2021

Site Monitoring Report

North
Indian Bend Wash
Superfund Site

Prepared for:

U.S. Environmental Protection Agency

Region IX

Prepared by:

NIBW Participating Companies

Issued February 28, 2022

Revised March 18, 2022

North Indian Bend Wash Superfund Site

SITE MONITORING REPORT

January - December 2021

North Indian Bend Wash Superfund Site

Scottsdale, Arizona

Issued February 28, 2022

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1 EXECUTIVE SUMMARY

The North Indian Bend Wash (NIBW) Superfund Site (Site) was listed on the Environmental Protection Agency (EPA) National Priorities List in September 1983 as a result of detection of volatile organic compounds (VOCs) in drinking water wells in south Scottsdale, Arizona. VOCs, primarily trichloroethene (TCE), entered the vadose zone and groundwater system from historical manufacturing and other industrial operations. Groundwater containment, treatment, and monitoring are conducted at the NIBW Site for the purpose of restoring groundwater for public water supply and for protecting unimpacted existing public supply wells (peripheral production wells), all within the context of effectively managing groundwater resources in Arizona.

The 2021 Site Monitoring Report (SMR) summarizes remedial activities and data collected by the NIBW Participating Companies (PCs) pursuant to compliance requirements described in the Amended Consent Decree (Amended CD). The performance evaluation is conducted pursuant to the Amended CD Statement of Work (SOW) Performance Standards and metrics outlined in the Site Groundwater Monitoring and Evaluation Plan (GM&EP).

The Site remedy was designed and is being implemented based on an understanding of the geologic framework and the groundwater flow system (also referred to as the Conceptual Site Model, or CSM). The Site remedy is driven by pumping and recharge to capture groundwater with VOCs above applicable standards at a series of extraction wells tied into treatment at five facilities. The five treatment facilities are the Central Groundwater Treatment Facility (CGTF), the NIBW Granular Activated Carbon Treatment Facility (NGTF), the Miller Road Treatment Facility (MRTF), the Area 7 Groundwater Extraction and Treatment System (Area 7 GWETS), and the Area 12 Groundwater Extraction and Treatment System (Area 12 GWETS).

There are three principal alluvial aquifer units at the Site: Upper Alluvium Unit (UAU), Middle Alluvium Unit (MAU), and Lower Alluvium Unit (LAU). Monitoring wells in these units are used to track and evaluate groundwater levels and concentrations of VOCs of concern at the Site, principally TCE, both spatially and temporally.

Most groundwater pumping in the vicinity of the Site occurs in the LAU, with a substantial contribution of groundwater pumping also occurring from wells screened in the MAU. Soil vapor extraction (SVE) at multiple locations and UAU groundwater extraction and treatment at Area 7 were conducted during the early phases of the remediation at the Site. When modeling and monitoring data indicated that the threat to groundwater at those source areas was below the Cleanup Standards, EPA approved closure of SVE operations as well as Area 7 UAU groundwater extraction. TCE groundwater concentrations are now below the Cleanup Standard in all but one of the UAU monitoring wells and UAU groundwater is approaching restoration.

The highest TCE concentrations at the Site are observed in the upper portion of the MAU. The plume area continues to be reduced over time and reductions in the higher concentration areas of the plume are most dramatic. The NIBW PCs voluntarily analyze TCE concentration changes over time using a Mann-Kendall statistical approach to determine whether wells show statistically significant trends. Trend analysis results from the 2021 evaluation are very encouraging. Statistically significant decreasing trends, stable trends, or no trends are observed at the majority of wells in all three alluvial units. Only three monitoring wells within the TCE 5 microgram per liter (µg/L) plume show a statistically significant increasing trend over the last 10 years.

Groundwater extraction and treatment in the Upper MAU is focused on containment of areas with relatively higher concentrations; currently, the highest TCE concentrations at the Site are located near Area 7 and at the Area 12 Granite Reef extraction well (Area 5B). Capture of the Area 7 MAU source includes Source Control pumping at Area 7 extraction wells which pump from the Upper MAU; and CGTF extraction wells which capture portions of the Upper MAU, Lower MAU, and LAU. The Area 12 extraction wells capture portions of both the Upper MAU and Lower MAU. Upper MAU containment is demonstrated using water level data. Remaining mass in the UAU and MAU migrates into the LAU, principally along the Western Margin, and is captured by downgradient LAU extraction wells. Capture by LAU extraction wells is demonstrated using water level data and simulated particle tracks generated using the NIBW groundwater flow model, which was updated by the PCs through a collaborative process with the NIBW Technical Committee in 2021.

Containment as required by performance standards in the Amended CD SOW was achieved both for the MAU/LAU plume and for the Source Control Programs in 2021. Most of the GM&EP performance metrics established to evaluate the remedy were also achieved in 2021, as described below.

- UAU Program: Based on the 2021 5-year running average, UAU VOC mass is decreasing with time compared to the 2020 5-year running average.
- MAU/LAU Program: The direction of groundwater movement along the periphery of MAU/LAU plume is toward either extraction wells or the Western Margin based on contoured April 2021 water level data. The lateral extent of the 5 µg/L TCE concentration contour in the MAU or LAU has not shifted more than 1,000 feet relative to the October 2001 baseline plumes, except as anticipated in the Northern LAU where the edge of the TCE plume is demonstrated to be migrating toward extraction wells tied into treatment. TCE concentrations in assigned wells were less than their associated achievement measures, with the exception of S-2LA, and PG-42LA. These wells are located in the Northern LAU where the TCE plume has shifted somewhat to the west as it

migrates toward Northern LAU extraction wells tied into treatment. Mann-Kendall trend analyses at both wells show no trends over the long-term (10-year) and decreasing trends in the more recent data set (5-year). These results indicated that TCE concentrations along the western part of the LAU plume are beginning to decline as mass migrating into the LAU along the Western Margin is reduced through MAU Source Control and the remaining mass migrates north for capture at northern extraction wells. The PCs anticipate these trends to continue.

- Northern LAU Program: The direction of groundwater movement along the Northern LAU plume periphery was toward extraction wells based on October and April 2021 water level contours and the estimated outermost extent of capture at the LAU extraction wells. Additionally, TCE concentrations in PG-42LA, PG-43LA, and PV-14 were all below 2 µg/L during the October 2021 annual monitoring round. TCE at PG-42LA was greater than 2 µg/L during the January quarterly monitoring round but otherwise less than or equal to 2 µg/L in samples collected in 2021.
- Source Control Programs: The combined 5-year running average TCE concentration metric was achieved for Area 7 but not for Area 12 indicator wells, the latter being impacted by reduced pumping at the Granite Reef well in 2020 resulting from pump replacement activities. Capture to the vicinity of PA-12MA was not demonstrated at Area 7 and capture to the vicinity of Hayden Road was achieved at Area 12.

Progress is being made toward achievement of the Remedial Action Objectives (RAOs) outlined in the Amended Record of Decision (Amended ROD). Treated water was put to beneficial use for municipal supply by the City of Scottsdale, EPCOR Water USA (EPCOR), and Salt River Project (SRP) (CGTF, MRTF, and NGTF). Treated water from Area 7 GWETS was returned to the UAU and treated water from Area 12 GWETS was delivered to SRP for irrigation use. Groundwater treatment performance standards were achieved at the five treatment facilities in 2021. The City of Scottsdale completed construction and began testing of a new treatment plant designed to address inorganic compounds unrelated to the Site in 2021. Thomas Groundwater Treatment Facility (TGTF) will be commissioned in early 2022 and will allow the City of Scottsdale to better balance the needs of the NIBW remedy with increasing concentrations of inorganics.

2 DOCUMENT CONTENT & PURPOSE

The 2021 Site Monitoring Report (SMR) summarizes remedial activities performed and data collected by the North Indian Bend Wash (NIBW) Participating Companies (PCs) (which include Motorola Solutions, Inc., Siemens, and GlaxoSmithKline) pursuant to the Amended Consent Decree (Amended CD), CV-91-1835-PHX-FJM, entered by the U.S. District Court for the District of Arizona on June 5, 2003. A detailed summary of the components and work requirements of the remedial action program can be found in the Record of Decision Amendment – Final Operable Unit (OU), Indian Bend Wash Area (Amended ROD), dated September 27, 2001, and Statement of Work (SOW), Appendix A to the Amended CD. An organizational chart identifying the key parties involved at the NIBW Superfund Site (the Site) is provided in **Appendix J**, along with contact information for current NIBW team members. Additional information describing remedial activities conducted at the NIBW Site in 2021 was provided in quarterly reports submitted to the U.S. Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ), dated May 28, August 27, and November 29, 2021. Consistent with requirements defined in the Amended CD and SOW, operational summaries and updates for fourth quarter 2021 are included in this annual SMR as **Appendix I**. Documents and data submitted to EPA during 2021 are listed in **Appendix G**.

This SMR presents a summary and overview of compliance monitoring data collected and acquired to demonstrate performance of the remedial action program. In conjunction with development of the 2021 SMR, the NIBW PCs compiled compliance monitoring data, laboratory analytical reports, quality assurance reports, and other monitoring data required by the Amended CD, SOW, governing work plans, and agency requests which are included in supplemental data reports that will be issued as electronic files on compact discs. Information covered in the SMR or submitted in supplemental data reports includes the following:

- An overview of the Site background, including regulatory history, a description of the remedy and treatment facilities, an overview of the conceptual site model (CSM), and applicable standards and metrics used for performance evaluation.
- Presentation of annual data and analyses, including groundwater pumping data, water level elevations, water quality sample results collected and analyzed for specific volatile organic compounds (VOCs) of concern, and annual operation of treatment facilities.
- An evaluation of remedy performance with respect to applicable performance standards and metrics.

- A summary of supplemental activities, including additional data collected in 2021, ongoing data collection and evaluations for remedy enhancement (including testing at PG-41MA/LA), support for EPA's optimization evaluation, and support to EPA for the 2021 Five-Year Review (U.S. Army Corps of Engineers (USACE), September 31, 2021)
- Results of NIBW PCs' annual audit activities at Eurofins TestAmerica (TestAmerica) in Phoenix, AZ
- Level 4 data analytical reports and a quality assurance (QA) report issued by TestAmerica (primary NIBW analytical laboratory contractor) for analyses conducted for the NIBW groundwater monitoring program during 2021
- Level 4 data analytical reports and a QA report issued by TestAmerica for analysis of compliance process water samples obtained at NIBW groundwater treatment systems during 2021
- Level 4 analytical report issued by PACE Analytical National Center for Testing & Innovation (Arizona Department of Health Services [ADHS] license number AZ0612) (PACE), the backup NIBW analytical laboratory contractor, for split sampling conducted at Area 12 Groundwater Extraction Treatment System (GWETS)
- 2021 air sampling summary and Air Toxics laboratory reports for Area 7 GWETS and Area 12 GWETS
- 2021 supplemental sample data not required for compliance but used for evaluation purposes in the SMR

3 SITE BACKGROUND

3.1 Regulatory History and Major Events

The Site was listed on EPA National Priorities List in September 1983 when VOCs were detected in drinking water wells in south Scottsdale, Arizona. VOCs entered the subsurface from historical manufacturing and other industrial operations. The following constituents of concern (COCs) were identified at the Site: trichloroethene (TCE), tetrachloroethene (PCE), 1,1-dichloroethene (1,1- DCE), 1,1,1-trichloroethane (1,1,1-TCA), and chloroform (TCM). The primary COC at the Site is TCE, since the magnitude and extent of TCE has consistently exceeded that of other VOCs during the monitoring history at the Site. **Table 1** provides a timeline which summarizes historical documents and major events for the Site.

Table 1. Timeline of Historical Documents and Major Events

Timeframe	Historical Document and/or Major Event
1981	Volatile organic compounds first detected in groundwater
1983	NIBW Site placed on National Priorities list
1984-1991	Initial Remedial Investigation and Report
1988-1992	Operable Unit I - Middle and Lower Alluvial Unit groundwater ○ Feasibility Study ○ Record of Decision ○ Consent Decree
1991-1993	Operable Unit II - Upper Alluvial Unit groundwater and vadose zone ○ Record of Decision ○ Consent Decree
1994 - 1999	Central Groundwater Treatment Facility online to treat volatile organic compounds (1994) Area 7 and Area 12 SVE Systems (1994) Voluntary actions ○ Area 7 UAU groundwater extraction and treatment system (1994) ○ Northern LAU extraction to provide protection of Paradise Valley wells (Miller Road Treatment Facility) (1997) ○ Groundwater extraction and treatment at Area 7 and Area 12 historical source areas in Middle Alluvial Unit (1999)
1999	Feasibility Study Addendum ○ Voluntary actions evaluated
2001	Amended Record of Decision ○ Remedy selected

Timeframe	Historical Document and/or Major Event
	○ Voluntary actions incorporated into selected remedy
2002	Groundwater Monitoring and Evaluation Plan ○ Prepared prior to signing of Amended Consent Decree ○ Documents agreed-upon activities and metrics
2003	Amended Consent Decree ○ Documents agreed upon compliance obligations, including Performance Standards (Appendix A of Statement of Work) ○ References Groundwater Monitoring and Evaluation Plan metrics for remedy performance and clarifies agreed upon additional work ○ Performance Standards and Groundwater Monitoring and Evaluation Plan metrics evaluated annually in Site Monitoring Report (see Section 5 and evaluation in Section 9)
2006	Remedy construction complete
2011	First Five-Year Review ○ Remedy deemed protective of human health and environment ○ Groundwater plume containment demonstrated
2012	Explanation of Significant Differences for treating PCX-1 at NIBW Granular Activated Carbon Treatment Facility
2013	NIBW Granular Activated Carbon Treatment Facility start-up
2015	EPA approved close out and decommissioning of final soil vapor extraction system (Area 7) to address threat to groundwater
2016	Second Five-Year Review ○ Remedy protectiveness determination deferred to evaluate potential exposure related to treatment facility emissions and soil vapor intrusion at historical sources ○ Groundwater plume containment demonstrated
2016-2020	Post Second Five-Year Review evaluations ○ Developed air dispersion model and conducted confirmatory sampling to demonstrate concentrations in vicinity of treatment systems are below applicable risk levels ○ Conducted vapor intrusion investigations at multiple historical source areas and indoor air investigations and mitigation at Area 7 where concentrations exceeded screening levels
2021	Third Five-Year Review o EPA concluded that the NIBW remedy is currently protective of human health and the environment o PCs submitted comments on the EPA 2021 Five-Year Review and a request for revision in November 2021

3.2 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site are listed as follows (Amended ROD, 2001).

A. *"Restore the Upper, Middle, and Lower Aquifers to drinking water quality by decreasing the concentrations of the contaminants of concern to below the Cleanup Standards.*

B. *Protect human health and the environment by eliminating exposure to contaminated groundwater.*

C. *Provide the City of Scottsdale with a water source that meets Maximum Contaminant Levels (MCLs) for NIBW contaminants of concern.*

D. *Achieve containment of the groundwater contamination plume by preventing any further lateral migration of contaminants in groundwater.*

E. *Reuse of the water treated at the Site to the extent possible in accordance with Arizona's Groundwater Management Act.*

F. *Mitigate any soil contamination that continues to impact groundwater.*

G. *Provide long-term management of contaminated groundwater to improve the regional aquifer's suitability for potable use."*

3.3 Constituents of Concern and Applicable Standards

Standards for treated groundwater include the NIBW Cleanup Standards for potable end use, the Arizona Pollutant Discharge Elimination System (AZPDES) requirements for discharge of treated groundwater to surface water, and the APP substantive requirements for injection back into the aquifer. The NIBW Cleanup Standards are based on EPA drinking water Maximum Contaminant Levels (MCLs) with the exception of TCM and 1,1 DCE; the MCL for 1,1, DCE is 7 µg/L. At the time of the Amended ROD, the MCL for TCM was 100 µg/L (Amended ROD, 2001). Cleanup Standards for the NIBW COCs are shown in **Table 2**.

Table 2. NIBW COCs and Cleanup Standards

NIBW Cleanup Standards In Micrograms per Liter (µg/L)				
TCE	PCE	1,1 DCE	TCM	1,1,1 TCA
5	5	6	6	200

3.4 Historical Sources and Vadose Zone Clean Ups

Historical COC sources at the NIBW Site were primarily from industrial activities during the 1950s through the 1970s. VOCs, disposed of at or near land surface during this period, percolated downward through the vadose zone to the groundwater. Fourteen historical source areas were originally identified across the Site, as shown on **Figure 1**. Four historical source areas (Area 1, 2, 4, and 10) required no further action while the other 10 required additional soil gas sampling. Soil vapor extraction (SVE) was conducted at four historical source areas to address the threat to groundwater; these include Area 6, Area 7, Area 8, and Area 12. SVE conducted at Area 6 was voluntary. All vadose zone SVE systems were approved for decommissioning with regard to threat to groundwater by the middle of 2015, with Area 7 being the final treatment system to be closed.

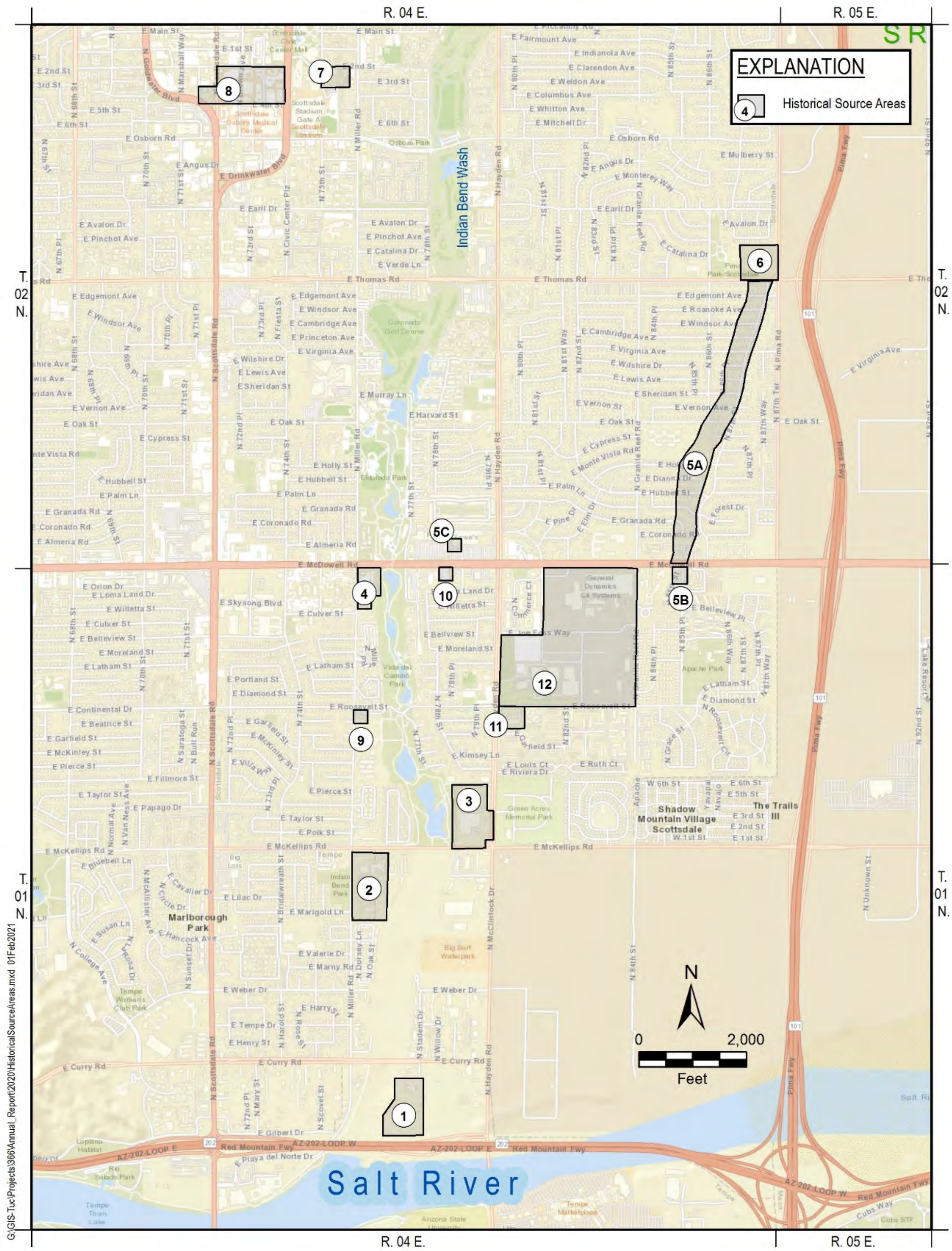

Figure 1. Location of Historical Source Areas at the NIBW Superfund Site

3.5 Groundwater Remedy Description

With the consideration of effectively managing groundwater resources in the state of Arizona, groundwater containment, treatment, and monitoring are conducted at the NIBW Site to restore groundwater for use as public water supply and to protect unimpacted existing public supply wells. The Site remedy has been designed and implemented based on an understanding of the geologic framework and the groundwater flow system to capture groundwater with VOCs above applicable standards at a series of extraction wells tied into treatment at five facilities. The five treatment facilities are the Central Groundwater Treatment Facility (CGTF), the NIBW Granular Activated Carbon Treatment Facility (NGTF), the Miller Road Treatment Facility (MRTF), the Area 7 GWETS, and the Area 12 GWETS. The three principal aquifer units at the Site are the Upper Alluvium Unit (UAU), Middle Alluvium Unit (MAU), and Lower Alluvium Unit (LAU). UAU groundwater extraction and treatment was voluntarily conducted during the early phases of the remediation at Area 7. After the PCs' vadose zone modeling and monitoring data demonstrated that the threat to groundwater was below Cleanup Standards, EPA approved closure of SVE and UAU groundwater extraction at Area 7 (**Section 3.4**). Groundwater extraction and treatment in the Upper MAU is focused on containment of areas with relatively higher concentrations; currently, the highest TCE concentrations at the Site are located near Area 7 and at the Granite Reef extraction well (Area 5B), part of the Area 12 GWETS. Capture of the Area 7 MAU source includes Source Control pumping at Area 7 extraction wells which pump from the Upper MAU and CGTF extraction wells which capture portions of the Upper MAU, Lower MAU, and LAU. The Area 12 extraction wells capture portions of both the Upper MAU and Lower MAU. Upper MAU containment is demonstrated using water level data. Remaining mass in the UAU and MAU migrates into the LAU, principally along the Western Margin, and is captured by downgradient LAU extraction wells. Capture by LAU extraction wells is demonstrated using water level data and simulated particle tracks generated using the NIBW groundwater flow model, which was updated by the PCs through a collaborative process with the NIBW Technical Committee in 2021.

3.5.1 Groundwater Extraction & Treatment Systems

The locations of treatment facilities, pipelines, and extraction wells tied into treatment at the Site are shown on **Figure 2**.

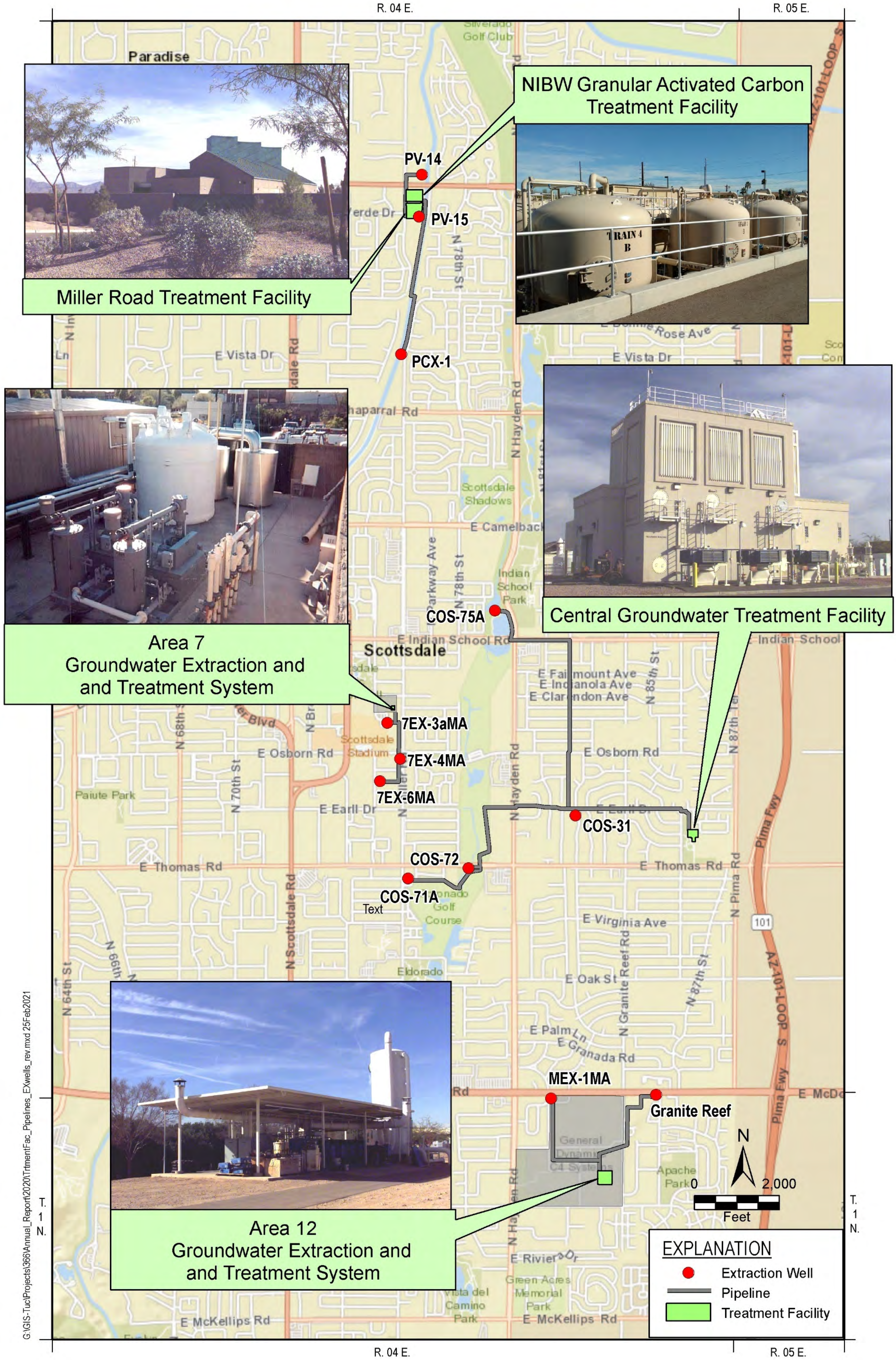

Figure 2. Location of Extraction Wells, Pipelines, and Treatment Facilities at the NIBW Superfund Site

An overview of treatment facility information, including the primary operator(s), the year of VOC treatment system start-up, the principal remedy function, names of associated extraction wells, facility treatment technologies and standards, and specified beneficial end uses, are summarized in **Table 3**. Treatment technologies, standards, and groundwater end uses for each of the treatment facilities comply with the Amended CD SOW Performance Standards for groundwater treatment.

Table 3. Overview of NIBW Treatment Facilities

Treatment Facility	CGTF	MRTF	NGTF	Area 7 GWETS	Area 12 GWETS
Treatment System Owner	City of Scottsdale	EPCOR	PCs	PCs	PCs
Primary Operator	City of Scottsdale	EPCOR	City of Scottsdale	PCs	PCs
Start of Operation to Treat VOCs	1994	1997	2013	1999	1999
Principal Remedy Function	MAU/LAU capture and treatment	Northern LAU capture and treatment	Northern LAU capture and treatment	MAU Source Control capture and treatment	MAU Source Control capture and treatment
Extraction Wells tied to Treatment and (Aquifer Unit)	COS-75A (LAU) COS-71A (MAU/LAU) COS-72 (MAU/LAU) COS-31 (MAU/LAU)	PV-14 (LAU)* PV-15 (LAU)*	PCX-1 (LAU)*	7EX-3aMA (MAU) 7EX-4MA (MAU) 7EX-6MA (MAU)	MEX-1MA (MAU) Granite Reef (MAU)
Treatment Technologies	Air stripping	Air stripping	Granular Activated Carbon	Ultraviolet oxidation and air stripping	Air stripping
Treatment Standards **	NIBW Cleanup Standards	NIBW Cleanup Standards	NIBW Cleanup Standards & AZPDES Permit	NIBW Cleanup Standards	NIBW Cleanup Standards & AZPDES Permit
Treated Groundwater End Use	Municipal supply for the City of Scottsdale or discharged to SRP water supply system via Grand Canal	Delivered to EPCOR for municipal use	Municipal supply for the City of Scottsdale or delivered to SRP water system via Arizona Canal	Injection to UAU using wells 7IN-1UA and 7IN-2UA	Discharged to SRP irrigation water supply system via McKellips Lake

Notes:
* Extraction wells are also influent samples for treatment facilities.
** See Table 2 for NIBW Cleanup Standards; AZPDES compliance monitoring is submitted under separate cover in monthly Discharge Monitoring Reports (DMRs).

3.5.2 CGTF

CGTF was the first treatment system constructed at the NIBW Site and began operations in 1994. CGTF, owned and operated by the City of Scottsdale, is located at 8650 East Thomas Road in Scottsdale, Arizona (**Figure 2**). It was constructed and modified to restore a potable water supply to the City of Scottsdale and to support capture of NIBW COCs in groundwater.

Groundwater extraction is performed at up to four supply wells owned by the City of Scottsdale or contracted for their use and designated as COS-31, COS-71A, COS-72, and COS-75A. Extracted groundwater is pumped through subsurface transmission pipelines to CGTF where it is treated by air stripping. Treated groundwater from CGTF is primarily used by the City of Scottsdale in its drinking water system but may be discharged to the SRP water distribution system via an irrigation lateral. Treated groundwater from CGTF has consistently met NIBW Cleanup Standards.

In 2016, the City of Scottsdale raised concerns about inorganic water quality constituents not associated with the NIBW Site at the CGTF wells. Since that time and because of its concerns, the City of Scottsdale has been following a reduced pumping regimen for wells COS-72 and COS-31 and using well COS-71A in the lowest priority and only when necessary. Well COS-71A is a critical extraction well for the NIBW remedy. The City of Scottsdale has also recently designed and constructed the Thomas Groundwater Treatment Facility (TGTF) to treat inorganic constituents in the groundwater. The City's pumping regimen of CGTF wells will be re-evaluated following commissioning of TGTF, expected to be in 2022.

3.5.3 MRTF

MRTF began operation in 1997 and is owned and operated by EPCOR. MRTF is located at 5975 North Miller Road in Scottsdale, Arizona (**Figure 2**). It was constructed to capture and treat groundwater containing NIBW COCs in the Northern LAU, to provide beneficial use of groundwater pumped from remedy extraction wells, and to prevent migration of the LAU plume to peripheral production wells.

Groundwater extraction is currently performed at two wells, designated as PV-14 and PV-15, which are individually connected to MRTF. COCs in extracted groundwater are reduced by air stripping at MRTF. Treated groundwater from wells PV-14 and PV-15 is pumped to EPCOR's Paradise Valley Arsenic Removal Facility (PVARF) for subsequent treatment and distribution by EPCOR for drinking water use in its Paradise Valley service area. Treated groundwater from MRTF has consistently met NIBW Cleanup Standards.

3.5.4 NGTF

NGTF began operations in 2013; the NIBW PCs own and are responsible for NGTF operations, maintenance, and performance. The City of Scottsdale operates the treatment facility under contract to the NIBW PCs because the treated water may be used in the City of Scottsdale's municipal system. NGTF is located at 5985 Cattletrack Road, at the southeast corner of the intersection of Cattletrack Road and McDonald Drive in Scottsdale, Arizona (**Figure 2**). It was constructed by the NIBW PCs to treat groundwater extracted from well PCX-1 to provide hydraulic capture of the Northern LAU plume and limit migration of the plume toward the EPCOR wellfield.

NGTF utilizes a granular activated carbon (GAC) treatment system. Groundwater extracted from PCX-1 is treated using four parallel treatment trains, each consisting of two GAC contactors in lead/lag configuration. Treated water from NGTF is delivered to the City of Scottsdale's Chaparral Water Treatment Plant (CWTP) for use in its drinking water system. In the event the City of Scottsdale does not need or cannot take PCX-1 treated water, it is discharged for SRP use to the adjacent Arizona Canal. Consideration of pumping from existing monitoring well (PG-41MA/LA) to enhance capture of the LAU between PCX-1 and the MRTF extraction wells led to testing of well PG-41MA/LA in May 2021 (described in further detail in **Section 10.1.3**). In its current configuration, NGTF has additional treatment capacity to accommodate treatment of up to approximately 900 gpm. Treated groundwater from NGTF has consistently met NIBW Cleanup Standards and AZPDES permit requirements.

3.5.5 Area 7 GWETS

Area 7 GWETS began operation in 1999. The NIBW PCs own and are responsible for operation of Area 7 GWETS. Area 7 is a former electronics manufacturing site located at the southeast corner of North 75th Street and East 2nd Street in Scottsdale, Arizona (**Figure 2**). Area 7 GWETS was constructed to enhance the NIBW groundwater remedy by extracting and treating MAU groundwater containing relatively higher COC concentrations associated with the source area, thereby reducing COC mass migrating to LAU extraction wells for removal and treatment.

Groundwater extraction and treatment is currently performed at two wells, designated as 7EX-3aMA and 7EX-6MA. Well 7EX-5MA became inoperable in 2012 and was abandoned in 2015. Well 7EX-6MA was constructed and added to the system in 2015. Well 7EX-4MA was removed from service in October 2016 due to poor performance. The NIBW PCs performed a limited rehabilitation of well 7EX-4MA in 2019. Several holes were discovered in the casing following the rehabilitation activities and the casing appeared to be in overall poor condition. The NIBW PCs are evaluating options for liners or casing repair. No work was performed on the well in 2020 and 2021 due to limitations from the pandemic. Further work on well 7EX-4MA is anticipated in 2022. Although well 7EX-6MA was principally installed to replace well 7EX-5MA, it was also located and designed to serve as a replacement well for 7EX-4MA, should ongoing rehabilitation efforts prove to be ineffective. Well 7EX-6MA and 7EX-4MA share a common pipeline that connects the wells to the treatment system. As such, increased pumping from well 7EX-6MA is possible when well 7EX-4MA is offline.

Groundwater from the Area 7 extraction wells is treated by ultraviolet oxidation (UV/Ox) followed by air stripping. Treated water is discharged to the UAU using two upgradient groundwater injection wells (7IN-1UA and 7IN-2UA). UAU injection of Area 7 treated groundwater provides flushing to enhance UAU migration toward the Western Margin. Treated water used to recharge the UAU aquifer must meet substantive requirements of the federal Underground Injection Control (UIC) Program and the Arizona Aquifer Protection Permit (APP) Program administered by ADEQ. In Arizona, all groundwater is classified for drinking water protected use, so the Aquifer Water Quality Standards (AWQS) are primary drinking water standards by rule. If an AWQS is already exceeded at the point of compliance in groundwater, then the discharge must not cause further degradation of the aquifer with respect to the parameter that exceeds the standard. Treated groundwater from Area 7 has consistently met NIBW Cleanup Standards and substantive requirements of UIC and APP.

3.5.6 Area 12 GWETS

Area 12 GWETS began operations in 1999. The NIBW PCs own and are responsible for operation of Area 12 GWETS. Area 12 GWETS is located at the former Motorola facility at 8201 East McDowell Road in Scottsdale, Arizona (**Figure 2**). It was installed to enhance the NIBW groundwater remedy by extracting and treating MAU groundwater containing relatively higher COC concentrations at the source area, reducing COC mass allowed to migrate to the Western Margin for removal and treatment at LAU extraction wells.

Groundwater extraction is performed using two MAU extraction wells designated as MEX-1MA and SRP well 23.6E,6.0N, also known as the Granite Reef well located in source Area 5B. The extracted groundwater is treated by air stripping and delivered to the SRP irrigation system at McKellips Lake to replace other SRP irrigation pumping within and near the Site. To the extent feasible, pumping is conducted at both the Granite Reef well and MEX-1MA, especially when well COT-6 is pumping, in accordance with recommendations in the M-2MA contingency response memorandum. Treated groundwater from Area 12 GWETS has consistently met NIBW Cleanup Standards and the AZPDES permit requirements.

4 CONCEPTUAL SITE MODEL

The NIBW CSM was initially developed by EPA in the late 1980s and documented in the Remedial Investigation Feasibility Study (RI/FS, 1991); the CSM was further refined in the 2000 Feasibility Study Addendum (FSA). In 2021, the CSM was updated to incorporate information and understanding developed over the period since the 2000 FSA. The updated CSM was submitted in draft form to the agencies in January 2021. EPA has provided comments on the draft and the PCs are in the process of responding to and incorporating comments where appropriate into a final report. Information provided in this section is largely excerpted from the draft CSM update, which contains appropriate references to previous investigations and studies. The CSM update, when finalized, will comprise the definitive current regional and local hydrogeologic reference.

Hydrogeologic features and groundwater flow regimes have generally been consistent throughout the history of the Site, and the remedy that was built around the CSM continues to be relevant. Over time, the understanding of the CSM has been clarified and refined with additional data collection, specifically regarding the understanding of aquifer responses to changes in local and regional system stresses (pumping and recharge). An overview of the current CSM is provided in the following section. Consistency of the CSM with data collected in 2021 is discussed in **Section 9.10**.

4.1 Setting and Key Features

The NIBW Site is geographically situated in the southwestern part of the Paradise Valley Basin in the eastern Salt River Basin. The Paradise Valley Basin is bounded to the east by the McDowell Mountains and to the west and southwest by Camelback Mountain, Mummy Mountain, and the Papago Buttes. The Site is in the southern portion of the City of Scottsdale. The actual Site boundaries are defined by the extent of COCs in groundwater above Cleanup Standards established in the Amended ROD. Since TCE is the COC with the largest extent and highest concentrations, the TCE plume defines the boundaries of the Site. The plume is generally within the area bounded by McDonald Road to the north, Pima Road to the east, the Salt River to the south, and 68th Street to the west, as shown on **Figure 3** and referred to in the SMR as the Site Boundary. East of the Site, occupying most of the land between the NIBW Site and the McDowell Mountains, are the Salt River Pima Maricopa Indian Community (SRPMIC) lands, which are primarily used for agriculture or are undeveloped.

Land surface in the region generally slopes southward toward the Salt River floodplain. Principal surface-water features in the vicinity of the Site include the Indian Bend Wash, the Salt River, the Salt River Project (SRP) canal system, Tempe Town Lake, McKellips Lake and several artificial recharge projects. Groundwater recharge within and surrounding the Site plays an important role in the groundwater flow system and is conceptualized to be principally from Salt River flows, infiltration of irrigation water on SRPMIC lands, and artificial recharge facilities, primarily the Granite Reef Underground Storage Project (GRUSP). **Figure 3** shows the location of the NIBW Site, nearby land use, and surrounding cities and mountains.

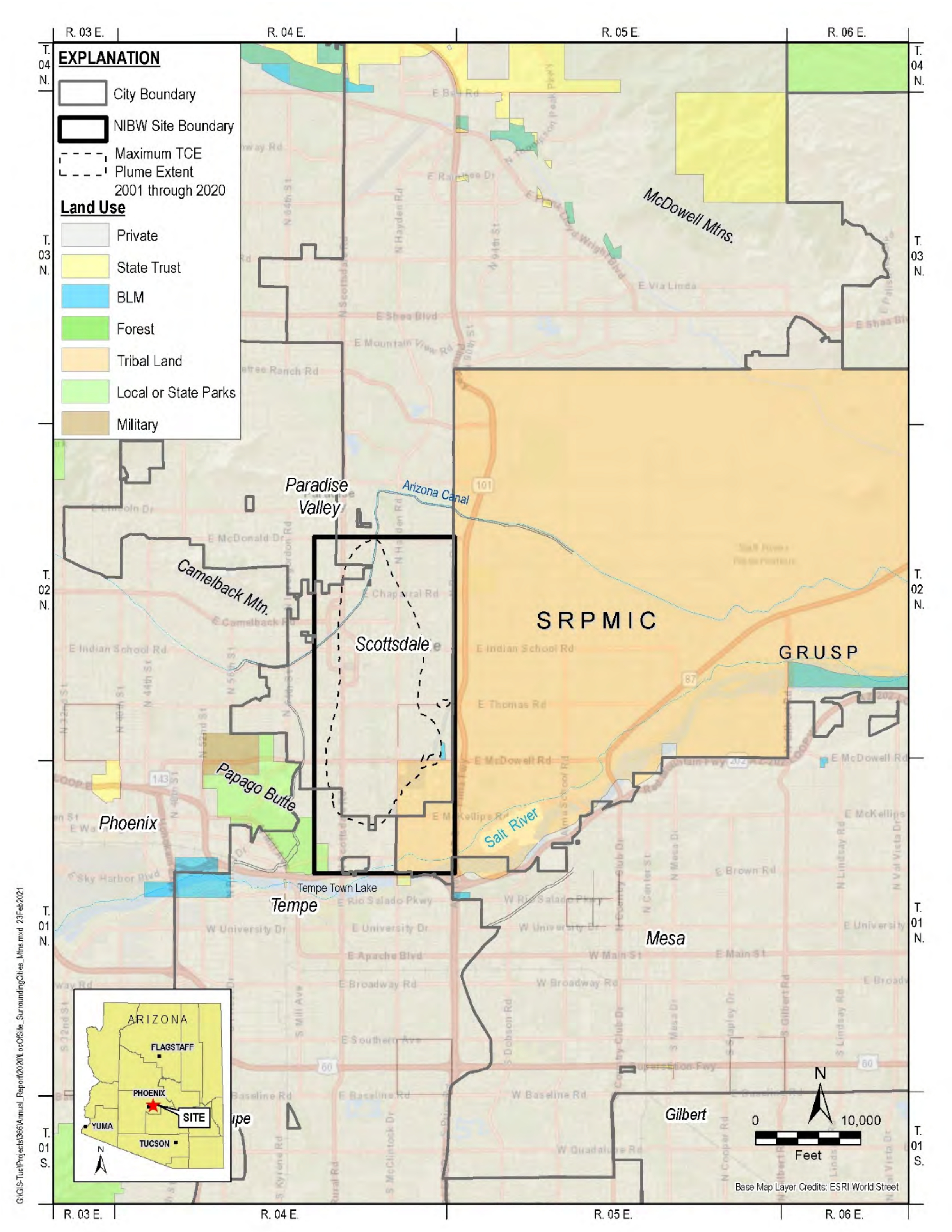

Figure 3. Location of the NIBW Superfund Site and Surrounding Land Area

4.2 Hydrogeologic Framework

The NIBW Site is situated in the Basin and Range geologic province, with the groundwater basin consisting primarily of Quaternary and late Tertiary age sedimentary deposits derived from erosion and uplift of the surrounding mountain blocks. Below the alluvial sedimentary deposits is the bedrock complex consisting of a Tertiary age strongly lithified sandstone/conglomerate known as the Red Unit, Precambrian age crystalline rocks, and some Tertiary age volcanics. Principal geologic characteristics of the sedimentary alluvial deposits in the vicinity of the NIBW Site are described in the following sections.

4.2.1 Upper Alluvium Unit

UAU sediments are interpreted to have been deposited as channel, floodplain, terrace, and alluvial fan deposits in an open basin with a through-flowing stream system. This unit consists of unconsolidated silt, sand, gravel, cobbles, and boulders, with occasional interbeds of finer-grained materials. Caliche is also present in some areas. Thickness of the UAU is relatively uniform across the Site, averaging about 150 feet. Consisting of generally coarse-grained material, the hydraulic conductivity in this unit is high relative to underlying sediments. The UAU is a water table aquifer and has the shallowest water levels of the three alluvial units at the Site. Saturated thickness of the UAU reaches a maximum of about 100 feet south of Indian School Road. Groundwater recharge occurs in the UAU from Salt River flows, infiltration of irrigation water on SRPMIC lands, infiltration of water from the Indian Bend Wash, and artificial recharge facilities, mainly GRUSP. Most recharge occurs east of the Site resulting in an east to west general groundwater flow direction in the UAU.

4.2.2 Middle Alluvium Unit

MAU sediments are generally much finer grained and heterogeneous than either the UAU or the LAU. Deposition of MAU sediments is interpreted to have been from low-energy playa lake and/or alluvial fan environments in an essentially closed basin. This unit consists of unconsolidated to weakly cemented clay and silt strata interbedded with fine- to coarse-grained sands. Overall, the fraction of silt and clay in the MAU in the Site vicinity is large, resulting in relatively low hydraulic conductivities. The variation in properties between fine-grained zones and coarse-grained interbeds, however, is significant. The uppermost part of the MAU is generally more fine-grained with some sandy interbeds. The aquifer zone that underlies the uppermost portion of the MAU is referred to as the Upper MAU and corresponds to the primary monitored interval in the MAU at the Site. The Upper MAU is generally less fine-grained and contains thicker and more continuous coarse-grained interbeds than the portions of the MAU stratigraphically above or below it. The Lower MAU near Area 7 is more fine-grained than other parts of the MAU at the Site. Thickness of the MAU varies across the Site from 0 to about

600 feet, averaging about 460 feet. Thickness generally increases eastward toward the center of the basin. To the west/southwest of the Site, MAU sediments are observed to thin and ultimately “pinch out” near the Western Margin, as described in **Section 4.2.4**. The MAU is fully saturated across the NIBW Site and is under confined to semi-confined conditions, depending on if the overlying UAU is saturated in the area. Water levels in the MAU are generally intermediary between the UAU and LAU. Groundwater flow in the MAU is principally driven by groundwater pumping and recharge from the overlying UAU. Outside of MAU extraction well capture, the groundwater flow direction is generally northeast to southwest in the northern portion of the Site and east-southeast to west-northwest in the southern portion of the Site.

4.2.3 Lower Alluvium Unit

The LAU is a coarse-grained, heterogeneous unit comprised of materials ranging from boulders to clay. The unit is interpreted to have been deposited in a closed, subsiding basin environment that was generally coincident with normal faulting associated with Basin and Range tectonic activity. Sediments were believed to have been derived locally from the uplifting mountain blocks and to have been deposited in playa lake, alluvial fan, and fluvial environments. Sediments in the LAU consist of primarily weakly to strongly lithified gravels and sands interbedded with silty and clayey strata. Percent silt and clay is variable and generally ranges from about 5% to 30%. The LAU is generally the thickest of the three alluvial units at the Site, with thickness up to 700 feet in certain areas. Similar to the MAU, the LAU thickens to the east toward the center of the basin and thins toward the exposed bedrock mountains to the west. The LAU constitutes the principal alluvial aquifer in the region and is fully saturated and under confined conditions across the NIBW Site. Water levels in the LAU are generally lower than in the two overlying units. Most pumping in the Site vicinity is in the LAU, which drives groundwater flow from overlaying units into the LAU, in addition to lateral flow from south of the Site. Groundwater flows principally from the south/southwest to the north where there is a regional cone of depression caused by pumping from LAU extraction and production wells.

4.2.4 Western Margin

To the west and southwest of the Site approaching the basin margin, MAU and LAU sediments thin, the units become less lithologically distinct, and shallow bedrock is encountered. In this region, water level elevations in the three alluvial units approach the same values, suggesting increased hydraulic communication and vertical connectivity between the units. This region is referred to as the Western Margin and its generalized extent is shown on **Figure 4**. The Western Margin is recognized as a region of enhanced vertical movement of groundwater from the UAU and MAU into the LAU, and its generalized extent is defined based on MAU thickness and vertical hydraulic gradient data. Specifically, the Western Margin is defined to extend across an area where both MAU thickness and vertical gradients from the UAU and MAU to underlying units decrease significantly. The MAU, which otherwise serves as an impediment to vertical flow, is generally 150 feet thick or less in this area and vertical gradients are small. An understanding of the Western Margin hydrogeology, flow regimes, and importance to the Site remedy has been part of the CSM since the original 1991 RI/FS, and data collected in the last 20-plus years continue to support this conceptualization. Conceptually, movement of UAU groundwater into the LAU generally occurs in the southern part of the margin region and movement of MAU groundwater into the LAU is focused in the central and northern part of the margin region. Downgradient from Area 7, vertical movement is conceptualized to occur from the Upper MAU into the Lower MAU in response to pumping from CGTF extraction wells screened across the Lower MAU. This is due to coarsening and thinning of MAU sediments approaching the Western Margin.

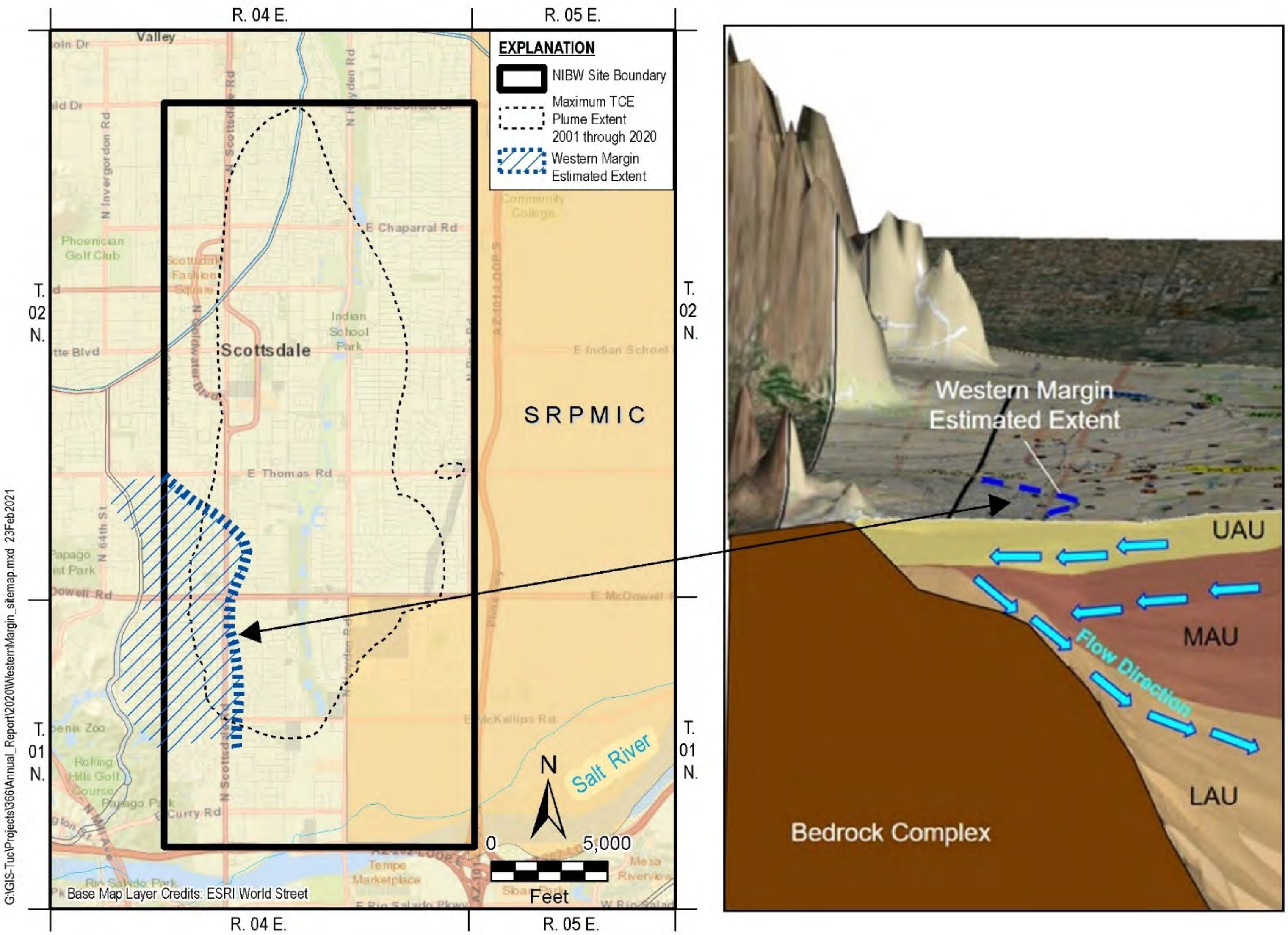

Figure 4. Western Margin Estimated Extent and Conceptual Diagram

4.3 Nature and Extent of COCs

The SMR focuses on the timeframe since 2001, when annual reporting began for the Site pursuant to the Amended CD and GM&EP. Additional background is provided in this section where appropriate to aid in the conceptual understanding of overall plume reduction and migration between the first discovery of COCs in groundwater in the early 1980s and the present time.

The primary COC at the Site is TCE, since the magnitude and extent of TCE are consistently larger than that of other VOCs over the monitoring history at the Site. The maximum extent of the TCE plume, since 2001, is shown on **Figure 3**. The TCE plume extent is delineated by the estimated extent of groundwater with concentrations above 5 micrograms per liter (µg/L) (the Cleanup Standard). The overall extent of the plume has decreased since 2001 and concentrations within the plume have generally reduced.

4.3.1 Upper Alluvium Unit

The UAU had the highest COC concentrations in groundwater at the Site in the 1980s and early 1990s, but by 2001 COC concentrations had reduced significantly and now the UAU is nearly restored. With completion of vadose zone remediation programs at Areas 6, 7, 8, and 12 that successfully addressed the threat to UAU groundwater, the vadose zone is no longer contributing significant mass of COCs to the groundwater system at the NIBW Site. This is evidenced by the low and decreasing concentrations of TCE in the UAU. Early TCE concentrations in the UAU at Area 7 (1993) were more than 10,000 µg/L, an order of magnitude higher than concentrations 10 years earlier at Area 12. UAU groundwater extraction at Area 7, vadose zone remediation at source areas, and movement of the UAU plume to lower aquifers via the Western Margin have worked together to bring the UAU close to restoration. TCE concentrations are now below Cleanup Standards in almost all UAU monitoring wells.

4.3.2 Middle Alluvium Unit

Like the UAU, TCE concentrations in the MAU have also reduced substantially over time. Due to the hydrogeologic properties of the MAU, including greater thickness and a predominance of fine-grained sediments, the timeframe for remediation of COCs in the MAU is anticipated to be substantially longer than the UAU or LAU. The highest TCE concentrations at the Site are currently observed in the Upper MAU, specifically near historical source Area 7 and Area 12. Since the UAU was largely unsaturated in the northern half of the Site at the time, the MAU at Area 7 was the uppermost aquifer in that region during the timeframe when disposal would have been occurring. This resulted in generally higher and more persistent concentrations of TCE in the MAU at Area 7 compared with Area 12. Due to the generally fine-grained and heterogeneous nature of the MAU, diffusion-limited processes play a role in the rate of clean up, especially near Area 7. VOC mass in fine-grained sediments slowly diffuses into adjacent coarser-grained layers where transport toward extraction wells occurs, impacting both the magnitude and changes over time in TCE concentrations in the Upper MAU. The highest concentrations in the Upper MAU near Area 12 have consistently occurred at the Granite Reef well located at historical source Area 5B, and monitoring wells directly downgradient from the Granite Reef well along McDowell Road. MAU Source Control at Area 7 GWETS extraction wells and Area 12 GWETS extraction wells began voluntarily in 1999 and were officially incorporated into the selected remedy in the 2001 Amended ROD. Area 7 GWETS extraction wells are screened only in the Upper MAU, whereas Area 12 GWETS extraction wells are also perforated in the Lower MAU. Concentrations in the Upper MAU near Area 7 have reduced from the 5,000 µg/L to 7,000 µg/L range in the 1990s, to the 400 µg/L to 2,000 µg/L range at present. The only area of the MAU near Area 12 with lingering higher concentrations is the Granite Reef well, source Area 5B. Concentrations at the Granite Reef well have reduced from over 1,000 µg/L in the 1980s to around 100 µg/L at present.

The Lower MAU has consistently had substantially lower TCE concentrations than the Upper MAU. Near Area 7 the highest measured concentration in the Lower MAU was 32 µg/L in 2001 at well PG-50MA. Since 2015, Lower MAU monitoring wells near Area 7 have had TCE concentrations mostly below the Cleanup Standard of 5 µg/L. The lack of vertical migration from the Upper MAU to the Lower MAU below Area 7 is interpreted to be due to the relatively finer grained lithology of the Lower MAU. Near Area 12, the highest TCE concentrations observed in the Lower MAU are at PG-48MA, located downgradient from the Granite Reef well. TCE concentrations at this well were above 100 µg/L in the late 1990s and early 2000s but have since reduced to below 20 µg/L. PG-47MA is adjacent to PG-48MA but perforated in a Lower MAU zone below both PG-48MA and the Granite Reef well. TCE concentrations at this well have consistently been below 5 µg/L and mostly below the detection limit (<0.50 µg/L). The occurrence of low to non-detect concentrations in the Lower MAU below historical source areas is consistent with site lithology and groundwater flow directions, suggesting a preference for lateral movement of Upper MAU mass toward extraction wells or toward the Western Margin.

4.3.3 Lower Alluvium Unit

While the TCE plume in the LAU grew as it advanced to the north toward extraction wells in the 1990s, it has had the largest footprint of the three units at the Site since 2001. Prior to voluntary implementation of Source Control containment in the MAU in 1999, the entire UAU plume and the portion of the MAU plume not contained by extraction at the CGTF wells moved into the LAU via the Western Margin. In fact, most of the LAU plume is interpreted to result from movement of TCE prior to 2001. In the 1990s and early 2000s, the highest concentrations in the LAU were in the 300 µg/L range; at present maximum concentrations have reduced to the

100 µg/L range, with most LAU monitoring wells now showing decreasing or stable concentration trends.

4.3.4 Alternate Sources

Although PCE is a COC at the NIBW Site, NIBW-sourced PCE concentrations have always been relatively low and are currently between about one and two orders of magnitude below TCE concentrations at Site monitoring wells (**Table C-1, Appendix C**). This is not the case at wells such as S-1LA that are impacted by known PCE sources unrelated to the NIBW Site. These alternate sources of PCE, which occur on the western flank of the NIBW Site, have been noted in various Site documents over time, including the FSA, RI/FS, and Third Five-Year Review. The two primary alternate source areas for PCE include the former Prestige Cleaners, in the vicinity of the Arcadia Water Company (AWC) irrigation wells (AWC wellfield), and the former Mastel Cleaners, near PG-4UA in the southern part of the Western Margin region. Elevated concentrations of PCE have been observed in the MAU and LAU to the west of the NIBW TCE plume. Specifically, PCE concentrations have been increasing significantly in monitoring well S-1LA, located in the LAU downgradient (north) of monitoring well PG-4UA and the former Mastel Cleaners location. The former Prestige Cleaners was also located in the area north of the Arizona Canal near the AWC wellfield. During the former Prestige Cleaners Phase II Investigation conducted in 1994, PCE was found in subsurface soils and in groundwater at nearby production well AWC-9A, where concentrations exceeded the MCL.

4.3.5 Emerging Contaminants

In recent years, many environmental sites have identified the presence of emerging contaminants such as 1,4-dioxane (1,4-DX) and per- and poly fluorinated alkyl substances (PFAS) in groundwater. While Federal drinking water standards do not exist for these compounds, both 1,4-DX and PFAS were investigated at the NIBW Site and were determined to be either not detected or detected at concentrations well below associated EPA health-based guidance levels.

The EPA advisory level for 1,4-DX, which was initially set at 3 µg/L, was revised in 2013 to 0.35 µg/L based on EPA risk assessments. Two rounds of 1,4-DX sampling were conducted at the Site at the request of EPA. Initially, in 2005, the CGTF and NGTF influent and effluent samples were analyzed for 1,4-DX. Results for all primary and duplicate samples were below the detection limit of 1.0 µg/L, except for a detection of 1.1 µg/L in the duplicate effluent sample from CGTF. Additional 1,4-DX sampling was conducted in 2015 which included both a broad set of monitoring wells completed in the three alluvial aquifers, all extraction wells (except MEX-1MA), and influent and effluent sample locations for CGTF and NGTF. Sample results were all low and ranged from below detection limits of between 0.07 and 0.22 µg/L for most of the samples. Concentrations of 1,4-DX were below 1 µg/L for all but one sample; the maximum observed concentration of 1.8 µg/L was at PA-6LA. Results of 2015 1,4-DX sampling were reported in the 2015 NIBW SMR. These data demonstrate that 1,4-DX is not a COC at the Site.

After EPA established a health advisory level of 70 parts per trillion (ppt) in drinking water for the combined concentrations of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in 2016, Scottsdale Water, at EPA's request, analyzed samples from each of the CGTF wells and PCX-1 for 21 PFAS compounds including PFOA and PFOS in 2017. Well COS-75A had the highest level of PFOA/PFOS at 8.2 ppt, which is well below EPA's health goal of 70 ppt. Trace levels of eight additional PFAS compounds were also detected in the wells tested. The highest overall level was detected at well COS-71A, with a combined PFAS concentration of 41 ppt. No health goal exists for the other PFAS compounds. The fact that concentrations for the combined 21 PFAS compounds do not exceed the 70 ppt EPA goal at the CGTF extraction wells demonstrates that PFOA/PFOS concentrations in the groundwater system are at very trace levels. Based on the results of this sampling, PFOA/PFOS is not a COC at the Site.

5 PERFORMANCE STANDARDS AND METRICS

Evaluation of the NIBW remedy is based on Performance Standards set forth in the Amended CD SOW and metrics described in the GM&EP. Performance Standards for groundwater containment and GM&EP metrics are outlined below in **Sections 5.1 and 5.2** and evaluated relative to 2021 data and analyses in **Section 9**.

5.1 Amended CD SOW Performance Standards for Groundwater Containment

The specific requirements for groundwater containment identified in the Amended CD SOW Performance Standards are summarized as follows:

5.1.1 MAU/LAU

1. Provide sufficient hydraulic control to prevent groundwater in the MAU/LAU with VOC concentrations above the Cleanup Standards from migrating toward and ultimately impacting production wells that did not contain NIBW COCs exceeding MCLs prior to the Effective Date of the Amended CD and which are not currently connected to an existing treatment facility.
2. Demonstrate that NIBW COC concentrations in the MAU outside the source areas (Area 7 and Area 12) are being reduced.

5.1.2 Area 7 and Area 12

1. Reduce the mass of NIBW COCs in groundwater at the Area 7 and Area 12 sources.
2. Achieve overall concentration reductions for NIBW COCs.
3. Provide sufficient hydraulic control to prevent MAU groundwater in the vicinity of Area 7 and Area 12 with concentrations higher relative to the surrounding vicinity from migrating away from the source areas.
4. Minimize the total amount of NIBW COCs that are allowed to migrate toward the Western Margin.

5.2 GM&EP Metrics

Performance of the NIBW remedy is evaluated based on a rigorous approach established in the GM&EP. In the GM&EP, monitoring program objectives are matched with specific performance criteria, a methodology for measuring achievement of performance criteria, a definition of when contingency evaluations or actions would be initiated, and a menu of alternative contingency response actions that may be taken.

In recent years the NIBW Technical Committee has been engaged in a process of reviewing the GM&EP performance metrics. As part of this process the PCs have proposed targeted updates to the GM&EP to align the performance metrics more directly to the Site RAOs and performance standards. The PCs plan to update these proposals based on new data and tools, including the groundwater flow model and three-dimensional (3D) visualization model, and hope to re-engage with the Technical Committee on the GM&EP in 2022. In the meantime, the PCs will continue to use the structure laid out in the 2002 GM&EP to evaluate progress and performance of the various remedy components.

The five remedy components identified for evaluation in the GM&EP are: 1) UAU mass flux and restoration; 2) MAU/LAU containment and restoration; 3) Northern LAU hydraulic capture; 4) Area 7 MAU Source Control; and 5) Area 12 MAU Source Control. Performance criteria and contingency actions associated with each component are summarized in **Table 4**.

Table 4. GM&EP Performance Criteria and Contingency Initiation Criteria by Program

Program	Performance Criteria	Contingency Initiation Criteria	GM&EP Section
UAU	A. Reduction in total VOC mass in UAU attributable to NIBW sources	A. UAU VOC mass increasing with time, based on 5-year running average	9.1
MAU/LAU	A. Hydraulic gradients and TCE plume consistent with overall capture of MAU/LAU plume by CGTF, MRTF, [and NGTF beginning in 2013] extraction wells B. VOC concentrations below Cleanup Standards in peripheral production wells	A. Direction of groundwater movement along periphery of MAU/LAU plume is not toward either extraction wells or Western Margin for two consecutive monitoring rounds (1 year) B. Shift of ≥1,000 feet in 5 µg/L TCE concentration contour in MAU or LAU relative to October 2001 (other than from movement toward extraction wells tied into treatment) C. Water quality data indicating TCE equal to or greater than achievement measure concentrations	9.2
Northern LAU	A. Consistent presence of cone of depression in vicinity of Northern LAU extraction wells B. Capture of Northern LAU plume C. VOC concentrations below Cleanup Standards in peripheral production wells	A. Direction of groundwater movement along Northern LAU plume periphery is not toward Northern LAU extraction wells for 1 year B. TCE concentrations in PG-42LA, PG-43LA, or PV-14 greater than 2 µg/L	9.3
Area 7 MAU Source Control	A. Generally declining TCE concentrations within capture zone associated with Area 7 extraction wells B. Hydraulic capture zone extending south to vicinity of PA-12MA	A. Increasing 5-year running average TCE concentration for the following group of wells: D-2MA, E-10MA, PA-10MA, PA-12MA, W-1MA, and W-2MA B. Capture to vicinity of PA-12MA not demonstrated	9.4
Area 12 MAU Source Control	A. Generally declining TCE concentrations within capture zone associated with Area 12 extraction wells B. Hydraulic capture zone extending west to vicinity of Hayden Road	A. Increasing 5-year running average TCE concentration for the following group of wells: E-1MA, M-4MA, M-5MA, M-6MA, M-7MA, M-9MA, M-15MA, and PA-21MA B. Capture to vicinity of Hayden Road not demonstrated	4.4

6 GROUNDWATER MONITORING PROGRAM

In addition to performance criteria and contingency response actions, groundwater monitoring requirements for the NIBW Site are also specified in the GM&EP. The GM&EP defines: 1) the scope and frequency of monitoring activities; 2) requirements for data reporting and preparation of interpretive work products; and 3) the approach to conducting groundwater flow model updates. Changes to the UAU monitoring program are documented in the EPA-approved Work Plan for Updated Long-term Groundwater Monitoring Program, Upper Alluvium Unit Groundwater, dated December 13, 2012 (NIBW PCs, 2012). Other monitoring program changes reviewed and approved by EPA have occurred over time, including abandonment of a total of 43 UAU monitoring wells in 2006, 2007, 2010, 2013, 2014, and 2018 (see appropriate annual SMRs for details). Monitoring program changes proposed for 2022 are presented below. Rationale for these changes is provided in **Sections 7.2.1 and 9.8**.

1. Use of MAU monitoring well OZ7-1 well as a replacement for monitoring well D-2MA.
2. The redesignation of the LAU monitoring well E-14LA as a Lower MAU/Upper LAU well, to be referred to as E-14MA/LA herein and for future compliance reporting.

The purpose of the Groundwater Monitoring Program is to:

1. Identify the zone of groundwater contamination in the MAU and LAU requiring remediation.
2. Identify the zone of hydraulic capture resulting from operation of extraction wells.
3. Evaluate the rate of VOC mass reduction in the UAU due to migration out of the unit.
4. Identify areas within the UAU, MAU, and LAU to which VOC mass is moving.
5. Provide long-term monitoring to verify the ongoing effectiveness of remedial actions.
6. Demonstrate capture and containment of the zone of contamination, such that concentrations of VOCs in excess of Cleanup Standards do not impact peripheral production wells.
7. Verify containment has effectively prevented VOC concentrations in excess of the Cleanup Standards from impacting peripheral production wells.
8. Document changes in concentrations to evaluate long-term restoration of the aquifer to drinking water end use.

The GM&EP contains the groundwater monitoring and reporting requirements. The Phase 1 Sampling and Analysis Plan (SAP) which includes a field sampling plan (FSP) and a quality assurance project plan (QAPP) was developed to cover sampling activities presented in the GM&EP. A draft Addendum to the Phase I SAP, dated October 28, 2015, was prepared by the NIBW PCs and submitted to EPA to document protocols for sampling at selected monitoring wells using the HydraSleeve™ technology method (HydraSleeve). This document, while not finalized, is currently being used as guidance for applicable field operations.

Groundwater monitoring at the NIBW Superfund Site includes collection, analysis, and reporting of extensive water level, water quality, and pumping data from a network of groundwater monitoring, extraction, peripheral production, irrigation, and other water wells completed in the UAU, MAU, and LAU. Locations of extraction wells (active, inactive, and abandoned), peripheral production wells, irrigation or other pumping wells (active, and inactive), and monitoring wells (active and recently abandoned or retired) in the vicinity of the NIBW Site are shown on **Figure 5**. Sampling details are summarized in **Table A-1**, **Appendix A**, including well type, aquifer unit, and frequency of water level and water quality monitoring. Well construction information is summarized in **Table A-2**, **Appendix A**.

Peripheral production (or "production" wells) are wells other than remedial extraction wells that are permitted and used for potable supply and that have not been impacted by COCs above Cleanup Standards prior to the Amended CD. Irrigation or other non-potable supply wells are permitted for specific uses and are not presently used for drinking water supply. Other wells also include pumping wells which are used for potable supply but were impacted prior to the Amended CD. While peripheral production wells are not defined with respect to their end-use in the Amended CD, Amended ROD, or the GM&EP, the remedy was designed to restore the aquifer as a resource for municipal supply and to protect wells that were not impacted for drinking water end-use. Irrigation water quality standards are orders of magnitude higher than drinking water standards. Distinguishing between municipal wells where drinking water standards apply and other supply wells in the area designated for current and future irrigation or other non-potable uses is consistent with the intent of the remedy obligations agreed upon in the Amended CD. Sampling details are summarized in **Table A-1**, including well type, aquifer unit, and frequency of water level and water quality monitoring. Well construction information is summarized in **Table A-2**.

6.1 Groundwater Level Monitoring Program

Groundwater level monitoring is conducted semi-annually using a network of 76 monitoring wells in April and 104 monitoring wells in October. A summary of the water level monitoring frequency is included in **Table A-1**. In addition to periodic water level monitoring conducted at unit-specific monitoring wells, high-frequency or "continuous" water level monitoring is conducted at a group of wells as part of the enhanced Northern LAU monitoring program described in the GM&EP. These wells are identified as "continuous" in **Table A-1** and are summarized in **Table A-3**, **Appendix A**. The continuously monitored Northern LAU locations include six LAU monitoring wells and four EPCOR production wells. Modifications noted in **Table A-3** were made to provide more useful data regarding capture and control in the Northern LAU plume or because a well became unavailable for monitoring. The NIBW PCs also voluntarily obtain continuous water level data at other selected MAU and LAU monitoring wells to evaluate trends and pumping responses; one-time water level measurements are also obtained at other wells that are not part of the compliance monitoring program.

6.2 Groundwater Quality Monitoring Program

Groundwater quality monitoring of the NIBW COCs is conducted in accordance with requirements of the GM&EP. Water quality monitoring includes the following components:

- Monthly sampling (when operating) at the four (4) CGTF extraction wells, two (2) MRTF extraction wells, and one (1) NGTF extraction well
- Quarterly sampling (when operating) at the three (3) Area 7 extraction wells and two (2) Area 12 extraction wells, and at a network of 24 selected MAU and LAU monitoring wells
- Semi-annual sampling at one (1) LAU monitoring well and annual sampling at an additional 59 wells

Sampling details are summarized in **Table A-1**, including well type, aquifer unit, and frequency of water quality monitoring. Well construction information is summarized in **Table A-2**.

In general, monitoring is conducted in accordance with the SAP for the NIBW Site, developed by SRP and approved by EPA in 2003. In October 2015, however, the PCs prepared and submitted to EPA a draft addendum to the Phase 1 SAP to describe standard operating procedures for collection of groundwater samples at monitoring wells using the HydraSleeve sampling method. Work continues to be conducted in accordance with this draft addendum to the Phase 1 SAP. Consistent with the original Phase 1 SAP for the NIBW Site, groundwater samples are obtained from many of the monitoring wells using dedicated pumps. A standard volume-based purge method requiring stabilization of water quality field parameters is specified, with treatment of purge water prior to discharge for wells where COCs are close to or exceed regulatory limits. The HydraSleeve sampling approach was integrated into the Phase 1 SAP to provide the opportunity to use a passive sampling method at the Site for monitoring wells where dedicated pumps either failed or their use was deemed impractical. In practice, when dedicated pumps have failed, HydraSleeve sampling is used as a sampling strategy on a case-by-case basis, considering both logistical and technical advantages and disadvantages. HydraSleeve samples have generally shown a good agreement with historical results from traditional purge samples. In wells where inconsistent results are apparent, and inconsistencies cannot be explained based on known conditions or trends, dedicated pumps are re-installed in the wells.

Monthly and quarterly groundwater quality monitoring is generally conducted during the first week of the month, beginning in January. The annual groundwater quality monitoring program is initiated at the beginning of October.

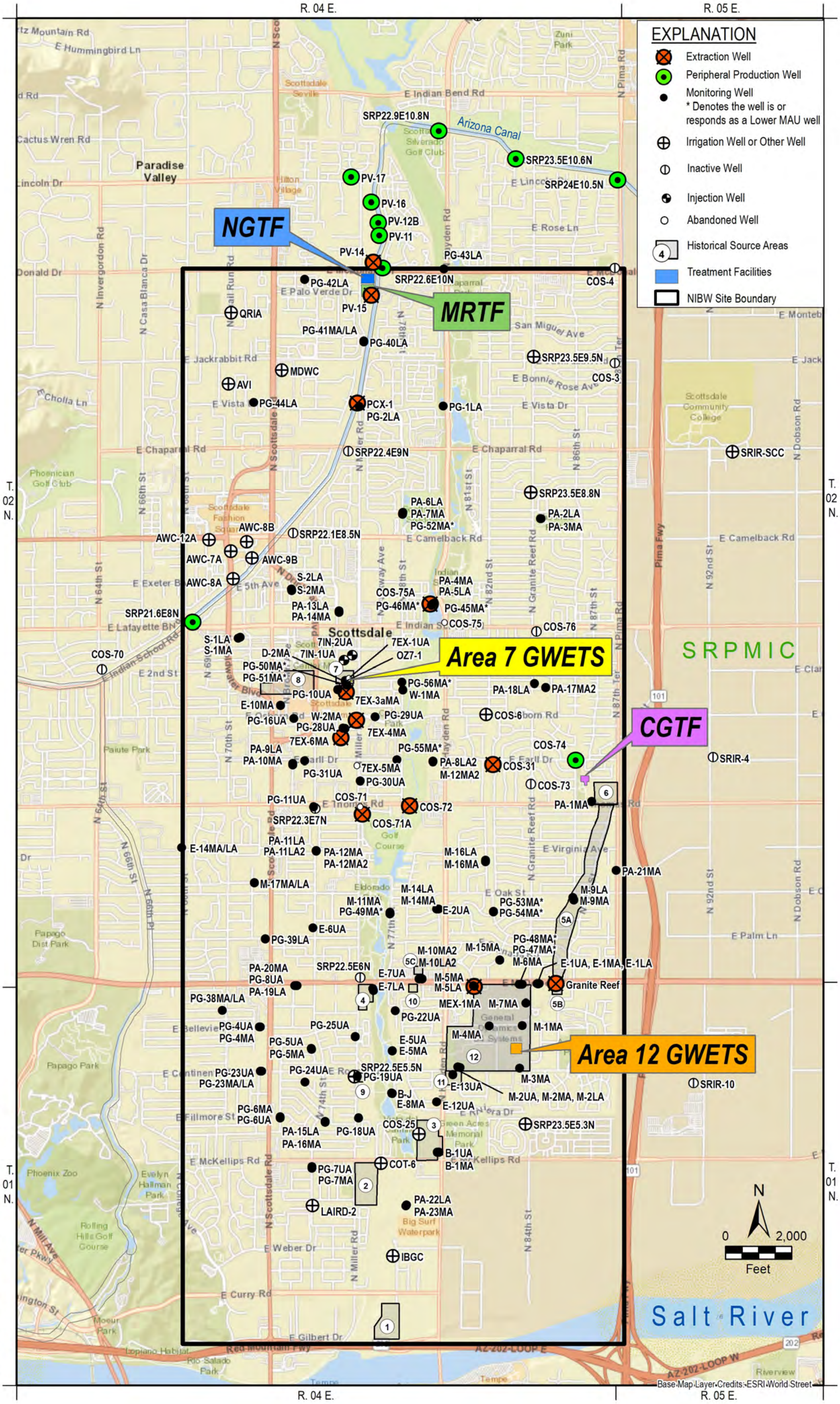

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Figure 5. Well Locations and Identifiers in the NIBW Superfund Site Vicinity

6.3 Groundwater Pumping Reporting Program

Monthly data for total groundwater pumped are compiled in accordance with the GM&EP for wells that pump at rates greater than 35 gpm and are reported to the NIBW PCs annually from municipalities, private water providers, and SRP (see **Figure 6 and Table 7** for well locations and pumping rates). In addition, the PCs obtain groundwater pumping data which encompasses a much larger area from the Arizona Department of Water Resources (ADWR) in conjunction with model updates.

6.4 Treatment System Monitoring Program

Groundwater discharged from the NIBW treatment facilities is required to meet treatment standards described in **Table 3** and sampling is conducted in accordance with requirements of the Phase 2 SAP and treatment facility Operation & Maintenance (O&M) Plans. Treatment system sampling locations and frequency are summarized in **Table 5**.

Table 5. Summary of Treatment System COC Monitoring Program

Treatment Facility	CGTF*	MRTF	NGTF	Area 7	Area 12
Sample Points	CD (eff) Raw (inf)	PV-14 (inf) PV-15 (inf) Tower 1 Tower 2 Tower 3	PCX-1 (inf) NGTF-CP or AZCO (eff)	SP-102 (inf) SP-103 (UV/Ox eff) SP-105 (Air Stripper eff)	WSP-1 (inf) WSP-2 (Air Stripper eff)
Sample Frequency	Weekly	Monthly	Weekly - eff Monthly - inf (PCX-1)	Monthly	Monthly

*CGTF is reported by the City of Scottsdale in its Compliance Monitoring Reports
inf = influent
eff = effluent

6.4.1 COC Water Quality Monitoring at Treatment Facilities

Process and treated groundwater sampling results for CGTF are reported directly to EPA and ADEQ by the City of Scottsdale on a quarterly basis. Results of analyses for process and treated groundwater samples from MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS conducted by TestAmerica are summarized in **Table C-3**, **Appendix C**. Management of Untreated Groundwater is detailed in **Appendix F**.

- <u>CGTF</u> - Treatment system influent samples, labeled “Raw,” and an effluent sample, labeled “CD,” are collected each week (when the treatment system is operational) and submitted to TestAmerica for analysis. The CD sample is analyzed for NIBW COCs, the “Raw” sample is only analyzed for TCE.

- MRTF - Treatment system influent is collected during the first week of the month at extraction wells PV-14 and PV-15. Extraction well (influent) results are summarized in **Table C-2, Appendix C**. Treatment system effluent samples from air stripping treatment train towers one, two, and three are collected during the first week of each month (when the treatment system is operational) by EnSolutions and submitted to TestAmerica for analysis of NIBW COCs. Process and treated groundwater sampling results for MRTF are reported quarterly by the NIBW PCs.

  In addition to the routine monitoring of MRTF extraction wells conducted pursuant to the GM&EP, the NIBW PCs conduct supplemental sampling at wells PV-11 and PV-12B when operating on the scheduled monthly sampling date for the MRTF extraction wells. These two water supply wells are located immediately downgradient from extraction well PV-14.

- NGTF - Treatment system influent is sampled during the first week of the month at extraction well PCX-1 by EnSolutions and samples are analyzed for NIBW COCs by TestAmerica. Extraction well (influent) sampling results are summarized in **Table C-2**. Treatment system effluent samples are collected each week (when the treatment system is operational) from either the CWTP (samples labeled "NGTF-CP") or the SRP Arizona Canal (samples labeled "AZCO") and are submitted to TestAmerica for analysis of NIBW COCs. Treated groundwater sampling results for NGTF are reported quarterly by the NIBW PCs.

- Area 7 GWETS - Treatment system influent from sample port SP-102 (combined influent from Area 7 extraction wells 7EX-3aMA and 7EX-6MA), UV/Ox reactor effluent from sample port SP-103, and air stripper effluent from sample port SP-105 are sampled during the first week of each month (when the treatment system is operational) by EnSolutions. Samples are submitted to TestAmerica for analysis of NIBW COCs. Process and treated groundwater sampling results for Area 7 GWETS are reported quarterly by the NIBW PCs.

- Area 12 GWETS - Treatment system influent from sample port WSP-1 (combined influent from Area 12 extraction wells MEX-1MA and Granite Reef well), and air stripper effluent from sample port WSP-2 are sampled during the first week of each month (when the treatment system is operational) by EnSolutions. Samples are submitted to TestAmerica for analysis of NIBW COCs. Process and treated groundwater sampling results for Area 12 GWETS are reported quarterly by the NIBW PCs.

6.5 Data Management & Quality Assurance / Quality Control

The following measures are taken in an ongoing manner to ensure collection, analysis, storage, and reporting of quality data:

- Water level and water quality data are collected in accordance with the Phase 1 SAP (including the draft 2015 Hydrasleeve Addendum) and Phase 2 SAP.
- Primary and backup laboratories are designated and certified by the ADHS for EPA method 524.2 for Site COCs.
- The appropriate number of trip blanks, field blanks, and field duplicates are obtained during each sampling round.
- Water level data are reviewed in relation to trends prior to being integrated into the data repository, and water levels are re-measured if data are suspect.
- Laboratory results are reviewed in relation to each laboratories published performance criteria and historical data trends; re-analysis and re-sampling may occur if results are suspect.
- Treatment system effluent samples are given careful and timely scrutiny and re-sampled immediately if results are out of anticipated ranges.
- All compliance data are digitally stored in a secure manner and are associated with specific wells and/or sampling locations using consistent station identifiers.
- Water quality samples are given unique sample identifiers (IDs) and are linked to supporting laboratory reports and field information for future reference.
- Annual laboratory audits are conducted and any issues that are identified during the year are reviewed and addressed.
- Periodic blind Performance Evaluation (PE) samples of known concentrations are sent to the primary laboratory and split samples are sent to the backup laboratory.
- All compliance reporting is based on direct output from the secure digital Site database that is maintained by the PCs.

7 DATA PRESENTATION AND ANALYSES

7.1 Groundwater Pumping

Monthly groundwater pumping data for 2021 is summarized in **Table 7**. Annual groundwater pumping data for 1991 through 2021 are summarized in **Table 8** and 2021 groundwater pumping data are shown graphically on **Figure 6**, with circle size increasing with pumping volume. The estimated annual pumping distribution between the UAU, MAU, and LAU for pumping wells in the vicinity of the Site is shown on **Figure 6** in percentages and in **Table 7** in acre-feet (AF).

Review of monthly groundwater pumping data (**Table 7**) indicates seasonal trends in pumping in response to fluctuations in demand for groundwater. In general, maximum groundwater pumping for municipal demand corresponds to the summer months while minimum groundwater pumping for municipal demand corresponds to the winter months. In 2021, combined monthly pumping for all wells tracked at the NIBW Site ranged from an annual minimum of approximately 1,431 AF--which is equivalent to about 466 million gallons (MG)--in December 2021, to an annual maximum of 2,285 AF (about 744 MG) in June 2021.

Review of the spatial distribution of groundwater pumping for 2021 (**Figure 6**) indicates the presence of several pumping centers. The predominant pumping center is associated with the Paradise Valley (PV) wellfield, located along the Arizona Canal in the vicinity of McDonald Road to the north. Total groundwater pumping for 2021 at the six PV wells was 10,100 AF (3,291 MG). This pumping is principally from the LAU. NGTF extraction well SRP22.5E9.3N (also known as PCX-1) pumped a total of 2,923 AF (952 MG) from the LAU in 2021. Combined pumping at PV wells and PCX-1 in the Northern LAU causes a regional cone of depression that controls groundwater movement in the LAU across the NIBW Site.

Outside of the Northern LAU pumping center, groundwater extraction at the CGTF extraction wells (COS-75A, COS-31, COS-72, and COS-71A) is the most significant pumping that occurs within the boundaries of the NIBW Site. Wells COS-75A pumps exclusively and well COS-71A primarily from the LAU. Wells COS-72 and COS-31 pumps from both the MAU and LAU. Extraction well COS-71A was not pumped in 2021 due to elevated levels of inorganics at this well. Increasing levels of inorganics has resulted in a reduction in overall pumping at CGTF extraction wells, establishing a new baseline based on the inorganic loading the City of Scottsdale can feasibly accept into its municipal supply system. Strategies to redevelop and potential modify COS-71A to this well to facilitate its operation in 2022, once the TGTF is commissioned, are being considered by the PCs and the City of Scottsdale. Total groundwater pumping for 2021 at the CGTF extraction wells was 4,477 AF (1,459 MG). CGTF pumping in 2021 was principally focused at well COS-75A, which accounted for approximately 70% of CGTF extraction, with about 3,078 AF of the 4,477 AF pumped.

Pumping associated with Area 7 and Area 12 GWETS is also fairly substantial, totaling 229 AF (75 MG) and 2,435 AF (793 MG) for 2021, respectively. Area 7 GWETS was offline due to a communications issue caused by storms beginning in July 2021. Planned activities to upgrade the communications system were initiated immediately. Delays caused by COVID-19 pandemic global supply chain issues, however, extended the down time of Area 7 GWETS through the end of 2021. Groundwater extraction for the Area 7 and Area 12 Source Control Programs is exclusively from the MAU.

The AWC wellfield comprises another pumping center in the vicinity of the NIBW Site. Total groundwater pumping during 2021 at the five AWC wells, which pump from the MAU and LAU, was 2,009 AF (655 MG). When operating, City of Tempe (COT) well COT-6 comprises another significant pumping center. Well COT-6 pumps principally from the MAU. COT-6 was only operated on a limited basis during 2021 and a total of 25 AF (8 MG) was pumped from well.

Table 8 summarizes annual groundwater pumping for wells in the vicinity of the NIBW Site for the period 1991 through 2021. Overall trends in pumping from 1991 through present are summarized in **Table 6**. Annual groundwater pumping in the vicinity of the NIBW Site for 2021 totaled 22,719 AF, or 7,403 MG, which is fairly consistent with the average since 2019.

Table 6. Annual Groundwater Pumping Trends in the NIBW Superfund Site Vicinity

Timeframe	Annual Groundwater Pumped
1991 through 1995	Remedy build-out in progress - pumping ranged from 18,887 AF (6,154 MG) to 31,824 AF (10,370 MG)
1996 through 2004	Initial remedy operation - pumping increased to average of 40,165 AF (13,088 MG)
2005 through 2016	Increase in surface water supply to the City of Scottsdale and SRP - pumping decreased to average of 29,324 AF (9,555 MG)
2017 through 2021	The City of Scottsdale balancing inorganics not related to Site - pumping decreased to average of approximately 23,554 AF (7,675 MG)

Table 7. 2021 Monthly Groundwater Pumping in the NIBW Superfund Site Vicinity

Well ID	Estimated Pumping Distribution Percentage			Gallons (x1000)													Total In Acre-Feet	Calculated Pumping Distribution (Acre-Feet)		
	UAU	MAU	LAU	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total		UAU	MAU	LAU
7EX-3aMA	0	100	0	3,484	5,183	6,230	6,586	6,637	1,434	1,575	0	0	0	0	0	31,126	95.5	0.0	95.5	0.0
7EX-4MA	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
7EX-6MA	0	100	0	4,406	7,619	9,533	8,957	8,633	2,096	2,307	0	0	0	0	0	43,552	133.7	0.0	133.7	0.0
PV-11	0	3	97	65,587	58,599	64,583	58,375	58,893	55,823	57,428	52,595	46,310	52,279	25,630	0	596,102	1,829.4	0.0	54.9	1,774.5
PV-12B	0	3	97	31,980	35,549	68,142	73,625	79,431	130,642	119,361	81,045	69,257	64,305	54,587	26,007	833,931	2,559.2	0.0	76.8	2,482.5
PV-14	0	0	100	0	0	0	44,622	80,339	0	0	66,330	89,038	92,747	91,814	87,080	551,970	1,693.9	0.0	0.0	1,693.9
PV-15	0	6	94	95,491	87,531	96,649	92,782	95,262	92,215	96,472	95,117	88,317	92,804	89,293	94,935	1,116,868	3,427.5	0.0	205.7	3,221.9
PV-16	0	0	100	173	318	244	221	2,397	4,230	1,319	326	309	1,042	1,073	86	11,738	36.0	0.0	0.0	36.0
PV-17	0	0	100	820	353	379	1,047	6,351	77,324	67,687	19,413	1,963	2,493	2,527	66	180,423	553.7	0.0	0.0	553.7
AVI **	0	100	0	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	30,255	92.8	0.0	92.8	0.0
AWC-7A **	0	14	86	10,156	10,156	10,156	10,156	10,156	10,156	10,156	10,156	10,156	10,156	10,156	10,156	121,876	374.0	0.0	52.4	321.7
AWC-8/8B ** ***	0	4	96	12,679	12,679	12,679	12,679	12,679	12,679	12,679	12,679	12,679	12,679	12,679	12,679	152,142	466.9	0.0	18.7	448.2
AWC-8A **	0	18	82	9,194	9,194	9,194	9,194	9,194	9,194	9,194	9,194	9,194	9,194	9,194	9,194	110,329	338.6	0.0	60.9	277.6
AWC-9A/9B **	0	16	84	5,125	5,125	5,125	5,125	5,125	5,125	5,125	5,125	5,125	5,125	5,125	5,125	61,501	188.7	0.0	30.2	158.5
AWC-12A **	0	11	89	17,407	17,407	17,407	17,407	17,407	17,407	17,407	17,407	17,407	17,407	17,407	17,407	208,879	641.0	0.0	70.5	570.5
COS-3	0	15	85	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS-4	0	9	91	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS-14	0	14	86	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS-25 *	0	20	80	34	46	108	1,071	1,409	2,104	1,432	1,424	1,591	538	60	35	9,851	30.2	0.0	6.0	24.2
COS-70	0	21	79	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS-71A	0	71	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
COS-72	0	48	52	100,109	89,686	3,672	0	9,683	28,587	17,040	26,368	12,715	0	0	25,921	313,782	963.0	0.0	462.2	500.7
COS-73	0	20	80	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COS-74	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
COS-75A	0	0	100	102,108	91,327	100,178	95,051	99,116	90,013	82,996	95,842	83,350	99,913	4,464	58,522	1,002,880	3,077.7	0.0	0.0	3,077.7
COS-76	0	69	31	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	0	0.0	0.0	0.0	0.0
COT-6	0	42	58	0	0	0	8,200	0	0	0	0	0	0	0	0	8,200	25.2	0.00	10.57	14.60
IBGC	0	60	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LAIRD 2	0	59	41	0	0	0	0	0	11	21	21	21	21	11	0	105	0.3	0.00	0.19	0.13
MDWC	0	12	88	1,520	1,535	1,478	3,031	4,346	3,610	1,251	3,027	3,094	2,932	1,625	1,513	28,962	88.9	0.0	10.7	78.2
MEX-1MA	0	100	0	39,730	34,680	40,350	40,289	40,790	39,461	28,124	27,271	39,730	38,942	39,570	14,531	423,468	1,299.6	0.0	1,299.6	0.0
QRIA	0	12	88	0	0	0	1,472	1,931	1,674	1,134	770	932	446	0	0	8,357	25.6	0.0	3.1	22.6
SRIR-SCC	0	100	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0.0	0.0	0.0	0.0
SRIR-4	0	100	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	0	0.0	0.0	0.0	0.0
SRIR-10	0	100	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	0	0.0	0.0	0.0	0.0

Well ID	Estimated Pumping Distribution Percentage			Gallons (x1000)													Total In Acre-Feet	Calculated Pumping Distribution (Acre-Feet)		
	UAU	MAU	LAU	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total		UAU	MAU	LAU
SRP21.6E8N	0	29	71	10,316	0	0	270	0	0	0	202	557	0	46	0	11,392	35.0	0.0	10.1	24.8
SRP22.1E8.5N	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP22.3E7N	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP22.4E9N	0	40	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP22.5E5.5N	0	52	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP22.5E6N	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
PCX-1 (SRP22.5E9.3N)	0	0	100	49,970	61,459	95,627	90,821	31,577	84,386	89,902	91,410	87,578	90,545	88,661	90,399	952,336	2,922.6	0.0	0.0	2,922.6
SRP22.6E10N	0	5	95	6,566	59	0	0	169	0	6,074	837	420	0	0	0	14,126	43.4	0.0	2.2	41.2
SRP22.9E10.8N	0	8	92	3	59	0	0	121	0	1,023	486	743	0	49	0	2,483	7.6	0.0	0.6	7.0
COS-31 (SRP23.3E7.3N)	0	30	70	37,147	80,557	2,769	0	0	0	2,163	14,921	4,453	0	0	0	142,009	435.8	0.0	130.7	305.1
COS 6 (SRP23.3E7.5N)	0	51	49	0	0	0	0	0	525	0	0	156	0	0	0	681	2.1	0.0	1.1	1.0
SRP23.5E5.3N	0	23	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.00	0.00
SRP23.5E8.8N	0	35	65	0	0	0	0	0	10,404	0	0	0	0	0	0	10,404	31.9	0.0	11.18	20.75
SRP23.5E9.5N	0	0	100	0	0	0	0	0	27,577	0	0	0	0	0	0	27,577	84.6	0.0	0.0	84.6
SRP23.5E10.6N	0	9	91	0	0	0	0	0	0	0	319	534	0	0	0	854	2.6	0.0	0.2	2.4
Granite Reef (SRP23.6E6N)	0	100	0	38,230	31,870	37,660	35,411	36,289	34,869	24,932	24,331	31,880	32,620	34,060	7,797	369,948	1,135.3	0.0	1,135.3	0.0
SRP24E10.5N	0	18	82	0	0	0	0	0	394	8,319	1,600	9,222	877	2,213	2,441	25,064	76.9	0.0	13.8	63.1
Total Monthly Discharge (Gallons x 1,000)				644,757	643,511	584,682	618,914	620,455	744,459	667,641	660,737	629,252	629,585	492,762	466,415	7,403,170				
Total Monthly Discharge (Acre-Feet)				1,979	1,975	1,794	1,899	1,904	2,285	2,049	2,028	1,931	1,932	1,512	1,431	22,719	22,719	0	3,990	18,730

ABBREVIATIONS:

7EX = Area 7 Extraction Wells
AB = Well Abandoned
AVI = Arcadia Vista Improvement
AWC = Arcadia Water Company
COS = City of Scottsdale
COT = City of Tempe
IBGC = Indian Bend (Rio Salado) Golf Course
LAIRD = Tempe School District No. 3
MDWC = McDowell Water Company
MEX = Motorola Extraction Well
NA = Not Available
N.I.S. = Not in Service
PV = Paradise Valley
QRIA = Quail Run Irrigation Association
SRIR = Salt River Indian Reservation
SRP = Salt River Project
SCC = Scottsdale Community College

NOTES:

* All water from Well COS-25 goes directly to McKellips Park irrigation and does not go to the City of Scottsdale's water delivery system.
** Monthly values are based on an average of the annual total.
***Includes pumping for AWC-8 and AWC-8B and is now AWC-8B

Table 8. Annual Groundwater Pumping in the NIBW Superfund Site Vicinity from 1991 through 2021

Well ID	Gallons (x1000)																														
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
7EX-1UA [1]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13,514	13,654	14,585	12,966	12,627	0	0	0	AB	AB	AB	AB	AB	AB
7EX-3aMA [2]	---	---	---	---	---	---	---	---	13,170	87,375	76,401	64,048	77,690	83,654	72,475	73,094	74,020	64,062	70,290	73,227	68,454	89,646	82,936	85,411	75,046	50,426	55,354	54,202	52,783	73,716	31,126
7EX-4MA [2]	---	---	---	---	---	---	---	---	12,498	57,645	50,958	29,736	35,822	27,685	19,076	22,205	12,790	12,225	19,259	24,851	30,447	46,901	51,448	35,461	28,280	16,720	0	0	0	0	0
7EX-5MA [3]	---	---	---	---	---	---	---	---	---	---	---	42,094	96,280	85,914	102,191	95,534	103,234	78,932	88,997	72,160	69,657	19,315	0	0	0	0	AB	AB	AB	AB	AB
7EX-6MA [4][a]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	25,524	76,991	107,116	105,021	89,539	108,698	43,552
PV-11	141,681	10,008	6,048	49,440	147,437	191,702	314,834	234,419	477,245	308,005	541,897	479,842	272,363	317,251	234,580	388,303	237,616	525,273	353,453	108,631	584,592	769,961	823,065	610,793	587,317	667,557	673,419	574,889	433,655	623,004	596,102
PV-12	78,760	161,849	160,265	197,764	442,311	766,800	302,222	224,958	317,991	242,826	292,758	269,215	255,925	181,905	190,159	235,528	177,350	415,980	478,840	182,527	416,242	72,486	0	AB	AB	AB	AB	AB	AB	AB	AB
PV-12B [b]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	464,884	769,618	438,959	422,165	809,273	558,911	452,431	835,263	741,792	833,931
PV-14	697,184	578,435	747,760	670,253	556,129	387,737	203,056	584,633	575,456	512,210	487,780	593,518	632,011	677,341	771,890	387,497	632,798	232,191	149,512	451,695	854,265	930,498	696,185	1,031,782	1,097,813	1,067,856	1,024,432	1,110,912	1,061,608	983,648	551,970
PV-15	607,810	653,910	616,805	404,378	204,347	289,088	629,291	950,086	1,066,526	996,539	811,431	913,461	1,017,488	1,082,598	1,059,244	1,066,791	281,022	418,495	890,424	997,698	1,053,100	1,022,323	831,104	1,078,491	1,006,058	620,398	1,089,449	1,066,873	851,657	1,033,416	1,116,868
PV-16	1,170,129	1,019,287	1,131,036	1,048,376	981,234	1,067,411	1,051,729	583,415	423,634	541,894	699,049	475,143	414,571	319,872	341,430	246,221	567,698	831,067	704,898	842,941	314,954	253,545	184,509	89,102	84,721	125,342	156,143	74,120	5,198	25,923	11,738
PV-17	---	---	7,080	715,206	711,787	711,787	906,660	568,588	358,059	54,352	105,121	57,730	128,252	102,762	38,113	173,522	451,742	1,015,459	1,297,930	1,005,540	221,181	10,293	35,513	12,581	12,304	31,554	10,217	173,515	156,611	122,929	180,423
AVI	78,763	79,074	89,128	95,840	91,608	88,372	93,030	79,825	84,295	75,740	79,388	76,049	70,533	78,501	68,605	62,650	54,663	67,011	57,627	60,168	60,117	54,030	51,308	48,633	44,140	43,214	40,492	37,393	32,484	34,637	30,255
AWC-7A	77,412	338,402	401,431	424,251	374,819	340,712	190,891	223,939	298,585	305,173	276,139	220,294	229,397	170,813	176,534	45,049	40,934	51,903	63,065	38,430	155,622	261,554	229,121	280,630	299,937	221,472	236,670	246,750	220,338	159,909	121,876
AWC-8	363,078	418,945	410,874	417,285	233,147	341,332	270,555	370,570	319,651	292,498	138,800	279,501	212,209	321,431	293,885	254,674	365,994	353,379	326,794	313,350	311,522	323,744	153,290	129,982	138,410	83,095	130,116	241,356	159,780	186,375	152,142
AWC-8A	0	0	0	215,398	394,624	265,618	271,981	266,446	271,888	184,594	136,050	226,063	257,184	245,347	156,650	195,585	3,353	112,147	117,745	195,986	34,276	54,811	113,073	44,916	67,315	106,568	99,776	101,678	71,389	64,861	110,329
AWC-9A	434,580	128,063	97,615	136,891	210,374	226,053	236,429	180,337	166,739	214,811	323,119	213,268	168,569	159,197	133,705	278,127	403,515	221,656	259,969	304,614	280,265	275,173	308,515	263,003	229,236	233,041	196,193	135,204	227,470	148,082	61,501
AWC-12A	242,769	182,413	171,403	174,068	329,099	241,366	331,889	272,153	232,164	309,621	329,926	295,895	321,098	312,606	370,420	406,087	405,590	426,091	349,362	365,767	391,746	233,788	337,512	309,414	274,882	297,279	231,665	191,707	135,610	174,663	208,879
COS-2	250,311	366,789	246,573	32,587	0	0	0	0	0	0	0	0	0	0	0	0	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS-3	226,940	237,611	371,887	410,270	406,218	322,974	386,618	363,730	260,750	91,100	156,906	142,948	129,909	95,897	162,641	2,062	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS-4	42,215	39,244	47,984	95,807	56,487	28,646	84,058	146,211	159,421	328,716	411,993	310,812	347,167	308,158	445,980	17,765	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS-14	116,505	71,871	214,611	317,726	343,300	265,520	238,930	229,608	306,935	396,650	91,174	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS-25	260,701	199,541	48,721	484,574	551,724	242,256	25,618	8,730	0	0	6,482	15,627	14,628	15,460	9,442	25,372	15,728	14,472	12,850	10,148	14,398	14,801	11,768	9,929	11,903	11,450	13,771	12,834	9,678	12,555	9,851
COS-69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS-70	133,678	2,553	43,066	390,067	110,774	55,201	93,123	2,709	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS-71	0	0	6,480	502,719	234,943	1,126,972	958,101	946,903	631,967	787,926	1,013,550	432,044	764,771	638,982	387,740	826,102	492,646	697,198	725,001	557,523	371,970	475,775	370,408	12,211	AB	AB	AB	AB	AB	AB	AB
COS-71A [c]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	52,797	505,229	559,816	4,064	7,011	0	6,075	0
COS-72	0	0	4,991	394,796	299,685	699,937	662,468	779,085	953,964	763,436	556,347	821,780	560,773	1,028,060	1,016,259	927,729	460,529	327,703	1,087,912	820,643	1,022,055	82,907	169,017	16,847	285,438	380,588	13,068	151,031	263,425	407,248	313,782
COS-73	3,271	649,298	1,007,101	3,252	795	9,743	3,157	527	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS-74	42,763	38,042	635,564	733,867	825,076	460,914	396,669	790,408	918,226	1,092,783	1,165,908	1,003,371	955,818	1,098,504	1,172,087	424,447	325,721	318,930	426,465	469,534	139,478	382,838	155,871	193,017	65	0	0	0	0	0	0
COS-75A	0	0	0	0	452,657	796,408	892,870	951,517	830,739	896,406	979,506	836,006	933,512	926,306	936,472	929,487	559,788	821,026	878,726	841,481	848,597	917,870	1,108,302	987,970	777,406	933,858	977,609	1,062,801	1,012,888	715,078	1,002,880
COS-76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS-77	0	3,088	1,103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS-78	999,204	328	1,029	650	0	0	3,099	0	0	0	0	0	0	0	0	0	0	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COT-6	150	1,668	2,777	10,122	3,441	160,308	4,197	0	0	446,480	734,304	221,080	26,831	0	22,571	390	0	153	1,666	389,936	355,018	9	506,354	369,685	385,707	417,507	536,592	33,524	24,030	258,834	8,200
IBGC	69,987	59,242	65,845	66,839	61,266	79,697	75,740	68,887	344	28,365	64,996	69,982	62,855	65,938	59,087	63,778	63,778	69,938	59,199	60,546	56,053	37,910	68,382	119	0	0	0	0	0	0	NA
LAIRD-2	8,178	1,453	1,827	964	1,655	1,655	4,650	1,573	8,432	9,857	0	0	0	0	0	3,853	3,853	322	530	357	285	365	558	412	119	0	104	207	65	0	105
MDWC	27,289	27,835	53,587	62,535	58,707	66,855	62,060	59,829	67,278	72,475	59,485	53,208	51,864	45,985	1,352	50,081	50,046	54,355	46,873	48,614	42,379	43,956	37,426	36,964	39,853	54,486	51,438	39,710	36,020	30,139	28,962
MEX-1MA [5]	---	---	---	---	---	---	---	---	34,348	256,586	361,409	227,273	119,380	315,708	309,919	311,978	332,752	405,260	394,010	407,090	398,980	273,270	318,740	223,710	200,600	283,710	164,430	240,280	393,191	423,872	423,468

Well ID	Gallons (x1000)														
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
QRIA	17,503	16,001	13,437	12,768	13,407	14,166	17,274	16,544	19,832	8,863	16,435	15,212	14,628	13,541	12,883
SRIR-SCC	86,231	86,231	78,736	91,777	79,599	84,063	77,791	36,374	69,629	78,217	76,349	76,153	65,411	68,046	76,319
SRIR-4	60,580	7,771	0	31,631	3	0	248	38	0	0	0	0	0	0	0
SRIR-10	47,583	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SRP21.5E8N	74,479	2,829	5,090	59,887	17,536	19,600	0	1,302	213,170	454,442	247,362	160,470	166,324	254,063	28,797
SRP21.6E8N[d]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SRP22.1E8.5N	147,778	103,488	14,221	78,782	3,189	21,219	25	1,051	8	488,285	214,764	3,126	0	7,299	0
SRP22.3E7N	0	0	0	0	756	22	0	0	0	0	0	0	0	0	0
SRP22.4E9N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SRP22.5E5.5N	0	0	0	0	0	0	0	0	0	0	123,673	264,377	0	0	0
SRP22.5E6N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCX-1[(6)] (SRP22.5E9.3N)	---	---	---	---	---	---	744,308	1,169,490	928,957	1,094,148	709,461	1,080,881	1,032,519	1,002,262	1,003,406
SRP22.6E10N	195,626	9,773	4,636	184,709	22,836	99,731	0	85	261,217	613,096	583,486	699,074	935,270	828,047	97,937
SRP22.9E10.8N[e]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SRP23E10.8N (COS-5W)	137,618	60,933	6,744	33,979	115,096	7,607	15,747	5,701	154,864	350,263	337,880	148,376	447,267	174,920	14,322
COS-31 (SRP23.3E7.3N)	0	1,305	21,834	1,007,196	15,974	1,222,373	973,894	493,236	916,864	748,167	983,356	1,091,407	1,019,344	516,934	826,859
COS-6 (SRP23.3E7.5N)	156,795	24,127	-3	35,527	47,921	192,207	168,263	246,769	101,318	62,194	102,249	80,341	138,380	88,935	1,638
SRP23.4E10.6N (COS-5E)	507,724	565,069	578,233	658,438	663,544	757,582	723,706	779,598	832,331	566,682	392,775	278,701	470,274	576,706	30,001
SRP23.5E5.3N	122,870	3,077	4,077	3,271	4,920	2,856	0	34,473	111,366	144,215	126,690	226,058	128,631	255,259	3,348
SRP23.5E8.8N	66,487	1,775	557	2,556	7,176	52	49	685	1,499	132,274	70,905	21,050	213,020	241,944	1,505
SRP23.5E9.5N	0	0	0	0	0	0	0	85	502	117,592	131	99,548	30,042	256,542	2,051
SRP23.5E10.6N[f]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Granite Reef (SRP23.6E6N)	0	0	0	0	0	0	0	0	104,439	287,660	174,199	319,110	180,870	42,938	58,781
SRP24E10.5N	113,065	3,151	578,233	113,496	16,493	122,709	2,124	2,397	381,364	470,577	408,894	616,127	528,528	428,180	31,260
Total Discharge (Gallons x1000)	7,807,696	6,154,481	7,898,386	10,369,940	9,092,091	11,779,250	11,417,355	11,676,917	12,887,663	14,970,743	14,519,488	13,549,998	13,527,407	13,461,492	10,741,611
Total Discharge (Acre-Feet)	23,961	18,887	24,239	31,824	27,903	36,149	35,039	35,835	39,551	45,943	44,559	41,583	41,514	41,312	32,965

Well ID	Gallons (x1000)															
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
QRIA	15,665	14,333	14,718	12,962	10,837	12,140	10,965	11,727	10,510	10,921	9,382	9,234	7,450	8,370	10,044	8,357
SRIR-SCC	82,780	61,274	68,592	74,861	42,721	67,924	74,567	56,762	65,405	60,768	56,972	61,068	60,161	45,217	33,014	NA
SRIR-4	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	AB	AB	AB
SRIR-10	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	AB	AB	AB
SRP21.5E8N	0	0	0	3,397	5,321	13,803	114,214	116,117	208,382	73,131	18,104	AB	AB	AB	AB	AB
SRP21.6E8N[d]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11,392
SRP22.1E8.5N	0	0	0	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
SRP22.3E7N	0	0	N.I.S.	0	0	0	0	0	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
SRP22.4E9N	0	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
SRP22.5E5.5N	0	0	0	0	0	0	0	64,101	0	88	212	0	101	7	0	0
SRP22.5E6N	0	0	N.I.S.	0	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
PCX-1[(6)] (SRP22.5E9.3N)	1,109,259	983,481	856,322	1,012,745	1,008,500	891,933	971,762	1,000,902	478,633	1,076,158	1,194,001	1,293,066	1,248,095	718,730	910,084	952,336
SRP22.6E10N	103,237	289,257	79,268	62,767	30,503	66,444	290,043	68,455	228,571	63,629	6,207	81	21,288	0	8,840	14,126
SRP22.9E10.8N[e]	---	---	---	---	---	---	128,034	173,499	305,492	183,239	29,066	91	16,957	2,222	150	2,483
SRP23E10.8N (COS-5W)	21,004	120,014	N.I.S.	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS-31 (SRP23.3E7.3N)	560,651	309,239	655,172	5,133	118,375	454,664	713,491	257,409	489,661	208,113	372,149	143,659	189,906	312,312	74,153	142,009
COS-6 (SRP23.3E7.5N)	1,769	175,013	0	0	0	0	0	0	0	7,723	4,054	0	1,082	4,920	1,457	681
SRP23.4E10.6N (COS-5E)	0	0	N.I.S.	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
SRP23.5E5.3N	0	78,673	0	2,941	0	0	0	0	7	6,194	1,776	0	0	518	13	0
SRP23.5E8.8N	2,922	134,579	0	1,551	0	965	0	531	3	101	935	0	0	0	528	10,404
SRP23.5E9.5N	1,988	163,479	0	2,021	0	1,303	33	15,054	163	0	352	0	0	0	65	27,577
SRP23.5E10.6N[f]	---	---	---	---	---	---	83,907	191,216	217,193	115,912	20,369	0	33,374	251	78	854
Granite Reef (SRP23.6E6N)	173,699	44,516	99,160	79,599	70,470	79,880	70,110	77,410	195,150	305,880	348,810	184,350	304,370	150,273	140,744	369,948
SRP24E10.5N	45,701	188,758	11,621	9,319	0	411	204,488	323,257	332,586	138,399	34,931	173	79,524	2,014	1,261	25,064
Total Discharge (Gallons x1000)	9,632,587	8,679,775	9,333,593	10,142,344	9,944,770	9,698,086	9,786,891	9,770,464	8,894,575	8,849,725	9,189,521	8,062,751	8,075,756	7,317,515	7,515,884	7,403,170
Total Discharge (Acre-Feet)	29,561	26,637	28,644	31,126	30,519	29,762	30,035	29,984	27,296	27,159	28,202	24,744	24,784	22,457	23,065	22,719

ABBREVIATIONS:

- 7EX = Area 7 Extraction Wells
- AB = Well Abandoned
- AVI = Arcadia Vista Improvement
- AWC = Arcadia Water Company
- COS = City of Scottsdale
- COT = City of Tempe
- IBGC = Indian Bend (Rio Salado) Golf Course
- LAIRD = Tempe School District No. 3
- MDWC = McDowell Water Company
- MEX = Motorola Extraction Well
- NA = Not available
- N.I.S. = Not in Service
- PV = Paradise Valley
- QRIA = Quail Run Irrigation Association
- SRIR = Salt River Indian Reservation
- SRP = Salt River Project
- --- = No Data

NOTES:

(1) Extraction well 7EX-1UA went into service in 2008.
(2) Extraction wells 7EX-3MA and 7EX-4MA went into service in September 1999.
(3) Extraction well 7EX-5MA went into service in February 2002.
(4) Extraction well 7EX-6MA went into service in October 13, 2015.
(5) Well MEX-1MA went into service in October 1999.
(6) Well SRP22.5E9.3N (PCX-1) went into service in April 1997.

a Replacement well for 7EX-5MA
b Replacement well for PV-12
c Replacement well for COS-71
d Replacement well for SRP21.5E8N
e Replacement well for SRP23E10.8N
f Replacement well for SRP23.4E10.6N

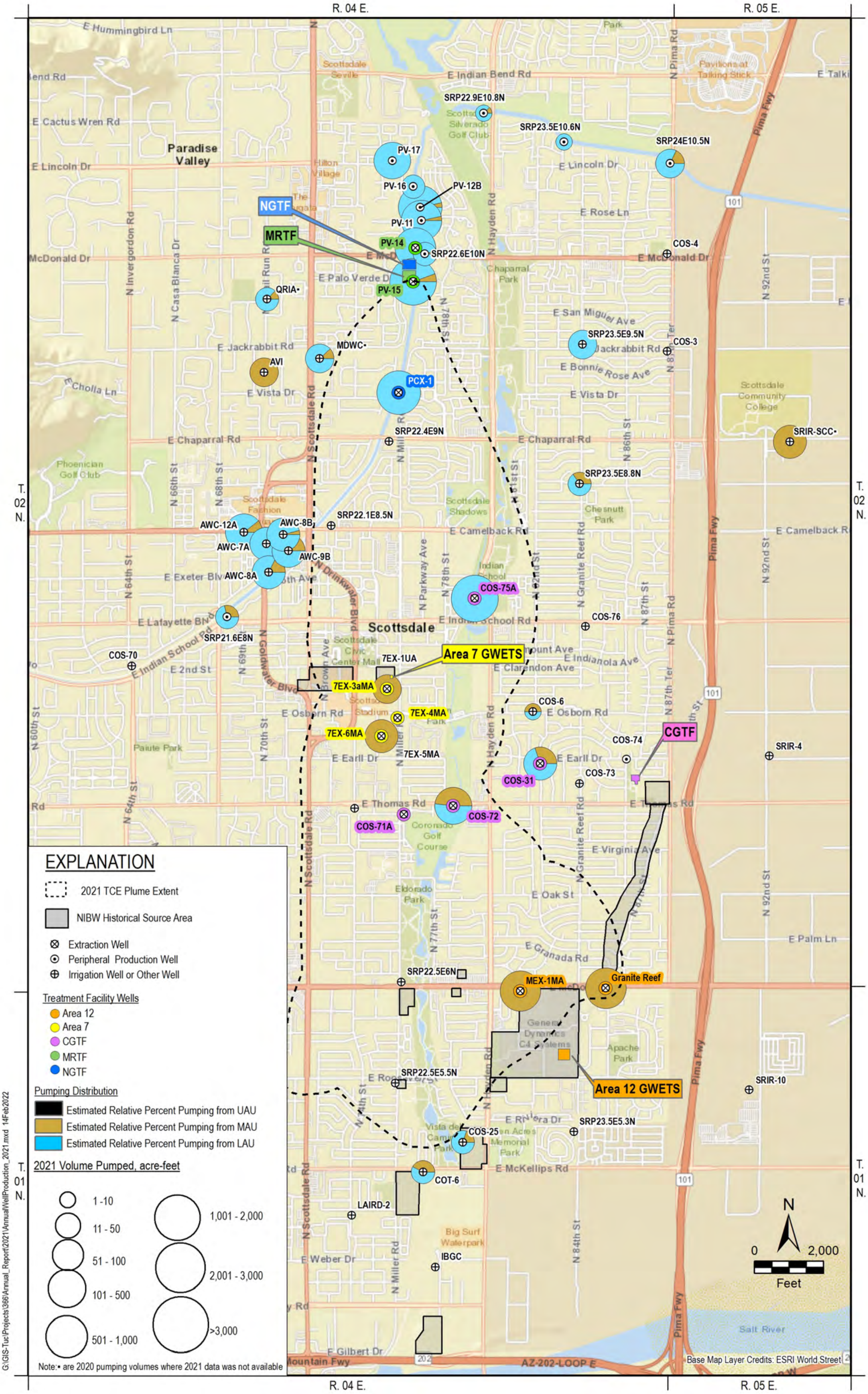

Figure 6. Annual Groundwater Pumping in the NIBW Superfund Site Vicinity

7.2 Groundwater Levels

Water level measurements obtained and reported by Montgomery & Associates in April and October are summarized in **Tables B-1 and B-2**, **Appendix B**, respectively. Water level monitoring for the UAU has been discontinued for April (as approved by EPA and ADEQ in 2013) and is now conducted annually in October at the remaining network of 28 UAU monitoring wells. April 2021 water level contour maps for the MAU and LAU are shown on **Figure 7**. October 2021 water level contour maps for the UAU, MAU, and LAU are shown on **Figure 8**.

Hydrographs showing continuous water level data for wells in the Northern LAU monitoring program are provided in **Appendix B**. The PCs collect additional continuous water level data (not required for compliance) at the Site at a set of selected MAU and LAU monitoring wells. While not included in this compliance monitoring report, these continuous water level data sets are helpful to interpret trends and responses.

Pumping, primarily in the MAU and LAU, influences water levels and patterns of groundwater movement in the three alluvial unit aquifers. The principal pumping centers are discussed in **Section 7.1**. **Table 7** summarizes monthly pumping and **Figure 6** shows annual pumping for wells in the vicinity of the NIBW Site. As in previous years, at the request of the PCs, the water providers worked within operational and demand constraints to maintain pumping at key extraction wells during the 2021 April and October compliance water level monitoring events. Where appropriate, the pumping status of wells within or close to the Site during the April and/or October 2021 water level rounds is noted in the following sections in relation to patterns of groundwater movement in each of the alluvial units.

7.2.1 2021 Groundwater Elevations

Based on the October 2021 water level contour map (**Figure 8**), direction of groundwater movement in the UAU is from east to west in the area south of McDowell Road and from northeast to southwest in the area north of McDowell Road. Little to no pumping occurs directly from the UAU within or in the immediate vicinity of the Site (**Figure 6**). UAU groundwater migrates toward the Western Margin, where it moves vertically into the LAU, either directly or through the MAU. Horizontal hydraulic gradients in the UAU generally increase from northeast to southwest, toward the Western Margin. Downward vertical hydraulic gradients exist across the Site and the conceptual model for the Site acknowledges vertical migration of groundwater from the UAU and the MAU to LAU in response to these gradients.

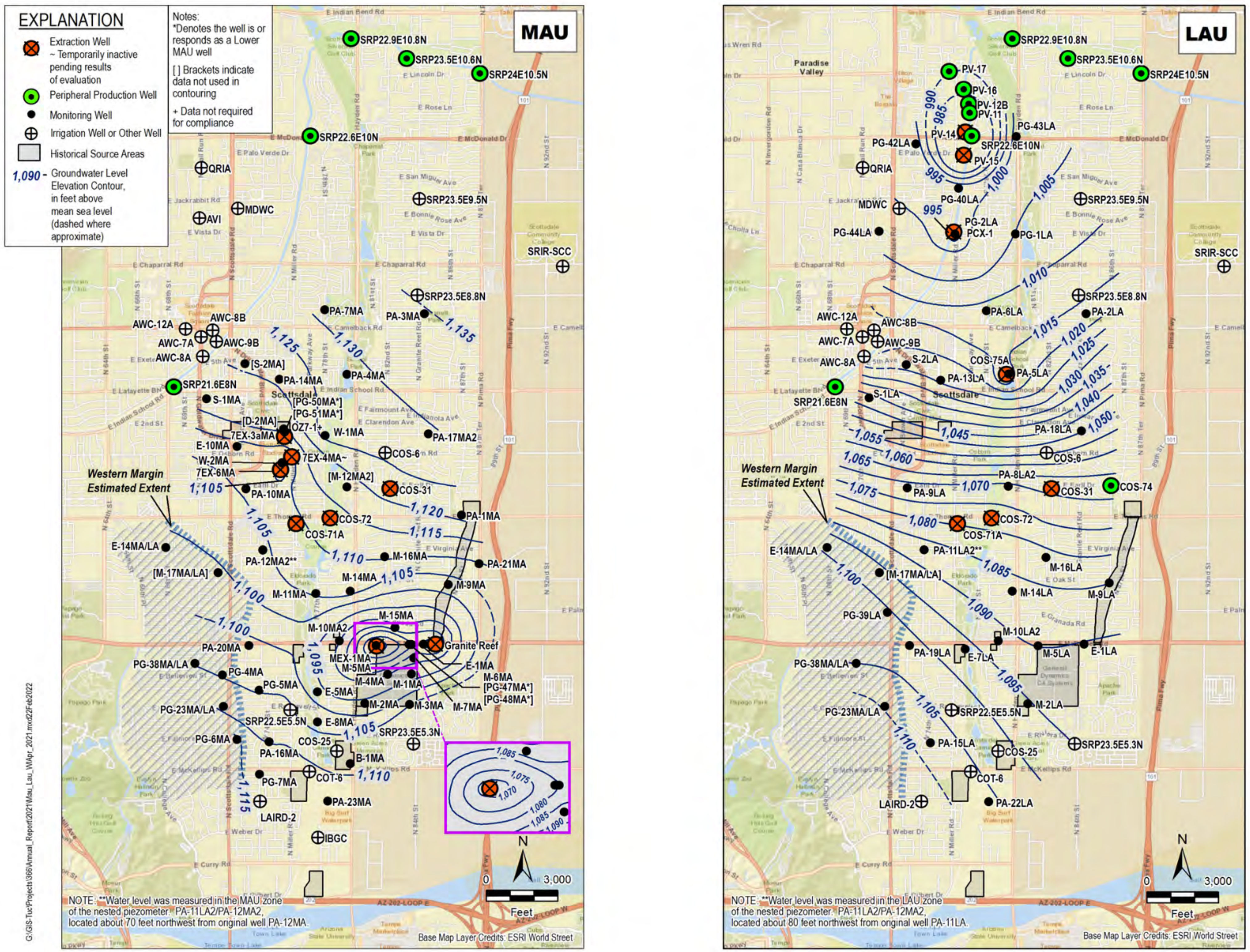

Figure 7. Groundwater Level Contours for the MAU and LAU from April 2021

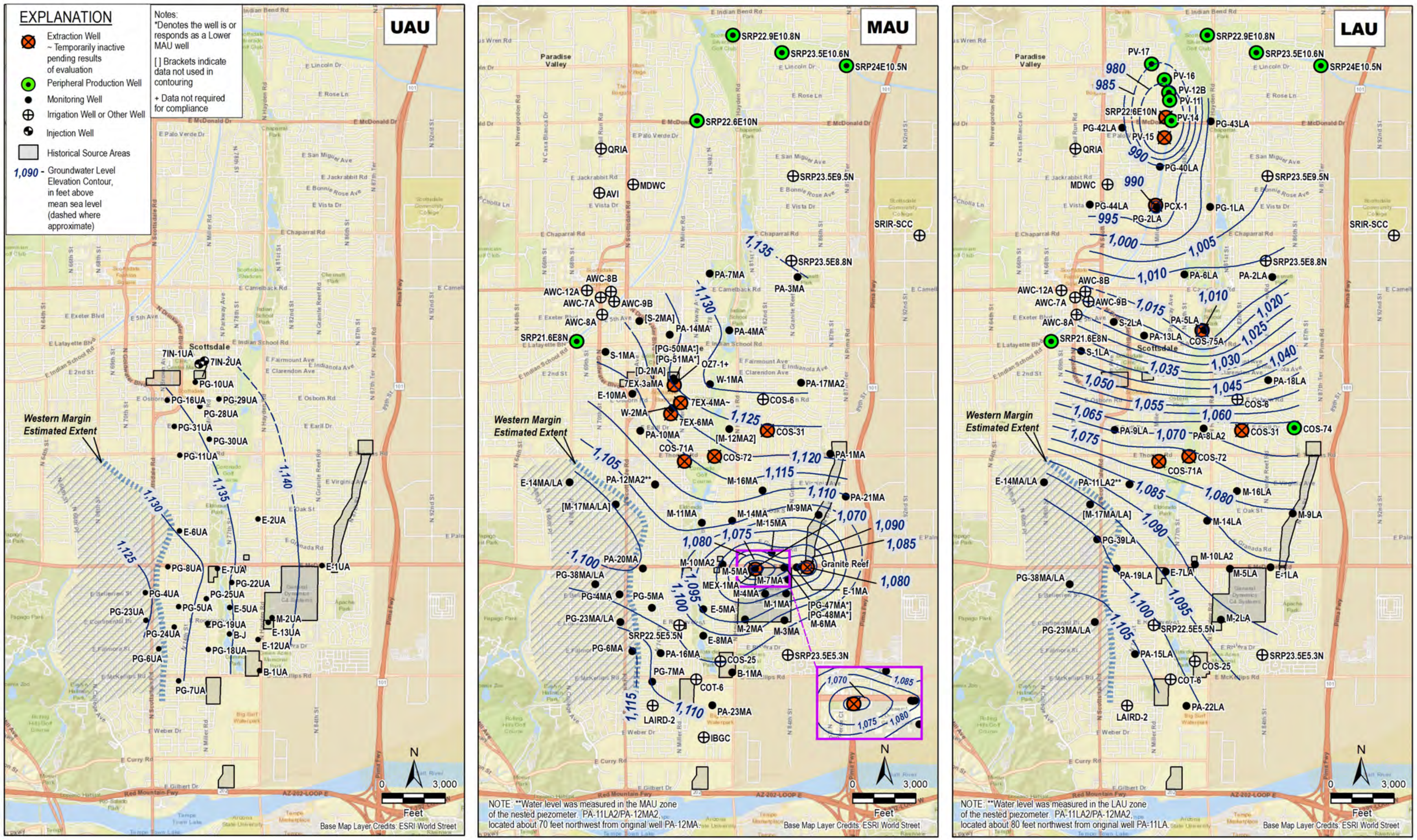

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Figure 8. Groundwater Level Contours for the UAU, MAU, and LAU from October 2021

The complex pattern of groundwater movement observed in the MAU is the result of competing influences between the various pumping centers and the Western Margin, where vertical movement of groundwater into the LAU occurs. During the April 2021 water level monitoring round, pumping was occurring at the following wells located within or adjacent to the Site that extract part or all of their water from the MAU: 1) Area 12 GWETS wells Granite Reef well and MEX-1MA; 2) Area 7 GWETS wells 7EX-3aMA and 7EX-6MA; and 3) nearby City of Tempe well COT-6 (pumped on April 9, near the end of the monitoring round). Based on April 2021 conditions (**Figure 7**), cones of depression are apparent in the MAU in the vicinity of these pumping wells, with the exception of COT-6, which was not pumping during monitoring at nearby wells. All water levels measured on April 9 were in the northern MAU area and not likely affected by pumping at COT-6. The following water levels were excluded from MAU contouring on figures and bracketed on **Figure 7 and Figure 8** for the reasons given:

- Lower MAU wells PG-47MA, PG-48MA, PG-50MA and PG-51MA – Water levels for the Lower MAU are generally lower than and inconsistent with the Upper MAU data that is used for water level elevation contouring.
- D-2MA –This well is completed in a shallower interval of the Upper MAU than the other monitoring wells and water levels are inconsistent with the Upper MAU data set. Data from this well, which may be in hydraulic communication with the UAU, has been bracketed for many years. NIBW PCs are recommending replacement of this well as a compliance data point with well OZ7-1.
- M-12MA2 – The NIBW PCs discontinued use of this water level monitoring location for contouring in the Upper MAU in 2015 after concluding that water level data was inconsistent with the surrounding wells. Review of high-frequency data demonstrated that M-12MA2 responds more readily to pumping stresses in the LAU than the MAU, and as such is not representative of Upper MAU hydraulic conditions.
- M-17MA/LA – Water level data at M-17MA/LA has been inconsistent with the trends observed in other MAU and LAU wells along the Western Margin since the pump was pulled in 2016. Trend anomalies became more apparent in 2018 when water levels increased significantly. NIBW PCs have continued to monitor this well, however, water levels are no longer considered representative for either the MAU or the LAU and therefore are not contoured.
- S-2MA – Continuous water level data for monitoring wells near the AWC wells indicate that the impact of pumping at AWC wells on water levels in the MAU is less pronounced than indicated by the measured values for S-2MA. The PCs have concluded that water levels at S-2MA may be affected by very localized hydrogeologic conditions and are likely not representative of regional MAU responses. As such, the PCs no longer interpret significant drawdown in the MAU from pumping at the AWC wellfield. The water level

data collected from S-2MA were not used for the contouring of water level elevations in 2021.

In April (**Figure 7**), horizontal hydraulic gradients in the MAU increased in all directions toward the Area 7 GWETS and Area 12 GWETS pumping centers. Horizontal hydraulic gradients decrease significantly in the areas between and outside of these pumping centers.

October 2021 MAU water level data displayed on **Figure 8** show that patterns of groundwater movement were generally similar to those observed in April, except near Area 7 GWETS. Temporary cessation of pumping at Area 7 extraction wells 7EX-3aMA and 7EX-6MA since July resulted in observed recovery of the cone of depression around these wells in the October round.

Based on October 2021 water level contours (**Figure 8**), horizontal hydraulic gradients in the MAU increase in the immediate vicinity of the Area 12 GWETS extraction wells. Horizontal hydraulic gradients decrease significantly in the areas outside of this pumping center.

Groundwater movement in the LAU is generally from recharge areas in the south and southwest parts of the Site to points of discharge at extraction and production wells to the north, as shown for April and October 2021 on **Figure 7 and Figure 8**, respectively. For both the April and October 2021 water level monitoring rounds, CGTF extraction well COS-75A, one of the upgradient LAU extraction wells for the remedy, was operating. Similarly, key LAU extraction well PCX-1 was pumping during both the April and October water level rounds.

Key LAU extraction wells PV-15 and PV-14 were both pumping continuously during the October water level round, but only PV-15 was pumping during the April water level round. Other wells pumping from the LAU during the two monitoring rounds include selected AWC wells and Paradise Valley wells PV-11 and PV-12B. The AWC wells were not pumping during the October water level round, but they were pumping during the April round.

As shown on **Figure 7 and Figure 8**, pumping at MRTF extraction wells PV-14 and PV-15 and NGTF extraction well PCX-1, combined with pumping at nearby SRP and PV production wells, results in a regional sink for LAU groundwater to the north. Based on both April and October 2021 water level data (**Figure 7 and Figure 8)**, horizontal hydraulic gradients in the LAU increase from south to north toward extraction well COS-75A, and then decrease sharply in the area downgradient from COS-75A toward PCX-1. Gradients increase from PCX-1 north to the EPCOR wellfield. Localized gradient increases observed near the AWC wellfield in April were absent in October due to the extended shutdown period at this wellfield prior to the October 2021 water level monitoring round.

7.2.2 Annual Changes in Groundwater Elevation

Groundwater level trends over time are evaluated by comparing short-term and long-term changes in water levels at UAU, MAU, and LAU monitoring wells. **Table B-3, Appendix B,** summarizes the difference in water level between October 2020 and October 2021 for all monitoring wells included in the water level monitoring programs for both years. Water level change is shown on maps and illustrated on associated inset bar graphs on **Figure 9, Figure 10, and Figure 11** for the UAU, MAU, and LAU, respectively. Wells are generally arranged based on location (north to south) on the inset bar graphs. Water level differences computed at individual wells using October 2020 and October 2021 data are representative of changes between two individual point measurements, which may not be reflective of long-term trends. In addition, water level changes on the order of 10 feet or more observed in monitoring wells adjacent to extraction wells are usually attributed to cycling of pumping at extraction wells rather than to regional water level conditions in the aquifer. Water level data trends are more accurately tracked by reviewing a larger set of water level data obtained over a longer period. Hydrographs showing water level data for wells included in the monitoring program are provided in **Appendix D**. Hydrographs for specific wells show only water level data or only TCE data, while others display both, depending on monitoring requirements.

Comparing data from October 2020 and October 2021, observed water level changes in the UAU were all less than 1.01 feet (**Figure 9**). Water levels rose in UAU monitoring wells north of McDowell Road, except at PG-10UA, which showed a slight decline, and in wells along the Western Margin to the south of McDowell Road. The magnitude of rise in the UAU generally increased from north to south in wells north of McDowell Road, ranging from 0.26 to 0.92 feet. The magnitude of rise along the Western Margin south of McDowell Road ranged from 0.11 to 0.73 feet, and generally increased from south to north. Water levels declined to the east of the Western Margin and to the south of McDowell Road. The magnitude of decline in the UAU along and east of Hayden Road was generally larger than to the west, ranging from -0.77 to -1.01 feet, while the magnitude of decline in the UAU west of Hayden Road ranged from -0.02 to -0.54 feet (**Figure 9**).

Water level change in the MAU between October 2020 and October 2021 was variable (**Figure 10**). Water levels generally declined between October 2020 and October 2021 in wells in the immediate vicinity of Area 12 GWETS to the south of Thomas Road and to the east of Hayden Road nearest to the Area 12 remedial extraction wells MEX-1MA and the Granite Reef well. In addition, two wells west of Hayden Road and south of McKellips Road decreased between October 2020 and October 2021. Water level decline is attributed to increased pumping of the Granite Reef and MEX-1MA wells in the time leading up to the October 2021 monitoring round relative to the lead up to the October 2020 round. The magnitude of decline ranged from -0.26 to -2.70 feet in this area.

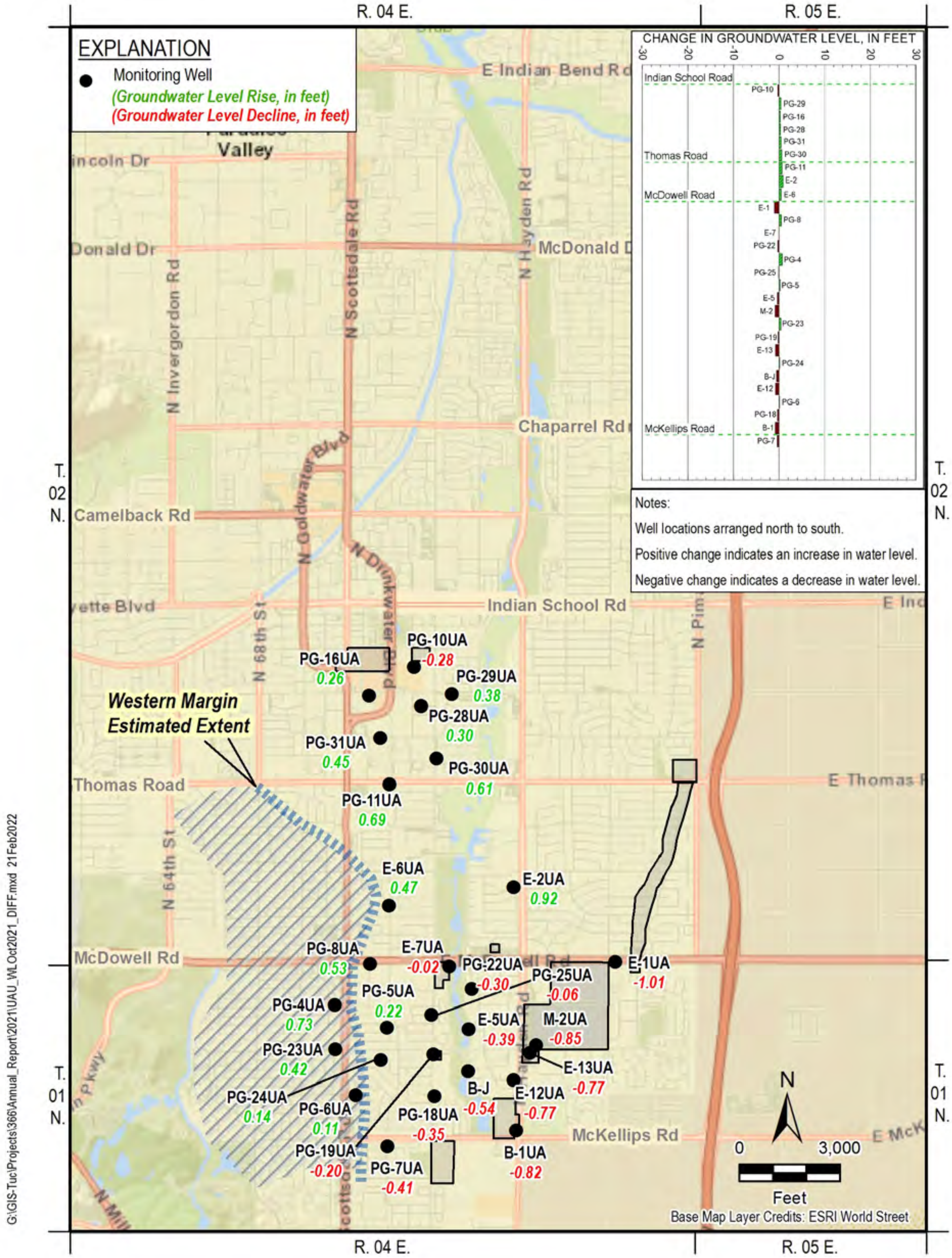

Figure 9. Change in UAU Groundwater Level from October 2020 to October 2021

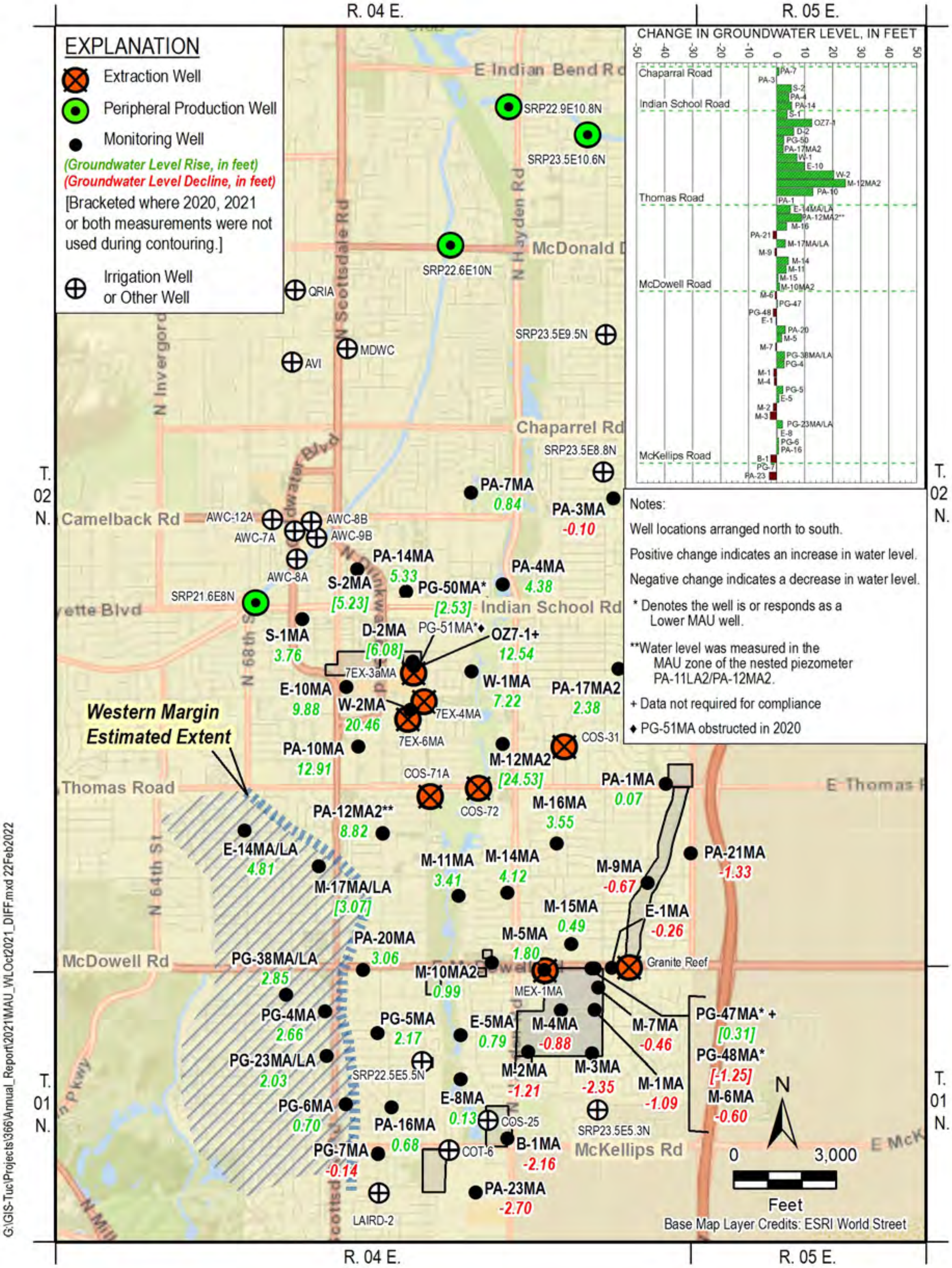

Figure 10. Change in MAU Groundwater Level from October 2020 to October 2021

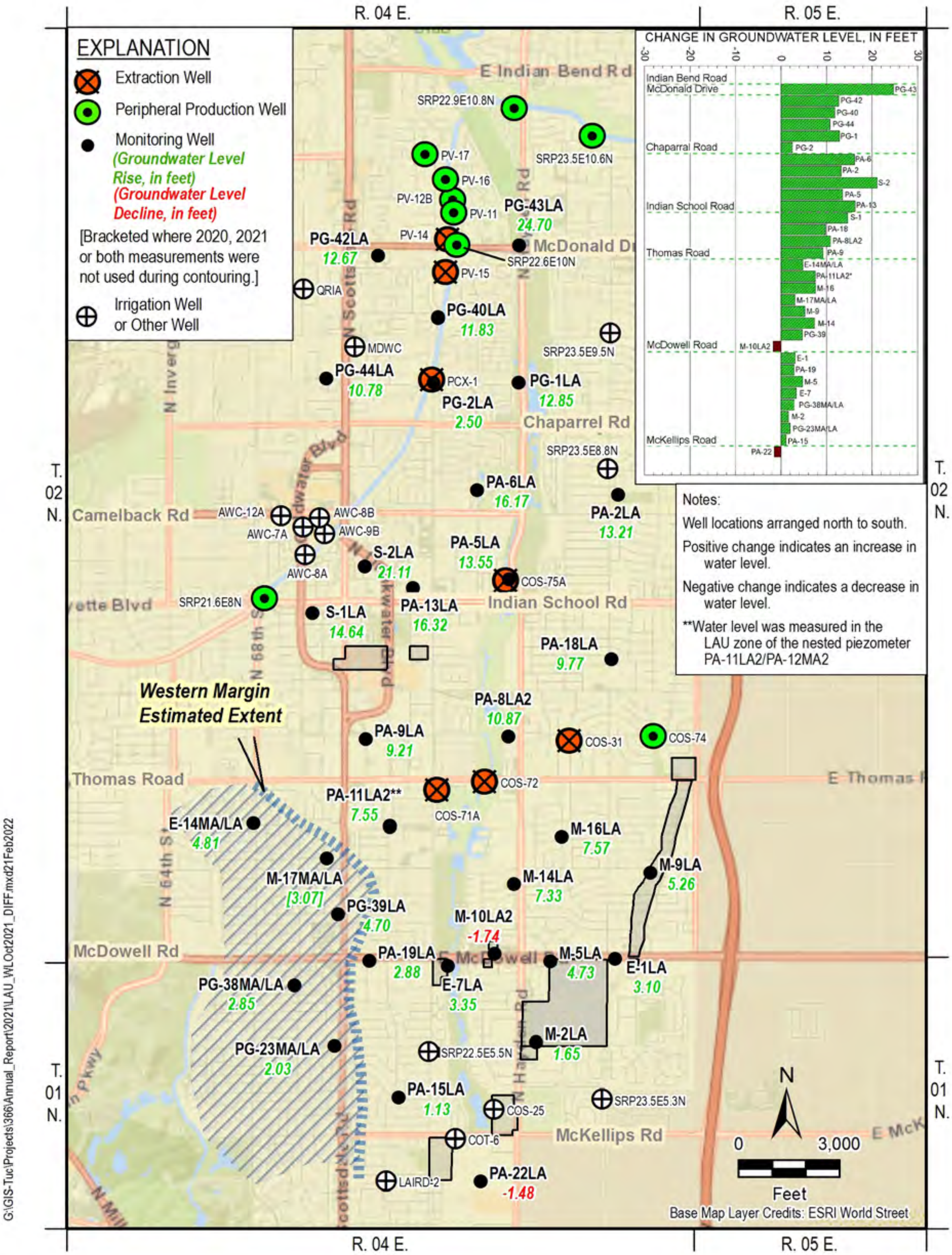

Figure 11. Change in LAU Groundwater Level from October 2020 to October 2021

MAU water levels south of Thomas Road rose for all other wells to the west and south of the large area of decline surrounding the Area 12 pumping center, and the magnitude of rise south of Thomas Road ranged from 0.13 to 8.82 feet (**Figure 10**).

MAU water levels north of Thomas Road generally rose between October 2020 and October 2021 except at well PA-3MA. The apparent larger-scale decline (>24 feet) at M-12MA2 is based on an anomalous measurement obtained in October 2020. In general, water levels at M-12MA2 are not believed to be representative of conditions in the Upper MAU. Water level rise is attributed to temporary cessation of pumping at Area 7 extraction wells 7EX-3aMA and 7EX-6MA in the months leading up to the October 2021 monitoring round. Excluding the anomalous value of M-12MA2, the overall magnitude of rise north of Thomas Road ranged from 0.07 to 20.46 feet. Cause for the decline in water level at well PA-3MA has not been determined but will be evaluated during future monitoring events.

Water levels in the LAU rose in most LAU monitoring wells between October 2020 and October 2021 (**Figure 11**) with the exception of wells M-10LA2 and PA-22LA, which declined. The magnitude of rise in the LAU north of about Indian School Road was generally larger than to the south, ranging from 2.50 to 24.7 feet. Localized water level rise at well PG-43LA is attributed to intermittent and decreased pumping of well PV-14 in the months prior to the October 2021 monitoring round, relative to October 2020, when PV-14 pumped continuously. Localized water level rise at well S-2LA is attributed to temporary cessation of pumping of the AWC wellfield in the weeks prior to the October monitoring round. The magnitude of rise in the LAU south of about Indian School Road ranged from 1.13 to 14.64 feet. Localized rise at wells S-1LA and PA-13LA is attributed to temporary cessation of pumping of the AWC wellfield in the weeks prior to the October monitoring round. The overall trend of rising LAU water levels is linked to regional conditions resulting from reduced pumping and use of imported water supplies. This trend is further enhanced by shutdown of the AWC wellfield in the weeks prior to the October 2021 monitoring event, as well as decreased pumping of the PCX-1 well in the months leading up to the October 2021 monitoring round relative to the lead up to the October 2020 round. The cause for the decline in water levels at wells M-10LA2 and PA-22LA has not been determined but will be evaluated during future monitoring events.

7.3 Water Quality

During 2021, Montgomery & Associates coordinated activities by both the analytical laboratory, TestAmerica, Inc., and the groundwater monitoring contractor, Verdad Group LLC.

7.3.1 2021 COC Concentrations

A summary of laboratory results of COCs for NIBW monitoring wells for 2021 is provided in **Table C-1**. Extraction well COC results are summarized in **Table C-2**. TCE is the principal COC at the Site and is therefore depicted in plume maps and time-series graphs. To analyze change in TCE concentrations, the 2021 plume contours are compared to 2001 plume contours, and a statistical analysis of trends is conducted for individual wells for the period of the last 10 years and last 5 years. The statistical trend analysis is not included in remedy performance evaluations but was voluntarily added by the PCs to provide additional information.

7.3.1.1 2021 TCE Magnitude & Extent

TCE concentration contours for October 2021 for the UAU, MAU, and LAU are shown on **Figure 12**. Hydrographs showing TCE concentrations and water levels for the 10-year period from 2011 through 2021 are shown for all monitoring wells included in the monitoring program in **Appendix D**.

The occurrence of TCE concentrations in UAU groundwater at or above the Cleanup Standard of 5 µg/L is now limited to one monitoring well, PG-31UA. The maximum TCE concentration detected was 7.6 µg/L at monitoring well PG-31UA in October 2021.

TCE concentrations in MAU groundwater are generally higher than in the other two units, with a 2021 maximum concentration of 2,700 µg/L detected in July and October 2021 at monitoring well W-2MA, located down-gradient from Area 7. The maximum concentration of TCE detected in October 2021 in a monitoring well in the vicinity of Area 12 was 47 µg/L at E-5MA, located down-gradient from Area 12. The Area 12 Granite Reef extraction well, located at historical source Area 5B, had a maximum TCE concentration of 140 µg/L in June and August 2021. Area 12 extraction well MEX-1MA had a maximum TCE concentration of 58 µg/L in December 2021. The third area of elevated TCE concentrations in MAU groundwater coincides with a localized region associated with monitoring well PG-6MA in the southern portion of the Western Margin. The persistence of elevated PCE and TCE concentrations at this well indicate an alternate VOC source unrelated to the NIBW Site. The agencies have concurred with this interpretation and since 2018 the PCs have modified MAU plume maps to distinguish the plume in the vicinity of PG-6MA as being attributed to an alternate source (**Figure 12**). TCE concentration at PG-6MA was 100 µg/L in October 2021.

TCE concentrations in LAU groundwater are generally intermediate between the UAU and the MAU, with a maximum concentration of 120 µg/L detected in January 2021 at monitoring well PA-6LA. The highest concentrations of TCE in LAU groundwater occur in the north-central part of the Site. Concentrations at PA-6LA have declined rapidly in 2021 and PG-2LA has the highest TCE concentration in October, as shown on **Figure 12**.

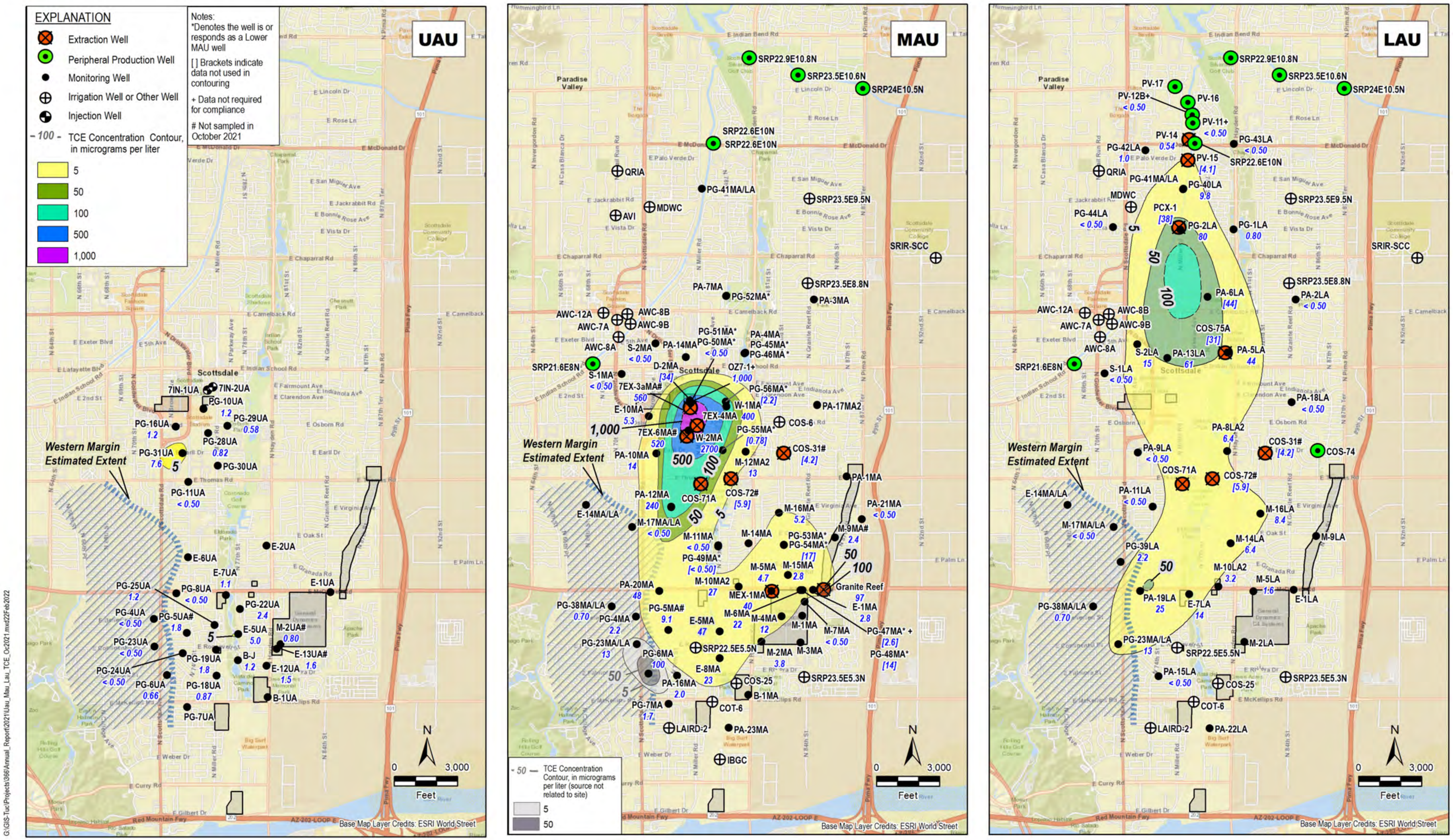

Figure 12. Concentrations of TCE in the UAU, MAU, and LAU from October 2021

7.3.1.2 TCE Concentration Change

Changes in the magnitude and extent of TCE concentrations between the baseline data set from October 2001, which coincides with the release of the Amended ROD, and October 2021, the current monitoring period, are shown for the UAU, MAU, and LAU on **Figure 13**.

The extent of the UAU plume has decreased significantly over time, as depicted on **Figure 13**. In fact, the area of the TCE plume in the UAU has decreased by about 97% from October 2001 to October 2021. For the MAU and LAU, a significant overall reduction in the 5 µg/L extent is not anticipated at this stage in the remedy. The metric serves, however, to ensure that no unanticipated migration of the plume occurs toward peripheral production wells. As expected very little change is observed in the overall area of the 5 µg/L TCE plumes in the MAU and LAU between October 2001 and October 2021, as illustrated on **Figure 13**. The exception is the predictable migration of the LAU plume to the north in response to regional hydraulic gradients (**Figure 8**) and LAU groundwater remedy extraction at CGTF, NGTF, and MRTF wells. Changes in the extent of the northern portion of the LAU TCE plume between October 2001 and October 2021 are generally small and attributable to northward migration of the plume toward remedial extraction wells (**Figure 13**). Review of inner contours on the MAU and LAU plumes demonstrates that the magnitude and extent of higher concentration areas has been reduced over time through groundwater extraction and treatment. The extent of the west flank of the MAU and LAU plumes is more accurately represented in maps generated after the October 2001 baseline period. This is due to the availability of data at monitoring well M-17MA/LA following its installation in 2002, and maps have been modified accordingly.

Figure 13. Concentrations of TCE in the UAU, MAU, and LAU for October 2001 and October 2021

7.3.1.3 Mann-Kendall TCE Concentration Trends

To support interpretation of changes in TCE concentration, the PCs voluntarily conduct a trend analysis for monitoring wells in the UAU, MAU, and LAU as part of the SMR. The Mann-Kendall trend test is performed using EPA's ProUCL software to determine if a statistically significant trend in TCE concentrations over time is present. This method is being considered for potential use in evaluating remedy performance in the GM&EP update. Hydrographs including TCE concentrations, where sampled, for NIBW monitoring wells can be found in **Appendix D**.

Mann-Kendall is a non-parametric trend test that relies on computing an "S" statistic. The S statistic is calculated by scoring each pair of data points. If the earlier concentration in a pair is lower than the later concentration, the pair is assigned a value of +1. Conversely, if the earlier concentration is higher than the later concentration, the pair is assigned a value of -1. If the two concentrations are equal, the pair is assigned a value of zero. The S statistic is computed by summing the values for each pair in the series. Assessing the S statistic, along with the number of statistically independent samples indicates whether or not an increasing or decreasing trend is apparent. A confidence level of 95% is used in the SMR to determine if a statistically significant trend exists. Non-detect values are assumed to always be less than the lowest detected value; as such, the reporting limit is used. If the dataset has greater than 50% non-detect values, then use of the Mann-Kendall test is not recommended.

Wells that do not have a statistically significant trend are categorized as either "stable" or "no trend". Stable indicates that the data set for a well has both a negative S statistic and a coefficient of variation that is less than 1 or has been consistently non-detect. Otherwise, the well is categorized as no trend. Criteria used to determine if a well is stable in the 2021 SMR are consistent with the methodology used in EPA's 2021 Five-Year Review.

TCE data from 2017 through 2021 (5 years) were used for analyzing trends for recent time. TCE data from 2012 through 2021 (10 years) were used to analyze longer-term trends. Field duplicate results were averaged with original sample results to ensure statistically independent values. "Trends" refer to statistically significant trends identified using the Mann-Kendall test method described herein. Mann-Kendall trend results are shown spatially for the most recent 10-year and 5-year periods on **Figure 14 and Figure 15**, respectively; trend results are also tabulated in **Table 9**.

TCE concentrations in UAU monitoring wells are relatively low and mostly decreasing or stable. Increasing TCE concentration trends are observed at three UAU monitoring wells; PG-31UA has an increasing trend over the 10-year period and PG-16UA and PG-10UA have an increasing trend over the 5-year period. PG-31UA is the only UAU monitoring well with TCE above 5 µg/L in 2021. Increasing concentrations in the UAU are consistent with the migration of remaining

UAU mass toward the Western Margin in accordance with the OU-2 remedy. TCE concentrations in UAU groundwater have reduced significantly with time as show on hydrographs and concentration plots included in **Appendix D**.

TCE concentrations in MAU monitoring wells are mostly decreasing or stable. Increasing TCE concentration trends are observed at one MAU monitoring well over the 10-year period and four monitoring wells over the 5-year period. PA-10MA has an increasing trend over the 10-year period, which is attributed to shifts in pumping from well 7EX-4MA and 7EX-5MA to well 7EX-6MA, downtime that occurred between the time that 7EX-5MA failed and replacement well 7EX-6MA was installed, and reduced pumping at COS-71A in recent years (**Table 8**). TCE concentrations at PA-10MA have reduced recently to 14 µg/L in October 2021. M-4MA, M-6MA, E-10MA, and E-5MA have increasing trends over the 5-year period which are attributed to downtime at the Granite Reef extraction well in 2019 and 2020 (**Table 8**). Significant longer-term declines in TCE concentrations have been observed at many MAU monitoring wells and recent samples at wells with increasing trends also appear to be generally lower in October 2021 than they were in late 2020/early 2021 (**Appendix D**).

TCE concentrations in the Lower MAU are mostly decreasing or stable. No increasing TCE concentration trends were observed in the Lower MAU monitoring wells for the 10- or the 5-year period, as shown on **Figure 14 and Figure 15** and in **Table 9**.

TCE concentrations in the LAU are mostly decreasing or stable. Increasing TCE concentration trends are observed at three LAU monitoring wells. PG-2LA has an increasing trend over both the 10-year period and the 5-year period. PG-2LA is located adjacent to extraction well PCX-1. PG-1LA and M-5LA have increasing trends over the 5-year period; concentrations at both of these wells are below the 5 µg/L. Increasing TCE concentrations in the Northern LAU are anticipated, as LAU mass migrates toward PCX-1 and the MRTF extraction wells; however, as observed, these trends level off and eventually decrease as the plume is captured. Decreasing 10- and 5-year trends are observed across much of the northern half of the LAU plume (PA-6LA, PA-5LA, PG-42LA, S-2LA, and PG-40LA); 10-year decreasing trends can be seen across many portions of the LAU. Stable or no trend at wells in the southern half of the LAU are attributed to a decrease in mass entering the LAU at the Western Margin over time.

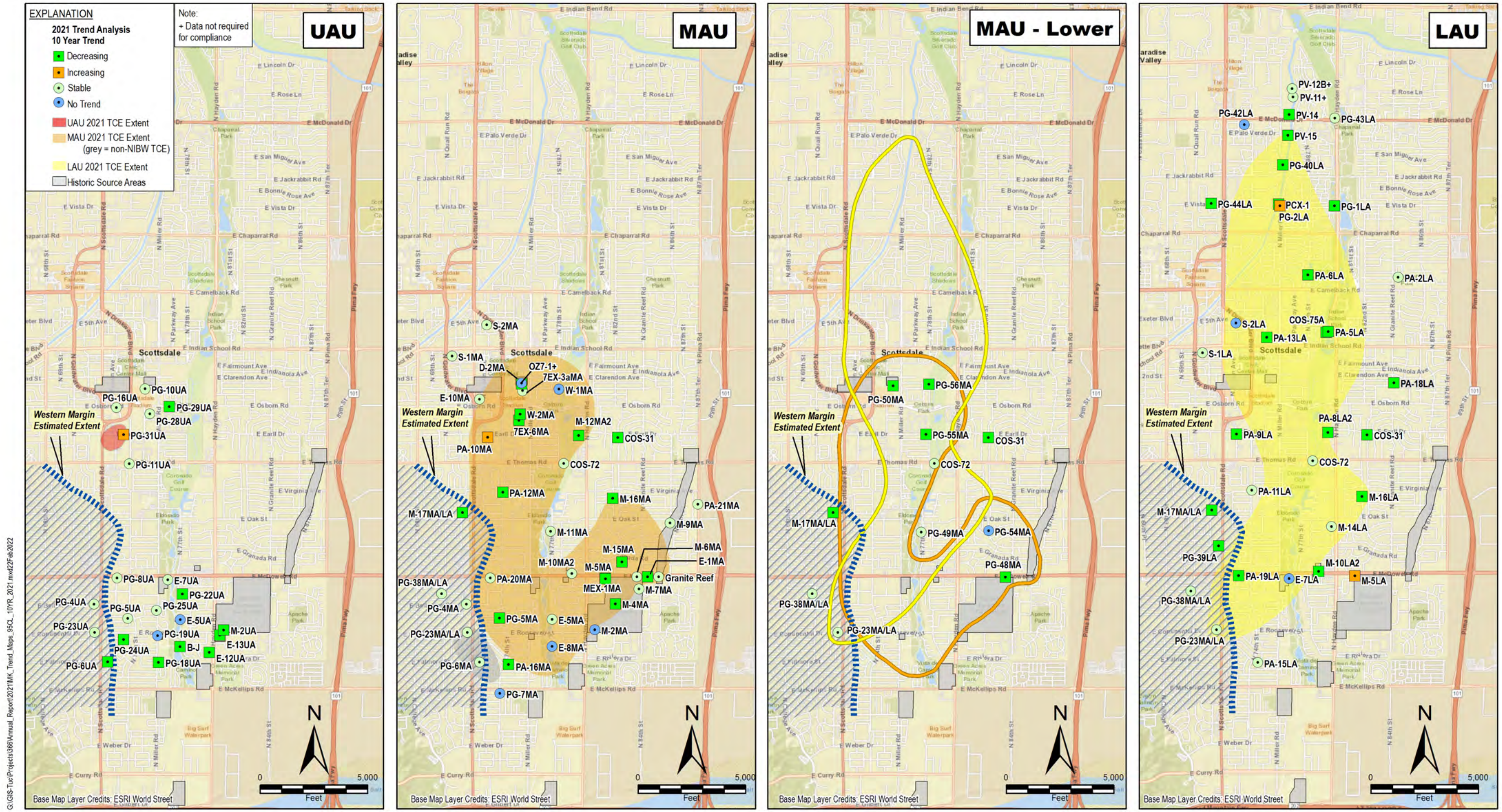

Figure 14. 10-Year Mann-Kendall TCE Trend or Stability Results for the UAU, MAU, MAU-Lower, and LAU

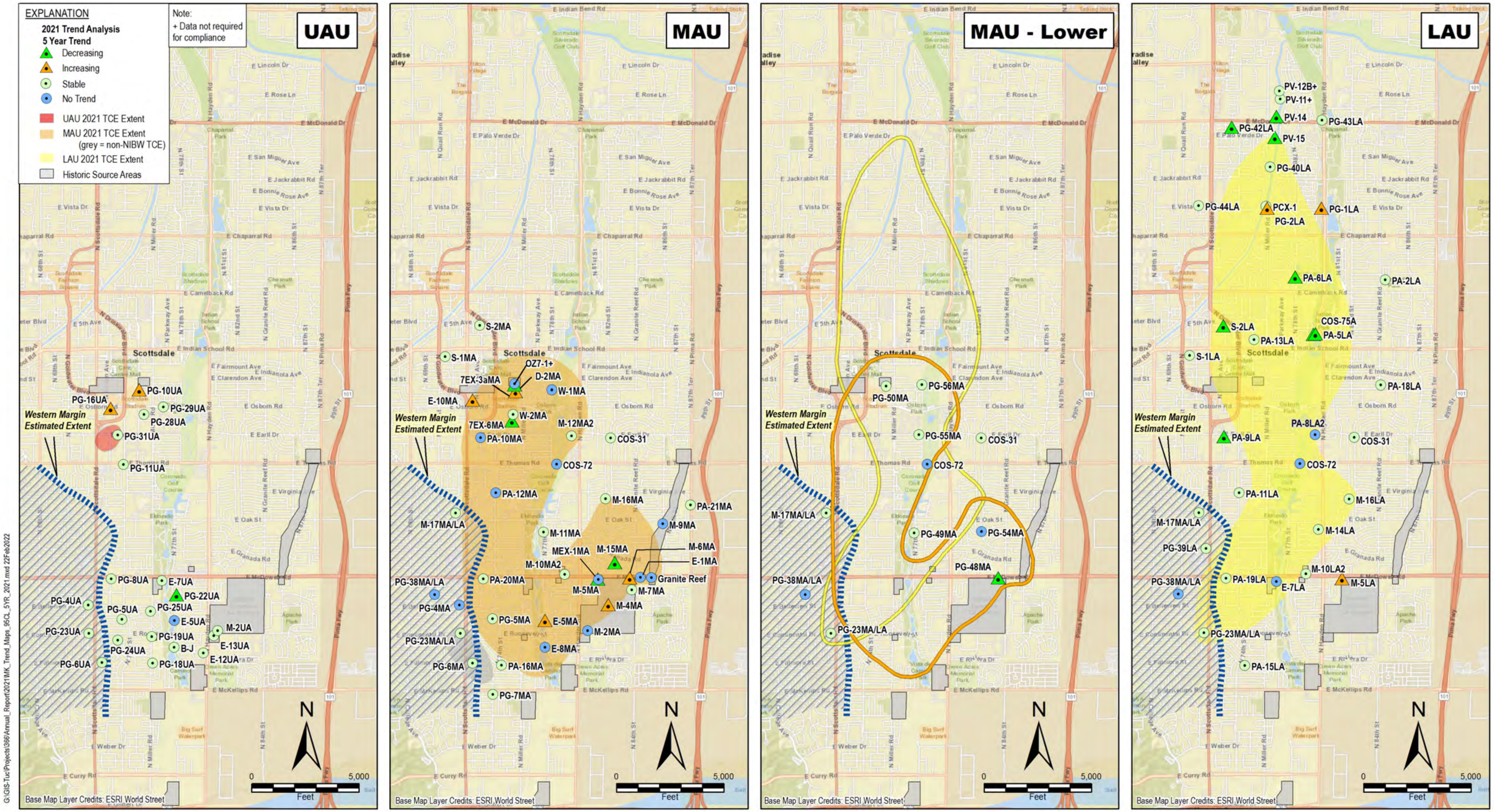

Figure 15. 5-Year Mann-Kendall TCE Trend or Stability Results for the UAU, MAU, MAU-Lower, and LAU

Table 9. Mann-Kendall Trend or Stability Results for TCE Concentrations in NIBW Superfund Site Monitoring and Extraction Wells

Well Identifier	Alluvium Unit	Well Type	10-Year Trend	5-Year Trend	TCE (µg/L) 10-Year Minimum Concentration	TCE (µg/L) 10-Year Maximum Concentration
7EX-3aMA	MAU	Extraction	Stable	Increasing	260	720
7EX-6MA	MAU	Extraction	Decreasing	Decreasing	290	700
B-J	UAU	Monitoring	Decreasing	Stable	0.66	3
COS-31	MAU/LAU	Extraction	Decreasing	Stable	3.4	19
COS-72	MAU/LAU	Extraction	Stable	No Trend	5.8	13
COS-75A	LAU	Extraction	Decreasing	Decreasing	27	92
D-2MA	MAU	Monitoring	Decreasing	Decreasing	8.4	1900
E-1MA	MAU	Monitoring	Decreasing	No Trend	1.5	110
E-5MA	MAU	Monitoring	Stable	Increasing	1.8	76
E-5UA	UAU	Monitoring	No Trend	No Trend	2.5	6
E-7LA	LAU	Monitoring	No Trend	No Trend	10	30
E-7UA	UAU	Monitoring	Stable	Stable	<0.50	2.1
E-8MA	MAU	Monitoring	No Trend	No Trend	18	39
E-10MA	MAU	Monitoring	Stable	Increasing	2.8	8.4
E-12UA	UAU	Monitoring	Decreasing	Stable	1.5	7
E-13UA	UAU	Monitoring	Decreasing	Stable	0.93	4.9
Granite Reef	MAU	Extraction	Stable	No Trend	30	170
M-2MA	MAU	Monitoring	No Trend	No Trend	1.6	30
M-2UA	UAU	Monitoring	Decreasing	Stable	0.58	1.8
M-4MA	MAU	Monitoring	Decreasing	Increasing	3.3	46
M-5LA	LAU	Monitoring	Increasing	Increasing	<0.50	1.6
M-5MA	MAU	Monitoring	Decreasing	Decreasing	3.8	52
M-6MA	MAU	Monitoring	Stable	Increasing	4.3	100
M-7MA	MAU	Monitoring	Stable	Stable	<0.50	0.8
M-9MA	MAU	Monitoring	Stable	No Trend	2.4	5.8
M-10LA2	LAU	Monitoring	Decreasing	Stable	2.8	24
M-10MA2	MAU	Monitoring	Stable	Stable	15	55
M-11MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
M-12MA2	MAU	Monitoring	Decreasing	Stable	12	23
M-14LA	LAU	Monitoring	Stable	Stable	6.4	24
M-15MA	MAU	Monitoring	Decreasing	Decreasing	2.6	11
M-16LA	LAU	Monitoring	Decreasing	Stable	8.4	53
M-16MA	MAU	Monitoring	Decreasing	Stable	3.7	18
M-17MA/LA	MAU/LAU	Monitoring	Decreasing	Stable	<0.50	8.4
MEX-1MA	MAU	Extraction	Decreasing	No Trend	32	120
OZ7-1	MAU	Monitoring	No Trend	No Trend	620	1000
PA-2LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PA-5LA	LAU	Monitoring	Decreasing	Decreasing	40	150
PA-6LA	LAU	Monitoring	Decreasing	Decreasing	44	270
PA-8LA2	LAU	Monitoring	Decreasing	No Trend	3.8	18
PA-9LA	LAU	Monitoring	Decreasing	Decreasing	<0.50	21
PA-10MA	MAU	Monitoring	Increasing	No Trend	9.3	87
PA-11LA	LAU	Monitoring	Stable	Stable	<0.50	0.57
PA-12MA	MAU	Monitoring	Decreasing	No Trend	190	370
PA-13LA	LAU	Monitoring	Decreasing	Stable	17	190
PA-15LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PA-16MA	MAU	Monitoring	Decreasing	Stable	0.61	25
PA-18LA	LAU	Monitoring	Decreasing	Stable	<0.50	1.6
PA-19LA	LAU	Monitoring	Decreasing	Stable	25	110
PA-20MA	MAU	Monitoring	Stable	Stable	35	81
PA-21MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
PCX-1	LAU	Extraction	Decreasing	Stable	38	81
PG-1LA	LAU	Monitoring	Decreasing	Increasing	<0.50	1.6
PG-2LA	LAU	Monitoring	Increasing	Increasing	41	80
PG-4MA	MAU	Monitoring	Stable	No Trend	1.5	4.3
PG-4UA	UAU	Monitoring	Stable	Stable	<0.50	2.1
PG-5MA	MAU	Monitoring	Decreasing	Stable	9.1	38
PG-5UA	UAU	Monitoring	Stable	Stable	1.6	3.6
PG-6MA	MAU	Monitoring	Stable	Stable	82	170
PG-6UA	UAU	Monitoring	Decreasing	Stable	<0.50	2.3
PG-7MA	MAU	Monitoring	No Trend	Stable	<0.50	6.1
PG-8UA	UAU	Monitoring	Stable	Stable	<0.50	<0.50
PG-10UA	UAU	Monitoring	Stable	Increasing	0.69	1.5
PG-11UA	UAU	Monitoring	Stable	Stable	<0.50	<0.50
PG-16UA	UAU	Monitoring	Stable	Increasing	<0.50	2.8
PG-18UA	UAU	Monitoring	Decreasing	Stable	0.71	3.5
PG-19UA	UAU	Monitoring	No Trend	Stable	1.8	3.7
PG-22UA	UAU	Monitoring	Decreasing	Decreasing	2.4	9.9
PG-23MA/LA	MAU/LAU	Monitoring	Stable	Stable	10	20
PG-23UA	UAU	Monitoring	Stable	Stable	<0.50	3.6
PG-24UA	UAU	Monitoring	Decreasing	Stable	<0.50	7.8
PG-25UA	UAU	Monitoring	Stable	Stable	1.2	3.3
PG-28UA	UAU	Monitoring	Stable	Stable	0.82	5.1
PG-29UA	UAU	Monitoring	Decreasing	Stable	<0.50	2.9
PG-31UA	UAU	Monitoring	Increasing	Stable	2.7	36
PG-38MA/LA	MAU/LAU	Monitoring	Stable	No Trend	<0.50	2.1
PG-39LA	LAU	Monitoring	Decreasing	Stable	2.2	11
PG-40LA	LAU	Monitoring	Decreasing	Stable	7.4	29
PG-42LA	LAU	Monitoring	No Trend	Decreasing	<0.50	3.7
PG-43LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PG-44LA	LAU	Monitoring	Decreasing	Stable	<0.50	3.5
PG-48MA	MAU - Lower	Monitoring	Decreasing	Decreasing	14	120
PG-49MA	MAU - Lower	Monitoring	Stable	Stable	<0.50	<0.50
PG-50MA	MAU - Lower	Monitoring	Decreasing	Stable	<0.50	12
PG-54MA	MAU - Lower	Monitoring	No Trend	No Trend	2	32
PG-55MA	MAU - Lower	Monitoring	Decreasing	Stable	0.78	6.9
PG-56MA	MAU - Lower	Monitoring	Decreasing	Stable	2.2	4.8
*PV-11	LAU	Production	Stable	Stable	<0.50	<0.50
*PV-12B	LAU	Production	Stable	Stable	<0.50	<0.50
PV-14	LAU	Extraction	Decreasing	Decreasing	<0.50	3.3
PV-15	LAU	Extraction	Decreasing	Decreasing	1.9	8.3
S-1LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
S-1MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
S-2LA	LAU	Monitoring	No Trend	Decreasing	2.3	41
S-2MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
W-1MA	MAU	Monitoring	No Trend	No Trend	120	690
W-2MA	MAU	Monitoring	Decreasing	Stable	970	4800

NOTES:
<0.50 = Below Detection at 0.50 µg/L
* = Sampling point not required for compliance

8 ANNUAL OPERATION OF TREATMENT FACILITIES

A monthly summary of groundwater pumping and estimated TCE mass removed from each NIBW extraction well is presented in **Table 10.** Concentrations for NIBW COCs in samples obtained at NIBW extraction wells in 2021 are summarized in **Table C-2** and treatment system sample results are shown in **Table C-3**. Historical groundwater extraction is summarized in **Table 8** and is graphed over the last 10-year period along with TCE concentrations in **Appendix E**. Fourth quarter compliance reporting for the treatment facilities, other than CGTF, is provided in **Appendix I**.

Mass removal estimates for individual extraction wells are computed by using a single (or an average) TCE concentration value for each month in which a given well operated, and the total reported pumping from that well during the month. **Table 10** also provides computed monthly and annual percent operating time for each of the extraction wells tied into treatment. Percent operation time for extraction wells is computed using higher frequency daily or hourly pumping data sets provided by well operators. Time when the associated treatment facilities were available for operation in 2021 is summarized in the Site Inspection Report (**Appendix H**). Results of samples obtained by the NIBW PCs are used where available; however, samples obtained by other parties, such as the City of Scottsdale, are used when no PC data are available. The PCs have no sample results when extraction wells are not operational during their monthly monitoring round. If no TCE concentrations are available for a particular well for a particular month, values from previous or subsequent months are used in mass removal estimates as appropriate based on review of the operational status of the well during the interim period.

Table 10. Groundwater Extraction and Estimated TCE Mass Removed During 2021 at the NIBW Superfund Site

			UNITS	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	TOTALS	ANNUAL PUMPAGE (in acre-feet)	ANNUAL PUMPAGE (in gpm)
CGTF	COS-31	Pumpage	x 1,000 gal	37,146.6	80,557.1	2,768.8	-	-	-	2,162.7	14,921.1	4,452.9	-	-	-	142,009	436	270
		Operating time	%	34%	81%	2%	0%	0%	0%	2%	13%	4%	0%	0%	0%	11%		
		[TCE conc.]	µg/L	12.	12.	13.	-	-	-	4.2	4.2	4.2	-	-	-	11		
		Est. TCE mass	pounds	3.7	8.1	0.3	-	-	-	0.1	0.5	0.2	-	-	-	13		
	COS-71A	Pumpage	x 1,000 gal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Operating time	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
		[TCE conc.]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	0		
		Est. TCE mass	pounds	-	-	-	-	-	-	-	-	-	-	-	-	0		
	COS-72	Pumpage	x 1,000 gal	100,109.1	89,686.2	3,671.9	-	9,682.9	28,587.3	17,040.2	26,368.4	12,714.8	-	-	25,920.8	313,782	963	597
		Operating time	%	100%	100%	3%	0%	10%	29%	16%	26%	14%	0%	0%	27%	27%		
		[TCE conc.]	µg/L	8.	9.6	8.3	-	5.9	5.9	5.9	5.9	5.9	-	-	7.8	8		
		Est. TCE mass	pounds	6.7	7.2	0.3	-	0.5	1.4	0.8	1.3	0.6	-	-	1.7	20		
	COS-75A	Pumpage	x 1,000 gal	102,108.3	91,327.3	100,177.9	95,050.9	99,116.5	90,012.8	82,995.5	95,842.	83,349.6	99,913.4	4,463.8	58,522.2	1,002,880	3,078	1,908
		Operating time	%	100%	99%	97%	96%	97%	92%	83%	96%	86%	99%	4%	58%	84%		
		[TCE conc.]	µg/L	32.	39.	28.	37.	29.	27.	40.	35.	31.	31.	31.	32.	33		
		Est. TCE mass	pounds	27.3	29.7	23.4	29.3	24.	20.3	27.7	28.	21.6	25.8	1.2	15.6	274		
	TOTAL	Pumpage	x 1,000 gal	239,364.	261,570.6	106,618.6	95,050.9	108,799.3	118,600.1	102,198.3	137,131.4	100,517.3	99,913.4	4,463.8	84,443.	1,458,671	4,476	2,775
		Est. TCE mass	pounds	37.7	45.	24.	29.3	24.5	21.7	28.6	29.8	22.3	25.8	1.2	17.3	307		
MRTF	PV-14	Pumpage	x 1,000 gal	-	-	-	44,622.	80,339.	-	-	66,330.	89,038.	92,747.	91,814.	87,080.	551,970	1,694	1,050
		Operating time	%	0%	0%	0%	50%	85%	0%	0%	74%	100%	100%	100%	94%	50%		
		[TCE conc.]	µg/L	-	-	-	0.5	0.5	-	-	0.7	0.6	0.5	0.5	0.5	1		
		Est. TCE mass	pounds	-	-	-	0.2	0.3	-	-	0.4	0.4	0.4	0.4	0.4	3		
	PV-15	Pumpage	x 1,000 gal	95,491.	87,531.	96,649.	92,782.	95,262.	92,215.	96,472.	95,117.	88,317.	92,804.	89,293.	94,935.	1,116,868	3,428	2,125
		Operating time	%	100%	100%	100%	100%	100%	100%	100%	100%	97%	100%	100%	100%	99.7%		
		[TCE conc.]	µg/L	4.7	5.7	5.	5.	4.3	4.9	5.5	5.4	4.8	4.1	4.5	4.5	5		
		Est. TCE mass	pounds	3.7	4.2	4.	3.9	3.4	3.8	4.4	4.3	3.5	3.2	3.4	3.6	45		
	TOTAL	Pumpage	x 1,000 gal	95,491.	87,531.	96,649.	137,404.	175,601.	92,215.	96,472.	161,447.	177,355.	185,551.	181,107.	182,015.	1,668,838	5,121	3,175
		Est. TCE mass	pounds	3.7	4.2	4.	4.1	3.8	3.8	4.4	4.7	4.	3.6	3.8	3.9	48		
NGTF	PCX-1	Pumpage	x 1,000 gal	49,970.4	61,458.8	95,626.8	90,821.3	31,577.3	84,385.6	89,901.6	91,410.3	87,578.2	90,544.8	88,661.4	90,399.5	952,336	2,923	1,812
		Operating time	%	48%	73%	99%	97%	33%	93%	97%	99%	100%	99%	100%	100%	86%		
		Discharge Canal	x 1,000 gal	26,813.3	61,130.7	95,496.3	90,642.6	31,464.4	22,759.6	3,163.7	1,034.	9,979.6	30,156.6	75,082.9	46,305.8	494,030	1,516	940
		Discharge CWTP	x 1,000 gal	22,851.4	-	-	26.1	-	61,465.3	86,535.2	90,257.4	77,499.6	60,256.6	13,469.3	43,922.7	456,284	1,400	868
		[TCE conc.]	µg/L	47.	54.	45.	44.	42.	53.	50.	50.	46.	38.	59.	40.	47		
		Est. TCE mass	pounds	19.6	27.7	35.9	33.3	11.1	37.3	37.5	38.1	33.6	28.7	43.7	30.18	377		
AREA 7 GWETS	7EX-3aMA	Pumpage	x 1,000 gal	3,483.7	5,182.5	6,229.6	6,585.5	6,637.	1,433.5	1,574.6	-	-	-	-	-	31,126	96	59
		Operating time	%	66%	88%	97%	94%	89%	23%	22%	0%	0%	0%	0%	0%	40%		
		[TCE conc.]	µg/L	430.	430.	430.	560.	560.	560.	260.	-	-	-	-	-	483		
		Est. TCE mass	pounds	12.5	18.6	22.4	30.8	31.	6.7	3.4	-	-	-	-	-	125		
	7EX-4MA	Pumpage	x 1,000 gal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Operating time	%	-	-	-	-	-	-	-	-	-	-	-	-	0%		
		[TCE conc.]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Est. TCE mass	pounds	-	-	-	-	-	-	-	-	-	-	-	-	-		
	7EX-6MA	Pumpage	x 1,000 gal	4,406.4	7,619.2	9,532.7	8,957.3	8,632.8	2,096.5	2,307.1	-	-	-	-	-	43,552	134	83
		Operating time	%	66%	90%	97%	94%	89%	23%	22%	0%	0%	0%	0%	0%	40%		
		[TCE conc.]	µg/L	470.	470.	470.	520.	520.	520.	290.	-	-	-	-	-	484		
		Est. TCE mass	pounds	17.3	29.9	37.4	38.9	37.5	9.1	5.6	-	-	-	-	-	176		
	TOTAL	Pumpage	x 1,000 gal	7,890.2	12,801.7	15,762.3	15,542.8	15,269.8	3,530.	3,881.7	-	-	-	-	-	74,678	229	142
		Est. TCE mass	pounds	29.8	48.5	59.7	69.6	68.5	15.8	9.	-	-	-	-	-	301		

			UNITS	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	TOTALS	ANNUAL PUMPAGE (in acre-feet)	ANNUAL PUMPAGE (in gpm)
AREA 12 GWETS	MEX-1MA (SRP 23.1E6N)	Pumpage	x 1,000 gal	39,730.	34,680.	40,350.	40,289.3	40,789.6	39,460.7	28,124.4	27,270.9	39,730.1	38,941.9	39,569.5	14,531.3	423,468	1,300	806
		Operating time	%	95%	92%	100%	100%	99%	100%	71%	67%	98%	93%	98%	34%	87%		
		[TCE conc.]	µg/L	42.	52.	46.	47.	40.	47.	55.	58.	44.	40.	45.	47.	46		
		Est. TCE mass	pounds	13.9	15.	15.5	15.8	13.6	15.5	12.9	13.2	14.6	13.	14.9	5.7	164		
	Granite Reef (SRP 23.6E6N)	Pumpage	x 1,000 gal	38,230.	31,870.	37,660.	35,411.4	36,288.7	34,868.8	24,932.1	24,330.6	31,879.7	32,620.2	34,059.7	7,797.	369,948	1,135	704
		Operating time	%	95%	87%	100%	99%	99%	100%	70%	66%	91%	90%	98%	21%	85%		
		[TCE conc.]	µg/L	110.	130.	120.	120.	98.	140.	130.	140.	110.	97.	110.	100.	117		
		Est. TCE mass	pounds	35.1	34.6	37.7	35.5	29.7	40.7	27.	28.4	29.3	26.4	31.3	6.5	362		
	TOTAL	Pumpage	x 1,000 gal	77,960.	66,550.	78,010.	75,700.8	77,078.3	74,329.6	53,056.5	51,601.5	71,609.9	71,562.1	73,629.3	22,328.3	793,416	2,435	1,510
		Est. TCE mass	pounds	49.	49.6	53.2	51.3	43.3	56.2	40.	41.6	43.9	39.4	46.1	12.2	526		

Total Pumping (in million gallons):	4,948	--	--
TCE Mass Removal (in pounds):	1,559	--	--
Total Pumping (in gpm):	--	--	9,414

EXPLANATION:
1) [TCE Conc.] = Concentration of trichloroethene, in micrograms per liter (µg/L).
2) Most TCE results listed are as reported from TestAmerica; where PCs samples(s) not available, the City of Scottsdale (COS) sample results may be used. Where multiple samples were collected during the same month, the value shown is the average of those results. Where samples were not able to be collected (e.g., extraction well was offline during scheduled sampling date), but a well operated during the month, TCE value used comprises the results (or average results) of samples obtained during previous or subsequent months.
3) Estimated TCE mass reported is in pounds.
4) Pumpage values reported is in thousands of gallons (x1000).
5) gpm = gallons per minute
6) CWTP = Chaparral Water Treatment Plant

8.1 CGTF

The City of Scottsdale reported that approximately 4,476 AF (or 1,459 MG) of groundwater were pumped and treated at CGTF in 2021. Of the total, 142 MG were extracted from well COS-31, 314 MG from well COS-72, and 1,003 MG from well COS-75A. The City of Scottsdale did not operate well COS-71A during 2021 due to elevated concentrations of inorganic constituents (**Table 10**). Based on extraction well data presented in **Table 10**, an estimated 307 pounds of TCE mass were removed from groundwater treated by CGTF during 2021. CGTF operated consistently during 2021. Down time was primarily attributed to column cleaning and routine maintenance. The treatment system and associated wells were offline for 5 weeks, from November 3, 2021, to December 12, 2021, for annual column cleaning activities.

TCE concentration trends for CGTF extraction wells are shown in **Table 9**. TCE concentrations at COS-75A show a decreasing trend for both recent time (5 years) and longer term (10 years). Well COS-31 TCE concentrations show a stable trend in recent time and a decreasing trend over the longer term. Well COS-72 TCE concentrations show no statistically significant trend in recent time and a stable trend over the longer term. Well COS-71A has been removed from the remedial pumping priority list due to inorganic water quality, and therefore was not sampled in 2021. Because COS-71A has not been regularly sampled since 2016, insufficient data exists to evaluate recent trends.

The City of Scottsdale reports results of laboratory testing and plant operations directly to EPA and ADEQ. Detailed reporting of the 2021 operational status, laboratory data, and system performance was provided by the City of Scottsdale in CGTF Compliance Monitoring Reports (CMRs) submitted on May 11, August 12, and November 22, 2021, and January 31, 2022. As demonstrated in operations reports and CMRs provided by the City of Scottsdale, NIBW COCs were not detected in groundwater treated at CGTF during 2021.

8.2 MRTF

Approximately 5,121 AF (or 1,669 MG) of groundwater were pumped and treated at MRTF in 2021. Of the total, 552 MG were extracted from well PV-14 and 1,117 MG were extracted from well PV-15 (**Table 10**). Well PV-15 is the highest priority EPCOR well for MRTF and operates whenever available. Well PV-15 was available for use most of the year. Well PV-14 is the second highest priority well for MRTF and was available for use after April 16 following conversion to a vertical turbine pump. The well pump at PV-14 was offline from June 1 to August 6 to repair a motor issue. During low demand periods (generally, December through March), well PV-14 is used on demand and cycles off when water is not needed by EPCOR. Based on extraction well data presented in **Table 10**, an estimated 48 pounds of TCE mass were removed from groundwater treated by MRTF during 2021.

TCE concentration trends for MRTF extraction wells are shown in **Table 9**. TCE concentrations at wells PV-14 and PV-15 both show a decreasing trend for recent time (5 years) as well as over the longer term (10 years).

A very small fraction of treated water from MRTF (approximated 0.12 MG) was delivered to the SRP Arizona Canal. Discharges to the Arizona Canal are regulated by an AZPDES permit. EPCOR is responsible for monitoring and reporting associated with the AZPDES permit for MRTF.

8.3 NGTF

Approximately 2,923 AF (or 952 MG) of groundwater were pumped from PCX-1 and treated at NGTF during 2021, with approximately 494 MG (52%) of the total volume discharged to the Arizona Canal and 456 MG (48%) to CWTP (**Table 10**). Well PCX-1 was available for use following restart with a new pump and motor on January 5 except for two periods: 1) between January 21 and February 8 due to pump motor failure and 2) between May 11 and June 1 during testing of well PG-41MA/LA (**Table 10**). Based on extraction well data presented in **Table 10**, an estimated 377 pounds of TCE mass were removed from groundwater treated by NGTF in 2021.

TCE concentration trends for the NGTF extraction well are shown in **Table 9**. TCE concentrations at well PCX-1 show a stable trend in recent time (5 years) and a decreasing trend over the longer term (10 years).

Treated water from NGTF that was not discharged to CWTP was discharged to the SRP Arizona Canal under the NGTF AZPDES permit. Treated water discharged to the Arizona Canal is monitored as required by the AZPDES permit. The results of sample analyses were summarized in monthly DMRs and submitted directly to EPA and ADEQ under separate cover.

8.4 Area 7 GWETS

Approximately 229 AF (or 75 MG) of groundwater were pumped and treated at Area 7 GWETS in 2021. Of the total, approximately 31 MG were extracted from well 7EX-3aMA and 44 MG from well 7EX-6MA (**Table 10**). Area 7 GWETS was available for operation up to June 9 when the drive for the air stripper blower failed. The system was restarted on July 15 and operated normally until an electrical storm on July 22 caused a failure of the control communication system. Following troubleshooting activities, the PCs elected to upgrade the entire communication system and variable frequency drives. Due to COVID-19 pandemic related supply-chain issues affecting the availability of electronic equipment world-wide, the system remained offline through the end of 2021. The system is anticipated to return to service in the first half of 2022. Treatment system performance data are provided by the Area 7 operator on a monthly basis. Mass removal estimates derived from quarterly monitoring of extraction wells indicate an estimated 301 pounds of TCE mass were removed from groundwater treated by Area 7 GWETS in 2021 (**Table 10**).

TCE concentration trends for Area 7 extraction wells are shown in **Table 9**. TCE concentrations at well 7EX-3aMA show an increasing trend for recent time (5 years) and a stable trend over the longer term (10 years). TCE concentrations at well 7EX-6MA show a decreasing trend for both recent time and over the longer term.

As part of Site QA procedures, PE samples (designated with sample identifier SP-104) were submitted to TestAmerica during January and July 2021, and process water split samples were submitted to PACE. A summary of the PE sample results, and laboratory reports is included with other GWETS data and quality control reporting submitted under separate cover as a supplemental data report (issued concurrently with this SMR).

8.5 Area 12 GWETS

Approximately 2,435 AF (or 793 MG) of groundwater were pumped and treated at Area 12 GWETS in 2021. Of the total, 423 MG were extracted from well MEX-1MA and 370 MG from the Granite Reef well (**Table 10**). SRP Dry-Up (typically from early January through early February) did not affect the Area 12 discharge location in 2021. As such, the treatment system was available for operation nearly the entire year. The system was offline for short periods of time for routine maintenance. The system was offline for about 16 days in late July and early August due to local issues from electrical storms. Treatment system performance data provided by the Area 12 GWETS operator based on monthly sampling of extraction wells (when operating) indicates an estimated 526 pounds of TCE mass were removed from groundwater treated by Area 12 GWETS in 2021 (**Table 10**).

TCE concentration trends for Area 12 extraction wells are shown in **Table 9**. TCE concentrations at both the Granite Reef well and MEX-1MA show no statistically significant trend in recent time (5 years) and a stable and decreasing trend over the longer term (10 years) for Granite Reef and MEX-1MA, respectively.

Treated water discharged to McKellips Lake is monitored as required by the AZPDES permit. The results of sample analyses were summarized in monthly DMRs and submitted directly to EPA and ADEQ under separate cover.

8.6 Laboratory Audit and Treatment Facility Inspections

To assure data quality and consistency associated with collection of compliance monitoring data at the treatment facilities, the NIBW PCs and the City of Scottsdale have contracted with TestAmerica (designated as the primary analytical laboratory), located in Phoenix, Arizona, and PACE located in Mt. Juliet, Tennessee. TestAmerica and PACE are licensed by the ADHS under analytical laboratory license numbers AZ0728 and AZ0612, respectively.

The City of Scottsdale and the NIBW PCs conducted an annual audit of TestAmerica on December 2, 2021. The objective of the annual audit is to assure laboratory performance and data quality and to resolve any issues that arose during the year. Results of the laboratory audit are submitted under separate cover as a supplemental data report (issued concurrently with this SMR).

The NIBW PCs coordinated the annual inspections of NGTF, CGTF, and Area 7 GWETS on October 19, 2021, and the inspections for MRTF and Area 12 GWETS on October 20, 2021, in accordance with Section VI.B.4.d of the SOW. Representatives of EPA and ADEQ participated in the annual inspections remotely via teleconference while the treatment system operators and the NIBW PCs conducted the inspections locally at each of the treatment facilities. The groundwater treatment and extraction systems were inspected for malfunctions, deterioration, issues with operator practices or errors that could result in a release of untreated groundwater. At each facility, the major system components were identified and examined for operability, condition of operating equipment, and management of untreated groundwater and residual materials. Additionally, data related to routine operation, system startup and shutdown, routine and non-routine maintenance, and sampling were made available for review during the inspections. No hazards, significant deterioration, or procedural issues were noted in the course of the inspections at CGTF, MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS that would affect groundwater treatment performance standards or compliance with the Amended CD/SOW. Additional details for the NIBW Site inspections are provided in the Inspection Report in **Appendix H**.

9 REMEDY PERFORMANCE EVALUATION

Remedy performance is evaluated relative to the Amended CD SOW Performance Standards and the GM&EP performance criteria and contingency initiation criteria. The Amended CD SOW Performance Standards for containment of COCs in the MAU/LAU and capture of relatively higher concentrations in the MAU (Area 7 and Area 12) are described in **Section 5.1**. GM&EP performance criteria and contingency initiation criteria for the UAU, MAU/LAU, Northern LAU, and Source Control Programs are summarized in **Table 4** in **Section 5.2**. Evaluation of remedy performance for 2021 is discussed as follows.

9.1 Evaluation of UAU Program

The assessment of remedy performance for the UAU plumes involves monitoring both VOC mass reduction over time and progress toward aquifer restoration. For the 2021 VOC mass flux analysis, total mass of VOCs present in UAU groundwater was computed using data for saturated thickness from the October 2021 water level monitoring round and VOC concentration data from the October 2021 water quality monitoring round. VOC mass is computed annually both with and without mass attributed to the vicinity of PG-4UA, which has historically shown elevated PCE concentrations from a source unrelated to the Site that has been acknowledged by EPA and ADEQ. **Table 11** summarizes VOC mass estimates for UAU groundwater for 2021. Based on 2021 data, a total of about 8.5 gallons, or 103 pounds, of VOCs are estimated to remain in the saturated portion of the UAU (**Table 11**). **Figure 16** illustrates the decline in total VOC mass in UAU groundwater over time. Estimated total mass of VOCs present in the saturated portion of the UAU has decreased substantially over the past 27 years, declining from a high of over 11,000 pounds in 1993 to the current estimate of 103 pounds. In recent years, the VOC mass reduction with time has become fairly asymptotic.

The inset table on **Figure 16** summarizes the calculated 5-year running average of VOC mass in UAU groundwater since annual mass estimates were initiated in 1996. Including PCE, the most recent VOC mass 5-year running average of 193 pounds represents a decrease relative to the previous 5-year average of 212 pounds, indicating the performance measure for UAU mass reduction has been achieved for 2021.

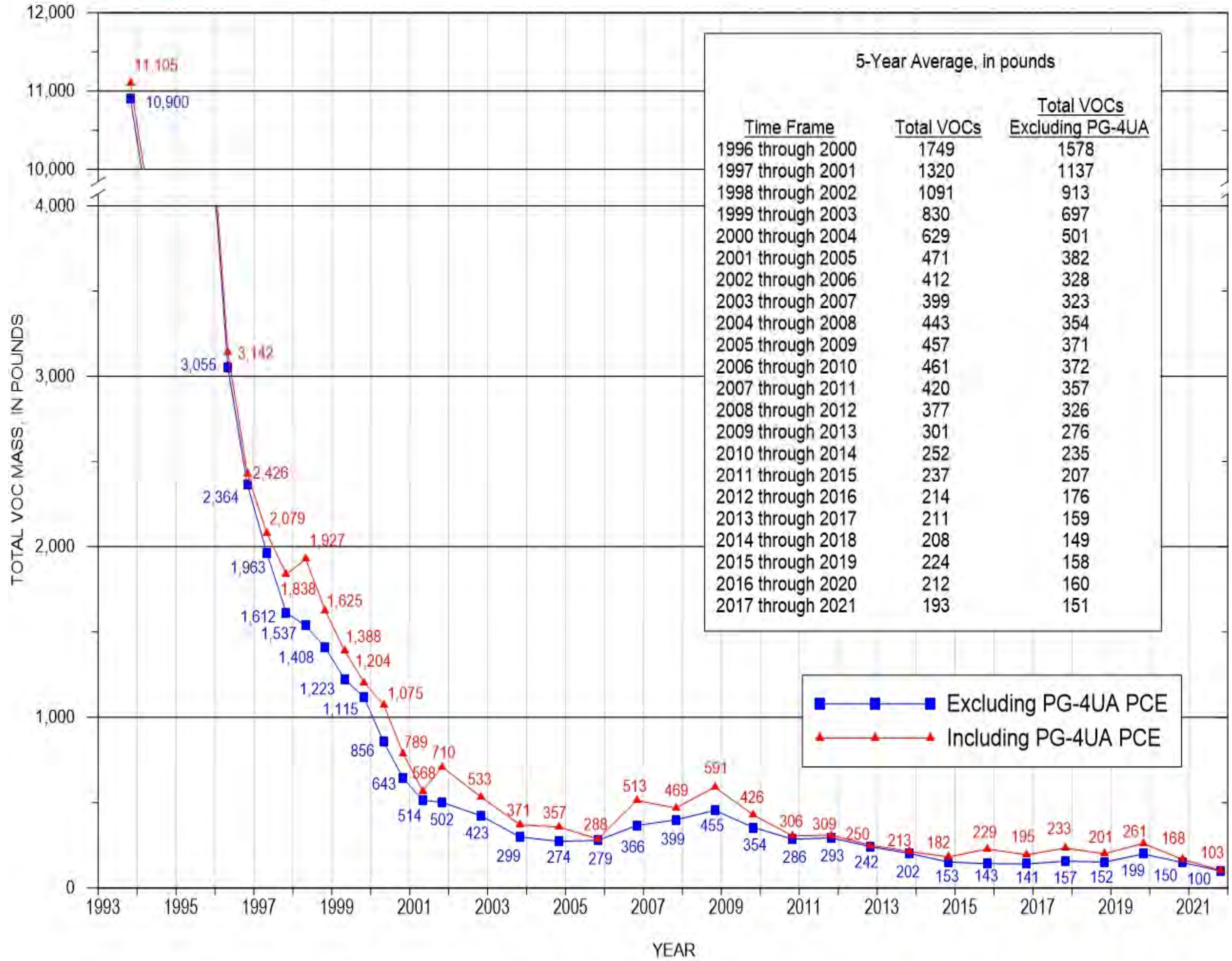

Figure 16. Total Mass of VOCs in Saturated Portion of UAU

Table 11. Summary of VOC Mass Estimates in UAU Groundwater

POLYGON (WELL NAME)	TOTAL VOCs (micrograms per liter)[a]	ELEVATION BASE OF UAU (feet, amsl)	ELEVATION UAU WATER TABLE (feet, amsl)	SATURATED THICKNESS (feet)	POLYGON AREA (square feet)	SATURATED POLYGON VOLUME (cubic feet)	SATURATED PORE VOLUME (liters)	VOC VOLUME (gallons)	VOC MASS (pounds)[b]
B-J	2.1	1,065	1,134.75	70	1,312,017	91,513,186	777,468,572	0.30	3.63
E-5UA	5.6	1,067	1,134.75	68	1,563,483	105,925,973	899,915,291	0.92	11.05
E-7UA	1.1	1,079	1,130.80	52	2,135,156	110,601,081	939,633,602	0.19	2.28
E-12UA	2.1	1,075	1,137.83	63	1,868,432	117,393,583	997,340,659	0.38	4.60
E-13UA	2.5	1,080	1,138.14	58	851,113	49,483,710	420,398,754	0.19	2.34
M-2UA	2	1,081	1,138.31	57	1,081,841	62,000,308	526,736,014	0.19	2.32
PG-4UA	0.8	1,055	1,124.46	69	2,867,709	199,191,067	1,692,267,549	0.24	2.84
PG-5UA	1.8	1,036	1,128.56	93	1,729,659	160,097,237	1,360,138,097	0.45	5.40
PG-6UA	1.5	1,043	1,126.90	84	2,363,199	198,272,396	1,684,462,796	0.45	5.42
PG-8UA	0.8	1,060	1,126.82	67	1,631,115	108,991,104	925,955,725	0.14	1.72
PG-10UA	2.5	1,089	1,137.00	48	693,947	33,309,456	282,987,145	0.13	1.56
PG-11UA	0	1,076	1,133.56	58	2,167,731	124,774,596	1,060,047,538	0.00	0.00
PG-16UA	1.2	1,079	1,134.72	56	1,327,719	73,980,503	628,516,157	0.14	1.66
PG-18UA	2.1	1,045	1,132.47	87	1,953,438	170,867,222	1,451,636,657	0.55	6.63
PG-19UA	2.6	1,049	1,131.76	83	1,407,810	116,510,356	989,837,028	0.47	5.63
PG-22UA	2.4	1,067	1,135.29	68	1,764,305	120,484,388	1,023,599,219	0.45	5.42
PG-23UA	0	1,055	1,124.70	70	1,753,035	122,186,540	1,038,060,184	0.00	0.00
PG-24UA	0	1,054	1,128.29	74	1,535,896	114,101,714	969,373,930	0.00	0.00
PG-25UA	1.9	1,056	1,132.02	76	1,538,241	116,937,081	993,462,358	0.35	4.18
PG-28UA	2.5	1,061	1,136.36	75	1,669,714	125,829,647	1,069,010,932	0.50	5.94
PG-29UA	1.1	1,080	1,137.35	57	1,345,997	77,192,928	655,807,958	0.13	1.61
PG-31UA	10.5	1,081	1,134.38	53	2,706,853	144,491,813	1,227,559,097	2.37	28.42
TOTALS							21,614,215,261	8.56	102.64

ABBREVIATIONS:
feet, amsl = feet, above mean sea level

NOTES:
[a] Includes total concentration of TCE, PCE, 1,1,1-TCA, DCE, and Chloroform from October 2021 water quality data set. "0" indicates either that concentrations of all VOCs were below the detection limit, the well was dry, or the well is no longer included in the NIBW Monitoring Program due to long-term ND levels of VOCs.
[b] Formula for calculation of VOC mass in pounds: (Total VOCs [micrograms per liter] * Saturated Pore Volume [liters] * 0.000000002205 [conversion from micrograms to pounds]

9.2 Evaluation of MAU/LAU Program

Overall, Amended CD SOW Performance Standards for MAU/LAU containment are being met at the Site. MAU/LAU extraction provides sufficient hydraulic control to prevent groundwater in the MAU/LAU with VOC contamination above the Cleanup Standards from migrating toward and ultimately impacting peripheral production wells that have not contained NIBW COCs exceeding MCLs prior to the Effective Date of the Amended CD and which are not currently connected to a treatment facility. In addition, TCE mass in the MAU outside the source areas (i.e., Area 7 and Area 12) is being reduced. Remedy performance metrics for the MAU/LAU Program, as outlined in the GM&EP, are summarized in **Table 4**. Compliance with most of the MAU/LAU Program GM&EP achievement measures was attained in 2021, as discussed in this section.

The objective of containment of the MAU and LAU plumes is principally to ensure protection of unimpacted public water supply wells with potable end-use from TCE above the MCL of 5 µg/L. These wells are shown on figures and referred to as peripheral production wells. One measure of capture is to demonstrate that direction of groundwater movement along the periphery of the 5 µg/L plumes is toward extraction wells tied into treatment or the Western Margin. Water level data for April 2021 and TCE concentration data for October 2021, with arrows indicating direction of groundwater movement, are shown for the MAU and LAU on **Figure 17**. Where arrows are not present, direction of groundwater movement is inferred as perpendicular to water level contours. Based on water level patterns shown on **Figure 17** the inferred direction of groundwater movement along the periphery of the MAU and LAU plumes is generally toward extraction wells or the Western Margin. Hydraulic capture for the MAU and LAU is further evaluated using estimated hydraulic capture zones, as shown on **Figure 17**. Water level data for April 2021 were used to estimate the extent of hydraulic capture for the MAU Area 7 and Area 12 Source Control Programs. The extent of hydraulic capture associated with LAU extraction wells was projected using the NIBW groundwater flow model. Hydraulic capture for the Area 7 and Area 12 Source Control Programs is discussed in **Section 9.4**.

For the MAU, April 2021 data demonstrate that direction of groundwater movement within and along the periphery of the plume is toward the remedial pumping centers associated with Area 7 and Area 12 or the Western Margin. MAU TCE mass outside of Source Control capture zones is migrating toward the Western Margin, consistent with Amended CD containment performance standards. TCE mass at the Western Margin moves vertically into the LAU where it is directed toward and captured at LAU extraction wells. While movement of the MAU TCE plume occurs toward well COT-6 when it is pumping; this well was impacted with TCE prior to the Amended CD and it is not a peripheral production well. Water quality at COT-6 is monitored and blended by the City of Tempe. Well COT-6 pumped relatively little in 2021, about 8.2 MG compared to about 260 MG in 2020.

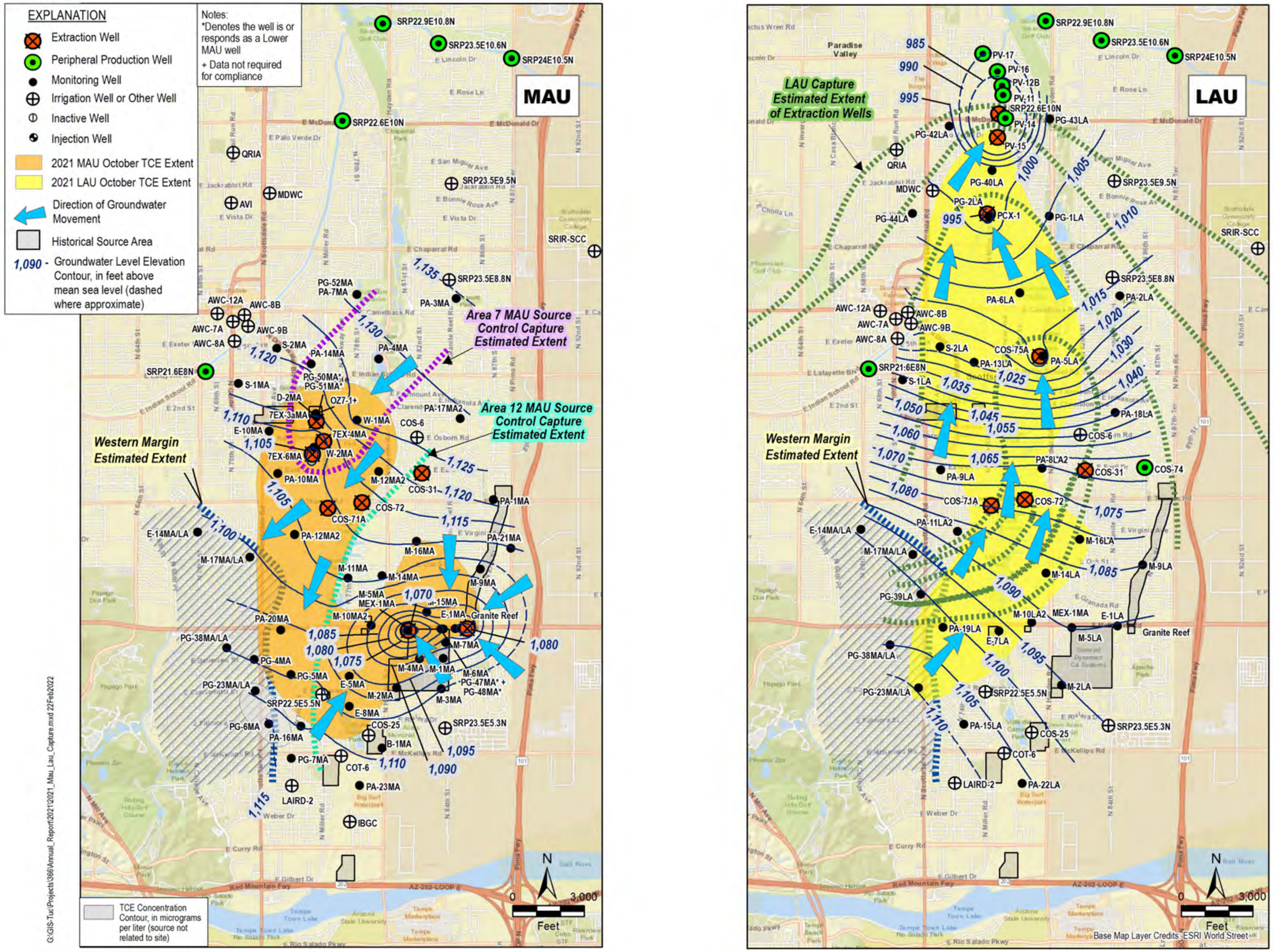

Figure 17. Estimated Hydraulic Capture of TCE Plume by MAU Source Control and Northernmost LAU Extraction Well for April 2021

For the LAU, flow patterns interpreted from April 2021 water level data (**Figure 17**) show that direction of groundwater movement within and along the periphery of the plume is toward LAU extraction wells associated with the NIBW remedy, principally COS-75A, PCX-1, PV-15, and PV-14. While a potential exists for groundwater movement toward the AWC irrigation wells along the western edge of the LAU plume, TCE has not been detected above the cleanup standard. The AWC wells have, however, been impacted by PCE from an alternate source since the time of the RI/FS. Because the AWC wells are designated for irrigation end use and they were impacted prior to the date of the Amended CD, they are not peripheral production wells. Overall, pumping of remedial extraction wells in 2021 resulted in groundwater flow patterns across the MAU and LAU plumes that meet GM&EP performance criteria.

With respect to the performance measure regarding comparison of the plume extent in 2021 relative to baseline (2001) conditions, there are no outward shifts in the location of the 5 µg/L TCE contour in either the MAU or LAU that are greater than the 1,000-foot performance measure (**Figure 13**). The noted and anticipated exception is the Northern LAU, where the plume is migrating toward extraction wells tied into treatment. Shifts of the 5 µg/L TCE concentration contour ranging from about 1,000 to 1,200 feet are observed between 2001 and 2021 along the northern and northwestern edge of the LAU plume due to migration of the LAU plume for capture by the NGTF and MRTF extraction wells. Over the last 5 years, TCE concentrations in wells in the northern part of the LAU show encouraging trends. Either statistically significant decreasing TCE concentration trends (S-2LA, PA-5LA, PA-6LA, PG-42LA, PV-15, and PV-14) or stable trends (PA-13LA and PG-40LA) are observed. TCE has not been detected over the last 10 or more years at wells PG-43LA, S-1LA, PV-11, and PV-12B (**Table 9**). These trends demonstrate that coordinated pumping of LAU extraction wells is reducing concentrations in the LAU plume to the north and protecting peripheral production wells serving drinking water end uses.

TCE concentration metrics specified in the GM&EP for selected MAU and LAU peripheral monitoring wells, along with concentrations reported for the October 2021 sampling round, are summarized in **Table 12 and Table 13**. Except at S-2LA, TCE concentrations are all less than or equal to specified achievement measures. The TCE concentration at well S-2LA was at or above the GM&EP achievement measure of 15 µg/L during all sampling rounds conducted in 2021 except for the July sample, which was 14 µg/L (**Table C-1**). Contingency response actions are discussed in **Section 9.5**.

Table 12. GM&EP Achievement Measures and Observed TCE Concentrations in Selected NIBW Monitoring Wells

Well Name	TCE Concentration (in µg/L)	
	Achievement Measure	October 2021 Sampling Round Results
MAU Monitoring Wells		
M-2MA	10	3.8/4.3*
M-7MA	10	<0.50
S-1MA	2	<0.50
S-2MA	3	<0.50
LAU Monitoring Wells		
M-5LA	10	1.6
PA-2LA	3	<0.50/<0.50*
PA-15LA	10	<0.50
PA-18LA	10	<0.50
PG-1LA	15	0.80
PG-44LA	5	<0.50
S-1LA	3	<0.50/<0.50*
S-2LA	15	15/17*

< = Non-Detected at concentration listed
* Indicates duplicate sample value

9.3 Evaluation of Northern LAU Program

Remedy performance metrics for the Northern LAU Program, as outlined in the GM&EP, are summarized in **Table 4**. For 2021, compliance with most of these achievement measures was attained, as discussed in this section.

Based on interpretation of flow directions using April 2021 water level data, the direction of groundwater movement along the Northern LAU plume is toward northern LAU extraction wells, consistent with the GM&EP metric. The extent of the October 2021 LAU TCE plume is shown with April 2021 LAU water level contours on **Figure 17**. Arrows are used to infer direction of groundwater movement along the periphery of and within the plume. Water level contours indicate that flow from the Western Margin to the north is controlled by regional pumping, with the northernmost extent of the LAU plume being captured by the broad cone of depression that results from focused LAU pumping at MRTF (PV-15 and PV-14) and NGTF (PCX-1) extraction wells. Additional capture is also provided by LAU pumping at CGTF extraction wells, particularly COS-75A. As mentioned previously, water level data indicate that the AWC irrigation wellfield also has a localized impact on LAU flow patterns, particularly when fully operational during the spring and summer months.

The extent of capture for the LAU extraction wells, simulated for 2021 pumping rates using the NIBW groundwater flow model, is shown with the entire LAU plume on **Figure 17** and for the northern LAU on **Figure 18**These projections show broad capture by the LAU extraction well network that extends beyond the LAU plume footprint. TCE concentration achievement measures specified in the GM&EP are compared to 2021 values for specified Northern LAU monitoring wells in **Table 13**.

Table 13. GM&EP Achievement Measures and Observed TCE Concentrations in Selected NIBW Northern LAU Program Wells

Well Name	TCE Concentration (in µg/L)	
	Achievement Measure	October 2021 Sampling Round Results
Northern LAU Program Wells		
PG-42LA	2	1.0*
PG-43LA	2	<0.50
PV-14	2	0.54

* October 2021 sample for PG-42LA was below the achievement measure but the sample obtained in January exceeded GM&EP achievement measure with a concentration of 2.2 µg/L.
< = Not detected at concentration listed

As indicated in **Table 13** and in **Appendix D**, TCE concentrations in 2021 were only above the 2 µg/L performance metric at monitoring well PG-42LA in the January quarterly sample but were otherwise below the performance metric. Contingency response for PG-42LA is discussed in **Section 9.5**. Interpretation of water level contour maps and results of groundwater flow modeling consistently indicate that groundwater in the well PG-42LA vicinity is captured by well PV-14, which is tied into treatment at MRTF. TCE concentrations in all samples obtained at wells PG-43LA (**Table 13 and Table C-1**) and PV-14 (**Table 13 and Table C-2**) were below the 2 µg/L performance metric in 2021. Changes in the northwestern part of the LAU plume will continue to be closely monitored in relation to GM&EP performance measures.

TCE concentration trends in the Northern LAU are encouraging and indicate that extraction and treatment are effectively reducing concentrations over time. Low-level TCE concentrations at well PV-14, which in 2021 ranged from <0.50 to 0.74 µg/L, continue to be relatively predictable and display a statically significant decreasing trend over both the short (5 years) and longer term (10 years) (**Figure 14 and Figure 15**). Similarly, TCE concentration trends at well PV-15 show a declining trend over the last 5- and 10-year periods (**Figure 14 and Figure 15**). These positive responses are attributable to operation of the MRTF extraction wells and other PV production wells consistent with the recommended south to north pumping strategy, along with consistent pumping of NGTF extraction well PCX-1.

Figure 19 is a stacked bar chart showing total annual pumping volume for PV wells and PCX-1 for 1990 through 2021. Wells are stacked in order of their position from south to north in the wellfield, such that annual pumping for well PCX-1, the southernmost well in the Northern LAU, is on the bottom and annual pumping for well PV-17, the northernmost well, is near the top of each bar. Pumping from SRP well 22.6E,10.0N, which is located southeast from well PV-14, was added at the very top of each bar. Although this well is completed across both the MAU and LAU, it contributes to LAU pumping in this region when operated by SRP. Pumping volumes for well PCX-1 and the MRTF extraction wells are shown in shades of red. Pumping volumes for wells without treatment are shown in shades of blue, green, and yellow. A dashed line is provided to group the three southern wells that are tied into treatment (PCX-1, PV-15, and PV-14). SRP well 22.6E,10.0N is shown in pink.

Data displayed on **Figure 19** show that focused pumping of extraction wells PCX-1, PV-15, and PV-14 began in 1998 and continued over the subsequent 10 years. This pumping pattern effectively contained the Northern LAU plume and limited impacts to peripheral production wells (including PV wells to the north and SRP 22.6E,10.0N). Beginning in 2007, however, a decrease in the amount of pumping by MRTF extraction wells occurred and resulted in the first instance where TCE concentrations exceeded performance metrics at Northern LAU indicator monitoring well PG-42LA and then later at extraction well PV-14. Focused pumping of MRTF extraction wells was restored midway through 2010 and since that time EPCOR has, to the extent practicable, maintained a south to north pumping strategy. This pumping approach has been shown through model projections to optimize plume containment.

Comparison of TCE mass removed over time at MRTF extraction wells PV-14 and PV-15 and NGTF extraction well PCX-1 shows that well PCX-1 has been responsible for the overwhelming majority of TCE mass captured in the Northern LAU over time, preventing much of the LAU plume from reaching the PV wellfield. In 2021, extraction from well PCX-1 was responsible for almost 90% of the combined mass removed at MRTF and NGTF extraction wells (**Table 10**).

Acknowledging that the performance measure was not met at well PG-42LA during one of the four sampling events, data trends and modeling support the conclusion that the Northern LAU remedy is operating effectively. Implementation of a coordinated extraction and treatment strategy continues to successfully achieve the Amended CD Performance Standard of protecting peripheral production wells for drinking water end use.

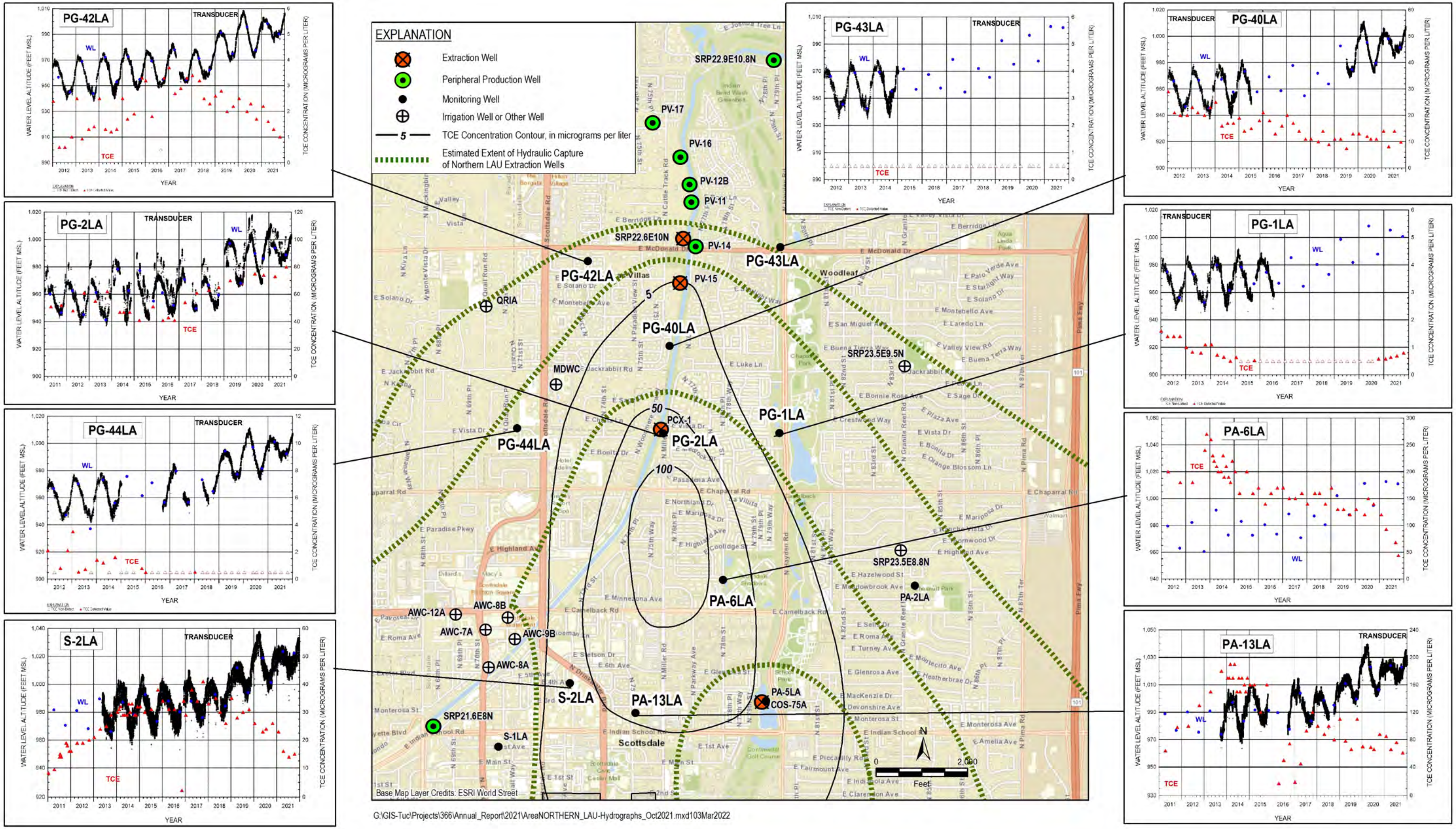

Figure 18. Water Levels, TCE Concentrations, and Estimated Hydraulic Capture for the Northernmost LAU Extraction Well - Northern LAU

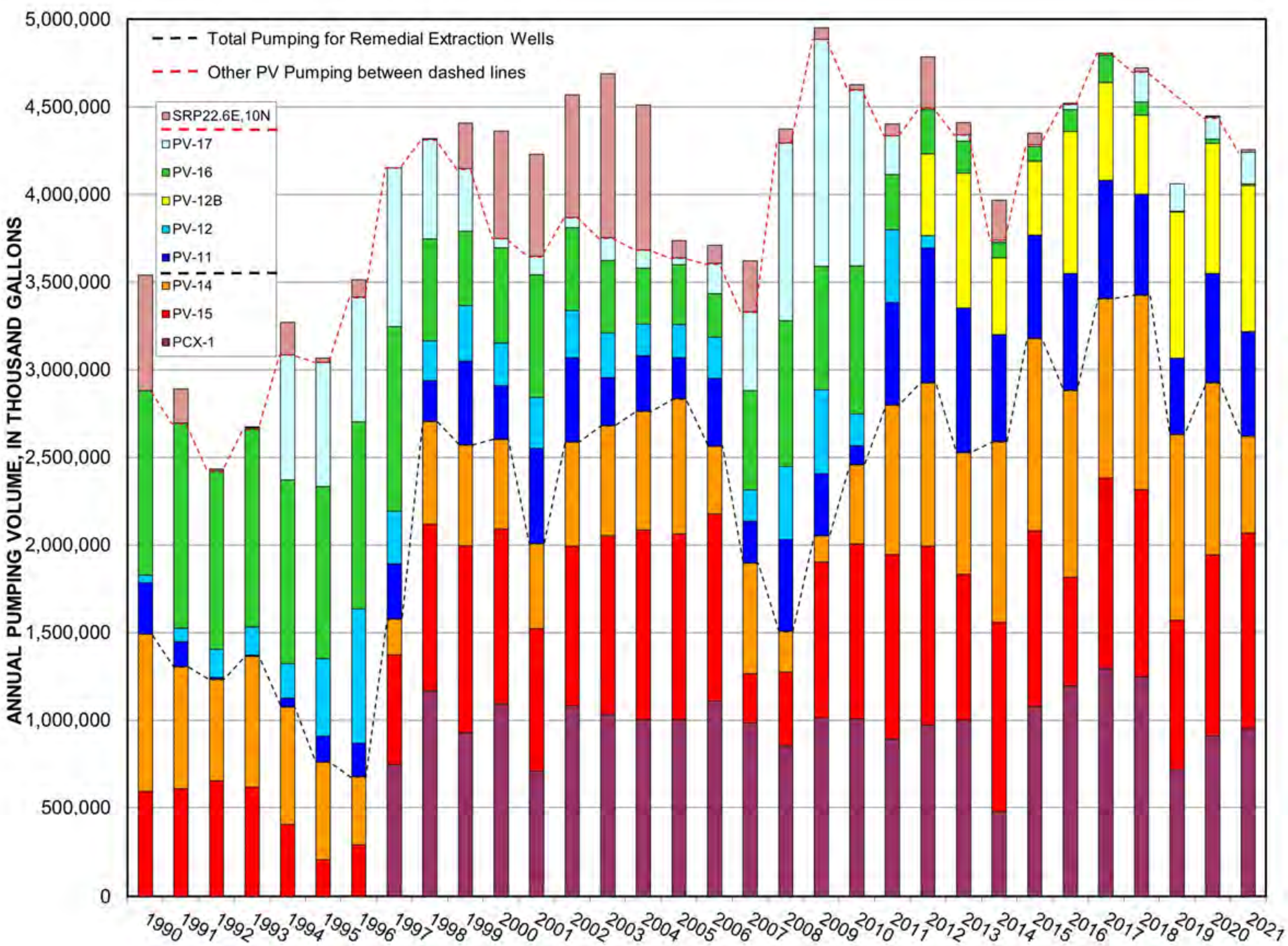

Figure 19. Distribution of Pumping in PV Wellfied

9.4 Evaluation of MAU Source Control Programs

The remedy meets the overall Area 7 and Area 12 Source Control Program Amended CD containment performance standards. The two systems are reducing the mass of COCs and providing sufficient hydraulic control to prevent MAU groundwater in the vicinity of Area 7 and Area 12 with TCE concentrations higher relative to the surrounding vicinity from migrating away from the source areas. Hydraulic control in these areas is minimizing the total mass of NIBW COCs that is allowed to migrate toward the Western Margin. As described in the following section, extraction at wells tied into Area 7 GWETS did not meet the GM&EP metric of extent of capture to the vicinity of PA-12MA in 2021. The PCs have discussed this issue with EPA and ADEQ and continue to conclude that Area 7 containment is consistent with the Amended CD Performance Standard of localized containment of higher concentration groundwater. In discussions with EPA and ADEQ, the PCs have noted that GM&EP performance criteria related to the Source Control Programs that involve demonstration of plume capture extending downgradient to a specified geographic location on the land surface are not responsive to the Amended CD requirement for capture of relatively higher concentration areas of the plume. The NIBW PCs believe that compliance should be evaluated based on changing concentrations over time and should incorporate 3D capture using up-to-date evaluations and tools. The PCs have presented preliminary proposals for alternative GM&EP metrics and look forward to continued discussions with the Technical Committee.

9.4.1 Area 7 Source Control

Remedy performance metrics for the Area 7 Source Control Program, as outlined in the GM&EP, are summarized in **Table 4**. For 2021, compliance with most of these achievement measures was attained, as discussed in this section.

The PCs are recommending replacement of well D-2MA with well OZ7-1 as an indicator well for Area 7. These two wells are located in close proximity to each other and water quality data from D-2MA has been deemed not representative of aquifer conditions in the area since 2016. Data for OZ7-1 is included in the 2021 SMR and will be used for the 2021 performance evaluation unless otherwise noted.

Figure 20 includes graphs of water level and TCE concentration data for indicator wells in the vicinity of Area 7. Data from these indicator wells are used to evaluate long-term trends and overall effectiveness of Area 7 Source Control. Water levels in the vicinity of Area 7 display some seasonal patterns in response to pumping but are otherwise fairly consistent with regional trends, increasing slightly through 2011 and then showing stable to declining trends. TCE concentration trends in the MAU indicator wells in the vicinity of Area 7 are encouraging and demonstrate that Source Control operations are controlling and slowly reducing mass in the vicinity of Area 7. Five of the six Area 7 indicator wells show stable or no trend for the most recent 5-year period and only one well (E-10MA) shows an increasing 5-year trend (**Figure 15 and Table 9**). TCE concentrations at E-10MA are low and this short-term increasing trend is not a concern in relation to performance of the Area 7 remedy. Review of 10-year trends indicates that the longer-term increasing trend previously apparent at PA-10MA is now showing no trend.

Figure 20 also shows the estimated extent of hydraulic capture associated with MAU extraction in the vicinity of Area 7. MAU remedial extraction wells 7EX-3aMA and 7EX-6MA were both operational during the April water level monitoring round but were offline during the October 2021 event, therefore April MAU water level data were used to evaluate Source Control hydraulic capture in 2021. Review of the interpreted hydraulic capture zone for Area 7 MAU GWETS indicates that the program performs in a manner consistent with the Amended CD SOW performance standard of providing sufficient hydraulic control to prevent migration away from the source area of MAU groundwater with COC concentrations higher relative to the surrounding vicinity. The Area 7 GWETS is also performing in a manner consistent with the EPA-approved design, which was projected to capture groundwater with TCE concentrations greater than 1,000 µg/L in the Upper MAU near the Area 7 source. The GM&EP achievement measure specifies that hydraulic capture from Area 7 pumping extend south to the vicinity of well PA-12MA. This achievement measure was not met in 2021 or for several years prior, and it may not be achievable using available MAU extraction wells tied into treatment at Area 7 GWETS and CGTF.

Hydraulic capture of MAU mass associated with the Area 7 source has always been evaluated in conjunction with overall MAU pumping at the Site. Hydraulic capture in the MAU has been impacted in the last several years by the inability of the City of Scottsdale to prioritize use of well COS-71A for extraction and treatment at CGTF due to elevated concentrations of inorganic COCs unrelated to the Site. As intended, the Area 7 MAU Source Control Program is controlling migration of the highest COC concentrations to the Western Margin. The PCs are actively engaged with the City of Scottsdale to bring well COS-71A back online to enhance the efficiency of the overall remedy. With TGTF coming online in 2022, the City of Scottsdale has indicated they should be able to utilize COS-71A as a higher-priority extraction well in their system. Testing will be conducted to evaluate the optimal configuration for pumping well COS-71A to further enhance local MAU capture and overall remedy efficiency.

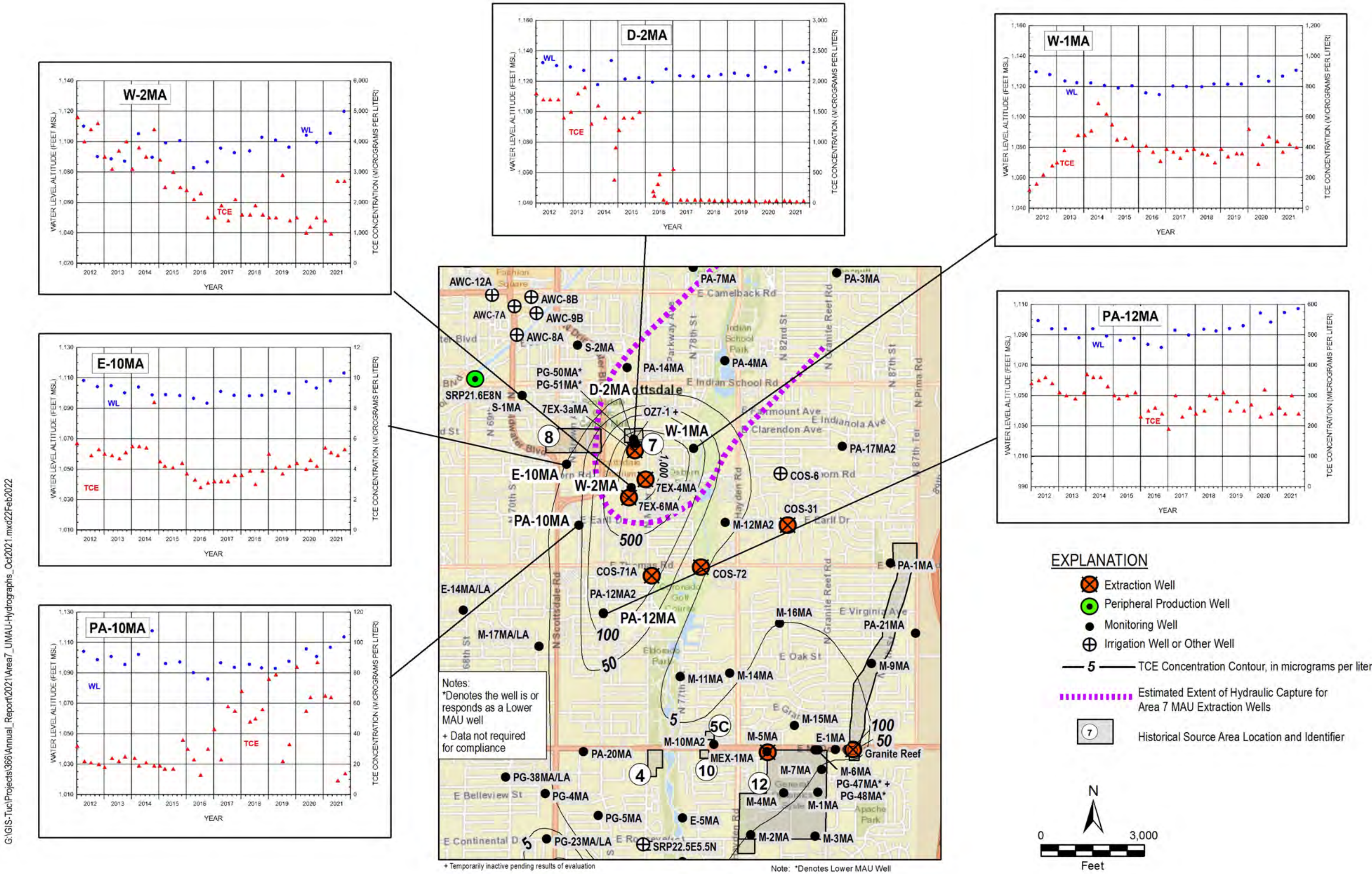

Figure 20. Water Levels, TCE Concentrations, and Estimated Hydraulic Capture from Area 7 MAU Extraction Wells

The second evaluation metric for the Area 7 MAU Source Control Program is demonstration of a decline in the 5-year running average of TCE concentrations for the designated index wells (D-2MA/OZ7-1, E-10MA, PA-10MA, PA-12MA, W-1MA, and W-2MA) for the period following full implementation of the Area 7 groundwater remedy. **Table 14** summarizes annual average TCE concentrations for the period 1995 through 2021 at the six Area 7 MAU indicator monitoring wells specified in the GM&EP. Responsive to the GM&EP performance criteria to demonstrate an overall reduction in concentrations at the Area 7 source area, this compliance metric is computed as a combined average of the 5-year running averages for the designated wells. As noted, the PCs are recommending replacement of D-2MA with OZ7-1 and are using this well in 2021 remedy effectiveness evaluations. Annual average TCE concentrations at each of the specified Area 7 MAU indicator wells were computed for each year during the period 1995 through 2021. A total combined annual TCE average for all indicator wells was then determined for each year. The 2015 average TCE concentration was used in the running average calculation for well D-2MA for 2016 through 2020 since analytical results for these years were not representative of historical values. Data for well OZ7-1 was used in place of well D-2MA in 2021. As shown in **Table 14**, the overall 2021 average TCE concentration for the six Area 7 indicator wells of 578 µg/L was higher than the annual average of 574 µg/L for 2020; however, the 5-year average TCE concentration that was calculated for the period 2017 through 2021 of 610 µg/L was lower than the average for the previous 5-year period of 630 µg/L. Accordingly, compliance with the mass reduction component of the Area 7 remedy performance was achieved in 2021.

Figure 21 depicts the computed 5-year running average TCE concentration for Area 7 indicator wells. These data indicate that, except for the 5-year periods ending in 2011 and 2012, a declining trend has been observed since this performance measure went into effect in 2004. Increases in the 5-year running averages for these two periods are directly correlated to variations in TCE concentrations reported at monitoring well W-2MA. Since TCE concentrations at well W-2MA are significantly higher than at other Area 7 indicator wells, slight variations in TCE concentrations can have a substantial effect on combined annual averages. TCE concentrations at W-2MA have varied considerably over time; however, data currently show a decreasing long-term (10-year) trend (**Figure 14 and Figure 20**).

In conclusion, the performance measure involving a decline in 5-year running average TCE concentrations was achieved at Area 7 in 2021. As with previous years, demonstration of hydraulic capture, such that the direction of groundwater movement from the vicinity of PA-12MA is toward the cone of depression associated with Area 7 pumping was not achieved in 2021. See **Section 9.5** for further discussion.

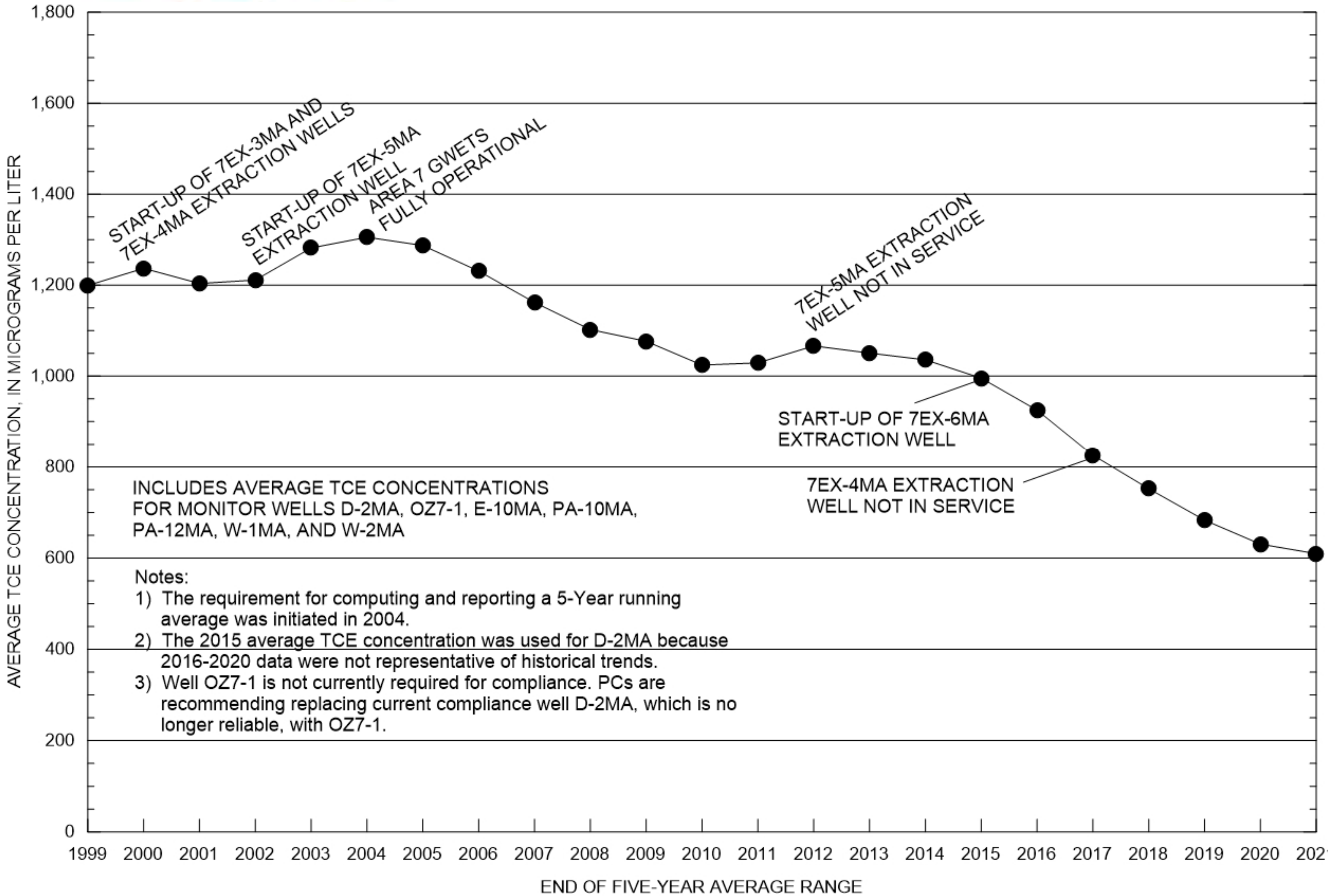

Figure 21. Five-Year Running Average of TCE Concentrations in the MAU - Vicinity of Area 7

Table 14. Average TCE Concentrations for MAU Monitoring Wells - Vicinity of Area 7

YEAR	AVERAGE TCE CONCENTRATIONS (micrograms per liter)							
	D-2MA	OZ7-1	E-10MA	PA-10MA	PA-12MA	W-1MA	W-2MA	ANNUAL AVERAGE
1995	---	---	6	12	190	2,800	3,000	1,202
1996	5,600	---	6	15	135	1,045	1,950	1,458
1997	4,650	---	6	26	175	560	2,050	1,245
1998	3,500	---	11	68	360	200	1,950	1,015
1999	2,200	---	15	96	760	497	2,900	1,078
2000	2,369	---	15	68	608	1,432	3,844	1,390
2001	2,533	---	15	39	586	707	3,875	1,292
2002	2,180	---	14	39	581	389	4,490	1,282
2003	2,200	---	10	46	580	495	4,875	1,368
2004	1,650	---	8	39	483	270	4,725	1,196
2005	1,650	---	7	41	483	335	5,275	1,298
2006	1,145	---	6	36	400	151	4,325	1,010
2007	828	---	5	35	407	129	4,225	938
2008	1,015	---	6	41	360	95	4,900	1,069
2009	1,550	---	5	34	400	88	4,325	1,067
2010	1,675	---	5	31	370	44	4,100	1,038
2011	1,825	---	6	36	343	70	3,925	1,034
2012	1,725	---	5	24	348	195	4,450	1,124
2013	1,650	---	5	22	303	387	3,575	990
2014	1,303	---	6	21	355	575	3,700	993
2015	1,375	---	4	22	300	468	2,850	837
2016	1,375	---	3	24	245	368	2,075	682
2017	1,375	---	3	45	245	368	1,725	627
2018	1,375	---	4	56	270	350	1,675	622
2019	1,375	---	4	53	273	363	1,825	649
2020	1,375	---	4	73	265	425	1,300	574
2021	---	813	5	38	260	408	1,943	578

NOTES:
1) Duplicates were not used in the calculation of 5-Year Average TCE Concentrations.
2) 2015 average TCE concentration was used for D-2MA because 2016-2020 data were not representative of historical trends.
3) Well OZ7-1 is not currently required for compliance. PCs are recommending replacing current compliance well D-2MA, which is no longer reliable, with OZ7-1.

Five-Year Average TCE Concentrations (micrograms per liter)

1995-1999	1,199	Start-Up of 7EX-3MA and 7EX-4MA Extraction Wells
1996-2000	1,237	
1997-2001	1,204	
1998-2002	1,211	Start-Up of 7EX-5MA Extraction Well
1999-2003	1,282	Area 7 GWETS Fully Operational
2000-2004	1,305	Performance Measure Became Effective
2001-2005	1,287	
2002-2006	1,231	
2003-2007	1,162	

Five-Year Average TCE Concentrations (micrograms per liter) – continued

2004-2008	1,102	
2005-2009	1,077	
2006-2010	1,024	
2007-2011	1,029	
2008-2012	1,066	Beginning in 2012 7EX-5MA Extraction Well Not in Service
2009-2013	1,051	
2010-2014	1,036	
2011-2015	996	Start-Up of 7EX-6MA Extraction Well
2012-2016	925	
2013-2017	826	Beginning in 2017 7EX-4MA Extraction Well Not in Service
2014-2018	752	
2015-2019	683	
2016-2020	630	
2017-2021	610	

9.4.2 Area 12 Source Control

Remedy performance metrics for the Area 12 Source Control Program, as outlined in the GM&EP, are summarized in **Table 4**. For 2021, compliance with most of these achievement measures was attained, as discussed in this section.

Figure 22 includes graphs showing 10 years of water level and TCE concentration data for indicator wells in the vicinity of Area 12. Data from these indicator wells help to evaluate long-term trends and confirm overall effectiveness of the Area 12 GWETS. Water levels in the vicinity of Area 12 display seasonal patterns in response to pumping. Water level trends at the Area 12 indicator wells were generally increasing through 2011, declining in 2012 and 2013, and then generally stable from 2014 through 2021, as shown on **Figure 22**. Although TCE concentration trends at all Area 12 MAU indicator wells are stable or declining over the long term (10 years), three wells (E-1MA, M-5MA, and M-6MA) exhibit short term (5 years) increasing TCE concentration trends (**Table 9**). The increasing trends are linked to variability of groundwater pumping patterns at Area 12 GWETS extraction wells MEX-1MA and the Granite Reef well. Specifically, while MEX-1MA was pumped consistently over the last 5 years, maintenance issues have resulted in a curtailed pumping regimen for the Granite Reef well for 3 of the last 5 years (2017, 2019, and 2020). SRP replaced the pump at the Granite Reef well in 2020 and consistent pumping occurred at this well in 2021.

Figure 22 also shows MAU TCE concentration contours for October 2021 and the estimated extent of hydraulic capture associated with Area 12 MAU extraction. MAU water level contours and the associated interpretation of MAU hydraulic capture for Area 12 GWETS for October 2021 are also shown on **Figure 17**. Review of patterns of groundwater movement and the extent of hydraulic capture indicates that a large cone of depression occurs as a result of MAU pumping at Area 12 extraction wells. Consistent with the achievement measure, direction of groundwater movement from the general vicinity of Hayden Road is to the east toward this cone of depression. Accordingly, compliance with the hydraulic capture component of the Area 12 remedy performance was achieved in 2021.

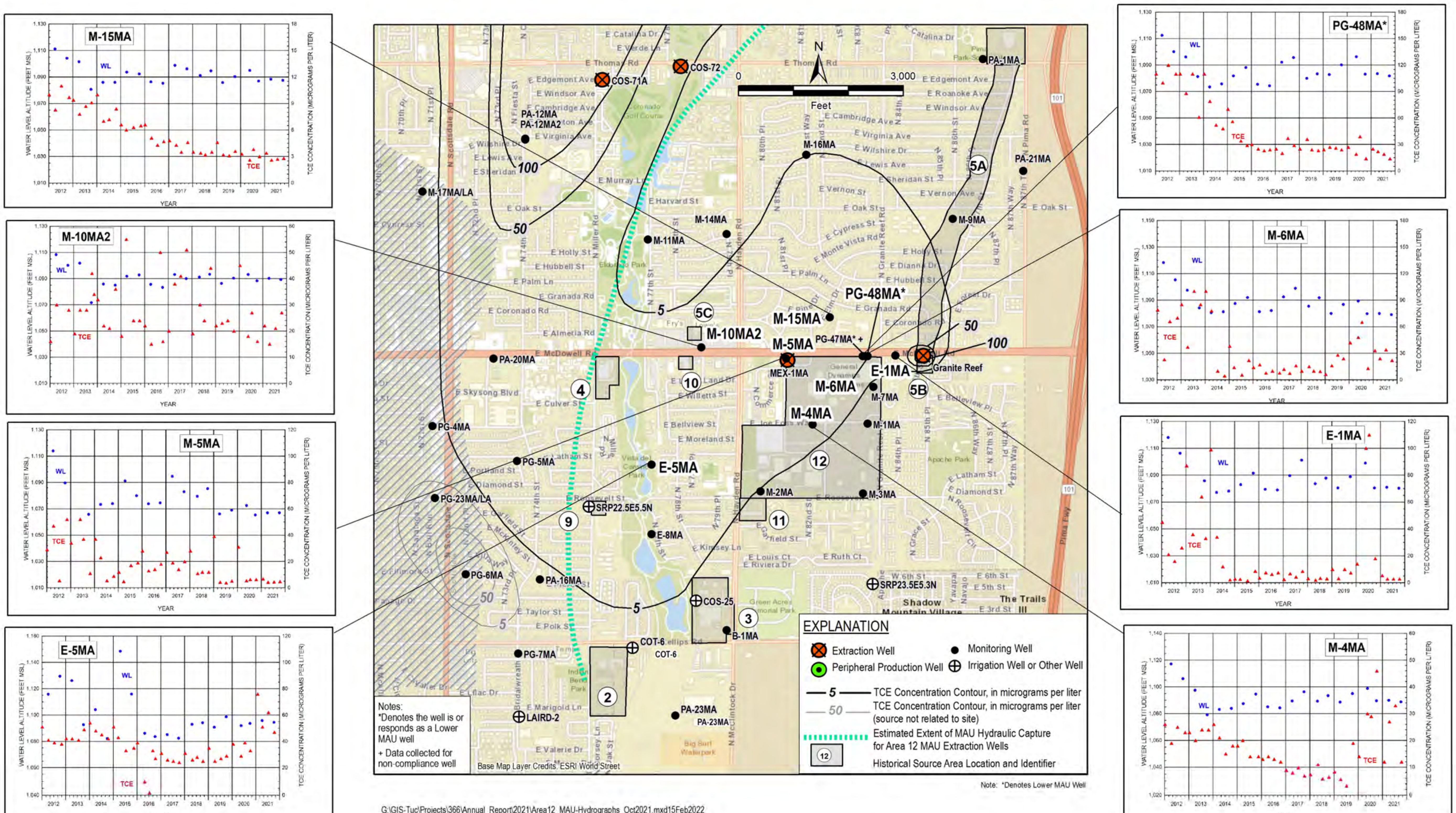

Figure 22. Water Levels, TCE Concentrations, and Estimated Hydraulic Capture from Area 12 MAU Extraction Wells

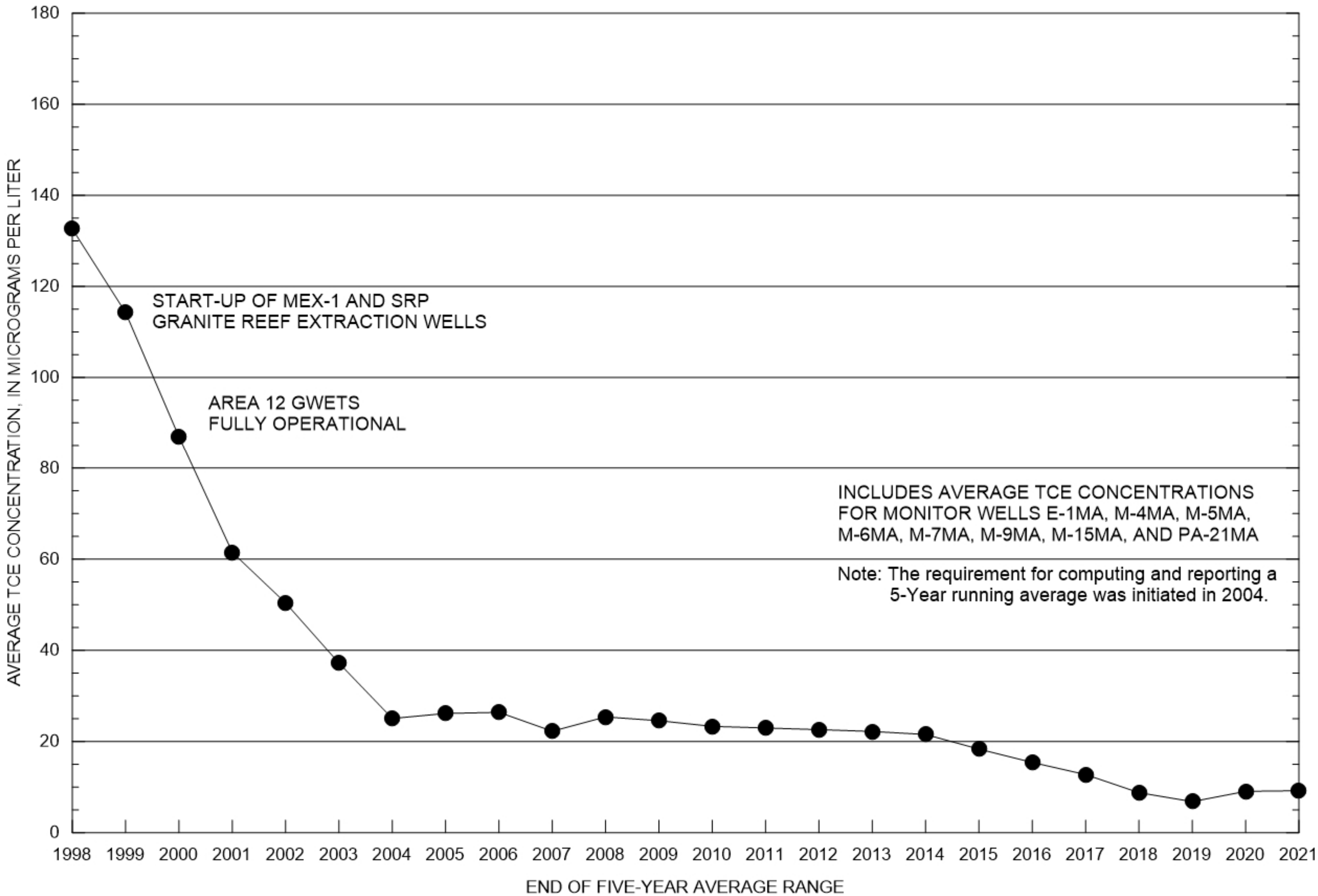

Figure 23. Five-Year Running Average of TCE Concentrations in the MAU - Vicinity of Area 12

The second evaluation metric for the Area 12 MAU Source Control Program is demonstration of a decline in the 5-year running average of TCE concentrations for the designated index wells (E-1MA, M-4MA, M-5MA, M-6MA, M-7MA, M-9MA, M-15MA, and PA-21MA) for the period following full implementation of the Area 12 groundwater remedy. **Table 15** summarizes annual average TCE concentrations for 1994 through 2021 for the eight Area 12 MAU indicator monitoring wells specified in the GM&EP. Responsive to the GM&EP performance measure to demonstrate an overall reduction in concentrations at the Area 12 source area, this compliance metric is computed as a combined average of the 5-year running averages for the designated wells. Annual average TCE concentrations at each of the specified Area 12 MAU indicator wells were computed for each year. The individual monitoring well annual average TCE concentrations were then averaged to arrive at a combined Area 12 average for each year. The combined average TCE concentration for the Area 12 MAU indicator wells for 2021 was 8 µg/L, which is lower than the annual average of 19 µg/L for 2020. Using the 2021 combined annual average TCE value, a 5-year average of 9 µg/L was computed for the period 2017 through 2021. This value is the same as the average computed for the previous 5-year period. As such, compliance with the mass reduction component of the Area 12 remedy performance was not achieved in 2021. Contingency responses are discussed in **Section 9.5**.

Figure 23 depicts the computed 5-year running average TCE concentrations for Area 12 indicator wells. These data indicate that, except for the 5-year periods ending in 2008 and 2020, a stable or declining trend in the running average TCE concentrations at Area 12 has been observed since this performance measure came into effect in 2004. The increase in the 5-year running average for the period ending in 2008 was small and appears to be attributable to a sequence of years with lower pumping for the Granite Reef well (**Table 8**). As discussed previously, this was also the case for the most recent 5-year averaging period.

In conclusion, demonstration of hydraulic capture, such that the direction of groundwater movement from the vicinity of Hayden Road is toward the cone of depression associated with Area 12 pumping was achieved in 2021. The performance measure involving a decline in 5-year running average TCE concentrations, however, was not achieved at Area 12 in 2021. See **Section 9.5** for further discussion.

Table 15. Average TCE Concentrations for MAU Monitoring Wells - Vicinity of Area 12

YEAR	AVERAGE TCE CONCENTRATIONS (micrograms per liter)								
	E-1MA	M-4MA	M-5MA	M-6MA	M-7MA	M-9MA	M-15MA	PA-21MA	ANNUAL AVERAGE
1994	367	29	377	333	11	150	105	44	177
1995	440	20	365	315	7	113	14	14	161
1996	490	32	295	180	6	72	115	8	150
1997	370	31	120	113	8	52	83	7	98
1998	350	32	43	120	9	24	40	3	78
1999	370	28	65	125	3	15	75	2	85
2000	18	27	79	22	0	10	40	2	24
2001	3	20	115	7	1	8	25	1	22
2002	130	24	105	55	2	5	19	0	42
2003	3	21	45	2	1	6	14	0	12
2004	56	25	53	40	1	7	13	0	24
2005	73	26	54	69	1	7	11	1	30
2006	42	20	68	43	1	4	12	0	24
2007	22	21	65	49	1	4	12	0	22
2008	63	20	50	68	1	5	12	0	27
2009	21	19	65	38	1	5	12	0	20
2010	34	20	58	63	1	4	11	0	24
2011	37	23	48	52	1	4	10	0	22
2012	27	23	33	60	1	5	10	0	20
2013	55	23	34	77	0	5	9	0	25
2014	37	20	19	48	0	4	8	0	17
2015	4	17	13	20	0	3	6	0	8
2016	6	13	18	12	0	3	5	0	7
2017	5	8	20	11	0	4	4	0	7
2018	3	8	16	11	0	2	3	0	5
2019	8	9	13	19	0	4	4	0	7
2020	61	30	12	42	0	6	3	0	19
2021	3	21	5	28	0	2	3	0	8

NOTES:
Duplicates were not used in the calculation of 5-Year Average TCE Concentrations.

Five-Year Average TCE Concentrations (micrograms per liter)

1994-1998	133	
1995-1999	114	Start-Up of MEX-1 and SRP Granite Reef Extraction
1996-2000	87	Area 12 GWETS Fully Operational
1997-2001	62	
1998-2002	50	
1999-2003	37	
2000-2004	25	Performance Measure Became Effective
2001-2005	26	

Five-Year Average TCE Concentrations (micrograms per liter) - continued

2002-2006	26
2003-2007	22
2004-2008	25
2005-2009	25
2006-2010	23
2007-2011	23
2008-2012	23
2009-2013	22
2010-2014	22
2011-2015	18
2012-2016	15
2013-2017	13
2014-2018	9
2015-2019	7
2016-2020	9
2017-2021	9

9.5 GM&EP Contingency Responses

9.5.1 TCE Concentration Achievement Measures at LAU Wells

Two LAU wells (S-2LA and PG-42LA) did not achieve their respective TCE concentration achievement measures in 2021. Increasing TCE concentrations in the Northern LAU were anticipated as LAU mass migrated toward northern extraction wells, and the TCE concentration trends at these two wells are directly attributable to plume migration. A general shift of the west has been observed over time as the LAU plume has migrated to the north toward extraction wells. The western flank of the LAU plume in the vicinity of S-2LA and PG-42LA has been being closely monitored for several years.

The TCE concentrations at well S-2LA has consistently exceeded the achievement measure of 15 µg/L since 2011. The PCs have conducted significant investigation work to characterize LAU groundwater conditions in the vicinity of well S-2LA and have updated the assessment of plume containment using both water level data and modeling. Results of initial contingency evaluations were summarized in the 2011 SMR. Findings of the 2011 evaluation indicated that the increase in TCE concentrations at well S-2LA was likely attributable to migration of TCE mass from an upgradient portion of the LAU plume that is within the combined hydraulic capture zone created by pumping of CGTF, NGTF, and MRTF extraction wells. After contingency response actions were initiated at well S-2LA in 2011, TCE concentrations continued to increase at a similar rate until 2014, when they began to stabilize (**Figure 18and Appendix D**). Mann-Kendall trend analyses conducted in 2021 show no trend over the long-term (10-year) and a decreasing trend in the more recent data set (5-year). These results indicated that TCE concentrations at S-2LA are beginning to decline as mass migrates toward the northern extraction wells. The PCs anticipate this trend to continue.

TCE concentrations were first reported to exceed the GM&EP metric of 2 µg/L at well PG-42LA in 2011, and contingency response actions included data acquisition and analyses to further characterize LAU groundwater conditions. The overall findings from this nearly year-long effort indicated that the NIBW remedy was performing effectively to contain the Northern LAU plume. Containment and capture of the leading edge of the Northern LAU plume are demonstrated by multiple lines of evidence, including evaluation of water quality data, water level data, and groundwater modeling analyses. Recent TCE concentration trends at PG-42LA, like S-2LA, are encouraging. The contingency metric of 2 µg/L was exceeded for only one of the four sampling rounds at PG-42LA in 2021. In addition, longer-term (10-year) data show no trend at PG-42LA and a decreasing trend over the last 5 years. These trends indicate that the northern edge of the LAU plume is being effectively captured and that mass in the area is being reduced over time.

Encouraging trends at S-2LA and PG-42LA are attributed to consistent pumping at PCX-1, PV-14, and PV-15. Coordinated pumping of other PV wells north of MRTF, in accordance with the optimal containment strategy that prioritizes pumping from south to north, is also critical (**Figure 18**). While EPA approved suspension of formal contingency actions associated with Northern LAU containment in 2012, the NIBW PCs continue to closely monitor water quality at LAU wells where metric exceedances have occurred. To provide additional protection of Northern LAU peripheral production wells, the PCs have been working with the City of Scottsdale to evaluate the potential to tie monitoring well PG-41MA/LA into treatment at NGTF. Testing has demonstrated the feasibility of pumping PG-41MA/LA at a sustained rate of up to 1,000 gpm, as described in **Section 10.1.3**. Modeling also showed that pumping at PG-41MA/LA would enhance Northern LAU capture and ensure protection of peripheral production wells should PCX-1 be down for a worst-case duration of up to 3 years.

9.5.2 Area 7 Capture to PA-12MA

Capture zones interpreted from water level data show that the current pumping configuration provides sufficient capture to prevent migration of relatively higher COC concentrations associated with Area 7 from migrating to the Western Margin and into the LAU. The status of Area 7 Source Control is, therefore, consistent with the Amended CD SOW performance standard. The GM&EP Area 7 achievement measure specifying hydraulic capture extending south to the vicinity of well PA-12MA, however, was not met in 2021. In fact, as discussed with the Technical Committee, this metric has not been achieved for several years and is not likely to be achievable using currently available MAU extraction wells tied into treatment at Area 7 GWETS and CGTF wells. The City of Scottsdale has been unable to prioritize use of well COS-71A for extraction and treatment at CGTF over the last several years due to inorganic water quality issues unrelated to the Site. The PCs in coordination with the City of Scottsdale and the other stakeholders are working to develop an approach to resume pumping at well COS-71A, which would significantly increase capture of the MAU plume downgradient from Area 7.

Modeling analyses show that this approach will enhance efficiency of the remedy by increasing local capture of mass MAU that would otherwise migrate to the Western Margin for capture in the LAU. Investigations are planned for 2022 to evaluate both the feasibility and potential benefits of this remedy enhancement.

9.5.3 Area 12 Five-Year Running Average

In 2021, Area 12 did not meet the GM&EP metric of a decline in the 5-year running average of annual average TCE concentrations for the group of eight Area 12 indicator wells. The 5-year running average TCE concentration of 9 µg/L did not change from 2020 to 2021. This recent lack of decline in running average TCE concentrations is likely linked to a curtailed pumping regimen for the Granite Reef well for 3 of the last 5 years (2017, 2019, and 2020). This reduction in pumping has resulted in two monitoring wells (M-4MA and M-6MA) in the immediate vicinity of the Granite Reef well exhibiting short term (5-year) increasing TCE concentration trends. SRP replaced the pump at the Granite Reef well in 2020 and more consistent pumping occurred in 2021.

9.6 Evaluation of Groundwater Treatment Performance Standard

Performance of the NIBW groundwater treatment systems is evaluated based on criteria established in the SOW and compliance with groundwater Cleanup Standards specified in the Amended ROD (**Table 2**). The following sections summarize monitoring data from treatment system effluent samples obtained during 2021. A summary of all treatment facility sample points and frequency is provided in **Table 5**. Laboratory results for COCs in treatment system samples are included for MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS in **Table C-3**. Quarterly results for treatment system performance sampling conducted by the City of Scottsdale at CGTF are reported to EPA and ADEQ under separate cover.

9.6.1 CGTF Evaluation

Throughout 2021, samples of treated groundwater were collected from the common sump at CGTF and analyzed for the NIBW COCs on a weekly basis when the treatment facility was in operation. The NIBW COC concentrations in all treated water samples from the common sump were below the Method Reporting Limit (MRL) of 0.50 µg/L. Sample results summarized in **Table C-3** demonstrate that CGTF consistently achieved Cleanup Standards for treated groundwater in 2021. Although the City of Scottsdale submits results under separate cover, Level 4 data analytical reports are included as part of the supplemental data reports submitted with the SMR.

9.6.2 MRTF Evaluation

Throughout 2021, samples of treated groundwater were collected from the MRTF treatment trains (Tower 1 Effluent, Tower 2 Effluent, Tower 3 Effluent) and analyzed for the NIBW COCs on a monthly basis when the treatment facility was in operation. The results of sampling and analysis are included in **Table C-3**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from MRTF were below the MRL of 0.50 µg/L. Sample results summarized in **Table C-3** demonstrate that MRTF consistently achieved the Cleanup Standards for treated groundwater in 2021.

9.6.3 NGTF Evaluation

Throughout 2021, samples of treated groundwater were collected from the treatment plant discharges to both the CWTP (NGTF-CP) and to the SRP Arizona Canal (referred to as AZCO for the City of Scottsdale samples) and analyzed for the NIBW COCs on a weekly basis when the treatment facility was in operation. The results of sampling and analysis are included in **Table C-3**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from the treatment plant discharges were below the MRL of 0.50 µg/L. Sample results summarized in **Table C-3** demonstrate that NGTF consistently achieved the Cleanup Standards for treated groundwater in 2021. Additionally, discharges from NGTF to the SRP Arizona Canal met the requirements of the AZPDES permit. Sampling and analyses data for water quality parameters required by the AZPDES permit are reported in monthly DMRs submitted to ADEQ and EPA under separate cover.

9.6.4 Area 7 GWETS Evaluation

Throughout 2021, samples of treated groundwater were collected from air stripper effluent (SP-105) at Area 7 GWETS and analyzed for the NIBW COCs on a monthly basis when the treatment facility was in operation. The results of sampling and analysis are included in **Table C-3**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from Area 7 GWETS (SP-105) were below the MRL of 0.50 µg/L. Sample results summarized in **Table C-3** demonstrate that Area 7 GWETS consistently achieved the Cleanup Standards for treated groundwater in 2021.

9.6.5 Area 12 GWETS Evaluation

Throughout 2021, samples of treated groundwater were collected from air stripper effluent (WSP-2) at Area 12 GWETS and analyzed for NIBW COCs on a monthly basis when the treatment system was in operation. The results of sampling and analysis are included in **Table C-3**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from Area 12 GWETS (WSP-2) were below the MRL of 0.50 µg/L. Sample results summarized in **Table C-3** demonstrate that Area 12 GWETS consistently achieved the Cleanup Standards for treated groundwater in 2021. Additionally, discharges from Area 12 GWETS to McKellips Lake met the requirements of the AZPDES permit. Sampling and analyses data for water quality parameters required by the AZPDES permit are reported in monthly DMRs submitted to ADEQ and EPA under separate cover.

9.7 Progress Toward Achievement of Remedial Action Objectives

EPA established seven RAOs for the NIBW Site (A through G) in the September 2001 Amended ROD (in Section 3.1.2). The following is a qualitative discussion of the progress achieved in satisfying RAOs, based on review of data through 2021. Details regarding data that provide a more quantitative basis to support the following qualitative statements regarding specific aspects of the remedy are provided in earlier sections of the SMR.

Remedial Action Objective A - Restoration:

Significant progress has been made toward the removal and restoration of groundwater to drinking water quality with respect to the Site COCs. In 2021, the NIBW remedial actions resulted in the extraction and treatment of about 5 billion gallons of groundwater and removal of about 1,560 pounds of TCE, as shown in **Table 10**. From the inception of the NIBW groundwater remedy in 1994, about 140 billion gallons of groundwater have been extracted to remove an estimated 97,900 pounds of TCE. Soil remedial actions (as discussed in RAO) have eliminated the threat to groundwater from historical sources of TCE at EPA-identified source areas. Consequently, TCE concentrations have dramatically decreased in the UAU and significantly decreased across large portions of the MAU and LAU.

The most significant declines observed in TCE concentrations are in UAU groundwater. According to UAU mass flux calculations, the estimated VOC mass in the UAU has declined from about 11,100 pounds in 1993 to approximately 103 pounds in 2021, representing a decrease of 99% in the past 28 years (**Figure 16**). In 2021, the Cleanup Standard for TCE was exceeded at only one UAU monitoring well, with a TCE concentration of 7.6 µg/L at well PG-31UA. Historically, TCE concentrations in UAU groundwater were two to three orders of magnitude higher than at present. The extent of VOC impact in the UAU has also been greatly reduced, as evident on **Figure 13**, where only small, localized TCE plumes remain down-gradient from Area 7 and Area 12. While PG-31UA has an increasing 10-year TCE concentration trend, it has a stable 5-year trend, consistent with the significant and widespread observed reductions across the UAU. EPA has approved and the NIBW PCs have conducted formal abandonment of a total of 43 UAU monitoring wells.

Evidence of progress toward restoration in the MAU and LAU is also significant (**Figure 14 and Figure 15**). Based on the last 5 years of TCE concentration data, no trends, stable trends, or declining trends are observed in all but four MAU monitoring wells and in all but one MAU extraction well. Longer-term (10-year) increasing trends are observed in only one MAU monitoring well (PA-10MA). These data indicate the impact of significant mass removal that has occurred since initiation of the MAU Source Control Programs. In the LAU, only one monitoring well with a TCE concentration above the MCL shows an increasing trend (PG-2LA). Well PG-2LA is located adjacent to extraction well PCX-1. No longer-term (10-year) TCE concentration increases are observed in LAU monitoring or extraction wells within the plume area. These data demonstrate that coordinated and consistent operation of key LAU extraction wells—particularly COS-75A and PCX-1—is effectively reducing mass in the LAU. These data also demonstrate that MAU Source Control Programs are significantly reducing the amount of new TCE mass entering the LAU via the Western Margin.

Restoration of the aquifer for drinking water end-use is the overriding goal of the NIBW remediation program. Restoration of UAU groundwater has progressed significantly since remediation at the Site began. Progress in the MAU and LAU, which are less permeable, thicker, and more aerially extensive than the UAU, will take significantly longer. As demonstrated herein, significant progress in restoration of the MAU and LAU has been made.

Remedial Action Objective B - Eliminate Exposure:

As presented in **Section 8**, groundwater extracted as part of the NIBW Site remedy in 2021 was treated to meet the groundwater Cleanup Standards specified in the Amended ROD, thereby protecting human health and the environment.

Remedial Action Objective C- Provide the City of Scottsdale with Potable Water Source:

CGTF was constructed to provide treatment of TCE-impacted groundwater for the City of Scottsdale's beneficial use. Since CGTF began operation in 1994, it has treated approximately 69 billion gallons of groundwater to levels safely below the respective NIBW COC MCLs. The treated groundwater is blended with other potable sources and used in the City of Scottsdale municipal water system.

Increasing concentrations of inorganic constituents not associated with NIBW have impacted the City of Scottsdale's ability to pump, treat, and serve water from certain key remedial extraction wells through its municipal system. Since 2017, the PCs have collaborated with the City of Scottsdale to develop solutions that enabled the City of Scottsdale to support extraction and treatment for TCE plume containment while managing its inorganic water quality challenges. By prioritizing pumping at extraction well COS-75A, and using other CGTF wells only as needed, the City of Scottsdale has been able to maintain a balance between the NIBW remedy and inorganic COCs in its system. TGTF is a reverse osmosis treatment facility capable of removing inorganic COCs from about 1,000 gpm of treated water from CGTF. TGTF is anticipated to come online in early 2022 providing an opportunity to restore well COS-71A to a higher pumping priority. The PCs will continue to work with the City of Scottsdale in 2022 to implement high-value enhancements to the NIBW remedy in a manner that supports municipal supply needs.

Remedial Action Objective D - Plume Containment:

Water level data continue to support the interpretation that direction of groundwater movement across the MAU/LAU plume is generally toward NIBW extraction wells or the Western Margin. Continued drawdown impacts of pumping at the AWC will be evaluated, particularly in the LAU. These wells have an irrigation end use and drinking water MCLs are not relevant to their continued beneficial use. Groundwater samples obtained from the AWC wells in October 2020 all showed TCE concentrations below the detection limit. Monitoring wells located near the edge or along the periphery of the MAU/LAU plume show non-increasing TCE trends in most parts of the Site. As such, peripheral production wells are protected for drinking water end-use. The 10-year TCE concentration trend at well PA-10MA is increasing, however, TCE concentrations at PA-10MA over the shorter-term (5 years) show no trend. In cases where increasing trends were previously noted at LAU wells (S-2LA and PG-42LA), now no trends exist over the longer term (10 years) and decreasing trends exist over the last 5 years. The NIBW PCs will continue to evaluate and report trends to the Technical Committee to ensure that the overall objectives of the MAU/LAU remedy are maintained.

Remedial Action Objective E - Consistency with Arizona's Groundwater Management Act:

Treated water produced by all five NIBW groundwater treatment facilities is beneficially used. CGTF and NGTF provide treated groundwater to the City of Scottsdale for use in its potable water system or alternately to SRP for its beneficial use. MRTF treats groundwater for use by EPCOR. At Area 7, treated groundwater is delivered to shallow injection wells that recharge the UAU aquifer and enhance UAU plume migration to the Western Margin. Treated water from the Area 7 system has elevated concentrations of inorganic COCs and is not suitable for direct potable use. At Area 12, treated groundwater is provided to SRP for use in its irrigation system. All NIBW end-uses are consistent with beneficial use designations of ADWR and in accordance with the Groundwater Management Act. Furthermore, the NIBW remedy has incorporated the City of Scottsdale, SRP, and EPCOR as end users of treated groundwater in lieu of groundwater pumping they have historically conducted and would have otherwise relied upon within and near the Site.

Remedial Action Objective F - Mitigate Soil Impacts to Groundwater:

As described in **Section 3.4**, the NIBW PCs have implemented soil remediation at four EPA-identified source areas: Areas 6, 7, 8, and 12. The collective soil remediation has resulted in the removal of over 10,000 pounds of TCE from the unsaturated zone and eliminated these sources as an ongoing threat for groundwater impacts. All vadose zone remedies at the Site were closed out with EPA approval.

Remedial Action Objective G - Improve Aquifer Suitability for Potable Use:

The NIBW PCs have closely coordinated the planning and implementation of NIBW remedial actions with the key water providers, including the City of Scottsdale, SRP, and EPCOR. The efforts have strongly focused on defining mutually beneficial objectives for all parties involved in the remedy. The NIBW remedy requires consistent and reliable groundwater extraction in the areas most favorable for capture and containment of the MAU/LAU plumes. The water providers have considerable, but variable, water demands in the NIBW Site area and a system of existing wells and infrastructure available for groundwater pumping.

Through technical discussions and cooperation, the parties have taken steps to focus groundwater extraction and end-uses for optimum water resource management. The NIBW PCs have provided technical assistance with the installation, modification, and replacement, as needed, of water provider wells to improve groundwater plume capture and mass removal. To assure that the water providers can utilize the treated groundwater, the NIBW PCs have upgraded treatment systems and enhanced infrastructure and control systems. The water providers have cooperated by prioritizing pumping to meet water demands using wells identified as most beneficial to the remedy.

In 2021, the PCs continued to support the City of Scottsdale's efforts to balance inorganic loading to their municipal system. Although inorganics are not Site COCs, increasing concentrations of inorganic constituents have impacted the City of Scottsdale's ability to accept water from certain key remedial extraction wells. Through discussions with the Technical Committee, solutions were developed and are being implemented that enable the City of Scottsdale to manage inorganic challenges while continuing to support extraction and treatment to provide for TCE plume containment. Remedy enhancements have been discussed that have the potential to benefit both the NIBW remedy and the City of Scottsdale's ability to control inorganic COCs in its system. These include bringing well COS-71A back online and initiating extraction at PG-41MA/LA. Steps will be taken to further evaluate and implement these enhancements in 2022.

9.8 Monitoring Network Evaluation

The GM&EP requires an annual assessment of the scope and frequency of monitoring activities to optimize program effectiveness over time. In the first Five-Year Review (2011), EPA comprehensively reviewed groundwater monitoring data obtained pursuant to the GM&EP and concluded significant progress has been achieved toward restoration of the UAU. Since that time

EPA has approved formal abandonment of a total of 43 UAU monitoring wells. Concentrations of COCs in the remaining 28 UAU monitoring wells are generally declining over time. The PCs will continue to collect data from the remaining UAU monitoring wells.

The scope and frequency of the MAU and LAU groundwater monitoring program is evaluated in an ongoing manner relative to GM&EP performance evaluation requirements. In response to input received from EPA in 2020 regarding the potential need for additional monitoring wells, the PCs conducted a comprehensive evaluation of the monitoring network in relation to compliance with the GM&EP. Results of this evaluation were discussed with EPA in Technical Committee meetings and supplemental data collection tasks in support of the monitoring network evaluation were completed and reported on in the 2020 SMR.

The current compliance monitoring network consists of 120 wells, 108 of which are monitoring wells (28 UAU wells, 48 MAU wells, 4 MAU/LAU wells, and 28 LAU wells) and 12 of which are extraction wells. Changes being proposed to the monitoring network for 2022 include: 1) replacement of Area 7 MAU compliance monitoring well D-2MA with adjacent monitoring well OZ7-1, which has more representative water quality; and 2) redesignation and renaming of monitoring well E-14LA as E-14MA/LA, based on review of lithologic, well construction, and monitoring data.

9.9 Evaluation of Need for Modeling Analyses

Starting in the beginning of 2020 and continuing through 2021, the PCs have been working closely with EPA to undergo a comprehensive groundwater flow model update. This effort has included:

- Migrating the model to an updated and more robust code
- Expanding the model domain to explicitly include regional features as they are simulated in the regional public domain model developed by ADWR (Salt River Valley [SRV] Regional Model)
- Incorporating data and information collected since the FSA model
- Developing a more representative characterization of the Western Margin
- Using the parameter estimation routine PEST (a software package and suite of utility programs) as an automated calibration tool
- Integrating lithologic interpolations from the 3D visualization model to help with conceptualization and QC of model construction and parameterization
- Integrating TCE plume interpolations from the 3D visualization model into forward particle tracking analyses to evaluate plume containment

- Conducting extensive predictive uncertainty analyses

Throughout the current model update process, the PCs have been working collaboratively with technical representatives from EPA and the entire NIBW Technical Committee. The PCs have also provided regular updates and sought-out input at critical junctures. The updated groundwater flow model has been used to evaluate potential remedy enhancements, worst-case treatment system downtimes, drought scenarios, and 2021 hydraulic capture. The model has helped the Technical Committee and the EPA Five-Year Review team to verify the effectiveness of the current remediation program, as well as its protectiveness under potential extreme conditions. The model will continue to be used as part of the on-going evaluation of high-value enhancements that can be cost-effectively integrated into the remedy within the constraints of the end-users. A report on the updated model is in progress and is anticipated to be completed in 2022.

9.10 CSM Evaluation

Interpretation of data from 2021 indicates no substantial changes to the overall understanding of the CSM around which the remedy was designed. The PCs will continue to evaluate consistency of data collected during 2022 with the CSM and discuss any observations regarding anomalies or changes with the Technical Committee.

Recognizing that significant data collection and analysis had occurred since the CSM presented in the 2000 FSA, the NIBW PCs prepared a CSM Update in 2020. A draft of the CSM Update was delivered to EPA, ADEQ, and other members of the Technical Committee for review on February 1, 2021. This report relies largely on data for the 20-year period between 2000 and 2019 to describe and depict the PCs’ current understanding of Site conditions and the associated hydrogeologic and hydrochemical framework. The PCs plan to respond to and address EPA’s comments on the draft CSM Update. Once finalized, the 2020 CSM Update will provide a consensus framework for evaluating new data and making sound technical decisions regarding the remedy.

10 SUPPLEMENTAL ACTIVITIES

10.1 Supplemental Data Collection

In 2021, supplemental data collected by the PCs included the following:

- Monitoring well sampling, including PG-47MA in the Lower MAU and well OZ7-1 in the MAU near Area 7; the latter is being proposed as a replacement for monitoring well D-2MA
- Extraction and production well sampling, included selected CGTF extraction wells in coordination with the City of Scottsdale, and MRTF production wells PV-11 and PV-12B in coordination with EPCOR
- Testing at monitoring well PG-41MA/LA to assess the feasibility of its use as a remedial extraction well to support the Northern LAU remedy

Information on these activities is summarized in the following sections.

10.1.1 Monitoring Well Sampling

The PCs collected water quality data during 2021 from monitoring well OZ7-1 and from adjacent compliance monitoring well D-2MA. As noted previously, well OZ7-1 is recommended as a replacement compliance monitoring location for well D-2MA and was used for remedy effectiveness evaluations in 2021. Well OZ7-1 was sampled quarterly in 2021. October results for well OZ7-1 are shown on **Figure 12** and other sample results for 2021 are included under separate cover as part of a supplemental data report. The PCs are seeking concurrence from EPA that OZ7-1 can be used to replace D-2MA moving forward as an Area 7 compliance monitoring point.

During the annual monitoring event, sampling was attempted at Lower MAU monitoring wells that had been previously eliminated from the compliance monitoring program. These wells include PG-45MA, PG-46MA, PG-47MA, PG-51MA, PG-52MA, and PG-53MA. Due to inoperable equipment, only PG-47MA could be sampled. Sample results for monitoring well PG-47MA, which are not required for compliance, are included under separate cover as part of a supplemental data report; the October 2021 TCE concentration for PG-47MA is shown on **Figure 12**. Removal of inoperable Lower MAU pumps to enable future sampling using Hydrasleeve methods will be considered in the future.

10.1.2 Extraction & Production Well Sampling

Prior to 2020, CGTF extraction wells were sampled only if the wells were operational during the scheduled monitoring event. In 2020 and 2021 the City of Scottsdale provided access to CGTF wells, where possible, during the timeframe for the annual monitoring event. CGTF extraction wells were pumped for a minimum of 2 days prior to sampling. Water quality results for the CGTF extraction wells are summarized in **Table C-2** and shown on **Figure 12**. MRTF extraction wells PV-14 and PV-15 are sampled monthly when they are operating. EPCOR production wells PV-11 and PV-12B, when operating, are also sampled monthly by the NIBW PCs during scheduled monitoring activities. Monitoring data from wells PV-11 and PV-12B are not part of the compliance program. The data from wells PV-11 and PV-12B, however, are used to help delineate the northern extent of plume migration in the LAU. Sample results for production wells PV-11 and PV-12B are included under separate cover as part of a supplemental data report.

10.1.3 PG-41MA/LA Testing

In May 2021, the PCs conducted testing to determine the feasibility of using PG-41MA/LA as a remedial extraction well. The water pumped from PG-41MA/LA would be treated at NGTF and used by the City of Scottsdale in its system. As such, inorganic water quality must meet the requirements of the City of Scottsdale.

The testing program involved pumping well PG-41MA/LA for 10 days at rates varying from 700 to 845 gpm with treatment at NGTF and discharge to either the City of Scottsdale sanitary sewer or Arizona Canal. Drawdown was measured in PG-41MA/LA and nearby monitoring well PG-40LA periodically. Daily water quality samples were collected and analyzed for the NIBW COCs and a set of other select constituents. Testing results indicated that PG-41MA/LA could sustain a pumping rate of approximately 1,000 gpm, with a projected drawdown of 50 feet resulting in a pumping water level of 330 feet below land surface. Additionally, laboratory results indicated that none of the inorganic constituents analyzed exceeded the City of Scottsdale or AZPDES discharge limits. If used as an extraction well, PG-41MA/LA would be permanently connected to the PCX-1 pipeline to convey water to NGTF for treatment.

Testing at PG-41MA/LA demonstrated that the well is suitable for use as a remedial extraction well to either operate in tandem with PCX-1 or serve as a backup when PCX-1 is inoperable. Modeling analyses were conducted to further evaluate and validate the anticipated benefits of adding extraction at PG-41MA/LA. Detailed results and recommendations from the PG-41MA/LA testing program were provided to EPA and other parties in a technical memorandum (**Appendix G**).

10.2 Remedy Enhancement Evaluations

The PCs collaborated with the City of Scottsdale and SRP beginning in 2020 to develop approaches to support remedy operation considering water provider concerns regarding increasing concentrations of inorganic constituents, specifically arsenic and nitrate. Although arsenic and nitrate are unrelated to the Site, these inorganic constituents impact the ability of water providers to integrate treated water into their potable water systems. Remedy enhancement concepts to balance the needs of water providers with current and future NIBW remedy operation were discussed with the Technical Committee beginning in late 2020. Priorities included: 1) increasing capture of MAU mass downgradient from Area 7 that would otherwise be captured in the LAU, and 2) providing redundancy in Northern LAU containment to increase protection of peripheral production wells.

In 2021, groundwater modeling was conducted to evaluate these potential remedy enhancements. Forward and reverse particle tracking were conducted using 3D TCE plume interpolations to aid in evaluation of particle capture. A particle batch flushing approach was used to evaluate the relative effectiveness of the current remedy compared to the enhancements. The methodology was consistent with analyses conducted with EPA concurrence for the 2011 Five-Year Review. The updated evaluation was presented to the Technical Committee in the September 2021 meeting. Simulations from the updated groundwater model demonstrated while the current remedy operational strategy continues to be effective and compliant with the RAOs and Amended CD Performance Standards, there are benefits associated with enhancements that include higher priority pumping at well COS-71A and adding extraction capability at northern LAU well PG-41MA/LA. Capture of the MAU plume down-gradient from Area 7 was increased with the additional extraction at COS-71A. Bringing COS-71A back on line increases the efficiency of the remedy by capturing mass locally that would otherwise migrate to the Western Margin for capture at extraction wells in the LAU. Capture of the Northern LAU plume, while complete, was increased with the addition of extraction at PG-41MA/LA. Pumping at PG-41MA/LA captured mass in the plume area between PCX-1 and the MRTF extraction wells, providing additional assurance of plume containment, particularly if PCX-1 is down for an extended period of time. Efforts to move toward implementation of these remedy enhancements will continue in 2022.

Groundwater modeling conducted by the PCs in 2021 also included potential worst-case treatment system downtimes and drought scenarios to evaluate possible impacts on particle capture. Worst-case treatment system downtime scenarios included 1 year for each treatment system, 1 year for all treatment systems, and 3 years for NGTF. The drought scenario included increased pumping at SRP wells based on input from SRP regarding their potential drought plans. Results indicate that no particles originating from the estimated 3D plume extent were captured in any peripheral production wells under any scenario, demonstrating the remedy to be very robust.

10.3 Optimization Review

In late 2020 and continuing into 2021, EPA has been engaged in a Remedy Optimization Evaluation. The PCs have supported this process by 1) providing a complete set of applicable digital NIBW Site documents, 2) presenting information on the CSM, 3) sharing perspectives on remedy enhancement concepts previously identified (**Section 10.2**) and 4) adding data and interpretations to the existing 3D LeapFrog visualization model of the Site at the Team's request.

The Remedy Optimization Team communicated early in the process that the 3D visualization model was a key component of the Remedy Optimization Evaluation. NIBW PCs support for the 3D visualization modeling effort included adding detailed geologic, water level, and water quality data to the existing Site 3D visualization model. This work was conducted with the understanding that the PCs' 3D visualization model would be used as a consensus tool for the NIBW Site moving forward. The PCs conducted interpolations and analyses using the model at the request of the Remedy Optimization Team. Results were presented at monthly Technical Committee meetings for review and discussion. Finally, the NIBW PCs provided a viewer and back-end data files for the 3D visualization model to the Remedy Optimization Team for its review and use. The PCs understanding is that the Remedy Optimization Team has chosen to develop an independent 3D visualization model using the data provided by the NIBW PCs. The NIBW PCs consider this effort to be duplicative and unnecessary. The Remedy Optimization Team reports that findings from their evaluation are anticipated to be available to the Technical Committee in 2022.

10.4 Area 7 Vapor Intrusion Investigations

In its second Five-Year Review (USACE on behalf of EPA, 2016) EPA deferred making a formal protectiveness determination at the NIBW Site pending vapor intrusion assessments in the vicinity of historical source areas and updated emission exposure assessments for groundwater treatment facilities.

To evaluate the potential risk of vapor intrusion from shallow soil gas, the NIBW PCs conducted the following activities in coordination with EPA between 2016 and 2020:

- 2016: Compiled soil gas data for the historical source areas, evaluated these data relative to EPA soil vapor intrusion screening levels, and proposed locations for installing shallow soil gas sampling (SGS) points.

- 2017: Installed a total of 47 shallow SGS points at seven of the historical source areas (**Figure 1**; Area 3, Area 5C, Area 7, Area 8, Area 9, Area 11, and Area 12).
- 2017: Presented results of soil-gas sampling and analyses demonstrating that, with the exception of a few SGS points at Area 7, TCE soil gas concentrations were all below land-use-specific EPA screening levels.
- 2017 and 2018: Abandoned all SGS points at Area 3, Area 5C, Area 8, Area 9, Area 11, and Area 12 and 16 of the 21 SGS points at Area 7.
- 2018 and 2019: Conducted several rounds of indoor ambient air sampling as well as follow-up sampling at the remaining SGS points at Area 7 to further evaluate the potential for vapor intrusion.
- 2019: Proactively installed a sub-slab vapor depressurization system below four of the apartment units in a complex located southeast of Area 7.
- 2019: Conducted a Human Health Risk Assessment (HHRA) (Hazardous Substance & Waste Management Research, Inc. on behalf of EPA, 2019). The HHRA confirmed that all calculated risks at Area 7 were less than the noncarcinogenic threshold and less than the most conservative end of EPA's acceptable range for carcinogenic risks for NIBW COCs under conservative exposure scenarios.
- 2019 and 2020: Participated in meetings with the Technical Committee to evaluate the need to address residual vadose zone mass at Area 7. The PCs requested that EPA, in consultation with ADEQ, review regulatory drivers and clarify RAOs for any action that might be conducted at the Site.

Vapor Mitigation Sciences, LLC (VMS), on behalf of the NIBW PCs, designed and installed the sub-slab depressurization system at four apartments units to the southwest of Area 7. VMS conducts annual operation and maintenance inspections that verify that vacuum is consistently maintained beneath the floors of the four apartments. Most recently, on October 8, 2021, VMS conducted testing at the sub-slab depressurization systems and determined that the mitigation systems are continuing to perform as designed. Indoor air sampling conducted in coordination with operation and maintenance of the sub-slab depressurization systems indicated TCE concentrations in indoor air remain low, ranging from below detection to 0.68 micrograms per cubic meter ($\mu g/m^3$). These values do not exceed the Ambient Air Screening Level short-term guidance thresholds.

In its Third Five-Year Review Report issued in September 2021, EPA indicated the vapor intrusion risk at Area 7 was within the acceptable range of 0.48 to 2 $\mu g/m^3$ for TCE in indoor air. In addition, the Five-Year Review acknowledged that indoor air collected after the mitigation measure was in place confirms that the sub-slab depressurization system had lowered TCE to concentrations at the low end of the risk range measured in 2019. In spite of this determination, EPA requested that the NIBW PCs conduct a pilot test for thermal remediation of the vadose zone at Area 7. The NIBW PCs conducted a preliminary investigation of thermal remediation technologies in 2019 and determined that the logistics, cost, required duration, and anticipated effectiveness of thermal remediation excluded this approach from consideration for this Site. Details of this evaluation were presented to the Technical Committee and other stakeholders in January 2020. In comments on the 2021 Five-Year Review, the NIBW PCs indicated that they did not intend to take this step, reiterating that the approach had been evaluated and deemed to be neither cost effective nor implementable.

10.5 2021 Five-Year Review

On September 30, 2021, the NIBW PCs received EPA's Third Five-Year Review Report for the Indian Bend Wash Superfund Site dated September 27, 2021. The Third Five-Year Review concludes that the current NIBW remedy is protective of human health and the environment.

After review of the Third Five-Year Review Report, the NIBW PCs submitted a letter and accompanying detailed comment matrix and reference package to EPA on November 19, 2021. The comments highlighted errors, misrepresentations, and areas requiring clarification in the document. The NIBW PCs' primary concerns are summarized as follows:

- Vapor intrusion at Area 7: Sub-slab depressurization, indoor air monitoring, and institutional controls are appropriate short and long-term mitigation measures to address potential vapor intrusion. Furthermore, thermal remediation has been evaluated at the Site and deemed not implementable or cost effective. The NIBW PCs requested new RAOs for any vapor intrusion remedy required by EPA in the Area 7 vadose zone after formal evaluation using the NCP Criteria. The PCs have provided a contingent concept to implement an SVE containment and treatment system at Area 7 if additional remedial action is required by EPA.
- Treatment system emissions control requirements: NIBW COC emissions at the treatment systems are below the regulatory thresholds that would warrant emission controls. The NIBW PCs have demonstrated by air dispersion modeling that adjacent outdoor off-site air quality meets EPA's indoor air screening levels. In addition, further air dispersion modeling evaluation and a Request for Letter of Determination were submitted by the NIBW PCs in December 2020. The Request for Letter of Determination itemized significant deficiencies in ADEQ's air dispersion modeling results which concluded the remedy is only protective if vapor emission controls remain in place. In the Response Letter, the NIBW PCs addressed EPA and ADEQ concerns with respect to ambient air quality in the vicinity of CGTF and again requested a Letter of Determination

from EPA to remove emissions controls from the treatment system. EPA has not responded to the NIBW PCs' request for Letter of Determination to remove emissions controls at CGTF

- Conceptual site model: The CSM continues to be supported by the data the NIBW PCs have collected since implementation of the work under the Amended CD. The selected remedy for the NIBW Site is a three-dimensional plume-containment strategy that includes both localized capture of higher concentration source areas as well as migration of mass outside of these areas to the Western Margin for capture at MAU and LAU extraction wells.
- PCE concentrations from non-NIBW sources: Off-site contributions of PCE were documented in investigative reports prior to the Amended CD and are not associated with the NIBW Site remediation. Concentrations of PCE from alternate sources that impact irrigation or water supply wells in the vicinity of the NIBW Site do not signify a lack of plume containment.
- Long-term protectiveness: The NIBW PCs have demonstrated that the remedy is effective and compliant with RAOs and Amended CD Performance Standards under the current operational strategy. The objective of optimization should be to identify practical and achievable enhancements to improve remedy efficiency. Such remedy enhancement evaluations have been presented by the NIBW PCs for consideration during Technical Committee Meetings in 2021.

The PCs have requested the Third Five-Year Review Report be revised to correct the inaccuracies and misconceptions described in the comments. To date, EPA has not responded to this request.

11 CONCLUSIONS AND RECOMMENDATIONS

Data collected and evaluated through 2021 indicate that NIBW COC mass continues to be removed by the NIBW treatment facilities. Treated groundwater from NIBW is put to beneficial use by reinjection, irrigation, or municipal supply. Additionally, the plume area continues to be reduced over time, with TCE concentrations showing no trends, stable trends, or decreasing trends at the majority of wells in all three alluvial units. UAU groundwater is approaching restoration. Containment, as required by performance standards in the Amended CD SOW, is achieved both for the MAU/LAU Program and the MAU Source Control Programs. In 2021, all GM&EP metrics were achieved in the UAU Program, as were most of the metrics associated with the MAU/LAU Program, the Northern LAU program, and the Source Control Programs. Exceptions are discussed in **Section 9.5** and tracked carefully. As data collection and reporting at the Site continue, the CSM will be critically evaluated and updated as appropriate. Areas where increasing concentrations are observed will be monitored and evaluated for consistency with the CSM and with the Site containment performance standards.

Recommendations for 2022 include:

- Respond to EPA comments and finalize the CSM Update Report.
- Complete sensitivity analyses for the groundwater flow model and prepare a report documenting model construction and calibration; presenting particle tracking results for plume capture under baseline, enhanced, worst case, and drought conditions; and summarizing sensitivity analyses conducted to evaluate uncertainty.
- Support the EPA Remedy Optimization Team as needed and provide critical review of associated findings.
- Conduct fluid movement and depth-sampling investigations at NGTF extraction well PCX-1, Area 12 extraction well MEX-1MA, and possibly at CGTF extraction well COS-71A, if deemed to be feasible in 2022.

12 REFERENCES

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13 ACRONYMS & ABBREVIATIONS

µg/L................micrograms per liter
µg/m^3.............micrograms per cubic meter
1,4-DX 1,4-dioxane
3D...................three-dimensional
ADEQ ....Arizona Department of Environmental Quality
ADHS.............Arizona Department of Health Services
ADWR ....Arizona Department of Water Resources
AF ....acre-feet
APP ....Aquifer Protection Permit
AWC ....Arcadia Water Company
AWQS............Aquifer Water Quality Standard
AZCO.............Arizona Canal Outfall Sample Identifier
AZPDES ....Arizona Pollutant Discharge Elimination System
CD ....Consent Decree
CGTF ....Central Groundwater Treatment Facility
CMR..............Compliance Monitoring Report
COC ....Constituent of Concern
COT................City of Tempe
CSM ....Conceptual Site Model
CWTP ....Chaparral Water Treatment Plant
DCE................1,1- Dichloroethene
DMR ....Discharge Monitoring Report
eff...................effluent
EPA ................U.S. Environmental Protection Agency
EPCOR...........EPCOR Water USA
FSA ....Feasibility Study Addendum
FSP.................field sampling plan
GAC ....Granular Activated Carbon
gpm ....gallons per minute
GM&EP ....Groundwater Monitoring and Evaluation Plan
GRUSP...........Granite Reef Underground Storage Project
GWETS..........Groundwater Extraction and Treatment System
HHRA ....Health and Human Risk Assessment
ID ....identifier
inf...................influent
LAU ....Lower Alluvium Unit
MAU ....Middle Alluvium Unit

MCL...............Maximum Contaminant Level
MG.................Million Gallons
MRL...............Method Reporting Limit
MRTF.............Miller Road Treatment Facility
NGTF ....NIBW Granular Activated Carbon Treatment Facility
NGTF-CP.......NGTF Effluent Chaparral Compliance Point Sample Identifier
NIBW.............North Indian Bend Wash
O&M..............Operation and Maintenance
OU..................Operable Unit
PACE ....PACE Analytical National Center for Testing & Innovation
PCE ....Tetrachloroethene
PCs.................Participating Companies
PE...................Performance Evaluation
PFAS.............poly fluorinated alkyl substances
PFOA ....perfluorooctanoic acid
PFOS.............perfluorooctane sulfonate
ppt ....parts per trillion
PV ....Paradise Valley
PVARF...........Paradise Valley Arsenic Removal Facility
QA..................quality assurance
QAPP ....quality assurance project plan
RAO...............Remedial Action Objective
RI/FS..............Remedial Investigation Feasibility Study
ROD...............Record of Decision
SAP ....Sampling and Analysis Plan
SGS ....Soil Gas Sampling
SMR...............Site Monitoring Report
SOW...............Statement of Work
SRP ....Salt River Project
SRPMIC.........Salt River Pima Maricopa Indian Community
SRV................Salt River Valley
SVE................Soil Vapor Extraction
TCA................1,1,1-Trichloroethane
TCE................Trichloroethene
TCM...............chloroform
TGTF.............Thomas Groundwater Treatment Facility
UAU...............Upper Alluvium Unit
UIC.................Underground Injection Control
USACE ..........U.S. Army Corps of Engineers

UV/OX...........Ultraviolet Oxidation
VMS...............Vapor Mitigation Services, Inc.
VOC...............Volatile Organic Compound

APPENDIX A
WELL INFORMATION AND SAMPLING FREQUENCY

Table A-1. Summary of Compliance Groundwater Monitoring Frequency
North Indian Bend Wash Area, Scottsdale, Arizona

Well Identifier	Well Type	Aquifer Unit	Water Quality Monitoring Frequency	Water Level Monitoring Frequency
7EX-3aMA	Extraction[1]	MAU	Quarterly	---
7EX-4MA	Extraction[1]	MAU	Quarterly	---
7EX-6MA	Extraction[1]	MAU	Quarterly	---
COS-31	Extraction[1]	MAU/LAU	Monthly	---
COS-71A	Extraction[1]	MAU/LAU	Monthly	---
COS-72	Extraction[1]	MAU/LAU	Monthly	---
COS-75A	Extraction[1]	LAU	Monthly	---
Granite Reef	Extraction[1]	MAU	Quarterly	---
MEX-1MA	Extraction[1]	MAU	Quarterly	---
PCX-1	Extraction[1]	LAU	Monthly	---
PV-11	Production	LAU	---	Continuous
PV-14	Extraction[1]	LAU	Monthly	Continuous
PV-15	Extraction[1]	MAU/LAU	Monthly	Continuous
PV-17	Production	LAU	---	Continuous
B-1MA	Monitoring	MAU	---	Semi-Annually
B-1UA	Monitoring	UAU	---	Annually
B-J	Monitoring	UAU	Annually	Annually
D-2MA	Monitoring	MAU	Quarterly	Semi-Annually
E-1LA	Monitoring	LAU	---	Semi-Annually
E-1MA	Monitoring	MAU	Quarterly	Semi-Annually
E-1UA	Monitoring	UAU	---	Annually
E-2UA	Monitoring	UAU	---	Annually
E-5MA	Monitoring	MAU	Quarterly	Semi-Annually
E-5UA	Monitoring	UAU	Annually	Annually
E-6UA	Monitoring	UAU	---	Annually
E-7LA	Monitoring	LAU	Annually	Semi-Annually
E-7UA	Monitoring	UAU	Annually	Annually
E-8MA	Monitoring	MAU	Annually	Semi-Annually
E-10MA	Monitoring	MAU	Quarterly	Semi-Annually
E-12UA	Monitoring	UAU	Annually	Annually
E-13UA	Monitoring	UAU	Annually	Annually
E-14MA/LA	Monitoring	LAU	---	Semi-Annually
M-1MA	Monitoring	MAU	---	Semi-Annually
M-2LA	Monitoring	LAU	---	Semi-Annually
M-2MA	Monitoring	MAU	Annually	Semi-Annually
M-2UA	Monitoring	UAU	Annually	Annually
M-3MA	Monitoring	MAU	---	Semi-Annually
M-4MA	Monitoring	MAU	Quarterly	Semi-Annually
M-5LA	Monitoring	LAU	Annually	Semi-Annually
M-5MA	Monitoring	MAU	Quarterly	Semi-Annually
M-6MA	Monitoring	MAU	Quarterly	Semi-Annually
M-7MA	Monitoring	MAU	Annually	Semi-Annually
M-9LA	Monitoring	LAU	---	Semi-Annually

Table A-1. Summary of Compliance Groundwater Monitoring Frequency
North Indian Bend Wash Area, Scottsdale, Arizona

Well Identifier	Well Type	Aquifer Unit	Water Quality Monitoring Frequency	Water Level Monitoring Frequency
M-9MA	Monitoring	MAU	Annually	Semi-Annually
M-10LA2	Monitoring	LAU	Annually	Continuous
M-10MA2	Monitoring	MAU	Quarterly	Continuous
M-11MA	Monitoring	MAU	Annually	Semi-Annually
M-12MA2	Monitoring	MAU	Annually	Semi-Annually
M-14LA	Monitoring	LAU	Annually	Semi-Annually
M-14MA	Monitoring	MAU	---	Semi-Annually
M-15MA	Monitoring	MAU	Quarterly	Semi-Annually
M-16LA	Monitoring	LAU	Annually	Semi-Annually
M-16MA	Monitoring	MAU	Annually	Semi-Annually
M-17MA/LA	Monitoring	MAU/LAU	Quarterly	Semi-Annually
PA-1MA	Monitoring	MAU	---	Semi-Annually
PA-2LA	Monitoring	LAU	Annually	Semi-Annually
PA-3MA	Monitoring	MAU	---	Semi-Annually
PA-4MA	Monitoring	MAU	---	Semi-Annually
PA-5LA	Monitoring	LAU	Quarterly	Semi-Annually
PA-6LA	Monitoring	LAU	Quarterly	Semi-Annually
PA-7MA	Monitoring	MAU	---	Semi-Annually
PA-8LA2	Monitoring	LAU	Annually	Continuous
PA-9LA	Monitoring	LAU	Annually	Semi-Annually
PA-10MA	Monitoring	MAU	Quarterly	Semi-Annually
PA-11LA	Monitoring	LAU	Annually	---
PA-11LA2	Monitoring	LAU	---	Continuous
PA-12MA	Monitoring	MAU	Quarterly	---
PA-12MA2	Monitoring	MAU	---	Continuous
PA-13LA	Monitoring	LAU	Quarterly	Continuous
PA-14MA	Monitoring	MAU	---	Semi-Annually
PA-15LA	Monitoring	LAU	Annually	Semi-Annually
PA-16MA	Monitoring	MAU	Annually	Semi-Annually
PA-17MA2	Monitoring	MAU	---	Semi-Annually
PA-18LA	Monitoring	LAU	Annually	Semi-Annually
PA-19LA	Monitoring	LAU	Annually	Semi-Annually
PA-20MA	Monitoring	MAU	Annually	Semi-Annually
PA-21MA	Monitoring	MAU	Annually	Semi-Annually
PA-22LA	Monitoring	LAU	---	Semi-Annually
PA-23MA	Monitoring	MAU	---	Semi-Annually
PG-1LA	Monitoring	LAU	Quarterly	Semi-Annually
PG-2LA	Monitoring	LAU	Semi-Annually	Continuous
PG-4MA	Monitoring	MAU	Annually	Semi-Annually
PG-4UA	Monitoring	UAU	Annually	Annually
PG-5MA	Monitoring	MAU	Annually	Semi-Annually
PG-5UA	Monitoring	UAU	Annually	Annually
PG-6MA	Monitoring	MAU	Annually	Semi-Annually
PG-6UA	Monitoring	UAU	Annually	Annually
PG-7MA	Monitoring	MAU	Annually	Semi-Annually

Table A-1. Summary of Compliance Groundwater Monitoring Frequency
North Indian Bend Wash Area, Scottsdale, Arizona

Well Identifier	Well Type	Aquifer Unit	Water Quality Monitoring Frequency	Water Level Monitoring Frequency
PG-7UA	Monitoring	UAU	---	Annually
PG-8UA	Monitoring	UAU	Annually	Annually
PG-10UA	Monitoring	UAU	Annually	Annually
PG-11UA	Monitoring	UAU	Annually	Annually
PG-16UA	Monitoring	UAU	Annually	Annually
PG-18UA	Monitoring	UAU	Annually	Annually
PG-19UA	Monitoring	UAU	Annually	Annually
PG-22UA	Monitoring	UAU	Annually	Annually
PG-23MA/LA	Monitoring	MAU/LAU	Annually	Semi-Annually
PG-23UA	Monitoring	UAU	Annually	Annually
PG-24UA	Monitoring	UAU	Annually	Annually
PG-25UA	Monitoring	UAU	Annually	Annually
PG-28UA	Monitoring	UAU	Annually	Annually
PG-29UA	Monitoring	UAU	Annually	Annually
PG-30UA	Monitoring	UAU	---	Annually
PG-31UA	Monitoring	UAU	Annually	Annually
PG-38MA/LA	Monitoring	MAU/LAU	Annually	Semi-Annually
PG-39LA	Monitoring	LAU	Annually	Semi-Annually
PG-40LA	Monitoring	LAU	Quarterly	Semi-Annually
PG-41MA/LA	Monitoring	MAU/LAU	---	Continuous
PG-42LA	Monitoring	LAU	Quarterly	Continuous
PG-43LA	Monitoring	LAU	Quarterly	Semi-Annually
PG-44LA	Monitoring	LAU	Quarterly	Continuous
PG-47MA	Monitoring	MAU-Lower	---	Semi-Annually
PG-48MA	Monitoring	MAU-Lower	Quarterly	Semi-Annually
PG-49MA	Monitoring	MAU-Lower	Annually	---
PG-50MA	Monitoring	MAU-Lower	Annually	Semi-Annually
PG-51MA	Monitoring	MAU-Lower	---	Semi-Annually
PG-54MA	Monitoring	MAU-Lower	Annually	---
PG-55MA	Monitoring	MAU-Lower	Annually	---
PG-56MA	Monitoring	MAU-Lower	Annually	---
S-1LA	Monitoring	LAU	Annually	Semi-Annually
S-1MA	Monitoring	MAU	Annually	Semi-Annually
S-2LA	Monitoring	LAU	Quarterly	Continuous
S-2MA	Monitoring	MAU	Annually	Semi-Annually
W-1MA	Monitoring	MAU	Quarterly	Semi-Annually
W-2MA	Monitoring	MAU	Quarterly	Semi-Annually

1 - Extraction wells are only sampled when operating during sampling event

EXPLANATION:

UAU = Upper Alluvium Unit
MAU = Middle Alluvium Unit
LAU = Lower Alluvium Unit

Table A-2. Summary Well Construction Details for NIBW Monitoring and Extraction Wells
North Indian Bend Wash Area, Maricopa County, Arizona

Well Name	Cadastral Location	ADWR Registration Number	Completion Date	Depth Drilled (ft, bls)	Casing				Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]
					Diameter (inches)	Type	Depth Interval (ft, bls)	Perforated Interval (ft, bls)				
MONITOR WELLS:												
B-1MA	(A-1-4) 2ddd1	55-510690	04/19/85	305	14 8 5	steel	0-20 +1-250 +1.2-300	--- --- 250-300	Not Sampled	---	33.451897	-111.909709
B-1UA	(A-1-4) 2ddd2	55-510691	05/01/85	122	6 4	steel	0-21 0-122	--- 72-122	Not Sampled	Unknown	33.451900	-111.909567
B-J	(A-1-4) 2dbd1	55-510693	05/20/85	114	8 4	steel	0-20 0-114	--- 64-114	Pump	Unknown	33.456741	-111.914229
D-2MA	(A-2-4) 26bda1	55-529966	11/30/90	260	6 4	steel	+1-20 0-248	--- 195-248	HydraSleeve	---	33.490414	-111.918838
E-1LA	(A-1-4) 1abb1	55-510220	05/14/85	749	10 6 4	steel	+1-20 0-695 0-749	--- --- 689-749*	Not Sampled	280	33.465686	-111.899727
E-1MA	(A-1-4) 1abb2	55-510221	05/23/85	300	10 6 4	steel	+1-20 0-250 0-300	--- --- 250-300	Pump	Unknown	33.465689	-111.899631
E-1UA	(A-1-4) 1abb3	55-510222	05/24/85	150	6 4	steel	+1-20 0-128	--- 78-128	Not Sampled	117	33.465689	-111.899799
E-2UA	(A-2-4) 35daa1	55-510208	05/29/85	161	6 4	steel	+1-20 0-150	--- 97-150	Not Sampled	136	33.471792	-111.909791
E-5MA	(A-1-4) 2acd2	55-520077	09/30/88	305	10 6 4	steel	+11-21 +1-250 +0.5-300	--- --- 250-300	Pump	Unknown	33.460212	-111.914192
E-5UA	(A-1-4) 2acd1	55-510210	06/02/85	132	6 4	steel	0-20 0-132	--- 78-132	HydraSleeve	---	33.460180	-111.914195
E-6UA	(A-2-4) 35cbd	55-520079	09/02/88	167	10 4	steel	+1-21 +0.5-160	--- 120-160	Not Sampled	147	33.470253	-111.922033
E-7LA	(A-1-4) 2abb2	55-520076	09/23/88	632	10 6 4	steel	+1-21 +1-530 +0.5-600	--- --- 550-600	Pump	Unknown	33.465112	-111.916059
E-7UA	(A-1-4) 2abb3	55-520078	10/18/88	143	10 4	steel	+1-21 +0.5-130	--- 100-130	HydraSleeve	---	33.465297	-111.916109
E-8MA	(A-1-4) 2dbd2	55-520075	10/24/88	315	10 6 4	steel	+1-21 +1-250 +1-300	--- --- 250-300	Pump	Unknown	33.456716	-111.914187
E-10MA	(A-2-4) 26bcc	55-521791	07/23/88	369	10 4	steel	0-20 0-300	--- 250-300	HydraSleeve	---	33.488454	-111.925249
E-12UA	(A-1-4) 2dad	55-523247	01/26/89	125	6 4	steel	0-20 0-125	--- 90-120	HydraSleeve	---	33.456015	-111.909780
E-13UA	(A-1-4) 1cbb	55-523302	03/15/89	121	6 4	steel	0-20 20-121	--- 91-121	HydraSleeve	---	33.458239	-111.908174
E-14MA/LA	(A-2-4) 34bad	55-521514	06/26/88	310	4	steel	0-310	290-310	Not Sampled	---	33.476826	-111.935063
M-1MA	(A-1-4) 1bad2	55-507300	04/03/84	302	10 6 4	steel	+1-20 0-252 0-302	--- --- 252-302	Not Sampled	Unknown	33.462270	-111.901285
M-2LA	(A-1-4) 1bcc3	55-518239	09/29/87	710	10 6 4	steel	+1-20 0-659 0-710	--- --- 659-710	Not Sampled	Unknown	33.458837	-111.907445
M-2MA	(A-1-4) 1bcc1	55-507296	04/09/84	303	10 6 4	steel	+1-21 0-251 0-303	--- --- 251-303	HydraSleeve	---	33.458873	-111.907681
M-2UA	(A-1-4) 1bcc2	55-507303	04/12/84	125	6 4	steel	+1.5-21 0-121	--- 79-121	HydraSleeve	---	33.458864	-111.907596
M-3MA	(A-1-4) 1bdd1	55-507294	04/19/84	303	10 6 4	steel	+1.5-21 0-250 0-303	--- --- 250-303	Not Sampled	Unknown	33.458762	-111.901552
M-4MA	(A-1-4) 1bdb2	55-507295	04/26/84	302	10 6 4	steel	+1.5-19 0-251 0-302	--- --- 251-302	HydraSleeve	---	33.462226	-111.904554
M-5LA	(A-1-4) 1bba3	55-518240	10/07/87	750	10 6 4	steel	+1-20 0-702 0-748	--- --- 697-748	Pump	Unknown	33.465492	-111.906038
M-5MA	(A-1-4) 1bba1	55-507304	04/30/84	302	10 6 4	steel	+1.5-19 0-251 0-302	--- --- 251-302	Pump	Unknown	33.465528	-111.906146
M-6MA	(A-1-4) 1baa1	55-507298	05/09/84	302	10 6 4	steel	+1.5-19 0-251 0-302	--- --- 249-302*	Pump	Unknown	33.465651	-111.901275
M-7MA	(A-1-4) 1bad3	55-507299	05/18/84	300	10 6 4	steel	+1-10 0-250 0-300	--- --- 258-300	Pump	Unknown	33.464102	-111.900938
M-9LA	(A-2-4) 36dba3	55-518243	08/27/87	835	10 6 4	steel	+1-20 0-777 0-835	--- --- 777-835	Not Sampled	Unknown	33.472741	-111.896258
M-9MA	(A-2-4) 36dba1	55-509772	03/27/85	302	10 4	steel	0-20 0-302	--- 249-302	Pump	Unknown	33.472553	-111.896187

Table A-2. Summary Well Construction Details for NIBW Monitoring and Extraction Wells
North Indian Bend Wash Area, Maricopa County, Arizona

					Casing							
Well Name	Cadastral Location	ADWR Registration Number	Completion Date	Depth Drilled (ft, bls)	Diameter (inches)	Type	Depth Interval (ft, bls)	Perforated Interval (ft, bls)	Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]
M-10LA2	(A-2-4) 35ddc5	55-905027	10/23/06	720	5	steel	0.5-700	650-700	HydraSleeve	---	33.466086	-111.911519
M-10MA2	(A-2-4) 35ddc4	55-905026	10/23/06	310	5	steel	0.5-300	250-300	Pump	240	33.466088	-111.911211
M-11MA	(A-2-4) 35dba	55-509773	04/11/85	300	10 4	steel	0-18 0-300	--- 245-300	Pump	Unknown	33.471516	-111.914409
M-12MA2	(A-2-4) 26dda4	55-906269	02/07/07	301	5	steel	0-299	250-299	Pump	285	33.483832	-111.910129
M-14LA	(A-2-4) 35daa2	55-518241	10/19/87	721	10 6 4	steel	+1-20 0-670 0-721	--- --- 670-721	Pump	Unknown	33.471794	-111.909596
M-14MA	(A-2-4) 35daa3	55-518242	10/22/87	302	10 6 4	steel	+1-20 0-251 0-302	--- --- 251-302	Not Sampled	Unknown	33.471793	-111.909696
M-15MA	(A-2-4) 36cdc1	55-518802	10/28/87	300	10 6 4	steel	+1-20 0-251 0-300	--- --- 251-300	Pump	Unknown	33.467612	-111.903534
M-16LA	(A-2-4) 36bca1	55-518799	11/11/87	779	10 6 4	steel	+1-20 0-729 0-779	--- --- 729-779	HydraSleeve	---	33.475689	-111.904934
M-16MA	(A-2-4) 36bca2	55-518800	11/19/87	300	10 6 4	steel	+1-20 0-250 0-300	--- --- 250-300	Pump	Unknown	33.475782	-111.904940
M-17MA/LA	(A-2-4) 34aca	55-594864	10/31/02	300	4	steel	0-300	250-300	HydraSleeve	---	33.473933	-111.927866
OZ7-1	(A-2-4)26bda1	Not Registered	Unknown	250	4	PVC	0-250	162-250	Pump	221	33.490483	-111.918828
PA-1MA	(A-2-4) 25ddc1	55-526966	03/23/90	301	10 6 4	steel	0-20 0-251 0-301	--- --- 241-301*	Not Sampled	Unknown	33.480586	-111.894394
PA-2LA	(A-2-4) 24acb1	55-526957	04/04/90	898	10 6 4	steel	0-20 0-845 0-898	--- --- 835-898*	Pump	Unknown	33.503743	-111.899419
PA-3MA	(A-2-4) 24acb2	55-526956	04/10/90	300	10 6 4	steel	0-20 0-250 0-300	--- --- 240-300*	Not Sampled	Unknown	33.503743	-111.899489
PA-4MA	(A-2-4) 23ddd3	55-526954	04/13/90	300	10 6 4	steel	0-20 0-250 0-300	--- --- 240-300*	Not Sampled	252	33.496748	-111.910162
PA-5LA	(A-2-4) 23ddd4	55-526955	04/25/90	802	10 6 4	steel	0-20 0-750 0-802	--- --- 740-802*	Pump	441	33.496804	-111.910083
PA-6LA	(A-2-4) 23adb1	55-526949	05/07/90	770	10 6 4	steel	0-20 0-730 0-770	--- --- 720-770*	HydraSleeve	---	33.504101	-111.913175
PA-7MA	(A-2-4) 23adb2	55-526948	05/11/90	302	10 6 4	steel	0-20 0-252 0-302	--- --- 242-302*	Not Sampled	Unknown	33.504191	-111.913175
PA-8LA2	(A-2-4) 26dda5	55-906270	02/12/07	754	5	steel	0-751	700-751	Pump	365	33.483905	-111.910128
PA-9LA	(A-2-4) 26ccb1	55-526951	06/01/90	681	10 6 4	steel	0-20 0-630 0-681	--- --- 620-681*	HydraSleeve	---	33.483704	-111.924057
PA-10MA	(A-2-4) 26ccb2	55-526950	06/06/90	300	10 6 4	steel	0-20 0-250 0-300	--- --- 240-300*	HydraSleeve	---	33.483601	-111.924053
PA-11LA	(A-2-4) 35bdb1	55-526961	06/15/90	585	10 6 4	steel	0-20 0-535 0-585	--- --- 525-585*	Pump	273	33.476466	-111.921734
PA-11LA2	(A-2-4) 35bdb3	55-906271	05/01/07	590	2	PVC	585	525-585	Not Sampled	---	33.476586	-111.921734
PA-12MA	(A-2-4) 35bdb2	55-526960	06/21/90	300	10 6 4	PVC	0-20 0-250 0-300	--- --- 240-300*	Pump	231	33.476540	-111.921733
PA-12MA2	(A-2-4) 35bdb3	55-906271	05/01/07	590	2	steel	301	240-301	Not Sampled	---	33.476586	-111.921734
PA-13LA	(A-2-4) 23cdd1	55-526953	07/23/90	710	6 4	steel	0-660 0-710	--- 650-710*	Pump	462	33.496065	-111.919461
PA-14MA	(A-2-4) 23cdd2	55-526952	07/27/90	306	10 6 4	steel	+0.5-20 0-255 0-305	--- --- 245-305*	Not Sampled	---	33.496181	-111.919460
PA-15LA	(A-1-4) 2cdb2	55-526965	08/03/90	525	10 6 4	steel	+1-20 0-475 0-525	--- --- 465-525*	HydraSleeve	---	33.454336	-111.920851
PA-16MA	(A-1-4) 2cdb3	55-526964	08/10/90	302	10 6 4	steel	+1-20 0-250 0-302	--- --- 240-302*	HydraSleeve	---	33.454439	-111.920845
PA-17MA2	(A-2-4) 25acc1	55-223679	07/10/14	305	2.375	PVC	0-303	243-303	Not Sampled	---	33.489903	-111.898958
PA-18LA	(A-2-4) 25acc2	55-526963	08/28/90	845	10 6 4	steel	+0.5-20 0-795 0-845	--- --- 785-845*	HydraSleeve	---	33.490250	-111.900068
PA-19LA	(A-1-4) 2bba3	55-526959	09/13/90	405	10 6 4	steel	+1-20 0-355 0-405	--- --- 345-405*	Pump	252	33.465528	-111.923724
PA-20MA	(A-1-4) 2bba2	55-526958	09/19/90	260	10 6 4	steel	+1-20 0-210 0-260	--- --- 200-260*	Pump	Unknown	33.465528	-111.923618

Table A-2. Summary Well Construction Details for NIBW Monitoring and Extraction Wells
North Indian Bend Wash Area, Maricopa County, Arizona

					Casing							
Well Name	Cadastral Location	ADWR Registration Number	Completion Date	Depth Drilled (ft, bls)	Diameter (inches)	Type	Depth Interval (ft, bls)	Perforated Interval (ft, bls)	Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]
PA-21MA	(A-2-4) 36add	55-526967	09/28/90	302	10 6 4	steel	+1-20 0-250 0-302	--- --- 240-302*	HydraSleeve	---	33.474963	-111.891986
PA-22LA	(A-1-4) 11adb1	55-526969	10/01/90	635	6 4	steel	0-584 0-635	--- 574-635*	Not Sampled	---	33.447509	-111.912847
PA-23MA	(A-1-4) 11adb2	55-526968	10/19/90	300	10 6 4	steel	+1-20 0-250 0-300	--- --- 240-300*	Not Sampled	Unknown	33.447595	-111.912772
PG-1LA	(A-2-4) 14dda	55-533846	12/30/91	810	10 6 4	steel	0-20 0-757 0-809	--- --- 754-809*	Pump	483	33.512941	-111.909137
PG-2LA	(A-2-4) 14cda1	55-533845	01/14/92	763	10 6 4	steel	0-20 0-710 0-762	--- --- 710-762	Pump	483	33.512932	-111.917459
PG-4MA	(A-1-4) 3aad1	55-534407	03/05/92	303	10 4	steel	0-20 0-225	--- 183-225	Pump	Unknown	33.462157	-111.927272
PG-4UA	(A-1-4) 3aad2	55-534408	03/10/92	172	6 4	steel	0-20 0-172	--- 140-172	HydraSleeve	---	33.462154	-111.927351
PG-5MA	(A-1-4) 2bca1	55-534411	03/18/92	500	10 6 4	steel	0-20 0-250 0-300	--- --- 249-300*	HydraSleeve	---	33.460405	-111.922224
PG-5UA	(A-1-4) 2bca2	55-534412	03/20/92	178	6 4	steel	0-20 0-178	--- 115-178	HydraSleeve	---	33.460321	-111.922194
PG-6MA	(A-1-4) 2ccb2	55-534410	03/25/92	400	10 6 4	steel	0-20 0-195 0-245	--- --- 185-245*	Pump	Unknown	33.454703	-111.925289
PG-6UA	(A-1-4) 2ccb1	55-534409	04/02/92	170	6 4	steel	+1-20 0-170	--- 107-170	Pump	Unknown	33.454793	-111.925289
PG-7MA	(A-1-4) 11bab	55-534413	04/08/92	435	10 6 4	steel	0-20 0-250 0-300	--- --- 237-300*	Pump	Unknown	33.450711	-111.922152
PG-7UA	(A-1-4) 11bba	55-534414	04/16/92	156	6 4	steel	+1-20 0-156	--- 72-156	Not Sampled	136	33.450591	-111.922153
PG-8UA	(A-1-4) 2bba1	55-534415	04/24/92	162	6 4	steel	+1-20 0-162	--- 122-162	Pump	Unknown	33.465526	-111.923863
PG-10UA	(A-2-4) 26bdb	55-535829	06/25/92	154	8 6	steel	+1-20 +1-154	--- 130-152	Pump	144	33.489743	-111.919585
PG-11UA	(A-2-4) 35bba2	55-535459	06/25/92	157	8 6	steel	+1-20 0-157	--- 124-154	HydraSleeve	---	33.480162	-111.921979
PG-16UA	(A-2-4) 26cbb	55-535458	07/18/92	166	8 6	steel	+1-20 0-166	--- 130-163	Pump	Unknown	33.487392	-111.923954
PG-18UA	(A-1-4) 2dcb	55-535470	07/28/92	160	8 6	steel	+1-20 0-160	--- 75-157	Pump	Unknown	33.454715	-111.917537
PG-19UA	(A-1-4) 2dbb2	55-535474	07/30/92	158	8 6	steel	+1-20 0-158	--- 82-155	Pump	146	33.458113	-111.917641
PG-22UA	(A-1-4) 2abd	55-535467	08/07/92	147	8 6	steel	+1-20 0-147	--- 83-143	HydraSleeve	---	33.463474	-111.913899
PG-23MA/LA	(A-1-4) 3add2	NA	10/15/93	300	11 4	steel	0-20 0-300	--- 250-300	Pump	Unknown	33.458535	-111.927121
PG-23UA	(A-1-4) 3add1	55-535473	08/12/92	174	8 6	steel	+1-20 0-174	--- 118-168	HydraSleeve	---	33.458535	-111.927269
PG-24UA	(A-1-4) 2cba	55-535471	08/13/92	163	8 6	steel	+1-20 0-163	--- 96-158	HydraSleeve	---	33.457657	-111.922843
PG-25UA	(A-1-4) 2bda	55-535468	08/18/92	153	8 6	steel	+1-20 0-153	--- 87-150	HydraSleeve	---	33.461354	-111.917861
PG-28UA	(A-2-4) 26caa2	55-539541	08/01/93	176	4	steel	0-173	113-173	Pump	163	33.486571	-111.918858
PG-29UA	(A-2-4) 26acc	55-539540	07/16/93	155	8 4	steel	0-20 0-152	--- 92-152	Pump	135	33.487523	-111.915867
PG-30UA	(A-2-4) 26dcb	55-539542	08/01/93	157	4	steel	0-152	107-152	Not Sampled	144	33.482279	-111.917370
PG-31UA	(A-2-4) 26ccb3	55-539539	08/01/93	156	8 4	steel	0-20 0-154	--- 114-154	HydraSleeve	---	33.483932	-111.922877
PG-38MA/LA	(A-1-4) 3abd2	55-540382	10/01/93	250	10 6 4	steel	0-20 0-200 0-250	--- --- 200-250	HydraSleeve	---	33.463494	-111.931033
PG-39LA	(A-2-4) 34dad1	55-540380	11/07/93	300	8 4	steel	0-20 0-300	--- 250-300	Pump	252	33.469351	-111.926777
PG-40LA	(A-2-4) 14acb3	55-544386	08/01/94	1,400	12 8 6	steel	0-20 0-900 856-1,400	--- --- 900-1,400	Pump	Unknown	33.518203	-111.917000
PG-41MA/LA	(A-2-4) 14acb4	55-550401	08/01/95	900	10 6	steel	0-503 492-900	--- 503-890	Not Sampled	---	33.518283	-111.916985
PG-42LA	(A-2-4) 11ccd	55-557440	06/21/96	830	8 4	steel	0-20 0-759	--- 597-759	Pump	567	33.523318	-111.922877
PG-43LA	(A-2-4) 11ddd	55-557441	07/15/96	907	8 4	steel	0-22 0-900	--- 720-900	HydraSleeve	---	33.524172	-111.909065

Table A-2. Summary Well Construction Details for NIBW Monitoring and Extraction Wells
North Indian Bend Wash Area, Maricopa County, Arizona

Well Name	Cadastral Location	ADWR Registration Number	Completion Date	Depth Drilled (ft, bls)	Casing Diameter (inches)	Casing Type	Casing Depth Interval (ft, bls)	Casing Perforated Interval (ft, bls)	Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]
PG-44LA	(A-2-4) 15dad	55-558952	08/01/96	869	8 4	steel	0-20 0-759	--- 633-759	Pump	525	33.513244	-111.927936
PG-47MA	(A-1-4) 1baa4	55-566511	07/02/96	690	4	steel	0-560	510-560	Not Sampled	232	33.465645	-111.901429
PG-48MA	(A-1-4) 1baa5	55-566512	07/12/96	450	4	steel	0-430	380-430	Pump	232	33.465649	-111.901578
PG-49MA	(A-2-4) 35dba3	55-566513	07/26/96	609	4	steel	0-574	524-574	HydraSleeve	---	33.471383	-111.914415
PG-50MA	(A-2-4) 26bda5	55-556193	08/08/96	638	4	steel	0-562	522-562	HydraSleeve	---	33.490186	-111.918715
PG-51MA	(A-2-4) 26bda6	55-556194	08/16/96	481	4	steel	0-480	460-480	Not Sampled	463	33.490134	-111.918714
PG-54MA	(A-2-4) 36cab3	55-566515	09/27/96	444	4	steel	0-424	389-424	Pump	232	33.471566	-111.904151
PG-55MA	(A-2-4) 26dca	55-559965	10/10/96	660	4	steel	0-570	520-570	Pump	274	33.483996	-111.913721
PG-56MA	(A-2-4) 26aca2	55-560235	10/29/96	690	4	steel	0-580	530-580	Pump	253	33.490350	-111.913239
S-1LA	(A-2-4) 27aab1	55-525290	08/26/89	662	10 6 4	steel	0-20 0-600 0-658	--- --- 608-658	Pump	Unknown	33.494044	-111.929281
S-1MA	(A-2-4) 27aab2	55-525291	08/31/89	274	10 6 4	steel	+2-20 0-174 0-273	--- --- 223-273	HydraSleeve	---	33.493951	-111.929480
S-2LA	(A-2-4) 23ccb1	55-525292	08/07/89	682	10 6 4	steel	+2-20 0-618 0-668	--- --- 618-668	Pump	Unknown	33.497868	-111.924166
S-2MA	(A-2-4) 23ccb2	55-525293	08/14/89	304	10 4	steel	+2-20 0-280	--- 230-280	HydraSleeve	---	33.497976	-111.924191
W-1MA	(A-2-4) 26aca1	55-530928	03/04/91	291	4	steel	0-290	240-290	Pump	260	33.489720	-111.913139
W-2MA	(A-2-4) 26caa1	55-530929	03/04/91	290	4	steel	0-290	240-290	Pump	280	33.486586	-111.919062
EXTRACTION WELLS:												
7EX-3aMA	(A-2-4) 26bda7	55-577372	09/24/99	355	6	stainless steel	0-354.5	165-354.5	Pump	275	33.489537	-111.918722
7EX-4MA	(A-2-4) 26caa3	55-400132	10/01/96	370	6	stainless steel	0-304	190-244	Pump	240	33.487221	-111.917712
7EX-6MA	(A-2-4) 26cad	55-224306	07/02/15	381	8	stainless steel	0-362	200-362	Pump		33.485782	-111.919273
COS-31	(A-2-4) 25cdb2	55-608435	08/02/57	1,300	20 16	steel	0-695 695-1,300	300-692 705-1,288	Pump		33.483906	-111.904478
COS-71A	(A-2-4) 35abb	55-222760	03/17/14	1,100	20	steel stainless steel	0-211 211-802	--- 211-402 422-507 552-687 713-792	Pump		33.479533	-111.917114
COS-72	(A-2-4) 35aab2	55-626542	08/21/51	985	20	steel	0-985	200-970	Pump	431	33.480214	-111.912430
COS-75A	(A-2-4) 23ddd5	55-546469	05/01/95	1,413	20	steel	0-1,278	658-1,258	Pump	500	33.496731	-111.910389
Granite Reef	(A-1-4) 01aba1	55-617830	01/01/41	493	24 18 16	steel	0-482 0-199 0-472	199-465 --- 192-472	Pump	312	33.465672	-111.898427
MEX-1MA	(A-2-4) 01bba4	55-566405	01/01/98	666	20	steel	0-656	140-544	Pump	415	33.465437	-111.906054
PCX-1	(A-2-4) 14cda2	55-564426	05/01/95	1,350	20	steel	0-1,245	720-1,151	Pump	562	33.513160	-111.917630
PV-14	(A-2-4) 11dcc3	55-624807	02/22/65	1,743	20 8	steel	0-1,400 1,400-1,730	700-1,400 1,400-1,730	Pump	580	33.524682	-111.916032
PV-15	(A-2-4) 14abc1	55-624808	02/11/69	1,430	20 18 16	steel	0-660 0-1,208 1,193-1,429	505-643 643-1,193 1,193-1,424	Pump	569	33.522000	-111.916250
PRODUCTION WELLS:												
AVI	(A-2-4) 14dab	55-800928	04/01/46	798	16	steel	0-798	165-798	Not Sampled	Unknown	33.513836	-111.931379
AWC-7A	(A-2-4) 22dab5	55-608782	11/23/71	801	14	steel	0-620	300-620	Not Sampled	Unknown	33.501092	-111.930144
AWC-8A	(A-2-4) 22dac	55-536833	02/05/94	630	20 16	steel	0-625 0-610	335-611 340-610	Not Sampled	Unknown	33.498840	-111.929952
AWC-8B	(A-2-4) 22dab	55-585033	04/02/01	785	18	steel	0-774	460-760	Not Sampled	Unknown	33.501781	-111.928658
AWC-9B	(A-2-4) 22daa	55-201729	06/16/04	1,210	18	steel	0-1200	500-1180	Not Sampled	Unknown	33.500603	-111.928328
AWC-12A	(A-2-4) 22dba3	55-540859	02/27/94	696	20	steel	0-650	345-645	Not Sampled	Unknown	33.501991	-111.932343
COS-6	(A-2-4) 25bcd	55-607686	11/09/53	1295	20 16	steel	0-470 470-1295	100-458 475-1205	Not Sampled	Unknown	33.487725	-111.904850
COS-25	(A-1-4) 02dda	55-626824	09/15/77	700	16 14	steel	0-500 500-700	350-480 484-700	Not Sampled	Unknown	33.453681	-111.911635
COS-74	(A-2-4) 25ddb	55-626615	03/13/74	1,200	20 16	steel	0-800 800-1,200	--- 800-1,200	Not Sampled	Unknown	33.483686	-111.895762
COT-6	(A-1-4) 11aba	55-628167	12/12/60	1,054	16	steel	0-1,050	300-980	Not Sampled	Unknown	33.450762	-111.914432
IBGC	(A-2-4) 11dba	55-527102	07/16/90	622	16	steel	0-622	300-610	Not Sampled	Unknown	33.443418	-111.914123
Laird 2	(A-1-4) 11bdb	55-603767	11/01/73	492	16	steel	0-445	155-430	Not Sampled	Unknown	33.447134	-111.922291
MDWC	(A-2-4) 14cbb	55-600523	02/23/50	840	20 12	steel	0-500 500-750	Unknown	Not Sampled	Unknown	33.516398	-111.925694
PV-11	(A-2-4) 11dcb	55-624805	07/01/59	1,372	20 16	steel	0-1,020 1,000-1,342	509-1,020 1,000-1,225	Pump	Unknown	33.526793	-111.915422
PV-12B	(A-2-4) 11dcb	55-220510	09/09/11	1,150	20	steel	0-1,130	716-1,130	Pump	Unknown	33.527877	-111.915644
PV-16	(A-2-4) 11dbb	55-624809	03/27/80	1,505	18	steel	0-1,500	650-1,500	Not Sampled	Unknown	33.529599	-111.916200
PV-17	(A-2-4) 11bdd	55-537967	04/20/93	1,590	20 16	steel	0-582 582-1,145	--- 582-1,125	Not Sampled	Unknown	33.531626	-111.918256
SRIR SCC	(A-2-5) 19aba	Not Registered	03/01/58	1,106	20	steel	0-984	450-984	Not Sampled	Unknown	33.508377	-111.879310

Table A-2. Summary Well Construction Details for NIBW Monitoring and Extraction Wells
North Indian Bend Wash Area, Maricopa County, Arizona

Well Name	Cadastral Location	ADWR Registration Number	Completion Date	Depth Drilled (ft, bls)	Casing Diameter (inches)	Casing Type	Casing Depth Interval (ft, bls)	Perforated Interval (ft, bls)	Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]
QRIA	(A-2-4) 15aa	55-802113	04/09/05	601	16 14	steel	0-450 450-601	Unknown	Not Sampled	Unknown	33.519280	-111.929246
Radisson	(A-2-4) 11abb	55-609565	01/01/76	684	10	steel	0-684	Unknown	Not Sampled	Unknown	33.537541	-111.916236
SRP21.6E,8N	(A-2-4) 22dcc	55-226628	03/15/17	640	20	steel	0-630	300-610	Not Sampled	Unknown	33.494956	-111.933857
SRP22.5E,5.5N	(A-1-4) 02dbb	55-608363	11/16/48	610	20	steel	0-520	Unknown	Not Sampled	Unknown	33.457799	-111.917339
SRP22.6E,10N	(A-2-4) 11dcc1	55-617843	03/02/57	1,003	20	steel	0-996	348-996	Pump	Unknown	33.523920	-111.915105
SRP22.9E,10.8N	(A-2-4) 11aad2	55-202099	09/25/04	1,210	20	steel	0-1,200	400-540 640-760 840-1,180	Not Sampled	Unknown	33.534954	-111.908941
SRP23.5E,5.3N	(A-1-4) 01cda	55-608365	07/06/52	850	20	steel	0-840	Unknown	Not Sampled	Unknown	33.454212	-111.900806
SRP23.5E,8.8N	(A-2-4) 24bad	55-607687	01/28/49	1,300	24 20 16	steel	0-460 460-1,012 1,012-1,300	Unknown	Not Sampled	Unknown	33.505549	-111.900505
SRP23.5E,9.5N	(A-2-4) 13caa	55-607716	04/03/52	1,020	20 16	steel	0-742 742-1,020	Unknown	Not Sampled	Unknown	33.515424	-111.901059
SRP23.5E,10.6N	(A-2-4) 12bdd	55-214647	11/20/07	1,005	20	steel	0-1,000	380-630 730-980	Not Sampled	Unknown	33.532846	-111.902218
SRP24E,10.5N	(A-2-4) 12add2	55-607710	05/06/49	1,200	24 20	steel	0-770 770-1,200	Unknown	Not Sampled	Unknown	33.531248	-111.891981

EXPLANATION:

ft, bls = feet, below land surface

NOTES:

--- Not applicable

[1] Coordinates of well locations use datum NAD 1983

* Asterisk indicates that the perforated interval in the production casing extends up into the sealed conductor casing. The effective perforated interval starts at bottom of outer blank casing.

NA Not available

Table A-3 Continuous Water Level Monitoring Locations, Northern LAU
North Indian Bend Wash Superfund Site

Northern LAU Well	Monitoring Location in GM&EP	Current Monitoring Location	Comments
PG-1LA	X		Transducer failed; replacement moved to well S-2LA
S-2LA		X	Replaced PG-1LA to provide better data for hydraulic capture and control
PG-2LA	X	X	
PG-40LA	X		Transducer failed; replacement moved to well PG-41MA/LA
PG-41MA/LA		X	Replaced PG-40LA to provide better data for hydraulic capture and control
PG-42LA	X	X	
PG-43LA	X		Transducer failed; replacement moved to well PA-13LA
PA-13LA		X	Replaced PG-43LA to provide better data for hydraulic capture and control
PG-44LA	X	X	
PV-11	X	X	
PV-12	X		Well abandoned; placed transducer in well PV-17
PV-17		X	Replaced PV-12 to provide better data for hydraulic capture and control
PV-14	X	X	
PV-15	X	X	

EXPLANATION:

LAU = Lower Alluvium Unit

GM&EP = Groundwater Monitoring & Evaluation Plan

APPENDIX B
WATER LEVEL TABLES AND NORTHERN LAU CONTINUOUS

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2021

Monitor Well Identifier	Measurement Date	Depth to Water (ft, bls)	Groundwater Altitude (ft, amsl)
B-1MA	4/5/21 15:38	81.76	1,108.51
B-1UA	Not included in April monitoring event		
B-J	Not included in April monitoring event		
D-2MA	4/6/21 15:40	112.55	1,127.48
E-1LA	4/5/21 15:35	124.67	1,090.33
E-1MA	4/5/21 15:23	133.34	1,081.03
E-1UA	Not included in April monitoring event		
E-2UA	Not included in April monitoring event		
E-5MA	4/5/21 17:34	103.58	1,095.85
E-5UA	Not included in April monitoring event		
E-6UA	Not included in April monitoring event		
E-7LA	4/6/21 10:18	100.82	1,096.97
E-7UA	Not included in April monitoring event		
E-8MA	4/5/21 18:07	89.92	1,102.97
E-10MA	4/6/21 13:35	135.94	1,107.92
E-12UA	Not included in April monitoring event		
E-13UA	Not included in April monitoring event		
E-14MA/LA	4/6/21 15:57	154.57	1,099.38
M-1MA	4/5/21 12:15	119.16	1,091.73
M-2LA	4/5/21 13:00	114.63	1,095.60
M-2MA	4/5/21 12:49	113.99	1,096.07
M-2UA	Not included in April monitoring event		
M-3MA	4/5/21 12:36	100.62	1,104.94
M-4MA	4/5/21 12:25	124.89	1,090.02
M-5LA	4/5/21 10:07	127.75	1,089.71
M-5MA	4/5/21 10:30	150.40	1,067.04
M-6MA	4/5/21 11:32	136.99	1,080.00
M-7MA	4/5/21 11:51	125.18	1,088.69
M-9LA	4/6/21 11:34	135.55	1,084.97
M-9MA	4/6/21 11:46	118.11	1,102.41
M-10LA2	4/5/21 13:56	128.43	1,091.27
M-10MA2	4/5/21 15:00	129.82	1,090.23
M-11MA	4/6/21 10:35	105.98	1,105.61
M-12MA2	4/7/21 14:40	120.91	1,107.01
M-14LA	4/5/21 17:51	136.79	1,089.43
M-14MA	4/5/21 17:46	119.03	1,107.31
M-15MA	4/5/21 17:20	130.6	1,088.31
M-16LA	4/5/21 16:34	145.51	1,082.57
M-16MA	4/5/21 16:41	117.56	1,110.59
M-17MA/LA	4/6/21 14:38	133.86	1,103.84

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2021

Monitor Well Identifier	Measurement Date	Depth to Water (ft, bls)	Groundwater Altitude (ft, amsl)
OZ7-1 *	4/6/21 16:51	123.4	1,116.63
PA-1MA	4/6/21 8:16	104.8	1,120.70
PA-2LA	4/6/21 17:45	237.72	1,016.04
PA-3MA	4/6/21 17:50	118.61	1,134.83
PA-4MA	5/6/21 14:26	103.11	1,127.81
PA-5LA	4/6/21 15:44	218.89	1,010.56
PA-6LA	4/9/21 13:34	240.37	1,012.56
PA-7MA	4/9/21 13:46	121.22	1,131.84
PA-8LA2	4/7/21 15:10	156.74	1,071.59
PA-9LA	4/6/21 10:25	166.05	1,070.73
PA-10MA	4/6/21 10:18	130.01	1,106.79
PA-11LA2 **	4/6/21 8:57	137.28	1,087.68
PA-12MA2 ***	4/6/21 8:43	120.36	1,104.60
PA-13LA	4/9/21 14:24	224.93	1,024.06
PA-14MA	4/9/21 14:45	128.84	1,120.25
PA-15LA	4/5/21 16:32	96.27	1,108.01
PA-16MA	4/5/21 16:11	95.11	1,109.37
PA-17MA2	4/7/21 12:43	109.01	1129.69
PA-18LA	4/8/21 10:01	189.55	1,049.31
PA-19LA	4/6/21 14:15	120.14	1,101.32
PA-20MA	4/6/21 14:20	118.29	1,102.99
PA-21MA	4/5/21 16:17	115.26	1,109.93
PA-22LA	4/5/21 15:19	77.92	1,106.08
PA-23MA	4/5/21 15:07	72.94	1,111.48
PG-1LA	4/6/21 16:51	244.27	1,005.39
PG-2LA	4/7/21 10:27	277.32	993.74
PG-4MA	4/5/21 18:39	122.64	1,104.90
PG-4UA	Not included in April monitoring event		
PG-5MA	4/5/21 18:24	109.51	1,104.76
PG-5UA	Not included in April monitoring event		
PG-6MA	4/5/21 16:52	96.25	1,116.45
PG-6UA	Not included in April monitoring event		
PG-7MA	4/5/21 15:57	85.88	1,111.98
PG-7UA	Not included in April monitoring event		
PG-8UA	Not included in April monitoring event		
PG-10UA	Not included in April monitoring event		
PG-11UA	Not included in April monitoring event		
PG-16UA	Not included in April monitoring event		
PG-18UA	Not included in April monitoring event		
PG-19UA	Not included in April monitoring event		

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2021

Monitor Well Identifier	Measurement Date	Depth to Water (ft, bls)	Groundwater Altitude (ft, amsl)
PG-22UA	Not included in April monitoring event		
PG-23MA/LA	4/5/21 17:07	112.72	1,109.81
PG-23UA	Not included in April monitoring event		
PG-24UA	Not included in April monitoring event		
PG-25UA	Not included in April monitoring event		
PG-28UA	Not included in April monitoring event		
PG-29UA	Not included in April monitoring event		
PG-30UA	Not included in April monitoring event		
PG-31UA	Not included in April monitoring event		
PG-38MA/LA	4/5/21 18:51	132.28	1,104.96
PG-39LA	4/6/21 14:21	131.9	1,100.68
PG-40LA	4/7/21 9:29	277.38	997.95
PG-42LA	4/7/21 10:55	294	998.31
PG-43LA	4/6/21 17:15	261.94	1,003.07
PG-44LA	4/7/21 9:57	296.36	1,001.23
PG-47MA	4/5/21 11:07	107.57	1,109.12
PG-48MA	4/5/21 11:12	133.3	1,083.54
PG-50MA	4/6/21 15:15	107.81	1,133.15
PG-51MA	4/6/21 15:24	136.37	1,104.54
S-1LA	4/9/21 15:38	219.19	1,041.26
S-1MA	4/9/21 15:31	143.31	1,117.03
S-2LA	4/9/21 15:11	236.46	1,023.51
S-2MA	4/9/21 15:03	147.02	1,113.47
W-1MA	4/7/21 11:28	103.57	1,126.81
W-2MA	4/6/21 11:12	129.57	1,105.51

ABBREVIATIONS:

ft, bls = feet below land surface

ft, amsl = feet above mean sea level

NOTES:

* = Well OZ7-1 is not currently required for compliance. PCs are recommending replacing current compliance well D-2MA, which is no longer reliable, with OZ7-1.

** = collected from LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA

*** = collected from MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA

Table B-2. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
October 2021

Monitor Well Identifier	Measurement Date & Time	Depth to Water (ft, bls)	Groundwater Level (ft, amsl)
B-1MA	10/4/21 11:33	83.77	1,106.49
B-1UA	10/4/21 11:47	52.48	1,137.84
B-J	10/4/21 15:12	57.49	1,134.75
D-2MA	10/6/21 15:02	107.55	1,132.48
E-1LA	10/5/21 12:52	129.24	1,085.76
E-1MA	10/5/21 12:45	134.09	1,080.28
E-1UA	10/5/21 13:12	73.90	1,141.46
E-2UA	10/5/21 11:44	86.76	1,139.79
E-5MA	10/4/21 14:57	105.01	1,094.42
E-5UA	10/4/21 14:51	64.81	1,134.75
E-6UA	10/5/21 9:56	91.94	1,130.36
E-7LA	10/4/21 14:21	103.11	1,094.68
E-7UA	10/4/21 14:26	66.61	1,130.80
E-8MA	10/4/21 15:08	91.74	1,101.15
E-10MA	10/5/21 16:17	130.62	1,113.24
E-12UA	10/4/21 15:50	65.80	1,137.83
E-13UA	10/5/21 15:13	70.49	1,138.14
E-14MA/LA	10/5/21 9:20	155.34	1,098.61
M-1MA	10/6/21 11:52	120.37	1,090.52
M-2LA	10/6/21 10:25	119.25	1,090.98
M-2MA	10/6/21 12:55	115.75	1,094.31
M-2UA	10/6/21 10:10	71.86	1,138.31
M-3MA	10/6/21 9:48	102.42	1,103.14
M-4MA	10/6/21 12:01	126.08	1,088.82
M-5LA	10/6/21 9:42	130.70	1,086.76
M-5MA	10/6/21 9:57	150.38	1,067.05
M-6MA	10/6/21 11:04	137.85	1,079.13
M-7MA	10/6/21 11:24	126.21	1,087.66
M-9LA	10/5/21 10:13	139.69	1,080.83
M-9MA	10/5/21 10:06	118.80	1,101.72
M-10LA2	10/6/21 13:36	132.14	1,087.56
M-10MA2	10/4/21 15:36	130.81	1,089.24
M-11MA	10/5/21 11:16	106.18	1,105.41
M-12MA2	10/5/21 17:02	120.02	1,107.90
M-14LA	10/19/21 6:30	140.69	1,085.53
M-14MA	10/5/21 11:39	119.24	1,107.10
M-15MA	10/5/21 12:32	131.44	1,087.47
M-16LA	10/5/21 12:00	149.16	1,078.92
M-16MA	10/5/21 11:57	116.99	1,111.16
M-17MA/LA	10/5/21 9:32	129.75	1,107.95

Table B-2. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
October 2021

Monitor Well Identifier	Measurement Date & Time	Depth to Water (ft, bls)	Groundwater Level (ft, amsl)
OZ7-1 *	10/6/21 15:14	113.90	1,126.13
PA-1MA	10/5/21 9:42	104.70	1,120.80
PA-2LA	10/4/21 17:15	241.25	1,012.51
PA-3MA	10/4/21 17:29	118.56	1,134.88
PA-4MA	10/4/21 16:26	100.63	1,130.29
PA-5LA	10/4/21 16:16	221.23	1,008.22
PA-6LA	10/5/21 11:40	241.98	1,010.95
PA-7MA	10/5/21 11:57	121.13	1,131.93
PA-8LA2	10/5/21 17:21	159.07	1,069.26
PA-9LA	10/5/21 15:43	167.25	1,069.53
PA-10MA	10/5/21 15:33	123.11	1,113.69
PA-11LA2 **	10/5/21 10:09	138.93	1,086.03
PA-12MA2 ***	10/5/21 10:07	117.82	1,107.14
PA-13LA	10/5/21 12:50	226.20	1,022.79
PA-14MA	10/5/21 13:09	126.19	1,122.90
PA-15LA	10/4/21 10:54	98.58	1,105.70
PA-16MA	10/4/21 10:42	96.95	1,107.53
PA-17MA2	10/5/21 11:05	107.64	1,131.06
PA-18LA	10/5/21 10:50	191.97	1,046.89
PA-19LA	10/4/21 13:55	121.86	1,099.60
PA-20MA	10/4/21 14:01	119.50	1,101.78
PA-21MA	10/5/21 10:30	115.97	1,109.22
PA-22LA	10/4/21 10:09	83.09	1,100.91
PA-23MA	10/4/21 10:04	75.73	1,108.69
PG-1LA	10/4/21 14:55	248.98	1,000.68
PG-2LA	10/4/21 14:18	282.43	988.63
PG-4MA	10/4/21 13:31	124.10	1,103.44
PG-4UA	10/4/21 13:35	103.37	1,124.46
PG-5MA	10/4/21 12:06	111.22	1,103.05
PG-5UA	10/4/21 12:10	85.64	1,128.56
PG-6MA	10/4/21 12:40	97.31	1,115.39
PG-6UA	10/4/21 12:43	86.19	1,126.90
PG-7MA	10/4/21 10:29	88.07	1,109.79
PG-7UA	10/4/21 10:34	67.83	1,129.73
PG-8UA	10/4/21 13:51	95.19	1,126.82
PG-10UA	10/6/21 15:31	103.84	1,137.00
PG-11UA	10/4/21 9:09	96.84	1,133.56
PG-16UA	10/5/21 16:05	107.17	1,134.72
PG-18UA	10/4/21 9:48	69.66	1,132.47
PG-19UA	10/4/21 9:36	72.54	1,131.76

Table B-2. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
October 2021

Monitor Well Identifier	Measurement Date & Time	Depth to Water (ft, bls)	Groundwater Level (ft, amsl)
PG-22UA	10/4/21 14:39	75.00	1,135.29
PG-23MA/LA	10/4/21 13:00	114.06	1,108.47
PG-23UA	10/4/21 13:04	98.26	1,124.70
PG-24UA	10/4/21 12:22	83.93	1,128.29
PG-25UA	10/6/21 12:21	74.52	1,132.02
PG-28UA	10/5/21 16:43	98.59	1,136.36
PG-29UA	10/6/21 15:33	95.68	1,137.35
PG-30UA	10/5/21 15:56	90.56	1,135.80
PG-31UA	10/6/21 15:49	101.07	1,134.38
PG-38MA/LA	10/4/21 13:19	133.35	1,103.89
PG-39LA	10/5/21 9:44	132.39	1,100.19
PG-40LA	10/4/21 10:24	283.84	991.49
PG-42LA	10/4/21 12:50	302.02	990.29
PG-43LA	10/4/21 9:42	262.82	1,002.19
PG-44LA	10/4/21 13:24	305.22	992.37
PG-47MA	10/6/21 10:55	111.78	1,104.91
PG-48MA	10/6/21 10:43	134.95	1,081.89
PG-50MA	10/6/21 14:48	105.94	1,135.02
PG-51MA	10/6/21 14:41	137.40	1,103.51
S-1LA	10/5/21 14:58	220.43	1,040.02
S-1MA	10/5/21 15:05	142.90	1,117.44
S-2LA	10/5/21 14:23	237.59	1,022.38
S-2MA	10/5/21 14:38	145.75	1,114.74
W-1MA	10/5/21 16:36	99.71	1,130.67
W-2MA	10/5/21 16:54	115.21	1,119.87

ABBREVIATIONS:

ft, bls = feet below land surface

ft, amsl = feet above mean sea level

NOTES:

* = Well OZ7-1 is not currently required for compliance. PCs are recommending replacing current compliance well D-2MA, which is no longer reliable, with OZ7-1.

** = collected from LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA

*** = collected from MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA

Table B-3. Summary of Groundwater Level Difference Between October 2020 and October 2021
North Indian Bend Wash Area, Scottsdale, Arizona

Monitor Well Identifier[1]	Alluvium Unit	October 2020 Depth to Groundwater Level (ft, bls)	October 2021 Depth to Groundwater Level (ft, bls)	Change in Depth to Groundwater Level (feet)
B-1	U	51.66	52.48	-0.82
B-1	M	81.61	83.77	-2.16
B-J	U	56.95	57.49	-0.54
D-2	M	113.63	107.55	6.08
E-1	U	72.89	73.90	-1.01
E-1	M	133.83	134.09	-0.26
E-1	L	132.34	129.24	3.10
E-2	U	87.68	86.76	0.92
E-5	U	64.42	64.81	-0.39
E-5	M	105.80	105.01	0.79
E-6	U	92.41	91.94	0.47
E-7	U	66.59	66.61	-0.02
E-7	L	106.46	103.11	3.35
E-8	M	91.87	91.74	0.13
E-10	M	140.50	130.62	9.88
E-12	U	65.03	65.80	-0.77
E-13	U	69.72	70.49	-0.77
E-14MA/LA	L	160.15	155.34	4.81
M-1	M	119.28	120.37	-1.09
M-2	U	71.01	71.86	-0.85
M-2	M	114.54	115.75	-1.21
M-2	L	120.90	119.25	1.65
M-3	M	100.08	102.42	-2.35
M-4	M	125.21	126.08	-0.88
M-5	M	152.18	150.38	1.80
M-5	L	135.43	130.70	4.73
M-6	M	137.25	137.85	-0.60
M-7	M	125.75	126.21	-0.46
M-9	M	118.13	118.80	-0.67
M-9	L	144.95	139.69	5.26
M-10MA2	M	131.80	130.81	0.99
M-10LA2	L	130.40	132.14	-1.74
M-11	M	109.59	106.18	3.41
M-12MA2	M	144.55	120.02	24.53
M-14	M	123.36	119.24	4.12
M-14	L	148.02	140.69	7.33
M-15	M	131.93	131.44	0.49
M-16	M	120.54	116.99	3.55
M-16	L	156.73	149.16	7.57
M-17MA/LA	M	132.82	129.75	3.07
OZ7-1*	M	126.44	113.90	12.54
PA-1	M	104.77	104.70	0.07
PA-2	L	254.46	241.25	13.21
PA-3	M	118.46	118.56	-0.10
PA-4	M	105.01	100.63	4.38
PA-5	L	234.78	221.23	13.55
PA-6	L	258.15	241.98	16.17
PA-7	M	121.97	121.13	0.84
PA-8LA2	L	169.94	159.07	10.87

Table B-3. Summary of Groundwater Level Difference Between October 2020 and October 2021
North Indian Bend Wash Area, Scottsdale, Arizona

Monitor Well Identifier[1]	Alluvium Unit	October 2020 Depth to Groundwater Level (ft, bls)	October 2021 Depth to Groundwater Level (ft, bls)	Change in Depth to Groundwater Level (feet)
PA-9	L	176.46	167.25	9.21
PA-10	M	136.02	123.11	12.91
PA-11LA2**	L	146.48	138.93	7.55
PA-12MA2***	M	126.64	117.82	8.82
PA-13	L	242.52	226.20	16.32
PA-14	M	131.52	126.19	5.33
PA-15	L	99.71	98.58	1.13
PA-16	M	97.63	96.95	0.68
PA-17MA2	M	110.02	107.64	2.38
PA-18	L	201.74	191.97	9.77
PA-19	L	124.74	121.86	2.88
PA-20	M	122.56	119.50	3.06
PA-21	M	114.64	115.97	-1.33
PA-22	L	81.61	83.09	-1.48
PA-23	M	73.03	75.73	-2.70
PG-1	L	261.83	248.98	12.85
PG-2	L	284.93	282.43	2.50
PG-4	U	104.10	103.37	0.73
PG-4	M	126.76	124.10	2.66
PG-5	U	85.86	85.64	0.22
PG-5	M	113.39	111.22	2.17
PG-6	U	86.30	86.19	0.11
PG-6	M	98.01	97.31	0.70
PG-7	U	67.42	67.83	-0.41
PG-7	M	87.93	88.07	-0.14
PG-8	U	95.72	95.19	0.53
PG-10	U	103.56	103.84	-0.28
PG-11	U	97.53	96.84	0.69
PG-16	U	107.43	107.17	0.26
PG-18	U	69.31	69.66	-0.35
PG-19	U	72.34	72.54	-0.20
PG-22	U	74.70	75.00	-0.30
PG-23	U	98.68	98.26	0.42
PG-23MA/LA	M	116.09	114.06	2.03
PG-24	U	84.07	83.93	0.14
PG-25	U	74.46	74.52	-0.06
PG-28	U	98.89	98.59	0.30
PG-29	U	96.06	95.68	0.38
PG-30	U	91.17	90.56	0.61
PG-31	U	101.52	101.07	0.45
PG-38MA/LA	M	136.20	133.35	2.85
PG-39	L	137.09	132.39	4.70
PG-40	L	295.67	283.84	11.83
PG-42	L	314.69	302.02	12.67
PG-43	L	287.52	262.82	24.70
PG-44	L	316.00	305.22	10.78
PG-47	M	112.09	111.78	0.31
PG-48	M	133.70	134.95	-1.25
PG-50	M	108.47	105.94	2.53

Table B-3. Summary of Groundwater Level Difference Between October 2020 and October 2021
North Indian Bend Wash Area, Scottsdale, Arizona

Monitor Well Identifier[1]	Alluvium Unit	October 2020 Depth to Groundwater Level (ft, bls)	October 2021 Depth to Groundwater Level (ft, bls)	Change in Depth to Groundwater Level (feet)
PG-51	M	Obstruction	137.40	---
S-1	M	146.66	142.90	3.76
S-1	L	235.07	220.43	14.64
S-2	M	150.98	145.75	5.23
S-2	L	258.70	237.59	21.11
W-1	M	106.93	99.71	7.22
W-2	M	135.67	115.21	20.46

ABBREVIATIONS:

ft, bls = feet below land surface
U = Upper Alluvium Unit monitor well
M = Middle Alluvium Unit monitor well
L = Lower Alluvium Unit monitor well

NOTES:

[1] Wells arranged alphabetically, then by unit.

* = Well OZ7-1 is not currently required for compliance. PCs are recommending replacing current compliance well D-2MA, which is no longer reliable, with OZ7-1.

** = collected from LAU completed well at piezometer PA-11LA2/12MA2 located approximately 80 feet northwest of original well PA-11LA

*** = collected from MAU completed well at piezometer PA-11LA2/12MA2 located approximately 70 feet northwest of original well PA-12MA

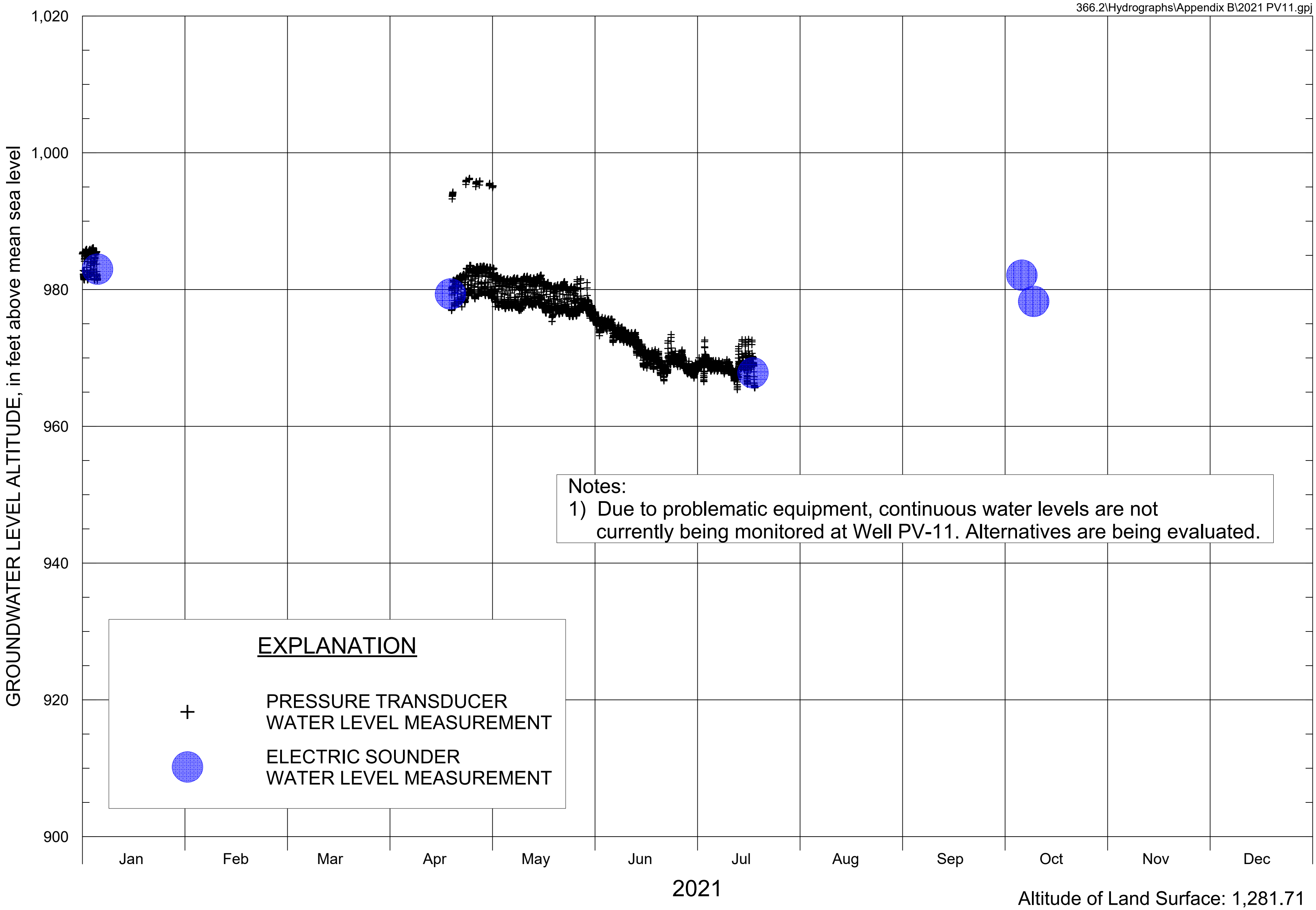


FIGURE B-1. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-11

Note: 1) Higher water levels are representative of non-pumping conditions; lower water levels are representative of pumping conditions.

North Indian Bend Wash Superfund Site

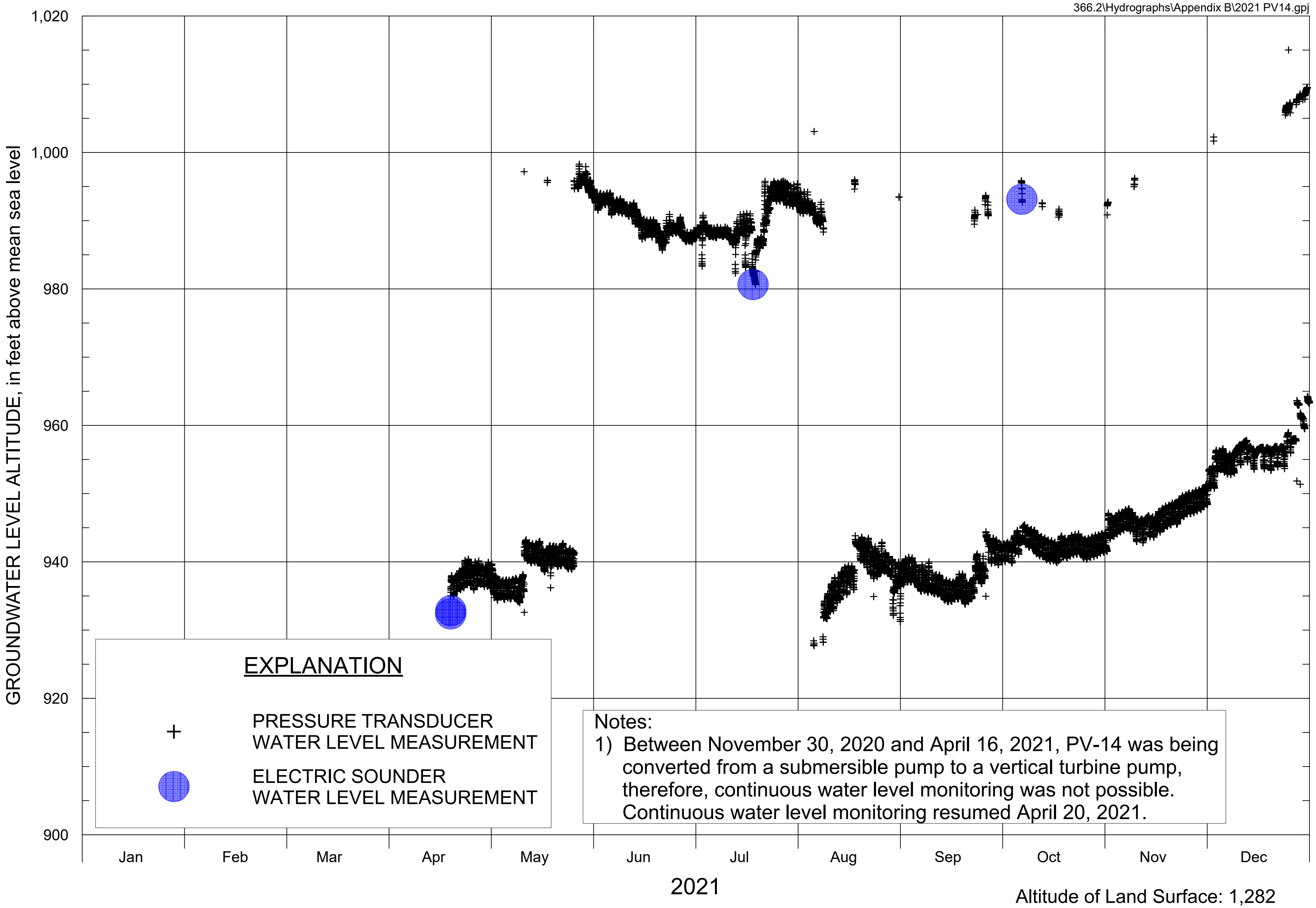
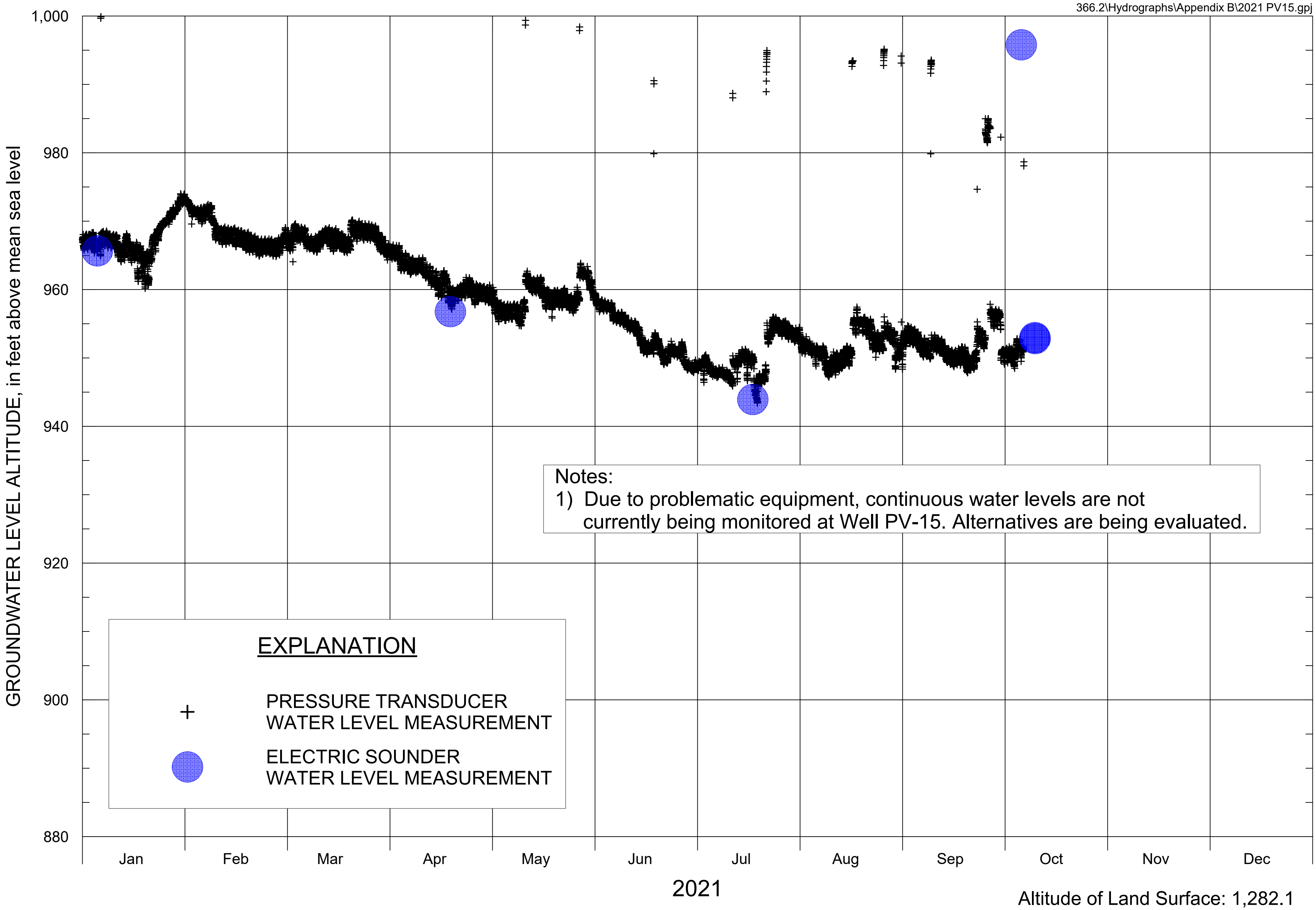


FIGURE B-2. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-14

Note: 1) Higher water levels are representative of non-pumping conditions; lower water levels are representative of pumping conditions.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,282.1

FIGURE B-3. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-15

Note: 1) Higher water levels are representative of non-pumping conditions; lower water levels are representative of pumping conditions.

North Indian Bend Wash Superfund Site

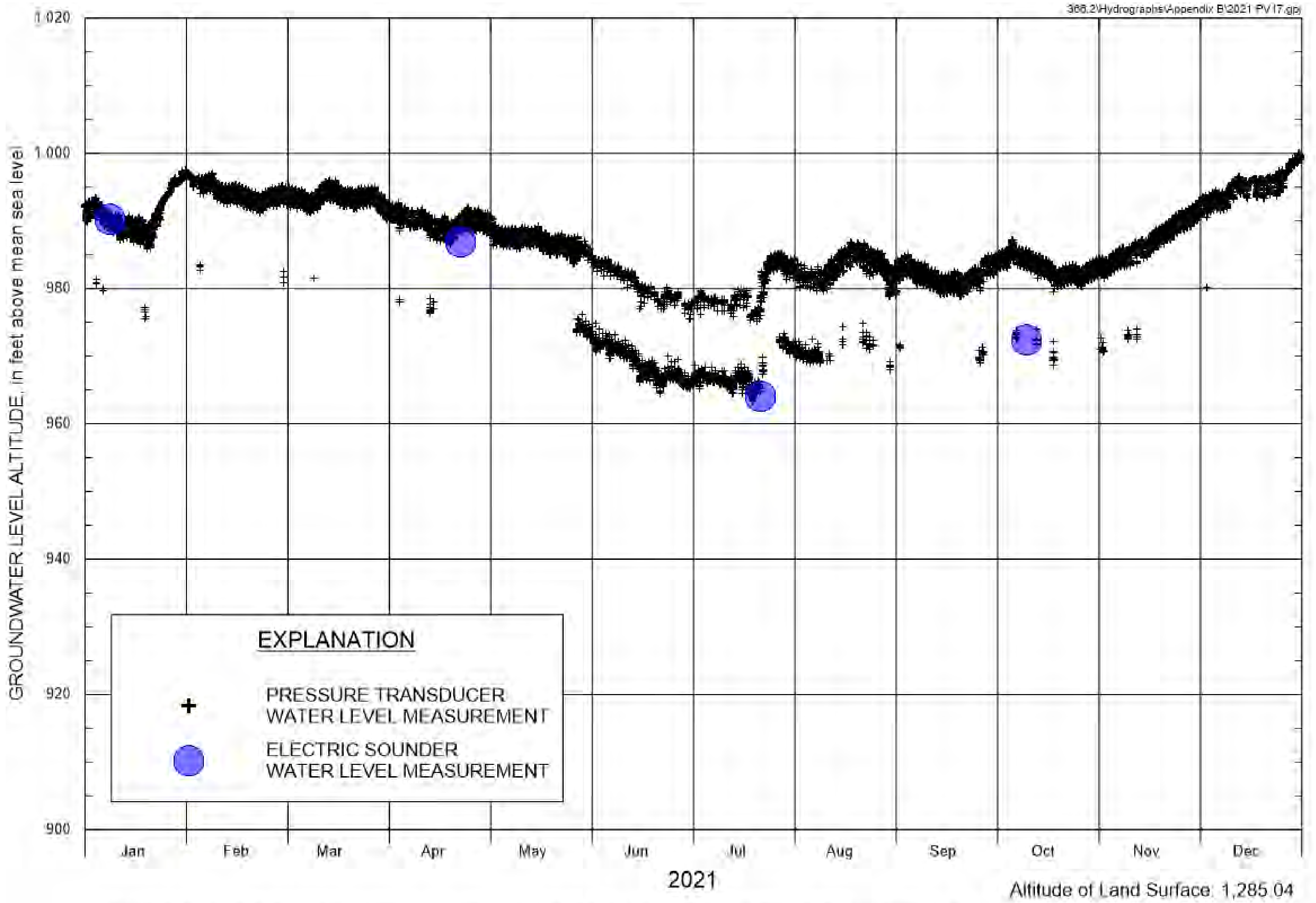


FIGURE B-4. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-17

Note: 1) Higher water levels are representative of non-pumping conditions; lower water levels are representative of pumping conditions.

North Indian Bend Wash Superfund Site

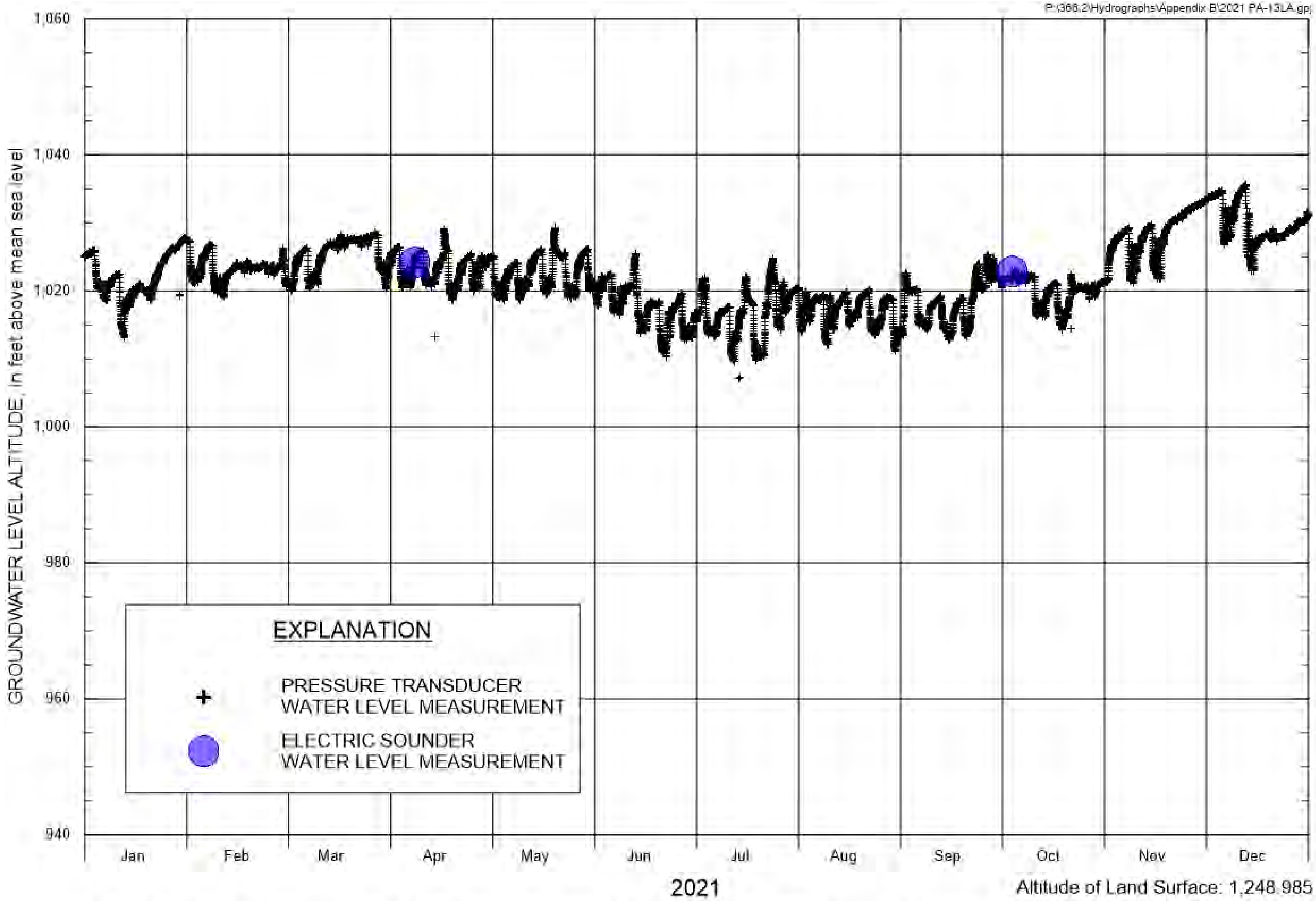
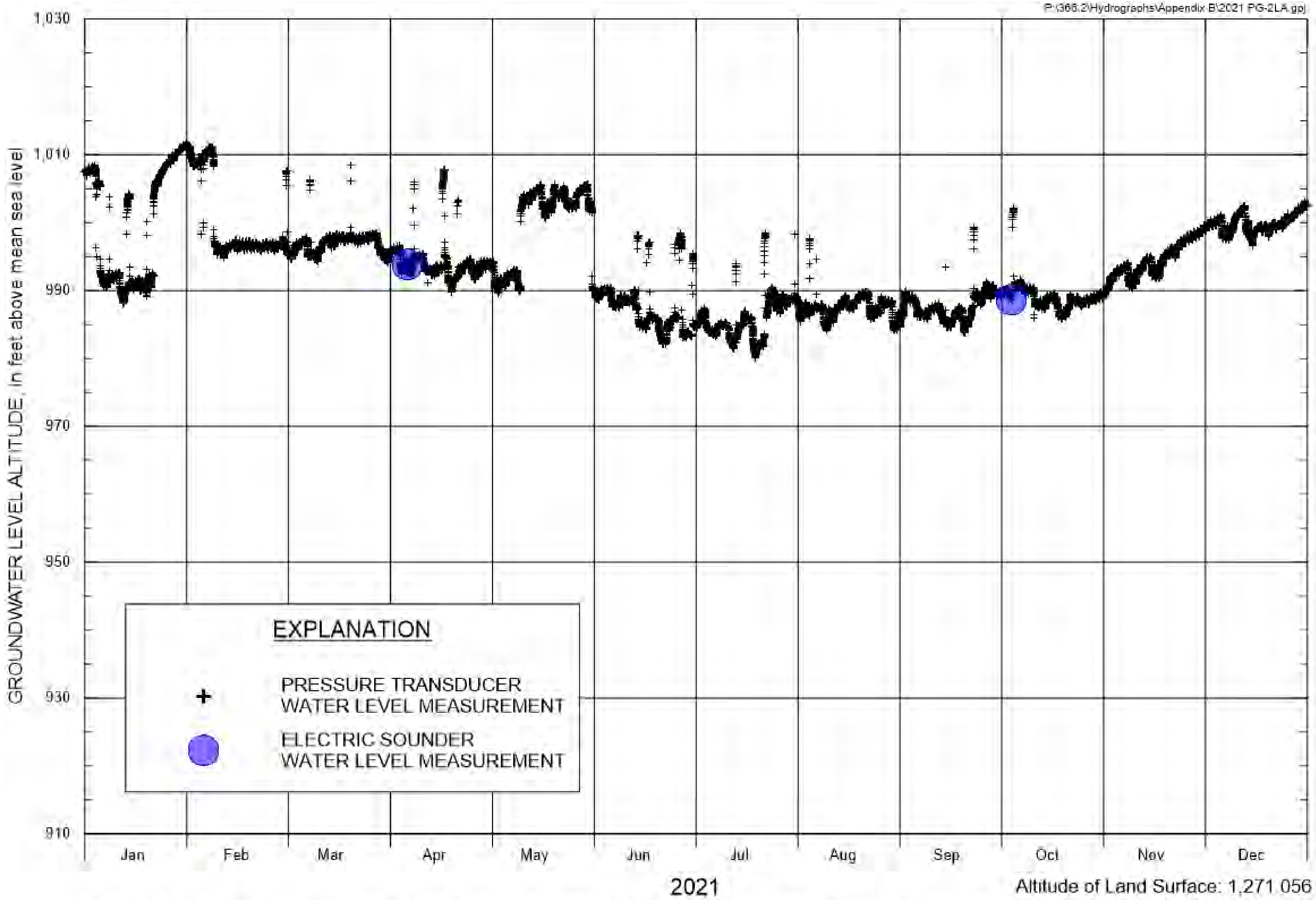


FIGURE B-5. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-13LA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,271.056

FIGURE B-6. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-2LA

North Indian Bend Wash Superfund Site

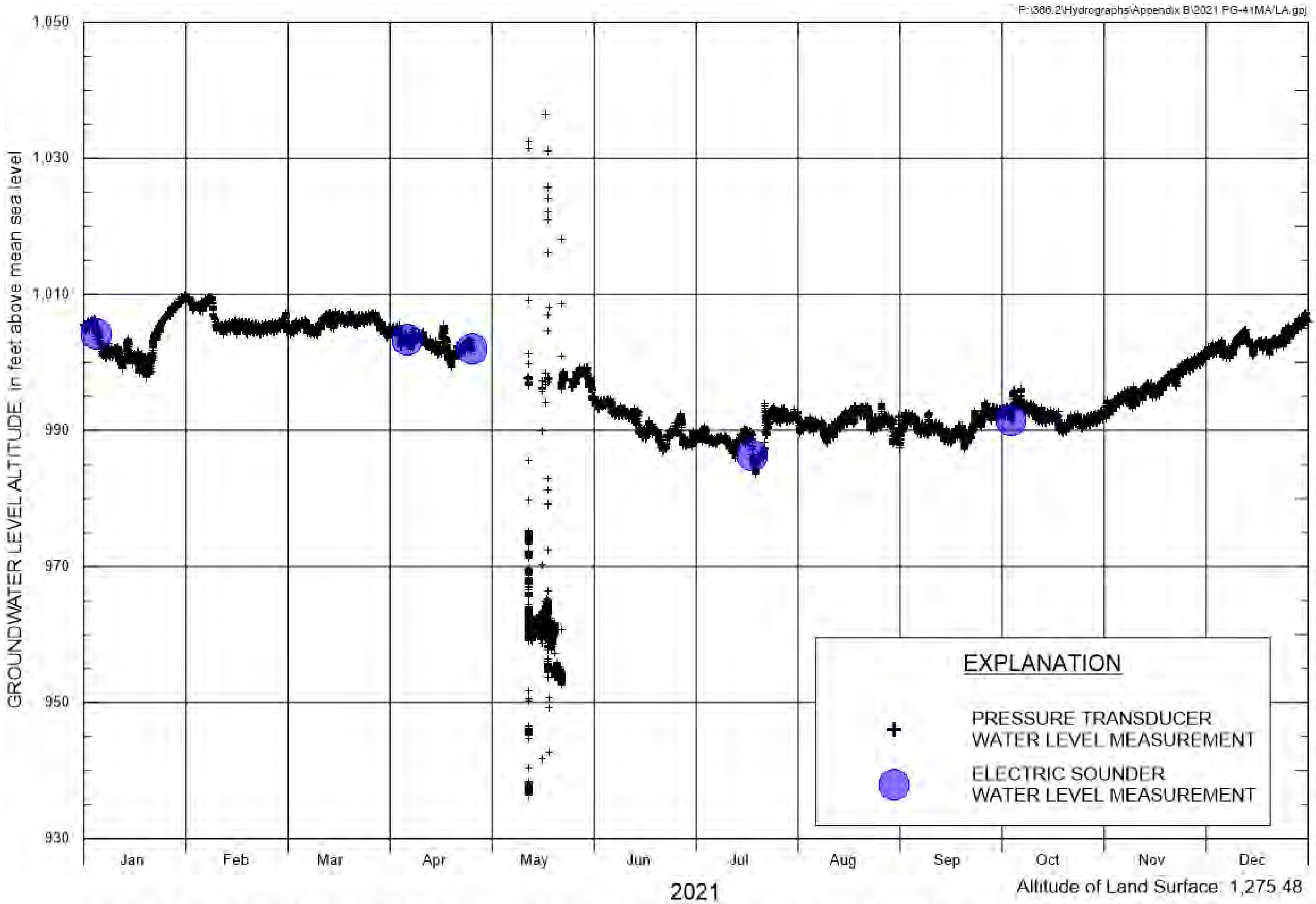


FIGURE B-7. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-41MA/LA

North Indian Bend Wash Superfund Site

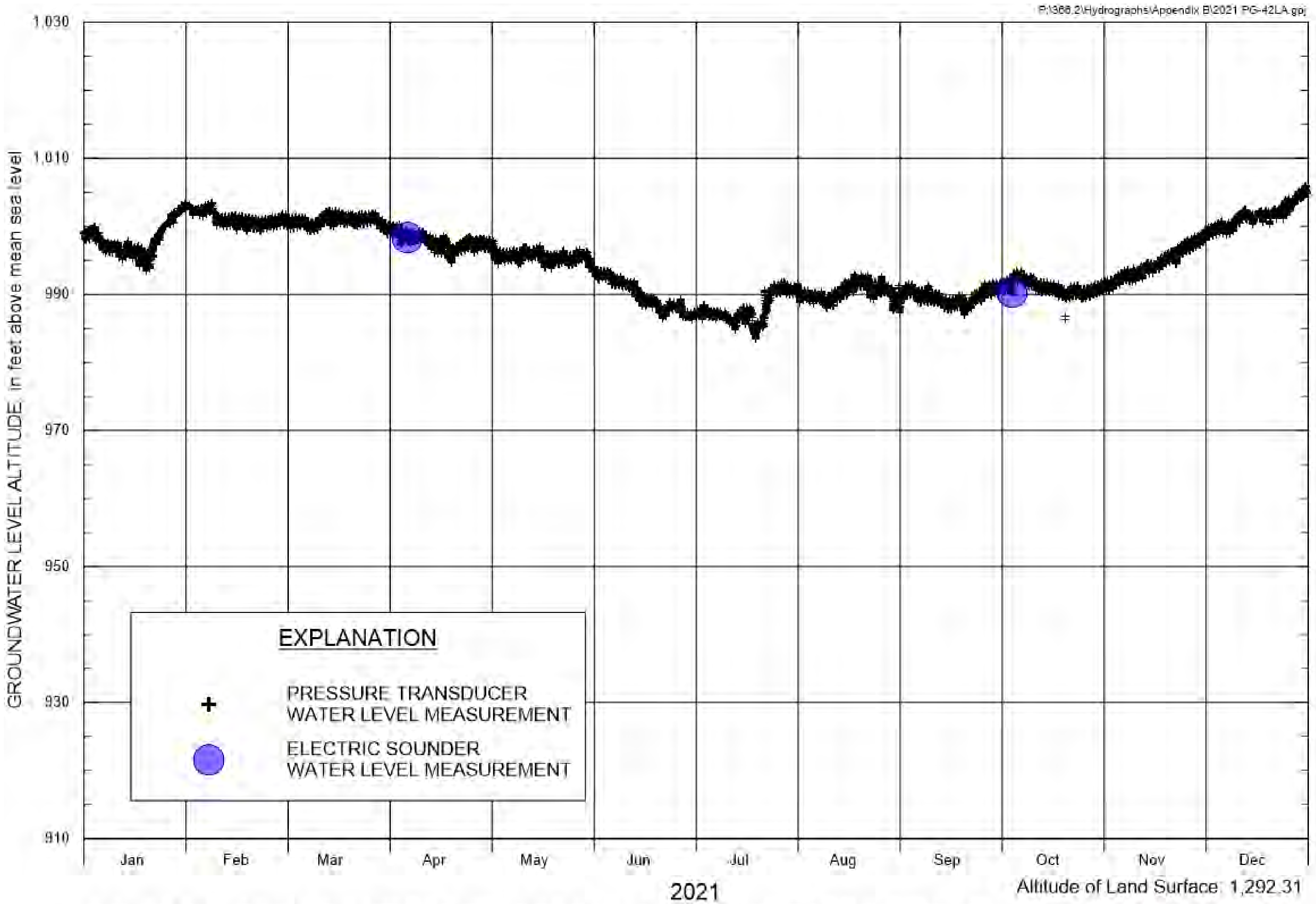


FIGURE B-8. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-42LA

North Indian Bend Wash Superfund Site

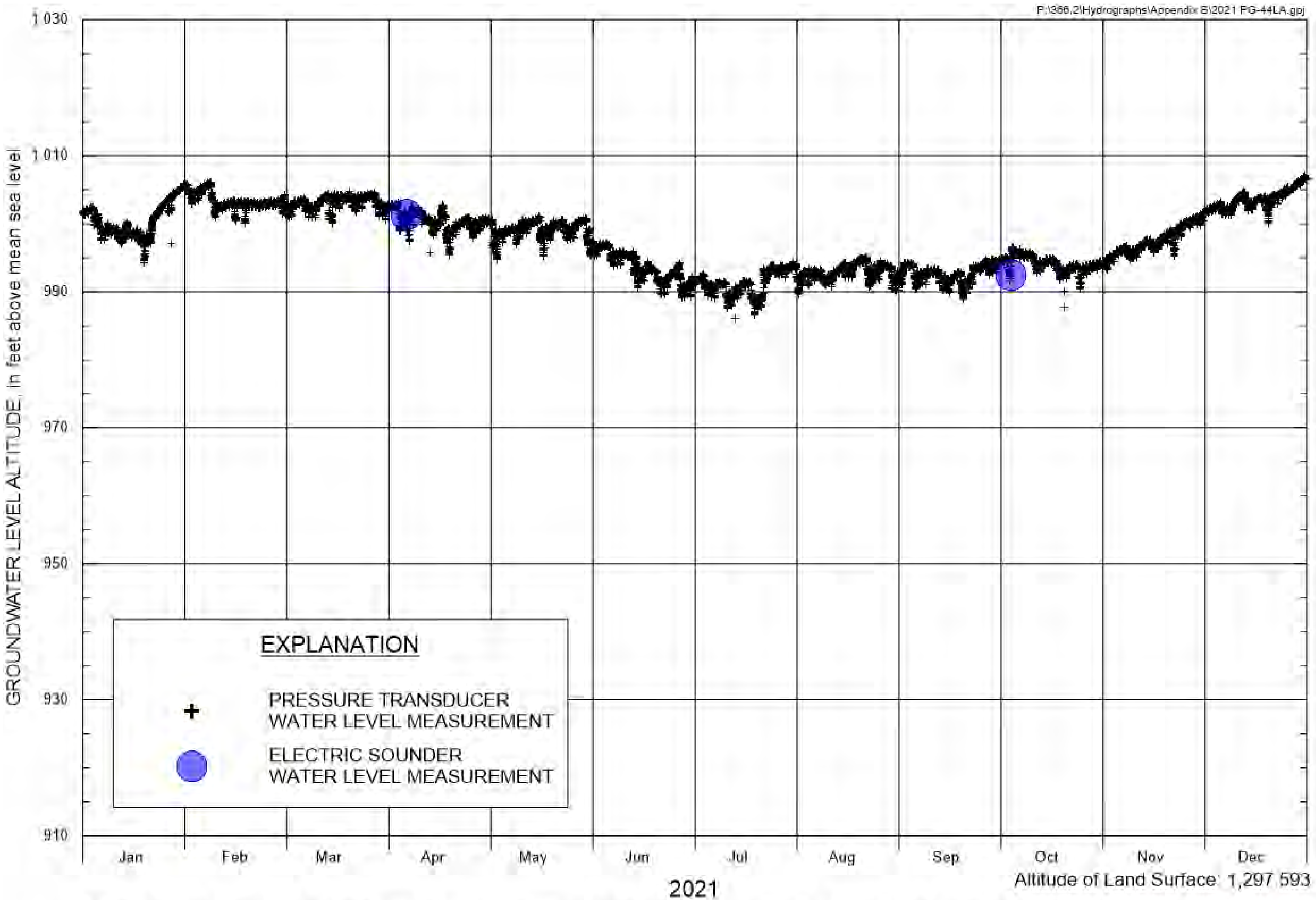
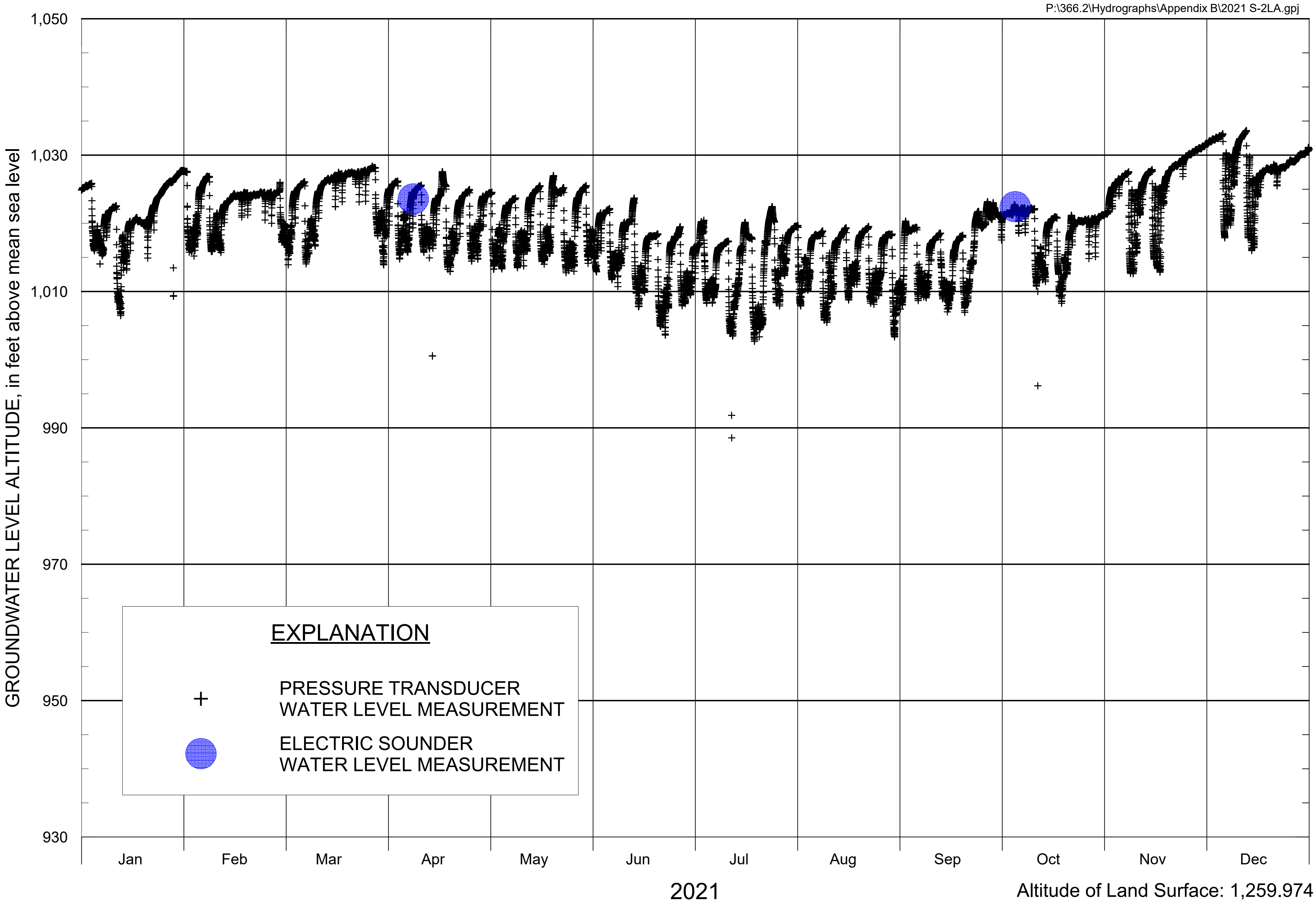


FIGURE B-9. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-44LA



Altitude of Land Surface: 1,259.974

FIGURE B-10. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-2LA

North Indian Bend Wash Superfund Site

APPENDIX C
LABORATORY RESULTS FOR VOLATILE ORGANIC COMPOUNDS, 2021

Table C-1. 2021 Laboratory Results For VOCs In Groundwater Monitoring Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
MON	B-J	B-J	10/19/2021	Original	TA	<0.50	<0.50	0.92	<0.50	1.2	550-172707
MON	D-2MA	D-2MA	1/26/2021	Original	TA	<0.50	<0.50	0.76	<0.50	40	550-157159
MON	D-2MA	D-2MA	4/12/2021	Original	TA	<0.50	<0.50	0.58	<0.50	36	550-161740
MON	D-2MA	E	4/12/2021	Duplicate	TA	<0.50	<0.50	0.58	<0.50	39	550-161740
MON	D-2MA	D-2MA	7/12/2021	Original	TA	<0.50	<0.50	0.67	<0.50	25	550-166883
MON	D-2MA	D-2MA	10/12/2021	Original	TA	<0.50	<0.50	1.5	<0.50	34	550-172250
MON	E-1MA	E-1MA	1/28/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	5.2	550-157320
MON	E-1MA	E-1MA	4/15/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.8	550-162012
MON	E-1MA	E-1MA	7/15/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.7	550-167175
MON	E-1MA	E-1MA	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.8	550-172459
MON	E-5MA	E-5MA	1/28/2021	Original	TA	<0.50	<0.50	3.7	1.6	76	550-157320
MON	E-5MA	E-5MA	4/13/2021	Original	TA	<0.50	<0.50	2.5	0.95	51	550-161844
MON	E-5MA	E-5MA	7/13/2021	Original	TA	<0.50	<0.50	3.0	1.1	62	550-166961
MON	E-5MA	E-5MA	10/13/2021	Original	TA	<0.50	<0.50	2.5	0.77	47	550-172352
MON	E-5UA	E-5UAHS	10/14/2021	Original	TA	<0.50	<0.50	0.57	<0.50	5.0	550-172459
MON	E-7LA	E-7LA	10/13/2021	Original	TA	<0.50	<0.50	1.1	2.0	14	550-172352
MON	E-7UA	E-7UAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.1	550-172352
MON	E-8MA	E-8MA	10/13/2021	Original	TA	<0.50	<0.50	1.1	<0.50	23	550-172352
MON	E-10MA	E-10MAHS	1/27/2021	Original	TA	<0.50	<0.50	0.82	3.7	5.4	550-157235
MON	E-10MA	E-10MAHS	4/15/2021	Original	TA	<0.50	<0.50	0.84	3.6	5.1	550-162012
MON	E-10MA	E-10MAHS	7/14/2021	Original	TA	<0.50	<0.50	0.80	3.0	4.9	550-167038
MON	E-10MA	E-10MAHS	10/14/2021	Original	TA	<0.50	<0.50	0.67	2.5	5.3	550-172459
MON	E-12UA	E-12UAHS	10/21/2021	Original	TA	<0.50	<0.50	0.59	<0.50	1.5	550-172897
MON	E-13UA	E-13UAHS	11/24/2021	Original	TA	<0.50	<0.50	0.92	<0.50	1.6	550-174831
MON	M-2MA	M-2MAHS	10/7/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	3.8	550-171985
MON	M-2MA	O	10/7/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	4.3	550-171985
MON	M-2UA	M-2UAHS	11/24/2021	Original	TA	<0.50	<0.50	1.2	<0.50	0.80	550-174831
MON	M-4MA	M-4MAHS	1/27/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	12	550-157235
MON	M-4MA	M-4MAHS	4/15/2021	Original	TA	<0.50	<0.50	0.74	1.2	27	550-162012
MON	M-4MA	M-4MAHS	7/14/2021	Original	TA	<0.50	0.83	<0.50	1.8	33	550-167038
MON	M-4MA	M-4MAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	0.53	12	550-172459
MON	M-5LA	M-5LA	10/19/2021	Original	TA	<0.50	<0.50	1.6	<0.50	1.6	550-172707
MON	M-5MA	M-5MA	1/28/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	6.8	550-157320
MON	M-5MA	M-5MA	4/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.3	550-161946
MON	M-5MA	M-5MA	7/15/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.4	550-167175
MON	M-5MA	M-5MA	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.7	550-172459
MON	M-6MA	M-6MA	1/28/2021	Original	TA	<0.50	<0.50	1.9	1.0	33	550-157320
MON	M-6MA	M-6MA	4/14/2021	Original	TA	<0.50	<0.50	1.3	0.78	24	550-161946
MON	M-6MA	M-6MA	7/15/2021	Original	TA	<0.50	<0.50	1.6	1.0	34	550-167175
MON	M-6MA	M-6MA	10/14/2021	Original	TA	<0.50	<0.50	1.3	0.56	22	550-172459
MON	M-7MA	M-7MA	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
MON	M-9MA	M-9MA	12/16/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.4	550-175943
MON	M-9MA	AE	12/16/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.6	550-175943
MON	M-10LA2	M-10LA2HS	10/7/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	3.2	550-171985
MON	M-10MA2	M-10MA2	1/28/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	22	550-157320
MON	M-10MA2	M-10MA2	4/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	15	550-161946

Table C-1. 2021 Laboratory Results For VOCs In Groundwater Monitoring Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
MON	M-10MA2	M-10MA2	7/15/2021	Original	TA	<0.50	<0.50	0.55	<0.50	21	550-167175
MON	M-10MA2	M-10MA2	10/18/2021	Original	TA	<0.50	0.51	0.78	0.61	27	550-172596
MON	M-11MA	M-11MA	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
MON	M-12MA2	M-12MA2	10/18/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	13	550-172596
MON	M-14LA	M-14LAHS	10/21/2021	Original	TA	<0.50	<0.50	<0.50	1.1	6.4	550-172897
MON	M-15MA	M-15MA	1/28/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	3.4	550-157320
MON	M-15MA	M-15MA	4/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.6	550-161946
MON	M-15MA	M-15MA	7/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.7	550-167038
MON	M-15MA	M-15MA	10/20/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.8	550-172796
MON	M-16LA	M-16LAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	0.86	8.4	550-172459
MON	M-16MA	M-16MA	10/18/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	5.2	550-172596
MON	M-17MA/LA	M-17MA/LAHS	1/27/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157235
MON	M-17MA/LA	M-17MA/LAHS	4/16/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-162100
MON	M-17MA/LA	I	4/16/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-162100
MON	M-17MA/LA	M-17MA/LAHS	7/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167038
MON	M-17MA/LA	M-17MA/LAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	PA-2LA	PA-2LA	10/25/2021	Original	TA	<0.50	<0.50	1.0	<0.50	<0.50	550-173016
MON	PA-2LA	AC	10/25/2021	Duplicate	TA	<0.50	<0.50	0.99	<0.50	<0.50	550-173016
MON	PA-5LA	PA-5LA	1/26/2021	Original	TA	<0.50	<0.50	2.8	2.9	52	550-157157
MON	PA-5LA	PA-5LA	4/13/2021	Original	TA	<0.50	<0.50	2.4	2.0	40	550-161846
MON	PA-5LA	PA-5LA	7/13/2021	Original	TA	<0.50	<0.50	2.6	1.9	43	550-166964
MON	PA-5LA	PA-5LA	10/12/2021	Original	TA	<0.50	<0.50	2.8	2.0	44	550-172252
MON	PA-6LA	PA-6LA	1/26/2021	Original	TA	<0.50	2.7	2.8	16	120	550-157157
MON	PA-6LA	A	1/26/2021	Duplicate	TA	<0.50	2.4	2.8	14	100	550-157157
MON	PA-6LA	PA-6LA	4/13/2021	Original	TA	<0.50	1.9	2.2	12	93	550-161846
MON	PA-6LA	PA-6LAHS	8/31/2021	Original	TA	<0.50	1.5	1.3	6.0	68	550-169817
MON	PA-6LA	N	8/31/2021	Duplicate	TA	<0.50	1.6	1.2	5.8	65	550-169817
MON	PA-6LA	PA-6LAHS	10/13/2021	Original	TA	<0.50	1.4	<0.50	4.0	44	550-172351
MON	PA-8LA2	PA-8LA2	10/18/2021	Original	TA	<0.50	<0.50	0.99	0.98	6.4	550-172596
MON	PA-8LA2	W	10/18/2021	Duplicate	TA	<0.50	<0.50	1.0	0.93	6.1	550-172596
MON	PA-9LA	PA-9LAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	PA-10MA	PA-10MAHS	1/27/2021	Original	TA	<0.50	<0.50	<0.50	1.1	65	550-157235
MON	PA-10MA	PA-10MAHS	4/15/2021	Original	TA	<0.50	<0.50	<0.50	1.3	64	550-162012
MON	PA-10MA	PA-10MAHS	7/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	9.3	550-167038
MON	PA-10MA	L	7/14/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	9.4	550-167038
MON	PA-10MA	PA-10MAHS	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	14	550-172897
MON	PA-10MA	Z	10/21/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	13	550-172897
MON	PA-11LA	PA-11LA	10/19/2021	Original	TA	<0.50	<0.50	1.4	<0.50	<0.50	550-172707
MON	PA-12MA	PA-12MA	1/28/2021	Original	TA	<0.50	<0.50	0.79	5.0	260	550-157320
MON	PA-12MA$^{(A)}$	PA-12MA	4/15/2021	Original	TA	<0.50	<0.50	0.71	3.8	170 $^{(B)}_{REJ}$	550-162012
				Lab dup		<0.50 $^{(C)}_{REJ}$	<0.50 $^{(C)}_{REJ}$	0.56 $^{(C)}_{REJ}$	2.6 $^{(C)}_{REJ}$	150 $^{(C)}_{REJ}$	
				Lab dup		<5.0 $^{(1),(2)}$	<5.0 $^{(1)}$	<5.0 $^{(1)}$	<5.0 $^{(1)}$	240 $^{(D),(1)}$	
MON	PA-12MA	PA-12MA	7/13/2021	Original	TA	<0.50	<0.50	0.69	3.8	300	550-166961
MON	PA-12MA	PA-12MA	10/13/2021	Original	TA	<0.50	<0.50	0.68	2.8	240	550-172352
MON	PA-13LA	PA-13LA	1/29/2021	Original	TA	<0.50	<0.50	2.0	0.76 $^{(E)}$	85	550-157437
MON	PA-13LA	D	1/29/2021	Duplicate	TA	<0.50	<0.50	2.0	1.3 $^{(E)}$	94	550-157437

Table C-1. 2021 Laboratory Results For VOCs In Groundwater Monitoring Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	6	6	5	5	
MON	PA-13LA	PA-13LA	4/15/2021	Original	TA	<0.50	<0.50	1.6	0.88	66	550-162014
MON	PA-13LA	H	4/15/2021	Duplicate	TA	<0.50	<0.50	1.6	0.91	70	550-162014
MON	PA-13LA	PA-13LA	7/15/2021	Original	TA	<0.50	<0.50	1.7	0.92	76	550-167177
MON	PA-13LA	M	7/15/2021	Duplicate	TA	<0.50	<0.50	1.8	0.90	75	550-167177
MON	PA-13LA	PA-13LA	10/22/2021	Original	TA	<0.50	<0.50	1.4	0.69	61	550-172952
MON	PA-13LA	AB	10/22/2021	Duplicate	TA	<0.50	<0.50	1.5	0.60	59	550-172952
MON	PA-15LA	PA-15LAHS	10/21/2021	Original	TA	<0.50	<0.50	0.60	0.50	<0.50	550-172897
MON	PA-16MA	PA-16MAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.0	550-172352
MON	PA-18LA (F)	PA-18LAHS	5/7/2021	Original	TA	<0.50	<0.50	0.83	<0.50	0.99	550-163404
MON	PA-18LA (F)	J	5/7/2021	Duplicate	TA	<0.50	<0.50	0.68	<0.50	0.87	550-163404
MON	PA-18LA	PA-18LAHS	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
MON	PA-19LA	PA-19LA	10/19/2021	Original	TA	<0.50	<0.50	1.1	1.1	25	550-172707
MON	PA-20MA	PA-20MA	10/19/2021	Original	TA	<0.50	0.51	1.1	3.0	48	550-172707
MON	PA-21MA	PA-21MAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172459
MON	PG-1LA	PG-1LA	1/27/2021	Original	TA	<0.50	<0.50	1.2	<0.50	0.58	550-157236
MON	PG-1LA	PG-1LA	4/13/2021	Original	TA	<0.50	<0.50	1.0	<0.50	0.64	550-161846
MON	PG-1LA	PG-1LA	7/13/2021	Original	TA	<0.50	<0.50	1.2	<0.50	0.69	550-166964
MON	PG-1LA	K	7/13/2021	Duplicate	TA	<0.50	<0.50	1.3	<0.50	0.78	550-166964
MON	PG-1LA	PG-1LA	10/18/2021	Original	TA	<0.50	<0.50	1.5	<0.50	0.80	550-172597
MON	PG-2LA	PG-2LA	4/13/2021	Original	TA	<0.50	<0.50	1.1	1.2	73	550-161846
MON	PG-2LA	F	4/13/2021	Duplicate	TA	<0.50	<0.50	1.1	1.3	75	550-161846
MON	PG-2LA	PG-2LA	10/11/2021	Original	TA	<0.50	<0.50	1.1	0.91	80	550-172134
MON	PG-2LA	P	10/11/2021	Duplicate	TA	<0.50	<0.50	1.1	1.1	92	550-172134
MON	PG-4MA	PG-4MA	10/15/2021	Original	TA	<0.50	<0.50	0.76	<0.50	2.2	550-172520
MON	PG-4UA	PG-4UAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	0.76	<0.50	550-172352
MON	PG-5MA	PG-5MAHS	11/24/2021	Original	TA	<0.50	<0.50	0.66 (G)	<0.50	9.1 (G)	550-174831
MON				*Lab dup*		<0.50	<0.50	0.58 (G)	<0.50	9.0 (G)	
MON				*Lab dup*		<0.50	<0.50	<0.50 (G)	<0.50	7.8 (G)	
MON	PG-5MA	AD	11/24/2021	Duplicate	TA	<0.50	<0.50	<0.50 (G)	<0.50	6.1 (G)	550-174831
MON				*Lab dup*		<0.50	<0.50	<0.50 (G)	<0.50	4.9 (G)	
MON				*Lab dup*		<0.50	<0.50	<0.50 (G)	<0.50	3.9 (G)	
MON	PG-5UA	PG-5UAHS	11/24/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.8	550-174831
MON	PG-6MA	PG-6MA	10/13/2021	Original	TA	<0.50	0.99	2.5	3.2	100	550-172352
MON	PG-6MA	R	10/13/2021	Duplicate	TA	<0.50	0.91	2.7	3.2	95	550-172352
MON	PG-6UA	PG-6UA	10/15/2021	Original	TA	<0.50	<0.50	0.80	<0.50	0.66	550-172520
MON	PG-6UA	V	10/15/2021	Duplicate	TA	<0.50	<0.50	0.83	<0.50	0.66	550-172520
MON	PG-7MA	PG-7MA	10/15/2021	Original	TA	<0.50	<0.50	1.1	<0.50	1.7	550-172520
MON	PG-8UA	PG-8UA	10/19/2021	Original	TA	<0.50	<0.50	0.84	<0.50	<0.50	550-172707
MON	PG-10UA	PG-10UA	10/21/2021	Original	TA	<0.50	<0.50	1.3	<0.50	1.2	550-172897
MON	PG-10UA	AA	10/21/2021	Duplicate	TA	<0.50	<0.50	1.5	<0.50	1.4	550-172897
MON	PG-11UA	PG-11UAHS	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
MON	PG-16UA	PG-16UA	10/19/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.2	550-172707
MON	PG-18UA	PG-18UA	10/15/2021	Original	TA	<0.50	<0.50	1.2	<0.50	0.87	550-172520
MON	PG-19UA	PG-19UA	10/21/2021	Original	TA	<0.50	<0.50	0.78	<0.50	1.8	550-172897
MON	PG-22UA	PG-22UAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.4	550-172459

Table C-1. 2021 Laboratory Results For VOCs In Groundwater Monitoring Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	6	6	5	5	
MON	PG-23MA/LA	PG-23MA/LA	10/14/2021	Original	TA	<0.50	<0.50	1.2	1.1	13	550-172459
MON	PG-23MA/LA	T	10/14/2021	Duplicate	TA	<0.50	<0.50	1.3	1.2	14	550-172459
MON	PG-23UA	PG-23UAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	PG-24UA	PG-24UAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	PG-25UA	PG-25UAHS	10/20/2021	Original	TA	<0.50	<0.50	0.71	<0.50	1.2	550-172796
MON	PG-28UA	PG-28UA	10/12/2021	Original	TA	<0.50	<0.50	1.7	<0.50	0.82	550-172250
MON	PG-29UA	PG-29UA	10/19/2021	Original	TA	<0.50	<0.50	0.53	<0.50	0.58	550-172707
MON	PG-31UA	PG-31UAHS	10/7/2021	Original	TA	<0.50	<0.50	2.9	<0.50	7.6	550-171985
MON	PG-38MA/LA	PG-38MA/LAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	2.3 (E)	0.70 (E)	550-172352
MON	PG-38MA/LA	S	10/13/2021	Duplicate	TA	<0.50	<0.50	0.60	3.1 (E)	0.86 (E)	550-172352
MON	PG-39LA	PG-39LA	10/14/2021	Original	TA	<0.50	<0.50	0.96	1.3	2.2	550-172459
MON	PG-40LA	PG-40LA	1/27/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	14	550-157236
MON	PG-40LA	B	1/27/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	15	550-157236
MON	PG-40LA	PG-40LA	4/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	8.1 (G)	550-161947
MON				*Lab dup*		<0.50	<0.50	<0.50	<0.50	9.2 (G)	
MON	PG-40LA	G	4/14/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	11 (G)	550-161947
MON				*Lab dup*		<0.50	<0.50	<0.50	<0.50	9.4 (G)	
MON	PG-40LA	PG-40LA	7/14/2021	Original	TA	<0.50	<0.50	0.54	<0.50	14	550-167037
MON	PG-40LA	PG-40LA	10/20/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	9.8	550-172797
MON	PG-40LA	Y	10/20/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	11	550-172797
MON	PG-42LA	PG-42LA	1/27/2021	Original	TA	<0.50	<0.50	0.97	<0.50	2.2	550-157236
MON	PG-42LA	PG-42LA	4/15/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.6	550-162014
MON	PG-42LA	PG-42LA	7/14/2021	Original	TA	<0.50	<0.50	0.50	<0.50	1.3	550-167037
MON	PG-42LA	PG-42LA	10/20/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.0	550-172797
MON	PG-43LA	PG-43LAHS	4/15/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-162014
MON	PG-43LA	PG-43LAHS	7/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167037
MON	PG-43LA	PG-43LAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172457
MON	PG-44LA	PG-44LA	1/27/2021	Original	TA	<0.50	<0.50	4.0	<0.50	<0.50	550-157236
MON	PG-44LA	PG-44LA	4/14/2021	Original	TA	<0.50	<0.50	4.4	<0.50	<0.50	550-161947
MON	PG-44LA	PG-44LA	7/14/2021	Original	TA	<0.50	<0.50	3.9	<0.50	<0.50	550-167037
MON	PG-44LA	PG-44LA	10/20/2021	Original	TA	<0.50	<0.50	3.5	<0.50	<0.50	550-172797
MON	PG-48MA	PG-48MA	1/29/2021	Original	TA	<0.50	<0.50	1.0	<0.50	25	550-157436
MON	PG-48MA	PG-48MA	4/14/2021	Original	TA	<0.50	<0.50	1.0	0.61	22	550-161946
MON	PG-48MA	PG-48MA	7/15/2021	Original	TA	<0.50	<0.50	0.87	0.52	19	550-167175
MON	PG-48MA	PG-48MA	10/14/2021	Original	TA	<0.50	<0.50	0.68	<0.50	14	550-172459
MON	PG-49MA	PG-49MAHS	10/20/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172796
MON	PG-50MA	PG-50MAHS	10/22/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172953
MON	PG-54MA	PG-54MA	10/14/2021	Original	TA	<0.50	<0.50	0.81	<0.50	17	550-172459
MON	PG-54MA	U	10/14/2021	Duplicate	TA	<0.50	<0.50	0.81	<0.50	18	550-172459
MON	PG-55MA (H)	PG-55MA	1/29/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.8	550-157436
MON	PG-55MA	PG-55MA	10/22/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	0.78	550-172953
MON	PG-56MA (H)	PG-56MA	1/29/2021	Original	TA	<0.50	<0.50	0.59	<0.50	2.8	550-157436
MON	PG-56MA	PG-56MA	10/21/2021	Original	TA	<0.50	<0.50	0.59	<0.50	2.2	550-172897
MON	S-1LA	S-1LA	10/19/2021	Original	TA	<0.50	<0.50	1.5	49	<0.50	550-172707
MON	S-1LA	X	10/19/2021	Duplicate	TA	<0.50	<0.50	1.5	42	<0.50	550-172707

Table C-1. 2021 Laboratory Results For VOCs In Groundwater Monitoring Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	6	6	5	5	
MON	S-1MA	S-1MAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	5.1	<0.50	550-172352
MON	S-2LA	S-2LA	1/28/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	23	550-157317
MON	S-2LA	C	1/28/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	20	550-157317
MON	S-2LA	S-2LA	4/15/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	16	550-162014
MON	S-2LA	S-2LA	7/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	14	550-166964
MON	S-2LA	S-2LA	10/12/2021	Original	TA	<0.50	<0.50	0.51	<0.50	15	550-172252
MON	S-2LA	Q	10/12/2021	Duplicate	TA	<0.50	<0.50	0.52	<0.50	17	550-172252
MON	S-2MA	S-2MAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	W-1MA	W-1MA	1/26/2021	Original	TA	<0.50	<0.50	0.96	2.3	440	550-157159
MON	W-1MA	W-1MA	4/12/2021	Original	TA	<0.50	<0.50	0.86	1.6	370	550-161740
MON	W-1MA	W-1MA	7/12/2021	Original	TA	<0.50	<0.50	0.95	1.9	420	550-166883
MON	W-1MA	W-1MA	10/12/2021	Original	TA	<0.50	<0.50	1.2	2.1	400	550-172250
MON	W-2MA	W-2MA	1/26/2021	Original	TA	<0.50	<0.50	<0.50	3.3	1400	550-157159
MON	W-2MA[A]	W-2MA	4/15/2021	Original	TA	<0.50	<0.50	0.58	3.5	690 [B] REJ	550-162012
				Lab dup		<0.50 [C] REJ	<0.50 [C] REJ	<0.50 [C] REJ	2.6 [C] REJ	400 [C] REJ	
				Lab dup		<5.0 [1],[2]	<5.0 [1]	<5.0 [1]	<5.0 [1]	970 [D],[1]	
MON	W-2MA	W-2MA	7/12/2021	Original	TA	<0.50	0.52	1.2	10	2700	550-166883
MON	W-2MA	W-2MA	10/12/2021	Original	TA	<0.50	0.59	1.2	11	2700	550-172250
--	QC	FRB (Trip)	1/26/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157159
--	QC	FRB (Trip)	1/27/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157236
--	QC	FRB (Trip)	1/28/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157320
--	QC	FRB (Trip)	1/29/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157436
--	QC	FRB (Trip)	4/12/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161740
--	QC	FRB (Trip)	4/13/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161846
--	QC	FRB (Trip)	4/14/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161946
--	QC	FRB (Trip)	4/15/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-162012
--	QC	FRB (Trip)	4/16/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-162100
--	QC	Trip Blank	5/7/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163404
--	QC	FRB (Trip)	7/12/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166883
--	QC	FRB (Trip)	7/13/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166964
--	QC	FRB (Trip)	7/14/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167038
--	QC	FRB (Trip)	7/15/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167175
--	QC	FRB (Trip)	8/31/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169817
--	QC	FRB(Trip)	10/7/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171985
--	QC	FRB (Trip)	10/11/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172134
--	QC	FRB (Trip)	10/12/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172250
--	QC	FRB (Trip)	10/13/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
--	QC	FRB (Trip)	10/14/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172459
--	QC	FRB (Trip)	10/15/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172520
--	QC	FRB (Trip)	10/18/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172596
--	QC	FRB (Trip)	10/19/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172707
--	QC	FRB (Trip)	10/20/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172796
--	QC	FRB (Trip)	10/21/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
--	QC	FRB (Trip)	10/22/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172952
--	QC	FRB (Trip)	10/25/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173016

Table C-1. 2021 Laboratory Results For VOCs In Groundwater Monitoring Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	*6*	*6*	*5*	*5*	
--	QC	FRB (Trip)	11/24/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174831
--	QC	FRB (TRIP)	12/16/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175943

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene
FRB = Field Reagent Blank (Trip Blank)
ID = Identifier
Lab dup = Laboratory duplicate
MON = Monitoring
QC = Quality Control
RPD = Relative Percent Difference
TA = Eurofins TestAmerica
TB = Trip Blank
VOC = Volatile Organic Compound

NOTES:

<0.50	Analytical result is less than laboratory detection limit (Non-Detect)
5	Cleanup Standards for Treated Water (µg/L)
5.1	Results in **bold** exceed Cleanup Standard for Treated Water

REJ - Lab analysis rejected (see additional notes)

(A) Lab analyses were inconsistent and problematic for this sample. Report contains a note in the case narrative reading: *When samples were reran on GCMS 17 (AB 550-240515), results were in line with the original results from GCMS 17 (AB 550-239968 and AB 550-239889). All of which were lower than expected compared to historical data. The samples were also run on GCMS 26 (AB 550-241982) and the results were higher than those from GCMS 17, and more in line with the expected results. It is believed that the difference in results is due to a difference in sensitivity between instruments. When comparing PT results between the instruments, GCMS 26 reported higher levels than GCMS 17, but both instruments were reporting within the designated acceptance range. At this time, no other technical justification can be found for the difference in results. W-2MA (550-162012-4) and PA-12MA (550-162012-6).*

(B) Original lab reported TCE value (diluted) was rejected due to historical inconsistency, inconsistency with split samples sent to the backup laboratory, and inability to reproduce results on the same equipment for this sample. The undiluted, original results for all other constituents are accepted due to historical consistency and consistency with split samples sent to the backup laboratory.

(C) Initial re-analysis results are rejected due to inability to duplicate results on the same equipment and inconsistency with split samples sent to the backup laboratory.

(D) Results run on second machine are accepted due to historical consistency and consistency with split samples sent to the backup laboratory.

(E) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to low concentration range of analyte.

(F) Samplers were unable to collect PA-18LA sample in Q4 of 2020. Sample was collected at first opportunity on 5/7/2021.

(G) Original and field duplicate sample results had >20% RPD. Re-analyses do not confirm either result as an outlier, so all results are reported

(H) Samplers were unable to collect PG-55MA and PG-56MA samples in Q4 of 2020 due to pump failures. Samples were collected on 1/29/2021.

Laboratories use standardized data qualifiers defined by Arizona Department of Health Services and listed in ADEQ document WQR282: Water Quality Database Arizona Lab Data Qualifiers.

(1) H1 Flag: Sample analysis performed past holding time.

(2) L3 Flag: The associated blank spike recovery was above method acceptance limits.

Table C-2. 2021 Laboratory Results For VOCs In Groundwater Extraction Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
AREA 7 GWETS											
Extraction	7EX-3aMA	7EX-3aMA	1/7/2021	Original	TA	<0.50	<0.50	0.71	3.8	430	550-155904
Extraction	7EX-3aMA	7EX-3aMA	4/5/2021	Original	TA	<0.50	<0.50	0.90	4.0	560	550-161215
Extraction	7EX-3aMA	7EX-3aMA	7/16/2021	Original	TA	<0.50 (A)	<0.50 (A)	1.2 (A)	2.5 (A)	260 (A)	550-167259
Extraction	7EX-6MA	7EX-6MA	1/7/2021	Original	TA	<0.50	<0.50	0.60	3.0	470	550-155904
Extraction	7EX-6MA	7EX-6MA	4/5/2021	Original	TA	<0.50	<0.50	0.81	3.0	520	550-161215
Extraction	7EX-6MA	7EX-6MA	7/16/2021	Original	TA	<0.50 (A)	<0.50 (A)	0.72 (A)	2.0 (A)	290 (A)	550-167259
CGTF											
Extraction	COS-31	COS-31	2/1/2021	Original	TA	<0.50	<0.50	0.66	2.2	12	550-157499
Extraction	COS-31	COS-31	3/1/2021	Original	TA	<0.50	<0.50	0.77[B]	2.2	13	550-159290
Extraction	COS-31	EXT-1A-03012021	3/1/2021	Duplicate	TA	<0.50	<0.50	0.56[B]	2.1	13	550-159290
Extraction	COS-31	COS-31	9/24/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.2	550-171183
Extraction	COS-31	EXT-1A-09242021	9/24/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	4.1	550-171183
Extraction	COS-72	COS-72	1/4/2021	Original	TA	<0.50	<0.50	0.68	1.0	8.0	550-155627
Extraction	COS-72	COS-72	2/1/2021	Original	TA	<0.50	<0.50	0.92	1.6	9.6	550-157499
Extraction	COS-72	COS-72	3/1/2021	Original	TA	<0.50	<0.50	0.79	1.2	8.3	550-159290
Extraction	COS-72	COS-72	9/23/2021	Original	TA	<0.50	<0.50	0.54	<0.50	5.9	550-171104
Extraction	COS-72	EXT-1A-09232021	9/23/2021	Duplicate	TA	<0.50	<0.50	0.62	<0.50	7.0	550-171104
Extraction	COS-75A	COS-75 A	1/4/2021	Original	TA	<0.50	<0.50	1.7	5.2	32	550-155627
Extraction	COS-75A	EXT-1A-01042021	1/4/2021	Duplicate	TA	<0.50	0.54	1.7	5.1	32	550-155627
Extraction	COS-75A	COS-75A	2/1/2021	Original	TA	<0.50	<0.50	2.1	6.6	39	550-157499
Extraction	COS-75A	EXT-1A-02012021	2/1/2021	Duplicate	TA	<0.50	<0.50	1.9	6.3	39	550-157499
Extraction	COS-75A	COS-75 A	3/17/2021	Original	TA	<0.50 (1)	<0.50	1.6 (1)	4.9	28	550-160264
				Lab dup		---	---	1.5	---	---	
Extraction	COS-75A	COS-75A	4/5/2021	Original	TA	<0.50	0.57	1.9	5.8	37	550-161216
Extraction	COS-75A	EXT-1A-04052021	4/5/2021	Duplicate	TA	<0.50	0.59	2.0	5.9	37	550-161216
Extraction	COS-75A	COS-75A	5/3/2021	Original	TA	<0.50	<0.50	1.6	4.8	29	550-163021
Extraction	COS-75A	EXT-1A-05032021	5/3/2021	Duplicate	TA	<0.50	<0.50	1.4	4.5	27	550-163021
Extraction	COS-75A	COS-75A	6/1/2021	Original	TA	<0.50	0.57	1.6	4.1[B]	27	550-164646
Extraction	COS-75A	EXT-1A-06012021	6/1/2021	Duplicate	TA	<0.50	0.69	1.9	5.1[B]	33	550-164646
Extraction	COS-75A	COS-75A	7/1/2021	Original	TA	<0.50	<0.50[B]	1.9	5.8	40	550-166328
Extraction	COS-75A	EXT-1A-07012021	7/1/2021	Duplicate	TA	<0.50	0.73[B]	2.0	5.6	39	550-166328
Extraction	COS-75A	COS-75A	8/2/2021	Original	TA	<0.50	0.56	1.9	5.6	35	550-168081
Extraction	COS-75A	EXT-1A-08022021	8/2/2021	Duplicate	TA	<0.50	0.60	2.0	5.7	37	550-168081
Extraction	COS-75A	COS-75A	9/1/2021	Original	TA	<0.50	0.57	1.7	4.7	31	550-169927
Extraction	COS-75A	EXT-1A-09012021	9/1/2021	Duplicate	TA	<0.50	0.60	1.8	4.7	30	550-169927
Extraction	COS-75A	COS-75A	10/2/2021	Original	TA	<0.50	<0.50	1.7 (B)	5.6 (B)	31 (C)	550-171583
Extraction	COS-75A	EXT-1A-10022021	10/2/2021	Duplicate	TA	<0.50	<0.50	1.3 (B)	3.2 (B)	25 (C)	550-171583
Extraction	COS-75A	COS-75A	11/1/2021	Original	TA	<0.50	0.55	1.7	4.2	31	550-173380
Extraction	COS-75A	EXT-1A-11012021	11/1/2021	Duplicate	TA	<0.50	0.51	1.7	4.4	31	550-173380
Extraction	COS-75A (D)	COS-75A	12/28/2021	Original	TA	<0.50	0.65	1.9	6.4	32	550-176389
Extraction	COS-75A (D)	EXT-1A-12282021	12/28/2021	Duplicate	TA	<0.50	0.63	1.9	6.2	31	550-176389

Table C-2. 2021 Laboratory Results For VOCs In Groundwater Extraction Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
AREA 12 GWETS											
Extraction	MEX-1MA	MEX-1-1A-1042021	1/4/2021	Original	TA	<0.50	1.1	1.5	2.3	42	550-155626
Extraction	MEX-1MA	MEX-1-1A-02012021	2/1/2021	Original	TA	<0.50	1.1	1.9	3.2	52	550-157500
Extraction	MEX-1MA	MEX-1-1A-03012021	3/1/2021	Original	TA	<0.50	1.1	1.7	2.9	46	550-159287
Extraction	MEX-1MA	MEX-1-1A-04052021	4/5/2021	Original	TA	<0.50	1.2	1.8	2.8	47	550-161214
Extraction	MEX-1MA	MEX-1-1A-05032021	5/3/2021	Original	TA	<0.50	0.80	1.5	2.2	40	550-163016
Extraction	MEX-1MA	MEX-1-1A-06012021	6/1/2021	Original	TA	<0.50	1.3	1.7	2.5	47	550-164637
Extraction	MEX-1MA	MEX-1-1A-07012021	7/1/2021	Original	TA	<0.50	1.4	1.9	2.8	55	550-166324
Extraction	MEX-1MA	MEX-1-1A-08022021	8/2/2021	Original	TA	<0.50	1.6	1.9	4.0	58	550-168080
Extraction	MEX-1MA	MEX-1-1A-09012021	9/1/2021	Original	TA	<0.50	1.8	1.7	2.5	44	550-169933
Extraction	MEX-1MA	MEX-1-1A-10022021	10/2/2021	Original	TA	<0.50	1.1	1.4	1.6	40	550-171576
Extraction	MEX-1MA	MEX-1-1A-11012021	11/1/2021	Original	TA	<0.50	1.2	1.6	2.1	45	550-173381
Extraction	MEX-1MA	MEX-1-1A-12012021	12/1/2021	Original	TA	<0.50	1.0	1.6	2.1	47	550-175024
Extraction	Granite Reef	GR-1-1A-1042021	1/4/2021	Original	TA	<0.50	1.2	4.9	2.3	110	550-155626
Extraction	Granite Reef	GR-1-1A-02012021	2/1/2021	Original	TA	<0.50	1.6	6.7	3.5	130	550-157500
Extraction	Granite Reef	GR-1-1A-03012021	3/1/2021	Original	TA	<0.50	1.5	6.2	2.9	120	550-159287
Extraction	Granite Reef	GR-1-1A-04052021	4/5/2021	Original	TA	<0.50	1.4	5.2	2.9	120	550-161214
Extraction	Granite Reef	GR-1-1A-05032021	5/3/2021	Original	TA	<0.50	1.0	4.2	2.4	98	550-163016
Extraction	Granite Reef	GR-1-1A-06012021	6/1/2021	Original	TA	<0.50	1.7	5.0	2.6	140	550-164637
Extraction	Granite Reef	GR-1-1A-07012021	7/1/2021	Original	TA	<0.50	1.8	5.5	3.0	130	550-166324
Extraction	Granite Reef	GR-1-1A-08022021	8/2/2021	Original	TA	<0.50	1.6	5.3	3.1	140	550-168080
Extraction	Granite Reef	GR-1-1A-09012021	9/1/2021	Original	TA	<0.50	1.7	4.7	2.4	110	550-169933
Extraction	Granite Reef	GR-1-1A-10022021	10/2/2021	Original	TA	<0.50	1.3	3.8	1.7	97	550-171576
Extraction	Granite Reef	GR-1-1A-11012021	11/1/2021	Original	TA	<0.50	1.1	4.1	2.2	110	550-173381
Extraction	Granite Reef	GR-1-1A-12012021	12/1/2021	Original	TA	<0.50	1.1	4.3	2.3	100	550-175024
NGTF											
Extraction	PCX-1	PCX-1	1/7/2021	Original	TA	<0.50	<0.50	1.1	2.7	47	550-155903
Extraction	PCX-1	PCX-1	2/9/2021	Original	TA	<0.50	<0.50	1.6	2.6	54	550-158095
Extraction	PCX-1	PCX-1	3/1/2021	Original	TA	<0.50	<0.50	1.6	3.1	45	550-159291
Extraction	PCX-1	PCX-1	4/5/2021	Original	TA	<0.50	0.54	1.8	3.9	44	550-161219
Extraction	PCX-1	PCX-1	5/3/2021	Original	TA	<0.50	0.57	1.5	3.5	42	550-163018
Extraction	PCX-1	PCX-1	6/1/2021	Original	TA	<0.50	<0.50	1.4	2.6	53	550-164636
Extraction	PCX-1	PCX-1	7/9/2021	Original	TA	<0.50	0.73	1.8	3.6	50	550-166816
Extraction	PCX-1	PCX-1	8/7/2021	Original	TA	<0.50	0.65	2.0	4.0	50	550-168621
Extraction	PCX-1	PCX-1	9/2/2021	Original	TA	<0.50 (2) REJ	<0.50 (2) REJ	1.2 (2) REJ	<0.50 (2) REJ	<0.50 (2) REJ	550-170062
				Lab dup		<0.50	1.1	1.9	3.6	46	
				Lab dup		<0.50	0.98	1.9	3.7	47	
Extraction	PCX-1	PCX-1	10/2/2021	Original	TA	<0.50	0.58	1.5	2.4	38	550-171573
Extraction	PCX-1 (D)	PCX-1	11/2/2021	Original	TA	<0.50	0.67	2.2	4.0	59	550-173516
Extraction	PCX-1	PCX-1	12/1/2021	Original	TA	<0.50	<0.50	1.6	2.7	40	550-175015

Table C-2. 2021 Laboratory Results For VOCs In Groundwater Extraction Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
MRTF											
Extraction	PV-14	PV 14	5/3/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163020
Extraction	PV-14	PV 14	8/17/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	0.74	550-169123
Extraction	PV-14	PV 14	9/1/2021	Original	TA	<0.50	<0.50 (1),(3)	<0.50	<0.50	0.56	550-169932
Extraction	PV-14	PV 14	10/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	0.54	550-171572
Extraction	PV-14	PV 14	11/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	0.54	550-173382
Extraction	PV-14	PV 14	12/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175021
Extraction	PV-15	PV 15	1/4/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.7	550-155623
Extraction	PV-15	PV 15	2/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	5.7	550-157505
Extraction	PV-15	PV 15	3/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	5.0	550-159294
Extraction	PV-15	PV 15	4/5/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	5.0	550-161220
Extraction	PV-15	PV 15	5/3/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.3	550-163020
Extraction	PV-15	PV 15	6/1/2021	Original	TA	<0.50	<0.50	0.51	<0.50	4.9	550-164647
Extraction	PV-15	PV 15	7/1/2021	Original	TA	<0.50	<0.50	0.60	<0.50	5.5	550-166327
Extraction	PV-15	PV 15	8/2/2021	Original	TA	<0.50	<0.50	0.57	<0.50	5.4	550-168083
Extraction	PV-15	PV 15	9/1/2021	Original	TA	<0.50	<0.50 (1),(3)	<0.50	<0.50	4.8	550-169932
Extraction	PV-15	PV 15	10/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.1	550-171572
Extraction	PV-15	PV 15	11/1/2021	Original	TA	<0.50	<0.50	0.50	<0.50	4.5	550-173382
Extraction	PV-15	PV 15	12/1/2021	Original	TA	<0.50	<0.50	0.56	<0.50	4.5	550-175021
Trip/Field Blanks											
--	EX-QC (E)	FRB (TRIP)	1/4/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155624
--	EX-QC (E)	FRB (TRIP)	1/7/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155906
--	EX-QC (E)	FRB (TRIP)	2/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157501
--	EX-QC (E)	TB-2-1A-02092021	2/9/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-158094
--	EX-QC (E)	FRB (TRIP)	3/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159298
--	EX-QC (E)	FRB (Trip)	3/17/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-160264
--	EX-QC (E)	FB	3/17/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-160264
--	EX-QC (E)	FRB (TRIP)	4/5/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161225
--	EX-QC (E)	FRB (TRIP)	5/3/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163024
--	EX-QC (E)	FRB (TRIP)	6/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164648
--	EX-QC (E)	FRB (TRIP)	7/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166325
--	EX-QC (E)	FRB (Trip)	7/9/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166817
--	EX-QC (E)	FRB (TRIP)	7/16/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167265
--	EX-QC (E)	FRB (TRIP)	8/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50 (3),(4)	<0.50	550-168087
--	EX-QC (E)	TB-2-1A-08072021	8/7/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168620
--	EX-QC (E)	FRB (TRIP)	8/17/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169124
--	EX-QC (E)	FRB (TRIP)	9/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169931
--	EX-QC (E)	TB-2-1A-09022021	9/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-170060
--	EX-QC (E)	FRB(Trip)	9/23/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171104
--	EX-QC (E)	FRB (TRIP)	9/24/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171183
--	EX-QC (E)	FRB (TRIP)	10/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171579

Table C-2. 2021 Laboratory Results For VOCs In Groundwater Extraction Wells
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
--	EX-QC [(E)]	FRB (TRIP)	11/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173385
--	EX-QC [(E)]	FRB (TRIP)	12/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175019

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene
CGTF = Central Groundwater Treatment Facility
FB = Field Blank
FRB = Field Reagent Blank (Trip Blank)
GWETS = Groundwater Extraction and Treatment System

ID = Identifier
Lab dup = Laboratory duplicate
MRTF = Miller Road Treatment Facility
NGTF = NIBW Granular Activated Carbon Treatment Facility
QC = Quality Control
RPD = Relative Percent Difference
TA = Eurofins TestAmerica
TB = Trip Blank
VOC = Volatile Organic Compound

NOTES:

<0.50	Analytical result is less than laboratory detection limit (Non-Detect)
5	Cleanup Standards for Treated Water (µg/L)
5.1	Results in **bold** exceed Cleanup Standard for Treated Water

REJ - Lab analysis rejected (see additional notes)

(A) Sample was collected shortly after restart of the treatment system; results do not represent long-term operating conditions.
(B) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to low concentration range of analyte.
(C) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to RPD being just over 20% criteria.
(D) Sample was collected opportunistically when well was pumping. Trip blanks were not available.
(E) EX-QC - A single trip blank is collected for all extraction well samples, regardless of facility, when collected and shipped on the same day.

Laboratories use standardized data qualifiers defined by Arizona Department of Health Services and listed in ADEQ document WQR282: Water Quality Database Arizona Lab Data Qualifiers.

(1) R6 Flag: LFB/LFBD RPD exceeded method control limit. Recovery met acceptance criteria.
(2) N1 Flag: The following sample was originally ran in analytical batch 550-252491. At the client's request, the sample was reran in duplicate for confirmation in analytical batch 550-253122. The results from the initial run were not confirmed by the reruns, but the results from vials B and C confirm one another. It is believed that the non-detect results observed in AB 550-252191 are because of a loss of communication with the purge and trap concentrator as the sample was running, causing the trap to not finish desorbing. Because the sample was already running, the GC/MS continued collecting information, even though no more sample was being introduced to the system. As a result, there is no indication in the original chromatography that something went wrong. The assumption of the purge and trap not fully desorbing is due to the inconsistent results between the two batches, the duplicates confirming one another and the final sample that had been loaded for batch 550-252491 not running because of the loss in communication.
(3) V1 Flag: CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.
(4) L5 Flag: The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.

Table C-3. 2021 Laboratory Results For VOCs In Treatment System Samples
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
AREA 7 GWETS										
SP-102 (influent)	SP-102	1/7/2021	Original	TA	<0.50	<0.50	0.73	3.4	490	550-155905
SP-102 (influent)	TS-2A-01072021	1/7/2021	Duplicate	TA	<0.50	<0.50	0.71	3.3	470	550-155905
SP-102 (influent)	SP-102	2/4/2021	Original	TA	<0.50	<0.50	1.0	4.6	510	550-157822
SP-102 (influent)	TS-2A-02042021	2/4/2021	Duplicate	TA	<0.50	<0.50	0.99	4.4	540	550-157822
SP-102 (influent)	SP-102	3/1/2021	Original	TA	<0.50	<0.50	0.82	3.4	460	550-159288
SP-102 (influent)	TS-2A-03012021	3/1/2021	Duplicate	TA	<0.50	<0.50	0.81	2.9	450	550-159288
SP-102 (influent)	SP-102	4/5/2021	Original	TA	<0.50	<0.50	0.87	3.4	560	550-161218
SP-102 (influent)	TS-2A-04052021	4/5/2021	Duplicate	TA	<0.50	<0.50	0.88	3.4	550	550-161218
SP-102 (influent)	SP-102	5/3/2021	Original	TA	<0.50	<0.50	0.68	2.7	370	550-163013
SP-102 (influent)	TS-2-1A-05032021	5/3/2021	Duplicate	TA	<0.50	<0.50	0.71	2.8	380	550-163013
SP-102 (influent)	SP-102	6/1/2021	Original	TA	<0.50 (A)	<0.50 (A)	0.84 (A)	1.6 (A)	230 (A)	550-164643
SP-102 (influent)	TS-2-1A-06012021	6/1/2021	Duplicate	TA	<0.50 (A)	<0.50 (A)	0.85 (A)	1.7 (A)	240 (A)	550-164643
SP-102 (influent)	SP-102	7/16/2021	Original	TA	<0.50 (A)	<0.50 (A)	0.96 (A)	2.2 (A)	280 (A)	550-167260
SP-102 (influent)	TS-2A-07162021	7/16/2021	Duplicate	TA	<0.50 (A)	<0.50 (A)	0.79 (A)	1.9 (A)	260 (A)	550-167260
SP-103 (UV/Ox effluent)	SP-103	1/7/2021	Original	TA	<0.50	<0.50	0.72	1.9	120	550-155905
SP-103 (UV/Ox effluent)	SP-103	2/4/2021	Original	TA	<0.50	<0.50	0.96	2.5	210	550-157822
SP-103 (UV/Ox effluent)	SP-103	3/1/2021	Original	TA	<0.50	<0.50	0.90	2.5	250	550-159288
SP-103 (UV/Ox effluent)	SP-103	4/5/2021	Original	TA	<0.50	<0.50	0.81	1.2	95	550-161218
SP-103 (UV/Ox effluent)	SP-103	5/3/2021	Original	TA	<0.50	<0.50	0.65	1.4	120	550-163013
SP-103 (UV/Ox effluent)	SP-103	6/1/2021	Original	TA	<0.50	<0.50	0.86	0.98	99	550-164643
SP-103 (UV/Ox effluent)	SP-103	7/16/2021	Original	TA	<0.50	<0.50	0.86	<0.50	22	550-167260
SP-105 (Air Stripper Effluent)	SP-105	1/7/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155909
SP-105 (Air Stripper Effluent)	SP-105	2/4/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157824
SP-105 (Air Stripper Effluent)	SP-105	3/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.3	550-159289
SP-105 (Air Stripper Effluent)	SP-105	4/5/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161217
SP-105 (Air Stripper Effluent)	SP-105	5/3/2021	Original	TA	<0.50	<0.50 (1)	<0.50	<0.50	<0.50	550-163014
SP-105 (Air Stripper Effluent)	SP-105	6/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164644
SP-105 (Air Stripper Effluent)	SP-105	7/16/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167263
AREA 12 GWETS										
WSP-1 (Influent)	WSP-1-1A-01042021	1/4/2021	Original	TA	<0.50	0.84	3.1	2.5	75	550-155625
WSP-1 (Influent)	TS-1-1A-01042021	1/4/2021	Duplicate	TA	<0.50	0.93	3.1	2.5	77	550-155625
WSP-1 (Influent)	WSP-1-1A-02012021	2/1/2021	Original	TA	<0.50	1.5	4.2	3.1	95	550-157497
WSP-1 (Influent)	TS-1-1A-02012021	2/1/2021	Duplicate	TA	<0.50	1.7	3.9	3.3	95	550-157497
WSP-1 (Influent)	WSP-1-1A-03012021	3/1/2021	Original	TA	<0.50	1.1 (B)	3.7	2.9	86	550-159286
WSP-1 (Influent)	TS-1-1A-03012021	3/1/2021	Duplicate	TA	<0.50	1.5 (B)	3.9	2.9	91	550-159286
WSP-1 (Influent)	WSP-1-1A-04052021	4/5/2021	Original	TA	<0.50	1.0	2.9	2.3	75	550-161226
WSP-1 (Influent)	TS-1-1A-04052021	4/5/2021	Duplicate	TA	<0.50	1.1	2.9	2.2	74	550-161226
WSP-1 (Influent)	WSP-1-1A-05032021	5/3/2021	Original	TA	<0.50	1.0	3.2	2.6	77	550-163023
WSP-1 (Influent)	TS-1-1A-05032021	5/3/2021	Duplicate	TA	<0.50	0.94	3.0	2.6	76	550-163023
WSP-1 (Influent)	WSP-1-1A-06012021	6/1/2021	Original	TA	<0.50	1.5	3.4	2.7	83	550-164639
WSP-1 (Influent)	TS-1-1A-06012021	6/1/2021	Duplicate	TA	<0.50	1.4	3.2	2.7	80	550-164639
WSP-1 (Influent)	WSP-1-1A-07012021	7/1/2021	Original	TA	<0.50	1.5	3.4	2.9	97	550-166320
WSP-1 (Influent)	TS-1-1A-07012021	7/1/2021	Duplicate	TA	<0.50	1.5	3.3	2.9	94	550-166320
WSP-1 (Influent)	WSP-1-1A-08022021	8/2/2021	Original	TA	<0.50	1.7	3.8	3.6	100	550-168090
WSP-1 (Influent)	TS-1-1A-08022021	8/2/2021	Duplicate	TA	<0.50	1.6	3.7	3.5	99	550-168090
WSP-1 (Influent)	WSP-1-1A-09012021	9/1/2021	Original	TA	<0.50	1.2	3.1	2.5	74	550-169926

Table C-3. 2021 Laboratory Results For VOCs In Treatment System Samples
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
WSP-1 (Influent)	TS-1-1A-09012021	9/1/2021	Duplicate	TA	<0.50	1.1	2.9	2.6	75	550-169926
WSP-1 (Influent)	WSP-1-1A-10022021	10/2/2021	Original	TA	<0.50	1.0	2.3 (B)	1.7 (B)	63	550-171580
WSP-1 (Influent)	TS-1-1A-10022021	10/2/2021	Duplicate	TA	<0.50	1.0	3.1 (B)	2.1 (B)	74	550-171580
WSP-1 (Influent)	WSP-1-1A-11012021	11/1/2021	Original	TA	<0.50	1.1	2.8	2.1	77	550-173379
WSP-1 (Influent)	TS-1-1A-11012021	11/1/2021	Duplicate	TA	<0.50	1.2	3.0	2.3	81	550-173379
WSP-1 (Influent)	WSP-1-1A-12012021	12/1/2021	Original	TA	<0.50	0.99	2.7	1.9	73	550-175013
WSP-1 (Influent)	TS-1-1A-12012021	12/1/2021	Duplicate	TA	<0.50	1.1	2.8	2.2	79	550-175013
WSP-2 (Air Stripper Effluent)	WSP-2-1A-01042021	1/4/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155617
WSP-2 (Air Stripper Effluent)	WSP-2-1A-2012021	2/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157495
WSP-2 (Air Stripper Effluent)	WSP-2-1A-03012021	3/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159281
WSP-2 (Air Stripper Effluent)	WSP-2-1A-4052021	4/5/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161210
WSP-2 (Air Stripper Effluent)	WSP-2-1A-05032021	5/3/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163010
WSP-2 (Air Stripper Effluent)	WSP-2-1A-06012021	6/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164652
WSP-2 (Air Stripper Effluent)	WSP-2-1A-07012021	7/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166302
WSP-2 (Air Stripper Effluent)	WSP-2-1A-08022021	8/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168079
WSP-2 (Air Stripper Effluent)	WSP-2-1A-09012021	9/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169919
WSP-2 (Air Stripper Effluent)	WSP-2-1A-10042021	10/4/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171571
WSP-2 (Air Stripper Effluent)	WSP-2-1A-11012021	11/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173378
WSP-2 (Air Stripper Effluent)	WSP-2-1A 12012021	12/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175014
MRTF										
Tower 1 Effluent	Tower 1	1/4/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155619
Tower 1 Effluent	Tower 1	2/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157506
Tower 1 Effluent	Tower 1	3/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159295
Tower 1 Effluent	Tower 1	4/5/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161222
Tower 1 Effluent	Tower 1	5/3/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163017
Tower 1 Effluent	Tower 1	6/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164649
Tower 1 Effluent	Tower 1	7/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166322
Tower 1 Effluent	Tower 1	8/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168084
Tower 1 Effluent	Tower 1	9/1/2021	Original	TA	<0.50	<0.50 (2),(3)	<0.50	<0.50	<0.50	550-169936
Tower 2 Effluent	Tower 2	5/3/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163017
Tower 2 Effluent	Tower 2	9/1/2021	Original	TA	<0.50	<0.50 (2),(3)	<0.50	<0.50	<0.50	550-169936
Tower 2 Effluent	Tower 2	10/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171584
Tower 2 Effluent	Tower 2	11/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173387
Tower 2 Effluent	Tower 2	12/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175020
Tower 3 Effluent	Tower 3	10/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171584
Tower 3 Effluent	Tower 3	11/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173387
Tower 3 Effluent	Tower 3	12/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175020
NGTF										
NGTF Influent (C)	NGTF - INF	2/16/2021	Original	TA	<0.50	<0.50	1.6	3.3	50	550-158587
Outfall 001 (Effluent)	NGTF-CP	1/6/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155896
Outfall 001 (Effluent)	NGTF-CP	1/11/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-156068
Outfall 001 (Effluent)	NGTF-CP	1/19/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-156664
Outfall 001 (Effluent)	NGTF-CP	2/10/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-158253
Outfall 001 (Effluent)	NGTF-AZCO	2/16/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-158587
Outfall 001 (Effluent)	NGTF-CP	2/22/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-158909
Outfall 001 (Effluent)	NGTF-CP	3/1/2021	Original	TA	<0.50	<0.50	0.55	<0.50	<0.50	550-159264
Outfall 001 (Effluent)	NGTF-CP	3/8/2021	Original	TA	<0.50	<0.50	0.82	<0.50	<0.50	550-159734
Outfall 001 (Effluent)	NGTF-CP	3/15/2021	Original	TA	<0.50	<0.50	0.52	<0.50	<0.50	550-160098

Table C-3. 2021 Laboratory Results For VOCs In Treatment System Samples
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
Outfall 001 (Effluent)	NGTF-CP	3/22/2021	Original	TA	<0.50	<0.50	0.53	<0.50	<0.50	550-160459
			Lab dup		<0.50 (4)	<0.50 (4)	0.60 (4)	<0.50 (4)	<0.50 (4)	
Outfall 001 (Effluent)	NGTF-CP	3/29/2021	Original	TA	<0.50	<0.50	0.70	<0.50	<0.50	550-160860
Outfall 001 (Effluent)	NGTF-CP	4/5/2021	Original	TA	<0.50	<0.50	1.1	<0.50	0.96	550-161189
Outfall 001 (Effluent)	NGTF-CP	4/12/2021	Original	TA	<0.50	<0.50	0.56	<0.50	<0.50	550-161729
Outfall 001 (Effluent)	NGTF-CP	4/19/2021	Original	TA	<0.50	<0.50	0.75	<0.50	<0.50	550-162145
Outfall 001 (Effluent)	NGTF-CP	4/26/2021	Original	TA	<0.50	<0.50	0.81	<0.50	<0.50	550-162556
Outfall 001 (Effluent)	NGTF-CP	5/3/2021	Original	TA	<0.50	<0.50	1.0	<0.50	<0.50	550-163002
Outfall 001 (Effluent)	NGTF-CP	5/10/2021	Original	TA	<0.50 (5)	<0.50	0.88	<0.50	<0.50	550-163479
Outfall 001 (Effluent)	NGTF-CP	5/17/2021	Original	TA	<0.50	<0.50	<0.50	<0.50 (2),(5)	<0.50	550-163882
Outfall 001 (Effluent)	NGTF-CP	6/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164714
Outfall 001 (Effluent)	NGTF-CP	6/7/2021	Original	TA	<0.50	<0.50	0.78	<0.50	<0.50	550-164957
Outfall 001 (Effluent)	NGTF-CP	6/16/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-165548
Outfall 001 (Effluent)	NGTF-CP	6/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-165756
Outfall 001 (Effluent)	NGTF-CP	6/30/2021	Original	TA	<0.50	<0.50	0.51	<0.50	<0.50	550-166241
Outfall 001 (Effluent)	NGTF-CP	7/6/2021	Original	TA	<0.50	<0.50	0.63	<0.50	<0.50	550-166468
Outfall 001 (Effluent)	NGTF-CP	7/12/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166869
Outfall 001 (Effluent)	NGTF-CP	7/19/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167326
Outfall 001 (Effluent)	NGTF-CP	7/26/2021	Original	TA	<0.50	<0.50	0.60	<0.50	<0.50	550-167726
Outfall 001 (Effluent)	NGTF-CP	8/2/2021	Original	TA	<0.50	<0.50	1.0	<0.50	<0.50	550-168123
Outfall 001 (Effluent)	NGTF-CP	8/9/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168631
Outfall 001 (Effluent)	NGTF-CP	8/16/2021	Original	TA	<0.50	<0.50	0.60	<0.50	<0.50	550-169046
Outfall 001 (Effluent)	NGTF-CP	8/23/2021	Original	TA	<0.50	<0.50	0.71	<0.50	<0.50	550-169421
Outfall 001 (Effluent)	NGTF-CP	8/30/2021	Original	TA	<0.50	<0.50	1.0	<0.50	<0.50	550-169791
Outfall 001 (Effluent)	NGTF-CP	9/7/2021	Original	TA	<0.50	<0.50	0.75	<0.50	<0.50	550-170185
Outfall 001 (Effluent)	NGTF-CP	9/13/2021	Original	TA	<0.50	<0.50	0.76	<0.50	<0.50	550-170506
Outfall 001 (Effluent)	NGTF-CP	9/20/2021	Original	TA	<0.50	<0.50	0.90	<0.50	<0.50	550-170911
Outfall 001 (Effluent)	NGTF-CP	9/27/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171261
Outfall 001 (Effluent)	NGTF-CP	10/4/2021	Original	TA	<0.50	<0.50	0.61	<0.50	<0.50	550-171595
Outfall 001 (Effluent)	NGTF-CP	10/11/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172115
Outfall 001 (Effluent)	NGTF-CP	10/18/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172566
Outfall 001 (Effluent)	NGTF-CP	10/25/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173032
Outfall 001 (Effluent)	NGTF-CP	11/1/2021	Original	TA	<0.50	<0.50	0.78	<0.50	<0.50	550-173406
Outfall 001 (Effluent)	NGTF-CP	11/8/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173915
Outfall 001 (Effluent)	NGTF-CP	11/15/2021	Original	TA	<0.50	<0.50	0.70	<0.50	<0.50	550-174285
Outfall 001 (Effluent)	NGTF-CP	11/22/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174664
Outfall 001 (Effluent)	NGTF-CP	11/29/2021	Original	TA	<0.50	<0.50	0.60	<0.50	<0.50	550-174876
Outfall 001 (Effluent)	NGTF-CP	12/6/2021	Original	TA	<0.50	<0.50	0.82	<0.50	<0.50	550-175249
Outfall 001 (Effluent)	NGTF-CP	12/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175731
Outfall 001 (Effluent)	NGTF-CP	12/20/2021	Original	TA	<0.50	<0.50	0.56	<0.50	<0.50	550-176084
Outfall 001 (Effluent)	NGTF-CP	12/27/2021	Original	TA	<0.50	<0.50	0.82	<0.50	<0.50	550-176359
Trip/Field Blanks										
QC - Area 12	FB-1-1A-01042021	1/4/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155618
QC - Area 12	TB-1-1A-01042021	1/4/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155618
QC - Area 12	FB-1-1A-02012021	2/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157503
QC - Area 12	TB-1-1A-02012021	2/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157503
QC - Area 12	FB-1-1A-03012021	3/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159297
QC - Area 12	TB-1-1A-03012021	3/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159297

Table C-3. 2021 Laboratory Results For VOCs In Treatment System Samples
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
QC - Area 12	FB-1-1A-04052021	4/5/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161224
QC - Area 12	TB-1-1A-04052021	4/5/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161224
QC - Area 12	FB-1-1A-05032021	5/3/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163022
QC - Area 12	TB-1-1A-05032021	5/3/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163022
QC - Area 12	FB-1-1A-06012021	6/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164651
QC - Area 12	TB-1-1A-06012021	6/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164651
QC - Area 12	FB-1-1A-07012021	7/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166329
QC - Area 12	TB-1-1A-07012021	7/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166329
QC - Area 12	FB-1-1A-08022021	8/2/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168088
QC - Area 12	TB-1-1A-08022021	8/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168088
QC - Area 12	FB-1-1A-09012021	9/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169929
QC - Area 12	TB-1-1A-09012021	9/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169929
QC - Area 12	FB-1-1A-10022021	10/2/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171581
QC - Area 12	TB-1-1A-10022021	10/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171581
QC - Area 12	FB-1-1A-11012021	11/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173384
QC - Area 12	TB-1-1A-11012021	11/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173384
QC - Area 12	FB-1-1A-12012021	12/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175017
QC - Area 12	TB-1-1A-12012021	12/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175017
QC - NGTF	TB	1/6/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155896
QC - NGTF	TB	1/11/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-156068
QC - NGTF	TB	1/19/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-156664
QC - NGTF	TB	2/10/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-158253
QC - NGTF	TB	2/16/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-158587
QC - NGTF	TB	2/22/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-158909
QC - NGTF	TB	3/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159264
QC - NGTF	TB	3/8/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159734
QC - NGTF	TB	3/15/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-160098
QC - NGTF	TB	3/22/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-160459
QC - NGTF	TB	3/29/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-160860
QC - NGTF	TB	4/5/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161189
QC - NGTF	TB	4/12/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161729
QC - NGTF	TB	4/19/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-162145
QC - NGTF	TB	4/26/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-162556
QC - NGTF	TB	5/3/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163002
QC - NGTF	TB	5/10/2021	TB	TA	<0.50 (5)	<0.50	<0.50	<0.50	<0.50	550-163479
QC - NGTF	TB	5/17/2021	TB	TA	<0.50 (5),(6),(7)	<0.50 (6)	<0.50 (6)	<0.50 (6)	<0.50 (6)	550-163882
QC - NGTF	TB	6/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164714
QC - NGTF	TB	6/7/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164957
QC - NGTF	TB	6/16/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-165548
QC - NGTF	TB	6/21/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-165756
QC - NGTF	TB	6/30/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166241
QC - NGTF	TB	7/6/2021	TB	TA	<0.50	<0.50	<0.50 (2)	<0.50	<0.50	550-166468
QC - NGTF	TB	7/12/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166869
QC - NGTF	TB	7/19/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167326
QC - NGTF	TB	7/26/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167726
QC - NGTF	TB	8/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168123
QC - NGTF	TB	8/9/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168631
QC - NGTF	TB	8/16/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169046

Table C-3. 2021 Laboratory Results For VOCs In Treatment System Samples
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
QC - NGTF	TB	8/23/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169421
QC - NGTF	TB	8/30/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169791
QC - NGTF	TB	9/7/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-170185
QC - NGTF	TB	9/13/2021	TB	TA	<0.50	<0.50 (5),(7)	<0.50	<0.50	<0.50	550-170506
QC - NGTF	TB	9/20/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-170911
QC - NGTF	TB	9/27/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171261
QC - NGTF	TB	10/4/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171595
QC - NGTF	TB	10/11/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172115
QC - NGTF	TB	10/18/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172566
QC - NGTF	TB	10/25/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173032
QC - NGTF	TB	11/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173406
QC - NGTF	TB	11/8/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173915
QC - NGTF	TB	11/15/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174285
QC - NGTF	TB	11/22/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174664
QC - NGTF	TB	11/29/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174876
QC - NGTF	TB	12/6/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175249
QC - NGTF	TB	12/13/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175731
QC - NGTF	TB	12/20/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-176084
QC - NGTF	TB	12/27/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-176359
QC-TS (D)	FB-2-1A-01042021	1/4/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155621
QC-TS (D)	TB-2-1A-01042021	1/4/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155621
QC-TS (D)	FB-2-1A-01072021	1/7/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155907
QC-TS (D)	TB-2-1A-01072021	1/7/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-155907
QC-TS (D)	FB-2-1A-02012021	2/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157504
QC-TS (D)	TB-2-1A-02012021	2/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157504
QC-TS (D)	FB-2-1A-02042021	2/4/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-157825
QC-TS (D)	TB-2-1A-02042021	2/4/2021	TB	TA	<1.3 (6),(8)	<1.3 (6),(8)	<1.3 (6),(8)	<1.3 (6),(8)	<1.3 (6),(8)	550-157825
QC-TS (D)	FB-2-1A-03012021	3/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159296
QC-TS (D)	TB-2-1A-03012021	3/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-159296
QC-TS (D)	FB-2-1A-04052021	4/5/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161223
QC-TS (D)	TB-2-1A-04052021	4/5/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-161223
QC-TS (D)	FB-2-1A-05032021	5/3/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-163019
QC-TS (D)	TB-2-1A-05032021	5/3/2021	TB	TA	<0.50	<0.50 (9),(10)	<0.50	<0.50	<0.50	550-163019
QC-TS (D)	FB-2-1A-06012021	6/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164650
QC-TS (D)	TB-2-1A-06012021	6/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-164650
QC-TS (D)	FB-2-1A-07012021	7/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166326
QC-TS (D)	TB-2-1A-07012021	7/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-166326
QC-TS (D)	FB-2-1A-07162021	7/16/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167264
QC-TS (D)	TB-2-1A-07162021	7/16/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-167264
QC-TS (D)	FB-2-1A-08022021	8/2/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-168085
QC-TS (D)	TB-2-1A-08022021	8/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50 (2),(5)	<0.50	550-168085
QC-TS (D)	FB-2-1A-09012021	9/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-169930
QC-TS (D)	TB-2-1A-09012021	9/1/2021	TB	TA	<0.50 (6)	<0.50 (6)	<0.50 (6)	<0.50 (6)	<0.50 (6)	550-169930
QC-TS (D)	FB-2-1A-10022021	10/2/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171577
QC-TS (D)	TB-2-1A-10022021	10/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171577
QC-TS (D)	FB-2-1A-11012021	11/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173386
QC-TS (D)	TB-2-1A-11012021	11/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173386

Table C-3. 2021 Laboratory Results For VOCs In Treatment System Samples
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
					200	*6*	*6*	*5*	*5*	
QC-TS (D)	FB-2-1A-12012021	12/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175016
QC-TS (D)	TB-2-1A-12012021	12/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175016

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene
AZCO = Arizona Canal Outfall
CP = Chaparral Compliance Point
FB = Field Blank
GWETS = Groundwater Extraction and Treatment System
ID = Identifier
MRTF = Miller Road Treatment Facility
NGTF = NIBW Granular Activated Carbon Treatment Facility
RPD = Relative Percent Difference
QC = Quality Control
TA = Eurofins TestAmerica
TB = Trip Blank
TS = Treatment System
VOC = Volatile Organic Compound

NOTES:

<0.50	Analytical result is less than laboratory detection limit (Non-Detect)
5	Cleanup Standards for Treated Water (µg/L)
5.1	Results in **bold** exceed Cleanup Standard for Treated Water

(A) Sample was collected shortly after restart of the treatment system; results do not represent long-term operating conditions.
(B) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to low concentration range of
(C) Influent sampling results at the NGTF are not required for compliance; however, they are reported here for completeness.
(D) QC-TS - A single trip blank and a single field blank are collected for Area 7, MRTF, and NGTF samples, when collected and shipped on the same day.

Laboratories use standardized data qualifiers defined by Arizona Department of Health Services and listed in ADEQ document WQR282: Water Quality Database Arizona Lab Data Qualifiers.

(1) N1 Flag: Sample was collected in a properly preserved vial; however, the pH-7 was outside the required criteria when verified by the laboratory. The sample was analyzed within the 7-day holding time specified for unpreserved samples.
(2) V1 Flag: CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.
(3) R6 Flag: LFB/LFBD RPD exceeded method control limit. Recovery met acceptance criteria.
(4) H1 Flag: Sample analysis performed past holding time.
(5) L5 Flag: The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.
(6) E6 Flag: Concentration estimated. Internal standard recoveries did not meet method acceptance criteria.
(7) R1 Flag: RPD/RSD exceeded the method acceptance limit. See case narrative.
(8) N1 Flag: The TB was inadvertently run with dilution 2.5X. The TB could not be rerun with 1X due to no sufficient sample left.
(9) L4 Flag: The associated blank spike recovery was below method acceptance limits.
(10) V9 Flag: CCV recovery was below method acceptance limits.

APPENDIX D
WATER LEVEL/TCE TIME-SERIES HYDROGRAPHS FOR NIBW WELLS

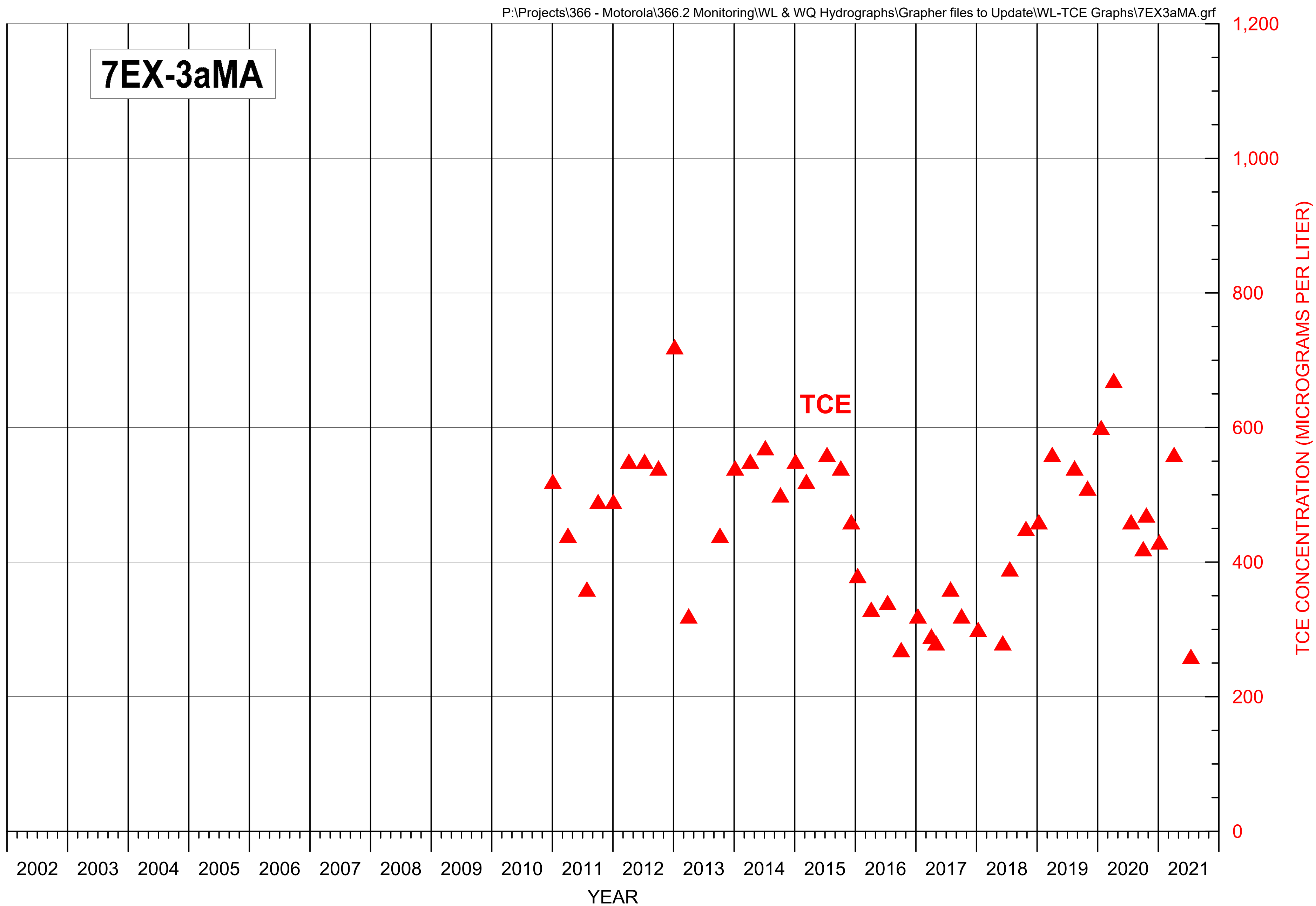


FIGURE D-1. TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-3aMA

North Indian Bend Wash Superfund Site

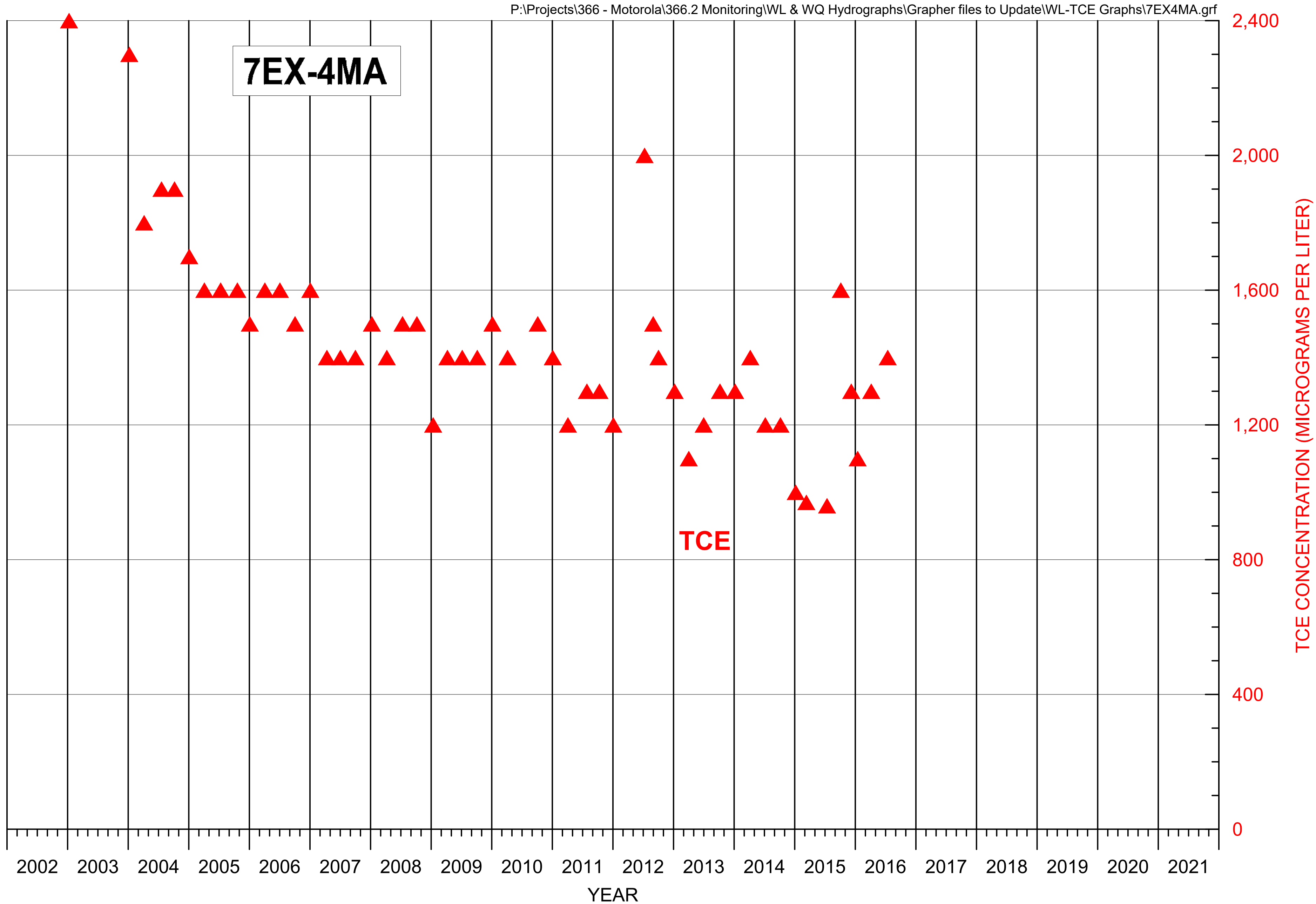


FIGURE D-2. TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-4MA

North Indian Bend Wash Superfund Site

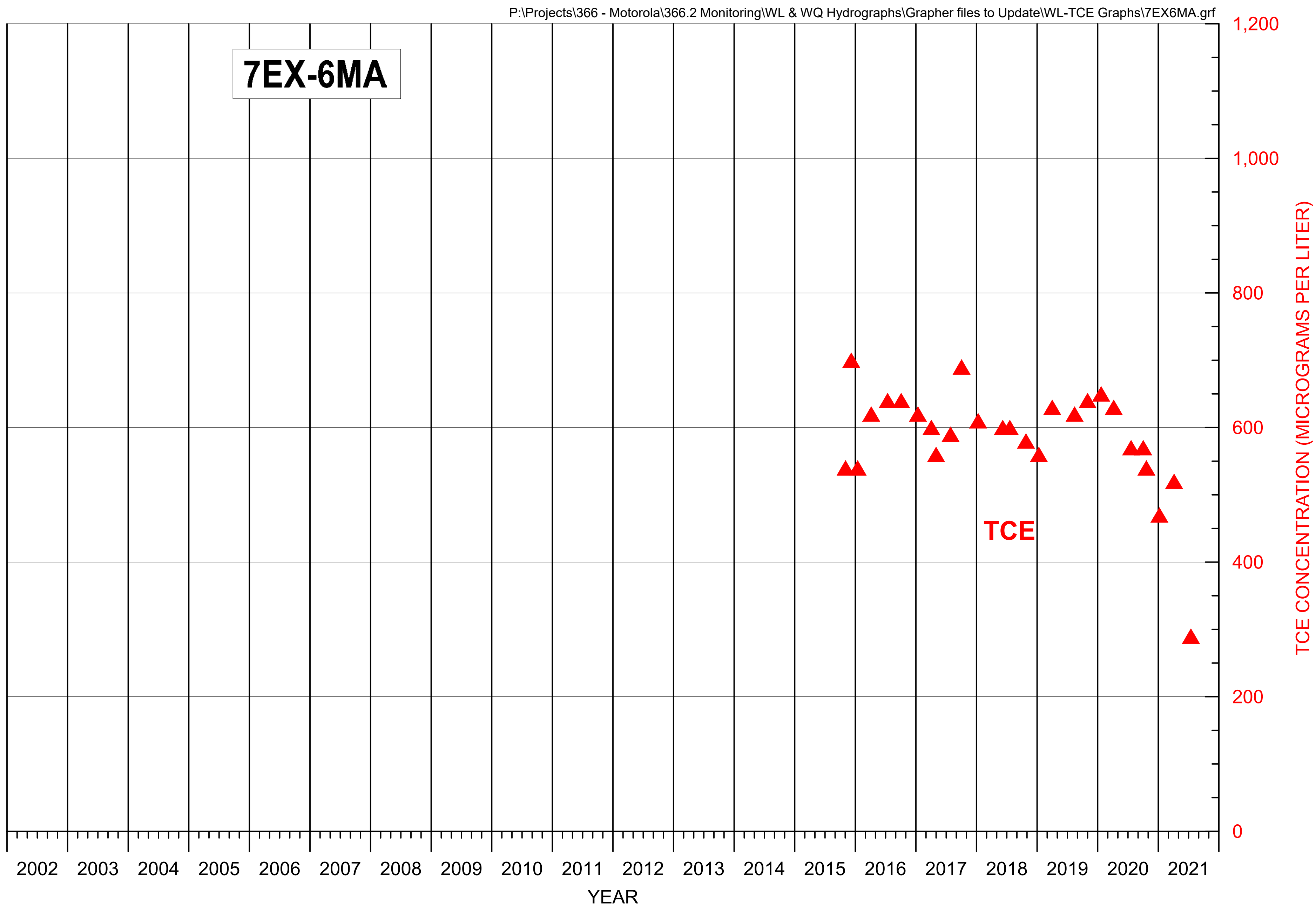


FIGURE D-3. TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-6MA

North Indian Bend Wash Superfund Site

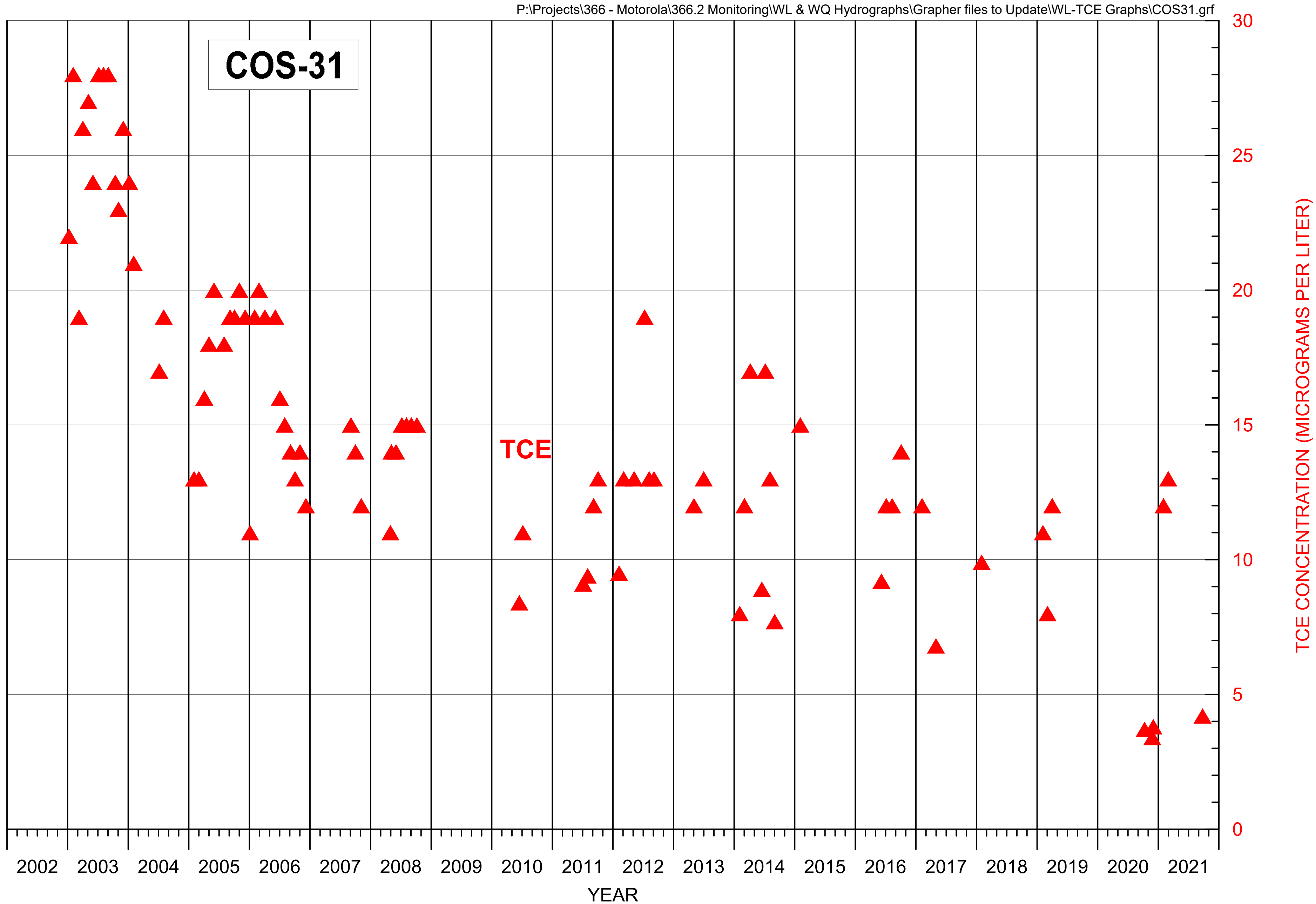


FIGURE D-4. TCE CONCENTRATIONS FOR EXTRACTION WELL COS-31

North Indian Bend Wash Superfund Site

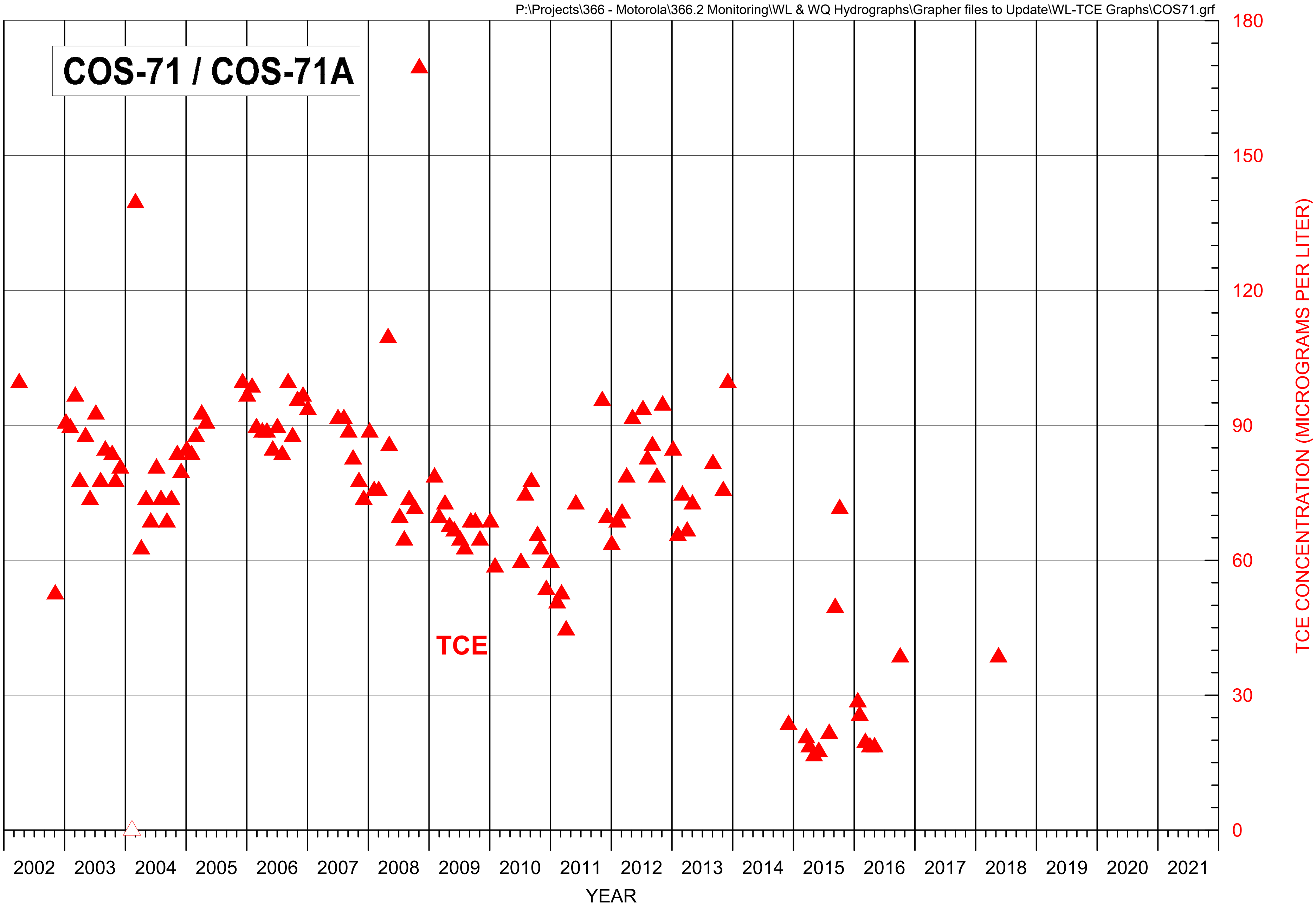


FIGURE D-5. TCE CONCENTRATIONS FOR EXTRACTION WELL COS-71 & COS-71A

Note: Well COS-71 was abandoned April 10, 2014 and was replaced by Well COS-71A.

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

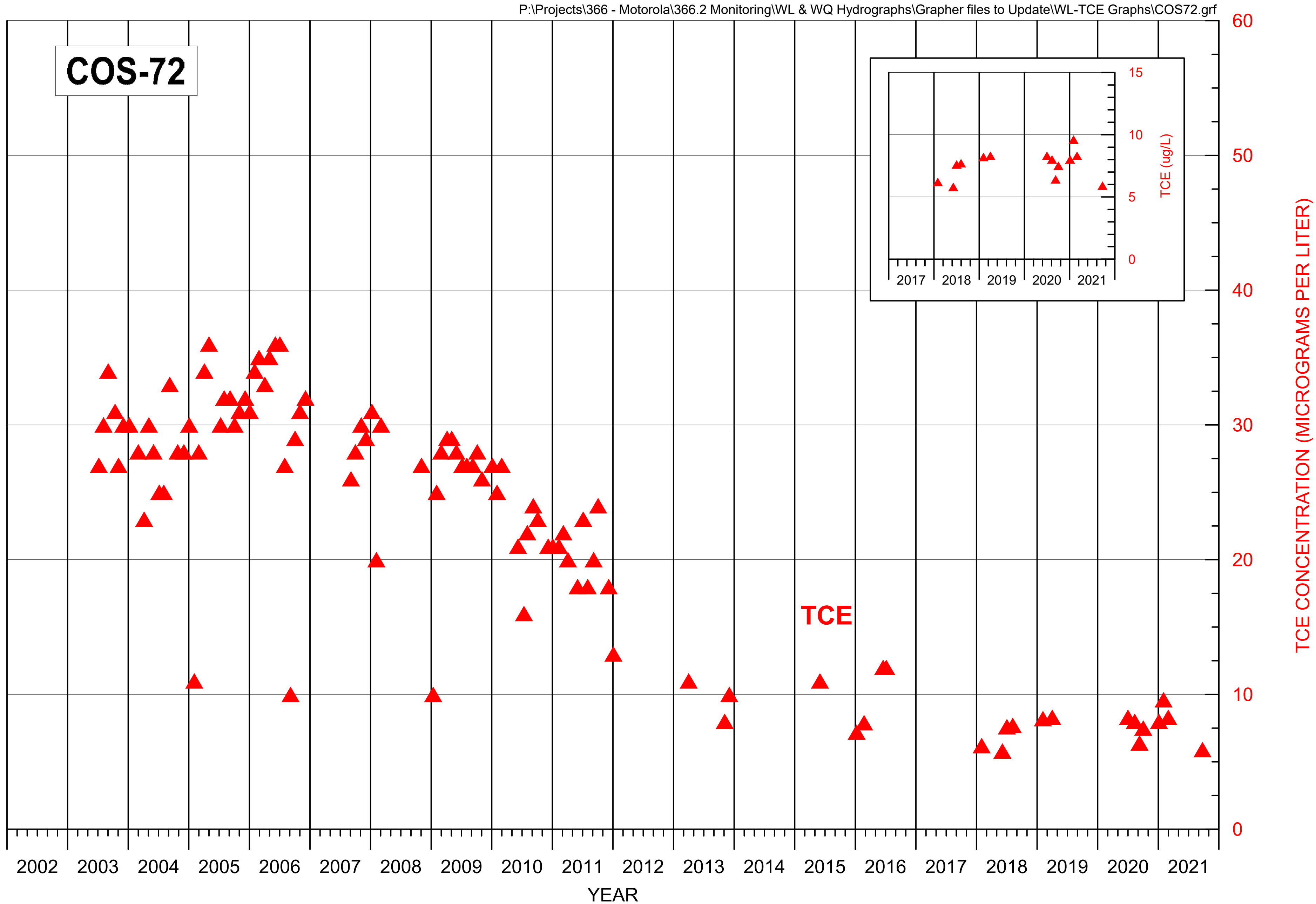


FIGURE D-6. TCE CONCENTRATIONS FOR EXTRACTION WELL COS-72

North Indian Bend Wash Superfund Site

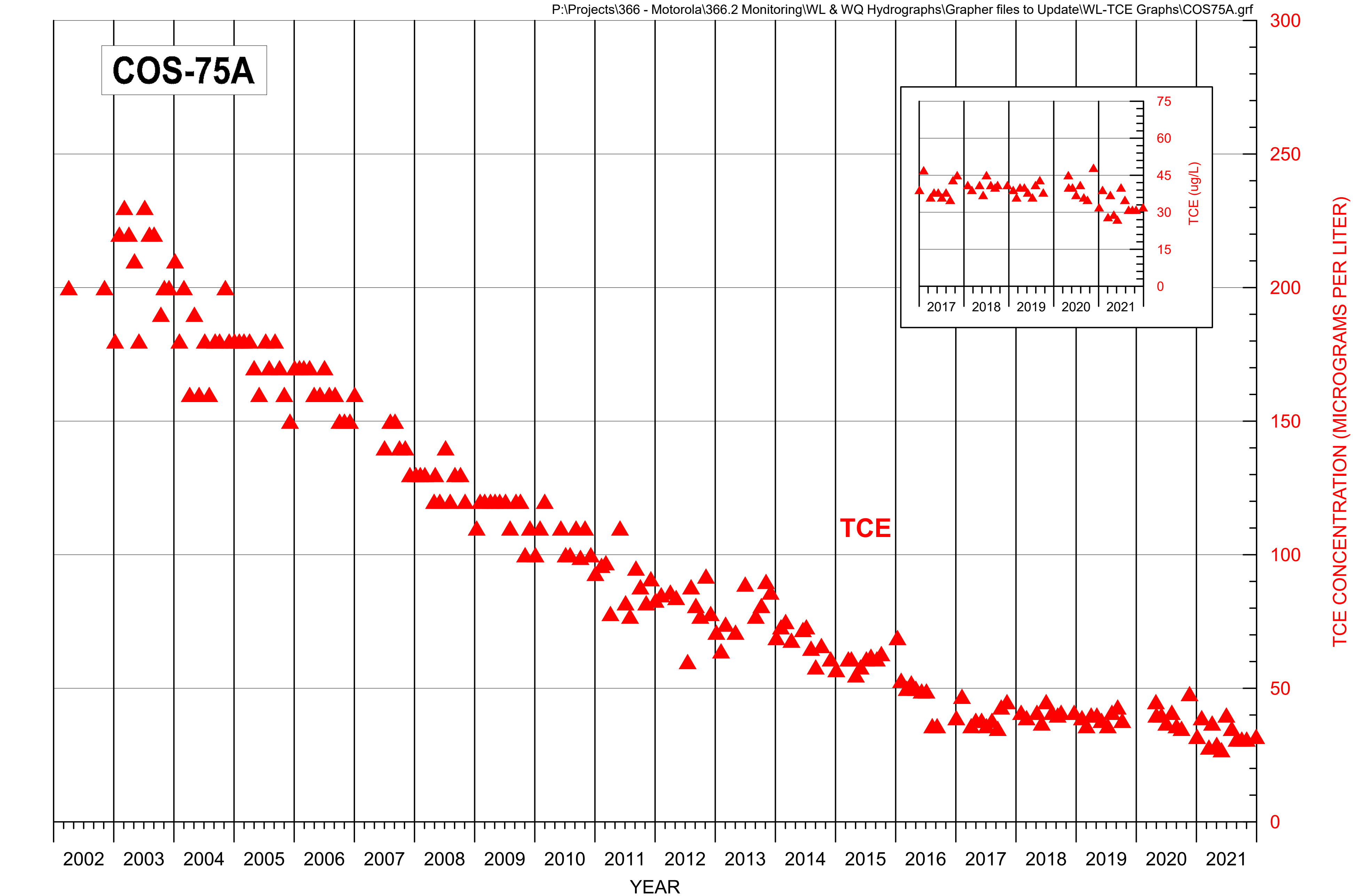


FIGURE D-7. TCE CONCENTRATIONS FOR EXTRACTION WELL COS-75A

North Indian Bend Wash Superfund Site

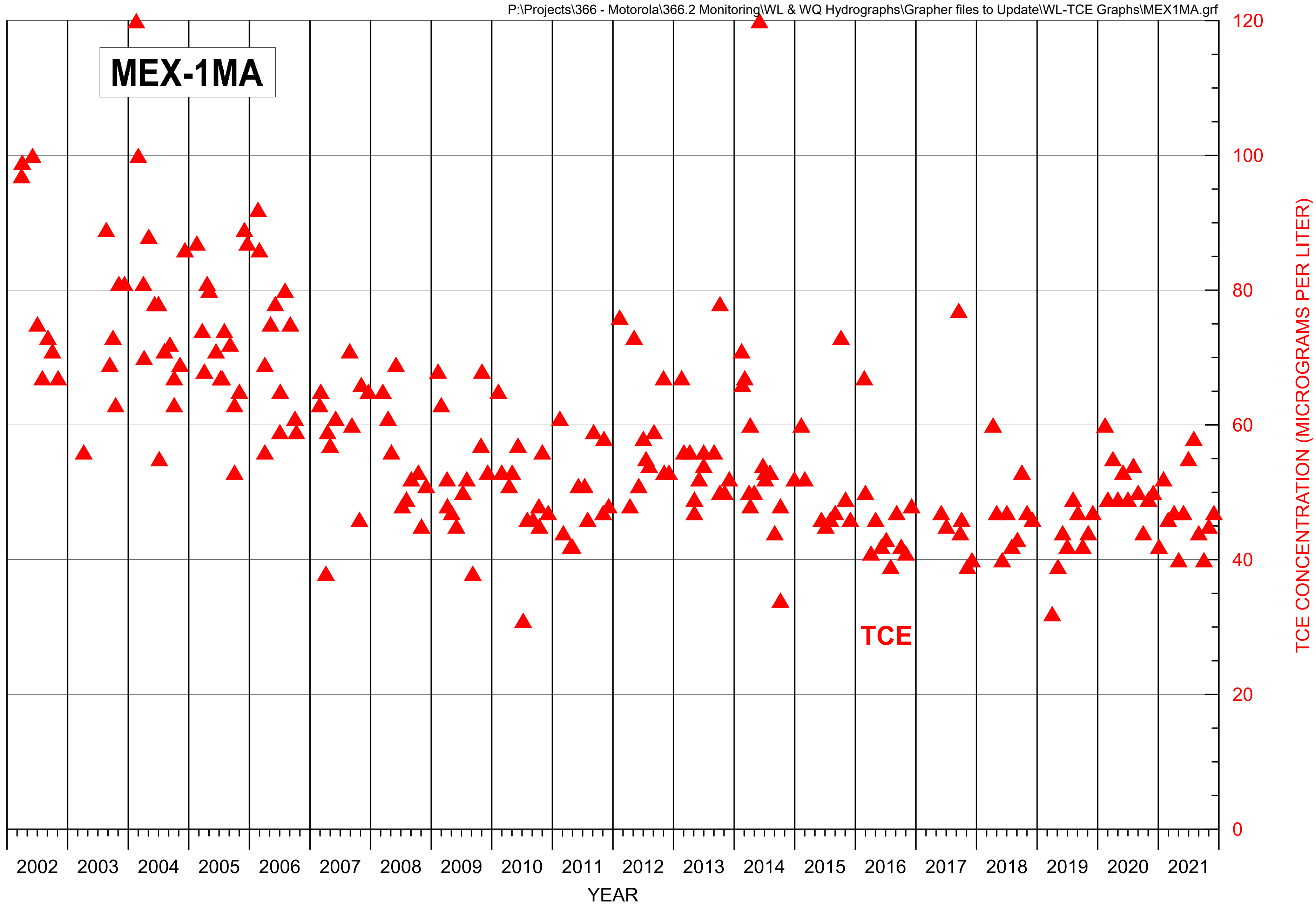


FIGURE D-8. TCE CONCENTRATIONS FOR EXTRACTION WELL MEX-1MA

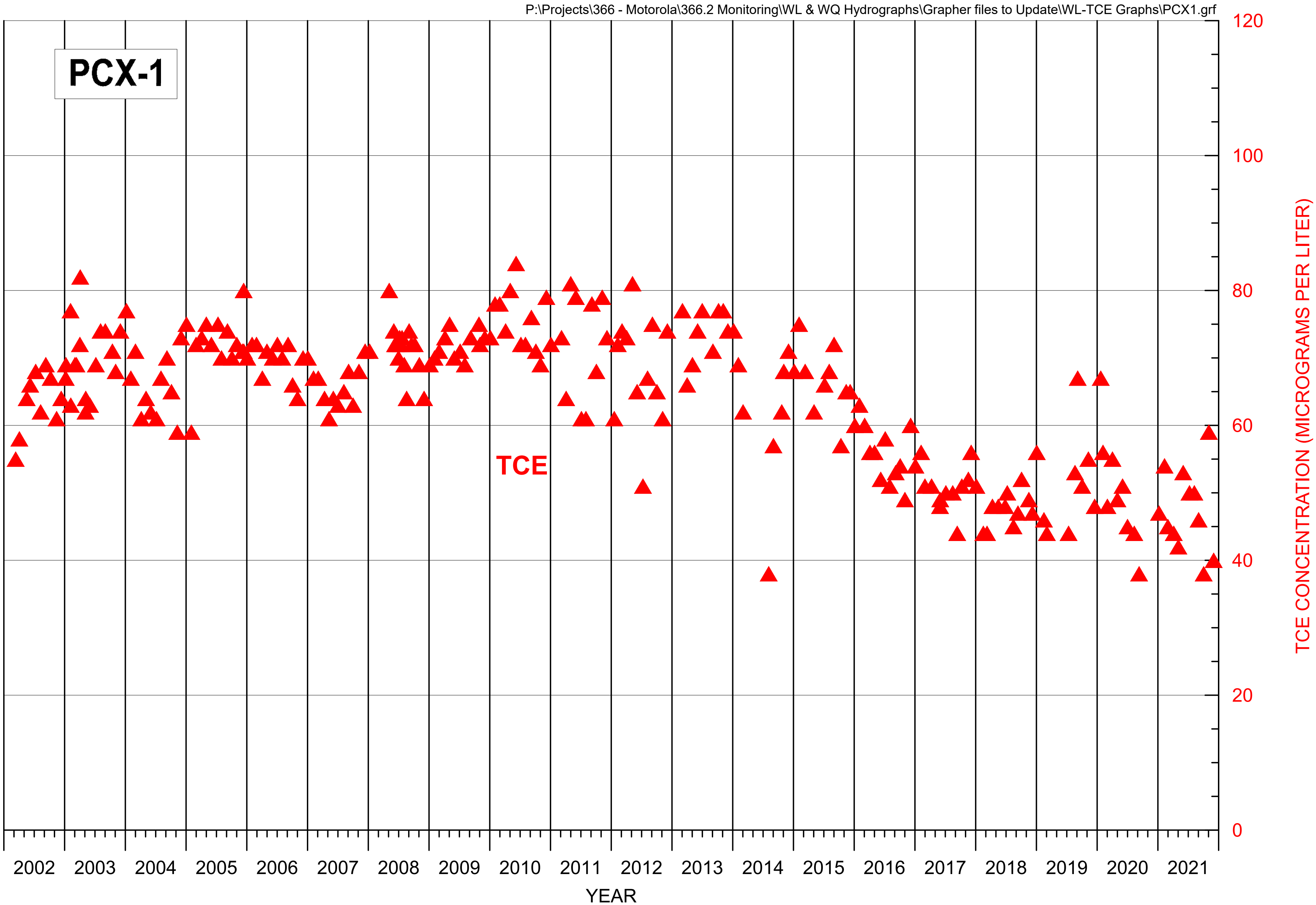


FIGURE D-9. TCE CONCENTRATIONS FOR EXTRACTION WELL PCX-1

North Indian Bend Wash Superfund Site

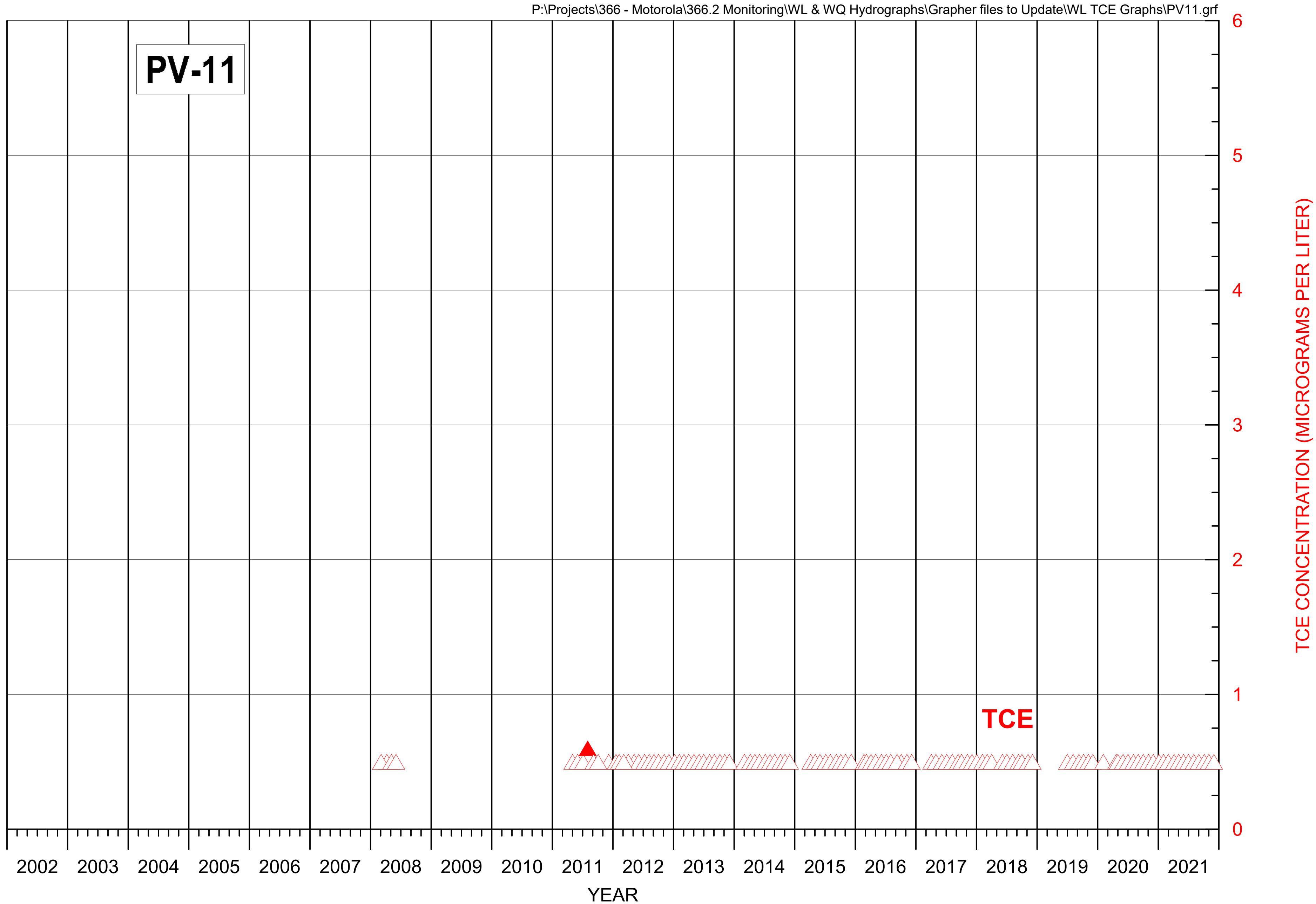


FIGURE D-10. TCE CONCENTRATIONS FOR PRODUCTION WELL PV-11

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

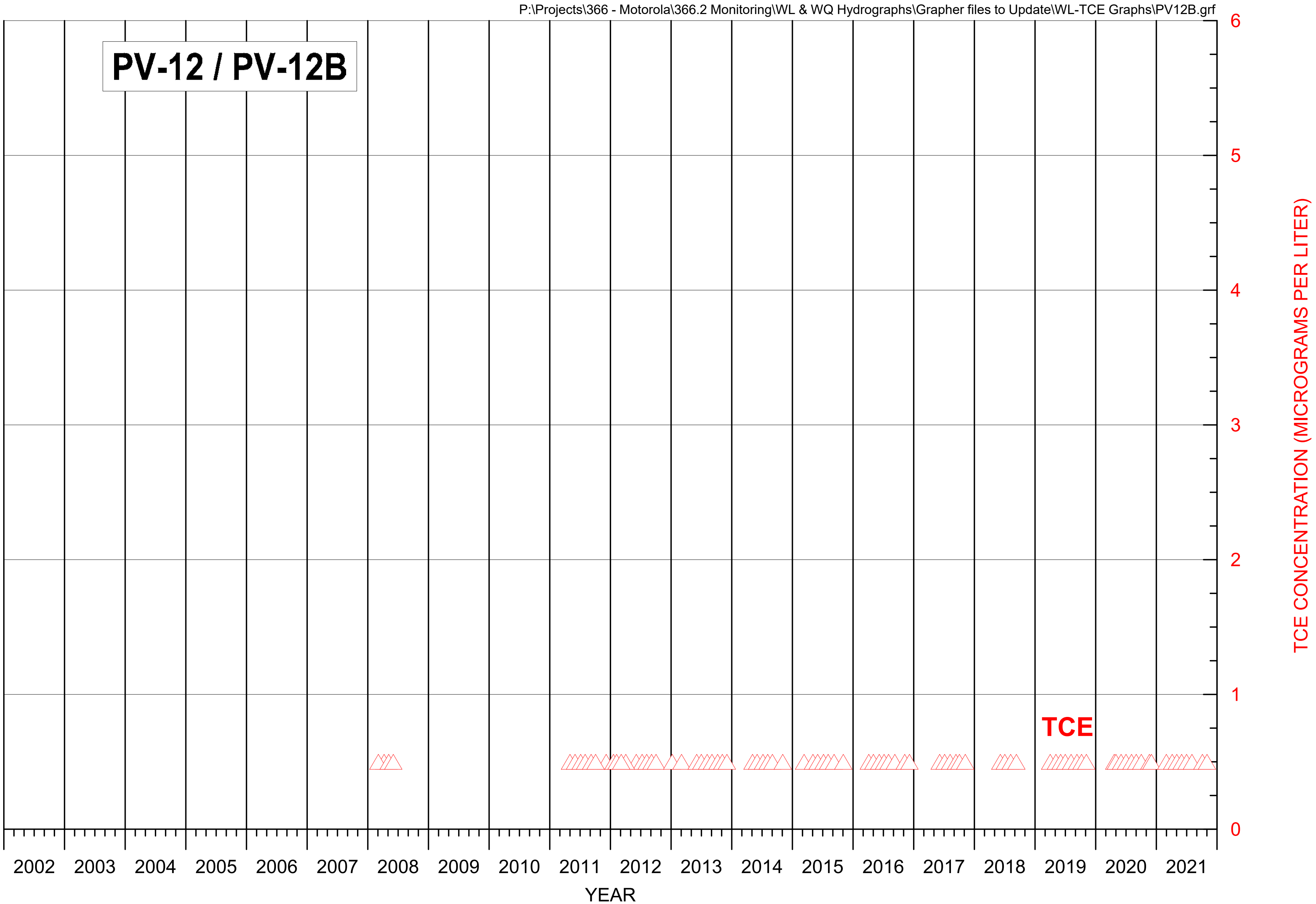


FIGURE D-11. TCE CONCENTRATIONS FOR PRODUCTION WELL PV-12B

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

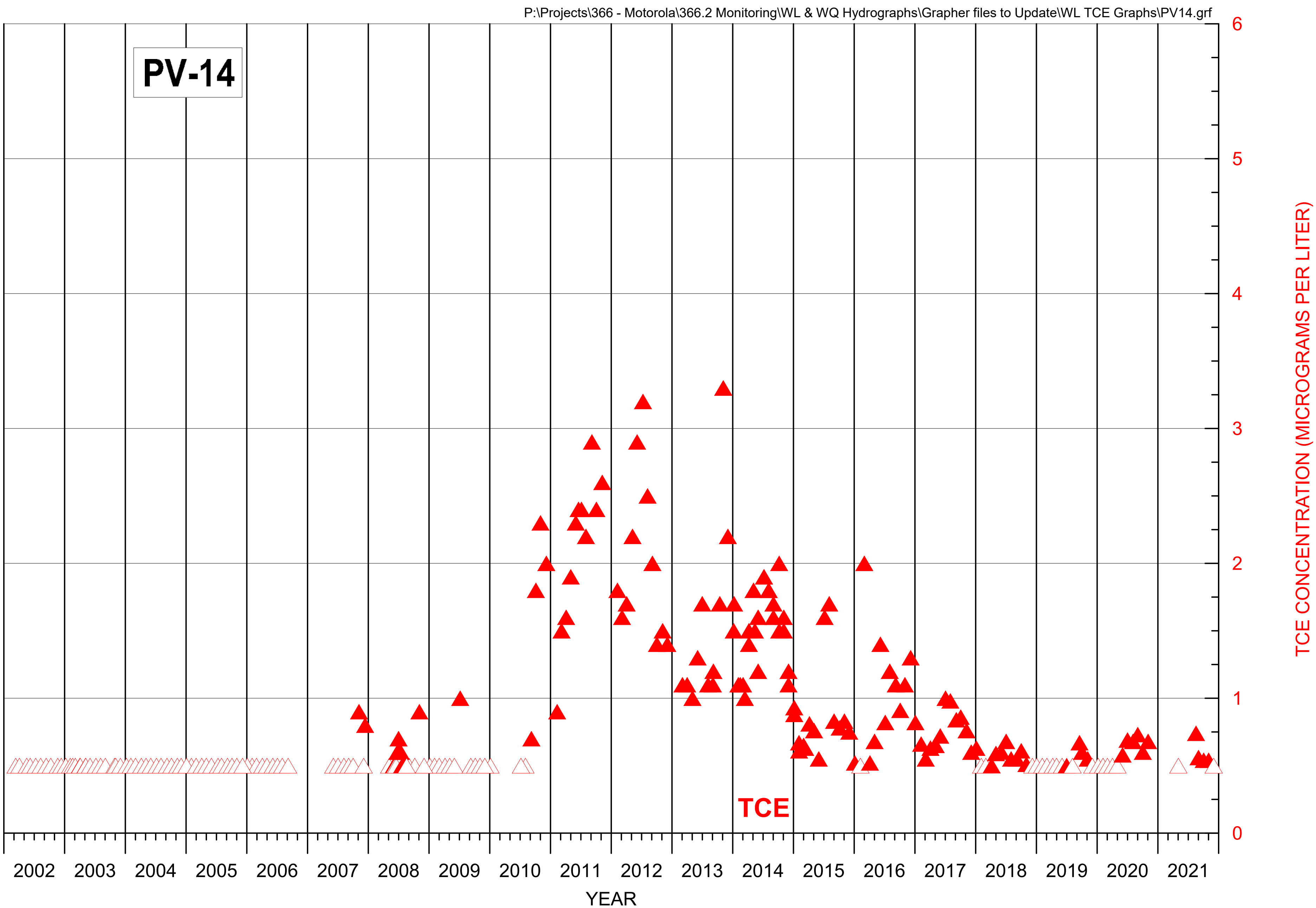


FIGURE D-12. TCE CONCENTRATIONS FOR PRODUCTION WELL PV-14

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

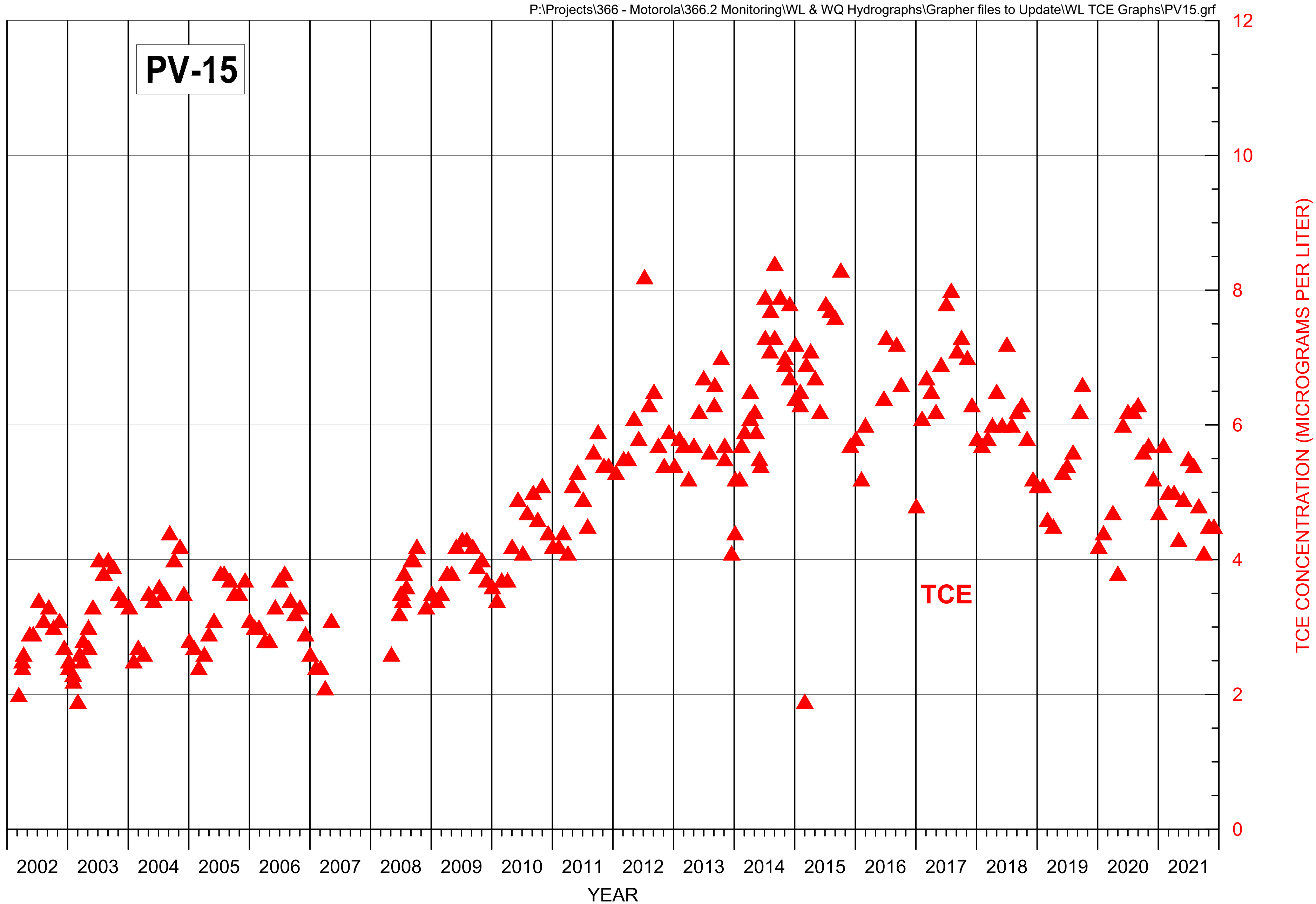


FIGURE D-13. TCE CONCENTRATIONS FOR PRODUCTION WELL PV-15

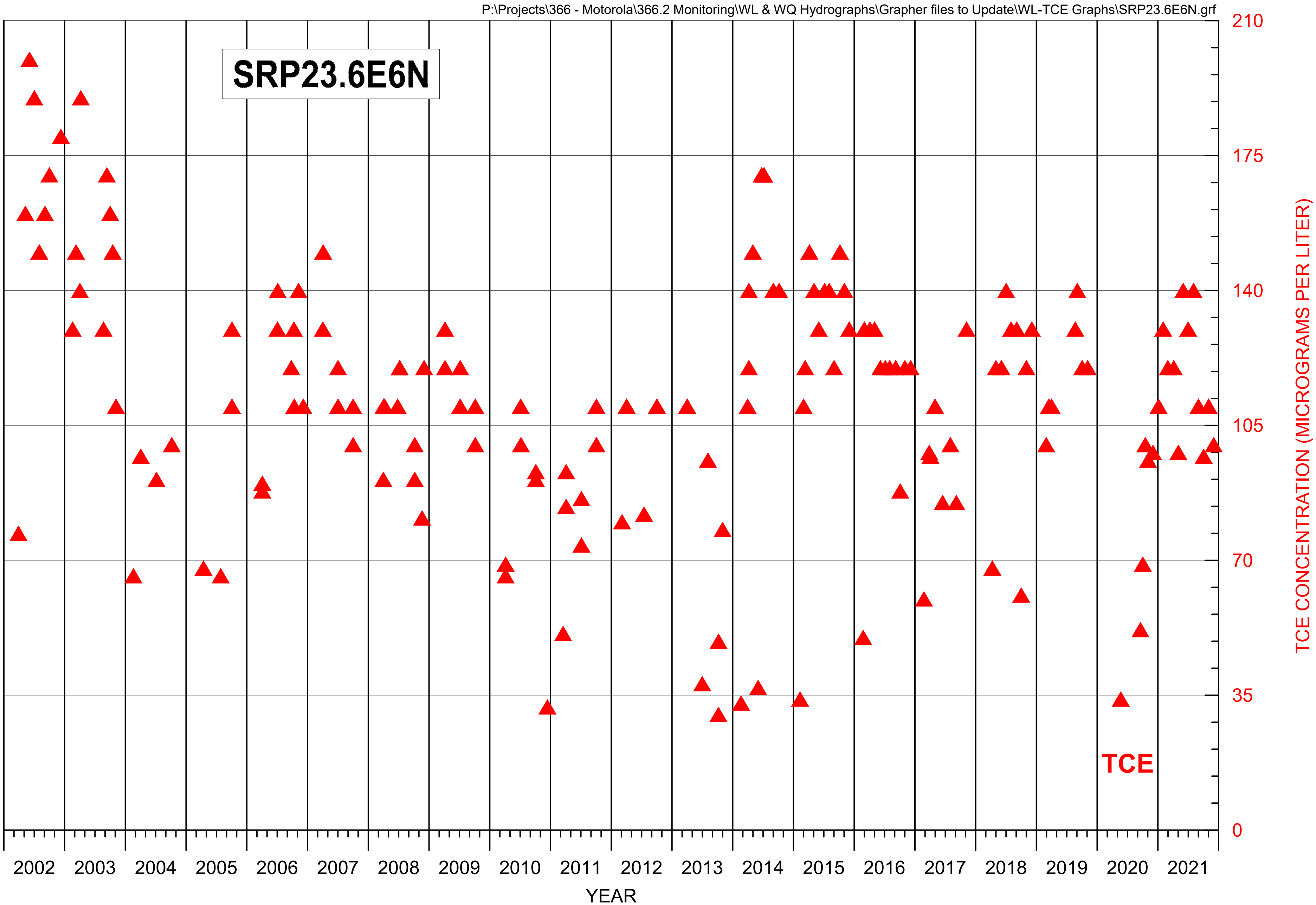
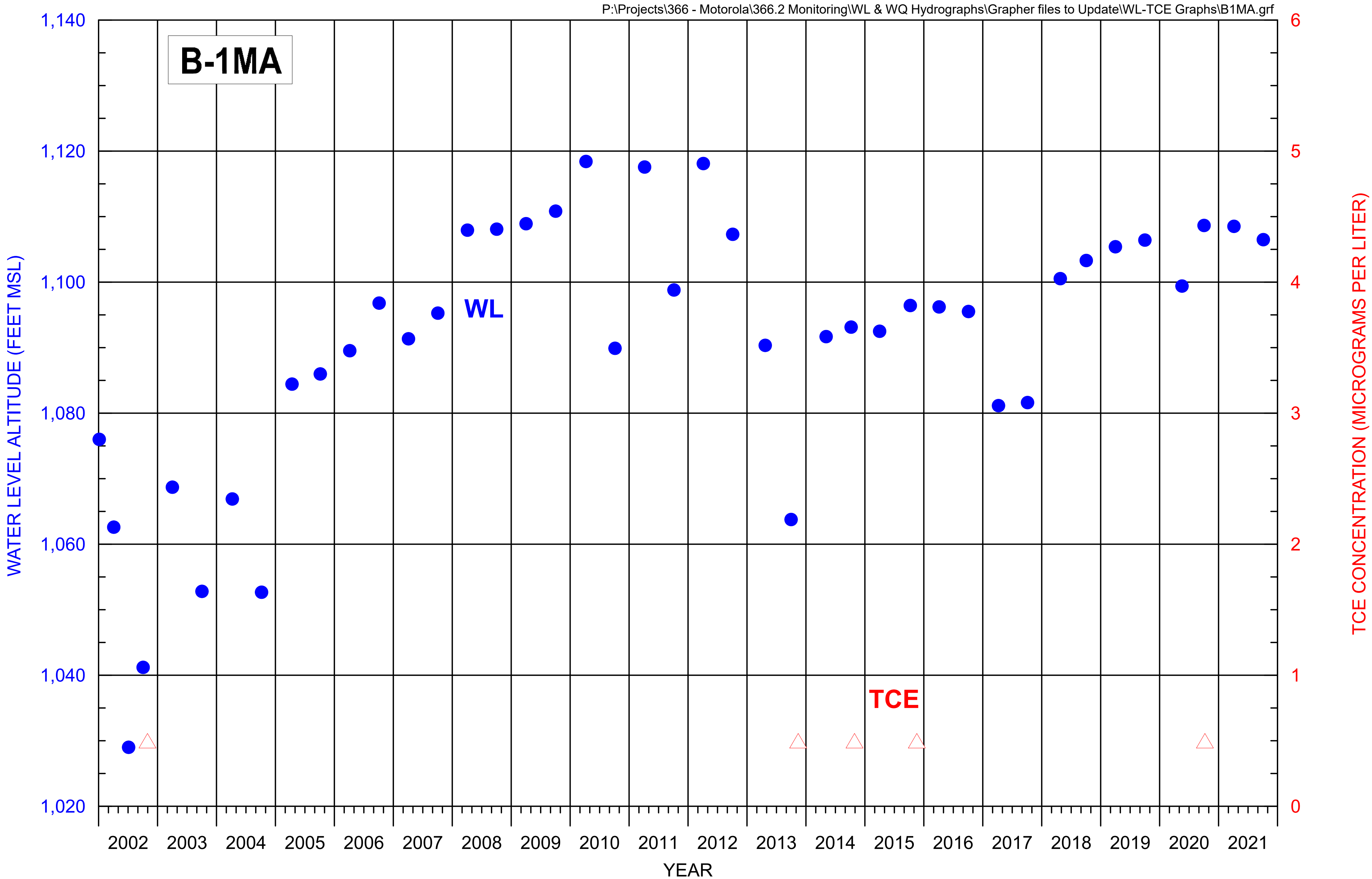


FIGURE D-14. TCE CONCENTRATIONS FOR EXTRACTION WELL SRP23.6E6N

North Indian Bend Wash Superfund Site



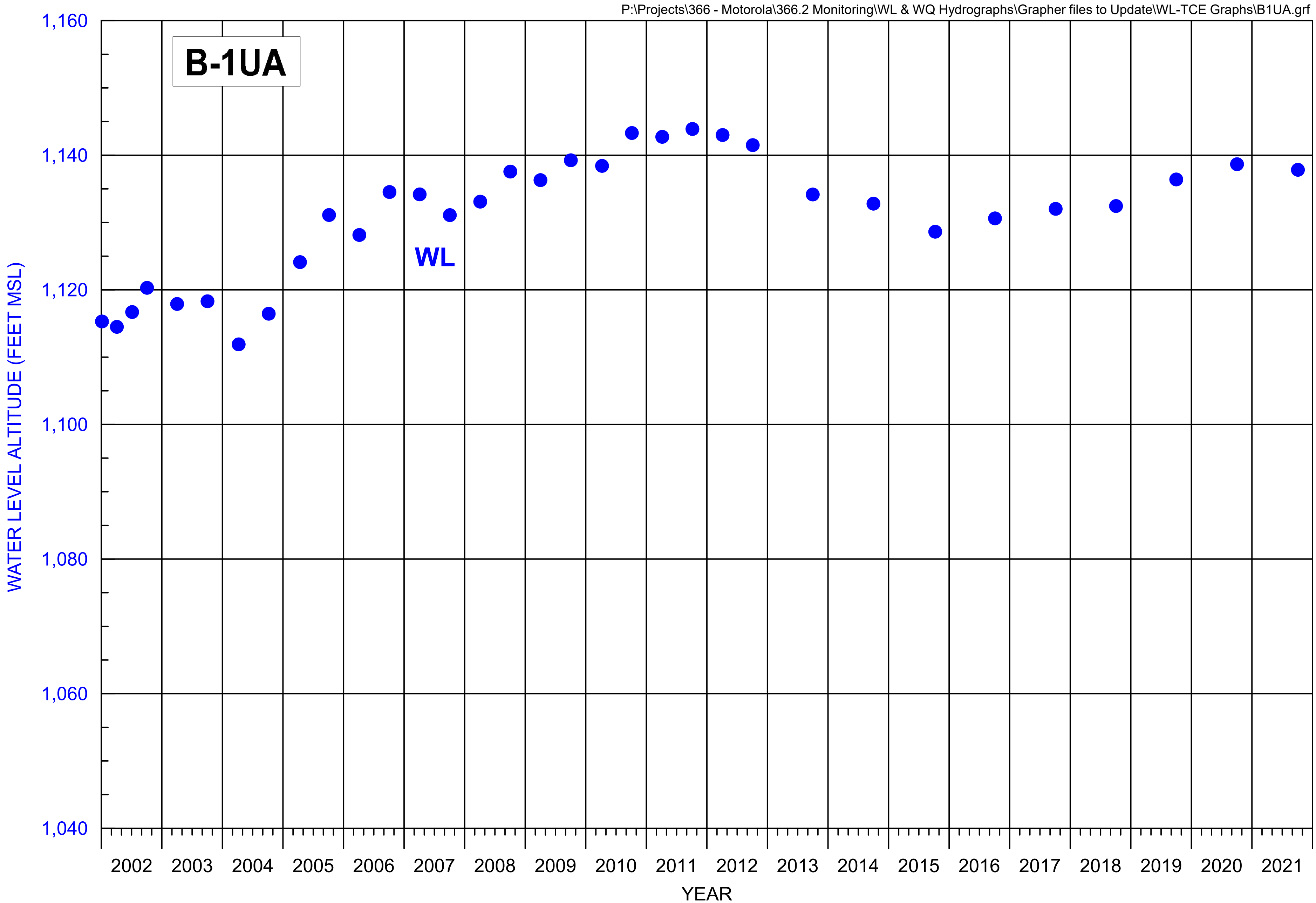
Altitude of Land Surface: 1,190.26

FIGURE D-15. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL B-1MA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,190.32

FIGURE D-16. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL B-1UA

North Indian Bend Wash Superfund Site

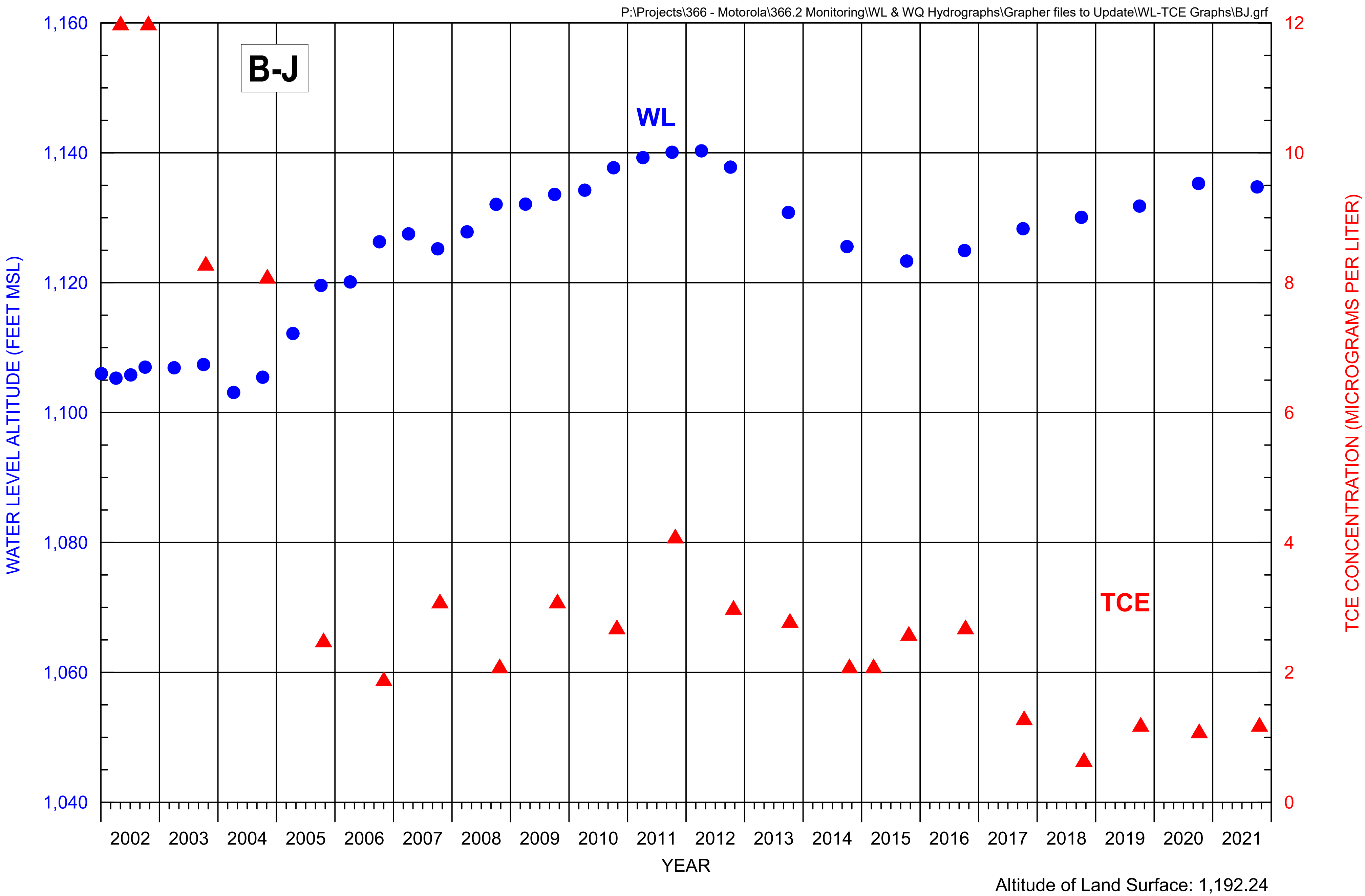


FIGURE D-17. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL B-J

North Indian Bend Wash Superfund Site

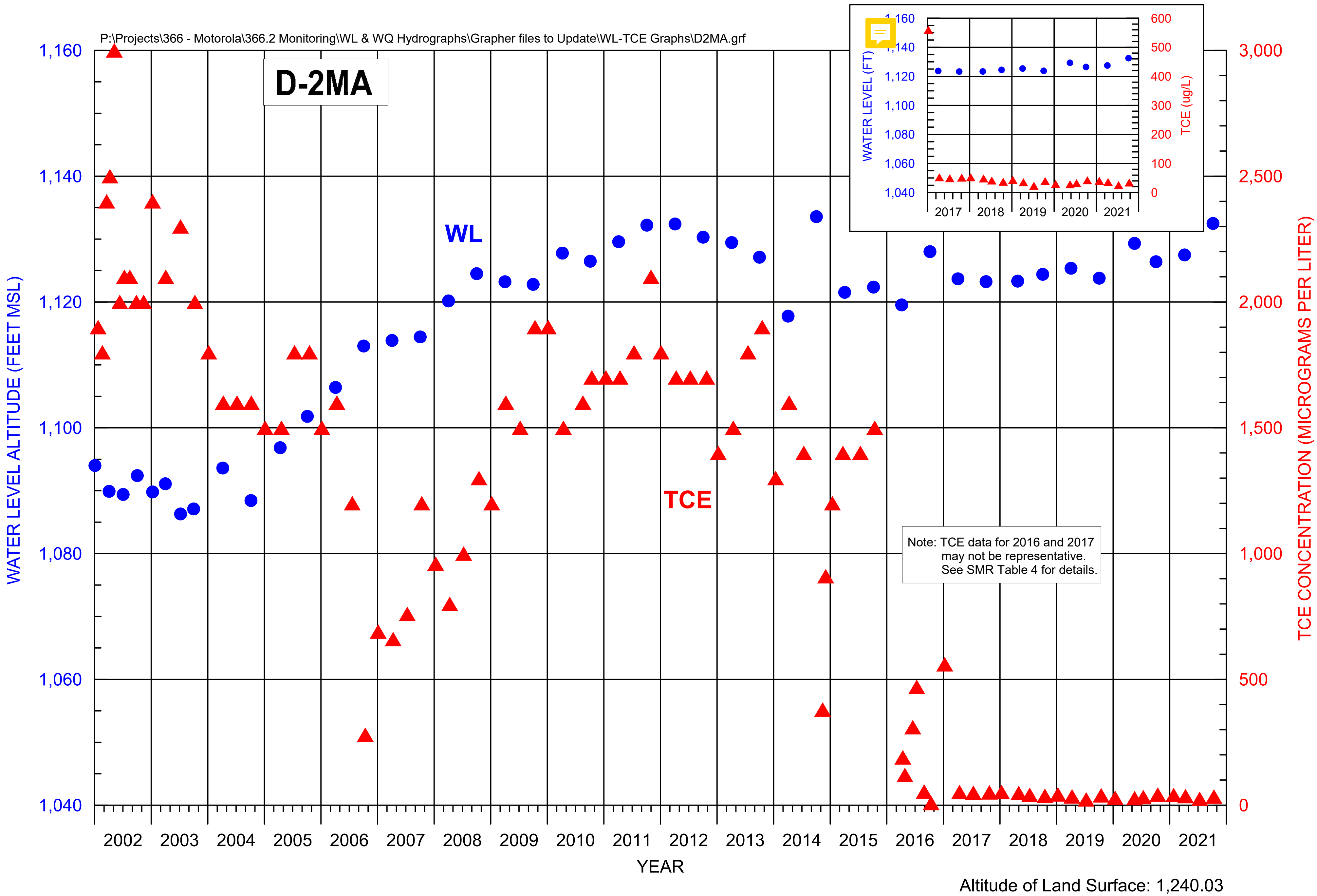


FIGURE D-18. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL D-2MA

North Indian Bend Wash Superfund Site

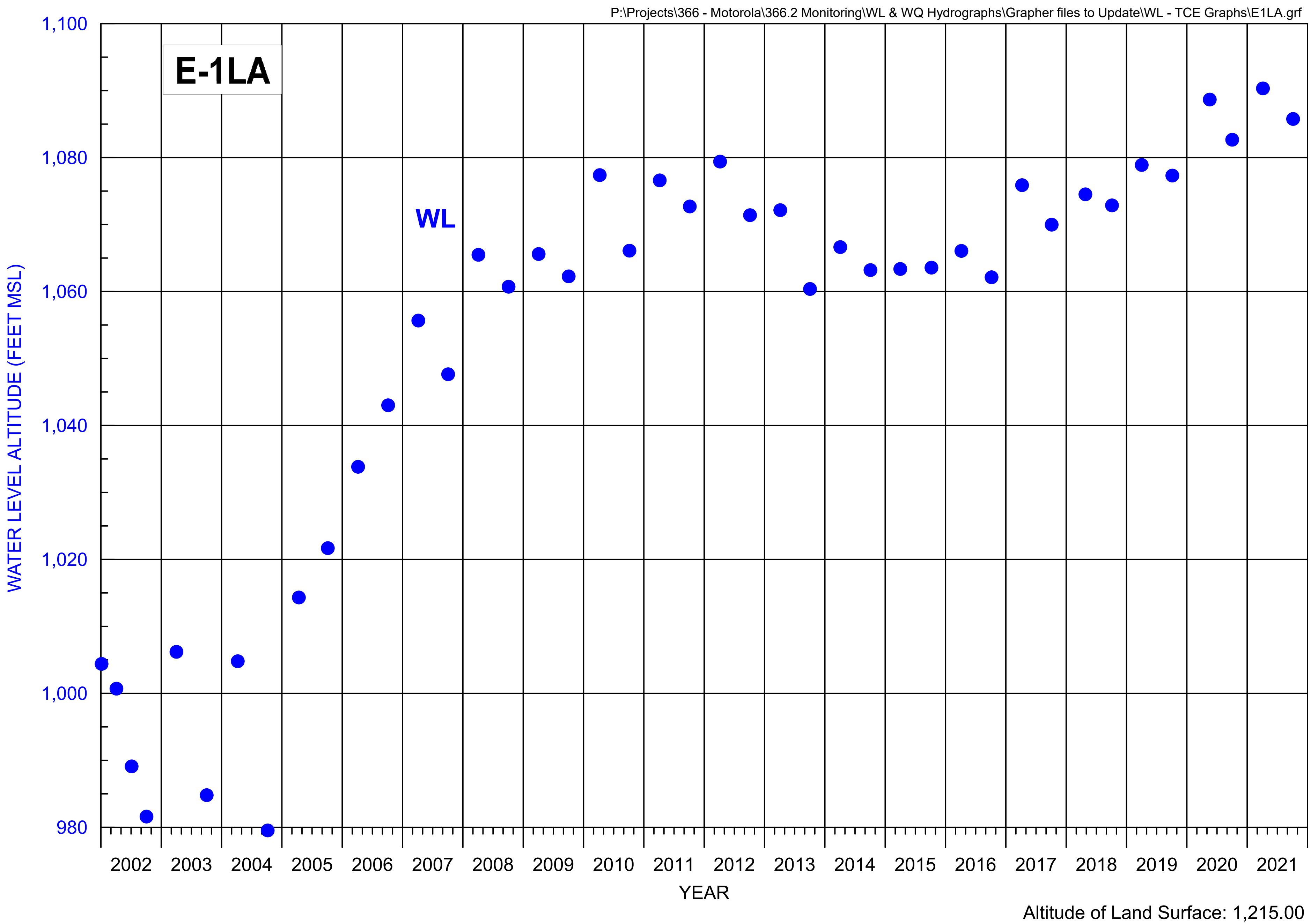


FIGURE D-19. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-1LA

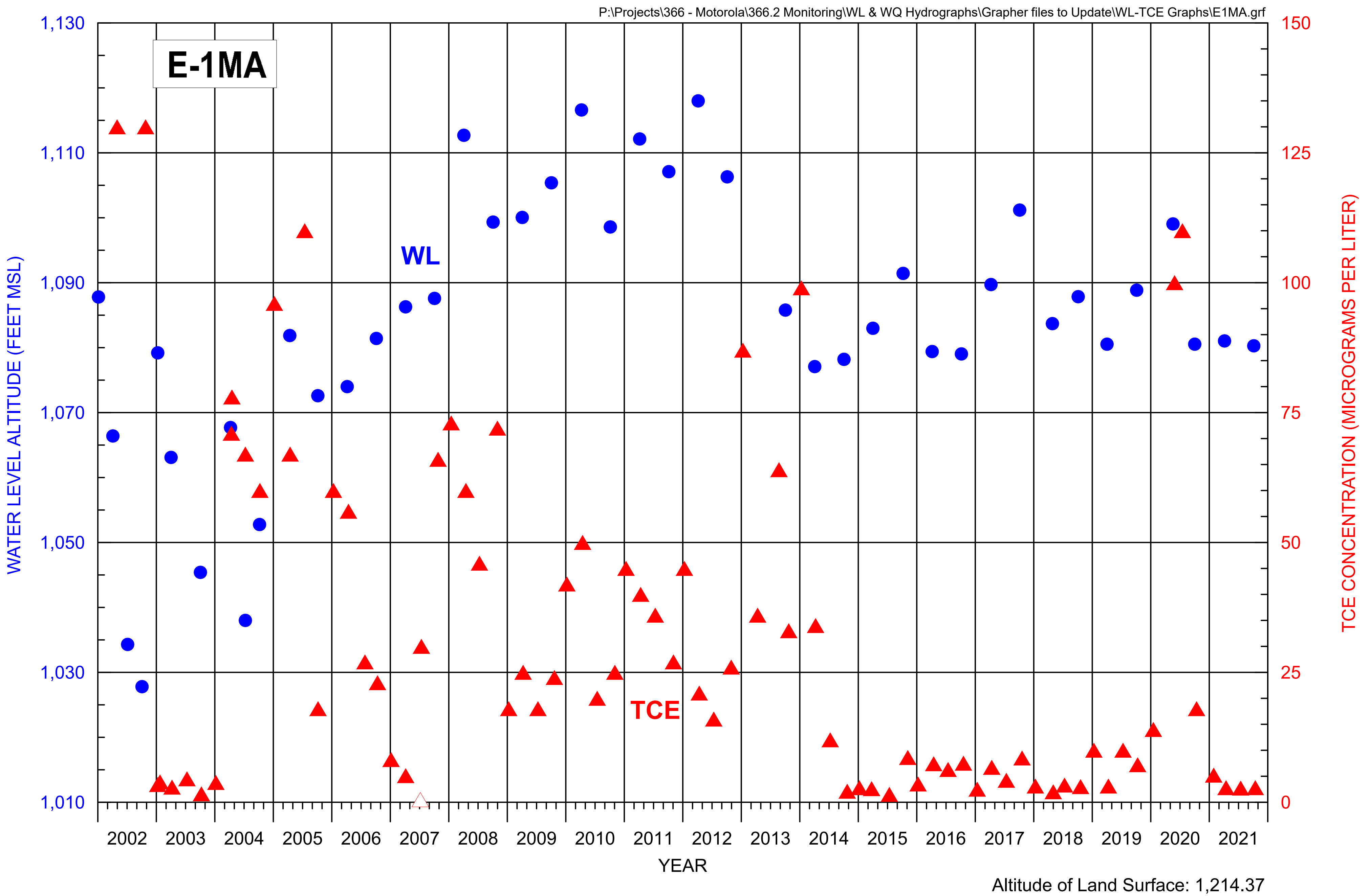
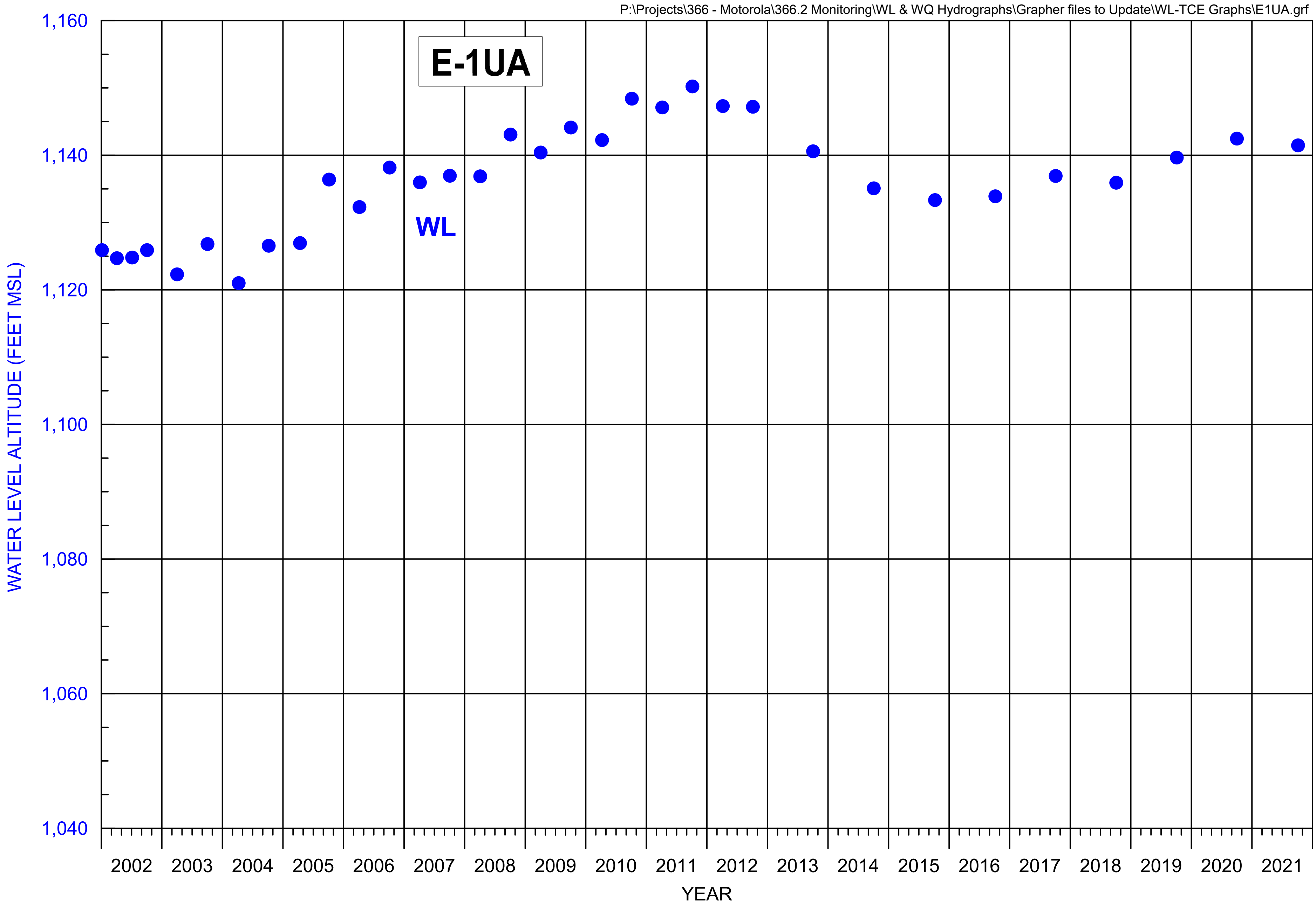


FIGURE D-20. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-1MA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,215.36

FIGURE D-21. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-1UA

North Indian Bend Wash Superfund Site

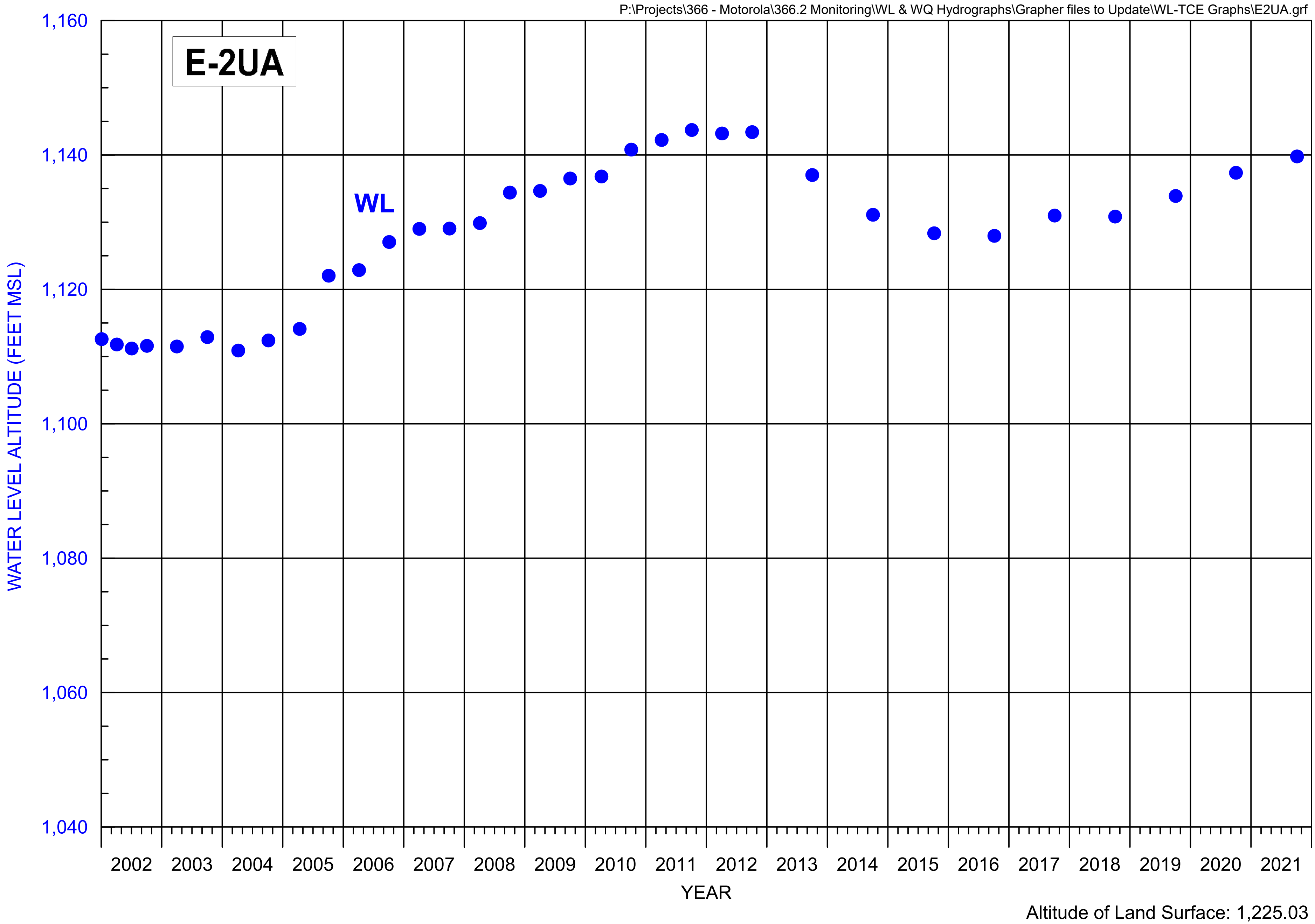


FIGURE D-22. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-2UA

North Indian Bend Wash Superfund Site

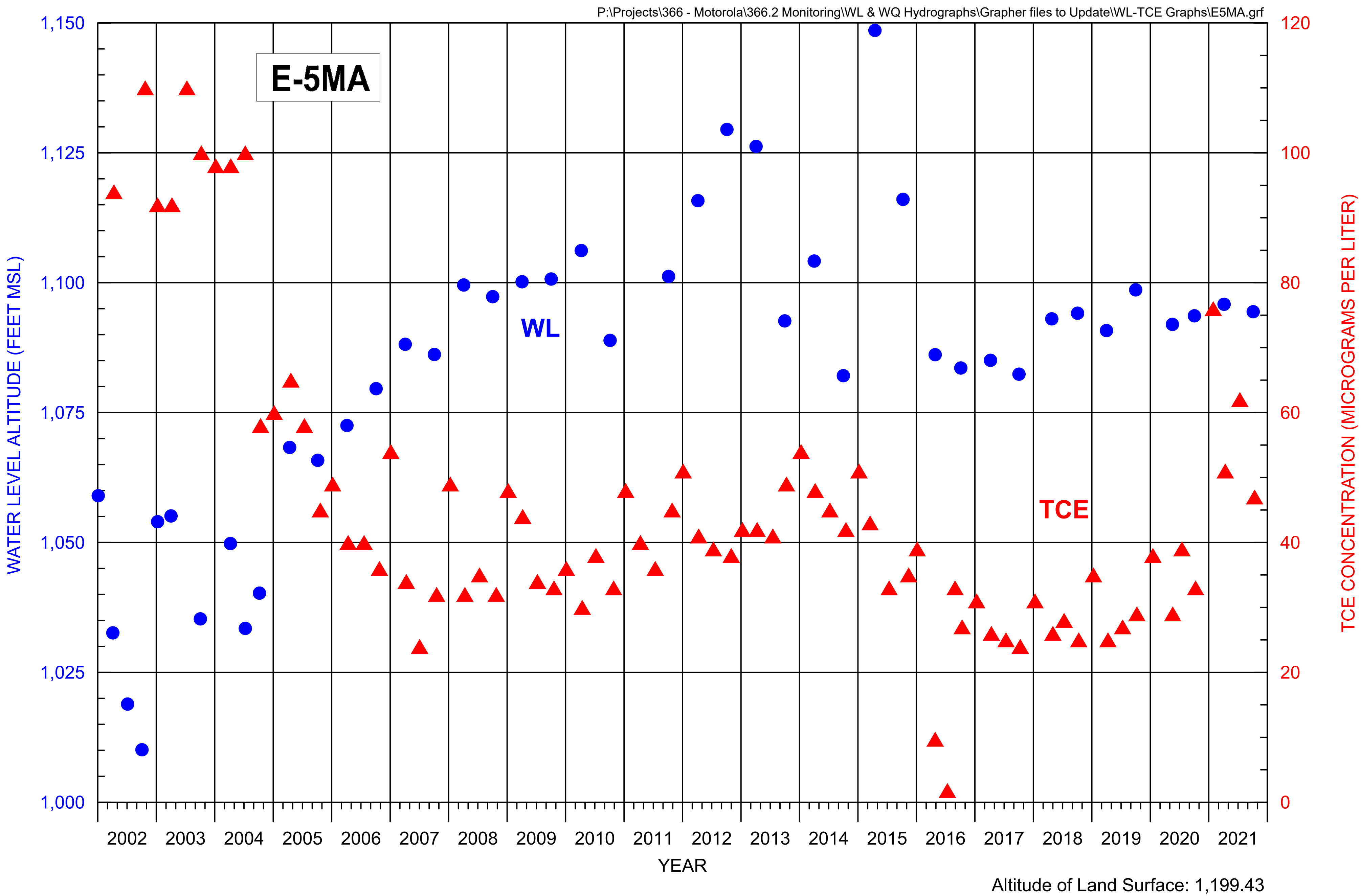


FIGURE D-23. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-5MA

North Indian Bend Wash Superfund Site

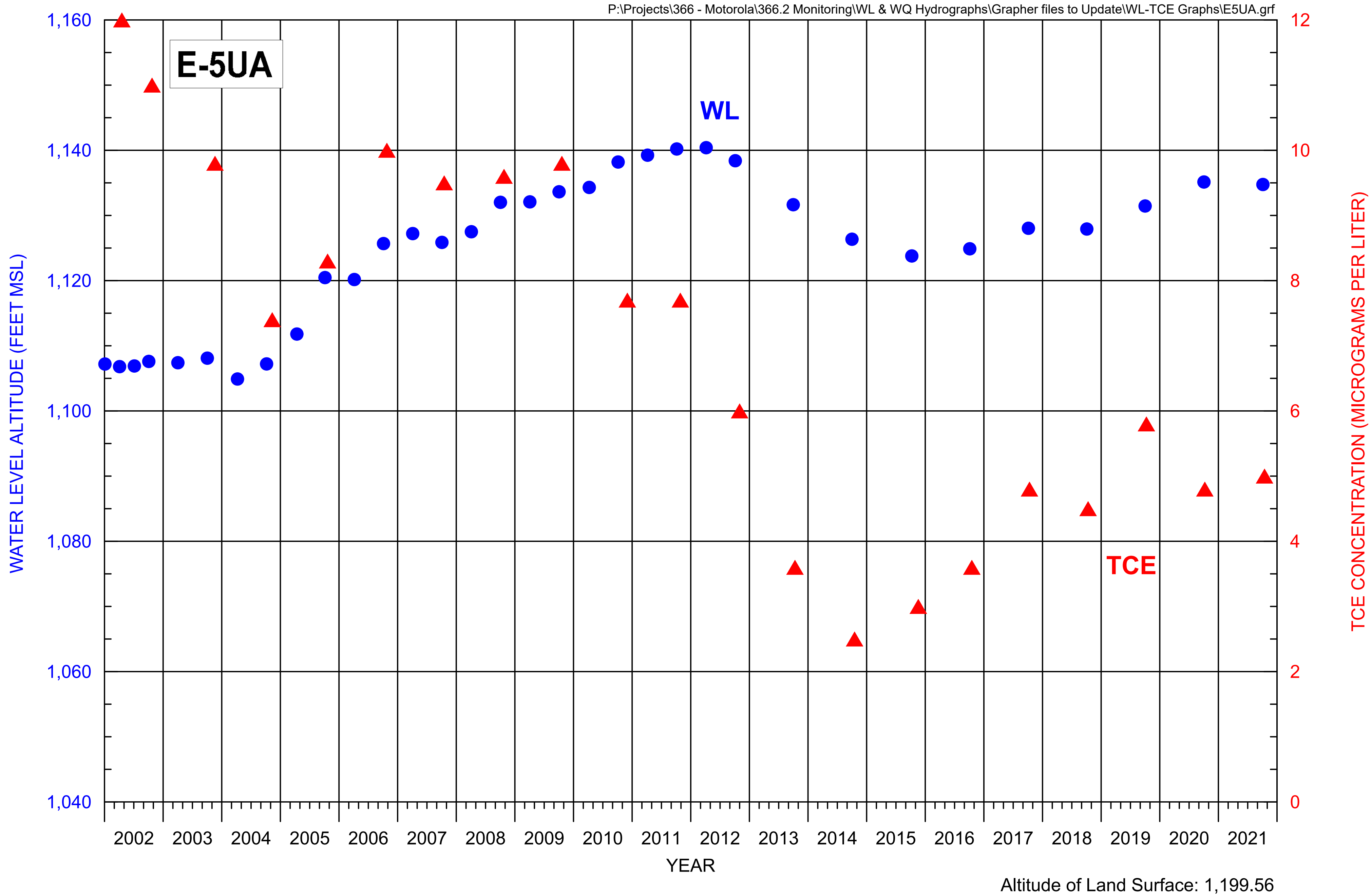


FIGURE D-24. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-5UA

North Indian Bend Wash Superfund Site

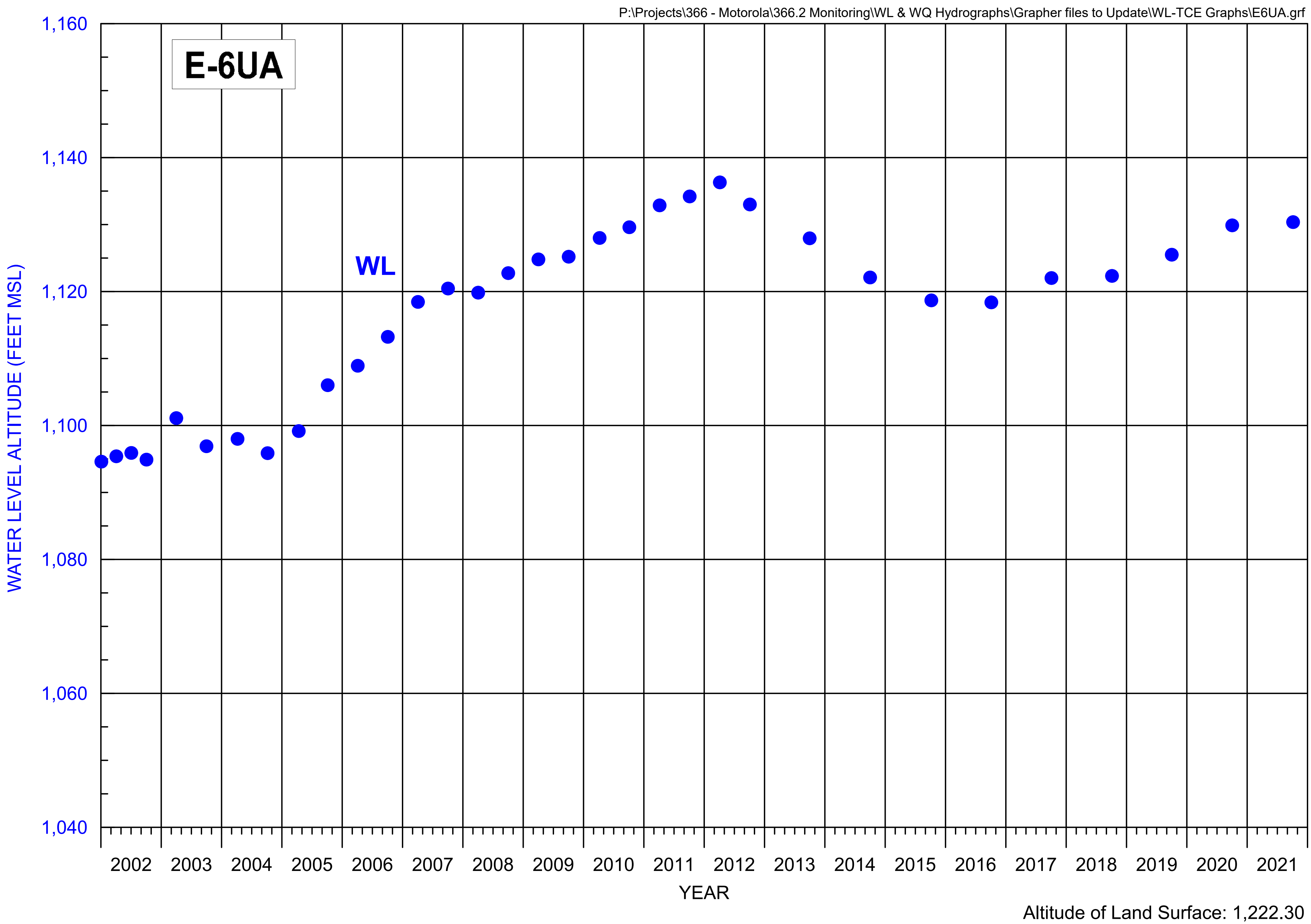


FIGURE D-25. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-6UA

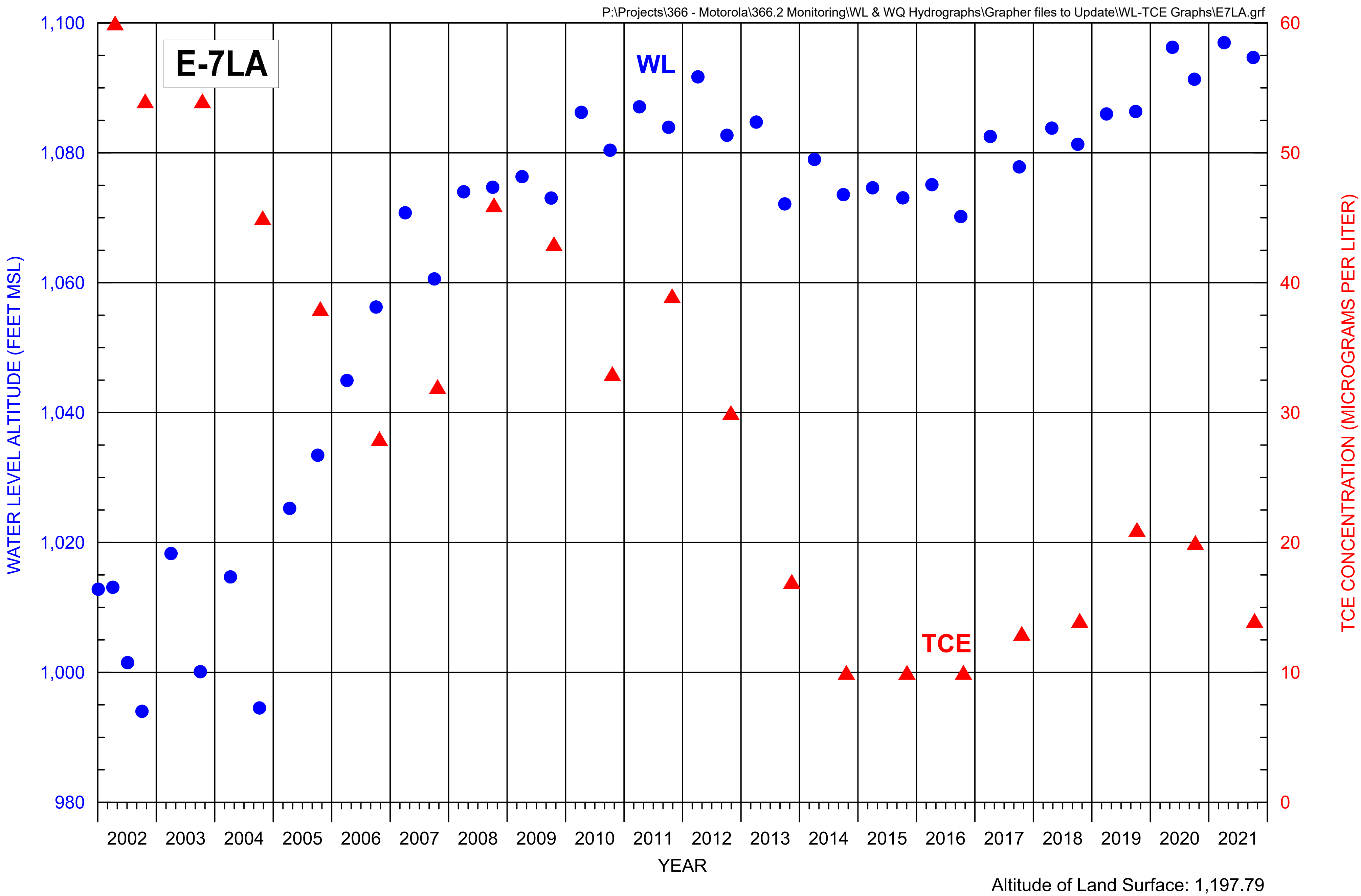


FIGURE D-26. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-7LA

North Indian Bend Wash Superfund Site

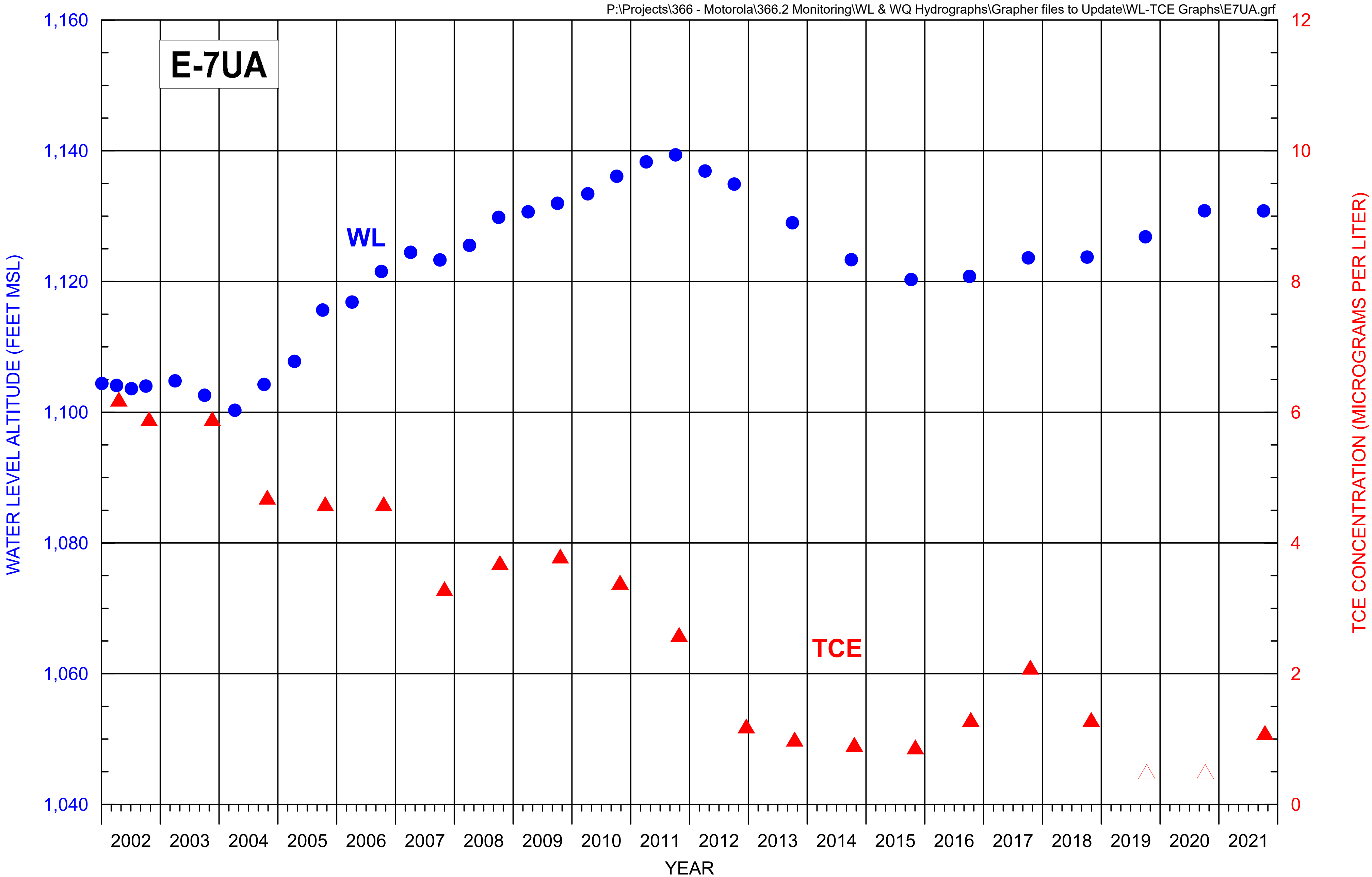


FIGURE D-27. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-7UA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

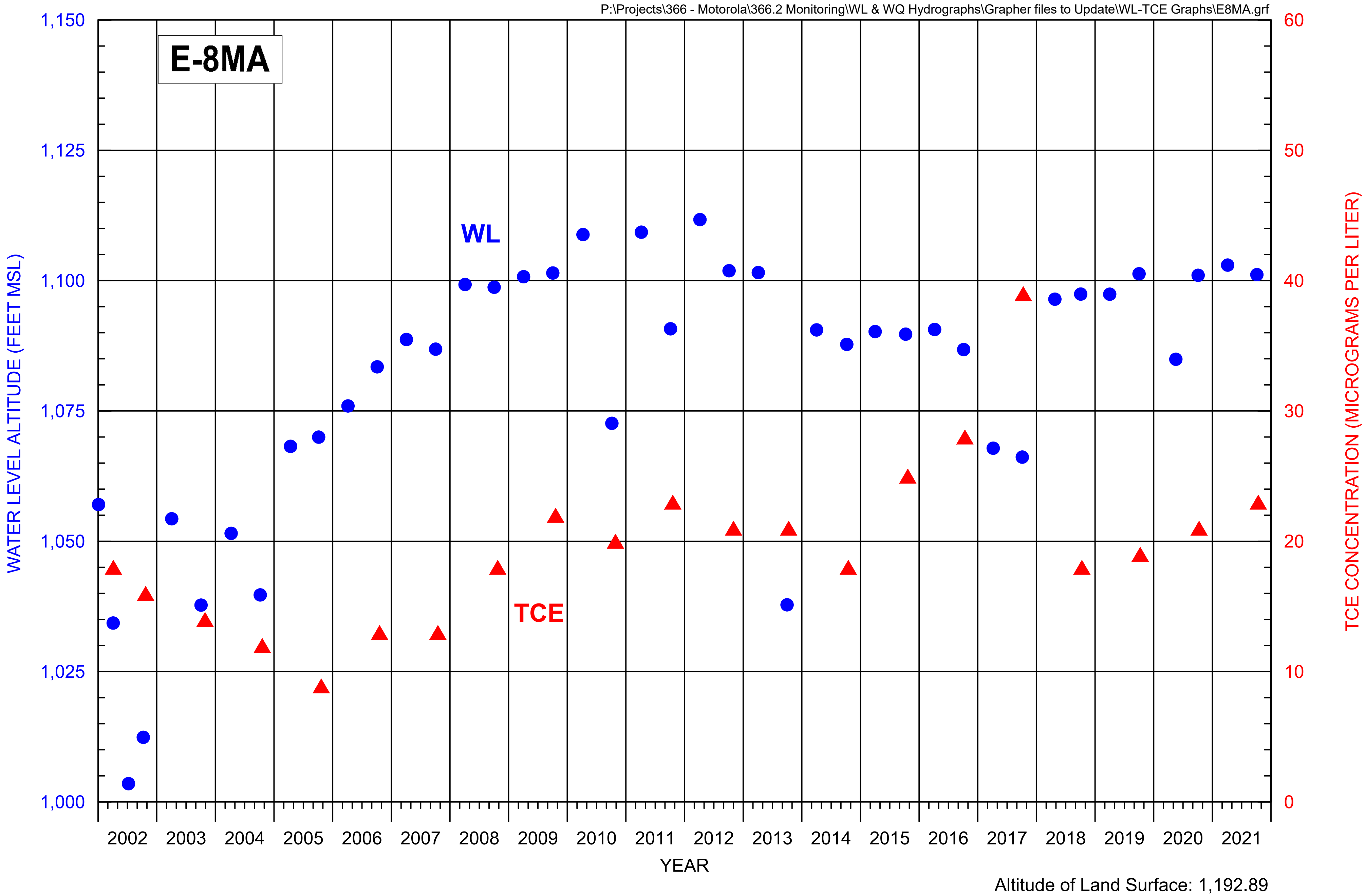


FIGURE D-28. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-8MA

North Indian Bend Wash Superfund Site

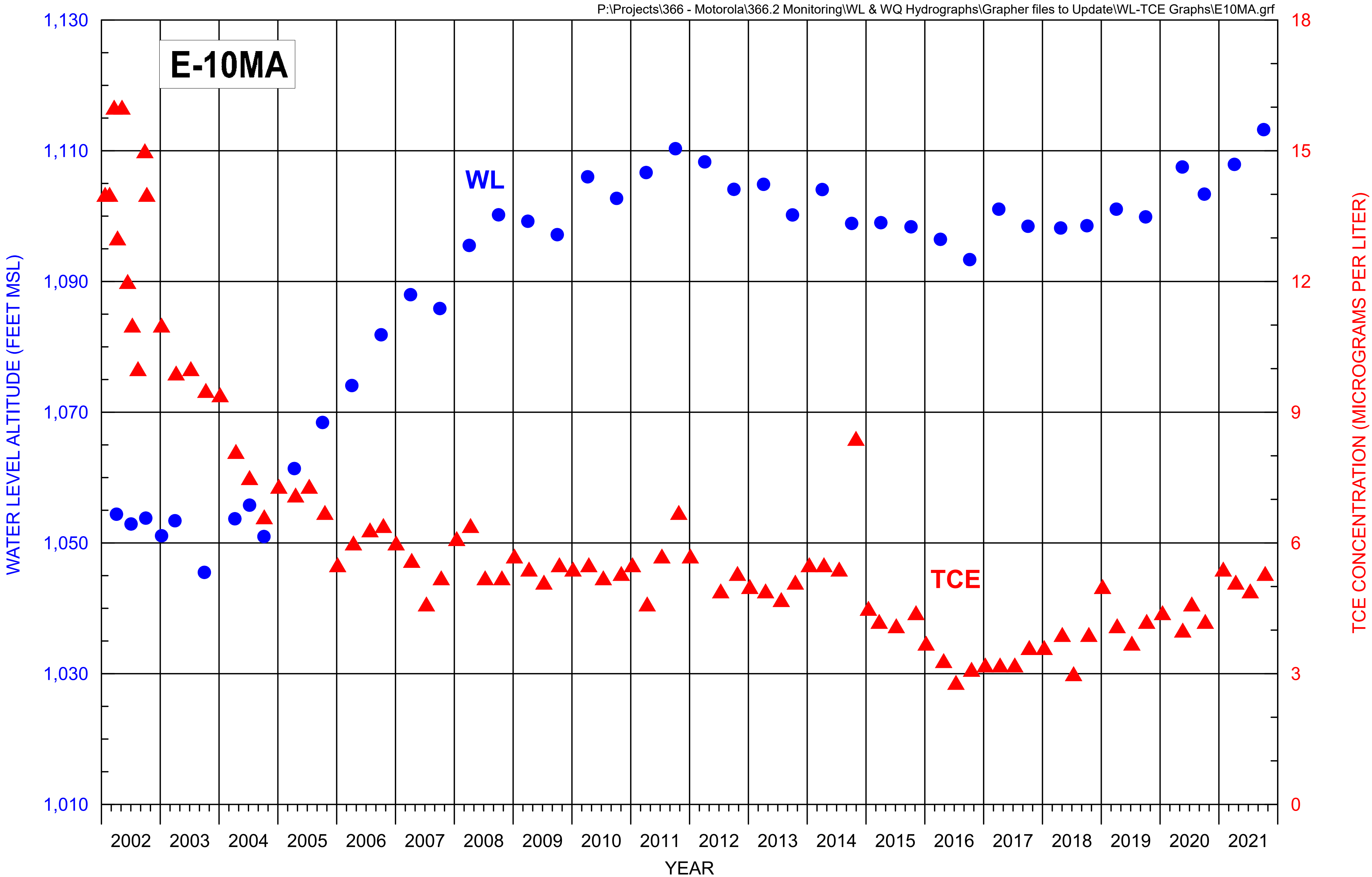


FIGURE D-29. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-10MA

North Indian Bend Wash Superfund Site

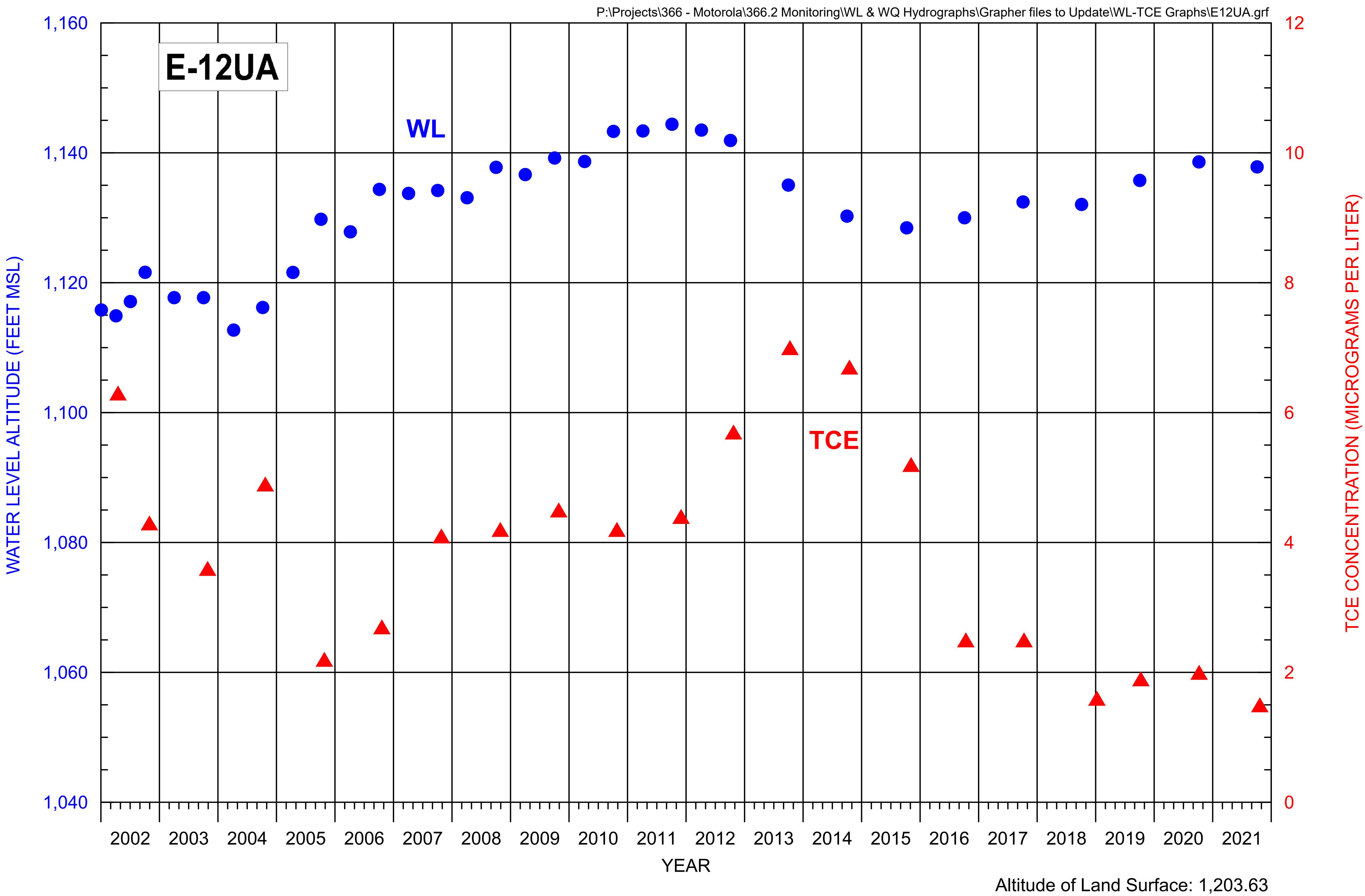


FIGURE D-30. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-12UA

North Indian Bend Wash Superfund Site

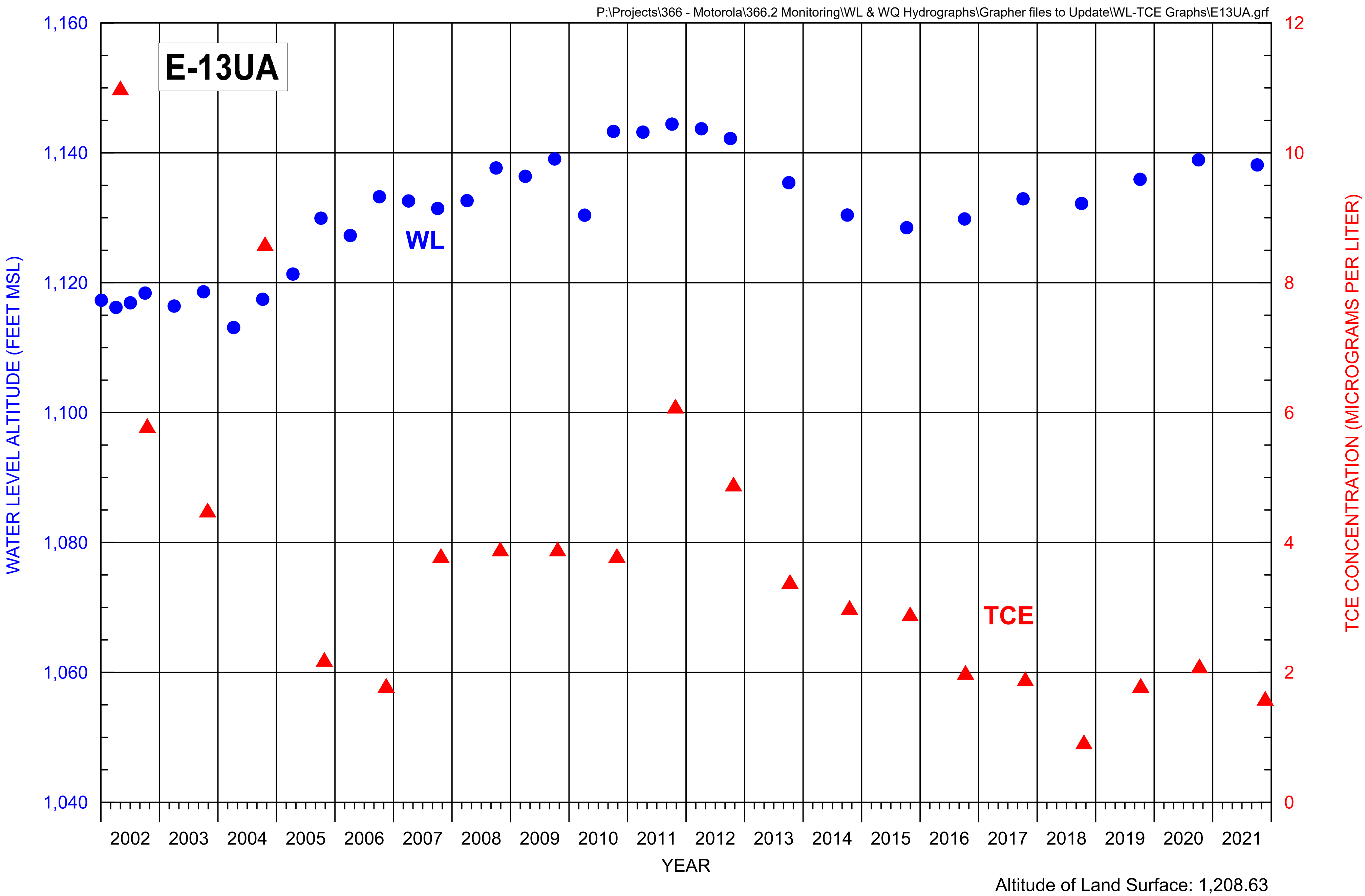


FIGURE D-31. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL E-13UA

North Indian Bend Wash Superfund Site

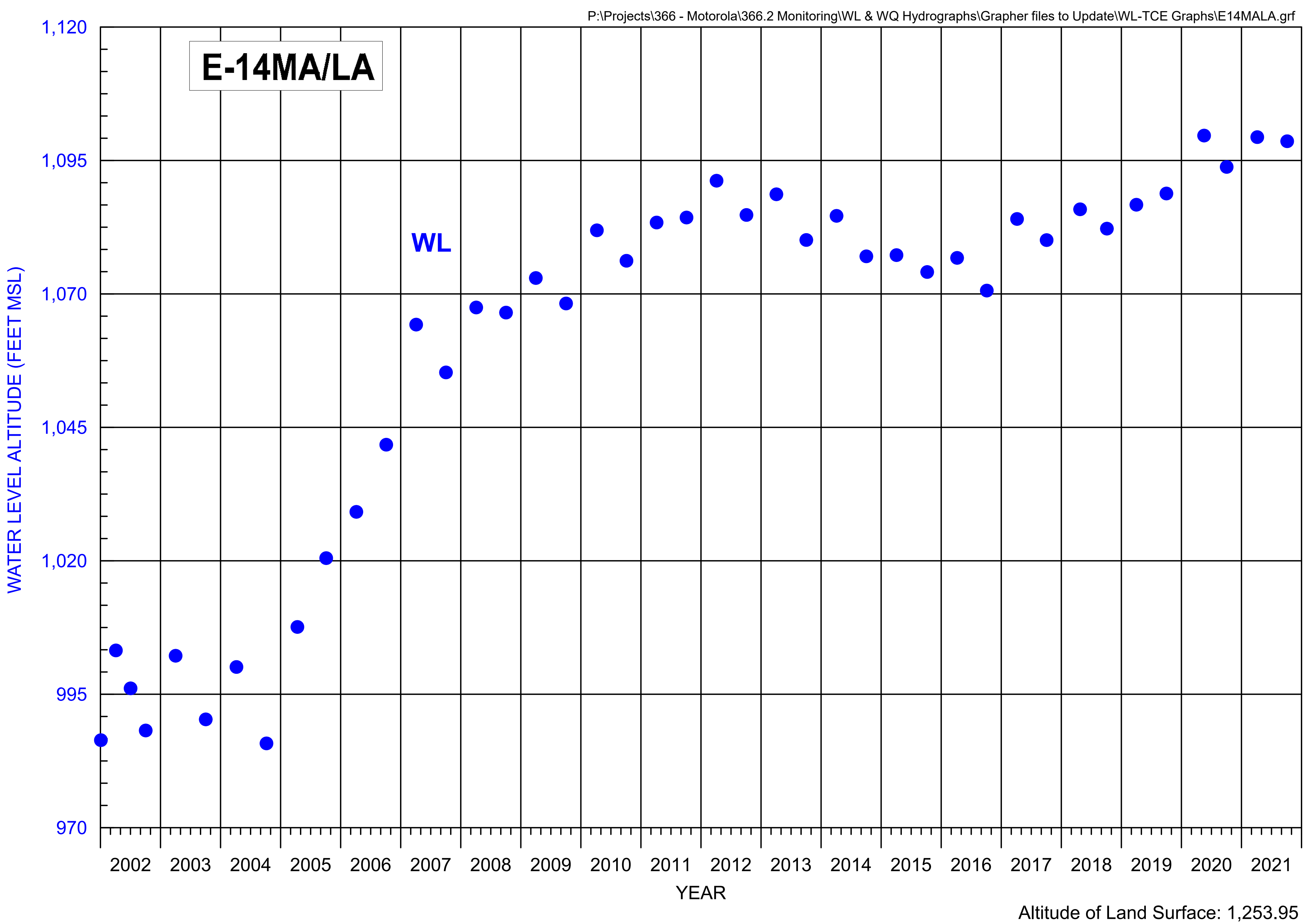
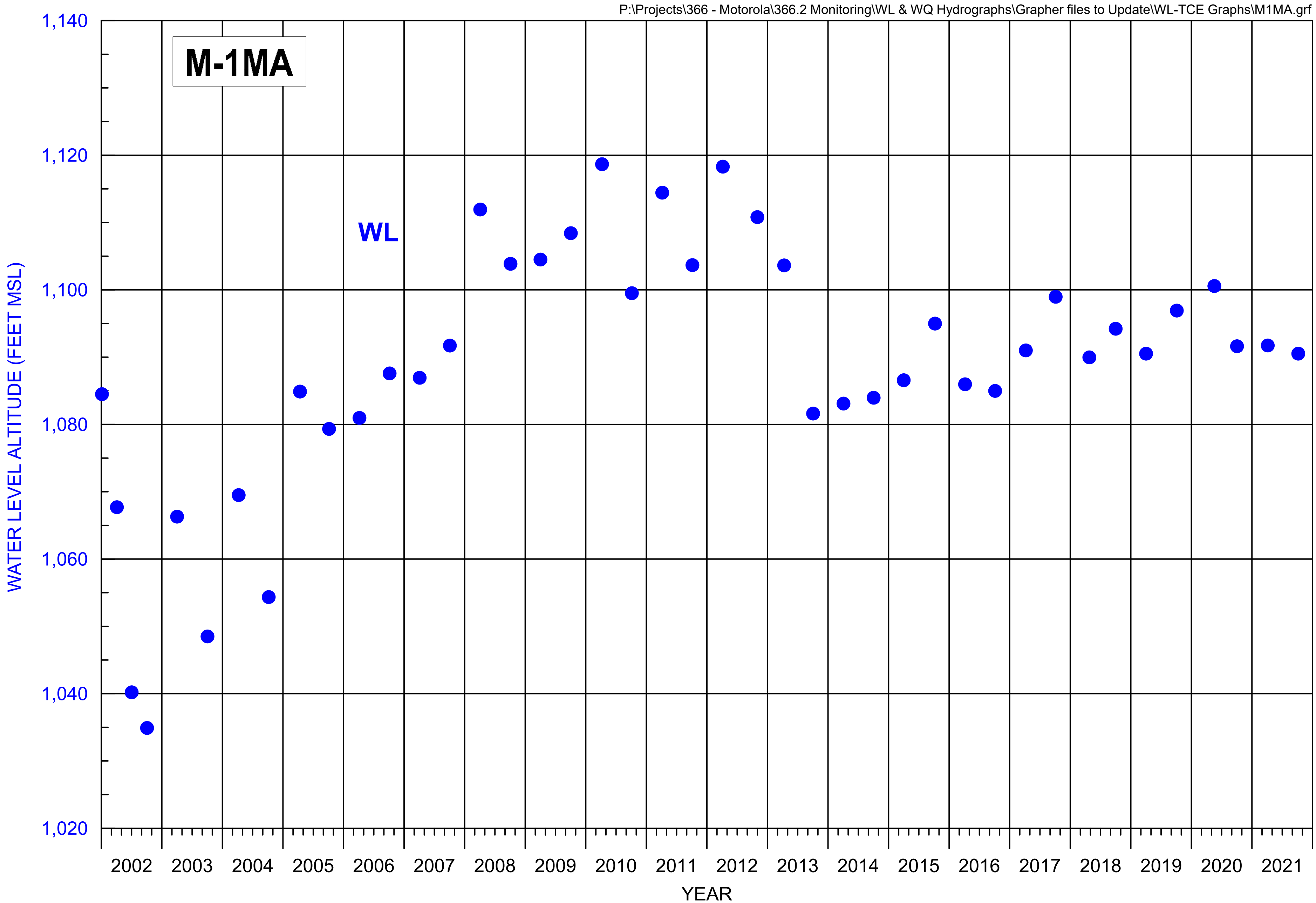


FIGURE D-32. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL E-14MA/LA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,210.89

FIGURE D-33. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-1MA

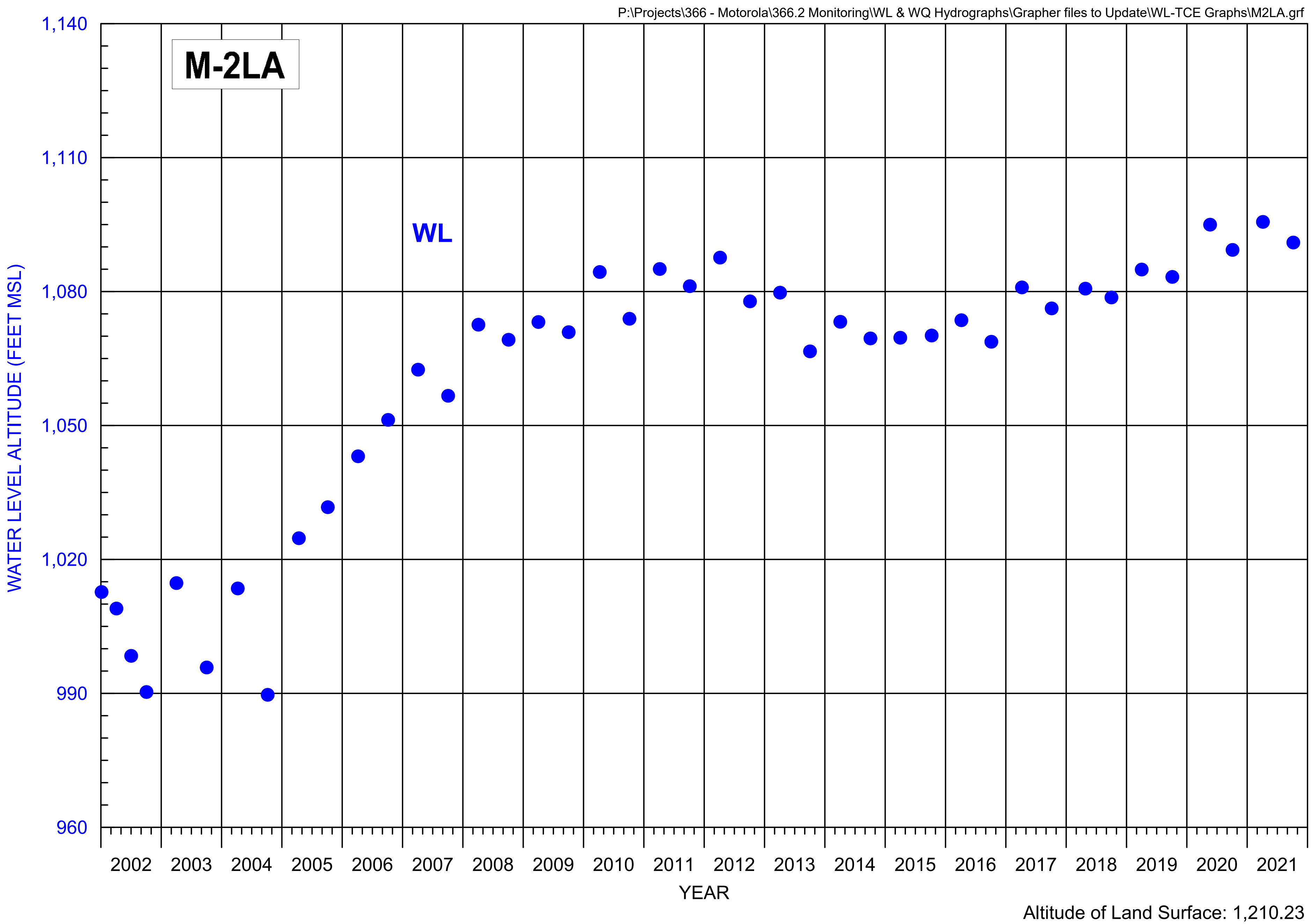


FIGURE D-34. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-2LA

North Indian Bend Wash Superfund Site

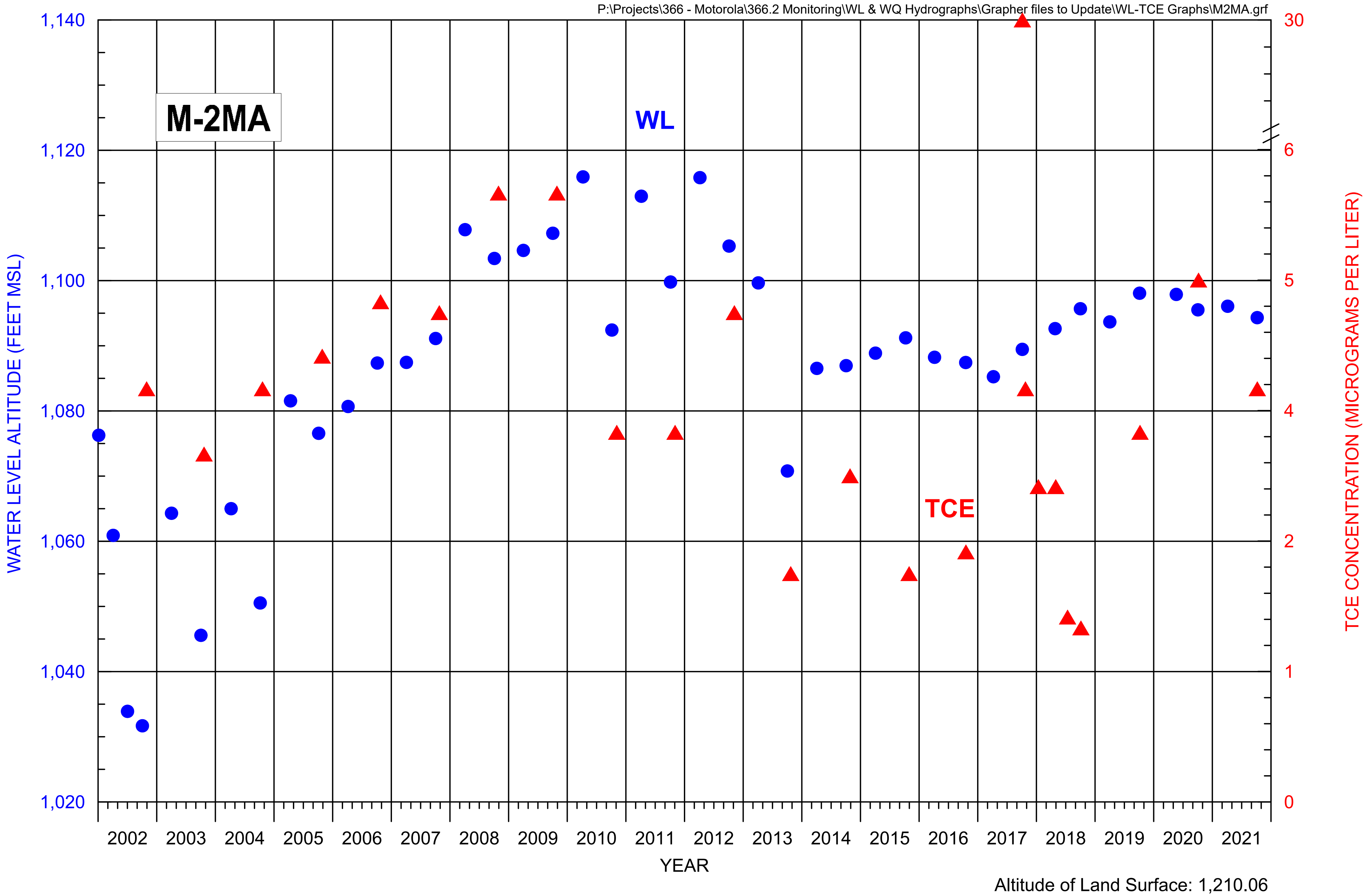


FIGURE D-35. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-2MA

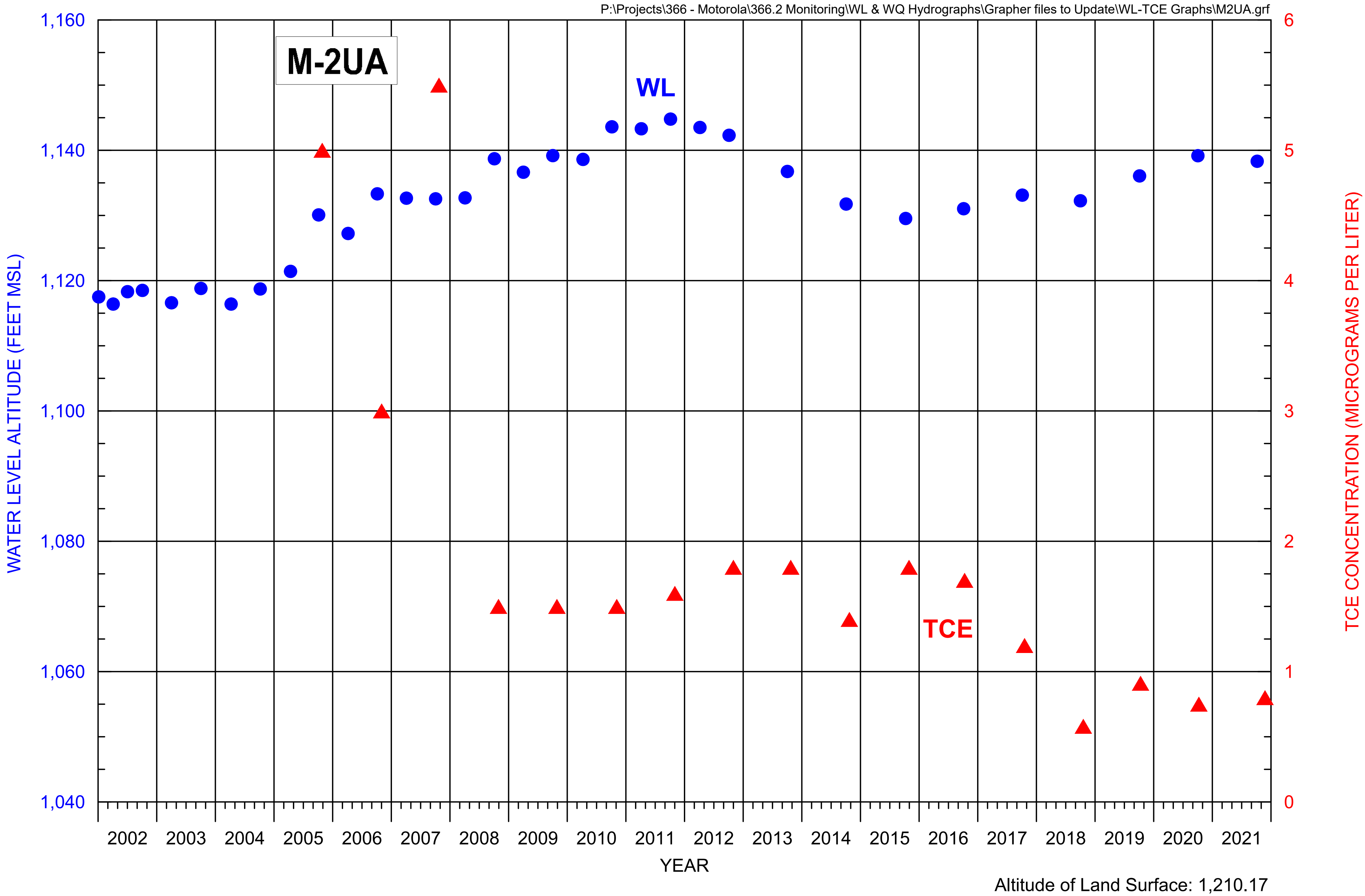


FIGURE D-36. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-2UA

North Indian Bend Wash Superfund Site

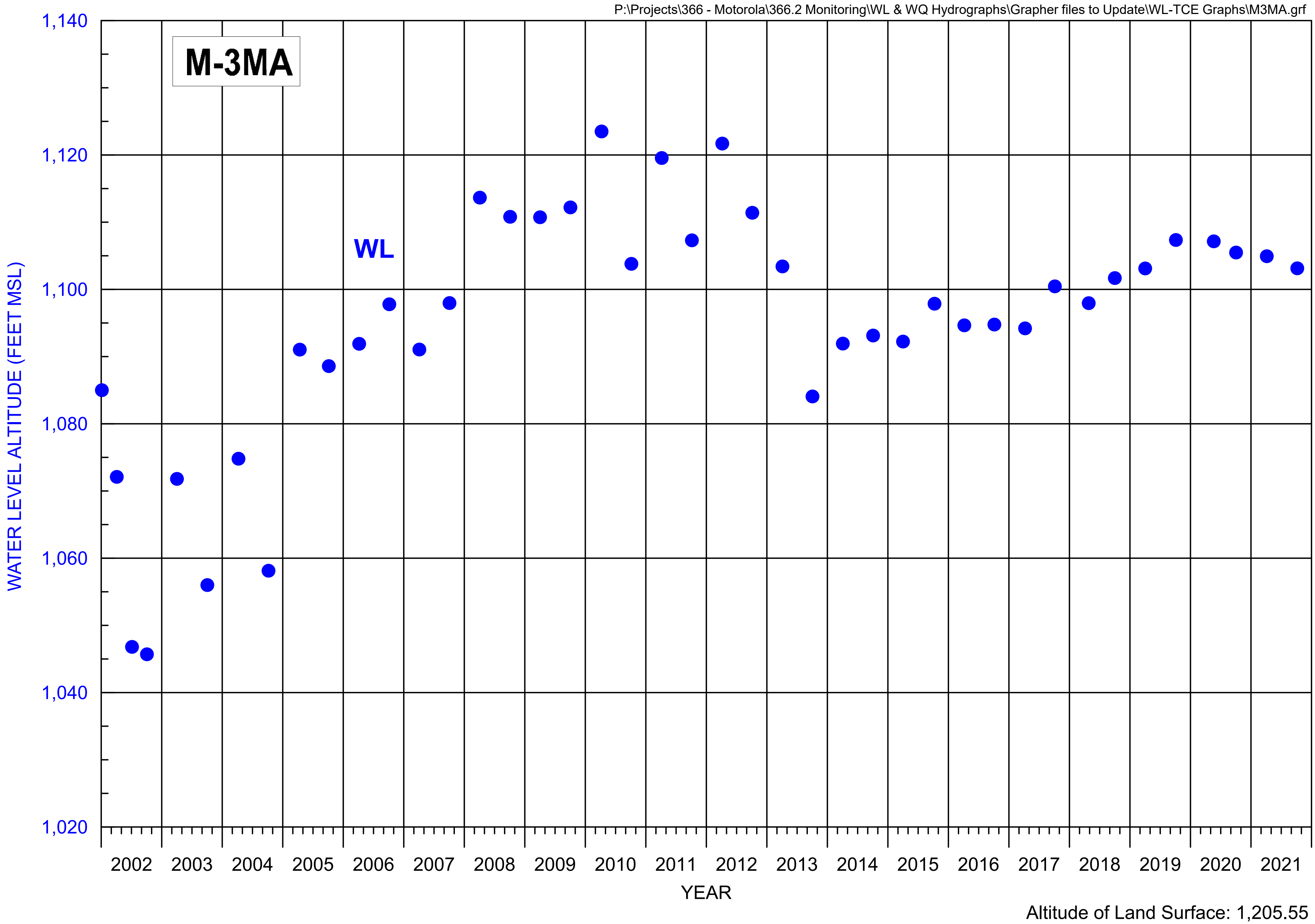


FIGURE D-37. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-3MA

North Indian Bend Wash Superfund Site

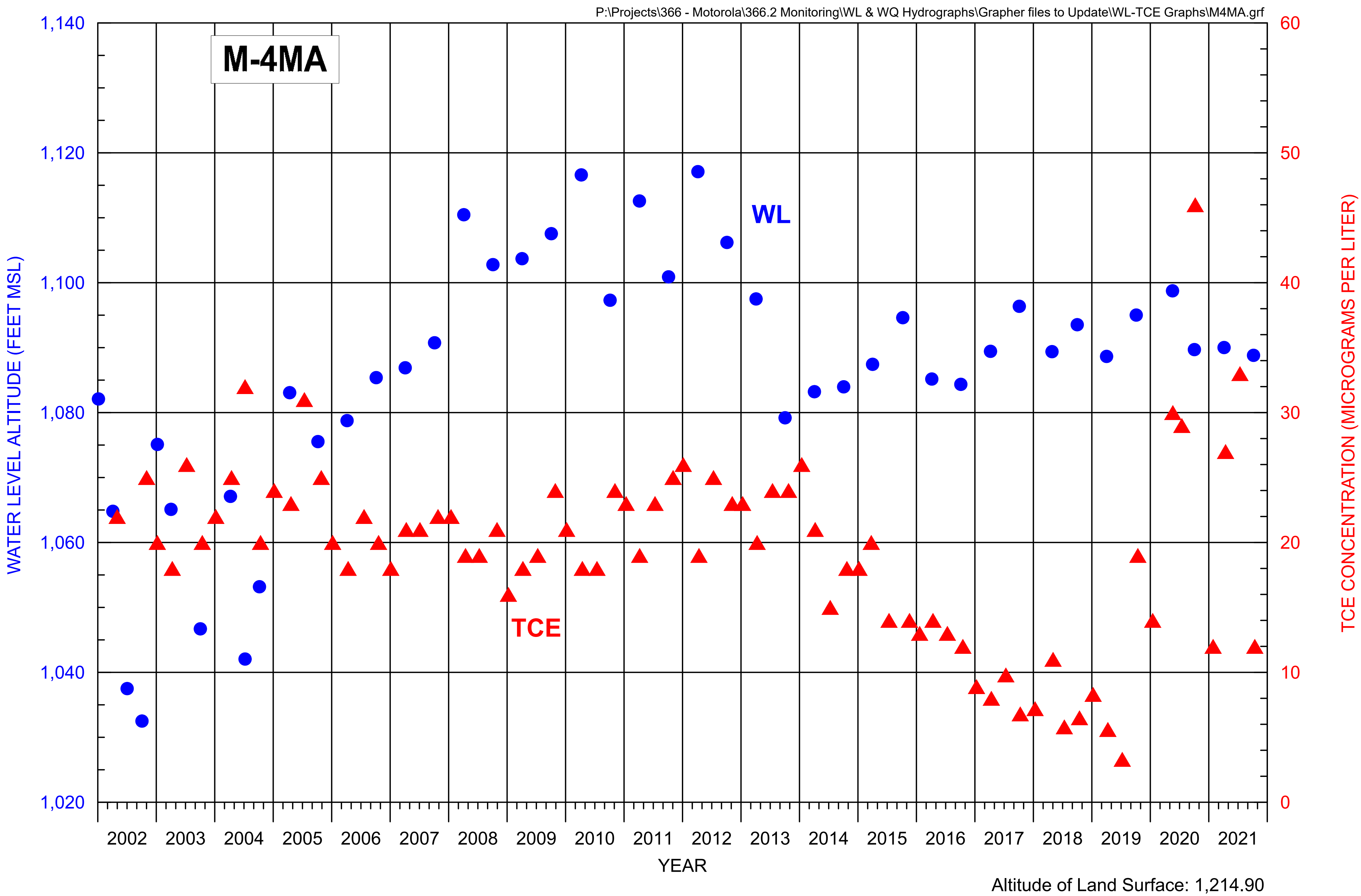


FIGURE D-38. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-4MA

North Indian Bend Wash Superfund Site

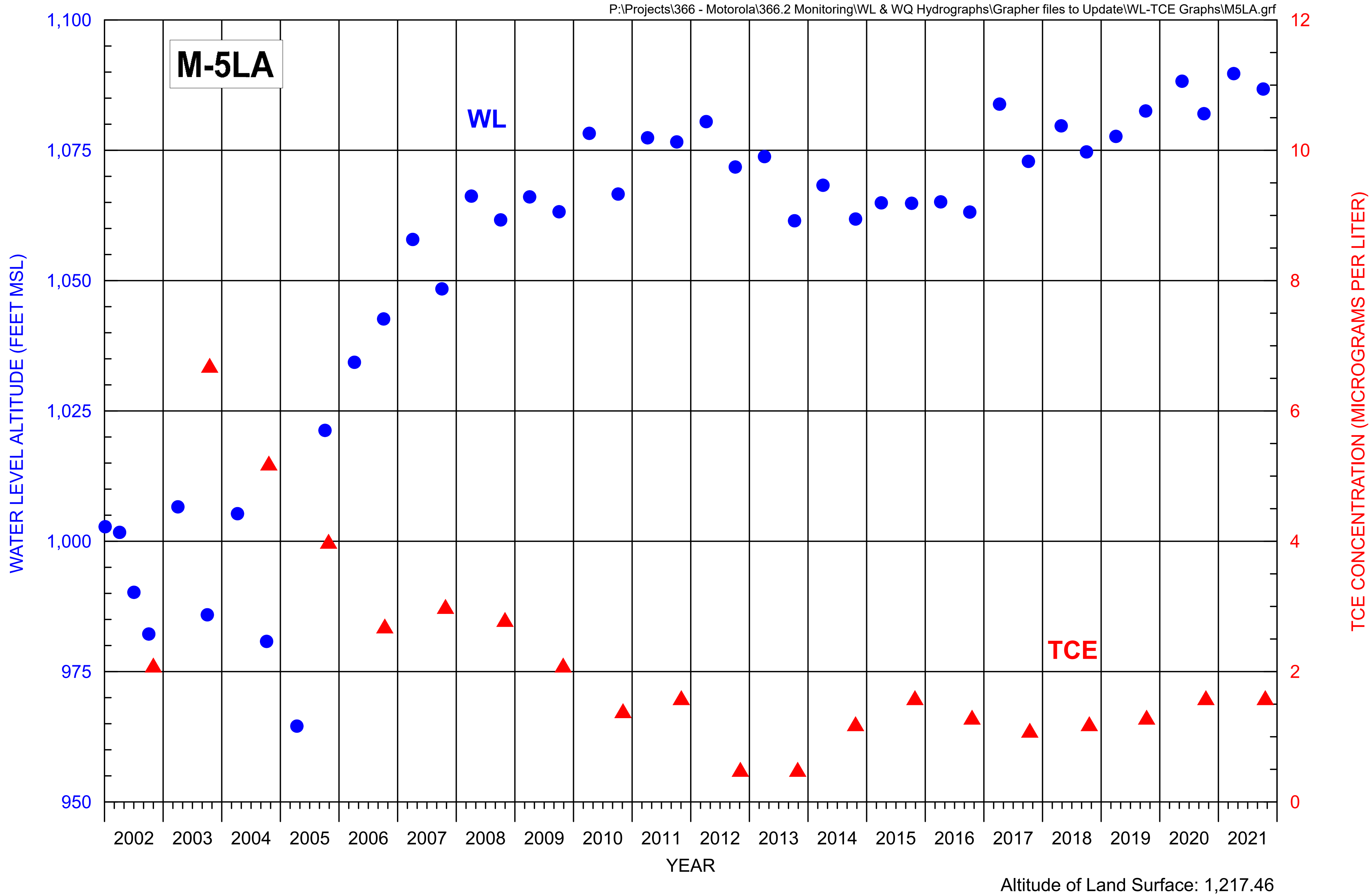


FIGURE D-39. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-5LA

North Indian Bend Wash Superfund Site

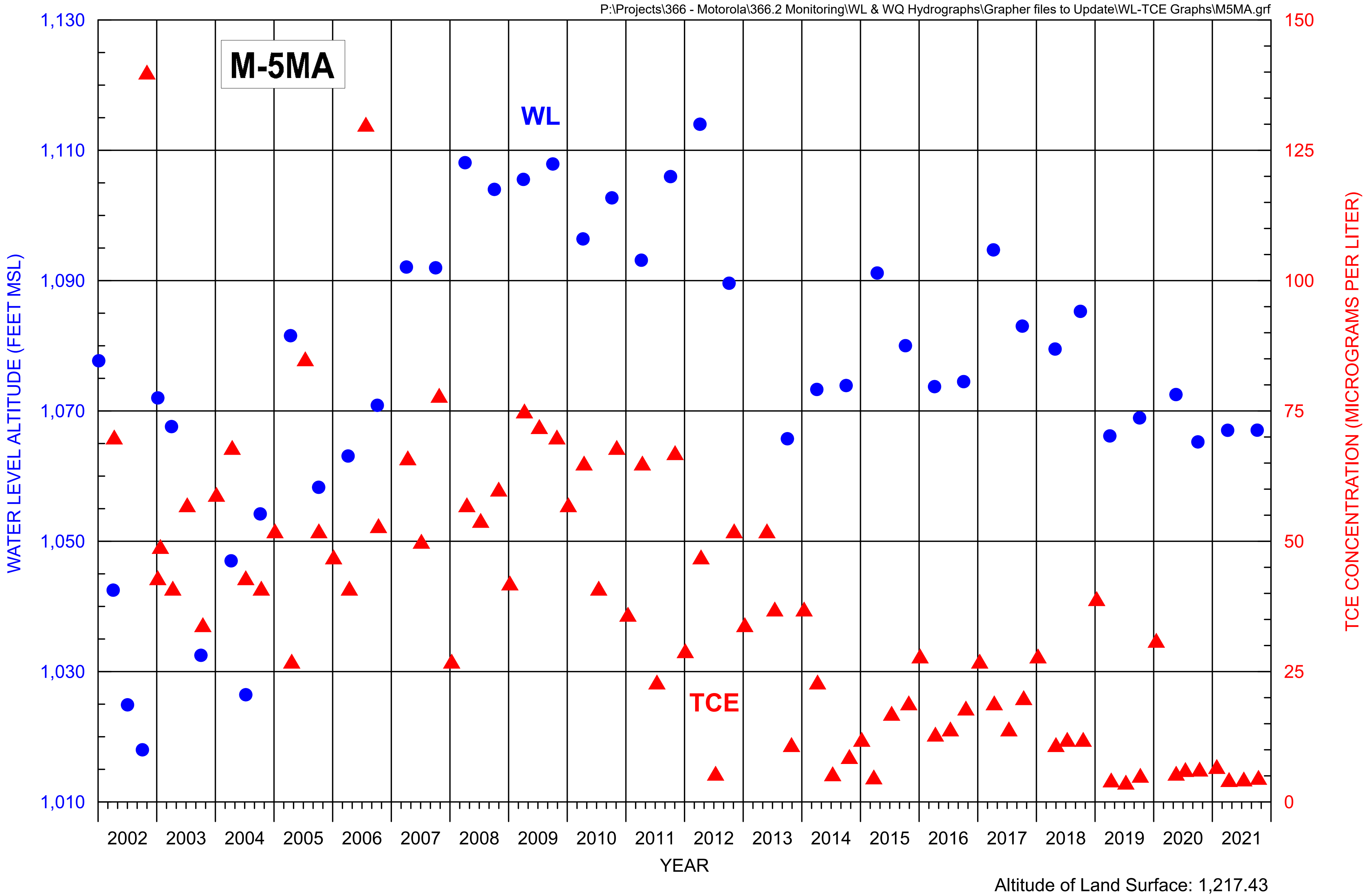
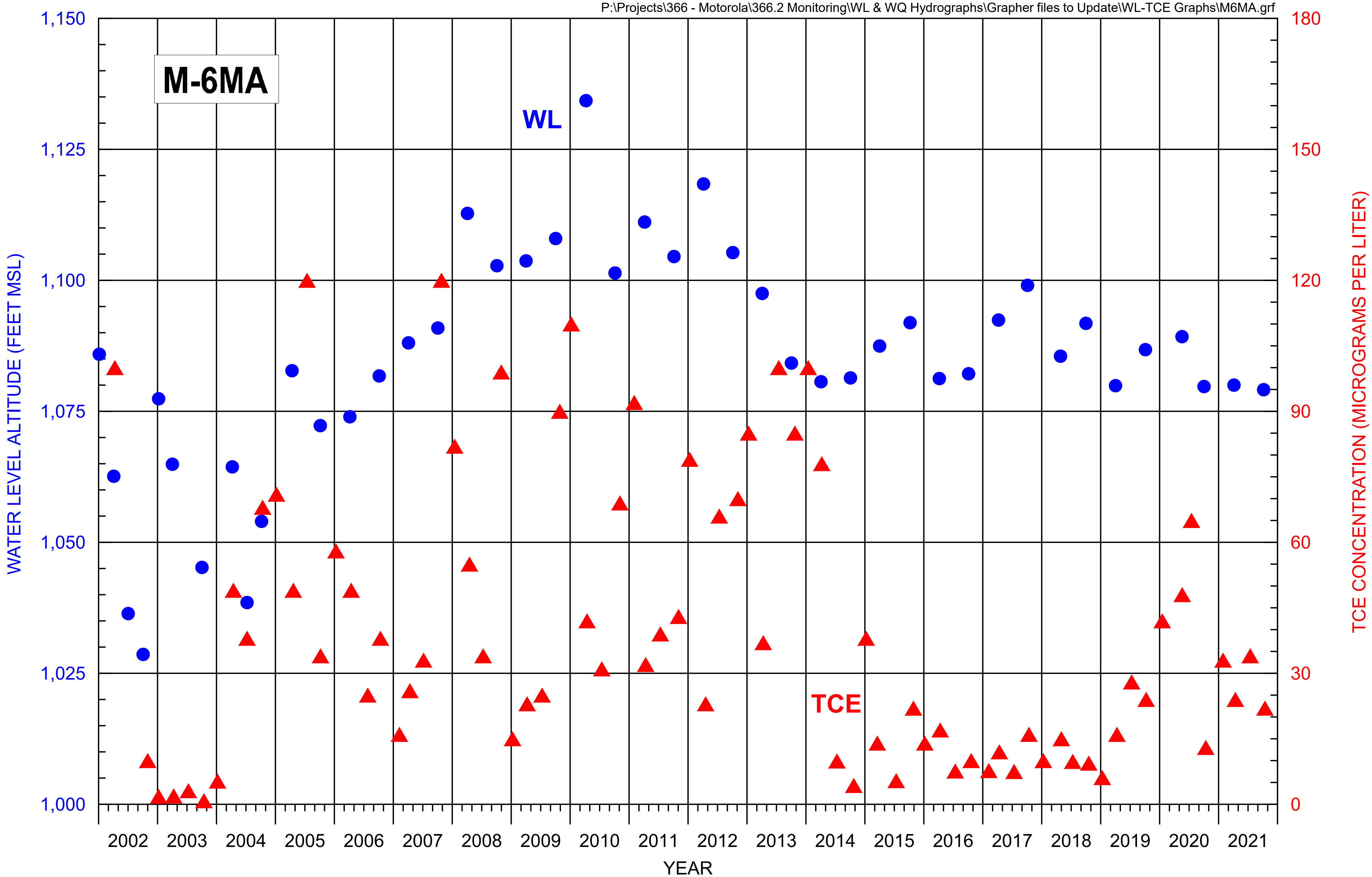


FIGURE D-40. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-5MA

North Indian Bend Wash Superfund Site

P:\Projects\366 - Motorola\366.2 Monitoring\WL & WQ Hydrographs\Grapher files to Update\WL-TCE Graphs\M6MA.grf



Altitude of Land Surface: 1,216.98

FIGURE D-41. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-6MA

North Indian Bend Wash Superfund Site

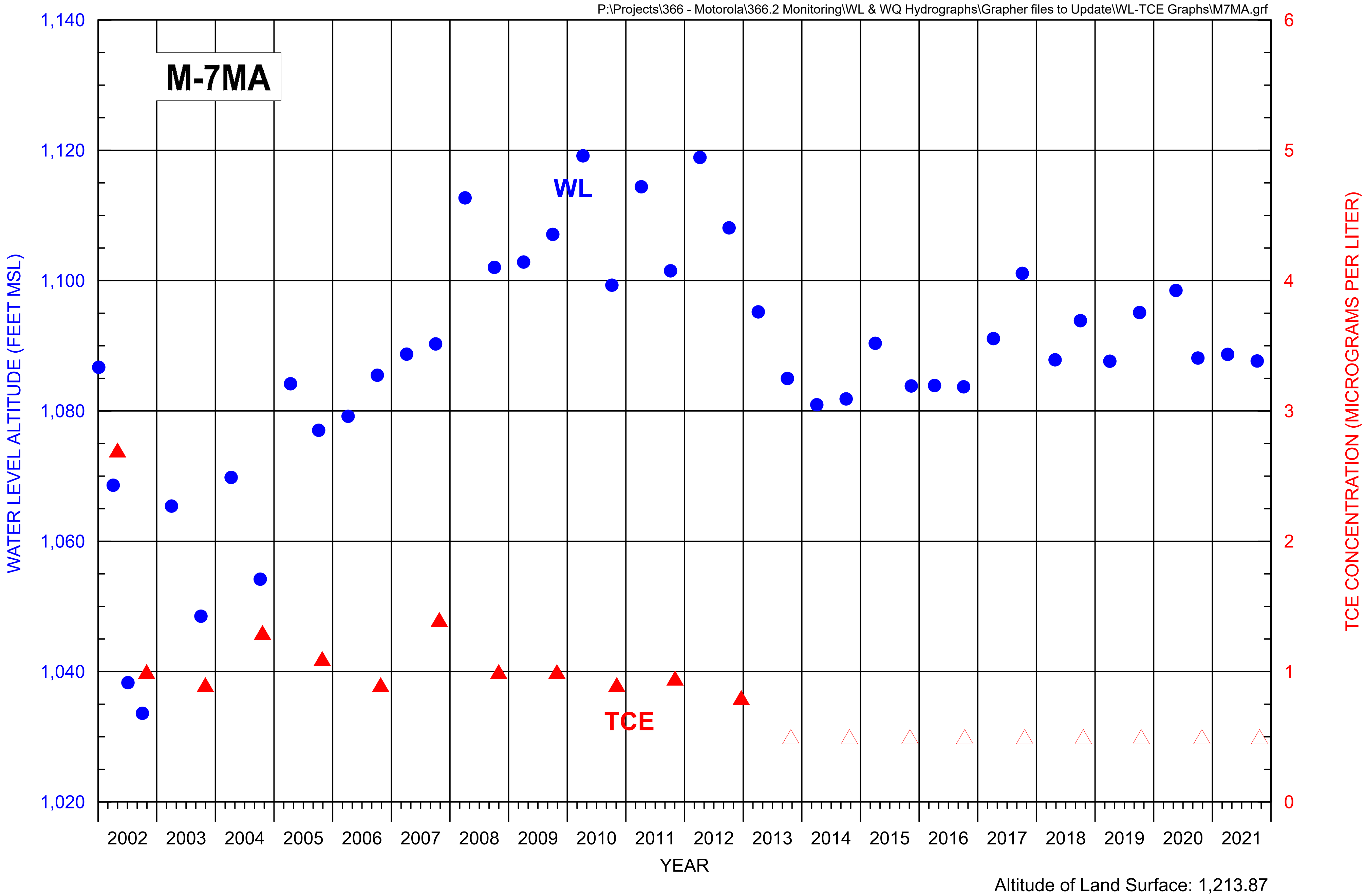


FIGURE D-42. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-7MA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

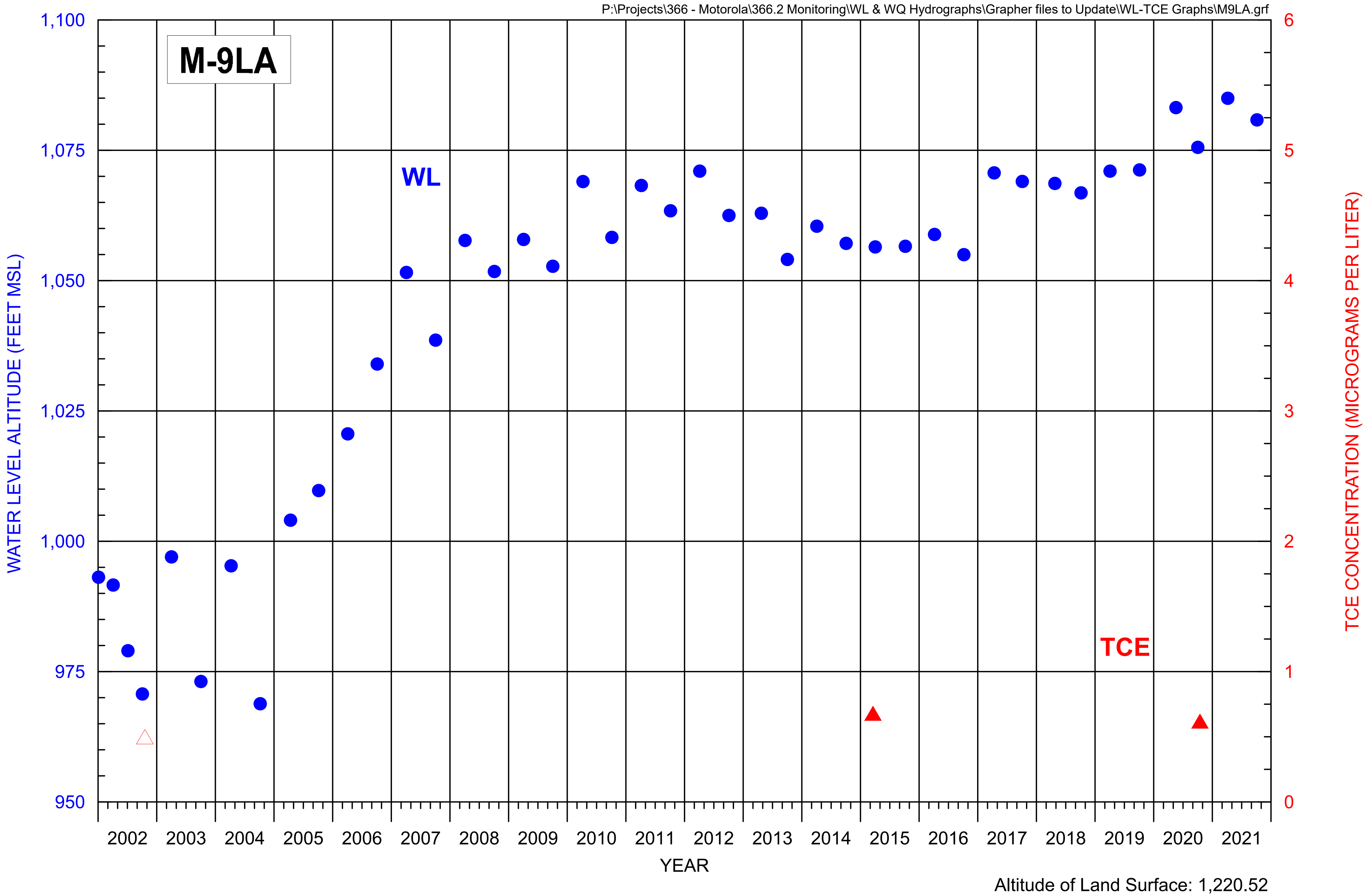
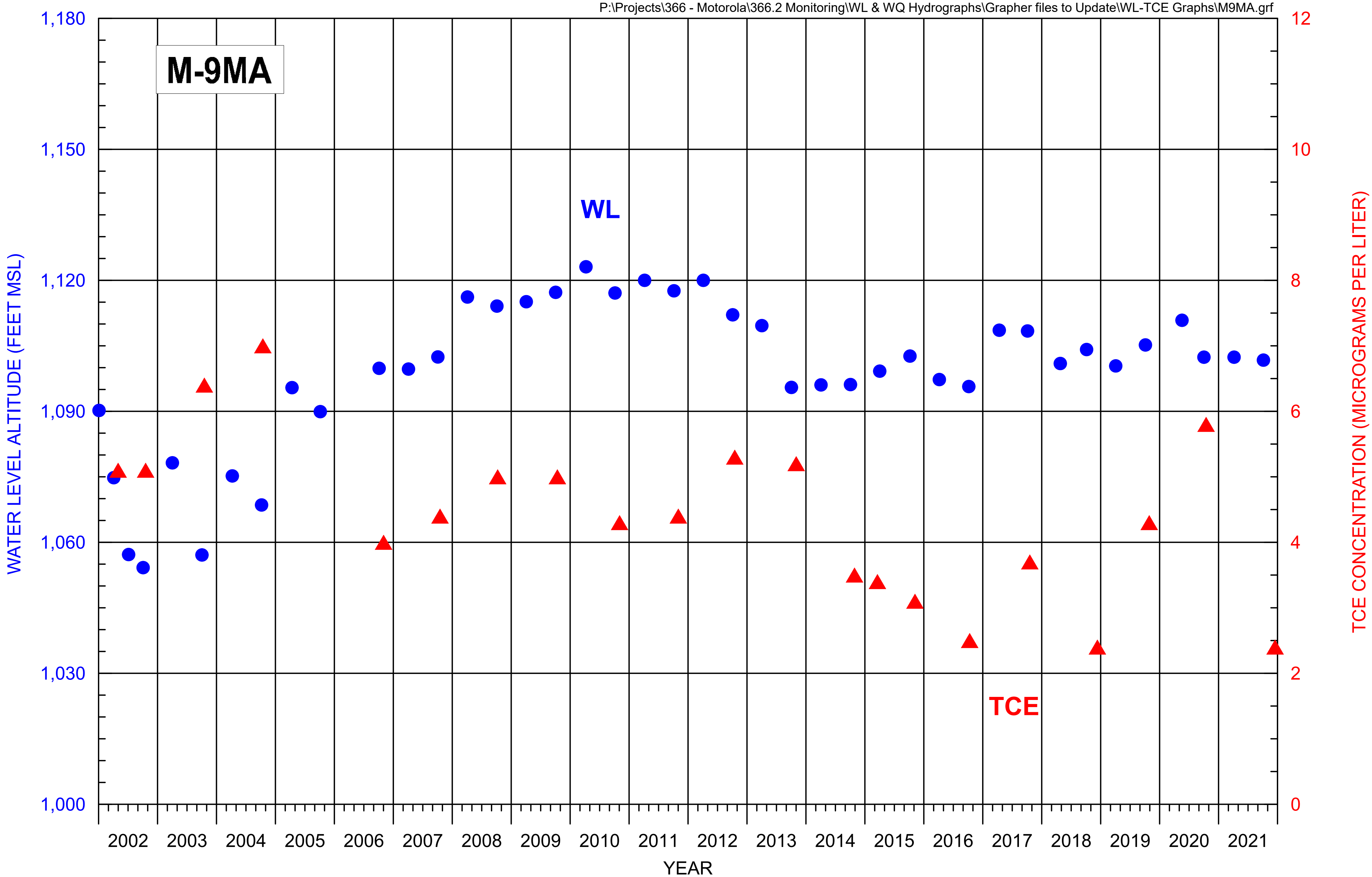


FIGURE D-43. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-9LA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,220.52

FIGURE D-44. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-9MA

North Indian Bend Wash Superfund Site

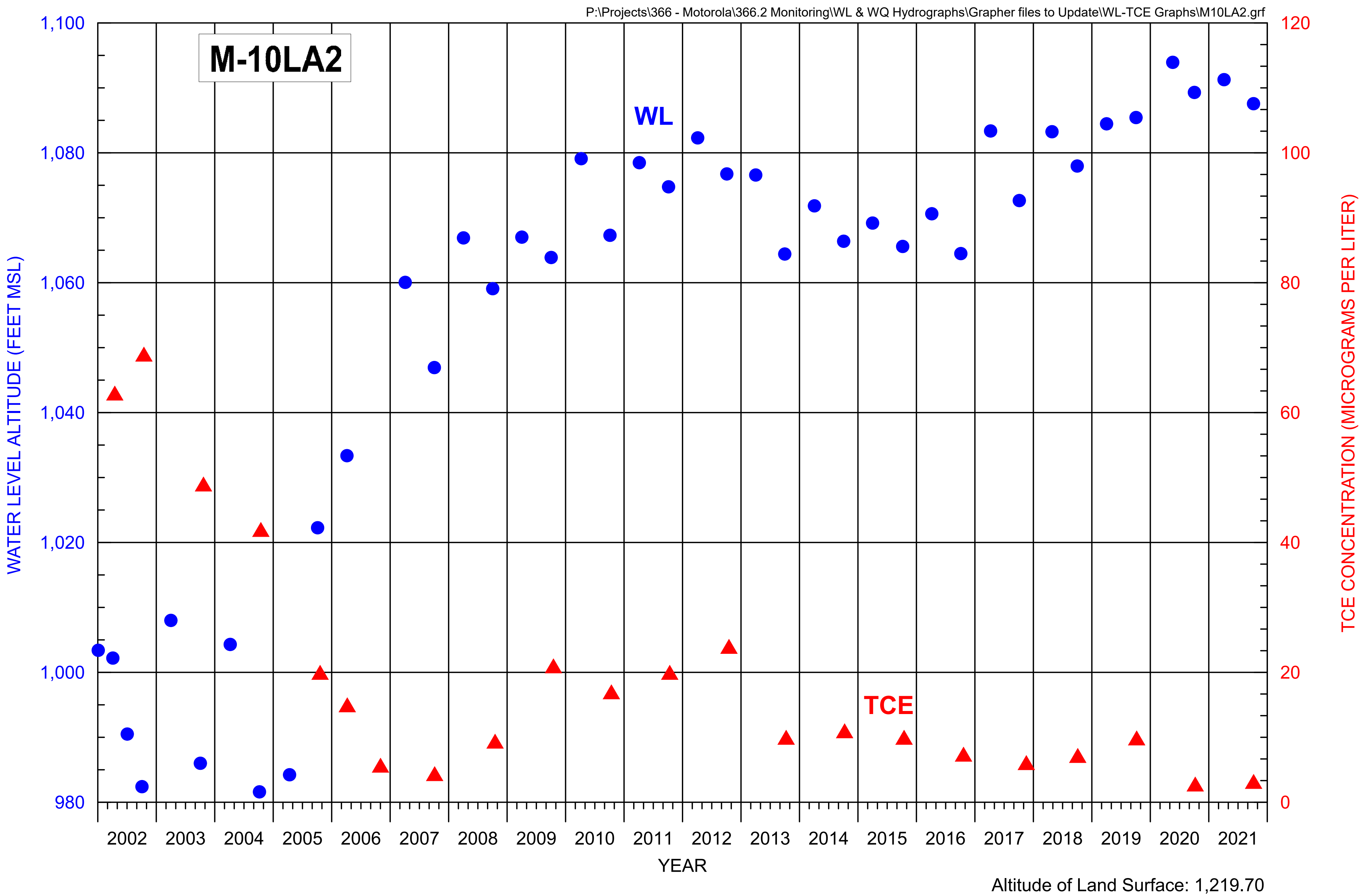


FIGURE D-45. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-10LA2

North Indian Bend Wash Superfund Site

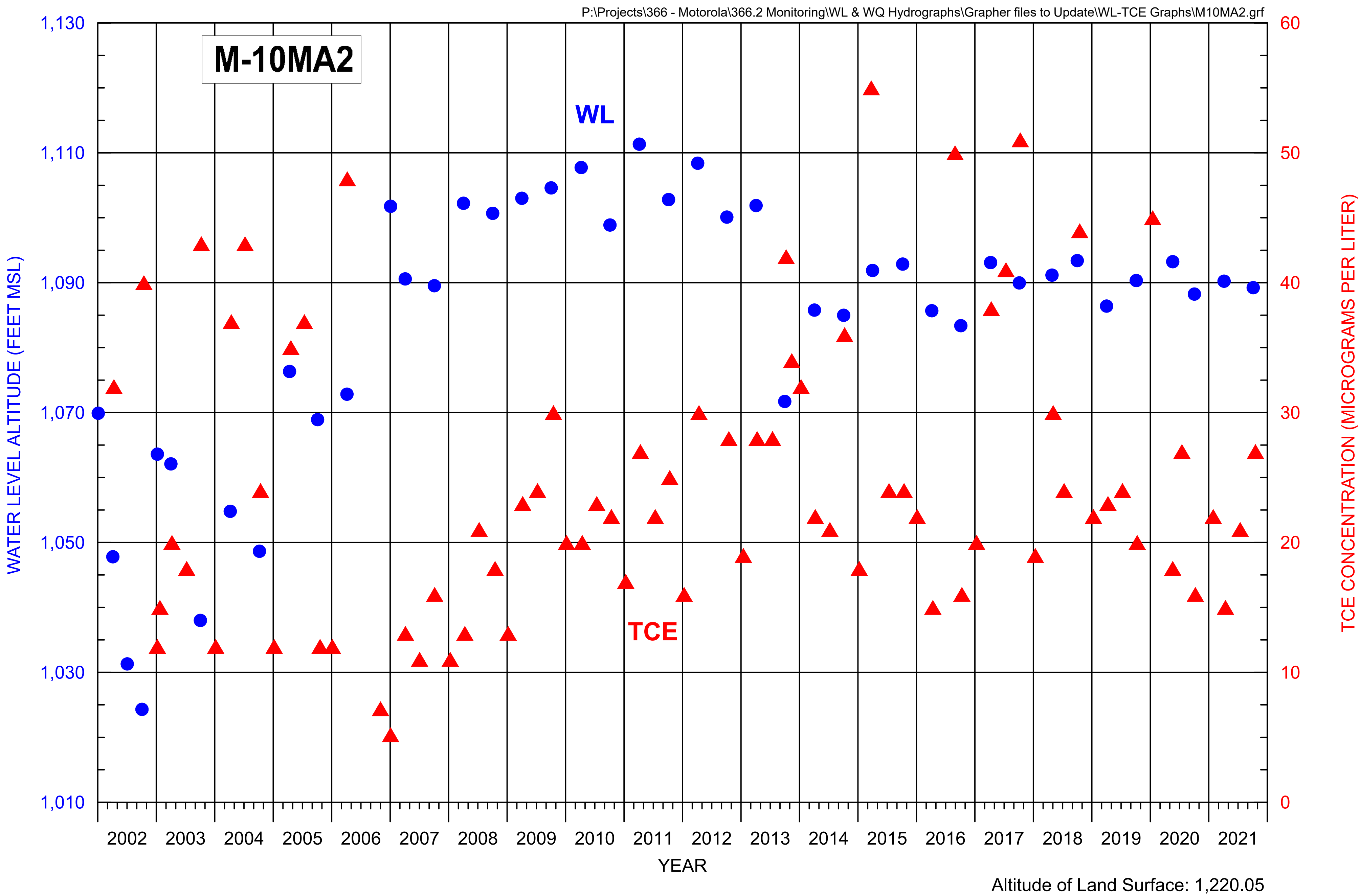


FIGURE D-46. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-10MA2

North Indian Bend Wash Superfund Site

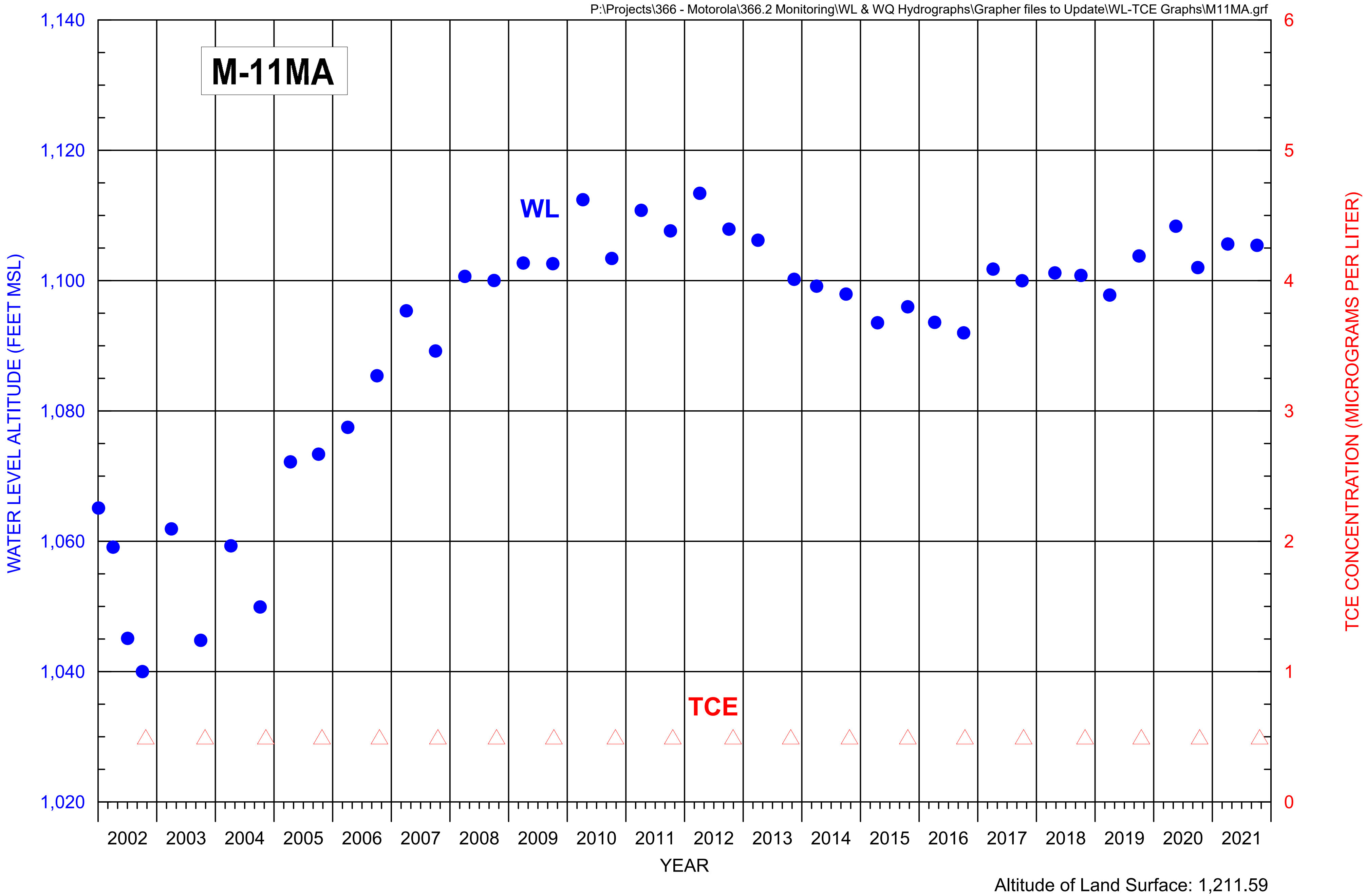


FIGURE D-47. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-11MA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

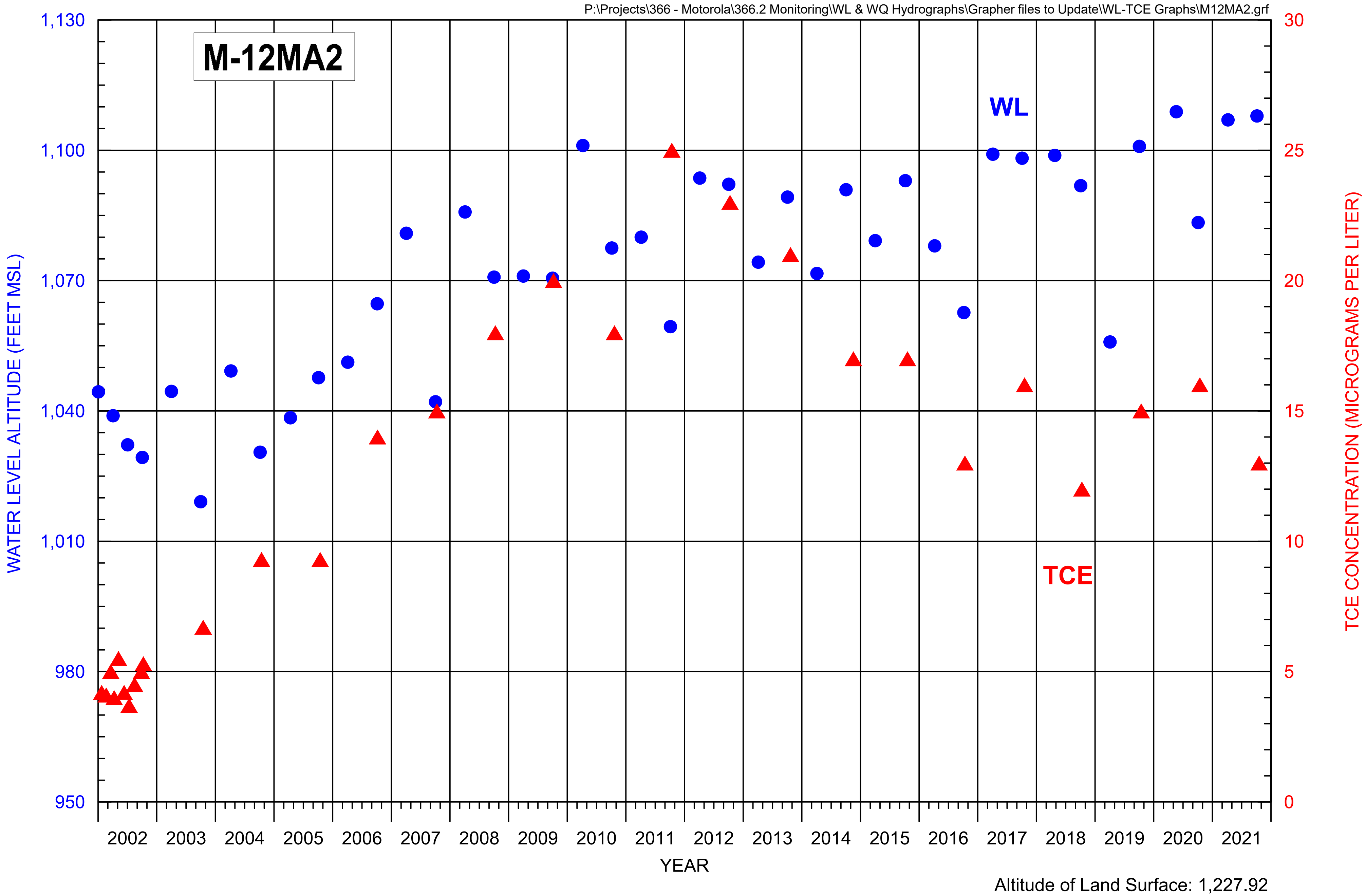
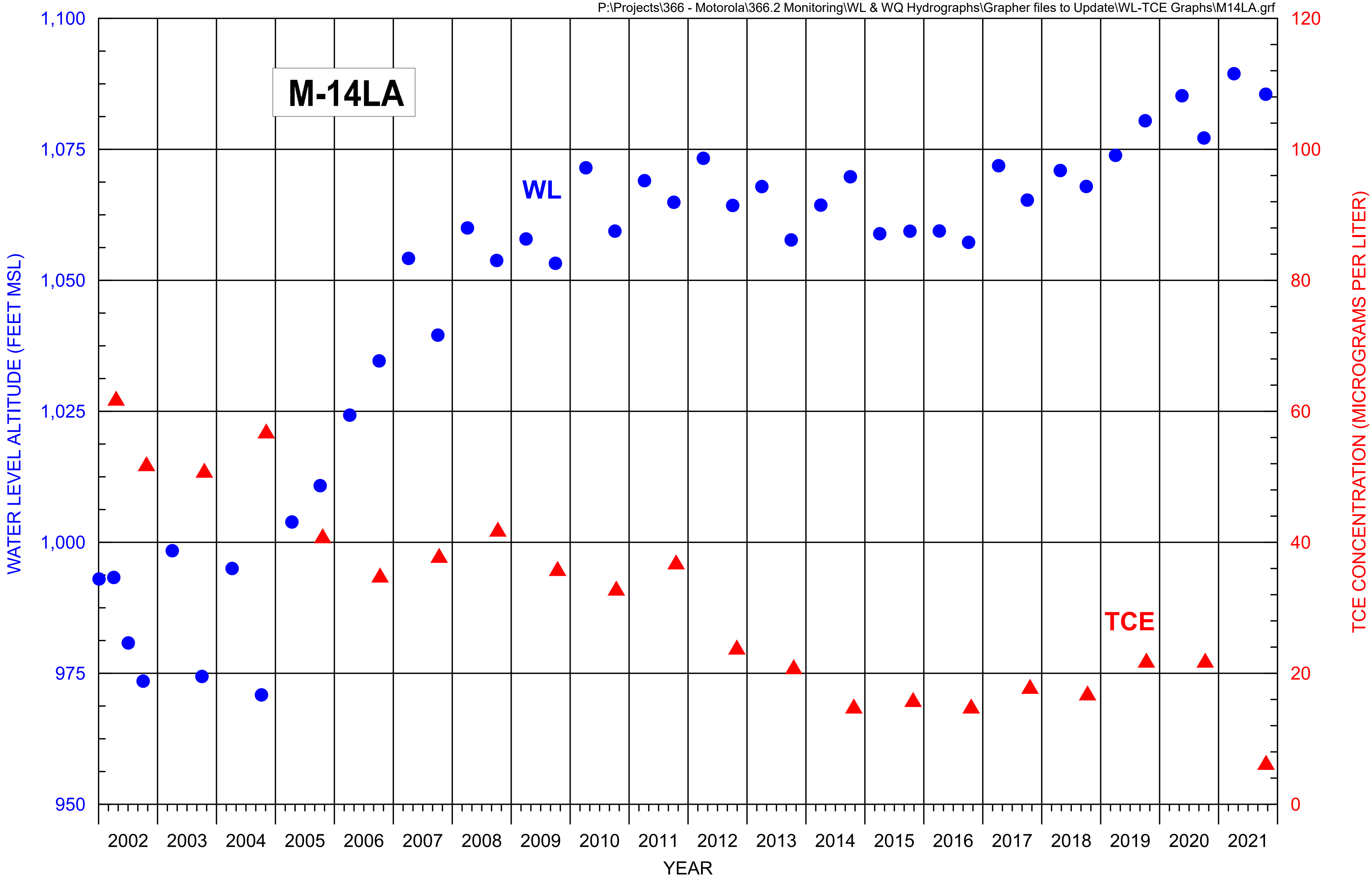


FIGURE D-48. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-12MA2

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,225.18

FIGURE D-49. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-14LA

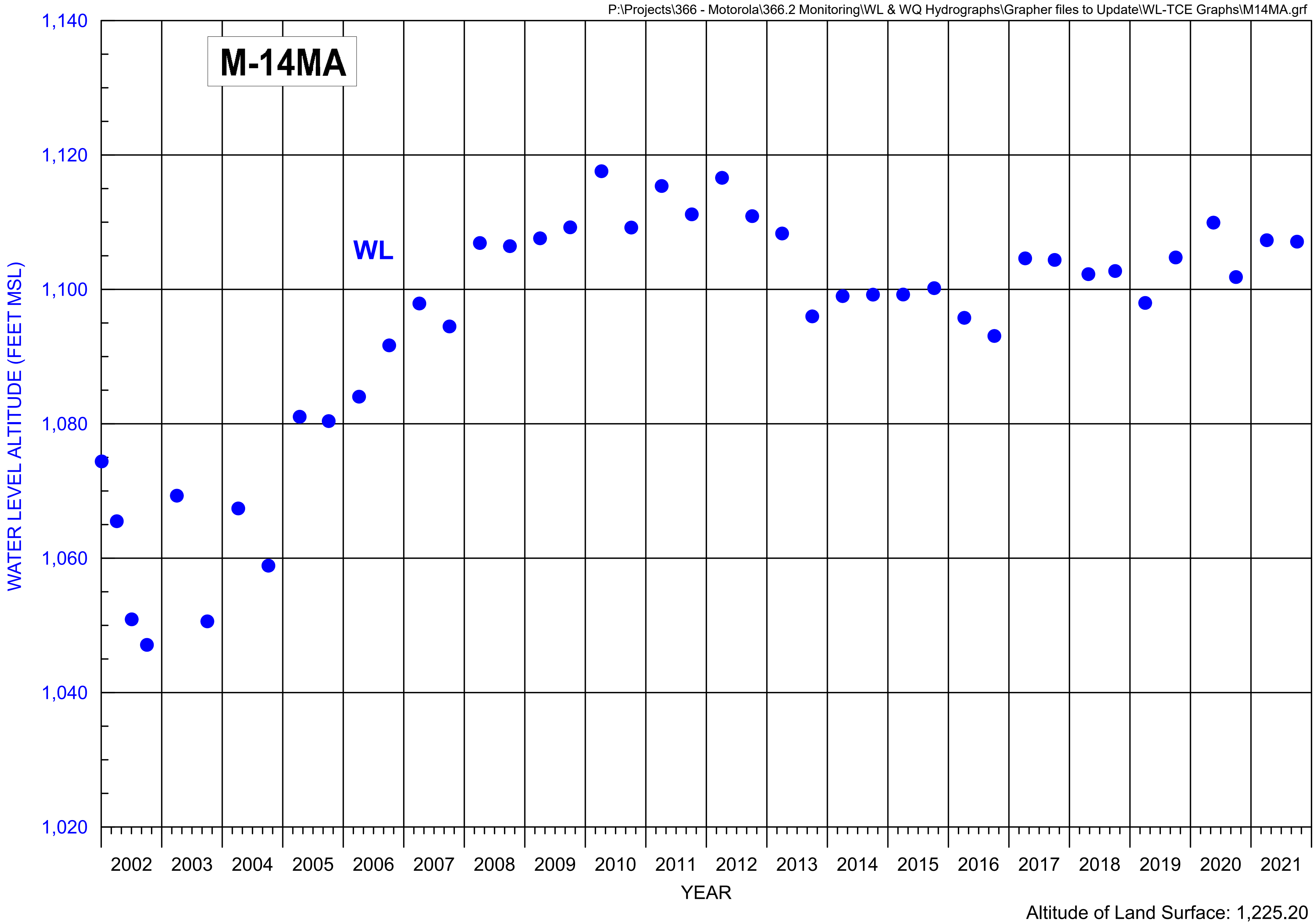


FIGURE D-50. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-14MA

North Indian Bend Wash Superfund Site

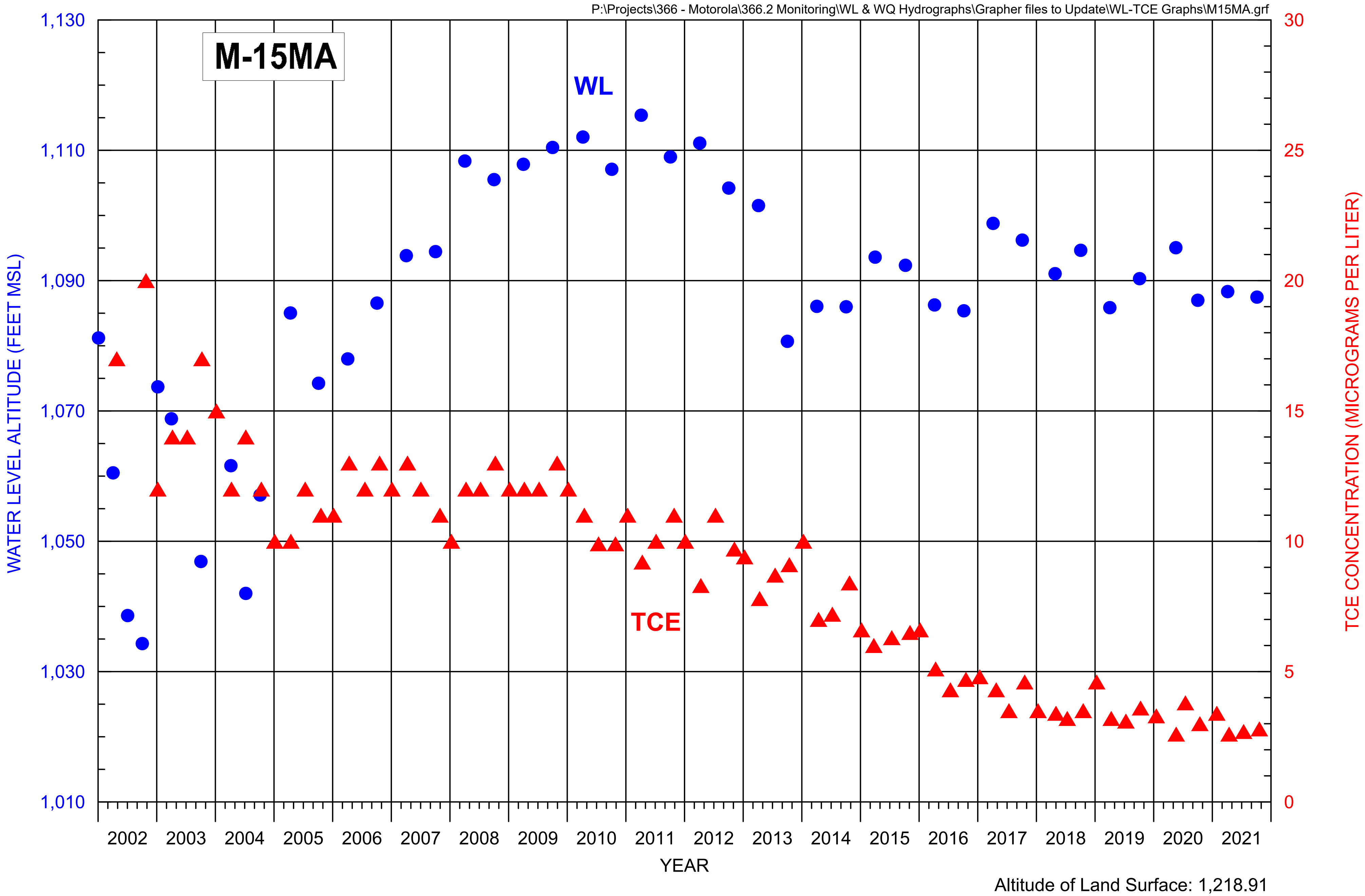


FIGURE D-51. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-15MA

North Indian Bend Wash Superfund Site

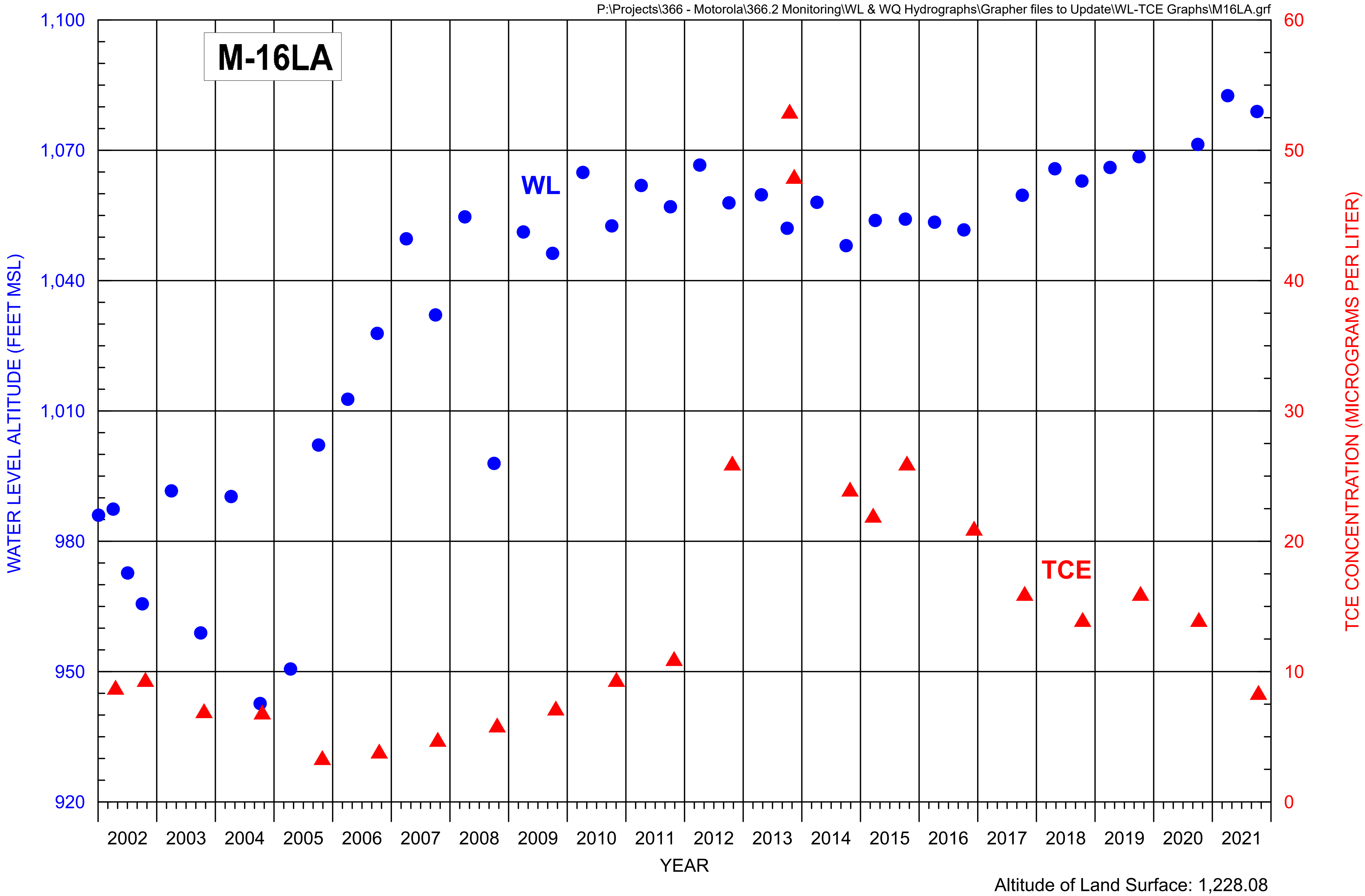


FIGURE D-52. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-16LA

North Indian Bend Wash Superfund Site

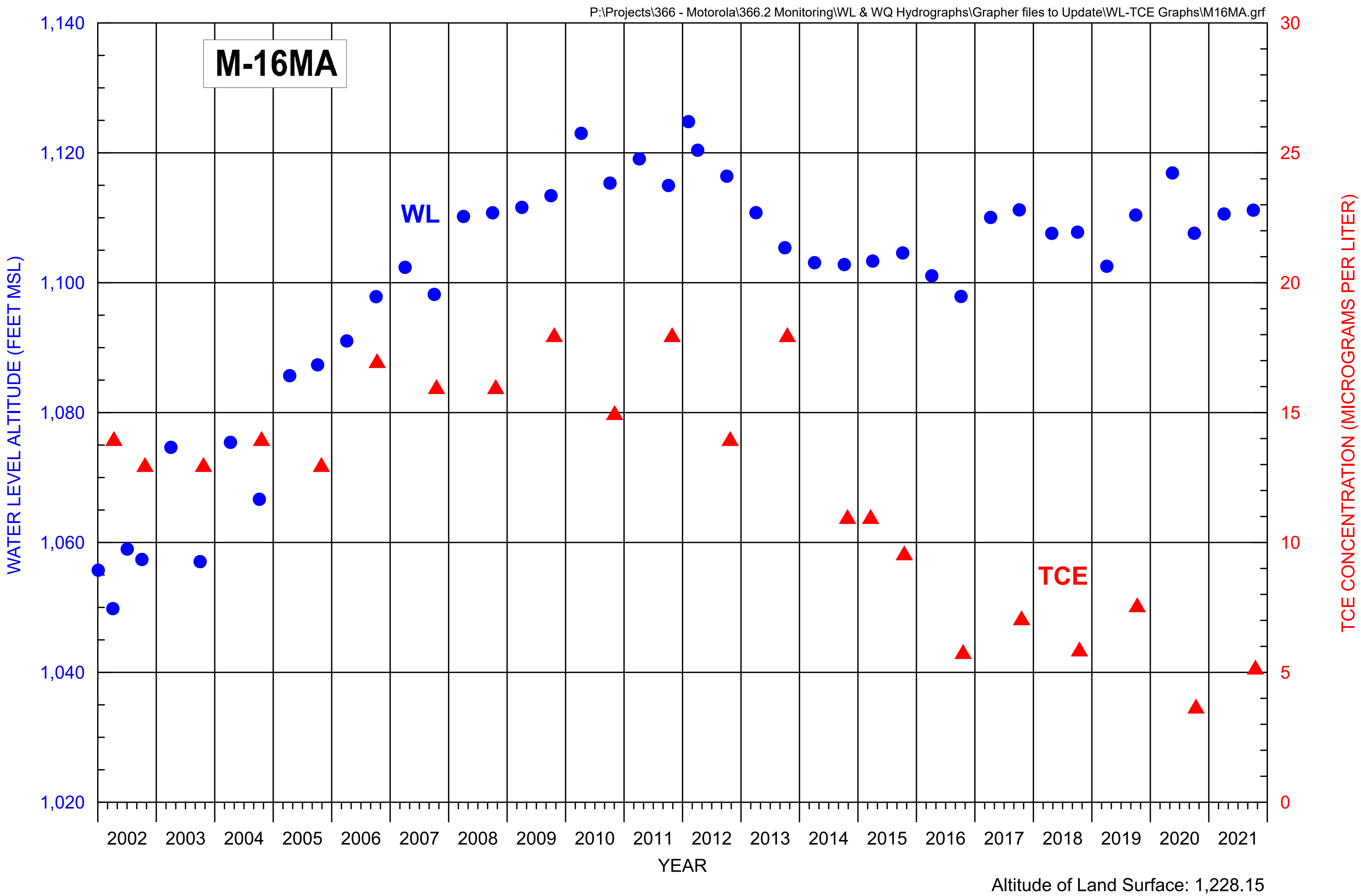


FIGURE D-53. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-16MA

North Indian Bend Wash Superfund Site

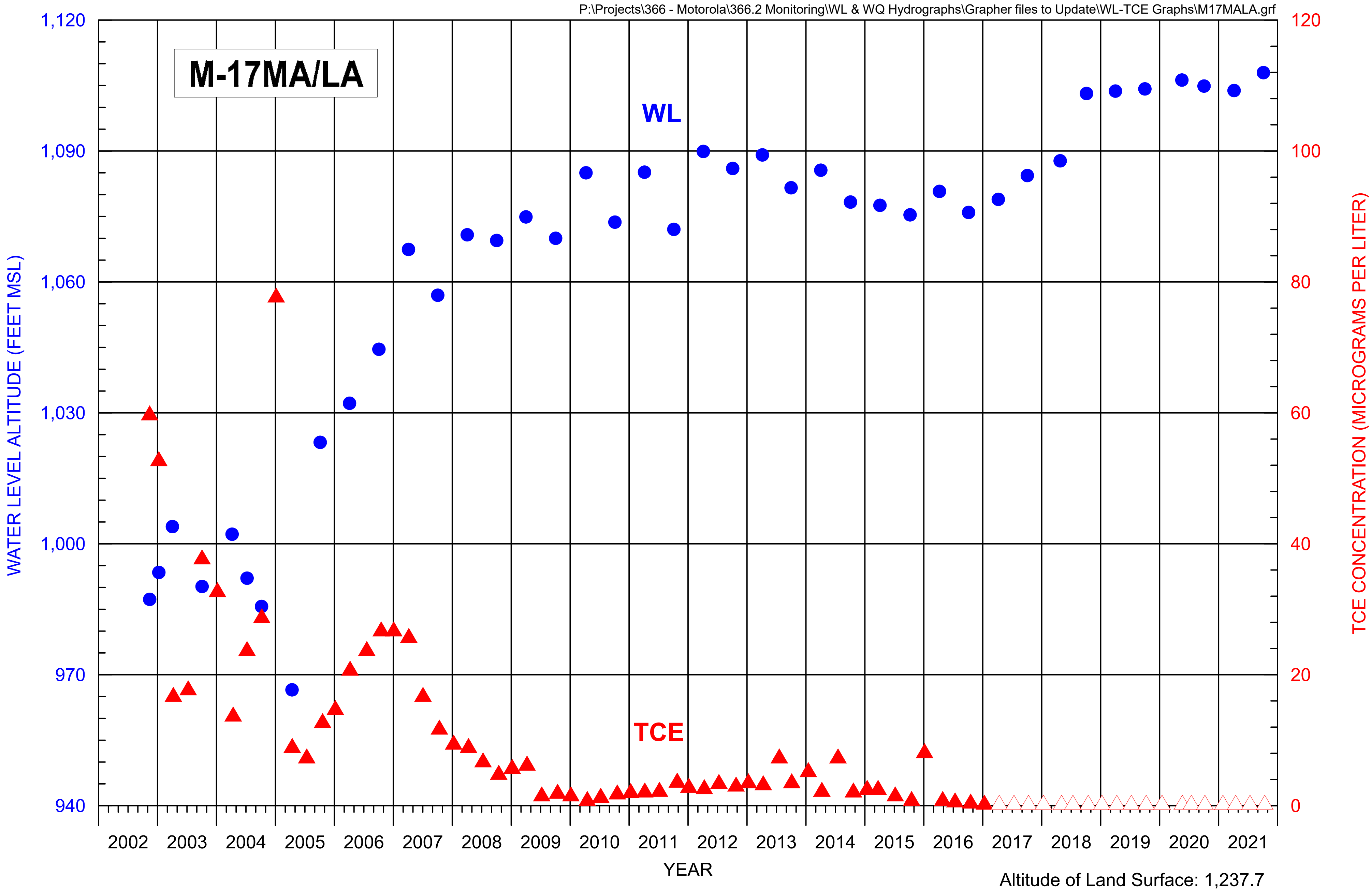


FIGURE D-54. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL M-17MA/LA

North Indian Bend Wash Superfund Site

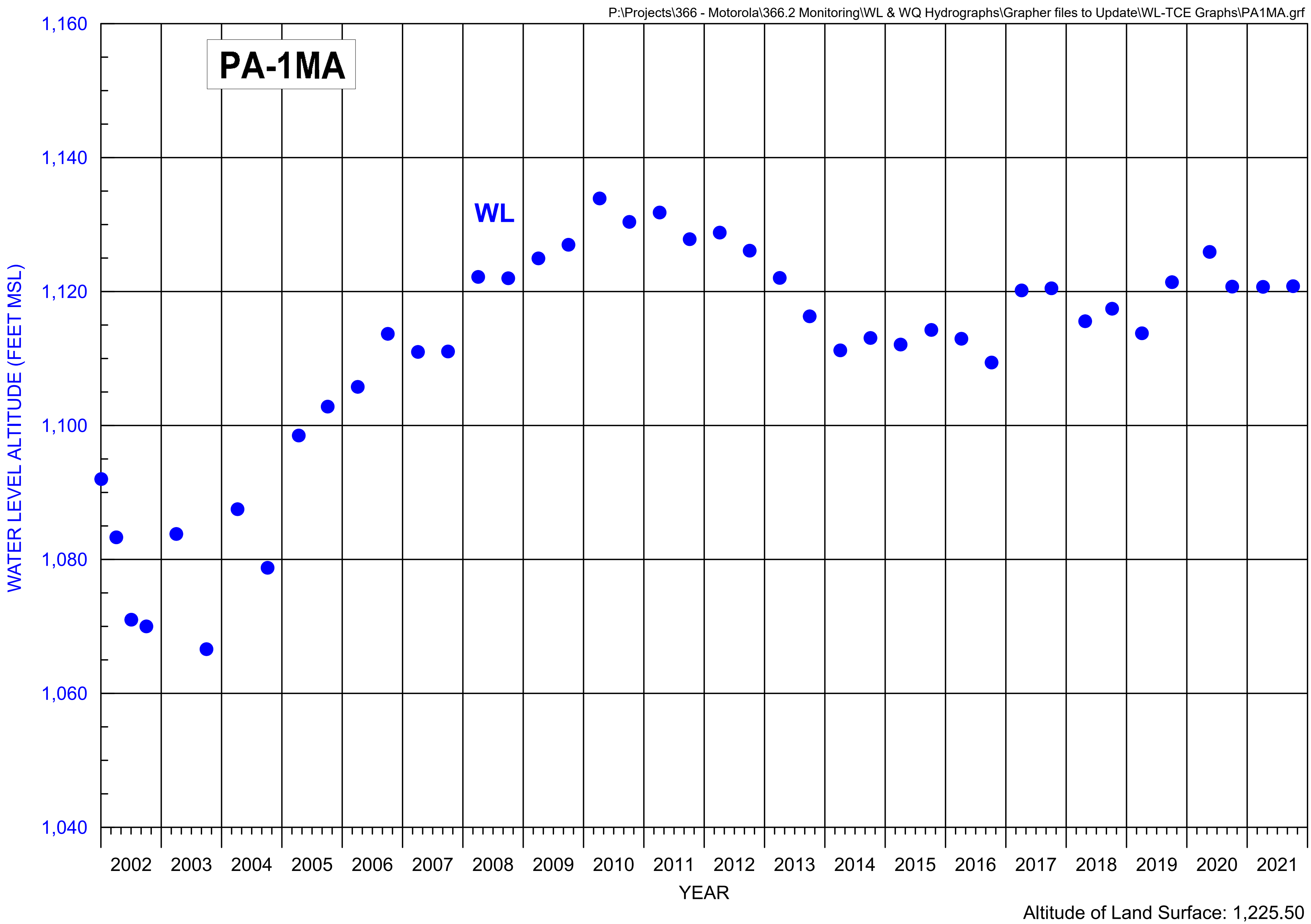
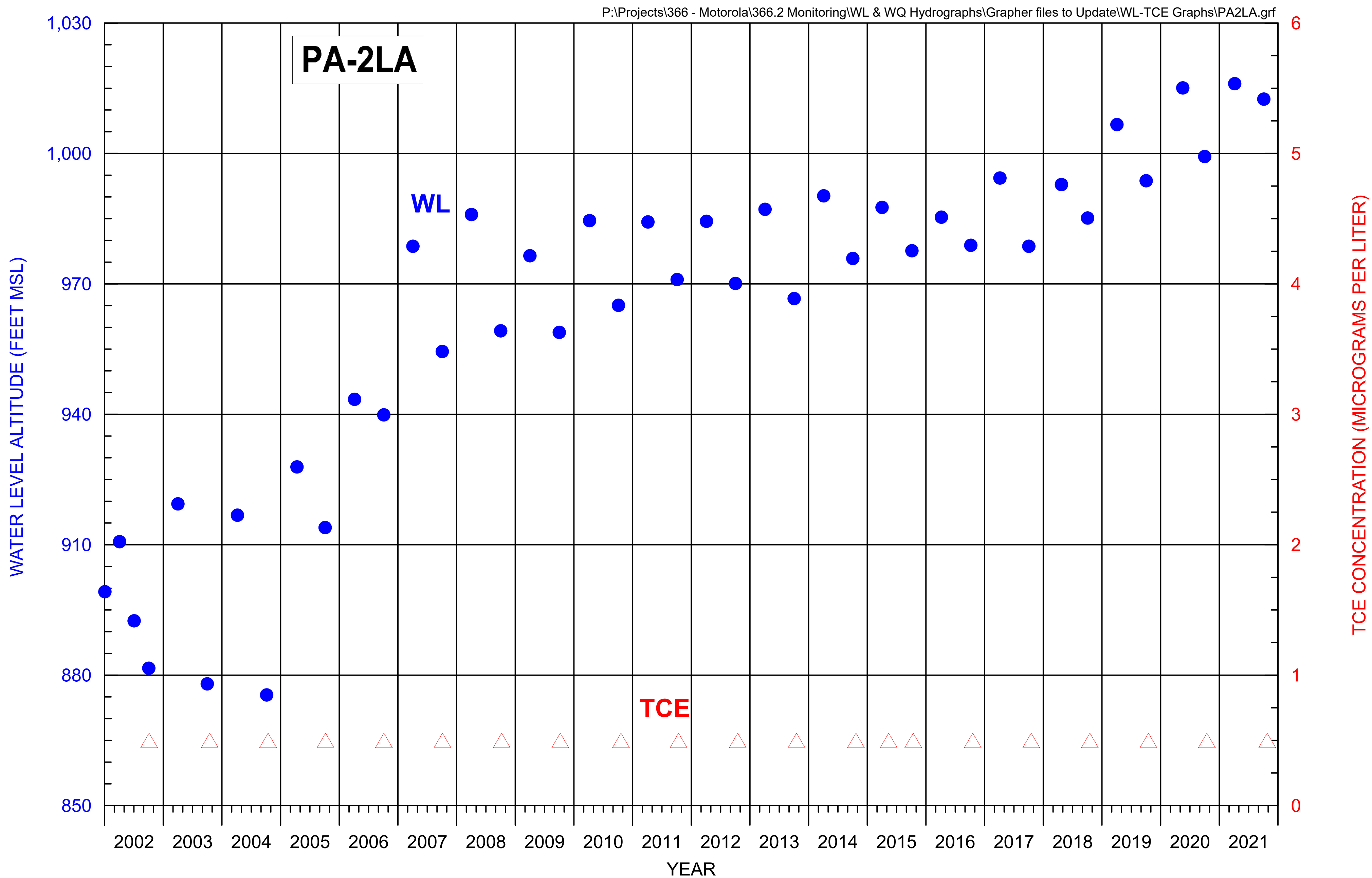


FIGURE D-55. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-1MA

North Indian Bend Wash Superfund Site



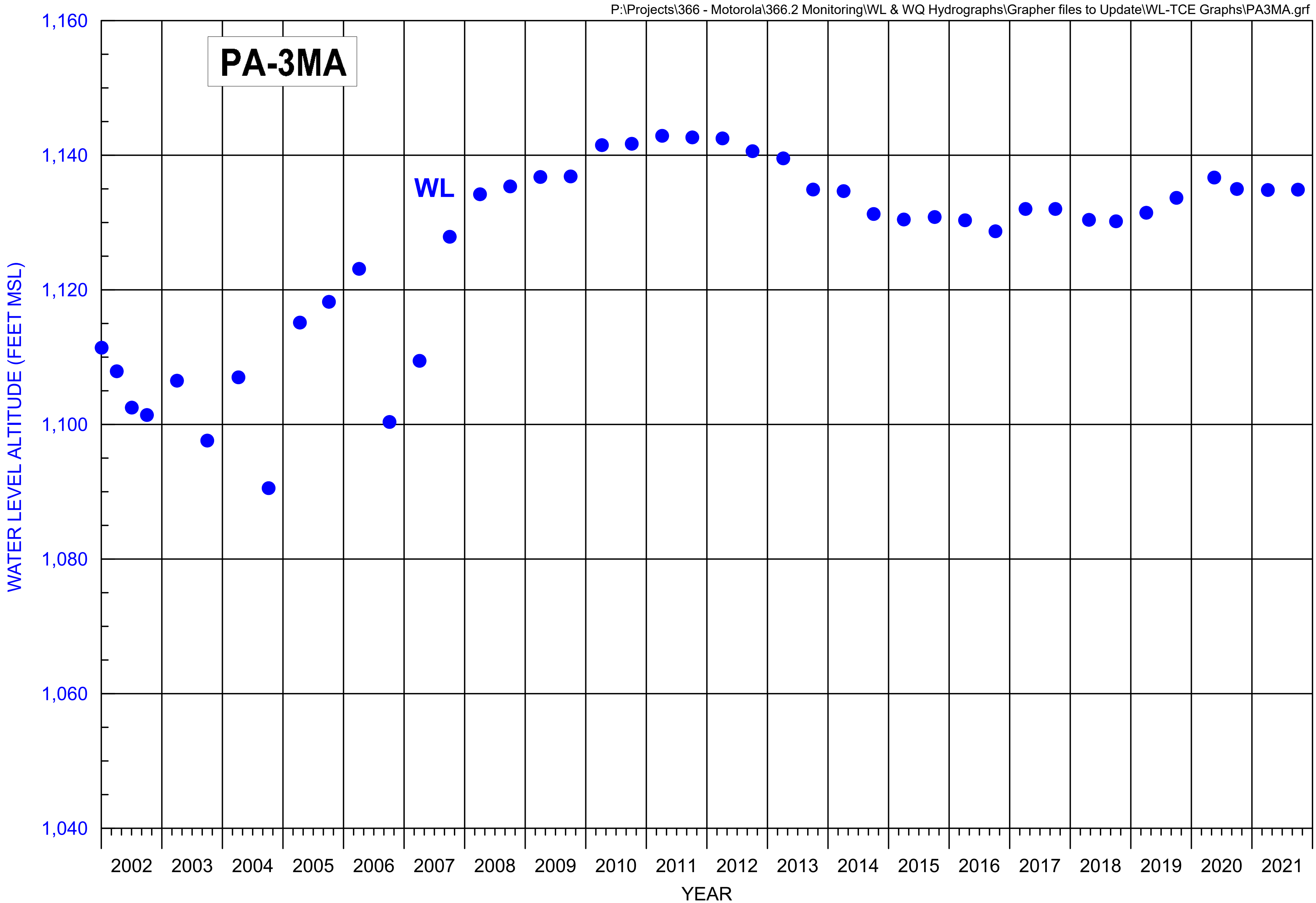
Altitude of Land Surface: 1,253.76

FIGURE D-56. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-2LA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,253.44

FIGURE D-57. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-3MA

North Indian Bend Wash Superfund Site

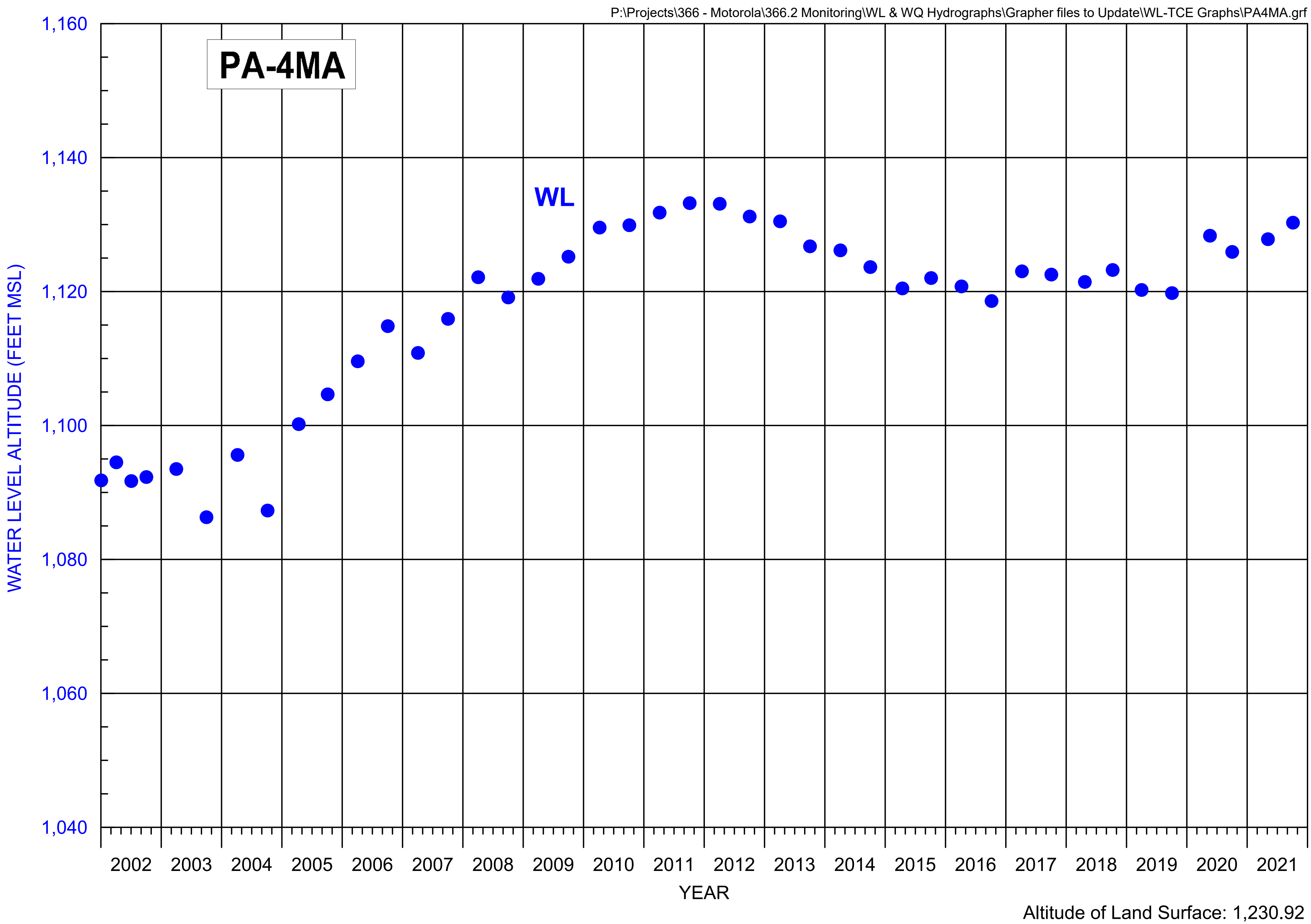
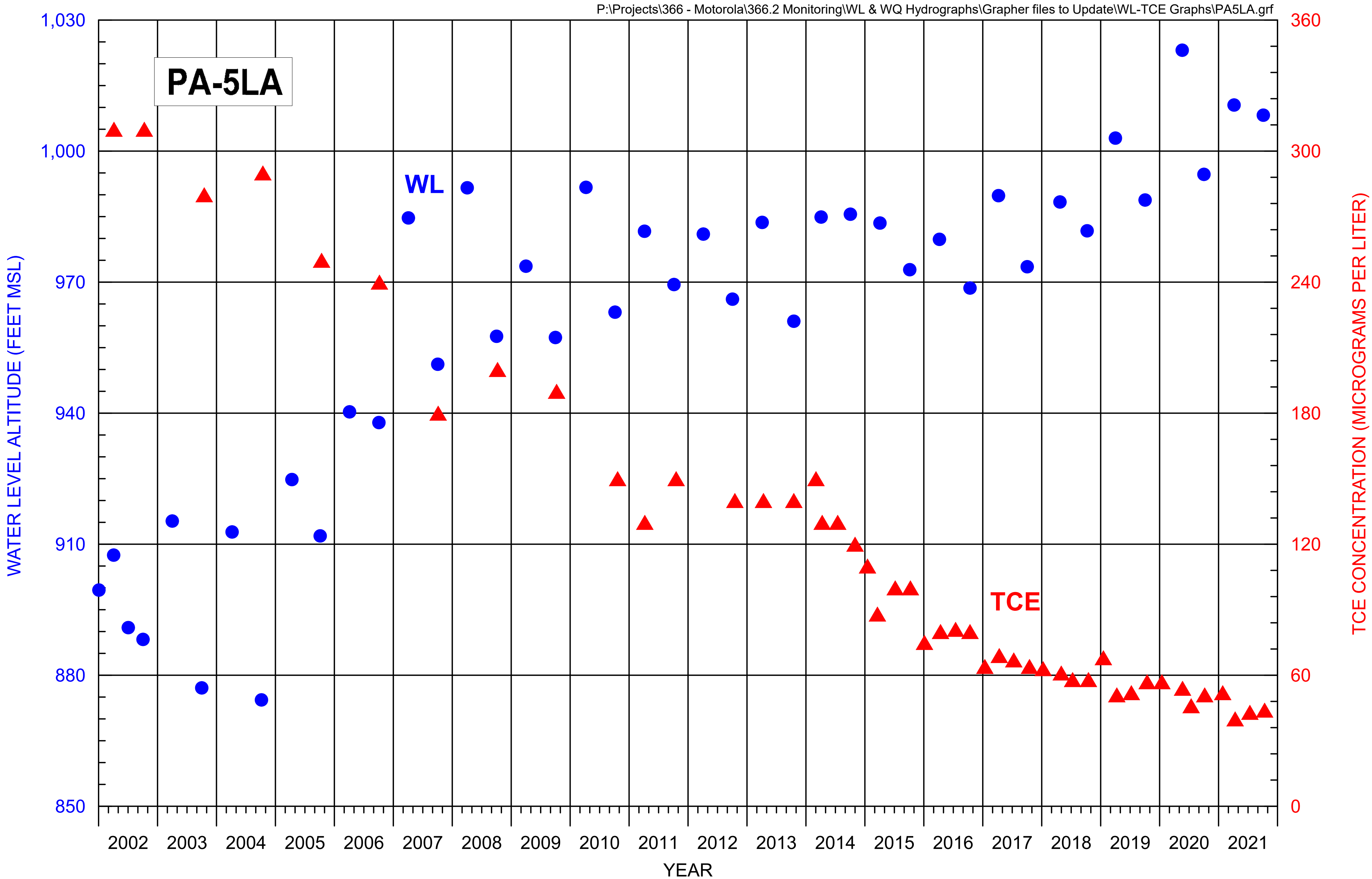


FIGURE D-58. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-4MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,229.45

FIGURE D-59. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-5LA

North Indian Bend Wash Superfund Site

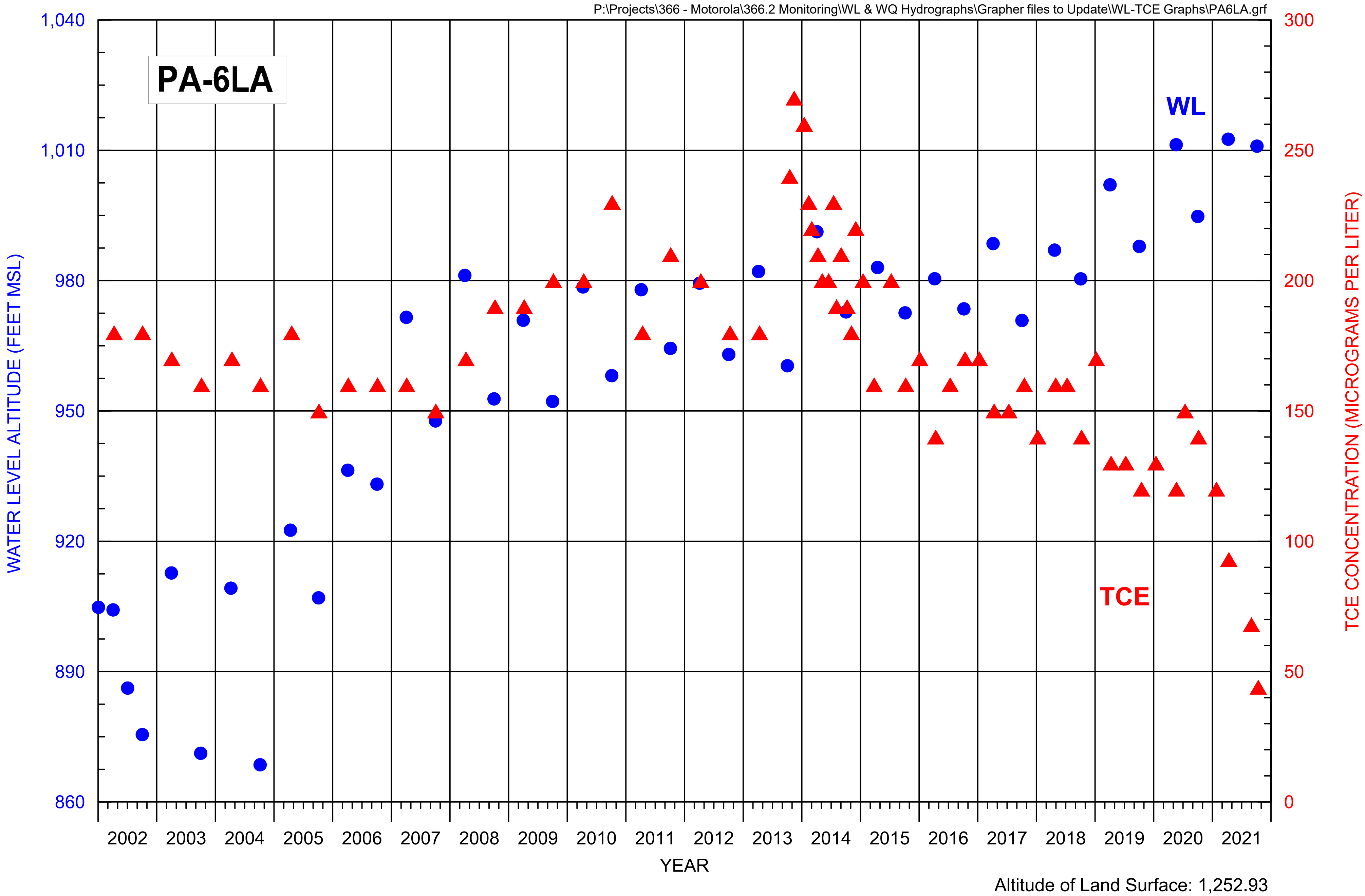


FIGURE D-60. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-6LA

North Indian Bend Wash Superfund Site

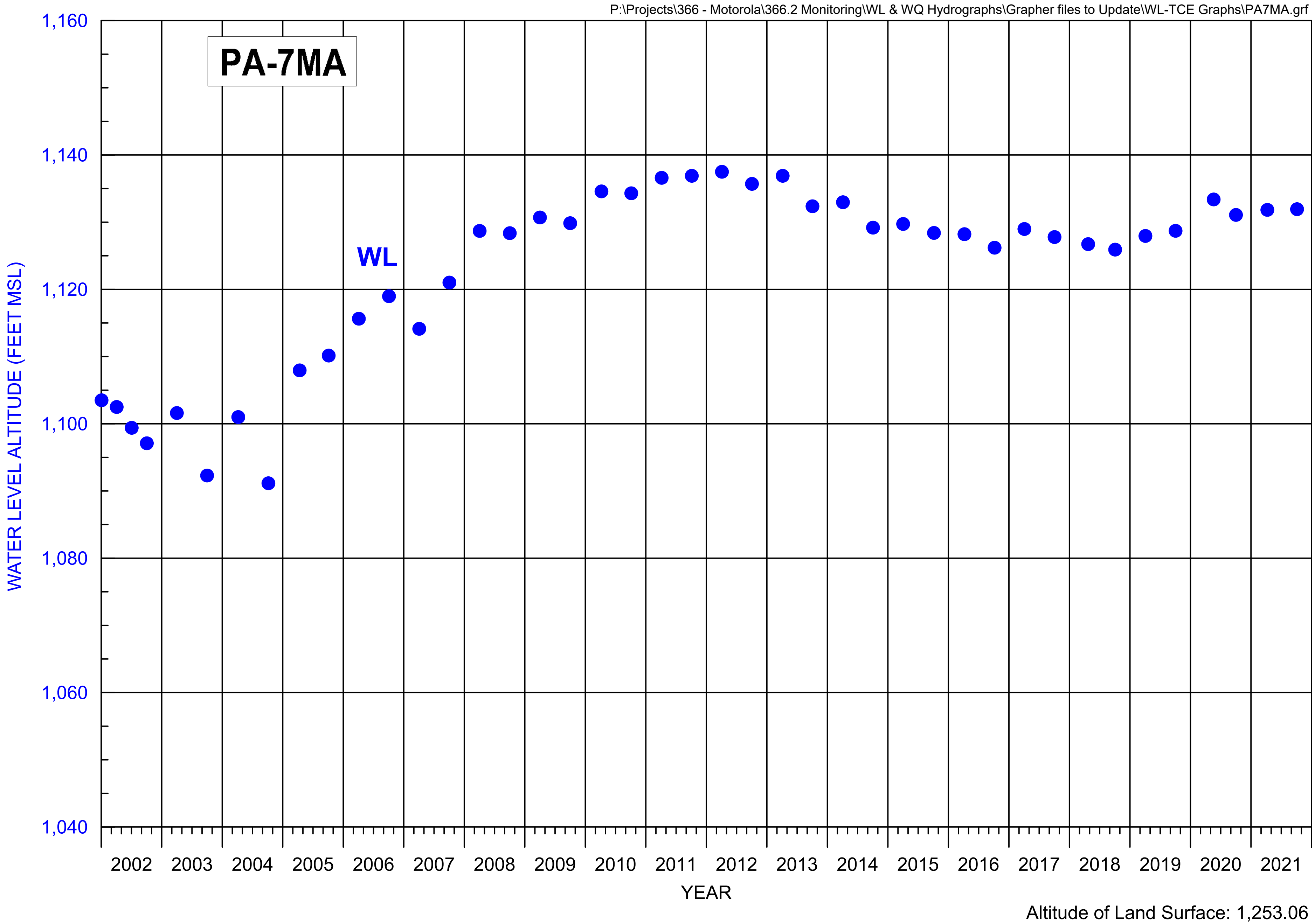


FIGURE D-61. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-7MA

North Indian Bend Wash Superfund Site

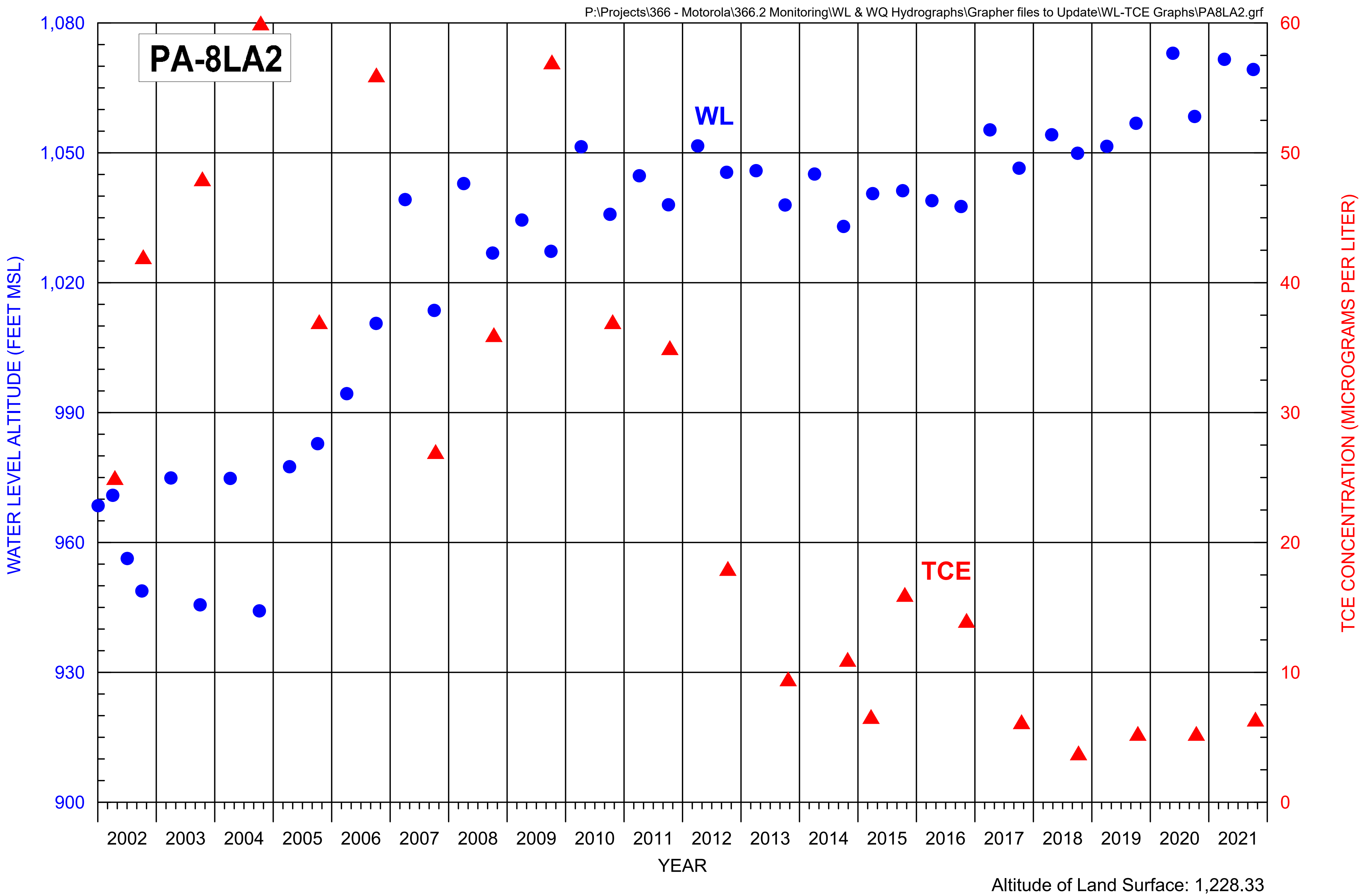


FIGURE D-62. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-8LA2

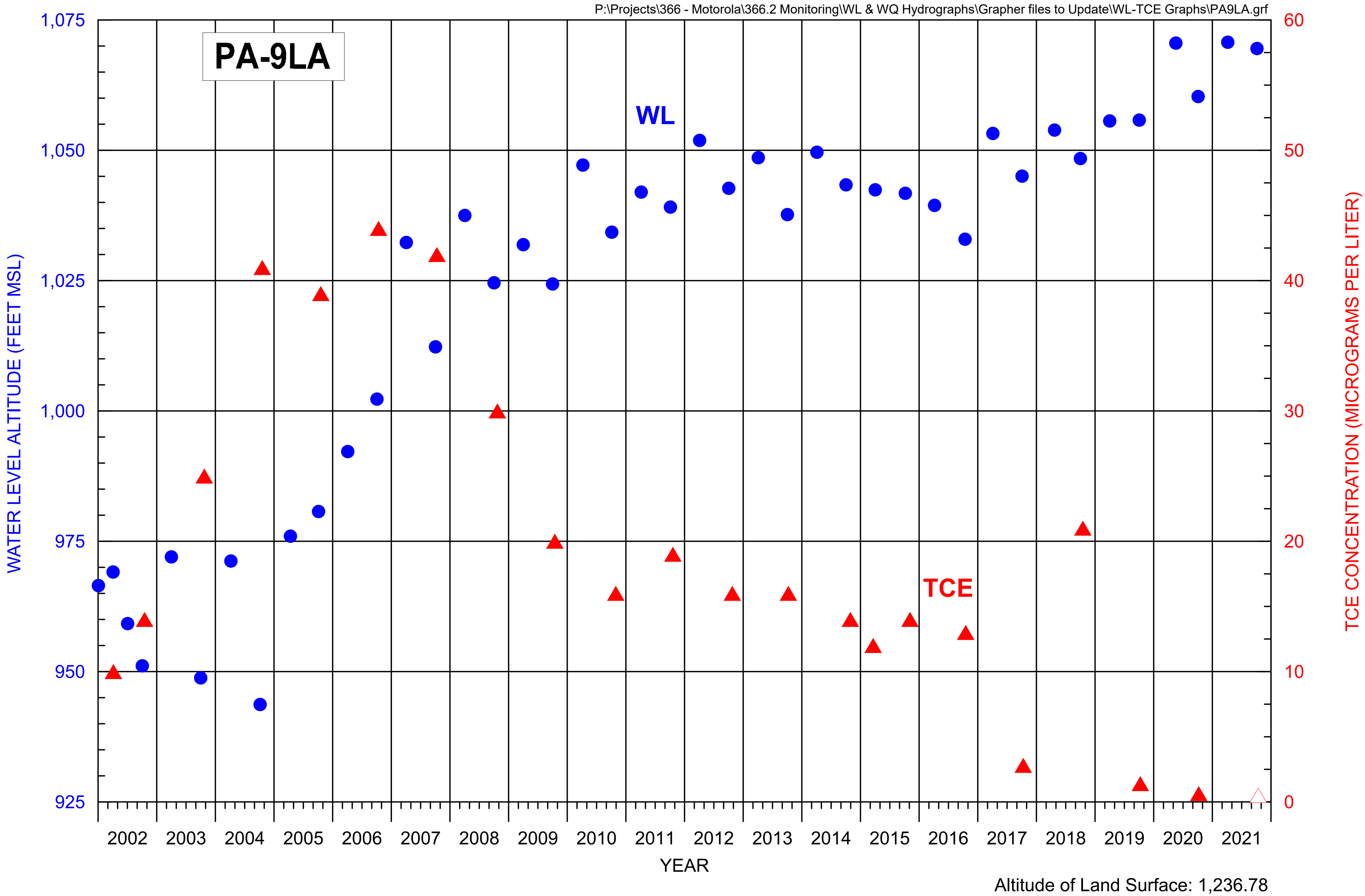


FIGURE D-63. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-9LA

North Indian Bend Wash Superfund Site

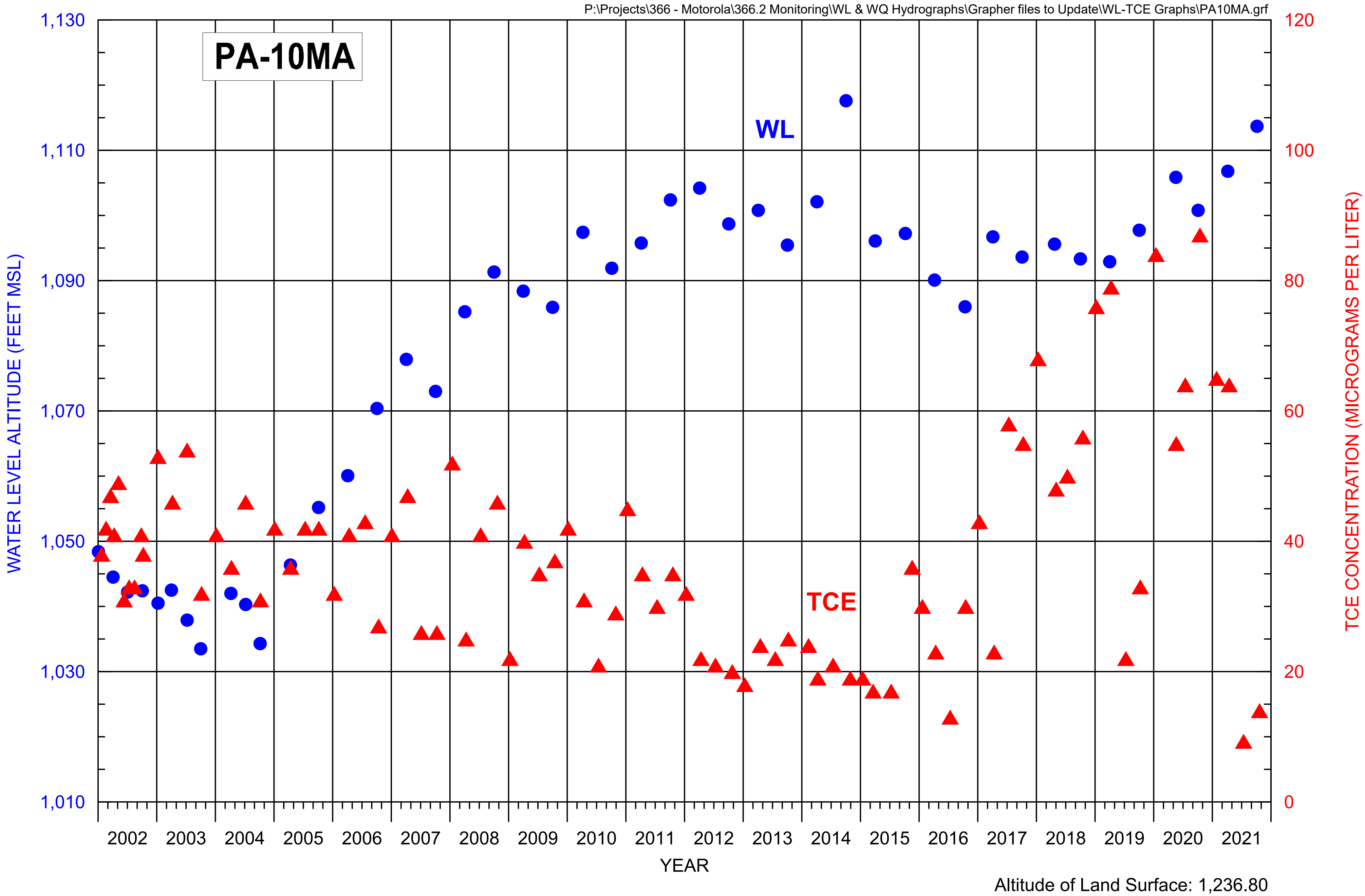


FIGURE D-64. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-10MA

North Indian Bend Wash Superfund Site

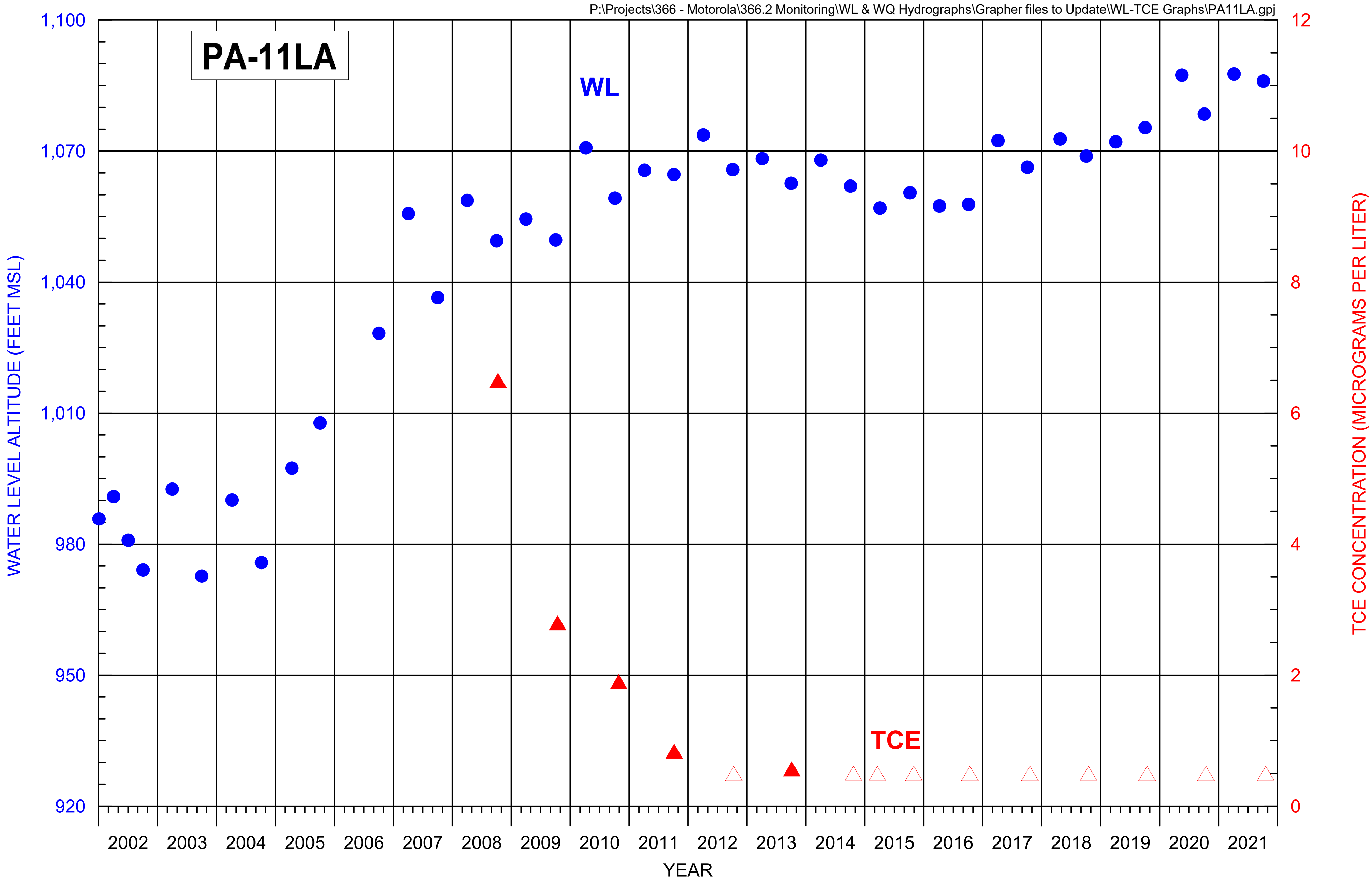


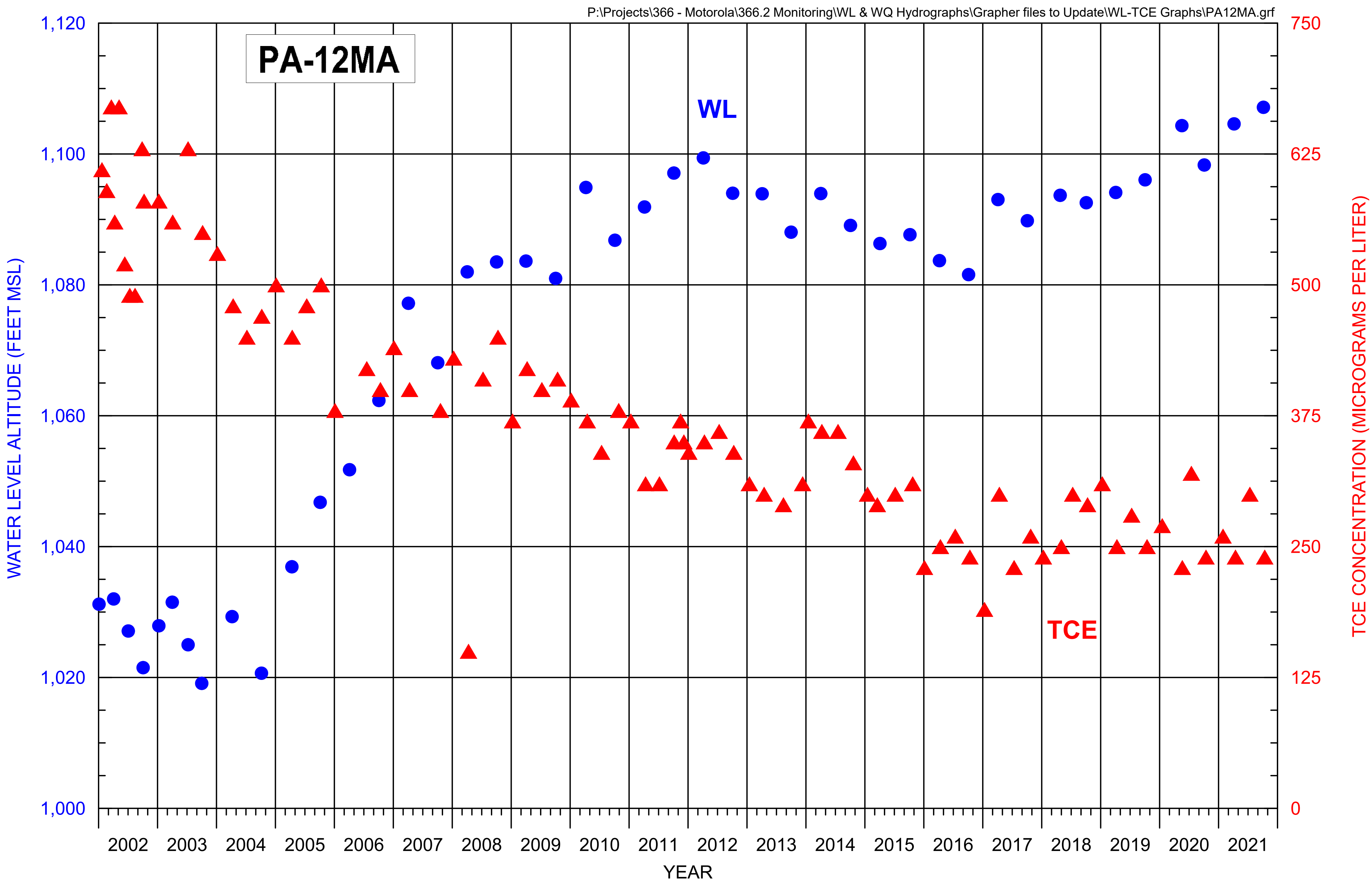
FIGURE D-65. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-11LA

Note: Water level collected from LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA.

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

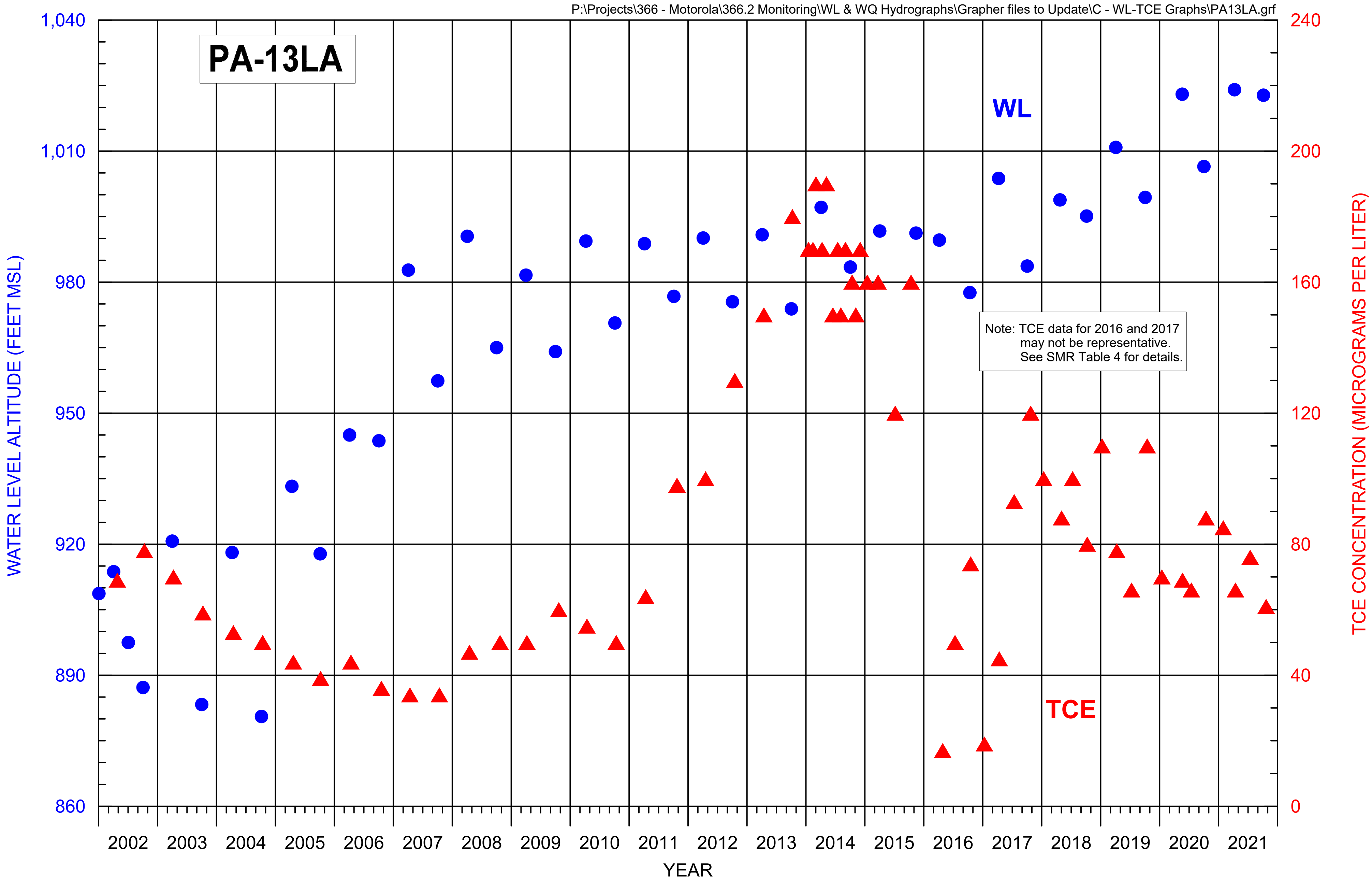


Altitude of Land Surface: 1,224.96

FIGURE D-66. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-12MA

Note: Water level collected from MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA.

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,248.99

FIGURE D-67. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-13LA

North Indian Bend Wash Superfund Site

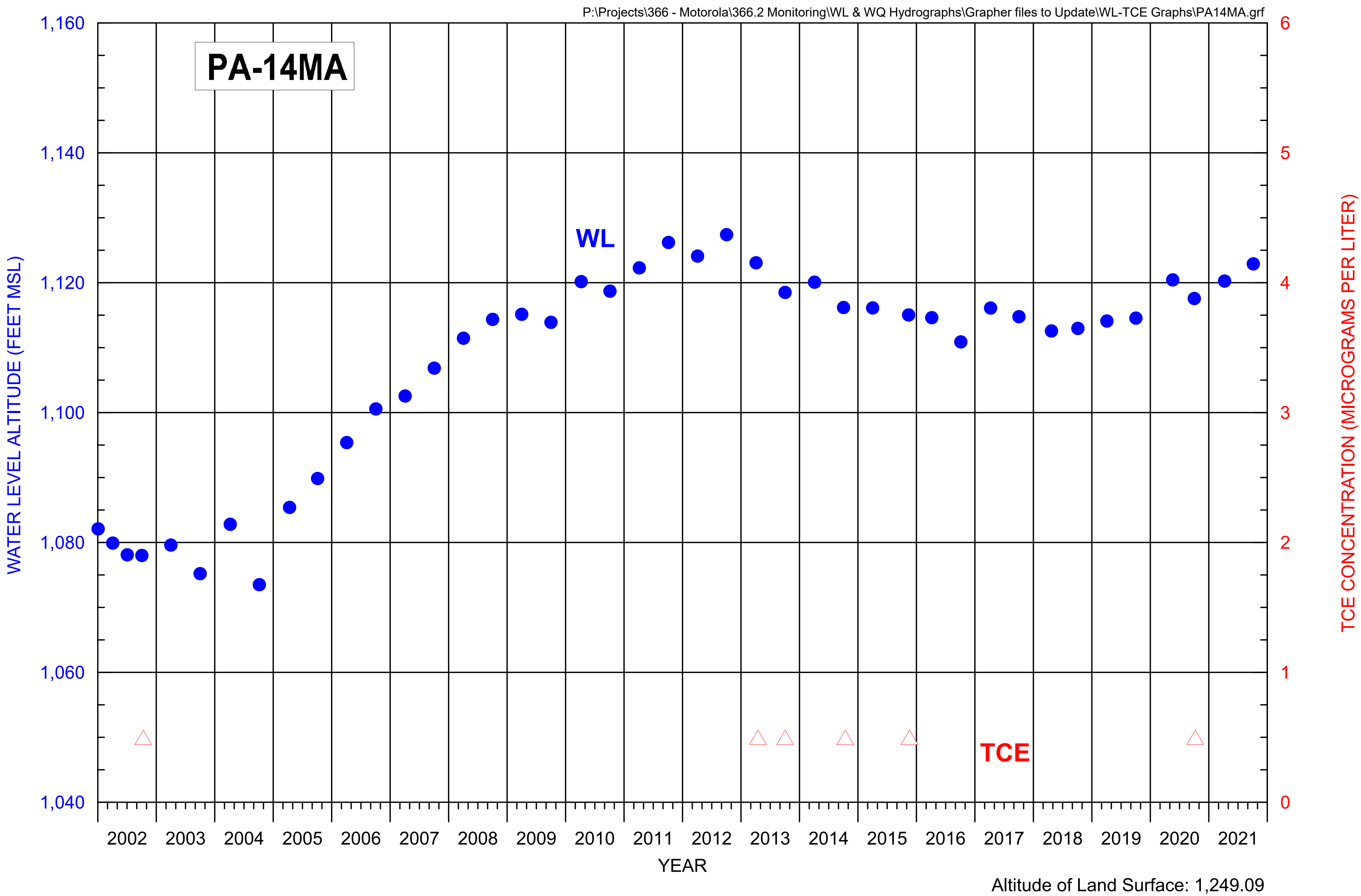
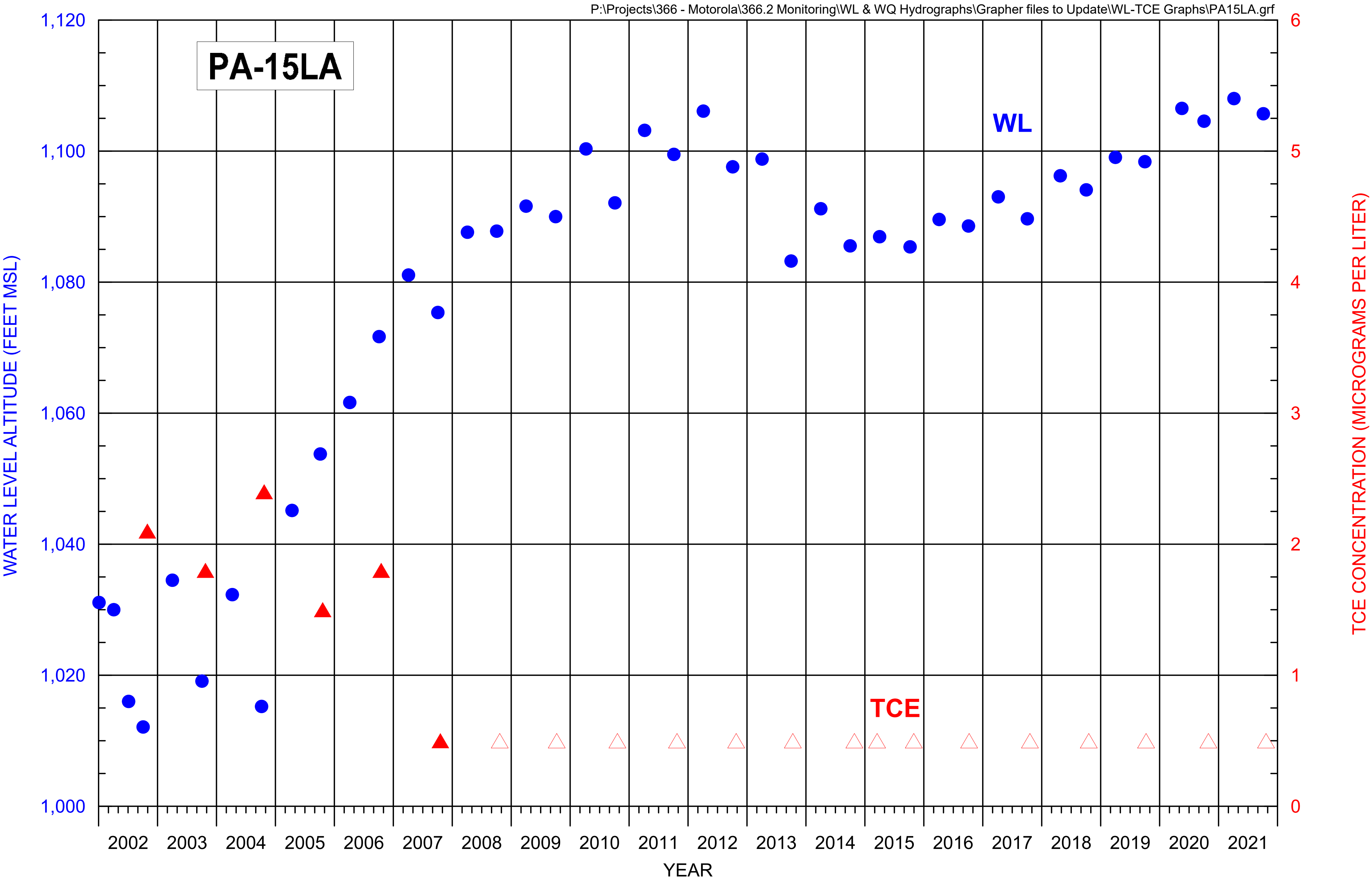


FIGURE D-68. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-14MA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,204.28

FIGURE D-69. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-15LA

EXPLANATION
TCE Non-Detect
TCE Detected Value

North Indian Bend Wash Superfund Site

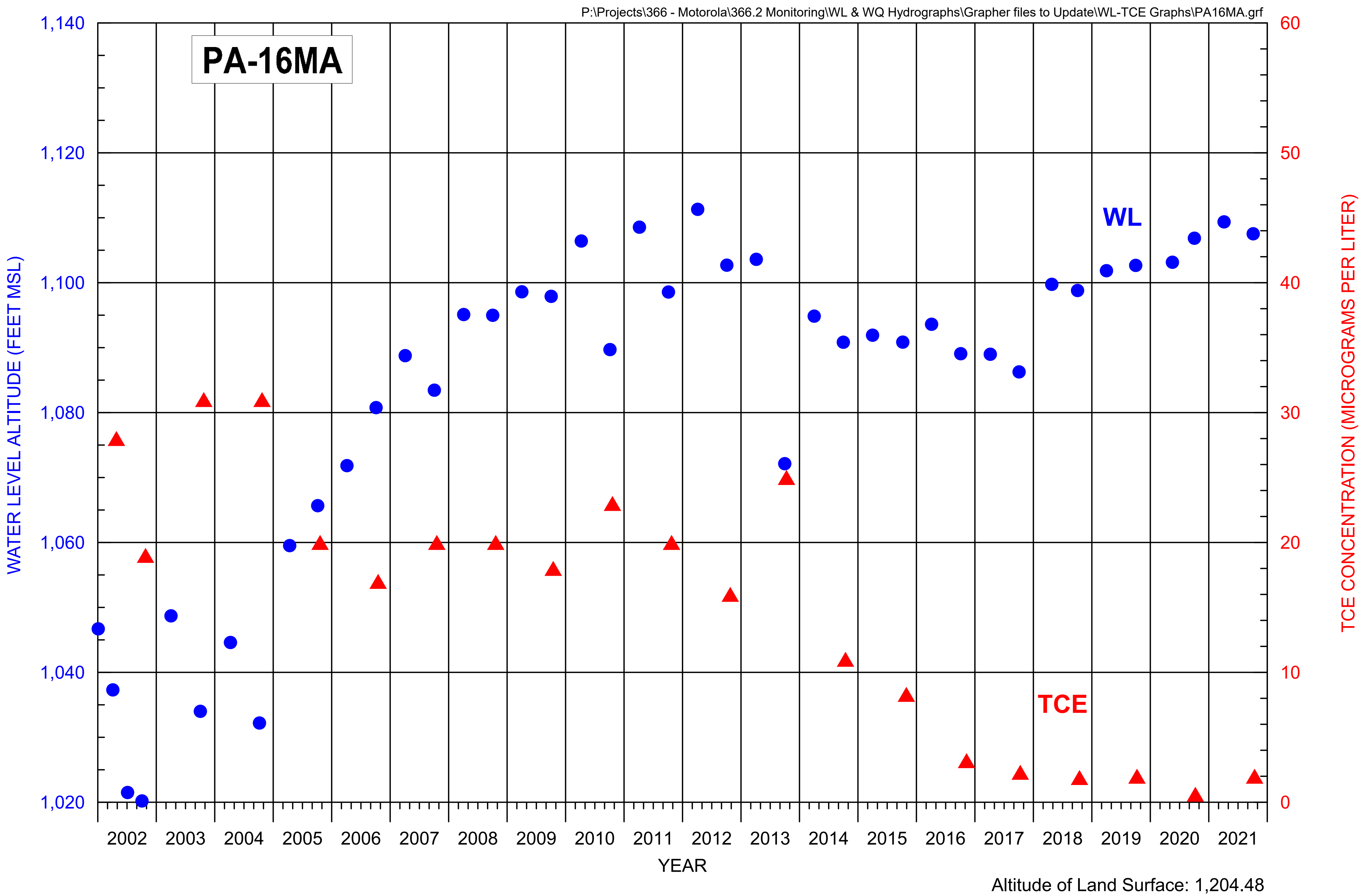


FIGURE D-70. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-16MA

North Indian Bend Wash Superfund Site

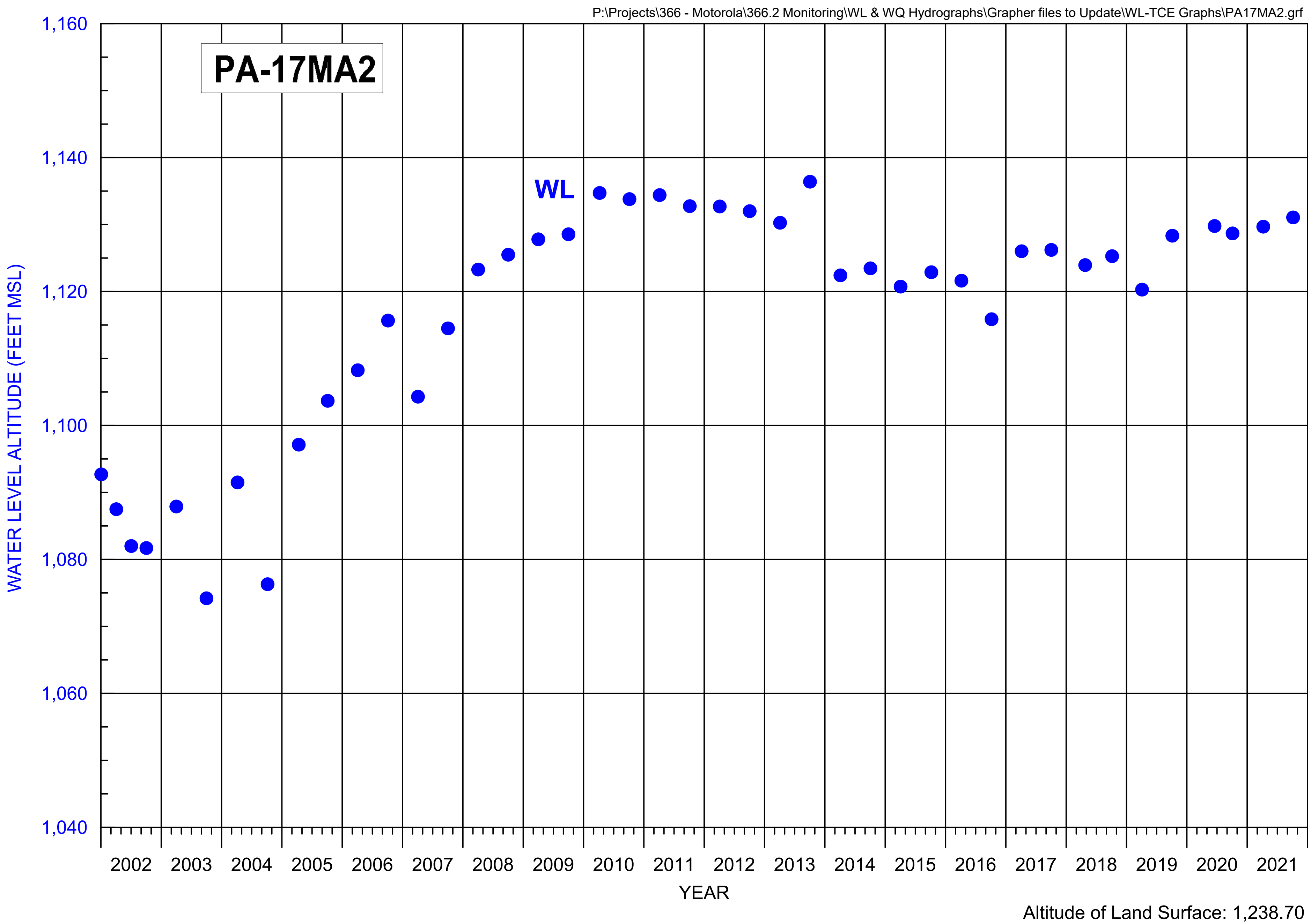


FIGURE D-71. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-17MA2

North Indian Bend Wash Superfund Site

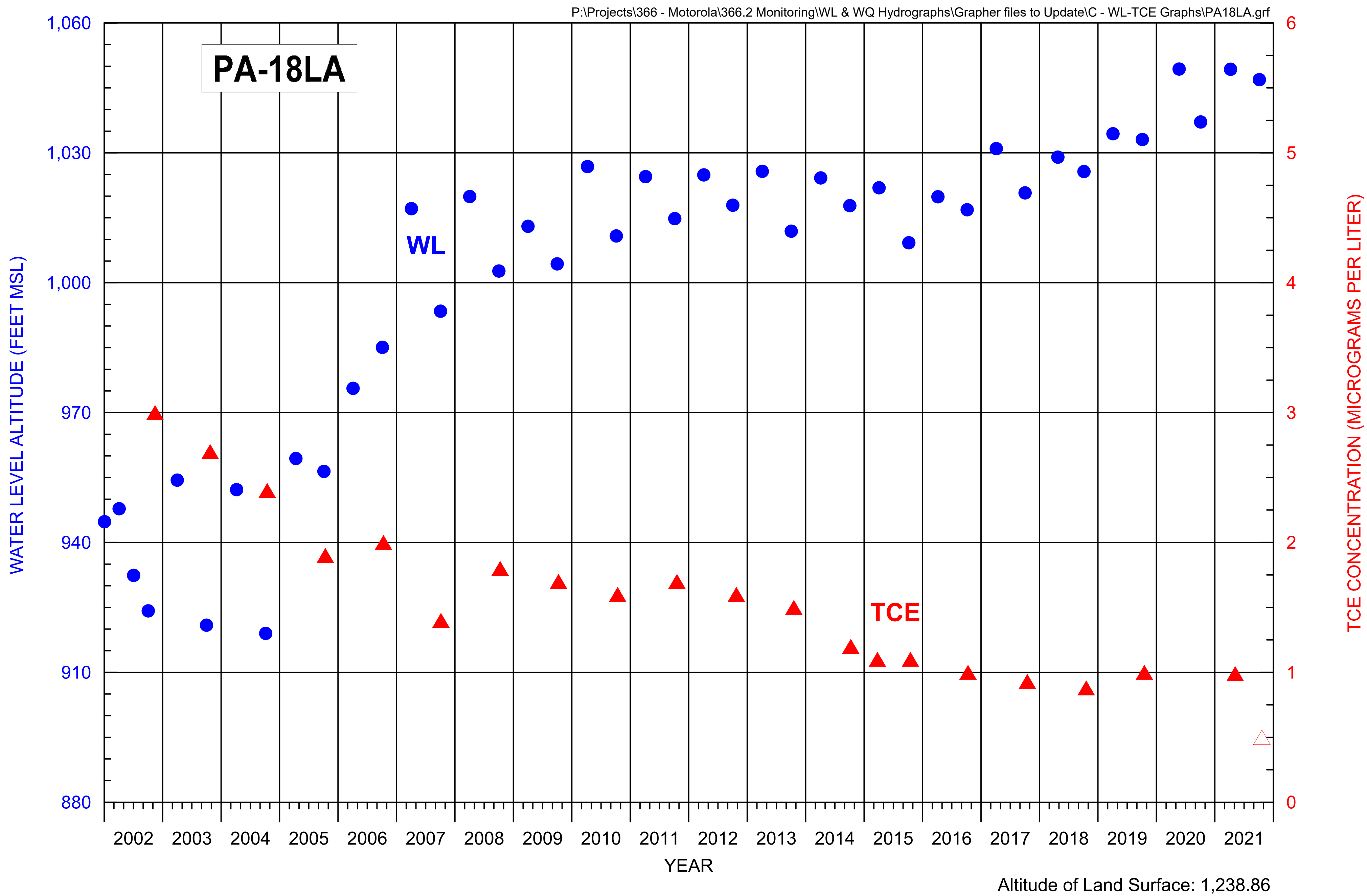


FIGURE D-72. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-18LA

North Indian Bend Wash Superfund Site

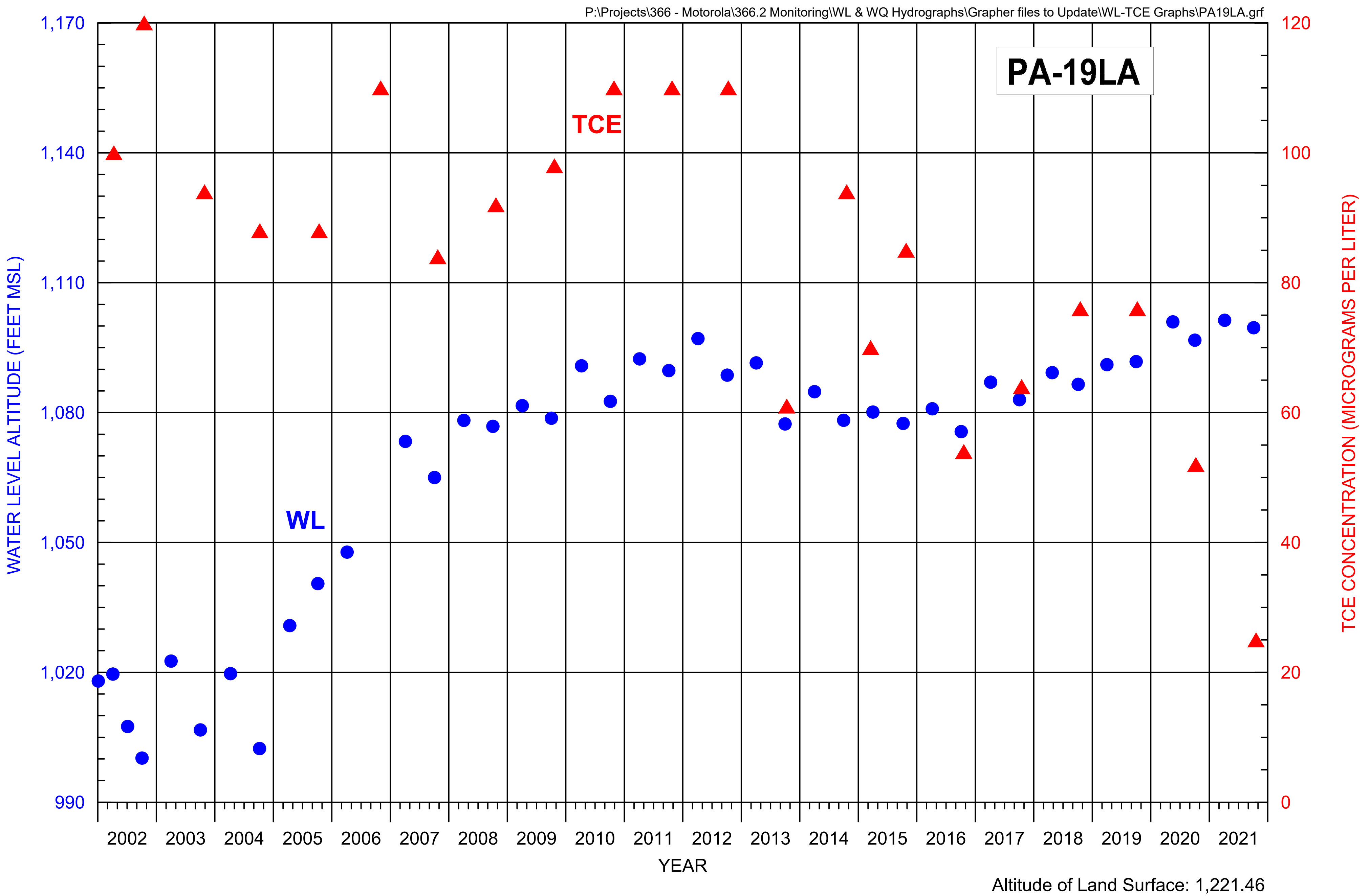


FIGURE D-73. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-19LA

North Indian Bend Wash Superfund Site

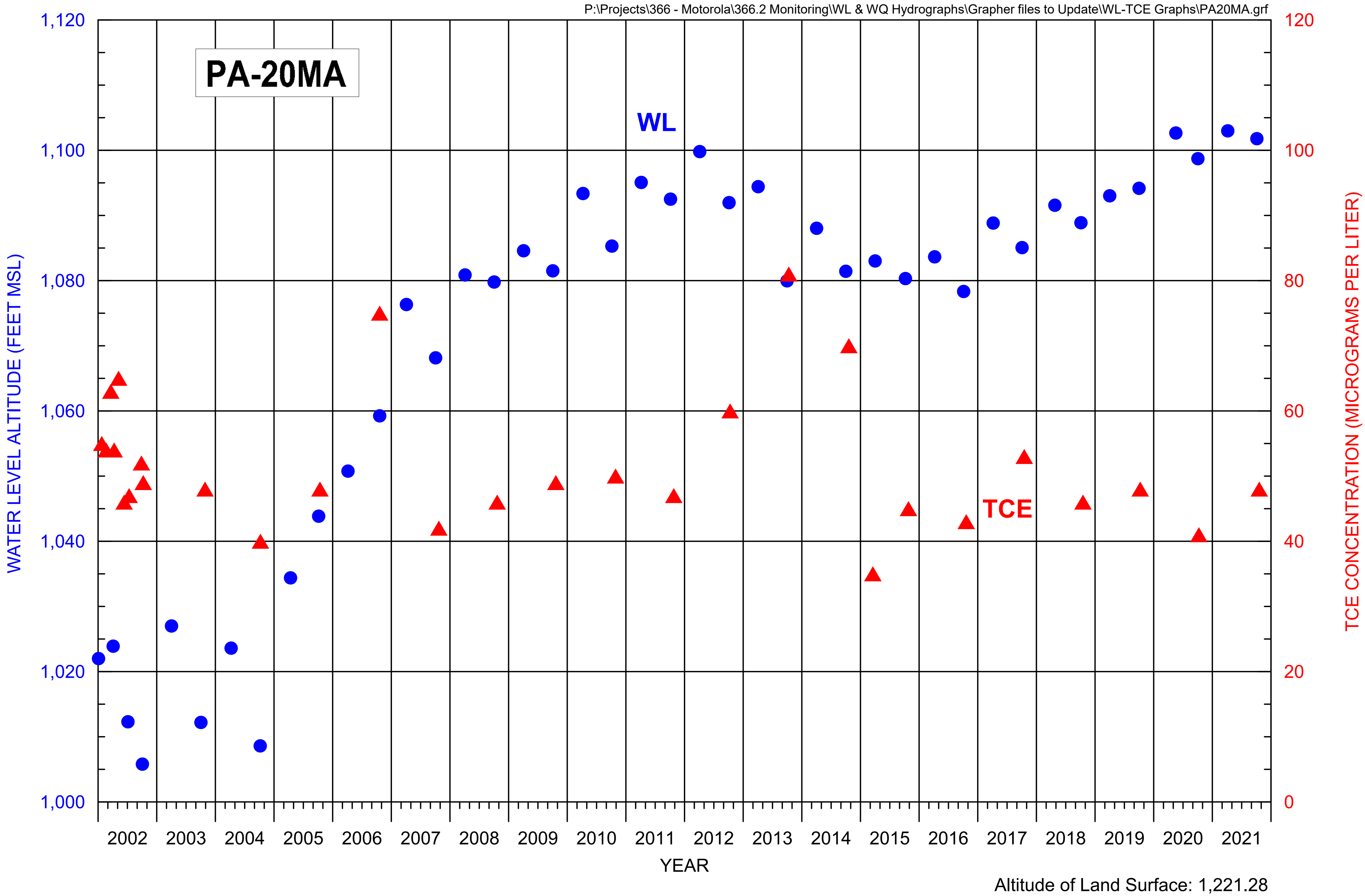
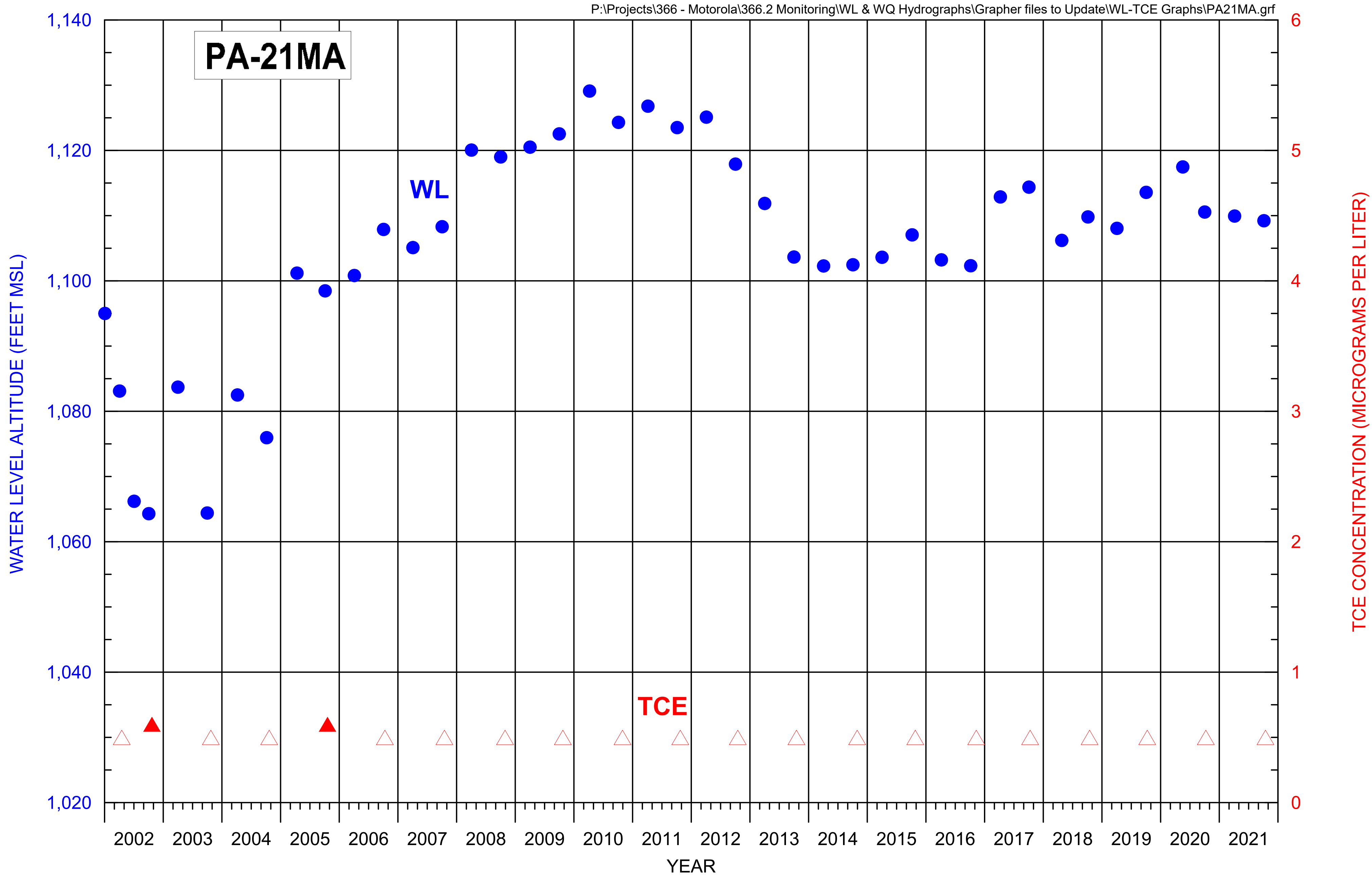


FIGURE D-74. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-20MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,225.19

FIGURE D-75. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PA-21MA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

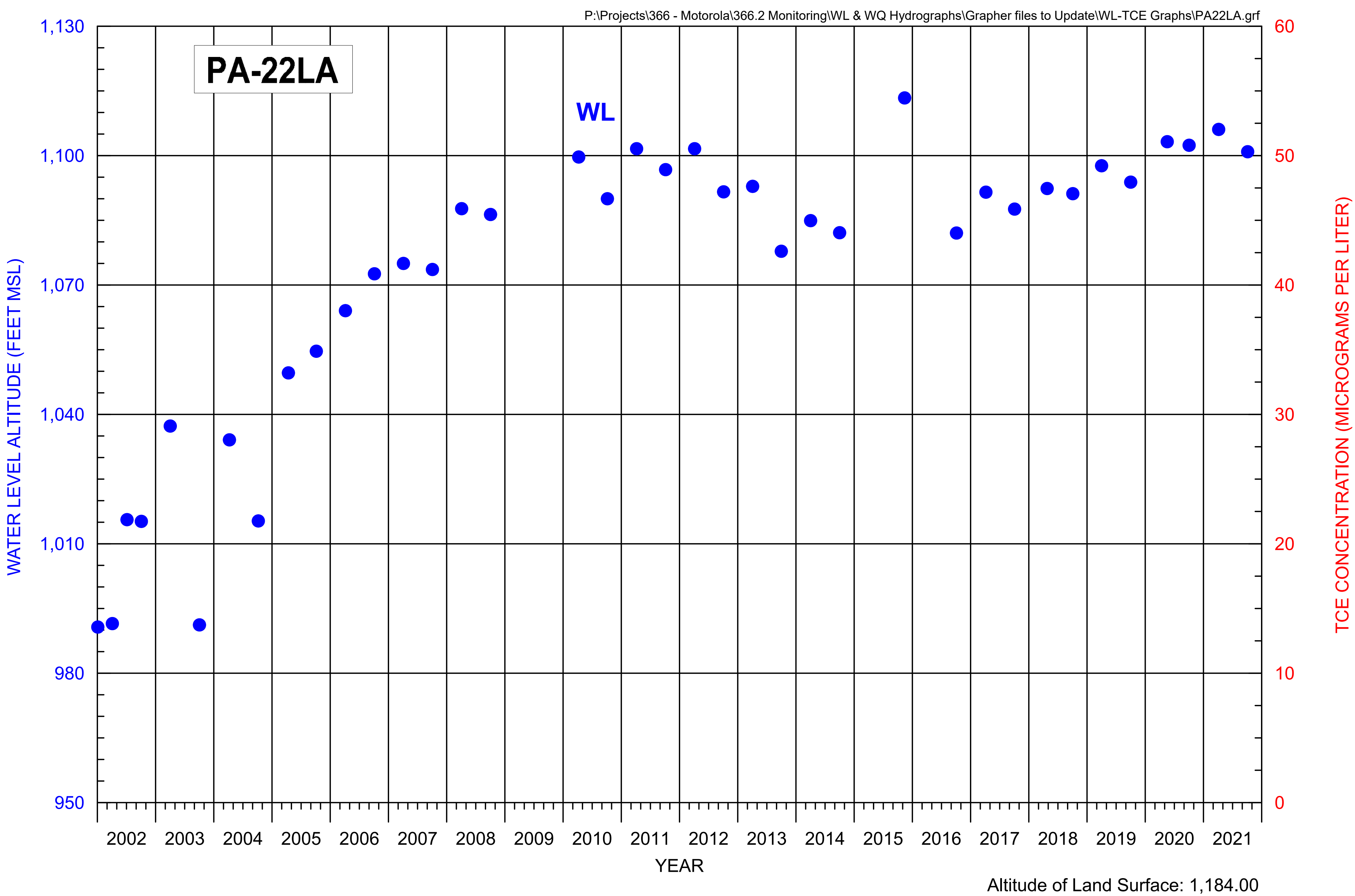
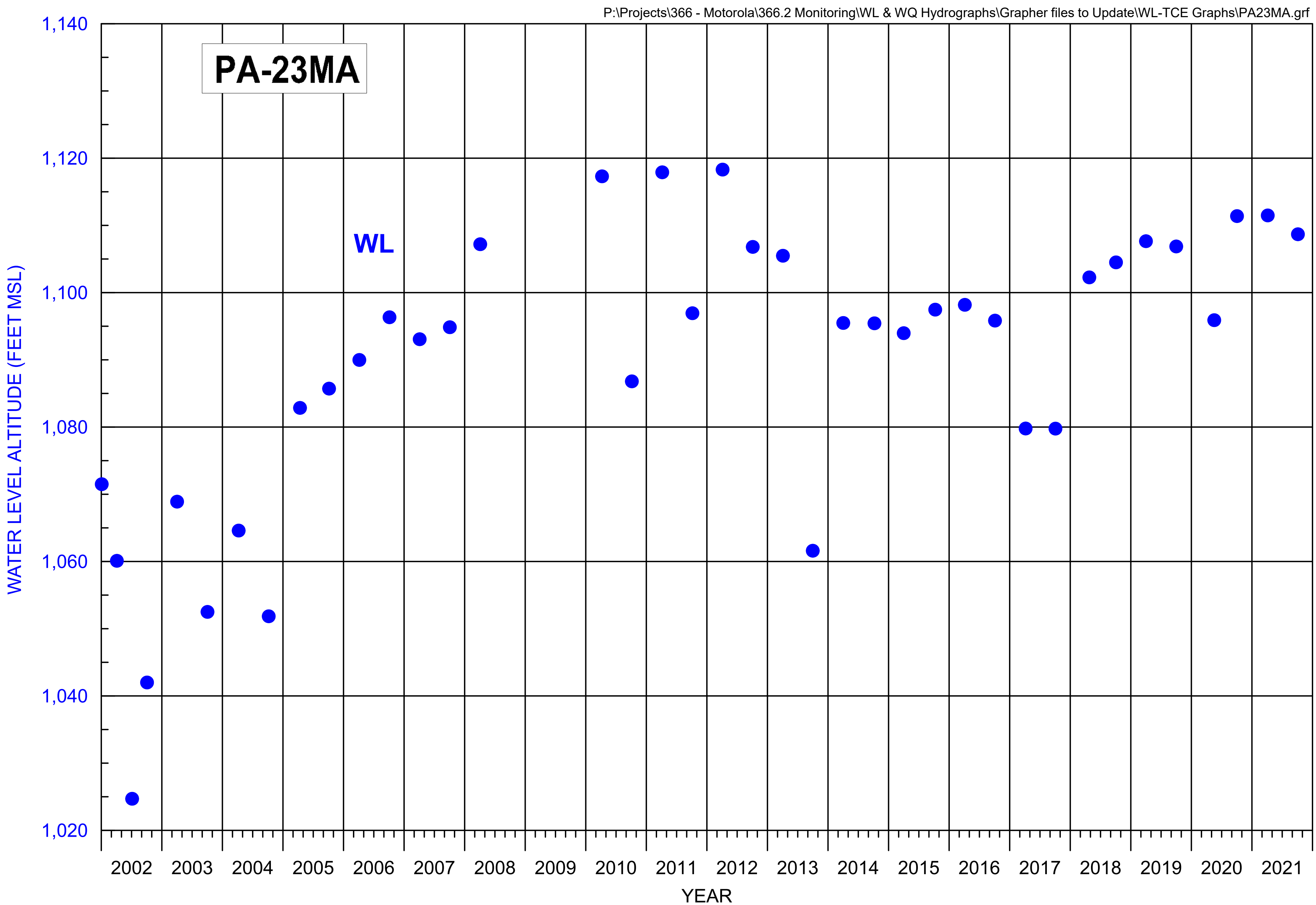


FIGURE D-76. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-22LA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,184.42

FIGURE D-77. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-23MA

North Indian Bend Wash Superfund Site

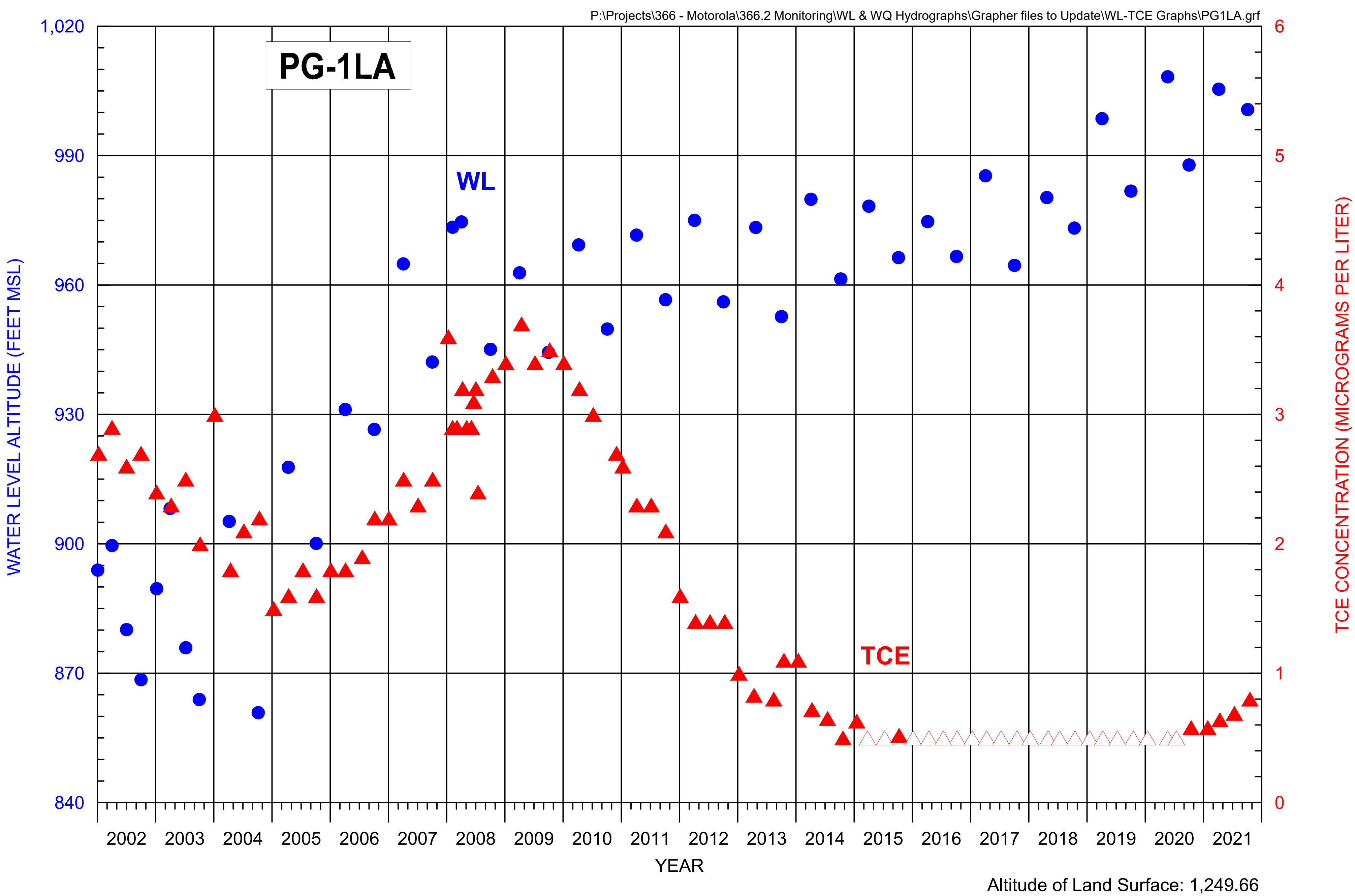


FIGURE D-78. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-1LA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

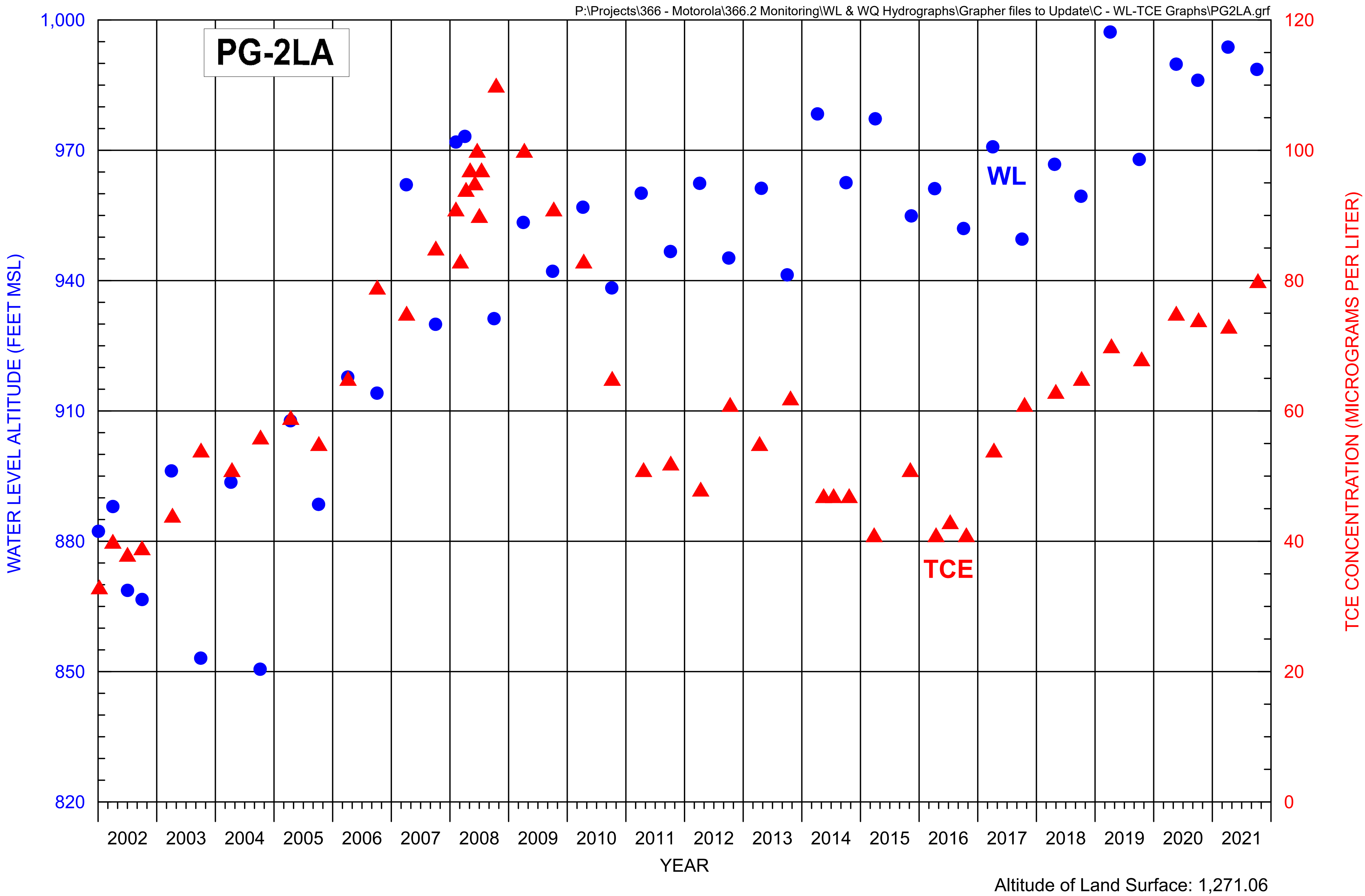


FIGURE D-79. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-2LA

North Indian Bend Wash Superfund Site

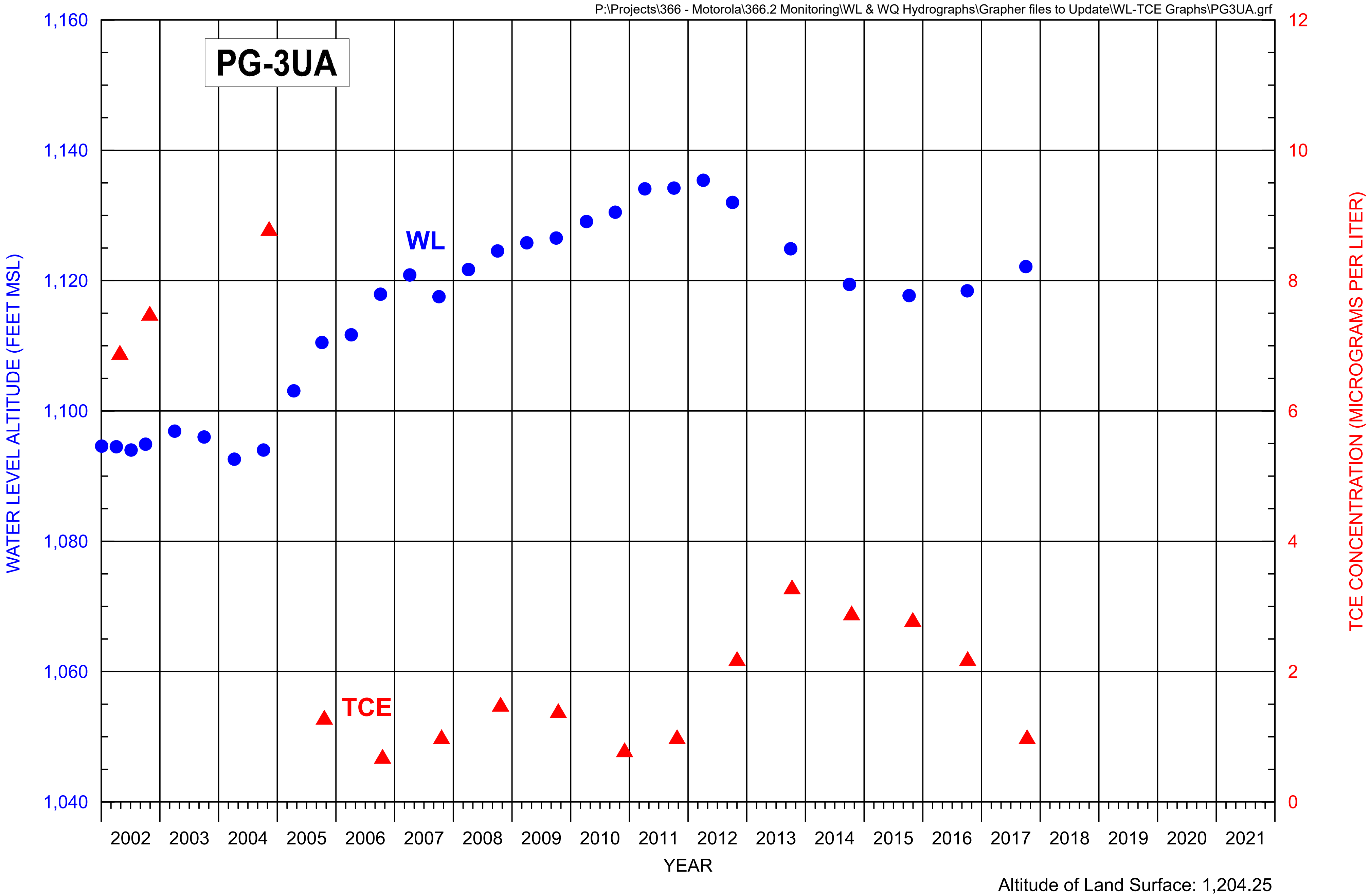


FIGURE D-80. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-3UA

Note: Well was abandoned 3/12/2018.

North Indian Bend Wash Superfund Site

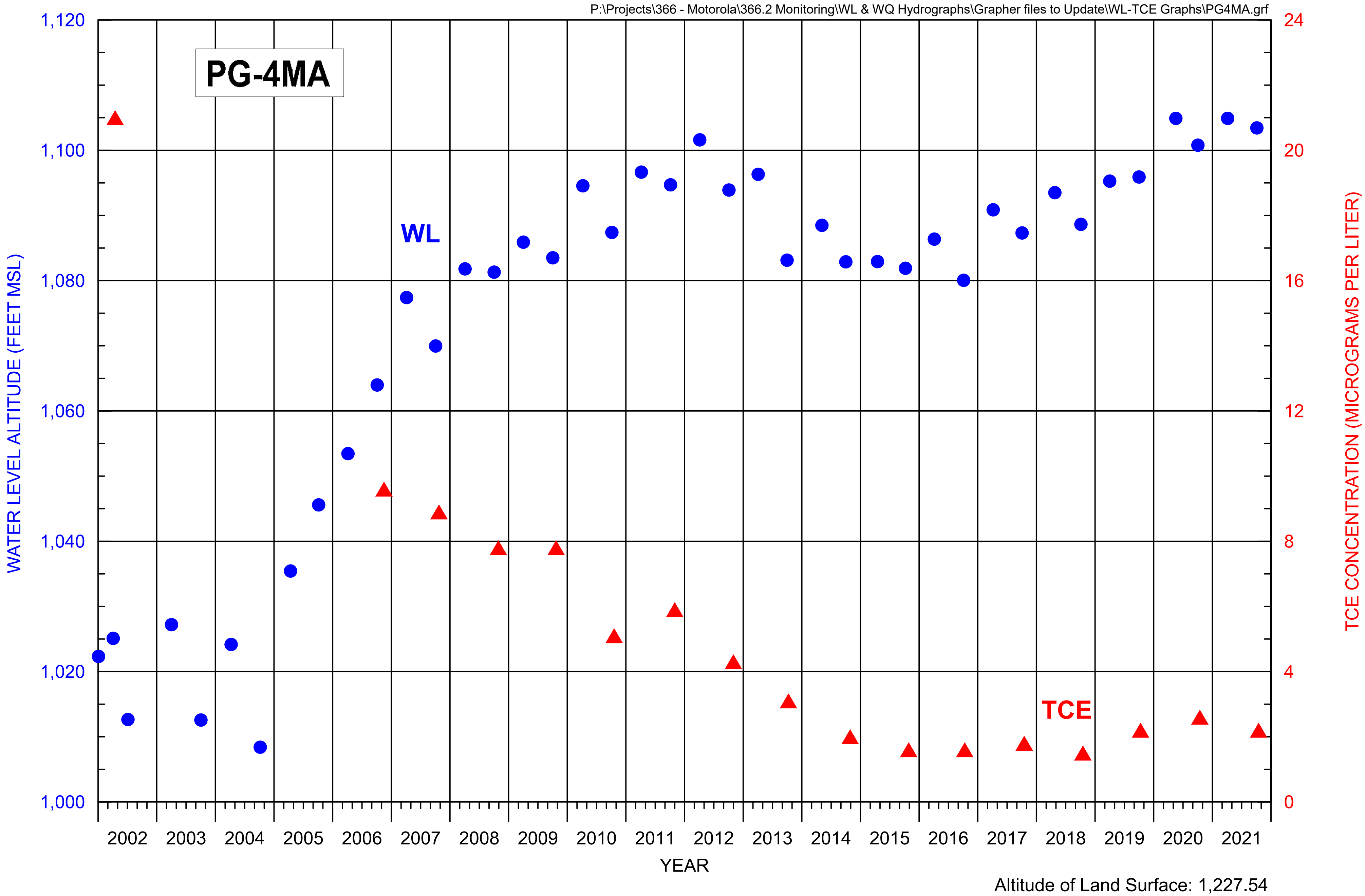


FIGURE D-81. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-4MA

North Indian Bend Wash Superfund Site

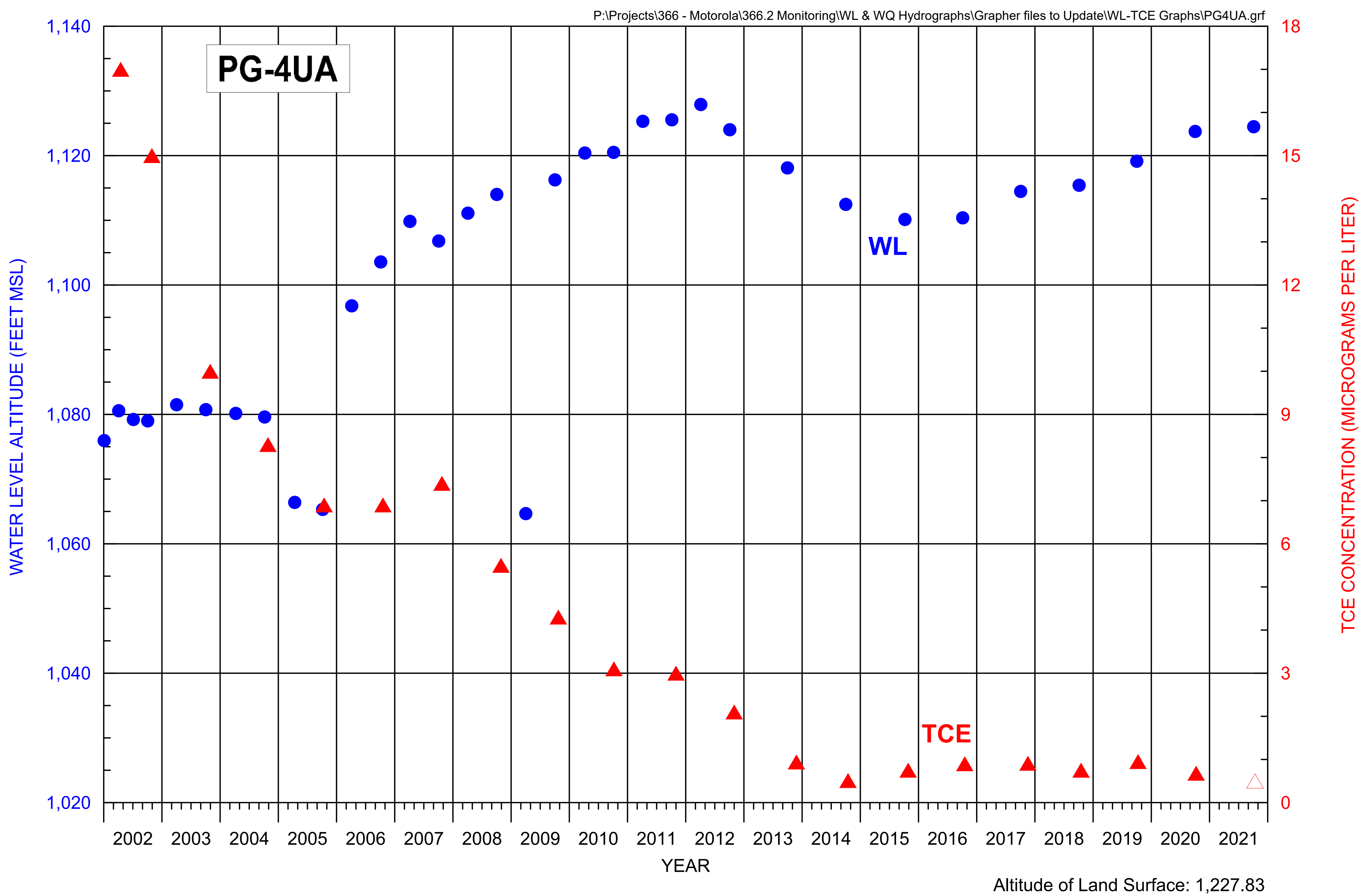


FIGURE D-82. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-4UA

North Indian Bend Wash Superfund Site

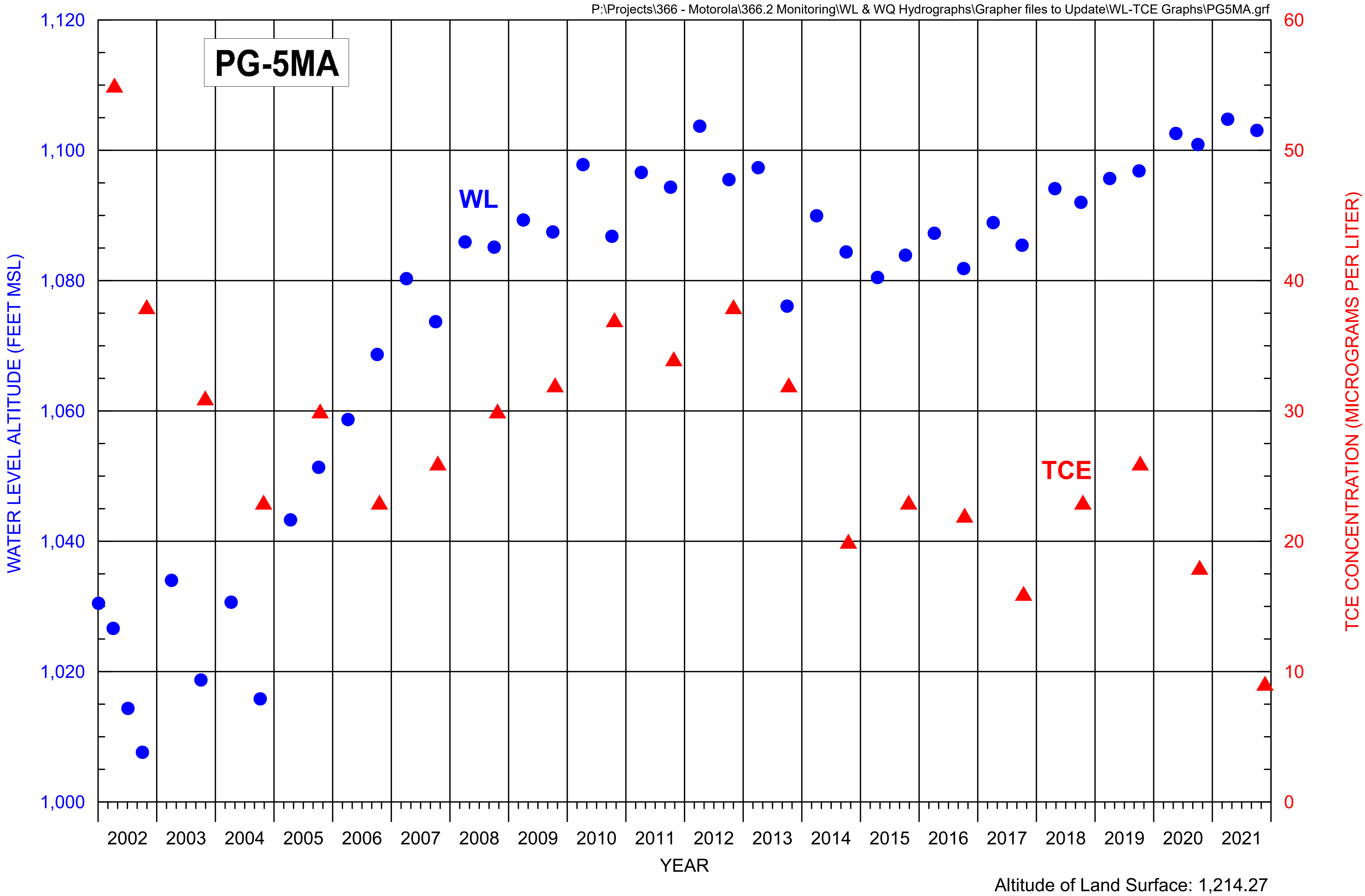


FIGURE D-83. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-5MA

North Indian Bend Wash Superfund Site

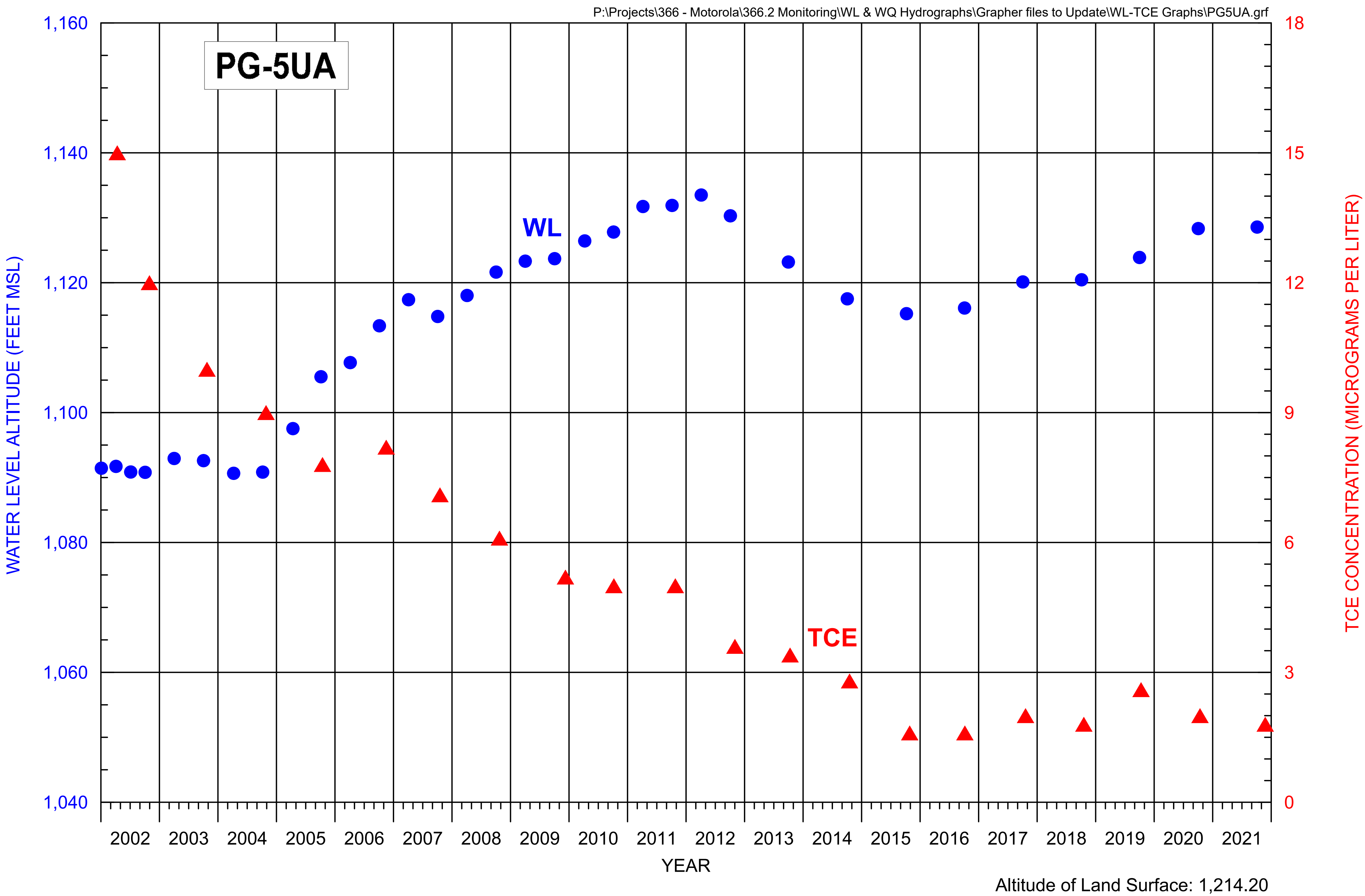


FIGURE D-84. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-5UA

North Indian Bend Wash Superfund Site

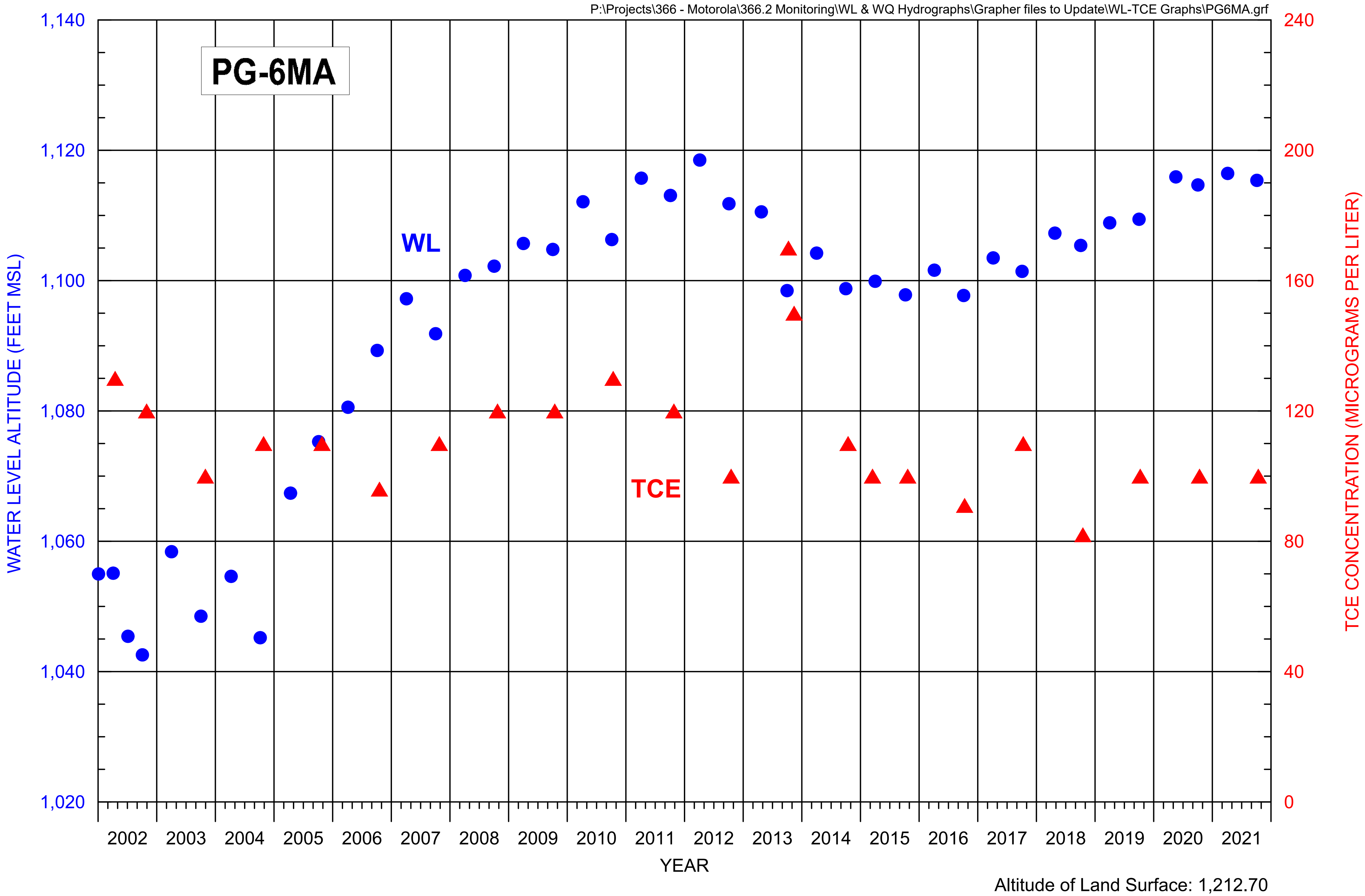


FIGURE D-85. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-6MA

North Indian Bend Wash Superfund Site

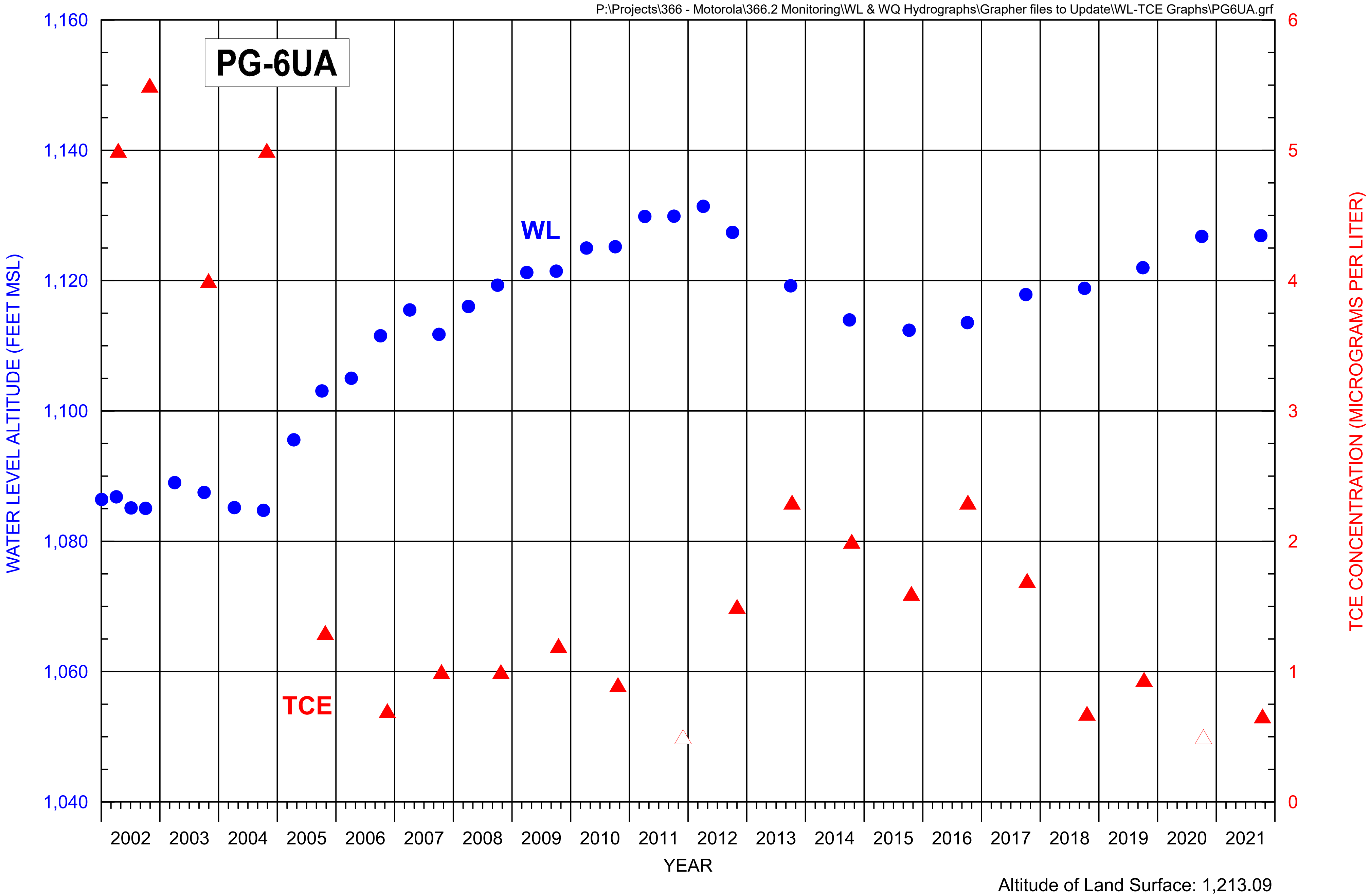
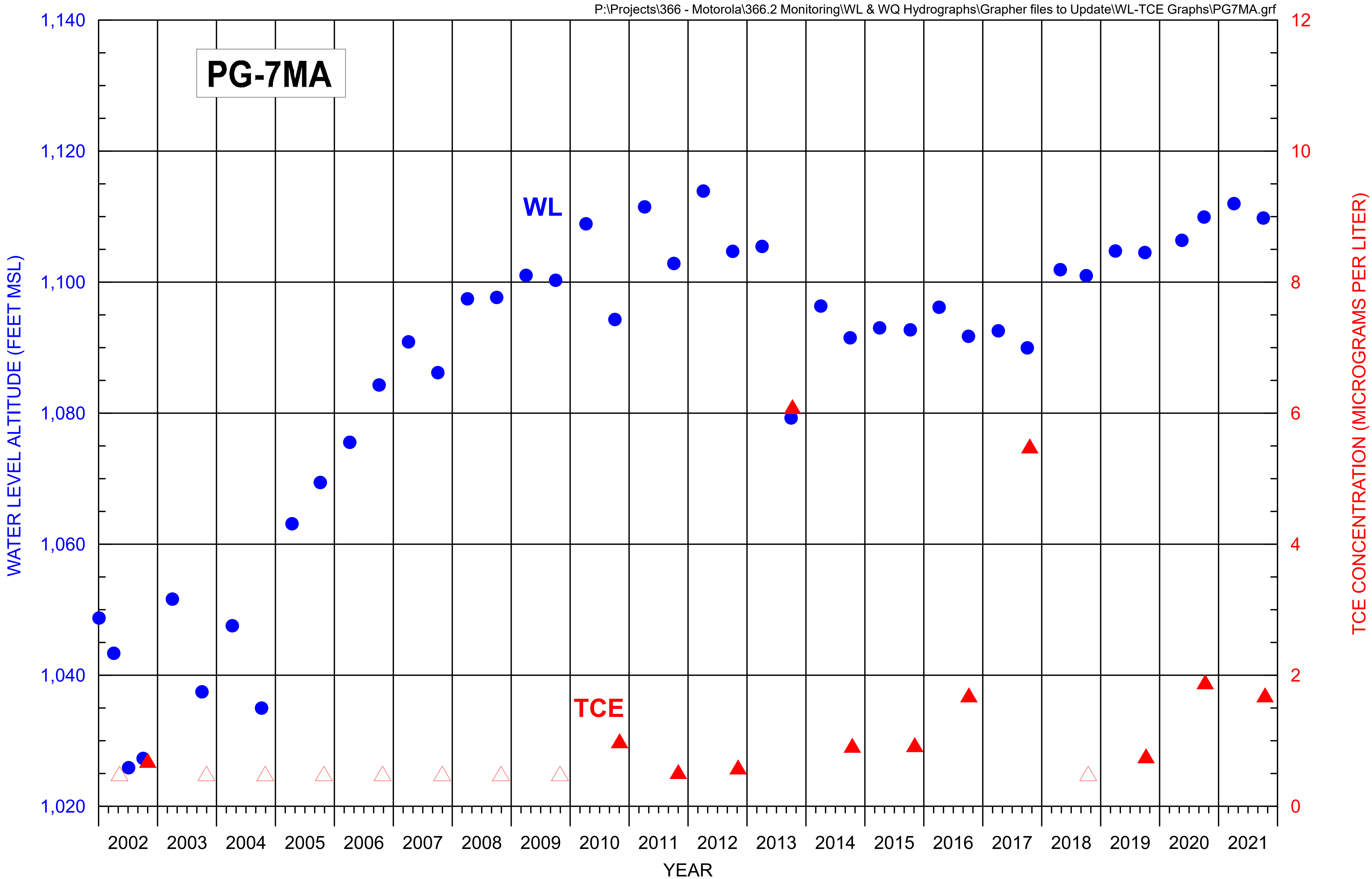


FIGURE D-86. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-6UA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,197.86

FIGURE D-87. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-7MA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

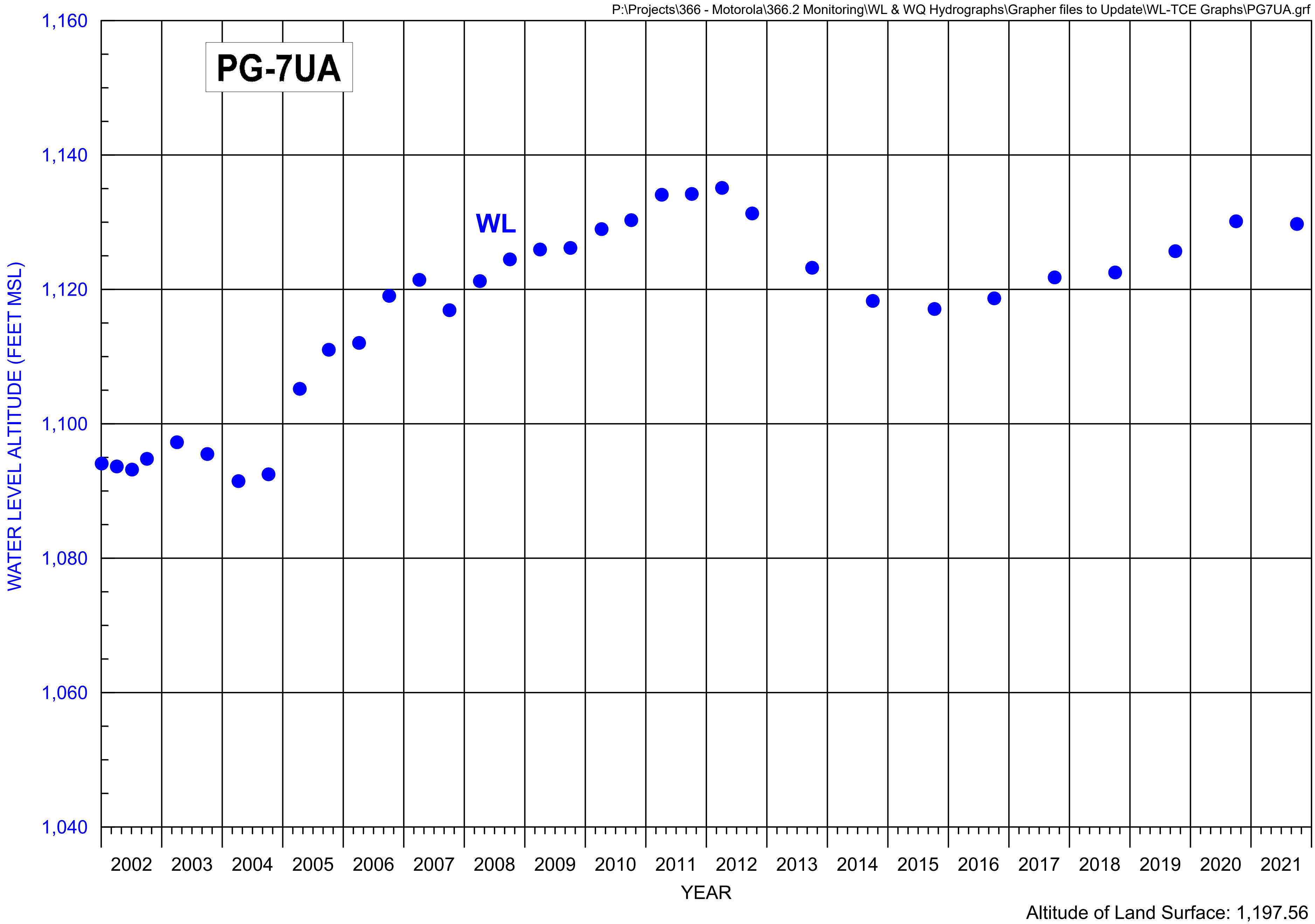


FIGURE D-88. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-7UA

North Indian Bend Wash Superfund Site

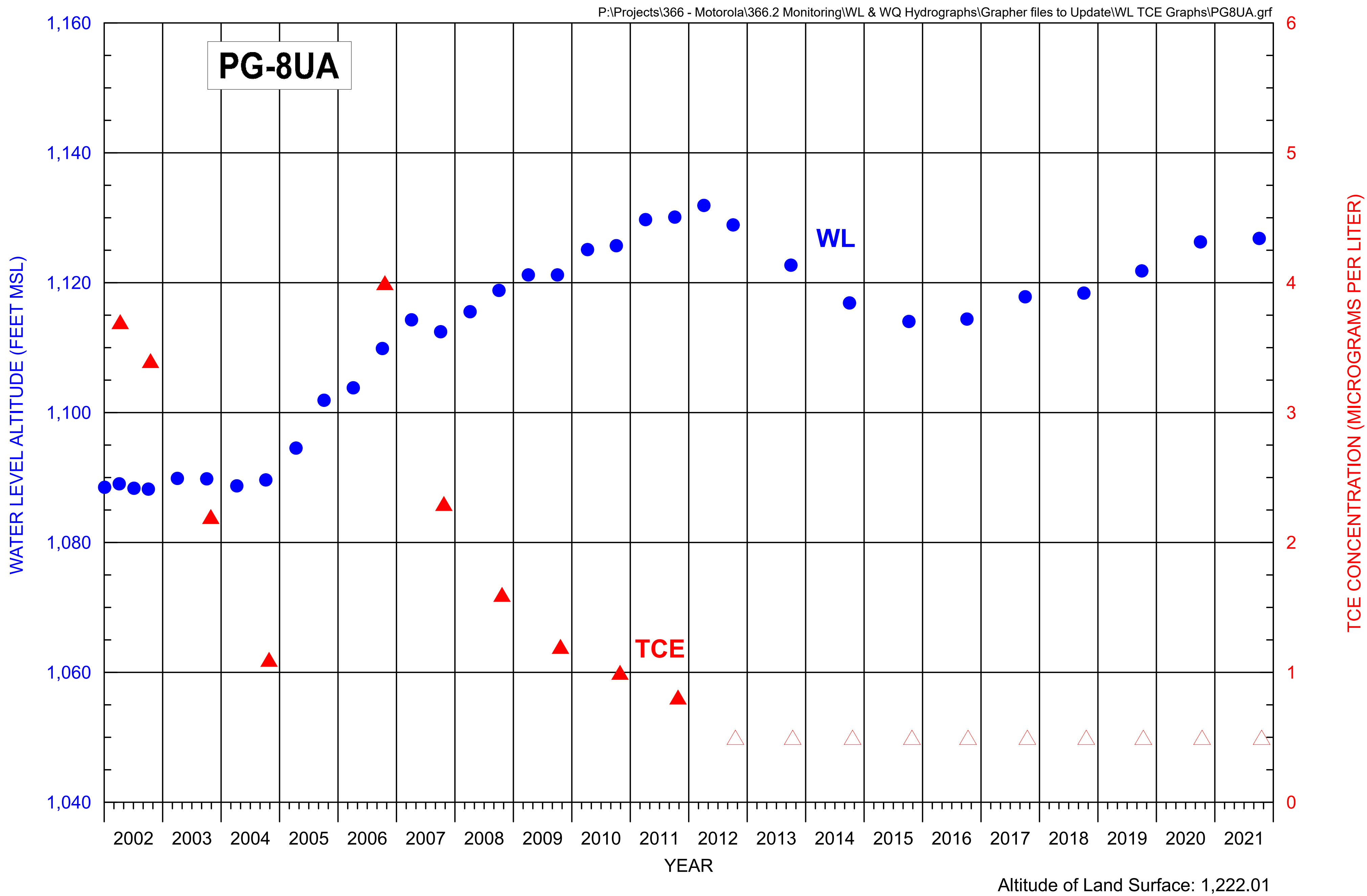


FIGURE D-89. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-8UA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

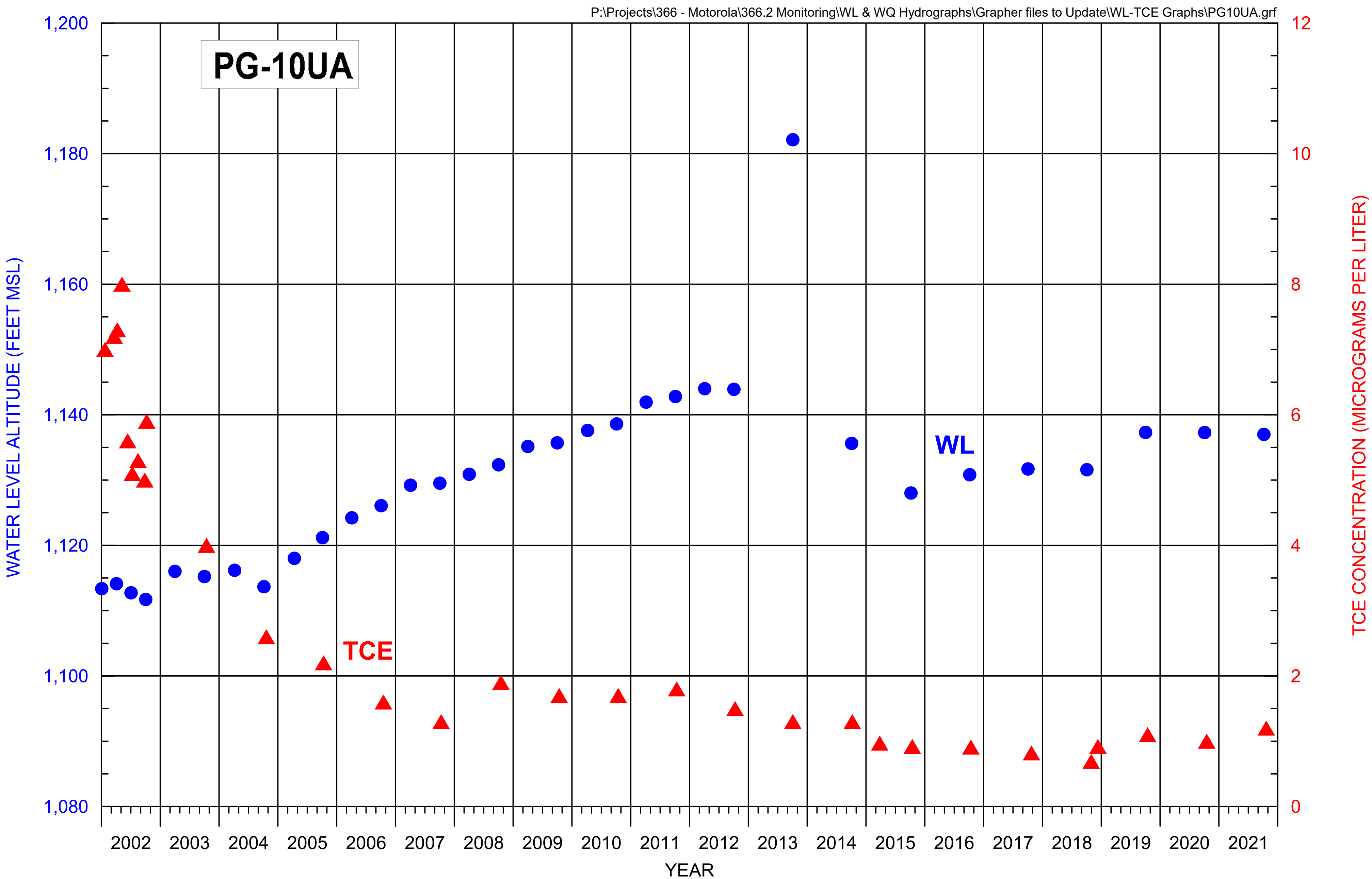


FIGURE D-90. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-10UA

North Indian Bend Wash Superfund Site

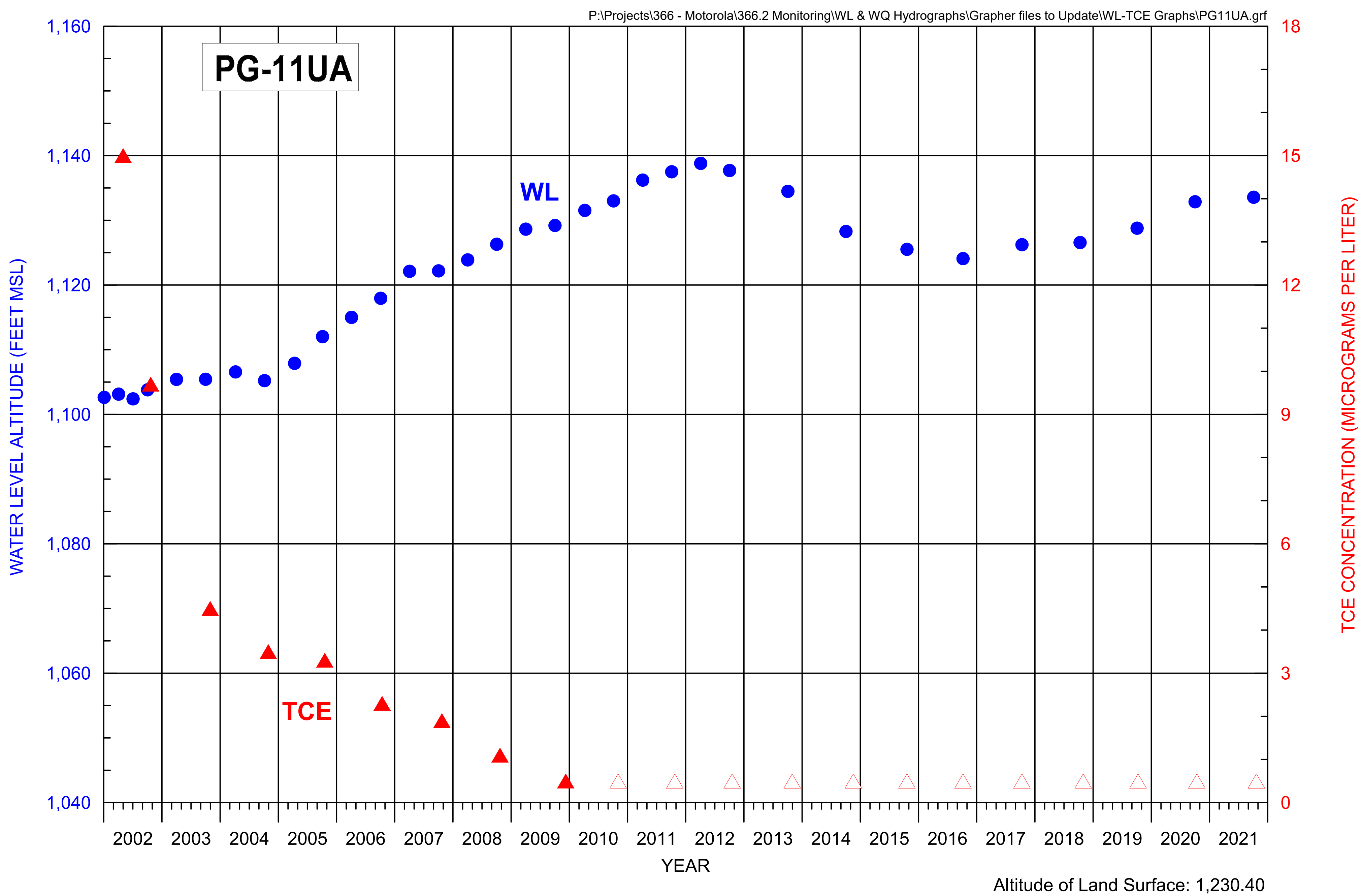


FIGURE D-91. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-11UA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

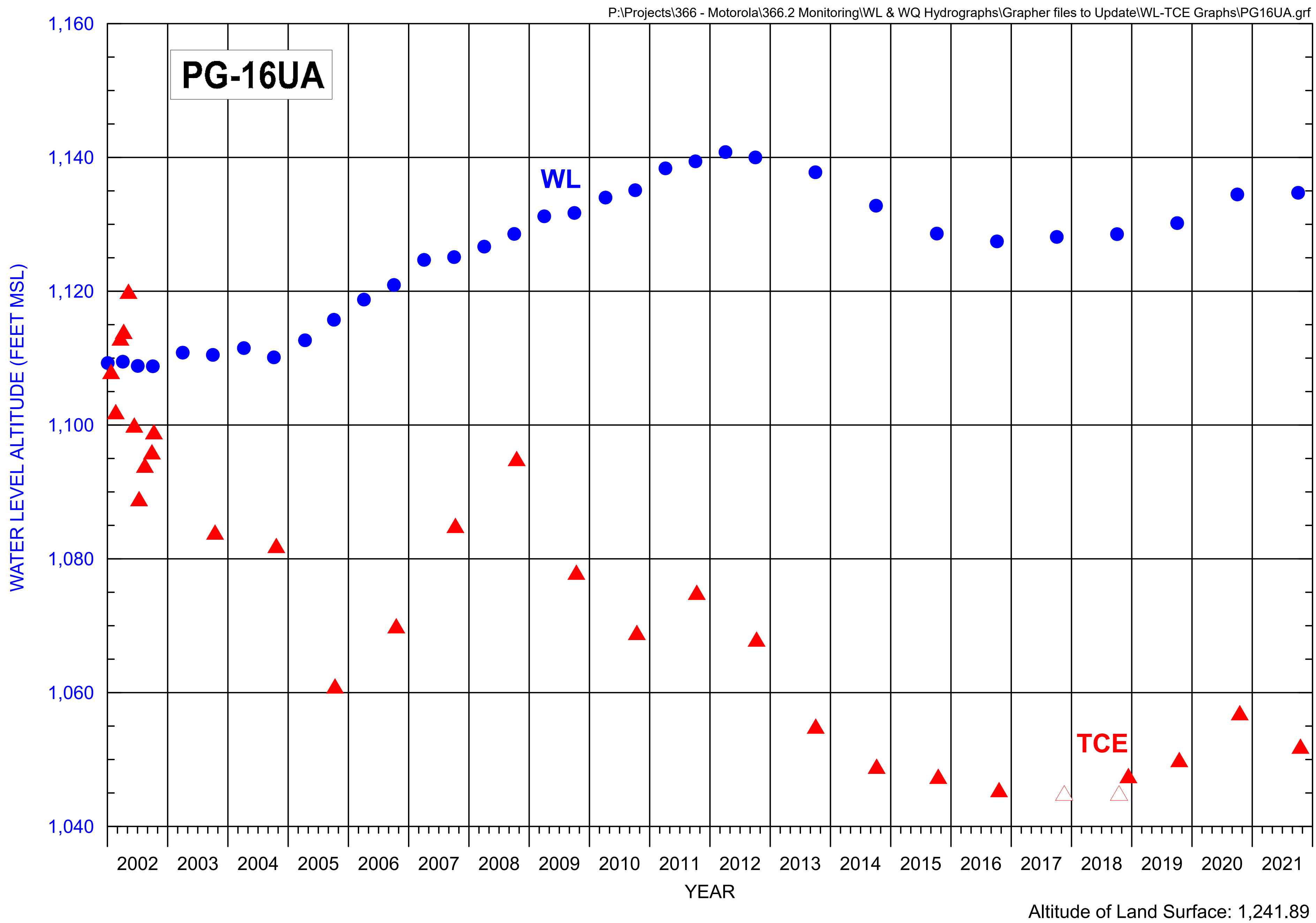


FIGURE D-92. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-16UA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

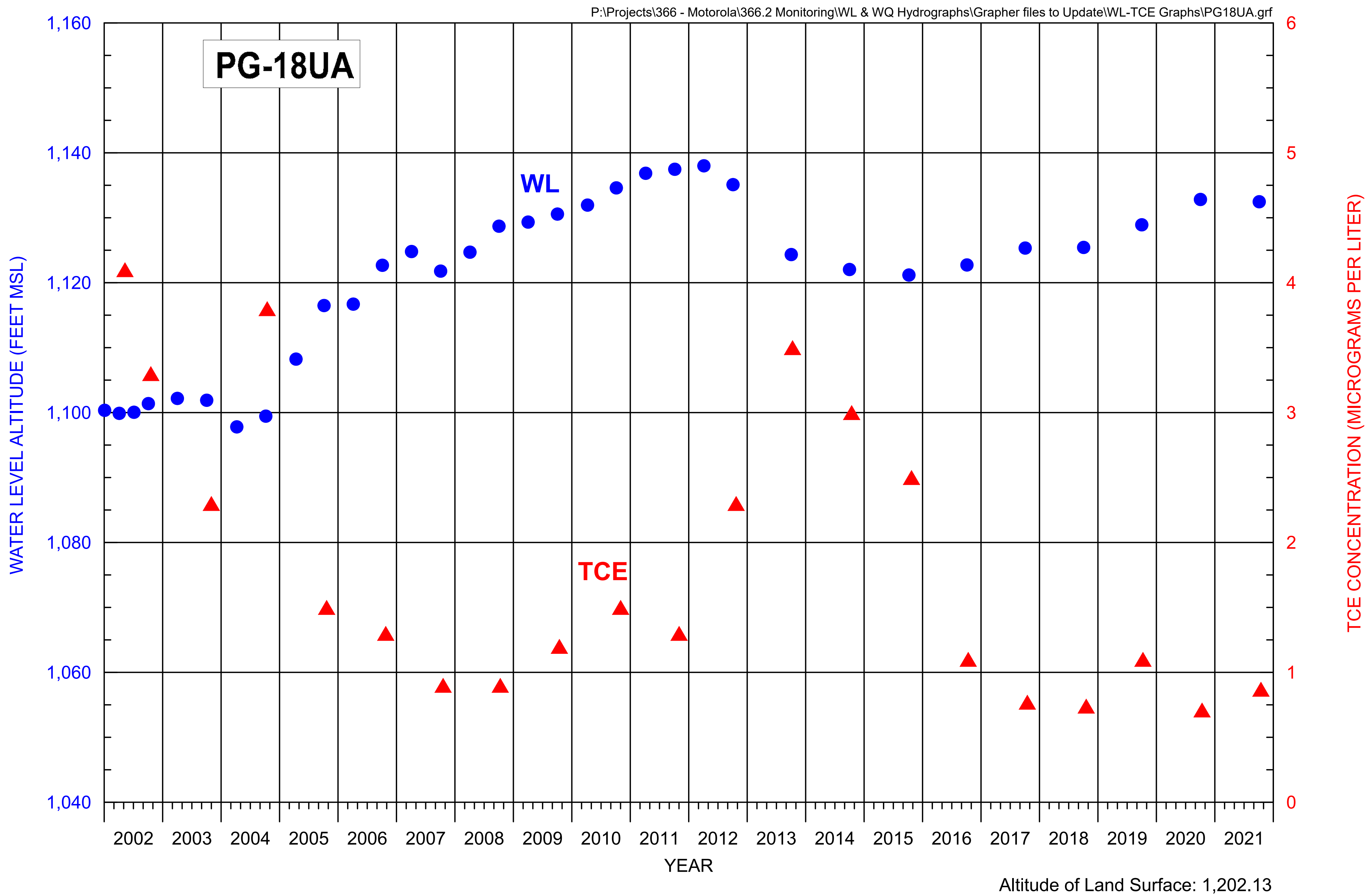


FIGURE D-93. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-18UA

North Indian Bend Wash Superfund Site

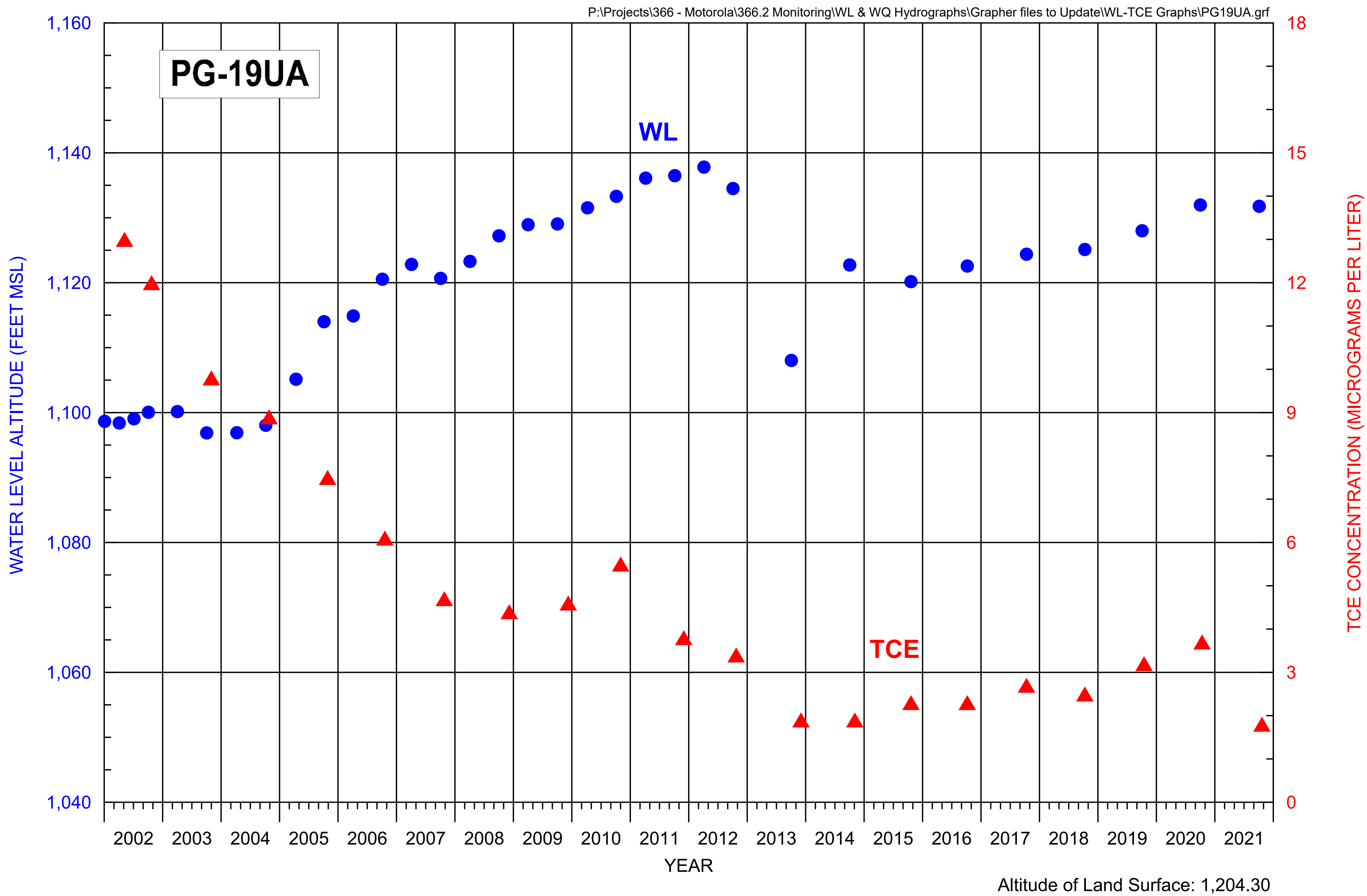
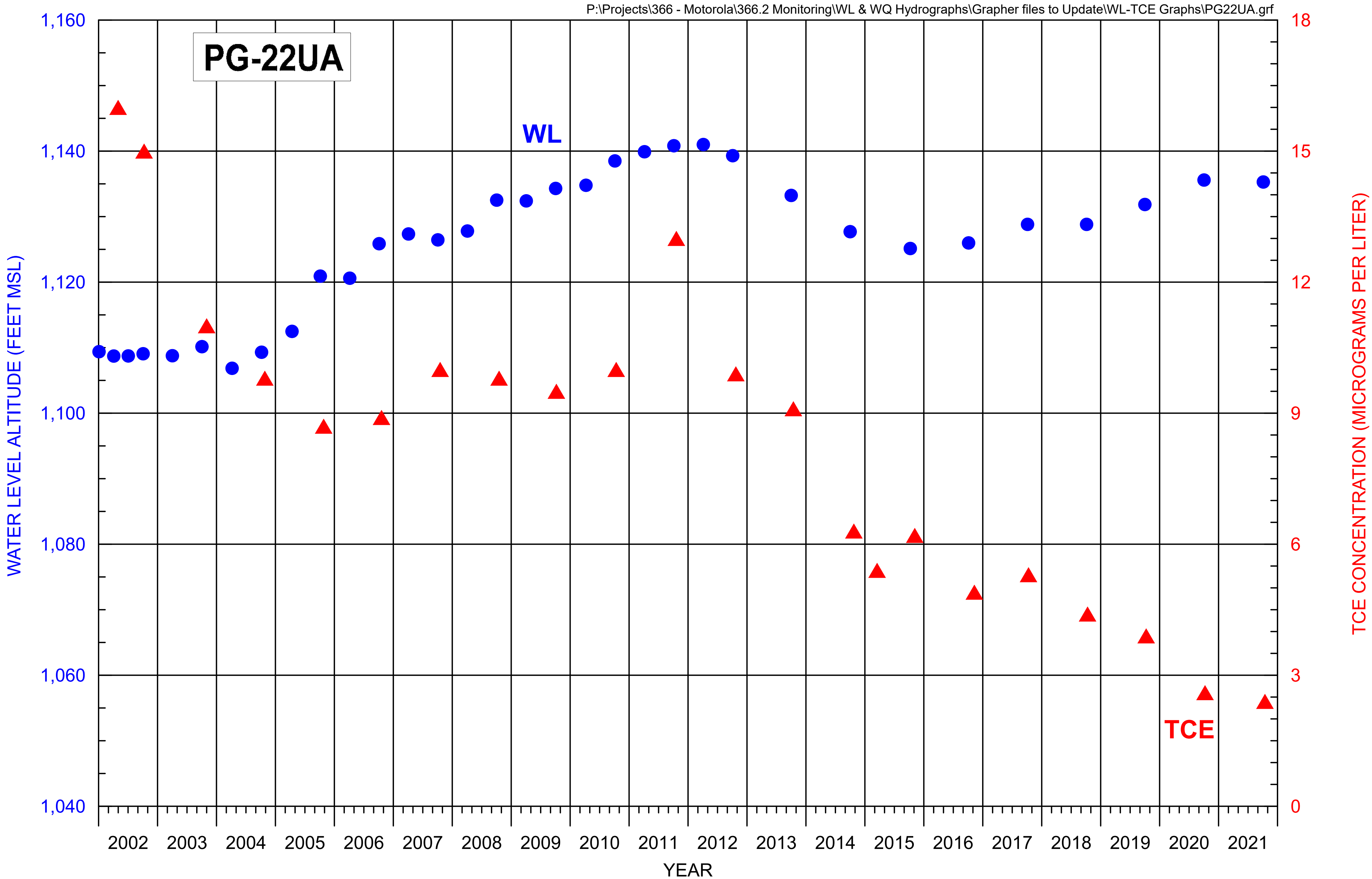


FIGURE D-94. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-19UA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,210.29

FIGURE D-95. WATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-22UA

North Indian Bend Wash Superfund Site

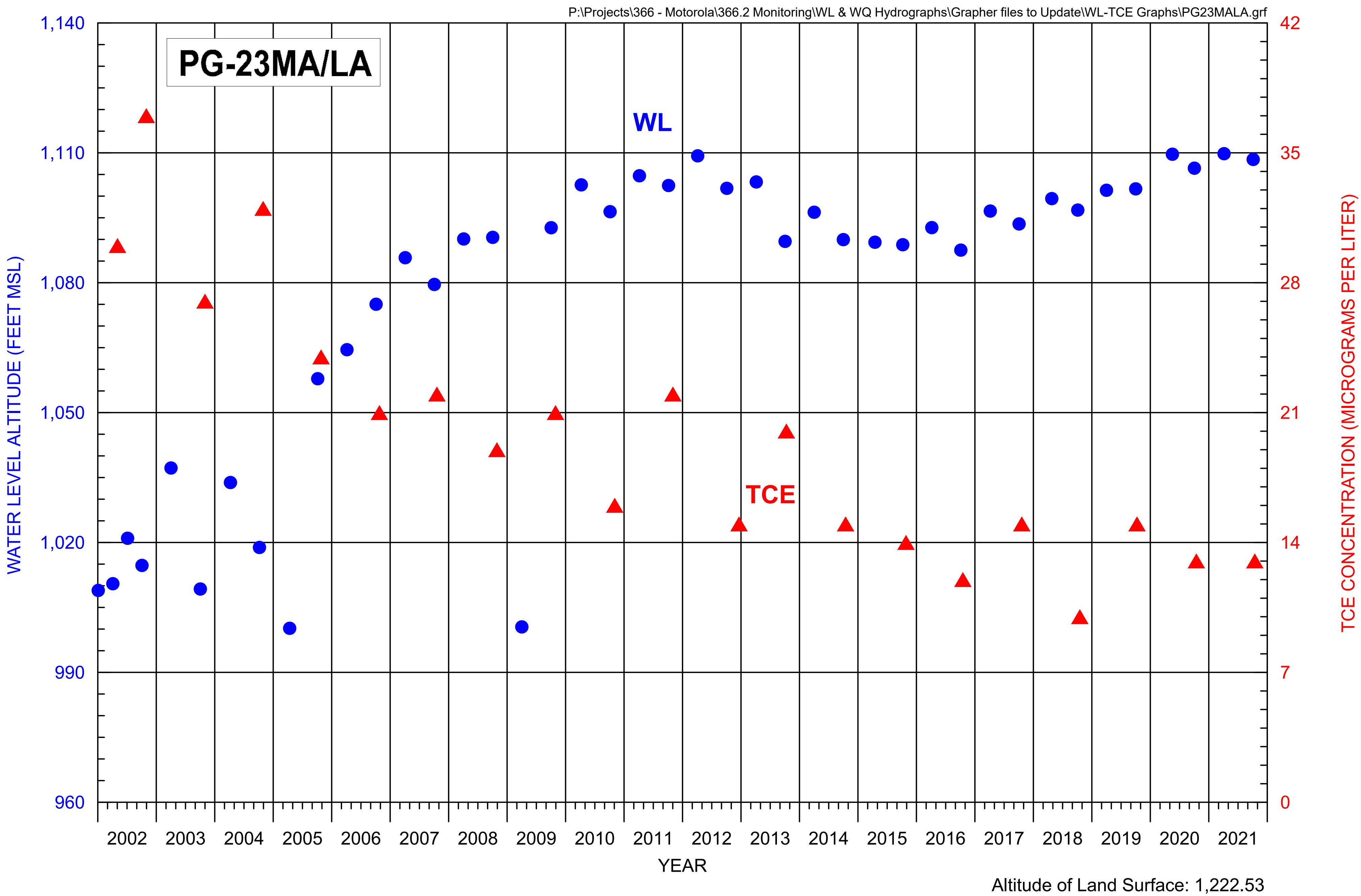
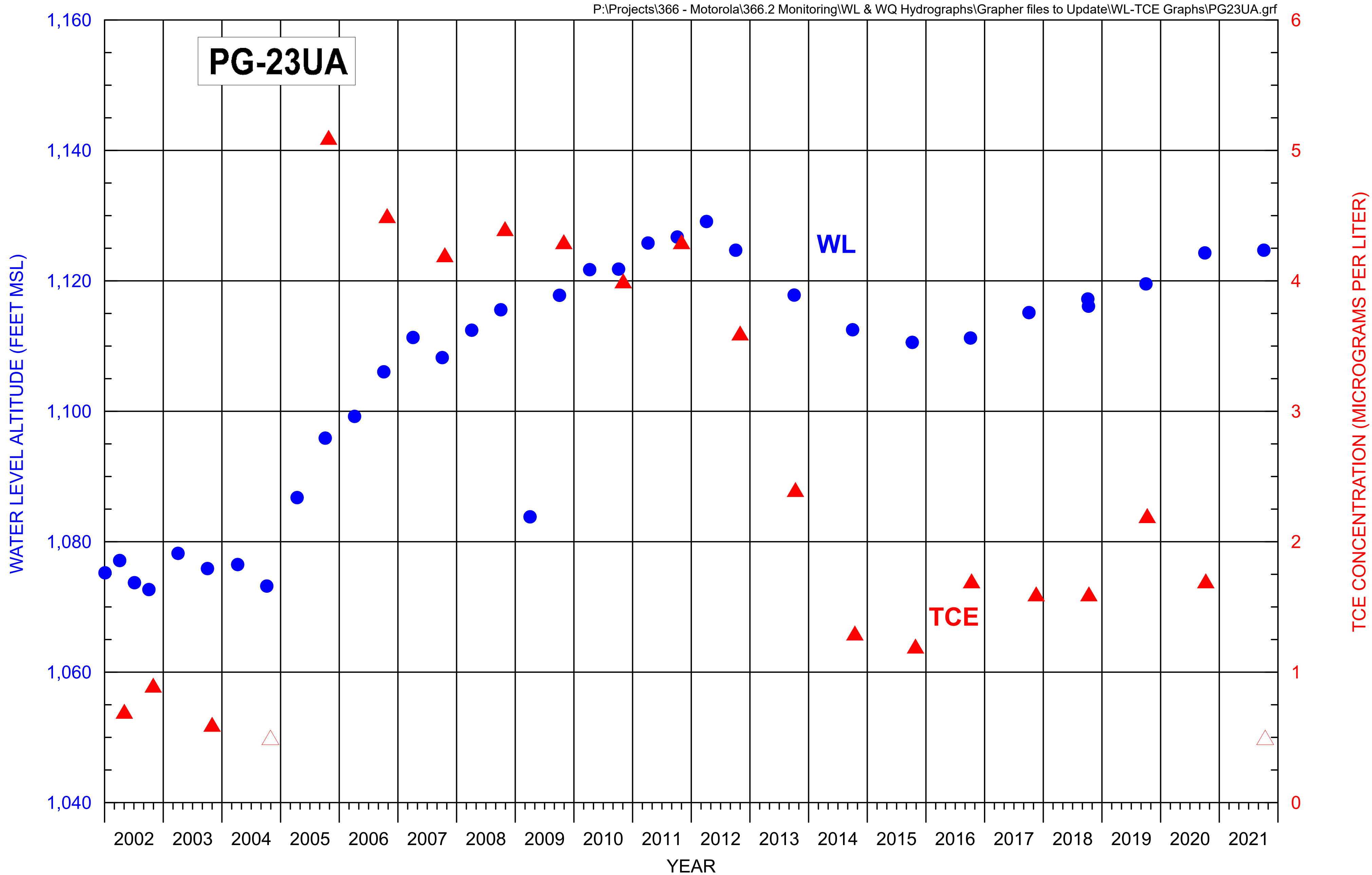


FIGURE D-96. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-23MA/LA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,222.96

FIGURE D-97. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-23UA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

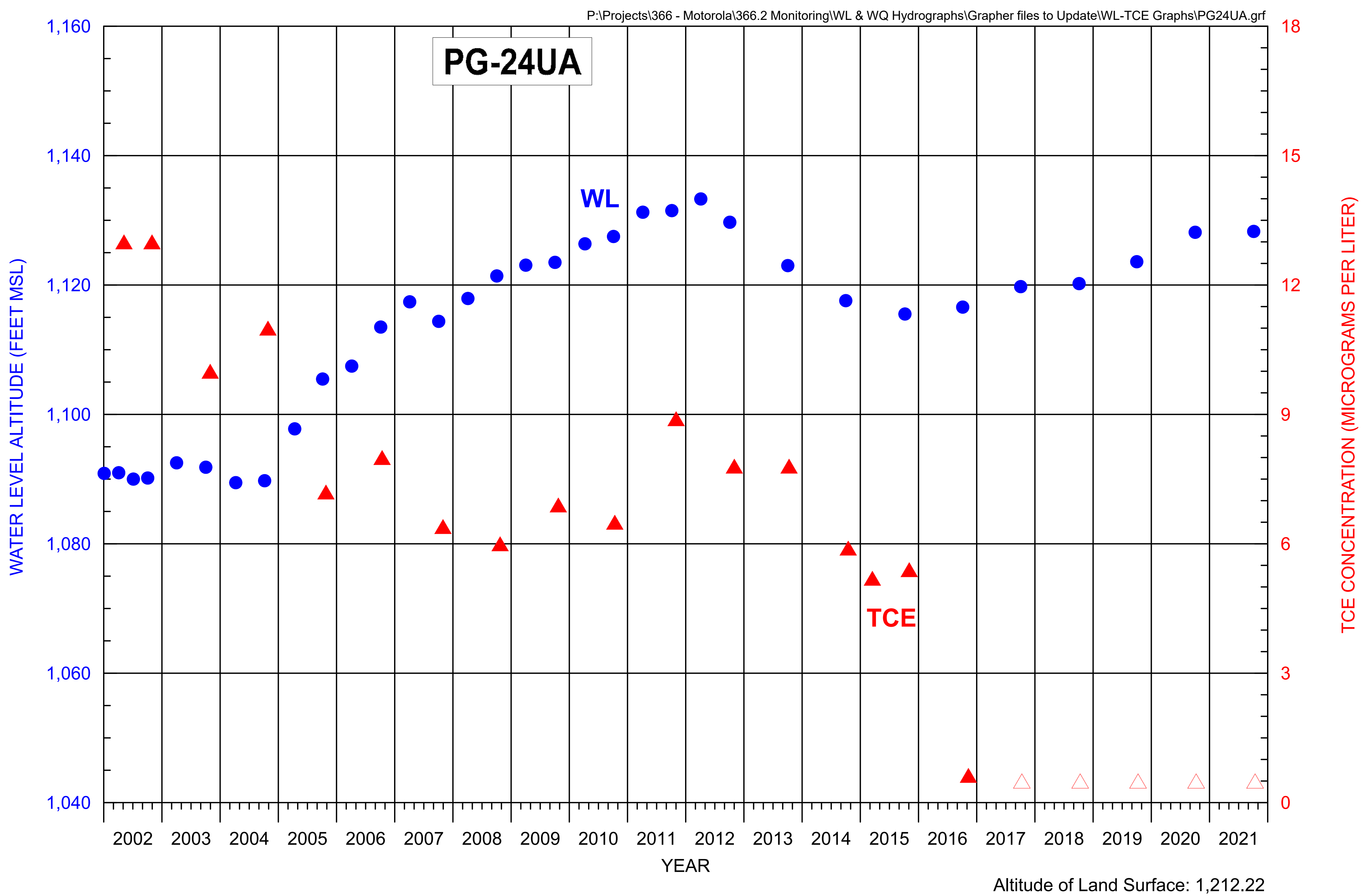


FIGURE D-98. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-24UA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

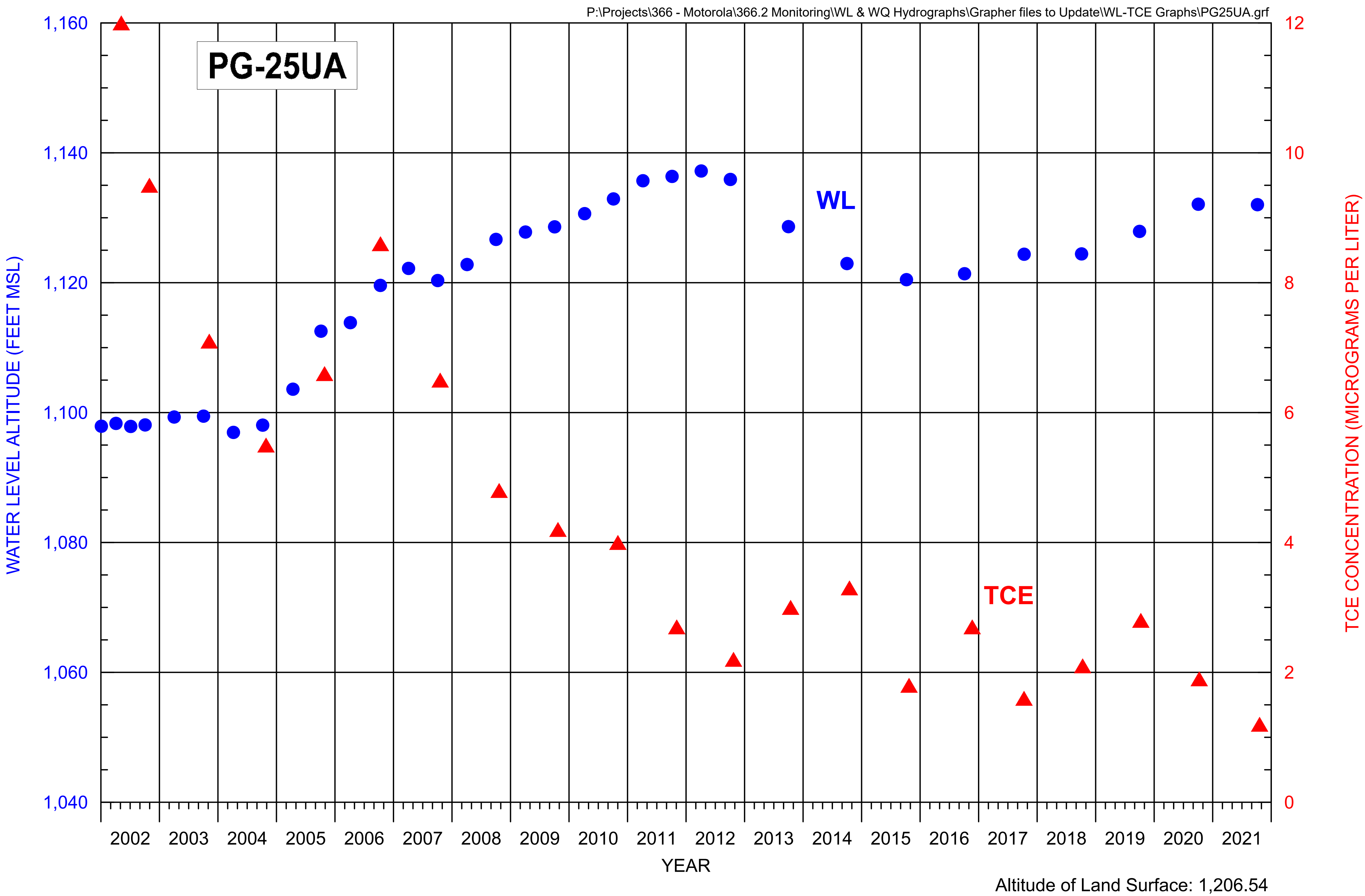


FIGURE D-99. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-25UA

North Indian Bend Wash Superfund Site

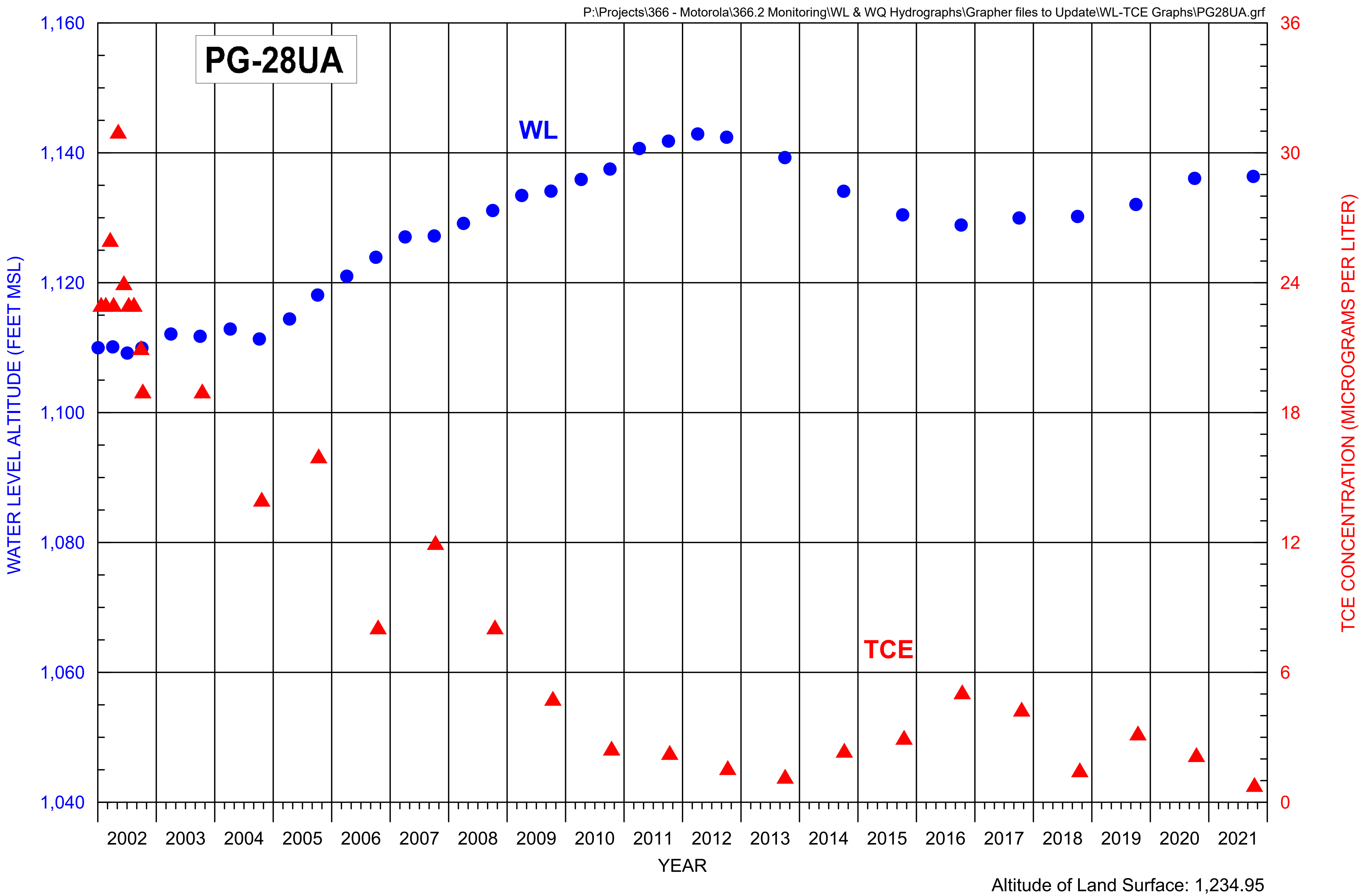


FIGURE D-100. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-28UA

North Indian Bend Wash Superfund Site

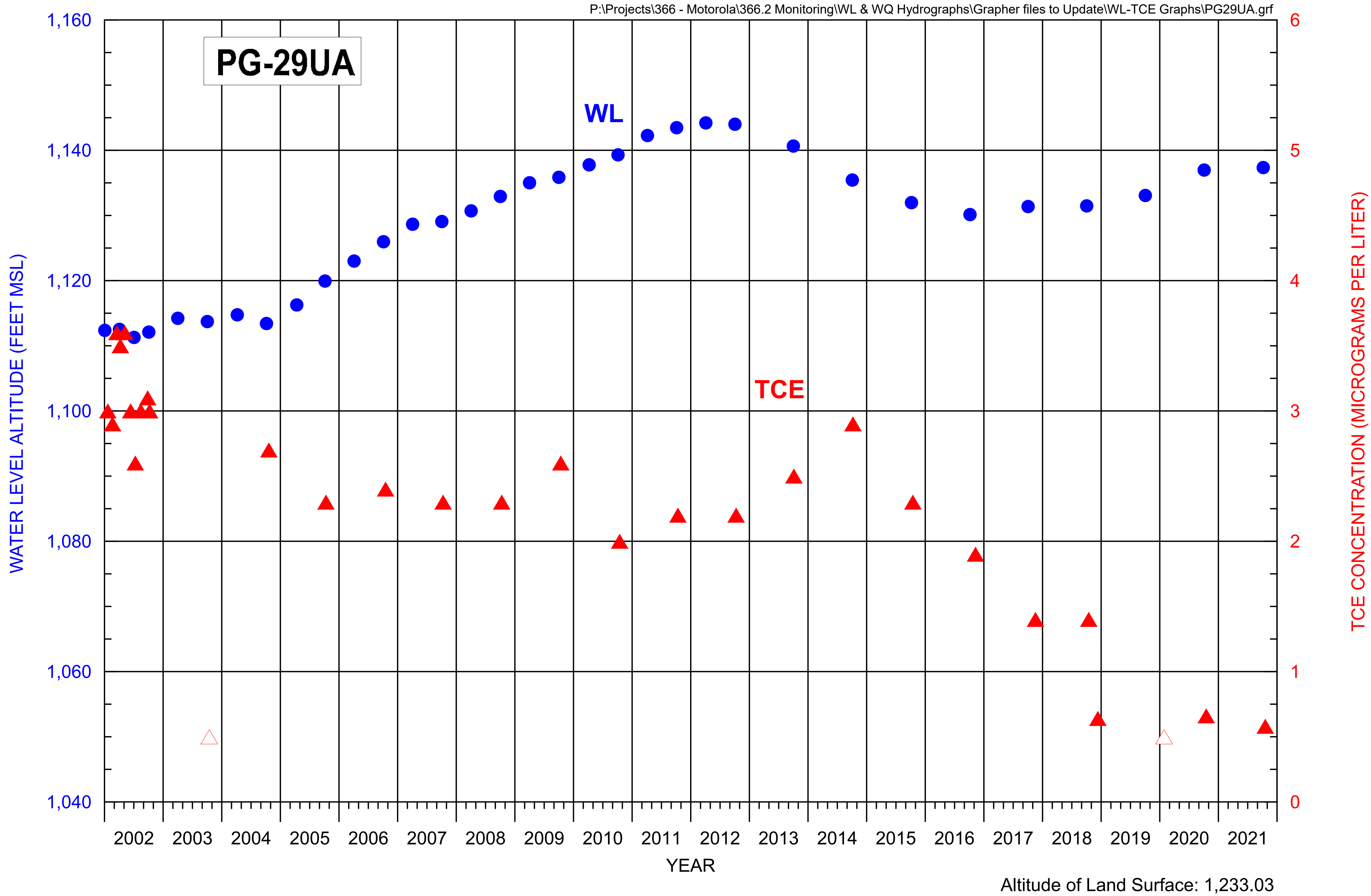
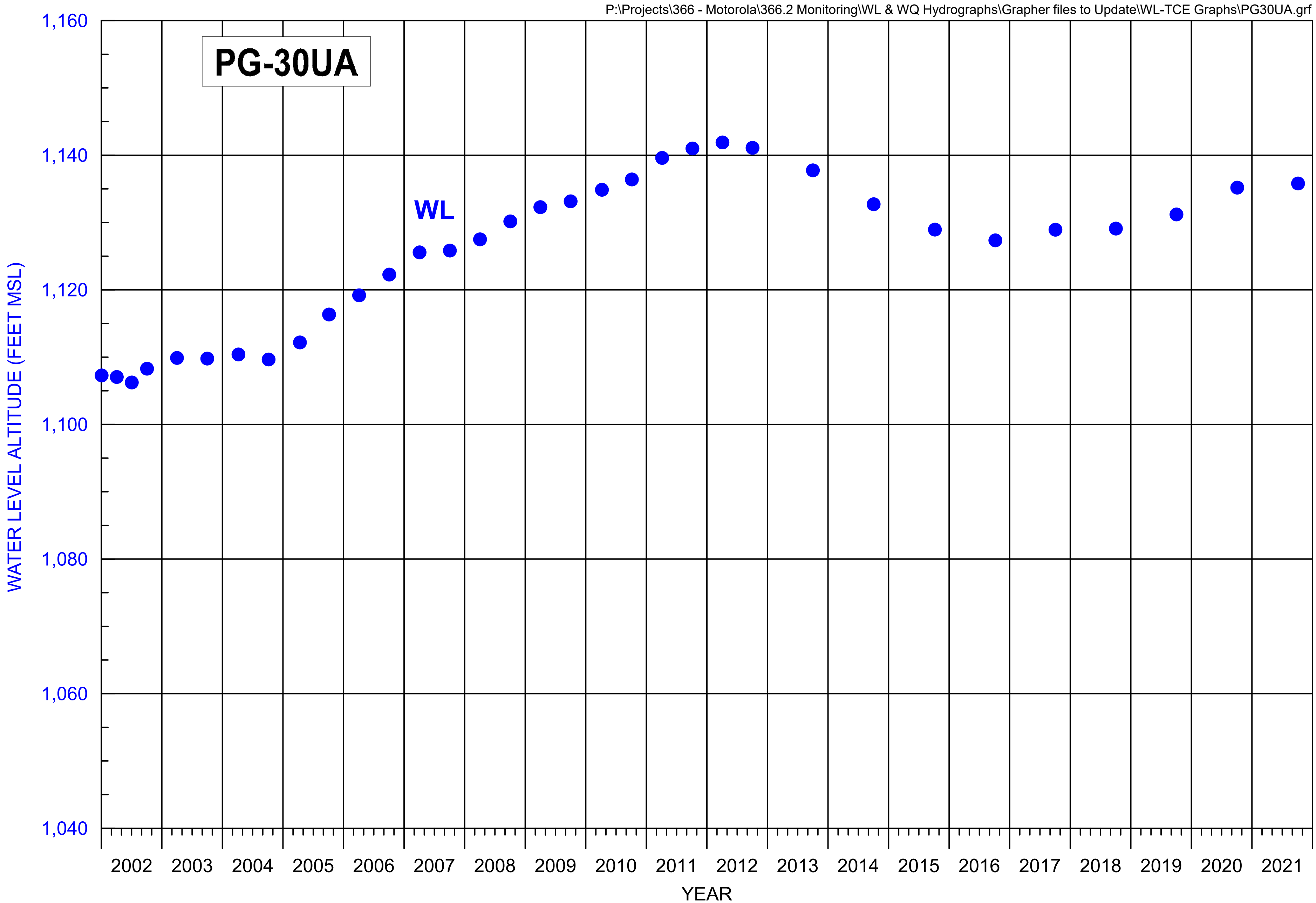


FIGURE D-101. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-29UA

*Note: Sampler was unable to collect water quality sample in October 2019. Sample was collected January 27, 2020.

EXPLANATION
△ TCE Non-Detect
▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,226.36

FIGURE D-102. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-30UA

North Indian Bend Wash Superfund Site

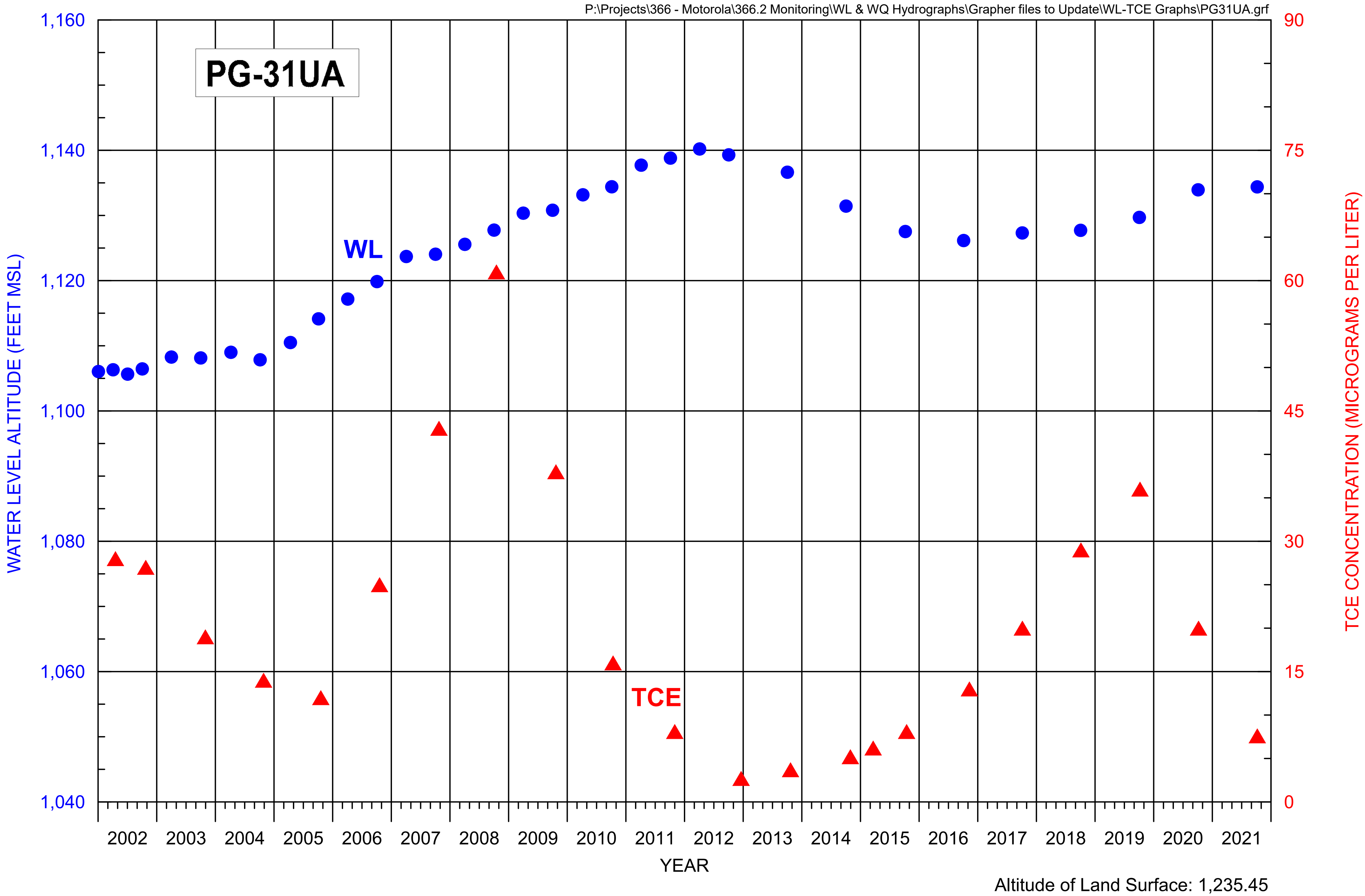
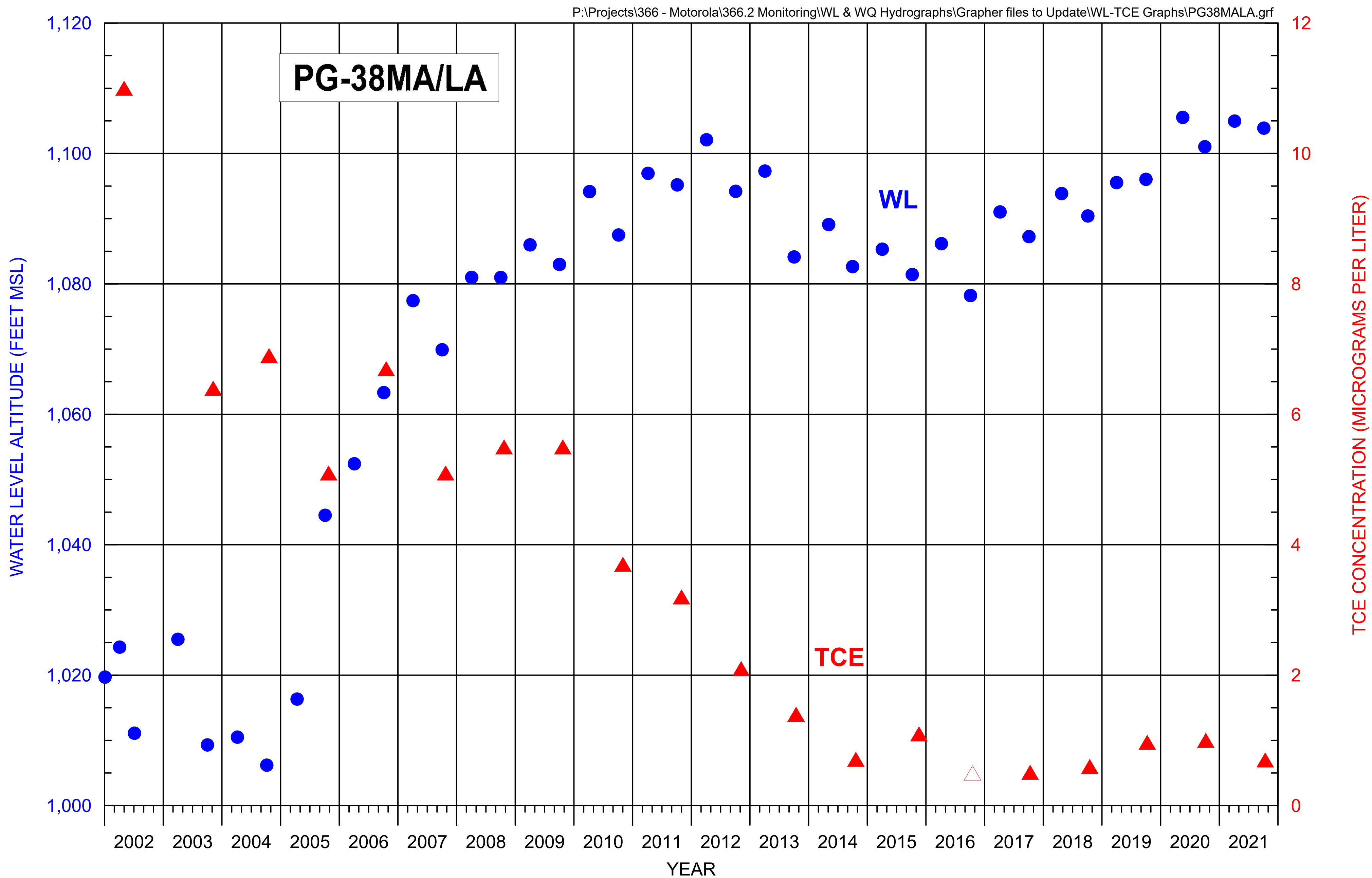


FIGURE D-103. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-31UA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,237.24

FIGURE D-104. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-38MA/LA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

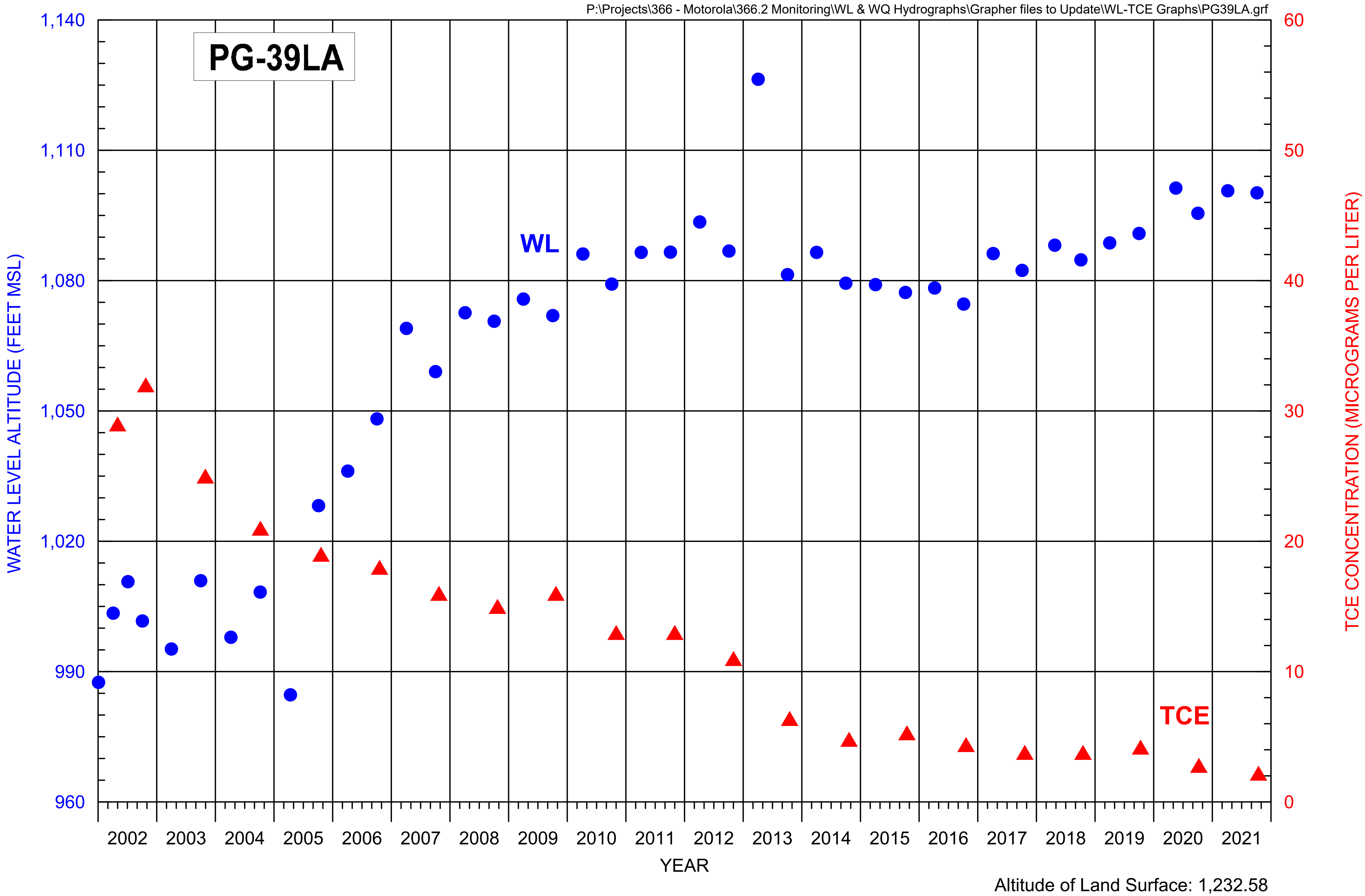


FIGURE D-105. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-39LA

North Indian Bend Wash Superfund Site

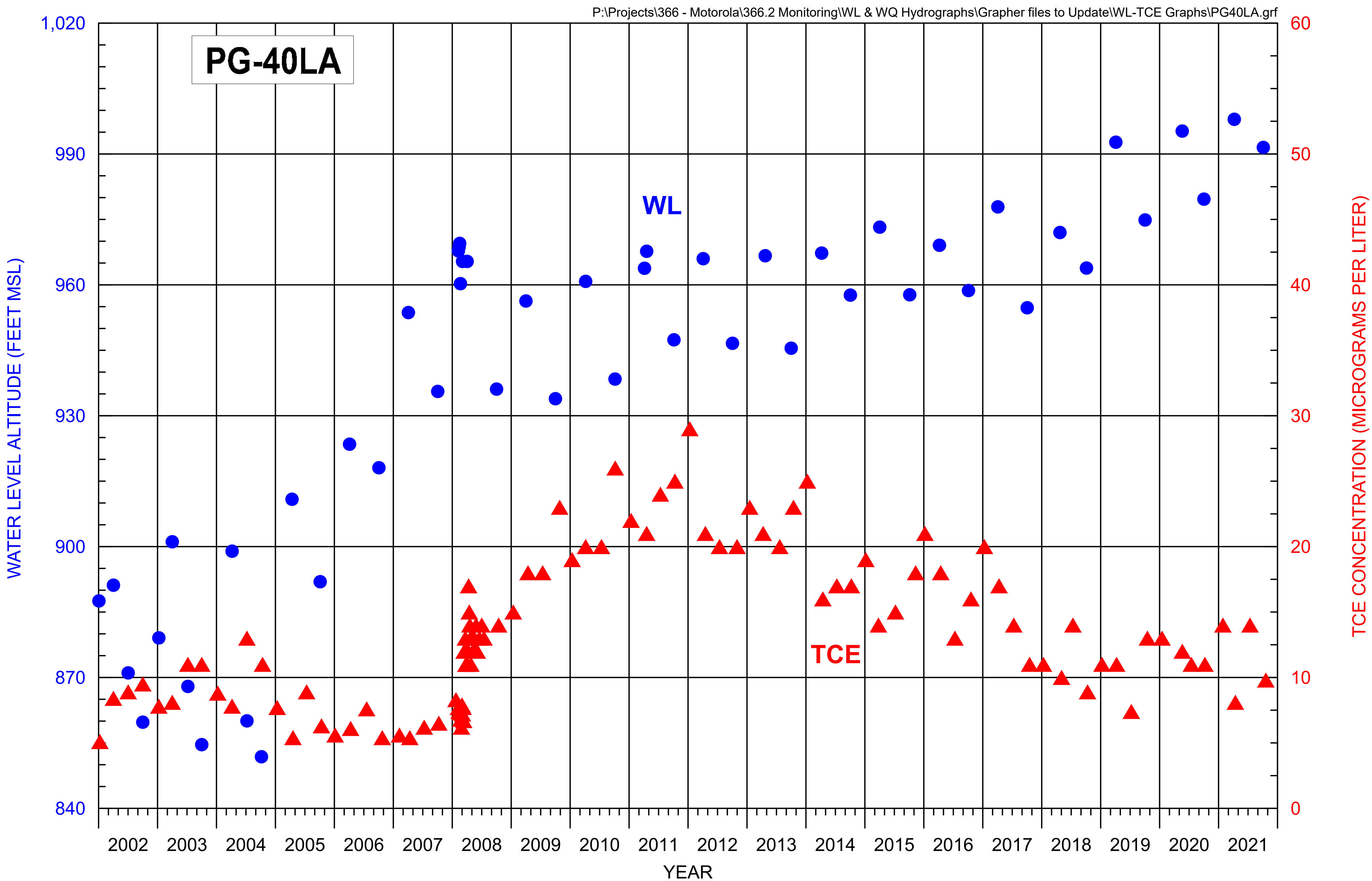


FIGURE D-106. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-40LA

North Indian Bend Wash Superfund Site

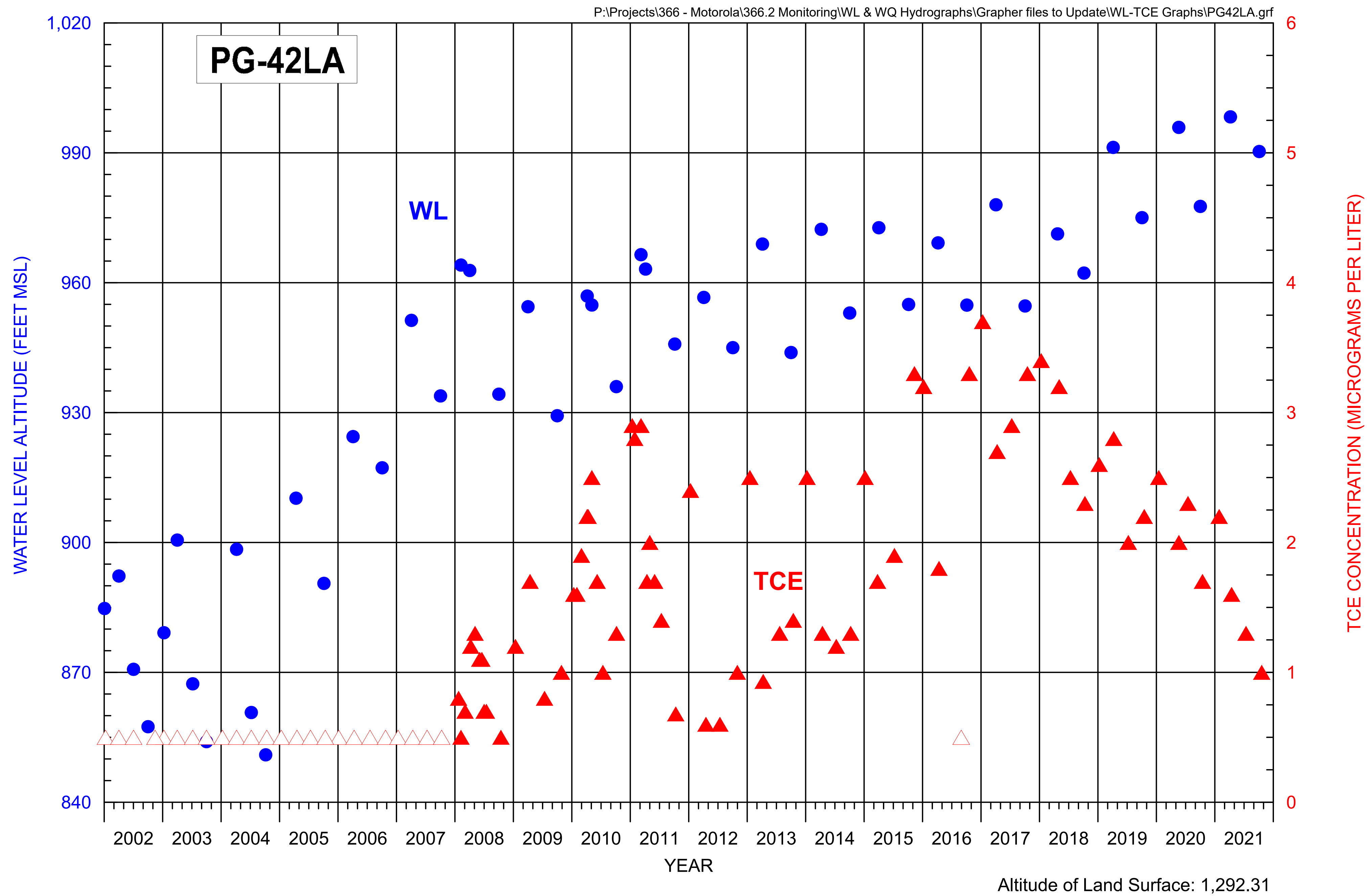
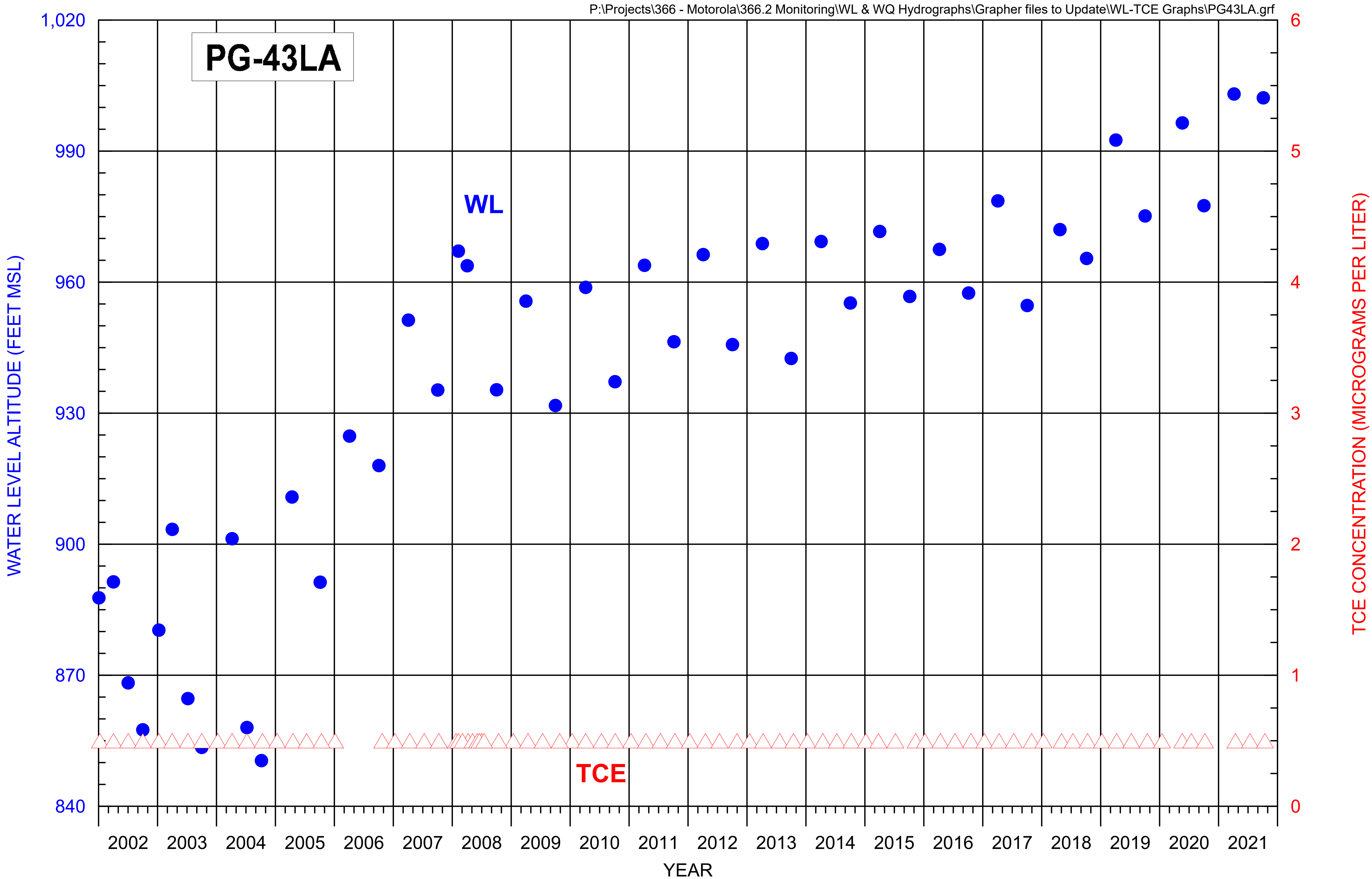


FIGURE D-107. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-42LA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

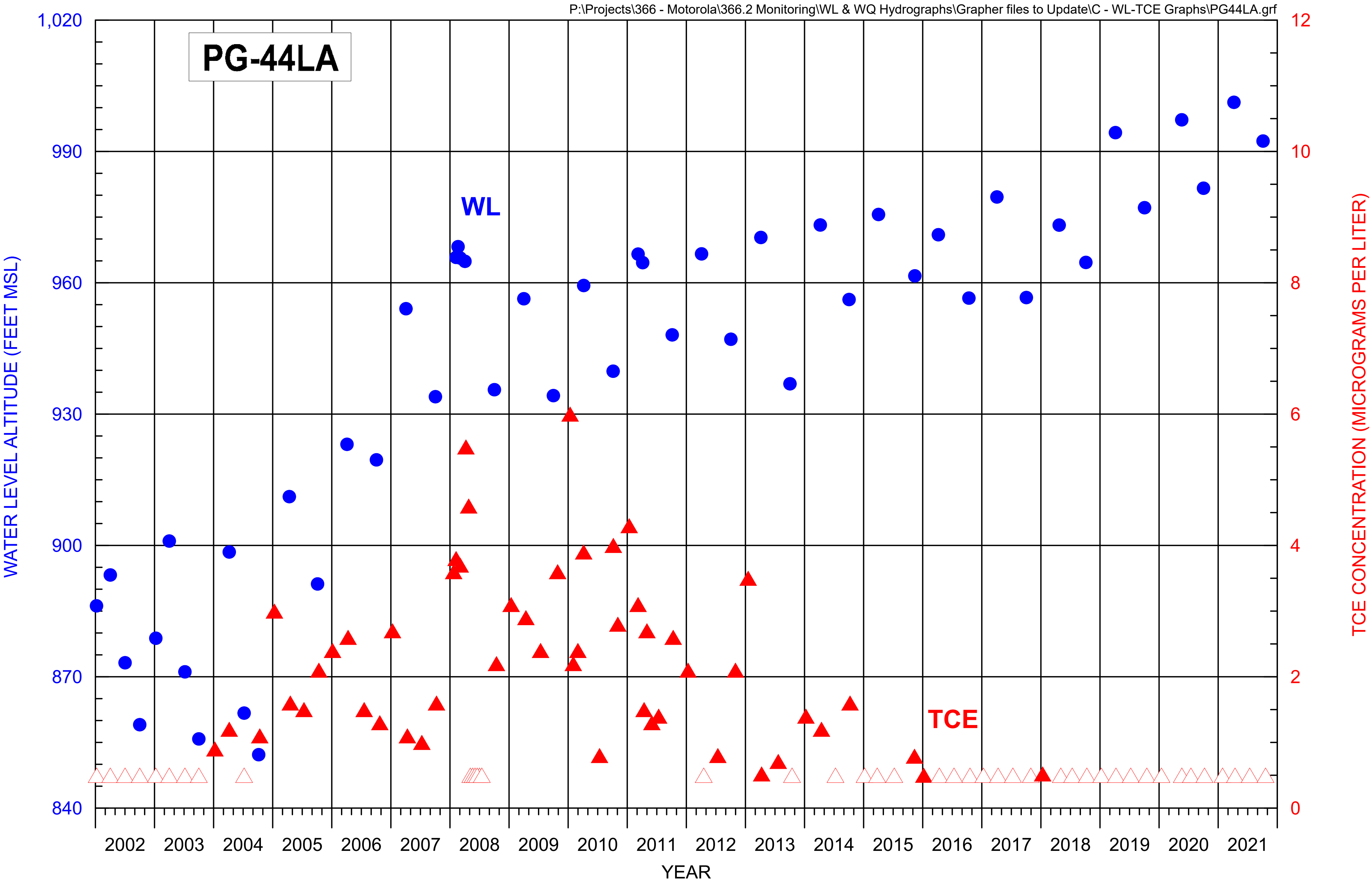


Altitude of Land Surface: 1,265.01

FIGURE D-108. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-43LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site



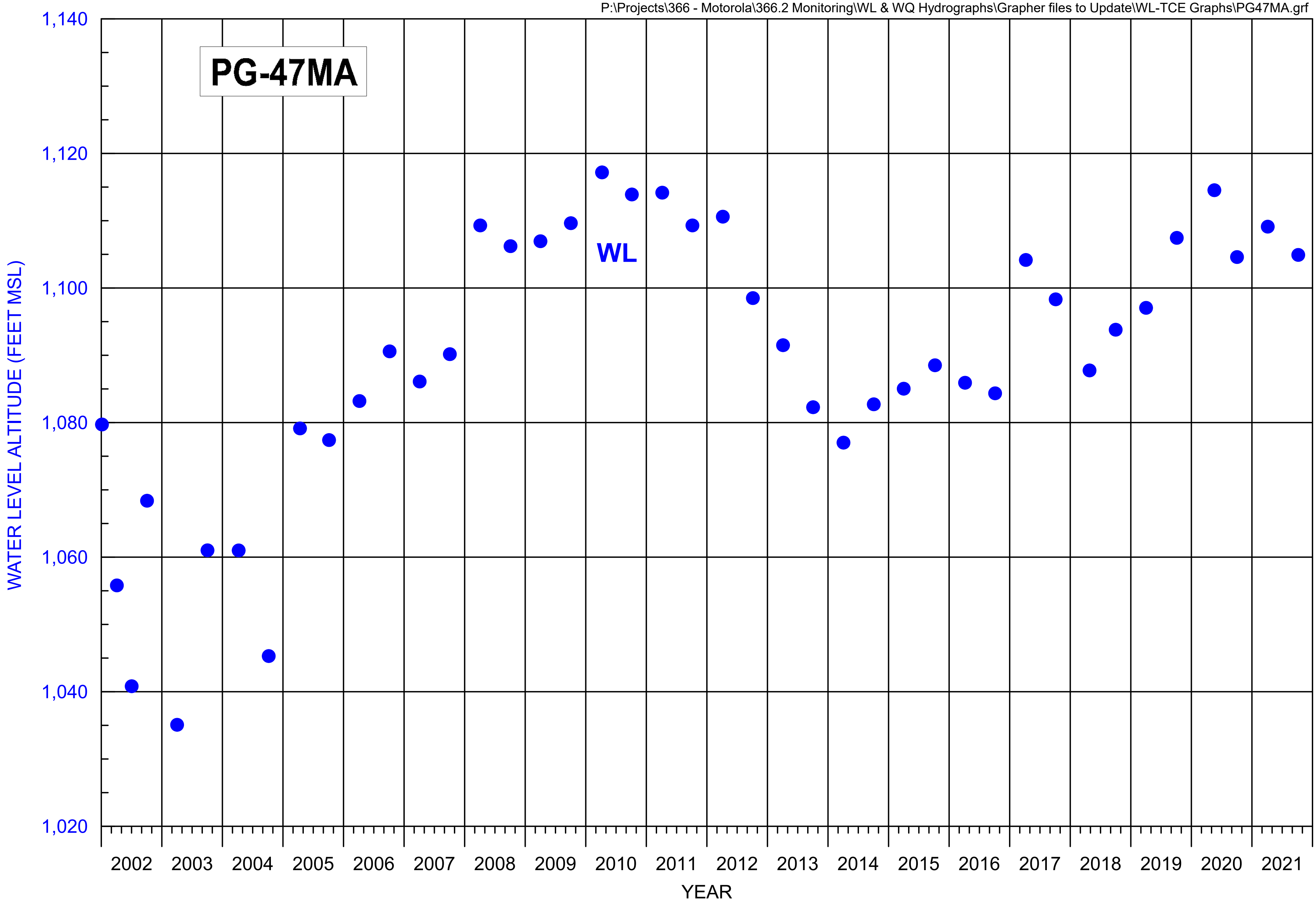
Altitude of Land Surface: 1,297.59

FIGURE D-109. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-44LA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

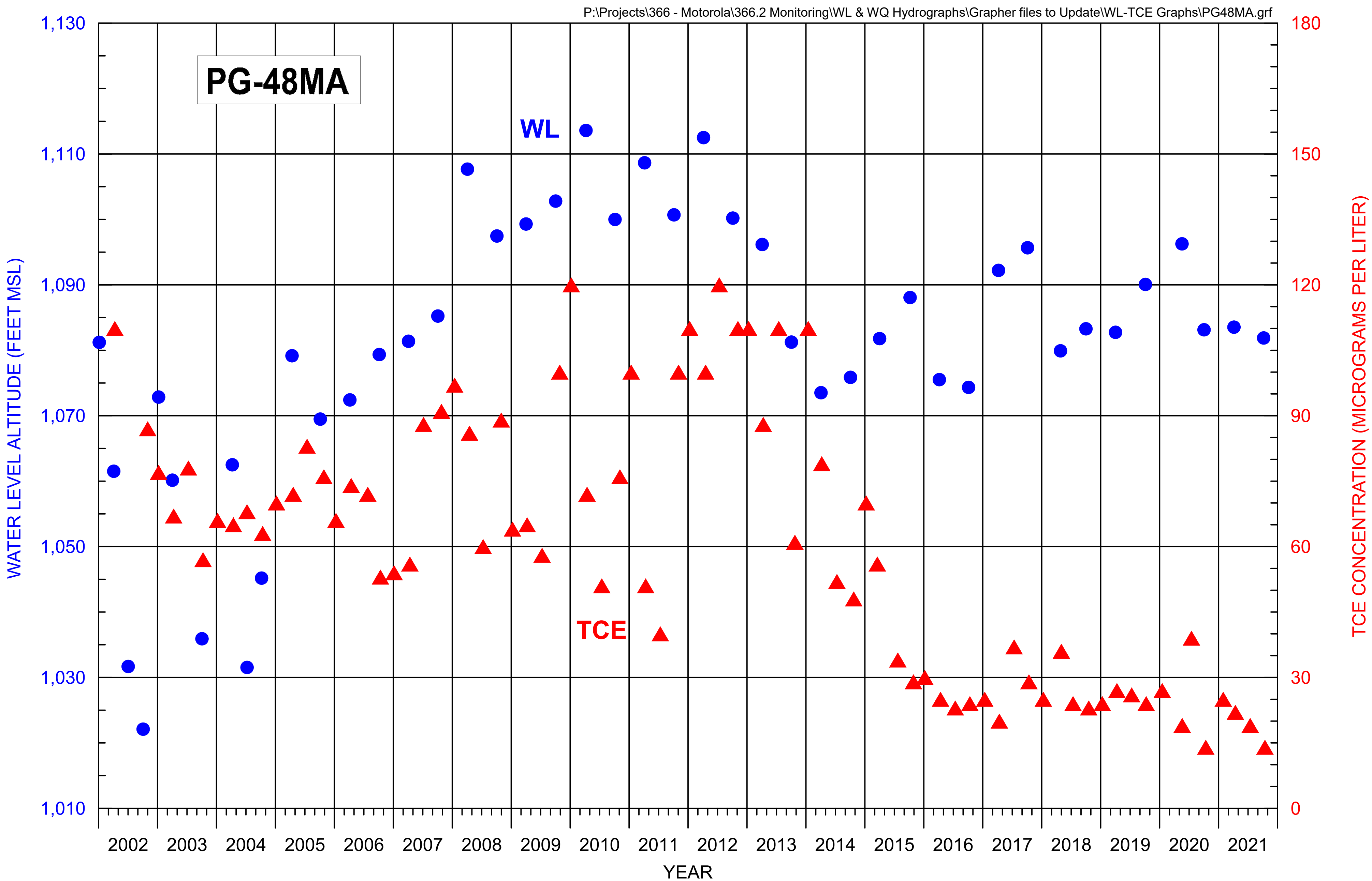
P:\Projects\366 - Motorola\366.2 Monitoring\WL & WQ Hydrographs\Grapher files to Update\WL-TCE Graphs\PG47MA.grf



Altitude of Land Surface: 1,216.69

FIGURE D-110. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-47MA

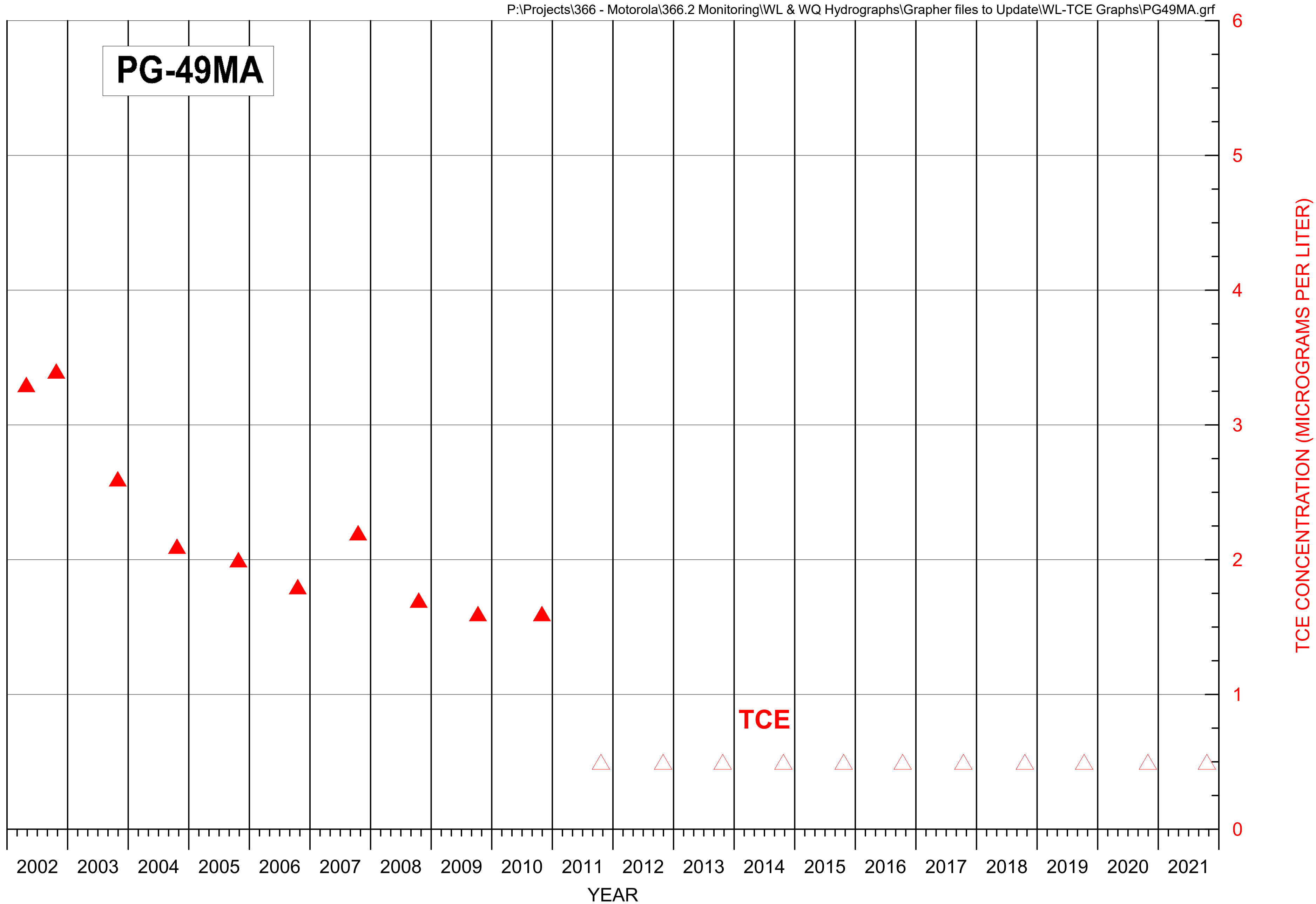
North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,216.84

FIGURE D-111. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-48MA

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,210.48

FIGURE D-112. TCE CONCENTRATIONS FOR MONITOR WELL PG-49MA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

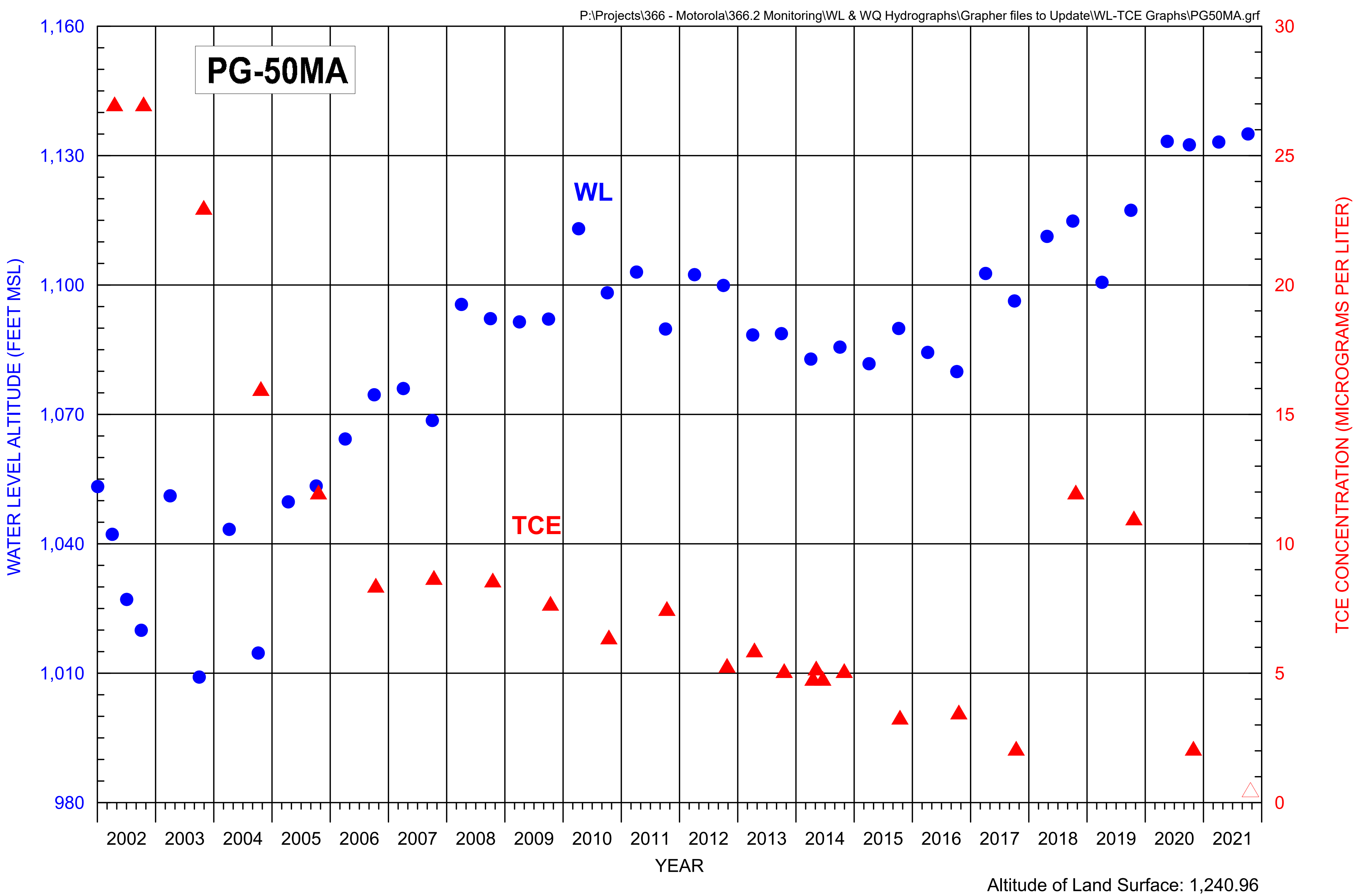
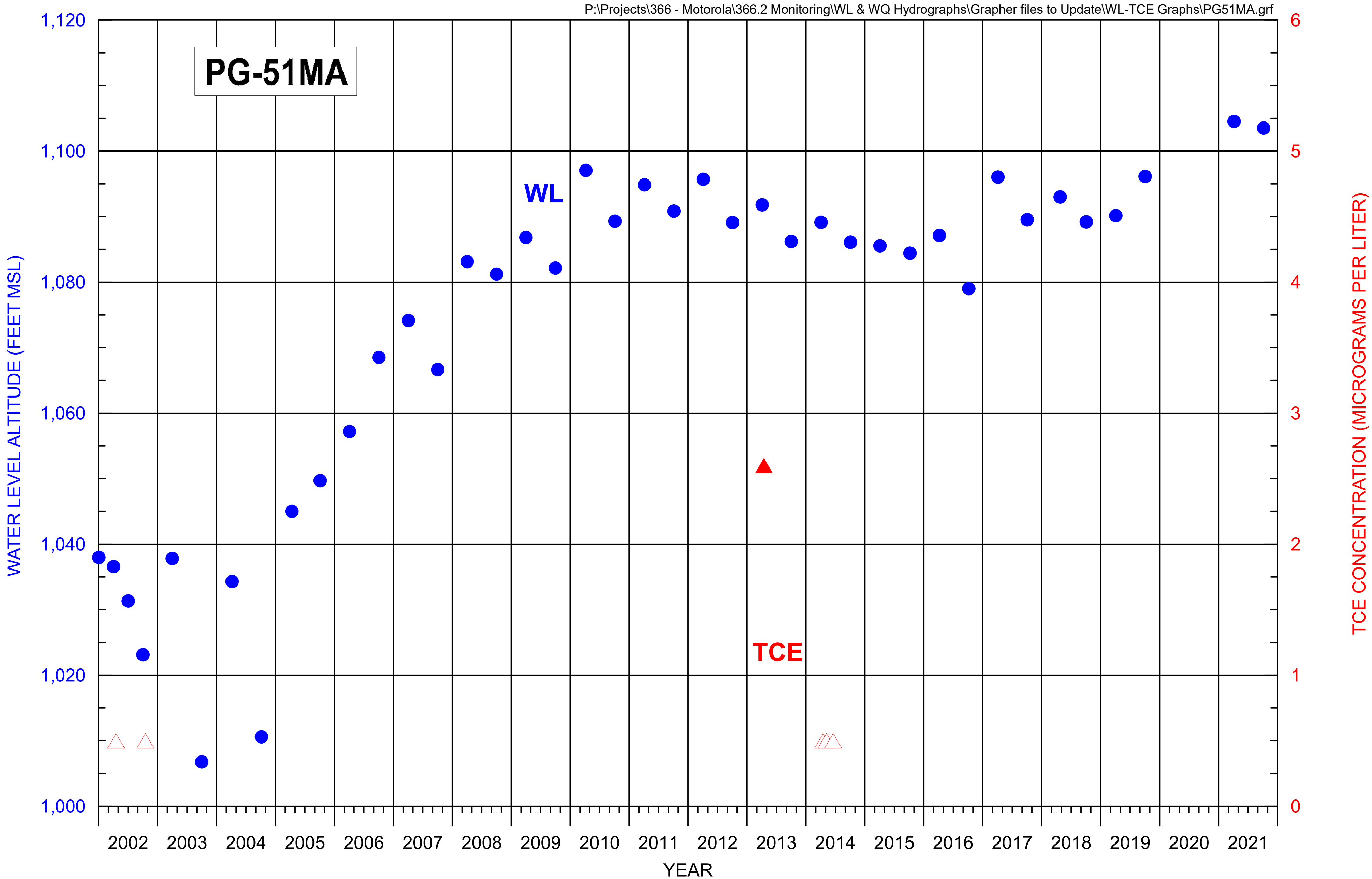


FIGURE D-113. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-50MA

North Indian Bend Wash Superfund Site

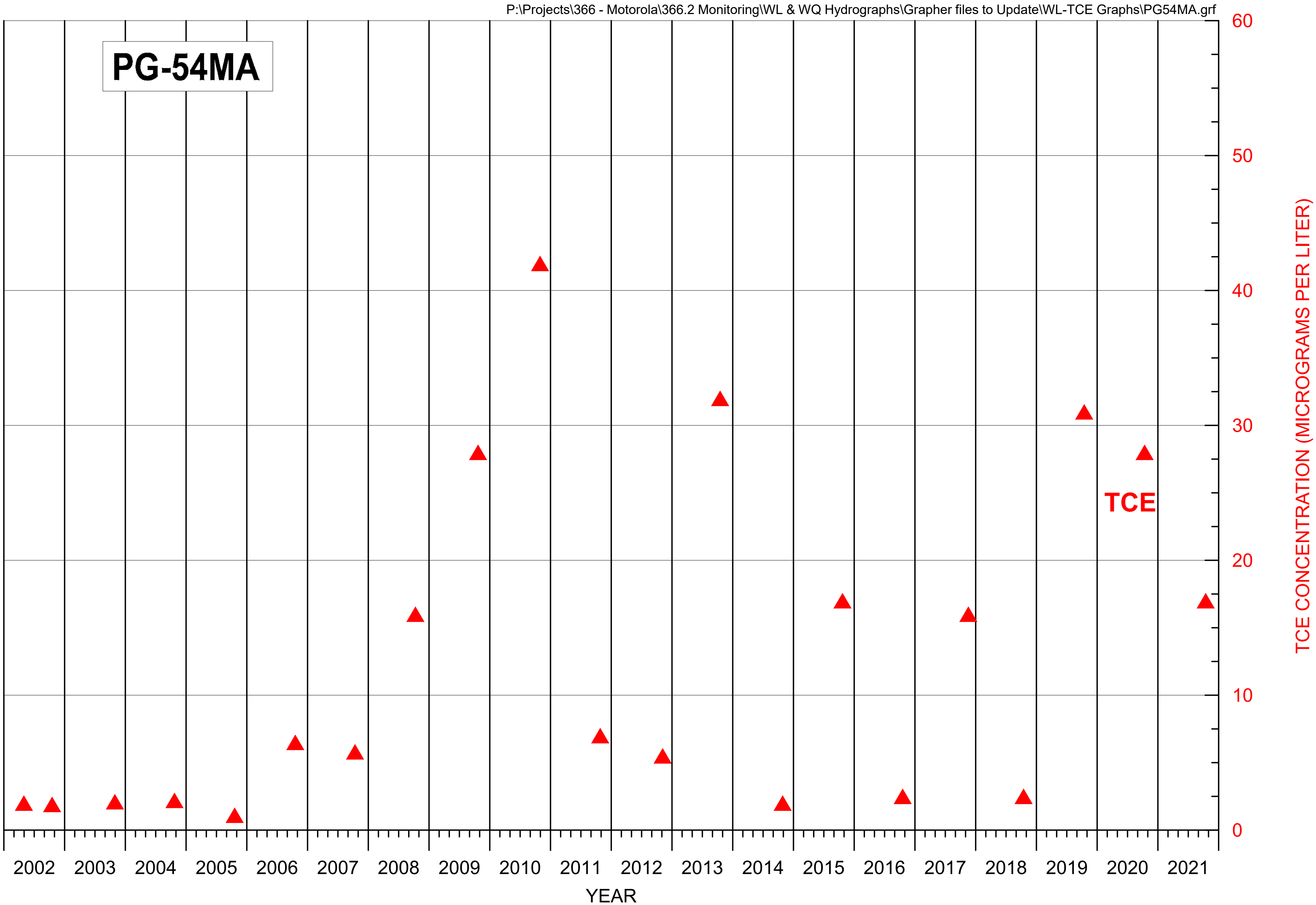


Altitude of Land Surface: 1,240.91

FIGURE D-114. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-51MA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,224.83

FIGURE D-115. TCE CONCENTRATIONS FOR MONITOR WELL PG-54MA

North Indian Bend Wash Superfund Site

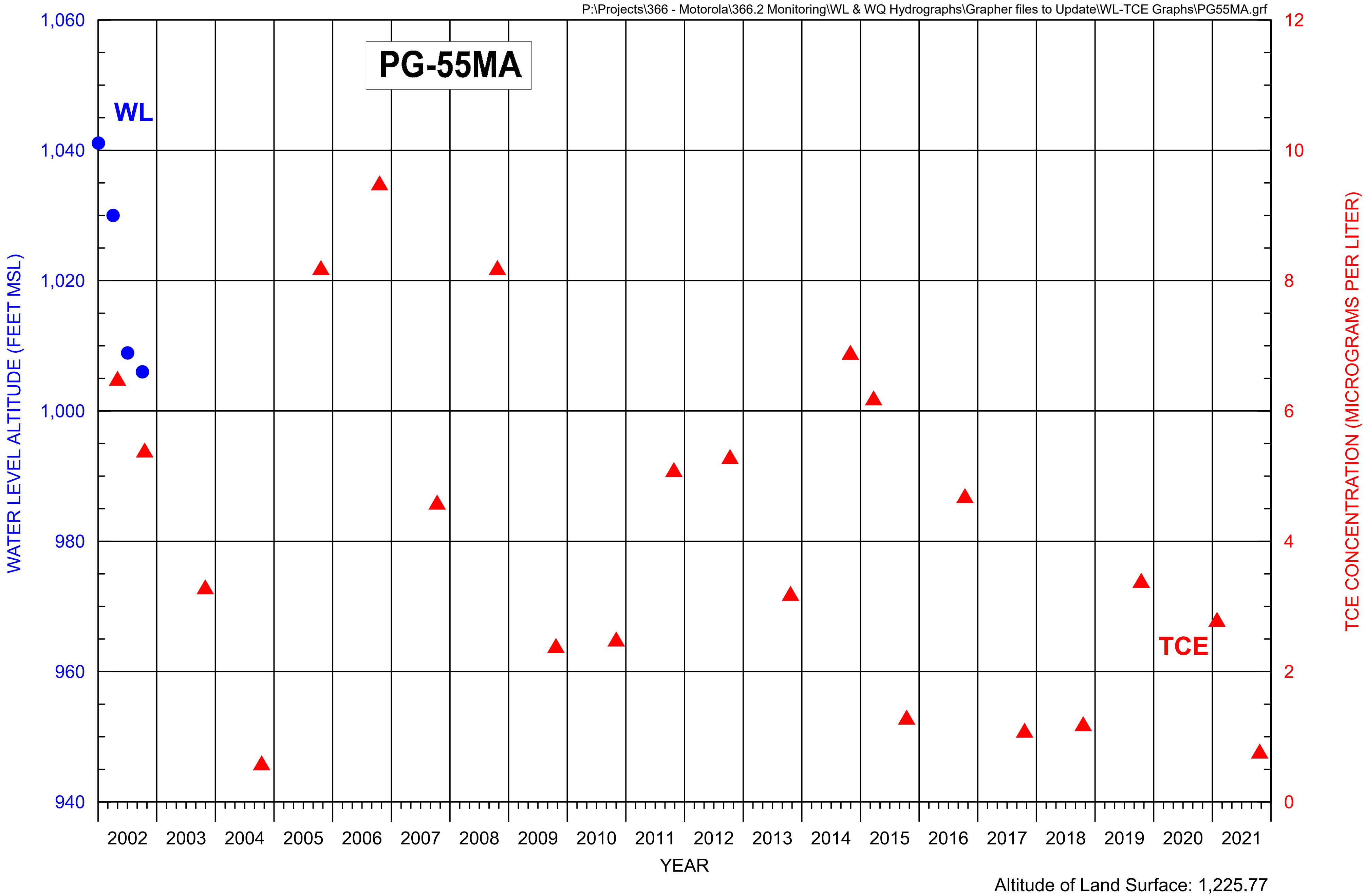
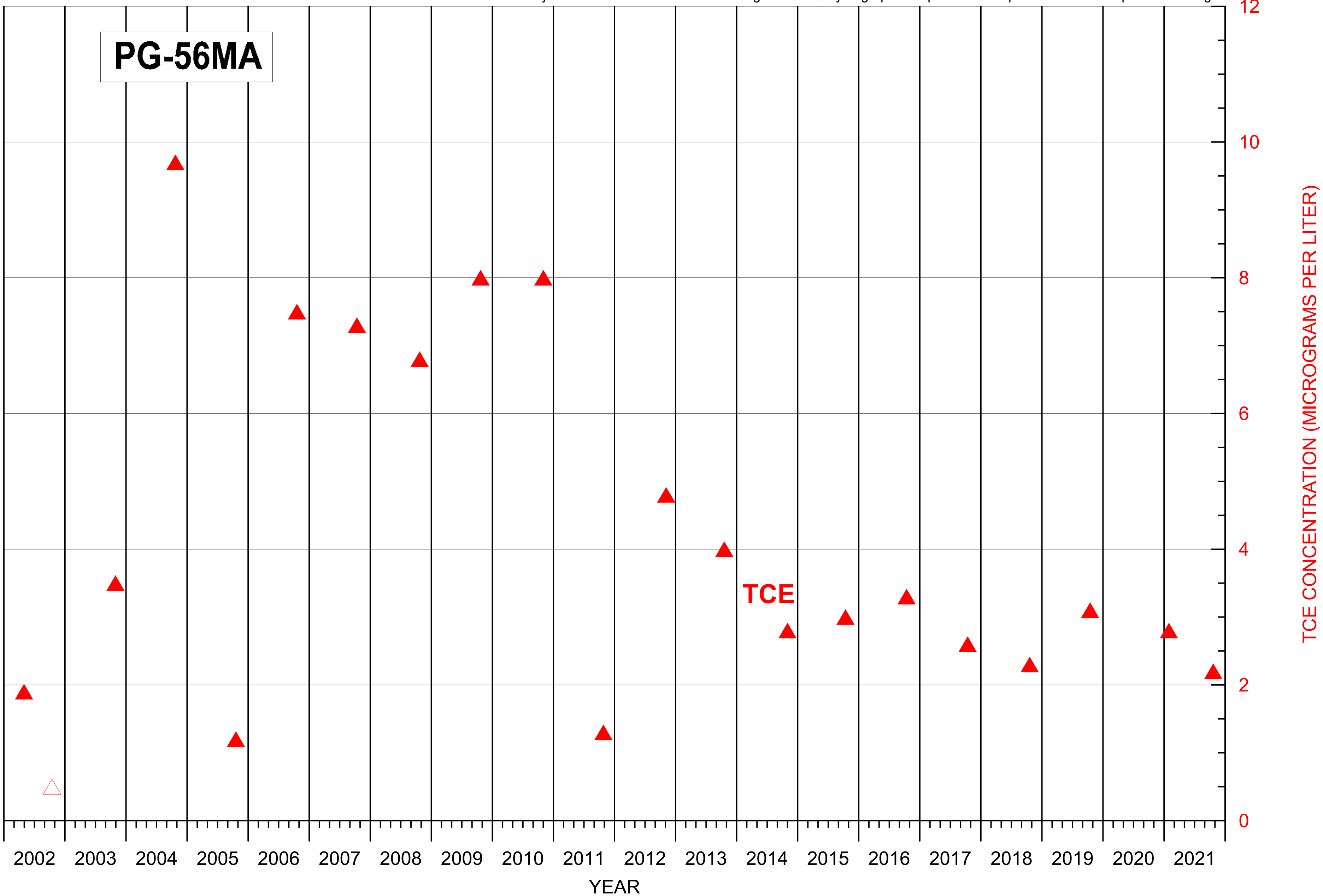


FIGURE D-116. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL PG-55MA

North Indian Bend Wash Superfund Site

P:\Projects\366 - Motorola\366.2 Monitoring\WL & WQ Hydrographs\Grapher files to Update\WL-TCE Graphs\PG56MA.grf



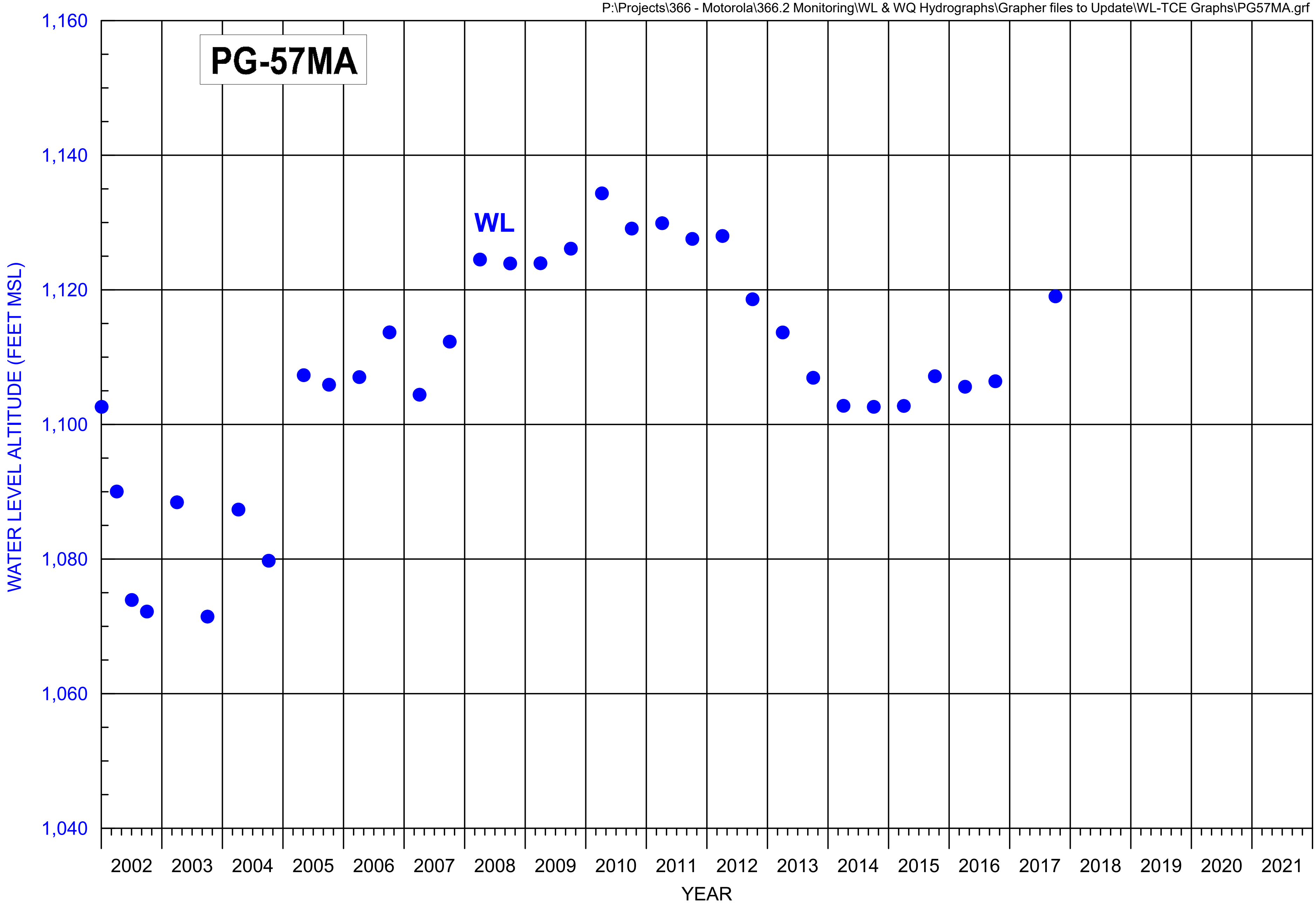
Altitude of Land Surface: 1,231.86

FIGURE D-117. TCE CONCENTRATIONS FOR MONITOR WELL PG-56MA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

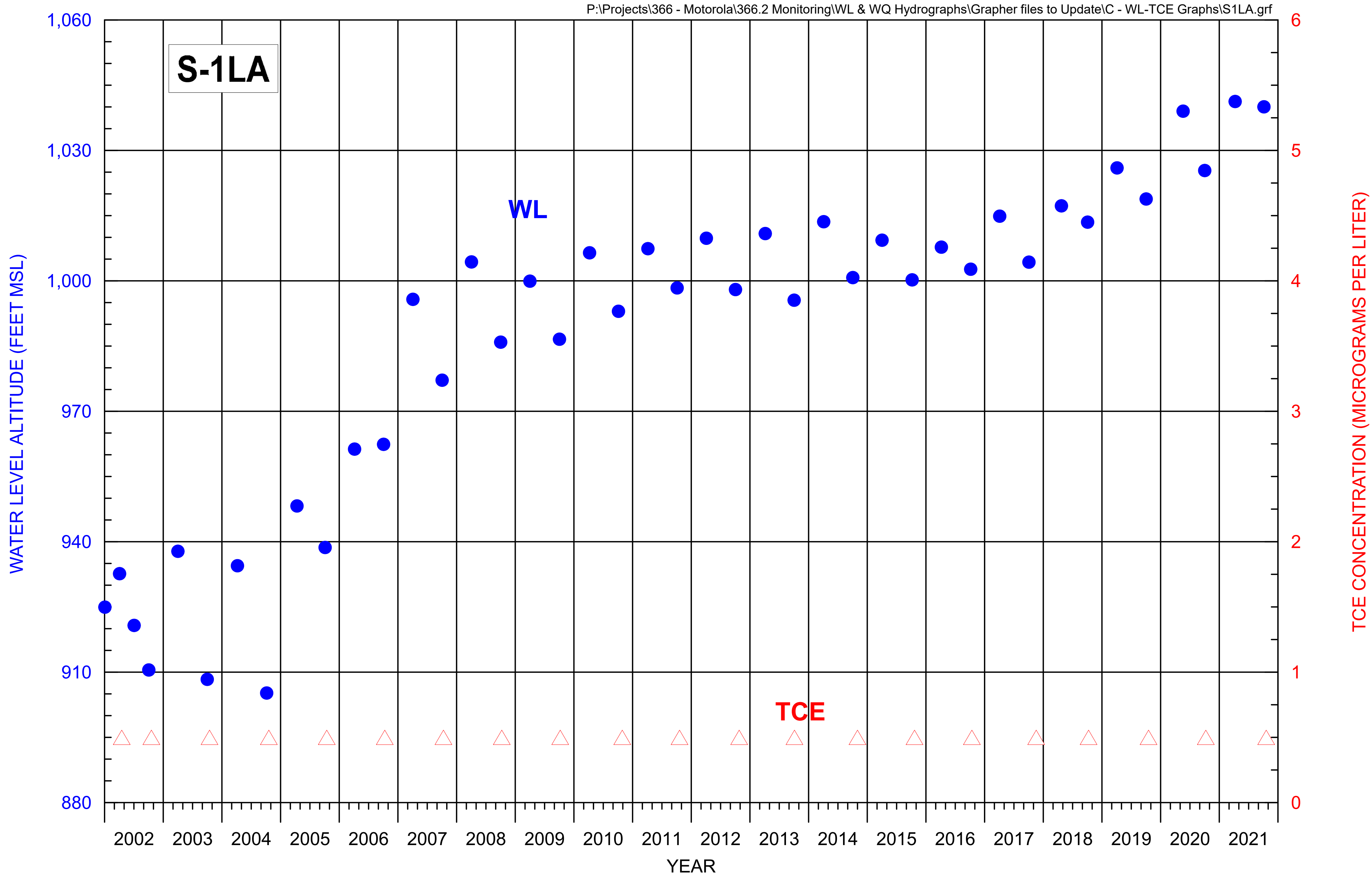
P:\Projects\366 - Motorola\366.2 Monitoring\WL & WQ Hydrographs\Grapher files to Update\WL-TCE Graphs\PG57MA.grf



Altitude of Land Surface: 1,227.03

FIGURE D-118. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-57MA

North Indian Bend Wash Superfund Site

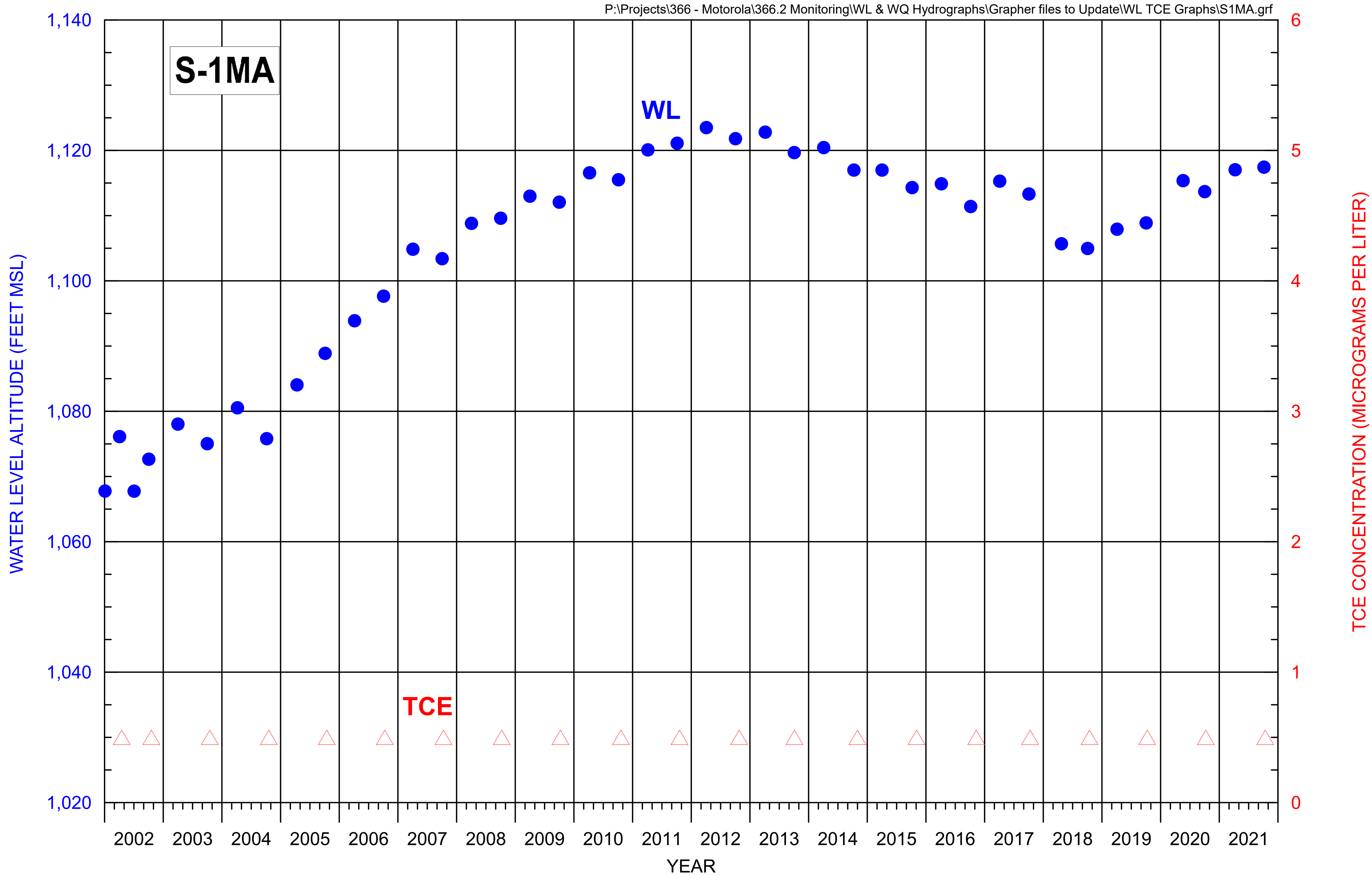


Altitude of Land Surface: 1,260.45

FIGURE D-119. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL S-1LA

EXPLANATION
△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site



Altitude of Land Surface: 1,260.34

FIGURE D-120. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL S-1MA

EXPLANATION

△ TCE Non-Detect ▲ TCE Detected Value

North Indian Bend Wash Superfund Site

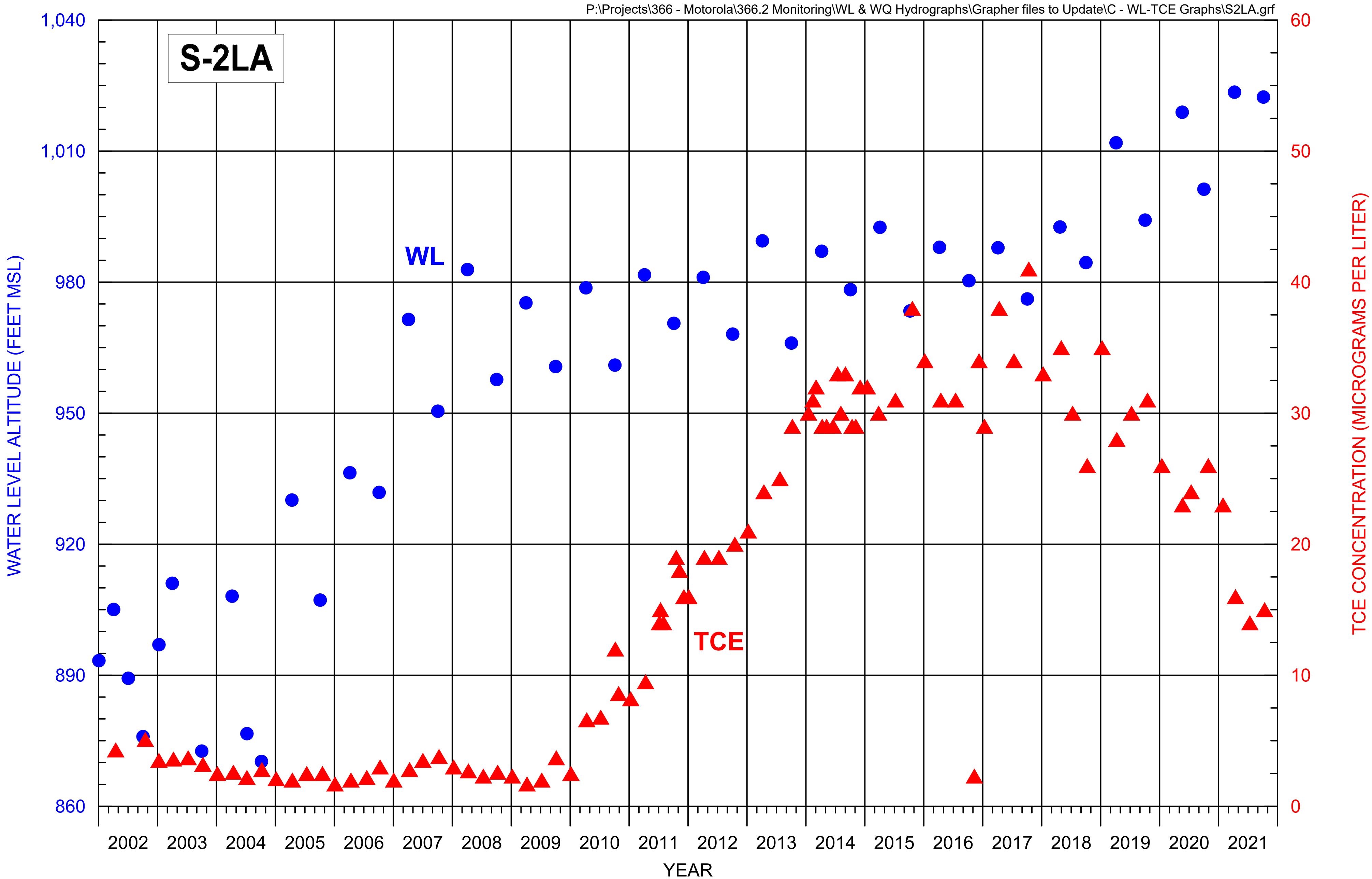


FIGURE D-121. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL S-2LA

North Indian Bend Wash Superfund Site

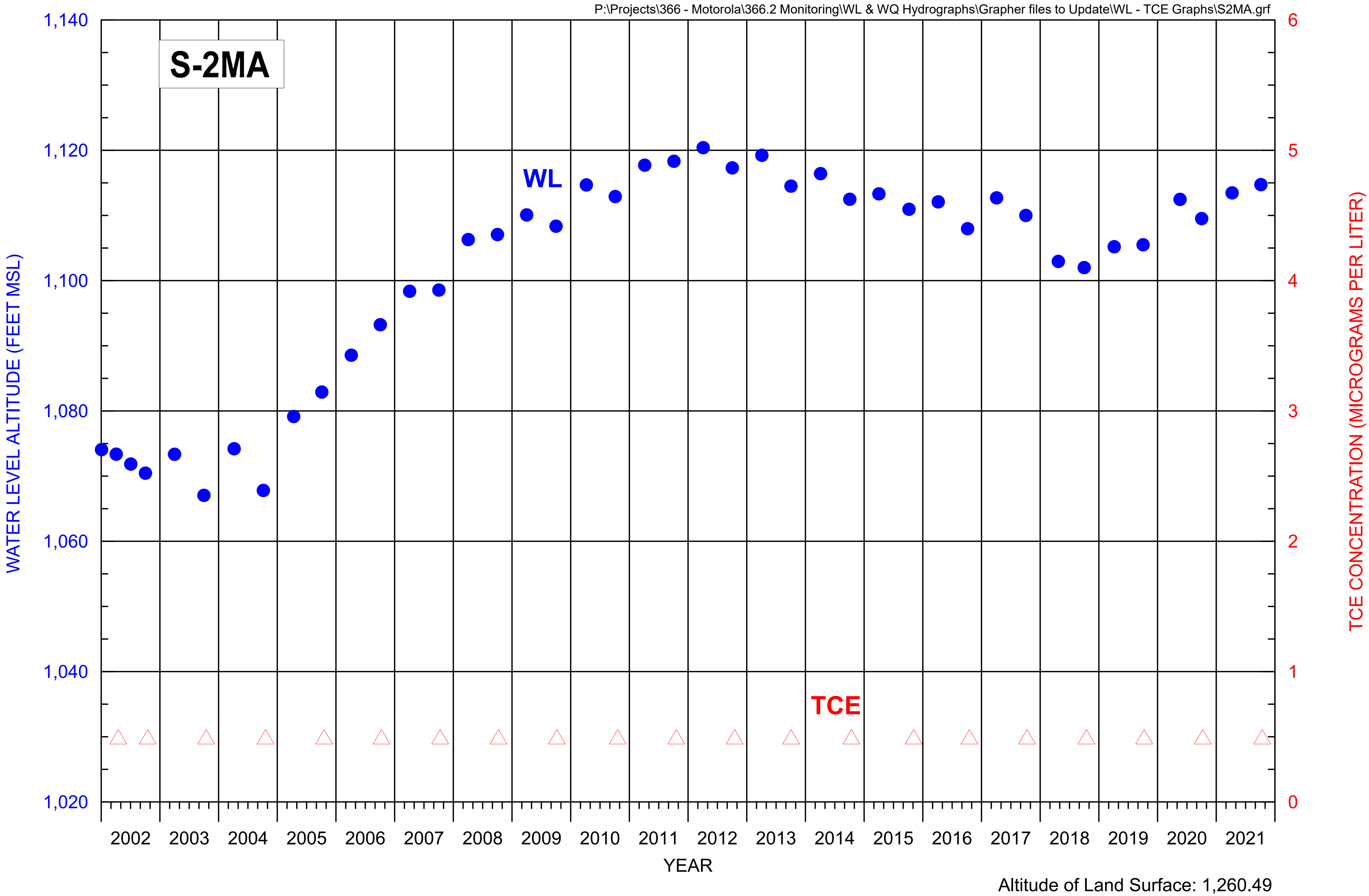


FIGURE D-122. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL S-2MA

Note: Results shown as having a concentration of '0' represent samples where TCE was not detected at the laboratory reporting limit.

North Indian Bend Wash Superfund Site

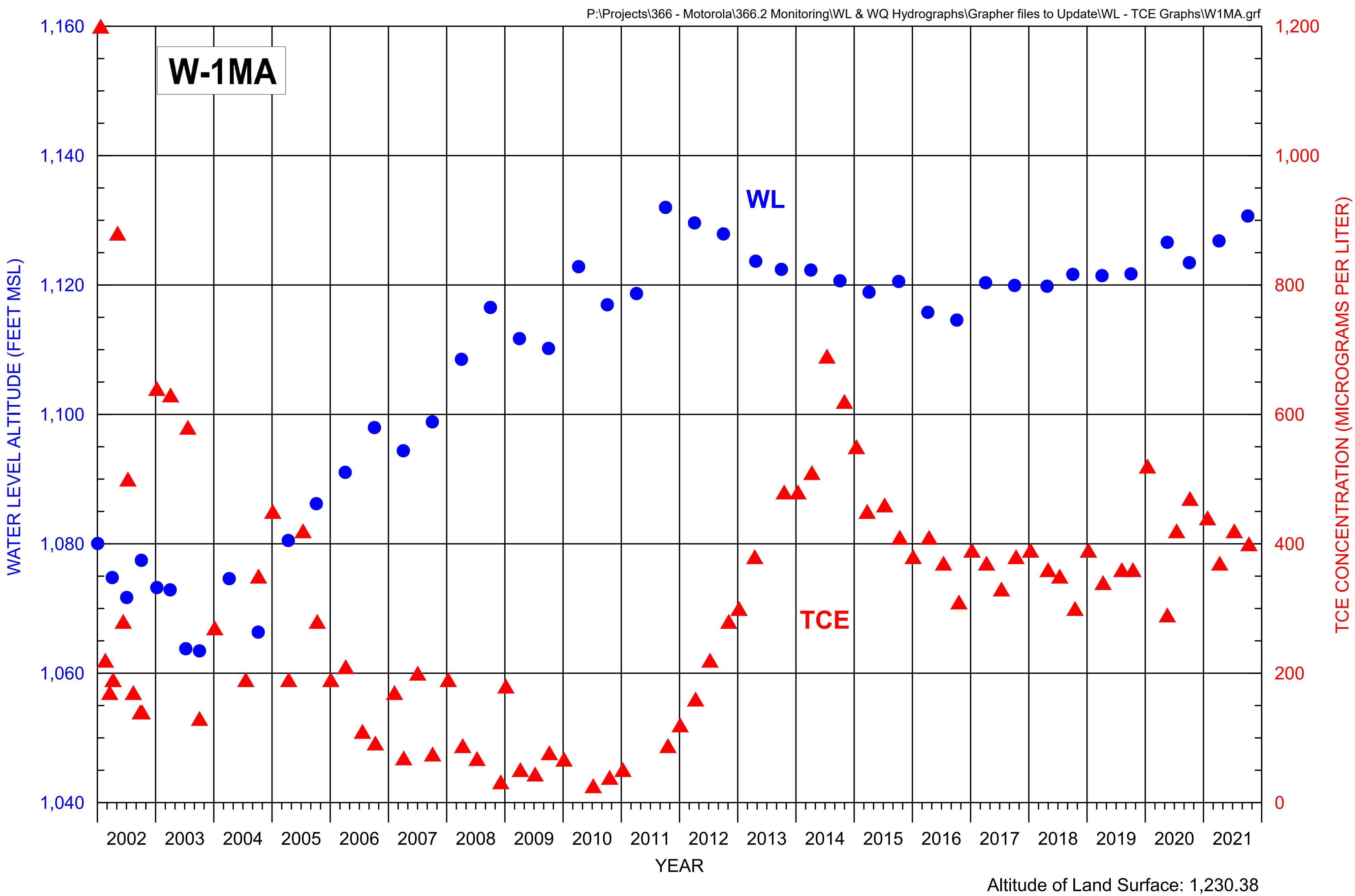


FIGURE D-123. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL W-1MA

North Indian Bend Wash Superfund Site

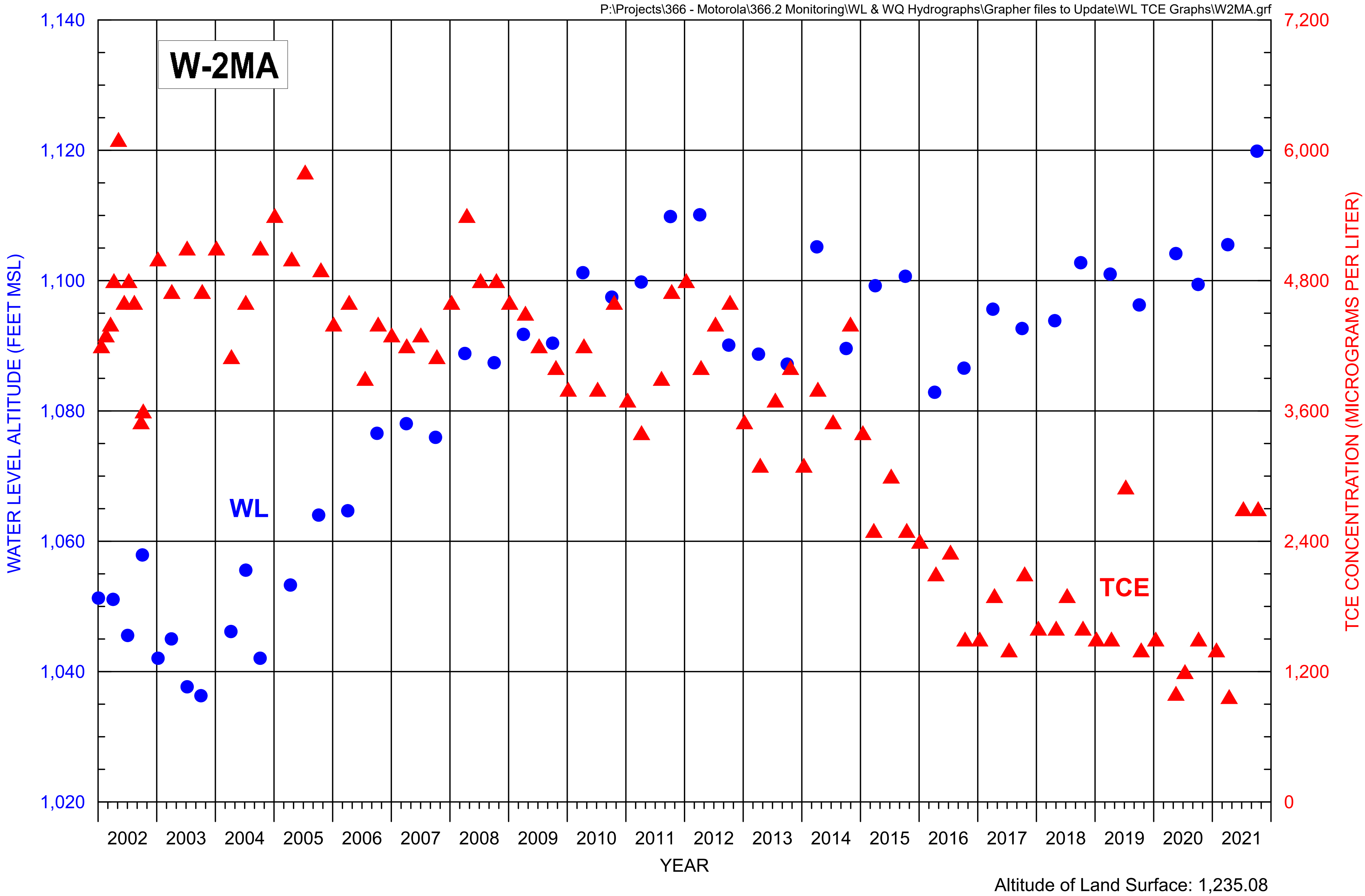


FIGURE D-124. GROUNDWATER LEVEL HYDROGRAPH AND TCE CONCENTRATIONS FOR MONITOR WELL W-2MA

North Indian Bend Wash Superfund Site

APPENDIX E
GROUNDWATER PUMPING AND TCE TIME-SERIES DATA FOR NIBW EXTRACTION WELLS

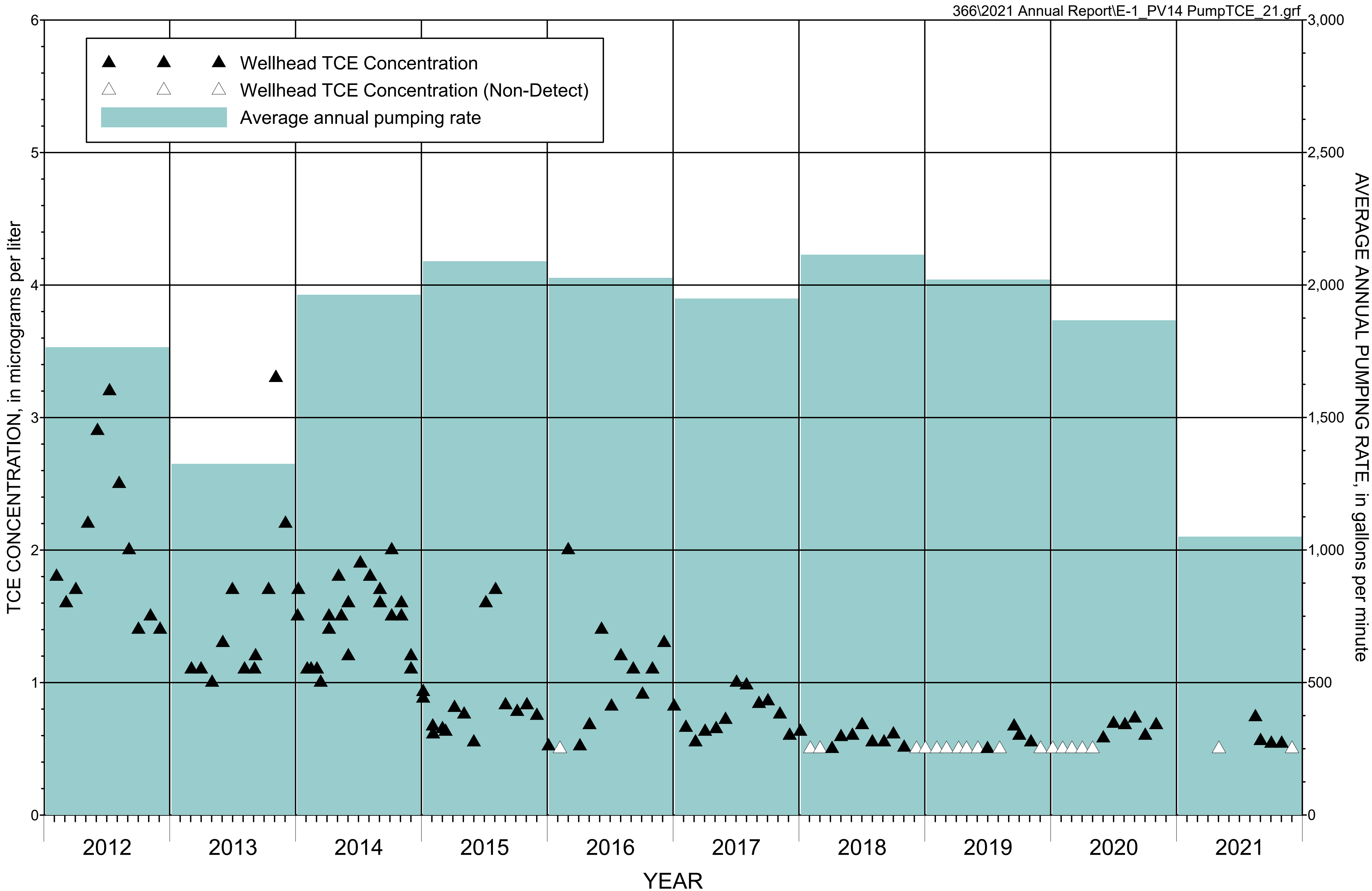


FIGURE E-1. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PV-14 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

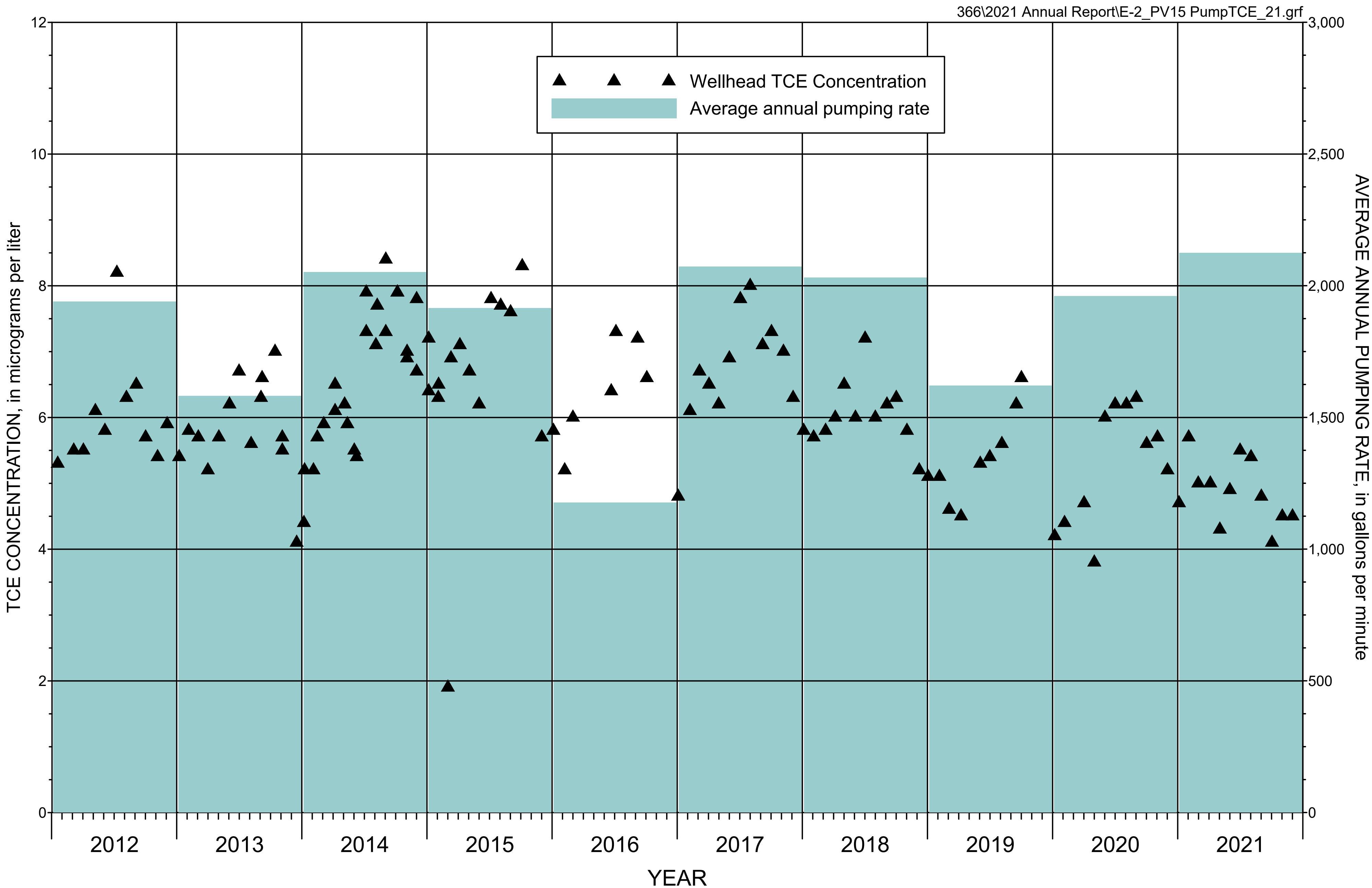


FIGURE E-2. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PV-15 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

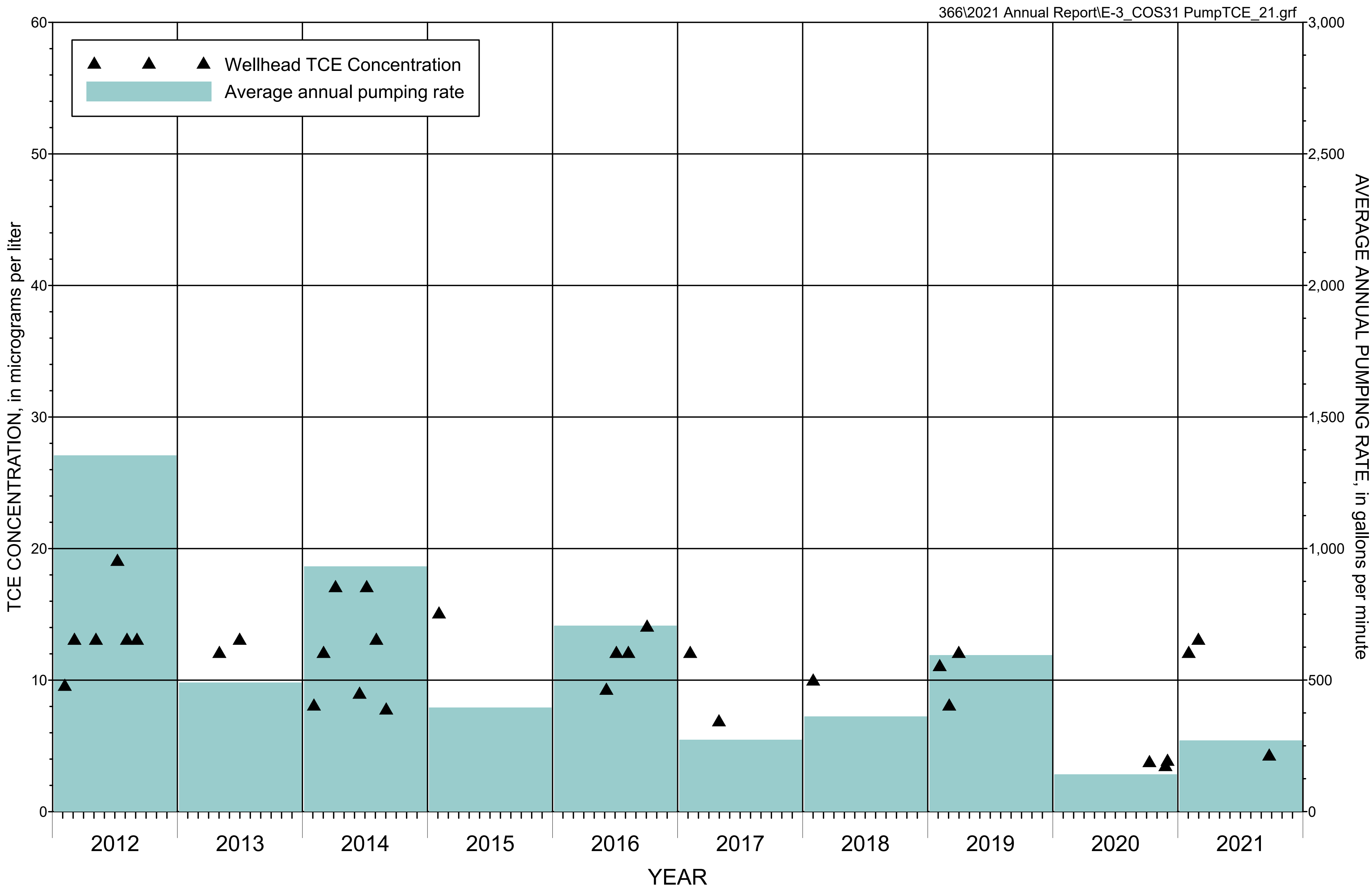


FIGURE E-3. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-31 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

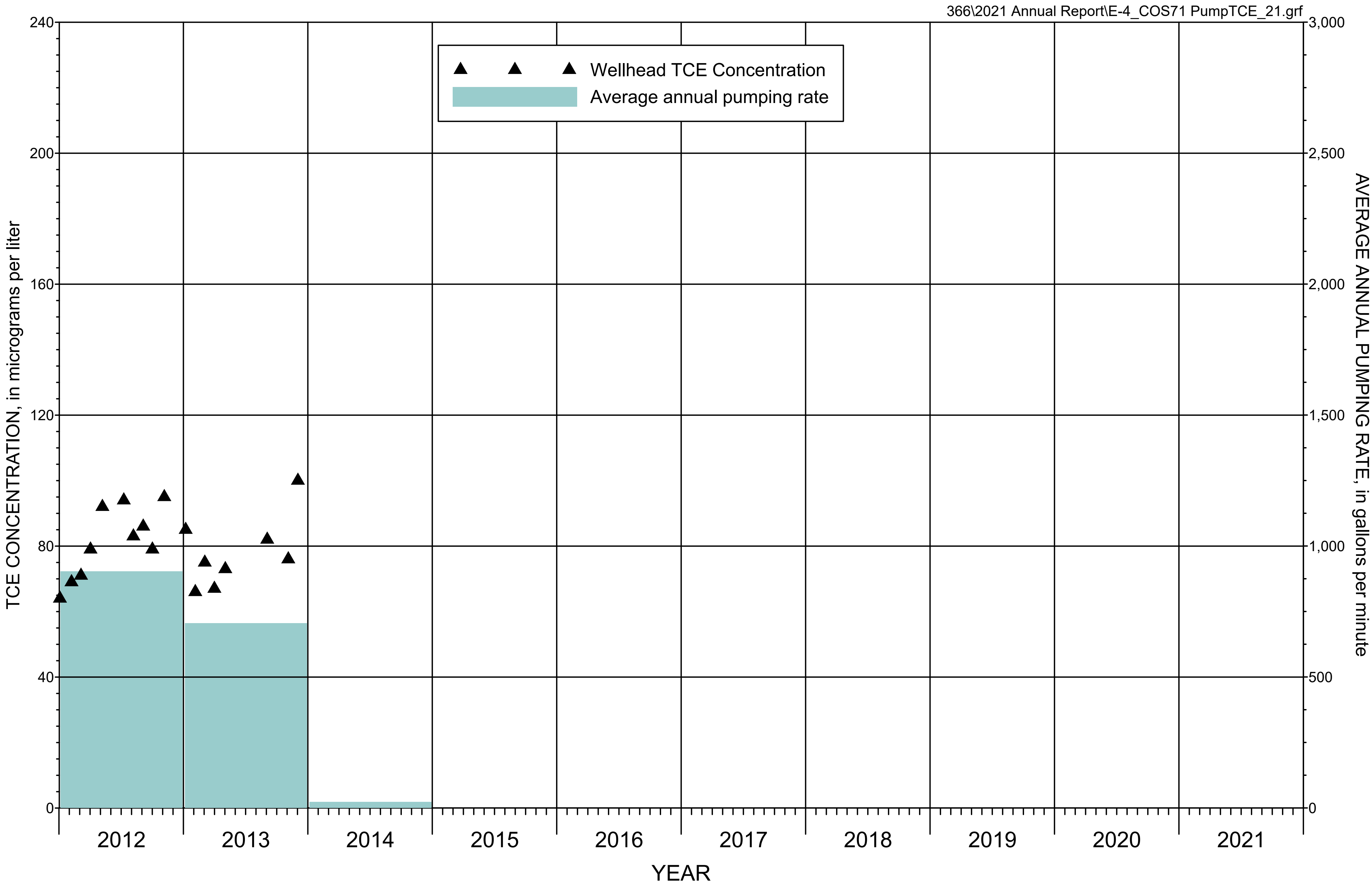


FIGURE E-4. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-71 2012 THROUGH 2021

Note: Well COS-71A replaced Well COS-71 April 2014.

North Indian Bend Wash Superfund Site

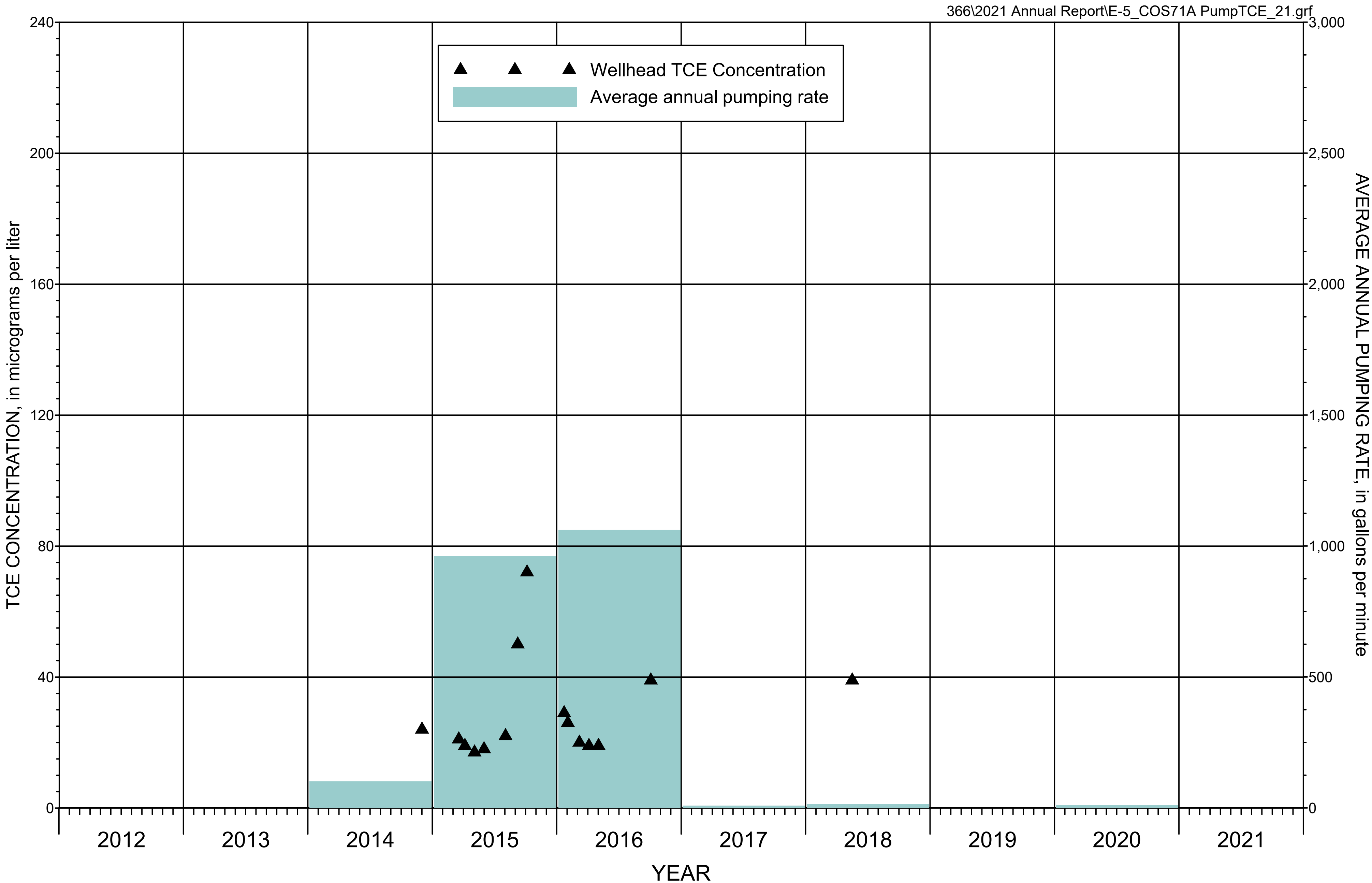


FIGURE E-5. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-71A 2012 THROUGH 2021

Note: Well COS-71A replaced Well COS-71 April 2014.

North Indian Bend Wash Superfund Site

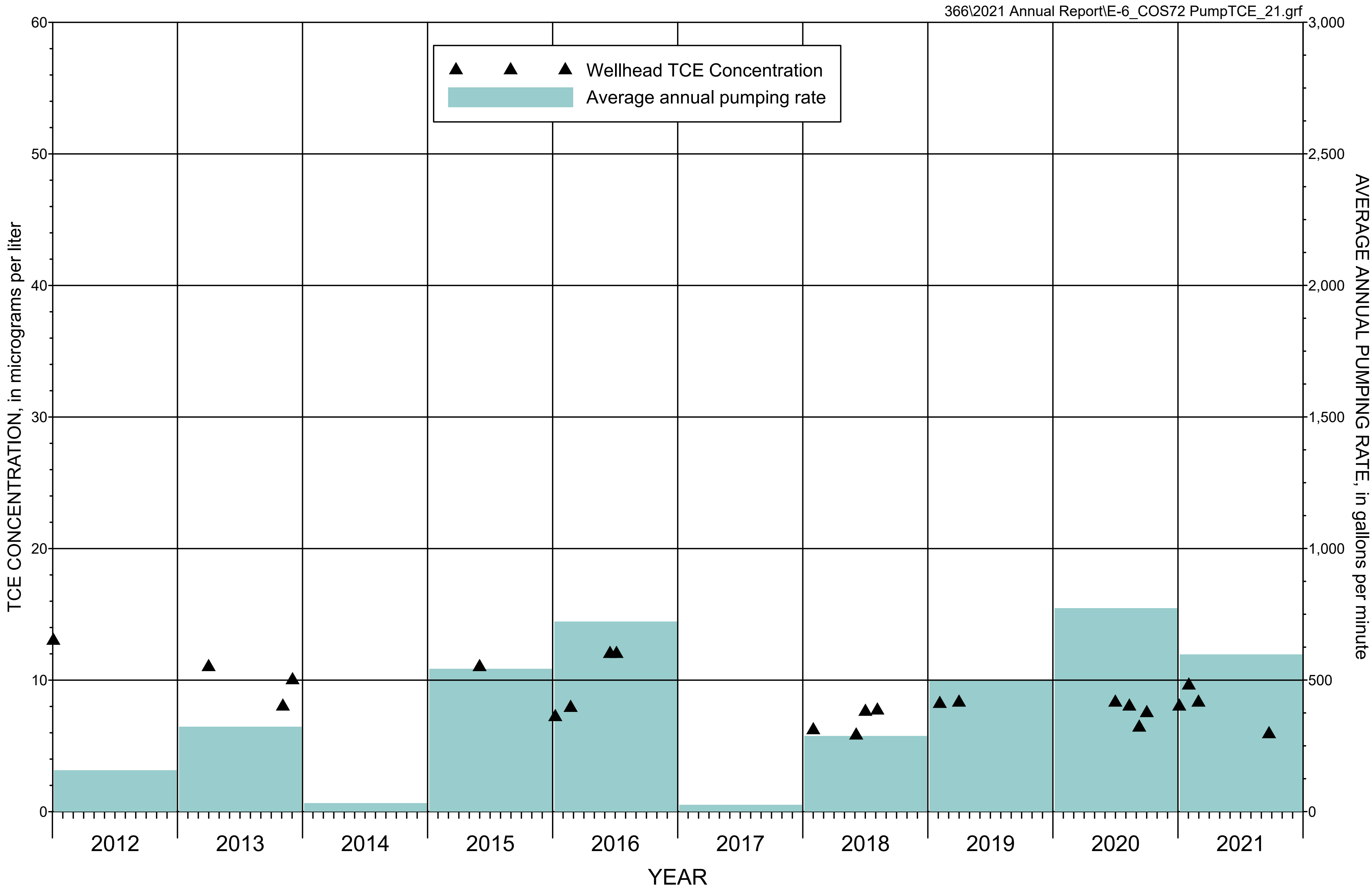


FIGURE E-6. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-72
2012 THROUGH 2021

North Indian Bend Wash Superfund Site

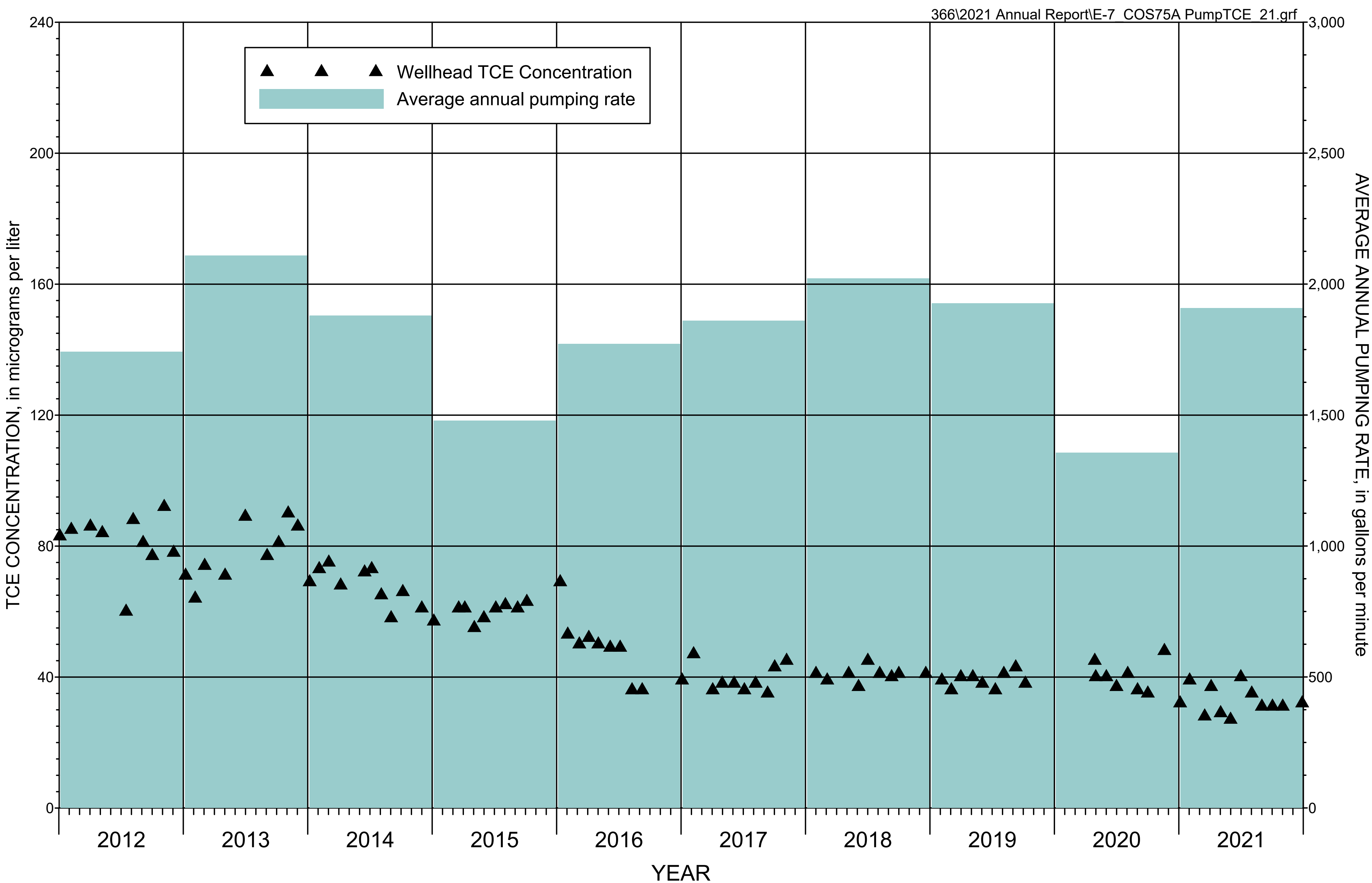


FIGURE E-7. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-75A 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

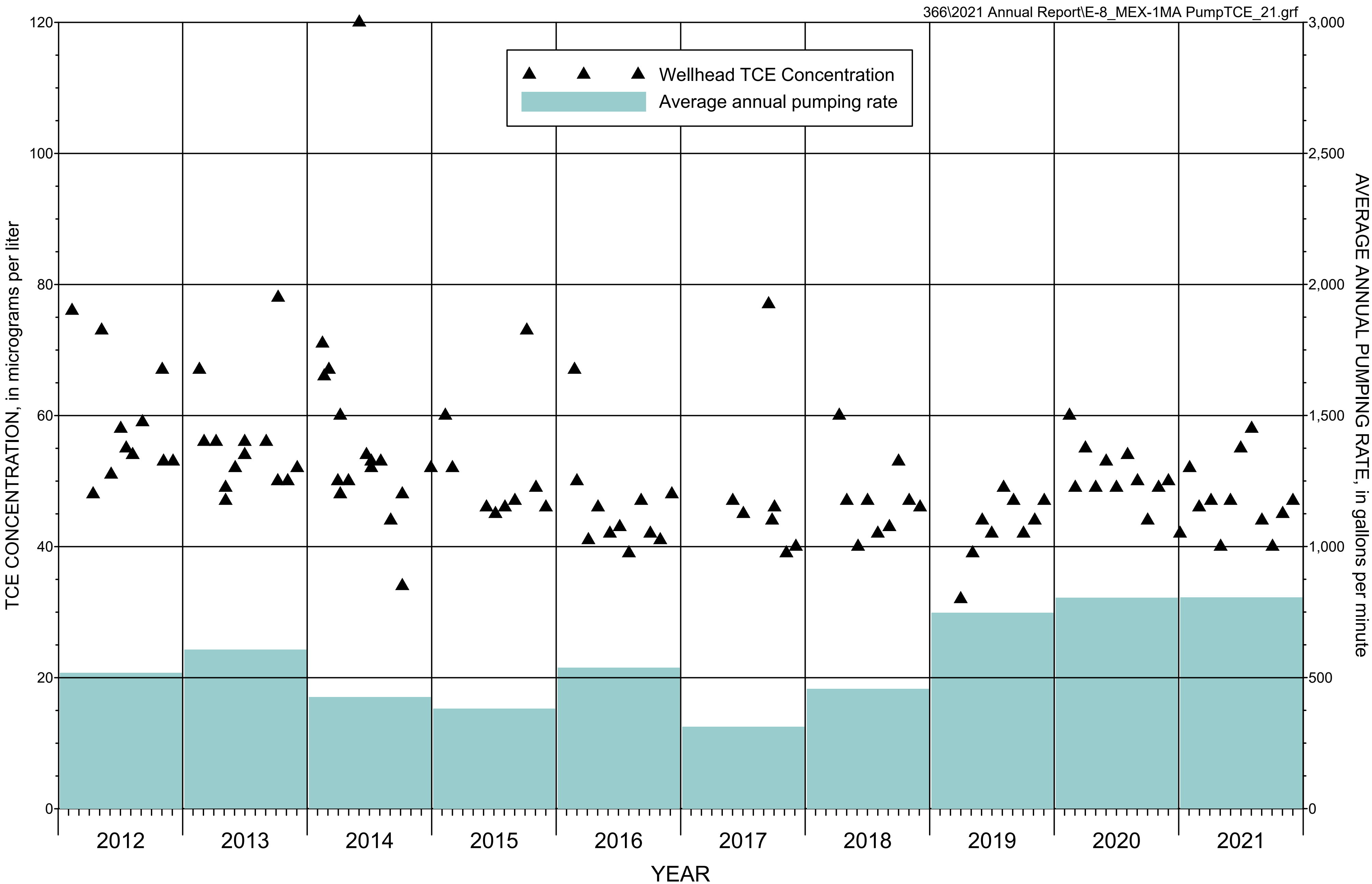


FIGURE E-8. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL MEX-1MA 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

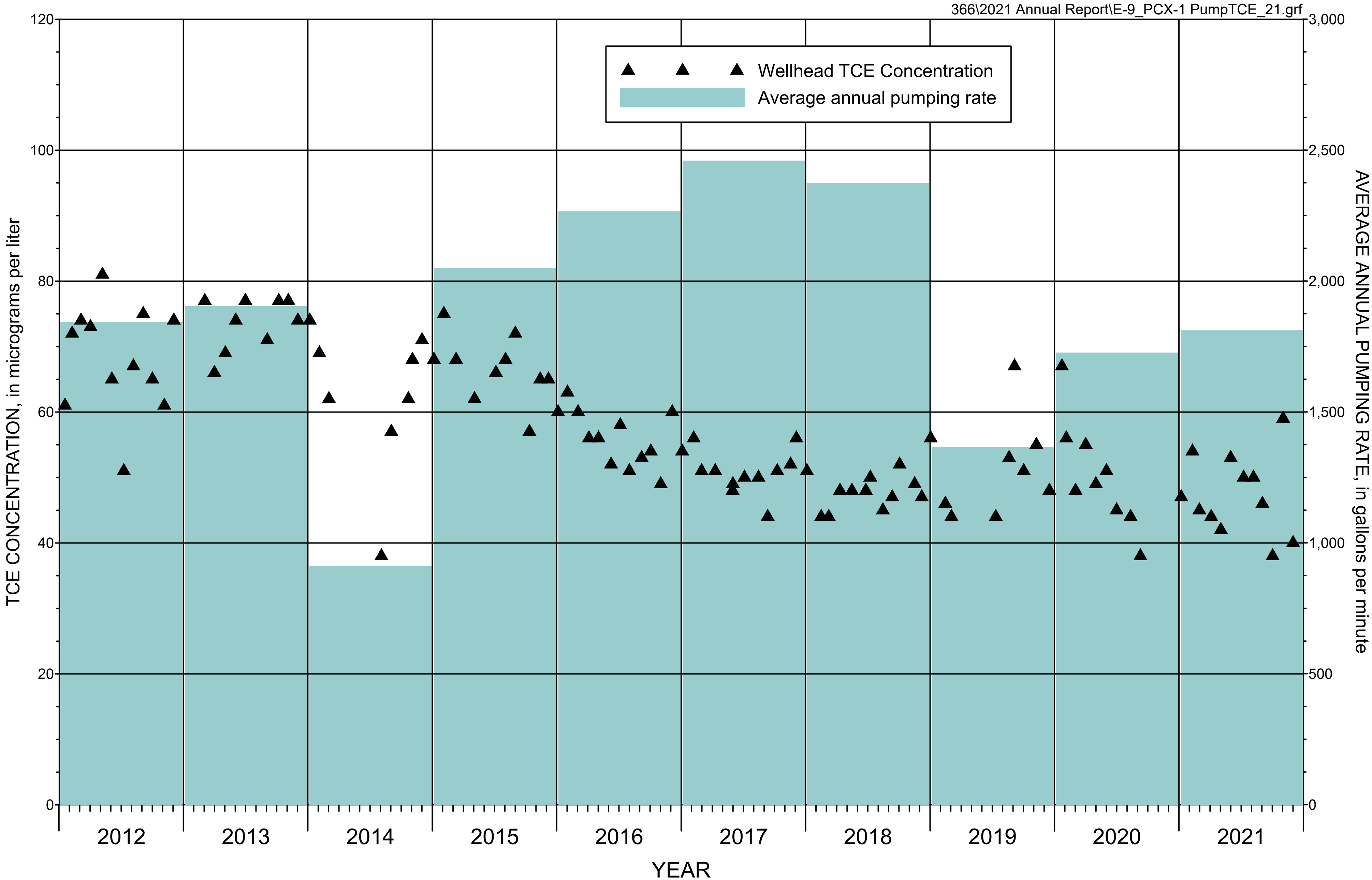


FIGURE E-9. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PCX-1 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

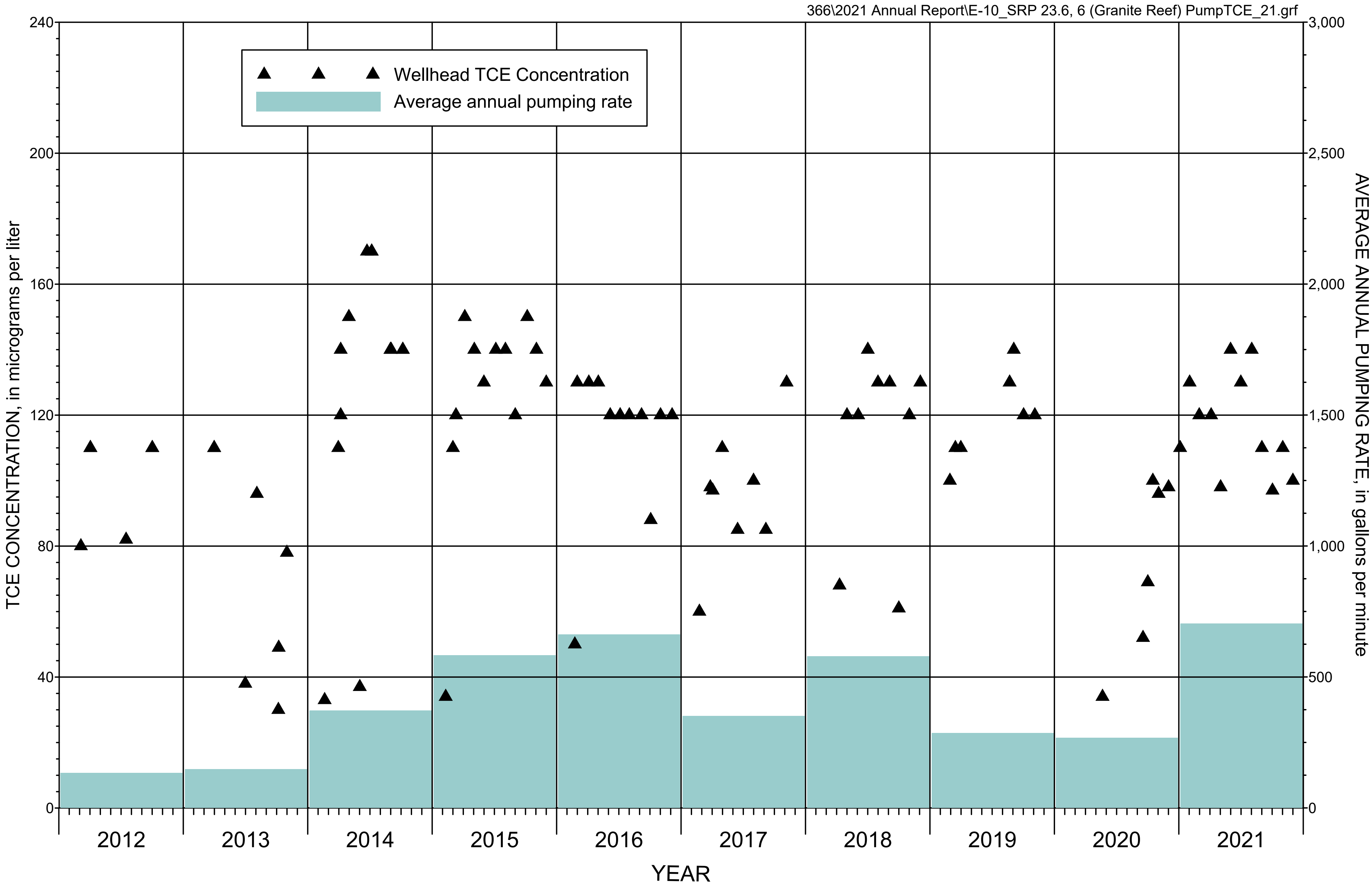


FIGURE E-10. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL SRP 23.6E, 6N (GRANITE REEF), 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

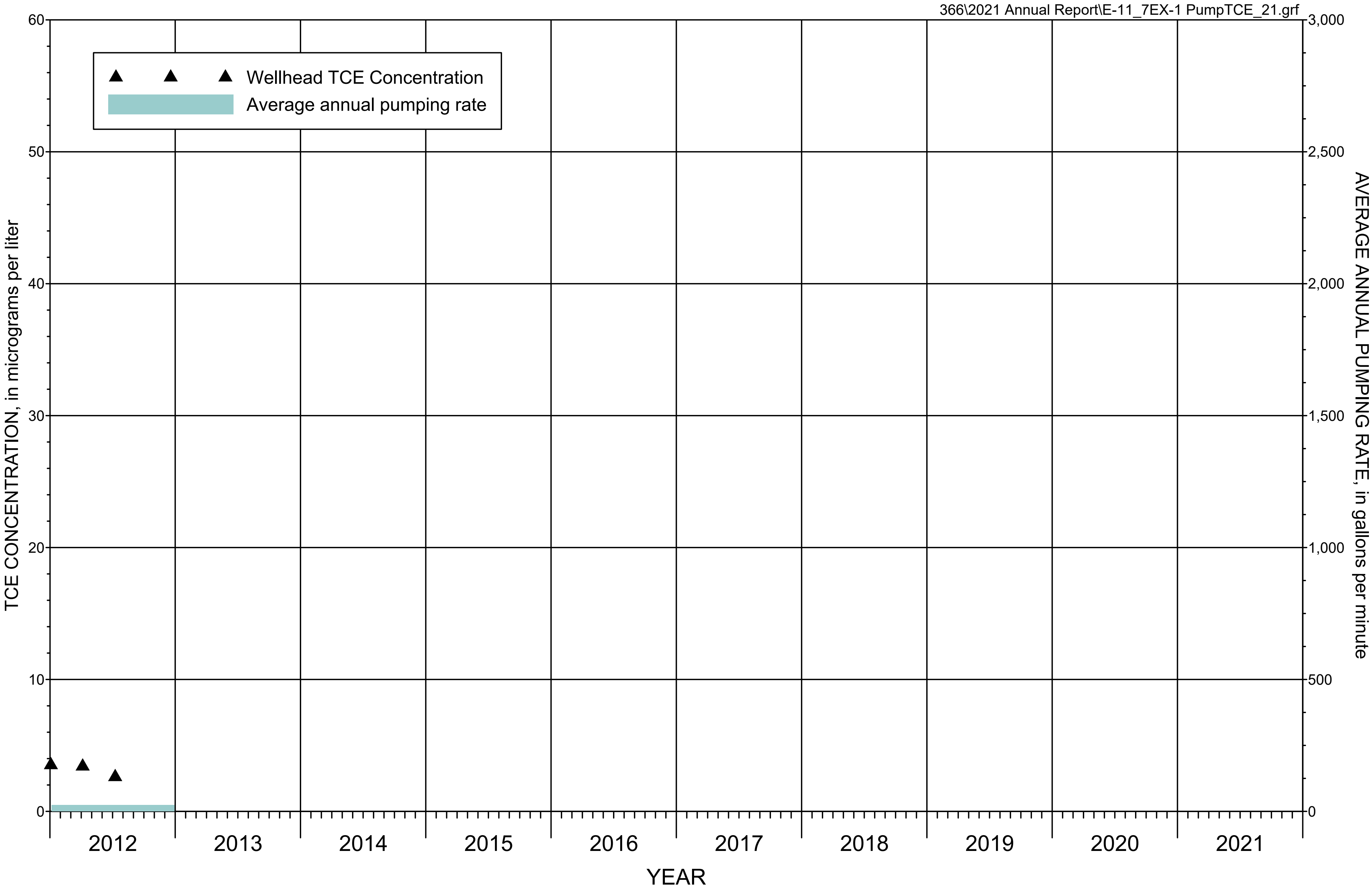


FIGURE E-11. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-1UA 2012 THROUGH 2021

Note: Well was abandoned in 2015.

North Indian Bend Wash Superfund Site

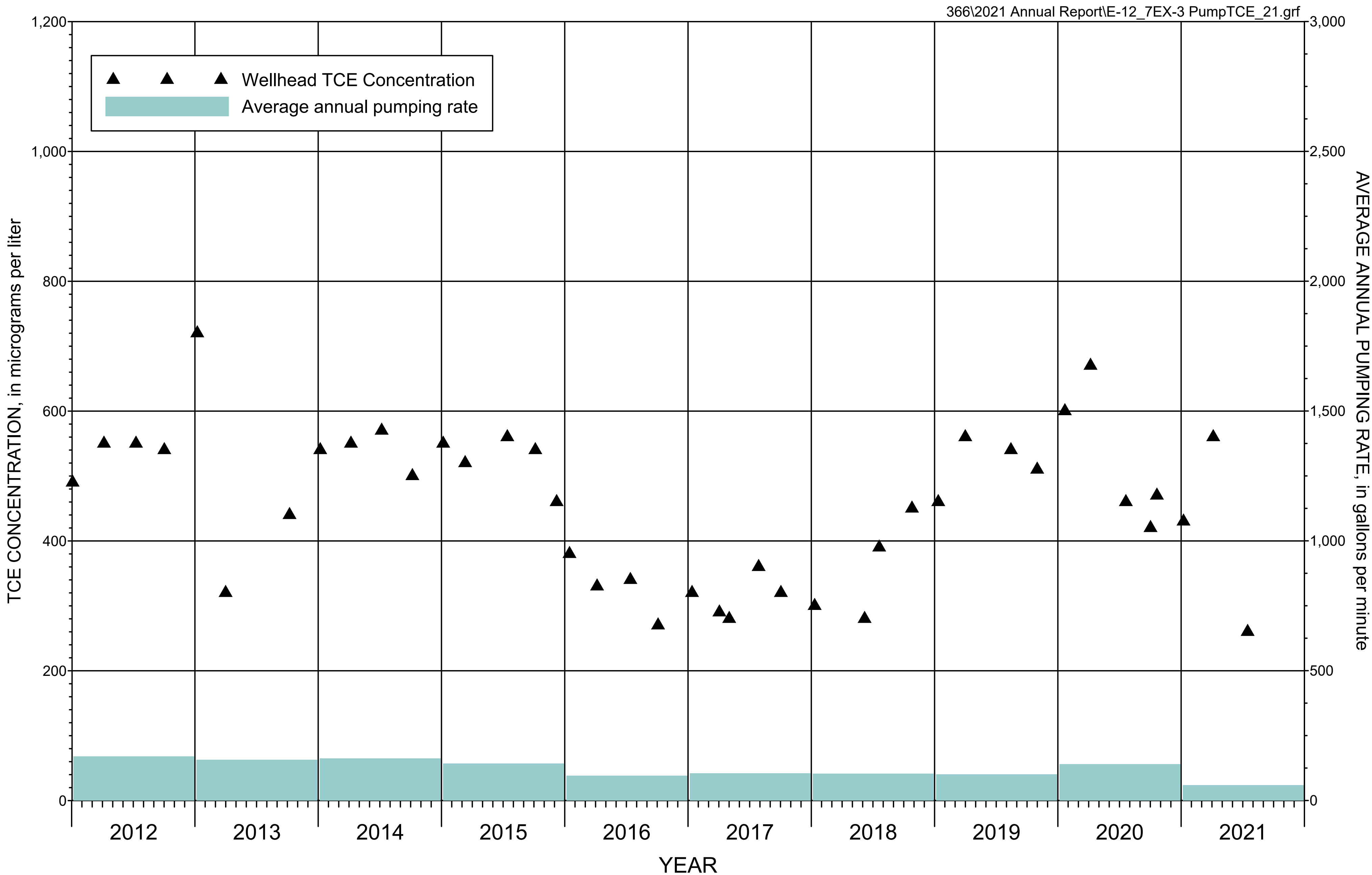


FIGURE E-12. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-3aMA 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

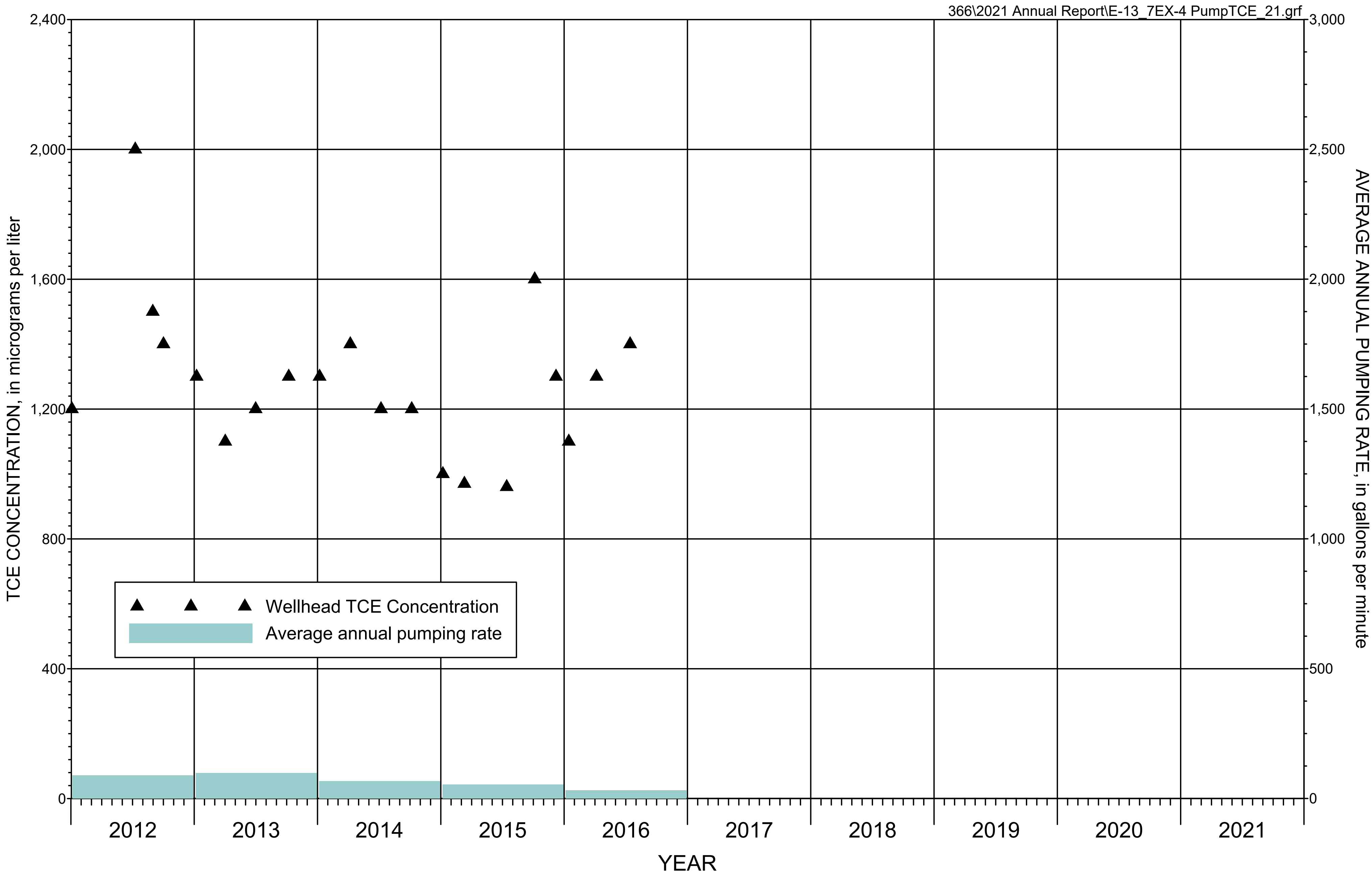


FIGURE E-13. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-4MA 2012 THROUGH 2021

North Indian Bend Wash Superfund Site

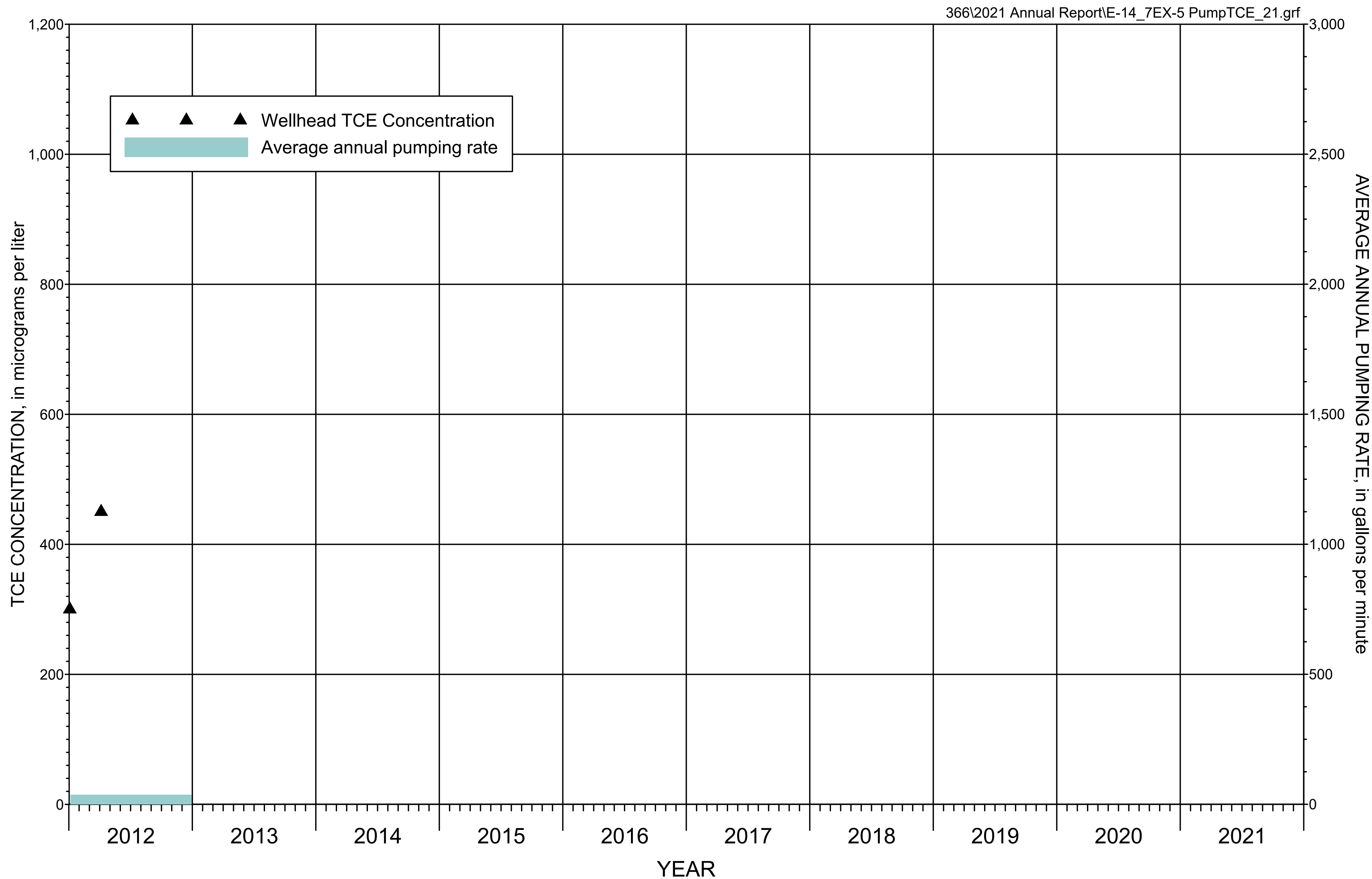


FIGURE E-14. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-5MA 2012 THROUGH 2021

Note: Well 7EX-6MA replaced Well 7EX-5MA August 2015.
Well 7EX-5MA was abandoned August 4, 2016.

North Indian Bend Wash Superfund Site

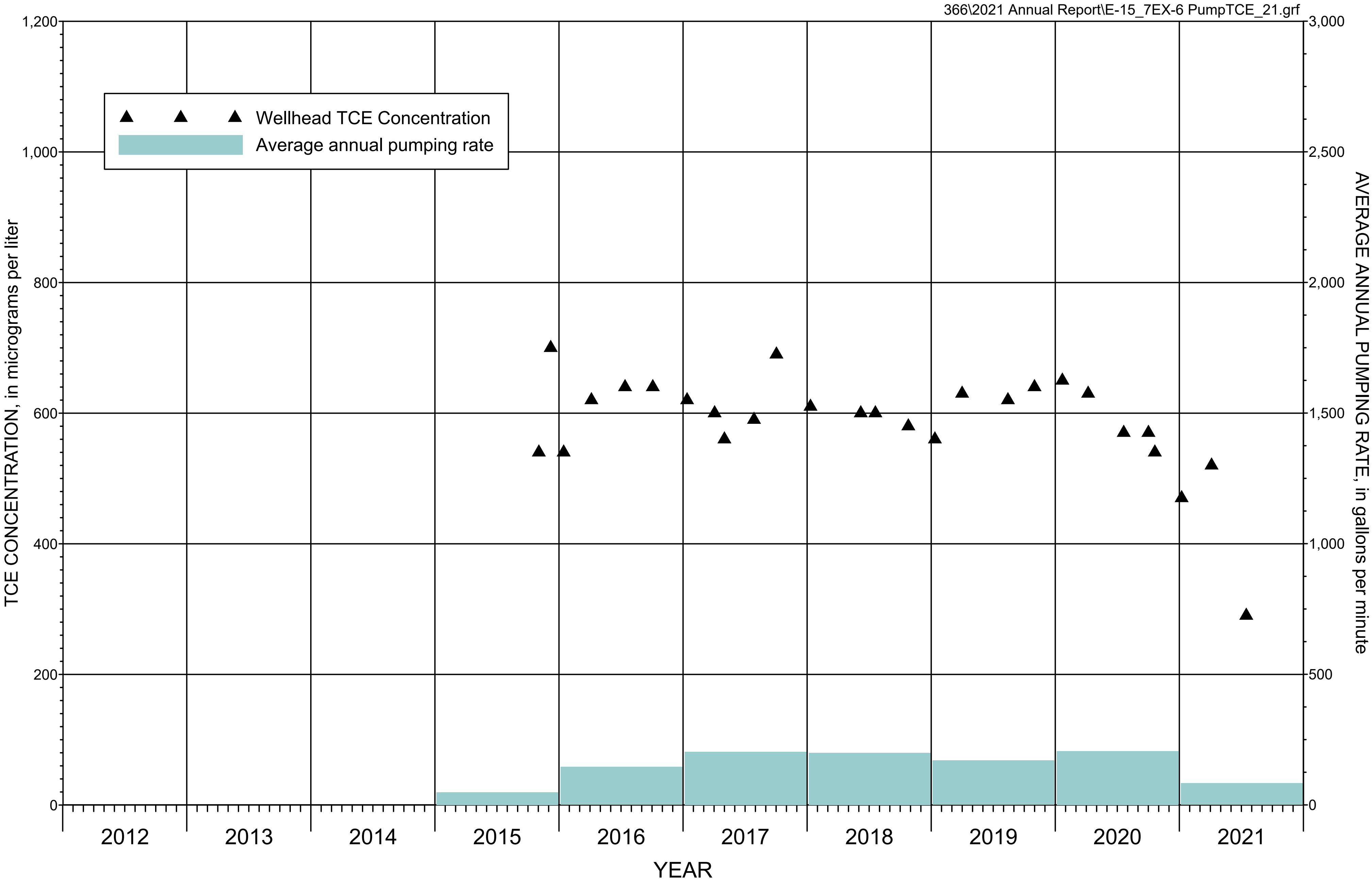


FIGURE E-15. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-6MA 2012 THROUGH 2021

Note: Well 7EX-6MA replaced Well 7EX-5MA August 2015.

North Indian Bend Wash Superfund Site

APPENDIX F
MANAGEMENT OF UNTREATED GROUNDWATER

APPENDIX F. MANAGEMENT OF UNTREATED GROUNDWATER

Section VI.B.4.n of the SOW requires the NIBW PCs, City of Scottsdale, and SRP to provide a report describing the creation and maintenance of records to document compliance with Section VI.B.4.a through VI.B.4.m of the SOW. Section VI.B.4 specifies provisions for managing untreated groundwater extracted from NIBW wells as part of the remedy. The NIBW PCs, City of Scottsdale, and SRP are submitting the following information to fulfill the requirements for annual reporting of compliance with Section VI.B.4 of the SOW. For ease of reference, information regarding the management practices of the NIBW PCs, City of Scottsdale, and SRP pertaining to applicable requirements of Section VI.B.4 are referenced in the order listed in the SOW.

Section VI.B.4.a – Normal Operation, Maintenance, and Monitoring Activities:

The NIBW PCs have specified procedures for management of untreated groundwater associated with sampling activities at the MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS and well equipment maintenance in O&M Plans and Responses to Comments that were submitted to EPA and ADEQ, as follows:

- MRTF on June 19, 2020
- NGTF on June 19, 2020
- Area 7 GWETS on June 19, 2020
- Area 12 GWETS on June 19, 2020
- Groundwater Extraction Well O&M Plan on February 2, 2021
- Groundwater Monitoring Well O&M Plan on March 11, 2021

The NIBW PCs followed procedures described in the Phase I SAP for managing untreated groundwater during monitor well sampling. City of Scottsdale has specified procedures for management of untreated groundwater associated with sampling activities at the CGTF and well equipment maintenance in the most recent O&M Plan (submitted on June 19, 2020).

During the 2021 reporting period, no accidental releases of untreated groundwater from NIBW extraction wells or treatment systems occurred at the Site.

Section VI.B.4.c – Well Access:

The Final Remedial Design/Remedial Action (RD/RA) Work Plan, prepared by the NIBW PCs and dated July 11, 2007, provides information concerning access at the extraction well sites.

Section VI.B.4.d – Annual Treatment Facility Inspections:

As part of normal O&M procedures, each NIBW groundwater treatment facility is inspected on a routine basis for equipment malfunction and deterioration that could result in the release of untreated groundwater.

As explained in Section 2 and **Appendix H** of this SMR, the NIBW PCs coordinated the annual inspections of the NGTF, CGTF, and Area 7 GWETs on October 19, 2021, and MRTF and Area 12 GWETs on October 20, 2021, in accordance with Section VI.B.4.d of the SOW. Representatives of EPA and ADEQ participated in the inspections remotely via teleconference while the treatment system operators and the NIBW PCs conducted the annual inspections locally at each of the treatment facilities. The treatment facilities were inspected for malfunctions, deterioration, and operator practices or errors that could result in a release of untreated groundwater. At each facility, the major system components were identified and examined for operability, condition of operating equipment, and management of untreated groundwater and residual materials. Additionally, data related to routine operation, system startup and shutdown, routine and non-routine maintenance, and sampling were available for review.

The inspections indicate that the facilities are in good working condition, are operated proficiently, and no treatment performance issues, hazards, or significant deterioration were apparent at the NIBW treatment systems. Based on these findings, the NIBW PCs conclude the facility operations comply with the Amended CD/SOW. No hazardous waste is generated, handled, or stored at the NIBW groundwater treatment plants. A summary report documenting the site inspection for each facility is provided in **Appendix H**.

Section VI.B.4.e – Training for Responding to Releases of Untreated Groundwater:

The NIBW PCs submitted a plan for health and safety training of GWETS Operators and Emergency Coordinators to EPA as part of materials included in an August 1, 2003, "Submittal of Information Required, Section VI of the Statement of Work" provided to EPA and ADEQ. The plan specified steps to be conducted for personnel at all groundwater treatment facilities so that they will have appropriate health and safety training to respond to releases of untreated groundwater in a manner to protect public health and the environment. All operators of the NIBW groundwater treatment facilities and emergency coordinators are trained in compliance with OSHA standard 29CFR 1910.120.

In 2021, City of Scottsdale provided online emergency response and incident management training for an untreated groundwater release for CGTF, NGTF, and Area 7 GWETS raw water pipelines. The training sessions are performed online, and the training is tracked within the City of Scottsdale training management program.

The Contingency and Emergency Response Plan (CERP) for Accidental Releases of Untreated Groundwater from SRP North Indian Bend Wash Site Extraction Wells, prepared by SRP, originally dated January 2007 and updated most recently in October 2021, describes the training to be conducted for personnel responding to an accidental release of untreated groundwater from an SRP facility. SRP maintains its employee training records.

Section VI.B.4.f and g – Land Disposal of Untreated Groundwater:

The NIBW PCs, SRP, and City of Scottsdale have not placed untreated groundwater in any salt dome formation, salt bed formation, underground mine or cave, surface impoundments, waste piles, land treatment units, incinerators, or landfills.

Section VI.B.4.h – Emergency and Contingency Response Plans:

The NIBW PCs, City of Scottsdale, and SRP prepared updated CERPs and Responses to Comments as follows:

- MRTF on December 31, 2020
- NGTF on December 31, 2020
- Area 7 GWETS on December 31, 2020
- Area 12 GWETS on December 31, 2020
- CGTF in August 2020
- SRP extraction wells in October 2021

The CERPs describe the procedures for handling an accidental release of untreated groundwater from an extraction well on the NIBW site.

Section VI.B.4.i – Emergency Coordinators:

The NIBW PCs, City of Scottsdale, and SRP list designated emergency response coordinators for the groundwater treatment facilities and the extraction well network. Currently identified personnel responsible for emergency response at the NIBW groundwater treatment facilities and extraction well sites are listed in each O&M Plan and CERP.

Section VI.B.4.j – Evidence of Holocene Faults:

The NIBW PCs (August 2003), SRP (September 2003), and the City of Scottsdale (July 2003) provided written verification to EPA and ADEQ indicating the existing NIBW extraction wells and treatment facilities are not located within 200 feet of a fault that has exhibited displacement in Holocene time. There are no recognized Holocene faults in the metropolitan Phoenix area.

Section VI.B.4.k – Floodplains:

City of Scottsdale (July 2003), NIBW PCs (August 2003), and SRP (September 2003) provided information to EPA and ADEQ to confirm that four NIBW extraction wells are in locations that would be inundated by a 100-year flood. According to maps produced by the Maricopa County Flood Control District, the following remedial extraction wells are located within 100-year floodplains:

- COS-72 and COS-75A - Indian Bend Wash
- Granite Reef well - Granite Reef Wash
- PV-14 – unnamed wash (current Maricopa County Flood Control District 100-year flood map shows PV-14 outside the 100-year floodplain)

The NIBW PCs described measures for operating the wells in the Groundwater Extraction Well Network O&M Plan to minimize a release of untreated groundwater during a 100-year storm.

Section VI.B.4.l – Closure:

NIBW PCs, SRP, and City of Scottsdale did not abandon any extraction or production wells associated with the NIBW project in 2021. There were no facility closure activities in 2021.

Section VI.B.4.m – Containment:

The Remedial Design/Remedial Action (RD/RA) Work Plan provides information concerning containment at the extraction well sites.

APPENDIX G
DOCUMENTS SUBMITTED IN 2021

APPENDIX G. DOCUMENTS SUBMITTED IN 2021

During the period January through December 2021, the NIBW PCs provided the following documents to EPA and ADEQ:

Draft Conceptual Site Model Update, electronic mail submitted by NIBW PCs on February 1, 2021.

Operation and Maintenance Plan, Groundwater Extraction Well Network, electronic mail submitted by NIBW PCs on February 2, 2021.

2020 Site Monitoring Report, North Indian Bend Wash Superfund Site, technical report submitted via CloudShare on February 26, 2021.

Groundwater Monitoring Program Supplemental Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 26, 2021.

Groundwater Extraction and Treatment System Supplemental Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 26, 2021.

Area 7 Inorganics Supplemental Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 26, 2021.

Summary of 2020 Air Sampling Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 26, 2021.

Revised Operations and Maintenance Plan, Groundwater Monitor Well Network, revised document together with response to agency comments on August 2020 revision, electronic mail submitted by NIBW PCs on March 11, 2021.

Optimization Question Responses, document regarding treatment systems submitted by NIBW PCs electronically via Optimization Team share site on March 24, 2021.

NIBW Annual Cost 2016-2020, submitted by NIBW PCs electronically via Optimization Team share site on March 24, 2021.

Site Monitoring Report Presentation and Plume Animations, submitted via CloudShare on March 25, 2021.

NIBW Groundwater Flow Model Calibration Review Presentation – May 2021, electronic mail submitted by NIBW PCs on May 7, 2021.

NIBW Quarterly Report – January through March 2021, electronic mail submitted by NIBW PCs on May 28, 2021.

NIBW PCs Responses to 2021 Five Year Review Survey for Indian Bend Wash Superfund Site, submitted via email July 7, 2021.

NIBW PG-41MA/LA Testing Overview – July 20, 2021, remote presentation from July 20, 2021 Technical Committee Meeting, electronic mail submitted by NIBW PCs on July 21, 2021.

NIBW Groundwater Flow Model Calibration and Predictive Scenarios to Date – July 20, 2021, electronic mail submitted by NIBW PCs on July 21, 2021.

Three-Dimensional Geologic Model Associated Files, provided link to cloudshare site where files could be accessed and downloaded via electronic mail by NIBW PCs on July 24, 2021.

2020 NIBW Participating Companies Annual Reports, provided electronic copies via electronic mail of 2020 Annual Financial Reports for Siemens, Motorola Solutions, Inc., and Glaxo-SmithKline on August 4, 2021.

NIBW Groundwater Flow Model Forward Particle Tracking and Cleanup Time Estimates – September 21, 2021, electronic mail submitted by NIBW PCs on September 22, 2021.

Copy of November 3, 2021 Presentation to Technical Committee on Results of Predictive Modeling for Baseline, Optimization, Worst-Case, and Drought Scenarios – electronic mail submitted by NIBW PCs on November 11, 2021.

Results of Testing at Monitor Well PG-41MA/LA, May 2021, technical memorandum submitted by NIBW PCs on November 19, 2021

NIBW Participating Companies Comments on EPA Third Five-Year Review of IBW Site, electronic mail submitted by NIBW PCs on November 21, 2021.

NIBW Quarterly Report – July through September 2021, electronic mail submitted by NIBW PCs on November 29, 2021.

NIBW Indoor Air and VI Mitigation Reports to EPA – 2021 – electronic mail submitted by NIBW PCs on December 1, 2021

2021 NIBW Technical Committee Meeting Minutes

NIBW Technical Committee Meeting Minutes – January through March 2021, electronic mail submitted by NIBW PCs on April 1, 2021.

NIBW Technical Committee Meeting Minutes – April 14, 2021, electronic mail submitted by NIBW PCs on May 14, 2021.

NIBW Technical Committee Meeting Minutes – May 17, 2021, electronic mail submitted by NIBW PCs on June 7, 2021.

NIBW Technical Committee Meeting Minutes – June 14, 2021, electronic mail submitted by NIBW PCs on July 21, 2021.

NIBW Technical Committee Meeting Minutes – July 20, 2021, electronic mail submitted by NIBW PCs on August 4, 2021.

NIBW Technical Committee Meeting Minutes – August 18, 2021, electronic mail submitted by NIBW PCs on September 20, 2021.

NIBW Technical Committee Meeting Minutes – September 21, 2021, electronic mail submitted by NIBW PCs on October 19, 2021.

NIBW Technical Committee Meeting Minutes – October 21, 2021, electronic mail submitted by NIBW PCs on December 2, 2021.

NIBW Technical Committee Meeting Minutes – November 16, 2021, electronic mail submitted by NIBW PCs on December 17, 2021.

APPENDIX H
2021 SITE INSPECTION REPORT
GROUNDWATER TREATMENT FACILITIES

2021 INSPECTION REPORT
GROUNDWATER TREATMENT FACILITIES

North Indian Bend Wash
Superfund Site

Prepared for:

U.S. Environmental Protection Agency

Region IX

Prepared by:

NIBW Participating Companies

February 28, 2022

North Indian Bend Wash Superfund Site

2021 ANNUAL INSPECTION REPORT
Groundwater Treatment Facilities
North Indian Bend Wash Superfund Site
Scottsdale, Arizona

1 INTRODUCTION

This report documents the activities and findings for the North Indian Bend Wash (NIBW) groundwater treatment plant inspections conducted in accordance with Section VI.B.4.d of the NIBW Statement of Work (SOW). The purpose of the inspections, as described in the SOW, is to identify malfunctions, deterioration, operator practices or errors, and discharges that may be causing or could result in a release of untreated groundwater. The inspections were coordinated and conducted by the NIBW Participating Companies (PCs) and attended by representatives of the U.S. Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ).

2 OVERVIEW

The groundwater remedy for the NIBW Superfund Site addresses aquifer restoration by monitoring, extracting, and treating groundwater affected by volatile organic compounds (VOCs), including the following five NIBW contaminants of concern (COCs): trichloroethene (TCE), tetrachloroethene (PCE), 1,1-dichloroethene (DCE), 1,1,1-trichloroethane (TCA), and chloroform. The NIBW COCs are treated to levels set forth in the Amended Consent Decree (Amended CD). Five separate groundwater extraction and treatment systems are used to extract and treat NIBW COC-affected groundwater at the Site. These systems are referred to as the Central Groundwater Treatment Facility (CGTF), Miller Road Treatment Facility (MRTF), North Indian Bend Wash Granular Activated Carbon Treatment Facility (NGTF), Area 7 Groundwater Extraction and Treatment System (GWETS), and Area 12 GWETS.

Complete descriptions of CGTF, MRTF, Area 7 GWETS and Area 12 GWETS and associated operation and maintenance (O&M) activities are presented in the following documents:

"*Feasibility Study Addendum, North Indian Bend Wash Superfund Site*", dated November 15, 2000 (FSA),

"*Record of Decision Amendment – Final Operable Unit, Indian Bend Wash Area*", dated September 27, 2002 (Amended ROD), and

"*Sitewide Operation and Maintenance Plan*", dated June 5, 2006 (Sitewide O&M Plan), with individual treatment plant O&M plan updates prepared in 2012, 2014, and 2020.

Detailed design and operational information for NGTF is included in:

"*Design Report, PCX-1 Granular Activated Carbon Treatment Facility*", dated August 2012, and "*Operation and Maintenance Plan, North Indian Bend Wash GAC Treatment Facility*", dated June 19, 2020.

All five groundwater treatment systems were designed to reduce NIBW COCs to below concentrations specified in Table 3 of the Amended ROD (Treatment Standards).

3 INSPECTION PROCEDURES

3.1 Routine Inspections

The operators routinely inspect the treatment facilities, either daily (CGTF, MRTF, and NGTF) or weekly (Area 7 GWETS and Area 12 GWETS). General operating parameters, such as totalized flow, local pressures and equipment state is logged manually during periodic site visits. Logging of more critical parameters, such as air and water flow rates, is performed by the computer control system at each facility on an hourly basis, at a minimum. The operators review the data for trends and anomalies to evaluate the overall operation of the treatment systems.

Due to the size of the treatment plants and the drinking water end-use, the NIBW PCs coordinate and conduct regular operational review meetings on an approximate monthly basis with the operators for CGTF and NGTF. The NIBW PCs also visit all the treatment facilities frequently to conduct walk-throughs and to meet with the operators. These meetings include discussions of current operations issues, routine maintenance, planning for upcoming non-routine maintenance such as column cleaning, and equipment and/or systems upgrades.

Weekly, monthly, and/or quarterly data and operating reports are submitted by the facility operators. These reports are reviewed by the NIBW PCs to document O&M issues and confirm treatment effectiveness of each plant. Updates are provided during monthly meetings of the NIBW Technical Committee.

The project team routinely reviews treatment system discharge monitoring data and laboratory reports as they become available to verify the treatment systems are operating effectively. This process ensures that the treatment systems comply with applicable discharge requirements and the Amended CD.

3.2 Annual Inspections

Inspections are conducted annually in accordance with the SOW and Amended CD. The field inspections for CGTF, NGTF, and Area 7 were conducted on October 19, 2021, and the field inspections for MRTF and Area 12 GWETS were conducted on October 20, 2021.

The schedule of site inspections was coordinated in advance with EPA and ADEQ to provide an opportunity for regulatory agency participation. The treatment system operators and managers as well as the NIBW PCs participated locally at the individual treatment systems. EPA and its representatives, as well as ADEQ, participated remotely via teleconference during the 2021 inspections. The inspections included a facility walk-through, an interview with the primary operator, visual inspections of the treatment equipment and groundwater containment systems, and review of operating and maintenance data. Detailed operating data and maintenance logs for routine operation and non-routine projects are maintained and available for review at each treatment facility in accordance with the SOW. Additionally, documents such as the facility O&M Plans, O&M Manuals, Contingency and Emergency Response Plans (CERPs), and Health and Safety Plan are maintained at each respective facility. Photographs of the treatment systems were collected and made available to EPA and ADEQ. A description of each facility inspection and associated results are provided in the following section.

4 FACILITY INSPECTIONS

4.1 Area 7 Groundwater Extraction and Treatment System

NIBW Area 7 is located at the southeast corner of 75th Street and 2nd Street in Scottsdale. The groundwater treatment system is located in the southeast corner of Area 7 in an area approximately 56 feet by 75 feet. The facility includes the treatment system and control equipment. Groundwater extraction is performed using two remote MAU groundwater extraction wells (7EX-3aMA and 7EX-6MA). Area 7 GWETS is operated and maintained by Arcadis, Inc. (Arcadis), an engineering consultant working on behalf of the NIBW PCs.

The major components of Area 7 GWETS include submersible groundwater pumps, wellhead equipment, piping from the wellheads to the treatment plant, a 5,000-gallon equalization tank, an ultraviolet oxidation (UV/Ox) system, a low-profile air stripper, and a vapor-phase granular activated carbon (GAC) treatment system.

The groundwater treatment plant includes a building, which houses the UV/Ox and air stripper systems. A control room is integrated into the building and is equipped with the motor control center (MCC) and human machine interface (HMI), main control center, including programmable logic controller (PLC), and motor drives.

The equalization tank and GAC adsorbers are located outside the building on the north side of the treatment plant area.

Chemical systems in use at Area 7 include hydrogen peroxide storage and injection for the UV/Ox and storage and injection of poly-phosphate scale inhibitor to minimize calcium carbonate scale in the air stripper. A double-contained 1,800-gallon crosslink polyethylene storage tank located outside the south side of the treatment building in a recessed area with six-inch berm is used to store approximately 27% hydrogen peroxide solution prior to injection immediately upstream of the UV/Ox system. The poly-phosphate chemical is food-grade scale inhibitor stored in a 50-gallon polyethylene tank located inside the treatment room at Area 7 GWETS.

The entire treatment plant area is paved with concrete and surrounded by a two-inch berm for containment. The treatment plant is surrounded by a block wall for security. Access to the plant is provided through three steel gates, two located on the west wall and one on the south wall.

In its current configuration, the groundwater treatment system is capable of treating up to approximately 450 gallons per minute (gpm) of NIBW COC-affected groundwater. Treated water is delivered to one of two remote groundwater injection wells (7IN-1UA and 7IN-2UA) for recharge to the Upper Alluvium Unit (UAU).

In 2012, well 7EX-5MA became unusable during a rehabilitation project to increase production at that location. Well 7EX-5MA was abandoned in early 2016. At the same time, production from well 7EX-4MA was declining due to well conditions. In 2015, well 7EX-6MA was installed to replace both wells 7EX-4MA and 7EX-5MA while still capturing the highest concentrations of NIBW COCs in the vicinity of Area 7.

In October 2016, the water level in well 7EX-4MA had decreased to a point that the pump began to stall. The pump already had been lowered to near the bottom of the well prior to that time. A previous well rehabilitation was performed at well 7EX-4MA in 2012 with limited results. Well 7EX-4MA is currently offline.

In 2021, the typical water flow rate to Area 7 GWETS was approximately 375-400 gpm. The typical air flow rate through the shallow-tray air stripper at Area 7 was approximately 2,700 cubic feet per minute (cfm).

During normal operation, treated groundwater is injected into the UAU via wells 7IN-1UA and 7IN-2UA. The GWETS is equipped to discharge treated groundwater either to the UAU aquifer upgradient of Area 7 through the injection wells or, under limited circumstances, to the City of Scottsdale sanitary sewer during maintenance on the system. Combined, the injection wells accept more than 450 gpm.

4.1.1 Notable Events at Area 7 in 2021

The NIBW PCs performed a limited rehabilitation of well 7EX-4MA in 2019. The rehabilitation effort included scrubbing, swabbing, and water jetting. Several holes were discovered in the casing following the rehabilitation activities. Other parts of the casing appeared to be in poor condition as well. The NIBW PCs are evaluating options for liners or casing repair. No work was performed on the well in 2020 and 2021 due to limitations from the pandemic. Further work on well 7EX-4MA is anticipated in 2022.

In 2021, the treatment system operated well until late May. Between May 28 and June 5, 2021, the treatment system shut down twice due to Profibus communications issues between the PLC and process pumps and the air stripper blower. The system was restarted on June 6. On June 9, 2021, the power supply from the variable frequency drive (VFD) to the air stripper blower failed. A new VFD was procured and installed. The system was restarted on July 15. On July 22. 2021, a system-wide Profibus communication error caused by monsoonal electrical storms in the vicinity of Area 7 occurred. Following extensive troubleshooting, the NIBW PCs elected to upgrade the entire treatment system communication system between the PLC and all of the VFDs. The planned upgrades include replacing the original Profibus communications system between the PLC and the system drives with Allen-Bradley communication protocol and associated equipment and new VFDs for the plant pumps, blower, and remote groundwater pumps. Global supply chain issues as a result of the pandemic caused long delays in procuring the equipment. The treatment system was offline through the end of the year. Some of the equipment was received in early 2022, but several critical pieces were still backordered.

4.1.2 Area 7 Maintenance and Condition

Arcadis makes daily remote checks on the system via computer link and makes weekly site inspections of the equipment and grounds at Area 7. The operator also maintains operations logs and data spreadsheets at Area 7. The logs and spreadsheets were presented for review during the site inspection. Equipment maintenance records, including task and date, are kept on a separate log. Other site and operational information kept in a log book includes daily inspection observations and any other data collected by the operator. Treatment system data is also automatically logged by the control system and accessed through the HMI. Arcadis made operation and maintenance records available for review during the inspection.

In general, at the time of the inspection, the facility was offline, but appeared clean with no apparent leaks or significant deterioration during the inspection. The equipment was clean, labeled, and well maintained.

When operating, the process pumps are inspected weekly and serviced monthly. No significant maintenance or replacement was required on the process pumps at Area 7 in 2021.

The UV/Ox system appeared in good condition during the inspection. Both lamps and the quartz sleeve wipers in UV/Ox system were replaced in early July 2021.

The blower is direct drive and operated via a VFD which maintains fan speed. The operator indicated that the blower has performed well, and no service has been required. All dampers are checked quarterly for operability.

The internal air stripper trays were descaled in February 2019. Visual inspections through the viewports of the trays are performed monthly. With the use of the scale inhibitor, only minor amounts of calcium carbonate scale accumulate on the air stripper trays. Descaling is typically performed every few years, as needed.

The exterior of the building and outdoor equipment such as the equalization tank and GAC system appeared in order without significant deterioration.

Treated water from Area 7 is injected into the underlying UAU aquifer using wells 7IN-1UA and 7IN-2UA. The injection wells are equipped with monitoring devices that will shut down discharge to the injection wells in the event that water in the wells rises to pre-determined levels. At the time of the inspection, no operational issues were apparent with either injection well 7IN-1UA or 7IN-2UA.

The instruments, alarms, and interlocks for the main control system were not tested during 2021 due to the communication system failure. The testing program is typically performed in late summer. Once the new communication system equipment is installed and ready for start-up, the system instruments will be calibrated as necessary, and the alarms and interlocks will be tested accordingly. No programming changes to the control system were made in 2021. No programming changes to the control logic will be made when the system network architecture is upgraded.

Other miscellaneous equipment service or replacements include testing of the fire suppression system in July 2021, and replacement of a switch on the compressor in May 2021.

Other downtime was attributed to issues associated with intense lightning and monsoon weather in the area. These events typically cause alarms on the UV/Ox system due to the sensitive electrical nature of the high voltage equipment.

Prior to the failure of the communication system in July, Area 7 GWETS was available for treatment of extracted groundwater greater than 80% of the time. Downtime of Area 7 GWETS is attributed to repair work, routine equipment maintenance, multiple periodic power outages which are attributed primarily to local weather and waiting for delivery of the new VFDs and communication equipment.

4.1.3 Results

Based on the 2021 inspection and a review of operating and monitoring data, Area 7 GWETS, when operating, has consistently met performance criteria set forth in the Amended CD.

No treatment performance issues, hazards, or significant deterioration were apparent at the Area 7 GWETS in 2021.

4.2 Area 12 Groundwater Extraction and Treatment System

Area 12 GWETS is located at the General Dynamics facility at 8201 East McDowell Road in Scottsdale, Arizona. At this site, the air stripping tower is located just west of the Chemical Operations Building. Area 12 GWETS is designed to treat up to 1,850 gpm of groundwater. Groundwater is extracted from two wells: MEX-1MA and SRP well 23.6E-6.0N, also known as the Granite Reef well (Area 5B). MEX-1MA is owned by Motorola Solutions and the Granite Reef well is owned by SRP. Both wells are operated by SRP. The treated groundwater from both wells is delivered to SRP's irrigation distribution system through a connection to an SRP lateral pipeline, located along Granite Reef Road.

Area 12 GWETS consists of an air stripping GAC treatment system. Groundwater is pumped from the extraction wells in individual pipes to a common manifold near the air stripper. The air stripper is a counter-current, forced-draft, packed column through which the NIBW COCs are removed from the groundwater.

The treated groundwater is discharged to SRP's irrigation distribution system at McKellips Lake under an agreement between SRP and Motorola Solutions, Inc.

The main control panel containing the system PLC is located at the Area 12 treatment plant. Each well pump system is connected to the PLC using an Ethernet connection with signals traveling via a fiber optic pathway. Each well site also contains a PLC to control the individual remote well operation. The remote well pump PLCs also interface with SRP systems to monitor and control well operation.

A small control room located at the treatment plant houses the HMI and various plant-specific records. The HMI consists of a computer that supports a graphical user interface, logs operational data, and allows remote operation and data transfer using a telephone modem.

Typical groundwater extraction rates at well MEX-1MA and the Granite Reef well in 2021 were approximately 905 gpm and 820 gpm, respectively.

In 2021, the typical air flow rate through the air stripper was approximately 5,400 cfm.

The Area 12 system is typically shut down for the annual SRP Dry-Up in December and restarted in early February once the discharge is allowed by SRP. In 2021, SRP Dry-Up did not affect the discharge location for Area 12. As such, the system remained operational during that time.

4.2.1 Notable Events at Area 12 in 2021

No significant operational events occurred at Area 12 in 2021. Several shutdowns were caused by monsoonal electrical storms in the vicinity of Area 12. In July the system was offline for 9 days due to the failure of a transformer on the General Dynamics property that supplies electrical power to Area 12 GWETS. In August the system was offline for approximately 7 days due to too much water at the discharge location from recent monsoon storms. ADEQ issued a new AZPDES permit for the Area 12 GWETS discharge to McKellips Lake in September 2021. Monthly DMRs are submitted to EPA under separate cover.

4.2.2 Area 12 Maintenance and Condition

Area 12 GWETS is operated and maintained by EnSolutions, an engineering consultant working on behalf of the NIBW PCs. When in operation, EnSolutions makes daily remote checks on the system via computer and approximately twice weekly visits to the GWETS. During the visits, the operator conducts inspections of the equipment and grounds at Area 12. A safety coordinator for the General Dynamics facility makes daily walk-throughs at Area 12 GWETS. The operator also maintains operations logs and data spreadsheets at the facility. The logs and spreadsheets were presented for review by the inspection team during the site inspection.

In general, the facility appeared clean, with no apparent leaks or significant deterioration during the inspection. The equipment was clean, labeled, and well maintained. At the time of the inspection, the blowers appeared to run smoothly. The operator indicated that the blowers have performed well since installation, and no other non-routine service has been required.

Normally, column cleaning activities are performed during the scheduled maintenance at the beginning of the year. Column cleaning activities were performed over 10 days in August 2020. As a result, the air stripper system was not descaled in 2021. Routine system maintenance and column cleaning was completed during SRP Dry-Up in early 2022.

In early-December 2021 during routine balancing activities, observations indicated a broken motor mount for the larger blower F-310. The blower was removed from service on December 5. The motor mount was repaired, and stiffeners were added to the frame to reduce movement and vibration. The blower was cleaned and balanced during the repair work. The blower was returned to service on December 24, 2021.

The process control system is monitored continuously by computer. The system must be in auto-mode for start-up and operation. The system cannot start with an active shutdown alarm. The primary control system alarms were tested during the column cleaning activities in August 2020. Since the system operated through normal SRP Dry-Up in 2021, no formal testing was completed in January 2021. The testing program resumed in January 2022. The operator indicated that the alarms are routinely tested when the system is shut down. The system shut down several times in 2021, mainly due to electrical storms and power fluctuations, as well as for routine maintenance. When forced to shut down for maintenance, a control parameter was used to initiate the alarm and subsequent shutdown. In each case, the treatment system responded according to the design.

Overall, Area 12 GWETS was available for treatment of extracted groundwater greater than approximately 94% of the time in 2021.

4.2.3 Results

Based on the 2021 inspection and a review operating and monitoring data, Area 12 GWETS has consistently met performance criteria set forth in the Amended CD.

No treatment performance problems, hazards, significant deterioration, or equipment malfunctions were apparent at Area 12 GWETS in 2021.

4.3 Miller Road Treatment Facility

MRTF is located at 5975 Cattletrack Road, south of the intersection of Cattletrack Road and McDonald Drive in Scottsdale, Arizona. The facility is owned and operated by, and the responsibility of, EPCOR Water USA (EPCOR). MRTF is used to treat water from EPCOR production wells PV-14 and PV-15.

MRTF consists of three individual air stripping treatment trains. Each treatment train includes a counter-current, forced-draft air stripper with appurtenant equipment, such as an air blower. The off-gas from each air stripper passes through a mist eliminator, then through ducting to one of three GAC adsorbers before discharge to the atmosphere. Each air stripper column treats groundwater at flow rates up to approximately 2,150 gpm, with an air flow rate of approximately 5,650 cfm.

Water produced from wells PV-14 and PV-15 is treated by EPCOR and delivered to the clearwell at MRTF, where it is then pumped to EPCOR's Paradise Valley Arsenic Removal Facility. If not required for use in EPCOR's system, treated water may be delivered to SRP via the Arizona Canal outfall. The treatment system is configured such that water from one well is treated through a specific column. Each well produces between approximately 2,100 gpm and 2,150 gpm. Wells PV-14 and PV-15 are operated based on demand from EPCOR's system. The treatment piping allows water from well PV-14 to be treated through Towers 2 or 3 and water from well PV-15 to be treated through Tower 1 or 2. EPCOR switches treatment of water from the wells between the towers periodically. During low demand periods, EPCOR prioritizes pumping of well PV-15. During the low demand period in winter months typically between December and March, well PV-14 is used between 12 and 20 hours a day to make up production for demand, as necessary.

At the time of the inspection, water from both wells PV-14 and PV-15 was being treated at MRTF.

All MRTF treatment equipment, except the GAC adsorbers and acid feed system, is located inside the treatment building. The treatment building consists of several rooms including the air stripper room, which houses the air stripper columns, blowers, and distribution pumps; the electrical room, which supports the MCCs, starters, Remote Terminal Units (RTUs), Remote Input/Output (RIO) cabinets, transformers, and other electrical equipment; and the control room, where the HMI, laboratory, and records are located.

For security and aesthetics, the facility is surrounded by a masonry wall with locking access gates.

4.3.1 Notable Events at MRTF in 2021

On November 30, 2020, well PV-14 was removed from service for conversion from a submersible pump to a vertical turbine pump. Well PV-14 was restarted with the vertical turbine pump on April 16, 2021. A motor issue caused well PV-14 to shut down on June 1, 2021. EPCOR had the motor repaired and the well and pump went back online on August 6, 2021. The well was available for operation for the rest of the year.

4.3.2 MRTF Maintenance and Condition

EPCOR made relevant operating, monitoring, and safety documents, as well as operating data and maintenance logs for MRTF, available during the inspection. Additionally, the operator was interviewed, and a walk-through of the facility was conducted.

EPCOR has an operator onsite at MRTF for several hours a day, seven days a week. The operator makes daily inspections of the equipment and grounds at MRTF. The operator also maintains operations logs and data spreadsheets at the facility.

Column cleaning to remove calcium carbonate scale from the air strippers was performed beginning on December 6, 2021 and was completed in early 2022. The treatment system is operated during column cleaning activities since a third column is available and that column can be isolated from the system.

The blowers and treatment area are inspected daily by the operator. Maintenance, such as balancing and belt alignment on the blowers, is performed by EPCOR technicians on an as needed basis in accordance with the O&M instructions provided by the manufacturer. EPCOR uses a system-wide preventative maintenance program that automatically schedules the appropriate maintenance on each piece of equipment in accordance with manufacturers' instructions. In September 2021, the discharge valves on Treatment Train 3 were replaced. The Tower 2 was used to treat groundwater so that the system remained online during the work. Blowers on Treatment Trains 1 and 3 were operating at the time of the inspection and appeared to run smoothly without excessive vibration and unusual noises.

The equipment and work areas at MRTF appeared clean and well maintained during the inspection. The piping, valves, and instruments were labeled and appeared in good condition.

EPCOR indicated that the automated valves are tested and calibrated once per year. The manual valves are exercised approximately three to four times a year. Process instruments are checked and calibrated and/or tested once per year by EPCOR.

The air handling system appeared tight and in good condition during the inspection. EPCOR indicated that the dampers are exercised periodically to maintain operability.

MRTF was available for treatment of extracted groundwater greater than 95% of the time in 2021. The facility was idle only for short periods of time during system maintenance or when electrical power to the facility was interrupted.

4.3.3 Results

Based on the 2021 inspection and a review of operating and monitoring data, MRTF has consistently met performance criteria set forth in the Amended CD.

No treatment performance issues, hazards, significant deterioration, or equipment malfunctions were apparent at MRTF in 2021.

4.4 Central Groundwater Treatment Facility

CGTF is located at 8650 E. Thomas Road in Scottsdale, Arizona at the northeast corner of Pima Park, a municipal park. Other related facilities include the CGTF extraction wells and Reservoir 80, into which treated water from CGTF is discharged for beneficial use as a supply to City of Scottsdale's potable water system.

Background and details of CGTF are provided in the O&M Plan developed for this facility. EPA approved the CGTF O&M Plan, dated March 2006, including several updates; the most recent in June 2020. The O&M Plan describes the facility, major pieces of equipment, control strategies, and performance monitoring of the treatment plant. Design parameters and performance of CGTF have been validated and documented in the O&M Plan, quarterly Compliance Monitoring Reports, and annual data reports for the NIBW Site.

CGTF uses air stripping to remove NIBW COCs, primarily TCE, from groundwater. CGTF is comprised of three separate, parallel treatment trains. Each treatment train consists of a packed column, a process air fan, and an off-gas vapor treatment system that removes NIBW COCs prior to discharge to the atmosphere. Each column has a design capacity of 3,150 gpm. The overall capacity of CGTF is approximately 9,450 gpm. The separate treatment trains allow for one or more columns to be removed from service while the other column(s) continue to operate.

Groundwater can be pumped from City of Scottsdale wells 75A, 71A, 72, and 31 through transmission pipelines to CGTF. Currently, only well 75A is routinely pumped to and treated at CGTF. Water from well 31 may be used as back-up if water from other sources is not available. Well 72 is operated infrequently. Due to inorganic water quality, City of Scottsdale has removed well 71A from service. Typical flow rates range from approximately 2,250 gpm at well 72 to 2,300 gpm at well 75A to 2,575 gpm at well 31.

Influent water combines in a common raw water header and is evenly distributed into the available columns, where it flows top to bottom through the column packing while airflow is pulled through the tower in a counter-current direction.

The blower air flow rates range from approximately 11,500 cfm to 14,000 cfm per column depending on the magnitude of calcium carbonate scaling in the packing and the amount of water treated in each column.

Since water from the wells is delivered to CGTF in a common header, the flow rate through each column can vary depending on the number of wells and columns in service at any given time. Typically, the flow rate through the columns ranges between approximately 1,500 and 3,000 gpm depending on the number of wells operating.

The treated water gravity flows to Scottsdale’s potable water system or is pumped to the SRP irrigation system. The capacity of the connection to the SRP irrigation system varies based on several factors, with a current maximum of approximately 4,000 gpm. Blending of CGTF treated water with other water supplies occurs in the potable water storage facility, Reservoir 80, just south of the site.

A process air fan is used to pull air through an intake filter then upward through the packed column, counter-current to the water flow. The off-gas is directed through a mist eliminator, a natural gas-fired duct heater, and then to a GAC contactor prior to discharge to the atmosphere. The duct heater heats the air which reduces relative humidity prior to VOC adsorption in the GAC contactors.

The majority of the treatment equipment, except the duct heaters, GAC contactors, and disinfection equipment, is located inside the CGTF treatment building. The treatment building consists of several rooms, including: the air stripper room, which houses the packed columns and process air fans; the electrical equipment room, which supports the MCCs, starters, RTUs, RIO cabinets, transformers, and other electrical equipment; and the laboratory. Disinfection equipment is located in a separate building at the Reservoir

80 booster station and is part of the drinking water system operated by City of Scottsdale. For security and aesthetics, the facility is surrounded by a masonry wall with locking access gates.

4.4.1 Notable Events at CGTF in 2021

The air strippers at CGTF underwent a complete refurbishment in 2020. The system has been operating well since that time. No notable events occurred at CGTF during 2021.

4.4.2 CGTF Maintenance and Condition

CGTF is operated and maintained by a City of Scottsdale water treatment operator. City of Scottsdale operations personnel also monitor the status of CGTF remotely. Operators make minimum daily inspections of the equipment and grounds at CGTF. The operator maintains operations logs and data spreadsheets at the facility. The logs and spreadsheets were presented for review by the inspection team during the site inspection. Technical staff from City of Scottsdale Water Operations such as mechanics, electricians, and instrumentation technicians also provide maintenance support, as needed.

The City of Scottsdale Water Resources Department uses a city-wide preventative maintenance program for all equipment operated by the water operations staff. This program maintains a service record database for each piece of equipment and prompts the technicians to perform routine preventative maintenance in accordance with manufacturers' instructions or as necessary.

At the time of the inspection, the facility appeared clean with no apparent leaks or significant deterioration. The equipment is clean, labeled, and well maintained. All piping appeared in good condition without leaks or corrosion during the inspection. All valves in the plant are turned at least once per year to verify proper working order.

All blowers appeared to run smoothly. Service is performed on the blowers as needed but, at least during each GAC service event on the associated treatment train, or at a minimum on a quarterly basis. Service activities may include alignment, bearing repacking, and inspection and tightening of the drive belts. The air handling and treatment system appeared tight and in good condition during the inspection.

Visual inspection through the viewports on the air stripper column during the inspection indicated light scaling of packing material. This was expected since the internal packing was replaced during the rehabilitation project. The trays at the top of each column are visually inspected by the operator on a monthly basis for even water distribution and for accumulation of debris produced from the wells.

Column cleaning was performed beginning in early November 2021 and was completed by mid-December 2021. Column cleaning activities at CGTF require the system to be offline during that period. The system was restarted on December 13, 2021.

The process control system is monitored continuously. City of Scottsdale has implemented a program to test all switches and alarms on a routine basis when a treatment train is offline for GAC service. Results of the control tests are maintained in a notebook at CGTF. Additionally, instruments are checked and calibrated during the GAC service events by City of Scottsdale instrument technicians.

Except during the column cleaning activities, CGTF was available for treatment of extracted groundwater greater than 95% of the time in 2021.

4.4.3 Results

Based on the 2021 inspection and a review of operating and monitoring data, CGTF has consistently met performance criteria set forth in the Amended CD.

No treatment performance problems, hazards, or significant deterioration, or equipment malfunctions were apparent in 2021.

4.5 NIBW GAC Treatment Facility

NGTF is located at 5985 North Cattletrack Road in Scottsdale, Arizona at the southwest corner of Cattletrack Road and McDonald Drive. NGTF is owned by Motorola Solutions, Inc. and is operated under contract by City of Scottsdale Water Resources. Treated water from NGTF is delivered to City of Scottsdale's Chaparral Water Treatment Plant (CWTP) located approximately one-half mile east of NGTF or to SRP's Arizona Canal through a dedicated outfall immediately east of the facility.

NGTF treats water from extraction well PCX-1. The typical production rate from well PCX-1 in 2021 was between approximately 2,000 and 2,100 gpm. Treatment of water from well PCX-1 at NGTF is accomplished using liquid-phase GAC. A pre-filter located upstream of the GAC system removes entrained solids to prevent accumulation of sediment in the media bed. The GAC system is comprised of four separate, parallel treatment trains. Each treatment train consists of two contactors, each containing approximately 20,000 pounds of GAC with interconnecting piping and valves. Each treatment train has a design capacity of approximately 1,050 gpm. All treatment trains are used for treatment of groundwater from well PCX-1. The flow of water from well PCX-1 is typically split across three treatment trains, while the remaining treatment train is in standby mode. Service rotates among the four treatment trains. This arrangement allows the system to remain operating while GAC media is serviced.

GAC service is accomplished on the standby treatment train while the other three trains remain in service treating groundwater. Currently, the service life of the carbon in the LEAD contactors is approximately six weeks.

Groundwater enters the treatment train through the LEAD contactor, which provides the required NIBW COC treatment. Treated groundwater then flows through the LAG contactor. The configuration of the treatment train allows for each of the two GAC contactors in the treatment train to operate in either LEAD or LAG position and also supports reverse flow through the contactors for backwashing the media.

Following GAC treatment, water is disinfected by City of Scottsdale and delivered to the CWTP finished water reservoir through a dedicated 16-inch pipeline between the facilities. Chlorination is required by City of Scottsdale to meet drinking water standards associated with the CWTP. The disinfection system at NGTF is not considered part of the treatment system for NIBW COCs in groundwater.

After GAC replacement or during normal operation, the media may require backwashing to remove fines and sediment build-up in the bed. Backwash water is collected in the backwash storage tank, and discharged to the sanitary sewer.

The control building at NGTF supports the control console with HMI, appurtenant mechanical equipment, electrical equipment, and the RTU containing the main PLC. The system is linked with City of Scottsdale's city-wide SCADA system. The program logic associated with the SCADA system is secure and only accessible by authorized personnel. Changes to the program can only be made after review and acceptance by City of Scottsdale and the NIBW PCs.

The City of Scottsdale Water Resources Department uses a city-wide preventative maintenance program for all equipment operated by the water operations staff. This program maintains a service record database for each piece of equipment and alerts the technicians when routine preventative maintenance is necessary. Service records for all the primary equipment at NGTF were available for review at the time of the inspection.

The treatment facility site comprises approximately one and a half acres surrounded by a masonry block wall, with a main vehicle entry gate and two walk-through gates. NGTF has a maximum hydraulic capacity of approximately 4,400 gpm.

4.5.1 Notable Events at NGTF in 2021

On September 16, 2020, the pump in well PCX-1 failed. The pump was replaced by SRP and start-up occurred on January 5, 2021. On January 21, 2021, the pump motor failed. The pump motor was replaced, and the system was operational on February 8, 2021. No other notable events occurred at NGTF in 2021. NGTF was used for treatment of water from well PG-41MA/LA between May 10, 2021 and June 1, 2021, during testing of the well. NGTF was not available for treatment of water from well PCX-1 during that time.

4.5.2 NGTF Maintenance and Condition

NGTF is maintained by a City of Scottsdale water treatment operator. City of Scottsdale operations personnel also monitor the status of NGTF remotely. Operators make minimum daily inspections of the equipment and grounds at NGTF. The operator maintains operations logs and data spreadsheets at the facility. The logs and spreadsheets were presented for review by the inspection team during the site inspection.

During the inspection, the facility appeared clean and well maintained with no apparent leaks or deterioration during the inspection. The equipment was clean and in good condition. The piping, valves, and instrumentation labeling appeared complete and intact. All piping appeared in good condition without leaks or corrosion.

The process control system is monitored continuously. Instruments are checked and calibrated in accordance with the manufacturers' instructions by City of Scottsdale instrument technicians. Maintenance is scheduled and performed through City of Scottsdale's city-wide preventive maintenance system.

NGTF was available for treatment of extracted groundwater greater than 95% of the time in 2021.

4.5.3 Results

Based on the 2021 inspection and a review of operating and monitoring data, NGTF has consistently met performance criteria set forth in the Amended CD.

No treatment performance problems, hazards, significant deterioration, or equipment malfunctions were apparent in 2021.

5 O&M DOCUMENT REVISIONS

The NIBW PCs updated and submitted the treatment system O&M Plans for Area 7 GWETS, Area 12 GWETS, MRTF, and NGTF on February 28, 2020. EPA provided comments on the NIBW PCs' O&M Plans and City of Scottsdale's 2018 CGTF O&M Plan on April 30, 2020. Revisions to the O&M Plans were made based on EPA comments. Based on EPA comments, the NIBW PCs and City of Scottsdale revised and resubmitted its treatment system O&M Plans on June 19, 2020.

The NIBW PCs updated and submitted the treatment system CERPS for Area 7 GWETS, Area 12 GWETS, MRTF, and NGTF on August 31, 2020. City of Scottsdale submitted its updated CGTF CERP on September 3, 2020. EPA provided its comments on the treatment system CERPs on October 5, 2020. The NIBW PCs revised the CERPs for Area 7 GWETS, Area 12 GWETS, MRTF, and NGTF on December 31, 2020.

In November 2020, Gilbane (EPA's then oversight contractor) indicated that it had no further comments on the revised O&M Plans. EPA, however, provided additional comments to the Area 7 O&M Plan and CERP on January 26, 2021, and the Area 12 O&M Plan and CERP on February 9, 2021. Further revisions to the O&M Plans are pending completion of the optimization study.

The NIBW Groundwater Extraction Well O&M Plan was submitted to EPA on August 28, 2020. Revisions were made to the document based on EPA's comments and the document was resubmitted to EPA February 2, 2021. The NIBW Groundwater Monitoring Well O&M Plan was submitted to EPA on March 11, 2021.

6 RECOMMENDATIONS

Finalize the treatment system and well O&M Plans into the Sitewide O&M Plan in accordance with the NIBW Statement of Work.

APPENDIX I
4TH QUARTER DATA REPORT

QUARTERLY REPORT

October through December 2021

North
Indian Bend Wash
Superfund Site

Prepared for:

U.S. Environmental Protection Agency

Region IX

Prepared by:

NIBW Participating Companies

February 28, 2022

North Indian Bend Wash Superfund Site

QUARTERLY REPORT

October – December 2021

North Indian Bend Wash Superfund Site

Scottsdale, Arizona

February 28, 2022

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Tables

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Appendix

1 INTRODUCTION

This Quarterly Report (Report) summarizes the remedial activities performed and data collected at the North Indian Bend Wash (NIBW) Superfund Site (Site) during October through December 2021 (the reporting period) by the NIBW Participating Companies (PCs) pursuant to the Amended Consent Decree, CV-91-1835-PHX-FJM (Amended CD), entered by the U.S. District Court on June 5, 2003. A detailed summary of the components and work requirements of the remedial action program can be found in the Record of Decision Amendment – Final Operable Unit, Indian Bend Wash Area, dated September 27, 2001, and the Statement of Work (SOW), Appendix A to the Amended CD. Remedial activities are conducted to address constituents of concern (COCs) in groundwater at the Site.

2 GROUNDWATER MONITORING AND EVALUATION PROGRAM

During the reporting period, the NIBW PCs conducted sampling and analysis of monitoring and extraction wells according to requirements specified in the Groundwater Monitoring and Evaluation Plan (GM&EP), dated October 8, 2002. The U.S. Environmental Protection Agency (EPA) approved the GM&EP on the same date. The GM&EP and associated Phase I Sampling and Analysis Plan supersede all previous groundwater monitoring requirements in the Operable Unit-1 (OU-1) and OU-2 Consent Decrees. The NIBW PCs are currently working with EPA and other Technical Committee members to prepare an updated GM&EP to ensure that monitoring, analysis, and reporting requirements are protective and relevant.

During the reporting period, NIBW PCs' contractors collected groundwater samples from monitoring wells and remedial extraction wells, as shown in **Table 1**. Wells that were sampled during the reporting period are shown on **Figure 1**. The NIBW COCs are: trichloroethene (TCE), tetrachloroethene (PCE), 1,1,1-trichloroethane (TCA), 1,1-dichloroethene (DCE), and chloroform. All samples are analyzed by Eurofins TestAmerica (TestAmerica) per EPA method 524.2 for drinking water. Results for all COCs are included in the tables in **Appendix A**. TCE is the principal COC for NIBW; results for TCE are given in the tables included in the report.

Sample counts for monitoring wells (by hydrologic unit) and extraction wells (by treatment system) are summarized in **Table 1**. Sampling details for the reporting period are summarized in **Appendix A**. **Table A-1** lists all wells scheduled for sampling during the reporting period as part of the NIBW monitoring program and indicates which aquifer unit(s) the wells are designed to monitor, the sampling frequency for each well, and comments regarding why any specific wells were not sampled as planned. A summary of results for groundwater samples collected from monitoring wells, pursuant to the GM&EP, during the reporting period is provided in **Table A-2**. A summary of results for groundwater samples collected from extraction wells, pursuant to the GM&EP, during the reporting period is provided in **Table A-3**.

Table 1. Groundwater Monitoring Summary

Number of Wells Sampled	Well Type	Hydrologic Unit	Treatment System	Contractor
22	Monitoring Well	UAU	---	Verdad / M&A
35	Monitoring Well	MAU	---	Verdad / M&A
24	Monitoring Well	LAU	---	Verdad / M&A
3	Monitoring Well	MAU/LAU	---	Verdad
0 [(A)]	Extraction Well	---	Area 7 GWETS	EnSolutions
2	Extraction Well	---	Area 12 GWETS	EnSolutions
2	Extraction Well	---	MRTF	EnSolutions
1	Extraction Well	---	NGTF	EnSolutions
1	Extraction Well	---	CGTF	EnSolutions
90	All Wells			

Notes:
(A) Area 7 GWETS did not operate in the fourth quarter; thus, no samples were obtained.

CGTF = Central Groundwater Treatment Facility
GWETS = Groundwater Extraction and Treatment System
LAU = Lower Alluvium Unit
MAU = Middle Alluvium Unit
MRTF = Miller Road Treatment Facility
NGTF = NIBW Granular Activated Carbon (GAC) Treatment Facility
UAU = Upper Alluvium Unit

Figure 1. Location Map

3 GROUNDWATER REMEDIATION PROGRAM

The NIBW remedy provides for containment of the Middle Alluvium Unit (MAU) / Lower Alluvium Unit (LAU) plumes through a groundwater extraction and treatment program. Treatment occurs at MRTF, NGTF, CGTF, and Area 7 and Area 12 GWETSs. Locations of the groundwater treatment facilities and their corresponding extraction wells are shown on **Figure** 1. The NIBW PCs are responsible for compliance monitoring and reporting for MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS. This Report provides a summary of operations and data collected for these 4 facilities during the reporting period. The City of Scottsdale owns and operates CGTF and reports the results of compliance testing and plant operations for this facility directly to EPA and Arizona Department of Environmental Quality (ADEQ). EPCOR Water USA (EPCOR) owns and operates MRTF. A summary of the treatment system monitoring data for MRTF, NGTF, Area 7, and Area 12 facilities for October through December 2021 is provided in **Table A-4**.

3.1 Groundwater Remediation at MRTF

MRTF achieved performance standards specified in the SOW during the reporting period by consistently treating groundwater to reduce NIBW COC concentrations safely below Treatment Standards. During the reporting period, groundwater from wells PV-14 and PV-15 was treated at MRTF by EPCOR and primarily delivered to the Paradise Valley Arsenic Removal Facility (PVARF) for subsequent distribution by EPCOR for drinking water use. If operating on the scheduled monitoring dates, monthly samples of groundwater from wells PV-14 and PV-15 were collected by the NIBW PCs and analyzed by TestAmerica. A summary of analytical results for extraction wells PV-14 and PV-15, in micrograms per liter (μg/L), is included in **Table** 2.

Table 2. MRTF Groundwater & Treatment System Monitoring
(TCE in μg/L)

Sample Date	PV-14	PV-15	Tower 1 Effluent	Tower 2 Effluent	Tower 3 Effluent
10/02/2021	0.54	4.1	---	<0.50	<0.50
11/01/2021	0.54	4.5	---	<0.50	<0.50
12/01/2021	<0.50	4.5	---	<0.50	<0.50

Note:
All samples collected by EnSolutions

In addition to the routine monitoring of extraction wells conducted pursuant to the GM&EP, the NIBW PCs ordinarily conduct supplemental sampling at wells PV-11 and PV-12B (if operating on the scheduled monthly sampling date). During the quarter, results of laboratory analyses indicated no detectable concentrations of COCs in the samples obtained from well PV-11 on

October 4, November 1, and December 1, 2021, or from well PV-12B on October 4, and November 1, 2021.

MRTF operated the entire reporting period. The total volume of groundwater extracted and treated at MRTF during the reporting period was approximately 548.7 million gallons (MG). Of this total, 271.6 MG was produced from well PV-14 and approximately 277 MG was produced from well PV-15. None of the treated water was discharged to the Salt River Project (SRP) Arizona Canal during the reporting period. An estimated 11 pounds of TCE were removed from groundwater treated at MRTF during the reporting period.

3.2 Groundwater Remediation at NGTF

NGTF achieved performance standards specified in the SOW during the reporting period by consistently treating groundwater to reduce NIBW COC concentrations below Treatment Standards. Treated water from the treatment system can be discharged to the City of Scottsdale Chaparral Water Treatment Plant (CWTP) and/or the Arizona Canal under the NGTF Arizona Pollutant Discharge Elimination System (AZPDES) permit; for the reporting period, about 117.6 MG of treated water was discharged to the CWTP and 151.5 MG of treated water was discharged to the Arizona Canal. For treated water discharged to the Arizona Canal, samples were collected at the Arizona Canal outfall for analyses required by the AZPDES permit. The results of sample analyses were summarized in monthly Discharge Monitoring Reports (DMRs) and submitted directly to EPA and ADEQ under separate cover.

During the reporting period, samples were collected monthly from NGTF extraction well PCX-1 by EnSolutions and analyzed for NIBW COCs by TestAmerica.

Compliance monitoring was performed in accordance with the SOW to verify removal of volatile organic compounds (VOCs) from the extracted groundwater and assure Treatment Standards were achieved. Treatment system samples were collected by the Operator and submitted to TestAmerica for analysis of NIBW COCs.

Results of TCE analyses for groundwater monitoring and treatment system samples collected during the reporting period are included in the following tables.

Table 3. NGTF Groundwater Monitoring

(TCE in μg/L)

Date	PCX-1
10/02/2021	38
11/02/2021	59
12/01/2021	40

Table 4. NGTF Treatment System Monitoring

(TCE in μg/L)

	Influent	Effluent
Week of:	NGTF-INF[a]	AZCO[b] or CHAP-CP[c]
Oct 04-08	---	<0.50
Oct 11-15	---	<0.50
Oct 18-22	---	<0.50
Oct 25-29	---	<0.50
Nov 01-05	---	<0.50
Nov 08-12	---	<0.50
Nov 15-19	---	<0.50
Nov 22-26	---	<0.50
Nov 29-Dec 03	---	<0.50
Dec 06-10	---	<0.50
Dec 13-17	---	<0.50
Dec 20-24	---	<0.50
Dec 27-31	---	<0.50

[a] Results for influent samples, if obtained, from NGTF are not compliance data; however, they are included here for completeness when obtained. Extraction well PCX-1 is not accessible for wellhead sampling. Samples for the well are obtained at the NGTF pipeline, just a few feet away from the sample port for the NGTF influent. These samples meet the compliance requirements for monitoring influent to the treatment plant, therefore, beginning in July 2018, the redundant NGTF influent samples are no longer obtained.

[b] AZCO = Discharge to Arizona Canal

[c] CHAP-CP = Discharge to City of Scottsdale Chaparral Water Treatment Plant

NGTF was available for treatment of groundwater the entire reporting period. The total volume of groundwater extracted from well PCX-1 and treated at NGTF during the reporting period was approximately 269.6 MG, and an estimated 103 pounds of TCE were removed.

3.3 Groundwater Remediation at Area 7 GWETS

NIBW Area 7 GWETS was not in operation during the reporting period due to communication system failure. On July 22, the system went offline due to severe electrical storms in the area. Following diagnostic tests, the NIBW PCs elected to upgrade the drives and communications system for Area 7 GWETS. Worldwide shipping delays related to the COVID-19 pandemic have postponed delivery of new equipment. Installation and start-up are anticipated to occur in the first half of 2022. Area 7 GWETS was offline and compliance monitoring could not be conducted during the 4th quarter of 2021.

Table 5. Area 7 Groundwater Monitoring
(TCE in µg/L)

Date	7EX-3aMA	7EX-4MA	7EX-6MA
October - December	Area 7 GWETS offline; no samples collected		

Note:
Area 7 GWETS did not operate in the fourth quarter; thus, no samples were obtained.

Table 6. Area 7 Treatment System Monitoring
(TCE in µg/L)

Date	GWETS Influent @ SP-102	UV/Ox Effluent @ SP-103	Air/Stripper Effluent @ SP-105
October - December	Area 7 GWETS offline; no samples collected		

Notes:
UV/Ox = Ultraviolet/Oxidation Reactor
Area 7 GWETS did not operate in the fourth quarter; thus, no samples were obtained.

No groundwater was extracted, treated, or injected and no TCE was removed during the 4th quarter of 2021.

3.4 Groundwater Remediation at Area 12 GWETS

NIBW Area 12 GWETS achieved performance standards specified in the SOW during the reporting period by consistently treating groundwater to reduce NIBW COC concentrations below Treatment Standards prior to discharge to an SRP irrigation lateral. Compliance monitoring was performed in accordance with the SOW to verify removal of VOCs from the extracted groundwater and assure groundwater treatment standards are achieved.

During the reporting period, treatment system samples were collected each month and submitted to TestAmerica for analysis of NIBW COCs. Treatment system samples included combined influent to Area 12 GWETS at sample port WSP-1 and effluent from Area 12 GWETS at sample port WSP-2. Area 12 extraction well samples were collected by the Operator, EnSolutions, on a monthly basis when the wells were operational, and submitted to TestAmerica for analysis.
The results of TCE analyses of samples obtained by the NIBW PCs for groundwater and process water monitoring are included in **Table 7**.

Table 7. Area 12 Groundwater and Treatment System Monitoring
(TCE in μg/L)

Date	MEX-1MA (SRP 23.1E6N)	Granite Reef Well (SRP 23.6E6N)	GWETS Influent WSP-1	GWETS Effluent WSP-2
10/02/2021	40	97	63/74	---
10/04/2021	---	---	---	<0.50
11/01/2021	45	110	77/81	<0.50
12/01/2021	47	100	73/79	<0.50

Treated groundwater from Area 12 discharges to the SRP distribution system for irrigation use and is regulated by an AZPDES permit. Samples were collected at the outfall to the irrigation lateral for analyses required by the permit. The results of the sample analyses were summarized in monthly DMRs and submitted directly to EPA and ADEQ under separate cover.

Area 12 GWETS operated most of the reporting period, except during routine preventative maintenance and short-term weather-related power outages. During the reporting period, Area 12 GWETS operated with both wells MEX-1 and Granite Reef pumping. The total volume of groundwater extracted and treated at Area 12 GWETS during the reporting period was approximately 167.5 MG. Performance data provided by the Area 12 GWETS Operator indicated an estimated 98 pounds of TCE were removed from the treated groundwater.

3.5 Groundwater Remediation Summary

Table 8 presents the volume of groundwater treated at each facility, as well as the estimated pounds of TCE removed from groundwater via treatment, both for the reporting period and cumulatively for the year (i.e., year-to-date).

Table 8. Summary of Groundwater Treatment and TCE Removal

Treatment System	Volume of Groundwater Treated (MG)	Estimated Pounds of TCE Removed (4Q21)	Cumulative Pounds of TCE Removed (YTD 2021)
MRTF	548.7	11	48
NGTF	269.6	103	377
Area 7 GWETS	0	0	301
Area 12 GWETS	167.5	98	526

Notes:
MG = million gallons
4Q21 = fourth quarter (October through December) 2021
YTD = year to date

4 MEETINGS AND OTHER EVENTS

Representatives of the NIBW Technical Committee held meetings by teleconference on October 21 and November 16 to coordinate ongoing NIBW remedial action efforts.

5 DOCUMENTS SUBMITTED BY NIBW PCS DURING THE REPORTING PERIOD

During the reporting period, from October through December 2021, the NIBW PCs provided EPA with the following documents.

NIBW Technical Committee Meeting Minutes – September 21, 2021, electronic mail submitted by NIBW PCs on October 19, 2021.

Copy of November 3, 2021 Presentation to Technical Committee on Results of Predictive Modeling for Baseline, Optimization, Worst-Case, and Drought Scenarios – electronic mail submitted by NIBW PCs on November 11, 2021.

Results of Testing at Monitor Well PG-41MA/LA, May 2021, technical memorandum submitted by NIBW PCs on November 19, 2021

NIBW Participating Companies Comments on EPA Third Five-Year Review of IBW Site, electronic mail submitted by NIBW PCs on November 21, 2021.

NIBW Quarterly Report – July through September 2021, electronic mail submitted by NIBW PCs on November 29, 2021.

NIBW Indoor Air and VI Mitigation Reports to EPA – 2021 – electronic mail submitted by NIBW PCs on December 1, 2021

NIBW Technical Committee Meeting Minutes – October 21, 2021, electronic mail submitted by NIBW PCs on December 2, 2021.

NIBW Technical Committee Meeting Minutes – November 16, 2021, electronic mail submitted by NIBW PCs on December 17, 2021.

APPENDIX A
WATER QUALITY DATA

Table A-1. Sampling Matrix - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona

WELL IDENTIFICATION	AQUIFER UNIT	SAMPLING FREQUENCY	COMMENTS
COS-31	MAU/LAU	Monthly	Not sampled during Quarter because the well was offline on the scheduled sampling dates
COS-71A	MAU/LAU	Monthly	Not sampled during Quarter because the well was offline on the scheduled sampling dates; COS has removed this well from the remedial pumping priority list due to inorganic water quality
COS-72	MAU/LAU	Monthly	Not sampled during Quarter because the well was offline on the scheduled sampling dates
COS-75A	LAU	Monthly	---
PCX-1	LAU	Monthly	---
PV-14	LAU	Monthly	---
PV-15	MAU/LAU	Monthly	---
MEX-1MA	MAU	Quarterly	---
Granite Reef	MAU	Quarterly	---
7EX-3aMA	MAU	Quarterly	Not sampled during Quarter because the well was offline on the scheduled sampling dates
7EX-4MA	MAU	Quarterly	Not sampled during Quarter because the well was offline on the scheduled sampling dates; Area 7 GWETS presently operating without well 4MA
7EX-6MA	MAU	Quarterly	Not sampled during Quarter because the well was offline on the scheduled sampling dates
B-J	UAU	Annually	---
D-2MA	MAU	Quarterly	---
E-1MA	MAU	Quarterly	---
E-5MA	MAU	Quarterly	---
E-5UA	UAU	Annually	---
E-7LA	LAU	Annually	---
E-7UA	UAU	Annually	---
E-8MA	MAU	Annually	---
E-10MA	MAU	Quarterly	---
E-12UA	UAU	Annually	---
E-13UA	UAU	Annually	---
M-2MA	MAU	Annually	---
M-2UA	UAU	Annually	---
M-4MA	MAU	Quarterly	---
M-5LA	LAU	Annually	---
M-5MA	MAU	Quarterly	---
M-6MA	MAU	Quarterly	---
M-7MA	MAU	Annually	---
M-9MA	MAU	Annually	---
M-10LA2	LAU	Annually	---
M-10MA2	MAU	Quarterly	---
M-11MA	MAU	Annually	---
M-12MA2	MAU	Annually	---
M-14LA	LAU	Annually	---
M-15MA	MAU	Quarterly	---
M-16LA	LAU	Annually	---
M-16MA	MAU	Annually	---
M-17MA/LA	MAU/LAU	Quarterly	---

Table A-1. Sampling Matrix - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona

WELL IDENTIFICATION	AQUIFER UNIT	SAMPLING FREQUENCY	COMMENTS
PA-2LA	LAU	Annually	---
PA-5LA	LAU	Quarterly	---
PA-6LA	LAU	Quarterly	---
PA-8LA2	LAU	Annually	---
PA-9LA	LAU	Annually	---
PA-10MA	MAU	Quarterly	---
PA-11LA	LAU	Annually	---
PA-12MA	MAU	Quarterly	---
PA-13LA	LAU	Quarterly	---
PA-15LA	LAU	Annually	---
PA-16MA	MAU	Annually	---
PA-18LA	LAU	Annually	---
PA-19LA	LAU	Annually	---
PA-20MA	MAU	Annually	---
PA-21MA	MAU	Annually	---
PG-1LA	LAU	Quarterly	---
PG-2LA	LAU	Semi-Annually	---
PG-4MA	MAU	Annually	---
PG-4UA	UAU	Annually	---
PG-5MA	MAU	Annually	---
PG-5UA	UAU	Annually	---
PG-6MA	MAU	Annually	---
PG-6UA	UAU	Annually	---
PG-7MA	MAU	Annually	---
PG-8UA	UAU	Annually	---
PG-10UA	UAU	Annually	---
PG-11UA	UAU	Annually	---
PG-16UA	UAU	Annually	---
PG-18UA	UAU	Annually	---
PG-19UA	UAU	Annually	---
PG-22UA	UAU	Annually	---
PG-23MA/LA	MAU/LAU	Annually	---
PG-23UA	UAU	Annually	---
PG-24UA	UAU	Annually	---
PG-25UA	UAU	Annually	---
PG-28UA	UAU	Annually	---
PG-29UA	UAU	Annually	---
PG-31UA	UAU	Annually	---
PG-38MA/LA	MAU/LAU	Annually	---
PG-39LA	LAU	Annually	---
PG-40LA	LAU	Quarterly	---
PG-42LA	LAU	Quarterly	---

Table A-1. Sampling Matrix - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona

WELL IDENTIFICATION	AQUIFER UNIT	SAMPLING FREQUENCY	COMMENTS
PG-43LA	LAU	Quarterly	---
PG-44LA	LAU	Quarterly	---
PG-48MA	MAU - Lower	Quarterly	---
PG-49MA	MAU - Lower	Annually	---
PG-50MA	MAU - Lower	Annually	---
PG-54MA	MAU - Lower	Annually	---
PG-55MA	MAU - Lower	Annually	---
PG-56MA	MAU - Lower	Annually	---
S-1LA	LAU	Annually	---
S-1MA	MAU	Annually	---
S-2LA	LAU	Quarterly	---
S-2MA	MAU	Annually	---
W-1MA	MAU	Quarterly	---
W-2MA	MAU	Quarterly	---

EXPLANATION:

UAU = Upper Alluvium Unit

MAU = Middle Alluvium Unit

LAU = Lower Alluvium Unit

Table A-2. Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	6	6	5	5	
MON	B-J	B-J	10/19/2021	Original	TA	<0.50	<0.50	0.92	<0.50	1.2	550-172707
MON	D-2MA	D-2MA	10/12/2021	Original	TA	<0.50	<0.50	1.5	<0.50	34	550-172250
MON	E-1MA	E-1MA	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.8	550-172459
MON	E-5MA	E-5MA	10/13/2021	Original	TA	<0.50	<0.50	2.5	0.77	47	550-172352
MON	E-5UA	E-5UAHS	10/14/2021	Original	TA	<0.50	<0.50	0.57	<0.50	5.0	550-172459
MON	E-7LA	E-7LA	10/13/2021	Original	TA	<0.50	<0.50	1.1	2.0	14	550-172352
MON	E-7UA	E-7UAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.1	550-172352
MON	E-8MA	E-8MA	10/13/2021	Original	TA	<0.50	<0.50	1.1	<0.50	23	550-172352
MON	E-10MA	E-10MAHS	10/14/2021	Original	TA	<0.50	<0.50	0.67	2.5	5.3	550-172459
MON	E-12UA	E-12UAHS	10/21/2021	Original	TA	<0.50	<0.50	0.59	<0.50	1.5	550-172897
MON	E-13UA	E-13UAHS	11/24/2021	Original	TA	<0.50	<0.50	0.92	<0.50	1.6	550-174831
MON	M-2MA	M-2MAHS	10/7/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	3.8	550-171985
MON	M-2MA	O	10/7/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	4.3	550-171985
MON	M-2UA	M-2UAHS	11/24/2021	Original	TA	<0.50	<0.50	1.2	<0.50	0.80	550-174831
MON	M-4MA	M-4MAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	0.53	12	550-172459
MON	M-5LA	M-5LA	10/19/2021	Original	TA	<0.50	<0.50	1.6	<0.50	1.6	550-172707
MON	M-5MA	M-5MA	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.7	550-172459
MON	M-6MA	M-6MA	10/14/2021	Original	TA	<0.50	<0.50	1.3	0.56	22	550-172459
MON	M-7MA	M-7MA	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
MON	M-9MA	M-9MA	12/16/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.4	550-175943
MON	M-9MA	AE	12/16/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	2.6	550-175943
MON	M-10LA2	M-10LA2HS	10/7/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	3.2	550-171985
MON	M-10MA2	M-10MA2	10/18/2021	Original	TA	<0.50	0.51	0.78	0.61	27	550-172596
MON	M-11MA	M-11MA	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
MON	M-12MA2	M-12MA2	10/18/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	13	550-172596
MON	M-14LA	M-14LAHS	10/21/2021	Original	TA	<0.50	<0.50	<0.50	1.1	6.4	550-172897
MON	M-15MA	M-15MA	10/20/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.8	550-172796
MON	M-16LA	M-16LAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	0.86	8.4	550-172459
MON	M-16MA	M-16MA	10/18/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	5.2	550-172596
MON	M-17MA/LA	M-17MA/LAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	PA-2LA	PA-2LA	10/25/2021	Original	TA	<0.50	<0.50	1.0	<0.50	<0.50	550-173016
MON	PA-2LA	AC	10/25/2021	Duplicate	TA	<0.50	<0.50	0.99	<0.50	<0.50	550-173016
MON	PA-5LA	PA-5LA	10/12/2021	Original	TA	<0.50	<0.50	2.8	2.0	44	550-172252
MON	PA-6LA	PA-6LAHS	10/13/2021	Original	TA	<0.50	1.4	<0.50	4.0	44	550-172351
MON	PA-8LA2	PA-8LA2	10/18/2021	Original	TA	<0.50	<0.50	0.99	0.98	6.4	550-172596
MON	PA-8LA2	W	10/18/2021	Duplicate	TA	<0.50	<0.50	1.0	0.93	6.1	550-172596
MON	PA-9LA	PA-9LAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	PA-10MA	PA-10MAHS	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	14	550-172897

Table A-2. Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	6	6	5	5	
MON	PA-10MA	Z	10/21/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	13	550-172897
MON	PA-11LA	PA-11LA	10/19/2021	Original	TA	<0.50	<0.50	1.4	<0.50	<0.50	550-172707
MON	PA-12MA	PA-12MA	10/13/2021	Original	TA	<0.50	<0.50	0.68	2.8	240	550-172352
MON	PA-13LA	PA-13LA	10/22/2021	Original	TA	<0.50	<0.50	1.4	0.69	61	550-172952
MON	PA-13LA	AB	10/22/2021	Duplicate	TA	<0.50	<0.50	1.5	0.60	59	550-172952
MON	PA-15LA	PA-15LAHS	10/21/2021	Original	TA	<0.50	<0.50	0.60	0.50	<0.50	550-172897
MON	PA-16MA	PA-16MAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.0	550-172352
MON	PA-18LA	PA-18LAHS	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
MON	PA-19LA	PA-19LA	10/19/2021	Original	TA	<0.50	<0.50	1.1	1.1	25	550-172707
MON	PA-20MA	PA-20MA	10/19/2021	Original	TA	<0.50	0.51	1.1	3.0	48	550-172707
MON	PA-21MA	PA-21MAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172459
MON	PG-1LA	PG-1LA	10/18/2021	Original	TA	<0.50	<0.50	1.5	<0.50	0.80	550-172597
MON	PG-2LA	PG-2LA	10/11/2021	Original	TA	<0.50	<0.50	1.1	0.91	80	550-172134
MON	PG-2LA	P	10/11/2021	Duplicate	TA	<0.50	<0.50	1.1	1.1	92	550-172134
MON	PG-4MA	PG-4MA	10/15/2021	Original	TA	<0.50	<0.50	0.76	<0.50	2.2	550-172520
MON	PG-4UA	PG-4UAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	0.76	<0.50	550-172352
MON	PG-5MA	PG-5MAHS	11/24/2021	Original	TA	<0.50	<0.50	0.66 (A)	<0.50	9.1 (A)	550-174831
MON				*Lab dup*		<0.50	<0.50	0.58 (A)	<0.50	9.0 (A)	
MON				*Lab dup*		<0.50	<0.50	<0.50 (A)	<0.50	7.8 (A)	
MON	PG-5MA	AD	11/24/2021	Duplicate	TA	<0.50	<0.50	<0.50 (A)	<0.50	6.1 (A)	550-174831
MON				*Lab dup*		<0.50	<0.50	<0.50 (A)	<0.50	4.9 (A)	
MON				*Lab dup*		<0.50	<0.50	<0.50 (A)	<0.50	3.9 (A)	
MON	PG-5UA	PG-5UAHS	11/24/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.8	550-174831
MON	PG-6MA	PG-6MA	10/13/2021	Original	TA	<0.50	0.99	2.5	3.2	100	550-172352
MON	PG-6MA	R	10/13/2021	Duplicate	TA	<0.50	0.91	2.7	3.2	95	550-172352
MON	PG-6UA	PG-6UA	10/15/2021	Original	TA	<0.50	<0.50	0.80	<0.50	0.66	550-172520
MON	PG-6UA	V	10/15/2021	Duplicate	TA	<0.50	<0.50	0.83	<0.50	0.66	550-172520
MON	PG-7MA	PG-7MA	10/15/2021	Original	TA	<0.50	<0.50	1.1	<0.50	1.7	550-172520
MON	PG-8UA	PG-8UA	10/19/2021	Original	TA	<0.50	<0.50	0.84	<0.50	<0.50	550-172707
MON	PG-10UA	PG-10UA	10/21/2021	Original	TA	<0.50	<0.50	1.3	<0.50	1.2	550-172897
MON	PG-10UA	AA	10/21/2021	Duplicate	TA	<0.50	<0.50	1.5	<0.50	1.4	550-172897
MON	PG-11UA	PG-11UAHS	10/21/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
MON	PG-16UA	PG-16UA	10/19/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.2	550-172707
MON	PG-18UA	PG-18UA	10/15/2021	Original	TA	<0.50	<0.50	1.2	<0.50	0.87	550-172520
MON	PG-19UA	PG-19UA	10/21/2021	Original	TA	<0.50	<0.50	0.78	<0.50	1.8	550-172897
MON	PG-22UA	PG-22UAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	2.4	550-172459
MON	PG-23MA/LA	PG-23MA/LA	10/14/2021	Original	TA	<0.50	<0.50	1.2	1.1	13	550-172459
MON	PG-23MA/LA	T	10/14/2021	Duplicate	TA	<0.50	<0.50	1.3	1.2	14	550-172459

Table A-2. Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	6	6	5	5	
MON	PG-23UA	PG-23UAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	PG-24UA	PG-24UAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	PG-25UA	PG-25UAHS	10/20/2021	Original	TA	<0.50	<0.50	0.71	<0.50	1.2	550-172796
MON	PG-28UA	PG-28UA	10/12/2021	Original	TA	<0.50	<0.50	1.7	<0.50	0.82	550-172250
MON	PG-29UA	PG-29UA	10/19/2021	Original	TA	<0.50	<0.50	0.53	<0.50	0.58	550-172707
MON	PG-31UA	PG-31UAHS	10/7/2021	Original	TA	<0.50	<0.50	2.9	<0.50	7.6	550-171985
MON	PG-38MA/LA	PG-38MA/LAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	2.3 (B)	0.70 (B)	550-172352
MON	PG-38MA/LA	S	10/13/2021	Duplicate	TA	<0.50	<0.50	0.60	3.1 (B)	0.86 (B)	550-172352
MON	PG-39LA	PG-39LA	10/14/2021	Original	TA	<0.50	<0.50	0.96	1.3	2.2	550-172459
MON	PG-40LA	PG-40LA	10/20/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	9.8	550-172797
MON	PG-40LA	Y	10/20/2021	Duplicate	TA	<0.50	<0.50	<0.50	<0.50	11	550-172797
MON	PG-42LA	PG-42LA	10/20/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	1.0	550-172797
MON	PG-43LA	PG-43LAHS	10/14/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172457
MON	PG-44LA	PG-44LA	10/20/2021	Original	TA	<0.50	<0.50	3.5	<0.50	<0.50	550-172797
MON	PG-48MA	PG-48MA	10/14/2021	Original	TA	<0.50	<0.50	0.68	<0.50	14	550-172459
MON	PG-49MA	PG-49MAHS	10/20/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172796
MON	PG-50MA	PG-50MAHS	10/22/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172953
MON	PG-54MA	PG-54MA	10/14/2021	Original	TA	<0.50	<0.50	0.81	<0.50	17	550-172459
MON	PG-54MA	U	10/14/2021	Duplicate	TA	<0.50	<0.50	0.81	<0.50	18	550-172459
MON	PG-55MA	PG-55MA	10/22/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	0.78	550-172953
MON	PG-56MA	PG-56MA	10/21/2021	Original	TA	<0.50	<0.50	0.59	<0.50	2.2	550-172897
MON	S-1LA	S-1LA	10/19/2021	Original	TA	<0.50	<0.50	1.5	49	<0.50	550-172707
MON	S-1LA	X	10/19/2021	Duplicate	TA	<0.50	<0.50	1.5	42	<0.50	550-172707
MON	S-1MA	S-1MAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	5.1	<0.50	550-172352
MON	S-2LA	S-2LA	10/12/2021	Original	TA	<0.50	<0.50	0.51	<0.50	15	550-172252
MON	S-2LA	Q	10/12/2021	Duplicate	TA	<0.50	<0.50	0.52	<0.50	17	550-172252
MON	S-2MA	S-2MAHS	10/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
MON	W-1MA	W-1MA	10/12/2021	Original	TA	<0.50	<0.50	1.2	2.1	400	550-172250
MON	W-2MA	W-2MA	10/12/2021	Original	TA	<0.50	0.59	1.2	11	2700	550-172250

Table A-2. Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	*6*	*6*	*5*	*5*	
--	QC	FRB(Trip)	10/7/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171985
--	QC	FRB (Trip)	10/11/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172134
--	QC	FRB (Trip)	10/12/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172250
--	QC	FRB (Trip)	10/13/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172352
--	QC	FRB (Trip)	10/14/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172459
--	QC	FRB (Trip)	10/15/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172520
--	QC	FRB (Trip)	10/18/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172596
--	QC	FRB (Trip)	10/19/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172707
--	QC	FRB (Trip)	10/20/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172796
--	QC	FRB (Trip)	10/21/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172897
--	QC	FRB (Trip)	10/22/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172952
--	QC	FRB (Trip)	10/25/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173016
--	QC	FRB (Trip)	11/24/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174831
--	QC	FRB (TRIP)	12/16/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175943

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene

FRB = Field Reagent Blank (Trip Blank)
ID = Identifier
Lab dup = Laboratory duplicate
MON = Monitoring
QC = Quality Control

RPD = Relative Percent Difference
TA = Eurofins TestAmerica
TB = Trip Blank
VOC = Volatile Organic Compound

NOTES:

<0.50	Analytical result is less than laboratory detection limit (Non-Detect)
5	Cleanup Standards for Treated Water (µg/L)
5.1	Results in **bold** exceed Cleanup Standard for Treated Water

(A) Original and field duplicate sample results had >20% RPD. Re-analyses do not confirm either result as an outlier, so all results are reported here.

(B) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to low concentration range of analyte.

Table A-3. Laboratory Results For VOCs In Groundwater Extraction Wells - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
AREA 7 GWETS											
Area 7 GWETS down for maintenance during Quarter 4											
CGTF											
Extraction	COS-75A	COS-75A	10/2/2021	Original	TA	<0.50	<0.50	1.7 (A)	5.6 (A)	31 (B)	550-171583
Extraction	COS-75A	EXT-1A-10022021	10/2/2021	Duplicate	TA	<0.50	<0.50	1.3 (A)	3.2 (A)	25 (B)	550-171583
Extraction	COS-75A	COS-75A	11/1/2021	Original	TA	<0.50	0.55	1.7	4.2	31	550-173380
Extraction	COS-75A	EXT-1A-11012021	11/1/2021	Duplicate	TA	<0.50	0.51	1.7	4.4	31	550-173380
Extraction	COS-75A (C)	COS-75A	12/28/2021	Original	TA	<0.50	0.65	1.9	6.4	32	550-176389
Extraction	COS-75A (C)	EXT-1A-12282021	12/28/2021	Duplicate	TA	<0.50	0.63	1.9	6.2	31	550-176389
AREA 12 GWETS											
Extraction	MEX-1MA	MEX-1-1A-10022021	10/2/2021	Original	TA	<0.50	1.1	1.4	1.6	40	550-171576
Extraction	MEX-1MA	MEX-1-1A-11012021	11/1/2021	Original	TA	<0.50	1.2	1.6	2.1	45	550-173381
Extraction	MEX-1MA	MEX-1-1A-12012021	12/1/2021	Original	TA	<0.50	1.0	1.6	2.1	47	550-175024
Extraction	Granite Reef	GR-1-1A-10022021	10/2/2021	Original	TA	<0.50	1.3	3.8	1.7	97	550-171576
Extraction	Granite Reef	GR-1-1A-11012021	11/1/2021	Original	TA	<0.50	1.1	4.1	2.2	110	550-173381
Extraction	Granite Reef	GR-1-1A-12012021	12/1/2021	Original	TA	<0.50	1.1	4.3	2.3	100	550-175024
NGTF											
Extraction	PCX-1	PCX-1	10/2/2021	Original	TA	<0.50	0.58	1.5	2.4	38	550-171573
Extraction	PCX-1 (C)	PCX-1	11/2/2021	Original	TA	<0.50	0.67	2.2	4.0	59	550-173516
Extraction	PCX-1	PCX-1	12/1/2021	Original	TA	<0.50	<0.50	1.6	2.7	40	550-175015
MRTF											
Extraction	PV-14	PV 14	10/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	0.54	550-171572
Extraction	PV-14	PV 14	11/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	0.54	550-173382
Extraction	PV-14	PV 14	12/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175021
Extraction	PV-15	PV 15	10/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	4.1	550-171572
Extraction	PV-15	PV 15	11/1/2021	Original	TA	<0.50	<0.50	0.50	<0.50	4.5	550-173382
Extraction	PV-15	PV 15	12/1/2021	Original	TA	<0.50	<0.50	0.56	<0.50	4.5	550-175021

Table A-3. Laboratory Results For VOCs In Groundwater Extraction Wells - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Well Type	Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA	DCE	TCM	PCE	TCE	Report
						200	*6*	*6*	*5*	*5*	
Trip/Field Blanks											
--	EX-QC (D)	FRB (TRIP)	10/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171579
--	EX-QC (D)	FRB (TRIP)	11/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173385
--	EX-QC (D)	FRB (TRIP)	12/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175019

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene
CGTF = Central Groundwater Treatment Facility
FRB = Field Reagent Blank (Trip Blank)
GWETS = Groundwater Extraction and Treatment System

ID = Identifier
MRTF = Miller Road Treatment Facility
NGTF = NIBW Granular Activated Carbon Treatment Facility
QC = Quality Control
RPD = Relative Percent Difference
TA = Eurofins TestAmerica
TB = Trip Blank
VOC = Volatile Organic Compound

NOTES:

<0.50	Analytical result is less than laboratory detection limit (Non-Detect)
5	Cleanup Standards for Treated Water (µg/L)
5.1	Results in **bold** exceed Cleanup Standard for Treated Water

(A) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to low concentration range of analyte.
(B) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to RPD being just over 20% criteria.
(C) Sample was collected opportunistically when well was pumping. Trip blanks were not available.
(D) EX-QC - A single trip blank is collected for all extraction well samples, regardless of facility, when collected and shipped on the same

Table A-4. Laboratory Results For VOCs In Treatment System Samples - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
AREA 7 GWETS										
Area 7 GWETS down for maintenance during Quarter 4										
AREA 12 GWETS										
WSP-1 (Influent)	WSP-1-1A-10022021	10/2/2021	Original	TA	<0.50	1.0	2.3 [A]	1.7 [A]	63	550-171580
WSP-1 (Influent)	TS-1-1A-10022021	10/2/2021	Duplicate	TA	<0.50	1.0	3.1 [A]	2.1 [A]	74	550-171580
WSP-1 (Influent)	WSP-1-1A-11012021	11/1/2021	Original	TA	<0.50	1.1	2.8	2.1	77	550-173379
WSP-1 (Influent)	TS-1-1A-11012021	11/1/2021	Duplicate	TA	<0.50	1.2	3.0	2.3	81	550-173379
WSP-1 (Influent)	WSP-1-1A-12012021	12/1/2021	Original	TA	<0.50	0.99	2.7	1.9	73	550-175013
WSP-1 (Influent)	TS-1-1A-12012021	12/1/2021	Duplicate	TA	<0.50	1.1	2.8	2.2	79	550-175013
WSP-2 (Air Stripper Effluent)	WSP-2-1A-10042021	10/4/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171571
WSP-2 (Air Stripper Effluent)	WSP-2-1A-11012021	11/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173378
WSP-2 (Air Stripper Effluent)	WSP-2-1A 12012021	12/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175014
MRTF										
Tower 2 Effluent	Tower 2	10/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171584
Tower 2 Effluent	Tower 2	11/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173387
Tower 2 Effluent	Tower 2	12/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175020
Tower 3 Effluent	Tower 3	10/2/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171584
Tower 3 Effluent	Tower 3	11/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173387
Tower 3 Effluent	Tower 3	12/1/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175020
NGTF										
Outfall 001 (Effluent)	NGTF-CP	10/4/2021	Original	TA	<0.50	<0.50	0.61	<0.50	<0.50	550-171595
Outfall 001 (Effluent)	NGTF-CP	10/11/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172115
Outfall 001 (Effluent)	NGTF-CP	10/18/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172566
Outfall 001 (Effluent)	NGTF-CP	10/25/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173032
Outfall 001 (Effluent)	NGTF-CP	11/1/2021	Original	TA	<0.50	<0.50	0.78	<0.50	<0.50	550-173406
Outfall 001 (Effluent)	NGTF-CP	11/8/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173915
Outfall 001 (Effluent)	NGTF-CP	11/15/2021	Original	TA	<0.50	<0.50	0.70	<0.50	<0.50	550-174285
Outfall 001 (Effluent)	NGTF-CP	11/22/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174664
Outfall 001 (Effluent)	NGTF-CP	11/29/2021	Original	TA	<0.50	<0.50	0.60	<0.50	<0.50	550-174876
Outfall 001 (Effluent)	NGTF-CP	12/6/2021	Original	TA	<0.50	<0.50	0.82	<0.50	<0.50	550-175249
Outfall 001 (Effluent)	NGTF-CP	12/13/2021	Original	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175731
Outfall 001 (Effluent)	NGTF-CP	12/20/2021	Original	TA	<0.50	<0.50	0.56	<0.50	<0.50	550-176084
Outfall 001 (Effluent)	NGTF-CP	12/27/2021	Original	TA	<0.50	<0.50	0.82	<0.50	<0.50	550-176359
Trip/Field Blanks										
QC - Area 12	FB-1-1A-10022021	10/2/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171581
QC - Area 12	TB-1-1A-10022021	10/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171581
QC - Area 12	FB-1-1A-11012021	11/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173384
QC - Area 12	TB-1-1A-11012021	11/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173384
QC - Area 12	FB-1-1A-12012021	12/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175017
QC - Area 12	TB-1-1A-12012021	12/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175017
QC - NGTF	TB	10/4/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171595
QC - NGTF	TB	10/11/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172115
QC - NGTF	TB	10/18/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-172566
QC - NGTF	TB	10/25/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173032
QC - NGTF	TB	11/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173406

Table A-4. Laboratory Results For VOCs In Treatment System Samples - Fourth Quarter 2021
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	Lab	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
QC - NGTF	TB	11/8/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173915
QC - NGTF	TB	11/15/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174285
QC - NGTF	TB	11/22/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174664
QC - NGTF	TB	11/29/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-174876
QC - NGTF	TB	12/6/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175249
QC - NGTF	TB	12/13/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175731
QC - NGTF	TB	12/20/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-176084
QC - NGTF	TB	12/27/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-176359
QC-TS (B)	FB-2-1A-10022021	10/2/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171577
QC-TS (B)	TB-2-1A-10022021	10/2/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-171577
QC-TS (B)	FB-2-1A-11012021	11/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173386
QC-TS (B)	TB-2-1A-11012021	11/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-173386
QC-TS (B)	FB-2-1A-12012021	12/1/2021	FB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175016
QC-TS (B)	TB-2-1A-12012021	12/1/2021	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-175016

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene
CP = Chaparral Compliance Point
FB = Field Blank
GWETS = Groundwater Extraction and Treatment System
ID = Identifier

MRTF = Miller Road Treatment Facility
NGTF = NIBW Granular Activated Carbon Treatment Facility
RPD = Relative Percent Difference
QC = Quality Control
TA = Eurofins TestAmerica
TB = Trip Blank
TS = Treatment System
VOC = Volatile Organic Compound

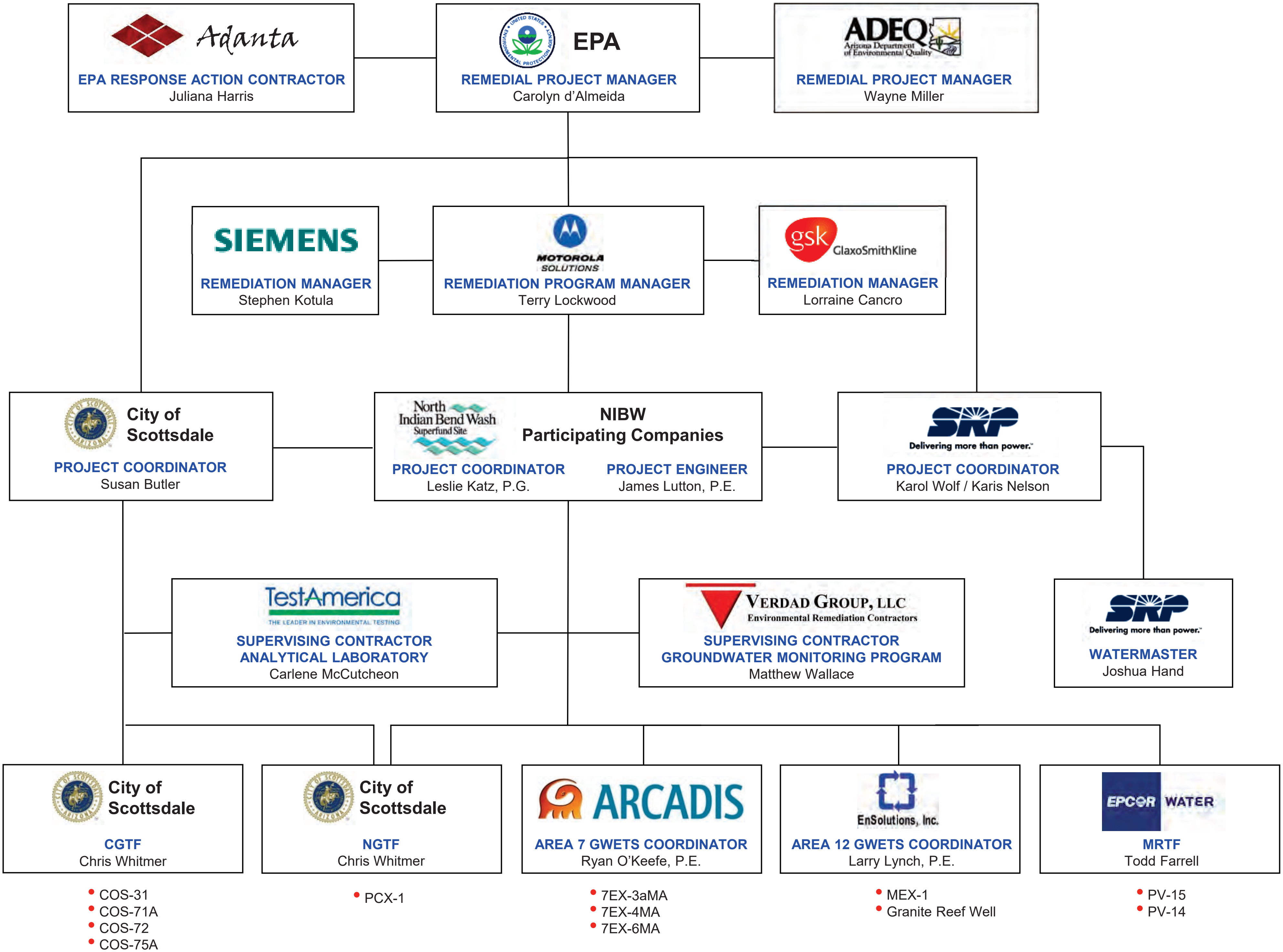
NOTES:

<0.50	Analytical result is less than laboratory detection limit (Non-Detect)
5	Cleanup Standards for Treated Water (µg/L)
5.1	Results in **bold** exceed Cleanup Standard for Treated Water

(A) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to low concentration range of analyte.

(B) QC-TS - A single trip blank and a single field blank are collected for Area 7, MRTF, and NGTF samples, when collected and shipped on the same day.

APPENDIX J
CONTACT LIST FOR NIBW SUPERFUND SITE REMEDIAL ACTIONS



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MRTF
Todd Farrell
COS-31
COS-71A
COS-72
COS-75A
PCX-1
7EX-3aMA
7EX-4MA
7EX-6MA
MEX-1
Granite Reef Well
PV-15
PV-14

TABLE J-1. CONTACT LIST FOR NIBW SUPERFUND SITE REMEDIAL ACTIONS

NAME	ROLE	ORGANIZATION	ADDRESS	OFFICE TELEPHONE	MOBILE TELEPHONE	EMAIL
NIBW Participating Companies						
Terry Lockwood	NIBW Program Manager	Motorola Solutions, Inc.	3332 E. Broadway Road, Phoenix, AZ 85040	602-760-4763	602-617-8563	terry.lockwood@motorolasolutions.com
Leslie Katz	NIBW Project Coordinator	EL Montgomery and Associates, Inc.	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912	520-245-4802	lkatz@elmontgomery.com
James Lutton	NIBW Project Engineer	NIBW Participating Companies	1550 E. Prince Road, Tucson, AZ 85719	480-442-9234	480-442-9234	james.lutton@jalpe.net
Lauren Candreva	NIBW Hydrogeologist, Field Services Coordinator	EL Montgomery and Associates, Inc.	4222 E. Thomas Road, Suite 315, Phoenix, AZ 85018	480-948-7747	602-920-3264	lcandreva@elmontgomery.com
Alyssa Kirk	NIBW Hydrogeologist	EL Montgomery and Associates, Inc.	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912	928-699-6405	akirk@elmontgomery.com
Marla Odom	NIBW QC Coordinator	EL Montgomery and Associates, Inc.	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912		modom@elmontgomery.com
Brady Nock	NIBW Modeler	EL Montgomery and Associates, Inc.	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912	713-992-0452	bnock@elmontgomery.com
Oversight Agencies						
Carolyn D'Almeida	EPA Project Manager	U.S. Environmental Protection Agency	SFD-8-1, 75 Hawthorne Street, San Francisco, CA 94105	415-972-3150	707-980-1605	dalmeida.carolyn@epa.gov
Wayne Miller	ADEQ Project Manager	Arizona Department of Environmental Quality	1110 West Washington Street, Phoenix, AZ 85007	602-771-4121		miller.wayne@azdeq.gov
City of Scottsdale						
Suzanne Grendahl	Water Quality Director	City of Scottsdale	P.O. Box 25089, 8787 East Hualapai Drive, Scottsdale, AZ 85255	480-312-8719	623-640-1474	sgrendahl@scottsdaleaz.gov
Susan Butler	NIBW Project Coordinator	City of Scottsdale	P.O. Box 25089, 8787 East Hualapai Drive, Scottsdale, AZ 85255	480-312-8712	480-225-6557	sbutler@scottsdaleaz.gov
Salt River Project						
Karol Wolf	Aquifer Management	Salt River Project	P.O. Box 52025, Mail Station PAB 38W, Phoenix, AZ 85072-2025	602-236-5767	602-236-3407	karol.wolf@srpnet.com
Karis Nelson	Senior Environmental Compliance Scientist	Salt River Project	P.O. Box 52025, Mail Station PAB 359, Phoenix, AZ 85072-2025	602-236-2916	602-535-6358	karis.nelson@srpnet.com
Treatment Systems						
NGTF and CGTF						
Chris Whitmer	CGTF & NGTF Senior Operator and Incident Coordinator	City of Scottsdale	8650 East Thomas Road, Scottsdale, AZ 85251	480-312-0390	602-402-3223	cwhitmer@scottsdaleaz.gov
Jeff Kaylor	Treatment Manager	City of Scottsdale	8650 East Thomas Road, Scottsdale, AZ 85251	480-312-5664	623-910-9150	jkaylor@scottsdaleaz.gov
Water Operations Staff	Control Room Operator	City of Scottsdale		480-312-8708		
Area 7 GWETS						
Ryan O'Keefe	Area 7 GWETS and Incident Coordinator	Arcadis U.S., Inc.	410 N. 44th Street, Suite 1000, Phoenix, AZ 85008	480-535-1698	602-295-6708	ryan.okeefe@arcadis.com
Area 12 GWETS						
Larry Lynch	Area 12 GWETS and Incident Coordinator	EnSolutions, Inc.	7620 E. McKellips Road, Suite 4-71, Scottsdale, AZ 85257	561-762-7690	561-762-7690	larry@ensolutions.us
MRTF						
Todd Farrell	MRTF Operations Manager, Incident Coordinator	EPCOR	6215 North Cattletrack Road, Scottsdale, AZ 85250	623-445-2463	602-388-7170	tfarrell@epcor.com