King County

Department of Natural Resources and Parks
Solid Waste Division

CEDAR HILLS REGIONAL LANDFILL 2011 GROUNDWATER DATA EVALUATION

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EXECUTIVE SUMMARY

This report summarizes groundwater data collected in 2011 and presents significant findings supported by the evaluation of this data.

Groundwater at the Cedar Hills Regional Landfill (CHRLF) occurs both in a regional aquifer and in perched zones. The regional aquifer flows through advance outwash and deeper deposits and is separated from the base of waste placement areas by more than 200 feet of unsaturated sands and gravels. Perched groundwater occurs in onsite till, ice-contact deposits and recessional outwash. No laterally or vertically extensive perched zones have been identified; leaving the regional aquifer beneath the landfill is the earliest target hydraulic pathway for groundwater contaminant detection.

REGIONAL AQUIFER

The regional aquifer beneath CHRLF is entirely recharged by precipitation. A local recharge area is located immediately south of the landfill within the Queen City Farms property, and is centered north of the Main Gravel Pit Lake. In general, groundwater flow in the regional aquifer is radial from the recharge area. Beneath the landfill, regional flow is to the north in the south and central portions of the landfill site. Flow direction in the northern part of the site turns northeasterly as recharge from the McDonald Creek drainage comes into effect. Regional Aquifer flow is physically separated from the Cedar River and likely discharges to Issaquah Creek. There is no significant seasonal variation in horizontal groundwater flow paths. Horizontal gradients are influenced by infiltrating precipitation in the recharge area. Vertical hydraulic gradients are demonstrated by head differences in adjacent wells screened at different depths and related to hydraulic conductivity of the aquifer materials.

A monitoring network is in place consisting of 45 monitoring and production wells. Monitoring network wells are located to characterize groundwater flow and to obtain representative samples for water quality characterization. A majority of the perimeter wells are upgradient to waste placement and indicate a complex flow regime in the landfill vicinity. Downgradient flow converges into a high transmissivity zone which provides excellent monitoring coverage for all flow paths within the potential source area.

An extensive list of chemical analytes and field parameters are analyzed and the results are evaluated by a variety of graphical and statistical methods. The groundwater data analyses presented in this report describe onsite groundwater elevations, flow direction and velocity; and summarizes the evaluation of groundwater quality to determine if chemical concentrations have changed over time or differ between well locations. This report also seeks evidence of impacts to groundwater quality by surface activities.

Upgradient groundwater quality, especially in wells nearest the southern recharge zone, is profoundly affected by conditions and activities that have occurred on the adjoining Queen City Farms property. Upgradient groundwater quality manifests a high degree of spatial variation and temporal trends, which is not unexpected given recharge area site history which has included a variety of land uses, investigations and remediation.

Downgradient groundwater quality also manifests a high degree of spatial variation and temporal trends. Much as recharge effects are dampened with distance from the source, the concentrations of many analytes are attenuated by processes such as dispersion dilution, sorption, and degradation as groundwater flows beneath the landfill. The highest concentrations of certain analytes occur in upgradient wells.

These data indicate that CHRLF acts as an attenuation zone for upgradient impacts, allowing a reduction in the concentration of chlorinated volatile organic compounds (CVOCs), iron and manganese.

The regional aquifer is the first continuously saturated zone beneath the landfill and serves as the earliest path for detection monitoring. Recent water quality evaluations of Queen City Farms groundwater are available in the *2010 Expanded Hydrogeology Assessment Queen City Farms King County, Washington*,(December 2010) and *Report Evaluation of Remedial Action 10-Year Review Queen City Farms King County, Washington* (2008).

PERCHED ZONES

Perched groundwater occurs in onsite till, ice-contact deposits and recessional outwash. No laterally or vertically extensive perched zones have been identified. Recharge is by precipitation with possible hydraulic continuity to surface streams.

Impacts from past landfilling practices have previously been recognized in several perched zone wells. Site improvements and engineered facilities have been effective in reducing contaminant concentrations attributable to past practices. Declining or stable long term trends for many contaminants are apparent in these wells. The influence of landfill gas on groundwater quality continues in east side perched groundwater. Additional investigations are in planning to evaluate residual impacts and make recommendations. Recent findings are available in the Technical Memoranda *Results of Groundwater Sampling and Fate and Transport Analysis South Solid Waste Area Perched Zone Assessment,* April 2010, and the *East Main Hill Perched Zones*, October 2010.

CEDAR HILLS REGIONAL LANDFILL 2010 GROUNDWATER DATA EVALUATION

1.0 INTRODUCTION

This Cedar Hills Regional Landfill (CHRLF) 2011 Groundwater Data Evaluation report evaluates groundwater monitoring data collected during the past calendar year and summarizes the significant findings supported by these evaluations. This report evaluates water quality in the regional aquifer, which is the first continuously saturated zone beneath the landfill and provides the earliest path for detection monitoring. Water quality in the perched water-bearing zones at CHRLF is also evaluated.

Chapter 2 contains a brief description of the geologic and hydrogeologic conditions at CHRLF. For a complete discussion of site conditions, the development of the hydrogeological model and monitoring network, see the *Cedar Hills Regional Landfill Hydrogeologic Report*, March 1999, and the *Cedar Hills Regional Landfill Sitewide Hydrogeologic Report*, March 2004. Additional findings from continuing investigations can be found in two Technical Memoranda: *Phase I Investigations Groundwater Monitoring Well System Enhancements*, October 2007 and *East Main Hill Perched Zones* October 2010.

Chapter 3 discusses the methods used to evaluate and analyze the groundwater data, and Chapter 4 presents the results of these evaluations. Conclusions based on the analyses results are included in Chapter 5.

Groundwater monitoring has been conducted at the CHRLF since 1983. A large quantity of data has been developed for the site as a result of the monitoring program. The groundwater monitoring program and this annual data evaluation are in accordance with the King County Board of Health Solid Waste Regulations (Title 10, Rules and Regulations No. 03-06) and “Criteria for Municipal Solid Waste Landfills” (Chapter173-351 WAC).

2.0 GEOLOGY AND HYDROGEOLOGY

In order to effectively analyze water quality data collected at CHRLF, it is important to have a clear understanding of the regional and site geology and hydrogeology, and to understand groundwater occurrence and flow beneath the Cedar Hills site. Figure 2-1 displays the location of CHRLF in a regional context and Figure 2-2 indicates the environmental monitoring locations for groundwater, surface water and landfill gas migration detection. Figures 2-3 and 2-4 provide cross sectional views of the major hydogeologic features of the landfill site. A detailed discussion of site geology and hydrogeology is beyond the scope of this report, but may be found in the *Cedar Hills Regional Landfill Site wide Hydrogeologic Report*, March 2004 and the *Phase I Investigations Groundwater Monitoring Well System Enhancements Technical Memorandum*, October 2007. Geologic evaluations of the CHRLF site have identified a complex history of sediments deposited by rivers, lakes and glaciers over volcanic and sedimentary bedrock. Sediments beneath the site consist of generally fine grained sands and silts, in some areas part of a prehistoric lake deposit. In the northern portion, the sediments are continuous with coarse sands and gravels, suggesting removal by erosion of the finer sediments and replacement by river channel deposits. These sediments are overlain by a thick blanket of sands and gravels deposited during Vashon era glacial advance. The advance outwash is capped by a complex group of deposits overridden by or deposited from the glacial ice (till, contact deposits and recessional outwash).

Groundwater occurs both as a regional aquifer and in perched zones. The regional aquifer flows through advance outwash and deeper deposits and is separated from the base of waste placement areas by more than 200 feet of unsaturated sands and gravels. Perched groundwater occurs in onsite till, ice-contact deposits and recessional outwash. No laterally or vertically extensive perched zones have been identified; therefore, the regional aquifer beneath the landfill is the earliest target hydraulic pathway for groundwater contaminant detection. The regional aquifer potentiometric surface lies at approximately 350 feet MSL at the south property line and at approximately 285 feet MSL at the north east.

The regional aquifer beneath CHRLF is entirely recharged by precipitation. A dominant local recharge area is located immediately south of the landfill within the Queen City Farms property, centered north of the Main Gravel Pit Lake. In general, groundwater flow in the regional aquifer is radial from the recharge area. Beneath the landfill, regional flow is to the north in the south and central portions of the landfill site. Flow direction in the northern part of the site turns northeasterly as recharge from the McDonald Creek drainage comes into effect. Flow then converges into a high transmissivity channel and likely discharges to Issaquah Creek. There is no significant seasonal variation in horizontal groundwater flow paths; horizontal gradients are influenced by infiltrating precipitation in the recharge area. Vertical hydraulic gradients in the southern area are demonstrated by head differences in adjacent wells screened at different depths. Flow determinations and a Regional Aquifer Potentiometric Surface Map are prepared quarterly by a licensed Hydrogeologist.

2.1 LOCAL PERCHED WATER BEARING ZONES

A number of local water bearing zones have been identified in the Vashon-aged units around the Cedar Hills site. Table 2-1 lists onsite wells, and gives construction dates and locational information. The perched zones are divided into three groups for discussion and presentation purposes. The North and West perched zones contain five wells and include areas along the west and north buffers and infrastructure north of landfilled areas. The East Main Hill perched zone contains 10 wells and extend along the eastern edge of the landfill adjacent to unlined areas. The South Solid Waste Area (SSWA) perched zone includes nine wells encompassing the non-contiguous South Solid Waste Area and extending into CHRLF's south buffer area, abutting Queen City Farms. Though water levels are obtained from multiple wells in each zone, lateral or vertical continuity between wells in a zone cannot be assumed.

Recently completed investigations focused on the SSWA perched zone and the East Main Hill perched zone. The SSWA is monitored by well MW-101 (water levels and water quality), MW-25, MW-41S, MW-41D, MW-45, MW-79, MW-96 and MW-97 (water levels only). Findings from this investigation are presented in the Technical Memorandum *Results of Groundwater Sampling and Fate and Transport Analysis South Solid Waste Area Perched Zone Assessment,* April 2010. The East Main Hill perched zones are monitored by wells MW-30A, MW-47, MW-62 and MW-EB6 (water level and water quality); and wells MW-48 and MW-50 (water levels only). Three additional wells, MW-102, MW-103 and MW-104, were installed in this zone as part of the Groundwater Monitoring Well System Enhancements project. Findings from this investigation are presented in the *East Main Hill Perched Zones Technical Memorandum*, October 2010.

2.2 REGIONAL AQUIFER

The regional aquifer, contained within the pre-Vashon stratigraphic units, has been identified as the shallowest laterally extensive water bearing zone encountered beneath the landfill; and is therefore the earliest target hydraulic pathway for groundwater contaminant detection. A monitoring network is in place consisting of 45 monitoring and production wells where water level measurements are obtained. Of those 45 wells, 39 are also sampled and analyzed for water quality. Table 2-1 lists all wells, construction dates and locational information for onsite wells.

As a follow up to the *Groundwater Monitoring Well System Enhancements Phase I* investigation, an addendum to the site-wide hydrogeological report is being prepared to evaluate regional aquifer flow and the enhancement of the groundwater monitoring network. This report will be completed in 2012.

The piezometric surface contour maps (Appendix I) indicate a north and northeasterly flow direction in the regional aquifer. Interpolation and contouring methodology are the methodology developed for the *Technical Memorandum Phase I Investigations Groundwater Monitoring Well System Enhancements,* October 2007. Quarterly monitoring of groundwater elevations has shown very little seasonal or annual variability in regional groundwater flow and velocity. For 2011, the average horizontal flow velocities for the regional aquifer have been calculated to range from 0.013 ft/day in the south landfill area, to 2.1 ft/day in the central area and 1.5 ft/day in the north area.

3.0 DATA COLLECTION AND EVALUATION

Environmental samples are collected and analyzed in accordance with the *Quality Assurance Project Plan for Environmental Monitoring at King County Solid Waste Facilities* (QAPP) (1999) and the *Environmental Monitoring Sampling and Analysis Plan for Cedar Hills Regional Landfill* (2002) (SAP). These documents contain procedures to ensure that environmental data meet desired objectives for quality, consistency and documentation.

Groundwater quality is evaluated by comparison of analysis results to regulatory standards, geochemical analysis and statistical evaluation. Following is a brief description of each. King County Solid Waste Division monitors groundwater in accordance with Chapter 173-351 WAC.

Data collected include field parameters and laboratory analysis results. These data are evaluated by a variety of graphical and statistical methods. The groundwater evaluation presented herein describes onsite groundwater elevations, flow direction and velocity.

Groundwater chemical data are evaluated to determine if chemical concentrations have changed over time or differ between well locations. Groundwater evaluation serves to determine evidence of impacts to groundwater quality by surface activities.

3.1 DATA REVIEW

Throughout the groundwater monitoring program conducted by KCSWD, Quality Assurance/Quality Control (QA/QC) samples are collected and analyzed per the QAPP, as an ongoing part of meeting data quality objectives. These samples include field and volatile trip blanks, field duplicates and split samples for inter-laboratory comparison. Laboratory data was reviewed as outlined in the QAPP for compliance with Data Quality Objectives (DQOs) and Quality Assurance/Quality Control (QA/QC).

Field data collection QA/QC is ensured by adherence to standardized procedures of instrument calibration and data acquisition as outlined in the SAP. The laboratory data review is conducted by county staff with the initial responsibility for the correctness and completeness of the data. The reviewer will evaluate the quality of the work based on guidelines established in the QAPP to ensure that:

- Appropriate procedures have been followed.
- Laboratory deliverables are correct and complete.
- Analyses are completed within holding times.
- QC sample and laboratory blank results are within appropriate QC limits.
- Documentation is complete.

Data qualifiers may be assigned to the data based on the QA review. The qualified data will then be made available for data evaluation and interpretation. A compilation of water quality data for groundwater, surface water and leachate are presented in Appendix IV.

3.2 GROUNDWATER ELEVATION AND FLOW

Groundwater levels in individual wells are presented in Appendix I. Upgradient and downgradient designations were determined by well position relative to the placement of waste.

Flow determinations are calculated quarterly by a Licensed Hydrogeologist and following the model presented in the Hydrogeologic Report and subsequent investigation.

3.3 GROUNDWATER ANALYTICAL DATA

The outcome of the sampling, analysis and data review provides information necessary to meet the requirements for evaluating groundwater quality and can be used as a basis for decision making. Statistical and graphical methods are then applied to facilitate comparisons.

Descriptive statistics are calculated and tabulated to provide a snapshot of data set distributional parameters. These include the number of analyses, number of detections, minimum, maximum, mean, standard deviation and median. Although both means and medians are reported in the summary tables, medians are used in the text because they tend to be a more reliable measure of central tendency in the case of non-normal distributions, particularly when there are outliers, as is the case here.

Using the Shapiro-Wilk test for normality, data sets are tested for approximation to a normal distribution, to determine which statistical procedures, described below in sections 3.5 and 3.6, and may be appropriately applied.

3.4 GROUNDWATER QUALITY STANDARDS

Water quality monitoring results are compared to Washington State Groundwater Quality Criteria, Chapter 173-200 WAC. Standards are compared to actual analytical values, not mean or median values. All exceedances are determined by the standards that were in effect at the time of the sampling and are summarized in Tables 4-1a and 4-1b. These tables include primary standard exceedances, those where concentrations are greater than the MCL for analytes having health consequences, and exceedances of secondary standard, non-mandatory guidelines regarding aesthetic (taste, odor, or color) or cosmetic (tooth or skin discoloration) effects.

3.5 TREND TESTING

Testing for trend is one of our primary means of evaluating water quality data over time. The statistical test used is the Mann-Kendall test for trend. This test is well suited for environmental data (Gibbons 1994) as it makes no distributional assumptions (non-parametric); and allows irregularly spaced (temporally) samples. Values below detection limits are allowed in the calculation, a condition which is frequently encountered in groundwater monitoring. The test yields the probability (p values) that a temporal trend is due to chance. Low p-values indicate low probability of a trend existing solely due to chance, therefore significant evidence of a trend exists. Values of less than 0.05 indicate statistical significance.

This test has been applied to data sets for parameters of value for evaluating water quality or that are indicative of impacts from anthropogenic sources. Naturally occurring trace level constituents with low detection frequencies are not trend tested.

To yield meaningful results, trend results must be interpreted carefully in cases where frequency of detection is low or in cases where reporting limits have changed over the period of record. Trend test are conducted on an annual basis and results are tabulated in the Statistical Summary Tables (Table 4-2a, 4-2b and 4-2c). Statistically significant decreasing trends are denoted by “D” in the table, statistically significant increasing trends by “I”. Absence of a trend and non-significant trends are indicated in the table as “--“.

3.6 PREDICTION LIMITS

The Prediction Limit used in this evaluation is an intrawell statistical test that compares an analytical result to a computed limit value. The limit value is derived from past analytical results from the same well, considered to be representative background data. A value outside of this limiting value is considered evidence that the result is not drawn from the same sample population distribution. Population here refers to the set of potential measurements or values, including not only cases actually observed but those that are potentially observable. The prediction limits generated in this report are based on a 5% false positive rate (type I error) and depend on the background distribution. For each parameter tested, an appropriate background data set is chosen. Limits are recalculated each year with the incorporation of the previous year’s data into the dataset. The updated limits are used to define the range of expected values for future samples. The data set is tested for normality by application of the Shapiro-Wilk Test for Normality. If the data set fails the test for normality, several transformations of the data are tested. When normal or transformed normal data sets are determined, a parametric prediction limit is calculated and future results compared to this value. When all transformations fail the test for normality, a non-parametric method is applied and future results are compared to this limit.

This test is performed on a quarterly basis, Prediction Limit Exceedances of Chapter 173-351 WAC Appendix I constituents are presented in Table 4-3.

3.7 TIME-CONCENTRATION PLOTS

Time plots are generated for parameters with high detection frequencies and relevance to groundwater quality evaluation. The plots contain data from a number of wells grouped by relative spatial and gradient location. The intent is to give the reader a visual synopsis of relevant and extensive interrelated data, rather than a graphical compilation of analytical results. All non-detections (ND) are displayed on graphs as one-half the limit of detection. All plots are scaled the same, to include the entire range of values measured and to provide a consistent context from plot to plot. Each plot shows analyte concentrations for the period 2001-2011. Since water quality data were typically collected quarterly, the plots are useful for showing temporal changes due to seasonality as well as long-term increasing or decreasing trends and a visual comparison of relative concentration magnitudes for wells in similar spatial and gradient location. Time-Concentration plots for selected parameters are included in Appendix II.

3.8 TRILINEAR DIAGRAMS

Geochemical data is 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 known as hydrochemical facies. Used here, hydrochemical facies refers to distinct chemical compositions of groundwater solute concentrations contained in an aquifer. In general, a groundwater will have a dominant cation or cation pair and a dominant anion or anion pair. For our purposes, the four dominant possibilities are: calcium/magnesium or sodium/potassium for cations and chloride/sulfate or bicarbonate for anions. These facies reflect distinct compositions of cation and anion concentrations such that the value of the diagram lies in the ability to recognize relationships that exist among individual samples. Trilinear Diagrams are included with ionic balance calculations in Appendix III.

4.0 GROUNDWATER QUALITY EVALUATION

This section contains an overall description of water quality and an examination of contamination issues supported by the data. As perched zones have been identified to be neither laterally or vertically extensive and as such do not provide an opportunity for regional aquifer background characterization nor site-wide detection of waste placement areas; the regional aquifer beneath the landfill is the earliest target hydraulic pathway for groundwater contaminant detection.

Water quality, both upgradient and downgradient, is notable for its variability spatially and over time. This variability is only reasonable considering the history of activities and flow regime in place. Wells comprising the monitoring network serve to provide background characterization and downgradient performance monitoring.

The objective of the monitoring program is to utilize a system consisting of a sufficient number of wells installed at appropriate locations and depths to yield representative ground water samples from those hydrostratigraphic units which have been identified as the earlier target hydraulic pathways. The system provides data capable of providing early warning detection of any groundwater contamination and facilitates decision making that insures protection of human health and the environment.

4.1 REGIONAL AQUIFER GROUNDWATER ELEVATION AND FLOW

The primary recharge area for the regional aquifer is immediately across the south property line. Flow is radial from this center such that the flow across the south property line is oriented S to N. As flow moves northward under the property footprint, it remains predominantly to the north. As the flow approaches the north third of the landfill property, recharge from the McDonald Creek drainage comes into effect and flow direction changes to the NE where flow lines converge and the gradient increases. This convergent effect influences regional flow in such a way that most wells on the east, west and north perimeters are upgradient or cross gradient to waste placement areas of the landfill. Available data indicate that all flow downgradient to waste placement flows in a relatively narrow corridor roughly between wells MW-66 on the NW and MW-67 on the SE. For the purposes of this review all wells north and east of and including these two locations, along with MW-68, are considered to be downgradient, while all wells outside this corridor are considered to be upgradient, see Table 2-1.

Response to seasonal rainfall is greatest at the southern wells and expresses little apparent time delay. Wells along the south property line can exhibit seasonal elevation changes in excess of eight feet and are highest in the spring, immediately following the wettest months of the water year. Seasonal lows generally occur in the fall and the end of the driest portion of the water year. For example, MW-76, MW-82 and MW-94, wells nearest to the recharge location and screened at the water table have seasonal changes of five to seven feet on average.

Downgradient wells on the site experience much less fluctuation with all downgradient water table wells having an average interseasonal range of one foot or less.

Hydrographs of groundwater elevations versus time are included in Appendix II in which seasonal changes in groundwater elevation are plotted along with cumulative annual precipitation. All regional well elevations are plotted along with April – March annual rainfall totals and top of screen elevations. Apparent on this plot are the correlation of seasonal recharge with depth to the water table and proximity to the recharge area. Also apparent are longer, multi-year effects of rainfall total and groundwater elevation. Wells completed in the regional aquifer are screened in pre-Vashon deposits consisting of lacusterine or fluvial sands and silts, alluvial gravels, fluvial gravels and fluvial sands and silts.

4.2 REGIONAL AQUIFER UPGRADIENT WATER QUALITY

Upgradient groundwater quality, especially in wells nearest the recharge zone, is profoundly affected by conditions and activities that have occurred over the past fifty years on the adjoining 320-acre Queen City Farms property. In general chronological order these activities included: a pig farming operation that brought MSW in for use as feed; a business that disposed of hazardous waste in excavated pits; a general aviation airport; a solvent reprocessing and recovery operation; a gravel mine with excavation extending down to a level near the water table of the regional aquifer (Gravel Pit Lake); and an MSW composting facility. The Queen City Farms property is listed on the National Priorities List for contaminated sites under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) and has undergone site remediation efforts that included extensive excavation, stabilization and barrier wall construction. . Groundwater quality in upgradient CHRLF wells is impacted by chlorinated volatile organic compounds (CVOCs) from the Queen City Farms site. Presence of these contaminants and their migration is well documented in *Report Evaluation of Remedial Action 10-Year Review Queen City Farms King County, Washington*, 2008 and the *Expanded Hydrogeology Assessment Queen City Farms King County, Washington*, 2010 .

Upgradient quality also manifests a high degree of spatial variation and temporal trends, which are not unexpected given recharge area site conditions as described. These unstable conditions make the establishment of a benchmark “background water quality” an unusable concept.

Instead of direct background-compliance or upgradient-downgradient comparisons, site conditions and history must be incorporated in the evaluation of groundwater quality.

4.2.1 Water Quality Exceedances

Water quality exceedances are tabulated in Table 4-1a. Data are compared to Washington State Ground Water Criteria (GWC) (WAC 173-200-040). The secondary standards provide a measure of the aesthetic condition (taste, odor and color) and do not present a risk to human health.

Analytes exceeding primary standards in some upgradient wells are arsenic, trichloroethene (TCE) and vinyl chloride.

Arsenic occurs naturally in native soils and can be mobilized in groundwater by depressed redox and affected by pH conditions and ions available to form complexes or adsorption sites.

Four of 25 upgradient wells had arsenic detections in 2011. All detections exceeded the state GWC of 0.00005 mg/L.

All CVOCs exceeding standards in 2011 are known compounds disposed of at Queen City Farms or degradation products of those compounds or contaminants. Trichloroethene is consistently detected in wells MW-76, MW-78, MW-82, MW-83 and MW-94. All 2011 samples collected from MW-76 and MW-82 exceeded state GWC. Vinyl chloride is regularly detected in MW-65 and exceeds the GWC.

Occurrence of these contaminants is well documented on the Queen City Farms site and the occurrence and concentration of these compounds in CHRLF upgradient groundwater is consistent with findings presented in the *Second Five-Year Review for Queen City Farms Superfund Site*, the *2008 Annual Monitoring Data Report Queen City Farms King County, Washington* and the *Report Evaluation of Remedial Action 10-Year Review Queen City Farms King County, Washington*, which both indicate migration across the property line.

Secondary standards exceeded include pH, iron and manganese. The lower pH standard of 6.5 was exceeded in MW-76 and MW-64 in 2011. Natural groundwaters in the region tend to be slightly acidic, and can be influenced by surface activities and proximity to recharge by rainfall as rainfall in equilibrium with the atmosphere has a pH of ~5.5. .

Iron and manganese, like arsenic, are naturally occurring and mobilization is controlled by similar processes: redox, pH and sorption. The occurrence and concentrations of iron and manganese vary greatly over short distances. Maximum iron and manganese concentrations in individual upgradient wells vary over three orders of magnitude in upgradient wells inferring rapidly changing redox conditions vertically and horizontally in the regional aquifer.

4.2.2 Trends

Trend test results are tabulated in the Statistical Summary of Upgradient Groundwater Quality Table 4-2a. Basic water quality indicators such as specific conductance, total dissolved solids (TDS), and dissolved cationic (i.e. calcium, magnesium, potassium, sodium) and anionic species (i.e. bicarbonate, nitrate, chloride sulfate) are found to have significant trends. Both increasing and decreasing trends are detected for these various parameters in upgradient wells; however, the VOCs present are generally stable or declining (see Trend results in Table 4-2a).

An exception to these trends is *cis*-1,2 DCE in wells MW-24 and MW-59 where further migration and degradation of parent CVOCs from Queen City Farms is evident.

Trend test results indicate a highly dynamic upgradient water quality. This is consistent with the activities that have taken place in and very near to the recharge zone. The character of these flows are representative of groundwater as it flows to Cedar Hills and provides a reference to determine changes that may take place along any of many flow paths between an upgradient well and further downgradient wells. With regard to specifics as to why trends occur in upgradient water quality, greater knowledge of conditions and activities on upgradient properties would be required. Detailing specifics and their impacts to groundwater beyond characterization as the flow reaches Cedar Hills property is beyond the scope of this report.

4.2.3 Prediction Limits

While trend testing detects a significant change in relative concentration over time by defining a direction and probability, prediction limit results provide a way of determining if future measurements are inconsistent with an established background It sets a criterion, a limit value, such that any measurement in a future sample that exceeds that value will be considered to have been drawn from a different population. In order for a prediction limit test to be useful to test for different sample populations between wells, it is assumed that a benchmark background data set can be determined. As discussed with trend testing, a suitable background data set is unavailable. Data drawn from a dynamic population to construct an interwell prediction limit will lead to erroneous conclusions, indicating contamination by the landfill where there is none, or worse, failing to indicate contamination if it were present. By using an intrawell prediction limit, testing future results from a well against its own background, we can avoid the uncertainty and erroneous conclusions brought in by spatial variation, and we can also determine the existence of a change in water quality at any given monitoring well for the time interval.

The prediction limit concept is useful for evaluating parameters with high detection frequencies to detect water quality changes in discrete time intervals. A test can be done on a sample or sequence of samples (four samples collected in a year) to determine divergence from the underlying population.

By regulation, a finding of statistical significance is determined for analytes listed in Appendix I of Chapter 173-351 WAC. Table 4-3 lists intrawell prediction limit exceedances in these analytes. Parameter, well, sample date, analytical result and limit values for 2011 are included.

Prediction limit exceedances in upgradient wells include nitrate in one sample from MW-56; and *cis* 1,2-dichloroethene in two samples from MW-59 likely representing plume spread from Queen City Farms.

The existence of upgradient prediction limit exceedances confirms that there is dynamic, unstable water quality in the regional aquifer flowing to the landfill. The prediction limit statistical test assumes a static, unchanging background dataset to compute expected future values. When this assumption does not hold, as is the case here, it increases the likelihood that exceedances of the computed limit will be found, even when these exceedances are not related to activities attributable to Cedar Hills.

Alterations to the measurable quality of these flows can be mediated by processes occurring as flow progresses across the landfill and sampled at downgradient locations. Attenuation processes act to decrease parameter concentrations most notably demonstrated by diminishing concentrations of VOCs to below detection limits downgradient.

Additionally, processes such as redox condition changes and inputs to flow can alter constituent concentrations. Redox depression along a flow path by dissolved oxygen depletion or input of reductive pressures can mobilize iron and manganese from native soils, influence arsenic mobility (increase or decrease depending on reductive strength). Also sensitive to redox environment are nitrogen (Ammonia-N and Nitrate-N) and sulfur containing compounds. Mineral weathering (dissolution) can also occur if soil concentrations of carbon dioxide increase via landfill gas migration bringing ionic forms of calcium, magnesium, barium and bicarbonate (alkalinity), among others, into solution. Redox reactions tend to be reversible with concentrations of representative species adjusting as redox environment changes.

In the case where upgradient water quality is unstable, prediction limits become useful as a tool to determine changing upgradient conditions with quantifiable certainty.

4.3 REGIONAL AQUIFER DOWNGRADIENT WATER QUALITY

Downgradient groundwater quality, like upgradient quality, also manifests a high degree of spatial variation and temporal trends. Much as recharge effects are dampened with distance from the source, so are the concentrations of many analytes attenuated by processes such as dispersion dilution, sorption, and degradation as groundwater flows beneath the landfill.

Additionally, flow analysis indicates convergence of flow, not only from recharge under Queen City Farms but also from areas west and north of the landfill.

4.3.1 Water Quality Exceedances

Downgradient water quality exceedances for 2011 are tabulated in Table 4-1a. Analytes exceeding primary standards in downgradient wells are arsenic and vinyl chloride.

In 2011, arsenic was detected in four of 13 downgradient wells. All detections exceed the state GWC of 0.00005 mg/L.

Vinyl chloride exceeded the state GWC in one sample from MW-43, and low level detections have occurred approximately once per year, since 2003 in this well. It is likely that these detections are related to the degradation of the PVC well construction materials at MW-43. Release of vinyl chloride monomer from PVC products manufactured in the 1970s is well documented. This well, installed in 1985, is likely to have been constructed using PVC materials susceptible to vinyl chloride leaching. MW-43 is recommended for decommissioning.

Secondary standards exceeded in 2011 were limited to iron and manganese and are consistent with previous results.. As in upgradient wells, iron and manganese vary greatly over short distances with concentrations ranging over a wide range.

4.3.2 Trends

Trend test results are summarized in Table 4-2b. As in upgradient wells, several basic water quality indicators such as conductance, total dissolved solids (TDS), and dissolved cationic and anionic species are found to have significant trends. Both increasing and decreasing trends are detected for these parameters in downgradient wells.

As explained in the previous section, a highly variable flow reaches the landfill footprint as upgradient flow. Processes acting to change parameter concentrations continue. Redox changes along the flow paths beneath the landfill modify the high iron and manganese concentrations measured at the upgradient south end of the landfill.

Mineral weathering effects (alkalinity, calcium, magnesium and barium) and redox sensitive species (iron, manganese) are apparent in long term trends in several downgradient wells (MW-67, MW-68, MW-74 and MW-75). These effects are consistent with changes brought about by the presence of carbon dioxide delivered by landfill gas. As redox reactions tend to be reversible, and as attenuation processes occur, concentrations of these parameters diminish with further downgradient flow.

Finally, inputs of solutes to groundwater flow from surface or near surface activities can alter water quality measurably. This is apparent with chloride concentrations in wells MW-66, MW-74, MW-75 and MW-85. Again, concentrations decline with further flow downgradient. Short term data do not continue these trends.

4.3.3 Prediction Limits

Table 4-3 lists downgradient intrawell prediction limit test results for Appendix I parameters in 2011. During 2011, there were no prediction limit exceedances of Appendix I parameters in downgradient wells.

4.4 PERCHED GROUNDWATER

Perched groundwater occurs in onsite glacial till, ice-contact deposits and recessional outwash. No laterally or vertically extensive perched zones have been identified. For purposes of presentation and discussion, perched zones are divided into three groups; North and West Perched Zones; East Perched Zone (EPZ); and South Solid Waste Area Perched Zone (SSWA Perched Zone).

Impacts to the EPZ and SSWA by historical site activities have been recognized over the years. Several investigations are underway to clarify interactions between engineered facilities, surface water and perched groundwater, and to further define perched zone extent.

Available data indicate that all onsite perched zones are separated from the regional aquifer by unsaturated deposits ranging from 100 to 300 feet. No laterally or vertically extensive perched zones have been identified leaving the regional aquifer beneath the landfill as the earliest target hydraulic pathway for groundwater contaminant detection. For this reason the regional aquifer, rather than any perched groundwater, is the target hydraulic pathway for detection monitoring. Table 2-1 lists perched wells, construction dates and locational information.

4.4.1 Groundwater Elevation and Flow

Depth to water and seasonal precipitation response plot is located in Appendix II. Flow direction and velocity are not able to be determined due to the discontinuous nature of perched zones. Additional borings in the East Main Hill perched zone may bring better definition of the extent of this zone and provide adequate data to infer flow in this zone. These findings are presented in the *East Main Hill Perched Zones Technical Memorandum*, published in 2010.

4.4.2 Water Quality Exceedances

Perched zones water quality exceedances for 2011 are presented in Table 4-1b. In the North and West zone wells, arsenic is measured in MW-27A at concentrations above the GWC. Secondary standards are exceeded for pH (wells MW-28 and MW-29) and manganese (MW-27A and MW-55).

In the EPZ, primary state GWC standards were exceeded for arsenic (MW-47 andMW-EB6) and 1,1-dichloroethane (MW-30A and MW-62). Vinyl chloride was detected in well, MW-47, exceeding criteria in all samples tested in 2011. GWC secondary standards were exceeded for pH in MW-30A, for TDS in MW-47, for iron in MW-47 and MW-EB6; and for manganese in MW-47 and MW-EB6.

In the SSWA perched zone, MW-101 exceeded the GWC for arsenic and the GWC for vinyl chloride. Iron and manganese exceeded the secondary standard.

As previously discussed, arsenic occurs naturally in native soils and can be mobilized in groundwater by depressed redox and affected by pH conditions and ions available to form complexes or adsorption sites. The physical and spatial properties of the perched zones enhance the likelihood of exposure to one or more of these mechanisms. Although arsenic can be found in leachate, the probability of leachate as a source of arsenic in groundwater samples is unlikely considering processes such as dilution and sorption that would reduce the contribution from leachate. It is likely that arsenic detected in site wells is mobilized from native soils by redox or pH changes which can be brought about by landfill associated processes.

The frequency and variety of VOC exceedances in the EPZ and SSWA wells have declined dramatically over time. Primary standards have been exceeded by seven VOCs at some point during the monitoring history of the perched zone wells. Presently only two compounds, 1,1-dichloroethane and vinyl chloride have exceeded standards.

Iron and manganese, like arsenic, are naturally occurring and are mobilized by similar processes, redox, pH and sorption. Iron and manganese exceedances occur in both impacted and unimpacted perched wells.

4.4.3 Trends

Trend test results are tabulated in the Statistical Summary of Perched Groundwater Quality Table 4-2c. North and West perched zone wells display few trends long term. In short term data, MW-27A shows significant increasing trend in ammonia and MW-28 tests significant increasing alkalinity, though all data in both instances are within historical ranges for the wells.

Trends in the East perched zone are detected primarily in wells MW-30A; and MW-47 and to a lesser extent in MW-62. Short term trends are generally not statistically significant in the East perched zone, long term trends are predominantly downward in MW-62 and increasing in

MW-30A and MW-47 especially constituents consistent with landfill gas migration (alkalinity, calcium, magnesium, conductance, TDS and redox sensitive species). CVOCs, also consistent with landfill gas migration, have stabilized after long term decreases in MW-30A and to a lesser extent in MW-47.

The South Solid Waste Area perched zone is monitored for water quality by MW-101. Several other SSWA zone wells have been sampled occasionally during ongoing investigation and have not produced sufficient data for trend testing. MW-101 yields short term declining short term trends for chloride, sulfate and sodium and a short term increase in pH.. No other analytes display any trend.

Short term trends can be influenced by more recent site activities, especially in perched zone wells with high response to seasonal precipitation. Analytical variation can also contribute statistically to trend detection.

4.4.4 Prediction Limits

Perched zone wells were tested for intrawell prediction limit exceedances for Appendix I analytes where adequate data are available. In wells with sufficient data, no exceedances of intrawell prediction limits were detected in any perched wells.

5.0 SUMMARY AND CONCLUSIONS

5.1 REGIONAL AQUIFER

Recharge of the regional aquifer beneath CHRLF is predominately by rainfall. Primary recharge areas are the May Creek Drainage to the northwest and Gravel Pit Lake centered on the Queen City Farms property to the south of the landfill. Queen City Farms has been the site of many activities including solid and hazardous waste disposal, solvent reprocessing and recovery; gravel mining; and a composting operation. The property is on the National Priorities List for hazardous waste sites and has gone through remediation efforts including excavation, stabilization and barrier wall construction. These past activities and current conditions affect and define upgradient groundwater quality for CHRLF. Groundwater flow from the recharge area is radial and is monitored by extensive networks of wells at both Queen City Farms and CHRLF.

Upgradient water quality to CHRLF exhibits wide spatial and temporal variation. Contamination of the regional groundwater by CVOCs on the Queen City Farms site is well documented, as is migration across the property line and under CHRLF.

The CVOCs TCE, PCE and *cis*-1,2-dichloroethene are detected regularly in several upgradient wells. TCE was present in five upgradient wells, exceeding primary drinking water standards in two. Vinyl chloride is regularly detected in one upgradient well and is likely related to degradation of the PVC monitoring well construction materials. Overall, primary drinking water standards were exceeded in some upgradient wells for PCE, TCE, vinyl chloride and arsenic. Some wells exceeded secondary standards for iron, manganese and occasionally pH.

In summary, the regional aquifer is the first continuously saturated zone beneath the landfill and serves as the earliest path for detection monitoring. Groundwater flowing onto the CHRLF site is highly variable both spatially and temporally.

A small crescent of wells in the northeast corner of the CHRLF property monitors regional aquifer flow along preferential flow paths downgradient to MSW placement. Surface activities have raised chloride concentrations in wells MW-66, MW- 74, MW-75 and MW-85. Concentrations decline with further flow in the high transmissivity flow path downgradient and reach near background levels as flow leaves the site.

Downgradient ground water quality has exceeded GWC primary standards for arsenic and secondary standards for iron, manganese and pH. Downgradient water quality is generally better than upgradient when compared with drinking water standards. The CVOCs TCE, PCE and *cis*-1,2 DCE are undetected in downgradient wells. Vinyl chloride was detected in one sample from a downgradient well in 2011, the detection is likely related to degradation of the PVC construction materials used for this monitoring well which is recommended for decommissioning. These data indicate that CHRLF is acting as an attenuation zone for upgradient Queen City Farms impacts, allowing a reduction in the concentration of VOCs, iron and manganese.

Groundwater analysis indicates the effects of interaction with carbon dioxide from landfill gas migration. This influence is detectable in regional aquifer wells screened near the water table in predominately the central portion of the landfill site. Effects noted are increased alkalinity calcium and magnesium relative to deeper screened wells. Other redox sensitive can be mobilized as well.

Additional findings related to regional aquifer flow analysis and monitoring well detection zones can be found in the *Phase I Investigations Groundwater Monitoring Well System Enhancements Technical Memorandum*, October 2007. An addendum to the site-wide hydrogeological report will be completed in 2012 and include an updated analysis of the regional aquifer and recommended enhancements to the regional aquifer monitoring network.

5.2 PERCHED ZONES

Perched groundwater occurs in onsite till, ice-contact deposits and recessional outwash. No laterally or vertically extensive perched zones have been identified at CHRLF. Recharge of perched groundwater is by precipitation with possible hydraulic continuity to surface streams.

The Hydrogeologic Investigation Report for Area 6 development (2003) determined that no perched zones have been identified to be either laterally or vertically extensive and as such do not provide an opportunity for regional aquifer background characterization or site wide detection monitoring of waste placement areas. On this basis, the regional aquifer beneath the landfill is the earliest target hydraulic pathway for groundwater contaminant detection.

Impacts from historical landfilling methods have previously been recognized in several perched zone wells. Area closure, capping, leachate collection and gas extraction have moderated some impacts to water quality. Long term declines for concentrations of conductance, chloride, nitrate, sulfate and volatile organic compounds in MW-30A indicate these improvements. The influence of landfill gas on groundwater quality continues in east side perched groundwater, based on presence of landfill gas in proximal gas probes and elevated alkalinity, calcium, magnesium and chlorinated organic compounds.

Two investigations that pertain to perched zone conditions were completed in 2010. The Technical Memoranda *Results of Groundwater Sampling and Fate and Transport Analysis South Solid Waste Area Perched Zone Assessment,* April 2010, and the *East Main Hill Perched Zones*, October 2010 evaluate occurrence and conditions in the Main Hill and South Solid Waste Area perched zones.

These memoranda include an evaluation of the gas-to-groundwater pathway for contaminant transport and further define extent and flow paths of groundwater in the perched zones

Action taken to evaluate the integrity and effectiveness of engineered facilities in closed, unlined landfill areas can be found in the *Cedar Hills Regional Landfill Environmental Management Facility Evaluation And Modifications For Closed Landfill Areas, 2007 Summary Report*, 2008.

Results and conclusions from these investigations will be presented in an addendum updating the Site Wide Hydrogeologic report.

6.0 REFERENCES

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TABLES

TABLE 2-1
SUMMARY OF CEDAR HILLS REGIONAL LANDFILL SITE WELLS

Well Number	Date Constructed	Screened Zone	Gradient[1]	Purpose[2]	Ground Surface Elevation	Top of Well Casing Elevation	Total Well Depth	Screened Interval Depth		Screened Interval Elevation		Coordinates Northing	Coordinates Easting
MW-21	5/17/1983	Regional	C	WL/WQ	418.2	420.66	180.0	155	163	263.2	255.2	173876.38	1697901.86
MW-22	5/25/1983	Regional	C	WL	515.0	517.09	284.0	279	283.8	236.0	231.2	173088.17	1701844.34
MW-24	6/1/1983	Regional	U	WL/WQ	473.8	475.99	193.0	187	192	286.8	281.8	167767.76	1702441.65
MW-43	4/30/1985	Regional	D	WL/WQ	544.6	547.06	325.0	299	309	245.6	235.6	174327.14	1701274.23
MW-54	9/26/1986	Regional	U	WL	579.3	580.43	360.0	329	351	250.3	228.3	168435.53	1702154.28
MW-56	10/12/1988	Regional	U	WL/WQ	479.2	480.33	170.5	156	166	323.2	313.2	167214.82	1698980.77
MW-57	8/22/1988	Regional	U	WL/WQ	455.7	456.64	145.5	129	144	326.7	311.7	167201.99	1699993.32
MW-58A	9/26/1988	Regional	U	WL/WQ	478.6	479.27	220.5	208.5	218.5	270.1	260.1	167207.16	1699006.59
MW-59	8/16/1988	Regional	U	WL/WQ	455.6	457.13	185.5	170.5	180.5	285.1	275.1	167193.44	1699983.91
MW-60	9/13/1991	Regional	U	WL/WQ	564.8	567.15	266.4	230	239	334.8	325.8	167873.2	1701154.47
MW-64	3/22/1993	Regional	C	WL/WQ	594.3	596.55	276.3	260.3	274.1	334.0	320.2	168772.19	1701980.27
MW-65	3/29/1993	Regional	U	WL/WQ	543.2	545.83	236.9	225.5	234.3	317.7	308.9	167146.55	1701602.10
MW-66	4/5/1993	Regional	D	WL/WQ	528.6	531.28	250.7	234.2	248	294.4	280.6	174250.32	1699750.19
MW-67	4/28/1993	Regional	D	WL/WQ	514.1	516.43	232.4	216.3	230.1	297.8	284.0	172610.65	1701776.69
MW-68	4/15/1993	Regional	D	WL/WQ	644.8	647.07	354.6	333.5	352.5	311.3	292.3	170609.35	1701917.32
MW-69	4/23/1993	Regional	C	WL/WQ	651.0	653.69	368.8	357.4	371	293.6	280.0	172400.20	1698061.86
MW-70	5/11/1993	Regional	U	WL/WQ	527.9	530.57	221.5	205.1	218.8	322.8	309.1	168699.89	1698412.97
MW-72	8/7/1998	Regional	C	WL/WQ	669.8	671.87	389.0	366.2	375.8	303.6	294.0	170987.71	1698229.92
MW-73	7/3/1999	Regional	C	WL/WQ	484.3	485.70	218.0	196.2	205.5	288.1	278.8	174995.59	1698954.95
MW-74	11/1/2000	Regional	D	WL/WQ	529.2	531.26	270.0	239.3	248.8	289.9	280.4	173813.79	1700386.85
MW-75	9/24/1999	Regional	D	WL/WQ	529.8	532.40	287.0	258.7	268.8	271.1	261.0	173432.42	1701059.70
MW-76	10/25/1999	Regional	U	WL/WQ	489.8	491.71	155.9	138.7	148.2	351.1	341.6	167193.13	1700376.23
MW-77	10/12/1999	Regional	U	WL/WQ	550.5	552.67	251.5	230	239.5	320.5	311.0	168999.71	1700007.63
MW-78	10/8/1999	Regional	U	WL/WQ	535.3	537.35	229.5	213	225.5	322.3	309.8	169027.58	1698881.94
MW-80	2/27/2001	Regional	D	WL/WQ	528.5	530.41	270.0	249.3	258.8	279.2	269.7	172964.99	1701309.78
MW-81	10/3/2002	Regional	C	WL/WQ	492.2	493.66	199.0	183	192	309.2	300.2	172113.99	1702568.87
MW-82	11/2/2000	Regional	U	WL/WQ	472.8	474.85	139.5	123.9	133.4	348.9	339.4	167725.31	1699553.72
MW-83	10/27/2000	Regional	U	WL/WQ	494.5	496.81	160.0	144.3	153.8	350.2	340.7	167212.27	1697939.89
MW-84	10/20/2000	Regional	C	WL/WQ	528.7	530.80	250.5	236.2	245.7	292.5	283.0	173894.54	1698602.89
MW-85	12/1/2000	Regional	D	WL/WQ	529.8	531.76	270.0	247.2	256.7	282.6	273.1	173694.52	1701828.95
MW-86	12/12/2000	Regional	D	WL/WQ	533.9	536.04	282.0	250.5	259.3	283.4	274.6	174917.90	1701331.25
MW-87	11/21/2000	Regional	D	WL/WQ	535.2	537.31	272.5	251.5	260.8	283.7	274.4	173493.76	1700670.27
MW-88	9/13/2001	Regional	D	WL/WQ	511.2	513.68	248.5	229.7	239	281.5	272.2	174303.06	1701807.87
MW-89	11/12/2001	Regional	D	WL/WQ	510.7	512.82	328.0	281.5	290.8	229.2	219.9	174319.44	1701799.57
MW-90	8/14/2002	Regional	D	WL/WQ	500.2	502.22	300.0	265	274	235.2	226.2	174300.67	1702203.13
MW-91	10/26/2001	Regional	D	WL/WQ	529.7	532.02	331.0	268.9	289	260.8	240.7	173423.94	1701023.09
MW-93	6/24/2002	Regional	C	WL/WQ	630.2	632.15	350.0	310.3	320.1	319.9	310.1	169851.24	1702259.35
MW-94	7/2/2002	Regional	U	WL/WQ	493.2	495.51	168.0	136	144.7	357.2	348.5	167210.22	1698674.21
MW-95	7/22/2002	Regional	U	WL/WQ	568.6	571.54	311.0	254	262.7	314.6	305.9	169426.92	1697265.32
MW-99	8/30/2002	Regional	U	WL/WQ	491.8	493.64	287.0	270	279	221.8	212.8	172098.73	1702556.06
MW-100	8/26/2002	Regional	C	WL/WQ	618.4	620.32	124.7	299.3	309.3	319.1	309.1	169610.46	1700791.72
MW-106	2/19/2009	Regional	C	WL	473.0	475.47	270.0	193	203	280.0	270.0	173461.69	1702536.99
WS-ATC-1	2/7/1972	Regional	C	WL	624.9	625.51	535.0	325	340	299.9	284.9	169823.34	1702268.95
WS-NPW-1	8/221990	Regional	C	WL	644.6	646.33	382.0	365.7	375.7	278.9	268.9	171138.99	1701906.96
WS-NPW-3	6/51990	Regional	C	WL	644.3	645.81	376.0	359.4	367.4	284.9	276.9	170663.28	1701922.88

TABLE 2-1
SUMMARY OF CEDAR HILLS REGIONAL LANDFILL SITE WELLS

Well Number	Date Constructed	Screened Zone	Gradient[1]	Purpose[2]	Ground Surface Elevation	Top of Well Casing Elevation	Total Well Depth	Screened Interval Depth		Screened Interval Elevation		Coordinates Northing	Coordinates Easting
MW-30A	9/6/1989	East Perched	--	WL/WQ	567.7	568.43	40.0	25	35	542.7	532.7	172345.48	1701628.59
MW-47	6/31/1985	East Perched	--	WL/WQ	633.6	634.60	50.0	23.5	43.5	610.1	590.1	171365.53	1701898.69
MW-48	5/24/1985	East Perched	--	WL	593.6	594.49	63.0	37	47	556.6	546.6	168758.73	1701985.17
MW-50	6/3/1985	East Perched	--	WL	636.2	637.02	39.5	27.5	37.5	608.7	598.7	170276.14	1701873.92
MW-62	2/1/1990	East Perched	--	WL/WQ	555.3	556.21	65.5	44	54	511.3	501.3	172397.77	1701719.18
MW-63	2/12/1990	East Perched	--	WL	513.8	515.88	22.0	12	17	501.8	496.8	172580.25	1701786.72
MW-102	1/27/2009	East Perched	--	WL	549.7	552.48	50	35	50	515.2	500.2	172313.75	1701858.76
MW-103	1/28/2009	East Perched	--	WL	636.8	639.08	40.00	25	35	611.8	601.8	170473.99	1702210.55
MW-104	1/29/2009	East Perched	--	WL	626.9	629.68	35.00	22	32	604.9	594.9	171153.34	1702169.14
MW-EB6	11/28/1990	East Perched	--	WL/WQ	587.9	589.61	50.0	20	30	567.9	557.9	171862.72	1702049.75
MW-98	3/9/2001	N - W Perched	--	WL	501.6	503.73	22.5	10.7	20	490.9	481.6	174810.64	1699245.65
MW-28	6/21/1983	N - W Perched	--	WL/WQ	526.2	527.75	39.0	27	37	499.2	489.2	174231.84	1699966.20
MW-29	6/23/1983	N - W Perched	--	WL/WQ	531.7	532.92	60.0	17	27	514.7	504.7	173552.23	1700926.39
MW-55	10/2/1986	N - W Perched	--	WL/WQ	651.1	652.29	67.0	37.5	47.5	613.6	603.6	172364.53	1698110.11
MW-27A	10/3/1985	N - W Perched	--	WL/WQ	583.2	584.23	80.0	59	69	524.2	514.2	169817.29	1697470.72
MW-25	6/3/1983	SSWA Perched	--	WL	473.2	474.41	43.0	18	38	455.2	435.2	167760.97	1699580.14
MW-41S	7/12/1983	SSWA Perched	--	WL	460.7	462.44	51.0	8	18	452.7	442.7	167171.51	1700100.82
MW-41D	7/12/1983	SSWA Perched	--	WL	460.7	462.32	51.0	30	50	430.7	410.7	167171.51	1700100.82
MW-45	5/17/1985	SSWA Perched	--	WL	487.7	488.40	64.0	31	41	447.6	457.6	167907.28	1699058.03
MW-79	11/5/1999	SSWA Perched	--	WL	456.9	459.17	56.0	40.5	50	416.4	406.9	167175.91	1699495.56
MW-96	12/18/2001	SSWA Perched	--	WL	545.4	547.74	102.9	88.8	97.5	456.6	447.9	168667.73	1699434.47
MW-97	9/5/2001	SSWA Perched	--	WL	562.5	564.54	124.7	101	110	461.5	452.5	168380.87	1700636.96
MW-101	6/2/2006	SSWA Perched	--	WL/WQ	472.1	474.72	57.50	44	54	428.1	418.1	167791.40	1699364
MW-105	1/30/2009	SSWA Perched	--	WL	518.7	521.23	30.00	18	28	500.7	490.7	167697.49	1698320.49

Notes

[1]Gradient relative to the postion of the well in the regional Aquifer relative to the waste placement areas.
U = Upgradient C = Crossgradient D = Downgradient

[2]WL = Water Level WQ = Water Quality

TABLE 4-1a

CEDAR HILLS REGIONAL LANDFILL

SUMMARY OF GROUNDWATER QUALITY CRITERIA EXCEEDANCES REGIONAL AQUIFER

(January 1, 2011 to December 31, 2011)

			Arsenic	Trichloro-ethene	Vinyl Chloride	pH (Field)	Iron	Manganese
			Primary Criteria			**Secondary Criteria**		
Well ID	Sample Date	Sample ID	0.0005 mg/L	3 ug/L	0.02 ug/L	< 6.5, > 8.5	0.3 mg/L	0.05 mg/L
Upgradient Wells								
MW-21	02/22/11	W21-110222-					2.24	0.081
MW-21	04/19/11	W21-110419-					1.82	0.0758
MW-21	08/01/11	W21-110801-					1.85	0.0706
MW-21	10/13/11	W21-111013-					1.77	0.069
MW-24	01/14/11	W24-110114-					3.43	0.127
MW-24	04/25/11	W24-110425-					3.75	0.146
MW-24	07/14/11	W24-110714-					3.35	0.132
MW-24	10/24/11	W24-111024-					3.25	0.116
MW-56	01/11/11	W56-110111-						0.074
MW-56	04/08/11	W56-110408-						0.064
MW-56	07/06/11	W56-110706-						0.060
MW-56	10/06/11	W56-111006-						0.084
MW-57	01/11/11	W57-110111-					9.63	0.250
MW-57	04/08/11	W57-110408-					9.3	0.267
MW-57	07/11/11	W57-110711-					9.62	0.287
MW-57	10/12/11	W57-111012-					9.64	0.27
MW-58A	01/05/11	W58A110105-					1.22	0.383
MW-58A	05/02/11	W58A110502-					0.995	0.344
MW-58A	07/12/11	W58A110712-					1.02	0.371
MW-58A	10/20/11	W58A111020-					1.08	0.377
MW-59	01/11/11	W59-110111-					4.64	0.104
MW-59	04/18/11	W59-110418-					4.31	0.104
MW-59	07/08/11	W59-110708-					4.33	0.109
MW-59	10/26/11	W59-111026-					3.99	0.099
MW-64	01/13/11	W64-110113-	0.0017				0.60	0.228
MW-64	04/15/11	W64-110415-	0.00157				0.467	0.3080
MW-64	07/18/11	W64-110718-	0.00137				0.417	0.3160
MW-64	10/10/11	W64-111010-	0.0014					0.590
MW-65	01/19/11	W65-110119-			0.063		4.0	0.20
MW-65	04/22/11	W65-110422-			0.042		4.5	0.187
MW-65	07/21/11	W65-110721-			0.041		4.4	0.192
MW-65	10/12/11	W65-111012-			0.040		4.3	0.194
MW-69	01/11/11	W69-110111-	0.0023				1.1	0.20
MW-69	04/21/11	W69-110421-	0.0024				1.0	0.211
MW-69	07/26/11	W69-110726-	0.0023				1	0.206
MW-69	10/13/11	W69-111013-	0.0023				1.04	0.193
MW-72	01/18/11	W72-110118-					2.06	0.269
MW-72	04/21/11	W72-110421-					1.85	0.282
MW-72	07/25/11	W72-110725-					1.8	0.267
MW-72	10/10/11	W72-111010-					2.14	0.266
MW-76	01/18/11	W76-110118-		9.97				
MW-76	04/25/11	W76-110425-		11.20				
MW-76	07/14/11	W76-110714-		7.69		6.3		
MW-76	10/11/11	W76-111011-		9.58		6.26		
MW-78	07/14/11	W78-110714-				6.41		
MW-82	01/18/11	W82-110118-		4.80				
MW-82	04/28/11	W82-110428-		5.76				
MW-82	07/21/11	W82-110721-		5.35				
MW-82	10/04/11	W82-111004-		4.78				
MW-83	07/25/11	W83-110725-						0.069

TABLE 4-1a

CEDAR HILLS REGIONAL LANDFILL

SUMMARY OF GROUNDWATER QUALITY CRITERIA EXCEEDANCES REGIONAL AQUIFER

(January 1, 2011 to December 31, 2011)

			Arsenic	Trichloro-ethene	Vinyl Chloride	pH (Field)	Iron	Manganese
			Primary Criteria			**Secondary Criteria**		
Well ID	Sample Date	Sample ID	0.0005 mg/L	3 ug/L	0.02 ug/L	< 6.5, > 8.5	0.3 mg/L	0.05 mg/L
MW-93	01/19/11	W93-110119-	0.0015					0.325
MW-93	04/29/11	W93-110429-	0.0015					0.314
MW-93	07/29/11	W93-110729-	0.0015					0.369
MW-93	10/24/11	W93-111024-	0.0013					0.282
MW-95	01/20/11	W95-110120-						0.125
MW-95	04/28/11	W95-110428-						0.130
MW-95	07/26/11	W95-110726-						0.137
MW-95	10/11/11	W95-111011-						0.135
MW-99	01/21/11	W99-110121-	0.0026					0.0529
MW-99	04/26/11	W99-110426-	0.0026					0.0519
MW-99	07/15/11	W99-110715-	0.0024					0.0542
MW-99	10/14/11	W99-111014-	0.0024					0.0655
MW-99	12/28/11	W99-111228-	0.0025					0.077
MW-100	01/27/11	W100110127-					1.8	0.21
MW-100	05/03/11	W100110503-					1.51	0.225
MW-100	07/29/11	W100110729-					1.48	0.219
MW-100	10/06/11	W100111006-					1.5	0.211

TABLE 4-1a

CEDAR HILLS REGIONAL LANDFILL

SUMMARY OF GROUNDWATER QUALITY CRITERIA EXCEEDANCES REGIONAL AQUIFER

(January 1, 2011 to December 31, 2011)

			Arsenic	Trichloro-ethene	Vinyl Chloride	pH (Field)	Iron	Manganese
			Primary Criteria			**Secondary Criteria**		
Well ID	Sample Date	Sample ID	0.0005 mg/L	3 ug/L	0.02 ug/L	< 6.5, > 8.5	0.3 mg/L	0.05 mg/L
Downgradient Wells								
MW-43	1/14/2011	W43-110114-			0.0245		0.99	0.207
MW-43	4/14/2011	W43-110414-					0.88	0.224
MW-43	8/1/2011	W43-110801-					0.93	0.235
MW-43	10/18/11	W43-111018-					0.95	0.234
MW-67	4/18/2011	W67-110418-						0.068
MW-67	7/20/2011	W67-110720-						0.087
MW-67	10/06/11	W67-111006-						0.056
MW-68	1/27/2011	W68-110127-					2.27	0.244
MW-68	5/3/2011	W68-110503-					1.87	0.231
MW-68	7/22/2011	W68-110722-					1.44	0.198
MW-68	10/07/11	W68-111007-					1.36	0.193
MW-74	1/21/2011	W74R110121-					1.6	0.13
MW-74	4/20/2011	W74R110420-					1.68	0.096
MW-74	7/15/2011	W74R110715-					1.1	0.0602
MW-74	10/14/11	W74R111014-					1.2	0.0632
MW-74	12/09/11	W74R111209-					1.33	0.08
MW-75	01/21/11	W75-110121-					1.56	0.13
MW-75	04/20/11	W75-110420-					1.44	0.119
MW-75	07/15/11	W75-110715-					1.41	0.128
MW-75	10/14/11	W75-111014-					1.65	0.124
MW-75	12/05/11	W75-111205-					1.52	0.119
MW-80	1/26/2011	W80-110126-	0.0049				1.400	0.254
MW-80	4/25/2011	W80-110425-	0.0052				1.550	0.26
MW-80	7/25/2011	W80-110725-	0.0049				1.480	0.268
MW-80	10/21/11	W80-111021-	0.0046				1.63	0.276
MW-86	1/20/2011	W86-110120-					0.564	
MW-86	4/26/2011	W86-110426-					0.426	
MW-86	10/13/11	W86-111013-					0.327	
MW-87	01/21/11	W87-110121-					2.7	0.32
MW-87	04/26/11	W87-110426-					2.8	0.34
MW-87	07/15/11	W87-110715-					3.05	0.38
MW-87	10/14/11	W87-111014-					3.21	0.362
MW-87	12/28/11	W87-111228-					3.16	0.343
MW-88	01/20/11	W88-110120-	0.0012					
MW-88	04/27/11	W88-110427-	0.0012					
MW-88	07/26/11	W88-110726-	0.0012					
MW-88	10/19/11	W88-111019-	0.0011					
MW-89	01/10/11	W89-110110-	0.0014				0.76	0.26
MW-89	04/27/11	W89-110427-	0.0016				0.72	0.250
MW-89	07/26/11	W89-110726-	0.0015				0.727	0.252
MW-89	10/19/11	W89-111019-	0.0013				0.778	0.262
MW-90	01/04/11	W90-110104-					1.3	0.269
MW-90	04/22/11	W90-110422-					1.15	0.265
MW-90	07/27/11	W90-110727-					1.09	0.286
MW-90	10/25/11	W90-111025-					1.09	0.243
MW-91	01/04/11	W91-110104-	0.0024				2.0	0.239
MW-91	04/19/11	W91-110419-	0.0038				2.10	0.217
MW-91	07/20/11	W91-110720-	0.0036				2.88	0.246
MW-91	10/12/11	W91-111012-	0.0017				2.59	0.268

TABLE 4-1b

CEDAR HILLS REGIONAL LANDFILL

SUMMARY OF GROUNDWATER QUALITY STANDARD EXCEEDANCES PERCHED ZONES

(January 1, 2011 to December 31, 2011)

			Arsenic	1,1-Dichloro-ethane	Vinyl Chloride	pH (Field)	TDS	Iron	Manganese
						Secondary Standards			
Well ID	Sample Date	Sample ID	0.0005	3 ug/L	0.02 ug/L	< 6.5, > 8.5	500	0.3	0.05
North and West Perched Wells									
MW-27A	01/04/11	W27A110104-	0.0165						0.056
MW-27A	04/19/11	W27A110419-	0.0167						
MW-27A	07/28/11	W27A110728-	0.0171						0.0746
MW-27A	10/17/11	W27A111017-	0.0156						0.0668
MW-28	07/07/11	W28-110707-				5.5			
MW-28	10/25/11	W28-111025-				5.8			
MW-29	07/07/11	W29-110707-				6.0			
MW-29	10/25/11	W29-111025-				6.2			
MW-55	01/10/11	W55-110110-							0.14
MW-55	04/20/11	W55-110420-							0.15
MW-55	07/05/11	W55-110705-							0.16
MW-55	10/24/11	W55-111024-							0.147
East Perched Zone Wells									
MW-30A	01/10/11	W30A110110-		2.93					
MW-30A	04/19/11	W30A110419-		3.17					
MW-30A	07/11/11	W30A110711-		3.32		6.3			
MW-30A	10/14/11	W30A111014-		2.27		6.4			
MW-47	01/07/11	W47-110107-			6.88		611	0.4	1.41 D
MW-47	04/13/11	W47-110413-	0.00162		5.65		600	0.4	1.64 D
MW-47	07/05/11	W47-110705-	0.00109		5.40		612	0.3	2.22 D
MW-47	10/17/11	W47-111017-			4.47		638		1.74 D
MW-62	01/10/11	W62-110110-		1.33					
MW-62	04/29/11	W62-110429-		1.34					
MW-EB6	01/10/11	WB6-110110-	0.01					8.5	0.711 D
South Solid Waste Area Wells									
MW-101	01/24/11	W101110124-	0.0105		0.77				1.7
MW-101	05/02/11	W101110502-	0.0155		0.53			0.4	1.54 D
MW-101	07/21/11	W101110721-	0.00735		0.33			0.4	1.47
MW-101	10/28/11	W101111028-	0.00616		0.50			0.3	1.34

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-21		MW-24		MW-56		MW-57		MW-58A		MW-59		MW-60		MW-64	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, (Field) Standard Units																
No. of Analyses	67	7	69	8	68	8	67	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	8	67	8	68	8	68	8	68	8	66	8
Maximum	9.36	7.8	9.06	7.2	8.4	7.5	7.6	6.9	9.0	7.7	8.7	7.1	7.5	7.2	8.1	7.4
Minimum	5.89	7.4	5.94	6.8	5.9	6.6	6.3	6.6	6.0	7.3	5.9	6.8	6.2	6.7	6.2	6.4
Mean	7.362	7.5	7.074	7.0	7.1	6.9	6.9	6.7	7.5	7.5	7.1	6.9	7.1	6.9	7.2	6.9
Standard Deviation	0.463	0.16	0.375	0.14	0.34	0.27	0.27	0.10	0.36	0.17	0.35	0.12	0.21	0.16	0.34	0.28
Median	7.35	7.5	7.01	7.0	7.1	6.9	6.9	6.7	7.5	7.5	7.1	6.9	7.1	7.0	7.2	6.9
Trend	I	--	--	--	D	--	--	--	--	--	--	--	D	--	I	--
Specific Conductance, (Field) micromhos/cm																
No. of Analyses	67	7	69	8	67	8	67	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	67	8	67	8	68	8	68	8	68	8	66	8
Maximum	162	118	303	198	255	152	300	228	265	313	250	176	500	215	360	363
Minimum	65	69	133	103	120	108	180	133	115	115	145	111	130	135	112	180
Mean	109	106	196	170	164	133	234	193	173	188	172	157	241	177	186	247
Standard Deviation	13	17	39	29	34	16	30	30	30	56	17	20	103	25	45	65
Median	110	113	190	177	150	130	230	195	170	178	170	158	200	178	180	235
Trend	I	--	I	--	D	--	D	--	I	--	D	--	--	I	--	I
Total Dissolved Solids, mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	8	68	8	68	8	68	8	68	8	65	8
Maximum	140.0	83	200	119	151	110	1100	155	157	129	250	121	300	143	270	225
Minimum	25.0	67	74	109	61	56	92	125	75	108	27	97	31	96	ND	130
Mean	68.3	73	117	113	98	93	160	142	109	117	104	104	152	126	111	170
Standard Deviation	16.51	7	23	3	20	16	119	9	19	7	26	8	61	14	41	37
Median	68.0	70	120	112	97	96	148	144	110	117	100	103	130	131	100	160
Trend	--	--	I	--	D	--	--	--	I	--	D	--	D	--	--	I
Alkalinity, total (CaCO3), mg/L																
No. of Analyses	58	7	60	8	59	8	59	8	59	8	59	8	59	8	59	8
No. of Detections	58	7	60	8	59	8	59	8	59	8	59	8	59	8	59	8
Maximum	62	53	110	75	86	58	110	88	96	112	110	64	260	96	120	111
Minimum	38	43	3	65	47	44	72	74	55	73	54	59	60	70	50	75
Mean	46	51	74	71	60	50	91	80	71	79	67	62	103	88	72	90
Standard Deviation	5	4	18	5	9	5	9	5	8	13	7	2	44	10	12	12
Median	46	52	75	74	56	50	92	79	72	75	66	63	90	92	72	89
Trend	I	--	I	D	D	--	D	--	I	--	D	--	--	--	--	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-65		MW-69		MW-70		MW-72		MW-73		MW-76		MW-77		MW-78		MW-81	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, (Field) Standard Units																		
No. of Analyses	67	7	65	8	67	8	45	8	41	8	41	8	41	8	40	5	40	8
No. of Detections	67	7	65	8	67	8	45	8	41	8	41	8	41	7	40	5	40	8
Maximum	8.2	7.2	8.2	7.7	8.0	7.5	7.5	7.3	7.5	7.1	7.0	6.7	7.3	7.1	7.3	6.6	7.7	7.4
Minimum	6.4	6.8	6.7	7.2	6.8	7.3	6.8	7.0	0.3	6.6	6.2	6.3	6.7	0.0	6.3	6.4	6.9	6.9
Mean	7.1	7.0	7.4	7.4	7.4	7.4	7.2	7.2	6.8	6.9	6.5	6.5	7.0	6.1	6.8	6.5	7.3	7.1
Standard Deviation	0.35	0.17	0.28	0.16	0.26	0.11	0.17	0.10	1.07	0.18	0.18	0.18	0.11	2.46	0.22	0.09	0.17	0.20
Median	7.1	6.9	7.4	7.4	7.5	7.4	7.3	7.2	7.0	6.8	6.6	6.5	7.0	6.9	6.8	6.5	7.3	7.1
Trend	--	--	--	--	--	--	--	--	--	--	D	D	--	--	D	--	--	--
Specific Conductance, (Field) mi																		
No. of Analyses	67	7	66	8	67	8	45	8	41	8	41	8	41	8	40	5	40	8
No. of Detections	67	7	66	8	67	8	45	8	41	8	41	8	41	7	40	5	40	8
Maximum	175	156	320	286	280	205	340	292	170	160	330	186	330	315	220	180	130	141
Minimum	88	97	85	155	127	122	220	166	115	99	115	108	200	0	150	114	95	77
Mean	140	136	205	239	178	175	269	252	149	140	150	149	259	233	181	157	116	121
Standard Deviation	13	19	59	42	23	28	29	39	13	20	33	28	27	98	17	26	9	21
Median	140	135	205	235	175	173	260	250	150	143	145	143	260	254	180	168	118	126
Trend	--	--	I	--	--	--	D	D	D	--	I	--	--	--	--	--	I	--
Total Dissolved Solids, mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
Maximum	170	106	210	169	160	126	220	180	1100	110	140	112	200	180	180	127	140	96
Minimum	60	66	40	126	46	84	130	156	61	99	60	69	80	141	96	113	56	84
Mean	89	94	131	155	110	115	175	170	124	104	97	98	160	144	126	119	87	89
Standard Deviation	16	14	38	16	19	14	25	9	157	4	18	13	22	59	16	6	15	4
Median	89	96	121	160	110	121	161	173	100	104	94	100	160	164	120	119	84	89
Trend	--	--	I	--	--	--	D	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, total (CaCO3), mg/L																		
No. of Analyses	60	7	59	8	60	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	60	7	59	8	60	8	46	8	41	8	41	8	41	7	41	5	40	8
Maximum	76	55	130	126	100	82	130	117	78	57	66	57	180	143	94	71	67	50
Minimum	42	51	56	116	63	71	26	105	42	52	38	44	120	120	69	67	41	47
Mean	52	53	98	121	77	76	110	112	61	55	47	49	138	113	80	69	48	49
Standard Deviation	4	2	23	3	8	4	14	4	7	1	6	4	14	46	7	1	5	1
Median	51	54	100	121	76	75	110	113	60	56	46	48	138	130	80	69	47	48
Trend	--	--	I	--	--	--	--	I	D	--	--	--	--	--	--	--	--	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-82		MW-83		MW-84		MW-93		MW-94		MW-95		MW-99		MW-100	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, (Field) Standard Units																
No. of Analyses	38	8	39	8	40	8	32	8	30	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	40	8	32	8	30	7	33	8	29	8	34	8
Maximum	7.7	7.1	7.6	7.2	7.3	7.0	7.9	7.4	7.5	7.5	7.6	7.6	8.1	7.9	7.1	6.9
Minimum	6.5	6.7	6.7	6.7	6.6	6.5	6.8	7.1	6.6	0.0	7.1	7.2	7.4	7.5	6.6	6.6
Mean	6.9	6.9	7.1	7.0	7.0	6.8	7.3	7.2	7.1	6.1	7.4	7.4	7.7	7.8	6.9	6.7
Standard Deviation	0.20	0.12	0.19	0.19	0.18	0.17	0.18	0.11	0.24	2.46	0.13	0.15	0.19	0.14	0.15	0.10
Median	6.9	6.9	7.1	7.0	7.1	6.8	7.3	7.2	7.0	6.8	7.4	7.4	7.7	7.7	6.9	6.7
Trend	--	--	D	--	D	--	I	--	--	--	--	--	--	--	D	--
Specific Conductance, (Field) mi																
No. of Analyses	38	8	39	8	40	8	32	8	31	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	40	8	32	8	31	8	33	8	29	8	34	8
Maximum	220	277	190	338	155	153	300	391	160	397	225	222	150	131	360	292
Minimum	150	154	100	165	100	86	120	257	115	115	160	124	110	78	245	152
Mean	183	198	157	214	137	134	235	326	140	177	197	187	120	116	295	247
Standard Deviation	19	43	18	72	11	21	31	52	9	94	16	31	10	16	32	43
Median	183	186	160	179	140	140	230	300	140	137	195	183	115	118	300	250
Trend	I	I	I	--	--	--	I	--	--	--	D	I	D	I	D	--
Total Dissolved Solids, mg/L																
No. of Analyses	38	8	38	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	38	8	39	8	32	8	26	8	33	8	29	8	34	8
Maximum	210	167	140	204	130	105	650	276	150	220	150	144	210	89	250	170
Minimum	97	101	42	107	ND	89	130	216	79	81	110	107	36	72	130	150
Mean	127	140	104	144	84	95	173	244	97	118	129	125	88	82	182	161
Standard Deviation	20	24	19	44	19	5	89	20	15	46	12	11	34	6	28	6
Median	120	141	100	117	87	94	155	243	94	99	130	127	81	83	180	162
Trend	--	--	I	--	--	--	I	I	--	--	D	--	D	--	D	--
Alkalinity, total (CaCO3), mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
Maximum	90	101	80	144	120	60	110	110	55	150	100	88	100	54	160	132
Minimum	38	72	50	65	46	53	64	97	44	48	78	78	46	49	95	117
Mean	77	86	61	92	60	57	93	102	51	72	89	84	54	52	133	123
Standard Deviation	9	12	7	36	11	2	8	4	4	35	7	3	9	1	14	5
Median	78	82	60	68	59	58	94	102	50	55	88	85	52	52	140	122
Trend	--	I	I	I	D	--	--	--	--	I	D	--	D	--	D	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-21		MW-24		MW-56		MW-57		MW-58A		MW-59		MW-60		MW-64	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Ammonia as N, mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	24	2	53	8	25	0	51	8	64	8	24	1	9	1	57	8
Maximum	0.2	0.0	0.4	0.0	0.2	ND	0.2	0.0	0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.1
Minimum	ND	ND	ND	0.0	ND	ND	ND	0.0	ND	0.1	ND	ND	ND	ND	ND	0.0
Mean	0.0	ID	0.0	0.0	0.0	ID	0.0	0.0	0.1	0.1	0.0	ID	0.0	ID	0.0	0.1
Standard Deviation	0.03	ID	0.06	0.00	0.02	ID	0.02	0.01	0.04	0.00	0.01	ID	0.03	ID	0.03	0.02
Median	0.0	ID	0.0	0.0	0.0	ID	0.0	0.0	0.1	0.1	0.0	ID	0.0	ID	0.0	0.0
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride, mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	66	7	69	8	68	8	67	8	68	8	68	8	68	8	66	8
Maximum	4.0	3.0	7.8	4.6	5.0	4.3	8.5	5.1	9.3	4.5	6.3	4.2	5.0	3.1	6.0	4.5
Minimum	ND	2.7	3.0	3.8	2.0	3.6	ND	3.9	3.0	3.4	2.9	3.8	2.6	2.5	2.0	3.1
Mean	2.6	2.8	4.2	4.2	3.3	4.0	5.1	4.5	4.7	3.8	3.9	4.0	3.4	2.7	3.2	3.6
Standard Deviation	0.5	0.1	1.0	0.3	0.7	0.2	1.4	0.5	1.4	0.4	1.1	0.2	0.6	0.2	0.7	0.4
Median	2.8	2.8	4.0	4.3	3.0	4.0	5.0	4.5	4.0	3.7	3.5	4.1	3.2	2.7	3.0	3.6
Trend	I	--	--	D	I	--	D	I	D	--	I	--	D	--	I	--
Nitrate as N, mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	12	0	19	0	50	8	18	2	6	2	13	1	62	8	23	8
Maximum	1.9	ND	1.0	ND	1.6	1.6	1.0	0.03	1.1	0.02	1.0	0.02	4.9	1.6	2.0	0.1
Minimum	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND	ND	ND	ND	1.2	ND	0.0
Mean	0.1	ID	0.1	ID	0.2	0.7	0.0	ID	0.0	ID	0.0	ID	1.8	1.4	0.1	0.0
Standard Deviation	0.23	ID	0.15	ID	0.26	0.48	0.12	ID	0.13	ID	0.12	ID	0.89	0.14	0.24	0.01
Median	0.0	ID	0.0	ID	0.2	0.7	0.0	ID	0.0	ID	0.0	ID	1.9	1.4	0.0	0.0
Trend	--	--	--	--	--	--	--	--	--	--	--	--	D	--	--	--
Sulfate, mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
Maximum	9	6	39	17	24	20	22	18	25	17	23	17	13	8	110	76
Minimum	2	5	9	15	12	13	2	17	9	16	14	16	6	2	7	8
Mean	7	5	16	16	18	16	19	18	15	16	17	17	8	6	25	35
Standard Deviation	1	2	4	1	3	2	2	0	4	1	2	1	2	2	20	21
Median	7	5	16	17	17	15	18	18	16	16	17	17	7	7	18	31
Trend	D	--	I	D	D	--	--	--	I	--	D	--	--	--	--	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-65		MW-69		MW-70		MW-72		MW-73		MW-76		MW-77		MW-78		MW-81	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Ammonia as N, mg/L																		
No. of Analyses	67	7	65	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	26	1	24	8	18	2	18	8	6	0	6	0	7	0	9	0	6	0
Maximum	0.1	0.0	0.1	0.0	0.3	0.0	0.1	0.0	0.2	ND	0.2	ND	0.1	ND	0.1	ND	0.1	ND
Minimum	ND	ND	ND	0.0	ND	ND	ND	0.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	0.0	ID	0.0	0.0	0.0	ID	0.0	0.0	0.0	ID	0.0	ID	0.0	ID	0.0	ID	0.0	ID
Standard Deviation	0.01	ID	0.03	0.00	0.07	ID	0.02	0.00	0.03	ID	0.03	ID	0.04	ID	0.01	ID	0.02	ID
Median	0.0	ID	0.0	0.0	0.0	ID	0.0	0.0	0.0	ID	0.0	ID	0.0	ID	0.0	ID	0.0	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride, mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	66	7	65	8	67	8	46	8	40	8	41	8	41	7	41	5	40	8
Maximum	7.0	5.0	4.3	5.0	7.0	4.2	4.3	4.3	3.7	3.9	8.0	6.2	5.1	5.1	6.1	5.1	5.0	3.2
Minimum	ND	1.8	ND	3.9	2.0	3.5	2.0	3.7	ND	3.0	2.0	3.4	3.0	4.0	3.4	3.9	2.0	2.7
Mean	4.3	3.8	3.0	4.2	3.3	3.8	3.6	3.9	2.8	3.5	4.7	4.5	3.9	4.1	4.8	4.3	2.3	2.9
Standard Deviation	1.1	1.0	0.9	0.4	0.7	0.2	0.5	0.2	0.5	0.3	1.2	1.0	0.5	1.7	0.6	0.5	0.5	0.2
Median	4.0	4.0	3.0	4.1	3.1	3.7	3.9	3.9	3.0	3.5	4.5	4.3	4.0	4.7	5.0	4.1	2.0	2.8
Trend	D	--	I	--	I	--	I	--	--	--	--	--	--	--	--	--	I	--
Nitrate as N, mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	9	1	12	0	56	7	12	0	41	8	41	8	40	7	41	5	39	8
Maximum	0.1	0.01	0.3	ND	0.2	0.1	1.0	ND	2.1	2.0	2.1	1.5	1.6	1.1	2.0	1.2	1.8	1.7
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	0.4	1.6	0.9	0.5	ND	0.8	0.6	0.9	ND	1.5
Mean	0.0	ID	0.0	ID	0.1	0.0	0.0	ID	1.1	1.9	1.4	1.0	0.5	0.8	1.3	1.0	1.5	1.6
Standard Deviation	0.02	ID	0.04	ID	0.05	0.02	0.15	ID	0.49	0.14	0.34	0.31	0.28	0.36	0.26	0.11	0.34	0.06
Median	0.0	ID	0.0	ID	0.1	0.0	0.0	ID	1.0	1.9	1.4	1.0	0.5	0.9	1.3	0.9	1.6	1.6
Trend	--	--	--	--	--	--	--	--	I	--	--	--	I	--	--	--	D	--
Sulfate, mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	66	7	65	8	67	8	46	8	40	8	40	8	41	7	41	5	39	8
Maximum	20	16	42	19	22	19	72	29	24	10	24	25	14	12	13	8	22	11
Minimum	ND	12	ND	14	10	17	18	25	ND	8	ND	14	8	9	7	7	ND	8
Mean	15	14	19	16	16	18	35	27	14	9	17	19	10	9	9	8	8	9
Standard Deviation	3	1	9	2	2	1	17	1	4	1	4	3	2	4	1	0	3	1
Median	15	14	16	15	16	18	28	27	13	9	18	19	10	11	9	8	8	9
Trend	D	--	I	--	I	--	D	I	D	D	I	--	--	--	--	--	I	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-82		MW-83		MW-84		MW-93		MW-94		MW-95		MW-99		MW-100	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Ammonia as N, mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	6	0	7	0	4	0	22	8	7	1	12	8	17	8	8	0
Maximum	0.1	ND	0.3	ND	0.1	ND	0.2	0.1	0.9	0.1	0.2	0.0	0.1	0.1	0.1	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	0.0	ND	ND	ND	0.0	ND	0.0	ND	ND
Mean	0.0	ID	0.0	ID	0.0	ID	0.0	0.1	0.0	ID	0.0	0.0	0.0	0.0	0.0	ID
Standard Deviation	0.03	ID	0.05	ID	0.02	ID	0.04	0.01	0.16	ID	0.04	0.00	0.03	0.01	0.02	ID
Median	0.0	ID	0.0	ID	0.0	ID	0.0	0.1	0.0	ID	0.0	0.0	0.0	0.1	0.0	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	D	--	--	--
Chloride, mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	39	8	32	8	26	8	33	8	29	8	34	8
Maximum	10.0	9.5	24.8	19.2	3.9	5.7	8.0	3.3	4.9	25.8	5.6	6.1	3.6	3.4	5.9	3.3
Minimum	4.0	4.0	3.0	4.4	ND	3.4	1.6	2.7	3.0	3.2	3.8	5.2	2.0	2.9	2.4	2.4
Mean	6.2	5.9	4.8	9.9	3.1	3.8	3.1	3.0	3.6	9.4	4.4	5.5	2.7	3.2	3.3	2.8
Standard Deviation	1.5	1.9	3.4	6.9	0.5	0.8	1.0	0.2	0.6	8.6	0.6	0.3	0.5	0.1	0.6	0.3
Median	6.0	5.0	4.0	5.1	3.0	3.6	3.0	2.9	3.6	3.8	4.0	5.5	2.9	3.2	3.1	2.8
Trend	--	--	I	--	I	--	--	D	I	I	I	--	I	--	--	--
Nitrate as N, mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	39	7	40	8	13	1	26	7	4	0	24	8	4	0
Maximum	1.5	1.2	1.8	0.5	1.4	0.7	1.2	0.01	1.5	0.9	0.1	ND	0.5	0.04	0.3	ND
Minimum	0.6	0.8	0.2	ND	0.1	0.3	ND	ND	0.8	ND	ND	ND	ND	0.02	ND	ND
Mean	1.0	0.9	0.7	0.1	0.4	0.5	0.1	ID	1.1	0.6	0.0	ID	0.2	0.03	0.04	ID
Standard Deviation	0.20	0.12	0.27	0.14	0.27	0.10	0.21	ID	0.18	0.40	0.01	ID	0.16	0.01	0.06	ID
Median	0.9	0.9	0.6	0.1	0.4	0.5	0.0	ID	1.0	0.8	0.0	ID	0.1	0.03	0.03	ID
Trend	--	--	D	--	I	--	--	--	I	D	--	--	D	--	--	--
Sulfate, mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
Maximum	18	16	63	20	18	14	57	101	20	13	28	17	18	8	110	23
Minimum	12	13	12	6	10	12	1	66	9	2	14	16	6	7	18	16
Mean	14	14	16	14	12	12	34	80	14	9	18	16	8	7	31	20
Standard Deviation	2	1	8	6	1	1	13	11	3	4	3	0	3	0	17	3
Median	14	14	15	16	12	12	28	78	15	11	17	16	7	7	25	20
Trend	I	--	I	D	--	--	I	I	D	D	D	D	D	--	--	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-21		MW-24		MW-56		MW-57		MW-58A		MW-59		MW-60		MW-64	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Iron, dissolved mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	6	68	8	68	8	68	8	66	3	66	8
Maximum	3.7	2.2	8.8	3.9	4.7	0.1	11.0	9.6	8.5	1.2	7.5	4.6	0.4	0.0	1.3	0.7
Minimum	1.3	1.8	1.7	3.3	0.0	ND	6.6	7.7	0.8	1.0	3.1	3.9	ND	ND	0.0	0.1
Mean	2.2	2.0	4.7	3.6	0.6	0.0	8.5	8.8	1.2	1.0	4.4	4.2	0.1	0.0	0.4	0.5
Standard Deviation	0.48	0.17	1.38	0.24	0.63	0.03	0.93	0.86	0.92	0.08	0.53	0.24	0.07	0.01	0.36	0.17
Median	2.2	2.0	4.4	3.7	0.5	0.0	8.6	9.1	1.1	1.0	4.3	4.1	0.1	0.0	0.2	0.5
Trend	I	--	--	--	--	--	--	I	I	--	D	--	I	--	I	--
Manganese, dissolved mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	8	68	8	67	8	68	8	39	4	66	8
Maximum	0.093	0.081	0.684	0.167	0.330	0.084	0.471	0.287	0.490	0.383	0.350	0.109	0.028	0.001	0.310	0.590
Minimum	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	ND	0.3	0.1	0.1	ND	ND	0.0	0.1
Mean	0.1	0.1	0.3	0.1	0.2	0.1	0.3	0.3	0.3	0.4	0.1	0.1	0.0	0.0	0.1	0.3
Standard Deviation	0.02	0.01	0.14	0.02	0.06	0.01	0.05	0.02	0.07	0.02	0.03	0.00	0.01	0.00	0.06	0.15
Median	0.1	0.1	0.2	0.1	0.2	0.1	0.3	0.3	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.2
Trend	I	--	D	--	--	--	D	--	I	--	D	--	--	--	D	I
Calcium, dissolved mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
Maximum	14	10	25	15	28	17	27	19	27	18	23	14	59	22	35	27
Minimum	6.8	8.8	11	12.6	11	13	15	15.2	11	16	12	12.8	12	15	9.5	16
Mean	8.7	9.3	16.7	14.1	16.5	15.0	20	16.5	17.5	16.9	14.4	13.3	27.4	19	16.2	21.2
Standard Deviation	1.0	0.4	3.8	1.2	4.7	1.2	2.9	1.2	3.3	0.9	1.7	0.4	14.0	2.2	4.2	4.2
Median	8.7	9.4	16	14	14	15.3	19	16.3	17	16	14.0	13.2	21.0	19.3	16	21.3
Trend	I	--	I	D	D	--	D	--	I	--	D	--	D	--	--	--
Magnesium, dissolved mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
Maximum	7.6	6.7	15.0	10	11.3	6.6	14.6	10	12.4	9	13	9	25.4	10.8	23	21.5
Minimum	3.9	5.2	6.7	8.1	4.6	4.7	7.7	7.9	6.2	7.8	7.1	7.2	6.4	7.3	5.1	10.4
Mean	4.8	5.7	10.0	9.1	7.3	5.5	10.8	9.3	8.4	8.5	8.5	8.1	12.4	9.1	9.7	15.5
Standard Deviation	0.6	0.5	2.1	0.8	1.6	0.6	1.7	0.6	1.5	0.5	0.9	0.5	6.1	1.2	3.2	3.6
Median	4.6	5.5	9.8	9	6.9	5.4	11	9.5	8.4	8.5	8.4	8.3	10	9.0	8.9	15.1
Trend	I	--	I	D	D	--	D	--	I	--	D	--	--	--	--	I

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-65		MW-69		MW-70		MW-72		MW-73		MW-76		MW-77		MW-78		MW-81	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Iron, dissolved mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	67	7	66	8	59	0	46	8	37	0	37	0	37	0	38	0	35	0
Maximum	8.4	4.5	3.2	1.1	0.3	ND	2.9	2.1	0.12	ND	8.80	ND	0.97	ND	0.14	ND	0.14	ND
Minimum	0.4	4.0	0.1	1.0	ND	ND	0.02	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	3.5	4.2	0.9	1.1	0.1	ID	2.2	1.9	0.0	ID	0.3	ID	0.1	ID	0.1	ID	0.0	ID
Standard Deviation	1.08	0.23	0.57	0.05	0.06	ID	0.45	0.20	0.03	ID	1.37	ID	0.15	ID	0.03	ID	0.02	ID
Median	3.7	4.0	0.8	1.1	0.0	ID	2.2	1.9	0.0	ID	0.0	ID	0.1	ID	0.1	ID	0.0	ID
Trend	I	--	I	--	I	--	D	--	--	--	--	--	--	--	--	--	--	--
Manganese, dissolved mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	67	7	65	8	52	7	46	8	8	0	7	0	40	7	5	0	8	0
Maximum	0.382	0.202	0.280	0.211	0.110	0.035	0.360	0.282	0.012	ND	0.067	ND	0.062	0.025	0.010	ND	0.006	ND
Minimum	0.1	0.2	ND	0.2	ND	ND	0.01	0.22	ND	ND	ND	ND	ND	0.0	ND	ND	ND	ND
Mean	0.2	0.2	0.1	0.2	0.0	0.0	0.3	0.3	0.0	ID	0.0	ID	0.0	0.0	0.0	ID	0.0	ID
Standard Deviation	0.03	0.01	0.05	0.02	0.03	0.01	0.05	0.02	0.00	ID	0.01	ID	0.02	0.01	0.00	ID	0.00	ID
Median	0.2	0.2	0.1	0.2	0.0	0.0	0.3	0.3	0.0	ID	0.0	ID	0.0	0.0	0.0	ID	0.0	ID
Trend	--	--	I	I	I	D	D	--	--	--	--	--	D	--	--	--	D	--
Calcium, dissolved mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
Maximum	14	12	40	28	23	18	34	25	19	14	17	15	33	28	23	16	12	11
Minimum	8.9	10.7	11	23	13	15	18	20	12	11.9	8.8	11	19	24	13	14	7.8	10
Mean	11.4	11.4	21.4	26.3	18.1	16.9	25.3	23.3	14.5	12.8	12.9	13.2	26.8	22.5	17.7	14.6	10	10
Standard Deviation	1.1	0.6	7.0	1.3	2.6	0.7	3.5	1.6	1.6	0.7	2.0	1.4	3.6	9.2	2.5	0.7	1.2	0.5
Median	11	11.3	20	26.7	18	17.1	24	23.9	14	12.7	13	13	27	26	18.0	14.5	10	11
Trend	--	--	I	--	--	--	D	--	--	--	I	--	--	--	I	--	I	--
Magnesium, dissolved mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
Maximum	7.9	6.9	18	13	13	10	19	15	16	7.4	7.5	7.0	17	15	10.0	7	6.8	6.0
Minimum	4.7	6.2	4.6	12	7.2	8.2	7.1	12.5	4.6	6.0	4.0	5.4	11	12	6.7	6.6	4.5	5.4
Mean	6.4	6.7	9.8	12.7	9.0	9.2	15	14.2	7.1	6.5	5.6	6.1	14	12.5	8	6.8	5.4	5.7
Standard Deviation	0.6	0.2	3.1	0.6	1.1	0.5	2.3	1.0	1.7	0.5	0.9	0.6	1.6	5.1	0.9	0.1	0.5	0.2
Median	6.4	6.8	9.1	13	9	9.2	14	14.3	6.9	6.4	5.4	6.0	15	14.1	8.0	6.8	5.4	5.7
Trend	--	--	--	--	--	--	D	--	D	D	I	--	--	--	--	--	I	--

Table 4-2a
Statistical Summary of Regional Aquifer Upgradient Groundwater Quality

Well Location	MW-82		MW-83		MW-84		MW-93		MW-94		MW-95		MW-99		MW-100	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Iron, dissolved mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	34	0	35	0	36	0	27	0	25	2	30	0	29	8	34	8
Maximum	0.18	ND	0.13	ND	0.48	ND	0.25	ND	0.27	0.02	0.19	ND	0.22	0.04	3.4	2.1
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0	0.0	1.2	1.5
Mean	0.1	ID	0.1	ID	0.0	ID	0.1	ID	0.1	ID	0.1	ID	0.1	0.0	2.6	1.8
Standard Deviation	0.05	ID	0.03	ID	0.08	ID	0.05	ID	0.05	ID	0.04	ID	0.04	0.01	0.48	0.24
Median	0.1	ID	0.0	ID	0.0	ID	0.1	ID	0.0	ID	0.1	ID	0.0	0.0	2.5	1.8
Trend	--	--	--	--	--	--	--	--	--	--	D	--	--	I	D	D
Manganese, dissolved mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	5	0	18	6	39	8	32	8	6	3	33	8	29	8	34	8
Maximum	0.002	ND	0.017	0.069	0.037	0.012	0.280	0.369	0.007	0.012	0.240	0.137	0.150	0.066	0.230	0.225
Minimum	ND	ND	ND	ND	ND	0.0	0.1	0.3	ND	ND	0.1	0.1	0.0	0.0	0.1	0.2
Mean	0.0	ID	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2
Standard Deviation	0.00	ID	0.00	0.02	0.01	0.00	0.03	0.03	0.01	0.00	0.05	0.01	0.03	0.01	0.03	0.02
Median	0.0	ID	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2
Trend	--	--	--	--	D	D	I	--	--	--	D	--	D	--	--	--
Calcium, dissolved mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
Maximum	21	24	23	35	15	11	29	37	16	40	23	19	10	9	38	26
Minimum	9.1	14	11	16	8.8	10.3	20	30	11	11	10	18	7	7.6	23	24
Mean	17.1	18.4	16.1	22.6	10.7	10.6	24.1	33.5	13.6	18.2	19.7	18.6	8.5	8.5	28.4	24.8
Standard Deviation	2.5	3.6	2.3	8.3	1.1	0.2	2.5	2.7	1.2	9.7	2.3	0.6	0.7	0.5	4.2	0.8
Median	18	17.7	16	17.4	11	11	24	33.9	14.0	13	20	19	8.6	8.7	28	25.0
Trend	I	I	I	--	--	--	I	I	--	--	D	--	--	--	D	--
Magnesium, dissolved mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
Maximum	12	13.5	8.9	13.9	9.7	9.2	16	18	7.2	15.5	12	11	4.5	4.3	21	16
Minimum	5.0	8.5	4.7	6.5	4.4	7.5	9.7	16	4.6	5.3	6.8	9.4	3.0	3.6	12	14
Mean	9.6	11.0	6.4	9.8	7.9	8.2	12.1	17.1	5.7	7.7	10.0	10.1	3.7	4.0	15.8	15.1
Standard Deviation	1.3	1.9	0.9	2.8	0.9	0.6	1.5	0.6	0.6	3.4	1.0	0.5	0.4	0.2	2.4	0.6
Median	9.9	10.7	6.3	8.5	7.9	8.3	12	17.4	5.6	6.0	10	10	3.7	4.1	15	15
Trend	I	I	I	--	--	D	I	--	--	--	D	--	--	--	D	D

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-21		MW-24		MW-56		MW-57		MW-58A		MW-59		MW-60		MW-64	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potassium, dissolved mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
Maximum	1.6	1.17	1.6	0.978	2.4	1.15	3.4	1.01	1.6	1.16	3.3	1.14	2.3	1.33	2.2	1.84
Minimum	0.6	0.9	0.7	0.8	0.8	0.9	0.7	0.9	0.6	0.9	0.6	0.9	0.9	1.1	0.9	1.3
Mean	1.0	1.1	1.0	0.9	1.3	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.3	1.2	1.3	1.6
Standard Deviation	0.2	0.1	0.2	0.1	0.4	0.1	0.4	0.1	0.2	0.1	0.3	0.1	0.4	0.1	0.2	0.2
Median	0.9	1.1	0.9	0.9	1.2	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.2	1.2	1.3	1.64
Trend	I	--	I	--	D	--	D	I	I	--	D	--	--	I	D	I
Sodium, dissolved mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
Maximum	7.2	6.34	7.42	6.37	6.61	5	22	7.32	7.8	5.78	7.6	5.61	14	6.47	8.9	8.24
Minimum	4.4	4.65	5.1	4.78	4	4.2	5.3	5.84	4.3	4.78	4.73	4.91	4.7	5.26	4.8	6.21
Mean	4.9	5.4	6.1	5.5	5.1	4.6	7.1	6.7	5.5	5.3	5.6	5.3	6.9	5.9	6.1	7.1
Standard Deviation	0.4	0.5	0.7	0.5	0.6	0.3	2.0	0.4	0.7	0.3	0.5	0.2	2.1	0.5	0.8	0.6
Median	4.8	5.4	5.8	5.4	4.9	4.7	6.8	6.7	5.3	5.3	5.6	5.3	6.0	6.0	6.0	7.1
Trend	I	--	D	--	D	--	D	--	I	--	D	--	D	--	--	I
Arsenic, dissolved mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	24	0	9	0	3	0	9	0	1	0	2	0	1	0	66	8
Maximum	0.002	ND	0.002	ND	0.002	ND	0.003	ND	0.001	ND	0.001	ND	0.001	ND	0.018	0.002
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.001
Mean	0.001	ID	0.001	ID	0.0005	ID	0.0006	ID	ID	ID	ID	ID	ID	ID	0.005	0.002
Standard Deviation	0.000	ID	0.000	ID	0.0002	ID	0.0004	ID	ID	ID	ID	ID	ID	ID	0.004	0.000
Median	0.001	ID	0.001	ID	0.0005	ID	0.0005	ID	ID	ID	ID	ID	ID	ID	0.003	0.002
Trend	D	--	--	--	--	--	--	--	--	--	--	--	--	--	I	D
Barium, dissolved mg/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	66	7	68	8	68	8	66	8	66	8	67	8	68	8	66	8
Maximum	0.008	0.003	0.008	0.002	0.018	0.0043	0.011	0.002	0.018	0.0053	0.005	0.0035	0.017	0.0035	0.023	0.013
Minimum	ND	0.003	ND	0.002	0.002	0.0033	ND	0.0015	ND	0.0042	ND	0.003	0.003	0.0028	0.006	0.007
Mean	0.004	0.003	0.003	0.002	0.005	0.004	0.003	0.002	0.005	0.004	0.004	0.003	0.006	0.003	0.009	0.010
Standard Deviation	0.001	0.000	0.001	0.000	0.003	0.000	0.001	0.000	0.002	0.000	0.001	0.000	0.004	0.000	0.003	0.002
Median	0.004	0.003	0.002	0.002	0.004	0.004	0.002	0.002	0.005	0.004	0.004	0.003	0.004	0.003	0.009	0.010
Trend	D	--	I	D	D	I	--	--	--	--	--	--	D	--	D	I

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-65		MW-69		MW-70		MW-72		MW-73		MW-76		MW-77		MW-78		MW-81	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potassium, dissolved mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	66	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
Maximum	1.2	1.01	1.9	1.76	1.5	1.52	2.4	1.85	1.6	0.859	1.3	1.3	2.4	1.62	2.5	2.11	0.86	0.791
Minimum	ND	0.9	0.6	1.5	1.1	1.3	1.1	1.5	0.7	0.7	0.9	1.0	1.3	1.4	1.7	1.9	0.6	0.6
Mean	0.9	0.9	1.4	1.6	1.3	1.4	1.7	1.7	0.9	0.8	1.1	1.1	1.5	1.3	2.1	2.0	0.7	0.7
Standard Deviation	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.5	0.2	0.1	0.1	0.1
Median	0.9	0.9	1.4	1.6	1.3	1.4	1.7	1.8	0.8	0.8	1.1	1.095	1.5	1.5	2.1	2.1	0.7	0.7
Trend	--	--	I	--	--	--	D	--	D	--	--	--	--	--	I	--	--	--
Sodium, dissolved mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
Maximum	7.74	5.59	8.8	8.08	8.4	6.04	8.7	7.23	7.8	6.06	9.2	7.45	10	9.22	7.9	6.46	7.5	5.76
Minimum	4.5	4.79	4.7	6.74	4.7	5.16	6.1	6.08	3.8	5.47	6	6.39	7	7.37	5.2	5.89	4.6	4.78
Mean	5.2	5.2	6.5	7.4	5.8	5.7	7.1	6.7	5.9	5.7	7.5	6.9	8.6	7.4	6.0	6.1	5.6	5.3
Standard Deviation	0.5	0.2	0.9	0.5	0.7	0.3	0.7	0.4	0.7	0.2	0.7	0.3	0.7	3.1	0.7	0.2	0.6	0.3
Median	5.1	5.2	6.4	7.4	5.7	5.7	6.9	6.7	6.0	5.6	7.4	6.9	8.6	8.5	5.8	6.0	5.6	5.3
Trend	--	--	I	--	D	--	D	--	D	--	--	--	--	--	--	--	D	--
Arsenic, dissolved mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	17	0	65	8	7	0	0	0	1	0	0	0	0	0	3	0	10	0
Maximum	0.002	ND	0.005	0.003	0.002	ND	ND	ND	0.001	ND	ND	ND	ND	ND	0.002	ND	0.002	ND
Minimum	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	0.001	ID	0.003	0.002	0.001	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.001	ID	0.001	ID
Standard Deviation	0.000	ID	0.001	0.000	0.000	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.000	ID	0.000	ID
Median	0.001	ID	0.002	0.002	0.001	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.0005	ID	5E-04	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	D	--
Barium, dissolved mg/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	41	7	41	5	40	8
No. of Detections	67	7	66	8	65	8	46	8	41	8	41	8	41	7	40	5	40	8
Maximum	0.015	0.0074	0.018	0.011	0.017	0.002	0.017	0.01	0.007	0.003	0.12	0.003	0.008	0.005	0.005	0.002	0.008	0.003
Minimum	0.004	0.0067	0.004	0.01	ND	0.002	0.008	0.008	0.003	0.002	0.002	0.0022	0.003	0.004	ND	0.002	0.002	0.002
Mean	0.008	0.007	0.009	0.011	0.003	0.002	0.011	0.009	0.004	0.003	0.006	0.003	0.004	0.004	0.002	0.002	0.004	0.003
Standard Deviation	0.002	0.000	0.003	0.000	0.002	0.000	0.002	0.001	0.001	0.000	0.018	0.000	0.001	0.002	0.001	0.000	0.001	0.000
Median	0.008	0.007	0.009	0.011	0.002	0.002	0.01	0.009	0.003	0.003	0.003	0.002	0.004	0.004	0.0021	0.002	0.003	0.003
Trend	D	--	I	--	D	I	D	--	D	--	--	--	D	--	--	--	D	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-82		MW-83		MW-84		MW-93		MW-94		MW-95		MW-99		MW-100	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potassium, dissolved mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
Maximum	1.7	1.77	2	2.49	1.3	1.17	1.9	1.65	1.7	2.53	1.4	1.27	1.2	0.908	2.1	2.18
Minimum	0.7	1.3	1.4	1.5	0.8	0.9	1.1	1.4	1.1	1.3	0.9	1.1	0.7	0.7	1.4	1.9
Mean	1.4	1.5	1.7	1.9	1.0	1.0	1.3	1.5	1.4	1.6	1.2	1.2	0.9	0.8	1.7	2.0
Standard Deviation	0.2	0.2	0.2	0.4	0.1	0.1	0.2	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.2	0.1
Median	1.4	1.5	1.7	1.8	0.9	1.0	1.2	1.5	1.4	1.5	1.1	1.2	0.9	0.8	1.7	2.0
Trend	I	I	--	I	D	--	I	--	I	--	--	--	D	--	I	--
Sodium, dissolved mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
Maximum	6.51	6.77	6.6	6.98	6.7	6.04	9.4	9.17	6	8.52	7.8	6.22	16	10	11	9.46
Minimum	4.9	5.23	4.7	5.54	4.5	5.2	6.2	7.65	4.3	4.76	5.3	5.25	8.5	8.42	7.5	8.44
Mean	5.7	6.2	5.4	6.2	5.5	5.7	7.5	8.6	4.9	5.6	6.2	5.9	11.1	9.3	8.6	9.0
Standard Deviation	0.5	0.6	0.4	0.6	0.5	0.3	0.8	0.5	0.4	1.2	0.6	0.3	2.1	0.5	0.7	0.3
Median	5.7	6.3	5.2	6.1	5.5	5.7	7.5	8.7	4.8	5.2	6.1	6.0	10.0	9.2	8.5	9.1
Trend	I	I	--	I	--	--	I	--	--	I	D	--	D	--	--	--
Arsenic, dissolved mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	0	0	1	0	0	0	31	8	0	0	5	0	29	8	0	0
Maximum	ND	ND	0.001	ND	ND	ND	0.002	0.001	ND	ND	0.001	ND	0.007	0.003	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND	0.003	0.002	ND	ND
Mean	ID	ID	ID	ID	ID	ID	0.002	0.001	ID	ID	0.0006	ID	0.004	0.003	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	0.000	0.000	ID	ID	0.000	ID	0.001	0.000	ID	ID
Median	ID	ID	ID	ID	ID	ID	0.002	0.001	ID	ID	5E-04	ID	0.004	0.003	ID	ID
Trend	--	--	--	--	--	--	D	--	--	--	--	--	D	D	--	--
Barium, dissolved mg/L																
No. of Analyses	38	8	39	8	40	8	32	8	26	8	33	8	29	8	34	8
No. of Detections	17	0	39	8	40	8	31	8	26	8	33	8	29	8	33	8
Maximum	0.004	ND	0.006	0.0055	0.017	0.004	0.008	0.009	0.017	0.0048	0.007	0.004	0.013	0.003	0.013	0.008
Minimum	ND	ND	0.002	0.002	0.003	0.003	ND	0.008	0.0017	0.0013	0.003	0.003	0.002	0.002	ND	0.007
Mean	0.001	ID	0.003	0.003	0.004	0.003	0.006	0.008	0.006	0.002	0.004	0.003	0.005	0.002	0.009	0.007
Standard Deviation	0.001	ID	0.001	0.001	0.002	0.000	0.001	0.000	0.004	0.001	0.001	0.000	0.003	0.000	0.002	0.000
Median	0.001	ID	0.003	0.003	0.003	0.003	0.007	0.008	0.004	0.002	0.004	0.003	0.004	0.002	0.008	0.007
Trend	--	--	--	I	D	D	--	--	D	I	D	--	D	--	D	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-21		MW-24		MW-56		MW-57		MW-58A		MW-59		MW-60		MW-64	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Dichlorodifluoromethane, ug/L																
No. of Analyses	58	7	60	8	59	8	59	8	59	8	59	8	59	8	59	8
No. of Detections	14	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	11	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	0.93	ID	2.46	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	2.13	ID	6.16	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	0.1	ID	0.1	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	D	--	D	--	--	--	--	--	--	--	--	--	--	--	--	--
cis 1,2-Dichloroethene, ug/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	0	0	10	6	65	7	0	0	0	0	5	7	0	0	0	0
Maximum	ND	ND	0.39	0.29	1.8	0.858	ND	ND	ND	ND	0.39	0.666	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	0.13	0.21	1.1	0.6	ID	ID	ID	ID	0.12	0.38	ID	ID	ID	ID
Standard Deviation	ID	ID	0.07	0.07	0.3	0.2	ID	ID	ID	ID	0.06	0.16	ID	ID	ID	ID
Median	ID	ID	0.1	0.235	1.2	0.6	ID	ID	ID	ID	0.1	0.355	ID	ID	ID	ID
Trend	--	--	I	--	--	--	--	--	--	--	--	I	--	--	--	--
Tetrachloroethene, ug/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene, ug/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	0.45	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-65		MW-69		MW-70		MW-72		MW-73		MW-76		MW-77		MW-78		MW-81	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Dichlorodifluoromethane, ug/L																		
No. of Analyses	60	7	59	8	60	8	46	8	40	8	40	8	42	7	41	5	39	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0	7	1	3	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.45	0.27	0.29	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.15	ID	0.1	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.11	ID	0.0	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.1	ID	0.1	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis 1,2-Dichloroethene, ug/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	42	7	41	5	40	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	39	6	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.1	1.15	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	1.5	0.6	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.7	0.3	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	1.6	0.7	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	D	--	--	--	--	--	--	--
Tetrachloroethene, ug/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	42	7	41	5	40	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	40	7	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.89	0.549	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.55	0.2954	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.13	0.21	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	0.55	0.263	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene, ug/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	42	7	41	5	40	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	41	8	0	0	18	4	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17	11.2	ND	ND	0.62	0.592	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.7	7.69	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	12.3	10.1	ID	ID	0.25	0.42	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	2.2	1.2	ID	ID	0.19	0.20	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	12	10	ID	ID	0.1	0.446	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	D	--	--	--	I	--	--	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-82		MW-83		MW-84		MW-93		MW-94		MW-95		MW-99		MW-100	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Dichlorodifluoromethane, ug/L																
No. of Analyses	37	8	38	8	40	8	31	8	30	8	33	8	99	12	34	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis 1,2-Dichloroethene, ug/L																
No. of Analyses	38	8	39	8	40	8	32	8	31	8	33	8	99	12	34	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene, ug/L																
No. of Analyses	38	8	39	8	40	8	32	8	31	8	33	8	99	12	34	8
No. of Detections	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	0.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene, ug/L																
No. of Analyses	38	8	39	8	40	8	32	8	31	8	33	8	99	12	34	8
No. of Detections	37	8	39	8	0	0	0	0	31	8	0	0	0	0	0	0
Maximum	11	6.52	3.8	1.9	ND	ND	ND	ND	5.4	3.19	ND	ND	ND	ND	ND	ND
Minimum	ND	4.78	1.3	0.504	ND	ND	ND	ND	1.1	1.03	ND	ND	ND	ND	ND	ND
Mean	7.7	5.5	2.2	1.3	ID	ID	ID	ID	3.6	2.2	ID	ID	ID	ID	ID	ID
Standard Deviation	1.8	0.6	0.5	0.5	ID	ID	ID	ID	1.0	0.8	ID	ID	ID	ID	ID	ID
Median	7.7	5.4	2.3	1.3	ID	ID	ID	ID	3.8	2.1	ID	ID	ID	ID	ID	ID
Trend	D	--	D	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-21		MW-24		MW-56		MW-57		MW-58A		MW-59		MW-60		MW-64	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Vinyl Chloride, ug/L																
No. of Analyses	67	7	69	8	68	8	68	8	68	8	68	8	68	8	66	8
No. of Detections	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Maximum	ND	ND	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTES: * Gradient indicates location of monitoring well relative to the hydraulic gradient of the Aquifer and the placement of Solid Waste.
ND = Not Detected

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-65		MW-69		MW-70		MW-72		MW-73		MW-76		MW-77		MW-78		MW-81	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Vinyl Chloride, ug/L																		
No. of Analyses	67	7	66	8	67	8	46	8	41	8	41	8	42	7	41	5	40	8
No. of Detections	53	7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Maximum	0.18	0.0653	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND	ND
Minimum	ND	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	0.08	0.05	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	0.03	0.01	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	0.08	0.05	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTES: * Gradient indicates location of monitoring well relative to the hydraulic gradient of the Aquifer and the placement of Solid Waste.
ND = Not Detected

Table 4-2a
Statistical Summary of Regional Aquifer
Upgradient Groundwater Quality

Well Location	MW-82		MW-83		MW-84		MW-93		MW-94		MW-95		MW-99		MW-100	
Time Period	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Vinyl Chloride, ug/L																
No. of Analyses	38	8	39	8	40	8	32	8	31	8	33	8	99	12	34	8
No. of Detections	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTES: * Gradient indicates location of monitoring well relative to the hydraulic gradient of the Aquifer and the placement of Solid Waste.
ND = Not Detected

Table 4-2b
Statistical Summary of Regional Aquifer
Downgradient Groundwater Quality

Well Location	MW-43		MW-66		MW-67		MW-68		MW-74		MW-75		MW-80		MW-85	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, (Field) Standard Units																
No. of Analyses	68	8	65	8	65	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	65	8	65	8	58	8	40	8	41	8	ID	11	38	8
Maximum	8.9	7.5	8.8	7.3	8.8	7.1	8.7	7.4	7.2	7.2	7.7	7.2	ID	7.7	7.4	7.2
Minimum	5.8	7.1	6.4	6.8	6.4	6.9	6.2	7.0	6.7	6.9	6.7	6.9	ID	7.0	6.9	6.7
Mean	7.4	7.3	7.3	7.0	7.3	7.0	7.3	7.1	7.0	7.0	7.1	7.0	ID	7.2	7.1	7.0
Standard Deviation	0.41	0.17	0.41	0.16	0.41	0.10	0.41	0.15	0.13	0.12	0.20	0.11	ID	0.20	0.13	0.14
Median	7.4	7.2	7.2	7.0	7.2	7.0	7.3	7.1	7.0	7.0	7.1	7.0	ID	7.1	7.2	6.9
Trend	--	--	D	--	--	--	--	--	D	--	D	--	--	--	--	--
Specific Conductance, (Field) micromhos/cm																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
Maximum	190	179	240	298	245	308	357	322	420	467	315	308	ID	279	220	266
Minimum	99	108	118	159	138	178	140	168	260	253	180	185	ID	176	165	158
Mean	155	155	186	239	199	238	239	274	336	396	251	268	ID	227	196	224
Standard Deviation	14	23	30	46	23	41	56	47	46	68	30	40	ID	32	15	35
Median	155	153	180	228	200	233	238	278	328	390	255	278	ID	210	195	225
Trend	--	--	--	--	I	--	I	--	I	--	--	--	--	--	I	--
Total Dissolved Solids, mg/L																
No. of Analyses	68	8	64	8	66	8	57	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	64	8	66	8	57	8	40	8	41	8	ID	11	38	8
Maximum	130	126	164	163	183	185	270	216	265	266	260	199	ID	237	152	163
Minimum	68	102	47	145	65	145	74	159	140	243	90	161	ID	143	100	143
Mean	100	110	113	155	130	176	150	186	208	258	163	183	ID	169	127	154
Standard Deviation	14	7	24	6	21	13	41	18	29	8	29	12	ID	26	13	8
Median	100	109	118	156	130	181	140	182	200	259	160	183	ID	166	130	158
Trend	--	--	--	--	I	--	I	D	I	--	--	--	--	--	I	--
Alkalinity, total (CaCO3), mg/L																
No. of Analyses	59	8	58	8	59	8	51	8	40	8	41	8	ID	11	38	8
No. of Detections	59	8	58	8	59	8	51	8	40	8	41	8	ID	11	38	8
Maximum	77	71	120	120	100	112	160	158	170	190	110	97	ID	87	90	94
Minimum	31	64	58	104	54	79	46	131	97	163	74	95	ID	74	65	83
Mean	70	69	84	113	78	101	115	146	126	172	90	96	ID	81	81	88
Standard Deviation	6.1	2.8	13.9	5.8	10.0	10.4	36.5	8.3	18.7	10.6	7.7	0.9	ID	4.2	7.1	3.4
Median	70	70	81	114	78	102	120	148	120	168	91	96	ID	81	84	88
Trend	D	--	--	I	I	--	I	D	I	I	I	--	--	I	I	I

Table 4-2b
Statistical Summary of Regional Aquifer Downgradient Groundwater Quality

Well Location	MW-86		MW-87		MW-88		MW-89		MW-90		MW-91	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, (Field) Standard Units												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	38	8	38	8	33	8	34	8
Maximum	7.7	7.1	7.2	7.0	7.7	7.5	7.7	7.4	7.7	7.5	7.5	7.2
Minimum	6.7	6.6	6.7	6.7	6.8	6.9	7.0	7.1	7.0	7.1	6.8	6.9
Mean	7.0	6.9	6.9	6.9	7.2	7.1	7.3	7.3	7.3	7.3	7.1	7.0
Standard Deviation	0.19	0.17	0.12	0.08	0.19	0.19	0.16	0.15	0.18	0.16	0.16	0.09
Median	7.0	6.9	6.9	6.9	7.2	7.1	7.3	7.4	7.3	7.3	7.1	7.0
Trend	--	--	D	--	D	--	--	--	--	--	--	--
Specific Conductance, (Field) micror												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	38	8	38	8	33	8	34	8
Maximum	220	188	380	431	125	133	220	203	195	212	260	271
Minimum	150	106	270	290	100	79	140	110	145	126	190	175
Mean	171	161	330	367	111	113	171	175	173	177	236	226
Standard Deviation	12	25	27	51	6	16	14	28	10	26	19	32
Median	170	164	338	353	110	115	170	183	170	173	240	218
Trend	--	--	I	I	I	--	I	--	I	--	D	--
Total Dissolved Solids, mg/L												
No. of Analyses	38	8	39	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	39	8	38	8	38	8	33	8	34	8
Maximum	150	126	282	306	96	87	150	127	142	145	176	806
Minimum	58	87	160	261	40	68	65	97	80	106	110	154
Mean	108	106	231	280	74	78	109	118	113	127	147	258
Standard Deviation	15	11	24	17	12	6	17	10	14	12	15	223
Median	110	107	230	280	77	78	110	120	117	129	150	175
Trend	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, total (CaCO3), mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	38	8	38	8	33	8	34	8
Maximum	82	67	157	92	58	54	82	79	76	72	96	128
Minimum	50	61	47	80	48	50	67	74	44	64	68	80
Mean	68	66	92	88	52	52	73	77	66	69	86	90
Standard Deviation	5.3	1.9	13.4	3.5	2.6	1.2	4.4	1.5	5.5	2.4	5.2	15.7
Median	68	66	92	89	51	53	72	77	66	70	86	85
Trend	--	--	--	--	--	--	I	--	--	--	D	--

Table 4-2b
Statistical Summary of Regional Aquifer
Downgradient Groundwater Quality

Well Location	MW-43		MW-66		MW-67		MW-68		MW-74		MW-75		MW-80		MW-85	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Ammonia as N, mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	33	8	11	0	9	0	35	7	9	1	9	2	ID	5	5	0
Maximum	0.13	0.03	0.21	ND	0.49	ND	0.17	0.02	0.53	0.01	0.06	0.01	ID	0.01	0.18	ND
Minimum	ND	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Mean	0.02	0.02	0.02	ID	0.02	ID	0.02	0.01	0.04	ID	0.01	ID	ID	0.01	0.02	ID
Standard Deviation	0.02	0.00	0.03	ID	0.06	ID	0.02	0.005	0.09	ID	0.01	ID	ID	0.00	0.03	ID
Median	0.02	0.02	0.01	ID	0.01	ID	0.02	0.02	0.02	ID	0.02	ID	ID	0.01	0.02	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride, mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	67	8	64	8	66	8	58	8	39	8	41	8	ID	11	38	8
Maximum	3.2	3	16	9	9	5	6.8	3.6	35	32	9	9	ID	6	10	7
Minimum	ND	2.7	ND	8	4	3	2	3	ND	22	3.3	7	ID	5	4	6
Mean	1.9	2.9	10.1	8.4	5.3	4.5	3.1	3.0	22.2	28.1	6.3	7.9	ID	5.1	5.3	6.4
Standard Deviation	0.4	0.2	2.9	0.4	1.4	0.4	0.7	0.30	7.8	4.5	1.7	0.4	ID	0.3	1.0	0.2
Median	2	3	10	8	5	5	3	3	23	31	7	8	ID	5	5	6
Trend	I	--	D	--	D	--	--	--	I	D	I	--	--	--	I	--
Nitrate as N, mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	12	0	65	8	66	8	11	0	30	4	7	0	ID	0	38	8
Maximum	0.4	ND	0.5	0.6	3.6	0.7	0.7	ND	1.4	0.4	2.0	ND	ID	ND	0.2	0.2
Minimum	ND	ND	0.16	0.43	0.53	0.56	ND	ND	ND	ND	ND	ND	ID	ND	0.03	0.11
Mean	0.03	ID	0.32	0.51	1.11	0.62	0.04	ID	0.43	0.14	0.07	ID	ID	ID	0.14	0.13
Standard Deviation	0.05	ID	0.07	0.04	0.54	0.04	0.09	ID	0.49	0.19	0.31	ID	ID	ID	0.03	0.02
Median	0.03	ID	0.31	0.51	0.96	0.62	0.03	ID	0.14	0.01	0.03	ID	ID	ID	0.14	0.12
Trend	--	--	I	--	D	--	--	--	D	--	--	--	--	--	I	--
Sulfate, mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	67	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
Maximum	20	14	12	16	36	36	70	18	29	27	54	45	ID	46	32	32
Minimum	ND	13	2.2	12	17.6	32	10	15	5	22	16	42	ID	32	16	27
Mean	12.7	14	8.2	13.3	24.2	34.2	19.5	16.3	24.0	25.3	39.5	43.2	ID	39.5	23.5	30.0
Standard Deviation	2	0	1.87	1.54	4.21	1.15	10.32	0.85	3.74	2.13	6.61	1.08	ID	4.72	4.68	1.43
Median	13	14	9	13	24.0	34.3	16	16.3	24	26	40	43	ID	41	23	30.0
Trend	I	--	I	I	--	I	D	--	--	--	--	--	--	--	--	--

Table 4-2b
Statistical Summary of Regional Aquifer
Downgradient Groundwater Quality

Well Location	MW-86		MW-87		MW-88		MW-89		MW-90		MW-91	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Ammonia as N, mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	6	0	12	8	5	0	19	8	8	8	9	8
Maximum	0.13	ND	0.16	0.02	0.11	ND	0.12	0.03	0.02	0.06	0.04	0.06
Minimum	ND	ND	ND	0.01	ND	ND	ND	0.02	ND	0.02	ND	0.01
Mean	0.02	ID	0.02	0.02	0.01	ID	0.02	0.02	0.01	0.03	0.01	0.02
Standard Deviation	0.02	ID	0.02	0.01	0.02	ID	0.02	0.00	0.01	0.02	0.01	0.01
Median	0.02	ID	0.02	0.01	0.01	ID	0.02	0.02	0.02	0.02	0.02	0.02
Trend	--	--	--	--	--	--	--	--	--	--	--	--
Chloride, mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	36	8	38	8	33	8	34	8
Maximum	8	4	4	5	3	2.9	5	4	4	4	9	7
Minimum	3	4.0	2	4	ND	2	2	3	2	4	2	7.0
Mean	5.0	4.2	2.7	4.4	2.1	2.6	2.5	3.4	2.6	3.7	7.5	7.3
Standard Deviation	1.0	0.1	0.77	0.2	0.5	0.22	0.72	0.2	0.6	0.1	1.2	0.1
Median	5	4	2	4.4	2	3	2	3	3	4	8	7
Trend	D	--	I	--	I	--	I	--	I	--	D	--
Nitrate as N, mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	32	8	10	1	37	8	7	0	5	0	9	8
Maximum	2.5	0.4	0.2	0.0	1.7	0.6	0.2	ND	1.8	ND	1.0	0.0
Minimum	ND	0.06	ND	ND	ND	0.48	ND	ND	ND	ND	ND	0.02
Mean	0.16	0.18	0.03	ID	0.38	0.52	0.02	ID	0.15	ID	0.06	0.02
Standard Deviation	0.40	0.11	0.04	ID	0.24	0.03	0.03	ID	0.41	ID	0.17	0.00
Median	0.07	0.16	0.03	ID	0.35	0.52	0.03	ID	0.03	ID	0.03	0.02
Trend	I	--	--	--	I	--	--	--	--	--	--	I
Sulfate, mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	36	8	38	8	33	8	34	8
Maximum	30	19	110	117	8	7	21	17	29	28	44	37
Minimum	10	16	72	105	ND	6.0	15	16	2	23.8	4	32
Mean	18.5	17.7	91.1	112.5	6.1	7	16.5	16.7	22.5	26.2	31.0	34.6
Standard Deviation	3	1	8.23	3.82	1.47	0.25	1.54	0.40	5.17	1.16	6.95	1.40
Median	18	18	92	114.0	6	7	16.0	17	23	26	31	35
Trend	D	--	I	--	D	--	--	D	I	--	D	I

Table 4-2b
Statistical Summary of Regional Aquifer
Downgradient Groundwater Quality

Well Location	MW-43		MW-66		MW-67		MW-68		MW-74		MW-75		MW-80		MW-85	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Iron, dissolved mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	56	0	63	8	58	8	40	8	41	8	ID	11	34	0
Maximum	1.7	1.1	1.70	ND	8.50	0.10	3.8	2.6	2.7	2.8	3.8	1.9	ID	1.6	0.22	ND
Minimum	0.04	0.88	ND	ND	ND	0.04	0.60	1.4	0.03	1.12	1.1	1.2	ID	0.9	ND	ND
Mean	0.97	0.96	0.08	ID	0.22	0.06	1.86	1.99	1.16	1.97	1.78	1.51	ID	1.34	0.06	ID
Standard Deviation	0.25	0.05	0.22	ID	1.04	0.02	0.76	0.50	0.96	0.67	0.45	0.19	ID	0.24	0.05	ID
Median	0.95	0.96	0.04	ID	0.07	0.07	1.8	2.1	1.28	1.91	1.7	1.50	ID	1.40	0.06	ID
Trend	--	--	--	--	I	--	I	--	I	--	I	--	--	I	--	--
Manganese, dissolved mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	9	0	46	8	58	8	40	8	41	8	ID	11	6	0
Maximum	0.25	0.24	0.006	ND	0.270	0.087	0.39	0.30	0.150	0.18	0.17	0.14	ID	0.28	0.003	ND
Minimum	0.01	0.20	ND	ND	ND	0.040	0.14	0.19	0.001	0.06	0.07	0.11	ID	0.18	ND	ND
Mean	0.21	0.22	0.001	ID	0.024	0.061	0.24	0.25	0.084	0.12	0.12	0.12	ID	0.24	0.001	ID
Standard Deviation	0.03	0.01	0.001	ID	0.038	0.017	0.07	0.04	0.058	0.04	0.02	0.01	ID	0.03	0.000	ID
Median	0.22	0.21	0.001	ID	0.012	0.062	0.21	0.25	0.110	0.13	0.12	0.12	ID	0.24	0.001	ID
Trend	--	--	--	--	I	--	I	D	I	--	--	--	--	I	--	--
Calcium, dissolved mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
Maximum	16.0	14	21	23	24	28	43	31	38	39	31	23	ID	27	35	21
Minimum	1.2	12	10	18.0	15	22	15	27	19	22	11	19	ID	18	8.4	19
Mean	12.7	12.8	14.8	20.3	18.7	25.4	23.5	29.1	27.9	34.5	19.0	21.5	ID	23.1	18.6	20.6
Standard Deviation	2	1	2.84	1.60	2.47	1.99	6.82	1.36	4.88	5.49	4.22	1.47	ID	2.68	4.45	0.61
Median	13	13	14	20.4	19	25.7	20.5	29.0	29	36.6	21	21.8	ID	23.4	18.0	21
Trend	--	I	--	I	I	--	I	--	I	--	I	--	--	--	I	I
Magnesium, dissolved mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
Maximum	10.0	9.3	15	17.3	14.2	15.7	22	18.2	25.1	29	21	17.7	ID	13.7	21	13.3
Minimum	2.8	8.5	7.1	13.5	8.0	12.9	8.2	15	15	17	8.5	14	ID	10	6.4	12.3
Mean	8.6	8.9	11.3	16	10.4	14.7	12.5	16.3	20.0	25.8	14.0	16.6	ID	11.7	11.2	12.9
Standard Deviation	1	0	2.1	1.2	1.4	1.1	3.4	1.0	2.7	3.6	2.9	1.4	ID	1.2	2.4	0.4
Median	9	9	11	16.0	10	15.1	12	16.2	20	27.1	15	17.1	ID	12.0	11.0	13
Trend	--	--	--	--	I	--	I	--	I	--	I	--	--	--	I	--

Table 4-2b
Statistical Summary of Regional Aquifer Downgradient Groundwater Quality

Well Location	MW-86		MW-87		MW-88		MW-89		MW-90		MW-91	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Iron, dissolved mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	34	0	38	8	33	8	34	8
Maximum	2.00	0.56	3.1	3.2	2.9	ND	0.87	0.8	1.2	1.3	2.3	2.9
Minimum	0.02	0.24	0.33	2.71	ND	ND	0.53	0.71	0.85	1.07	0.4	1.9
Mean	0.42	0.41	2.64	2.95	0.11	ID	0.72	0.7	1.03	1.14	2.01	2.25
Standard Deviation	0.30	0.13	0.44	0.18	0.47	ID	0.07	0.02	0.10	0.07	0.33	0.36
Median	0.35	0.42	2.7	3.0	0.03	ID	0.71	0.74	1.00	1.1	2.05	2.15
Trend	I	--	--	--	--	--	--	--	I	--	I	--
Manganese, dissolved mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	37	8	40	8	13	0	38	8	33	8	34	8
Maximum	0.250	0.024	0.35	0.38	0.31	ND	0.40	0.29	0.38	0.29	0.29	0.27
Minimum	ND	0.006	0.02	0.27	ND	ND	0.26	0.25	0.24	0.24	0.02	0.20
Mean	0.022	0.013	0.30	0.33	0.01	ID	0.33	0.26	0.28	0.26	0.24	0.23
Standard Deviation	0.039	0.005	0.05	0.03	0.05	ID	0.03	0.01	0.03	0.01	0.04	0.02
Median	0.016	0.014	0.30	0.33	0.00	ID	0.33	0.26	0.27	0.26	0.25	0.23
Trend	D	--	--	I	D	--	D	--	--	--	--	--
Calcium, dissolved mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	38	8	38	8	33	8	34	8
Maximum	21	15	34	36	30	9.0	18	14	19	17	25	22
Minimum	11	13	4	29	7.4	8	10	13	14	15	15	18
Mean	14.2	13.4	27.7	33	9.6	8.6	13.0	13.3	15.8	16.1	21	20.1
Standard Deviation	2	1	5.22	2	4.03	0.31	1.37	0.56	1.20	0.49	2.16	1.23
Median	14	13	29	34	8.8	8.6	13	13.2	16	16	21	20
Trend	--	--	I	--	--	--	I	--	I	--	D	--
Magnesium, dissolved mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	38	8	38	8	33	8	34	8
Maximum	12	11	23	24.6	19	6.5	9.9	10.2	10	9.82	15	14.2
Minimum	7.6	8.5	11.0	21.1	4.9	5.9	7.0	8.8	7.3	8.7	10	13
Mean	9.4	9.2	18.9	23.1	6.6	6.2	8.5	9.5	8.6	9.4	12.6	13.5
Standard Deviation	1.0	0.7	2.3	1.1	2.3	0.3	0.8	0.5	0.8	0.5	1.1	0.5
Median	9.5	9	19.0	23.3	6.2	6.4	8.7	9.5	8.6	9.7	13	13.5
Trend	--	--	I	--	--	D	I	--	I	--	--	--

Table 4-2b
Statistical Summary of Regional Aquifer Downgradient Groundwater Quality

Well Location	MW-43		MW-66		MW-67		MW-68		MW-74		MW-75		MW-80		MW-85	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potassium, dissolved mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
Maximum	2.1	1.4	1.8	1.39	1.7	1.59	2.2	1.78	2.5	2.43	2.3	1.78	ID	1.62	2.3	1.47
Minimum	0.9	1.2	0.4	1.19	0.8	1.3	0.7	1.6	1.4	1.8	0.8	1.4	ID	1.3	0.8	1.3
Mean	1.3	1.3	1.0	1.3	1.2	1.5	1.4	1.7	1.8	2.1	1.6	1.7	ID	1.5	1.3	1.3
Standard Deviation	0.18	0.06	0.20	0.08	0.16	0.09	0.25	0.07	0.20	0.19	0.24	0.14	ID	0.10	0.22	0.07
Median	1.3	1.3	1.0	1.3	1.2	1.5	1.4	1.7	1.805	2.085	1.6	1.7	ID	1.5	1.2	1.3
Trend	--	I	--	--	--	--	I	--	I	--	--	--	--	--	I	--
Sodium, dissolved mg/L																
No. of Analyses	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	65	8	66	8	58	8	40	8	41	8	ID	11	38	8
Maximum	6.9	6.4	8.4	8.49	12.6	8.63	10	8.76	11	12.7	46	8.72	ID	7.77	8	8.11
Minimum	5.2	5.5	4.5	7.57	5.9	7.46	5	8.02	7.7	8.23	5.3	6.97	ID	5.74	4.6	7.01
Mean	6.1	6.0	6.6	8.0	7.3	8.3	7.2	8.4	9.2	11.0	12	8.0	ID	6.6	6.8	7.5
Standard Deviation	0.40	0.27	0.77	0.32	0.9	0.4	0.98	0.24	0.79	1.48	10	0.54	ID	0.63	0.74	0.36
Median	6.1	6.1	6.5	7.9	7.1	8.4	7.1	8.3	9.1	11.0	8	8.2	ID	6.6	6.8	7.5
Trend	--	--	--	--	--	--	I	--	--	--	--	--	--	--	I	--
Arsenic, dissolved mg/L																
No. of Analyses	68	8	65	8	65	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	6	0	6	0	3	0	21	0	25	2	39	3	ID	0	10	0
Maximum	0.002	ND	0.001	ND	0.003	ND	0.005	ND	0.003	0.001	0.007	0.001	ID	ND	0.002	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Mean	0.001	ID	0.001	ID	0.001	ID	0.001	ID	0.001	ID	0.002	0.001	ID	ID	0.001	ID
Standard Deviation	0.000	ID	0.000	ID	0.000	ID	0.001	ID	0.001	ID	0.001	0.000	ID	ID	0.000	ID
Median	0.001	ID	0.001	ID	0.001	ID	0.001	ID	0.001	ID	0.002	0.001	ID	ID	0.001	ID
Trend	--	--	--	--	--	--	D	--	I	--	D	--	--	--	--	--
Barium, dissolved mg/L																
No. of Analyses	68	8	65	8	65	8	58	8	40	8	41	8	ID	11	38	8
No. of Detections	68	8	65	8	64	8	58	8	40	8	41	8	ID	11	38	8
Maximum	0.012	0.007	0.078	0.007	0.015	0.008	0.018	0.014	0.019	0.019	0.02	0.009	ID	0.005	0.023	0.005
Minimum	0.003	0.006	0.003	0.005	ND	0.006	0.005	0.013	0.008	0.009	0.002	0.007	ID	0.004	0.004	0.004
Mean	0.007	0.006	0.010	0.006	0.006	0.008	0.012	0.013	0.013	0.016	0.010	0.009	ID	0.005	0.005	0.004
Standard Deviation	0.001	0.000	0.011	0.001	0.002	0.001	0.003	0.001	0.003	0.003	0.003	0.001	ID	0.000	0.003	0.000
Median	0.007	0.006	0.006	0.006	0.006	0.008	0.012	0.013	0.013	0.016	0.009	0.009	ID	0.005	0.004	0.004
Trend	--	--	D	I	I	I	I	--	I	--	--	--	--	--	--	--

Table 4-2b
Statistical Summary of Regional Aquifer Downgradient Groundwater Quality

Well Location	MW-86		MW-87		MW-88		MW-89		MW-90		MW-91	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potassium, dissolved mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	38	8	38	8	33	8	34	8
Maximum	1.6	1.3	2.2	2.27	2	0.892	1.6	1.56	1.4	1.43	1.9	1.72
Minimum	0.9	1.2	1.3	1.9	0.7	0.8	1.2	1.4	1.1	1.23	1.20	1.47
Mean	1.1	1.2	1.8	2.1	0.9	0.8	1.4	1.5	1.2	1.35	1.52	1.64
Standard Deviation	0.13	0.04	0.15	0.12	0.21	0.04	0.11	0.05	0.10	0.07	0.13	0.08
Median	1.1	1.2	1.8	2.1	0.8	0.83	1.4	1.5	1.2	1.4	1.5	1.7
Trend	--	--	I	--	D	I	--	--	--	--	--	--
Sodium, dissolved mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	38	8	40	8	38	8	38	8	33	8	34	8
Maximum	7.4	6.8	10	9.99	8.6	5.67	9.8	9.13	7	6.76	8.2	7.79
Minimum	5.5	5.6	7.1	8.45	4.3	4.8	6.3	7.44	4.9	5.3	6.1	6.86
Mean	6.3	6.3	8.2	9.3	5.4	5.4	7.8	8.4	5.7	6.0	6.8	7.3
Standard Deviation	0.50	0.39	0.70	0.51	0.69	0.28	0.86	0.61	0.5	0.5	0.49	0.30
Median	6	6	8.2	9.3	5.3	5.5	8.0	8.3	5.7	6.1	6.7	7.3
Trend	--	--	I	--	--	--	I	--	I	D	--	--
Arsenic, dissolved mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	1	0	2	0	24	8	37	8	0	0	33	8
Maximum	0.003	ND	0.003	ND	0.001	0.001	0.007	0.002	ND	ND	0.006	0.005
Minimum	ND	ND	ND	ND	ND	0.001	ND	0.001	ND	ND	ND	0.002
Mean	ID	ID	ID	ID	0.001	0.001	0.003	0.002	ID	ID	0.004	0.003
Standard Deviation	ID	ID	ID	ID	0.000	0.000	0.002	0.000	ID	ID	0.001	0.001
Median	ID	ID	ID	ID	0.001	0.001	0.002	0.002	ID	ID	0.004	0.003
Trend	--	--	--	--	I	--	D	--	--	--	D	--
Barium, dissolved mg/L												
No. of Analyses	38	8	40	8	38	8	38	8	33	8	34	8
No. of Detections	37	8	40	8	38	8	37	8	33	8	34	8
Maximum	0.008	0.005	0.019	0.02	0.006	0.002	0.009	0.006	0.008	0.006	0.012	0.009
Minimum	ND	0.004	0.014	0.017	0.002	0.002	ND	0.006	0.005	0.005	0.005	0.008
Mean	0.005	0.005	0.017	0.018	0.003	0.002	0.007	0.006	0.005	0.006	0.009	0.009
Standard Deviation	0.001	0.000	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001
Median	0.005	0.005	0.017	0.018	0.002	0.002	0.007	0.006	0.005	0.005	0.009	0.009
Trend	D	--	--	--	D	--	D	--	--	D	D	I

Table 4-2b
Statistical Summary of Regional Aquifer
Downgradient Groundwater Quality

Well Location	MW-43		MW-66		MW-67		MW-68		MW-74		MW-75		MW-80		MW-85	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Dichlorodifluoromethane, ug/L																
No. of Analyses	62	8	58	8	60	4	51	8	118	12	121	12	ID	11	39	8
No. of Detections	14	0	0	0	0	0	0	0	0	0	0	0	ID	0	0	0
Maximum	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Mean	0.24	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	0.29	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	0.1	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis 1,2-Dichloroethene, ug/L																
No. of Analyses	71	8	65	8	67	4	58	8	118	12	121	12	ID	11	39	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	1	0	ID	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.26	ND	ID	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene, ug/L																
No. of Analyses	71	8	65	8	67	4	58	8	118	12	121	12	ID	11	39	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0	ID	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene, ug/L																
No. of Analyses	71	8	65	8	67	4	58	8	118	12	121	12	ID	11	39	8
No. of Detections	0	0	1	0	0	0	0	0	0	0	0	0	ID	0	0	0
Maximum	ND	ND	0.32	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 4-2b
Statistical Summary of Regional Aquifer Downgradient Groundwater Quality

Well Location	MW-86		MW-87		MW-88		MW-89		MW-90		MW-91	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Dichlorodifluoromethane, ug/L												
No. of Analyses	38	8	115	12	37	8	37	8	33	8	34	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--
cis 1,2-Dichloroethene, ug/L												
No. of Analyses	38	8	115	12	38	8	38	8	33	8	34	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene, ug/L												
No. of Analyses	38	8	115	12	38	8	38	8	33	8	34	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene, ug/L												
No. of Analyses	38	8	115	12	38	8	38	8	33	8	34	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	1	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--

Table 4-2b
Statistical Summary of Regional Aquifer
Downgradient Groundwater Quality

Well Location	MW-43		MW-66		MW-67		MW-68		MW-74		MW-75		MW-80		MW-85	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Vinyl Chloride, ug/L																
No. of Analyses	71	8	65	8	67	4	58	8	118	12	121	12	ID	11	39	8
No. of Detections	8	2	0	0	0	0	1	0	0	0	2	0	ID	0	0	0
Maximum	0.07	0.031	ND	ND	ND	ND	0.02	ND	ND	ND	0.07	ND	ID	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ID	ND	ND	ND
Mean	0.025	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	0.032	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	0.01	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTES: * Gradient indicates location of monitoring well relative to the hydraulic gradient of the Aquifer and the placement of Solid Waste.
ND = Not Detected

Table 4-2b
Statistical Summary of Regional Aquifer
Downgradient Groundwater Quality

Well Location	MW-86		MW-87		MW-88		MW-89		MW-90		MW-91	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Vinyl Chloride, ug/L												
No. of Analyses	38	8	115	12	38	8	38	8	33	8	34	8
No. of Detections	0	0	2	0	1	0	1	0	0	0	0	0
Maximum	ND	ND	0.08	ND	0.03	ND	0.04	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	--	--	--	--

NOTES: *Gradient indicates location of monitoring well relative to the hydraulic gradient of the Aquifer and the placement of Solid Waste.
ND = Not Detected

Table 4-2c
Statistical Summary of Perched Zones
Groundwater Data

Well Location	MW-27A		MW-28		MW-29		MW-55		MW-30A		MW-47		MW-62		MW-EB6		MW-101	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
	North and West								East Perched Zone								SSWA	
pH, (Field) Standard Units																		
No. of Analyses	68	8	56	8	66	8	68	8	74	8	74	8	44	5	32	5	7	8
No. of Detections	68	8	56	8	66	8	68	8	74	8	74	8	44	5	32	5	7	8
Maximum	8.3	8.0	7.6	5.9	7.9	6.4	8.6	7.9	7.4	6.5	7.5	7.2	7.5	6.8	7.6	6.4	6.9	8.9
Minimum	5.9	7.0	5.4	5.5	5.8	5.9	6.9	7.6	5.8	6.2	6.4	6.9	6.1	6.1	5.6	6.0	6.6	6.8
Mean	7.7	7.7	6.1	5.7	6.6	6.2	7.8	7.8	6.5	6.3	7.0	7.0	6.9	6.4	6.8	6.2	6.8	7.2
Standard Deviation	0.463	0.35	0.428	0.12	0.502	0.20	0.311	0.10	0.307	0.12	0.203	0.11	0.319	0.30	0.476	0.16	0.10	0.70
Median	7.7	7.8	6.1	5.7	6.5	6.2	7.8	7.8	6.5	6.3	7.0	7.0	6.9	6.4	6.7	6.3	6.8	7.0
Trend	I	--	D	--	D	--	--	--	D	--	--	--	D	--	--	--	--	I
Specific Conductance, (Field) uS/cm																		
No. of Analyses	68	8	56	8	66	8	68	8	93	8	74	8	40	5	32	5	7	8
No. of Detections	68	8	56	8	66	8	68	8	93	8	74	8	40	5	32	5	7	8
Maximum	180	223	242	119	108	87	160	160	469	380	1047	1090	324	257	710	200	827	778
Minimum	130	87	100	73	68	70	112	104	70	218	550	8	50	190	100	159	660	429
Mean	156	169	144	101	84	79	131	137	268	318	816	816	250	230	255	181	713	648
Standard Deviation	13	46	38	15	8	6	10	18	112	55	100	358	51	27	122	16	65	127
Median	157	183	125	100	84	78	130	138	290	315	823	945	250	245	675	185	675	700
Trend	I	--	D	--	I	--	I	--	I	--	I	--	D	--	D	--	D	--
Total Dissolved Solids, mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	44	5	24	5	7	7
No. of Detections	68	8	56	8	67	8	68	8	74	8	74	8	44	5	24	5	7	7
Maximum	500	145	180	86	3100	364	130	129	350	238	1500	661	240	181	560	144	490	481
Minimum	27.0	62.0	47.0	72.0	40.0	62	58	80	120	206	120	587	95	138	29	102	450	435
Mean	117.4	122.5	101.2	80.5	148.4	117.8	96.8	113.1	226.6	225.5	533.0	621.0	169.0	154.8	170.3	126.0	468.6	450.6
Standard Deviation	52.30	27.26	26.72	4.28	382	100	14.01	14.38	40.54	11.45	134	24.1	28.51	18.78	104.4	15.44	15.74	16.34
Median	110	129	100	82	77	86	98	116	218	229	516	616	175	146	470	129	470	452
Trend	--	--	D	--	--	--	I	--	I	--	I	--	D	--	--	--	--	--
Alkalinity, total (CaCO3), mg/L																		
No. of Analyses	59	8	49	8	58	8	59	8	59	8	59	8	38	5	20	5	7	7
No. of Detections	59	8	49	8	58	8	59	8	59	8	59	8	38	5	20	5	7	7
Maximum	90	83	71	29	48	31	68	68	200	194	920	660	110	104	600	102	520	448
Minimum	66	29	24	24	21	22	52	59	66	160	400	597	42	58	64	79	230	417
Mean	80	71	38	27	26	27	59	64	134	180	530	623	71	78	165	93	441	430
Standard Deviation	4	19	12	2	4	3	3	3	38	10	76	20	15	17	147	9	96	11
Median	80	79	34	28	26	26	59	64	140	181	520	619	69	75	460	95	460	427
Trend	--	--	D	I	--	--	I	--	I	--	I	--	D	--	--	--	--	--

Table 4-2c
Statistical Summary of Perched Zones
Groundwater Data

Well Location	MW-27A		MW-28		MW-29		MW-55		MW-30A		MW-47		MW-62		MW-EB6		MW-101	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
	North and West								East Perched Zone								SSWA	
Ammonia as N, mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	44	5	18	5	7	7
No. of Detections	68	8	22	1	18	0	61	8	15	0	55	8	7	0	18	5	2	7
Maximum	0.26	0.24	0.22	0.01	0.12	ND	0.12	0.07	0.29	ND	0.16	0.12	0.03	ND	1.90	1.97	0.11	0.0
Minimum	0.0	0.0	ND	ND	ND	ND	ND	0.0	ND	ND	ND	0.0	ND	ND	0.1	0.8	ND	0.0
Mean	0.15	0.14	0.02	ID	0.01	ID	0.05	0.06	0.02	ID	0.05	0.08	0.01	ID	0.90	1.35	ID	0.02
Standard Deviation	0.04	0.07	0.04	ID	0.02	ID	0.02	0.01	0.04	ID	0.04	0.02	0.01	ID	0.52	0.45	ID	0.01
Median	0.2	0.2	0.0	ID	0.0	ID	0.1	0.1	0.0	ID	0.0	0.1	0.0	ID	ID	1.3	ID	0.0
Trend	D	I	--	--	--	--	--	--	--	--	I	--	--	--	I	--	--	--
Chloride, mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	44	5	21	5	7	7
No. of Detections	68	8	56	8	66	8	68	8	73	8	74	8	44	5	17	5	7	7
Maximum	43.0	9.6	5.0	4.6	14.0	3.8	2.5	3.7	10.3	4.5	26.0	8.4	30.0	14.4	33.0	1.3	8.9	7.5
Minimum	1.0	3.5	2.0	3.5	ND	3.2	1.6	1.9	ND	2.4	3.8	7.3	3.0	5.4	ND	0.8	6.7	4.6
Mean	2.3	7.0	3.1	4.1	3.6	3.4	2.0	2.2	3.2	3.3	13.3	7.9	11.2	9.4	3.1	1.0	8.3	5.6
Standard Deviation	5.11	1.71	0.61	0.45	1.89	0.24	0.15	0.61	2.74	0.79	5.70	0.37	7.13	3.52	6.91	0.28	0.77	1.06
Median	1.5	7.1	3.0	4.3	3.0	3.3	2.0	2.0	2.0	3.2	12.0	7.8	9.0	9.0	8.6	0.8	8.6	5.4
Trend	--	--	I	--	I	--	--	--	I	D	D	--	D	--	--	--	--	D
Nitrate as N, mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	44	5	19	5	7	7
No. of Detections	29	6	48	8	65	8	8	0	73	8	9	0	44	5	7	2	1	0
Maximum	0.3	1.1	1.2	0.5	5.1	2.0	0.1	ND	22.0	1.1	1.1	ND	12.0	3.8	0.1	0.0	0.0	ND
Minimum	ND	ND	ND	0.1	ND	1.2	ND	ND	ND	0.3	ND	ND	3.0	2.6	ND	ND	ND	ND
Mean	0.0	0.3	0.4	0.3	2.4	1.8	0.0	ID	4.4	0.7	0.0	ID	5.9	2.3	0.0	ID	ID	ID
Standard Deviation	0.05	0.42	0.32	0.16	0.84	0.28	0.02	ID	4.92	0.24	0.13	ID	1.93	1.64	0.04	ID	ID	ID
Median	0.03	0.06	0.4	0.2	2.4	1.9	0.02	ID	2.7	0.6	0.03	ID	5.7	3.0	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	D	D	--	--	D	--	--	--	--	--
Sulfate, mg/L																		
No. of Analyses	68	8	55	8	67	8	68	8	74	8	74	8	44	5	21	5	7	7
No. of Detections	68	8	55	8	66	8	68	8	74	8	74	8	44	5	12	3	7	7
Maximum	15.0	16.5	59.5	17.8	4.0	2.1	27.0	14.3	65.0	14.0	13.9	8.5	41.0	25.2	8.0	0.3	13.0	6.4
Minimum	1.6	5.2	14.0	13.8	ND	1.8	9.0	11.0	2.0	9.5	1.6	6.4	17.0	16.3	ND	ND	5.2	5.2
Mean	7.4	12.4	27.8	15.7	2.1	1.9	10.6	12.0	23.6	10.7	6.9	7.1	26.2	13.8	1.4	0.1	7.0	4.9
Standard Deviation	1.39	3.40	11.90	1.21	0.60	0.10	2.14	1.03	9.32	1.43	1.98	0.76	6.18	9.90	1.83	0.10	2.66	2.01
Median	7.0	13.6	24.0	15.8	2.0	1.9	10.0	11.8	23.0	10.4	6.8	6.8	26.8	16.7	6.3	0.1	6.3	5.4
Trend	--	--	D	--	--	--	I	--	D	--	--	--	D	--	--	--	--	D

Table 4-2c
Statistical Summary of Perched Zones
Groundwater Data

Well Location	MW-27A		MW-28		MW-29		MW-55		MW-30A		MW-47		MW-62		MW-EB6		MW-101	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
	North and West								East Perched Zone								SSWA	
Iron, dissolved mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
No. of Detections	61	0	52	1	62	1	68	8	65	1	74	6	43	0	30	4	7	7
Maximum	0.2	ND	1.11	0.02	34.0	0.0	0.6	0.3	0.5	0.0	3.0	0.4	1.7	ND	29.3	8.8	3.5	2.1
Minimum	ND	ND	ND	ND	ND	ND	0.0	0.2	ND	ND	0.0	0.1	ND	ND	0.5	3.8	1.0	0.3
Mean	0.1	ID	0.1	ID	0.9	ID	0.2	0.2	0.1	ID	0.6	0.2	0.2	ID	11.3	5.3	1.8	0.6
Standard Deviation	0.04	ID	0.19	ID	4.27	ID	0.08	0.04	0.09	ID	0.61	0.16	0.30	ID	7.76	3.63	0.95	0.67
Median	0.0	ID	0.0	ID	0.0	ID	0.2	0.2	0.1	ID	0.5	0.3	0.1	ID	1.5	5.6	1.5	0.4
Trend	--	--	--	--	I	--	I	--	I	--	--	--	--	--	D	--	--	--
Manganese, dissolved mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
No. of Detections	68	8	56	5	42	0	68	8	21	0	74	8	12	0	30	4	7	7
Maximum	0.2	0.1	4.2	0.0	0.5	ND	0.2	0.2	0.1	ND	2.8	2.2	0.0	ND	3.0	0.9	2.0	1.73
Minimum	0.0	0.0	0.0	ND	ND	ND	0.0	0.1	ND	ND	0.5	1.3	ND	ND	0.2	0.7	1.5	1.3
Mean	0.1	0.0	1.0	0.0	0.0	ID	0.1	0.2	0.0	ID	1.1	1.6	0.0	ID	1.1	0.6	1.7	1.6
Standard Deviation	0.02	0.02	1.25	0.00	0.07	ID	0.02	0.01	0.01	ID	0.46	0.29	0.01	ID	0.60	0.35	0.17	0.14
Median	0.1	0.0	0.3	0.0	0.0	ID	0.1	0.2	0.0	ID	1.0	1.6	0.0	ID	1.7	0.7	1.7	1.6
Trend	D	0.04	D	--	I	--	I	--	--	--	I	--	--	--	D	--	--	--
Calcium, dissolved mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
No. of Detections	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
Maximum	23.5	24.7	25.2	10.5	12	8	17	13	55	33	160	137	32	27	29	14	98	83
Minimum	2.8	8.7	9.8	8.5	6	6	2	11	6	28	63	105	16	19	5	12	68	65
Mean	18.1	19.8	14.8	9.4	8	7	12	12	31	31	105	122	24	22	14	11	77	74
Standard Deviation	2.75	5.06	4.33	0.73	1	1	2	1	9	2	17	10	4	3	6	6	10	7
Median	19.0	21.4	13.0	9.2	8	7	12	12	31	31	105	122	24	22	74	13	74	73
Trend	--	--	D	--	I	--	I	--	I	--	I	I	D	--	D	--	--	--
Magnesium, dissolved mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
No. of Detections	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
Maximum	6.13	6.41	8.6	2.71	6.3	2.1	7.6	6.7	31.0	20.0	64.0	62.8	12.0	9.6	12.9	8.2	50.0	49.7
Minimum	3.1	2.1	2.3	2.0	1.5	1.5	3.4	6.1	1.7	16.9	31.0	49.5	4.4	5.0	2.7	6.3	37.0	35.4
Mean	4.9	5.4	3.5	2.4	2.1	1.8	5.7	6.3	17.9	17.9	49.5	57.9	8.1	6.8	6.6	5.6	42.6	41.3
Standard Deviation	0.52	1.44	1.16	0.23	0.6	0.2	0.6	0.2	5.3	1.1	6.5	4.3	1.8	1.7	2.6	3.2	3.9	4.8
Median	4.80	6.02	3.10	2.36	1.9	1.9	5.6	6.3	17.0	17.5	49.4	58.2	8.1	6.3	42.0	6.5	42.0	40.3
Trend	--	--	D	--	I	--	I	--	I	--	I	--	D	--	D	--	--	--

Table 4-2c
Statistical Summary of Perched Zones
Groundwater Data

Well Location	MW-27A		MW-28		MW-29		MW-55		MW-30A		MW-47		MW-62		MW-EB6		MW-101	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
	North and West								East Perched Zone								SSWA	
Potassium, dissolved mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
No. of Detections	68	8	56	8	63	8	68	8	74	8	74	8	45	5	30	4	7	7
Maximum	15	3.92	4.6	1.12	1.6	0.613	2.2	1.82	7.2	1.93	24	5.36	1.6	1.37	2.8	1.92	3.7	3.52
Minimum	2.2	1.28	0.9	0.893	ND	0.48	1.00	1.52	0.53	1.66	3.70	4.47	0.70	0.97	1.00	1.32	2.70	2.92
Mean	3.5	3.3	1.2	1.0	0.6	0.5	1.56	1.65	1.8	1.8	5.14	4.97	1.15	1.12	1.55	1.26	2.93	3.2
Standard Deviation	1.5	0.9	0.6	0.1	0.2	0.0	0.2	0.1	0.7	0.1	2.3	0.3	0.2	0.2	0.4	0.7	0.4	0.2
Median	3.3	3.7	1.035	0.954	0.6	0.5	1.5	1.7	1.7	1.8	4.9	5.0	1.1	1.0	2.9	1.4	2.9	3.1
Trend	--	--	D	--	I	--	--	--	I	--	--	--	--	--	D	--	--	--
Sodium, dissolved mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
No. of Detections	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
Maximum	7.96	7.77	10.6	6.61	7.6	5.3	6.9	6.13	20	17.4	21	18.5	20	18.7	350	15.8	25	18.6
Minimum	5.3	3.01	5.6	5.02	3.5	4.3	4.7	4.97	4.3	13.3	13	16.7	13	12.4	8.9	12.1	16	14.7
Mean	6.6	6.4	7.6	6.1	5.1	4.6	5.6	5.6	13.3	15.5	16.2	17.7	15.4	15.1	34.1	11.1	19.3	16.4
Standard Deviation	0.51	1.50	1.26	0.53	0.81	0.32	0.44	0.39	1.75	1.23	1.73	0.78	1.67	2.34	63.78	6.41	3.15	1.36
Median	6.5	6.9	7.3	6.2	4.9	4.5	5.5	5.5	13.0	15.5	16.0	17.7	15.0	14.7	18.0	12.6	18.0	16.5
Trend	--	--	D	--	--	--	--	--	--	--	I	--	--	--	--	--	D	D
Arsenic, dissolved mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
No. of Detections	68	8	1	0	5	0	2	0	4	0	67	2	1	0	30	4	7	7
Maximum	0.019	0.017	0.002	ND	0.009	ND	0.001	ND	0.013	ND	0.006	0.002	0.001	ND	0.016	0.01	0.01	0.0155
Minimum	0.010	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.0017	0.0049	0.006
Mean	0.016	0.014	ID	ID	0.001	ID	ID	ID	0.001	ID	0.003	ID	ID	ID	0.006	0.004	0.007	0.011
Standard Deviation	0.001	0.004	ID	ID	0.001	ID	ID	ID	0.001	ID	0.001	ID	ID	ID	0.004	0.004	0.002	0.003
Median	0.016	0.016	ID	ID	0.001	ID	ID	ID	5E-04	ID	0.002	ID	ID	ID	0.007	0.0023	0.0065	0.011
Trend	D	--	--	--	--	--	--	--	--	--	D	--	--	--	D	--	--	--
Barium, dissolved mg/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	30	4	7	7
No. of Detections	68	8	55	8	63	8	68	8	74	8	74	8	45	5	30	4	7	7
Maximum	0.018	0.008	0.02	0.007	0.2	0.002	0.009	0.005	0.083	0.007	0.04	0.04	0.008	0.003	0.04	0.0177	0.049	0.0406
Minimum	0.004	0.005	ND	0.006	ND	0.001	0.004	0.004	0.005	0.006	0.026	0.031	0.002	0.002	0.009	0.013	0.030	0.0338
Mean	0.007	0.006	0.011	0.006	0.007	0.001	0.006	0.004	0.009	0.006	0.033	0.035	0.003	0.002	0.024	0.012	0.038	0.036
Standard Deviation	0.002	0.001	0.004	0.000	0.025	0.000	0.001	0.000	0.009	0.000	0.003	0.003	0.001	0.001	0.009	0.007	0.006	0.003
Median	0.007	0.006	0.010	0.006	0.002	0.001	0.005	0.004	0.007	0.006	0.034	0.035	0.002	0.002	0.038	0.015	0.038	0.0364
Trend	D	--	D	--	--	--	D	--	--	--	--	--	D	--	D	--	--	--

Table 4-2c
Statistical Summary of Perched Zones
Groundwater Data

Well Location	MW-27A		MW-28		MW-29		MW-55		MW-30A		MW-47		MW-62		MW-EB6		MW-101	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
	North and West								East Perched Zone								SSWA	
Dichlorodifluoromethane, ug/L																		
No. of Analyses	59	8	48	8	58	8	59	8	59	8	58	8	38	5	26	3	7	7
No. of Detections	0	0	1	0	0	0	0	0	17	0	52	7	0	0	0	0	0	0
Maximum	ND	ND	0.84	ND	ND	ND	ND	ND	0.67	ND	46	5.9	ND	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	0.2	ID	12.2	2.8	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	0.2	ID	11.9	2.2	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	0.1	ID	8.55	1.86	ID	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	D	--	D	--	--	--	--	--	--	--
1,1-Dichloroethane, ug/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	33	3	7	7
No. of Detections	0	0	0	0	0	0	0	0	73	8	66	8	44	5	0	0	1	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	77	3.48	2.1	0.591	13	3.7	ND	ND	0.21	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.27	ND	0.39	ND	1.28	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	18.7	3.1	0.5	0.5	5.9	1.9	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	18.1	0.4	0.3	0.1	3.6	1.0	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	11	3.245	0.46	0.484	5.98	1.34	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	D	--	--	--	D	--	--	--	--	--
1,2-Dichloroethane, ug/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	33	3	7	7
No. of Detections	0	0	0	0	0	0	0	0	42	0	1	0	7	0	0	0	0	1
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	3.8	ND	0.21	ND	0.6	ND	ND	ND	ND	0.22
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	0.6	ID	ID	ID	0.1	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	0.7	ID	ID	ID	0.1	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	0.33	ID	ID	ID	0.1	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	D	--	--	--	D	--	--	--	--	--
***cis* 1,2-Dichloroethene, ug/L**																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	33	3	7	7
No. of Detections	0	0	2	0	0	0	0	0	74	7	70	7	45	5	0	0	1	0
Maximum	ND	ND	0.24	ND	ND	ND	ND	ND	110	5.27	3.2	1.8	14	7.52	ND	ND	0.21	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	4.6	ND	ND	ND	1.3	1.91	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	28.5	3.9	1.0	0.9	7.2	3.5	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	26.2	1.6	0.8	0.5	3.4	2.3	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	18	4.345	0.715	0.822	7	2.74	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	D	--	I	I	D	--	--	--	--	--

Table 4-2c
Statistical Summary of Perched Zones
Groundwater Data

Well Location	MW-27A		MW-28		MW-29		MW-55		MW-30A		MW-47		MW-62		MW-EB6		MW-101	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
	North and West								East Perched Zone								SSWA	
Trichloroethene, ug/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	33	3	7	7
No. of Detections	0	0	0	0	0	0	0	0	74	8	0	0	25	0	0	0	0	0
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	3.5	1.23	ND	ND	0.47	ND	ND	ND	ND	ND
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	1.2	0.93	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	1.82	1.04	ID	ID	0.20	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	0.50	0.10	ID	ID	0.10	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	1.65	1.04	ID	ID	0.21	ID	ID	ID	ID	ID
Trend	--	--	--	--	--	--	--	--	D	--	--	--	--	--	--	--	--	--
Vinyl Chloride, ug/L																		
No. of Analyses	68	8	56	8	67	8	68	8	74	8	74	8	45	5	33	3	7	7
No. of Detections	1	0	0	0	0	0	0	0	24	0	74	8	3	0	1	0	7	7
Maximum	0.06	ND	ND	ND	ND	ND	ND	ND	3.22	ND	15.9	6.88	0.23	ND	0.02	ND	0.9	0.769
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4	3.93	ND	ND	ND	ND	0.51	0.328
Mean	ID	ID	ID	ID	ID	ID	ID	ID	0.26	ID	7.43	5.10	0.03	ID	ID	ID	0.70	1
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	0.60	ID	3.72	1.04	0.05	ID	ID	ID	0.14	0
Median	ID	ID	ID	ID	ID	ID	ID	ID	0.01	ID	6.925	4.935	0.01	ID	0.71	ID	0.71	0.555
Trend	--	--	--	--	--	--	--	--	D	--	D	--	--	--	--	--	--	--

NOTES:

* Gradient indicates location of monitoring well relative to the hydraulic gradient of the Aquifer and the placement of Solid Waste.

ND = Not Detected

Perched Zone Wells MW-25, MW-41S, MW-41D, NW-45, MW-79, MW-102 and MW-103 are not tabulated due to insufficient data.

TABLE 4-3

CEDAR HILLS REGIONAL LANDFILL

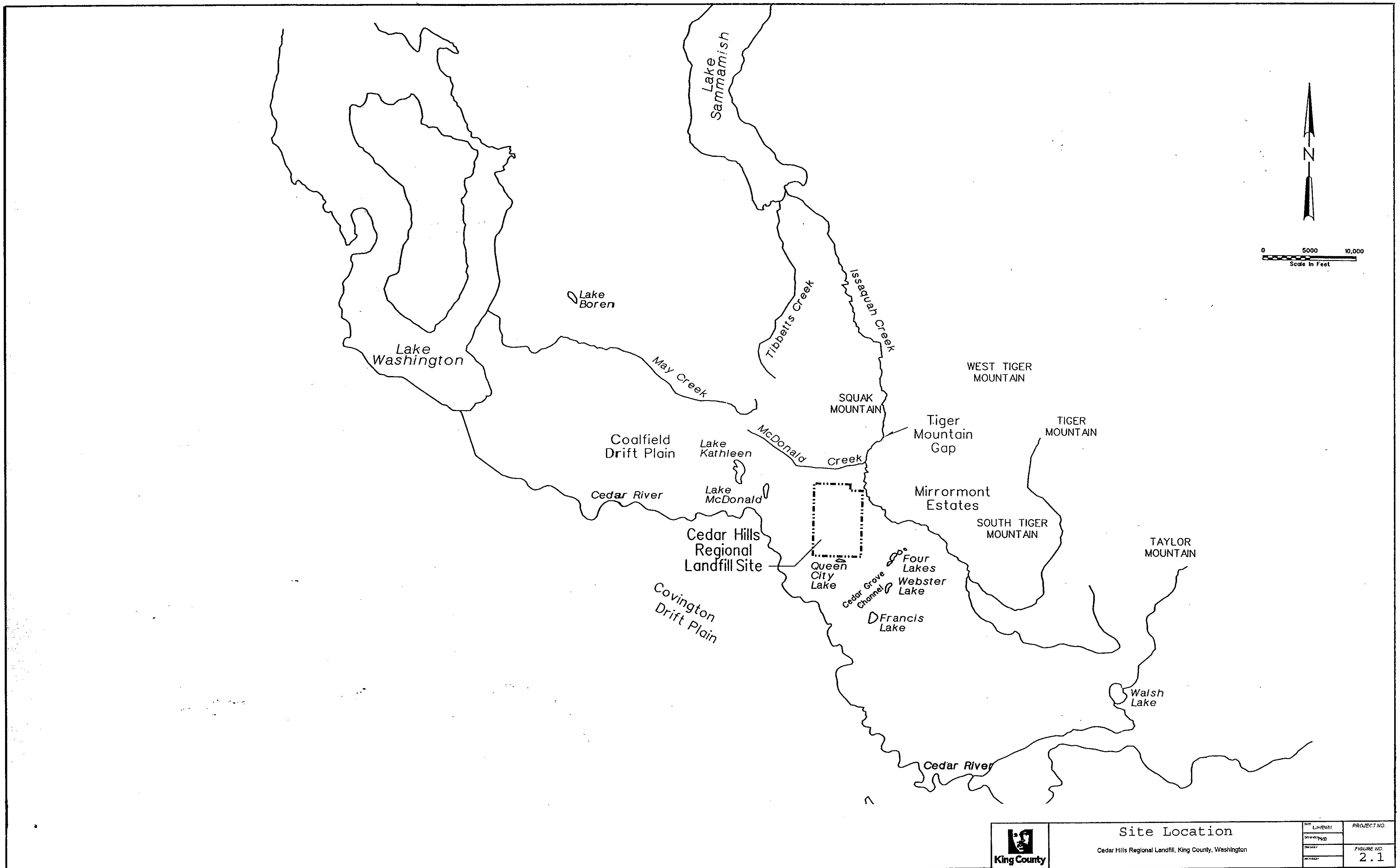
2011 REGIONAL AQUIFER GROUNDWATER

INTRAWELL PREDICTION LIMIT EXCEEDANCES

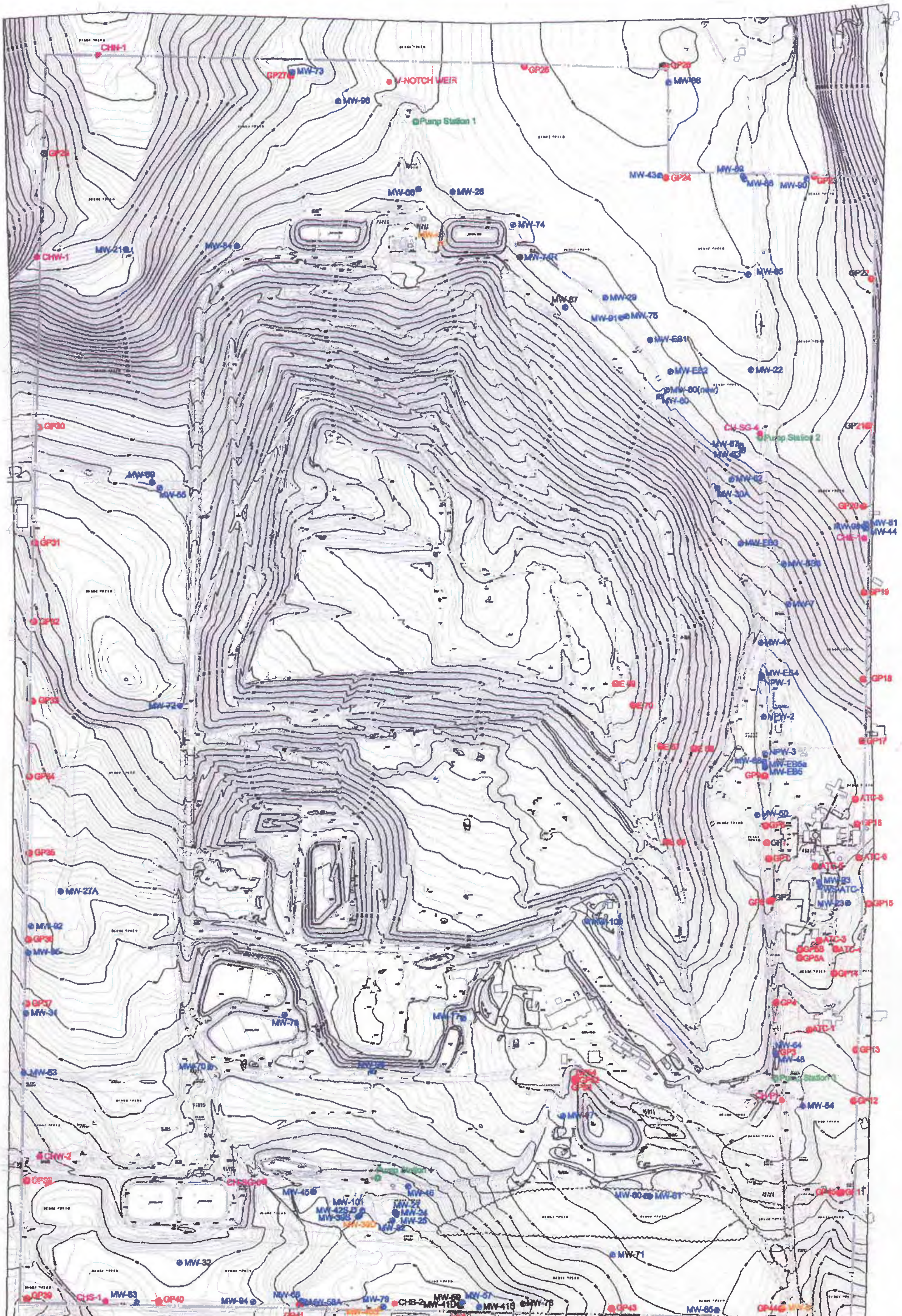
(January 1, 2010 to December 31, 2010)

Parameter	Units	Well ID	Sample Date	Max 2010 Value	Intrawell Limit Value
Upgradient Wells					
Nitrate as N	(mg/L)	MW-56	01/11/11	1.57	1.56
cis- 1,2-Dichloroethene	(υg/L)	MW-59	4/18/11	0.494	0.449
		MW-59	7/8/11	0.666	0.449
Downgradient Wells					
NO DOWN GRADIENT PREDICTION LIMIT EXCEEDANCES IN 2011					

FIGURES



Excerpted from *Cedar Hills Regional Landfill Site-Wide Hydrogeologic Report* 2004

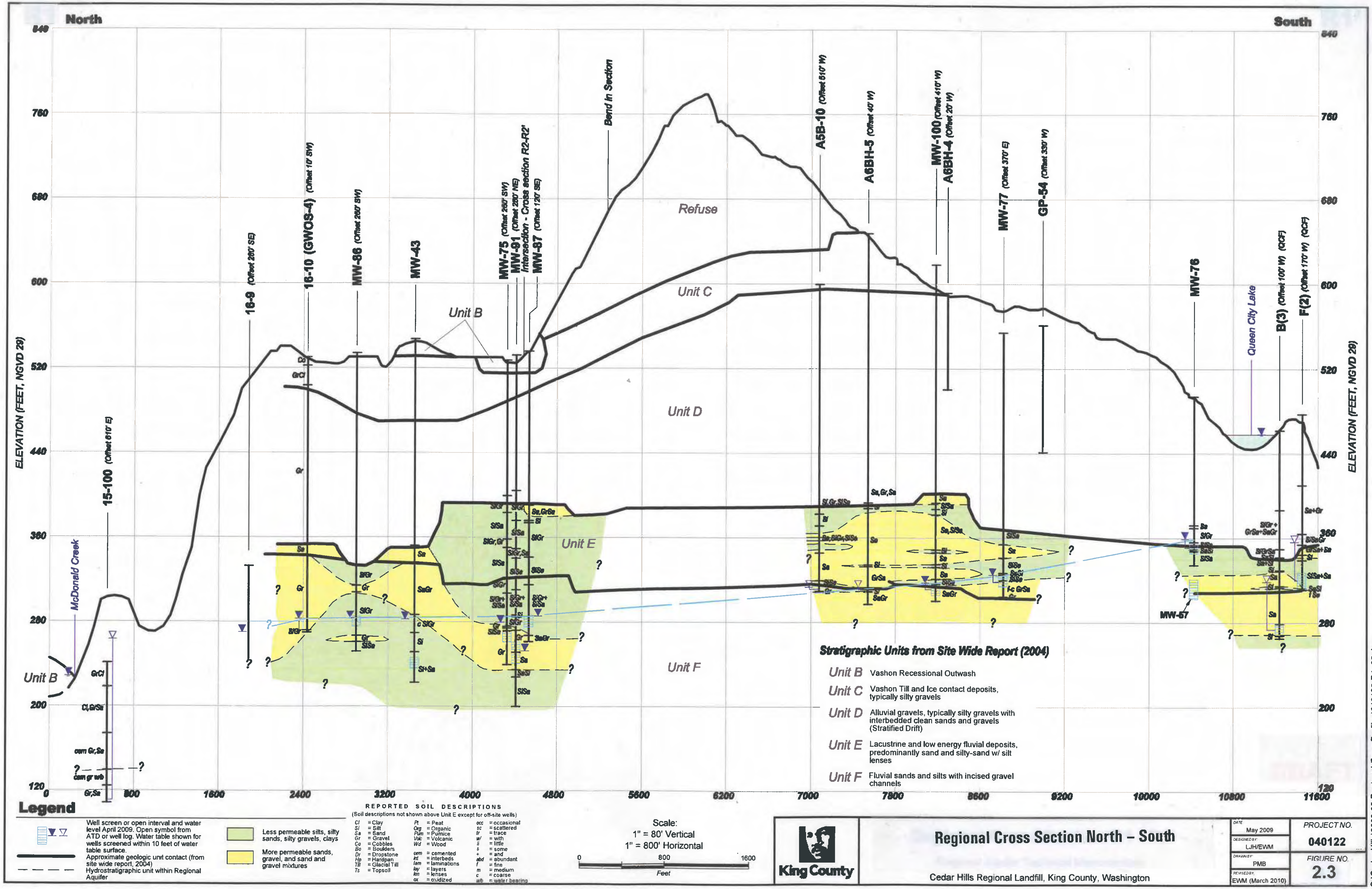


LEGEND

MW–9	Monitoring Well
GP–19	Gas Probe
MW–8	Decommissioned Monitoring Well
GP–13	Decommissioned Gas Probe
	Pump Station NO.__
MW–9	Surface Water Stations

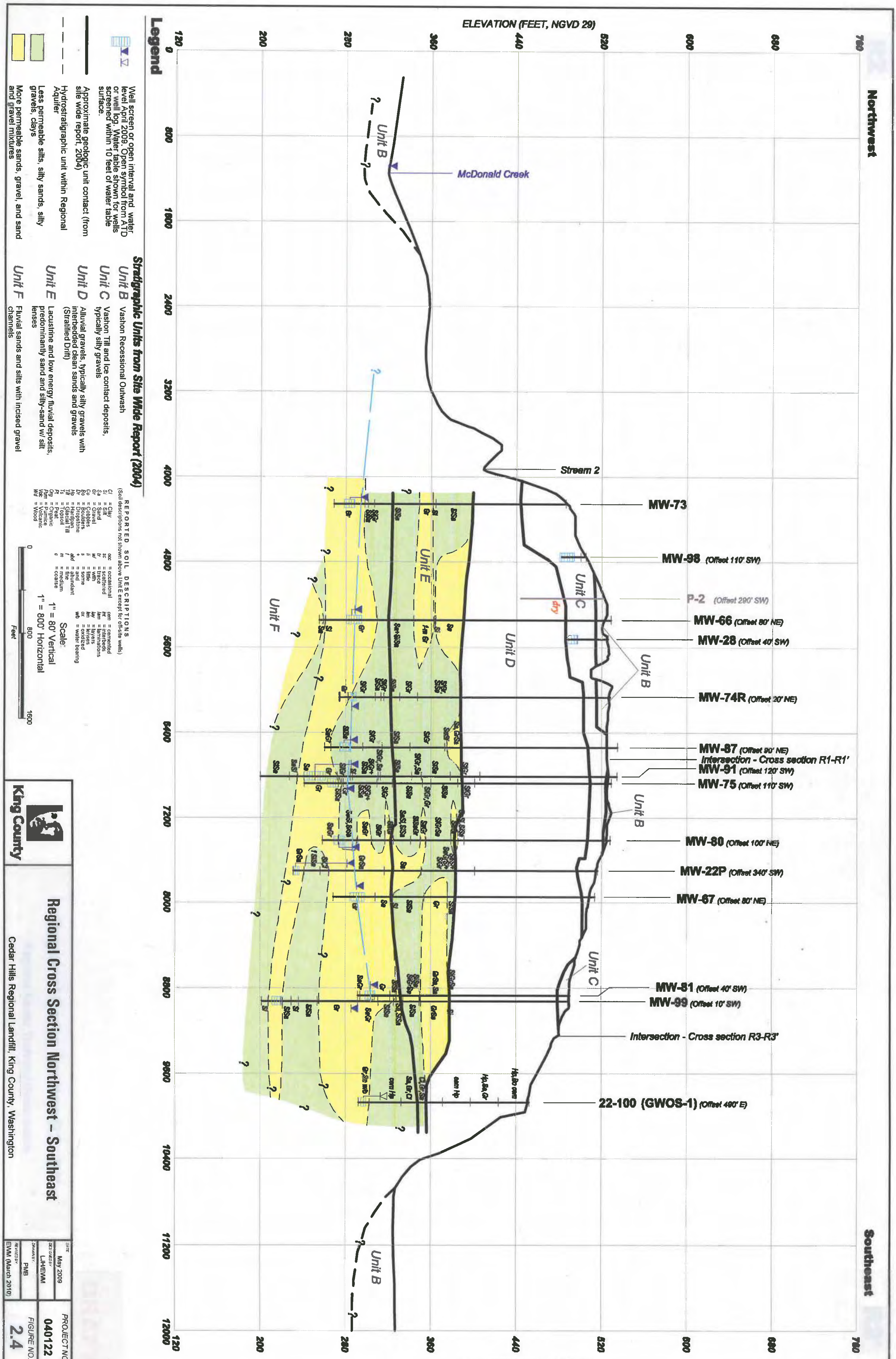
Scale 1"=200'

King County Solid Waste Division	DATE: Oct. 2007	Figure 2.2 **SITE MAP** Cedar Hills Landfill Maple Valley, Washington	Aero-Metric Aerial Photo taked August 24, 2007	PROJECT NO.
	DESIGNED/DWN:			FIGURE NO.



Excerpted from: *Cedar Hills Regional Landfill Regional Aquifer Technical Memorandum 2011*

Excerpted From: Cedar Hills Regional Aquifer Regional Aquifer Technical Memorandum 2011



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