CEDAR HILLS REGIONAL LANDFILL QUARTERLY ENVIRONMENTAL MONITORING REPORT

First Quarter 2018

King County
Department of
Natural Resources and Parks
Solid Waste Division

Serving Community • Protecting Environment • Operating Excellence

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June 2018

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

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

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

1st ✓ 2nd 3rd 4th YEAR 2018	Reference (section, subsection)	Included in this report	Location – page # or appendix #
***Quarterly Groundwater Reports**: 173-351-415 (2) plus the referenced section*			
Statistical calculations and summaries			
Descriptive statistics	420, (1)	☐	
Statistical tests	420, (2)	☒	3
Notification of statistical increase (if applicable)	420, (4)	☒	3
Notification of concentrations above Chapter 173-200 WAC criteria (if any)	430, (4)	☒	21
Static water level readings	415, (2)	☒	App B
Potentiometric surface elevation maps depicting flow direction	415, (2)	☒	App A
Flow rate – calculated	415, (2)	☒	App A
Cation-anion balances	430, (5a)	☒	29
Explanation of greater than 5% (or 10%) difference if needed	430, (5a)	☐	
Trilinear diagrams	430, (5b)	☒	35, 36
Leachate analyses (if sampled and tested)	415, (2)	☒	App B
Data entered into EIM database (date entered:)	415, (3)	☐	
Complete copy of the lab report with chain of custody record.		☐	
***Annual Groundwater Reports**: 173-351-415 (1)* **YEAR**			
Summary of statistical results and trends	415, (1)	☐	
Summary of groundwater flow rate and direction for the year	415, (1)	☐	
Copy of all potentiometric maps for the year	415, (1)	☐	
Summary geochemical evaluation	415, (1)	☐	
For Quarterly and Annual Reports			
Stamped by a licensed professional	RCW 18.220	☒	

Signature of Report Author — June 29, 2018 Date — Cedar Hills Regional Landfill Landfill

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CERTIFICATION

Quarterly Report Groundwater Evaluation Report Certification

I certify in accordance with the requirements of WAC 173-351-400(c) (3), that the contents of this **Cedar Hills Landfill Quarterly Environmental Monitoring Report** were prepared under my direction or supervision under a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Where applicable, some specific and related hydrogeologic portions have been duly certified by the responsible groundwater scientist. Based on my inquiry of the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Name: Laura Belt, P.E.	**Title:** Supervising Engineer, Facility Engineering and Science Unit	**Date:** June 28, 2018
Mailing Address: Solid Waste Division King County Department of Natural Resources & Parks 201 South Jackson Street, Suite 701 Seattle, WA 98104-3855		**Telephone Number:** 206-477-5215
Signature:		

EXPIRES 9-10-2019

KING COUNTY SOLID WASTE
CEDAR HILLS REGIONAL LANDFILL
QUARTERLY ENVIRONMENTAL MONITORING REPORT

CONTENTS

Cedar Hills Regional Landfill Summary of Quarterly Environmental Monitoring First Quarter of 2018

This summary contains a discussion of quarterly environmental monitoring results for groundwater, stormwater, and landfill gas migration monitoring for Cedar Hills Regional Landfill (CHRLF).

Environmental samples were collected and analyzed in accordance with the *Environmental Monitoring Sampling and Analysis Plan for Cedar Hills Regional Landfill (Dec., 2013),* (SAP); and the *Quality Assurance Project Plan for Environmental Monitoring at King County Solid Waste Facilities* (QAPP). These plans describe procedures and activities to obtain sufficient and representative quality data to adequately conduct environmental monitoring at the CHRLF and provide documentation.

1.0 Quarterly Results and Analysis

This Section discusses the monitoring results and how they compare to previously collected data at the site.

1.1 Groundwater

Groundwater monitoring well details, locations, and monitoring status are presented in Table 1 and Figure 1. Monitoring activities for the first quarter are listed in Table 2.

1.1.1 Regional Aquifer

A refined conceptual model was developed in the *Cedar Hills Regional Landfill Site Wide Hydrogeologic Report Addendum (Dec., 2013).* The model fits the site into its regional context of recharge and discharge, provides a detailed look at flow paths within the Regional Aquifer, and defines specific detection zones for each monitoring well. The model provides a thorough evaluation of the monitoring well coverage from the facility waste placement areas and indicates that CHRLF has a sufficient and effective monitoring well network in place. In addition, an alternate groundwater sampling frequency has been implemented for detection groundwater monitoring consistent with WAC 173-351-450 (see SAP, Table 1 and Figure 1).

> **Note**: For discussion and graphical presentation, monitoring wells are grouped together according to the flow path analysis for the regional aquifer.

Regional aquifer analysis results for downgradient and crossgradient wells for this quarter are generally consistent with past results. Several upgradient wells continue to show elevated concentrations of several parameters indicating changing water quality up-gradient of CHRLF.

Groundwater elevations and potentiometric surfaces are within historical ranges and reflect seasonal responses to precipitation. The Potentiometric Surface Map and Groundwater Flow Analysis Report can be found in Appendix A. Elevations measured this quarter conform to the current hydrogeologic model.

Groundwater samples were analyzed for both dissolved and total metal fractions per WAC 173-351-430(2)(b)(ii) as revised. However, only total metals results were compared to the water quality standards listed in WAC 173-351-990 Appendix I.

Implementation of the new SAP resulted in a reduction in the total number of wells that are monitored, and designating the remaining wells to be monitored as either Quarterly or Semi-Annual (i.e. the second and fourth quarters of the year). This quarter only wells marked as Quarterly in Table 1 were monitored.

During the second quarter of 2017, a transition to the Lower Limit of Quantitation (LLOQ) methodology for analytical testing occurred and resulted in revised reporting limits for a number of analytes. Further information on the transition to the LLOQ is available in Section 2.4.1: Laboratory Data Quality - LLOQ. Results can be viewed in Appendix B: Field and Analytical Test Results, and a discussion of exceedances is below.

Exceedances of the Primary Ground Water Quality Criteria were observed for total arsenic as follows:

	Upgradient and Crossgradient	Downgradient
Quarterly Sampled Wells	MW-59, MW-66, MW-81, MW-83, MW-84, MW-93, MW-94	MW-68, MW-69, MW-72, MW-74, MW-75, MW-80, MW-85, MW-87
Semi-Annually Sampled Wells	*not sampled this quarter*	*not sampled this quarter*

Exceedances of the Secondary Ground Water Quality Criteria were observed for dissolved iron as follows:

	Upgradient and Crossgradient	Downgradient
Quarterly Sampled Wells	MW-59	MW-68, MW-69, MW-72, MW-75, MW-80, MW-87
Semi-Annually Sampled Wells	*not sampled this quarter*	*not sampled this quarter*

Exceedances of the Secondary Ground Water Quality Criteria were observed for dissolved manganese as follows:

	Upgradient and Crossgradient	Downgradient
Quarterly Sampled Wells	MW-59, MW-93	MW-68, MW-69, MW-72, MW-75, MW-80, MW-87
Semi-Annually Sampled Wells	*not sampled this quarter*	*not sampled this quarter*

Primary and secondary exceedances of regulatory standards are tabulated and presented in Table 3. This result set contains more exceedances for both primary and secondary criteria due to the switch to LLOQ methodology (as explained in Section 2.4.1) versus previous years' analyses.

MW-68 was sampled twice this quarter due the short time period between the fourth quarter of 2017 sampling event (12/28/17) and the first sampling event of the first quarter of 2018 (01/12/18). The second sample was collected when it was recognized that the time period between the December sample and the January sample was not sufficient to serve as separate sampling events. Therefore, only the results from the second sampling event on 02/23/2018 were used for analysis in this report and both sets of results are reported in Appendix B.

Trilinear Diagrams (Figures 5 and 6) indicate water quality type (hydrochemical facie) based on dissolved ion distribution. The diagrams are useful to recognize spatial variability, potential analytical error, or change in hydrochemical facie over time. All regional samples are within the calcium-magnesium-bicarbonate hydrochemical facie. Data are consistent with previous quarters. Ion balance calculations (Table 4) indicate no analytical error in regional aquifer samples as all samples are within 10% on the ion balance.

Intra-well upper prediction limits (UPLs) are calculated annually and have been updated with data collected through the end of 2017. Calculated prediction limits and analytical results for Appendix I parameters are presented in Table 5 and summarized below.

Result values greater than UPLs for Appendix I parameters this quarter include:

	Upgradient and Crossgradient	Downgradient
Quarterly Sampled Wells	MW-83 (Copper) MW-84 (Barium)	--
Semi-Annually Sampled Wells	*not sampled this quarter*	*not sampled this quarter*

MW-83 also had a UPL exceedance of total copper during fourth quarter of 2017. The total barium UPL exceedance in MW-84 is new.

Volatile Organic Compound (VOC) detections in regional aquifer wells this quarter are presented in Table 6. There have been regularly occurring detections of chlorinated VOCs and their breakdown products associated with the upgradient Queen City Farms (QCF) site. VOCs detected in quarterly monitored wells were trichloroethene (TCE) in quarterly sampled monitoring wells MW-83 and MW-94. *Cis*-1,2-dichloroethene was detected in quarterly sampled MW-59. These upgradient well detections are consistent with past data and continuing migration from QCF.

Carbon disulfide was detected in upgradient quarterly monitoring wells MW-59 and downgradient quarterly monitoring wells MW-69 and MW-80. This compound has not been detected frequently in the CHRLF monitoring program. Detections are likely due to implementation of LLOQ procedures, which allows for quantification at lower concentrations when acceptable performance criteria are met. Previous analytical results for carbon disulfide had been reported at a higher detection limit, which precluded quantification and reporting at the levels currently being reported. Evaluation is on-going to assess if the source of these detections are from presence in native samples, or due to a possible field sampling or lab contamination.

1.1.2 Perched Zones

The East Main Hill perched zones (EPZ) are localized areas of shallow subsurface saturation that appear laterally and vertically discontinuous, predominantly within till and lacustrine silts.

In the South Solid Waste Area perched zone (SSWA), perched groundwater occurs in pockets within variable surficial deposits comprised of local alluvium, recessional outwash, and/or weathered till (shallow perched zone) and within melt-out deposits in an overall predominately lodgment till sequence (deeper perched zone).

Groundwater elevations measured during the quarter in the perched zones are within historical ranges. Samples were collected from three EPZ monitoring wells (MW-30A, MW-47, and MW-62), one groundwater extraction well (EW-25), and surface water station SW-E1, which is believed to receive discharge from the EPZ. MW-101 near the former SSWA was also sampled. Groundwater quality data from perched zones wells collected during the first quarter of 2018 are consistent with previous samples.

MW-105 was installed on the south side of the east leachate lagoon to provide a monitoring well in the shallowest perched groundwater zone to provide early leak detection. If specific conductance shows a statistically significant increasing trend, or exceeds 500 µmhos/cm specific conductance (whichever condition is triggered first), then additional sampling (per the SAP) will be conducted and results assessed with respect to potential leakage from the lagoon.

This quarter, MW-105 was monitored for specific conductance per the SAP and was found to be consistent with previous characterizations (170 µmhos/cm).

Exceedances of regulatory standards for the perched zone wells are tabulated and presented in Table 7. All are consistent with past analyses and known impacts.

Trilinear plots for perched zones samples are all within the calcium-magnesium-bicarbonate hydrochemical facie, as in past samples (Table 8 and Figures 7 and 8). Cation/Anion balances indicate no potential analytical error (greater than 10% ion imbalance) in any perched wells.

As with the regional data, perched zone prediction limits are derived from cumulative data through the end of 2017. Calculated prediction limits for Appendix I parameters along with analytical results are presented in Table 9.

MW-30A again had a nitrate UPL exceedance occur this quarter; however, a historical review of the data at that monitoring location indicates that there is a long-term history of similar nitrate concentrations as seen during the current period. Upon consideration of the fact that the EPZ is already under current investigation, MW-30A will not enter into a retesting protocol for nitrate at this time. Consistent with previous quarters MW-

101 had a cis-1,2-Dichloroethane UPL exceedance. Future results will continue to be monitored and testing for UPL exceedances will occur quarterly.

VOC detections in the perched zones are presented in Table 10. Multiple detections that are listed in the table are due to switch to LLOQ methodology, which lowered the detection limit for a variety of VOCs. These data points are qualified 'JT' in Table 10, 'JT' qualified results are only reported as qualitative, i.e. 'present but unquantified'. All other analytes are consistent with past analyses and known impacts.

1.2 Stormwater

Cedar Hills Regional Landfill is covered by an Industrial Stormwater General Permit (ISGP) issued by the Washington State Department of Ecology. The permit defines discharge Benchmarks, applicable to all facilities, and Effluent Limits, applicable specifically to landfills. These values are reproduced in Table 15. Stations SW-N4, SW-SL3 and SW-GS1 are the designated points for comparison to permit benchmarks and effluent limits.

Monitoring activities are listed in Table 11. Samples were obtained from all the designated compliance stations SW-GS1, SW-SL3 and SW-N4. As per our ISGP, after eight quarters of consistent measurements below the benchmark, sampling is no longer required for that constituent. As a result, turbidity was not measured during the first quarter of 2018 at station SW-SL3.

ISGP Discharge Monitoring Reports (DMRs) are included in Appendix B.

In 2017, KCSWD also had a Construction Stormwater General Permit (CSGP) - permit number WAR305034 with WDOE - for the Area 8 construction activities. A separate SWPPP was created for this CSGP permit. This permit is still active and will be in effect through the duration of the construction project.

Four discharge locations are monitored weekly for compliance with the CSGP in accordance with the SWPPP. The construction contractor also monitors the construction site BMPs and the CSGP monitoring locations daily during construction activities. The four monitoring locations are as follows: C-1 at the northwest end of the site downstream of the northwest siltation pond; C-2 at the northeast end of the site, downstream of the north stormwater pond; C-3 at the southeast part of the site, downstream of the south stormwater lagoon and upstream of the bioswale; and C-4 at the southwest part of the site, downstream from the southwest siltation pond.

Due to exceedances of the turbidity benchmark in 2017 a Chitosan Enhanced Sand Filtration system was installed to pretreat the construction stormwater. As required per the regulations, authorization was obtained from Ecology prior to installation and operation.

Turbidity was exceeded multiple times this quarter at stations C1, C3, and C4 (Table 12). Copies of required stormwater reports submitted to WDOE are included in Appendix B.

1.3 Landfill Gas

Compliance probes, interior probes, on-site buildings, and supplemental monitoring probe results and location maps are included in Appendix B.

1.3.1 Compliance Probe Network

A network of compliance probes are monitored for landfill gas (LFG) migration around the perimeter of the landfill. Probes are monitored by the LFG crew monthly to monitor system performance and quarterly for compliance. Location of the compliance probes can be viewed in Figure 4 and in Appendix B.

No compliance probe methane detections occurred during the first quarter of 2018.

1.3.2 Interior Probe Network

Additional probes on the landfill site, located interior to the compliance probes and outside of the waste footprint are monitored. These probes are monitored by the LFG crew monthly primarily to monitor system performance and as an early warning for LFG migration. Location of the interior probes can be viewed in Appendix B.

Previously, the results for interior gas probes had not been included in the quarterly compliance reporting for the landfill, as they do not represent points of compliance for the site. At the request of the regulatory agencies, these results are being reported although they do not represent compliance points. Results can be view in Appendix B.

1.3.3 On-Site Building Monitoring

As required by WAC 173-351-200, gas concentrations are monitored inside facility structures. Structures are monitored on a quarterly for methane. No methane was detected this quarter. The location map and monitoring results are presented in Appendix B.

1.3.4 Supplemental Migration Monitoring

Detections above the regulatory limit in LFG probe GP-33C in September of 2011 prompted actions including: monitoring frequency increases, operational adjustments to increase LFG recovery rates, off-site structure monitoring and preparation of a response plan. Operational review resulted in modifications to enhance extraction from unlined areas and under liner spaces that could potentially act as gas conveyance pathways. The plan resulted in installation of 13 borings targeting the potential zone of LFG migration in the native sediments. Eight borings serve as LFG extraction wells and five as monitoring probes. The extraction wells and migration probes are currently monitored twice a month, and methane has not been detected in these probes this quarter.

Data indicate the system has been effective in controlling LFG migration to the perimeter probes.

Location map and supplemental Monitoring Probe results are included in Appendix B.

2.0 Analytical Methods

Groundwater quality is evaluated by comparison of analysis results to regulatory standards, geochemical analysis and statistical evaluation. Water quality analytical results for stormwater runoff discharged from the landfill site are compared to the limits set in the ISGP. The following is a brief description of the standards and analytical tools used to review each matrix.

2.1 Regulatory Standards

Groundwater monitoring results are compared to Washington State Groundwater Quality Criteria, WAC 173-200 (Table 14). Stormwater monitoring results are compared to the ISGP Benchmark Criteria, or WAC 173-201A Water Quality Standards for Surface Waters of the State of Washington.

2.2 Trilinear Diagrams and Major Ion Balance

Geochemical data are presented on trilinear diagrams. Major cations and anions are plotted on individual triangles as percentages of total milliequivalents per liter (meq/L). These diagrams illustrate differences in major ion chemistry between groundwater samples and can be used to categorize water composition into identifiable groups or hydrochemical facies. These hydrochemical facies reflect distinct compositions of cation and anion concentrations. The value of the diagram lies in pointing out relationships that exist among individual samples. Trilinear diagrams are included with ionic balance calculations in this report. Ion balance calculations are useful for determining analytical correctness and can be of value in detecting laboratory error or variation in field sampling procedures.

2.3 Prediction Limits

A Prediction Limit is a statistical test that compares an analytical result to a computed limit value. The limit value is derived from past analytical results, which are considered representative historical data. A value outside of this limiting value is considered evidence that the result is not drawn from the same sample population distribution.

At CHRLF, intra-well comparisons present a more conservative approach to determining if a statistically significant release has occurred and is the recommended approach for evaluation of detection monitoring data. In the intra-well approach, a threshold background value is set by determining an UPL. Prediction limits set a comparison threshold for background data with compliance well data and are used to determine if a sample is statistically elevated above background conditions.

The calculated prediction limits are based entirely on intra-well comparisons. All of the prediction limits are one-sided UPLs.

UPLs for the subsequent year's detection monitoring are calculated at the end of each

year and incorporate the previous year's analytical results.

UPLs are based on a 0.05 significance level, as approved by Ecology to be protective of human health and the environment. A 0.05 significance level indicates that at most there is a 5 percent chance that a Type I error (false positive) will occur in the results.

The method for calculating the UPLs depends on both the type of distribution and the number of non-detects present in the background data set. UPLs for background data sets with 100 percent non-detects (NDs) are equal to the highest laboratory method detection limit (MDL). UPLs for background data sets with greater than 50 percent, but less than 100 percent non-detects are calculated based on the highest detected concentration for the respective data set. Although there are alternative methods for calculating UPLs for background data sets with greater than 90 percent, but less than 100 percent non-detects (e.g., Poisson's Method), the use of the highest detected concentration is generally considered to be the most conservative. UPLs for background data sets with less than 50 percent non-detects are evaluated for normality, as non-parametric data sets are based on the highest detected concentration for the respective data set. For UPLs of constituents that had been only ever had non-detects prior to the implementation of the LLOQ and are now detected, the MDL is being used until sufficient data is available to calculate at UPL.

UPLs for either normally distributed or transformed data sets with 0 percent non-detects are calculated based on the following equations used to calculate parametric prediction limits with retesting (*EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance, 2009*):

Normal Distribution

$$UPL = x + \kappa s$$

or

Transformed Distribution:

$$UPL = y + \kappa s_y$$

where: x = mean of the baseline data
y = mean of the transformed data
κ = multiplier for intra-well prediction limits
s = standard deviation of baseline data
s_y = standard deviation of transformed data

Analytical results are compared to the respective UPLs on a quarterly/semi-annual basis, depending on the monitoring program, for Appendix I parameters. If there is an exceedance of the UPL, retesting of the respective analytical parameter at the respective location is required in order to determine if the exceedance is representative of a statistically significant increase over background.

A 1-of-3 retesting plan will be used for any exceedances of the intra-well UPLs at the

CHRLF. This retesting plan provides adequate statistical power and minimizes Type II (False Negative) errors, while providing retesting that accommodates lab turnaround time, data review, and scheduling. This test is performed on parameters listed in WAC 173-351-990 Appendix I and is used to detect a change in the population distribution of the individual well.

2.4 Laboratory Data Quality

Laboratory analytical data is reviewed to verify meeting data quality objectives (DQOs) as defined in the QAPP. Occasionally, results identified during this process are deemed to be unsuitable for evaluation purposes. A summary of suspect results can be found in Table 16.

2.4.1 Lower Limit of Quantification (LLOQ)

Changes made in accordance with federal regulations for the guidance of analytical testing methodologies covered by SW-846 (Test Methods for Evaluating Solid Waste) were implemented in 2017 by the contract laboratory. One specific effect of these changes was to replace the Method Detection Limit (MDL) methodology with the LLOQ methodology as the basis for determining the lowest quantitative value of an analyte that can be reported. This affected all methods covered within SW-486.

The LLOQ is a performance based methodology that tests known standards repeatedly to create a calibration curve for a specific method. Commonly, the lowest concentration of the (linear) calibration curve is set as the LLOQ. However, in some cases the LLOQ may be greater than the baseline curve concentration due to lab specific factors such as instrument sensitivity and method analytical uncertainty.

During the second quarter of 2017, the transition to using the LLOQ methodology resulted in revised reporting limits for a number of analytes. Quantitation limits for all trace metals (i.e. non-major cationic species metals), and a subset of the VOCs analyzed for regularly are lower than past analyses, while some VOCs have higher or the same limits as before. As a result of these changes, previously unobserved trace metals and VOCs in a number of wells are now reportable at concentrations lower than previous methodologies could detect. This does not invalidate past analytical data reported at the MDL as non-detects, but serves to confirm that some analytes can be present below detection limits due to instrumentation and/or analytical methodology limitations.

The change to LLOQ does increase the need for continually assessing and evaluating whether analytes detected that had been previously not detected are due to a confirmed presence in the native sample, or result from either field sampling or laboratory contamination.

Due to the change to the LLOQ methodology change, it may be necessary to re-establish background data sets for any parameters with modified reporting limits in order to maintain statistical integrity and support hypothesis testing conclusions. Transition to new background data sets will occur when sufficient data has been acquired based on

minimum statistical requirements.

2.4.2 Analytical Uncertainty and Data Review

An important consideration when reviewing analytical test data is to examine the uncertainty associated with the measurement of each analyte. In some cases, this uncertainty can be greater than the degree of confidence a prediction limit spans due to the 'noise' that is intrinsic to analytical testing methods. When a UPL and reporting limit are close in magnitude, the uncertainty around whether an exceedance did or did not occur increases. Arsenic exceedances in groundwater are an example of such a case. Both the UPL and detection limit for arsenic are typically quite low (parts per billion), which cause the result to be subject to both the uncertainty within the calculation of the UPL, and the noise inherent to analytical method used to detect at a low target detection/quantitation limit. Therefore the inherent uncertainty in both of these methodologies needs to be considered during a statistical evaluation of data.

Northeast Perched Zone (approximate)

East Shallow Perched Zone (approximate)

Property Boundary

WAC 173-351-300 Compliance Boundary

Outer Cover / Liner Limits

Vertical Barrier Wall (approximate)

South Solid Waste Area (SSWA) Original Refuse Limits

MW-81 306.95 2
SG-5
MW-99 -69
SW-E1
MW-106 282.63 0
MW-104
MW-103
MW-93 320.34 0
EB-6
EB-5S
EB-5
MW-54
MW-64 328.97 5
MW-68 310.77 1
MW-47
MW-102
SG-4
MW-90 -44
MW-88 284.63 -3
MW-89 -50
MW-85 283.55 0
MW-22P -33
MW-67 293.12 5
MW-30A
EW-25
MW-65 -18
MW-86 285.32 -2
MW-43 -37
MW-63
MW-80 288.76 -10
MW-62
MW-75 -14
MW-91 -22
MW-87 286.71 -3
MW-74R 288.15 -3
MW-100 319.52 -2
MW-60
MW-71
MW-76 357.22 -6
MW-57 -30
MW-59 -48
MW-66 291.01 -3
MW-77 Decommissioned
MW-24 -42
MW-82 351.73 -3
MW-101
MW-58a -58
MW-56 -32
MW-73 293.00 -5
MW-78 Decommissioned
MW-94 356.13 1
MW-84 292.65 0
MW-70 Decommissioned
MW-72 307.15 -4
MW-69 294.49 -1
MW-21 -29
MW-83 353.32 -3
MW-95 317.43 -3

15-207
15-208
15-209
Issaquah
Issaquah1
McDonald3
3
4
5
K-2a
P-2
M-2a
J-2a
G-2a
L-2a
V-2a

Legend

- MW-76 357.22 -6 — Well recommended for quarterly groundwater quality monitoring
- MW-68 310.77 1 — Well recommended for semi-annual groundwater quality monitoring
- MW-81 306.95 2 — Contingency monitoring well (sample if assessment monitoring is triggered in upgradient well)
- MW-104 — Well recommended for Quarterly static water levels
- MW-70 322.79 5 — Regional Aquifer monitoring well; Groundwater elevation - April 2009; Position (ft) of top of screen with respect to water table (April 2009)
- MW-47 — Perched Zone Aquifer monitoring well
- EB-6 — Perched Zone Piezometer
- EW-25 — Groundwater extraction well
- SG-4 — Staff Gauge with Piezometer
- SW-E1 — Surface water monitoring station

N

0 800 1600 Feet

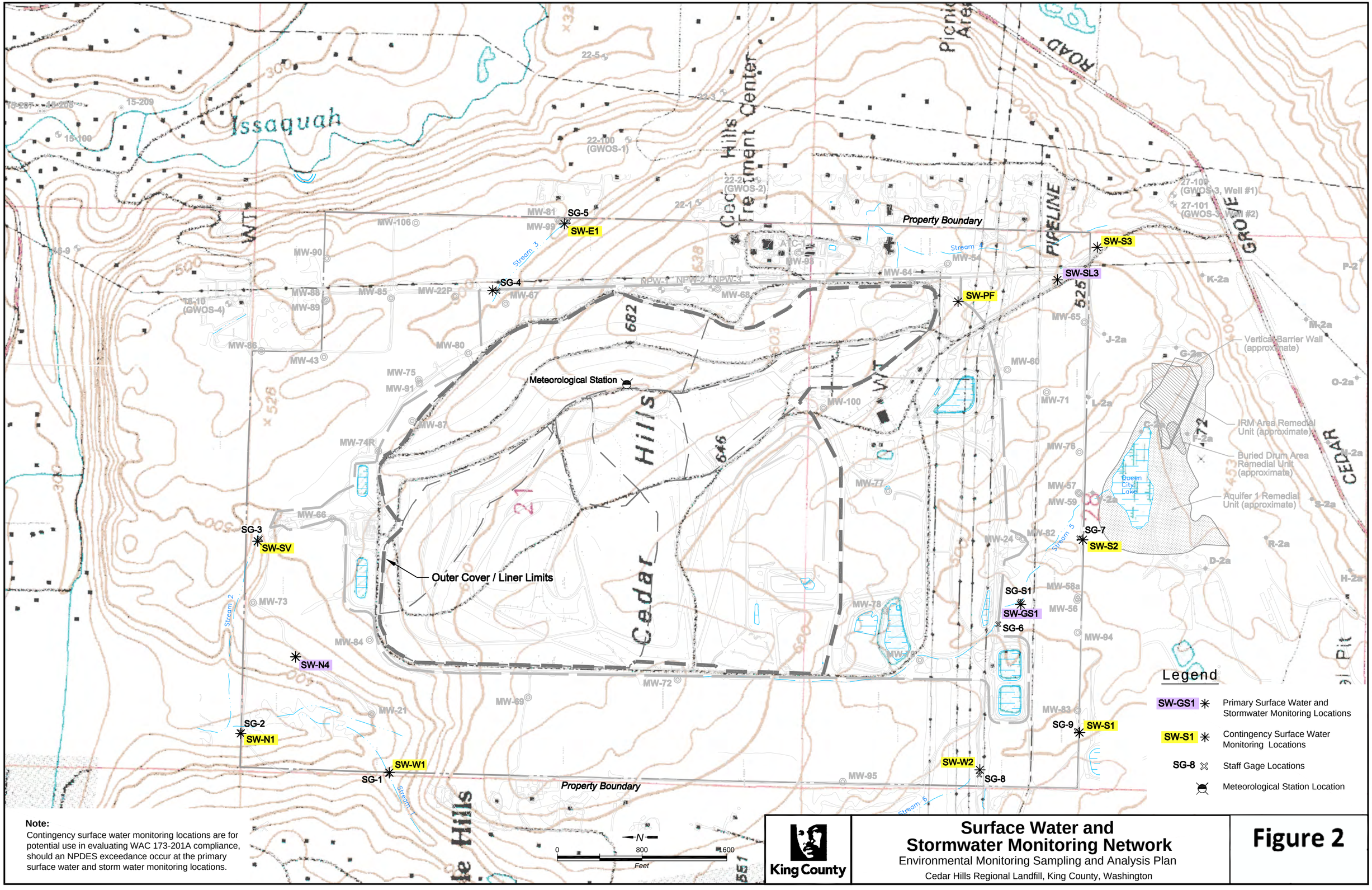
King County

Groundwater Monitoring Network

Environmental Monitoring Sampling and Analysis Plan
Cedar Hills Regional Landfill, King County, Washington

Figure 1

CAD Path: Q:\Cedar Hills\2013-11 SAP\Q40122-71-Recovered.dwg Figure 7.1 (11 x 17) || Coordinate System: NAD 1983 State Plane Washington North FIPS 4601 Feet || Date Saved: Dec 31, 2013 11:59am || User: mscrafford



Note:
Contingency surface water monitoring locations are for potential use in evaluating WAC 173-201A compliance, should an NPDES exceedance occur at the primary surface water and storm water monitoring locations.

Legend

SW-GS1 ✳	Primary Surface Water and Stormwater Monitoring Locations
SW-S1 ✳	Contingency Surface Water Monitoring Locations
SG-8 ⊗	Staff Gage Locations
	Meteorological Station Location

King County

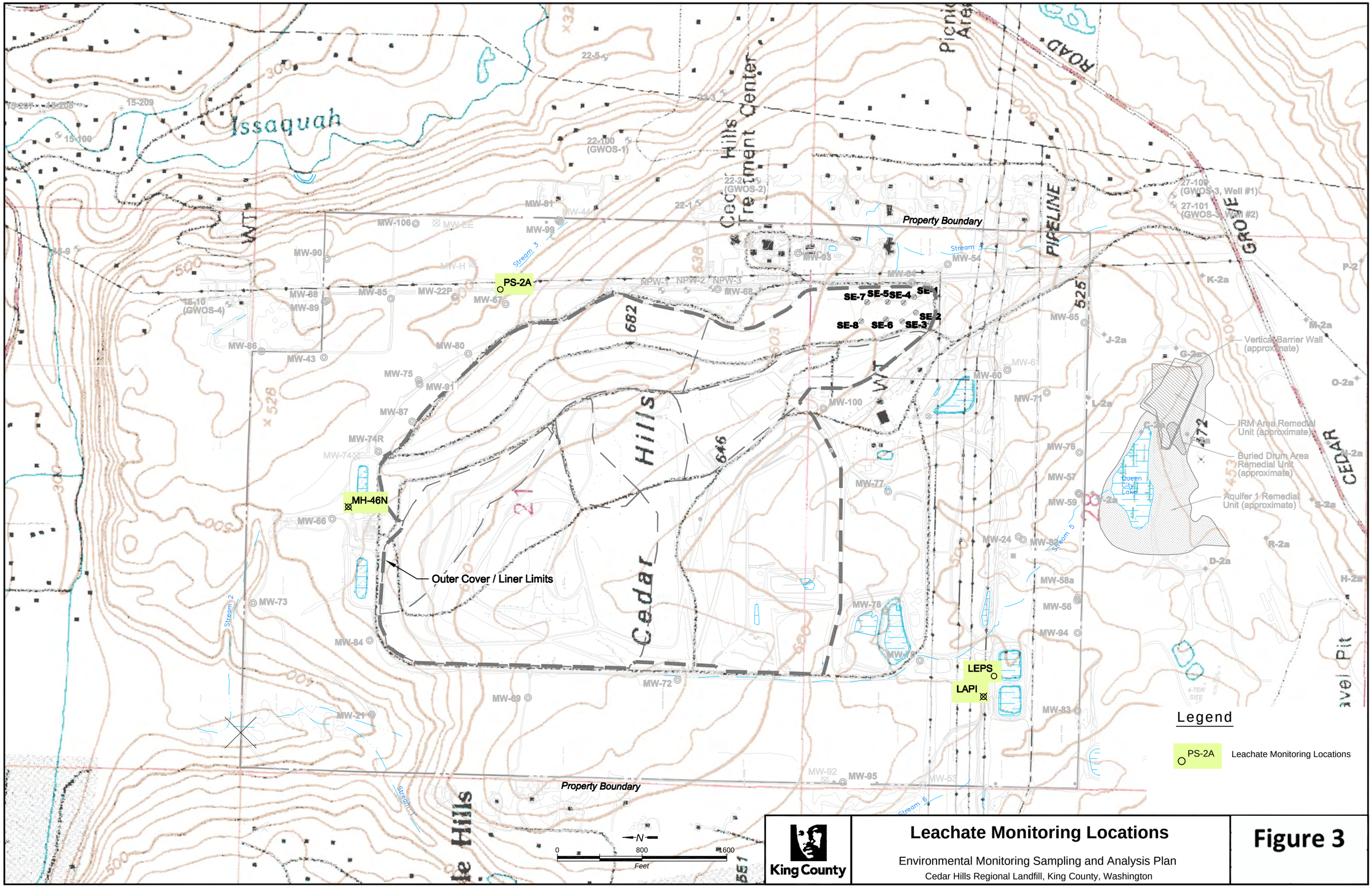
Surface Water and Stormwater Monitoring Network

Environmental Monitoring Sampling and Analysis Plan

Cedar Hills Regional Landfill, King County, Washington

Figure 2

CAD Path: Q:\Cedar Hills\2012-01 Environmental Analysis Plan\040122-81_2012.dwg Figure 8.1 (11 x 17) || Coordinate System: NAD 1927 State Plane Washington North FIPS 4601 Feet || Date Saved: Jan 25, 2012 11:47am || User: pbaker



King County

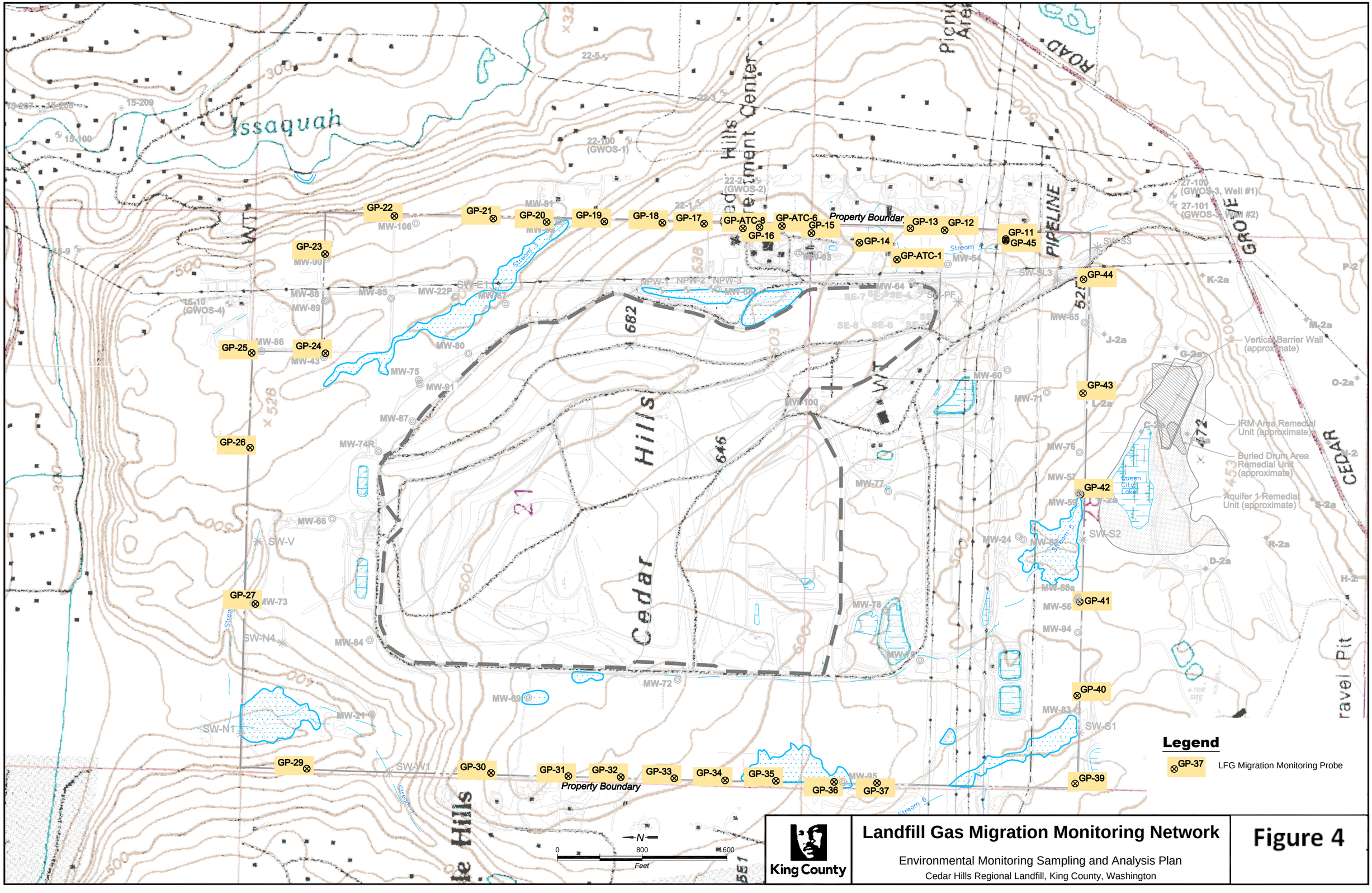
Leachate Monitoring Locations

Environmental Monitoring Sampling and Analysis Plan

Cedar Hills Regional Landfill, King County, Washington

Figure 3

CAD Path: Q:\Cedar Hills\2012-01 Environmental Analysis Plan\040122-91.dwg Figure 10.1 (11 x 17) || Coordinate System: NAD 1927 State Plane Washington North FIPS 4601 Feet || Date Saved: Jan 27, 2012 12:21pm || User: pbaker


GP-22
GP-21
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GP-17
GP-ATC-8
GP-ATC-6
GP-16
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GP-30
GP-31
GP-32
GP-33
GP-34
GP-35
GP-36
GP-37
GP-43
GP-42
GP-41
GP-40
GP-39
Property Boundary
Issaquah
Hills Center
Cedar Hills
PIPELINE
ROAD
GROVE
Stream 3
Stream 1
Stream 5
Stream 6
Stream 7
Vertical Barrier Wall (approximate)
IRM Area Remedial Unit (approximate)
Buried Drum Area Remedial Unit (approximate)
Aquifer 1 Remedial Unit (approximate)
Queen City Lake
Legend
LFG Migration Monitoring Probe
N
0
800
1600
Feet
King County
Landfill Gas Migration Monitoring Network
Environmental Monitoring Sampling and Analysis Plan
Cedar Hills Regional Landfill, King County, Washington
Figure 4
CAD Path: Q:\Cedar Hills\2012-01 Environmental Analysis Plan\040122-111.dwg Site Gas Probes (11 x 17) || Coordinate System: NAD 1927 State Plane Washington North FIPS 4601 Feet || Date Saved: Nov 26, 2013 3:17pm || User: scudd

Table 1
CEDAR HILLS REGIONAL LANDFILL GROUNDWATER MONITORING WELLS

Well Name	General Condition				Recommendations				
	Casing Diameter (inches)	Well Depth (feet)	Installation Date	Water Table or Deep Zone	Well Monitoring Classification	Comments on Well Use	Static Water Level Monitoring Frequency	Water Quality Monitoring Frequency	Rationale
MW-21 (Upgradient)	6	163	5/17/83	Deep	Detection	Background	Quarterly	Semi-annual	Monitors background conditions of deep aquifer.
MW-22P (Downgradient)	2	284	5/25/83	Deep	Detection	WL only	Quarterly	None	Not effectively located for facilities or background monitoring.
MW-24 (Upgradient)	6	192	6/2/83	Deep	Detection	Background	Quarterly	Semi-annual	Twice-annual monitoring of QCF impacts in deep upgradient well. Monitor SWLs to define deeper Regional Aquifer flow paths.
MW-54 (Upgradient)	2	351	9/26/86	Deep	Detection	WL only	Quarterly	None	Not effectively located for facilities monitoring as it lies up gradient of the CHRLF facilities. Upgradient water quality monitored in other wells.
MW-56 (Upgradient)	2	166	10/12/88	Deep	Detection	Background	Quarterly	Semi-annual	Twice-annual monitoring of QCF impacts in upgradient well. Low groundwater velocities (0.014 ft/day) indicate slow movement of QCF contaminants through this area. Travel distance for 180 days is estimated at 2.5 ft indicating any releases would be detected with 6 month sample interval. Comparison quarterly and semiannual statistics indicates semiannual sampling does not have significant effect on trend analysis. Monitor SWLs to define deeper Regional Aquifer flow paths.
MW-57 (Upgradient)	2	144	8/22/88	Deep	Detection	WL only	Quarterly	None	Monitoring redundant with MW-59. Strong downward vertical gradients indicate impacts at MW-57 would also be detected at MW-59.
MW-58A (Upgradient)	2	219	9/26/88	Deep	Detection	WL only	Quarterly	None	Monitoring redundant with MW-56. Strong downward vertical gradients indicate impacts at MW-58A would also be detected at MW-56.
MW-59 (Upgradient)	2	180.5	8/16/88	Deep	Detection	Background	Quarterly	Quarterly	Quarterly monitoring of QCF impacts in upgradient well.
MW-60 (Upgradient)	2.5	240	9/13/91	Water Table	Detection	WL only	Quarterly	None	Upgradient flow from QCF in shallow Regional Aquifer characterized by MW-65 and MW-76. Downgradient area monitored by MW-100.
MW-64 (Upgradient)	2.5	274	3/22/93	Water Table	Detection		Quarterly	Semi-annual	Adjacent to SE Pit. Conversion from quarterly to semiannual sampling does not have significant effect on intrawell statistics.
MW-65 (Upgradient)	2.5	234	3/29/93	Deep	Detection	Background	Quarterly	Semi-annual	Twice-annual monitoring of QCF impacts in upgradient well. Monitor SWLs to define deeper Regional Aquifer flow paths.
MW-66 (Upgradient)	2.5	248	4/5/93	Water Table	Detection		Quarterly	Quarterly	Monitor north end leachate detention facilities.
MW-67 (Downgradient)	2.5	230	4/28/93	Water Table	Detection		Quarterly	Semi-annual	Monitors potential EPZ contaminants infiltrating into Regional Aquifer.
MW-68 (Cross-Gradient/ Downgradient)	2.5	353	4/15/93	Water Table	Detection		Quarterly	Quarterly	Well is completed adjacent to unlined Main Hill where downward flow from Main Hill and impacted EPZ would be captured. Monitors Main Hill gas effected area.
MW-69 (Downgradient)	2.5	371	4/23/93	Water Table	Detection		Quarterly	Quarterly	West side flow converges in this area and well is upgradient of key downgradient wells.
MW-72 (Downgradient)	2.5	376	8/7/98	Water Table	Detection		Quarterly	Quarterly	Key water quality monitoring well for southwest landfill area.
MW-73 (Upgradient)	4	206	9/3/99	Water Table	Detection	Background	Quarterly	Semi-annual	Background water quality monitoring for northwest facility area. Downgradient flow paths from well largely by-pass facility so provides only general indication of background conditions.
MW-74R (Downgradient)	4	249	11/1/00	Water Table	Detection		Quarterly	Quarterly	Detection zone monitors north end facilities. Quarterly monitoring recommended due to elevated chloride.
MW-75 (Downgradient)	4	269	9/24/99	Deep	Detection		Quarterly	Quarterly	Key downgradient monitoring well.
MW-76 (Upgradient)	4	148	10/25/99	Water Table	Detection	Background	Quarterly	Semi-annual	Monitor QCF impacts effecting upgradient water quality in shallow portion of Regional Aquifer. Low groundwater velocities (0.014 ft/day) indicate slow movement of QCF contaminants through this area. Travel distance for 180 days is estimated at 2.5 ft indicating any releases would be detected with 6 month sample interval. Comparison of annual and semiannual statistics indicates semiannual sampling does not have significant effect on trend analysis. Additional demonstration for reduction in water quality sampling frequency is presented in Appendix F.

Table 1
CEDAR HILLS REGIONAL LANDFILL GROUNDWATER MONITORING WELLS

Well Name	General Condition				Recommendations				
	Casing Diameter (inches)	Well Depth (feet)	Installation Date	Water Table or Deep Zone	Well Monitoring Classification	Comments on Well Use	Static Water Level Monitoring Frequency	Water Quality Monitoring Frequency	Rationale
MW-80 (Downgradient)	4	259	2/27/01	Water Table	Detection		Quarterly	Quarterly	Key downgradient monitoring well for monitoring impacts from unlined Main Hill and EPZ.
MW-81 (Upgradient)	4	192	10/3/02	Water Table	Detection		Quarterly	Quarterly	Monitors ground water quality from off-site area east of facility. Retain as monitoring point to monitor for potential LFG impacts to groundwater. Key well for defining potentiometric divide on east side.
MW-82 (Upgradient)	4	133	11/2/00	Water Table	Detection	Background	Quarterly	Semi-annual	Twice-annual monitoring of QCF impacts in shallow Regional upgradient well. Low groundwater velocities (0.014 ft/day) indicate slow movement of QCF contaminants through this area. Travel distance for 180 days is estimated at 2.5 ft indicating any releases would be detected with 6 month sample interval. Comparison quarterly and semiannual statistics indicates semiannual sampling does not have significant effect on trend analysis. Monitor SWLs to define deeper Regional Aquifer flow paths.
MW-83 (Upgradient)	4	154	10/27/00	Water Table	Detection	Background	Quarterly	Quarterly	Quarterly monitoring of QCF impacts in shallow Regional upgradient well.
MW-84 (Upgradient)	4	246	10/20/00	Water Table	Detection	Background	Quarterly	Quarterly	Monitor background conditions in shallow regional aquifer
MW-85 (Downgradient)	4	257	12/1/00	Water Table	Detection		Quarterly	Quarterly	Key downgradient monitoring well with large detection zone underlying waste placement areas. Located in area of convergent groundwater flow and near center of high transmissivity channel.
MW-86 (Downgradient)	4	259	12/12/00	Water Table	Detection		Quarterly	Semi-annual	Provides monitoring of north end facilities. Conversion from quarterly to semiannual sampling does not have significant effect on intrawell statistics.
MW-87 (Downgradient)	4	261	11/21/00	Water Table	Detection		Quarterly	Quarterly	Key downgradient monitoring well.
MW-88 (Downgradient)	4	239	9/13/01	Water Table	Detection		Quarterly	Semi-annual	Provides limited monitoring of north end facilities. Conversion from quarterly to semiannual sampling does not have significant effect on intrawell statistics.
MW-89 (Downgradient)	4	291	11/12/01	Deep	Detection		Quarterly	Semi-annual	Provides limited monitoring of north end facilities in deep Regional Aquifer. Continue monitoring in place of MW-43. Conversion from quarterly to semiannual sampling does not have significant effect on intrawell statistics.
MW-90 (Downgradient)	4	274	8/14/02	Deep	Assessment		Quarterly	Contingent	Water quality monitoring redundant with MW-89. Reserve as contingency well in event assessment monitoring is triggered in MW-88,89 or 85.
MW-91 (Downgradient)	6	289	10/26/01	Deep	Detection	WL only	Quarterly	None	Large diameter well used for testing. Redundant with well MW-75. Additional demonstration for reduction in water quality sampling frequency is presented in Appendix F.
MW-93 (Cross Gradient)	4	320	6/24/02	Water Table	Detection		Quarterly	Quarterly	Well monitors the Main Hill gas affected area.
MW-94 (Upgradient)	4	145	7/2/02	Water Table	Detection	Background	Quarterly	Quarterly	Quarterly monitoring of QCF impacts in shallow Regional upgradient well.
MW-95 (Cross Gradient)	4	263	7/22/02	Water Table	Detection		Quarterly	Semi-annual	Monitor off-site water quality at south end of facility. Downgradient flow paths poorly defined and may by-pass facility. Additional demonstration for reduction in water quality sampling frequency is presented in Appendix F.
MW-99 (Upgradient)	4	279	8/30/02	Deep	Assessment		Quarterly	Contingent	Monitors easterly upgradient water quality from offsite. Reserve as contingency well in event assessment monitoring is triggered in MW-81. Additional demonstration for reduction in water quality sampling frequency is presented in Appendix F.
MW-100 (Downgradient)	4	300	8/26/02	Water Table	Detection		Quarterly	Semi-annual	Well useful for flowpath and geochemical modeling. Assists in tracking QCF contaminant migration through facility. Additional demonstration for reduction in water quality sampling frequency is presented in Appendix F.
MW-106 (Cross gradient)	4	203	2/19/09	Water Table	Detection	WL only	Quarterly	None	Defines east side flow paths.

Table 1
CEDAR HILLS REGIONAL LANDFILL GROUNDWATER MONITORING WELLS

Well Name	General Condition				Recommendations				
	Casing Diameter (inches)	Well Depth (feet)	Installation Date	Water Table or Deep Zone	Well Monitoring Classification	Comments on Well Use	Static Water Level Monitoring Frequency	Water Quality Monitoring Frequency	Rationale
East Main Hill Perched Zones									
EB-5	2	60	5/06/90	EPZ	Assessment	WL only	Quarterly	None	Monitor water levels to evaluate affect of extraction system shut down.
EB-5S	2	20	6/06/90	EPZ	Assessment	WL only	Quarterly	None	Monitor water levels to evaluate affect of extraction system shut down.
EB-6	2	30	11/28/90	EPZ	Assessment	WL only	Quarterly	None	Monitor water levels to evaluate affect of extraction system shut down. Well has limited water yield limiting ability to collect samples.
EW-25	6	36	6/10/92	EPZ	Assessment		Quarterly	Quarterly	Key EPZ compliance well. Temporary monitoring point sampled with passive diffusion sampler.
MW-30A	3	35	6/09/89	EPZ	Assessment		Quarterly	Quarterly	Monitor attenuating VOCs.
MW-47	2	44	5/31/85	EPZ	Assessment		Quarterly	Quarterly	Key EPZ compliance well.
MW-62	2	54	1/02/90	EPZ	Assessment		Quarterly	Quarterly	Monitor attenuating VOCs.
MW-63	2	17	12/02/90	EPZ	Assessment	WL only	Quarterly	None	Monitor water levels to evaluate affect of extraction system shut down.
MW-102	2	50	1/27/09	EPZ	Assessment	WL only	Quarterly	None	Monitor water levels to evaluate affect of extraction system shut down.
MW-103	2	35	1/28/09	EPZ	Assessment	WL only	Quarterly	None	Monitor water levels to evaluate affect of extraction system shut down.
MW-104	2	32	1/29/09	EPZ	Assessment	WL only	Quarterly	None	Monitor water levels to evaluate affect of extraction system shut down.
South Solid Waste Area Perched Zone									
MW-101	2	54	6/2/06	SSWA	Assessment		Quarterly	Quarterly	Key SSWA perched zone compliance well

Notes:
(1) The following wells were decommissioned: MW-70, MW-77, MW-78, MW-96 and MW-97 as of 2016.
(2) Shallow wells are wells completed in the Regional Aquifer with the top screen slot within 10 ft of the water table. Deep wells are completed in the Regional Aquifer with the top screen slot greater than 10 ft below the water table.
(3) Water quality monitoring shading relates to Figure 2.

Abbreviations:
WL = Water Level
NA = Not Applicable
DZ = Detection Zone EPZ = East Perched Zone
SSWA = South Solid Waste Area QCF = Queen City Farms

TABLE 2

GROUNDWATER MONITORING ACTIVITIES 1st QUARTER 2018

Well ID	Zone	Date	Planned Activity	Sample ID	Comment
EW-25	Perched	2/6/18	Quarterly Groundwater Sampling	EW25180206-	
EW-25	Perched	1/8/18	Groundwater Elevation Measurement	NA	
EW-25	Perched	2/5/18	Groundwater Elevation Measurement	NA	
MW-21	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-22	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-24	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-25	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-27A	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-28	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-29	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-30A	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-30A	Perched	2/5/18	Groundwater Elevation Measurement	NA	
MW-30A	Perched	2/7/18	Quarterly Groundwater Sampling	W30A180207-	
MW-41D	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-41S	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-43	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-45	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-47	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-47	Perched	2/5/18	Groundwater Elevation Measurement	NA	
MW-47	Perched	2/6/18	Quarterly Groundwater Sampling	W47-180206-	
MW-48	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-50	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-54	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-55	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-56	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-57	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-58A	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-59	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-59	Regional	1/9/18	Quarterly Groundwater Sampling	W59-180109-	
MW-60	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-62	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-62	Regional	2/5/18	Groundwater Elevation Measurement	NA	
MW-62	Perched	2/7/18	Quarterly Groundwater Sampling	W62-180207-	
MW-63	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-63	Regional	2/5/18	Groundwater Elevation Measurement	NA	
MW-64	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-65	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-66	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-66	Regional	1/12/18	Quarterly Groundwater Sampling	W66-180112-	
MW-67	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-67	Regional	2/5/18	Groundwater Elevation Measurement	NA	
MW-68	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-68	Regional	1/12/18	Quarterly Groundwater Sampling	W68-180112-	
MW-68	Regional	2/23/18	Quarterly Groundwater Sampling	W68-180223-	
MW-69	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-69	Regional	1/24/18	Quarterly Groundwater Sampling	W69-180124-	
MW-72	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-72	Regional	1/19/18	QA/QC Sample	W72-180119D	Field Duplicate
MW-72	Regional	1/19/18	Quarterly Groundwater Sampling	W72-180119-	
MW-73	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-74	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-74	Regional	1/11/18	Quarterly Groundwater Sampling	W74R180111-	
MW-75	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-75	Regional	1/11/18	Quarterly Groundwater Sampling	W75-180111-	
MW-76	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-79	Regional	1/8/18	Groundwater Elevation Measurement	NA	Damaged
MW-80	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-80	Regional	1/9/18	Quarterly Groundwater Sampling	W80-180109-	
MW-81	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-81	Regional	1/9/18	Quarterly Groundwater Sampling	W81-180109-	

TABLE 2

GROUNDWATER MONITORING ACTIVITIES 1st QUARTER 2018

Well ID	Zone	Date	Planned Activity	Sample ID	Comment
MW-82	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-83	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-83	Regional	1/9/18	Quarterly Groundwater Sampling	W83-180109-	
MW-84	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-84	Regional	1/22/18	Quarterly Groundwater Sampling	W84-180122-	
MW-85	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-85	Regional	1/12/18	Quarterly Groundwater Sampling	W85-180112-	
MW-86	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-87	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-87	Regional	1/11/18	Quarterly Groundwater Sampling	W87-180111-	
MW-88	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-89	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-90	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-91	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-93	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-93	Regional	1/24/18	Quarterly Groundwater Sampling	W93-180124-	
MW-94	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-94	Regional	1/11/18	Quarterly Groundwater Sampling	W94-180111-	
MW-95	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-98	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-99	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-100	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-101	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-101	Perched	2/6/18	Quarterly Groundwater Sampling	W101180206-	
MW-102	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-102	Perched	2/5/18	Groundwater Elevation Measurement	NA	
MW-103	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-103	Perched	2/5/18	Groundwater Elevation Measurement	NA	
MW-104	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-104	Perched	2/5/18	Groundwater Elevation Measurement	NA	
MW-105	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-105	Perched	1/22/18	Leachate Lagoon Monitoring	NA	Conductivity only
MW-106	Regional	1/8/18	Groundwater Elevation Measurement	NA	
MW-106	Regional	2/5/18	Groundwater Elevation Measurement	NA	
MW-EB5	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-EB5	Perched	2/5/18	Groundwater Elevation Measurement	NA	
MW-EB5S	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-EB5S	Perched	2/5/18	Groundwater Elevation Measurement	NA	
MW-EB6	Perched	1/8/18	Groundwater Elevation Measurement	NA	
MW-EB6	Perched	2/5/18	Groundwater Elevation Measurement	NA	
WS-NPW-1	Regional	1/8/18	Groundwater Elevation Measurement	NA	
WS-NPW-3	Regional	1/8/18	Groundwater Elevation Measurement	NA	
SW-E1	Perched	2/6/2018	East Perched Zone SW Monitoring	SE1-180206Q	
Field Blank	NA	2/6/18	QA/QC Sample	EW25180206F	
Field Blank	NA	2/7/18	QA/QC Sample	W62-180207F	
EQUIPMENT BLANK	NA	3/1/2018	QA/QC Sample	WU1H180301E	
EQUIPMENT BLANK	NA	3/1/2018	QA/QC Sample	WU1M180301E	
EQUIPMENT BLANK	NA	3/1/2018	QA/QC Sample	WU1S180301E	

NA = No sample ID assigned, No sample collected.

Table 3
GROUNDWATER CONCENTRATIONS ABOVE WAC 173-200-040 CRITERIA
WATER QUALITY STANDARDS FOR GROUND WATERS OF THE STATE OF WASHINGTON

CEDAR HILLS REGIONAL LANDFILL REGIONAL AQUIFER
(Data Collected from January 1, 2018 to March 31, 2018)

Parameter	Units	Well ID	Sample Date	Sample ID	Sample Value
Upgradient and Crossgradient Wells					
pH (Field)	pH Units	MW-81	1/9/2018	W81-180109-	6.45
		MW-94	1/11/2018	W94-180111-	6.29
Arsenic (Total)	(mg/L)	MW-59	1/9/2018	W59-180109-	0.000422
		MW-66	1/12/2018	W66-180112-	0.000654
		MW-81	1/9/2018	W81-180109-	0.000541
		MW-83	1/9/2018	W83-180109-	0.000428
		MW-84	1/22/2018	W84-180122-	0.000353
		MW-93	1/24/2018	W93-180124-	0.00136
		MW-94	1/11/2018	W94-180111-	0.000148
Iron (Dissolved)	(mg/L)	MW-59	1/9/2018	W59-180109-	3.72
Manganese (Dissolved)	(mg/L)	MW-59	1/9/2018	W59-180109-	0.12
		MW-93	1/24/2018	W93-180124-	0.205
Wells Downgradient to Waste Cells and North end Facilities					
Arsenic (Total)	(mg/L)	MW-68	2/23/2018	W68-180223-	0.0213
		MW-69	1/24/2018	W69-180124-	0.00238
		MW-72	1/19/2018	W72-180119-	0.000107
		MW-74	1/11/2018	W74R180111-	0.000416
		MW-75	1/11/2018	W75-180111-	0.000555
		MW-80	1/9/2018	W80-180109-	0.004
		MW-85	1/12/2018	W85-180112-	0.000736
		MW-87	1/11/2018	W87-180111-	0.00527
Iron (Dissolved)	(mg/L)	MW-68	2/23/2018	W68-180223-	0.584
		MW-69	1/24/2018	W69-180124-	1.1
		MW-72	1/11/2018	W72-180119-	2.61
		MW-75	1/11/2018	W75-180111-	2.09
		MW-80	1/12/2018	W80-180109-	2.02
		MW-87	1/11/2018	W87-180111-	4.73
Manganese (Dissolved)	(mg/L)	MW-68	2/23/2018	W68-180223-	0.306
		MW-69	1/24/2018	W69-180124-	0.26
		MW-72	1/19/2018	W72-180119-	0.36
		MW-75	1/11/2018	W75-180111-	0.179
		MW-80	1/9/2018	W80-180109-	0.327
		MW-87	1/11/2018	W87-180111-	0.518

Table 4
Ion Balance Calculations
Cedar Hills Regional Landfill Quarterly and Semi-Annual Regional Aquifer Groundwater Monitoring

Data Collected from January 1, 2018 to March 31, 2018

			Upgradient and Crossgradient															
Site ID			**MW-59**			**MW-83**			**MW-94**			**MW-81**			**MW-84**			**MW-66**		
			1/9/18			1/9/18			1/11/18			1/9/18			1/22/18			1/12/18		
Cations	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
pH			6.6			6.6			6.3			6.5			6.6			6.8		
Conductance			196			639			302			159			180			218		
TDSobs			124			426			194			109			110			132		
Calcium	40.1	2	16.0	0.7984	39.1	67.3	3.35828	51.5	30.7	1.53194	49.7	13.5	0.67365	41.7	13.1	0.65369	35.7	16.7	0.83333	36.0
Magnesium	24.3	2	9.9	0.81136	39.8	28.9	2.37811	36.5	13.8	1.13557	36.8	7.6	0.62456	38.7	10.5	0.86402	47.2	13.5	1.11088	48.0
Potassium	39.1	1	1.1	0.02813	1.4	3.6	0.09105	1.4	2.3	0.05806	1.9	0.8	0.02051	1.3	1.1	0.02788	1.5	1.2	0.03044	1.3
Sodium	23.0	1	6.1	0.26403	12.9	16.0	0.69596	10.7	8.1	0.3532	11.5	6.8	0.29578	18.3	6.6	0.28491	15.6	7.8	0.33972	14.7
Iron	55.8	2	3.72	0.13322	6.5	0.01	0.00036	0.0	0.12	0.00415	0.1	0.01	0.00036	0.0	0.01	0.00036	0.0	0.01	0.00036	0.0
Manganese	54.9	2	0.12	0.00437	0.2	0.00	9.7E-05	0.0	0.00	0.00016	0.0	0.00	3.6E-06	0.0	0.01	0.00047	0.0	0.00	4.3E-06	0.0
Ammonia-N	14.0	1	0.01	0.00036	0.0	0.00	0.00014	0.0	0.00	0.00019	0.0	0.00	0.00014	0.0	0.00	0.00014	0.0	0.00	0.00014	0.0
Total Cations (meq/L)				**2.0**			**6.5**			**3.1**			**1.6**			**1.8**			**2.3**	
Anions																				
Alkalinity, Total			66			194			103			55			68			88		
Carbonate	60.0	2	0.017	0.00057	0.0	0.04751	0.00158	0.0	0.01208	0.0004	0.0	0.00929	0.00031	0.0	0.01792	0.0006	0.0	0.0358	0.00119	0.1
Bicarbonate	61.0	1	80.85	1.32523	72.1	236.58	3.87783	61.8	125.64	2.05929	71.4	66.84	1.09553	72.0	83.29	1.3652	76.9	107.41	1.76054	80.7
Chloride	35.5	1	6.7	0.18926	10.3	74.3	2.09573	33.4	24.3	0.68541	23.8	4.9	0.13821	9.1	3.7	0.10295	5.8	4.7	0.13257	6.1
Nitrate-N	14.0	1	0.01	0.00071	0.0	1.45	0.10352	1.6	0.30	0.0212	0.7	1.34	0.09567	6.3	0.15	0.01078	0.6	0.52	0.03705	1.7
Sulfate	96.1	2	15.5	0.32272	17.6	9.6	0.19905	3.2	5.6	0.11618	4.0	9.3	0.19259	12.7	14.2	0.29566	16.7	12.0	0.24985	11.5
Total Anions (meq/L)				**1.8**			**6.3**			**2.9**			**1.5**			**1.8**			**2.2**	
Total Ions (meq/L)				**3.9**			**12.8**			**6.0**			**3.1**			**3.6**			**4.5**	
Cation/Anion Ratio				**1.11**			**1.04**			**1.07**			**1.06**			**1.03**			**1.06**	
Percent Difference			**5.2**			**1.9**			**3.4**			**3.0**			**1.6**			**3.0**		
Trilinear Diagram Data																				
sum (Ca, Mg, Na+K)				1.90			6.52			3.08			1.61			1.83			2.31	
Calcium					41.98			51.48			49.76			41.72			35.71			36.01
Magnesium					42.66			36.46			36.88			38.68			47.20			48.00
Sodium + Potassium					15.36			12.06			13.36			19.59			17.09			15.99
					100.0			100.0						100.0			100.0			100.0
sum (SO_4, Cl, HCO_3+CO_3)				1.84			6.17			2.86			1.43			1.76			2.14	
Sulfate					17.560			3.224			4.060			13.500			16.757			11.653
Chloride					10.299			33.943			23.955			9.688			5.835			6.183
Bicarbonate + Carbonate					72.141			62.833			71.985			76.812			77.408			82.165
					100.0			100.0												

Table 4
Ion Balance Calculations
Cedar Hills Regional Landfill Quarterly and Semi-Annual Regional Aquifer Groundwater Monitoring

Data Collected from January 1, 2018 to March 31, 2018

																			Downgradient to Waste Cells and North End Facilities
Site ID			**MW-93**			**MW-68**			**MW-69**			**MW-72**			**MW-74**			**MW-75**		
			1/24/18			2/23/18			1/24/18			1/19/18			1/11/18			1/11/18		
Cations	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
pH			6.9			7.1			7.3			6.8			6.8			6.6		
Conductance			324			284			327			343			559			359		
TDSobs			199			173			193			208			326			225		
Calcium	40.1	2	31.1	1.5519	44.9	26.9	1.34232	44.3	32.9	1.64172	48.0	32.1	1.6018	42.5	48.4	2.41517	38.7	30.1	1.502	38.9
Magnesium	24.3	2	17.4	1.4318	41.4	14.9	1.22609	40.4	15.9	1.30837	38.2	19.9	1.63752	43.4	38.5	3.16807	50.8	22.0	1.81033	46.9
Potassium	39.1	1	1.6	0.04143	1.2	1.7	0.04322	1.4	1.8	0.04681	1.4	2.0	0.05166	1.4	2.3	0.05908	0.9	2.0	0.05192	1.3
Sodium	23.0	1	9.7	0.42193	12.2	8.9	0.38756	12.8	8.6	0.37495	11.0	8.5	0.37103	9.8	13.7	0.59592	9.6	9.5	0.41192	10.7
Iron	55.8	2	0.01	0.00036	0.0	0.58	0.02091	0.7	1.10	0.03939	1.2	2.61	0.09347	2.5	0.01	0.00036	0.0	2.09	0.07485	1.9
Manganese	54.9	2	0.21	0.00746	0.2	0.31	0.01114	0.4	0.26	0.00947	0.3	0.36	0.01311	0.3	0.00	3.6E-06	0.0	0.18	0.00652	0.2
Ammonia-N	14.0	1	0.05	0.00392	0.1	0.02	0.00122	0.0	0.02	0.00167	0.0	0.02	0.00114	0.0	0.00	0.00018	0.0	0.01	0.00066	0.0
Total Cations (meq/L)				**3.5**			**3.0**			**3.4**			**3.8**			**6.2**			**3.9**	
Anions																				
Alkalinity, Total			121			129			135			126			227			106		
Carbonate	60.0	2	0.0591	0.00197	0.1	0.08695	0.0029	0.1	0.15091	0.00503	0.2	0.0467	0.00156	0.0	0.08221	0.00274	0.0	0.02368	0.00079	0.0
Bicarbonate	61.0	1	147.50	2.41767	73.2	157.20	2.57671	85.5	164.39	2.69456	81.1	153.63	2.51806	73.2	276.77	4.53658	77.4	129.27	2.11889	59.8
Chloride	35.5	1	3.0	0.0849	2.6	3.1	0.08716	2.9	3.8	0.10803	3.3	5.9	0.16501	4.8	24.0	0.67695	11.5	9.8	0.2767	7.8
Nitrate-N	14.0	1	0.02	0.00107	0.0	0.01	0.00071	0.0	0.01	0.00071	0.0	0.01	0.00071	0.0	0.30	0.02142	0.4	0.01	0.00071	0.0
Sulfate	96.1	2	38.3	0.79744	24.1	16.6	0.34563	11.5	24.7	0.51427	15.5	36.2	0.75371	21.9	30.0	0.62463	10.7	55.0	1.14515	32.3
Total Anions (meq/L)				**3.3**			**3.0**			**3.3**			**3.4**			**5.9**			**3.5**	
Total Ions (meq/L)				**6.8**			**6.0**			**6.7**			**7.2**			**12.1**			**7.4**	
Cation/Anion Ratio				**1.05**			**1.01**			**1.03**			**1.10**			**1.06**			**1.09**	
Percent Difference			**2.3**			**0.3**			**1.5**			**4.6**			**3.1**			**4.3**		
Trilinear Diagram Data																				
sum (Ca, Mg, Na+K)				3.45			3.00			3.37			3.66			6.24			3.78	
Calcium					45.02			44.76			48.69			43.74			38.72			39.78
Magnesium					41.54			40.88			38.80			44.72			50.78			47.94
Sodium + Potassium					13.44			14.36			12.51			11.54			10.50			12.28
sum (SO_4, Cl, HCO_3+CO_3)				3.30			3.01			3.32			3.44			5.84			3.54	
Sulfate					24.150			11.473			15.481			21.921			10.694			32.335
Chloride					2.571			2.893			3.252			4.799			11.590			7.813
Bicarbonate + Carbonate					73.278			85.633			81.267			73.280			77.716			59.852

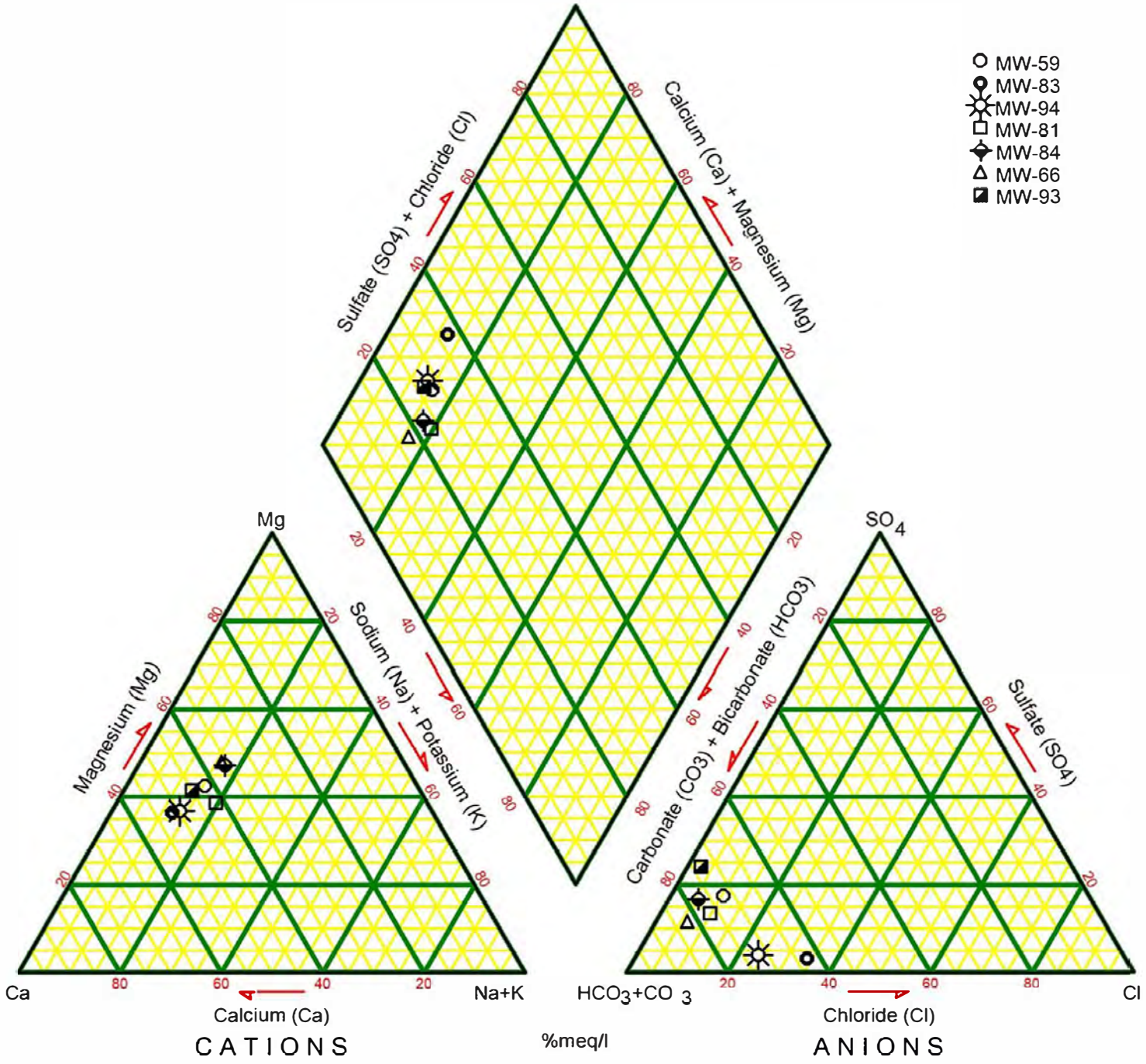
Table 4
Ion Balance Calculations
Cedar Hills Regional Landfill Quarterly and Semi-Annual Regional Aquifer Groundwater Monitoring

Data Collected from January 1, 2018 to March 31, 2018

Site ID			**MW-80**			**MW-85**			**MW-87**		
			1/9/18			1/12/18			1/11/18		
Cations	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
pH			6.9			6.6			6.8		
Conductance			312			347			527		
TDSobs			202			212			361		
Calcium	40.1	2	30.5	1.52196	46.0	32.5	1.62176	43.5	46.9	2.34032	41.7
Magnesium	24.3	2	15.9	1.30837	39.6	19.8	1.62929	43.7	30.9	2.54269	45.4
Potassium	39.1	1	1.6	0.04195	1.3	1.7	0.0445	1.2	2.5	0.0642	1.1
Sodium	23.0	1	8.0	0.34798	10.5	9.9	0.42932	11.5	10.8	0.46977	8.4
Iron	55.8	2	2.02	0.07234	2.2	0.01	0.00036	0.0	4.73	0.16939	3.0
Manganese	54.9	2	0.33	0.0119	0.4	0.00	3.6E-06	0.0	0.52	0.01886	0.3
Ammonia-N	14.0	1	0.01	0.00071	0.0	0.00	0.00014	0.0	0.02	0.00136	0.0
Total Cations (meq/L)				**3.3**			**3.7**			**5.6**	
Anions											
Alkalinity, Total			112			126			99		
Carbonate	60.0	2	0.04765	0.00159	0.1	0.03231	0.00108	0.0	0.03511	0.00117	0.0
Bicarbonate	61.0	1	136.54	2.23807	72.7	153.65	2.51854	72.2	120.95	1.98253	37.6
Chloride	35.5	1	4.6	0.1289	4.2	9.7	0.27304	7.8	10.8	0.30463	5.8
Nitrate-N	14.0	1	0.01	0.00071	0.0	0.11	0.00764	0.2	0.01	0.00071	0.0
Sulfate	96.1	2	34.1	0.70999	23.1	33.0	0.68709	19.7	143.0	2.97738	56.5
Total Anions (meq/L)				**3.1**			**3.5**			**5.3**	
Total Ions (meq/L)				**6.4**			**7.2**			**10.9**	
Cation/Anion Ratio				**1.07**			**1.07**			**1.06**	
Percent Difference			**3.5**			**3.3**			**3.1**		
Trilinear Diagram Data											
sum (Ca, Mg, Na+K)				3.22			3.72			5.42	
Calcium					47.26			43.54			43.20
Magnesium					40.63			43.74			46.94
Sodium + Potassium					12.11			12.72			9.86
					100.0						
sum (SO_4, Cl, HCO_3+CO_3)				3.08			3.48			5.27	
Sulfate					23.062			19.745			56.543
Chloride					4.187			7.846			5.785
Bicarbonate + Carbonate					72.750			72.408			37.672
					100.0						

Cedar Hills Regional Landfill

Figure 5. Regional Aquifer Upgradient Wells
First Quarter 2018



Cedar Hills Regional Landfill

Figure 6. Regional Aquifer Downgradient Wells
First Quarter 2018

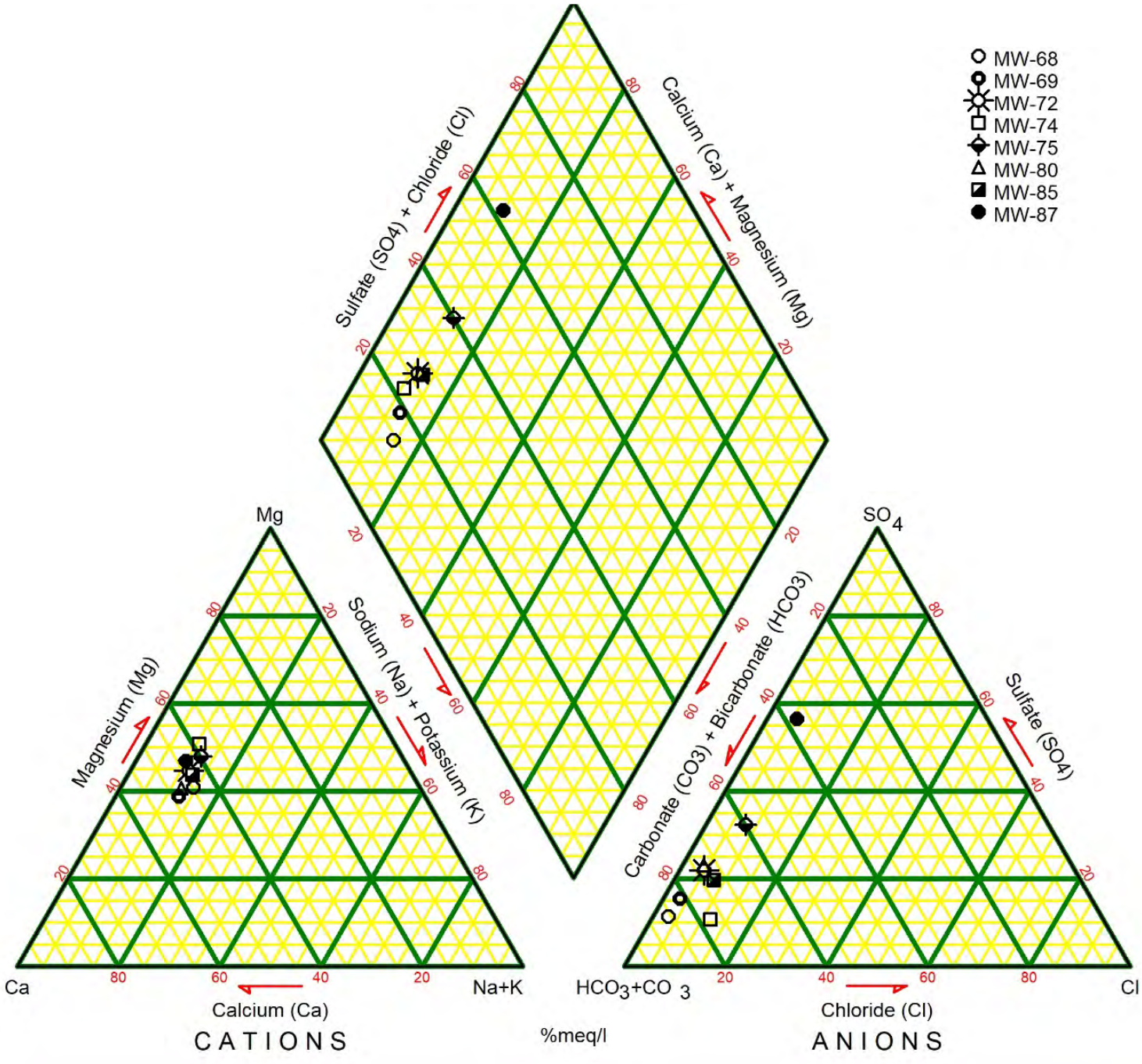


TABLE 5
CEDAR HILLS REGIONAL LANDFILL REGIONAL AQUIFER QUARTERLY MONITORING WELLS
SUMMARY OF WAC 173-351 APPENDIX I INTRAWELL PREDICTION LIMIT VALUES
(Data Collected from January 1, 2018 to March 31, 2018)

Parameter		Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc	Nitrate as N	*cis*-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride
Well	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	ug/L	*ug/L*	ug/L	ug/L
Upgradient and Crossgradient Wells																					
MW-59	Limit	0.001	0.001	0.0055	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.001	0.003	0.001	0.002	0.00748	0.29	1.37	0.2	0.45	0.02
	Result	< 0.0003	0.000422	0.00372	< 0.0001	< 0.00005	< 0.0002	< 0.00005	< 0.0002	< 0.0001	0.00025	< 0.0005	< 0.00004	< 0.0001	< 0.000075	0.00138	< 0.01	1.20	< 0.1	< 0.1	< 0.01
MW-66	Limit	0.001	0.001	0.0065	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.00104	0.003	0.001	0.002	0.004	0.881329	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.000654	0.0050	< 0.0001	< 0.00005	0.000236	< 0.00005	< 0.0002	< 0.0001	0.000249	0.001	< 0.00004	< 0.0001	0.000666	0.00181	0.519	< 0.1	< 0.1	< 0.1	< 0.01
MW-81	Limit	0.001	0.001	0.0049	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.00104	0.003	0.001	0.00253	0.00895	1.77	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.000541	0.0031	< 0.0001	< 0.00005	< 0.0002	< 0.00005	< 0.0002	< 0.0001	0.000142	0.000904	< 0.00004	< 0.0001	0.00167	0.000602	1.34	< 0.1	< 0.1	< 0.1	< 0.01
MW-83	Limit	0.001	0.001	0.0110	0.001	0.002	0.005	0.003	0.00549	0.001	0.01	0.001	0.003	0.001	0.002	0.004	4.11	0.2	0.2	3.03	0.02
	Result	< 0.0003	0.000428	0.0097	< 0.0001	< 0.00005	< 0.0002	0.000279	**0.00601**	< 0.0001	0.00284	< 0.0005	< 0.00004	< 0.0001	0.000847	0.000699	1.45	< 0.1	< 0.1	1.49	< 0.01
MW-84	Limit	0.001	0.001	0.0041	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.001	0.003	0.001	0.002	0.004	0.739614	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.000353	**0.00412**	< 0.0001	< 0.00005	< 0.0002	< 0.00005	< 0.0002	< 0.0001	0.00145	0.000878	< 0.00004	< 0.0001	0.000485	0.000697	0.151	< 0.1	< 0.1	< 0.1	< 0.01
MW-93	Limit	0.001	0.001435	0.0096	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.001	0.003	0.001	0.00231	0.0112	0.21	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.00136	0.0080	< 0.0001	< 0.00005	0.000429	9.78E-05	< 0.0002	< 0.0001	0.00041	< 0.0005	< 0.00004	< 0.0001	0.00229	0.0010	0.015	< 0.1	< 0.1	< 0.1	< 0.01
MW-94	Limit	0.001	0.001	0.0050	0.001	0.002	0.005	0.003	0.0051	0.001	0.01	0.001	0.003	0.001	0.002	0.004	2.295128	0.2	0.2	4.71	0.02
	Result	< 0.0003	0.000148	0.0027	< 0.0001	< 0.00005	0.00066	0.00017	0.00102	< 0.0001	0.00069	< 0.0005	< 0.00004	< 0.0001	0.000953	< 0.0005	0.297	< 0.1	< 0.1	2.61	< 0.01
Downgradient Wells																					
MW-68	Limit	0.001	0.495	0.0197	0.001	0.002	0.005	0.003	0.00737	0.001	0.01	0.001	0.003	0.001	0.0037	0.004	0.13	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.021	0.0108	< 0.0001	< 0.00005	0.000235	0.000257	0.0008	< 0.0001	0.000755	< 0.0005	< 0.00004	< 0.0001	0.000398	0.00141	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01
MW-69	Limit	0.001	0.004	0.0144	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.001	0.003	0.001	0.002	0.0112	0.076	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.002	0.0124	< 0.0001	< 0.00005	0.000266	< 0.00005	< 0.0002	< 0.0001	0.000248	< 0.0005	< 0.00004	< 0.0001	< 0.000075	< 0.0005	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01
MW-72	Limit	0.001	0.001	0.0156	0.001	0.002	0.005	0.003	0.00331	0.00104	0.01	0.001	0.003	0.001	0.002	0.0201	0.15	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.000	0.0118	< 0.0001	< 0.00005	0.000785	< 0.00005	0.0002	< 0.0001	0.000234	< 0.0005	< 0.00004	< 0.0001	< 0.000075	0.0017	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01
MW-74	Limit	0.001	0.001	0.0171	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.00104	0.003	0.001	0.002	0.004	0.487	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.000	0.0125	< 0.0001	< 0.00005	< 0.0002	< 0.00005	0.000213	< 0.0001	0.00112	0.000614	< 0.00004	< 0.0001	0.0006	< 0.0005	0.3	< 0.1	< 0.1	< 0.1	< 0.01
MW-75	Limit	0.001	0.001	0.0134	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.001	0.003	0.001	0.002	0.004	0.11	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.001	0.0119	< 0.0001	< 0.00005	< 0.0002	< 0.00005	< 0.0002	< 0.0001	< 0.0001	< 0.0005	< 0.00004	< 0.0001	< 0.000075	0.000577	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01
MW-80	Limit	0.001	0.039	0.0230	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.001	0.003	0.001	0.002	0.0117	0.028	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.004	0.0135	< 0.0001	< 0.00005	< 0.0002	< 0.00005	< 0.0002	< 0.0001	0.000136	< 0.0005	< 0.00004	< 0.0001	< 0.000075	0.000548	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01
MW-85	Limit	0.001	0.001	0.0071	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.00132	0.003	0.001	0.002	0.004	1.630	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.001	0.00622	< 0.0001	< 0.00005	< 0.0002	< 0.00005	< 0.0002	< 0.0001	0.000235	0.00104	< 0.00004	< 0.0001	0.0009	< 0.0005	0.107	< 0.1	< 0.1	< 0.1	< 0.01
MW-87	Limit	0.001	0.027	0.0409	0.001	0.002	0.005	0.003	0.00347	0.001	0.01	0.001	0.003	0.001	0.005	0.004	0.24	0.2	0.2	0.2	0.02
	Result	< 0.0003	0.005	0.0264	< 0.0001	< 0.00005	0.000225	0.000128	0.000389	0.000109	0.000208	< 0.0005	< 0.00004	< 0.0001	0.0012	0.000733	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01

Results greater than Limit Value in **Bold**
F2 Secondary Federal Drinking Water Quality Standard
SGW State of Washington Ground Water Quality Standard
See Revised Data Qualifier List for Qualifier Information

TABLE 6

CEDAR HILLS REGIONAL LANDFILL

VOLATILE ORGANIC COMPOUND DETECTIONS IN REGIONAL AQUIFER WELLS

(Data Collected from January 1, 2018 to March 31, 2018)

Analyte	Site ID	Date	Sample ID	Sample Value (ug/L)
Upgradient and Crossgradient Wells				
Carbon Disulfide	MW-59	01/09/18	W59-180109-	0.12 JT
cis -1,2-Dichloroethene	MW-59	1/9/2018	W59-180109-	1.2
Trichloroethene	MW-83	1/9/2018	W83-180109-	1.49
	MW-94	1/11/2018	W94-180111-	2.61
Wells Downgradient to Waste Cells and North end Facilities				
Carbon Disulfide	MW-69	1/24/2018	W69-180124-	0.15 JT
Carbon Disulfide	MW-80	01/09/18	W80-180109-	0.235

TABLE 7
SUMMARY OF EXCEEDANCES OF WAC 173-200-040
WATER QUALITY STANDARDS FOR GROUND WATERS OF THE STATE OF WASHINGTON

CEDAR HILLS REGIONAL LANDFILL PERCHED ZONES
(Data Collected from January 1, 2018 to March 31, 2018)

Parameter	Units	Well ID	Sample Date	Sample ID	Sample Value
East Perched Zone Wells					
pH	Std. Units	MW-30A	2/7/2018	W30A180207-	6.39
1,1-Dichloroethane	(ug/L)	MW-30A	2/7/2018	W30A180207-	1.48
		MW-62	2/7/2018	W62-180207-	1.44
Arsenic (Total)	(mg/L)	MW-30A	2/7/2018	W30A180207-	0.000511
		MW-47	2/6/2018	W47-180206-	0.00407
		MW-62	2/7/2018	W62-180207-	0.000423
Iron (Dissolved)	(mg/L)	MW-47	2/6/2018	W47-180206-	4.77
Manganese (Dissolved)	(mg/L)	MW-47	2/6/2018	W47-180206-	3.19
Nitrate	(mg/L)	MW-30A	2/7/2018	W30A180207-	15.3
Specific Conductance (Field)	(umhos/cm)	MW-47	2/6/2018	W47-180206-	830
Total Dissolved Solids	(mg/L)	MW-47	2/6/2018	W47-180206-	719
Vinyl Chloride	(ug/L)	MW-47	2/6/2018	W47-180206-	5.48
South Solid Waste Area Perched Wells					
Arsenic (Total)	(mg/L)	MW-101	2/6/2018	W101180206-	0.0124
Iron (Dissolved)	(mg/L)	MW-101	2/6/2018	W101180206-	1.14
Manganese (Dissolved)	(mg/L)	MW-101	2/6/2018	W101180206-	1.07
Vinyl Chloride	(ug/L)	MW-101	2/6/2018	W101180206-	0.342

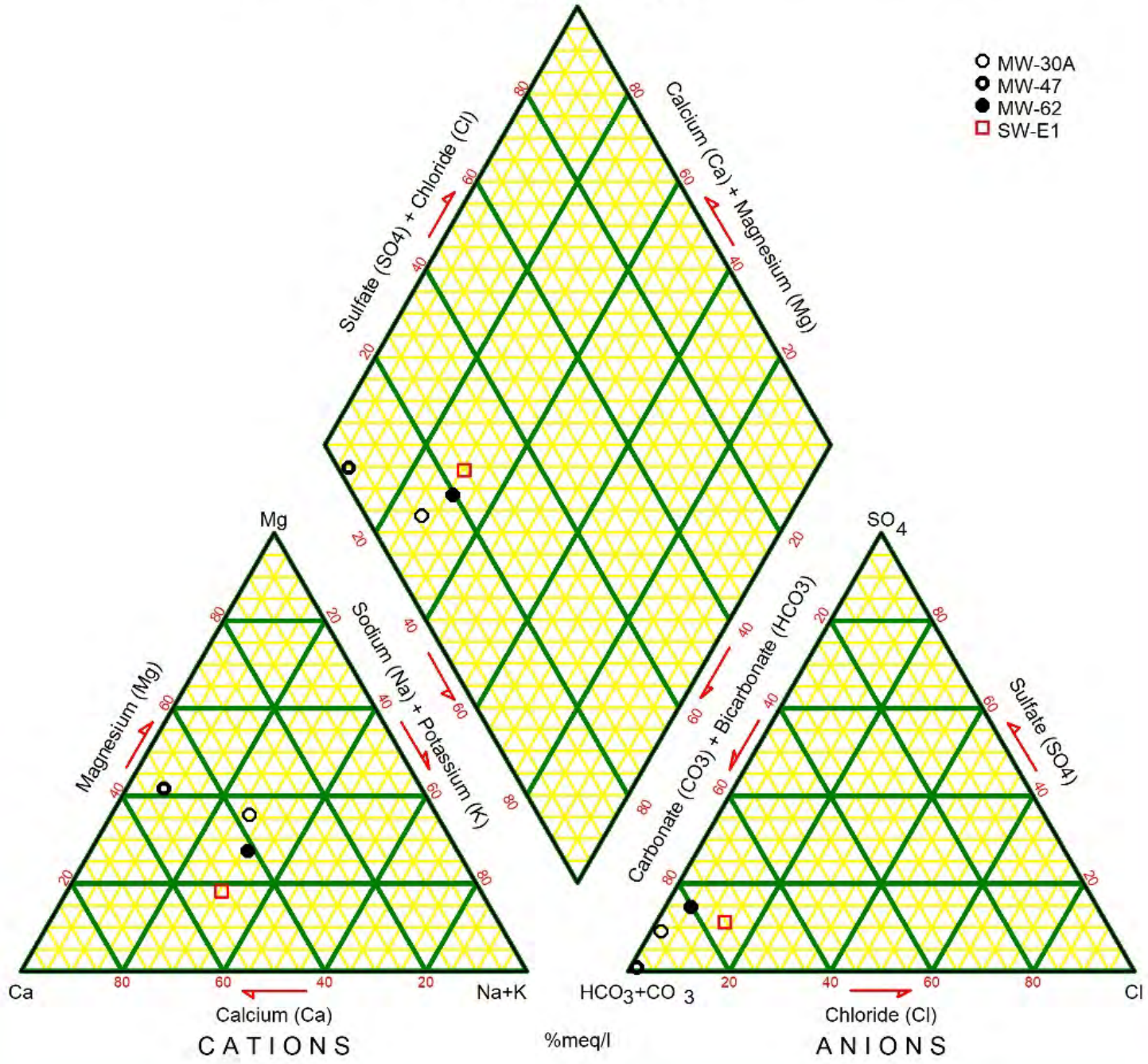
See Data Qualifier List for Qualifier Information.

		East Perched Zone												SSWA		
Site ID		**MW-30A**			**MW-47**			**MW-62**			**SW-E1**			**MW-101**		
Date		2/7/18			2/6/18			2/7/18			2/6/18			2/6/18		
Cations	Molecular Weight	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
pH		6.4			6.9			6.9			5.7			7.0		
Conductance		220			830			215			38			405		
TDSobs		206			719			144			43			345		
Calcium	40.1	19.5	0.97305	37.0	140.0	6.98603	49.9	18.3	0.91317	41.4	3.9	0.19261	51.1	52.6	2.62475	43.0
Magnesium	24.3	11.4	0.93808	35.7	69.4	5.71076	40.8	7.4	0.60481	27.5	0.8	0.06871	18.2	31.3	2.5756	42.2
Potassium	39.1	1.5	0.03734	1.4	4.8	0.12353	0.9	1.1	0.02788	1.3	0.4	0.0111	2.9	2.6	0.06727	1.1
Sodium	23.0	15.6	0.67856	25.8	20.3	0.883	6.3	15.1	0.65681	29.8	2.4	0.10352	27.5	17.5	0.76121	12.5
Iron	55.8	0.0	0.00036	0.0	4.8	0.17082	1.2	0.0	0.00036	0.0	0.0	0.00075	0.2	1.1	0.04083	0.7
Manganese	54.9	0.0	5.9E-06	0.0	3.2	0.11613	0.8	0.0	6E-06	0.0	0.0	0.00012	0.0	1.1	0.03895	0.6
Ammonia-N	14.0	0.0	0.00014	0.0	0.0	0.00014	0.0	0.0	0.00014	0.0	0.0	0.00022	0.1	0.0	0.0011	0.0
Total Cations (meq/L)			**2.6**			**14.0**			**2.2**			**0.4**			**6.1**	
Anions																
Alkalinity, Total		59.7			653			73.2			11.2			305		
Carbonate	60.0	0.00881	0.00029	0.0	0.27783	0.00926	0.1	0.03659	0.00122	0.1	0.00033	1.1E-05	0.0	0.18325	0.00611	0.1
Bicarbonate	61.0	72.82	1.19353	49.0	796.10	13.0488	97.8	89.23	1.46256	71.3	13.66	0.22396	70.6	371.73	6.09297	97.5
Chloride	35.5	0.9	0.02541	1.0	5.7	0.16106	1.2	3.2	0.09139	4.5	1.4	0.04005	12.6	2.6	0.07418	1.2
Nitrate-N	14.0	15.3	1.09231	44.9	0.0	0.00071	0.0	3.2	0.22917	11.2	0.3	0.01985	6.3	0.0	0.00114	0.0
Sulfate	96.1	5.9	0.1218	5.0	5.6	0.11743	0.9	12.8	0.26651	13.0	1.6	0.03331	10.5	3.7	0.07704	1.2
Total Anions (meq/L)			**2.4**			**13.3**			**2.1**			**0.3**			**6.3**	
Total Ions (meq/L)			**5.1**			**27.3**			**4.3**			**0.7**			**12.4**	
Cation/Anion Ratio			**1.08**			**1.05**			**1.07**			**1.19**			**0.98**	
Percent Difference			**3.8**			**2.4**			**3.6**			**8.6**			**-1**	
TRILINEAR DIAGRAM DATA																
sum (Ca, Mg, Na+K)			2.63			13.70			2.20			0.38			6.03	
Calcium				37.0			51.0			41.46			51.23			43.54
Magnesium				35.7			41.7			27.46			18.28			42.72
Sodium + Potassium				27.3			7.3			31.08			30.49			13.74
										100.0			100.0			
sum (SO_4, Cl, HCO_3+CO_3)			1.34			13.34			1.82			0.30			6.25	
Sulfate				9.1			0.9			14.6			11.2			1.2
Chloride				1.9			1.2			5.0			13.5			1.2
Bicarbonate + Carbonate				89.0			97.9			80.4			75.3			97.6
										100.0			100.0			

Cedar Hills Regional Landfill

Figure 7. East Perched Zone Wells and Surface Water

First Quarter 2018



Cedar Hills Regional Landfill

Figure 8. South Perched Zone Wells
First Quarter 2018

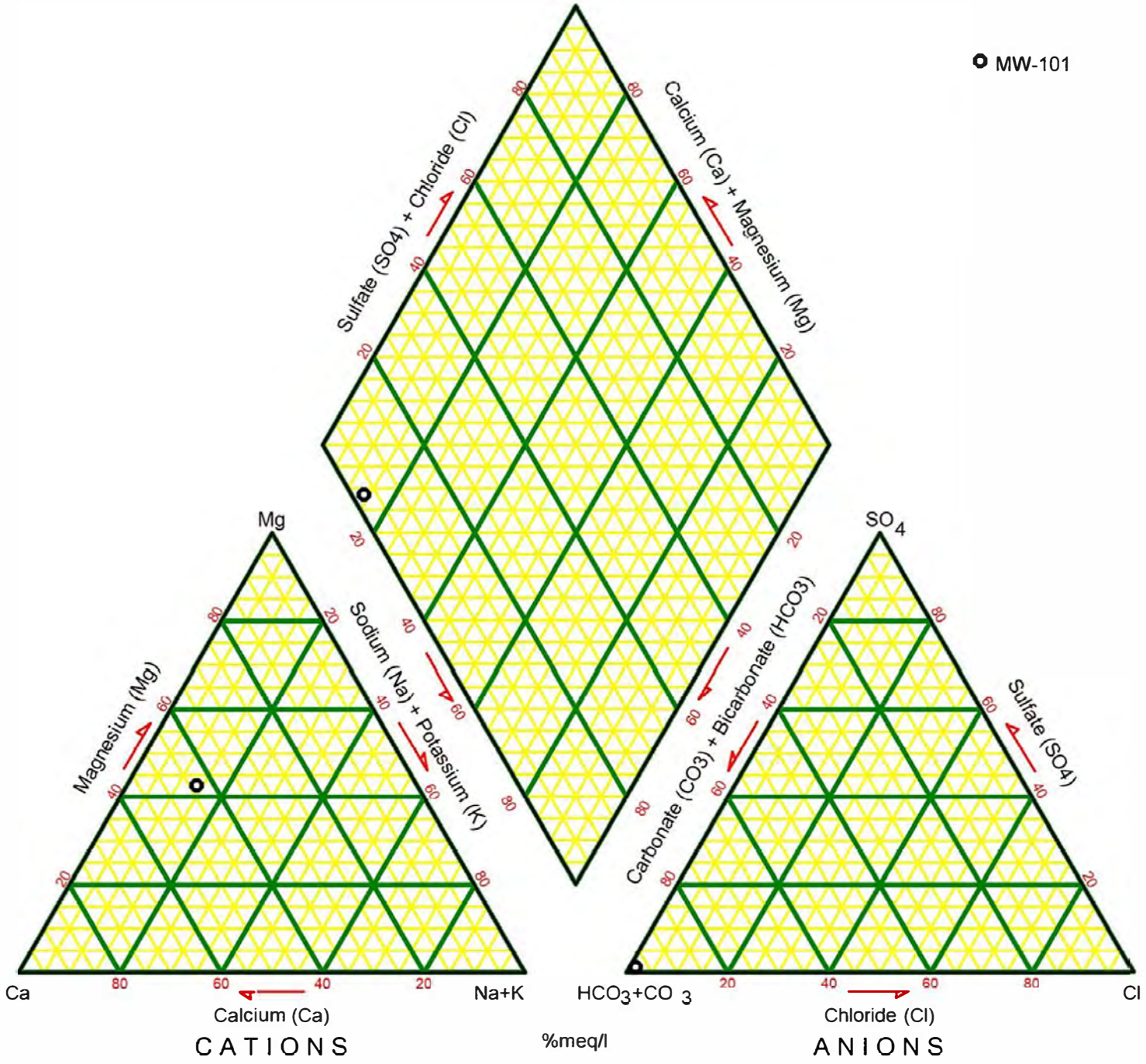


TABLE 9
CEDAR HILLS REGIONAL LANDFILL PERCHED ZONES MONITORING WELLS
SUMMARY OF WAC 173-351 APPENDIX I INTRAWELL PREDICTION LIMIT VALUES
(Data Collected from January 1, 2018 to March 31, 2018)

Well	Parameter / Units	Total Antimony mg/L	Total Arsenic mg/L	Total Barium mg/L	Total Beryllium mg/L	Total Cadmium mg/L	Total Chromium mg/L	Total Cobalt mg/L	Total Copper mg/L	Total Lead mg/L	Total Nickel mg/L	Total Selenium mg/L	Total Silver mg/L	Total Thallium mg/L	Total Vanadium mg/L	Total Zinc mg/L	Nitrate as N mg/L	1,1-Dichloroethane ug/L	1,1-Dichloroethene ug/L	1,2-Dichloroethane ug/L	*cis* -1,2-Dichloroethene *ug/L*	*trans* -1,2-Dichloroethene ug/L	Trichloroethene ug/L	Vinyl Chloride ug/L
East Perched Zone Wells																								
MW-30A	Limit	0.001	0.001	0.0077	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.001	0.003	0.001	0.00307	0.0188	14.0	6.9	0.2	0.23	13.76	0.2	1.63	0.03
	Result	< 0.0003	0.000511	0.0043	< 0.0001	< 0.00005	0.000786	0.000076	0.00107	0.000153	0.000834	< 0.0005	< 0.00004	< 0.0001	0.00217	0.0016	**15.3**	1.48	< 0.1	< 0.1	1.94	< 0.1	0.753	< 0.01
MW-47	Limit	0.001	0.0113	0.0458	0.001	0.002	0.005	0.003	0.0105	0.00143	0.01	0.001	0.003	0.001	0.00307	0.168	0.024	0.89	0.2	0.16	5.3	0.2	0.2	8.64
	Result	< 0.0003	0.00407	0.0438	< 0.0001	< 0.00005	< 0.0002	0.000453	< 0.0002	< 0.0001	0.00237	< 0.0005	< 0.00004	< 0.0001	0.000135	< 0.0005	< 0.01	0.732	< 0.1	0.16	3.06	< 0.1	< 0.1	5.48
MW-62	Limit	0.001	0.001	0.0033	0.001	0.002	0.005	0.003	0.002	0.001	0.01	0.001	0.003	0.001	0.002	0.004	7.7	15.2	6.1	0.2	16.3	0.21	0.47	0.23
	Result	< 0.0003	0.000423	0.002	< 0.0001	< 0.00005	0.000502	0.0000998	0.000574	< 0.0001	0.000574	< 0.0005	< 0.00004	< 0.0001	0.00156	0.000557	3.21	1.44	< 0.1	< 0.1	4.08	< 0.1	0.12	< 0.01
South Solid Waste Area Wells																								
MW-101	Limit	0.001	0.028	0.0378	0.001	0.002	0.005	0.003	0.00416	0.00109	0.01	0.001	0.003	0.001	0.0039	0.00729	0.0593	0.21	0.2	0.22	0.23	0.2	0.2	0.96
	Result	< 0.0003	0.012	0.0222	< 0.0001	< 0.00005	0.00107	0.000367	0.000417	0.000129	0.00437	< 0.0005	< 0.00004	< 0.0001	0.000461	0.00161	0.016	0.13	< 0.1	0.204	**0.238**	< 0.1	< 0.1	0.34

Results greater than Limit Value in **RED Bold**

TABLE 10

CEDAR HILLS REGIONAL LANDFILL

VOLATILE ORGANIC COMPOUND DETECTIONS IN PERCHED ZONE WELLS

(Data Collected from January 1, 2018 to March 31, 2018)

Analyte	Site ID	Date	Sample ID	Sample Value (ug/L)
East Perched Zone Wells				
1,1-Dichloroethane	MW-30A	2/7/2018	W30A180207-	1.48
	MW-47	2/6/2018	W47-180206-	0.732
	MW-62	2/7/2018	W62-180207-	1.44
1,2-Dichloroethane	MW-47	2/6/2018	W47-180206-	0.16 JT
Acetone	EW-25	2/6/2018	EW25180206-	12.7
Chloroethane	MW-47	2/6/2018	W47-180206-	0.249
cis-1,2-Dichloroethene	EW-25	2/6/2018	EW25180206-	0.226
	MW-30A	2/7/2018	W30A180207-	1.94
	MW-47	2/6/2018	W47-180206-	3.06
	MW-62	2/7/2018	W62-180207-	4.08
Dichlorodifluoromethane	MW-47	2/6/2018	W47-180206-	4.59
Trichloroethene	EW-25	2/6/2018	EW25180206-	0.242
	MW-30A	2/7/2018	W30A180207-	0.753
	MW-62	2/7/2018	W62-180207-	0.12 JT
Vinyl Chloride	MW-47	2/6/2018	W47-180206-	5.48
South Solid Waste Area Perched Wells				
1,1-Dichloroethane	MW-101	2/6/2018	W101180206-	0.13 JT
1,2-Dichloroethane	MW-101	2/6/2018	W101180206-	0.204
Chloroethane	MW-101	2/6/2018	W101180206-	0.19 JT
cis-1,2-Dichloroethene	MW-101	2/6/2018	W101180206-	0.238
Vinyl Chloride	MW-101	2/6/2018	W101180206-	0.342

See Data Qualifier List for Qualifier Information.

Table 11

Storm & Surface Water Monitoring Activities 1st Quarter 2018

Station ID	Date	Planned Acitvity	Sample ID	Comment
SW-GS1	2/7/2018	NPDES Permit Sample	SGS1180207P	
SW-SL3	2/12/2018	NPDES Permit Sample	SSL3180212P	
SW-GS1 [1]	2/16/2018	NPDES Permit Sample	--	Turbidity resample.
SW-N4	2/17/2018	NPDES Permit Sample	SN4-180207P	
SW-TD1	2/7/2018	Area 5 Top Deck Monitoring	STD1180207-	
SW-TD2 [1]	2/7/2018	Area 5 Top Deck Monitoring	--	No flow, no sample taken.
SW-TD4 [1]	2/7/2018	Area 5 Top Deck Monitoring	--	No flow, no sample taken.
SW-TD6 [1]	2/7/2018	Area 5 Top Deck Monitoring	--	No flow, no sample taken.
SW-TD2 [1]	3/14/2018	Area 5 Top Deck Monitoring	--	No flow, no sample taken.
SW-TD4 [1]	3/14/2018	Area 5 Top Deck Monitoring	--	No flow, no sample taken.
SW-TD6 [1]	3/14/2018	Area 5 Top Deck Monitoring	--	No flow, no sample taken.
Stream Gauges	1/22/2018	Monthly Stream Gauge Level Measurement	--	
Stream Gauges	2/5/2018	Monthly Stream Gauge Level Measurement	--	
Stream Gauges	3/21/2018	Monthly Stream Gauge Level Measurement	--	
Field Blank	2/12/2018	QA/QC Sample	SSL3180212F	
CSGP-C1	Weekly (minimum)	CSGP[2] Permit Turbidity Measurement	--	Turbidity only
CSGP-C2	Weekly (minimum)	CSGP Permit Turbidity Measurement	--	Turbidity only
CSGP-C3	Weekly (minimum)	CSGP Permit Turbidity Measurement	--	Turbidity only
CSGP-C4	Weekly (minimum)	CSGP Permit Turbidity Measurement	--	Turbidity only

[1] No sample ID assigned, No sample collected.

[2] Construction Stormwater General Permit

TABLE 12
CEDAR HILLS LANDFILL
SUMMARY OF ISGP* STORMWATER PERMIT EXCEEDANCES
(Data Collected from January 1, 2018 to March 31, 2018)

Parameter	Units	Sampling Location	Date	Value	Regulatory Limit	Type
No ISGP Stormwater Exceedances for this Quarter						

*ISGP - Industrial General Stormwater Permit

CEDAR HILLS LANDFILL
SUMMARY OF CSGP* STORMWATER PERMIT EXCEEDANCES
(Data Collected from January 1, 2018 to March 31, 2018)

Parameter	Units	Sampling Location	Date	Value	Regulatory Limit	Type
Turbidity	NTU	C1	01/30/18	50.5	25	Benchmark
Turbidity	NTU	C1	01/31/18	29.7	25	Benchmark
Turbidity	NTU	C1	02/02/18	56.5	25	Benchmark
Turbidity	NTU	C1	02/05/18	27.9	25	Benchmark
Turbidity	NTU	C1	03/26/18	56.1	25	Benchmark
Turbidity	NTU	C1	03/27/18	47.6	25	Benchmark
Turbidity	NTU	C1	03/29/18	30.1	25	Benchmark
Turbidity	NTU	C3	02/01/18	38.4	25	Benchmark
Turbidity	NTU	C3	02/02/18	190	25	Benchmark
Turbidity	NTU	C4	01/17/18	106	25	Benchmark
Turbidity	NTU	C4	01/18/18	86	25	Benchmark
Turbidity	NTU	C4	01/19/18	109	25	Benchmark
Turbidity	NTU	C4	01/23/18	64	25	Benchmark
Turbidity	NTU	C4	01/29/18	65.8	25	Benchmark
Turbidity	NTU	C4	01/30/18	65.9	25	Benchmark
Turbidity	NTU	C4	01/31/18	73.5	25	Benchmark
Turbidity	NTU	C4	02/01/18	86.8	25	Benchmark
Turbidity	NTU	C4	02/02/18	99.2	25	Benchmark
Turbidity	NTU	C4	02/05/18	79.3	25	Benchmark
Turbidity	NTU	C4	02/07/18	30.3	25	Benchmark

*CSGP - Construction General Stormwater Permit

TABLE 13
CEDAR HILLS REGIONAL LANDFILL
VOLATILE ORGANIC COMPOUND DETECTIONS IN BLANKS
(Data Collected from January 1, 2018 to March 31, 2018)

Analyte	Site ID	Date	Sample ID	Sample Value (ug/L)
2-Butanone	FIELD BLANK	02/06/18	EW25180206F	1.1 JT
Acetone	FIELD BLANK	02/06/18	EW25180206F	16.7

See Data Qualifier List for Qualifier Information.

Table 14
Groundwater Quality Criteria

	Analyte	CAS No.	Ground Water Quality Criteria Criterion*	
I.	PRIMARY AND SECONDARY CONTAMINANTS AND RADIONUCLIDES			
	A. Primary Contaminants			
	Barium	7440-39-3	1.0	mg/L
	Cadmium	7440-43-9	0.005	mg/L
	Chromium	7440-47-3	0.05	mg/L
	Lead	7439-92-1	0.015	mg/L
	Mercury	7439-97-6	0.002	mg/L
	Selenium	7782-49-2	0.01	mg/L
	Silver	7440-22-4	0.05	mg/L
	Fluoride	16984-48-8	4.0	mg/L
	Nitrate	14797-55-8	10.0	mg/L
	Endrin	72-20-8	0.2	ug/L
	Methoxychlor	72-43-5	40	ug/L
	1,1,1-Trichloroethane	71-55-6	200	ug/L
	2,4-D	94-75-7	70	ug/L
	2,4,5-TP	93-72-1	100	ug/L
	Total Coliforms		1/100	mL
	B. Secondary Standards			
	Copper	7440-50-8	1.0	mg/L
	Iron	7439-89-6	0.3	mg/L
	Manganese	7439-96-5	0.05	mg/L
	Zinc	7440-66-6	5.0	mg/L
	Chloride	16887-00-6	250	mg/L
	Sulfate	14808-79-8	250	mg/L
	Total Dissolved Solids		500	mg/L
	Foaming Agents		0.5	mg/L
	pH	12408-02-5	6.5-8.5	units
	Corrosivity		non-corrosive	
	Color		15	units
	Odor-Threshold		3	units
	C. Radionuclides and Radioactivity			
	Gross Alpha particle activity		15	pCi/L
	Gross Beta particle activity		50	pCi/L
	Tritium	10028-17-8	20,000	pCi/L
	Strontium	7440-24-6	8	pCi/L
	Radium 226 & Radium 228		5	pCi/L
	Radium 226	13982-63-3	3	pCi/L
II.	CARCINOGENS			
	1,1-Dichloroethane	75-34-3	1	ug/L
	1,2-Dichloroethane	107-06-2	0.5	ug/L
	1,2-Dichloropropane	78-87-5	0.6	ug/L
	1,2-Dimethylhydrazine	540-73-8	60	ug/L
	1,2-Diphenylhydrazine	122-66-7	0.09	ug/L
	1,3-Dichloropropene tot.	542-75-6	0.2	ug/L
	1,4-Dichlorobenzene	106-46-7	4	ug/L
	1,4-Dioxane	123-91-1	7	ug/L
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	0.0000006	ug/L
	2,4,6-Trichlorophenol	88-06-2	4.0	ug/L
	2,4-Dinitrotoluene	121-14-2	0.1	ug/L
	2,4-Toluenediamine	95-80-7	0.002	ug/L
	2,6-Dinitrotoluene	606-20-2	0.1	ug/L
	2-Methoxy-5-nitroanaline	99-59-2	2.0	ug/L
	2-Methylanaline	95-53-4	0.2	ug/L
	2-Methylanaline hydrochloride	636-21-5	0.5	ug/L
	3,3'-Dichlorobenzidine	91-94-1	0.2	ug/L
	3,3'-Dimethoxybenzidine	119-90-4	6.0	ug/L
	3,3-Dimethylbenzidine	119-93-7	0.007	ug/L
	4,4'-Methylene bis(N,N'-dimethyl) aniline	101-61-1	2.0	ug/L
	4-Chloro-2-methyl analine	95-69-2	0.1	ug/L
	4-Chloro-2-methyl analine hydrochloride	3165-93-3	0.2	ug/L
	Acrylamide	79-06-1	0.02	ug/L
	Acrylonitrile	107-13-1	0.07	ug/L
	Aldrin	309-00-2	0.005	ug/L
	Aniline	62-53-3	14	ug/L
	Aramite	140-57-8	3	ug/L
	Arsenic	7440-38-2	0.00005	mg/L
	Azobenzene	103-33-3	0.7	ug/L
	Benzene	71-43-2	1	ug/L

Table 14
Groundwater Quality Criteria

Analyte	CAS No.	Ground Water Quality Criteria Criterion*	
Benzidine	92-87-5	0.0004	ug/L
Benzo(a)pyrene	50-32-8	0.008	ug/L
Benzotrichloride	98-07-7	0.007	ug/L
Benzyl chloride	100-44-7	0.5	ug/L
Bis(2-ethylhexyl)phthalate	117-81-7	6	ug/L
Bis(chloroethyl)ether	111-44-4	0.07	ug/L
Bis(chloromethyl)ether	542-88-1	0.0004	ug/L
Bromodichloromethane	75-27-4	0.3	ug/L
Bromoform	75-25-2	5	ug/L
Carbazole	86-74-8	5	ug/L
Carbon Tetrachloride	56-23-5	0.3	ug/L
Chlordane	5103-71-9	0.06	ug/L
Chlorodibromomethane	124-48-1	0.5	ug/L
Chloroform	67-66-3	7	ug/L
Chlorthalonil	1897-45-6	30	ug/L
DDT (includes DDE and DDD)	50-29-3, 72-55-9, 72-54-8	0.3	ug/L
Diallate	2303-16-4	1	ug/L
Dichlorovos	62-73-7	0.3	ug/L
Dieldrin	60-57-1	0.005	ug/L
Direct Black 38	1937-37-7	0.009	ug/L
Direct Blue 6	2602-46-2	0.009	ug/L
Direct Brown 95	16071-86-6	0.009	ug/L
Epichlorohydrin	106-89-8	8	ug/L
Ethyl acrylate	140-88-5	2	ug/L
Ethylene dibromide	106-93-4	0.001	ug/L
Ethylene thiourea	96-45-7	2	ug/L
Folpet	133-07-3	20	ug/L
Furazolidone	67-45-8	0.02	ug/L
Furium	531-82-8	0.002	ug/L
Furmecyclox	60568-05-0	3	ug/L
Heptachlor	76-44-8	0.02	ug/L
Heptachlor epoxide	1024-57-3	0.009	ug/L
Hexachlorobenzene	118-74-1	0.05	ug/L
Hexachlorocyclohexane (alpha)	319-84-6	0.001	ug/L
Hexachlorocyclohexane (technical)	608-73-1	0.05	ug/L
Hexachlorodibenzo-p-dioxin, mix	34465-46-8	0.00001	ug/L
Hydrazine/hydrazine sufate	302-01-2/10034-93-2	0.03	ug/L
Lindane	58-89-9	0.06	ug/L
Methylene Chloride	75-09-2	5	ug/L
Mirex	2385-85-5	0.05	ug/L
Nitrofurazone	59-87-0	0.06	ug/L
N-Nitrosodiethanolamine	1116-54-7	0.03	ug/L
N-Nitrosodiethylamine	55-18-5	0.0005	ug/L
N-Nitrosodimethylamine	62-75-9	0.002	ug/L
N-Nitroso-di-n-butylamine	924-16-3	0.02	ug/L
N-Nitroso-di-n-propylamine	621-64-7	0.01	ug/L
N-Nitrosodiphenylamine	86-30-6	17.0	ug/L
N-Nitroso-N-methylethylylamine	10595-95-6	0.004	ug/L
N-Nitrosopyrrolidine	930-55-2	0.04	ug/L
o-Chloronitrobenzene	88-73-3	3	ug/L
o-Phenylenediamine	95-54-5	0.005	ug/L
o-Toluidine	95-53-4	0.2	ug/L
p,a,a,a-Tetrachlorotoluene	5216-25-1	0.004	ug/L
PAHs [Benzo(a)pyrene]		0.01	ug/L
PBBs	59536-65-1	0.01	ug/L
PCBs c	27323-18-8	0.01	ug/L
p-Chloronitrobenzene	100-00-5	5	ug/L
Propylene oxide	75-56-9]	0.01	ug/L
Tetrachloroethylene	127-18-4	0.8	ug/L
Toxaphene c	8001-35-2	0.08	ug/L
Trichloroethylene (TCE)	79-01-6	3	ug/L
Trimethyl phosphate	512-56-1	2.0	ug/L
Vinyl chloride	75-01-4	0.02	ug/L

NOTES: pCi/L=picocuries per liter
mg/L=milligrams per liter
ug/L=micrograms per liter
*Ground Water Quality Criteria=173-200 WAC Water Quality Standards for Ground Waters of the State of Washington

TABLE 15
CEDAR HILLS LANDFILL
INDUSTRIAL STORMWATER GENERAL PERMIT

BENCHMARKS and EFFLUENT LIMITS

Parameter	Units	Minimum Sampling Frequency	Benchmark	Effluent Limit	
				Monthly Average	Daily Maximum
pH	Std. Units	Quarterly	5.0 to 9.0	6.0 to 9.0	
Turbidity	NTU	Quarterly	25	--	--
Oil Sheen	Yes/No	Quarterly	None Visible	--	--
Copper, Total	ug/L	Quarterly	14	--	--
Zinc, Total	ug/L	Quarterly	117	110	200
BOD	mg/L	Quarterly	--	37	140
TSS	mg/L	Quarterly	--	27	88
Ammonia-N	mg/L	Quarterly	--	4.9	10
Alpha Terpineol	ug/L	Quarterly	--	16	33
Benzoic Acid	ug/L	Quarterly	--	71	120
4-Methylphenol*	ug/L	Quarterly	--	14	25
Phenol	ug/L	Quarterly	--	15	26

* Analytical result reported as the total of 3-Methylphenol (CAS RN 108-39-4) and 4-Methylphenol (CAS RN 106-44-5)

TABLE 16
CEDAR HILLS REGIONAL LANDFILL
LABORATORY DATA REVIEW - SUSPECT DATA ALL MATRICES
(Data Collected from January 1, 2018 to March 31, 2018)

Parameter	Units	Well ID	Sample Date	Sample ID	Sample Value	Cause of Unuseability
Acetone	ug/L	Field Blank	2/6/2018	EW25180206F	16.7	Blank Contamination