Sparton Technology, Inc.
Former Coors Road Plant
Remedial Program

2013 Annual Report

Σ²Π S.S. PAPADOPULOS & ASSOCIATES, INC.
Environmental & Water-Resource Consultants

May 20, 2014

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May 20, 2014

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Subject: **Sparton Technology, Inc: Former Coors Road Plant Remedial Program 2013 Annual Report**

Gentlemen:

On behalf of Sparton Technology, Inc. (Sparton), S.S. Papadopulos & Associates, Inc. (SSP&A) is pleased to submit the subject report. The report presents data collected at Sparton's former Coors Road Plant during the operation of the remedial systems in 2013, and evaluations of these data to assess the performance of the systems.

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of either the person or persons who manage the system and/or the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify, to the best of my knowledge and belief, that this document is consistent with the applicable requirements of the Consent Decree entered among the New Mexico Environment Department, the U.S. Environmental Protection Agency, Sparton Technology, Inc., and others in connection with Civil Action No. CIV 97 0206 LH/JHG, United States District Court for the District of New Mexico. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions concerning the report, please contact me.

Sincerely,

S.S. PAPADOPULOS & ASSOCIATES, INC.

Stavros S. Papadopulos, PhD, PE, NAE
Founder & Senior Principal

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Sparton Technology, Inc.
Former Coors Road Plant
Remedial Program

2013 Annual Report

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Schaumburg, Illinois

Prepared by:

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Environmental & Water-Resource Consultants

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Table of Contents

		Page
Section 1	**Introduction**	**1**
Section 2	**Systems Operations**	**4**
	2.1 Monitoring Well System	4
	2.2 Containment Systems	4
	2.2.1 Off-Site Containment System	4
	2.2.2 Source Containment System	4
	2.3 Problems and Responses	4
Section 3	**Monitoring Results - 2013**	**7**
	3.1 Monitoring Wells	7
	3.1.1 Water Levels	7
	3.1.2 Water Quality	7
	3.2 Containment Systems	8
	3.2.1 Flow Rates	8
	3.2.2 Influent and Effluent Quality	8
Section 4	**Evaluation of Operations - 2013**	**9**
	4.1 Hydraulic Containment	9
	4.1.1 Water Levels and Capture Zones	9
	4.1.2 Effects of Containment Well Shutdown on Capture	10
	4.2 Groundwater Quality in Monitoring Wells	11
	4.2.1 Concentration Trends	11
	4.2.2 Concentration Distribution and Plume Extent	11
	4.2.2.1 Changes in Concentrations	12
	4.3 Containment Systems	13
	4.3.1 Flow Rates	13
	4.3.2 Influent and Effluent Quality	13
	4.3.3 Contaminant Mass Removal	14
	4.4 Site Permits	14
	4.4.1 Off-Site Containment System	14
	4.4.2 Source Containment System	15
	4.5 Contacts	15
Section 5	**Conclusions and Future Plans**	**17**
	5.1 Summary and Conclusions	17
	5.2 Future Plans	18

Section 6 List of Reports and Documents 19

Figures

Tables

List of Figures

Figure 1.1 Location of the Former Sparton Coors Road Plant

Figure 1.2 Location of Existing Wells

Figure 1.3 Schematic Cross-Section Showing Screened Interval of Wells and Relation to Flow Zones

Figure 1.4 Layout of the Off-Site Containment System

Figure 1.5 Layout of the Source Containment System

Figure 3.1 Monitoring Well Hydrographs

Figure 4.1 Elevation of the Onsite Wells Water Table - February 2013

Figure 4.2 Elevation of Water Levels and Limits of Containment Well Capture Zones in the UFZ/ULFZ - February 2013

Figure 4.3 Elevation of Water Levels and Limits of Containment Well Capture Zones in the LLFZ - February 2013

Figure 4.4 Elevation of the Onsite Wells Water Table - May 2013

Figure 4.5 Elevation of Water Levels and Limits of Containment Well Capture Zones in the UFZ/ULFZ - May 2013

Figure 4.6 Elevation of Water Levels and Limits of Containment Well Capture Zones in the LLFZ - May 2013

Figure 4.7 Elevation of the Onsite Wells Water Table - August 2013

Figure 4.8 Elevation of Water Levels and Limits of Containment Well Capture Zones in the UFZ/ULFZ - August 2013

Figure 4.9 Elevation of Water Levels and Limits of Containment Well Capture Zones in the LLFZ - August 2013

Figure 4.10 Elevation of the Onsite Wells Water Table - November 2013

Figure 4.11 Elevation of Water Levels and Limits of Containment Well Capture Zones in the UFZ/ULFZ - November 2013

Figure 4.12 Elevation of Water Levels and Limits of Containment Well Capture Zones in the LLFZ - November 2013

Figure 4.13 Groundwater Flow Direction and Hydraulic Gradient in the DFZ - 2013

Figure 4.14 Contaminant Concentration Trends in On-Site Monitoring Wells

Figure 4.15 Contaminant Concentration Trends in Off-Site Monitoring Wells

Figure 4.16 Horizontal Extent of TCE Plume - November 2013

Figure 4.17 Horizontal Extent of DCE Plume - November 2013

Figure 4.18 Changes in TCE Concentrations at Wells used for Plume Definition - November 1998 to November 2013

Figure 4.19 Changes in DCE Concentrations at Wells used for Plume Definition - November 1998 to November 2013

Figure 4.20 Monthly Volume of Water Pumped by the Containment Wells - 2013

Figure 4.21 Cumulative Volume of Water Pumped by the Containment Wells

Figure 4.22 Off-Site and Source Containment Systems - TCE, DCE, and Total Chromium Concentrations in the Influent - 2013

Figure 4.23 Monthly Contaminant Mass Removal by the Containment Wells - 2013

Figure 4.24 Cumulative Contaminant Mass Removal by the Containment Wells

List of Tables

Table 2.1 Completion Flow Zone, Location Coordinates, and Measuring Point Elevation of Existing Wells

Table 2.2 Well Screen Data

Table 2.3 Operation and Downtime of the Off-Site Containment System - 2013

Table 2.4 Operation and Downtime of the Source Containment System - 2013

Table 3.1 Quarterly Water-Level Elevations - 2013

Table 3.2 Water-Quality Data from Groundwater Monitoring Program Wells - 2013

Table 3.3 Water-Quality Data from Infiltration Gallery and Pond Monitoring Wells - 2013

Table 3.4 Containment System Flow Rates - 2013

Table 3.5 Off Site Containment System Influent and Effluent Chemistry

Table 3.6 Source Containment System Influent and Effluent Chemistry

Table 4.1 Concentration Changes in Monitoring Wells - 1998 to 2013

Table 4.2 Containment System Flow Rates - 2013

Table 4.3 Contaminant Mass Removal - 2013

Table 4.4 Summary of Contaminant Mass Removal - 1998 to 2013

List of Acronymns

μg/L	Microgram per liter
cis-1,2-DCE	cis-1,2-Dichloroethene
Cr	Chromium
DCE	1,1-Dichloroethene
DFZ	Deep Flow Zone below the 4800-foot clay
Fe	Iron
ft	foot or feet
ft MSL	feet above Mean Sea Level
ft/d	feet per day
ft/yr	feet per year
ft^3	cubic feet
gpm	gallons per minute
in	inch or inches
kg	Kilogram
lb	Pounds
LLFZ	Lower Lower Flow Zone
MCL	Maximum Contaminant Level
Metric	Metric Corporation
mg/L	Milligrams per liter
Mn	Manganese
MSL	Mean Sea Level
ND	Not Detected
NMED	New Mexico Environment Department
NMEID	New Mexico Environmental Improvement Division
NMWQCC	New Mexico Water Quality Control Commission
PCE	Tetrachloroethene
Sparton	Sparton Technology, Inc.
SSP&A	S.S. Papadopulos and Associates, Inc.
SVE	Soil Vapor Extraction
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
UFZ	Upper Flow Zone
ULFZ	Upper Lower Flow Zone
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound

REPORT

REPORT

Section 1
Introduction

The former Coors Road Plant of Sparton Technology, Inc. (Sparton) is located at 9621 Coors Boulevard NW (on the west side of the boulevard), Albuquerque, New Mexico, north of Paseo del Norte and south of the Arroyo de las Calabacillas (see Figure 1.1). Investigations conducted between 1983 and 1987 at and around the plant revealed that on-site soils and groundwater were contaminated by volatile organic compounds (VOCs), primarily trichloroethene (TCE), 1,1,1-trichloroethane (TCA) and 1,1-dichloroethene (DCE), and by chromium, and that contaminated groundwater had migrated beyond the boundaries of the facility to downgradient, off-site areas.

These investigations also indicated that groundwater contamination was primarily within a sandy unit that lies above a 2-4 feet (ft) thick clay unit referred to as the 4,800-ft clay unit. This unit was encountered in every deep well installed during site investigations and in the U.S. Geological Survey (USGS) Hunter Ridge Park 1 Boring about 0.5 mile north of the site. The saturated thickness of the sands above the clay unit is about 160 ft. Beneath the facility, and in an approximately 1,500 ft wide band trending north from the facility, a silty clay unit has been mapped between an elevation of about 4,965 ft above mean sea level (ft MSL) and 4,975 ft MSL. This unit is referred to as the 4,970-ft silt/clay unit. Depending on the depth of their screened interval, wells installed at the site and its vicinity during site investigations, or later, have been referred to as Upper Flow Zone (UFZ) wells if screened across, or within 15 ft of, the water table, Upper Lower Flow Zone (ULFZ) wells if screened 15-45 ft below the water table, Lower Lower Flow Zone (LLFZ) wells if screened more than 45 ft below the water table, and Deep Flow Zone (DFZ) wells if screened below the 4,800-ft clay. The USGS boring also indicates a 15-ft thick clay unit below the DFZ between elevations of 4,705 and 4,720 ft MSL. At the onsite area, another low permeability, 5-20 ft thick unit separates the UFZ from the ULFZ. Well locations are shown in Figure 1.2 and their screened interval in relation to these flow zones is shown in Figure 1.3.

On March 3, 2000, the United States Environmental Protection Agency (USEPA), the State of New Mexico Environment Department (NMED), the County of San Bernalillo, the City of Albuquerque (COA) and Sparton entered into a Consent Decree that set the terms for addressing soil and groundwater contamination. Under the terms of this Consent Decree, Sparton is currently operating an off-site and a source containment system to address groundwater contamination. The off-site containment system consists of a containment well, CW-1, that fully penetrates the saturated portion of the sand unit above the 4,800-ft clay, a treatment building with an air stripper to treat the pumped water, a pipeline to the nearby Arroyo de las Calabacillas, and an infiltration gallery in the arroyo for returning the treated water to the aquifer (see Figure 1.4). The source containment system also consists of a containment well, CW-2, with a 50-ft screen across the upper part of the sand unit, an on-site treatment building with an air stripper to treat the pumped water, and pipelines to four on-site ponds[1] for returning the treated water to the aquifer (see Figure 1.5).

The predominant contaminant at the site is TCE. Based on the horizontal and vertical extent of the 1998 TCE plume [see Appendix B to both the 1999 and the 2000 Annual Reports (S.S. Papadopulos & Associates, Inc. [SSP&A], 2001a; 2001b)] and a porosity of 0.3, the initial pore volume of the plume was estimated to be approximately 150 million cubic ft (ft^3), or 1.13 billion gallons, or 3,450 acre ft. The initial dissolved TCE mass within this pore volume was estimated through the development of a numerical groundwater flow and transport model of the hydrogeologic system underlying the Site. Based on the calibration of this model against 1999 through 2009 water-quality data the current estimate of the initial TCE mass is about 7,360 kilograms (kg) or 16,230 pounds (lbs). Using this estimate, and ratios of the removed TCE mass to the removed DCE and TCA mass, the initial masses of dissolved DCE and TCA are estimated to be approximately 460 kg (1,010 lbs) and 22 kg (48 lbs), respectively. Thus, the total initial mass of dissolved contaminants is currently estimated to be about 7,840 kg (17,290 lbs).

The off-site containment well began operating on December 31, 1998 and is currently operating at an average pumping rate of about 300 gallons per minute (gpm). The year 2013 constitutes the 15^{th} year of operation of the off-site containment system. The source containment system began operating at an average rate of about 50 gpm on January 3, 2002. Thus, the year 2013 constitutes the 12^{th} year of operation of this system. As it will be discussed later in this report, the source containment system was shut down on November 15, 2013 to implement corrective measures for addressing increased chromium concentrations in the pumped water.

Between the beginning of the current remedial operations in December 1998 and the end of May 2011, Metric Corporation of Albuquerque (Metric) and then of Los Lunas, New Mexico was responsible for the operation of the remedial systems, the collection of monitoring and of system performance data, and for other field activities; after the passing away of Gary Richardson of Metric in May of 2011, SSP&A took over the responsibility for these activities effective June 1, 2011.

The objectives of the containment systems are:

- To contain and capture contaminated groundwater in the off-site area;
- To contain and capture most of the contaminated groundwater leaving the on-site area;
- To treat the captured water and return it to the aquifer; and
- Achieve ground water standards to the extent required by the terms of the Consent Decree (2000).

[1]The original design consisted of six infiltration ponds. Based on performance data from these ponds, two ponds were backfilled in late 2005 with the approval of the regulatory agencies.

The purpose of this 2013 Annual Report is to:

- Discuss problems encountered during the 2013 operation of the systems;
- Present the data collected during 2013 from operating and monitoring systems; and
- Evaluate the performance of the systems with respect to meeting the above cited objectives, and the requirements of the site's permits.

This report was prepared by SSP&A on behalf of Sparton. Issues related to the year-2013 operation of the off-site and source containment systems are discussed in Section 2. Data collected to evaluate system performance and to satisfy permit or other requirements are presented in Section 3. Section 4 presents evaluations of the data with respect to the performance and the goals of the remedial systems. A summary and conclusions of the report and a discussion of future plans are presented in Section 5. Section 6 lists previous reports and documents pertinent to site investigations and activities, including references cited in this report.

Section 2
Systems Operations

2.1 Monitoring Well System

During 2013, water levels were measured in and samples were collected from all monitoring wells that were not dry and had sufficient water during the measurement or sampling event. Water levels were measured quarterly and samples were collected from each well at the frequency specified either in the Groundwater Monitoring Program Plan[2] (Monitoring Plan) and the State of New Mexico Groundwater Discharge Permit DP-1184 (Discharge Permit).

The completion flow zone, location coordinates, and measuring point elevation of all existing wells are presented on Table 2.1; their diameters and screened intervals are summarized on Table 2.2.

2.2 Containment Systems

2.2.1 Off-Site Containment System

The operation of the Off-Site Containment System and system downtime during the year are summarized on Table 2.3.

2.2.2 Source Containment System

The operation of the Source Containment System and system downtime during the year are summarized on Table 2.4.

2.3 Problems and Responses

A problem that arose during 2013 was damage to one of the infiltration ponds (Pond #1 in Figures 1.2 and 1.5) due to storm water overflows from a property adjacent to the northwest boundary of the Sparton site. These overflows occurred during rainstorms in July and again in August and early September apparently due to the blockage of a storm drain inlet on the adjacent property. Sparton contacted the owner of the adjacent property requesting that the storm drain be cleaned of debris and be properly and routinely maintained. Sparton also questioned the need for repairing the damaged pond because observations indicated that only one pond is adequate for returning all the water

[2] Attachment A to the Consent Decree

pumped and treated by the source containment system back to the aquifer. A request for approval to abandon this pond and the adjacent Pond #4 was submitted to USEPA and NMED on September 18, 2013[3]. Approval to abandon these ponds was received from the agencies on October 4, 2013[4]. Upon receipt of this approval, Sparton began negotiations with the Tenant of the property, Melloy Dodge, for turning over the ponds for parking lot use. Sparton is requesting the Tenant to agree to restore one or both of the ponds, if a need for them arises in the future, to replace the 2-inch pipelines to the remaining two ponds, Pond #2 and Pond #3, with new 3-inch pipelines, to install new flowmeters on the lines that will feed these pipelines, and to modify the wellheads of wells MW-17 and MW-72 which might be affected by the backfilling of Ponds #1 and #4 and their conversion to parking lots for the Tenant's use. It is anticipated that the parties will reach agreement in early 2014 and that pipeline and flowmeter installation and wellhead modification will follow soon after.

Another issue that arose during 2013 was the increase of chromium concentrations in the source containment system influent, and hence effluent, slightly above the New Mexico Water Quality Control Commission (NMWQCC) standard of 0.050 milligrams per liter (mg/L) for groundwater. The NMED was notified of these conditions on September 10, 2013 [5] and well CW-2 was shut down on the same day. The increase in the effluent concentrations also resulted in the increase of chromium concentrations in one of the three pond monitoring wells, MW-17. The NMED was notified of these conditions on September 23, 2013[6].

This concentration increase was originally attributed to a decline of the pumping rate of CW-2 from about 50 gpm to about 33 gpm. A number of corrective measures aimed at increasing the pumping rate of the well were, therefore implemented. These measures consisted of:

- Cleaning of the well screen, of the discharge column, and of the well pump;
- Acid cleaning of the pipeline between the well and the air stripper;
- Rehabilitation of the well; and
- Replacement of the flow meter to reduce back pressure.

Measurements made after the implementation of these corrective measures indicated that the pumping rate of the well had increased to 47 to 49 gpm, and that chromium concentrations in the effluent from the air stripper were reduced to about 0.03 mg/L or less. Based on these results, the well was restarted on October 15. Sampling of the effluent was scheduled to continue on a weekly frequency and sampling of MW-17 on a monthly frequency. A report presenting the details of these implemented corrective

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[3]Letter to Charles Hendrickson of USEPA and John Kieling of NMED from Stavros S. Papadopulos of SSP&A on the subject: Sparton Technology Inc. Former Coors Road Plant Remedial Program, Request to Abandon Two Infiltration Ponds.

[4]Letter from Chuck Hendrickson of USEPA and John E. Kieling of NMED to Ernesto Martinez of Sparton, Re: Approval, Request to Abandon Two Infiltration Ponds, Sparton Technology Inc., EPA ID No. NMD083212332.

[5]Telephone conversation between Naomi Davidson of the NMED and Stavros Papadopulos of SSP&A.

[6]Letter to Naomi Davidson of NMED from Stavros S. Papadopulos of SSP&A on the subject: Sparton Technology, Inc. Discharge Permit - DP-1184.

measures and their results was prepared and submitted to the NMED on October 21, 2013 with a request for their approval[7].

The results of the weekly effluent sample collected on November 1, 2013, and received on November 5, 2013, indicated that chromium concentrations in the effluent had risen again above the NMWQCC standard (0.064 mg/L and 0.063 mg/L, respectively, for total and dissolved chromium)[8]. The NMED was notified of this exceedance on November 6, 2013[9], and an agreement was reached to: (1) continue system operation; (2) conduct confirmatory sampling and chromium speciation; (3) review results and determine whether chromium treatment is required. The confirmatory sample was collected on the same day and a second sample was collected the next day for speciation analysis. The results of the confirmatory sample (0.060 mg/L and 0.061 mg/L, respectively, for total and dissolved chromium) were received on November 12, 2013, and those for the speciation sample (0.062 mg/L for hexavalent chromium) were received on November 11, 2013. These results were reported to the NMED on November 14, 2013, and subsequently it was agreed that (1) the system will be shut down until the chromium issue is addressed, and (2) a plan will be developed for chromium removal. The source containment system was shut down on November 15, 2013.

A plan for the installation of a chromium removal system and for modifications to the piping at the treatment building to accommodate the system was developed during the remainder of 2013. This proposed corrective action plan will be submitted to NMED in early 2014 and implemented upon approval[10].

[7]Letter to Ms. Naomi Davidson of the NMED form Stavros S. Papadopulos of SSP&A on the subject: Sparton Technology, Inc. Discharge Permit DP-1184 ÂŰ Request for Approval of Implemented Corrective Actions.

[8]The chromium concentrations in the sample collected on October 25, 2013 (0.061 mg/L for both total and dissolved) were also above the New Mexico standard but these results were not received until November 26, 2013.

[9]Telephone conversation between Naomi Davidson of the NMED and Alex Spiliotopoulos of SSP&A.

[10]The corrective action plan was submitted to NMED on January 8, 2014 and approved by the agency on February 5, 2014.

Section 3
Monitoring Results - 2013

The following data were collected in 2013 to evaluate the performance of the operating remedial systems and to meet the requirements of the Consent Decree and of the permits for the site:

- Water-level and water-quality data from monitoring wells;
- Data on containment well flow rates; and
- Data on the quality of the influent to and effluent from the water-treatment systems.

3.1 Monitoring Wells

3.1.1 Water Levels

Water levels during 2013 were measured quarterly, in February, May, August and November. During each round of measurements, the depth to water was measured in all monitoring wells that were not dry during the measurement round, the off-site and source containment wells, the two observation wells near CW-1 (see Figure 1.2), and the piezometer installed in the infiltration gallery. The corresponding elevations of the water levels during each of the four measurement rounds, calculated from these data, are summarized on Table 3.1. Selected monitoring well hydrographs are presented in Figure 3.1. These hydrographs indicate a regional water-level decline which is attributed to groundwater production from deeper aquifers and a reduction in the extent of irrigated lands in the vicinity of the Site.

3.1.2 Water Quality

Monitoring wells within and in the vicinity of the plume were sampled at the frequency specified in the Monitoring Plan and the Discharge Permit. The samples were analyzed for VOCs and for total chromium (unfiltered, and occasionally filtered, samples). The results of the analysis of the samples collected from the groundwater monitoring program wells during all sampling events conducted in 2013, and for all of the analyzed constituents, are presented in Table 3.2. The results of the analysis of the samples collected from the infiltration gallery and pond monitoring wells during all sampling events conducted in 2013, are presented in Table 3.3. Concentrations of TCE, DCE, TCA and of chromium that exceed the more stringent of their Maximum Contaminant Levels (MCLs) for drinking water or their maximum allowable concentrations in groundwater set by NMWQCC are highlighted on Tables 3.2 and 3.3.

3.2 Containment Systems

3.2.1 Flow Rates

The volumes of groundwater pumped by the off-site and source containment wells during 2013 and the corresponding flow rates are summarized on Table 4.2.

3.2.2 Influent and Effluent Quality

Concentrations of TCE, DCE, TCA, and of total chromium, iron, and manganese in influent and effluent samples collected from the Off-Site Containment System during 2013 are summarized on Table 3.5. The concentrations of the same constituents in influent and effluent samples collected from the Source Containment System during 2013 are summarized on Table 3.6. Concentrations of TCE, DCE, TCA and of chromium that exceed the more stringent of their MCLs for drinking water or their maximum allowable concentrations in groundwater set by NMWQCC are highlighted on Tables 3.5 and 3.6.

Section 4
Evaluation of Operations - 2013

As stated in the Introduction (Section 1), the objectives of the off-site and source containment systems are:

- To contain and capture contaminated groundwater in the off-site area;
- To contain and capture most of the contaminated groundwater leaving the on-site area;
- To treat the captured water and return it to the aquifer; and
- Achieve ground water standards to the extent required by the terms of the Consent Decree (2000).

This section presents evaluations of the performance of the off-site and source containment systems, based on data collected during 2013, with respect to their meeting the above-stated objectives.

4.1 Hydraulic Containment

4.1.1 Water Levels and Capture Zones

The water-level elevation data presented in Table 3.1 were used to evaluate the performance of both the off-site and source containment wells with respect to providing hydraulic containment for the plume and potential on-site source areas. Maps of the elevation of the on-site water table and of the water levels in the UFZ/ULFZ and the LLFZ during each quarterly round of water-level measurements in 2013 are shown in Figures 4.1 through 4.12. Also shown on these water-level maps are: (1) the limit of the capture zones of the containment wells in the UFZ/ULFZ or the LLFZ, as determined from the configuration of the water levels; and (2) the extent of the TCE plume. The extent of the TCE plume shown in Figures 4.1 through 4.9 is based on last year's (November 2012) water-quality data from monitoring wells, and that shown on the water-level maps for November 2013 (Figures 4.10 through 4.12) is based on the November 2013 water-quality data.

The quarterly water levels and the capture zones of the off-site and source containment wells within the UFZ/ULFZ are shown in Figures 4.2, 4.5, 4.8, and 4.11; those within the LLFZ are shown in Figures 4.3, 4.6, 4.9, and 4.12. As shown in these figures, at a pumping rate that averaged about 280 gpm during 2013, the capture zone of the off-site containment well CW-1 extends well beyond the November 2012 or November 2013 extent of the TCE plume and provides an ample safety margin to the hydraulic containment of the off-site plume. The figures also indicate that, despite its lower average pumping rate of 31 gpm during 2013 and its extensive shutdown due to the chromium problem, the source containment well CW-2, when operating, contained and captured most of the contaminated groundwater leaving the on-site area.

The direction of groundwater flow and the hydraulic gradient in the DFZ during each quarterly round of the 2013 water-level measurements in the three DFZ wells, MW-67, MW-71R, and MW-79, and for the average water level in these wells are shown in Figure 4.13. During 2013 the direction of groundwater flow in the DFZ ranged from W 1.5° N in May to W 34.9° N in August, and the hydraulic gradient from 0.00234 in February to 0.00297 in August. The average direction of groundwater flow in the DFZ during 2013 was W 16.8° N with an average hydraulic gradient of 0.00268.

4.1.2 Effects of Containment Well Shutdown on Capture

The containment systems are occasionally shut down for maintenance and repairs, and sometimes due to power or equipment failures. For example, during 2013 the off-site containment system was shut down numerous times for periods as long as about 30 hours due to power outages, repairs and maintenance problems, and the exceedance of chromium in the source containment system effluent caused the shutdown of this system for most of October and November and for the entire month of December.

The capture zone of the source containment well lies within the capture zone of the off-site containment well, and its downgradient limit is within the plume area. Any shutdown of this well would cause some contaminants to escape beyond its capture zone, but these contaminants will remain within the capture zone of the off-site containment well and eventually be captured by this well.

Given the distance between the leading edge of the off-site plume and the limits of the capture zone of the off-site containment well, it is highly unlikely that any contaminants would escape beyond the capture zone of the well during a shutdown of limited duration. Under non-pumping conditions, the hydraulic gradient near the leading edge of the plume is about 0.003. The aquifer above the 4800-ft clay has a hydraulic conductivity of 25 feet per day (ft/d) and a porosity of about 0.3. Thus, the rate at which groundwater, and hence contaminants, would move under non-pumping conditions is 0.25 ft/d or about 90 feet per year (ft/yr). The downgradient distance between the limit of the capture zone of the off-site containment well and the leading edge of the plume is more than several hundred feet (see Figures 4.1 through 4.12). Thus, shutdowns of the length that have been experienced in the past, and of even much longer periods, could not cause any contaminants to escape beyond the capture zone of the well. Hydraulic containment of the plume has been, therefore, maintained during any past shutdowns of the off-site containment system, and will continue to be maintained during any future shutdowns of reasonable duration.

4.2 Groundwater Quality in Monitoring Wells

4.2.1 Concentration Trends

Plots showing temporal changes in the concentrations of TCE, DCE, and TCA were prepared for a number of on-site and off-site wells to evaluate long-term water-quality changes at the Sparton site. Plots for on-site wells are shown in Figure 4.14 and plots for off-site wells in Figure 4.15.

The concentrations in the on-site wells (Figure 4.14) indicate a general decreasing trend. In fact, the data from wells MW-9 and MW-16, which have the longest record, suggest that this decreasing trend started before 1983. A significant decrease in concentrations occurred in well MW-16 during 1999 through 2001 when a soil vapor extraction (SVE) system was operating at its vicinity. Since the termination of the SVE operations in 2001, low concentrations have been observed not only in this well but also in all other onsite wells completed above the 4,970-ft silt/clay unit. The lower concentrations measured in these onsite wells indicate that the cleanup of the unsaturated zone beneath the former Sparton plant area by the SVE system, and the flushing provided by the water infiltrating from the infiltration ponds of the source containment system has been very effective in reducing VOC concentrations in the saturated sediments overlying the 4,970-ft silt clay.

The concentration plots of the six off-site monitoring wells shown in Figure 4.15 indicate that concentrations in most wells have declined and are much lower than their pre-remediation levels. The 2013 concentrations in well MW-60 continued to be the highest observed in an off-site well, as it has been the case since the beginning of remedial operations. Note, however, that concentrations in this well have been declining since the mid-2000s; TCE concentrations in the well have declined from 18,000 micrograms per liter (μg/L) in November 2004 to 790 μg/L in November 2013.

Of the three monitoring wells completed in the DFZ, wells MW-67 and MW-79 have been clean since their installation in 1996 and 2006, respectively. The third DFZ well, MW-71R, located about 30 ft south of the MW-60/61 cluster, was installed in February 2002 as a replacement for DFZ well MW-71 which was plugged and abandoned in October 2001 because of contamination[11]. The first sample from MW-71R, obtained in February 2002, had a TCE concentration of 130 μg/L and the well has remained contaminated since then. Concentrations of TCE in the well during quarterly sampling events in 2013 ranged from 63 μg/L to 72 μg/L.

4.2.2 Concentration Distribution and Plume Extent

The Fourth Quarter 2013 TCE and DCE data presented in Tables 3.2 and 3.3 were used to prepare concentration distribution maps showing conditions near the end

[11]See 1999 Annual Report (SSP&A, 2001a) for a detailed discussion of the history of well MW-71, and SSP&A and Metric (2002) for actions taken prior to its plugging and abandonment.

of 2013. The horizontal extent of the TCE and DCE plumes and the concentration distribution within these plumes in November 2013 are shown on Figures 4.16 and 4.17, respectively[12]. Concentrations of TCA in all monitoring and both containment wells have been below regulatory standards since 2003; in November 2013 only the off-site containment well and 4 of the 51 sampled monitoring wells contained TCA above the detection limit of 1 μg/L. The highest TCA concentrations were measured in well MW-46 (3.1 μg/L); the concentrations in the other wells where TCA was detected were less than 2 μg/L. Based on the low concentrations of TCA that have been observed since 2003 and with the approval of the agencies, inclusion of a concentration distribution map for TCA and of other evaluations of TCA data in the Annual Reports has been discontinued since the 2011 Annual Report; however, TCA concentrations in the off-site containment well continue to be used in calculations of mass removal by this well.

4.2.2.1 Changes in Concentrations

A total of 51 monitoring wells and the influent from the two containment wells were sampled in November 2013. Of these 53 wells, 36 are wells that existed in November 1998 (prior to the implementation of the current remedial activities), 7 are replacement or deepened version of wells that existed in November 1998, and the remaining 10 are wells that were installed in later years. Changes between the TCE and DCE concentrations measured in these wells in November 2013 and those measured in November 1998, or during the first sampling event after their installation, are summarized on Table 4.1. Twenty-one of the 53 wells listed on Table 4.1 are wells, or their replacements/deepened versions, that were used for defining both the November 1998 and the November 2013 plume; another 15 are wells that were used to define either the November 1998 or the November 2013 plume. Concentration changes in these 36 wells are presented in Figures 4.18, and 4.19 to show the distribution of concentration changes that occurred since the implementation of the off-site and source containment systems.

As this table and figures indicate, considerable progress has been made towards aquifer restoration. Current concentrations in most, if not all, wells are much lower than those that existed prior to the start of the current remedial operations. The only wells where a significant increase in concentrations occurred are the off-site containment well CW-1, on-site monitoring well MW-19, and off-site monitoring well MW-52R. Increases in CW-1 were to be expected since this well has been drawing water from the entire plume area where higher concentrations existed and continue to exist. The increase in MW-19 is attributed to increased downward leakage through the 4,970-ft silt/clay unit caused by the pond discharge and the resulting increased vertical gradients across this unit where residual contaminants may persist.

[12] At well cluster locations, the concentrations shown in Figures 4.16 and 4.17 are those for the well with the highest concentration.

4.3 Containment Systems

4.3.1 Flow Rates

A total of about 164.2 million gallons of water, corresponding to an average pumping rate of about 313 gpm, were pumped during 2013 from the off-site and source containment wells (see Table 4.2). The volume of water pumped during each year of the operation of the containment wells is summarized on Table **??**. The total volume pumped from both wells since the beginning of remedial pumping in December 1998 is about 2.15 billion gallons, and corresponds to an average rate of 256 gpm over the 15 years of operation. This volume represents approximately 190 percent of the initial plume pore volume.

The volume of water pumped from the off-site containment well during 2013 was approximately 147.7 million gallons and that pumped from the source containment well was 16.5 million gallons. The corresponding average annual pumping rates were 281 gpm and 31 gpm, respectively, and the average pumping rates during operating hours were about 286 gpm and 40 gpm, respectively.

The total volume of water pumped by the off-site containment well since the beginning of its operation is 1.87 billion gallons, or 165 percent of the plume pore volume; the corresponding numbers for the source containment well are 0.284 billion gallons and 25 percent.

A plot of the volume of water pumped by each well during each month of 2013 and of the total monthly volume is presented in Figure 4.20; a plot of the cumulative volume pumped by the wells since the beginning of their operation is presented in Figure 4.21.

4.3.2 Influent and Effluent Quality

The concentrations of TCE, DCE, TCA, and of total chromium, iron, and manganese in the monthly samples of influent to and effluent from the off-site treatment system during 2013 were presented on Table 3.5; the corresponding concentrations in the monthly samples of influent to and effluent from the source treatment system were presented on Table 3.6. Plots of the TCE, DCE, and total chromium concentrations in the influent to both systems, prepared from these data, are presented in Figure 4.22.

As discussed earlier, chromium concentrations in the influent to, and hence in the effluent from, the source containment system air stripper exceeded the maximum allowable concentrations in groundwater set for this compound by NMWQCC. As also discussed earlier, a number of corrective measures that were implemented in September and early October temporarily reduced the chromium concentrations, but the concentrations rose again and the system was shut down on November 15, 2013. Installation of a chromium removal unit to address chromium concentrations is planned for early 2014[13].

[13]The installation of the chromium removal system was completed in April 2014 and the source containment system resumed operation on April 23, 2014.

4.3.3 Contaminant Mass Removal

The monthly and total mass of contaminants removed by the Off-Site Containment System (TCE, DCE and TCA) and the Source Containment System (TCE and DCE) during 2013, calculated from the monthly flow volumes reported on Table 4.2 and the influent concentrations reported on Tables 3.5 and 3.6, are summarized on Table 4.3; also shown on this table is the total mass of contaminants removed by both systems.

A total of about 260 kg (574 lbs) of contaminants, consisting of about 233 kg (513 lbs) of TCE, kg (lbs) of DCE, and kg (lbs) of TCA, were removed by the two containment wells during 2013. A plot of the TCE, DCE and total mass removed by the two containment wells during each month of 2013 is presented in Figure 4.23. The total mass of contaminants removed by the two containment wells during each year of their operation is summarized on Table 4.4 (a), and a plot of the cumulative TCE, DCE, and total mass removed by the wells is presented in Figure 4.24. As shown on Table 4.4 (a), the total mass removed by the containment wells, since the beginning of the current remedial operations in December 1998, is about 7,170 kg (15,800 lbs), consisting of about 6,680 kg (14,700 lbs) of TCE, 469 kg (1,030 lbs) of DCE, and 20 kg (44.1 lbs) of TCA. This represents about 91 percent of the total dissolved contaminant mass currently estimated to have been present in the aquifer prior to the testing and operation of the off-site containment system.

4.4 Site Permits

The infiltration gallery associated with the off-site containment system and the rapid infiltration ponds associated with the source containment system are operated under a State of New Mexico Groundwater Discharge Permit (DP-1184). This Discharge Permit was originally issued by the Groundwater Bureau of the NMED for a five-year period on June 23, 1998 and renewed for two more five-year periods on December 29, 2006 and on October 18, 2012.

The air stripper associated with the off-site containment system is operated under Air Quality Source Registration No. NM/001/00462/967, issued by the Air Quality Services Section, Air Pollution Control Division, Environmental Health Department, City of Albuquerque, and the source containment system air stripper is operated under Albuquerque/Bernalillo County Authority-to-Construct Permit No. 1203.

The performance of the off-site and source containment systems with respect to the requirements of these permits is discussed below.

4.4.1 Off-Site Containment System

Discharge Permit DP-1184 requires monthly sampling of the treatment system effluent, and the quarterly sampling of the infiltration gallery monitoring wells MW-74, MW-75 and MW-76. The results of these sampling events during 2013 (see Tables 3.3 and 3.5) were reported to the NMED Groundwater Bureau in the 2013 Annual Monitoring Report for the permit submitted to the Bureau on February 6, 2013[14].

Calculations of VOC emissions made in June 1999 indicated that the off-site air stripper was in in full compliance with the limits (0.32 pound per hour [lb/hr] or 1.37 tons/yr) specified in Registration No. NM/001/00462/967. Under the terms of the registration, further monitoring and/or reporting of the emissions from the air stripper was not required, and has not been carried out since that time.

No violation notices were received during 2013 for activities associated with the operation of the off-site containment system.

4.4.2 Source Containment System

The rapid infiltration ponds associated with the source containment system are also subject to the above-stated requirements of Discharge Permit DP-1184. The monitoring wells for this system are MW-17, MW-77 and MW-78; the data collected from these wells (see Tables 3.3 and 3.6) were included in the 2013 Annual Monitoring Report for the permit. As discussed in Section 2.3, chromium concentrations above the NMWQCC standard of 0.050 mg/L were detected in the effluent from the air stripper and in samples from MW-17. This led to the implementation and planning of the corrective measures discussed in Section 2.3.

Emissions of VOCs from the source containment system air stripper during 2013 (0.00044 lb/hr or 0.0019 ton/yr) met the requirements of The Authority-to-Construct Permit No. 1203 and were reported to the Albuquerque Environmental Health Department, Air Quality Division in the 2013 Annual Report on Air Emissions which was submitted on March 4, 2014[15].

4.5 Contacts

Under the terms of the Consent Decree[16], Sparton is required to prepare an annual Fact Sheet summarizing the status of the remedial actions, and after approval by USEPA/NMED, distribute this Fact Sheet to property owners located above the plume and adjacent to the off-site treatment plant water discharge pipeline. After the approval of the 2012 Annual Report on September 13, 2013[17] Sparton prepared a 2013 Fact Sheet

[14] Letter to Ms. Naomi Davidson of the Groundwater Bureau, NMED from Stavros S. Papadopulos of SSP&A on the subject "2013 Annual Monitoring Report for Discharge Permit DP-1184."

[15] Letter to Regan Eyerman, Health Scientist, Air Quality Division, Environmental Health Department, City of Albuquerque, from Stavros S. Papadopulos of SSP&A on the subject"Authority-to-Construct Permit #1203 - 2013 Annual Report on Air Emissions"

[16] Public Involvement Plan for Corrective Measure Activities. Attachment B to the Consent Decree in Albuquerque v. Sparton Technology, Inc., No. CV 07 0206 (D.N.M.).

[17] Letter from Mr. John E. Kieling of NMED and Mr. Chuck Hendrickson of USEPA to Mr. Ernesto Martinez of Sparton, Re: Approval, 2012 Annual Report, Sparton Technology, Inc., EPA ID NO. NMD083212332

and submitted it to the USEPA/NMED for approval on October 15, 2013[18]. The agencies approved the Fact Sheet on October 31, 2013, and the approved Fact Sheet was distributed to the property owners located above the plume and adjacent to the off-site treatment plant water discharge pipeline on November 4, 2013.

[18]Letter from John E. Kieling of NMED and Chuck Hendrickson of USEPA to Ernesto Martinez of Sparton, Re: 2012 Fact Sheet Approval, Sparton Technology Inc., EPA ID No.:NMD083212332.

Section 5
Conclusions and Future Plans

5.1 Summary and Conclusions

During 2013, considerable progress was made towards achieving the goals of the remedial measures:

- The off-site containment well operated 98.4 percent of the time available in 2013 at an average rate of 286 gpm and maintained hydraulic containment of the off-site plume.
- The concentrations of constituents of concern in the water treated at the off-site containment system met all the requirements of the Discharge Permit for the site.
- Because of an increase of the chromium concentration in the air-stripper effluent above the NMWQCC standard, the source containment well operated only 78.5 percent of the time available in 2013. During its operating hours the average pumping rate of the well was 40 gpm, and the well contained most of contaminated groundwater leaving the on-site area.
- The treated water from both systems was returned to the aquifer through the infiltration gallery in the Arroyo de las Calabacillas and the on-site infiltration ponds.
- Corrective actions implemented to address the chromium concentrations in the source containment system influent were effective only for a very limited time period indicating the need for more aggressive corrective actions, such as the installation of a chromium removal system.
- Groundwater monitoring was conducted as specified in the Monitoring Plan and the Discharge Permit.
- Water levels in all accessible wells and/or piezometers were measured quarterly. Samples were collected for water-quality analyses from monitoring wells at the frequency specified in the Monitoring Plan and analyzed for VOCs and total chromium.
- Samples were obtained from the influent and effluent of the treatment plants for the off-site and source containment systems, and the infiltration gallery and infiltration pond monitoring wells at the frequency specified in the Discharge Permit. All samples were analyzed for VOCs, total chromium, iron, and manganese.
- Changes in concentrations observed in monitoring wells since the implementation of the current remedial measures indicate that contaminant concentrations decreased significantly both in the on-site and off-site area.
- A total of about 164.2 million gallons of water were pumped from the wells. The total volume of water pumped since the beginning of the current remedial operations on December 1998 is about 2.15 billion gallons and represents 190 percent of the initial volume of contaminated groundwater (pore volume).

- A total of about 260 kg (574 lbs) of VOCs were removed from the aquifer by the two containment wells during 2013. The total VOC mass that was removed since the beginning of the of the current remedial operations through the end of 2013 is about 7,170 kg (15,800 lbs), and represents about 91 percent of the total dissolved VOC mass estimated to have been initially present in groundwater.

5.2 Future Plans

The off-site containment system will continue to operate during 2014 at a pumping rate as close as possible to its current design pumping rate of 300 gpm. A chromium removal unit will be installed at the treatment facility of the source containment system, and a new higher capacity pump will also be installed to insure that the pumping rate of the source containment well is as close as possible to its current design rate of 50 gpm. The evaluation of the chemistry of CW-2 which was started in 2013 will be completed and if its results indicate that scaling of the pipeline to the air stripper can be prevented by additional measures, these measures will be implemented[19].

Data collection will continue in accordance with the Monitoring Plan and the Discharge Permit, and as necessary for the evaluation of the performance of the remedial systems. Monitoring wells whose water level was below the bottom of the screen during all or some of the 2013 measurement rounds will be evaluated to assess whether data from these wells can be relied upon, or whether they should be abandoned or replaced. The evaluation of the system maintenance and operation processes which was started in 2013 will be completed and the Operating Manuals for both systems will be updated, if necessary.

The USEPA and the NMED will continue to be kept informed of any significant milestones or changes in remedial system operations. The goal of the systems will continue to be the return of the contaminated groundwater to beneficial use.

[19]This evaluation was completed on April 7, 2014; the results indicate that the scaling is caused by the precipitation of one or more manganese oxide minerals on the pump and in the piping network, and that the most cost effective approach for addressing it may be the present practice of periodic cleaning up the pipeline and well.

Section 6
List of Reports and Documents

Black & Veatch. 1997. Report on Soil Gas Characterization and Vapor Extraction System Pilot Testing. Report prepared for Sparton Technology, Inc. June.

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FIGURES

FIGURES

Figure 1.1: Location of the Former Sparton Coors Road Plant

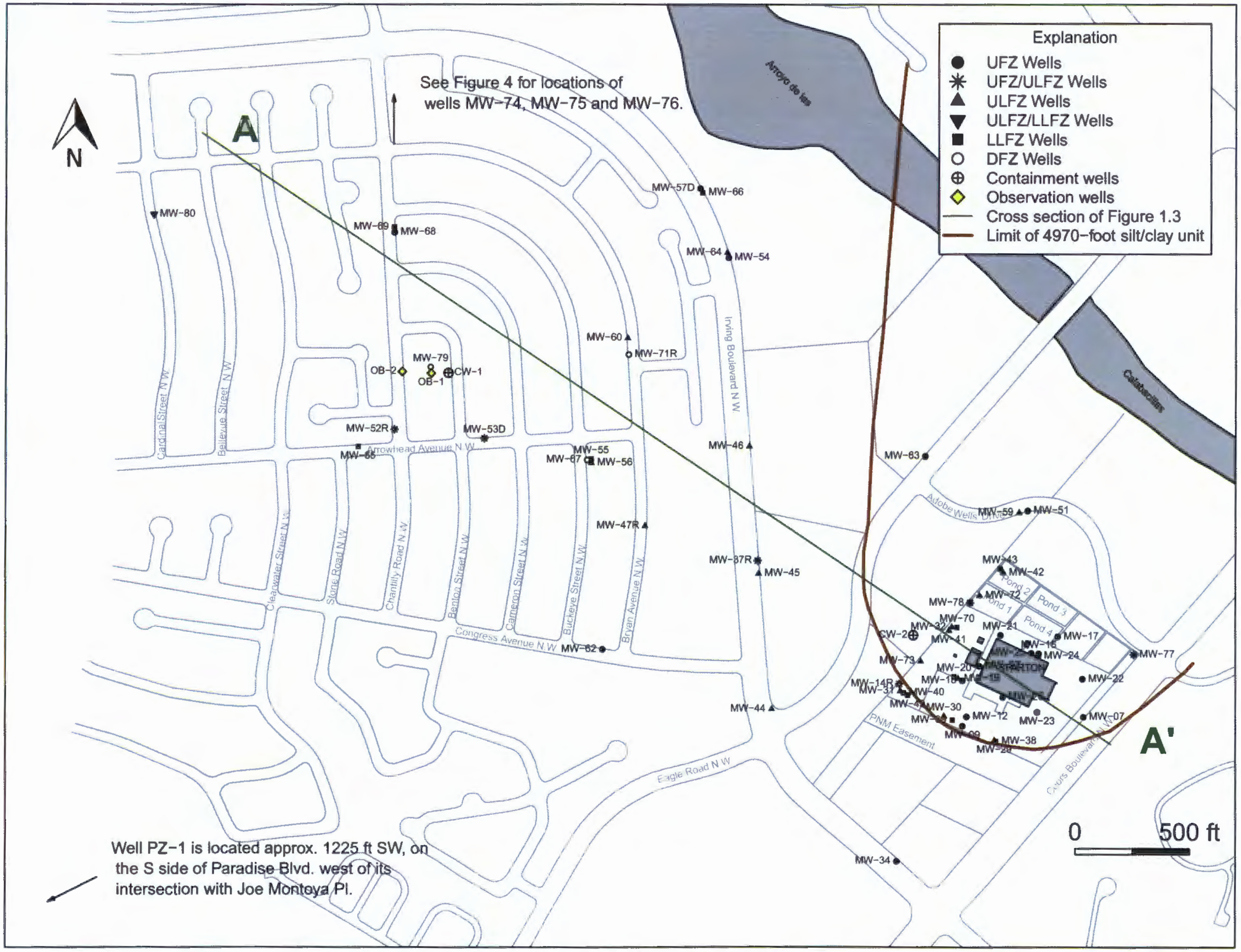


Figure 1.2: Location of Existing Wells

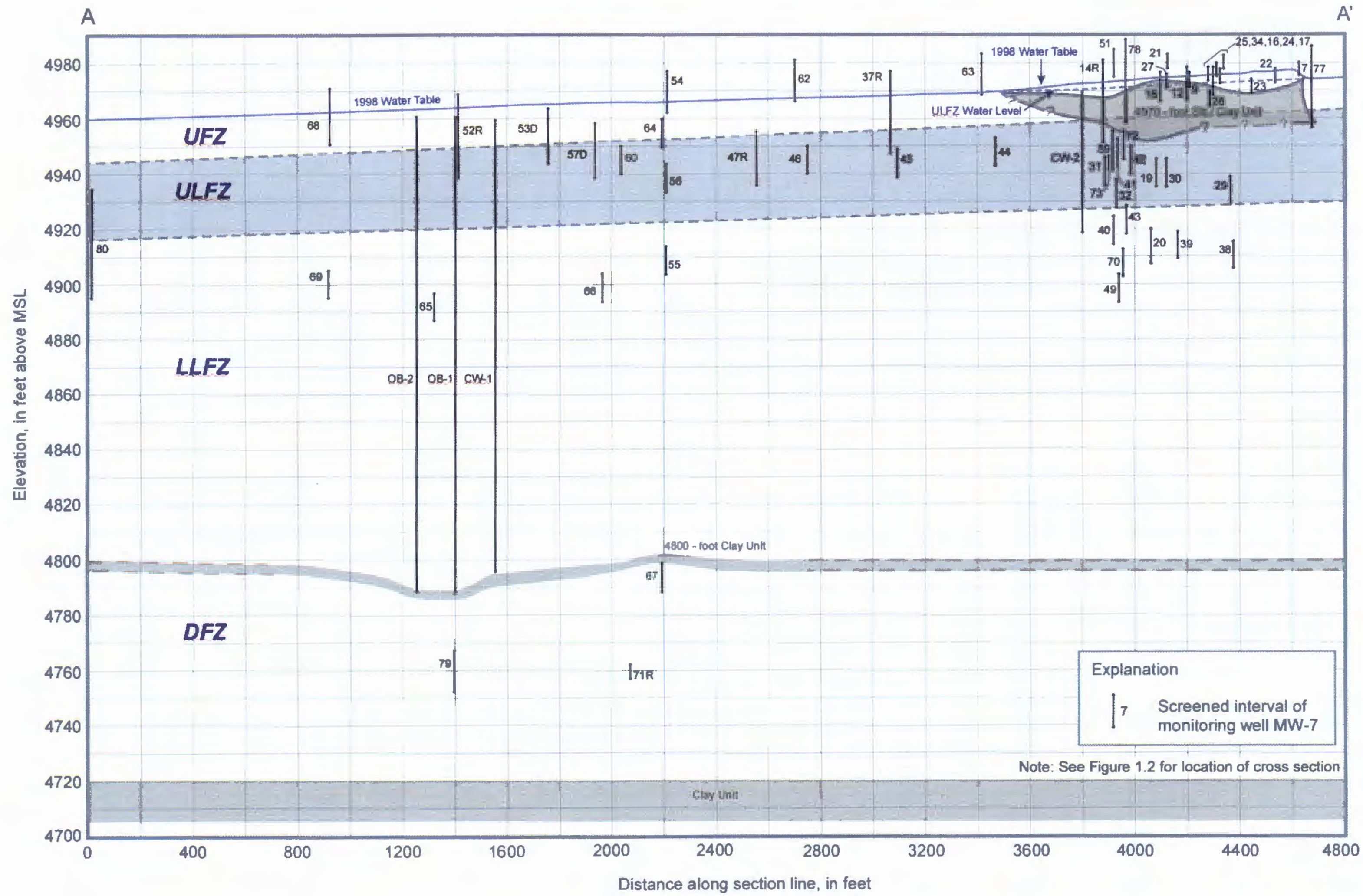


Figure 1.3: Schematic Cross-Section Showing Screened Interval of Wells and Relation to Flow Zones

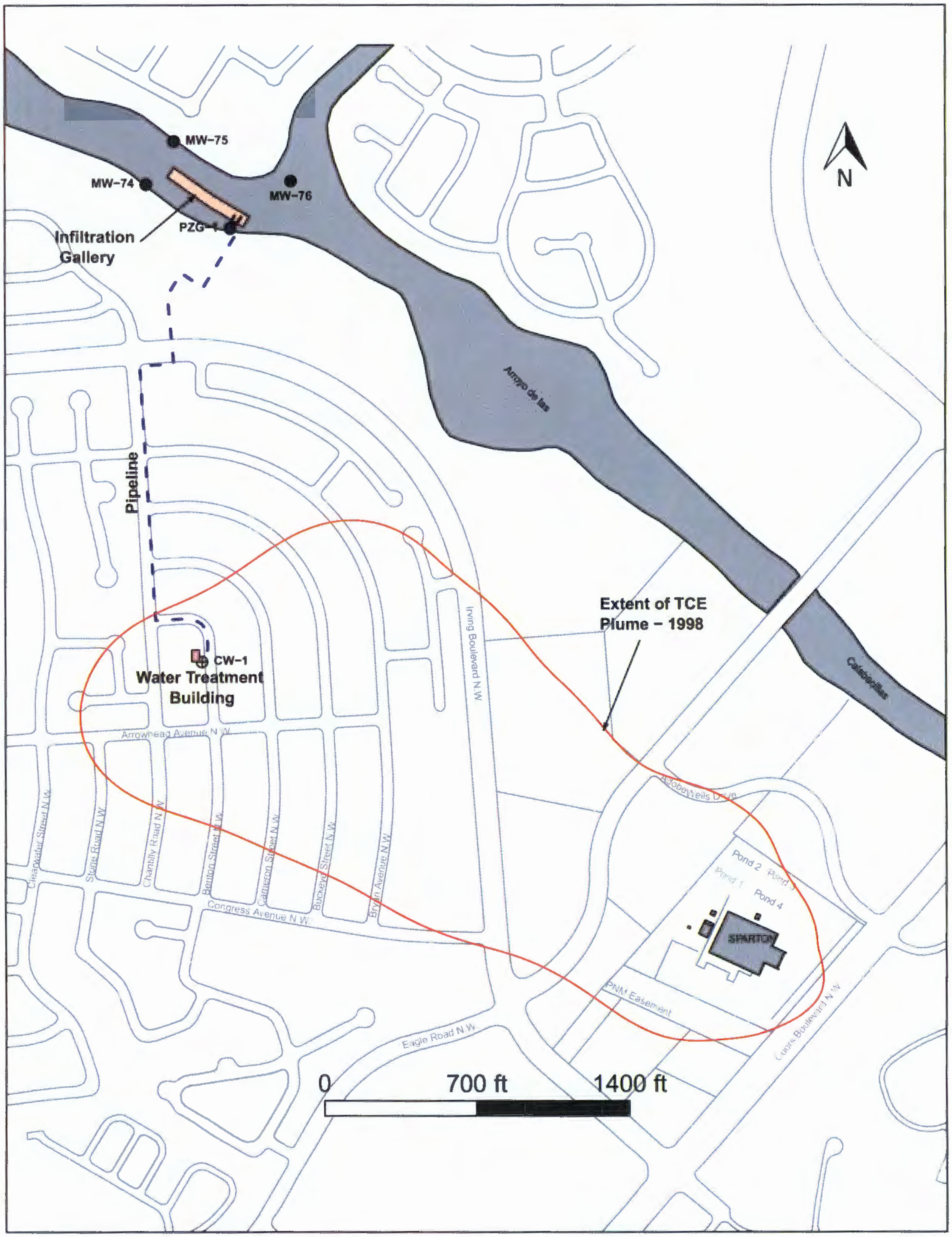


Figure 1.4: Layout of the Off-Site Containment System

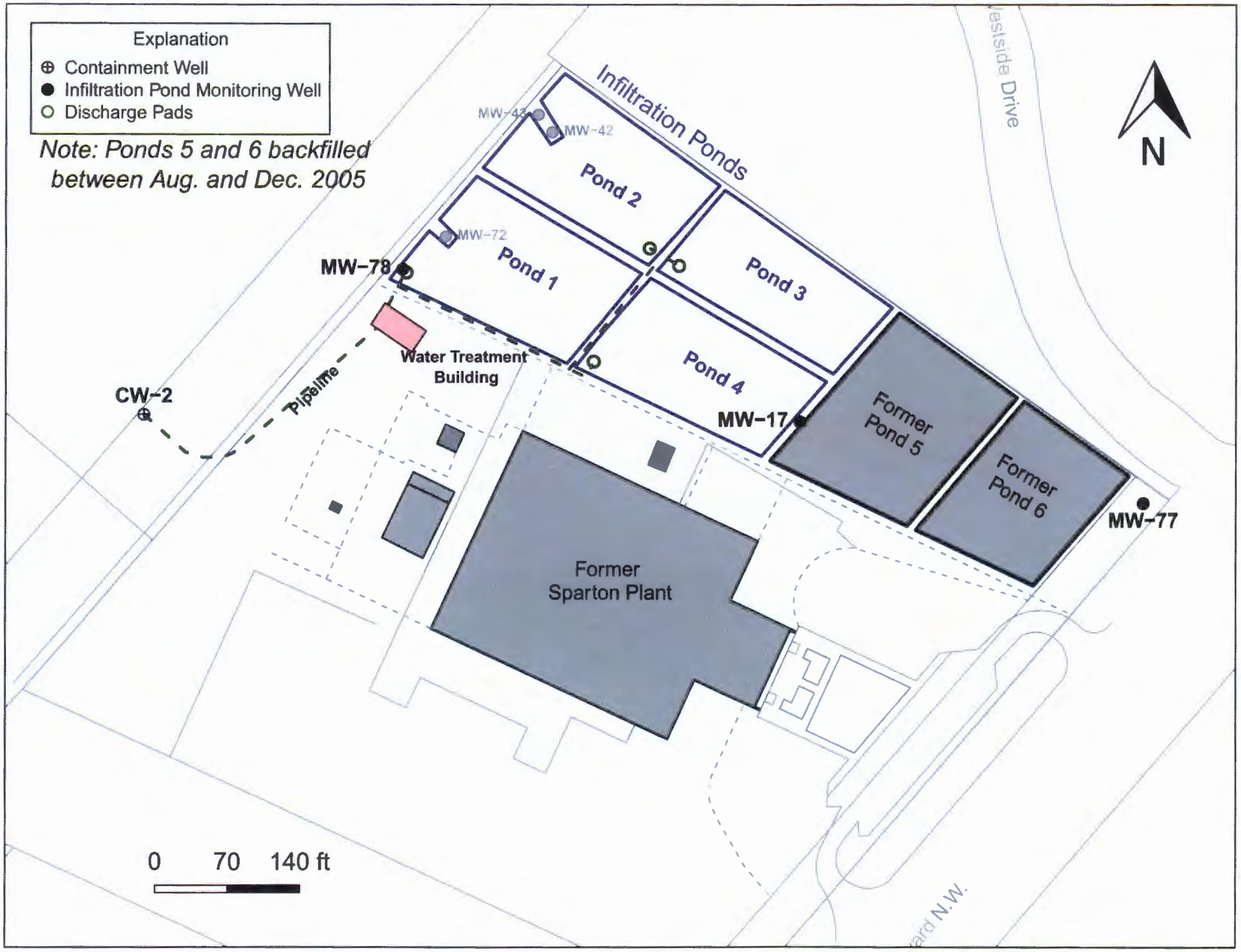


Figure 1.5: Layout of the Source Containment System

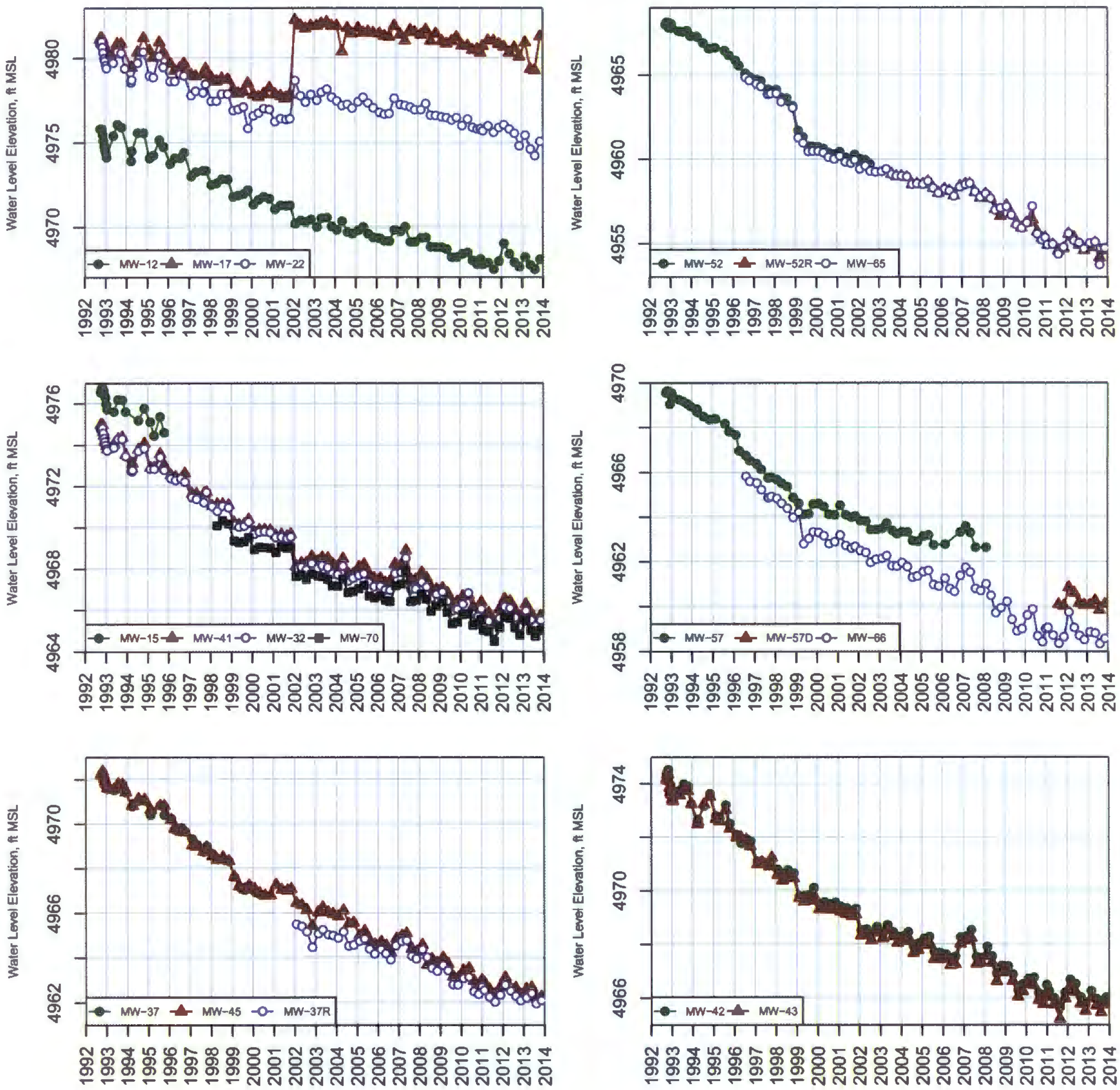


Figure 3.1: Monitoring Well Hydrographs

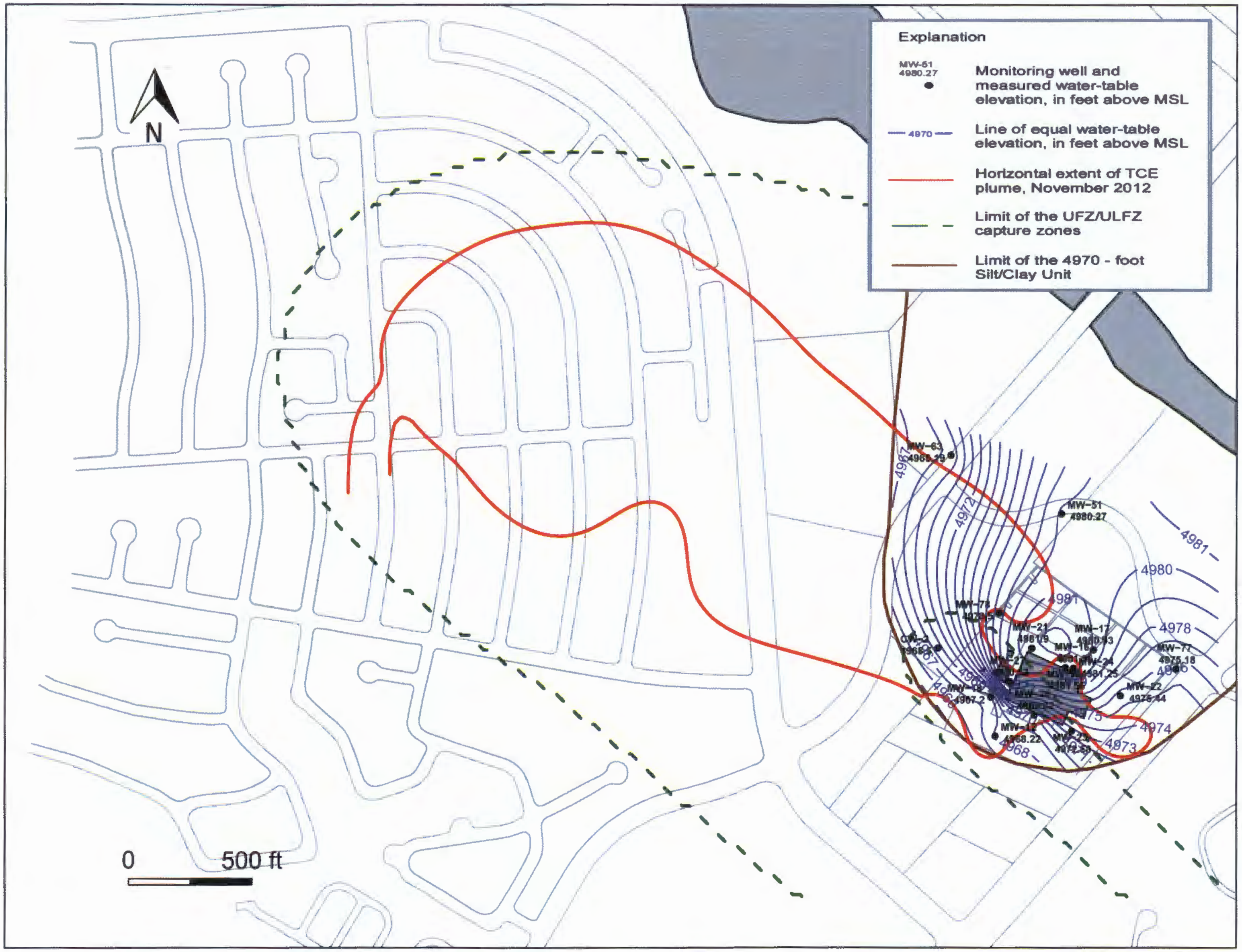


Figure 4.1: Elevation of the Onsite Wells Water Table - February 2013

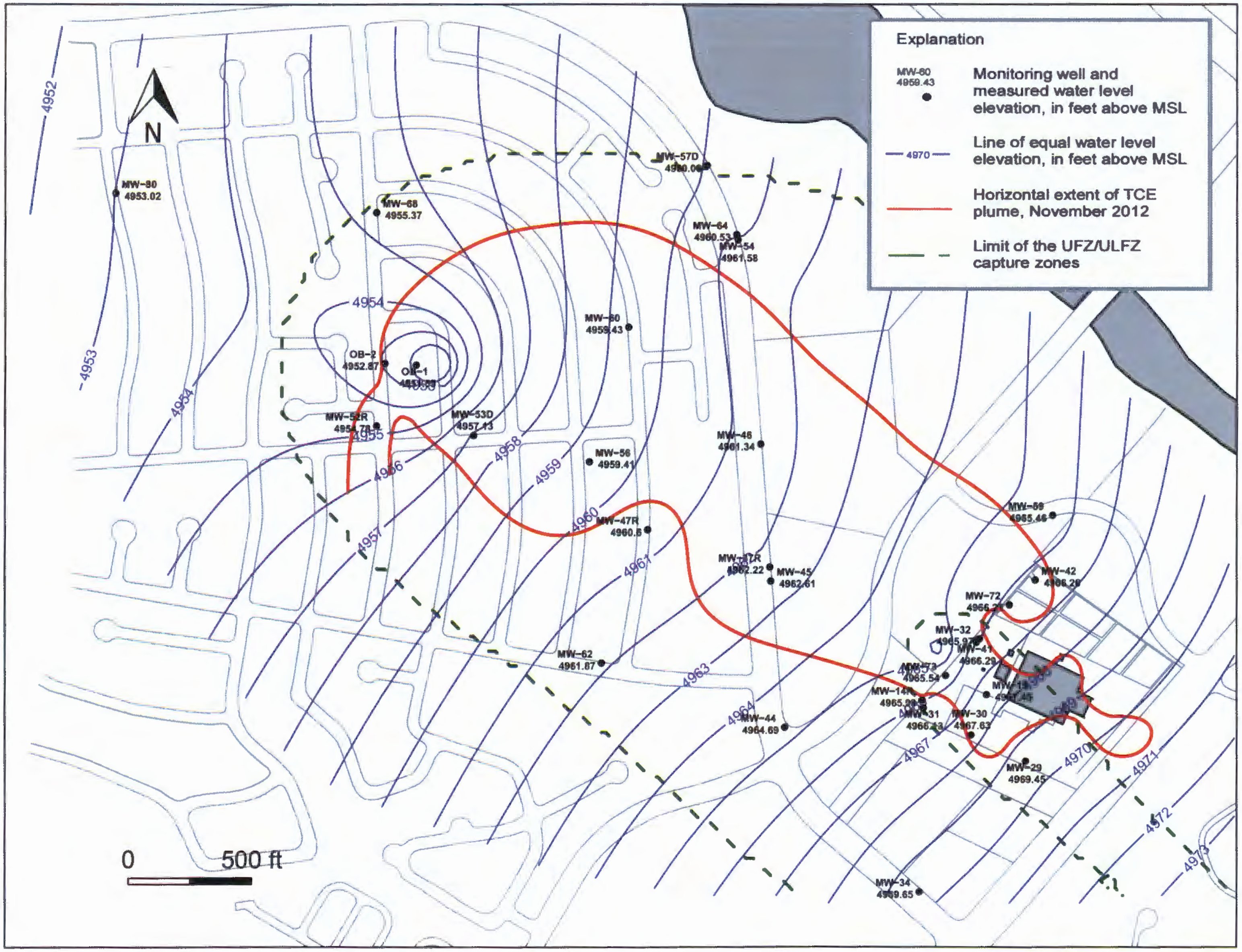


Figure 4.2: Elevation of Water Levels and Limits of Containment Well Capture Zones in the UFZ/ULFZ - February 2013

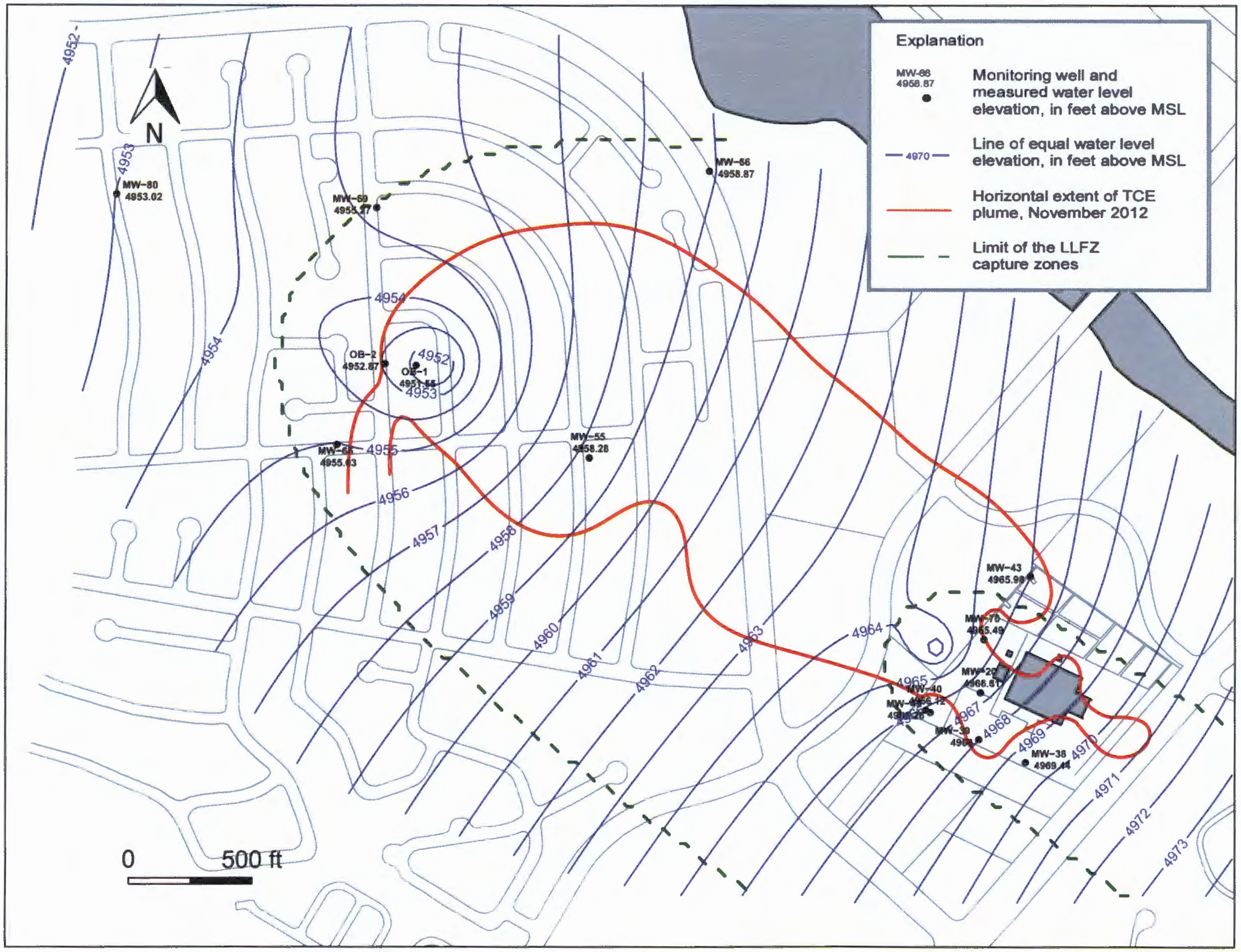


Figure 4.3: Elevation of Water Levels and Limits of Containment Well Capture Zones in the LLFZ - February 2013

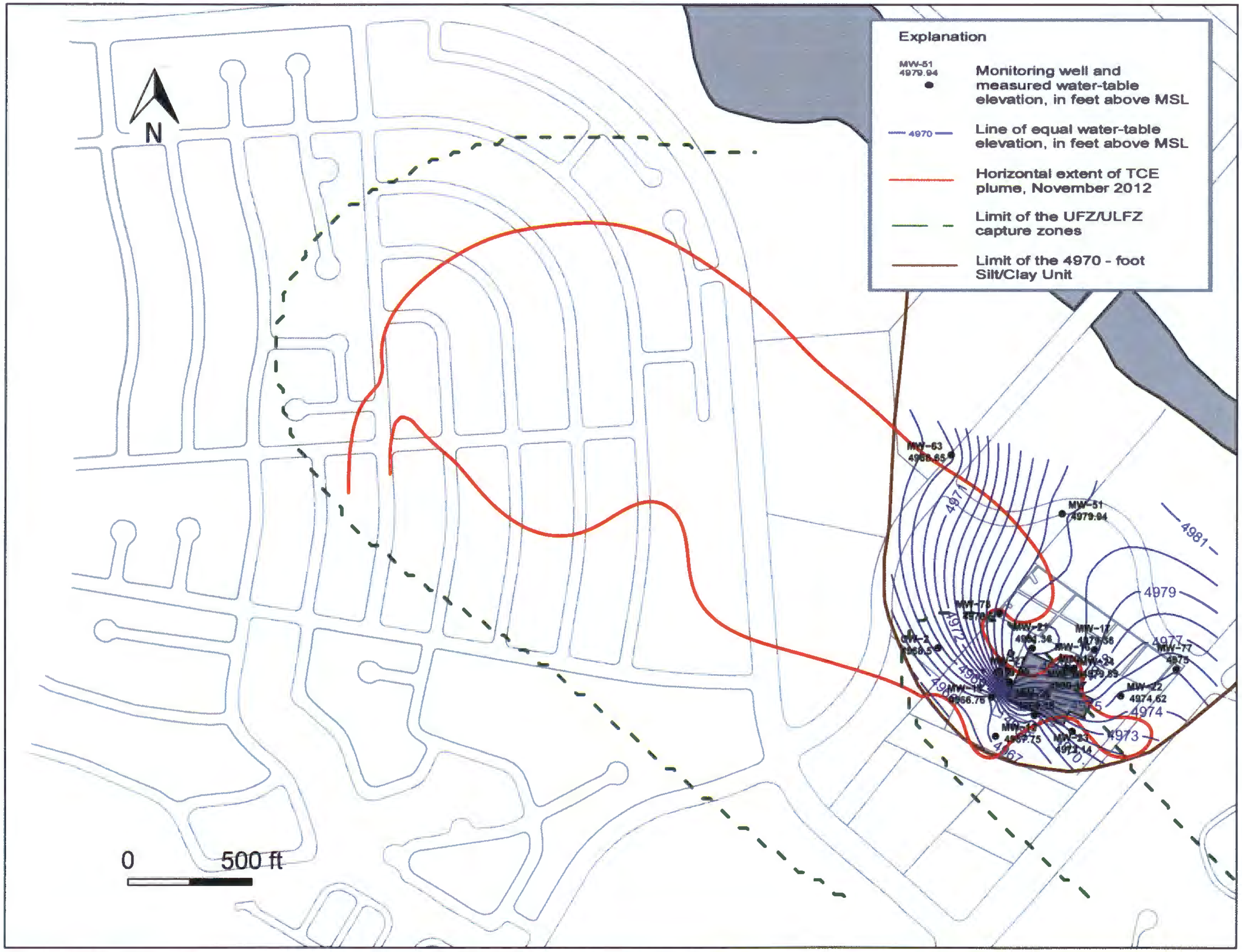


Figure 4.4: Elevation of the Onsite Wells Water Table - May 2013

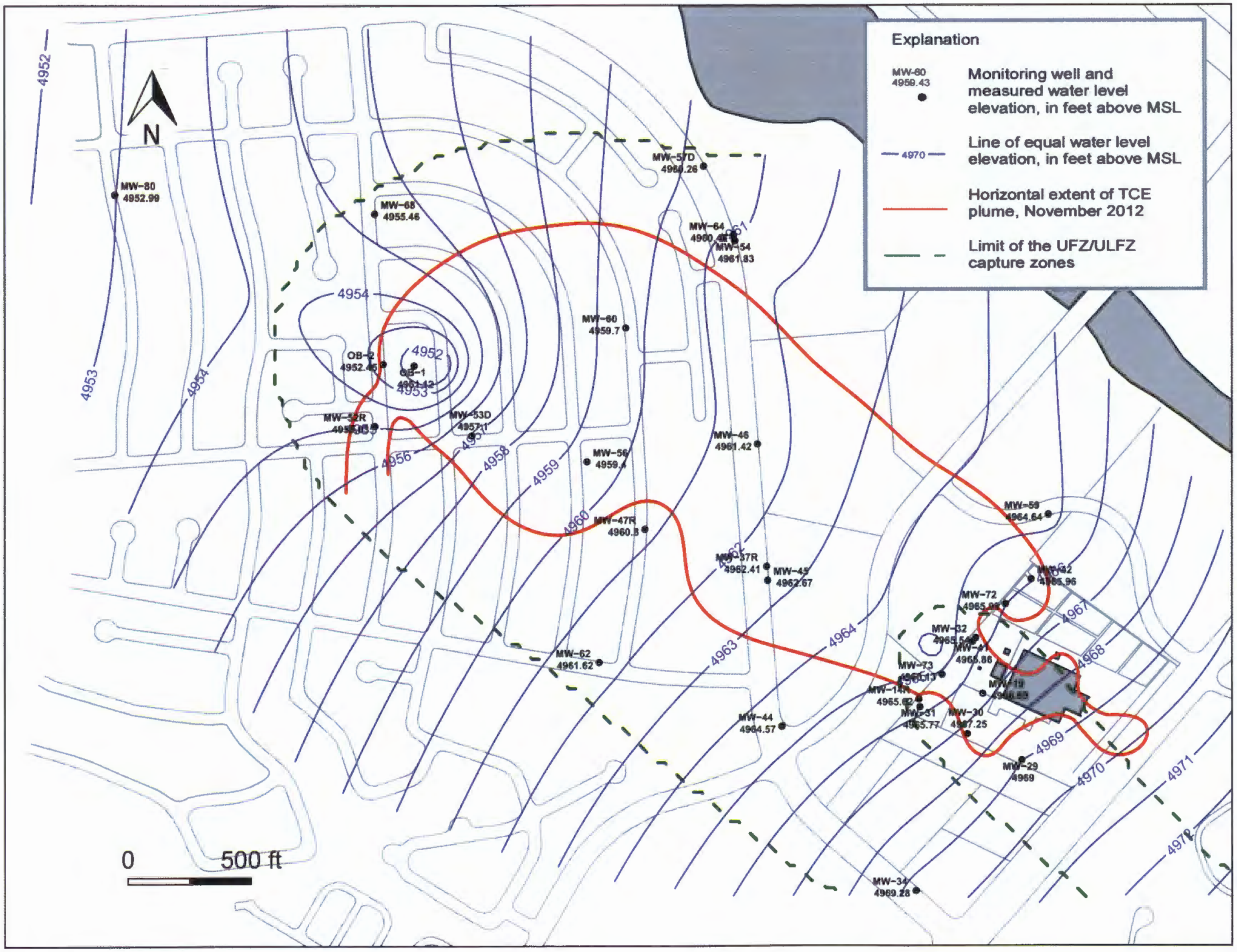


Figure 4.5: Elevation of Water Levels and Limits of Containment Well Capture Zones in the UFZ/ULFZ - May 2013

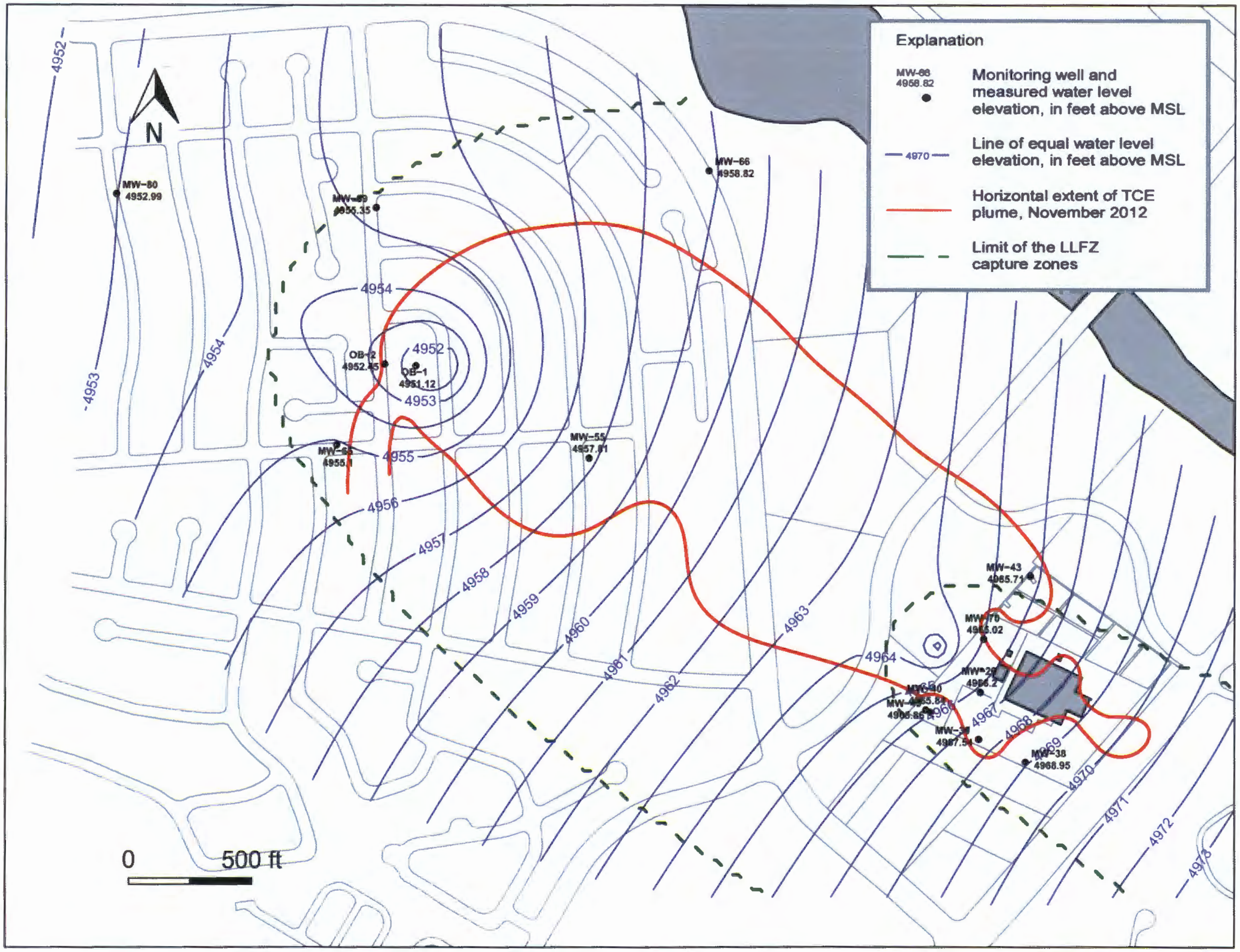


Figure 4.6: Elevation of Water Levels and Limits of Containment Well Capture Zones in the LLFZ - May 2013

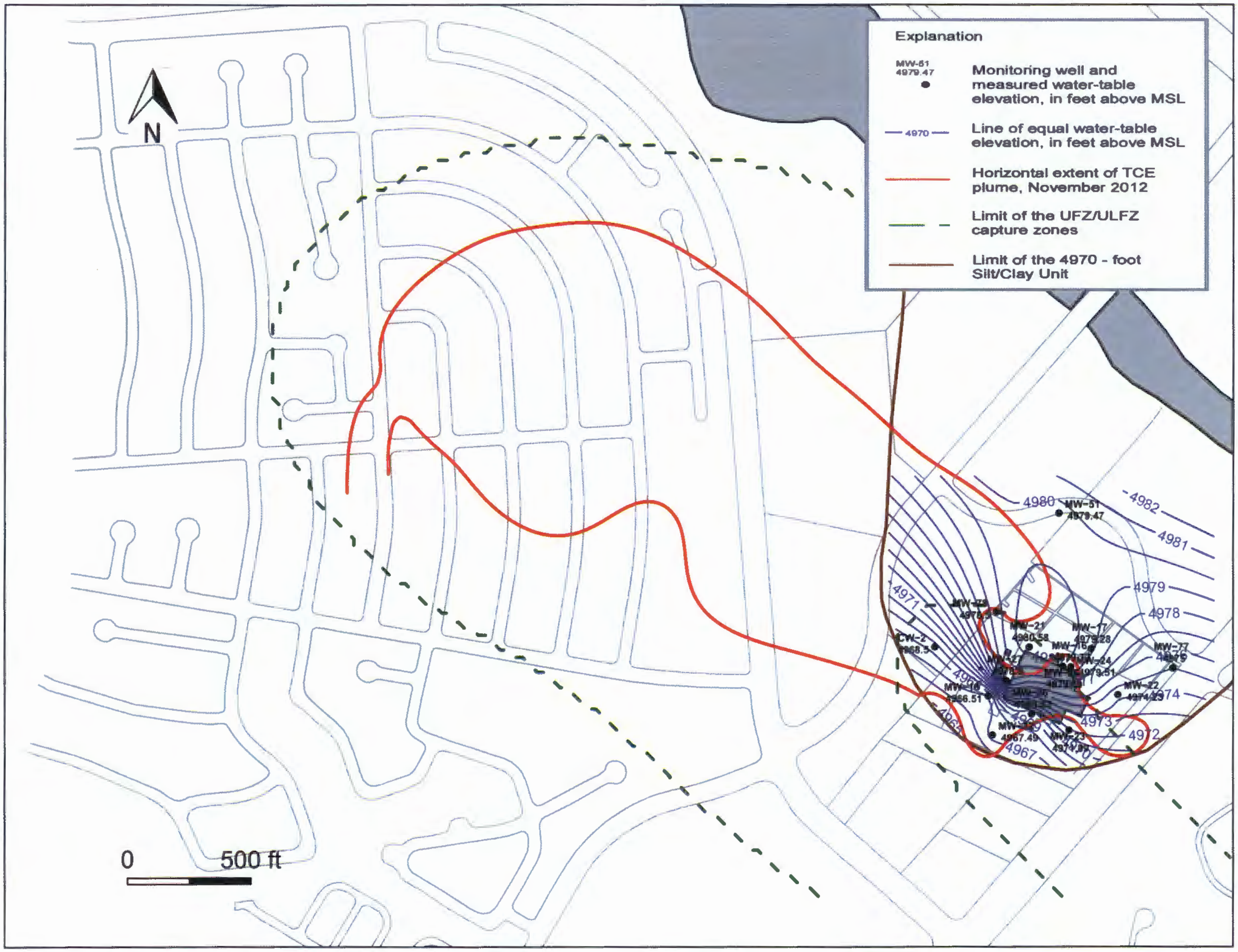


Figure 4.7: Elevation of the Onsite Wells Water Table - August 2013

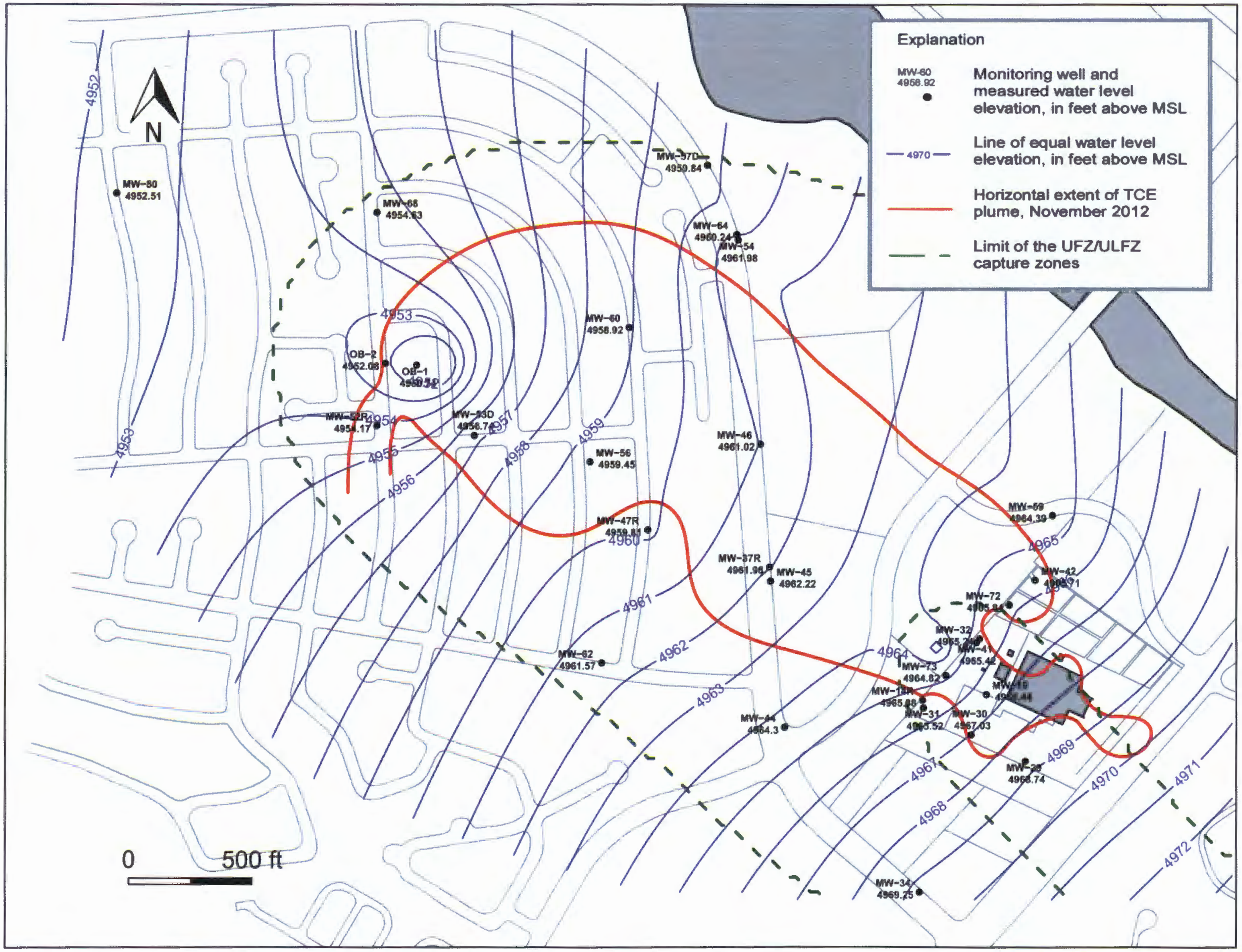


Figure 4.8: Elevation of Water Levels and Limits of Containment Well Capture Zones in the UFZ/ULFZ - August 2013

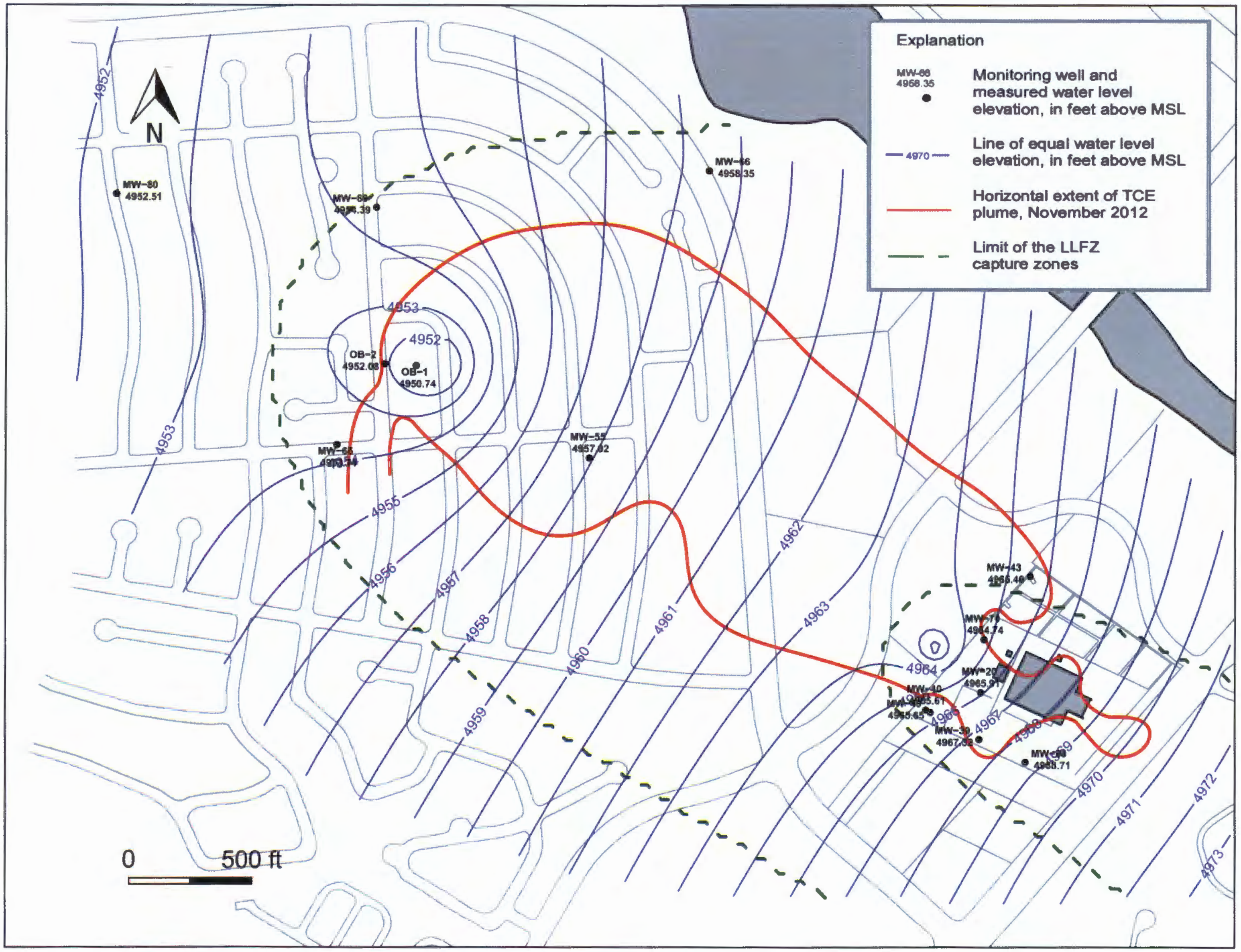


Figure 4.9: Elevation of Water Levels and Limits of Containment Well Capture Zones in the LLFZ - August 2013

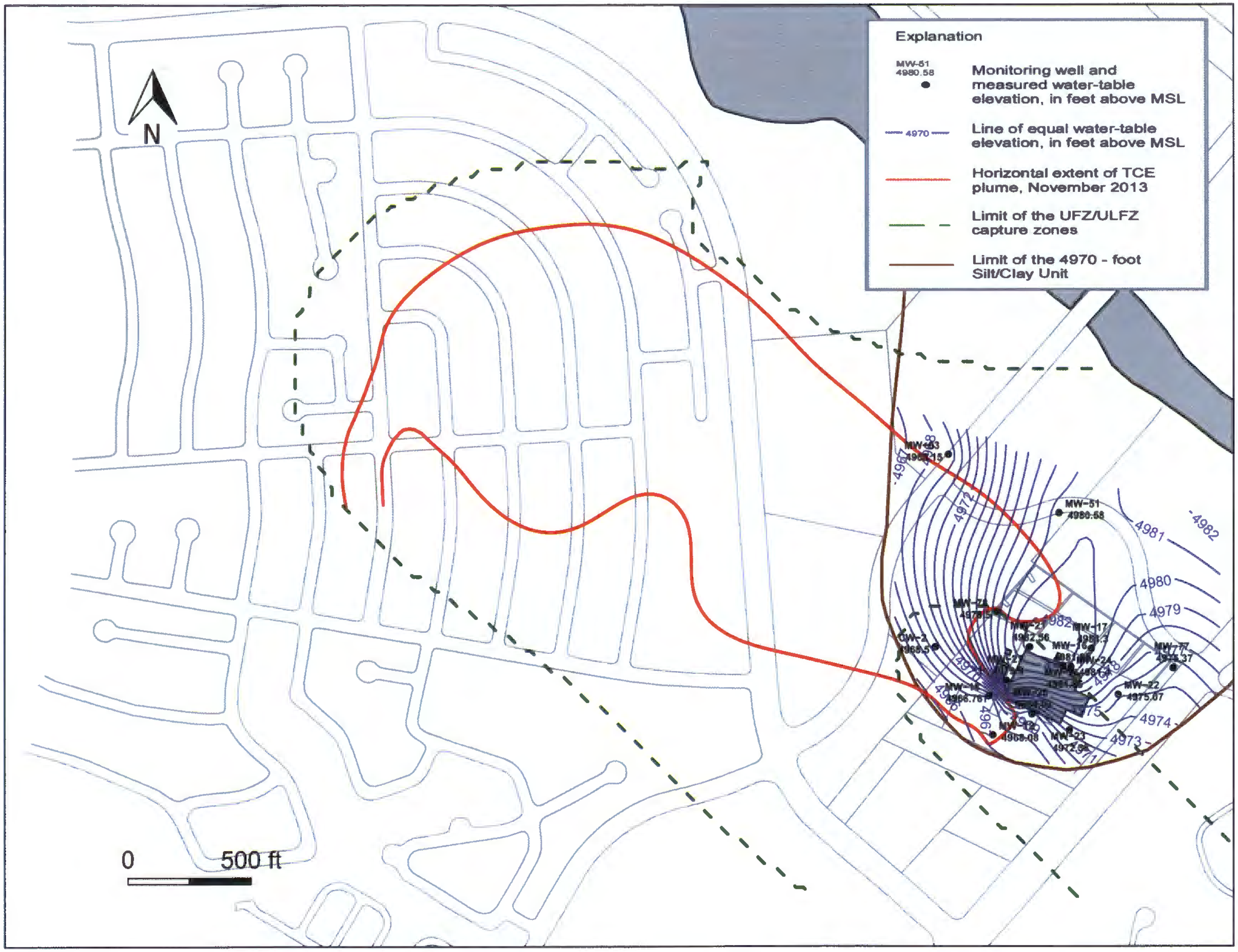


Figure 4.10: Elevation of the Onsite Wells Water Table - November 2013

S.S. PAPADOPULOS & ASSOCIATES, INC.

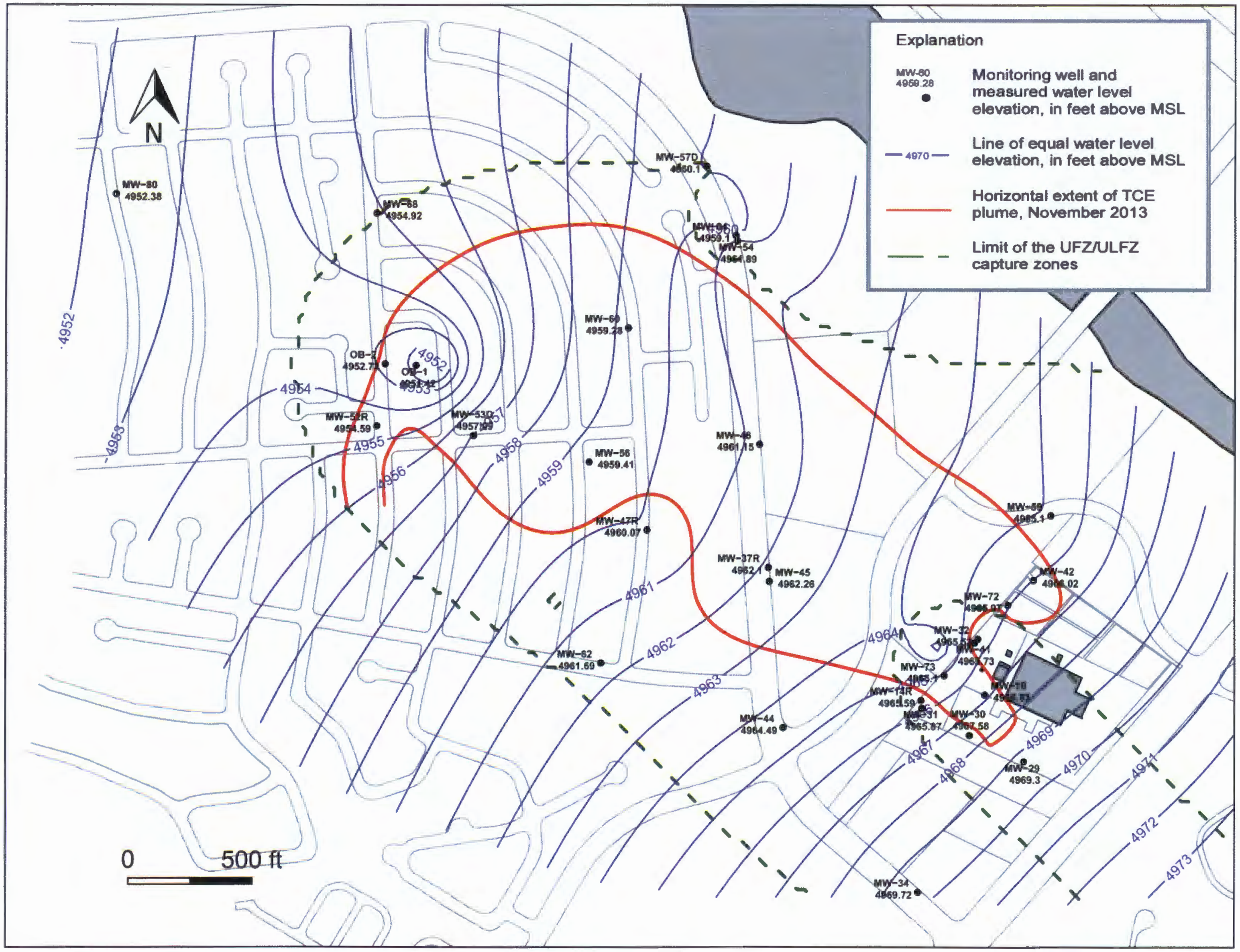


Figure 4.11: Elevation of Water Levels and Limits of Containment Well Capture Zones in the UFZ/ULFZ - November 2013

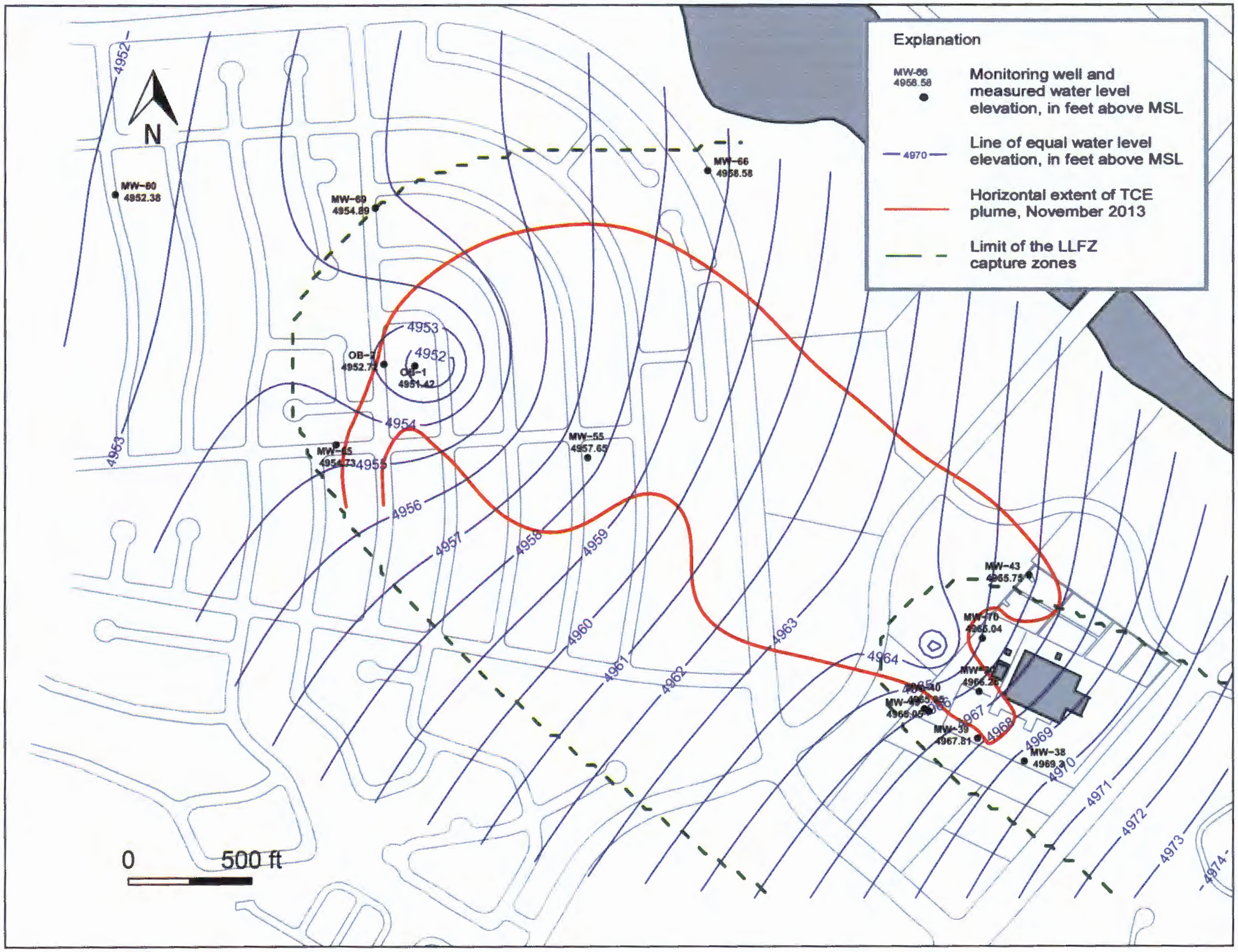


Figure 4.12: Elevation of Water Levels and Limits of Containment Well Capture Zones in the LLFZ - November 2013

S.S. PAPADOPULOS & ASSOCIATES, INC.

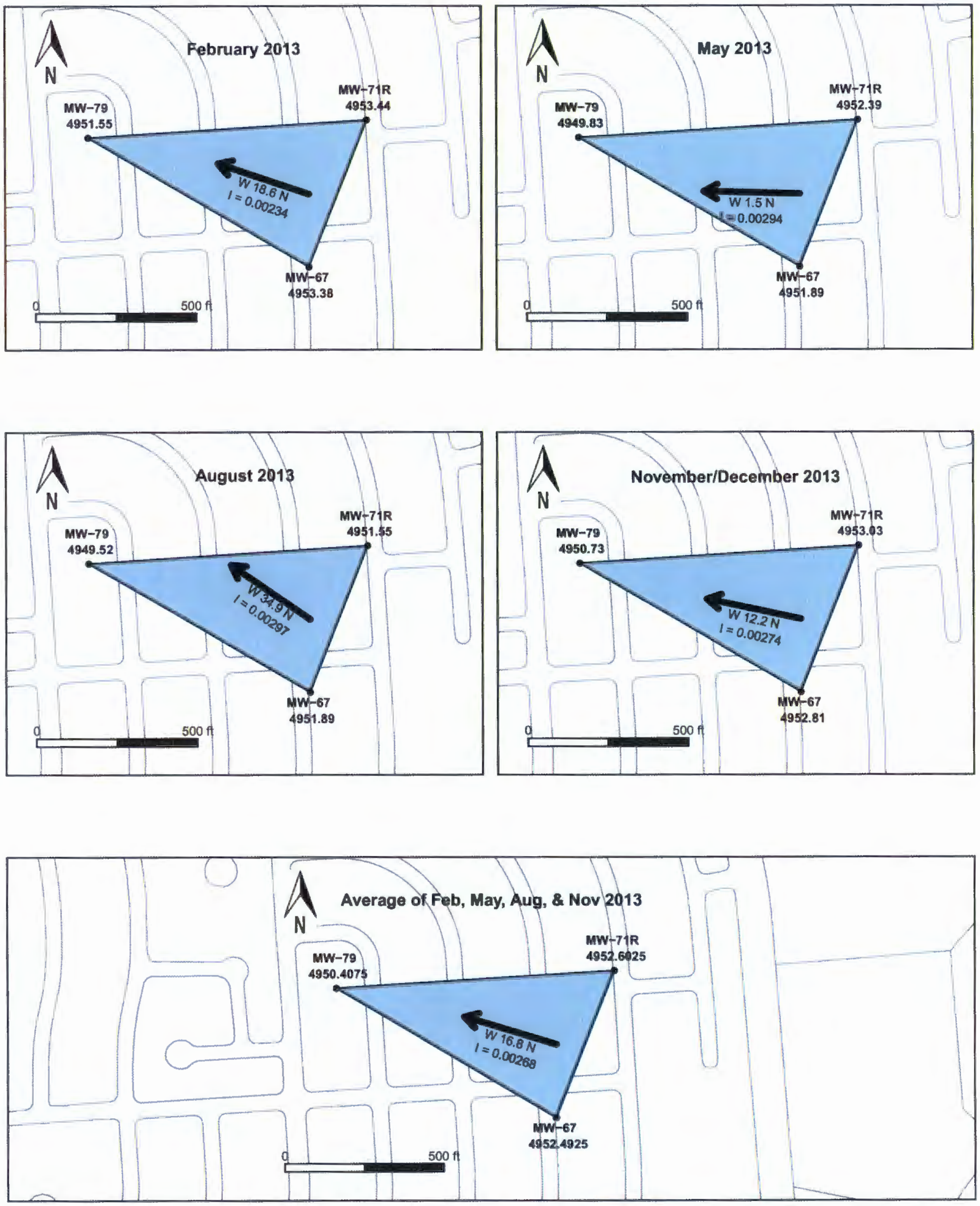
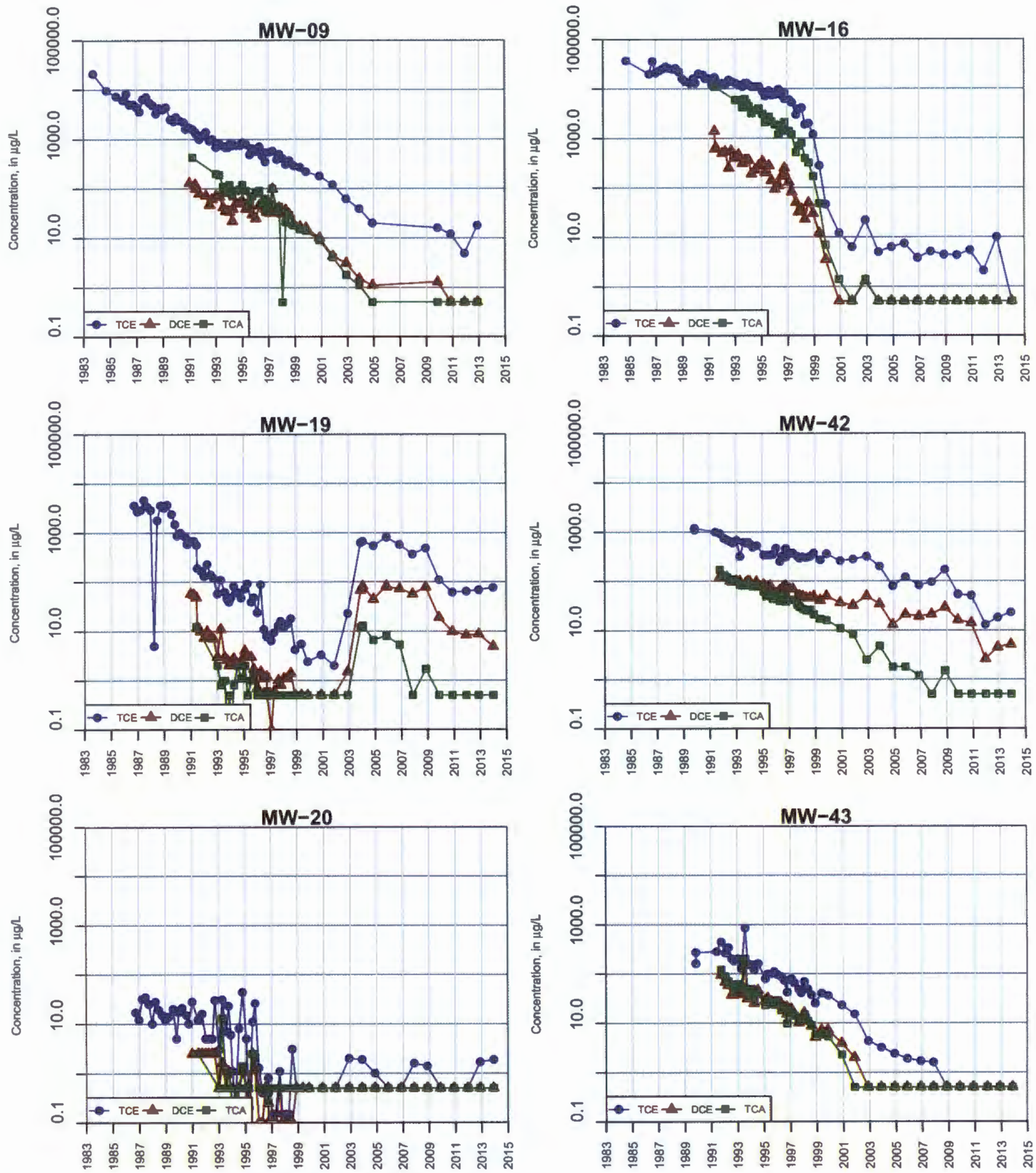
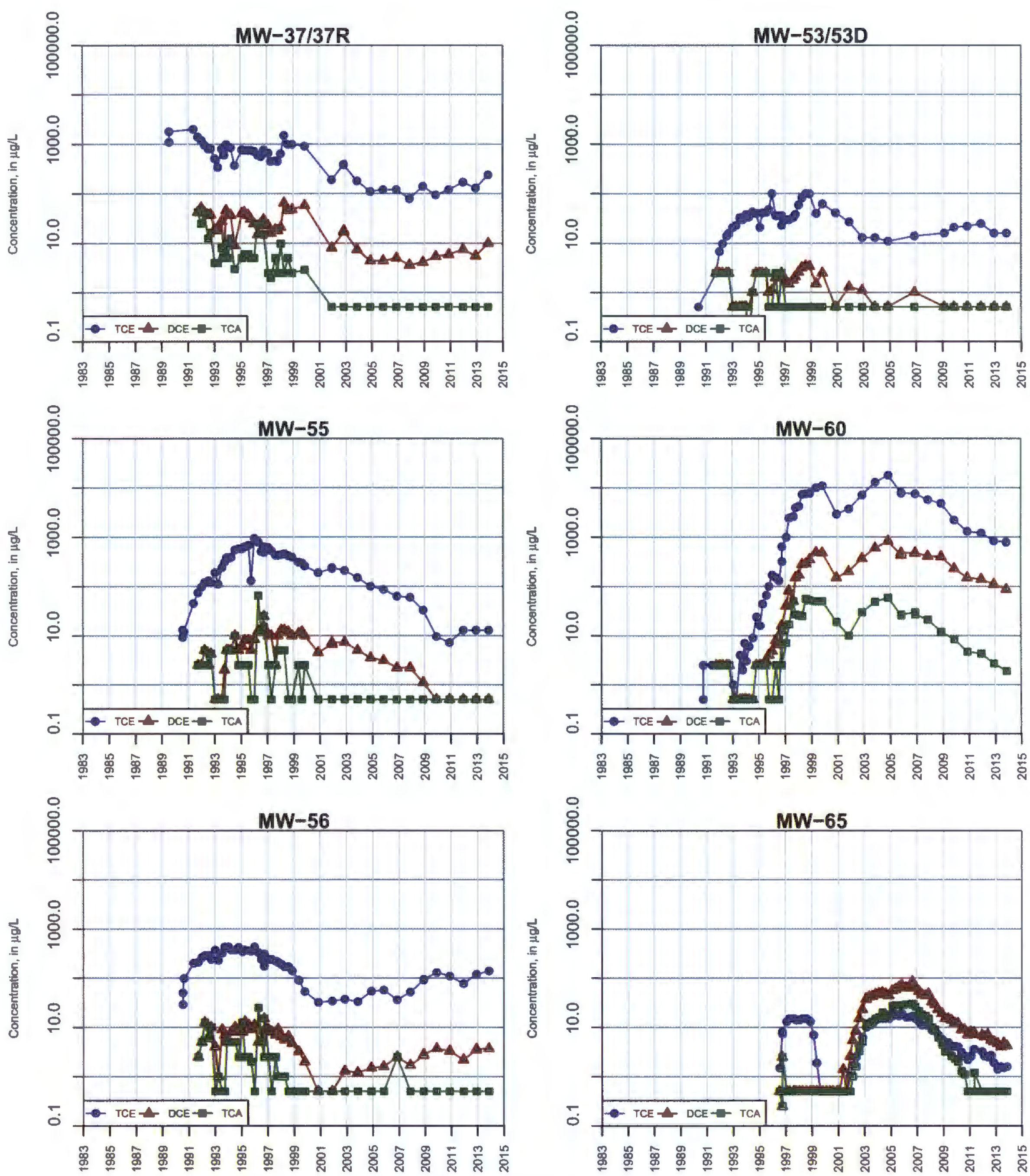


Figure 4.13: Groundwater Flow Direction and Hydraulic Gradient in the DFZ - 2013



Concentrations reported as less than the detection limit are plotted as 1/2 the detection limit.

Figure 4.14: Contaminant Concentration Trends in On-Site Monitoring Wells



Concentrations reported as less than the detection limit are plotted as 1/2 the detection limit.

Figure 4.15: Contaminant Concentration Trends in Off-Site Monitoring Wells

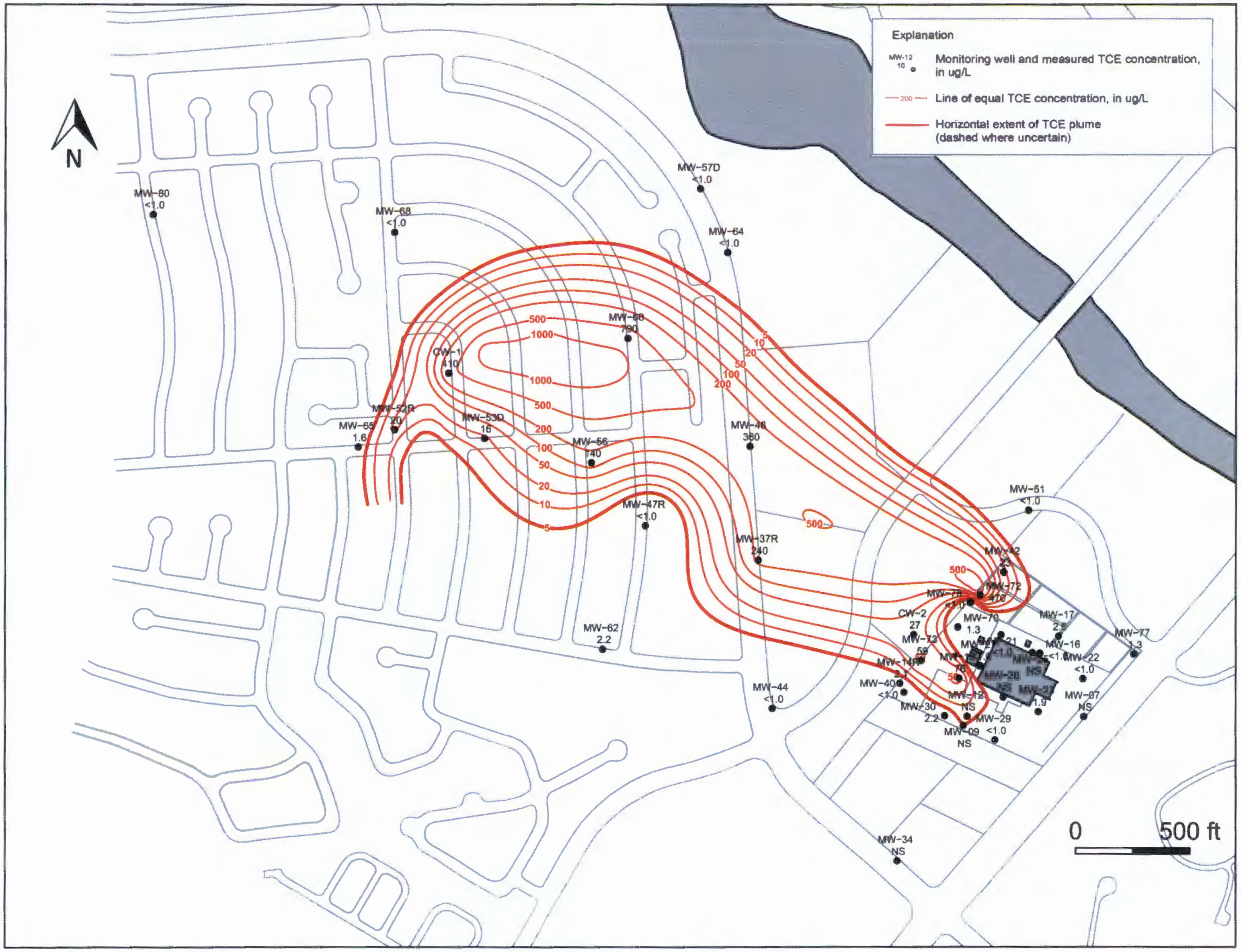


Figure 4.16: Horizontal Extent of TCE Plume - November 2013

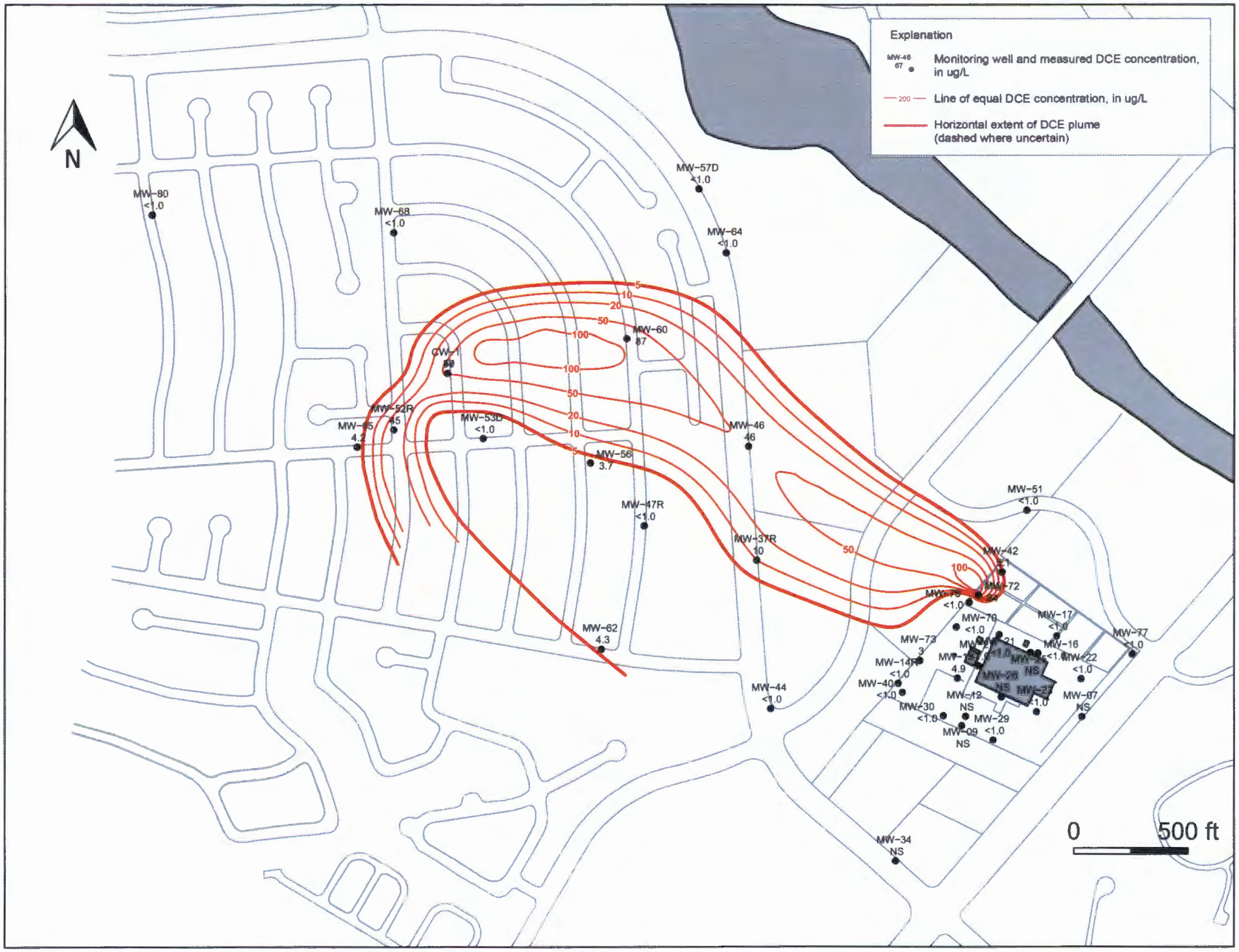


Figure 4.17: Horizontal Extent of DCE Plume - November 2013

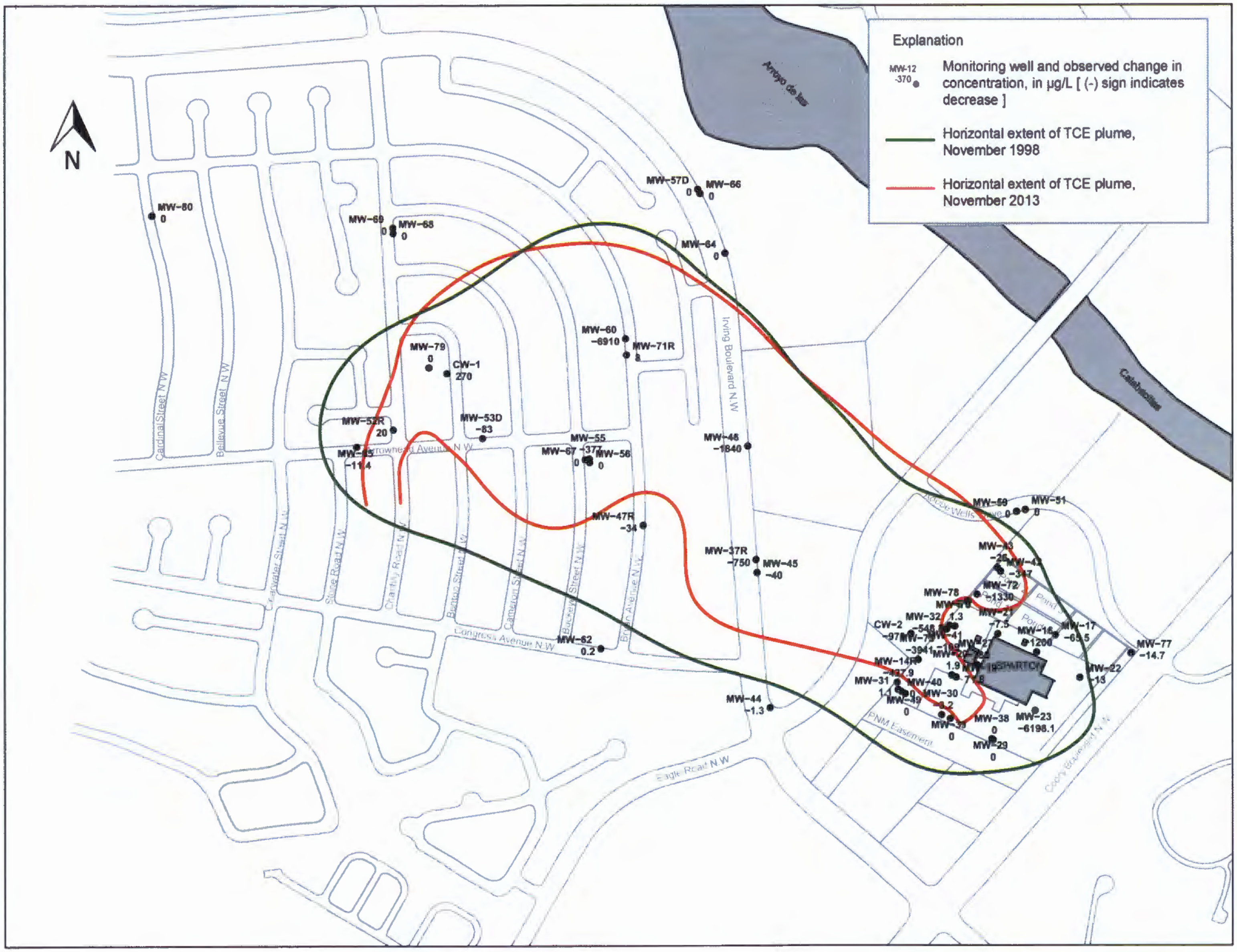


Figure 4.18: Changes in TCE Concentrations at Wells used for Plume Definition - November 1998 to November 2013

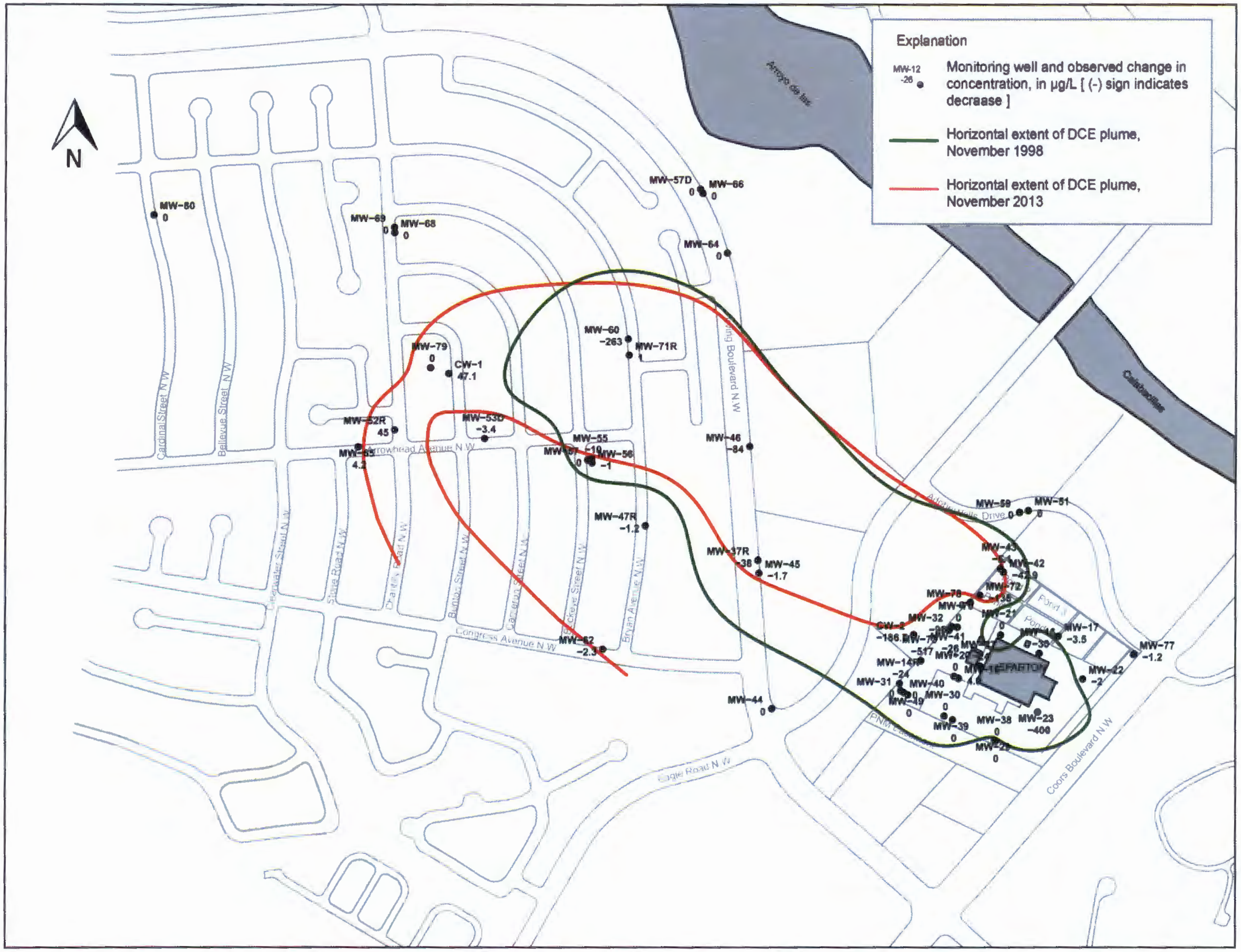


Figure 4.19: Changes in DCE Concentrations at Wells used for Plume Definition - November 1998 to November 2013

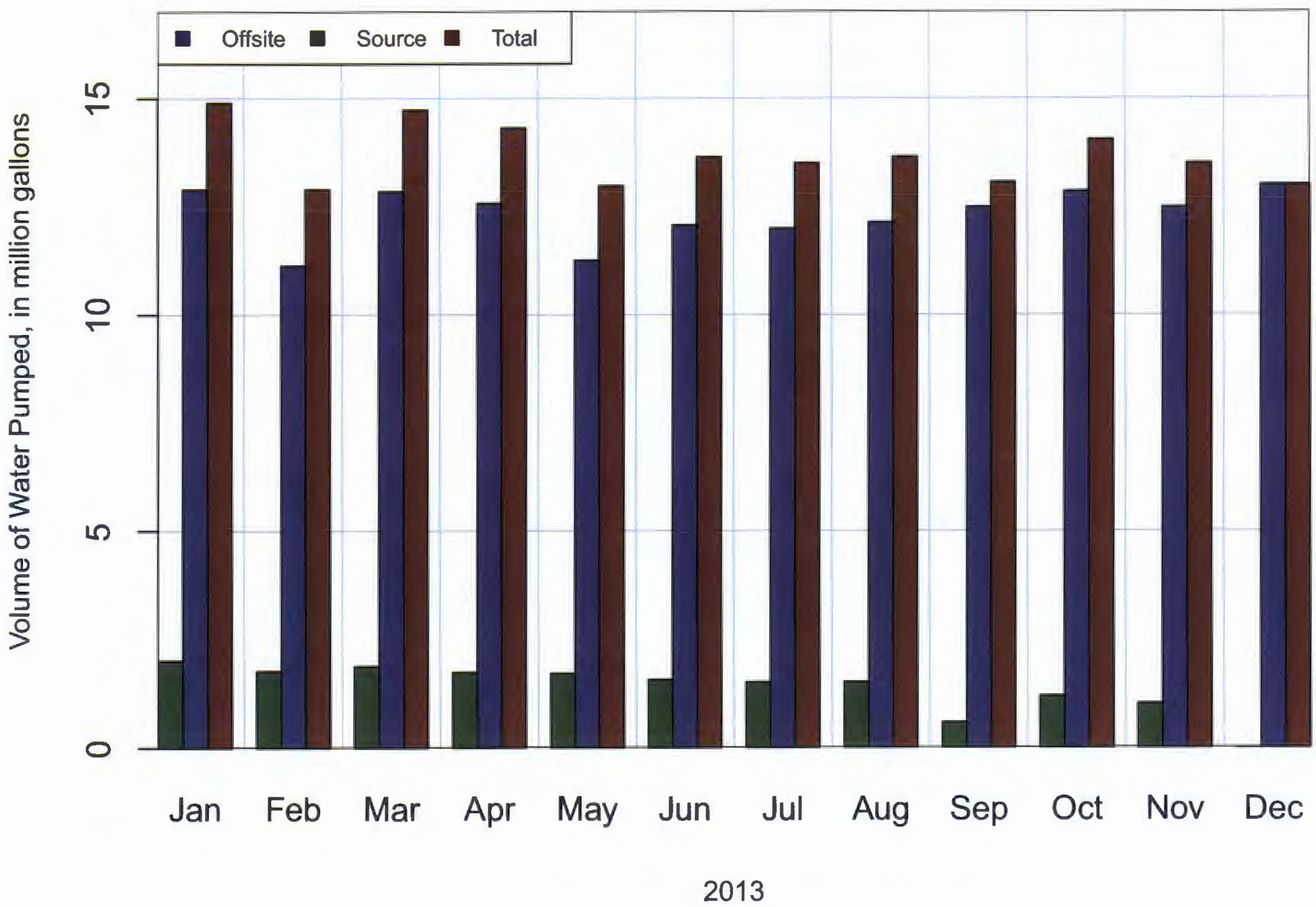


Figure 4.20: Monthly Volume of Water Pumped by the Containment Wells - 2013

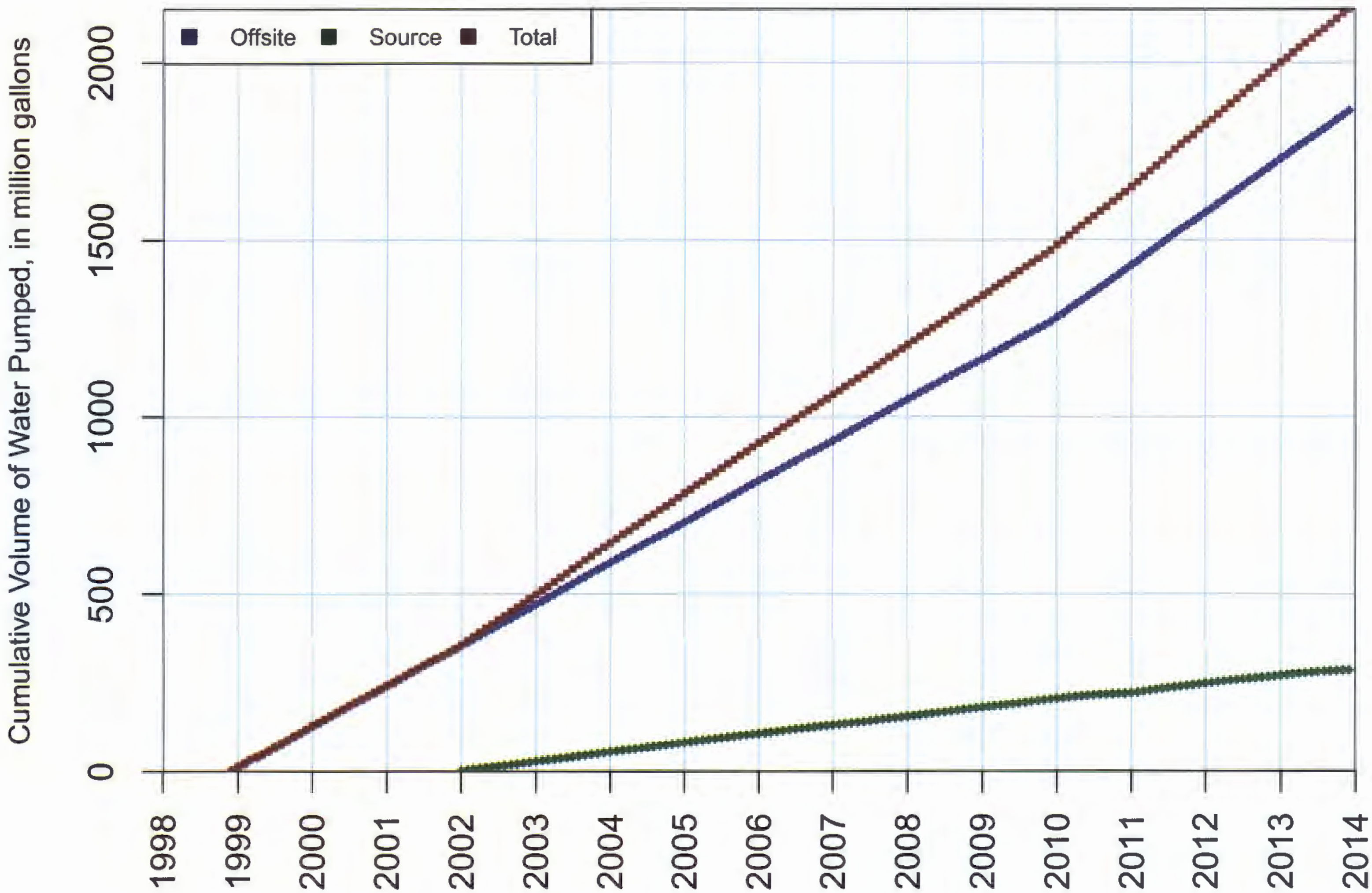


Figure 4.21: Cumulative Volume of Water Pumped by the Containment Wells

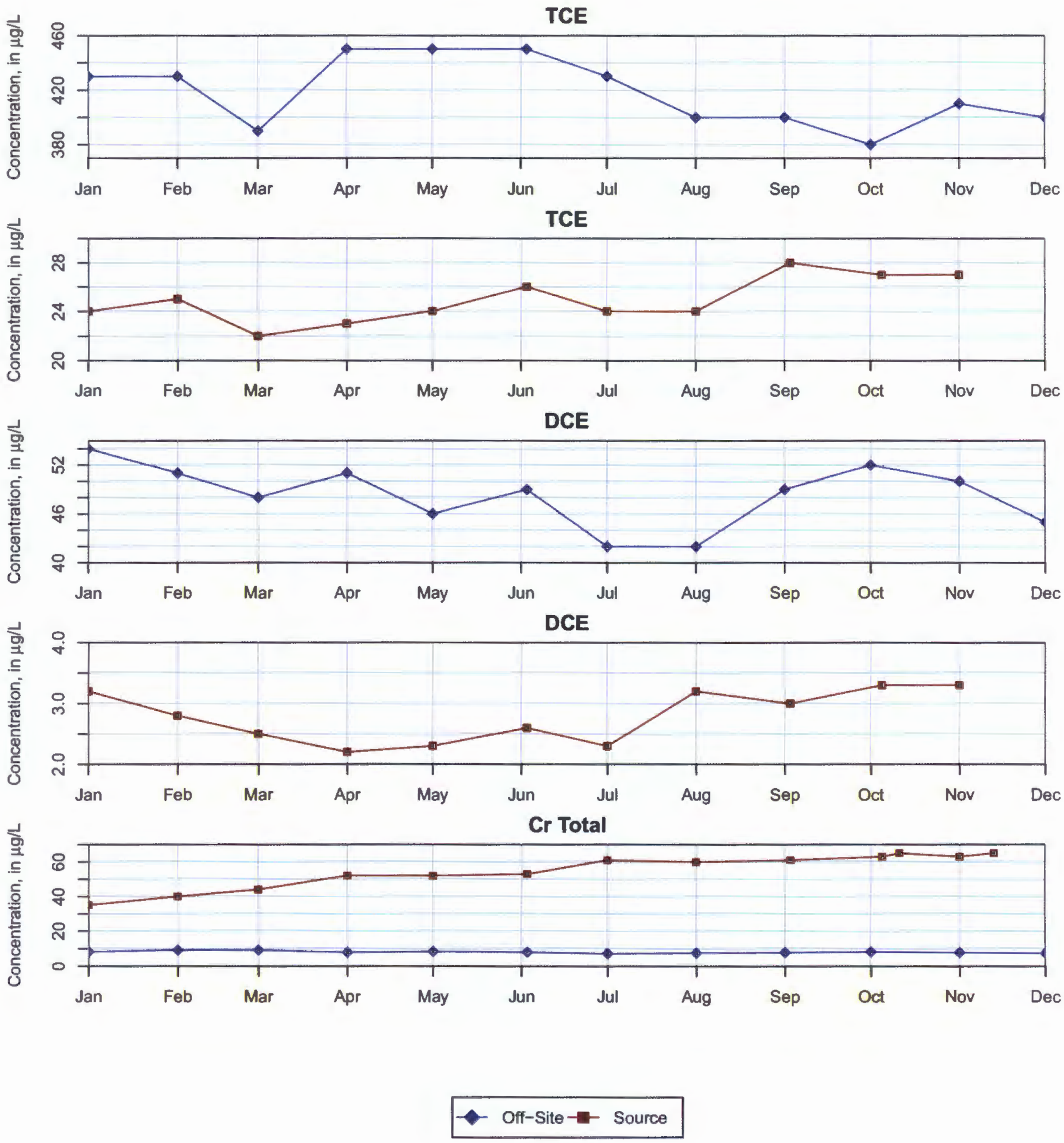


Figure 4.22: Off-Site and Source Containment Systems - TCE, DCE, and Total Chromium Concentrations in the Influent - 2013

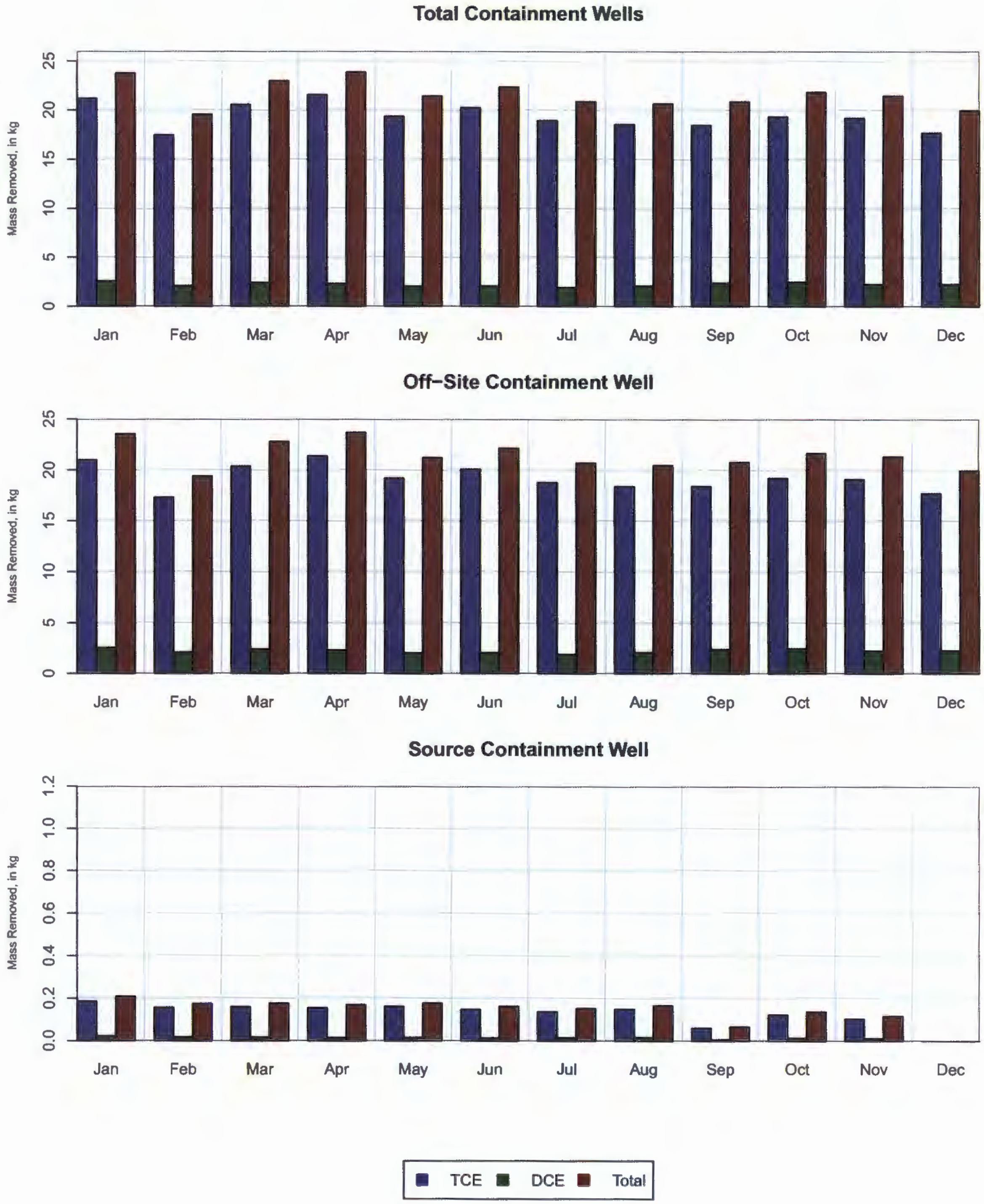


Figure 4.23: Monthly Contaminant Mass Removal by the Containment Wells - 2013

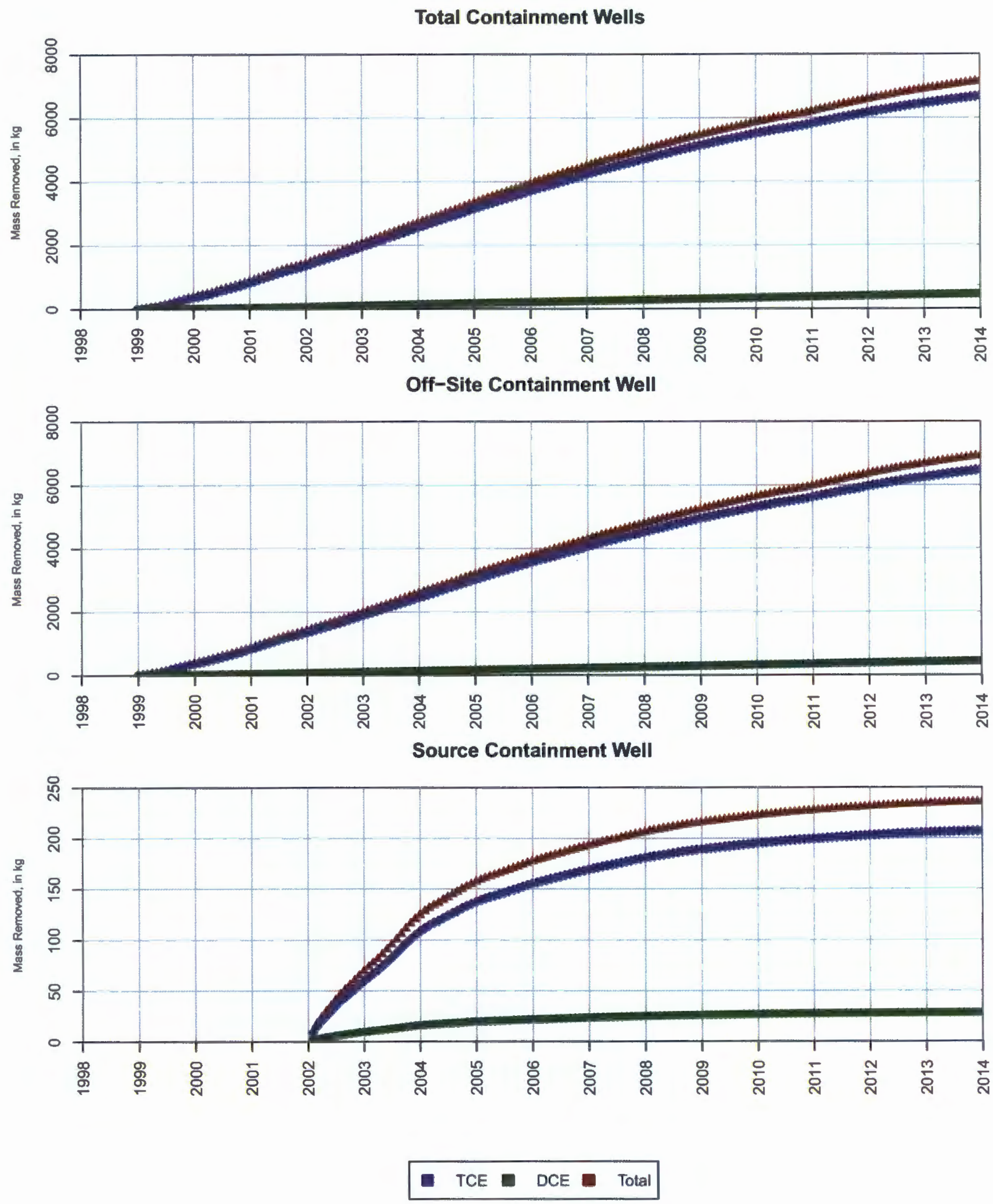


Figure 4.24: Cumulative Contaminant Mass Removal by the Containment Wells

TABLES

Table 2.1: Completion Flow Zone, Location Coordinates, and Measuring Point Elevation of Existing Wells

Well ID	Flow Zone[a]	Easting [b]	Northing [b]	Elevation[c]
CW-1	UFZ&LFZ	374740.43	1525601.48	5168.02
CW-2	UFZ-LLFZ	376788.70	1524459.40	5045.61
MW-07	UFZ	377535.41	1524101.14	5043.48
MW-09	UFZ	377005.75	1524062.25	5042.46
MW-12	UFZ	377023.27	1524102.56	5042.41
MW-14R	UFZ/ULFZ	376727.10	1524246.40	5040.92
MW-16	UFZ	377340.57	1524378.38	5047.50
MW-17	UFZ	377423.18	1524452.68	5049.28
MW-18	UFZ	377005.22	1524260.58	5043.38
MW-19	ULFZ	376986.52	1524269.27	5043.30
MW-20	LLFZ	376967.98	1524277.98	5043.20
MW-21	UFZ	377171.22	1524458.71	5045.78
MW-22	UFZ	377531.77	1524267.24	5044.73
MW-23	UFZ	377333.63	1524123.03	5045.74
MW-24	UFZ	377338.05	1524367.39	5048.70
MW-25	UFZ	377307.91	1524380.40	5046.17
MW-26	UFZ	377180.89	1524187.40	5045.37
MW-27	UFZ	377078.91	1524323.46	5046.04
MW-29	ULFZ	377144.48	1523998.74	5041.88
MW-30	ULFZ	376924.12	1524105.15	5042.12
MW-31	ULFZ	376731.49	1524215.04	5041.38
MW-32	ULFZ	376958.37	1524494.18	5045.29
MW-34	UFZ	376715.25	1523469.17	5034.33
MW-37R	UFZ/ULFZ	376104.50	1524782.90	5093.15
MW-38	LLFZ	377150.52	1523995.17	5041.70
MW-39	LLFZ	376961.13	1524088.17	5042.30
MW-40	LLFZ	376745.33	1524207.40	5041.44
MW-41	ULFZ	376945.67	1524479.28	5044.56
MW-42	ULFZ	377183.28	1524730.69	5057.33
MW-43	LLFZ	377169.66	1524747.27	5057.74
MW-44	ULFZ	376166.14	1524136.09	5058.63
MW-45	ULFZ	376108.80	1524726.75	5089.50
MW-46	ULFZ	376067.09	1525279.84	5118.86
MW-47R	ULFZ	375607.91	1524933.31	5115.17

Well ID	Flow Zone[a]	Easting [b]	Northing [b]	Elevation[c]
MW-49	LLFZ	376763.40	1524197.32	5041.44
MW-51	UFZ	377291.45	1525000.02	5060.34
MW-52R	UFZ/ULFZ	374504.50	1525353.60	5156.37
MW-53D	UFZ/ULFZ	374899.50	1525314.41	5148.62
MW-54	UFZ	375974.55	1526106.27	5097.69
MW-55	LLFZ	375370.70	1525224.15	5143.45
MW-56	ULFZ	375371.31	1525207.68	5141.45
MW-57D	UFZ	375849.02	1526406.98	5103.62
MW-59	ULFZ	377253.38	1524991.51	5060.65
MW-60	ULFZ	375530.19	1525753.61	5134.40
MW-62	UFZ	375421.24	1524395.94	5073.69
MW-63	UFZ	376840.50	1525236.52	5063.10
MW-64	ULFZ	375968.81	1526127.81	5097.84
MW-65	LLFZ	374343.87	1525277.92	5156.45
MW-66	LLFZ	375859.24	1526389.09	5103.19
MW-67	DFZ	375352.47	1525220.38	5142.21
MW-68	UFZ	374503.81	1526216.71	5168.54
MW-69	LLFZ	374502.80	1526239.55	5167.79
MW-70	LLFZ	376981.33	1524492.75	5046.74
MW-71R	DFZ	375534.49	1525681.93	5134.12
MW-72	ULFZ	377079.68	1524630.73	5056.25
MW-73	ULFZ	376821.45	1524346.08	5051.08
MW-74	UFZ/ULFZ	374484.30	1527810.76	5094.80
MW-75	UFZ/ULFZ	374613.33	1528009.97	5113.74
MW-76	UFZ/ULFZ	375150.41	1527826.10	5108.32
MW-77	UFZ/ULFZ	377754.90	1524374.20	5045.64
MW-78	UFZ/ULFZ	377038.50	1524599.30	5052.91
MW-79	DFZ	374662.64	1525626.72	5168.50
MW-79	DFZ	374662.64	1525626.72	5168.50
MW-80	ULFZ/LLFZ	373445.75	1526294.35	5203.31
OB-1	UFZ&LFZ	374665.16	1525599.52	5169.10
OB-2	UFZ&LFZ	374537.98	1525606.65	5165.22
PZ-1	UFZ	372283.60	1523143.31	5147.36
PZG-1	Infilt. Gall.	374871.44	1527608.15	5090.90

a UFZ denotes the Upper Flow Zone; ULFZ and LLFZ denote the upper and lower, intervals of the Lower Flow Zone (LFZ); DFZ denotes a deeper flow zone separated from the Lower Flow Zone by a continuous clay layer that causes significant head differences between LFZ and DFZ.

b New Mexico "Modified State Plane" coordinates, in feet.

c In feet above Mean Sea Level (ft MSL).

Table 2.2: Well Screen Data

Well ID[a]	Flow Zone	Diameter (in)	Ground Surface	Top of Screen	Bottom of Screen	Top of Screen	Bottom of Screen	Screen Length (ft)
CW-1	UFZ&LFZ	8	5166.40	4957.50	4797.50	208.90	368.90	160.00
CW-2	UFZ-LLFZ	4	5048.50	4968.50	4918.50	80.00	130.00	50.00
MW-07	UFZ	2	5043.00	4979.70	4974.70	63.30	68.30	5.00
MW-09	UFZ	2	5042.40	4975.80	4970.80	66.60	71.60	5.00
MW-12	UFZ	4	5042.30	4978.20	4966.20	64.10	76.10	12.00
MW-14R	UFZ/ULFZ	2	5040.80	4980.50	4950.50	60.30	90.30	30.00
MW-16	UFZ	2	5046.20	4979.70	4974.70	66.50	71.50	5.00
MW-17	UFZ	2	5047.50	4982.30	4977.30	65.20	70.20	5.00
MW-18	UFZ	4	5042.90	4976.00	4966.00	66.90	76.90	10.00
MW-19	ULFZ	4	5042.90	4944.80	4934.80	98.10	108.10	10.00
MW-20	LLFZ	4	5042.80	4919.20	4906.80	123.60	136.00	12.40
MW-21	UFZ	2	5045.70	4982.80	4977.80	62.90	67.90	5.00
MW-22	UFZ	2	5044.60	4977.20	4972.20	67.40	72.40	5.00
MW-23	UFZ	4	5045.60	4973.80	4968.80	71.80	76.80	5.00
MW-24	UFZ	4	5046.20	4977.50	4972.50	68.70	73.70	5.00
MW-25	UFZ	4	5046.10	4977.90	4972.90	68.20	73.20	5.00
MW-26	UFZ	2	5045.40	4969.10	4964.10	76.30	81.30	5.00
MW-27	UFZ	2	5045.80	4975.40	4970.40	70.40	75.40	5.00
MW-29	ULFZ	4	5041.90	4938.30	4928.30	103.60	113.60	10.00
MW-30	ULFZ	4	5041.70	4944.80	4934.80	96.90	106.90	10.00
MW-31	ULFZ	4	5040.90	4945.20	4935.20	95.70	105.70	10.00
MW-32	ULFZ	4	5044.80	4937.30	4927.30	107.50	117.50	10.00
MW-34	UFZ	2	5034.40	4978.00	4968.00	56.40	66.40	10.00
MW-37R	UFZ/ULFZ	2	5093.00	4976.60	4946.60	116.40	146.40	30.00
MW-38	LLFZ	4	5041.60	4915.00	4905.00	126.60	136.60	10.00
MW-39	LLFZ	4	5042.20	4918.70	4908.70	123.50	133.50	10.00
MW-40	LLFZ	4	5040.00	4923.90	4913.90	116.10	126.10	10.00
MW-41	ULFZ	4	5044.10	4952.10	4942.10	92.00	102.00	10.00
MW-42	ULFZ	4	5054.80	4949.30	4939.30	105.50	115.50	10.00
MW-43	LLFZ	4	5055.20	4927.70	4917.70	127.50	137.50	10.00
MW-44	ULFZ	4	5058.80	4952.40	4942.40	106.40	116.40	10.00
MW-45	ULFZ	4	5090.10	4948.50	4938.50	141.60	151.60	10.00
MW-46	ULFZ	4	5118.50	4949.40	4939.40	169.10	179.10	10.00
MW-47R	ULFZ	4	5115.20	4955.20	4935.20	160.00	180.00	20.00
MW-49	LLFZ	4	5041.00	4903.20	4893.20	137.80	147.80	10.00
MW-51	UFZ	2	5059.90	4984.50	4974.50	75.40	85.40	10.00
MW-52R	UFZ/ULFZ	4	5156.20	4968.50	4938.50	187.00	217.00	30.00
MW-53D	UFZ/ULFZ	2	5148.60	4963.60	4943.60	185.00	205.00	20.00
MW-54	UFZ	4	5097.20	4976.80	4961.80	120.40	135.40	15.00
MW-55	LLFZ	4	5143.10	4913.10	4903.10	230.00	240.00	10.00
MW-56	ULFZ	4	5141.00	4942.90	4932.90	198.10	208.10	10.00
MW-57D	UFZ	4	5103.10	4958.10	4938.10	145.00	165.00	20.00
MW-59	ULFZ	4	5060.20	4954.90	4944.40	105.30	115.80	10.50
MW-60	ULFZ	4	5134.40	4949.50	4939.50	184.90	194.90	10.00
MW-62	UFZ	2	5073.70	4975.10	4960.10	98.60	113.60	15.00
MW-63	UFZ	2	5063.10	4983.10	4968.10	80.00	95.00	15.00
MW-64	ULFZ	4	5097.40	4959.30	4949.10	138.10	148.30	10.20
MW-65	LLFZ	4	5156.50	4896.40	4886.40	260.10	270.10	10.00
MW-66	LLFZ	4	5102.60	4903.30	4893.30	199.30	209.30	10.00
MW-67	DFZ	4	5142.20	4798.10	4788.10	344.10	354.10	10.00
MW-68	UFZ	4	5168.50	4970.50	4950.50	198.00	218.00	20.00
MW-69	LLFZ	4	5167.80	4904.70	4894.70	263.10	273.10	10.00
MW-70	LLFZ	2	5046.30	4912.10	4902.10	134.20	144.20	10.00
MW-71R	DFZ	4	5134.20	4761.50	4756.50	372.70	377.70	5.00
MW-72	ULFZ	2	5053.70	4955.00	4945.00	98.70	108.70	10.00
MW-73	ULFZ	2	5050.60	4945.50	4940.50	105.10	110.10	5.00
MW-74	UFZ/ULFZ	2	5092.40	4969.20	4939.20	123.20	153.20	30.00
MW-75	UFZ/ULFZ	2	5111.60	4971.20	4941.20	140.40	170.40	30.00
MW-76	UFZ/ULFZ	2	5105.50	4972.40	4942.40	133.10	163.10	30.00
MW-77	UFZ/ULFZ	2	5045.50	4985.90	4955.90	59.60	89.60	30.00
MW-78	UFZ/ULFZ	2	5050.50	4988.10	4958.10	62.40	92.40	30.00
MW-79	DFZ	6	5166.70	4767.70	4752.70	399.00	414.00	15.00
MW-79	DFZ	6	5166.70	4747.70	4732.70	419.00	434.00	15.00
MW-80	ULFZ/LLFZ	4	5203.30	4934.30	4894.30	269.00	309.00	40.00
OB-1	UFZ&LFZ	4	5166.20	4960.30	4789.80	205.90	376.40	170.50
OB-2	UFZ&LFZ	4	5164.80	4960.30	4789.70	204.50	375.10	170.60
PZ-1	UFZ	2	5141.30	4961.50	4951.30	179.80	190.00	10.20
PZG-1	Infilt. Gall.		5090.50					

a The letter R after the number in the Well ID indicates that the well is a new and deeper replacement well installed near the original well location; the letter D after the number in the Well ID indicates that the well has been deepened.

Table 2.3: Operation and Downtime of the Off-Site Containment System - 2013

(a) Operation

Available Hours	8,760 hrs
Total Operating Hours	8,619 hrs
Percent of Operating to Available Hours	98.39%
Total Downtime Hours	140.7 hrs
Range of Downtime Hours	0.15 - 29.75 hrs

(b) Downtime

Start	End	Duration (hours)	Cause
02/10/2013	02/11/2013	29.75	Repair discharge pump
03/12/2013	03/12/2013	2.67	Repair leaks
03/15/2013	03/15/2013	0.32	Building power outage
03/23/2013	03/23/2013	1.67	Building power outage
03/23/2013	03/23/2013	0.20	Building power outage
04/30/2013	04/30/2013	0.67	Building power outage
04/30/2013	04/30/2013	0.15	High sump level
05/03/2013	05/03/2013	6.08	Building power outage
06/10/2013	06/10/2013	0.47	Pump down
06/10/2013	06/11/2013	22.33	Pump down
06/14/2013	06/14/2013	0.50	Repair electrical control panel
07/14/2013	07/15/2013	11.97	Building power outage
07/15/2013	07/15/2013	3.15	Building power outage
07/20/2013	07/20/2013	0.32	System down for maintenance
07/26/2013	07/27/2013	12.48	Building power outage
07/30/2013	07/30/2013	4.92	Building power outage
07/30/2013	07/30/2013	0.25	System down for maintenance
08/06/2013	08/07/2013	11.72	Building power outage
08/07/2013	08/08/2013	26.95	Building power outage
08/30/2013	08/30/2013	0.52	Building power outage
08/30/2013	08/30/2013	1.83	Building power outage
10/07/2013	10/07/2013	1.60	System down for maintenance
10/07/2013	10/07/2013	0.18	System down for maintenance

Table 2.4: Operation and Downtime of the Source Containment System - 2013

(a) Operation

Available Hours	8,760 hrs
Total Operating Hours	6,881 hrs
Percent of Operating to Available Hours	78.55%
Total Downtime Hours	1879.12 hrs
Range of Downtime Hours	0.12 - 1111.5 hrs

(b) Downtime

Start	End	Duration (hours)	Cause
01/07/2013	01/07/2013	0.67	Replace water meter
02/17/2013	02/17/2013	2.00	Repair pond meters
03/01/2013	03/01/2013	0.83	Building power outage
03/23/2013	03/23/2013	1.98	Building power outage
06/03/2013	06/03/2013	0.12	High air stripper sump level
06/03/2013	06/03/2013	0.48	High air stripper sump level
06/11/2013	06/11/2013	3.72	Building power outage
07/14/2013	07/15/2013	12.67	Building power outage
07/26/2013	07/27/2013	13.40	Pond 1 out of service
08/05/2013	08/05/2013	1.50	Building power outage
08/07/2013	08/07/2013	0.30	Building power outage
09/10/2013	10/08/2013	624.35	System shut down due to chromium exceedance and for well and pump rehabilitation and for pipeline clean-up to address problem. Well operated occasionally for sampling.
10/10/2013	10/10/2013	2.00	Installed new flow meter.
10/11/2013	10/15/2013	103.60	System turned off to await sampling results
11/15/2013	01/01/2014	1111.50	System shut down again due to chromium exceedance

Table 3.1: Quarterly Water-Level Elevations - 2013

Well ID	Flow Zone	Feb	May	Aug	Nov
CW-1	UFZ and LFZ	4920.21	4920.04	4917.92	4919.12
CW-2	UFZ-LLFZ	4951.59	4953.51	4954.54	4956.55
MW-07	UFZ	4973.63	4973.19	4973.04	4973.75
MW-09	UFZ	4969.14	4969.16	4968.96	4969.32
MW-12	UFZ	4968.22	4967.75	4967.49	4968.08
MW-14R	UFZ/ULFZ	4965.99	4965.62	4965.38	4965.59
MW-16	UFZ	4981.56	4980.12	4979.77	4981.88
MW-17	UFZ	4980.93	4979.36	4979.28	4981.30
MW-18	UFZ	4967.20	4966.76	4966.51	4966.76
MW-19	ULFZ	4967.45	4966.69	4966.44	4966.83
MW-20	LLFZ	4966.61	4966.20	4965.91	4966.28
MW-21	UFZ	4981.90	4981.36	4980.58	4982.56
MW-22	UFZ	4975.44	4974.62	4974.23	4975.07
MW-23	UFZ	4972.58	4972.14	4971.89	4972.38
MW-24	UFZ	4981.25	4979.89	4979.51	4981.40
MW-25	UFZ	4981.56	4980.17	4979.69	4981.85
MW-26	UFZ	4969.82	4969.18	4968.83	4969.03
MW-27	UFZ	4980.52	4979.99	4978.80	4979.90
MW-29	ULFZ	4969.45	4969.00	4968.74	4969.30
MW-30	ULFZ	4967.63	4967.25	4967.03	4967.58
MW-31	ULFZ	4966.13	4965.77	4965.52	4965.87
MW-32	ULFZ	4965.97	4965.54	4965.24	4965.52
MW-34	UFZ	4969.65	4969.28	4969.25	4969.72
MW-37R	UFZ/ULFZ	4962.22	4962.41	4961.96	4962.10
MW-38	LLFZ	4969.44	4968.95	4968.71	4969.30
MW-39	LLFZ	4968.00	4967.54	4967.32	4967.81
MW-40	LLFZ	4966.12	4965.84	4965.61	4965.95
MW-41	ULFZ	4966.29	4965.86	4965.42	4965.73
MW-42	ULFZ	4966.26	4965.96	4965.71	4966.02
MW-43	LLFZ	4965.98	4965.71	4965.46	4965.75
MW-44	ULFZ	4964.69	4964.57	4964.30	4964.49
MW-45	ULFZ	4962.61	4962.67	4962.22	4962.26
MW-46	ULFZ	4961.34	4961.42	4961.02	4961.15
MW-47R	ULFZ	4960.60	4960.80	4959.81	4960.07
MW-49	LLFZ	4966.26	4965.86	4965.65	4966.05

Well ID	Flow Zone	Feb	May	Aug	Nov
MW-51	UFZ	4980.27	4979.94	4979.47	4980.58
MW-52R	UFZ/ULFZ	4954.78	4955.03	4954.17	4954.59
MW-53D	UFZ/ULFZ	4957.13	4957.10	4956.74	4957.09
MW-54	UFZ	4961.58	4961.83	4961.98	4961.89
MW-55	LLFZ	4958.28	4957.81	4957.92	4957.65
MW-56	ULFZ	4959.41	4959.40	4959.45	4959.41
MW-57D	UFZ	4960.06	4960.26	4959.84	4960.10
MW-59	ULFZ	4965.46	4964.64	4964.39	4965.10
MW-60	ULFZ	4959.43	4959.70	4958.92	4959.28
MW-62	UFZ	4961.87	4961.62	4961.57	4961.69
MW-63	UFZ	4968.19	4968.65	NM	4968.15
MW-64	ULFZ	4960.53	4960.48	4960.24	4959.10
MW-65	LLFZ	4955.03	4955.10	4953.74	4954.73
MW-66	LLFZ	4958.87	4958.82	4958.35	4958.58
MW-67	DFZ	4953.38	4951.89	4951.89	4952.81
MW-68	UFZ	4955.37	4955.46	4954.63	4954.92
MW-69	LLFZ	4955.27	4955.35	4954.39	4954.89
MW-70	LLFZ	4965.49	4965.02	4964.74	4965.04
MW-71R	DFZ	4953.44	4952.39	4951.55	4953.03
MW-72	ULFZ	4966.21	4965.99	4965.84	4965.97
MW-73	ULFZ	4965.54	4965.13	4964.82	4965.10
MW-74	UFZ/ULFZ	4958.44	4958.43	4957.43	4958.08
MW-75	UFZ/ULFZ	4964.24	4964.76	4963.69	4964.50
MW-76	UFZ/ULFZ	4965.55	4966.08	4964.49	4966.19
MW-77	UFZ/ULFZ	4975.18	4974.76	4974.60	4975.37
MW-78	UFZ/ULFZ	4972.24	4971.74	4970.55	4969.49
MW-79	DFZ	4951.55	4949.83	4949.52	4950.73
MW-80	ULFZ/LLFZ	4953.02	4952.99	4952.51	4952.38
OB-1	UFZ and LFZ	4951.55	4951.12	4950.74	4951.42
OB-2	UFZ and LFZ	4952.87	4952.45	4952.08	4952.72
PZ-1	UFZ	4952.01	4951.19	4950.51	4951.06
PZG-1	Infilt. Gall.	5067.66	5067.63	5067.34	5067.65

Measured water level is below the bottom of screen
NM Not Measured

Table 3.2: Water-Quality Data from Groundwater Monitoring Program Wells - 2013

Well ID	Sample Date	TCE μg/L	DCE μg/L	TCA μg/L	Total Cr mg/L	Dissolved Cr mg/L	Other[a]
MW-07	11/08/2013	NS	NS	NS	NS	NS	
MW-09	11/08/2013	NS	NS	NS	NS	NS	
MW-12	11/08/2013	NS	NS	NS	NS	NS	
MW-14R	11/27/2013	2.1	<1.0	<1.0	0.55	0.53	Chloroform 6.0; Bromodichloromethane 5.2; Dibromochloromethane 4.9
MW-16	01/10/2014	<1.0	<1.0	<1.0	1.1	0.24	
MW-18	11/08/2013	NS	NS	NS	NS	NS	
MW-19	12/23/2013	76	4.9	<1.0	0.015		
MW-20	11/29/2013	1.9	<1.0	<1.0	<0.0060		
MW-21	11/19/2013	<1.0	<1.0	<1.0	0.16	0.063	
MW-22	11/15/2013	<1.0	<1.0	<1.0	0.052		
MW-23	11/19/2013	1.9	<1.0	<1.0	0.28	0.28	
MW-25	11/08/2013	NS	NS	NS	NS	NS	
MW-26	11/08/2013	NS	NS	NS	NS	NS	
MW-27	11/18/2013	<1.0	<1.0	<1.0	0.059	0.059	
MW-29	11/21/2013	<1.0	<1.0	<1.0	<0.0060		
MW-30	11/25/2013	2.2	<1.0	<1.0	0.19	0.19	Chloroform 5.5; Bromodichloromethane 4.6; Dibromochloromethane 3.5
MW-31	11/25/2013	1.1	<1.0	<1.0	0.24	0.23	Chloroform 5.3; Bromodichloromethane 4.6; Dibromochloromethane 5.0
MW-32	11/15/2013	1.2	<1.0	<1.0	0.02	0.018	
MW-34	11/08/2013	NS	NS	NS	NS	NS	
MW-37R	11/11/2013	240	10	<1.0	0.061	0.059	cis-DCE 1.2
MW-38	11/21/2013	<1.0	<1.0	<1.0	<0.0060		
MW-39	11/21/2013	<1.0	<1.0	<1.0	<0.0060		
MW-40	11/26/2013	<1.0	<1.0	<1.0	<0.0060		
MW-41	11/16/2013	1	<1.0	<1.0	0.033		
MW-42	11/27/2013	23	5.1	<1.0	0.026		
MW-43	11/16/2013	<1.0	<1.0	<1.0	<0.0060		Fe(Total) <0.020; Mn(Total) 0.53
MW-44	11/09/2013	<1.0	<1.0	<1.0	<0.0060		
MW-45	11/11/2013	<1.0	<1.0	<1.0	<0.0060		
MW-46	11/09/2013	360	46	3.1	0.048		PCE 3.1
MW-47R	11/08/2013	<1.0	<1.0	<1.0	<0.0060	<0.0060	
MW-49	11/26/2013	<1.0	<1.0	<1.0	<0.0060		
MW-51	11/16/2013	<1.0	<1.0	<1.0	0.04		
MW-52R	02/22/2013	16	46	1.7	<0.0060	<0.0060	
MW-52R	05/23/2013	20	42	1.8	<0.0060		
MW-52R	08/08/2013	23	60	2.7	<0.0060		
MW-52R	11/07/2013	20	45	1.9	<0.0060		
MW-53D	11/12/2013	16	<1.0	<1.0	0.021	0.024	
MW-55	11/11/2013	13	<1.0	<1.0	0.0098		
MW-56	11/11/2013	140	3.7	<1.0	0.038		
MW-57D	02/21/2013	<1.0	<1.0	<1.0	<0.0060	<0.0060	
MW-57D	05/28/2013	<1.0	<1.0	<1.0	<0.0060	<0.0060	
MW-57D	08/08/2013	<1.0	<1.0	<1.0	<0.0060	<0.0060	
MW-57D	11/08/2013	<1.0	<1.0	<1.0	<0.0060	<0.0060	
MW-59	11/21/2013	<1.0	<1.0	<1.0	0.036		
MW-60	11/12/2013	790	87	1.9	0.78	0.027	PCE 8.2; Cloroform 2.5

(yellow) Concentration exceeds the more stringent of the MCL for drinking water or maximum allowable concentration in groundwater set by the NMWQCC (5 μg/L for TCE and DCE, 60 μg/L for TCA and 50 μg/L for Total Chromium)

NS Not sampled due to insufficient water

a VOCs are reported in μg/L and Metals are reported in mg/L

Table 3.2: Water-Quality Data from Groundwater Monitoring Program Wells - 2013 (cont.)

Well ID	Sample Date	TCE μg/L	DCE μg/L	TCA μg/L	Total Cr mg/L	Dissolved Cr mg/L	Other[a]
MW-62	02/20/2013	2.2	5.7	1.2	0.0088	0.0068	
MW-62	05/22/2013	2	3.6	<1.0	0.012	0.0083	
MW-62	08/13/2013	2.7	4.5	1.1	0.01	0.0074	
MW-62	11/19/2013	2.2	4.3	<1.0	0.0091	0.0074	
MW-64	01/09/2014	<1.0	<1.0	<1.0	<0.0060		
MW-65	02/20/2013	1.4	4.7	<1.0	<0.0060		
MW-65	05/23/2013	1.6	4	<1.0	<0.0060		
MW-65	08/08/2013	1.5	4.8	<1.0	<0.0060		
MW-65	11/08/2013	1.6	4.2	<1.0	<0.0060		
MW-66	02/21/2013	<1.0	<1.0	<1.0	<0.0060		
MW-66	02/21/2013-DUP	<1.0	<1.0	<1.0	<0.0060		
MW-66	05/24/2013	<1.0	<1.0	<1.0	<0.0060		
MW-66	08/09/2013	<1.0	<1.0	<1.0	<0.0060		
MW-66	11/08/2013	<1.0	<1.0	<1.0	<0.0060		
MW-67	05/23/2013	<1.0	<1.0	<1.0	<0.0060		
MW-67	05/23/2013-DUP	<1.0	<1.0	<1.0	<0.0060		
MW-67	11/09/2013	<1.0	<1.0	<1.0	<0.0060		
MW-68	02/22/2013	<1.0	<1.0	<1.0	<0.0060		
MW-68	05/27/2013	<1.0	<1.0	<1.0	<0.0060		
MW-68	08/10/2013	<1.0	<1.0	<1.0	<0.0060		
MW-68	11/07/2013	<1.0	<1.0	<1.0	<0.0060		
MW-69	02/22/2013	<1.0	<1.0	<1.0	<0.0060		
MW-69	05/24/2013	<1.0	<1.0	<1.0	<0.0060		
MW-69	08/08/2013	<1.0	<1.0	<1.0	<0.0060		
MW-69	11/07/2013	<1.0	<1.0	<1.0	<0.0060		
MW-70	11/15/2013	1.3	<1.0	<1.0	<0.0060		
MW-71R	02/25/2013	71	2.8	<1.0	<0.0060		
MW-71R	02/25/2013-DUP	63	3	<1.0	<0.0060		
MW-71R	05/24/2013	72	2.2	<1.0	<0.0060		
MW-71R	08/09/2013	66	2.7	<1.0	<0.0060		
MW-71R	11/12/2013	64	2.6	<1.0	<0.0060	<0.0060	
MW-72	11/25/2013	470	84	1.5	0.2	0.21	PCE 5.7; Chloroform 2.0
MW-73	11/13/2013	59	3	<1.0	0.049	0.055	Fe(Total) 0.083; Mn(Total) 0.0063; Fe(Dis) <0.020; Mn(Dis) <0.0020
MW-79	05/22/2013	<1.0	<1.0	<1.0	<0.0060		
MW-79	11/22/2013	<1.0	<1.0	<1.0	<0.0060		
MW-80	02/25/2013	<1.0	<1.0	<1.0	<0.0060		
MW-80	05/27/2013	<1.0	<1.0	<1.0	<0.0060	<0.0060	
MW-80	08/14/2013	<1.0	<1.0	<1.0	<0.0060		
MW-80	11/29/2013	<1.0	<1.0	<1.0	<0.0060		

Concentration exceeds the more stringent of the MCL for drinking water or maximum allowable concentration in groundwater set by the NMWQCC (5 μg/L for TCE and DCE, 60 μg/L for TCA and 50 μg/L for Total Chromium)

NS Not sampled due to insufficient water

a VOCs are reported in μg/L and Metals are reported in mg/L

Table 3.3: Water-Quality Data from Infiltration Gallery and Pond Monitoring Wells - 2013

(a) VOC Results

Well ID	Sample Date	TCE μg/L	DCE μg/L	TCA μg/L
MW-17	02/20/2013	1.6	<1.0	<1.0
MW-17	05/22/2013	<1.0	<1.0	<1.0
MW-17	08/13/2013	<1.0	<1.0	<1.0
MW-17	11/20/2013	2.5	<1.0	<1.0
MW-74	02/20/2013	<1.0	<1.0	<1.0
MW-74	05/23/2013	<1.0	<1.0	<1.0
MW-74	08/12/2013	<1.0	<1.0	<1.0
MW-74	11/12/2013	<1.0	<1.0	<1.0
MW-75	02/20/2013	<1.0	<1.0	<1.0
MW-75	05/23/2013	<1.0	<1.0	<1.0
MW-75	08/12/2013	<1.0	<1.0	<1.0
MW-75	11/12/2013	<1.0	<1.0	<1.0
MW-76	02/20/2013	<1.0	<1.0	<1.0
MW-76	05/23/2013	<1.0	<1.0	<1.0
MW-76	08/12/2013	<1.0	<1.0	<1.0
MW-76	11/14/2013	<1.0	<1.0	<1.0
MW-77	02/22/2013	1.2	<1.0	<1.0
MW-77	05/24/2013	<1.0	<1.0	<1.0
MW-77	08/09/2013	1.9	<1.0	<1.0
MW-77	11/15/2013	1.3	<1.0	<1.0
MW-78	02/21/2013	<1.0	<1.0	<1.0
MW-78	05/24/2013	<1.0	<1.0	<1.0
MW-78	08/09/2013	<1.0	<1.0	<1.0
MW-78	08/09/2013-DUP	<1.0	<1.0	<1.0
MW-78	11/15/2013	<1.0	<1.0	<1.0

(b) Metals Results

Well ID	Sample Date	Cr (Total) mg/L	Fe (Total) mg/L	Mn (Total) mg/L	Cr (Dis) mg/L	Fe (Dis) mg/L	Mn (Dis) mg/L
MW-17	02/20/2013	0.058	2.9	0.21	0.045	<0.02	0.027
MW-17	05/22/2013	0.06	4.1	0.26	0.051	<0.02	0.0087
MW-17	08/13/2013	0.064	1.8	0.069	0.061	<0.02	<0.002
MW-17	10/22/2013	0.055			0.06		
MW-17	11/20/2013	0.14	9.6	0.41	0.14	6.4	0.15
MW-17	11/20/2013-DUP	0.13			0.12		
MW-74	02/20/2013	0.0079	<0.02	<0.0022			
MW-74	05/23/2013	0.0085	<0.02	<0.002			
MW-74	08/12/2013	0.0085	<0.02	0.0023			
MW-74	11/12/2013	0.0084	0.029	0.0064			
MW-75	02/20/2013	0.0083	<0.02	<0.002			
MW-75	05/23/2013	0.0088	<0.02	<0.002			
MW-75	08/12/2013	0.0081	<0.02	<0.002			
MW-75	11/12/2013	0.0089	<0.02	<0.002			
MW-76	02/20/2013	0.0081	<0.02	<0.002			
MW-76	05/23/2013	0.009	<0.02	<0.002			
MW-76	08/12/2013	0.0078	<0.02	<0.002			
MW-76	11/14/2013	0.0084	<0.02	<0.002			
MW-77	02/22/2013	<0.0060	0.49	4.3	<0.0060	<0.02	0.68
MW-77	05/24/2013	<0.0060	0.29	8.6	<0.0060	<0.02	0.53
MW-77	08/09/2013	<0.0060	0.12	5.2	<0.0060	<0.02	0.63
MW-77	11/15/2013	<0.0060	0.16	16	<0.0060	<0.02	0.39
MW-78	02/21/2013	0.027	0.15	0.014	0.031	<0.02	0.0048
MW-78	05/24/2013	0.034	0.86	0.057	0.034	<0.02	<0.002
MW-78	08/09/2013	0.039	0.68	0.042	0.04	<0.02	<0.002
MW-78	08/09/2013-DUP	0.042	0.67	0.042	0.041	<0.02	<0.002
MW-78	11/15/2013	0.044			0.048		

Concentration exceeds the more stringent of the MCL for drinking water or maximum allowable concentration in groundwater set by the NMWQCC (5 μg/L for TCE and DCE, 60 μg/L for TCA and 50 μg/L for Total Chromium)

Table 3.4: Containment System Flow Rates - 2013

Month	Off-Site Containment Well		Source Containment Well		Total	
	Volume Pumped (gal)	Average Rate (gpm)	Volume Pumped (gal)	Average Rate (gpm)	Volume Pumped (gal)	Average Rate (gpm)
Jan	12,894,932	289	2,003,594	45	14,898,527	334
Feb	11,133,802	276	1,765,543	44	12,899,345	320
Mar	12,845,461	288	1,877,195	42	14,722,656	330
Apr	12,572,944	291	1,740,401	40	14,313,345	331
May	11,264,086	252	1,716,234	38	12,980,320	291
Jun	12,069,420	279	1,568,949	36	13,638,370	316
Jul	11,992,590	269	1,513,417	34	13,506,007	303
Aug	12,137,076	272	1,512,401	34	13,649,476	306
Sep	12,486,057	289	578,855	13	13,064,912	302
Oct	12,850,364	288	1,191,333	27	14,041,697	315
Nov	12,484,803	289	1,016,443	24	13,501,246	313
Dec	13,004,874	291	0	0	13,004,874	291
Total or Average	**147,736,408**	**281**	**16,484,367**	**31**	**164,220,774**	**313**

Table 3.5: Off Site Containment System Influent and Effluent Chemistry

(a) Influent Chemistry

Sampling Date	TCE μg/L	DCE μg/L	TCA μg/L	Cr (Total) mg/L	Fe (Total) mg/L	Mn (Total) mg/L
01/01/2013	430	54	1.5	0.0082	<0.050	<0.0020
02/01/2013	430	51	1.4	0.0091	0.039	<0.0020
03/01/2013	390	48	1.4	0.0091	0.022	<0.0020
04/01/2013	450	51	1.4	0.0078	<0.020	<0.0020
05/01/2013	450	46	1.4	0.0083	0.039	<0.0020
06/03/2013	450	49	1.4	0.008	<0.020	<0.0020
07/01/2013	430	42	1.2	0.0072	<0.050	<0.010
08/01/2013	400	42	1.4	0.0076	<0.020	<0.0020
09/01/2013	400	49	1.2	0.0078	<0.020	<0.0020
10/01/2013	380	52	1.3	0.0082	<0.020	<0.0020
11/01/2013	410	50	1.2	0.0078	0.076	<0.0020
12/01/2013	400	45	1.2	0.0074	<0.020	<0.0020
01/01/2014	320	47	1.1	0.0086	0.026	<0.0020

(b) Effluent Chemistry

Sampling Date	TCE μg/L	DCE μg/L	TCA μg/L	Cr (Total) mg/L	Fe (Total) mg/L	Mn (Total) mg/L
01/01/2013	<1.0	<1.0	<1.0	0.0086	<0.050	<0.0020
02/01/2013	<1.0	<1.0	<1.0	0.0085	<0.020	<0.0020
03/01/2013	<1.0	<1.0	<1.0	0.0083	<0.020	<0.0020
04/01/2013	<1.0	<1.0	<1.0	0.0087	<0.020	<0.0020
05/01/2013	<1.0	<1.0	<1.0	0.0086	<0.020	<0.0020
06/03/2013	<1.0	<1.0	<1.0	0.0066	<0.020	<0.0020
07/01/2013	<1.0	<1.0	<1.0	0.0074	<0.050	<0.0020
08/01/2013	<1.0	<1.0	<1.0	0.0072	<0.020	<0.0020
09/01/2013	<1.0	<1.0	<1.0	0.0078	<0.020	<0.0020
10/01/2013	<1.0	<1.0	<1.0	0.0081	<0.020	<0.0020
11/01/2013	<1.0	<1.0	<1.0	0.0076	<0.020	<0.0020
12/01/2013	<1.0	<1.0	<1.0	0.0075	<0.020	<0.0020
01/01/2014	<1.0	<1.0	<1.0	0.0079	<0.020	<0.0020

Concentration exceeds the more stringent of the MCL for drinking water or maximum allowable concentration in groundwater set by the NMWQCC (5 μg/L for TCE and DCE, 60 μg/L for TCA and 50 μg/L for Total Chromium)

Table 3.6: Source Containment System Influent and Effluent Chemistry

(a) Influent Chemistry

Sampling Date	TCE μg/L	DCE μg/L	TCA μg/L	Cr (Total) mg/L	Fe (Total) mg/L	Mn (Total) mg/L
01/01/2013	24	3.2	<1.0	0.035	<0.050	0.170
02/01/2013	25	2.8	<1.0	0.04	<0.020	0.58
03/01/2013	22	2.5	<1.0	0.044	<0.020	0.4
04/01/2013	23	2.2	<1.0	0.052	<0.020	0.13
05/01/2013	24	2.3	<1.0	0.052	<0.020	0.43
06/03/2013	26	2.6	<1.0	0.053	<0.020	0.12
07/01/2013	24	2.3	<1.0	0.061	<0.050	0.081
08/01/2013	24	3.2	<1.0	0.06	<0.020	0.4
09/03/2013	28	3	<1.0	0.061	<0.020	0.22
10/05/2013	27	3.3	<1.0	0.063	<0.020	0.17
10/11/2013				0.065	<0.020	0.078
11/01/2013	27	3.3	<1.0	0.063		
11/13/2013				0.065		

(b) Effluent Chemistry

Sampling Date	TCE μg/L	DCE μg/L	TCA μg/L	Cr (Total) mg/L	Fe (Total) mg/L	Mn (Total) mg/L
01/01/2013	<1.0	<1.0	<1.0	0.034	<0.050	0.044
02/01/2013	<1.0	<1.0	<1.0	0.04	<0.020	0.053
03/01/2013	<1.0	<1.0	<1.0	0.042	<0.020	0.039
04/01/2013	<1.0	<1.0	<1.0	0.056	<0.020	0.04
05/01/2013	<1.0	<1.0	<1.0	0.05	<0.020	0.041
06/03/2013	<1.0	<1.0	<1.0	0.057	<0.020	0.068
07/01/2013	<1.0	<1.0	<1.0	0.056	<0.050	0.033
08/01/2013	<1.0	<1.0	<1.0	0.062	<0.020	0.034
09/03/2013	<1.0	<1.0	<1.0	0.061	<0.020	0.03
09/20/2013	<1.0	<1.0	<1.0	0.05	<0.020	0.18
10/05/2013				0.026		
10/11/2013				0.028		
10/18/2013				0.039		
10/25/2013				0.061		
11/01/2013	<1.0	<1.0	<1.0	0.06		
11/01/2013				0.064		
11/06/2013				0.06		
11/13/2013				0.068		

Concentration exceeds the more stringent of the MCL for drinking water or maximum allowable concentration in groundwater set by the NMWQCC (5 μg/L for TCE and DCE, 60 μg/L for TCA and 50 μg/L for Total Chromium)

Table 4.1: Concentration Changes in Monitoring Wells - 1998 to 2013

Well ID	Change in Concentration (μg/L) TCE	DCE
CW-1	270	47.1
CW-2[a]	-973	-186.7
MW-14R[b]	-427.9	-24
MW-16	-1200	-30
MW-17	-65.5	-3.5
MW-19	71.8	4.9
MW-20	1.9	0
MW-21	-7.5	0
MW-22	-13	-2
MW-23	-6198.1	-400
MW-27	-380	-24
MW-29	0	0
MW-30	-3.2	0
MW-31	1.1	0
MW-32	-548.8	-96
MW-37R[b]	-750	-38
MW-38	0	0
MW-39	0	0
MW-40	0	0
MW-41	-169	-26
MW-42	-347	-42.9
MW-43	-25	-5.1
MW-44	-1.3	0
MW-45	-40	-1.7
MW-46	-1840	-84
MW-49	0	0
MW-51	0	0
MW-52R[b]	20	45
MW-53D[b]	-83	-3.4
MW-55	-377	-10
MW-56	0	-1
MW-57D[b]	0	0
MW-59	0	0
MW-60	-6910	-263
MW-62	0.2	-2.3
MW-64	0	0
MW-65	-11.4	4.2
MW-66	0	0
MW-67	0	0
MW-68	0	0
MW-69	0	0
MW-70	1.3	0
MW-71R[b]	8	1
MW-72[a]	-1330	-136
MW-73[a]	-3941	-517
MW-74	0	0
MW-75	0	0
MW-76	0	0
MW-77[a]	-14.7	-1.2
MW-78[a]	-6	0
MW-79[a]	0	0

a Change from concentration in first available sample
b Change in concentration in original well
c "0" indicates concentration below detection limits during both sampling events
(yellow) Well used in both the original and the current plume definition
(pink) Well used either in the original or in the current plume definition

Table 4.2: Containment System Flow Rates - 2013

Month	Off-Site Containment Well Volume Pumped (gal)	Off-Site Containment Well Average Rate (gpm)	Source Containment Well Volume Pumped (gal)	Source Containment Well Average Rate (gpm)	Total Volume Pumped (gal)	Total Average Rate (gpm)
1998[a]	1,694,830	NA	NA	NA	1,694,830	NA
1999	114,928,700	219	NA	NA	114,928,700	219
2000	114,094,054	217	NA	NA	114,094,054	217
2001	113,654,183	216	NA	NA	113,654,183	216
2002	116,359,389	221	25,403,490	48	141,762,879	270
2003	118,030,036	225	27,292,970	52	145,323,006	276
2004	113,574,939	216	26,105,202	50	139,680,141	266
2005	118,018,628	225	25,488,817	48	143,507,445	273
2006	112,213,088	213	24,133,213	46	136,346,301	259
2007	117,098,422	223	23,983,802	46	141,082,224	268
2008	114,692,635	218	25,432,013	48	140,124,648	267
2009	114,752,782	218	24,524,740	47	139,277,522	265
2010	147,736,408	281	16,484,367	31	164,220,774	312
2011	149,171,757	284	26,989,781	51	176,161,538	335
2012	151,260,826	288	22,133,042	42	173,393,868	330
2013	147,736,408	281	16,484,367	31	164,220,774	312
Total or Average	**1,865,017,085**	**222**	**284,455,802**	**45**	**2,149,472,888**	**256**

a Volume pumped during the testing of the well in early December, and during the first day of operation on December 31, 1998

Table 4.3: Contaminant Mass Removal - 2013

(a) Total

Mass Removed	(kg)	(lb)
TCE	232.54	512.67
DCE	27.02	59.57
TCA	0.74	1.62
Total	**260.3**	**573.86**

(b) Off-Site Containment Well

MONTH	TCE (kg)	TCE (lb)	DCE (kg)	DCE (lb)	TCA (kg)	TCA (lb)	Total (kg)	Total (lb)
Jan	21	46.3	2.6	5.6	0.0708	0.156	23.6	52.1
Feb	17.3	38.1	2.1	4.6	0.059	0.13	19.4	42.9
Mar	20.4	45	2.4	5.3	0.0681	0.15	22.9	50.4
Apr	21.4	47.2	2.3	5.1	0.0666	0.147	23.8	52.4
May	19.2	42.3	2	4.5	0.0597	0.132	21.3	46.9
Jun	20.1	44.3	2.1	4.6	0.0594	0.131	22.2	49
Jul	18.8	41.4	1.9	4.2	0.059	0.13	20.8	45.8
Aug	18.4	40.6	2.1	4.6	0.0597	0.132	20.5	45.3
Sep	18.4	40.6	2.4	5.3	0.0591	0.13	20.8	46
Oct	19.2	42.3	2.5	5.5	0.0608	0.134	21.7	47.9
Nov	19.1	42.1	2.2	4.9	0.0567	0.125	21.4	47.2
Dec	17.7	39	2.3	5	0.0566	0.125	20	44.1
Total	**231**	**509.3**	**26.9**	**59.2**	**0.7355**	**1.622**	**258.6**	**570.1**

(c) Source Containment Well

MONTH	TCE (kg)	TCE (lb)	DCE (kg)	DCE (lb)	Total (kg)	Total (lb)
Jan	0.186	0.41	0.02	0.05	0.21	0.46
Feb	0.157	0.35	0.02	0.04	0.18	0.39
Mar	0.16	0.35	0.02	0.04	0.18	0.39
Apr	0.155	0.34	0.01	0.03	0.17	0.37
May	0.162	0.36	0.02	0.04	0.18	0.39
Jun	0.148	0.33	0.01	0.03	0.16	0.36
Jul	0.137	0.3	0.02	0.03	0.15	0.34
Aug	0.149	0.33	0.02	0.04	0.17	0.37
Sep	0.061	0.13	0.01	0.01	0.07	0.15
Oct	0.123	0.27	0.01	0.03	0.14	0.3
Nov	0.104	0.23	0.01	0.03	0.12	0.26
Dec	0	0	0	0	0	0
Total	**1.542**	**3.4**	**0.17**	**0.38**	**1.71**	**3.77**

Table 4.4: Summary of Contaminant Mass Removal - 1998 to 2013

(a) Total

YEAR	TCE (kg)	TCE (lb)	DCE (kg)	DCE (lb)	TCA (kg)	TCA (lb)	Total (kg)	Total (lb)
1998	1.31	2.88	0.03	0.0661	0	0	1.34	2.95
1999	358	788	16.2	35.7	0	0	374	824
2000	463	1020	23.3	51.4	0	0	486	1070
2001	519	1140	26.6	58.7	0	0	546	1200
2002	603	1330	40.6	89.5	3.66	8.08	645	1420
2003	617	1360	38.2	84.1	3.05	6.73	656	1450
2004	595	1310	35.2	77.7	2.43	5.37	632	1390
2005	558	1230	34.6	76.4	2.01	4.43	593	1310
2006	512	1130	34.3	75.7	1.67	3.68	548	1210
2007	468	1030	32.9	72.6	1.04	2.29	502	1110
2008	434	956	32.5	71.7	1.08	2.39	467	1030
2009	378	833	31.9	70.4	1.23	2.71	411	906
2010	309	682	29.2	64.3	0.967	2.13	340	749
2011	351	774	34.8	76.7	1.16	2.56	387	853
2012	285	629	31.8	70.2	0.975	2.15	318	701
2013	233	513	27	59.6	0.736	1.62	261	574
Total or Avg	**6680**	**14700**	**469**	**1030**	**20**	**44.1**	**7170**	**15800**

(b) Off-Site Containment well

YEAR	TCE (kg)	TCE (lb)	DCE (kg)	DCE (lb)	TCA (kg)	TCA (lb)	Total (kg)	Total (lb)
1998	1.31	2.88	0.03	0.0661	0	0	1.34	2.95
1999	358	788	16.2	35.7	0	0	374	824
2000	463	1020	23.3	51.4	0	0	486	1070
2001	519	1140	26.6	58.7	0	0	546	1200
2002	543	1200	30.9	68.2	2.05	4.52	576	1270
2003	568	1250	31.6	69.7	2.064	4.55	602	1330
2004	567	1250	31.7	69.8	1.97	4.34	600	1320
2005	540	1190	32.4	71.3	1.79	3.95	574	1270
2006	499	1100	32.6	71.8	1.576	3.47	533	1170
2007	456	1010	31.5	69.4	1.037	2.29	489	1080
2008	425	937	31.5	69.4	1.083	2.39	458	1010
2009	372	820	31.2	68.7	1.231	2.71	404	892
2010	305	673	28.6	63.1	0.967	2.13	335	738
2011	348	766	34.4	75.8	1.163	2.56	383	845
2012	283	623	31.6	69.6	0.975	2.15	315	695
2013	231	509	26.8	59.2	0.736	1.62	259	570
Total or Avg	**6480**	**14300**	**441**	**972**	**16.641**	**36.7**	**6930**	**15300**

(c) Source Containment Well

YEAR	TCE (kg)	TCE (lb)	DCE (kg)	DCE (lb)	TCA (kg)	TCA (lb)	Total (kg)	Total (lb)
2002	59.6	131	9.66	21.3	1.61	3.56	70.9	156
2003	48.7	107	6.53	14.4	0.989	2.18	56.2	124
2004	28.9	63.7	3.56	7.85	0.464	1.02	32.9	72.5
2005	18.1	39.9	2.28	5.03	0.218	0.481	20.6	45.4
2006	13.8	30.5	1.74	3.84	0.0933	0.206	15.7	34.6
2007	11.6	25.6	1.45	3.19	<0.05	<0.1	13	28.8
2008	8.42	18.6	1.04	2.29	<0.05	<0.1	9.46	20.9
2009	5.91	13	0.763	1.68	<0.05	<0.1	6.68	14.7
2010	4.3	9.48	0.573	1.26	<0.05	<0.1	4.87	10.7
2011	3.52	7.75	0.413	0.911	0	0	3.93	8.66
2012	2.53	5.58	0.289	0.638	0	0	2.82	6.22
2013	1.54	3.4	0.17	0.375	0	0	1.71	3.77
Total or Avg	**207**	**456**	**28.5**	**62.8**	**3.38**	**7.45**	**239**	**526**