Midway Landfill
Groundwater Monitoring Status Report
2010-2014

Prepared for
City of Seattle/Seattle Public Utilities

City of Seattle
Seattle Public Utilities

May 2015

Prepared by
Parametrix

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Groundwater Monitoring Status Report
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Prepared for

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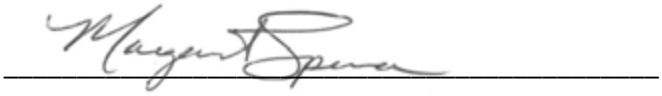
CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional hydrogeologist licensed to practice as such, is affixed below.

Prepared by Lisa Gilbert, LHG



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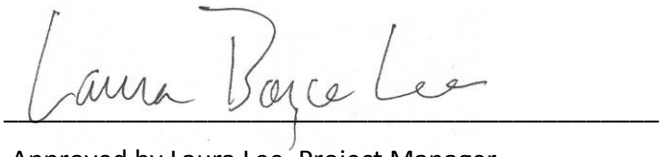

Approved by Laura Lee, Project Manager

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ACRONYMS AND ABBREVIATIONS

1,2-DCA	1,2-dichloroethane
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
µg/L	microgram per liter
mg/L	milligram per liter
CAP	Cleanup Action Plan
CERCLA	Comprehensive Environmental Response Compensation Liability Act
City	City of Seattle
COCs	Contaminants of Concern
COD	Chemical Oxygen Demand
EA	Endangerment Assessment
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
FS	Feasibility Study
MCLs	Maximum Contaminant Levels
MTCA	State of Washington Model Toxics Control Act
NPL	National Priorities List
PCE	Tetrachloroethene
RCW	Revised Code of Washington
RI	Remedial Investigation
ROD	Record of Decision
SA	Sand Aquifer
SG/SR	Shallow Groundwater/Saturated Refuse
SGA	Southern Gravel Aquifer
Site	Midway Landfill
SPU	Seattle Public Utilities
TCE	Trichloroethene
TOC	Total Organic Carbon
UGA	Upper Gravel Aquifer
VOCs	Volatile Organic Compounds
WAC	Washington Administrative Code

1. INTRODUCTION

This report summarizes the 2010 through 2014 fluid level and groundwater chemistry data for the Midway Landfill (the site) in Kent, Washington (Rounds 57 through 61). The data summary is intended to provide information to support the Third Five-Year Review being conducted in 2015 by the U.S. Environmental Protection Agency (USEPA).

Groundwater monitoring involves both fluid level and groundwater chemistry monitoring. Fluid level monitoring includes collection of groundwater levels within the saturated portion of Midway Landfill (termed Shallow Groundwater/Saturated Refuse (SG/SR), as well as groundwater levels in the shallow groundwater surrounding the landfill. Fluid level monitoring has also been referred to as "performance monitoring" in previous documents. The fluid level monitoring program was initiated in December 1989 and has been conducted monthly, quarterly, semi-annually, and is currently conducted annually in May.

The present fluid level monitoring program consists of collecting fluid level measurements from 22 wells located in key hydraulic areas of the site (described in Appendix H of 2006 Annual Monitoring Report; Parametrix 2007). This program was developed due to falling and stable trends in wells, dry wells, and a number of wells with obstructions and structural problems caused by settling of the refuse (Parametrix 2008).

Groundwater chemistry monitoring includes collection and analysis of groundwater samples from monitoring wells located upgradient and downgradient of the landfill and groundwater flow determination. Groundwater chemistry monitoring has also been referred to as "compliance monitoring" in previous documents. Groundwater chemistry monitoring was initiated in February 1990 with Round 1 (QM-1) and was conducted on a quarterly to semi-annual basis through Round 56 (November 2008). The first semi-annual groundwater chemistry event was Round 34 (QM-34, November 1998). Data from these rounds of groundwater chemistry monitoring were presented in previous reports.

The current groundwater chemistry monitoring program consists of annual sampling of 11 wells screened in three aquifers. Four additional wells are part of the monitoring program but are not currently sampled because they are dry. The groundwater samples are analyzed for conventional parameters, metals, and volatile organic compounds (VOCs).

Fluid level and groundwater chemistry data are discussed in Sections 2 and 3 of this report, respectively.

1.1 Background

The City of Seattle (City) operated the Midway Landfill from 1966 to 1983. The Midway Landfill is located north of South 252nd Street between SR 99 and I-5 in Kent, Washington (Figure 1-1). When the City closed the Midway Landfill in 1983, extensive testing for landfill gas and analysis of groundwater in and around the landfill began. The presence of contaminants with a potential for off-site migration was indicated, and Washington State Department of Ecology (Ecology) began to investigate the site. In 1986, the site was placed on the National Priorities List (NPL) by the USEPA For groundwater conditions at the site. As required by USEPA, the City completed a Remedial Investigation (RI), an Endangerment Assessment (EA), and a Feasibility Study (FS). In May 1990, prior to completion of the RI and FS studies, the City and Ecology entered into a consent decree pursuant to the State of Washington Model Toxics Control Act (MTCA). This legal agreement set forth Ecology's determination that undertaking certain remedial actions, prior to a Cleanup Action Plan (CAP), would provide immediate protection to human health and the environment.

The remedial actions were completed by 1992 and consisted of the following four landfill closure elements:

- Construction of a landfill cover.
- Completion of a gas extraction system.
- Completion of a surface water management system.
- Preparation of a comprehensive operation and maintenance manual.

Under MTCA, the decision document that selects the cleanup action and cleanup levels is called the CAP (similar to an USEPA Record of Decision [ROD]). Ecology and the City had been working on a CAP since 1992. In September 2000, the USEPA completed a Comprehensive Environmental Response Compensation Liability Act (CERCLA) ROD for the landfill so that a determination of CERCLA construction completion could be made (USEPA 2000). Ecology then decided to utilize the ROD as a CAP for a final MTCA remedy, pursuant to Washington Administrative Code (WAC) 173-340-360 (13).

The Midway Landfill ROD documented and approved the selected remedial action for the site. The selected remedy incorporated elements required in the 1990 consent decree and added some elements to ensure long-term protectiveness of the remedy. The selected remedy consists of monitoring, continuing to operate and maintain all remedial elements in the 1990 consent decree, and implementing institutional controls. The selected remedy also sets cleanup standards for groundwater downgradient of the landfill. Table 1-2 lists the groundwater contaminants of concern (COCs) and their respective cleanup levels established in the ROD.

Table 1-2. Groundwater Contaminants of Concern and Cleanup Levels Established in the ROD

Contaminant	Cleanup Level
1,2-dichloroethane (1,2-DCA)	5.0 µg/L
Vinyl chloride	0.29 µg/L*
Manganese	2.2 mg/L

Source: USEPA 2000.

* The revised cleanup level for vinyl chloride is 0.29 µg/L, using the MTCA adjusted cancer risk of 1e-5.

In 2008, due to budget constraints and stable and/or decreasing trends in concentrations, the City reduced the frequency of groundwater sampling and reporting. This reduction included sampling annually, collecting fluid levels annually, and preparing a data report annually, with a comprehensive groundwater status report every five data sets to be prepared the year prior to the Five-Year Review reporting. A comprehensive status report, as detailed in the recommendations of the 2008 Annual Report (Parametrix 2009) was completed in 2009 (Parametrix 2010) in anticipation of the Second Five-Year Review scheduled for the site in 2010.

In 2009, due to falling water levels and obstructions in some wells, the City implemented the fluid level monitoring program changes recommended in Appendix H of the 2006 Annual Report (Parametrix 2007). These changes reduced the frequency of monitoring to annually and the number of wells monitored to 22.

1.2 Year 2010 through 2014 Activities

In 2010, monitoring well MW-25, located on South 248th Street east of 23rd Avenue South, was destroyed during a Midway Sewer District sewer replacement project. The well was used for fluid level monitoring for the Midway Landfill but not required for compliance monitoring. MW-25 was a resource protection well, and the Ecology concurred that the well should be decommissioned. The sewer repair was completed and well MW-25 was decommissioned.

Due to the extension of 242nd St. S to Pacific Highway, wells MW-12 and MW-28 are now located in the road, but a vault was installed so these wells can still be accessed for monitoring.

1.2.1 Second Five-Year Review

In 2010, USEPA prepared the Second Five-Year Review (USEPA 2010) to evaluate whether the cleanup remedy was still protective of human health and the environment. The Second Five-Year Review was based on data presented in a comprehensive annual report completed through 2009 (Parametrix 2010).

The issues, recommendations, follow-up actions, and protectiveness statement presented in the Second Five-Year Review are summarized in the sections below.

1.2.1.1 Issues

The following issues were presented in the Second Five-Year Review.

- Upgradient sources of VOCs in groundwater will continue to limit the potential for the COCs in the Southern Gravel Aquifer (SGA) to decrease below the ROD cleanup levels, especially because the concentrations of VOCs in upgradient Sand Aquifer (SA) well MW-21B are increasing over time. Vinyl chloride is a daughter product of the ethenes and ethanes detected in upgradient wells, and both vinyl chloride and 1,2-DCA are also present upgradient of the landfill. Although this was a recommendation of the First Five-Year Review, no efforts were made in the last 5 years by Ecology to identify the source of this contamination.
- Downgradient wells that were initially part of the groundwater monitoring network in the Upper Gravel Aquifer (UGA) and the SA have gone dry. There are currently no downgradient wells in these aquifers.
- 1,4-dioxane was added to the sampling round beginning in 2005, after the First Five-Year Review. It was detected in the three wells that it was sampled in (upgradient wells MW-17B and MW-21B and downgradient well MW-14B). The current sampling in only three wells does not provide adequate data to develop a conceptual site model for 1,4-dioxane.

The following operation and maintenance issues that do not affect current or future protectiveness were also identified during the Second Five-Year Review:

- The Midway Landfill Operations and Maintenance Manual has not been updated since 1992 and does not have the current landfill gas sampling locations and schedule, or locations of operational gas extraction wells.

1.2.1.2 Recommendations and Follow-up Actions

The following recommendations and follow-up actions were presented in the Second Five-Year Review.

- Ecology should investigate upgradient sources of VOC contamination and encourage upgradient property owners to voluntarily clean up contamination.
- Ecology will notify property owners that have upgradient sources of contamination by September 2011. Ecology will advise the property owners on cleanup requirements. By September 2013, property owners need to take substantive action on the upgradient contamination sources.
- Add well MW-7B to the monitoring network to further evaluate groundwater contamination in the SA.
- Add 1,4-dioxane to be sampled in all wells in the monitoring network.
- If 1,4-dioxane is found in downgradient wells at levels greater than upgradient wells, and above cleanup levels, then the City and Ecology need to meet and reevaluate the remedy.

The following are operation and maintenance recommendations related to issues that do not affect current or future protectiveness identified during the Second Five-Year Review:

- Revise the Midway Landfill Operations and Maintenance Manual to include the current landfill gas sampling locations and schedule, and locations of operational gas extraction wells.

1.2.1.3 Protectiveness Statement

Protectiveness deferred. A protectiveness determination of the remedy at the Midway Landfill cannot be made at this time until further information on 1,4-dioxane is obtained. Further information will be obtained by adding one well (MW-7B) to the monitoring network and adding 1,4-dioxane to be sampled in all monitoring wells. The City has agreed to incorporate this additional well and contaminant to the monitoring network. It is expected that the protectiveness determination can be made after two rounds of sampling are completed, which is estimated to be available by September 2012.

1.2.1.4 Actions Taken to Address the Second Five-Year Review

The following actions were taken by the City to address the recommendations of the Second Five-Year Review.

- Well MW-7B in the SA was added in 2011 to the list of wells routinely sampled.
- 1,4-dioxane was added to the list of parameters in 2011 for the routinely monitored wells.
- A special sampling event was conducted in 2012 for 1,4-dioxane in five additional wells to investigate its extent upgradient of the landfill.

1.3 Objectives

The objectives of this report are as follows:

- Document the continued effectiveness of the selected remedy at Midway Landfill, as shown by fluid level and groundwater quality results.

- Comply with post-closure groundwater monitoring requirements under the Minimum Functional Standards (WAC 173-304-407) consistent with the Midway Landfill Monitoring Plan (Parametrix 2000), an appendix to the Operations and Maintenance Manual. This manual and its appendix are equivalent to the Operations, Monitoring, and Maintenance Plan required under the Minimum Functional Standards.
- Describe the current regulatory status of the Midway Landfill as stated in the ROD (USEPA 2000).

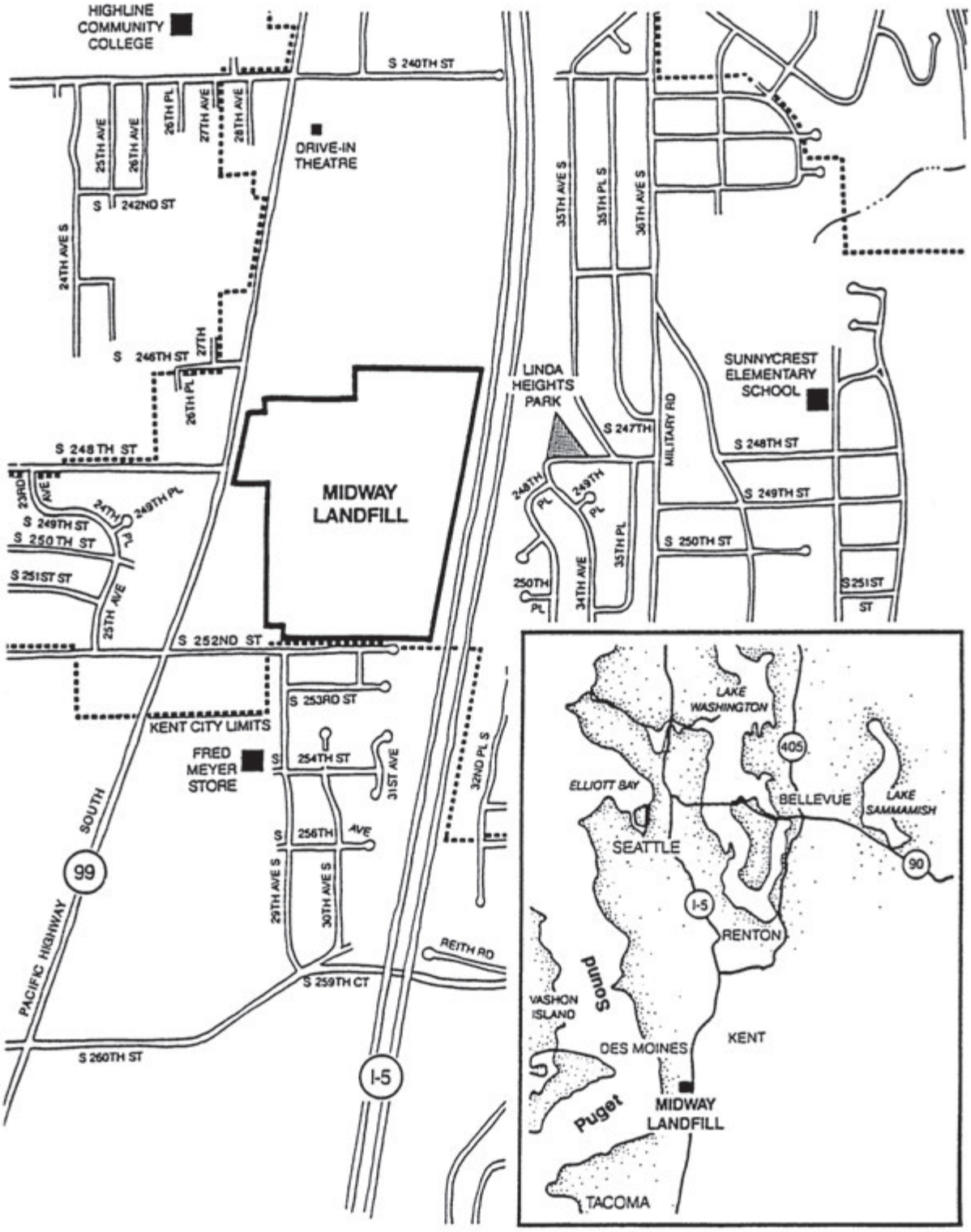

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Figure 1-1
Site Location Map
Midway Landfill
Kent, Washington

2. FLUID LEVEL MONITORING AND GROUNDWATER FLOW DETERMINATION

Fluid levels were measured in seven key hydraulic areas in 22 wells screened in the Shallow Groundwater/Saturated Refuse (SG/SR). These wells were also checked for the presence and thickness of free product. Water level measurements were also collected from 33 wells screened in the Upper Gravel Aquifer (UGA), Sand Aquifer (SA), and the Southern Gravel Aquifer (SGA) for the purpose of determining flow within these aquifers. A description of water level measurement procedures and well designations is presented in the Midway Landfill Monitoring Plan (Parametrix 2000) and in the 2001 Annual Groundwater Monitoring Report Round 40 (Parametrix 2002).

2.1 Fluid Level Monitoring

The SG/SR well locations and hydraulic areas are shown in Figure 2-1. Fluid levels measured in the 22 monitoring wells during each annual monitoring event are presented in Tables A-1a through A-1e of Appendix A. Figure 2-2 shows fluid level trends in one representative well from each key hydraulic area, and Figures 2-3 through 2-9 show hydrographs for all the key wells in each of the seven areas.

Groundwater flow within the SG/SR was previously evaluated in the Midway Landfill 2005 Groundwater Remediation Status Report (Parametrix 2005) and the Midway Landfill 2009 Annual Groundwater Monitoring Report (Parametrix 2010). The changes between the most recent 2014 fluid measurements and previous fluid levels measured during comparable seasonal measurements during the RI (1989 to 1990), and at the end of each five-year status report period (2005 and 2009) are presented in Table 2-1. Fluid level trends are summarized in Table 2-2.

In general, the water levels are stable or decreasing, except in the North End Shallow, North End, and Linda Heights Area wells. Fluid levels in these areas have increased over the past 5 to 10 years, although the actual fluid levels in most of the wells remain within the range of historical measurements.

The wells in the West Side, Central Mound, Hydraulic Sink, and South End have shown the greatest overall fluid level decreases since the RI.

Free product was not detected in any of the wells monitored during this period, except in Central Mound Area well MW-43D, where thicknesses of product ranging from 0.25 ft to 0.55 ft were measured.

2.2 Groundwater Flow Determination

Locations of the 33 groundwater monitoring points are shown in Figure 2-10. Potentiometric contour maps were generated for the UGA, SA, and the SGA based on water level data measured in May 2014 and are presented in Figures 2-11 through 2-13. The water level data are presented in Tables A-2a through A-2e of Appendix A.

Flow patterns in the UGA (Figure 2-11) and SA (Figure 2-12) have remained relatively stable compared to previous results. Flow within the SGA (Figure 2-13) has changed slightly since the RI, with a more northeast/northwest direction instead of east/west. However, this slight change has not affected the upgradient and downgradient relationships with respect to monitoring wells within the SGA as previously determined in the RI.

Table 2-1. Changes in Fluid Level Data for Shallow Groundwater/Saturated Refuse Monitoring Wells since the RI, Midway Landfill, Kent, Washington

		Measuring Point	Fluid Elevations (ft)				Change Between Events (ft)		
Area	Well #	Elevation (ft)	June 1989	Jun-05	May 2009	May 2014	1989-2014	2005-2014	2009-2014
North End Shallow	AM-M**	368	309.3 *	308.47	310.29	312.68	3.38	4.21	2.39
	AN-M	364.5	340.0 *	335.7	339.24	340.16	0.21	4.46	0.92
	AO-M	356.2	335.6 *	330.7	332.38	335.59	0.01	4.89	3.21
	AR-M	354.4	338.9 *	329.65	333.30	338.20	(0.68)	8.55	4.90
North End	14	370.63	311.1	309.58	309.69	309.95	(1.15)	0.37	0.26
	PC4S	349.16	314.8 *	313.51	313.34	314.38	(0.42)	0.87	1.04
	PC6S	348.68	324.5 *	316.55	317.75	321.58	(2.92)	5.03	3.83
Linda Heights Area	26	380.89	310.7	310.2	310.86	311.71	1.01	1.51	0.85
	27	379	303.6	305.55	306.54	309.73	6.13	4.18	3.19
	45D	379.82	312.1	305.36	306.24	309.08	(3.02)	3.72	2.84
West Side	2	366.13	325.8	303.23	<303.40	<303.33	(22.47)	0.10	(0.07)
	5	365.67	321.5	299.12	298.62	298.42	(23.08)	(0.70)	(0.20)
Central Mound	42D	380.32	311.5	306.65	306.64	306.62	(4.88)	(0.03)	(0.02)
	43D	374.7	316.8	300.82	298.95	298.75	(18.05)	(2.07)	(0.20)
	47D	381.58	321.2	291.88	291.81	<291.48	(29.72)	(0.40)	(0.33)
Hydraulic Sink	40D	400.27	285.1	273.37	272.46	270.49	(14.61)	(2.88)	(1.97)
	49D	395.45	286.2 *	288.32	<282.65	284.65	(1.55)	(3.67)	2.00
	54D	385.98	291.6 *	290.51	<290.68	<290.58	(1.02)	0.07	(0.10)
	54S	385.97	341.1 * DRY	340.4	340.39	340.62	(0.48)	0.22	0.23
South End	38D**	396.93	316.2	296.57	294.67	294.35	(21.85)	(2.22)	(0.32)
	56S	382.84	340.1 *	327.41	<327.34	<327.44	(12.66)	0.03	0.10
	56D	383.11	307.7 *	298.89	298.85	298.91	(8.79)	0.02	0.06

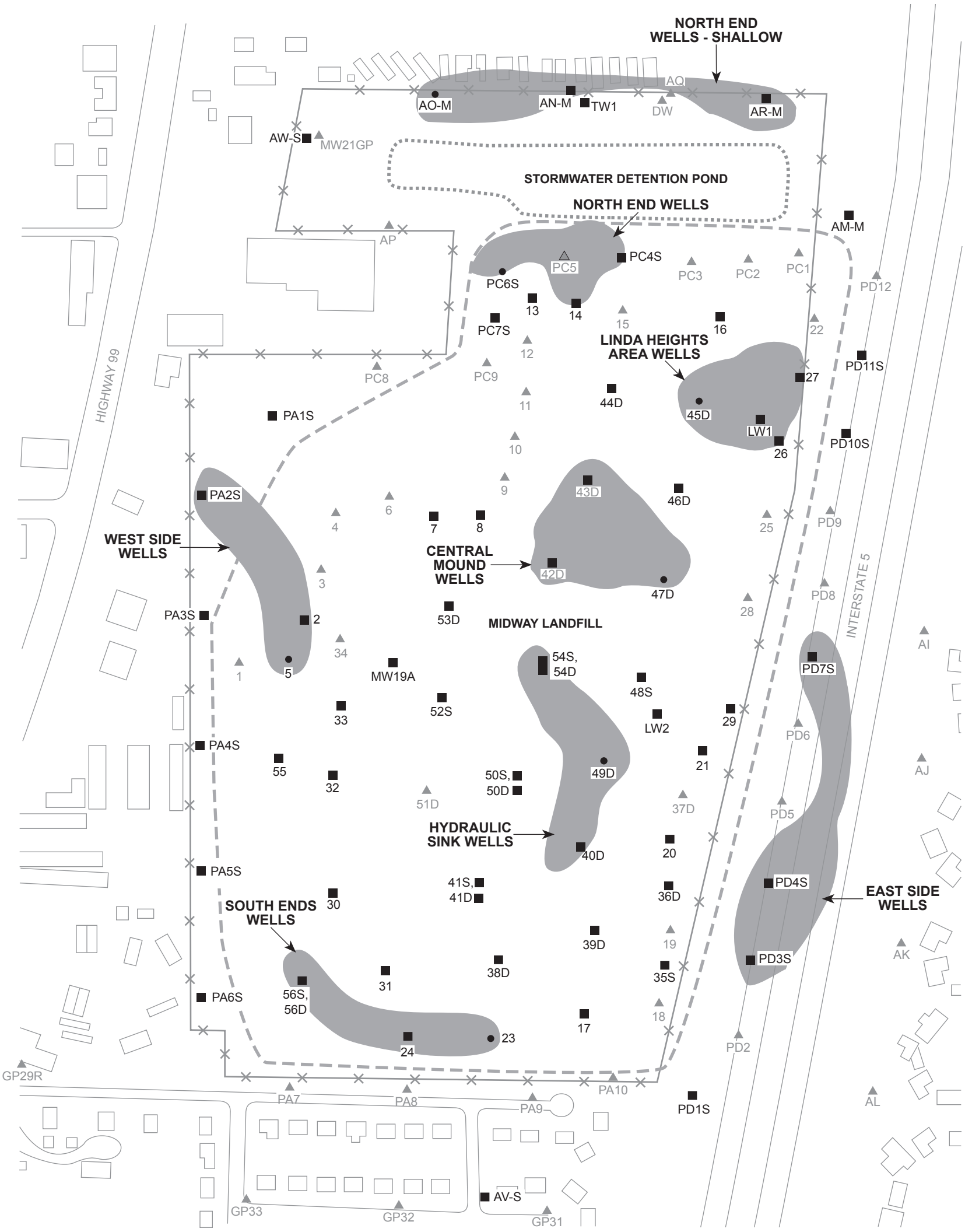
Notes:
* = No data for June 1989 were available; April 1990 data were used.
** = Well not in a specific hydraulic area; located between areas listed in the table.
DRY = Well was dry.

Table 2-2. Fluid Level Data Trends for Shallow Groundwater/Saturated Refuse Monitoring Wells through May 2014, Midway Landfill, Kent, Washington

Area	Well #	Comments
North End Shallow	AM-M*	Seasonal variability; stable within historical range
	AN-M	Variable with overall decreasing trend since RI; stable since 2001 but within historical range
	AO-M	Variable with overall decreasing trend since RI; slight increasing trend since 2007 but within historical range
	AR-M	Variable with overall decreasing trend since RI; slight increasing trend since 2007 but within historical range
North End	14	Stable
	PC4S	Stable
	PC6S	Variable with slight decreasing trend since RI; slight increasing trend since 2008 but within historical range
Linda Heights Area	26	Decreasing trend between RI and 2002; slight increasing trend since 2003 but within historical range
	27	Decreasing trend between RI and 2002; slight increasing trend since 2003 but within historical range
	45D	Decreasing trend between RI and 2002; slight increasing trend since 2003 but within historical range
West Side	2	Overall decreasing trend since RI; dry since 2003
	5	Overall decreasing trend since RI; stable since 2004
Hydraulic Sink	40D	Continued decreasing trend since RI
	49D	Slight increasing trend between RI and 1995; decreasing trend since 1995
	54D	Dry since 1997
	54S	Dry since 2003
Central Mound	42D	Overall decreasing trend since RI; stable since 2004
	43D	Overall decreasing trend since RI
	47D	Overall decreasing trend since RI; dry since 2009
South End	38D*	Continued decreasing trend since RI
	56S	Dry since 1997
	56D	Slight overall decreasing trend since RI; stable since 2000.

Notes:

* = Well not in a specific hydraulic area; located between areas listed in the table.



Base Map Source: City of Seattle Department of Engineering
Midway Landfill Vicinity Map, 5-15-86

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23 — Gas probe, gas extraction well, or groundwater monitoring well number and location. Included in monitoring network. Monitoring frequency twice per year.

GP33 — Gas probe, gas extraction well, or groundwater monitoring well number and location. Not included in monitoring network.

17 — Gas probe, gas extration well, or groundwater monitoring well number and location. Included in monitoring network. Monitoring frequency once every other year.

Approximate limit of refuse

Fenced site boundary

N

0 250

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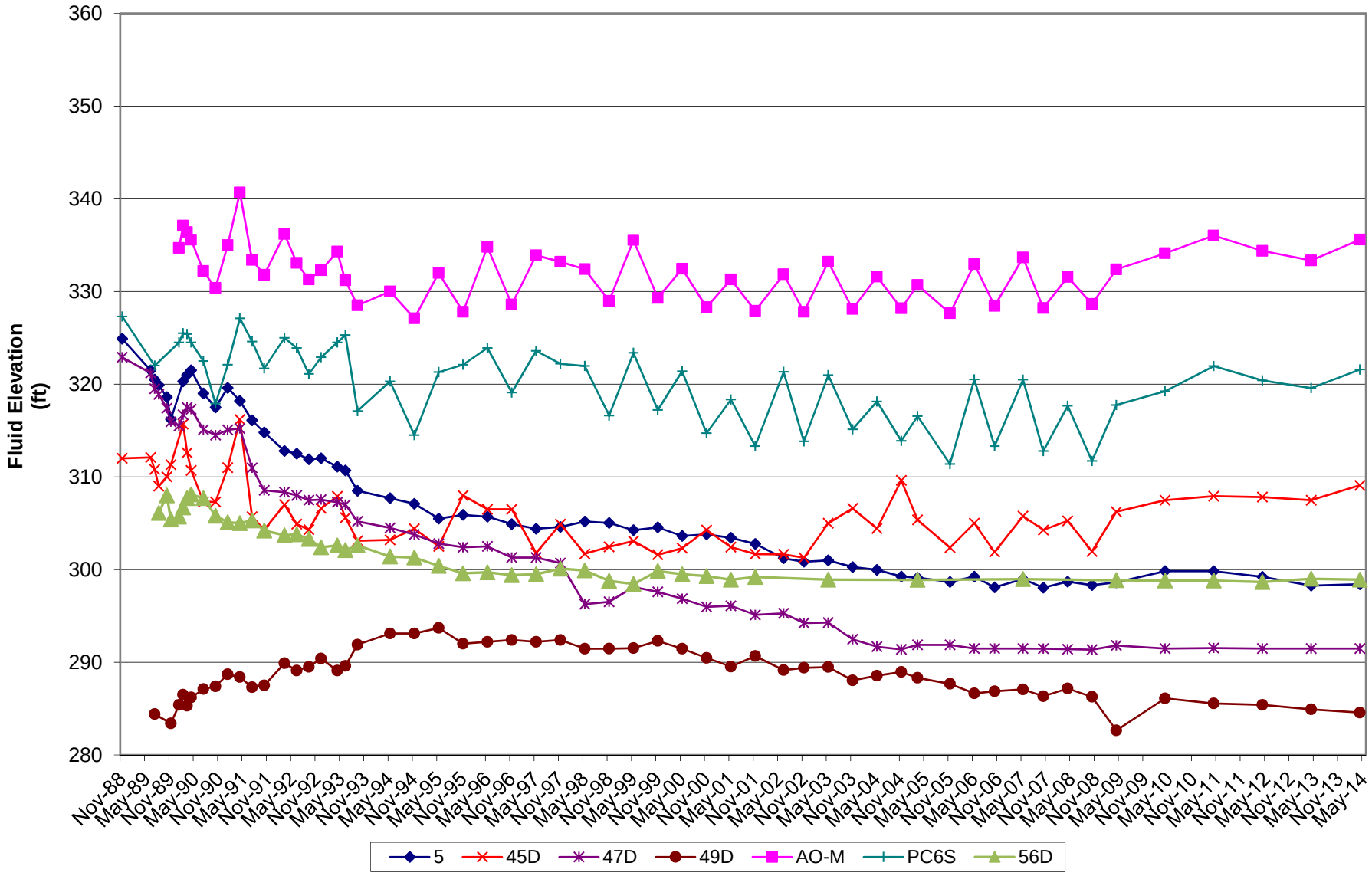
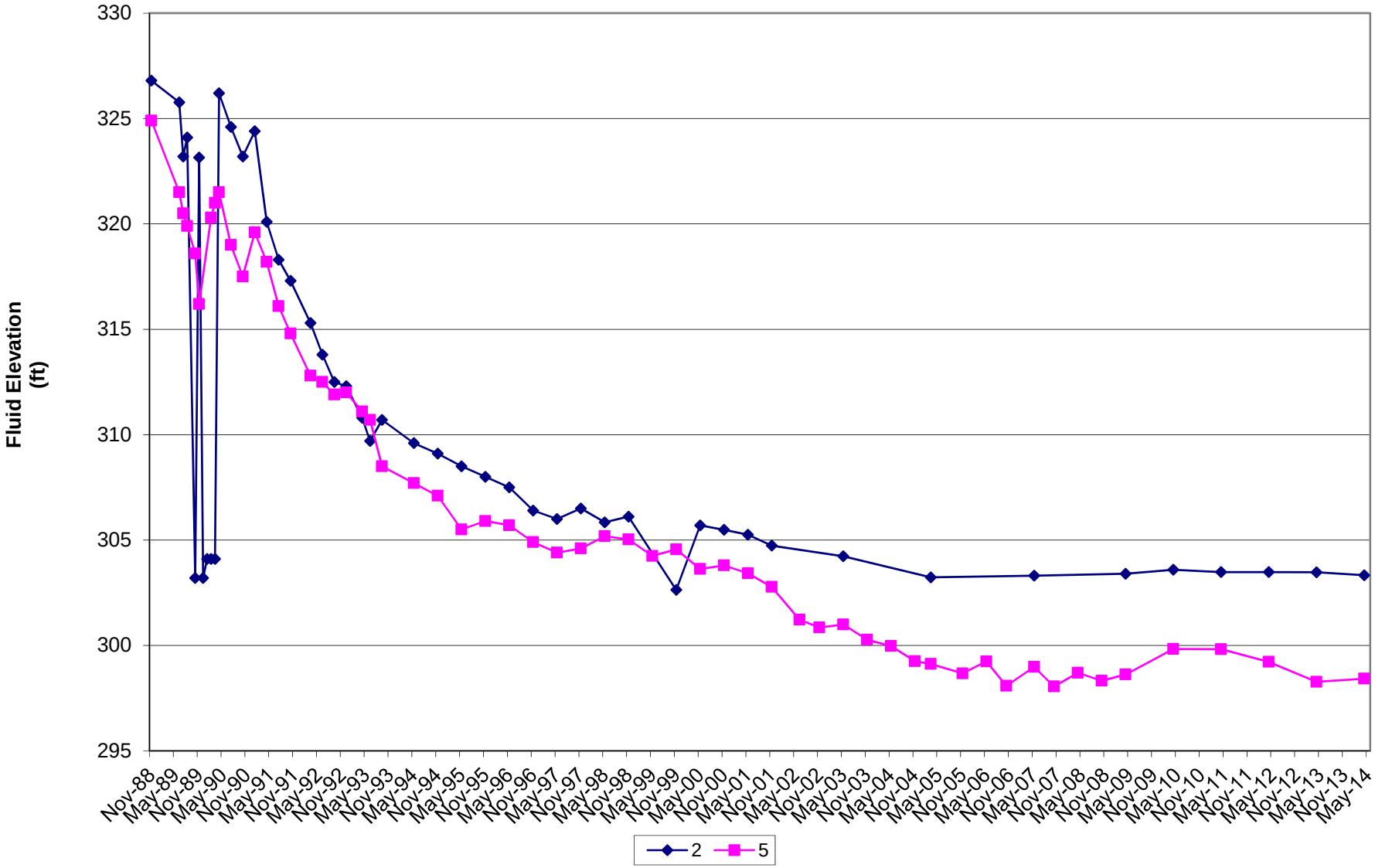
Figure 2-1
Shallow Groundwater/ Saturated Refuse Fluid Level Monitoring Network
Midway Landfill
Kent, Washington



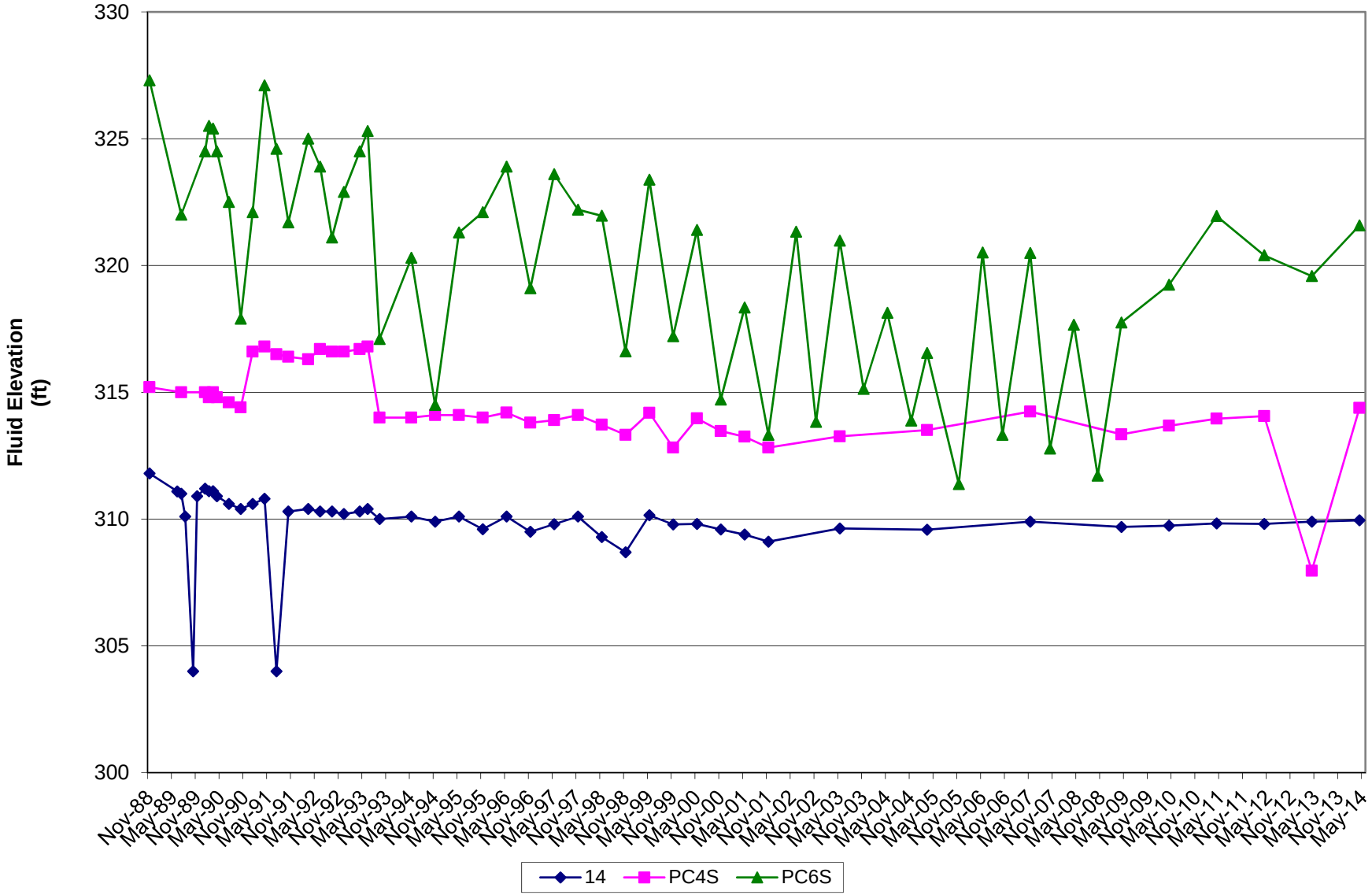
Note: Bottom of well elevations shown for dry measurements are from Table A-1.

Figure 2-2. Summary of Shallow Groundwater/Saturated Refuse Hydrographs Midway Landfill Kent, Washington



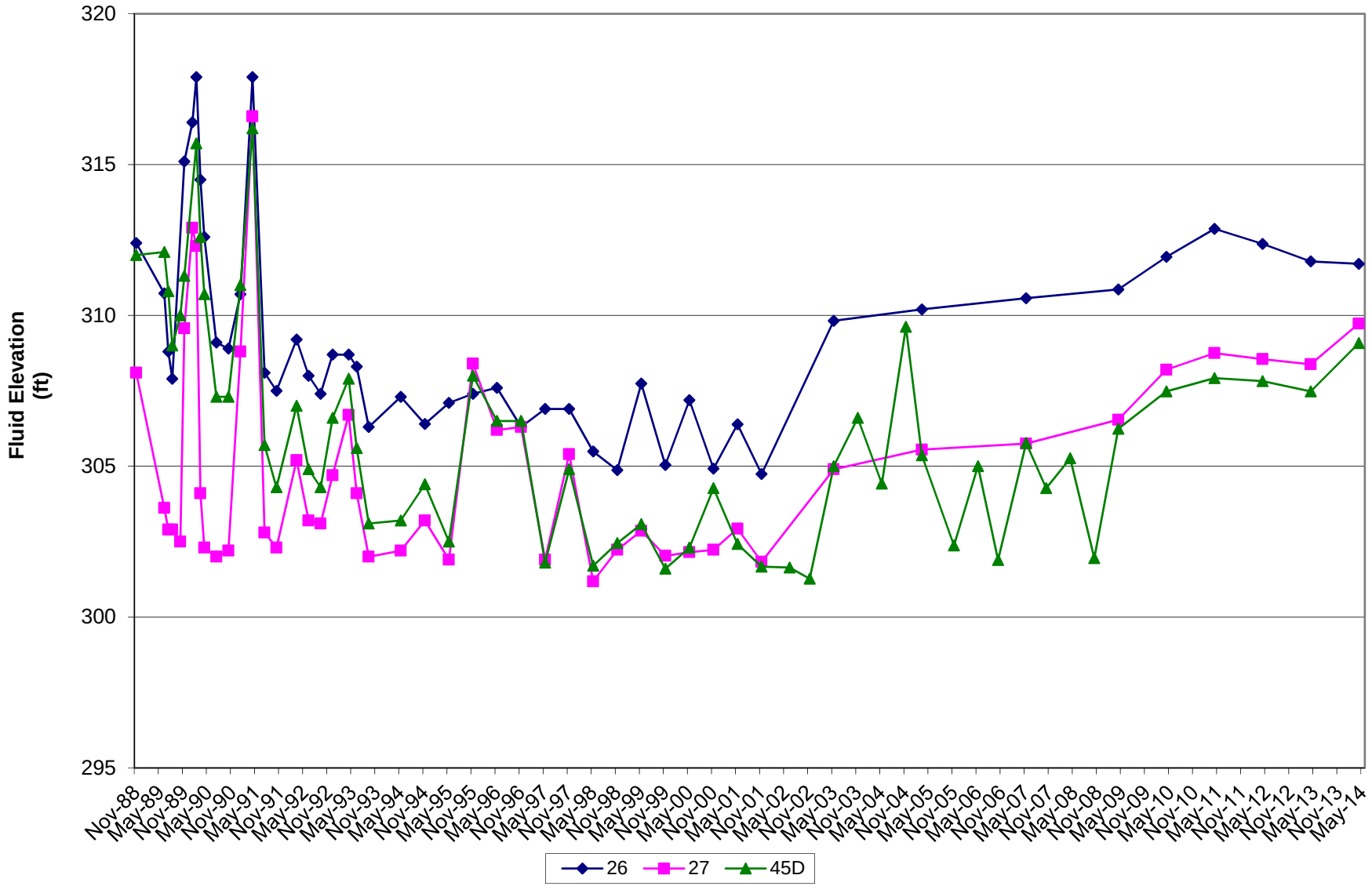
Note: Bottom of well elevations shown for dry measurements are from Table A-1.

Figure 2-3. Shallow Groundwater/ Saturated Refuse Hydrographs - West Side Wells Midway Landfill Kent, Washington



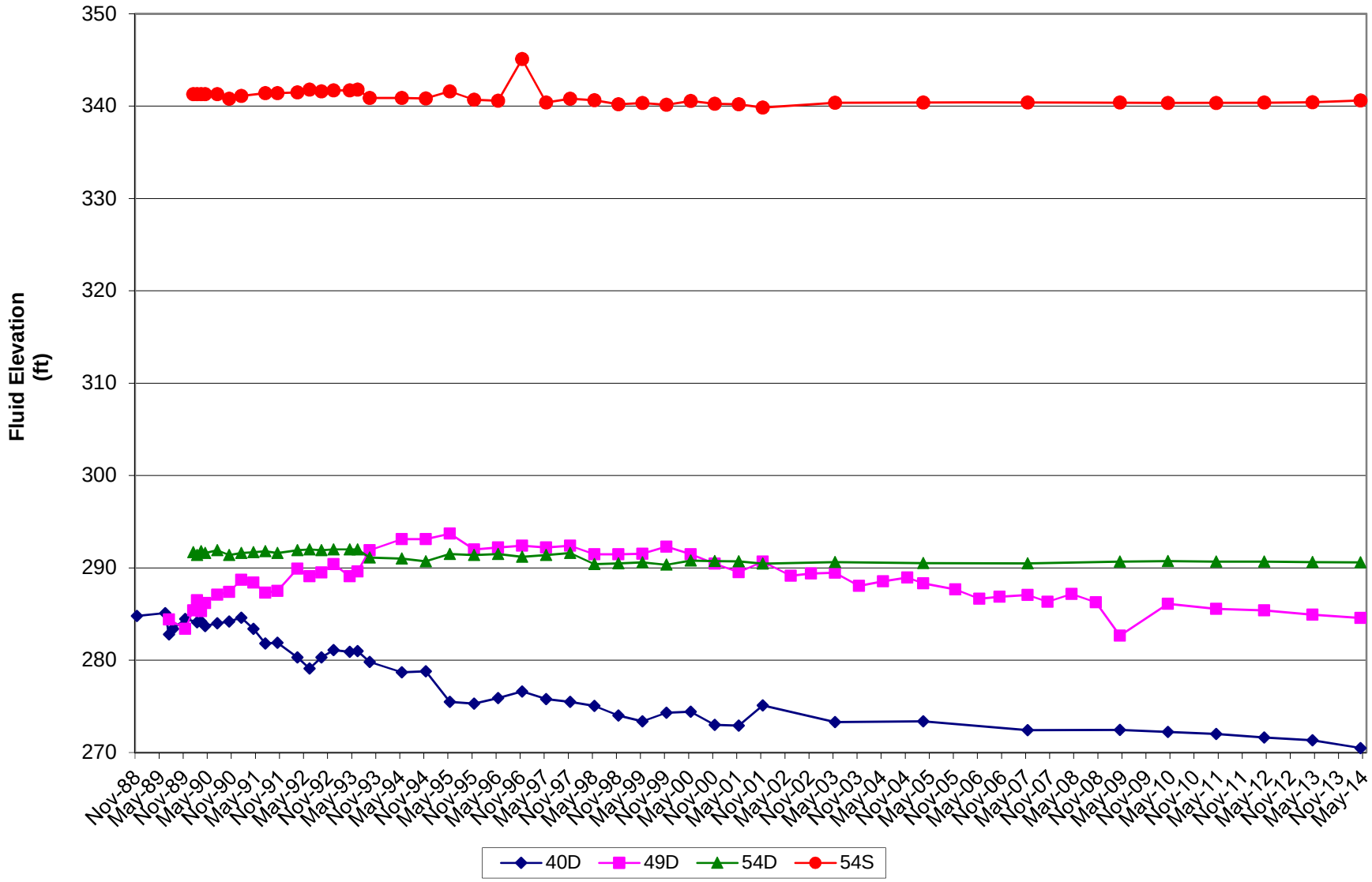
Note: Bottom of well elevations shown for dry measurements are from Table A-1.

Figure 2-4. Shallow Groundwater/ Saturated Refuse Hydrographs - North End Wells Midway Landfill Kent, Washington



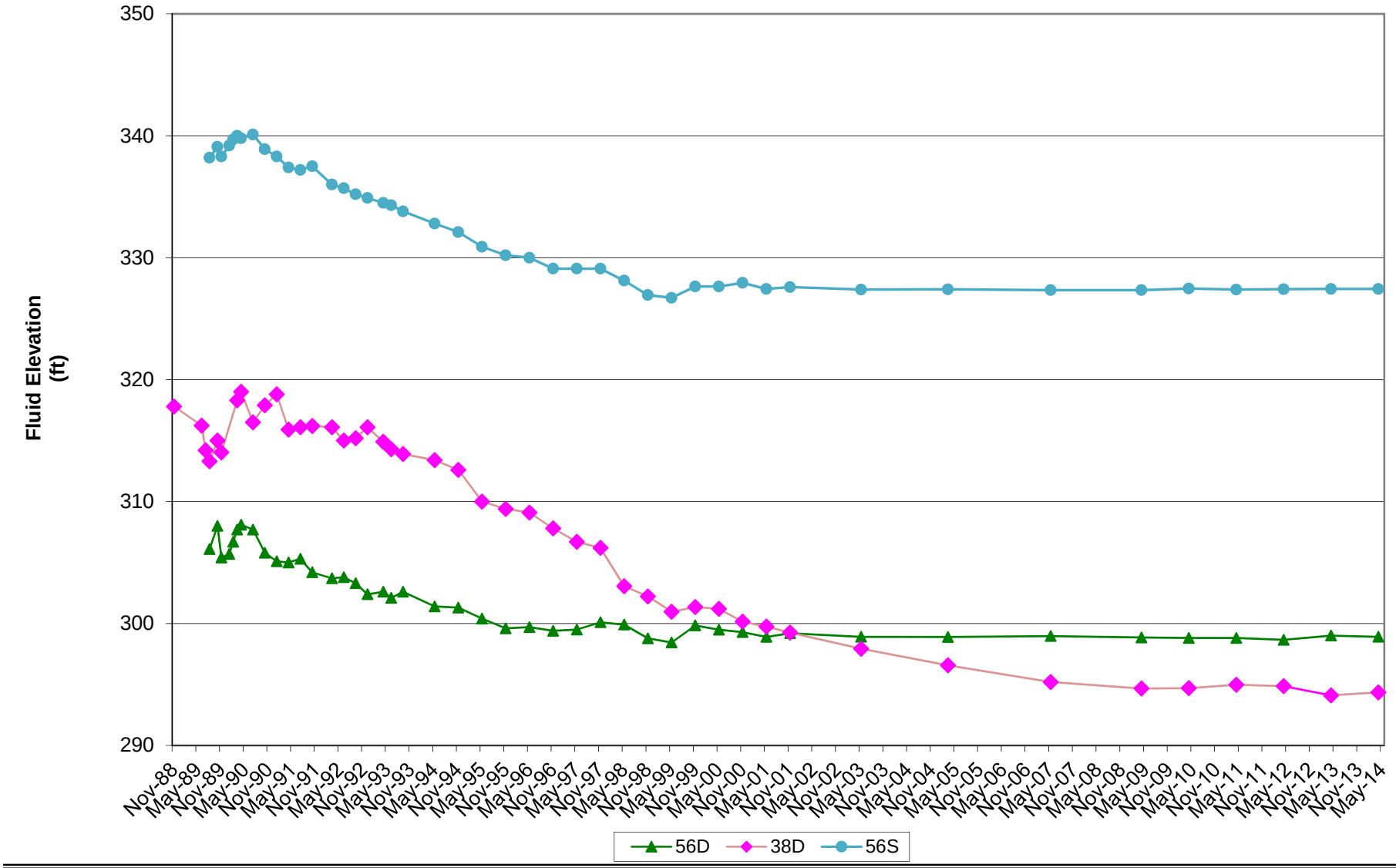
Note: Bottom of well elevations shown for dry measurements are from Table A-1.

Figure 2-5. Shallow Groundwater/ Saturated Refuse Hydrographs - Linda Heights Wells Midway Landfill Kent, Washington



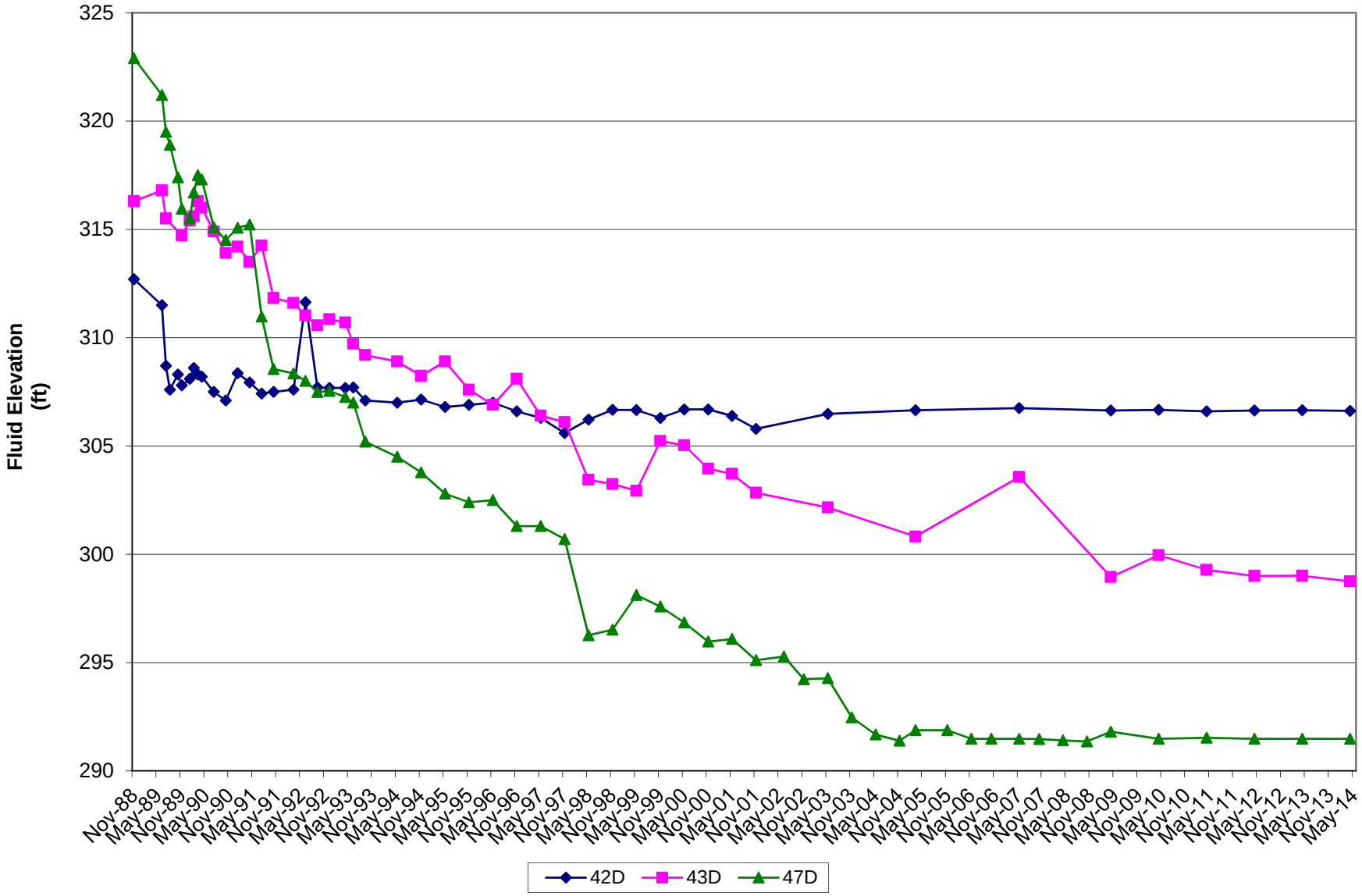
Note: Bottom of well elevations shown for dry measurements are from Table A-1.

Figure 2-6. Shallow Groundwater/ Saturated Refuse Hydrographs - Hydraulic Sink Wells Midway Landfill Kent, Washington



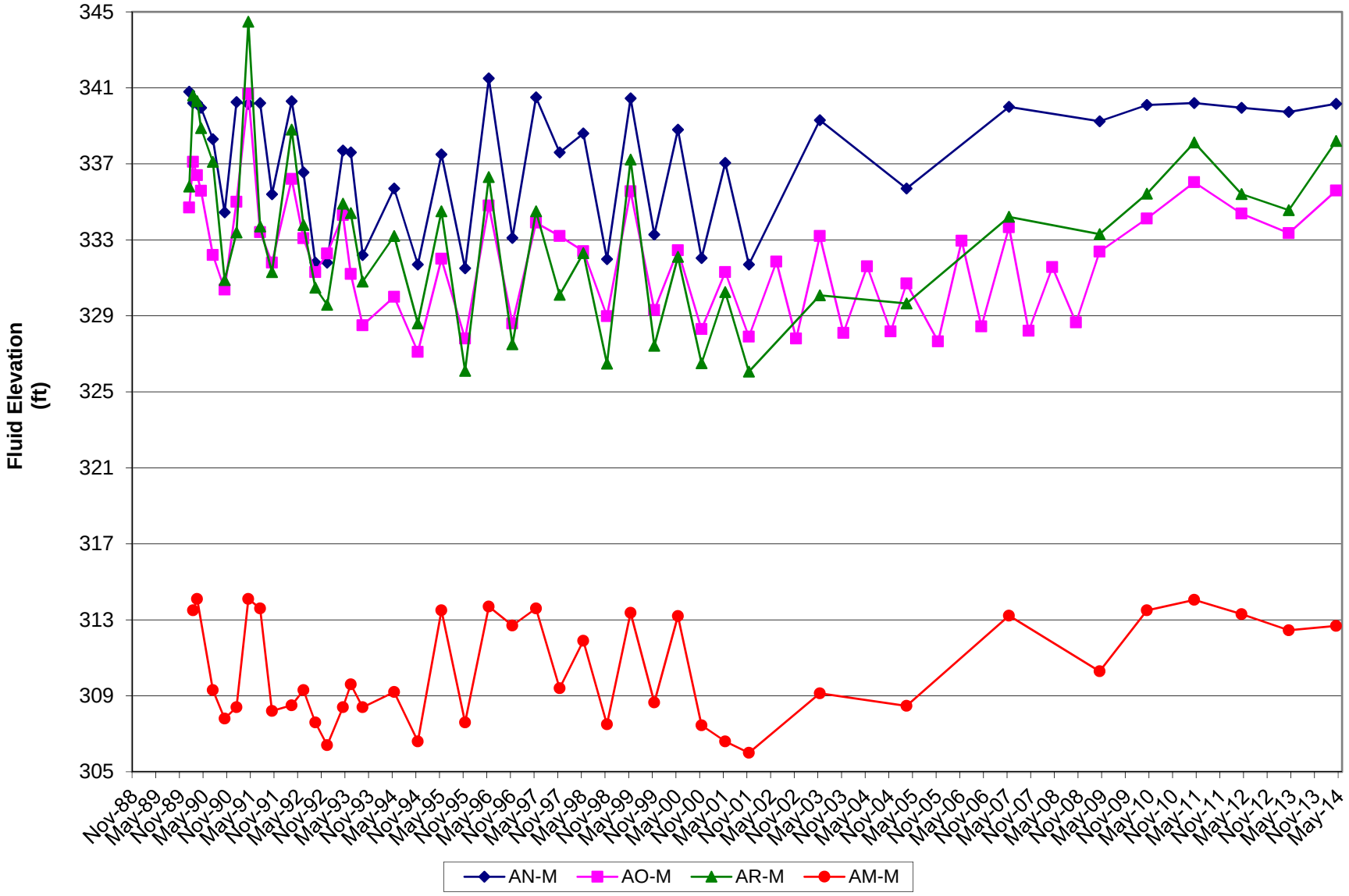
Note: Bottom of well elevations shown for dry measurements are from Table A-1.

Figure 2-7. Shallow Groundwater/ Saturated Refuse Hydrographs - South End Wells Midway Landfill Kent, Washington



Note: Bottom of well elevations shown for dry measurements are from Table A-1.

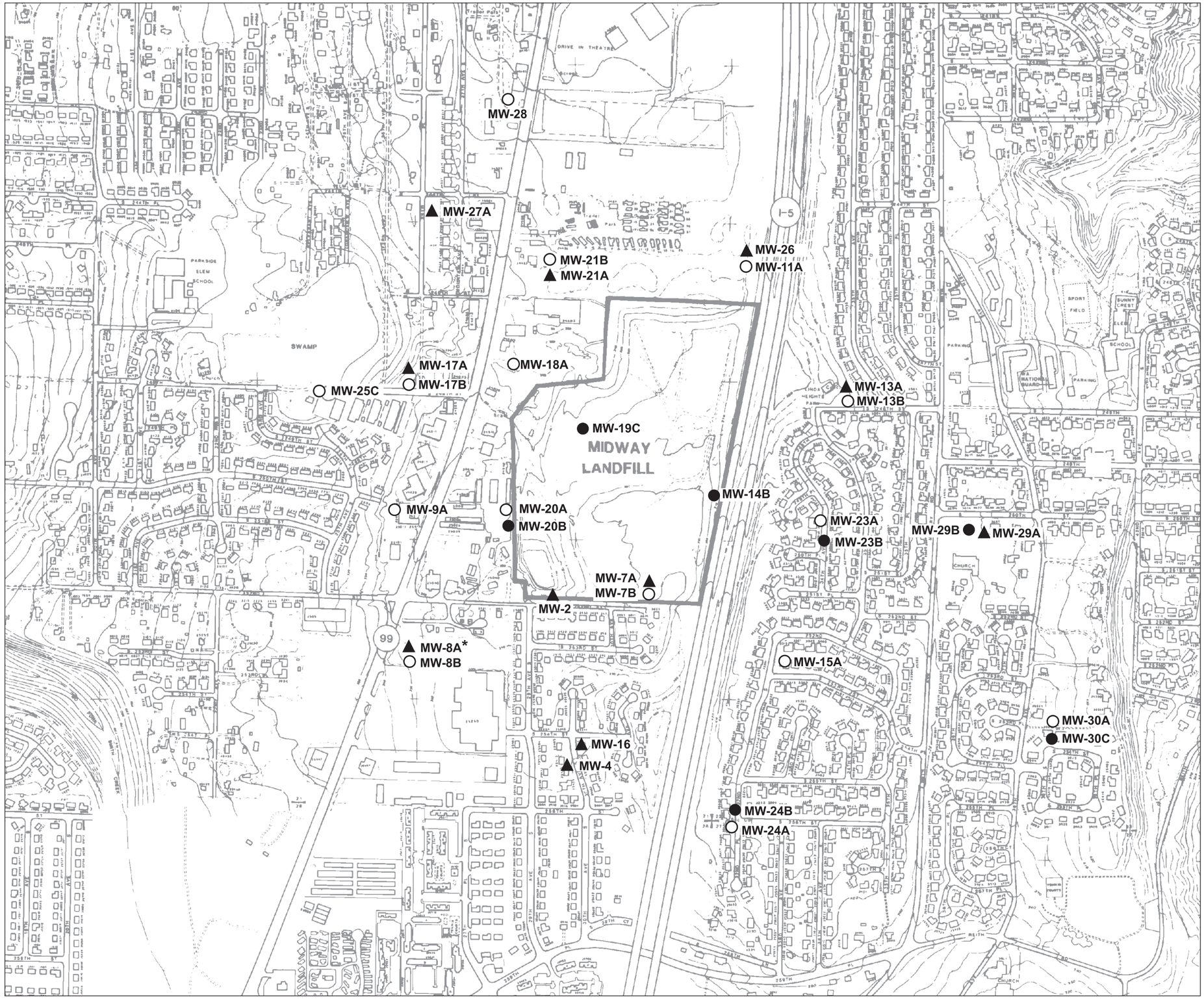
Figure 2-8. Shallow Groundwater/ Saturated Refuse Hydrographs - Central Mound Wells Midway Landfill Kent, Washington



Note: Bottom of well elevations shown for dry measurements are from Table A-1.

Figure 2-9. Shallow Groundwater Hydrographs - North End Shallow Wells
Midway Landfill
Kent, Washington

Figure 2-10
Upper Gravel Aquifer, Sand Aquifer and Southern Gravel Aquifer Groundwater Level Monitoring Network
Midway Landfill
Kent, Washington



▲ Upper Gravel Aquifer Monitoring Well
○ Sand Aquifer Monitoring Well
● Southern Gravel Aquifer Monitoring Well

* MW-8A is screened at the contact between the UGA and SA. Fluid levels in this well are considered representative of the UGA and the SA.

Base Map Source: Supplemental Hydrogeologic and Hydrochemical Investigation, AGI 1990

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Figure 2-11
Generalized Upper Gravel Aquifer Potentiometric Surface Map, May 2014
Midway Landfill
Kent, Washington

MW-7A ●	Upper Gravel Aquifer Monitoring Well Number and Approximate Location
—250—	Approximate Potentiometric Surface Contour (in feet)
(279.14)	Measured Groundwater Elevation in Feet May 12-14, 2014
←	General Direction of Groundwater Flow
(<215.11)	Well was Dry, Elevation is Elevation of Bottom of Well
	Inferred Extent of Upper Gravel Aquifer

Base Map Source: Supplemental Hydrogeologic and Hydrochemical Investigation, AGI 1990

N

0 300 600

Scale in Feet

Parametrix Midway Landfill/555-1550-054/01(01A2)

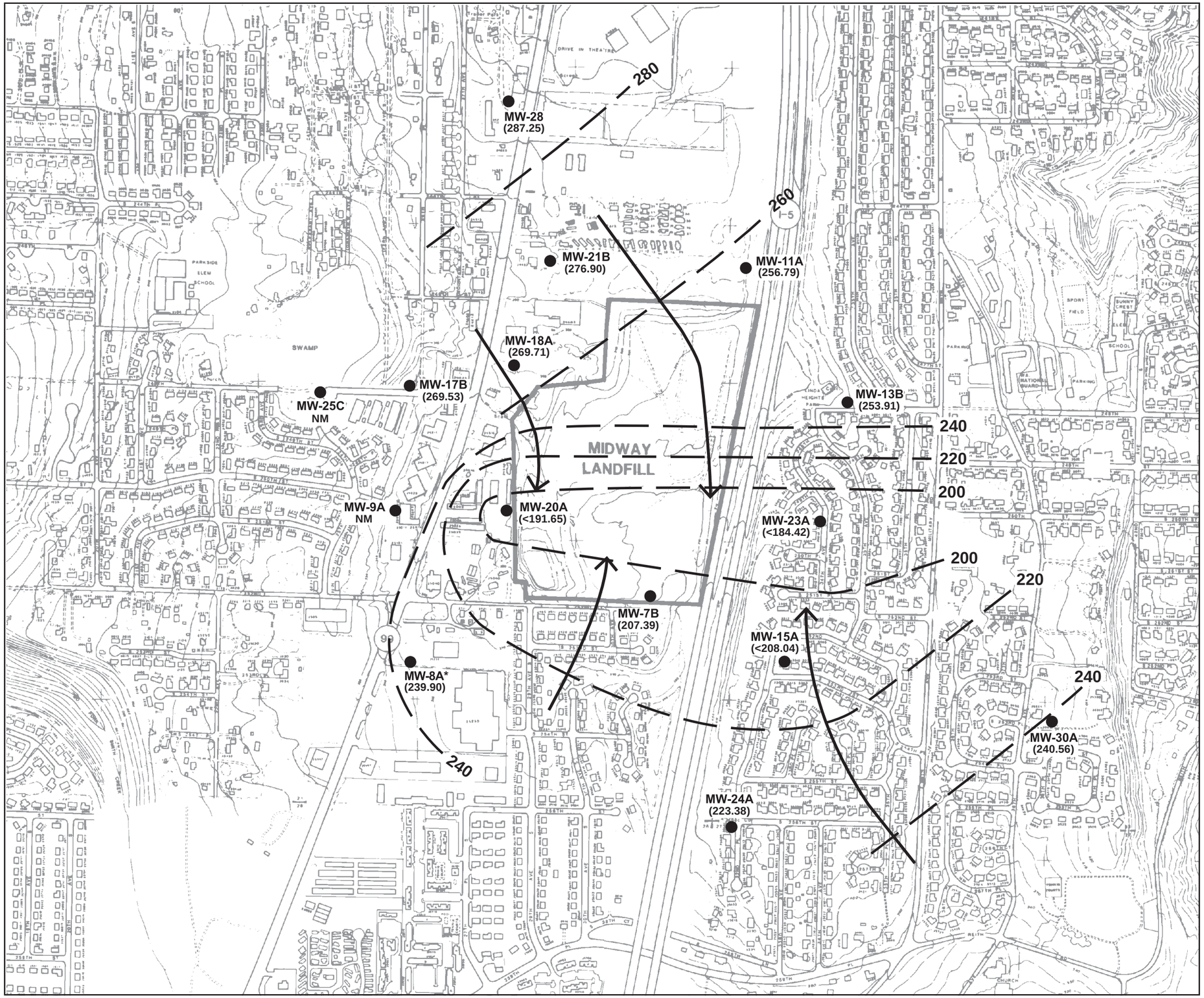


Figure 2-12
Generalized Sand Aquifer
Potentiometric Surface Map, May 2014
Midway Landfill
Kent, Washington

MW-11A ●	Sand Aquifer Monitoring Well Number and Approximate Location
—220—	Approximate Potentiometric Surface Contour (in feet)
(203.87)	Measured Groundwater Elevation in Feet May 12-14, 2014
←	General Direction of Groundwater Flow
(<208.17)	Well was Dry, Elevation is Elevation of Bottom of WelL
NM	Not Measured

* Although MW-8A is Used for Groundwater Chemistry Monitoring in the UGA, Water Elevations in this Well are Considered Representative of the SA

Base Map Source: Supplemental Hydrogeologic and Hydrochemical Investigation, AGI 1990

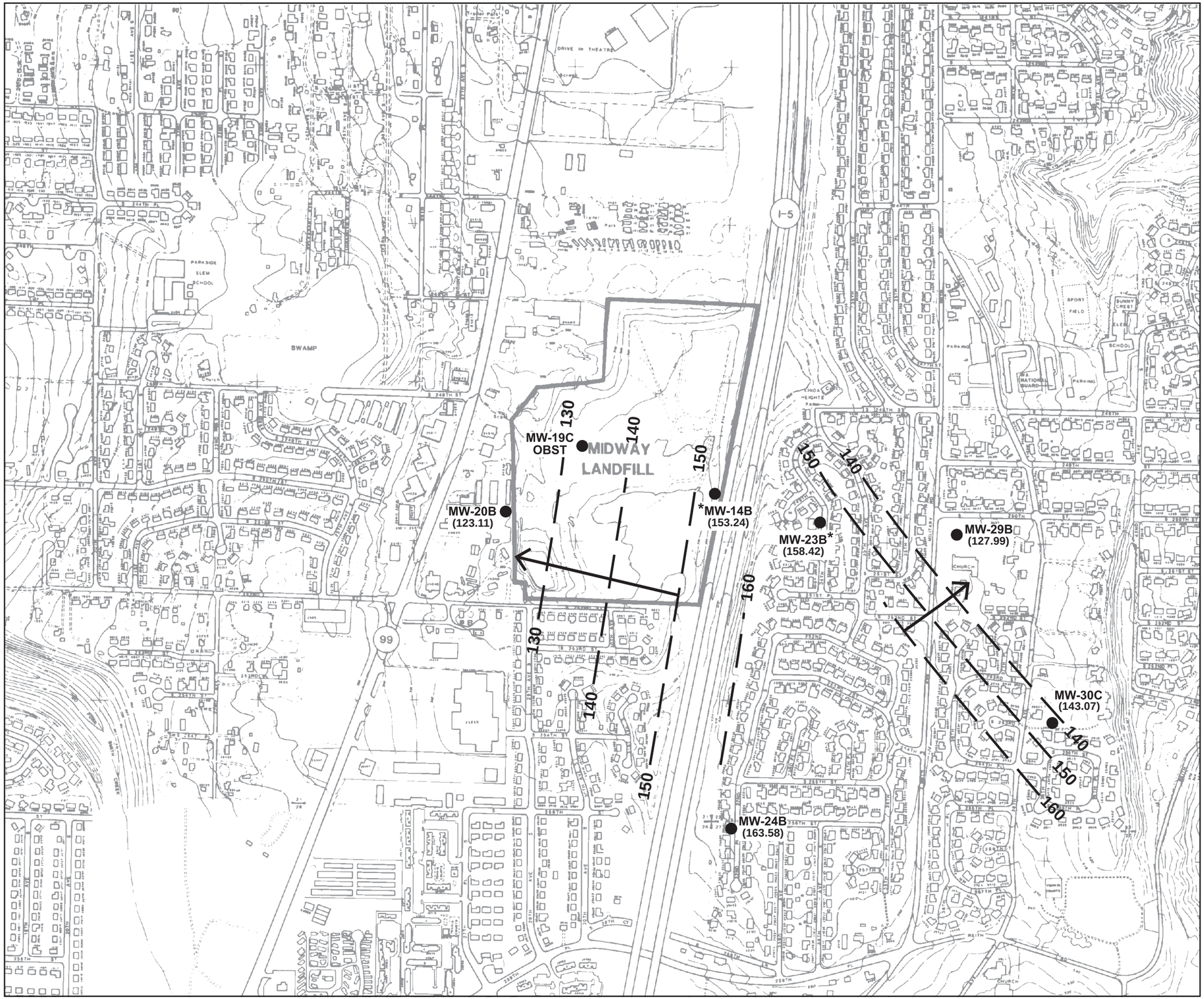
N

0 300 600

Scale in Feet

Parametrix Midway Landfill/555-1550-054/01(01A2)

Figure 2-13
Generalized Southern Gravel Aquifer Potentiometric Surface Map, May 2014
Midway Landfill
Kent, Washington



MW-14B ●	Southern Gravel Aquifer Monitoring Well Number and Approximate Location
—120—	Approximate Potentiometric Surface Contour (in feet)
(149.04)	Measured Groundwater Elevation in Feet May 12-14, 2014
←	General Direction of Groundwater Flow
*	Groundwater Level in These Wells Calculated Using Air Pressure Measurements at the Wellheads
OBST	Well Obstructed at 56.87

Base Map Source: Supplemental Hydrogeologic and Hydrochemical Investigation, AGI 1990

N

0 300 600

Scale in Feet

Parametrix Midway Landfill/555-1550-054/01(01A2)

3. GROUNDWATER CHEMISTRY MONITORING

3.1 Groundwater Chemistry Monitoring Network

Annual sampling events of the groundwater chemistry monitoring program from 2010 through 2014 were conducted in May of each year (R-56 through R-61). Groundwater samples were collected by Seattle Public Utilities (SPU) staff from wells completed in the UGA, SA, and SGA (Figure 3-1). All samples were collected in accordance with the methods outlined in the approved Midway Landfill Monitoring Plan (Parametrix 2000). The annual groundwater chemistry monitoring event includes monitoring at 15 wells, although 4 of the wells are routinely dry.

One of the recommendations from the First Five-Year Review (USEPA 2005) was to test selected wells for 1,4-dioxane, a chemical additive commonly associated with solvents. The City agreed to test for 1,4-dioxane in groundwater samples collected from MW-17B and MW-21B (upgradient SA wells) and from MW-14B (downgradient SGA well) and began this testing in November 2005. As a result of the Second Five-Year Review, 1,4-dioxane was added to the list of parameters in 2011 for the routinely monitored wells. A special sampling event was also conducted in 2012 for 1,4-dioxane in five additional wells to investigate its extent upgradient of the landfill.

3.1.1 Upper Gravel Aquifer

The monitoring network in the UGA includes two upgradient wells (MW-16 and MW-21A) and one downgradient well (MW-7A). These three wells were selected because groundwater in the UGA flows in two general directions (north and south) and also discharges vertically into the underlying SA. The two upgradient monitoring wells (MW-16 and MW-21A) provide information on groundwater quality entering the landfill. Downgradient monitoring well MW-7A is located where the UGA discharges into the SA. Previously, well MW-19B was part of the groundwater monitoring network in the UGA. MW-19B was eliminated because of pump problems and the inability to remove the pump for repairs.

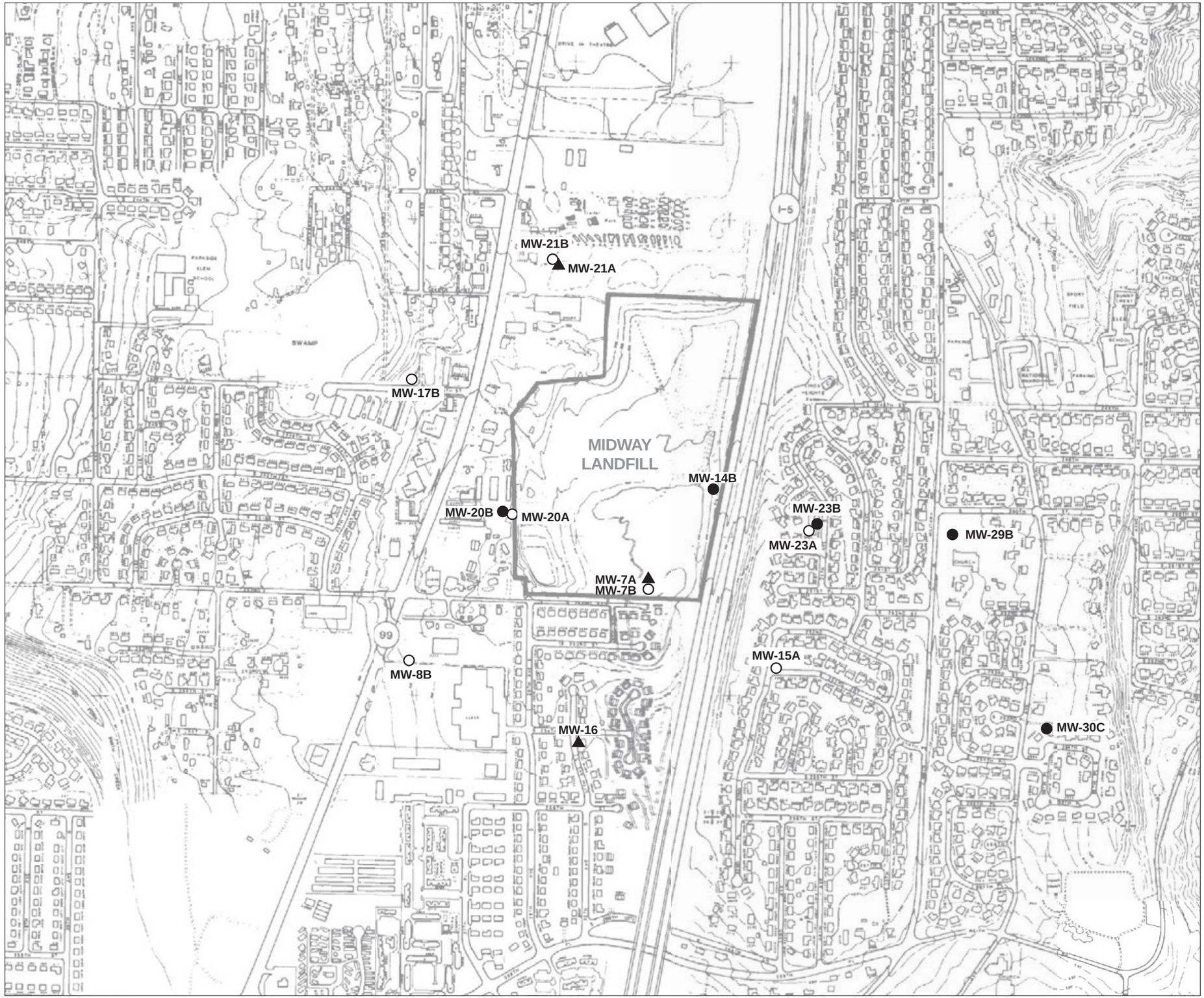
Downgradient well MW-7A has not been sampled since 1992 due to the declining groundwater levels in the UGA (the well has been dry). This suggests that the volume of leachate entering the UGA from the SG/SR has greatly decreased, resulting in lowering of the UGA potentiometric surface.

3.1.2 Sand Aquifer

The monitoring network in the SA includes three upgradient wells (MW-8B, MW-17B, and MW-21B) and four downgradient wells (MW-7B, MW-15A, MW-20A, and MW-23A). Well MW-7B was added to the monitoring program beginning in 2011 based on the recommendations of the Second Five-Year Review. These wells were selected because groundwater in the SA flows inward toward a hydraulic sink that discharges downward into the SGA. The three upgradient wells (MW-8B, MW-17B, and MW-21B) provide information on groundwater quality outside the hydraulic sink area, while three of the downgradient wells (MW-7B, MW-15A and MW-23A) provide information on groundwater quality in the hydraulic sink area. One additional downgradient well (MW-20A), located just west of the landfill, showed historical groundwater quality impacts and was selected for groundwater chemistry monitoring.

Downgradient wells MW-7B, MW-15A, MW-20A, and MW-23A represent the quality of groundwater discharging from the UGA downward through the SA to the underlying SGA. Well MW-23A has not been sampled since 1993 due to declining groundwater levels (the well has been dry). Well MW-15A has not been sampled since 2001, because it has been dry. Downgradient well MW-20A has not been sampled since 1994 because the well has been dry. Since the initiation of remedial measures at the landfill, the decrease in water levels in the SA is a result of decreased discharge from the UGA, which in turn has

Figure 3-1
Well Locations for Groundwater Chemistry Monitoring
Midway Landfill
Kent, Washington



MW-16 ▲	Upper Gravel Aquifer Monitoring Well Number and Approximate Location
MW-17B ○	Sand Aquifer Monitoring Well Number and Approximate Location
MW-14B ●	Southern Gravel Aquifer Monitoring Well Number and Approximate Location

Base Map Source: Supplemental Hydrogeologic and Hydrochemical Investigation, AGI 1990

N

0 600

SCALE IN FEET

Parametrix Midway Landfill 555-1550-052/01(01A2) 5/11

resulted in a reduction in leachate generation due to reduced saturated refuse. Therefore, groundwater quality in the SA aquifer is not directly measureable and is reflected by the groundwater in the underlying SGA.

3.1.3 Southern Gravel Aquifer

The monitoring network in the SGA consists of five downgradient wells (MW-14B, MW-20B, MW-23B, MW-29B, and MW-30C). Well MW-14B is located where SA groundwater discharges into the SGA. Wells MW-20B and MW-23B are downgradient of the landfill and provide information on groundwater quality in the west and east sections, respectively, of the SGA. Well MW-29B is downgradient of the landfill and provides information on groundwater quality in the east section of the SGA. Well MW-30C is a downgradient well in the SGA, but is cross-gradient in relation to influence from the landfill.

3.2 Groundwater Quality Results

Groundwater samples were collected in conformance with the Midway Landfill Monitoring Plan (Parametrix 2000) under guidelines set in the State of Washington Minimum Functional Standards for Solid Waste Handling (Chapter 173-304 WAC).

Groundwater samples were analyzed as outlined in Table 3-1.

Table 3-1. Groundwater Chemistry Analytical Schedule, Midway Landfill, Kent, Washington

Annual Event[1]	
• Temperature	• Dissolved manganese
• Specific conductivity	• Chemical oxygen demand (COD)
• pH	• Total organic carbon (TOC)
• Chloride	• Volatile organic compounds (VOCs)
• Sulfate	• Vinyl chloride
• Dissolved iron	• 1,4-dioxane[2]

Notes:

1 Annual event monitoring wells = MW-7A, MW-7B, MW-8B, MW-14B, MW-15A, MW-16, MW-17B, MW-20A, MW-20B, MW-21A, MW-21B, MW-23A, MW-23B, MW-29B and MW-30C.

2 Tested by EPA 8270 (semi-volatile organic compounds) in groundwater samples collected from MW-17B, MW-21B, and MW-14B beginning in 2005, and in the other wells beginning in 2011.

Summary tables of the groundwater chemistry monitoring results for 2010 through 2014 are presented in Appendix B. Laboratory reports, groundwater sampling field data sheets, and data quality assurance summaries are presented in Appendix C.

The 2010 through 2014 groundwater data for the three COCs (manganese; 1,2-DCA; and vinyl chloride) were compared to the cleanup levels established in the ROD (Table 3-2). Groundwater data that exceeded the ROD cleanup levels are highlighted in Table 3-2. The groundwater data for the remaining tested parameters were compared to “applicable” regulatory standards per the ROD. The applicable regulatory standards selected for this post-ROD monitoring were federal Maximum Contaminant Levels (MCLs) for drinking water, and MTCA Method B cleanup levels for groundwater. Comparison of the data to these standards is presented in Table 3-3. Groundwater data that exceeded the MCLs and MTCA Method B cleanup levels are highlighted in Table 3-3. A discussion of the data that exceeded ROD cleanup levels and applicable regulatory standards is presented in Section 3.2.1.

Table 3-2. Comparison of Contaminants of Concern in Groundwater to ROD Cleanup Levels, 2010-2014 Data Summary, Midway Landfill, Kent, Washington

				Upper Gravel Aquifer			Sand Aquifer						Southern Gravel Aquifer						
				MW-16	MW-16 Dup	MW-21A	MW-7B	MW-7B Dup	MW-8B	MW-8B Dup	MW-17B	MW-21B	MW-21B Dup	MW-14B	MW-20B	MW-23B	MW-29B	MW-29B Dup	MW-30C	MW-30C Dup
Compound	Units	Cleanup Level[a]	Round	UP		UP	DOWN		UP		UP	UP		DOWN	DOWN	DOWN	DOWN		DOWN	
Manganese	mg/L	2.2	R-57	0.094	0.094	0.016	- -	- -	0.004	- -	0.053	0.405	0.408	0.961	**3.24**	0.153	0.98	- -	0.706	- -
			R-58	0.094	- -	0.013	**3.07**	- -	0.047	0.046	0.050	0.396	- -	0.897	**2.99**	0.143	0.966	- -	0.639	0.645
			R-59	0.094	0.097	0.005	**3.20**	- -	0.024	- -	0.042	0.410	- -	0.908	**2.95**	0.140	0.948	0.944	0.643	- -
			R-60	0.100	- -	0.001	**2.94**	**2.90**	0.006	- -	0.042	0.415	- -	0.913	**2.77**	0.141	0.869	0.809	0.648	- -
			R-61	0.094	0.095	0.001 U	**2.63**	- -	0.006	- -	0.044	0.399	- -	0.904	**2.43**	0.131	0.941	- -	0.674	0.678
Vinyl Chloride	µg/L	0.29*	R-57	0.20 U	0.20 U	0.20 U	- -	- -	0.20 U	- -	0.22	0.20 U	0.20 U	**0.63**	0.27	0.27	**0.65**	- -	0.20 U	- -
			R-58	0.20 U	- -	0.20 U	**0.30**	- -	0.20 U	0.20 U	0.20 U	0.20 U	- -	**0.64**	0.24	0.20 U	**0.54**	- -	0.20 U	0.20 U
			R-59	0.20 U	0.20 U	0.20 U	**0.31**	- -	0.20 U	- -	0.20 U	0.20 U	- -	**0.41**	0.22	0.20 U	**0.56**	**0.52**	0.20 U	- -
			R-60	0.20 U	- -	0.20 U	**0.31**	**0.32**	0.20 U	- -	0.20 U	0.20 U	- -	**0.39**	**0.34**	0.20 U	**0.62**	**0.62**	0.20 U	- -
			R-61	0.20 U	0.20 U	0.20 U	0.20	- -	0.20 U	- -	0.20 U	0.20 U	- -	0.28	**0.30**	0.20 U	**0.47**	- -	0.20 U	0.20 U
1,2-dichloroethane	µg/L	5	R-57	1.0 U	1.0 U	1.0 U	- -	- -	1.0 U	- -	4.4	1.0 U	1.0 U	1.0 U	1.0 U	2.7	4.7	- -	1.0 U	- -
			R-58	1.0 U	- -	1.0 U	1.0 U	- -	1.0 U	1.0 U	3.8	1.0 U	- -	1.0 U	1.0 U	2.1	4.1	- -	1.0 U	1.0 U
			R-59	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	- -	4.5	1.0 U	- -	1.0 U	1.0 U	2.4	4.7	4.6	1.0 U	- -
			R-60	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	- -	3.9	1.0 U	- -	1.0 U	1.0 U	2.6	4.9	**5.1**	1.0 U	- -
			R-61	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	- -	3.0	1.0 U	- -	1.0 U	1.0 U	2.0	4.0	- -	1.0 U	1.0 U

Notes:

ROD =Record of Decision.

R-57 = Round 57, May 2010

R-58 = Round 58, May 2011

R-59 = Round 59, May 2012

R-60 = Round 60, May 2013

R-61 = Round 61, May 2014

a =Cleanup levels established in the Final USEPA ROD for the Midway Landfill Site, September 6, 2000.

= Exceeds cleanup level established in the Final ROD for the Midway Landfill Site, September 6, 2000.

U =Indicates the compound was undetected at the reported concentration.

DUP =Duplicate.

* =The revised cleanup level for vinyl chloride is 0.29 µg/L using the MTCA adjusted cancer risk of 1e-5.

UP or DOWN in column title denotes whether the well is located upgradient or downgradient of the landfill's influence.

Table 3-3. Summary of Detected Groundwater Quality Parameters Not Included in the ROD and Comparison to Regulatory Standards, 2010-2014 Data Summary, Midway Landfill, Kent, Washington

					Upper Gravel Aquifer					Sand Aquifer									Southern Gravel Aquifer							
					MW-8A	MW-16	MW-16 Dup	MW-21A	MW-27B	MW-7B	MW-7B Dup	MW-8B	MW-8B Dup	MW-11A	MW-17B	MW-18A	MW-21B	MW-21B Dup	MW-28	MW-14B	MW-20B	MW-23B	MW-29B	MW-29B Dup	MW-30C	MW-30C Dup
Compound	Units	MCL[a]	MTCA B[b]	Round	UP	UP		UP	UP	DOWN		UP		UP	UP	UP	UP		UP	DOWN	DOWN	DOWN	DOWN		DOWN	
Field Parameters																										
pH	s.u.	6.5-8.5		R-57	--	7.40	--	6.51	--	--	--	6.45	--	--	6.34	--	6.79	--	--	6.46	6.73	6.23	6.23	--	6.57	--
				R-58	--	7.71	--	6.70	--	6.58	--	7.17	--	--	6.83	--	6.94	--	--	6.56	6.79	6.44	6.47	--	7.04	--
				R-59	7.64	7.69	--	6.67	7.34	6.63	--	6.89	--	7.09	6.81	7.12	6.92	--	6.77	6.54	6.84	6.44	6.55	--	7.07	--
				R-60	--	7.52	--	6.61	--	6.60	--	6.52	--	--	6.43	--	6.82	--	--	6.61	6.85	6.35	6.29	--	6.78	--
				R-61	--	7.68	--	6.74	--	6.69	--	6.69	--	--	6.81	--	6.97	--	--	6.59	6.83	6.51	6.51	--	7.09	--
Conductivity	µmhos/cm			R-57	--	280	--	331	--	--	--	155	--	--	335	--	681	--	--	703	1303	569	705	--	320	--
				R-58	--	290	--	338	--	696	--	207	--	--	353	--	676	--	--	685	1260	555	694	--	297	--
				R-59	143	278	--	326	341	666	--	167	--	191	317	471	658	--	486	653	1111	528	674	--	301	--
				R-60	--	285	--	335	--	614	--	201	--	--	315	--	658	--	--	649	1062	523	661	--	301	--
				R-61	--	284	--	328	--	552	--	162	--	--	316	--	624	--	--	632	991	511	648	--	309	--
Temperature	C			R-57	--	11.4	--	11.8	--	--	--	11.0	--	--	11.5	--	11.1	--	--	13.1	12.1	11.1	10.0	--	9.6	--
				R-58	--	11.1	--	11.7	--	13.3	--	11.3	--	--	11.6	--	11.2	--	--	14.0	11.9	11.1	9.8	--	9.5	--
				R-59	11.6	11.6	--	11.6	11.5	12.7	--	11.0	--	10.9	11.7	11.7	11.5	--	13.3	13.9	11.6	11.2	10.2	--	10.3	--
				R-60	--	11.9	--	12.1	--	13.3	--	11.6	--	--	11.9	--	11.4	--	--	14.1	12.0	11.9	10.6	--	10.3	--
				R-61	--	11.9	--	12.0	--	13.2	--	12.0	--	--	12.4	--	11.6	--	--	15.3	12.6	12.0	10.5	--	10.2	--
Conventional Parameters																										
Chloride	mg/L	250**		R-57	--	8.4	8.3	6.6	--	--	--	5.3	--	--	9.6	--	15.0	15.2	--	18.0	44.7	14.8	32.9	--	12.9	--
				R-58	--	8.6	--	6.9	--	25.0	--	7.6	7.5	--	8.8	--	15.5	--	--	19.4	44.9	13.7	31.8	--	13.5	13.2
				R-59	--	8.3	8.4	6.7	--	28.1	--	6.9	--	--	8.9	--	14.5	--	--	16.6	35.2	12.1	26.6	26.5	11.8	--
				R-60	--	8.3	--	6.5	--	18.6	19.7	7.1	--	--	9.5	--	14.1	--	--	16.3	30.6	11.0	26.1	26.1	11.9	--
				R-61	--	8.5	8.3	6.5	--	14.4	--	5.4	--	--	10.1	--	13.1	--	--	14.8	26.6	10.2	23.4	--	12.6	11.6
Sulfate	mg/L	250**		R-57	--	28.4	27.9	39.1	--	--		17.9	--	--	23.7	--	133	133	--	30.9	8.9	33	23	--	12.9	--
				R-58	--	26.7	--	39.8	--	39.2	--	24.8	24.9	--	22.4	--	106	--	--	32.2	10.1	33.3	23.7	--	13.5	13.7
				R-59	--	28.3	28.2	31.2	--	27.9	--	23.5	--	--	23.2	--	106	--	--	34.6	13.0	36.5	26.8	27.2	15.5	--
				R-60	--	22.6	--	33.2	--	29.4	28.9	23.0	--	--	18.4	--	103	--	--	24.8	11.5	26.5	18.9	18.7	12.7	--
				R-61	--	24.5	23.5	35.7	--	29.9	--	18.2	--	--	19.7	--	101	--	--	25.2	9.9	28.1	19.1	--	14.0	13.9
Chemical Oxygen Demand	mg/L			R-57	--	5.00 U	5.00 U	5.36 J	--	--		5.00 U	--	--	5.68 J	--	11.8 J	5.00 U	--	5.00 U	17	5.68 J	10.4	--	6.00 J	--
				R-58	--	5.00 U	--	5.00 U	--	5.00 U	--	5.00 U	5.00 U	--	5.00 U	--	5.00 U	--	--	6.31	20.2	5.00 U	5.00 U	--	5.00 U	5.00 U
				R-59	--	5.00 U	5.00 U	5.00 U	--	5.00 U	--	5.00 U	--	--	5.00 U	--	5.00 U	--	--	9.34	14.3	5.00 U	6.94	5.00 U	5.00 U	--
				R-60	--	5.00 U	--	5.00 U	--	5.00 U	9.25	11.8	--	--	5.00 U	--	5.00 U	--	--	8.31	17.1	5.00 U	5.00 U	6.75	5.00 U	--
				R-61	--	10.0 U	10.0 U	10.0 U	--	10.0 U	--	16.0	--	--	10.0 U	--	10.0 U	--	--	10.0 U	13.1	10.0 U	10.0 U	--	10.0 U	10.0 U
Total Organic Carbon	mg/L			R-57	--	1.50 U	1.50 U	1.50 U	--	--		1.50 U	--	--	1.50 U	--	1.50 U	1.50 U	--	2.30	6.47	1.90	2.37	--	1.50 U	--
				R-58	--	1.50 U	--	1.50 U	--	1.66	--	1.50 U	1.50 U	--	1.93	--	1.50 U	--	--	2.73	6.15	1.79	2.50	--	1.50 U	1.50 U
				R-59	--	0.50 U	27.0 R	0.50 U	--	1.10	--	0.50 U	--	--	0.76	--	0.50 U	--	--	1.20	4.80	0.84	1.60	1.60	0.50 U	--
				R-60	--	1.50 U	--	1.50 U	--	1.50 U	1.50 U	1.50 U	--	--	1.50 U	--	1.50 U	--	--	1.53	4.26	1.50 U	1.57	1.62	1.50 U	--
				R-61	--	1.50 U	1.50 U	1.50 U	--	1.50 U	--	1.50 U	--	--	1.50 U	--	1.50 U	--	--	1.63	4.17	1.50 U	1.77	--	1.50 U	1.50 U

Table 3-3. Summary of Detected Groundwater Quality Parameters Not Included in the ROD and Comparison to Regulatory Standards, 2010-2014 Data Summary, Midway Landfill, Kent, Washington (continued)

					Upper Gravel Aquifer					Sand Aquifer									Southern Gravel Aquifer							
					MW-8A	MW-16	MW-16 Dup	MW-21A	MW-27B	MW-7B	MW-7B Dup	MW-8B	MW-8B Dup	MW-11A	MW-17B	MW-18A	MW-21B	MW-21B Dup	MW-28	MW-14B	MW-20B	MW-23B	MW-29B	MW-29B Dup	MW-30C	MW-30C Dup
Compound	Units	MCL[a]	MTCA B[b]	Round	UP	UP		UP	UP	DOWN		UP		UP	UP	UP	UP		UP	DOWN	DOWN	DOWN	DOWN		DOWN	
Dissolved Metals																										
Iron	mg/L	0.3**		R-57	--	0.25	0.25	0.05 U	--	--	--	0.05 U	-- --	--	0.05	--	0.05 U	0.05 U	--	11.2	9.48	8.67	15	--	2.74	--
				R-58	--	0.24	--	0.05 U	--	3.57	--	0.05 U	0.05 U	--	0.06	--	0.05 U	--	--	11.0	8.80	8.08	14.9	--	2.62	**2.60**
				R-59	--	0.22	0.23	0.05 U	--	3.57	--	0.05 U	--	--	0.05 U	--	0.05 U	--	--	10.1	8.17	8.26	14.6	14.4	2.43	--
				R-60	--	0.20	--	0.05 U	--	3.32	3.28	0.05 U	--	--	0.05 U	--	0.05 U	--	--	10.3	7.53	7.95	12.9	12.0	2.41	--
				R-61	--	0.18	0.17	0.05 U	--	3.05	--	0.09	--	--	0.05 U	--	0.05 U	--	--	10.3	6.86	7.89	14.4		2.48	**2.50**
Semi-Volatile Organics																										
1,4-dioxane	µg/L		0.44	R-57	--	--	--	--	--	--	--	--	--	--	2.4	--	5.3	5.8	--	17	--	--	--	--	--	--
				R-58	--	2.0 U	--	2.0 U	--	4.3	--	2.0 U	2 U	--	2.4	--	4.2	--	--	13	53	4.4	21	--	7.4	**6.2**
				R-59	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	6.0	--	0.4 U	--	0.4 U	2.2	0.4 U	4.2	--	0.4 U	12	48	3.5	21	22	7.1	--
				R-60	--	0.4 U	--	0.4 U	--	3.4	3.6	0.4 U	--	--	1.9	--	3.7	--	--	9.3	39	2.3	17	18	6.2	--
				R-61	--	0.4 U	0.4 U	0.4 U	--	2.0	--	0.4 U	--	--	1.9	--	3.4	--	--	9.1	35	2.4	15	--	6.3	**5.1**
Volatile Organics																										
Chloroethane	µg/L			R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	-- --	--	1.4	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.1	--	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
1,1-dichloroethene	µg/L	7*	0.0729	R-57	--	1.0 U	1.0 U	1.0 U	--		--	1.0 U	-- --	--	2.6	--	3.6	3.6	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	2.2	--	3.2	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	2.2	--	4.2	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.8	--	3.3	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.7	--	3.1	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
1,1-dichloroethane	µg/L		800	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	-- --	--	36	--	3.6	3.6	--	1.5	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	2.1	--	1.0 U	1.0 U	--	31	--	2.8	--	--	1.3	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	2.9	--	1.0 U	--	--	30	--	3.7	--	--	1.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	2.1	2.2	1.0 U	--	--	21	--	3.2	--	--	1.2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.9	--	1.0 U	--	--	22	--	2.9	--	--	1.1	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
cis-1,2-dichloroethene	µg/L	70*	80	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	-- --	--	3.8	--	1.0 U	1 U	--	4.5	1.0 U	3.4	1.0	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	3.7	--	1.0 U	--	--	3.8	1.0 U	3.2	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	3.2	--	1.0 U	--	--	3.9	1.0 U	2.8	1.1	1.2	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	3.1	--	1.0 U	--	--	3.3	1.0 U	2.4	1.0 U	1.0	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	3.0	--	1.0 U	--	--	3.1	1.0 U	2.6	1.0 U	--	1.0 U	1.0 U
1,1,1-Trichloroethane	µg/L	200*	7200	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	-- --	--	1.0 U	--	3.8	3.9	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	2.5	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	3.2	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	2.8	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	2.1	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U

Table 3-3. Summary of Detected Groundwater Quality Parameters Not Included in the ROD and Comparison to Regulatory Standards, 2010-2014 Data Summary, Midway Landfill, Kent, Washington (continued)

					Upper Gravel Aquifer						Sand Aquifer										Southern Gravel Aquifer									
					MW-8A	MW-16	MW-16 Dup	MW-21A	MW-27B	MW-7B	MW-7B Dup	MW-8B	MW-8B Dup	MW-11A	MW-17B	MW-18A	MW-21B	MW-21B Dup	MW-28	MW-14B	MW-20B	MW-23B	MW-29B	MW-29B Dup	MW-30C	MW-30C Dup				
Compound	Units	MCL[a]	MTCA B[b]	Round	UP	UP		UP	UP	DOWN		UP		UP	UP	UP	UP		UP	DOWN	DOWN	DOWN	DOWN		DOWN				
Trichloroethene	µg/L	5*	3.98	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	--	--	1.0 U	--	4.8	5.1	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--				
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	4.7	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U				
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	5.3	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--				
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	5.5	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--				
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	5.3	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U				
Tetrachloroethene	µg/L	5*	0.858	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	--	--	1.0 U	--	130	130	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--				
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	110	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U				
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	120	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--				
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	120	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--				
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	120	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U				
Trichloro fluoromethane	µg/L		2400	R-57	--	1.0 U	1.0 U	2.5	--	--	--	1.0 U	--	--	1.0 U	--	4.4	4.3	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--				
				R-58	--	1.0 U	--	1.9	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	2.9	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U				
				R-59	--	1.0 U	1.0 U	2.4	--	1.0 U	--	1.0 U	--	--	1.0 U	--	3.6	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--				
				R-60	--	1.0 U	--	1.8	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	2.8	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--				
				R-61	--	1.0 U	1.0 U	1.6	--	1.0 U	--	1.0 U	--	--	1.0 U	--	2.2	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U				

Notes:

=Exceeds Federal MCL or MTCA Method B Cleanup Level for groundwater.

* =Primary MCL Standards; USEPA National Primary Drinking Water Regulations (40 CFR 141 59 FR 34322).

** =Secondary MCL Standards; USEPA National Primary Drinking Water Regulations (40 CFR 141 59 FR 34322).

*** =Testing for 1,4-dioxane in selected groundwater samples was recommended by Ecology and USEPA.

[a] =MCL/Federal maximum contaminant level.

[b] =MTCA B/Model Toxics Control Act (WAC 173-340) Method B Cleanup Level. CLARC II Database, Ecology.

R-57 = Round 57, May 2010

R-58 = Round 58, May 2011

R-59 = Round 59, May 2012

R-60 = Round 60, May 2013

R-61 = Round 61, May 2014

U = Indicated the compound was undetected at the reported concentration.

J = Indicated the compound was detected at an estimated concentration.

R = Rejected based on QC review. See report for details.

- - =Not analyzed

Dup = duplicate

U = upgradient; D = downgradient

Time-series plots of the groundwater data are also presented for the purpose of detecting changes in parameter values over time. The plots were created for the three COCs and for the detected groundwater quality parameters not included in the ROD. ROD cleanup levels, applicable regulatory standards, and average concentrations measured during the RI (Parametrix 1988) were added to the plots for comparison purposes. A complete set of the plots is presented in Appendices E and F. A discussion of the time-series analysis of the data is presented in Section 3.2.1.

The selected remedy in the ROD requires the City to submit annual notices to the appropriate agencies, water districts, and active well drillers so that water supply wells are not constructed in areas of groundwater contamination. The annual notification identifies the locations of the monitoring wells and summarizes groundwater quality results. A copy of the annual notification is included in Appendix F.

3.2.1 Time-Series Analysis

3.2.1.1 Time-Series Plots for ROD Contaminants of Concern

Concentrations of ROD COCs in groundwater samples collected between 2010 and 2014 are presented in Appendix D and discussed below for each aquifer.

Upper Gravel Aquifer

- Manganese concentrations in upgradient wells MW-16 and MW-21A have shown stable to decreasing trends (respectively) since monitoring began in 1990. Manganese concentrations for both of these wells have always been below the ROD cleanup level. The manganese concentrations measured for MW-16 were slightly above the average RI value but within the historical range of values, and for MW-21A were the lowest reported concentrations since monitoring began. Vinyl chloride and 1,2-DCA have never been detected in these wells.

Sand Aquifer

- Manganese concentrations have been fairly stable in upgradient wells MW-8B and MW-21B, with reported values below the ROD cleanup level. The other two COCs (1,2-DCA and vinyl chloride) have never been detected in these wells.
- All three COCs have shown decreasing trends in upgradient well MW-17B. The concentrations of vinyl chloride and 1,2-DCA were both detected below the ROD cleanup levels.

Southern Gravel Aquifer

- All three COCs (manganese, vinyl chloride, 1,2-DCA) are showing stable or decreasing trends in downgradient wells MW-14B and MW-23B. Manganese and 1,2-DCA were below the ROD cleanup level and the average RI value in both wells. Historically low concentrations were reported for manganese in MW-23B. 1,2-DCA remained undetected in well MW-14B. Vinyl chloride concentrations were below the average RI value but above the ROD cleanup level in MW-14B, except for 2014. The vinyl chloride concentrations in MW-23B were below the ROD cleanup level.
- Manganese concentrations had historically shown an increasing trend in downgradient well MW-20B, with a high measured in November 2000. However, since November 2000, concentrations have decreased to the lowest concentration since 1990, although still remaining above the ROD cleanup level and the average RI value. The highest vinyl chloride concentration in MW-20B was reported in May 2001. Vinyl chloride concentrations in MW-20B have decreased

since that time and were slightly above the ROD cleanup level during 2013 and 2014. 1,2-DCA has never been detected in well MW-20B.

- Manganese concentrations in downgradient well MW-29B continued to decrease and were below the average RI value in 2013, and have been below the ROD cleanup level since May 1990. Historically high concentrations of 1,2-DCA and vinyl chloride were reported in MW-29B during December 1997 and May 2002, respectively. Concentrations of these two parameters have shown decreasing trends since that time. 1,2-DCA was below the ROD cleanup level, but vinyl chloride remained above the ROD cleanup level.
- Manganese concentrations have been stable in cross-gradient well MW-30C, with concentrations reported below the ROD cleanup level and average RI values. Vinyl chloride has been detected in MW-30C 10 times since the detection limit was lowered in November 2000. The 2000 detection initiated testing for vinyl chloride during subsequent monitoring periods. Vinyl chloride was not detected in this well between 2010 and 2014. 1,2-DCA has been detected only one time (May 2000) in MW-30C, but the concentration was below the ROD cleanup level.

3.2.1.2 Time-Series Plots for Groundwater Quality Parameters Not Included in the ROD

Concentrations of groundwater quality parameters not included in the ROD in groundwater samples collected between 2010 and 2014 are presented in Appendix E and discussed below for each aquifer.

In the Upper Gravel Aquifer:

Except as noted below, groundwater quality over the history of monitoring has remained stable or decreased over the history of monitoring and during the past 5 years in upgradient wells MW-16 and MW-21A.

- Specific conductivity in well MW-16 has increased over time, but remained generally stable over the last 5 years.

In the Sand Aquifer:

Except as noted below, groundwater quality over the history of monitoring has remained stable or decreased over the history of monitoring and during the past 5 years in upgradient wells MW-8B, MW-17B, and MW-21B.

- Specific conductivity has increased over time in well MW-8B, but remained stable during the last 5 years.
- Three VOCs (1,1-dichloroethene [1,1-DCE]; tetrachloroethene [PCE]; and trichloroethene [TCE]) have shown increasing trends in well MW-21B since 1994, with concentrations above the applicable regulatory standards and the average RI value. However, concentrations of 1,1-DCE and PCE have stabilized over the past 5 years.

In the Southern Gravel Aquifer:

Groundwater quality over the history of monitoring has remained stable or decreased over the history of monitoring and during the past 5 years.

3.3 Special Sampling for 1,4-Dioxane

Groundwater monitoring for 1,4-dioxane at Midway Landfill began in 2005 at three monitoring wells (SA wells MW-17B and MW-21B and SGA well MW-14B) as requested in the First Five-Year Review. 1,4-

dioxane is a synthetic industrial chemical used in many products and as a stabilizer for other solvents such as 1,1,1-trichloroethane. It leaches readily from soil to groundwater, migrates rapidly in groundwater, and is relatively resistant to biodegradation in the subsurface.

Beginning in 2011, 1,4-dioxane was also tested in the eight other routinely monitored wells as requested in the Second Five-Year Review. In May 2012, five additional upgradient wells were also tested for 1,4-dioxane (MW-8A and MW-27B in the UGA; MW-11A, MW-18A, and MW-28 in the SA) to evaluate the possible occurrence of an upgradient source. VOCs have been detected in wells MW-17B and MW-21B upgradient of the Midway Landfill, and MW-21B has shown an increasing trend of VOC concentrations. The compounds that make up this trend include PCE, TCE, and 1,1-DCE. It is possible that the 1,4-dioxane detected in downgradient wells is associated with the same source or sources of the VOCs detected upgradient of the landfill.

The MTCA Method B cleanup level for 1,4-dioxane was reduced from 7.95 µg/L to 0.44 µg/L in April 2011. Prior to May 2012, the reporting limit for 1,4-dioxane was 2.0 µg/L. The May 2012 groundwater samples were analyzed using methodology that provided a reporting limit of 0.4 µg/L to allow comparison of 1,4-dioxane levels with the recently lowered MTCA Method B cleanup level. Therefore all the detected concentrations are above the current MTCA Method B cleanup level.

3.3.1 Detected Concentrations of 1,4-Dioxane

Concentrations of 1,4-dioxane between 2010 and 2014 are presented in Table 3-3 and discussed below for each aquifer.

3.3.1.1 Upper Gravel Aquifer

1,4-dioxane was not detected in UGA groundwater samples collected from upgradient wells MW-8A, MW-16, MW21A, or MW-27B.

3.3.1.2 Sand Aquifer:

1,4-dioxane was detected in groundwater samples collected from upgradient wells MW-17B and MW-21B, and in downgradient well MW-7B at concentrations above the MTCA Method B cleanup level. The highest concentrations in the SA were detected in downgradient well MW-7B (up to 6.0 µg/L).

3.3.1.3 Southern Gravel Aquifer:

1,4-dioxane was detected in groundwater samples collected from all downgradient wells at concentrations above the MTCA Method B cleanup level. The highest concentrations in the SGA were measured at well MW-29B on the east side of the landfill (up to 21 µg/L) and at well MW-20B on the west side of the landfill (up to 53 µg/L).

3.3.2 Trends in 1,4-Dioxane

A time series plot of 1,4-dioxane in Midway Landfill wells from November 2005 through May 2014 is included in Figure 3-2, and a plot showing the concentrations by aquifer is included in Figure 3-3. The plots shows data since 2005 for wells MW-17B and MW-21B screened within the SA and upgradient of the Midway Landfill, and well MW-14B screened within the SGA and downgradient of the Midway Landfill. The plots also include data for the remaining sampled wells beginning in 2011. Trends in all the wells indicate stable or slightly decreasing concentrations.

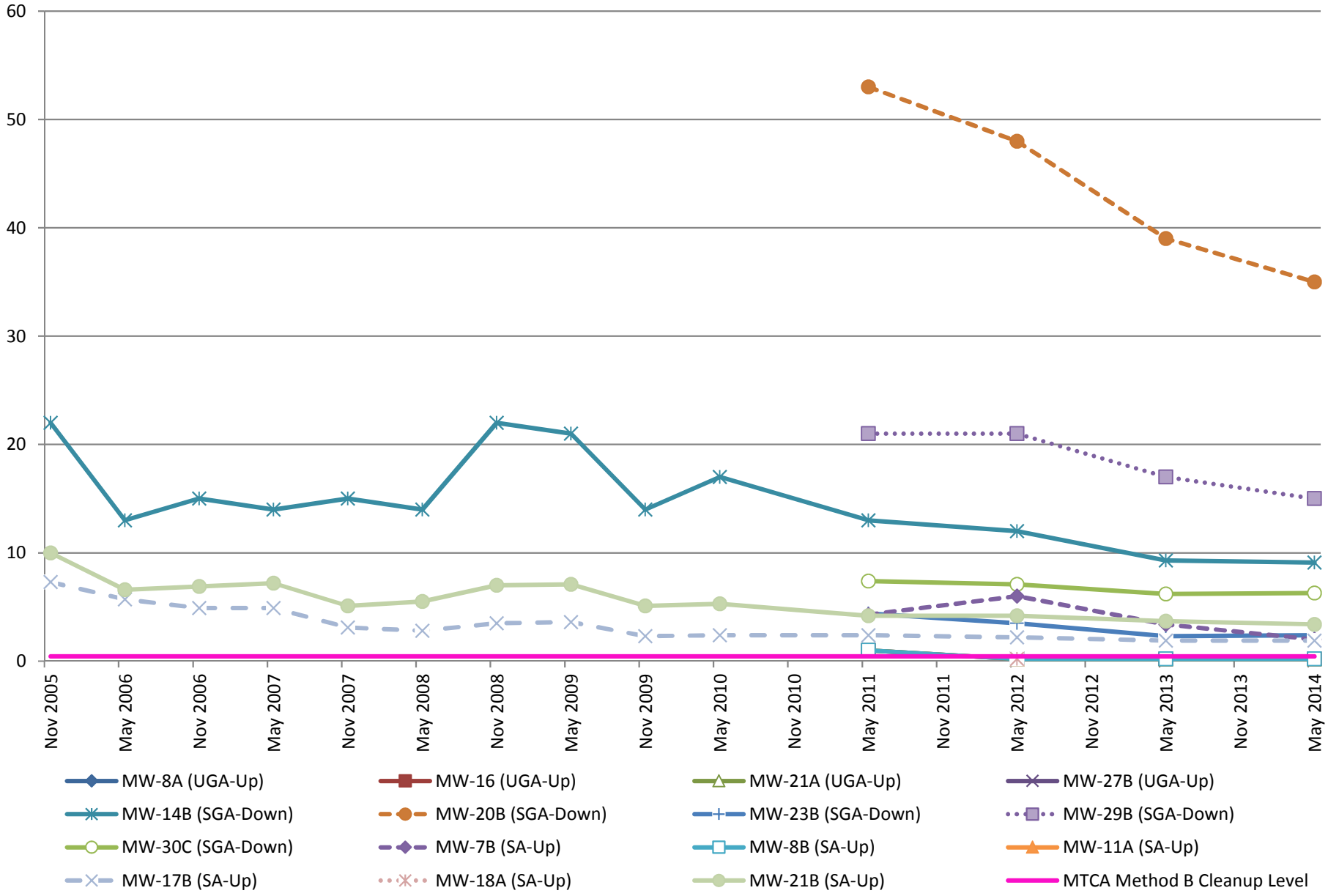
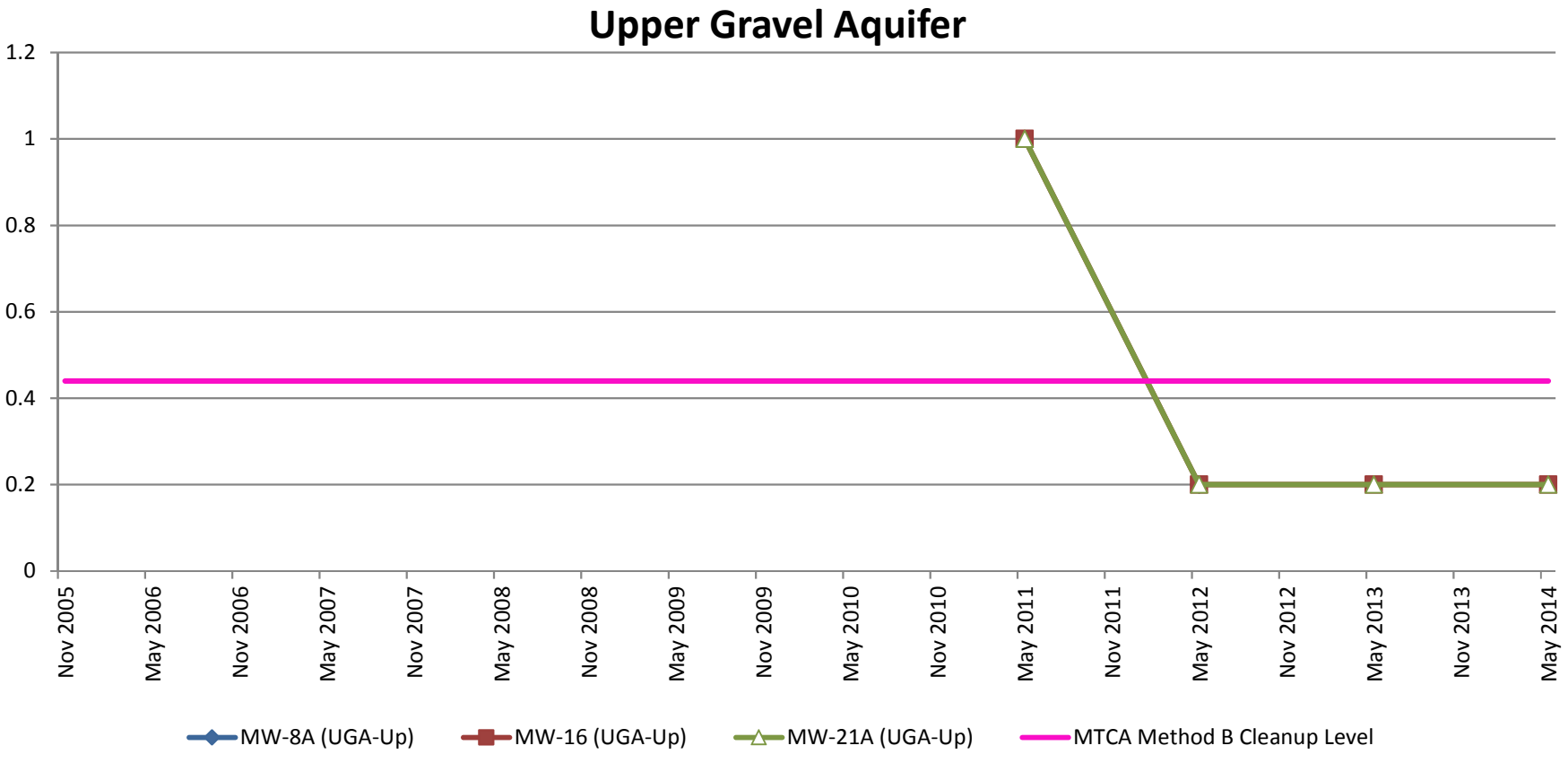
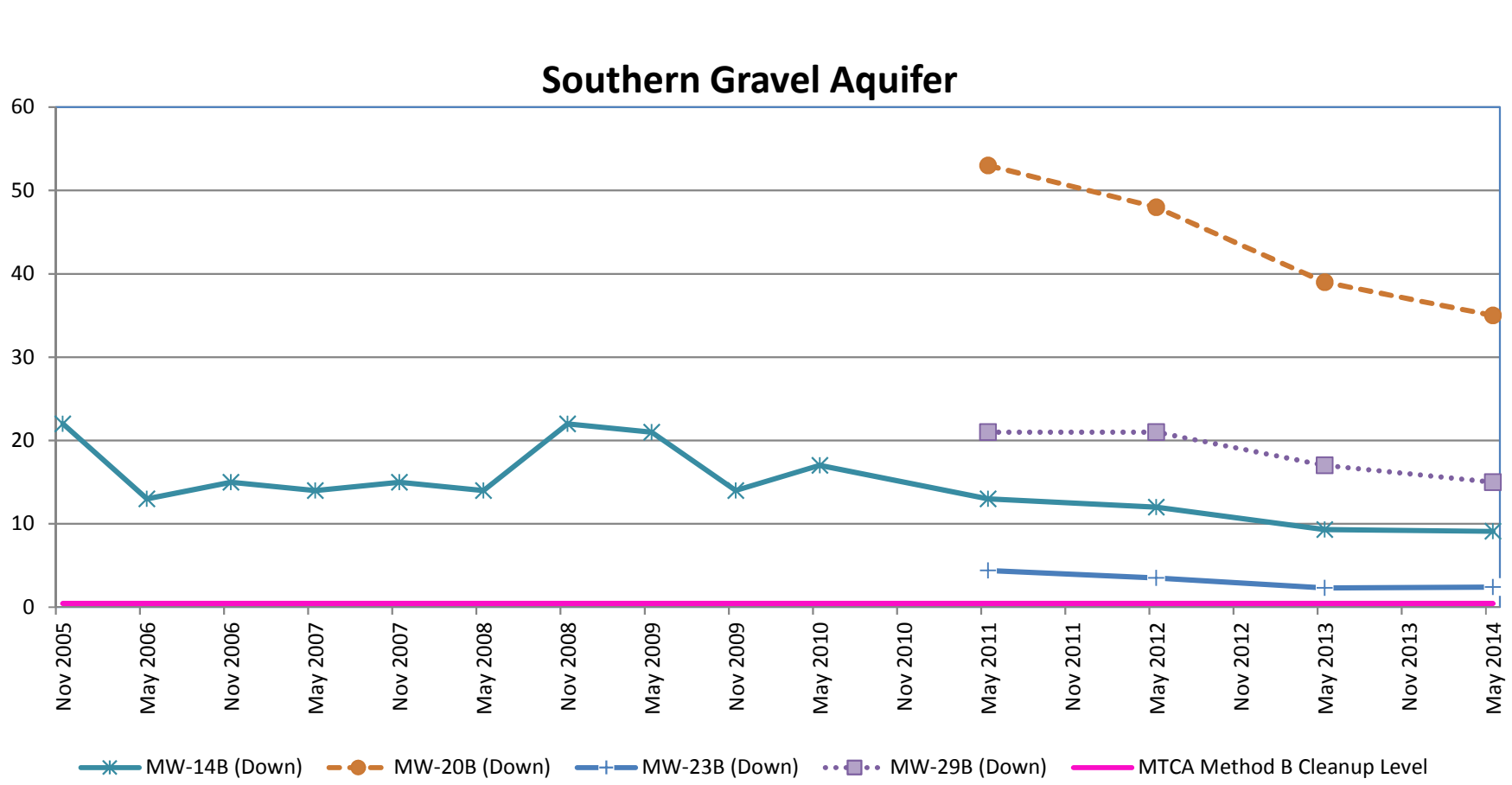


Figure 3-2
1,4-Dioxane Results
Midway Landfill, Kent, Washington





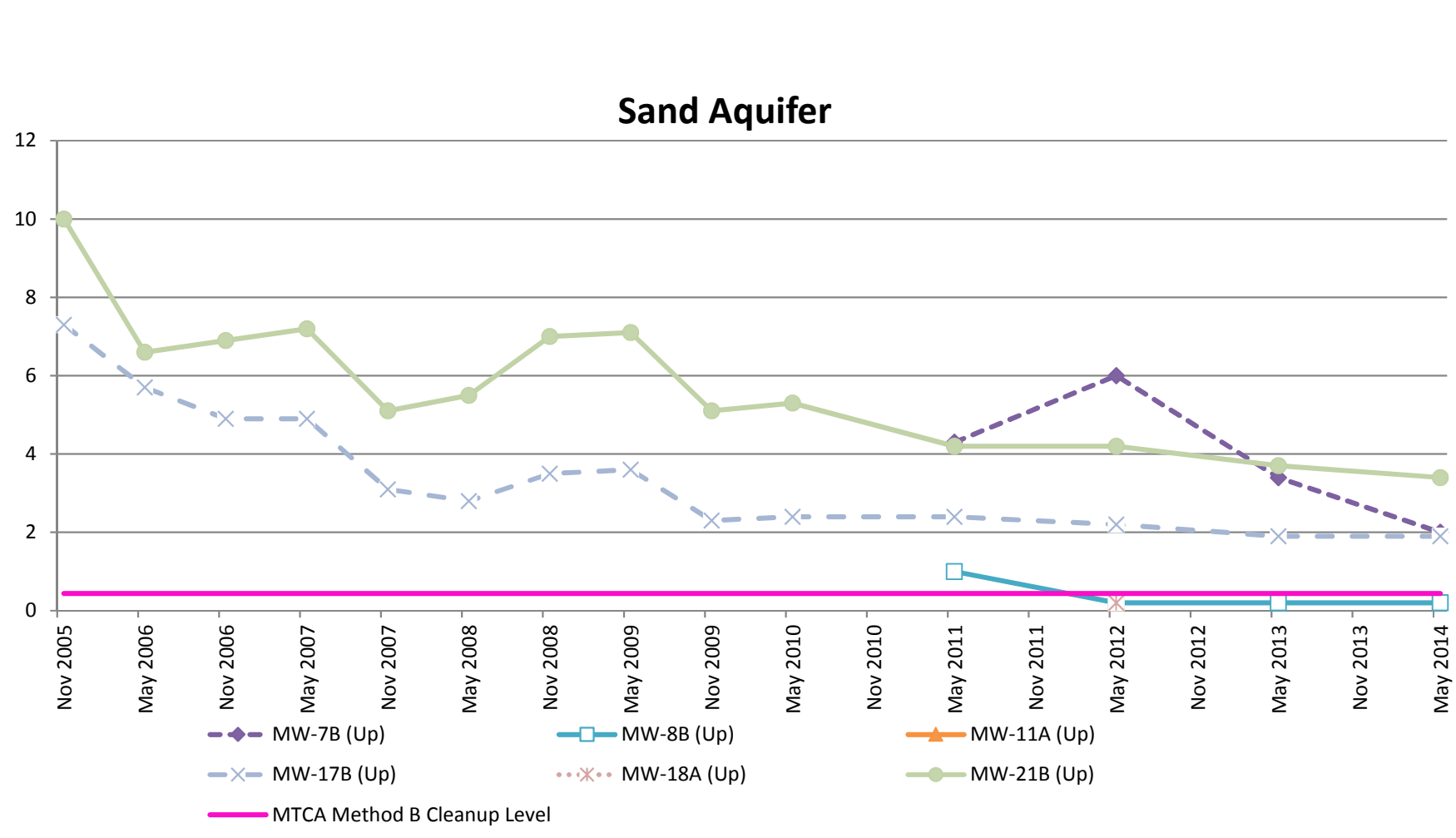


Figure 3-3
1,4-Dioxane Results by Aquifer
Midway Landfill, Kent, Washington

4. SUMMARY

4.1 Conclusions

Specific conclusions based on the data presented in this report are listed below:

- Fluid levels are stable or decreasing, except in the North End Shallow, North End, and Linda Heights Area wells. Fluid levels in these areas have increased over the past 5 to 10 years, although the actual fluid levels remain within the range of historical measurements.
- The wells in the West Side, Central Mound, Hydraulic Sink, and South End have shown the greatest overall fluid level decreases since the RI.
- Free product was not detected in any of the wells monitored during this period, except in Central Mound Area well MW-43D, where 0.25 ft to 0.55 ft of product was measured.
- Groundwater flow directions and flow paths in the UGA, SA, and SGA have remained relatively stable compared to previous data.
- The time-series plots showed that concentrations for most of the tested parameters are stable or decreasing over time.
- Historically low chemical concentrations of ROD COCs were detected in the following wells:
  - Upgradient SA wells MW-17B (1,1-DCA, vinyl chloride, and manganese) and MW-8B (manganese).
  - Upgradient UGA well MW-21A (manganese).
  - Downgradient SGA wells MW-23B (1,2-DCA, vinyl chloride, and manganese) and MW-14B (manganese).
- Historically low chemical concentrations of groundwater quality parameters not included in the ROD were detected in the following wells:
  - Upgradient SA wells MW-17B (iron, chloride, and specific conductivity) and MW-21B (chloride).
  - Upgradient UGA well MW-21A (specific conductivity).
  - Downgradient SGA wells MW-23B (chloride, specific conductivity, and iron) and MW-14B (chloride and TOC).
- ROD cleanup levels were exceeded by one or more groundwater COCs in groundwater samples from one downgradient well (MW-7B) in the SA, and three downgradient wells in the SGA (MW-14B, MW-20B, and MW-29B).
- Vinyl chloride was not detected in well MW-30C.
- The source or sources of contamination upgradient of the Midway Landfill in the SA were still present as indicated by the data from MW-17B and MW-21B. The results from these two wells are showing two different trends over time. The concentrations of several VOCs detected in MW-17B are decreasing while the concentrations of several VOCs in MW-21B are increasing. Downgradient groundwater concentrations of VOCs in the SA and the SGA continue to be affected by these contaminant sources.
- 1,4-dioxane was tested in groundwater samples from SA wells MW-17B and MW-21B, and SGA well MW-14B during each annual event beginning in 2005, as recommended by Ecology and USEPA in the First Five-Year Review (USEPA 2005). 1,4-dioxane testing in all the sampled monitoring wells was

added beginning in 2011 as recommended by Ecology and the USEPA in the Second Five-Year Review (USEPA 2010). 1,4-dioxane was not detected in wells in the UGA. The concentration of 1,4-dioxane in samples from two upgradient wells (MW-17B and MW-21B) and one downgradient well (MW-7B) in the SA, and all five downgradient wells in the SGA (MW-14B, MW-20B, MW-23B, MW-29B, and MW-30C) exceeded the MTCA Method B cleanup level; however, decreasing trends over time have been observed. Concentrations in the SGA were higher than in the SA, and the highest concentrations were observed in SGA well MW-20B, followed by well MW-29B.

- Five additional upgradient wells in the UGA and SA were sampled one time in 2001 for 1,4-dioxane, and concentrations in these wells were not detected.

4.2 Recommendations

In consideration of these conclusions, the City recommends the following for the Midway Landfill monitoring program:

- Ecology should investigate upgradient sources of VOC contamination and encourage upgradient property owners to voluntarily clean up contamination.
- Based on the absence of detection of vinyl chloride in MW-30C and continuing concentrations below ROD cleanup levels, continue to monitor MW-30C on a regular annual schedule.
- Continue monitoring all the sampled wells for 1,4-dioxane as directed by Ecology to confirm decreasing trends.
- Continue monitoring and reporting at an annual frequency.

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Appendix A

Fluid Level and Groundwater Measurements

Table A-1a. Fluid Level Data for Shallow Groundwater/Saturated Refuse Monitoring Wells, April 2010, Midway Landfill, Kent, Washington

Area	Well #	Measuring Point Elevation* (ft.)	Fluid Depth (ft.)	Fluid Elev. (ft.)	Comments
West Side	2	366.13	Dry @ 62.54	<303.59	Into black mud
	5	365.67	65.84	299.83	
North End	14	370.63	60.89	309.74	
	PC4S	349.16	35.48	313.68	
	PC6S	348.68	29.44	319.24	
Linda Heights Area	26	380.89	68.95	311.94	
	27	379	70.80	308.2	
	45D	379.82	72.34	307.48	
Hydraulic Sink	40D	400.27	128.04	272.23	
	49D	395.45	109.35	286.1	
	54D	385.98	Dry @ 95.25	<290.73	
	54S	385.97	45.62	340.35	
(area refuse)	38D	396.93	102.23	294.7	
South End	56D	383.11	84.30	298.81	
	56S	382.84	Dry @ 55.37	<327.47	
Central Mound	42D	380.32	73.65	306.67	
	43D	374.7	74.74	299.96	0.25 Oil thickness
	47D	381.58	Dry @ 90.10	<291.48	Into mud
(area refuse)	AM-M	368	54.50	313.5	
North End Shallow	AN-M	364.5	24.40	340.1	
	AO-M	356.2	22.08	334.12	
	AR-M	354.4	18.97	335.43	

NOTES:

All fluid depth measurements are to first encountered fluid.

* = Measuring point elevations updated April 1998.

DRY = Well was dry.

(area refuse) = Well not in a specific hydraulic area located between the two areas on the table.

Table A-1b. Fluid Level Data for Shallow Groundwater/Saturated Refuse Monitoring Wells, April 2011, Midway Landfill, Kent, Washington

Area	Well #	Measuring Point Elevation* (ft.)	Fluid Depth (ft.)	Fluid Elev. (ft.)	Comments
West Side	2	366.13	Dry @ 62.65	<303.48	into black mud
	5	365.67	65.85	299.82	
North End	14	370.63	60.80	309.83	
	PC4S	349.16	35.20	313.96	
	PC6S	348.68	26.73	321.95	
Linda Heights Area	26	380.89	68.02	312.87	
	27	379	70.25	308.75	
	45D	379.82	71.90	307.92	
Hydraulic Sink	40D	400.27	128.25	272.02	
	49D	395.45	109.90	285.55	
	54D	385.98	Dry @ 95.30	<290.68	into mud
	54S	385.97	45.62	340.35	
(area refuse)	38D	396.93	101.95	294.98	
South End	56D	383.11	84.30	298.81	
	56S	382.84	Dry @ 55.45	<327.39	into mud
Central Mound	42D	380.32	73.72	306.6	
	43D	374.7	75.42	299.28	0.33 Oil thickness, black
	47D	381.58	Dry @ 90.05	<291.53	into black mud
(area refuse)	AM-M	368	53.95	314.05	
North End Shallow	AN-M	364.5	24.30	340.2	
	AO-M	356.2	20.17	336.03	
	AR-M	354.4	16.28	338.12	

NOTES:

All fluid depth measurements are to first encountered fluid.

Fluid levels measured on April 25, 2011.

* = Measuring point elevations updated April 1998.

DRY = Well was dry.

(area refuse) = Well not in a specific hydraulic area located between the two areas on the table.

Table A-1c. Fluid Level Data for Shallow Groundwater/Saturated Refuse Monitoring Wells, April and May 2012, Midway Landfill, Kent, Washington

Area	Well #	Measuring Point Elevation* (ft.)	Fluid Depth (ft.)	Fluid Elev. (ft.)	Comments
West Side	2	366.13	Dry @ 62.65	<303.48	
	5	365.67	66.45	299.22	
North End	14	370.63	60.82	309.81	
	PC4S	349.16	35.10	314.06	
	PC6S	348.68	28.28	320.4	
Linda Heights Area	26	380.89	68.52	312.37	
	27	379	70.45	308.55	
	45D	379.82	72.00	307.82	
Hydraulic Sink	40D	400.27	128.65	271.62	
	49D	395.45	110.05	285.4	
	54D	385.98	Dry @ 95.30	<290.68	
	54S	385.97	45.58	340.39	
(area refuse)	38D	396.93	102.07	294.86	
South End	56D	383.11	84.45	298.66	
	56S	382.84	Dry @ 55.42	<327.42	
Central Mound	42D	380.32	73.68	306.64	
	43D	374.7	75.70	299	0.38 Oil thickness, light brown
	47D	381.58	Dry @ 90.10	<291.48	
(area refuse)	AM-M	368	54.70	313.3	
North End Shallow	AN-M	364.5	24.55	339.95	
	AO-M	356.2	21.82	334.38	
	AR-M	354.4	18.99	335.41	

NOTES:

All fluid depth measurements are to first encountered fluid.

Fluid levels measured on April 30 and May 1, 2012.

* = Measuring point elevations updated April 1998.

DRY = Well was dry.

(area refuse) = Well not in a specific hydraulic area located between the two areas on the table.

Table A-1d. Fluid Level Data for Shallow Groundwater/Saturated Refuse Monitoring Wells, April 2013, Midway Landfill, Kent, Washington

Area	Well #	Measuring Point Elevation* (ft.)	Fluid Depth (ft.)	Fluid Elev. (ft.)	Comments
West Side	2	366.13	Dry @ 62.66	<303.47	
	5	365.67	67.40	298.27	
North End	14	370.63	60.73	309.9	
	PC4S	349.16	41.20	307.96	
	PC6S	348.68	29.10	319.58	
Linda Heights Area	26	380.89	69.10	311.79	
	27	379	70.62	308.38	
	45D	379.82	72.34	307.48	
Hydraulic Sink	40D	400.27	128.95	271.32	
	49D	395.45	110.53	284.92	
	54D	385.98	Dry @ 95.35	<290.63	
	54S	385.97	45.55	340.42	
(area refuse)	38D	396.93	102.82	294.11	
South End	56D	383.11	84.10	299.01	
	56S	382.84	Dry @ 55.40	<327.44	
Central Mound	42D	380.32	73.67	306.65	
	43D	374.7	75.69	299.01	0.43 Oil thickness, dark
	47D	381.58	Dry @ 90.10	<291.48	
(area refuse)	AM-M	368	55.55	312.45	
North End Shallow	AN-M	364.5	24.77	339.73	
	AO-M	356.2	22.85	333.35	
	AR-M	354.4	19.84	334.56	

NOTES:

All fluid depth measurements are to first encountered fluid.

Fluid levels measured on April 29, 2013.

* = Measuring point elevations updated April 1998.

DRY = Well was dry.

(area refuse) = Well not in a specific hydraulic area located between the two areas on the table.

Table A-1e. Fluid Level Data for Shallow Groundwater/Saturated Refuse Monitoring Wells, May 2014, Midway Landfill, Kent, Washington

Area	Well #	Measuring Point Elevation* (ft.)	Fluid Depth (ft.)	Fluid Elev. (ft.)	Comments
West Side	2	366.13	Dry @ 62.80	<303.33	Into mud
	5	365.67	67.25	298.42	
North End	14	370.63	60.68	309.95	
	PC4S	349.16	34.78	314.38	
	PC6S	348.68	27.10	321.58	
Linda Heights Area	26	380.89	69.18	311.71	
	27	379	69.27	309.73	
	45D	379.82	70.74	309.08	
Hydraulic Sink	40D	400.27	129.78	270.49	
	49D	395.45	110.88	284.57	
	54D	385.98	Dry @ 95.40	<290.58	
	54S	385.97	45.35	340.62	
(area refuse)	38D	396.93	102.58	294.35	
South End	56D	383.11	84.20	298.91	
	56S	382.84	Dry @ 55.40	<327.44	Into mud
Central Mound	42D	380.32	73.70	306.62	
	43D	374.7	75.95	298.75	0.55 Oil thickness, dark
	47D	381.58	Dry @ 90.10	<291.48	
(area refuse)	AM-M	368	55.32	312.68	
North End Shallow	AN-M	364.5	24.34	340.16	
	AO-M	356.2	20.61	335.59	
	AR-M	354.4	16.20	338.20	

NOTES:

All fluid depth measurements are to first encountered fluid.

Fluid levels measured on May 13-14, 2014.

* = Measuring point elevations updated April 1998.

DRY = Well was dry.

(area refuse) = Well not in a specific hydraulic area located between the two areas on the table.

Table A-2a. Water Level Data for April 2010, Groundwater Monitoring Wells, Midway Landfill

Well ID	Date Measured	Aquifer	Reference Elevation (ft-MSL)	Depth to Water (ft)	Water Level Elevation (ft-MSL)
MW-2	4/26/2010	UGA	384.39	Dry @ 156.40	<227.99 (a)
MW-4	4/26/2010	UGA	362.82	Dry @ 91.59	<271.23 (a)
MW-7A	4/26/2010	UGA	412.73	Dry @ 197.30	<215.43 (a)
MW-7B	4/26/2010	SA	412.73	209.66	203.07
MW-8A	4/26/2010	UGA/SA	353.02 *	112.90	240.12
MW-8B	4/26/2010	SA	351.35	139.05	212.30
MW-9A	4/26/2010	SA	353.79	nm	
MW-11A	4/26/2010	SA	370.41	117.20	253.21
MW-13A	4/26/2010	UGA	382.68	108.18	274.50
MW-13B	4/26/2010	SA	382.68	132.50	250.18
MW-14B	4/26/2010	SGA	381.85	233.53	148.32
MW-15A	4/26/2010	SA	438.54	Dry @ 230.45	<208.09 (a)
MW-16	4/26/2010	UGA	362.80	124.93	237.87
MW-17A	4/26/2010	UGA	337.08	67.62	269.46
MW-17B	4/26/2010	SA	337.08	69.05	268.03
MW-18A	4/26/2010	SA	343.91	76.25	267.66
MW-19C	4/26/2010	SGA	370.20	OBST @ 60.05	
MW-20A	4/26/2010	SA	375.65	Dry @ 184.00	<191.65 (a)
MW-20B	4/26/2010	SGA	375.65	255.42	120.23
MW-21A	4/26/2010	UGA	359.95	81.58	278.37
MW-21B	4/26/2010	SA	359.95	85.05	274.90
MW-23A	4/26/2010	SA	424.42	Dry @ 239.64	<184.78 (a)
MW-23B	4/26/2010	SGA	424.42	270.54	153.88
MW-24A	4/26/2010	SA	418.58	199.95	218.63
MW-24B	4/26/2010	SGA	418.58	259.18	159.40
MW-25C	4/26/2010	SA	260.84	4.05	256.79
MW-26	4/26/2010	UGA	370.58	93.05	277.53
MW-27A	4/26/2010	UGA	330.05	48.47	281.58
MW-28	4/26/2010	SA	374.15	90.01	284.14
MW-29A	4/26/2010	UGA	428.50	194.20	234.30
MW-29B	4/26/2010	SGA	428.50	303.10	125.40
MW-30A	4/26/2010	SA	407.91	168.50	239.41
MW-30C	4/26/2010	SGA	407.91	267.83	140.08

(a) Well was dry during groundwater chemistry monitoring. Elevation shown is bottom of well.
Elevation datum NAVD 83
* = Measuring point elevation raised 1.67 ft
ft = Feet
MSL = Mean sea level
UGA = Upper Gravel Aquifer
SA = Sand Aquifer
SGA = Southern Gravel Aquifer
OBST =well is obstructed at noted depth
nm = Not measured, no access- locked gate

Table A-2b. Water Level Data for April 2011, Groundwater Monitoring Wells, Midway Landfill

Well ID	Date Measured	Aquifer	Reference Elevation (ft-MSL)	Depth to Water (ft)	Water Level Elevation (ft-MSL)
MW-2	4/26/2011	UGA	384.39	Dry @ 156.40	<227.99 (a)
MW-4	4/26/2011	UGA	362.82	Dry @ 91.08	<271.74 (a)
MW-7A	4/26/2011	UGA	412.73	Dry @ 197.74	<214.99 (a)
MW-7B	4/26/2011	SA	412.73	207.58	205.15
MW-8A	4/26/2011	UGA/SA	353.02 *	111.45	241.57
MW-8B	4/26/2011	SA	351.35	137.55	213.80
MW-9A	4/25/2011	SA	353.79	nm	
MW-11A	4/25/2011	SA	370.41	113.90	256.51
MW-13A	4/26/2011	UGA	382.68	106.80	275.88
MW-13B	4/26/2011	SA	382.68	130.72	251.96
MW-14B	4/26/2011	SGA	381.85	232.39	149.46
MW-15A	4/26/2011	SA	438.54	Dry @ 230.53	<208.01 (a)
MW-16	4/26/2011	UGA	362.80	124.27	238.53
MW-17A	4/26/2011	UGA	337.08	65.84	271.24
MW-17B	4/26/2011	SA	337.08	67.46	269.62
MW-18A	4/25/2011	SA	343.91	73.20	270.71
MW-19C	4/25/2011	SGA	370.20	OBST @ 60.00	
MW-20A	4/26/2011	SA	375.65	Dry @ 184.00	<191.65 (a)
MW-20B	4/26/2011	SGA	375.65	255.00	120.65
MW-21A	4/25/2011	UGA	359.95	78.50	281.45
MW-21B	4/25/2011	SA	359.95	81.73	278.22
MW-23A	4/26/2011	SA	424.42	Dry @ 239.60	<184.82 (a)
MW-23B	4/26/2011	SGA	424.42	269.16	155.26
MW-24A	4/26/2011	SA	418.58	198.12	220.46
MW-24B	4/26/2011	SGA	418.58	257.33	161.25
MW-25C	4/26/2011	SA	260.84	nm	
MW-26	4/25/2011	UGA	370.58	90.45	280.13
MW-27A	4/26/2011	UGA	330.05	44.24	285.81
MW-28	4/26/2011	SA	374.15	85.25	288.90
MW-29A	4/26/2011	UGA	428.50	193.30	235.20
MW-29B	4/26/2011	SGA	428.50	301.71	126.79
MW-30A	4/26/2011	SA	407.91	167.90	240.01
MW-30C	4/26/2011	SGA	407.91	266.33	141.58

(a) Well was dry during groundwater chemistry monitoring. Elevation shown is bottom of well.
Elevation datum NAVD 83
* = Measuring point elevation raised 1.67 ft
ft = Feet
MSL = Mean sea level
UGA = Upper Gravel Aquifer
SA = Sand Aquifer
SGA = Southern Gravel Aquifer
OBST =well is obstructed at noted depth
nm = Not measured, no access (9A locked gate, 25C destroyed)

Table A-2c. Water Level Data for April 2012, Groundwater Monitoring

Well ID	Date Measured	Aquifer	Reference Elevation (ft-MSL)	Depth to Water (ft)	Water Level Elevation (ft-MSL)
MW-2	4/30/2012	UGA	384.39	Dry @ 156.90	<227.49 (a)
MW-4	4/30/2012	UGA	362.82	Dry @ 91.15	<271.67 (a)
MW-7A	4/30/2012	UGA	412.73	Dry @ 197.65	<215.08 (a)
MW-7B	4/30/2012	SA	412.73	205.02	207.71
MW-8A	4/30/2012	UGA/SA	353.02 *	112.15	240.87
MW-8B	4/30/2012	SA	351.35	137.60	213.75
MW-9A	4/30/2012	SA	353.79	nm	
MW-11A	4/30/2012	SA	370.41	112.75	257.66
MW-13A	4/30/2012	UGA	382.68	106.10	276.58
MW-13B	4/30/2012	SA	382.68	129.35	253.33
MW-14B	4/30/2012	SGA	381.85	228.84	153.01
MW-15A	4/30/2012	SA	438.54	Dry @ 230.49	<208.05 (a)
MW-16	4/30/2012	UGA	362.80	123.90	238.90
MW-17A	4/30/2012	UGA	337.08	66.95	270.13
MW-17B	4/30/2012	SA	337.08	68.55	268.53
MW-18A	4/30/2012	SA	343.91	75.05	268.86
MW-19C	4/30/2012	SGA	370.20	OBST @ 60.00	
MW-20A	4/30/2012	SA	375.65	Dry @ 184.00	<191.65 (a)
MW-20B	4/30/2012	SGA	375.65	253.10	122.55
MW-21A	4/30/2012	UGA	359.95	80.75	279.20
MW-21B	4/30/2012	SA	359.95	83.80	276.15
MW-23A	4/30/2012	SA	424.42	Dry @ 239.60	<184.82 (a)
MW-23B	4/30/2012	SGA	424.42	268.39	156.03
MW-24A	4/30/2012	SA	418.58	195.35	223.23
MW-24B	4/30/2012	SGA	418.58	255.90	162.68
MW-25C	4/30/2012	SA	260.84	nm	
MW-26	4/30/2012	UGA	370.58	90.37	280.21
MW-27A	4/30/2012	UGA	330.05	46.95	283.10
MW-27B	4/30/2012	UGA	330.05	49.90	280.15
MW-28	4/30/2012	SA	374.15	87.44	286.71
MW-29A	4/30/2012	UGA	428.50	190.80	237.70
MW-29B	4/30/2012	SGA	428.50	300.84	127.66
MW-30A	4/30/2012	SA	407.91	166.50	241.41
MW-30C	4/30/2012	SGA	407.91	265.52	142.39

(a) Well was dry during groundwater chemistry monitoring. Elevation shown is bottom of well.
Elevation datum NAVD 83
* = Measuring point elevation raised 1.67 ft
ft = Feet
MSL = Mean sea level
UGA = Upper Gravel Aquifer
SA = Sand Aquifer
SGA = Southern Gravel Aquifer
OBST =well is obstructed at noted depth
nm = Not measured, no access (9A locked gate, 25C destroyed)

Table A-2d. Water Level Data for April 2013, Groundwater Monitoring

Well ID	Date Measured	Aquifer	Reference Elevation (ft-MSL)	Depth to Water (ft)	Water Level Elevation (ft-MSL)
MW-2	4/30/2013	UGA	384.39	Dry @ 156.90	<227.49 (a)
MW-4	4/30/2013	UGA	362.82	Dry @ 91.20	<271.62 (a)
MW-7A	4/30/2013	UGA	412.73	Dry @ 197.60	<215.13 (a)
MW-7B	4/30/2013	SA	412.73	204.95	207.78
MW-8A	4/30/2013	UGA/SA	353.02 *	112.00	241.02
MW-8B	4/30/2013	SA	351.35	137.69	213.66
MW-9A	4/30/2013	SA	353.79	nm	
MW-11A	4/29/2013	SA	370.41	112.72	257.69
MW-13A	4/30/2013	UGA	382.68	106.05	276.63
MW-13B	4/30/2013	SA	382.68	129.10	253.58
MW-14B	4/30/2013	SGA	381.85	228.77	153.08
MW-15A	4/30/2013	SA	438.54	Dry @ 230.50	<208.04 (a)
MW-16	4/30/2013	UGA	362.80	123.90	238.90
MW-17A	4/30/2013	UGA	337.08	68.17	268.91
MW-17B	4/30/2013	SA	337.08	69.35	267.73
MW-18A	4/29/2013	SA	343.91	75.95	267.96
MW-19C	4/29/2013	SGA	370.20	OBST @ 60.00	
MW-20A	4/30/2013	SA	375.65	Dry @ 184.00	<191.65 (a)
MW-20B	4/30/2013	SGA	375.65	252.65	123.00
MW-21A	4/29/2013	UGA	359.95	81.50	278.45
MW-21B	4/29/2013	SA	359.95	84.69	275.26
MW-23A	5/6/2013	SA	424.42	Dry @ 239.62	<184.80 (a)
MW-23B	5/6/2013	SGA	424.42	265.38	159.04
MW-24A	4/30/2013	SA	418.58	195.74	222.84
MW-24B	4/30/2013	SGA	418.58	255.10	163.48
MW-25C	4/30/2013	SA	260.84	nm	
MW-26	4/29/2013	UGA	370.58	90.63	279.95
MW-27A	4/30/2013	UGA	330.05	48.57	281.48
MW-27B	4/30/2013	UGA	330.05	51.00	279.05
MW-28	4/30/2013	SA	374.15	88.97	285.18
MW-29A	4/30/2013	UGA	428.50	191.32	237.18
MW-29B	4/30/2013	SGA	428.50	300.97	127.53
MW-30A	4/30/2013	SA	407.91	166.90	241.01
MW-30C	4/30/2013	SGA	407.91	265.13	142.78

(a) Well was dry during groundwater chemistry monitoring. Elevation shown is bottom of well.
Elevation datum NAVD 83
* = Measuring point elevation raised 1.67 ft
ft = Feet
MSL = Mean sea level
UGA = Upper Gravel Aquifer
SA = Sand Aquifer
SGA = Southern Gravel Aquifer
OBST =well is obstructed at noted depth
nm = Not measured, no access (9A locked gate, 25C destroyed)

Table A-2e. Water Level Data for May 2014, Groundwater Monitoring

Well ID	Date Measured	Aquifer	Reference Elevation (ft-MSL)	Depth to Water (ft)	Water Level Elevation (ft-MSL)
MW-2	5/12/2014	UGA	384.39	Dry @ 157.00	<227.39 (a)
MW-4	5/12/2014	UGA	362.82	91.00	271.82
MW-7A	5/12/2014	UGA	412.73	Dry @ 197.50	<215.23 (a)
MW-7B	5/12/2014	SA	412.73	205.34	207.39
MW-8A	5/12/2014	UGA/SA	353.02 *	113.12	239.90
MW-8B	5/12/2014	SA	351.35	137.34	214.01
MW-9A	5/12/2014	SA	353.79	nm	
MW-11A	5/12/2014	SA	370.41	113.62	256.79
MW-13A	5/14/2014	UGA	382.68	106.40	276.28
MW-13B	5/14/2014	SA	382.68	128.77	253.91
MW-14B	5/12/2014	SGA	381.85	228.61	153.24
MW-15A	5/14/2014	SA	438.54	Dry @ 230.50	<208.04 (a)
MW-16	5/12/2014	UGA	362.80	123.84	238.96
MW-17A	5/12/2014	UGA	337.08	66.25	270.83
MW-17B	5/12/2014	SA	337.08	67.55	269.53
MW-18A	5/13/2014	SA	343.91	74.20	269.71
MW-19C	5/13/2014	SGA	370.20	OBST @ 60.00	
MW-20A	5/12/2014	SA	375.65	Dry @ 184.00	<191.65 (a)
MW-20B	5/12/2014	SGA	375.65	252.54	123.11
MW-21A	5/13/2014	UGA	359.95	79.80	280.15
MW-21B	5/13/2014	SA	359.95	83.05	276.90
MW-23A	5/14/2014	SA	424.42	Dry @ 240.00	<184.42 (a)
MW-23B	5/14/2014	SGA	424.42	266.00	158.42
MW-24A	5/14/2014	SA	418.58	195.20	223.38
MW-24B	5/14/2014	SGA	418.58	255.00	163.58
MW-25C	5/12/2014	SA	260.84	nm	
MW-26	5/12/2014	UGA	370.58	91.44	279.14
MW-27A	5/12/2014	UGA	330.05	46.36	283.69
MW-27B	5/12/2014	UGA	330.05	49.73	280.32
MW-28	5/14/2014	SA	374.15	86.90	287.25
MW-29A	5/14/2014	UGA	428.50	191.43	237.07
MW-29B	5/14/2014	SGA	428.50	300.51	127.99
MW-30A	5/14/2014	SA	407.91	167.35	240.56
MW-30C	5/14/2014	SGA	407.91	264.87	143.04

(a) Well was dry during groundwater chemistry monitoring. Elevation shown is bottom of well.
Elevation datum NAVD 83
* = Measuring point elevation raised 1.67 ft
ft = Feet
MSL = Mean sea level
UGA = Upper Gravel Aquifer
SA = Sand Aquifer
SGA = Southern Gravel Aquifer
OBST =well is obstructed at noted depth
nm = Not measured, no access (9A locked gate, 25C destroyed)

Appendix B

Groundwater Chemistry Summary Tables

Table B-1a. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Upper Gravel Aquifer, 2010-2014 Data Summary

		Upper Gravel Aquifer														
		MW-8A UP	MW-16 UP								MW-21A UP					MW-27B UP
		R-59	R-57		R-58	R-59		R-60	R-61		R-57	R-58	R-59	R-60	R-61	R-59
Compound	Units	5/9/12	5/3/10	Duplicate (MW-31) 5/3/10	5/5/11	5/10/12	Duplicate (MW-35) 5/10/12	5/16/13	5/22/14	Duplicate (MW-35) 5/22/14	5/4/10	5/3/11	5/8/12	5/14/13	5/20/14	5/8/12
Field Parameters																
pH	s.u.	7.64	7.40	- -	7.71	7.69	- -	7.52	7.68	- -	6.51	6.70	6.67	6.61	6.74	7.34
Conductivity	µmhos/cm	143	280	- -	290	278	- -	285	284	- -	331	338	326	335	328	341
Temperature	C	11.6	11.4	- -	11.1	11.6	- -	11.9	11.9	- -	11.8	11.7	11.6	12.1	12.0	11.5
Conventional Parameters																
Chloride	mg/L	- -	8.4	8.3	8.6	8.3	8.4	8.3	8.5	8.3	6.6	6.9	6.7	6.5	6.5	- -
Sulfate	mg/L	- -	28.4	27.9	26.7	28.3	28.2	22.6	24.5	23.5	39.1	39.8	31.2	33.2	35.7	- -
Chemical Oxygen Demand	mg/L	- -	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U	10.0 U	5.36 J	5.00 U	5.00 U	5.00 U	10.0 U	- -
Total Organic Carbon	mg/L	- -	1.50 U	1.50 U	1.50 U	0.50 U	27.0 R	1.50 U	1.50 U	1.50 U	1.50 U	1.50 U	0.50 U	1.50 U	1.50 U	- -
Dissolved Metals																
Iron	mg/L	- -	0.25	0.25	0.24	0.22	0.23	0.20	0.18	0.17	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	- -
Manganese	mg/L	- -	0.094	0.094	0.094	0.094	0.097	0.100	0.094	0.095	0.016	0.013	0.005	0.001	0.001 U	- -
Semi-Volatile Organics																
1,4-Dioxane	µg/L	0.4 U	- -	- -	2.0 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	- -	2.0 U	0.4 U	0.4 U	0.4 U	0.4 U
Volatile Organics																
Chloromethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Bromomethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Vinyl Chloride	µg/L	- -	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	- -
Chloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Methylene Chloride	µg/L	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -
Acetone	µg/L	- -	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	- -
Carbon Disulfide	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,1-Dichloroethene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,1-Dichloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
trans-1,2-Dichloroethene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
cis-1,2-Dichloroethene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Chloroform	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,2-Dichloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
2-Butanone	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -
1,1,1-Trichloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Carbon Tetrachloride	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Vinyl Acetate	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -
Bromodichloromethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,2-Dichloropropane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
cis-1,3-Dichloropropene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Trichloroethene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Dibromochloromethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,1,2-Trichloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Benzene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
trans-1,3-Dichloropropene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
2-Chloroethylvinylether	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -
Bromoform	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
4-Methyl-2-Pentanone (MIBK)	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -
2-Hexanone	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -

Table B-1a. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Upper Gravel Aquifer, 2010-2014 Data Summary

		Upper Gravel Aquifer														
		MW-8A UP	MW-16 UP							MW-21A UP					MW-27B UP
		R-59	R-57		R-58	R-59		R-60	R-61		R-57	R-58	R-59	R-60	R-61	R-59
Compound	Units	5/9/12	5/3/10	Duplicate (MW-31) 5/3/10	5/5/11	5/10/12	Duplicate (MW-35) 5/10/12	5/16/13	5/22/14	Duplicate (MW-35) 5/22/14	5/4/10	5/3/11	5/8/12	5/14/13	5/20/14	5/8/12
Volatile Organics (continued)																
Tetrachloroethene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,1,2,2-Tetrachloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Toluene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Chlorobenzene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Ethylbenzene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Styrene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Trichlorofluoromethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.5	1.9	2.4	1.8	1.6	- -
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -
m,p-Xylene	µg/L	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -
o-Xylene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -

Table B-1b. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Sand Aquifer, 2010-2014 Data Summary

		Sand Aquifer																
		MW-7B DOWN					MW-8B UP						MW-11A UP	MW-17B UP				
		R-58	R-59	R-60		R-61	R-57	R-58		R-59	R-60	R-61	R-59	R-57	R-58	R-59	R-60	R-61
Compound	Units	5/4/11	5/9/12	5/15/13	Duplicate (MW-35) 5/15/13	5/21/14	5/5/10	5/4/11	Duplicate (MW-35) 5/4/11	5/9/12	5/15/13	5/21/14	5/7/12	5/4/10	5/3/11	5/10/12	5/14/13	5/20/14
Field Parameters																		
pH	s.u.	6.58	6.63	6.60	- -	6.69	6.45	7.17	- -	6.89	6.52	6.69	7.09	6.34	6.83	6.81	6.43	6.81
Conductivity	µmhos/cm	696	666	614	- -	552	155	207	- -	167	201	162	191	335	353	317	315	316
Temperature	C	13.3	12.7	13.3	- -	13.2	11.0	11.3	- -	11.0	11.6	12.0	10.9	11.5	11.6	11.7	11.9	12.4
Conventional Parameters																		
Chloride	mg/L	25.0	28.1	18.6	19.7	14.4	5.3	7.6	7.5	6.9	7.1	5.4	- -	9.6	8.8	8.9	9.5	10.1
Sulfate	mg/L	39.2	27.9	29.4	28.9	29.9	17.9	24.8	24.9	23.5	23.0	18.2	- -	23.7	22.4	23.2	18.4	19.7
Chemical Oxygen Demand	mg/L	5.00 U	5.00 U	5.00 U	9.25	10.0 U	5.00 U	5.00 U	5.00 U	5.00 U	11.8	16.0	- -	5.68 J	5.00 U	5.00 U	5.00 U	10.0 U
Total Organic Carbon	mg/L	1.66	1.10	1.50 U	1.50 U	1.50 U	1.50 U	1.50 U	1.50 U	0.50 U	1.50 U	1.50 U	- -	1.50 U	1.93	0.76	1.50 U	1.50 U
Dissolved Metals																		
Iron	mg/L	3.57	3.57	3.32	3.28	3.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.09	- -	0.05	0.06	0.05 U	0.05 U	0.05 U
Manganese	mg/L	3.07	3.20	2.94	2.90	2.63	0.004	0.047	0.046	0.024	0.006	0.006	- -	0.053	0.050	0.042	0.042	0.044
Semi-Volatile Organics																		
1,4-Dioxane	µg/L	4.3	6.0	3.4	3.6	2.0	- -	2.0 U	2.0 U	0.4 U	0.4 U	0.4 U	0.4 U	2.4	2.4	2.2	1.9	1.9
Volatile Organics																		
Chloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	µg/L	0.30	0.31	0.31	0.32	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	- -	0.22	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.4	1.0 U	1.1	1.0 U	1.0 U
Methylene Chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acetone	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	- -	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	2.6	2.2	2.2	1.8	1.7
1,1-Dichloroethane	µg/L	2.1	2.9	2.1	2.2	1.9	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	36	31	30	21	22.0
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	3.8	3.7	3.2	3.1	3.0
Chloroform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	4.4	3.8	4.5	3.9	3.0
2-Butanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Acetate	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chloroethylvinylether	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone (MIBK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Table B-1b. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Sand Aquifer, 2010-2014 Data Summary

		Sand Aquifer							
		MW-18A UP	MW-21B UP						MW-28 UP
		R59	R-57		R-58	R-59	R-60	R-61	R-59
Compound	Units	5/7/12	5/4/10	Duplicate (MW-35) 5/4/10	5/3/11	5/8/12	5/14/13	5/20/14	5/9/12
Field Parameters									
pH	s.u.	7.12	6.79	- -	6.94	6.92	6.82	6.97	6.77
Conductivity	µmhos/cm	471	681	- -	676	658	658	624	486
Temperature	C	11.7	11.1	- -	11.2	11.5	11.4	11.6	13.3
Conventional Parameters									
Chloride	mg/L	- -	15.0	15.2	15.5	14.5	14.1	13.1	- -
Sulfate	mg/L	- -	133	133	106	106	103	101	- -
Chemical Oxygen Demand	mg/L	- -	11.8 J	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U	- -
Total Organic Carbon	mg/L	- -	1.50 U	1.50 U	1.50 U	0.50 U	1.50 U	1.50 U	- -
Dissolved Metals									
Iron	mg/L	- -	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	- -
Manganese	mg/L	- -	0.405	0.408	0.396	0.410	0.415	0.399	- -
Semi-Volatile Organics									
1,4-Dioxane	µg/L	0.4 U	5.3	5.8	4.2	4.2	3.7	3.4	0.4 U
Volatile Organics									
Chloromethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Bromomethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Vinyl Chloride	µg/L	- -	0.20 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	- -
Chloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Methylene Chloride	µg/L	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -
Acetone	µg/L	- -	10 U	10 U	10 U	10 U	10 U	10 U	- -
Carbon Disulfide	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,1-Dichloroethene	µg/L	- -	3.6	3.6	3.2	4.2	3.3	3.1	- -
1,1-Dichloroethane	µg/L	- -	3.6	3.6	2.8	3.7	3.2	2.9	- -
trans-1,2-Dichloroethene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
cis-1,2-Dichloroethene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Chloroform	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,2-Dichloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
2-Butanone	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -
1,1,1-Trichloroethane	µg/L	- -	3.8	3.9	2.5	3.2	2.8	2.1	- -
Carbon Tetrachloride	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Vinyl Acetate	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -
Bromodichloromethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,2-Dichloropropane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
cis-1,3-Dichloropropene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Trichloroethene	µg/L	- -	4.8	5.1	4.7	5.3	5.5	5.3	- -
Dibromochloromethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
1,1,2-Trichloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Benzene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
trans-1,3-Dichloropropene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
2-Chloroethylvinylether	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -
Bromoform	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
4-Methyl-2-Pentanone (MIBK)	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -
2-Hexanone	µg/L	- -	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	- -

Table B-1b. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Sand Aquifer, 2010-2014 Data Summary

		Sand Aquifer																
		MW-7B DOWN					MW-8B UP						MW-11A UP	MW-17B UP				
		R-58	R-59	R-60		R-61	R-57	R-58		R-59	R-60	R-61	R-59	R-57	R-58	R-59	R-60	R-61
Compound	Units	5/4/11	5/9/12	5/15/13	Duplicate (MW-35) 5/15/13	5/21/14	5/5/10	5/4/11	Duplicate (MW-35) 5/4/11	5/9/12	5/15/13	5/21/14	5/7/12	5/4/10	5/3/11	5/10/12	5/14/13	5/20/14
Volatile Organics (continued)																		
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
m,p-Xylene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table B-1b. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Sand Aquifer, 2010-2014 Data Summary

		Sand Aquifer							
		MW-18A UP	MW-21B UP						MW-28 UP
		R59	R-57		R-58	R-59	R-60	R-61	R-59
Compound	Units	5/7/12	5/4/10	Duplicate (MW-35) 5/4/10	5/3/11	5/8/12	5/14/13	5/20/14	5/9/12
Volatile Organics (continued)									
Tetrachloroethene	µg/L	- -	130	130	110	120	120	120	- -
1,1,2,2-Tetrachloroethane	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Toluene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Chlorobenzene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Ethylbenzene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Styrene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -
Trichlorofluoromethane	µg/L	- -	4.4	4.3	2.9	3.6	2.8	2.2	- -
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -
m,p-Xylene	µg/L	- -	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	- -
o-Xylene	µg/L	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -

Table B-1c. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Southern Gravel Aquifer, 2010-2014 Data Summary

		Southern Gravel Aquifer														
		MW-14B DOWN					MW-20B DOWN					MW-23B DOWN				
		R-57	R-58	R-59	R-60	R-61	R-57	R-58	R-59	R-60	R-61	R-57	R-58	R-59	R-60	R-61
Compound	**Units**	**5/4/10**	**5/3/11**	**5/8/12**	**5/14/13**	**5/20/14**	**5/3/10**	**5/4/11**	**5/9/12**	**5/15/13**	**5/21/14**	**5/7/10**	**5/5/11**	**5/10/12**	**5/16/13**	**5/22/14**
Field Parameters																
pH	s.u.	6.46	6.56	6.54	6.61	6.59	6.73	6.79	6.84	6.85	6.83	6.23	6.44	6.44	6.35	6.51
Conductivity	µmhos/cm	703	685	653	649	632	1303	1260	1111	1062	991	569	555	528	523	511
Temperature	C	13.1	14.0	13.9	14.1	15.3	12.1	11.9	11.6	12.0	12.6	11.1	11.1	11.2	11.9	12.0
Conventional Parameters																
Chloride	mg/L	18.0	19.4	16.6	16.3	14.8	44.7	44.9	35.2	30.6	26.6	14.8	13.7	12.1	11.0	10.2
Sulfate	mg/L	30.9	32.2	34.6	24.8	25.2	8.9	10.1	13.0	11.5	9.9	33	33.3	36.5	26.5	28.1
Chemical Oxygen Demand	mg/L	5.00 U	6.31	9.34	8.31	10.0 U	17	20.2	14.3	17.1	13.1	5.68 J	5.00 U	5.00 U	5.00 U	10.0 U
Total Organic Carbon	mg/L	2.30	2.73	1.20	1.53	1.63	6.47	6.15	4.80	4.26	4.17	1.90	1.79	0.84	1.50 U	1.50 U
Dissolved Metals																
Iron	mg/L	11.2	11.0	10.1	10.3	10.3	9.48	8.80	8.17	7.53	6.86	8.67	8.08	8.26	7.95	7.89
Manganese	mg/L	0.961	0.897	0.908	0.913	0.904	3.24	2.99	2.95	2.77	2.43	0.153	0.143	0.140	0.141	0.131
Semi-Volatile Organics																
1,4-Dioxane	µg/L	17	13	12	9.3	9.1	- -	53	48	39	35	- -	4.4	3.5	2.3	2.4
Volatile Organics																
Chloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	µg/L	0.63	0.64	0.41	0.39	0.28	0.27	0.24	0.22	0.34	0.30	0.27	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acetone	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	1.5	1.3	1.4	1.2	1.1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	4.5	3.8	3.9	3.3	3.1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	3.4	3.2	2.8	2.4	2.6
Chloroform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.7	2.1	2.4	2.6	2.0
2-Butanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Acetate	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table B-1c. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Southern Gravel Aquifer, 2010-2014 Data Summary

		Southern Gravel Aquifer													
		MW-29B DOWN							MW-30C DOWN						
		R-57	R-58	R-59		R-60		R-61	R-57	R-58		R-59	R-60	R-61	
Compound	Units	5/3/10	5/2/11	5/7/12	Duplicate (MW-31) 5/7/12	5/13/13	Duplicate (MW-31) 5/13/13	5/19/14	5/5/10	5/2/11	Duplicate (MW-31) 5/2/11	5/7/12	5/13/13	5/19/14	Duplicate (MW-31) 5/19/14
Field Parameters															
pH	s.u.	6.23	6.47	6.55	- -	6.29	- -	6.51	6.57	7.04	- -	7.07	6.78	7.09	- -
Conductivity	µmhos/cm	705	694	674	- -	661	- -	648	320	297	- -	301	301	309	- -
Temperature	C	10.0	9.8	10.2	- -	10.6	- -	10.5	9.6	9.5	- -	10.3	10.3	10.2	- -
Conventional Parameters															
Chloride	mg/L	32.9	31.8	26.6	26.5	26.1	26.1	23.4	12.9	13.5	13.2	11.8	11.9	12.6	11.6
Sulfate	mg/L	23.0	23.7	26.8	27.2	18.9	18.7	19.1	12.9	13.5	13.7	15.5	12.7	14.0	13.9
Chemical Oxygen Demand	mg/L	10.4	5.00 U	6.94	5.00 U	5.00 U	6.75	10.0 U	6.00 J	5.00 U	5.00 U	5.00 U	5.00 U	10.0 U	10.0 U
Total Organic Carbon	mg/L	2.37	2.50	1.60	1.60	1.57	1.62	1.77	1.50 U	1.50 U	1.50 U	0.50 U	1.50 U	1.50 U	1.50 U
Dissolved Metals															
Iron	mg/L	15.0	14.9	14.6	14.4	12.9	12.0	14.4	2.74	2.62	2.60	2.43	2.41	2.48	2.50
Manganese	mg/L	0.980	0.966	0.948	0.944	0.869	0.809	0.941	0.706	0.639	0.645	0.643	0.648	0.674	0.678
Semi-Volatile Organics															
1,4-Dioxane	µg/L	- -	21	21	22	17	18	15	- -	7.4	6.2	7.1	6.2	6.3	5.1
Volatile Organics															
Chloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	µg/L	0.65	0.54	0.56	0.52	0.62	0.62	0.47	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acetone	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	1.0	1.0 U	1.1	1.2	1.0 U	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	4.7	4.1	4.7	4.6	4.9	5.1	4.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Acetate	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table B-1c. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Southern Gravel Aquifer, 2010-2014 Data Summary

		Southern Gravel Aquifer														
		MW-14B DOWN					MW-20B DOWN					MW-23B DOWN				
		R-57	R-58	R-59	R-60	R-61	R-57	R-58	R-59	R-60	R-61	R-57	R-58	R-59	R-60	R-61
Compound	**Units**	**5/4/10**	**5/3/11**	**5/8/12**	**5/14/13**	**5/20/14**	**5/3/10**	**5/4/11**	**5/9/12**	**5/15/13**	**5/21/14**	**5/7/10**	**5/5/11**	**5/10/12**	**5/16/13**	**5/22/14**
Volatile Organics (continued)																
Trichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chloroethylvinylether	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone (MIBK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
m,p-Xylene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table B-1c. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Southern Gravel Aquifer, 2010-2014 Data Summary

		Southern Gravel Aquifer													
		MW-29B DOWN							MW-30C DOWN						
		R-57	R-58	R-59		R-60		R-61	R-57	R-58		R-59	R-60	R-61	
Compound	Units	5/3/10	5/2/11	5/7/12	Duplicate (MW-31) 5/7/12	5/13/13	Duplicate (MW-31) 5/13/13	5/19/14	5/5/10	5/2/11	Duplicate (MW-31) 5/2/11	5/7/12	5/13/13	5/19/14	Duplicate (MW-31) 5/19/14
Volatile Organics (continued)															
Trichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chloroethylvinylether	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone (MIBK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
m,p-Xylene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table B-1d. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Field and Trip Blanks, 2010-2014 Data Summary

		Blanks																							
		Field Blanks					Trip Blanks																		
		R-57	R-58	R-59	R-60	R-61	R-57				R-58				R-59				R-60				R-61			
Compound	**Units**	**5/10/10**	**5/5/11**	**5/10/12**	**5/13/13**	**5/21/14**	**5/7/10**	**5/8/10**	**5/9/10**	**5/10/10**	**5/2/11**	**5/3/11**	**5/4/11**	**5/5/11**	**5/7/12**	**5/8/12**	**5/9/12**	**5/10/12**	**5/13/13**	**5/14/13**	**5/15/13**	**5/16/13**	**5/19/14**	**5/20/14**	**5/21/14**	**5/22/14**
Field Parameters																									
pH	s.u.	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Conductivity	µmhos/cm	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Temperature	C	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Conventional Parameters																									
Chloride	mg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Sulfate	mg/L	2.3	2.0 U	3.1	2.0 U	2.0 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Chemical Oxygen Demand	mg/L	5.00 U	5.00 U	21.2	5.00 U	10.0 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Total Organic Carbon	mg/L	1.50 U	1.50 U	1.30	1.50 U	1.50 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Dissolved Metals																									
Iron	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Manganese	mg/L	0.001 U	0.001 U	0.001	0.001 U	0.001 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Semi-Volatile Organics																									
1,4-Dioxane	µg/L	2.0 U	2.0 U	0.4 U	0.4 U	0.4 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Volatile Organics																									
Chloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	µg/L	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Acetone	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Acetate	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chloroethylvinylether	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone (MIBK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Table B-1d. Minimum Functional Standard and Organic Parameters in Groundwater, Midway Landfill, Field and Trip Blanks, 2010-2014 Data Summary

		Blanks																							
		Field Blanks					Trip Blanks																		
		R-57	R-58	R-59	R-60	R-61	R-57				R-58				R-59				R-60				R-61			
Compound	**Units**	**5/10/10**	**5/5/11**	**5/10/12**	**5/13/13**	**5/21/14**	**5/7/10**	**5/8/10**	**5/9/10**	**5/10/10**	**5/2/11**	**5/3/11**	**5/4/11**	**5/5/11**	**5/7/12**	**5/8/12**	**5/9/12**	**5/10/12**	**5/13/13**	**5/14/13**	**5/15/13**	**5/16/13**	**5/19/14**	**5/20/14**	**5/21/14**	**5/22/14**
Volatile Organics (continued)																									
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
m,p-Xylene	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table B-1 Notes:

UP or DOWN in column title denotes whether the well is located upgradient or down gradient of the landfills influence.
U = Indicated the compound was undetected at the reported concentration
J = Indicated the compound was detected at an estimated concentration
R = Rejected based on QC review. See report for details.
- - = Not ananlyzed
R-57 = Round 57, May 2010
R-58 = Round 58, May 2011
R-59 = Round 59, May 2012
R-60 = Round 60, May 2013
R-61 = Round 61, May 2014

Appendix C

Laboratory Reports and Chain-of-Custody Documentation

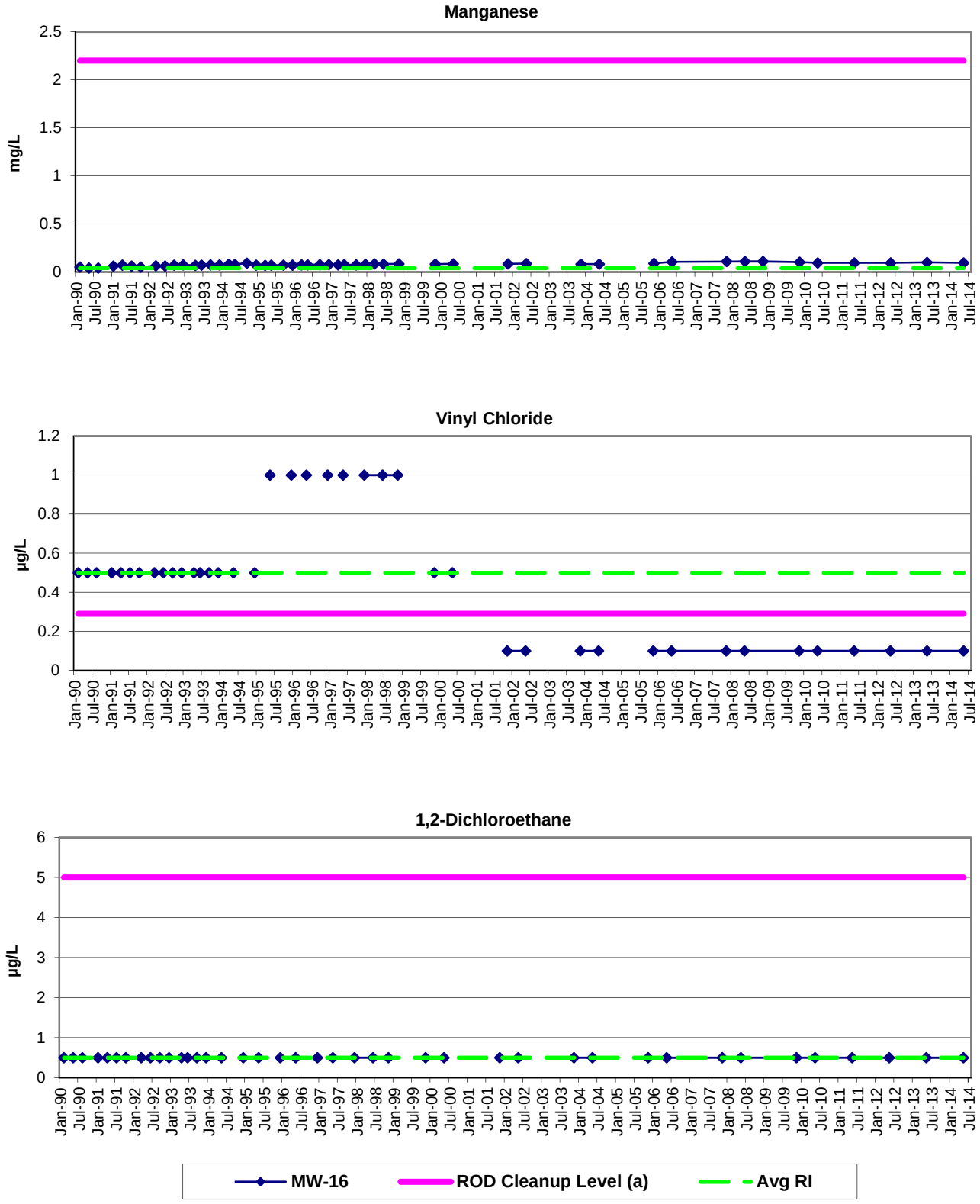
(See Attached CD)

Appendix D

Time-Series Plots, ROD Contaminants of Concern

Midway Landfill
ROD Contaminants of Concern

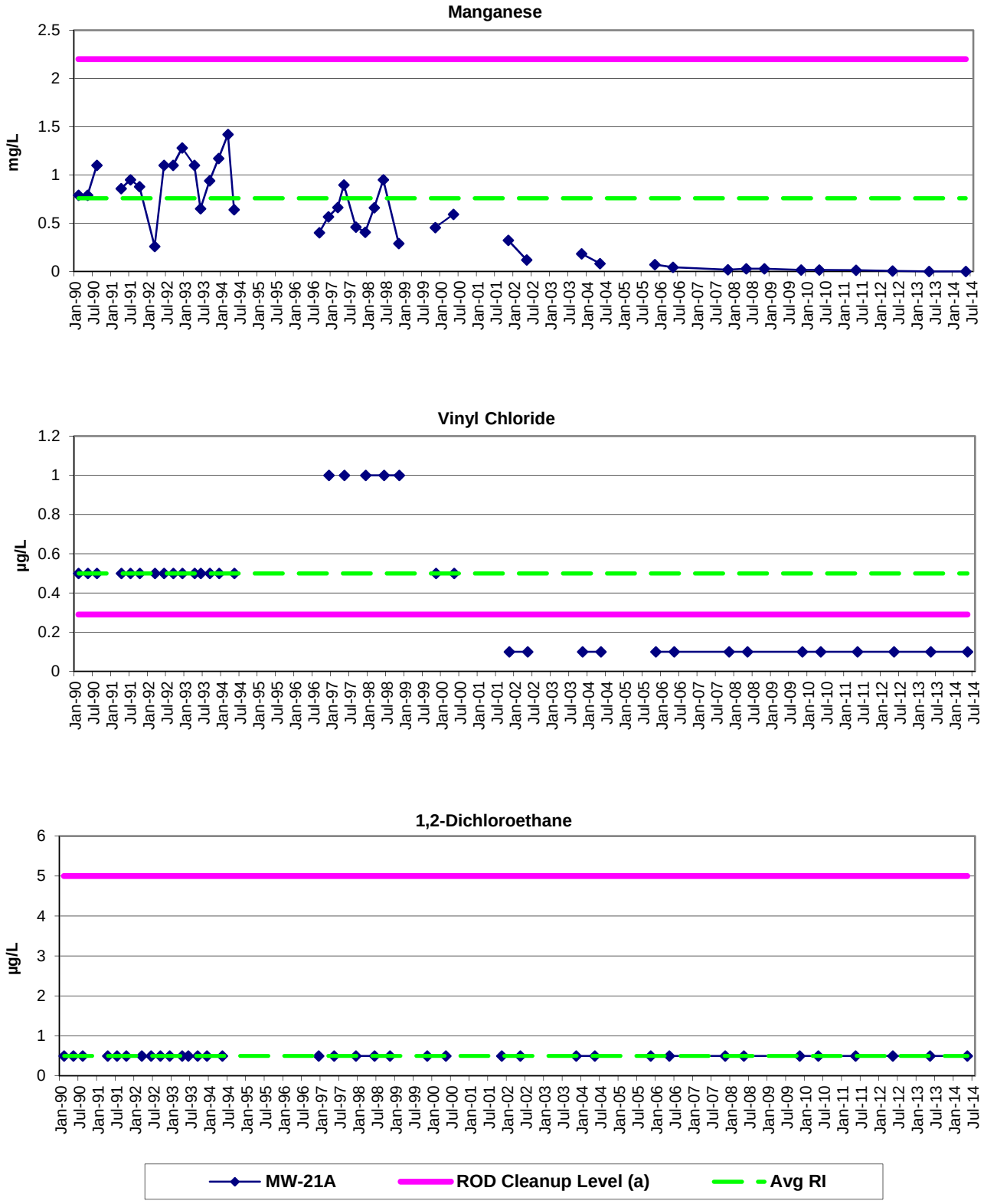
Upgradient Upper Gravel Aquifer Well
MW-16



(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Midway Landfill
ROD Contaminants of Concern

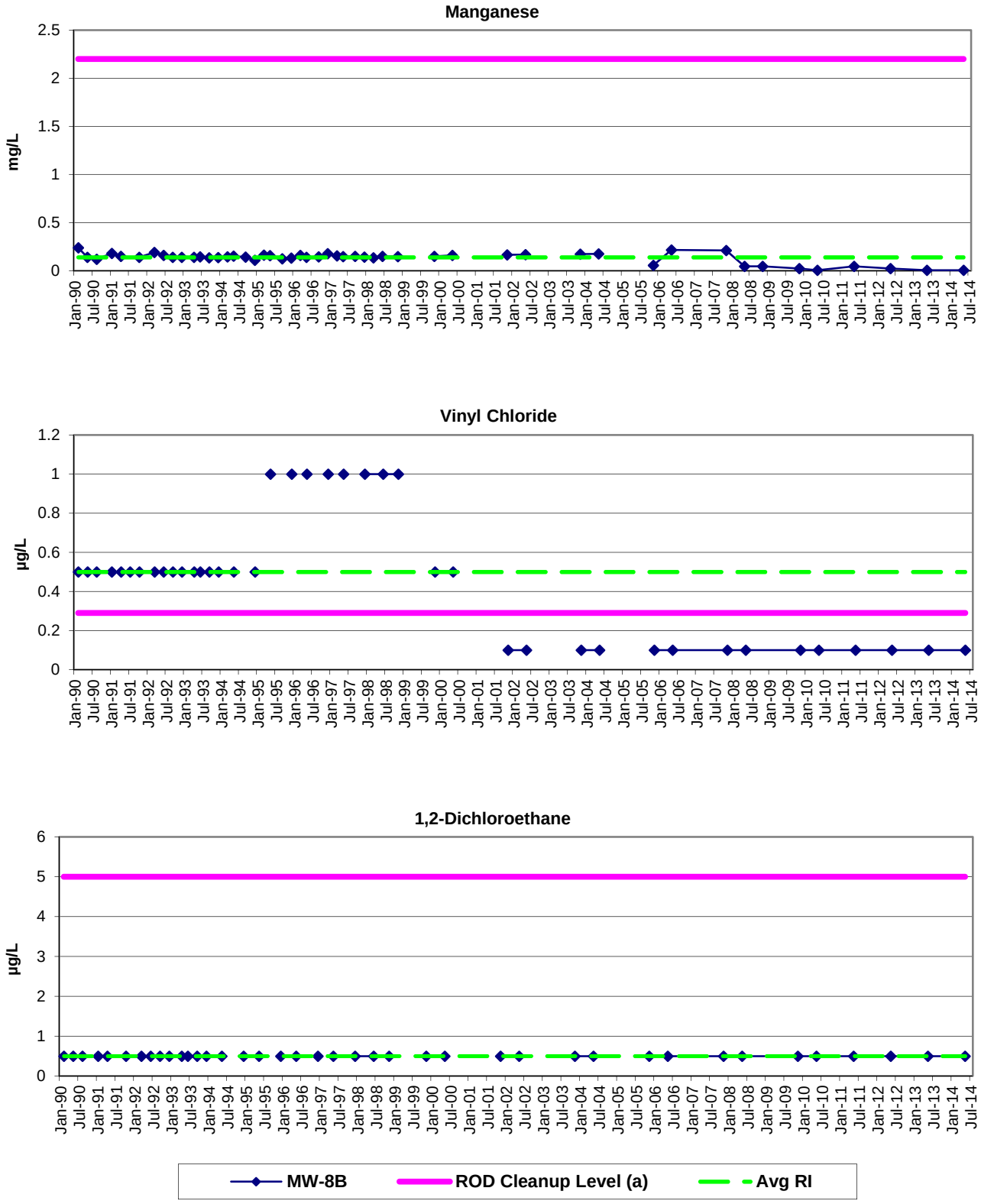
Upgradient Upper Gravel Aquifer Well
MW-21A



(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Midway Landfill
ROD Contaminants of Concern

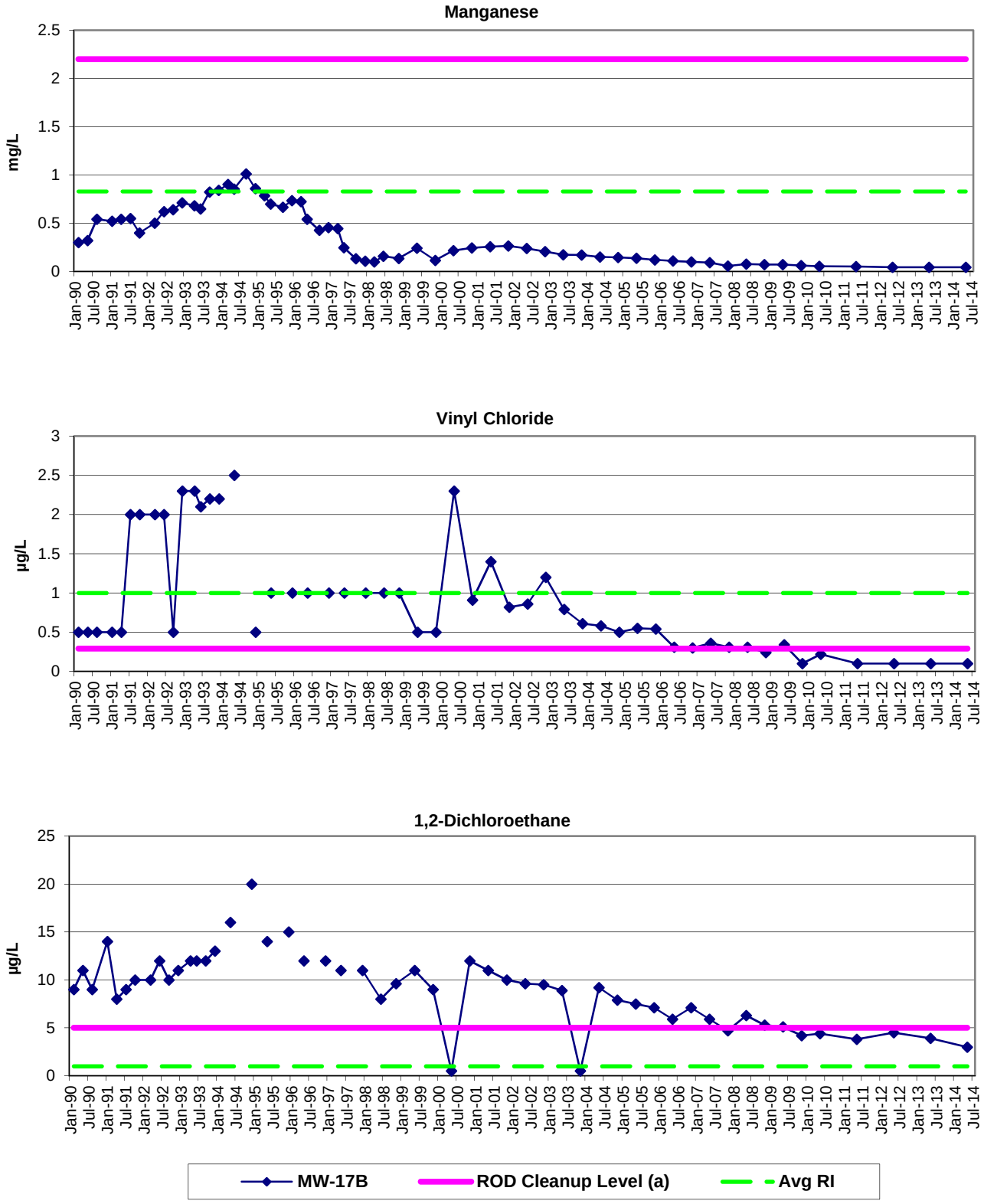
Upgradient Sand Aquifer Well
MW-8B



(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Midway Landfill
ROD Contaminants of Concern

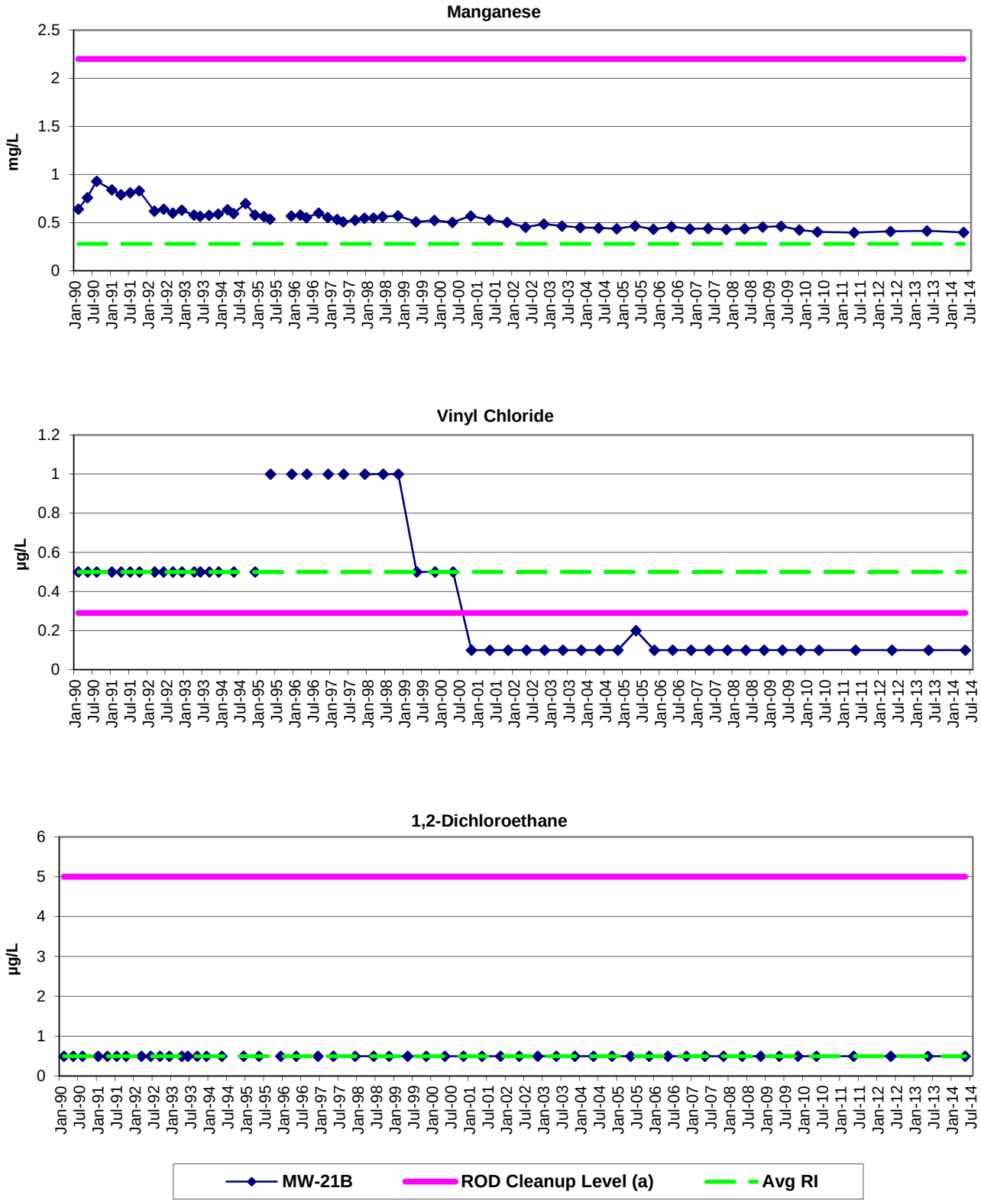
Upgradient Sand Aquifer Well
MW-17B



(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Midway Landfill
ROD Contaminants of Concern

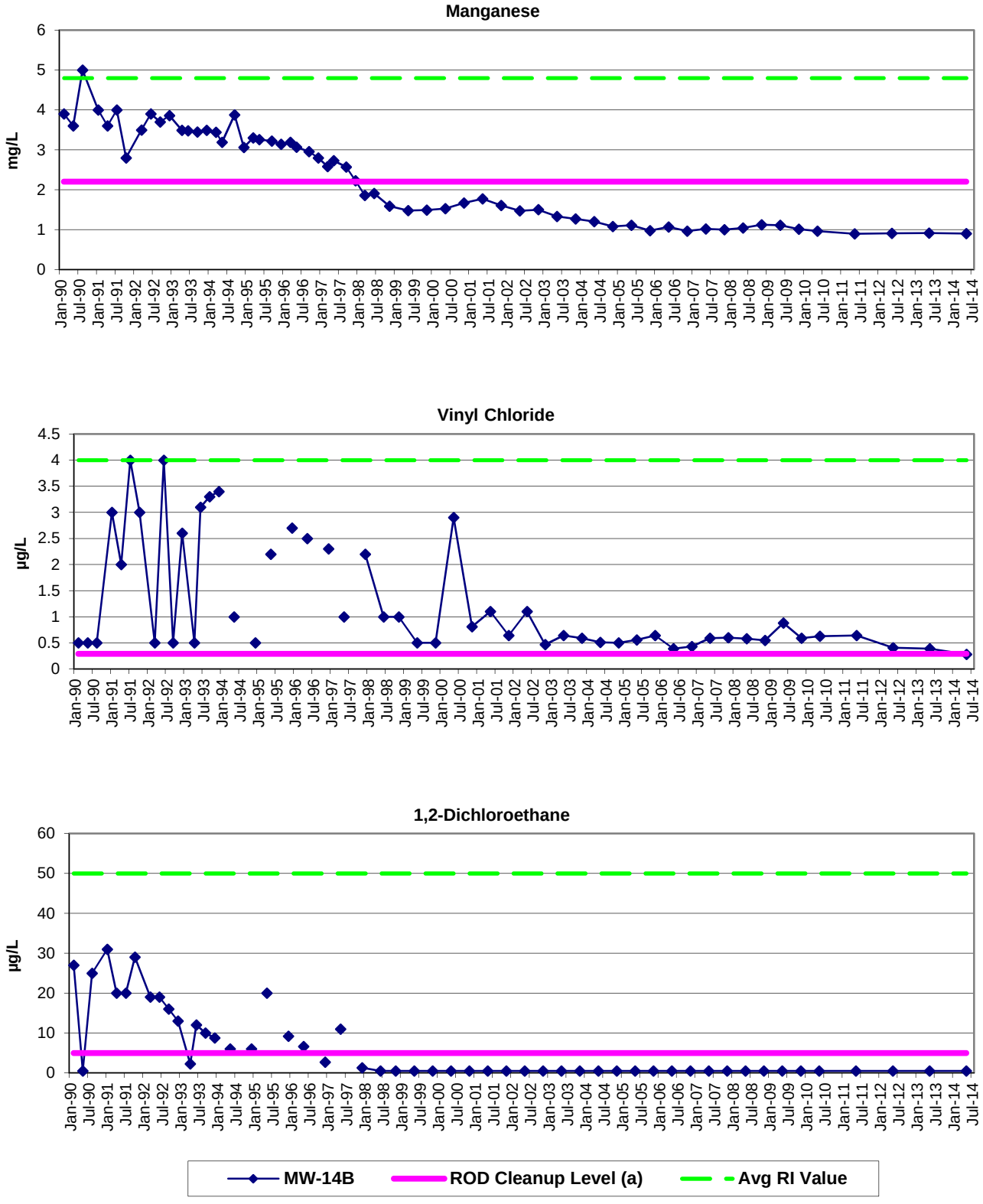
Upgradient Sand Aquifer Well
MW-21B



(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Midway Landfill
ROD Contaminants of Concern

Downgradient Southern Gravel Aquifer Well
MW-14B

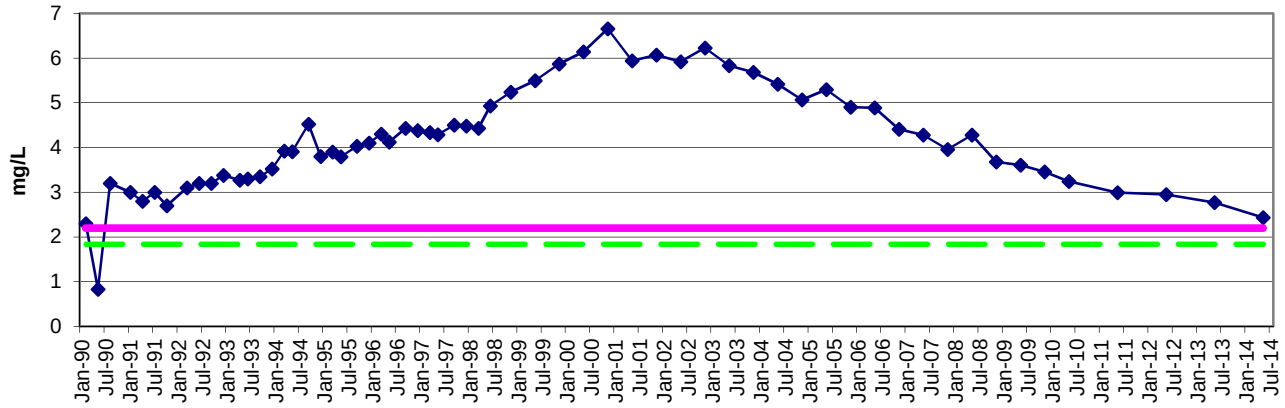


(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

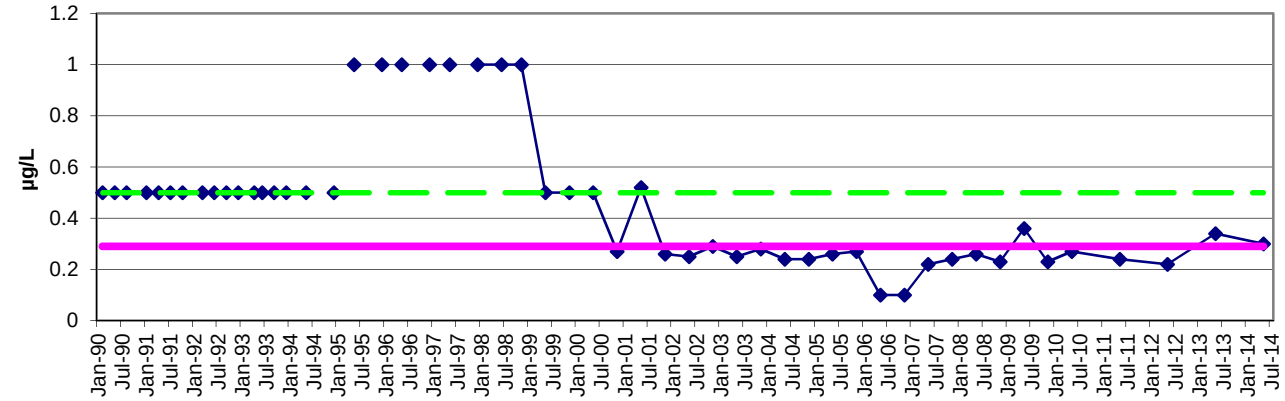
Midway Landfill
ROD Contaminants of Concern

Downgradient Southern Gravel Aquifer Well
MW-20B

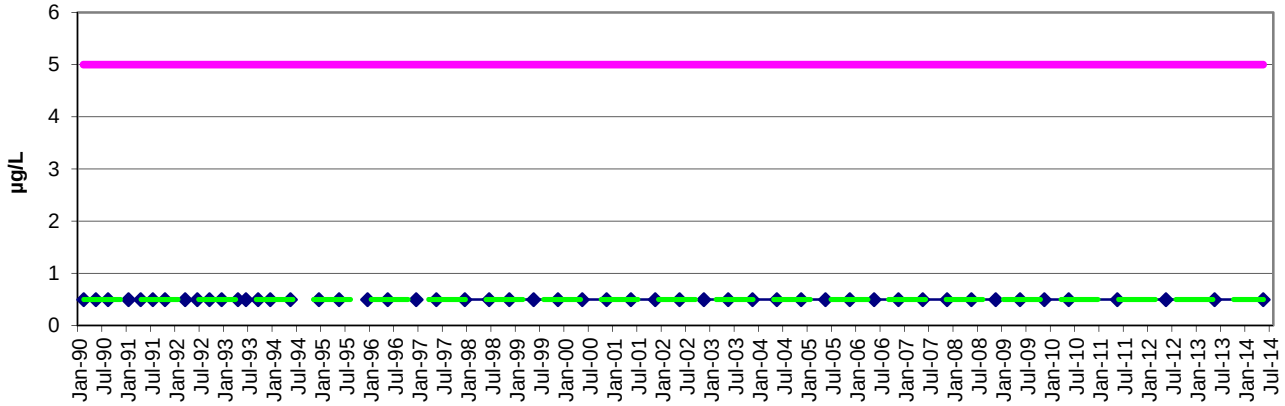
Manganese



Vinyl Chloride



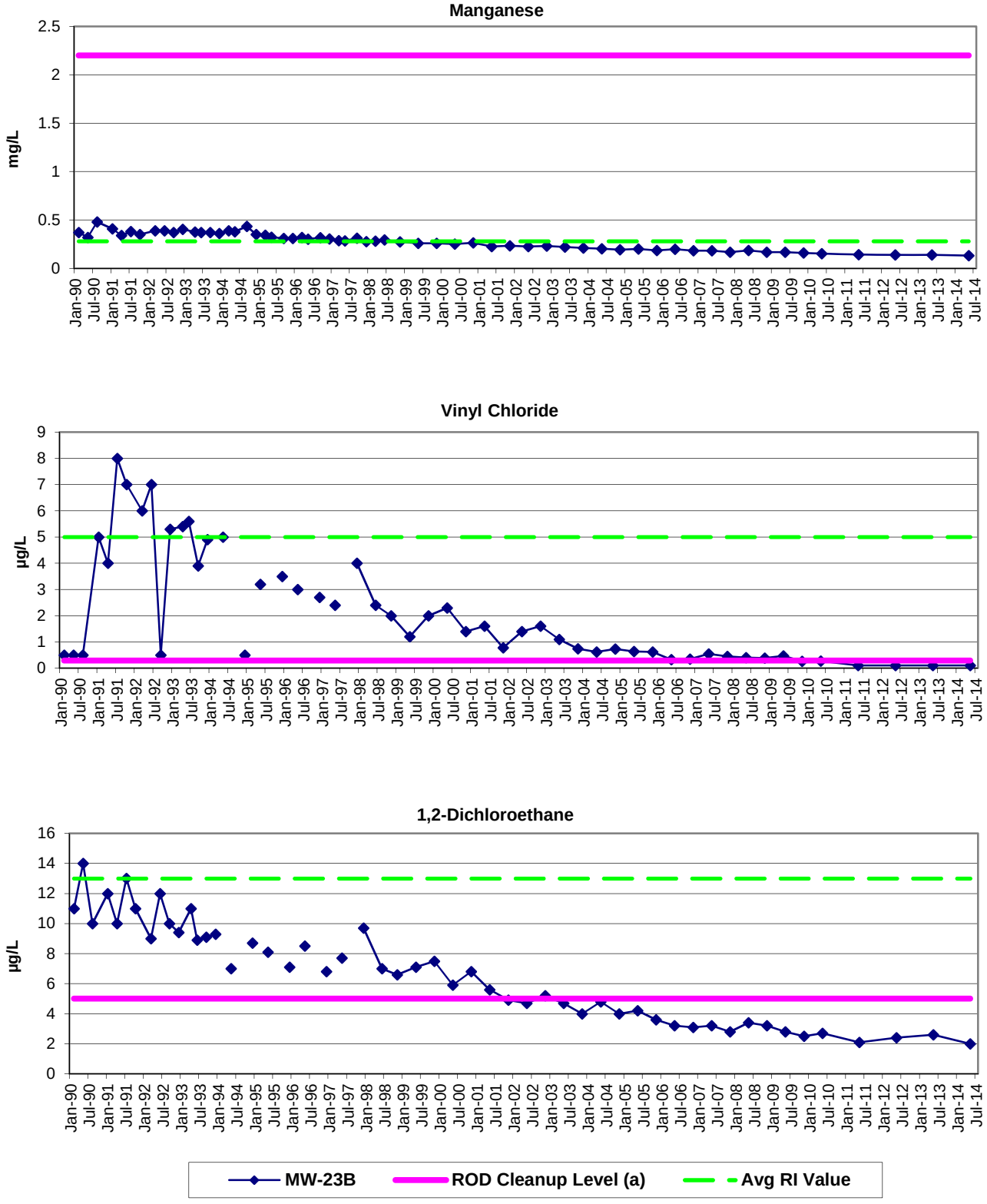
1,2-Dichloroethane



(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Midway Landfill
ROD Contaminants of Concern

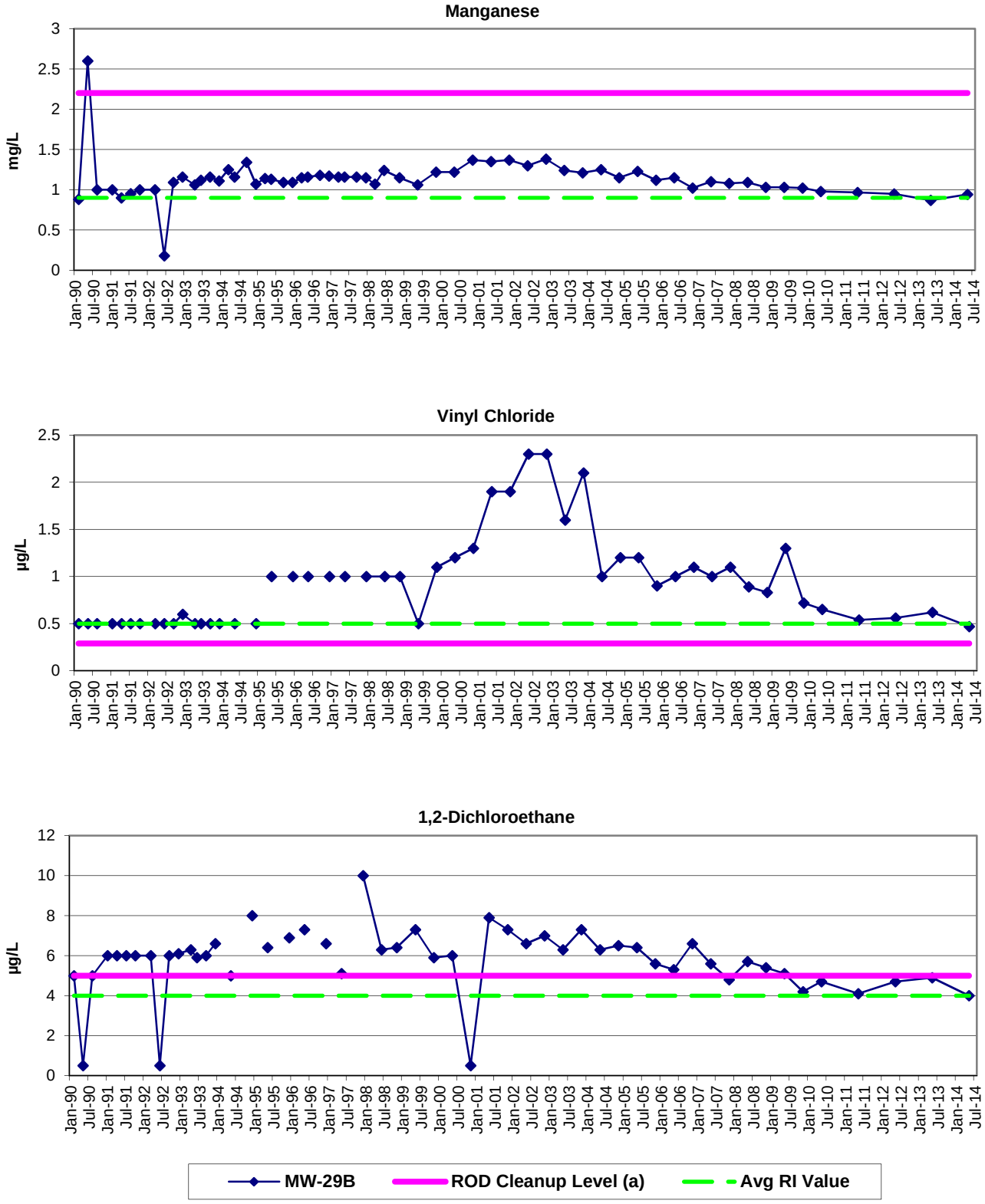
Downgradient Southern Gravel Aquifer Well
MW-23B



(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Midway Landfill
ROD Contaminants of Concern

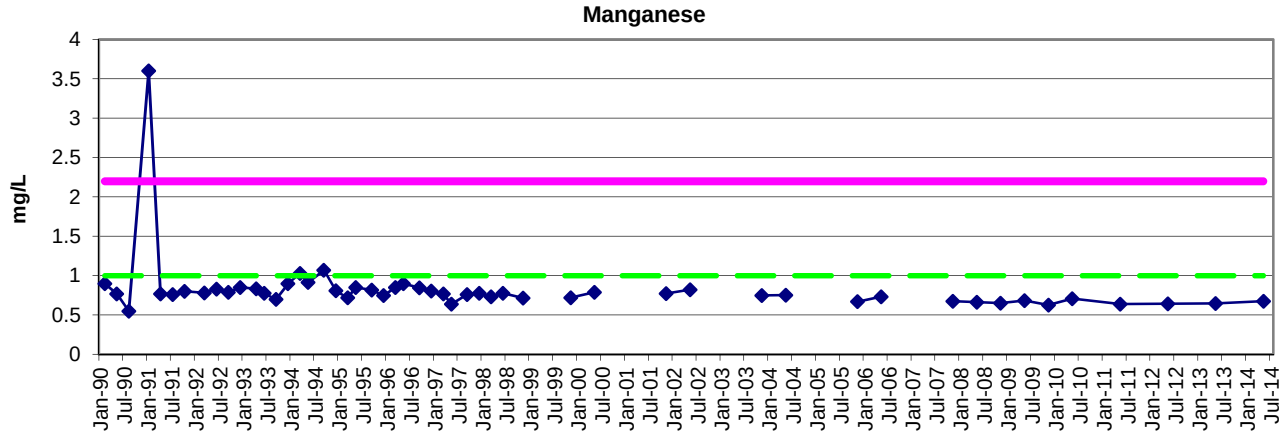
Downgradient Southern Gravel Aquifer Well
MW-29B

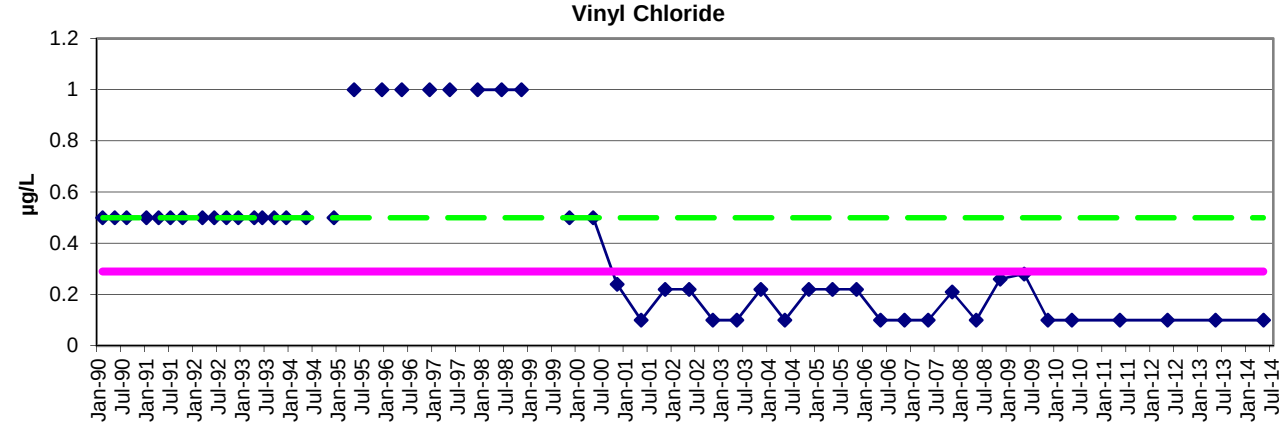


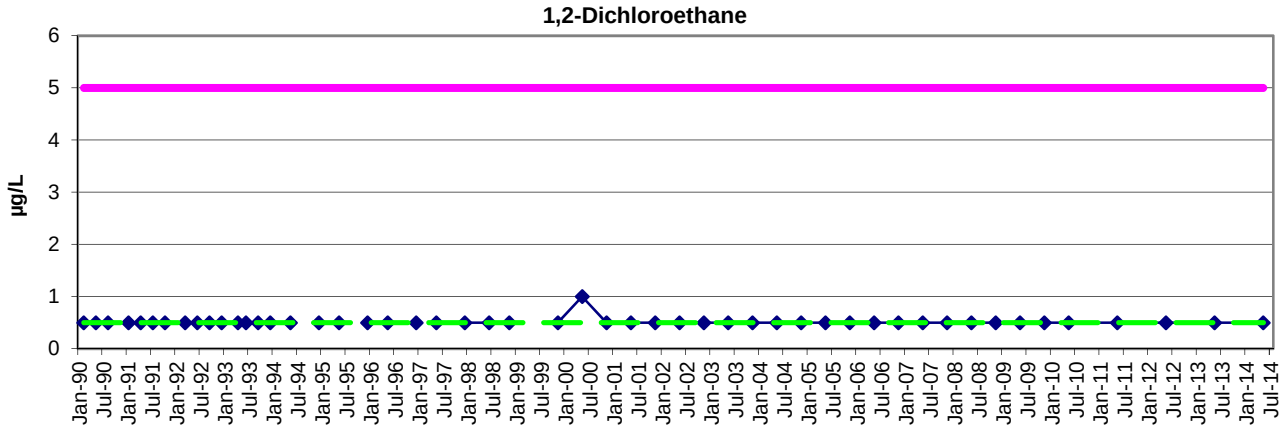
(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Midway Landfill
ROD Contaminants of Concern

Downgradient Southern Gravel Aquifer Well
MW-30C







MW-30C | ROD Cleanup Level (a) | Avg RI Value

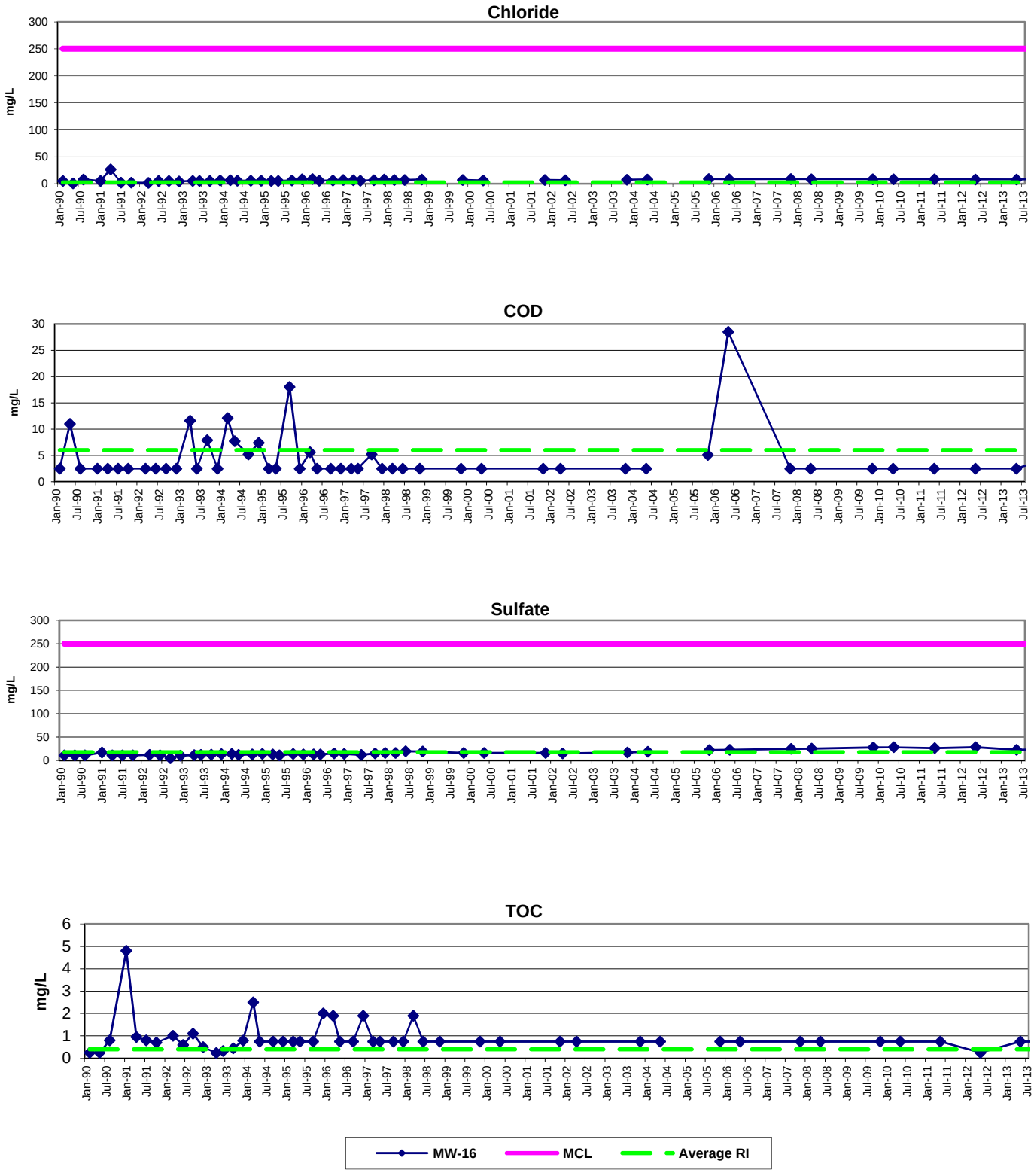
(a) Cleanup level established in the final EPA Record of Decision for the Midway Landfill, September 6, 2000.
Non-detected values are shown as 1/2 the detection limit.
RI = Remedial Investigation

Appendix E

Time-Series Plots, Groundwater Quality Parameters not included in the ROD

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

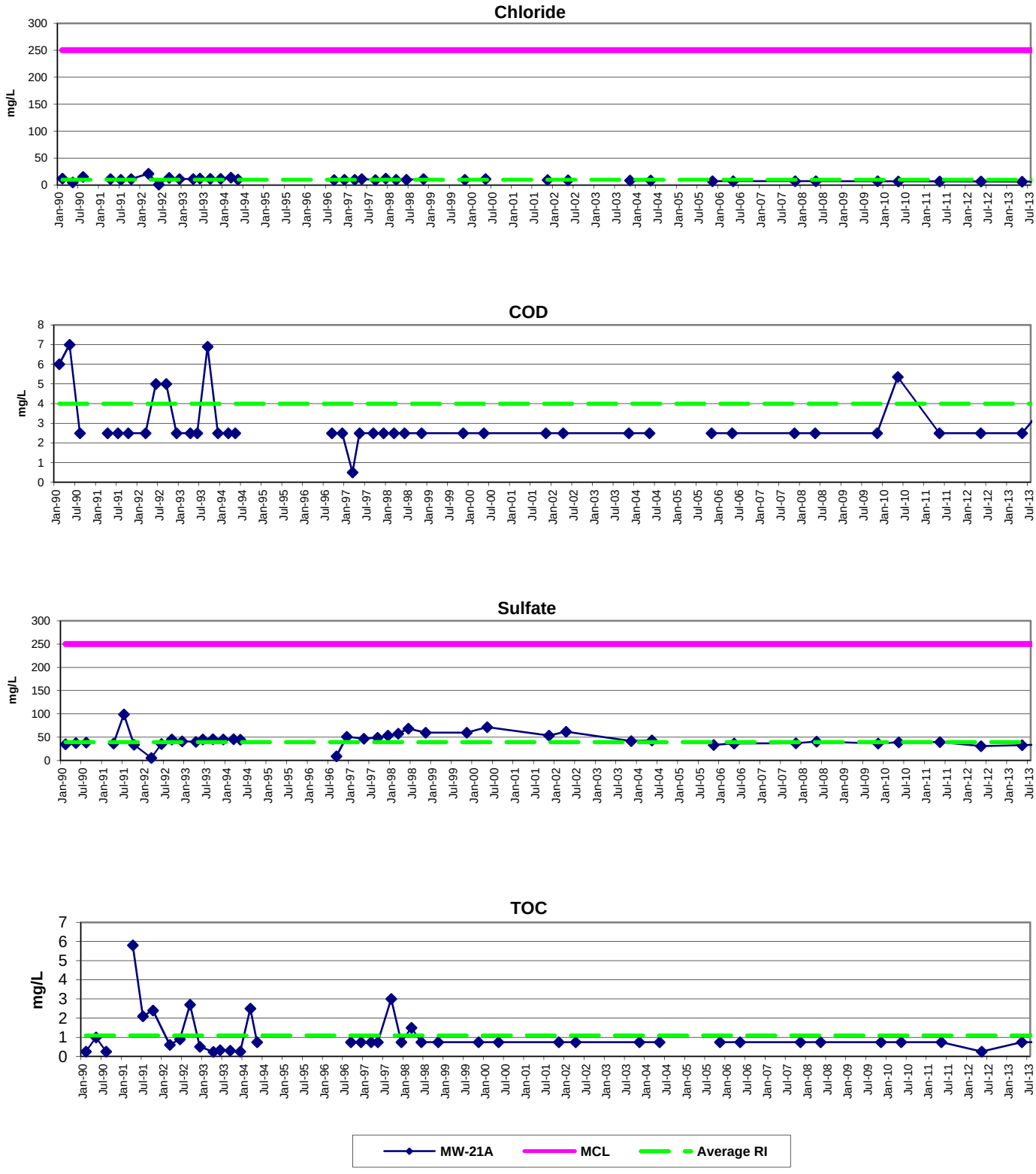
Upgradient Upper Gravel Aquifer Well
MW-16



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

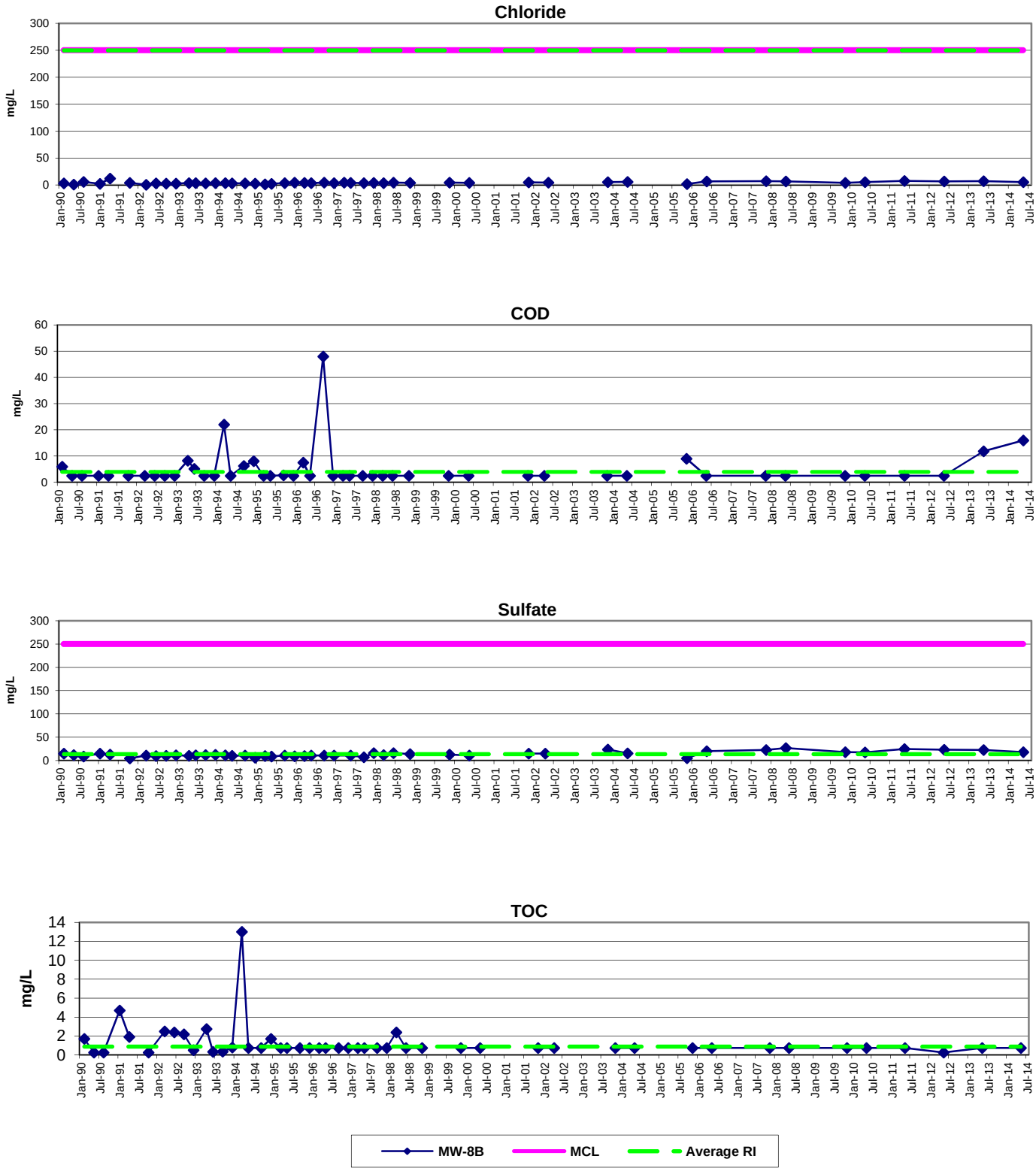
Upgradient Upper Gravel Aquifer Well
MW-21A



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

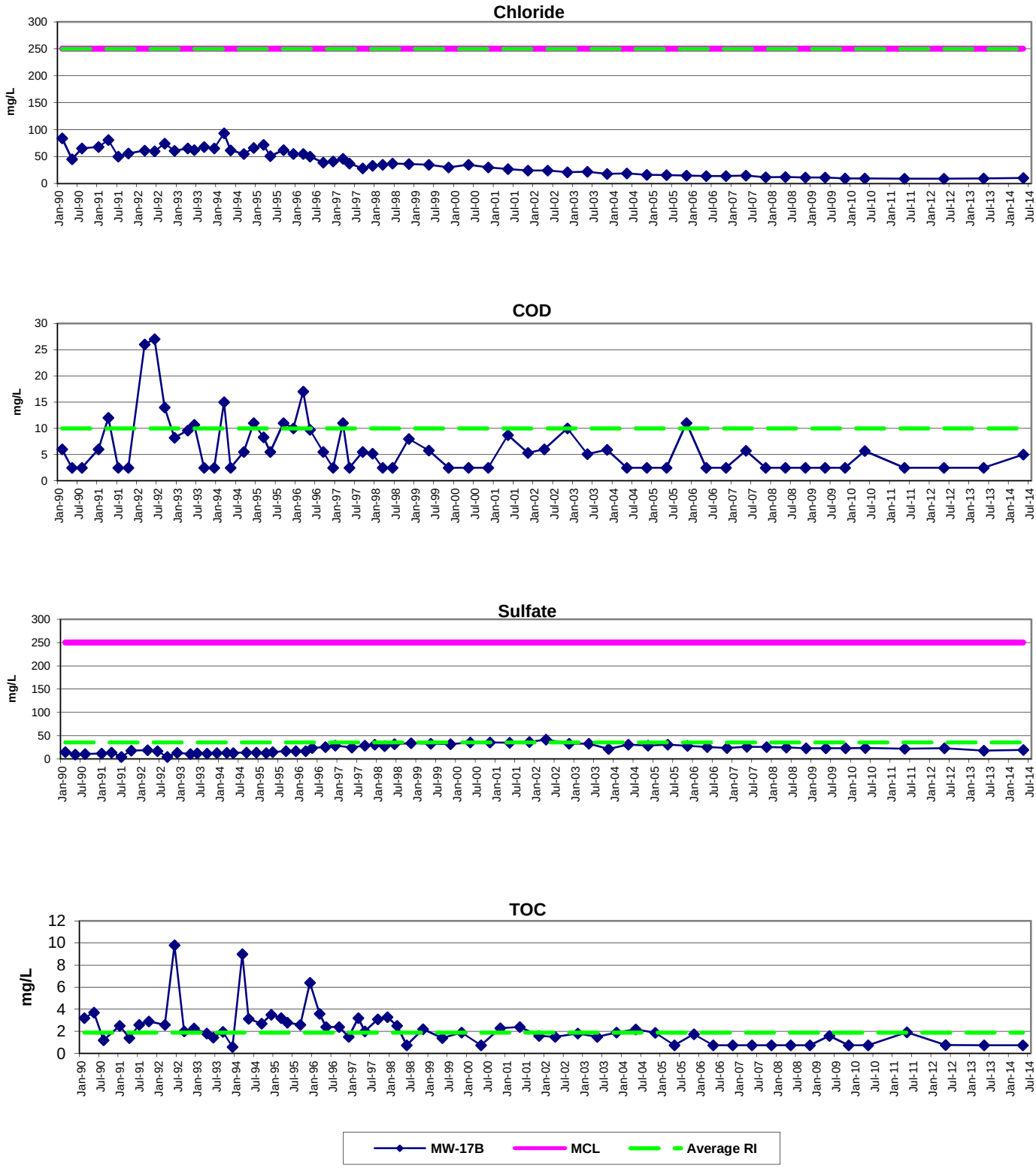
Upgradient Sand Aquifer Well
MW-8B



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

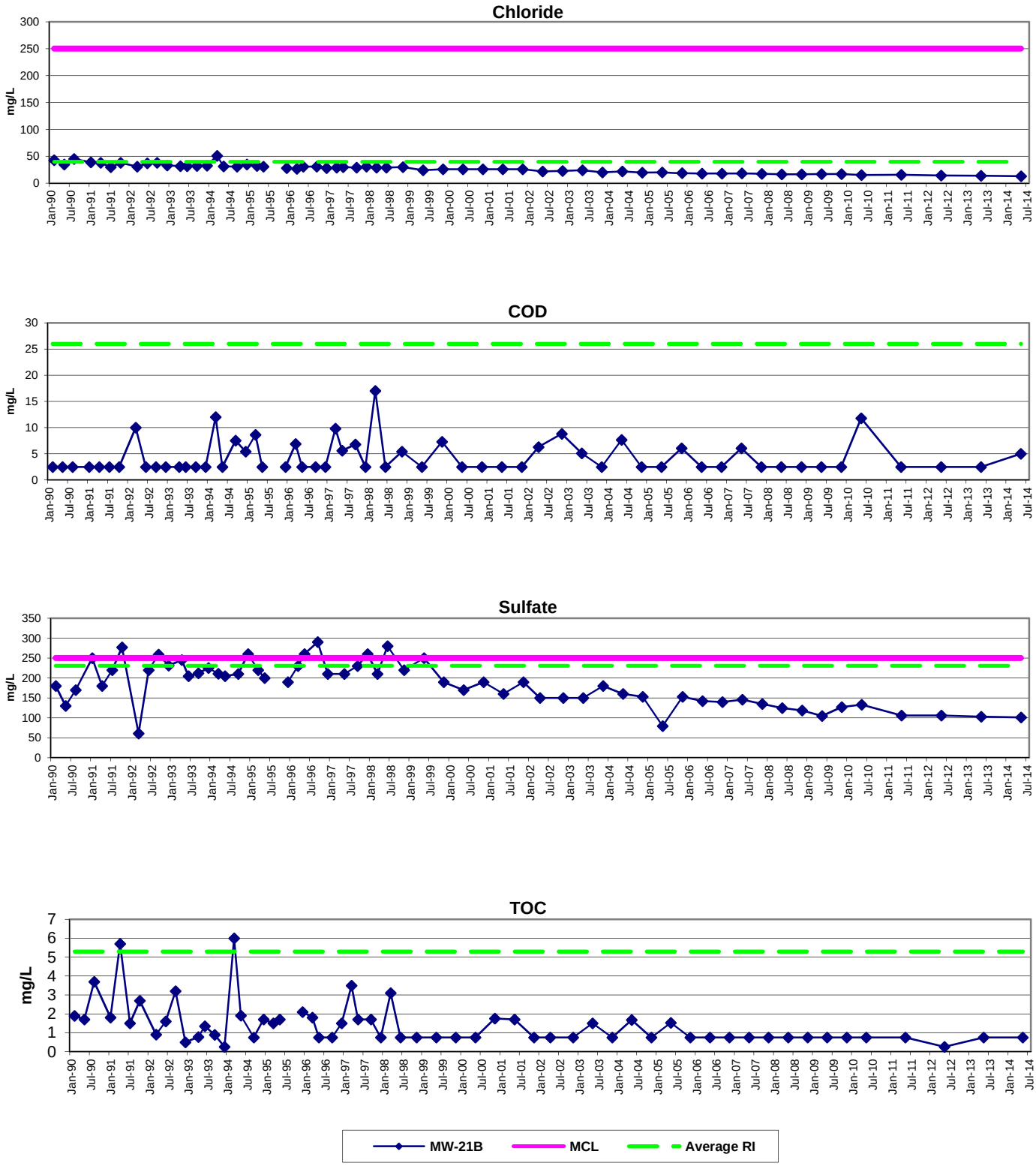
Upgradient Sand Aquifer Well
MW-17B



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

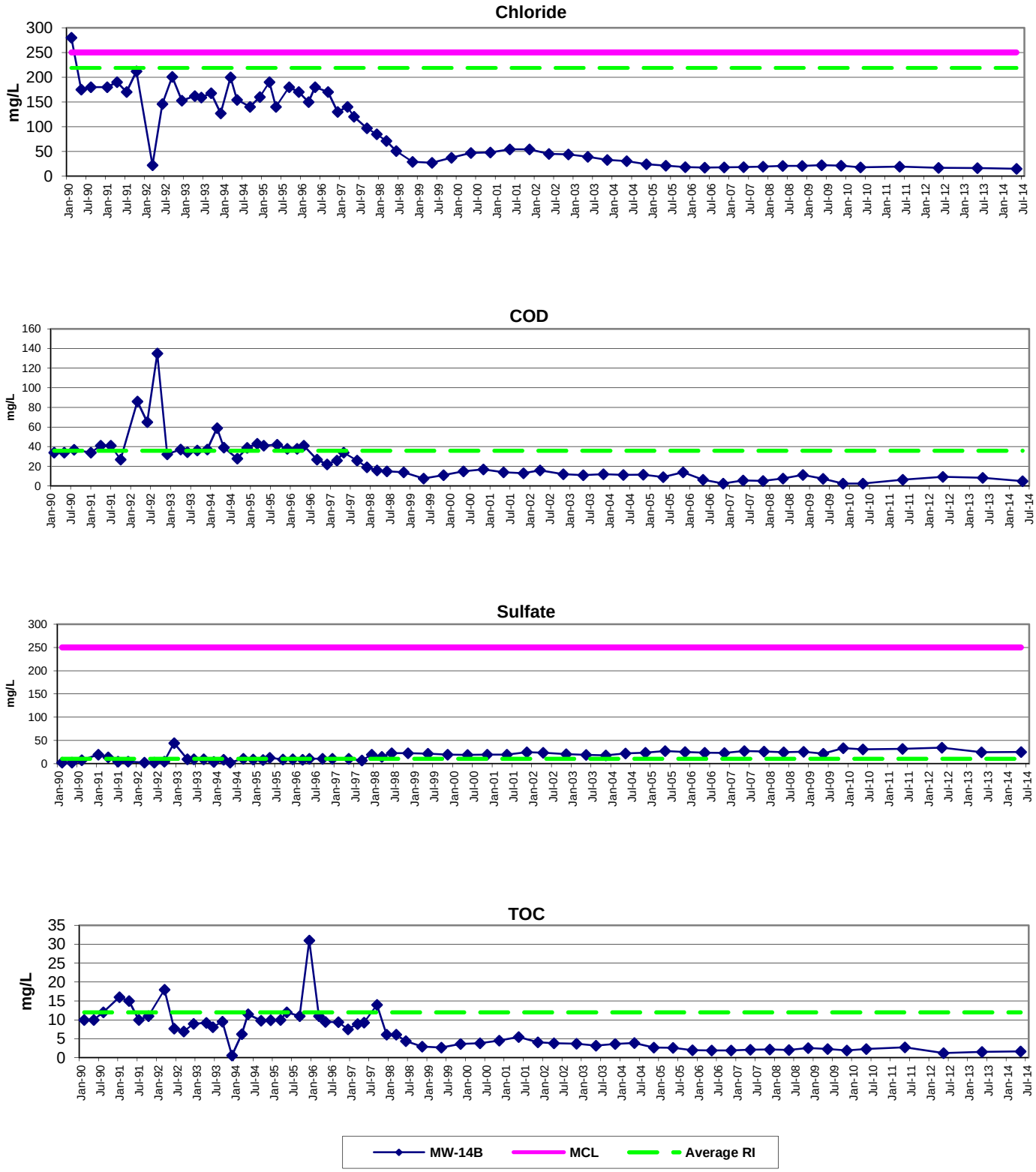
Upgradient Sand Aquifer Well
MW-21B



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

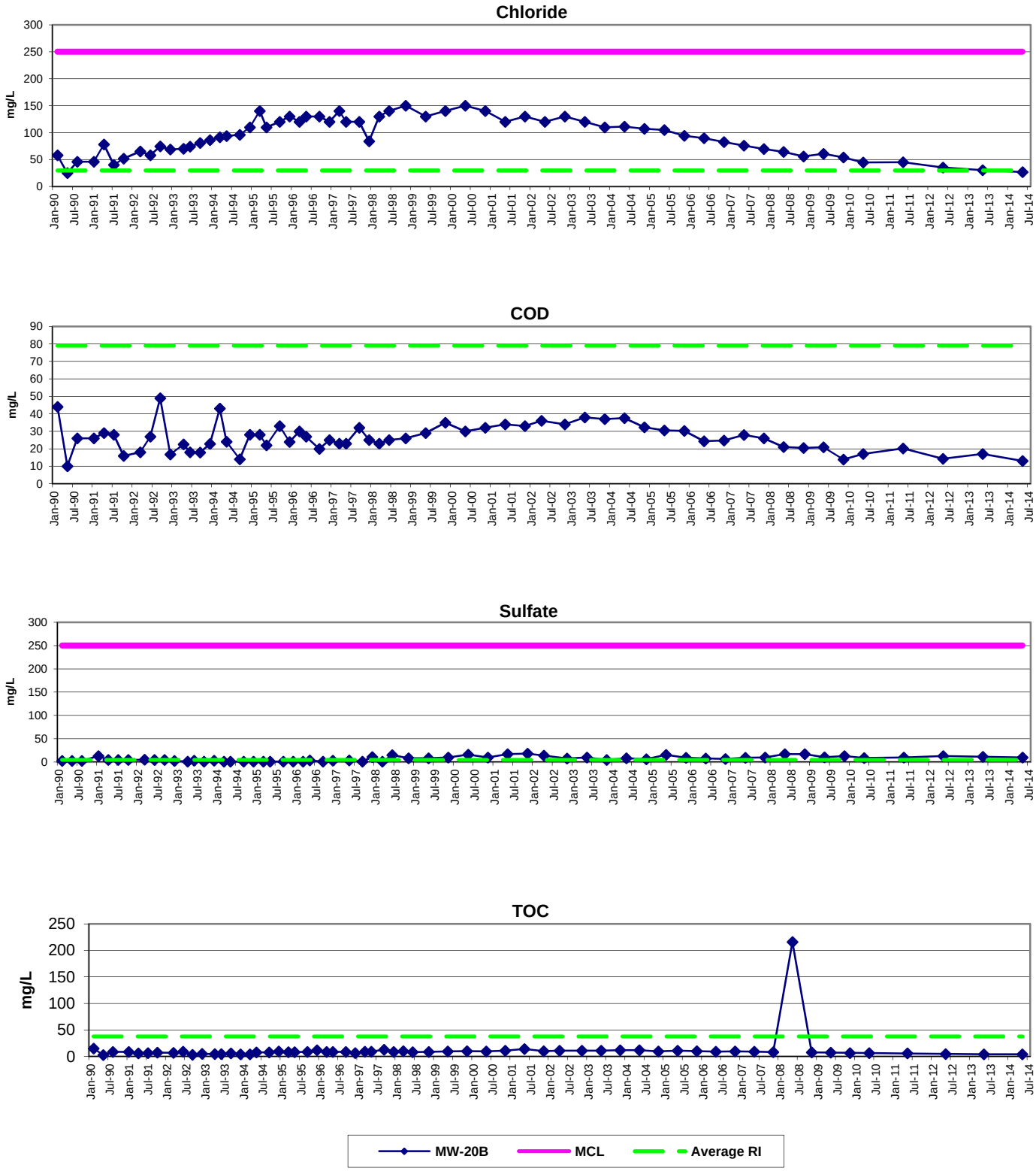
Downgradient Southern Gravel Aquifer Well
MW-14B



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

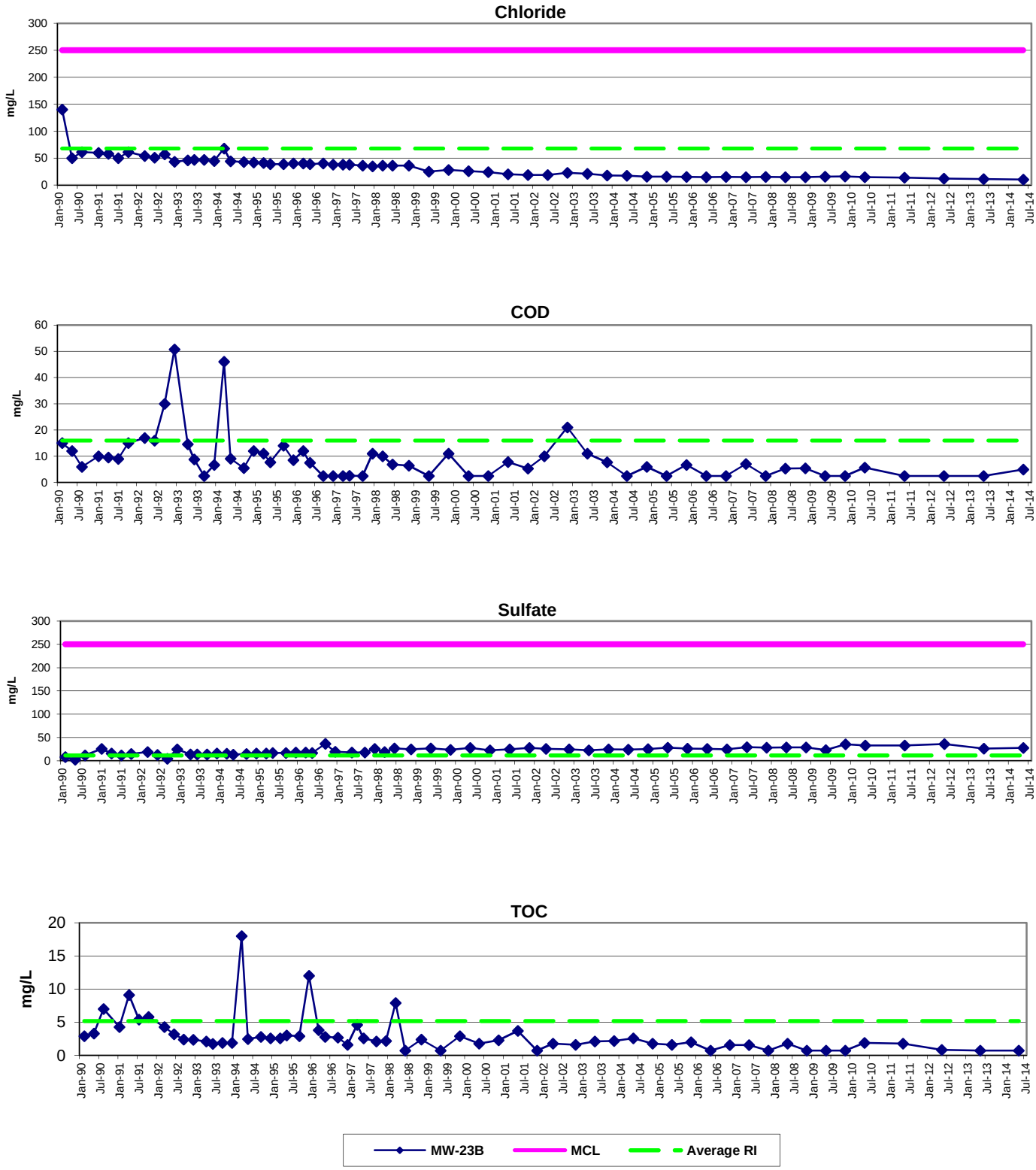
Downgradient Southern Gravel Aquifer Well
MW-20B



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

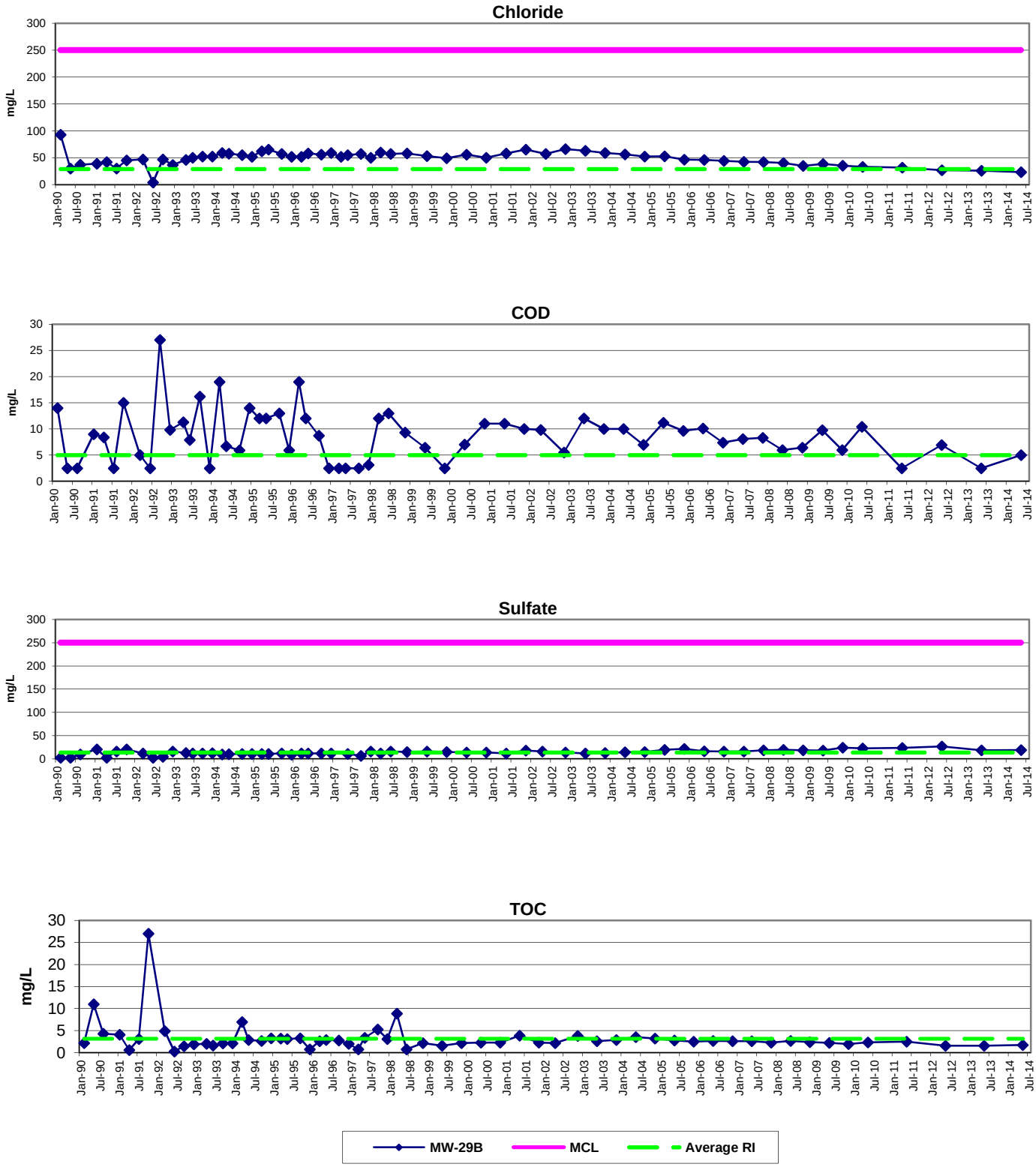
Downgradient Southern Gravel Aquifer Well
MW-23B



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

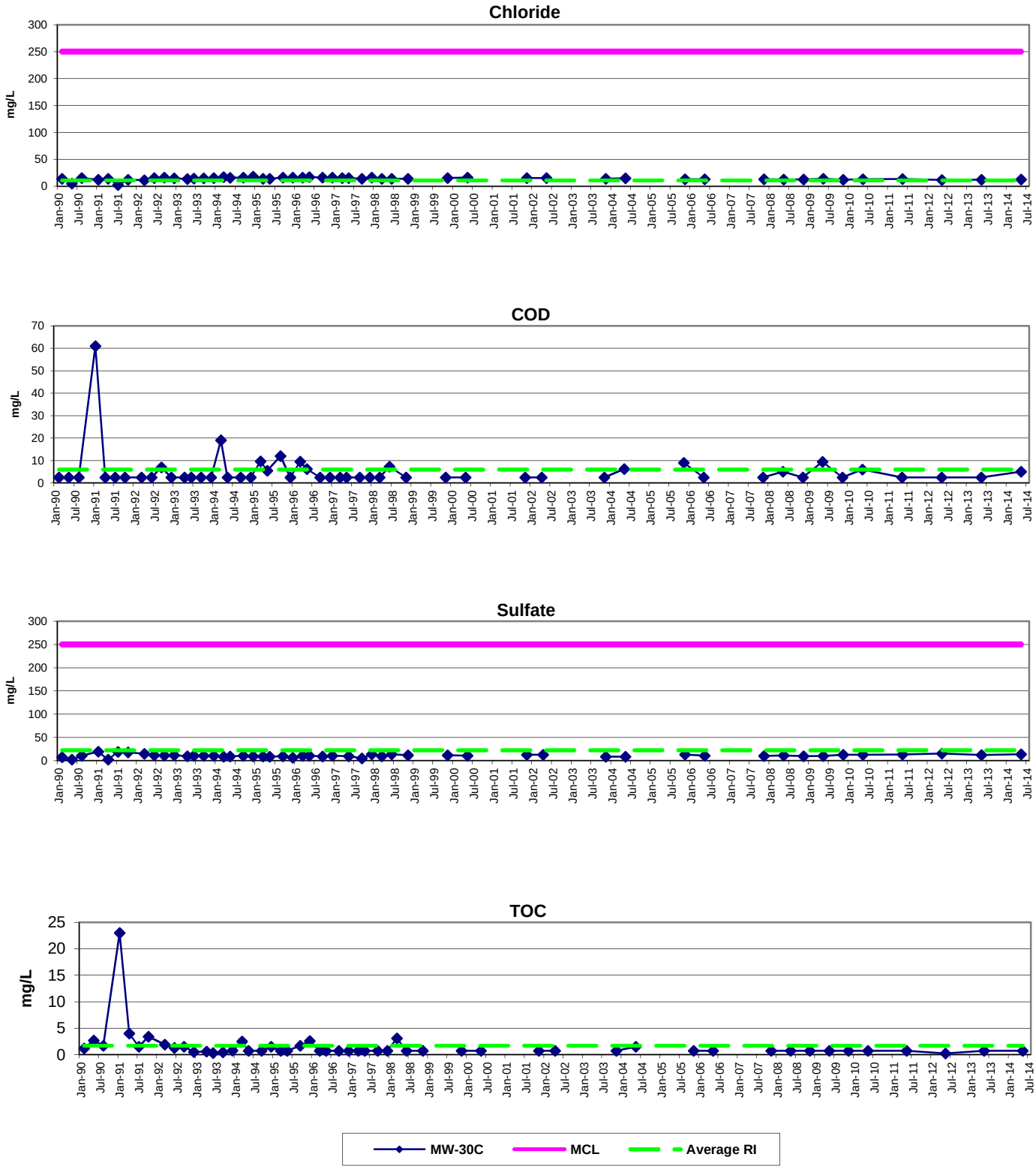
Downgradient Southern Gravel Aquifer Well
MW-29B



Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

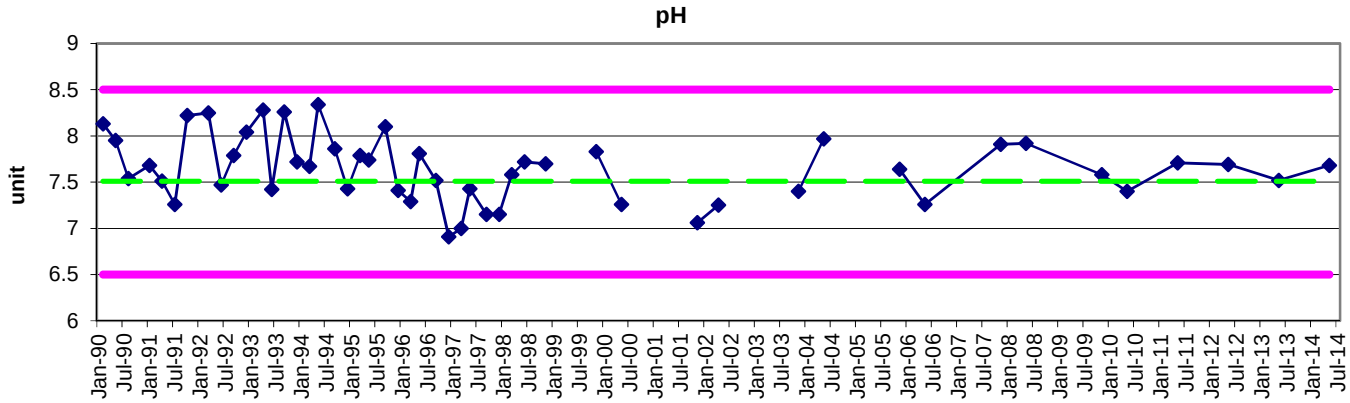
Downgradient Southern Gravel Aquifer Well
MW-30C

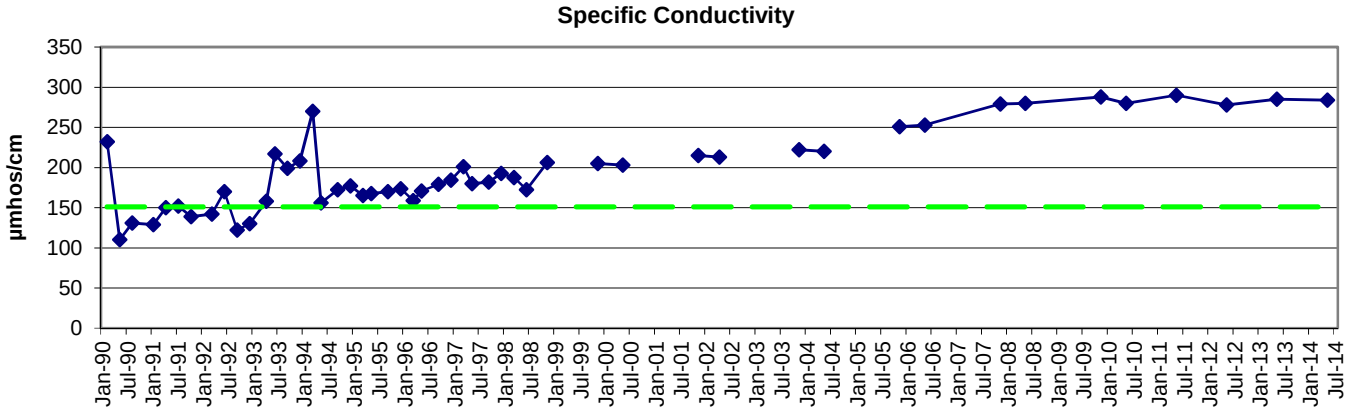


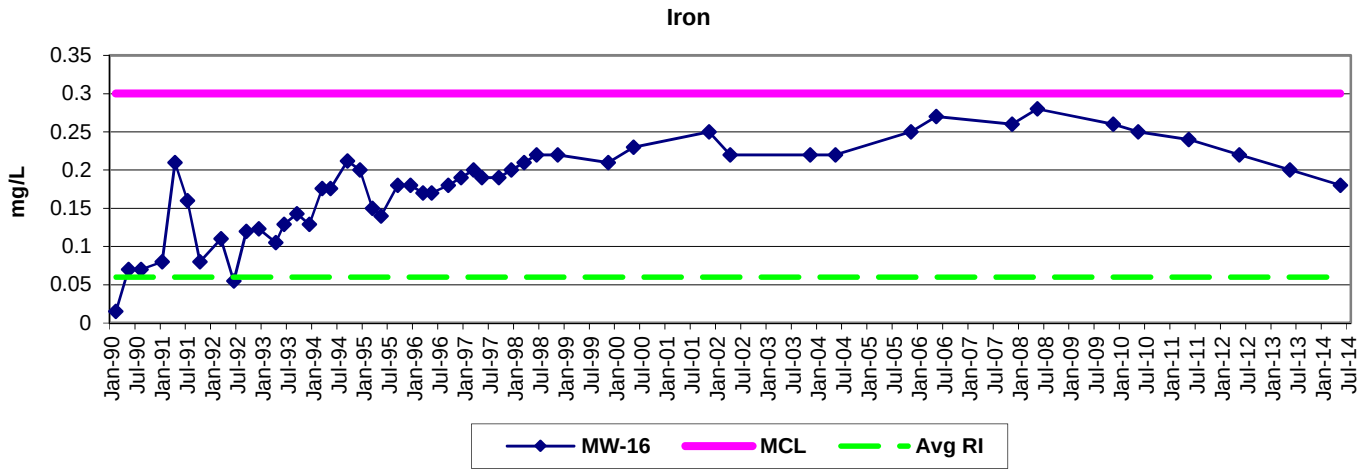
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Upper Gravel Aquifer Well
MW-16



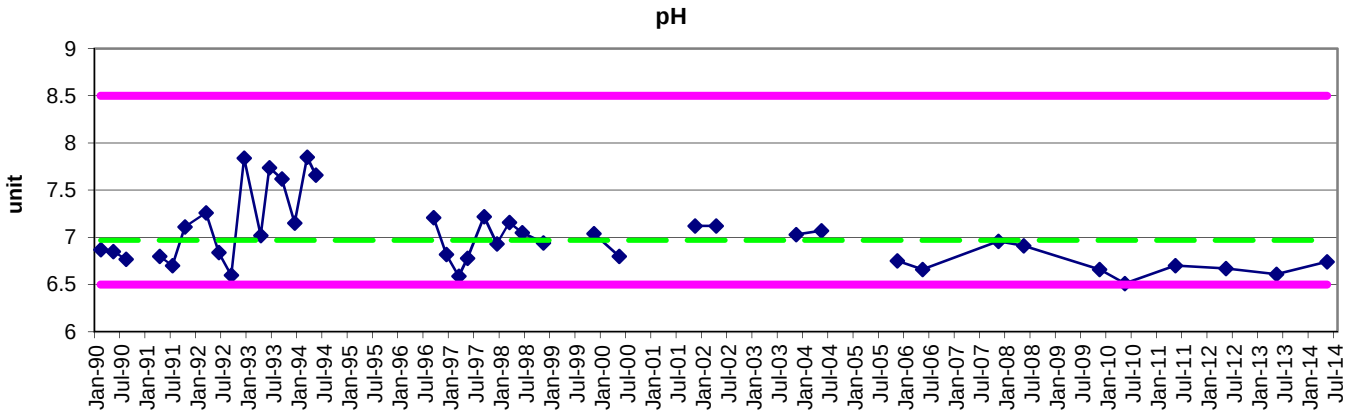


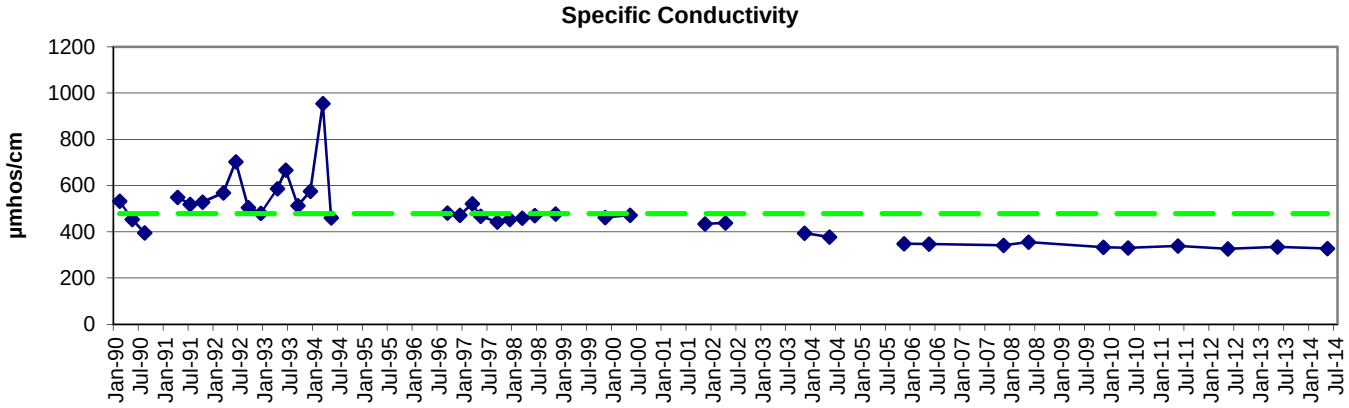


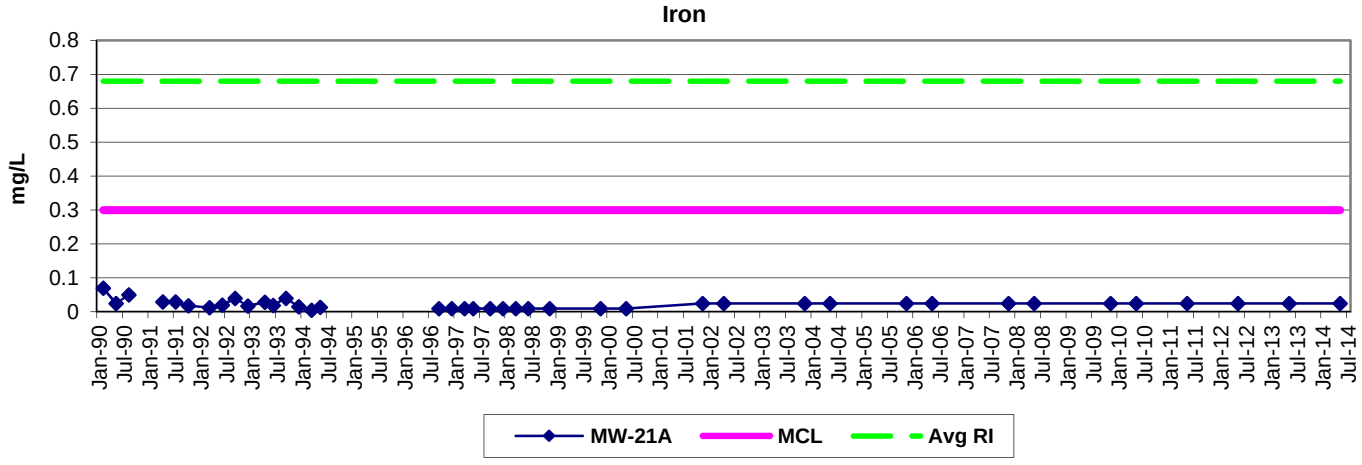
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Upper Gravel Aquifer Well
MW-21A



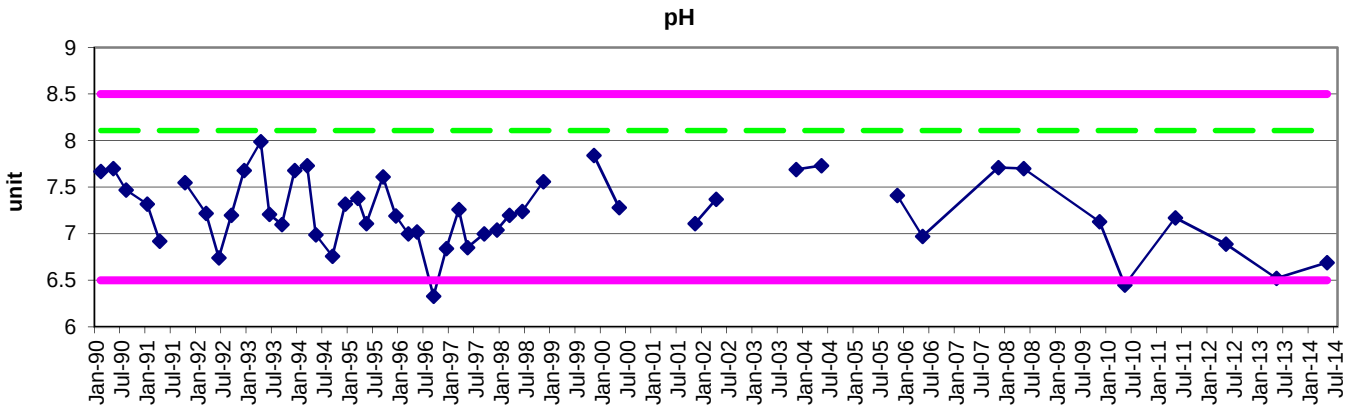


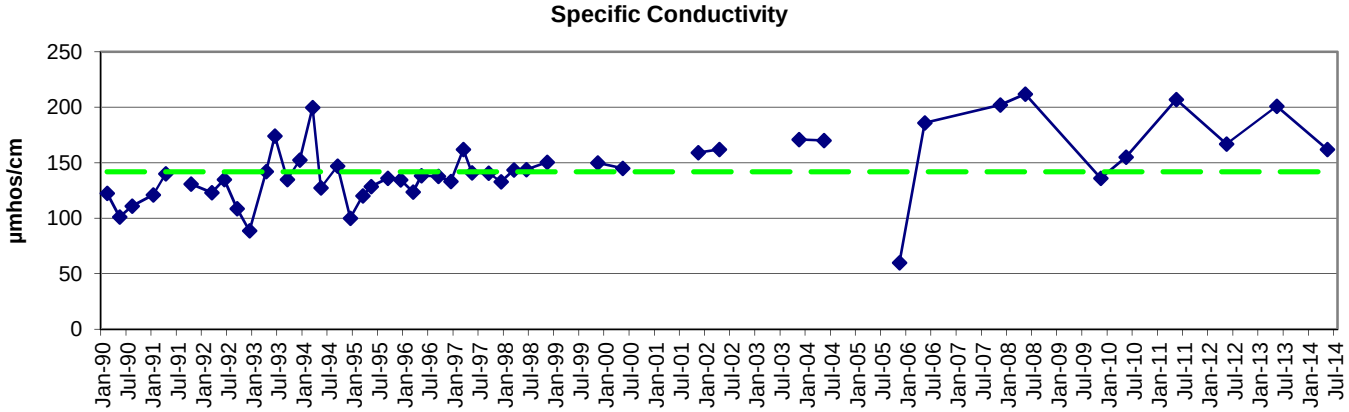


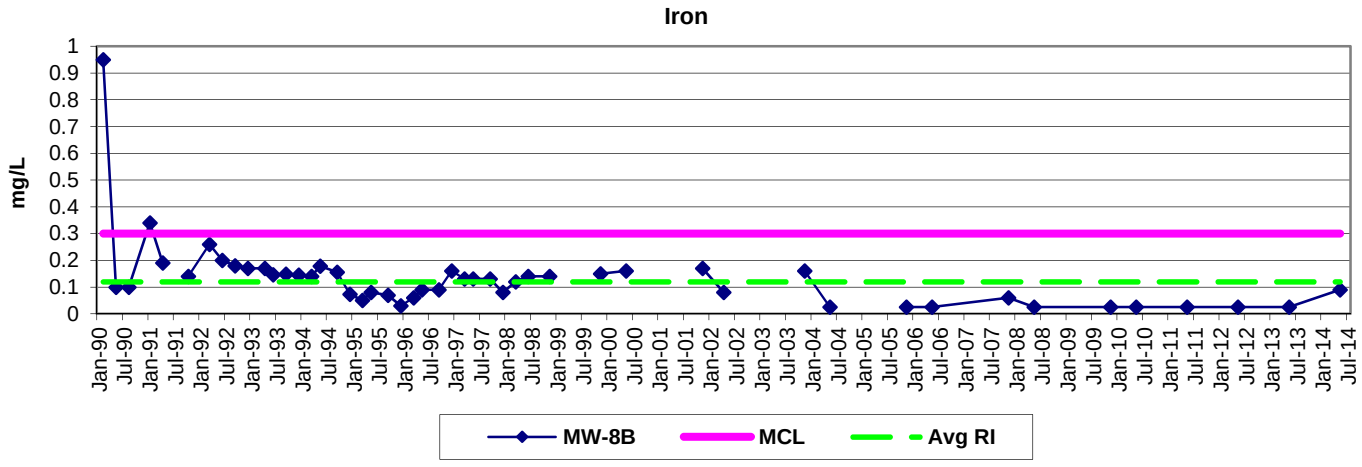
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Sand Aquifer Well
MW-8B



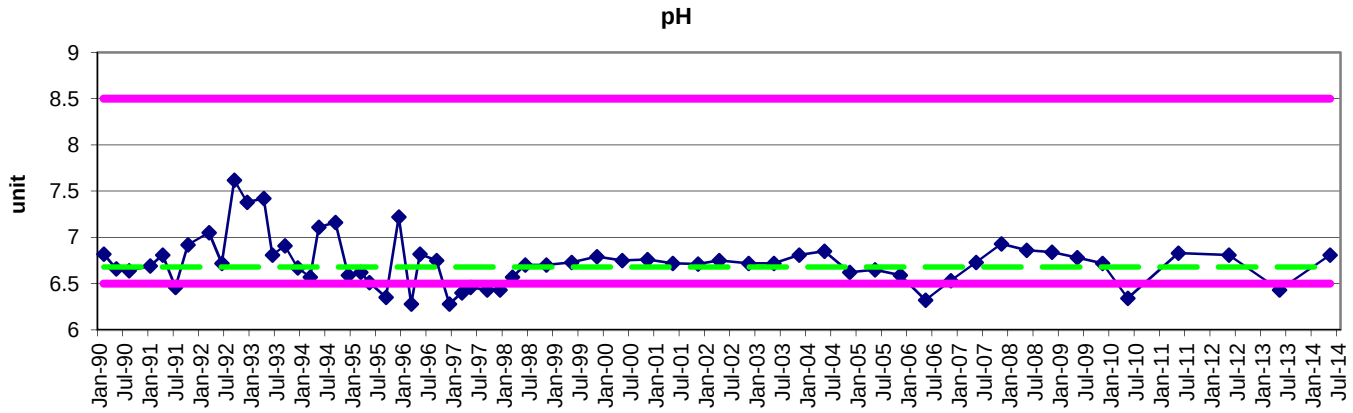


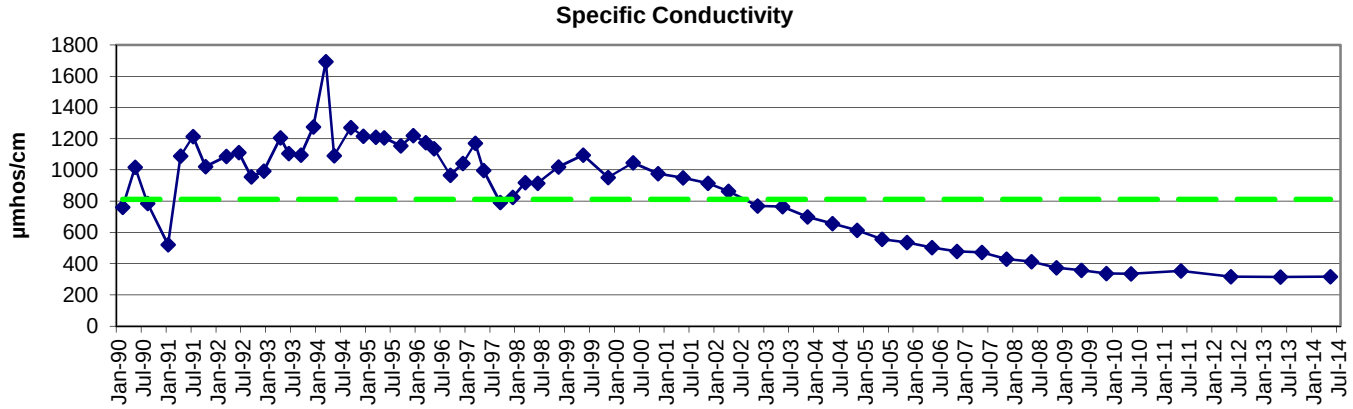


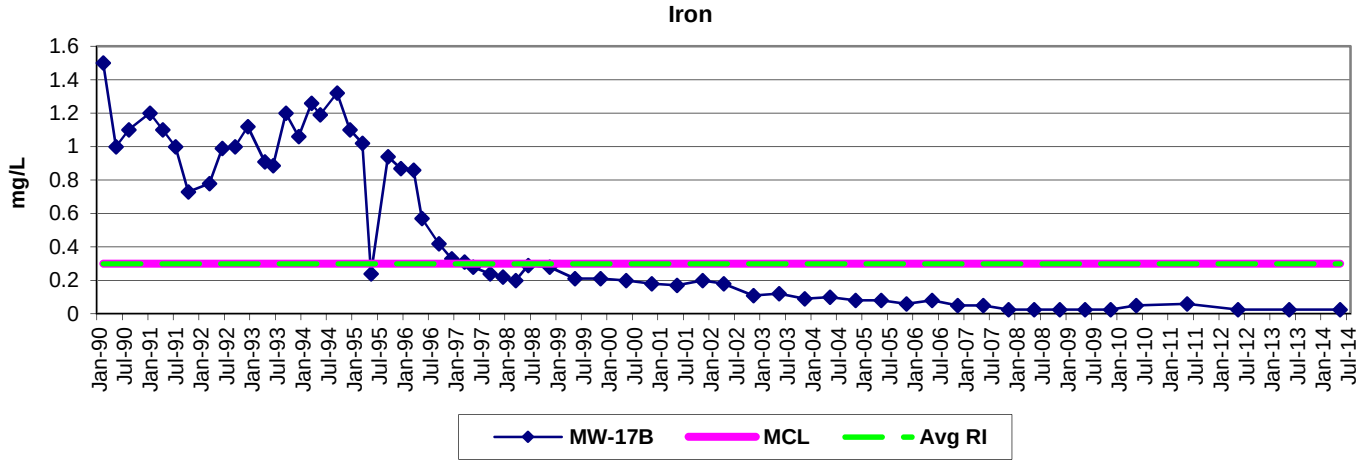
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Sand Aquifer Well
MW-17B



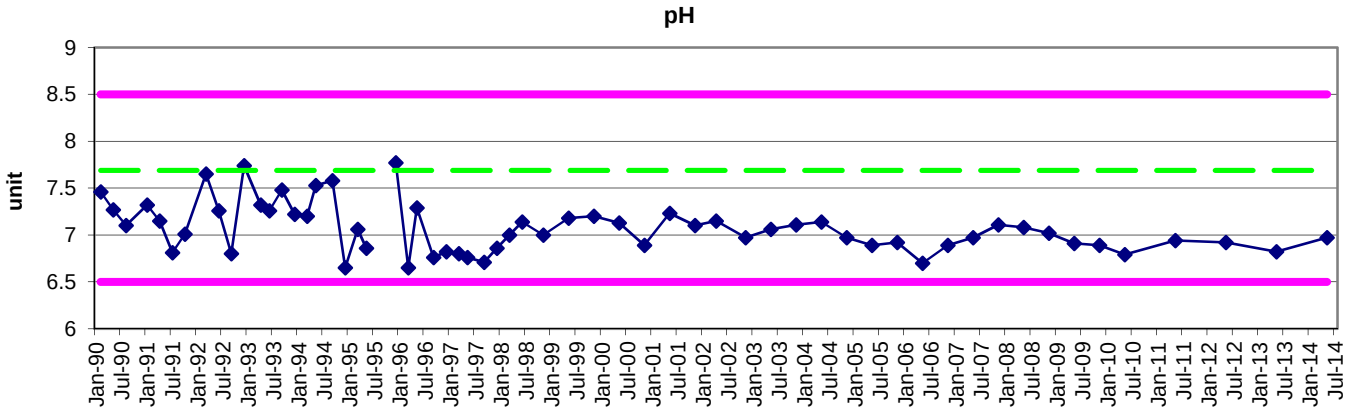


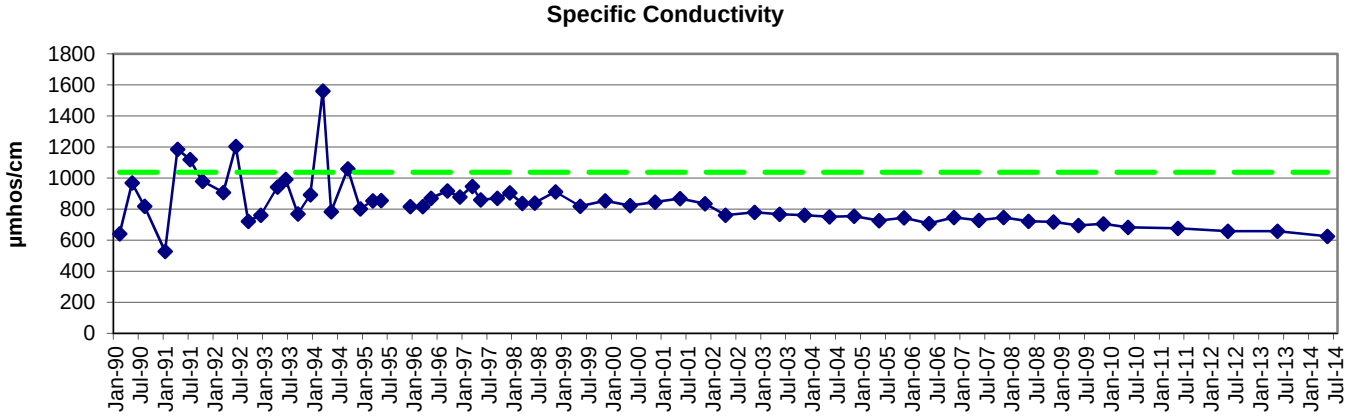


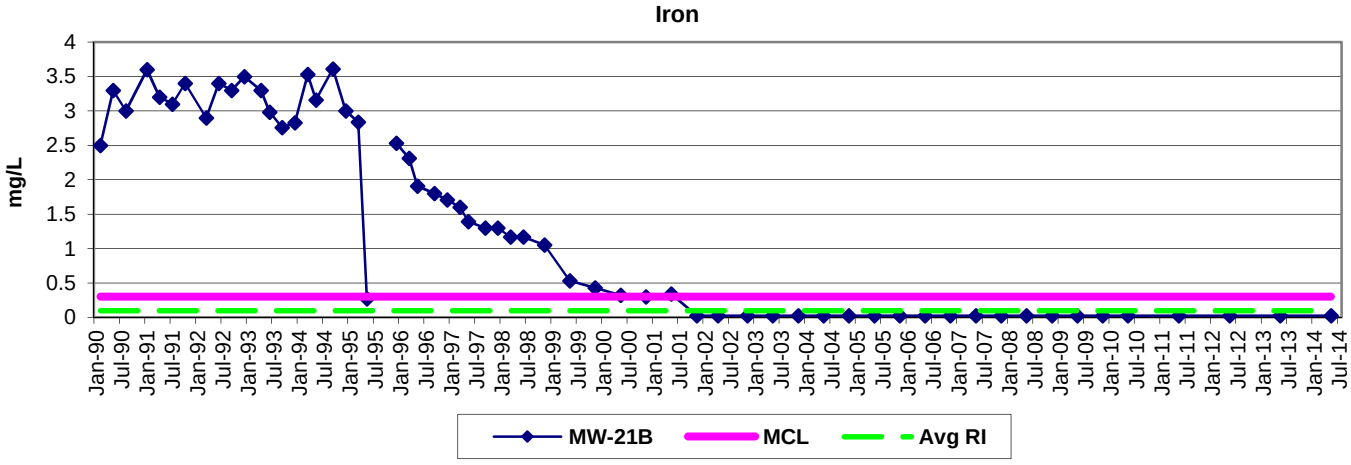
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Sand Aquifer Well
MW-21B



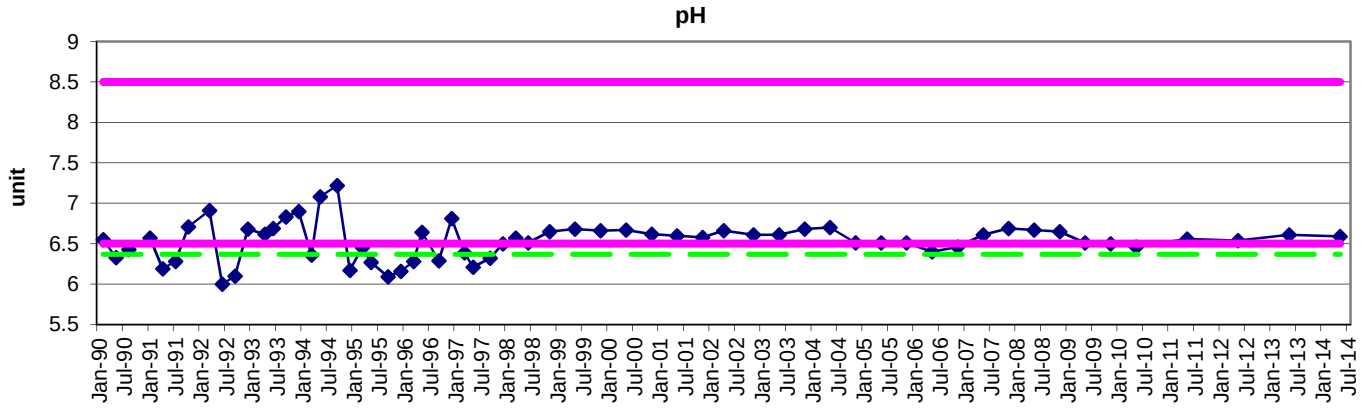


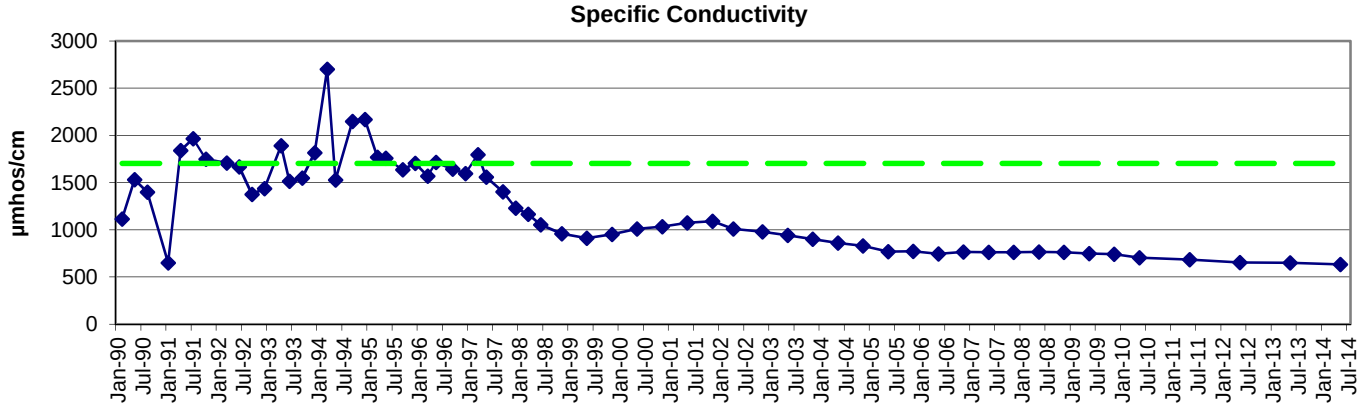


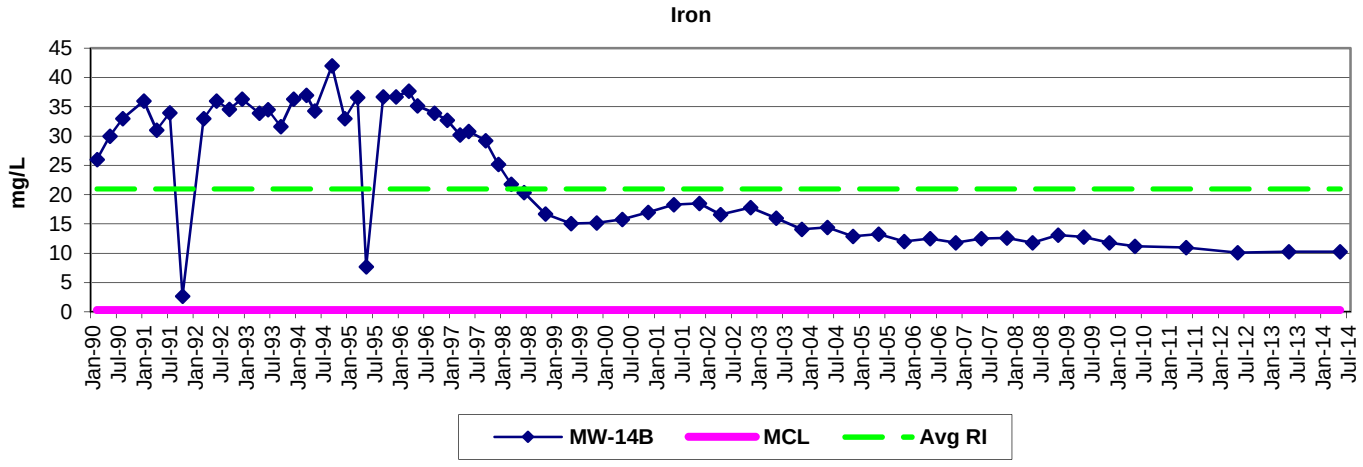
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-14B



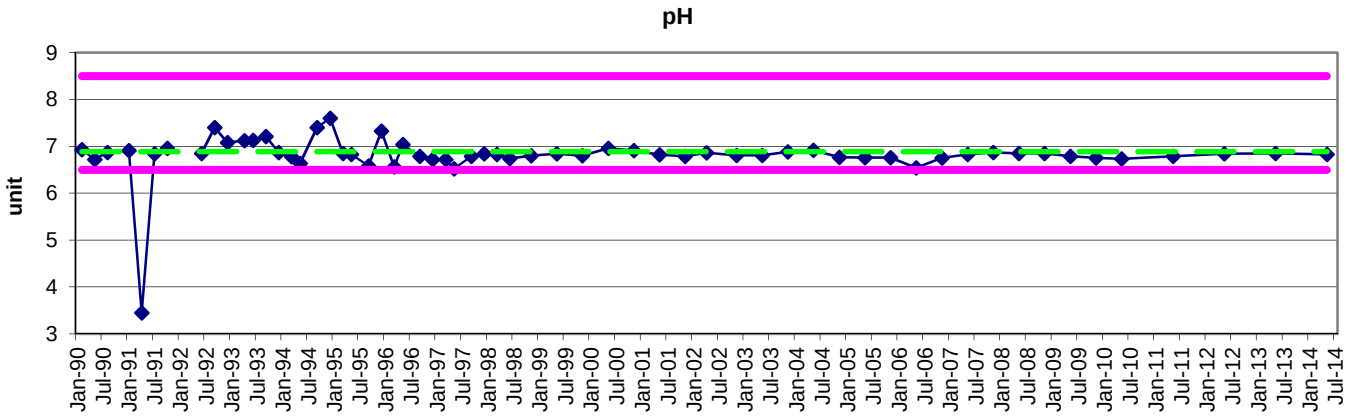


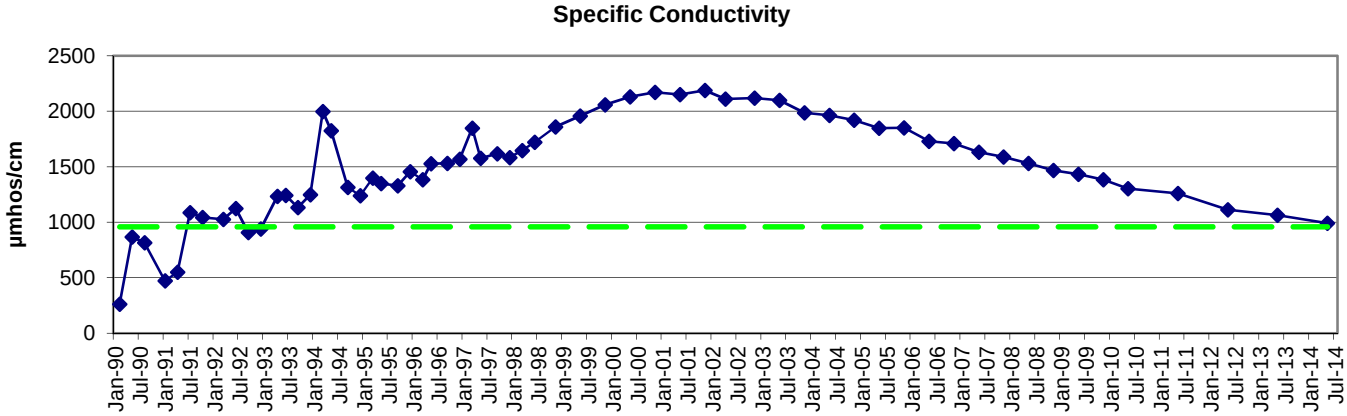


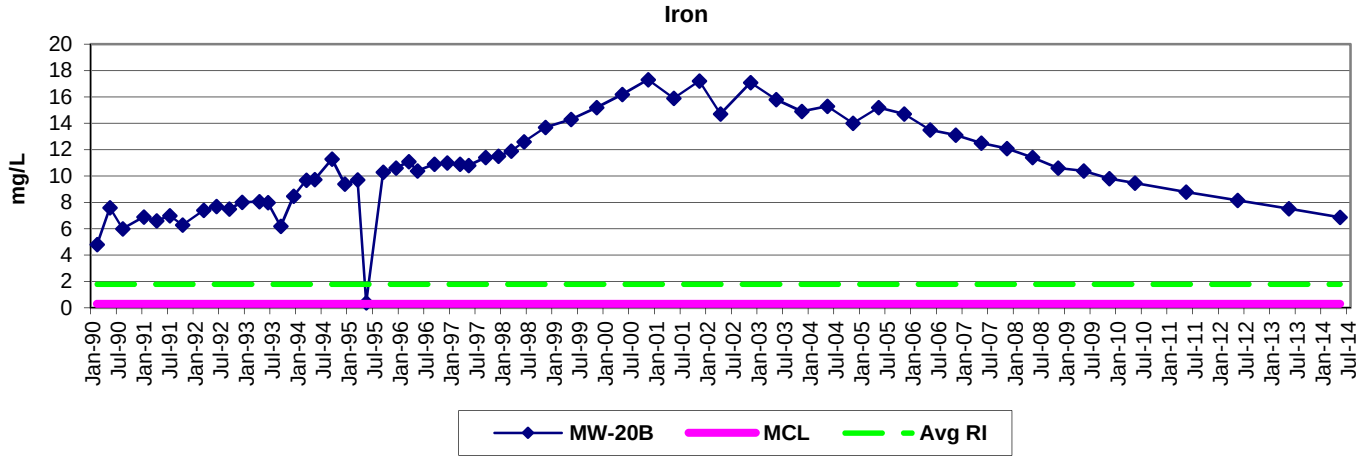
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-20B



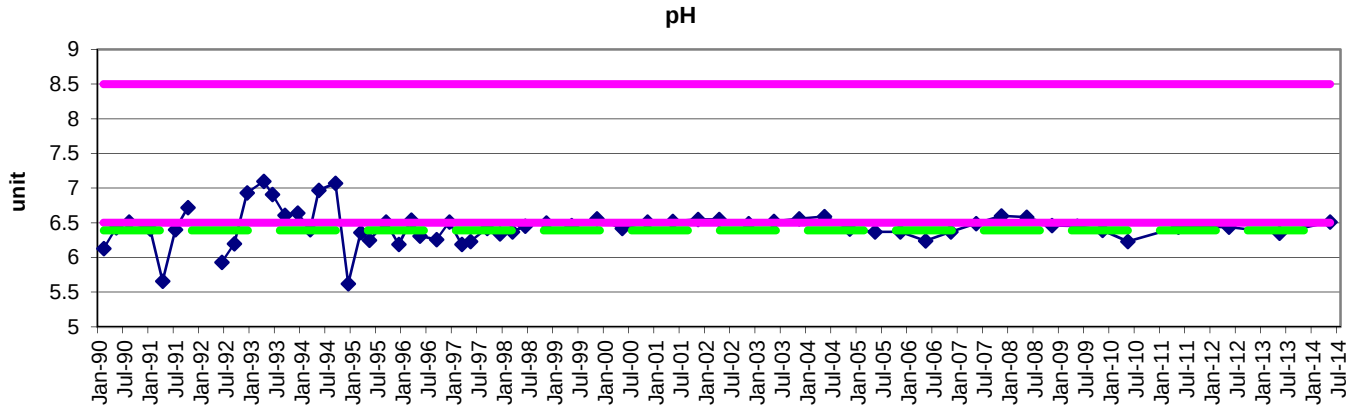


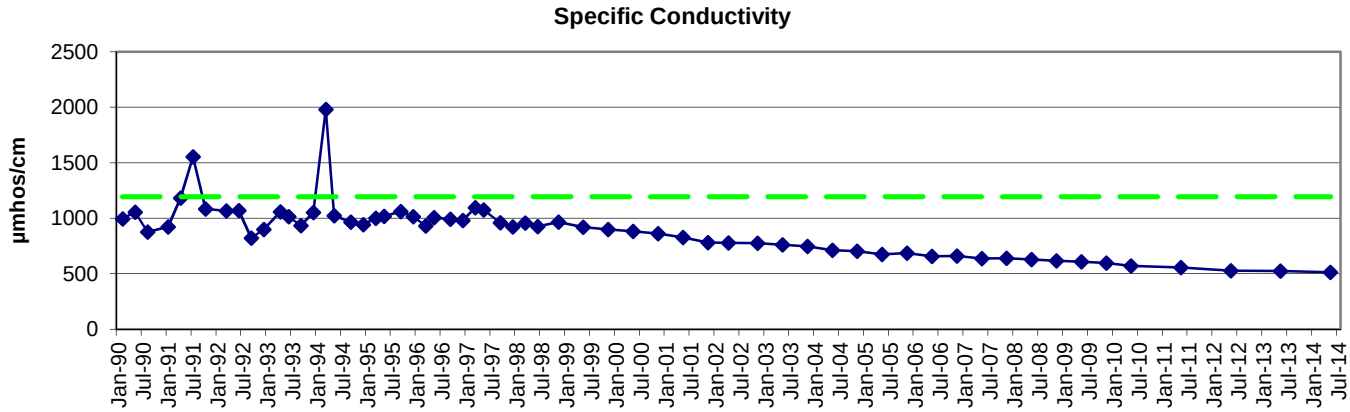


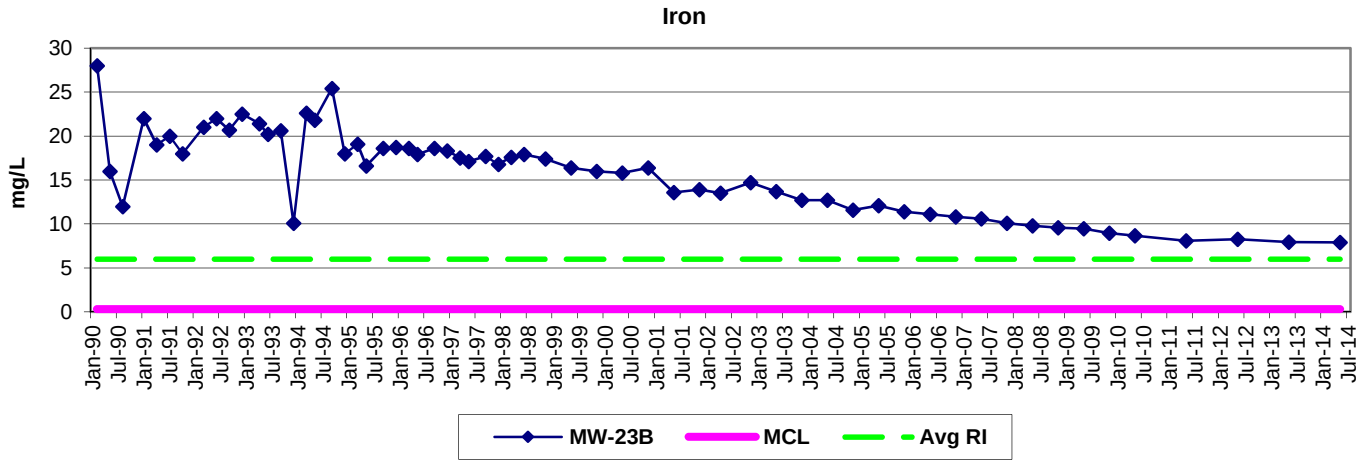
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-23B



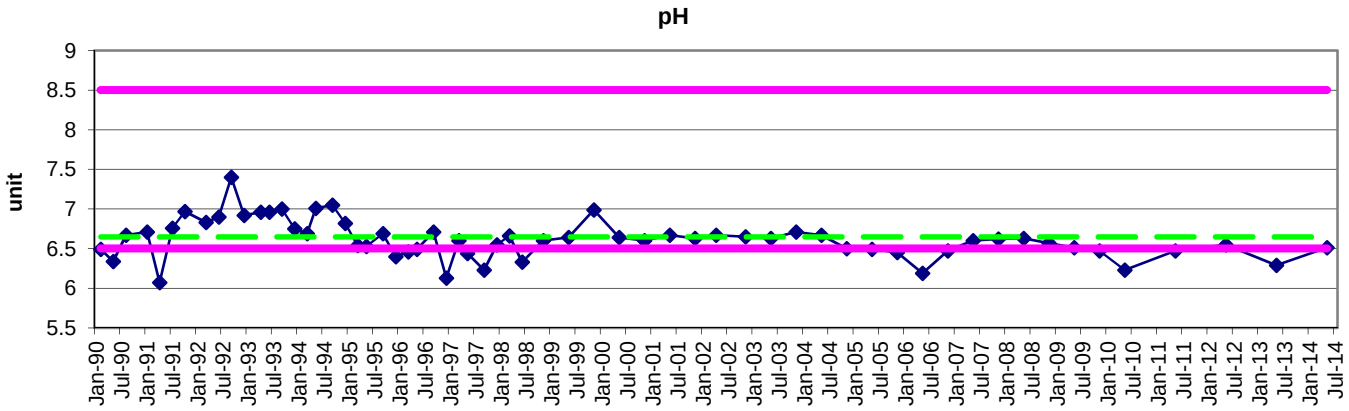


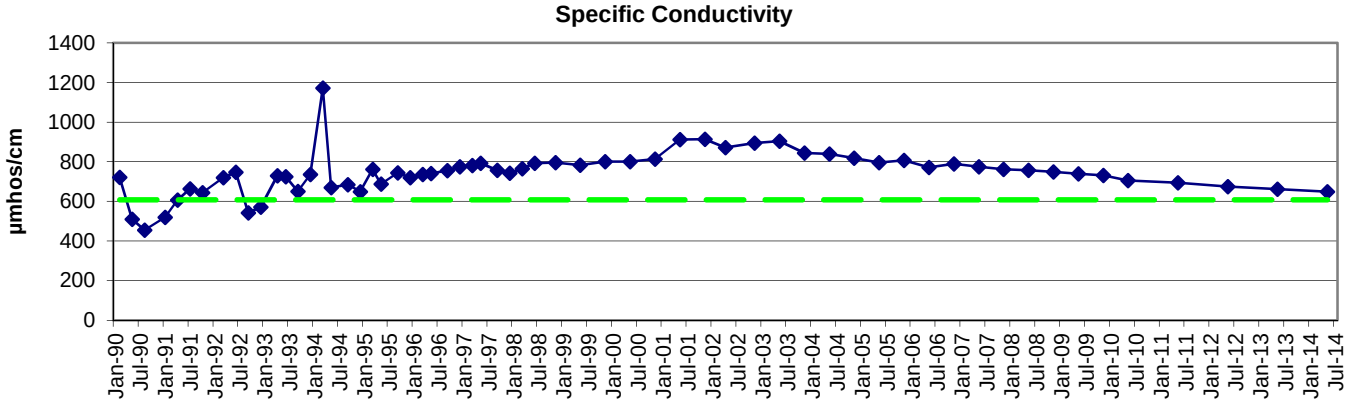


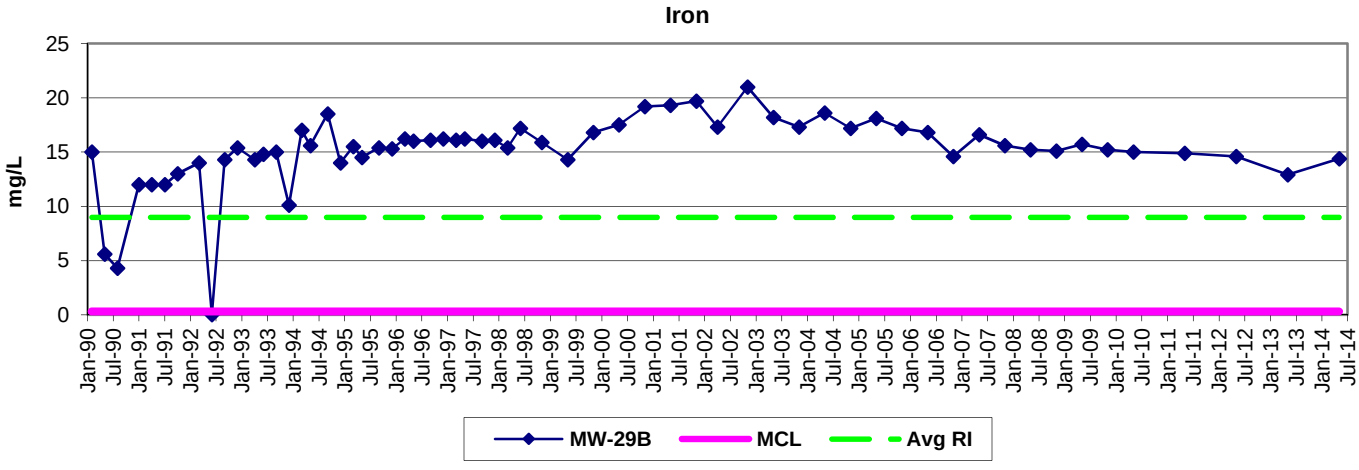
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-29B



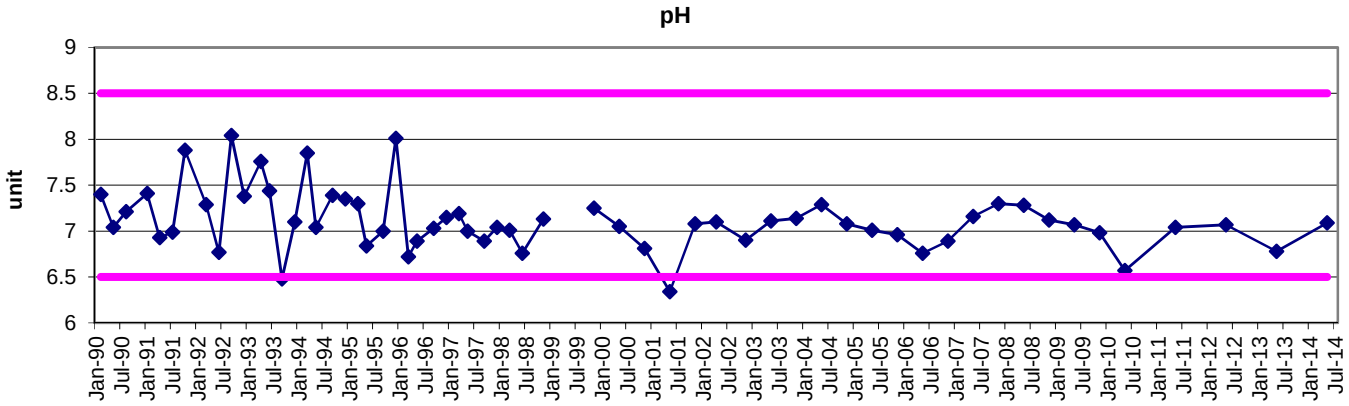


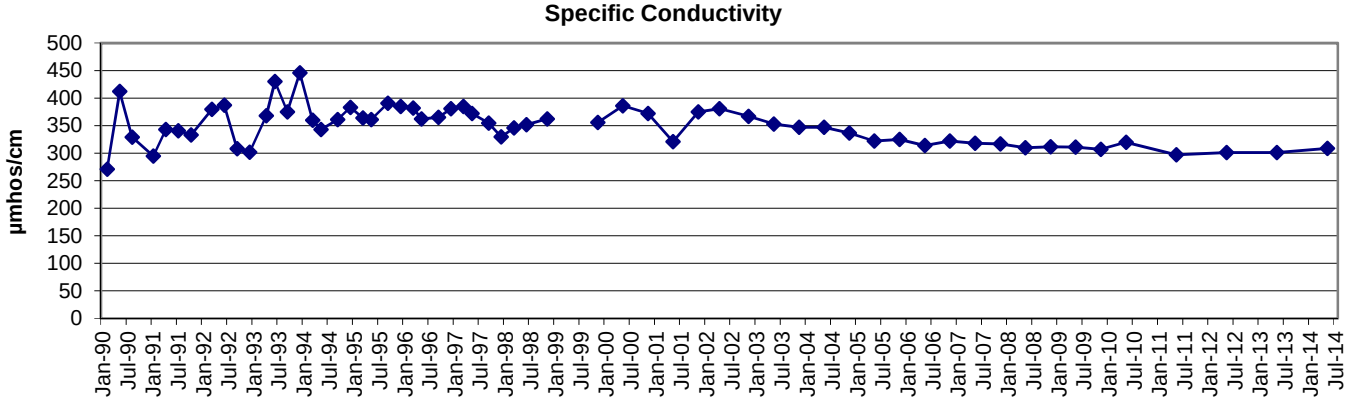


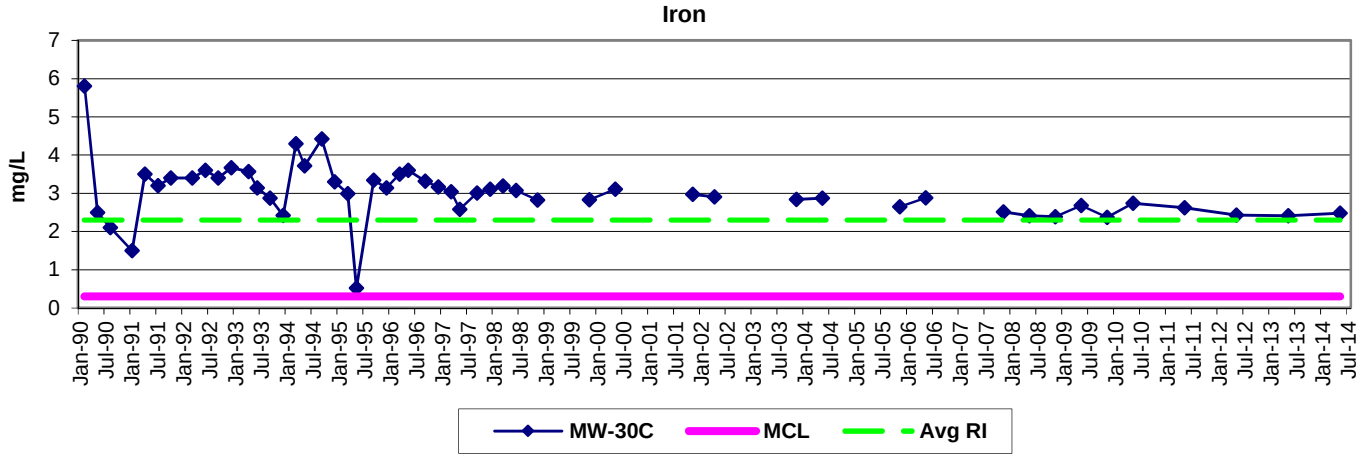
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-30C



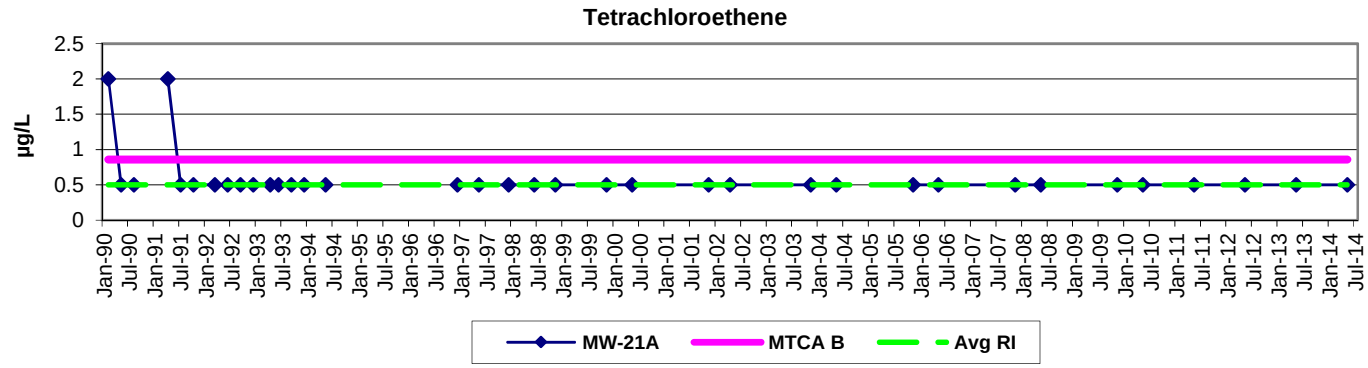


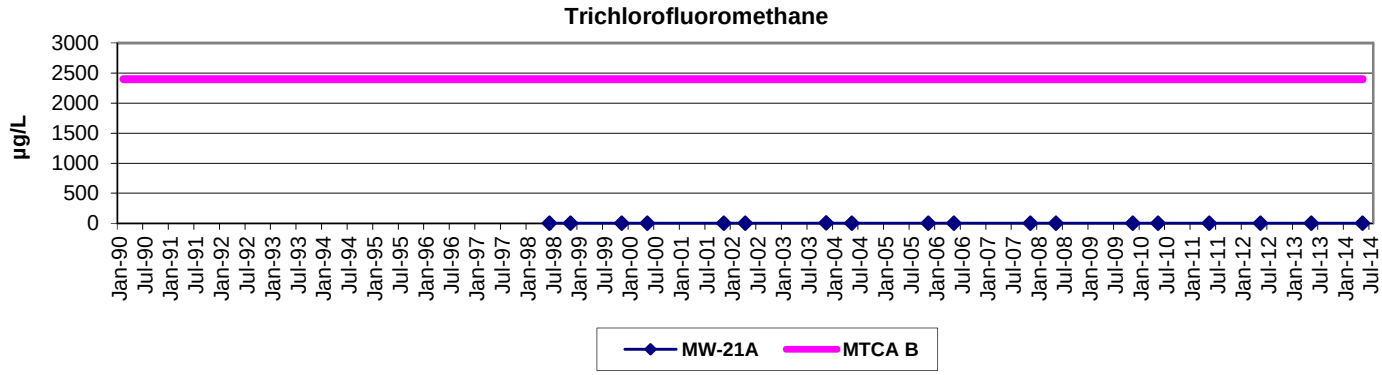


Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Upper Gravel Aquifer Well
MW-21A

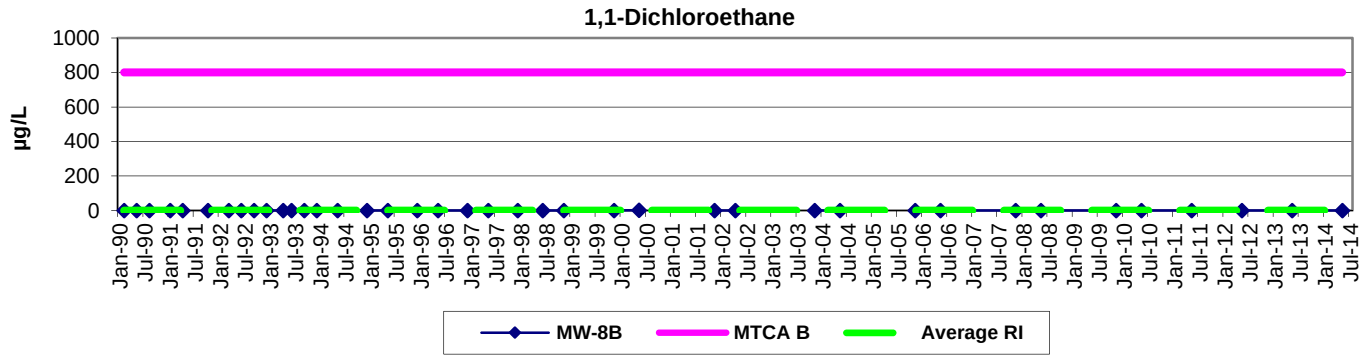




Non-detected values are shown as 1/2 the detection limit.
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Sand Aquifer Well
MW-8B

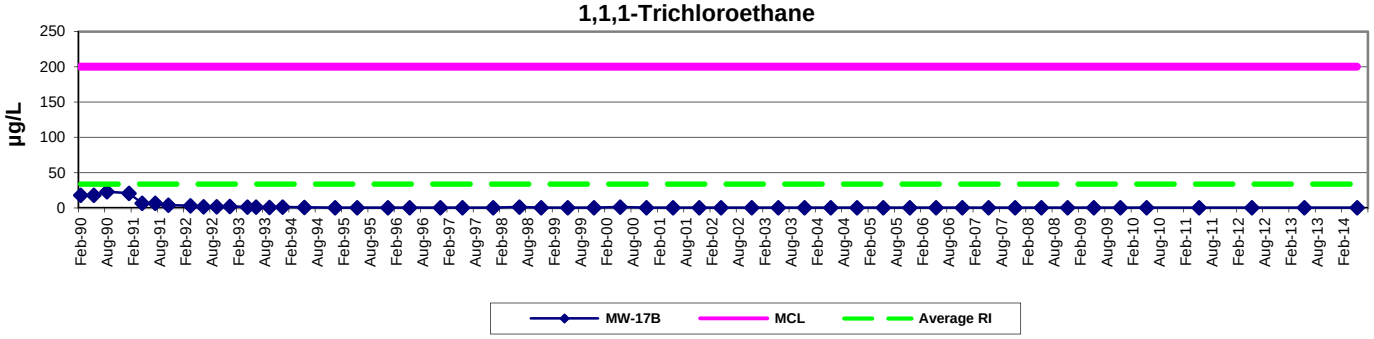


Non-detected values are shown as 1/2 the detection limit.
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

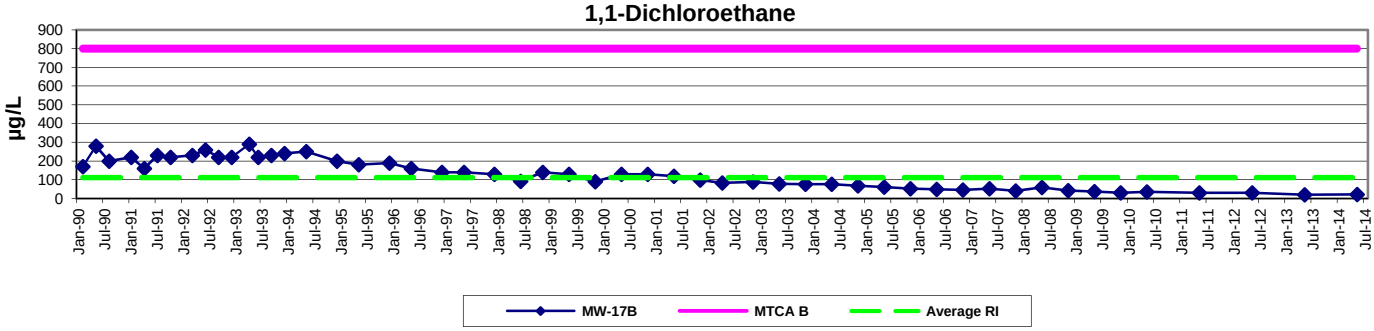
Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Sand Aquifer Well
MW-17B

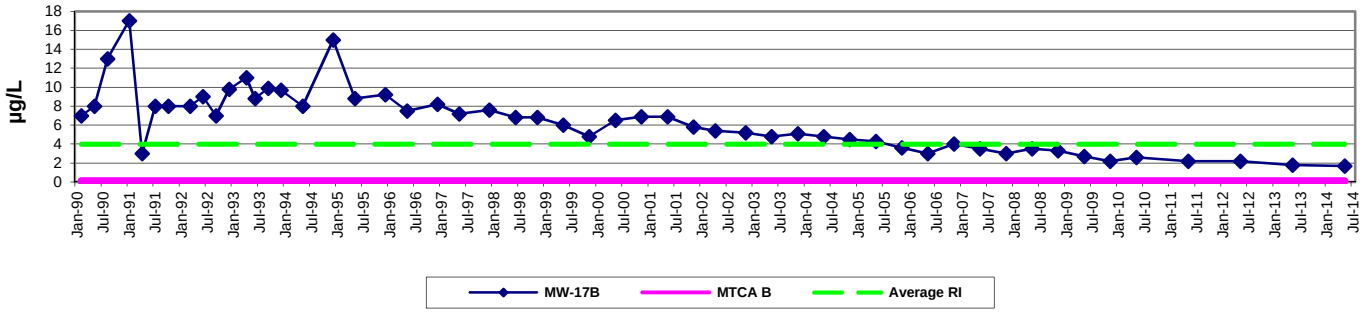
1,1,1-Trichloroethane



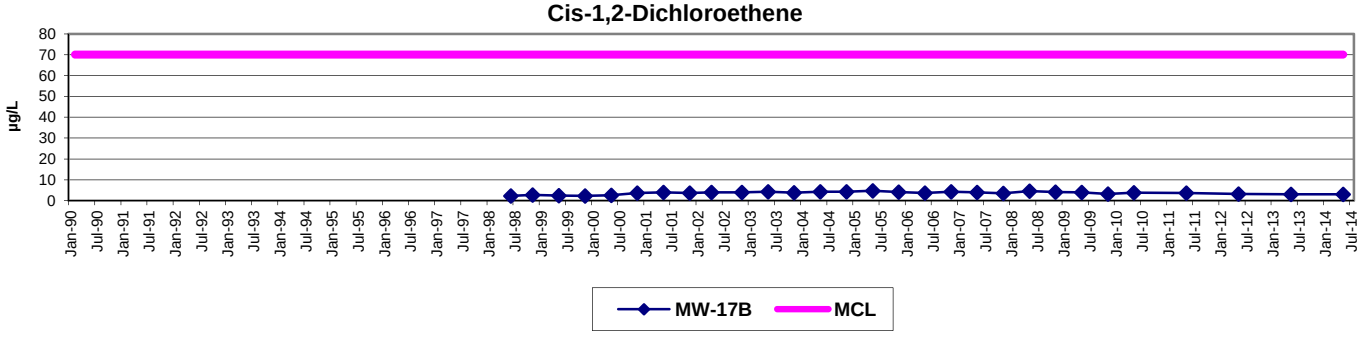
1,1-Dichloroethane



1,1-Dichloroethene



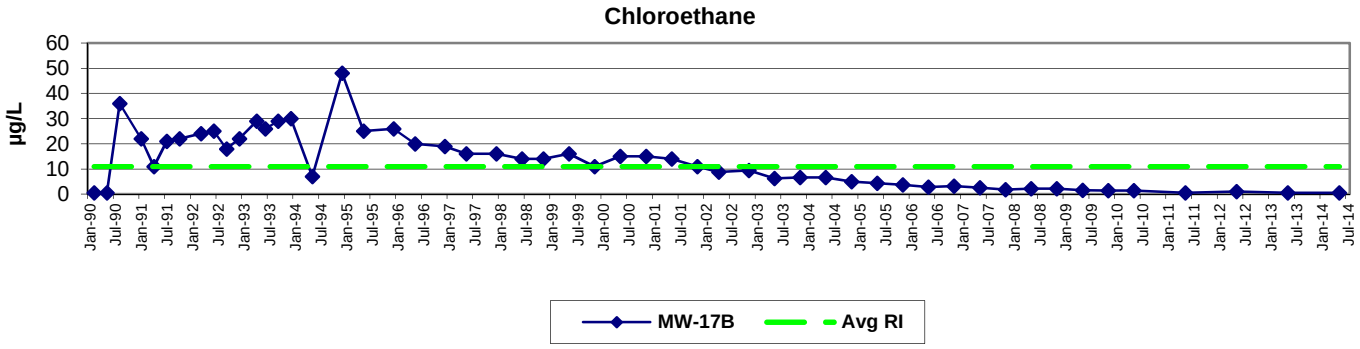
Cis-1,2-Dichloroethene

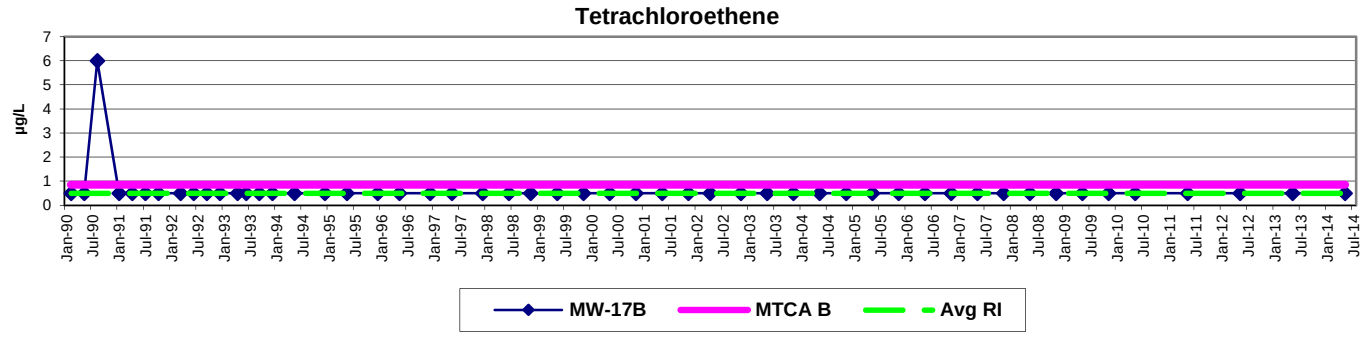


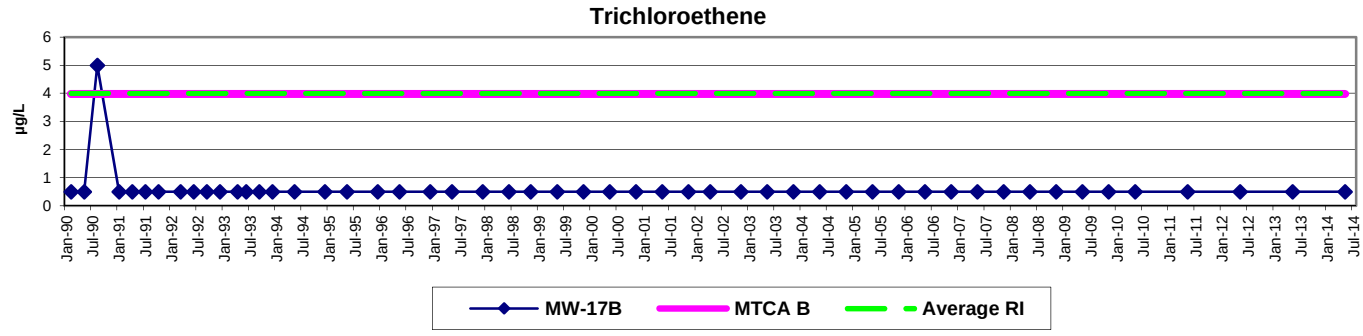
Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Sand Aquifer Well
MW-17B







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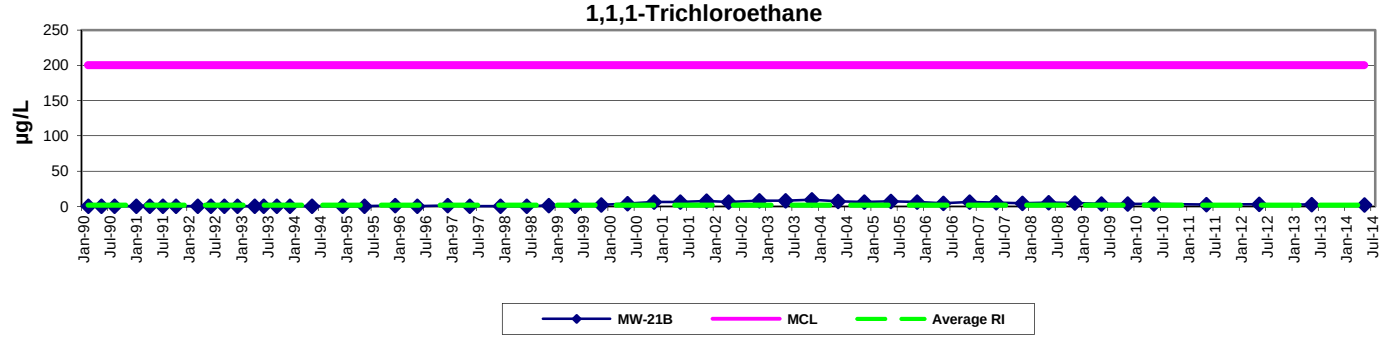
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

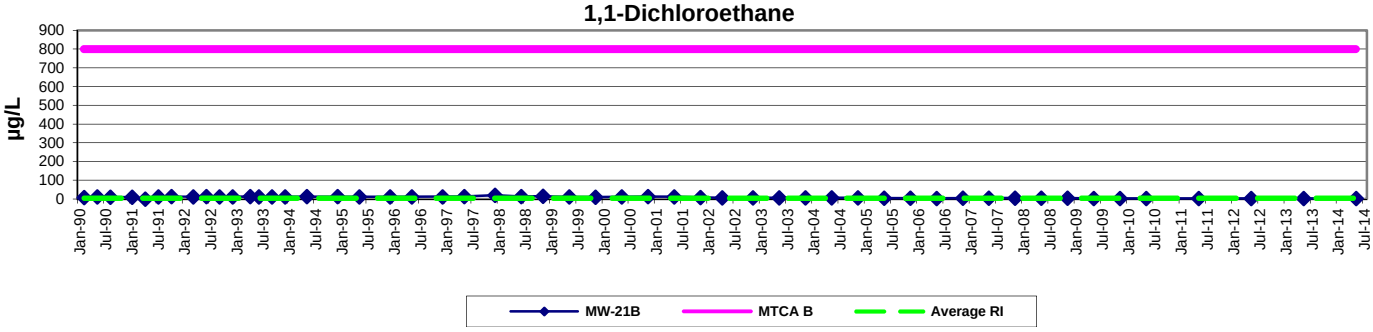
Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Sand Aquifer Well
MW-21B

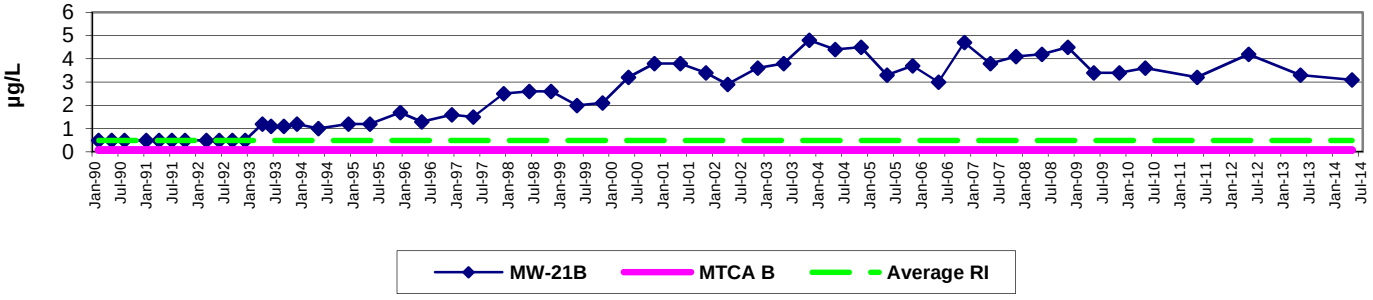
1,1,1-Trichloroethane



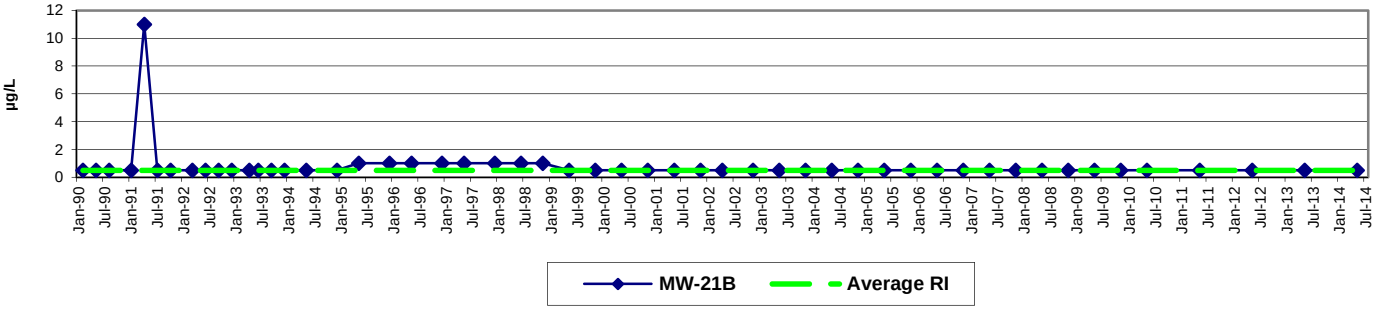
1,1-Dichloroethane



1,1-Dichloroethene



Chloroethane



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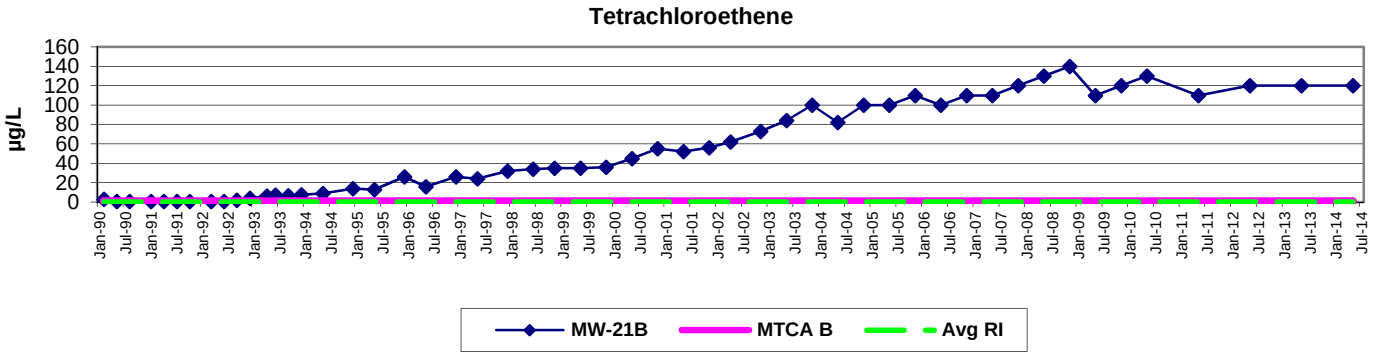
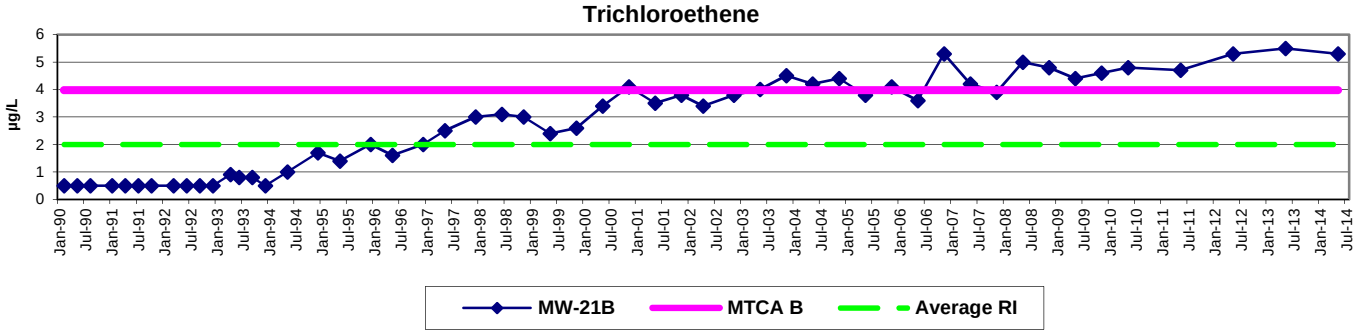
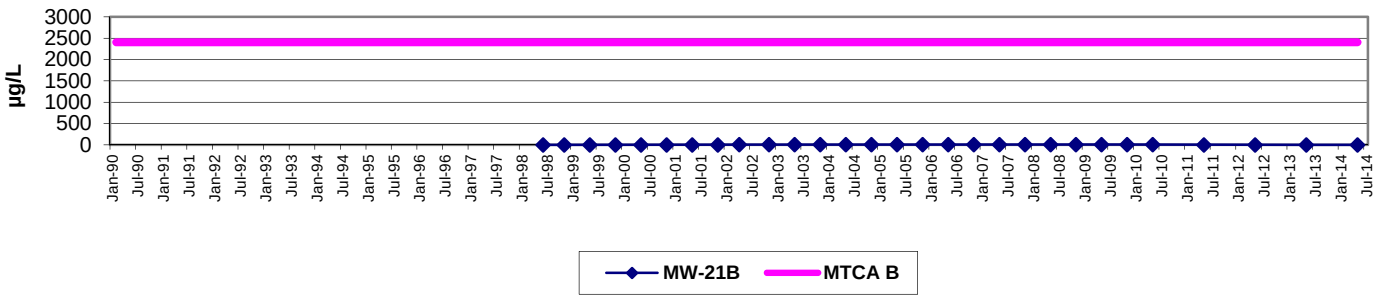
Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Upgradient Sand Aquifer Well
MW-21B





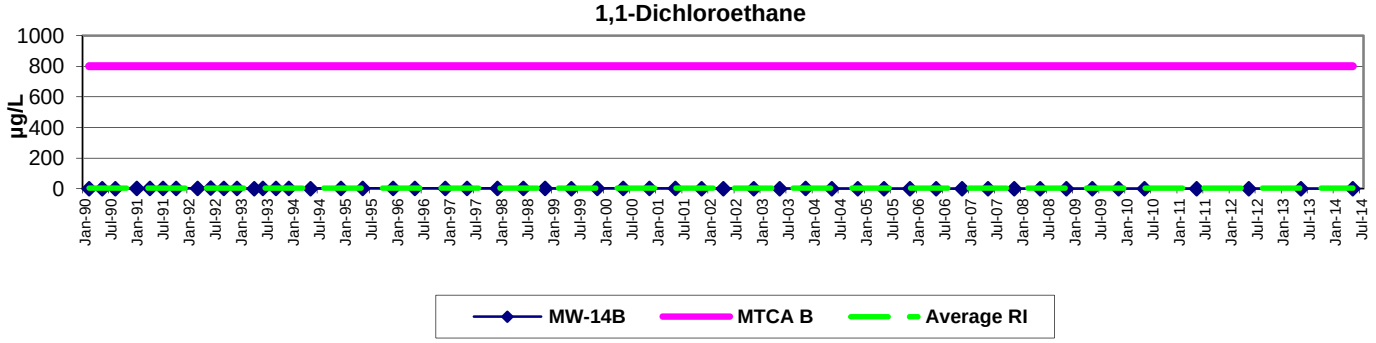


Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

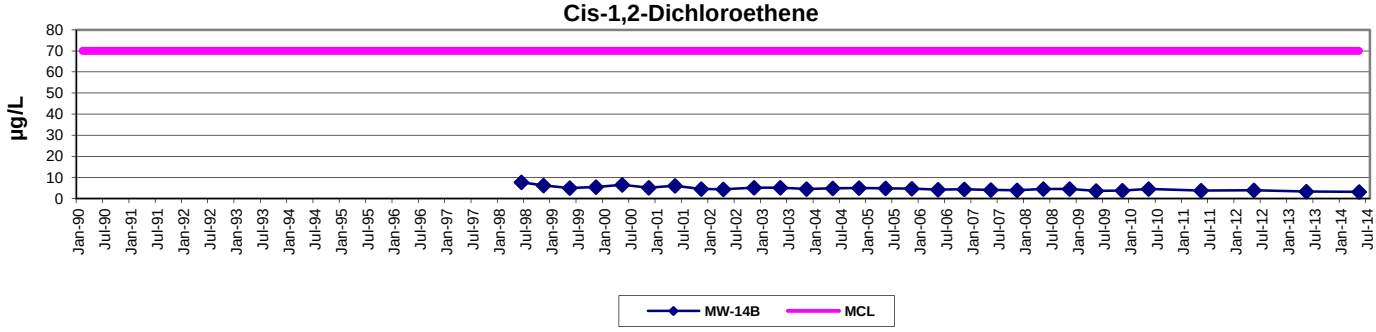
Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-14B

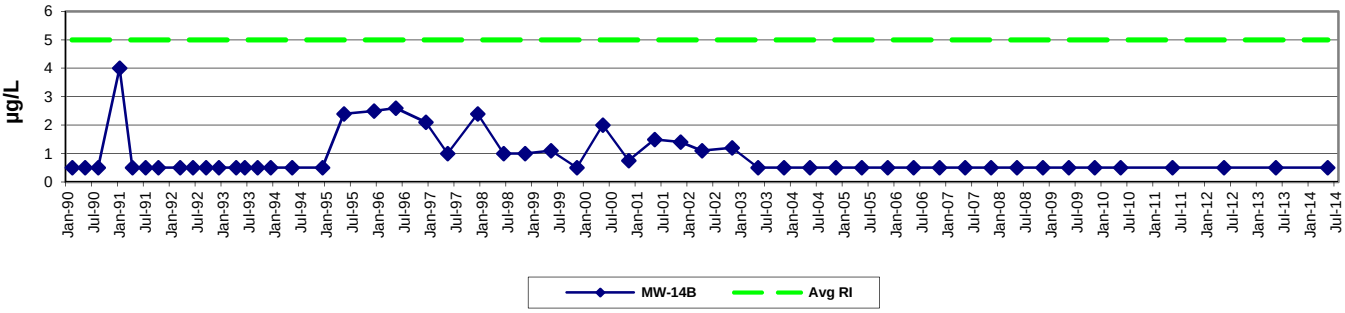
1,1-Dichloroethane



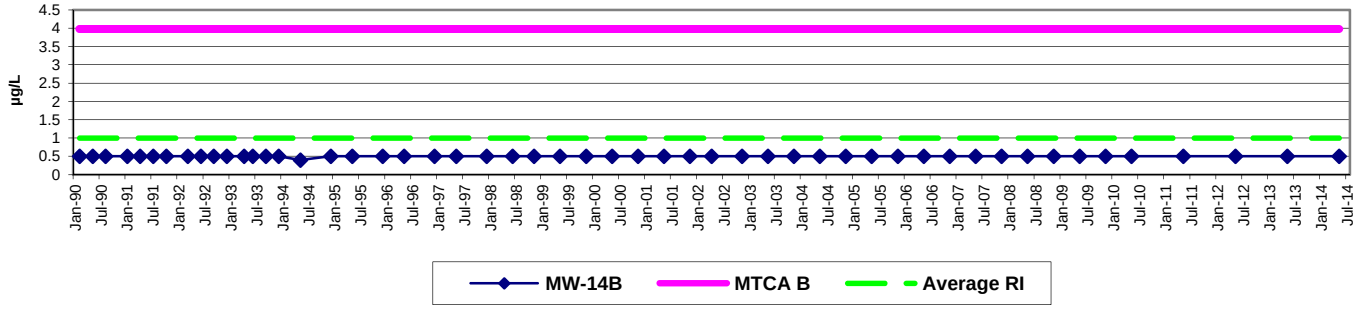
Cis-1,2-Dichloroethene



Chloroethane



Trichloroethene



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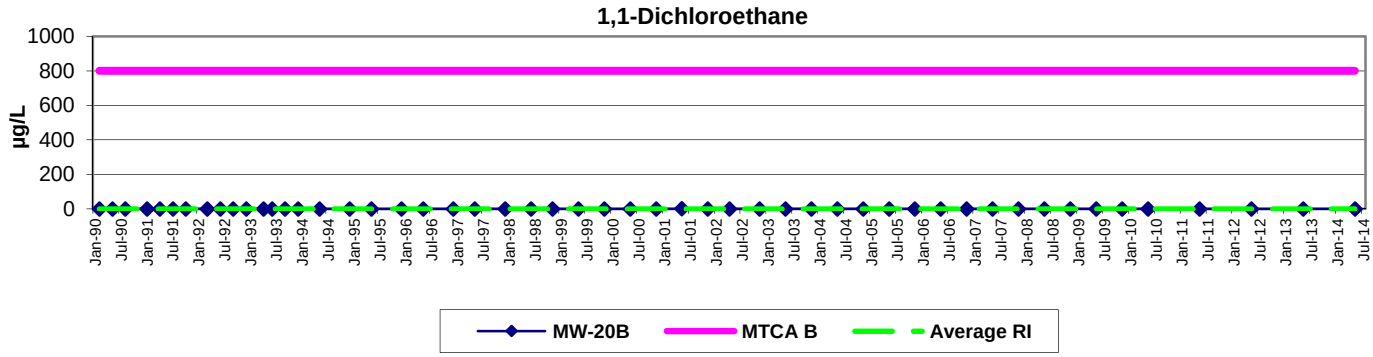
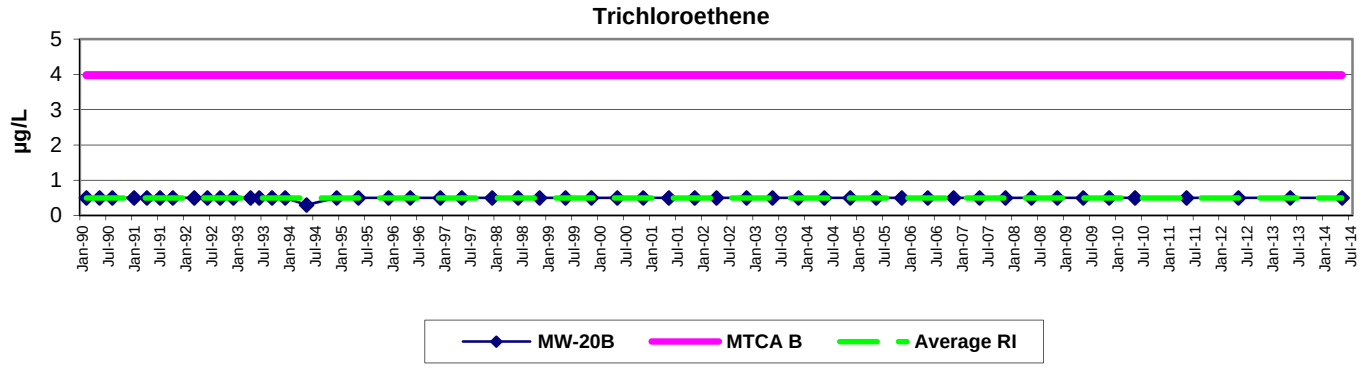
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-20B



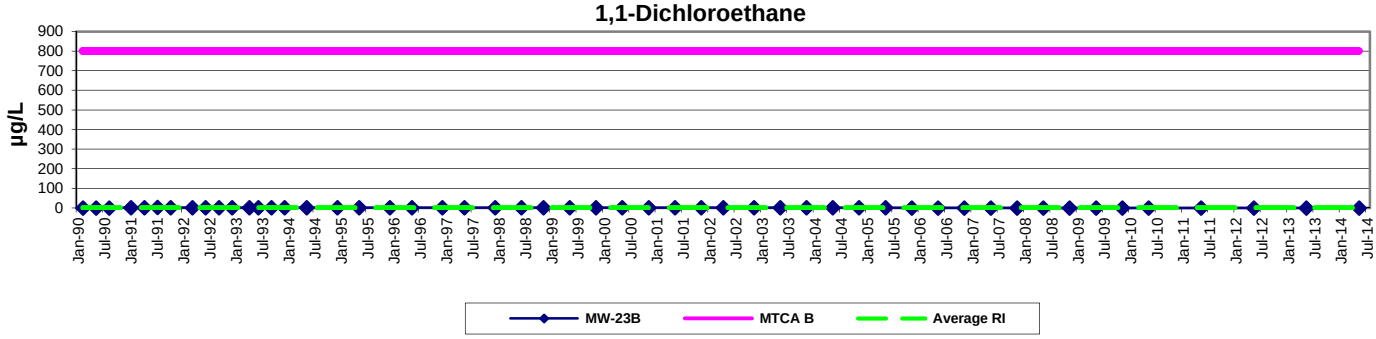


Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

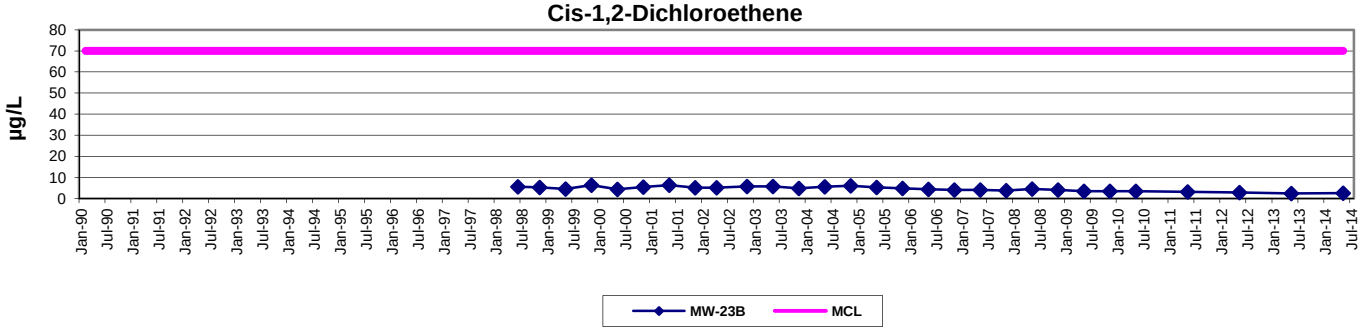
Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-23B

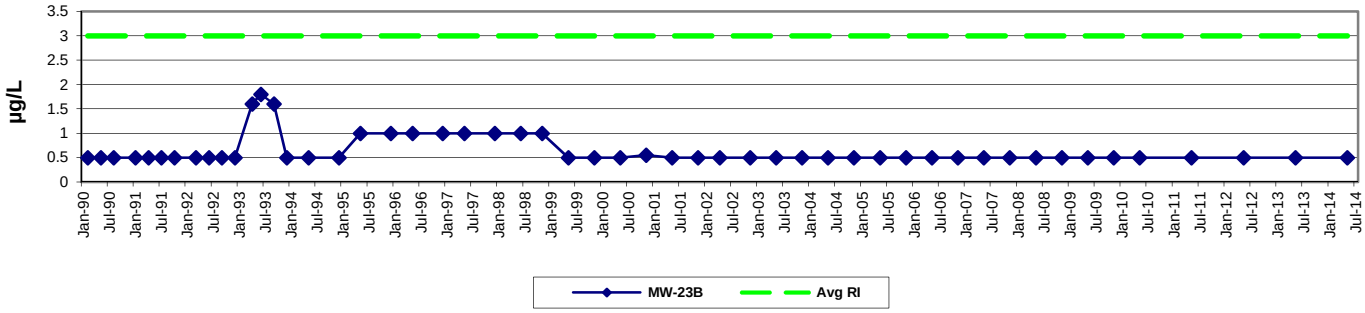
1,1-Dichloroethane



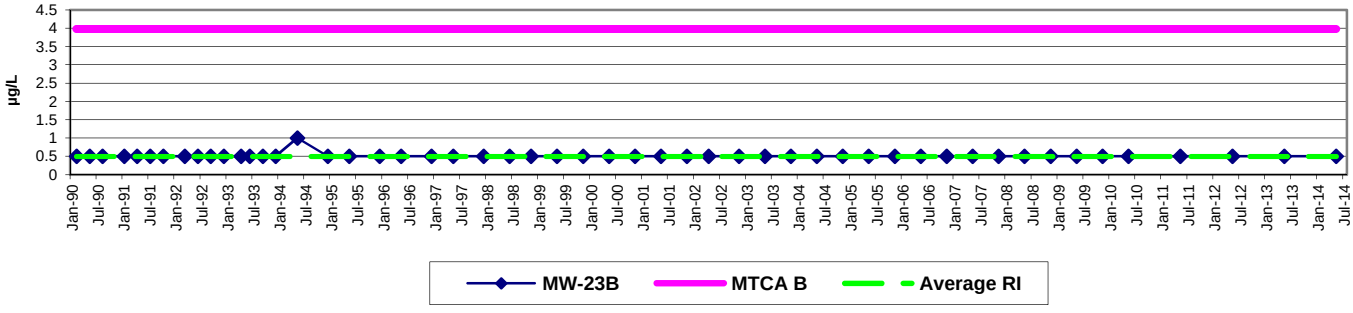
Cis-1,2-Dichloroethene



Chloroethane



Trichloroethene



Non-detected values are shown as 1/2 the detection limit.
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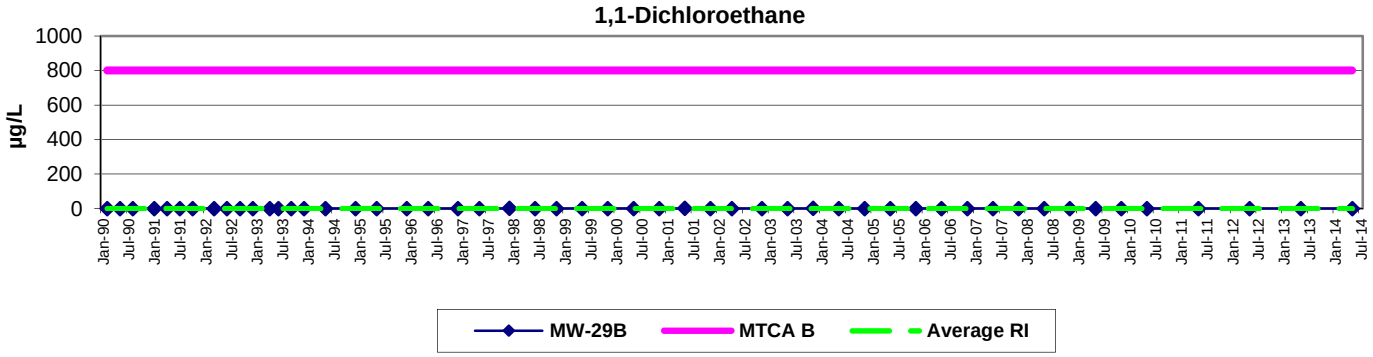
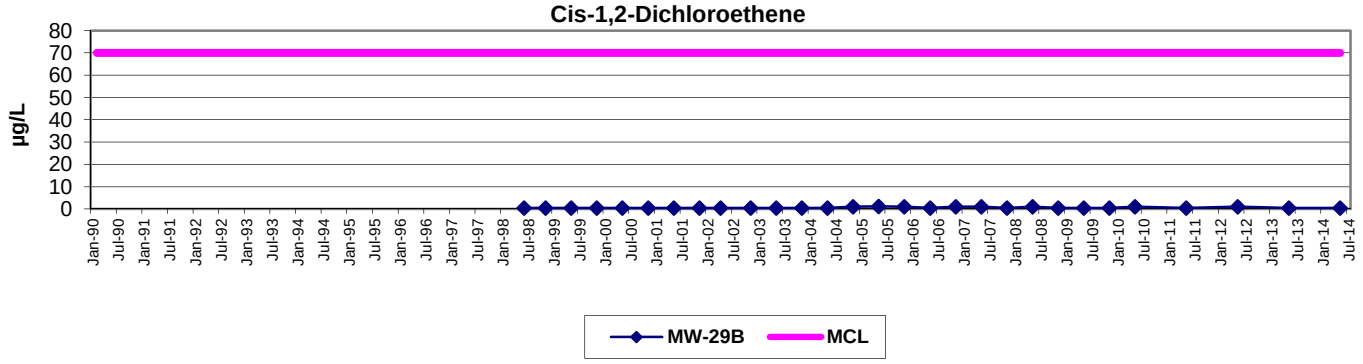
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

Midway Landfill
Groundwater Quality Parameters Not Included in the ROD

Downgradient Southern Gravel Aquifer Well
MW-29B





Non-detected values are shown as 1/2 the detection limit.
MCL = Primary of secondary maximum contaminat level standard.
MTCA B = MTCA B/Model Toxics Control Act (WAC 173-340) Method B cleanup level.
RI = Remedial Investigation

Appendix F

Annual Notice of Groundwater Conditions in Affected Areas Downgradient of the Midway Landfill

ANNUAL NOTICE OF GROUNDWATER CONDITIONS IN AFFECTED AREAS DOWNGRADIENT OF THE MIDWAY LANDFILL[1]

The City of Seattle is the owner and previous operator of the Midway Landfill, located north of South 252nd Street between SR-99 and I-5 in Kent, Washington (Figure F-1).

Extensive testing of groundwater within and surrounding the landfill area has indicated the presence of various contaminants that do not meet federal drinking water standards (MCLs) or state groundwater standards (MTCA Method B cleanup levels). The affected groundwater monitoring wells downgradient of the Midway Landfill are listed in Table F-1 and their locations are shown in Figure F-2. A summary of the contaminants of concern and their reported concentrations in groundwater are presented in Table F-2. A summary of results for additional parameters is presented in Table F-3.

In compliance with a Consent Decree between the City of Seattle and the Washington State Department of Ecology (Ecology), and in accordance with a Record of Decision between the City of Seattle and the USEPA, Ecology and all appropriate local health districts, water districts, and certified well drillers are hereby notified that no water supply wells are to be constructed or used in the areas of known groundwater contamination listed in Table F-1 and shown on Figure F-2.

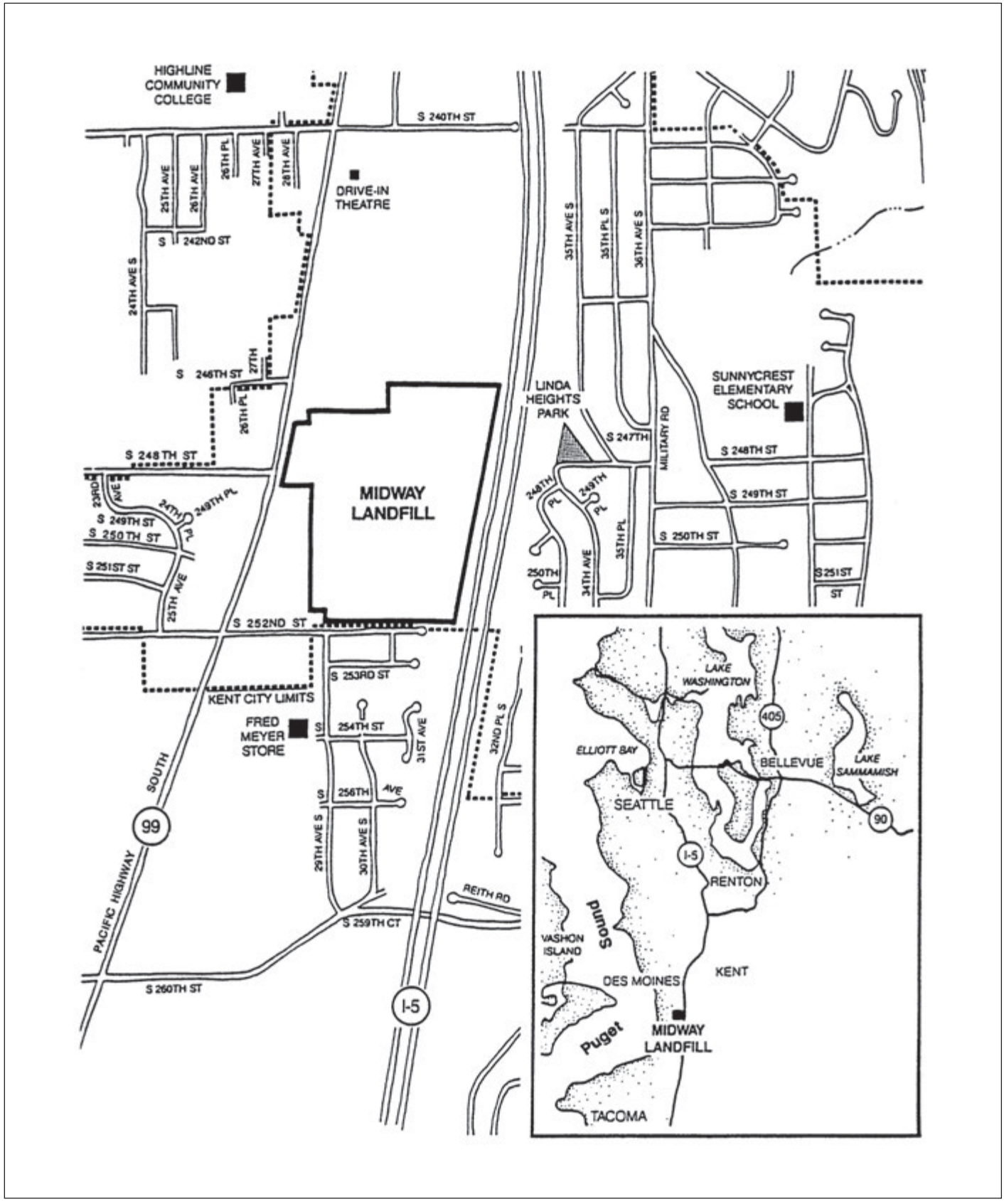
This is an annual notification.

Table F-1. Affected Groundwater Monitoring Wells Downgradient of the Midway Landfill

Monitoring Well	Land Surface Elevation	Elevation of Screened Interval	Aquifer
MW-14B	381.0	79 - 73.5	SGA
MW-20B	373.7	78.7 - 73.7	SGA
MW-23B	425.0	104.7 - 94.7	SGA
MW-29B	428.8	58.9 - 51.9	SGA
MW-30C	407.5	61.8 - 56.8	SGA

Notes:
SGA = Southern Gravel Aquifer

[1] The City will annually notify the Seattle-King County Department of Public Health, Ecology, the local water districts, and locally active well drillers in writing of groundwater conditions in the affected areas downgradient of the landfill.



Parametrix Midway Landfill/555-1550-054/01(01A2) 5/11

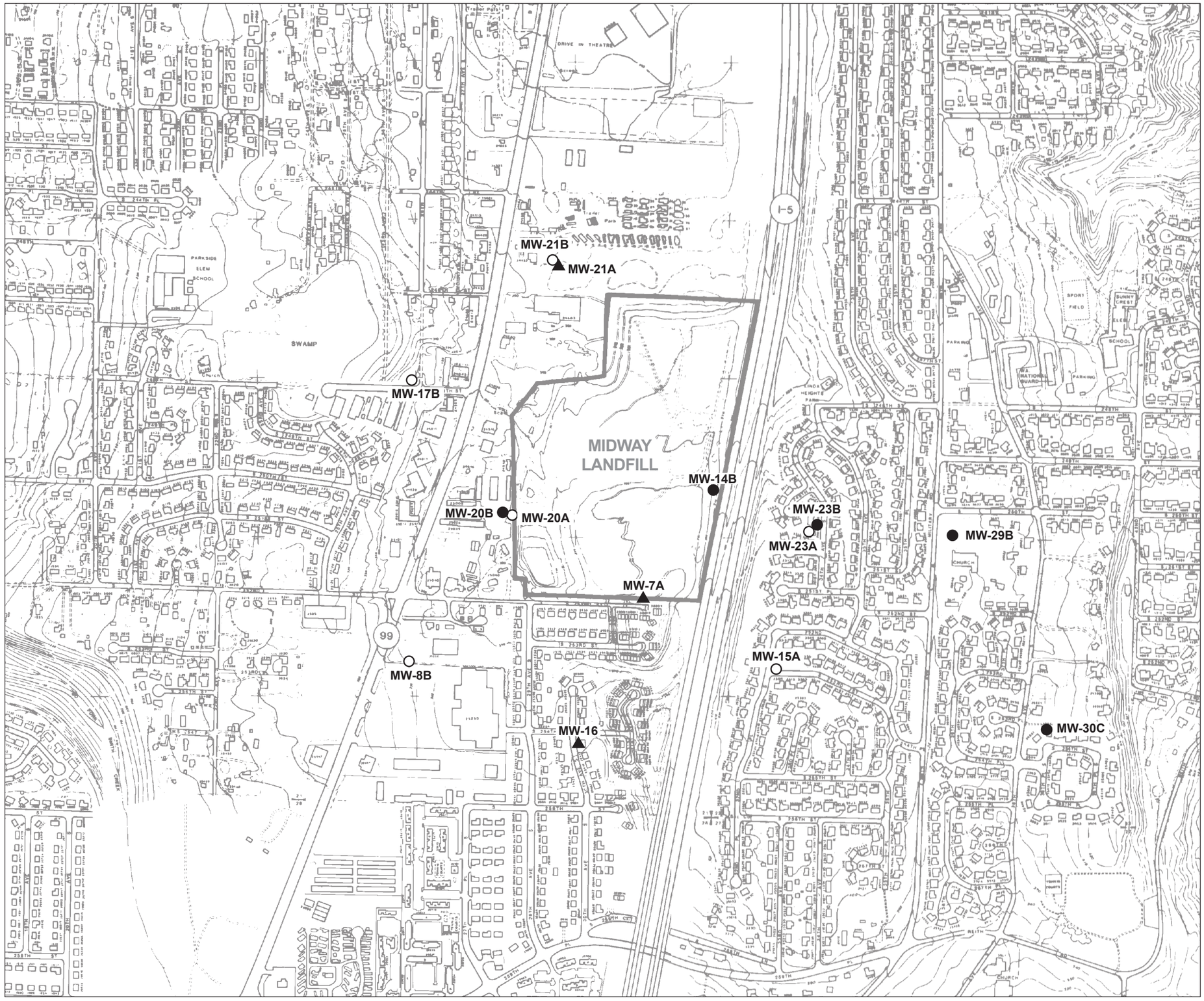
N

0 100

SCALE IN FEET

Figure F-1
Site Location Map
Midway Landfill
Kent, Washington

Figure F-2
Well Locations for Groundwater Chemistry Monitoring
Midway Landfill
Kent, Washington



MW-16 ▲ Upper Gravel Aquifer Monitoring Well Number and Approximate Location

MW-17B ○ Sand Aquifer Monitoring Well Number and Approximate Location

MW-14B ● Southern Gravel Aquifer Monitoring Well Number and Approximate Location

Base Map Source: Supplemental Hydrogeologic and Hydrochemical Investigation, AGI 1990

N

0 600

SCALE IN FEET

Table F-2. Comparison of Contaminants of Concern in Groundwater in ROD Cleanup Levels, 2010-2014 Data Summary

				Upper Gravel Aquifer			Sand Aquifer							Southern Gravel Aquifer						
				MW-16	MW-16 Dup	MW-21A	MW-7B	MW-7B Dup	MW-8B	MW-8B Dup	MW-17B	MW-21B	MW-21B Dup	MW-14B	MW-20B	MW-23B	MW-29B	MW-29B Dup	MW-30C	MW-30C Dup
Compound	Units	Cleanup Level[a]	Round	UP		UP	DOWN		UP		UP	UP		DOWN	DOWN	DOWN	DOWN		DOWN	
Manganese	mg/L	2.2	R-57	0.094	0.094	0.016	- -	- -	0.004	- -	0.053	0.405	0.408	0.961	**3.24**	0.153	0.98	- -	0.706	- -
			R-58	0.094	- -	0.013	**3.07**	- -	0.047	0.046	0.050	0.396	- -	0.897	**2.99**	0.143	0.966	- -	0.639	0.645
			R-59	0.094	0.097	0.005	**3.20**	- -	0.024	- -	0.042	0.410	- -	0.908	**2.95**	0.140	0.948	0.944	0.643	- -
			R-60	0.100	- -	0.001	**2.94**	**2.90**	0.006	- -	0.042	0.415	- -	0.913	**2.77**	0.141	0.869	0.809	0.648	- -
			R-61	0.094	0.095	0.001 U	**2.63**	- -	0.006	- -	0.044	0.399	- -	0.904	**2.43**	0.131	0.941	- -	0.674	0.678
Vinyl Chloride	µg/L	0.29*	R-57	0.20 U	0.20 U	0.20 U	- -	- -	0.20 U	- -	0.22	0.20 U	0.20 U	**0.63**	0.27	0.27	**0.65**	- -	0.20 U	- -
			R-58	0.20 U	- -	0.20 U	**0.30**	- -	0.20 U	0.20 U	0.20 U	0.20 U	- -	**0.64**	0.24	0.20 U	**0.54**	- -	0.20 U	0.20 U
			R-59	0.20 U	0.20 U	0.20 U	**0.31**	- -	0.20 U	- -	0.20 U	0.20 U	- -	**0.41**	0.22	0.20 U	**0.56**	**0.52**	0.20 U	- -
			R-60	0.20 U	- -	0.20 U	**0.31**	**0.32**	0.20 U	- -	0.20 U	0.20 U	- -	**0.39**	**0.34**	0.20 U	**0.62**	**0.62**	0.20 U	- -
			R-61	0.20 U	0.20 U	0.20 U	0.20	- -	0.20 U	- -	0.20 U	0.20 U	- -	0.28	**0.30**	0.20 U	**0.47**	- -	0.20 U	0.20 U
1,2-Dichloroethane	µg/L	5	R-57	1.0 U	1.0 U	1.0 U	- -	- -	1.0 U	- -	4.4	1.0 U	1.0 U	1.0 U	1.0 U	2.7	4.7	- -	1.0 U	- -
			R-58	1.0 U	- -	1.0 U	1.0 U	- -	1.0 U	1.0 U	3.8	1.0 U	- -	1.0 U	1.0 U	2.1	4.1	- -	1.0 U	1.0 U
			R-59	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	- -	4.5	1.0 U	- -	1.0 U	1.0 U	2.4	4.7	4.6	1.0 U	- -
			R-60	1.0 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	- -	3.9	1.0 U	- -	1.0 U	1.0 U	2.6	4.9	**5.1**	1.0 U	- -
			R-61	1.0 U	1.0 U	1.0 U	1.0 U	- -	1.0 U	- -	3.0	1.0 U	- -	1.0 U	1.0 U	2.0	4.0	- -	1.0 U	1.0 U

Notes:

ROD =Record of Decision
R-57 = Round 57, May 2010
R-58 = Round 58, May 2011
R-59 = Round 59, May 2012
R-60 = Round 60, May 2013
R-61 = Round 61, May 2014
a =Cleanup levels established in the Final EPA ROD for the Midway Landfill Site, September 6, 2000.
=Exceeds cleanup level established in the Final ROD for the Midway Landfill Site, September 6, 2000.
U =Indicates the compound was undetected at the reported concentration.
DUP =Duplicate.
* =The revised cleanup level for vinyl chloride is 0.29 µg/L using the MTCA adjusted cancer risk of 1e-5.
Up or Down in column title denotes whether the well is located upgradient or downgradient of the landfill's influence.

Table F-3. Summary of Detected Groundwater Quality Parameters Not Included in the ROD and Comparision to Regulatory Standards, 2010-2014 Data Summary

					Upper Gravel Aquifer					Sand Aquifer										Southern Gravel Aquifer						
						MW-16				MW-7B		MW-8B					MW-21B							MW-29B		MW-30C	
					MW-8A	MW-16	Dup	MW-21A	MW-27B	MW-7B	Dup	MW-8B	Dup	MW-11A	MW-17B	MW-18A	MW-21B	Dup	MW-28	MW-14B	MW-20B	MW-23B	MW-29B	Dup	MW-30C	Dup
Compound	**Units**	**MCL[a]**	**MTCA B[b]**	**Round**	**UP**	**UP**		**UP**	**UP**	**DOWN**		**UP**		**UP**	**UP**	**UP**	**UP**		**UP**	**DOWN**	**DOWN**	**DOWN**	**DOWN**		**DOWN**	
Field Parameters																										
pH	s.u.	6.5-8.5		R-57	--	7.40	--	6.51	--	--	--	**6.45**	--	--	**6.34**	--	6.79	--	--	**6.46**	6.73	**6.23**	**6.23**	--	6.57	--
				R-58	--	7.71	--	6.70	--	6.58	--	7.17	--	--	6.83	--	6.94	--	--	6.56	6.79	**6.44**	**6.47**	--	7.04	--
				R-59	7.64	7.69	--	6.67	7.34	6.63	--	6.89	--	7.09	6.81	7.12	6.92	--	6.77	6.54	6.84	**6.44**	6.55	--	7.07	--
				R-60	--	7.52	--	6.61	--	6.60	--	6.52	--	--	**6.43**	--	6.82	--	--	6.61	6.85	**6.35**	**6.29**	--	6.78	--
				R-61	--	7.68	--	6.74	--	6.69	--	6.69	--	--	6.81	--	6.97	--	--	6.59	6.83	6.51	6.51	--	7.09	--
Conductivity	µmhos/cm			R-57	--	280	--	331	--	--	--	155	--	--	335	--	681	--	--	703	1303	569	705	--	320	--
				R-58	--	290	--	338	--	696	--	207	--	--	353	--	676	--	--	685	1260	555	694	--	297	--
				R-59	143	278	--	326	341	666	--	167	--	191	317	471	658	--	486	653	1111	528	674	--	301	--
				R-60	--	285	--	335	--	614	--	201	--	--	315	--	658	--	--	649	1062	523	661	--	301	--
				R-61	--	284	--	328	--	552	--	162	--	--	316	--	624	--	--	632	991	511	648	--	309	--
Temperature	C			R-57	--	11.4	--	11.8	--	--	--	11.0	--	--	11.5	--	11.1	--	--	13.1	12.1	11.1	10.0	--	9.6	--
				R-58	--	11.1	--	11.7	--	13.3	--	11.3	--	--	11.6	--	11.2	--	--	14.0	11.9	11.1	9.8	--	9.5	--
				R-59	11.6	11.6	--	11.6	11.5	12.7	--	11.0	--	10.9	11.7	11.7	11.5	--	13.3	13.9	11.6	11.2	10.2	--	10.3	--
				R-60	--	11.9	--	12.1	--	13.3	--	11.6	--	--	11.9	--	11.4	--	--	14.1	12.0	11.9	10.6	--	10.3	--
				R-61	--	11.9	--	12.0	--	13.2	--	12.0	--	--	12.4	--	11.6	--	--	15.3	12.6	12.0	10.5	--	10.2	--
Conventional Parameters																										
Chloride	mg/L	250**		R-57	--	8.4	8.3	6.6	--	--	--	5.3	--	--	9.6	--	15.0	15.2	--	18.0	44.7	14.8	32.9	--	12.9	--
				R-58	--	8.6	--	6.9	--	25.0	--	7.6	7.5	--	8.8	--	15.5	--	--	19.4	44.9	13.7	31.8	--	13.5	13.2
				R-59	--	8.3	8.4	6.7	--	28.1	--	6.9	--	--	8.9	--	14.5	--	--	16.6	35.2	12.1	26.6	26.5	11.8	--
				R-60	--	8.3	--	6.5	--	18.6	19.7	7.1	--	--	9.5	--	14.1	--	--	16.3	30.6	11.0	26.1	26.1	11.9	--
				R-61	--	8.5	8.3	6.5	--	14.4	--	5.4	--	--	10.1	--	13.1	--	--	14.8	26.6	10.2	23.4	--	12.6	11.6
Sulfate	mg/L	250**		R-57	--	28.4	27.9	39.1	--	--		17.9	--	--	23.7	--	133	133	--	30.9	8.9	33	23	--	12.9	--
				R-58	--	26.7	--	39.8	--	39.2	--	24.8	24.9	--	22.4	--	106	--	--	32.2	10.1	33.3	23.7	--	13.5	13.7
				R-59	--	28.3	28.2	31.2	--	27.9	--	23.5	--	--	23.2	--	106	--	--	34.6	13.0	36.5	26.8	27.2	15.5	--
				R-60	--	22.6	--	33.2	--	29.4	28.9	23.0	--	--	18.4	--	103	--	--	24.8	11.5	26.5	18.9	18.7	12.7	--
				R-61	--	24.5	23.5	35.7	--	29.9	--	18.2	--	--	19.7	--	101	--	--	25.2	9.9	28.1	19.1	--	14.0	13.9
Chemical Oxygen Demand	mg/L			R-57	--	5.00 U	5.00 U	5.36 J	--	--		5.00 U	--	--	5.68 J	--	11.8 J	5.00 U	--	5.00 U	17	5.68 J	10.4	--	6.00 J	--
				R-58	--	5.00 U	--	5.00 U	--	5.00 U	--	5.00 U	5.00 U	--	5.00 U	--	5.00 U	--	--	6.31	20.2	5.00 U	5.00 U	--	5.00 U	5.00 U
				R-59	--	5.00 U	5.00 U	5.00 U	--	5.00 U	--	5.00 U	--	--	5.00 U	--	5.00 U	--	--	9.34	14.3	5.00 U	6.94	5.00 U	5.00 U	--
				R-60	--	5.00 U	--	5.00 U	--	5.00 U	9.25	11.8	--	--	5.00 U	--	5.00 U	--	--	8.31	17.1	5.00 U	5.00 U	6.75	5.00 U	--
				R-61	--	10.0 U	10.0 U	10.0 U	--	10.0 U	--	16.0	--	--	10.0 U	--	10.0 U	--	--	10.0 U	13.1	10.0 U	10.0 U	--	10.0 U	10.0 U
Total Organic Carbon	mg/L			R-57	--	1.50 U	1.50 U	1.50 U	--	--		1.50 U	--	--	1.50 U	--	1.50 U	1.50 U	--	2.30	6.47	1.90	2.37	--	1.50 U	--
				R-58	--	1.50 U	--	1.50 U	--	1.66	--	1.50 U	1.50 U	--	1.93	--	1.50 U	--	--	2.73	6.15	1.79	2.50	--	1.50 U	1.50 U
				R-59	--	0.50 U	27.0 R	0.50 U	--	1.10	--	0.50 U	--	--	0.76	--	0.50 U	--	--	1.20	4.80	0.84	1.60	1.60	0.50 U	--
				R-60	--	1.50 U	--	1.50 U	--	1.50 U	1.50 U	1.50 U	--	--	1.50 U	--	1.50 U	--	--	1.53	4.26	1.50 U	1.57	1.62	1.50 U	--
				R-61	--	1.50 U	1.50 U	1.50 U	--	1.50 U	--	1.50 U	--	--	1.50 U	--	1.50 U	--	--	1.63	4.17	1.50 U	1.77	--	1.50 U	1.50 U
Dissolved Metals																										
Iron	mg/L	0.3**		R-57	--	0.25	0.25	0.05 U	--	--	--	0.05 U	--	--	0.05	--	0.05 U	0.05 U	--	**11.2**	**9.48**	**8.67**	**15**	--	**2.74**	--
				R-58	--	0.24	--	0.05 U	--	**3.57**	--	0.05 U	0.05 U	--	0.06	--	0.05 U	--	--	**11.0**	**8.80**	**8.08**	**14.9**	--	**2.62**	**2.60**
				R-59	--	0.22	0.23	0.05 U	--	**3.57**	--	0.05 U	--	--	0.05 U	--	0.05 U	--	--	**10.1**	**8.17**	**8.26**	**14.6**	**14.4**	**2.43**	--
				R-60	--	0.20	--	0.05 U	--	**3.32**	**3.28**	0.05 U	--	--	0.05 U	--	0.05 U	--	--	**10.3**	**7.53**	**7.95**	**12.9**	**12.0**	**2.41**	--
				R-61	--	0.18	0.17	0.05 U	--	**3.05**	--	0.09	--	--	0.05 U	--	0.05 U	--	--	**10.3**	**6.86**	**7.89**	**14.4**		**2.48**	**2.50**
Semi-Volatile Organics																										
1,4-Dioxane	µg/L		0.44	R-57	--	--	--	--	--	--	--	--	--	--	**2.4**	--	**5.3**	**5.8**	--	**17**	--	--	--	--	--	--
				R-58	--	2.0 U	--	2.0 U	--	**4.3**	--	2.0 U	2 U	--	**2.4**	--	**4.2**	--	--	**13**	**53**	**4.4**	**21**	--	**7.4**	**6.2**
				R-59	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	**6.0**	--	0.4 U	--	0.4 U	**2.2**	0.4 U	**4.2**	--	0.4 U	**12**	**48**	**3.5**	**21**	**22**	**7.1**	--
				R-60	--	0.4 U	--	0.4 U	--	**3.4**	**3.6**	0.4 U	--	--	**1.9**	--	**3.7**	--	--	**9.3**	**39**	**2.3**	**17**	**18**	**6.2**	--
				R-61	--	0.4 U	0.4 U	0.4 U	--	**2.0**	--	0.4 U	--	--	**1.9**	--	**3.4**	--	--	**9.1**	**35**	**2.4**	**15**	--	**6.3**	**5.1**

Table F-3. Summary of Detected Groundwater Quality Parameters Not Included in the ROD and Comparision to Regulatory Standards, 2010-2014 Data Summary

					Upper Gravel Aquifer					Sand Aquifer										Southern Gravel Aquifer						
					MW-8A	MW-16	MW-16 Dup	MW-21A	MW-27B	MW-7B	MW-7B Dup	MW-8B	MW-8B Dup	MW-11A	MW-17B	MW-18A	MW-21B	MW-21B Dup	MW-28	MW-14B	MW-20B	MW-23B	MW-29B	MW-29B Dup	MW-30C	MW-30C Dup
Compound	**Units**	**MCL[a]**	**MTCA B[b]**	**Round**	**UP**	**UP**		**UP**	**UP**	**DOWN**		**UP**		**UP**	**UP**	**UP**	**UP**		**UP**	**DOWN**	**DOWN**	**DOWN**	**DOWN**		**DOWN**	
Volatile Organics																										
Chloroethane	µg/L			R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	--	--	1.4	--	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.1	--	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	7*	0.0729	R-57	--	1.0 U	1.0 U	1.0 U	--		--	1.0 U	--	--	**2.6**	--	**3.6**	**3.6**	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	**2.2**	--	**3.2**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	**2.2**	--	**4.2**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	**1.8**	--	**3.3**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	**1.7**	--	**3.1**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
1,1-Dichloroethane	µg/L		800	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	--	--	36	--	3.6	3.6	--	1.5	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	2.1	--	1.0 U	1.0 U	--	31	--	2.8	--	--	1.3	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	2.9	--	1.0 U	--	--	30	--	3.7	--	--	1.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	2.1	2.2	1.0 U	--	--	21	--	3.2	--	--	1.2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.9	--	1.0 U	--	--	22	--	2.9	--	--	1.1	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	70*	80	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	--	--	3.8	--	1.0 U	1 U	--	4.5	1.0 U	3.4	1.0	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	3.7	--	1.0 U	--	--	3.8	1.0 U	3.2	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	3.2	--	1.0 U	--	--	3.9	1.0 U	2.8	1.1	1.2	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	3.1	--	1.0 U	--	--	3.3	1.0 U	2.4	1.0 U	1.0	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	3.0	--	1.0 U	--	--	3.1	1.0 U	2.6	1.0 U	--	1.0 U	1.0 U
1,1,1-Trichloroethane	µg/L	200*	7200	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	--	--	1.0 U	--	3.8	3.9	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	2.5	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	3.2	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	2.8	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	2.1	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
Trichloroethene	µg/L	5*	3.98	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	--	--	1.0 U	--	**4.8**	**5.1**	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	**4.7**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	**5.3**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	**5.5**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	**5.3**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
Tetrachloroethene	µg/L	5*	0.858	R-57	--	1.0 U	1.0 U	1.0 U	--	--	--	1.0 U	--	--	1.0 U	--	**130**	**130**	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	**110**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	**120**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	**120**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.0 U	--	1.0 U	--	1.0 U	--	--	1.0 U	--	**120**	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
Trichlorofluoromethane	µg/L		2400	R-57	--	1.0 U	1.0 U	2.5	--	--	--	1.0 U	--	--	1.0 U	--	4.4	4.3	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	--
				R-58	--	1.0 U	--	1.9	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U	--	2.9	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U
				R-59	--	1.0 U	1.0 U	2.4	--	1.0 U	--	1.0 U	--	--	1.0 U	--	3.6	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-60	--	1.0 U	--	1.8	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	2.8	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--
				R-61	--	1.0 U	1.0 U	1.6	--	1.0 U	--	1.0 U	--	--	1.0 U	--	2.2	--	--	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U

Notes:

=Exceeds Federal MCL or MTCA Method B Groundwater Cleanup Level.

* =Primary MCL Standards; EPA National Primary Drinking Water Regulations (40 CFR 141 59 FR 34322).

** =Secondary MCL Standards; EPA National Primary Drinking Water Regulations (40 CFR 141 59 FR 34322).

*** =Testing for 1,4-Dioxane in selected groundwater samples was recommended by Ecology and EPA.

[a] =MCL/Federal maximum contaminant level.

[b] =MTCA B/Model Toxics Control Act (WAC 173-340) Method B Cleanup Level. CLARC II Database, Ecology.

R-57 = Round 57, May 2010

R-58 = Round 58, May 2011

R-59 = Round 59, May 2012

R-60 = Round 60, May 2013

R-61 = Round 61, May 2014

U = Indicated the compound was undetected at the reported concentration

J: Indicated the compound was detected at an estimated concentration

R = Rejected based on QC review. See report for details.

-- =Not ananlyzed