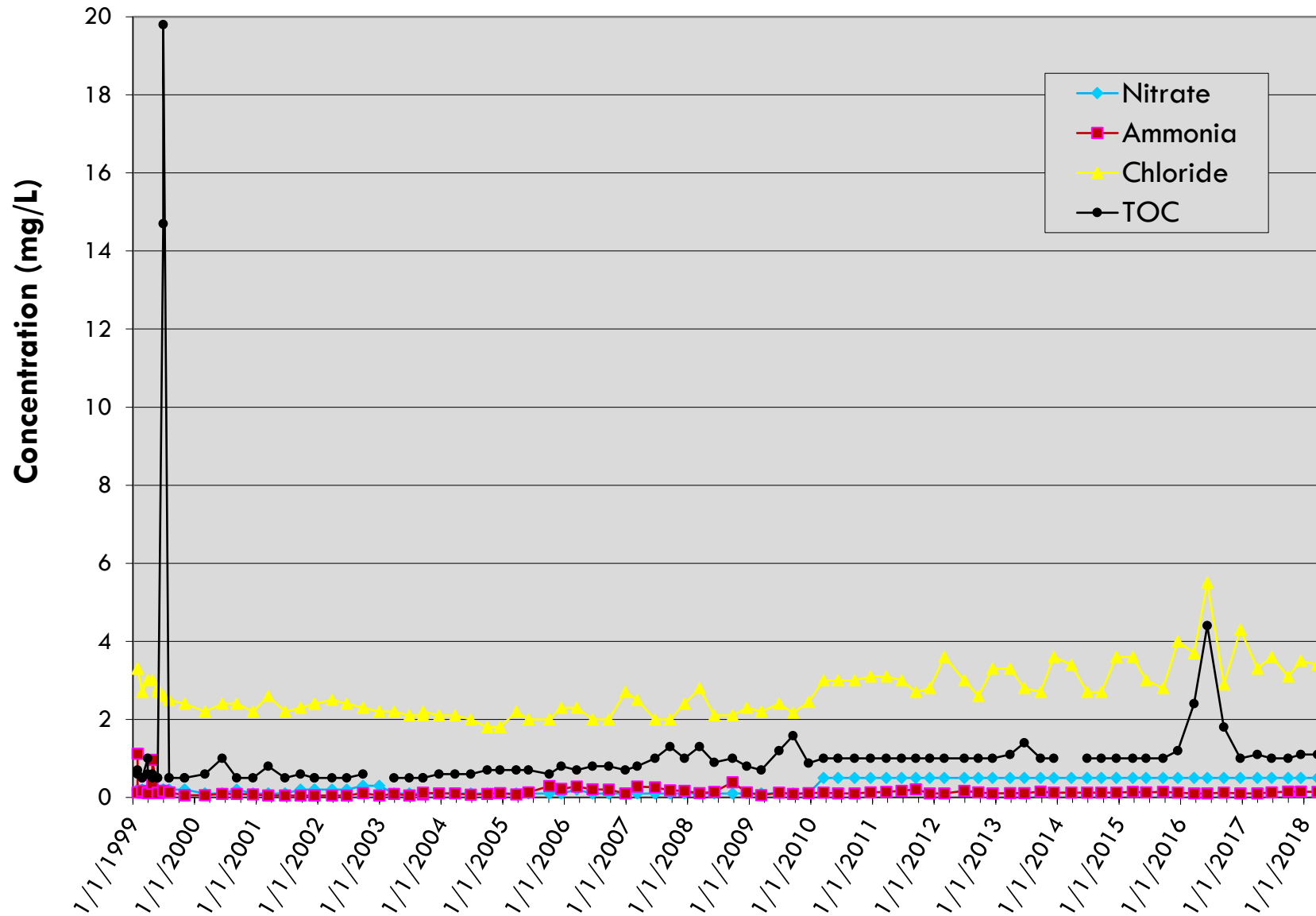
MW-3

LRI Landfill, Pierce County, Washington



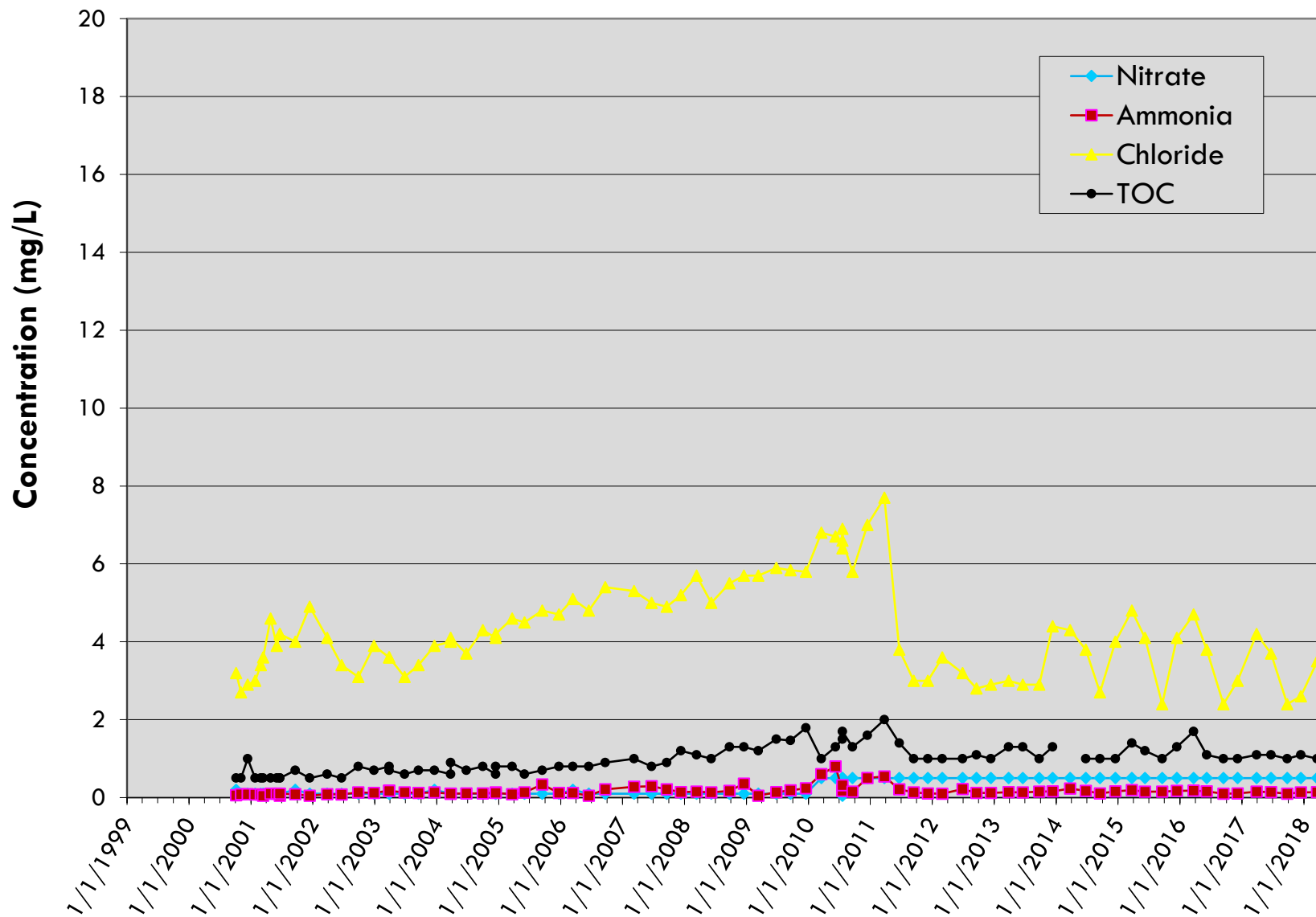
MW-4

LRI Landfill, Pierce County, Washington



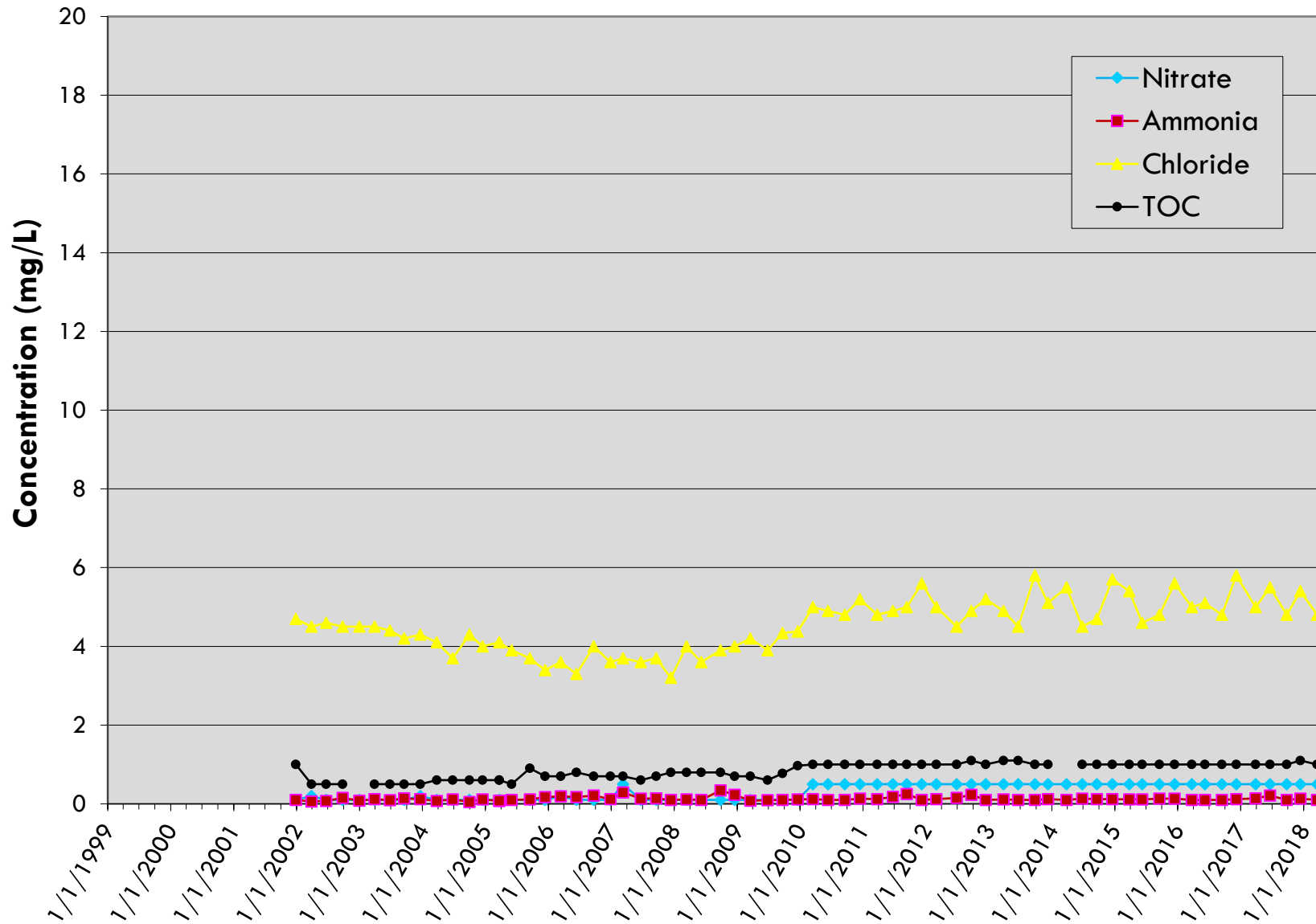
MW-5A

LRI Landfill, Pierce County, Washington



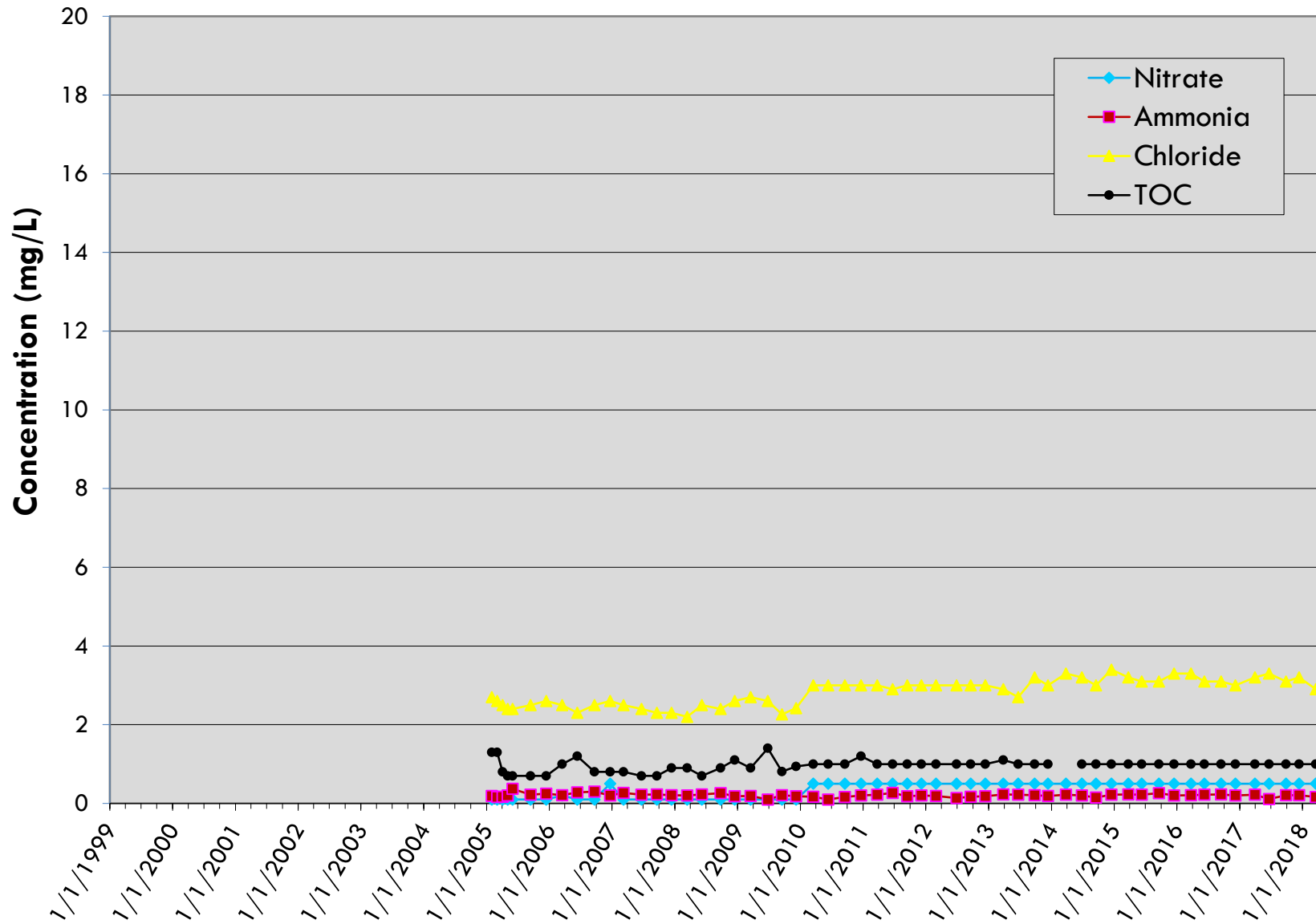
MW-6

LRI Landfill, Pierce County, Washington

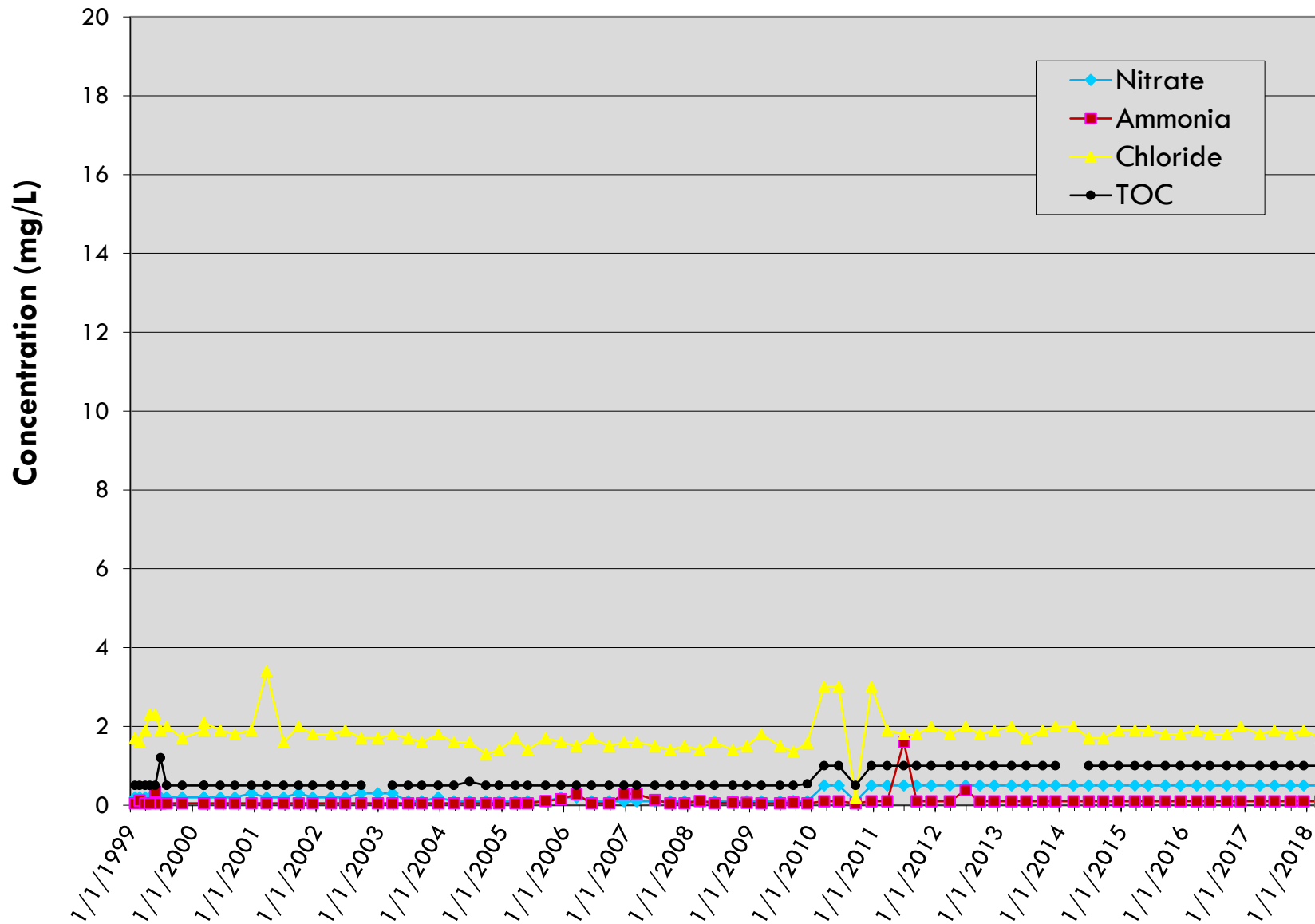


MW-7

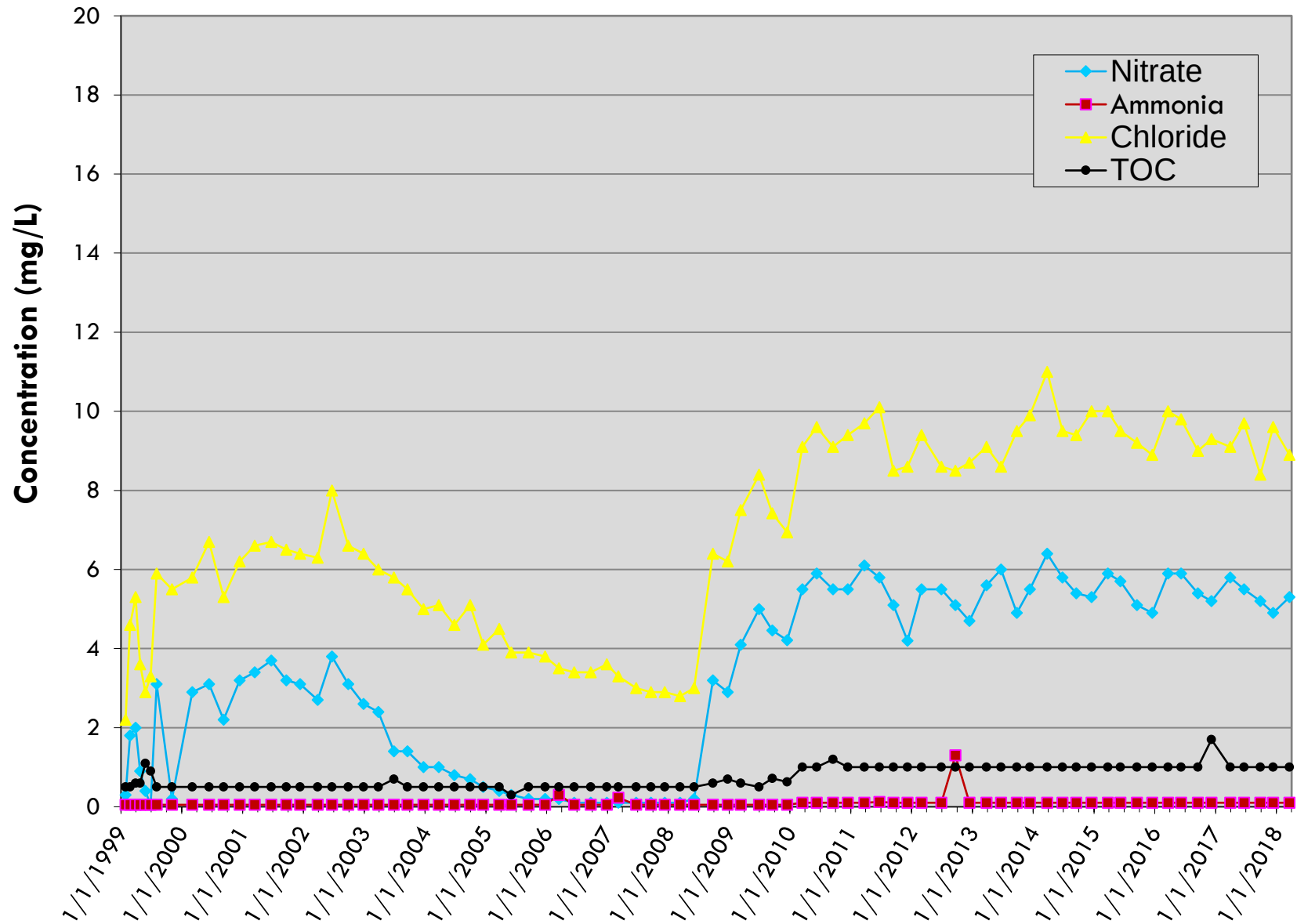
LRI Landfill, Pierce County, Washington



MW-9 (Background)
LRI Landfill, Pierce County, Washington

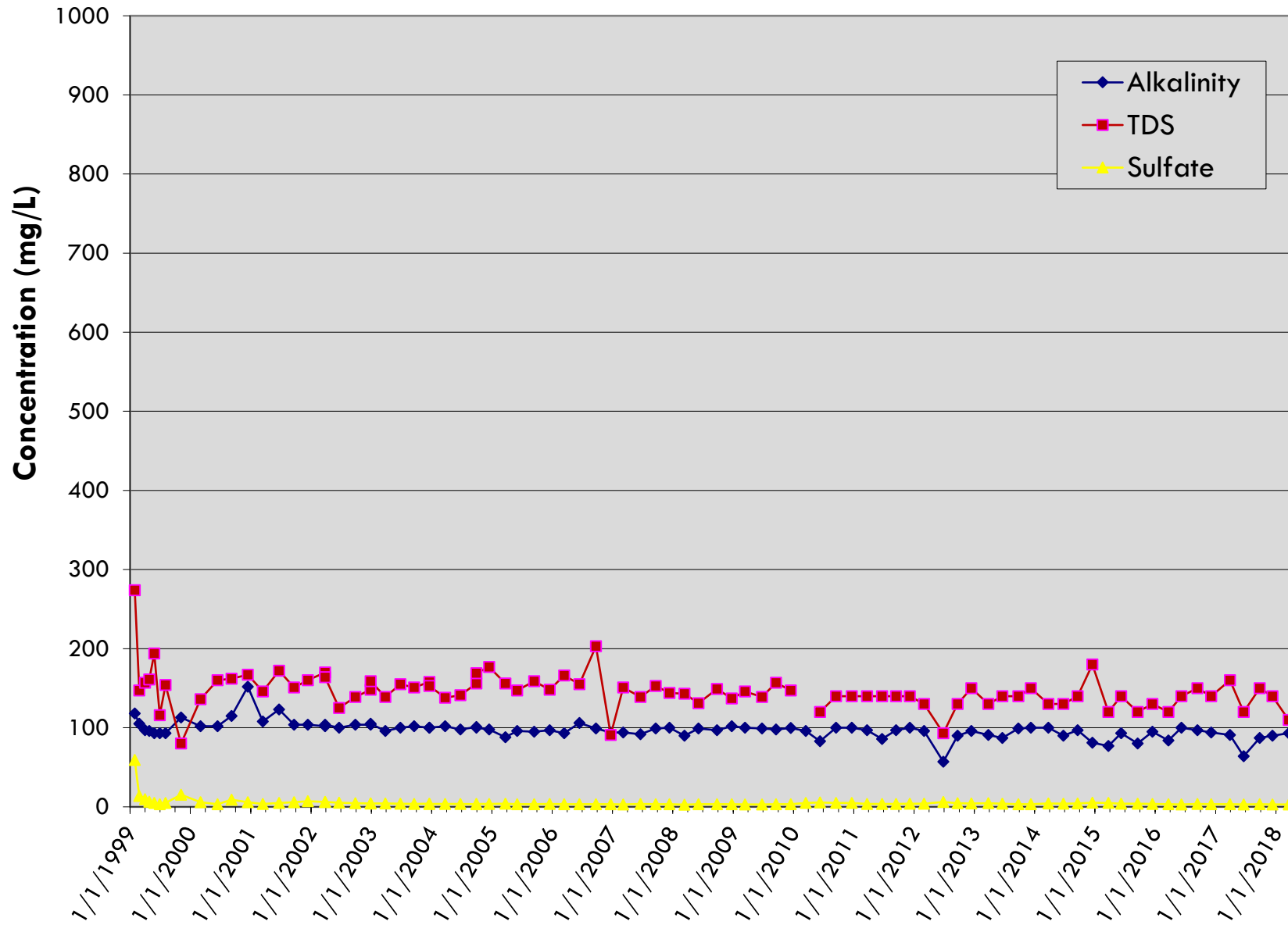


MW-10 (Background)
LRI Landfill, Pierce County, Washington



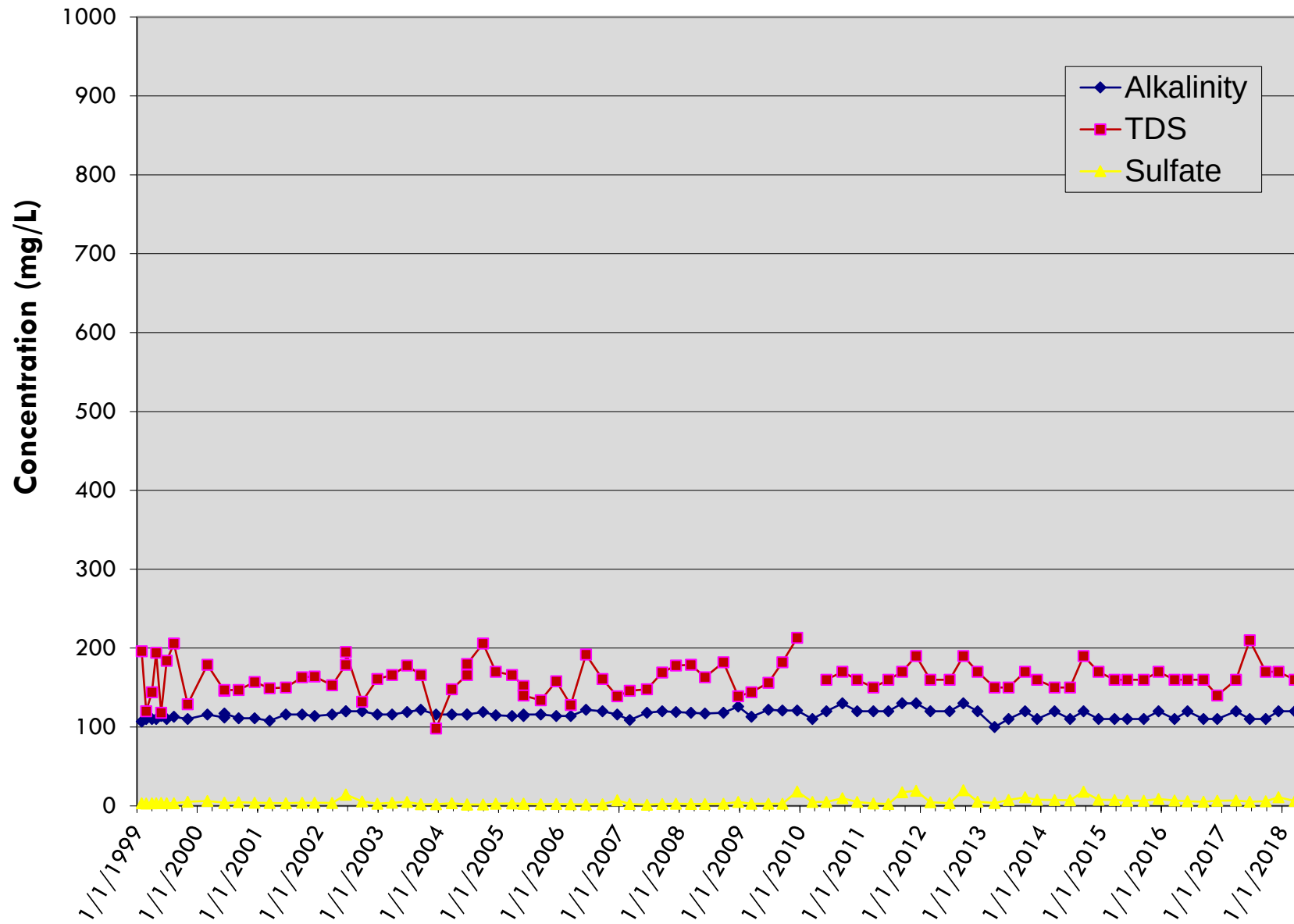
MW-1A

LRI Landfill, Pierce County, Washington



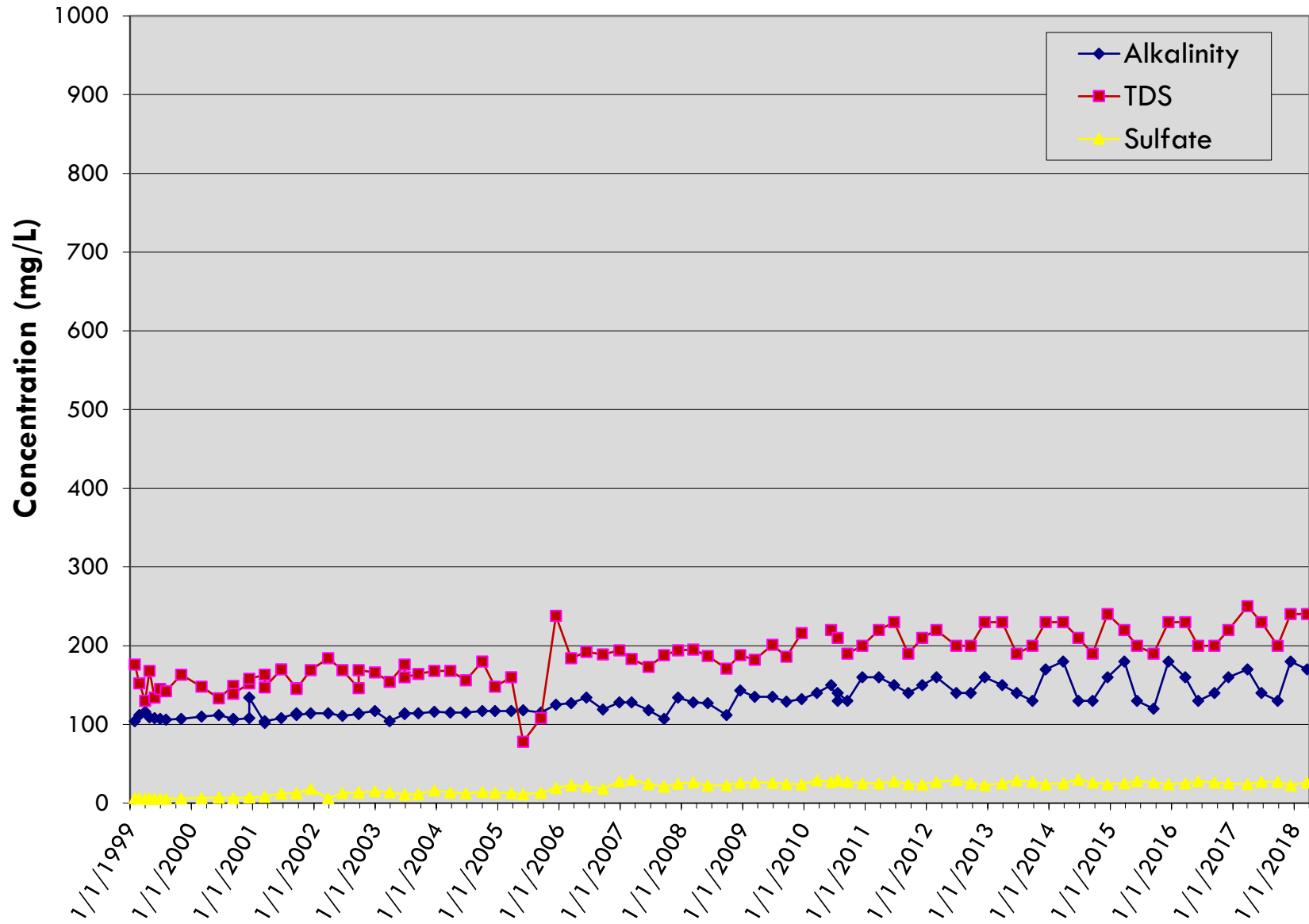
MW-2A

LRI Landfill, Pierce County, Washington



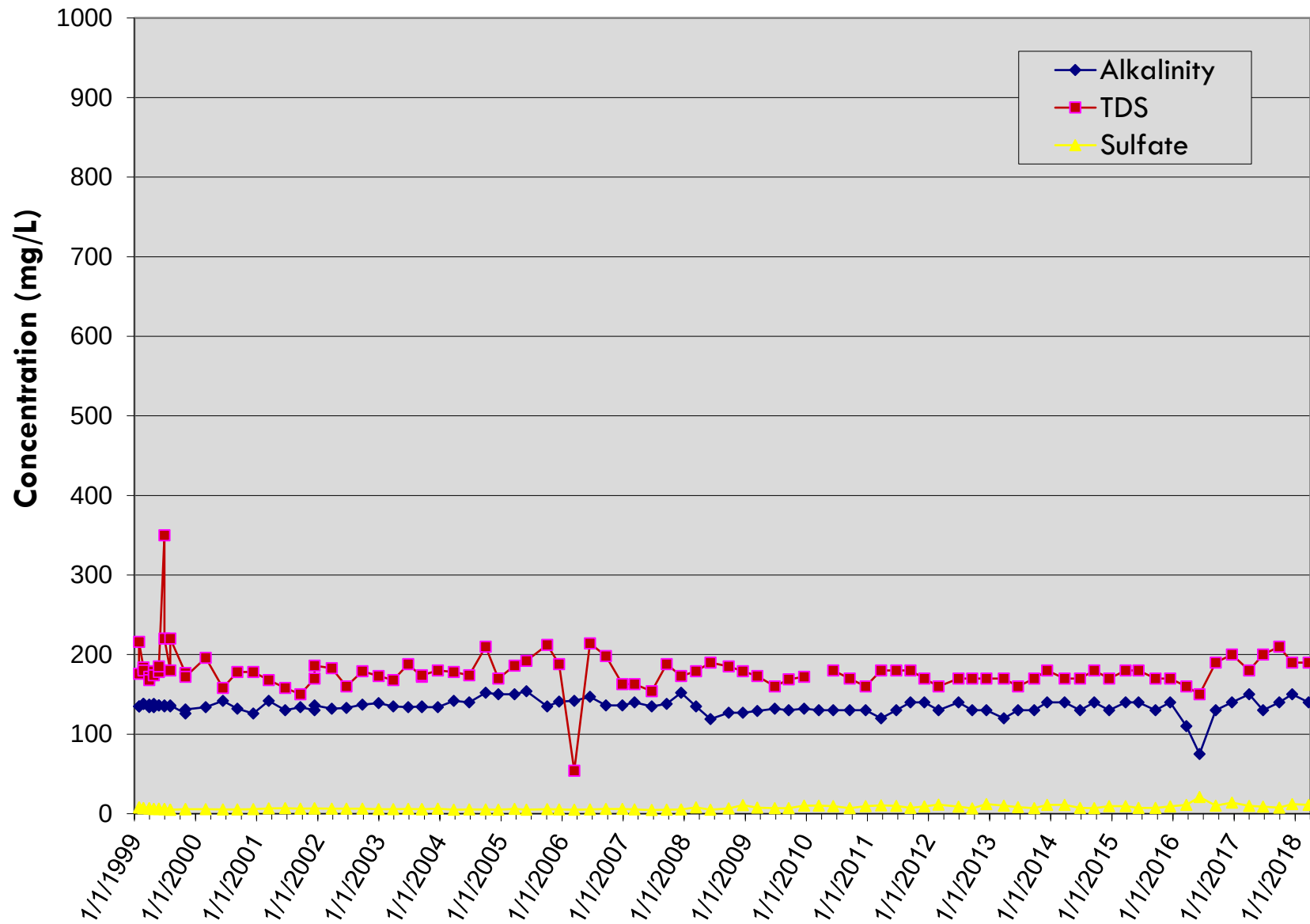
MW-3

LRI Landfill, Pierce County, Washington



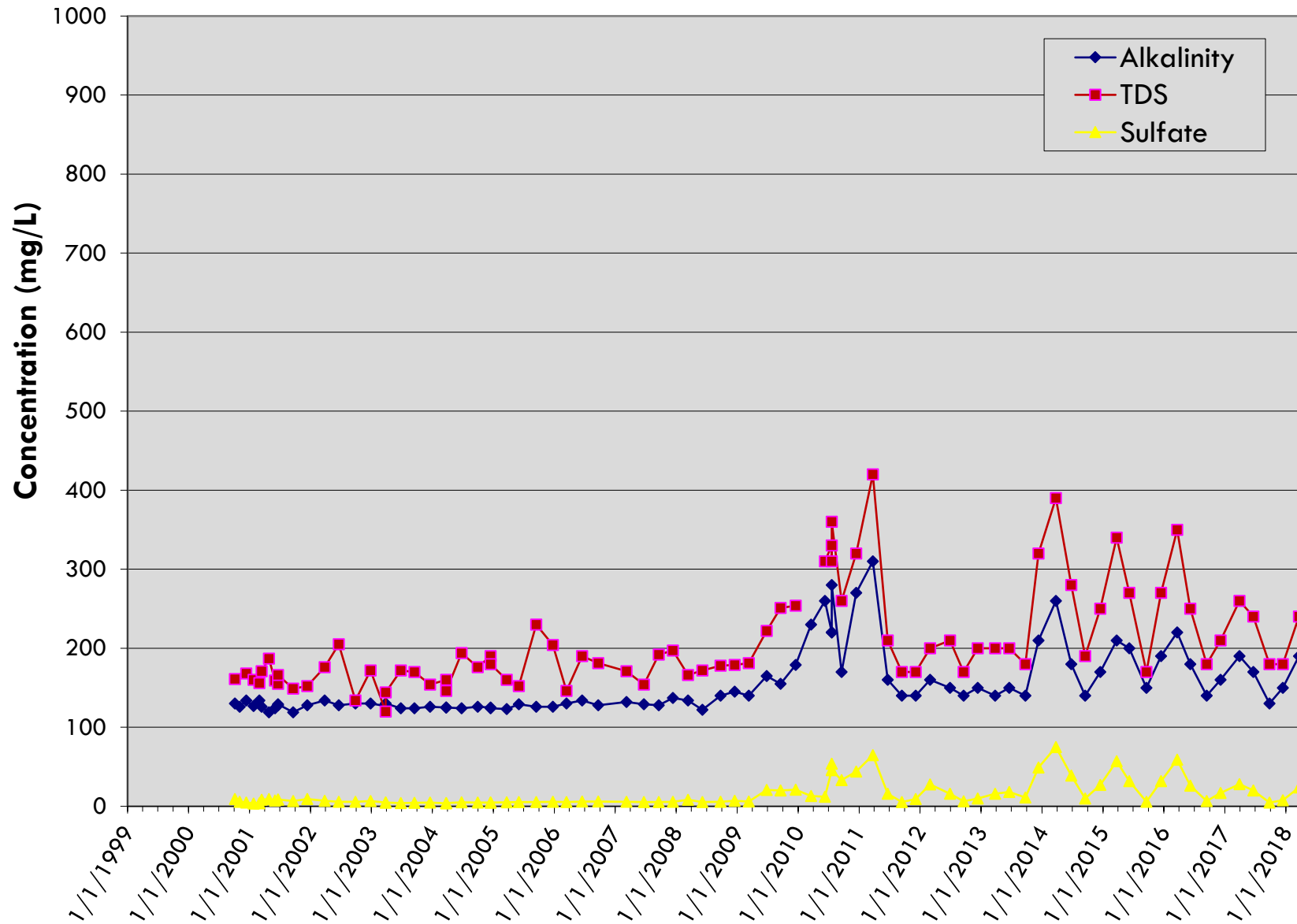
MW-4

LRI Landfill, Pierce County, Washington



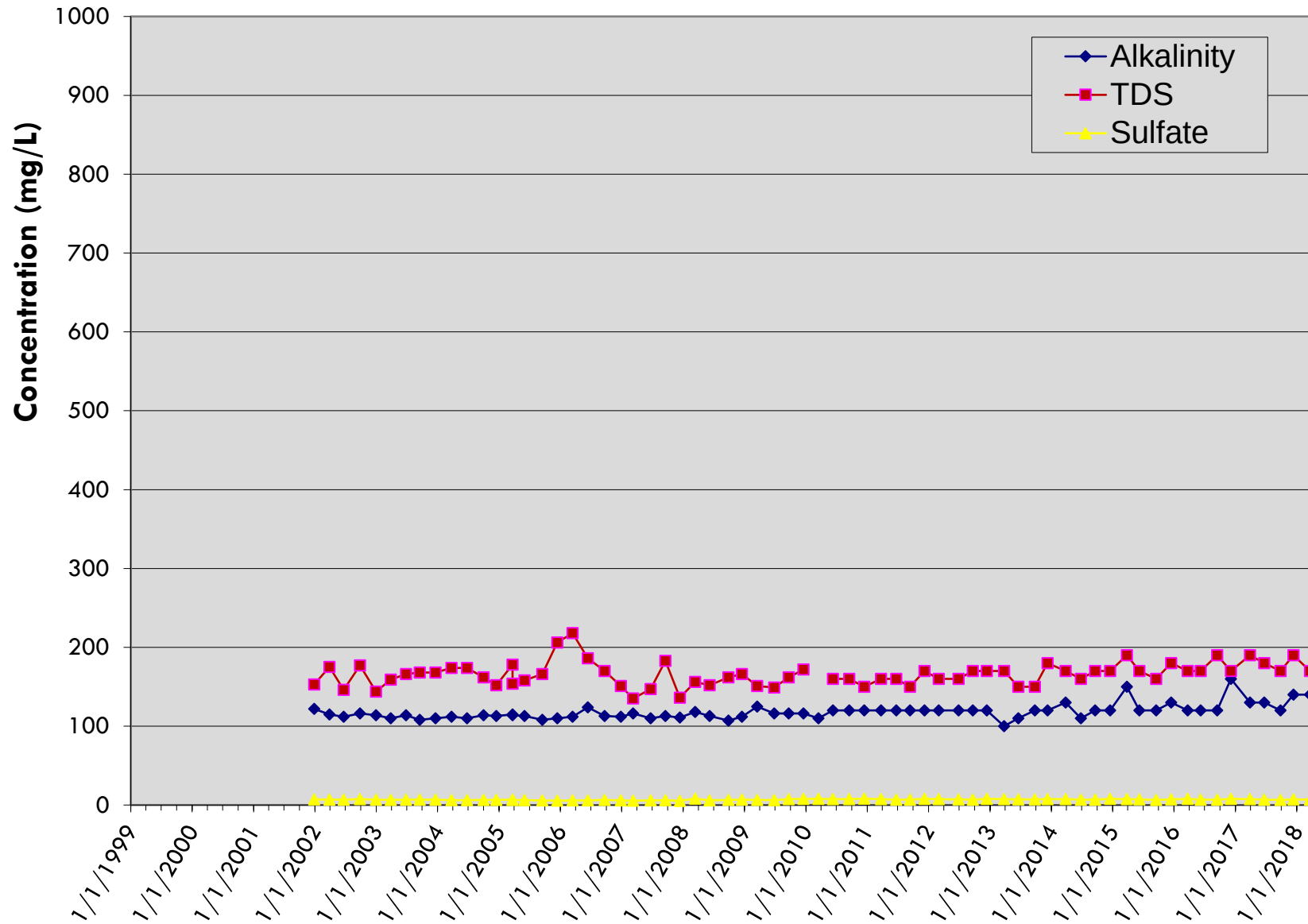
MW-5A

LRI Landfill, Pierce County, Washington

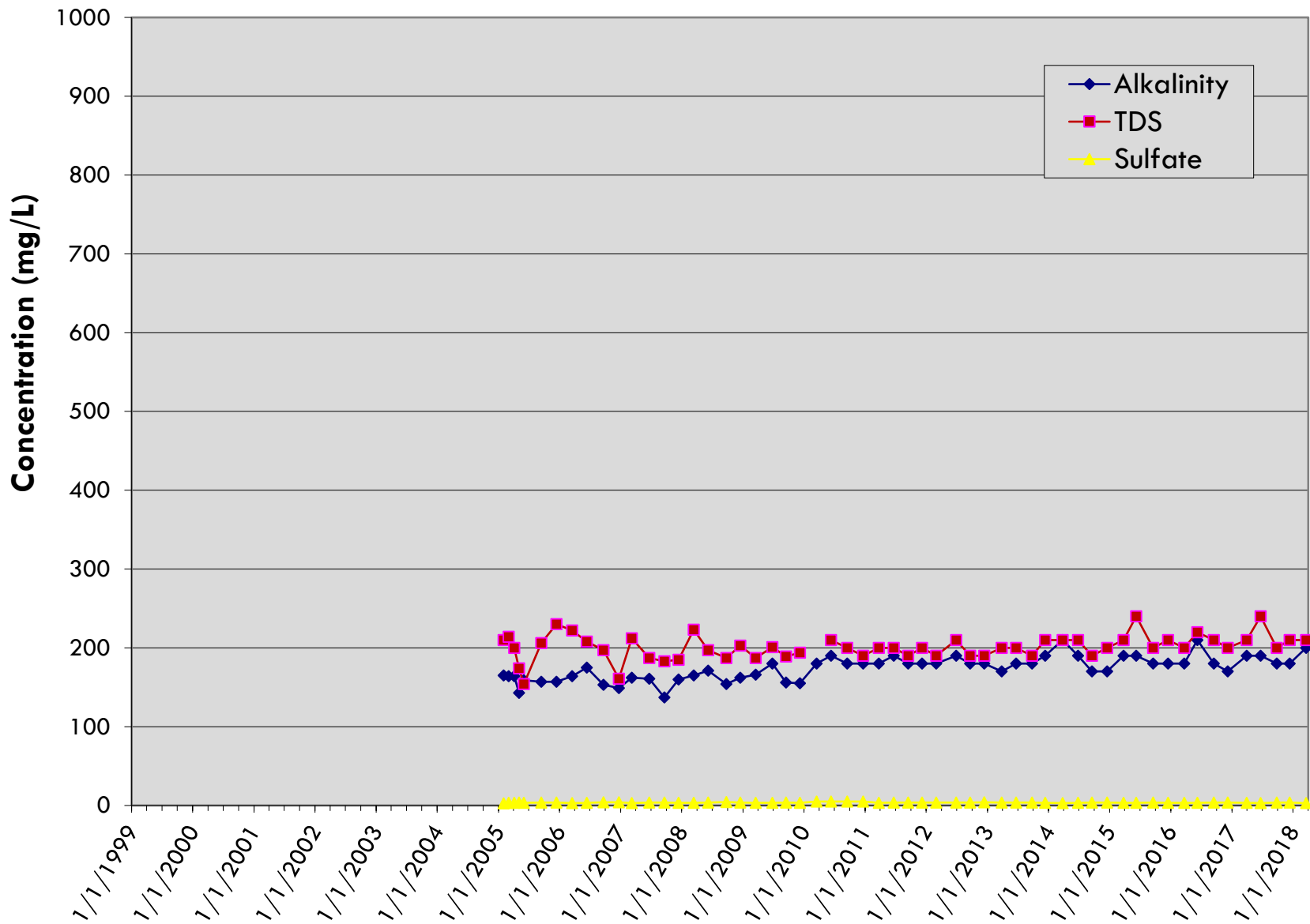


MW-6

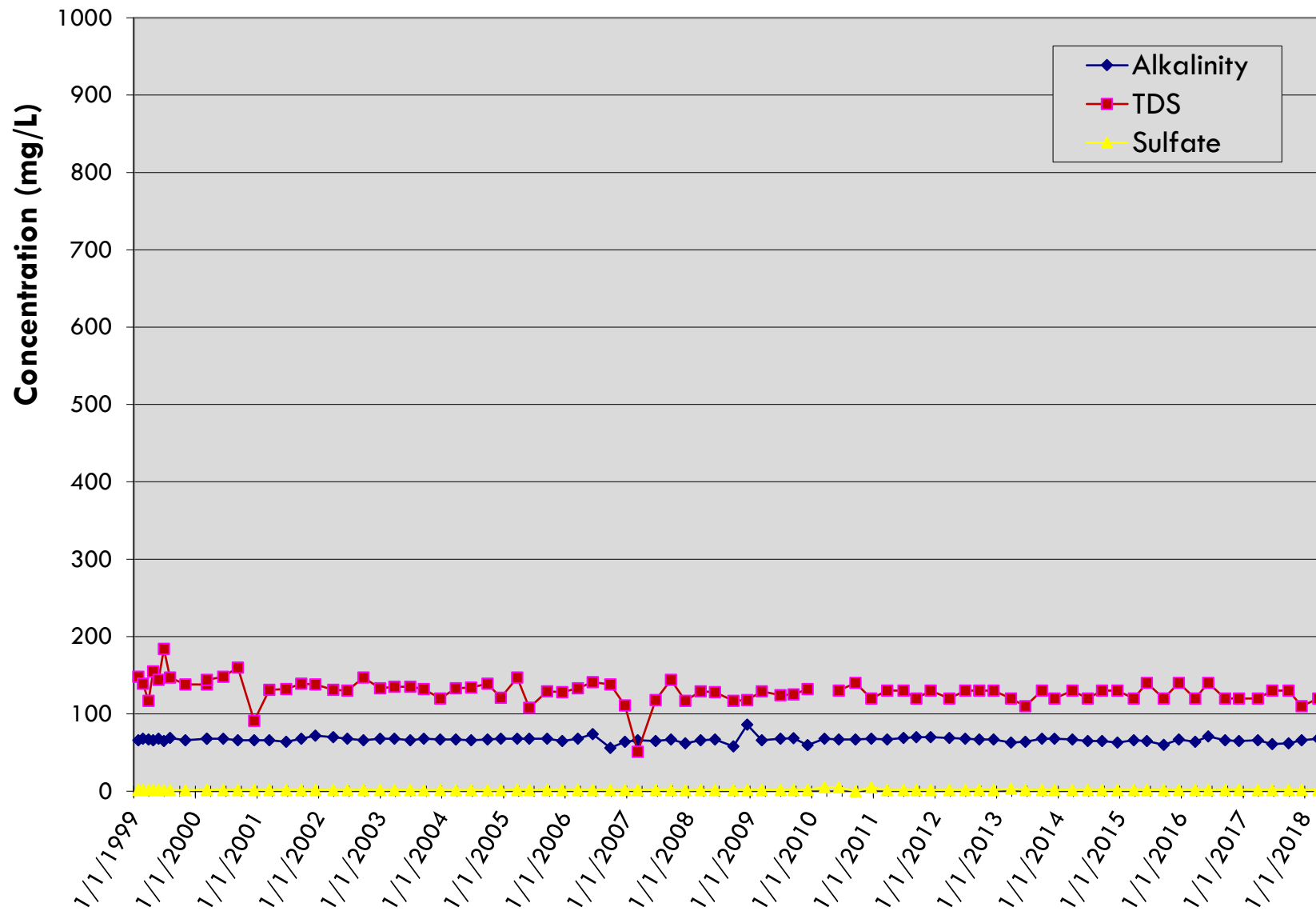
LRI Landfill, Pierce County, Washington



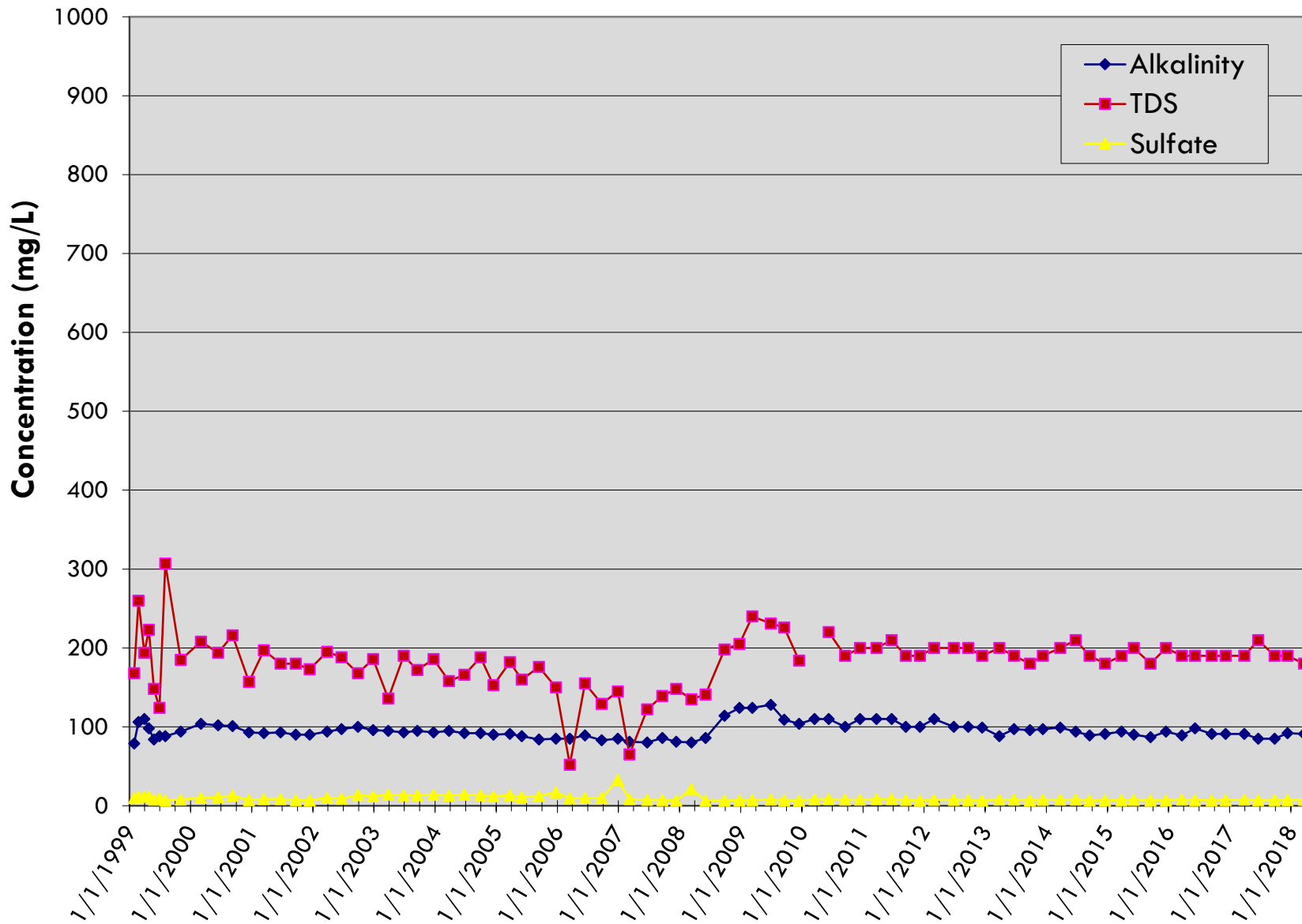
MW-7
LRI Landfill, Pierce County, Washington



MW-9 (Background)
LRI Landfill, Pierce County, Washington

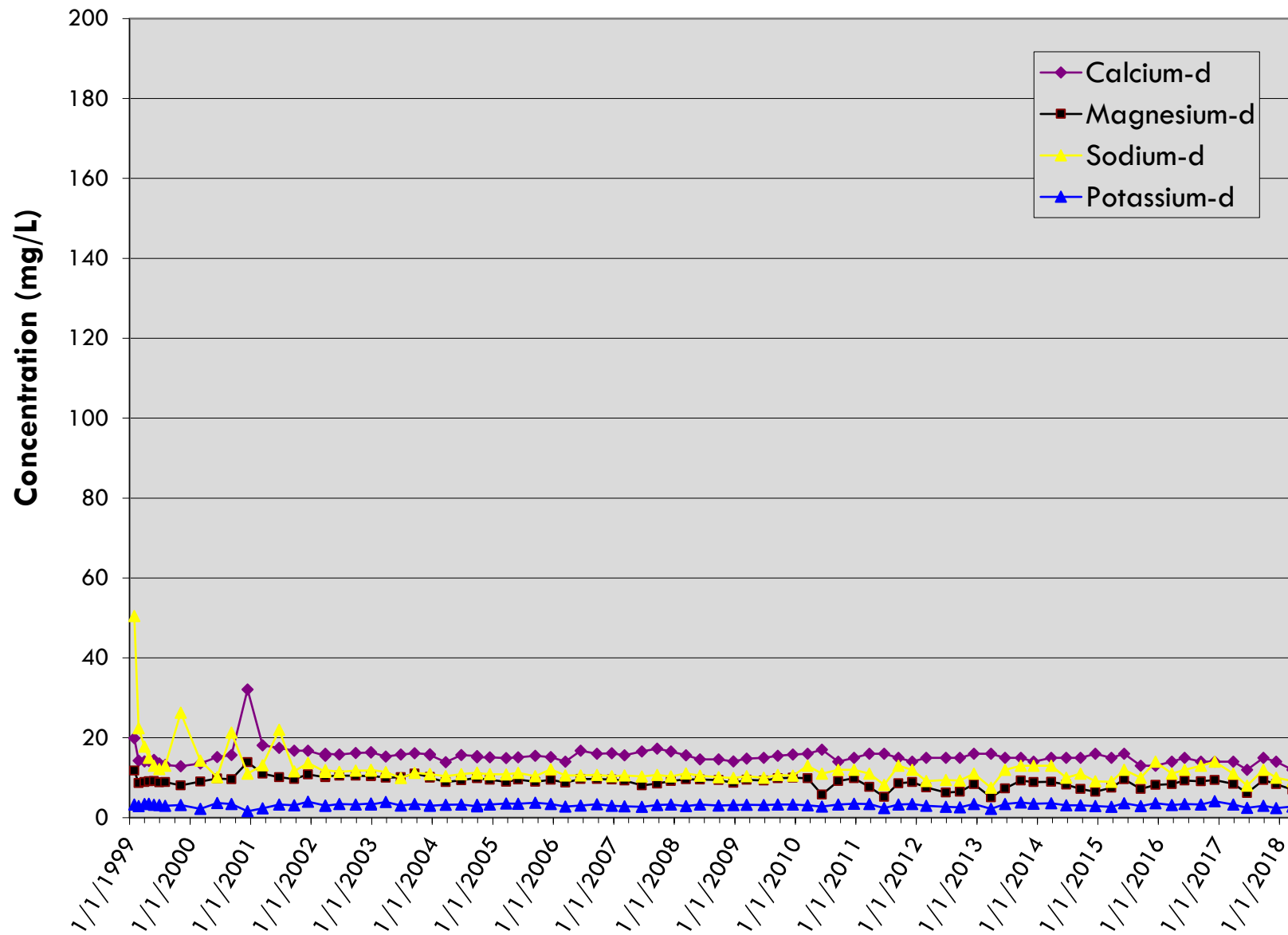


MW-10 (Background)
LRI Landfill, Pierce County, Washington



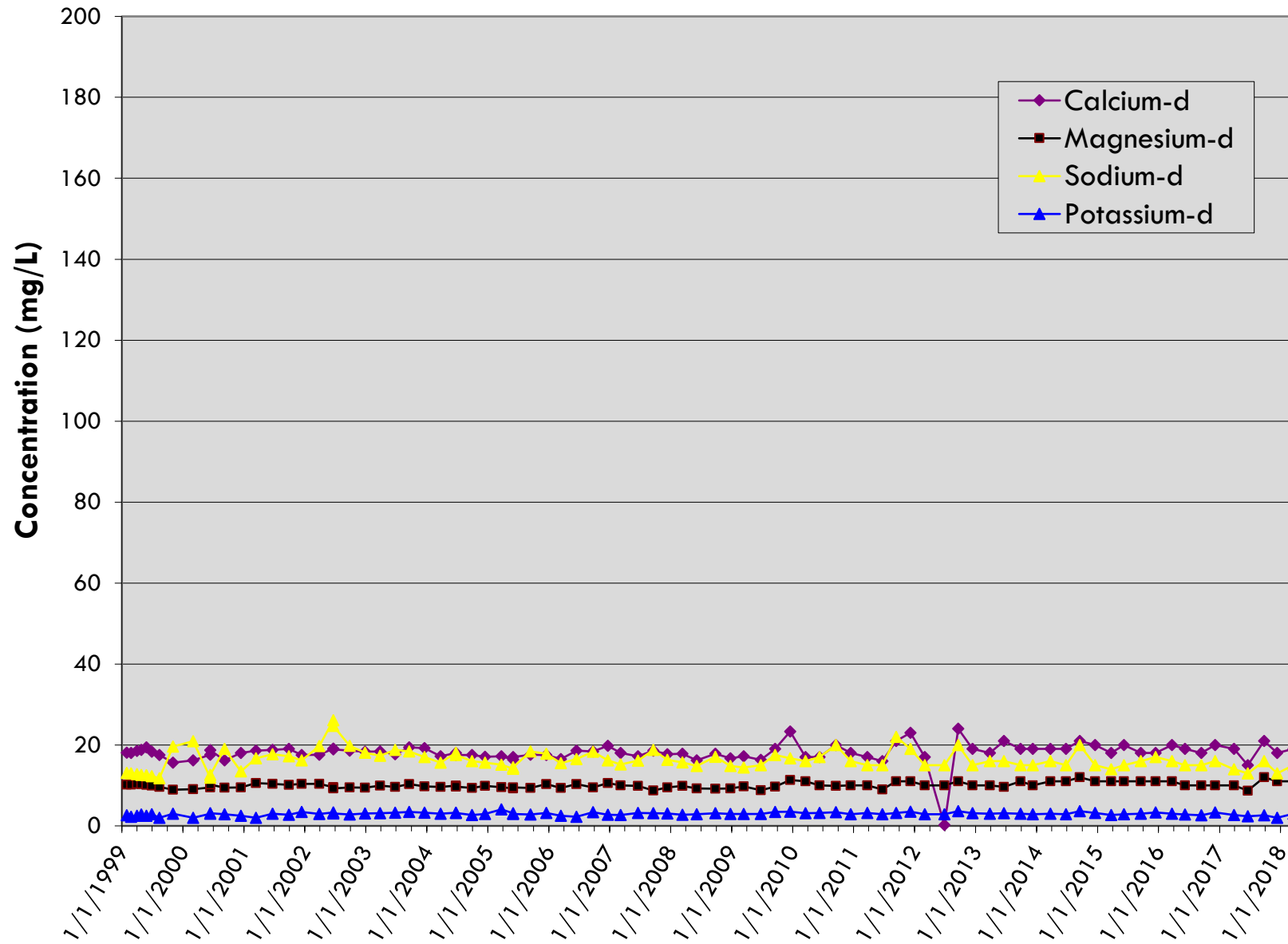
MW-1A

LRI Landfill, Pierce County, Washington



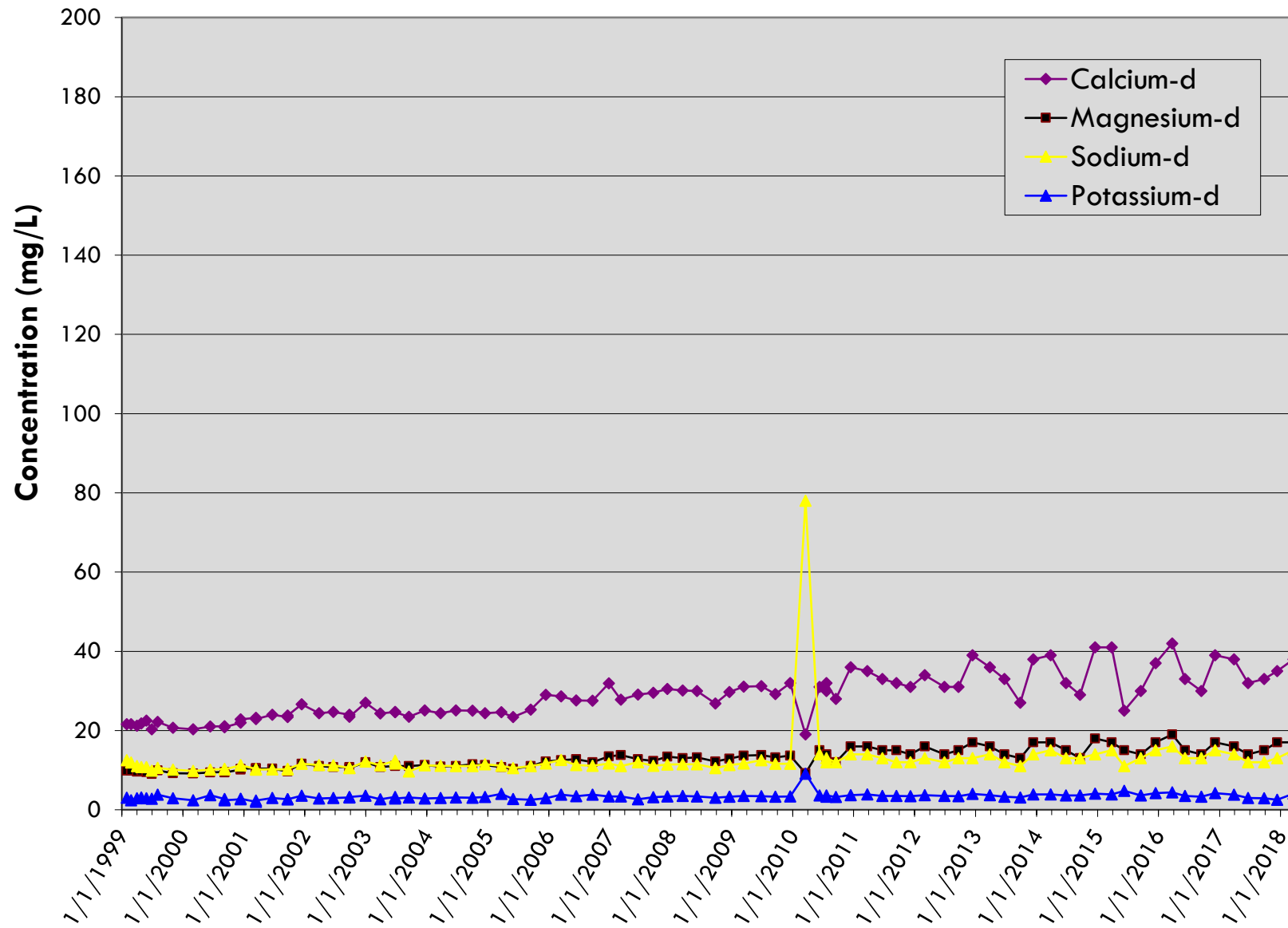
MW-2A

LRI Landfill, Pierce County, Washington

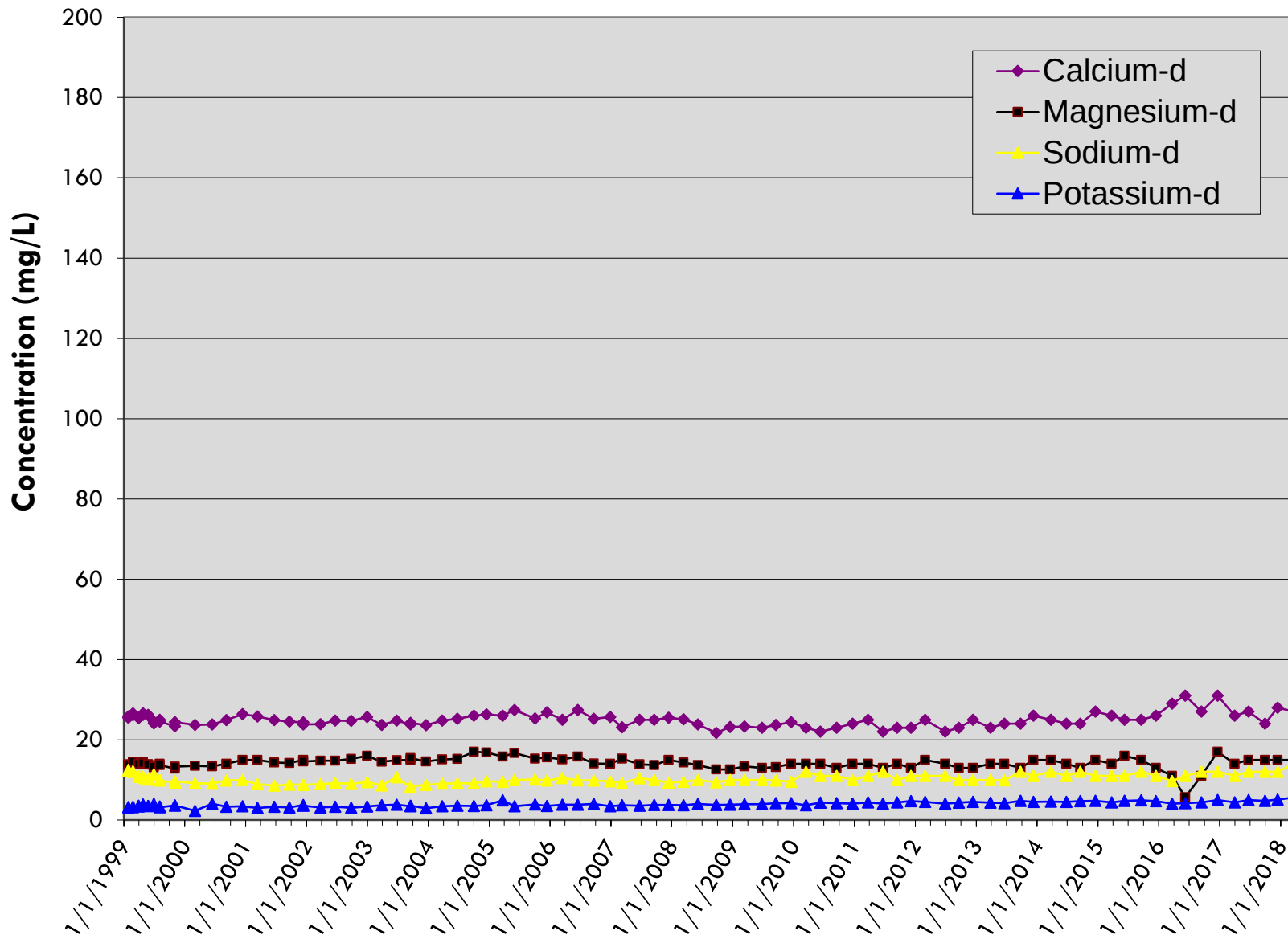


MW-3

LRI Landfill, Pierce County, Washington

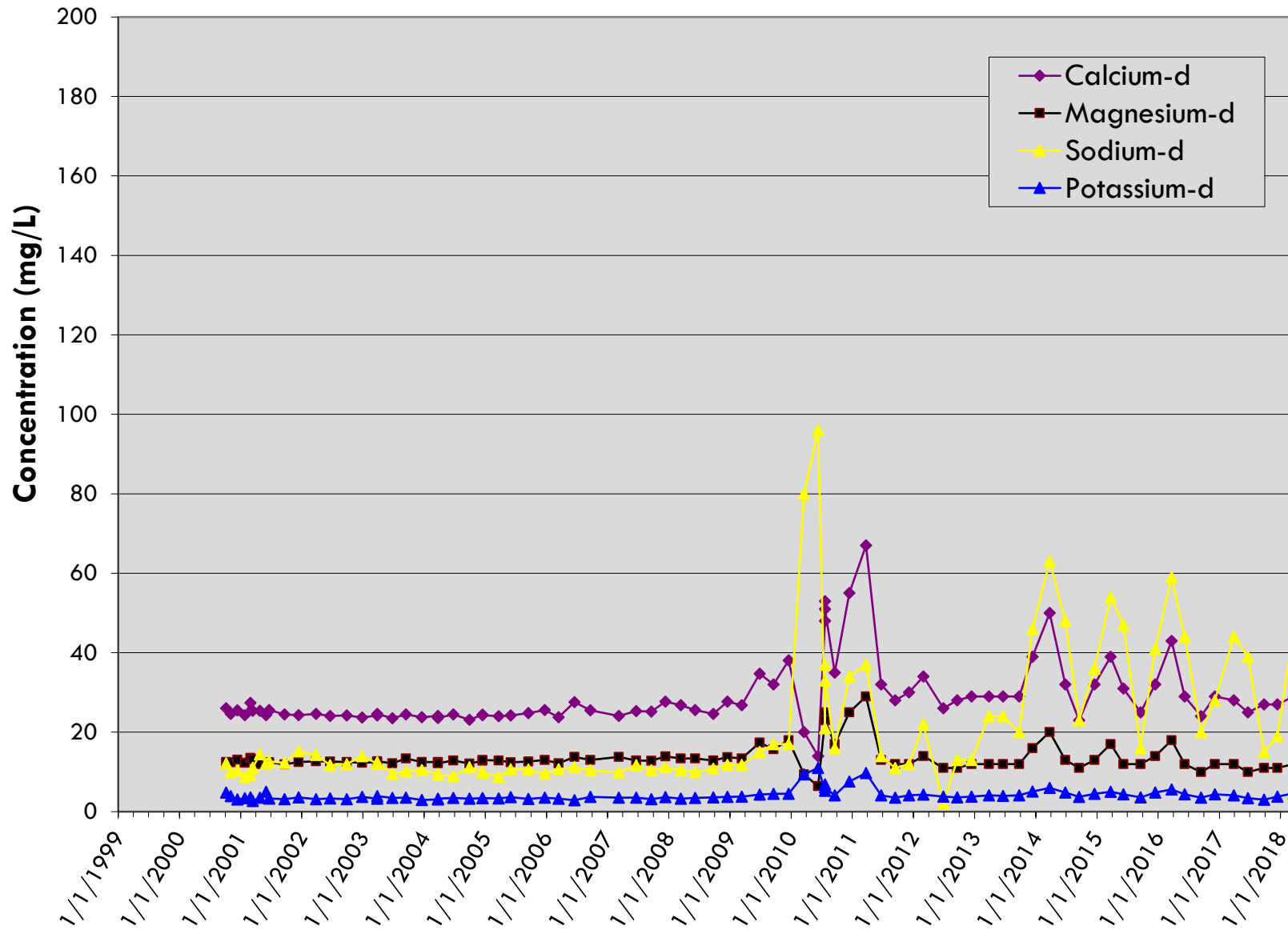


MW-4
LRI Landfill, Pierce County, Washington



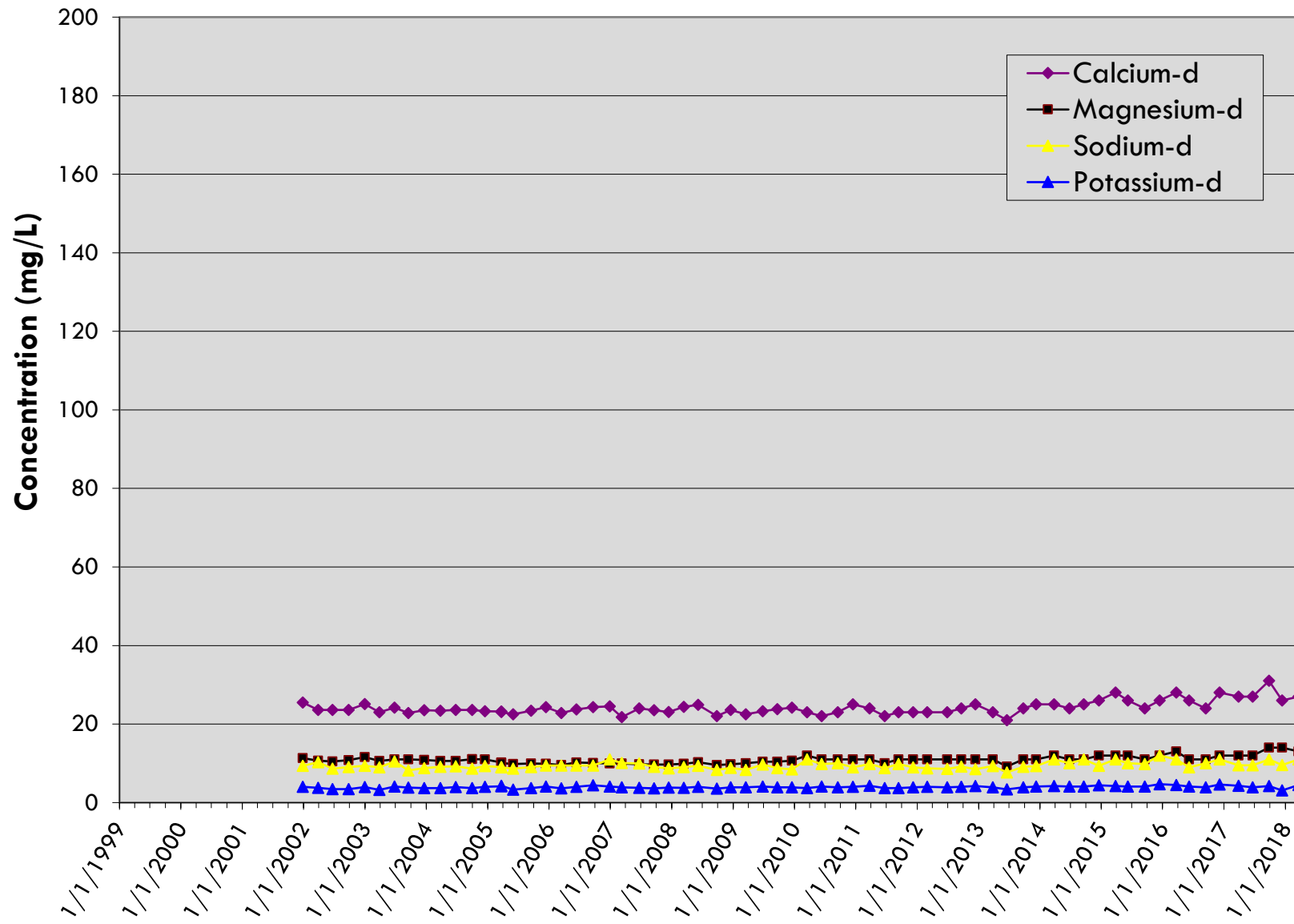
MW-5A

LRI Landfill, Pierce County, Washington



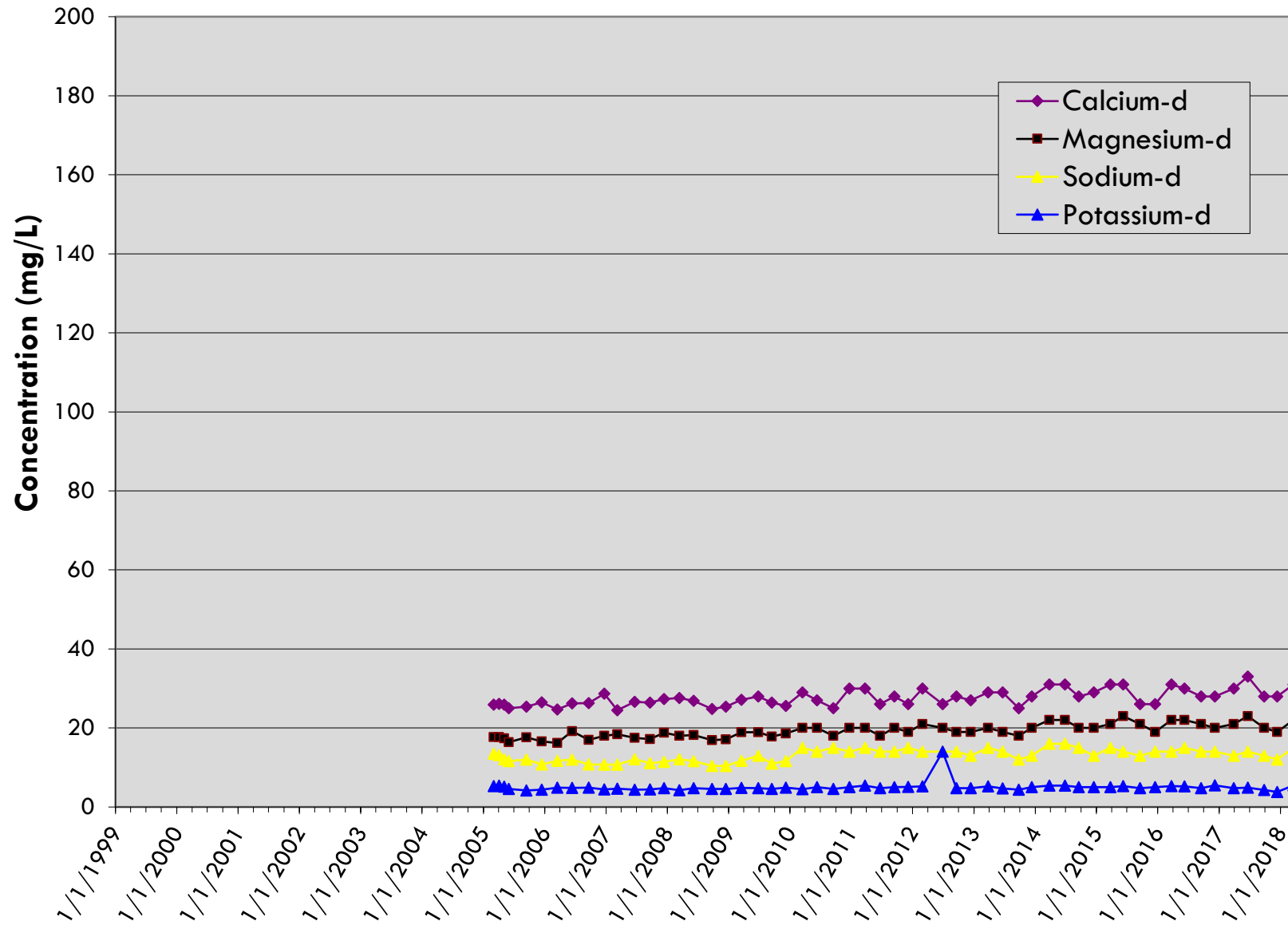
MW-6

LRI Landfill, Pierce County, Washington

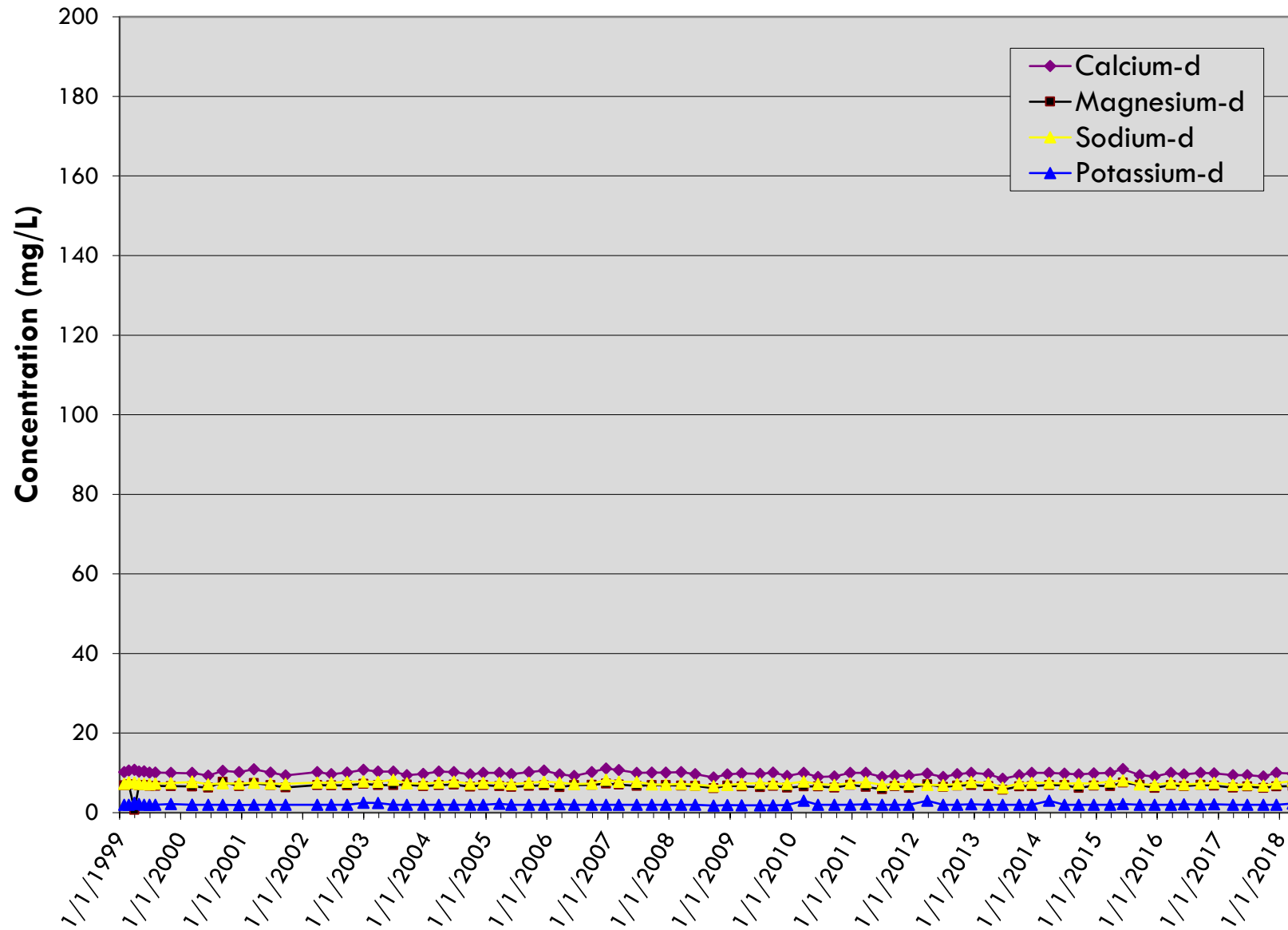


MW-7

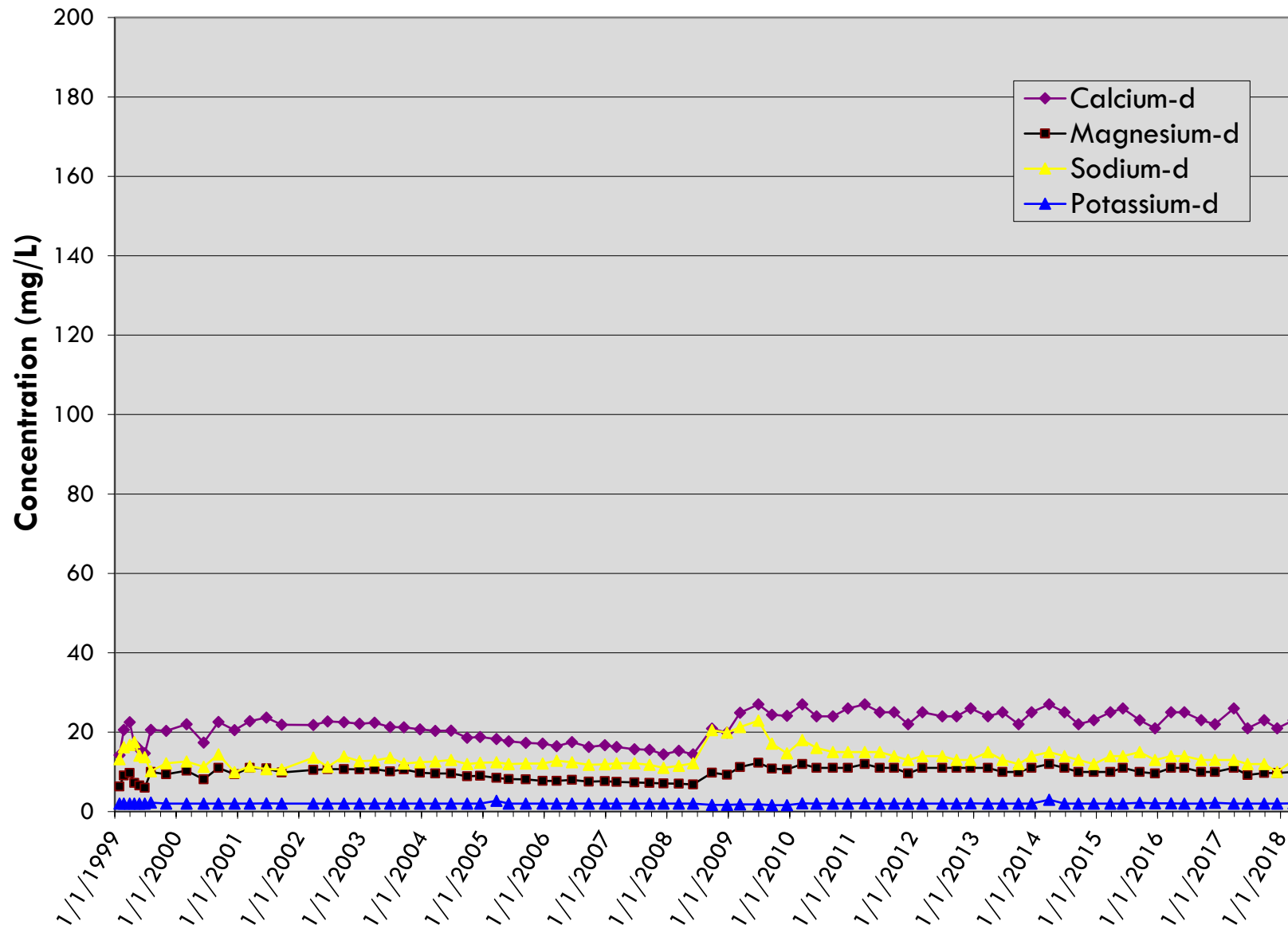
LRI Landfill, Pierce County, Washington



MW-9 (Background)
LRI Landfill, Pierce County, Washington

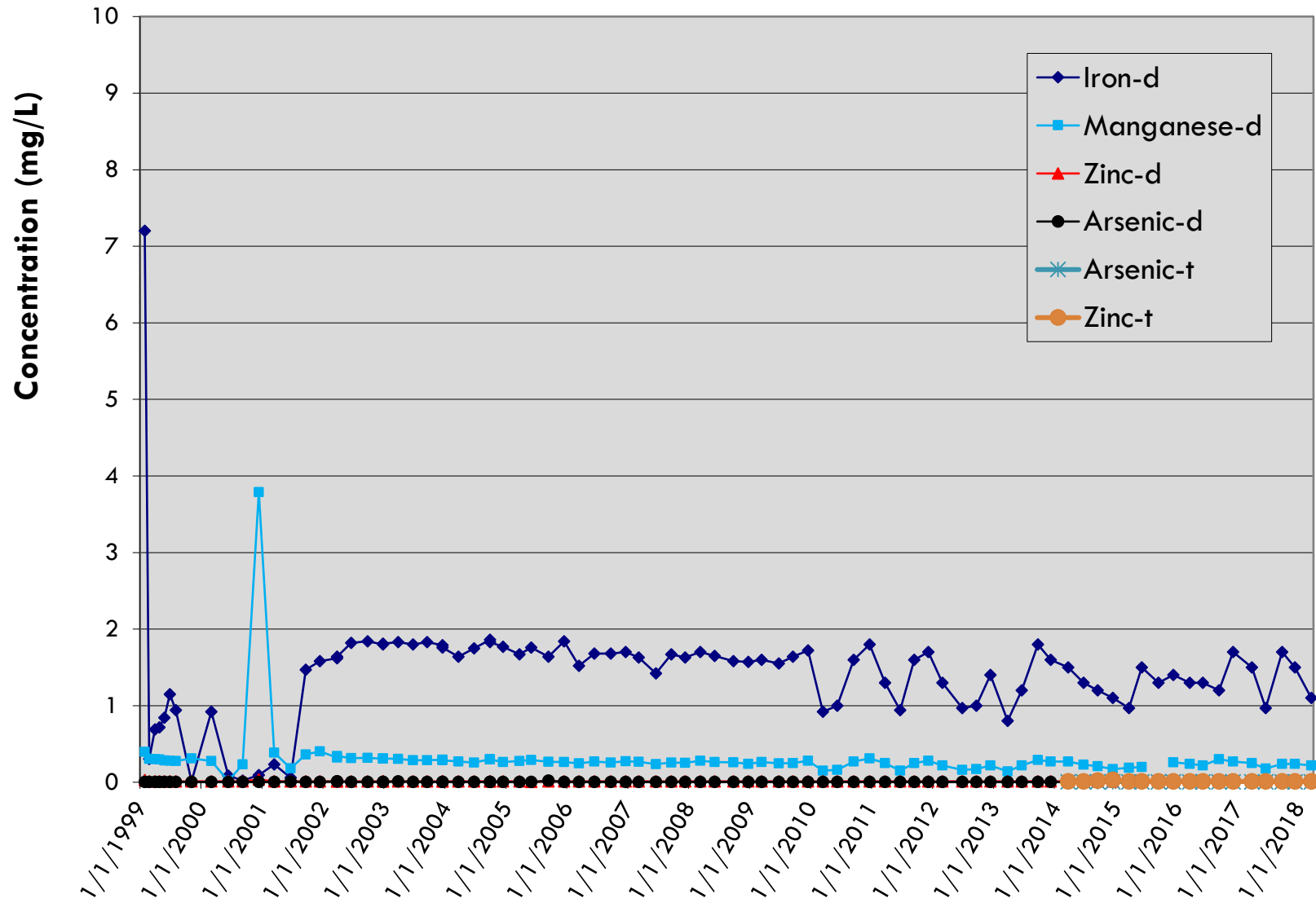


MW-10 (Background)
LRI Landfill, Pierce County, Washington



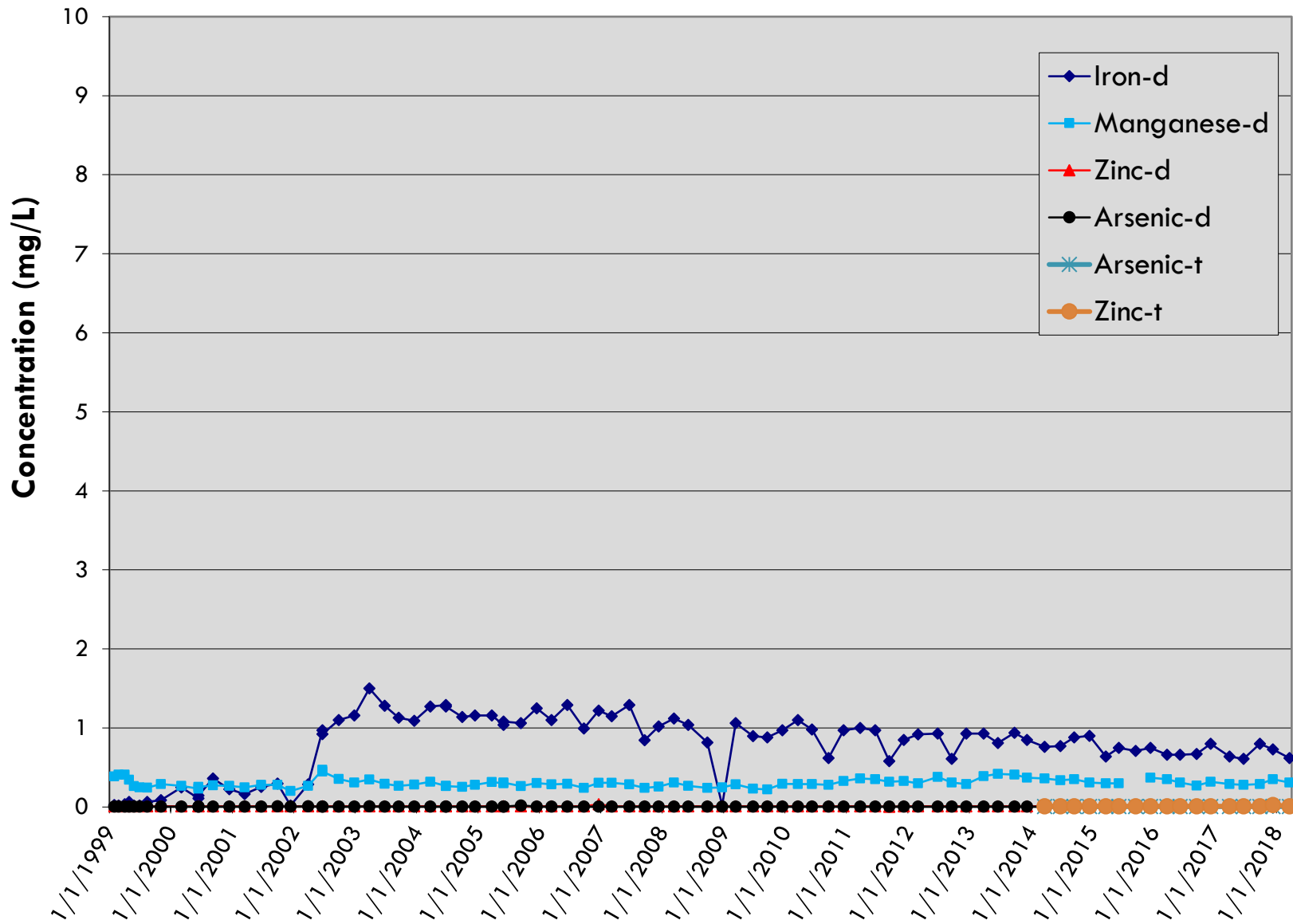
MW-1 A

LRI Landfill, Pierce County, Washington



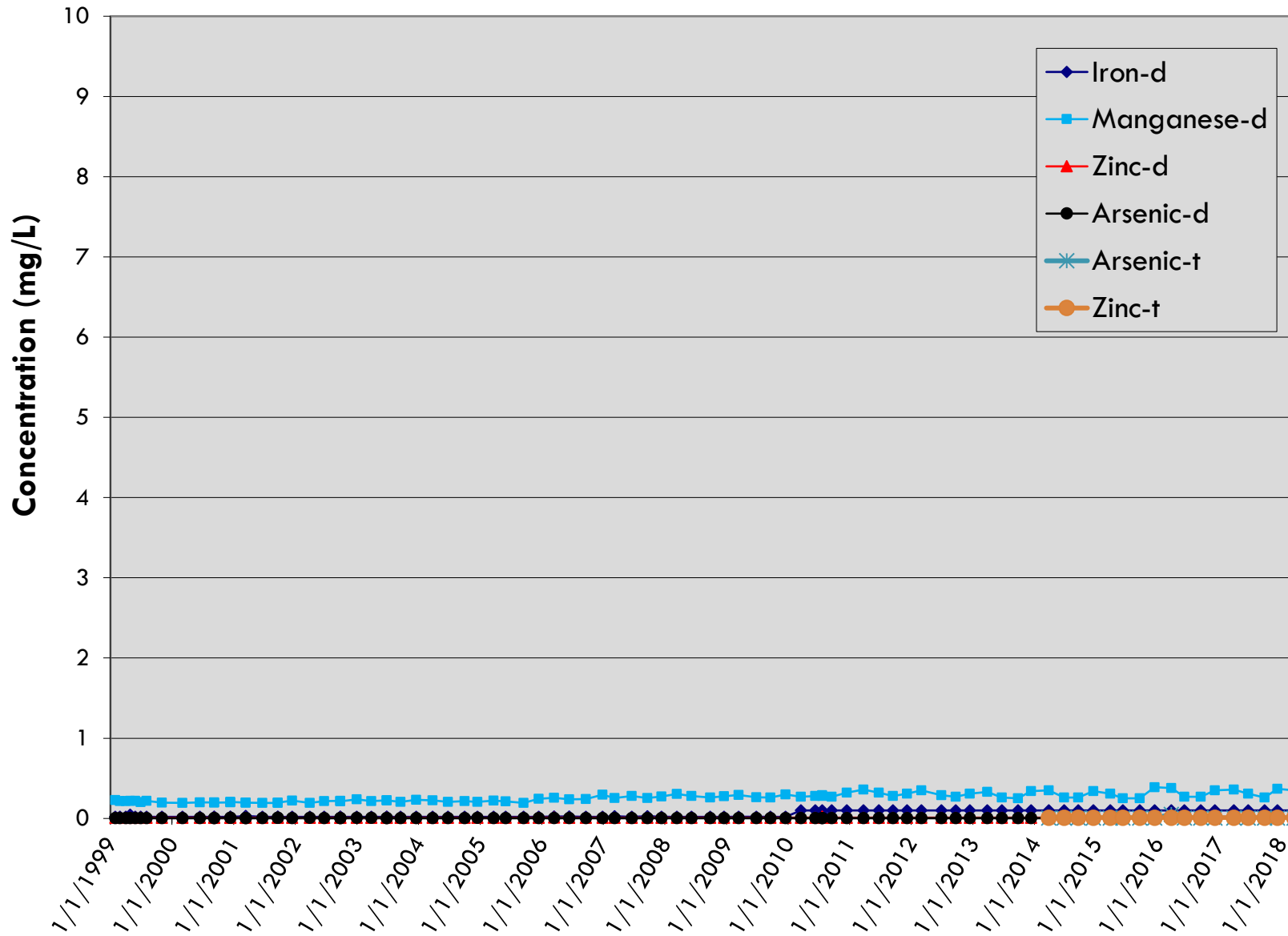
MW-2A

LRI Landfill, Pierce County, Washington



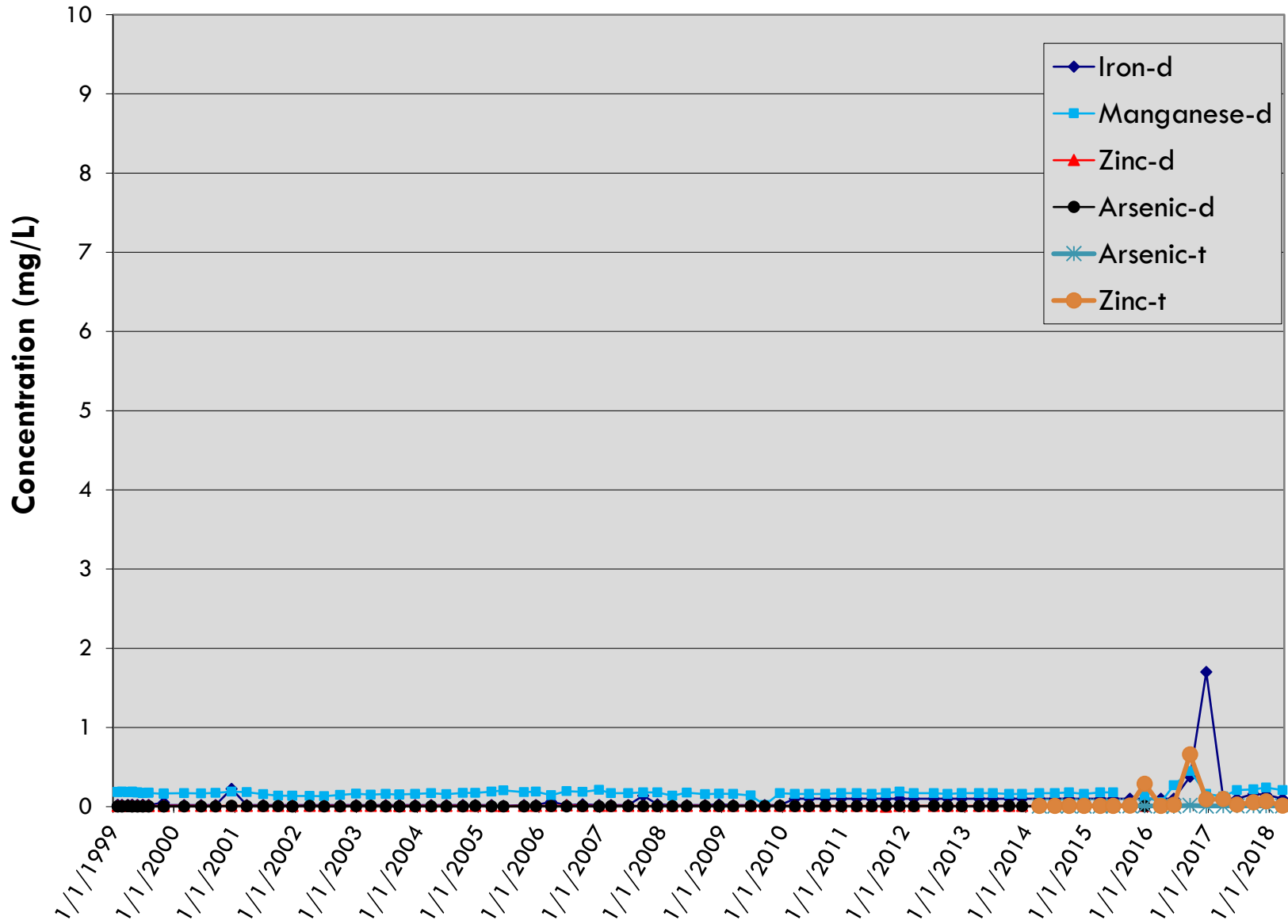
MW-3

LRI Landfill, Pierce County, Washington



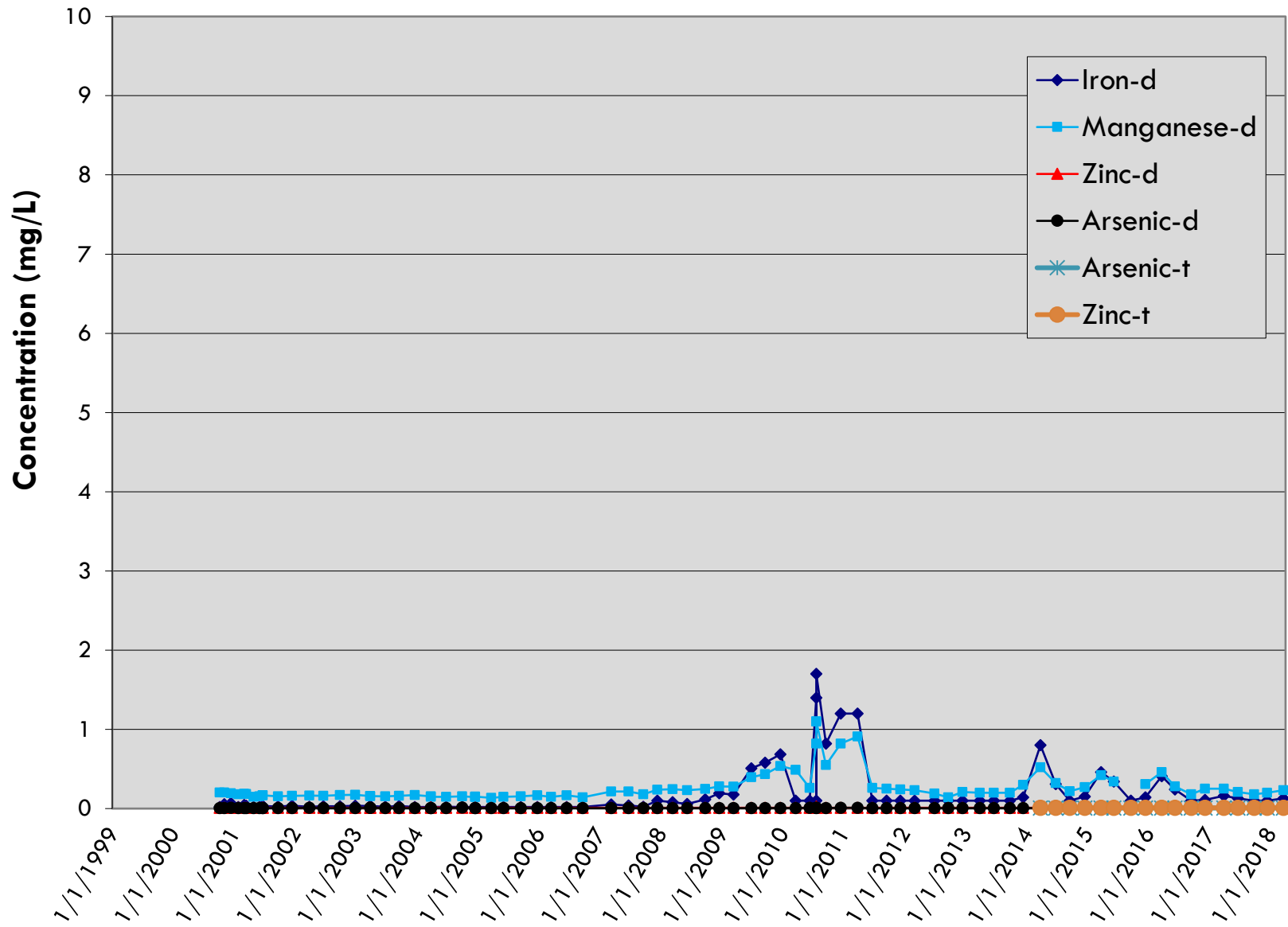
MW-4

LRI Landfill, Pierce County, Washington



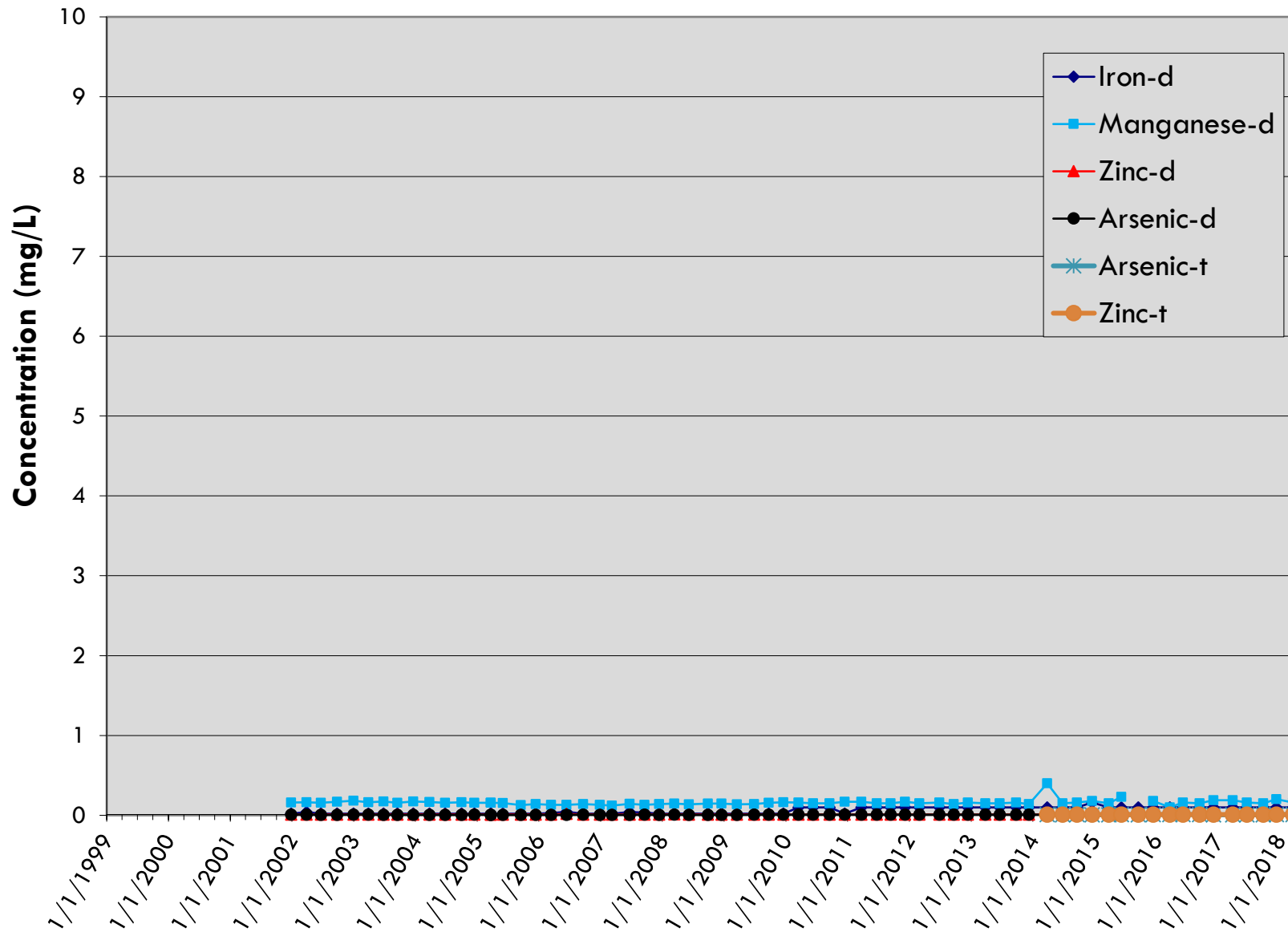
MW-5A

LRI Landfill, Pierce County, Washington

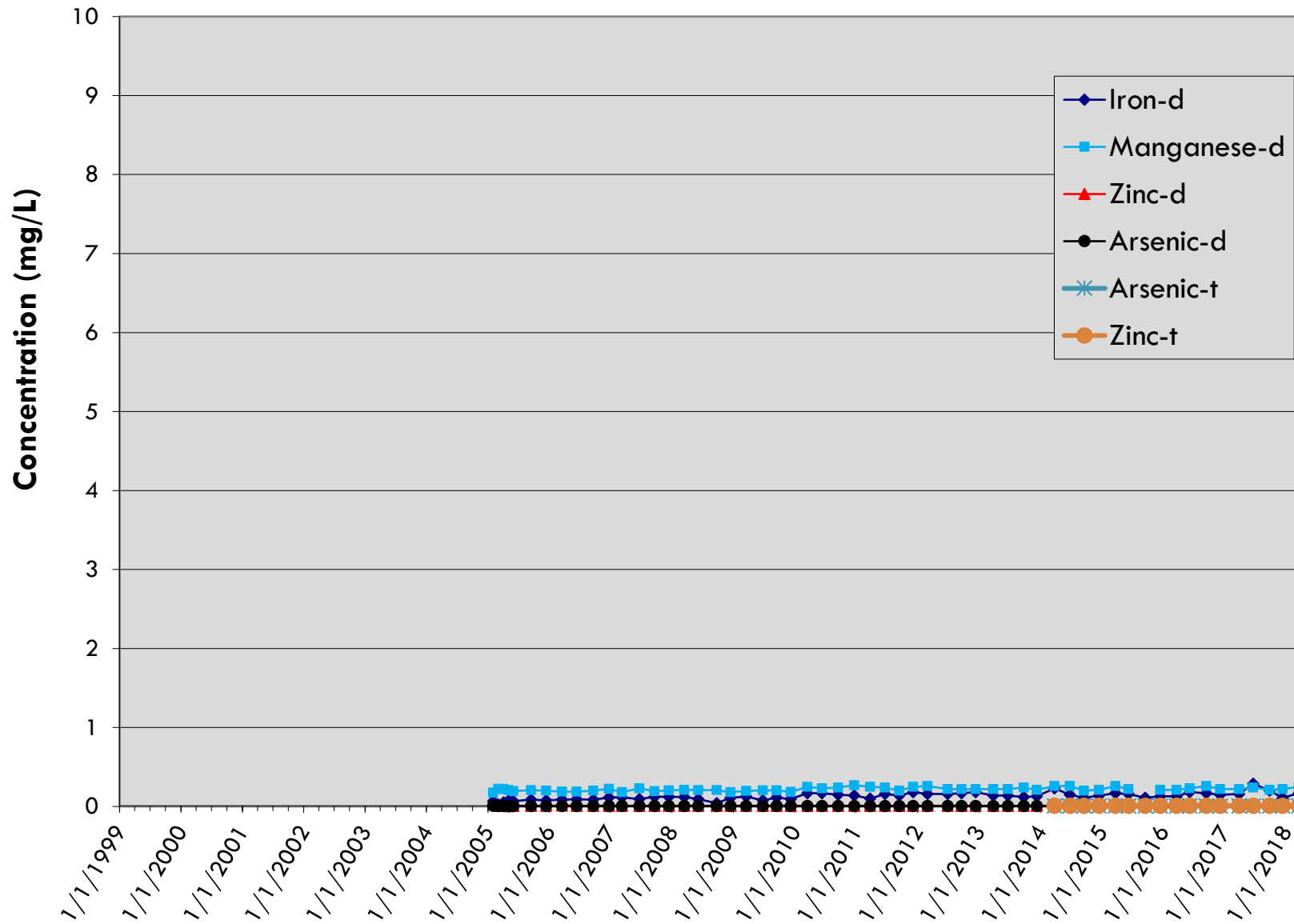


MW-6

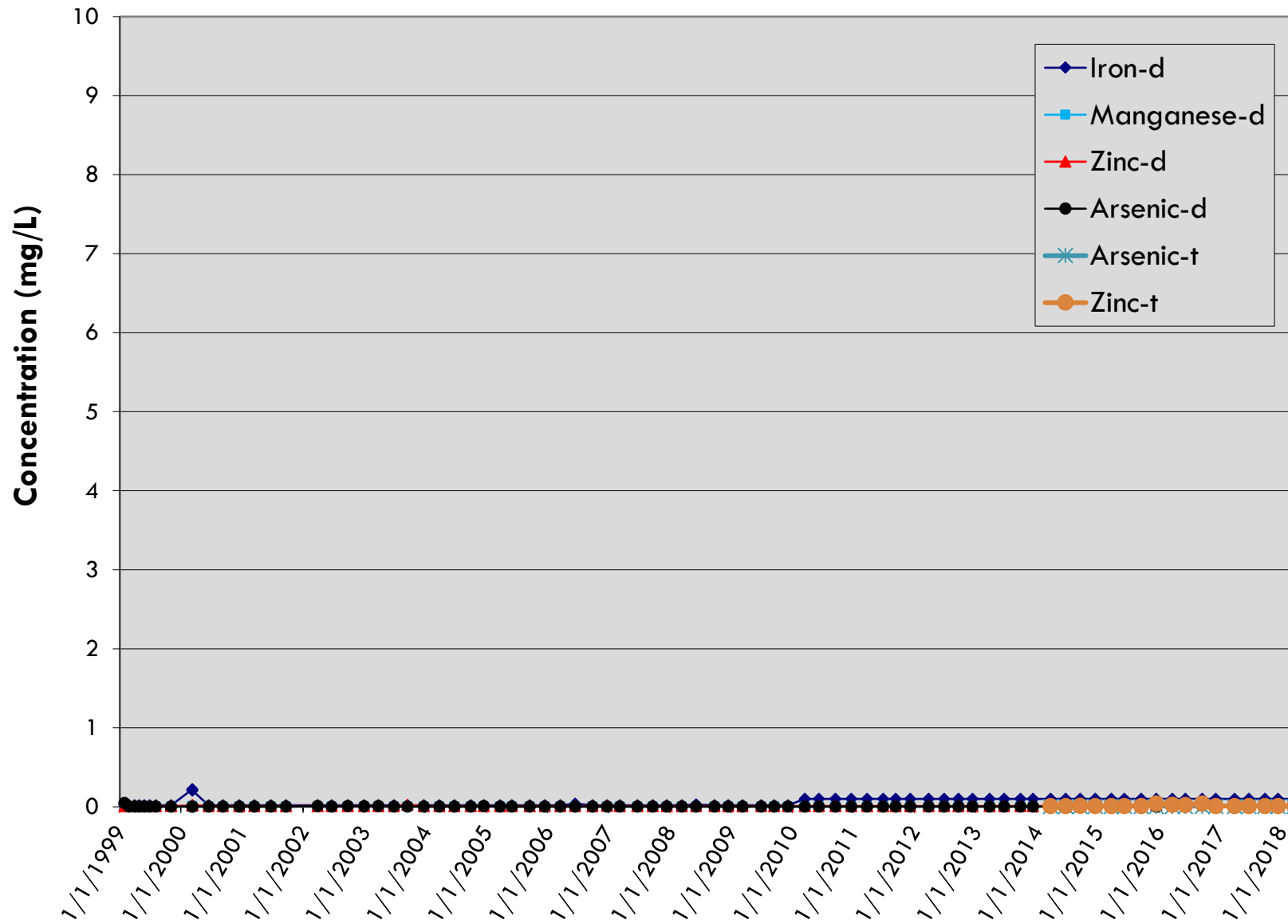
LRI Landfill, Pierce County, Washington



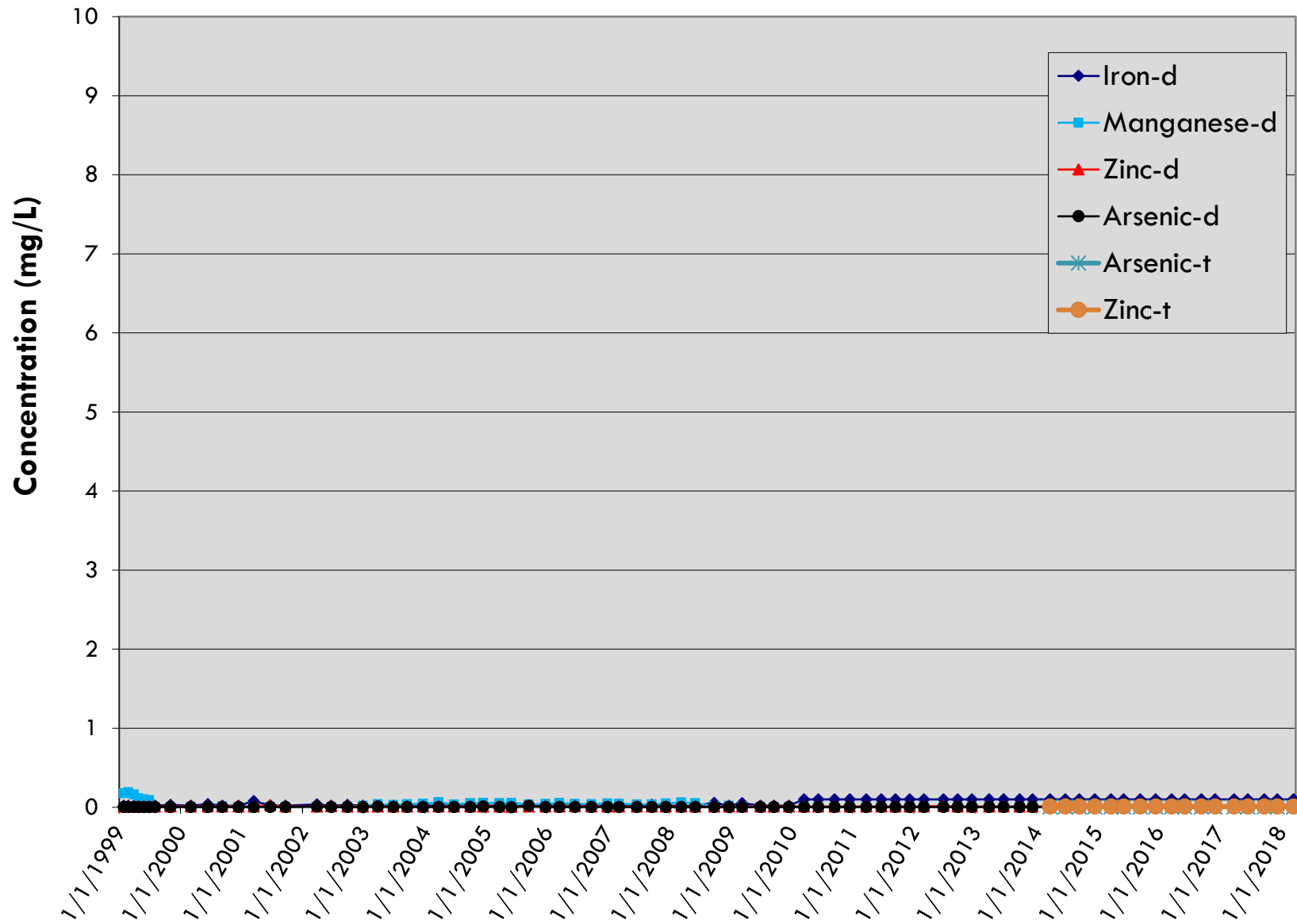
MW-7
LRI Landfill, Pierce County, Washington



MW-9 (Background)
LRI Landfill, Pierce County, Washington

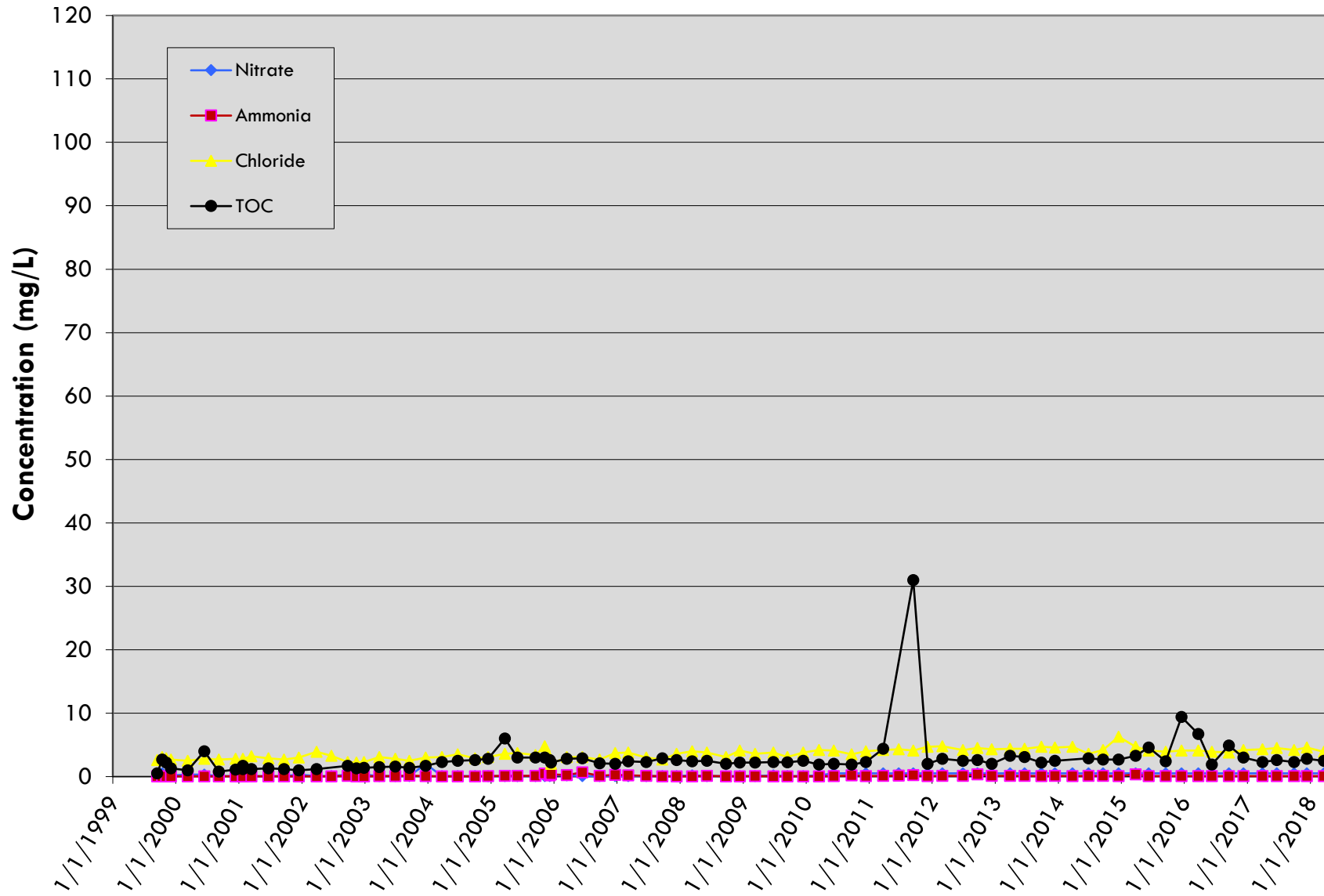


MW-10 (Background)
LRI Landfill, Pierce County, Washington



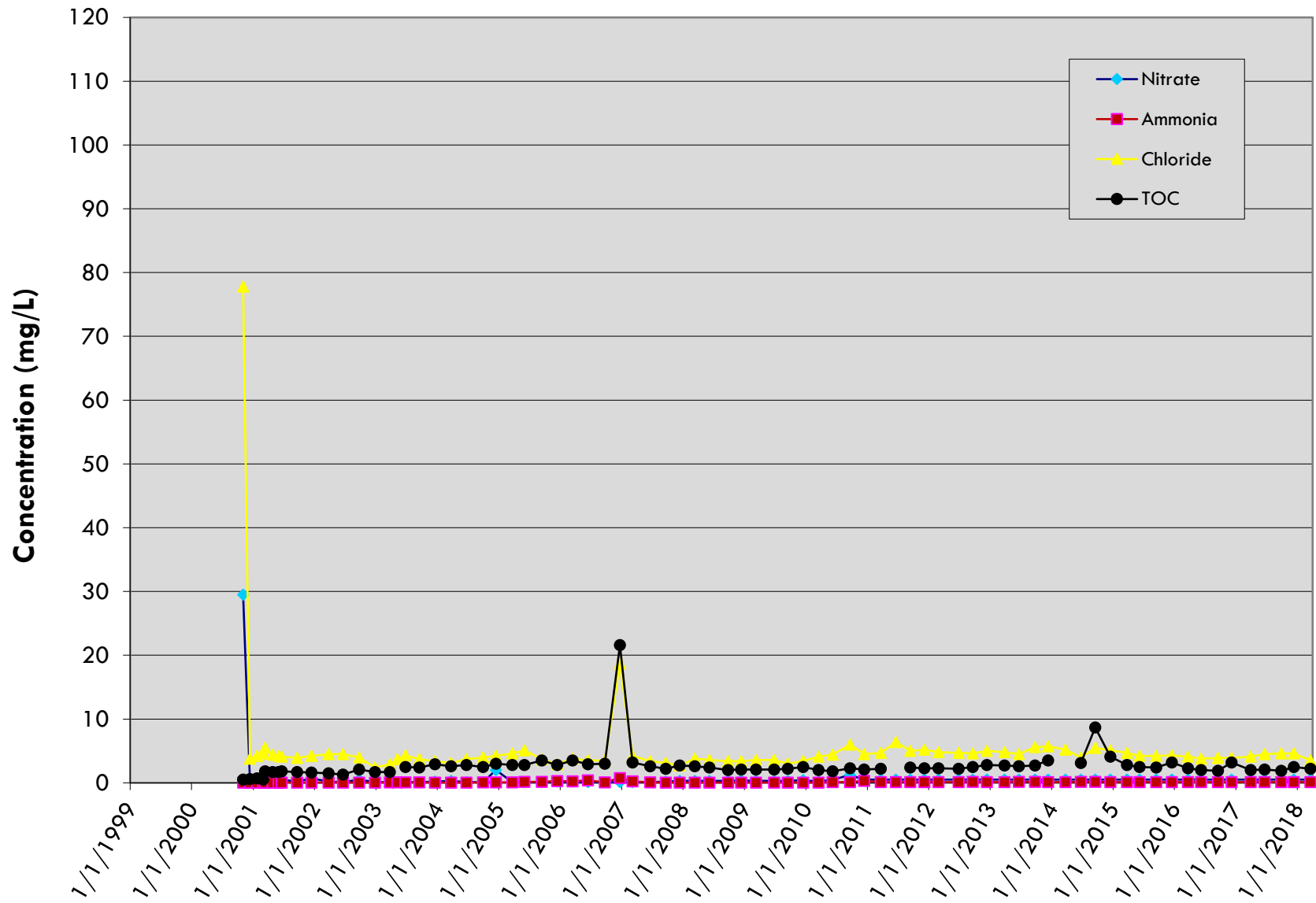
LDCS-1

LRI Landfill, Pierce County, Washington



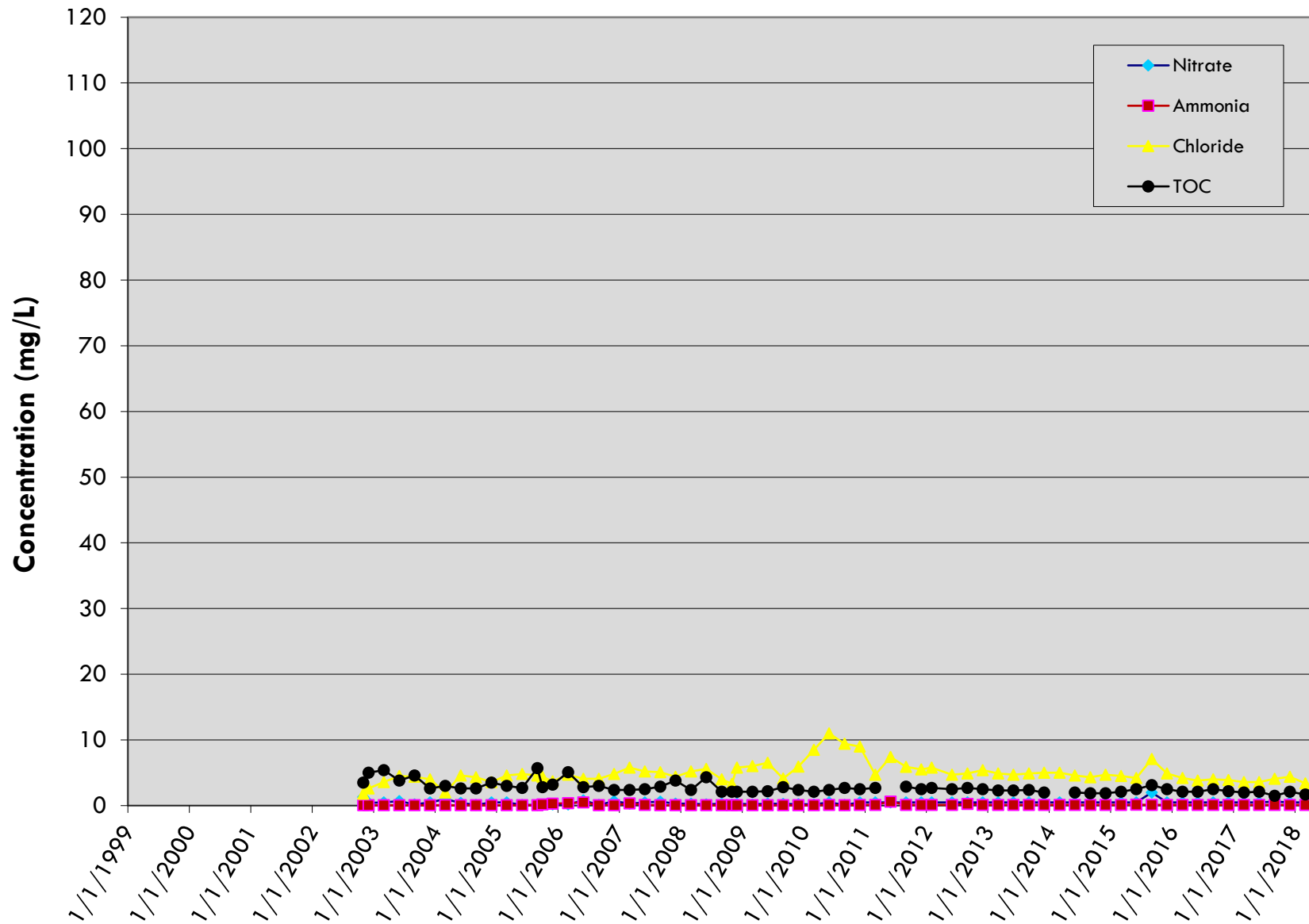
LDCS-2A

LRI Landfill, Pierce County, Washington



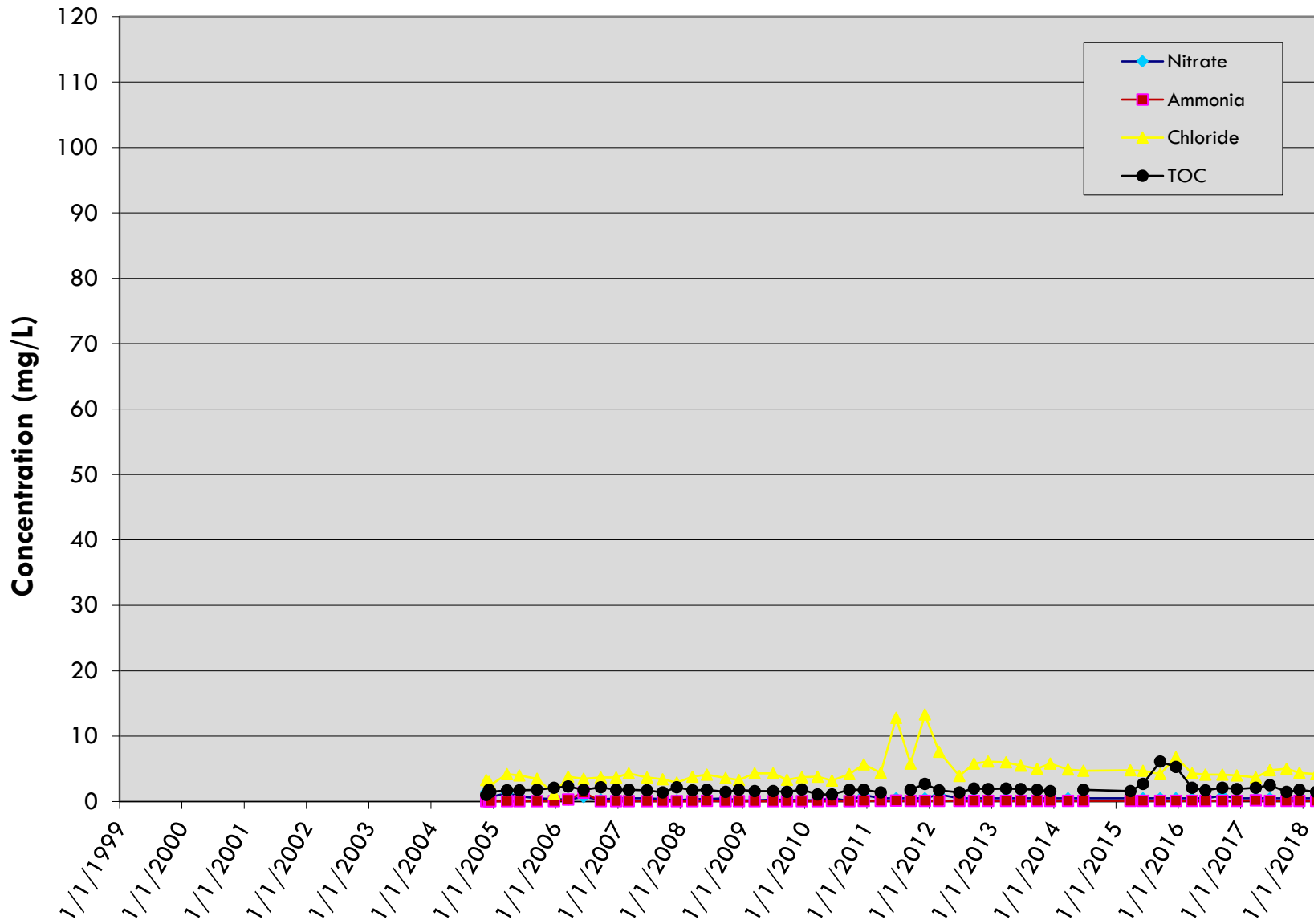
LDCS-2B

LRI Landfill, Pierce County, Washington



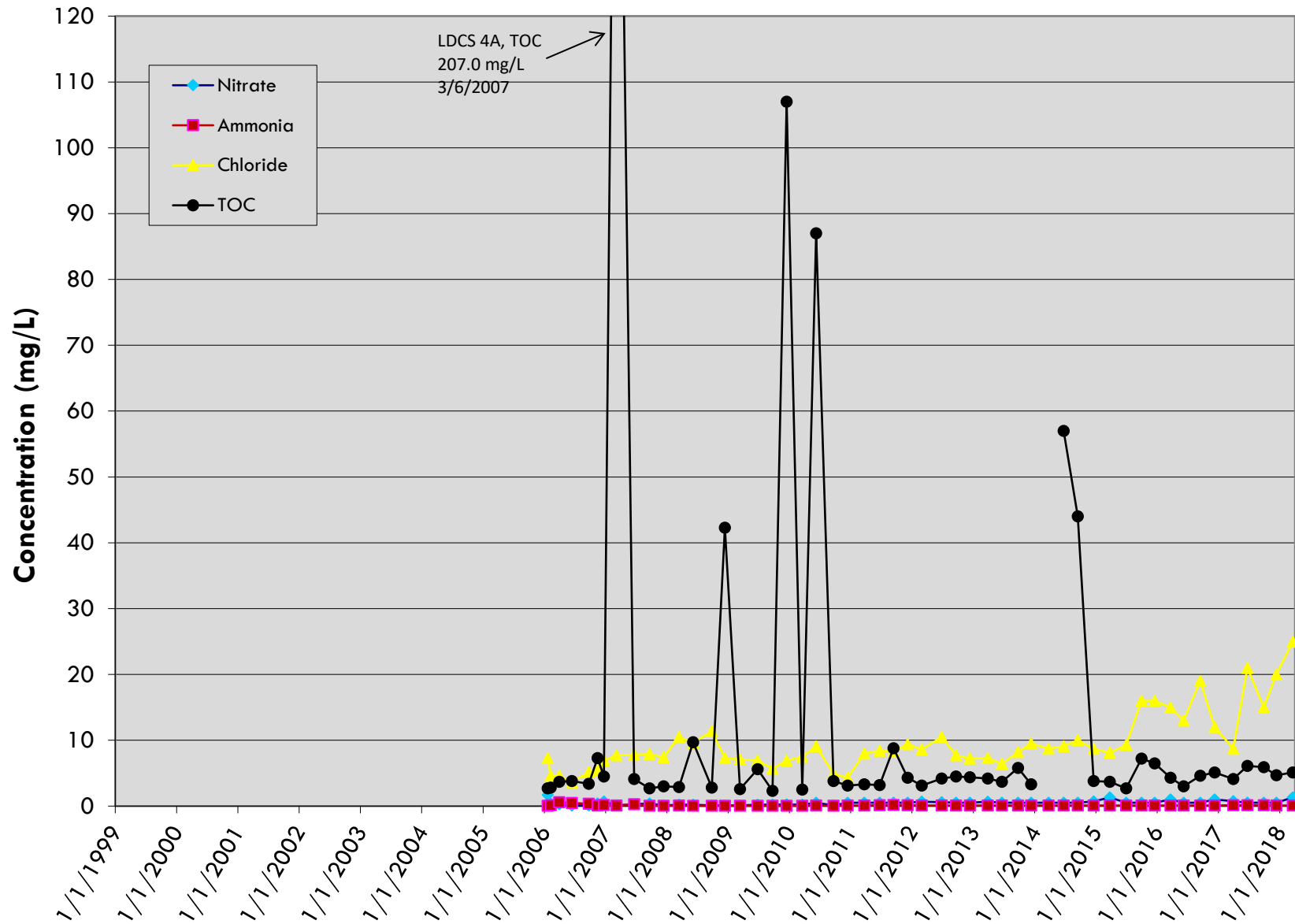
LDCS-3A

LRI Landfill, Pierce County, Washington



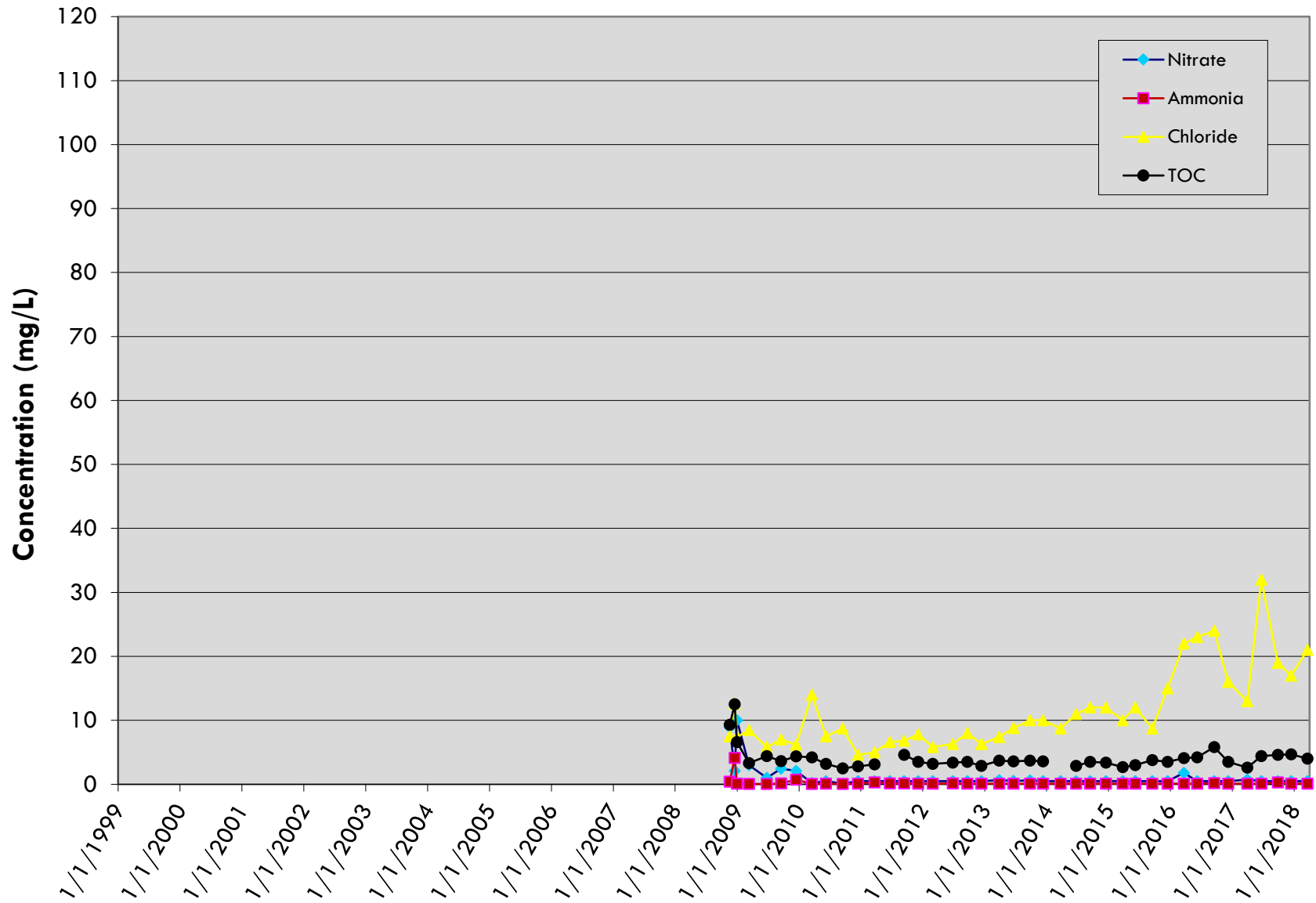
LDCS-4A

LRI Landfill, Pierce County, Washington



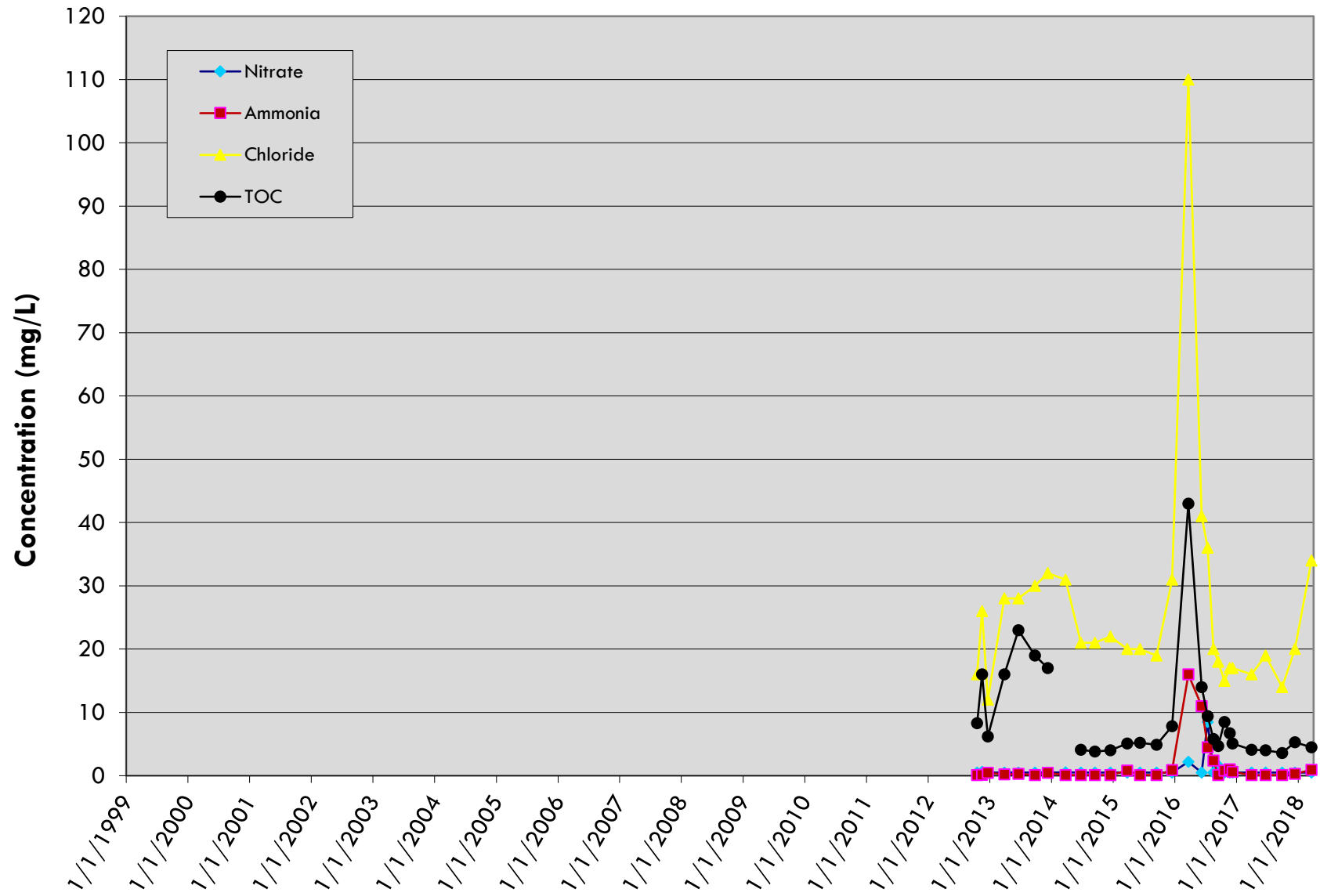
LDCS-4B

LRI Landfill, Pierce County, Washington



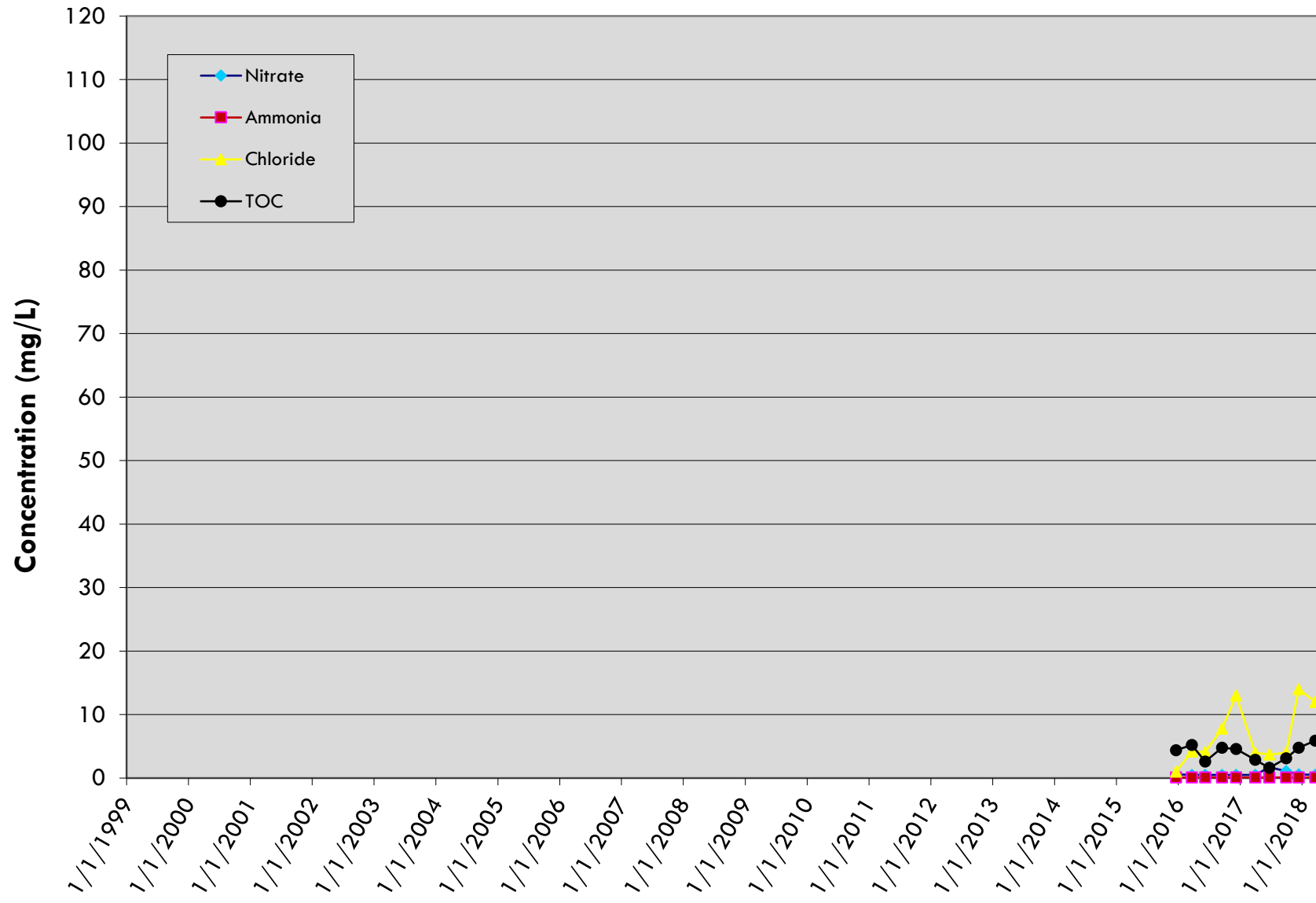
LDCS-5A

LRI Landfill, Pierce County, Washington



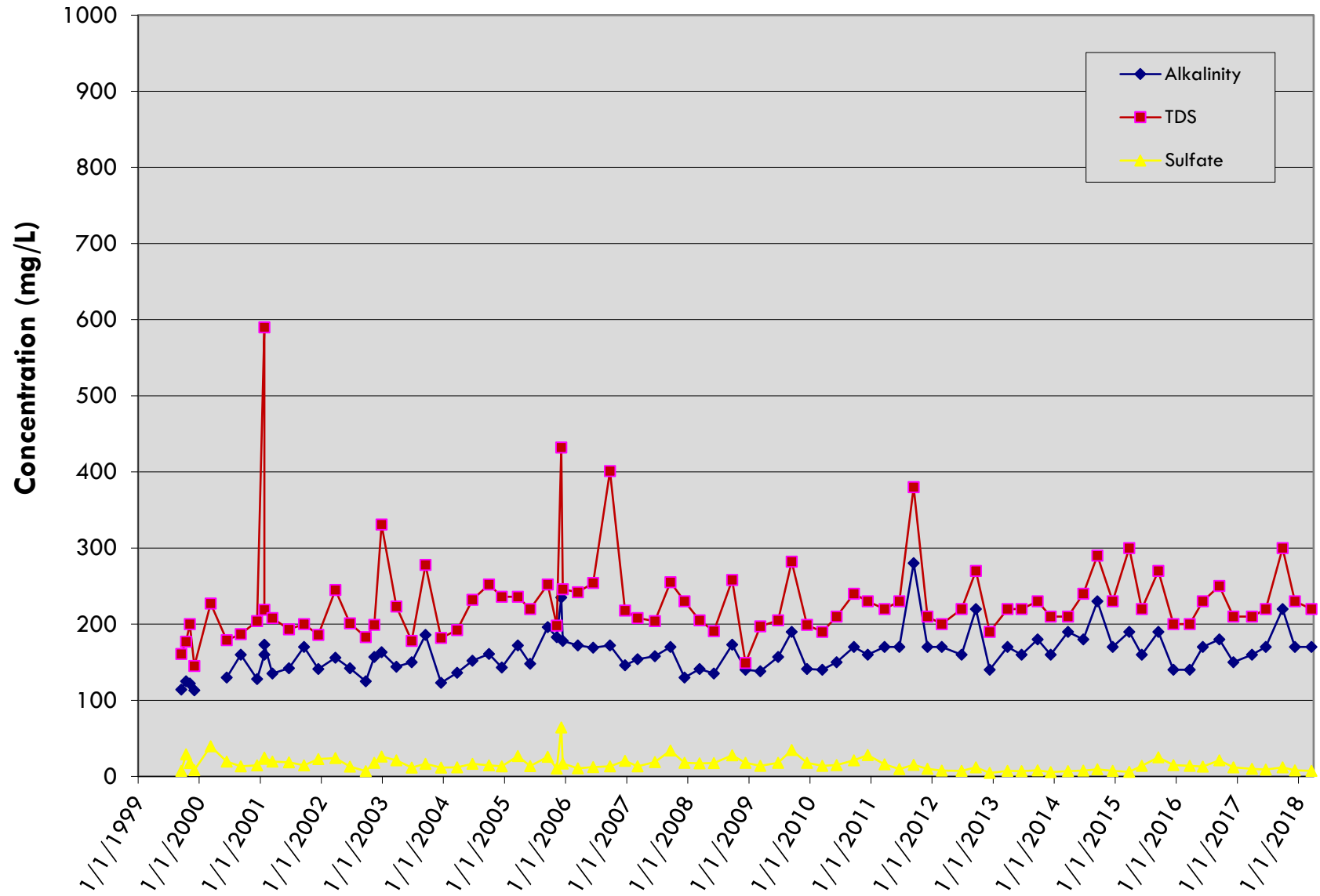
LDCS-6A

LRI Landfill, Pierce County, Washington



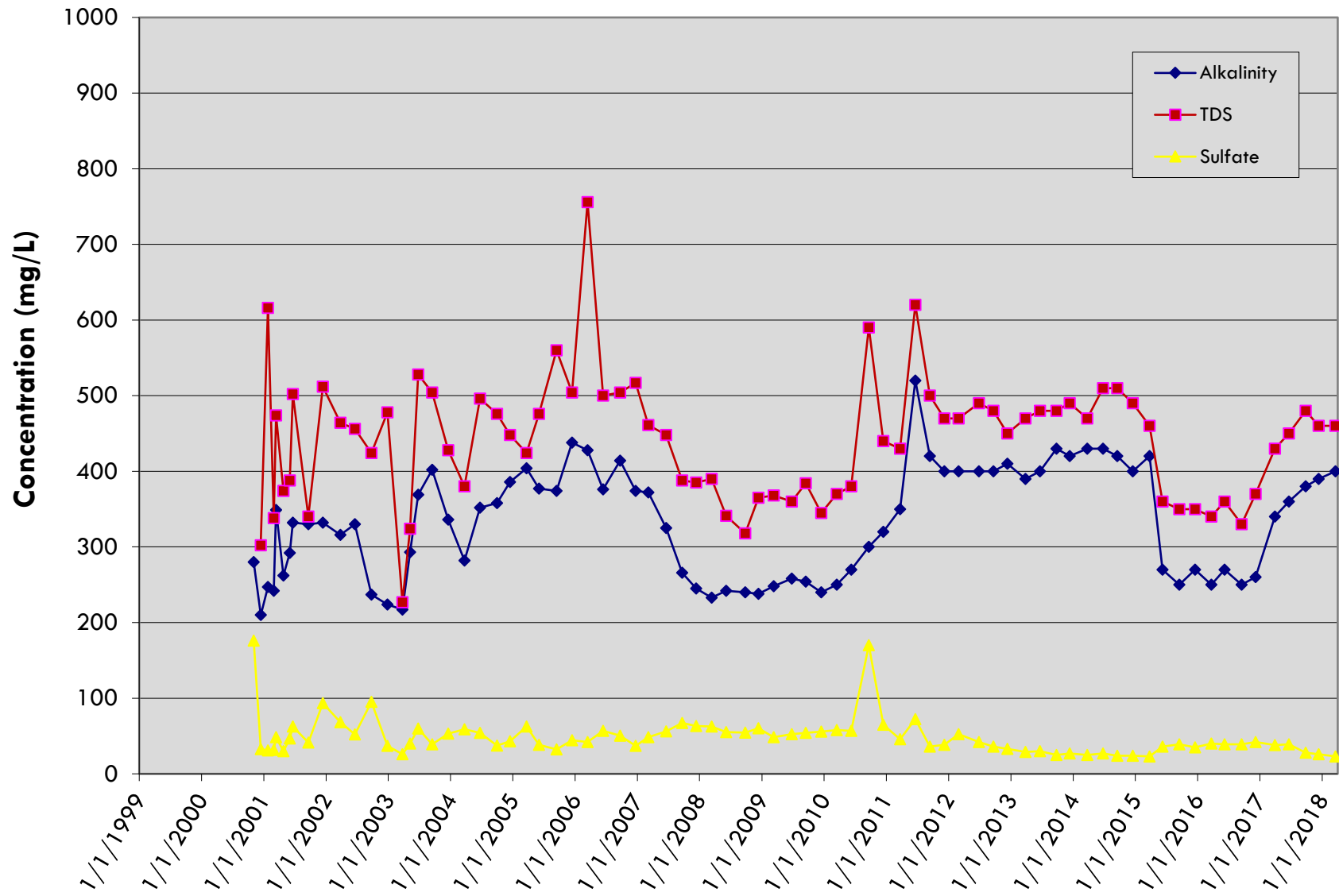
LDCS-1

LRI Landfill, Pierce County, Washington



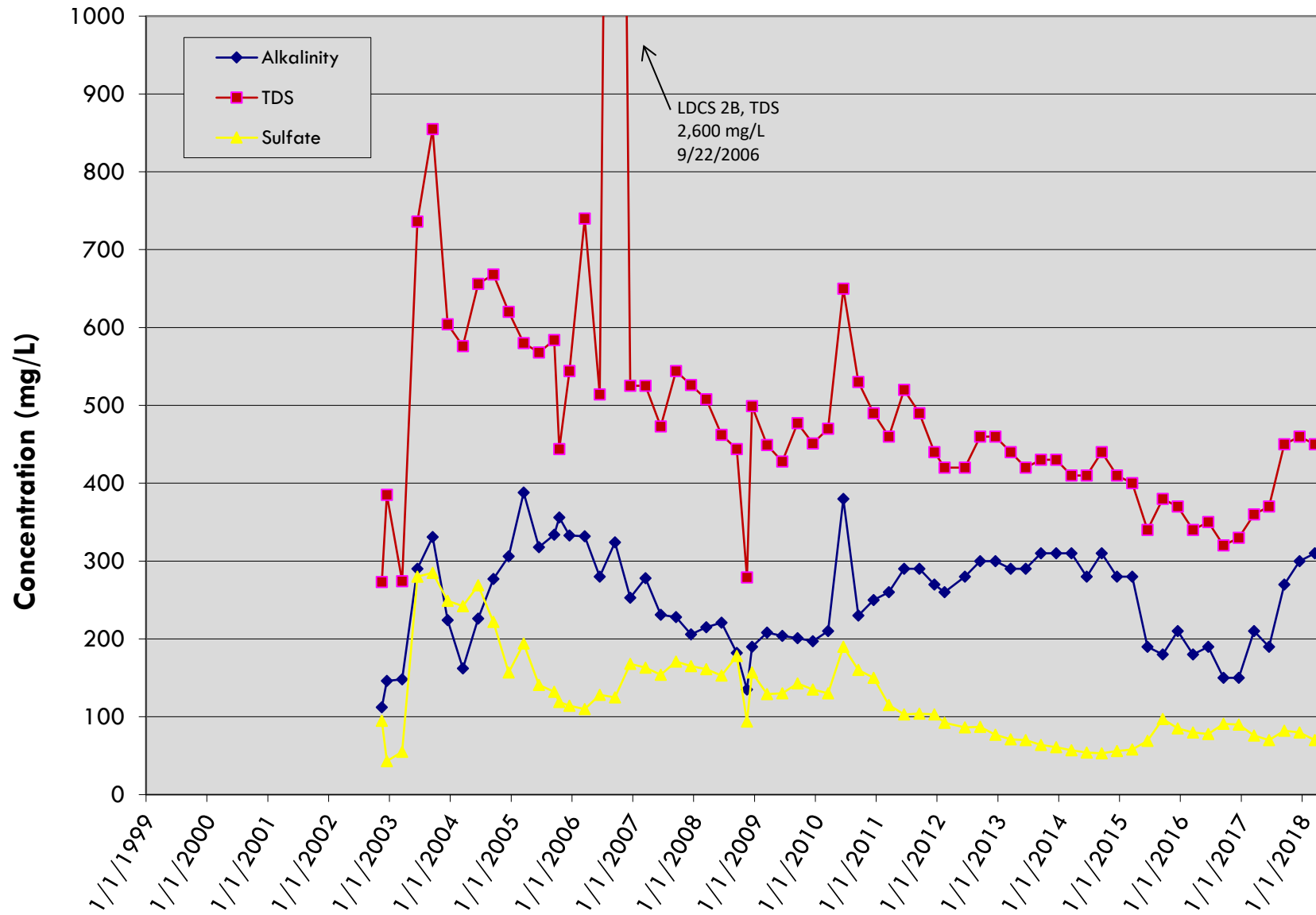
LDCS-2A

LRI Landfill, Pierce County, Washington



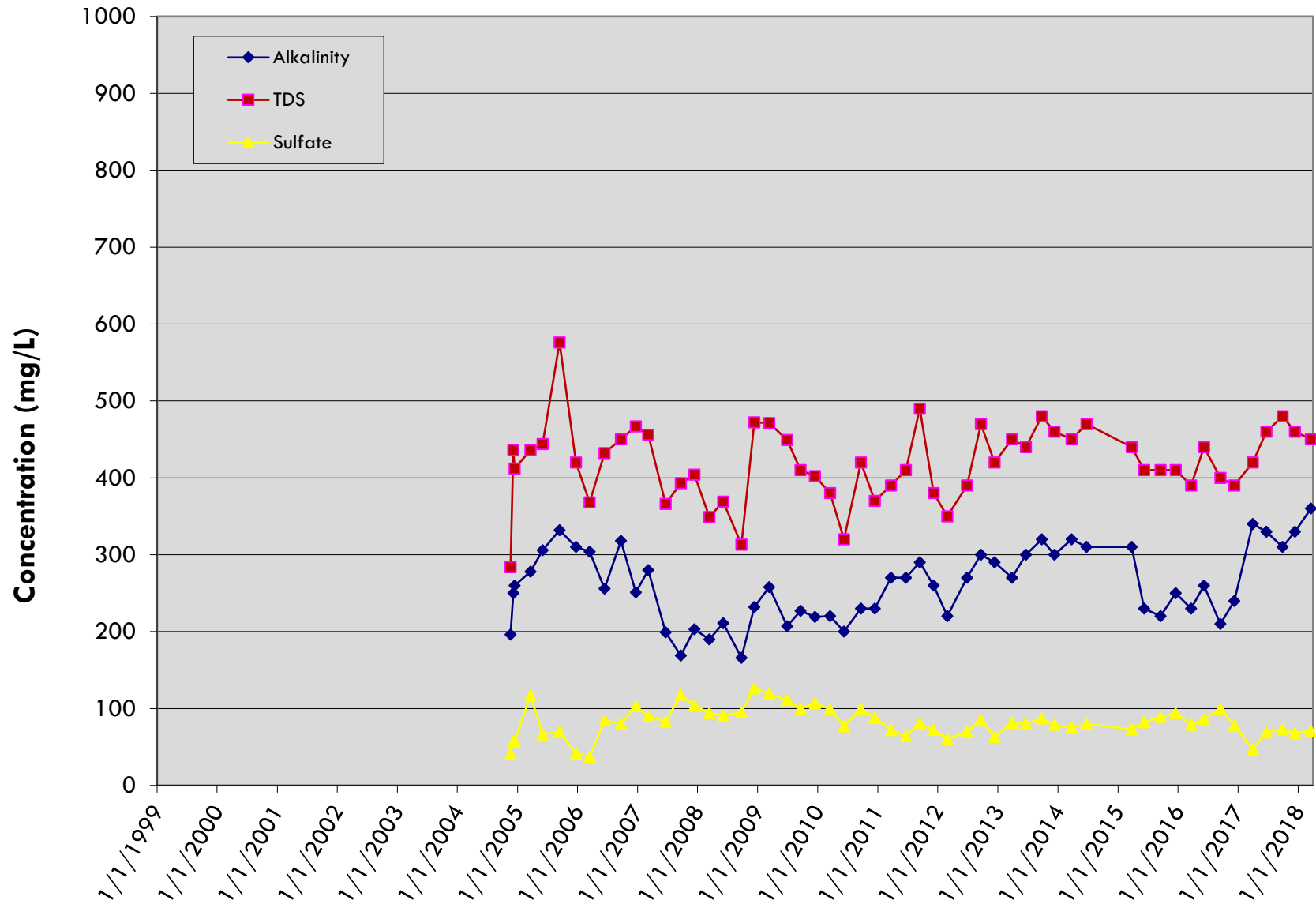
LDCS-2B

LRI Landfill, Pierce County, Washington



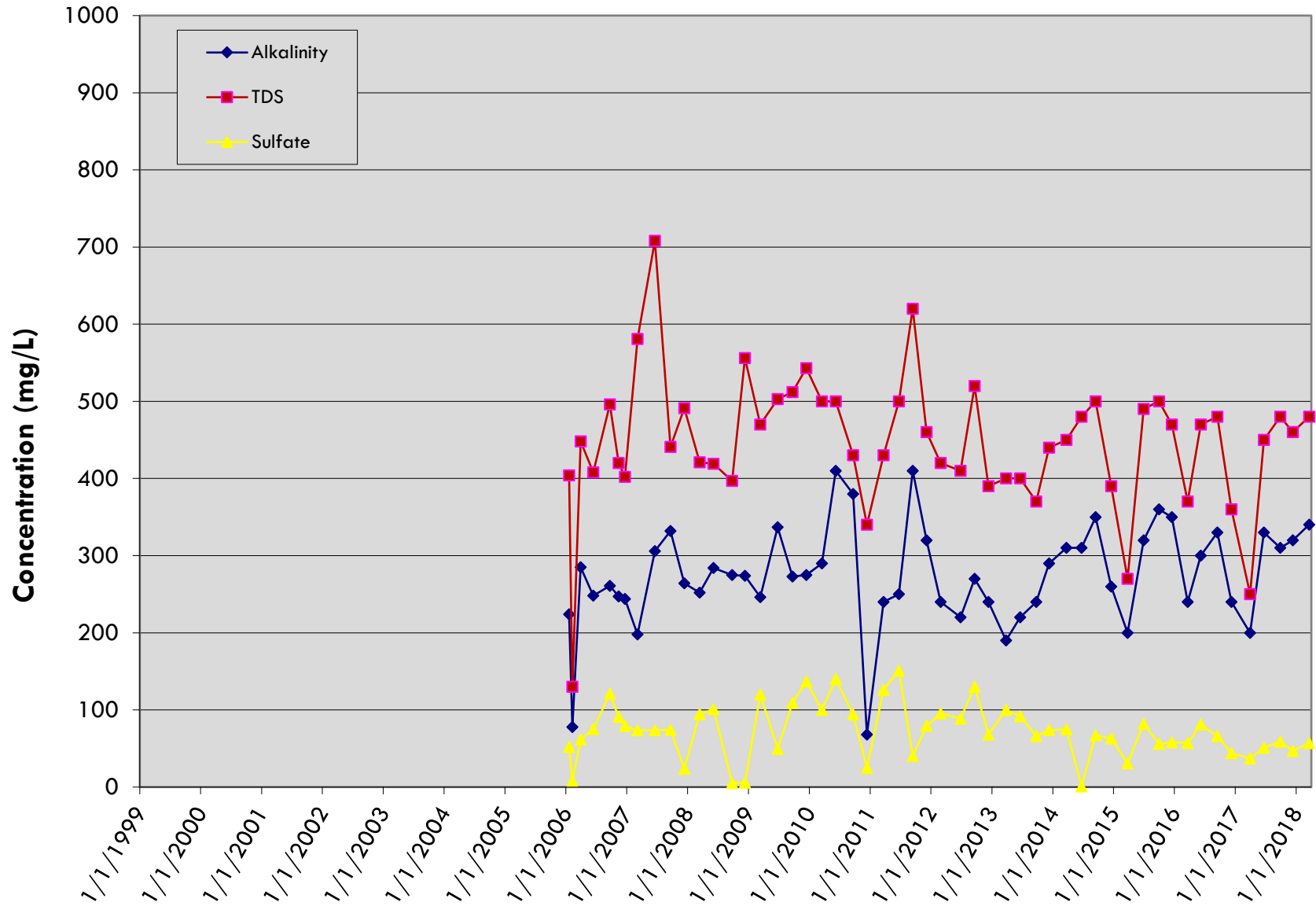
LDCS-3A

LRI Landfill, Pierce County, Washington



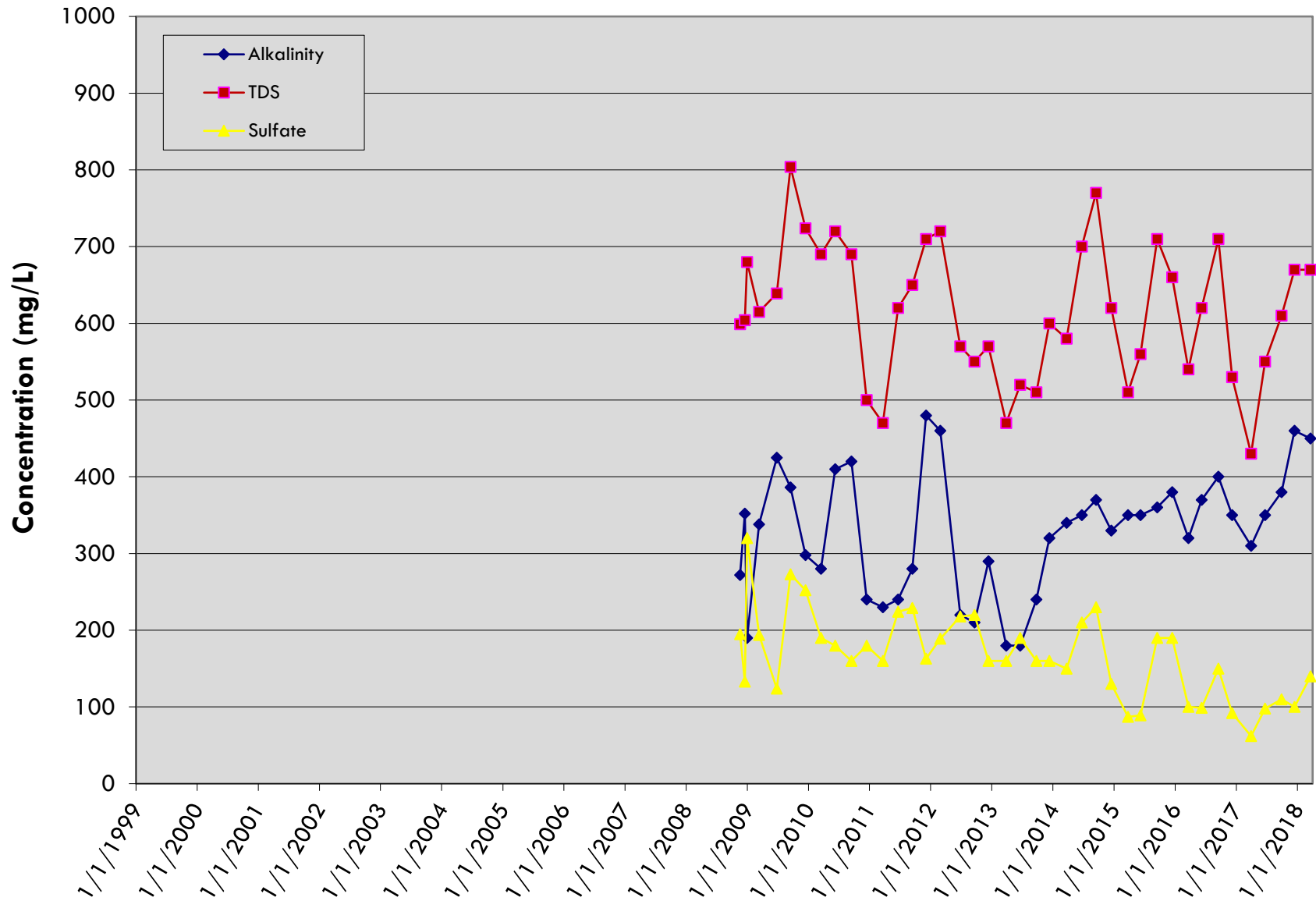
LDCS-4A

LRI Landfill, Pierce County, Washington



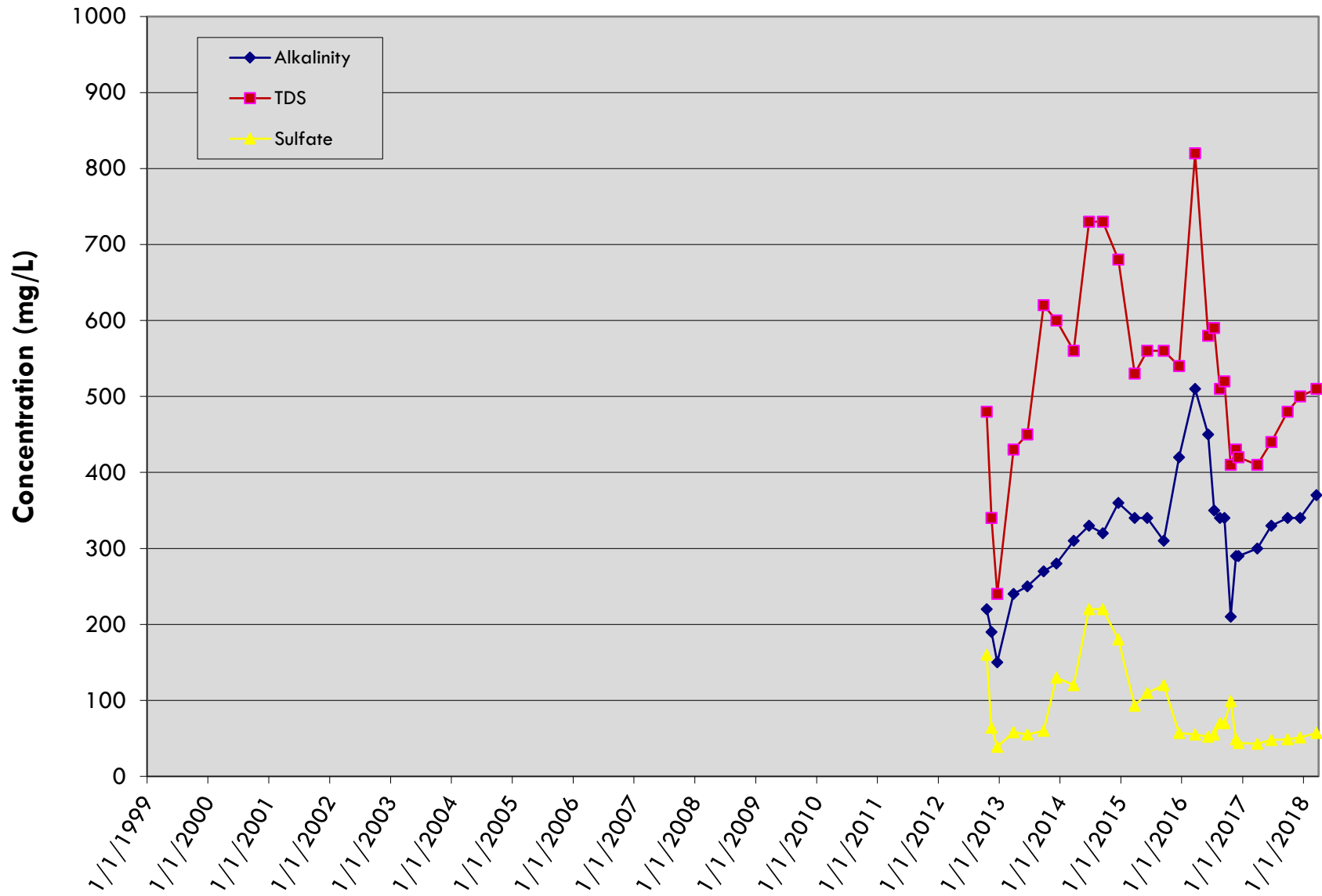
LDCS-4B

LRI Landfill, Pierce County, Washington



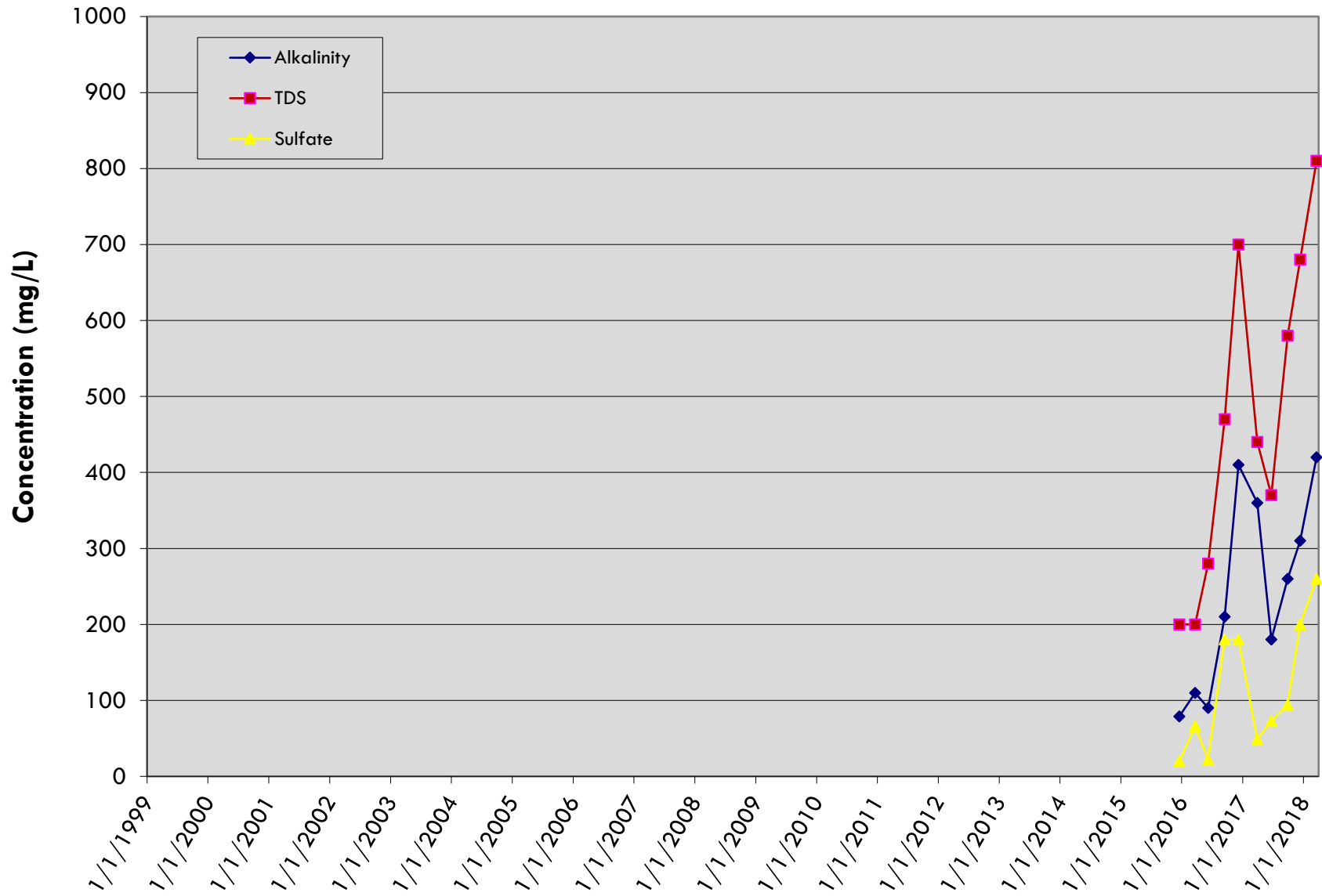
LDCS-5A

LRI Landfill, Pierce County, Washington



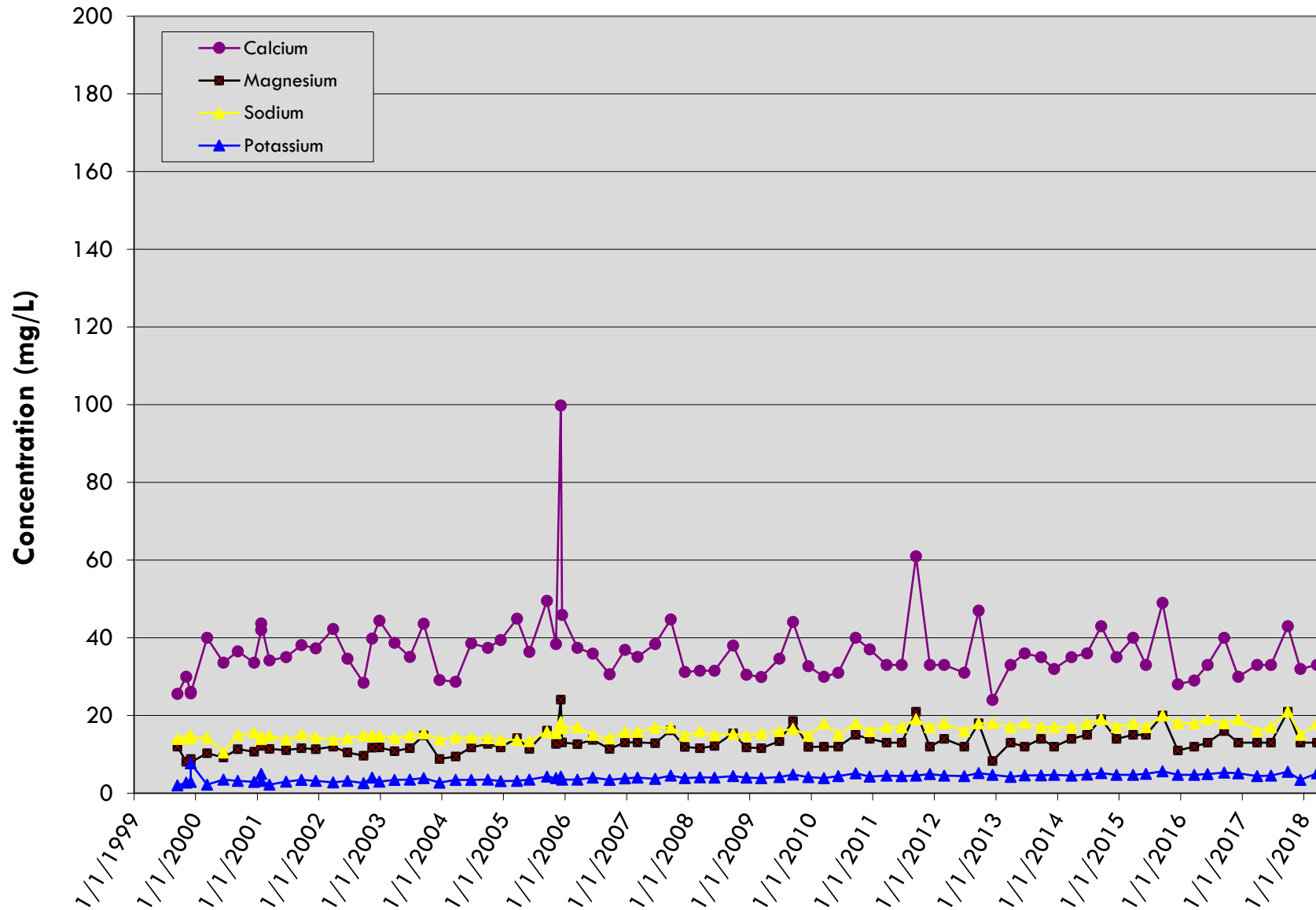
LDCS-6A

LRI Landfill, Pierce County, Washington



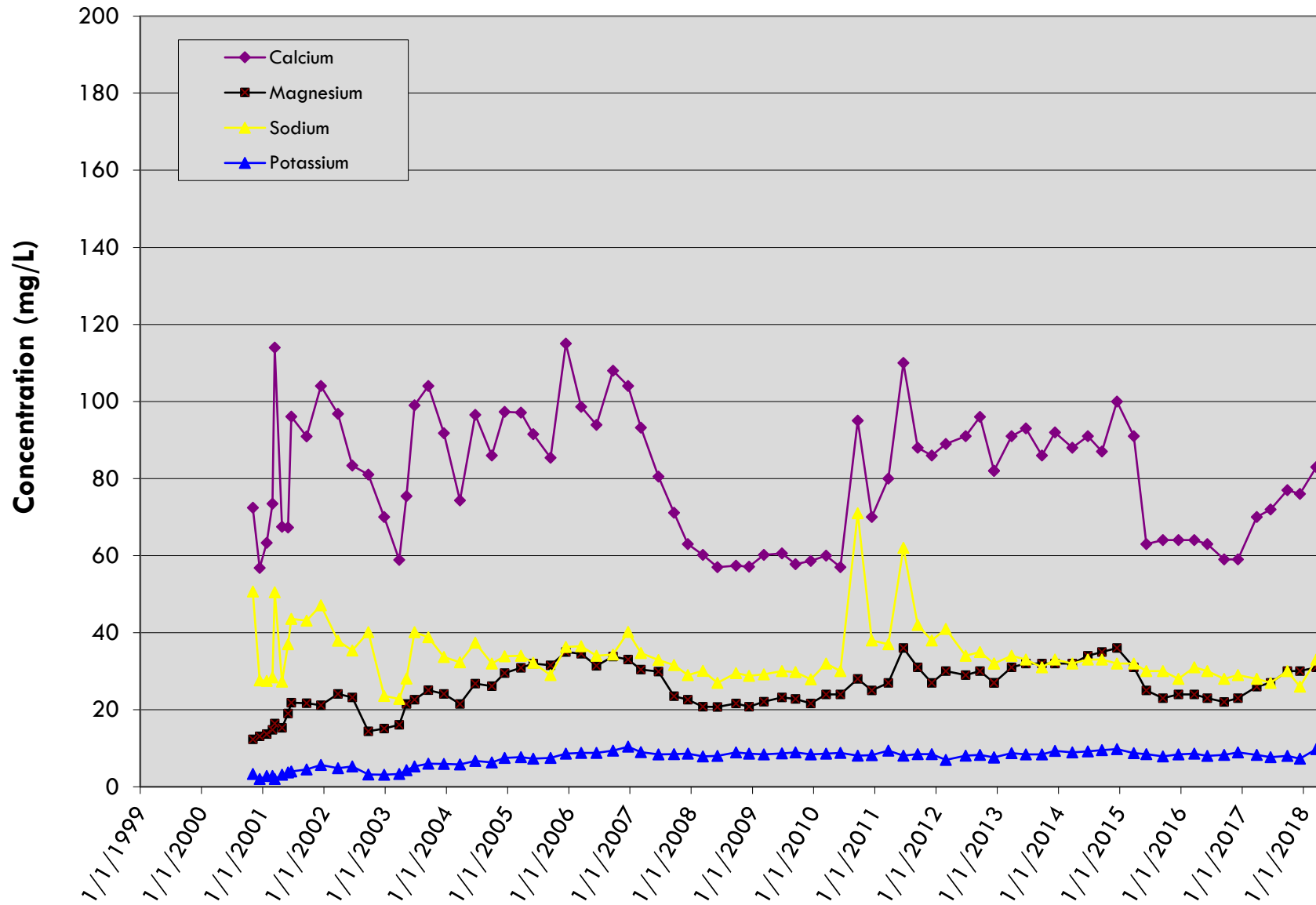
LDCS-1

LRI Landfill, Pierce County, Washington



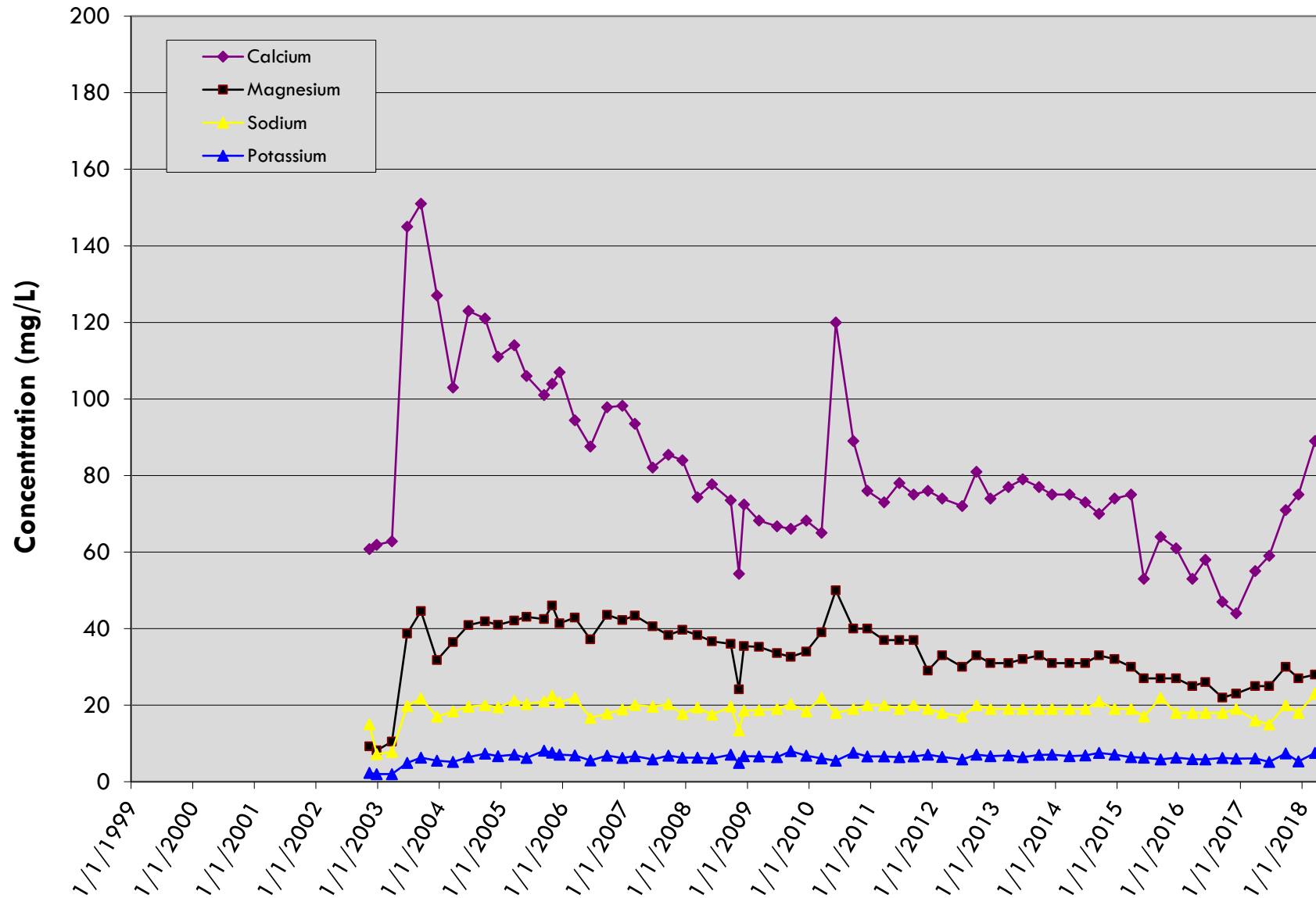
LDCS-2A

LRI Landfill, Pierce County, Washington



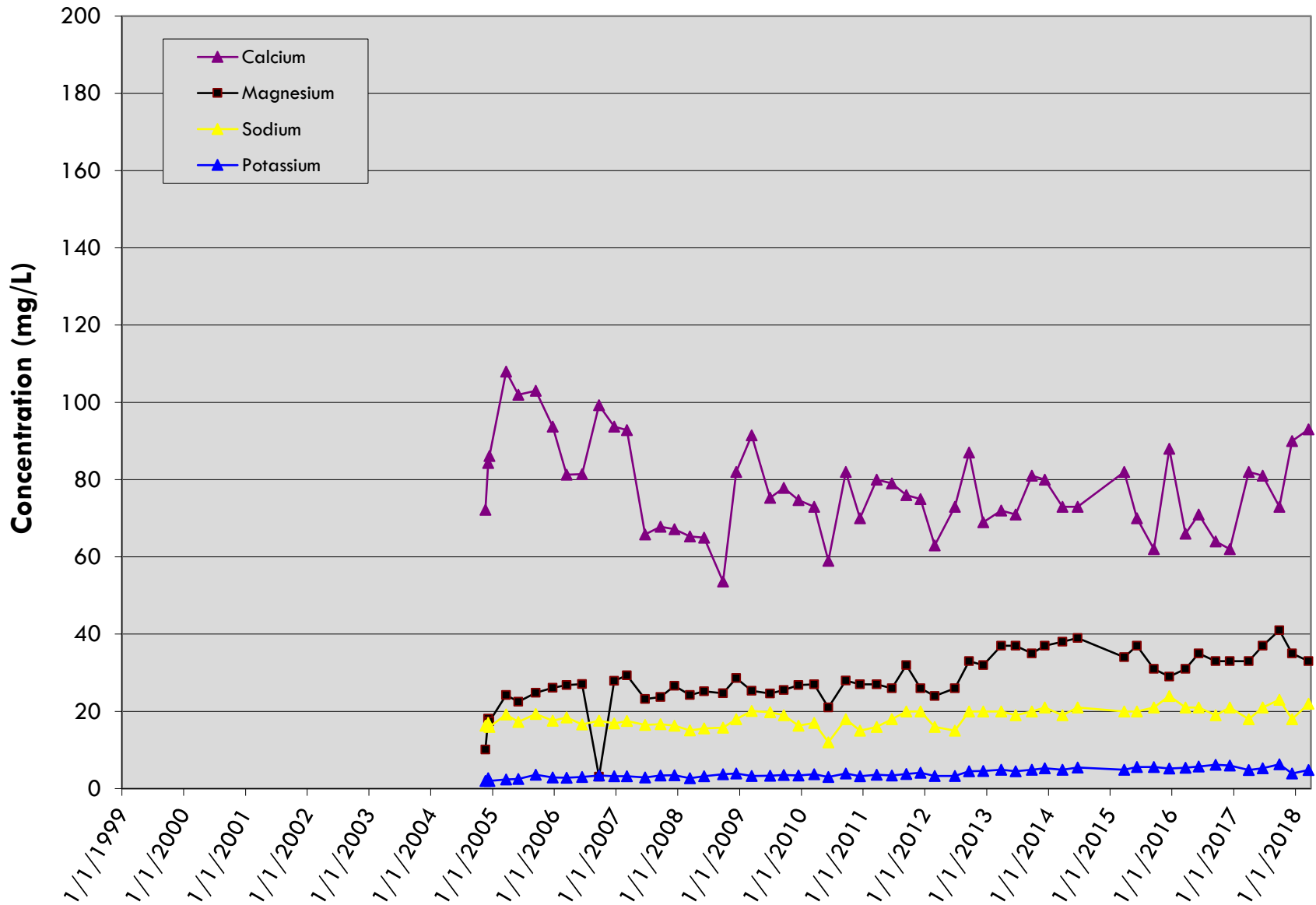
LDCS-2B

LRI Landfill, Pierce County, Washington



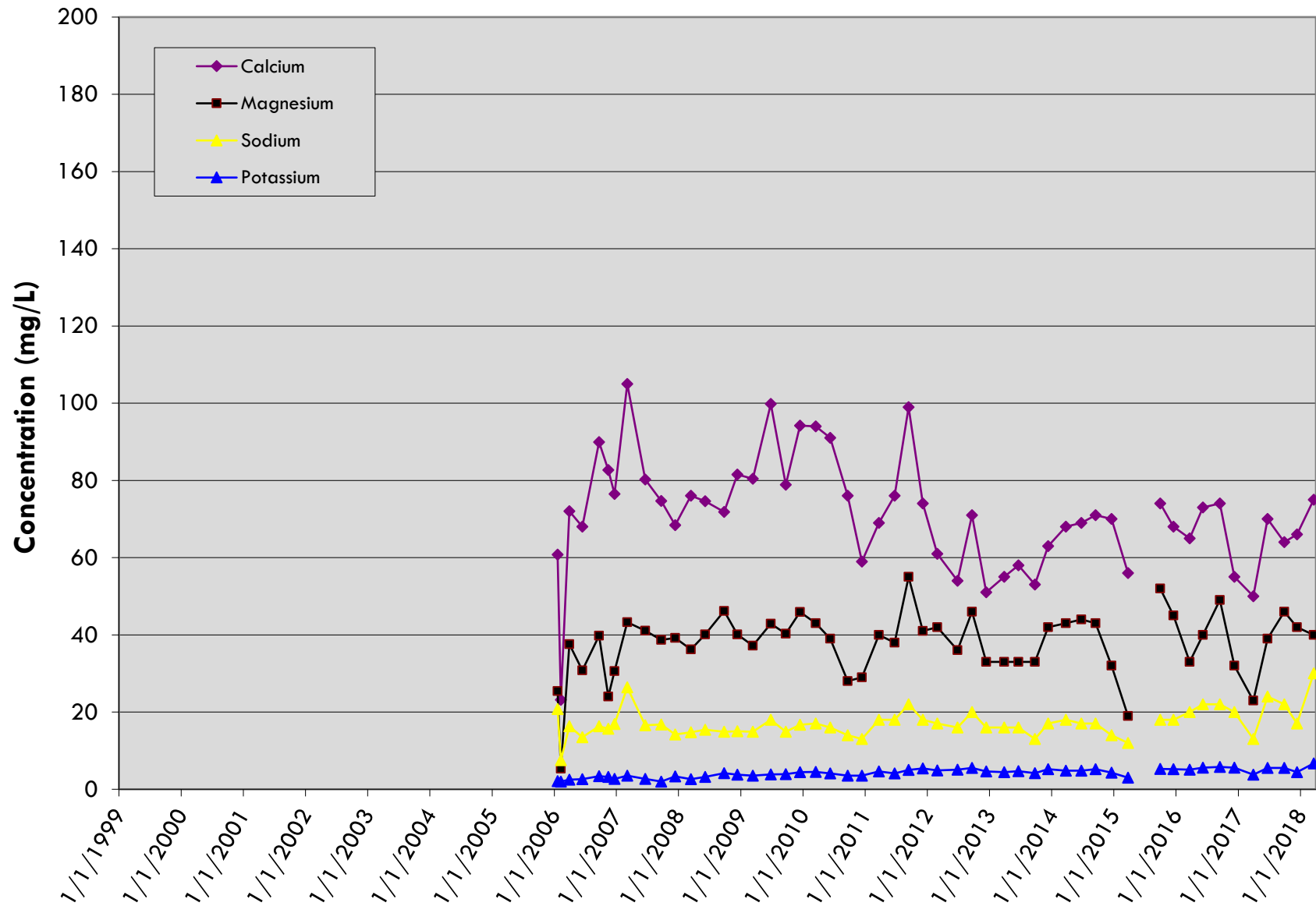
LDCS-3A

LRI Landfill, Pierce County, Washington



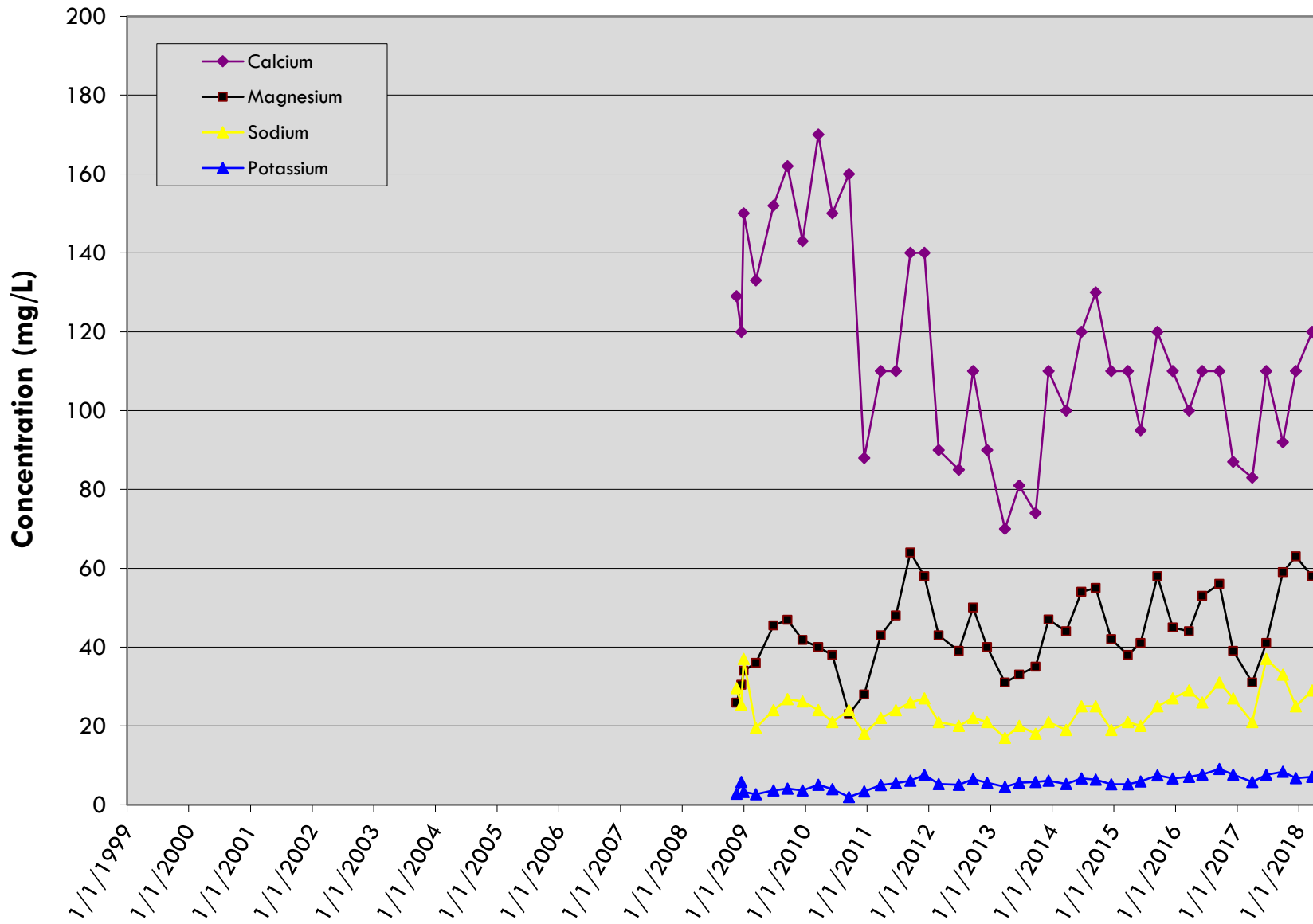
LDCS-4A

LRI Landfill, Pierce County, Washington



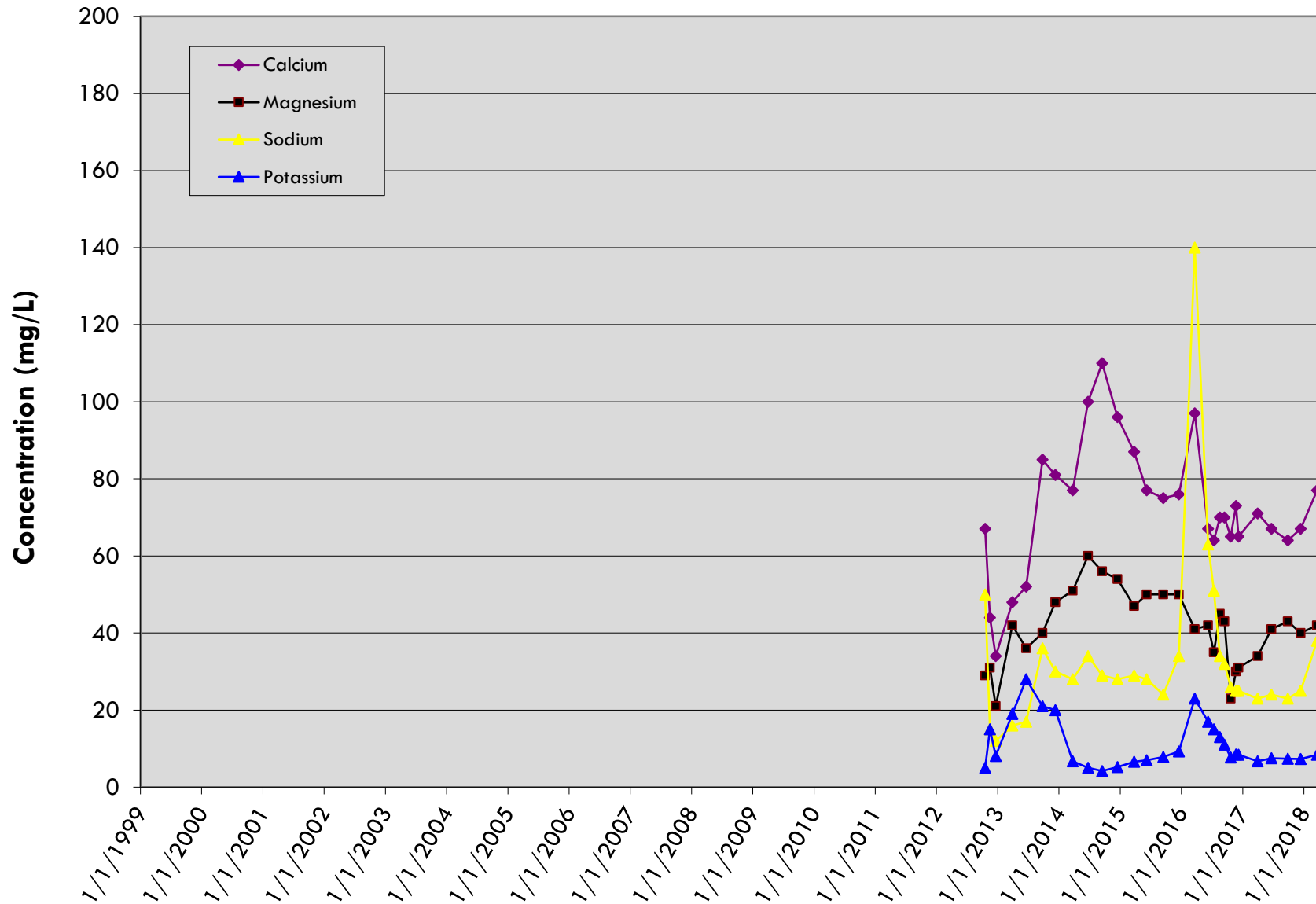
LDCS-4B

LRI Landfill, Pierce County, Washington



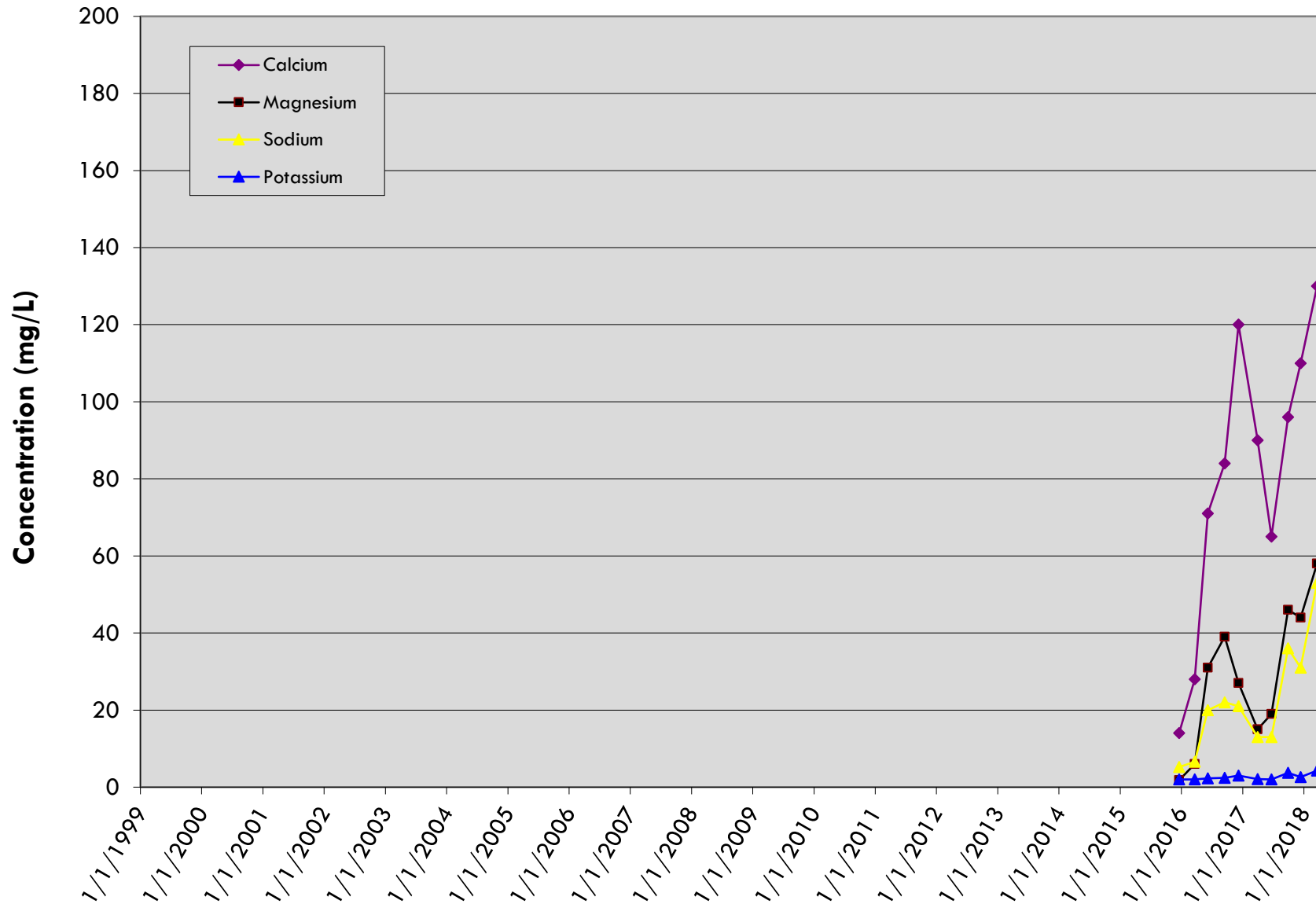
LDCS-5A

LRI Landfill, Pierce County, Washington



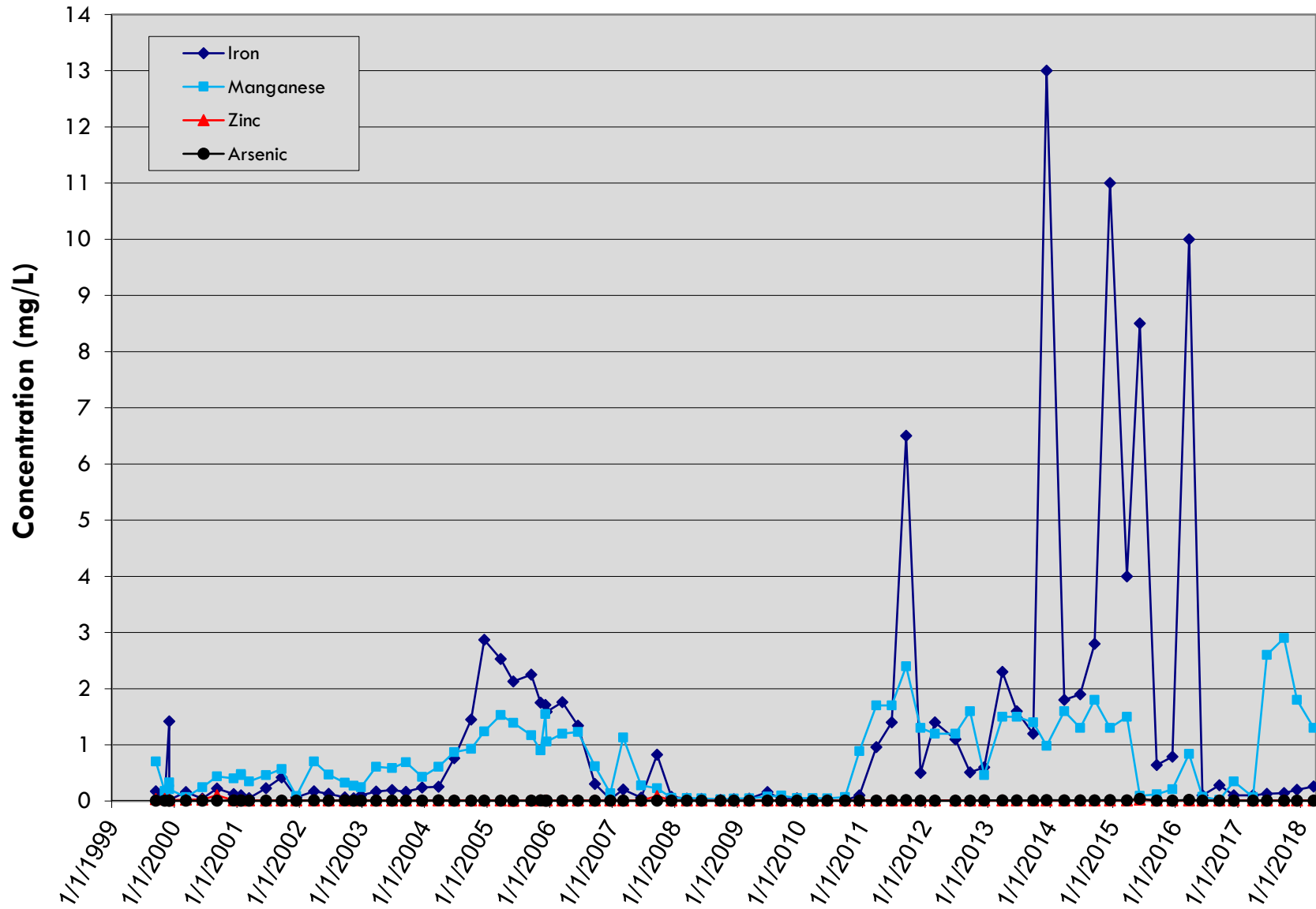
LDCS-6A

LRI Landfill, Pierce County, Washington



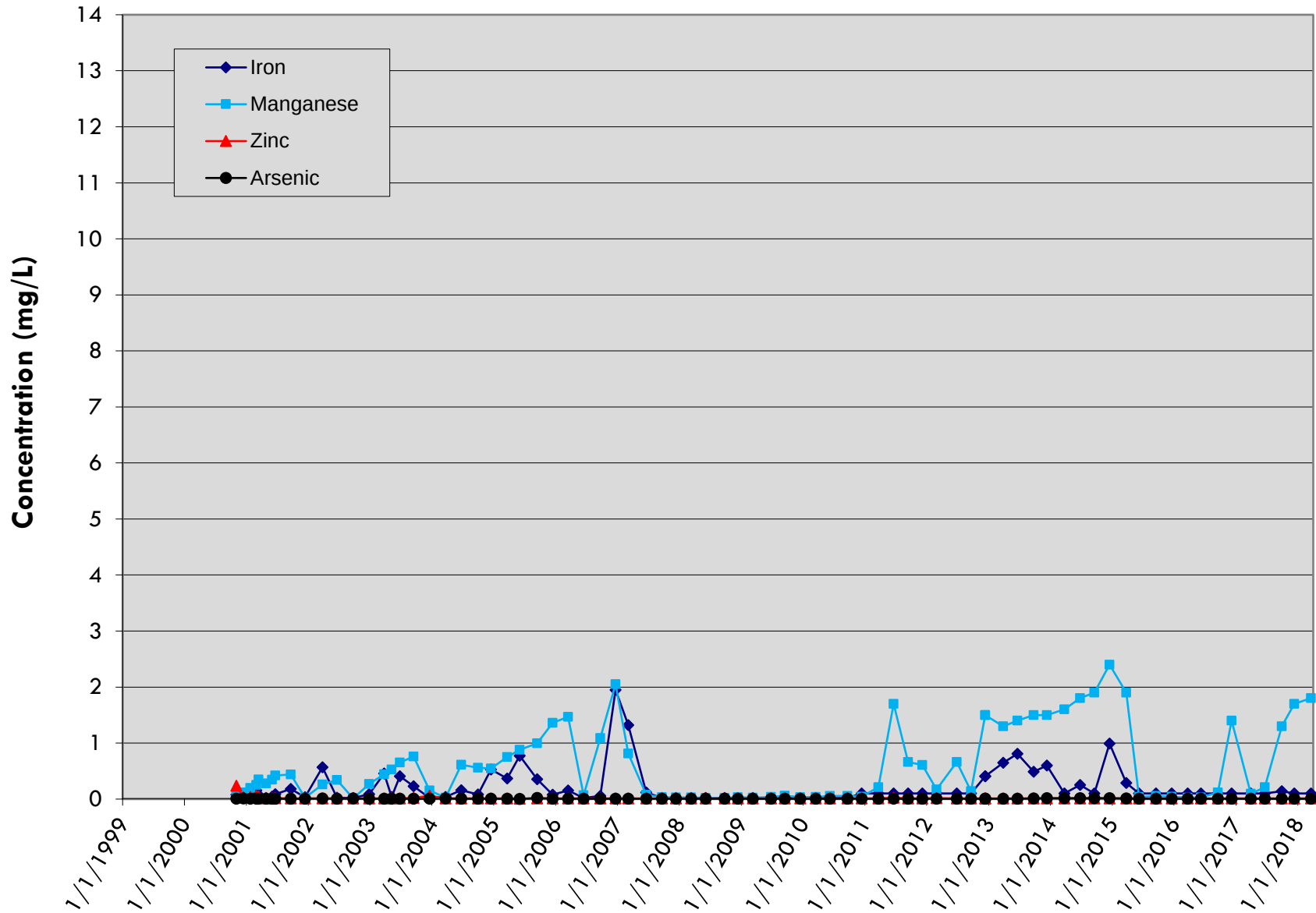
LDCS-1

LRI Landfill, Pierce County, Washington



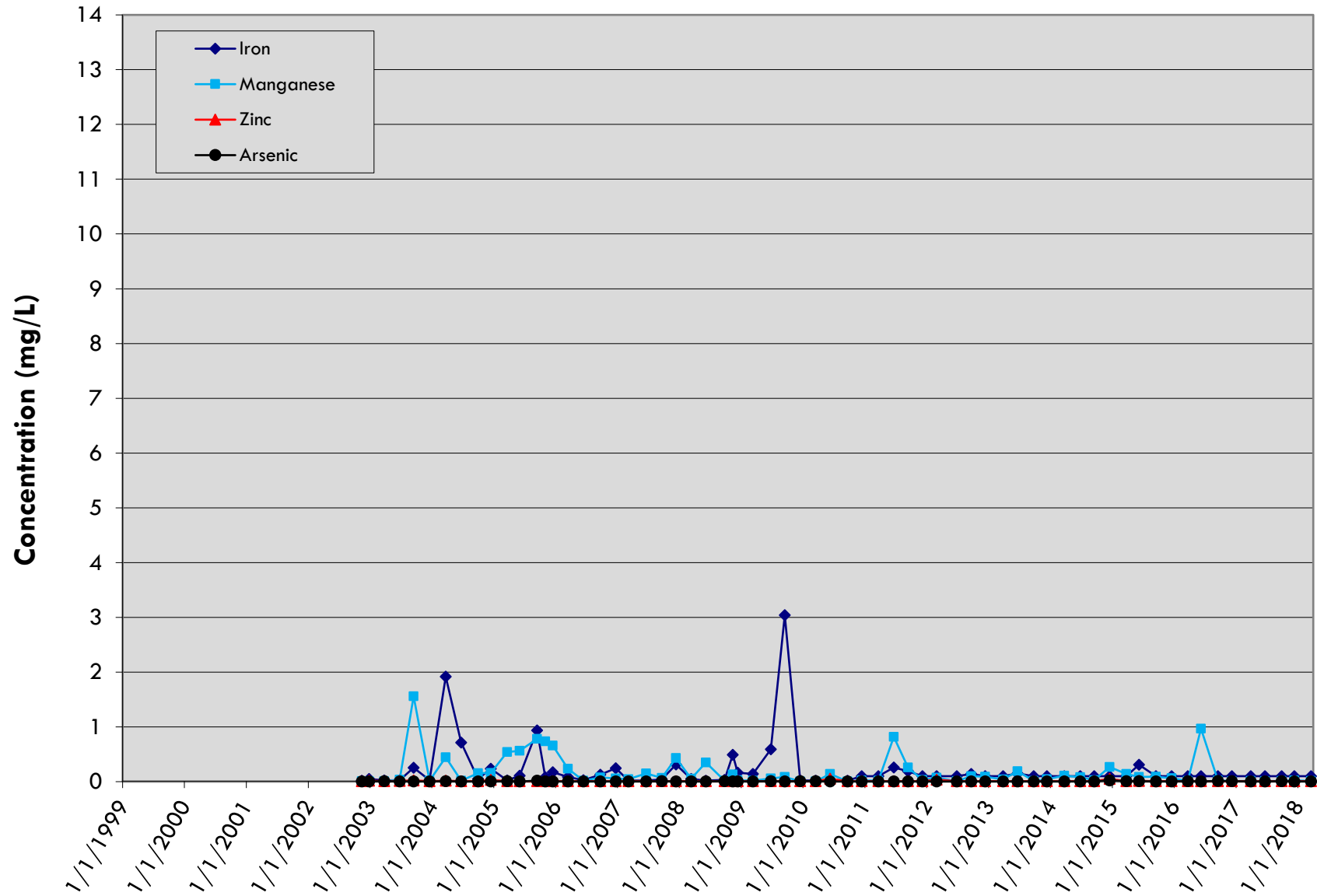
LDCS-2A

LRI Landfill, Pierce County, Washington



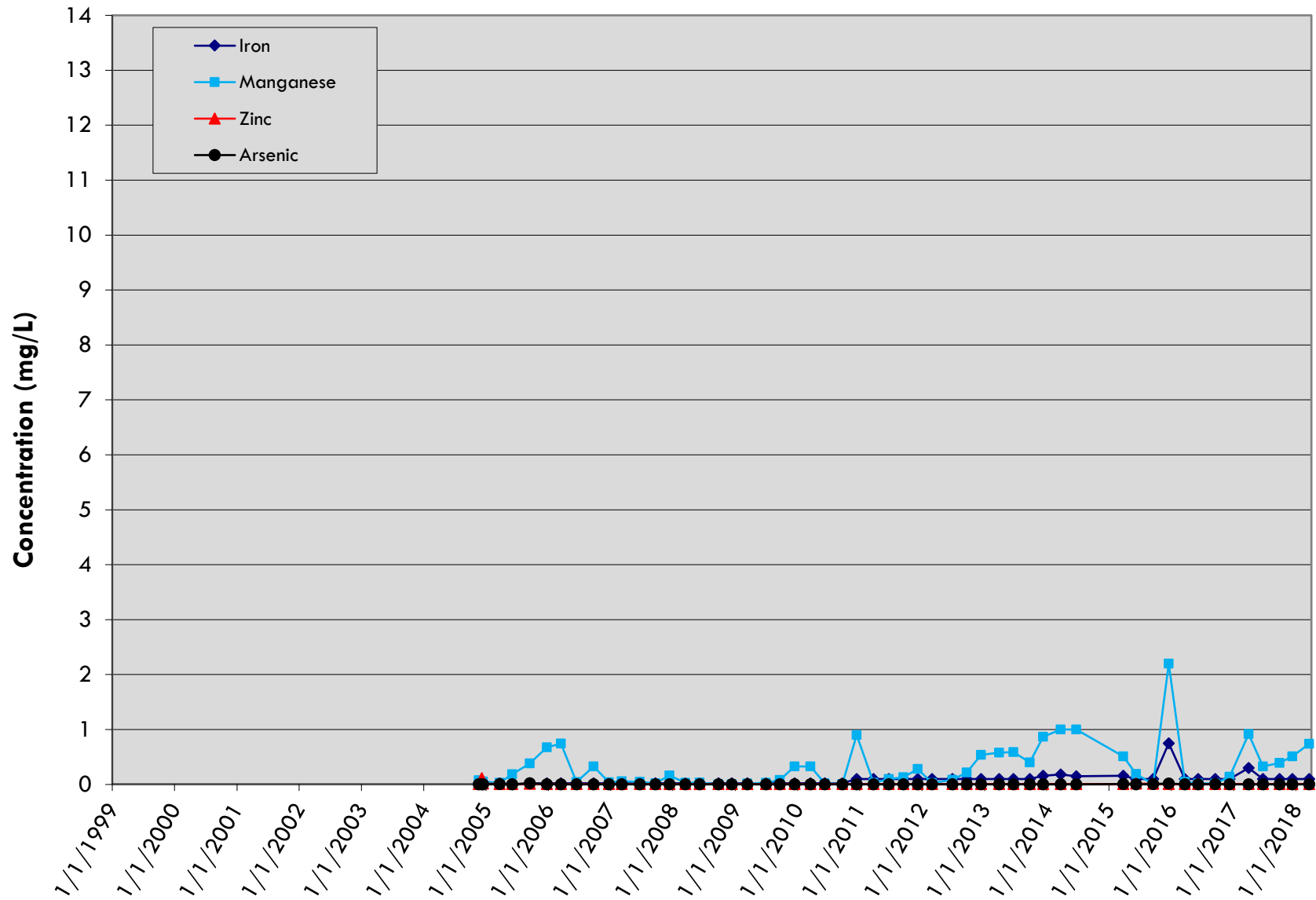
LDCS-2B

LRI Landfill, Pierce County, Washington



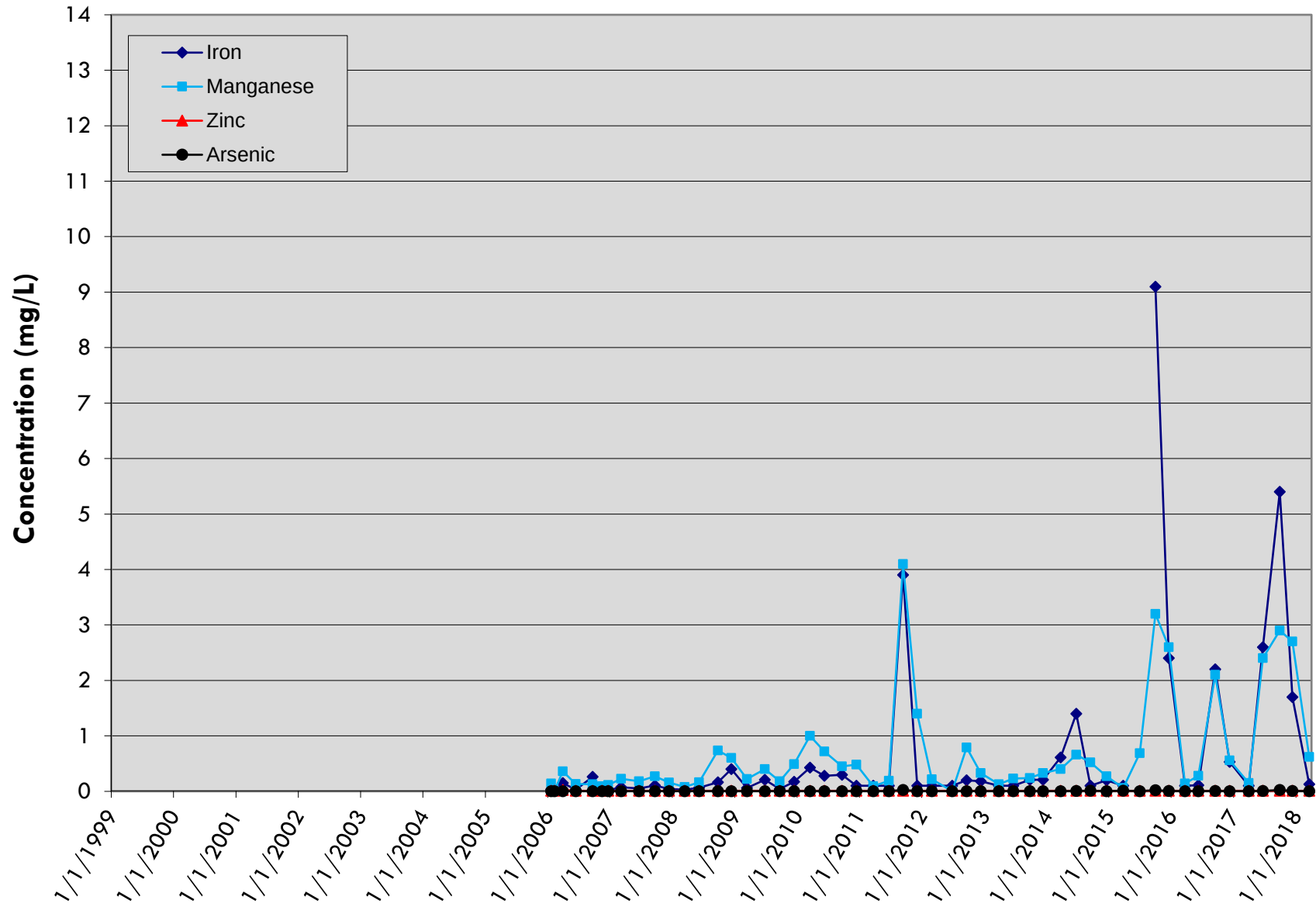
LDCS-3A

LRI Landfill, Pierce County, Washington



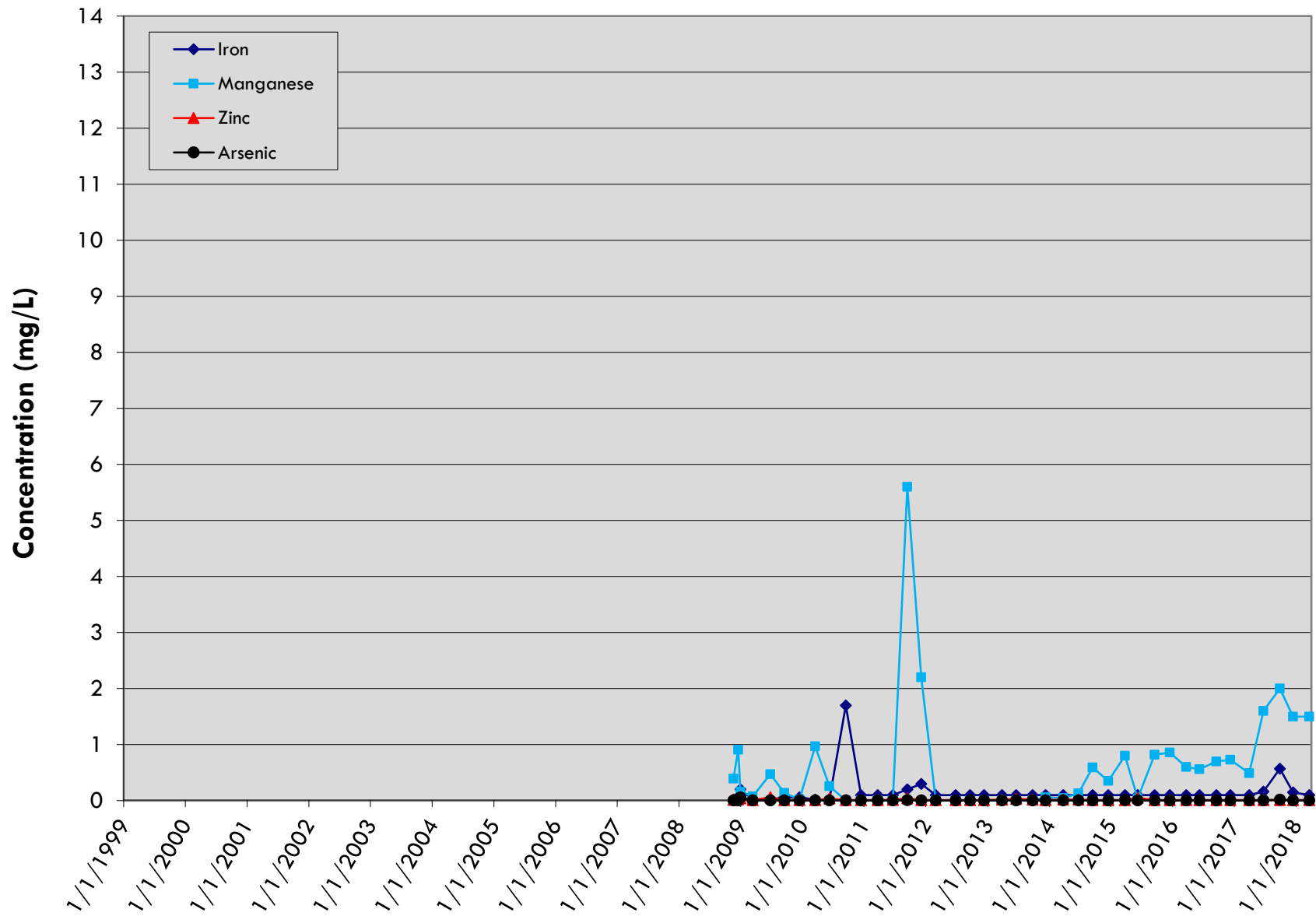
LDCS-4A

LRI Landfill, Pierce County, Washington



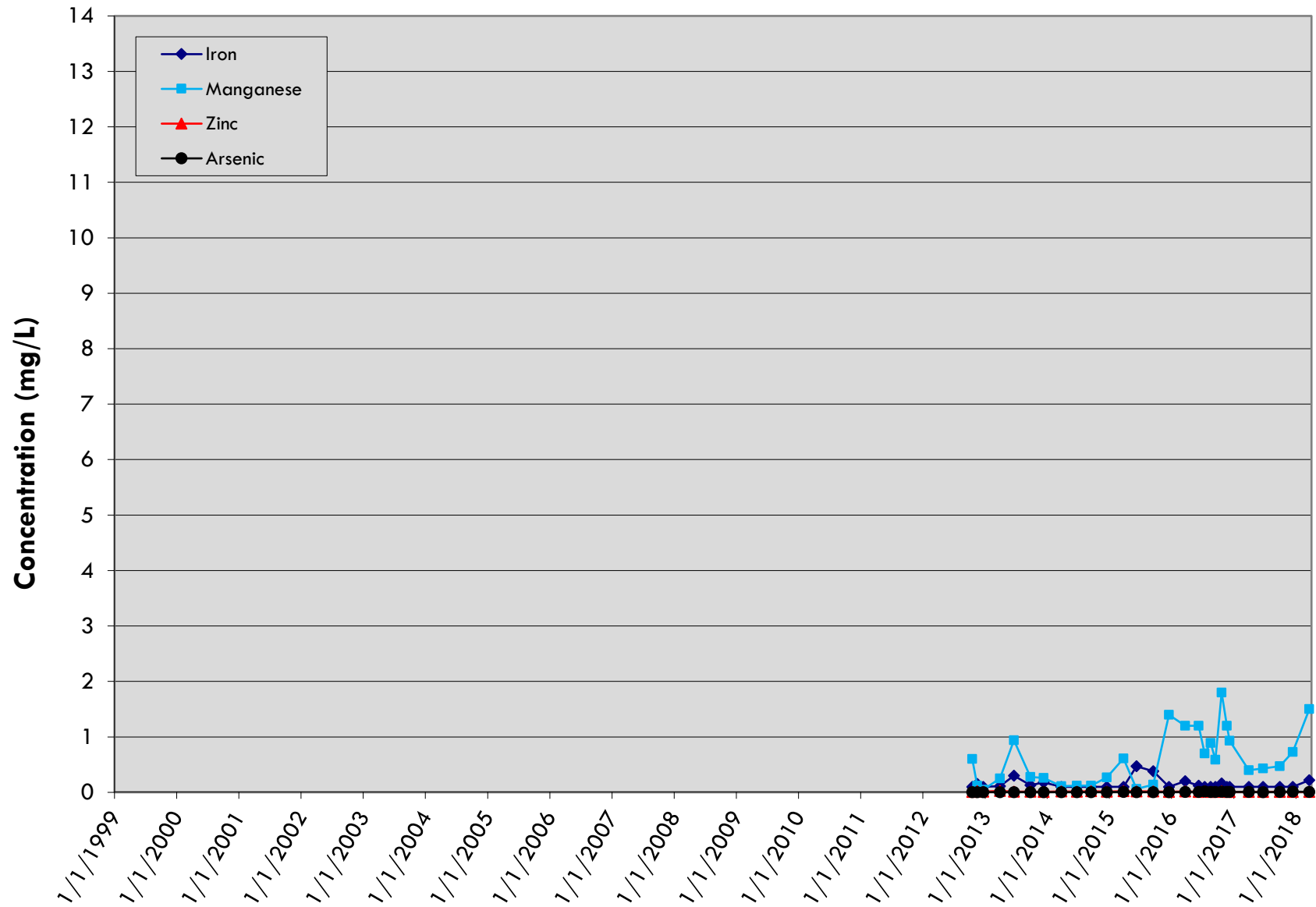
LDCS-4B

LRI Landfill, Pierce County, Washington



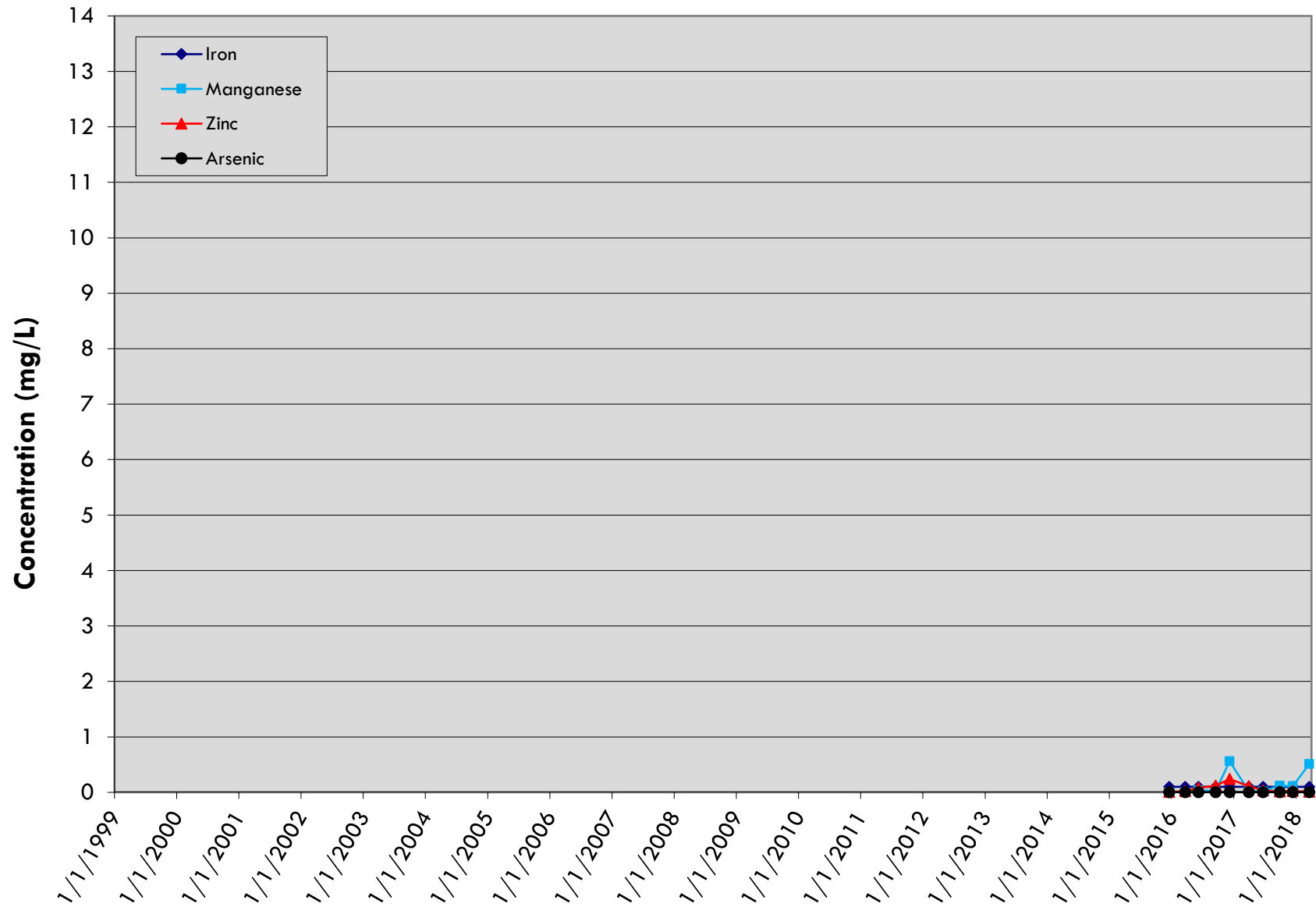
LDCS-5A

LRI Landfill, Pierce County, Washington



LDCS-6A

LRI Landfill, Pierce County, Washington



Appendix H
**LDCS Pumping Records and Conductivity
Measurements**

Summary of Leachate Volume and Depth Data
First Quarter 2018
LRI Landfill, Pierce County, Washington

Date	Cell 1 Leachate Volume (GPD)	Cell 1 Leachate Level (in.)	Cell 2A Leachate Volume (GPD)	Cell 2A Leachate Level (in.)	Cell 2B Leachate Volume (GPD)	Cell 2B Leachate Level (in.)	Cell 3A Leachate Volume (GPD)	Cell 3A Leachate Level (in.)	Cell 4A Leachate Volume (GPD)	Cell 4A Leachate Level (in.)	Cell 4B Leachate Volume (GPD)	Cell 4B Leachate Level (in.)	Cell 5 Leachate Volume (GPD)	Cell 5 Leachate Level (in.)	Cell 6 Leachate Volume (GPD)	Cell 6 Leachate Level (in.)
01/01/18	1,481	9.0	0	10.7	0	75.1	2,107	18.7	0	22.3	0	25.2	36,946	83.0	7,905	-
01/02/18	2	9.2	21	12.5	504	86.5	1,295	25.7	201	20.4	250	26.8	28,296	41.7	142	-
01/03/18	1	9.8	0	14.1	11,608	63.0	285	25.1	11,815	10.3	18,726	28.2	11,427	9.4	32,418	-
01/04/18	1	10.0	0	15.5	5,601	18.7	76	12.3	21,648	8.2	32,362	27.9	25,686	18.8	33,288	-
01/05/18	0	10.0	0	16.8	5,471	12.6	281	10.8	4,930	9.6	52,678	26.7	34,509	19.4	18,310	-
01/06/18	0	10.0	18,125	14.6	4,429	19.5	722	10.8	13,332	18.4	22,914	26.5	8,412	20.0	18,310	-
01/07/18	9	10.3	1	7.2	4,530	14.6	684	10.4	27,015	13.4	46,418	25.3	7,002	20.5	18,310	-
01/08/18	3	11.0	1	9.4	1,663	41.4	399	19.9	3,669	12.4	43,338	24.2	26,882	21.0	1,302	-
01/09/18	2	11.0	1	11.2	8,976	38.5	703	18.7	14,415	9.6	40,806	22.2	13,791	20.9	33,478	-
01/10/18	0	11.0	0	12.7	4,634	12.0	193	10.4	29,465	8.4	38,784	21.1	29,252	21.0	14,468	-
01/11/18	6	11.0	0	14.4	4,695	19.2	479	12.1	4,879	11.8	36,516	19.4	12,305	20.9	22,817	-
01/12/18	0	11.0	1	15.4	4,413	16.0	1,087	10.8	3	15.3	40,836	18.2	39,909	21.0	17,350	-
01/13/18	0	11.0	1,047	16.8	5,667	12.5	222	10.2	3,192	17.0	24,692	14.4	10,536	21.2	17,350	-
01/14/18	6	11.0	16,277	7.9	4,200	11.3	13	11.1	36,831	9.9	23,642	16.3	1,562	22.0	17,350	-
01/15/18	12	11.1	1	8.5	4,757	16.9	516	9.9	12,672	11.8	14,844	14.5	25,308	21.9	13,028	-
01/16/18	3	11.0	2	10.0	4,918	22.8	325	13.4	8,883	16.6	19,062	17.0	32,630	21.3	16,636	-
01/17/18	2	11.9	0	12.2	4,669	23.1	305	13.7	29,107	14.6	14,678	15.7	62,528	20.5	11,657	-
01/18/18	406	12.0	4	13.5	5,001	22.5	293	12.5	16,704	14.0	29,362	16.7	37,578	20.3	23,830	-
01/19/18	0	12.0	0	14.8	4,773	22.3	523	13.3	14,682	12.6	17,230	15.4	61,206	19.4	11,263	-
01/20/18	0	12.0	3,489	15.2	4,613	11.4	484	11.5	12,811	13.4	35,504	16.3	23,460	19.3	11,263	-
01/21/18	9	12.0	21	15.5	4,364	11.7	316	10.3	11,976	14.6	9,028	14.3	21,446	20.0	11,263	-
01/22/18	4,040	10.6	4,683	14.8	4,666	8.1	478	13.4	1,145	7.2	26,222	16.6	0	20.4	18,009	-
01/23/18	1	0.0	0	0.0	4,643	0.0	172	0.0	0	0.0	0	0.0	32,260	0.0	23,063	-
01/24/18	1	0.0	0	0.0	4,625	0.0	982	0.0	0	0.0	44,806	0.0	48,497	0.0	25,435	-
01/25/18	2	12.0	1	17.3	13,696	15.9	837	10.2	0	10.1	21,939	14.4	41,552	19.0	2	14.3
01/26/18	0	12.0	18,074	8.5	4,384	13.9	79	11.1	0	10.3	31,842	16.9	31,563	20.1	0	20.2
01/27/18	15	12.3	1	8.7	4,447	13.8	643	10.3	0	11.0	22,648	14.6	25,323	21.6	32,513	19.1
01/28/18	7,073	10.4	1	10.6	4,141	11.5	343	11.2	3,733	10.7	42,838	15.6	7,040	22.4	0	23.7
01/29/18	1,611	11.3	1,552	12.2	4,803	8.9	198	10.9	34,099	18.5	2,130	14.9	19,346	23.7	0	-
01/30/18	20	12.0	1	13.0	4,088	20.8	202	10.5	30,484	13.3	21,264	17.4	27,175	24.3	33,080	37.2
01/31/18	9	12.0	0	14.2	4,437	17.7	1,428	12.0	14,536	13.9	22,132	15.3	42,927	24.9	39,722	38.9
02/01/18	1,481	12.3	0	15.5	4,727	20.4	30	11.7	18,218	13.0	23,964	17.2	36,946	25.6	34,607	31.3
02/02/18	0	13.0	0	16.7	4,169	12.0	40	10.1	11,523	13.6	20,980	14.8	33,814	26.2	24,670	27.2
02/03/18	0	13.0	17,921	12.6	3,862	13.1	136	11.3	9,950	14.3	13,946	17.0	23,495	25.9	24,670	22.3
02/04/18	6	13.0	0	7.4	3,130	33.9	260	9.3	7,525	15.8	10,806	17.7	40,842	26.0	24,670	21.1
02/05/18	4	13.0	1	9.2	9,852	46.6	152	15.4	11,520	17.6	17,498	19.1	54,383	25.8	15,524	22.5
02/06/18	0	13.0	2	10.7	4,739	22.2	278	14.6	18,384	13.6	27,014	18.7	14,771	25.9	0	20.4
02/07/18	5	13.0	2	12.5	4,445	13.8	601	18.6	12,480	13.8	17,356	16.4	39,066	26.7	36,930	15.1
02/08/18	2	13.0	0	13.9	4,258	12.8	4	12.3	8,145	14.1	33,414	14.2	22,581	27.4	21,178	16.9
02/09/18	1,245	12.1	3,904	13.6	4,706	9.8	164	11.3	17,567	12.6	22,606	15.0	37,529	27.2	0	11.5
02/10/18	1,245	13.0	1	14.1	4,172	13.3	309	11.4	7,941	13.9	33,680	10.6	21,040	27.7	0	10.4
02/11/18	1,245	13.0	0	15.6	4,619	11.6	315	11.5	17,438	12.8	20,392	9.9	63,756	28.3	33,659	10.4
02/12/18	8	13.0	0	16.5	4,409	12.1	25	11.2	7,544	13.9	16,828	10.3	60,625	27.5	9,062	10.4
02/13/18	8,700	11.0	17,494	10.7	5,189	3.9	29	11.7	9,932	14.4	17,990	10.2	57,138	26.6	14,665	10.4
02/14/18	0	12.8	1	7.5	3,828	13.3	22	12.2	0	11.5	19,988	10.6	72,072	26.3	7,937	10.2
02/15/18	1	13.0	0	9.3	4,362	13.6	45	10.7	11,428	12.8	15,982	10.3	49,196	25.4	12,133	10.4
02/16/18	0	13.0	1	11.2	4,292	13.6	56	11.3	20,173	12.7	21,112	10.6	43,403	25.7	19,080	10.3
02/17/18	0	14.0	3	13.2	4,361	14.3	285	10.9	6,054	9.9	22,908	10.6	44,087	26.2	19,080	12.1
02/18/18	2	14.0	0	14.0	4,256	14.0	273	10.2	0	8.0	17,692	10.3	42,594	26.8	19,080	10.6
02/19/18	5,052	12.1	5,295	13.4	4,679	8.9	926	11.6	1,359	8.7	24,192	10.2	40,760	26.7	14,124	9.8
02/20/18	1,798	12.6	1,722	12.8	4,542	8.9	270	11.3	651	9.3	6,050	10.8	56,481	26.2	9,559	10.0
02/21/18	5,376	6.9	5,375	11.4	4,391	4.9	126	11.9	3,439	9.4	33,586	12.3	34,978	17.5	8,046	8.1
02/22/18	29,741	17.7	1	11.5	1,627	4.5	198	11.7	0	10.0	20,744	10.6	54,141	4.4	11,670	10.3
02/23/18	0	18.9	1	13.1	4,850	0.0	85	14.7	2	10.0	18,414	10.2	48,340	12.6	2,139	12.3
02/24/18	5,551	12.0	11,982	9.6	11,351	0.0	878	17.5	18,346	11.9	30,120	10.4	39,124	23.4	26,563	14.6
02/25/18	0	12.9	0	7.6	0	0.0	217	10.1	36,728	9.1	17,808	10.2	36,063	24.4	19,815	10.2
02/26/18	0	13.0	0	9.2	1	0.0	453	11.2	4,398	11.4	19,854	10.3	50,882	24.7	6,129	10.2
02/27/18	0	13.8	0	11.0	7,008	5.8	514	12.0	9,135	11.9	19,532	10.6	47,852	24.6	9,732	10.7
02/28/18	0	14.0	0	12.9	9,469	12.8	218	11.6	25,604	10.2	20,346	10.5	52,899	24.6	13,258	10.6

Summary of Leachate Volume and Depth Data
First Quarter 2018
LRI Landfill, Pierce County, Washington

03/01/18	0	14.4	1	14.4	25	16.7	311	11.9	28,208	11.6	22,318	10.9	31,228	24.3	8,788	10.4
03/02/18	0	14.5	0	15.5	0	17.0	529	12.1	0	13.7	19,570	10.4	16,530	23.7	0	10.6
03/03/18	0	14.8	2	16.7	7,907	15.6	464	11.6	17,424	13.4	21,392	10.4	10,280	23.9	0	10.6
03/04/18	0	15.0	16,231	9.4	7,436	15.2	364	11.4	2	13.4	16,590	10.3	13,588	24.2	35,115	11.3
03/05/18	1,150	14.4	1	8.5	1,855	15.9	716	11.2	860	15.0	14,982	10.3	16,458	24.1	7,952	10.2
03/06/18	2,964	13.9	1,956	9.5	5,132	11.9	757	11.1	2,527	15.5	18,944	10.5	11,608	24.0	12,368	10.0
03/07/18	2,274	14.3	1,622	9.9	9,251	13.2	676	11.2	2,688	16.3	20,776	10.6	13,050	24.2	11,149	9.9
03/08/18	0	15.0	0	11.2	1	14.1	96	11.4	41,170	16.0	25,936	10.4	14,160	23.7	17,186	11.2
03/09/18	0	15.0	0	11.9	0	14.7	459	10.7	29,330	11.3	18,412	10.5	15,016	22.6	0	12.6
03/10/18	0	15.0	0	12.6	0	15.5	823	8.9	16,279	12.8	14,492	10.2	3,952	21.7	0	7.2
03/11/18	0	15.0	0	14.0	13,396	14.6	346	11.7	13,808	12.6	15,076	11.2	20,522	21.8	40,894	13.0
03/12/18	0	15.5	2	15.5	3,541	14.9	733	11.7	6,302	12.5	10,678	10.2	16,720	21.0	7,410	9.1
03/13/18	0	16.0	0	16.5	0	12.9	378	11.6	0	9.0	0	10.0	0	20.0	28,725	17.8
03/14/18	0	16.0	18,433	13.0	4,762	14.9	360	10.8	4,756	10.8	51,142	10.0	17,952	20.0	4,929	6.7
03/15/18	1	16.0	1	7.6	2	14.9	651	10.4	20,823	12.6	18,246	10.3	7,092	19.4	9,944	12.1
03/16/18	0	16.0	0	9.4	0	14.9	293	11.0	0	11.5	0	10.4	0	19.3	11,362	11.6
03/17/18	0	16.0	0	10.9	0	12.8	593	11.5	10,548	13.0	18,886	10.6	10,358	18.4	16,681	9.7
03/18/18	1	16.0	2	12.5	8,576	16.9	1,221	12.2	11,253	14.1	11,694	10.4	6,608	17.9	11,845	11.0
03/19/18	0	16.0	0	13.7	5,485	13.7	0	10.6	9,421	12.5	23,012	10.1	9,372	17.2	5,523	5.4
03/20/18	0	16.0	0	15.4	7,406	15.6	247	10.9	10,560	13.0	16,896	10.4	9,304	16.3	14,546	10.9
03/21/18	0	16.0	0	16.6	2,708	13.0	363	11.1	16,304	12.7	19,456	10.6	10,402	15.2	46	7.1
03/22/18	5	16.0	16,995	9.4	0	12.9	0	11.4	9,263	13.0	23,260	10.6	8,572	14.4	35,583	13.9
03/23/18	0	16.0	0	8.2	0	13.9	0	10.7	6	14.4	0	10.3	0	14.1	155	6.8
03/24/18	0	16.0	0	9.7	0	14.8	665	11.9	15,739	11.0	19,198	10.4	9,304	13.5	25,395	12.6
03/25/18	2	16.0	0	11.4	23,278	14.2	337	11.4	8,036	14.3	20,648	10.4	10,270	13.1	15,424	8.8
03/26/18	0	16.0	0	12.6	4,771	12.5	0	10.9	10,571	12.4	13,988	10.2	11,158	12.1	27,042	13.4
03/27/18	0	16.0	0	13.9	3	16.6	149	10.9	15,269	14.5	18,246	10.4	17,994	10.2	1,733	5.6
03/28/18	0	16.1	0	15.2	5,288	14.1	31	11.3	11,282	12.9	13,788	10.1	8,556	8.1	19,590	11.2
03/29/18	0	16.6	1	16.5	3,147	15.5	0	11.3	0	13.9	0	10.6	0	5.5	0	7.0
03/30/18	0	17.0	17,479	13.8	0	12.5	0	10.6	9,208	14.1	16,690	10.3	25,532	2.4	17,193	12.2
03/31/18	0	17.0	0	7.5	0	15.9	0	10.9	0	12.7	0	10.3	0	2.4	5,371	6.1

Summary of LDCS Volumes Pumped and Conductivity Data
First Quarter 2018
LRI Landfill, Pierce County, Washington

Date	Rainfall	LDCS-1 Vol. (Gal.)	LDCS-1 Cond. (µS/cm)	LDCS-2A Vol. (Gal)	LDCS-2A Cond. (µS/cm)	LDCS-2B Vol. (Gal)	LDCS-2B Cond. (µS/cm)	LDCS-3A Vol. (Gal)	LDCS-3A Cond. (µS/cm)	LDCS-4A Vol. (Gal)	LDCS-4A Cond. (µS/cm)	LDCS-4B Vol. (Gal)	LDCS-4B Cond. (µS/cm)	LDCS-5 Vol. (Gal)	LDCS-5 Cond. (µS/cm)	LDCS-6 Vol. (Gal)	LDCS-6 Cond. (µS/cm)
01/01/18	0.00	--	307	1020	646	1000	239	650	450	2,410	528	--	988	0	995	10831	-
01/02/18	0.00	--	302	0	647	900	238	0	495	2,200	552	--	1,030	0	941	1588	-
01/03/18	0.01	--	308	990	644	1050	240	1050	540	2,210	570	--	1,065	53	685	1351	-
01/04/18	0.14	--	314	0	645	850	242	1660	364	2,200	585	--	1,093	0	845	1319	-
01/05/18	0.25	--	330	990	646	1050	243	2570	357	3,180	604	--	1,114	0	910	0	-
01/06/18	0.03	--	326	1010	644	850	241	1740	506	3,140	600	--	1,125	0	933	0	-
01/07/18	0.45	--	340	0	641	1050	240	2000	571	3,670	590	--	1,131	0	935	4658	-
01/08/18	0.22	--	215	1020	634	1050	244	940	595	4,280	578	--	1,139	127	931	1926	-
01/09/18	0.16	--	263	1010	305	1050	248	1390	601	5,650	562	--	1,147	1485	916	2168	-
01/10/18	0.45	--	448	0	438	1000	246	800	605	3,400	552	--	1,155	654	891	382	-
01/11/18	1.27	--	536	1020	277	1050	243	2200	608	7,240	554	--	1,162	1567	868	3805	-
01/12/18	0.01	--	449	920	447	900	243	2450	603	3,850	543	--	1,169	738	853	0	-
01/13/18	0.02	--	440	0	575	1000	241	2330	607	2,920	546	--	1,173	502	844	6578	-
01/14/18	0.01	--	382	1010	622	900	243	2600	610	2,670	558	--	1,176	404	843	0	-
01/15/18	0.04	--	364	1020	639	1000	245	1900	614	2,590	574	--	1,178	357	846	1740	-
01/16/18	0.10	--	350	0	646	1050	245	1510	616	2,570	592	--	1,183	404	850	1540	-
01/17/18	0.18	--	352	1010	647	1050	244	1960	617	3,120	606	--	1,187	393	852	1533	-
01/18/18	0.45	--	364	1010	646	1000	245	600	615	4,530	599	--	1,190	619	856	1698	-
01/19/18	0.06	--	369	0	643	1050	243	830	614	3,590	581	--	1,191	636	859	0	-
01/20/18	0.10	--	471	1010	642	900	241	1270	617	3,990	573	--	1,193	648	862	0	-
01/21/18	0.25	--	427	1010	644	1000	243	1300	620	3,370	566	--	1,196	554	864	5205	-
01/22/18	0.67	--	378	0	644	1050	245	760	623	3,350	568	--	1,198	701	866	1585	-
01/23/18	0.52	--	--	1015	--	1033	--	223	--	4,003	--	--	--	943	--	1647	-
01/24/18	0.53	--	--	0	--	1033	--	285	--	4,003	--	--	--	943	--	1964	-
01/25/18	0.25	--	428	1015	639	1033	248	140	610	4,003	558	--	1,206	943	865	235	999
01/26/18	0.41	--	501	1010	640	1050	244	0	608	3,440	554	--	1,206	735	864	0	995
01/27/18	0.12	--	452	0	640	1000	243	730	605	3,480	550	--	1,206	631	861	5669	978
01/28/18	0.09	--	231	1010	372	1050	143	1450	353	2,790	321	--	1,210	522	856	0	972
01/29/18	0.72	--	281	1010	405	1050	156	1510	263	3,390	359	--	1,211	619	854	0	--
01/30/18	0.11	--	434	0	548	1050	215	410	328	3,590	483	--	1,207	994	853	4078	--
01/31/18	0.03	2,430	521	1020	604	900	232	740	339	3,350	522	264	1,192	716	853	1820	--
02/01/18	0.00	3,700	484	1010	620	1050	238	1440	336	3,890	537	23,835	1,163	930	852	1690	776
02/02/18	0.68	3,900	441	0	634	1050	243	2020	500	5,420	539	48,003	1,232	1243	849	0	905
02/03/18	0.25	4,010	435	1010	640	1050	243	2020	556	4,180	538	47,735	1,328	616	843	0	946
02/04/18	0.08	4,070	544	0	642	1000	245	2010	578	4,430	551	46,806	1,435	480	833	5518	960
02/05/18	0.03	4,100	557	1020	641	1200	246	1610	588	4,240	566	45,862	1,547	435	827	1678	973
02/06/18	0.04	3,970	511	1010	637	1050	243	1850	314	3,800	583	24,395	1,634	390	823	0	988
02/07/18	0.01	3,970	435	0	637	1000	241	1350	223	3,600	609	111	1,655	351	823	2853	996
02/08/18	0.00	4,080	409	1010	639	1050	244	1130	218	3,580	628	--	1,615	346	826	1417	998
02/09/18	0.02	3,980	424	1020	639	1050	245	770	349	3,390	636	--	1,544	303	831	0	999
02/10/18	0.01	3,990	427	0	639	1050	242	650	519	3,170	641	--	1,487	347	837	0	1000
02/11/18	0.00	4,240	396	1010	638	1200	244	470	584	3,170	641	--	1,429	347	844	4112	1000
02/12/18	0.01	3,860	366	1010	638	1050	245	470	610	2,960	638	--	1,365	346	851	1314	1000
02/13/18	0.00	3,930	346	0	639	1000	242	780	623	2,810	635	--	1,296	348	859	1315	1000
02/14/18	0.10	4,070	375	1020	640	1050	244	90	629	3,770	631	--	1,244	567	867	1367	1000
02/15/18	0.17	3,780	344	0	641	1050	244	310	631	3,350	628	743	1,198	626	874	1318	1000
02/16/18	0.15	3,790	353	1020	641	1050	243	840	629	6,020	623	1,004	1,163	2269	879	0	1000
02/17/18	0.41	4,160	426	1020	636	1200	248	920	612	6,890	611	1,445	1,123	2141	879	0	1000
02/18/18	0.71	4,460	527	170	638	1150	248	0	597	4,660	590	1,879	1,091	1154	873	5894	1000
02/19/18	0.03	2,320	435	840	640	1200	243	350	594	3,610	581	1,948	1,060	759	866	1969	1000
02/20/18	0.00	--	376	1020	642	1050	237	0	595	2,980	582	2,176	1,048	614	861	1859	1000
02/21/18	0.05	--	240	0	643	1050	237	0	586	2,840	585	1,641	1,037	580	857	1705	1000
02/22/18	0.02	--	222	1010	643	1000	239	450	530	2,700	584	1,223	1,032	1131	853	1646	1000
02/23/18	0.08	--	296	1020	644	1050	238	0	465	2,960	587	--	1,043	850	851	1575	1000
02/24/18	0.23	--	104	0	644	1200	242	890	417	3,780	585	--	1,066	1358	853	1959	1000
02/25/18	0.39	--	248	1020	645	1200	244	0	402	5,320	585	--	1,099	1691	863	1751	1000
02/26/18	0.00	--	293	1020	644	1050	242	1510	404	3,610	583	--	1,131	762	874	1987	1000
02/27/18	0.00	--	303	0	643	1000	238	1410	419	3,010	586	--	1,156	487	880	1759	1000
02/28/18	0.00	--	328	1030	644	1200	241	2350	449	3,290	586	--	1,126	394	884	1876	1000

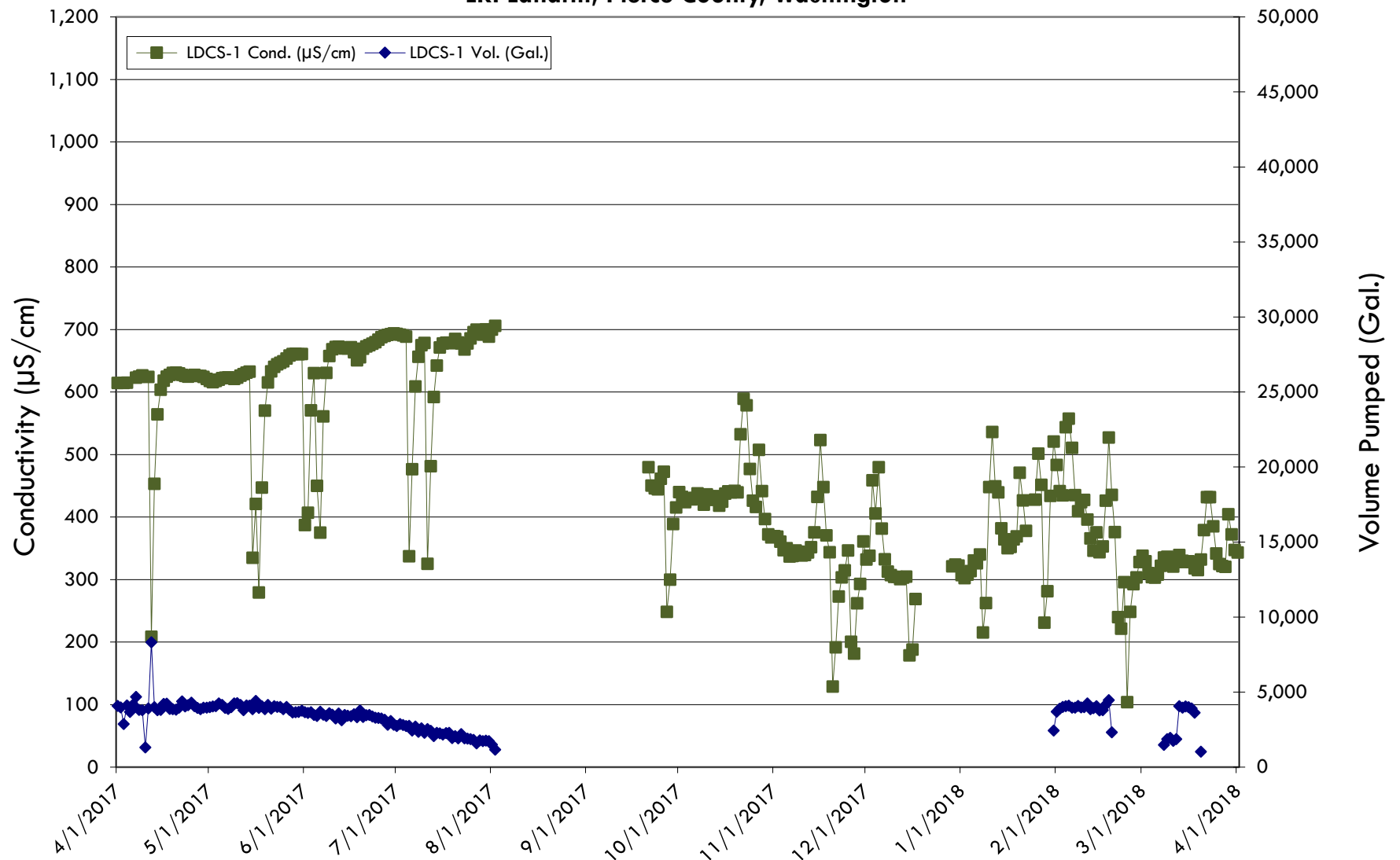
Summary of LDCS Volumes Pumped and Conductivity Data
First Quarter 2018
LRI Landfill, Pierce County, Washington

Date	Rainfall	LDCS-1 Vol. (Gal.)	LDCS-1 Cond. (µS/cm)	LDCS-2A Vol. (Gal)	LDCS-2A Cond. (µS/cm)	LDCS-2B Vol. (Gal)	LDCS-2B Cond. (µS/cm)	LDCS-3A Vol. (Gal)	LDCS-3A Cond. (µS/cm)	LDCS-4A Vol. (Gal)	LDCS-4A Cond. (µS/cm)	LDCS-4B Vol. (Gal)	LDCS-4B Cond. (µS/cm)	LDCS-5 Vol. (Gal)	LDCS-5 Cond. (µS/cm)	LDCS-6 Vol. (Gal)	LDCS-6 Cond. (µS/cm)
03/01/18	0.06	--	338	1020	644	1200	245	1530	491	3,180	593	--	1,123	439	888	1915	1000
03/02/18	0.11	--	329	0	639	1200	244	1610	522	3,630	607	3,615	1,140	575	890	0	1000
03/03/18	0.01	--	310	1030	640	1050	239	1330	538	2,750	627	--	1,155	485	893	0	1000
03/04/18	0.15	--	304	1030	642	1050	235	1350	555	2,550	648	--	1,168	440	895	4862	1000
03/05/18	0.04	--	303	0	643	1050	234	1920	572	2,540	673	--	1,133	578	897	1367	1000
03/06/18	0.00	--	308	1020	644	1000	235	1320	588	2,730	696	--	1,105	488	897	1472	1000
03/07/18	0.00	--	322	0	645	1200	242	1900	600	2,760	719	--	1,081	440	897	1585	1000
03/08/18	0.18	1,480	335	1030	645	1200	246	2220	608	3,230	741	--	1,081	484	897	1705	1000
03/09/18	0.12	1,860	336	1020	645	1050	245	1660	614	3,610	764	--	1,057	953	898	0	1000
03/10/18	0.00	1,950	325	0	644	1000	240	1210	619	3,000	787	--	1,041	533	899	0	1000
03/11/18	0.00	1,750	321	1020	644	1050	237	1480	624	2,740	807	--	1,059	397	898	1641	1000
03/12/18	0.00	1,860	328	0	467	1200	238	1290	629	2,140	575	--	1,066	264	897	1511	1000
03/13/18	0.30	4,060	339	1030	351	1050	243	2500	631	0	--	--	1,029	0	895	1584	1000
03/14/18	0.12	3,970	330	0	537	1200	243	1980	634	1,360	--	2,659	1,015	3077	894	1639	1000
03/15/18	0.01	4,040	328	0	605	1150	240	1290	635	3,220	842	2,609	991	533	890	1753	1000
03/16/18	0.00	3,990	329	1020	629	1050	240	1330	634	0	838	--	1,007	0	887	1754	1000
03/17/18	0.00	3,910	328	0	638	1200	237	1410	622	2,740	836	--	1,037	492	885	1693	1000
03/18/18	0.05	3,630	318	0	641	1050	234	1440	629	2,670	833	--	1,072	445	884	1541	1000
03/19/18	0.01	--	315	1080	642	1000	233	0	636	2,410	830	--	1,102	410	883	1482	1000
03/20/18	0.06	1,030	332	0	643	1150	237	1090	637	2,530	827	--	1,091	389	883	1513	1000
03/21/18	0.38	--	379	1010	643	1150	244	1160	635	2,520	828	--	1,106	398	884	1635	1000
03/22/18	0.10	--	432	1010	642	1500	247	0	635	3,640	832	--	1,125	1951	885	1709	1000
03/23/18	0.32	--	432	0	642	1150	243	0	625	0	833	--	1,137	0	885	1807	1000
03/24/18	0.03	--	385	1010	643	1150	238	1860	612	3,920	830	--	1,149	2156	883	1857	1000
03/25/18	0.18	--	342	1010	644	1150	235	2350	601	3,270	826	--	1,157	1052	880	2031	1000
03/26/18	0.02	--	325	0	645	900	233	0	599	3,750	817	--	1,164	1463	875	1879	1000
03/27/18	0.00	--	322	1010	646	1150	235	2390	594	3,250	808	--	1,173	698	870	1868	1000
03/28/18	0.00	--	321	150	647	1050	237	2240	597	2,790	794	1,053	1,179	489	866	1804	1000
03/29/18	0.00	--	405	840	648	1150	238	0	599	10	779	--	1,164	0	862	1746	1000
03/30/18	0.00	--	372	1000	646	1166	242	0	602	2,440	765	2,446	1,116	438	860	1749	1000
03/31/18	0.01	--	347	0	646	1166	242	0	606	0	757	--	1,071	0	860	1642	1000

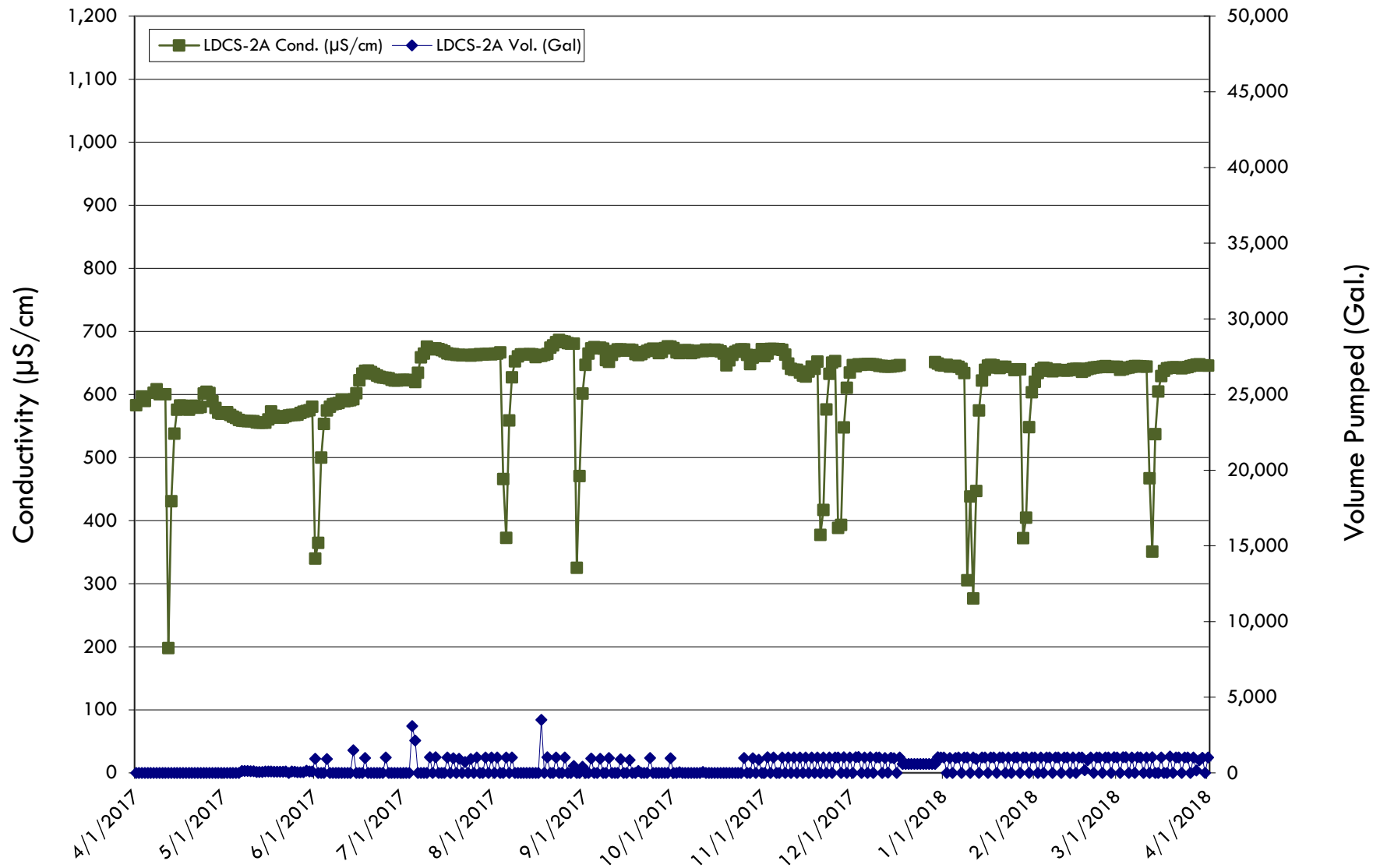
Notes

-- = No data collected, meter not functioning properly

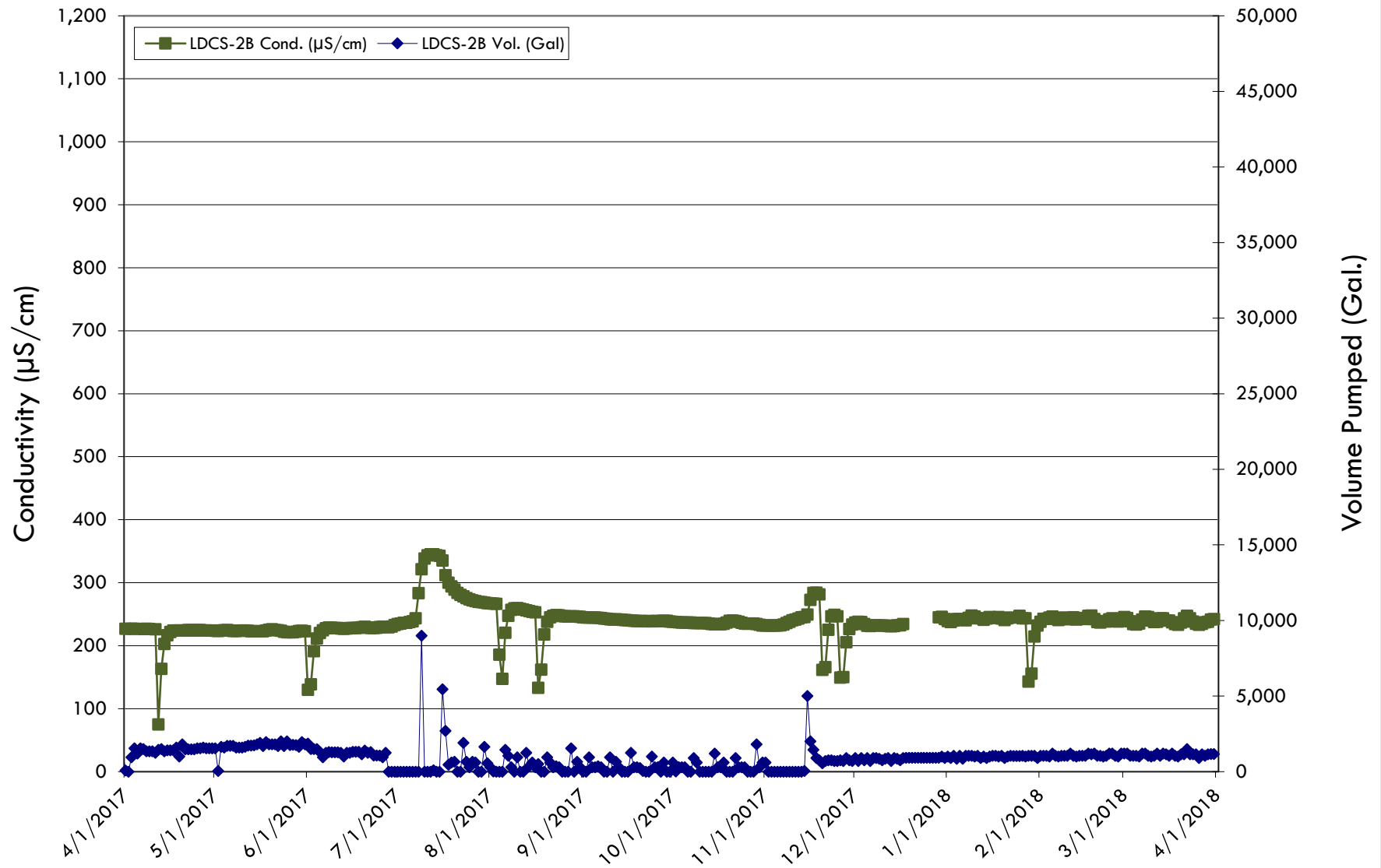
LDCS-1 (DailyTotals)
Conductivity vs Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



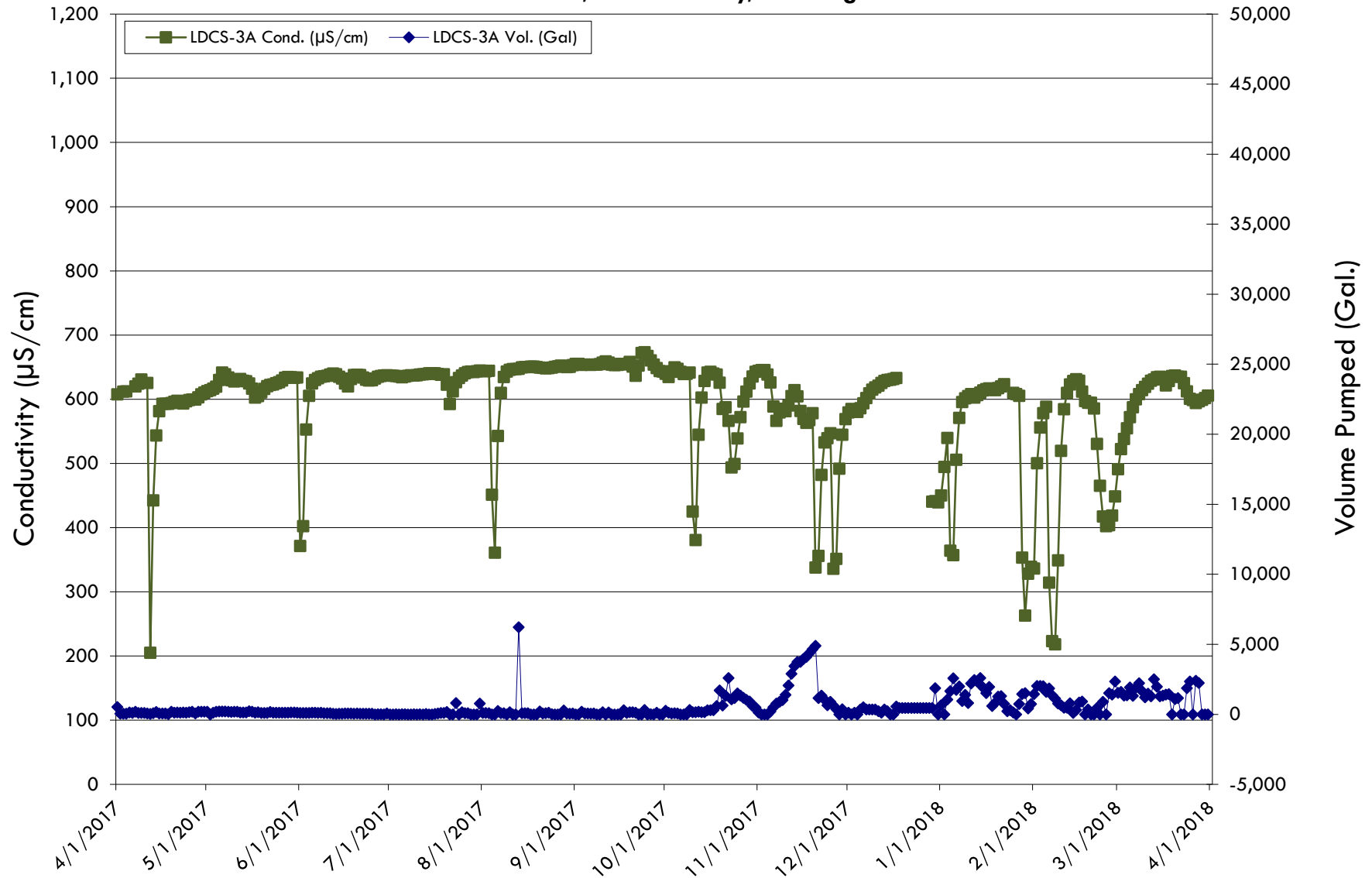
LDCS-2A (Daily Totals)
Conductivity vs Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



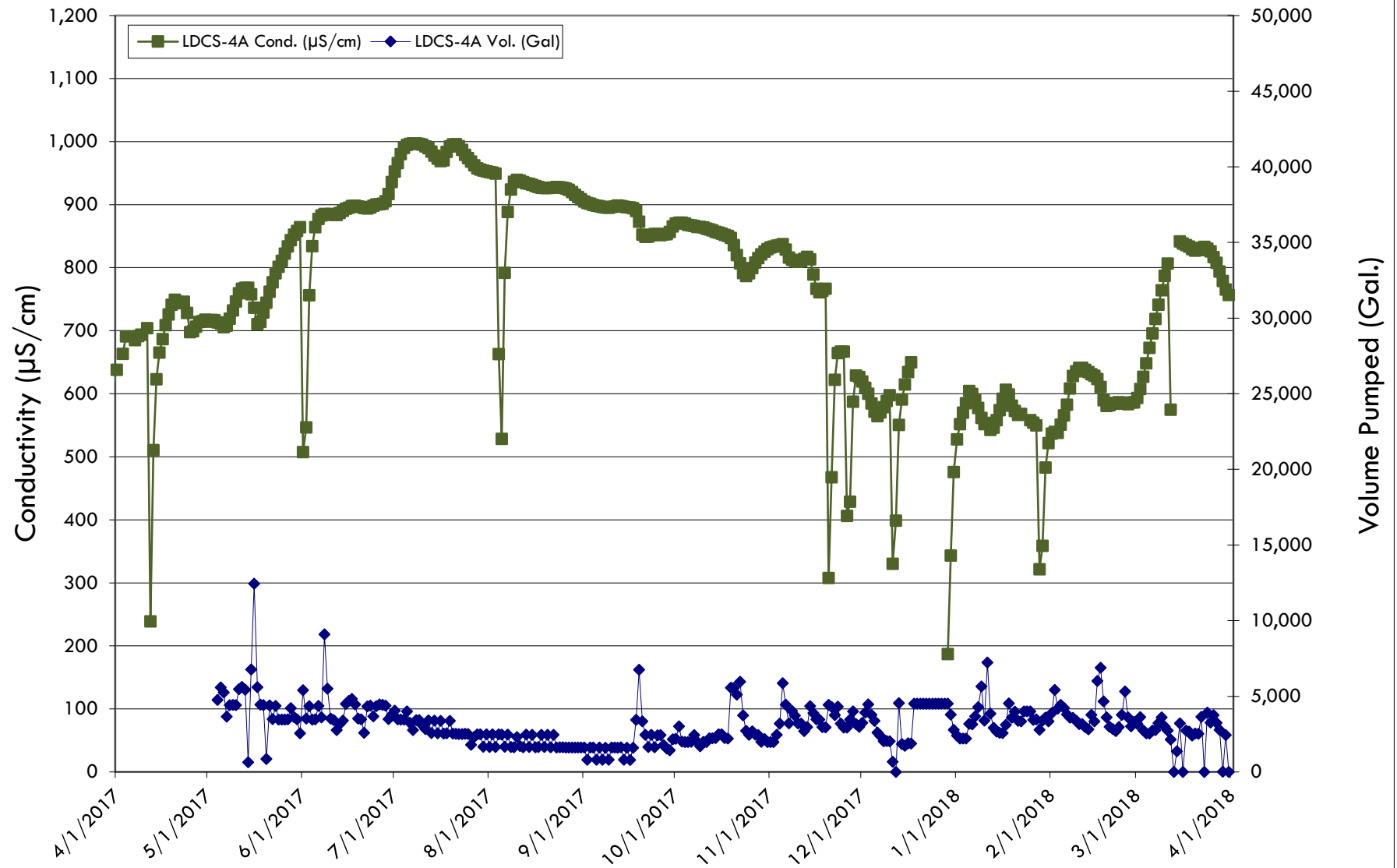
LDCS-2B (Daily Totals)
Conductivity vs Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



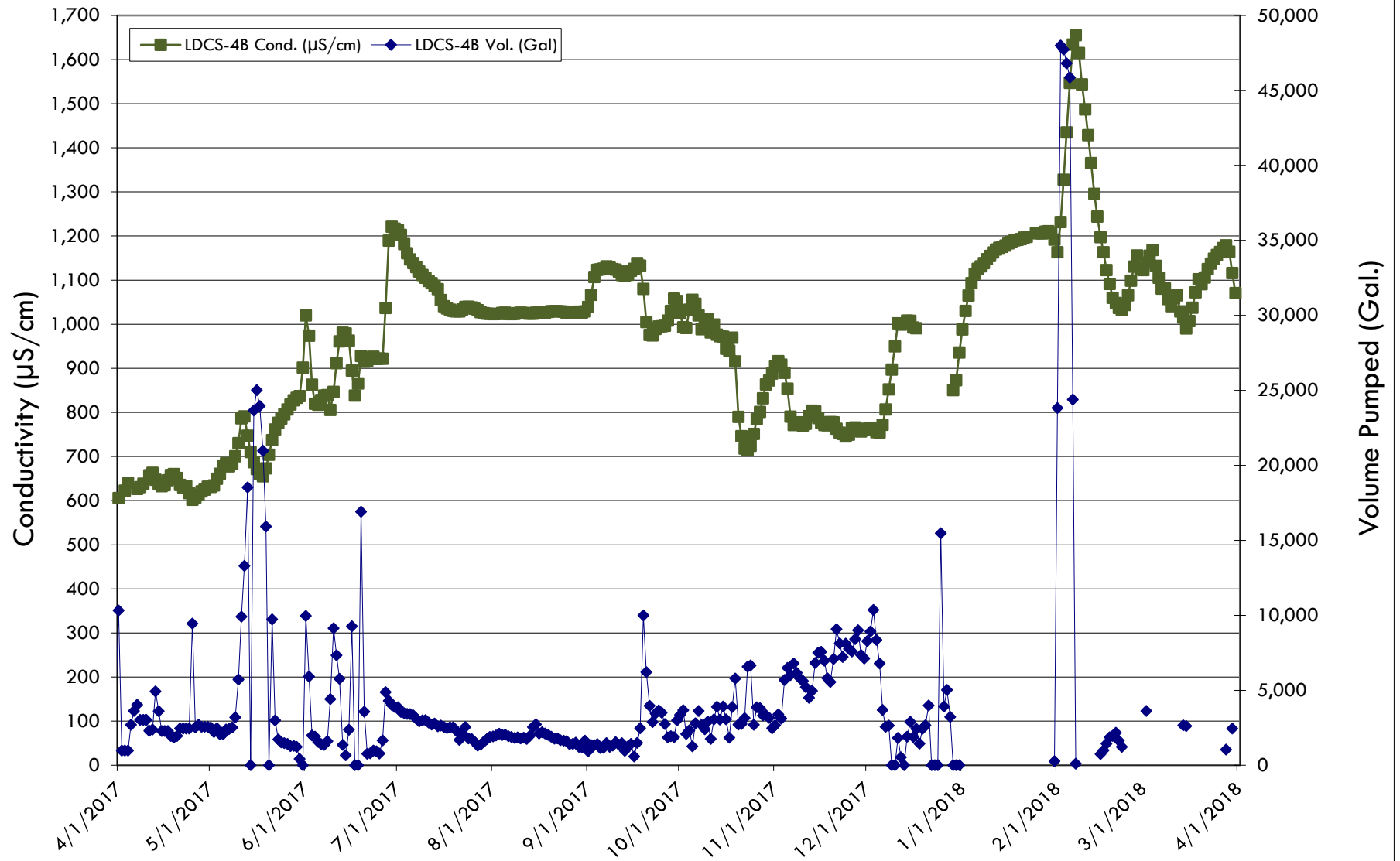
LDCS-3A (Daily Totals)
Conductivity vs Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



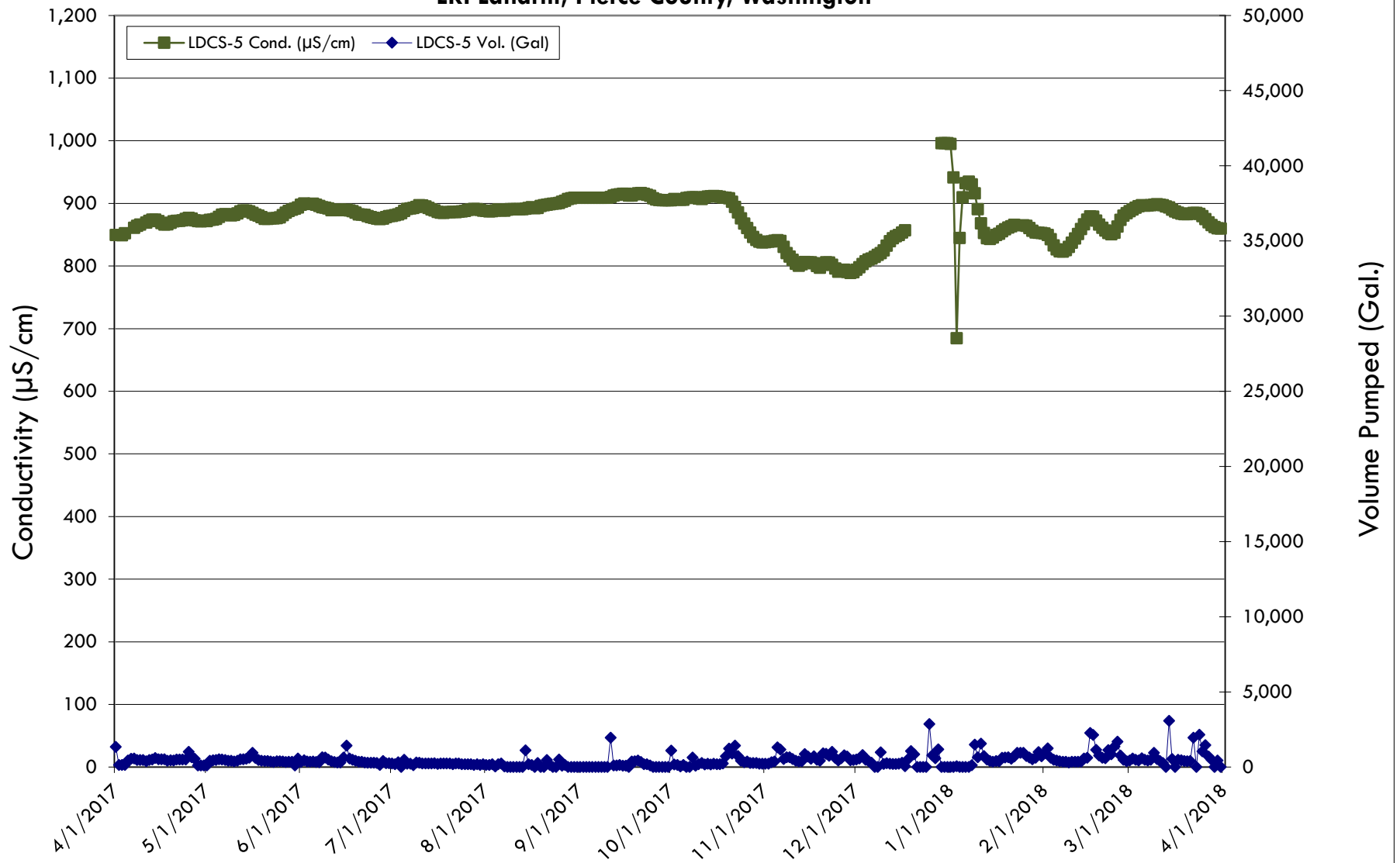
LDCS-4A (Daily Totals)
Conductivity vs Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



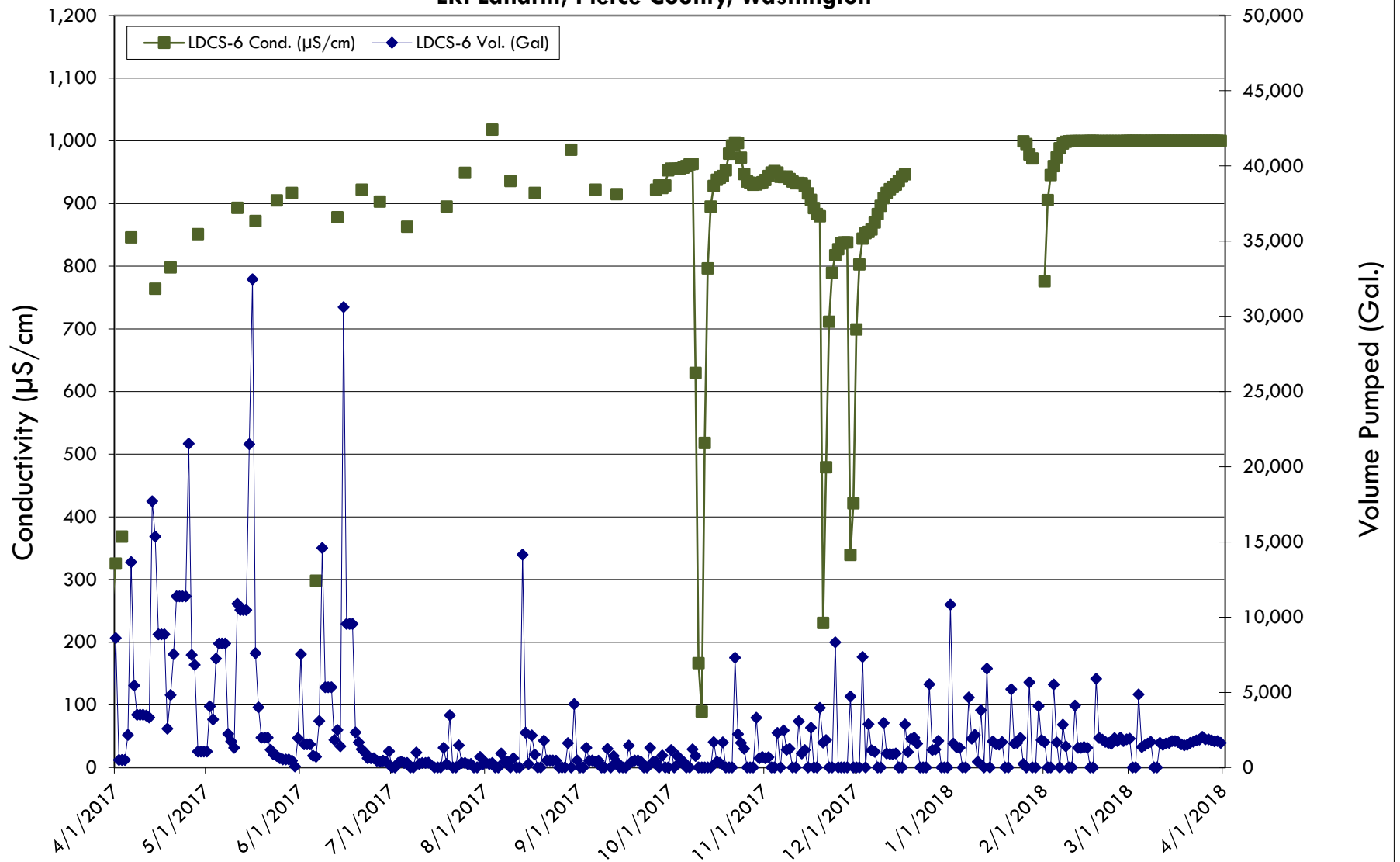
LDCS-4B (Daily Totals)
Conductivity vs Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



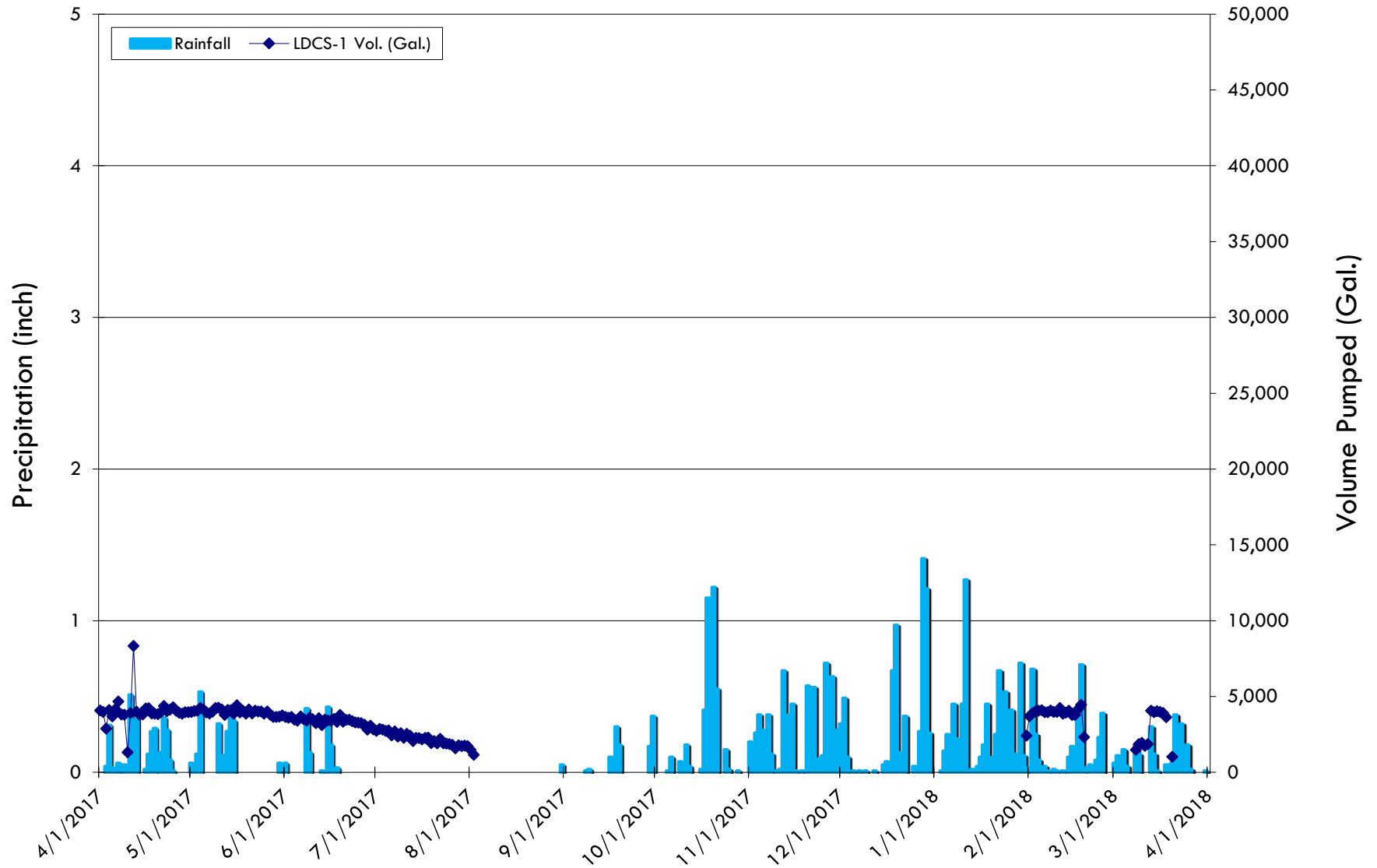
LDCS-5 (Daily Totals)
Conductivity vs Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



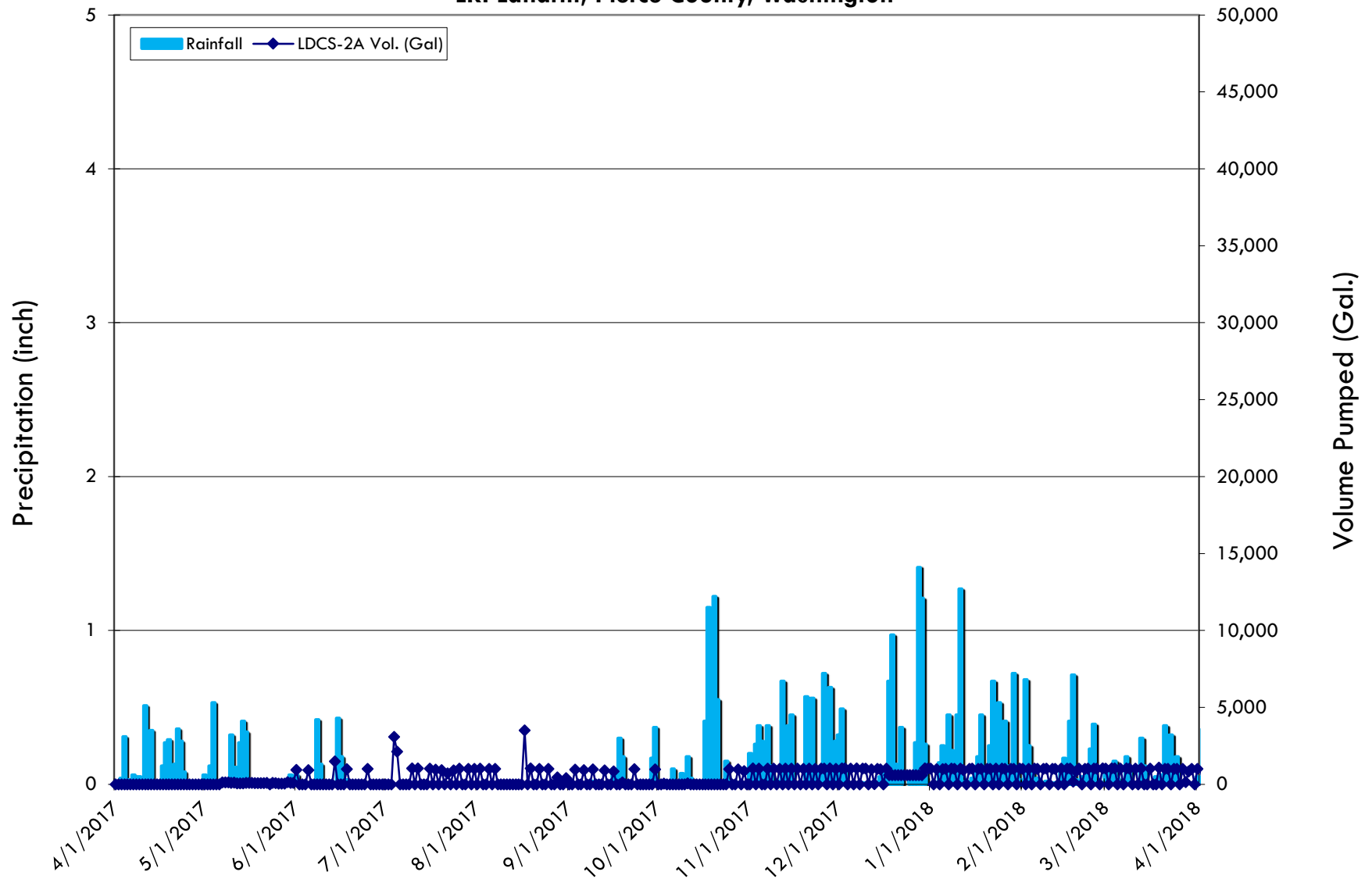
LDCS-6 (Daily Totals)
Conductivity vs Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



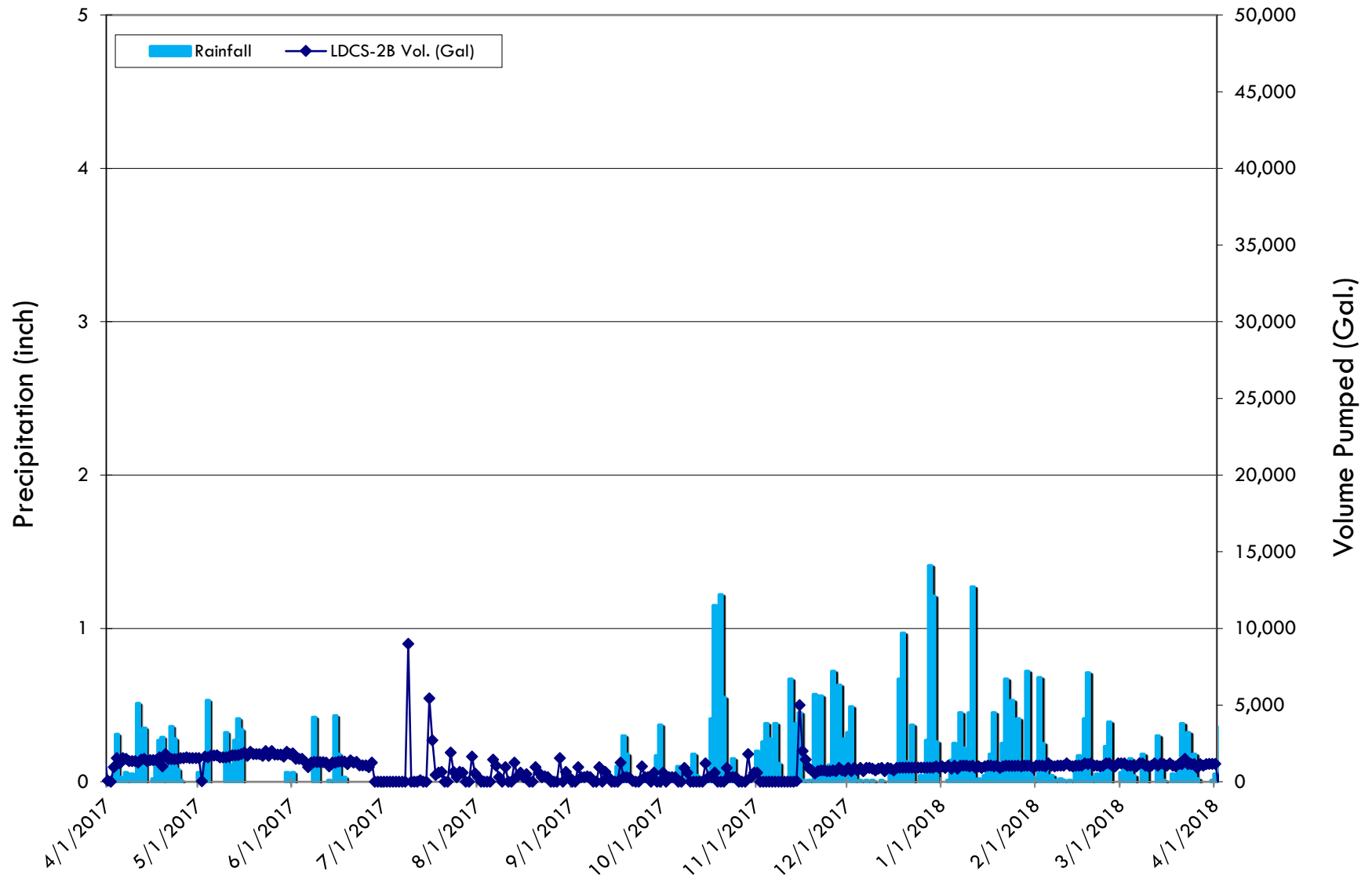
**LDCS-1 (Daily Totals)
Volume Pumped vs Precipitation
First Quarter 2018
LRI Landfill, Pierce County, Washington**



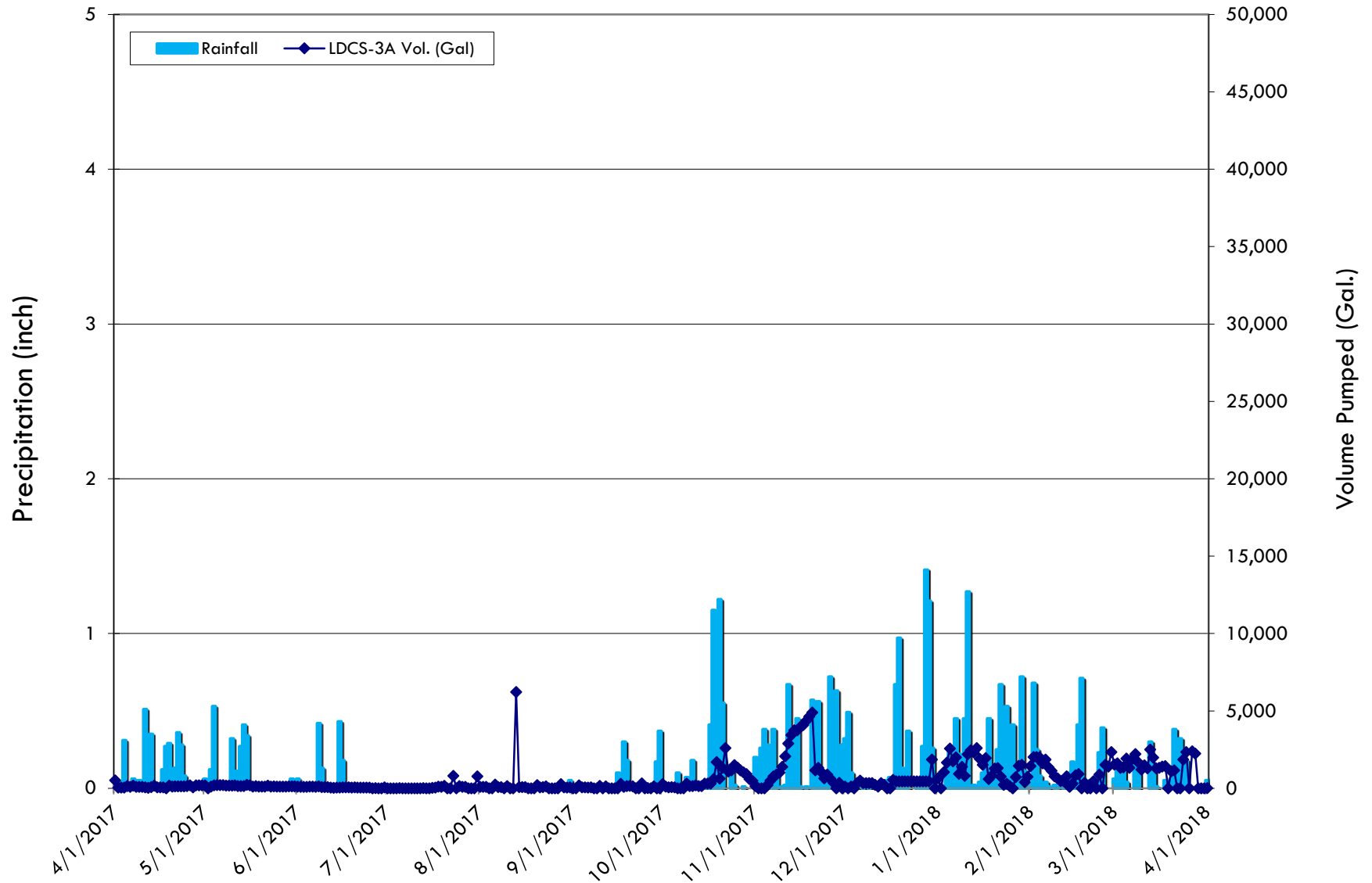
LDCS-2A (Daily Totals)
Volume Pumped vs Precipitation
First Quarter 2018
LRI Landfill, Pierce County, Washington



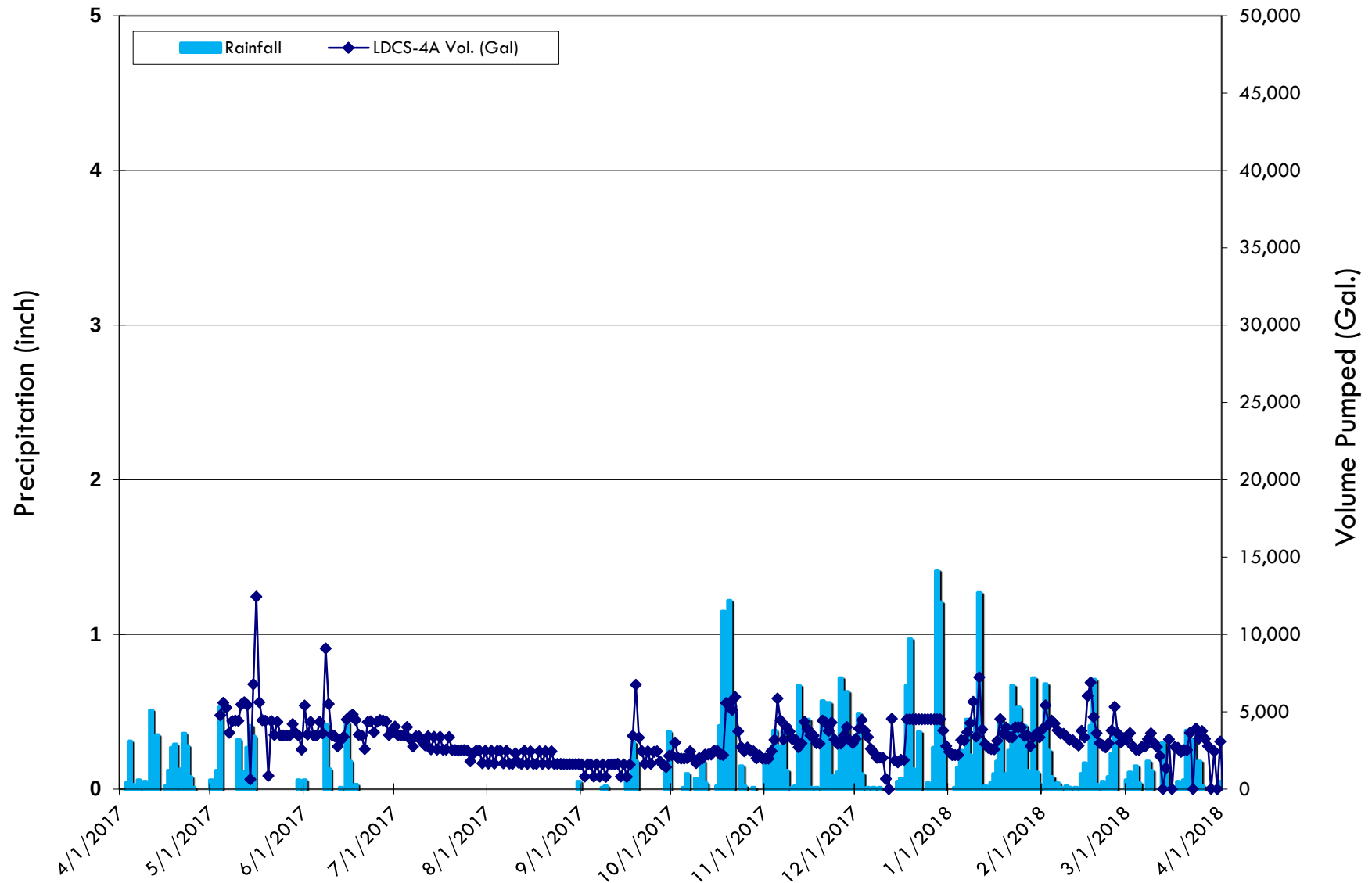
**LDCS-2B (Daily Totals)
Volume Pumped vs Precipitation
First Quarter 2018
LRI Landfill, Pierce County, Washington**



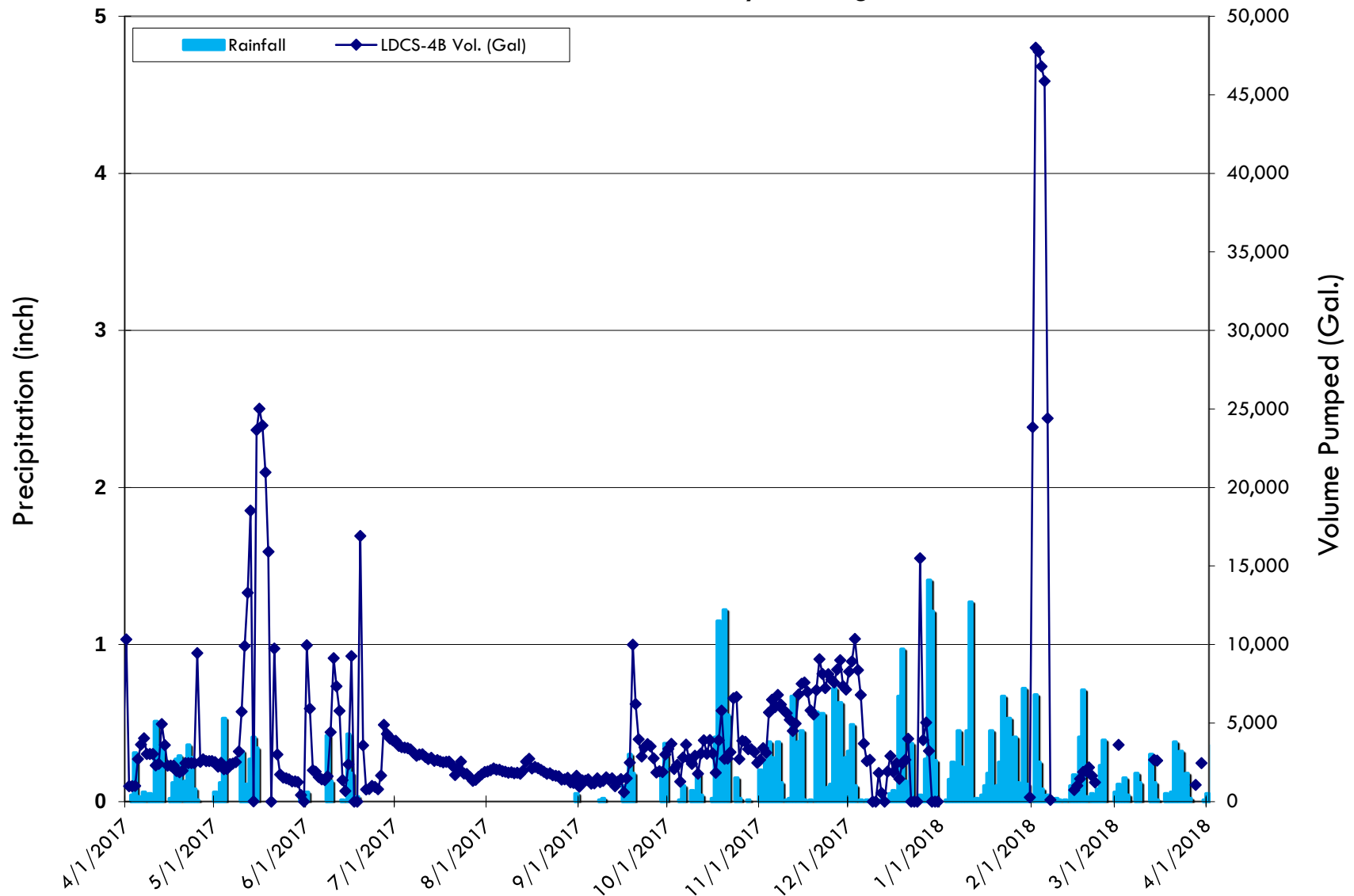
LDCS-3A (Daily Totals)
Volume Pumped vs Precipitation
First Quarter 2018
LRI Landfill, Pierce County, Washington



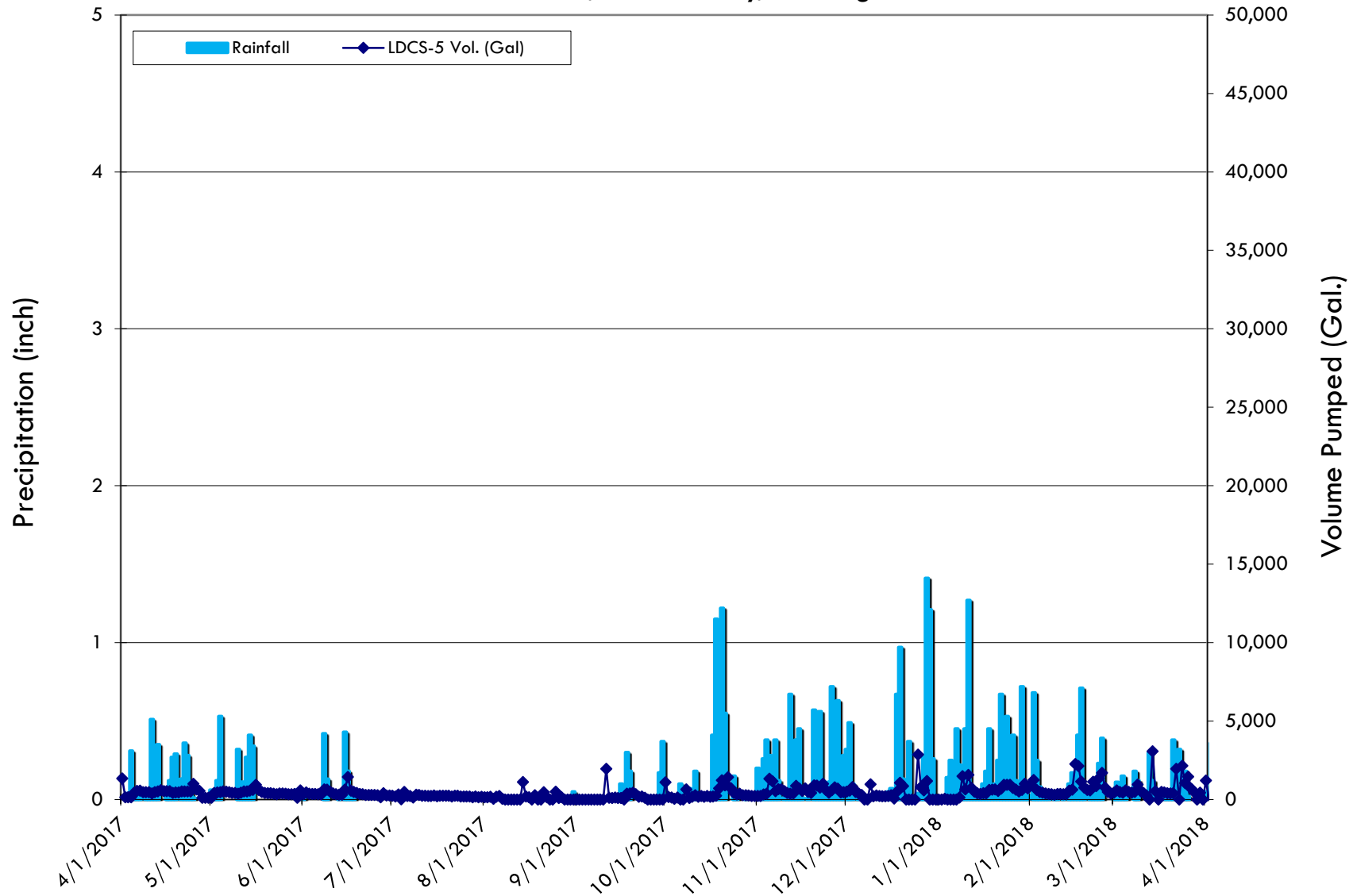
LDCS-4A (Daily Totals)
Volume Pumped vs Precipitation
First Quarter 2018
LRI Landfill, Pierce County, Washington



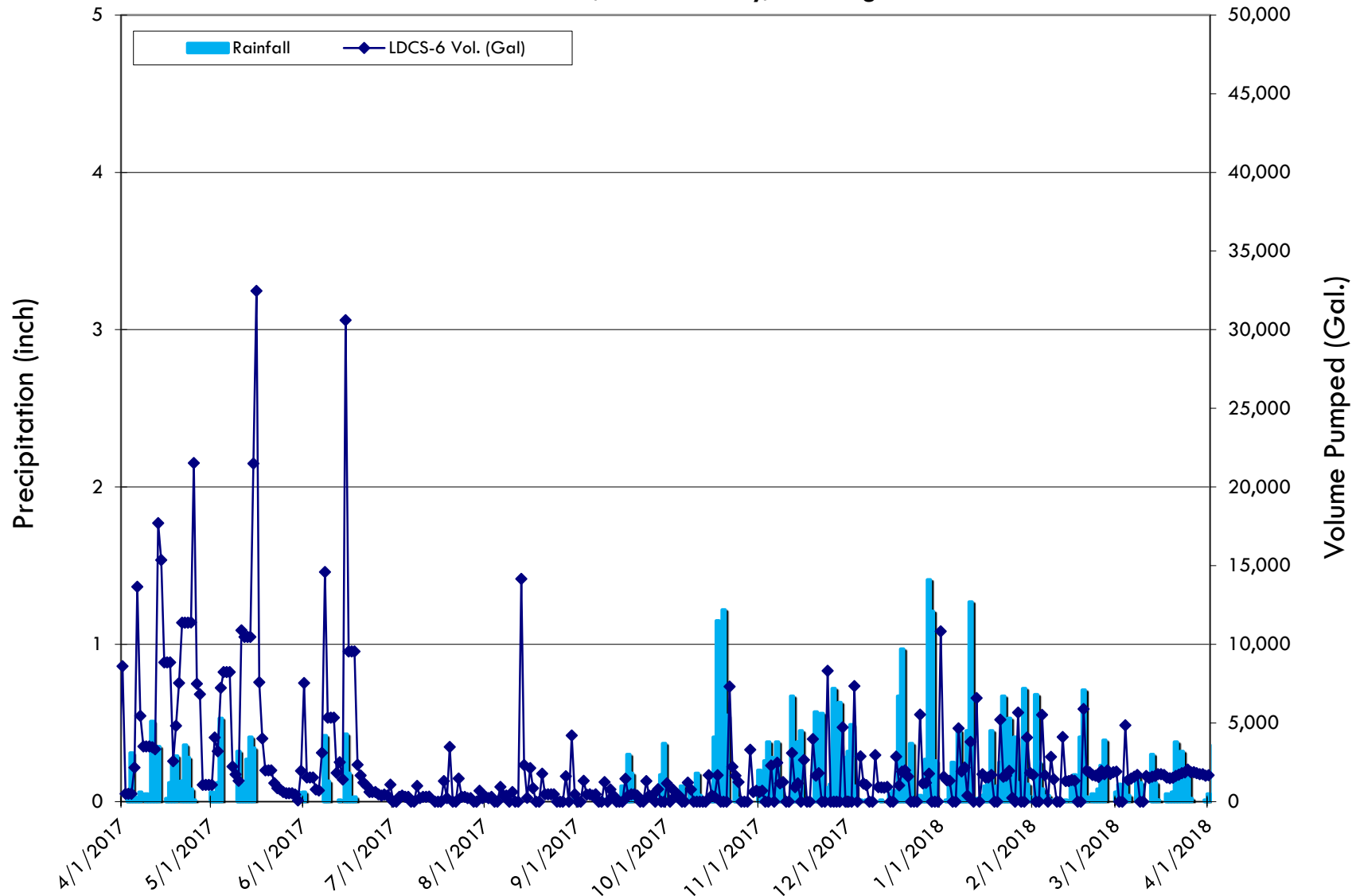
LDCS-4B (Daily Totals)
Volume Pumped vs Precipitation
First Quarter 2018
LRI Landfill, Pierce County, Washington



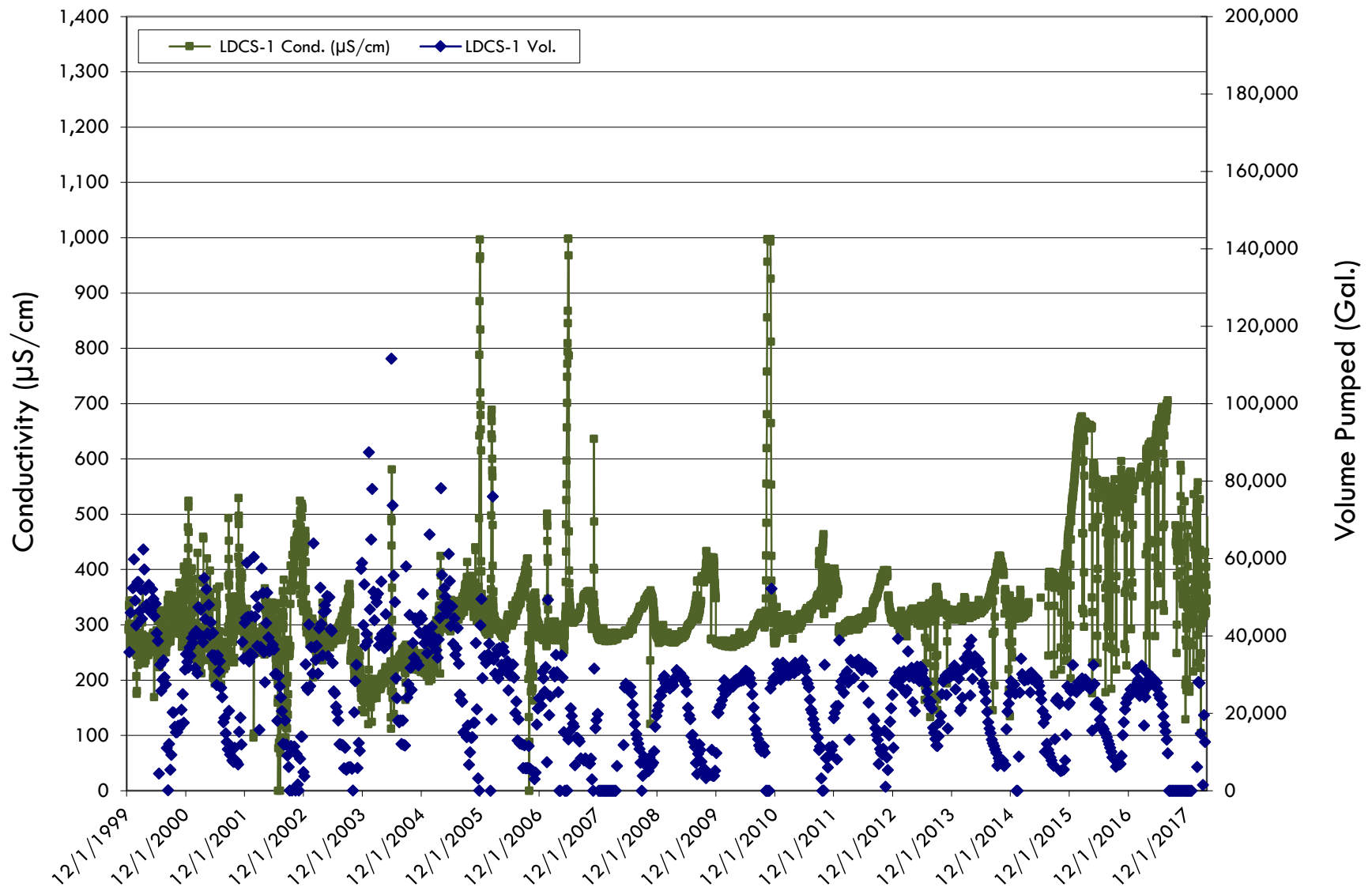
**LDCS-5 (Daily Totals)
Volume Pumped vs Precipitation
First Quarter 2018
LRI Landfill, Pierce County, Washington**



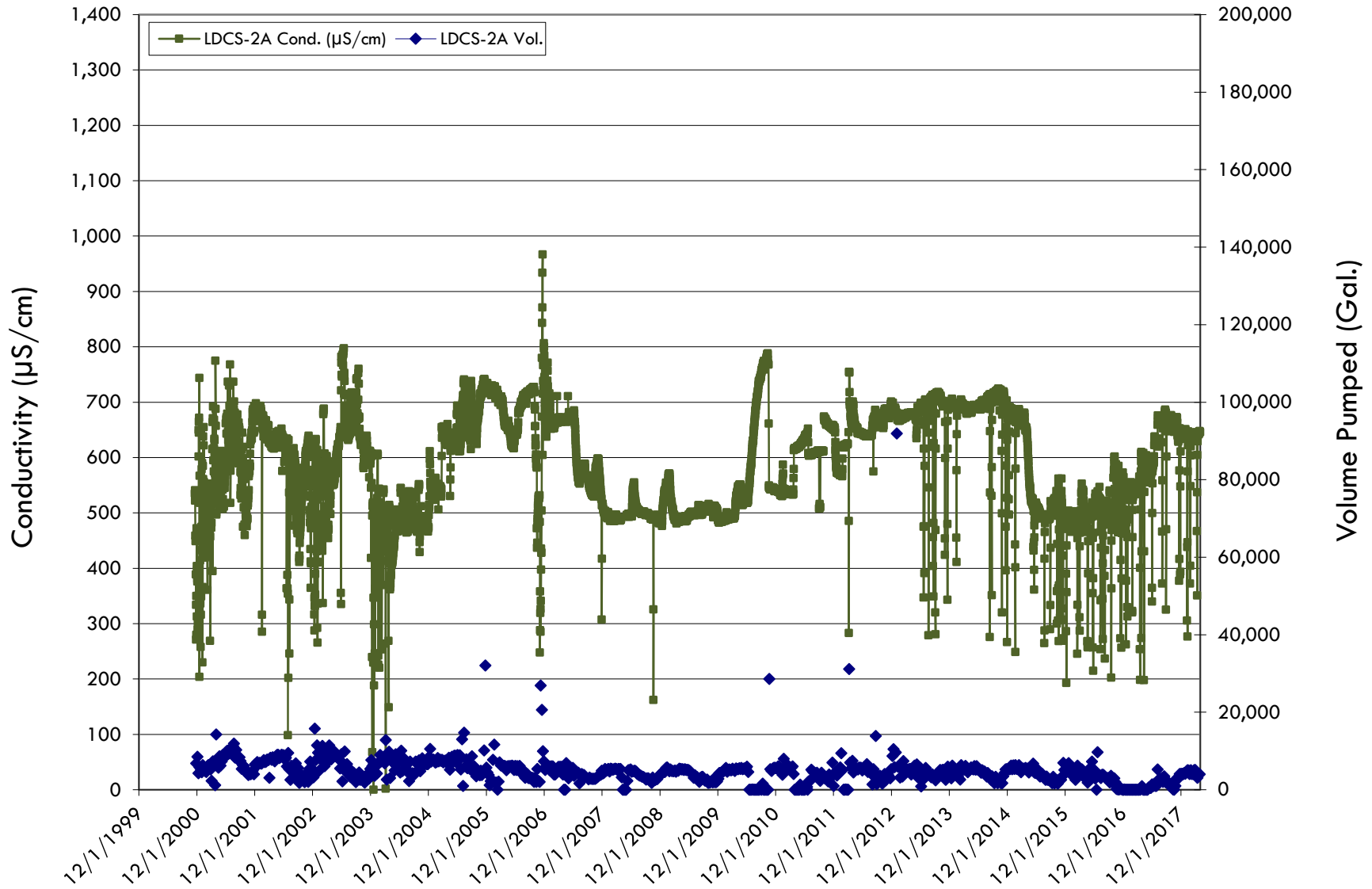
LDCS-6 (Daily Totals)
Volume Pumped vs Precipitation
First Quarter 2018
LRI Landfill, Pierce County, Washington



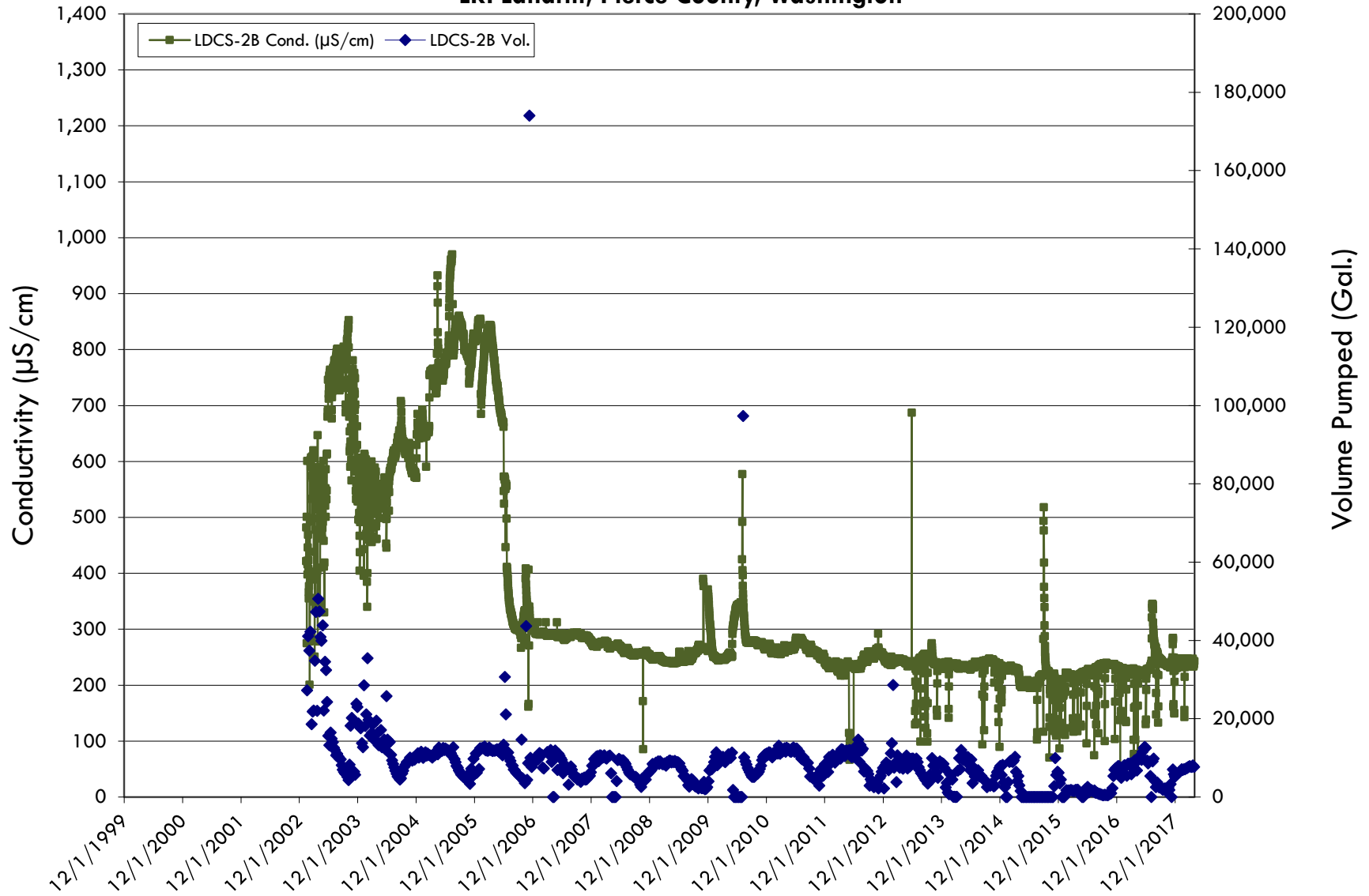
LDCS-1
Daily Conductivity vs Weekly Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



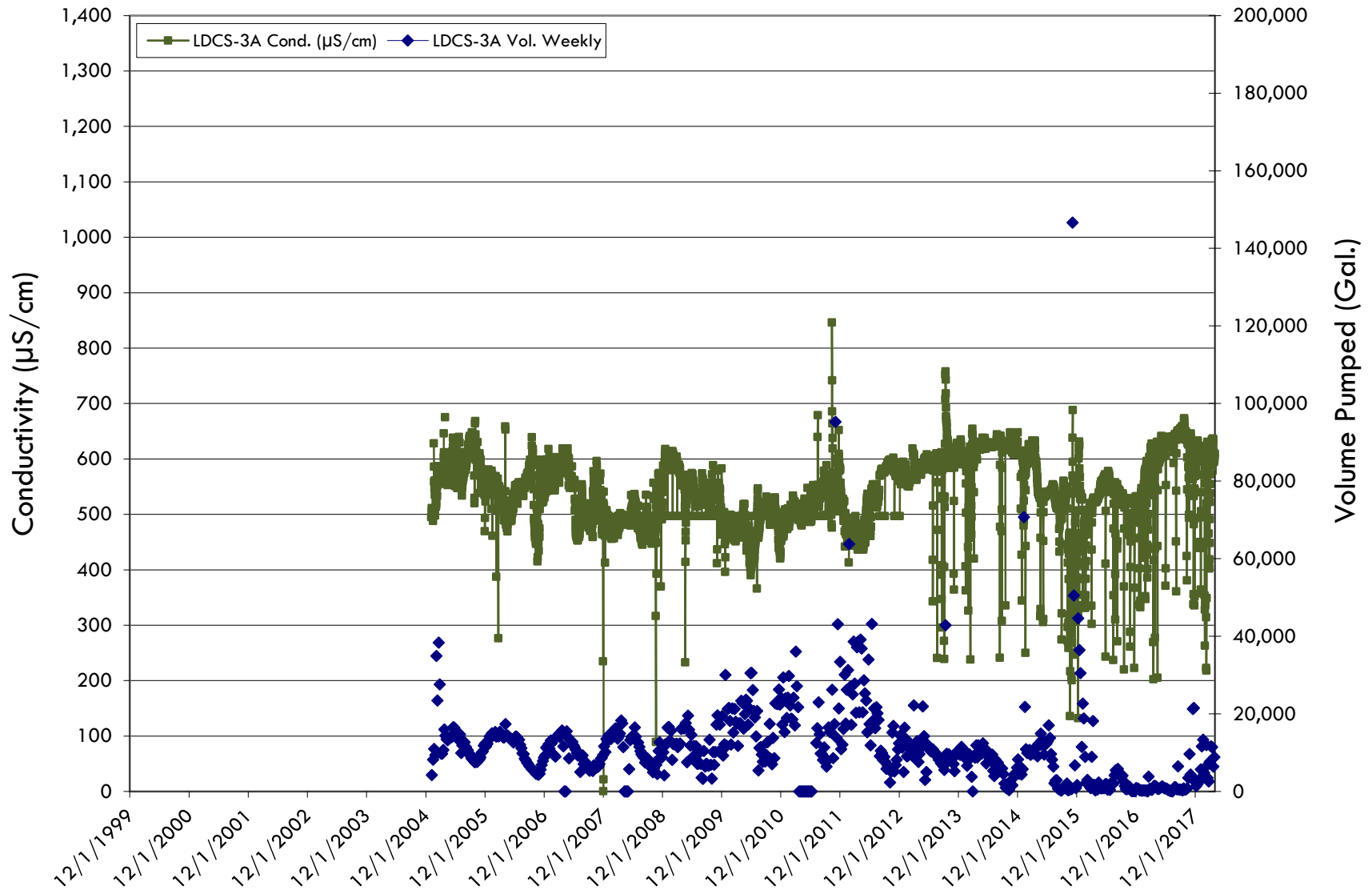
LDCS-2A
Daily Conductivity vs Weekly Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



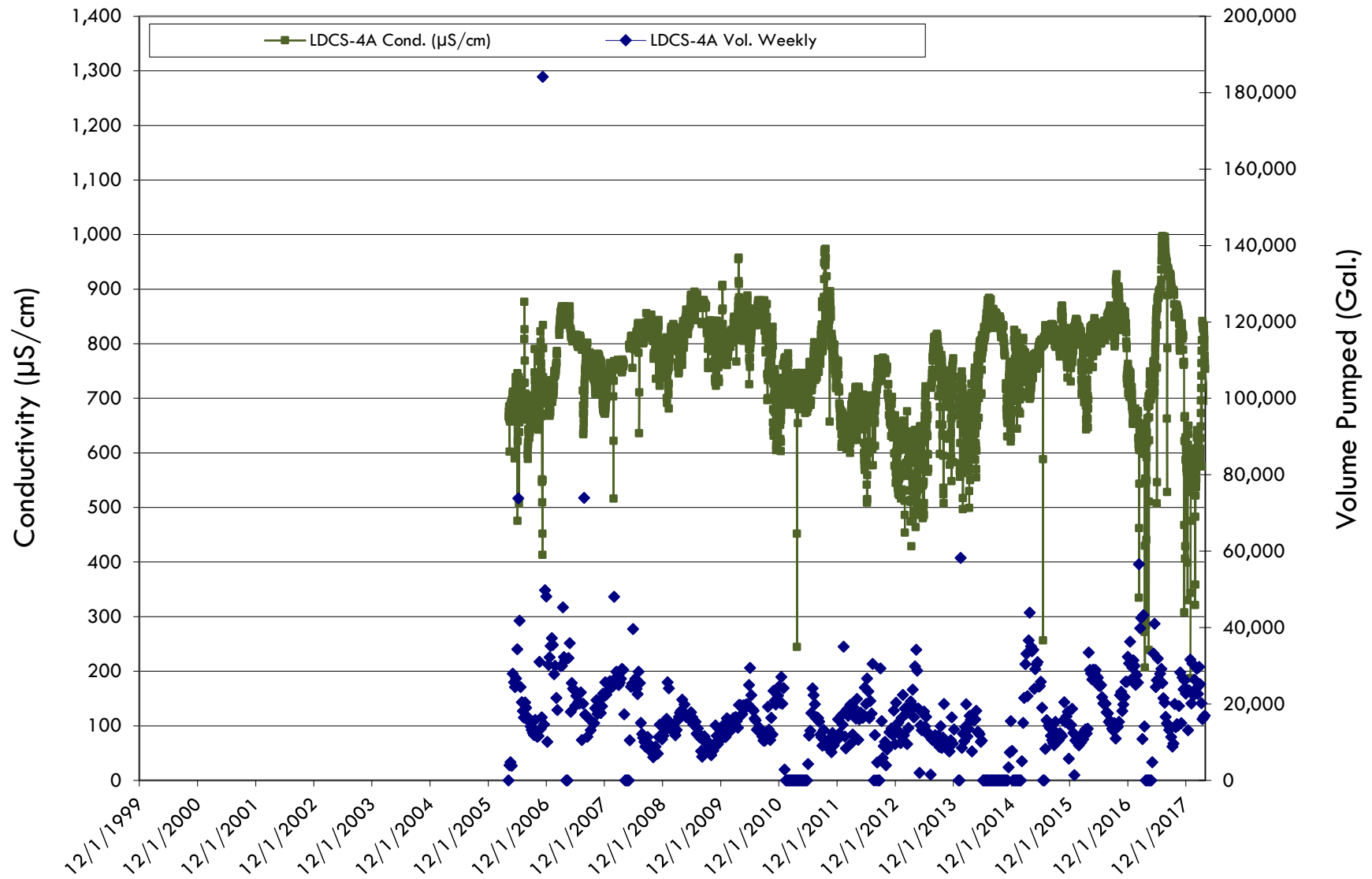
LDCS-2B
Daily Conductivity vs Weekly Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



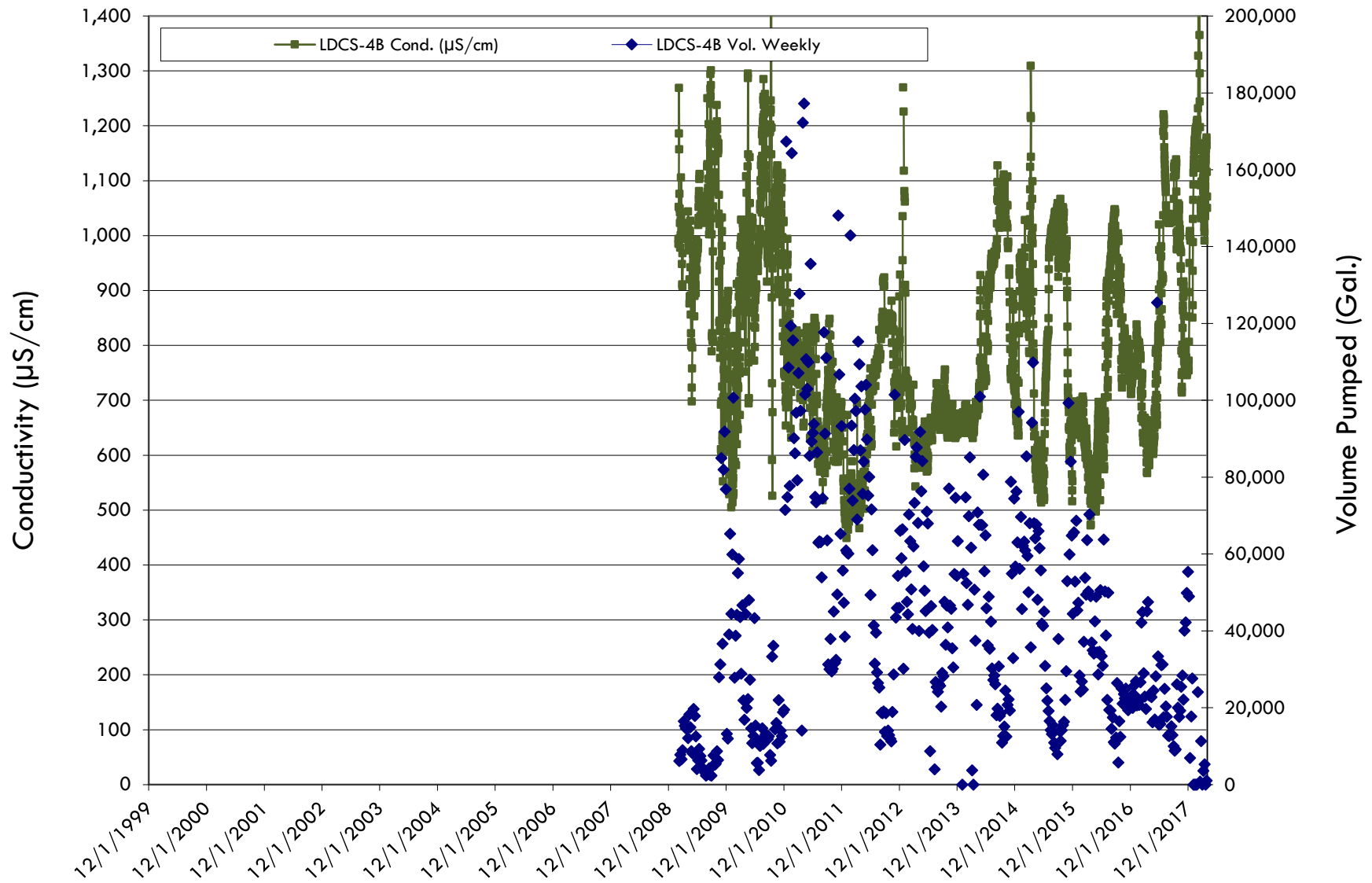
LDCS-3A
Daily Conductivity vs Weekly Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



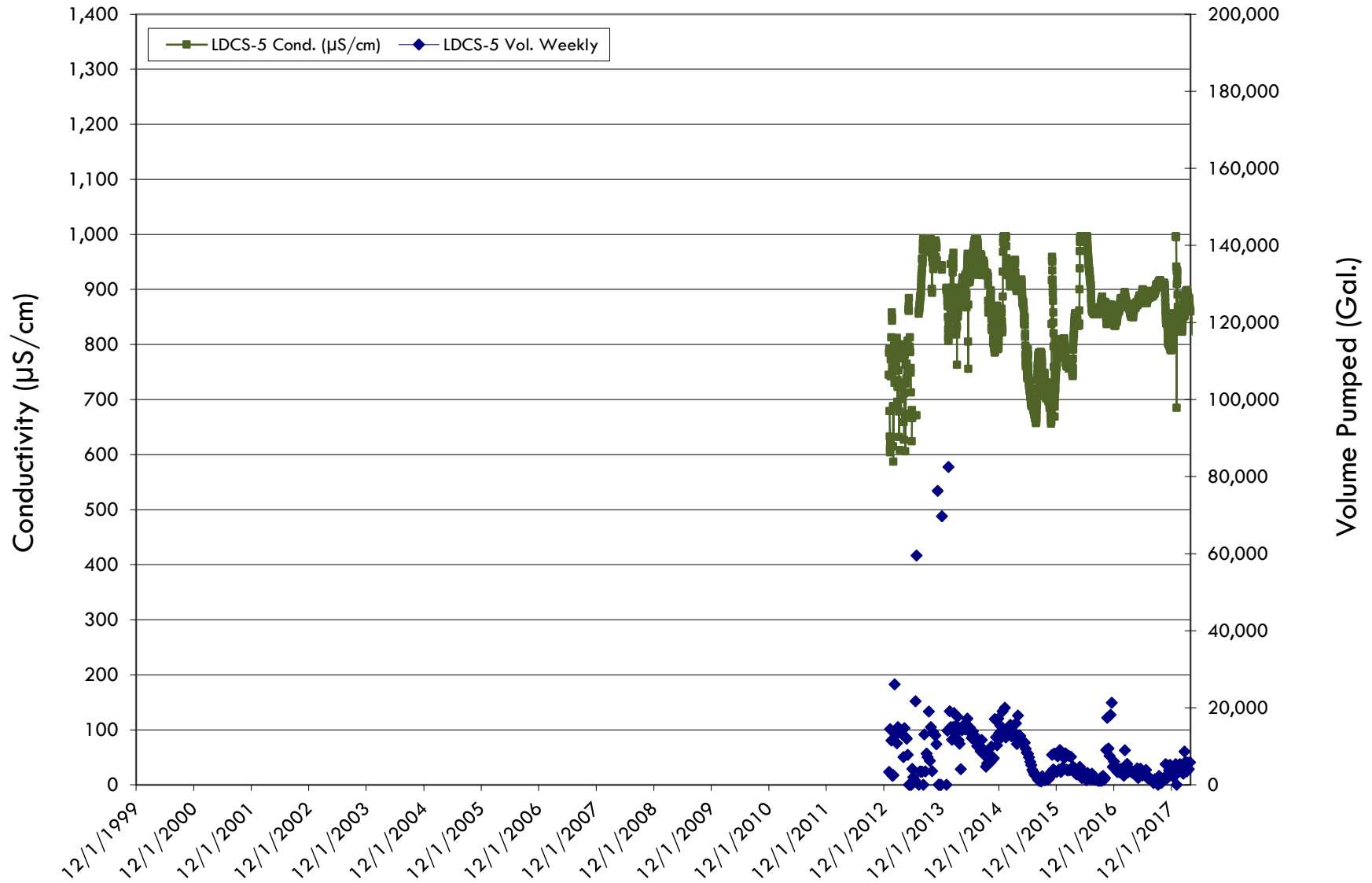
LDCS-4A
Daily Conductivity vs Weekly Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



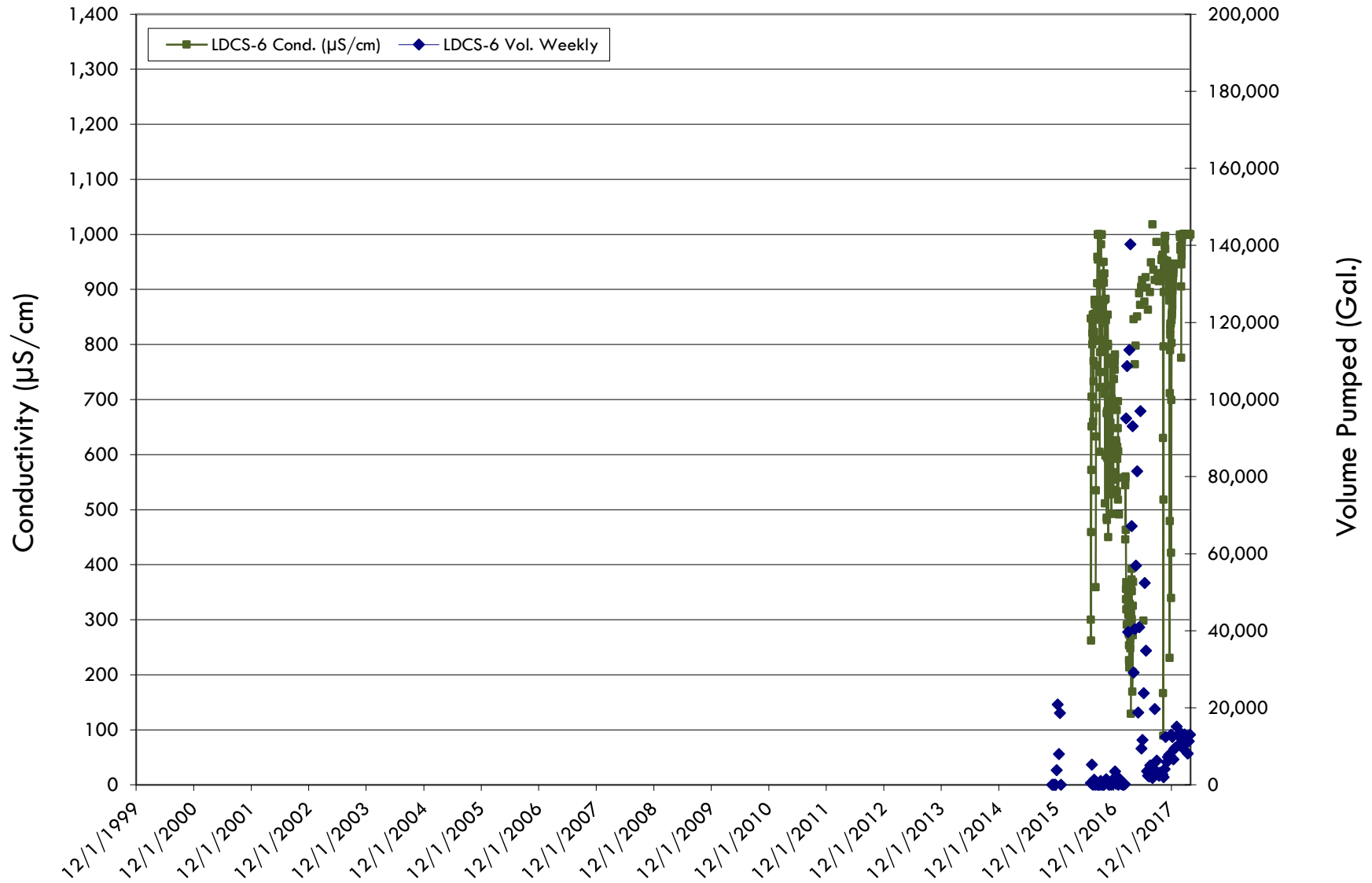
LDCS-4B
Daily Conductivity vs Weekly Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



LDCS-5
Daily Conductivity vs Weekly Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



LDCS-6
Daily Conductivity vs Weekly Volume Pumped
First Quarter 2018
LRI Landfill, Pierce County, Washington



Appendix I
Surface Water Monitoring Data



Permit Number: WAR002603

Permittee: LRI 304th Street Landfill

Facility County: Pierce

Receiving Waterbody:

Monitoring Period: 01/01/2018 - 01/31/2018

Outfall: 001 - NEWB 2

Version: 1

Week	Monitoring Point	Turbidity (NTU) Measured NTU Optional Grab	Turbidity (cm) Measured Centimeters Optional Grab	pH Standard Units Optional Grab
		001	001	001
1-F	1/5/18	Q		Q
2-M	1/8/18	21.2		6.3
3-T	1/16/18	23.1		6.6
4-F	1/26/18	19.5		6.9
Minimum				6.3
			BM: >= 33 (RO)	BM: >= 6.5 (RO)
Maximum		23.1		6.9
		BM: <= 25 (RO)		BM: <= 8.5 (RO)

Reporting Codes Used: Q - Flooding

Overall DMR Notes/Comment

Listed BMP's were in operation for the entire month.

BMPs

Monitoring Point	Week	BMP
001		Check Dams
001		Other
001		Sediment Trap
001		Silt Fence
001		Straw Wattles

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

George Duvendack

Signature

2/15/2018 3:30:02 PM

Date



Permit Number: WAR002603

Permittee: LRI 304th Street Landfill

Facility County: Pierce

Receiving Waterbody:

Monitoring Period: 02/01/2018 - 02/28/2018

Outfall: 001 - NEWB 2

Version: 1

Week	Monitoring Point	Turbidity (NTU) Measured NTU Optional Grab	Turbidity (cm) Measured Centimeters Optional Grab	pH Standard Units Optional Grab
		001	001	001
1-F	2/2/18	16		7.1
2-Th	2/8/18	12		7.0
3-F	2/16/18	18		7.0
4-F	2/23/18	10		6.9
5-W	2/28/18	17		6.8
Minimum				6.8
			BM: >= 33 (RO)	BM: >= 6.5 (RO)
Maximum		18		7.1
		BM: <= 25 (RO)		BM: <= 8.5 (RO)

Overall DMR Notes/Comment

Listed BMP's were in operation for the entire month.

BMPs

Monitoring Point	Week	BMP
001		Check Dams
001		Other
001		Sediment Trap
001		Silt Fence
001		Straw Wattles

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

George Duvendack

3/14/2018 5:49:37 PM

Signature

Date



Permit Number: WAR002603

Permittee: LRI 304th Street Landfill

Facility County: Pierce

Receiving Waterbody:

Monitoring Period: 03/01/2018 - 03/31/2018

Outfall: 001 - NEWB 2

Version: 1

Week	Monitoring Point	Turbidity (NTU) Measured NTU Optional Grab	Turbidity (cm) Measured Centimeters Optional Grab	pH Standard Units Optional Grab
		001	001	001
2-W	3/7/18	12		6.9
3-Th	3/15/18	14		7.0
4-T	3/20/18	4		7.0
5-Th	3/29/18	5		7.5
Minimum				
			BM: >= 33 (RO)	BM: >= 6.5 (RO)
Maximum				
		BM: <= 25 (RO)		BM: <= 8.5 (RO)

Overall DMR Notes/Comment

Listed BMP's were in operation for the entire month.

BMPs

Monitoring Point	Week	BMP
001		Check Dams
001		Other
001		Sediment Trap
001		Silt Fence
001		Straw Wattles

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

George Duvendack

Signature

4/13/2018 9:28:14 AM

Date



Permit Number: WAR002557

Permittee: Pierce County Recycling - 304th Street L

Facility County: Pierce

Receiving Waterbody: South Creek

Monitoring Period: 01/01/2018 - 03/31/2018

Outfall: NEWB - NEWB 2

Version: 1

Week	Monitoring Point	Turbidity (NTU) Measured NTU Quarterly Grab	pH Standard Units Quarterly Grab	Oil & Grease Yes/No Quarterly Visual Observation	Copper Total Micrograms/L (ug/L) Quarterly Grab	Zinc Total Micrograms/L (ug/L) Quarterly Grab	Total BOD5 Total Milligrams/L (mg/L) Quarterly Grab	Solids (Residue) Total suspended (TSS) Milligrams/L (mg/L) Quarterly Grab	Ammonia Total Milligrams/L (mg/L) Quarterly Grab	Alpha-terpineol (3-Cyclohexene-1-methanol, alpha, alpha, trimethyl-) Micrograms/L (ug/L) Quarterly Grab	Benzoic Acid Micrograms/L (ug/L) Quarterly Grab	p-Cresol (4-methylphenol) Micrograms/L (ug/L) Quarterly Grab
		NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB	NEWB
Limit Set		ISGP Western WA - 2015 Permit	ISGP Western WA - 2015 Permit	ISGP Western WA - 2015 Permit	ISGP Western WA - 2015 Permit	ISGP Western WA - 2015 Permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit
2-M	1/8/18	21.2	6.3	No	J 4.4	J 11	B 2	7	J 0.44	B 5.5	B 55	B 11
3-T	1/16/18	23.1	6.6									
4-F	1/26/18	19.5	6.9									
5-F	2/2/18	16	7.1									
6-Th	2/8/18	12	7.0									
7-F	2/16/18	18	7.0									
8-F	2/23/18	10	6.9									
9-W	2/28/18	17	6.8									
10-W	3/7/18	12	6.9									
11-Th	3/15/18	14	7.0									
12-T	3/20/18	4	7.0									
13-Th	3/29/18	5	7.5									
Minimum			6.3 BM: >= 5.0 (RO)									
Average		14.3 BM: <= 25			4.4 BM: <= 14	11 BM: <= 117						
Maximum			7.5 BM: <= 9.0 (RO)									
Month 1 Average							B 2 <= 37	7 <= 27	J 0.44 <= 4.9	B 5.5 <= 16	B 55 <= 71	B 11 <= 14
Month 2 Average							B 2 <= 37	7 <= 27	J 0.44 <= 4.9	B 5.5 <= 16	B 55 <= 71	B 11 <= 14
Month 3 Average							B 2 <= 37	7 <= 27	J 0.44 <= 4.9	B 5.5 <= 16	B 55 <= 71	B 11 <= 14

Reporting Codes Used: B - Below Detection Limit/No Detection, J - Estimated Value/Below Quantitation Limit



Week	Monitoring Point	Phenol Micrograms/L (ug/L) Quarterly Grab	Zinc Total Micrograms/L (ug/L) Quarterly Grab	pH Standard Units Quarterly Grab
		NEWB	NEWB	NEWB
Limit Set		ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit	ISGP Non-Haz Waste Landfill (40CFR part 445 subpart B)- 2015 permit
2-M	1/8/18	B 4.4	J 11	6.3
3-T	1/16/18			6.6
4-F	1/26/18			6.9
5-F	2/2/18			7.1
6-Th	2/8/18			7.0
7-F	2/16/18			7.0
8-F	2/23/18			6.9
9-W	2/28/18			6.8
10-W	3/7/18			6.9
11-Th	3/15/18			7.0
12-T	3/20/18			7.0
13-Th	3/29/18			7.5
Minimum				6.3
				>= 6.0 (RO)
Average				
Maximum				7.5
				<= 9.0 (RO)
Month 1 Average		B 4.4	J 11	
		<= 15	<= 110	
Month 2 Average		B 4.4	J 11	
		<= 15	<= 110	
Month 3 Average		B 4.4	J 11	
		<= 15	<= 110	



I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

George Duvendack

5/10/2018 6:04:45 PM

Signature

Date

Appendix J
Landfill Gas Monitoring Data

Landfill Gas Probe Monitoring

SCS Engineers

304th Street Landfill
PCRCD dba LRI

04218001.04

January 29, 2018

Location Reference Designation <i>Note 1</i>	Date	Time	Pressure (in. H ₂ O)	CH ₄ (% vol.)	CO ₂ (% vol.)	O ₂ (% vol.)	Spike CH4 <i>Note 2</i> (% vol.)	Spike CO2 <i>Note 2</i> (% vol.)	Other
GP-1	1/29/2018	8:57	-0.01	1.4	2.2	16.7	3.6	-	
GP-2	1/29/2018	9:13	0.03	14.4	16.7	2.4	17.0	-	
GP-3	1/29/2018	9:22	0.03	0.0	8.9	8.8	-	-	
GP-4	1/29/2018	9:31	-0.03	0.0	1.8	18.9	-	-	
GP-9	1/29/2018	9:40	-0.04	0.0	9.0	4.1	-	-	
GP-10	1/29/2018	8:43	-0.02	0.0	1.7	20.5	-	-	
GP-10P	1/29/2018	8:39	0.14	19.6	29.7	0.0	22.1		
GP-11	1/29/2018	8:28	0.00	0.0	20.3	1.7	-	-	
GP-12									<i>Note 4</i>
GP-13	1/29/2018	8:08	0.07	2.0	24.5	1.9	2.2	-	
GP-14	1/29/2018	10:07	0.45	0.0	0.2	20.9	-	-	<i>Note 3</i>
GP-15	1/29/2018	9:58	1.04	0.0	0.7	20.8	-	-	<i>Note 3</i>

General Data

Date: 29-Jan-18
Monitored by: A. Deep
Instruments: GEM 2000
Calibration Date: Daily

Weather Conditions
Sky Cover: Partly Cloudy
Wind / Rain / Snow: Light Rain
Temperature (°F): 51

Notes

1. Gas Probes GP-5, GP-6, GP-7, and GP-8 were temporary gas probes and no longer exist.
2. Measurement for spike concentrations of CH₄ and CO₂ are recorded if observed during sampling.
3. Gas Probe installed on September 22, 2016. See installation report for details.
4. Unable to monitor due to presence of water and sediment in probe casing.

GP = Gas Probe
NM = Not measured

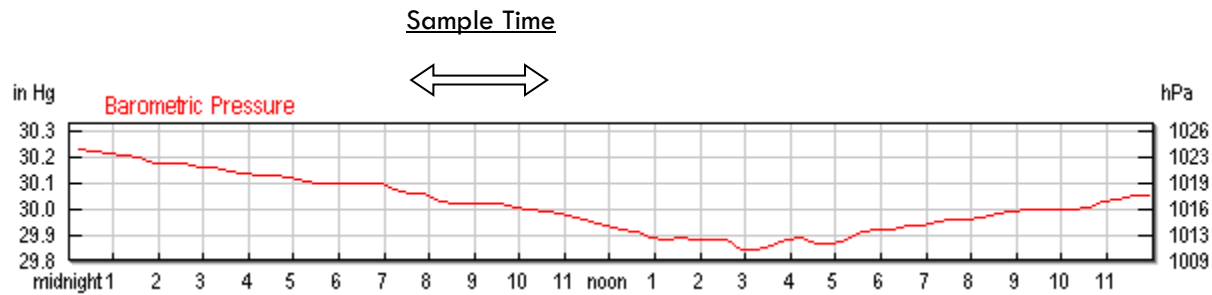
CH₄ = Methane
CO₂ = Carbon Dioxide
O₂ = Oxygen

Barometric Pressure Trend – January 2018 LRI Landfill, Pierce County, Washington

Barometric Pressure Trend for January 2018



Barometric Pressure Trend for January 29, 2018



Source :

https://www.wunderground.com/history/airport/KPLU/2018/1/29/DailyHistory.html?req_city=Graham&req_state=WA&req_statename=&reqdb.zip=98338&reqdb.magic=1&reqdb.wmo=99999

Landfill Gas Probe Monitoring

SCS Engineers

304th Street Landfill
PCRCD dba LRI

04218001.04

February 27, 2018

Location Reference Designation <i>Note 1</i>	Date	Time	Pressure (in. H ₂ O)	CH ₄ (% vol.)	CO ₂ (% vol.)	O ₂ (% vol.)	Spike CH ₄ <i>Note 2</i> (% vol.)	Spike CO ₂ <i>Note 2</i> (% vol.)	Other
GP-1	2/27/2018	7:40	0.02	1.0	1.6	17.4	1.5	-	
GP-2	2/27/2018	7:46	0.10	16.2	18.1	0.1	18.2	-	
GP-3	2/27/2018	7:51	0.31	0.0	8.8	9.4	-	-	
GP-4	2/27/2018	7:58	0.03	0.0	1.2	19.3	-	-	
GP-9	2/27/2018	8:02	0.00	0.0	8.5	4.7	-	-	
GP-10	2/27/2018	7:33	0.07	0.1	7.8	14.8	1.2	-	
GP-10P	2/27/2018	7:29	0.01	21.9	27.1	0.0	23.2		
GP-11	2/27/2018	7:22	0.00	0.0	7.0	15.0	0.3	-	
GP-12	2/27/2018	7:16	-0.02	34.0	58.7	0.2	35.1		
GP-13	2/27/2018	7:11	0.15	2.2	25.4	0.4	2.6	-	
GP-14	2/27/2018	8:19	0.06	0.0	0.1	21.2	-	-	<i>Note 3</i>
GP-15	2/27/2018	8:12	0.00	0.0	0.2	21.3	-	-	<i>Note 3</i>

General Data

Date:	27-Feb-18	Weather Conditions	
Monitored by:	S. Adlington	Sky Cover:	Sunny
Instruments:	GEM 2000	Wind / Rain / Snow:	-
Calibration Date:	Daily	Temperature (°F):	41

Notes

1. Gas Probes GP-5, GP-6, GP-7, and GP-8 were temporary gas probes and no longer exist.
2. Measurement for spike concentrations of CH₄ and CO₂ are recorded if observed during sampling.
3. Gas Probe installed on September 22, 2016. See installation report for details.

GP = Gas Probe	CH ₄ = Methane
NM = Not measured	CO ₂ = Carbon Dioxide
	O ₂ = Oxygen

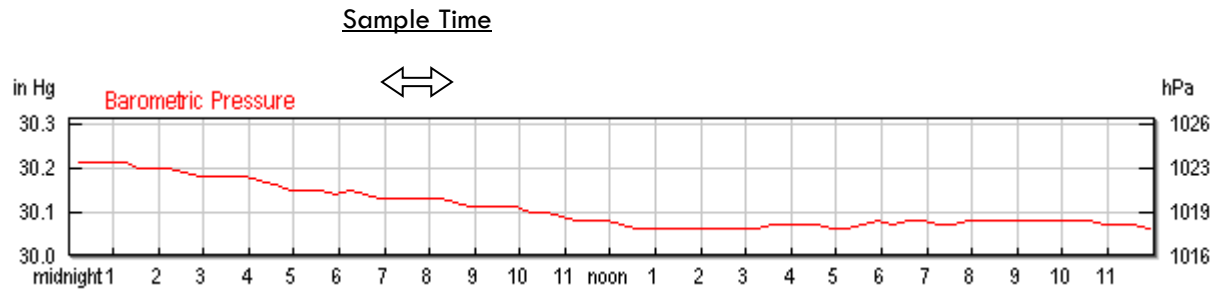
Barometric Pressure Trend – February 2018

LRI Landfill, Pierce County, Washington

Barometric Pressure Trend for February 2018



Barometric Pressure Trend for February 27, 2018



Source :

<https://www.wunderground.com/history/airport/KPLU/2018/2/27/MonthlyHistory.html?reqdb.zip=&reqdb.magic=&reqdb.wmo=>

Landfill Gas Probe Monitoring

SCS Engineers

304th Street Landfill
PCRCD dba LRI

04218001.04

March 20, 2018

Location Reference Designation <i>Note 1</i>	Date	Time	Pressure (in. H ₂ O)	CH ₄ (% vol.)	CO ₂ (% vol.)	O ₂ (% vol.)	Spike CH ₄ <i>Note 2</i> (% vol.)	Spike CO ₂ <i>Note 2</i> (% vol.)	Other
GP-1	3/20/2018	8:22	-0.09	1.6	2.3	14.8	2.1	-	
GP-2	3/20/2018	8:34	-0.54	16.4	18.0	0.0	17.2	-	
GP-3	3/20/2018	8:43	1.06	0.0	9.2	8.5	-	-	
GP-4	3/20/2018	9:02	-0.02	0.0	1.9	18.5	-	-	
GP-9	3/20/2018	9:10	0.73	0.0	8.1	4.4	-	-	
GP-10	3/20/2018	8:05	0.00	0.9	17.7	0.0	0.9	-	
GP-10P	3/20/2018	8:02	0.08	16.1	25.7	0.0	26.8		
GP-11	3/20/2018	7:48	0.02	0.0	8.2	11.2	-	-	
GP-12	3/20/2018	9:42	0.00	35.9	59.7	0.0	39.8		
GP-13	3/20/2018	7:35	0.02	2.3	24.7	0.0	2.6	-	
GP-14	3/20/2018	9:30	0.09	0.0	0.1	20.8	-	-	<i>Note 3</i>
GP-15	3/20/2018	9:22	0.03	0.0	0.3	21.0	0.5	-	<i>Note 3</i>

General Data

Date:	20-Mar-18	Weather Conditions	
Monitored by:	A. Deep	Sky Cover:	Sunny
Instruments:	GEM 2000	Wind / Rain / Snow:	-
Calibration Date:	Daily	Temperature (°F):	42

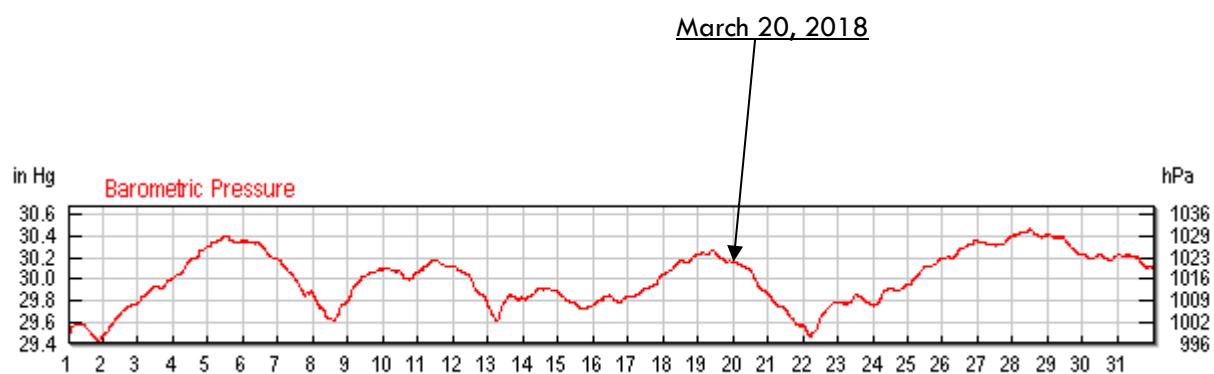
Notes

1. Gas Probes GP-5, GP-6, GP-7, and GP-8 were temporary gas probes and no longer exist.
2. Measurement for spike concentrations of CH₄ and CO₂ are recorded if observed during sampling.
3. Gas Probe installed on September 22, 2016. See installation report for details.

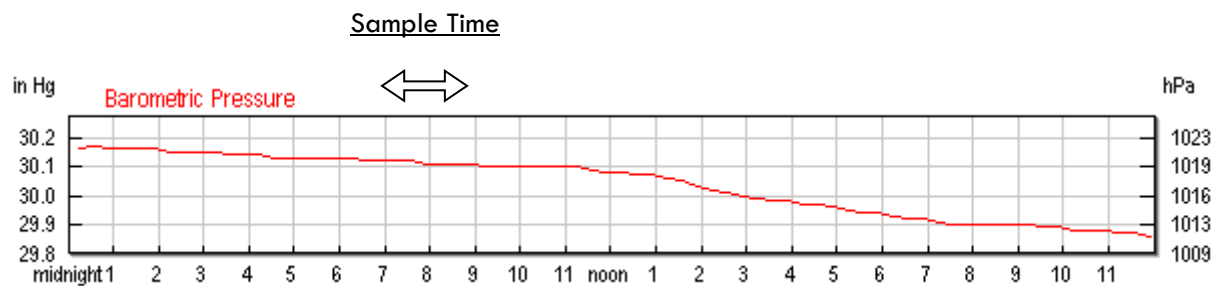
GP = Gas Probe	CH ₄ = Methane
NM = Not measured	CO ₂ = Carbon Dioxide
	O ₂ = Oxygen

Barometric Pressure Trend – March 2018 LRI Landfill, Pierce County, Washington

Barometric Pressure Trend for March 2018



Barometric Pressure Trend for March 20, 2018



Source :

<https://www.wunderground.com/history/airport/KPLU/2018/3/20/DailyHistory.html?&reqdb.zip=&reqdb.magic=&reqdb.wmo=>

LRI 304th Street Landfill
Landfill Gas Monitoring of On-site Buildings

Project Number: 04216001.04

Date: 3/21/18
Weather Conditions: sunny
Instrument: MicroPID
Measured By: A. Deep

The atmosphere inside buildings at the landfill were monitored for possible intrusion of methane gas. Per WAC 173-351, concentrations of methane in on-site structures must not exceed 25% of the lower explosive limit (LEL). If off-site gas migration is suspected, concentrations of methane in off-site structures must not exceed 100 ppm methane.

The areas monitored included:

- The general overall work area
- Floor drains
- Underground conduit protrusions
- Closed areas where landfill gas could collect, such as under cupboards and inside closets

The gas detection instrument must be calibrated using calibration gas containing methane equal to 50 % LEL. Calibration must be performed before and after the survey is completed.

Checked boxes indicate that the survey revealed **no detectable methane**.

- ☒ Main Office - individual office spaces, storage areas and within open crawl-space area.
- ☒ Repair Shop – survey atmosphere conditions throughout (lower height levels).
- ☒ Pay/Scale Booth – interior of building.
- ☒ Work Shop - interior of shed adjacent to stormwater ponds.


Signature