TETRA TECH

October 28, 2011

Maryland Square Shopping Center, LLC
Herman Kishner Trust
c/o Mr. Tom Vandenburg
Dongell Lawrence Finney LLP
707 Wilshire Boulevard, Suite 4500
Los Angeles, California 90017

RE: **GROUNDWATER MONITORING REPORT – 3RD QUARTER 2011**
MARYLAND SQUARE PCE SITE
3661 SOUTH MARYLAND PARKWAY
LAS VEGAS, NEVADA
FACILITY ID NO. H-000086

Dear Mr. Vandenburg:

Enclosed please find one copy of the 3rd Quarter 2011 Groundwater Monitoring Report for the above referenced project. This report is being provided to the Nevada Division of Environmental Protection Bureau of Corrective Action (NDEP BCA) in both hard copy and electronic Adobe Acrobat format on this date, October 28, 2011.

Per comment 2b in NDEP's letter, dated September 22, 2011, on the 2nd Quarter Groundwater Monitoring Report, the incorrect entry in input data for statistical analysis for MW-11, has been corrected. Given that MW-11 has never had detections of PCE, the Air Force Center for Environmental Excellence (AFCEE) Monitoring and Remediation Optimization System Software (MAROS) is not including MW-11's data in its analysis and summary. In addition, Tetra Tech reviewed all data that was being input to MAROS and found a few incorrect data entries, where the reporting limit was listed as the PCE detection. These inaccurate entries have been corrected, and have impacted some of the trends reported in these wells.

Water levels in two wells (MW-12 and MW-17) could not be collected due to the ingoing soil corrective action. Should you have questions or require additional information, please do not hesitate to contact me or Robert Manriquez, Program Manager, at 619.321.6748. Thank you for your time and consideration in this matter.

Regards,

Tamara Pelham
Project Manager
CEM No. 1537, Exp. Sept. 11, 2012
Class A 60505

Enclosure(s) (1) 3rd Quarter 2011 Groundwater Monitoring Report

Dist: 1/Addressee
1/NDEP, Carson City, NV, Attn: Ms. Mary Siders
1/General Growth Properties, Inc., Attn: Ms. Lynne Stella

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QUARTERLY GROUNDWATER MONITORING REPORT

3RD QUARTER 2011

MARYLAND SQUARE PCE SITE

3661 SOUTH MARYLAND PARKWAY

LAS VEGAS, NEVADA

SUBMITTED TO

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
901 SOUTH STEWART STREET, SUITE 4001
CARSON CITY, NEVADA 89701-5249

PREPARED FOR

HERMAN KISHNER TRUST C/O
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OCTOBER 28, 2011

SIGNATURE PAGE

QUARTERLY GROUNDWATER MONITORING REPORT
3rd Quarter 2011
Maryland Square PCE Site
3661 South Maryland Parkway
Las Vegas, Nevada

For the services provided and described in this document, the following language is from NAC 459:

> *I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, state and local statutes, regulations and ordinances.*

October 28, 2011

Tamara Pelham
Project Manager
Nevada Certified Environmental Manager
CEM # 1537, Exp. September 11, 2012

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ABBREVIATIONS AND ACRONYMS

° C	Degrees Celsius
AFCEE	Air Force Center for Environmental Excellence
amsl	Above mean sea level
APTC	Al Phillips the Cleaner
ASTM	American Society for Testing and Materials (ASTM International)
bgs	Below ground surface
COC	Chain of custody
Converse	Converse Consultants
COV	Coefficient of Variation
D	Decreasing
DO	Dissolved oxygen
EPA	U.S. Environmental Protection Agency
H_0	Null hypothesis
HCl	Hydrochloric acid
HRC	Hydrogen release compound
I	Increasing
L/min	Liters per minute
MAROS	Monitoring and Remediation Optimization System Software
MCL	Maximum Contaminant Level
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
$\mu g/m^3$	Micrograms per cubic meter
µS/cm	MicroSiemens per centimeter
mg/L	Milligrams per liter
mL	Milliliter
mL/min	Milliliters per minute
MSSC	Maryland Square Shopping Center
mV	Millivolt
MW	Monitoring well
NA	Not applicable
ND	Not detected
NDEP	Nevada Division of Environmental Protection
NT	No trend
NM	Not measured
NS	Not sampled
NTU	Nephelometric Turbidity Units
ORP	Oxidation-reduction potential
PCE	Tetrachloroethene
ppb	Parts per billion
PRG	Preliminary Remediation Goal
PD	Probably decreasing
PI	Probably increasing
PQL	Practical quantitation limit
RPD	Relative Percent Difference
RSL	Regional Screening Level

ABBREVIATIONS AND ACRONYMS (continued)

S	Mann-Kendall statistic value
SC	Specific conductance
SU	Standard Unit
SVB	Soil vapor boring
Tetra Tech	Tetra Tech EM Inc.
TCE	Trichloroethene
Trust	Herman Kishner Trust
URS	URS Corporation
VOC	Volatile organic compound

1.0 INTRODUCTION

This Quarterly Groundwater Monitoring Report was prepared on behalf of the Herman Kishner Trust (Trust) for the Maryland Square PCE Site. The former Maryland Square Shopping Center (MSSC) was located at 3661 South Maryland Parkway, Las Vegas, Nevada (Property). The quarterly report is being submitted to the State of Nevada, Division of Environmental Protection (NDEP), to document the results of third quarter 2011 groundwater monitoring conducted from September 29 and 30, 2011. Groundwater monitoring in the third quarter 2011 was conducted in general accordance with established protocol[1] and included acquisition of data at the following 11 of the 33 monitoring wells associated with the property:

- MW-18, MW-19, MW-20, MW-23, MW-25, MW26, MW-27, MW-30, MW-31, MW-32, and MW-33

Summarized results include groundwater elevation data and graphic interpretation, current and historical groundwater concentrations of tetrachloroethene (PCE), and data analysis using nonparametric and linear regression statistical methods.

1.1 SITE DESCRIPTION

The property location is shown on Figure 1. The property was developed as a shopping center, which previously had included a dry cleaning facility, Al Phillips the Cleaner (APTC). For descriptive purposes, the Property includes the former APTC site. Associated properties include the downgradient Boulevard Mall, residential neighborhood, and golf course east of MSSC, collectively referenced as "the Site."

1.2 BACKGROUND

The following chronology summarizes the technical development of the MSSC site characterization and groundwater monitoring program:

November 2000: ***Phase II Assessment Report,*** dated November 28, 2000, and received by NDEP on July 25, 2001.

As the result of a property transaction, subsurface soil and groundwater conditions were investigated along the eastern boundary of the property by advancing one soil boring and converting it into a monitoring well (MW-1). Analysis of water samples collected from well MW-1 confirmed PCE concentrations in groundwater at the property exceeded the established U.S. Environmental Protection

[1] Nevada Division of Environmental Protection (NDEP). 2004. Letter requesting quarterly groundwater monitoring. From Shannon Harbour. To Randall Jackson, DCI Management Group, Ltd. December 16.

NDEP. 2007. Letter concurring with change to low flow (micro-purge) sampling of Maryland Square monitoring wells. From Mary A. Siders. To Randall Jackson, DCI Management Group, Ltd. September 10.

NDEP. 2010. Letter commenting on 4th Quarter 2009 Groundwater Monitoring Report and reiterating groundwater monitoring schedule. From Mary A. Siders. To Bryan Garrie, Herman Kishner Trust and Maryland Square Shopping Center, LLC. February 10.

NDEP. 2010. Letter commenting on the 1st Quarter 2010 Groundwater Monitoring Report and adding MW-11 to the monitoring schedule. From Mary A. Siders. To. Mr. Tim Swickard, Dongell, Lawrence, Finney, LLP and the Maryland Square Shopping Center, LLC. June 10.

NDEP. 2010. Letter commenting on the 2nd Quarter 2010 Groundwater Monitoring Report and indicating MW-11 should be monitored in the 4th quarter. From Mary A. Siders. To. Mr. Tim Swickard, Dongell, Lawrence, Finney, LLP and the Maryland Square Shopping Center, LLC. September 10.

Agency (EPA) primary maximum contamination level (MCL) for PCE in drinking water of 5.0 micrograms per liter (µg/L) or parts per billion (ppb).

November 2000: ***Spill Report,*** telephone spill notification made November 29, 2000, and received and logged by NDEP on November 29, 2000.

Based on preliminary results obtained from the Phase II field investigation, a spill notification was called into NDEP and a spill report was recorded.

August 2001: ***A through K Report,*** dated August 22, 2001, and received by NDEP on September 11, 2001.

Per NDEP requirements, downgradient subsurface soil and groundwater conditions were investigated by advancing five additional soil borings in the vicinity of the Boulevard Mall parking garage and converting the borings into monitoring wells (MW-2 through MW-6). Groundwater samples collected from these wells exhibited concentrations of PCE and trichloroethene (TCE) exceeding 5 µg/L, which is the primary MCL for both compounds.

November 2002: ***Additional Soil and Groundwater Investigation Report,*** dated November 13, 2002, and received by NDEP on November 18, 2002**.**

Converse Consultants (Converse) completed an additional soil and groundwater investigation beneath the shopping center building located on the property and on the Boulevard Mall property. Five soil samples were collected from beneath the suite previously occupied by the dry cleaning facility. PCE was detected in four of these five soil samples at concentrations of 110 micrograms per kilogram (µg/kg) or ppb (in two samples), 170 µg/kg, and 15,000 µg/kg. At that time, the EPA Preliminary Remediation Goal (PRG) for PCE in industrial soil was 3,400 ppb, which was the concentration threshold used to compare and screen investigation samples. PRGs have now been superseded by Regional Screening Levels (RSL), which are updated and revised biennially in even-numbered years.

Additionally, six groundwater monitoring wells were installed (MW-7 through MW-12) on the property and on the Boulevard Mall property. This additional investigation (1) indicated the presence of PCE in soil beneath the shopping center building, (2) established a lateral PCE boundary location upgradient on the property (MW-12), and (3) established the lateral extent of PCE-contaminated groundwater north of MW-3 on the Boulevard Mall property.

May 2003: ***Additional Soil and Groundwater Investigation Report,*** dated May 16, 2003, and received by NDEP May 16, 2003.

An additional well (MW-13) was installed on the Boulevard Mall property to evaluate the extent of PCE-contaminated groundwater to the northeast. The boring for well MW-13 was drilled to 29 feet below ground surface (bgs), the water level was measured at 17.25 feet bgs, and a soil sample was collected from the vadose zone at 14 feet bgs. This soil sample contained PCE at a concentration of 45 µg/kg. The groundwater sample collected at this location exhibited a PCE concentration of 2,100 µg/L.

March 2004: ***Well Installation/Slug Testing/Groundwater Monitoring Report – 4th Quarter 2003 and 1st Quarter 2004,*** dated March 26, 2004, and received by NDEP March 26, 2004.

Subsurface soil conditions were explored by advancing eight soil borings and converting six of the borings into monitoring wells (MW-14 through MW-16 and MW-19 through MW-21). Groundwater

samples collected at these locations in January 2004 exhibited dissolved PCE that ranged in concentration from below detection limits (MW-16) to 1,200 µg/L (MW-19).

During the same period, slug tests were performed on seven monitoring wells (MW-2, MW-3, MW-13, MW-15, MW-16, MW-19, and MW-20) to obtain hydraulic parameters required for designing a hydrogen release compound (HRC) groundwater treatment system. Hydraulic conductivities derived using the Bouwer-Rice method ranged from 1.9 to 17 feet per day, while those derived via the Hvorslev Method ranged from 0.8 to 6.4 feet per day.

February 2004: ***Correspondence from Dickerson, Dickerson, Consul & Pocker,*** dated February 27, 2004, and received by NDEP March 1, 2004.

APTC accepted responsibility for the release and assumed control of assessment activities from the Trust, after which all site characterization and monitoring work was conducted by URS Corporation (URS). During this time, Converse was retained to review documents prepared by URS on behalf of the Trust.

June 2005: ***Report – Subsurface Investigation June 2005,*** dated July 2005 and received by NDEP on July 11, 2005.

URS completed an additional soil and groundwater investigation and an investigation of the soil beneath the shopping center building located on the property. Seven soil borings (B-5 through B-12) were advanced at locations within the suite previously occupied by the dry cleaning facility. Soil samples were collected at 5-foot intervals from borings B-6 through B-10 to a total depth of 15 feet bgs, and at 2.5 and 3.5 feet bgs at boring locations B-11 and B-12. Three soil samples collected at B-8 (5 feet bgs) and B-10 (10 and 15 feet bgs) contained PCE concentrations above the industrial PRG (relevant at that time) of 3,400 ppb. In addition, five groundwater monitoring wells were installed on the property and in the residential neighborhood east of the Boulevard Mall (MW-17, MW-18, and MW-22 through MW-24).

April 2006: ***Report – Quarterly Groundwater Sampling and Additional Monitor Well Installation,*** dated April 25, 2006, and received by NDEP on April 27, 2006.

Two additional groundwater monitoring wells (MW-26 and MW-27) were installed in March 2006 at locations representing the eastern end of the residential neighborhood. PCE concentrations of 730 and 220 µg/L in groundwater were observed at wells MW-26 and MW-27. TCE concentrations were reported to be below method detection limits.

February 2007: ***Source Area Soil Assessment,*** dated February 23, 2007.

URS advanced 17 soil borings at the property to collect and analyze additional subsurface soil samples to refine the source area soil assessment. The report compiled analytical data profiling 24 soil samples collected from 12 borings advanced within the source area in 2002 and 2005, with new analytical data generated from 53 soil samples collected at 17 additional boring locations cited within the source area. A total of 77 subsurface soil data points representing conditions within the source area at MSSC were considered for assessment of soil in the source area, and URS proposed a remedial method, schedule, and site-specific cleanup level based on the examination of the derived data population.

April 2007: ***Report of Off-Site Soil Vapor Assessment,*** dated April 13, 2007.

In March 2007, URS conducted an off-site soil vapor study in the Boulevard Mall parking lot and select locations in the residential area east of the mall. Soil vapor concentrations measured at total depth reportedly ranged from below method detection limits at soil vapor boring (SVB)-2, and 11 to 170,000 micrograms per cubic meter (µg/m^3) at SVB-14.

September 2007: **Correspondence Issued from NDEP, dated September 10, 2007.**

Groundwater sampling procedures were changed for the project from a three volume purge-and-sample method to low-flow sampling using ASTM International (ASTM) D6771-02.

November 2007: ***Installation of Downgradient Groundwater Monitoring Wells,*** dated November 26, 2007.

URS installed three monitoring wells (MW-28 through MW-30) within the residential area in October 2007. These wells expanded the groundwater monitoring network farther to the eastern and south-southeastern portions of the residential area. PCE concentrations in groundwater samples collected from these new wells ranged from 2.5 µg/L at monitoring well location MW-29 to 74 µg/L at monitoring well location MW-30. TCE concentrations were reported to be below method detection limits.

March 2008: ***Installation of Additional Downgradient Groundwater Monitoring Wells,*** dated March 24, 2008.

URS constructed three additional groundwater monitoring wells (MW-31 through MW-33), two of which bounded the east portion of the residential area, and the third bounded the east-northeast portion of the residential area. PCE concentrations in groundwater samples collected from these new wells ranged from 2.4 µg/L at monitoring well location MW-33 to 720 µg/L at monitoring well location MW-32. TCE concentrations were reported to be below method detection limits.

July 2008: ***Notice of Hearing to Consider First Day of Pleadings (Chapter 11),*** undated and received by NDEP on July 8, 2008.

APTC declared bankruptcy and URS discontinued work at the property. Converse, on behalf of the Trust, resumed quarterly monitoring, supported the litigation work, and prepared a remediation scope of work.

July 2010: ***Quarterly Groundwater Monitoring Report – 2nd Quarter 2010,*** dated July 23, 2010, and received at NDEP electronically on July 23, 2010.

Field activities and responsibilities were transferred from Converse to Tetra Tech EM Inc. (Tetra Tech) during the second quarter of 2010. Groundwater monitoring protocol and procedures used by Converse and accepted by NDEP were generally continued to maintain data consistency.

October 2010: ***Quarterly Groundwater Monitoring Report – 3rd Quarter 2010,*** dated October 22, 2010, and received at NDEP electronically on October 22, 2010; resubmitted with NDEP-requested modifications December 21, 2010.

December 2011 ***Permanent Injunction Governing the Clean Up of Hazardous Substances at and Emanating from Maryland Square Shopping Center,*** dated December 27, 2010.

The injunction dictated the schedule for remediation of the source area and groundwater at the site. It also decreed that groundwater monitoring should continue based on the previously defined NDEP schedule.

January 2011: ***Quarterly Groundwater Monitoring Report – 4rd Quarter 2010,*** dated January 21, 2011, and received at NDEP electronically on January 21, 2011.

February 2011 ***Draft Plan for Mitigation of Indoor Air and Well Water,*** dated February 28, 2011 and received at NDEP electronically on February 28, 2011.

This work plan describes indoor air monitoring and additional groundwater characterization required by the permanent injunction to delineate the PCE plume to 5 µg/L.

April 2011: ***Quarterly Groundwater Monitoring Report – 1st Quarter 2011,*** dated April 20, 2011, and received at NDEP electronically on April 20, 2011.

June 2011 ***Draft Plan for Mitigation of Indoor Air and Well Water,*** dated June 28, 2011, and received at NDEP electronically on April 20, 2011.

This work plan incorporated NDEP comments on the previously submitted draft.

July 2011 ***Quarterly Groundwater Monitoring Report – 3rd Quarter 2011,*** dated July 28, 2011, and received at NDEP electronically on July 28, 2011.

August 2011 ***Addendum to the Draft Work Plan for Mitigation of Indoor Air and Well Water***, dated August 15, 2011, and received at NDEP electronically on August 15, 2011.

This addendum incorporated NDEP comments on the previously submitted draft.

2.0 GROUNDWATER MONITORING AND SAMPLING

The following sections specify the groundwater sampling schedule, describe the sampling procedure, present groundwater elevation data, and summarize analytical results.

2.1 SAMPLING SCHEDULE

Based on the observed site conditions, NDEP has directed monitoring of the site-related groundwater monitoring well network as outlined in its response letter to the Converse report titled "Groundwater Monitoring Report, 3rd Quarter 2009, Maryland Square Shopping Center," dated December 22, 2009 (NDEP 2009). The quarterly monitoring schedule was also reiterated to Tetra Tech by NDEP in February, June, and September 2010[2].

Currently, the groundwater monitoring network consists of 33 monitoring wells, of which one well (MW-4) is to be abandoned. Communications between NDEP and the Trust concluded that well MW-4 is no longer fit for sampling because of an obstruction and should be properly abandoned. Monitoring well MW-4 is therefore no longer sampled as part of this program.

Based on the accepted schedule for the third-quarter sampling event, which prescribes sampling at 11 site-related active monitoring wells, each well was sampled to record groundwater characteristics and quantify volatile organic compound (VOC) concentrations. Depth-to-water measurements were collected at all active monitoring well locations.

As per agreement with NDEP, select monitoring wells are sampled on a quarterly, semi-annual, or annual basis. The sampling schedule is based on the relative PCE concentrations detected in individual monitoring wells in addition to the proximity of a monitoring well to the ascertained plume area. The annual sampling schedule for monitoring wells included in the groundwater monitoring program is:

- First Quarter – MW-18, MW-19, MW-20, MW-23, MW-25, MW-26, MW-27, MW-30, MW-31, MW-32, and MW-33
- Second Quarter – MW-1, MW-2, MW-5, MW-6, MW-9, MW-13, MW-14, MW-17, MW-18, MW-19, MW-20, MW-23, MW-25, MW-26, MW-27, MW-28, MW-29, MW-30, MW-31, MW-32, and MW-33
- Third Quarter – MW-18, MW-19, MW-20, MW-23, MW-25, MW26, MW-27, MW-30, MW-31, MW-32, and MW-33
- Fourth Quarter – MW-1 through MW-33 (well MW-4 was discontinued from the analytical program due to an obstruction).

[2] NDEP. 2010. Letter commenting on 4th Quarter 2009 Groundwater Monitoring Report and reiterating groundwater monitoring schedule. From Mary A. Siders. To Bryan Garrie, Herman Kishner Trust and Maryland Square Shopping Center, LLC. February 10.

NDEP. 2010. Letter commenting on the 1st Quarter 2010 Groundwater Monitoring Report and adding MW-11 to the monitoring schedule. From Mary A. Siders. To. Mr. Tim Swickard, Dongell, Lawrence, Finney, LLP and the Maryland Square Shopping Center, LLC. June 10.

NDEP. 2010b. Letter commenting on the 2nd Quarter 2010 Groundwater Monitoring Report and indicating MW-11 should be monitored in the 4th quarter. From Mary A. Siders. To. Mr. Tim Swickard, Dongell, Lawrence, Finney, LLP and the Maryland Square Shopping Center, LLC. September 10

2.2 SAMPLING PROCEDURE

Groundwater monitoring procedures are consistent with the protocol presented by URS in its August 2007 (URS 2007) letter and accepted by NDEP in its September 10, 2007, letter (NDEP 2007). The prescribed groundwater monitoring protocol used at the site was revised to employ the ASTM D6771-02 method in the fourth quarter of 2007. This sampling method relies on low-flow pumping that moderates the velocity of water entering the pump intake from the formation pore water surrounding the well. Minimized stress and turbulence within the water-bearing unit during pumping allows collection of groundwater samples generally considered more representative of water quality in the formation than the conventional method, which calls for evacuation of three well volumes of groundwater using downhole pumps or bailers.

Typically, pumping flow rates of 0.1 to 0.5 liters per minute (L/min) are used to control groundwater entrance velocity through the well screen, which promotes laminar flow while minimizing turbulence within the well and surrounding formation. The optimum flow rate of 0.25 L/min has been established for the wells at this site based on previous assessments of water level drawdown while wells were purged at different rates.

Water quality parameter measurements were obtained while each well was purged, including pH, temperature, specific conductance (SC), dissolved oxygen (DO), turbidity, and oxidation-reduction potential (ORP). Groundwater samples collected after these water quality parameters have stabilized during the purge procedure are considered representative of the surrounding formation. Criteria defining stabilized water quality parameters, as indicated by the relative change between iterative readings, are:

pH: ±0.2 Standard Unit (SU)

Specific conductance: ±3% microSiemens per centimeter (µS/cm)

Temperature: ±0.2 degrees Celsius (° C)

DO: ±10% or ± 0.2 milligrams per liter (mg/L), whichever is greater

ORP: ±20 millivolts (mV)

Turbidity: ±10% Nephelometric Turbidity Units (NTU)

Water level measurements were recorded before sampling procedures began at the 11 wells scheduled for sampling to establish unaltered groundwater elevations prior to sampling. After groundwater parameters stabilized during the low-flow purging process, groundwater samples were pumped through isolated and dedicated tubing directly into laboratory-prepared, 40-milliliter (mL) glass vials preserved with hydrochloric acid (HCL). Each sample was secured with Teflon-lined lids, labeled, placed on ice in an insulated cooler, and logged on a chain-of-custody (COC) form. Samples remained in the possession and direct control of field personnel until they were transferred to the analytical laboratory. Groundwater samples were subsequently transported to Advanced Technology Laboratories, Inc. (NDEP Certification No. NV009222007A/-008A) for VOC analysis according to EPA Method 8260B.

Decontamination procedures were performed throughout sampling. The pump, water level meter, and field meter probe were decontaminated after sampling at each well. Purge water and decontamination water was placed in a 55-gallon drum, properly labeled, and stored at the former APTC facility pending off-site disposal.

2.3 GROUNDWATER ELEVATIONS

Groundwater elevations for this sampling event are summarized in Table 1, while historical groundwater data are summarized in Table A-1 under Appendix A. Depths to groundwater in wells sampled during this quarterly event ranged from 13.61 feet bgs at well MW-18 to 28.36 feet bgs at MW-16. Groundwater elevation contours are depicted on Figure 2. Based on the third-quarter results, the local hydraulic gradient across the site (the property and associated properties) is calculated at 0.0138 and is generally toward the east.

2.4 ANALYTICAL RESULTS SUMMARY

PCE was present in 10 of 11 wells sampled at concentrations ranging from 25 to 1,300 ppb. TCE was present in 8 of 11 wells sampled at concentrations ranging from 0.6 to 3.6 ppb. Figure 3 is an aerial map illustrating PCE concentrations and contours generated using data obtained during the fourth quarter of 2010 and the second and third quarters of 2011.

Table 2 summarizes the current analytical results for PCE and daughter products. Analytical results compiled for each well location are in Table A-2, Appendix A. Copies of final laboratory analytical reports are included in Appendix B and copies of field sampling forms are compiled in Appendix C.

Laboratory analysis of each groundwater and field quality control sample produced quantitative data within quality assurance standards. Surrogate compound recoveries associated with each field sample consistently verified proper analytical technique.

No laboratory quality control data were flagged outside of established tolerances. Therefore, the analytical data on water quality for the second quarter were accepted as representative of actual site conditions.

Table 3 summarizes comparable water quality data obtained in the second and third quarters of 2011, in conjunction with a qualitative indication of overall increase or decrease in groundwater elevation. This presentation provides a discrete frame of reference and context that can be used to gauge fluctuations in groundwater characteristics at monitored locations.

Table 1
Groundwater Elevations, Third Quarter 2011

Well ID	Top of Casing Elevation (feet amsl)	3rd Quarter Depth to Groundwater (feet)	Groundwater Elevation (feet amsl)
MW-1	1992.01	19.85	1972.16
MW-2	1983.97	19.11	1964.86
MW-3	1984.41	20.45	1963.96
MW-5	1989.15	19.19	1969.96
MW-6	1989.03	20.30	1968.73
MW-7	1990.22	18.02	1972.20
MW-8	1994.22	20.27	1973.95
MW-9	1992.25	19.99	1972.26
MW-10	1983.78	21.75	1962.03
MW-11	1980.21	27.45	1952.76
MW-12	1996.48	NM*	NM*
MW-13	1984.18	18.64	1965.54
MW-14	1987.86	18.74	1969.12
MW-15	1983.25	16.18	1967.07
MW-16	1980.61	28.36	1952.25
MW-17	1990.89	NM*	NM*
MW-18	1962.86	13.61	1949.25
MW-19	1980.24	27.68	1952.56
MW-20	1979.95	27.56	1952.39
MW-21	1979.54	26.67	1952.87
MW-22	1974.75	27.87	1946.88
MW-23	1962.29	17.67	1944.62
MW-24	1960.73	15.31	1945.42
MW-25	1960.73	20.83	1939.90
MW-26	1953.48	19.04	1934.44
MW-27	1944.23	20.23	1924.00
MW-28	1942.96	14.93	1928.03
MW-29	1932.25	13.84	1918.41
MW-30	1940.56	21.28	1919.28
MW-31	1937.93	18.73	1919.20
MW-32	1952.82	20.91	1931.91
MW-33	1950.92	19.31	1931.61j

Notes:
* Due to soil corrective action occurring on the Property, MW-12 and MW-17 were inaccessible.
amsl Above mean sea level
MW Monitoring well

Table 2
Groundwater Analytical Results, Third Quarter 2011

WELL ID	DATE SAMPLED	PCE (µg/L)	TCE (µg/L)	*cis*-1,2-Dichloroethene (µg/L)	Vinyl Chloride (µg/L)
		MCL 5.0 µg/L	MCL 5.0 µg/L	MCL 70 µg/L	MCL 2.0 µg/L
MW-18	9/30/2011	1,300	3.2	ND	ND
MW-19	9/30/2011	950	3.6	ND	ND
MW-20	9/30/2011	680	1.8	ND	ND
MW-23	9/30/2011	1,000	2.4	ND	ND
MW-25	9/30/2011	680	0.8	ND	ND
MW-26	9/30/2011	780	0.6	ND	ND
MW-27	9/29/2011	470	1.3	ND	ND
MW-30	9/29/2011	25	ND	ND	ND
MW-31	9/29/2011	57	ND	ND	ND
MW-31D	9/29/2011	67	ND	ND	ND
MW-32	9/30/2011	610	1.9	ND	ND
MW-33	9/29/2011	ND	ND	ND	ND

Notes: MW-31D is a duplicate sample.
MCL Maximum Contaminant Level
MW Monitoring Well
PCE Tetrachloroethene
TCE Trichloroethene
µg/L Micrograms per liter
ND Not detected (above the practical quantitation limit of 0.5 µg/L)

Table 3
Groundwater Analytical Results
Second and Third Quarters 2011

	Second Quarter 2011 Data (June 14-16, 2011)		Third Quarter 2011 Data (September 29-30, 2011)		Net Change in Groundwater Elevation
WELL ID	PCE (µg/L)	TCE (µg/L)	PCE (µg/L)	TCE (µg/L)	(2nd versus 3rd Quarter 2011)
MW-18	1,300	2.9	1,300	3.2	-
MW-19	1,000	3.5	950	3.6	-
MW-20	740	1.9	680	1.8	-
MW-23	970	2.3	1,000	2.4	-
MW-25	700	0.8	680	0.8	-
MW-26	860	0.7	780	0.6	-
MW-27	440	1.3	470	1.3	-
MW-30	50	ND	25	ND	-
MW-31	64	ND	57 (67)	ND	-
MW-32	790	2.3	610	1.9	-
MW-33	ND	ND	ND	ND	-

Notes:

MW Monitoring Well
ND Not detected (above the practical quantitation limit of 0.5 µg/L)
NS Not sampled
NM Not measured
PCE Tetrachloroethene
TCE Trichloroethene
µg/L Micrograms per liter
- Decreased groundwater elevation in third quarter 2011 compared with second quarter, 2011,
+ Increased groundwater elevation in third quarter 2011 compared with second quarter, 2011

3.0 DISCUSSION

The groundwater locations selected for quarterly monitoring represent groundwater conditions at the source area, east and west of Boulevard Mall, adjacent to and beneath the residential neighborhood, and western portions of the adjacent golf course. The range of groundwater elevations spanned from 1918.41 feet above mean sea level (amsl) at monitoring well location MW-29 to 1973.95 feet amsl at monitoring well location MW-8 (Table 1).

Groundwater elevations rose on the western side of Boulevard Mall and fell on the eastern side of Boulevard Mall compared with the second quarter (July) 2011 data. The third quarter groundwater gradient of 0.0138 vertical foot per horizontal foot, with a flow direction generally toward the east (Figure 2), is fairly consistent with groundwater gradients measured in the second quarter of 2011 of 0.0131. Application of a large volume of irrigation water at the golf course, especially during the summer months, may influence water elevation in shallow groundwater (which can exhibit a pronounced seasonal periodicity in wells near the golf course).

Measured PCE concentrations were above the practical quantitation limit (PQL) of 0.5 µg/L at 10 of the 11 well locations sampled and ranged from 25 to 1,300 µg/L. PCE was not detected at well MW-33. TCE was present in 8 of 11 wells sampled at concentrations ranging from 0.6 to 3.6 ppb (Table 2). A duplicate sample was collected at MW-31. In MW-31, concentrations of PCE were measured at 57 µg/L and 67 µg/L, a relative percent difference (RPD) of 15%. TCE was not detected in duplicate samples. The calculated RPD is within the acceptable range for duplicate samples. Figure 3 depicts the distribution of PCE concentrations rendered from the third quarter 2011, combined with prior data for those wells not sampled collected during the fourth quarter 2010 and second quarter 2011. Concentrations are illustrated by a series of contour intervals down to a threshold value of 5 µg/L. Table 3 shows the differences in concentration between second and third quarters 2011.

Mann-Kendall and Linear Regression Statistical Analyses

Tetra Tech conducted statistical trend analyses using Air Force Center for Environmental Excellence (AFCEE) Monitoring and Remediation Optimization System Software (MAROS). Statistical output from the MAROS software includes, but is not limited to, linear regression and Mann-Kendall statistics summaries presenting the results of parametric and nonparametric statistical test methods.

The linear regression analysis is intended to identify the trend in data through estimation of the log slope, to place confidence limits on the log slope of the trend (the fit of predicted values to observed values), and to determine the standard error of the slope (standard deviation). Positive log slopes indicate an increase in constituent concentrations over time, whereas negative values indicate a decrease in constituent concentrations over time. The coefficient of variation (COV) is the statistical measure of how the individual data points vary about the mean value. Values less than 1.00 indicate data are relatively clustered about the mean value, while values larger than 1.00 indicate a greater degree of scatter. The confidence in trend is the statistical probability that the constituent concentration is increasing (ln slope >0) or decreasing (ln slope <0).

The Mann-Kendall test is a non-parametric statistical procedure for analyzing trends in data over time and is suitable for analyzing data that do not follow a normal distribution and that may include irregular sampling intervals and missing data. Results of non-parametric test methods are not biased by the overall magnitude of outlier data points, but depend on the ranking of individual data points against the null hypothesis (H_0), which is that "there is no trend." Positive Mann-Kendall statistic values (S) indicate an increase in constituent concentrations over time, whereas negative values indicate decreasing

concentrations. Larger positive or negative values indicate the strength or relative confidence in the trend.

The MAROS Mann-Kendall decision matrix is defined as follows:

Mann-Kendall Statistic (S)	Confidence in Trend (%)	Concentration Trend
S > 0	> 95%	Increasing (I)
S > 0	90 – 95%	Probably Increasing (PI)
S > 0	< 90%	No Trend (NT)
S ≤ 0	< 90% and COV ≥ 1	No Trend (NT)
S ≤ 0	< 90% and COV< 1	Stable
S < 0	90 – 95%	Probably Decreasing (PD)
S < 0	95%	Decreasing

The Linear Regression decision matrix is defined as follows

	Log Slope (Ln Slope)		
Confidence in Trend (%)	Positive	Negative	
< 90%	No Trend	COV < 1 COV > 1	Stable No Trend
90% - 95%	Probably Increasing	Probably Decreasing	
> 95%	Increasing	Decreasing	

Using the Mann-Kendall statistical test using the most recent data, PCE concentrations were:

Status:	**Monitoring Well Locations:**
Increasing (I) at:	MW-5, MW-6, and MW-27
Stable at:	MW-7, MW-8, MW-19, MW-29, MW-31, and MW-33
Probably Decreasing (PD) at:	MW-15, MW-26, MW-28, MW-32, and MW-33
Decreasing at:	MW-1, MW-2, MW-3, MW-9, MW-13, MW-14, MW-17, MW-18, MW-20, MW-21, MW-23, MW-24, MW-25, and MW-30,

Discernible trends based on data representing PCE concentrations at the remaining well locations (MW-4, MW-10, MW-12, MW-16, and MW-22) were not noted (No Trend; NT) or Not Applicable (NA) because of insufficient data. Given there were no detections reported in MW-11, it was not analyzed or reported by MAROS.

Trend assignments based on Linear Regressions indicate PCE concentrations were:

Status:	**Monitoring Well Locations:**
Increasing (I) at:	MW-5, MW-6, and MW-27
Stable at:	MW-15
Probably Decreasing (PD) at:	MW-8, MW-26, MW-28, and MW-29
Decreasing (D) at:	MW-1, MW-2, MW- 3, MW-7, MW-9, MW-12, MW-13, MW-14, MW-17, MW-18, MW-19, MW-20, MW-21, MW-23, MW-24, MW-25, MW-30, and MW-32

Discernible linear regression trends based on data representing PCE concentrations at the remaining well locations (MW-4, MW-10, MW-11, MW-16, MW-22, MW-31, and MW-33) were not noted (NT) or Not Applicable (NA) because of insufficient data. Given there were no detections reported in MW-11, it was not analyzed or reported by MAROS.

Standard deviation and COV values associated with statistical average and median concentrations at the well locations assessed suggest the data form a relatively close grouping around mean values. Summary reports for both the linear regression and Mann-Kendall analyses, as well as linear regression statistics reports that include graphed data for each well location, are included in Appendix D**.**

4.0 LIMITATIONS AND LIABILITY

Any conclusions presented in this report are professional opinions based on the data cited in this report. They are intended only for the purpose, site location, and project indicated and are based on the assumption that conditions do not deviate from those observed during our study, as described in this report. No other warranty is either expressed or implied.

Any conclusions and recommendations stated in this report are based on the sampling and testing completed for the scope of work described. Sampling and testing locations are intended to confirm the presence or absence of target contaminants at selected locations.

Contaminant levels observed may not be the highest levels present at the site. It is not the intent of this study to explore for other contaminants. Observed contaminants may change with relation to time, on-site activities, and adjacent site activities. This report represents information specific only to the time when that information was obtained.

FIGURES

APPENDIX A

HISTORICAL DATA

APPENDIX B

LABORATORY ANALYTICAL DATA

APPENDIX C

FIELD FORMS

APPENDIX D

STATISTICAL ANALYSIS REPORTS

APPENDIX E

ELECTRONIC FILES