2022

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, 2023

North Indian Bend Wash Superfund Site

SITE MONITORING REPORT

January - December 2022

North Indian Bend Wash Superfund Site

Scottsdale, Arizona

Issued February 28, 2023

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February 28, 2023

CERTIFICATION

All geological information, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by Registered Geologists.

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1 EXECUTIVE SUMMARY

The North Indian Bend Wash (NIBW) Superfund Site (Site) was listed on the U.S. 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 2022 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, 2003). 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; NIBW PCs, 2002).

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). An updated CSM Report is in progress and planned for completion in 2023. 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 Central Groundwater Treatment Facility (CGTF), the NIBW Granular Activated Carbon (GAC) 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).

The three principal alluvial aquifer units at the Site include the Upper Alluvial Unit (UAU), the Middle Alluvial Unit (MAU), and the Lower Alluvial 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 historical source areas 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 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 TCE concentrations in monitoring wells show statistically significant trends.

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 pumping at 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 outside of Source Control capture migrates into the LAU, principally along the Western Margin, and is captured by down-gradient 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. The model underwent a comprehensive update by the PCs through a collaborative process with the NIBW Technical Committee in 2021 and was updated most recently in 2022 for interpretation of capture. A final report documenting the model update is in progress and will be completed in 2023.

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 2022, as follows:

- UAU Program: Based on the 2022 5-year running average, UAU VOC mass is decreasing with time compared to the 2021 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 October 2022 water level data. The lateral extent of the 5 micrograms per liter (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, with the exception of the anticipated migration of the LAU plume north for capture at PV-15. TCE concentrations in all assigned MAU/LAU indicator wells were less than their associated achievement measures. Mann-Kendall trend analyses show declining, stable, or no trends over both the long-term (10-year) and in the more recent data set (5-year) for most MAU and LAU monitoring wells. These results indicated that TCE concentrations in capture zones associated with the MAU Source Control programs are declining, mass migrating into the LAU along the Western Margin is being reduced, and the LAU plume is cleaning up as it

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 2022 water level contours and the estimated outermost extent of capture at the LAU extraction wells. Additionally, TCE concentrations in indicator monitoring wells PG-42LA, PG-43LA, and PV-14 were all below 2 µg/L during 2022 monitoring rounds.
- Source Control Programs: The combined 5-year running average TCE concentration metric was not achieved for either Area 7 or Area 12 indicator wells for 2022. In both cases, short-term TCE concentration increases due to treatment system downtime for maintenance are responsible for the lack of compliance with this metric. 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) at three of the treatment facilities (CGTF, MRTF, and NGTF). Treated water from the Area 7 GWETS was returned to the UAU and treated water from the Area 12 GWETS was delivered to SRP for municipal and irrigation use. Groundwater treatment performance standards were achieved at the five treatment facilities in 2022. The City of Scottsdale completed construction and began testing of a new treatment plant designed to address inorganic compounds unrelated to the Site in 2022. Due to delays related to supply chain issues, the start-up of the TGTF is now planned for early 2023. Operation of the TGTF 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 2022 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 K**, along with contact information for current NIBW team members. Additional information describing remedial activities conducted at the NIBW Site in 2022 was provided in quarterly reports submitted to the U.S. Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ), dated May 27, August 29, and November 29, 2022. Consistent with requirements defined in the Amended CD and SOW (2003), operational summaries and updates for fourth quarter 2022 are included in this annual SMR as **Appendix I**. Documents and data submitted to EPA during 2022 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 2022 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 issued as electronic files under separate cover. 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 2022, ongoing data collection and evaluations for remedy enhancement (including testing at extraction well PCX-1), and support for EPA's optimization evaluation.
- Results of NIBW PCs' annual audit activities at Eurofins Environment Testing Southwest (Eurofins) (Arizona Department of Health Services [ADHS] license number AZ0728) in Phoenix, Arizona.
- Level 4 data analytical reports and a quality assurance (QA) report issued by Eurofins (primary NIBW analytical laboratory contractor) for analyses conducted for the NIBW groundwater monitoring program during 2022.
- Level 4 data analytical reports and a QA report issued by Eurofins for analysis of compliance process water samples obtained at NIBW groundwater treatment systems during 2022.
- Level 4 analytical report issued by PACE Analytical National Center for Testing & Innovation (PACE) (ADHS license number AZ0612), the backup NIBW analytical laboratory contractor, for split sampling conducted at Area 12 Groundwater Extraction Treatment System (GWETS).
- 2022 air sampling summary and Air Toxics laboratory reports for Area 7 GWETS and Area 12 GWETS.
- 2022 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 the 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 that summarizes historical documents and major events for the Site.

Table 1. Timeline of Historical Documents and Major Events

Time frame	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 ○ 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

Time frame	Historical Document and/or Major Event
	○ 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 Draft Conceptual Site Model Update o PCs submitted draft report in January 2021 o EPA provided comments on the draft in December 2021 o PCs submitted responses to comments in April 2022

EXPLANATION:
SVE = Soil Vapor Extraction

3.2 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site are listed as follows (EPA, 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 Arizona Aquifer Protection Permit (APP) substantive requirements for injection back into the aquifer. The NIBW Cleanup Standards are based on EPA drinking water MCLs with the exception of TCM and 1,1 DCE; the MCL for 1,1, DCE is 7 micrograms per liter (µg/L). At the time of the Amended ROD, the MCL for TCM was 100 µg/L (EPA, 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. To address the threat to groundwater, SVE was conducted at four historical source areas, including 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 in early 2015, with the Area 7 SVE system being the final treatment system decommissioned in January 2016.

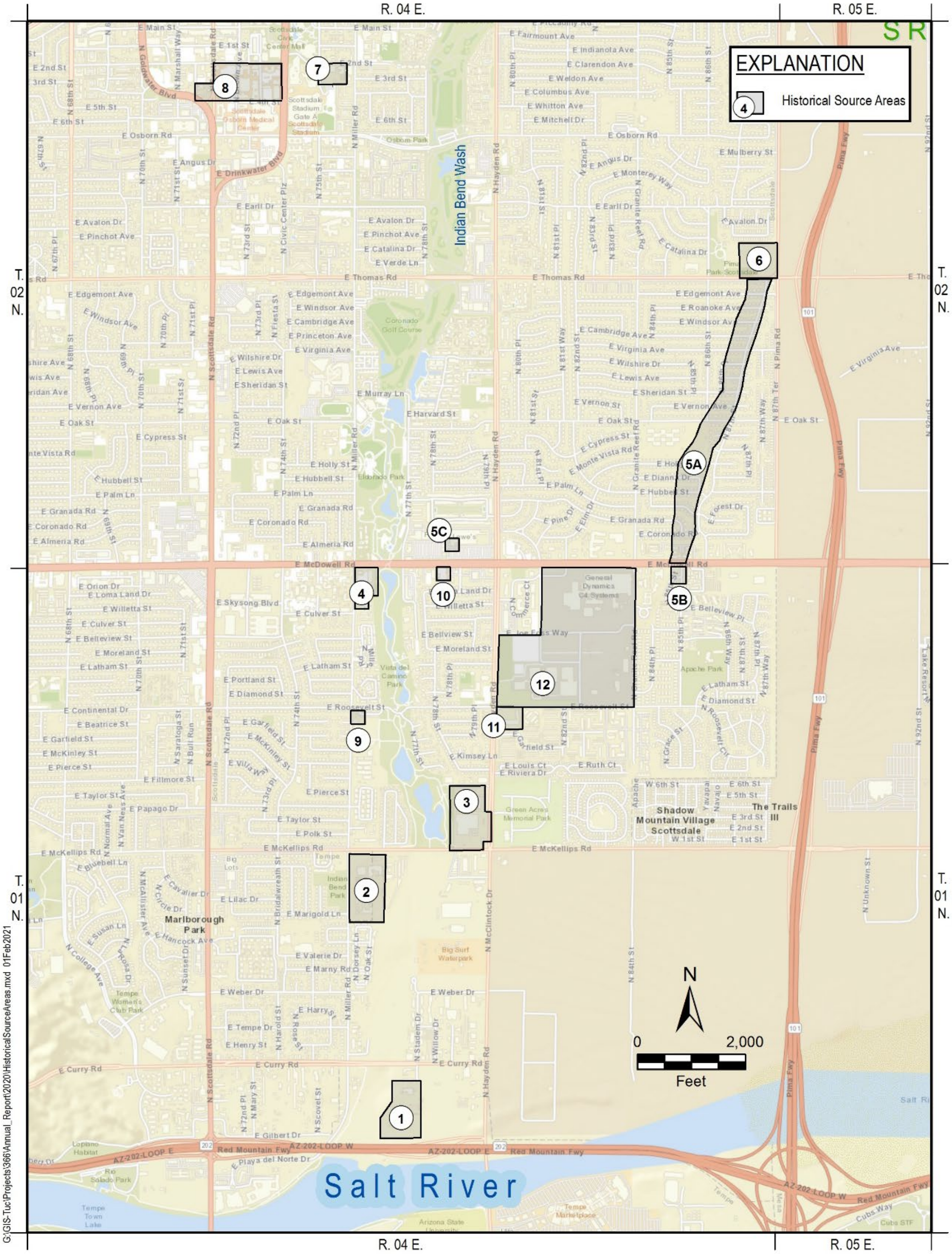

Figure 1. Location of Historical Source Areas at the NIBW Superfund Site

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 Central Groundwater Treatment Facility (CGTF), the NIBW Granular Activated Carbon (GAC) 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 Alluvial Unit (UAU), Middle Alluvial Unit (MAU), and Lower Alluvial 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. 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 down-gradient LAU extraction wells. Capture by MAU and LAU extraction wells is demonstrated using water level data (both units) and simulated particle tracks generated using the NIBW groundwater flow model (LAU), which underwent a comprehensive update by the PCs through a collaborative process with the NIBW Technical Committee in 2021 and was updated most recently in 2022 for interpretation of capture.

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**.

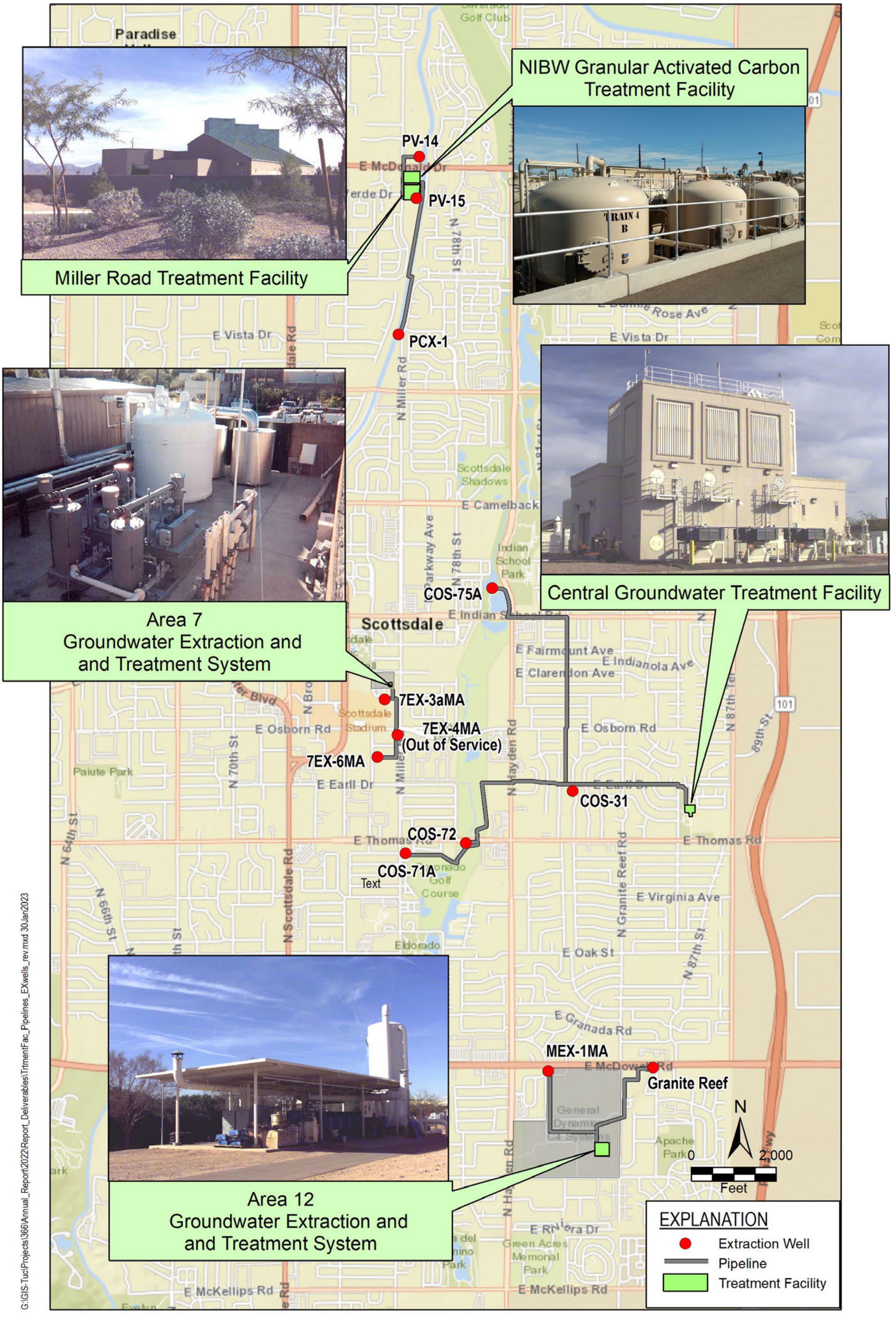

Figure 2. Location of Extraction Wells, Pipelines, and Treatment Facilities at the NIBW Superfund Site

An overview of treatment facility information, including the primary operators, 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 the SRP water supply system via the Grand Canal	Delivered to EPCOR for municipal use	Municipal supply for the City of Scottsdale or delivered to the SRP water system via the Arizona Canal	Injection to UAU using wells 7IN-1UA and 7IN-2UA	Discharged to the SRP water supply system via McKellips Lake

EXPLANATION:
EPCOR = EPCOR Water USA
* Extraction wells are also used as influent samples for treatment facilities.
** 7EX-4MA is not in service
*** 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

The CGTF was the first treatment system constructed at the NIBW Site and began operations in 1994. The 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 the CGTF where it is treated by air stripping. Treated groundwater from the 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 the 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. Planning is underway for a testing and well modification program at COS-71A with the objective of extracting a lower volume of water from the MAU only that can be more readily integrated into City of Scottsdale's water supply. Capture in the MAU at COS-71A has been demonstrated through monitoring data and modeling to enhance containment of the MAU plume associated with Area 7. Completion of the City of Scottsdale's Thomas Groundwater Treatment Facility (TGTF), which is designed to treat inorganic constituents in groundwater, is a critical element of the plan to bring COS-71A back online at a higher pumping priority. The City of Scottsdale's pumping regimen for the CGTF wells will be re-evaluated following commissioning of the TGTF. While delayed due to supply chain issues, commissioning of the TGTF is anticipated in early 2023.

3.5.3 MRTF

The MRTF began operation in 1997 and is owned and operated by EPCOR Water USA (EPCOR). The facility 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 the MRTF. COCs in extracted groundwater are reduced by air stripping at the MRTF. Treated groundwater from wells PV-14 and PV-15 is pumped to EPCOR's Paradise Valley Arsenic Removal Facility for subsequent treatment and distribution by EPCOR for drinking water use in its Paradise Valley (PV) service area. Treated groundwater from the MRTF has consistently met NIBW Cleanup Standards.

3.5.4 NGTF

The 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. The 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.

The NGTF utilizes a 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 the 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. During 2022, the PCs continued working with the City of Scottsdale and SRP to permit and equip an existing monitoring well (PG-41MA/LA) for extraction and treatment at the NGTF to enhance capture of the LAU between PCX-1 and the MRTF extraction wells. In its current configuration, the NGTF has additional treatment capacity to accommodate treatment of approximately 1,000 gallons per minute (gpm). Treated groundwater from the NGTF has consistently met NIBW Cleanup Standards and AZPDES permit requirements. The AZPDES permit for the NGTF was renewed in 2022, effective as of November 29, 2022, through November 28, 2027.

3.5.5 Area 7 GWETS

The Area 7 GWETS began operation in 1999. The NIBW PCs own and are responsible for operation of the 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**). The 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 conducted an evaluation of 7EX-4MA and attempted to install a pre-packed casing liner in 2022. The liner installation work was not successful in rehabilitating the well, and continued use of the well as an extraction or monitoring well is impractical. As a result, well 7EX-4MA will be decommissioned in 2023. 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 that be needed. Well 7EX-6MA and 7EX-4MA share a common pipeline that connects the wells to the treatment system. With the loss of 7EX-4MA, the pumping rate at 7EX-6MA increased, minimizing the effects of the lack of extraction at 7EX-4MA and ensuring continued effective operation of the Area 7 GWETS.

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 up-gradient groundwater injection wells (7IN-1UA and 7IN-2UA). Treated water used to recharge the UAU aquifer must meet substantive requirements of the federal Underground Injection Control (UIC) Program and the 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 the UIC and APP programs.

3.5.6 Area 12 GWETS

The Area 12 GWETS began operations in 1999. The NIBW PCs own and are responsible for operation of the Area 12 GWETS, 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 Area 5B and Area 12 source areas, 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 water distribution system at McKellips Lake to replace other SRP pumping within and near the Site. The impacts of pumping on water levels and NIBW COC concentration trends at M-2MA and other wells in the vicinity of City of Tempe well COT-6 are being evaluated. Treated groundwater from the 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 provided comments on the draft in December 2021 and the PCs submitted responses to comments in April 2022. The PCs are currently in the process of incorporating comments where appropriate into a final report for submittal in the first quarter of 2023. Information provided in this section is largely excerpted from the draft CSM update, which contains appropriate references to previous investigations and studies. When finalized, the CSM update 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. 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 2022 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, Arizona. 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 68^{th} 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, principally from Salt River flows, infiltration of irrigation water on SRPMIC lands, and artificial recharge facilities, primarily the Granite Reef Underground Storage Project (GRUSP), significantly affects the groundwater flow system. **Figure 3** shows the location of the NIBW Site, nearby land use, and surrounding cities and mountains.

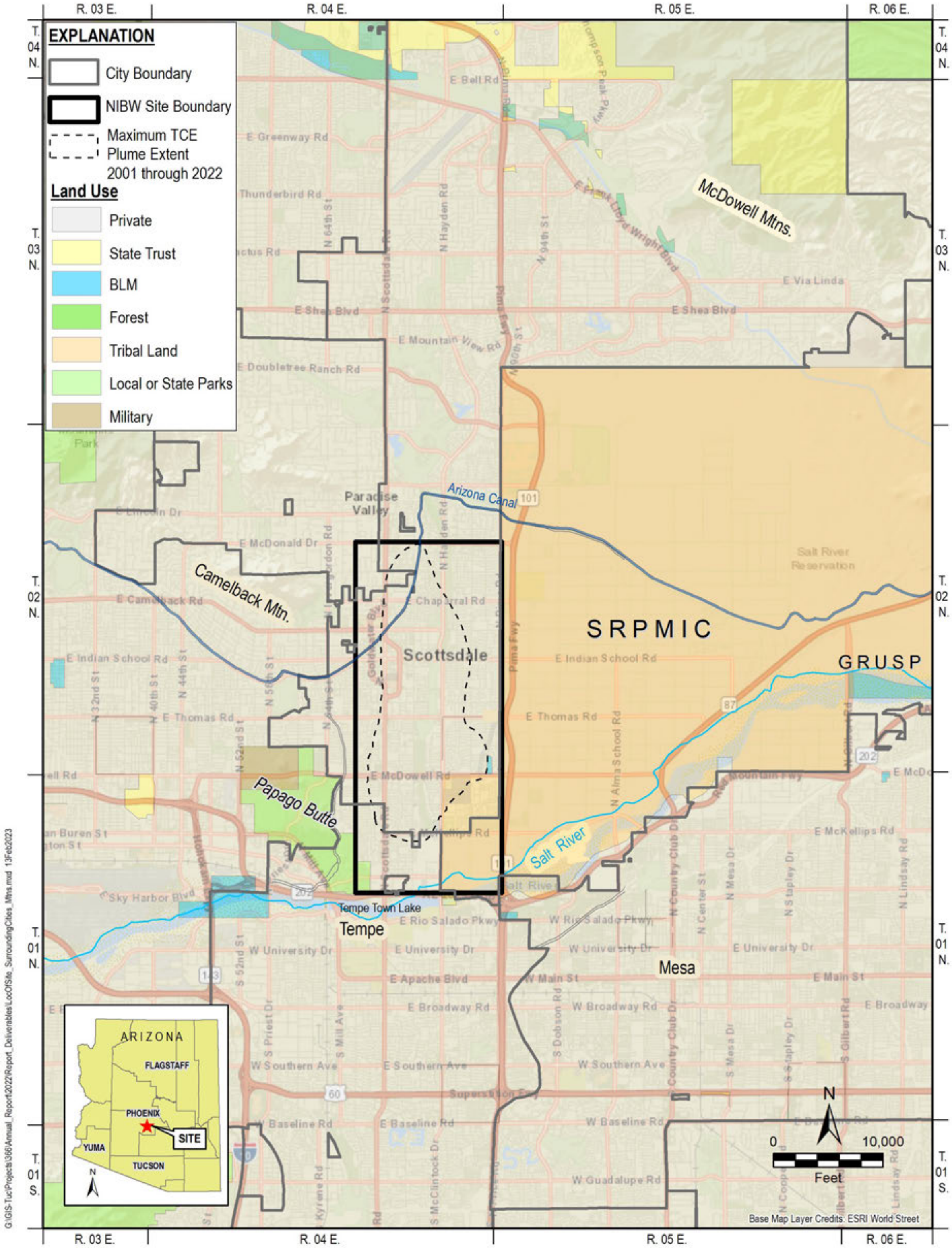

Figure 3. Location of the NIBW Superfund Site and Surrounding Land Area

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 Alluvial Unit

UAU sediments were 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 Alluvial Unit

MAU sediments are generally much finer grained and more heterogeneous than either the UAU or the LAU. Deposition of MAU sediments was 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. The MAU is under confined to semi-confined conditions, depending on saturation of the overlying UAU 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 in both the MAU and underlying LAU, recharge from the overlying UAU, and recharge directly into the MAU along the basin margins. 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 Alluvial Unit

The LAU is a coarse-grained, heterogeneous unit composed of materials ranging from boulders to clay. The unit was 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. 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. Water level contours indicate 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, water level data and modeling indicate that vertical movement occurs 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.

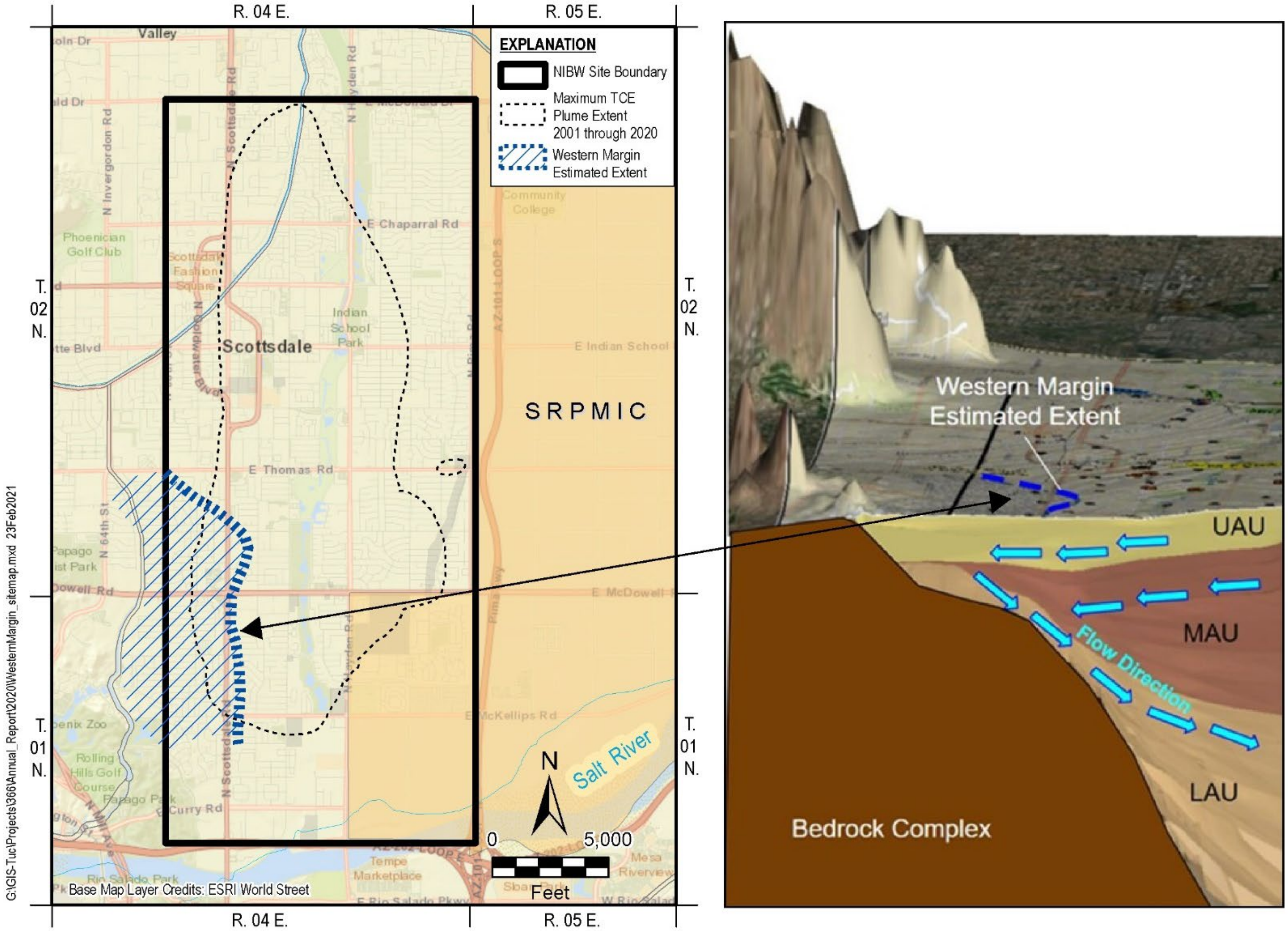

Figure 4. Western Margin Estimated Extent and Conceptual Diagram

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 (NIBW PCs, 2002). 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 COCs 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 TCE concentrations above 5 µg/L (the Cleanup Standard). The overall extent of the plume has decreased since 2001 and TCE concentrations within the plume have generally reduced.

4.3.1 Upper Alluvial 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 TCE concentrations 10 years earlier at Area 12. UAU groundwater extraction at Area 7, vadose zone remediation at the various 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. Based on data from October 2022, TCE concentrations are now below Cleanup Standards in all UAU monitoring wells.

4.3.2 Middle Alluvial Unit

Like the UAU, TCE concentrations in the MAU have also decreased substantially over time. Due to the hydrogeologic properties of the MAU, including greater thickness and a predominance of fine-grained sediments, the time frame 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, to a lesser extent, Area 12. The UAU was largely unsaturated in the northern half of the Site during the time when historical Area 7 industrial facilities were in operation. Any release of COCs during that time would have occurred directly to the MAU, which was the uppermost aquifer in the Area 7 region. As such, COC concentrations in the MAU are relatively higher and more persistent 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. COC 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 TCE 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 show impacts from this source. MAU Source Control actions 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. TCE concentrations in the Upper MAU near Area 7 have reduced by half in many wells and up to an order of magnitude in others since the 1990s. The only area of the MAU near Area 12 with lingering higher concentrations is the Granite Reef well at source Area 5B. Concentrations at the Granite Reef well have reduced by an order of magnitude since the 1980s.

4.3.3 Lower Alluvial Unit

The Lower MAU has consistently had substantially lower TCE concentrations than the Upper MAU. Near Area 7, the highest measured TCE concentration in the Lower MAU was approximately 30 µg/L in 2001. Since 2015, laboratory results of samples collected from Lower MAU monitoring wells near Area 7 have consistently shown TCE concentrations close to or below the Cleanup Standard of 5 µg/L. Near Area 12, the highest TCE concentrations observed in the Lower MAU are downgradient from the Granite Reef well. TCE concentrations in the Lower MAU near Area 12 have decreased by an order of magnitude since the late 1990s and early 2000s, when concentrations exceeded 100 µg/L. In recent years, groundwater samples collected from monitoring wells perforated within the lowest elevation of the Lower MAU near Area 12 have TCE concentrations that are consistently below 5 µg/L and generally below the detection limit (<0.50 µg/L). The occurrence of low to non-detect concentrations of TCE in the Lower MAU below both Area 7 and Area 12 is consistent with site lithologic and hydrologic conditions. While a downward vertical gradient generally exists across the MAU and from the MAU to the LAU at the Site, vertical migration is impeded due to the highly interbedded and overall fine-grained nature of the MAU. In fact, the driving force for vertical migration has decreased significantly over time as regional water level recovery observed across the basin has preferentially occurred in the LAU over the MAU in the Site vicinity. These factors combine to create a strong preference for lateral movement of Upper MAU groundwater and mass toward extraction wells or toward the Western Margin.

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 the result of movement of TCE prior to 2001. In the 1990s and early 2000s, the highest TCE concentrations in the LAU were in the 300 µg/L range; at present maximum concentrations have reduced by two thirds, 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. PCE concentrations are currently between about one and two orders of magnitude below TCE concentrations at Site monitoring wells (**Appendix C, Table C-1**). 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 also was 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.

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 2022 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 NIBW COC 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 a 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 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 NIBW COC 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 will re-engage with the Technical Committee on the GM&EP in 2023. 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 (replaced with D-4MA), 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, UAU 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 2023 include the replacement of the Lower MAU well PG-49MA for annual sampling with the Lower MAU well PG-53MA. Further details are provided in **Section 10.1.1**.

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 and a quality assurance project plan (QAPP) was developed to cover sampling activities presented in the GM&EP. A draft Addendum to the Phase 1 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). While final EPA approval is pending, this document is currently 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 **Appendix A**, **Table A-1**, including well type, aquifer unit, and frequency of water level and water quality monitoring. Well construction information is summarized in **Appendix A**, **Table A-2**.

Peripheral production (or "production" wells) are wells other than remedial extraction wells that are permitted and used for potable supply and that were not 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 drinking water end use and to protect unimpacted water supply wells. Irrigation water quality standards are orders of magnitude higher than drinking water standards. Distinguishing between municipal wells where drinking water standards apply and other water supply wells 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.

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 **Appendix A**, **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 **Appendix A**, **Table A-1** and are summarized in **Appendix A**, **Table A-3**. The continuously monitored Northern LAU locations include six LAU monitoring wells and four EPCOR production wells. Since the GM&EP was prepared, modifications to the continuously monitored well locations have been necessary to collect data useful for evaluating capture and control in the Northern LAU plume. Modifications and rationale for changes to the continuous monitoring program are noted in **Appendix A**, **Table A-3**. 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 the requirements of the GM&EP. Water quality monitoring includes the following components:

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

In general, monitoring is conducted in accordance with the Phase 1 SAP for the NIBW Site, developed by SRP and approved by EPA in 2003. The Sitewide SAP consists of the Phase 1 and Phase 2 SAPs. The Phase 1 SAP covers all groundwater sampling activities as identified in the GM&EP and includes the Field Sampling and QAPPs. In October 2015, 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. Pending EPA approval, groundwater monitoring is 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 is used that requires stabilization of water quality field parameters prior to sampling. The Phase 1 SAP also requires treatment of purge water prior to discharge for wells where recent sample results show NIBW COC concentrations that are near and/or exceed associated regulatory limits. The HydraSleeve sampling approach provides 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 been consistent with historical results from traditional purge samples. At 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. An update to the Phase 1 SAP is currently underway and will incorporate the 2015 SAP Addendum. The 2006 Phase 2 SAP presents methods and procedures for Operation & Maintenance (O&M) associated with the groundwater extraction and treatment facilities, as further discussed in **Section 6.4**. Monthly and quarterly groundwater quality monitoring generally commences the first week of the month. Quarterly sampling is conducted in January, April, July, and October. The annual groundwater quality monitoring program occurs in October.

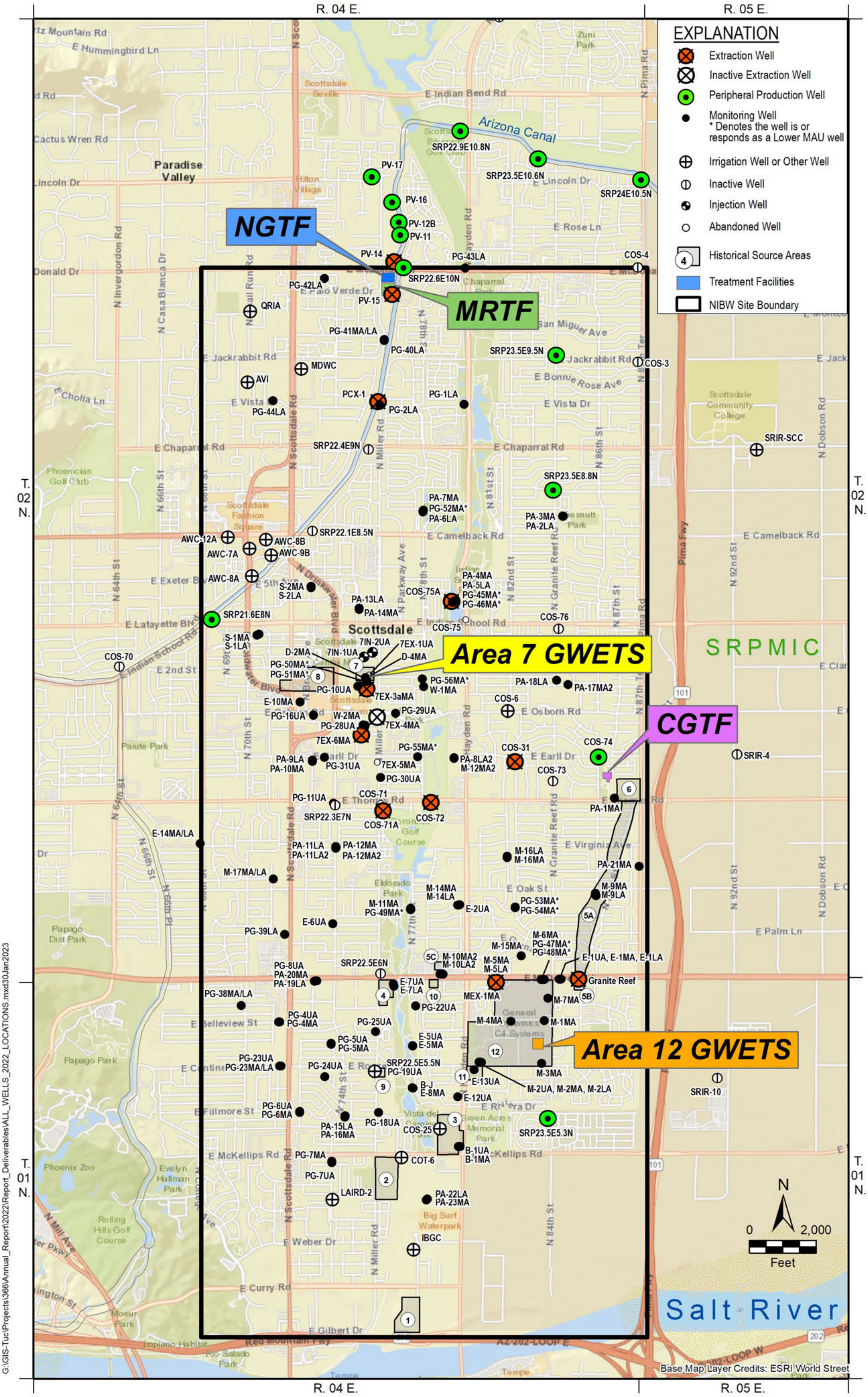

Figure 5. Well Locations and Identifiers in the NIBW Superfund Site Vicinity

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 **Section 8.1** for further details). 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 groundwater 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**. Sampling at the treatment systems is conducted in accordance with requirements of the Phase 2 SAP and treatment facility 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

EXPLANATION:
inf = influent
eff = effluent
NGTF-CP = NGTF Effluent Chaparral Compliance Point Sample Identifier
*CGTF is reported by the City of Scottsdale in its Compliance Monitoring Reports

6.4.1 COC Water Quality Monitoring at Treatment Facilities

All treatment system samples are submitted to Eurofins for analysis of NIBW COCs.

Process and treated groundwater samples for CGTF are collected by the City of Scottsdale and analytical results are reported directly to EPA and ADEQ by the City of Scottsdale on a quarterly basis.

Analytical results for influent, process, and treated groundwater samples from the MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS are summarized in **Appendix C, Table C-3**. Management of Untreated Groundwater is detailed in **Appendix F**. Influent, process, and treated groundwater samples for the MRTF, Area 7 GWETS, and Area 12 GWETS are collected by EnSolutions. Process and treated groundwater samples for NGTF are collected by City of Scottsdale; influent samples for the NGTF are collected by EnSolutions. Process and treated groundwater sampling results for these four treatment systems are reported quarterly by the NIBW PCs.

- CGTF - Treatment system influent samples, labeled "Raw," and an effluent sample, labeled "CD," are collected each week (when the treatment system is operational). The CD sample is analyzed for NIBW COCs; the "Raw" sample is analyzed only for TCE.
- MRTF - Samples are collected during the first week of the month at extraction wells PV-14 and PV-15 (when operational). The MRTF extraction well samples are considered air stripper influent samples. Analytical results for extraction well samples are summarized in **Appendix C, Table C-2**. Treatment system effluent samples from air stripping treatment trains are collected during the first week of each month (when the treatment system is operational).

  In addition to the routine monitoring of MRTF extraction wells pursuant to the GM&EP, the NIBW PCs conduct supplemental monthly sampling at wells PV-11 and PV-12B (when operational). 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 (when operational). The extraction well sample is considered the treatment system influent sample. Analytical results for extraction well samples are summarized in **Appendix C, Table C-2**. Treatment system effluent samples are collected each week (when the treatment system is operational) from either the CWTP (labeled "NGTF-CP") or the SRP Arizona Canal (labeled "AZCO").
- 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).
- 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).

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). Treatment system performance data are collected in accordance with the 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 laboratory 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 (IDs).
- Water quality samples are given unique sample 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 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 6**. Concentrations for NIBW COCs in samples obtained at NIBW extraction wells in 2022 are summarized in **Appendix C, Table C-2** and treatment system sample results are shown in **Appendix C, Table C-3**. The 2022 Site Inspection Report is provided in **Appendix H**. Fourth quarter compliance reporting for the treatment facilities, other than the 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 6** 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 2022 is summarized in **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 TCE concentrations are not available for a well during a given 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 6. Groundwater Extraction and Estimated TCE Mass Removed During 2022 at the NIBW Superfund Site

			UNITS	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	TOTALS	ANNUAL PUMPAGE (in acre-feet)	ANNUAL PUMPAGE (in gpm)
CGTF	COS-31	Pumpage	x 1,000 gal	-	-	-	2,953.1	-	-	-	-	-	-	-	-	2,953	9	6
		Operating time	%	0%	0%	0%	2.8%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
		[TCE conc.]	µg/L	-	-	-	*9.7*	-	-	-	-	-	-	-	-	10		
		Est. TCE mass	pounds	-	-	-	0.2	-	-	-	-	-	-	-	-	0		
	COS-71A	Pumpage	x 1,000 gal	-	-	-	-	-	246	-	280.9	-	-	-	-	527	2	1
		Operating time	%	0%	0%	0%	0%	0%	0.3%	0%	0%	0%	0%	0%	0%	0%		
		[TCE conc.]	µg/L	-	-	-	-	-	*48.2*	-	*48.2*	-	-	-	-	48		
		Est. TCE mass	pounds	-	-	-	-	-	0.1	-	0.1	-	-	-	-	0		
	COS-72	Pumpage	x 1,000 gal	67,602.7	79,929.6	59,295.4	7,881.1	-	13,667.7	56,926.3	28,747.6	20,997.	-	-	12,944.6	347,992	1,068	662
		Operating time	%	72.7%	95.5%	63.4%	8.8%	0%	15.3%	62.1%	31.9%	22.9%	0%	0%	13.8%	32%		
		[TCE conc.]	µg/L	8.5	8.7	8.3	8.4	-	10.	10	6.7	8.2	-	-	8.2	9		
		Est. TCE mass	pounds	4.8	5.8	4.1	0.6	-	11	4.8	1.6	1.4	-	-	0.9	25		
	COS-75A	Pumpage	x 1,000 gal	100,270.	91,493.	102,084.	98,555.	100,076.	95,627.	97,080.	93,657.	94,077.	33,015.8	-	70,593.7	976,528	2,997	1,858
		Operating time	%	98.9%	100.0%	99.9%	99.0%	98.7%	98.3%	97.4%	93.8%	97.8%	33.2%	0%	76.9%	83%		
		[TCE conc.]	µg/L	33.	32.	31.	33.	32.	31.	31.	37.	28.	32.	-	33.	32		
		Est. TCE mass	pounds	27.6	24.4	26.4	27.1	26.7.	24.7	25.1	28.9.	22.	8.8	-	19.4	261		
	TOTAL	Pumpage	x 1,000 gal	167,872.7	171,422.6	161,379.4	109,389.3	100,076.	109,540.7	154,006.3	122,685.4	115,074.	33,015.8	-	83,538.3	1,328,000	4,075	2,527
		Est. TCE mass	pounds	32.4	30.2.	30.5	27.9	26.7	26	29.9	30.6	23.4	8.8	-	20.3	287		
MRTF	PV-14	Pumpage	x 1,000 gal	91,369.	86,653.	95,584.	90,758.	93,523.	89,340.	95,411.	94,879.	91,117.	93,975.	90,280.	39,492.	1,052,381	3,230	2,002
		Operating time	%	96.7%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	41.9%	95%		
		[TCE conc.]	µg/L	<0.50	0.8	0.6	0.6	<0.50	<0.50	0.6	0.5	<0.5	<0.50	0.5	<0.50	1		
		Est. TCE mass	pounds	0.4	0.6	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.2	5		
	PV-15	Pumpage	x 1,000 gal	97,591.	87,985.	97,363.	94,334.	98,019.	94,076.	96,031.	95,638.	92,214.	97,488.	95,019.	99,197.	1,144,955	3,514	2,178
		Operating time	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
		[TCE conc.]	µg/L	4.9	5.8	4.6	4.6	5.1	4.9	6.4	5.6	4.8	5.	5.	4.5	5		
		Est. TCE mass	pounds	4.	4.3	3.7	3.7	4.2	3.8	5.1	4.5	3.7	4.1	4.	3.7	49		
	TOTAL	Pumpage	x 1,000 gal	188,960.	174,638.	192,947.	185,902.	191,542.	183,416.	191,442.	190,517.	183,331.	191,463.	185,299.	138,689.	2,197,336	6,743	4,181
		Est. TCE mass	pounds	4.4	4.8	4.2	4.4	4.6	4.2	5.6	4.9	4.1	4.5	4.4	3.9	54		
NGTF	PCX-1	Pumpage	x 1,000 gal	88,538.8	81,892.	89,318.9	93,579.	93,165.3	88,443.	91,528.8	89,293.	85,432.5	90,146.3	86,291.8	91,491.8	1,069,121	3,281	2,034
		Operating time	%	100.0%	100.0%	93.5%	100.0%	100.0%	100.0%	100.0%	100.0%	98.9%	100.0%	100.0%	99.7%	99%		
		Discharge Canal	x 1,000 gal	211.3	206.2	39,226.4	18,391.4	176.7	361.8	264.1	426.4.	214.8	1,565.3	411.7	21,775.1	83,231	255	158
		Discharge CWTP	x 1,000 gal	88,296.8	81,658.9	49,900.3	74,541.4	92,546.5	87,853.2	91,114.6	88,607.8	84,960.4	88,299.8	85,828.7	69,378.6	982,987	3,017	1,870
		[TCE conc.]	µg/L	44.	40.	41.	45.	44.	43.	51.	50.	43.	43.	44.	44.	44		
		Est. TCE mass	pounds	32.5	27.3	30.6	35.1	34.2	31.7	39	37.3	30.7	32.3	31.7	33.59	396		
AREA 7 GWETS	7EX-3aMA	Pumpage	x 1,000 gal	-	-	-	3,183.1	3,969.6	4,544.2	5,108.6	3,141.8	5,561.2	5,802.4	-	2,280.9	33,592	103	64
		Operating time	%	0%	0%	0%	41.5%	56.%	65.4%	71.4%	44.5%	83.2%	78.6%	0%	40.8%	40%		
		[TCE conc.]	µg/L	-	-	-	*310.*	310.	*310.*	430.	460.	*460*	480.	-	*480*	408		
		Est. TCE mass	pounds	-	-	-	8.2	10.3.	11.8	18.3	12.1	21.3	23.2	-	9.1	114		
	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	-	-	-	-	-	-	218.9	3,996.7	4,008.7	4,351.6	6,867.7	8,013.1	27,457	84	52
		Operating time	%	0%	0%	0%	-	-	-	4.7%	39.4%	40.7%	54.6%	81.2%	87.3%	26%		
		[TCE conc.]	µg/L	-	-	-	-	-	-	*370.*	370	*370*	380.	*380*	*380*	377		
		Est. TCE mass	pounds	-	-	-	-	-	-	0.7	12.3	12.4	13.8	21.8	25.4	86		
	TOTAL	Pumpage	x 1,000 gal	-	-	-	3,183.1	3,969.6	4,544.2	5,327.5	7,138.5	9,569.9	10,153.9	6,867.7	10,293.9	61,048	187	116
		Est. TCE mass	pounds	-	-	-	8.2	10.3	11.8	19.	24.4	33.7	37.	21.8	34.5	201		

			UNITS	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	TOTALS	ANNUAL PUMPAGE (in acre-feet)	ANNUAL PUMPAGE (in gpm)
AREA 12 GWETS	MEX-1MA (SRP 23.1E6N)	Pumpage	x 1,000 gal	-	22,169.3	30,177.1	37,812.3	40,907.8	33,611.7	39,217.7	38,509	37,903.2	40,723.9	38,749.8	37,107.2	396,889	1,218	755
		Operating time	%	-	58.4%	72.2%	93.8%	98.9%	84.1%	96.3%	94.8%	96.1%	100.0%	98.4%	90.5%	82%		
		[TCE conc.]	µg/L	-	47.	44.	47.	46.	49.	51.	55.	50.	50.	39.	55.	49		
		Est. TCE mass	pounds	-	8.7	11.1	14.8	15.7	13.7	16.7	17.7	15.8	17.	12.6	17	161		
	Granite Reef (SRP 23.6E6N)	Pumpage	x 1,000 gal	-	16,940.7	34,378.8	32,413.6	34,976.2	28,719.9	33,068.6	33,211.1	32,504.	34,338.8	32,677.1	31,503.4.	344,732	1,058	656
		Operating time	%	-	51.6%	95.6%	93.8%	98.9%	83.9%	95.6%	96.7%	97.5%	100.0%	98.4%	90.5%	84%		
		[TCE conc.]	µg/L	-	78.	94.	88.	110.	89.	100.	120.	120.	100..	85.	110.	101		
		Est. TCE mass	pounds	-	11.	27.	23.8	32.1	21.3	27.6.	33.3	32.5	28.7	23.2	28.9	289		
	TOTAL	Pumpage	x 1,000 gal	-	39,110.	64,555.9.	70,225.8	75,884.1	62,331.6	72,286.3	71,720.1	70,407.2	75,062.8	71,426.9	68,610.7	741,621	2,276	1,411
		Est. TCE mass	pounds	-	19.7	38.	38.6	47.8	35.1	44.3	50.9	48.4	45.6	35.8	45.9	450		

Total Pumping (in million gallons):	5,397	--	--
TCE Mass Removal (in pounds):	1,388	--	--
Total Pumping (in gpm):	--	--	10,269

EXPLANATION:

% = percent

Est. TCE mass = Estimated TCE mass, reported in pounds

[TCE conc.] = Concentration of trichloroethene, in µg/L

NOTES:

1) Most TCE results listed are as reported from TestAmerica; where PCs samples(s) are 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.
2) Pumpage totals reported are in thousands of gallons (x1000).
3) Area 12 was not operating in January due to annual SRP canal dry-up.
4) Italicized values are approximate based on former, subsequent, or averaged values, where appropriate, when an extraction well is not sampled within the month of operation.
5) The discrepancy between PCX-1 Influent total and the combined discharge to CWTP and the Arizona Canal is within the range of instrumentation error of the individual flowmeters.

7.1 CGTF

The City of Scottsdale reported that approximately 4,075 acre-feet (AF) (or 1,328 million gallons [MG]) of groundwater were pumped and treated at the CGTF in 2022. Of the total, 3 MG were extracted from well COS-31, 0.5 MG from well COS-71A, 348 MG from well COS-72, and 977 MG from well COS-75A (**Table 6**). The City of Scottsdale operated well COS-71A in August 2022 for a short duration during a pipeline assessment. This well has not been operated for any duration of consequence since 2016 due to elevated concentrations of inorganic constituents (**Table 6**). Based on extraction well data presented in **Table 6**, an estimated 287 pounds of TCE mass were removed from groundwater and treated by the CGTF during 2022. The CGTF operated consistently during 2022. Downtime was primarily attributed to column cleaning, routine maintenance, and maintenance specific to the commissioning of the TGTF. The treatment system and associated wells were offline for 8 weeks, from October 11, 2022, to December 5, 2022, for annual column cleaning and TGTF commissioning activities. Except during the column cleaning activities, the CGTF was available for treatment of extracted groundwater greater than 95% of the time in 2022.

The City of Scottsdale reports results of laboratory testing and plant operations directly to EPA and ADEQ. Detailed reporting of the 2022 operational status, laboratory data, and system performance was provided by the City of Scottsdale in CGTF Compliance Monitoring Reports (CMRs) submitted on May 18, August 22, and November 16, 2022, and February 23, 2023. As demonstrated in operations reports and CMRs provided by the City of Scottsdale, NIBW COCs were not detected in groundwater treated at CGTF during 2022.

7.2 MRTF

Approximately 6,743 AF (or 2,197 MG) of groundwater were pumped and treated at the MRTF in 2022. Of the total, 1,052 MG were extracted from well PV-14 and 1,145 MG were extracted from well PV-15 (**Table 6**). Well PV-15 is the highest priority EPCOR well for the MRTF and was operated 100% of the time in 2022. Well PV-14 is the second highest priority well for the MRTF and was available for use throughout 2022. Extraction well PV-14 operated 95% of 2022, with a reduction in pumping hours in December due to lower seasonal demand. 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 6**, an estimated 54 pounds of TCE mass were removed from groundwater treated by the MRTF during 2022. The MRTF was available for treatment of extracted groundwater greater than 95% of the time in 2022.

Discharges from the MRTF to the SRP Arizona Canal are regulated by an AZPDES permit. EPCOR is responsible for monitoring and reporting associated with the AZPDES permit for the MRTF. However, treated water from the MRTF was not delivered to the SRP Arizona Canal in 2022.

7.3 NGTF

Approximately 3,281 AF (or 1,069 MG) of groundwater were pumped from PCX-1 and treated at the NGTF during 2022, with approximately 83 MG (8%) of the total volume discharged to the Arizona Canal and 983 MG (92%) to the CWTP (**Table 6**). Well PCX-1 was available for use and operational nearly 100% of the time in 2022. Based on extraction well data presented in **Table 6**, an estimated 396 pounds of TCE mass were removed from groundwater treated by the NGTF in 2022. The NGTF was available for treatment of extracted groundwater greater than 95% of the time in 2022. Treated water from the NGTF that was not discharged to the 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 AZPDES permit was renewed as of November 29, 2022, effective through November 28, 2027. The results of AZPDES sample analyses were summarized in monthly DMRs and submitted to ADEQ under separate cover during 2022.

7.4 Area 7 GWETS

Approximately 187 AF (or 61 MG) of groundwater were pumped and treated at the Area 7 GWETS in 2022. Of the total, approximately 34 MG were extracted from well 7EX-3aMA and 27 MG from well 7EX-6MA (**Table 6**). In July 2021, the system shut down during a severe electrical storm. Following diagnostics on the system, the operator determined that the communication system had irreparably failed. The NIBW PCs elected to use the opportunity to upgrade the entire treatment system communication system. Due to global supply-chain issues, most of the equipment was backordered and shipping was continually delayed until the third quarter of 2022.

In March and April 2022, a temporary alternative communication system was implemented to restart the system. The Area 7 GWETS was restarted on April 12, 2022, and commenced treating water from well 7EX-3aMA. The system pumped periodically through May and June while maintenance issues were addressed. Well 7EX-3aMA underwent rehabilitation in mid-June and was returned to service and restarted on June 20, 2022. The pump in well 7EX-3aMA failed on July 29, 2022. A new pump was installed in the well and restarted on August 19, 2022. The new pump in well 7EX-3aMA failed again on October 31, 2022. Investigations indicated that excessive sand production caused the pumps to fail. A new pump designed to handle some sand in the pumped groundwater was installed in early December. Production from 7EX-3aMA resumed on December 19, 2022.

The new drive for well 7EX-6MA was received, installed, and programmed in early July. Wireless communication between the Area 7 GWETS and the remote well was established during this time. The system was fully operational treating water from wells 7EX-3aMA and 7EX-6MA on July 12, 2022. The pump in well 7EX-6MA failed on July 17, 2022. Following removal of the pump, the well was brushed and bailed. A new pump was installed in the well in early August. Following wiring, programming, and maintenance, the pump in 7EX-6MA was restarted on August 15, 2022, and was operational for the remainder of 2022. Once the temporary communication system was initially set up in April, the Area 7 GWETS was available for treatment of extracted groundwater greater than 80% of the time. The remaining equipment for the new communication system was received in October 2022. The new communication system implementation was completed in November 2022.

In July of 2022, an attempt to modify the construction of extraction well 7EX-4MA to seal the breach in the casing was unsuccessful, rendering the use of the well for extraction impractical, as discussed in **Section 3.5.5**. The well is not suitable for groundwater monitoring purposes and will be decommissioned in 2023. Additional details regarding the 7EX-4MA operational history and rehabilitation activities performed since 2012 are provided in the Extraction Well 7EX-4MA Assessment Technical Memorandum in **Appendix J**.

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 201 pounds of TCE mass were removed from groundwater treated by the Area 7 GWETS in 2022 (**Table 6**).

As part of Site QA procedures, Performance Evaluation (PE) samples (designated with sample ID SP-104) were submitted to Eurofins during January and July 2022, and process water split samples were submitted to PACE. A summary of the PE sample results and laboratory reports are included with other GWETS data and quality control reporting in the supplemental data report (issued under separate cover concurrently with this SMR).

7.5 Area 12 GWETS

Approximately 2,276 AF (or 742 MG) of groundwater were pumped and treated at the Area 12 GWETS in 2022. Of the total, 397 MG were extracted from well MEX-1MA and 345 MG from the Granite Reef well (**Table 6**). The Area 12 system was shut down for the annual SRP dry-up beginning in early January. The system was restarted on February 11, 2022, once the discharge to McKellips Lake was allowed by SRP. In June, July, August, and September the system was offline periodically due to severe heat, monsoonal electrical storms in the area, and on several occasions due to too much water at the discharge receiving location. Treatment system performance data provided by the Area 12 GWETS operator based on monthly sampling of extraction wells (when operating) indicates an estimated 450 pounds of TCE mass were removed from groundwater treated by the Area 12 GWETS in 2022 (**Table 6**). Overall, the Area 12 GWETS was available for treatment of extracted groundwater greater than 90% of the time in 2022.

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

7.6 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 submit samples to Eurofins (designated as the primary analytical laboratory), located in Phoenix, Arizona, and PACE located in Mt. Juliet, Tennessee. Eurofins 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 Eurofins on November 17, 2022. 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 for the MRTF, Area 7 GWETS, and Area 12 GWETS on September 27, 2022 and for the CGTF and NGTF on September 28, 2022, in accordance with Section VI.B.4.d of the SOW. In accordance with the SOW, the schedule of site inspections was coordinated two weeks in advance with EPA and ADEQ to provide an opportunity for regulatory agency participation. Hydrogeologic, Inc. participated in the field inspections on behalf of EPA. Other participants included the respective treatment system operators, managers, and the NIBW PCs.

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 the CGTF, MRTF, NGTF, Area 7 GWETS, or 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**.

8 DATA PRESENTATION AND ANALYSES

8.1 Groundwater Pumping

Groundwater pumping trends in the vicinity of the NIBW site are summarized in **Table 7**. Monthly groundwater pumping data for 2022 are summarized in **Table 8**. Annual groundwater pumping data for 1991 through 2022 are summarized in **Table 9**. Groundwater pumping data for 2022 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 8** (in AF). Historical groundwater extraction is graphed over the last 10-year period along with TCE concentrations in **Appendix E**.

Review of monthly groundwater pumping data (**Table 8**) 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 2022, combined monthly pumping for all wells tracked at the NIBW Site ranged from an annual minimum of approximately 1,422 AF (463 MG) in November 2022, to an annual maximum of 2,559 AF (about 834 MG) in July 2022 (**Table 8**).

Review of the spatial distribution of groundwater pumping for 2022 (**Figure 6**) indicates the presence of several pumping centers. The predominant pumping center is associated with the EPCOR wellfield, located along the Arizona Canal in the vicinity of McDonald Road and to the north. Total groundwater pumping for 2022 at the six PV wells was 10,168 AF (3,313 MG). This pumping is principally from the LAU. NGTF extraction well SRP22.5E9.3N (also known as PCX-1) pumped a total of 3,281 AF (1,069 MG) from the LAU in 2022 (**Table 8**). 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. Well COS-75A pumps exclusively from the LAU, while COS-71A pumps primarily from the MAU. Wells COS-72 and COS-31 pump from both the MAU and LAU. Extraction well COS-71A has not pumped routinely since 2016 due to elevated levels of inorganic constituents at this well. Increasing levels of inorganics have 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. The PCs and the City of Scottsdale are collaborating to rehabilitate, test, and modify the construction of COS-71A to pump solely from the MAU, and return the well to service in

2023. Total groundwater pumping for 2022 at the CGTF extraction wells was 4,075 AF (1,328 MG). CGTF pumping in 2022 was principally focused at well COS-75A, which accounted for approximately 74% of CGTF extraction, with about 98 MG of the 1,328 MG pumped (**Table 8**).

Pumping associated with the Area 12 GWETS is also fairly substantial, totaling 2,276 AF (742 MG) for 2022. Pumping associated with the Area 7 GWETS totaled 187 AF (61 MG) in 2022. The Area 7 GWETS was offline in early 2022 due to a communications issue initially caused by storms in 2021. Delays from equipment shipments caused by COVID-19 pandemic global supply chain issues extended the downtime of the Area 7 GWETS. Pumping resumed at 7EX-3aMA in April 2022 and at 7EX-6MA in August 2022. 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 2022 at the five AWC wells, which pump from the MAU and LAU, was 2,017 AF (657 MG). When operating, well COT-6 comprises another significant pumping center. Well COT-6 pumps from both the MAU and LAU. In 2022, COT-6 was only operated from June through August for a total of 455 AF (148 MG).

Overall trends in pumping from 1991 through present are summarized in **Table 7**. Annual groundwater pumping in the vicinity of the NIBW Site for 2022 totaled 23,670 AF (7,713 MG) which is fairly consistent with the average since 2017.

Table 7. 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 2022	The City of Scottsdale balancing inorganics not related to Site - pumping decreased to an average of approximately 23,573 AF (7,681 MG)

Table 8. 2022 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	0	0	0	3,183	3,970	4,544	5,109	3,142	5,561	5,802	0	2,281	33,592	103.1	0.0	103.1	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 [a]	0	100	0	0	0	0	0	0	0	219	3,997	4,009	4,352	6,868	8,013	27,457	84.3	0.0	84.3	0.0
PV-11	0	3	97	141	0	0	0	0	0	0	0	52,833	94,267	52,439	43,030	242,710	744.8	0.0	22.3	722.5
PV-12B [b]	0	3	97	13,566	24,552	45,395	97,570	133,273	130,232	134,430	119,446	50,813	11,561	1,061	908	762,807	2,341.0	0.0	70.2	2,270.7
PV-14	0	0	100	91,369	86,653	95,584	90,758	93,523	89,340	95,411	94,879	91,117	93,975	90,280	39,492	1,052,381	3,229.6	0.0	0.0	3,229.6
PV-15	0	6	94	97,591	87,985	97,363	94,334	98,019	94,076	96,031	95,638	92,214	97,488	95,019	99,197	1,144,955	3,513.7	0.0	210.8	3,302.9
PV-16	0	0	100	0	0	180	196	38	185	325	119	148	139	154	0	1,484	4.6	0.0	0.0	4.6
PV-17	0	0	100	325	0	186	675	11,669	30,452	42,526	13,079	7,733	1,477	872	0	108,994	334.5	0.0	0.0	334.5
AVI **	0	100	0	1,902	1,902	1,902	1,902	1,902	1,902	1,902	1,902	1,902	1,902	1,902	1,902	22,821	70.0	0.0	70.0	0.0
AWC-7A **	0	14	86	8,932	8,932	8,932	8,932	8,932	8,932	8,932	8,932	8,932	8,932	8,932	8,932	107,184	328.9	0.0	46.1	282.9
AWC-8B [c] **	0	4	96	17,165	17,165	17,165	17,165	17,165	17,165	17,165	17,165	17,165	17,165	17,165	17,165	205,982	632.1	0.0	25.3	606.8
AWC-8A **	0	18	82	6,105	6,105	6,105	6,105	6,105	6,105	6,105	6,105	6,105	6,105	6,105	6,105	73,257	224.8	0.0	40.5	184.4
AWC-9A/9B **	0	16	84	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	10,877	130,529	400.6	0.0	64.1	336.5
AWC-12A **	0	11	89	11,700	11,700	11,700	11,700	11,700	11,700	11,700	11,700	11,700	11,700	11,700	11,700	140,398	430.9	0.0	47.4	383.5
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.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
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.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
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.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS-25 *	0	20	80	0	11	271	1,096	2,008	1,675	2,045	1,815	1,600	458	103	3	11,087	34.0	0.0	6.8	27.2
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.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COS-71A [d]	0	71	29	0	0	0	0	0	246	0	281	0	0	0	0	527	1.6	0.0	1.1	0.5
COS-72	0	48	52	67,603	79,930	59,295	7,881	0	13,668	56,926	28,748	20,997	0	0	12,945	347,992	1,067.9	0.0	512.6	555.3
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.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
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	100,270	91,493	102,084	98,555	100,076	95,627	97,080	93,657	94,077	33,016	0	70,594	976,529	2,996.9	0.0	0.0	2,996.9
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.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.
COT-6	0	42	58	0	0	0	0	0	39,844	62,102	46,276	0	0	0	0	148,223	454.9	0.00	191.05	263.83
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	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MDWC	0	12	88	1,462	1,409	1,433	3,054	3,039	3,181	3,119	4,476	2,881	2,097	1,561	1,361	29,073	89.2	0.0	10.7	78.5
MEX-1MA	0	100	0	0	22,169	30,177	37,812	40,908	33,612	39,218	38,509	37,903	40,724	38,750	37,107	396,889	1,218.0	0.0	1,218.0	0.0
QRIA	0	12	88	0	0	0	1,053	1,269	1,323	1,053	945	1,040	486	0	0	7,169	22.0	0.0	2.6	19.4
SRIR-SCC [e]	0	100	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.	N.I.S.	N.I.S.	N.I.S.
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 [f]	0	29	71	34,667	8,453	0	0	0	0	1,411	4,963	1,867	2,480	0	2,001	55,841	171.4	0.0	49.7	121.7
SRP22.1E8.5N	0	100	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.	N.I.S.	N.I.S.	N.I.S.
SRP22.3E7N	0	100	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.	N.I.S.	N.I.S.	N.I.S.
SRP22.4E9N	0	40	60	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.	N.I.S.	N.I.S.	N.I.S.
SRP22.5E5.5N	0	52	48	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.	N.I.S.	N.I.S.	N.I.S.
SRP22.5E6N	0	100	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.	N.I.S.	N.I.S.	N.I.S.
PCX-1 (SRP22.5E9.3N)	0	0	100	88,539	81,892	89,319	93,579	93,165	88,443	91,529	89,293	85,432	90,146	86,292	91,492	1,069,121	3,281.0	0.0	0.0	3,281.0
SRP22.6E10N	0	5	95	96,260	22,718	0	5,282	0	0	622	7,433	1,336	2,571	417	2,630	139,269	427.4	0.0	21.4	406.0
SRP22.9E10.8N [g]	0	8	92	2,304	1,698	0	0	0	0	345	4,197	1,916	1,789	72	1,496	13,816	42.4	0.0	3.4	39.0
COS-31 (SRP23.3E7.3N)	0	30	70	0	0	0	2,953	0	0	0	0	0	0	0	0	2,953	9.1	0.0	2.7	6.3
COS 6 (SRP23.3E7.5N)	0	51	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP23.5E5.3N	0	23	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP23.5E8.8N	0	35	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP23.5E9.5N	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
SRP23.5E10.6N [h]	0	9	91	231	5,865	0	9,059	3,193	5,611	2,819	5,350	3,376	2,620	0	0	38,125	117.0	0.0	10.5	106.5
Granite Reef (SRP23.6E6N)	0	100	0	0	16,941	34,379	32,414	34,976	28,720	33,069	33,211	32,504	34,339	32,677	31,503	344,732	1,057.9	0.0	1,057.9	0.0
SRP24E10.5N	0	18	82	877	33	0	17,515	11,529	10,486	11,858	12,226	6,390	6,018	0	0	76,930	236.1	0.0	42.5	193.6
Total Monthly Discharge (Gallons x 1,000)				651,886	588,482	612,348	653,650	687,336	727,946	833,927	758,360	652,428	582,486	463,245	500,733	7,712,827				
Total Monthly Discharge (Acre-Feet)				2,001	1,806	1,879	2,006	2,109	2,234	2,559	2,327	2,002	1,788	1,422	1,537	23,670	23,670	0	3,915	19,755

EXPLANATION:

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 well
MDWC = McDowell Water Company
MEX = Motorola Extraction Well
NA = Not Available
N.I.S. = Not in Service
QRIA = Quail Run Irrigation Association
SRIR = Salt River Indian Reservation
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.

[a] Replacement well for 7EX-4MA and 7EX-5MA
[b] Replacement well for PV-12
[c] Replacement well for AWC-8
[d] Replacement well for COS-71
[e] Scottsdale Community College is now connected to the SRPMIC community water system, well SRIR-SCC will no longer be used.
[f] Replacement well for SRP 21.5E,8N
[g] Replacement well for SRP 23E,10.8N
[h] Replacement well for SRP 23.4E,10.6N

Table 9. Annual Groundwater Pumping in the NIBW Superfund Site Vicinity from 1991 through 2022

	Gallons (x1000)																															
Well ID	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	2022
7EX-1UA (1)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13,514	13,654	14,585	12,966	12,627	0	0	0	AB	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	33,592
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	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	AB
7EX-6MA (4)a	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	25,524	76,991	107,116	105,021	89,539	108,698	43,552	27,457
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	242,710
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	AB
PV-12B b	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	464,884	769,618	438,959	422,165	809,273	558,911	452,431	835,263	741,792	833,931	762,807
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	1,052,381
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	1,144,955
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	1,484
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	108,994
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	22,821
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	107,184
AWC-8/8B (5)	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	205,982
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	73,257
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	130,529
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	140,398
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	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.	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.	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.	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	11,087
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	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.	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	AB
COS-71A c	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	52,797	505,229	559,816	4,064	7,011	0	6,075	0	527
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	347,992
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.	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	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	976,529
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.	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	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	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	148,223
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	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	NA
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	29,073
MEX-1MA (6)	---	---	---	---	---	---	---	---	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	396,889

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	2022
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	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	7,169
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	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	NA
SRIR-4	60,580	7,771	0	31,631	3	0	248	38	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.	AB	AB	AB	AB
SRIR-10	47,583	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.	AB	AB	AB	AB
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	0	0	0	3,397	5,321	13,803	114,214	116,117	208,382	73,131	18,104	AB	AB	AB	AB	AB	AB
SRP21.6E8N[d]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11,392	55,841
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	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.
SRP22.3E7N	0	0	0	0	756	22	0	0	0	0	0	0	0	0	0	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.	N.I.S.
SRP22.4E9N	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.	N.I.S.
SRP22.5E5.5N	0	0	0	0	0	0	0	0	0	0	123,673	264,377	0	0	0	0	0	0	0	0	0	0	64,101	0	88	212	0	101	7	0	0	N.I.S.
SRP22.5E6N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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.	N.I.S.
PCX-1[(7)] (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	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	1,069,121
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	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	139,269
SRP22.9E10.8N[e]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	128,034	173,499	305,492	183,239	29,066	91	16,957	2,222	150	2,483	13,816
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	21,004	120,014	N.I.S.	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
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	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	2,953
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	1,769	175,013	0	0	0	0	0	0	0	7,723	4,054	0	1,082	4,920	1,457	681	0
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	0	0	N.I.S.	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
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	0	78,673	0	2,941	0	0	0	0	7	6,194	1,776	0	0	518	13	0	0
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	2,922	134,579	0	1,551	0	965	0	531	3	101	935	0	0	0	528	10,404	0
SRP23.5E9.5N	0	0	0	0	0	0	0	85	502	117,592	131	99,548	30,042	256,542	2,051	1,988	163,479	0	2,021	0	1,303	33	15,054	163	0	352	0	0	0	65	27,577	0
SRP23.5E10.6N[f]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	83,907	191,216	217,193	115,912	20,369	0	33,374	251	78	854	38,125
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	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	344,732
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	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	76,930
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	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	7,712,827
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	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	23,670

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 well
MDWC = McDowell Water Company
MEX = Motorola Extraction Well
NA = Not available
N.I.S. = Not in Service
QRIA = Quail Run Irrigation Association
SRIR = Salt River Indian Reservation
--- = No Data

NOTES:

(1) Extraction well 7EX-1UA went into service in 2008.
(2) Extraction wells 7EX-3aMA 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 on October 13, 2015.
(5) AWC-8B replaced AWC-8 in April 2001. Pumping includes AWC-8 and AWC-8B
(6) Well MEX-1MA went into service in October 1999.
(7) Well SRP22.5E9.3N (PCX-1) went into service in April 1997.

a Replacement well for 7EX-4MA and 7EX-5MA
b Replacement well for PV-12
c Replacement well for COS-71
d Scottsdale Community College is now connected to the SRPMIC community water system, well SRIR-SCC will no longer be used.
e Replacement well for SRP21.5E8N
f Replacement well for SRP23E10.8N
g Replacement well for SRP23.4E10.6N

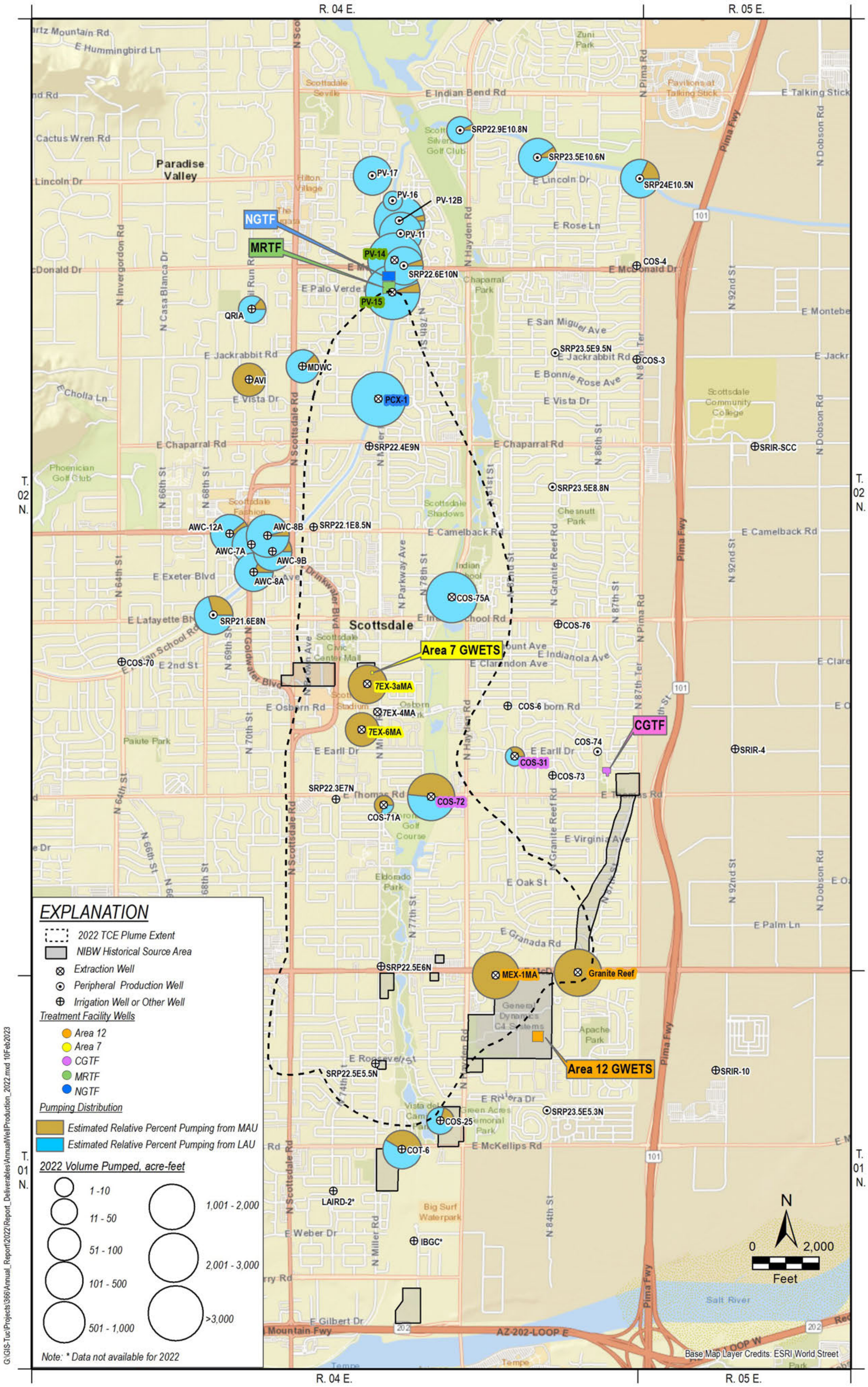

Figure 6. Annual Groundwater Pumping in the NIBW Superfund Site Vicinity

8.2 Groundwater Levels

Water level measurements obtained and reported by Montgomery & Associates in April, June, and October are summarized in **Appendix B**, **Table B-1 and Table B-2**, 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 2022 water level contour maps for the MAU and LAU are shown on **Figure 7**. A subset of wells in the vicinity of Area 7 were also measured in June 2022 after 7EX-3aMA resumed pumping. June 2022 water level data from the vicinity of Area 7 are shown as an inset on the MAU water level contour map on **Figure 7**. October 2022 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 also collect supplemental continuous water level data (not required per the GM&EP) at the Site at select MAU and LAU monitoring wells. While not included in this SMR, these continuous water level data sets are helpful to interpret trends and responses (See **Section 10.1.3**).

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 7.0**. **Table 8** 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 2022 April and October compliance water level monitoring events. Due to the offline status of Area 7 extraction wells during the April monitoring event, a subset of monitoring wells in the area were measured in June 2022 after pumping at 7EX-3aMA had resumed. Where appropriate, the pumping status of wells within or close to the Site during the April and/or October 2022 water level rounds is noted in the following sections in relation to patterns of groundwater movement in each of the alluvial units.

8.2.1 2022 Groundwater Elevations

Based on the October 2022 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 from recharge areas to the east 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. As discussed in the CSM (**Section 4.2.3**), vertical migration from the Upper MAU to underlying units also occurs along the Western Margin as the MAU thins and coarsens approaching the basin margin. Downward vertical hydraulic gradients exist across the Site and the conceptual model acknowledges vertical migration of groundwater from the UAU and the MAU to the LAU in response to these gradients. Vertical gradients have decreased over time at the Site due to increased groundwater recovery in the LAU compared to the MAU. In fact, recent monitoring in the lowermost interval of the MAU shows upward gradients in localized areas of the Site. To facilitate evaluation of vertical gradients, some supplemental water level data for the Lower MAU has been included on contour maps and tables for the SMR this year.

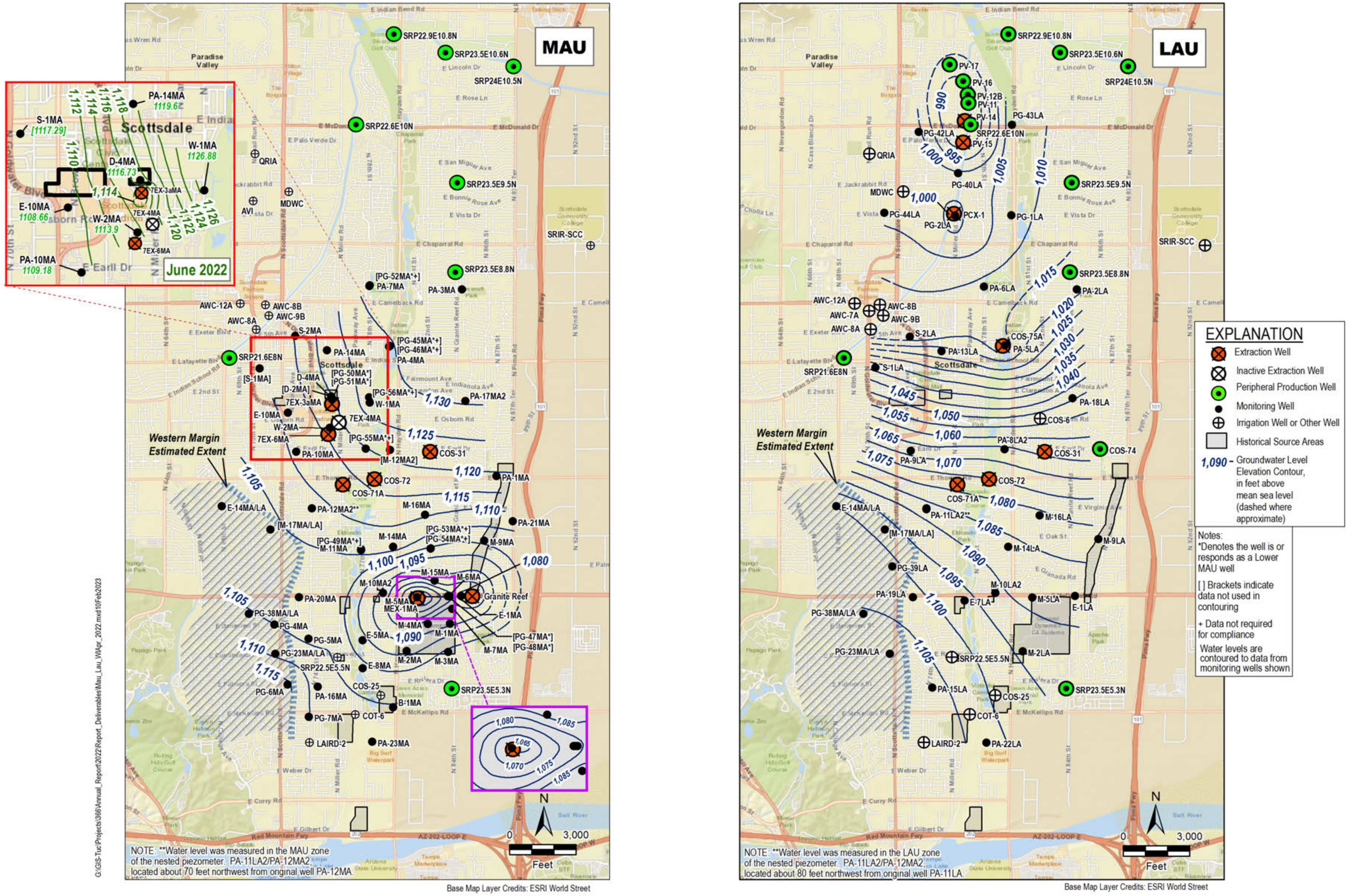

Figure 7. Groundwater Level Contours for the MAU and LAU from April 2022

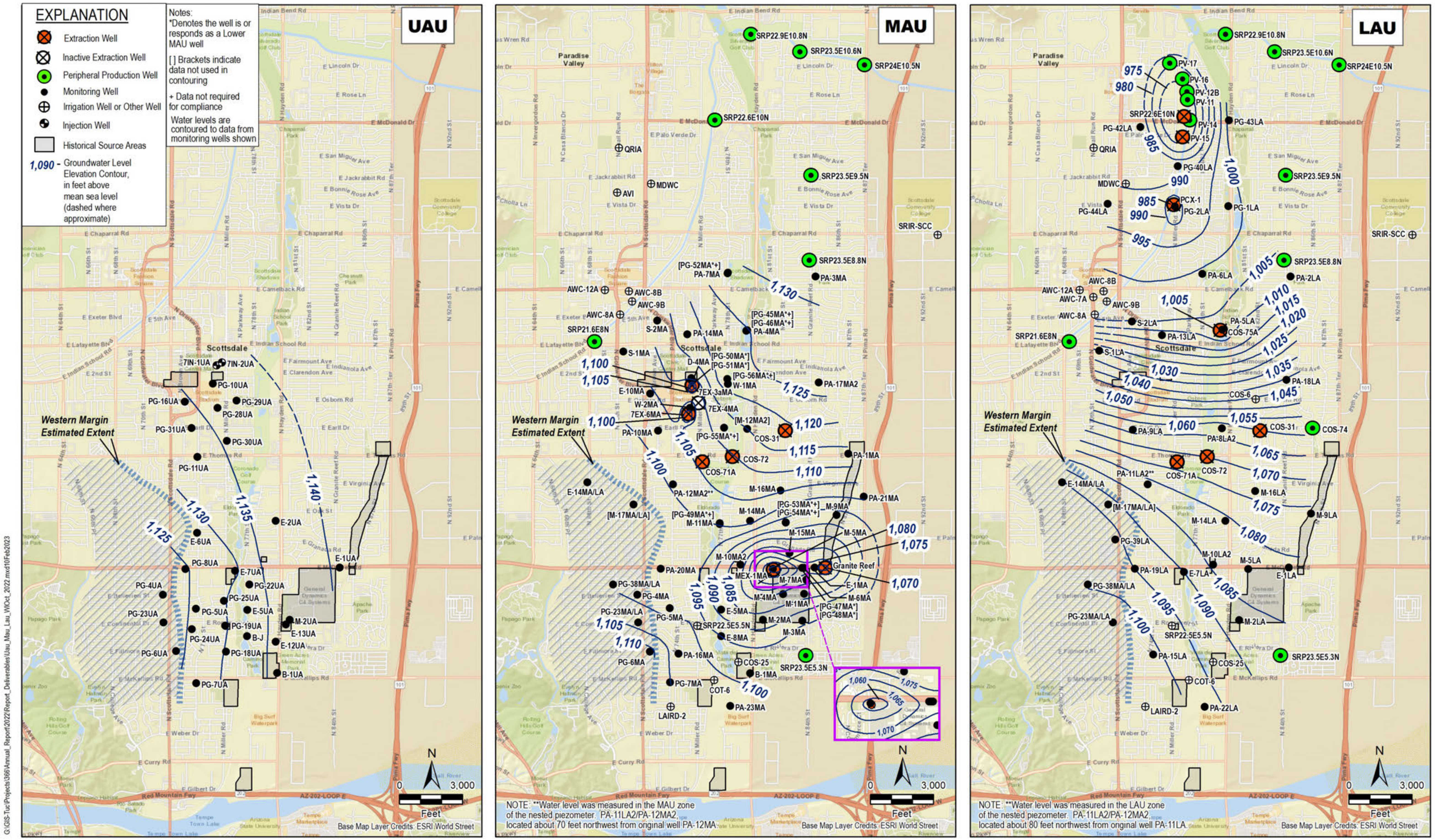

Figure 8. Groundwater Level Contours for the UAU, MAU, and LAU from October 2022

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 October 2022 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; and 2) Area 7 GWETS wells 7EX-3aMA and 7EX-6MA. Based on October 2022 conditions (**Figure 8**), cones of depression are apparent in the MAU in the vicinity of both the Area 7 and Area 12 extraction wells. 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 inconsistent with the Upper MAU data and are therefore not used for contouring. Historically, Lower MAU water level elevations have generally been lower than the Upper MAU. In the last few years, differential water level recovery has caused pressure heads in the Lower MAU to be above the Upper MAU in some locations. To further evaluate recent localized vertical gradient reversals, the NIBW PCs collected voluntary supplemental water level data from the following Lower MAU wells in October 2022: PG-45MA, PG-46MA, PG-49MA, PG-52MA, PG-53MA, PG-54MA, PG-55MA, and PG-56MA. Although these supplemental Lower MAU data are also not contoured with the Upper MAU data set, they are provided for reference in **Appendix B, Table B-2**.
- D-2MA – This well is completed in a shallower interval than the other Upper MAU 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. In 2021, the NIBW PCs recommended replacement of this well as a compliance data point with well D-4MA (formerly well OZ7-1). Permanent replacement of this well on the GM&EP schedule was approved by EPA on July 12, 2022, following the Third Quarter monitoring event. Data collection was discontinued from D-2MA for the annual event in October 2022. Water level data from October 2022 from D-4MA were used in contouring data from the MAU.
- 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 that was previously obtained from the well suggested that M-12MA2 responded more readily to pumping stresses in the Lower MAU and LAU than the Upper MAU, and as such was not representative of Upper MAU hydraulic conditions. The NIBW PCs re-installed high-frequency water level monitoring equipment in M-12MA2 in 2022 and will be continuing to evaluate responses to pumping in relation to future use of data from this well.

- 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-1MA – Further evaluation of high-frequency water level data collected in the well pairs S-1MA/LA and S-2MA/LA in 2022 has helped to clearly identify which of these MAU wells produce water level data congruent with the Upper MAU. The pumping signature from Area 7 is clearly visible at S-2MA as opposed to a significantly muted response to local and regional pumping stresses at S-1MA. The supplemental high-frequency data supports use of water level measurements from S-2MA over those from S-1MA, where the hydraulic response is inconsistent with the surrounding MAU wells (**Appendix B**). These wells are crossgradient of Area 7 extraction wells and water quality at these wells continued to be below the laboratory detection limit for TCE in 2022.

In April, horizontal hydraulic gradients in the MAU increased in all directions toward the Area 12 GWETS pumping center (**Figure 7**). Horizontal hydraulic gradients decrease significantly in the area outside of this pumping center. The temporary shutdown of the Area 7 GWETS extended through the groundwater monitoring event in April, as evidenced by the uniform gradient near Area 7. The Area 7 GWETS did resume operation following the monitoring event in April and continued operating intermittently throughout the second quarter. The June 2022 water level contours also shown on **Figure 7** were collected from a subset of Area 7 monitoring wells when extraction well 7EX-3aMA was pumping and localized drawdown is evident.

October 2022 MAU water level data displayed on **Figure 8** show that patterns of groundwater movement were generally similar to those observed in April near the Area 12 GWETS. Both 7EX-3aMA and 7EX-6MA were pumping at Area 7 in October, as indicated by the cone of depression near the Area 7 pumping center.

Based on October 2022 water level contours (**Figure 8**), horizontal hydraulic gradients in the MAU increase in the immediate vicinity of the Area 7 GWETS and Area 12 GWETS extraction wells. Horizontal hydraulic gradients decrease significantly in the areas between and outside of these pumping centers.

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 2022 on **Figure 7** and **Figure 8**, respectively. CGTF extraction well COS-75A, one of the up-gradient LAU extraction wells for the remedy, was operating for both the April and October 2022 water level monitoring rounds, as was key LAU extraction well PCX-1.

Key LAU extraction wells PV-14 and PV-15 were both pumping continuously during the April water level round but were off for a period of about six hours during the October water level round. During these six hours, PV wells PV-12B, PV-16, and PV-17 were pumping. Other wells pumping from the LAU include selected AWC wells during both water level rounds and PV wells PV-11 during the October water level round and PV-12B during the April water level 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 EPCOR production wells, results in a regional sink for LAU groundwater to the north. Based on both April and October 2022 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 are apparent in the LAU near the AWC wellfield in April and October as water levels were collected at peak pumping periods during both monitoring events.

8.2.2 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. Short-term changes are evaluated by comparing water level data from two consecutive years. **Appendix B**, **Table B-3** summarizes the difference in water level between October 2021 and October 2022 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 2021 and October 2022 data 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. Longer-term water level data trends are evaluated using water level data obtained over a longer period. Hydrographs showing the last 20 years of water level data for wells included in the monitoring program are provided in **Appendix D**. Hydrographs for specific wells show water level and/or TCE data in accordance with the GM&EP monitoring schedule.

Comparing data from October 2021 and October 2022, observed water level changes in the UAU were all less than 2.97 feet (**Figure 9**). Water levels rose in only two UAU monitoring wells, PG-16UA and PG-10UA, with 0.01-foot and 0.34-foot increase, respectively. These wells are located downgradient of the Area 7 injection wells. The Area 7 system was down and no injection was occurring in 2021. Water levels declined in all other UAU wells, with the largest magnitude of decline observed in the southwest portion of the Site, south of McDowell Road near the Western Margin. The magnitude of decline in the UAU along and west of Hayden Road was generally larger than to the east, ranging from -0.16 feet north of Thomas Road to -2.97 feet south of McDowell Road, while the magnitude of decline in the UAU east of Hayden Road ranged from -1.08 to -1.63 feet (**Figure 9**).

Water levels in the MAU between October 2021 and October 2022 declined from a minimum of -0.77 feet to a maximum of -17.63 feet (**Figure 10**). Water level decline in the MAU is observed regionally and is likely due to increased groundwater pumping across the region under drought conditions. The maximum water level decline of -17.63 feet was observed near Area 7 and is attributed to pumping that occurred at Area 7 extraction wells prior to the October 2022 monitoring round compared with the 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. A higher magnitude of decline was also observed in MAU monitoring wells near the Area 12 Granite Reef and MEX-1MA extraction wells. Pumping rates at the Area 12 extraction wells were comparable leading up to the October events in 2021 and 2022; however, regional MAU water levels declined an average of 6.7 feet, which can preferentially impact water levels near pumping centers. The magnitude of decline in MAU monitoring wells ranged from -7.48 feet to -8.67 feet near the Area 12 GWETS.

Water levels declined in all LAU monitoring wells between October 2021 and October 2022 (**Figure 11**). The magnitude of decline in the LAU ranged from a minimum of -0.58 feet to a maximum of -17.10 feet. The smallest decline in water levels was observed in wells in the northern portion of the Site, north of Chaparral Road, ranging from -0.58 feet to -4.33 feet. The magnitude of decline was greatest north of Indian School Road and south of Chaparral Road, with a maximum decline of -17.10 observed at well S-2LA. The October 2022 water level at S-2LA was measured during peak diurnal pumping of the AWC wellfield, which depressed the water level approximately 12 to 13 feet at this well.

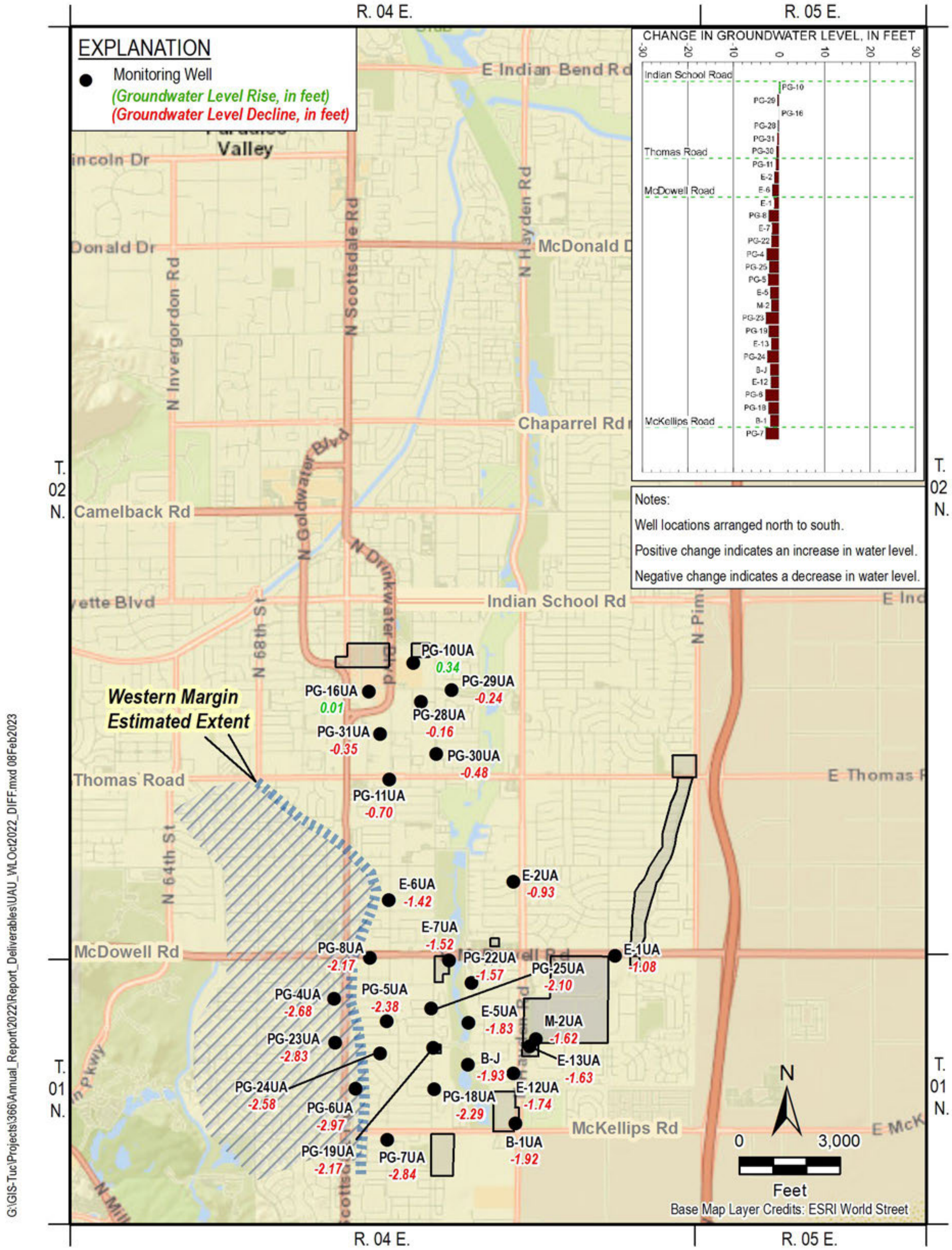

Figure 9. Change in UAU Groundwater Level from October 2021 to October 2022

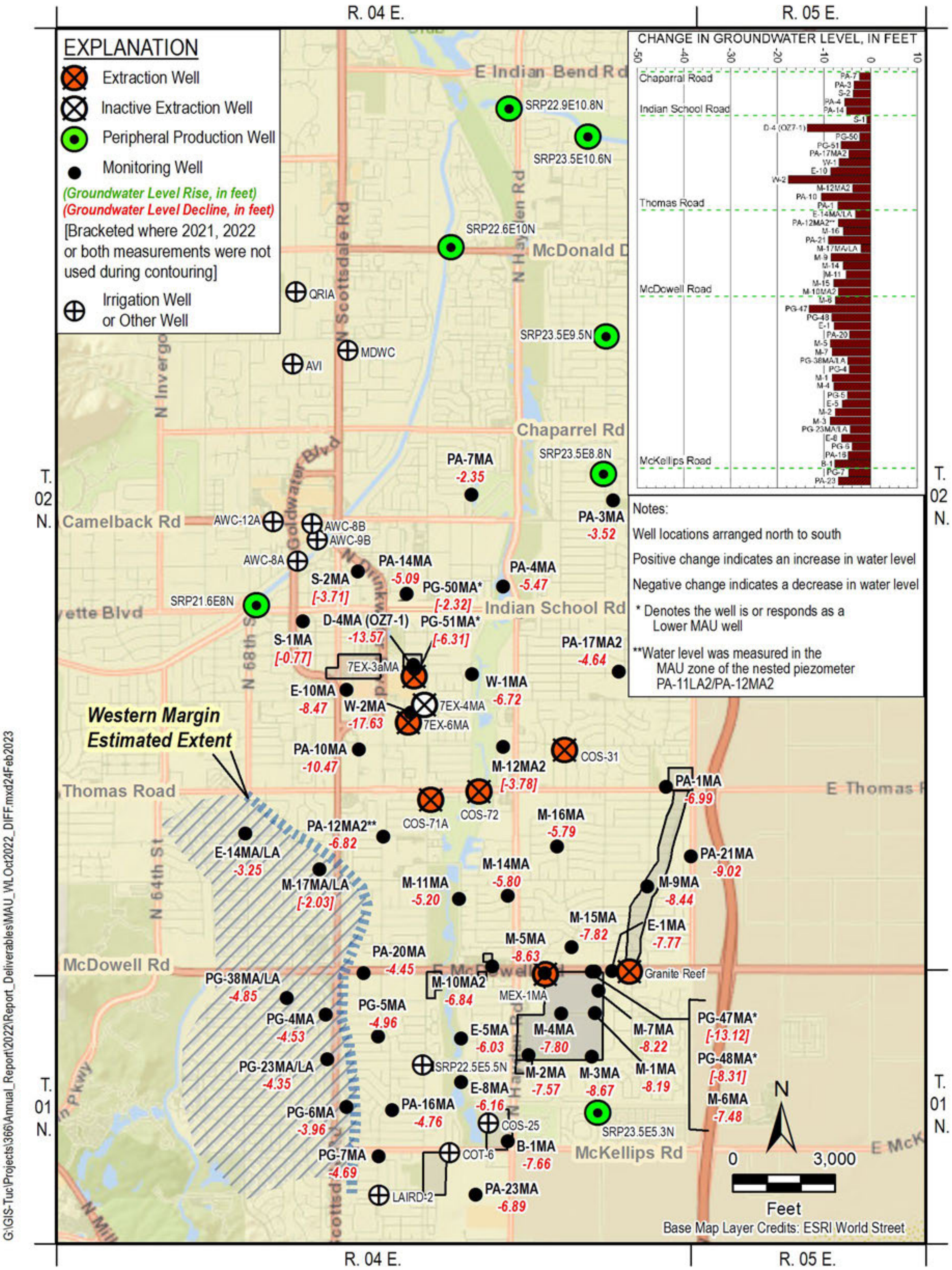

Figure 10. Change in MAU Groundwater Level from October 2021 to October 2022

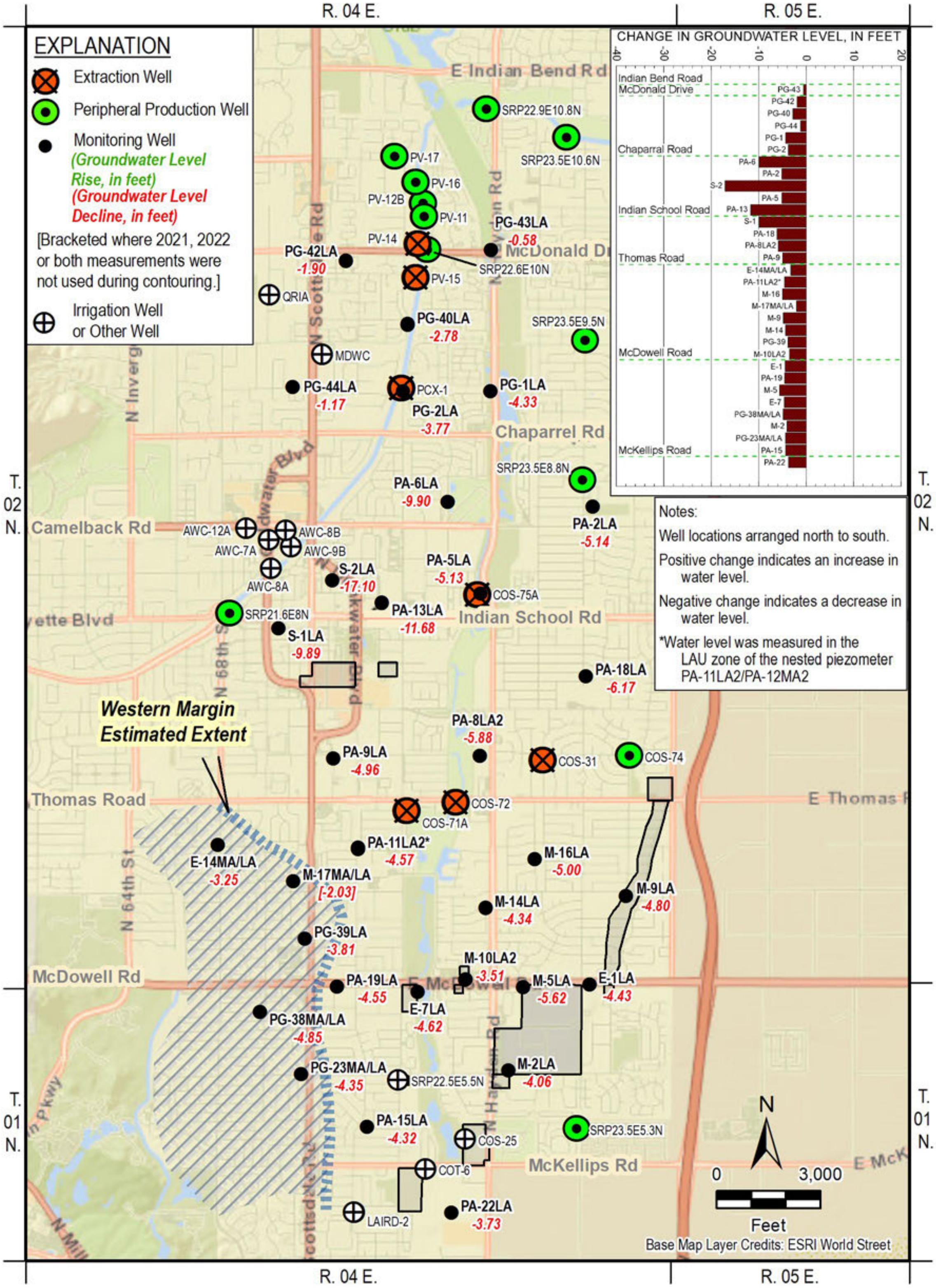

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Figure 11. Change in LAU Groundwater Level from October 2021 to October 2022

8.3 Water Quality

During 2022, Montgomery & Associates coordinated activities by both the analytical laboratory, Eurofins, Inc., and the groundwater monitoring contractor, Verdad Group LLC.

8.3.1 2022 COC Concentrations

A summary of laboratory results of COCs for NIBW monitoring wells for 2022 is provided in **Appendix C, Table C-1**. Extraction well COC results for 2022 are summarized in **Appendix C, 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 2022 plume contours are compared to 2001 plume contours, and a statistical trend analysis is conducted for individual wells for the last 10 years and last five years. The statistical trend analysis is not included in remedy performance evaluations but is voluntarily conducted by the PCs to provide additional quantitative information on TCE concentration changes over time.

8.3.1.1 2022 TCE Magnitude & Extent

TCE concentration contours for October 2022 for the UAU, MAU, and LAU are shown on **Figure 12**. Hydrographs showing TCE concentrations and water levels for the 20-year period from 2002 through 2022 are shown for all monitoring wells included in the monitoring program in **Appendix D**.

Results from the October 2022 monitoring round show that all UAU monitoring wells have TCE concentrations below the Cleanup Standard of 5 µg/L. The maximum TCE concentration detected was 4.8 µg/L at monitoring well PG-31UA in October 2022. A small plume is shown in the UAU with dashed contours on **Figure 12** based on the interpretation that concentrations are anticipated to remain above Cleanup Standards in a limited area between monitor wells.

TCE concentrations in MAU groundwater are generally higher than in the other two units, with a 2022 maximum concentration of 3,800 µg/L detected in July 2022 at monitoring well W-2MA, located downgradient from Area 7 (**Appendix C, Table C-1**). TCE detected at monitoring well W-2MA declined to 2,500 µg/L in October 2022, following the start-up of the Area 7 extraction wells. The maximum concentration of TCE detected in a monitoring well in the vicinity of Area 12 was 59 µg/L at M-10MA2, located crossgradient from Area 12, in January 2022. However, concentrations through the remainder of 2022 at M-10MA2 ranged between 21 µg/L and 32 µg/L. Historically, the highest TCE concentrations in monitoring wells near Area 12 have been detected at E-5MA, which had a maximum TCE concentration of 56 µg/L in July 2022. The Area 12 Granite Reef extraction well, located at historical source Area 5B, had a maximum TCE concentration of 120 µg/L in August and September 2022 (**Appendix C,**

Table C-2). Area 12 extraction well MEX-1MA had a maximum TCE concentration of 55 µg/L in August and December 2022. 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 is attributed to 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 a separate plume in the vicinity of PG-6MA that is attributed to an alternate source (**Figure 12**). TCE concentration at PG-6MA was 88 µg/L in October 2022.

TCE concentrations in LAU groundwater are generally intermediate between the UAU and the MAU, with a maximum concentration of 95 µg/L detected in April 2022 at monitoring well PG-2LA (**Appendix C; Table C-1**), located near extraction well PCX-1. The highest concentrations of TCE in LAU groundwater occur in the north-central part of the Site, as shown on **Figure 12**. Historically, concentrations of TCE have been the highest in the LAU at monitoring well PA-6LA. However, concentrations have been steadily declining in this well since 2020 (**Appendix D; Figure D-60**).

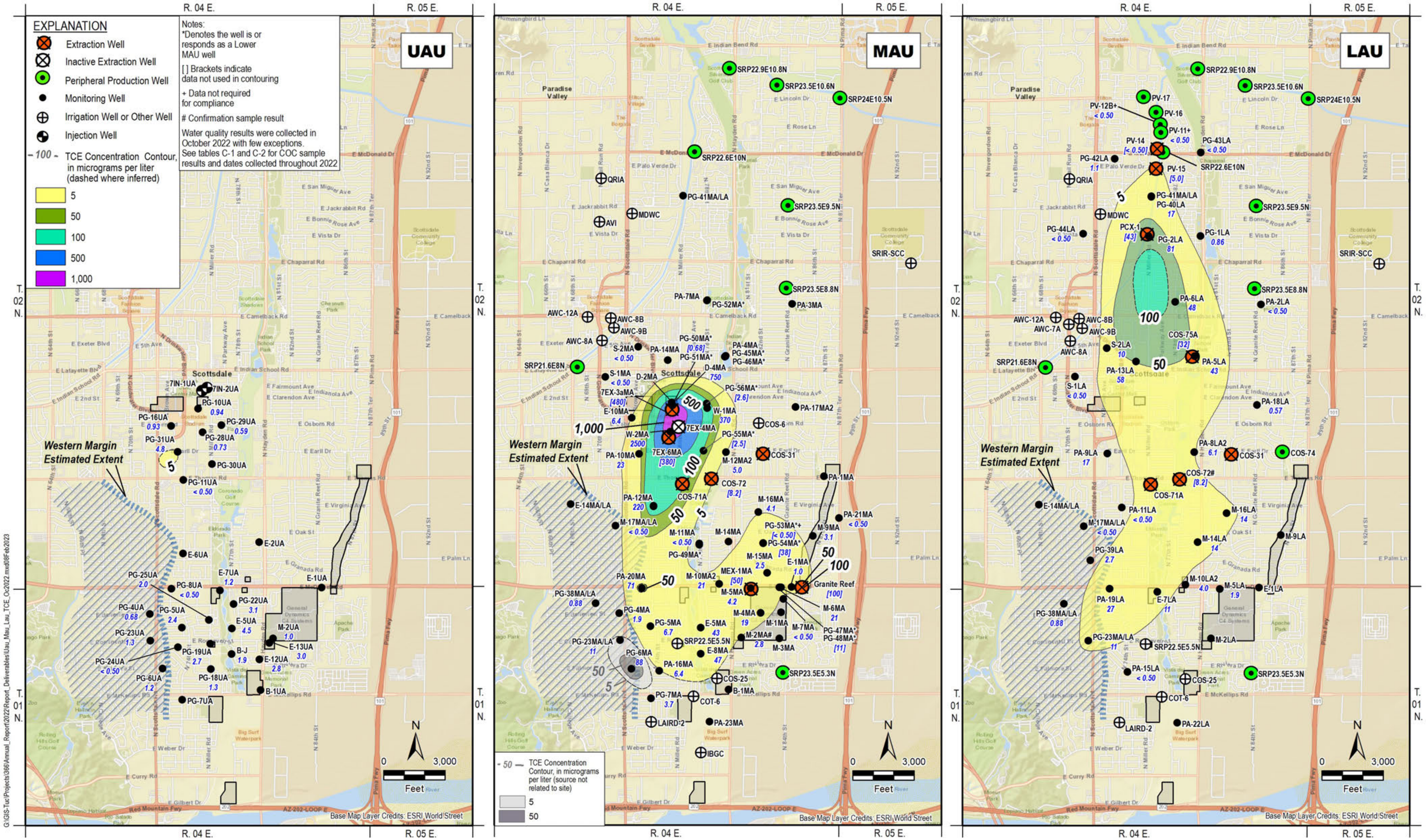

Figure 12. Concentrations of TCE in the UAU, MAU, and LAU from October 2022

8.3.1.2 TCE Concentration Change

For the UAU, MAU, and LAU, **Figure 13** shows 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 the current monitoring period of October 2022. 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 following installation of M-17MA/LA.

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 98% from October 2001 to October 2022. For the MAU and LAU, a significant overall reduction in the 5 µg/L extent is not anticipated at this stage in the remedy. However, the metric serves 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 TCE plumes in the MAU and LAU between October 2001 and October 2022, 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 2022 are generally small (**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 significantly over time through groundwater extraction and treatment.

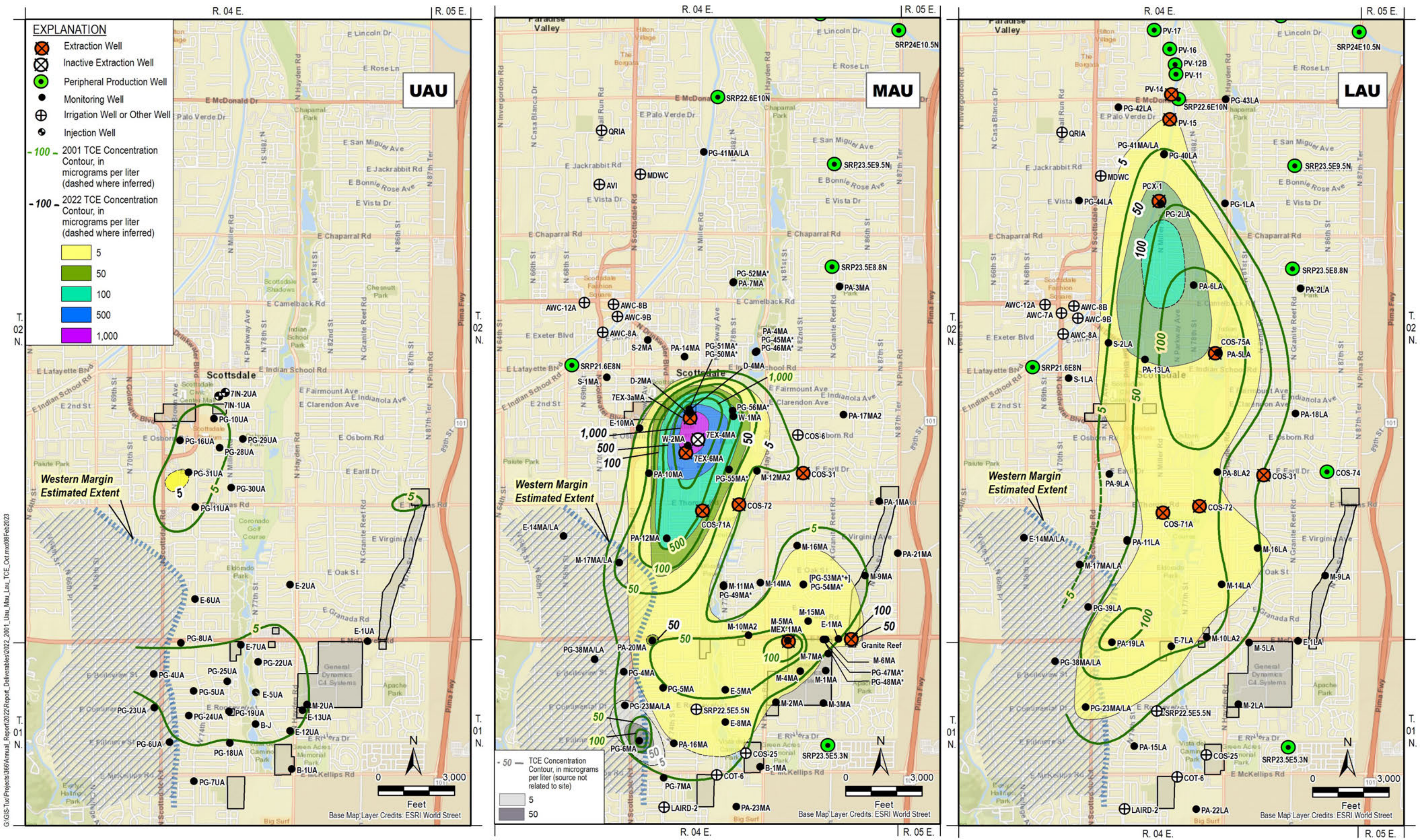

Figure 13. Concentrations of TCE in the UAU, MAU, and LAU for October 2001 and October 2022

8.3.2 Mann-Kendall TCE Concentration Trends

To support interpretation of changes in TCE concentrations over time, 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 is present. This method is being considered for potential use in evaluating remedy performance in the GM&EP update. Hydrographs that include TCE concentrations for NIBW monitoring wells included in the Site sampling program 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 consecutive pairs 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 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; therefore, the reporting limit is used. The Mann-Kendall test is not recommended if the dataset has greater than 50% non-detect values.

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 one or has been consistently non-detect. Otherwise, the well is categorized as no trend. Trend criteria used in the 2022 SMR are consistent with the methodology used in EPA's 2021 Five-Year Review.

TCE data from 2018 through 2022 (5 years) were used for analyzing trends for recent time. TCE data from 2013 through 2022 (10 years) were used to analyze longer-term trends. Field duplicate results were omitted from the data set and only original sample results were used to ensure statistically independent values. Wells with less than four samples in the last five years are not included in the analysis; as such, if a well was not sampled during the reporting year, a trend analysis is still conducted unless there are fewer than four total samples for the well. Wells with "Insufficient Data" for the 10-year period are those where sampling has only been conducted in recent time. "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 10**.

8.3.2.1 Monitoring Well TCE Concentration Trends

TCE concentrations in UAU monitoring wells are relatively low and mostly show decreasing or stable trends. An increasing TCE concentration trend is observed at one UAU monitoring well, E-5UA, over the 10-year period (**Figure 14**). TCE concentrations at E-5UA have been consistently low, generally below 5 µg/L over the 10-year period. The TCE concentration at E-5UA in 2022 was 4.5 µg/L (**Appendix C, Table C-1**). No UAU wells have an increasing trend over the 5-year period (**Figure 15**). 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 shown on hydrographs and concentration plots included in **Appendix D**.

TCE concentrations in MAU monitoring wells are mostly decreasing, stable, or have no statistically significant trend. An increasing TCE concentration trend was observed at one MAU monitoring well over the 10-year period and five 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 extraction wells 7EX-4MA and 7EX-5MA to well 7EX-6MA, downtime that occurred between the time that well 7EX-5MA failed and replacement well 7EX-6MA was installed, and significant reductions in pumping at COS-71A in recent years (**Table 9** and **Figure 14**). The TCE concentration at monitoring well PA-10MA was 23 µg/L in October 2022. Monitoring wells M-4MA, E-8MA, PG-7MA, E-10MA, and E-5MA and extraction well COS-72 have increasing trends over the 5-year period (**Figure 15**). Trends at these wells are primarily attributed to downtime at the Granite Reef extraction well in 2019 and 2020 or downtime at the Area 7 GWETS in 2021 and 2022 (**Table 9**). Significant longer-term declines in TCE concentrations have been observed at many MAU monitoring wells. TCE concentrations in the Lower MAU are mostly decreasing or stable. No increasing TCE concentration trends were observed in Lower MAU monitoring wells for the 10- or the 5-year period, as shown in **Table 10** and on **Figure 14** and **Figure 15**.

TCE concentrations in the LAU are mostly decreasing or stable. Increasing TCE concentration trends are observed at two LAU monitoring wells for the 10-year period and three monitoring wells for the 5-year period. The Mann-Kendall analysis indicates that monitoring wells PG-2LA and M-5LA have an increasing trend over both the 10-year period and the 5-year period. Monitoring well PG-2LA is located adjacent to northern LAU extraction well PCX-1. Monitoring well PG-1LA has an increasing trend over the 5-year period. Concentrations at both PG-1LA and M-5LA were below 5 µg/L in 2022. 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 PA-13LA); 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 from overlying units at the Western Margin over time (**Table 10**).

8.3.2.2 Extraction Well TCE Concentration Trends

TCE concentration trends for CGTF extraction wells are generally decreasing, stable, or show no statistically significant trend. 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 no statistically significant trend in recent time and a decreasing trend over the longer term. Well COS-72 TCE concentrations show an increasing 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 2022. Because COS-71A has not been regularly sampled since 2016, insufficient data exist to evaluate recent trends.

TCE concentration trends for MRTF extraction wells are either decreasing or show no statistically significant trend. TCE concentrations at well PV-15 show a decreasing trend for recent time (5 years) as well as over the longer term (10 years). TCE concentrations at well PV-14 show no statistically significant trend for recent time but show a decreasing trend over the longer term (**Table 10**).

TCE concentration trends for NGTF extraction well PCX-1 are decreasing for recent time (5 years) as well over the longer term (10 years) (**Table 10**).

TCE concentration trends for Area 7 extraction well 7EX-3aMA show no statistically significant trend for recent time (5 years) and are stable over the longer term (10 years). TCE concentrations for Area 7 extraction well 7EX-6MA show a decreasing trend for both recent time and over the longer term (**Table 10**).

TCE concentration trends for the Area 12 Granite Reef and MEX-1MA extraction wells are stable or have no trend in recent time (5 years) and show a decreasing trend over the longer term (10 years) (**Table 10)**.

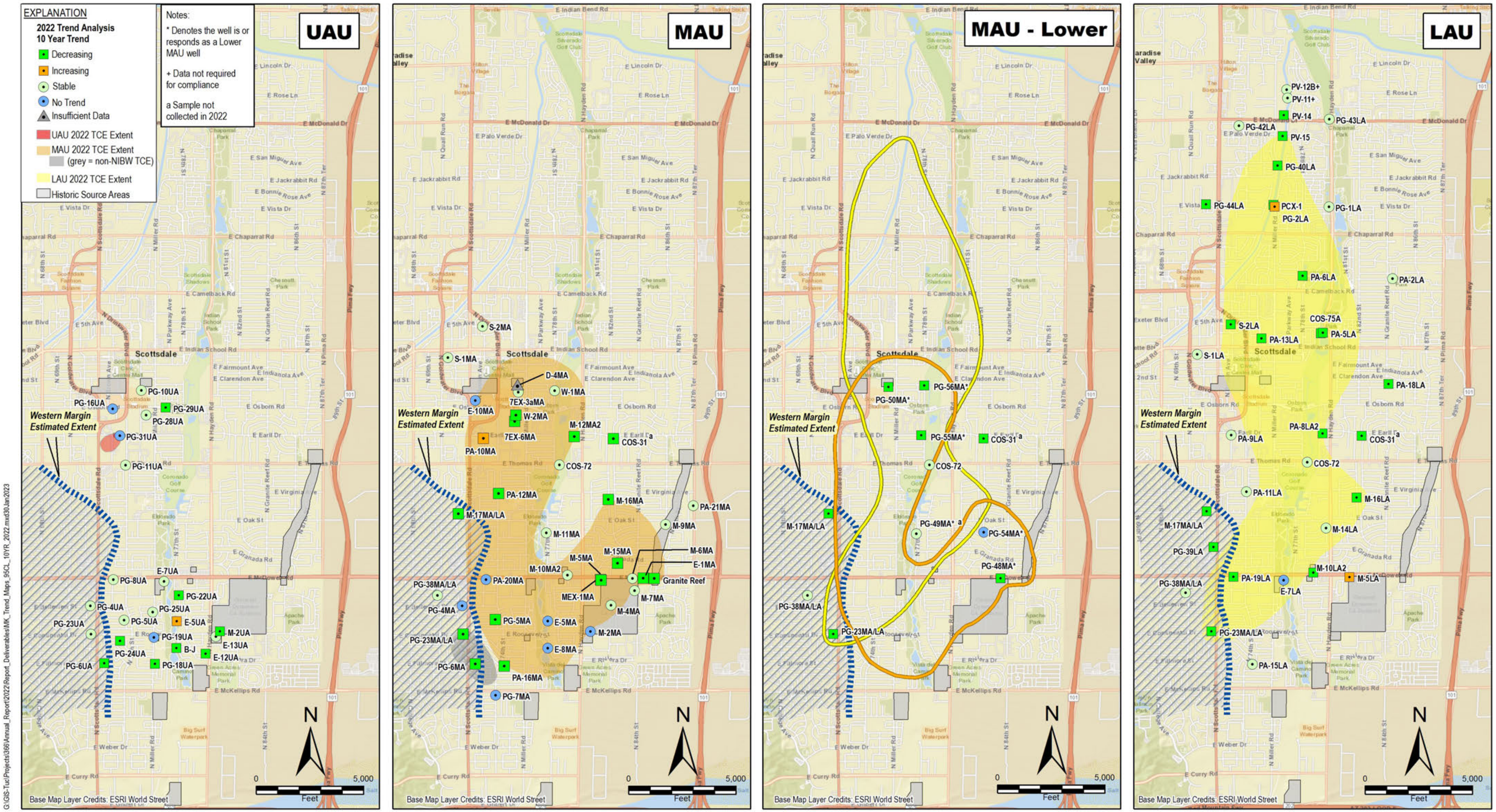

Figure 14. 10-Year Mann-Kendall TCE Trend or Stability Results for the UAU, MAU, MAU-Lower, and LAU

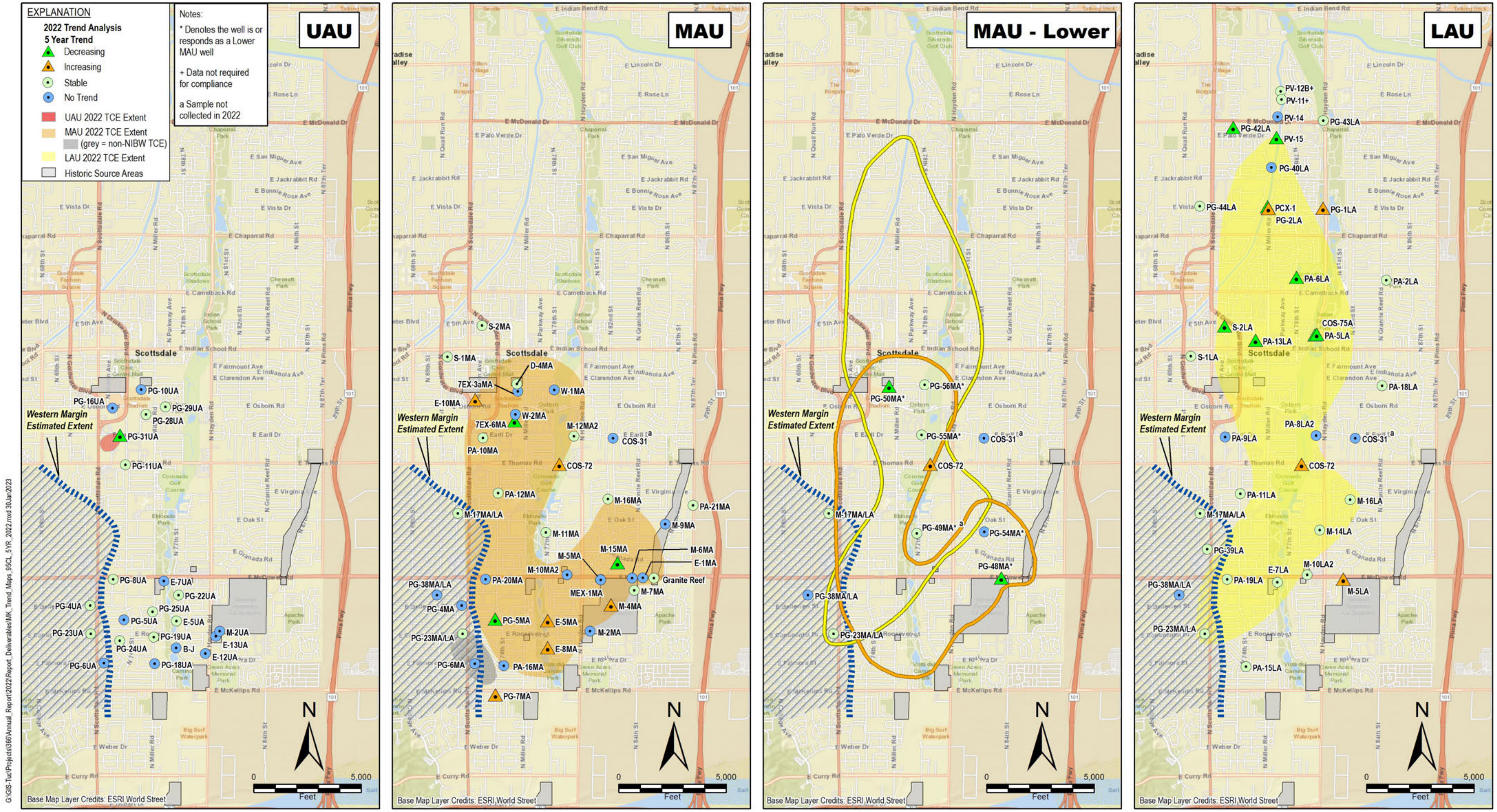

Figure 15. 5-Year Mann-Kendall TCE Trend or Stability Results for the UAU, MAU, MAU-Lower, and LAU

Table 10. Mann-Kendall Trend or Stability Results for TCE Concentrations in NIBW Superfund Site Monitoring and Extraction Wells

Well Identifier	Alluvial 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	No Trend	260	720
7EX-6MA	MAU	Extraction	Decreasing	Decreasing	290	700
B-J	UAU	Monitoring	Decreasing	No Trend	0.66	3.0
COS-31	MAU/LAU	Extraction	Decreasing	No Trend	3.4	19
COS-72	MAU/LAU	Extraction	Stable	Increasing	5.8	13
COS-75A	LAU	Extraction	Decreasing	Decreasing	27	92
D-4MA	MAU	Monitoring	Insufficient Data	Stable	620	1,000
E-1MA	MAU	Monitoring	Decreasing	No Trend	1.5	110
E-5MA	MAU	Monitoring	No Trend	Increasing	1.8	76
E-5UA	UAU	Monitoring	Increasing	Stable	2.5	6.0
E-7LA	LAU	Monitoring	No Trend	Stable	10	30
E-7UA	UAU	Monitoring	Stable	No Trend	<0.50	2.1
E-8MA	MAU	Monitoring	No Trend	Increasing	18	47
E-10MA	MAU	Monitoring	No Trend	Increasing	2.8	8.4
E-12UA	UAU	Monitoring	Decreasing	No Trend	1.5	7.0
E-13UA	UAU	Monitoring	Stable	No Trend	0.93	4.9
Granite Reef	MAU	Extraction	Decreasing	Stable	30	170
M-2MA	MAU	Monitoring	No Trend	No Trend	1.6	30
M-2UA	UAU	Monitoring	Decreasing	No Trend	0.58	1.8
M-4MA	MAU	Monitoring	Stable	Increasing	3.3	46
M-5LA	LAU	Monitoring	Increasing	Increasing	1.2	1.9
M-5MA	MAU	Monitoring	Decreasing	Stable	3.8	52
M-6MA	MAU	Monitoring	Stable	No Trend	4.3	100
M-7MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
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	No Trend	15	59
M-11MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
M-12MA2	MAU	Monitoring	Decreasing	Stable	5.0	23
M-14LA	LAU	Monitoring	Stable	Stable	6.4	24
M-15MA	MAU	Monitoring	Decreasing	Decreasing	2.5	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
PA-2LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PA-5LA	LAU	Monitoring	Decreasing	Decreasing	37	150
PA-6LA	LAU	Monitoring	Decreasing	Decreasing	20	270
PA-8LA2	LAU	Monitoring	Decreasing	No Trend	3.8	18
PA-9LA	LAU	Monitoring	Stable	No Trend	<0.50	21
PA-10MA	MAU	Monitoring	Increasing	Stable	9.3	87
PA-11LA	LAU	Monitoring	Stable	Stable	<0.50	0.57
PA-12MA	MAU	Monitoring	Decreasing	Stable	190	370
PA-13LA	LAU	Monitoring	Decreasing	Decreasing	17	190
PA-15LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PA-16MA	MAU	Monitoring	Decreasing	No Trend	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	No Trend	No Trend	35	81
PA-21MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
PCX-1	LAU	Extraction	Decreasing	Decreasing	38	81
PG-1LA	LAU	Monitoring	Stable	Increasing	<0.50	1.6
PG-2LA	LAU	Monitoring	Increasing	Increasing	41	95
PG-4MA	MAU	Monitoring	No Trend	No Trend	1.5	4.3
PG-4UA	UAU	Monitoring	Stable	Stable	<0.50	2.1
PG-5MA	MAU	Monitoring	Decreasing	Decreasing	6.7	38
PG-5UA	UAU	Monitoring	Stable	No Trend	1.6	3.6
PG-6MA	MAU	Monitoring	Decreasing	No Trend	82	170
PG-6UA	UAU	Monitoring	Decreasing	No Trend	<0.50	2.3
PG-7MA	MAU	Monitoring	No Trend	Increasing	<0.50	6.1
PG-8UA	UAU	Monitoring	Stable	Stable	<0.50	<0.50
PG-10UA	UAU	Monitoring	Stable	No Trend	0.69	1.5
PG-11UA	UAU	Monitoring	Stable	Stable	<0.50	<0.50
PG-16UA	UAU	Monitoring	No Trend	No Trend	<0.50	2.8
PG-18UA	UAU	Monitoring	Decreasing	No Trend	0.71	3.5
PG-19UA	UAU	Monitoring	No Trend	Stable	1.8	3.7
PG-22UA	UAU	Monitoring	Decreasing	Stable	2.4	9.9
PG-23MA/LA	MAU/LAU	Monitoring	Decreasing	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	0.73	5.1
PG-29UA	UAU	Monitoring	Decreasing	Stable	<0.50	2.9
PG-31UA	UAU	Monitoring	No Trend	Decreasing	2.7	36
PG-38MA/LA	MAU/LAU	Monitoring	Stable	No Trend	0.6	2.1
PG-39LA	LAU	Monitoring	Decreasing	Stable	2.2	11
PG-40LA	LAU	Monitoring	Decreasing	No Trend	7.4	29
PG-42LA	LAU	Monitoring	Stable	Decreasing	1.0	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	11	120
* PG-49MA	MAU - Lower	Monitoring	Stable	Stable	<0.50	<0.50
PG-50MA	MAU - Lower	Monitoring	Decreasing	Decreasing	<0.50	12
PG-54MA	MAU - Lower	Monitoring	No Trend	No Trend	2.0	38
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	No Trend	<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	Decreasing	Decreasing	2.3	41
S-2MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
W-1MA	MAU	Monitoring	Stable	No Trend	120	690
W-2MA	MAU	Monitoring	Decreasing	No Trend	970	4,800

EXPLANATION:
<0.50 = Below Detection at 0.50 µg/L
* = Sample not collected in 2022
** = Sampling point not required for compliance

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 2022 is discussed as follows.

9.1 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 2022. A summary of all treatment facility sample points and frequency is provided in **Table 5**. Laboratory results for COCs in treatment system samples for the MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS are included in **Appendix C, Table C-3**. Quarterly results for treatment system performance sampling conducted by the City of Scottsdale at the CGTF are reported to EPA and ADEQ under separate cover.

9.1.1 CGTF Evaluation

Throughout 2022, samples of treated groundwater were collected from the common sump at the 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 **Appendix C, Table C-3** demonstrate that the CGTF consistently achieved Cleanup Standards for treated groundwater in 2022. 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.

9.1.2 MRTF Evaluation

Throughout 2022, 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 **Appendix C, Table C-3**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from the MRTF were below the MRL of 0.50 µg/L.

Sample results summarized in **Appendix C, Table C-3** demonstrate that the MRTF consistently achieved the Cleanup Standards for treated groundwater in 2022.

9.1.3 NGTF Evaluation

Throughout 2022, samples of treated groundwater were collected by the City of Scottsdale from the treatment plant discharges to both the CWTP (labeled NGTF-CP) and to the SRP Arizona Canal (labeled AZCO) 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 **Appendix C, Table C-3**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from the treatment plant discharges (labeled Effluent) were below the MRL of 0.50 µg/L with the exception of TCM that had a maximum concentration of 1.7 µg/L. Sample results summarized in **Appendix C, Table C-3** demonstrate that the NGTF consistently achieved the Cleanup Standards for treated groundwater in 2022. Additionally, discharges from the NGTF to the SRP Arizona Canal met the requirements of the AZPDES permit. Laboratory analytical data for water quality parameters required by the AZPDES permit are reported in monthly DMRs submitted to ADEQ under separate cover.

9.1.4 Area 7 GWETS Evaluation

Throughout 2022, samples of treated groundwater were collected from air stripper effluent (SP-105) at the 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 **Appendix C, Table C-3**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from the Area 7 GWETS (SP-105) were below the MCL of 5.0 µg/L and most were below the MRL of 0.50 µg/L. Sample results summarized in **Appendix C, Table C-3** demonstrate that the Area 7 GWETS consistently achieved the Cleanup Standards for treated groundwater in 2022.

9.1.5 Area 12 GWETS Evaluation

Throughout 2022, samples of treated groundwater were collected from air stripper effluent (WSP-2) at the 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 **Appendix C, Table C-3**. As evidenced from the data, the NIBW COC concentrations in all treated water samples from the Area 12 GWETS (WSP-2) were below the MRL of 0.50 µg/L. Sample results summarized in **Appendix C, Table C-3** demonstrate that the Area 12 GWETS consistently achieved the Cleanup Standards for treated groundwater in 2022. Additionally, discharges from the Area 12 GWETS to McKellips Lake met the requirements of the AZPDES permit. Laboratory analytical data for water quality parameters required by the AZPDES permit are reported in monthly DMRs submitted to ADEQ under separate cover.

9.2 Evaluation of UAU Program

The assessment of remedy performance for the UAU plume involves monitoring both VOC mass reduction over time and progress toward aquifer restoration. For the 2022 VOC mass flux analysis, total mass of VOCs present in UAU groundwater was computed using data for saturated thickness from the October 2022 water level monitoring round and VOC concentration data from the October 2022 water quality monitoring round. VOC mass is computed annually both with and without PCE mass in 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. **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 28 years, declining from a high of over 11,000 pounds in 1993 to the current estimate of 135 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 from PG-4UA, the most recent VOC mass 5-year running average of 174 pounds represents a decrease relative to the previous 5-year average of 193 pounds, indicating the performance measure for UAU mass reduction has been achieved for 2022.

Table 11 summarizes VOC mass estimates for UAU groundwater for 2022. Based on 2022 data, a total of about 11.2 gallons, or 135 pounds, of VOCs are estimated to remain in the saturated portion of the UAU (**Table 11**).

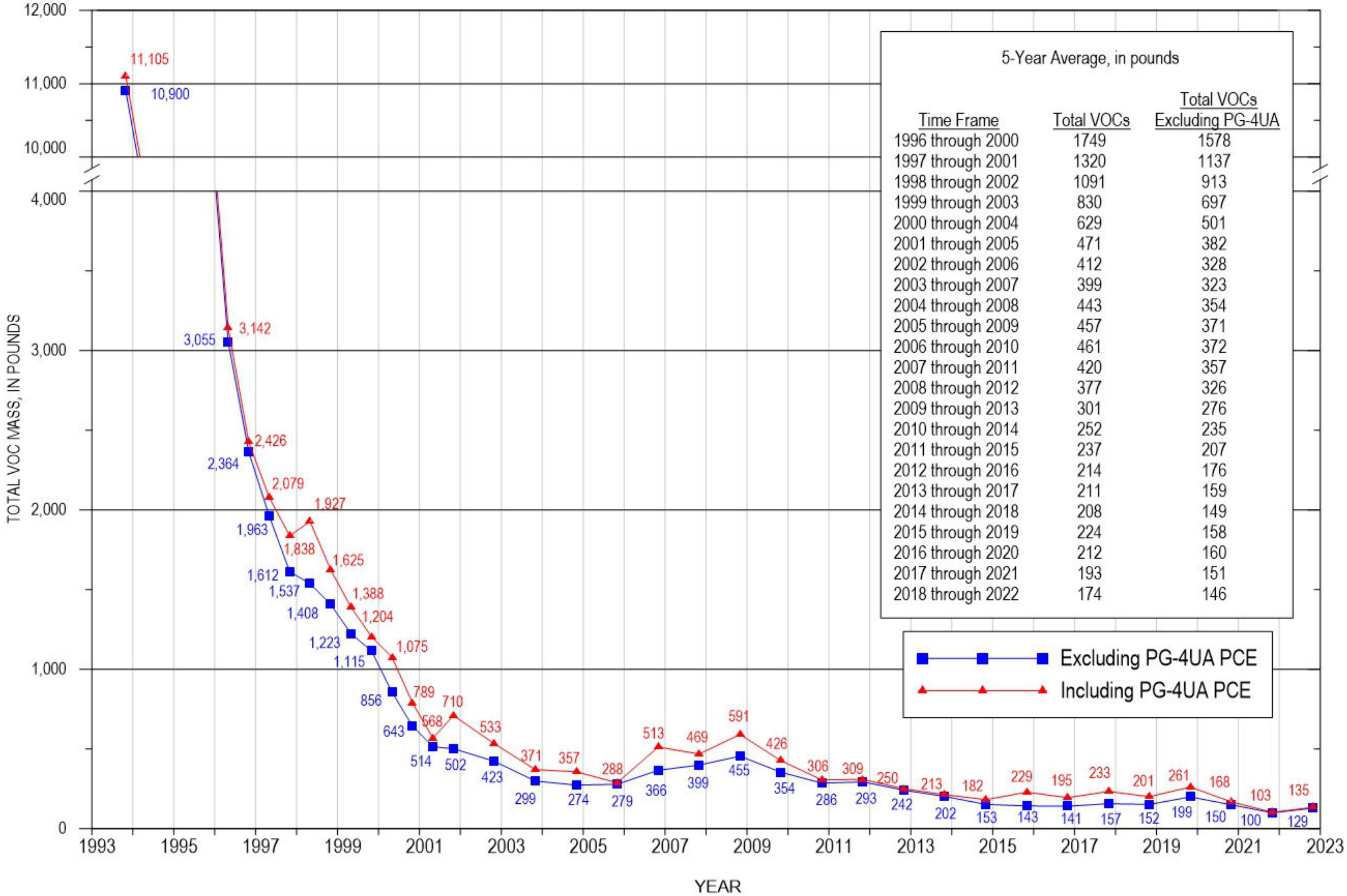

Figure 16. Total Mass of VOCs in Saturated Portion of UAU

Table 11. Summary of VOC Mass Estimates in UAU Groundwater

POLYGON (WELL NAME)	TOTAL VOCs (µg/L)[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	3.1	1,065	1,132.82	68	1,312,017	88,980,993	755,955,822	0.43	5.17
E-5UA	5.1	1,067	1,132.92	66	1,563,483	103,064,799	875,607,616	0.82	9.89
E-7UA	1.9	1,079	1,129.28	50	2,135,156	107,355,644	912,061,342	0.32	3.82
E-12UA	3.9	1,075	1,136.09	61	1,868,432	114,142,511	969,720,530	0.70	8.34
E-13UA	4.0	1,080	1,136.51	57	851,113	48,096,396	408,612,548	0.30	3.60
M-2UA	2.1	1,081	1,136.69	56	1,081,841	60,247,725	511,846,600	0.20	2.37
PG-4UA	3.2	1,055	1,121.78	67	2,867,709	191,505,607	1,626,974,186	0.95	11.37
PG-5UA	3.1	1,036	1,126.18	90	1,729,659	155,980,649	1,325,164,796	0.75	8.97
PG-6UA	2.3	1,043	1,123.93	81	2,363,199	191,253,695	1,624,834,017	0.69	8.24
PG-8UA	0.9	1,060	1,124.65	65	1,631,115	105,451,585	895,885,029	0.14	1.68
PG-10UA	2.7	1,089	1,137.34	48	693,947	33,545,398	284,991,638	0.14	1.72
PG-11UA	1.2	1,076	1,132.86	57	2,167,731	123,257,185	1,047,156,064	0.23	2.77
PG-16UA	0.9	1,079	1,134.73	56	1,327,719	73,993,780	628,628,956	0.11	1.29
PG-18UA	2.8	1,045	1,130.18	85	1,953,438	166,393,849	1,413,632,222	0.73	8.73
PG-19UA	3.6	1,049	1,129.59	81	1,407,810	113,455,408	963,883,109	0.63	7.55
PG-22UA	3.7	1,067	1,133.72	67	1,764,305	117,714,430	1,000,066,480	0.69	8.27
PG-23UA	2.1	1,055	1,121.87	67	1,753,035	117,225,450	995,912,259	0.39	4.63
PG-24UA	0.0	1,054	1,125.71	72	1,535,896	110,139,102	935,708,770	0.00	0.00
PG-25UA	3.0	1,056	1,129.92	74	1,538,241	113,706,775	966,018,646	0.53	6.39
PG-28UA	2.5	1,061	1,136.20	75	1,669,714	125,562,493	1,066,741,270	0.50	5.95
PG-29UA	1.2	1,080	1,137.11	57	1,345,997	76,869,889	653,063,513	0.15	1.79
PG-31UA	8.2	1,081	1,134.03	53	2,706,853	143,544,415	1,219,510,283	1.84	22.05
TOTALS							21,081,975,694	11.22	134.58

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

NOTES:
[a] Includes total concentration of TCE, PCE, 1,1,1-TCA, DCE, and Chloroform from October 2022 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 [µg/L] * Saturated Pore Volume [liters] * 0.000000002205 [conversion from micrograms to pounds]
[c] Samplers were unable to collect PG-16UA sample in October 2022. Sample was collected on 11/14/2022.

9.3 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 is being reduced in the MAU outside the source areas (i.e., Area 7 and Area 12). Remedy performance metrics for the MAU/LAU Program, as outlined in the GM&EP, are summarized in **Table 4**. Compliance with all of the MAU/LAU Program GM&EP achievement measures was attained in 2022, 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 concentrations 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 plumes is toward extraction wells tied into treatment or the Western Margin. Water level and TCE concentration data for October 2022, 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 October 2022 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 9.5**.

For the MAU, October 2022 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 (**Figure 17**). 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 lower MAU and LAU where it is directed toward and captured at CGTF, NGTF, and MRTF 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 more in 2022 than in 2021, about 148,000 AF compared to about 8,200 AF in 2021 (**Table 9**). Prolonged pumping at this well can result in changes in groundwater flow patterns that trigger contingency conditions at monitoring well M-2MA, as described in **Section 10.1.4**.

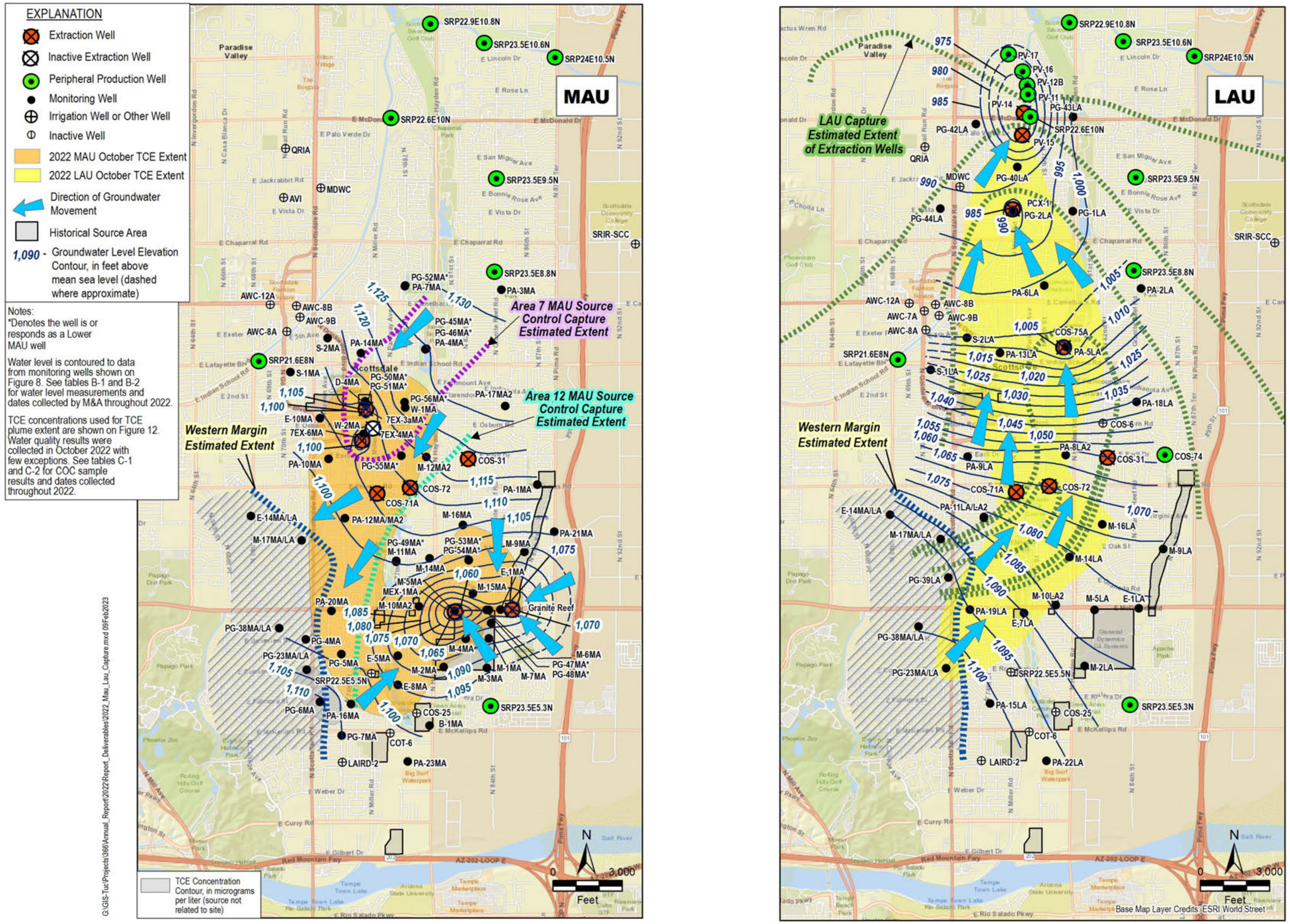

Figure 17. Estimated Hydraulic Capture of TCE Plume by MAU Source Control and Northernmost LAU Extraction Wells for October 2022

For the LAU, flow patterns interpreted from October 2022 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 the AWC irrigation wells are located in relatively close proximity to the western edge of the LAU plume, TCE has not been detected above the cleanup standard at these wells and LAU monitoring wells along the western edge of the plume are all showing stable or declining 10-year trends (**Table 10** and **Figure 14**). The AWC wells are designated for irrigation end use and were impacted by PCE from an alternate source since the time of the RI/FS. Wells impacted prior to the Amended CD and wells designated for irrigation end use are not considered NIBW peripheral production wells. Overall, pumping of remedial extraction wells in 2022 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 2022 relative to baseline (2001) conditions, 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 are apparent. The anticipated exception is the LAU plume migration north for capture at PV-15 (**Figure 13**). In previous SMRs, anticipated outward shifts were observed along the northwestern edge of the LAU, where the plume migrates toward extraction wells tied into treatment. However, this changed in 2022. Over the last five years, TCE concentrations in wells in the northern part of the LAU show encouraging trends. TCE concentration statistical trends in these wells are either significantly decreasing (S-2LA, PA-5LA, PA-6LA, PA-13LA, PG-42LA, and PV-15), stable (PG-44LA), or indicate no significant trend (PG-40LA and PV-14). TCE has not been detected over the last 10 or more years at wells PG-43LA, S-1LA, PV-11, and PV-12B (**Table 10**). 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 2022 sampling round, are summarized in **Table 12** and **Table 13**. TCE concentrations are all less than or equal to specified achievement measures. For the first time in several years, TCE concentrations at well S-2LA were below the GM&EP achievement measure of 15 µg/L during all sampling rounds conducted in 2022 (**Appendix C; Table C-1**).

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 2022 Sampling Round Results
MAU Monitoring Wells		
M-2MA[#]	10	2.8/7.1*
M-7MA	10	<0.50
S-1MA	2	<0.50
S-2MA	3	<0.50
LAU Monitoring Wells		
M-5LA	10	1.9
PA-2LA	3	<0.50
PA-15LA	10	<0.50
PA-18LA	10	0.57
PG-1LA	15	0.86
PG-44LA	5	<0.50
S-1LA	3	<0.50/<0.50*
S-2LA	15	10

EXPLANATION:
< = Non-Detected at concentration listed
* Indicates duplicate sample value
# Results posted for M-2MA are from the confirmation samples collected on October 20, 2022. See **Section 10.1.4.**

9.4 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 2022, compliance with all of these achievement measures was attained, as discussed in this section.

Based on interpretation of flow directions using October 2022 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 October 2022 extent of the LAU TCE plume and

LAU water level contours are shown 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 2022 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 far beyond the LAU plume footprint. TCE concentration achievement measures specified in the GM&EP are compared to 2022 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 2022 Sampling Round Results
Northern LAU Program Wells		
PG-42LA	2	1.1/1.0*
PG-43LA	2	<0.50
PV-14	2	<0.50

EXPLANATION:
< = Not detected at concentration listed
* Indicates duplicate sample value

As indicated in **Table 13** and in **Appendix D**, TCE concentrations in 2022 were not reported above the 2 µg/L performance metric at any of the Northern LAU indicator wells. In addition, TCE concentration trends in other Northern LAU wells are encouraging and indicate that extraction and treatment are effectively reducing concentrations over time. Low-level TCE concentrations at well PV-14, which in 2022 ranged from <0.50 to 0.80 µg/L, are predictable and display a statically significant decreasing 10-year trend (**Figure 14**). 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 Northern LAU wells for 1990 through 2022. 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 next 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 2022, extraction from well PCX-1 was responsible for 88% of the combined mass removed at MRTF and NGTF extraction wells (**Table 6**).

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.

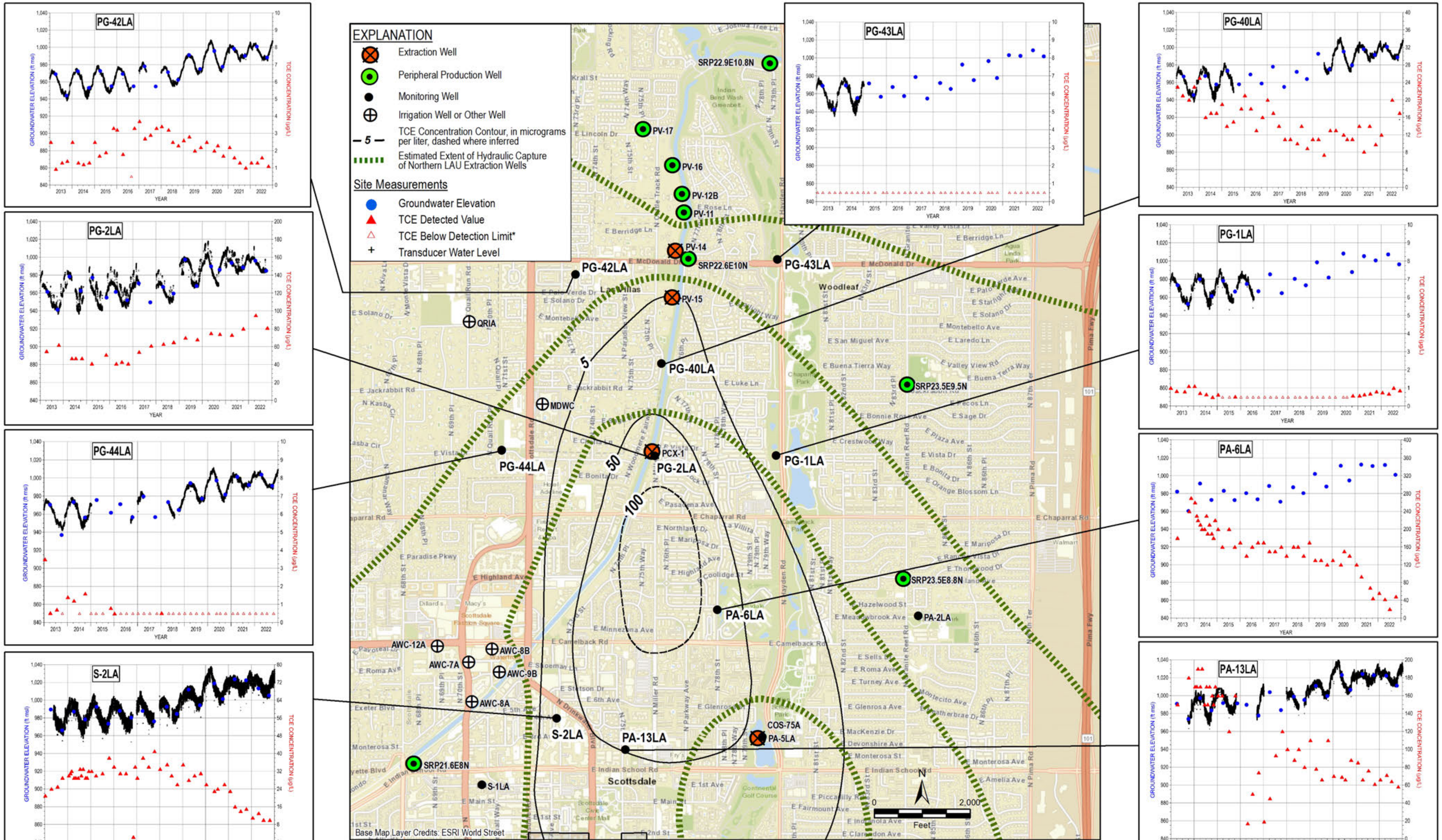

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Figure 18. Water Levels, TCE Concentrations, and Estimated Hydraulic Capture for the Northernmost LAU Extraction Wells - Northern LAU

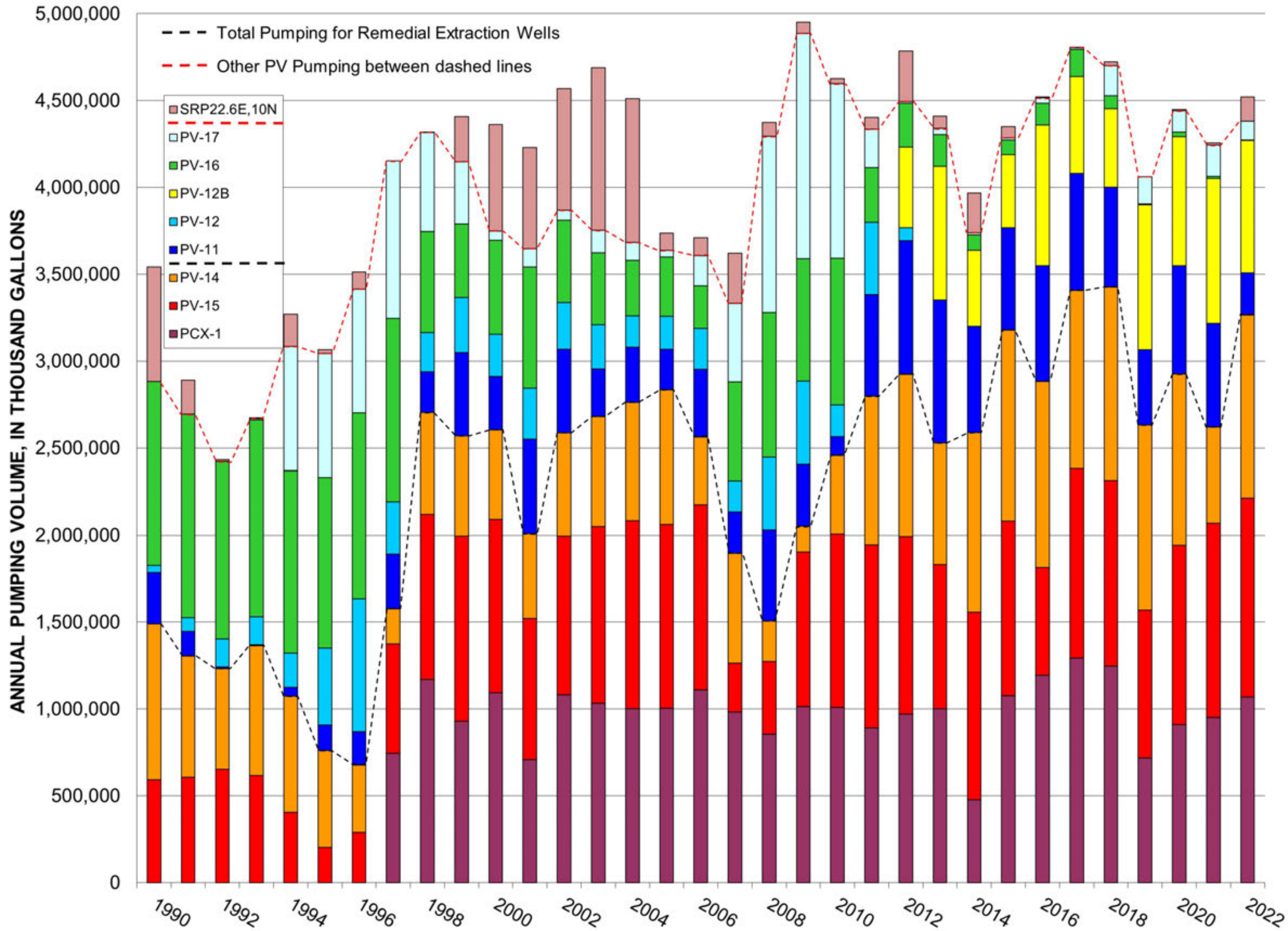

Figure 19. Distribution of Pumping in Northern LAU

9.5 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 that are 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 the Area 7 GWETS did not meet the GM&EP metric of extent of capture to the vicinity of PA-12MA in 2022. 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 state-of-the-art evaluations and tools. The PCs have presented preliminary proposals for alternative GM&EP metrics and look forward to continued discussions with the Technical Committee.

9.5.1 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 2022, compliance with these achievement measures was not attained, as discussed in this section.

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, showing fairly stable trends over the last 10 years. 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 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 10**). 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. Two critical Area 7 indicator wells, W-2MA and PA-12MA, show declining 10-year concentration trends (**Figure 14**).

Figure 20 also shows the estimated extent of hydraulic capture associated with MAU extraction in the vicinity of Area 7 for October 2022. Review of the interpreted hydraulic capture zone for the 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. In fact, based on October 2022 data, hydraulic capture for the Area 7 GWETS encompasses most of the MAU plume in excess of 500 µg/L as shown on **Figure 20**. 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 2022 or for several years prior, and it may not be achievable using available MAU extraction wells tied into treatment at the Area 7 GWETS and the CGTF. See **Section 9.6** for further discussion.

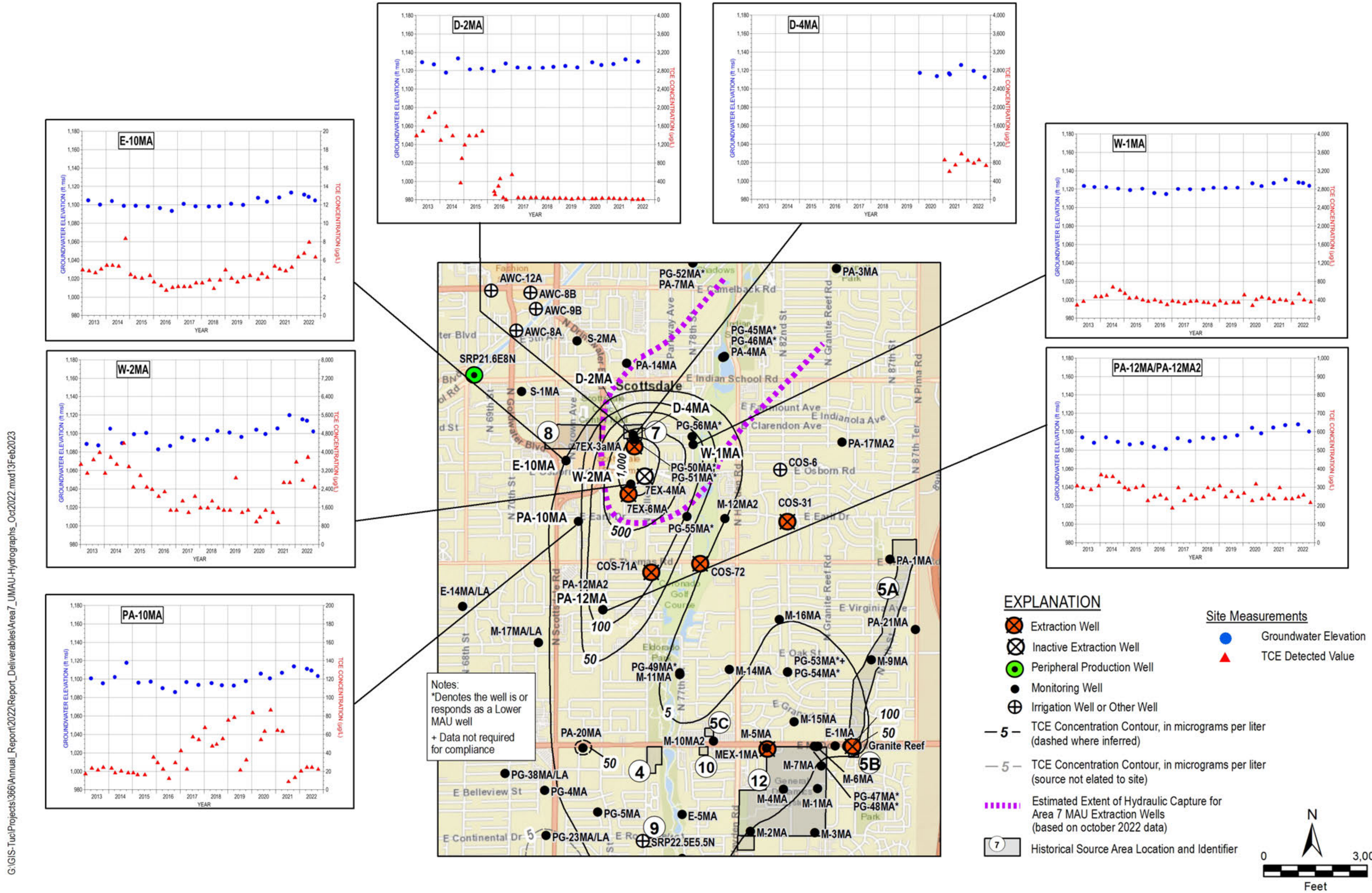

Figure 20. Water Levels, TCE Concentrations, and Estimated Hydraulic Capture from Area 7 MAU Extraction Wells

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 indicator wells (D-2MA/D-4MA, 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 2022 at the six Area 7 MAU indicator monitoring wells. 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. With approval from EPA, the NIBW PCs have replaced D-2MA with D-4MA and have been using this well in remedy effectiveness evaluations beginning in 2021. Annual average TCE concentrations at each of the specified Area 7 MAU indicator wells were computed for each year during the period 1995 through 2022. 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 D-4MA was used in place of well D-2MA in 2021 and 2022. As shown in **Table 14**, the overall 2022 average TCE concentration for the six Area 7 indicator wells of 780 µg/L was higher than the annual average of 578 µg/L for 2021. The 5-year average TCE concentration that was calculated for the period 2018 through 2022 of 640 µg/L was higher than the average for the previous 5-year period of 610 µg/L. Accordingly, compliance with the mass reduction component of the Area 7 remedy performance was not achieved in 2022.

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, 2012, and 2022, a declining trend has been observed since this performance measure went into effect in 2004. Increases in the 5-year running averages for these three 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 continue to show a decreasing long-term (10-year) trend (**Figure 14**).

In conclusion, the performance measure involving a decline in 5-year running average TCE concentrations was not achieved at Area 7 in 2022. 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 also not achieved in 2022. See **Section 9.6** for further discussion.

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

	AVERAGE TCE CONCENTRATIONS (μg/L)							
YEAR	D-2MA	D-4MA	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
2022	---	820	7	24	243	415	3,175	780

EXPLANATION:
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) On May 19, 2022, the PCs formally requested the replacement of monitoring well D-2MA per the GM&EP schedule with monitoring well D-4MA.
This request was approved by EPA on July 12, 2022 and D-2MA monitoring was discontinued in October 2022.

5-Year Average TCE Concentrations (**μg/L**)

1995-1999	1,199	Start-Up of 7EX-3aMA 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	
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	Data from well D-4MA (OZ7-1) replaced D-2MA for use in the average TCE concentration
2018-2022	640	Treatment System Down for Communication Upgrades

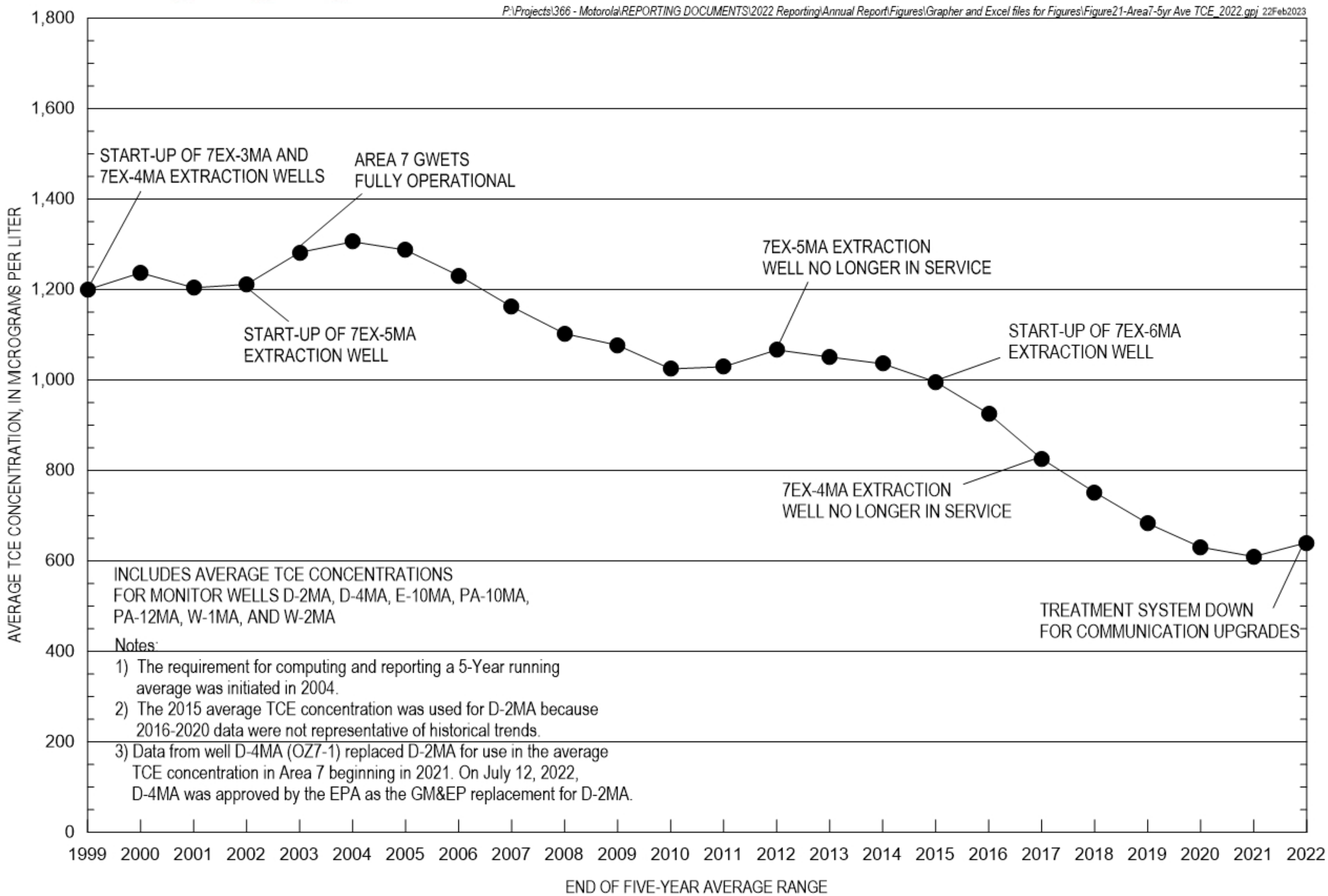

Figure 21. 5-Year Running Average of TCE Concentrations in the MAU - Vicinity of Area 7

9.5.2 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 2022, compliance with one of the two 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 but are generally decreasing to stable over the last 10 years, as shown on **Figure 22**. Although TCE concentration trends at all Area 12 MAU indicator wells are stable, no trend, or declining over the long term (10-year), two wells (E-5MA and M-4MA) exhibit short term (5 years) increasing TCE concentration trends (**Table 10**). The increasing trends are linked to variability of groundwater pumping patterns at Area 12 GWETS Granite Reef well and at well COT-6. Specifically, during the last five years, pump maintenance issues resulted in curtailed extraction at the Granite Reef well (2019 and 2020) and fairly significant pumping occurred at well COT-6, which has a tendency to pull mass to the southwest (2020 and 2022) (**Table 9**).

Figure 22 also shows MAU TCE concentration contours for October 2022 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 the Area 12 GWETS for October 2022 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 2022.

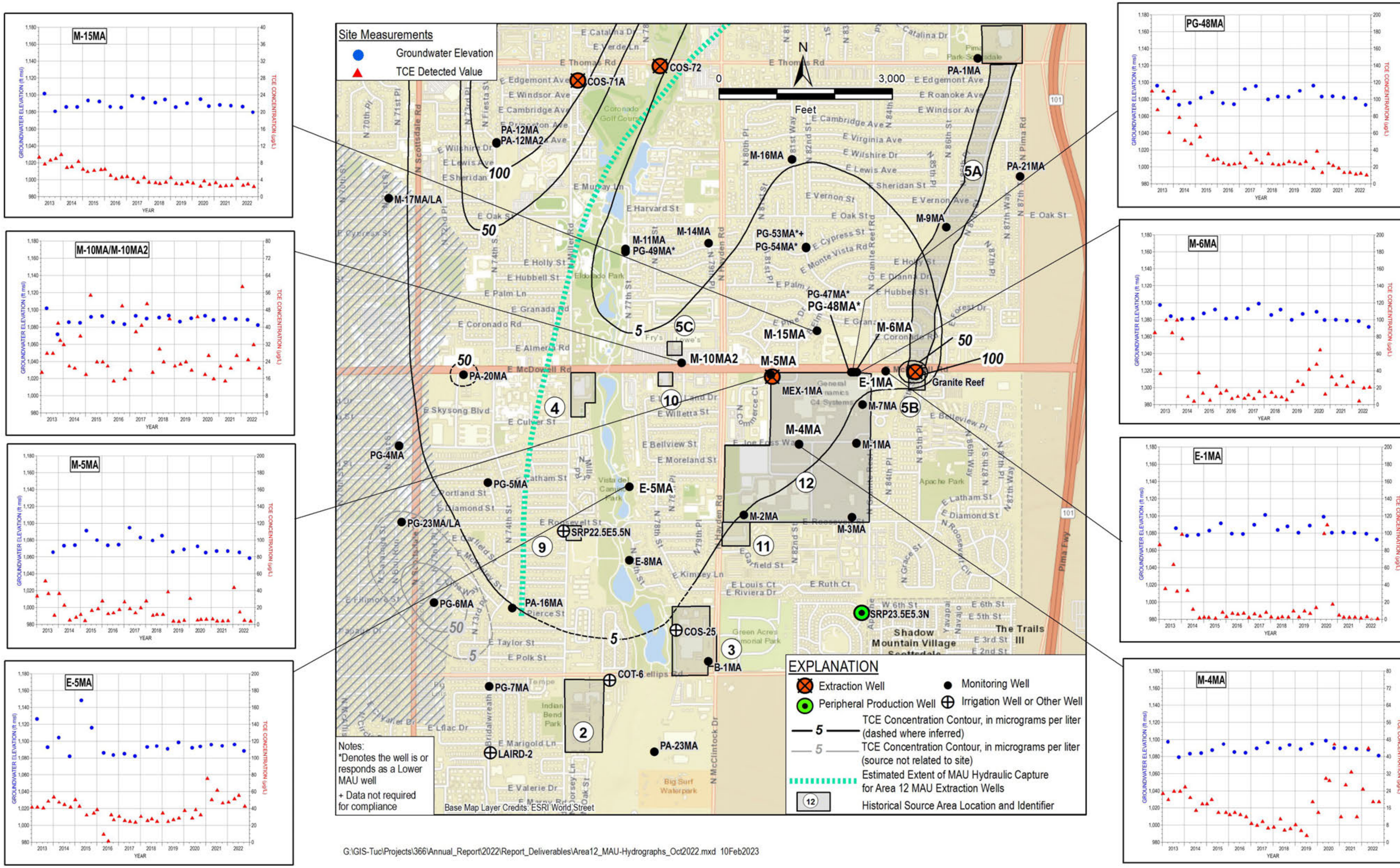

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Figure 22. Water Levels, TCE Concentrations, and Estimated Hydraulic Capture from Area 12 MAU Extraction Wells

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 indicator 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 2022 for the eight Area 12 MAU indicator monitoring wells. 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 2022 was 9 µg/L, which is higher than the annual average of 8 µg/L for 2021. Using the 2022 combined annual average TCE value, a 5-year average of 10 µg/L was computed for the period 2018 through 2022. This value is higher than 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 2022. Contingency responses are discussed in **Section 9.6**.

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, 2020, and 2022, 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 increases in the 5-year running average for these periods were all small and appear to be attributable to a sequence of years with lower pumping for the Granite Reef well and potentially higher pumping at well COT-6 (**Table 9**). 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 2022. However, the performance measure involving a decline in 5-year running average TCE concentrations was not achieved at Area 12 in 2022. See **Section 9.6** for further discussion.

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

YEAR	AVERAGE TCE CONCENTRATIONS (µg/L)								
	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	27	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
2022	2	27	17	18	0	3	3	0	9

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

5-Year Average TCE Concentrations (µg/L)

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	
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	Granite Reef Well not operating full time due to maintenance and testing
2017-2021	9	
2018-2022	10	

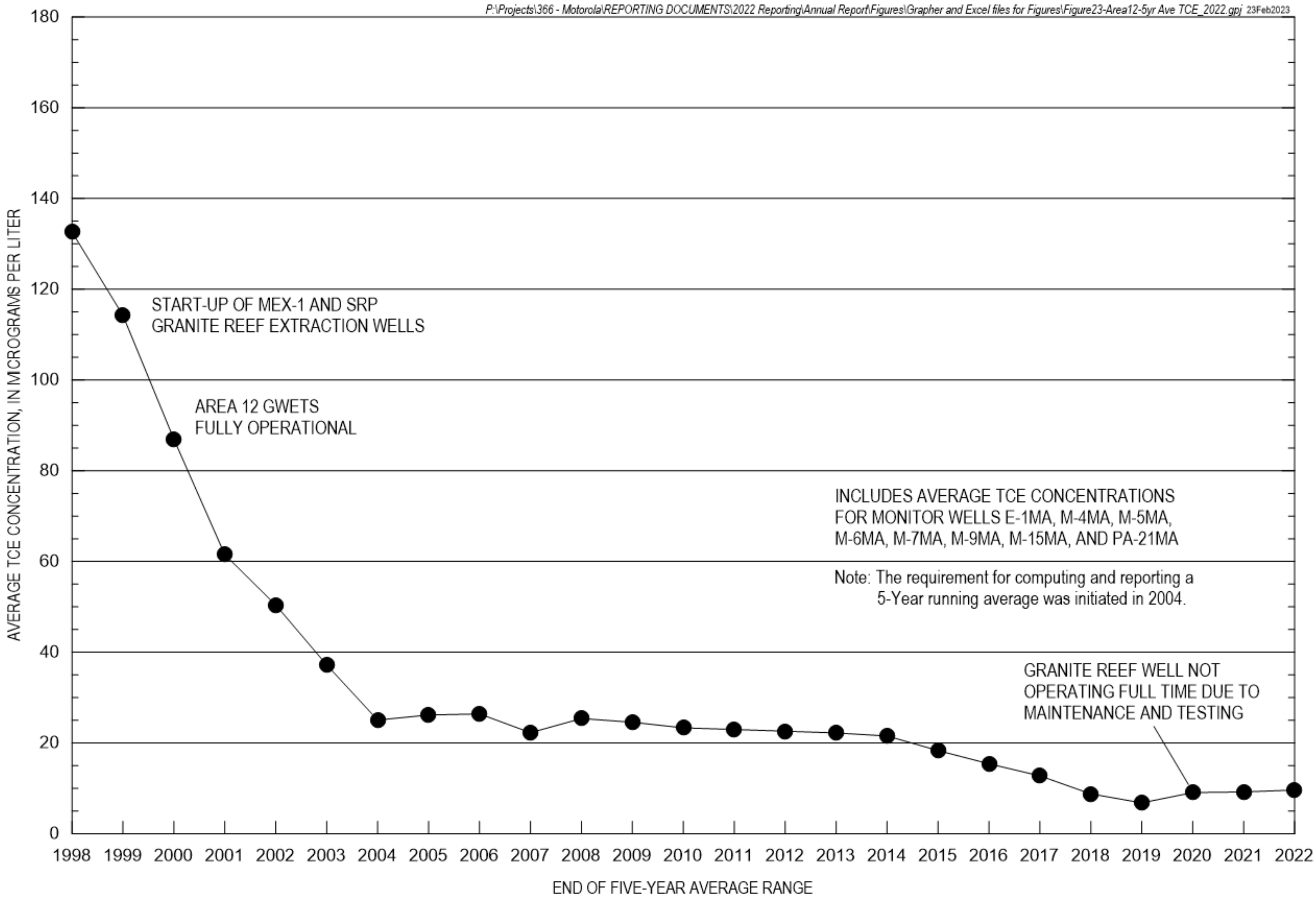

Figure 23. 5-Year Running Average of TCE Concentrations in the MAU - Vicinity of Area 12

9.6 GM&EP Contingency Responses

9.6.1 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. Therefore, the status of Area 7 Source Control is 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 2022. 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 the Area 7 GWETS and the 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. The City of Scottsdale has been unable to prioritize use of well COS-71A for extraction and treatment at the CGTF over the last several years due to inorganic water quality issues unrelated to the Site. In 2022, the PCs in coordination with the City of Scottsdale and the other stakeholders continued to work toward resumption of pumping at well COS-71A, which would significantly increase capture of the MAU plume downgradient from Area 7. Testing, rehabilitation, and modification operations are planned at well COS-71A in 2023. This work will enable pumping from the MAU only at a rate such that the City of Scottsdale can prioritize pumping at both COS-71A and COS-75A going forward. Commissioning of the TGTF, which is scheduled for the first quarter in 2023, is critical to accomplish this pumping configuration. Modeling analyses show that this approach will enhance efficiency of the remedy by increasing local capture of mass in the Upper MAU that would otherwise migrate along a longer flow path toward the Western Margin for capture in the Lower MAU and LAU.

9.6.2 Area 7 Five-Year Running Average

In 2022, Area 7 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 six Area 7 indicator wells. Specifically, the 5-year average TCE concentration calculated for the period 2018 through 2022 of 640 µg/L was higher than the average for the previous 5-year period of 610 µg/L (**Table 14**). As in previous years when compliance with this Area 7 metric has not been achieved, an increase in TCE concentration at W-2MA is responsible. In 2022, the higher TCE concentrations at well W-2MA occurred in response to downtime at the Area 7 extraction wells. The Area 7 GWETS was offline beginning in July 2021 due to pandemic related delays in receiving upgraded communications equipment and new variable frequency drives for the pumps. The GWETS was restarted in April

2022 with pumping from only well 7EX-3aMA. Well 7EX-6MA, which is near to W-2MA, came online in August 2022. This extended downtime likely contributed to the increase in 2022 annual average TCE concentrations and the calculated 5-year average TCE concentration. While the GM&EP 5-year running average metric was not achieved for 2022 at Area 7, overall data trends demonstrate that Source Control operations are controlling and 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 10**). In addition, two critical Area 7 indicator wells, W-2MA and PA-12MA, show declining 10-year concentration trends (**Figure 14**).

9.6.3 Area 12 Five-Year Running Average

In 2022, 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 calculated for the period 2018 through 2022 is 10 µg/L which is higher than the average for the previous 5-year period of 9 µg/L (**Table 15**). This recent lack of decline in running average TCE concentrations is likely linked to changes in pumping patterns during the last five years. Pump maintenance issues resulted in curtailed extraction at the Granite Reef well during 2019 and 2020 and fairly significant pumping occurred at well COT-6, which has a tendency to pull mass to the southwest, during 2020 and 2022 (**Table 9**). Five-year average TCE concentrations at two monitoring wells (M-4MA and M-5MA) showed the most substantial increases (**Figure 15**). TCE concentration trends at all Area 12 MAU indicator wells are stable, no trend, or declining over the long term (10-year), indicating that Source Control operations are controlling and reducing mass in the vicinity of Area 12.

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 (**Section 3.2**). The following is a general discussion of the progress achieved in satisfying RAOs, based on review of data through 2022. Details regarding data that support the assessment for specific aspects of the remedy are provided in earlier sections of the SMR.

Remedial Action Objective A – Aquifer Restoration:

Significant progress has been made toward the removal and restoration of groundwater to drinking water quality with respect to the Site COCs. In 2022, the NIBW remedial actions resulted in the extraction and treatment of about 5.4 billion gallons of groundwater and removal of about 1,390 pounds of TCE, as shown in **Table 6**. From the inception of the NIBW groundwater remedy in 1994, about 145 billion gallons of groundwater have been extracted to remove an estimated 99,205 pounds of TCE. Soil remedial actions (as discussed in RAO F) 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 135 pounds in 2022, representing a decrease of 99% in the past 29 years (**Figure 16**). For the first time, data from the annual monitoring round in October 2022 show that the Cleanup Standard for TCE was not exceeded at any of the UAU monitoring wells and there is only a small area downgradient of Area 7 where TCE concentrations are interpreted to be above 5 µg/L (**Figure 13)**. 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 to date and the UAU is approaching restoration.

Evidence of progress toward restoration in the MAU and LAU is significant and can be demonstrated by widespread decreasing and stable longer-term and shorter-term TCE concentration trends as shown on **Figure 14**, **Figure 15**, and **Appendix D**. Based on the last five years of TCE concentration data, no trends, stable trends, or decreasing trends are observed in all but five MAU monitoring wells (**Table 10**). 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 within the TCE plume area shows an increasing 5- and 10-year trend (PG-2LA). Well PG-2LA is located adjacent to extraction well PCX-1, which is drawing mass north for capture and treatment. 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 and near-term closeout of the UAU groundwater remedy is anticipated. 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, extensive progress in restoration of the MAU and LAU has been made.

Remedial Action Objective B - Eliminate Exposure to Impacted Groundwater:

As presented in **Section 9.1**, groundwater extracted as part of the NIBW Site remedy in 2022 was treated to meet the groundwater Cleanup Standards specified in the Amended ROD, thereby eliminating exposure and protecting human health and the environment.

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

The CGTF was constructed to provide treatment of TCE-impacted groundwater for the City of Scottsdale's beneficial use. Since the CGTF began operation in 1994, it has treated approximately 69 billion gallons of groundwater to levels safely below the respective NIBW Cleanup Standards. 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 the NIBW Site have impacted the City of Scottsdale's ability to pump, treat, and serve water from certain key remedial extraction wells through its municipal system in recent years. Since 2017, the PCs have collaborated with the City of Scottsdale to develop solutions that support extraction and treatment for TCE plume containment while allowing the City of Scottsdale to manage 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. The TGTF is a reverse osmosis treatment facility capable of removing inorganic COCs from about 1,000 gpm of treated water from the CGTF. TGTF is anticipated to be commissioned in early 2023 providing an opportunity to restore well COS-71A to a higher pumping priority. The PCs are working with the City of Scottsdale to modify well COS-71A to pump only from the MAU. This modification will enhance MAU extraction and treatment in a critical area of the Site, increasing local capture of MAU mass from Area 7 and improving the overall efficiency of the remedy. On a parallel path, the PCs are working with both SRP and the City of Scottsdale to convert monitoring well PG-41MA/LA into an extraction well, with treatment at the NGTF. This enhancement will provide additional assurances that peripheral production wells north of the LAU plume would be protected should any of the northern extraction wells unexpectedly go off-line. The PCs will continue to work with the City of Scottsdale in 2023 to implement these 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. Evaluation of the impacts of pumping from the AWC wells, particularly in the LAU, will continue. While 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. Over the last five years, almost all monitoring wells located near the edge or along the periphery of the MAU/LAU plume show non-increasing TCE trends. TCE concentrations at E-10MA show a short-term (5-year) increasing trend; however, concentrations at this well remain low and are not interpreted to impact containment. In addition, in 2022, no GM&EP metric exceedances occurred in any of the MAU/LAU or Northern LAU indicator wells, demonstrating that containment is effectively protecting peripheral production wells for drinking water end use. The NIBW PCs will continue to evaluate and report trends to the Technical Committee to ensure that the overall objectives of the MAU/LAU plume containment 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. The CGTF and the NGTF provide treated groundwater to the City of Scottsdale for use in its potable water system or alternately to SRP for its beneficial use. The MRTF treats groundwater for municipal use by EPCOR. At Area 7, treated groundwater is delivered to shallow injection wells that recharge the UAU aquifer. Treated water from the Area 7 system has elevated concentrations of inorganic constituents not suitable for direct potable use. At Area 12, treated groundwater is provided to SRP for use in its municipal and irrigation supply 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 other 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 conducted 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 have been closed out since 2015 with EPA approval.

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

The NIBW PCs closely coordinate the planning and implementation of NIBW remedial actions with the key water providers, including the City of Scottsdale, SRP, and EPCOR. These efforts focus 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. This need is balanced with the fact that water providers have considerable, but variable, water demands in the NIBW Site area and that they access water supplies via a system of existing wells and infrastructure.

Through ongoing technical discussions and cooperation, the parties take steps to focus groundwater extraction and end uses for the remedy on optimum water resource management. The NIBW PCs provide technical assistance with the installation, testing, modification, and replacement 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 upgrade treatment systems and enhance infrastructure and control systems as needed. The water providers make efforts to prioritize pumping to meet water demands using wells identified as most beneficial to the remedy.

In 2022, the PCs continued to support the City of Scottsdale's efforts to balance inorganic loading to their municipal system. Although not NIBW 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. Actions planned and in progress are both beneficial to the NIBW remedy and improve the City of Scottsdale's ability to control inorganic COCs in its system. These actions include bringing well COS-71A back online as an MAU-only extraction well and initiating LAU extraction at PG-41MA/LA, both planned for 2023.

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. Based on the significant remedy progress in the UAU, EPA approved formal abandonment of a total of 43 UAU monitoring wells. There are no increasing TCE concentrations trends in any of the remaining 28 UAU monitoring wells over the last five years and 2022 was the first year when concentrations of TCE for all UAU monitoring wells from the annual monitoring round were below the MCL of 5 µg/L (**Appendix C, Table C-1**). The PCs will continue to collect data from the UAU monitoring well network in 2023.

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, the PCs conducted a comprehensive evaluation of the monitoring network in relation to compliance with the GM&EP, which was reported 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, four MAU/LAU wells, and 28 LAU wells) and 12 of which are extraction wells. Proposed changes to the monitoring network for 2023 include the replacement of Lower MAU compliance monitoring well PG-49MA, with the Lower MAU well PG-53MA. Monitoring well PG-49MA has a casing breach, is no longer producing representative data, and will be abandoned. The two wells are completed in similar intervals of the Lower MAU, are located approximately 3,000 feet from each other, and have TCE concentrations that are in the same low to non-detect range.

9.9 Evaluation of Need for Modeling Analyses

The PCs worked closely with EPA to complete a comprehensive update to the NIBW groundwater flow model in 2020 and 2021. Preparation of a report to document the construction and calibration of the updated model as well as results of projections designed to evaluate remedy performance under current and potential future conditions is in progress. Completion of the report is planned for the first half of 2023.

During 2022, the groundwater flow model was used to evaluate drawdown impacts from planned extraction at PG-41MA/LA as part of the State permitting process. The groundwater flow model also supported assessments of hydraulic capture of the LAU plume for the 2022 Site Monitoring Report. The model will be used in 2023 to evaluate capture for the remedy as well as potential remedy impacts of planned injection by the City of Tempe at well COT-6, located in the southern part of the Site. Evaluation results will be included in the 2023 Site Monitoring Report.

9.10 CSM Evaluation

Interpretation of data from 2022 indicates no substantial changes to the overall understanding of the CSM around which the remedy was designed. Water level recovery observed in all three alluvial units due to decreased pumping and increased recharge beginning in the early to mid-2000s has stabilized (**Appendix D**). Small to moderate water level declines are now observed in the UAU, MAU, and LAU across the Site (**Figure 9** through **Figure 11**) Downward hydraulic gradients have decreased over time. Recent data from monitoring of the lowermost interval of the MAU shows localized upward gradients from the LAU to the Lower MAU. The PCs will continue to evaluate consistency of data collected during 2023 with the CSM. Observations of anomalies or changes relevant to fate, transport, and cleanup of the groundwater plumes will be discussed with the Technical Committee.

Recognizing that significant data collection and analysis had occurred since the CSM was presented in the 2000 FSA, the NIBW PCs prepared a draft CSM Update in 2020 that 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. EPA provided comments on the draft report on December 17, 2021, and the PCs responded to EPA's comments on April 29, 2022. Issuance of the final report is planned in the first half of 2023. Once finalized, the 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 2022, supplemental data collected by the PCs included the following:

- Monitoring well sampling at PG-53MA, a proposed as a replacement for compliance monitoring well PG-49MA.
- Sampling at EPCOR production wells PV-11 and PV-12B in coordination with EPCOR.
- Collection of high-frequency water level data at selected locations across the Site, beyond those identified in the GM&EP.
- Sampling and water level monitoring associated with an evaluation of potential contingency conditions at indicator monitoring well M-2MA.
- Testing at monitoring well PCX-1 to assess the vertical flow and TCE concentration distribution in the Northern LAU plume.

Information about these activities is summarized in the following sections.

10.1.1 Monitoring Well Sampling

The PCs collected water quality data during 2022 from Lower MAU monitoring well PG-53MA in lieu of sampling at compliance Lower MAU monitoring well PG-49MA. During the October 2022 monitoring event, a sample could not be obtained from PG-49MA due to the presence of what was believed to be an obstruction in the well. The NIBW PCs reviewed historical data from this well and noted a shift in water level elevation that corresponds with a decline in TCE concentration to below the laboratory reporting limit that had occurred beginning in 2012. Discovery of the obstruction brought into question the validity of data collected since 2012 and the on-going usefulness of this monitoring well. This information was presented to the Technical Committee on October 31, 2022. Subsequently, NIBW PCs conducted a video survey at PG-49MA on November 2, 2022 and verified the presence of an obstruction at 276 feet below land surface (bls). Upon further review of historical water quality and water level data obtained from the well, a breach in the casing within the UAU is suspected. As such, well PG-49MA is recommended for abandonment. The NIBW PCs recommend replacement of this well in the compliance monitoring program with Lower MAU well PG-53MA. Monitoring well PG-53MA is located to the east (down- and crossgradient) from PG-49MA (**Figure 7** and **Figure 8)**. PG-53MA is screened from 535 ft to 585 ft bls, similar to the screened interval at PG-49MA of 524 to 574 ft bls. The TCE concentration at PG-53MA was below the laboratory reporting limit of 0.50 µg/L in November 2022 (**Appendix C, Table C-1**). Historical data is provided in

Appendix D, Figure D-118. The NIBW PCs seek concurrence from EPA that PG-53MA will be used to replace PG-49MA as a Lower MAU compliance monitoring well for water quality.

Removal of inoperable pumps to enable future sampling was conducted in November 2022 at Lower MAU monitoring wells PG-45MA, PG-46MA, PG-52MA, and PG-53MA. During the process, a sample was obtained from PG-53MA to provide additional information relative to its proposed use as a replacement for PG-49MA, as noted previously.

10.1.2 Production Well Sampling

MRTF extraction wells PV-14 and PV-15 are sampled monthly when in operation in accordance with the GM&EP. Down-gradient EPCOR production wells PV-11 and PV-12B, when operating, are also sampled monthly by the NIBW PCs during scheduled monitoring activities. These supplemental monitoring data from wells PV-11 and PV-12B are used to help delineate the northern extent of plume migration in the LAU. Laboratory analytical results for samples collected from production wells PV-11 and PV-12B are included under separate cover as part of a supplemental data report.

10.1.3 Supplemental High-Frequency Water Level Data

The PCs collect supplemental high-frequency water level data from wells throughout the Site in addition to the wells required for continuous monitoring by the GM&EP (**Appendix A, Table A-3; Appendix B**). This effort has assisted the NIBW PCs to evaluate water level fluctuations in key wells, particularly in monitoring wells located near pumping wells and within capture zones. High-frequency water level data is beneficial for groundwater modeling purposes and for evaluating vertical and lateral differences in pumping impacts and vertical gradients. Hydrographs showing high-frequency water level data collected at compliance and selected supplemental monitoring locations is presented in **Appendix B**. Locations for supplemental high-frequency water level monitoring are routinely evaluated and modified as needed to fill data gaps and respond to the current needs of the project. Additions to the supplemental network of high-frequency data in 2022 include the installation of continuous monitoring equipment in well pair S-1MA/LA, well pair S-2MA/LA, and in MAU well M-12MA2, as described in the following paragraphs.

In 2022, continuous monitoring equipment was added to each of the well pairs S-1MA/LA and S-2MA/LA to better understand MAU and LAU groundwater flow patterns near the western portion of the MAU and LAU plumes. The goal was to evaluate the lateral and vertical pumping influence of the AWC wellfield and the Area 7 extraction wells. Pumping data from these two pumping centers were evaluated in conjunction with both recent high-frequency and historical manual water level data from the S-1MA/LA and S-2MA/LA well pairs. While previously understood from manual measurements that one of the two Upper MAU wells was problematic, high-frequency data collection clearly identified which of the two wells was reliable for interpreting impacts of pumping from Area 7 extraction wells on the Upper MAU. Well S-1MA exhibited a significantly muted response, whereas water level data from well S-2MA demonstrated the well responded in a predictable manner to pumping at both Area 7 extraction wells and regional MAU water level stresses. These data are displayed in **Appendix B**. Both of the LAU wells from the S-1MA/LA and S-2MA/LA well pairs show a strong response to pumping from the AWC wellfield.

High-frequency water level monitoring was also initiated in 2022 at MAU well M-12MA2 to help resolve concerns about the reliability of water level data from this well for evaluating capture in the Upper MAU associated with Area 7 and CGTF pumping. Of interest is the degree to which M-12MA2 responds to pumping from lower priority CGTF extraction wells COS-31 and COS-72 compared with how it responds to Area 7 extraction wells. The two CGTF extraction wells pump from the entire MAU interval, whereas the Area 7 extraction wells, only pump from the Upper MAU. The planned additional monitoring effort may be helpful for evaluating the water level response to pumping from COS-71A once it comes back online.

Supplemental high-frequency water level data collection will continue at these wells through 2023. Additional insights gained from these data will be presented in the 2023 SMR.

10.1.4 Indicator Well M-2MA Evaluation

The sample collected on October 12, 2022, from MAU indicator well M-2MA showed a TCE concentration of 24 µg/L, which is above the GM&EP contingency initiation level of 10 µg/L (**Appendix C, Table C-1**). In accordance with contingency actions outlined in the GM&EP, a confirmation sample was collected on October 20, 2022. The results of the original and duplicate confirmation sample were both below the contingency criteria for an action response plan, at 2.8 µg/L and 7.1 µg/L, respectively. In accordance with the GM&EP contingency initiation requirements, the NIBW PCs began an evaluation which included the following steps:

- Review of historical TCE data and the previous (2017) M-2MA Contingency Action Evaluation (PCs, 2017).
- Review of water levels and water quality samples at nearby wells.
- Collection of a confirmation sample at E-8MA. TCE concentrations showed a similar pattern as M-2MA of an increase followed by a decrease.
- Request for and review of pumping data for City of Tempe well COT-6 to evaluate pumping status prior to and during the two sampling events.

- Review of Area 12 pumping data to evaluate pumping status prior to and during the two sampling events.

Based on M-2MA confirmation results showing TCE concentrations below the GM&EP response action criteria, as well as review of the information and data detailed previously, the PCs concluded that contingency conditions at M-2MA were not verified and that a contingency response action plan was not necessary. Nevertheless, the NIBW PCs notified EPA of contingency response actions, sampling results, and conclusions to date in the December 2022 Technical Committee Meeting. The following conclusions and observations were summarized in the meeting:

- Water level responses to changes in production well COT-6 pumping are the primary mechanism affecting short-term flow patterns and water quality at monitoring well M-2MA and surrounding wells.
- The NIBW PCs anticipate fluctuations and periodic increases in TCE concentrations at M-2MA to occur seasonally in response to pumping at COT-6.
- Replacement of COT-6 by COT-6R is not anticipated to significantly change hydraulic conditions. The replacement well is constructed in a generally consistent manner and the rate and frequency of pumping is planned to be similar to the original well when it comes online near the end of 2023.
- No peripheral production wells are impacted or threatened to be impacted by shifts in the MAU TCE plume in response to COT-6 pumping.
- Remedy performance is not negatively impacted by periodic shifts in the MAU TCE plume in response to COT-6 pumping.
- TCE concentrations decline quickly when the flow regime stabilizes after COT-6 is offline.

To further evaluate the mechanism behind TCE concentration fluctuations observed at indicator well M-2MA and nearby wells, the PCs will voluntarily conduct the following actions:

- Conduct enhanced data collection for one calendar year (through 2023).
    - Increase frequency of M-2MA monitoring to quarterly for water quality and water levels.
    - Increase water level monitoring at surrounding wells (E-5MA, E-8MA, PA-23MA, PA-16MA, B-1MA) from semi-annual to quarterly.
    - Install a transducer at E-5MA to collect continuous water level data between the Area 12 and the COT-6 capture zones.

    - Continue to sample MEX-1MA and Granite Reef on a monthly basis (quarterly sampling is required per the GM&EP).
- Continue to operate the Area 12 extraction wells in an optimal configuration for the remedy, subject to water demands by SRP.
- Request information on the status of pumping at well COT-6 from the City of Tempe prior to monitoring events.
- Re-evaluate GM&EP criteria for M-2MA as part of the GM&EP update process.
- Prepare a summary of the M-2MA evaluation for inclusion in the 2023 SMR (February 2024)

The City of Tempe is seeking a permit from the State of Arizona to inject excess surface water into well COT-6 once the replacement well, COT-6R, is available for use as a pumping well. As part of the reinjection permit process, the NIBW PCs in conjunction with the City of Tempe and ADEQ will evaluate the impacts of pumping at COT-6R and reinjection at COT-6 on groundwater flow and TCE concentrations at the Site. As discussed with EPA and ADEQ on January 10, 2023, the NIBW groundwater model will be used to support this evaluation.

10.1.5 PCX-1 Testing

In March 2022, the PC's conducted fluid movement investigations, consisting of spinner-flowmeter surveys and depth-specific sampling, at extraction well PCX-1. The purpose of these investigations was to evaluate the vertical distribution of NIBW COCs and inorganic COCs unrelated to the Site in the Northern LAU. The investigations were conducted during both pumping and non-pumping conditions and were compared to previous investigations conducted at PCX-1 in 1998, 2003, and 2011. A technical memorandum summarizing the 2022 testing is included in **Appendix L**.

The spinner-flowmeter surveys during pumping conditions showed the profile of groundwater flow into extraction well PCX-1 has not significantly changed from earlier investigations. The unit flow rate into the well generally decreased with depth along the entire screened interval from a depth of 720 to 1,151 feet bls. The uppermost 80 feet of the screened interval was the most productive, with almost 10 gpm of inflow per foot of screen, while the bottom 80 to 90 feet yielded almost no water. No measurable vertical flow was detected in the well during the non-pumping conditions survey.

Results of depth-specific sampling showed that calculated interval-specific TCE concentrations generally decreased with depth. The second interval from the top (800 to 870 feet bls) had the highest TCE concentration (60 µg/L) while the deepest interval (1,065 to 1,151 feet bls) had the lowest TCE concentration (26 µg/L). TCE concentrations are more uniform with depth compared to previous investigations. Specifically, TCE concentrations in the lowermost interval have increased from non-detect in previous investigations to 26 µg/L in 2022. TCE concentrations in upper intervals have consistently decreased from their peak in 2003 to the 2022 maximum concentration of 45.9 µg/L. The concentration profile becoming more uniform over time is supported by the CSM. This is consistent with early arrival in the northern part of the Site of mass migrating in the more permeable upper intervals of the LAU and later arrival of mass in deeper, less permeable intervals. Similar to TCE, concentrations of arsenic and nitrate are more uniform with depth in 2022 compared to previous investigations. Wellhead concentrations of arsenic and nitrate are similar at PCX-1, but nitrate concentrations have increased and arsenic concentrations have decreased in the lower portion of the well since 2011.

Additional fluid movement investigations are planned for 2023 at extraction well COS-71A prior to well modification. As opportunities arise, fluid movement and depth-specific sampling investigations at critical extraction wells will provide valuable information on changes in the vertical distribution of NIBW COCs in intervals other than the principal monitored zones. Detailed results from the PCX-1 fluid movement investigations are provided in **Appendix L**.

10.2 Remedy Enhancement Evaluations

Beginning in 2020, the NIBW PCs, in conjunction with the City of Scottsdale and SRP, developed and evaluated 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. Priorities for remedy enhancements to balance the needs of water providers with current and future NIBW remedy operation included: 1) increasing capture of MAU mass downgradient from Area 7 that would otherwise be captured in the LAU by bringing COS-71A back online as an MAU-only extraction well, and 2) providing redundancy in Northern LAU containment to increase protection of peripheral production wells by adding extraction at monitoring well PG-41MA/LA.

Groundwater modeling was conducted in 2021 to evaluate these potential remedy enhancements and results were presented at Technical Committee meetings. Simulations demonstrated the following: 1) capture of the MAU plume downgradient from Area 7 was increased with the additional extraction at COS-71A, improving 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; and 2) capture of the Northern LAU plume, while complete, was increased with the addition of extraction at PG-41MA/LA, 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 2023.

10.3 Optimization Review

Beginning in late 2020 and continuing through 2023, the NIBW PCs have supported the on-going EPA Remedy Optimization Evaluation through sharing of applicable digital documents, collaborating to develop a 3D visualization model of the Site using LeapFrog, and reviewing and providing feedback on Optimization Evaluation preliminary findings. The NIBW PCs believe that development of an independent 3D visualization model by the Remedy Optimization Team was duplicative and unnecessary. However, the NIBW PCs look forward to reviewing the Remedy Optimization Evaluation report, anticipated in early 2023, and working with the team to evaluate potentially beneficial recommendations.

10.4 Area 7 Vapor Intrusion Investigations

Based on findings in the second Five-Year Review (U.S. Army Corps of Engineers [USACE] on behalf of EPA, 2016), the NIBW PCs have conducted the following activities to evaluate and address potential vapor intrusion risk at the Site, in coordination with EPA, between 2016 and 2022:

- 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 and the cost/implementation challenges associated with EPA's suggested approach of thermal remediation. 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.

- 2021: Provided comments on the Third Five-Year Review Report (USACE, 2021), including comments that relate to Area 7 vapor intrusion risk. The PCs agreed with EPA's finding that the vapor intrusion risk at Area 7 was within the acceptable range for TCE in indoor air. However, the NIBW PCs responded that they did not intend to conduct the requested pilot test for thermal remediation of the vadose zone at Area 7. The approach had been previously evaluated and deemed to be neither cost effective nor implementable.

- 2019 through 2022: Vapor Mitigation Systems conducted annual operation and maintenance inspections on vapor mitigation systems, most recently on August 26, 2022, verifying that vacuum is consistently maintained beneath the floors of the four apartments.

- 2019 through 2022: Conducted indoor air sampling, most recently on August 26, 2022. Results of the indoor air monitoring indicated TCE concentrations in indoor air remain low, currently ranging from below detection to 0.55 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. Indoor air data collected in August 2022 was submitted to EPA under separate cover in February 2023.

10.5 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), perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in groundwater. While Federal drinking water standards do not exist for these compounds, both 1,4-DX and PFAS, PFOA/PFOS and other related compounds were investigated at the NIBW Site.

The EPA advisory level for 1,4-DX, which was initially set at 3 µg/L, was lowered 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 samples were below the detection limit of 1.0 µg/L. 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. Analytical results indicated that 1,4-DX concentrations were all low, ranging from below detection limits of between 0.07 and 0.22 µg/L for most of the samples to a maximum concentration of 1.8 µg/L at PA-6LA. Results of 2015 1,4-DX sampling, reported in the 2015 NIBW SMR, demonstrate that 1,4-DX is not a COC of concern at the Site. No additional 1,4-DX sampling is planned or recommended at the Site.

EPA established a health advisory level of 70 parts per trillion (ppt) in drinking water for the combined concentrations of PFOA and PFOS in 2016. EPA's 2019 interim guidance recommended additional investigation when a PFOA or PFOS concentration of 40 ppt is exceeded. At EPA's request, the City of Scottsdale analyzed samples from each of the CGTF wells and PCX-1 for 21 PFAS compounds, including PFOA and PFOS, in 2017. The highest level of combined PFOA/PFOS was detected at well COS-75A at 8.2 ppt, which was significantly below the EPA's established combined PFOA/PFOS health goal of 70 ppt and the interim trigger level of 40 ppt individually for PFOA and PFOS. Trace levels of eight additional PFAS compounds were also detected in the wells tested.

On June 15, 2022, EPA released four drinking water health advisories for PFAS-related chemicals, which included PFOA; PFOS; GenX chemicals (hexaflouropropylene), dimer acid and its ammonium salt; and perfluorobutane sulfonic acid [PFBS] and its related compound potassium perfluorobutane sulfonate. In 2022 extraction wells COS-75A, COS-72, and PCX-1 were sampled for PFOA, PFOS, and PFBS. Wells COS-71A and COS-31 were not pumping during sampling activities and were not sampled. The results for PFOA and PFOS at each of the wells sampled exceeded the new EPA health advisories. Concentrations of PFBS, however, were all below the associated health advisory. The highest concentration of PFOA detected in 2022 was 3.3 ppt at COS-75A and COS-72. The highest concentration of PFOS was 6.5 ppt at COS-75A. The highest concentration of PFBS was 5.9 ppt, detected at COS-72. GenX chemicals were not analyzed in 2022. The City of Scottsdale plans to sample wells COS-71A and COS-31 for PFAS-related chemicals in early 2023 when rehabilitation and testing is underway at COS-71A.

EPA has indicated it will establish primary drinking water standards (MCLs) for the four PFAS chemical compounds, including PFOA, PFOS, PFBS, and GenX chemicals. No health advisory exists for the other PFAS compounds. PFOA, PFOS, PFBS and GenX chemicals are not COCs at the Site.

11 CONCLUSIONS AND RECOMMENDATIONS

Data collected and evaluated throughout 2022 indicate that the NIBW treatment facilities continue to effectively remove COC mass from groundwater. Treated groundwater from NIBW is put to beneficial use by reinjection, or use as 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 2022, all GM&EP metrics were achieved in the UAU Program, the MAU/LAU Program, and the Northern LAU program, and some were achieved for the Source Control Programs. Exceptions are discussed in **Section 9.6** and tracked carefully. As data collection and reporting at the Site continue, the CSM will be critically evaluated and updated as appropriate. In the limited cases where increasing concentrations are observed, conditions will be monitored and evaluated for consistency with the CSM and with the Site containment performance standards.

Recommendations for 2023 include:

- Finalize the CSM Update Report.
- Prepare and distribute a draft Groundwater Flow Model Update Report for review by the Technical Committee.
- Review and provide comments on the pending EPA Remedy Optimization Team's final report.
- Conduct fluid movement and depth-sampling investigations at CGTF extraction well COS-71A and complete the associated modification of this well to an MAU-only extraction well.
- Continue efforts to equip monitoring well PG-41MA/LA for extraction and tie it into treatment at the NGTF.
- Abandon Area 7 extraction well 7EX-4MA in accordance with ADWR regulations and increase extraction at 7EX-6MA to the degree possible, subject to pipeline and treatment system capacity, to ensure capture of the highest TCE concentration portions of the Area 7 MAU plume.

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
amsl................above mean sea level
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
bls...................below land surface
CD..................Consent Decree
CGTF ....Central Groundwater Treatment Facility
CMR...............Compliance Monitoring Report
COCs..............Constituent of Concern
COT................City of Tempe
CSM ....Conceptual Site Model
CWTP ....Chaparral Water Treatment Plant
DCE................1,1-dichloroethene
DMR ....Discharge Monitoring Reports
eff ....effluent
EPA ................U.S. Environmental Protection Agency
EPCOR...........EPCOR Water USA
FSA ....Feasibility Study Addendum
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 ....Human Health Risk Assessment
ID ....identifier
inf ....influent
LAU ....Lower Alluvial Unit
MAU ....Middle Alluvial 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 & 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
QA ....quality assurance
QAPP ....quality assurance project plan
RAOs..............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
SVE ....Soil Vapor Extraction
TCA................1,1,1-Trichloroethane
TCE ....Trichloroethene
TCM ....chloroform
TGTF..............Thomas Groundwater Treatment Facility
UAU ....Upper Alluvial Unit
UIC.................Underground Injection Control
USACE ..........U.S. Army Corps of Engineers
UV/OX ....Ultraviolet Oxidation
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	MAU	Quarterly	---
7EX-4MA	Extraction	MAU	Quarterly	---
7EX-6MA	Extraction	MAU	Quarterly	---
COS-31	Extraction	MAU/LAU	Monthly	---
COS-71A	Extraction	MAU/LAU	Monthly	---
COS-72	Extraction	MAU/LAU	Monthly	---
COS-75A	Extraction	LAU	Monthly	---
Granite Reef	Extraction	MAU	Quarterly	---
MEX-1MA	Extraction	MAU	Quarterly	---
PCX-1	Extraction	LAU	Monthly	---
PV-11	Extraction	LAU	---	Continuous
PV-14	Extraction	LAU	Monthly	Continuous
PV-15	Extraction	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-4MA*	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

EXPLANATION:

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

NOTES:

* = On May 19, 2022, the PCs formally requested the replacement of monitoring well D-2MA per the GM&EP schedule with monitoring well D-4MA. This request was approved by EPA on July 12, 2022.

1) Extraction wells are only sampled when operating during sampling event.

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]**
MONITORING 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	113	8 4	steel	0-20 0-114	--- 64-114	Pump	Unknown	33.456741	-111.914229
D-4MA	(A-2-4) 26bda	Registration Pending	01/25/99	250	4	PVC	0-249.5	163.5-175 184-189.5 214.5-224 230-249.5	Pump	221	33.490465	-111.918839
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	---	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-14LA	(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	---	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
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

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]
M-12MA2	(A-2-4) 26dda4	55-906269	02/07/07	301	5	steel	0-299	250-299	HydraSleeve	---	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	HydraSleeve	---	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	---	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
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
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

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]
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	HydraSleeve	---	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/ /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	445	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	Pump	Unknown	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
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

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]
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) 26aaa1	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	0-465 465-1295	Unknown	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	Unknown	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
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
SRP21.5E,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	12/01/40	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

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]
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:

--- = Not applicable
ft, bls = feet, below land surface
NA = Not available

NOTES:

[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.

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 Alluvial Unit

GM&EP = Groundwater Monitoring & Evaluation Plan

APPENDIX B
WATER LEVEL TABLES AND COMPLIANCE/SUPPLEMENTAL CONTINUOUS GRAPHS

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery & Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2022

Monitoring Well Identifier	Measurement Date	Depth to Water (feet, bls)	Groundwater Altitude (feet, amsl)
B-1UA	Not included in April monitoring event		
B-J	Not included in April monitoring event		
E-1UA	Not included in April monitoring event		
E-2UA	Not included in April monitoring event		
E-5UA	Not included in April monitoring event		
E-6UA	Not included in April monitoring event		
E-7UA	Not included in April monitoring event		
E-12UA	Not included in April monitoring event		
E-13UA	Not included in April monitoring event		
M-2UA	Not included in April monitoring event		
PG-4UA	Not included in April monitoring event		
PG-5UA	Not included in April monitoring event		
PG-6UA	Not included in April monitoring event		
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		
PG-22UA	Not included in April monitoring event		
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		
B-1MA	04/18/2022 16:05	86.24	1105.39
D-2MA	04/21/2022 11:16	109.83	1130.2
D-4MA (A)	04/21/2022 11:34	120.64	1119.39
D-4MA (A), (B)	06/29/2022 12:02	123.30	1116.73
E-1MA	04/19/2022 16:27	135.03	1079.34
E-5MA	04/27/2022 12:21	103.39	1096.04
E-8MA	04/18/2022 11:51	92.01	1100.88
E-10MA	04/21/2022 17:36	132.88	1,110.98
E-10MA (B)	06/29/2022 15:08	135.20	1,108.66
M-1MA	04/19/2022 14:31	121.46	1,089.43
M-2MA	04/19/2022 16:23	116.42	1,093.64
M-3MA	04/19/2022 15:43	103.72	1,101.84

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery & Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2022

Monitoring Well Identifier	Measurement Date	Depth to Water (feet, bls)	Groundwater Altitude (feet, amsl)
M-4MA	04/19/2022 15:24	127.00	1,087.90
M-5MA	04/19/2022 17:43	151.88	1,065.56
M-6MA	04/20/2022 14:50	138.61	1,078.38
M-7MA	04/19/2022 14:17	127.30	1,086.57
M-9MA	04/20/2022 09:38	120.21	1,100.31
M-10MA2	04/20/2022 13:43	131.51	1,088.54
M-11MA	04/18/2022 12:22	106.17	1,105.42
M-12MA2	04/21/2022 13:25	148.58	1,079.34
M-14MA	04/19/2022 10:17	119.59	1,106.75
M-15MA	04/18/2022 13:58	132.51	1,086.40
M-16MA	04/18/2022 13:25	117.49	1,110.66
PA-1MA	04/18/2022 14:11	105.94	1,119.56
PA-3MA	04/18/2022 14:37	119.24	1,134.20
PA-4MA	04/18/2022 14:58	101.32	1,129.60
PA-7MA	04/20/2022 08:48	121.11	1,131.95
PA-10MA	04/21/2022 18:17	125.74	1,111.06
PA-10MA (B)	06/29/2022 14:08	127.62	1,109.18
PA-12MA2 (C)	04/19/2022 13:27	116.94	1,108.02
PA-14MA	04/19/2022 14:53	126.28	1,122.81
PA-14MA (B)	06/29/2022 15:25	129.49	1,119.60
PA-16MA	04/18/2022 09:59	96.42	1,108.06
PA-17MA2	04/19/2022 11:09	108.36	1,130.34
PA-20MA	04/18/2022 11:14	117.98	1,103.30
PA-21MA	04/18/2022 13:42	117.56	1,107.63
PA-23MA	04/18/2022 09:35	76.55	1,107.87
PG-4MA	04/18/2022 10:43	122.50	1,105.04
PG-5MA	04/18/2022 11:27	109.96	1,104.31
PG-6MA	04/18/2022 10:16	97.03	1,115.67
PG-7MA	04/18/2022 09:49	87.73	1,110.13
S-1MA	04/19/2022 15:49	141.66	1,118.68
S-1MA (B)	06/29/2022 15:38	143.05	1,117.29
S-2MA	04/19/2022 14:38	145.43	1,115.06
W-1MA	04/21/2022 11:34	102.91	1,127.47
W-1MA (B)	06/29/2022 12:36	103.51	1,126.88
W-2MA	04/21/2022 13:44	119.80	1,115.28
W-2MA (B)	06/29/2022 13:51	121.19	1,113.90
PG-45MA (D)	04/19/2022 12:05	123.44	1,108.82
PG-46MA (D)	04/19/2022 11:54	120.59	1,112.72
PG-47MA	04/20/2022 14:43	115.43	1,101.26

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery & Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2022

Monitoring Well Identifier	Measurement Date	Depth to Water (feet, bls)	Groundwater Altitude (feet, amsl)
PG-48MA	04/20/2022 14:20	135.67	1,081.17
PG-49MA (D)	04/19/2022 12:57	76.00	1,134.48
PG-50MA	04/21/2022 09:37	107.83	1,133.13
PG-51MA	04/21/2022 11:04	136.39	1,104.52
PG-52MA (D)	04/20/2022 10:46	149.83	1,103.38
PG-53MA (D)	04/19/2022 10:43	120.83	1,104.14
PG-54MA (D)	04/19/2022 10:49	129.26	1,095.57
PG-55MA (D)	04/26/2022 11:25	125.74	1,100.03
PG-56MA (D)	04/21/2022 11:22	131.36	1,100.50
E-14MA/LA	04/18/2022 12:42	153.20	1,100.75
M-17MA/LA	04/20/2022 13:55	131.78	1,105.92
PG-23MA/LA	04/18/2022 10:31	112.97	1109.56
PG-38MA/LA	04/18/2022 10:56	131.87	1,105.37
E-1LA	04/19/2022 16:17	126.42	1,088.58
E-7LA	04/18/2022 12:09	101.00	1,096.79
M-2LA	04/19/2022 16:53	116.33	1,093.90
M-5LA	04/19/2022 17:23	129.28	1,088.18
M-9LA	04/20/2022 09:45	138.29	1,082.23
M-10LA2	04/20/2022 13:24	128.93	1,090.77
M-14LA	04/19/2022 10:25	138.06	1,088.16
M-16LA	04/19/2022 09:52	146.85	1,081.23
PA-2LA	04/18/2022 14:46	235.42	1,018.34
PA-5LA	04/18/2022 15:10	217.13	1,012.32
PA-6LA	04/20/2022 12:23	240.84	1,012.09
PA-8LA2	04/21/2022 12:51	162.96	1,065.37
PA-9LA	04/21/2022 12:29	168.95	1,067.83
PA-11LA2 (E)	04/19/2022 13:39	137.92	1,087.04
PA-13LA	04/19/2022 14:59	226.86	1,022.13
PA-15LA	04/18/2022 10:06	97.32	1,106.96
PA-18LA	04/19/2022 11:24	188.90	1,049.96
PA-19LA	04/18/2022 11:08	120.11	1,101.35
PA-22LA	04/18/2022 09:29	82.24	1,101.76
PG-1LA	04/18/2022 18:49	242.29	1,007.37
PG-2LA	04/18/2022 14:25	274.95	996.11
PG-39LA	04/19/2022 13:07	130.81	1,101.77
PG-40LA	04/18/2022 12:19	274.61	1,000.72
PG-42LA	04/18/2022 13:38	291.53	1,000.78
PG-43LA	04/18/2022 18:28	256.64	1,008.37
PG-44LA	04/18/2022 15:16	293.84	1,003.75

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery & Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2022

Monitoring Well Identifier	Measurement Date	Depth to Water (feet, bls)	Groundwater Altitude (feet, amsl)
S-1LA	04/19/2022 15:42	221.21	1,039.24
S-2LA	04/20/2022 15:33	246.67	1,013.30

EXPLANATION:

feet, bls = feet below land surface

feet, amsl = feet above mean sea level

GM&EP = Groundwater Monitoring & Extraction Plan

NOTES:

(A) = Monitoring of well D-4MA was not required per the GM&EP during the April monitoring event. On May 19, 2022, the PCs formally requested the replacement of monitoring well D-2MA per the GM&EP schedule with monitoring well D-4MA. This request was approved by EPA on July 12, 2022.

(B) = During the GM&EP April monitoring event, the Area 7 GWETS wells were offline. MAU monitoring wells in the vicinity of Area 7 GWETS were remeasured when Area 7 extraction wells resumed pumping.

(C) = The water level was collected from the MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA.

(D) = A water level was collected from this well as supplemental data and is not required per the GM&EP. These data are included in the 2022 annual supplemental report.

(E) = The water level was collected from the LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA.

Table B-2. Summary of Groundwater Level Measurements Taken by Montgomery & Associates
North Indian Bend Wash Area, Scottsdale, Arizona
October 2022

Monitoring Well Identifier	Measurement Date & Time	Depth to Water (feet, bls)	Groundwater Level (feet, amsl)
B-1UA	10/04/2022 11:33	55.79	1,135.92
B-J	10/04/2022 14:54	59.42	1,132.82
E-1UA	10/05/2022 12:55	74.98	1,140.38
E-2UA	10/06/2022 12:17	87.69	1,138.86
E-5UA	10/04/2022 16:09	66.64	1,132.92
E-6UA	10/05/2022 15:03	93.36	1,128.94
E-7UA	10/05/2022 12:02	68.13	1,129.28
E-12UA	10/04/2022 16:34	67.54	1,136.09
E-13UA	10/05/2022 12:38	72.12	1,136.51
M-2UA	10/06/2022 14:48	73.48	1,136.69
PG-4UA	10/05/2022 10:34	106.05	1,121.78
PG-5UA	10/05/2022 10:52	88.02	1,126.18
PG-6UA	10/04/2022 13:21	89.16	1,123.93
PG-7UA	10/04/2022 12:22	70.67	1,126.89
PG-8UA	10/05/2022 16:08	97.36	1,124.65
PG-10UA	10/07/2022 11:21	103.50	1,137.34
PG-11UA	10/05/2022 09:40	97.54	1,132.86
PG-16UA	10/07/2022 12:13	107.16	1,134.73
PG-18UA	10/04/2022 14:39	71.95	1,130.18
PG-19UA	10/05/2022 09:10	74.71	1,129.59
PG-22UA	10/06/2022 10:04	76.57	1,133.72
PG-23UA	10/05/2022 09:39	101.09	1,121.87
PG-24UA	10/04/2022 13:42	86.51	1,125.71
PG-25UA	10/05/2022 11:14	76.62	1,129.92
PG-28UA	10/07/2022 11:35	98.75	1,136.20
PG-29UA	10/07/2022 11:05	95.92	1,137.11
PG-30UA	10/07/2022 11:45	91.04	1,135.32
PG-31UA	10/07/2022 12:37	101.42	1,134.03
B-1MA	10/04/2022 11:58	92.80	1,098.83
D-2MA (A)	Well no longer monitored for compliance water levels		
D-4MA (A)	10/07/2022 10:54	127.47	1,112.56
E-1MA	10/05/2022 12:59	141.86	1,072.51
E-5MA	10/04/2022 15:53	111.04	1,088.39
E-8MA	10/04/2022 15:32	97.90	1,094.99
E-10MA	10/07/2022 15:05	139.09	1,104.77
M-1MA	10/06/2022 09:54	128.64	1,082.25
M-2MA	10/06/2022 15:50	123.32	1,086.74
M-3MA	10/06/2022 10:09	111.08	1,094.47
M-4MA	10/06/2022 16:10	133.88	1,081.02
M-5MA	10/06/2022 09:13	159.01	1,058.42
M-6MA	10/06/2022 14:50	145.33	1,071.65
M-7MA	10/06/2022 08:54	134.43	1,079.44
M-9MA	10/07/2022 09:35	127.24	1,093.28

Table B-2. Summary of Groundwater Level Measurements Taken by Montgomery & Associates
North Indian Bend Wash Area, Scottsdale, Arizona
October 2022

Monitoring Well Identifier	Measurement Date & Time	Depth to Water (feet, bls)	Groundwater Level (feet, amsl)
M-10MA2	10/05/2022 14:25	137.65	1,082.40
M-11MA	10/05/2022 14:44	111.38	1,100.21
M-12MA2	10/05/2022 11:30	123.80	1,104.12
M-14MA	10/06/2022 12:05	125.04	1,101.30
M-15MA	10/06/2022 11:05	139.26	1,079.65
M-16MA	10/06/2022 11:54	122.78	1,105.37
PA-1MA	10/07/2022 10:18	111.69	1,113.81
PA-3MA	10/07/2022 08:35	122.08	1,131.36
PA-4MA	10/07/2022 09:45	106.10	1,124.82
PA-7MA	10/04/2022 16:20	123.48	1,129.58
PA-10MA	10/07/2022 14:16	133.58	1,103.22
PA-12MA2 (B)	10/05/2022 12:15	124.64	1,100.32
PA-14MA	10/04/2022 15:23	131.28	1,117.81
PA-16MA	10/04/2022 14:20	101.71	1,102.77
PA-17MA2	10/07/2022 09:25	112.28	1,126.42
PA-20MA	10/05/2022 15:33	123.95	1,097.33
PA-21MA	10/06/2022 12:44	124.99	1,100.20
PA-23MA	10/04/2022 10:34	82.62	1,101.80
PG-4MA	10/05/2022 10:20	128.63	1,098.91
PG-5MA	10/05/2022 11:00	116.18	1,098.09
PG-6MA	10/04/2022 13:08	101.27	1,111.43
PG-7MA	10/04/2022 14:44	92.76	1,105.10
S-1MA	10/04/2022 15:05	143.67	1,116.67
S-2MA	10/04/2022 15:50	149.46	1,111.03
W-1MA	10/04/2022 13:50	106.43	1,123.95
W-2MA	10/05/2022 08:35	132.84	1,102.24
PG-45MA (C)	10/07/2022 10:00	131.51	1,100.75
PG-46MA (C)	10/07/2022 10:10	127.74	1,105.57
PG-47MA	10/06/2022 10:29	124.90	1,091.79
PG-48MA	10/06/2022 14:35	143.26	1,073.58
PG-49MA (C)	10/05/2022 14:25	76.53	1,133.95
PG-50MA	10/07/2022 15:50	108.26	1,132.70
PG-51MA	10/07/2022 11:45	143.71	1,097.20
PG-52MA (C)	10/04/2022 16:30	148.89	1,104.32
PG-53MA (C)	10/06/2022 11:01	130.70	1,094.27
PG-54MA (C)	10/06/2022 11:12	136.60	1,088.23
PG-55MA (C)	10/05/2022 10:50	130.38	1,095.39
PG-56MA (C)	10/07/2022 10:50	126.49	1,105.37
E-14MA/LA	10/05/2022 16:45	158.59	1,095.36
M-17MA/LA	10/05/2022 17:19	131.78	1,105.92
PG-23MA/LA	10/05/2022 09:32	118.41	1,104.12
PG-38MA/LA	10/05/2022 10:00	138.20	1,099.04

Table B-2. Summary of Groundwater Level Measurements Taken by Montgomery & Associates
North Indian Bend Wash Area, Scottsdale, Arizona
October 2022

Monitoring Well Identifier	Measurement Date & Time	Depth to Water (feet, bls)	Groundwater Level (feet, amsl)
E-1LA	10/05/2022 12:45	133.67	1,081.33
E-7LA	10/05/2022 11:46	107.73	1,090.06
M-2LA	10/06/2022 15:20	123.31	1,086.92
M-5LA	10/06/2022 09:28	136.18	1,081.28
M-9LA	10/07/2022 09:57	144.49	1,076.03
M-10LA2	10/05/2022 14:35	135.65	1,084.05
M-14LA	10/06/2022 11:25	145.03	1,081.19
M-16LA	10/06/2022 12:12	154.16	1,073.92
PA-2LA	10/07/2022 08:45	246.39	1,007.37
PA-5LA	10/07/2022 10:25	226.36	1,003.09
PA-6LA	10/04/2022 16:10	251.88	1,001.05
PA-8LA2	10/05/2022 11:15	164.95	1,063.38
PA-9LA	10/07/2022 13:33	172.21	1,064.57
PA-11LA2 (D)	10/05/2022 12:20	143.50	1,081.46
PA-13LA	10/04/2022 15:30	237.88	1,011.11
PA-15LA	10/04/2022 14:07	102.90	1,101.38
PA-18LA	10/05/2022 17:00	198.14	1,040.72
PA-19LA	10/05/2022 16:01	126.41	1,095.05
PA-22LA	10/04/2022 10:56	86.82	1,097.18
PG-1LA	10/04/2022 13:05	253.31	996.35
PG-2LA	10/04/2022 12:45	286.20	984.86
PG-39LA	10/05/2022 17:05	136.20	1,096.38
PG-40LA	10/04/2022 10:30	286.62	988.71
PG-42LA	10/04/2022 11:55	303.92	988.39
PG-43LA	10/04/2022 11:30	263.40	1,001.61
PG-44LA	10/04/2022 12:20	306.39	991.20
S-1LA	10/04/2022 14:45	230.32	1,030.13
S-2LA	10/05/2022 15:05	254.69	1,005.28

EXPLANATION:

feet, bls = feet below land surface

feet, amsl = feet above mean sea level

GM&EP = Groundwater Monitoring & Extraction Plan

NOTES:

(A) = On May 19, 2022, the PCs formally requested the replacement of monitoring well D-2MA per the GM&EP schedule with monitoring well D-4MA. This request was approved by EPA on July 12, 2022 and D-2MA monitoring was discontinued in October 2022.

(B) = The water level was collected from the MAU completed well at piezometer PA-11/12 located approximately 70 feet northwest of original well PA-12MA.

(C) = A water level was collected from this well as supplemental data and is not required per the GM&EP. These data are included in the 2022 annual supplemental report.

(D) = The water level was collected from the LAU completed well at piezometer PA-11/12 located approximately 80 feet northwest of original well PA-11LA.

Table B-3. Summary of Groundwater Level Difference Between October 2021 and October 2022
North Indian Bend Wash Area, Scottsdale, Arizona

Alluvium Unit	Monitoring Well Identifier	October 2021 Depth to Groundwater Level (feet, bls)	October 2022 Depth to Groundwater Level (feet, bls)	Change in Depth to Groundwater Level (feet)
UAU	B-1UA	53.87	55.79	-1.92
	B-J	57.49	59.42	-1.93
	E-1UA	73.90	74.98	-1.08
	E-2UA	86.76	87.69	-0.93
	E-5UA	64.81	66.64	-1.83
	E-6UA	91.94	93.36	-1.42
	E-7UA	66.61	68.13	-1.52
	E-12UA	65.80	67.54	-1.74
	E-13UA	70.49	72.12	-1.63
	M-2UA	71.86	73.48	-1.62
	PG-4UA	103.37	106.05	-2.68
	PG-5UA	85.64	88.02	-2.38
	PG-6UA	86.19	89.16	-2.97
	PG-7UA	67.83	70.67	-2.84
	PG-8UA	95.19	97.36	-2.17
	PG-10UA	103.84	103.50	0.34
	PG-11UA	96.84	97.54	-0.70
	PG-16UA	107.17	107.16	0.01
	PG-18UA	69.66	71.95	-2.29
	PG-19UA	72.54	74.71	-2.17
	PG-22UA	75.00	76.57	-1.57
	PG-23UA	98.26	101.09	-2.83
	PG-24UA	83.93	86.51	-2.58
	PG-25UA	74.52	76.62	-2.10
	PG-28UA	98.59	98.75	-0.16
	PG-29UA	95.68	95.92	-0.24
	PG-30UA	90.56	91.04	-0.48
	PG-31UA	101.07	101.42	-0.35
MAU	B-1MA	85.14	92.80	-7.66
	D-2MA [(A)]	107.55	---	---
	D-4MA (OZ7-1) [(A)]	113.90	127.47	-13.57
	E-1MA	134.09	141.86	-7.77
	E-5MA	105.01	111.04	-6.03
	E-8MA	91.74	97.90	-6.16
	E-10MA	130.62	139.09	-8.47
	M-1MA	120.45	128.64	-8.19
	M-2MA	115.75	123.32	-7.57
	M-3MA	102.41	111.08	-8.67
	M-4MA	126.08	133.88	-7.80
	M-5MA	150.38	159.01	-8.63
	M-6MA	137.85	145.33	-7.48
	M-7MA	126.21	134.43	-8.22
	M-9MA	118.80	127.24	-8.44
	M-10MA2	130.81	137.65	-6.84

Table B-3. Summary of Groundwater Level Difference Between October 2021 and October 2022
North Indian Bend Wash Area, Scottsdale, Arizona

Alluvium Unit	Monitoring Well Identifier	October 2021 Depth to Groundwater Level (feet, bls)	October 2022 Depth to Groundwater Level (feet, bls)	Change in Depth to Groundwater Level (feet)
MAU	M-11MA	106.18	111.38	-5.20
	M-12MA2	120.02	123.80	-3.78
	M-14MA	119.24	125.04	-5.80
	M-15MA	131.44	139.26	-7.82
	M-16MA	116.99	122.78	-5.79
	PA-1MA	104.70	111.69	-6.99
	PA-3MA	118.56	122.08	-3.52
	PA-4MA	100.63	106.10	-5.47
	PA-7MA	121.13	123.48	-2.35
	PA-10MA	123.11	133.58	-10.47
	PA-12MA2 (B)	117.82	124.64	-6.82
	PA-14MA	126.19	131.28	-5.09
	PA-16MA	96.95	101.71	-4.76
	PA-17MA2	107.64	112.28	-4.64
	PA-20MA	119.50	123.95	-4.45
	PA-21MA	115.97	124.99	-9.02
	PA-23MA	75.73	82.62	-6.89
	PG-4MA	124.10	128.63	-4.53
	PG-5MA	111.22	116.18	-4.96
	PG-6MA	97.31	101.27	-3.96
	PG-7MA	88.07	92.76	-4.69
	S-1MA	142.90	143.67	-0.77
	S-2MA	145.75	149.46	-3.71
	W-1MA	99.71	106.43	-6.72
	W-2MA	115.21	132.84	-17.63
Lower MAU	PG-47MA	111.78	124.90	-13.12
	PG-48MA	134.95	143.26	-8.31
	PG-50MA	105.94	108.26	-2.32
	PG-51MA	137.40	143.71	-6.31
MAU/LAU	E-14MA/LA	155.34	158.59	-3.25
	M-17MA/LA	129.75	131.78	-2.03
	PG-23MA/LA	114.06	118.41	-4.35
	PG-38MA/LA	133.35	138.20	-4.85
LAU	E-1LA	129.24	133.67	-4.43
	E-7LA	103.11	107.73	-4.62
	M-2LA	119.25	123.31	-4.06
	M-5LA	130.56	136.18	-5.62
	M-9LA	139.69	144.49	-4.80
	M-10LA2	132.14	135.65	-3.51
	M-14LA	140.69	145.03	-4.34
	M-16LA	149.16	154.16	-5.00
	PA-2LA	241.25	246.39	-5.14
	PA-5LA	221.23	226.36	-5.13
	PA-6LA	241.98	251.88	-9.90

Table B-3. Summary of Groundwater Level Difference Between October 2021 and October 2022
North Indian Bend Wash Area, Scottsdale, Arizona

Alluvium Unit	Monitoring Well Identifier	October 2021 Depth to Groundwater Level (feet, bls)	October 2022 Depth to Groundwater Level (feet, bls)	Change in Depth to Groundwater Level (feet)
LAU	PA-8LA2	159.07	164.95	-5.88
	PA-9LA	167.25	172.21	-4.96
	PA-11LA2 (C)	138.93	143.50	-4.57
	PA-13LA	226.20	237.88	-11.68
	PA-15LA	98.58	102.90	-4.32
	PA-18LA	191.97	198.14	-6.17
	PA-19LA	121.86	126.41	-4.55
	PA-22LA	83.09	86.82	-3.73
	PG-1LA	248.98	253.31	-4.33
	PG-2LA	282.43	286.20	-3.77
	PG-39LA	132.39	136.20	-3.81
	PG-40LA	283.84	286.62	-2.78
	PG-42LA	302.02	303.92	-1.90
	PG-43LA	262.82	263.40	-0.58
	PG-44LA	305.22	306.39	-1.17
	S-1LA	220.43	230.32	-9.89
	S-2LA	237.59	254.69	-17.10

EXPLANATION:

feet, bls = feet below land surface
UAU = Upper Alluvial Unit monitor well
MAU = Middle Alluvial Unit monitor well
LAU = Lower Alluvial Unit monitor well
Lower MAU = Lower Middle Alluvial Unit monitor well

NOTES:

(A) = On May 19, 2022, the PCs formally requested the replacement of monitoring well D-2MA per the GM&EP schedule with monitoring well D-4MA. This request was approved by EPA on July 12, 2022 and D-2MA monitoring was discontinued in October 2022.
(B) = The water level was collected from the MAU completed well at piezometer PA-11LA2/12MA2 located approximately 70 feet northwest of original well PA-12MA
(C) = The water level was collected from the LAU completed well at piezometer PA-11LA2/12MA2 located approximately 80 feet northwest of original well PA-11LA
--- = No Data Available

APPENDIX B
COMPLIANCE CONTINUOUS WATER LEVEL GRAPHS

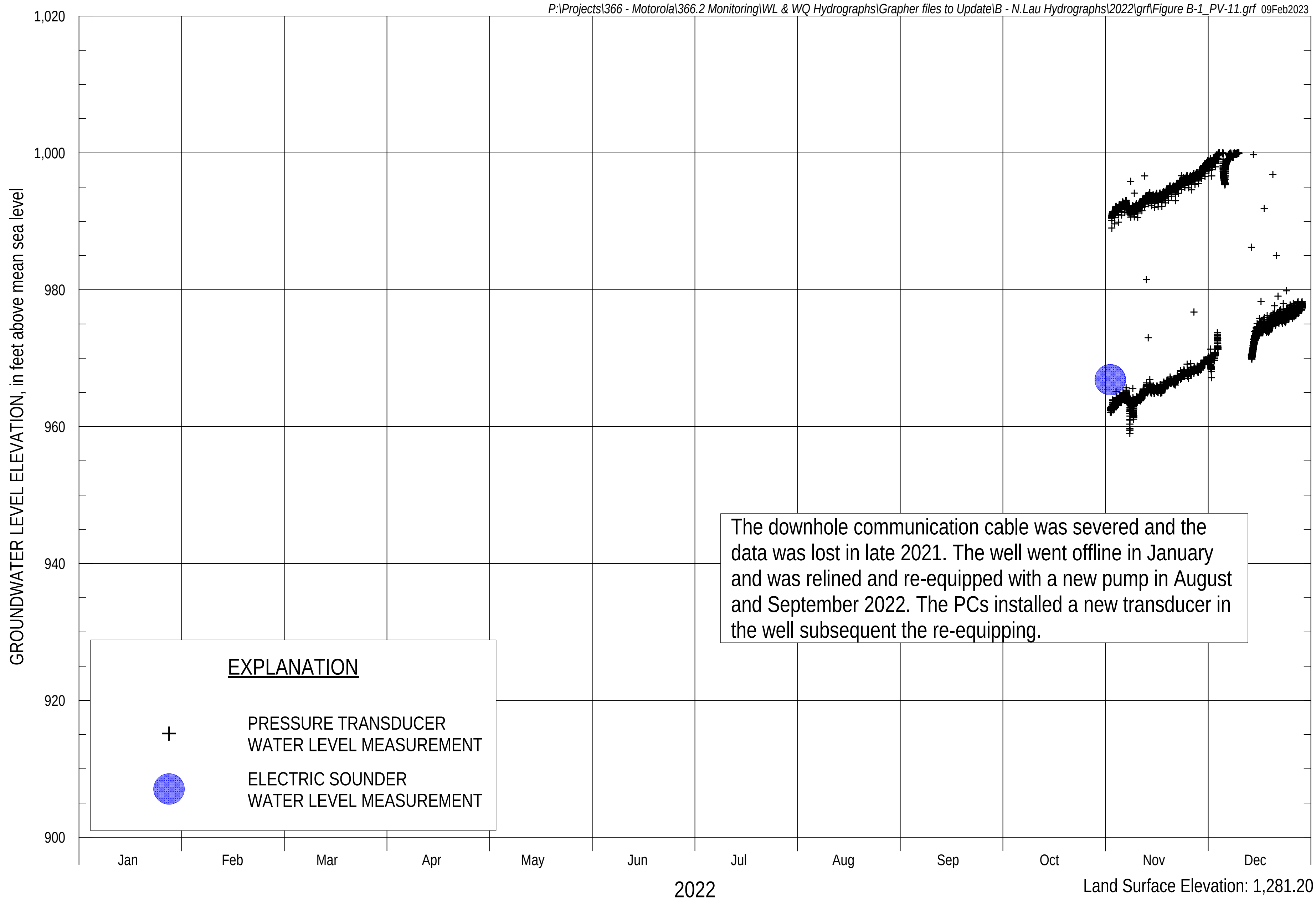


FIGURE B-1. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-11

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

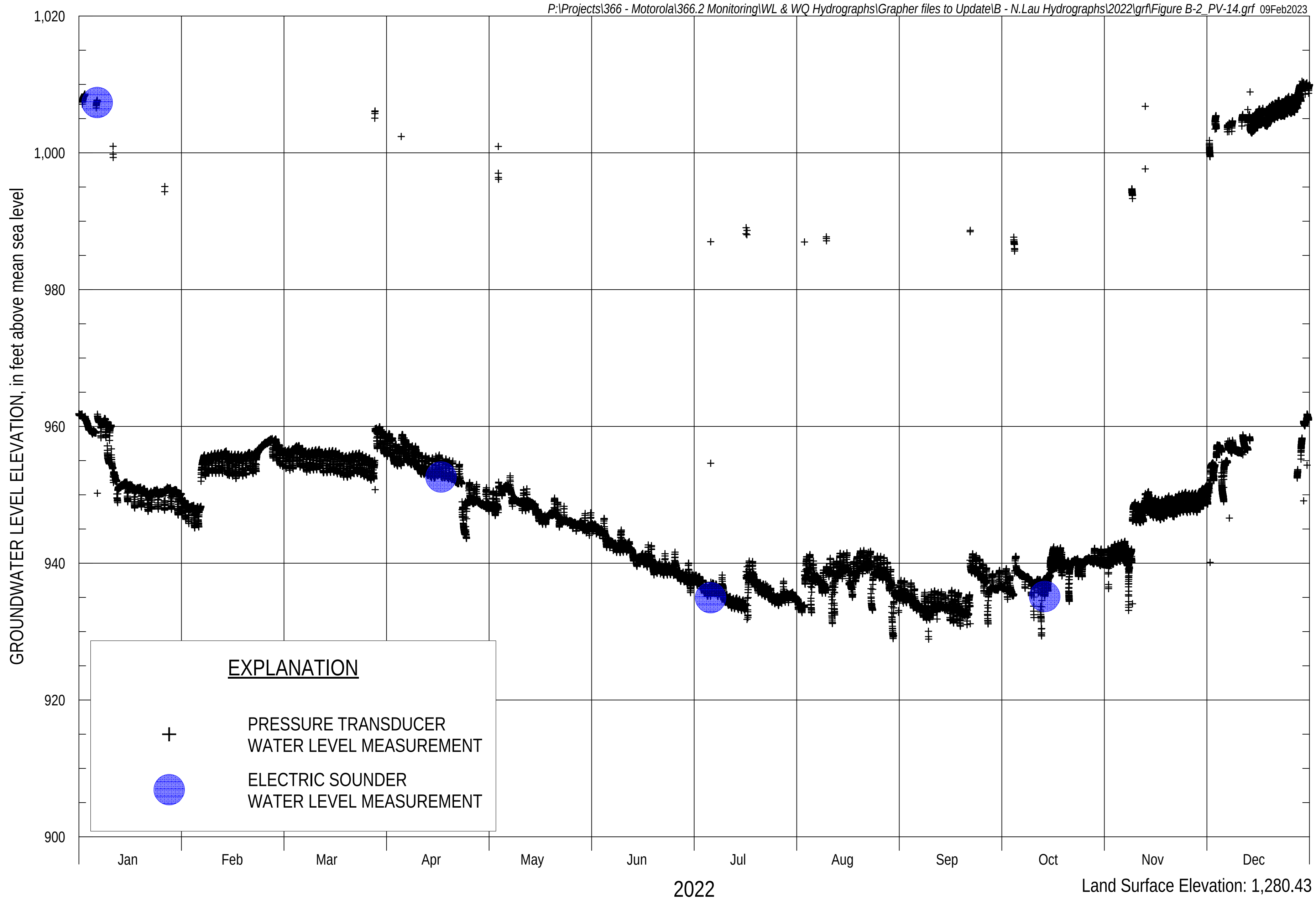


FIGURE B-2. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-14

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

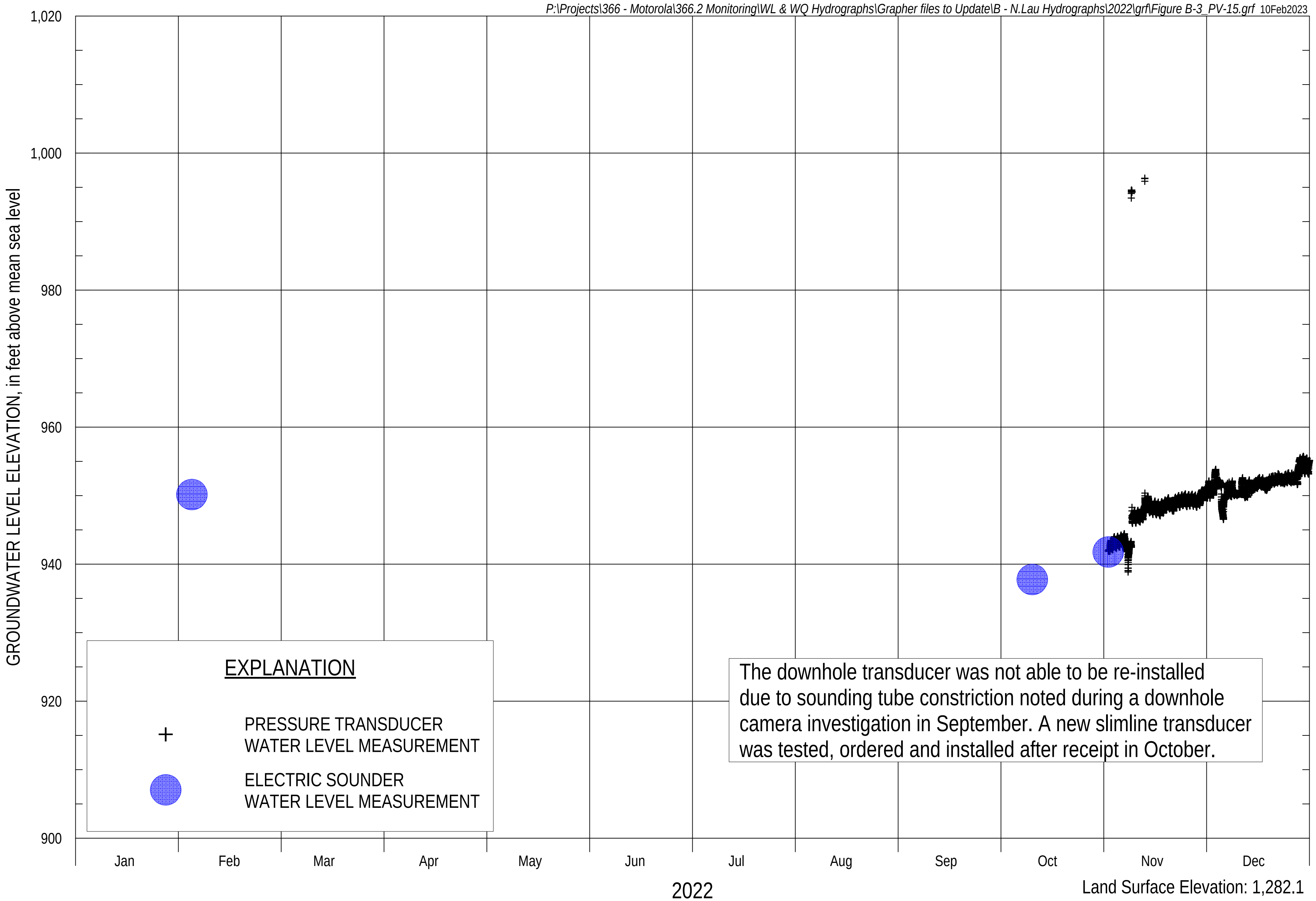


FIGURE B-3. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-15

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

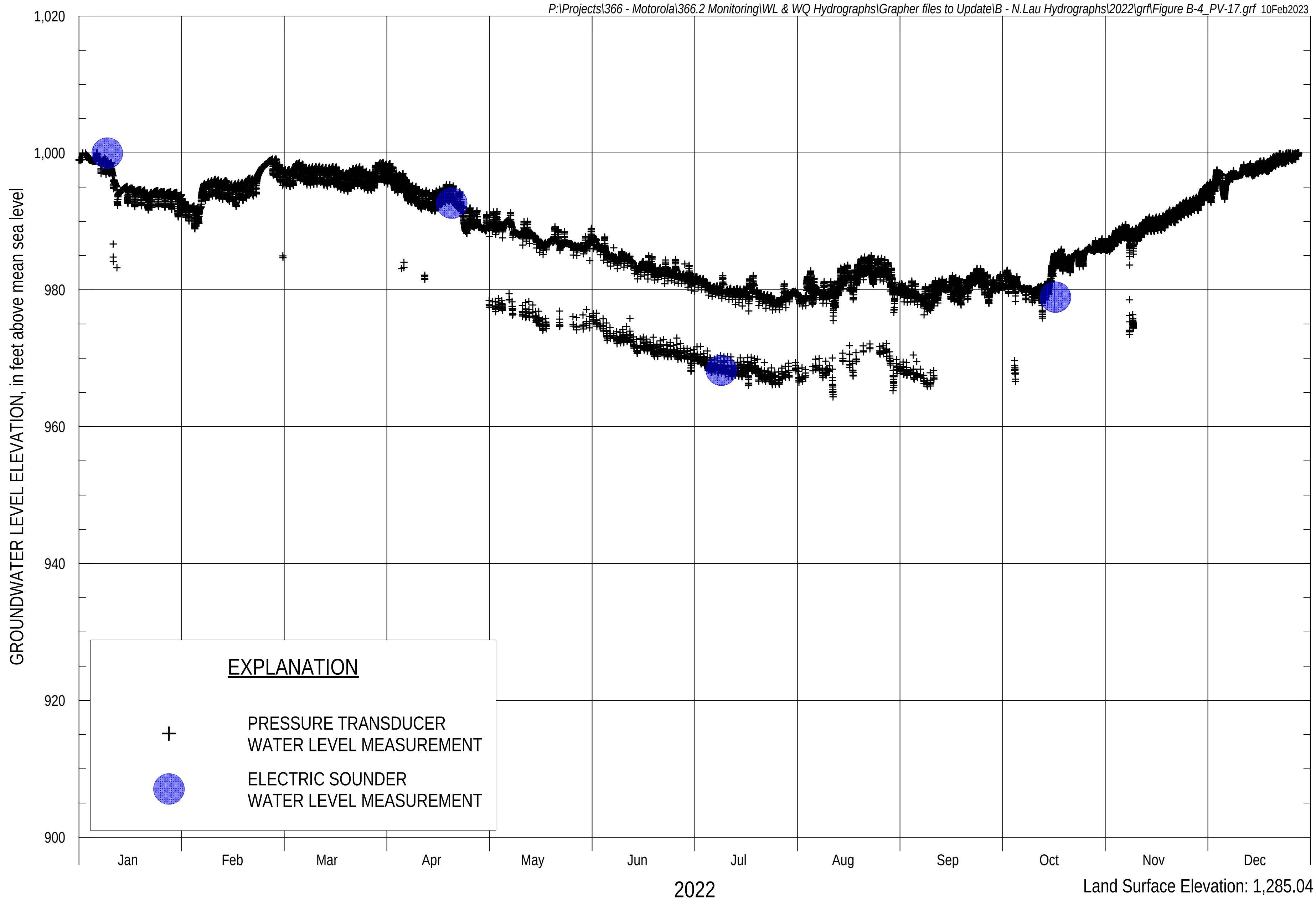


FIGURE B-4. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-17

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

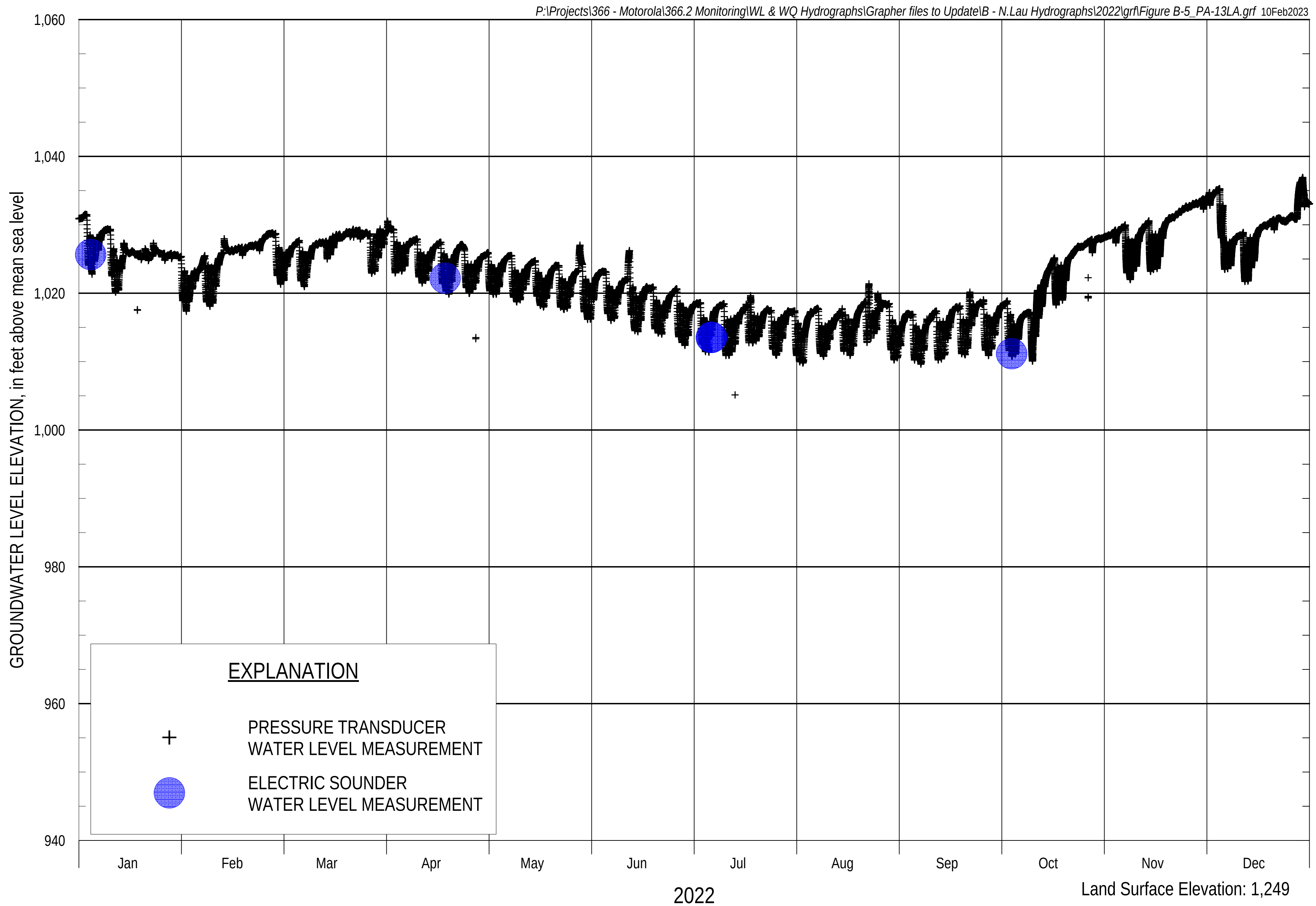


FIGURE B-5. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-13LA

North Indian Bend Wash Superfund Site

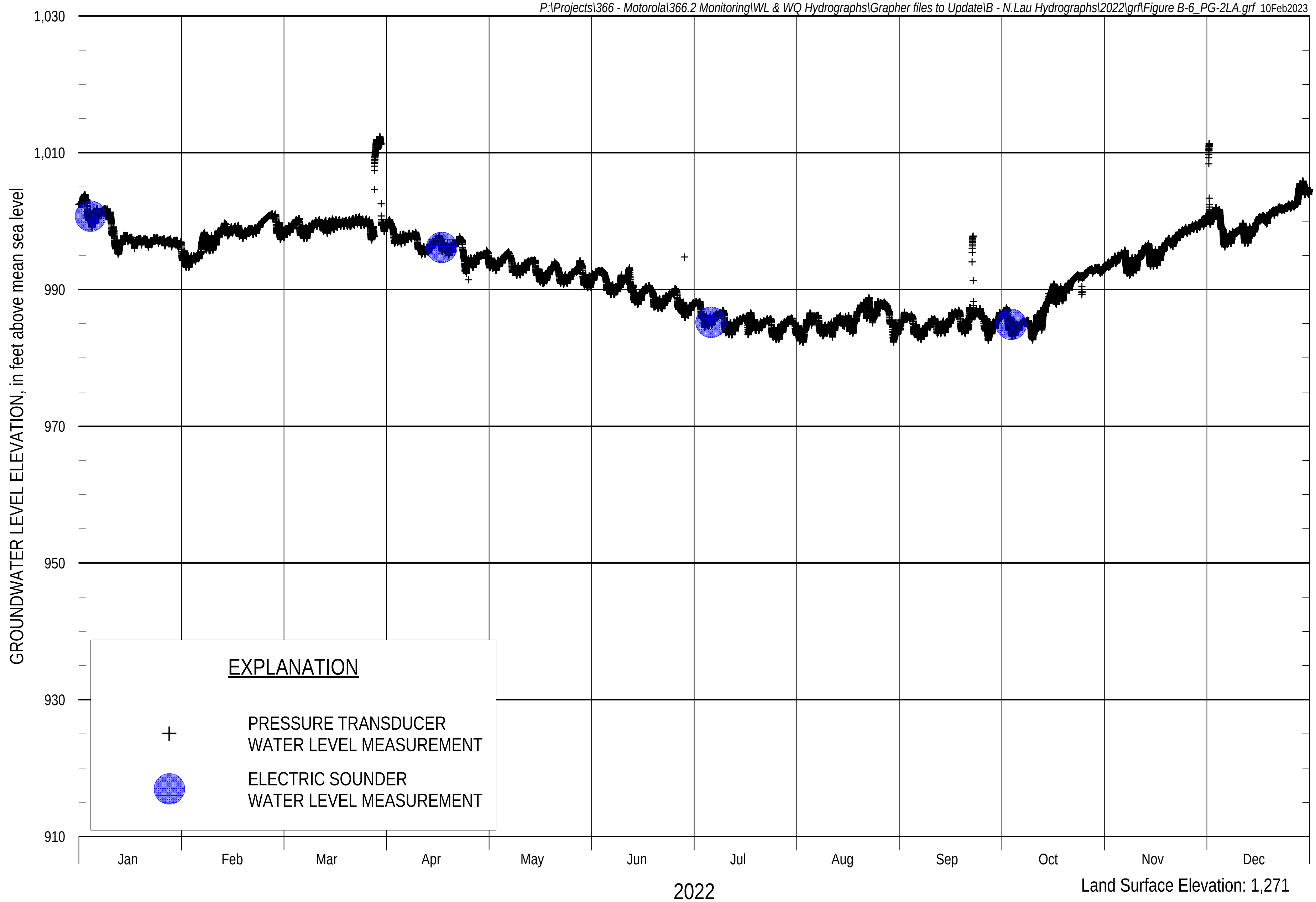


FIGURE B-6. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-2LA

North Indian Bend Wash Superfund Site

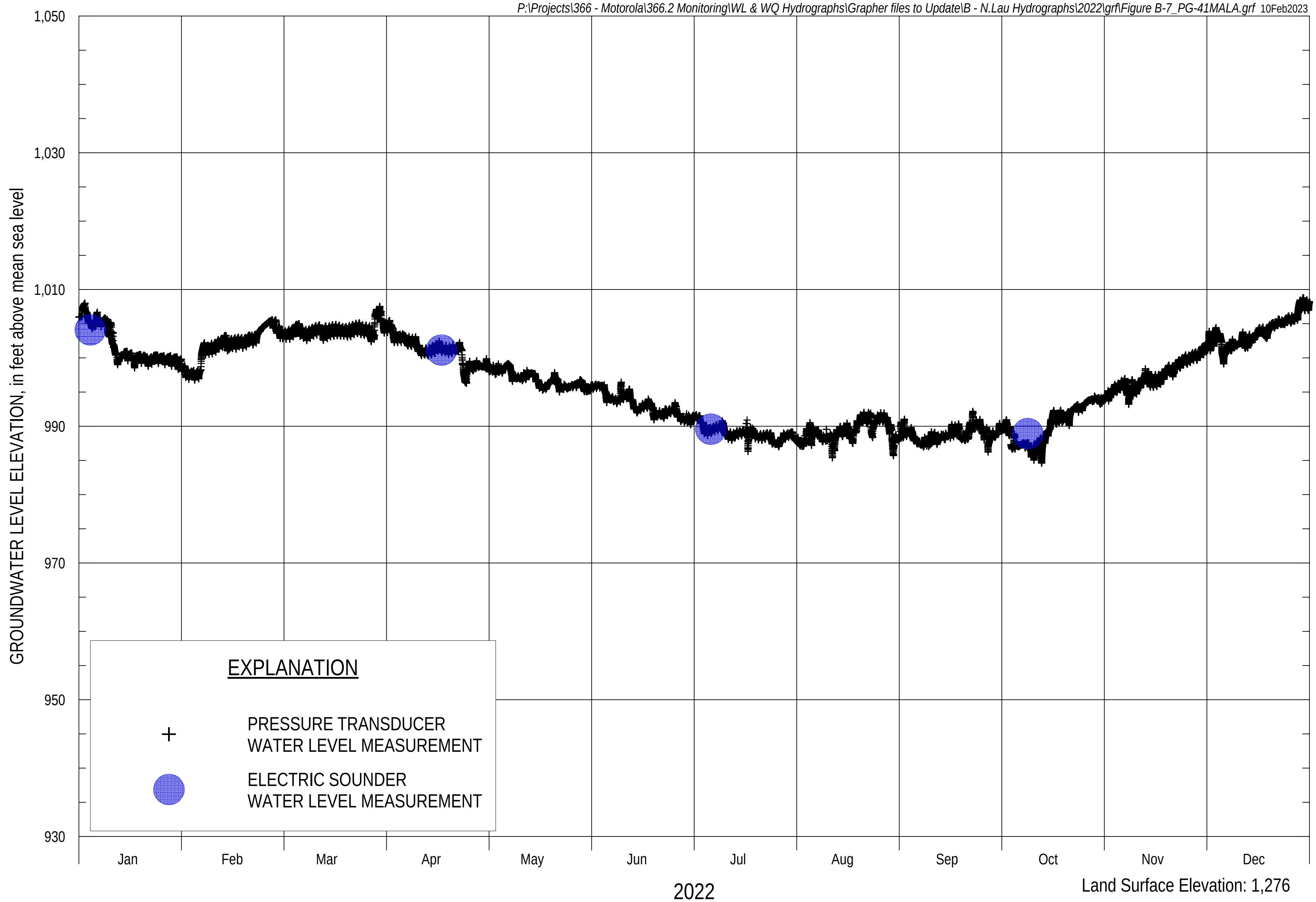


FIGURE B-7. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-41MA/LA

North Indian Bend Wash Superfund Site

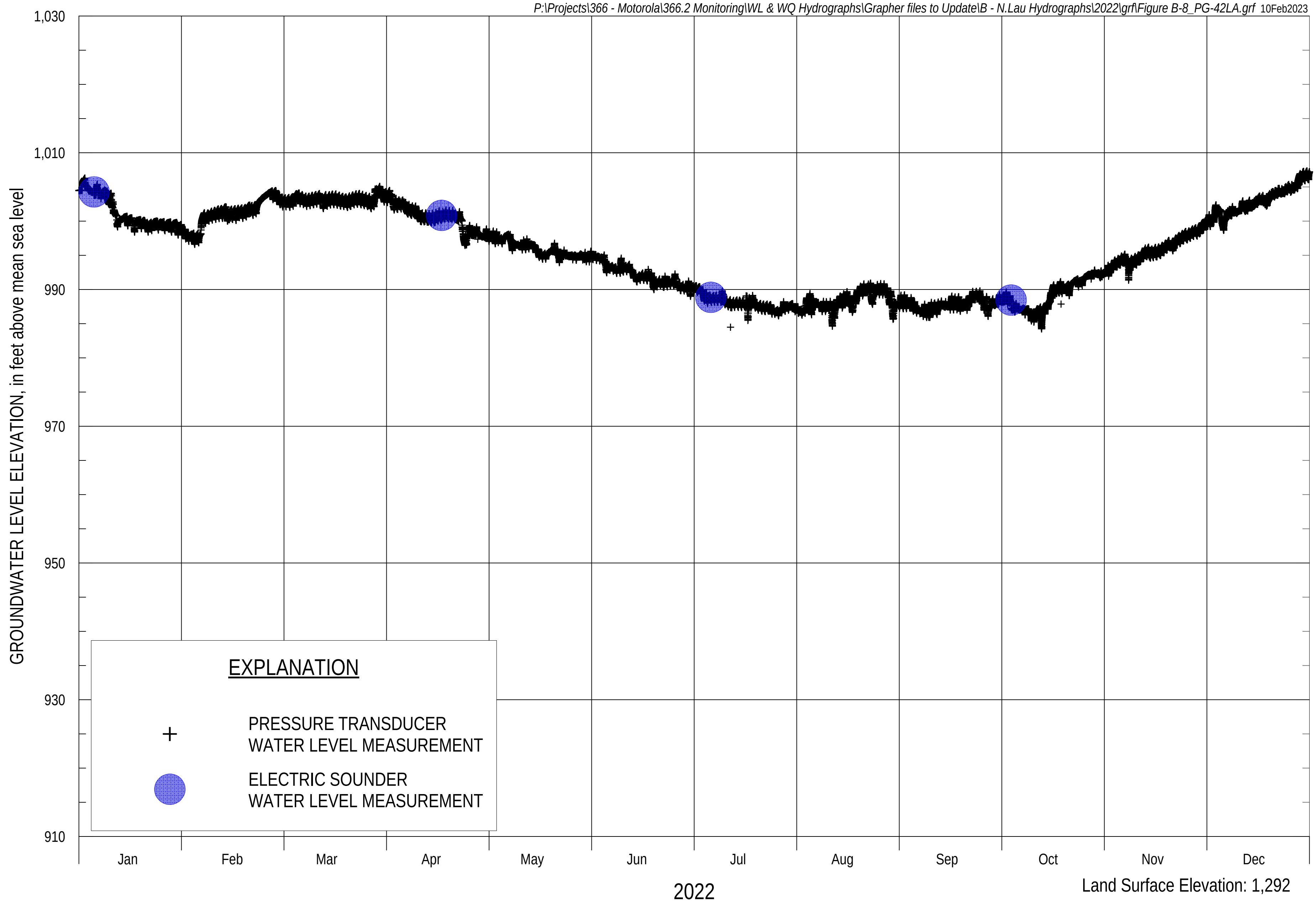


FIGURE B-8. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-42LA

North Indian Bend Wash Superfund Site

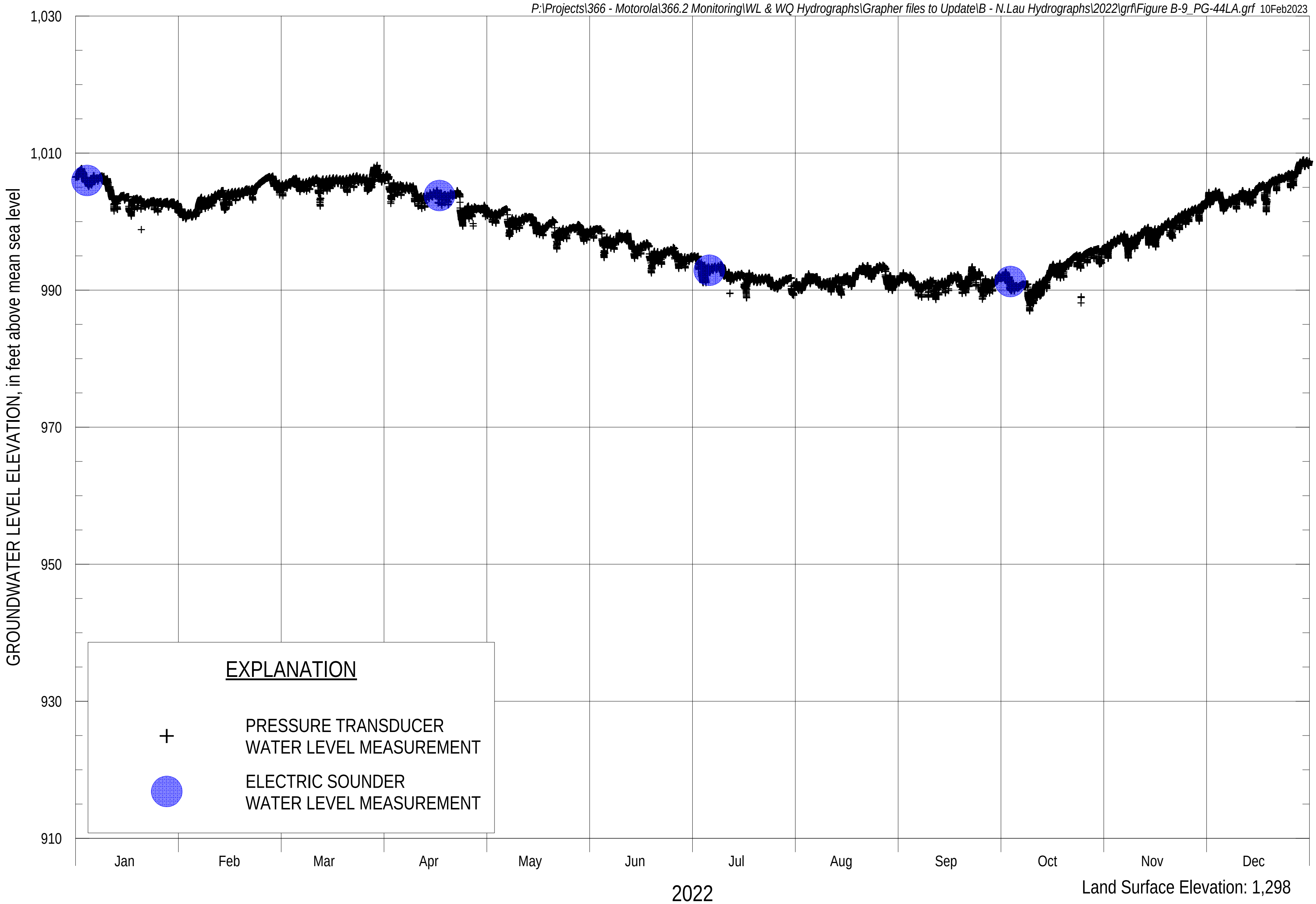


FIGURE B-9. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-44LA

North Indian Bend Wash Superfund Site

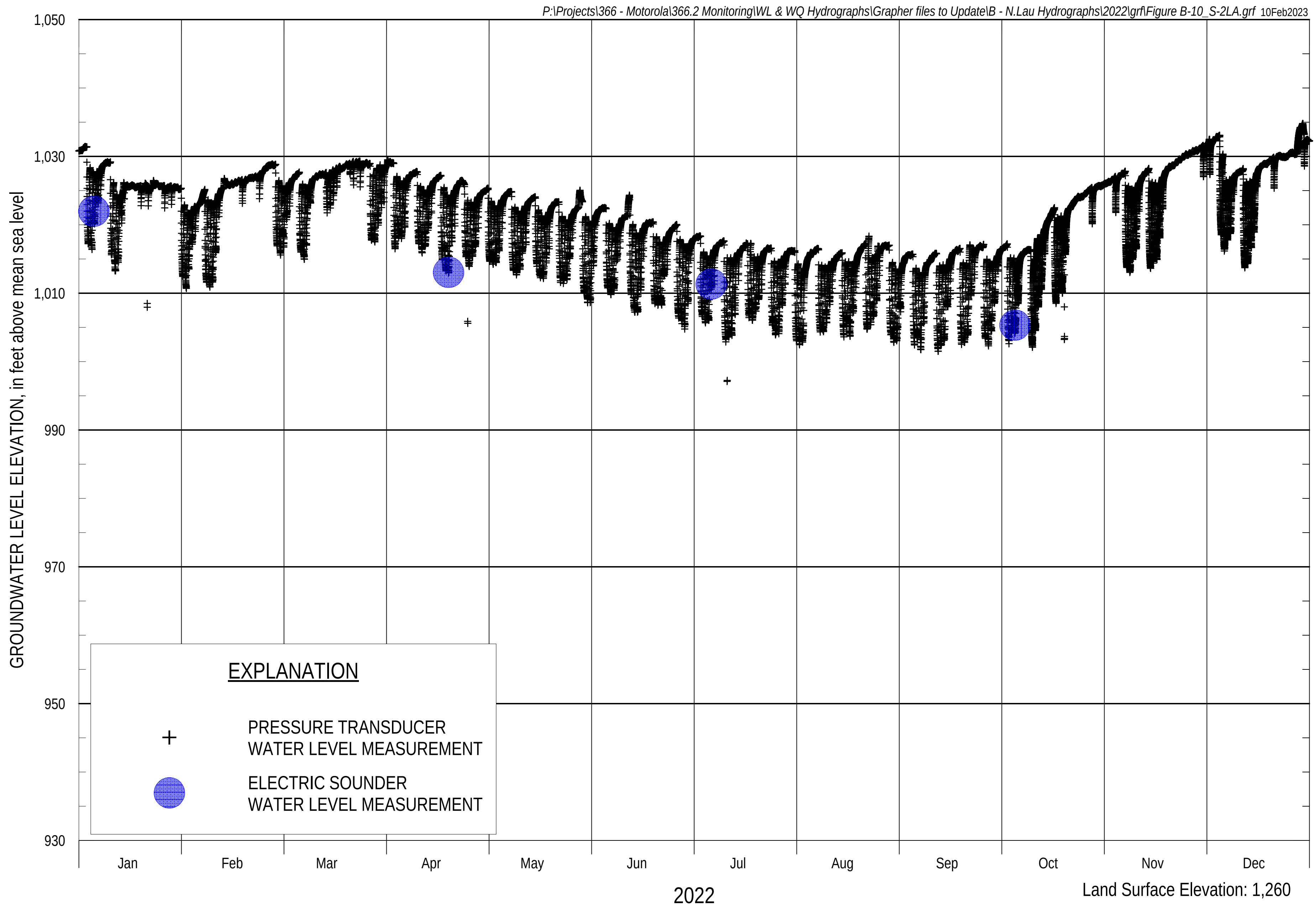


FIGURE B-10. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-2LA

North Indian Bend Wash Superfund Site

APPENDIX B
SUPPLEMENTAL CONTINUOUS WATER LEVEL GRAPHS

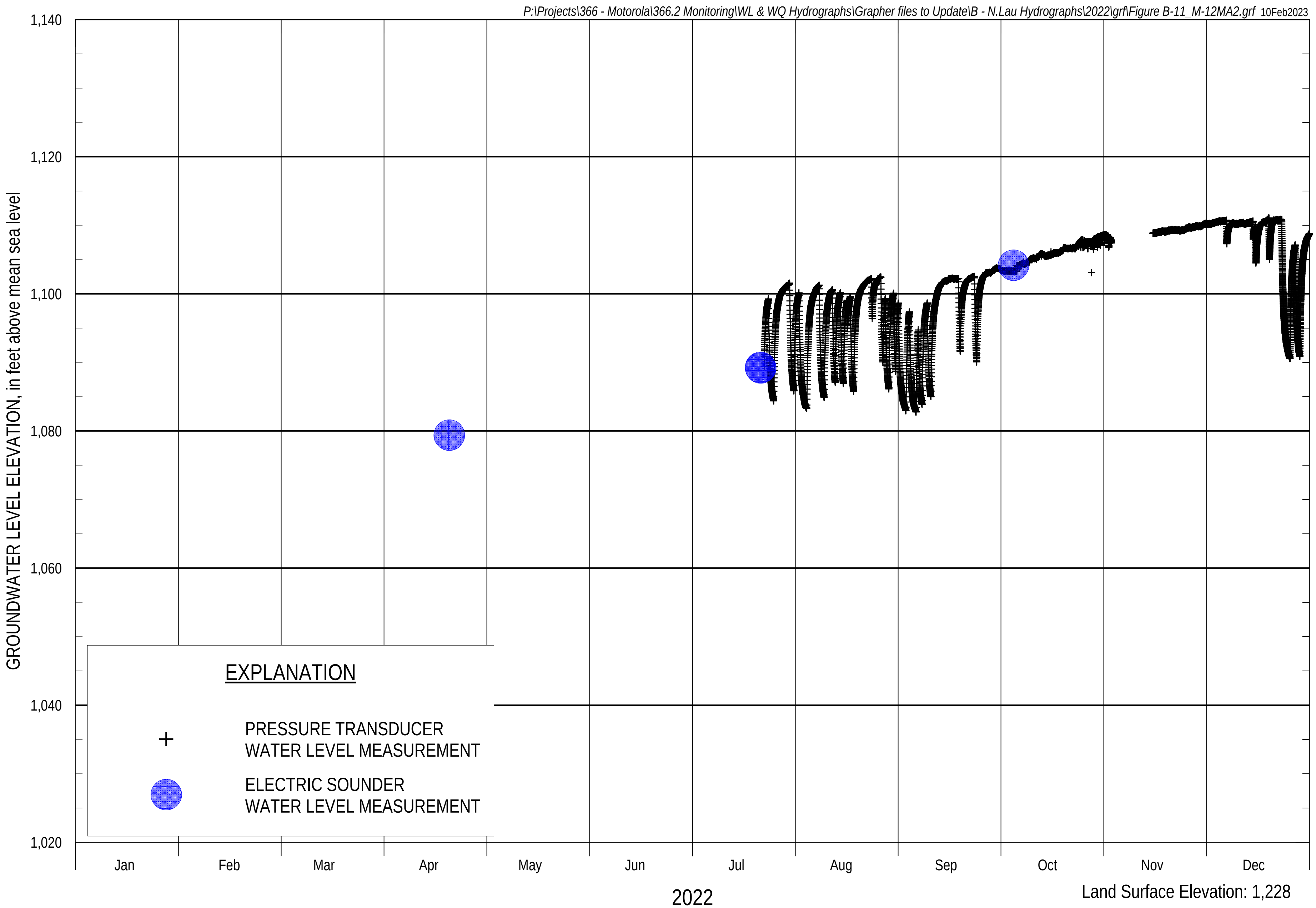


FIGURE B-11. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-12MA2

North Indian Bend Wash Superfund Site

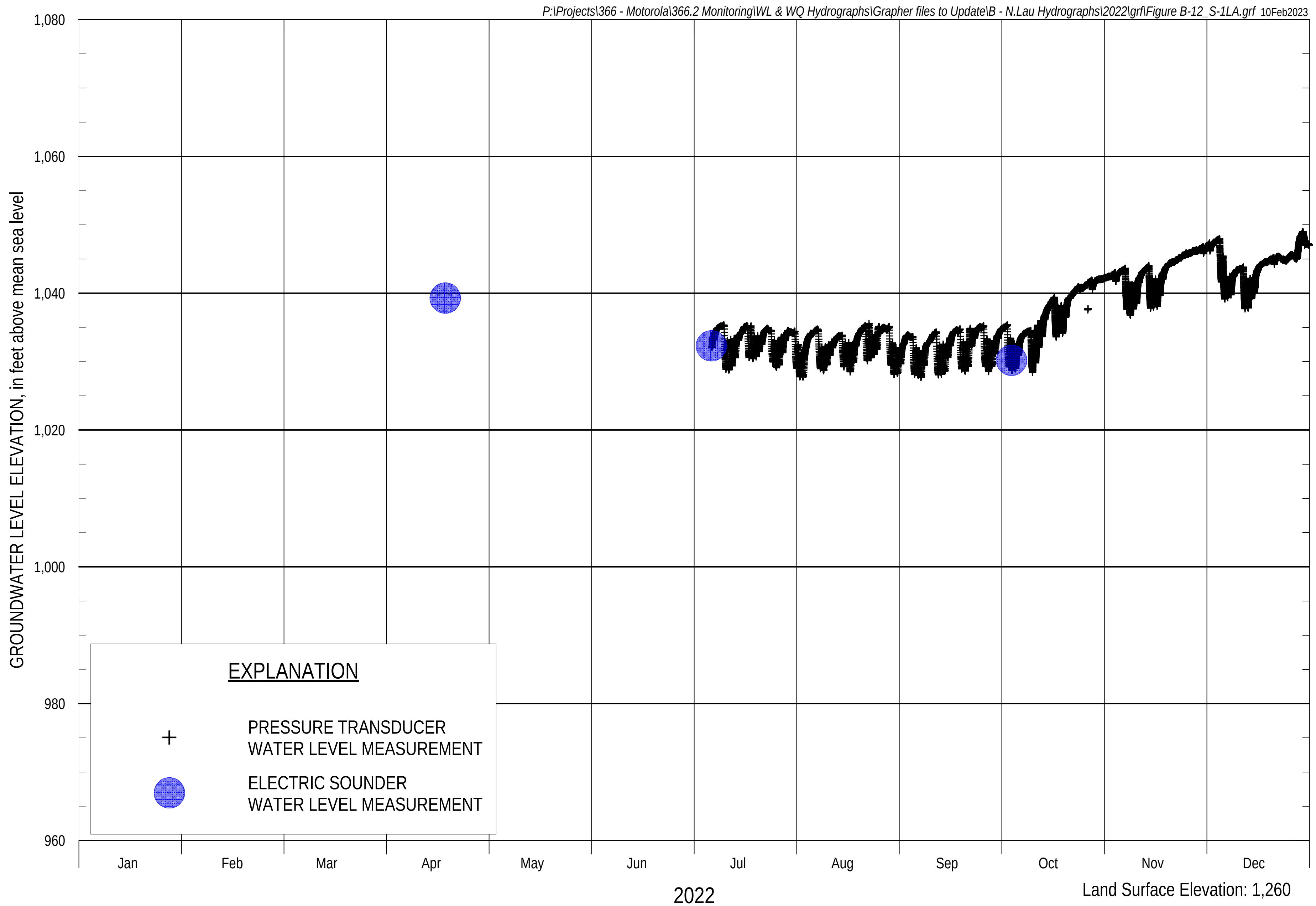


FIGURE B-12. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-1LA

North Indian Bend Wash Superfund Site

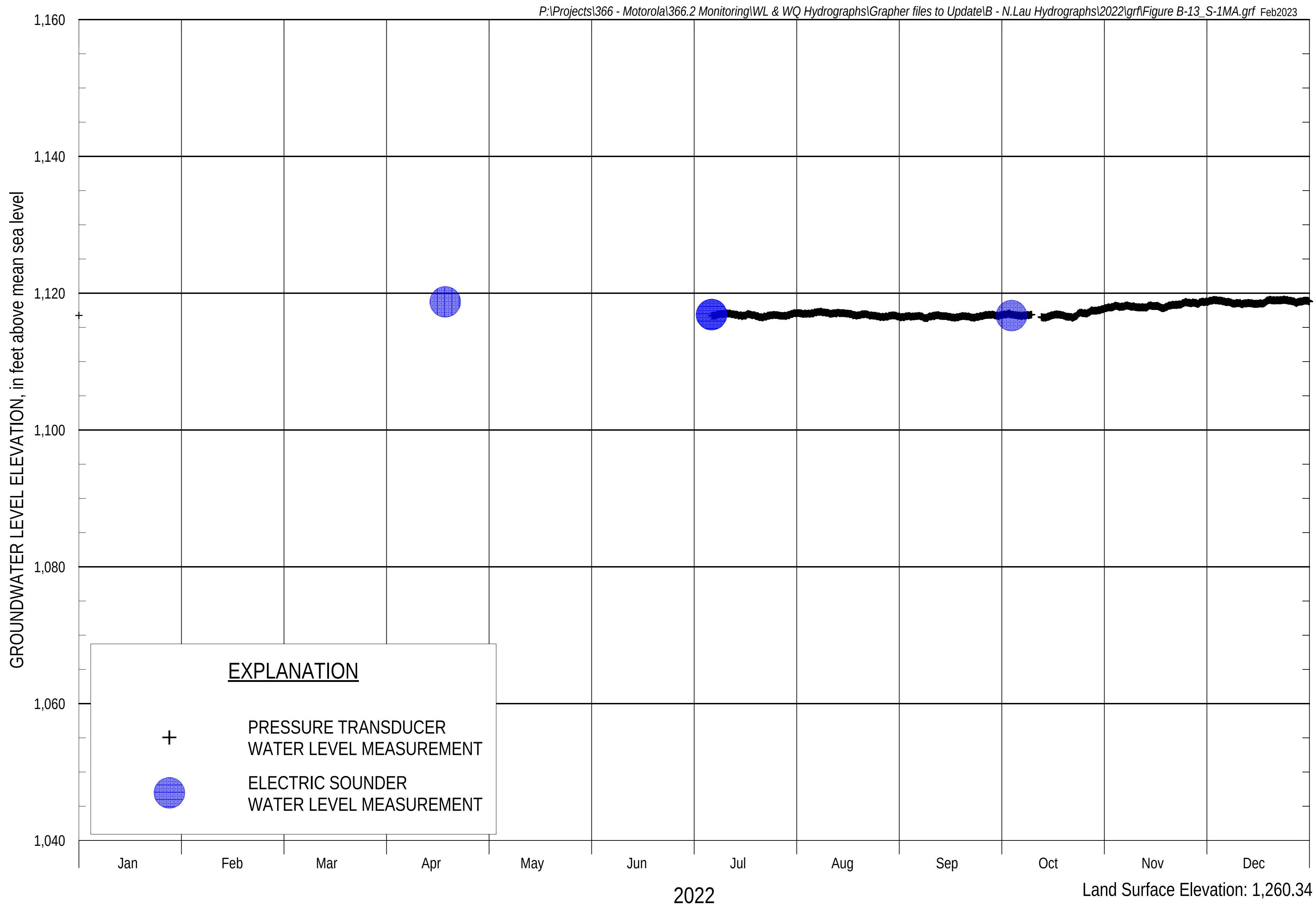


FIGURE B-13. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-1MA

North Indian Bend Wash Superfund Site

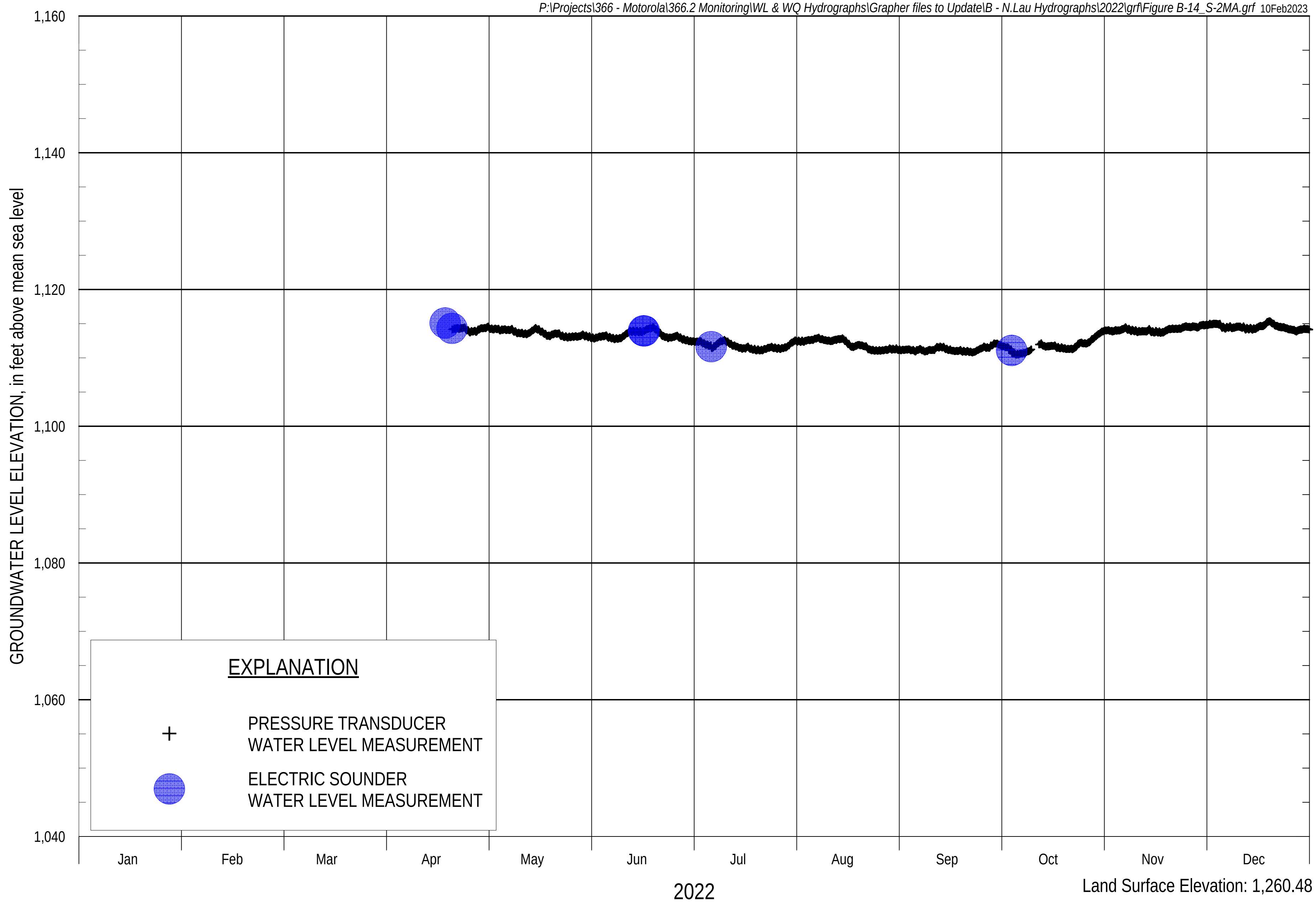


FIGURE B-14. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-2MA

North Indian Bend Wash Superfund Site

APPENDIX C
LABORATORY RESULTS FOR VOLATILE ORGANIC COMPOUNDS, 2022

Table C-1. 2022 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	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
MON	B-J	B-J	10/20/2022	Original	<0.50	<0.50	1.2	<0.50	1.9	550-192410
MON	D-2MA	D-2MAHS	1/21/2022	Original	<0.50	<0.50	0.91	<0.50	13	550-177729
MON	D-2MA	D-2MAHS	4/22/2022	Original	<0.50	<0.50	1.2	<0.50	14	550-182949
MON	D-2MA	D-2MAHS	7/7/2022	Original	<0.50	<0.50	1.8	<0.50	17	550-186782
MON	D-4MA	OZ7-1	1/18/2022	Original	<0.50	<0.50	1.4	7.1	860	550-177489
MON	D-4MA	OZ7-1	4/26/2022	Original	<0.50	<0.50	1.6	5.6	800	550-183084
MON	D-4MA	OZ7-1	7/12/2022	Original	<0.50	<0.50	1.6	7.4	870	550-186961
MON	D-4MA	D-4MA	10/28/2022	Original	<0.50	<0.50	1.1	5.5	750	550-192832
MON	E-1MA	E-1MA	1/19/2022	Original	<0.50	<0.50 (1)	<0.50	<0.50	1.7	550-177580
MON	E-1MA	B	1/19/2022	Duplicate	<0.50	<0.50 (1)	<0.50	<0.50	1.6	550-177580
MON	E-1MA	E-1MA	4/28/2022	Original	<0.50	<0.50	<0.50	<0.50	3.4	550-183238
MON	E-1MA	E-1MA	7/13/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-187075
MON	E-1MA	E-1MA	10/20/2022	Original	<0.50	<0.50	<0.50	<0.50	1.0	550-192410
MON	E-5MA	E-5MA	1/19/2022	Original	<0.50	<0.50 (1)	2.7	0.87	48	550-177580
MON	E-5MA	E-5MA	4/27/2022	Original	<0.50	<0.50	2.8	0.63	52	550-183138
MON	E-5MA	E-5MA	7/12/2022	Original	<0.50	<0.50	2.9	1.1	56	550-186962
MON	E-5MA	E-5MA	10/18/2022	Original	<0.50	<0.50	2.4	0.67	43	550-192241
MON	E-5UA	E-5UAHS	10/13/2022	Original	<0.50	<0.50	0.62	<0.50	4.5	550-192066
MON	E-7LA	E-7LA	10/20/2022	Original	<0.50	<0.50	1.1	3.3	11	550-192410
MON	E-7LA	W	10/20/2022	Duplicate	<0.50	<0.50	1.1	3.1	10	550-192410
MON	E-7UA	E-7UAHS	10/13/2022	Original	<0.50	<0.50	0.70	<0.50	1.2	550-192066
MON	E-8MA	E-8MA	10/18/2022	Original	<0.50	<0.50	2.0	<0.50	47	550-192241
				Lab dup	<0.50 (2)	<0.50 (2)	1.3 (2)	<0.50 (2)	35 (2)	
MON	E-8MA	T	10/18/2022	Duplicate	<0.50	<0.50	2.0	<0.50	48	550-192241
MON	E-8MA	E-8MA	11/11/2022	Original	<0.50	<0.50	1.5	<0.50	33	550-193566
MON	E-8MA	AD	11/11/2022	Duplicate	<0.50	<0.50	1.5	<0.50	31	550-193566
MON	E-10MA	E-10MAHS	1/21/2022	Original	<0.50	<0.50	0.76	2.8	6.4	550-177729
MON	E-10MA	E-10MAHS	4/22/2022	Original	<0.50	<0.50	0.80	2.0	6.8	550-182949
MON	E-10MA	E-10MAHS	7/7/2022	Original	<0.50	<0.50	0.83	2.8	8.0	550-186782
MON	E-10MA	E-10MAHS	10/13/2022	Original	<0.50	<0.50	0.75	2.9	6.4	550-192068
MON	E-10MA	Q	10/13/2022	Duplicate	<0.50	<0.50	0.62	2.4	5.6	550-192068
MON	E-12UA	E-12UAHS	10/13/2022	Original	<0.50	<0.50	1.1	<0.50	2.8	550-192066
MON	E-13UA	E-13UAHS	10/13/2022	Original	<0.50	<0.50	1.0	<0.50	3.0	550-192066
MON	M-2MA	M-2MAHS	10/12/2022	Original	<0.50	<0.50	1.1	<0.50	24	550-191978
				Lab dup	<0.50	<0.50	1.2	<0.50	25	
				Lab dup	<0.50	<0.50	1.1	<0.50	24	
MON	M-2MA	M-2MAHS	10/20/2022	Original	<0.50	<0.50	<0.50	<0.50	2.8	550-192415
				Lab dup	<0.50	<0.50	<0.50	<0.50	3.1	

Table C-1. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
MON	M-2MA	V	10/20/2022	Duplicate	<0.50	<0.50	<0.50	<0.50	7.1	550-192415
				Lab dup	<0.50	<0.50	<0.50	<0.50	5.9	
MON	M-2UA	M-2UAHS	10/12/2022	Original	<0.50	<0.50	1.1	<0.50	1.0	550-191978
MON	M-4MA	M-4MAHS	1/21/2022	Original	<0.50	<0.50	0.80	1.1	25	550-177729
MON	M-4MA	M-4MAHS	4/22/2022	Original	<0.50	1.1	0.50	2.0	44	550-182949
MON	M-4MA	M-4MAHS	7/7/2022	Original	<0.50	<0.50	<0.50	0.93	19	550-186782
MON	M-4MA	J	7/7/2022	Duplicate	<0.50	<0.50	<0.50	0.84	18	550-186782
MON	M-4MA	M-4MAHS	10/12/2022	Original	<0.50	0.54	<0.50	0.96	19	550-191978
MON	M-4MA	O	10/12/2022	Duplicate	<0.50	<0.50	<0.50	0.96	18	550-191978
MON	M-5LA	M-5LA	10/21/2022	Original	<0.50	<0.50	1.7	<0.50	1.9	550-192464
MON	M-5MA	M-5MA	1/19/2022	Original	<0.50	2.0	1.6	4.9	44	550-177580
MON	M-5MA	M-5MA	4/27/2022	Original	<0.50	<0.50	0.97	<0.50	15	550-183138
MON	M-5MA	G	4/27/2022	Duplicate	<0.50	<0.50	1.0	<0.50	16	550-183138
MON	M-5MA	M-5MA	7/14/2022	Original	<0.50	<0.50	<0.50	<0.50	5.1	550-187189
MON	M-5MA	M-5MA	10/24/2022	Original	<0.50	<0.50	<0.50	<0.50	4.2	550-192557
MON	M-6MA	M-6MA	1/19/2022	Original	<0.50	<0.50 (1)	1.5	0.80	27	550-177580
MON	M-6MA	M-6MA	4/27/2022	Original	<0.50	<0.50	<0.50	<0.50	4.6	550-183138
				Lab dup	<0.50	<0.50	<0.50	<0.50	4.8	
				Lab dup	<0.50	<0.50	<0.50	<0.50	4.2	
MON	M-6MA	M-6MA	7/14/2022	Original	<0.50	<0.50	1.1	0.62	20	550-187189
MON	M-6MA	M-6MA	10/21/2022	Original	<0.50	<0.50	1.4	0.56	21	550-192464
MON	M-6MA	X	10/21/2022	Duplicate	<0.50	<0.50	1.4	0.59	23	550-192464
MON	M-7MA	M-7MA	10/27/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192772
MON	M-9MA	M-9MA	10/20/2022	Original	<0.50	<0.50	<0.50	<0.50	3.1	550-192410
MON	M-10LA2	M-10LA2HS	10/13/2022	Original	<0.50	<0.50	<0.50	<0.50	4.0	550-192066
MON	M-10MA2	M-10MA2	1/19/2022	Original	<0.50	1.0	1.4	1.3	59	550-177580
MON	M-10MA2	M-10MA2	4/29/2022	Original	<0.50	<0.50	0.76	0.61	25	550-183274
MON	M-10MA2	M-10MA2	7/29/2022	Original	<0.50	0.64	0.92	1.1	32	550-188018
MON	M-10MA2	N	7/29/2022	Duplicate	<0.50	0.65	0.89	1.0	31	550-188018
MON	M-10MA2	M-10MA2	10/27/2022	Original	<0.50	<0.50	<0.50	0.73	21	550-192772
MON	M-11MA	M-11MA	10/18/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192241
MON	M-12MA2	M-12MA2HS	11/14/2022	Original	<0.50	<0.50	<0.50	<0.50	5.0	550-193643
MON	M-12MA2	AE	11/14/2022	Duplicate	<0.50	<0.50	<0.50	<0.50	5.2	550-193643
MON	M-14LA	M-14LAHS	10/14/2022	Original	<0.50	<0.50	0.91	4.6	14	550-192140
				Lab dup	<0.50	<0.50	1.2	5.8	17	
MON	M-14LA	R	10/14/2022	Duplicate	<0.50	<0.50	0.57	3.0	9.8	550-192140
				Lab dup	<0.50	<0.50	<0.50	2.0	7.2	
MON	M-15MA	M-15MA	1/19/2022	Original	<0.50	<0.50 (1)	<0.50	<0.50	4.4	550-177580
MON	M-15MA	M-15MA	4/27/2022	Original	<0.50	<0.50	<0.50	<0.50	2.8	550-183138

Table C-1. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
MON	M-15MA	M-15MA	7/14/2022	Original	<0.50	<0.50	<0.50	<0.50	3.1	550-187189
MON	M-15MA	M-15MA	10/25/2022	Original	<0.50	<0.50	<0.50	<0.50	2.5	550-192618
MON	M-16LA	M-16LAHS	10/13/2022	Original	<0.50	<0.50	<0.50	1.5	14	550-192066
MON	M-16MA	M-16MA	10/18/2022	Original	<0.50	<0.50	<0.50	<0.50	4.1	550-192241
MON	M-17MA/LA	M-17 MA/LAHS	1/21/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-177729
MON	M-17MA/LA	M-17MALAHS	4/22/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-182949
MON	M-17MA/LA	M-17MA/LAHS	7/7/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-186782
MON	M-17MA/LA	M-17MA/LAHS	10/13/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192068
MON	PA-2LA	PA-2LA	10/24/2022	Original	<0.50	<0.50	1.4	<0.50	<0.50	550-192555
MON	PA-5LA	PA-5LA	1/21/2022	Original	<0.50	<0.50	2.5	2.5	40	550-177696
MON	PA-5LA	PA-5LA	4/26/2022	Original	<0.50	<0.50	2.7	1.7	40	550-183087
MON	PA-5LA	PA-5LA	7/12/2022	Original	<0.50	<0.50	2.5	2.1	37	550-186963
MON	PA-5LA	PA-5LA	10/20/2022	Original	<0.50	<0.50	2.7	3.0	43	550-192406
MON	PA-6LA	PA-6LAHS	1/21/2022	Original	<0.50	1.5	0.84	4.1	56	550-177729
MON	PA-6LA	PA-6LAHS	4/22/2022	Original	<0.50	1.0	0.53	3.8	42	550-182948
MON	PA-6LA	PA-6LAHS	7/7/2022	Original	<0.50	0.98	<0.50	1.5	20	550-186784
MON	PA-6LA	PA-6LAHS	10/13/2022	Original	<0.50	1.2	0.75	3.8	48	550-192068
MON	PA-8LA2	PA-8LA2	10/27/2022	Original	<0.50	<0.50	0.62	0.90	6.1	550-192772
MON	PA-9LA	PA-9LAHS	10/13/2022	Original	<0.50	<0.50	2.5	<0.50	17	550-192068
				Lab dup	<0.50	<0.50	2.8	<0.50	18	
MON	PA-10MA	PA-10MAHS	1/21/2022	Original	<0.50	<0.50	<0.50	0.56	21	550-177729
MON	PA-10MA	D	1/21/2022	Duplicate	<0.50	<0.50	<0.50	0.68	23	550-177727
MON	PA-10MA	PA-10MAHS	4/22/2022	Original	<0.50	<0.50	<0.50	0.52	25	550-182949
MON	PA-10MA	E	4/22/2022	Duplicate	<0.50	<0.50	<0.50	<0.50	25	550-182949
MON	PA-10MA	PA-10MAHS	7/7/2022	Original	<0.50	<0.50	<0.50	0.76	25	550-186782
MON	PA-10MA	PA-10MAHS	10/13/2022	Original	<0.50	<0.50	<0.50	0.83	23	550-192068
MON	PA-10MA	P	10/13/2022	Duplicate	<0.50	<0.50	<0.50	0.78	23	550-192068
MON	PA-11LA	PA-11LA	10/21/2022	Original	<0.50	<0.50	2.0	<0.50	<0.50	550-192464
MON	PA-12MA	PA-12MA	1/18/2022	Original	<0.50	<0.50	0.74	3.3	240	550-177492
MON	PA-12MA	PA-12MA	4/26/2022	Original	<0.50	<0.50	0.76	2.7	250	550-183085
MON	PA-12MA	PA-12MA	7/12/2022	Original	<0.50	<0.50	0.70	3.3	260	550-186962
MON	PA-12MA	PA-12MA	10/28/2022	Original	<0.50	<0.50	<0.50	2.6	220	550-192832
MON	PA-13LA	PA-13LA	1/18/2022	Original	<0.50	<0.50	1.6	0.90	66	550-177491
MON	PA-13LA	A	1/18/2022	Duplicate	<0.50	<0.50	1.6	0.88	65	550-177491
MON	PA-13LA	PA-13LA	4/29/2022	Original	<0.50	<0.50	1.7	0.73	71	550-183273
MON	PA-13LA	I	4/29/2022	Duplicate	<0.50	<0.50	1.7	0.73	71	550-183273
MON	PA-13LA	PA-13LA	7/14/2022	Original	<0.50	<0.50	1.7	0.82	64	550-187191
MON	PA-13LA	PA-13LA	10/27/2022	Original	<0.50	<0.50	1.2	0.85	58	550-192773
MON	PA-15LA	PA-15LAHS	10/14/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192140

Table C-1. 2022 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	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
MON	PA-16MA	PA-16MAHS	10/14/2022	Original	<0.50	<0.50	0.64	<0.50	6.4	550-192140
MON	PA-18LA	PA-18LAHS	10/14/2022	Original	<0.50	<0.50	0.68	<0.50	0.57	550-192140
MON	PA-19LA	PA-19LA	10/20/2022	Original	<0.50	<0.50	1.3	1.2	27	550-192410
MON	PA-20MA	PA-20MA	10/20/2022	Original	<0.50	0.84	1.2	5.4	71	550-192410
				Lab dup	<0.50	<0.50	0.80	4.2	52	
MON	PA-20MA	PA-20MA	11/11/2022	Original	<0.50	0.75	1.3	4.7	61	550-193566
MON	PA-21MA	PA-21MAHS	10/13/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192066
MON	PG-1LA	PG-1LA	1/20/2022	Original	<0.50	<0.50	1.3	<0.50	0.75	550-177677
MON	PG-1LA	PG-1LA	4/29/2022	Original	<0.50	<0.50	1.3	<0.50	0.68	550-183273
MON	PG-1LA	PG-1LA	7/13/2022	Original	<0.50	<0.50	1.9	<0.50	1.0	550-187077
MON	PG-1LA	PG-1LA	10/19/2022	Original	<0.50	<0.50	1.6	<0.50	0.86	550-192277
MON	PG-1LA	U	10/19/2022	Duplicate	<0.50	<0.50	1.6	<0.50	0.86	550-192277
MON	PG-2LA	PG-2LA	4/26/2022	Original	<0.50	<0.50	1.4	0.91	95	550-183087
				Lab dup	<0.50	<0.50	1.1	0.86	81	
				Lab dup	<0.50	<0.50	1.3	1.1	94	
MON	PG-2LA	PG-2LA	10/25/2022	Original	<0.50	<0.50	1.3	1.2	81	550-192619
MON	PG-2LA	Z	10/25/2022	Duplicate	<0.50	<0.50	1.3	1.2	83	550-192619
MON	PG-4MA	PG-4MA	10/20/2022	Original	<0.50	<0.50	0.87	<0.50	1.9	550-192410
MON	PG-4UA	PG-4UAHS	10/14/2022	Original	<0.50	<0.50	0.89	1.6	0.68	550-192140
MON	PG-5MA	PG-5MAHS	10/14/2022	Original	<0.50	<0.50	0.64	<0.50	6.7	550-192140
MON	PG-5UA	PG-5UAHS	10/14/2022	Original	<0.50	<0.50	0.67	<0.50	2.4	550-192140
MON	PG-6MA	PG-6MA	10/26/2022	Original	<0.50	0.96	3.1	3.3	88	550-192667
MON	PG-6MA	AA	10/26/2022	Duplicate	<0.50	0.88	3.0	3.3	94	550-192667
MON	PG-6UA	PG-6UA	10/24/2022	Original	<0.50	<0.50	1.1	<0.50	1.2	550-192557
MON	PG-7MA	PG-7MA	10/20/2022	Original	<0.50	<0.50	1.0	<0.50	3.7	550-192410
MON	PG-8UA	PG-8UA	10/21/2022	Original	<0.50	<0.50	0.85	<0.50	<0.50	550-192464
MON	PG-10UA	PG-10UA	10/18/2022	Original	<0.50	<0.50	1.8	<0.50	0.94	550-192241
MON	PG-11UA	PG-11UAHS	10/13/2022	Original	<0.50	<0.50	1.2	<0.50	<0.50	550-192068
MON	PG-16UA	PG-16UAHS	11/14/2022	Original	<0.50	<0.50	<0.50	<0.50	0.93	550-193643
MON	PG-18UA	PG-18UA	10/20/2022	Original	<0.50	<0.50	1.5	<0.50	1.3	550-192410
MON	PG-19UA	PG-19UA	10/25/2022	Original	<0.50	<0.50	0.85	<0.50	2.7	550-192618
MON	PG-22UA	PG-22UAHS	10/13/2022	Original	<0.50	<0.50	<0.50	0.65	3.1	550-192066
MON	PG-23MA/LA	PG-23 MA/LA	10/18/2022	Original	<0.50	<0.50	1.2	0.88	11	550-192241
MON	PG-23UA	PG-23UAHS	10/14/2022	Original	<0.50	<0.50	0.81	<0.50	1.3	550-192140
MON	PG-24UA	PG-24UAHS	10/14/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192140
MON	PG-25UA	PG-25UAHS	10/13/2022	Original	<0.50	<0.50	1.0	<0.50	2.0	550-192066
MON	PG-28UA	PG-28UA	10/18/2022	Original	<0.50	<0.50	1.8	<0.50	0.73	550-192241
MON	PG-29UA	PG-29UA	10/17/2022	Original	<0.50	<0.50	0.65	<0.50	0.59	550-192173
MON	PG-29UA	S	10/17/2022	Duplicate	<0.50	<0.50	0.65	<0.50	0.54	550-192173

Table C-1. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
MON	PG-31UA	PG-31UAHS	10/13/2022	Original	<0.50	<0.50	3.4	<0.50	4.8	550-192068
MON	PG-38MA/LA	PG-38MA/LAHS	10/13/2022	Original	<0.50	<0.50	0.82	2.3	0.88	550-192068
MON	PG-39LA	PG-39LA	10/18/2022	Original	<0.50	<0.50	0.92	1.4	2.7	550-192241
MON	PG-40LA	PG-40LA	1/20/2022	Original	<0.50	<0.50	0.53	<0.50	12	550-177677
MON	PG-40LA	C	1/20/2022	Duplicate	<0.50	<0.50	0.54	<0.50	11	550-177677
MON	PG-40LA	PG-40LA	7/13/2022	Original	<0.50	<0.50	0.86	0.66	20	550-187077
MON	PG-40LA	PG-40LA	11/10/2022	Original	<0.50	<0.50	0.64	0.62	17	550-193476
MON	PG-40LA	AF	11/10/2022	Duplicate	<0.50	<0.50	0.61	0.58	17	550-193476
MON	PG-42LA	PG-42LA	1/20/2022	Original	<0.50	<0.50	0.56	<0.50	1.3	550-177677
MON	PG-42LA	PG-42LA	4/29/2022	Original	<0.50	<0.50	0.51	<0.50	1.3	550-183273
MON	PG-42LA	PG-42LA	7/13/2022	Original	<0.50	<0.50	0.67	<0.50	1.6	550-187077
MON	PG-42LA	PG-42 LA	10/28/2022	Original	<0.50	<0.50	<0.50	<0.50	1.1	550-192831
MON	PG-42LA	AC	10/28/2022	Duplicate	<0.50	<0.50	<0.50	<0.50	1.0	550-192831
MON	PG-43LA	PG-43LAHS	1/21/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-177729
MON	PG-43LA	PG-43LAHS	4/22/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-182948
MON	PG-43LA	PG-43LAHS	7/7/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-186784
MON	PG-43LA	PG-43LAHS	10/13/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192068
MON	PG-44LA	PG-44LA	1/20/2022	Original	<0.50	<0.50	3.7	<0.50	<0.50	550-177677
MON	PG-44LA	PG-44LA	4/28/2022	Original	<0.50	<0.50	4.2	<0.50	<0.50	550-183237
MON	PG-44LA	H	4/28/2022	Duplicate	<0.50	<0.50	4.0	<0.50	<0.50	550-183237
MON	PG-44LA	PG-44LA	7/13/2022	Original	<0.50	<0.50	4.7	<0.50	<0.50	550-187077
MON	PG-44LA	L	7/13/2022	Duplicate	<0.50	<0.50	4.8	<0.50	<0.50	550-187077
MON	PG-44LA	PG-44LA	10/25/2022	Original	<0.50	<0.50	3.6	<0.50	<0.50	550-192619
MON	PG-48MA	PG-48MA	1/19/2022	Original	<0.50	<0.50 (1)	0.68	<0.50	14	550-177580
MON	PG-48MA	PG-48MA	4/27/2022	Original	<0.50	<0.50	0.55	<0.50	12	550-183138
MON	PG-48MA	PG-48MA	7/14/2022	Original	<0.50	<0.50	0.64	<0.50	13	550-187189
MON	PG-48MA	PG-48MA	10/24/2022	Original	<0.50	<0.50	0.52	<0.50	11	550-192557
MON	PG-48MA	Y	10/24/2022	Duplicate	<0.50	<0.50	0.51	<0.50	10	550-192557
MON	PG-49MA (A)	PG-49MAHS	October 2022	---	---	---	---	---	---	---
MON	PG-50MA	PG-50MAHS	10/13/2022	Original	<0.50	<0.50	1.0	<0.50	0.68	550-192068
MON	PG-53MA (B)	PG-53MAHS	11/14/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-193644
MON	PG-54MA	PG-54MA	10/18/2022	Original	<0.50	<0.50	1.7	1.1	38	550-192241
				Lab dup	<0.50 (2)	<0.50 (2)	1.1 (2)	0.89 (2)	30 (2)	
MON	PG-55MA	PG-55MA	10/17/2022	Original	<0.50	<0.50	<0.50	<0.50	2.5	550-192173
MON	PG-56MA	PG-56MA	10/18/2022	Original	<0.50	<0.50	0.87	<0.50	2.6	550-192241
MON	S-1LA	S-1LA	10/27/2022	Original	<0.50	<0.50	1.1	39	<0.50	550-192772
MON	S-1LA	AB	10/27/2022	Duplicate	<0.50	<0.50	1.1	45	<0.50	550-192772
MON	S-1MA	S-1MAHS	10/13/2022	Original	<0.50	<0.50	<0.50	6.5	<0.50	550-192068
MON	S-2LA	S-2LA	1/21/2022	Original	<0.50	<0.50	<0.50	<0.50	11	550-177696

Table C-1. 2022 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	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
MON	S-2LA	S-2LA	4/26/2022	Original	<0.50	<0.50	0.52	<0.50	13	550-183087
MON	S-2LA	F	4/26/2022	Duplicate	<0.50	<0.50	0.50	<0.50	12	550-183087
MON	S-2LA	S-2LA	7/12/2022	Original	<0.50	<0.50	<0.50	<0.50	10	550-186963
MON	S-2LA	K	7/12/2022	Duplicate	<0.50	<0.50	0.53	<0.50	11	550-186963
MON	S-2LA	S-2LA	10/20/2022	Original	<0.50	<0.50	0.53	<0.50	10	550-192406
MON	S-2MA	S-2MAHS	10/12/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-191978
MON	W-1MA	W-1MA	1/18/2022	Original	<0.50	<0.50	1.1	1.7	340	550-177492
MON	W-1MA	W-1MA	4/29/2022	Original	<0.50	<0.50	1.1	1.4	540	550-183274
				Lab dup	<0.50	<0.50	1.1	1.9	530 (3)	
				Lab dup	---	---	---	---	320 (4)	
MON	W-1MA	W-1MA	7/14/2022	Original	<0.50	<0.50	1.2	2.2	410	550-187189
MON	W-1MA	M	7/14/2022	Duplicate	<0.50	<0.50	1.2	2.2	350	550-187189
MON	W-1MA	W-1MA	10/28/2022	Original	<0.50	<0.50	0.59	1.5	370	550-192832
MON	W-2MA	W-2MA	1/18/2022	Original	<0.50	0.71	1.3	13	3600	550-177492
MON	W-2MA	W-2MA	4/26/2022	Original	<0.50	0.54	1.1	9.0	2800	550-183085
MON	W-2MA	W-2MA	7/14/2022	Original	<0.50	0.66	1.3	12	3800	550-187189
				Lab dup	<25 (5)	<25 (5)	<25 (5)	<25 (5)	3500 (5)	
MON	W-2MA	W-2MA	10/28/2022	Original	<0.50	<0.50	0.65	8.7	2500	550-192832
Trip/Field Blanks										
--	QC	FRB (Trip)	1/18/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-177492
--	QC	FRB (Trip)	1/19/2022	TB	<0.50	<0.50 (1)	<0.50	<0.50	<0.50	550-177580
--	QC	FRB (Trip)	1/20/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-177677
--	QC	FRB (Trip)	1/21/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-177696
--	QC	FRB (Trip)	4/22/2022	TB	<0.50	<0.50	<0.50	<0.50 (1),(6)	<0.50	550-182949
--	QC	FRB (Trip)	4/26/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183087
--	QC	FRB (Trip)	4/27/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183138
--	QC	FRB (Trip)	4/28/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183237
--	QC	FRB (Trip)	4/29/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183273
--	QC	FRB (Trip)	7/7/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186782
--	QC	FRB (Trip)	7/12/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186963
--	QC	FRB (Trip)	7/13/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-187077
--	QC	FRB (Trip)	7/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-187189
--	QC	FRB (Trip)	7/29/2022	TB	<0.50	<0.50 (1),(6)	<0.50	<0.50	<0.50	550-188018
--	QC	FRB (TRIP)	10/12/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191978
--	QC	FRB (Trip)	10/13/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192066
--	QC	FRB(Trip)	10/13/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192068
--	QC	FRB(Trip)	10/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192140
--	QC	FRB (TRIP)	10/17/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192173
--	QC	FRB (Trip)	10/18/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192241

Table C-1. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
					200	*6*	*6*	*5*	*5*	
--	QC	FRB (Trip)	10/19/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192277
--	QC	FRB (Trip)	10/20/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192410
--	QC	FRB (Trip) - 1	10/20/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192415
--	QC	FRB (TRIP)	10/21/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192464
--	QC	FRB (Trip)	10/25/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192618
--	QC	FRB (Trip)	10/26/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192667
--	QC	FRB (Trip)	10/27/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192772
--	QC	FRB (Trip)	11/10/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193476
--	QC	FRB (Trip)	11/11/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193566
--	QC	FRB (Trip)	11/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193643

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; re-analysis of the original sample requested for verification
MON = Monitoring
QC = Quality Control
VOC = Volatile Organic Compound

NOTES:

All samples analyzed by Eurofins Environment Testing Southwest (Eurofins) using EPA method 524.2.

<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) Samplers were unable to collect sample at PG-49MA in Q4 of 2022 due to an obstruction; sample was collected at nearby Lower MAU well PG-53MA.

(B) Proposed replacement well for PG-49MA; groundwater sample was collected from this well as supplemental data and is not required per the GM&EP. These data are included in the 2022 annual supplemental report.

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) L5 Flag: The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.
(2) H1 Flag: Sample analysis performed past holding time.
(3) E2 Flag: Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.
(4) H2 Flag: Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
(5) L3 Flag: The associated blank spike recovery was above method acceptance limits.
(6) V1 Flag: Continuing Calibration Verification (CCV) recovery was above method acceptance limits. This analyte was not detected in the sample.

Table C-2. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
AREA 7 GWETS										
Extraction	7EX-3aMA	7EX-3aMA	5/2/2022	Original	<0.50	<0.50	0.87	2.0	310	550-183332
Extraction	7EX-3aMA	7EX-3aMA	7/6/2022	Original	<0.50	<0.50	1.0	3.8	430	550-186632
Extraction	7EX-3aMA	7EX-3aMA	8/26/2022	Original	<0.50	<0.50	0.90	3.5	460	550-189479
Extraction	7EX-3aMA	7EX-3aMA	10/25/2022	Original	<0.50	<0.50	0.97	3.7	480	550-192600
Extraction	7EX-6MA	7EX-6MA	8/26/2022	Original	<0.50	<0.50	0.71	2.0	370	550-189479
Extraction	7EX-6MA	7EX-6MA	10/25/2022	Original	<0.50	<0.50	0.79	2.3	380	550-192600
CGTF										
Extraction	COS-72	COS-72	2/1/2022	Original	<0.50	<0.50	0.87	0.98	8.7	550-178235
Extraction	COS-72	COS-72	3/1/2022	Original	<0.50	<0.50	0.79	1.1	8.3	550-179954
Extraction	COS-72	COS-72	7/6/2022	Original	<0.50	<0.50	0.93	0.88	10	550-186647
Extraction	COS-72	COS-72	9/1/2022	Original	<0.50	<0.50	0.76	0.72	8.2	550-189788
Extraction	COS-75A	COS-75A	1/3/2022	Original	<0.50	0.58	1.8	5.2	33	550-176556
Extraction	COS-75A	EXT-1A-01032022	1/3/2022	Duplicate	<0.50	0.57	1.9	4.9	32	550-176556
Extraction	COS-75A	COS-75A	2/1/2022	Original	<0.50	0.67	1.9	5.5	32	550-178235
Extraction	COS-75A	EXT-1A-02012022	2/1/2022	Duplicate	<0.50	0.72	1.9	5.6	32	550-178235
Extraction	COS-75A	COS-75A	3/1/2022	Original	<0.50	0.60	1.7	5.2	31	550-179954
Extraction	COS-75A	EXT-1A-03012022	3/1/2022	Duplicate	<0.50	0.58	1.7	5.1	30	550-179954
Extraction	COS-75A	COS-75A	4/1/2022	Original	<0.50	0.59	1.9	4.8	33	550-181704
Extraction	COS-75A	EXT-1A-04012022	4/1/2022	Duplicate	<0.50	<0.50	1.8	4.5	32	550-181704
Extraction	COS-75A	COS-75 A	5/2/2022	Original	<0.50	<0.50	1.8	3.9	32	550-183329
Extraction	COS-75A	EXT-1A-05022022	5/2/2022	Duplicate	<0.50	0.57	1.8	4.0	32	550-183329
Extraction	COS-75A	COS-75 A	6/1/2022	Original	<0.50	0.67	2.0	6.1	31	550-184901
Extraction	COS-75A	EXT-1A-06012022	6/1/2022	Duplicate	<0.50	0.65	2.0	5.9	30	550-184901
Extraction	COS-75A	COS-75 A	7/6/2022	Original	<0.50	0.54	1.8	5.2	31	550-186647
Extraction	COS-75A	EXT-1A-07062022	7/6/2022	Duplicate	<0.50	0.52	1.7	5.1	31	550-186647
Extraction	COS-75A	COS-75A	8/1/2022	Original	<0.50	0.67	2.1	6.4	37	550-188070
Extraction	COS-75A	EXT-1A-08012022	8/1/2022	Duplicate	<0.50	0.66	2.1	6.2	36	550-188070
Extraction	COS-75A	COS-75A	9/1/2022	Original	<0.50	0.52	1.7	4.9	28	550-189788
Extraction	COS-75A	EXT-1A-09012022	9/1/2022	Duplicate	<0.50	0.53	1.7	4.8	28	550-189788
Extraction	COS-75A	COS-75A	10/3/2022	Original	<0.50	0.56	1.9	5.4	32	550-191356
Extraction	COS-75A	EXT-1A-10032022	10/3/2022	Duplicate	<0.50	<0.50	1.9	5.4	32	550-191356
Extraction	COS-75A	COS-75A	12/16/2022	Original	<0.50	0.57	1.8	6.5	33	550-195131
Extraction	COS-75A	EXT-1A-12162022	12/16/2022	Duplicate	<0.50	0.52	1.8	6.3	33	550-195131
AREA 12 GWETS										
Extraction	MEX-1MA	MEX-1-1A-02142022	2/14/2022	Original	<0.50	1.7	1.6	3.3	47	550-178996
Extraction	MEX-1MA	MEX-1-1A-03012022	3/1/2022	Original	<0.50	1.3	1.6	2.5	44	550-179955
Extraction	MEX-1MA	MEX-1-1A-04012022	4/1/2022	Original	<0.50	1.3	1.7	2.5	47	550-181702
Extraction	MEX-1MA	MEX-1-1A-05022022	5/2/2022	Original	<0.50	1.1	1.6	2.0	46	550-183326
Extraction	MEX-1MA	MEX-1-1A-06012022	6/1/2022	Original	<0.50	1.3	2.0	3.1	49	550-184908

Table C-2. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
Extraction	MEX-1MA	MEX-1-1A-07062022	7/6/2022	Original	<0.50	1.3	1.8	2.9	51	550-186634
Extraction	MEX-1MA	MEX-1-1A-08012022	8/1/2022	Original	<0.50	1.4	2.0	3.3	55	550-188069
Extraction	MEX-1MA	MEX-1-1A-09012022	9/1/2022	Original	<0.50	1.3	1.8	2.9	50	550-189804
Extraction	MEX-1MA	MEX-1-1A-10032022	10/3/2022	Original	<0.50	1.2	1.8	2.6	50	550-191357
Extraction	MEX-1MA	MEX-1-1A-11012022	11/1/2022	Original	<0.50	0.74	1.2	2.2	39	550-192980
Extraction	MEX-1MA	MEX-1-1A- 12012022	12/1/2022	Original	<0.50	1.3	2.0	2.9	55	550-194344
Extraction	Granite Reef	GR-1-1A-02222022	2/22/2022	Original	<0.50	1.2	3.7	3.3	78	550-179554
Extraction	Granite Reef	GR-1-1A-03012022	3/1/2022	Original	<0.50	1.4	4.0	2.6	94	550-179955
Extraction	Granite Reef	GR-1-1A-04012022	4/1/2022	Original	<0.50	1.5	5.0	2.7	88	550-181702
Extraction	Granite Reef	GR-1-1A-05022022	5/2/2022	Original	<0.50	1.4	4.4	2.0	110	550-183326
Extraction	Granite Reef	GR-1-1A-06012022	6/1/2022	Original	<0.50	1.9	5.5	3.5	89	550-184908
Extraction	Granite Reef	GR-1-1A-07062022	7/6/2022	Original	<0.50	1.5	4.9	3.0	100	550-186634
Extraction	Granite Reef	GR-1-1A-08012022	8/1/2022	Original	<0.50	1.7	5.5	3.7	120	550-188069
Extraction	Granite Reef	GR-1-1A-09012022	9/1/2022	Original	<0.50	1.5	4.8	3.0	120	550-189804
Extraction	Granite Reef	GR-1-1A-10032022	10/3/2022	Original	<1.0	1.5	4.3	2.7	100	550-191357
Extraction	Granite Reef	GR-1-1A-11012022	11/1/2022	Original	<0.50	0.72	3.8	2.3	85	550-192980
Extraction	Granite Reef	GR-1-1A- 12012022	12/1/2022	Original	<0.50	1.7	5.4	3.2	110	550-194344
NGTF										
Extraction	PCX-1	PCX-1	1/5/2022	Original	<0.50	0.60	1.8	3.3	44	550-176731
Extraction	PCX-1	PCX-1	2/22/2022	Original	<0.50	0.72	1.6	4.5	40	550-179556
Extraction	PCX-1	PCX-1	3/14/2022	Original	<0.50	0.59	1.7	4.7	41	550-180755
Extraction	PCX-1	PCX-1	4/1/2022	Original	<0.50	0.58	1.9	3.3	45	550-181705
Extraction	PCX-1	PCX-1	5/11/2022	Original	<0.50	0.61	1.9	3.1	44	550-183913
Extraction	PCX-1	PCX-1	6/8/2022	Original	<0.50	0.70	2.3	4.2	43	550-185250
Extraction	PCX-1	PCX-1	7/7/2022	Original	<0.50	0.66	2.3	4.0	51	550-186727
Extraction	PCX-1	PCX-1	8/14/2022	Original	<0.50	<0.50	2.3	4.1	50	550-188825
Extraction	PCX-1	PCX-1	9/4/2022	Original	<0.50	0.60	2.0	3.6	43	550-189897
Extraction	PCX-1	PCX-1	10/24/2022	Original	<0.50	<0.50	1.9	3.0	43	550-192558
Extraction	PCX-1	PCX-1	11/14/2022	Original	<0.50	0.57	1.9	3.6	44	550-193612
Extraction	PCX-1	PCX-1	12/10/2022	Original	<0.50	0.58	1.8	3.4	44	550-194805
MRTF										
Extraction	PV-14	PV 14	1/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-176561
Extraction	PV-14	PV 14	2/1/2022	Original	<0.50	<0.50	0.79	<0.50	0.80	550-178233
Extraction	PV-14	PV 14	3/1/2022	Original	<0.50	<0.50	0.55	<0.50	0.59	550-179957
Extraction	PV-14	PV 14	4/1/2022	Original	<0.50	<0.50	0.70	<0.50	0.61	550-181717
Extraction	PV-14	PV 14	5/2/2022	Original	<0.50	<0.50	0.59	<0.50	<0.50	550-183330
Extraction	PV-14	PV 14	6/1/2022	Original	<0.50	<0.50	0.52	<0.50	<0.50	550-184905
Extraction	PV-14	PV 14	7/6/2022	Original	<0.50	<0.50	0.57	<0.50	0.64	550-186633
Extraction	PV-14	PV 14	8/1/2022	Original	<0.50	<0.50 (1)	0.59	<0.50	0.54	550-188071
Extraction	PV-14	PV 14	9/1/2022	Original	<0.50	<0.50	0.54	<0.50	<0.50	550-189805

Table C-2. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
Extraction	PV-14	PV 14	10/3/2022	Original	<0.50	<0.50	0.57	<0.50	<0.50	550-191353
Extraction	PV-14	PV 14	11/1/2022	Original	<0.50	<0.50	0.54	<0.50	0.52	550-192956
Extraction	PV-14	PV 14	12/1/2022	Original	<0.50	<0.50	0.57	<0.50	<0.50	550-194338
Extraction	PV-15	PV 15	1/3/2022	Original	<0.50	<0.50	0.61	<0.50	4.9	550-176561
Extraction	PV-15	PV 15	2/1/2022	Original	<0.50	<0.50	0.64	<0.50	5.8	550-178233
Extraction	PV-15	PV 15	3/1/2022	Original	<0.50	<0.50	0.55	<0.50	4.6	550-179957
Extraction	PV-15	PV 15	4/1/2022	Original	<0.50	<0.50	0.67	<0.50	5.0	550-181717
Extraction	PV-15	PV 15	5/2/2022	Original	<0.50	<0.50	0.64	<0.50	5.1	550-183330
Extraction	PV-15	PV 15	6/1/2022	Original	<0.50	<0.50	0.66	<0.50	4.9	550-184905
Extraction	PV-15	PV 15	7/6/2022	Original	<0.50	<0.50	0.78	<0.50	6.4	550-186633
Extraction	PV-15	PV 15	8/1/2022	Original	<0.50	<0.50 (1)	0.76	<0.50	5.6	550-188071
Extraction	PV-15	PV 15	9/1/2022	Original	<0.50	<0.50	0.70	<0.50	4.8	550-189805
Extraction	PV-15	PV 15	10/3/2022	Original	<0.50	<0.50	0.78	<0.50	5.0	550-191353
Extraction	PV-15	PV 15	11/1/2022	Original	<0.50	<0.50	0.74	<0.50	5.0	550-192956
Extraction	PV-15	PV 15	12/1/2022	Original	<0.50	<0.50	0.68	<0.50	4.5	550-194338
Trip/Field Blanks										
--	EX-QC (C)	FRB (TRIP)	1/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-176560
--	EX-QC (C)	TB-2-1A-01052022	1/5/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-176728
--	EX-QC (C)	FRB (TRIP)	2/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-178231
--	EX-QC (C)	FRB (TRIP)	2/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-178999
--	EX-QC (C)	FRB (TRIP)	2/22/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179555
--	EX-QC (C)	FRB (TRIP)	3/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179959
--	EX-QC (C)	FRB (TRIP)	3/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-180754
--	EX-QC (C)	FRB (TRIP)	4/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-181708
--	EX-QC (C)	FRB (TRIP)	5/2/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183323
--	EX-QC (C)	FRB (TRIP)	5/11/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183912
--	EX-QC (C)	FRB (TRIP)	6/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-184909
--	EX-QC (C)	FRB (TRIP)	6/8/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-185252
--	EX-QC (C)	FRB (TRIP)	7/6/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186644
--	EX-QC (C)	FRB (TRIP)	7/7/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186730
--	EX-QC (C)	FRB (TRIP)	8/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-188085
--	EX-QC (C)	FRB (TRIP)	8/14/2022	TB	<0.50	<0.50 (1)	<0.50	<0.50	<0.50	550-188827
--	EX-QC (C)	FRB (TRIP)	8/26/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189474
--	EX-QC (C)	FRB (TRIP)	9/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189795
--	EX-QC (C)	FRB (TRIP)	9/4/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189895
--	EX-QC (C)	FRB (TRIP) (A)	10/3/2022	TB	---	---	---	---	---	550-191346
--	EX-QC (C)	TB-2-1A-10032022 (B)	10/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191345
--	EX-QC (C)	FRB (TRIP)	10/24/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192525
--	EX-QC (C)	FRB (TRIP)	10/25/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192598
--	EX-QC (C)	FRB (TRIP)	11/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192949

Table C-2. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
					200	*6*	*6*	*5*	*5*	
--	EX-QC (C)	FRB (TRIP)	11/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193610
--	EX-QC (C)	FRB (TRIP)	12/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194333
--	EX-QC (C)	FRB (TRIP)	12/10/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194802
--	EX-QC (C)	FRB (TRIP)	12/16/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195130

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
TB = Trip Blank
VOC = Volatile Organic Compound

NOTES:

All samples analyzed by Eurofins Environment Testing Southwest (Eurofins) using EPA method 524.2.

<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) EX-QC - A single trip blank is collected for all extraction well samples, regardless of facility, when collected and shipped on the

(B) Sample not reported. Lab indicated via email on October 18, 2022: *Due to instrument error (bad purge) the associated sample could not be reported. There was not enough sample volume to rerun so the sample has been cancelled.* Treatment System sample TB-2-1A-10032022 was used as trip blank.

(C) Treatment system trip blank made the same sampling trip as the extraction well on this date

Laboratories use standardized data qualifiers defined by Arizona Department of Health Services and listed in ADEQ document WQR282:

(1) L5 Flag: The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the

Table C-3. 2022 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	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
AREA 7 GWETS									
SP-102 (influent)	SP-102	5/2/2022	Original	<0.50	<0.50	0.87	1.9	310	550-183334
SP-102 (influent)	TS-2-1A-05022022	5/2/2022	Duplicate	<0.50	<0.50	0.93	2.1	330	550-183334
SP-102 (influent)	SP-102	6/1/2022	Original	<0.50	<0.50	0.85	3.4	360	550-184911
SP-102 (influent)	TS-2-1A-06012022	6/1/2022	Duplicate	<0.50	<0.50	0.92	3.6	360	550-184911
SP-102 (influent)	SP-102	7/6/2022	Original	<0.50	<0.50	1.1	3.8	410	550-186652
SP-102 (influent)	TS-2-1A-07062022	7/6/2022	Duplicate	<0.50	<0.50	1.1	3.8	430	550-186652
SP-102 (influent)	SP-102	8/26/2022	Original	<0.50	<0.50	0.81	2.6	420	550-189477
SP-102 (influent)	TS-2-1A-08262022	8/26/2022	Duplicate	<0.50	<0.50	0.81	2.6	380	550-189477
SP-102 (influent)	SP-102	9/1/2022	Original	<0.50	<0.50	0.84	2.5	390	550-189811
SP-102 (influent)	TS-2-1A-09012022	9/1/2022	Duplicate	<0.50	<0.50	0.81	2.6	400	550-189811
SP-102 (influent)	SP-102	10/25/2022	Original	<0.50	<0.50	0.87	2.9	460	550-192602
SP-102 (influent)	TS-2-1A-10252022	10/25/2022	Duplicate	<0.50	<0.50	0.87	2.9	460	550-192602
SP-102 (influent)	SP-102	11/1/2022	Original	<0.50	<0.50	0.81	2.7	460	550-192960
SP-102 (influent)	TS-2-1A-11012022	11/1/2022	Duplicate	<0.50	<0.50	0.86	2.9	470	550-192960
SP-102 (influent)	SP-102	12/1/2022	Original	<0.50	<0.50	0.85	3.3	430	550-194345
SP-102 (influent)	TS-2-1A- 12012022	12/1/2022	Duplicate	<0.50	<0.50	0.87	3.0	440	550-194345
SP-103 (UV/Ox effluent)	SP-103	5/2/2022	Original	<0.50	<0.50	0.94	<0.50	0.53	550-183334
SP-103 (UV/Ox effluent)	SP-103	6/1/2022	Original	<0.50	<0.50	0.89	<0.50	9.2 (1)	550-184911
SP-103 (UV/Ox effluent)	SP-103	7/6/2022	Original	<0.50	<0.50	1.0	<0.50	1.4	550-186652
SP-103 (UV/Ox effluent)	SP-103	8/26/2022	Original	<0.50	<0.50	0.76	1.8	320	550-189477
SP-103 (UV/Ox effluent)	SP-103	9/1/2022	Original	<0.50	<0.50	0.74	0.75	48	550-189811
SP-103 (UV/Ox effluent)	SP-103	10/25/2022	Original	<0.50	<0.50	0.82	1.8	200	550-192602
SP-103 (UV/Ox effluent)	SP-103	11/1/2022	Original	<0.50	<0.50	0.79	<0.50	12	550-192960
SP-103 (UV/Ox effluent)	SP-103	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	2.4	550-194345
SP-105 (Air Stripper Effluent)	SP-105	5/2/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-183333
SP-105 (Air Stripper Effluent)	SP-105	6/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-184910
SP-105 (Air Stripper Effluent)	SP-105	7/6/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-186638
SP-105 (Air Stripper Effluent)	SP-105	8/26/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-189478
SP-105 (Air Stripper Effluent)	SP-105	9/1/2022	Original	<0.50	<0.50	<0.50	<0.50	1.1	550-189810
SP-105 (Air Stripper Effluent)	SP-105	10/25/2022	Original	<0.50	<0.50	<0.50	<0.50	0.58	550-192601
			Lab dup	<0.50	<0.50	<0.50	<0.50	0.57	
SP-105 (Air Stripper Effluent)	SP-105	11/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192959
SP-105 (Air Stripper Effluent)	SP-105	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-104348

Table C-3. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
				200	6	6	5	5	
AREA 12 GWETS									
WSP-1 (Influent)	WSP-1-1A-02142022	2/14/2022	Original	<0.50	1.7	1.7	3.5	48	550-178998
WSP-1 (Influent)	TS-1-1A-02142022	2/14/2022	Duplicate	<0.50	1.7	1.7	3.3	49	550-178998
WSP-1 (Influent)	WSP-1-1A-03012022	3/1/2022	Original	<0.50	1.5	3.0	3.4 (A)	74	550-179956
WSP-1 (Influent)	TS-1-1A-03012022	3/1/2022	Duplicate	<0.50	1.4	2.9	2.6 (A)	74	550-179956
WSP-1 (Influent)	WSP-1-1A-04012022	4/1/2022	Original	<0.50	1.4	3.1	2.6	83	550-181695
WSP-1 (Influent)	TS-1-1A-04012022	4/1/2022	Duplicate	<0.50	1.3	2.9	2.5	77	550-181695
WSP-1 (Influent)	WSP-1-1A-05022022	5/2/2022	Original	<0.50	1.1	2.9	2.0	78	550-183327
WSP-1 (Influent)	TS-1-1A-05022022	5/2/2022	Duplicate	<0.50	1.2	3.1	1.8	80	550-183327
WSP-1 (Influent)	WSP-1-1A-06012022	6/1/2022	Original	<0.50	1.3	3.5	3.2	78	550-184902
WSP-1 (Influent)	TS-1-1A-06012022	6/1/2022	Duplicate	<0.50	1.5	3.3	3.0	74	550-184902
WSP-1 (Influent)	WSP-1-1A-070622	7/6/2022	Original	<0.50	1.4	3.2	2.8	81	550-186636
WSP-1 (Influent)	TS-1-1A-070622	7/6/2022	Duplicate	<0.50	1.4	3.4	3.0	87	550-186636
WSP-1 (Influent)	WSP-1-1A-08012022	8/1/2022	Original	<0.50	1.7	3.7	3.5	90	550-188067
WSP-1 (Influent)	TS-1-1A-08012022	8/1/2022	Duplicate	<0.50	1.8	3.6	3.6	90	550-188067
WSP-1 (Influent)	WSP-1-1A-09012022	9/1/2022	Original	<0.50	1.3	3.0	2.6	70	550-189806
WSP-1 (Influent)	TS-1-1A-09012022	9/1/2022	Duplicate	<0.50	1.3	2.9	2.6	69	550-189806
WSP-1 (Influent)	WSP-1-1A-10032022	10/3/2022	Original	<0.50	1.4	3.4	2.9	84	550-191358
WSP-1 (Influent)	TS-1-1A-10032022	10/3/2022	Duplicate	<0.50	1.4	3.3	3.0	83	550-191358
WSP-1 (Influent)	WSP-1-1A-11012022	11/1/2022	Original	<0.50	1.4	3.1	3.0	78	550-192952
WSP-1 (Influent)	TS-1-1A-11012022	11/1/2022	Duplicate	<0.50	1.5	3.2	3.0	78	550-192952
WSP-1 (Influent)	WSP-1-1A- 12012022	12/1/2022	Original	<0.50	1.4	3.6	3.2	90	550-194341
WSP-1 (Influent)	TS-1-1A- 12012022	12/1/2022	Duplicate	<0.50	1.4	3.4	3.1	87	550-194341
WSP-2 (Air Stripper Effluent)	WSP-2-1A-02142022	2/14/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-178997
WSP-2 (Air Stripper Effluent)	WSP-2-1A 03012022	3/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-179952
WSP-2 (Air Stripper Effluent)	WSP-2-1A-04012022	4/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-181701
WSP-2 (Air Stripper Effluent)	WSP-2-1A-05022022	5/2/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-183328
WSP-2 (Air Stripper Effluent)	WSP-2-1A 06012022	6/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-184904
WSP-2 (Air Stripper Effluent)	WSP-2-1A 07062022	7/6/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-186641
WSP-2 (Air Stripper Effluent)	WSP-2-1A-08012022	8/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-188079
WSP-2 (Air Stripper Effluent)	WSP-2-1A-09012022	9/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-189808
WSP-2 (Air Stripper Effluent)	WSP-2-1A-10032022	10/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-191359
WSP-2 (Air Stripper Effluent)	WSP-2-1A 11012022	11/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192961
WSP-2 (Air Stripper Effluent)	WSP-2-1A-12012022	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-194342

Table C-3. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
				200	6	6	5	5	
MRTF									
Tower 1 Effluent	Tower 1	1/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-176558
Tower 1 Effluent	Tower 1	2/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-178232
Tower 1 Effluent	Tower 1	3/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-179958
Tower 1 Effluent	Tower 1	4/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-181718
Tower 1 Effluent	Tower 1	5/2/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-183335
Tower 1 Effluent	Tower 1	6/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-184896
Tower 1 Effluent	Tower 1	10/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-191354
Tower 1 Effluent	Tower 1	11/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192955
Tower 1 Effluent	Tower 1	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-194340
Tower 2 Effluent	Tower 2	7/6/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-186648
Tower 2 Effluent	Tower 2	8/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-188082
Tower 2 Effluent	Tower 2	9/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-189802
Tower 2 Effluent	Tower 2	10/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-191354
Tower 2 Effluent	Tower 2	11/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192955
Tower 2 Effluent	Tower 2	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-194340
Tower 3 Effluent	Tower 3	1/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-176558
Tower 3 Effluent	Tower 3	2/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-178232
Tower 3 Effluent	Tower 3	3/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-179958
Tower 3 Effluent	Tower 3	4/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-181718
Tower 3 Effluent	Tower 3	5/2/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-183335
Tower 3 Effluent	Tower 3	6/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-184896
Tower 3 Effluent	Tower 3	7/6/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-186648
Tower 3 Effluent	Tower 3	8/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-188082
Tower 3 Effluent	Tower 3	9/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-189802
NGTF									
NGTF Influent (B)	NGTF - INF	3/14/2022	Original	<0.50	0.58	1.9	4.7	43	550-180732
Outfall 001 (Effluent)	NGTF-CP	1/3/2022	Original	<0.50	<0.50	1.0	<0.50	<0.50	550-176575
Outfall 001 (Effluent)	NGTF-CP	1/10/2022	Original	<0.50	<0.50	0.66	<0.50	<0.50	550-176930
Outfall 001 (Effluent)	NGTF-CP	1/18/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50 (2)	550-177472
Outfall 001 (Effluent)	NGTF-CP	1/24/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-177803
Outfall 001 (Effluent)	NGTF-CP	1/31/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-178146
Outfall 001 (Effluent)	NGTF-CP	2/7/2022	Original	<0.50	<0.50	0.59	<0.50	<0.50	550-178598
Outfall 001 (Effluent)	NGTF-CP	2/14/2022	Original	<0.50	<0.50	0.76	<0.50	<0.50	550-178991

Table C-3. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
				200	6	6	5	5	
Outfall 001 (Effluent)	NGTF-CP	2/22/2022	Original	<0.50	<0.50	1.0	<0.50	<0.50	550-179549
Outfall 001 (Effluent)	NGTF-CP	2/28/2022	Original	<0.50	<0.50	0.63	<0.50	<0.50	550-179856
Outfall 001 (Effluent)	NGTF-CP	3/7/2022	Original	<0.50	<0.50	0.77	<0.50	<0.50	550-180298
Outfall 001 (Effluent)	NGTF-CP	3/14/2022	Original	<0.50	<0.50	0.85	<0.50	<0.50	550-180732
Outfall 001 (Effluent)	NGTF-CP	3/21/2022	Original	<0.50	<0.50	0.90	<0.50	<0.50	550-181131
Outfall 001 (Effluent)	NGTF-CP	3/28/2022	Original	<0.50	<0.50	0.62	<0.50	<0.50	550-181442
Outfall 001 (Effluent)	NGTF-CP	4/4/2022	Original	<0.50	<0.50	0.90	<0.50	<0.50	550-181767
Outfall 001 (Effluent)	NGTF-CP	4/11/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-182207
Outfall 001 (Effluent)	NGTF-CP	4/18/2022	Original	<0.50	<0.50	0.67	<0.50	<0.50	550-182590
Outfall 001 (Effluent)	NGTF-CP	4/25/2022	Original	<0.50	<0.50	0.83	<0.50	<0.50	550-182997
Outfall 001 (Effluent)	NGTF-CP	5/2/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-183359
Outfall 001 (Effluent)	NGTF-CP	5/9/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-183813
Outfall 001 (Effluent)	NGTF-CP	5/16/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-184195
Outfall 001 (Effluent)	NGTF-CP	5/23/2022	Original	<0.50	<0.50	0.56	<0.50	<0.50	550-184502
Outfall 001 (Effluent)	NGTF-CP	5/31/2022	Original	<0.50	<0.50	1.1	<0.50	<0.50	550-184815
Outfall 001 (Effluent)	NGTF-CP	6/6/2022	Original	<0.50	<0.50	1.7	<0.50	<0.50	550-185106
Outfall 001 (Effluent)	NGTF-CP	6/13/2022	Original	<0.50	<0.50	1.1	<0.50	<0.50	550-185544
Outfall 001 (Effluent)	NGTF-CP	6/21/2022	Original	<0.50	<0.50	1.3	<0.50	<0.50	550-186006
Outfall 001 (Effluent)	NGTF-CP	6/27/2022	Original	<0.50 [2)]	<0.50 [(2)]	0.74	<0.50	<0.50	550-186251
Outfall 001 (Effluent)	NGTF-CP	7/5/2022	Original	<0.50 [2)]	<0.50 [(2)]	0.94	<0.50	<0.50	550-186553
Outfall 001 (Effluent)	NGTF-CP	7/11/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-186898
Outfall 001 (Effluent)	NGTF-CP	7/18/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-187286
Outfall 001 (Effluent)	NGTF-CP	7/25/2022	Original	<0.50	<0.50 [2)]	0.86	<0.50	<0.50	550-187893
Outfall 001 (Effluent)	NGTF-CP	8/1/2022	Original	<0.50	<0.50	1.1	<0.50	<0.50	550-188095
Outfall 001 (Effluent)	NGTF-CP	8/8/2022	Original	<0.50	<0.50	0.82	<0.50	<0.50	550-188468
Outfall 001 (Effluent)	NGTF-CP	8/15/2022	Original	<0.50	<0.50	0.81	<0.50	<0.50	550-188852
Outfall 001 (Effluent)	NGTF-CP	8/22/2022	Original	<0.50	<0.50	1.3	<0.50	<0.50	550-189211
Outfall 001 (Effluent)	NGTF-CP	8/29/2022	Original	<0.50	<0.50	0.90	<0.50	<0.50	550-189548
Outfall 001 (Effluent)	NGTF-CP	9/6/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-189920
Outfall 001 (Effluent)	NGTF-CP	9/12/2022	Original	<0.50	<0.50	0.53	<0.50	<0.50	550-190271
Outfall 001 (Effluent)	NGTF-CP	9/19/2022	Original	<0.50	<0.50	0.83	<0.50	<0.50	550-190719
Outfall 001 (Effluent)	NGTF-CP	9/26/2022	Original	<0.50	<0.50	1.2	<0.50	<0.50	550-191029
Outfall 001 (Effluent)	NGTF-CP	10/3/2022	Original	<0.50	<0.50	0.64	<0.50	<0.50	550-191360
Outfall 001 (Effluent)	NGTF-CP	10/10/2022	Original	<0.50	<0.50	0.74	<0.50	<0.50	550-191816
Outfall 001 (Effluent)	NGTF-CP	10/17/2022	Original	<0.50	<0.50	0.78	<0.50	<0.50	550-192162
Outfall 001 (Effluent)	NGTF-CP	10/24/2022	Original	<0.50	<0.50	1.0	<0.50	<0.50	550-192543

Table C-3. 2022 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	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
Outfall 001 (Effluent)	NGTF-CP	10/31/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192898
Outfall 001 (Effluent)	NGTF-CP	11/7/2022	Original	<0.50	<0.50	1.2	<0.50	<0.50	550-193260
Outfall 001 (Effluent)	NGTF-CP	11/14/2022	Original	<0.50	<0.50	1.7	<0.50	<0.50	550-193635
Outfall 001 (Effluent)	NGTF-CP	11/21/2022	Original	<0.50	<0.50	1.1	<0.50	<0.50	550-193988
Outfall 001 (Effluent)	NGTF-CP	11/28/2022	Original	<0.50	<0.50	0.63	<0.50	<0.50	550-194141
Outfall 001 (Effluent)	NGTF-CP	12/5/2022	Original	<0.50	<0.50	0.81	<0.50	<0.50	550-194439
Outfall 001 (Effluent)	NGTF-CP	12/12/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-194834
Outfall 001 (Effluent)	NGTF-CP	12/19/2022	Original	<0.50	<0.50	0.73	<0.50	<0.50	550-195177
Outfall 001 (Effluent)	NGTF-CP	12/27/2022	Original	<0.50	<0.50	0.80	<0.50	<0.50	550-195386
Trip/Field Blanks									
QC - Area 12	FB-1-1A-02142022	2/14/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179000
QC - Area 12	TB-1-1A-02142022	2/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179000
QC - Area 12	FB-1-1A-03012022	3/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179961
QC - Area 12	TB-1-1A-03012022	3/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179961
QC - Area 12	FB-1-1A-04012022	4/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-181724
QC - Area 12	TB-1-1A-04012022	4/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-181724
QC - Area 12	FB-1-1A-05022022	5/2/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183324
QC - Area 12	TB-1-1A-05022022	5/2/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183324
QC - Area 12	FB-1-1A-06012022	6/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-184906
QC - Area 12	TB-1-1A-06012022	6/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-184906
QC - Area 12	FB-1-1A-07062022	7/6/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186643
QC - Area 12	TB-1-1A-07062022	7/6/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186643
QC - Area 12	FB-1-1A-08012022	8/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-188081
QC - Area 12	TB-1-1A-08012022	8/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-188081
QC - Area 12	FB-1-1A-09012022	9/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189800
QC - Area 12	TB-1-1A-09012022	9/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189800
QC - Area 12	FB-1-1A-10032022	10/3/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191344
QC - Area 12	TB-1-1A-10032022	10/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191344
QC - Area 12	FB-1-1A-11012022	11/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192950
QC - Area 12	TB-1-1A-11012022	11/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192950
QC - Area 12	FB-1-1A- 12012022	12/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194335
QC - Area 12	TB-1-1A- 12012022	12/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194335
QC - NGTF	TB	1/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-176575
QC - NGTF	TB	1/10/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-176930
QC - NGTF	TB	1/18/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50 [(2)]	550-177472
QC - NGTF	TB	1/24/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-177803

Table C-3. 2022 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	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
QC - NGTF	TB	1/31/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-178146
QC - NGTF	TB	2/7/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-178598
QC - NGTF	TB	2/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-178991
QC - NGTF	TB	2/22/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179549
QC - NGTF	TB	2/28/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179856
QC - NGTF	TB	3/7/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-180298
QC - NGTF	TB	3/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-180732
QC - NGTF	TB	3/21/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-181131
QC - NGTF	TB	3/28/2022	TB	<0.50	<0.50 (3),(4)	<0.50	<0.50	<0.50	550-181442
QC - NGTF	TB	4/4/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-181767
QC - NGTF	TB	4/11/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-182207
QC - NGTF	TB	4/18/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-182590
QC - NGTF	TB	4/25/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-182997
QC - NGTF	TB	5/2/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183359
QC - NGTF	TB	5/9/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183813
QC - NGTF	TB	5/16/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-184195
QC - NGTF	TB	5/23/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-184502
QC - NGTF	TB	5/31/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-184815
QC - NGTF	TB	6/6/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-185106
QC - NGTF	TB	6/13/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-185544
QC - NGTF	TB	6/21/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186006
QC - NGTF	TB	6/27/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186251
QC - NGTF	TB	7/5/2022	TB	<0.50	<0.50	<0.50	<0.50 (2),(5)	<0.50	550-186553
QC - NGTF	TB	7/11/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186898
QC - NGTF	TB	7/18/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-187286
QC - NGTF	TB	7/25/2022	TB	<0.50	<0.50 (2)	<0.50	<0.50	<0.50	550-187893
QC - NGTF	TB	8/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-188095
QC - NGTF	TB	8/8/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-188468
QC - NGTF	TB	8/15/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-188852
QC - NGTF	TB	8/22/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189211
QC - NGTF	TB	8/29/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189548
QC - NGTF	TB	9/6/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189920
QC - NGTF	TB	9/12/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-190271
QC - NGTF	TB	9/19/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-190719
QC - NGTF	TB	9/26/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191029
QC - NGTF	TB	10/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191360

Table C-3. 2022 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	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
QC - NGTF	TB	10/10/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191816
QC - NGTF	TB	10/17/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192162
QC - NGTF	TB	10/24/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192543
QC - NGTF	TB	10/31/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192898
QC - NGTF	TB	11/7/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193260
QC - NGTF	TB	11/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193635
QC - NGTF	TB	11/21/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193988
QC - NGTF	TB	11/28/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194141
QC - NGTF	TB	12/5/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194439
QC - NGTF	TB	12/12/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194834
QC - NGTF	TB	12/19/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195177
QC - NGTF	TB	12/27/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195386
QC-TS (C)	FB-2-1A-01032022	1/3/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-176559
QC-TS (C)	TB-2-1A-01032022	1/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-176559
QC-TS (C)	FB-2-1A-02012022	2/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-178234
QC-TS (C)	TB-2-1A-02012022	2/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-178234
QC-TS (C)	FB-2-1A-03012022	3/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179960
QC-TS (C)	TB-2-1A-03012022	3/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-179960
QC-TS (C)	FB-2-1A-04012022	4/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-181722
QC-TS (C)	TB-2-1A-04012022	4/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-181722
QC-TS (C)	FB-2-1A-05022022	5/2/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183325
QC-TS (C)	TB-2-1A-05022022	5/2/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-183325
QC-TS (C)	FB-2-1A-06012022	6/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-184907
QC-TS (C)	TB-2-1A-06012022	6/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-184907
QC-TS (C)	FB-2-1A-07062022	7/6/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186630
QC-TS (C)	TB-2-1A-07062022	7/6/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-186630
QC-TS (C)	FB-2-1A-08012022	8/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-188084
QC-TS (C)	TB-2-1A-08012022	8/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-188084
QC-TS (C)	FB-2-1A-08262022	8/26/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189476
QC-TS (C)	TB-2-1A-08262022	8/26/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189476
QC-TS (C)	FB-2-1A-09012022	9/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189801
QC-TS (C)	TB-2-1A-09012022	9/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-189801
QC-TS (C)	FB-2-1A-10032022	10/3/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191345
QC-TS (C)	TB-2-1A-10032022	10/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191345
QC-TS (C)	FB-2-1A-10252022	10/25/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192599
QC-TS (C)	TB-2-1A-10252022	10/25/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192599

Table C-3. 2022 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	TCA	DCE	TCM	PCE	TCE	Report
				200	*6*	*6*	*5*	*5*	
QC-TS [(C)]	FB-2-1A-11012022	11/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192951
QC-TS [(C)]	TB-2-1A-11012022	11/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192951
QC-TS [(C)]	FB-2-1A-12012022	12/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194337
QC-TS [(C)]	TB-2-1A-12012022	12/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194337

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
TB = Trip Blank
TS = Treatment System
VOC = Volatile Organic Compound

NOTES:

All samples analyzed by Eurofins Environment Testing Southwest (Eurofins) using EPA method 524.2.

<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) Influent sampling results at the NGTF are not required for compliance; however, they are reported here for completeness.
(C) QC-TS - A single trip blank and a single field blank are collected for Area 7 and MRTF 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: SP-103 (550-184911-1): The vial for the associated low-level Continuing Calibration Verification (CCVL 810-21249/3) broke on the autosampler and no data was obtained for it. This client sample could not be repeated as replicate vials were used as matrix spike/matrix spike duplicate. Trichloroethylene at 10.0 ug/L had a calculated result of 53% for the matrix spike, which failed to pass the Spike Percent Recovery Lower Limit (70 to 130). This may be due to vial-to-vial differences in sample amounts between the client sample and MS as parameter was present in the client sample. Within-range recoveries were obtained for other parameters. (Analytical batch 810-21249)
(2) V1 Flag: Continuing Calibration Verification (CCV) recovery was above method acceptance limits. This target analyte was not detected in the sample.
(3) L4 Flag: The associated blank spike recovery was below method acceptance limits.
(4) V9 Flag: Continuing Calibration Verification (CCV) recovery was below method acceptance limits.
(5) L5 Flag: The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.

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

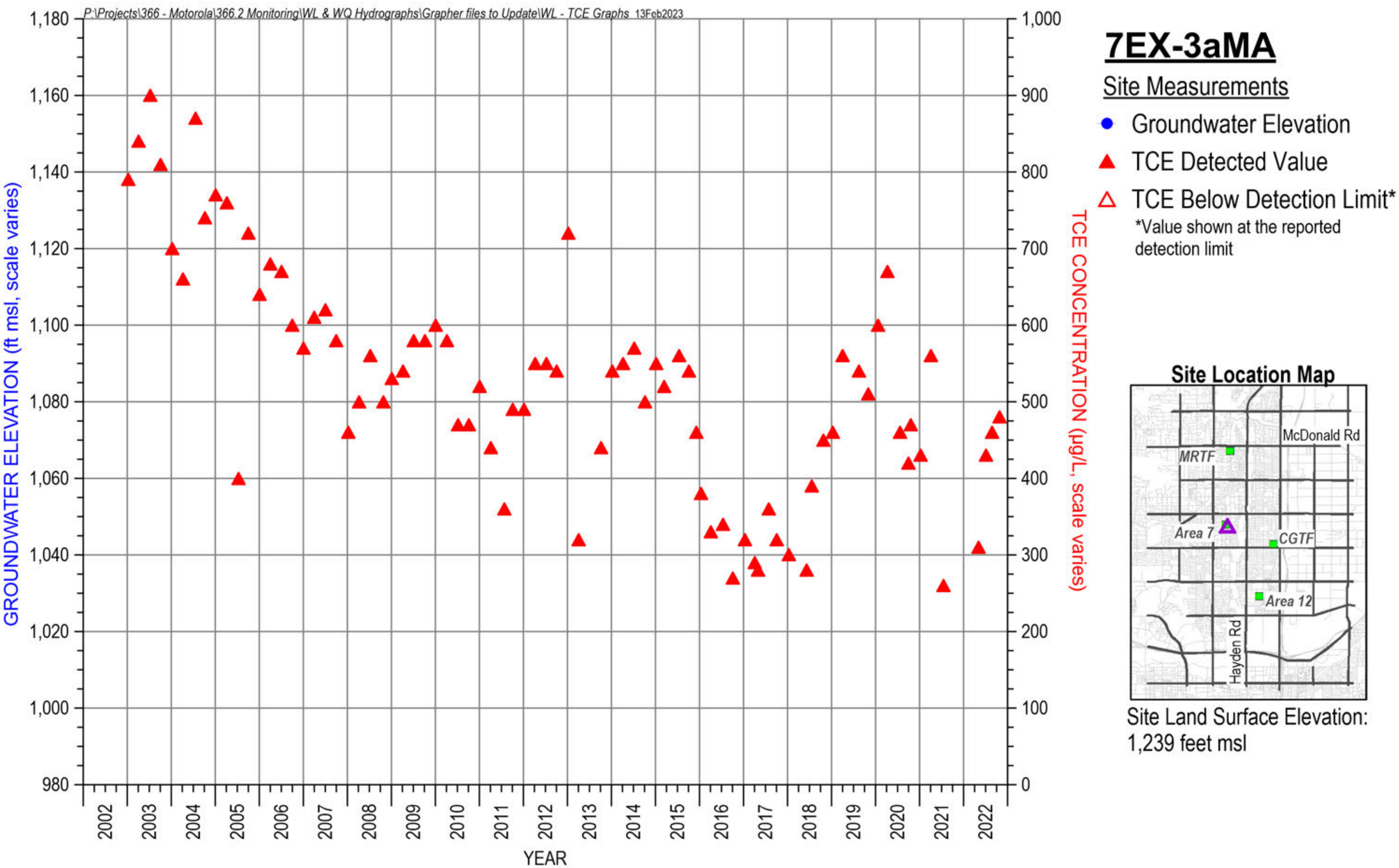
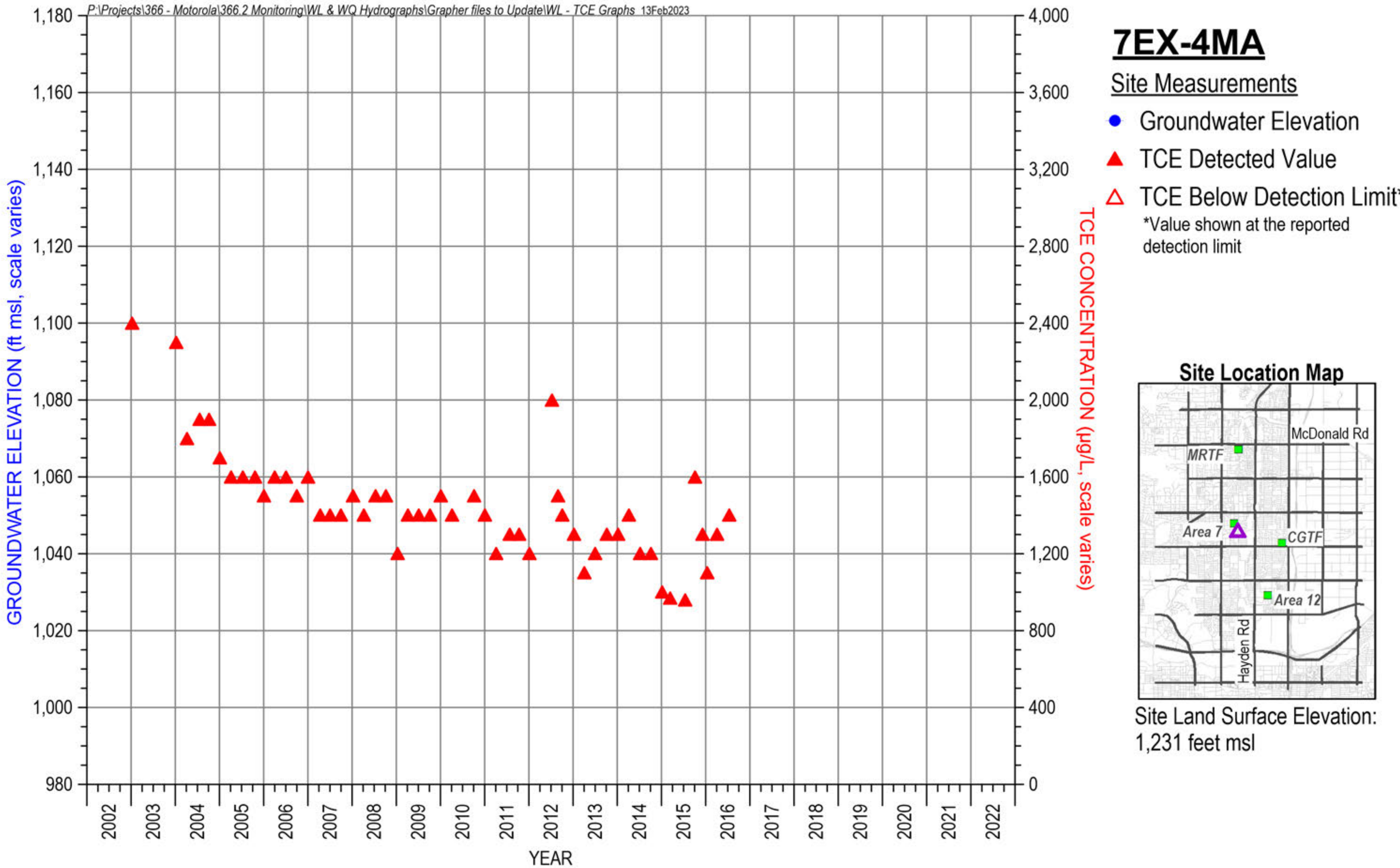


FIGURE D-001. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-3aMA

North Indian Bend Wash Superfund Site



North Indian Bend Wash Superfund Site

FIGURE D-002. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-4MA

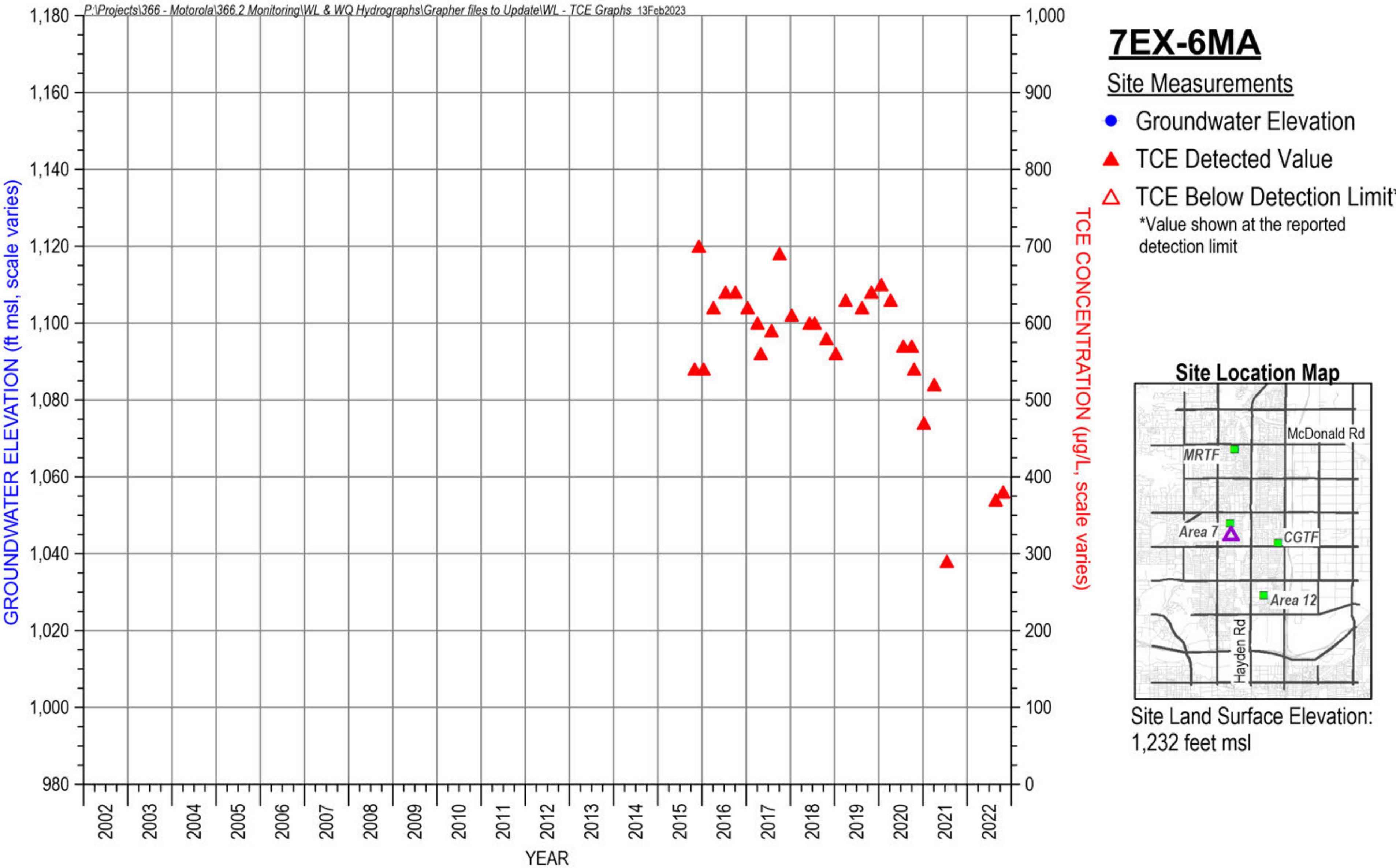
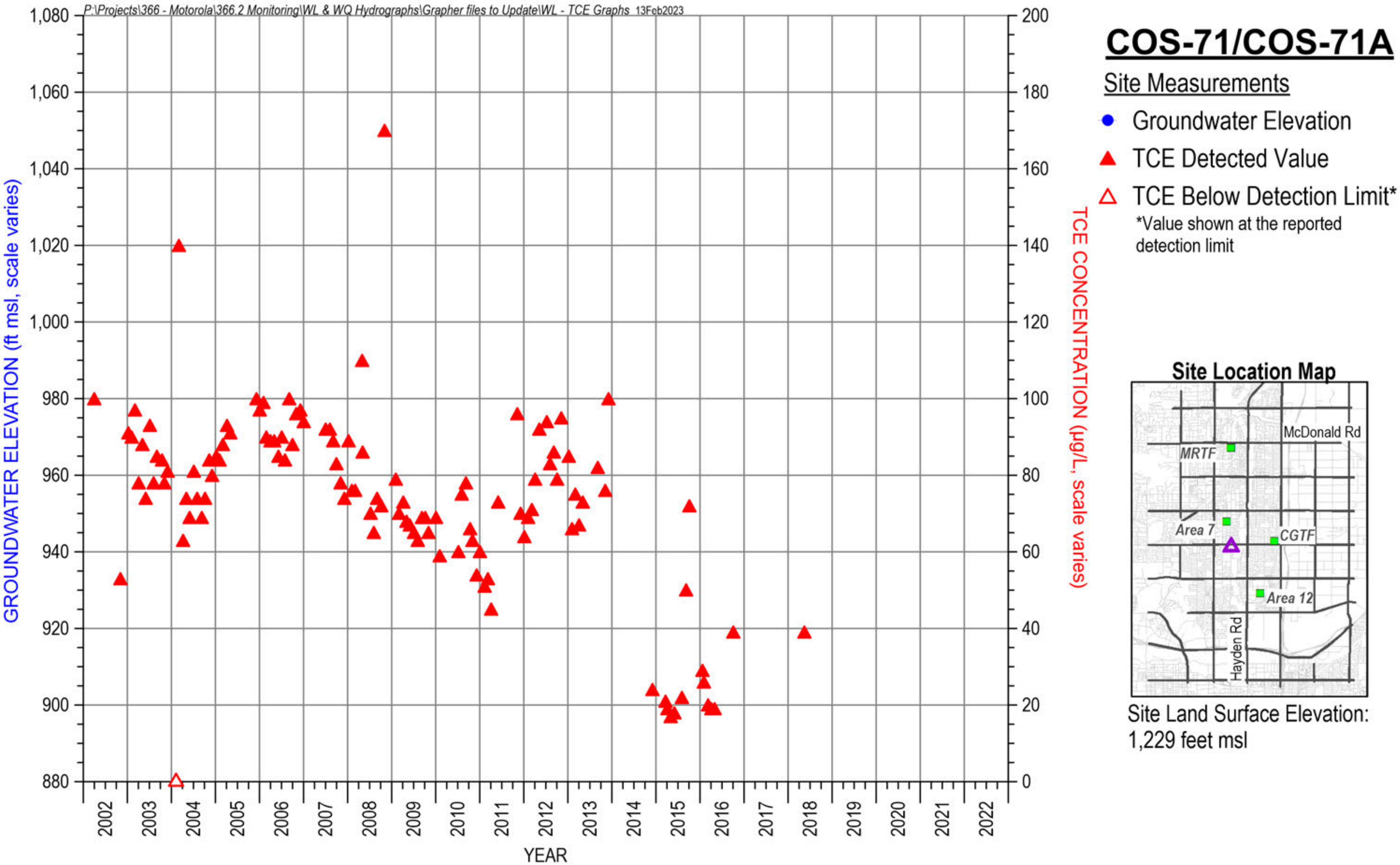


FIGURE D-003. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL 7EX-6MA

North Indian Bend Wash Superfund Site



Note: Well COS-71 was abandoned 04/10/2014 and was replaced by Well COS-71A.

FIGURE D-004. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL COS-71/COS-71A

North Indian Bend Wash Superfund Site

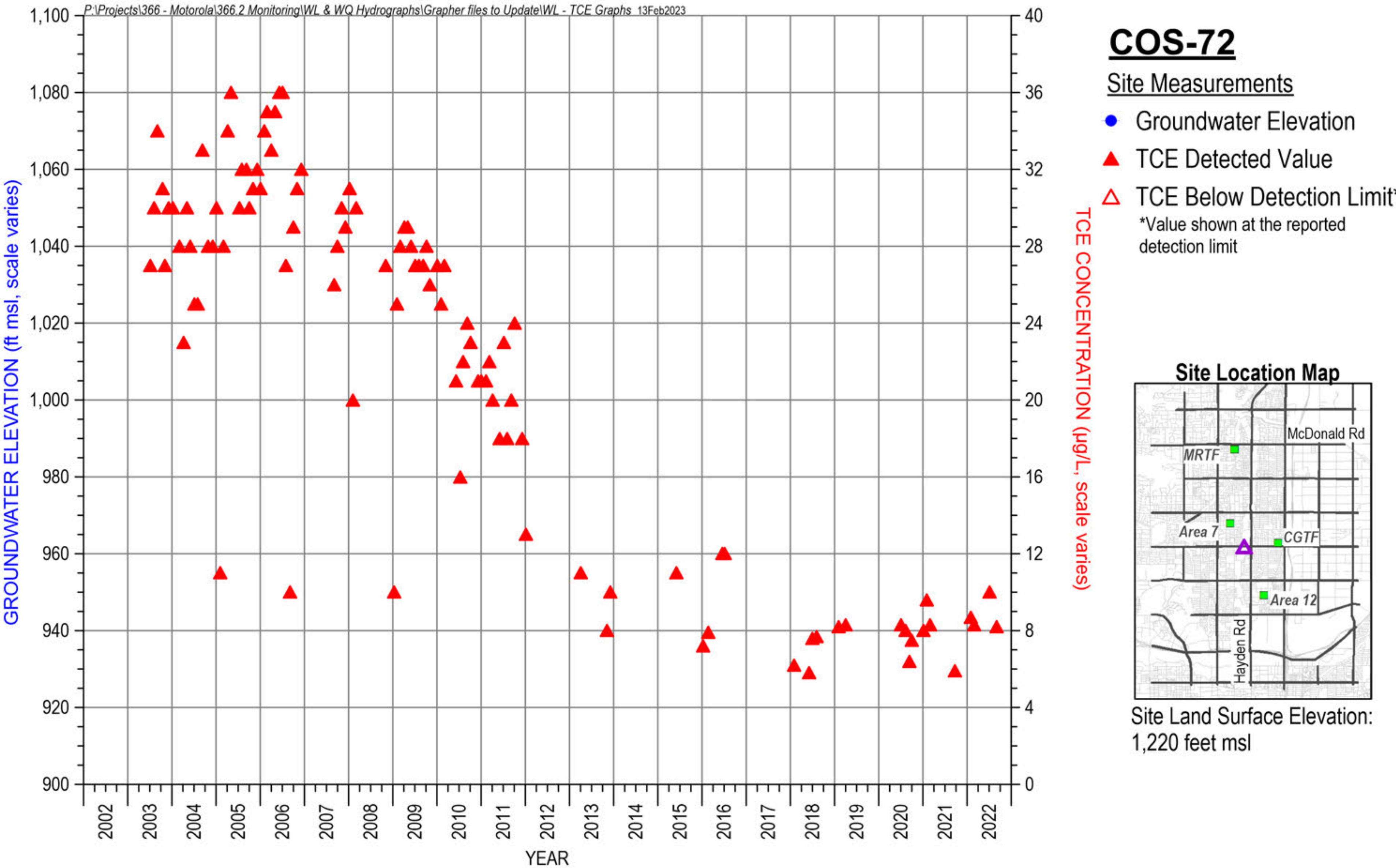
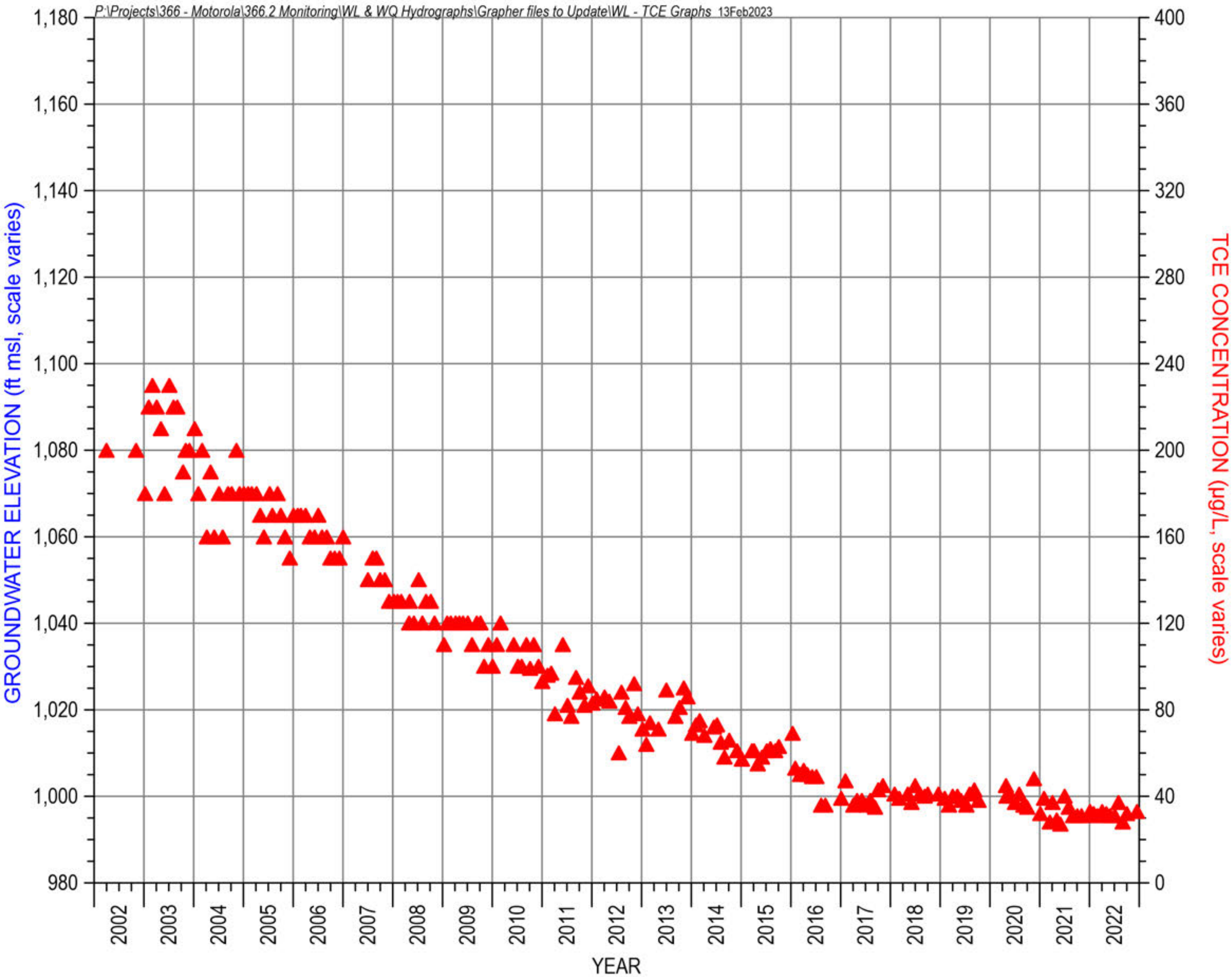


FIGURE D-005. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL COS-72

North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,237 feet msl

FIGURE D-006. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL COS-75A

North Indian Bend Wash Superfund Site

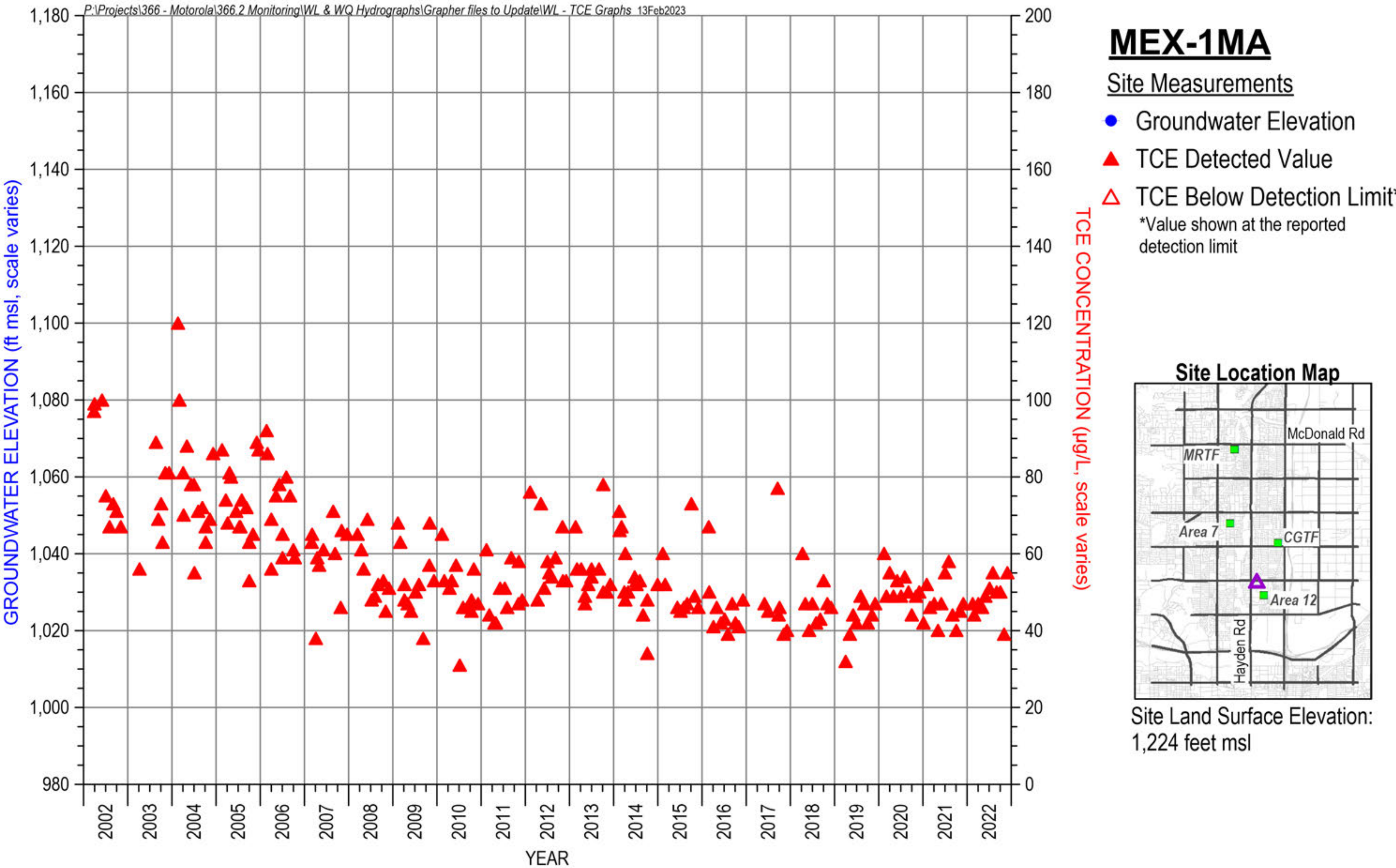
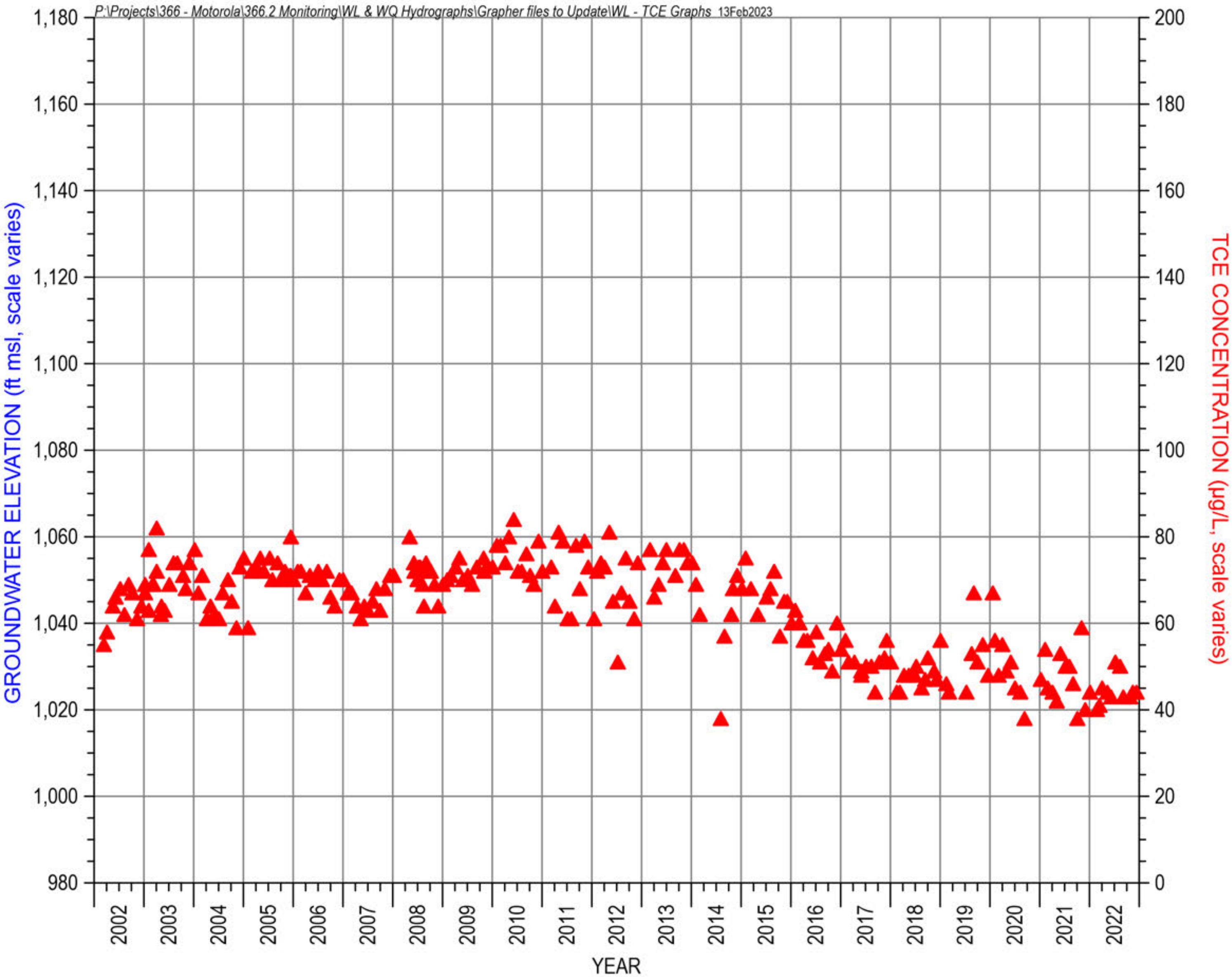


FIGURE D-007. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL MEX-1MA

North Indian Bend Wash Superfund Site



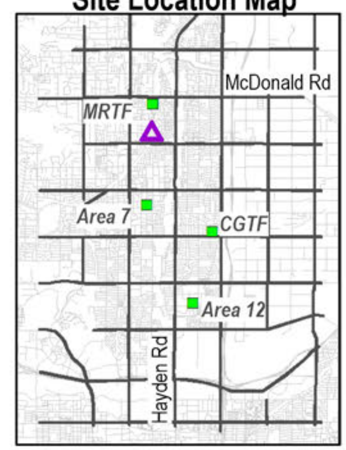
PCX-1

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation:
1,279 feet msl

FIGURE D-008. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL PCX-1

North Indian Bend Wash Superfund Site

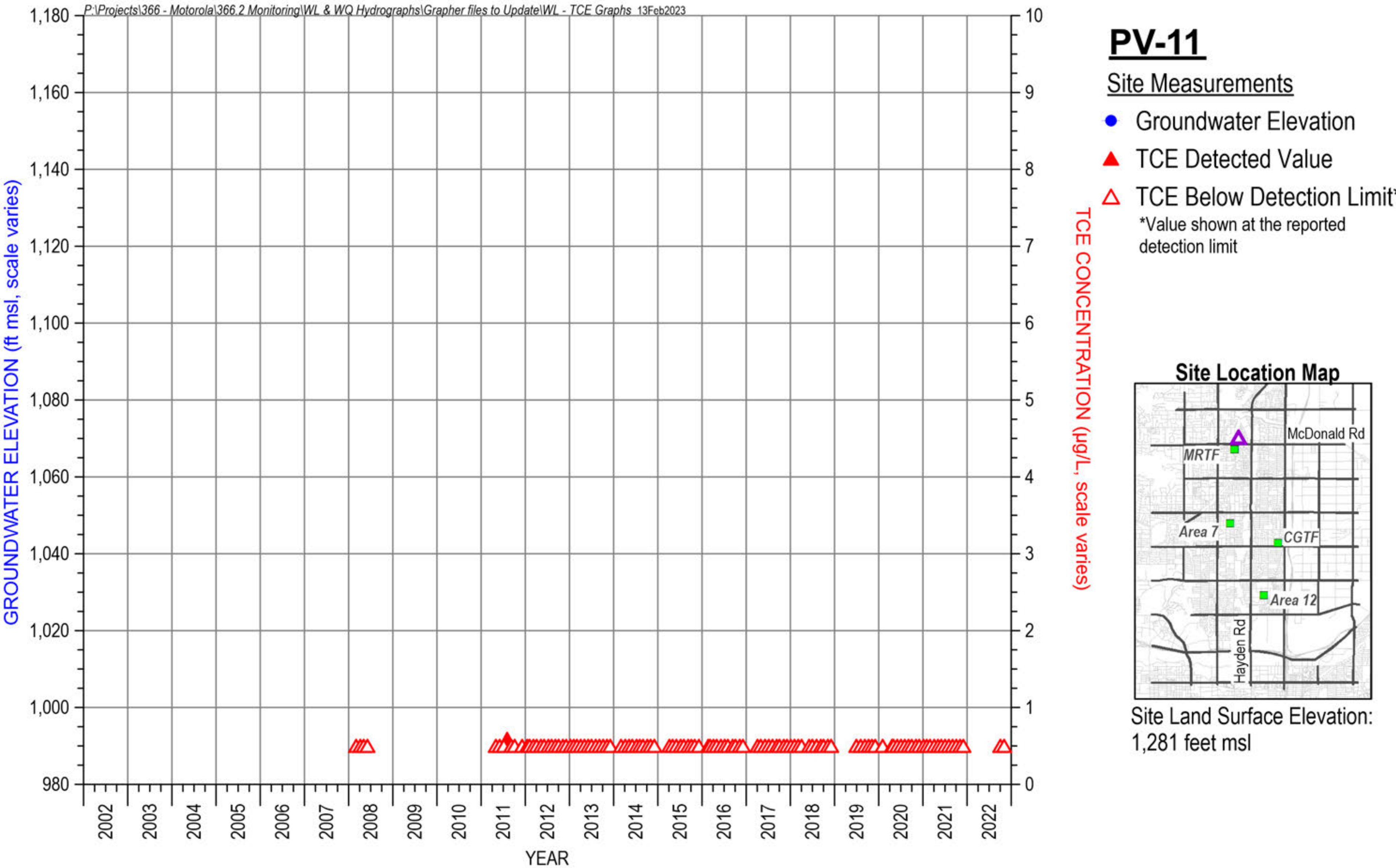


FIGURE D-009. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR PRODUCTION WELL PV-11

North Indian Bend Wash Superfund Site

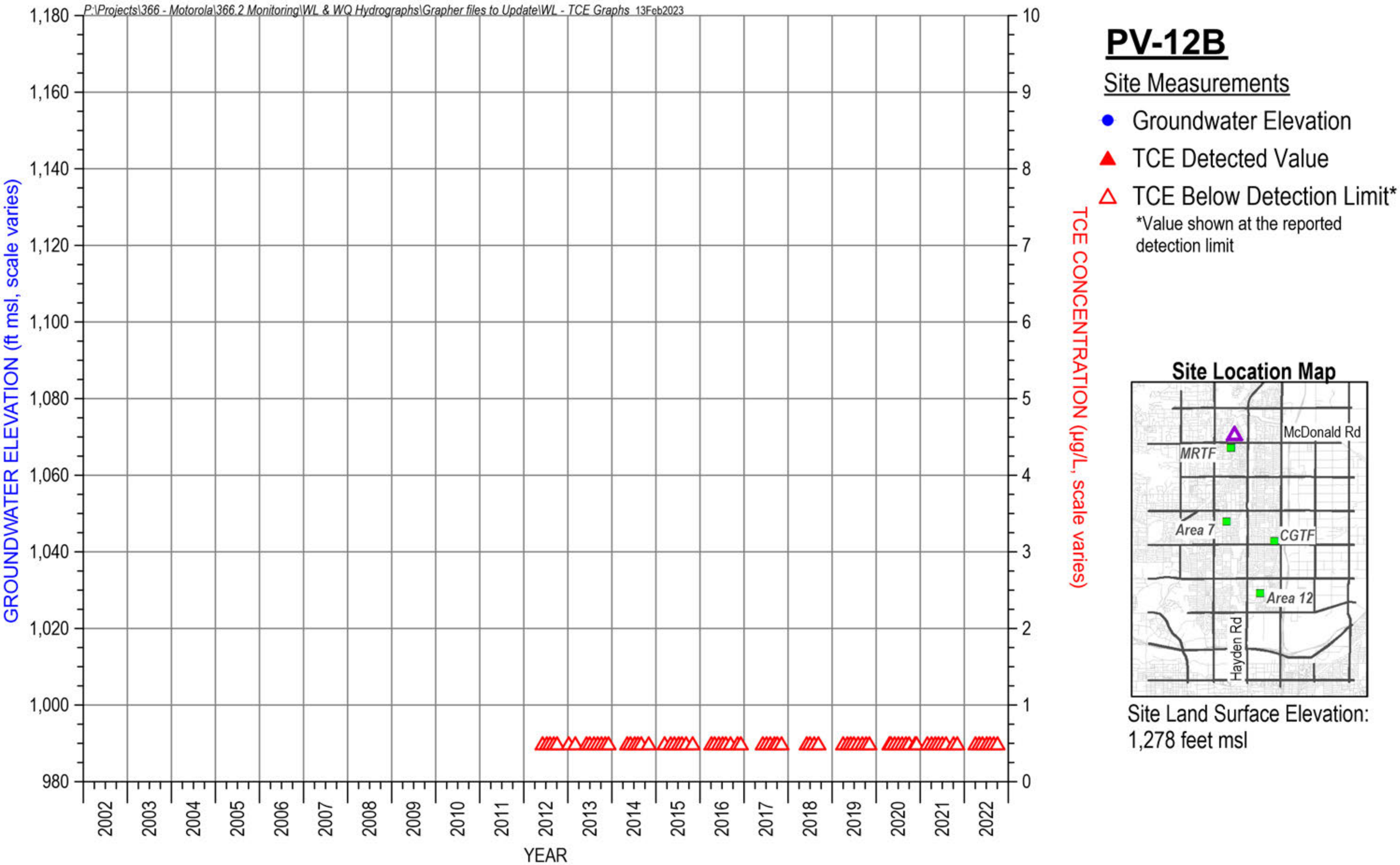
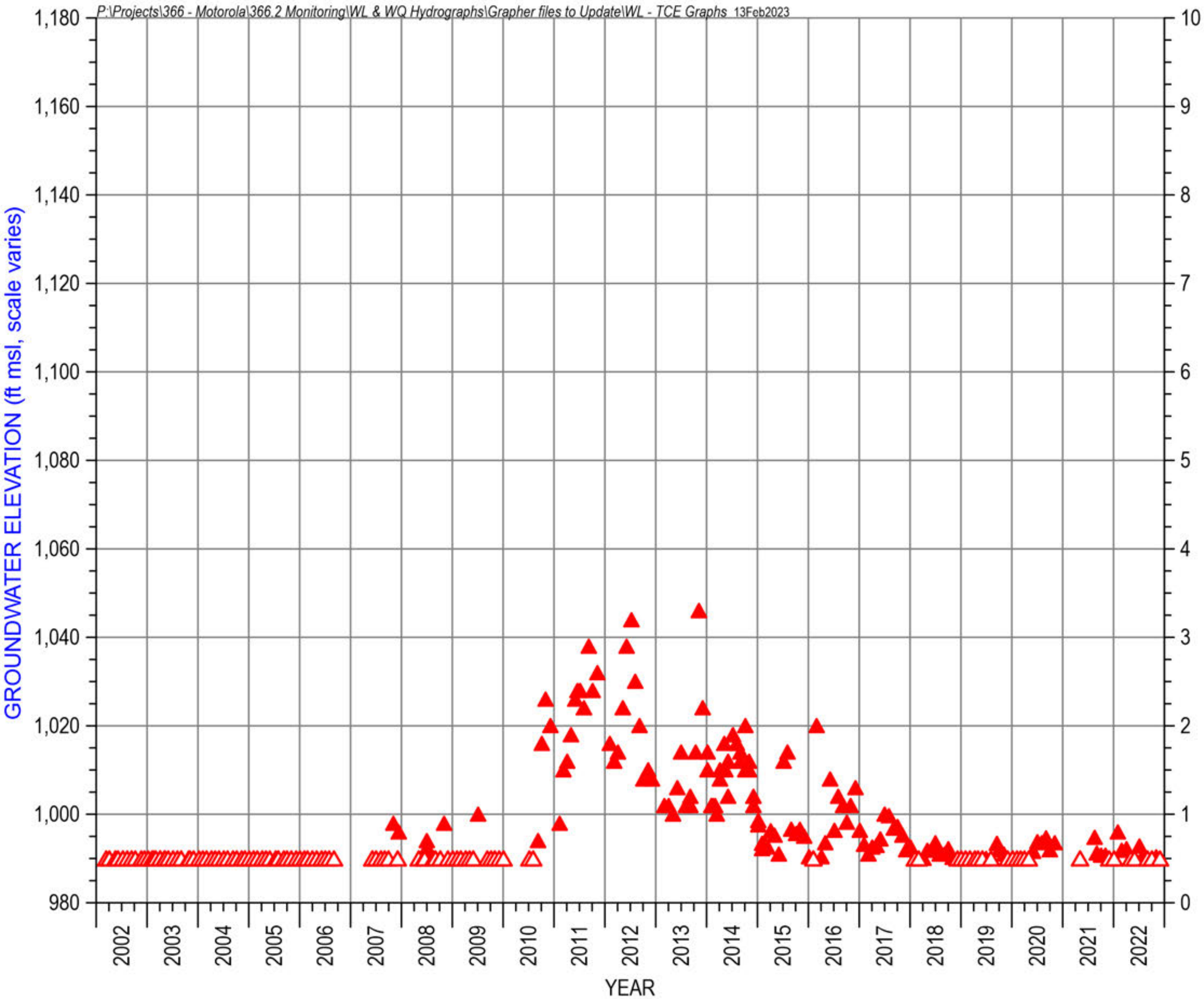


FIGURE D-010. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR PRODUCTION WELL PV-12B

North Indian Bend Wash Superfund Site

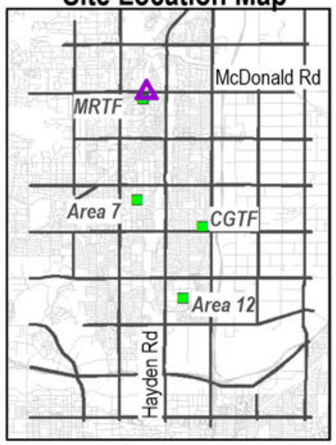


PV-14

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

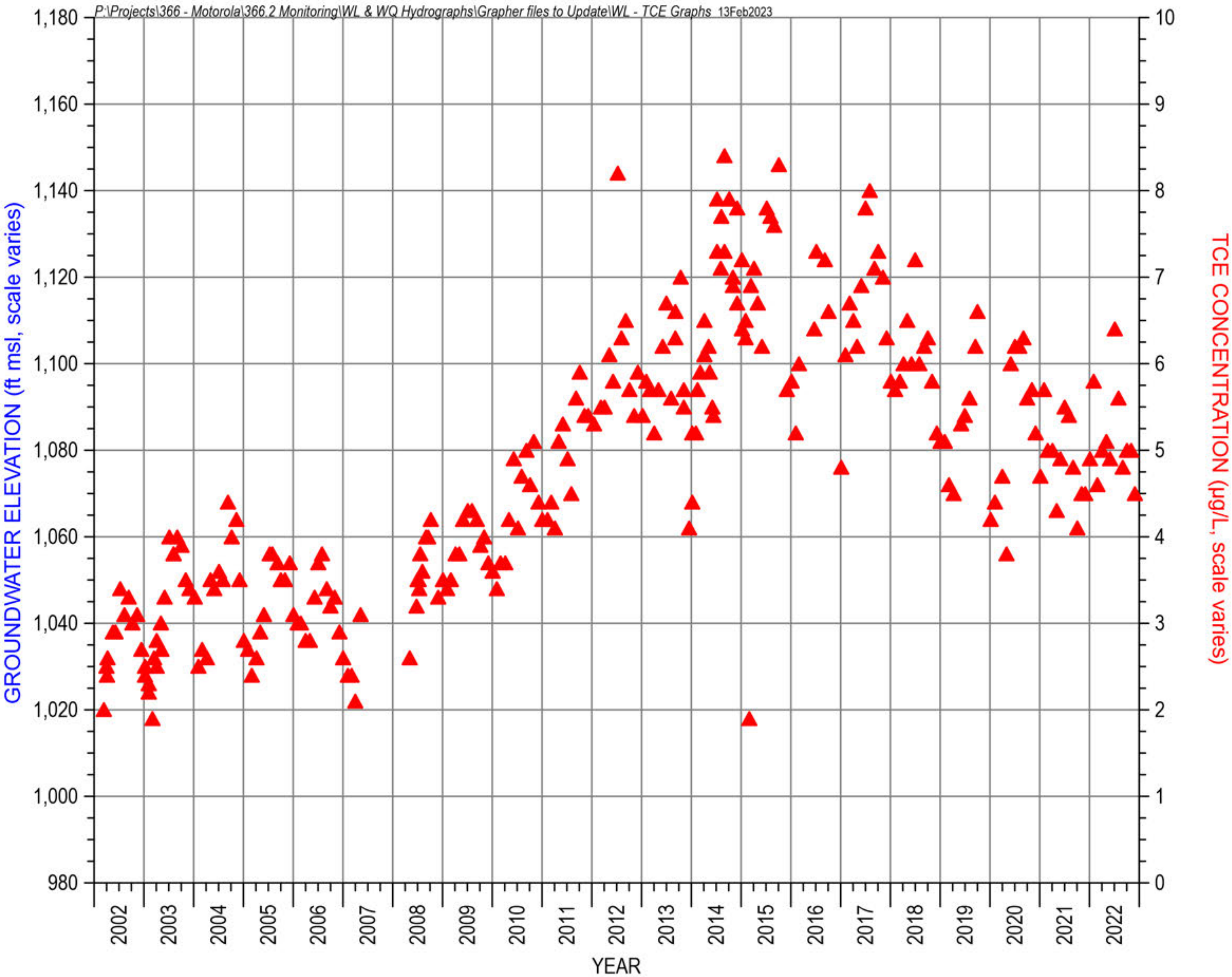
*Value shown at the reported detection limit



Site Land Surface Elevation:
1,280 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-011. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR PRODUCTION WELL PV-14



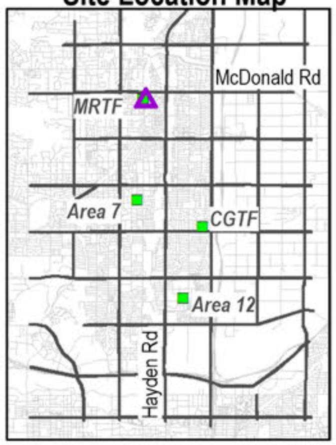
PV-15

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation: 1,282 feet msl

FIGURE D-012. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR PRODUCTION WELL PV-15

North Indian Bend Wash Superfund Site

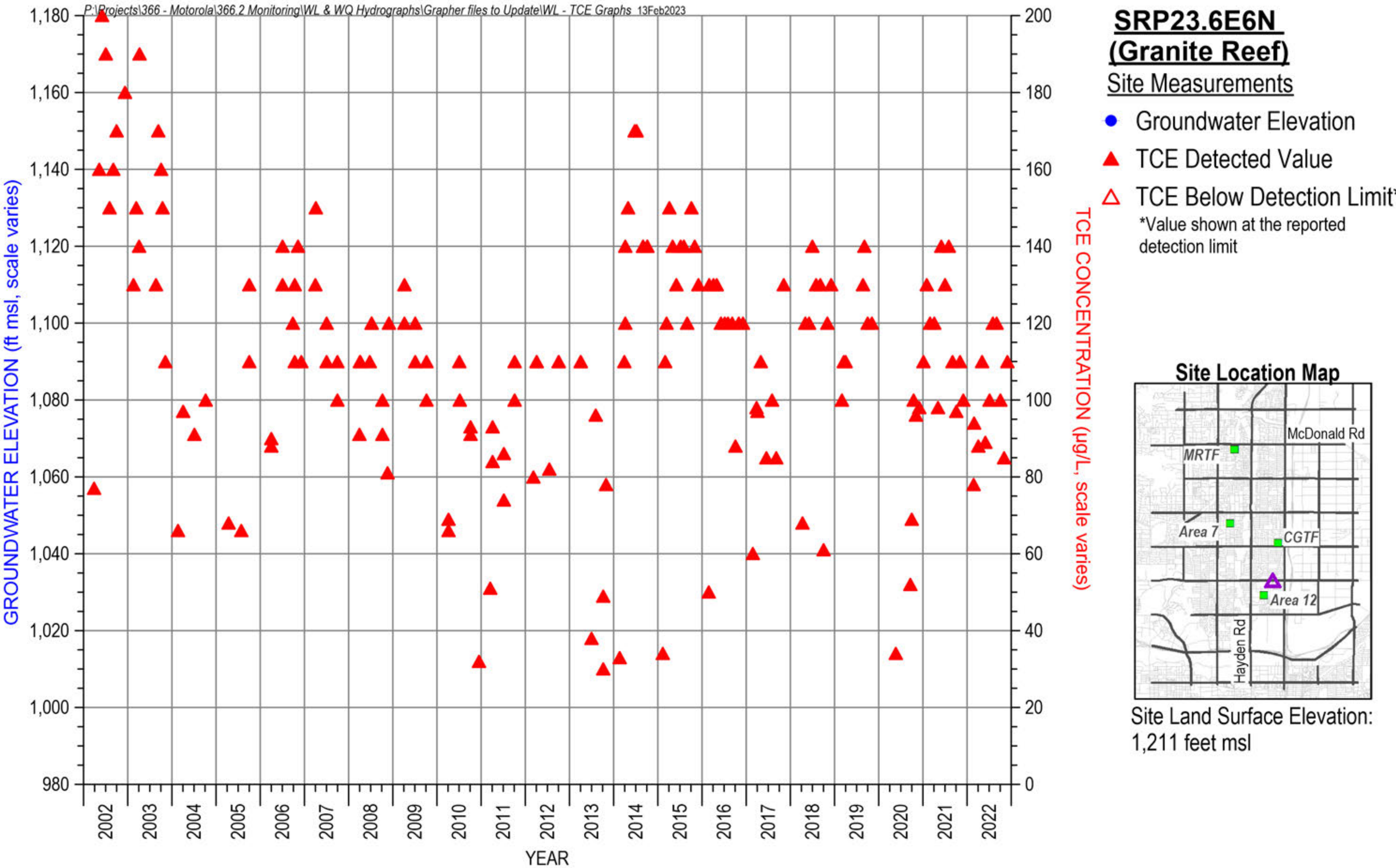
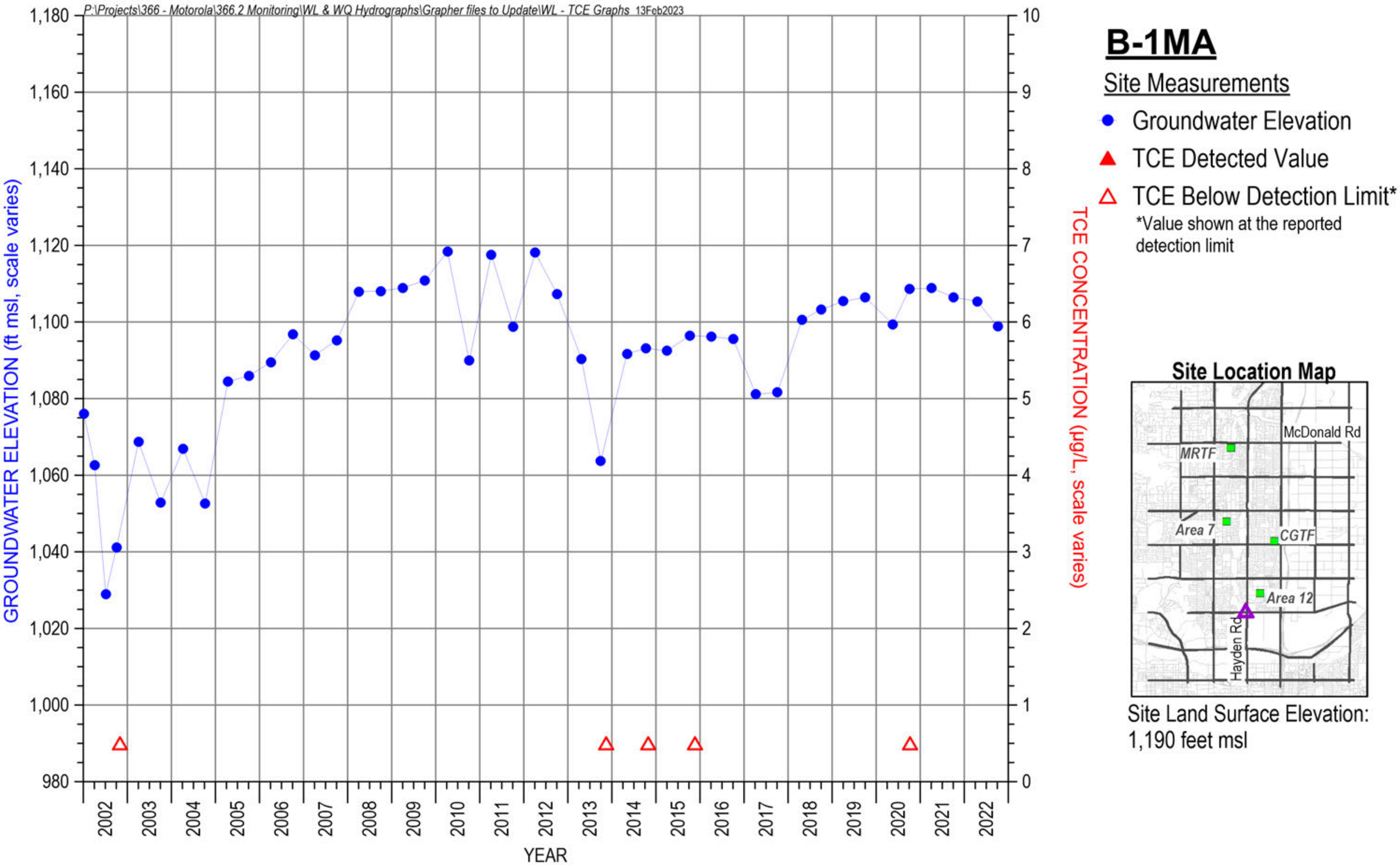


FIGURE D-013. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL SRP23.6E6N (Granite Reef)

North Indian Bend Wash Superfund Site



Note: TCE data collected after the GM&EP in 2002 is supplemental

FIGURE D-014. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL B-1MA

North Indian Bend Wash Superfund Site

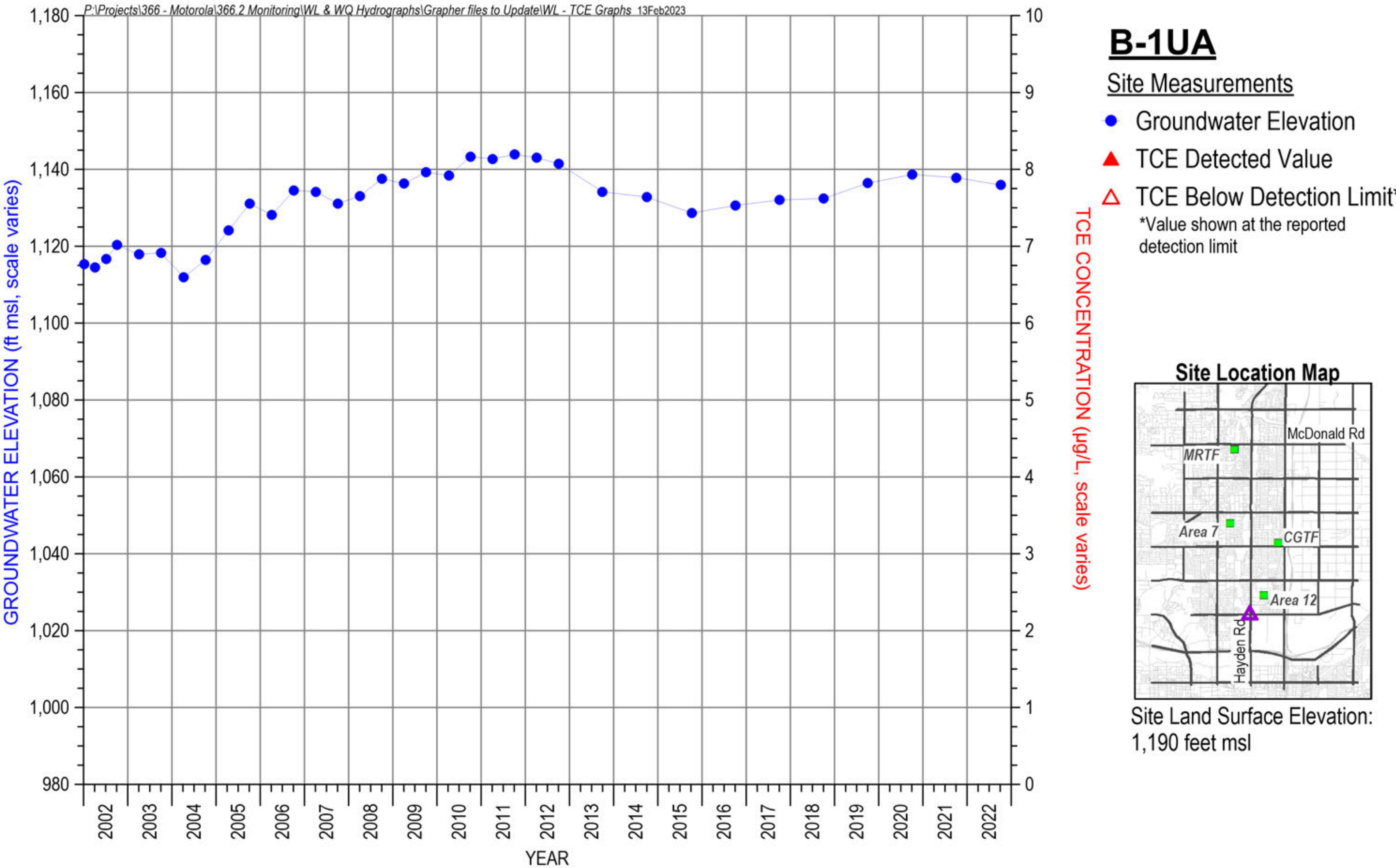
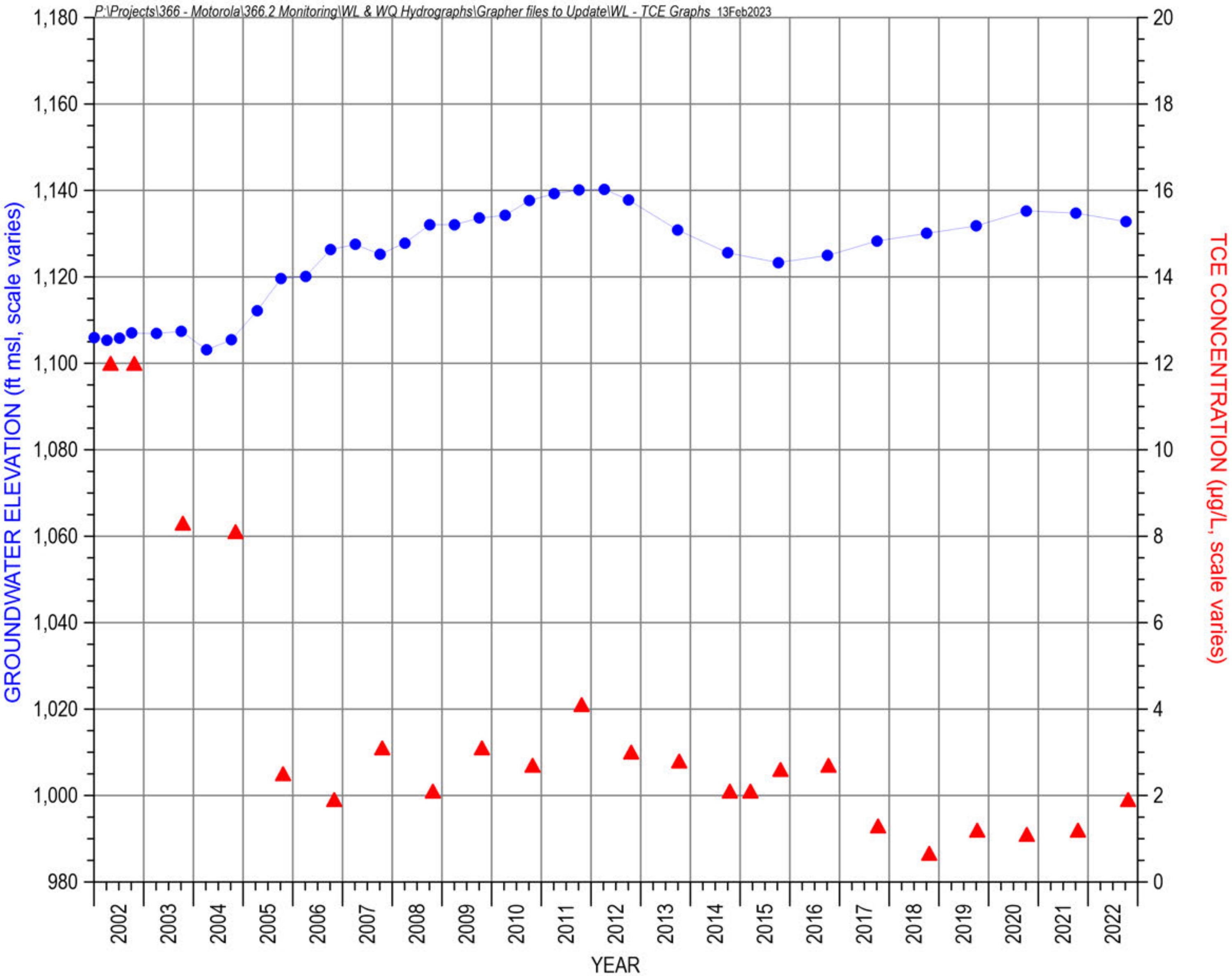
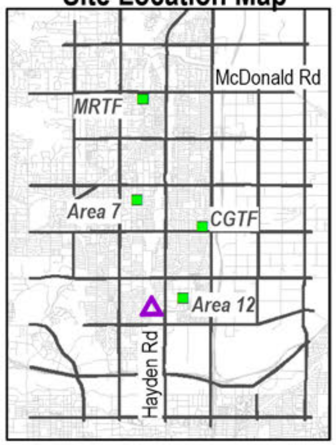


FIGURE D-015. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL B-1UA

North Indian Bend Wash Superfund Site



Site Location Map



Site Land Surface Elevation:
1,192 feet msl

FIGURE D-016. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL B-J

North Indian Bend Wash Superfund Site

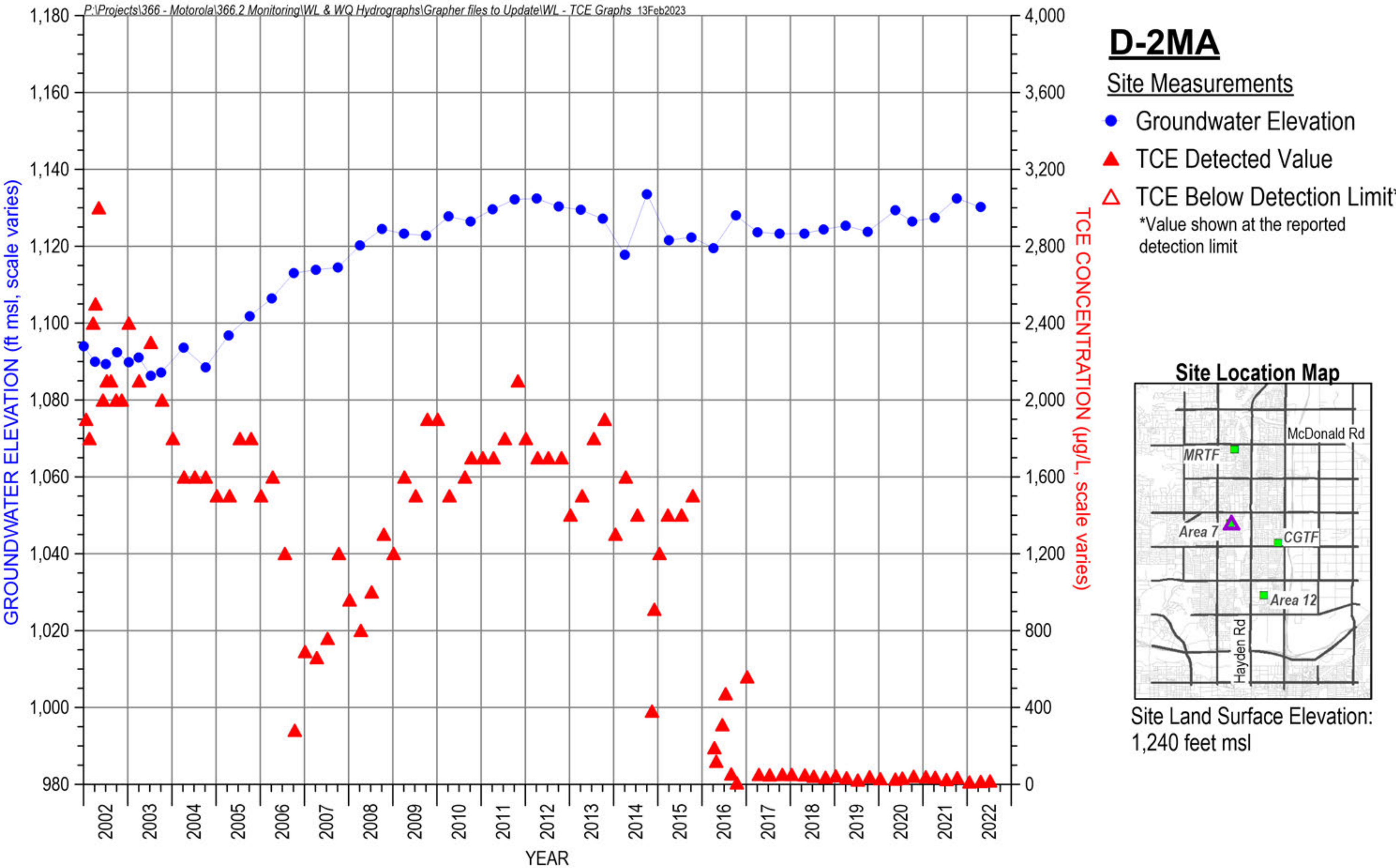
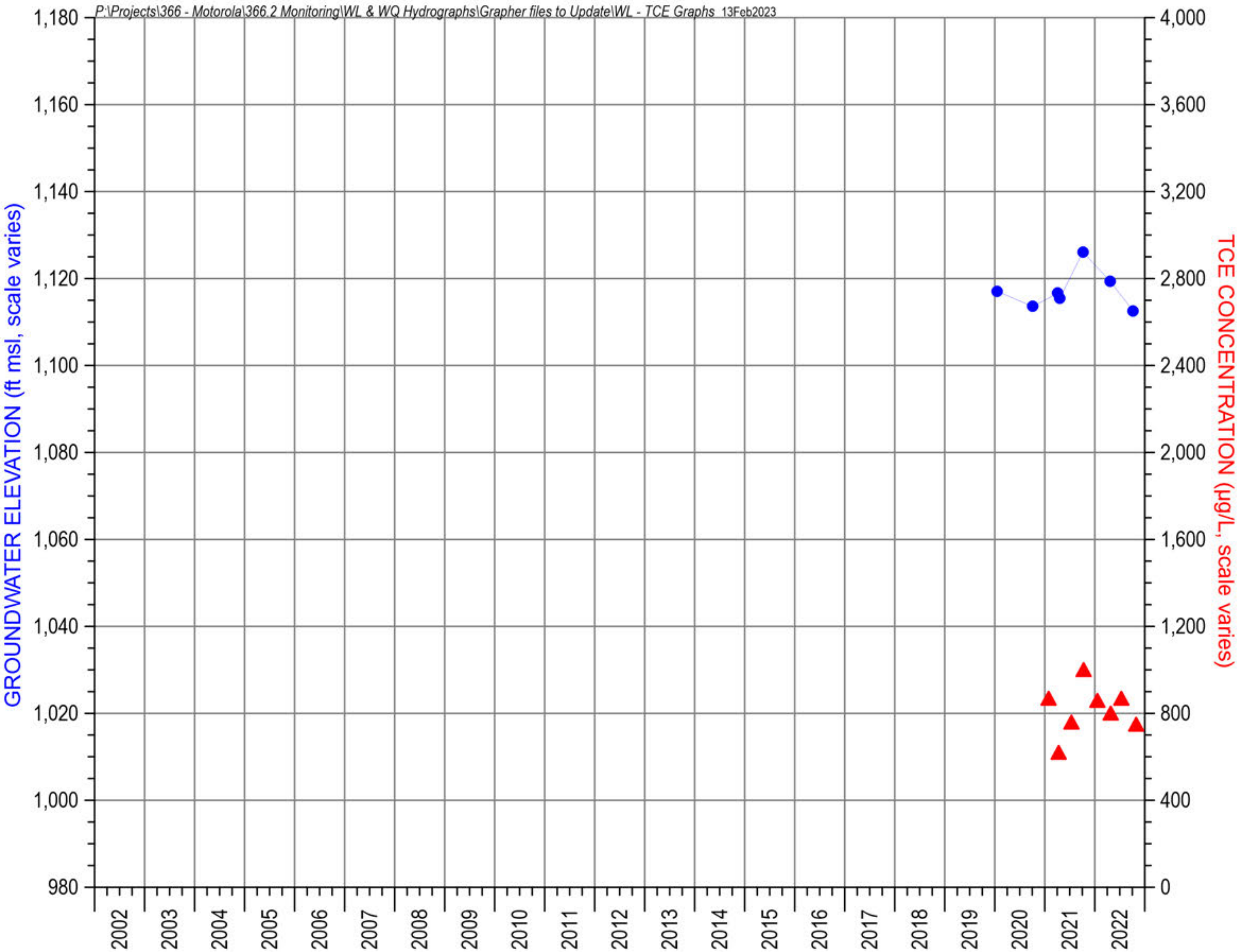


FIGURE D-017. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL D-2MA

North Indian Bend Wash Superfund Site



Note: TCE and water level data collected prior to July 2022 is supplemental

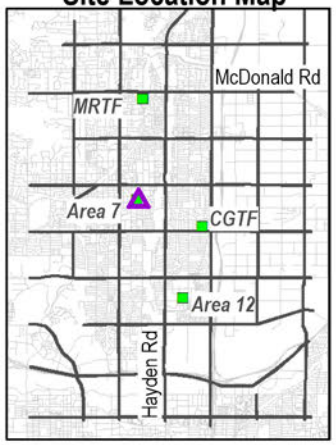
D-4MA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

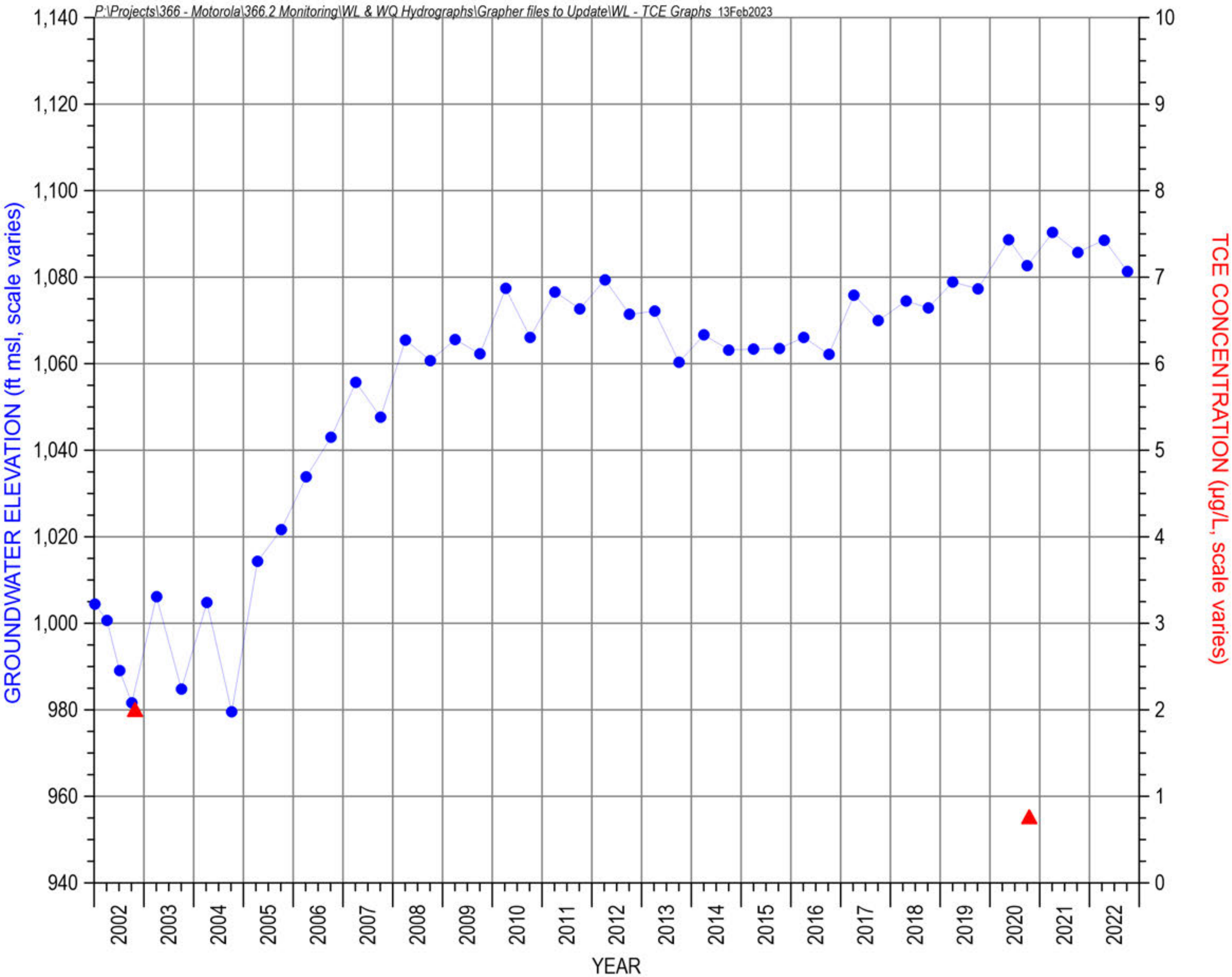
Site Location Map



Site Land Surface Elevation:
1,240 feet msl

FIGURE D-018. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL D-4MA

North Indian Bend Wash Superfund Site



Note: TCE data collected after the GM&EP in 2002 is supplemental

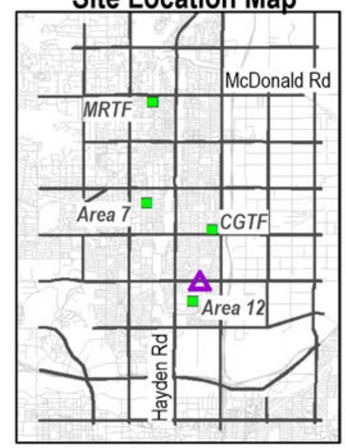
E-1LA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation: 1,215 feet msl

FIGURE D-019. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-1LA

North Indian Bend Wash Superfund Site

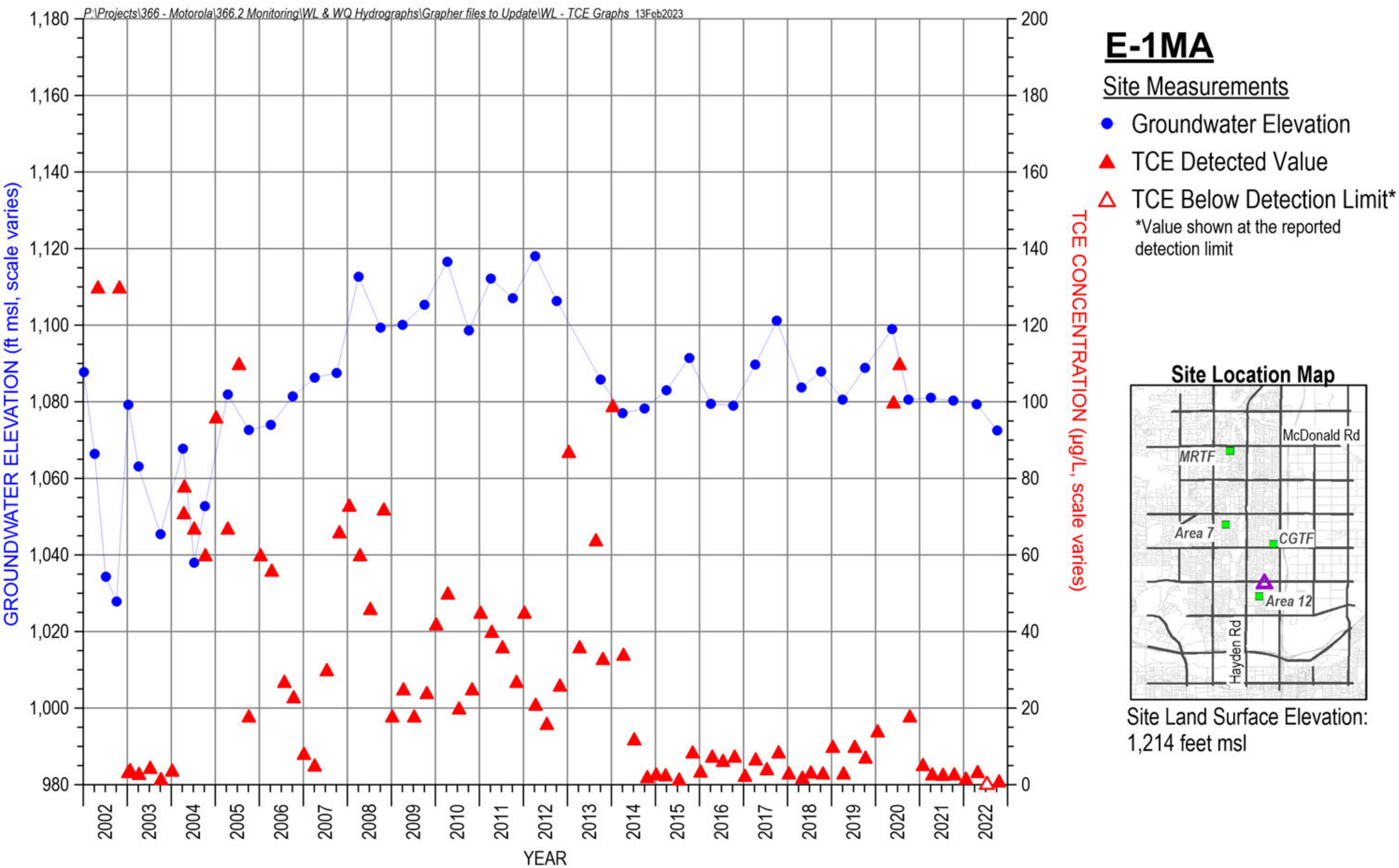
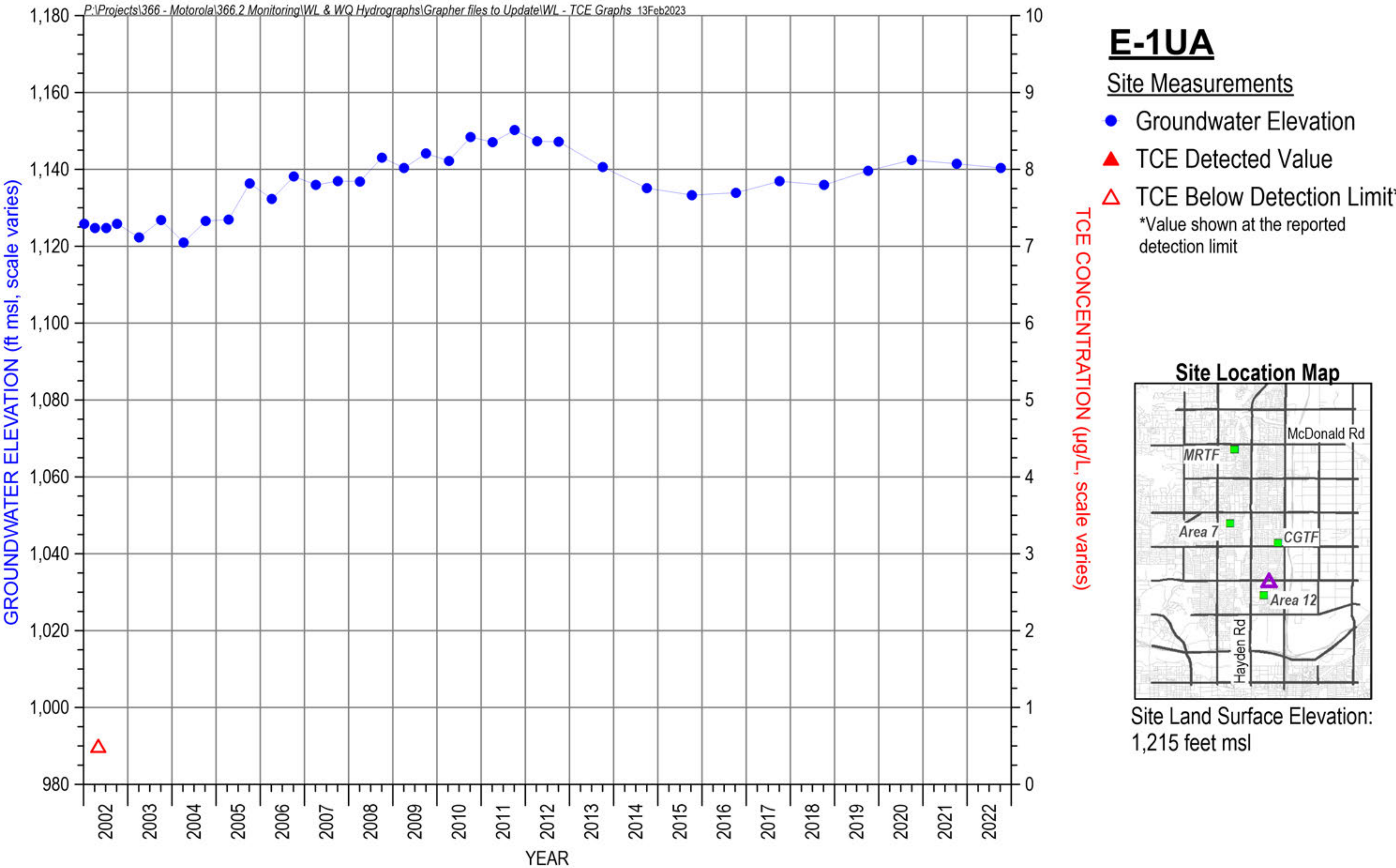


FIGURE D-020. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-1MA

North Indian Bend Wash Superfund Site



North Indian Bend Wash Superfund Site

FIGURE D-021. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-1UA

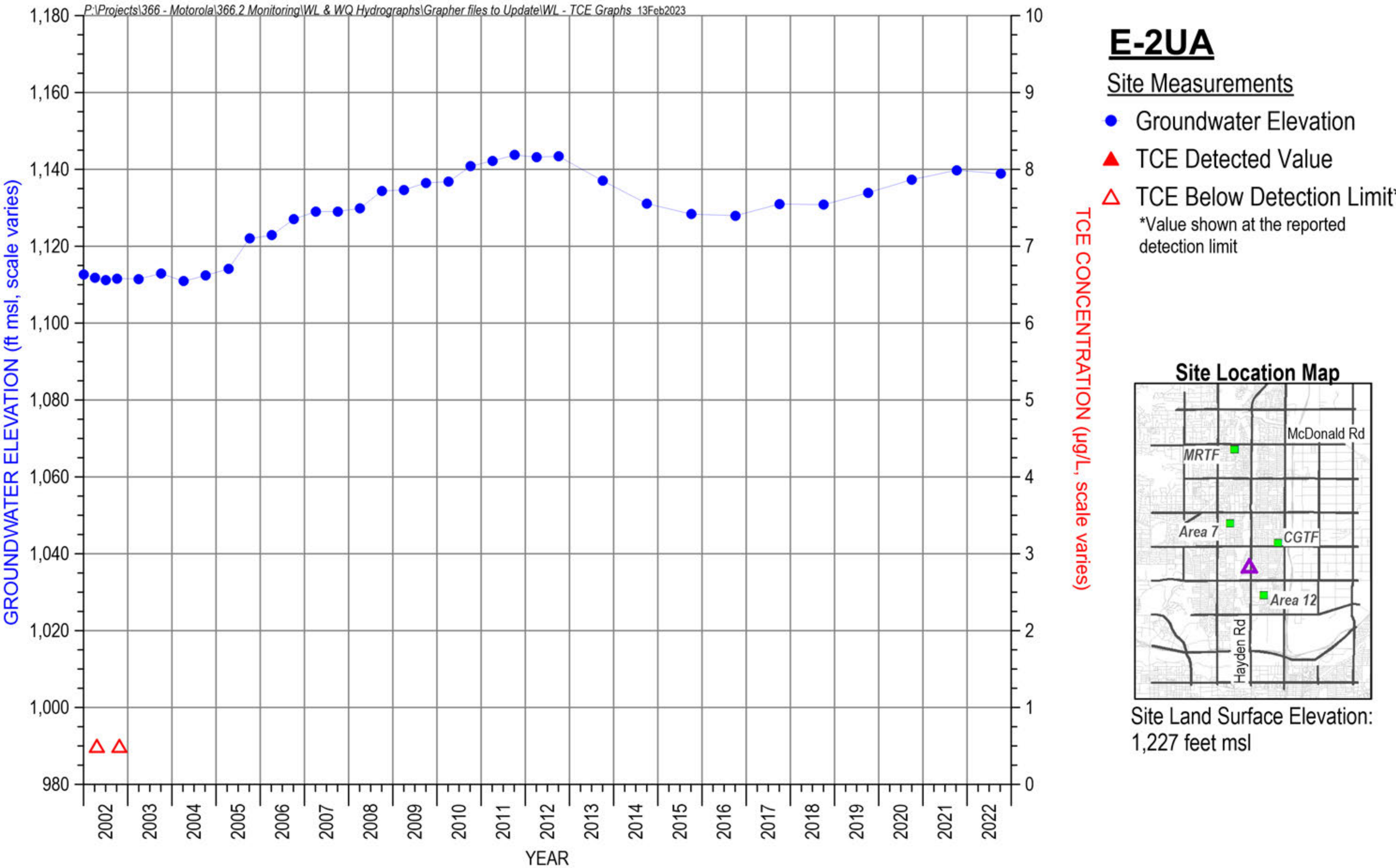


FIGURE D-022. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-2UA

North Indian Bend Wash Superfund Site

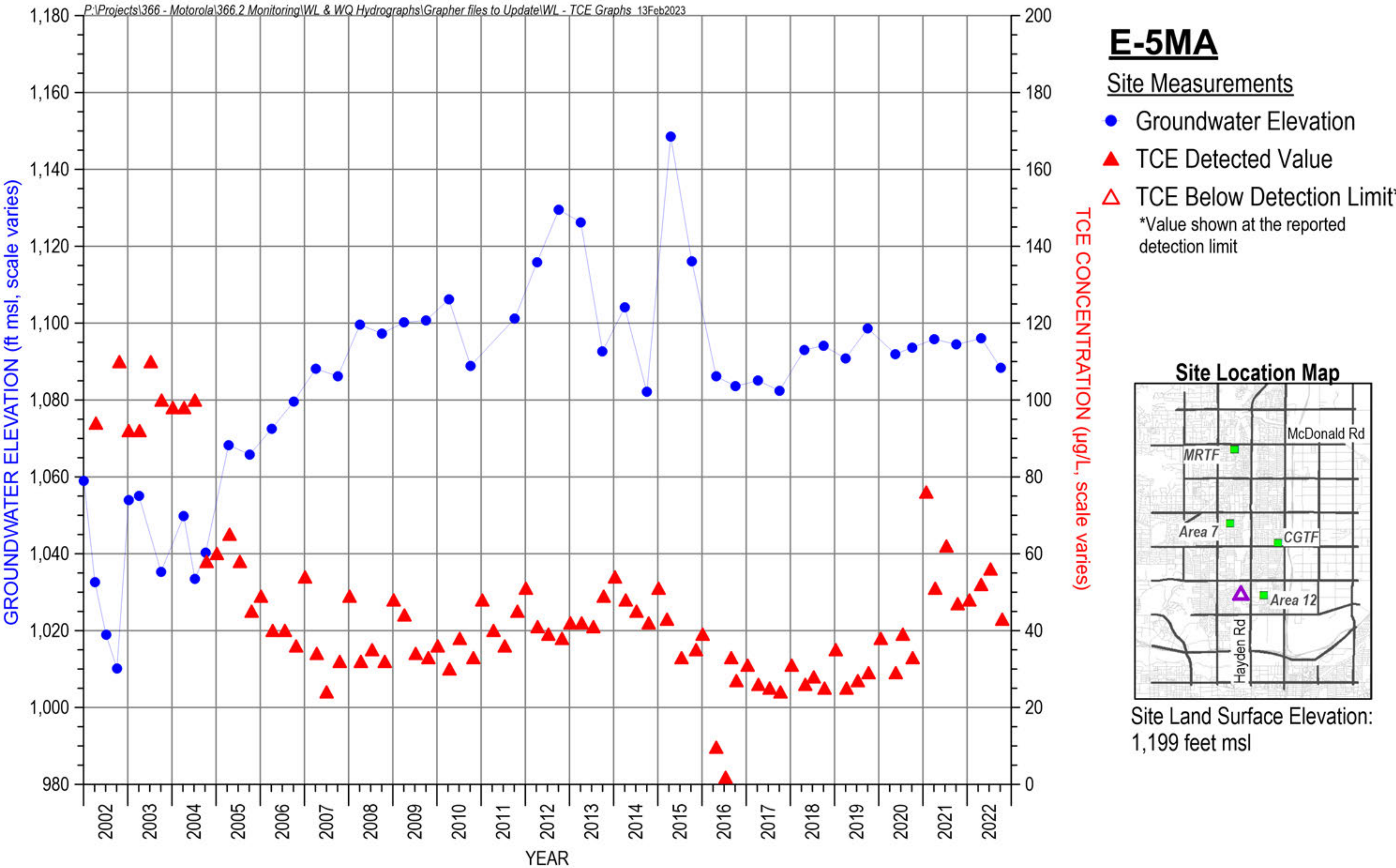


FIGURE D-023. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-5MA

North Indian Bend Wash Superfund Site

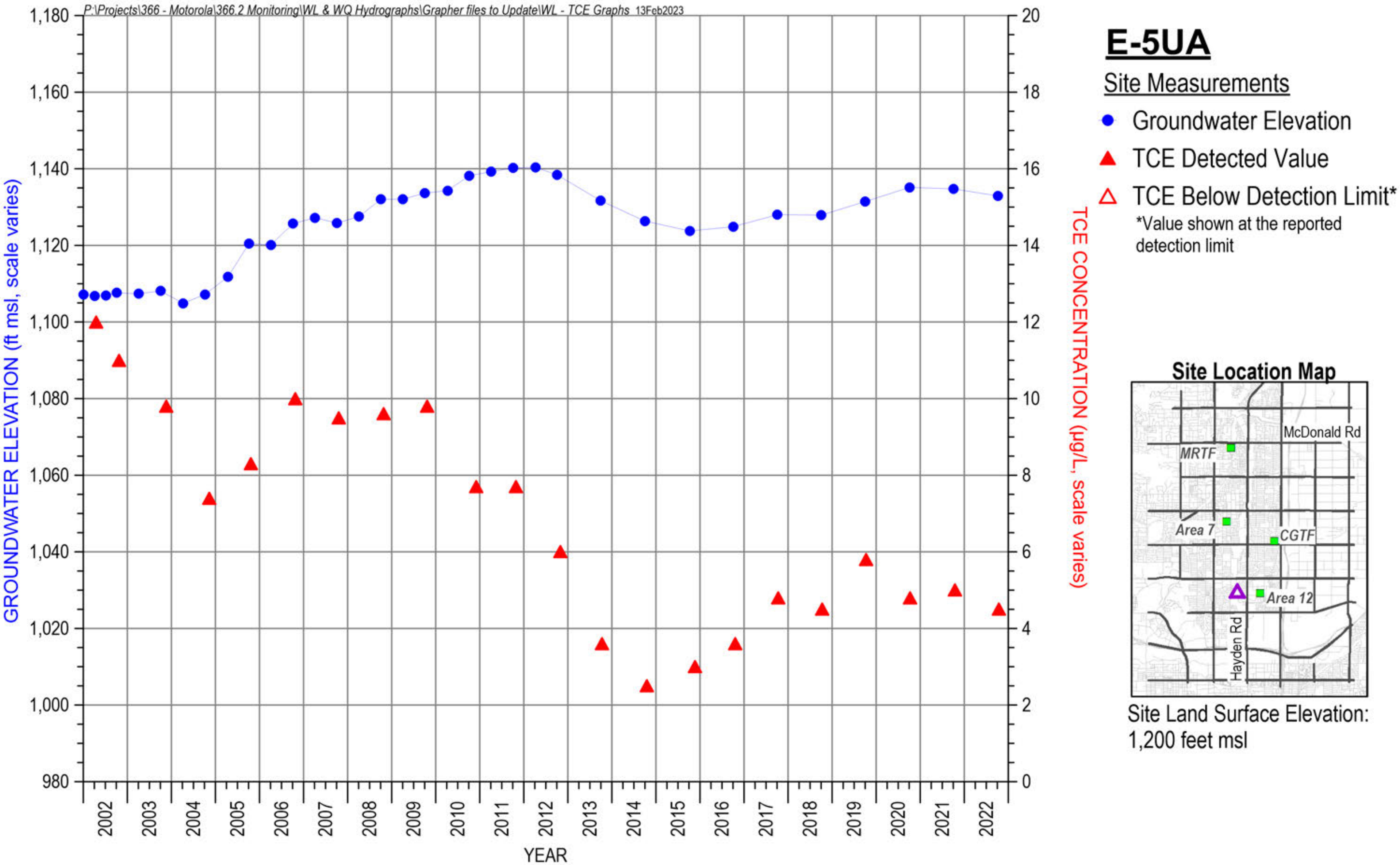
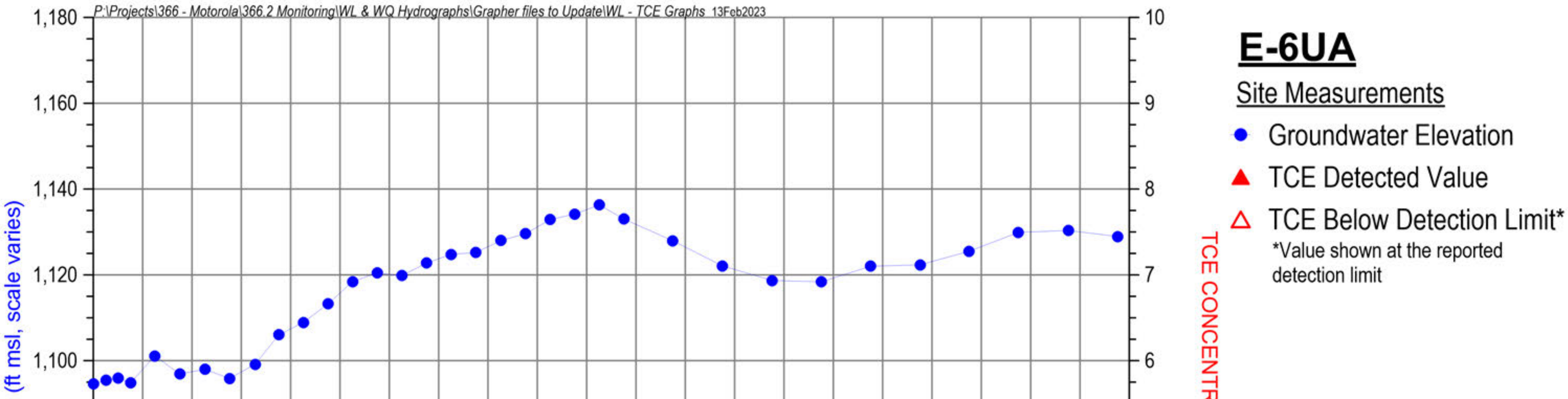
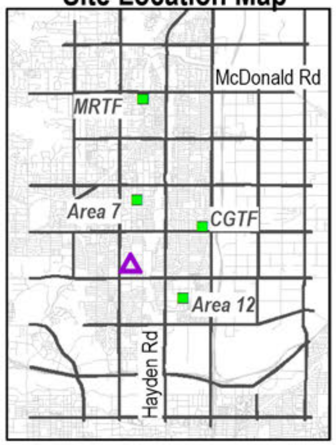


FIGURE D-024. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-5UA

North Indian Bend Wash Superfund Site



Site Location Map



Site Land Surface Elevation:
1,222 feet msl

FIGURE D-025. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-6UA

North Indian Bend Wash Superfund Site

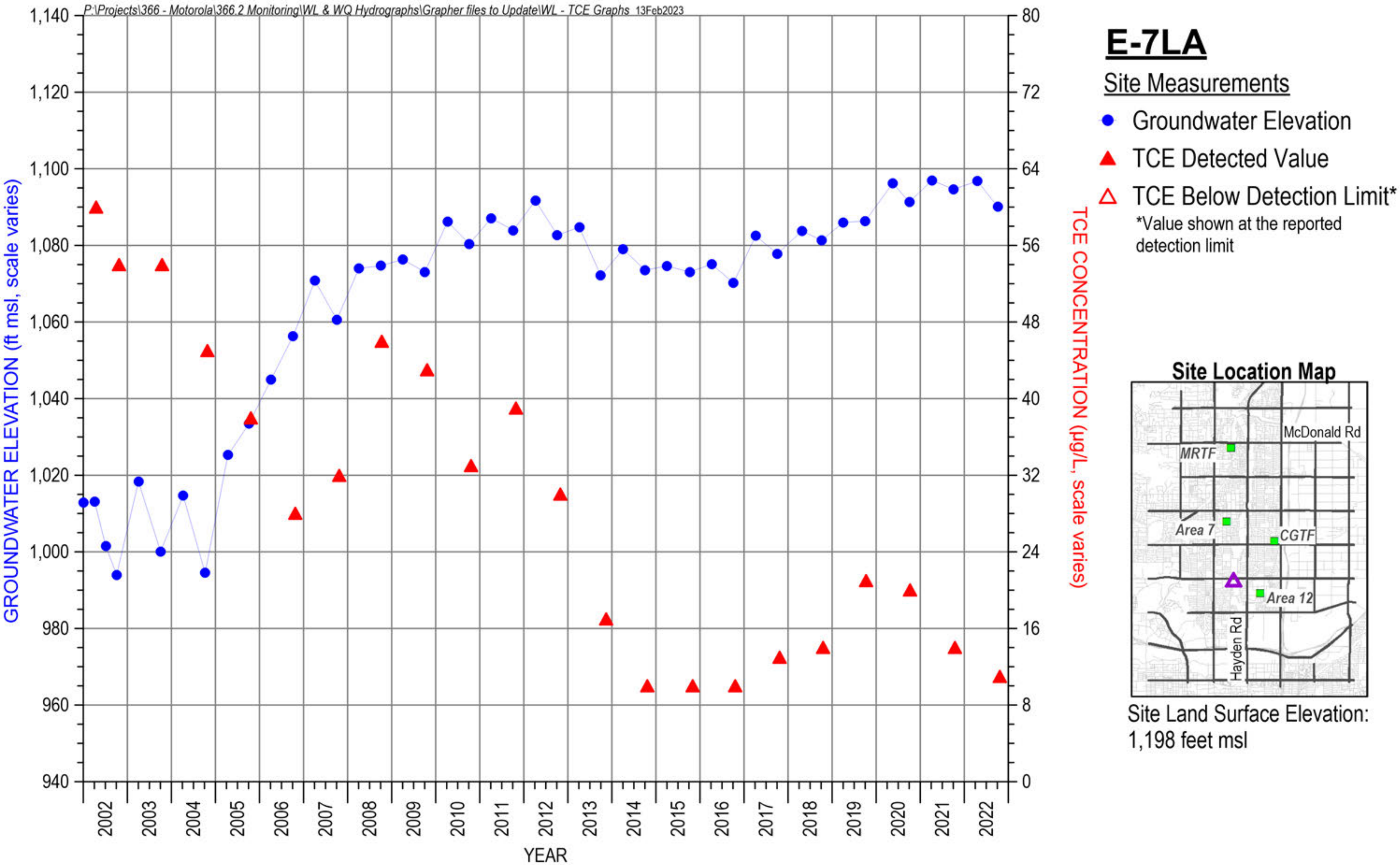
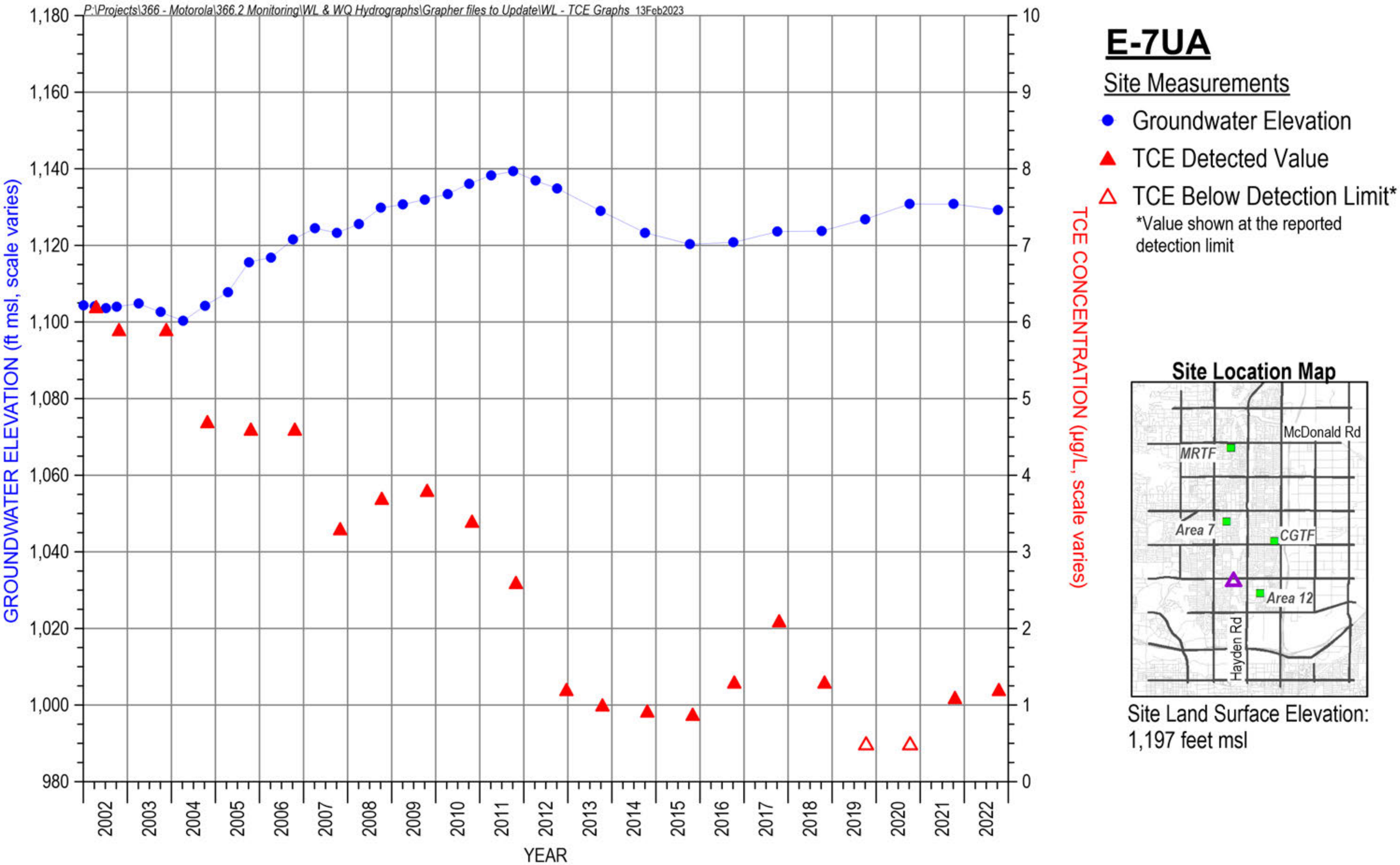


FIGURE D-026. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-7LA

North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,197 feet msl

FIGURE D-027. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-7UA

North Indian Bend Wash Superfund Site

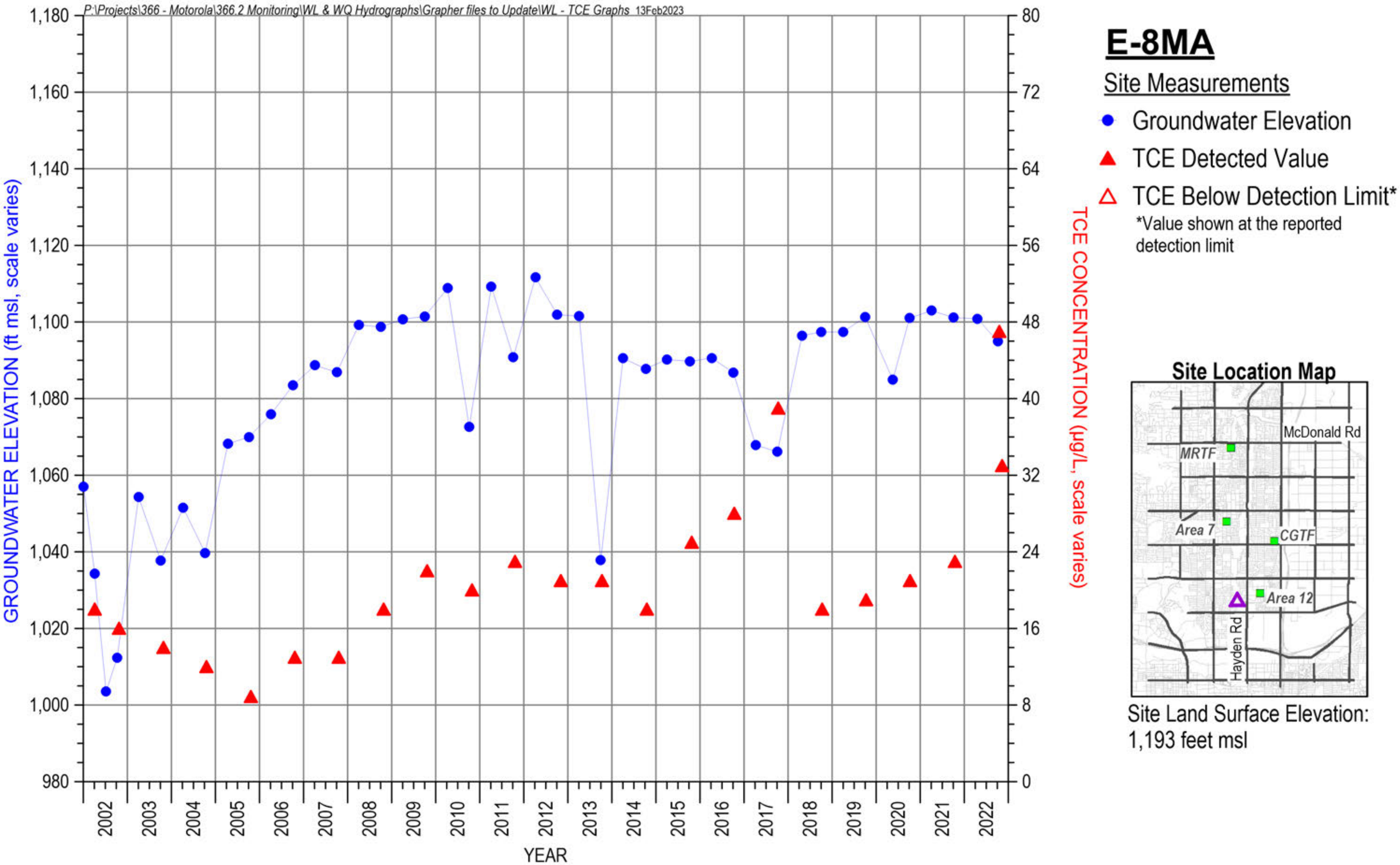
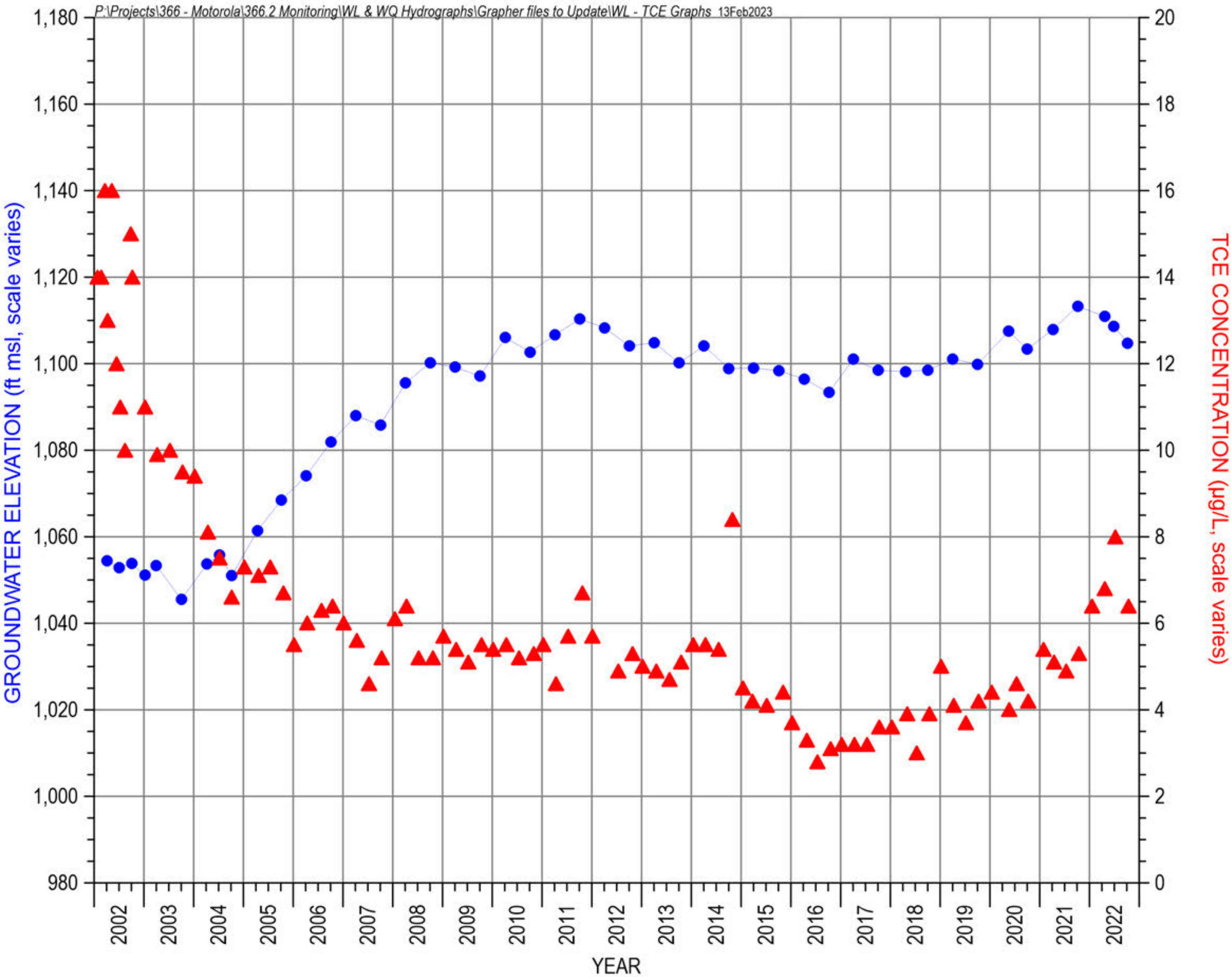
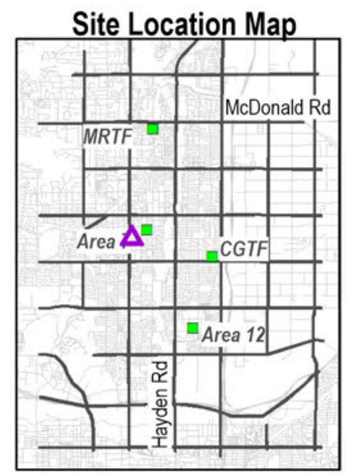


FIGURE D-028. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-8MA

North Indian Bend Wash Superfund Site





Site Land Surface Elevation:
1,244 feet msl

FIGURE D-029. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-10MA

North Indian Bend Wash Superfund Site

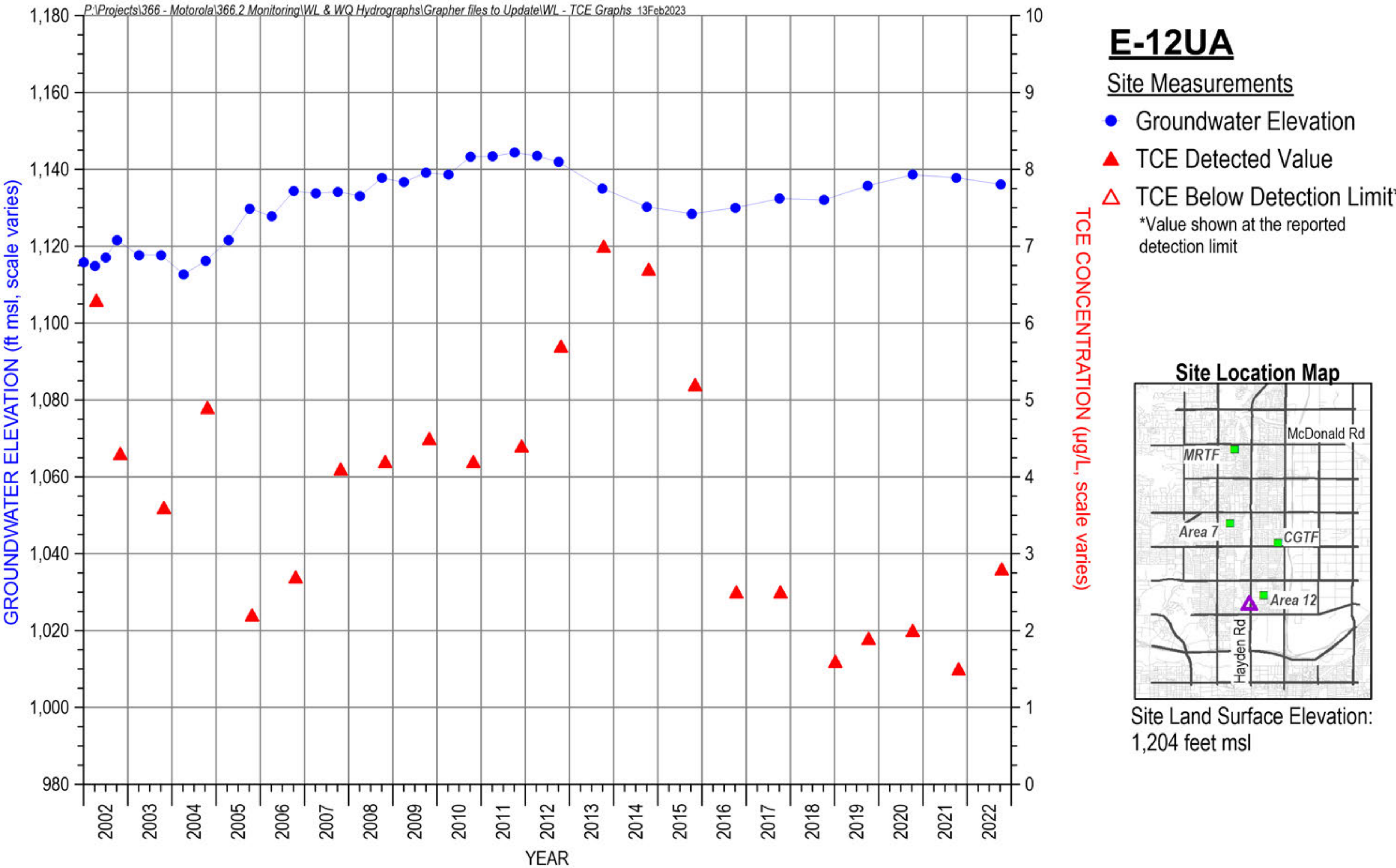
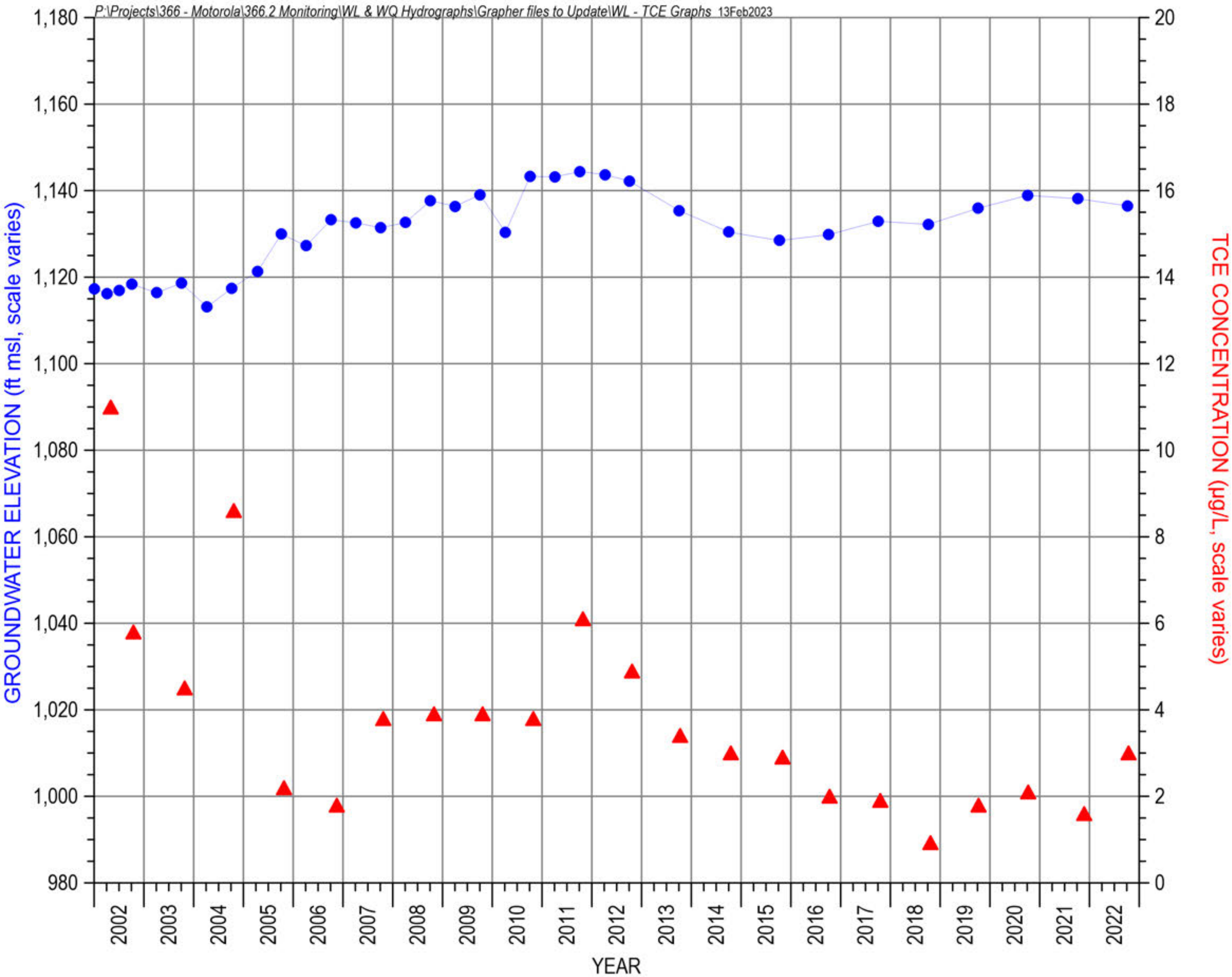
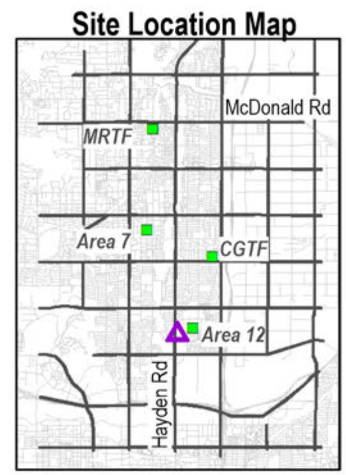


FIGURE D-030. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-12UA

North Indian Bend Wash Superfund Site

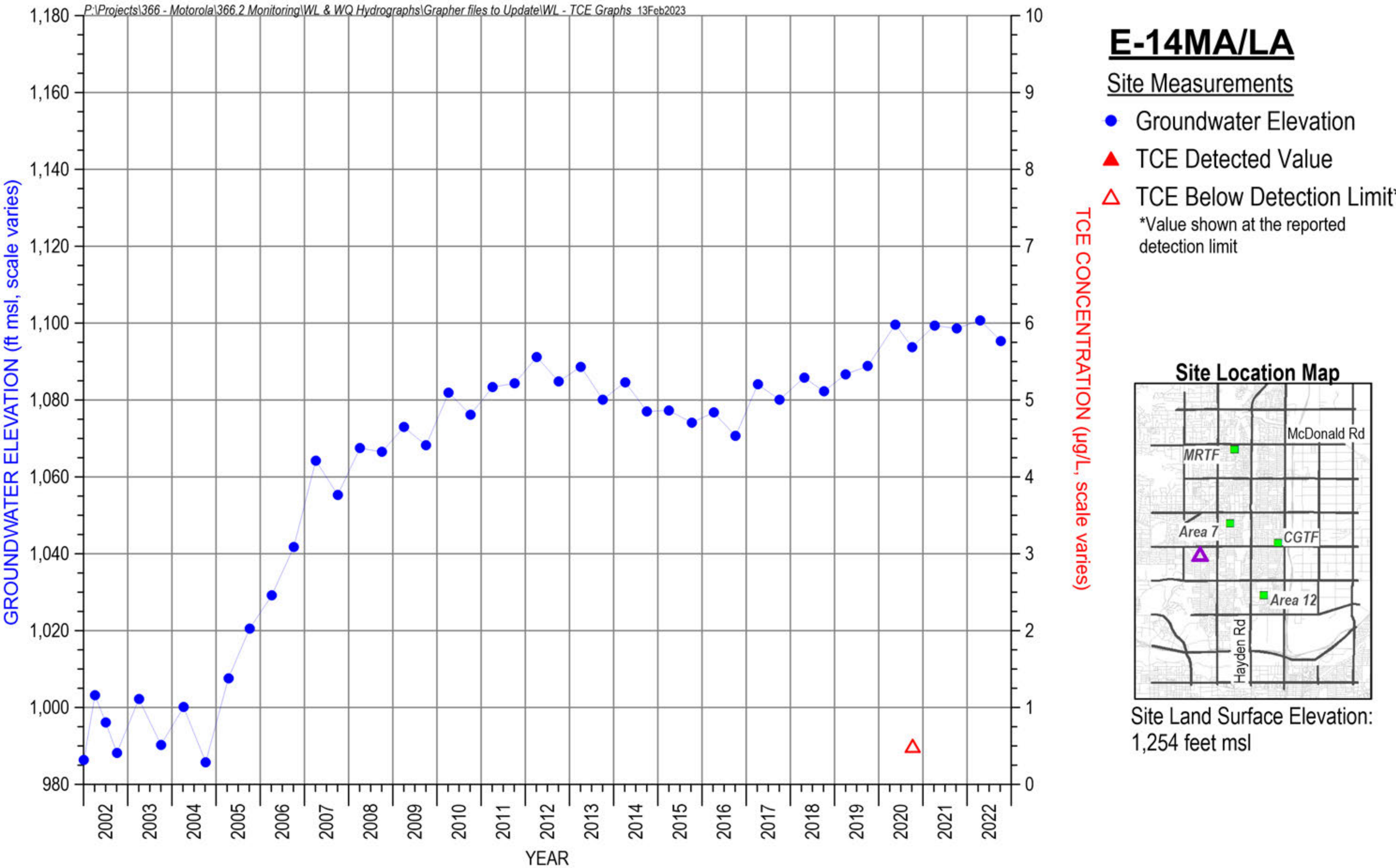




Site Land Surface Elevation: 1,209 feet msl

FIGURE D-031. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-13UA

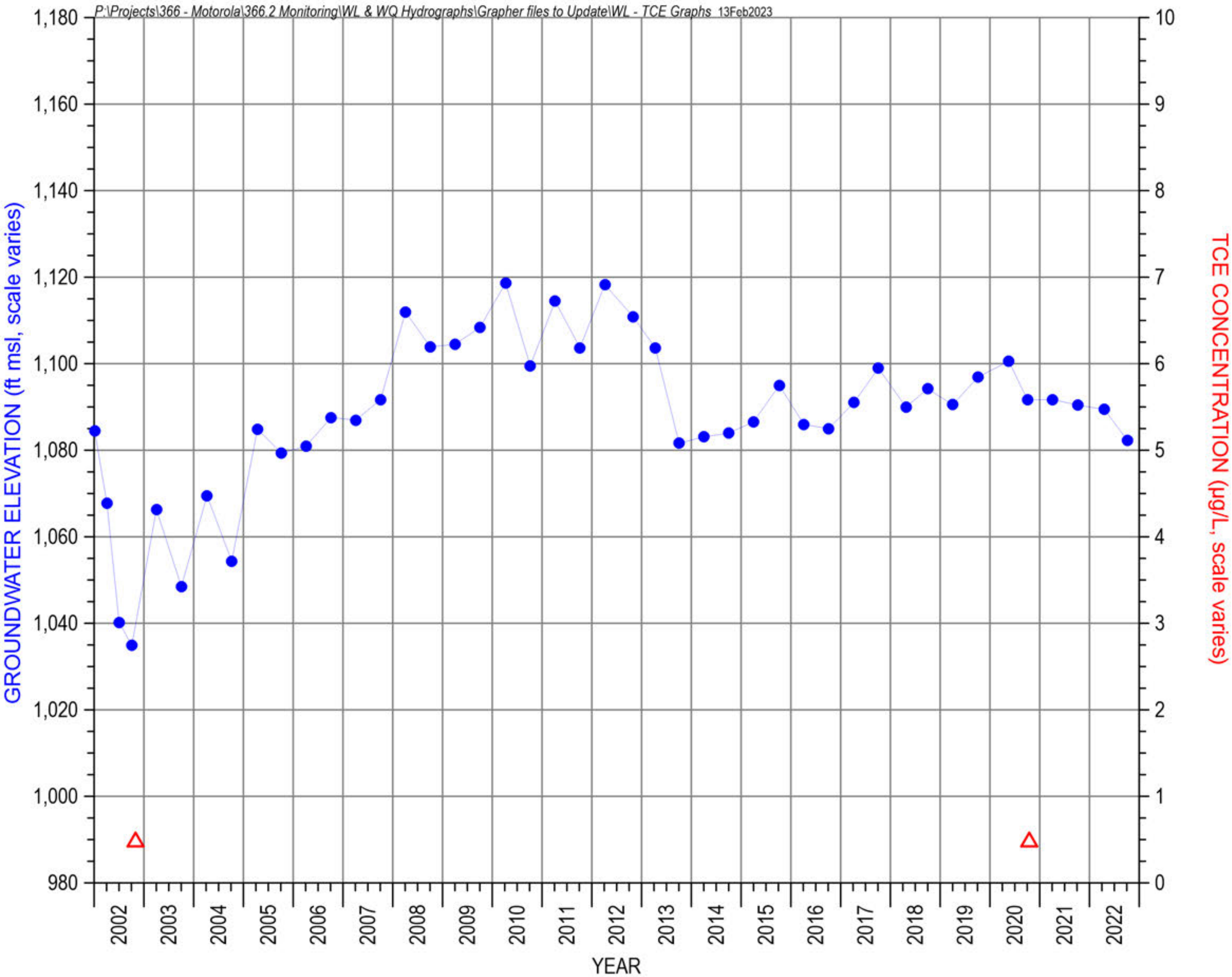
North Indian Bend Wash Superfund Site



Note: TCE data collected after the GM&EP in 2002 is supplemental

FIGURE D-032. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-14MA/LA

North Indian Bend Wash Superfund Site



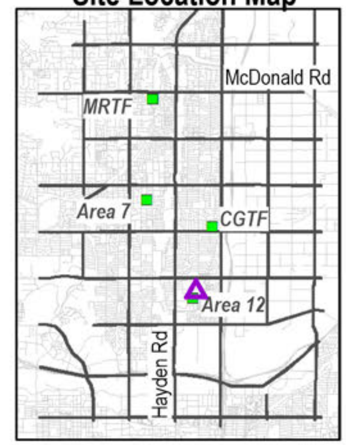
M-1MA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation: 1,211 feet msl

Note: TCE data collected after the GM&EP in 2002 is supplemental

North Indian Bend Wash Superfund Site

FIGURE D-033. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-1MA

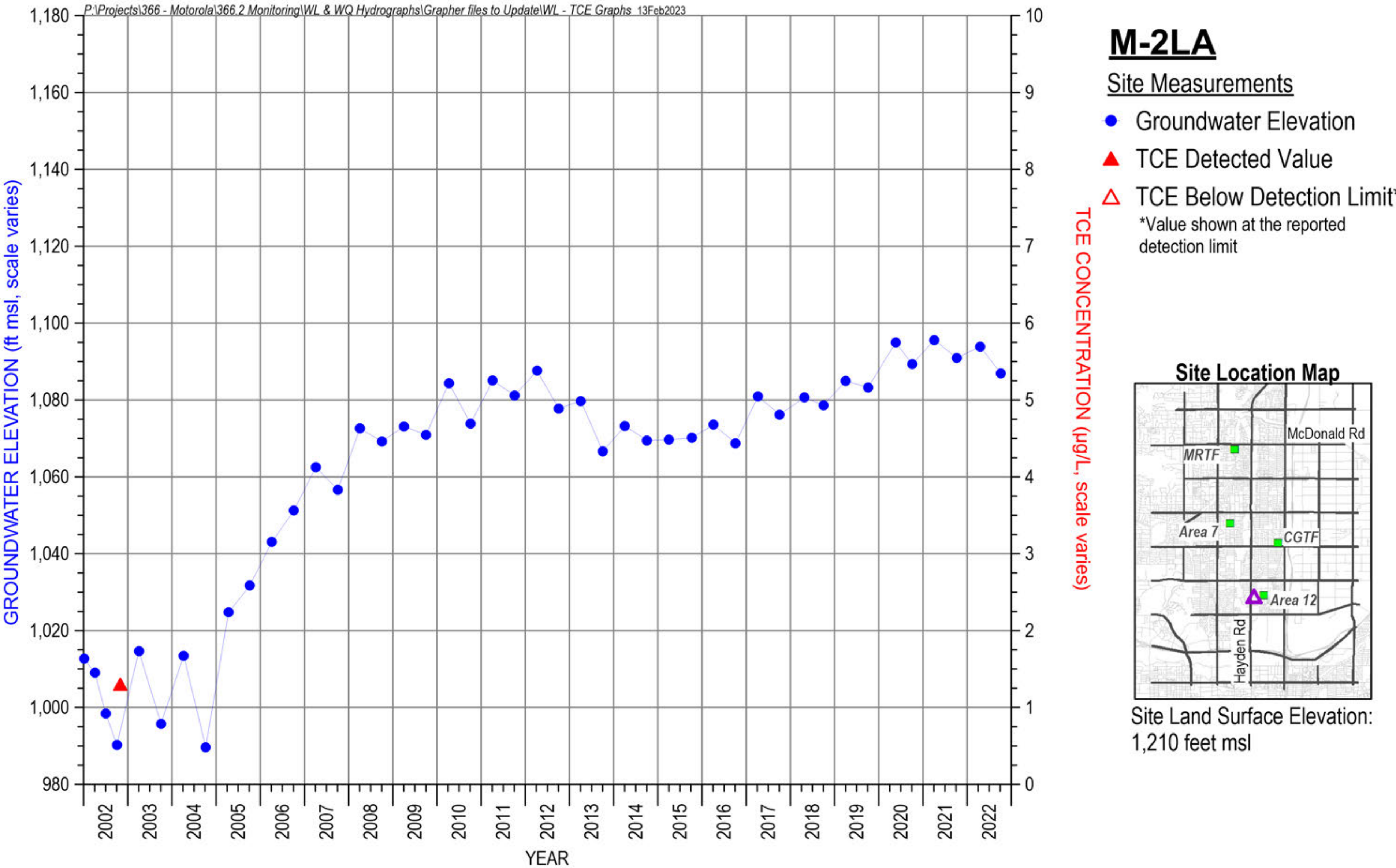
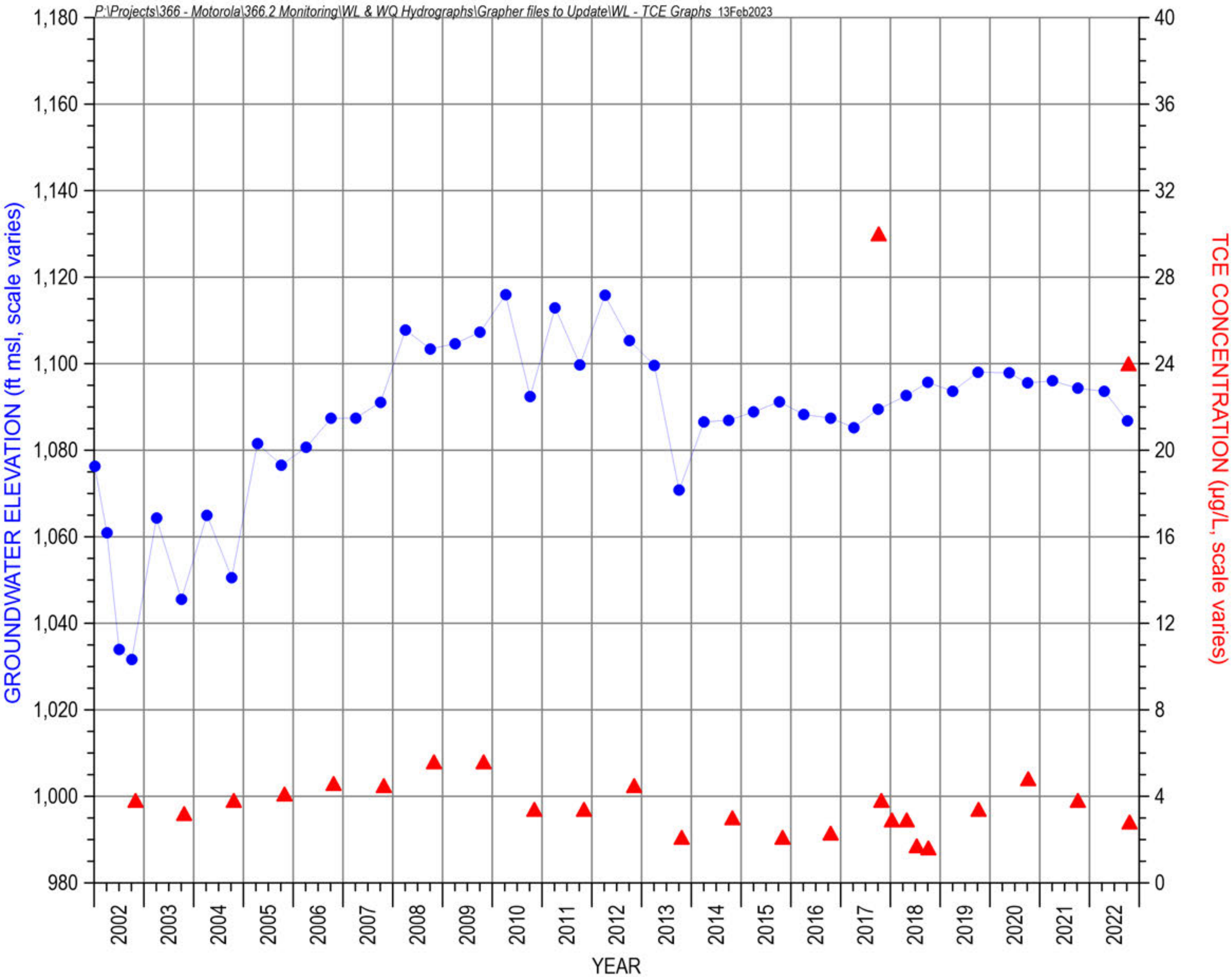
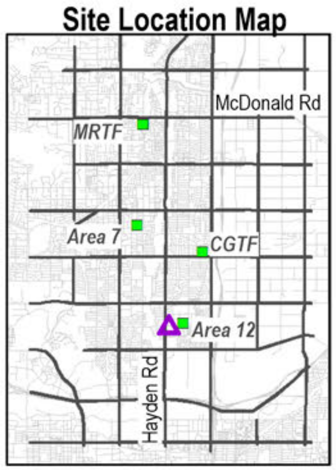


FIGURE D-034. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-2LA

North Indian Bend Wash Superfund Site

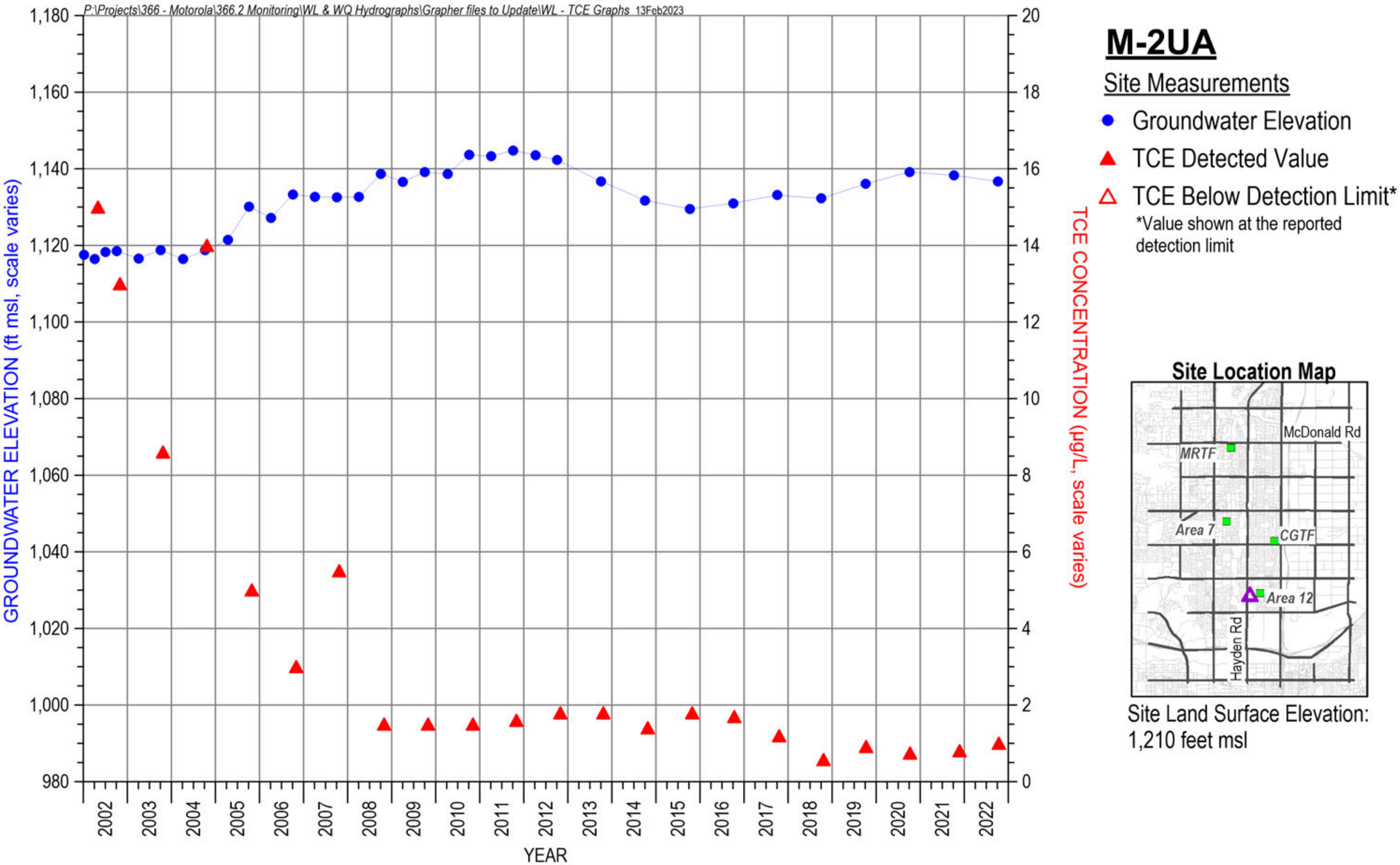




Site Land Surface Elevation:
1,210 feet msl

FIGURE D-035. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-2MA

North Indian Bend Wash Superfund Site



North Indian Bend Wash Superfund Site

FIGURE D-036. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-2UA

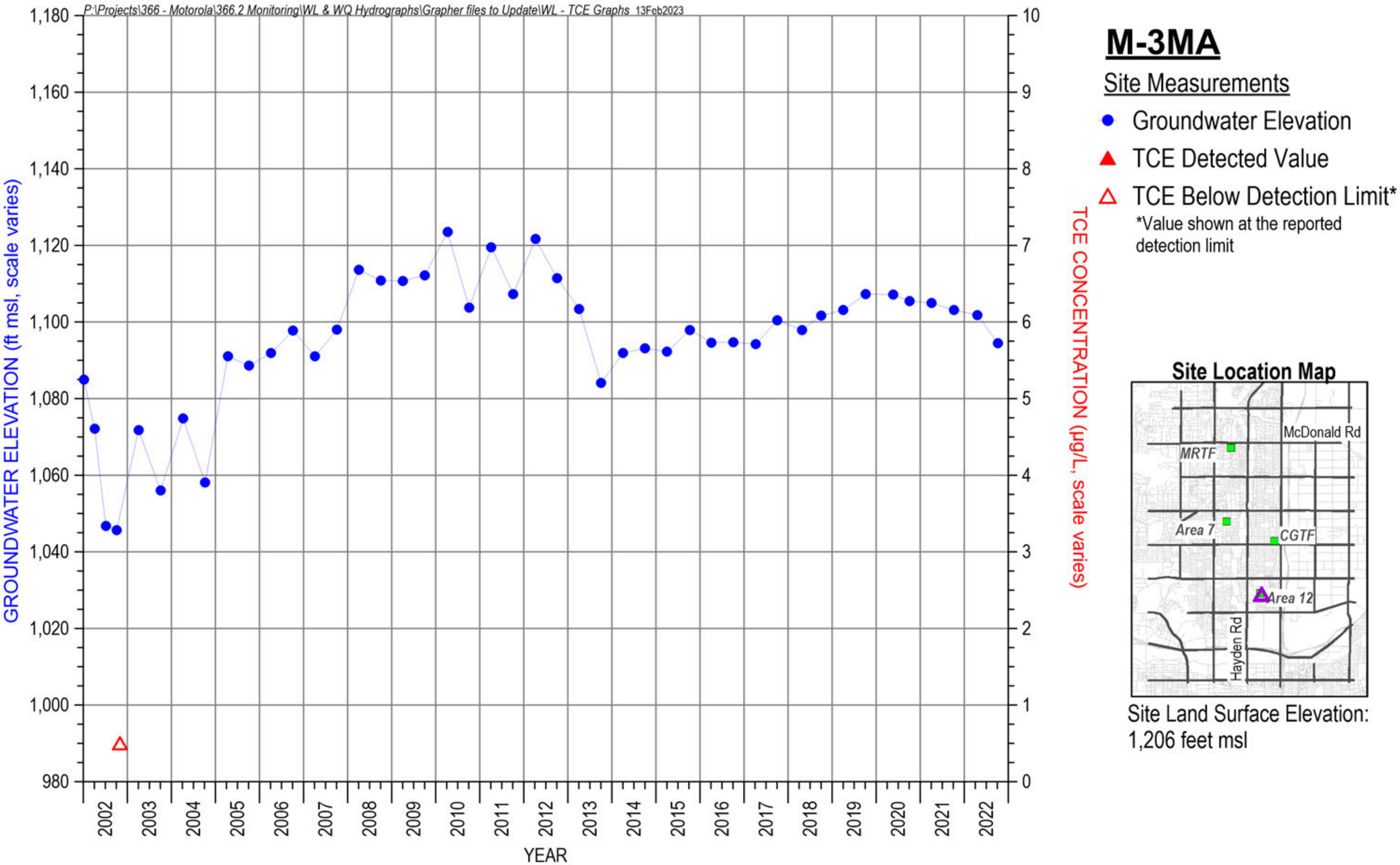
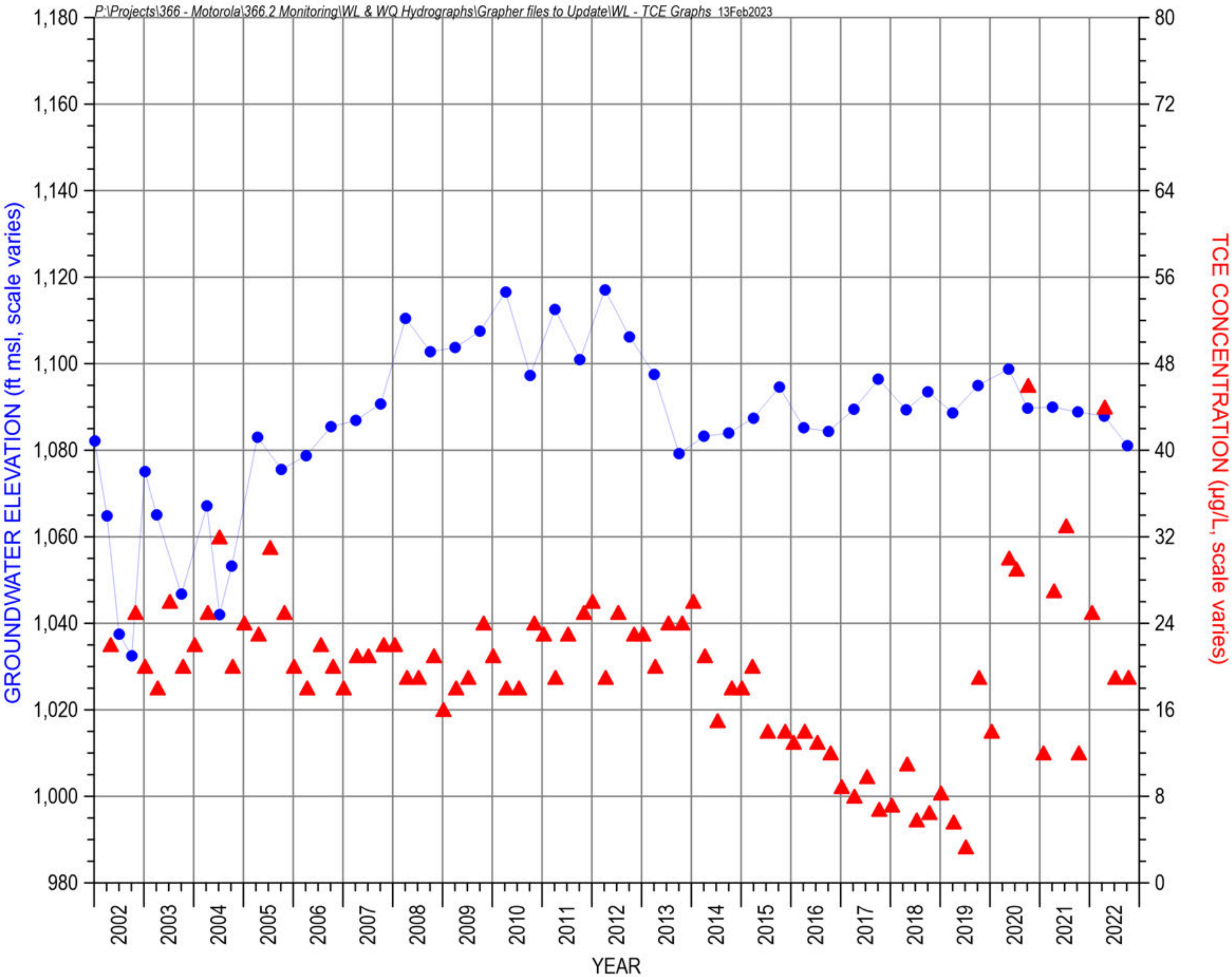


FIGURE D-037. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-3MA

North Indian Bend Wash Superfund Site



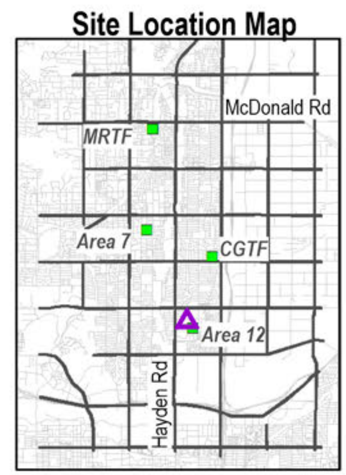
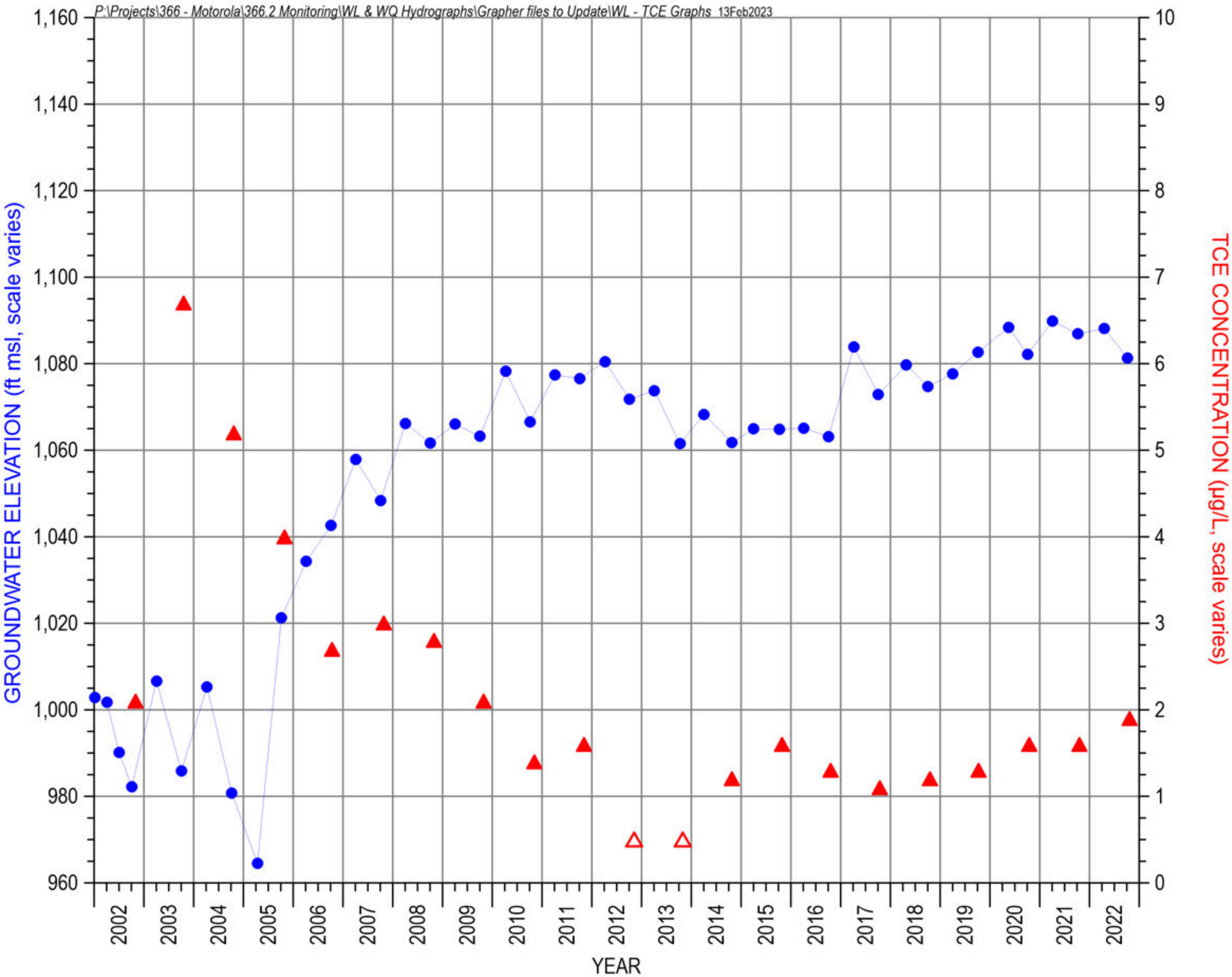


FIGURE D-038. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-4MA

North Indian Bend Wash Superfund Site



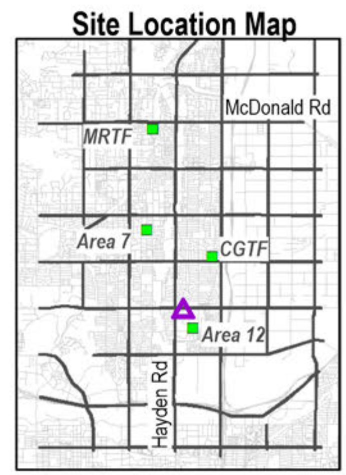
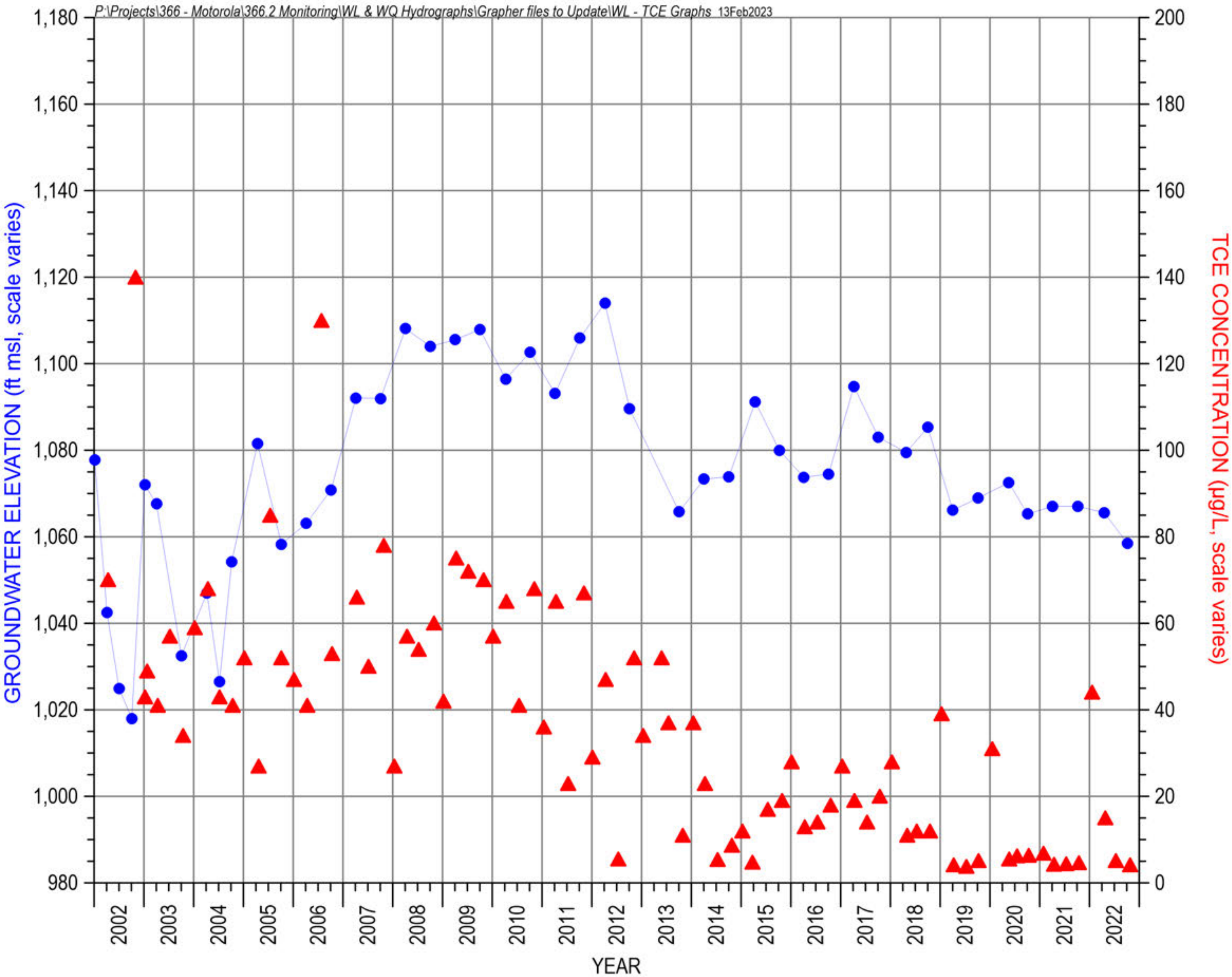


FIGURE D-039. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-5LA

North Indian Bend Wash Superfund Site

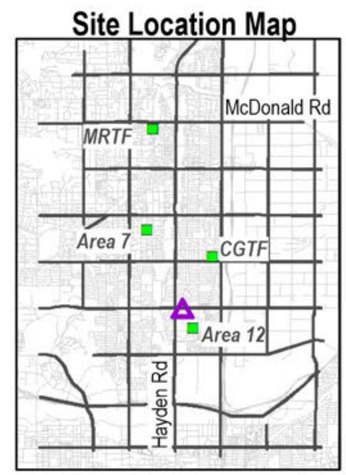


M-5MA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit



Site Land Surface Elevation:
1,217 feet msl

FIGURE D-040. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-5MA

North Indian Bend Wash Superfund Site

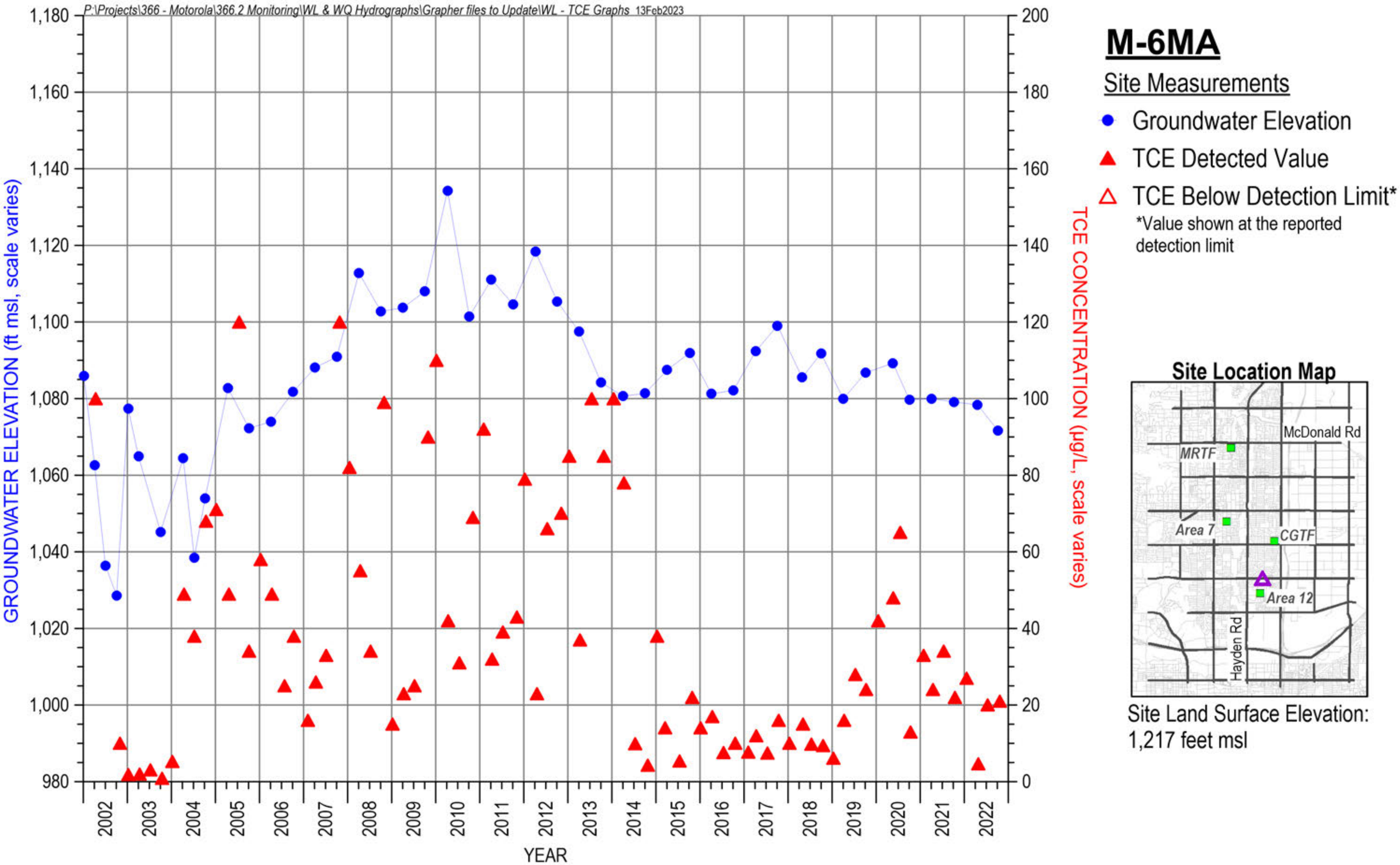


FIGURE D-041. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-6MA

North Indian Bend Wash Superfund Site

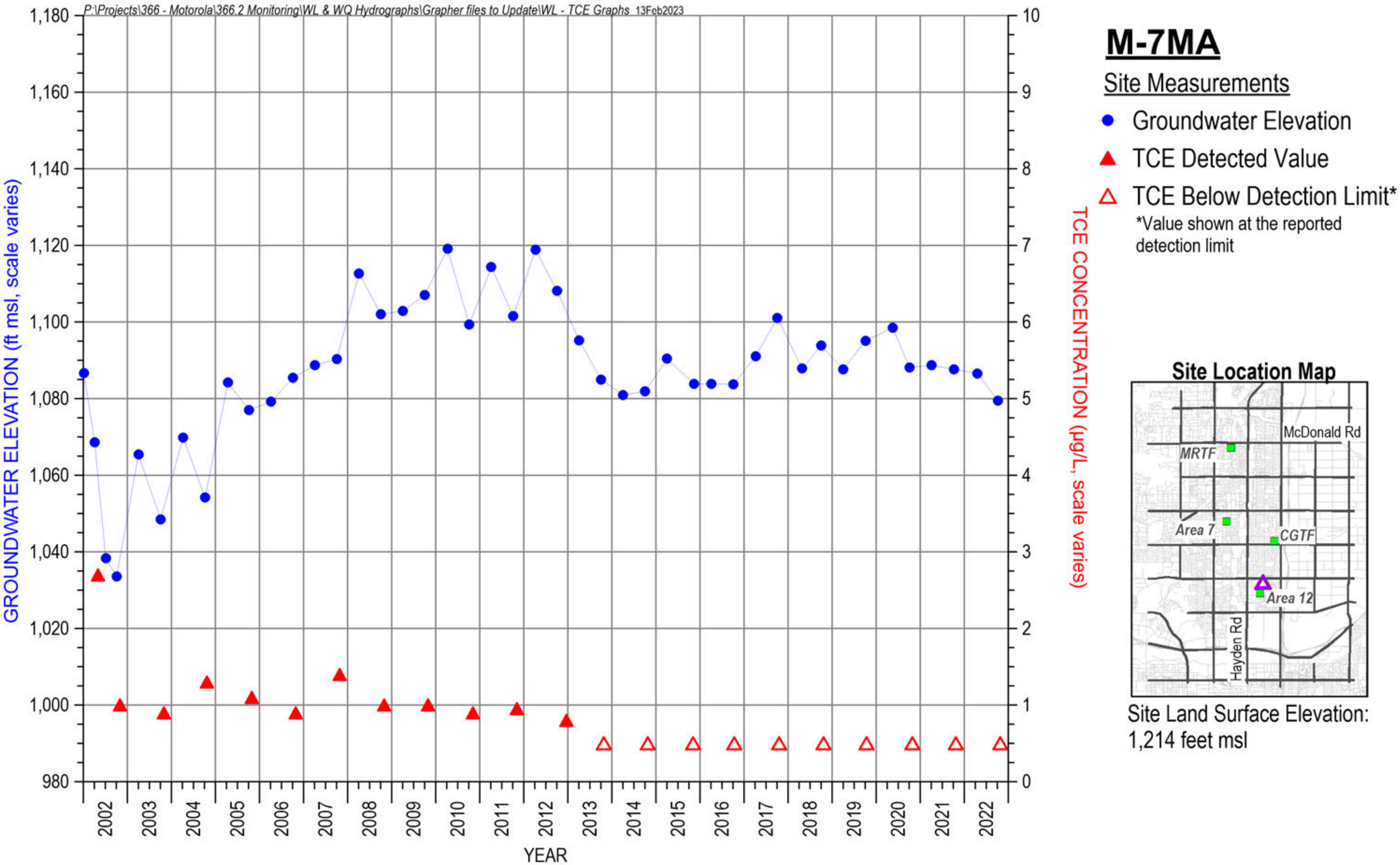
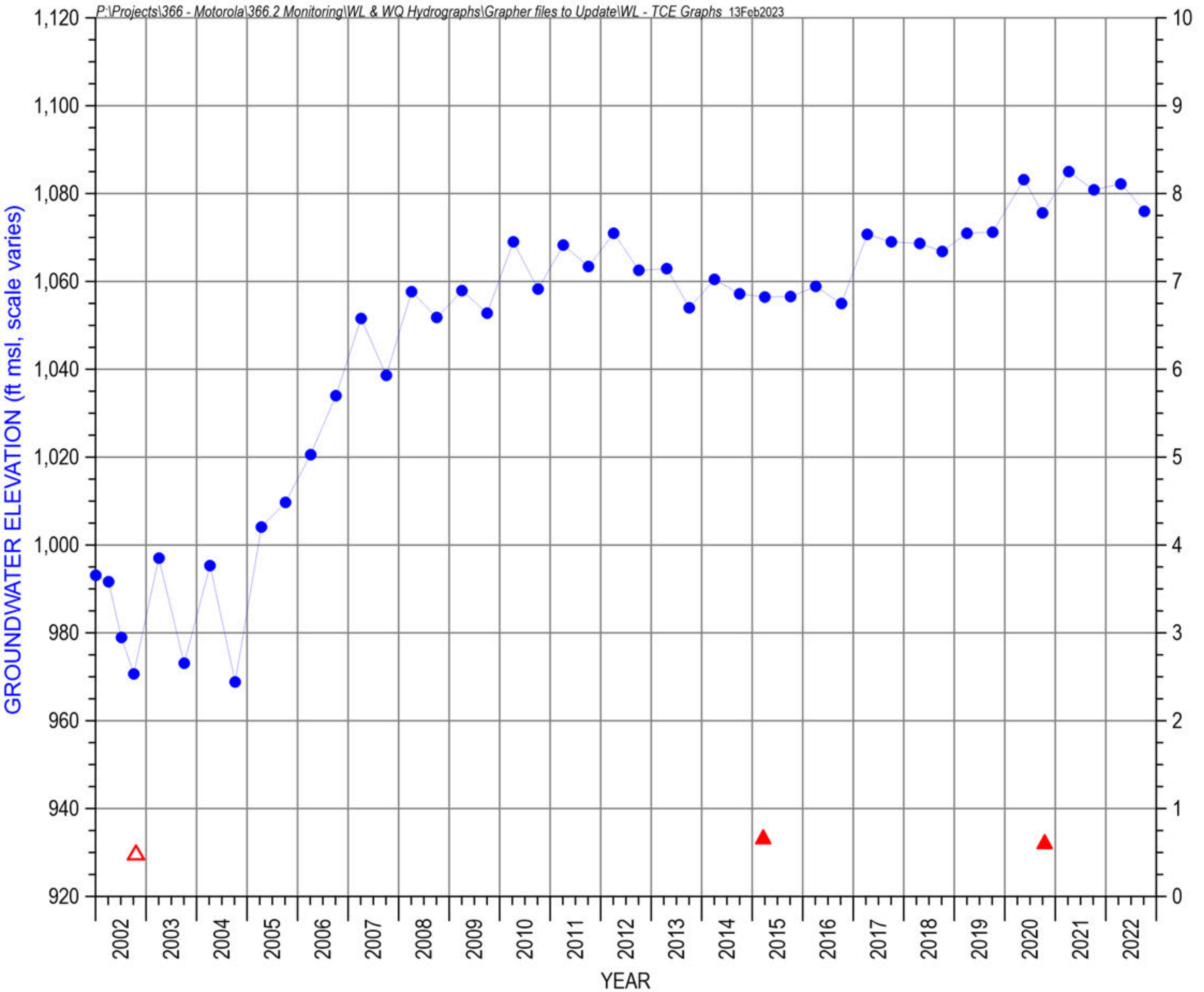


FIGURE D-042. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-7MA



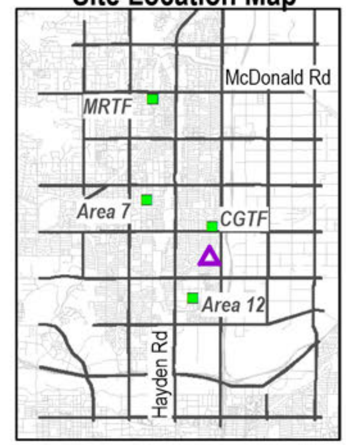
M-9LA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation:
1,221 feet msl

Note: TCE data collected after the GM&EP in 2002 is supplemental

FIGURE D-043. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-9LA

North Indian Bend Wash Superfund Site

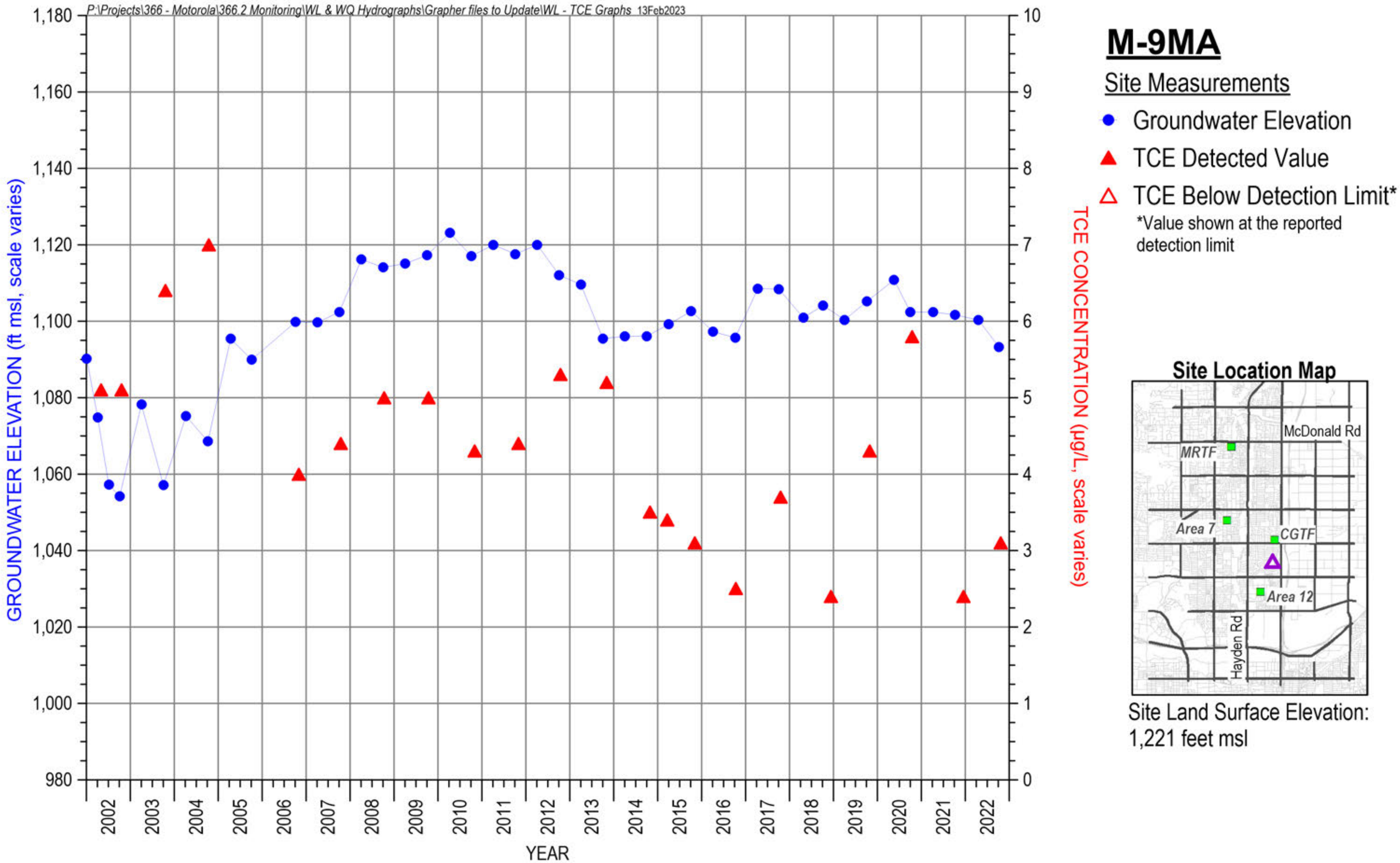
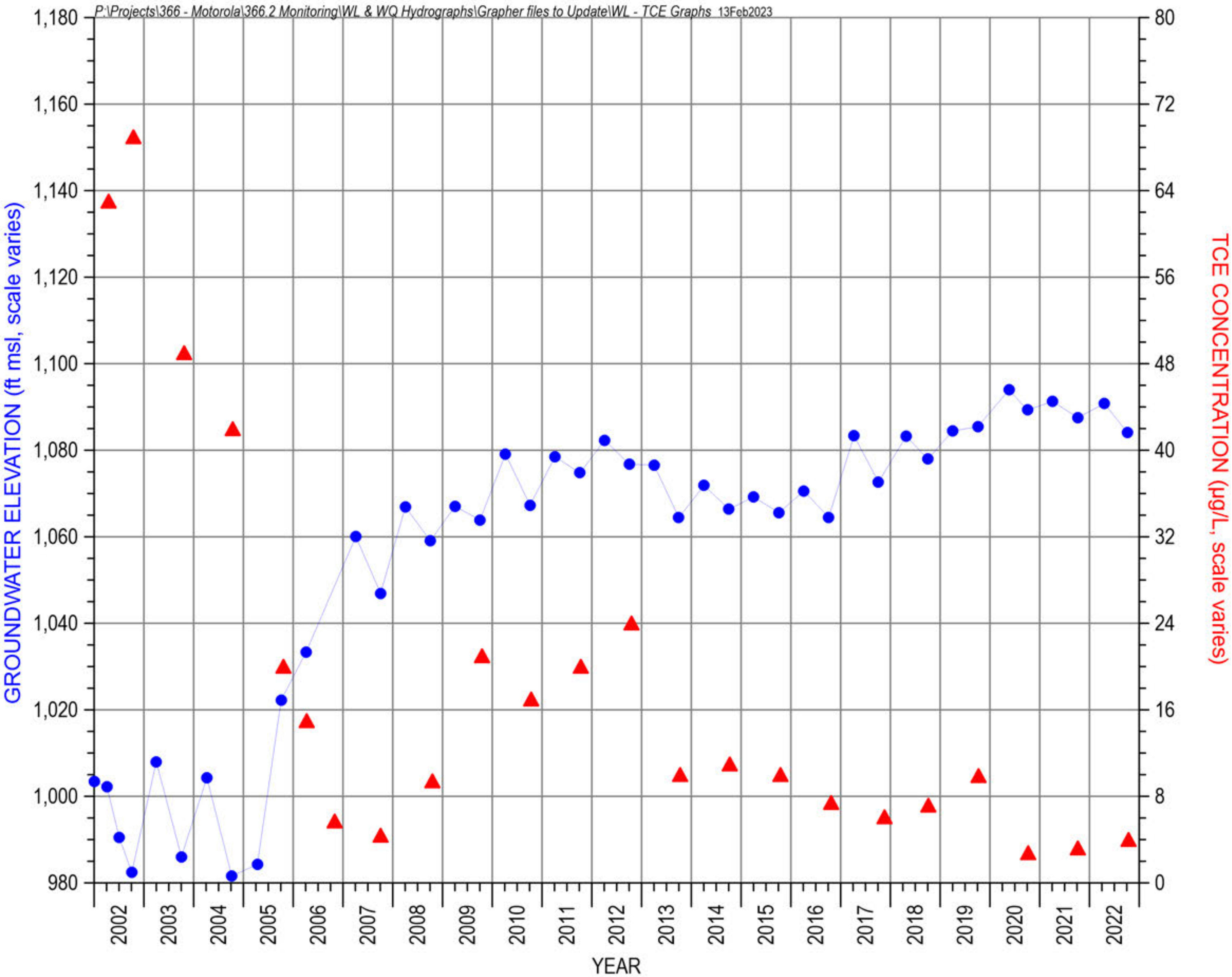


FIGURE D-044. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-9MA

North Indian Bend Wash Superfund Site

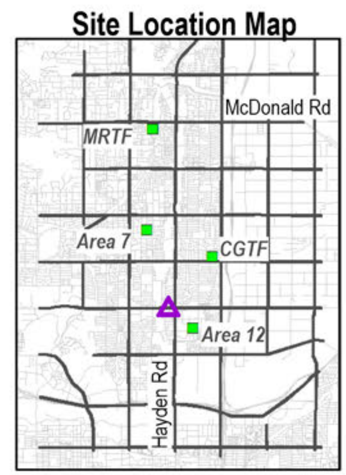


M-10LA/M-10LA2

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

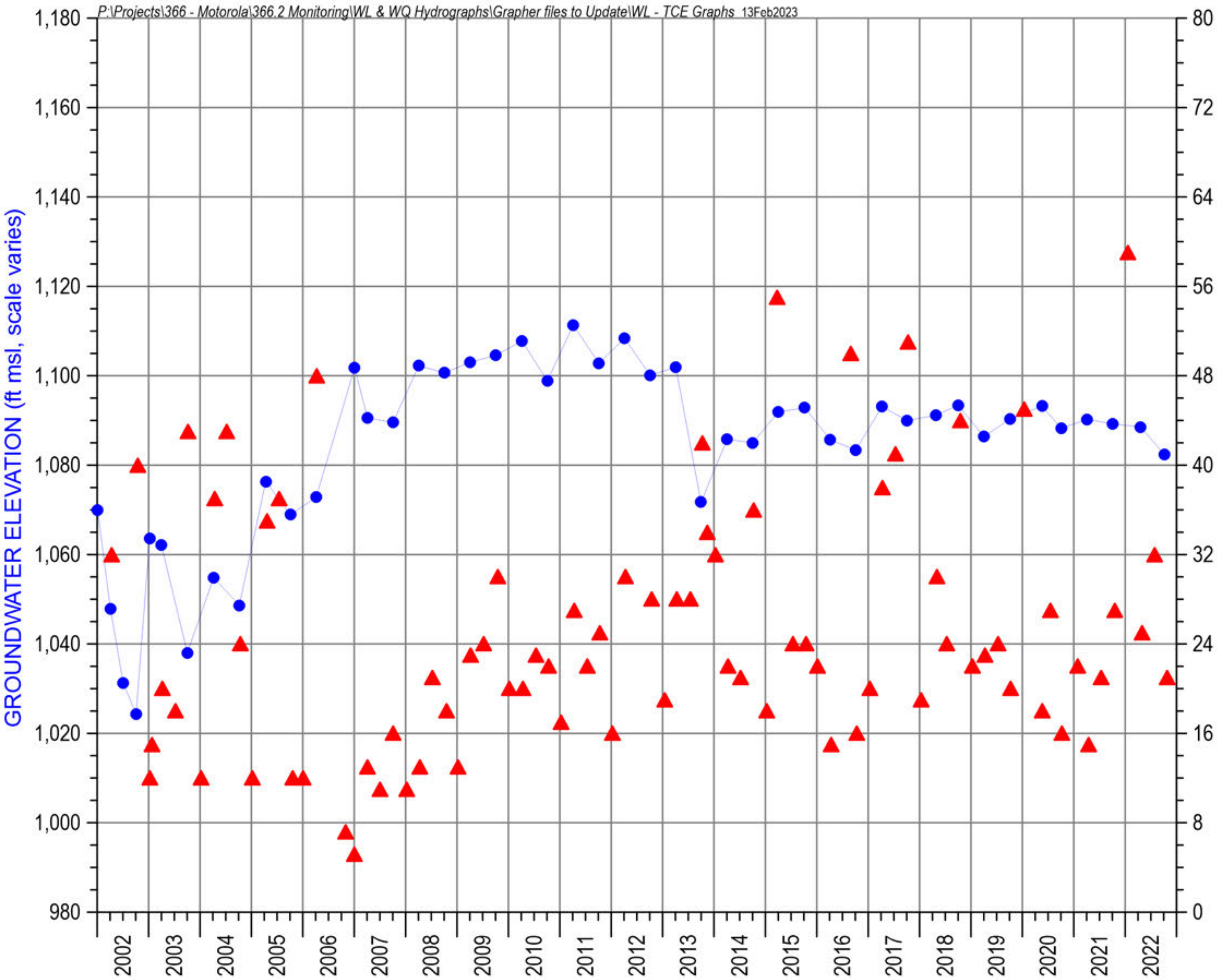


Site Land Surface Elevation:
1,220 feet msl

Note: Well M-10LA was replaced by M-10LA2 in 2007.

FIGURE D-045. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-10LA/M-10LA2

North Indian Bend Wash Superfund Site

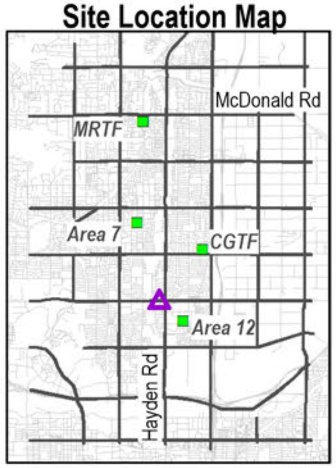


M-10MA/M-10MA2

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit



Site Land Surface Elevation: 1,220 feet msl

Note: Well M-10MA was replaced by M-10MA2 in 2007.

FIGURE D-046. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-10MA/M-10MA2

North Indian Bend Wash Superfund Site

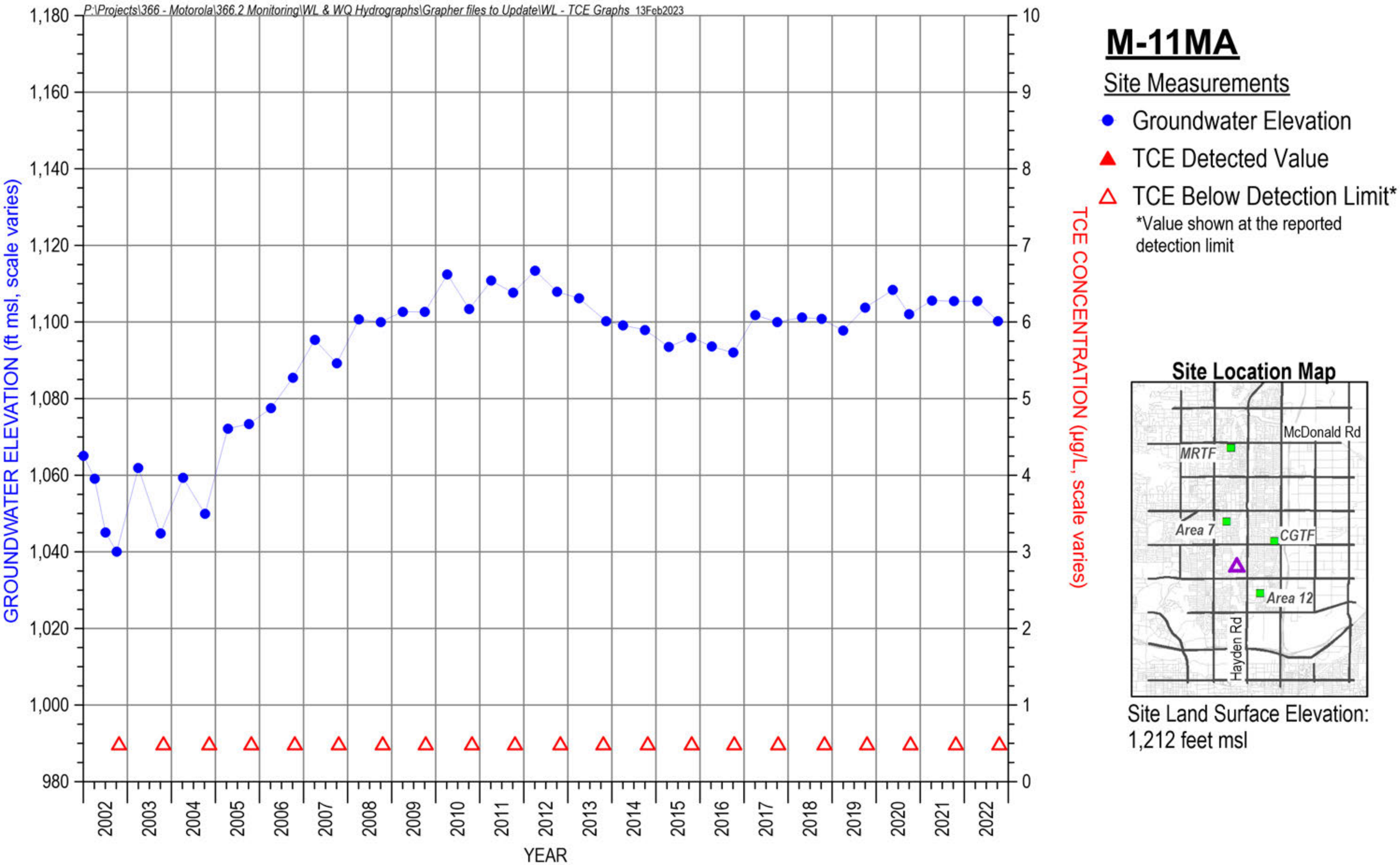
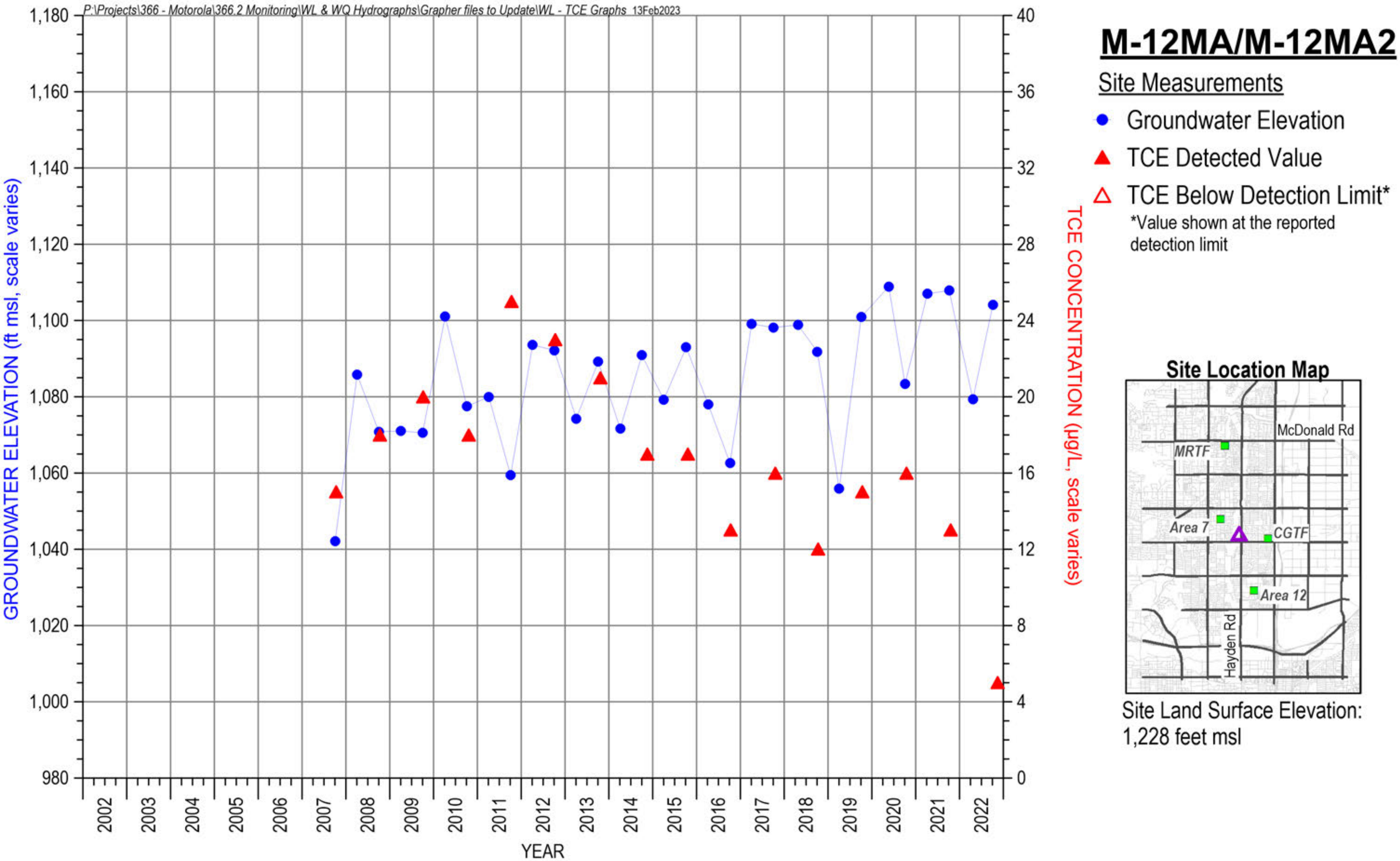


FIGURE D-047. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-11MA

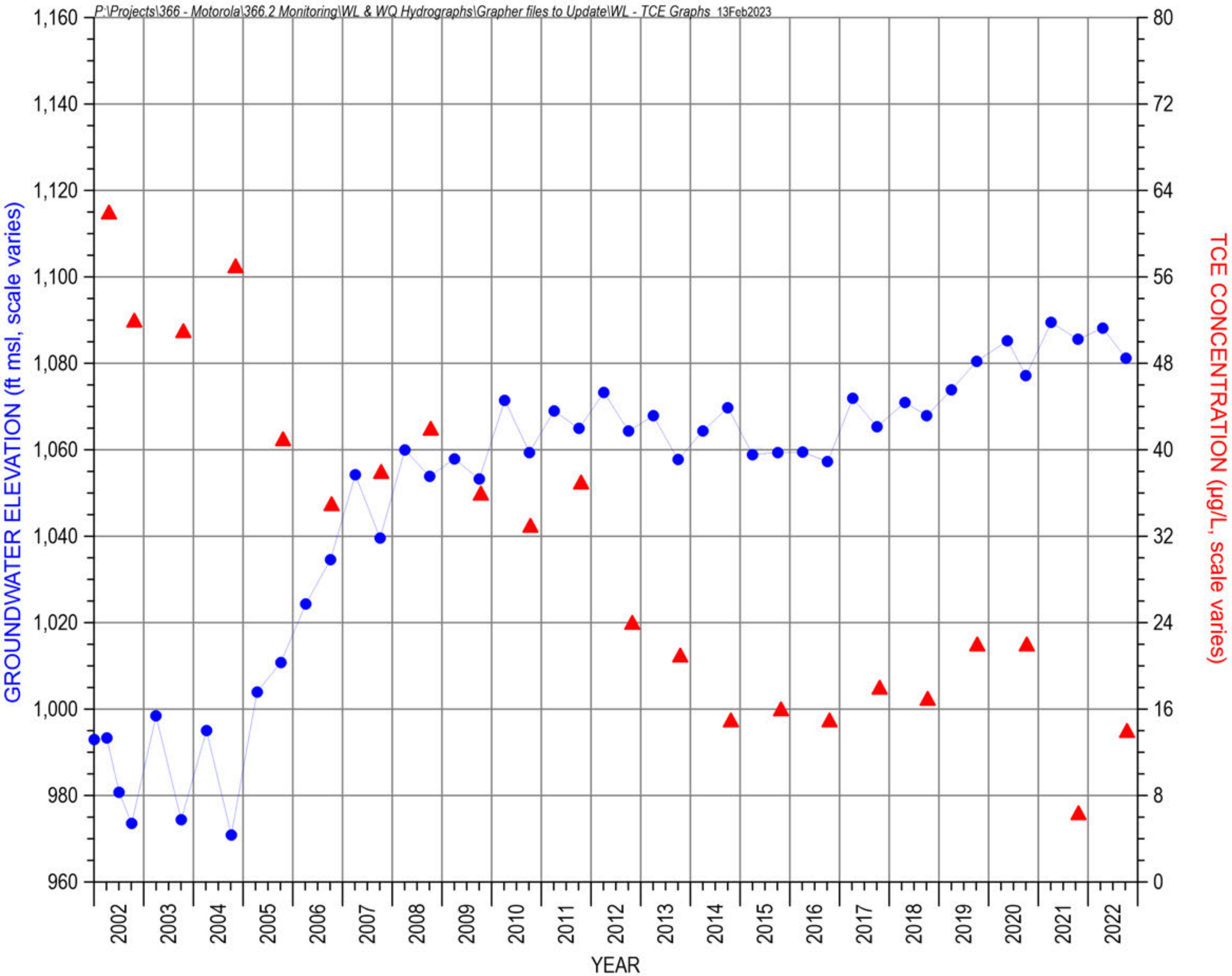
North Indian Bend Wash Superfund Site

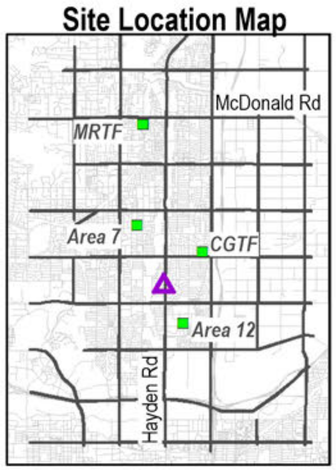


Note: Well M-12MA was replaced by M-12MA2 in 2007.

FIGURE D-048. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-12MA/M-12MA2

North Indian Bend Wash Superfund Site

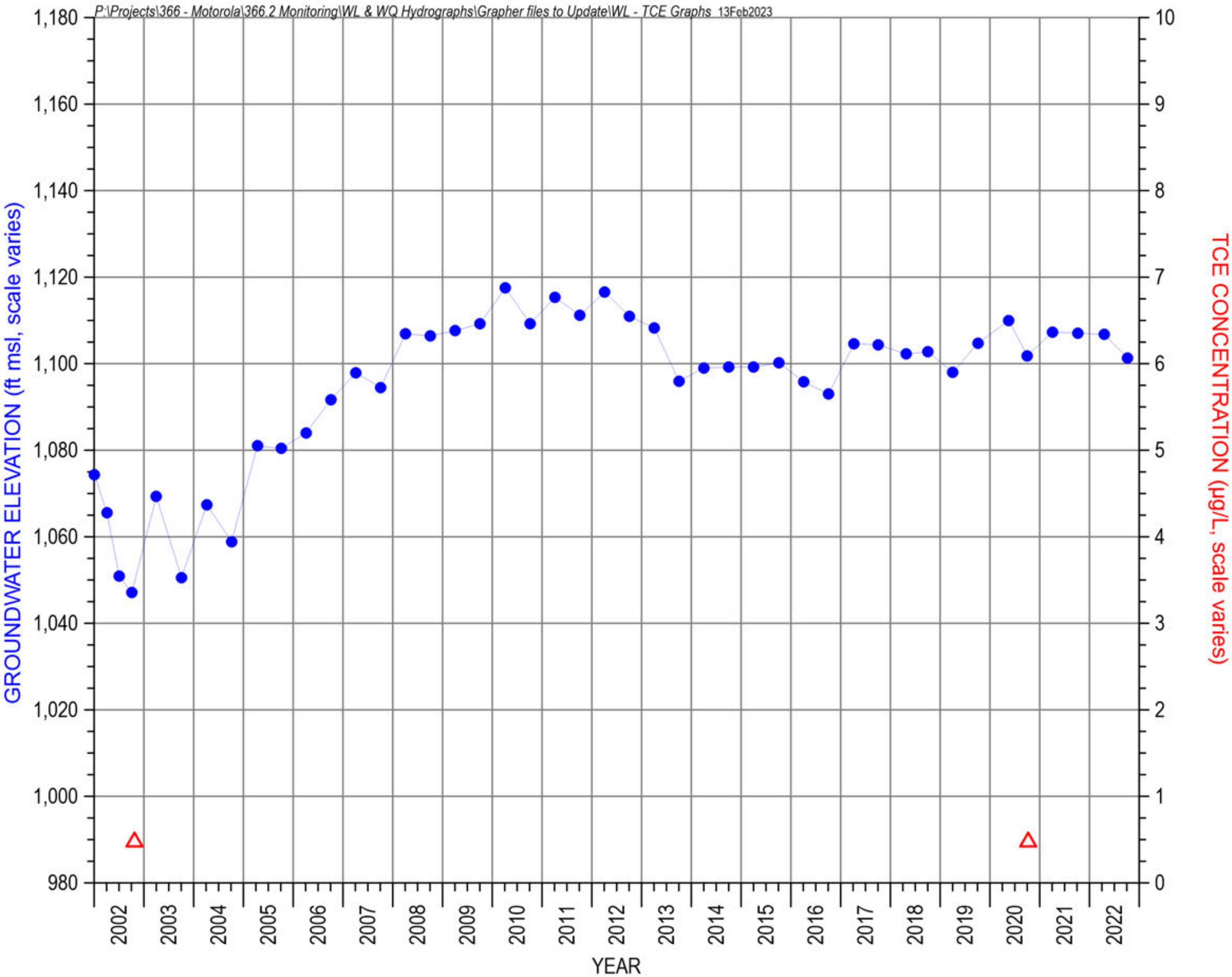




Site Land Surface Elevation:
1,226 feet msl

FIGURE D-049. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-14LA

North Indian Bend Wash Superfund Site



Note: TCE data collected after the GM&EP in 2002 is supplemental

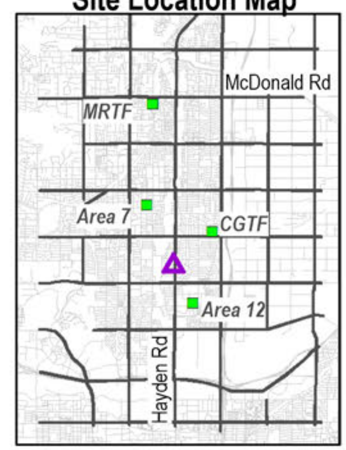
M-14MA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation:
1,226 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-050. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-14MA

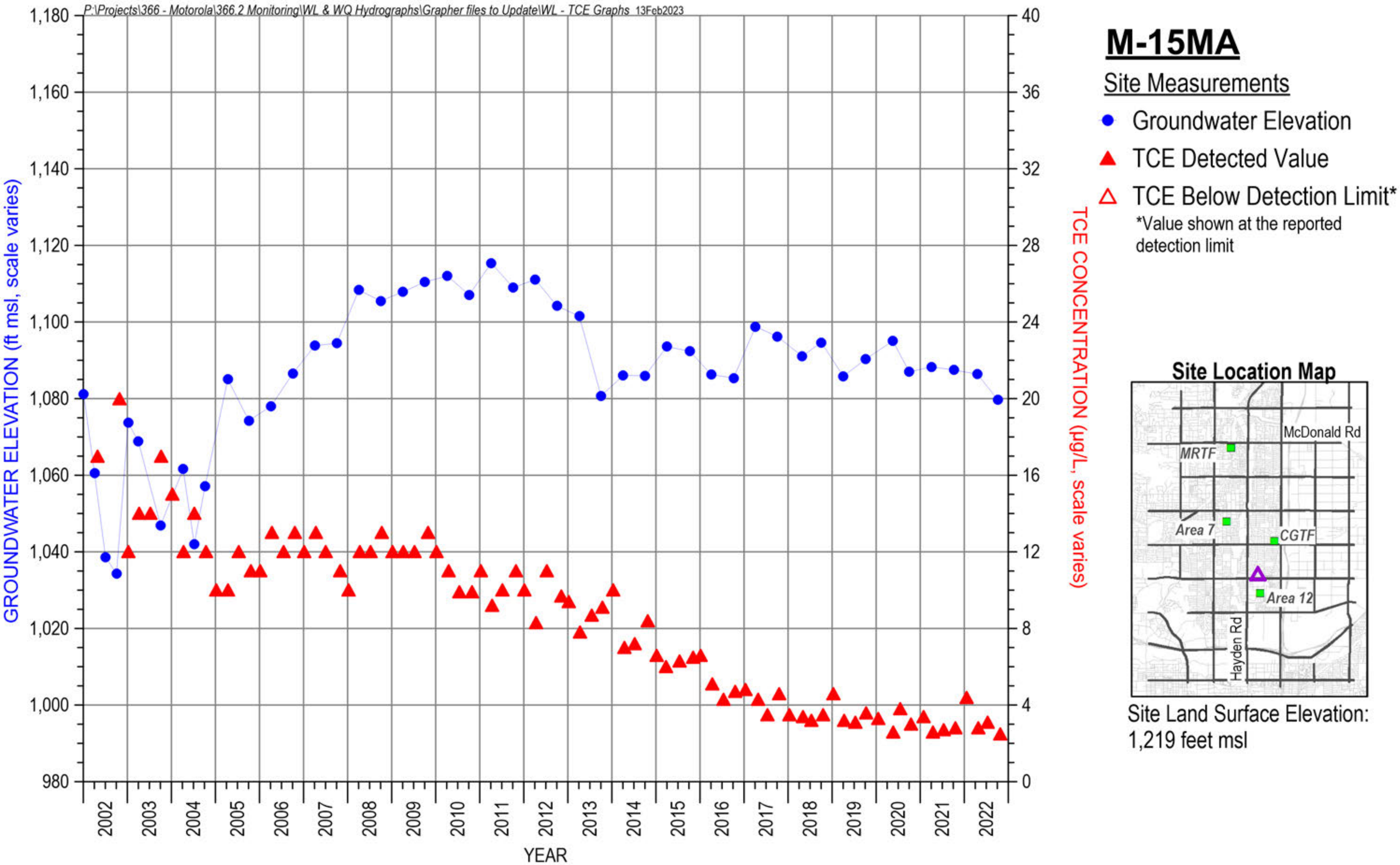


FIGURE D-051. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-15MA

North Indian Bend Wash Superfund Site

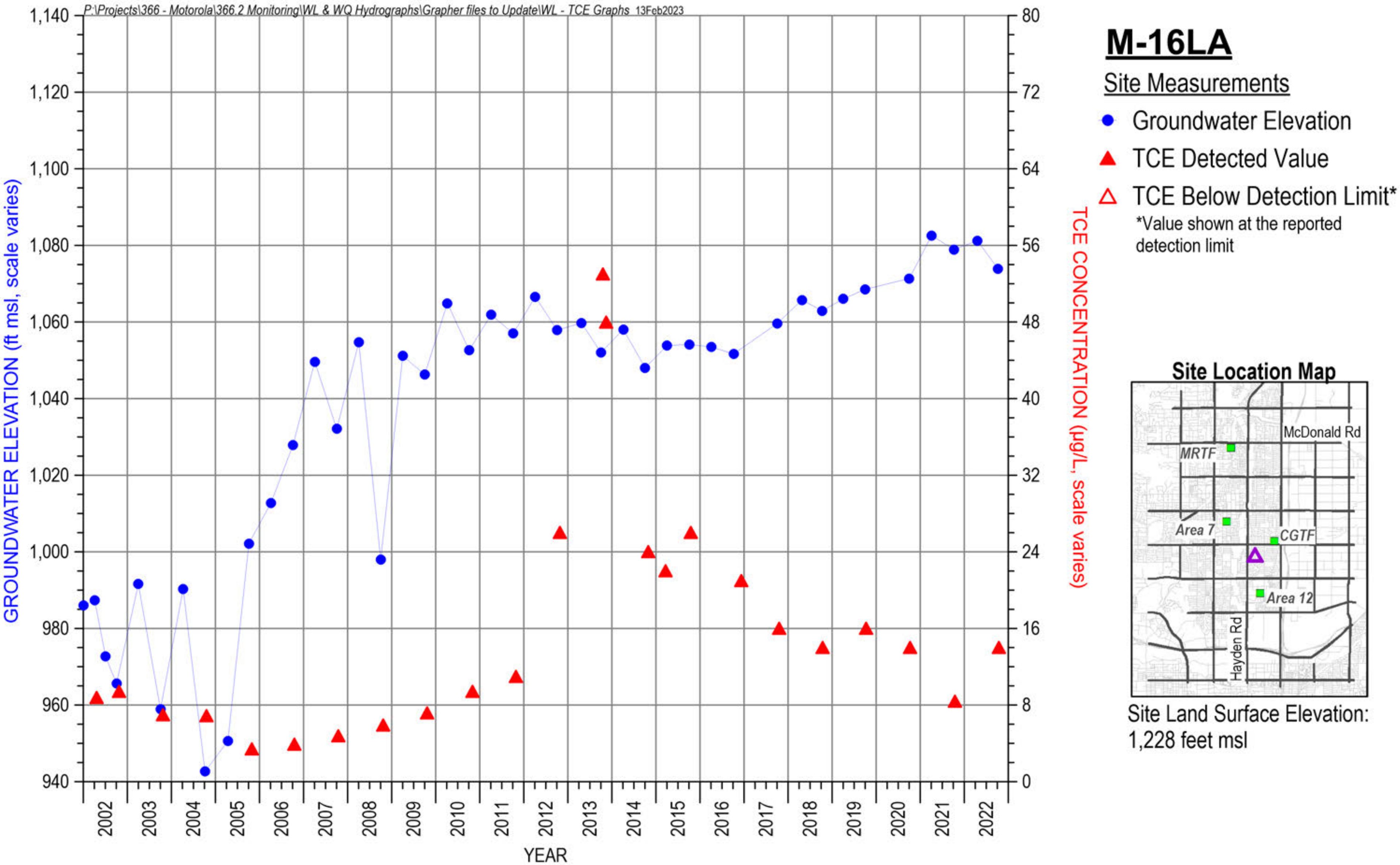


FIGURE D-052. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-16LA

North Indian Bend Wash Superfund Site

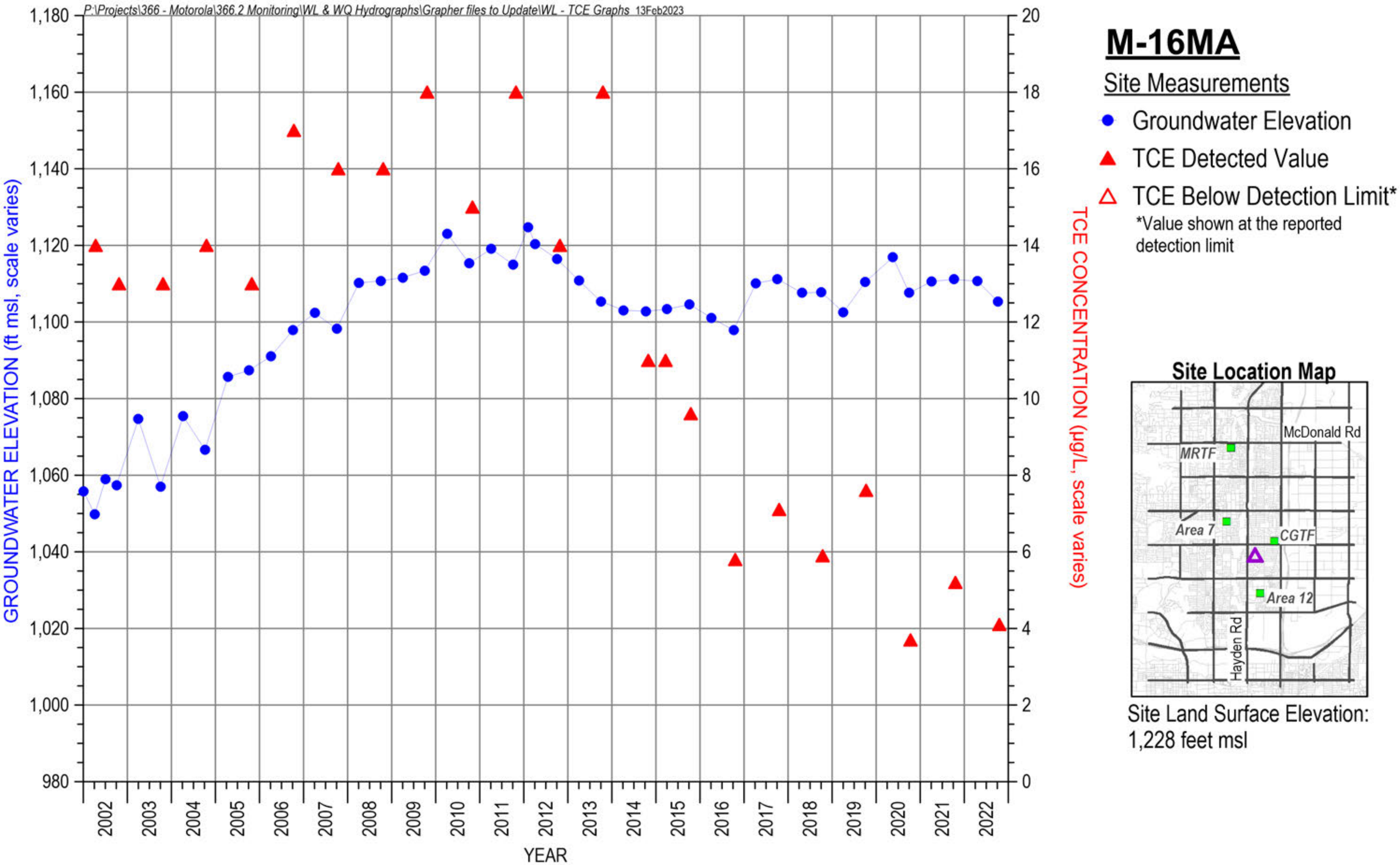


FIGURE D-053. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-16MA

North Indian Bend Wash Superfund Site

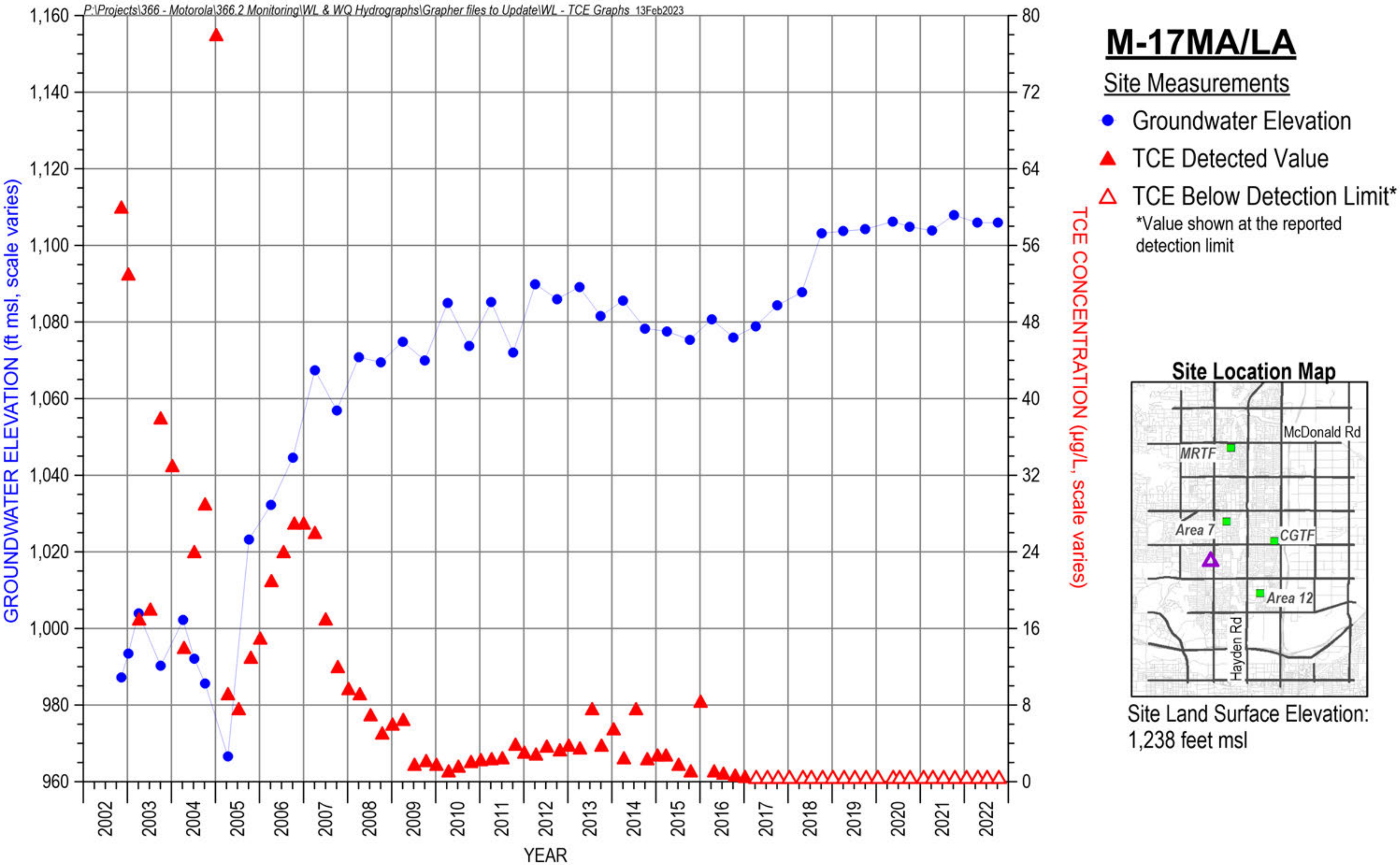


FIGURE D-054. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-17MA/LA

North Indian Bend Wash Superfund Site

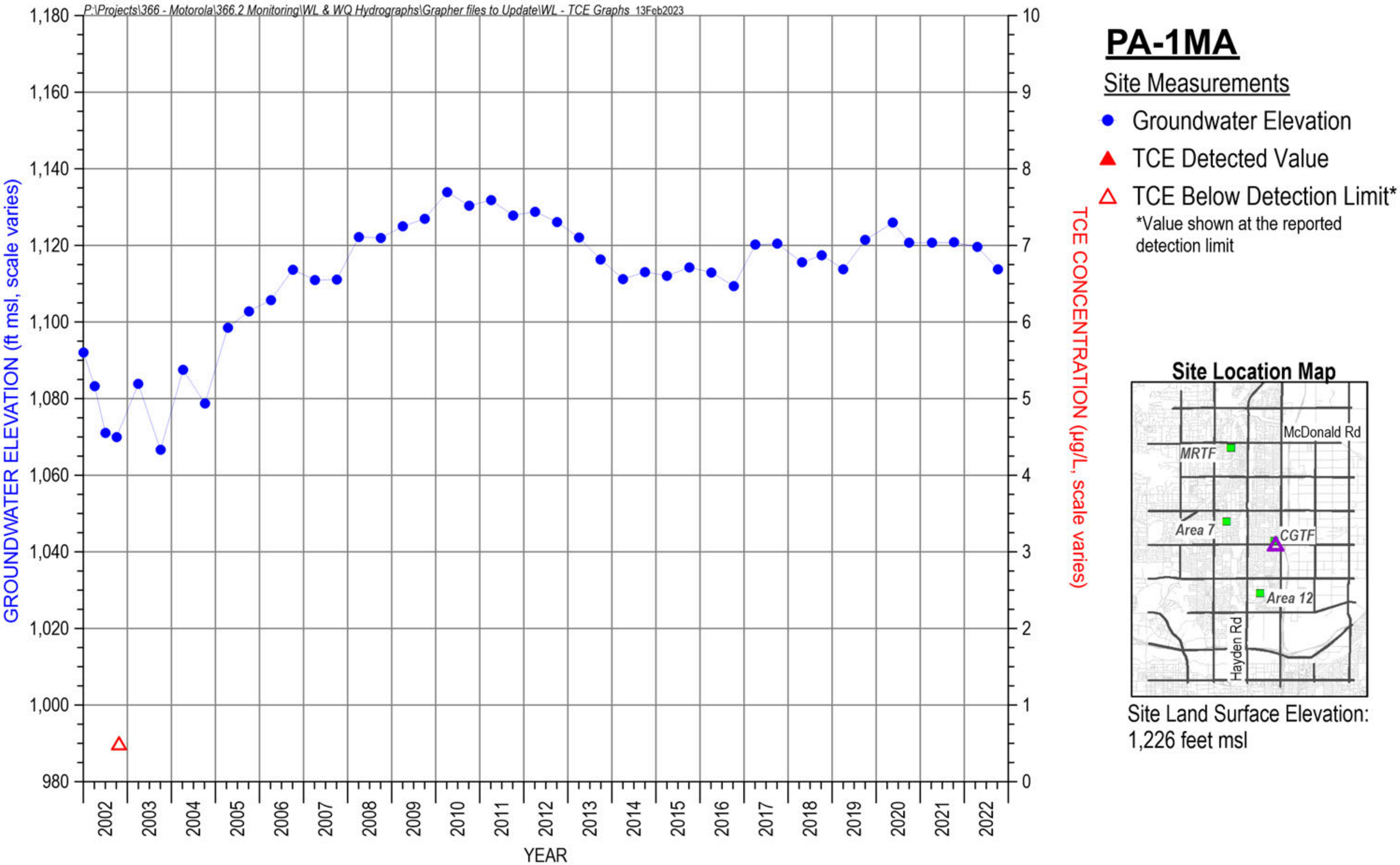
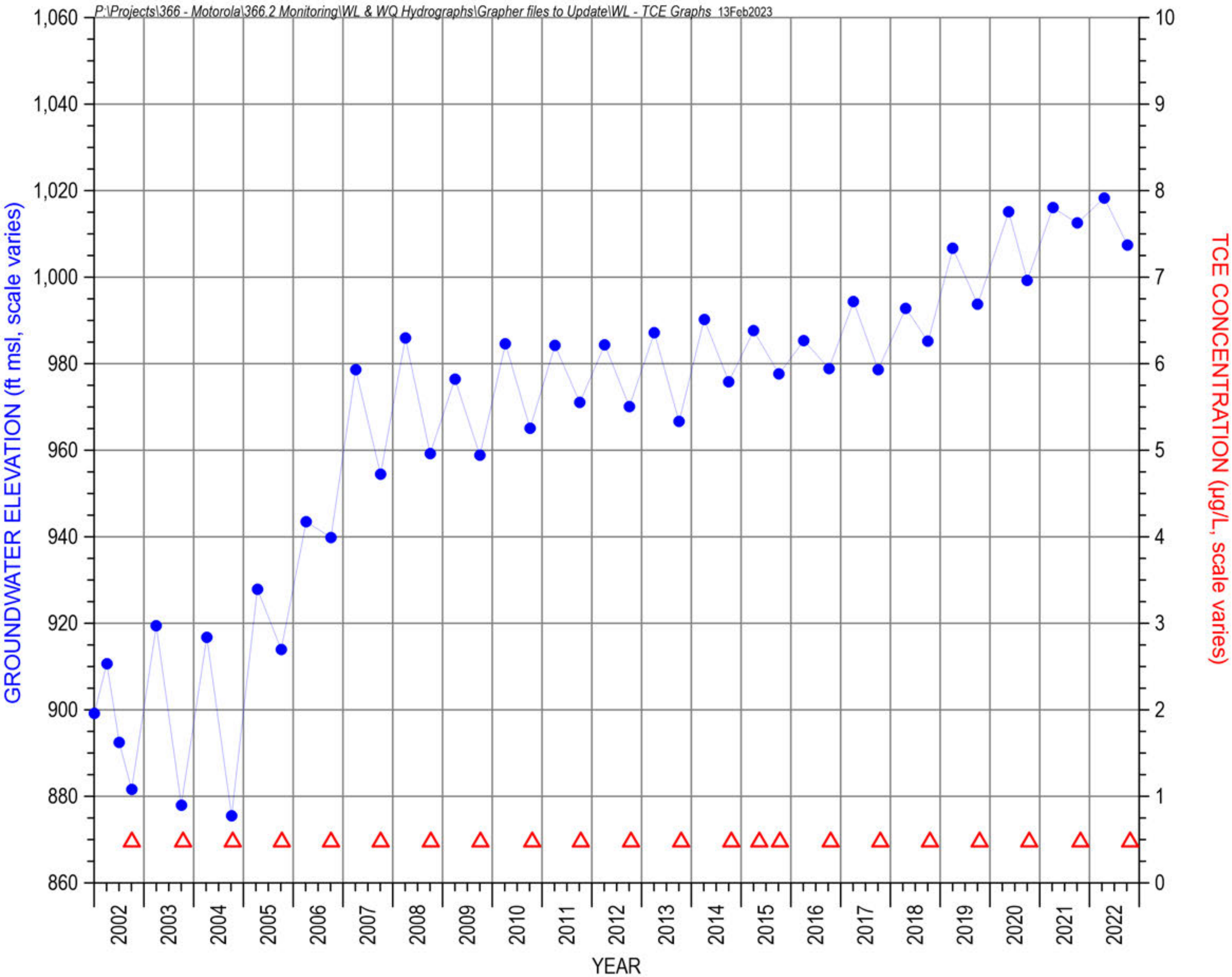


FIGURE D-055. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-1MA

North Indian Bend Wash Superfund Site



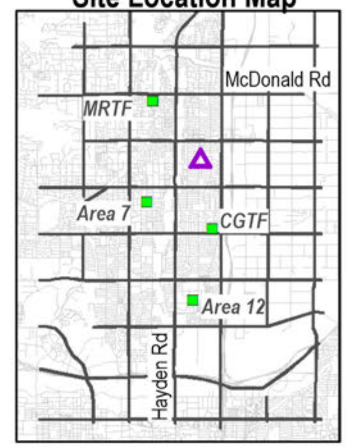
PA-2LA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation: 1,254 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-056. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-2LA

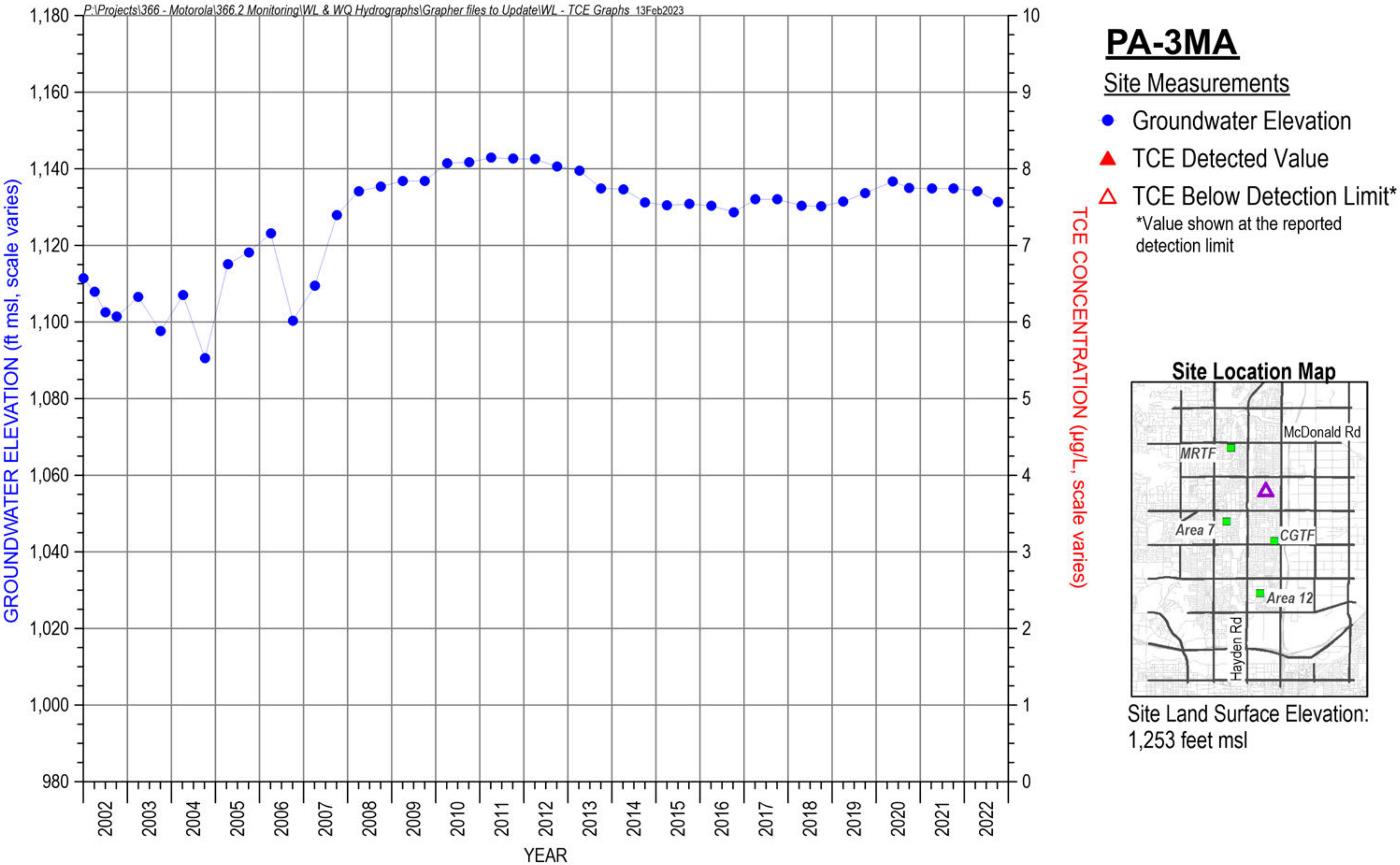
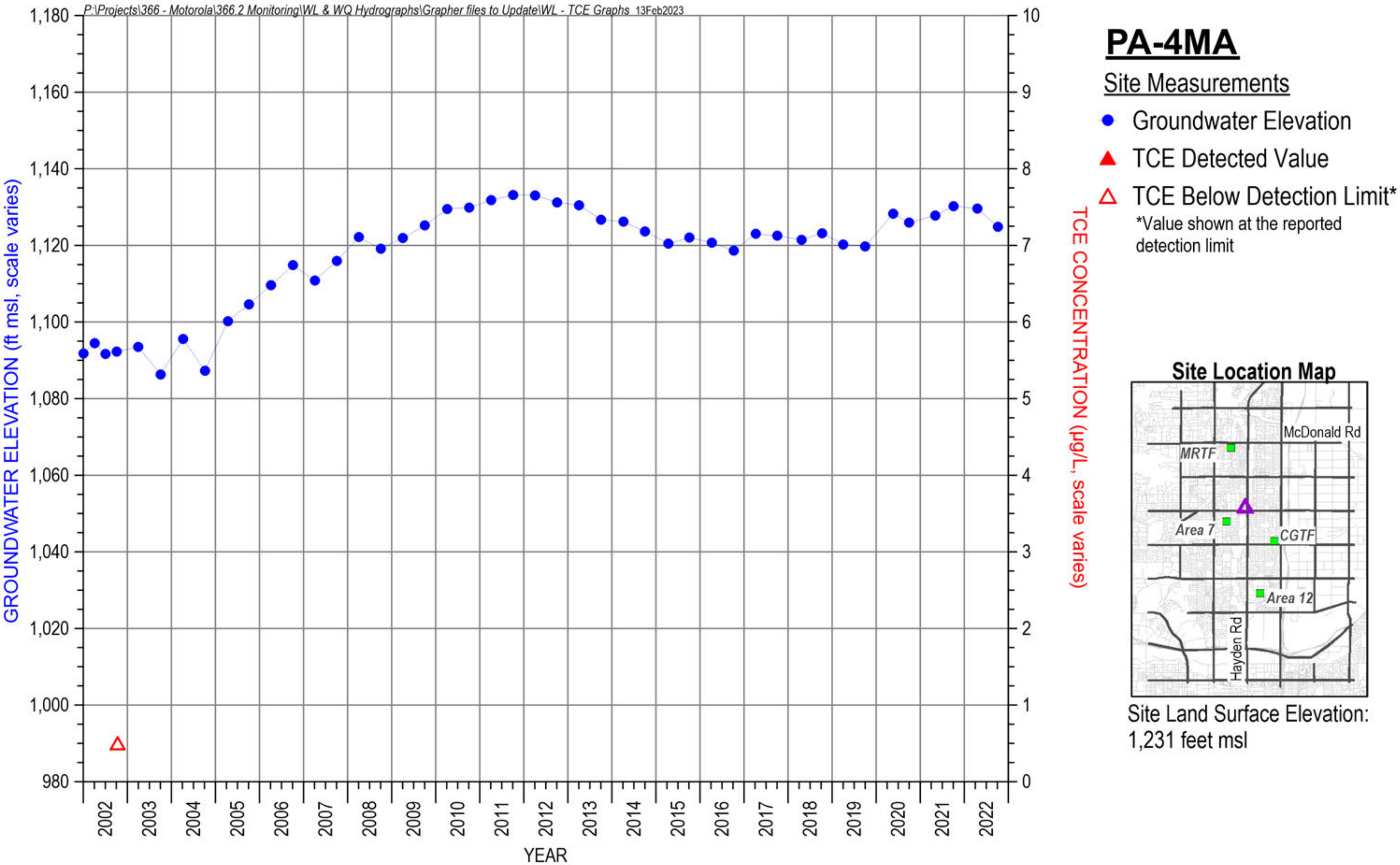


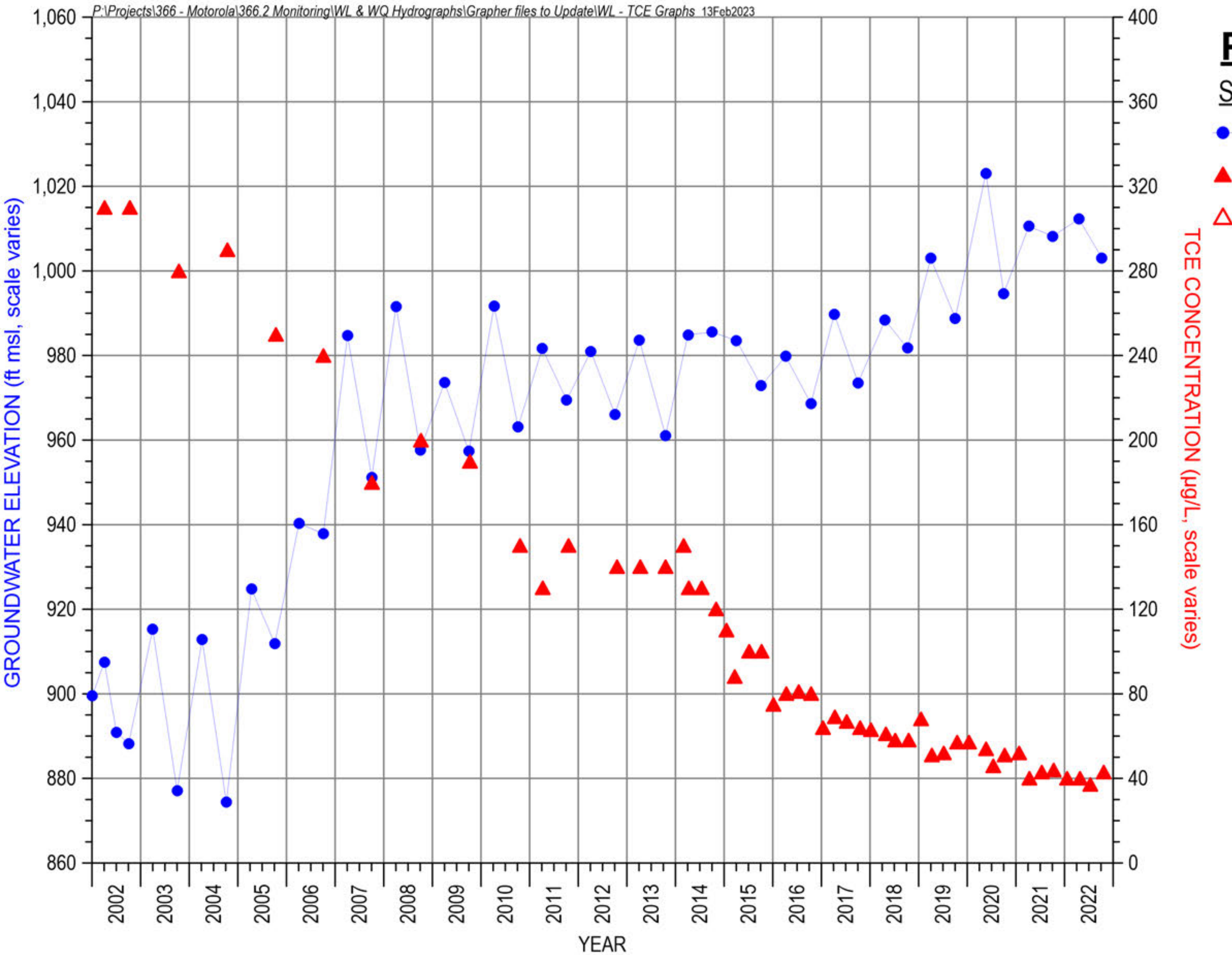
FIGURE D-057. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-3MA

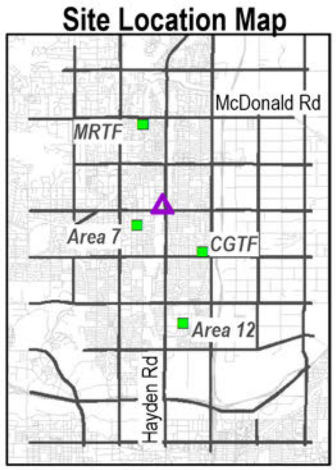
North Indian Bend Wash Superfund Site



North Indian Bend Wash Superfund Site

FIGURE D-058. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-4MA





Site Land Surface Elevation:
1,229 feet msl

FIGURE D-059. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-5LA

North Indian Bend Wash Superfund Site

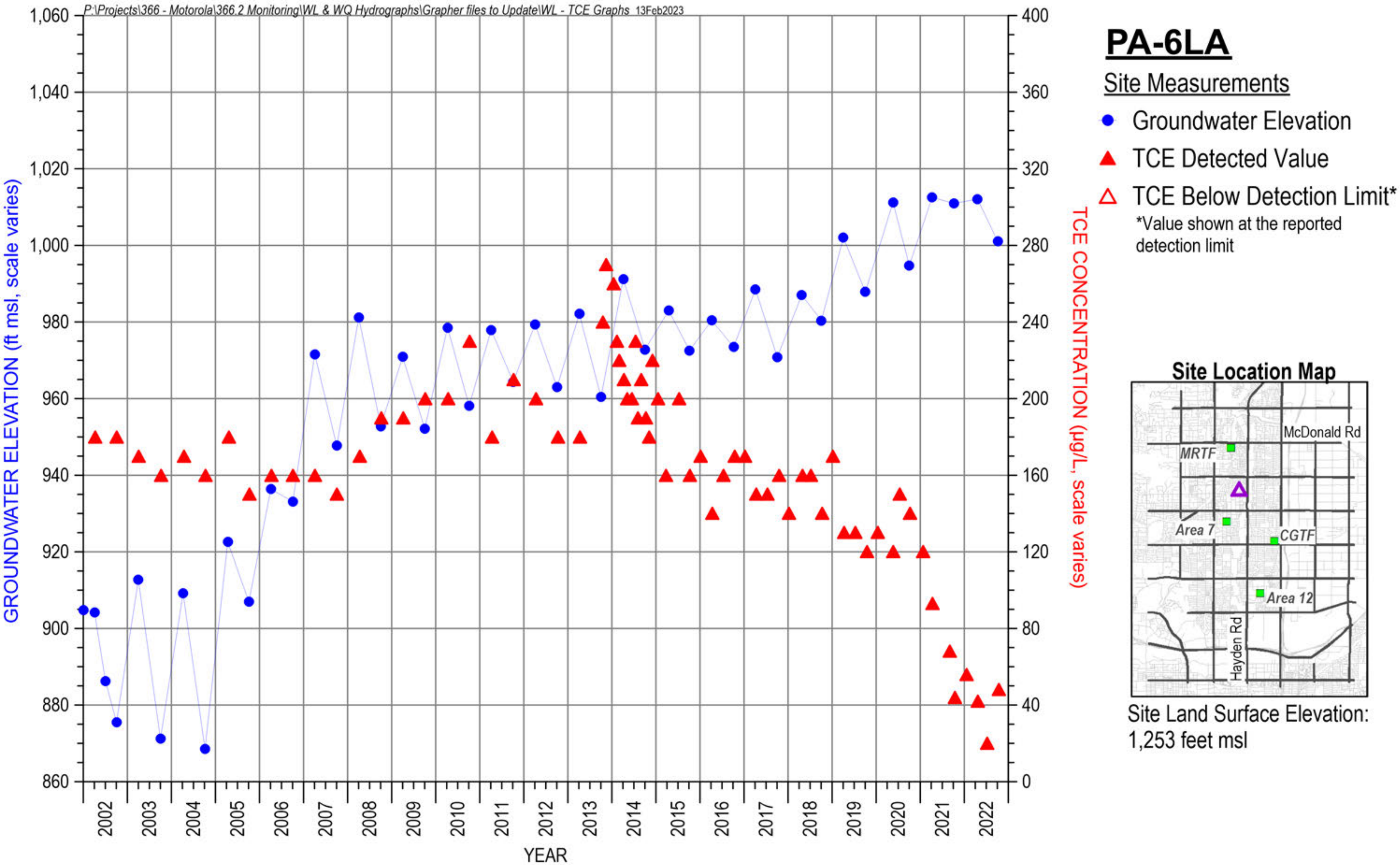


FIGURE D-060. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-6LA

North Indian Bend Wash Superfund Site

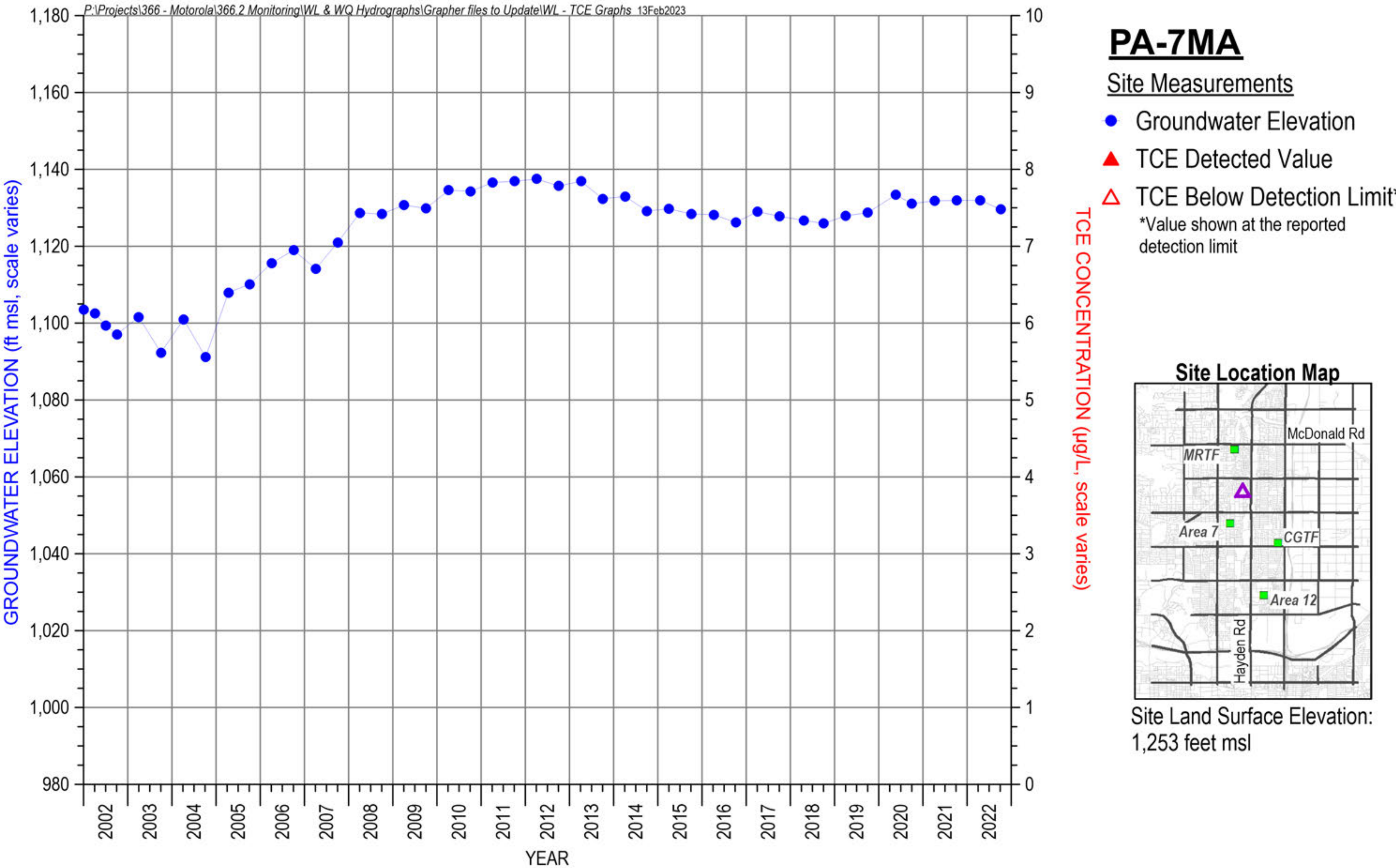
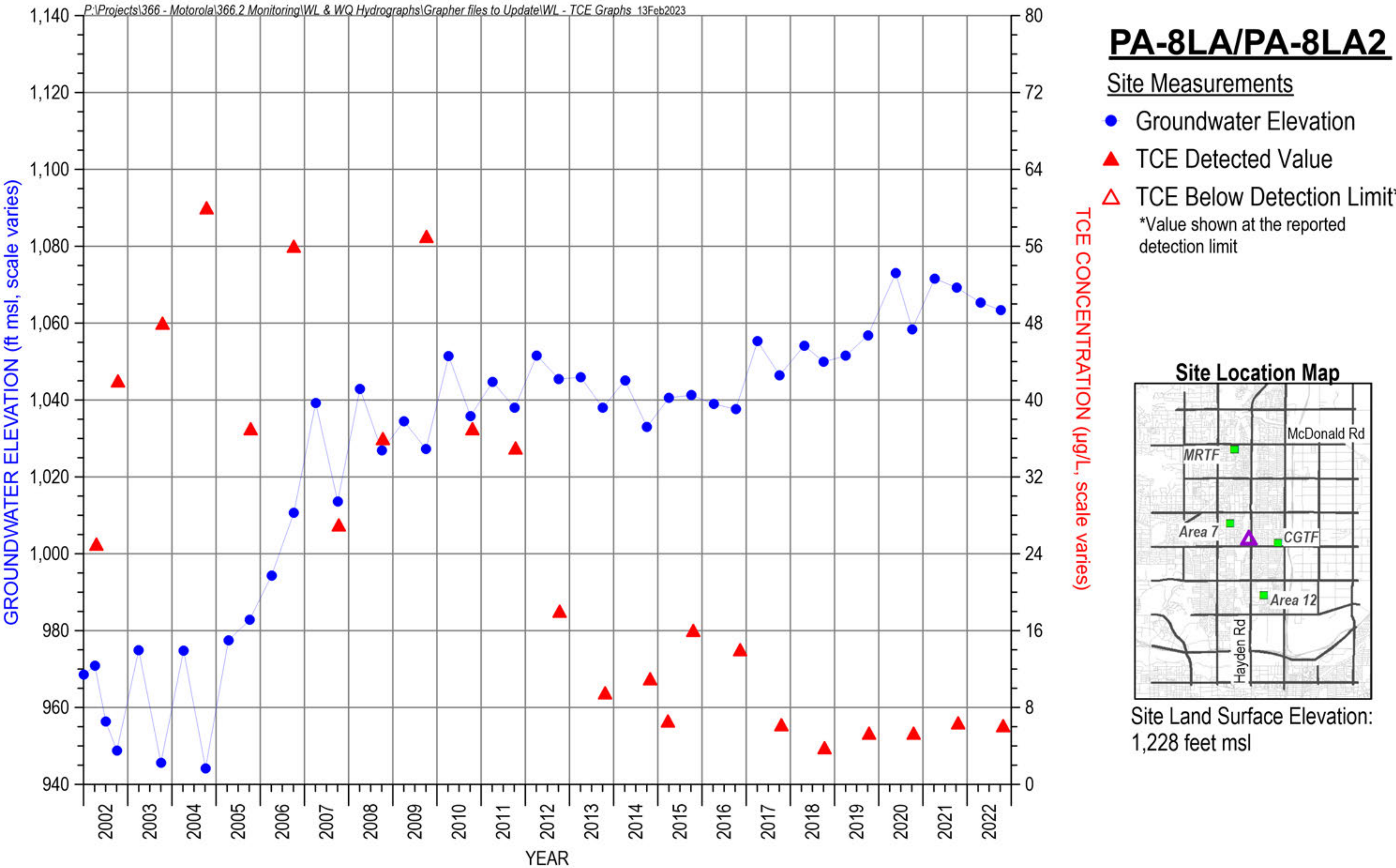


FIGURE D-061. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-7MA

North Indian Bend Wash Superfund Site



Note: Well PA-8LA was replaced by PA-8LA2 in 2007.

FIGURE D-062. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-8LA/PA-8LA2

North Indian Bend Wash Superfund Site

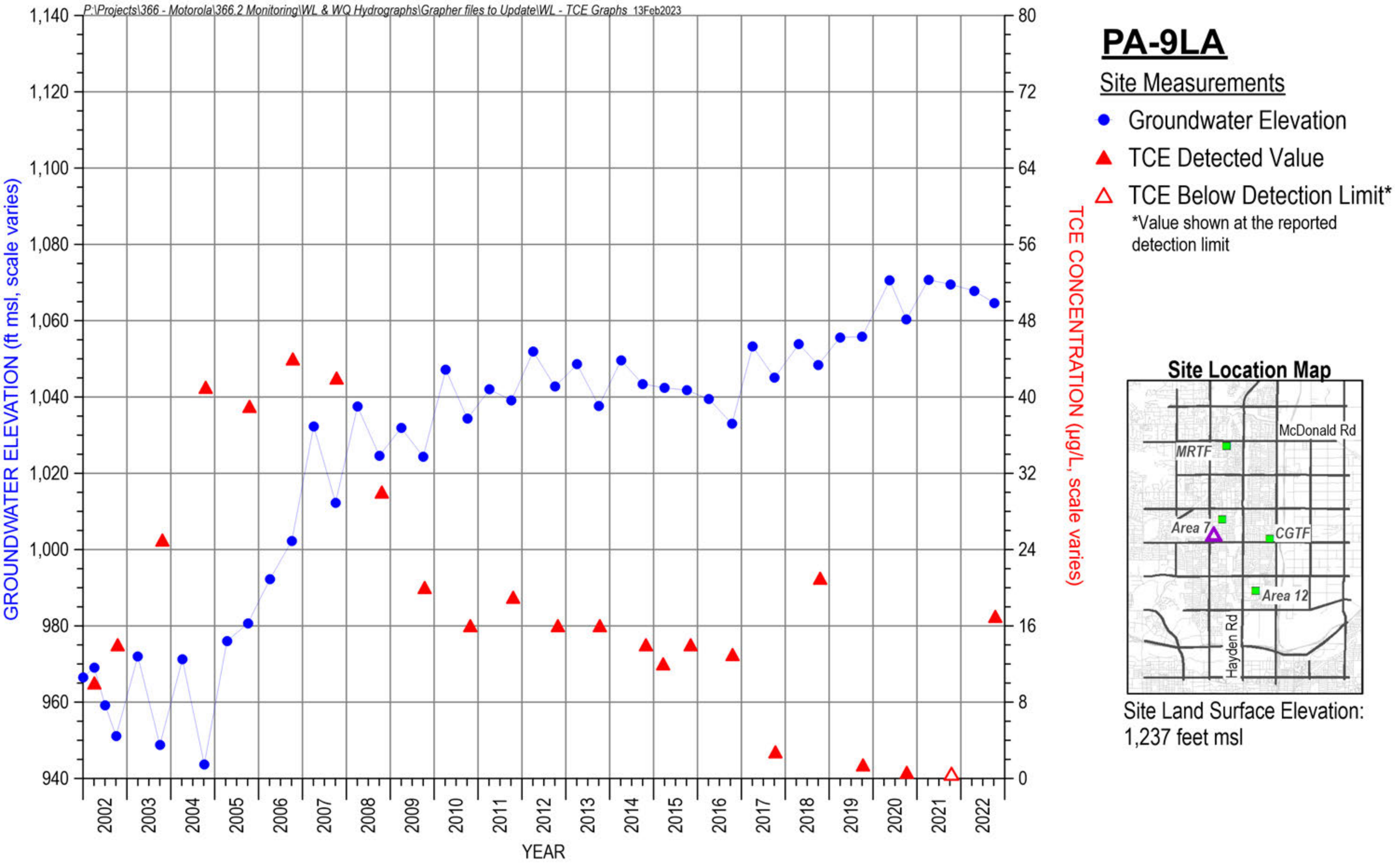
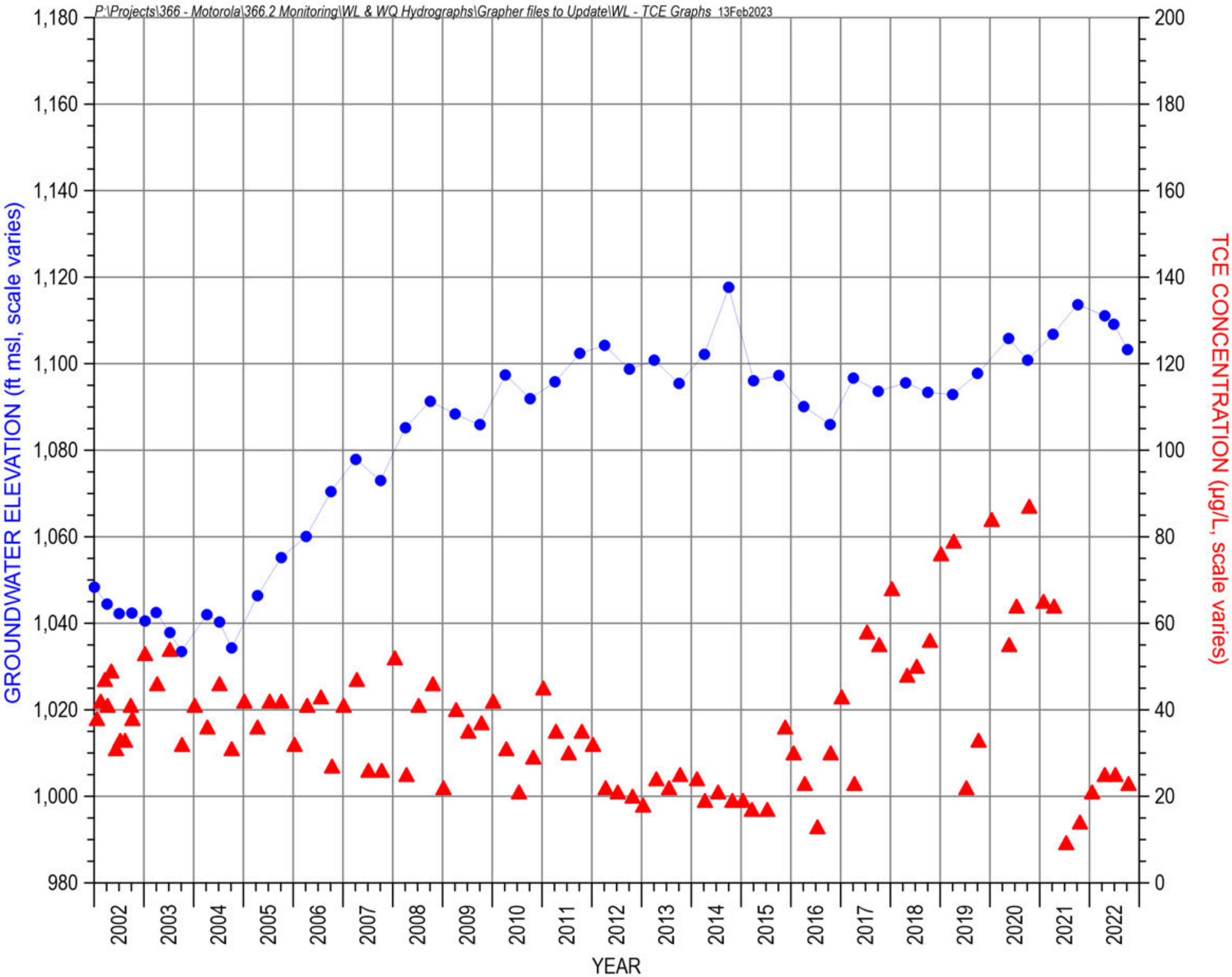


FIGURE D-063. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-9LA

North Indian Bend Wash Superfund Site



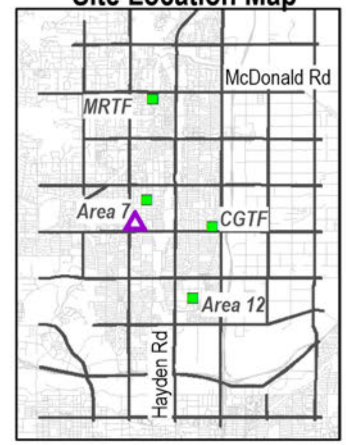
PA-10MA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

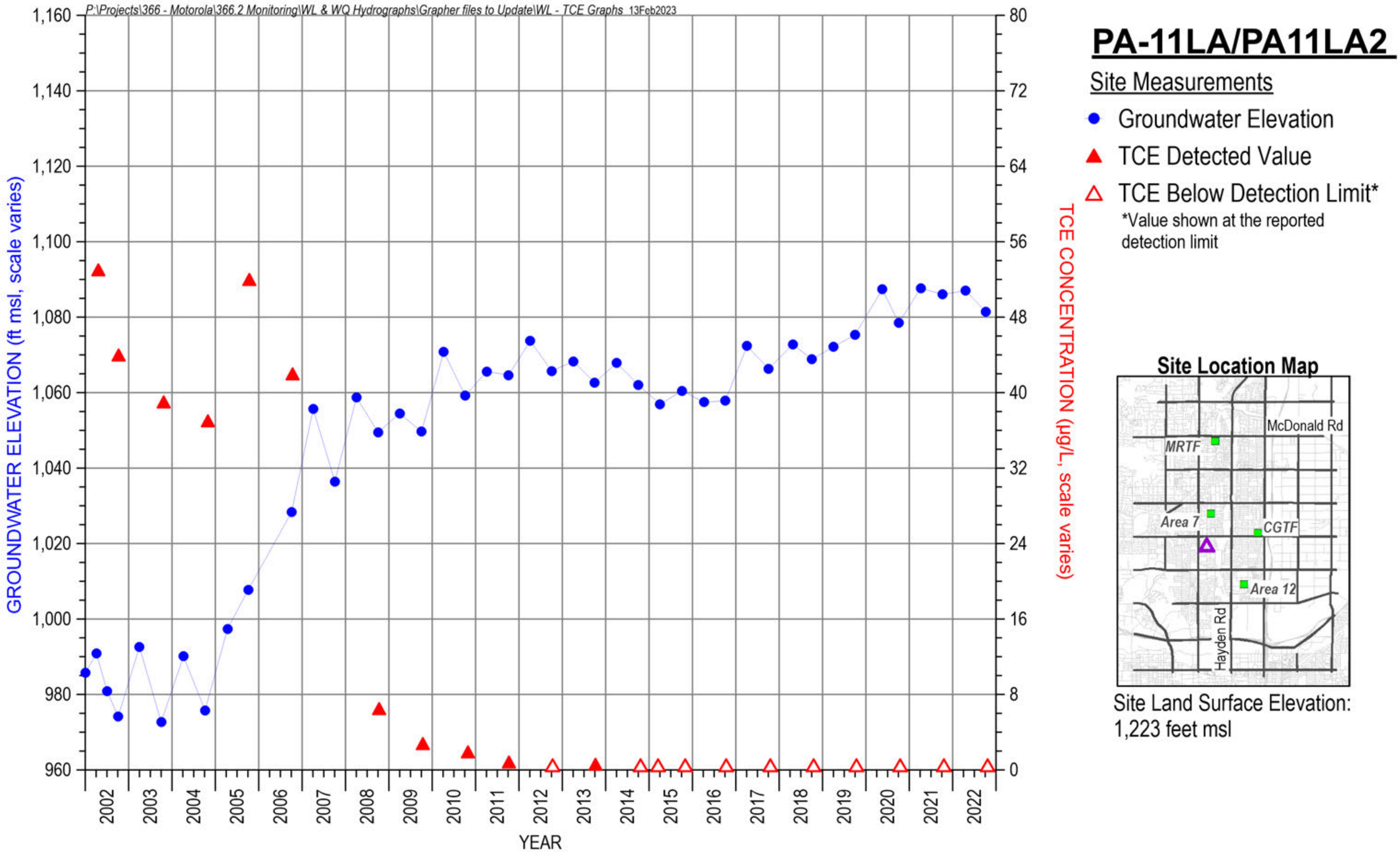
Site Location Map



Site Land Surface Elevation: 1,237 feet msl

North Indian Bend Wash Superfund Site

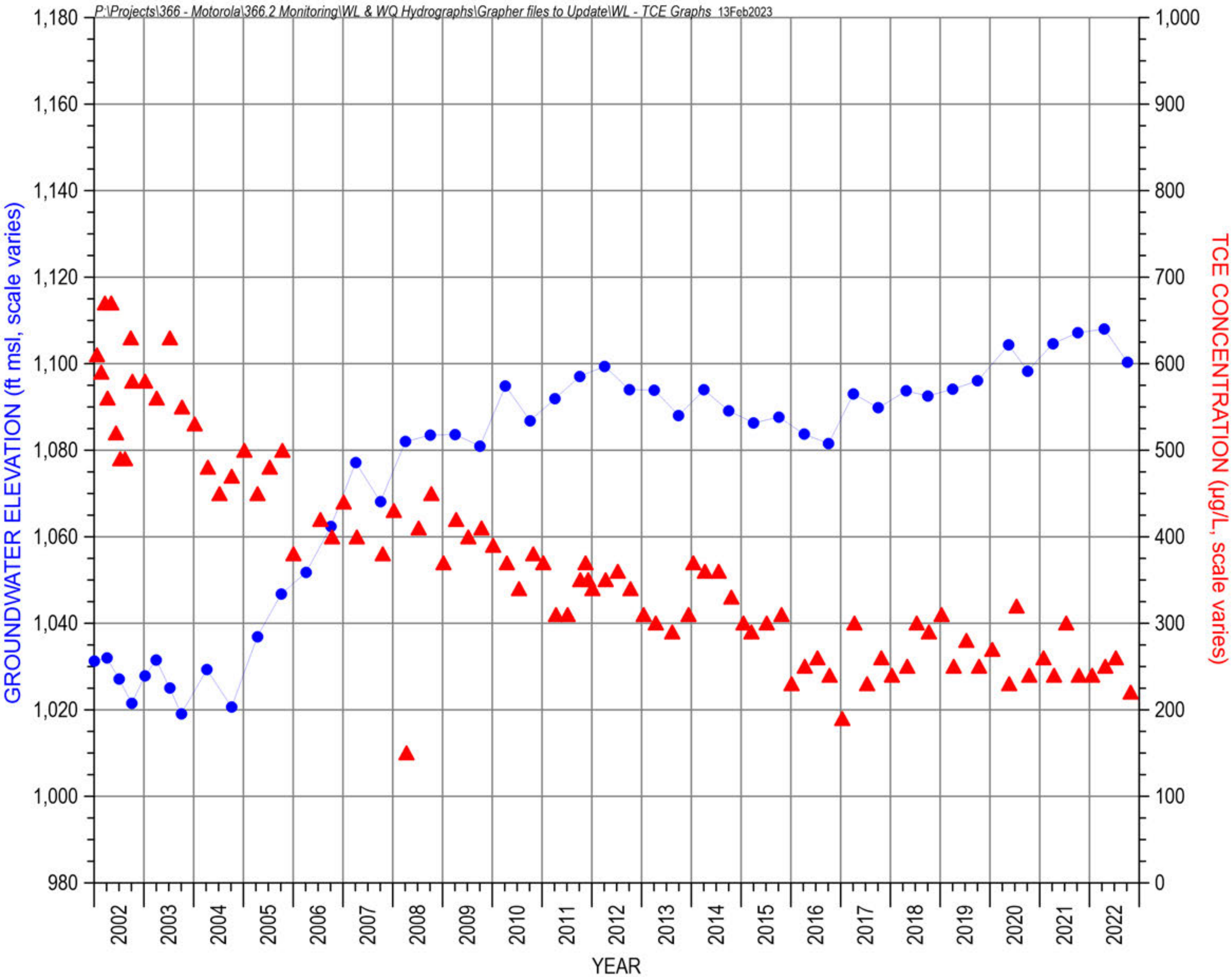
FIGURE D-064. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-10MA



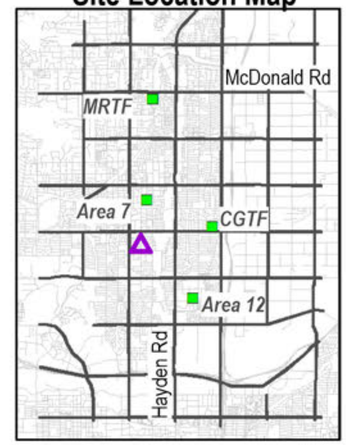
Note: Water level collected from LAU completed well at piezometer PA-11LA2 located approximately 80 feet northwest of original well PA-11LA.

FIGURE D-065. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-11LA/PA11LA2

North Indian Bend Wash Superfund Site



Site Location Map



Site Land Surface Elevation:
1,223 feet msl

Note: Water level collected from MAU completed well at piezometer PA-12MA2 located approximately 70 feet northwest of original well PA-12MA.

North Indian Bend Wash Superfund Site

FIGURE D-066. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-12MA/PA-12MA2

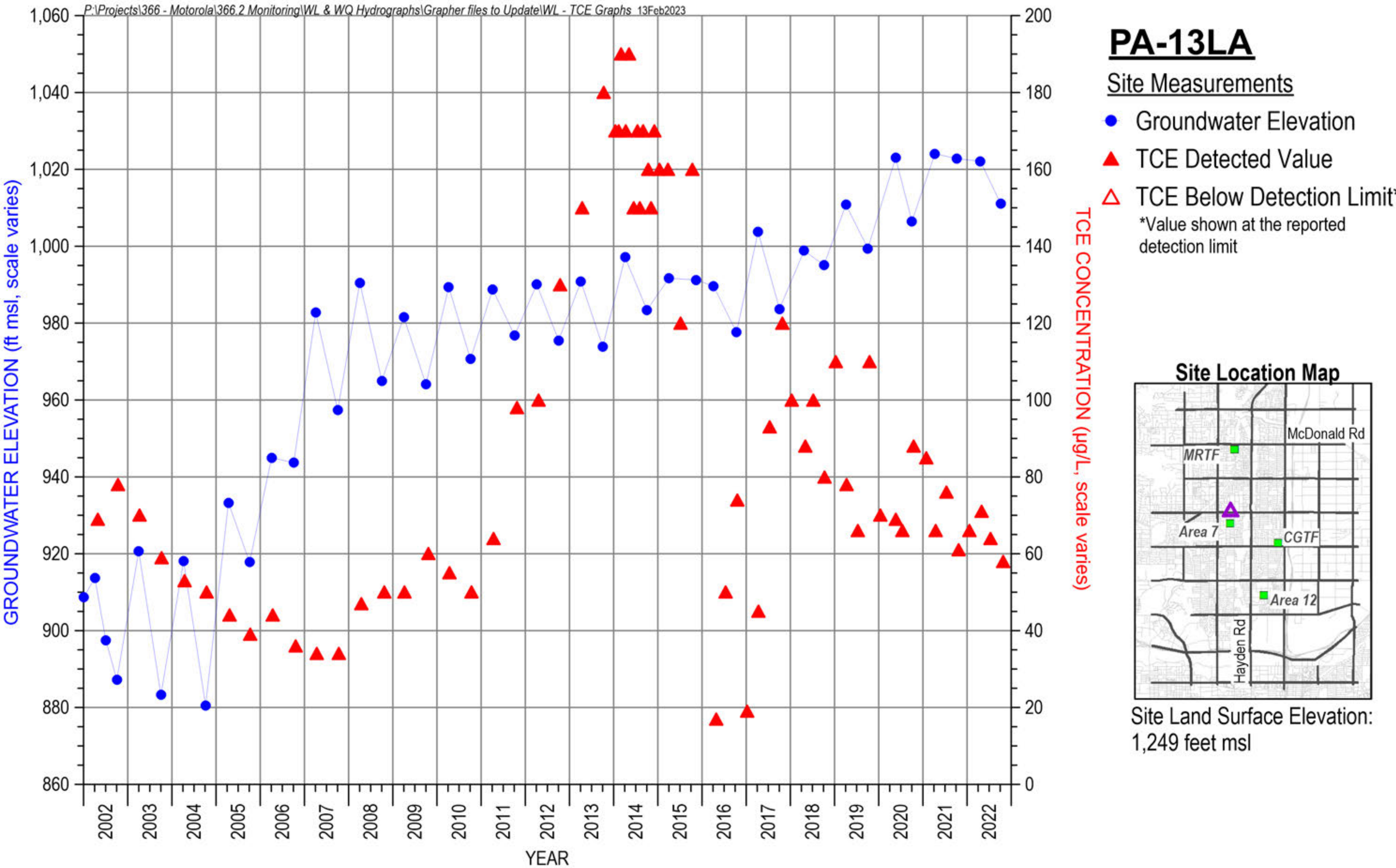
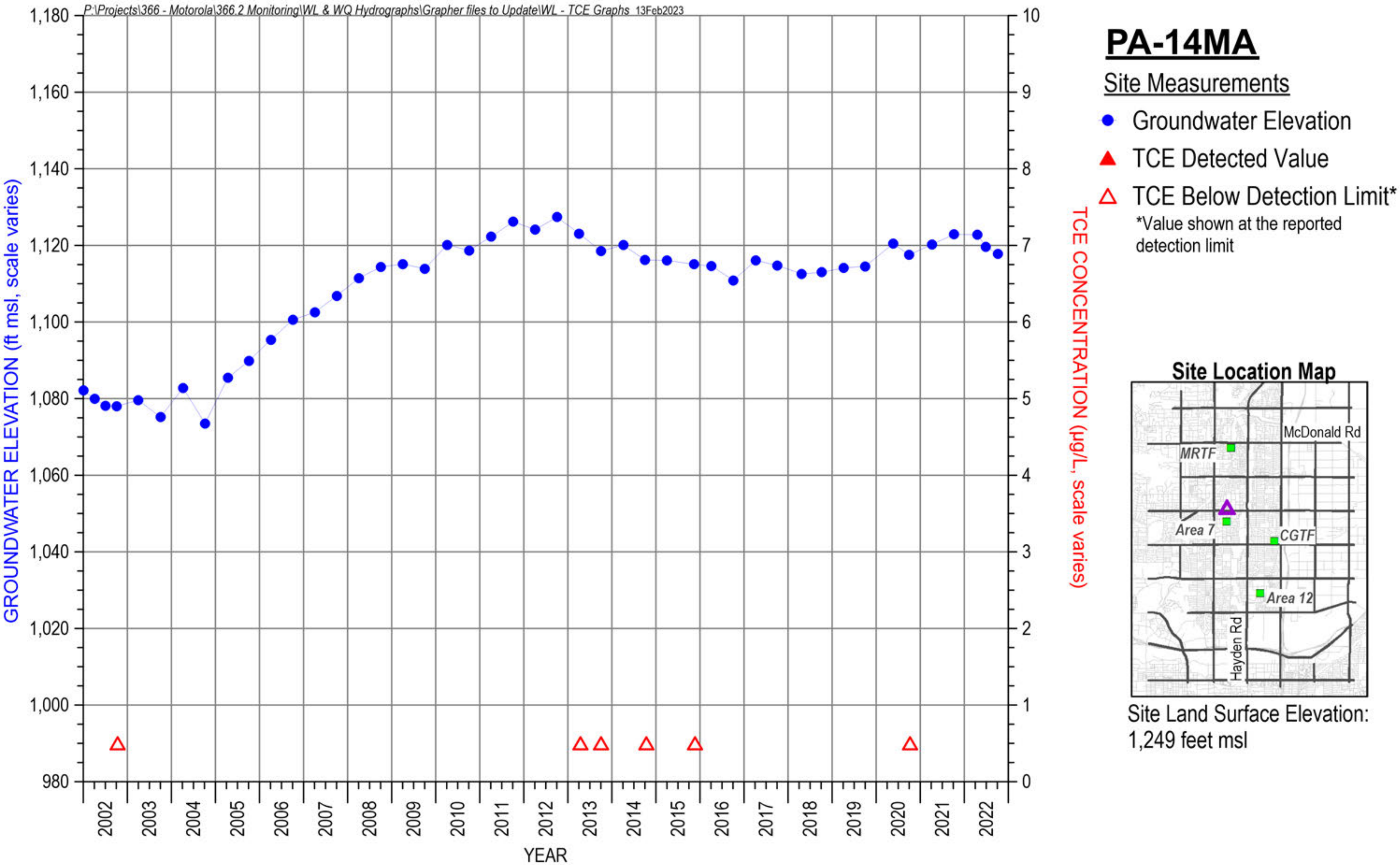


FIGURE D-067. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-13LA

North Indian Bend Wash Superfund Site



Note: TCE data collected after the GM&EP in 2002 is supplemental

FIGURE D-068. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-14MA

North Indian Bend Wash Superfund Site

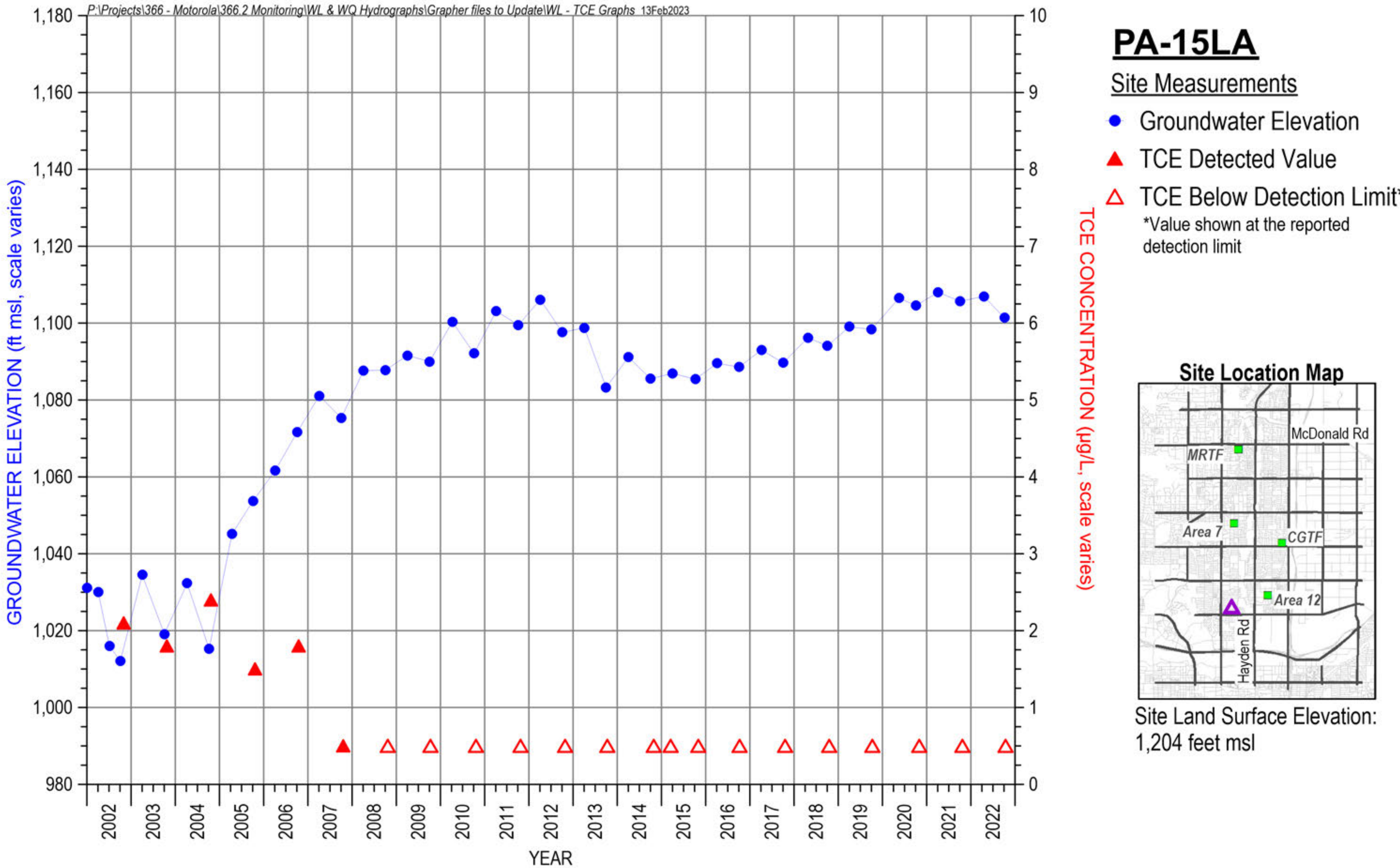


FIGURE D-069. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-15LA

North Indian Bend Wash Superfund Site

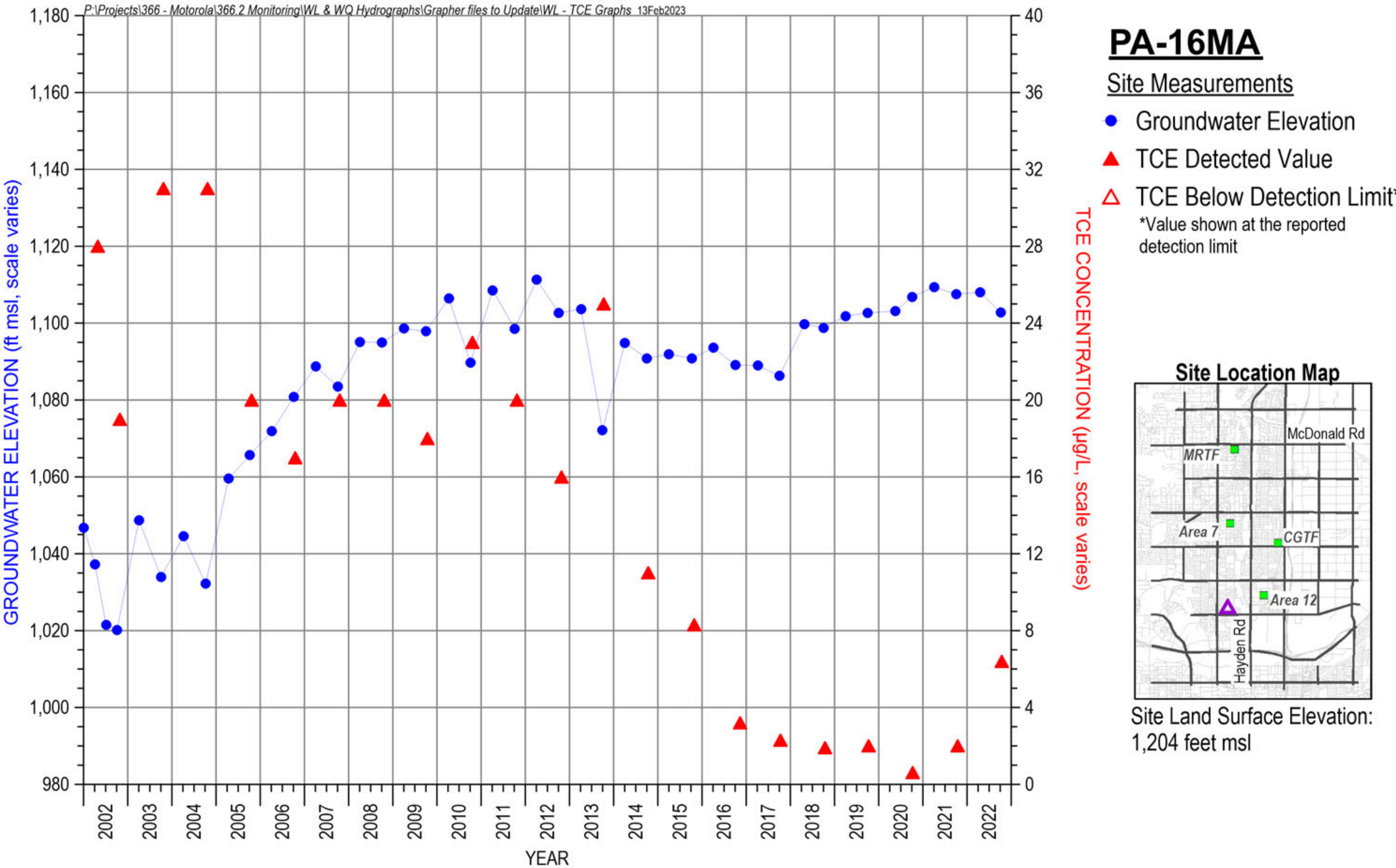
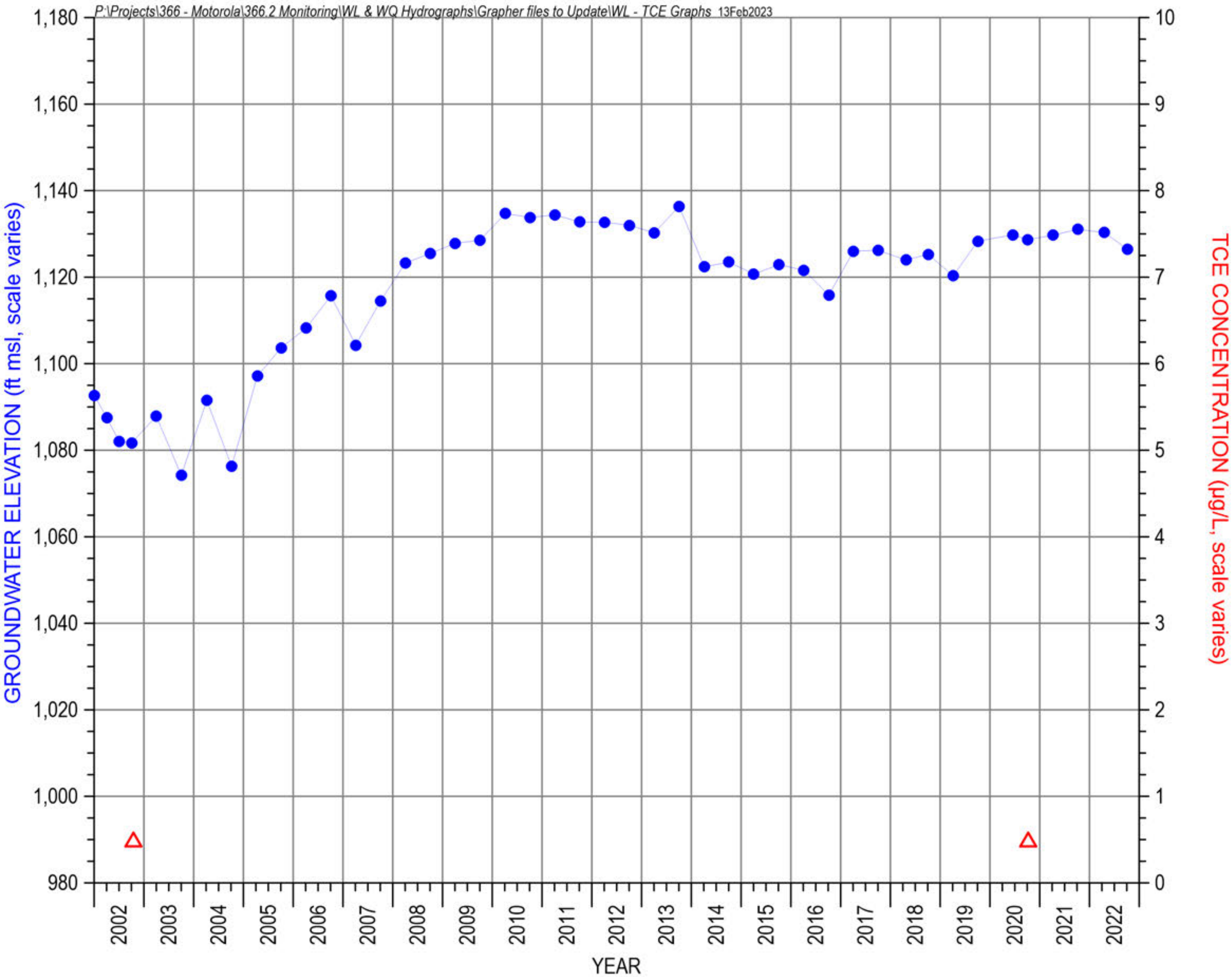


FIGURE D-070. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-16MA

North Indian Bend Wash Superfund Site



Note: Well M-17MA was replaced by M-17MA2 in 2014.

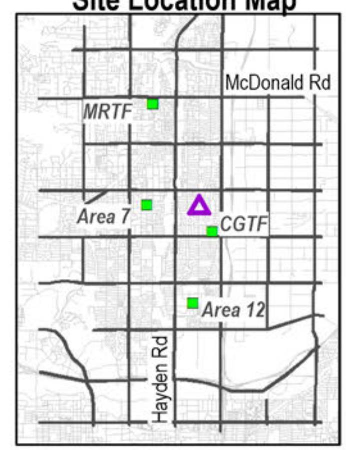
PA-17MA/PA-17MA2

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation:
1,239 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-071. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-17MA/PA-17MA2

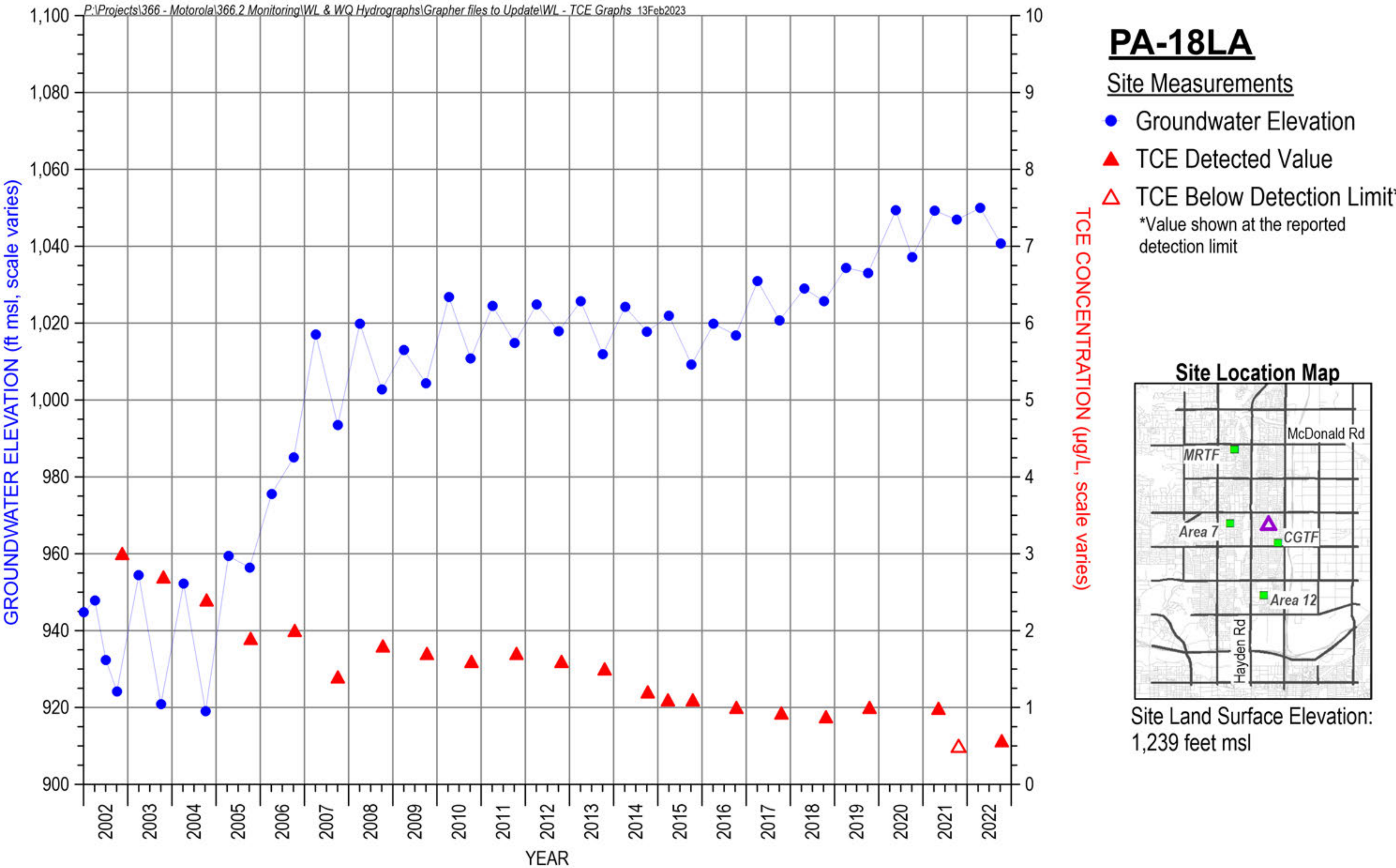


FIGURE D-072. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-18LA

North Indian Bend Wash Superfund Site

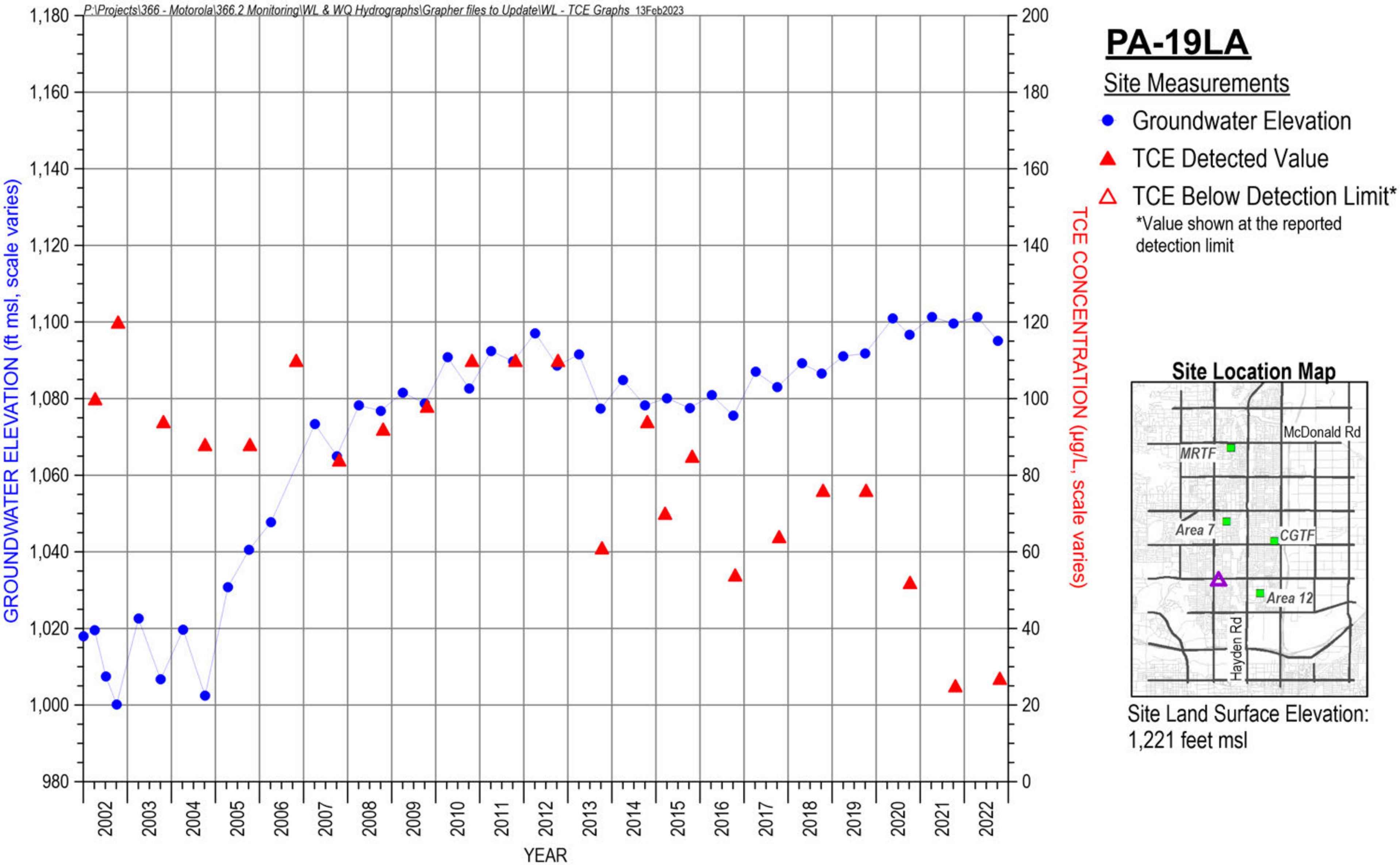
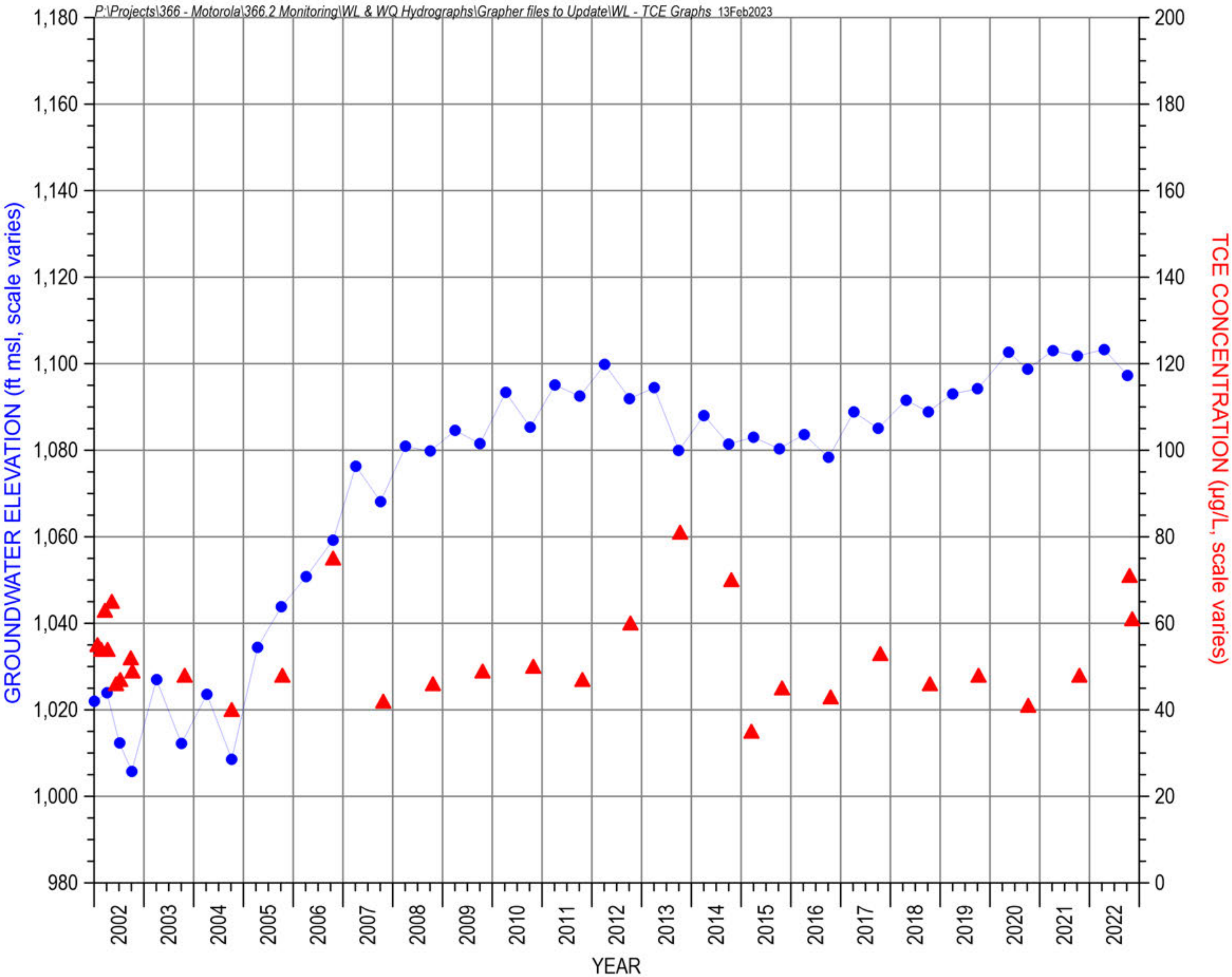


FIGURE D-073. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-19LA

North Indian Bend Wash Superfund Site



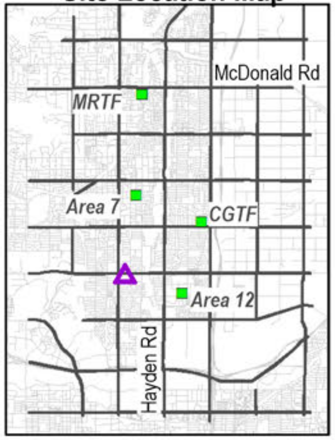
PA-20MA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation:
1,221 feet msl

FIGURE D-074. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-20MA

North Indian Bend Wash Superfund Site

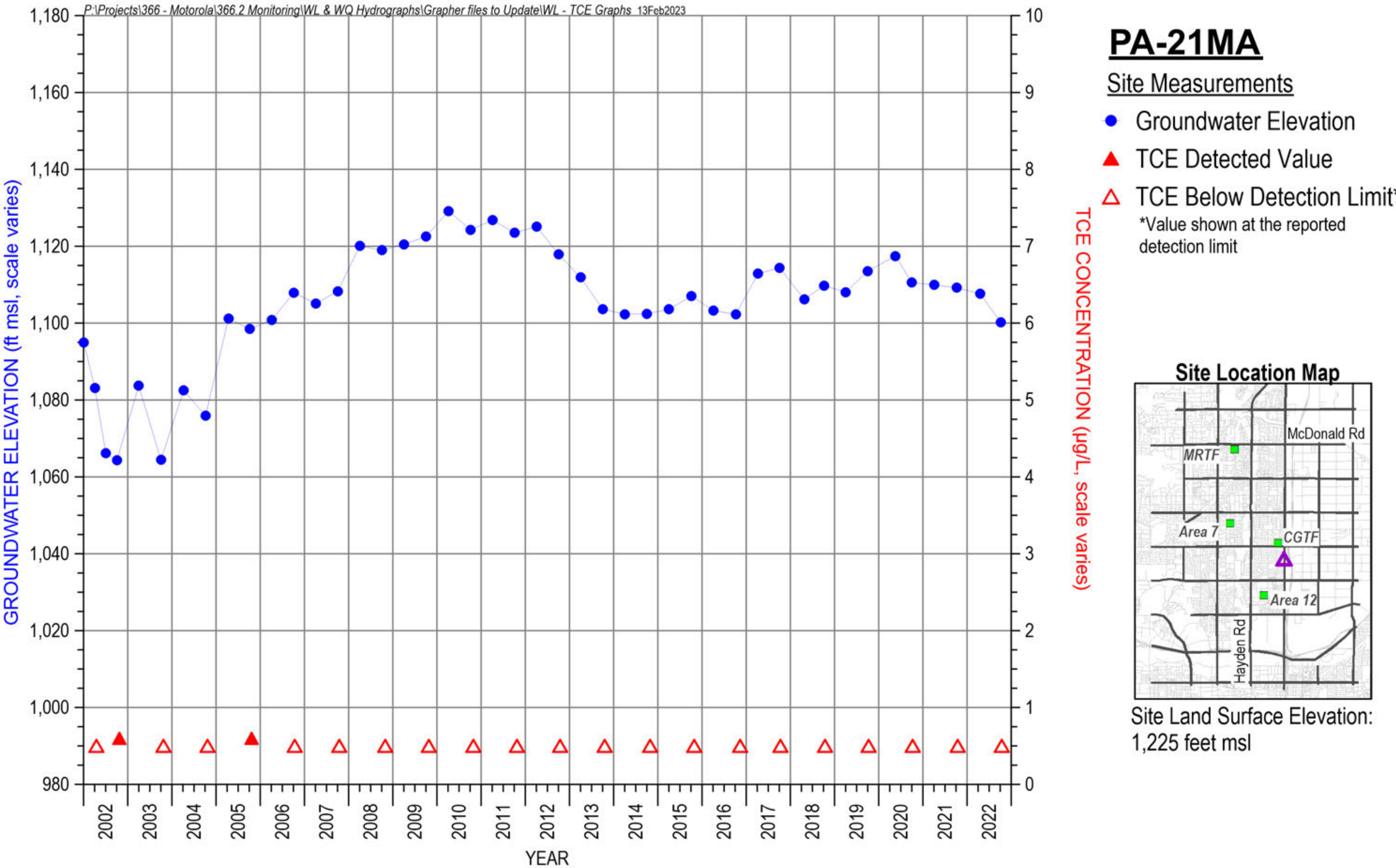
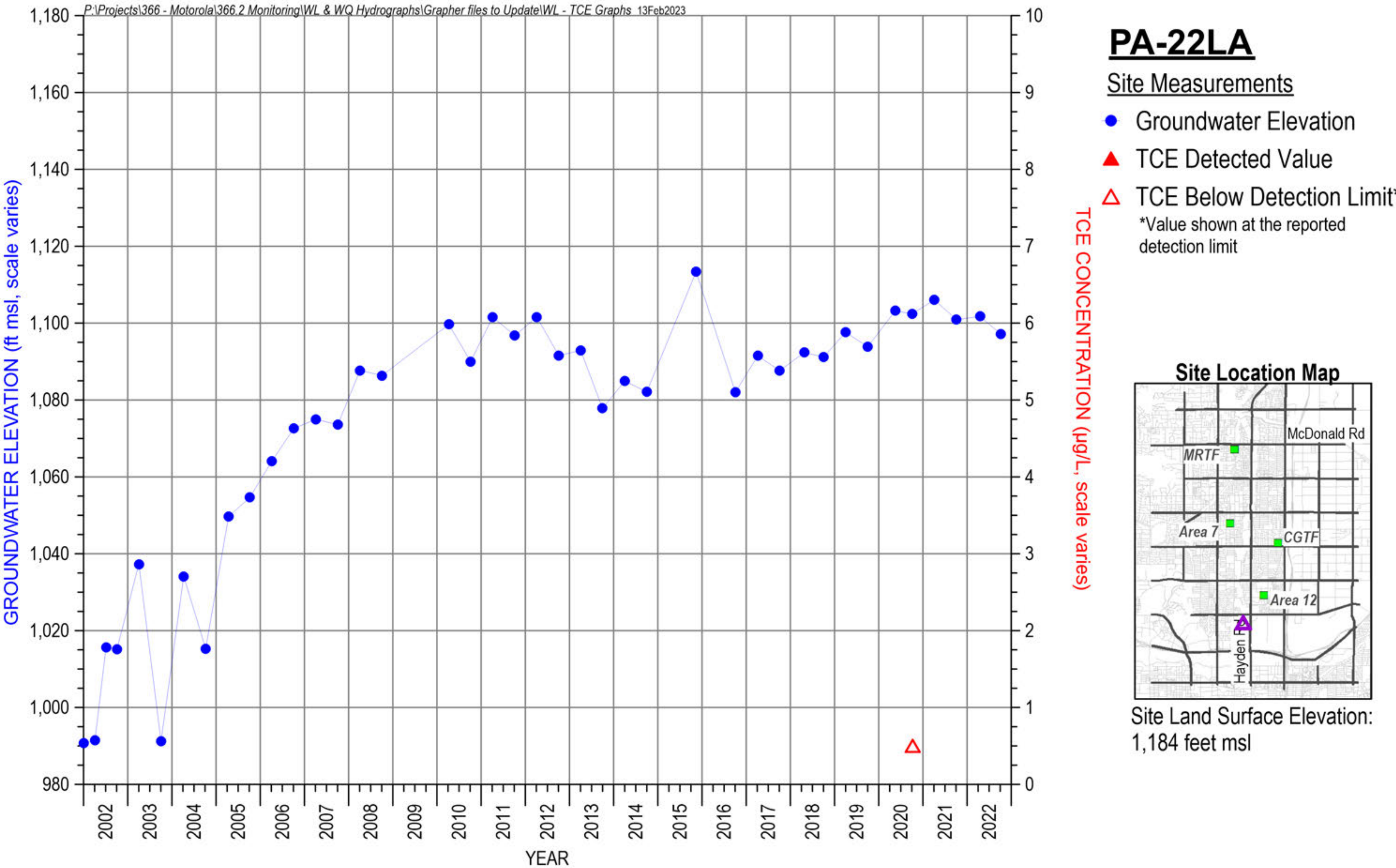


FIGURE D-075. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-21MA

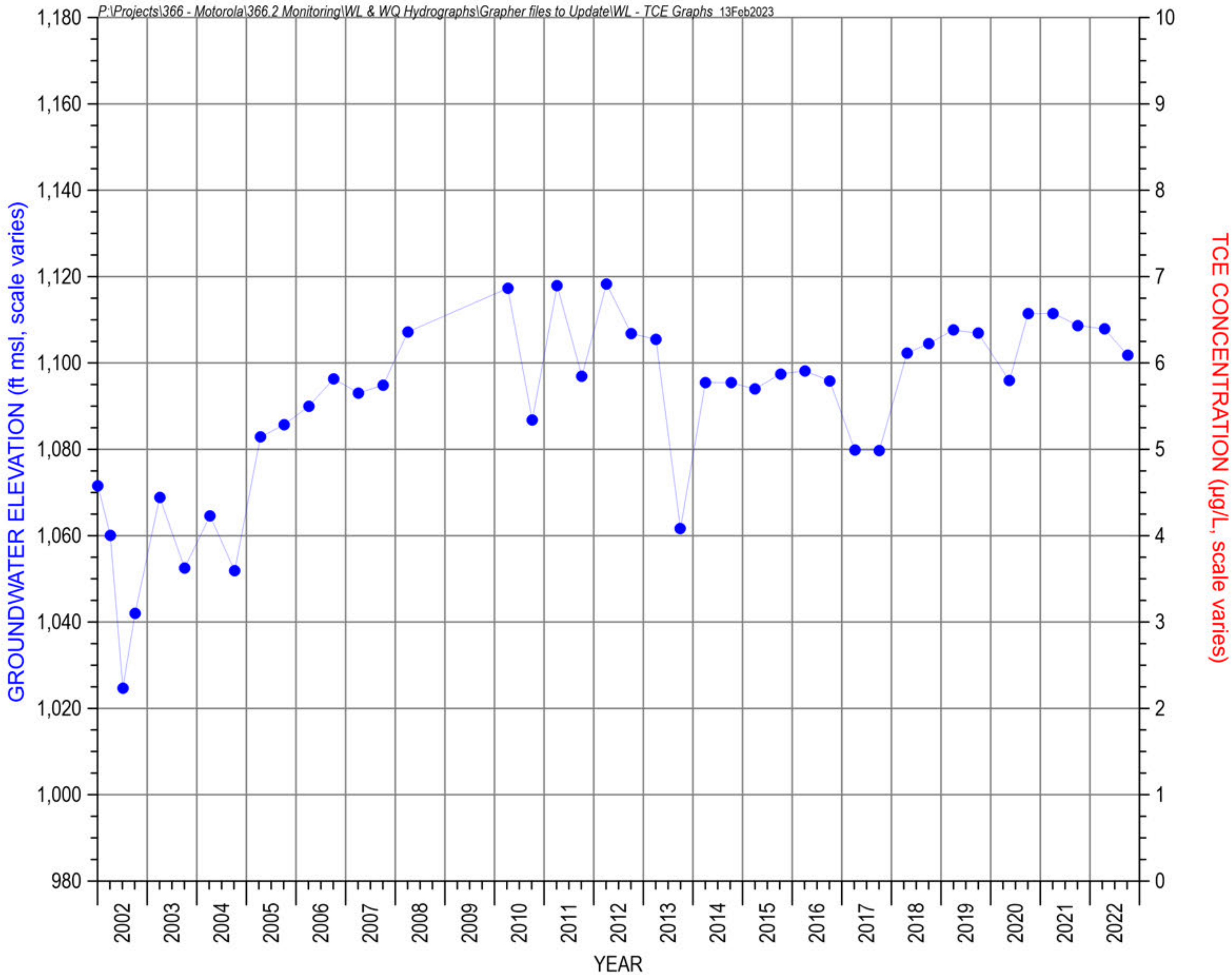
North Indian Bend Wash Superfund Site



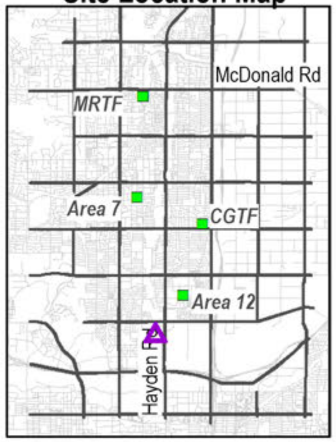
Note: TCE data collected after the GM&EP in 2002 is supplemental

FIGURE D-076. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-22LA

North Indian Bend Wash Superfund Site



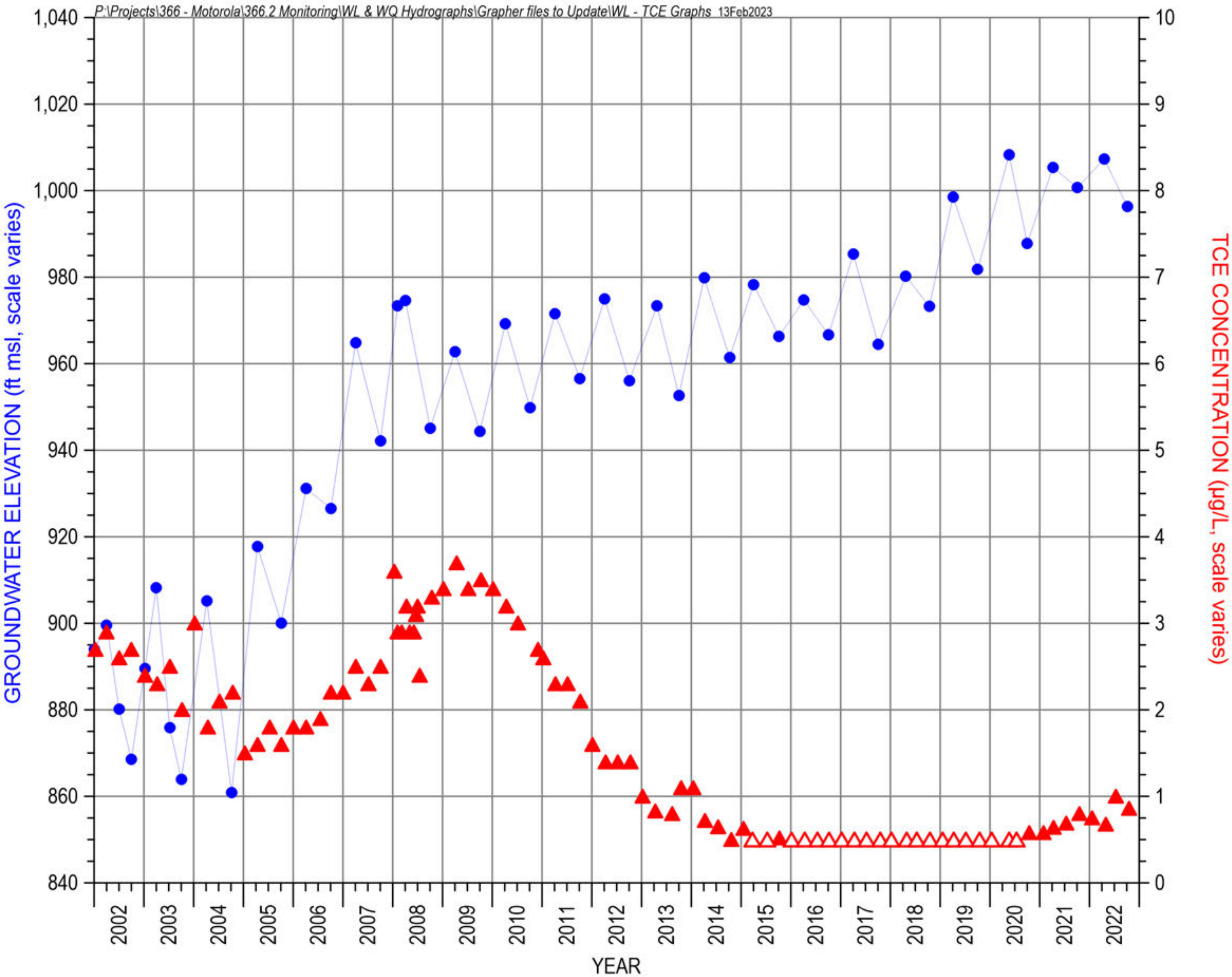
Site Location Map

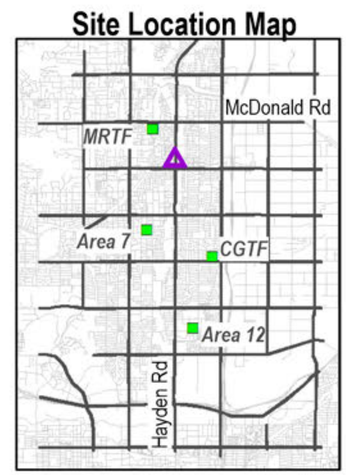


Site Land Surface Elevation:
1,184 feet msl

FIGURE D-077. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-23MA

North Indian Bend Wash Superfund Site





Site Land Surface Elevation: 1,250 feet msl

FIGURE D-078. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-1LA

North Indian Bend Wash Superfund Site

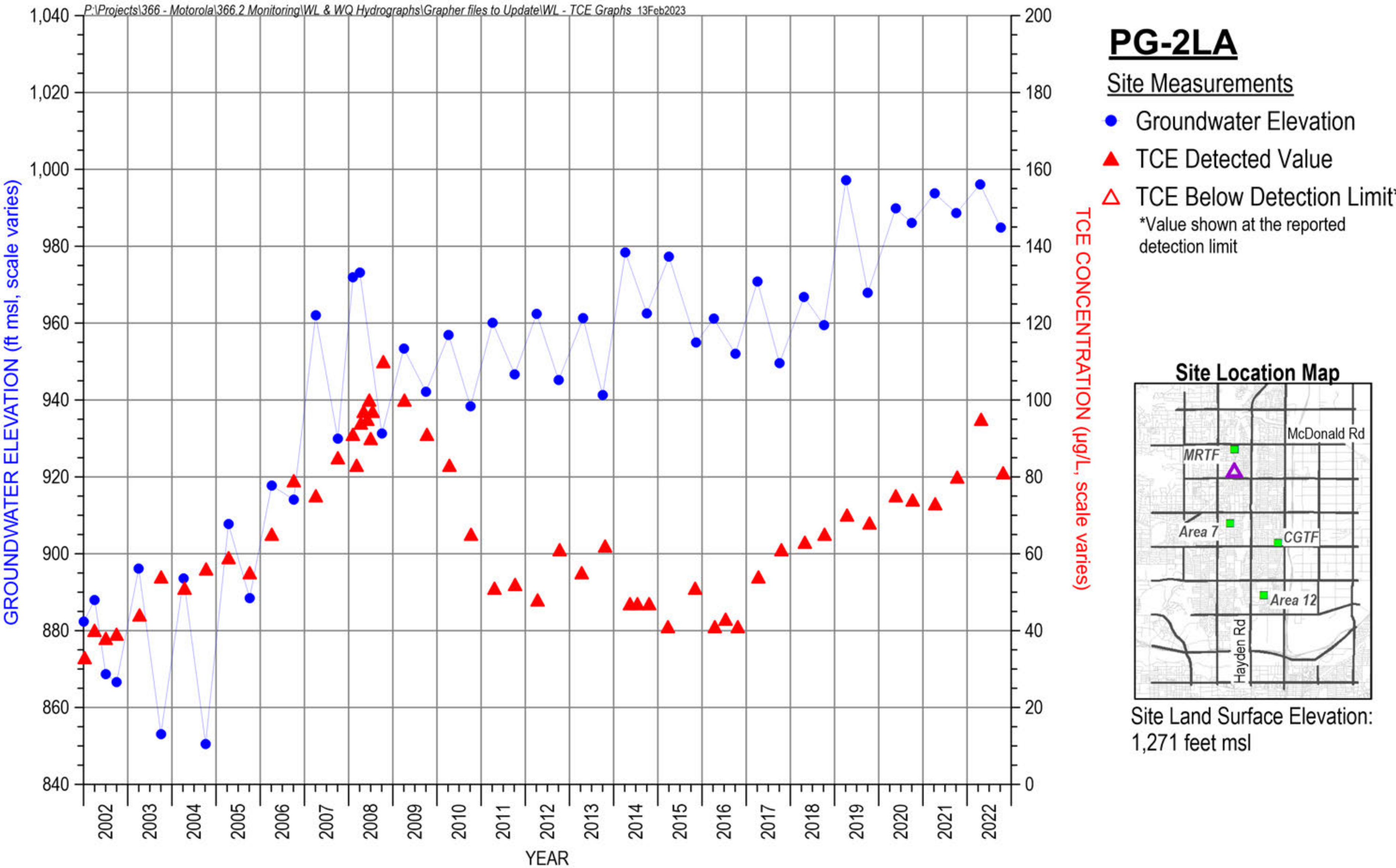
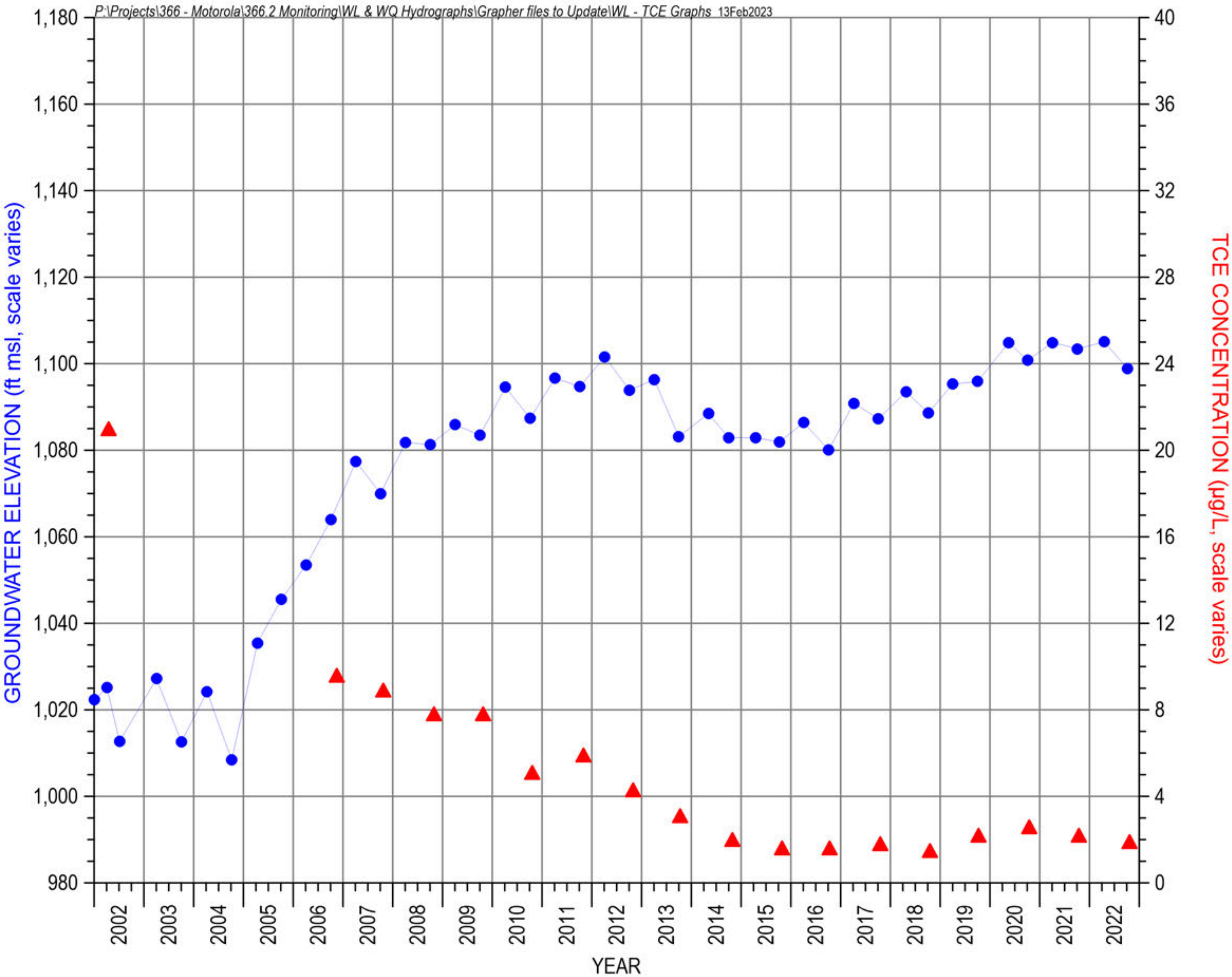
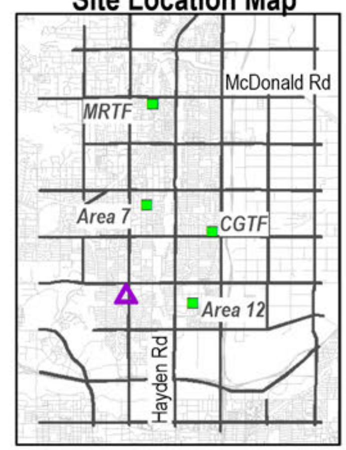


FIGURE D-079. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-2LA

North Indian Bend Wash Superfund Site





Site Land Surface Elevation:
1,227 feet msl

FIGURE D-080. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-4MA

North Indian Bend Wash Superfund Site

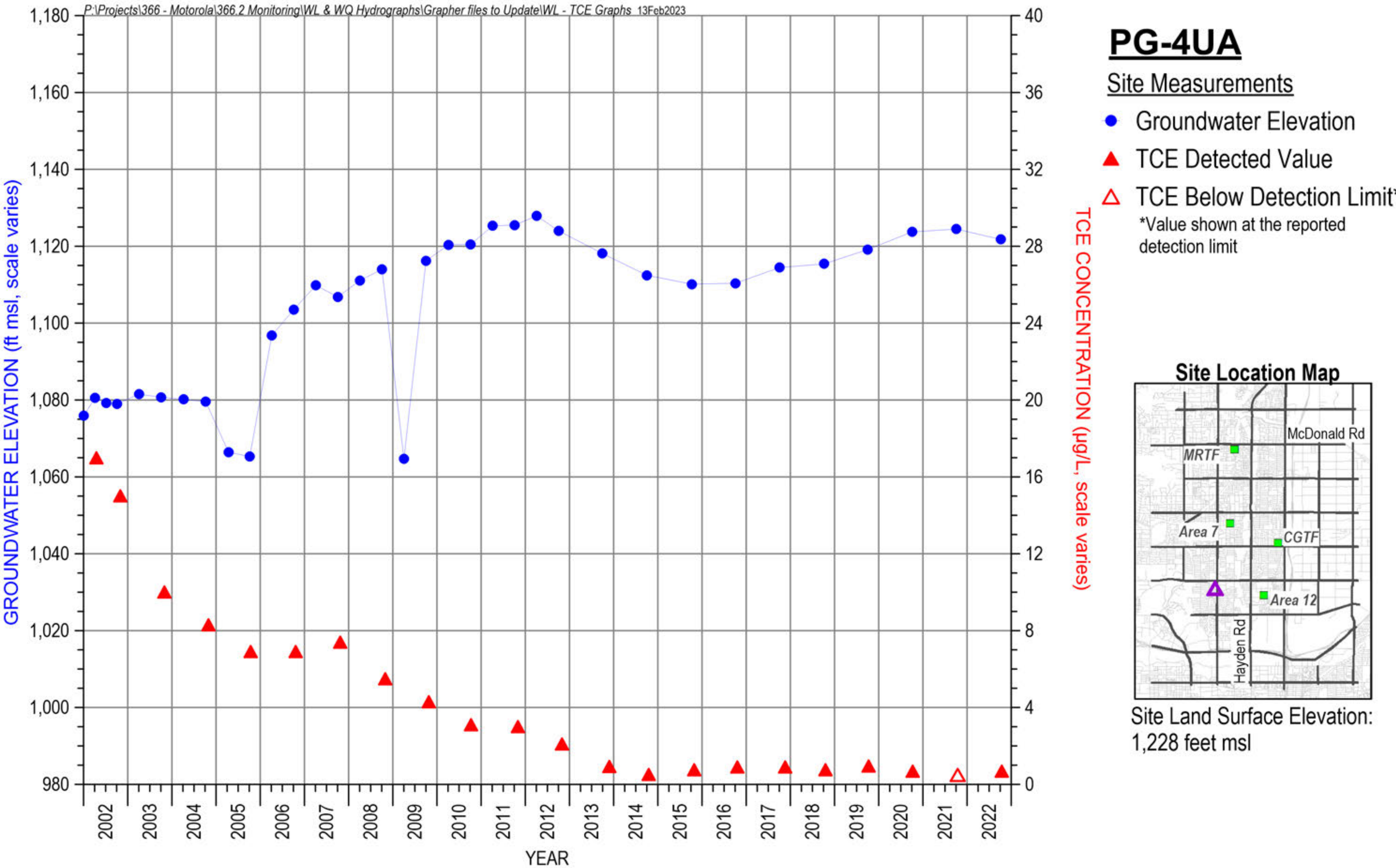


FIGURE D-081. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-4UA

North Indian Bend Wash Superfund Site

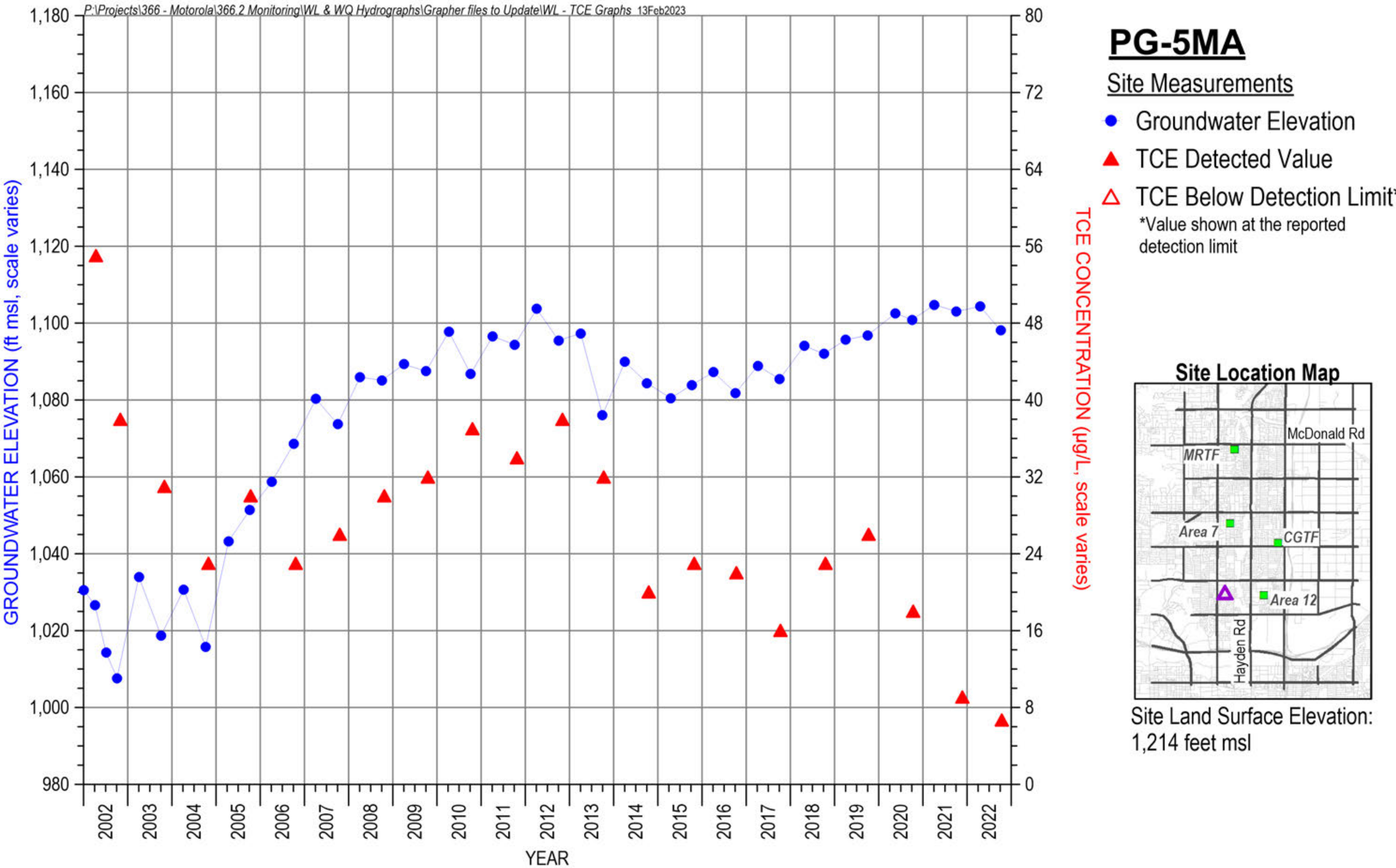
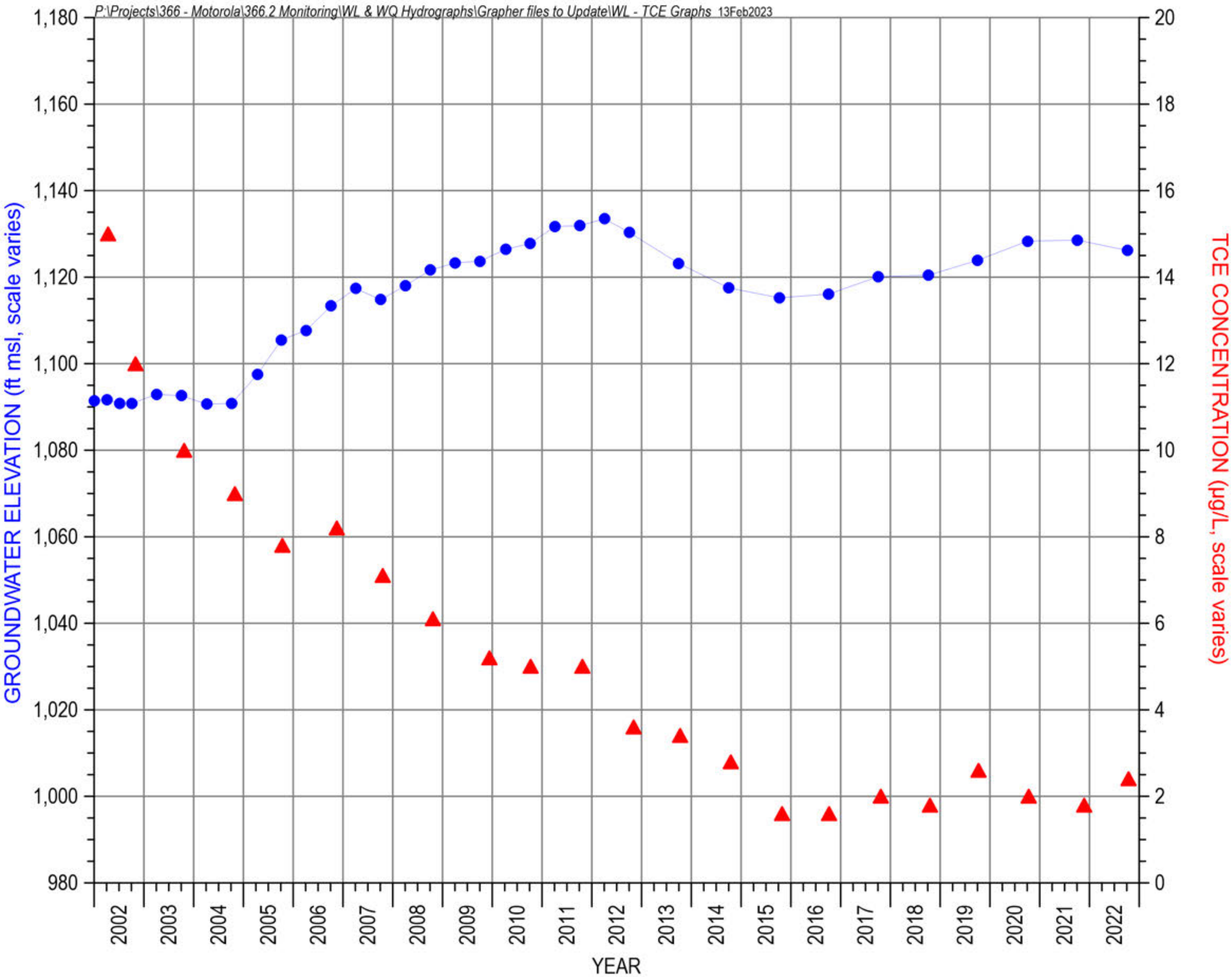
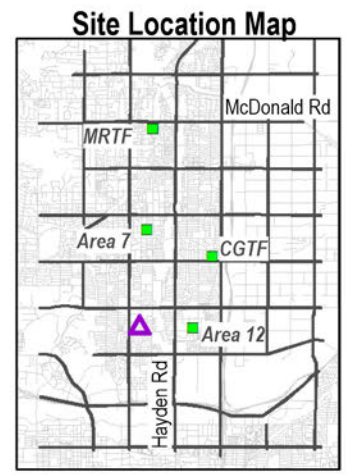


FIGURE D-082. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-5MA

North Indian Bend Wash Superfund Site

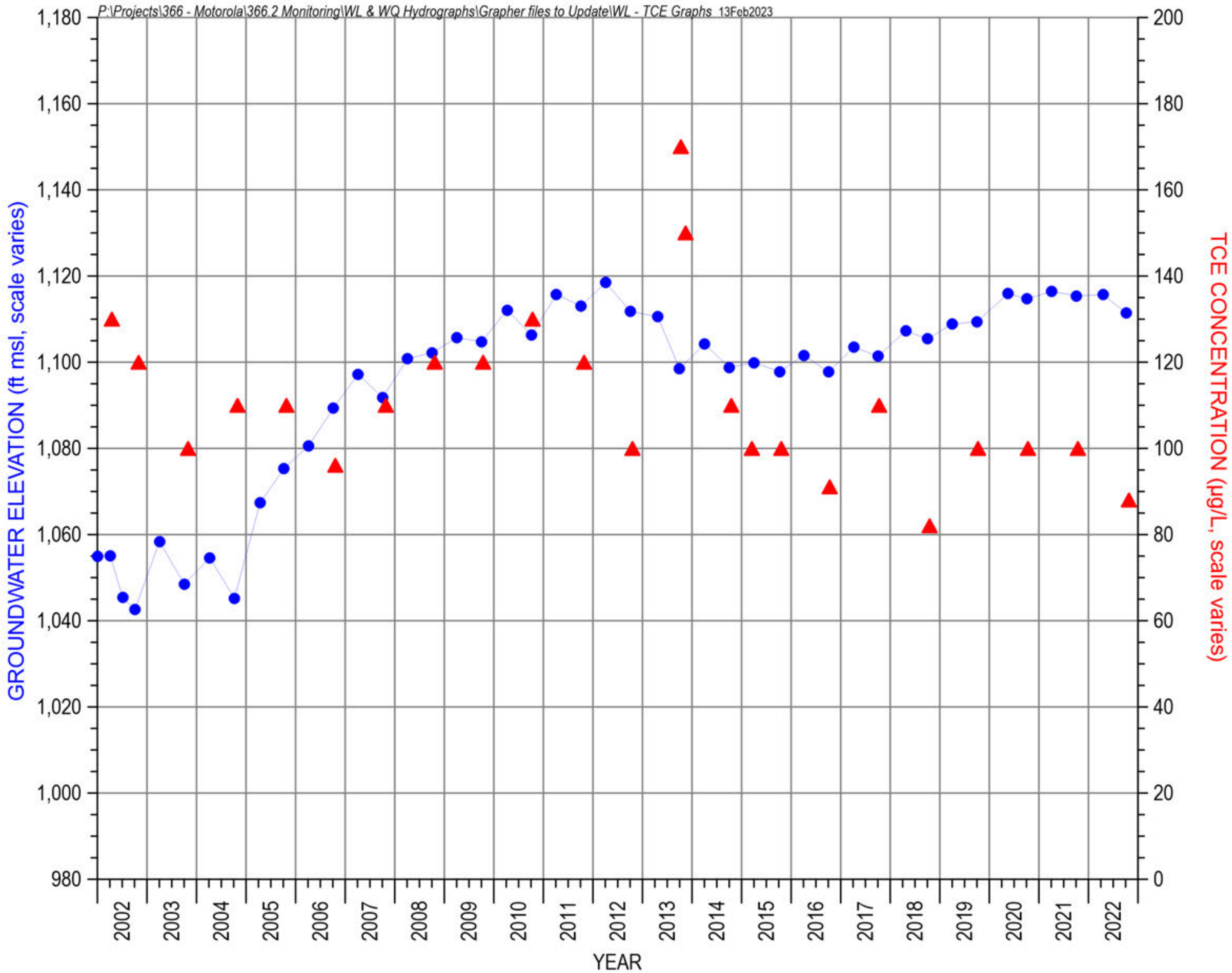


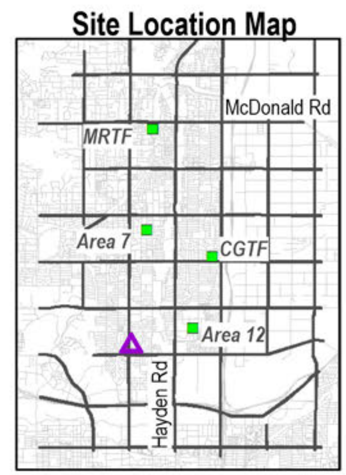


Site Land Surface Elevation:
1,214 feet msl

FIGURE D-083. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-5UA

North Indian Bend Wash Superfund Site

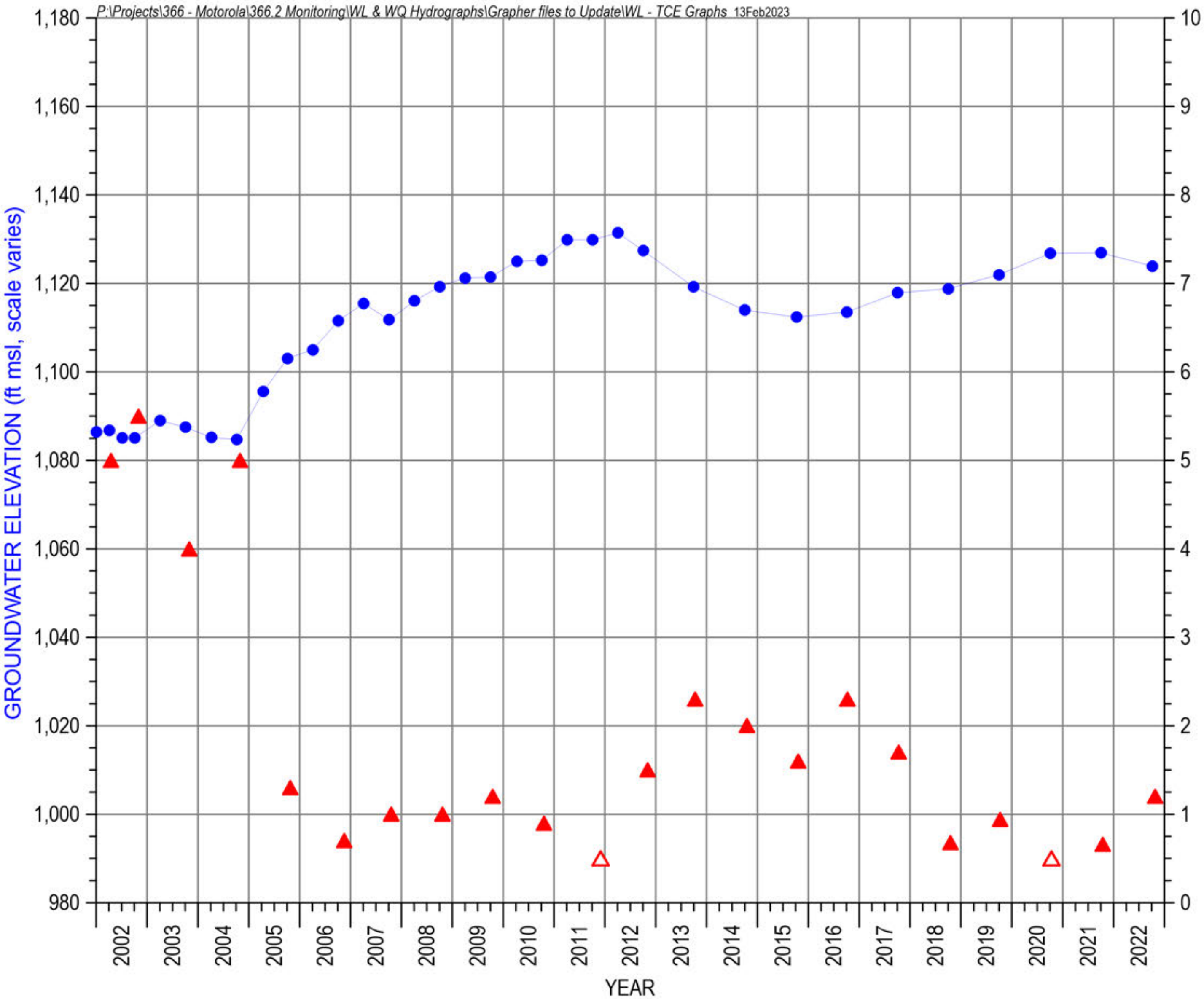




Site Land Surface Elevation:
1,213 feet msl

FIGURE D-084. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-6MA

North Indian Bend Wash Superfund Site

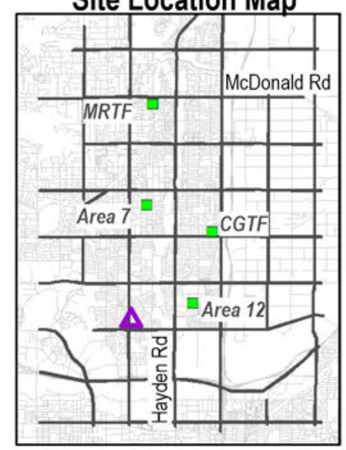


PG-6UA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

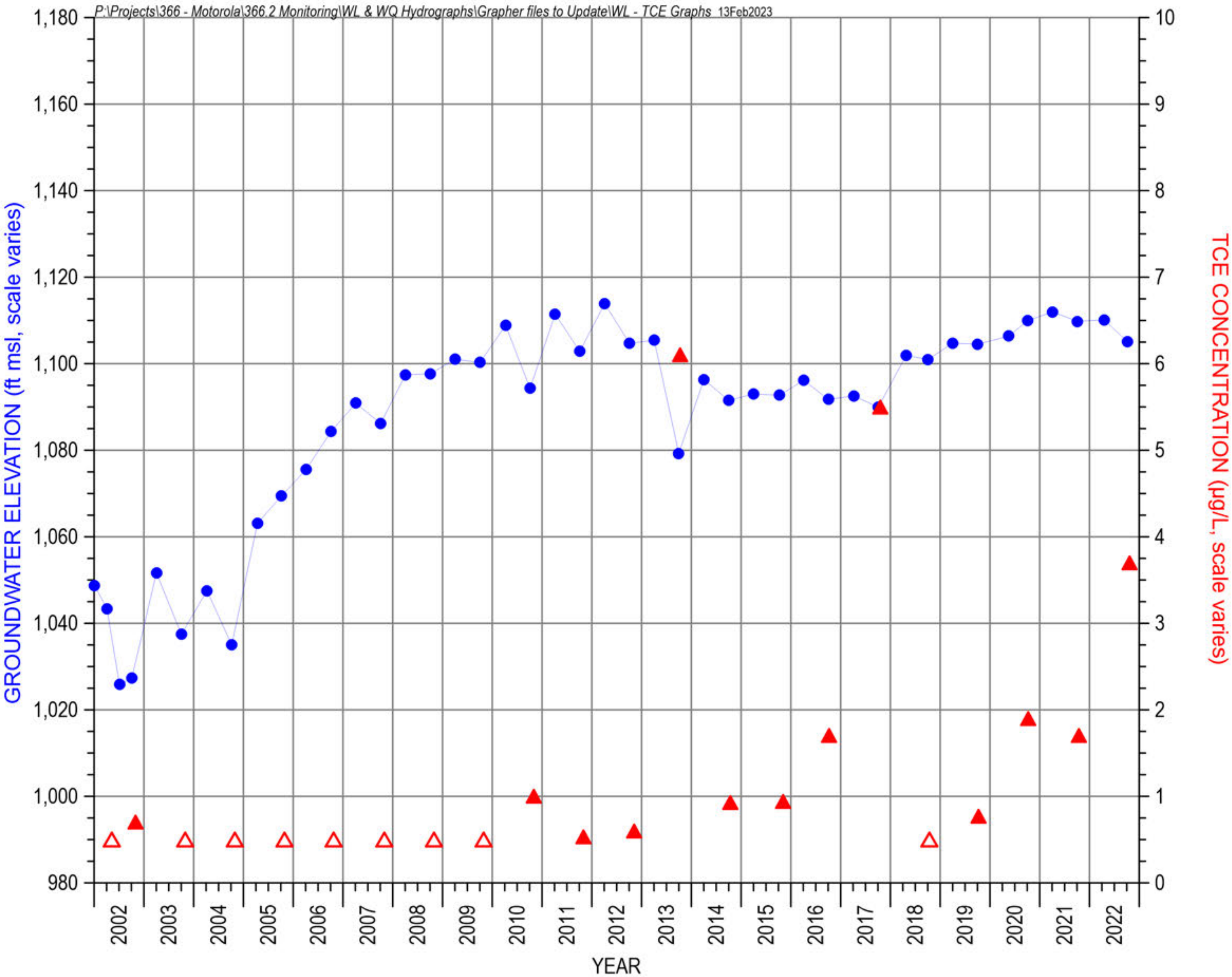
*Value shown at the reported detection limit



Site Land Surface Elevation: 1,213 feet msl

FIGURE D-085. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-6UA

North Indian Bend Wash Superfund Site

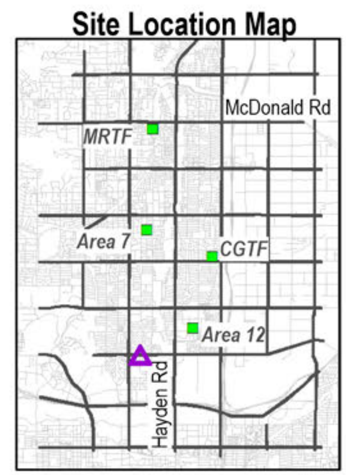


PG-7MA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

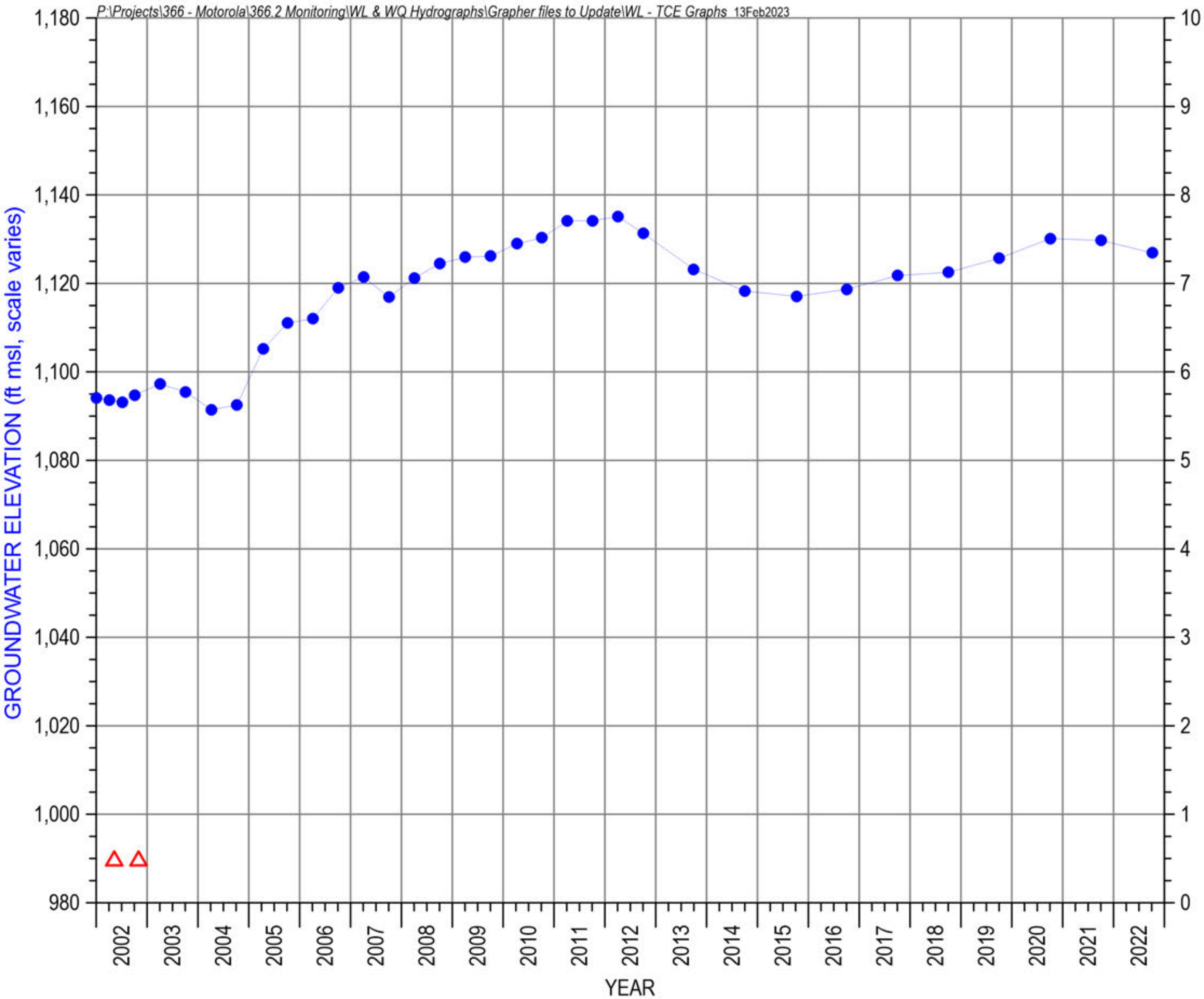
*Value shown at the reported detection limit



Site Land Surface Elevation: 1,198 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-086. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-7MA



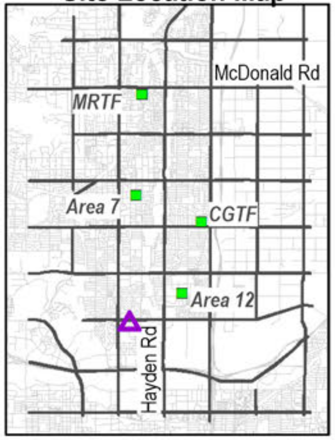
PG-7UA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation:
1,197 feet msl

FIGURE D-087. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-7UA

North Indian Bend Wash Superfund Site

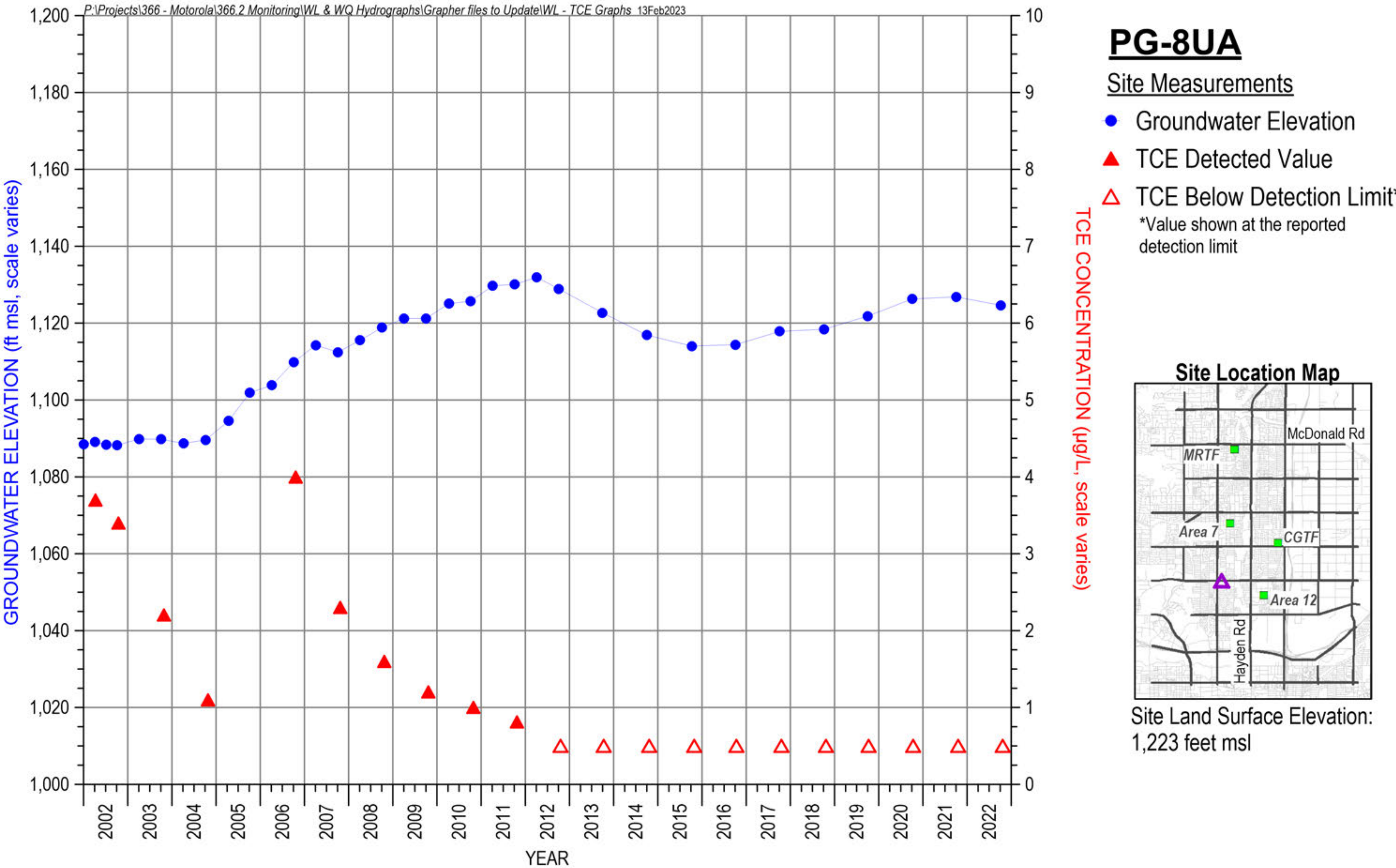
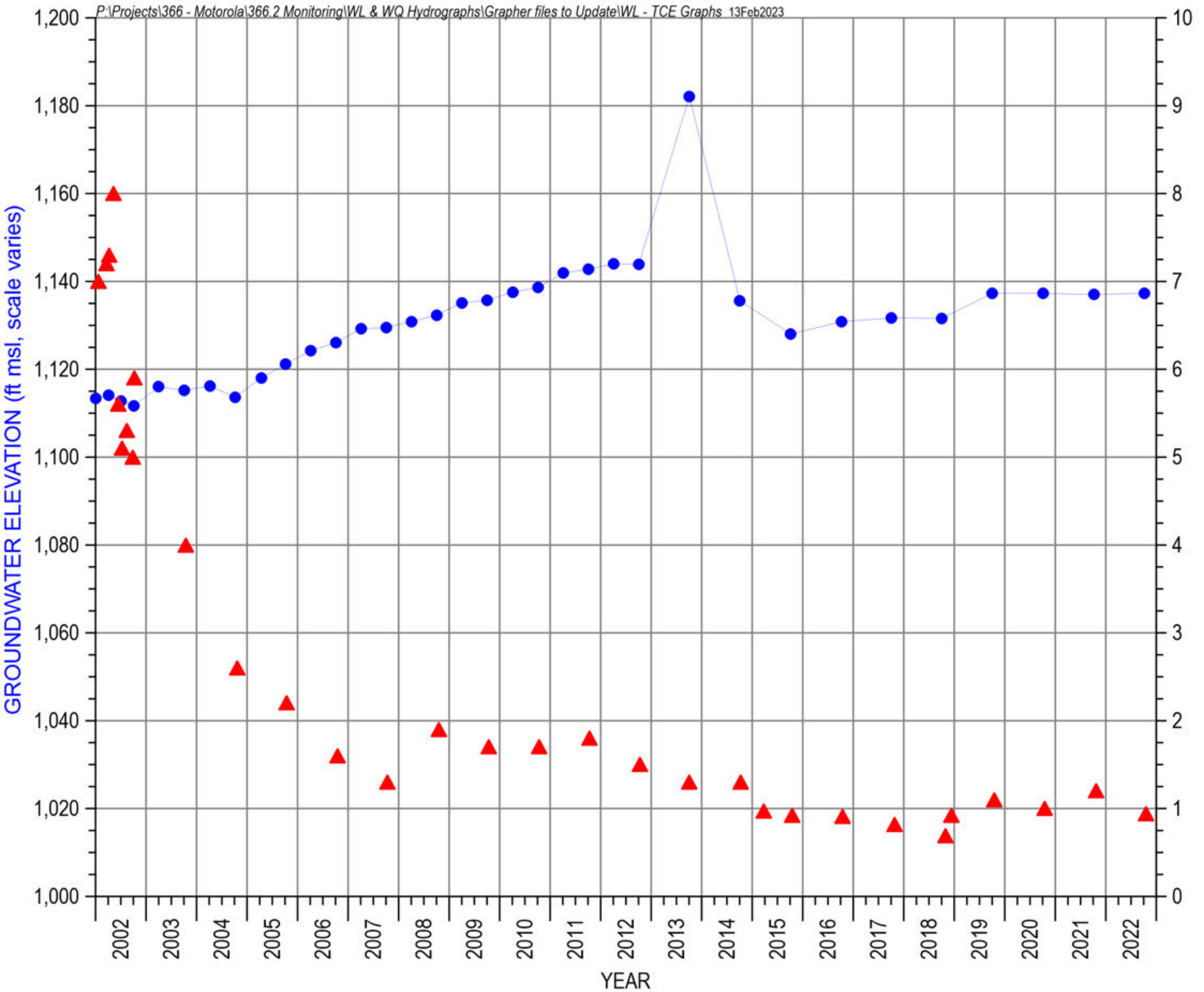


FIGURE D-088. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-8UA

North Indian Bend Wash Superfund Site



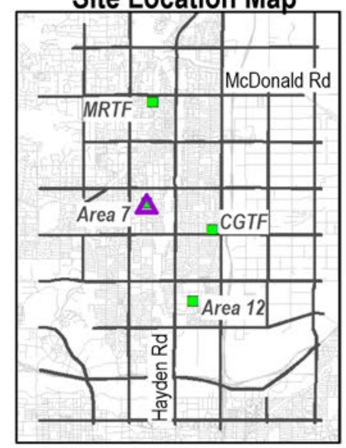
PG-10UA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation:
1,241 feet msl

FIGURE D-089. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-10UA

North Indian Bend Wash Superfund Site

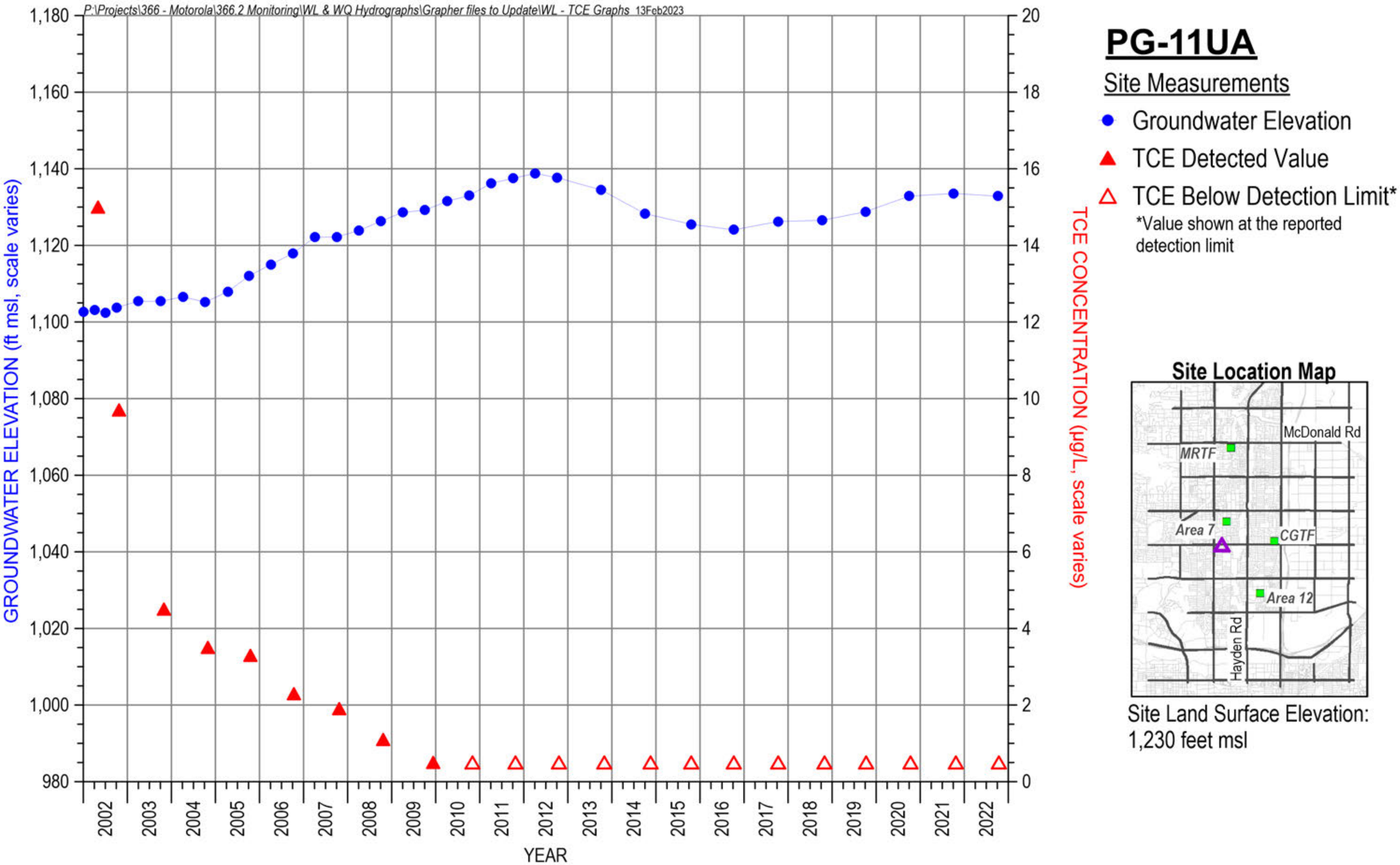
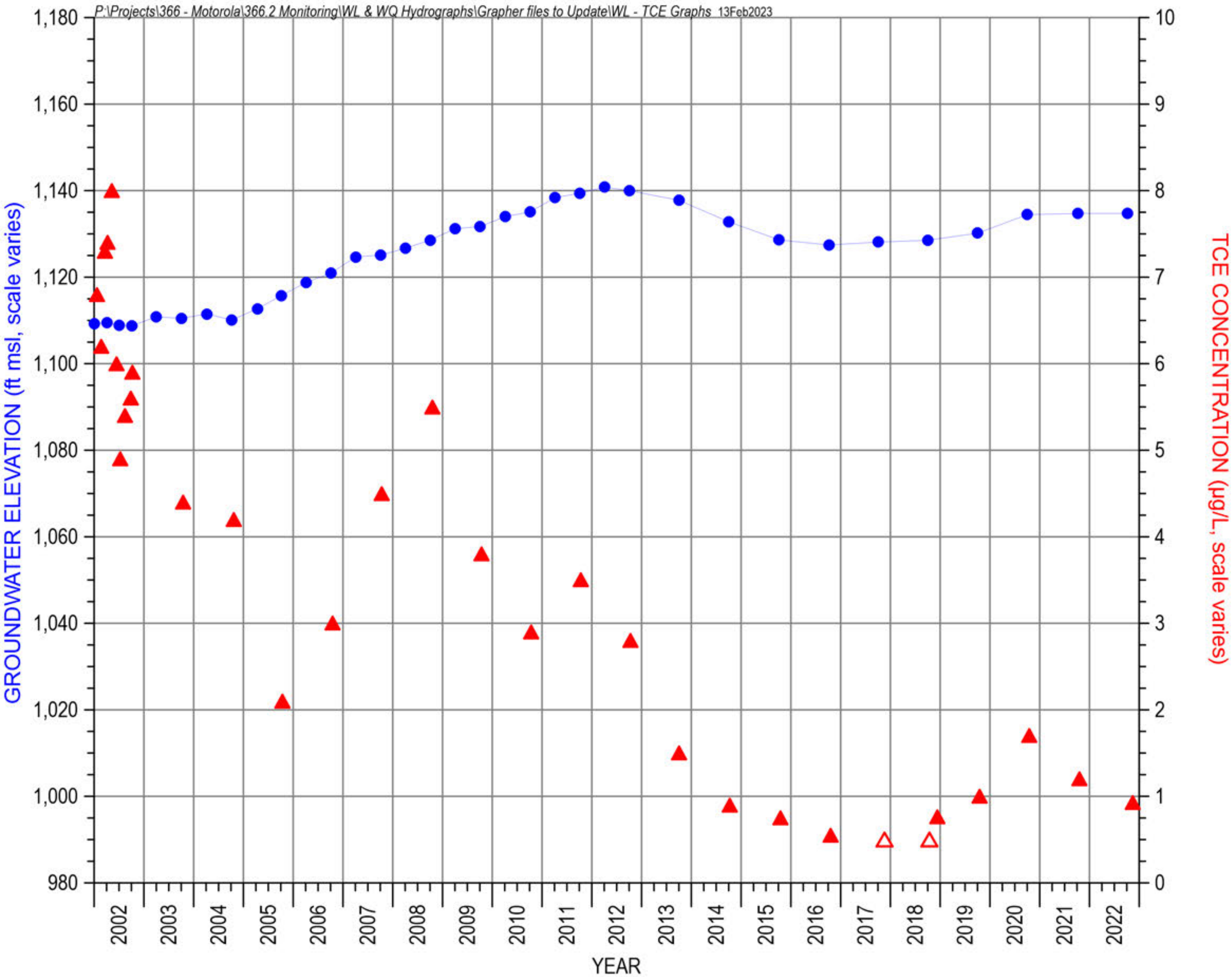
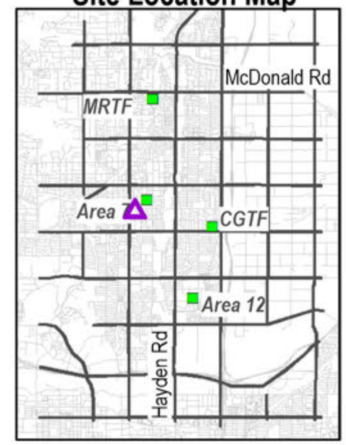


FIGURE D-090. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-11UA

North Indian Bend Wash Superfund Site



Site Location Map



Site Land Surface Elevation: 1,242 feet msl

FIGURE D-091. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-16UA

North Indian Bend Wash Superfund Site

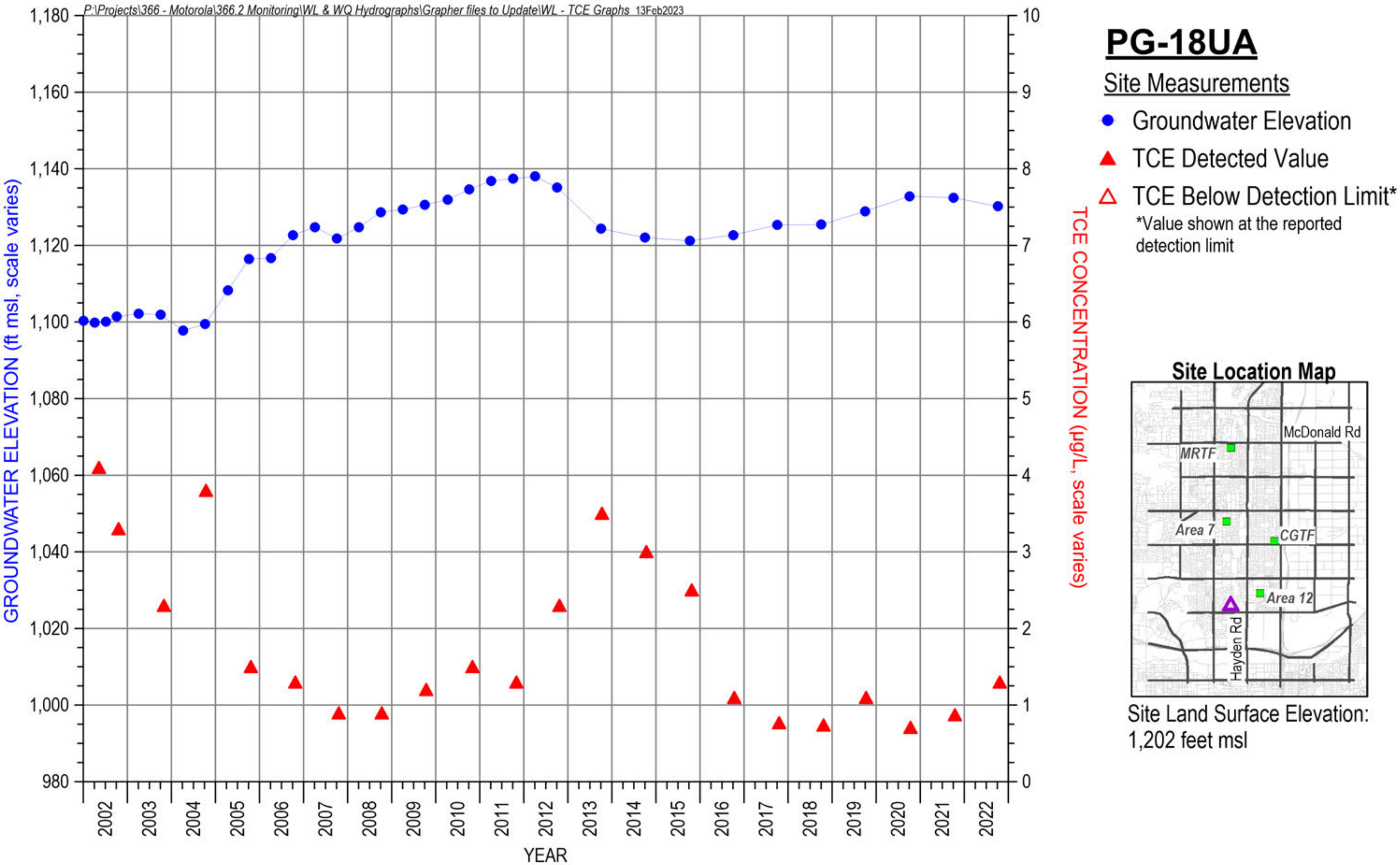
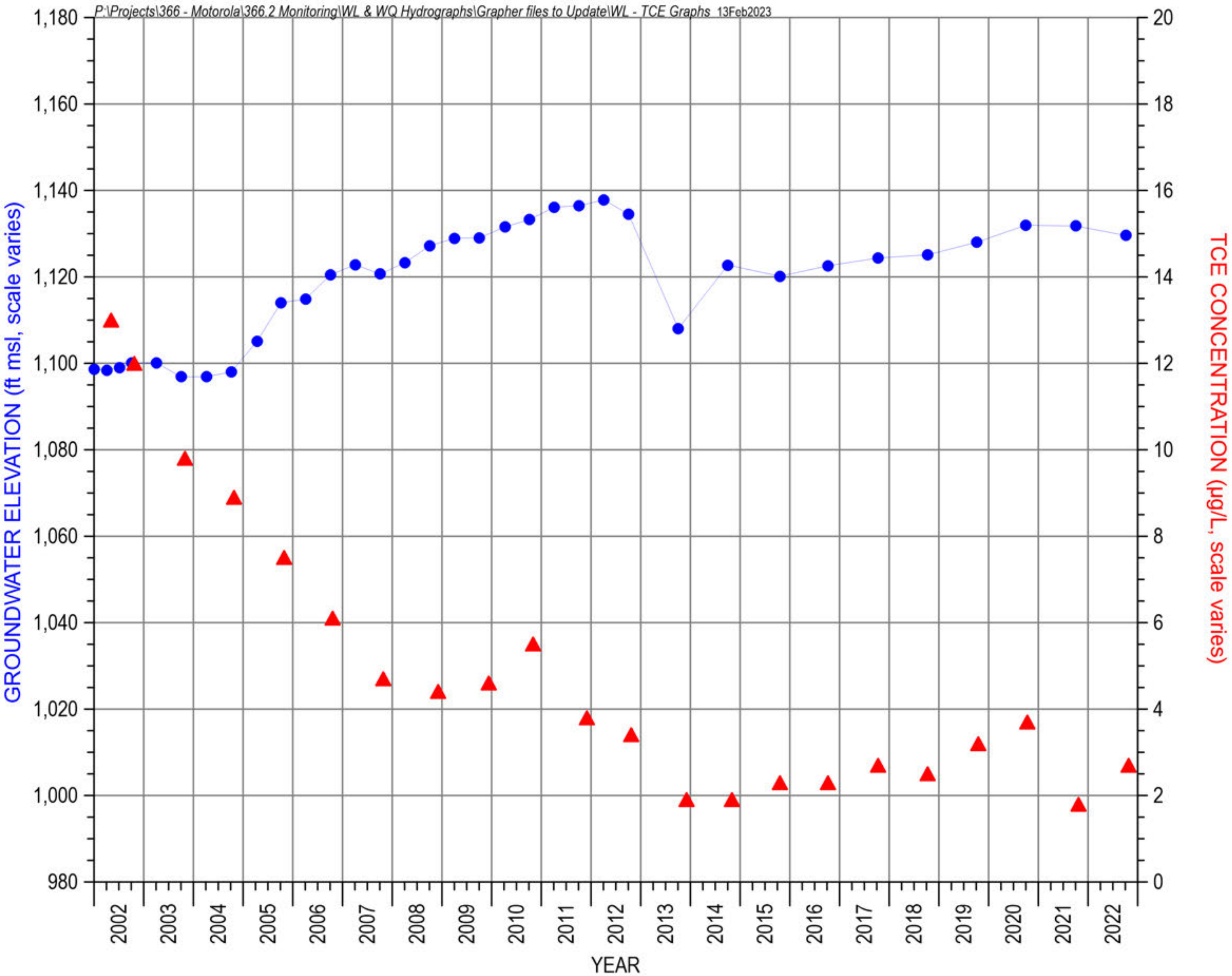
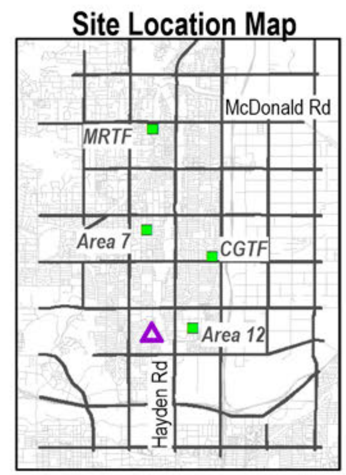


FIGURE D-092. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-18UA

North Indian Bend Wash Superfund Site





Site Land Surface Elevation:
1,204 feet msl

FIGURE D-093. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-19UA

North Indian Bend Wash Superfund Site

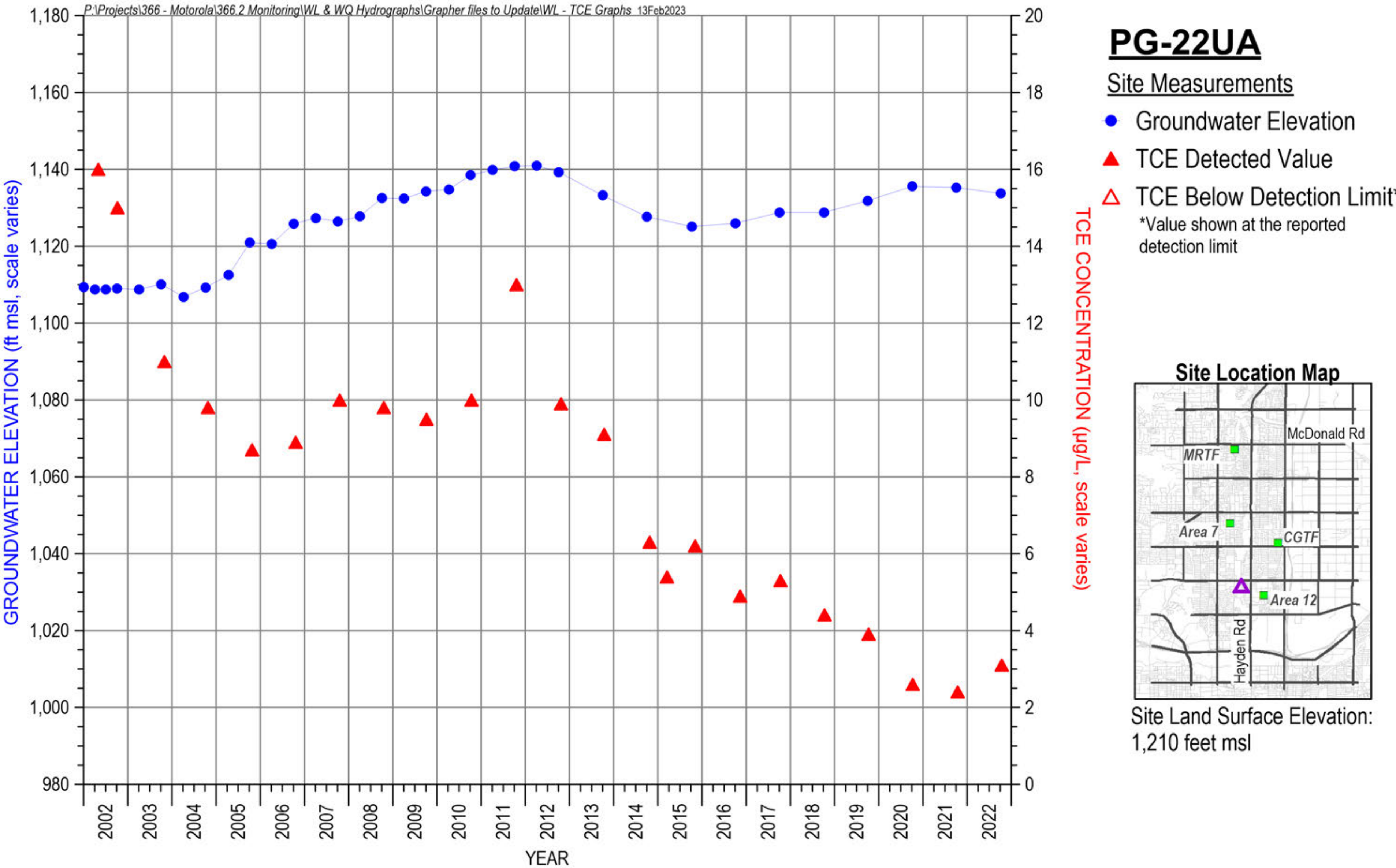
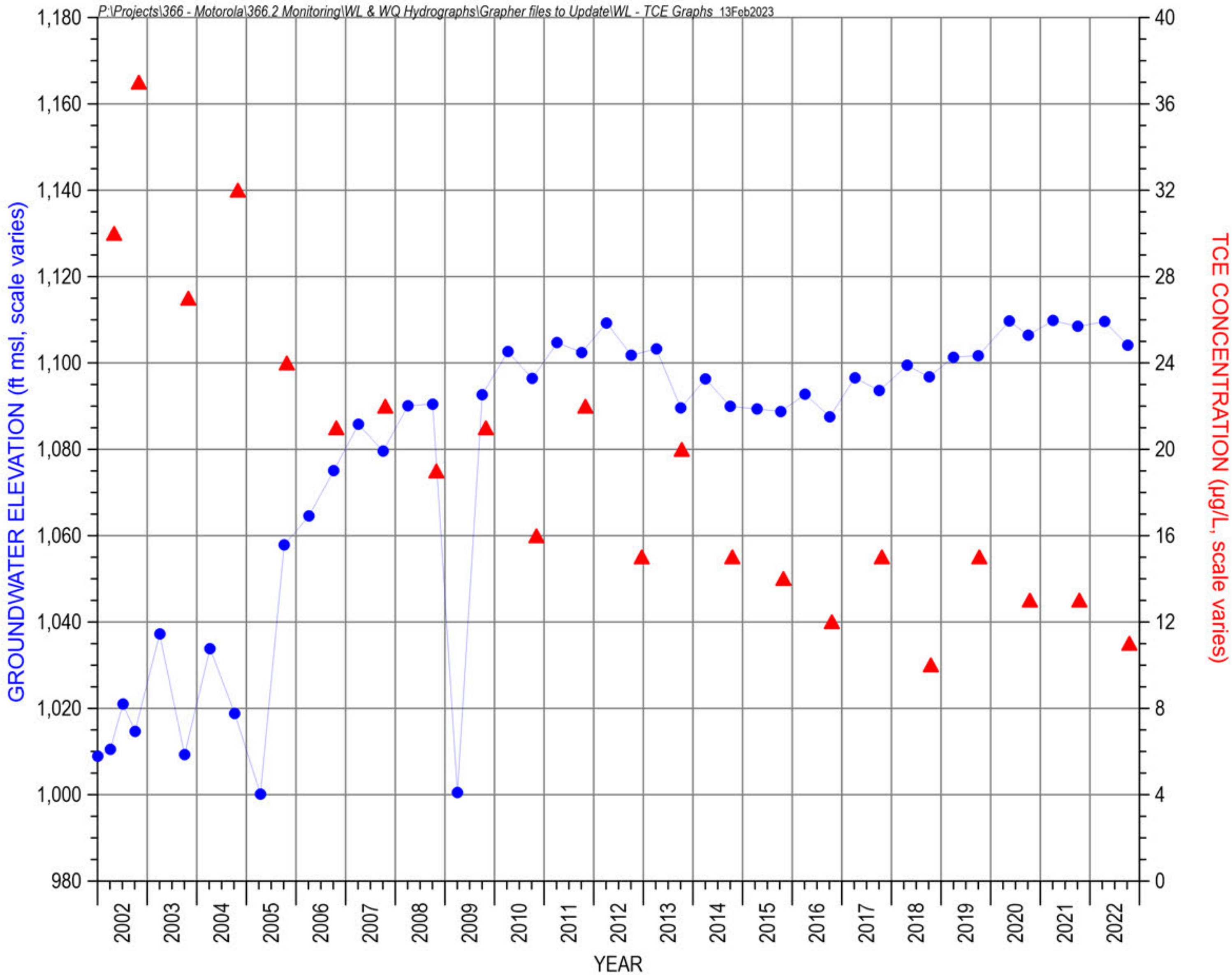


FIGURE D-094. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-22UA

North Indian Bend Wash Superfund Site



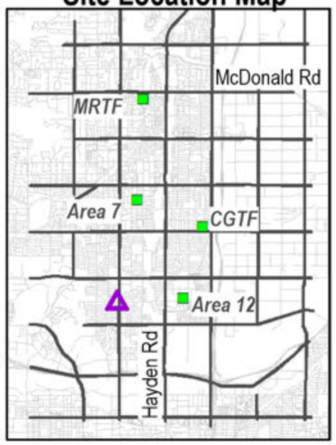
PG-23MA/LA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map



Site Land Surface Elevation: 1,223 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-095. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-23MA/LA

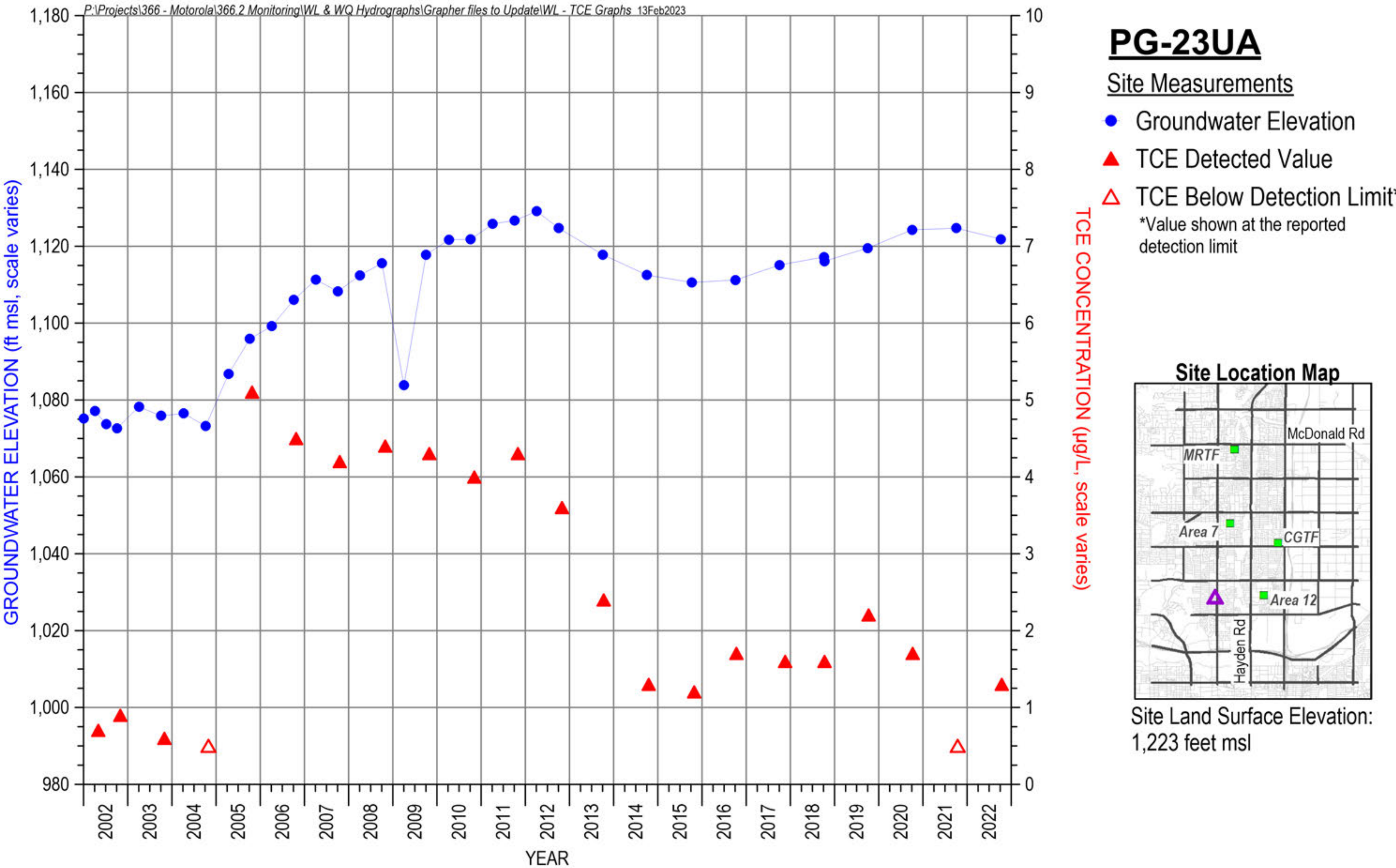
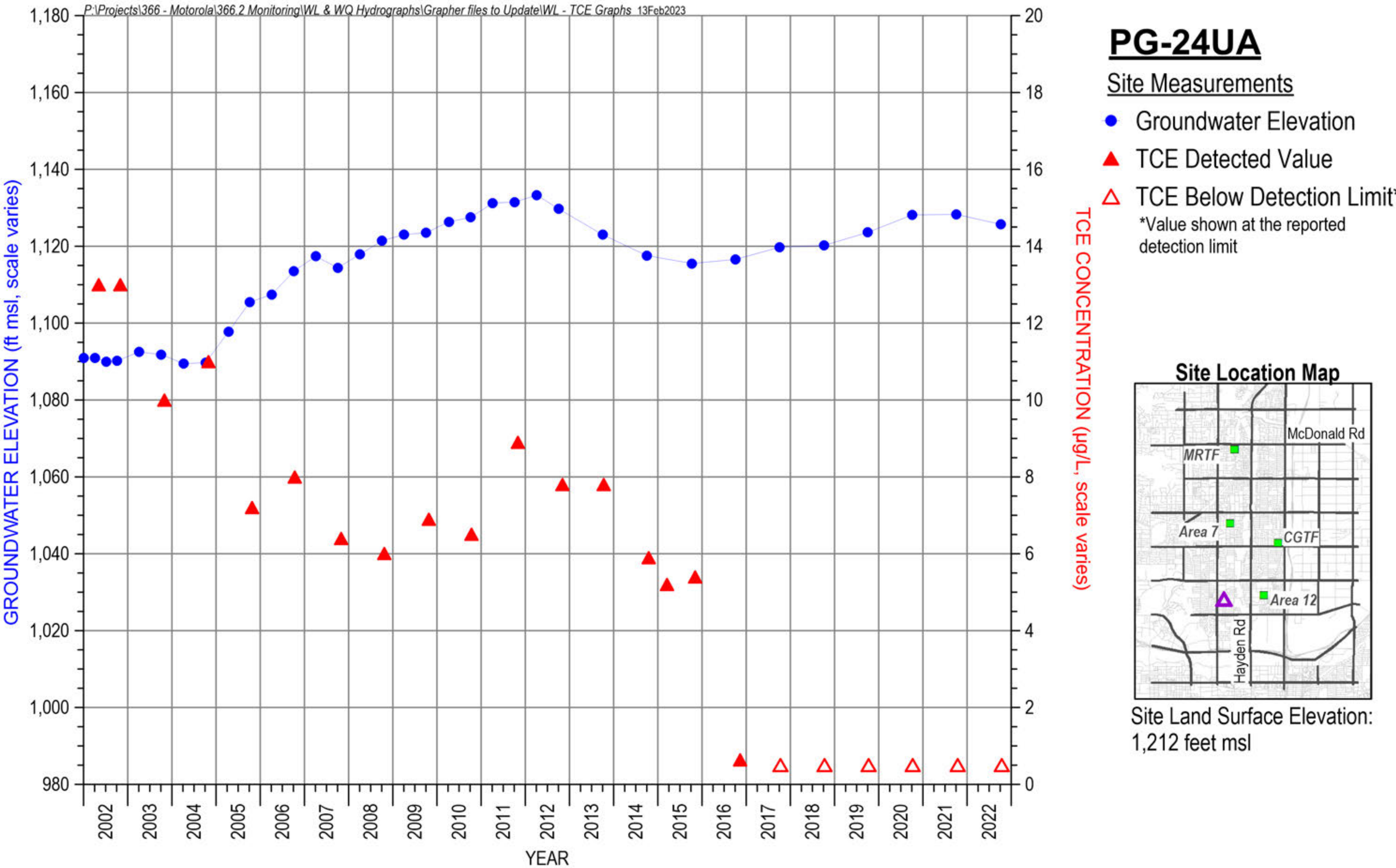


FIGURE D-096. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-23UA

North Indian Bend Wash Superfund Site



North Indian Bend Wash Superfund Site

FIGURE D-097. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-24UA

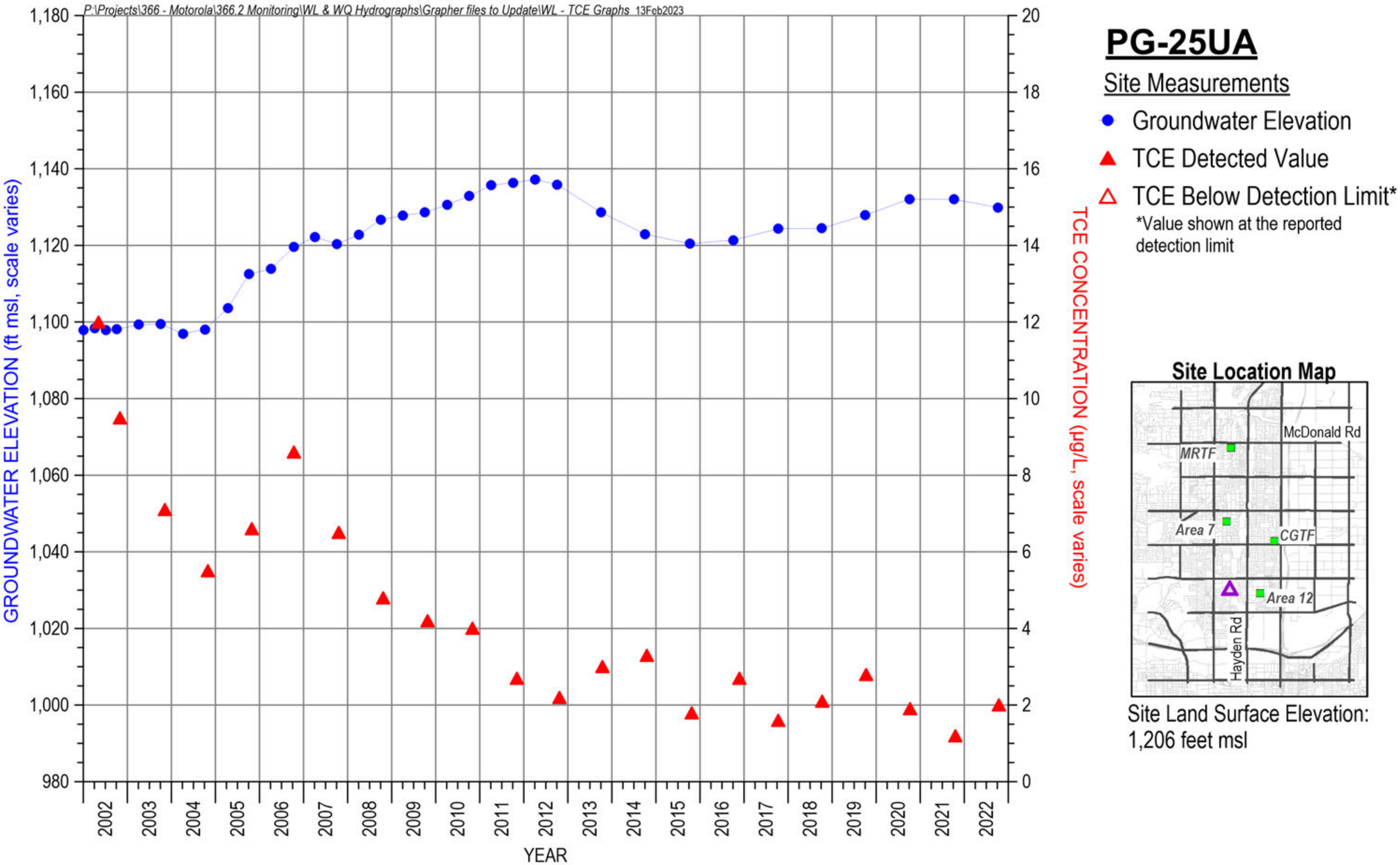


FIGURE D-098. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-25UA

North Indian Bend Wash Superfund Site

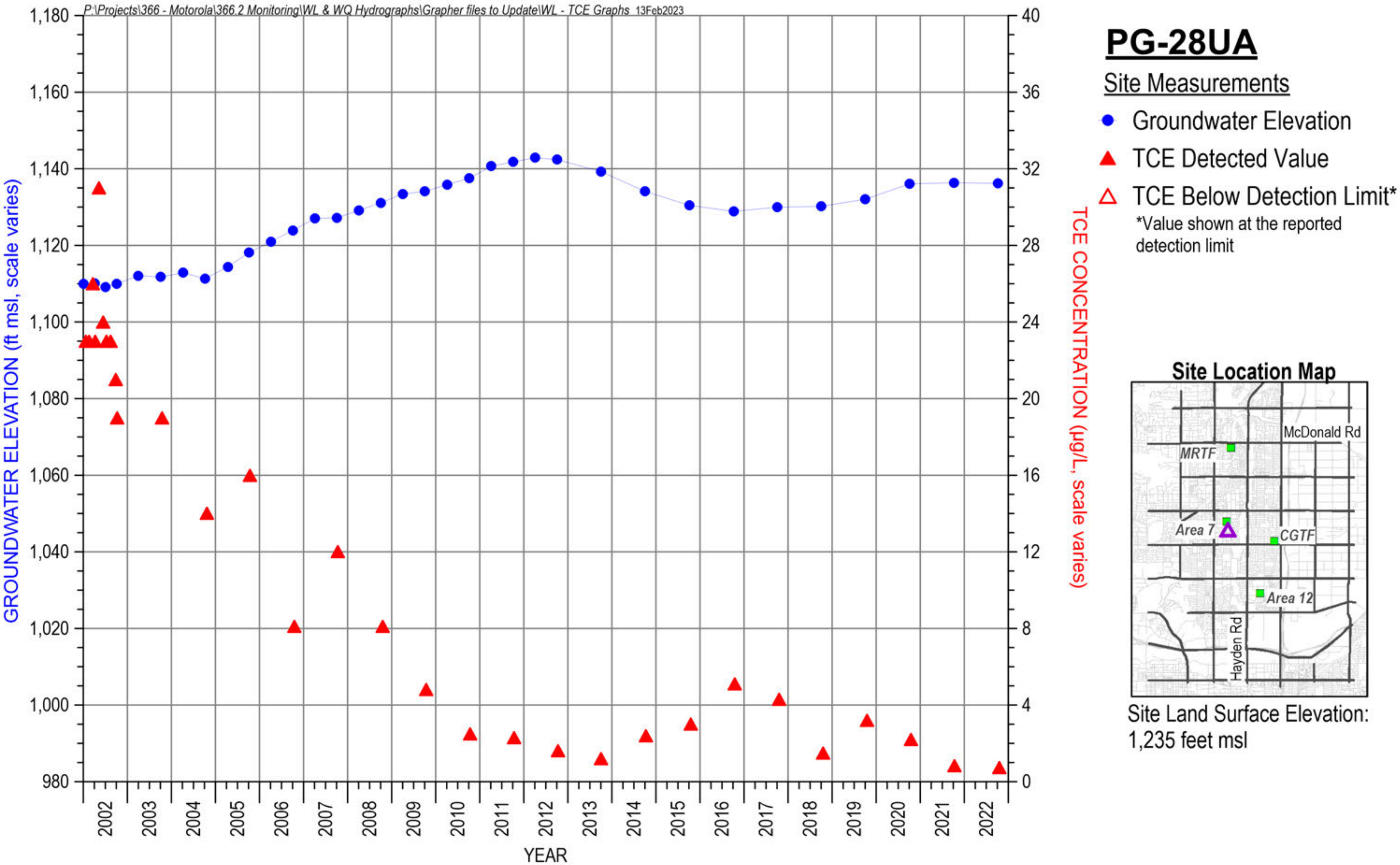
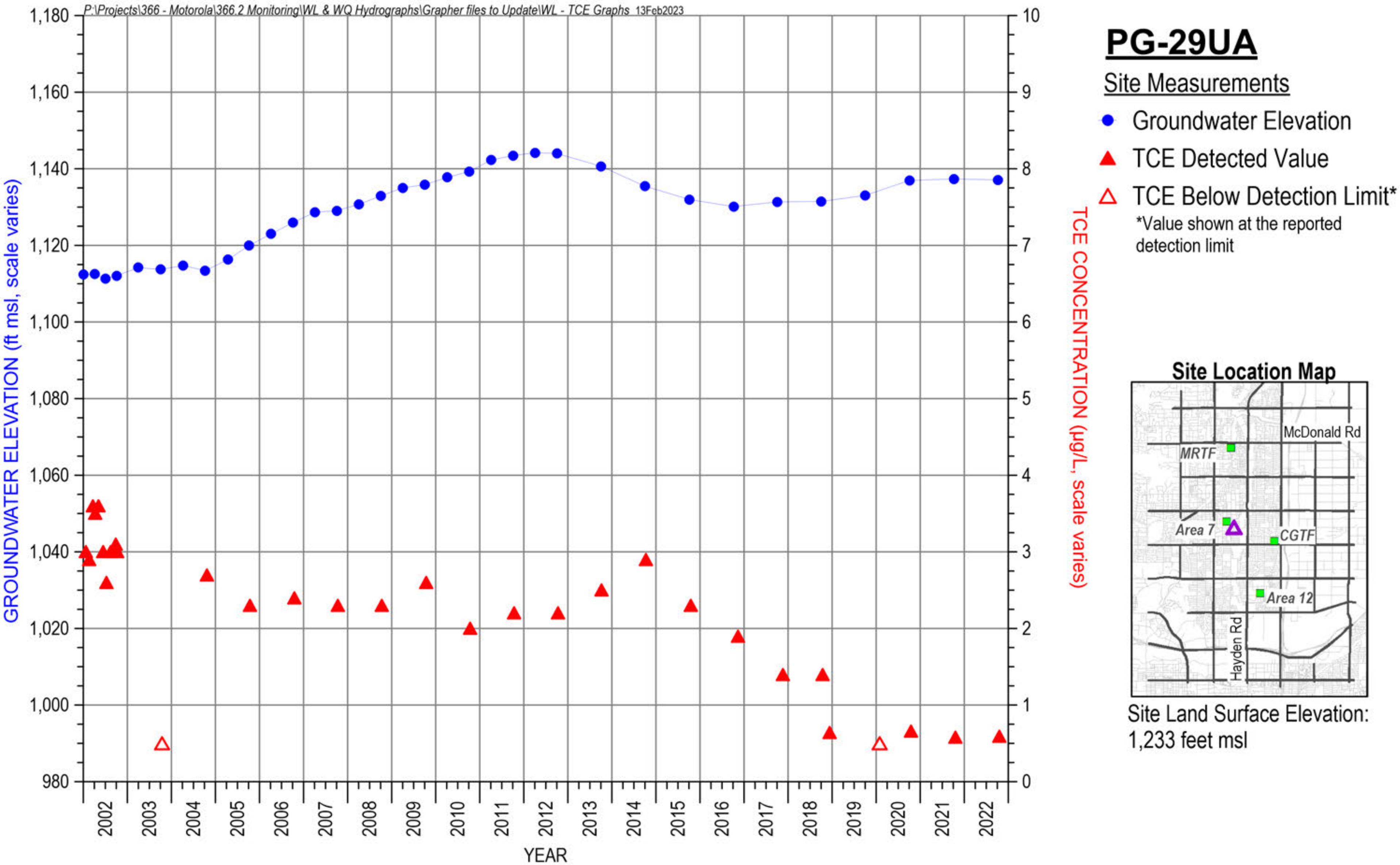


FIGURE D-099. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-28UA

North Indian Bend Wash Superfund Site



Note: Sampler was unable to collect water quality sample in October 2019. Sample was collected 01/27/2020.

FIGURE D-100. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-29UA

North Indian Bend Wash Superfund Site

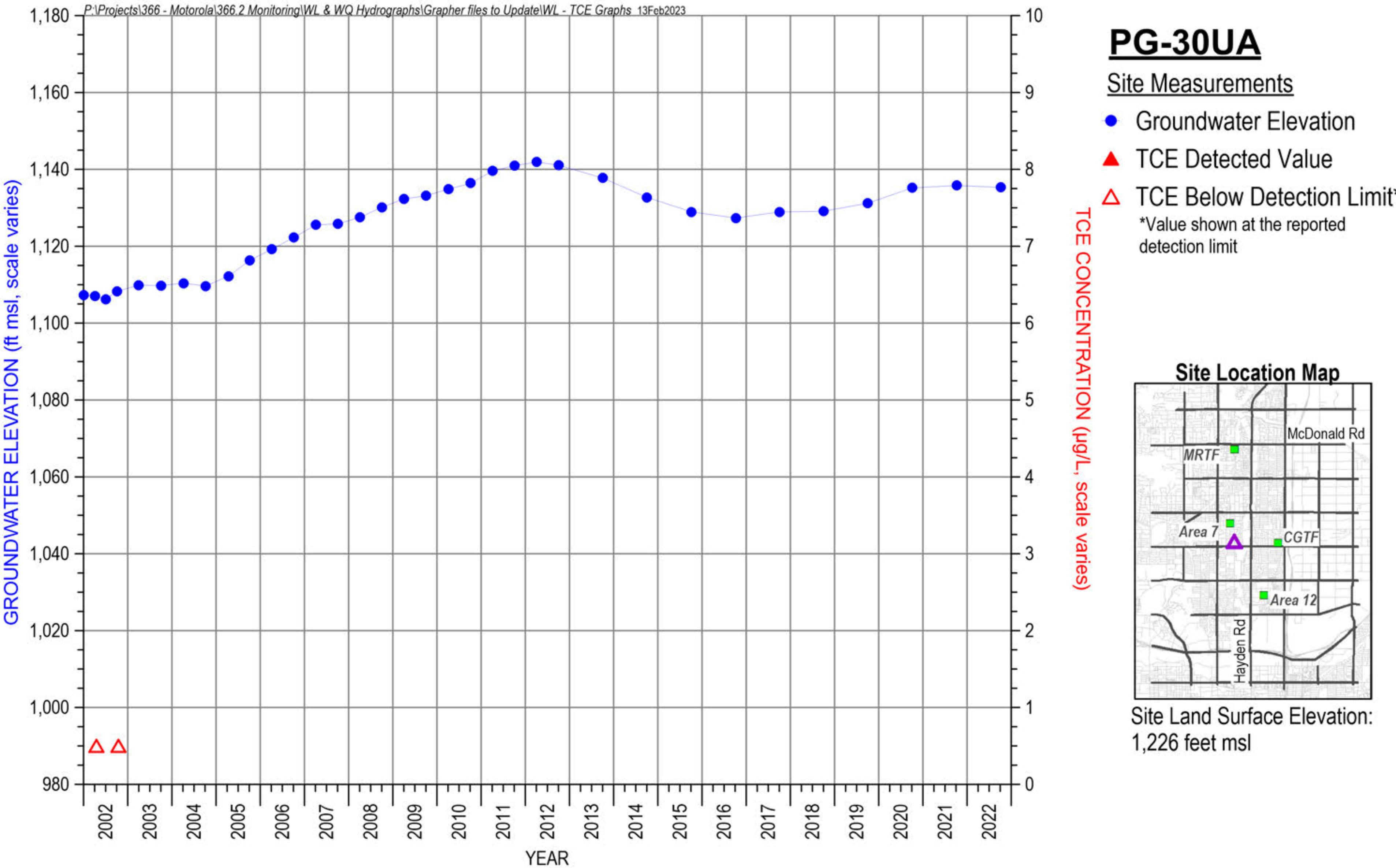


FIGURE D-101. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-30UA

North Indian Bend Wash Superfund Site

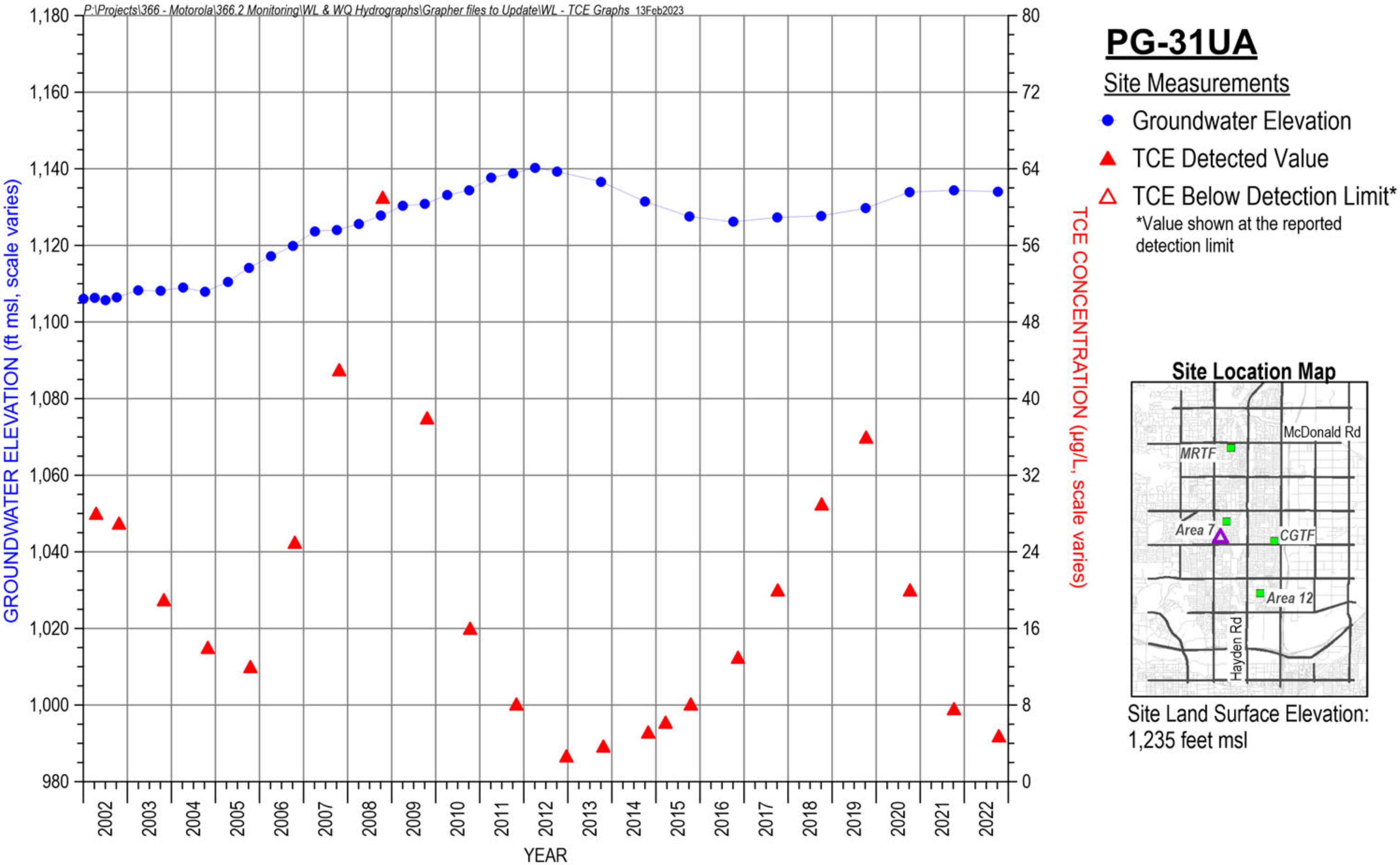


FIGURE D-102. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-31UA

North Indian Bend Wash Superfund Site

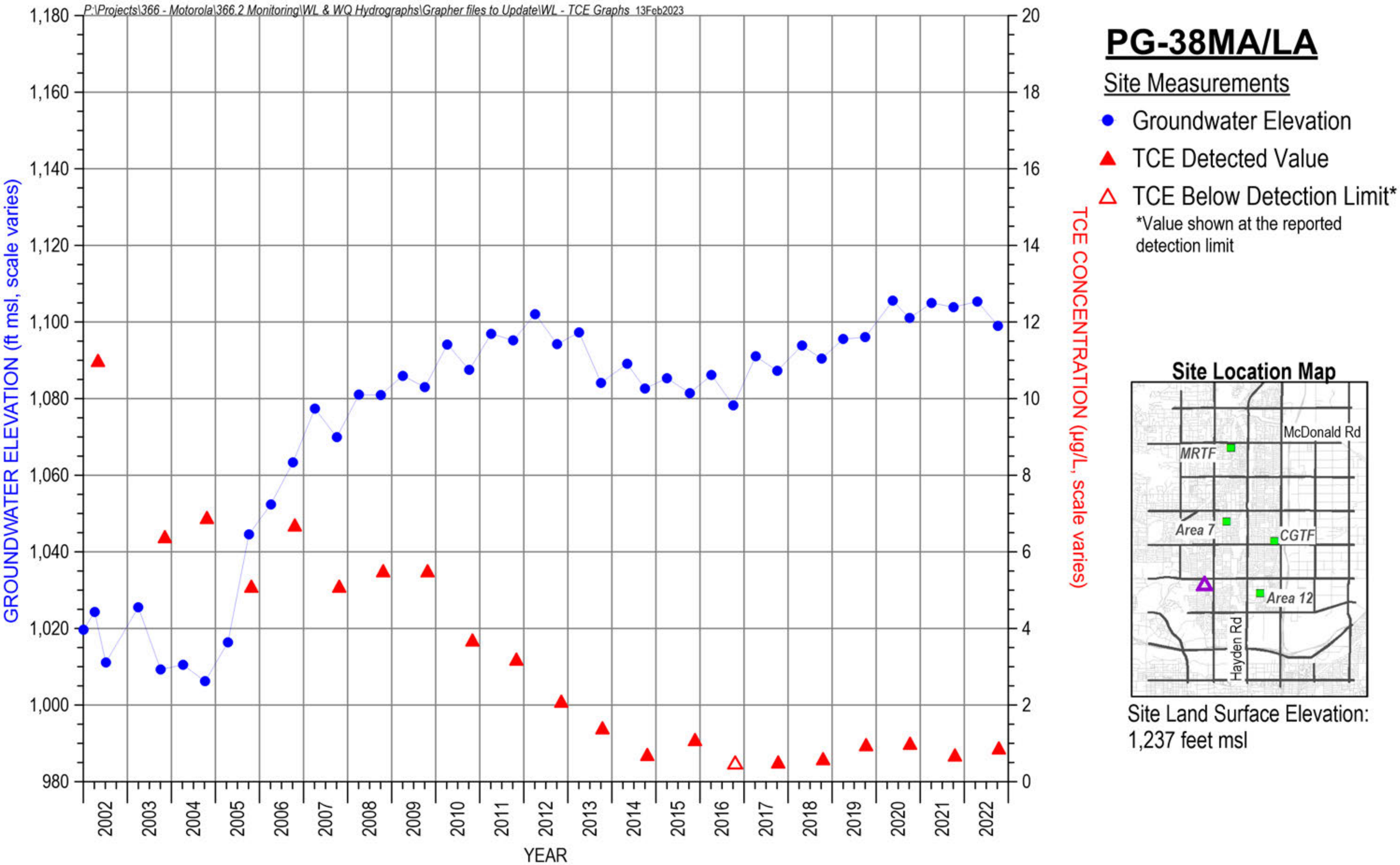
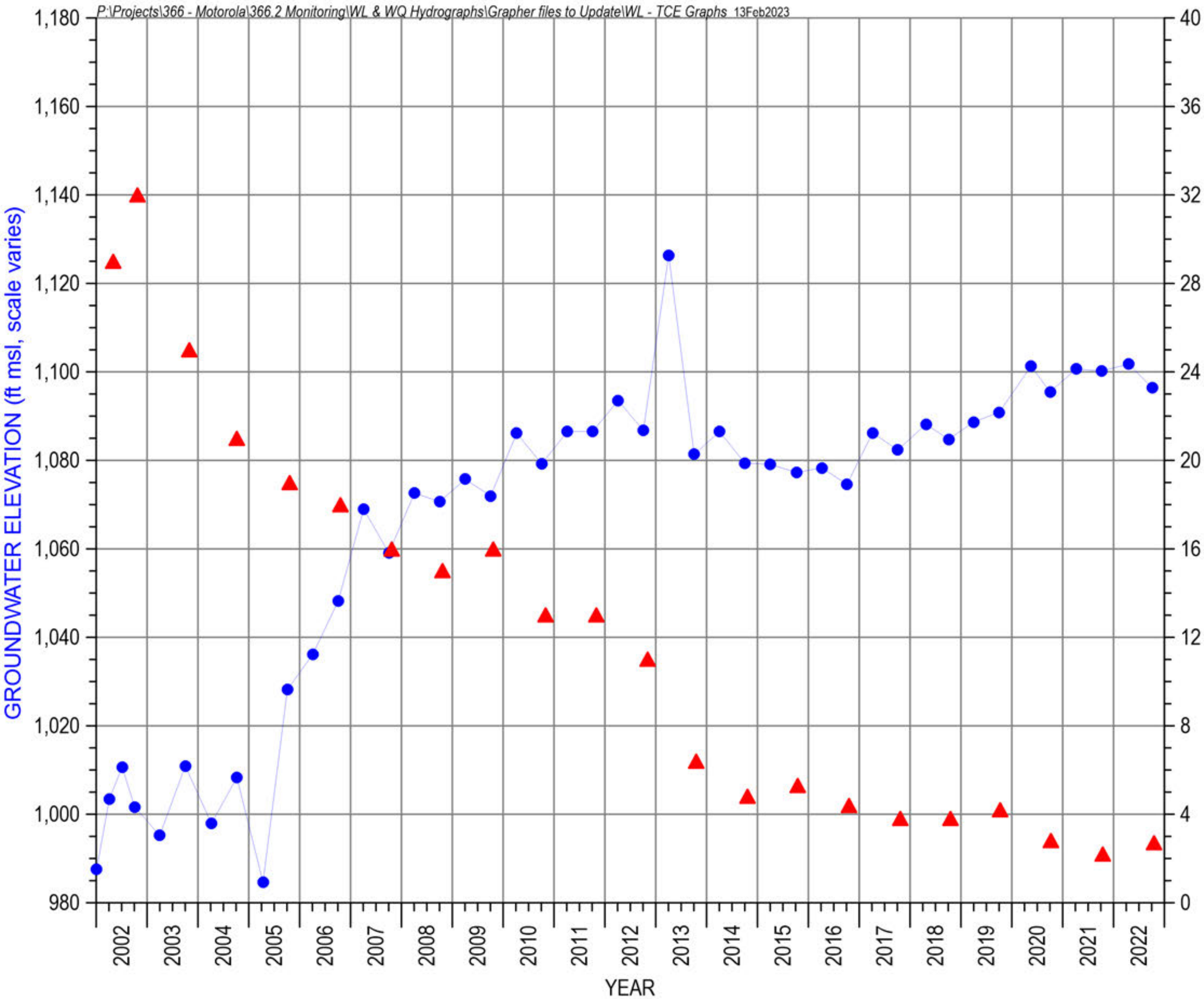


FIGURE D-103. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-38MA/LA

North Indian Bend Wash Superfund Site



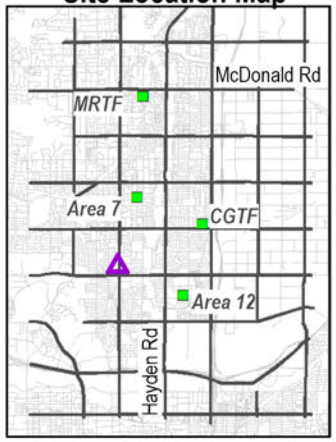
PG-39LA

Site Measurements

- Groundwater Elevation
- TCE Detected Value
- TCE Below Detection Limit*

*Value shown at the reported detection limit

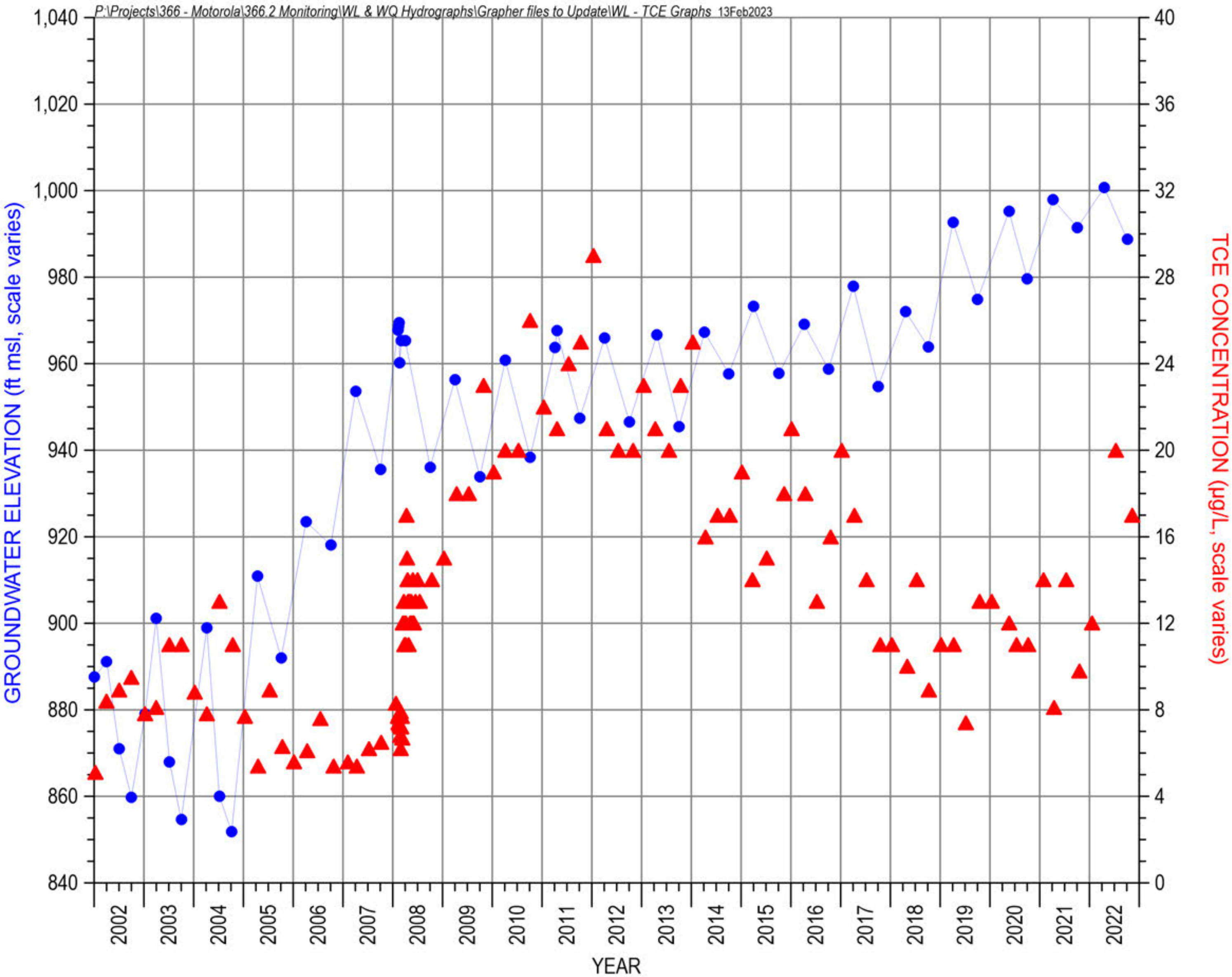
Site Location Map

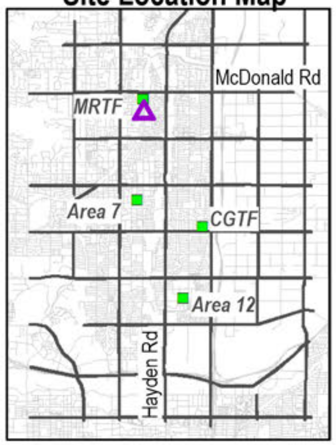


Site Land Surface Elevation: 1,233 feet msl

FIGURE D-104. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-39LA

North Indian Bend Wash Superfund Site

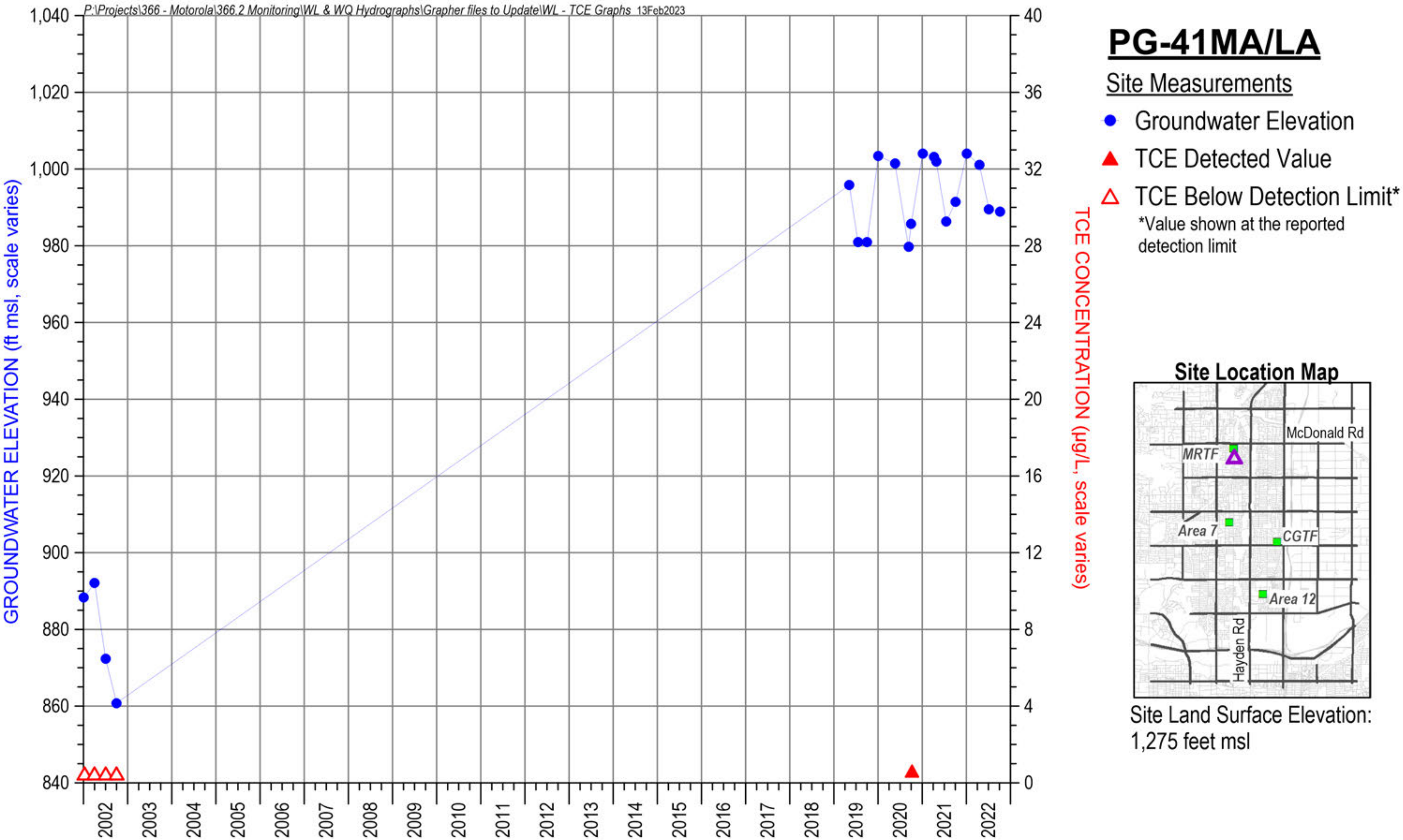




Site Land Surface Elevation:
1,275 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-105. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-40LA



Note: TCE and water level data collected after the GM&EP in 2002 is supplemental

FIGURE D-106. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-41MA/LA

North Indian Bend Wash Superfund Site

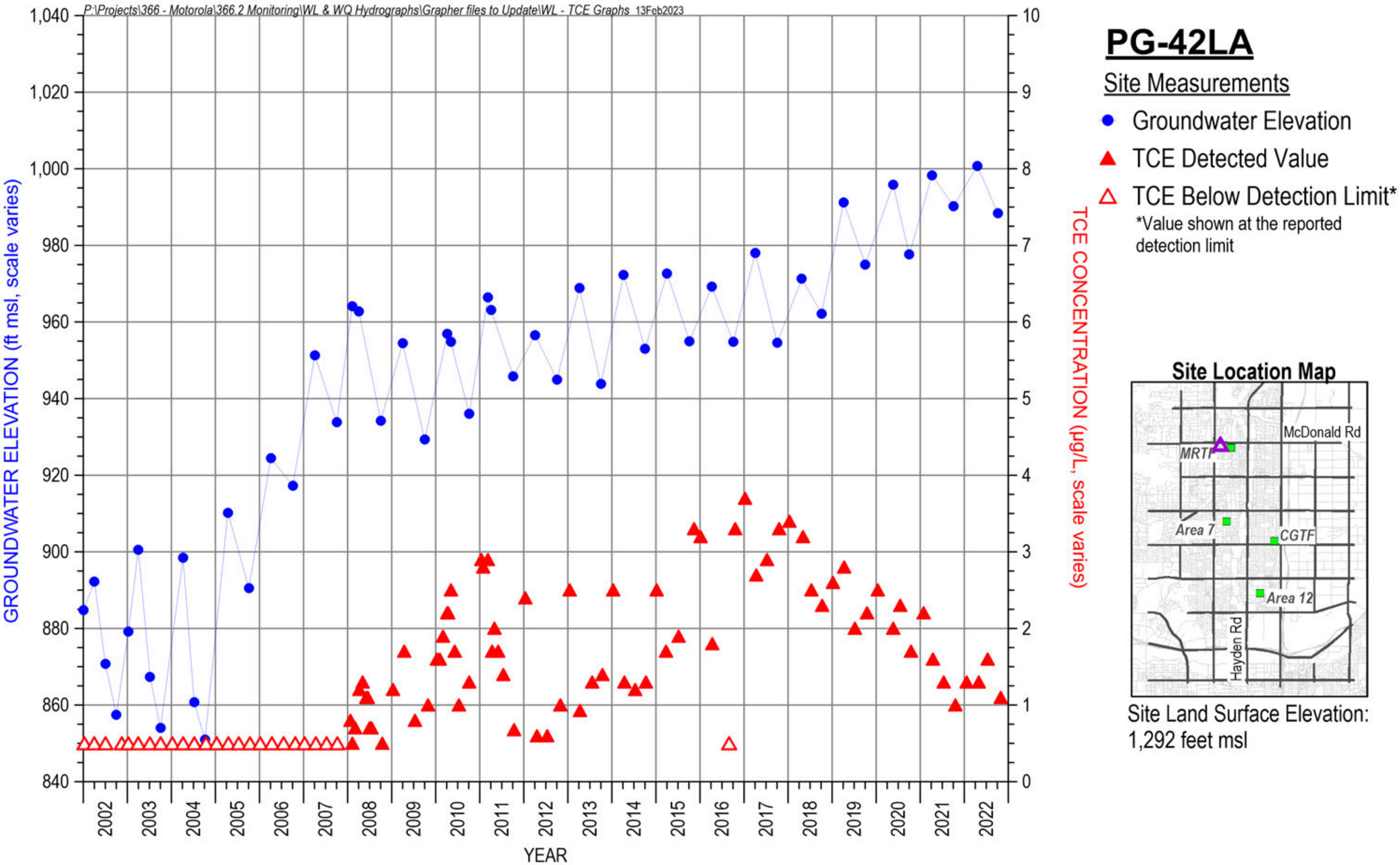
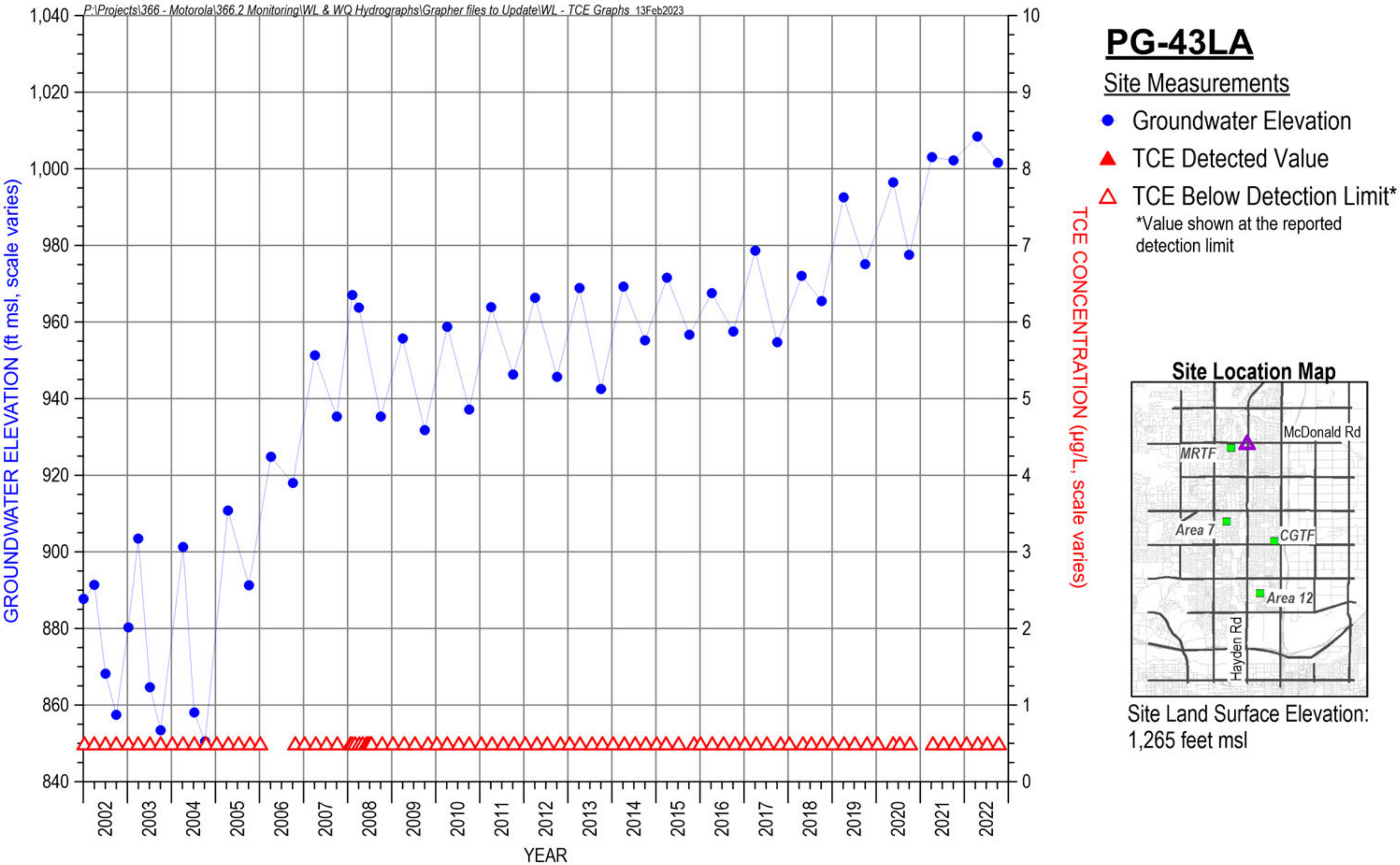


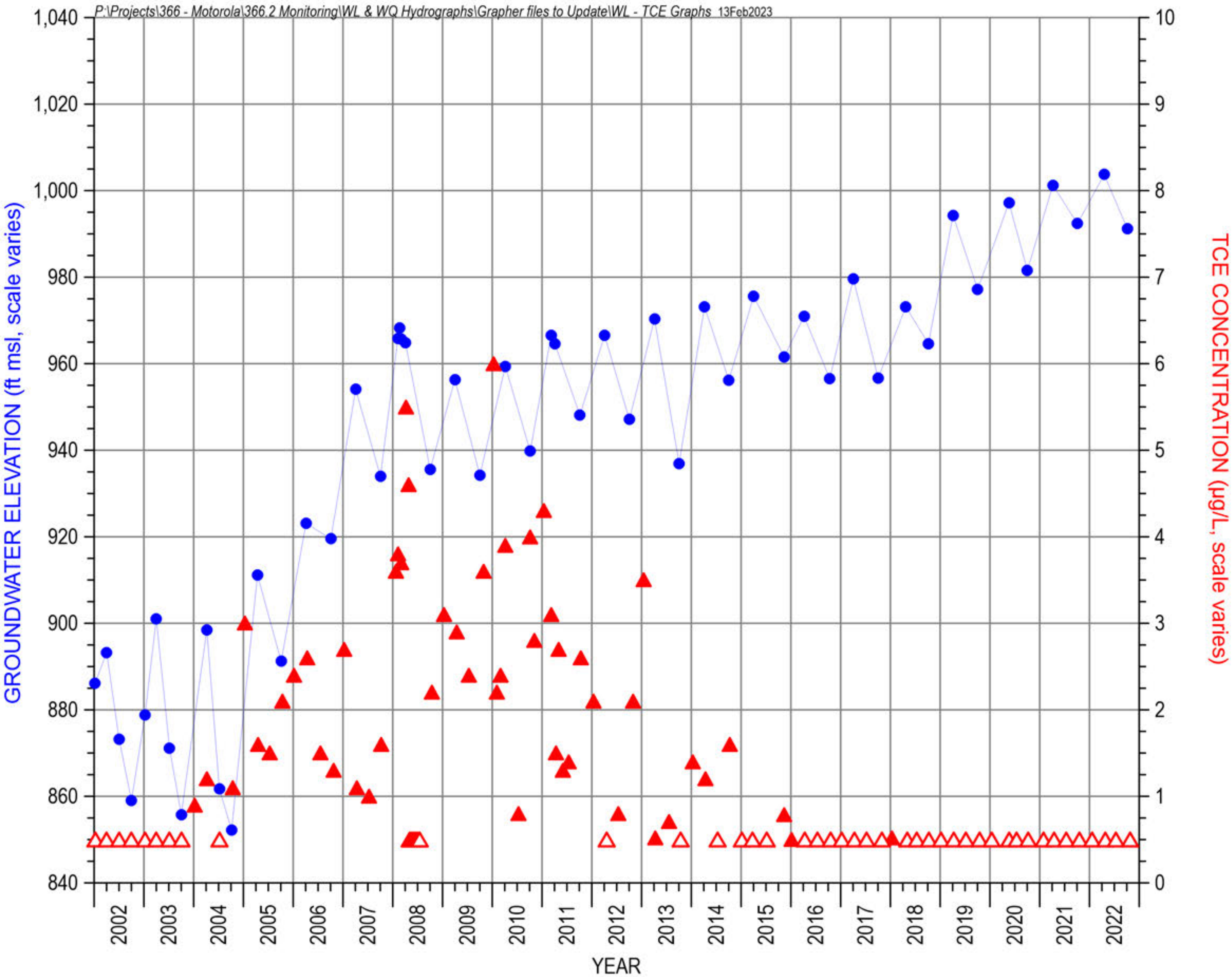
FIGURE D-107. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-42LA

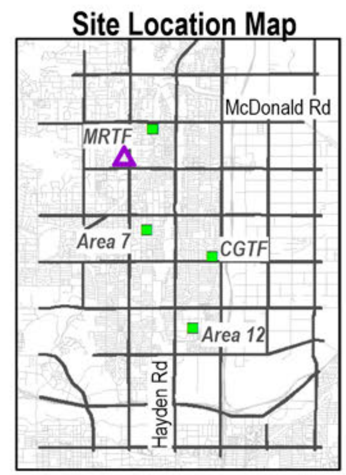
North Indian Bend Wash Superfund Site



North Indian Bend Wash Superfund Site

FIGURE D-108. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-43LA

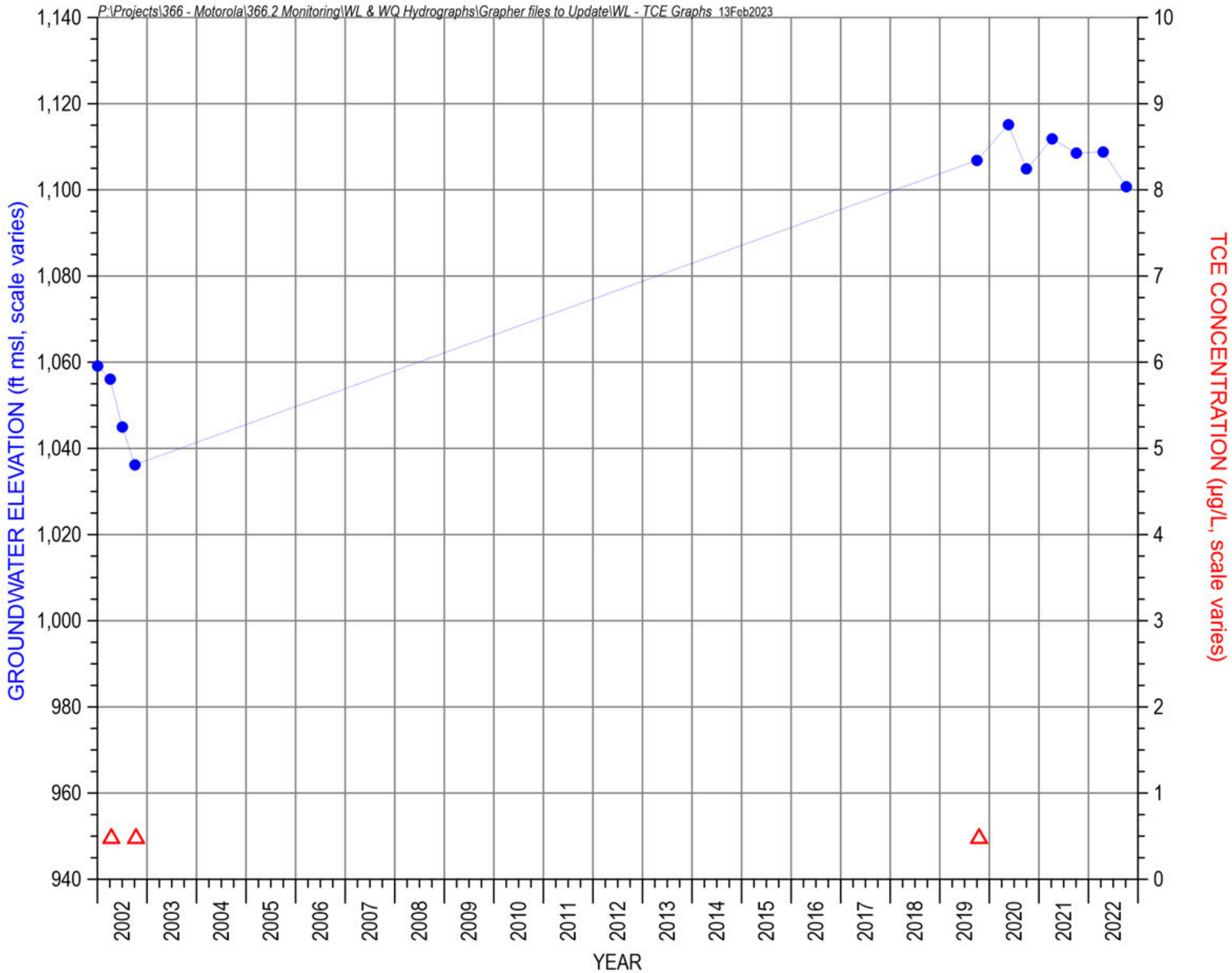


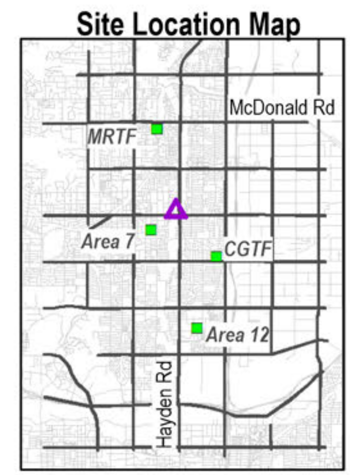


Site Land Surface Elevation:
1,298 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-109. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-44LA



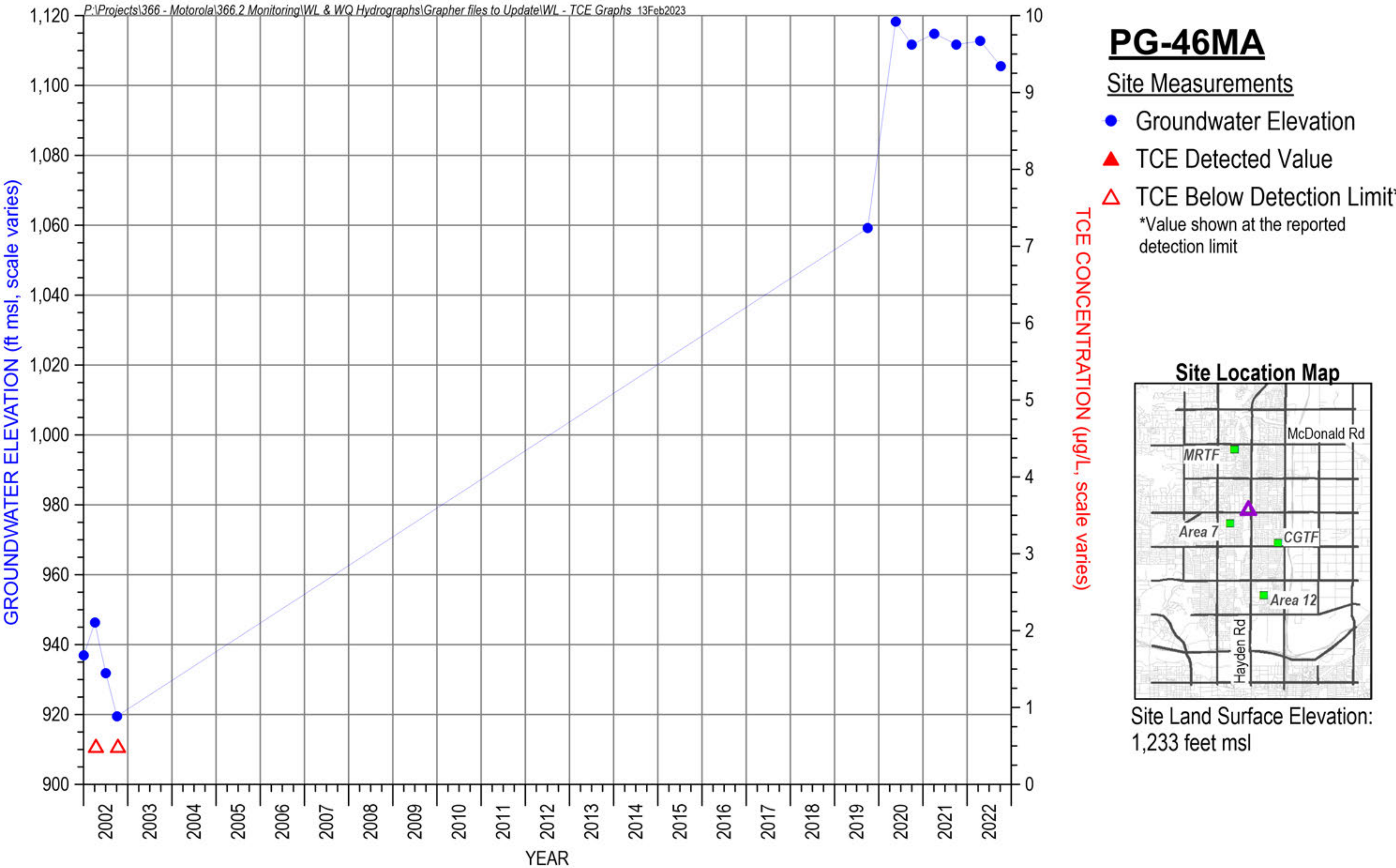


Site Land Surface Elevation:
1,232 feet msl

Note: TCE and water level data collected after the GM&EP in 2002 is supplemental

FIGURE D-110. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-45MA

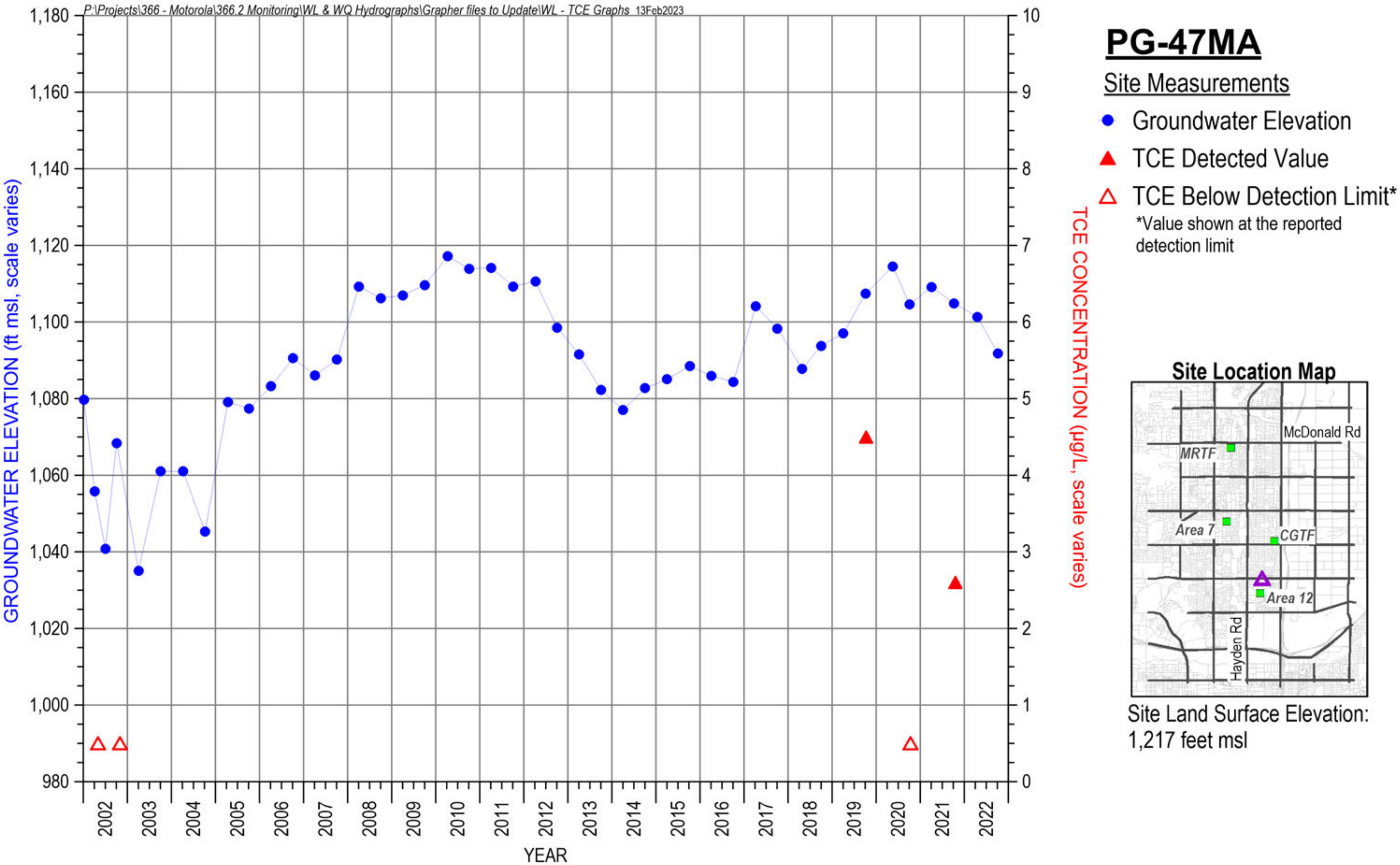
North Indian Bend Wash Superfund Site



Note: TCE and water level data collected after the GM&EP in 2002 is supplemental

FIGURE D-111. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-46MA

North Indian Bend Wash Superfund Site



Note: TCE data collected after the GM&EP in 2002 is supplemental

FIGURE D-112. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-47MA

North Indian Bend Wash Superfund Site

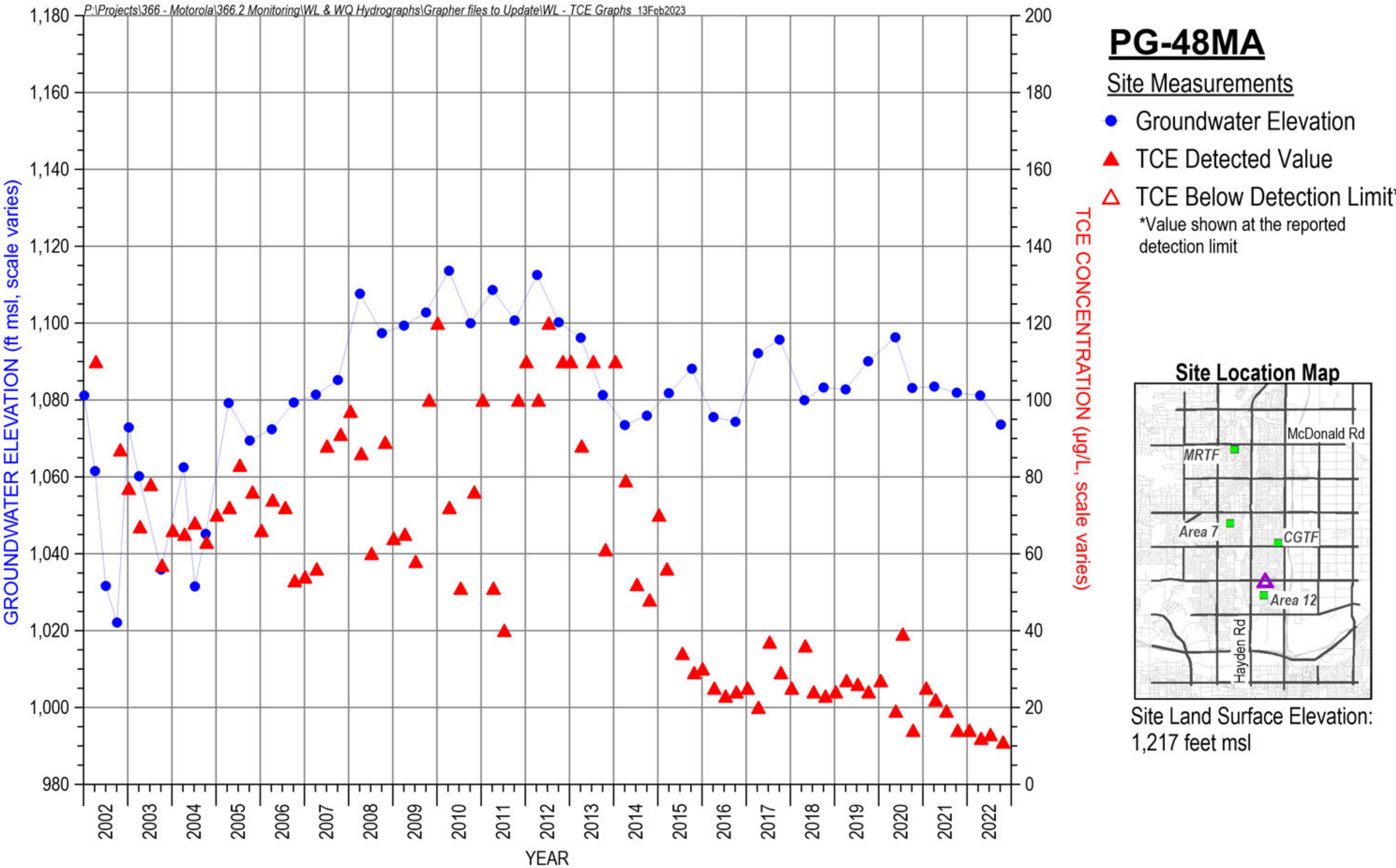


FIGURE D-113. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-48MA

North Indian Bend Wash Superfund Site

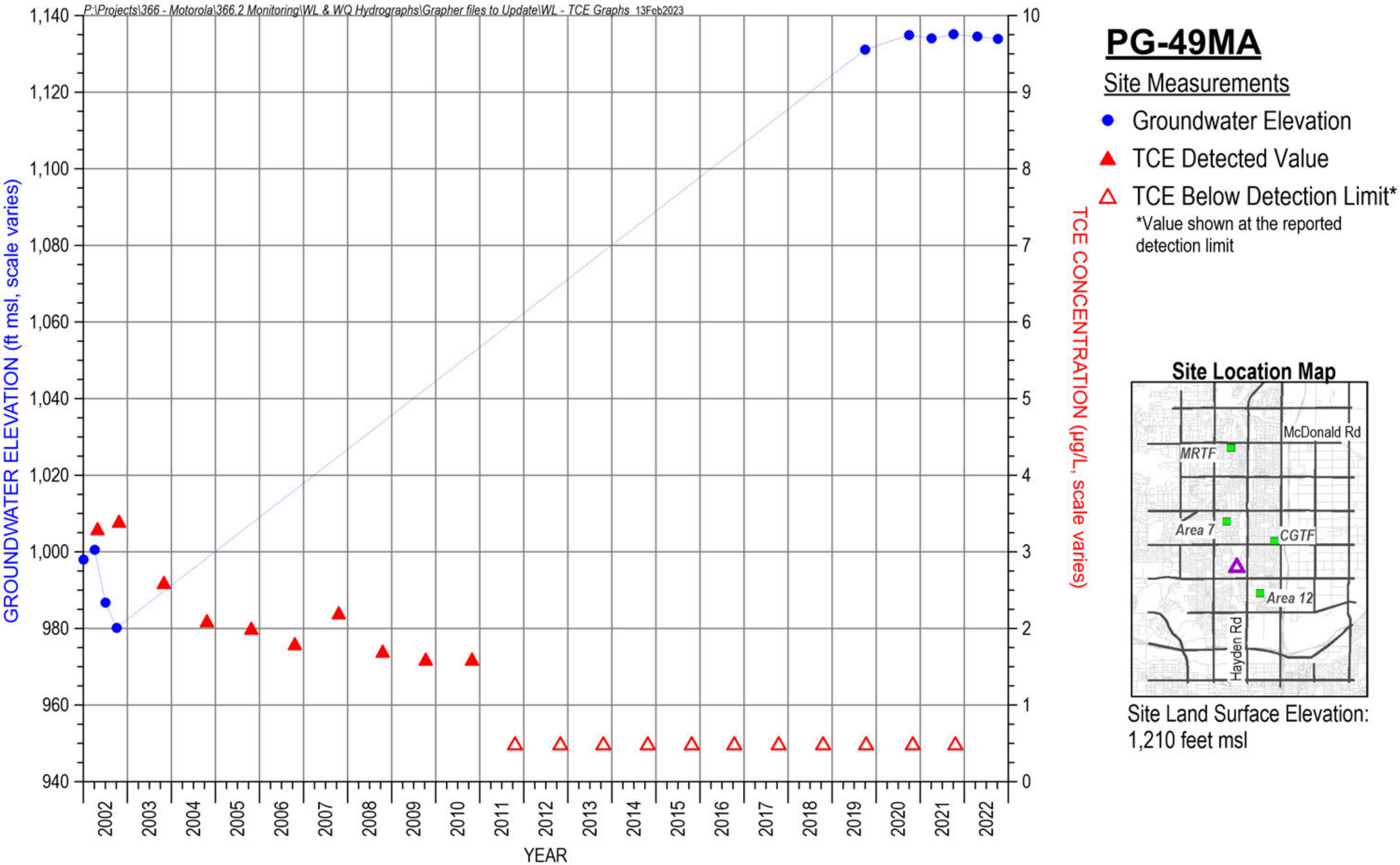


FIGURE D-114. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-49MA

North Indian Bend Wash Superfund Site

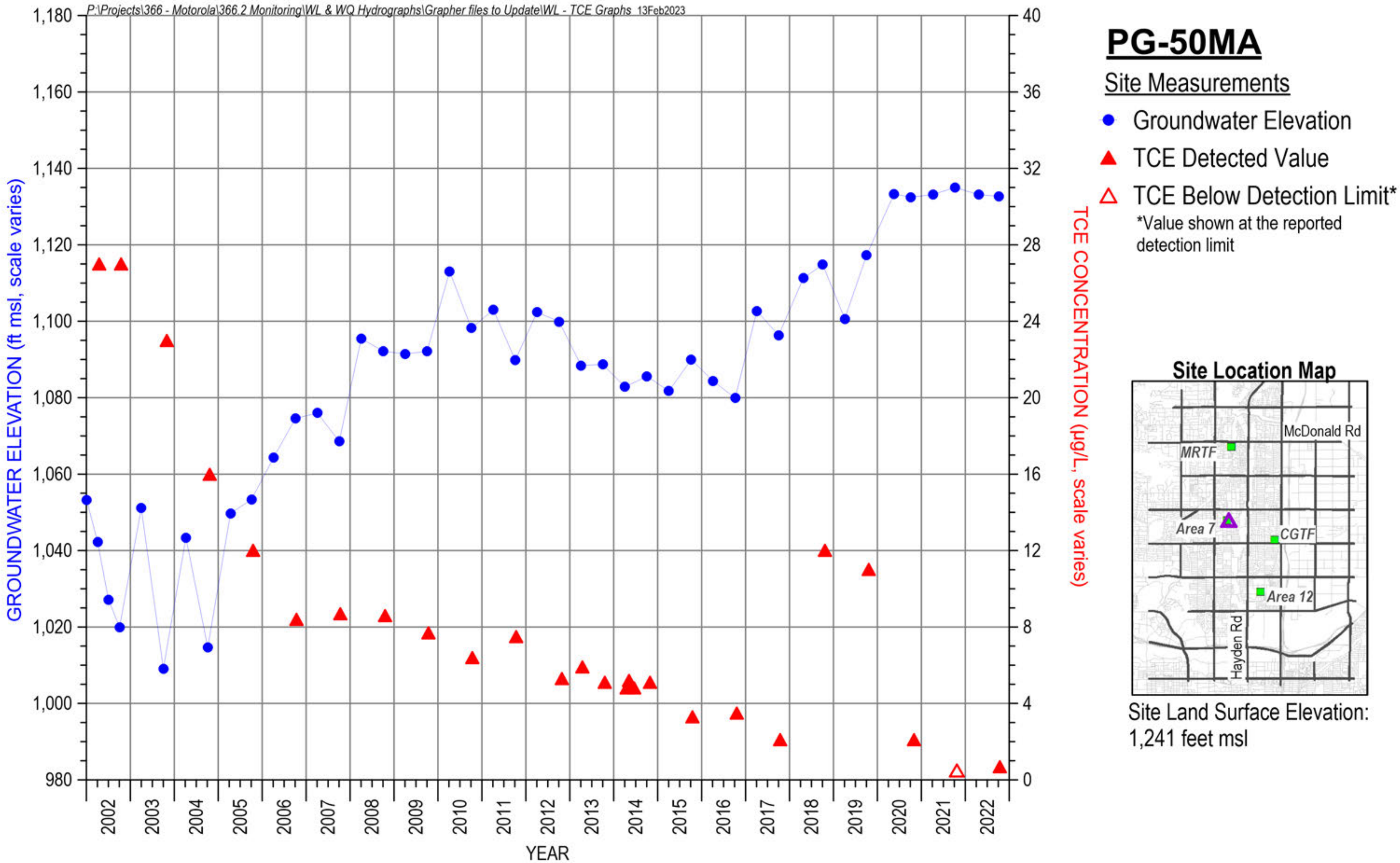
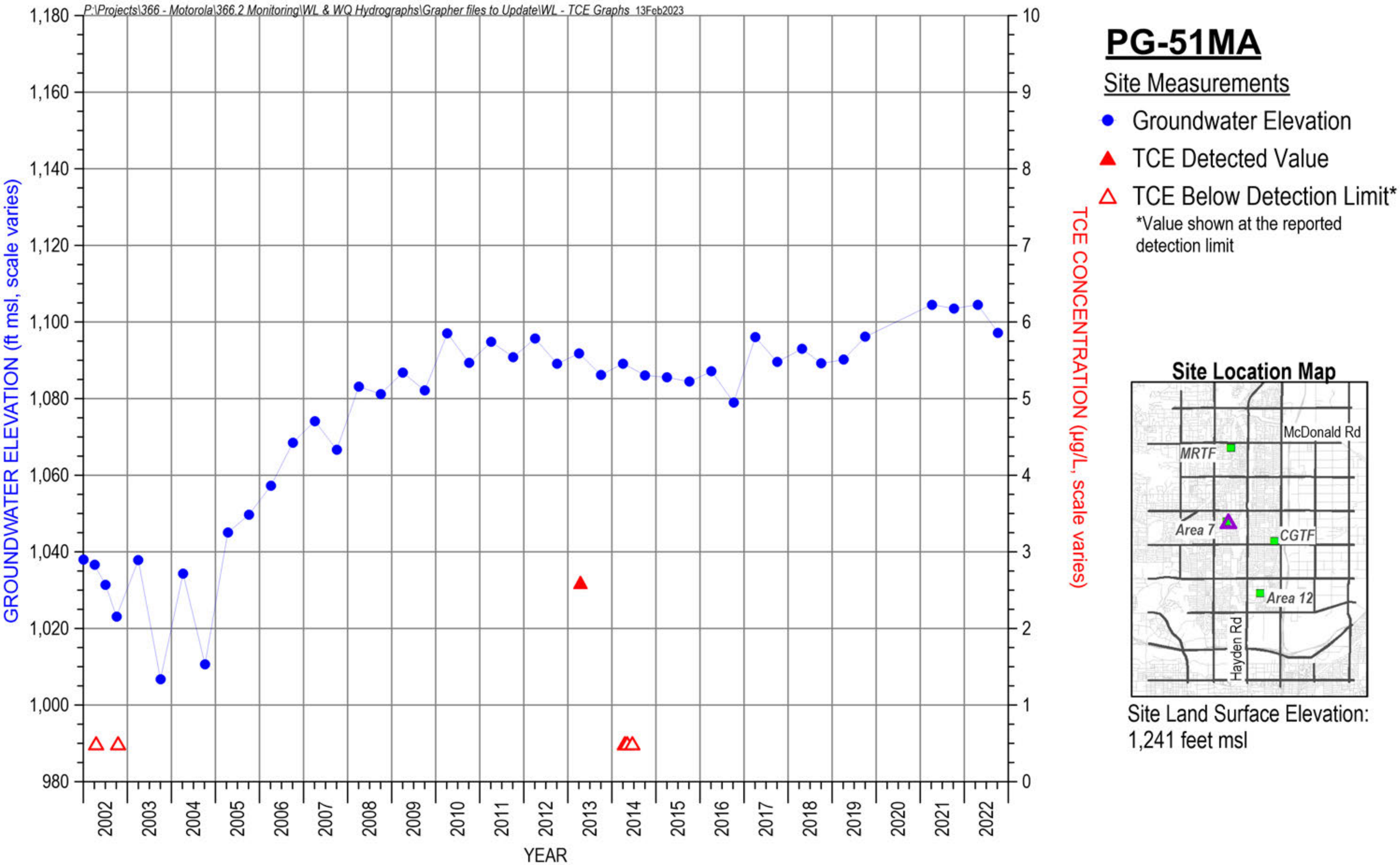


FIGURE D-115. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-50MA

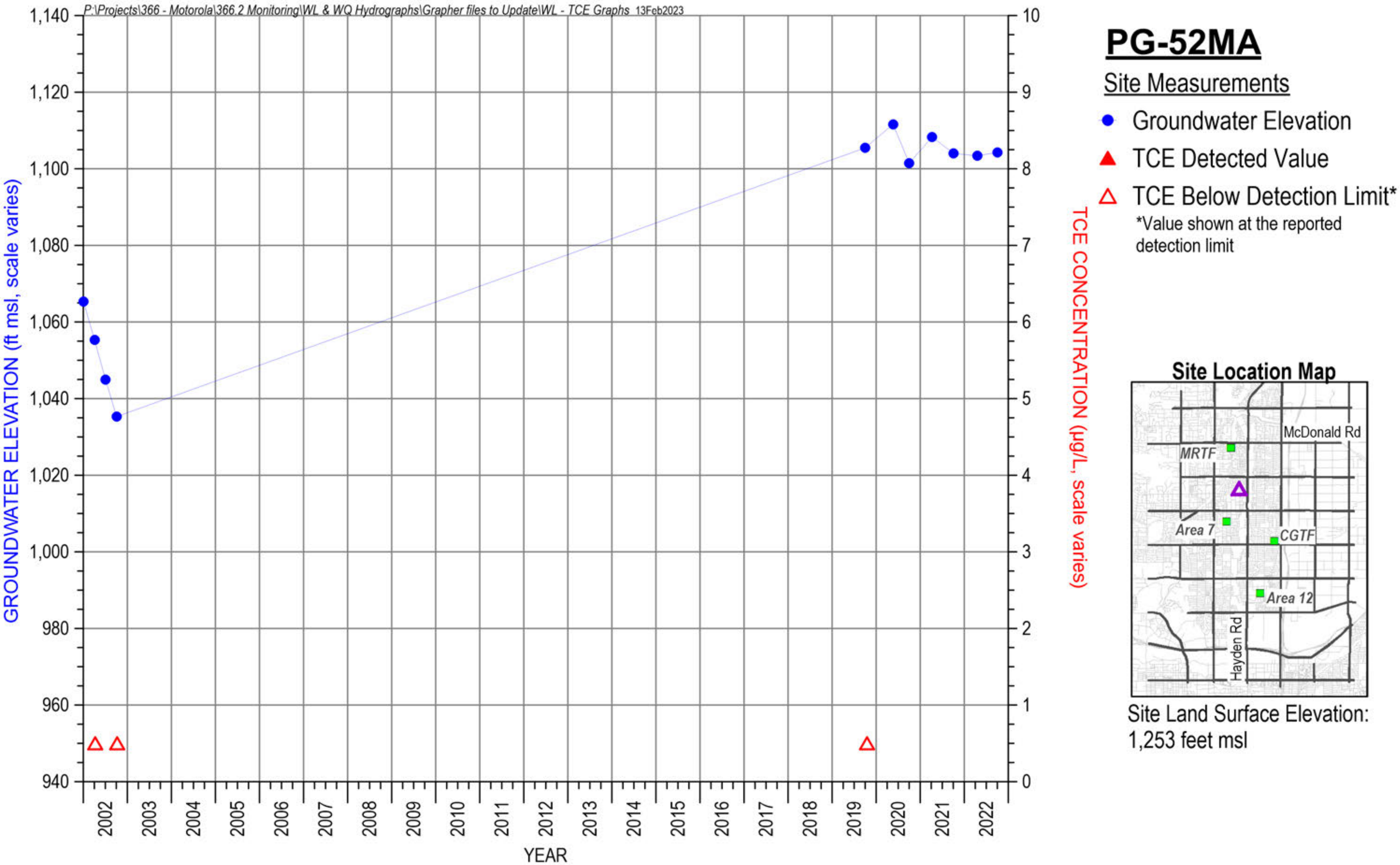
North Indian Bend Wash Superfund Site



Note: TCE data collected after the GM&EP in 2002 is supplemental

FIGURE D-116. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-51MA

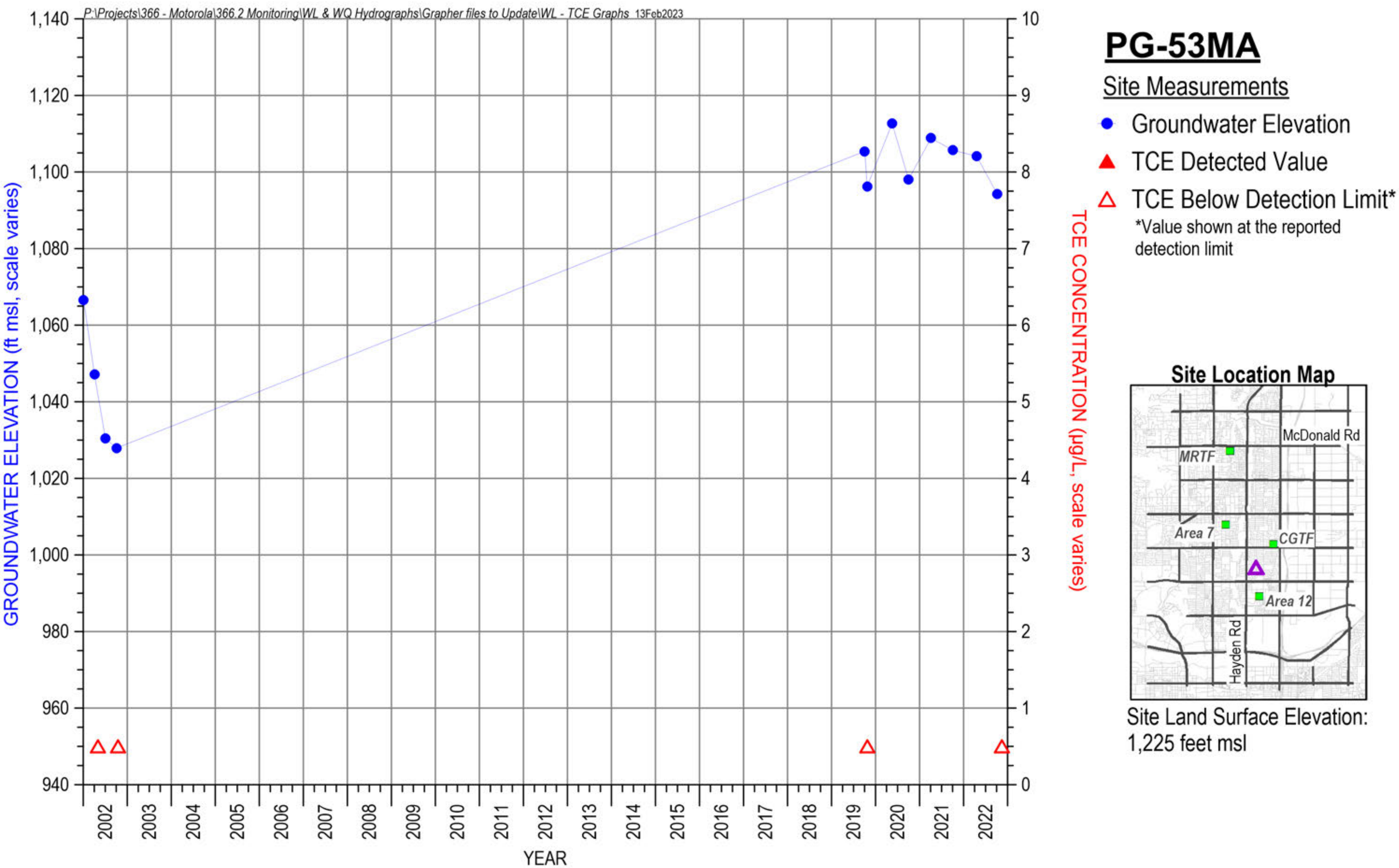
North Indian Bend Wash Superfund Site



Note: TCE and water level data collected after the GM&EP in 2002 is supplemental

FIGURE D-117. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-52MA

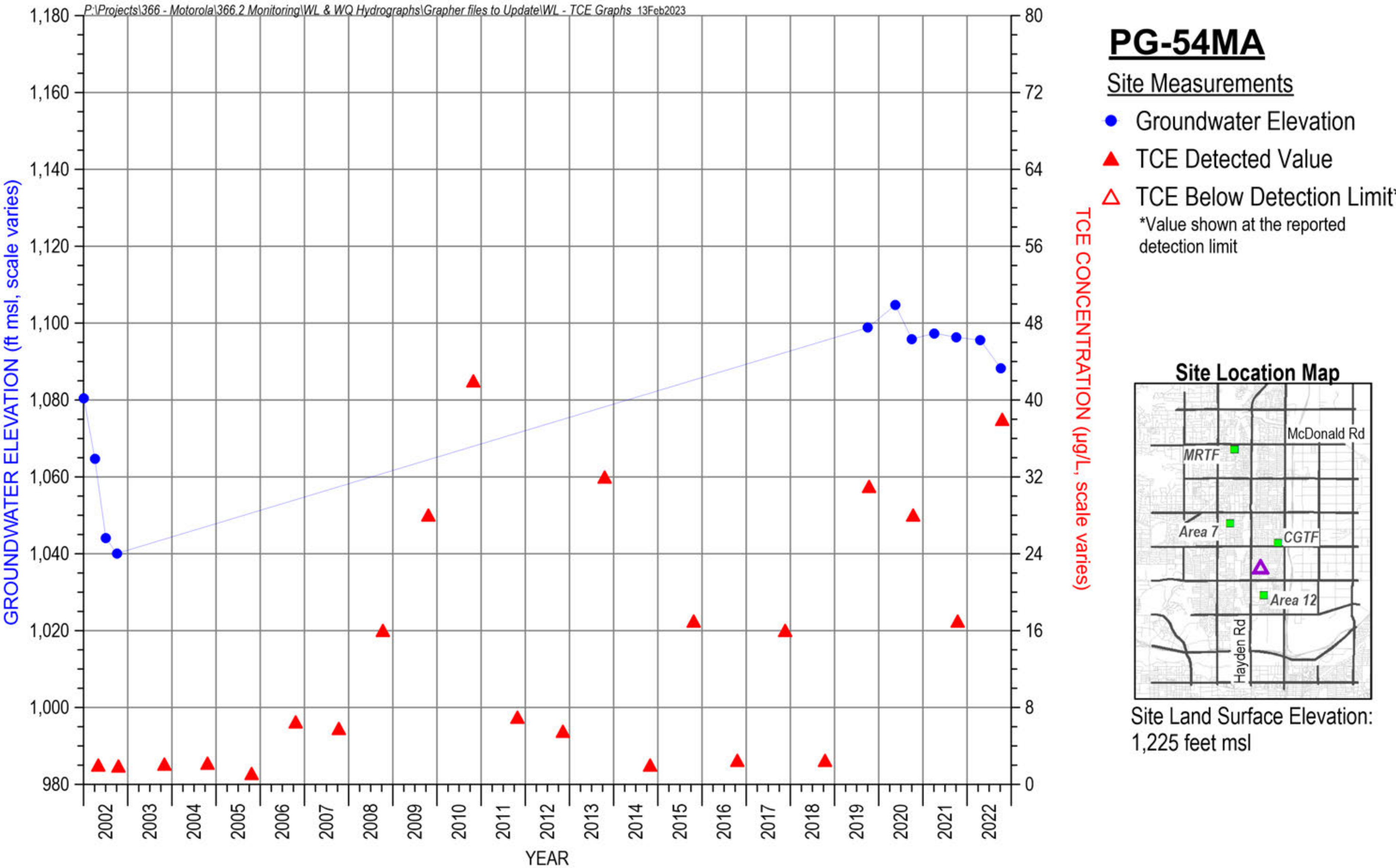
North Indian Bend Wash Superfund Site



Note: TCE and water level data collected after the GM&EP in 2002 is supplemental

FIGURE D-118. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-53MA

North Indian Bend Wash Superfund Site



Note: Water level data collected after the GM&EP in 2002 is supplemental

FIGURE D-119. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-54MA

North Indian Bend Wash Superfund Site

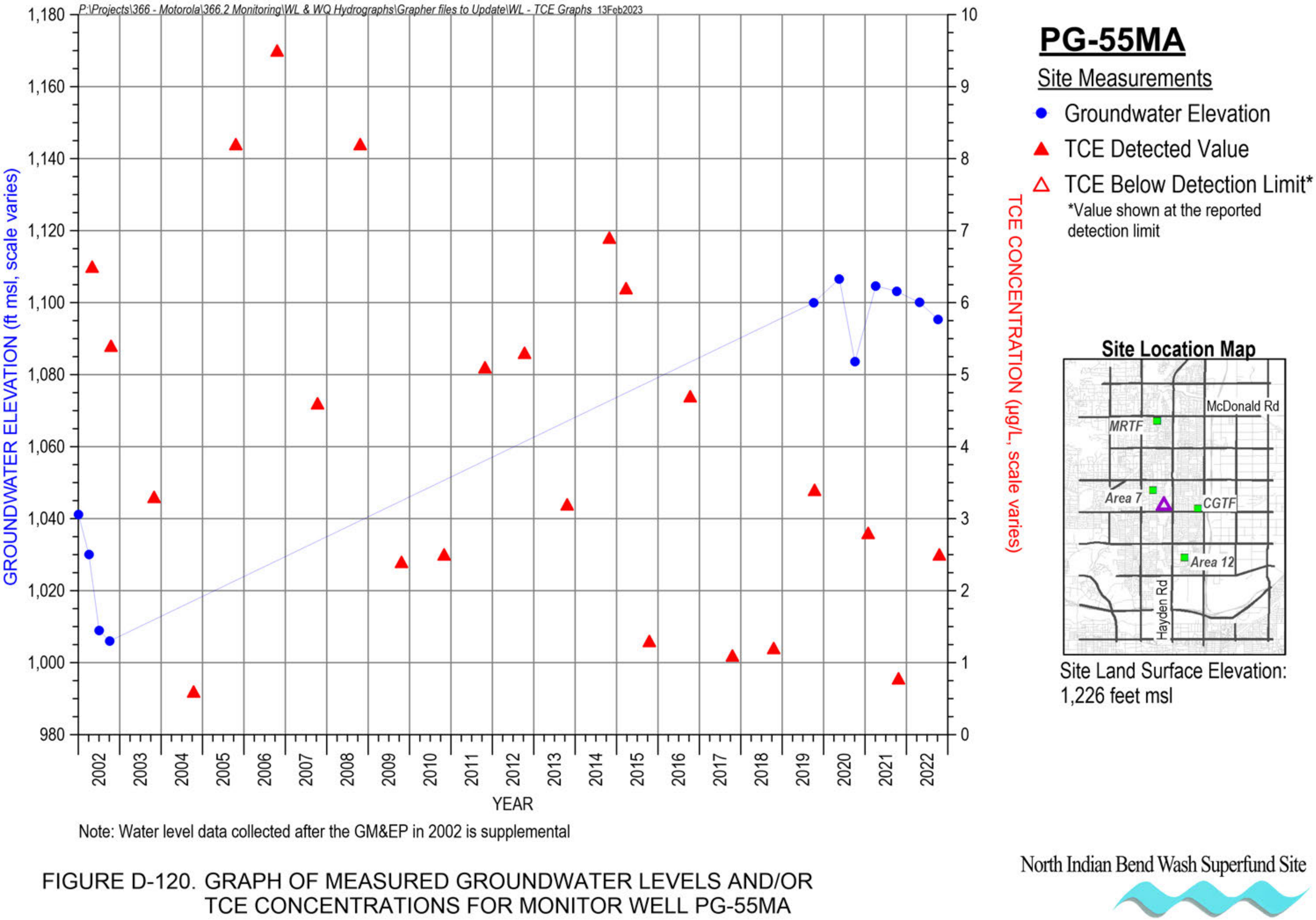
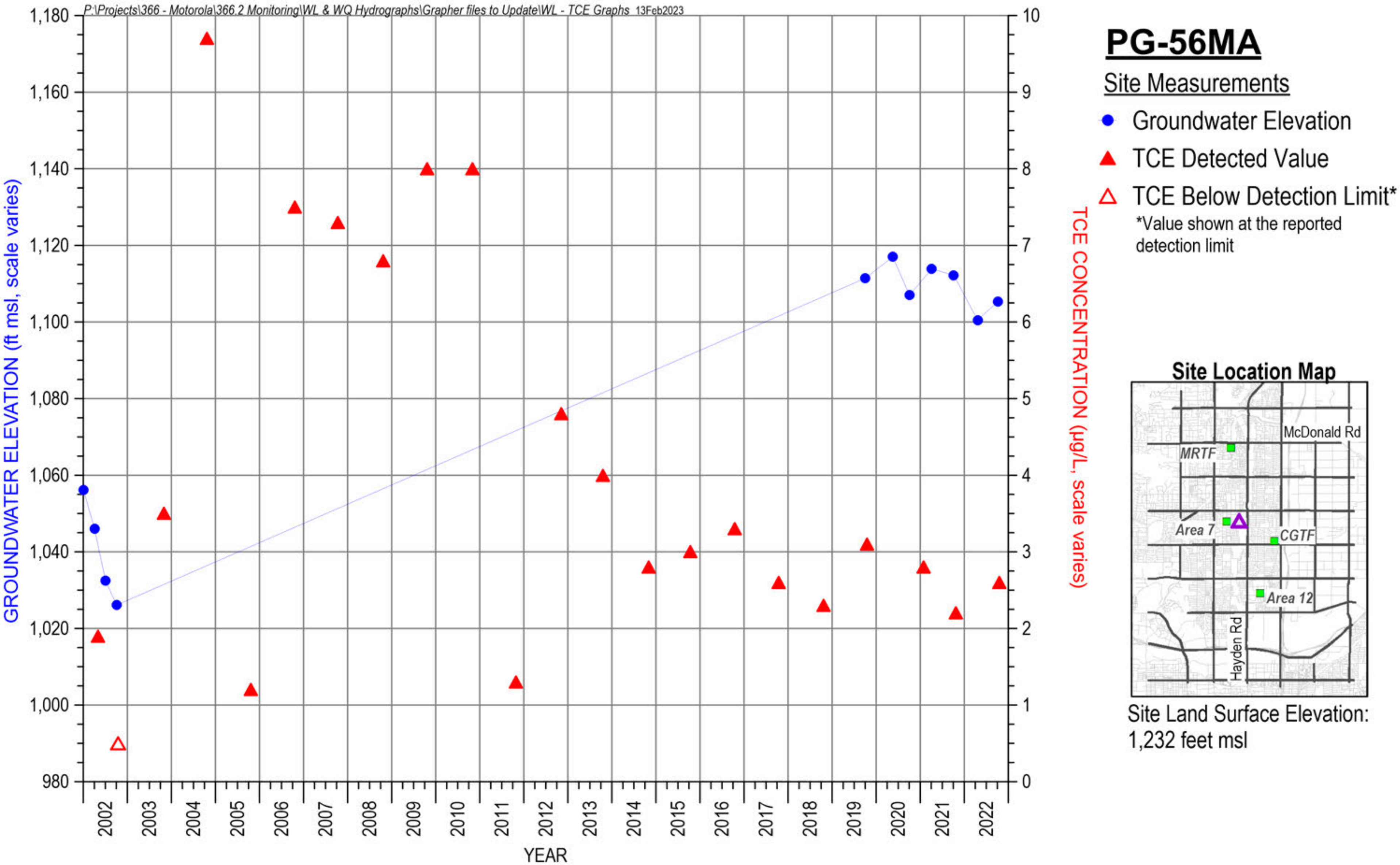


FIGURE D-120. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-55MA



Note: Water level data collected after the GM&EP in 2002 is supplemental

FIGURE D-121. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-56MA

North Indian Bend Wash Superfund Site

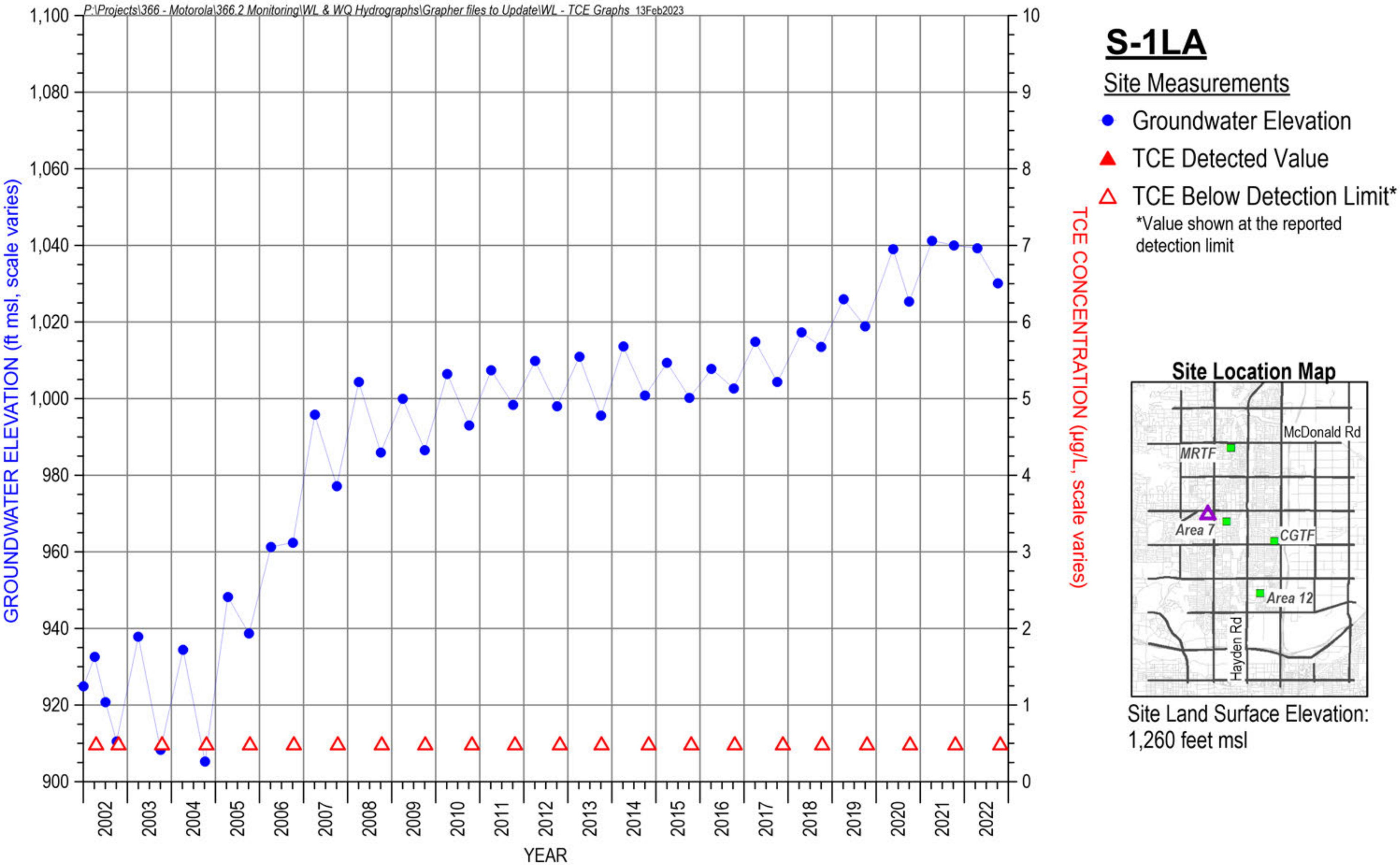


FIGURE D-122. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL S-1LA

North Indian Bend Wash Superfund Site

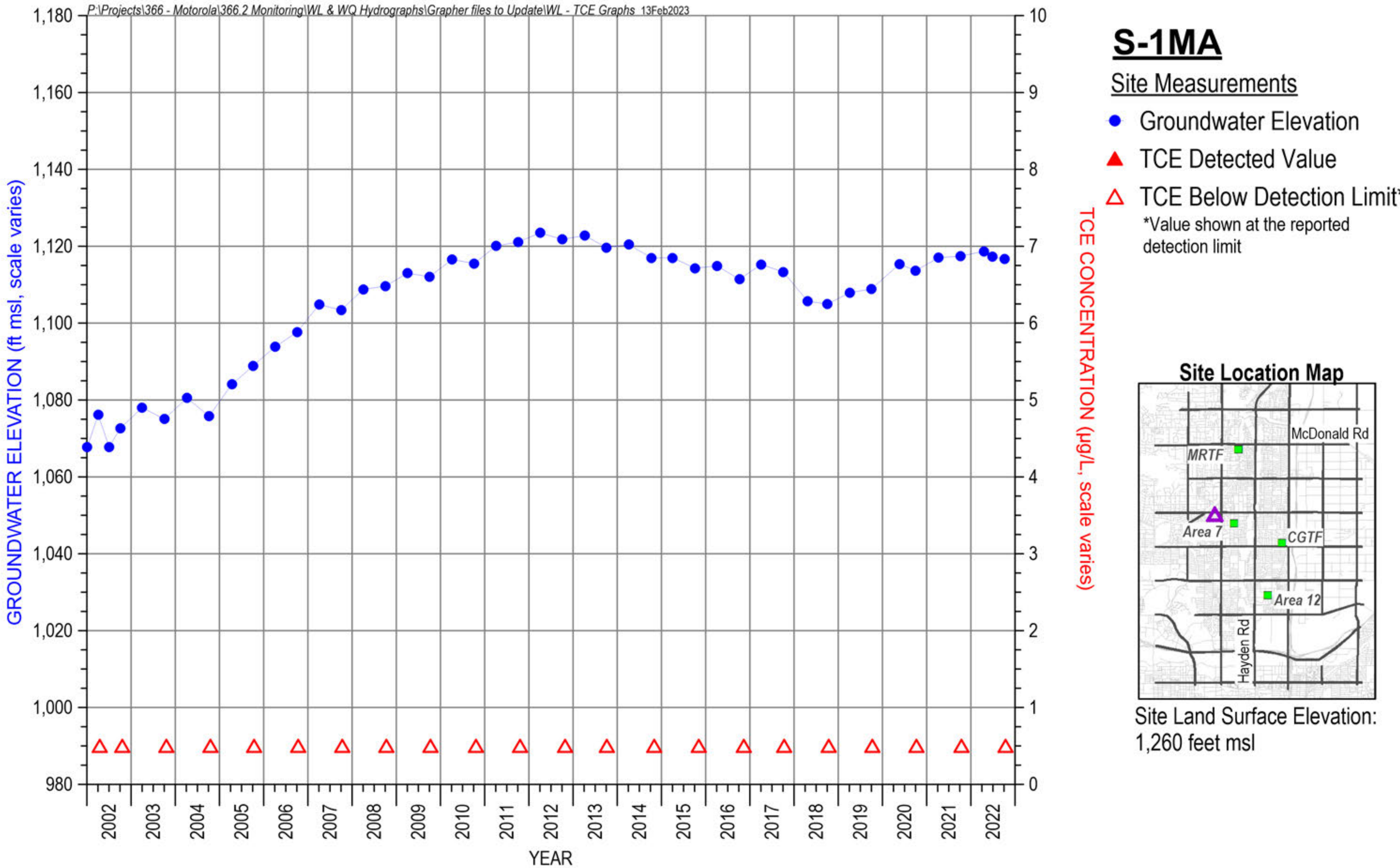
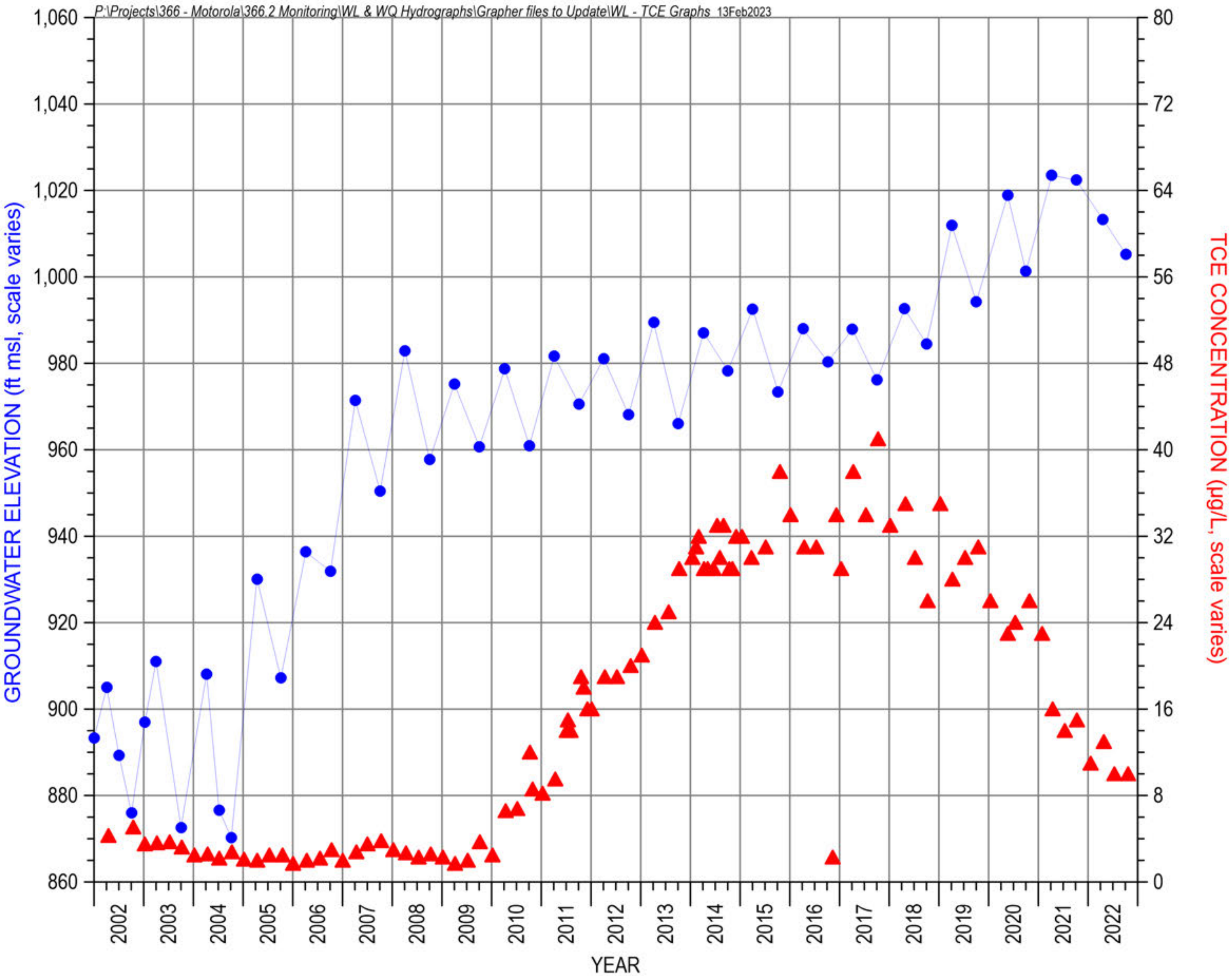
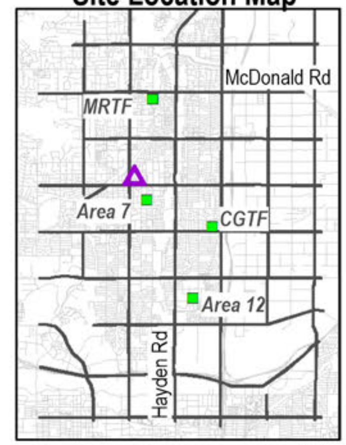


FIGURE D-123. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL S-1MA



Site Location Map



Site Land Surface Elevation:
1,260 feet msl

FIGURE D-124. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL S-2LA

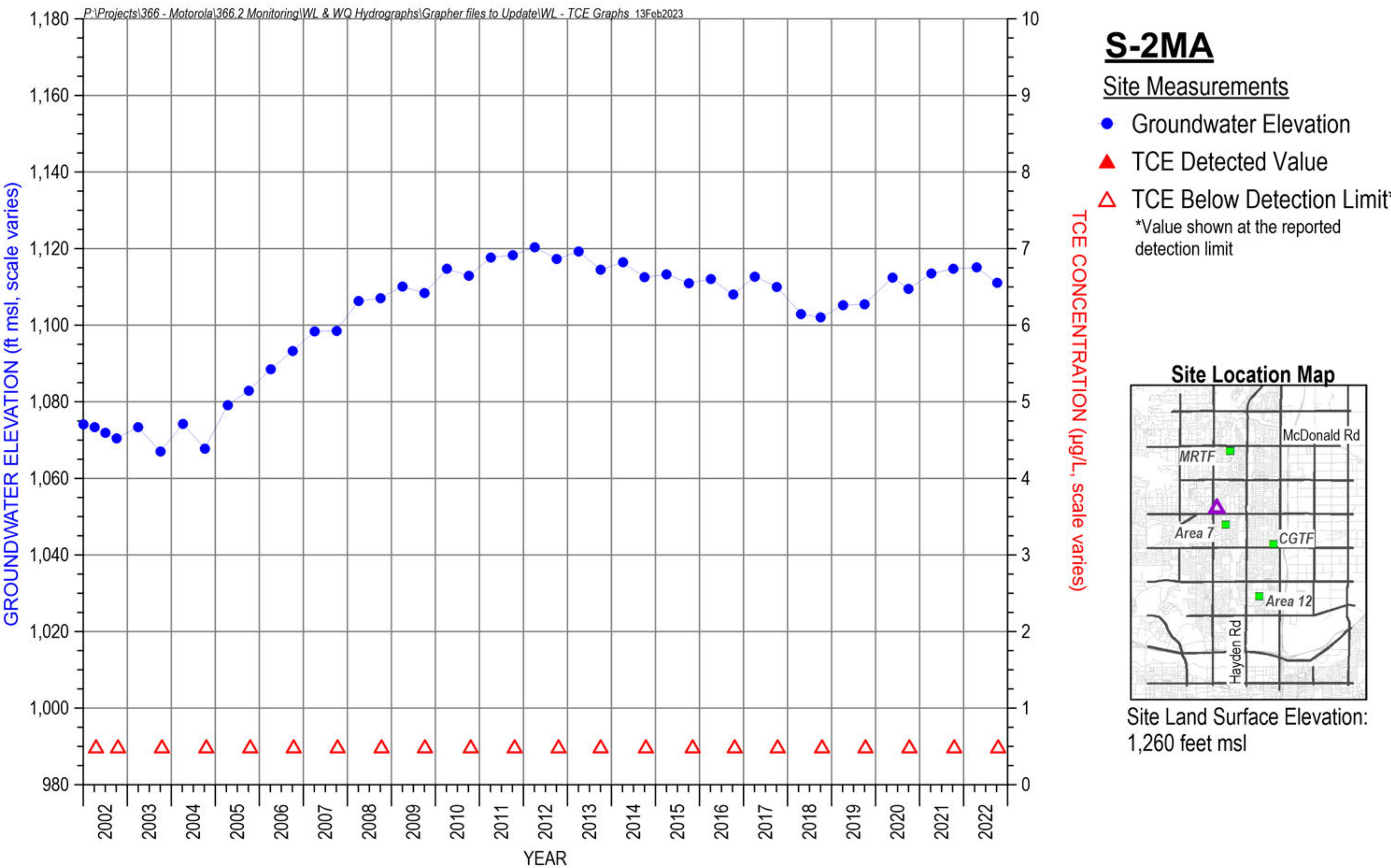


FIGURE D-125. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL S-2MA

North Indian Bend Wash Superfund Site

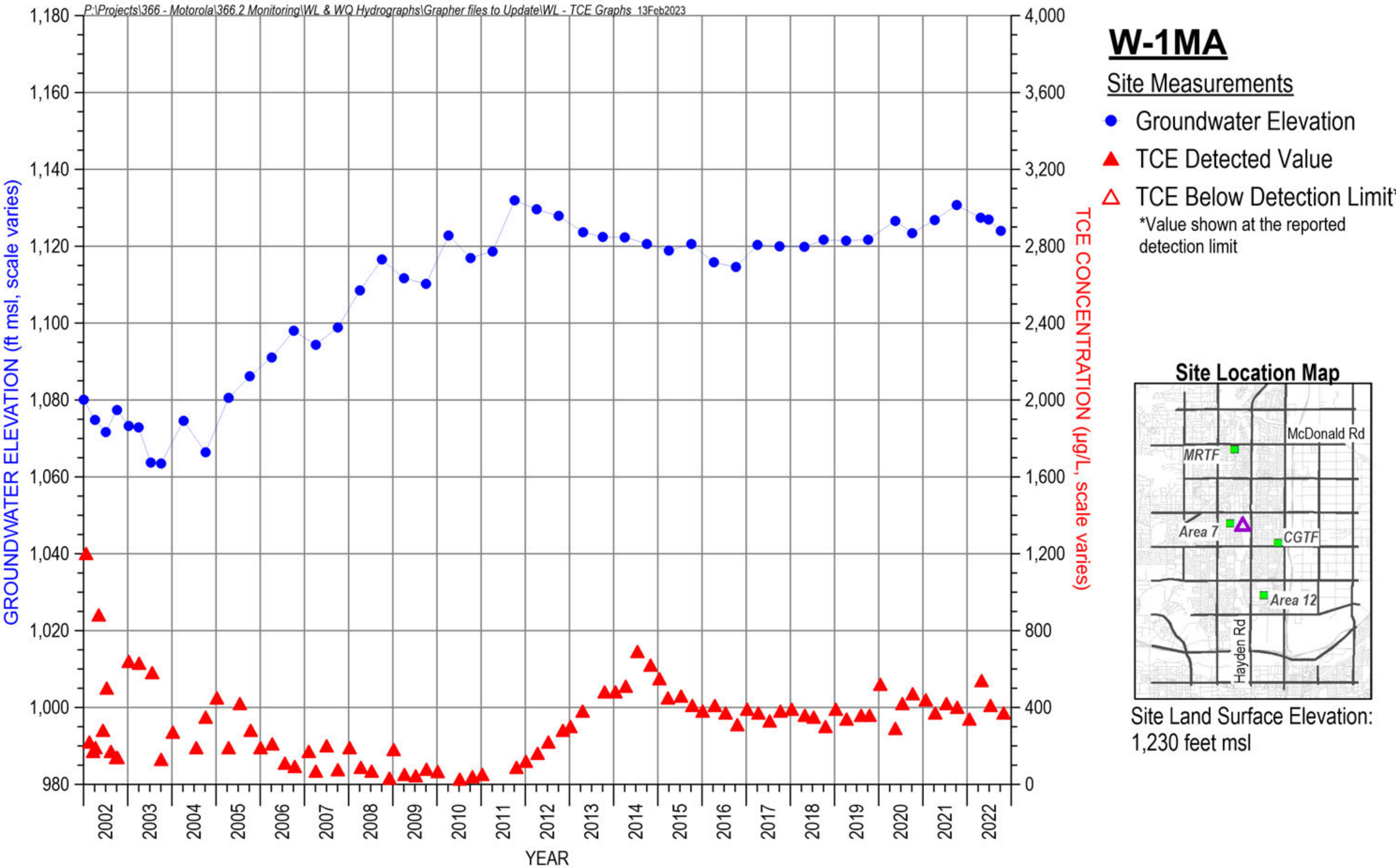


FIGURE D-126. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL W-1MA

North Indian Bend Wash Superfund Site

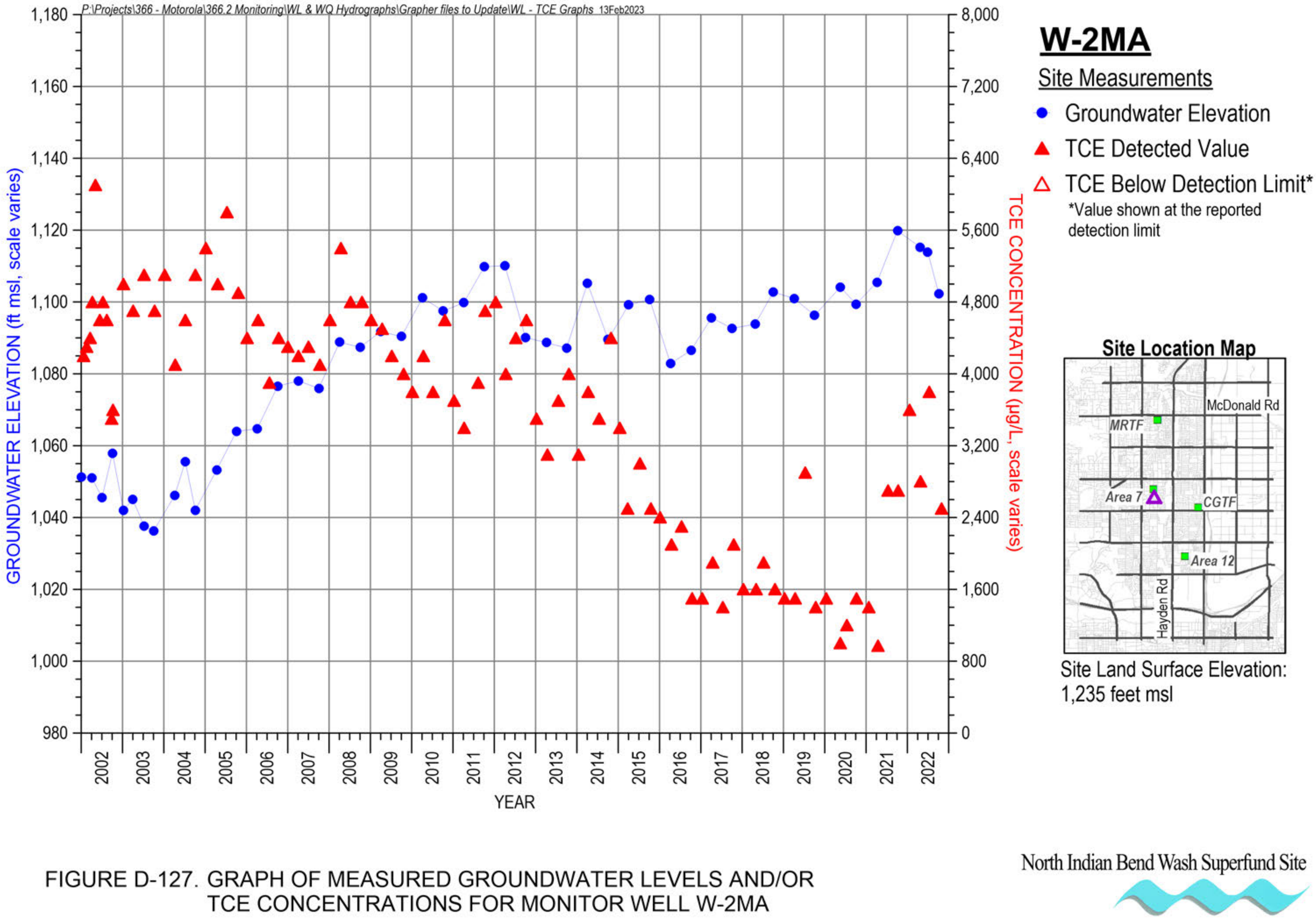


FIGURE D-127. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL W-2MA

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

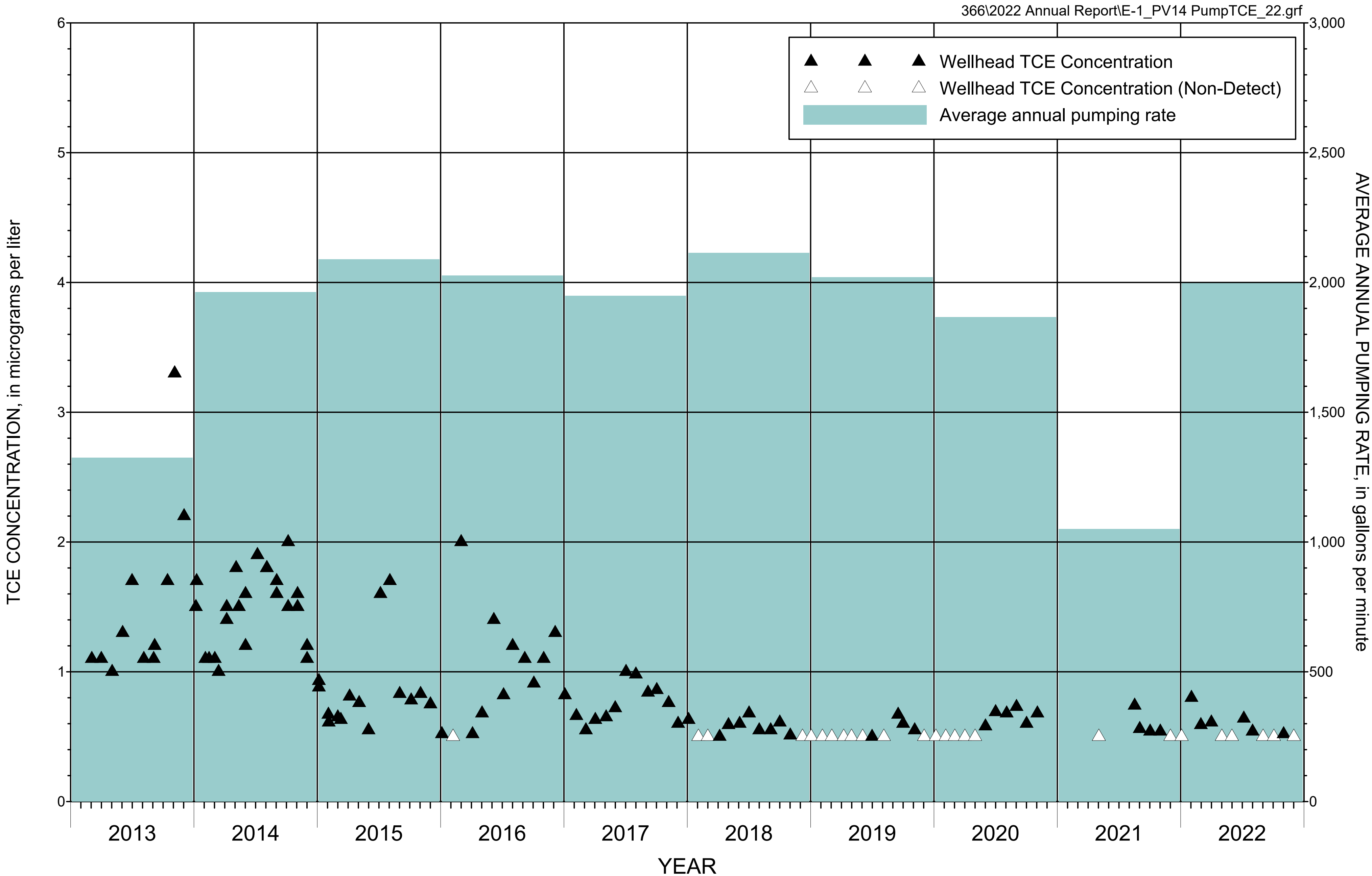


FIGURE E-1. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PV-14 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

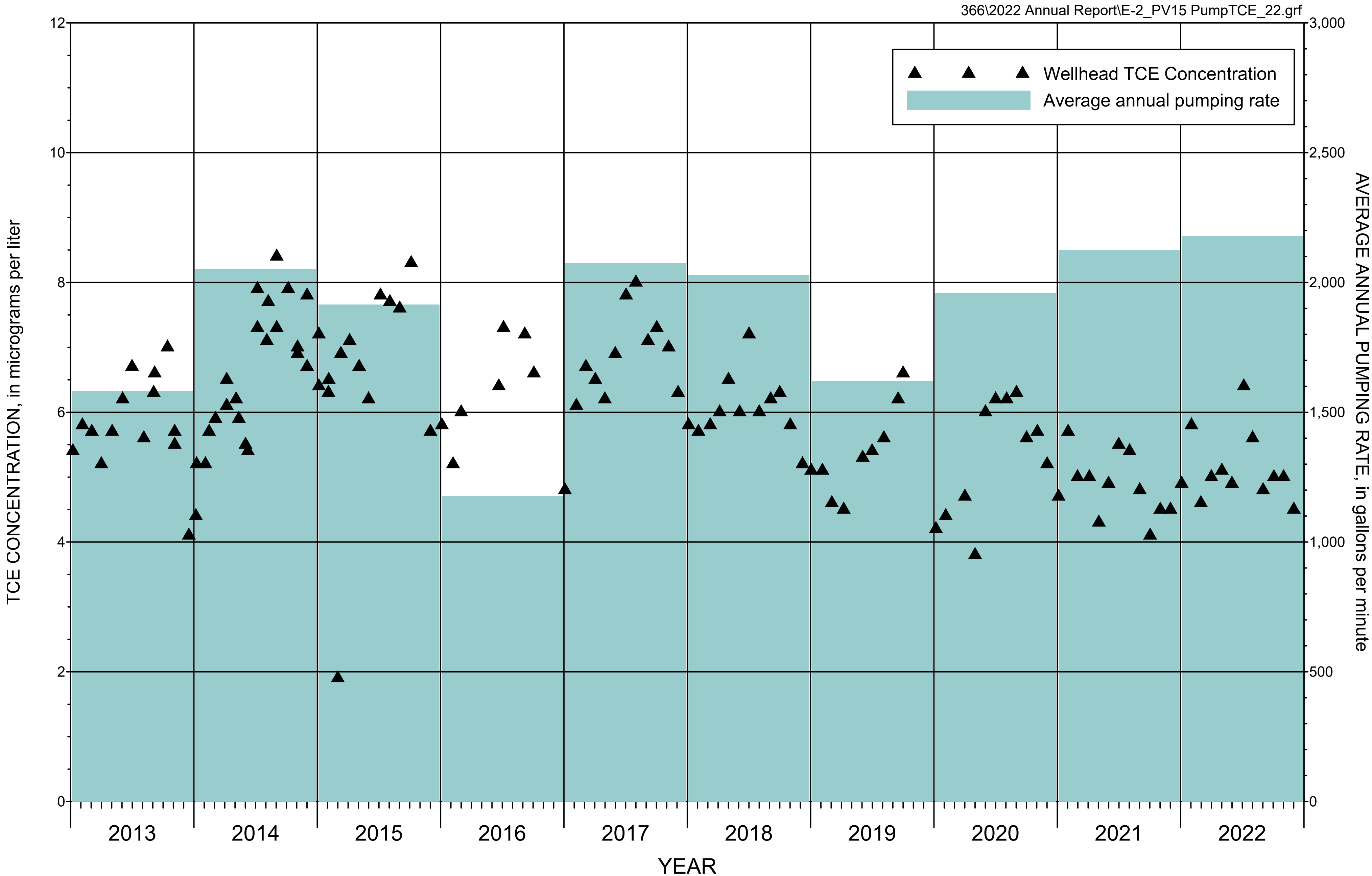


FIGURE E-2. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PV-15 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

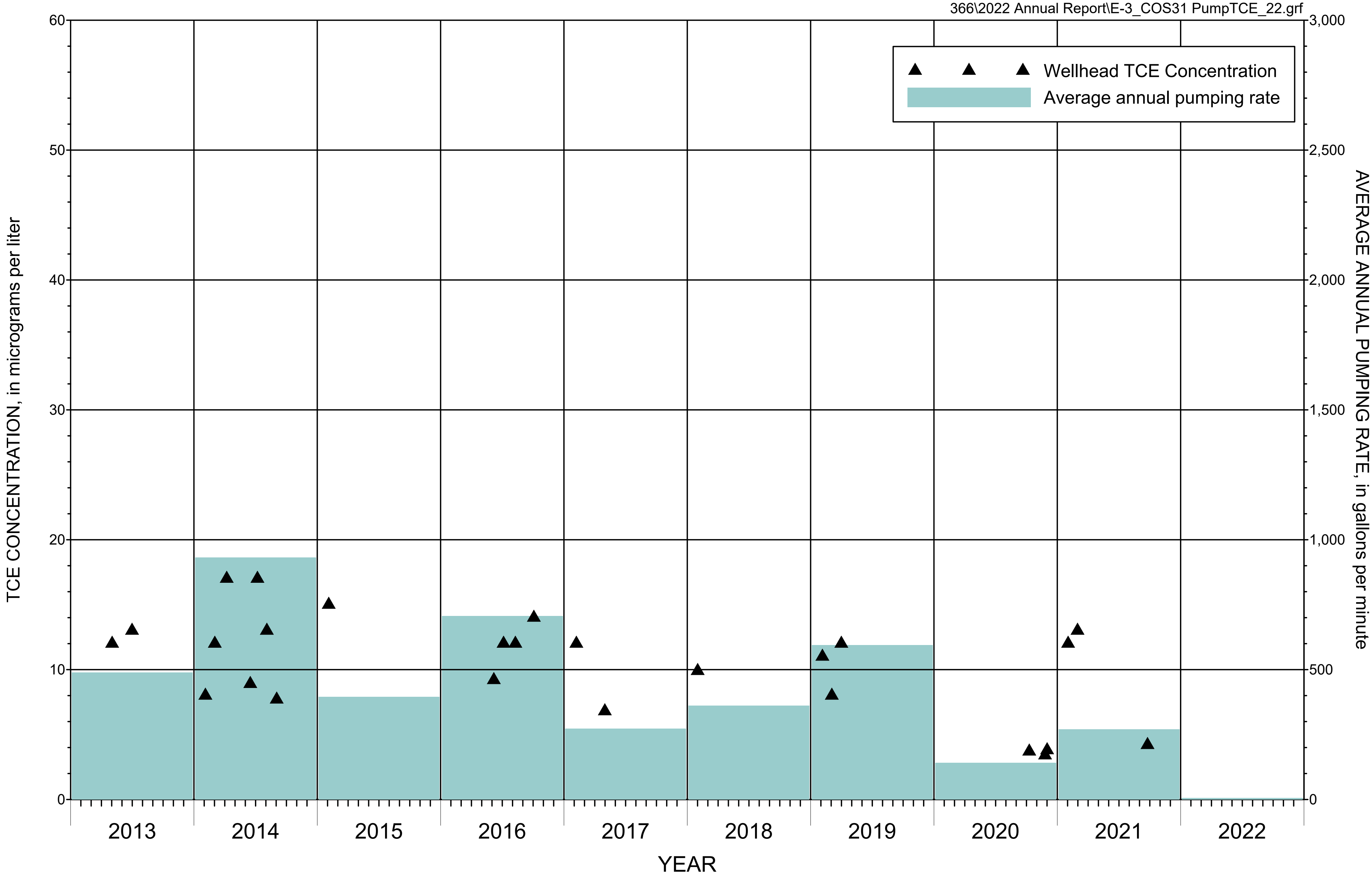


FIGURE E-3. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-31 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

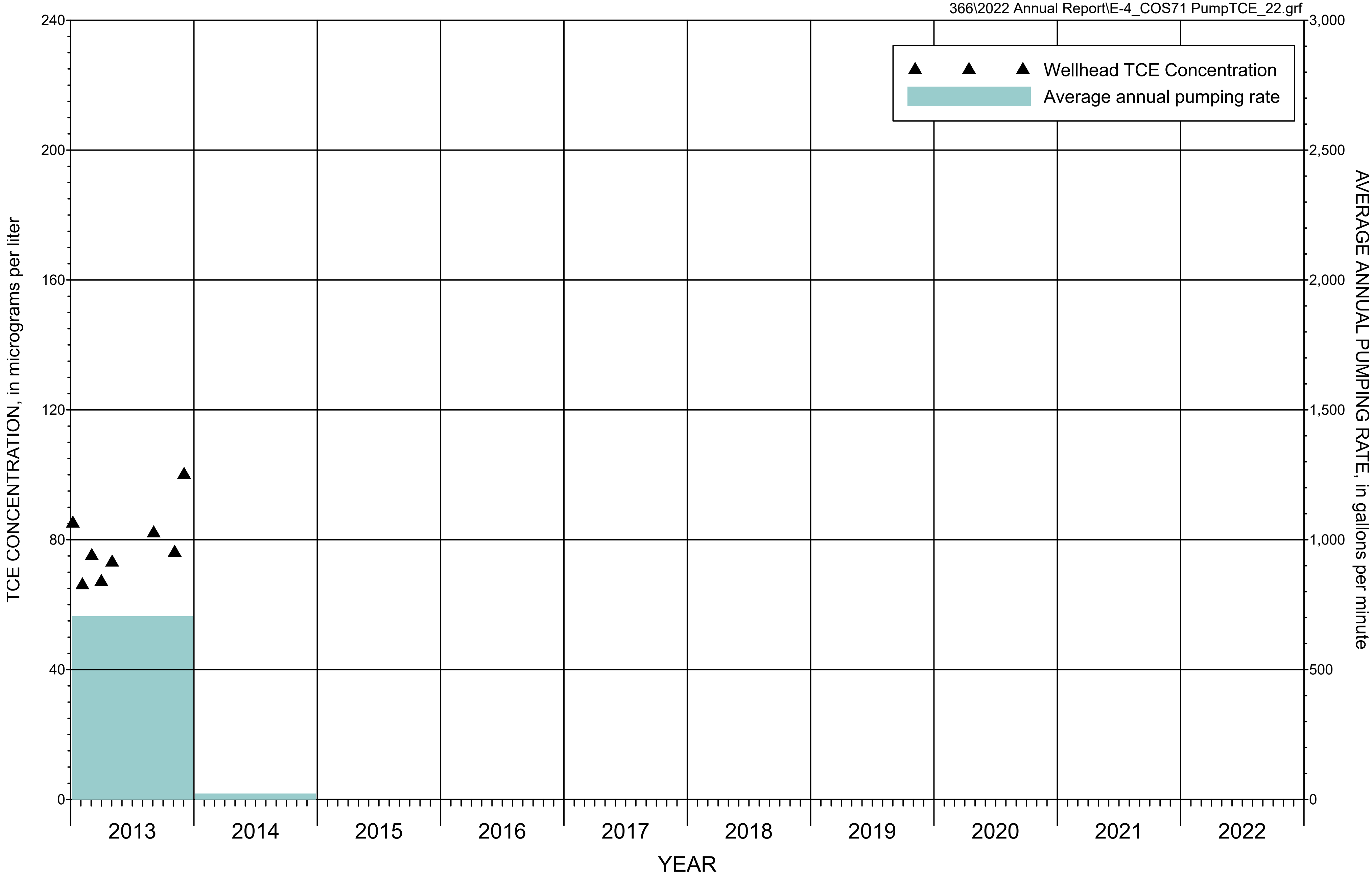


FIGURE E-4. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-71 2013 THROUGH 2022

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

North Indian Bend Wash Superfund Site

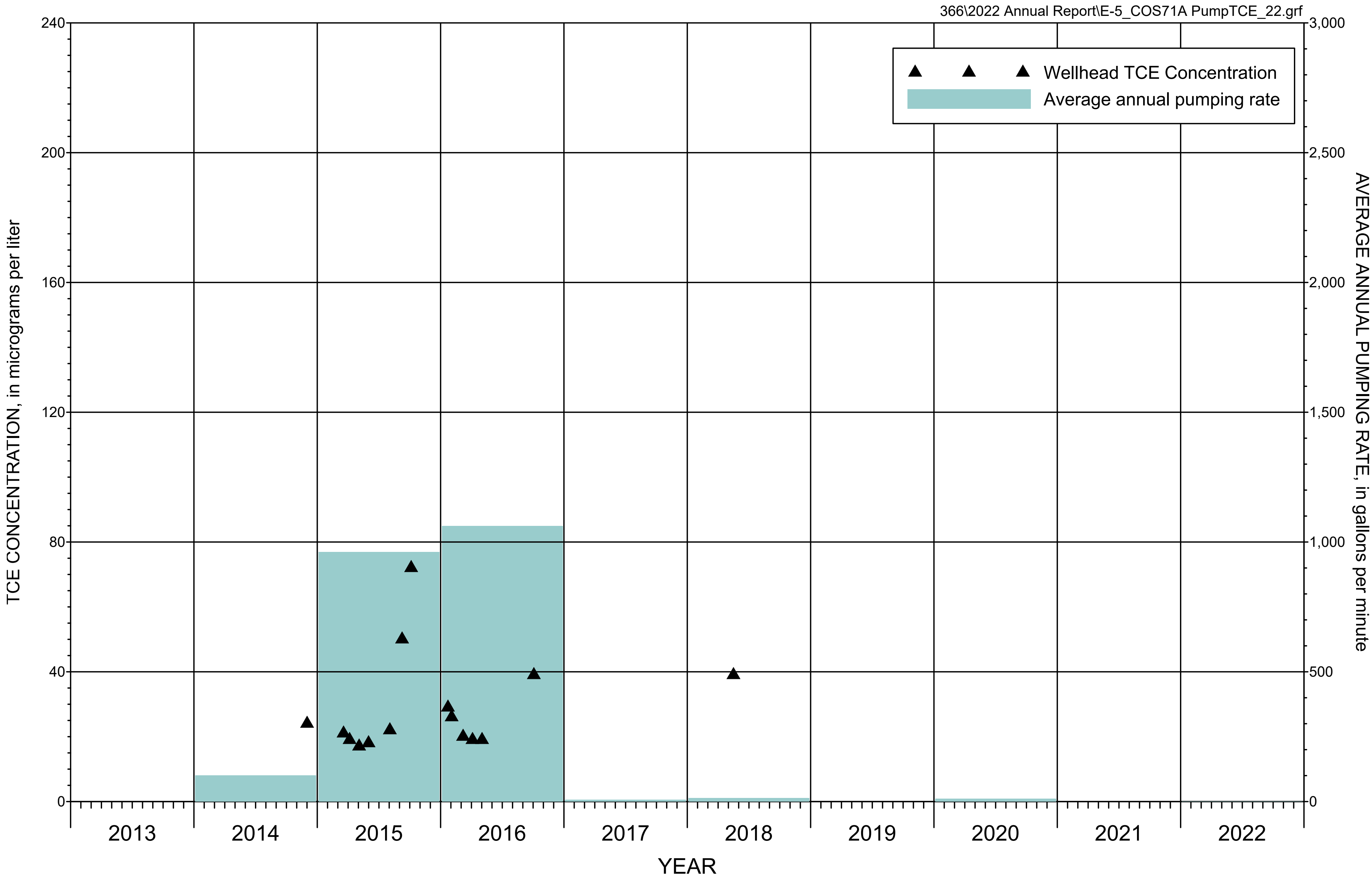


FIGURE E-5. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-71A 2013 THROUGH 2022

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

North Indian Bend Wash Superfund Site

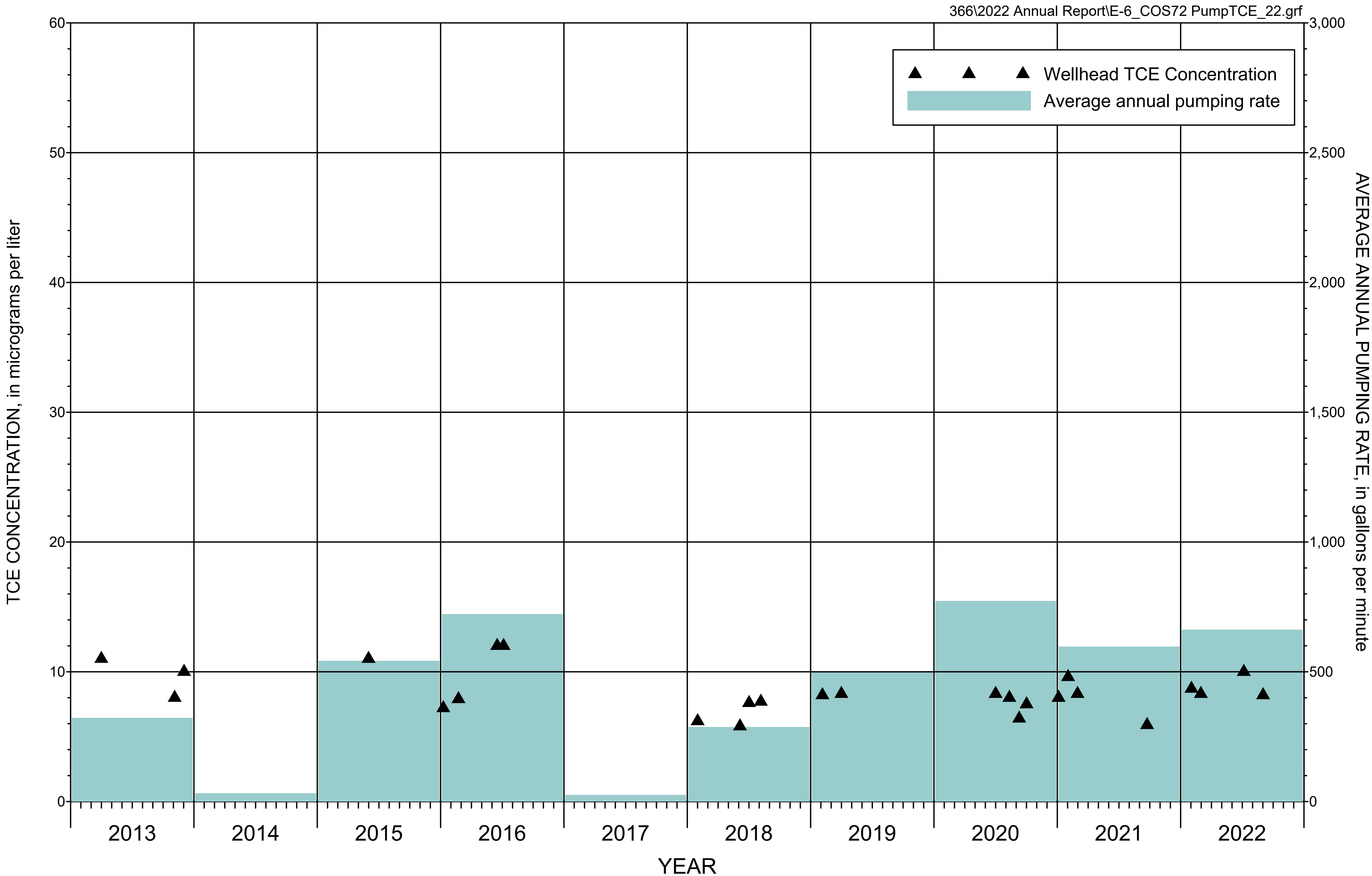


FIGURE E-6. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-72 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

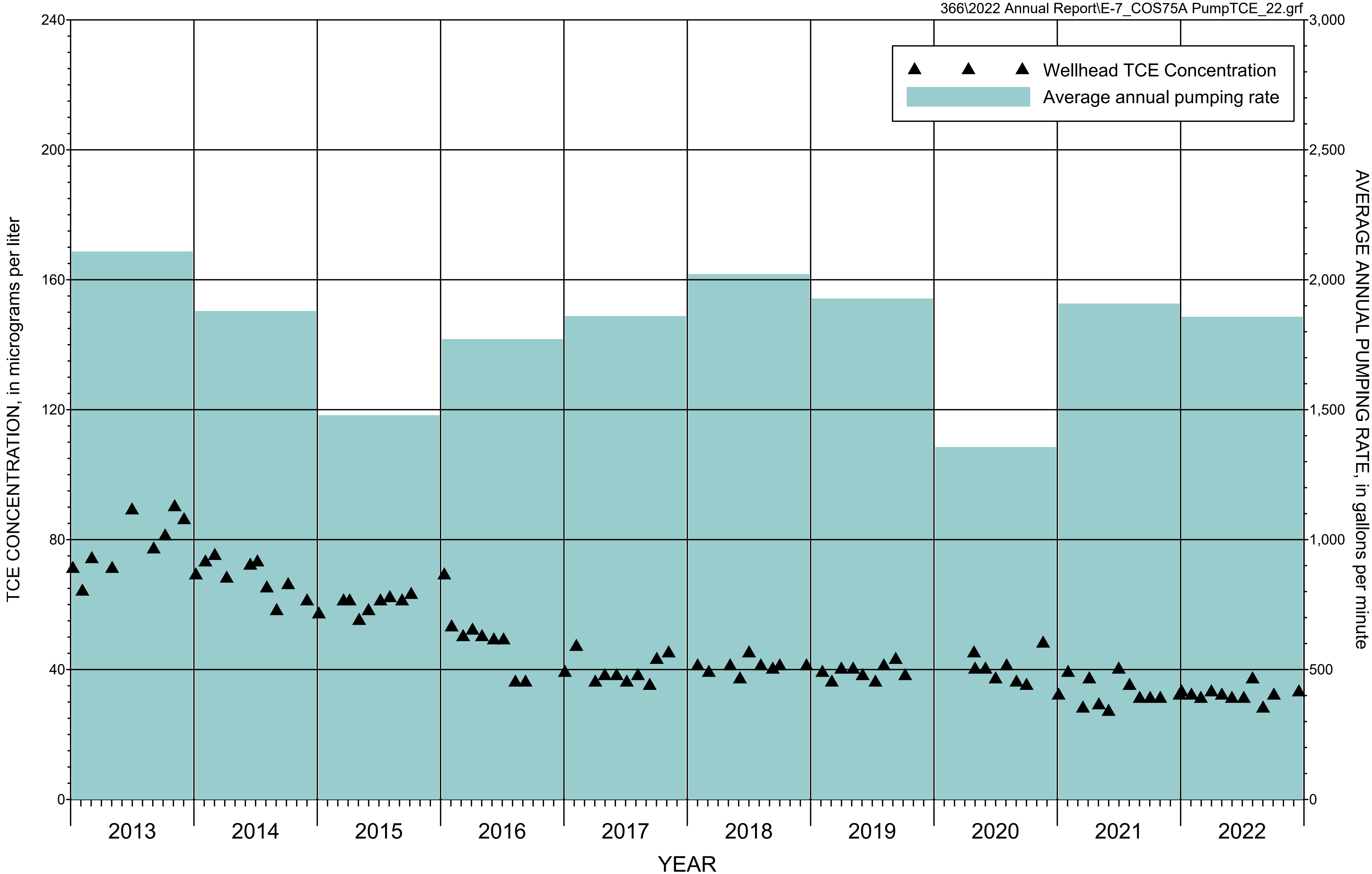


FIGURE E-7. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-75A 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

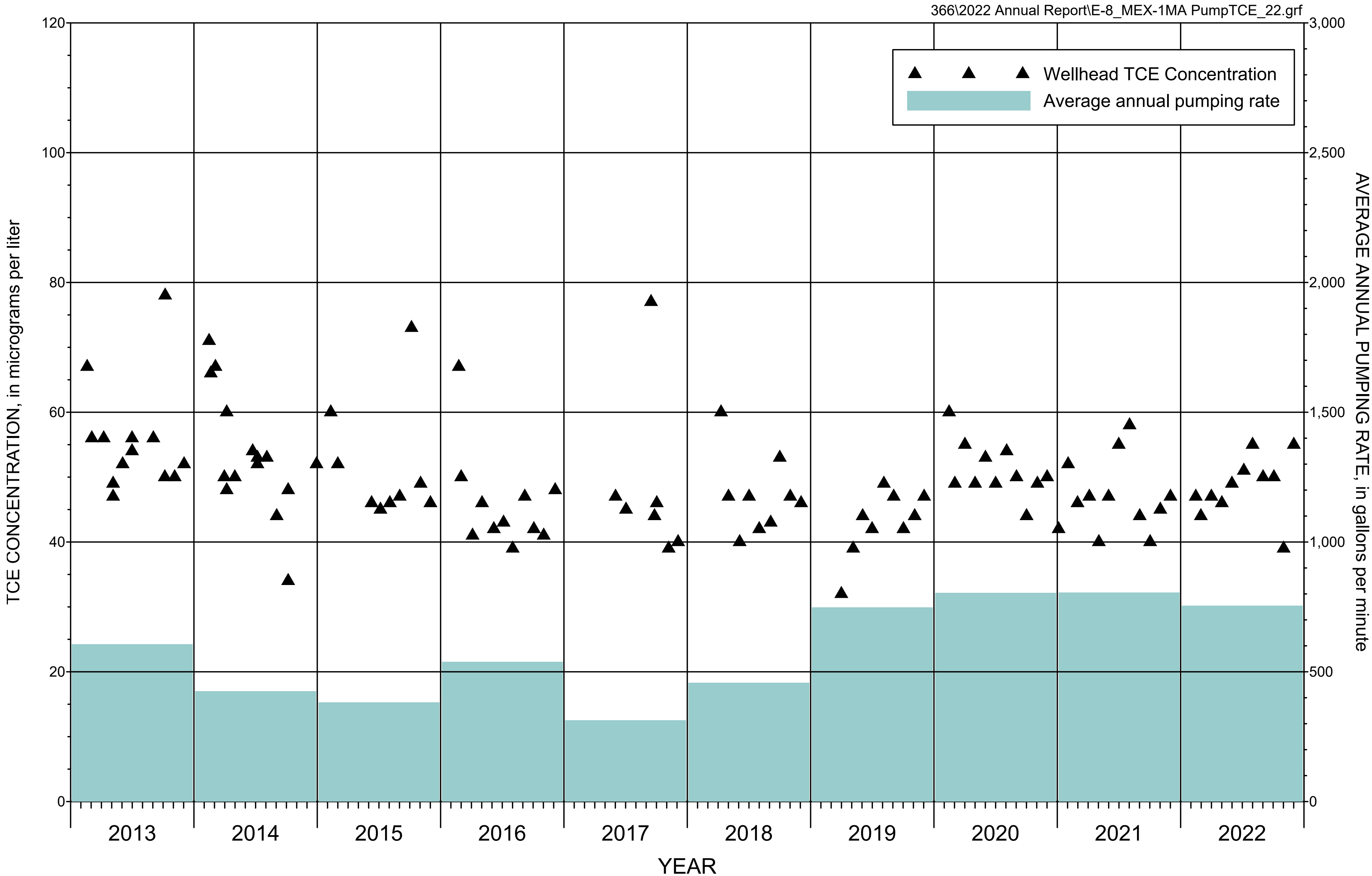


FIGURE E-8. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL MEX-1MA 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

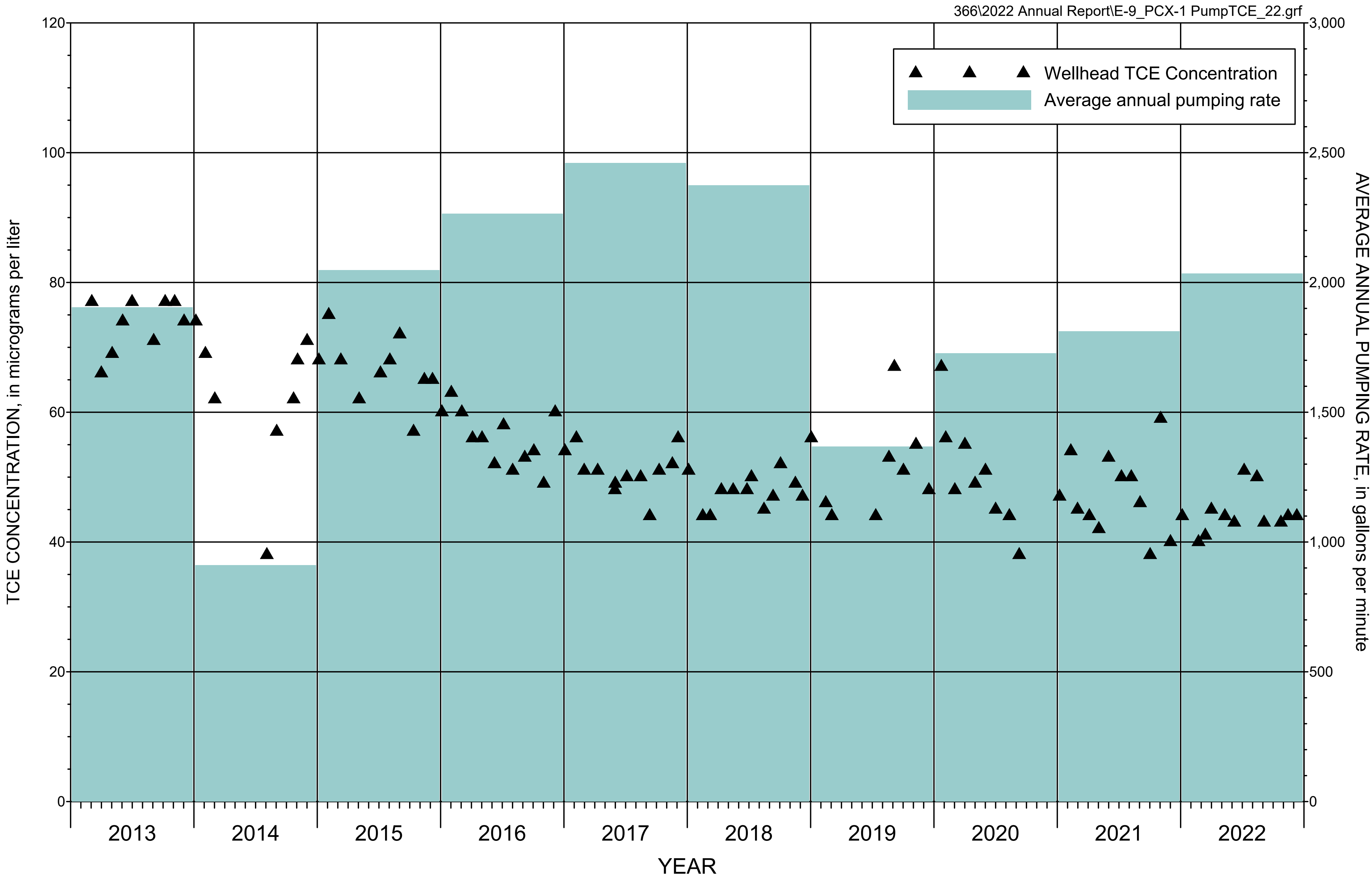


FIGURE E-9. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PCX-1 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

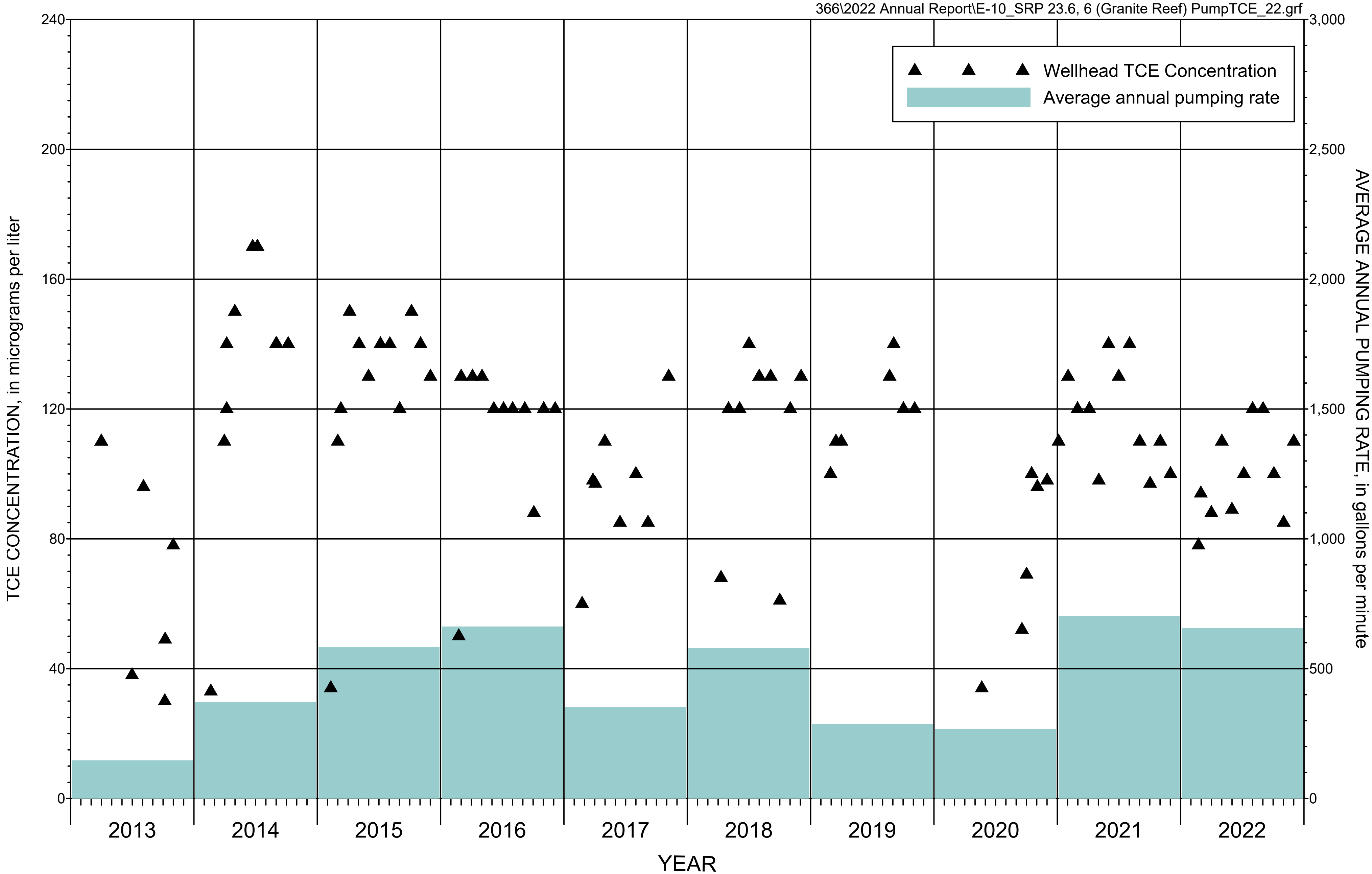


FIGURE E-10. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL SRP 23.6E, 6N (GRANITE REEF), 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

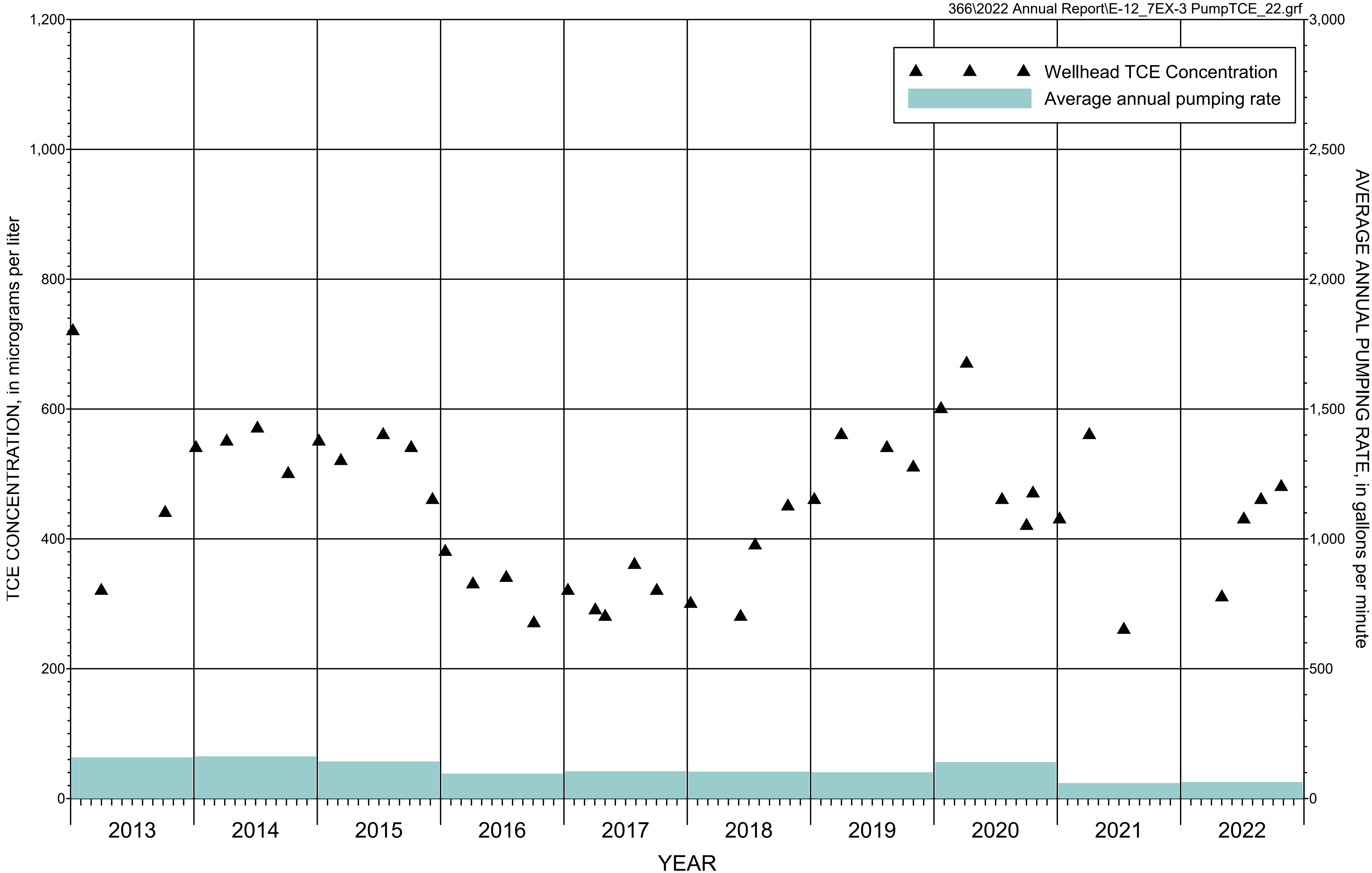


FIGURE E-11. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-3aMA 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

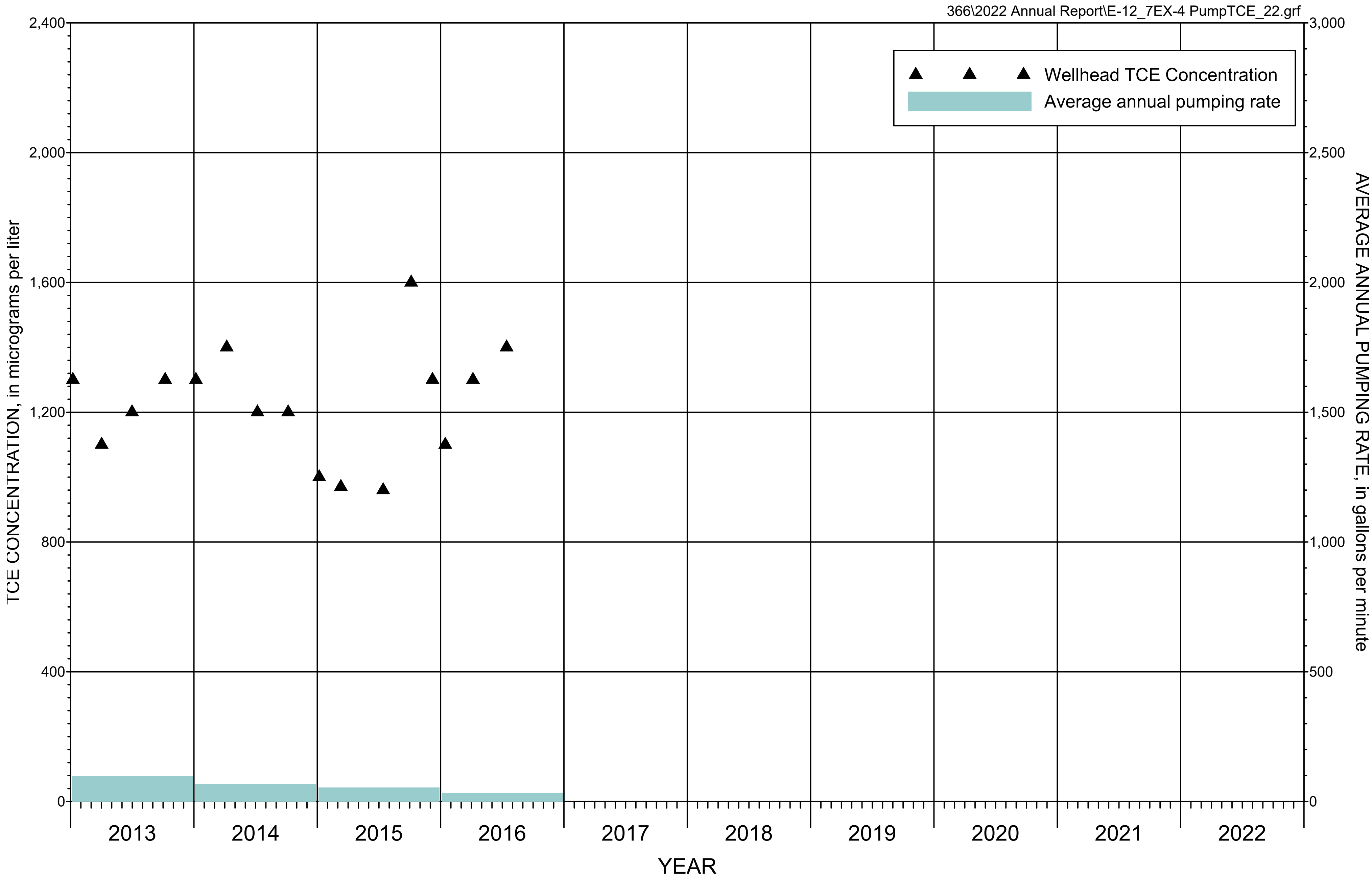


FIGURE E-12. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-4MA 2013 THROUGH 2022

North Indian Bend Wash Superfund Site

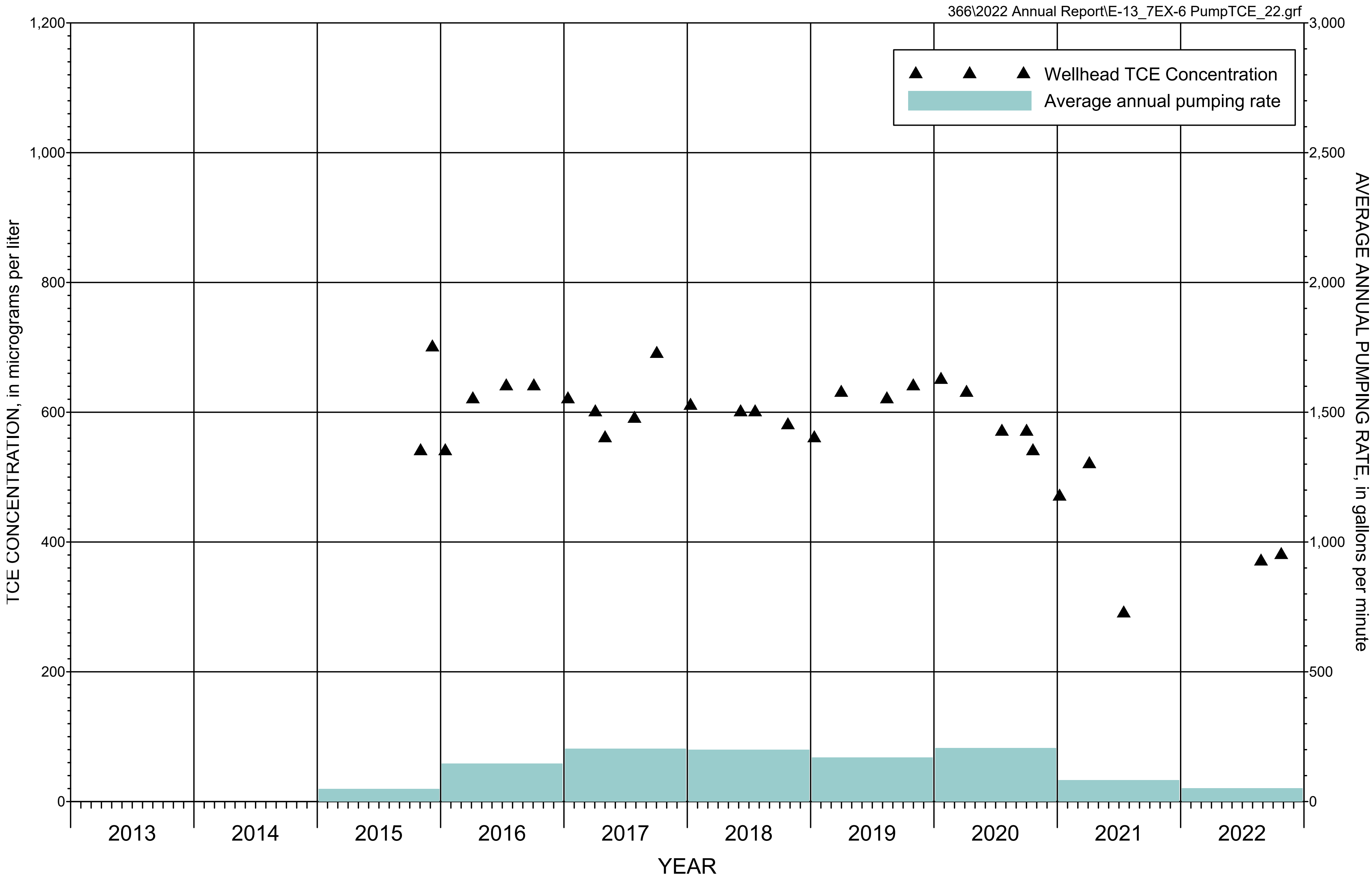


FIGURE E-13. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-6MA 2013 THROUGH 2022

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 and b – 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. These documents were submitted to EPA and ADEQ and are pending EPA approval:

- MRTF O&M Plan on June 19, 2020
- NGTF O&M Plan on June 19, 2020
- Area 7 GWETS O&M Plan on June 19, 2020
- Area 12 GWETS O&M Plan 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 1 SAP for managing untreated groundwater during monitoring well sampling. The 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 2022 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 treatment facilities and 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 the SMR, to which this document is also an appendix, the NIBW PCs coordinated the annual inspections of the MRTF, Area 7, and Area 12 GWETS, on September 27, 2022, and CGTF and NGTF on September 28, 2022, in accordance with Section VI.B.4.d of the SOW. The treatment facilities were inspected for malfunctions, deterioration, and operator practices or errors that could result in a release of untreated groundwater.

No hazardous waste is generated, handled, or stored at the NIBW groundwater treatment plants. A 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 2022, the City of Scottsdale provided training to pertinent COS staff for emergency response and incident management 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. These documents are pending EPA approval:

- 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 maintain a list of 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 2022. There were no facility closure activities in 2022.

Section VI.B.4.m – Containment:

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

APPENDIX G
DOCUMENTS SUBMITTED IN 2022

APPENDIX G. DOCUMENTS SUBMITTED IN 2022

During the period January through December 2022, the NIBW PCs provided the following documents to EPA and ADEQ:

Response to EPA Optimization Team Data Request, data package submitted via electronic mail on February 23, 2022.

2021 Site Monitoring Report, North Indian Bend Wash Superfund Site, technical report submitted via CloudShare on February 28, 2022.

Groundwater Monitoring Program Supplemental Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 28, 2022.

Groundwater Extraction and Treatment System Supplemental Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 28, 2022.

NIBW Quarterly Report – October through December 2021, as Appendix I of the 2021 Site Monitoring Report, submitted by NIBW PCs via electronic mail on February 28, 2022.

Summary of 2021 Air Sampling Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 28, 2022.

Supplemental Data Collection Not Required for Compliance During 2021, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 28, 2022.

2021 Site Monitoring Report - Revised, revised technical report submitted via CloudShare on March 18, 2022.

2021 Site Monitoring Report Presentation, and Plume Animations, North Indian Bend Wash Superfund Site, revised technical report submitted via CloudShare on March 18, 2022.

Summary of Key NIBW 2021 Five-Year Review Statements and PCs Comments Presentation – April 25, 2022, electronic mail submitted by NIBW PCs on April 28, 2022.

Request for Change in Area 7 Compliance Monitoring Location, electronic email submitted by NIBW PCs on May 19, 2022.

NIBW Quarterly Report – January through March 2022, electronic mail submitted by NIBW PCs on May 27, 2022.

EPCOR Water 2021 Water Quality Report for Paradise Valley, consumer confidence report submitted via electronic mail by NIBW PCs on June 14, 2022.

Demonstration of Financial Ability, North Indian Bend Wash Superfund Site, submitted on August 26, 2022.

NIBW Quarterly Report – April through June 2022, electronic mail submitted by NIBW PCs on August 29, 2022.

NIBW EPA Optimization Evaluation Meeting, Questions, Comments, and Information Requested, electronic mail submitted by NIBW PCs on October 24, 2022.

NIBW Optimization Q&A Slides, PCX-1 Testing Presentation, and Recording from October 31 Technical Committee Meeting electronic mail and Cloudshare submitted by NIBW PCs on November 1, 2022.

NIBW Quarterly Report – July through September 2022, electronic mail submitted by NIBW PCs on November 29, 2022.

2022 NIBW Technical Committee Meeting Minutes

NIBW Technical Committee Meeting Minutes – January 11, 2022, electronic mail submitted by NIBW PCs on March 11, 2022.

NIBW Technical Committee Meeting Minutes – February 14, 2022, electronic mail submitted by NIBW PCs on March 11, 2022.

NIBW Technical Committee Meeting Minutes –March 21, 2022, electronic mail submitted by NIBW PCs on April 18, 2022.

NIBW Technical Committee Meeting Minutes – April 25, 2022, electronic mail submitted by NIBW PCs on May 20, 2022.

NIBW Technical Committee Meeting Minutes – May 20, 2022, electronic mail submitted by NIBW PCs on June 17, 2022.

NIBW Technical Committee Meeting Minutes – June 12, 2022, electronic mail submitted by NIBW PCs on July 14, 2022.

NIBW Technical Committee Meeting Minutes – July 15, 2022, electronic mail submitted by NIBW PCs on August 18, 2022.

NIBW Technical Committee Meeting Minutes – August 18, 2022, electronic mail submitted by NIBW PCs on September 15, 2022.

NIBW Technical Committee Meeting Minutes – September 29, 2022, electronic mail submitted by NIBW PCs on November 1, 2022.

NIBW Technical Committee Meeting Minutes – November 7, 2022, electronic mail submitted by NIBW PCs on December 22, 2022.

APPENDIX H
2022 SITE INSPECTION REPORT

2022 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, 2023

CONTENTS

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 the 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 the 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 (the CGTF, MRTF, and NGTF) or weekly (the Area 7 GWETS and Area 12 GWETS). General operating parameters, such as totalized flow, local pressures and equipment state are 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 the CGTF and the 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 the MRTF, Area 7, and Area 12 GWETS were conducted on September 27, 2022. The field inspections for the CGTF and the NGTF were conducted on September 28, 2022.

In accordance with the SOW, the schedule of site inspections was coordinated two weeks in advance with EPA and ADEQ to provide an opportunity for regulatory agency participation. Representing EPA, Hydrogeologic, Inc. participated in the field inspections along with the respective treatment system operators, managers, and the NIBW PCs. 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). The 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 the 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 the main 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 within a 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 the 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. Further rehabilitation activities at well 7EX-4MA were performed in 2022, detailed as follows.

In 2022, the typical water flow rate to the Area 7 GWETS ranged from approximately 300 to 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 approximately 450 gpm.

4.1.1 Notable Events at Area 7 in 2022

A significant amount of work was performed on the Area 7 GWETS and extraction wells in 2022. This work included implementation of a communication system between the main PLC and the plant equipment and remote wells. Rehabilitation work on wells 7EX-3aMA, 7EX-4MA, and 7EX-6MA was also performed in 2022.

4.1.1.1 Treatment System

In July 2021, the system shut down during a severe electrical storm. Following diagnostics on the system, the operator determined that the Profibus communication system had irreparably failed. The NIBW PCs elected to upgrade the entire treatment system communication system between the PLC and all the motor drives. The planned upgrades included replacing the original Profibus communications system between the PLC and the system drives with Allen-Bradley communication protocol and associated equipment and new variable frequency drives (VFDs) for the plant pumps, blower, and remote groundwater pumps. Due to supply-chain issues, most of the equipment was back-ordered and not expected to ship until the third quarter 2022.

In March and April 2022, a temporary alternative communication system was implemented to restart the system. The Area 7 GWETS was restarted, treating water from well 7EX-3aMA, on April 12, 2022. Realignment of the air compressor motor was completed in May 2022. The new drive for well 7EX-6MA was received, installed, and programmed in early July. Wireless communication between the Area 7 GWETS and the remote well was established during this time. The system was fully operational, treating water from wells 7EX-3aMA and 7EX-6MA, on July 12, 2022.

New magnetic flow meters were installed at the well heads in July and August. A new peristaltic pump was installed on the peroxide feed system in October 2022.

The remaining equipment for the new communication system was received in October 2022. The new communication system implementation was completed in November 2022.

4.1.1.2 Well Activities

The NIBW PCs performed rehabilitation on three Area 7 extraction wells in 2022. Rehabilitation activities included brushing, scrubbing, swabbing, water jetting, and bailing, as necessary.

Well 7EX-3aMA

Rehabilitation activities at well 7EX-3aMA were performed between June 13 and June 17, 2022. A new pump was installed in well 7EX-3aMA following completion of the rehabilitation work. Well 7EX-3aMA was returned to service and restarted on June 20, 2022. The pump in well 7EX-3aMA failed on July 29, 2022. A new pump was installed in the well and restarted on August 19, 2022. The new pump in well 7EX-3aMA failed again on October 31, 2022. Following an investigation based on visual inspection of the pump and video logging of the well, the issue appeared to be excessive sand production from the well. A new pump was designed and installed in the well in early-December. Well 7EX-3aMA was back online on December 19, 2022.

Well 7EX-4MA

A limited rehabilitation of well 7EX-4MA was performed in 2019. Observations of a video log of the well at the time indicated several holes in the casing. Other parts of the casing also appeared to be in poor condition. No work was performed on the well in 2020 and 2021 due to limitations from the pandemic. Attempts to rehabilitate the well were conducted between June 27 and July 12, 2022. This work involved installing a pre-packed sleeve and well liner to patch the existing holes in the well casing. At the same time and in preparation of returning the well to service, a new VFD and a magnetic flow meter were installed at the well site.

Results of the effort to rehabilitate and modify the well casing were ultimately unsuccessful as bentonite and grout had short-circuited into the pre-packed screen and well. Considering the work performed at the well in 2022, its already poor condition, and its history of diminishing recovery from prior rehabilitation efforts, the well will be decommissioned in 2023.

Well 7EX-6MA

The pump in well 7EX-6MA failed on July 17, 2022. Following removal of the pump, the well was brushed and bailed. Subsequent video log observations indicated that the well was in good condition. A new pump was installed in the well in early August. Following wiring and other programming at the local VFD, the pump in 7EX-6MA was restarted on August 15, 2022.

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 2022.

The UV/Ox system appeared in good condition during the inspection.

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 main control system alarms and interlocks were tested and validated during set-up of the temporary alternative communication system in April and new communication system in November. No programming changes to the interlocks in the control system were made in 2022. No programming changes to the control logic were made when the system network architecture and communications system were upgraded.

Other miscellaneous equipment service or replacements include testing of the fire suppression system in July 2022, and realignment of the air compressor motor on the compressor in May 2022.

Downtime was attributed to implementation and programming of the communications systems and installation of new VFDs, as well as issues associated with severe monsoon weather in the area. The monsoonal events typically initiate alarms on the UV/Ox system due to the sensitive electrical nature of the high voltage equipment.

Once the temporary communication system was initially set up in April, the Area 7 GWETS was available for treatment of extracted groundwater greater than 80% of the time.

4.1.3 Results

Based on the 2022 inspection and a review of operating and monitoring data, the 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 2022.

4.2 Area 12 Groundwater Extraction and Treatment System

The 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. The 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, Inc. (MSI) 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.

The 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 MSI.

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 2022 were approximately 905 gpm and 820 gpm, respectively.

In 2022, the typical air flow rate through the air stripper was approximately 5,400 cfm.

The Area 12 system was shut down for the annual SRP Dry-Up beginning in early January. The system was restarted on February 11, 2022 once the discharge to McKellips Lake was allowed by SRP. Annual maintenance activities at Area 12 during Dry-Up included air stripper blower inspections for performance, balancing, and vibration and column cleaning to remove calcium carbonate scale on the air stripper packing.

4.2.1 Notable Events at Area 12 of 2022

No significant operational events occurred at Area 12 in 2022. In June, July, August, and September the system was offline periodically due to severe heat, monsoonal electrical storms in the area, and on several occasions due to too much water at the discharge receiving location.

4.2.2 Area 12 Maintenance and Condition

The 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 visits to the GWETS approximately twice per week. 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.

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 maintenance period in January 2022. The operator indicated that the alarms are routinely tested when the system is shut down. 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, the Area 12 GWETS was available for treatment of extracted groundwater greater than approximately 90% of the time in 2022.

4.2.3 Results

Based on the 2022 inspection and a review of operating and monitoring data, the 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 the Area 12 GWETS in 2022.

4.3 Miller Road Treatment Facility

The 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). The MRTF is used to treat water from EPCOR production wells PV-14 and PV-15.

The 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 the 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 the 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 2022

No noteworthy events occurred at the MRTF in 2022.

4.3.2 MRTF Maintenance and Condition

EPCOR made relevant operating, monitoring, and safety documents, as well as operating data and maintenance logs for the 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 the MRTF for several hours a day, seven days a week. The operator makes daily inspections of the equipment and grounds at the 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 in January through early February 2022. Column cleaning commenced again in December 2022 and continued into 2023. The treatment system is operated during column cleaning activities since a third column is available and the column being cleaned 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. Blower 3 was removed from service in July for balancing and bearing replacement. The equipment was returned to service in August.

EPCOR uses a system-wide preventative maintenance program that automatically schedules the appropriate maintenance on each piece of equipment in accordance with manufacturers' instructions.

The equipment and work areas at the 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. Control system interlocks are tested once per year and were last checked in mid-September 2022.

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

The MRTF was available for treatment of extracted groundwater greater than 95% of the time in 2022. 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 2022 inspection and a review of operating and monitoring data, the 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 the MRTF in 2022.

4.4 Central Groundwater Treatment Facility

The 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 the CGTF is discharged for beneficial use as a supply to City of Scottsdale's potable water system.

Background and details on the CGTF are provided in the O&M Plan developed for this facility. EPA approved the CGTF O&M Plan, dated March 2006. The CGTF O&M Plan has had several updates since then, 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 the CGTF have been validated and documented in the O&M Plan, quarterly Compliance Monitoring Reports, and annual data reports for the NIBW Site.

The CGTF uses air stripping to remove NIBW COCs, primarily TCE, from groundwater. The 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 the 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 the CGTF. Currently, only well 75A is routinely pumped to and treated at the CGTF. Extracted groundwater from well 72 may be used as back-up if water from other sources is not available. Well 31 is operated infrequently. Due to inorganic water quality, City of Scottsdale has removed well 71A from service. Typical flow rates range from approximately 2,100 gpm at well 72 to 2,250 gpm at well 75A.

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 the 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 the CGTF treated water with other water supplies occurs in the potable water storage facility, Reservoir 80, just south of the site.

For each column, 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. Equipment used for disinfection 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 2022

The air strippers at the CGTF underwent a complete refurbishment in 2020. The system has been operating well since that time. No notable events occurred at the CGTF during 2022.

4.4.2 CGTF Maintenance and Condition

The CGTF is operated and maintained by a City of Scottsdale water treatment operator. City of Scottsdale operations personnel also monitor the status of the CGTF remotely. Operators make minimum daily inspections of the equipment and grounds at the 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, 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 on October 11, 2022 and was completed on December 5, 2022. Column cleaning activities at the CGTF require the system to be offline during that period. The system was restarted on December 6, 2022.

Upon start-up following a maintenance event in December, the flow rate at well 75A was approximately 300 gpm lower than the typical flow rate from that well. City of Scottsdale is monitoring the reduced production from well 75A.

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 the CGTF. Additionally, instruments are checked and calibrated during the GAC service events by City of Scottsdale instrument technicians.

Except during the column cleaning activities, the CGTF was available for treatment of extracted groundwater greater than 95% of the time in 2022.

4.4.3 Results

Based on the 2022 inspection and a review of operating and monitoring data, the CGTF has consistently met performance criteria set forth in the Amended CD.

No treatment performance problems, hazards, significant deterioration, or equipment malfunctions were apparent in 2022.

4.5 NIBW GAC Treatment Facility

The NGTF is located at 5985 North Cattletrack Road in Scottsdale, Arizona at the southwest corner of Cattletrack Road and McDonald Drive. The NGTF is owned by MSI 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.

The NGTF treats water from extraction well PCX-1. The typical production rate from well PCX-1 in 2022 was approximately 2,100 gpm. Treatment of water from well PCX-1 at the 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 the 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 the 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 the 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. The NGTF has a maximum hydraulic capacity of approximately 4,400 gpm.

4.5.1 Notable Events at NGTF in 2022

No notable events occurred at NGTF in 2022.

4.5.2 NGTF Maintenance and Condition

The NGTF is maintained by a City of Scottsdale water treatment operator. City of Scottsdale operations personnel also monitor the status of the NGTF remotely. Operators make minimum daily inspections of the equipment and grounds at the 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.

The NGTF was available for treatment of extracted groundwater greater than 95% of the time in 2022.

4.5.3 Results

Based on the 2022 inspection and a review of operating and monitoring data, the 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 2022.

5 O&M DOCUMENT REVISIONS

The NIBW PCs updated and submitted the treatment system O&M Plans for the 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. EPA provided *Final Agency Comments to the PCs Response to Commen*ts, dated September 30, 2020 to the NIBW PCs on October 28, 2020.

The NIBW PCs updated and submitted the treatment system CERPS for the 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 CERPs for the Area 7 GWETS, Area 12 GWETS, MRTF, and NGTF were revised by the NIBW PCs and submitted to EPA 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 EPA 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 2022

North Indian Bend Wash Superfund Site

Prepared for:

U.S. Environmental Protection Agency

Region IX

Prepared by:

NIBW Participating Companies

February 28, 2023

North Indian Bend Wash Superfund Site

QUARTERLY REPORT

October – December 2022

North Indian Bend Wash Superfund Site

Scottsdale, Arizona

February 28, 2023

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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 2022 (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 were analyzed by Eurofins Environment Testing Southwest (Eurofins) 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. On May 19, 2022, the PCs formally requested the replacement of D-2MA as a compliance monitoring well with monitoring well D-4MA (previously referred to as OZ7-1 and Ozone Pilot Test Well). This request was approved by EPA on July 12, 2022, via email. Sampling of D-4MA commenced in October, replacing D-2MA which will no longer be sampled. 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 / M&A
2	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
92	All Wells			

Notes:
CGTF = Central Groundwater Treatment Facility
GWETS = Groundwater Extraction and Treatment System
LAU = Lower Alluvial Unit
M&A = Montgomery & Associates, Inc.
MAU = Middle Alluvial Unit
MRTF = Miller Road Treatment Facility
NGTF = NIBW Granular Activated Carbon (GAC) Treatment Facility
UAU = Upper Alluvial Unit

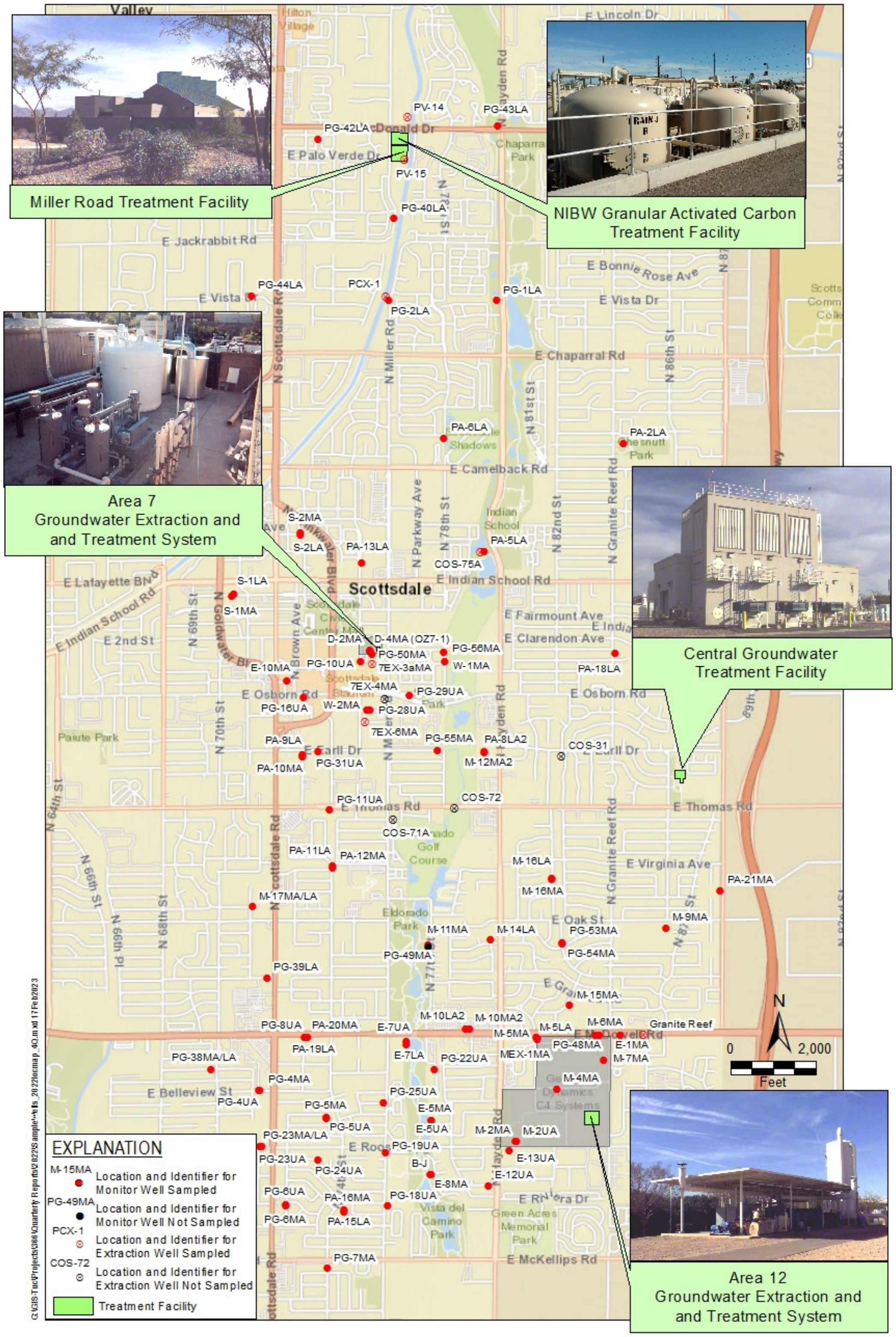

Figure 1. Location Map

3 GROUNDWATER REMEDIATION PROGRAM

The NIBW remedy provides for containment of the Middle Alluvial Unit (MAU) / Lower Alluvial Unit (LAU) plumes through a groundwater extraction and treatment program. Treatment occurs at the MRTF, NGTF, CGTF, Area 7 GWETS, and Area 12 GWETS. 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 the MRTF, NGTF, Area 7 GWETS, and Area 12 GWETS. This Report provides a summary of operations and data collected for these four 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 the MRTF. A summary of the treatment system monitoring data for the MRTF, NGTF, Area 7, and Area 12 facilities for October through December 2022 is provided in **Table A-4**.

3.1 Groundwater Remediation at MRTF

The 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 the 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 Eurofins. The results of TCE analyses of samples obtained by the NIBW PCs for groundwater and process water monitoring are 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
10/03/2022	<0.50	5.0	<0.50	<0.50	---
11/01/2022	0.52	5.0	<0.50	<0.50	---
12/01/2022	<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 3 and November 1, 2022, and from PV-12B on October 1, 2022. No samples were obtained at well PV-11 in December or at well PV-12B in November or December because the wells were offline when the NIBW PCs visited the wells to obtain a sample.

The MRTF operated the entire reporting period. The total volume of groundwater extracted and treated at the MRTF during the reporting period was approximately 515.4 million gallons (MG). Of this total, 223.7 MG was produced from well PV-14 and approximately 291.7 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 13 pounds of TCE were removed from groundwater treated at the MRTF during the reporting period.

3.2 Groundwater Remediation at NGTF

The 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 243.5 MG of treated water was discharged to the CWTP and 23.7 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 to 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 Eurofins.

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 weekly by the operator and submitted to Eurofins for analysis of NIBW COCs.

The results of TCE analyses of samples obtained by the NIBW PCs for groundwater and process water monitoring are included in **Table 3** and **Table 4**.

Table 3. NGTF Groundwater Monitoring
(TCE in µg/L)

Date	PCX-1
10/24/2022	43
11/14/2022	44
12/10/2022	44

Table 4. NGTF Treatment System Monitoring
(TCE in µg/L)

	Effluent
Week of:	AZCO[a] or CHAP-CP[b]
Oct 03-07	<0.50
Oct 10-14	<0.50
Oct 17-21	<0.50
Oct 24-28	<0.50
Oct 31-Nov 04	<0.50
Nov 07-11	<0.50
Nov 14-18	<0.50
Nov 21-25	<0.50
Nov 28-Dec 02	<0.50
Dec 05-09	<0.50
Dec 12-16	<0.50
Dec 19-23	<0.50
Dec 26-30	<0.50

[a] AZCO = Discharge to Arizona Canal
[b] CHAP-CP = Discharge to City of Scottsdale Chaparral Water Treatment Plant

The NGTF was available for treatment of groundwater the entire reporting period. The total volume of groundwater extracted from well PCX-1 and treated at the NGTF during the reporting period was approximately 267.9 MG, and an estimated 98 pounds of TCE were removed.

3.3 Groundwater Remediation at Area 7 GWETS

The NIBW Area 7 GWETS achieved performance standards specified in the SOW during the reporting period by consistently treating groundwater to reduce NIBW COC concentrations safely below Treatment Standards prior to injection into the Upper Alluvial Unit (UAU) near the GWETS. Compliance monitoring was performed in accordance with the SOW to verify removal of VOCs from the extracted groundwater and assure groundwater Treatment Standards were achieved.

During the reporting period, samples were collected quarterly from Area 7 extraction wells 7EX-3aMA and 7EX-6MA by EnSolutions and analyzed for NIBW COCs by Eurofins. Also, during the reporting period, treatment system samples were collected monthly and submitted to Eurofins for analysis of NIBW COCs. Samples were collected from the combined influent to the GWETS at sample port SP-102, from the ultraviolet/oxidation (UV/Ox) reactor effluent at sample port SP-103, and from the air stripper effluent at sample port SP-105. The results of TCE analyses of samples obtained by the NIBW PCs for groundwater and process water monitoring are included in **Table 5** and **Table 6**.

Table 5. Area 7 Groundwater Monitoring
(TCE in µg/L)

Date	7EX-3aMA	7EX-4MA	7EX-6MA
10/25/2022	480	NS	380

Notes:
NS = Not sampled
Well 7EX-4MA was not sampled during fourth quarter because the well was offline for rehabilitation and assessment; Area 7 GWETS operated without well 7EX-4MA during the fourth quarter.

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
10/25/2022	460/460	200	0.58/0.57
11/01/2022	460/470	12	<0.50
12/01/2022	430/440	2.4	<0.50

Notes:
UV/Ox = Ultraviolet/Oxidation Reactor

The treatment system operated intermittently with downtime attributed to well maintenance activities, installation of a new peroxide injection pump, and installation and configuration of remaining communications system equipment in October and November 2022.

- The new pump in well 7EX-3aMA failed on October 31, 2022 due to excessive sand production from the well. A new pump was designed and installed in the well in early December, and the well was back online on December 19, 2022.

- Rehabilitation activities at well 7EX-4MA that began in June 2022 were unsuccessful due to bentonite and grout short-circuiting into the pre-packed screen and well. Considering the work performed at the well between 2012 and 2022, the compromised condition of the well, and the history of diminishing recovery from prior rehabilitation efforts, the well will be decommissioned in 2023.

The total volume of groundwater extracted, treated, and injected during the reporting period was approximately 27.3 MG. Of this total, approximately 8.1 MG was produced from well 7EX-3aMA and approximately 19.2 MG was produced from 7EX-6MA. Performance data provided by the Area 7 GWETS operator indicates an estimated 93 pounds of TCE were removed from the extracted groundwater.

3.4 Groundwater Remediation at Area 12 GWETS

The 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 lateral. Compliance monitoring was performed in accordance with the SOW to verify removal of VOCs from the extracted groundwater and assure groundwater Treatment Standards were achieved.

During the reporting period, treatment system samples were collected each month and submitted to Eurofins for analysis of NIBW COCs. Treatment system samples included combined influent to the Area 12 GWETS at sample port WSP-1 and effluent from the Area 12 GWETS at sample port WSP-2. Area 12 extraction well samples were collected by the operator on a monthly basis when the wells were operational, and submitted to Eurofins for analysis. The results of TCE analysis 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	GWETS Effluent
			WSP-1	WSP-2
10/03/2022	50	100	84/83	<0.50
11/01/2022	39	85	78/78	<0.50
12/01/2022	55	110	90/87	<0.50

Treated groundwater from Area 12 discharges to the SRP distribution system and is regulated by an AZPDES permit. Samples were collected at the outfall to the SRP lateral for analyses required by the permit. The results of the sample analyses were summarized in monthly DMRs and submitted to ADEQ under separate cover.

Area 12 GWETS was available for treatment of groundwater nearly the entire reporting period. Minimal downtime is attributed to equipment maintenance and infrequent power outages. During the reporting period, both wells, MEX-1 and Granite Reef, were available for pumping. The total volume of groundwater extracted and treated at Area 12 GWETS during the reporting period was approximately 215.1 MG. Of this total, approximately 116.6 MG was produced from well MEX-1 and approximately 98.5 MG was produced from the Granite Reef Well. Performance data provided by the Area 12 GWETS operator indicated an estimated 127 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 (4Q22)	Cumulative Pounds of TCE Removed (YTD 2022)
MRTF	515.4	13	54
NGTF	267.9	98	396
Area 7 GWETS	27.3	93	201
Area 12 GWETS	215.1	127	450

Notes:
MG = million gallons
4Q22 = fourth quarter (October through December) 2022
YTD = year to date

4 MEETINGS AND OTHER EVENTS

Representatives of the NIBW Technical Committee held meetings by teleconference on November 7 and December 5 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 2022, the NIBW PCs provided EPA with the following documents.

NIBW EPA Optimization Evaluation Meeting, Questions, Comments, and Information Requested, electronic mail submitted by NIBW PCs on October 24, 2022.

NIBW Optimization Q&A Slides, PCX-1 Testing Presentation, and Recording from October 31 Technical Committee Meeting electronic mail and Cloudshare submitted by NIBW PCs on November 1, 2022.

NIBW Technical Committee Meeting Minutes – September 29, 2022, electronic mail submitted by NIBW PCs on November 1, 2022.

NIBW Quarterly Report – July through September 2022, electronic mail submitted by NIBW PCs on November 29, 2022.

NIBW Technical Committee Meeting Minutes – November 7, 2022, electronic mail submitted by NIBW PCs on December 22, 2022.

APPENDIX A
MATRIX AND LABORATORY RESULTS

Table A-1. Sampling Matrix - Fourth Quarter 2022
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	---
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	---
B-J	UAU	Annually	---
D-2MA	MAU	Quarterly	On May 19, 2022, the PCs formally requested the replacement of monitoring well D-2MA per the GM&EP schedule with monitoring well D-4MA. This request was approved by EPA on July 12, 2022 and D-2MA monitoring was discontinued in October 2022
D-4MA	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	---
PA-2LA	LAU	Annually	---

Table A-1. Sampling Matrix - Fourth Quarter 2022
North Indian Bend Wash Superfund Site, Scottsdale, Arizona

WELL IDENTIFICATION	AQUIFER UNIT	SAMPLING FREQUENCY	COMMENTS
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	---
PG-43LA	LAU	Quarterly	---
PG-44LA	LAU	Quarterly	---
PG-48MA	MAU - Lower	Quarterly	---
PG-49MA	MAU - Lower	Annually	Samplers were unable to collect sample in Q4 of 2022 due to an obstruction; sample was collected at nearby Lower MAU well PG-53MA.
PG-50MA	MAU - Lower	Annually	---

Table A-1. Sampling Matrix - Fourth Quarter 2022
North Indian Bend Wash Superfund Site, Scottsdale, Arizona

WELL IDENTIFICATION	AQUIFER UNIT	SAMPLING FREQUENCY	COMMENTS
PG-53MA	MAU - Lower	Annually	Proposed replacement well for PG-49MA; groundwater sample was collected from this well as supplemental data and is not required per the GM&EP. These data are included in the 2022 annual supplemental report.
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 Alluvial Unit

MAU = Middle Alluvial Unit

LAU = Lower Alluvial Unit

Table A-2. 2022 Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2022
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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
MON	B-J	B-J	10/20/2022	Original	<0.50	<0.50	1.2	<0.50	1.9	550-192410
MON	D-4MA	D-4MA	10/28/2022	Original	<0.50	<0.50	1.1	5.5	750	550-192832
MON	E-1MA	E-1MA	10/20/2022	Original	<0.50	<0.50	<0.50	<0.50	1.0	550-192410
MON	E-5MA	E-5MA	10/18/2022	Original	<0.50	<0.50	2.4	0.67	43	550-192241
MON	E-5UA	E-5UAHS	10/13/2022	Original	<0.50	<0.50	0.62	<0.50	4.5	550-192066
MON	E-7LA	E-7LA	10/20/2022	Original	<0.50	<0.50	1.1	3.3	11	550-192410
MON	E-7LA	W	10/20/2022	Duplicate	<0.50	<0.50	1.1	3.1	10	550-192410
MON	E-7UA	E-7UAHS	10/13/2022	Original	<0.50	<0.50	0.70	<0.50	1.2	550-192066
MON	E-8MA	E-8MA	10/18/2022	Original	<0.50	<0.50	2.0	<0.50	47	550-192241
				Lab dup	<0.50 (1)	<0.50 (1)	1.3 (1)	<0.50 (1)	35 (1)	
MON	E-8MA	T	10/18/2022	Duplicate	<0.50	<0.50	2.0	<0.50	48	550-192241
MON	E-8MA	E-8MA	11/11/2022	Original	<0.50	<0.50	1.5	<0.50	33	550-193566
MON	E-8MA	AD	11/11/2022	Duplicate	<0.50	<0.50	1.5	<0.50	31	550-193566
MON	E-10MA	E-10MAHS	10/13/2022	Original	<0.50	<0.50	0.75	2.9	6.4	550-192068
MON	E-10MA	Q	10/13/2022	Duplicate	<0.50	<0.50	0.62	2.4	5.6	550-192068
MON	E-12UA	E-12UAHS	10/13/2022	Original	<0.50	<0.50	1.1	<0.50	2.8	550-192066
MON	E-13UA	E-13UAHS	10/13/2022	Original	<0.50	<0.50	1.0	<0.50	3.0	550-192066
MON	M-2MA	M-2MAHS	10/12/2022	Original	<0.50	<0.50	1.1	<0.50	24	550-191978
				Lab dup	<0.50	<0.50	1.2	<0.50	25	
				Lab dup	<0.50	<0.50	1.1	<0.50	24	
MON	M-2MA	M-2MAHS	10/20/2022	Original	<0.50	<0.50	<0.50	<0.50	2.8	550-192415
				Lab dup	<0.50	<0.50	<0.50	<0.50	3.1	
MON	M-2MA	V	10/20/2022	Duplicate	<0.50	<0.50	<0.50	<0.50	7.1	550-192415
				Lab dup	<0.50	<0.50	<0.50	<0.50	5.9	
MON	M-2UA	M-2UAHS	10/12/2022	Original	<0.50	<0.50	1.1	<0.50	1.0	550-191978
MON	M-4MA	M-4MAHS	10/12/2022	Original	<0.50	0.54	<0.50	0.96	19	550-191978
MON	M-4MA	O	10/12/2022	Duplicate	<0.50	<0.50	<0.50	0.96	18	550-191978
MON	M-5LA	M-5LA	10/21/2022	Original	<0.50	<0.50	1.7	<0.50	1.9	550-192464
MON	M-5MA	M-5MA	10/24/2022	Original	<0.50	<0.50	<0.50	<0.50	4.2	550-192557
MON	M-6MA	M-6MA	10/21/2022	Original	<0.50	<0.50	1.4	0.56	21	550-192464
MON	M-6MA	X	10/21/2022	Duplicate	<0.50	<0.50	1.4	0.59	23	550-192464

Table A-2. 2022 Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2022
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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
MON	M-7MA	M-7MA	10/27/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192772
MON	M-9MA	M-9MA	10/20/2022	Original	<0.50	<0.50	<0.50	<0.50	3.1	550-192410
MON	M-10LA2	M-10LA2HS	10/13/2022	Original	<0.50	<0.50	<0.50	<0.50	4.0	550-192066
MON	M-10MA2	M-10MA2	10/27/2022	Original	<0.50	<0.50	<0.50	0.73	21	550-192772
MON	M-11MA	M-11MA	10/18/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192241
MON	M-12MA2	M-12MA2HS	11/14/2022	Original	<0.50	<0.50	<0.50	<0.50	5.0	550-193643
MON	M-12MA2	AE	11/14/2022	Duplicate	<0.50	<0.50	<0.50	<0.50	5.2	550-193643
MON	M-14LA	M-14LAHS	10/14/2022	Original	<0.50	<0.50	0.91	4.6	14	550-192140
				Lab dup	<0.50	<0.50	1.2	5.8	17	
MON	M-14LA	R	10/14/2022	Duplicate	<0.50	<0.50	0.57	3.0	9.8	550-192140
				Lab dup	<0.50	<0.50	<0.50	2.0	7.2	
MON	M-15MA	M-15MA	10/25/2022	Original	<0.50	<0.50	<0.50	<0.50	2.5	550-192618
MON	M-16LA	M-16LAHS	10/13/2022	Original	<0.50	<0.50	<0.50	1.5	14	550-192066
MON	M-16MA	M-16MA	10/18/2022	Original	<0.50	<0.50	<0.50	<0.50	4.1	550-192241
MON	M-17MA/LA	M-17MA/LAHS	10/13/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192068
MON	PA-2LA	PA-2LA	10/24/2022	Original	<0.50	<0.50	1.4	<0.50	<0.50	550-192555
MON	PA-5LA	PA-5LA	10/20/2022	Original	<0.50	<0.50	2.7	3.0	43	550-192406
MON	PA-6LA	PA-6LAHS	10/13/2022	Original	<0.50	1.2	0.75	3.8	48	550-192068
MON	PA-8LA2	PA-8LA2	10/27/2022	Original	<0.50	<0.50	0.62	0.90	6.1	550-192772
MON	PA-9LA	PA-9LAHS	10/13/2022	Original	<0.50	<0.50	2.5	<0.50	17	550-192068
				Lab dup	<0.50	<0.50	2.8	<0.50	18	
MON	PA-10MA	PA-10MAHS	10/13/2022	Original	<0.50	<0.50	<0.50	0.83	23	550-192068
MON	PA-10MA	P	10/13/2022	Duplicate	<0.50	<0.50	<0.50	0.78	23	550-192068
MON	PA-11LA	PA-11LA	10/21/2022	Original	<0.50	<0.50	2.0	<0.50	<0.50	550-192464
MON	PA-12MA	PA-12MA	10/28/2022	Original	<0.50	<0.50	<0.50	2.6	220	550-192832
MON	PA-13LA	PA-13LA	10/27/2022	Original	<0.50	<0.50	1.2	0.85	58	550-192773
MON	PA-15LA	PA-15LAHS	10/14/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192140
MON	PA-16MA	PA-16MAHS	10/14/2022	Original	<0.50	<0.50	0.64	<0.50	6.4	550-192140
MON	PA-18LA	PA-18LAHS	10/14/2022	Original	<0.50	<0.50	0.68	<0.50	0.57	550-192140
MON	PA-19LA	PA-19LA	10/20/2022	Original	<0.50	<0.50	1.3	1.2	27	550-192410

Table A-2. 2022 Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2022
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	TCA	DCE	TCM	PCE	TCE	Report
					200	6	6	5	5	
MON	PA-20MA	PA-20MA	10/20/2022	Original	<0.50	0.84	1.2	5.4	71	550-192410
				Lab dup	<0.50	<0.50	0.80	4.2	52	
MON	PA-20MA	PA-20MA	11/11/2022	Original	<0.50	0.75	1.3	4.7	61	550-193566
MON	PA-21MA	PA-21MAHS	10/13/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192066
MON	PG-1LA	PG-1LA	10/19/2022	Original	<0.50	<0.50	1.6	<0.50	0.86	550-192277
MON	PG-1LA	U	10/19/2022	Duplicate	<0.50	<0.50	1.6	<0.50	0.86	550-192277
MON	PG-2LA	PG-2LA	10/25/2022	Original	<0.50	<0.50	1.3	1.2	81	550-192619
MON	PG-2LA	Z	10/25/2022	Duplicate	<0.50	<0.50	1.3	1.2	83	550-192619
MON	PG-4MA	PG-4MA	10/20/2022	Original	<0.50	<0.50	0.87	<0.50	1.9	550-192410
MON	PG-4UA	PG-4UAHS	10/14/2022	Original	<0.50	<0.50	0.89	1.6	0.68	550-192140
MON	PG-5MA	PG-5MAHS	10/14/2022	Original	<0.50	<0.50	0.64	<0.50	6.7	550-192140
MON	PG-5UA	PG-5UAHS	10/14/2022	Original	<0.50	<0.50	0.67	<0.50	2.4	550-192140
MON	PG-6MA	PG-6MA	10/26/2022	Original	<0.50	0.96	3.1	3.3	88	550-192667
MON	PG-6MA	AA	10/26/2022	Duplicate	<0.50	0.88	3.0	3.3	94	550-192667
MON	PG-6UA	PG-6UA	10/24/2022	Original	<0.50	<0.50	1.1	<0.50	1.2	550-192557
MON	PG-7MA	PG-7MA	10/20/2022	Original	<0.50	<0.50	1.0	<0.50	3.7	550-192410
MON	PG-8UA	PG-8UA	10/21/2022	Original	<0.50	<0.50	0.85	<0.50	<0.50	550-192464
MON	PG-10UA	PG-10UA	10/18/2022	Original	<0.50	<0.50	1.8	<0.50	0.94	550-192241
MON	PG-11UA	PG-11UAHS	10/13/2022	Original	<0.50	<0.50	1.2	<0.50	<0.50	550-192068
MON	PG-16UA	PG-16UAHS	11/14/2022	Original	<0.50	<0.50	<0.50	<0.50	0.93	550-193643
MON	PG-18UA	PG-18UA	10/20/2022	Original	<0.50	<0.50	1.5	<0.50	1.3	550-192410
MON	PG-19UA	PG-19UA	10/25/2022	Original	<0.50	<0.50	0.85	<0.50	2.7	550-192618
MON	PG-22UA	PG-22UAHS	10/13/2022	Original	<0.50	<0.50	<0.50	0.65	3.1	550-192066
MON	PG-23MA/LA	PG-23 MA/LA	10/18/2022	Original	<0.50	<0.50	1.2	0.88	11	550-192241
MON	PG-23UA	PG-23UAHS	10/14/2022	Original	<0.50	<0.50	0.81	<0.50	1.3	550-192140
MON	PG-24UA	PG-24UAHS	10/14/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192140
MON	PG-25UA	PG-25UAHS	10/13/2022	Original	<0.50	<0.50	1.0	<0.50	2.0	550-192066
MON	PG-28UA	PG-28UA	10/18/2022	Original	<0.50	<0.50	1.8	<0.50	0.73	550-192241
MON	PG-29UA	PG-29UA	10/17/2022	Original	<0.50	<0.50	0.65	<0.50	0.59	550-192173
MON	PG-29UA	S	10/17/2022	Duplicate	<0.50	<0.50	0.65	<0.50	0.54	550-192173
MON	PG-31UA	PG-31UAHS	10/13/2022	Original	<0.50	<0.50	3.4	<0.50	4.8	550-192068

Table A-2. 2022 Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2022
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	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
MON	PG-38MA/LA	PG-38MA/LAHS	10/13/2022	Original	<0.50	<0.50	0.82	2.3	0.88	550-192068
MON	PG-39LA	PG-39LA	10/18/2022	Original	<0.50	<0.50	0.92	1.4	2.7	550-192241
MON	PG-40LA	PG-40LA	11/10/2022	Original	<0.50	<0.50	0.64	0.62	17	550-193476
MON	PG-40LA	AF	11/10/2022	Duplicate	<0.50	<0.50	0.61	0.58	17	550-193476
MON	PG-42LA	PG-42 LA	10/28/2022	Original	<0.50	<0.50	<0.50	<0.50	1.1	550-192831
MON	PG-42LA	AC	10/28/2022	Duplicate	<0.50	<0.50	<0.50	<0.50	1.0	550-192831
MON	PG-43LA	PG-43LAHS	10/13/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192068
MON	PG-44LA	PG-44LA	10/25/2022	Original	<0.50	<0.50	3.6	<0.50	<0.50	550-192619
MON	PG-48MA	PG-48MA	10/24/2022	Original	<0.50	<0.50	0.52	<0.50	11	550-192557
MON	PG-48MA	Y	10/24/2022	Duplicate	<0.50	<0.50	0.51	<0.50	10	550-192557
MON	PG-49MA [(A)]	PG-49MAHS	October 2022	---	---	---	---	---	---	---
MON	PG-50MA	PG-50MAHS	10/13/2022	Original	<0.50	<0.50	1.0	<0.50	0.68	550-192068
MON	PG-53MA [(B)]	PG-53MAHS	11/14/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-193644
MON	PG-54MA	PG-54MA	10/18/2022	Original	<0.50	<0.50	1.7	1.1	38	550-192241
				Lab dup	<0.50 [(1)]	<0.50 [(1)]	1.1 [(1)]	0.89 [(1)]	30 [(1)]	
MON	PG-55MA	PG-55MA	10/17/2022	Original	<0.50	<0.50	<0.50	<0.50	2.5	550-192173
MON	PG-56MA	PG-56MA	10/18/2022	Original	<0.50	<0.50	0.87	<0.50	2.6	550-192241
MON	S-1LA	S-1LA	10/27/2022	Original	<0.50	<0.50	1.1	39	<0.50	550-192772
MON	S-1LA	AB	10/27/2022	Duplicate	<0.50	<0.50	1.1	45	<0.50	550-192772
MON	S-1MA	S-1MAHS	10/13/2022	Original	<0.50	<0.50	<0.50	6.5	<0.50	550-192068
MON	S-2LA	S-2LA	10/20/2022	Original	<0.50	<0.50	0.53	<0.50	10	550-192406
MON	S-2MA	S-2MAHS	10/12/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-191978
MON	W-1MA	W-1MA	10/28/2022	Original	<0.50	<0.50	0.59	1.5	370	550-192832
MON	W-2MA	W-2MA	10/28/2022	Original	<0.50	<0.50	0.65	8.7	2500	550-192832
Trip/Field Blanks										
--	QC	FRB (TRIP)	10/12/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191978
--	QC	FRB (Trip)	10/13/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192066
--	QC	FRB(Trip)	10/13/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192068
--	QC	FRB(Trip)	10/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192140
--	QC	FRB (TRIP)	10/17/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192173
--	QC	FRB (Trip)	10/18/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192241

Table A-2. 2022 Laboratory Results For VOCs In Groundwater Monitoring Wells - Fourth Quarter 2022
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	TCA	DCE	TCM	PCE	TCE	Report
					200	*6*	*6*	*5*	*5*	
--	QC	FRB (Trip)	10/19/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192277
--	QC	FRB (Trip)	10/20/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192410
--	QC	FRB (Trip) - 1	10/20/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192415
--	QC	FRB (TRIP)	10/21/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192464
--	QC	FRB (Trip)	10/25/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192618
--	QC	FRB (Trip)	10/26/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192667
--	QC	FRB (Trip)	10/27/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192772
--	QC	FRB (Trip)	11/10/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193476
--	QC	FRB (Trip)	11/11/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193566
--	QC	FRB (Trip)	11/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193643

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; re-analysis of the original sample requested for verification
MON = Monitoring
QC = Quality Control
VOC = Volatile Organic Compound

NOTES:

All samples analyzed by Eurofins Environment Testing Southwest (Eurofins) using EPA method 524.2.

<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)	Samplers were unable to collect PG-49MA in Q4 of 2022; sample was collected at nearby PG-53MA
(B)	Proposed replacement well for PG-49MA; groundwater sample was collected from this well as supplemental data and is not required per the GM&EP. These data are included in the 2022 annual supplemental report.

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.

Table A-3. 2022 Laboratory Results For VOCs In Groundwater Extraction Wells - Fourth Quarter 2022
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	
AREA 7 GWETS											
Extraction	7EX-3aMA	7EX-3aMA	10/25/2022	Original	TA	<0.50	<0.50	0.97	3.7	480	550-192600
Extraction	7EX-6MA	7EX-6MA	10/25/2022	Original	TA	<0.50	<0.50	0.79	2.3	380	550-192600
CGTF											
Extraction	COS-75A	COS-75A	10/3/2022	Original	TA	<0.50	0.56	1.9	5.4	32	550-191356
Extraction	COS-75A	EXT-1A-10032022	10/3/2022	Duplicate	TA	<0.50	<0.50	1.9	5.4	32	550-191356
Extraction	COS-75A	COS-75A	12/16/2022	Original	TA	<0.50	0.57	1.8	6.5	33	550-195131
Extraction	COS-75A	EXT-1A-12162022	12/16/2022	Duplicate	TA	<0.50	0.52	1.8	6.3	33	550-195131
AREA 12 GWETS											
Extraction	MEX-1MA	MEX-1-1A-10032022	10/3/2022	Original	TA	<0.50	1.2	1.8	2.6	50	550-191357
Extraction	MEX-1MA	MEX-1-1A-11012022	11/1/2022	Original	TA	<0.50	0.74	1.2	2.2	39	550-192980
Extraction	MEX-1MA	MEX-1-1A- 12012022	12/1/2022	Original	TA	<0.50	1.3	2.0	2.9	55	550-194344
Extraction	Granite Reef	GR-1-1A-10032022	10/3/2022	Original	TA	<1.0	1.5	4.3	2.7	100	550-191357
Extraction	Granite Reef	GR-1-1A-11012022	11/1/2022	Original	TA	<0.50	0.72	3.8	2.3	85	550-192980
Extraction	Granite Reef	GR-1-1A- 12012022	12/1/2022	Original	TA	<0.50	1.7	5.4	3.2	110	550-194344
NGTF											
Extraction	PCX-1	PCX-1	10/24/2022	Original	TA	<0.50	<0.50	1.9	3.0	43	550-192558
Extraction	PCX-1	PCX-1	11/14/2022	Original	TA	<0.50	0.57	1.9	3.6	44	550-193612
Extraction	PCX-1	PCX-1	12/10/2022	Original	TA	<0.50	0.58	1.8	3.4	44	550-194805
MRTF											
Extraction	PV-14	PV 14	10/3/2022	Original	TA	<0.50	<0.50	0.57	<0.50	<0.50	550-191353
Extraction	PV-14	PV 14	11/1/2022	Original	TA	<0.50	<0.50	0.54	<0.50	0.52	550-192956
Extraction	PV-14	PV 14	12/1/2022	Original	TA	<0.50	<0.50	0.57	<0.50	<0.50	550-194338
Extraction	PV-15	PV 15	10/3/2022	Original	TA	<0.50	<0.50	0.78	<0.50	5.0	550-191353
Extraction	PV-15	PV 15	11/1/2022	Original	TA	<0.50	<0.50	0.74	<0.50	5.0	550-192956
Extraction	PV-15	PV 15	12/1/2022	Original	TA	<0.50	<0.50	0.68	<0.50	4.5	550-194338
Trip/Field Blanks											
--	EX-QC (A)	FRB (TRIP) (B)	10/3/2022	TB	TA	---	---	---	---	---	550-191346
--	EX-QC (A)	TB-2-1A-10032022 (C)	10/3/2022	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-191345
--	EX-QC (A)	FRB (TRIP)	10/24/2022	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-192525
--	EX-QC (A)	FRB (TRIP)	10/25/2022	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-192598
--	EX-QC (A)	FRB (TRIP)	11/1/2022	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-192949
--	EX-QC (A)	FRB (TRIP)	11/14/2022	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-193610

Table A-3. 2022 Laboratory Results For VOCs In Groundwater Extraction Wells - Fourth Quarter 2022
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*	
--	EX-QC (A)	FRB (TRIP)	12/1/2022	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-194333
--	EX-QC (A)	FRB (TRIP)	12/10/2022	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-194802
--	EX-QC (A)	FRB (TRIP)	12/16/2022	TB	TA	<0.50	<0.50	<0.50	<0.50	<0.50	550-195130

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
TB = Trip Blank
VOC = Volatile Organic Compound

NOTES:

All samples analyzed by Eurofins Environment Testing Southwest (Eurofins) using EPA method 524.2.

<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) EX-QC - A single trip blank is collected for all extraction well samples, regardless of facility, when collected and shipped on the same day.
(B) Sample not reported. Lab indicated via email on October 18, 2022: *Due to instrument error (bad purge) the associated sample could not be reported. There was not enough sample volume to rerun so the sample has been cancelled.*
Treatment System sample TB-2-1A-10032022 was used as trip blank.
(C) Treatment system trip blank made the same sampling trip as the extraction well on this date

Table A-4. 2022 Laboratory Results For VOCs In Treatment System Samples - Fourth Quarter 2022
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	TCA 200	DCE 6	TCM 6	PCE 5	TCE 5	Report
AREA 7 GWETS									
SP-102 (influent)	SP-102	10/25/2022	Original	<0.50	<0.50	0.87	2.9	460	550-192602
SP-102 (influent)	TS-2-1A-10252022	10/25/2022	Duplicate	<0.50	<0.50	0.87	2.9	460	550-192602
SP-102 (influent)	SP-102	11/1/2022	Original	<0.50	<0.50	0.81	2.7	460	550-192960
SP-102 (influent)	TS-2-1A-11012022	11/1/2022	Duplicate	<0.50	<0.50	0.86	2.9	470	550-192960
SP-102 (influent)	SP-102	12/1/2022	Original	<0.50	<0.50	0.85	3.3	430	550-194345
SP-102 (influent)	TS-2-1A- 12012022	12/1/2022	Duplicate	<0.50	<0.50	0.87	3.0	440	550-194345
SP-103 (UV/Ox effluent)	SP-103	10/25/2022	Original	<0.50	<0.50	0.82	1.8	200	550-192602
SP-103 (UV/Ox effluent)	SP-103	11/1/2022	Original	<0.50	<0.50	0.79	<0.50	12	550-192960
SP-103 (UV/Ox effluent)	SP-103	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	2.4	550-194345
SP-105 (Air Stripper Effluent)	SP-105	10/25/2022	Original	<0.50	<0.50	<0.50	<0.50	0.58	550-192601
			Lab dup	<0.50	<0.50	<0.50	<0.50	0.57	
SP-105 (Air Stripper Effluent)	SP-105	11/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192959
SP-105 (Air Stripper Effluent)	SP-105	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-104348
AREA 12 GWETS									
WSP-1 (Influent)	WSP-1-1A-10032022	10/3/2022	Original	<0.50	1.4	3.4	2.9	84	550-191358
WSP-1 (Influent)	TS-1-1A-10032022	10/3/2022	Duplicate	<0.50	1.4	3.3	3.0	83	550-191358
WSP-1 (Influent)	WSP-1-1A-11012022	11/1/2022	Original	<0.50	1.4	3.1	3.0	78	550-192952
WSP-1 (Influent)	TS-1-1A-11012022	11/1/2022	Duplicate	<0.50	1.5	3.2	3.0	78	550-192952
WSP-1 (Influent)	WSP-1-1A- 12012022	12/1/2022	Original	<0.50	1.4	3.6	3.2	90	550-194341
WSP-1 (Influent)	TS-1-1A- 12012022	12/1/2022	Duplicate	<0.50	1.4	3.4	3.1	87	550-194341
WSP-2 (Air Stripper Effluent)	WSP-2-1A-10032022	10/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-191359
WSP-2 (Air Stripper Effluent)	WSP-2-1A 11012022	11/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192961
WSP-2 (Air Stripper Effluent)	WSP-2-1A-12012022	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-194342
MRTF									
Tower 1 Effluent	Tower 1	10/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-191354
Tower 1 Effluent	Tower 1	11/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192955
Tower 1 Effluent	Tower 1	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-194340
Tower 2 Effluent	Tower 2	10/3/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-191354
Tower 2 Effluent	Tower 2	11/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192955
Tower 2 Effluent	Tower 2	12/1/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-194340

Table A-4. 2022 Laboratory Results For VOCs In Treatment System Samples - Fourth Quarter 2022
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	TCA	DCE	TCM	PCE	TCE	Report
				200	6	6	5	5	
NGTF									
Outfall 001 (Effluent)	NGTF-CP	10/3/2022	Original	<0.50	<0.50	0.64	<0.50	<0.50	550-191630
Outfall 001 (Effluent)	NGTF-CP	10/10/2022	Original	<0.50	<0.50	0.74	<0.50	<0.50	550-191816
Outfall 001 (Effluent)	NGTF-CP	10/17/2022	Original	<0.50	<0.50	0.78	<0.50	<0.50	550-192162
Outfall 001 (Effluent)	NGTF-CP	10/24/2022	Original	<0.50	<0.50	1.0	<0.50	<0.50	550-192543
Outfall 001 (Effluent)	NGTF-CP	10/31/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-192898
Outfall 001 (Effluent)	NGTF-CP	11/7/2022	Original	<0.50	<0.50	1.2	<0.50	<0.50	550-193260
Outfall 001 (Effluent)	NGTF-CP	11/14/2022	Original	<0.50	<0.50	1.7	<0.50	<0.50	550-193635
Outfall 001 (Effluent)	NGTF-CP	11/21/2022	Original	<0.50	<0.50	1.1	<0.50	<0.50	550-193988
Outfall 001 (Effluent)	NGTF-CP	11/28/2022	Original	<0.50	<0.50	0.63	<0.50	<0.50	550-194141
Outfall 001 (Effluent)	NGTF-CP	12/5/2022	Original	<0.50	<0.50	0.81	<0.50	<0.50	550-194439
Outfall 001 (Effluent)	NGTF-CP	12/12/2022	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-194834
Outfall 001 (Effluent)	NGTF-CP	12/19/2022	Original	<0.50	<0.50	0.73	<0.50	<0.50	550-195177
Outfall 001 (Effluent)	NGTF-CP	12/27/2022	Original	<0.50	<0.50	0.80	<0.50	<0.50	550-195386
Trip/Field Blanks									
QC - Area 12	FB-1-1A-10032022	10/3/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191344
QC - Area 12	TB-1-1A-10032022	10/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191344
QC - Area 12	FB-1-1A-11012022	11/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192950
QC - Area 12	TB-1-1A-11012022	11/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192950
QC - Area 12	FB-1-1A- 12012022	12/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194335
QC - Area 12	TB-1-1A- 12012022	12/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194335
QC - NGTF	TB	10/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191630
QC - NGTF	TB	10/10/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191816
QC - NGTF	TB	10/17/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192162
QC - NGTF	TB	10/24/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192543
QC - NGTF	TB	10/31/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192898
QC - NGTF	TB	11/7/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193260
QC - NGTF	TB	11/14/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193635
QC - NGTF	TB	11/21/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-193988
QC - NGTF	TB	11/28/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194141
QC - NGTF	TB	12/5/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194439
QC - NGTF	TB	12/12/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194834

Table A-4. 2022 Laboratory Results For VOCs In Treatment System Samples - Fourth Quarter 2022
North Indian Bend Wash Superfund Site, Scottsdale, Arizona
(results presented in micrograms per liter, µg/L)

Sample Location	Sample ID	Sample Date	Sample Type	TCA	DCE	TCM	PCE	TCE	Report
				200	*6*	*6*	*5*	*5*	
QC - NGTF	TB	12/19/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195177
QC - NGTF	TB	12/27/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195386
QC-TS (A)	FB-2-1A-10032022	10/3/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191345
QC-TS (A)	TB-2-1A-10032022	10/3/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-191345
QC-TS (A)	FB-2-1A-10252022	10/25/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192599
QC-TS (A)	TB-2-1A-10252022	10/25/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192599
QC-TS (A)	FB-2-1A-11012022	11/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192951
QC-TS (A)	TB-2-1A-11012022	11/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-192951
QC-TS (A)	FB-2-1A-12012022	12/1/2022	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194337
QC-TS (A)	TB-2-1A-12012022	12/1/2022	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-194337

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
TB = Trip Blank
TS = Treatment System
VOC = Volatile Organic Compound

NOTES:

All samples analyzed by Eurofins Environment Testing Southwest (Eurofins) using EPA method 524.2.

<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) QC-TS - A single trip blank and a single field blank are collected for Area 7 and MRTF samples, when collected and shipped on the same day.

APPENDIX J
EXTRACTION WELL 7EX-4MA ASSESSMENT TECHNICAL MEMORANDUM

John Pekala
Motorola Solutions, Inc.
3332 East Broadway Road
Phoenix, Arizona 85040

Arcadis U.S., Inc.
410 N. 44th Street
Suite 1000
Phoenix
Arizona 85008
Phone: 602 438 0883
Fax: 602 438 0102
www.arcadis.com

Date: February 27, 2023
Subject: Operational History and Future Use Assessment of Extraction Well 7EX-4MA at the Area 7 Groundwater Extraction and Treatment System, North Indian Bend Wash Superfund Site, Scottsdale, Arizona

Dear John,

This technical memorandum has been prepared in response to Motorola Solutions' request to provide an overview of the operational history and assessment of future use for extraction well 7EX-4MA at the Area 7 Groundwater Extraction and Treatment System (GWETS), North Indian Bend Wash Superfund Site, Scottsdale, Arizona.

Background

Extraction well 7EX-4MA was installed in 1998 and is located within a concrete vault secured by a steel lid, approximately 1,150 feet south of Area 7 near the southwestern corner of Miller and Osborn Roads in Scottsdale, Arizona. Its purpose is to extract groundwater from the Middle Alluvial Unit (MAU) beneath and south of Area 7. Specifications for extraction well 7EX-4MA are summarized in the table below:

Extraction Well 7EX-4MA	
Well Diameter	6 inches
Casing Material	Steel
Initial Total Depth of Well	304 feet bgs
Modified Total Depth of Well	245 feet bgs
Initial Screened Interval	190-303.5 feet bgs
Current Screened Interval	190-245 feet bgs
Well Pump	15 HP Variable Speed Submersible
Maximum Sustainable Yield	135 gpm
Transmission Piping	SDR 21 HDPE

Historical Service and Rehabilitation Activities

The recurrence of equipment failure and loss of sustainable pumping yield since 2012 at the 7EX-4MA extraction well has precipitated the performance of multiple rehabilitation, well modification, and equipment replacement events over the past decade. These events included: chemical treatments, mechanical cleaning, hydro-jetting, screen abandonment, and casing liner installation. These rehabilitation events were marginally successful in prolonging the service life of the extraction well.

2012 Pump Replacement and Rehabilitation

Failure of the downhole pump in the extraction well occurred on March 2, 2012 due to a loss of a phase leg in the pump motor. Root cause of the loss of the phase leg was determined to be repeated de-watering of the extraction well leading to overheating and degradation of the pump motor.

Downhole equipment and conveyance piping was removed in April 2012 to accommodate a video log of the condition of the well casing and screened interval. Significant evidence of screen fouling via scale buildup was noted across the entire screened interval (190’-303.5’ bgs).

Chemical rehabilitation efforts with subsequent mechanical cleaning efforts (i.e. brushing, swabbing, and bailing) commenced in early May 2012. A post-cleaning video log was performed on May 11, 2012. From the video log, limited removal of surficial scale and debris deposits from the screened interval was observed.

Downhole equipment was replaced in the extraction well including a new pump and motor assembly, and riser piping. Extraction from well 7EX-4MA resumed on May 12, 2012. Pumping data from this period indicated a decline in production from approximately 130 gpm in May 2012 to approximately 78 gpm in March 2015 **(Figure 1)**.

2015 Pump Replacement

Failure of the downhole pump in the extraction well occurred on March 8, 2015 due to ground fault conditions in the pump motor. Variable frequency drive (VFD) ground fault errors in addition to electrical troubleshooting indicated the loss of a phase leg to ground. Repeated de-watering of the extraction well caused the pump motor to overheat and fail.

Downhole equipment was replaced in the extraction well including a new pump and motor assembly, and riser piping. As a precautionary measure, the pump inlet was lowered by adding additional riser pipe sections to mitigate the risks of de-watering the well. Additionally, a downhole data logging transducer was placed in the well to monitor water levels during pumping and static conditions.

Extraction operations from well 7EX-4MA resumed on April 3, 2015. Operational data from the pump’s VFD indicated repeated shutdowns due to ground fault conditions from April 2015 to the subsequent pump failure on September 28, 2016.

During this operational phase, another nearby extraction well, 7EX-6MA, was brought online and blended pumping operations from extraction wells 7EX-4MA and 7EX-6MA began on August 28, 2015. Pump testing and balancing activities at extraction wells 7EX-4MA and 7EX-6MA were performed during the 1st quarter of 2016. Pumping data from this period indicated a decline in production from approximately 88 gpm in August 2015 to approximately 39 gpm in July 2016. Despite the reduced production from 7EX-4MA, transducer data indicated the pumping water level continued to routinely encroach upon the pump inlet.

Extraction well 7EX-6MA was designed to function and operate as a replacement for extraction wells 7EX-4MA and 7EX-5MA. Therefore, focus was shifted to the operation of well 7EX-6MA pending the evaluation of rehabilitation options for well 7EX-4MA. As such, well 7EX-4MA was shut down in October 2016.

2019 Rehabilitation and Well Modification

Downhole equipment and conveyance piping for well 7EX-4MA was removed in July 2019 to accommodate a video log of the condition of the well casing and screened interval. Significant evidence of screen deterioration and fouling via scale buildup was noted across the entire screened interval (190’-303.5’ bgs).

Chemical rehabilitation efforts with subsequent mechanical cleaning efforts (i.e. brushing, swabbing, and bailing) commenced in July 2019. During the mechanical cleaning efforts, a breach in the screened interval occurred causing the filter pack and formation sediments to settle and occlude approximately 50 feet of the lower screened interval. Attempts were made to air lift the sediment from the well but were ultimately unsuccessful. A 10-foot concrete plug was installed from 245 to 255 feet bgs to isolate the occluded screened interval in an attempt to salvage operational functionality of the extraction well (**Figure 2**).

Well jetting activities were performed on September 30, 2019 in an attempt to complete the mechanical cleaning efforts without causing further damage to the screened interval and blank casing.

An additional video log was performed after well jetting activities indicated multiple void spaces in the filter pack, breaches in the remaining screened interval, and one hole in the blank casing above the screened interval.

An injection/slug test to estimate the yield of the extraction well with the reduced screened interval was conducted on December 6, 2019. Results from this testing event suggested a maximum sustainable yield between 50-75 gpm, or more. The deterioration of the screened interval facilitated the need to investigate the installation of alternate pumping equipment and well configuration to mitigate potential risks from the intrusion of formation sediments damaging GWETS equipment.

2022 Rehabilitation and Well Modification

Deployment of a pre-packed casing liner combined with a smaller diameter pump/motor assembly was selected as a possible scenario to mitigate risks of drawing filter pack and formation sediments into the extraction well, and to attempt to salvage operation of the extraction well, if possible.

Rehabilitation activities utilizing mechanical methods including brushing and air lifting debris were completed in June 2022 prior to the deployment of the pre-packed casing liner. A post-rehabilitation video survey was also completed.

Deployment of the pre-packed casing liner began in July 2022. During the grouting process, after the installation of the pre-packed casing liner, slumping of the grout seal between the pre-packed casing liner and existing well casing was noted. The grouting process was paused to investigate the cause of the slumping. During this investigation, a disposable bailer was deployed to the bottom of the pre-packed casing liner to determine if cement grout had infiltrated the liner. A significant amount of cement grout and fine sediments were noted in the sample collected from the bailer. An additional video log was performed on July 15, 2022, evidence of intrusion of cement grout was noted near the beginning of the screened interval at 191’ bgs and continued through 218’ bgs.

The video log could not be advanced past 218’ due to a constriction in the well. The video log, and sample collected from the provided conclusive evidence of grout infiltration into the liner thus rendering the use of the well for extraction purposes impractical.

Use Assessment for Extraction Well 7EX-4MA

Considering the infiltration of grout into the pre-packed casing liner and the inability to remove the liner without the risk of further damage to the screened interval, the future use of well 7EX-4MA as an extraction well is impractical. Furthermore, breaches in the blank casing above the screened interval cause water from the Upper Alluvial Unit (UAU) to mix with water from the screened interval from the MAU rendering the well as an ineffective candidate for use as a monitoring well. Future attempts to rehabilitate this well are not recommended and well abandonment is the most practical solution. With the loss of 7EX-4MA, the pumping rate at 7EX-6MA increased, minimizing the effects of the lack of extraction at 7EX-4MA and ensuring continued effective operation of the Area 7 GWETS.

If you have any questions about the information detailed above, please call me at 602-295-6708.

Sincerely,
Arcadis U.S., Inc.

Ryan O’Keefe, P.E.
Principal Environmental Engineer

Email: ryan.okeefe@arcadis.com
Direct Line: 480.535.1698

Copies:

Arcadis project file

Enclosures:

Figure 1
Figure 2

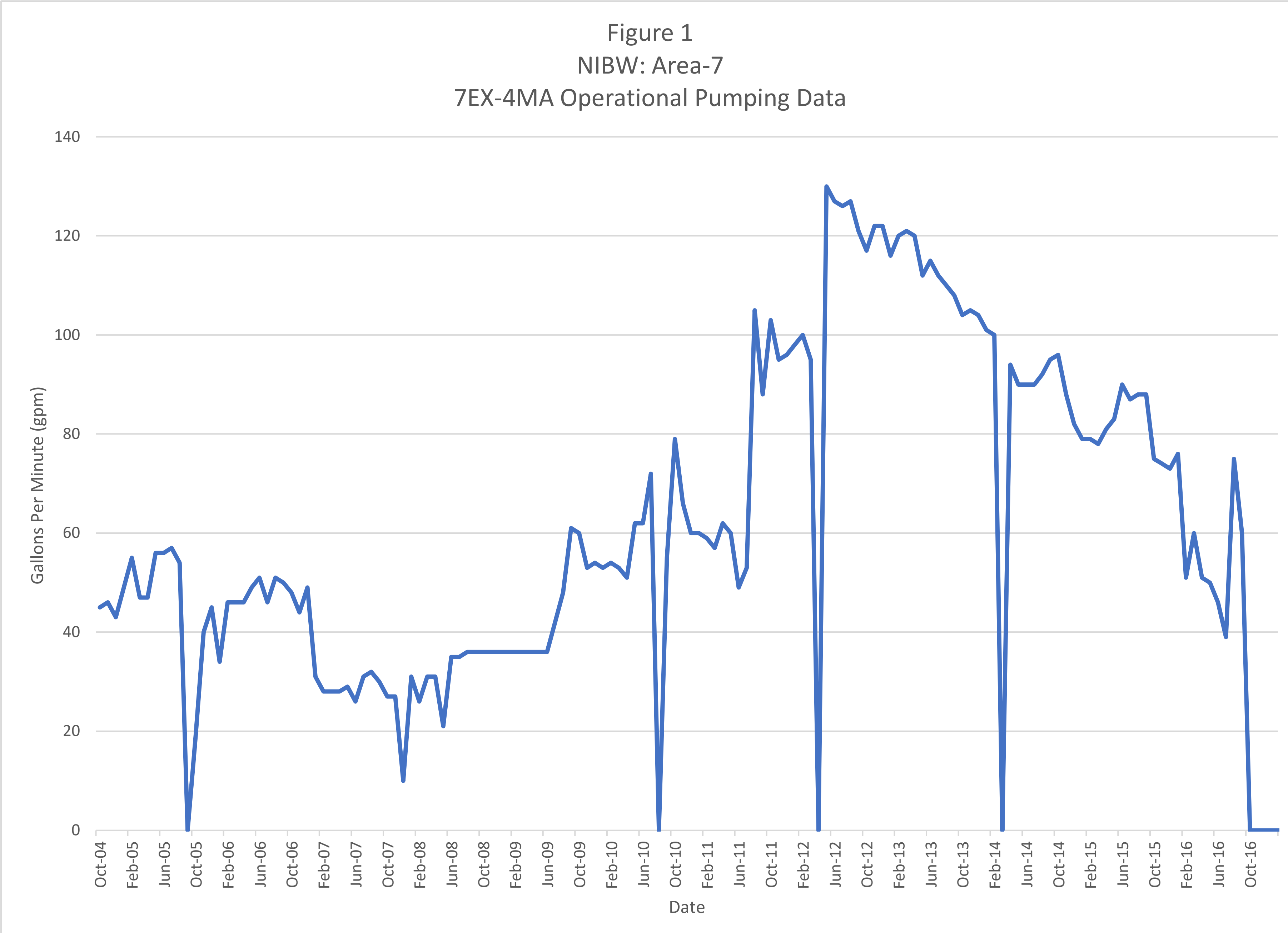
Figure 1
NIBW: Area-7
7EX-4MA Operational Pumping Data
Gallons Per Minute (gpm)
140
120
100
80
60
40
20
0
Oct-04
Feb-05
Jun-05
Oct-05
Feb-06
Jun-06
Oct-06
Feb-07
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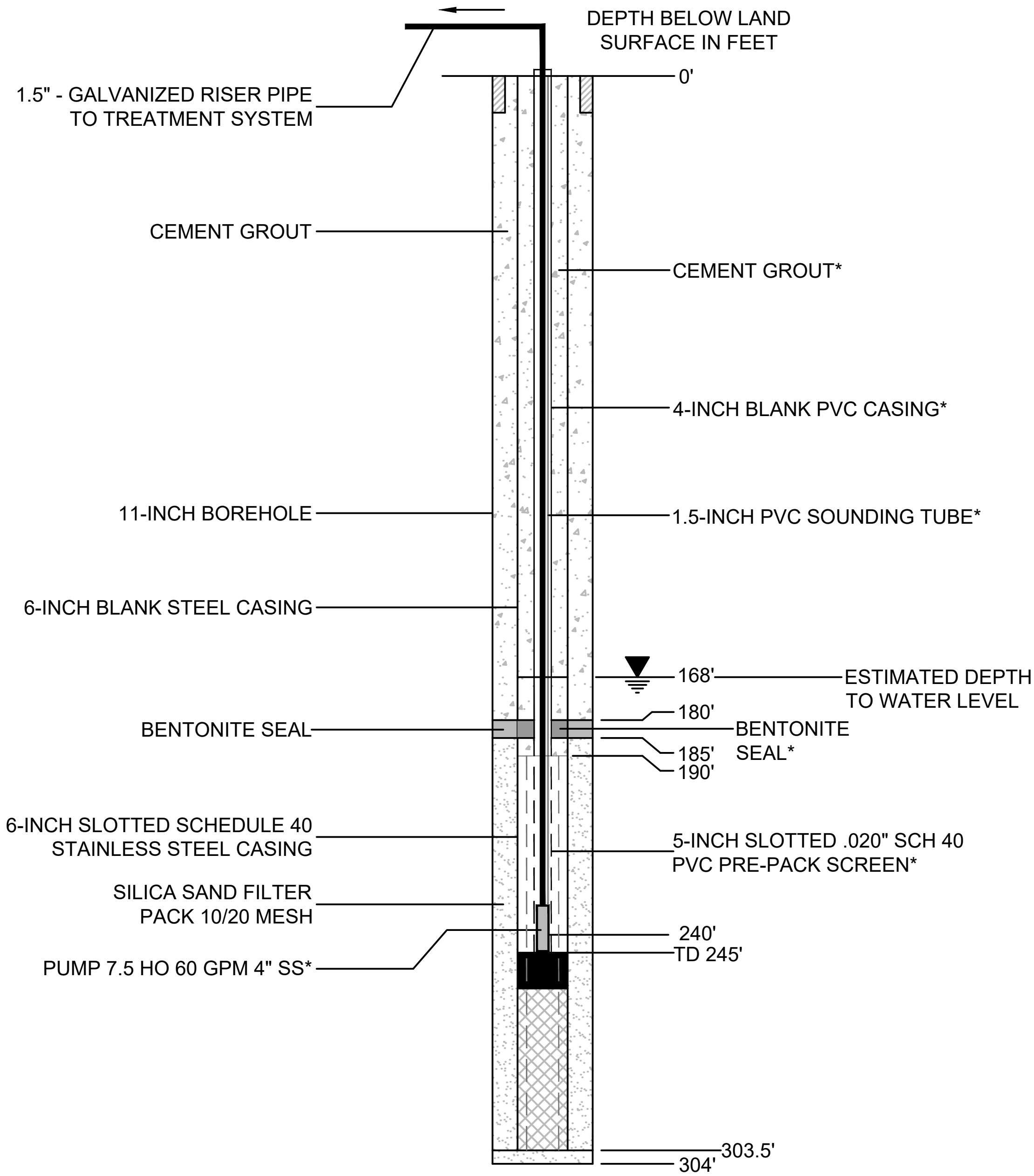
Jun-16
Oct-16
Date



NOT TO SCALE

* INDICATES A PROPOSED MODIFICATION

MOTOROLA SOLUTIONS INC.
NORTH INDIAN BEND WASH SUPERFUND SITE: AREA 7

WELL 7EX-4MA
PROPOSED 2022 MODIFICATION

ARCADIS

FIGURE
2

APPENDIX K
CONTACT LIST FOR NIBW SUPERFUND SITE AND REMEDIAL ACTIONS

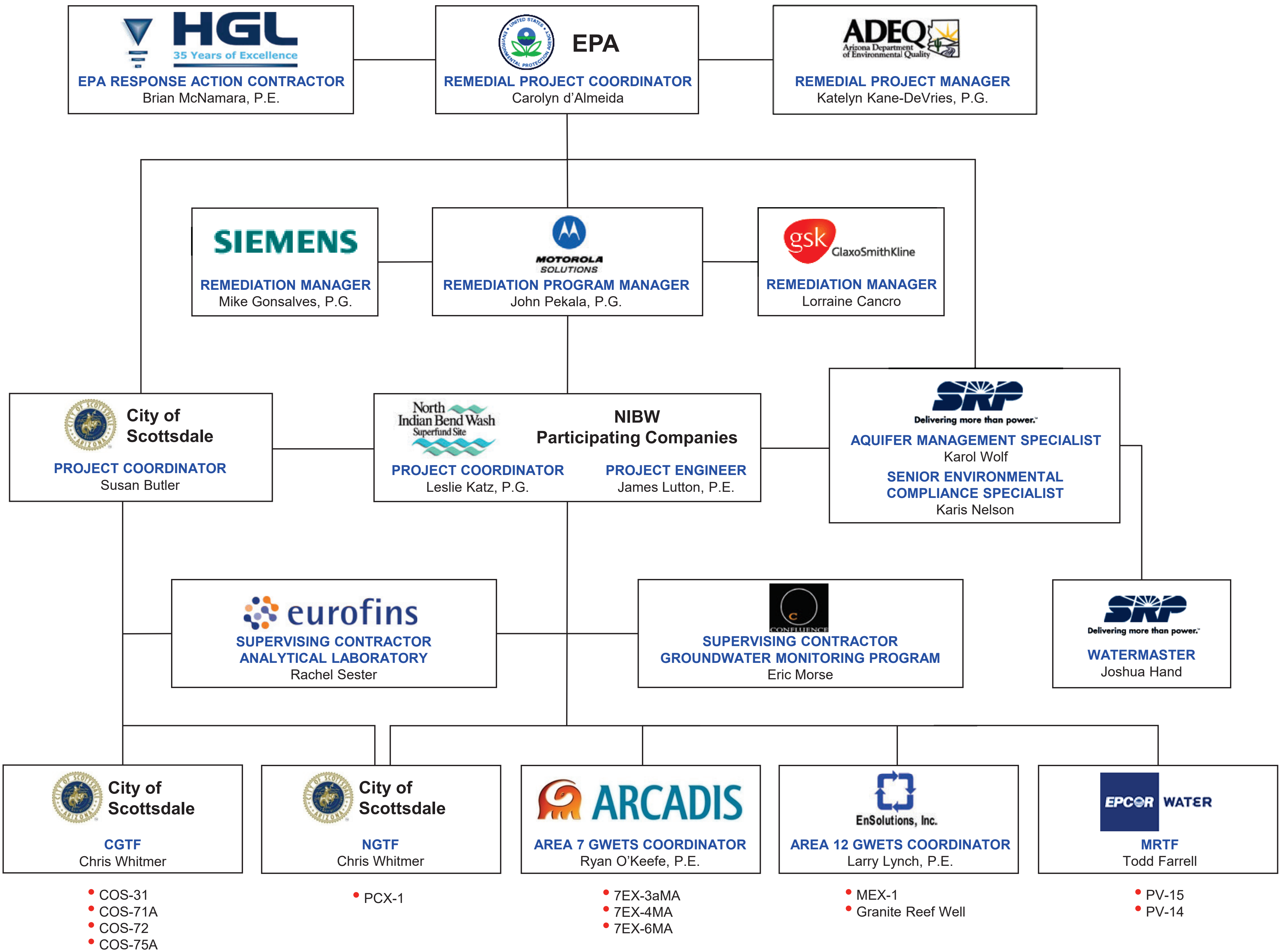

HGL
35 Years of Excellence
EPA RESPONSE ACTION CONTRACTOR
Brian McNamara, P.E.
EPA
REMEDIAL PROJECT COORDINATOR
Carolyn d'Almeida
ADEQ Arizona Department of Environmental Quality
REMEDIAL PROJECT MANAGER
Katelyn Kane-DeVries, P.G.
SIEMENS
REMEDIATION MANAGER
Mike Gonsalves, P.G.
MOTOROLA SOLUTIONS
REMEDIATION PROGRAM MANAGER
John Pekala, P.G.
gsk GlaxoSmithKline
REMEDIATION MANAGER
Lorraine Cancro
City of Scottsdale
PROJECT COORDINATOR
Susan Butler
North Indian Bend Wash Superfund Site
NIBW
Participating Companies
PROJECT COORDINATOR
Leslie Katz, P.G.
PROJECT ENGINEER
James Lutton, P.E.
SRP
Delivering more than power.
AQUIFER MANAGEMENT SPECIALIST
Karol Wolf
SENIOR ENVIRONMENTAL COMPLIANCE SPECIALIST
Karis Nelson
eurofins
SUPERVISING CONTRACTOR
ANALYTICAL LABORATORY
Rachel Sester
CONFLUENCE
SUPERVISING CONTRACTOR
GROUNDWATER MONITORING PROGRAM
Eric Morse
SRP
Delivering more than power.
WATERMASTER
Joshua Hand
City of Scottsdale
CGTF
Chris Whitmer
• COS-31
• COS-71A
• COS-72
• COS-75A
City of Scottsdale
NGTF
Chris Whitmer
• PCX-1
ARCADIS
AREA 7 GWETS COORDINATOR
Ryan O'Keefe, P.E.
• 7EX-3aMA
• 7EX-4MA
• 7EX-6MA
EnSolutions, Inc.
AREA 12 GWETS COORDINATOR
Larry Lynch, P.E.
• MEX-1
• Granite Reef Well
EPCOR WATER
MRTF
Todd Farrell
• PV-15
• PV-14

TABLE K-1. CONTACT LIST FOR NIBW SUPERFUND SITE REMEDIAL ACTIONS

NAME	ROLE	ORGANIZATION	ADDRESS	OFFICE TELEPHONE	MOBILE TELEPHONE	EMAIL
NIBW Participating Companies						
John Pekala	NIBW Program Manager	Motorola Solutions, Inc.	3332 E. Broadway Road, Phoenix, AZ 85040	602-353-5547	602-859-9294	john.pekala@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
Amanda Beam	Project Manager	EL Montgomery and Associates, Inc.	4222 E. Thomas Road, Suite 315, Phoenix, AZ 85018	480-948-7747	619-254-8749	abeam@elmontgomery.com
Alyssa Kirk	Senior Hydrologist	EL Montgomery and Associates, Inc.	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912	928-699-6405	akirk@elmontgomery.com
Marla Odom	Data Manager	EL Montgomery and Associates, Inc.	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912		modom@elmontgomery.com
Brady Nock	Groundwater 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 Coordinator	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
Katelyn Kane-DeVries	ADEQ Project Manager	Arizona Department of Environmental Quality	1110 West Washington Street, Phoenix, AZ 85007	602-771-0167		kane-devries.katelyn@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						
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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

APPENDIX L
SUMMARY OF FLUID-MOVEMENT INVESTIGATIONS AT EXTRACTION WELL PCX-1, MARCH 2022

North Indian Bend Wash Superfund Site

TECHNICAL MEMORANDUM

DATE: February 28, 2023 PROJECT #: 366.2

TO: John Pekala, Motorola Solutions Inc.

CC: Leslie Katz, P.G.; Lauren Candreva, P.G.;
and Alyssa Kirk, Montgomery & Associates

FROM: Andrew Platt, G.I.T. and Amanda Beam, P.G., C.Hg

PROJECT: North Indian Bend Wash Superfund Site, Scottsdale, AZ

REGISTERED GEOLOGIST CERTIFICATE NO. 71661 AMANDA BEAM DATE SIGNED 02/28/2023 ARIZONA U.S.A.
Exp. 09/30/2023

SUBJECT: SUMMARY OF FLUID-MOVEMENT INVESTIGATIONS AT EXTRACTION WELL PCX-1, MARCH 2022, NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, AZ

INTRODUCTION

The North Indian Bend Wash (NIBW) Participating Companies (NIBW PCs) have prepared this technical memorandum to document field investigations conducted at the Salt River Project (SRP) extraction well PCX-1 (22.5N 9.3E). PCX-1 is located in the northern part of the NIBW Superfund Site in Scottsdale, Arizona (**Figure 1**), and provides source water for the NIBW Granular Activated Carbon Treatment Facility (NGTF). This data submittal comprises a summary of testing procedures and data gathered during the well investigations, together with interpretation of the results.

Fluid-movement investigations were conducted at PCX-1 to evaluate the vertical distribution of groundwater flow and water quality in the Lower Alluvial Unit (LAU) under pumping and non-pumping conditions. The purpose of the latest fluid-movement investigations was to measure any changes compared to previous investigations in the flow and trichloroethene (TCE) concentration with depth under pumping and non-pumping conditions.

PCX-1 was originally perforated between 720 and 1,240 feet below land surface (bls), which is entirely within the LAU. In July 2014, cement was installed inside the casing to 1,151 feet bls to seal a section of the bottom of the well where fill material could not be removed. A schematic diagram of the well construction is attached in **Appendix A**.

Geophysical investigations were conducted by Southwest Exploration Services, LLC. All samples were analyzed at the City of Scottsdale Water Campus. M&A coordinated tasks, observed logging operations, assisted with acquisition of groundwater samples, and conducted the data analysis.

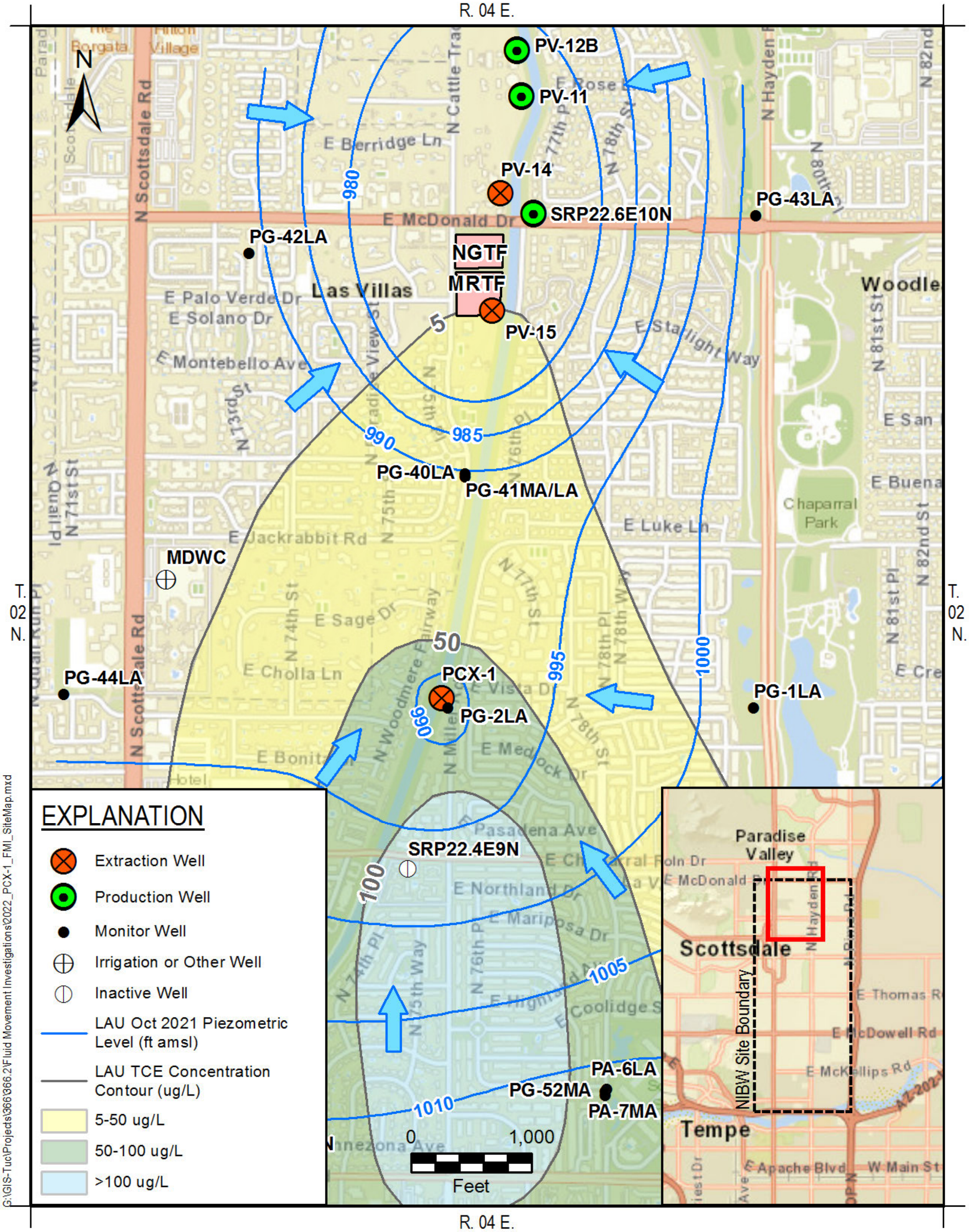


Figure 1. PCX-1 Well Site Map

FIELD INVESTIGATIONS

Geophysical logging and depth-specific sampling were conducted at PCX-1 under both non-pumping and pumping conditions. The existing submersible pump and access pipe were used for pumping investigations and remained in place during non-pumping investigations.

On March 29, 2022, temperature, fluid conductivity, and spinner-flowmeter surveys were conducted at PCX-1 under pumping conditions. The pump had been operating since October 5, 2021, prior to investigations. The flow rate was approximately 2,195 gallons per minute (gpm) and pumping water level varied between 396.26 feet bls and 397.38 feet bls for the duration of the pumping investigation. Samples were collected at depths of 700, 725, 800, 870, 950, 1,025, and 1,065 feet bls. These depths were selected at slight inflection points in the spinner survey. Additionally, wellhead samples were collected before and after depth-specific sampling.

On March 31, 2022, temperature, fluid conductivity, and spinner-flowmeter surveys were conducted at PCX-1 during non-pumping conditions. Static water level varied between 267.54 feet bls and 268.29 feet bls for the duration of the non-pumping investigation. Depth-specific samples were collected at the same depths during both non-pumping and pumping investigations. Samples were analyzed for the NIBW constituents of concern (COCs) (TCE, tetrachloroethene (PCE), 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and chloroform (TCM)), trace metals, anions, cations, total hardness, total alkalinity, SiO2, and total dissolved solids (TDS). In addition, the following field parameters were collected: pH, temperature, electrical conductivity, and turbidity.

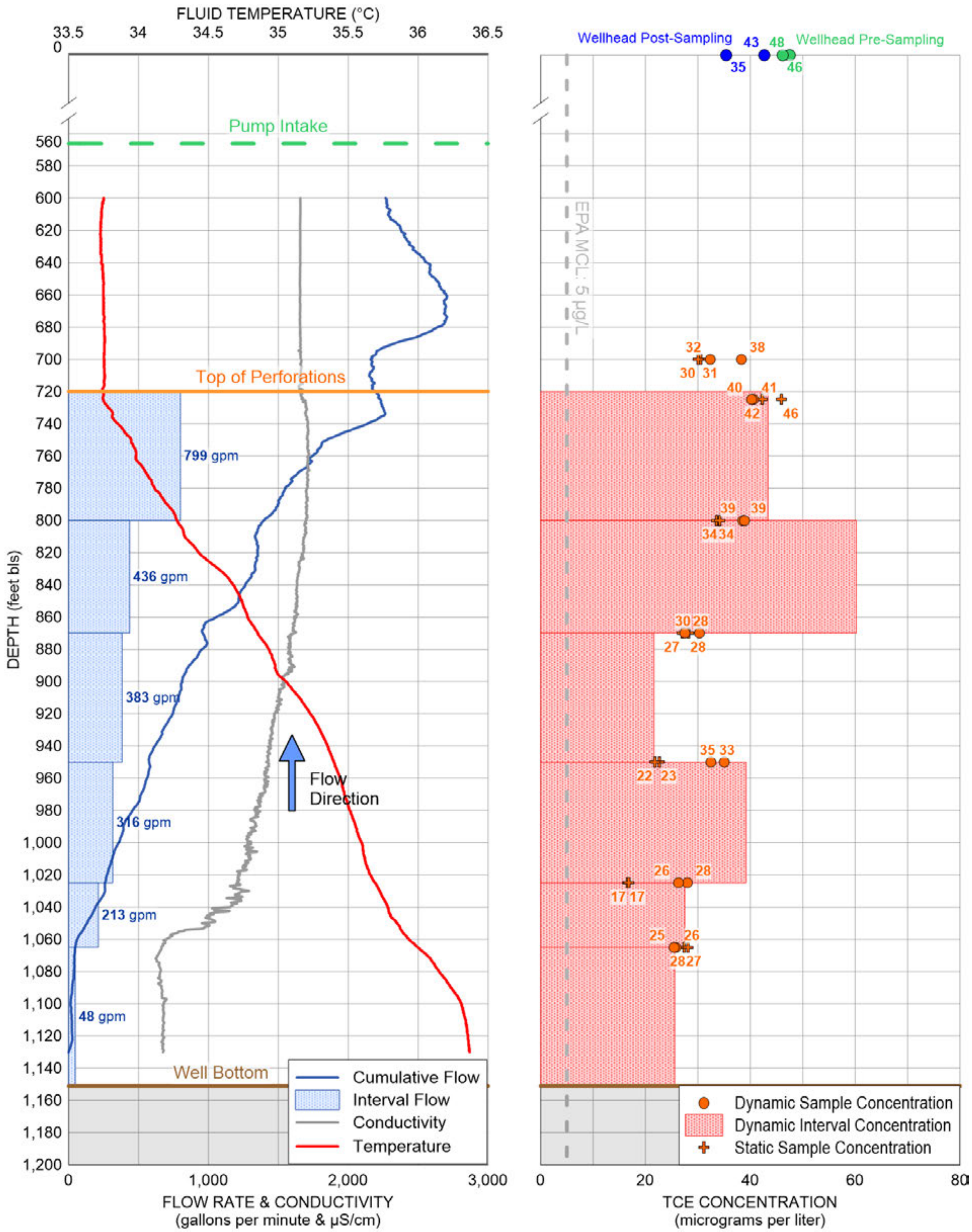
RESULTS AND INTERPRETATION

In addition to the most recent fluid-movement investigation conducted in 2022, similar investigations were also completed in 2011, 2003, and 1998. When the previous investigations were conducted, the bottom of the well was 1,240 feet bls as opposed to 1,151 feet bls during the 2022 investigations; however, results from previous investigations indicate that the total flow entering the well from below 1,151 feet bls was negligible. Flow rates at the wellhead during the previous investigations were 2,500 gpm in 1998, 1,882 gpm in 2003, and 2,180 gpm in 2011. Previous depth-specific sampling was only conducted during pumping conditions. Inorganic water quality was not assessed during the 1998 and 2003 fluid-movement investigations. As the primary NIBW COC, this technical memorandum is focused on the evaluation of TCE and select inorganic constituents of interest to the City of Scottsdale for municipal water supply.

Spinner-Flowmeter Surveys

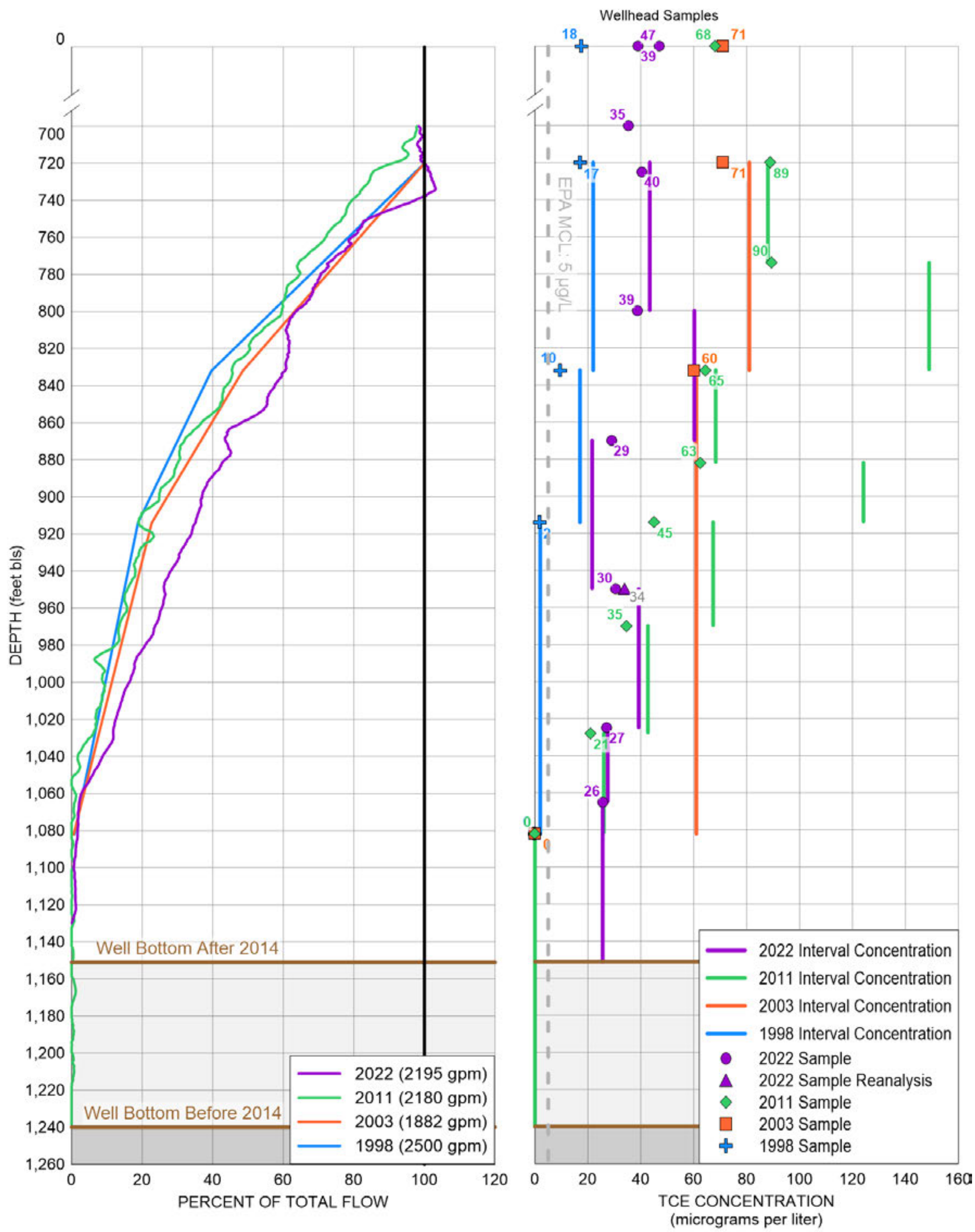
Spinner-flowmeter surveys conducted under pumping conditions showed the unit flow rate (gpm per foot of screened interval [gpm/ft]) into the well generally decreases with depth (**Figure 2**). Unit flow rate between the top of the perforations at 720 feet bls and 800 feet bls is approximately 10 gpm/ft, while the unit flow rate in the interval from 1,025 to 1,065 feet bls is approximately 5 gpm/ft. Minimal flow (approximately 48 gpm) can be seen entering the well between 1,065 and 1,151 feet bls. The pump intake was at 566 feet bls, resulting in upward flow within the well under pumping conditions. Spinner-flowmeter surveys under non-pumping conditions showed no measurable vertical flow in the well. This indicates vertical flow is either not occurring within the well or is occurring below the flowmeter detection limit. Copies of the geophysical surveys are included in **Appendix B**.

Previous investigations show the flow profile of PCX-1 has not changed significantly with time. **Figure 3** shows flow profiles for all fluid-movement investigations conducted at PCX-1 during pumping conditions, which are displayed as a percent of total flow due to the different wellhead flow rates for each test. In each investigation, there was little to no flow into the well below 1,065 feet bls. Previous investigations also showed that unit flow rate decreased with depth.



Note: Average of original sample and duplicate were used to determine interval concentrations.

Figure 2. Interpretation of PCX-1 Interval-Specific Flow Rates and TCE Concentrations, March 29, 2022



Note:
1. Average of 2022 original sample and duplicate are displayed and were used to determine interval concentrations.
2. Average of 2011 SRP and TestAmerica sample are displayed and were used to determine interval concentrations.
3. No wellhead samples were collected during depth specific sampling in 1998 and 2003, so compliance wellhead samples collected within the same month are displayed.

Figure 3. TCE Concentration and Percent of Total Flow with Depth for all Fluid-Movement Investigations During Pumping

Depth-Specific Sampling

Results of depth-specific samples collected under both pumping and non-pumping conditions show a slightly decreasing trend in TCE concentration with depth. While pumping, or in the case where vertical flow within the well dominates horizontal flow under non-pumping conditions, a sample collected at a specific depth is not composed of water contributed to the well only at that depth; rather, it is a mixture of water from that depth and all water "upstream" from that depth (further from the pump). Since the pump intake was above all the depth-specific samples collected and all water entering the well was flowing upward, each sample is a mixture of all water that has entered the well below that sampling depth. The concentration of a constituent within a defined depth interval can be calculated using the following equation:

$$C_i = \frac{F_n C_n - F_m C_m}{F_n - F_m}$$

Where:

C_i = interval concentration of a given constituent
F_n = flow rate at a given depth sampled
C_n = concentration at a given depth sampled
F_m = flow rate at the adjacent (lower) depth sampled
C_m = concentration at the adjacent (lower) depth sampled

Each interval is bounded by samples obtained at the top and bottom of the interval. For the uppermost interval, the sample collected under pumping conditions in the blank casing at 700 feet bls had a higher relative percent difference (RPD) between TCE concentrations in the original (PCX-D700A) and duplicate (PCX-D700B) samples and may not be reliable; therefore, the sample collected at 725 feet bls was selected to represent the top of this interval. Sample concentrations used to calculate interval concentrations are the average of the original sample and the duplicate sample. A summary of lab results is included in **Table 1**.

Interval flow rates and interval concentrations could not be calculated for non-pumping conditions, as the spinner-flowmeter surveys showed no measurable vertical flow within the well. Because interval concentrations could not be calculated without measurable flow, comparisons between pumping and non-pumping conditions are made with depth-specific sample concentrations rather than interval concentrations.

Table 1. Lab Results from Fluid-Movement Investigations at PCX-1 Collected in March 2022

SAMPLE INFORMATION					VOCs µg/L					TRACE METALS mg/L																						
SAMPLE NAME	SAMPLE DATE-TIME	SAMPLE TYPE	SAMPLE DEPTH feet, bls	FLOW RATE gpm	TCE	TCM	PCE	1,1-DCE	1,1,1-TCA	Al	Sb	As	Ba	Be	B	Br	Cd	Cr	Co	Cu	Fe	Pb	Mn	Mo	Ni	Se	Sr	Tl	Th	U	V	Z
PCX-WH1A	3/29/22 10:20	Original	Wellhead	2195	47.5	1.89	4.31	0.71	<0.50	<0.010	<0.0010	0.0065	0.0289	<0.0010	0.1	0.34	<0.0010	0.0093	<0.0010	0.003	<0.020	<0.0010	<0.0010	<0.010	<0.0010	0.0036	1.64	<0.0010	<0.0010	0.0028	0.017	0.015
PCX-WH1B	3/29/22 10:20	Duplicate	Wellhead	2195	46.2	2.05	4.25	0.77	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D700A	3/29/22 15:15	Original	700	2195	38.3	1.95	2.8	<0.50	<0.50	0.029	<0.0010	0.0056	0.0365	<0.0010	0.11	0.34 (1)	<0.0010	0.0124	<0.0010	0.0921	0.823	<0.0010	0.0276	<0.010	0.0039	0.0033	1.63	<0.0010	<0.0010	0.0026	0.016	0.216
PCX-D700B	3/29/22 15:15	Duplicate	700	2195	32.3	1.6	2.41	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D725A	3/29/22 14:50	Original	725	2195	40.6 (3)	1.94 (3)	3.09 (3)	<0.50 (3)	<0.50 (3)	0.03	<0.0010	0.0055	0.0365	<0.0010	0.11	0.32	<0.0010	0.0115	<0.0010	0.081	0.958	<0.0010	0.0293	<0.010	0.0039	0.0034	1.65	<0.0010	<0.0010	0.0027	0.016	0.205
PCX-D725B	3/29/22 14:50	Duplicate	725	2195	40.2	1.98	3.06	0.5	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D800A	3/29/22 14:20	Original	800	2195	38.5	1.83	3.34	<0.50	<0.50	0.044	<0.0010	0.0058	0.0333	<0.0010	0.09	0.32	<0.0010	0.0097	<0.0010	0.0847	0.889	<0.0010	0.033	<0.010	0.0042	0.0033	1.61	<0.0010	<0.0010	0.0027	0.016	0.168
PCX-D800B	3/29/22 14:20	Duplicate	800	2195	38.9	2.01	3.33	0.53	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D870A	3/29/22 13:50	Original	870	2195	27.5	1.4	2.52	<0.50	<0.50	0.032	<0.0010	0.0062	0.0321	<0.0010	0.09	0.32	<0.0010	0.0122	<0.0010	0.0677	1.95	<0.0010	0.0397	<0.010	0.0055	0.0032	1.56	<0.0010	<0.0010	0.0026	0.016	0.146
PCX-D870B	3/29/22 13:50	Duplicate	870	2195	30.3	1.55	2.82	0.53	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D950A	3/29/22 13:25	Original	950	2195	32.5	1.54 (A)	2.65 (A)	<0.50	<0.50	0.025	<0.0010	0.0061	0.0319	<0.0010	0.09	0.31	<0.0010	0.013	<0.0010	0.0653	0.885	<0.0010	0.0436	<0.010	0.0059	0.0031	1.5	<0.0010	<0.0010	0.0026	0.016	0.132
PCX-D950B	3/29/22 13:25	Duplicate	950	2195	35 (B)(2)	1.74 (A)(2)	3.18 (A)(2)	<0.50 (2)	<0.50 (2)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D1025A	3/29/22 12:45	Original	1025	2195	28	1.19	2.37	<0.50	<0.50	0.034	<0.0010	0.0067	0.0283	<0.0010	0.09	0.28	<0.0010	0.0166	<0.0010	0.117	1.64	<0.0010	0.0728	<0.010	0.0105	0.0027	1.41	<0.0010	<0.0010	0.0025	0.018	0.087
PCX-D1025B	3/29/22 12:45	Duplicate	1025	2195	26.3	1.17	2.15	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D1065A	3/29/22 12:10	Original	1065	2195	25.8	1.27	2.09	<0.50	<0.50	0.06	<0.0010	0.0058	0.0264	<0.0010	0.09	0.29	<0.0010	0.0131	0.0011	0.122	9.03	<0.0010	0.228	<0.010	0.0137	0.0027	1.44	<0.0010	<0.0010	0.0023	0.016	0.092
PCX-D1065B	3/29/22 12:10	Duplicate	1065	2195	25.4	1.2	2.13	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-WH2A	3/29/22 15:40	Original	Wellhead	2195	42.6	1.77	4.06 (A)	0.64	<0.50	<0.010	<0.0010	0.0063	0.0276	<0.0010	0.11	0.35	<0.0010	0.0091	<0.0010	0.0021	<0.020	<0.0010	<0.0010	<0.010	<0.0010	0.0035	1.64	<0.0010	<0.0010	0.0027	0.017	<0.010
PCX-WH2B	3/29/22 15:40	Duplicate	Wellhead	2195	35.4	1.52	3.2 (A)	0.54	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S700A	3/31/22 14:35	Original	700	0	30.5	1.55 (A)	1.94 (A)	<0.50	<0.50	0.037	<0.0010	0.0071	0.037	<0.0010	0.09	0.31	<0.0010	0.0111 (5)	<0.0010	0.0241	2.45	<0.0010	0.0444	<0.010	0.0029	0.0032	1.62	<0.0010	<0.0010	0.0026	0.017	0.449
PCX-S700B	3/31/22 14:35	Duplicate	700	0	30	1.61 (A)	1.89 (A)	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S725A	3/31/22 14:15	Original	725	0	45.9 (2)	2.27 (2)	2.97 (2)	<0.50 (2)	<0.50 (2)	0.038	<0.0010	0.0075	0.0405	<0.0010	0.1	0.31	<0.0010	0.014	<0.0010	0.0314	2.47	<0.0010	0.0559	<0.010	0.0032	0.0033	1.59	<0.0010	<0.0010	0.0027	0.018	0.456
PCX-S725B	3/31/22 14:15	Duplicate	725	0	42.3 (2)	2.17 (2)	2.94 (2)	0.5 (2)	<0.50 (2)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S800A	3/31/22 13:50	Original	800	0	33.6	1.71 (A)	2.19 (A)	<0.50	<0.50	0.031	<0.0010	0.009	0.0383	<0.0010	0.1	0.31	<0.0010	0.0163	<0.0010	0.033	3.29	<0.0010	0.0505	<0.010	0.0034	0.0034	1.59	<0.0010	<0.0010	0.0027	0.02	0.375
PCX-S800B	3/31/22 13:50	Duplicate	800	0	34.2	1.68 (A)	2 (A)	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S870A	3/31/22 13:25	Original	870	0	28.2	1.7	2.37	<0.50	<0.50	0.033	<0.0010	0.0082	0.0337	<0.0010	0.09	0.32	<0.0010	0.0123	<0.0010	0.0329	3.6	<0.0010	0.0688	<0.010	0.0033	0.0032	1.55	<0.0010	<0.0010	0.0027	0.019	0.375
PCX-S870B	3/31/22 13:25	Duplicate	870	0	27	1.68	2.24	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S950A	3/31/22 12:55	Original	950	0	22.6	1.4	1.93	<0.50	<0.50	0.031	<0.0010	0.0076	0.0325	<0.0010	0.09	0.29	<0.0010	0.0115	<0.0010	0.0437	3.52	<0.0010	0.0926	<0.010	0.0044	0.0029	1.4	<0.0010	<0.0010	0.0025	0.017	0.341
PCX-S950B	3/31/22 12:55	Duplicate	950	0	21.8	1.41	1.85	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S1025A	3/31/22 12:30	Original	1025	0	16.6	0.89	1.27	<0.50	<0.50	0.041	<0.0010	0.0109	0.0297	<0.0010	0.09	0.24	<0.0010	0.0194	<0.0010	0.126	4.77	<0.0010	0.0987	<0.010	0.005	0.0023	1.17	<0.0010	<0.0010	0.0023	0.023	0.285
PCX-S1025B	3/31/22 12:30	Duplicate	1025	0	16.8	1.04	1.36	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S1065A	3/31/22 11:55	Original	1065	0	27.4	1.57	1.58 (A)	<0.50	<0.50	0.07	<0.0010	0.0054	0.0419	<0.0010	0.1	0.32	<0.0010	0.015	<0.0010	0.215	2.64	<0.0010	0.0719	<0.010	0.0064	0.0033	1.58	<0.0010	<0.0010	0.0027	0.015	0.654
PCX-S1065B	3/31/22 11:55	Duplicate	1065	0	28.1	1.52	1.63 (A)	<0.50	<0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

SAMPLE INFORMATION					CATIONS mg/L				ANIONS mg/L							GENERAL CHEMISTRY mg/L				FIELD PARAMETERS			
SAMPLE NAME	SAMPLE DATE-TIME	SAMPLE TYPE	SAMPLE DEPTH feet, bls	FLOW RATE gpm	Ca	Mg	Na	K	HCO_3 Alk (as $CaCO_3$)	CO_3 Alk (as $CaCO_3$)	NO_3 (as N)	NO_2 (as N)	SO_4	F	Cl	Hardness, Total (calc)	Alkalinity, Total (as $CaCO_3$)	SiO_2	TDS (Laboratory)	pH	Temp °F	EC µS/cm	Turbidity NTU
PCX-WH1A	3/29/22 10:20	Original	Wellhead	2195	95.3	73.6	61	5	126	<20	6.3	<0.2	131	0.3	233	541	126	33	692	7.2	91.9	1323	0.23
PCX-WH1B	3/29/22 10:20	Duplicate	Wellhead	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D700A	3/29/22 15:15	Original	700	2195	96.3	74	62	5	134	<20	5.6	<0.2	129	0.3	235	545	134	32.9	804 (4)	7.4	88.1	1319	6.95
PCX-D700B	3/29/22 15:15	Duplicate	700	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D725A	3/29/22 14:50	Original	725	2195	94.3	74.5	61	5	134	<20	5.7	<0.2	130	0.3	238	542	134	33.3	756	7.4	87.5	1328	6.98
PCX-D725B	3/29/22 14:50	Duplicate	725	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D800A	3/29/22 14:20	Original	800	2195	95.2	74.3	62	5	136	<20	5.7	<0.2	130	0.3	238	544	136	32.6	660	7.3	88.9	1336	7.21
PCX-D800B	3/29/22 14:20	Duplicate	800	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D870A	3/29/22 13:50	Original	870	2195	91.5	72.6	61	5	140	<20	5.6	<0.2	124	0.3	231	527	140	32.6	676	7.3	88.7	1308	9.31
PCX-D870B	3/29/22 13:50	Duplicate	870	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D950A	3/29/22 13:25	Original	950	2195	86.4	69.8	61	5	138	<20	5.3	<0.2	116	0.3	220	503	138	31.6	628	7.3	89.5	1249	5.6
PCX-D950B	3/29/22 13:25	Duplicate	950	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D1025A	3/29/22 12:45	Original	1025	2195	80.3	65.3	62	5	138	<20	4.9	<0.2	106	0.3	204	469	138	31.7	616	7.4	90.1	1177	13.3
PCX-D1025B	3/29/22 12:45	Duplicate	1025	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-D1065A	3/29/22 12:10	Original	1065	2195	84	67	63	5	136	<20	5.1	<0.2	114	0.3	211	486	136	33	624	7.4	88.7	1216	44.7
PCX-D1065B	3/29/22 12:10	Duplicate	1065	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-WH2A	3/29/22 15:40	Original	Wellhead	2195	96	73.2	61	5	132	<20	6.3	<0.2	131	0.3	235	541	132	33.2	612	7.3	91	1326	0.24
PCX-WH2B	3/29/22 15:40	Duplicate	Wellhead	2195	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S700A	3/31/22 14:35	Original	700	0	93.1	72.3	61	5	134	<20	5.5	<0.2	124	0.3	227	530	134	32.8	592	7.4	86.7	1284	25.4
PCX-S700B	3/31/22 14:35	Duplicate	700	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S725A	3/31/22 14:15	Original	725	0	90.9	70.9	60	5	132	<20	5.8	<0.2	130	0.3	237	519	132	32.2	604	7.4	87.1	1280	25.5
PCX-S725B	3/31/22 14:15	Duplicate	725	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S800A	3/31/22 13:50	Original	800	0	90.7	71.9	61	5	134	<20	5.5	<0.2	122	0.3	224	523	134	32.3	572	7.4	87.1	1282	29.5
PCX-S800B	3/31/22 13:50	Duplicate	800	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S870A	3/31/22 13:25	Original	870	0	93.2	72.4	62	5	136	<20	5.4	<0.2	124	0.3	223	531	136	32.3	616	7.4	87.8	1284	36.7
PCX-S870B	3/31/22 13:25	Duplicate	870	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S950A	3/31/22 12:55	Original	950	0	82.2	64.4	60	4	134	<20	4.9	<0.2	108	0.3	203	470	134	30.7	672	7.5	86.9	1187	---
PCX-S950B	3/31/22 12:55	Duplicate	950	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S1025A	3/31/22 12:30	Original	1025	0	66.3	52.1	59	4	138	<20	4.7	<0.2	95	0.3	166	380	138	30.3	476	7.6	87.6	1003	45.8
PCX-S1025B	3/31/22 12:30	Duplicate	1025	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCX-S1065A	3/31/22 11:55	Original	1065	0	93.8	71.3	61	5	140	<20	5.1	<0.2	127	0.3	230	528	140	32.3	788	7.3	87.7	1298	26
PCX-S1065B	3/31/22 11:55	Duplicate	1065	0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

EXPLANATION:

Al = Aluminum
Alk = Alkalinity
As = Arsenic
Ba = Barium
Be = Beryllium
B = Boron
Br = Bromine
bls = below land surface
Ca = Calcium
$CaCO_3$ = Calcium Carbonate
Cd = Cadmium
Cl = Chloride
Co = Cobalt
CO_3 = Carbon
Cr = Chromium
Cu = Copper
DCE = 1,1-Dichloroethene
EC = Electrical Conductivity
°F = degrees Fahrenheit
F = Fluoride
Fe = Iron
gpm = gallons per minute
HCO_3 = Bicarbonate
K = Potassium
Mg = Magnesium
mg/L = milligrams per liter
Mn = Manganese
Mo = Molybdenum
Na = Sodium
Ni = Nickel
NO_3 = Nitrate
NO_2 = Nitrite
NTU = Nephelometric Turbidity units
Pb = lead
PCE = Tetrachloroethene
Sb = Antimony
Se = Selenium
SiO_2 = Silica
SO_4 = Sulfate
Sr = Strontium
TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
TCM = Chloroform
TDS = Total Dissolved Solids
Tl = Thallium
Th = Thorium
U = Uranium
V = Vanadium
Zn = Zinc
µg/L = micrograms per liter
µS/cm = microsiemens per centimeter

NOTES:

(grey shading)	below detection limit
---	not analyzed

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

(B) Re-analysis not possible due to lack of sample volume remaining

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) M2: Matrix spike recovery was low; the associated blank spike recovery was acceptable.

(2) N1|E6: Concentration estimated; Internal standard response recovery was low; results are biased high.

(3) N1|L3: The internal standard response recovery was low for the laboratory control spike (LCS) causing the LCS to recover above method acceptance limits. The field sample was not impacted.

(4) R8: Sample RPD exceeded the method acceptance limit.

(5) R14: Sample RSD exceeded laboratory acceptance criteria.

TCE

Interval TCE concentration generally decreases with depth, with slight declines in concentration at the shallowest interval from 720 to 800 feet bls and the middle interval from 870 to 950 feet bls (**Figure 2**). The highest interval TCE concentration is 60 µg/L from 800 to 870 feet bls, which is directly above the lowest interval TCE concentration of 22 µg/L from 870 to 950 feet bls. Calculated interval TCE concentrations are summarized in **Table 2**. The TCE concentration of the wellhead sample collected before depth-specific sampling is about 8 µg/L greater than the wellhead sample collected after depth-specific sampling when comparing averages of original and duplicate samples. TCE concentrations of the samples collected at 700 and 725 feet bls (which are either above or very close to the top of the perforated interval, and therefore should be equivalent to a sample collected at the wellhead) more closely resemble TCE concentrations of the wellhead sample collected after depth-specific sampling. The 700 and 725-foot bls samples were collected much closer in time to the wellhead sample collected after depth-specific sampling, however the RPD between the original and duplicate sample from the 700-foot bls sample exceeded the acceptable criteria.

Calculated interval TCE concentrations for pumping and non-pumping conditions are similar for most depths, except for the samples collected at 950 and 1,025 feet bls (**Figure 2**). TCE concentrations during non-pumping conditions at these depths are about 10 µg/L lower than during pumping conditions.

Confidence in calculated interval concentrations is high where large differences in the magnitude of flow rate and/or TCE concentration are detected between depth intervals. Overall, there are not substantial differences in sample concentration with depth, which suggests any sampling or laboratory analysis error would have a larger impact on calculated interval concentrations than if there were substantial differences in concentration between samples.

Concentrations generally decrease with increasing depth in all fluid-movement investigations (**Figure 3**). Concentrations were at their lowest in 1998 and highest in 2011. TCE is more uniformly distributed with depth in 2022, compared with previous investigations. TCE concentrations in most depth intervals have decreased between 2011 and 2022 except for the lowest two intervals, where concentrations were either similar or higher. The higher concentration within the 1,065 to 1,151 feet bls interval in 2022 is likely the result of vertical homogenization of the plume from regional pumping within the LAU driving flow northward and throughout the less permeable deeper portions of the LAU over time. However, due to the modification of the well that occurred in 2014 that sealed off the lowest portion of the screen with limited flow and no detected TCE, this lowermost interval concentration should not be compared with the historical interval concentration. In 2011, there was no TCE detected at a depth of 1,082 feet bls while the most recent investigation shows a TCE concentration of

26 µg/L at a depth of 1,065 feet bls. A sample was not collected below 1,065 feet bls in 2022 because very little flow was detected below this depth, so the TCE concentration at 1,082 feet bls in 2022 is unknown. Trends at well PCX-1 and other wells indicate that TCE mass continues to move from the source areas in the southern part of the Site toward the northern remedial extractions, including PCX-1 (North Indian Bend Wash Participating Companies, 2022).

Table 2. Calculated Interval Concentrations of Select Constituents

Interval (feet bls)	Sample Depth[1] (feet bls)	Interval Flow Rate (gpm)	Interval TCE (µg/L)	Interval NO_3 (mg/L)	Interval As (mg/L)	Interval TDS (mg/L)
720-1,151	Wellhead Pre-sampling	2,195	47[2]	6.3[2]	0.0065[2]	692[2]
720-1,151	Wellhead Post-sampling	2,195	39[2]	6.3[2]	0.0063[2]	612[2]
720-800	725	799	43	5.7	0.0050	924
800-870	800	436	60	5.9	0.0049	625
870-950	870	383	22	6.1	0.0064	748
950-1025	950	316	39	5.6	0.0056	638
1,025-1,065	1,025	213	27	4.9	0.0069	614
1,065-1,151	1,065	48	26	5.1	0.0058	624

(1) Depth of sample used to calculate interval concentration
(2) Discrete sample analysis, not calculated interval. TCE concentration is average of original and duplicate sample

Inorganic Constituents

Concentrations of select inorganic constituents exceed or are near the Environmental Protection Agency (EPA) primary maximum contaminant levels (MCLs) and/or secondary MCLs. Primary MCLs are enforceable standards, while secondary MCLs are unenforceable aesthetic considerations that affect taste, color, odor, etc.

Nitrate

In 2022, nitrate concentration in each depth interval is less than the MCL of 10 mg/L, however most of concentrations are greater than 50% of the MCL, the designated alert level for the City of Scottsdale for nitrate. Calculated interval nitrate concentrations are summarized in **Table 2** and are relatively consistent with depth. Wellhead concentrations of nitrate are slightly higher than any depth-specific sample concentration within the well. Nitrate concentrations with depth during pumping and non-pumping conditions are almost identical (**Figure 4**). Any slight differences seen in nitrate concentrations with depth are likely within the margin of error of the survey and laboratory analysis methods.

Nitrate concentrations have a more uniform distribution with depth in 2022 when compared with 2011 concentrations (**Figure 4**). Nitrate concentrations near the top of the perforated interval are similar between 2022 and 2011. Concentrations decrease with depth in 2011 while remaining about the same in 2022. Wellhead nitrate concentrations are slightly higher in 2022 than in 2011, with concentrations of 6.3 and 5.4 mg/L, respectively. In both investigations, concentrations of nitrate in all samples collected did not exceed the MCL.

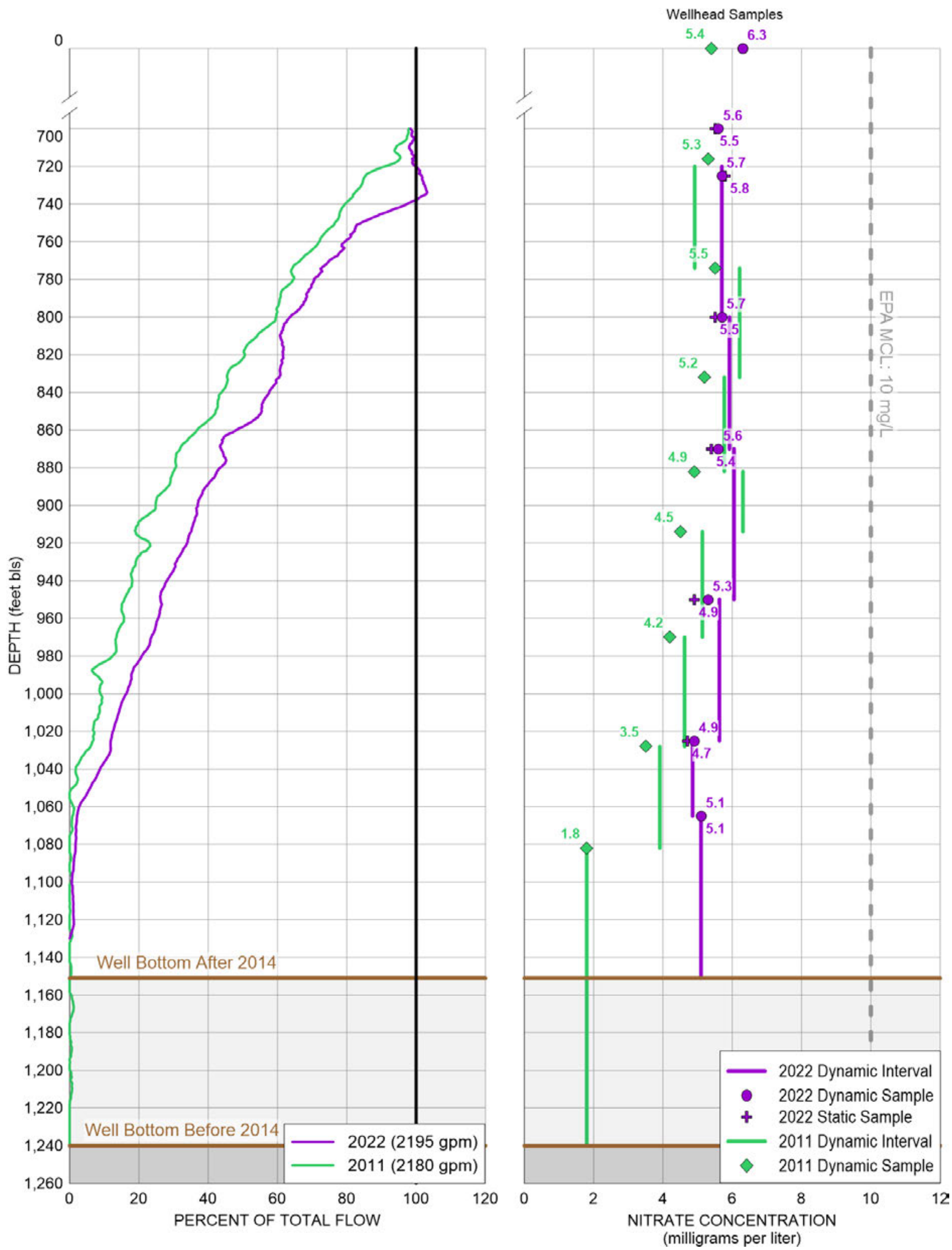


Figure 4. Nitrate Concentration and Percent of Total Flow with Depth for
2011 and 2022 Fluid-Movement Investigations During Pumping

Arsenic

Arsenic concentrations in all but one depth interval during the 2022 investigation are below the MCL of 0.010 mg/L, however, most of the concentrations are greater than 50% of the respective MCL, the designated alert level for the City of Scottsdale for arsenic (**Figure 5**). Calculated interval arsenic concentrations are summarized in **Table 2** and do not vary significantly with depth. Wellhead concentration of arsenic is slightly higher than sample concentrations at 700 and 725 feet bls and closer to concentrations near the bottom of the well. During non-pumping conditions, arsenic concentrations are slightly higher at every depth sampled except the sample collected at 1,065 feet bls. The sample collected at 1,025 feet bls during non-pumping conditions had a concentration of 0.0109 mg/L, the only sample which exceeded the MCL.

Arsenic concentrations have a more uniform distribution with depth in 2022 when compared with 2011 concentrations (**Figure 5**). Arsenic concentrations at the wellhead and near the top of the perforated interval are similar between 2022 and 2011, but opposite from nitrate, increase with depth in 2011 while remaining about the same in 2022. In both investigations, wellhead samples of arsenic did not exceed the MCL.

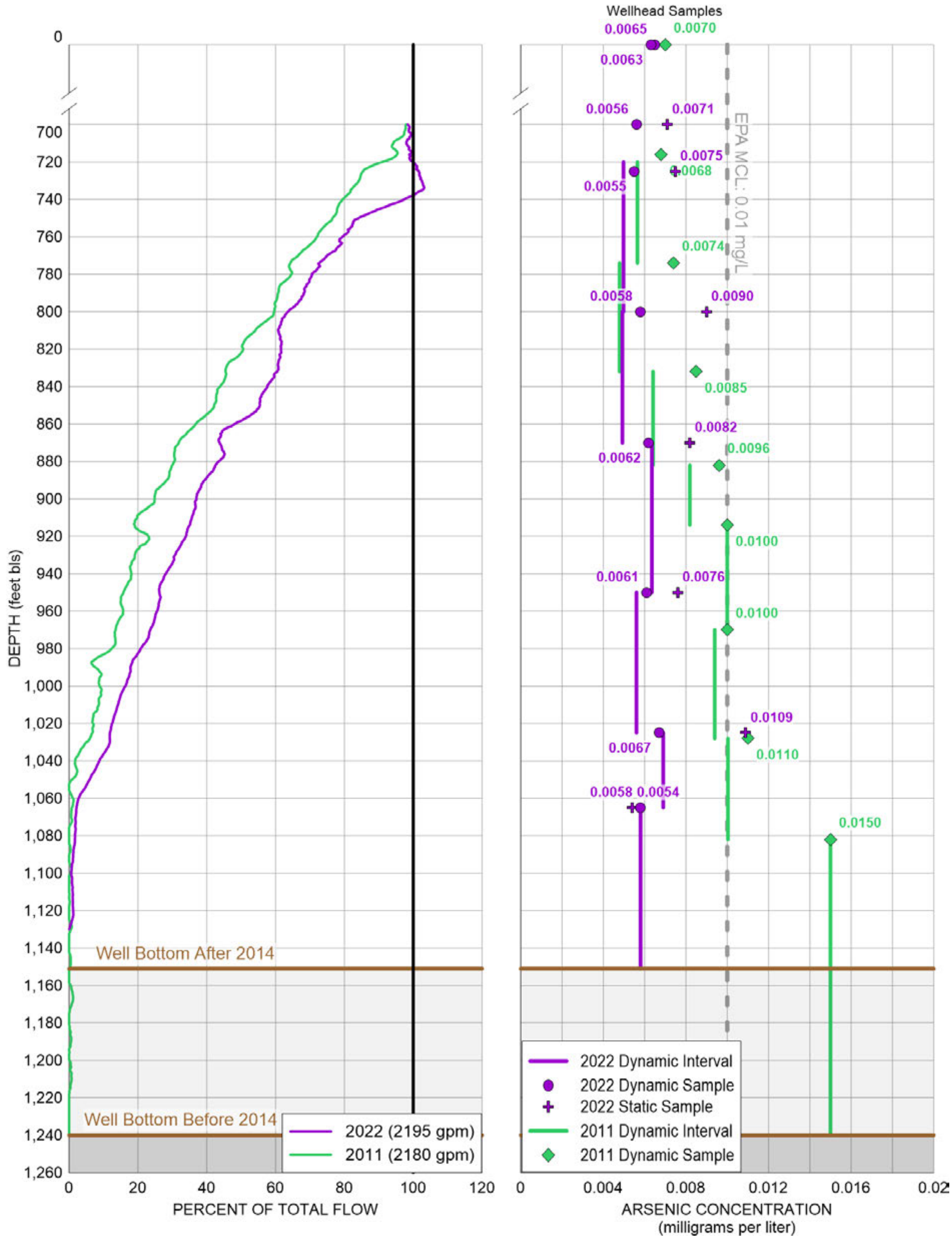


Figure 5. Arsenic Concentration and Percent of Total Flow with Depth for
2011 and 2022 Fluid-Movement Investigations During Pumping

Total Dissolved Solids

TDS concentrations are above the secondary drinking water standard in all depth intervals and wellhead samples (**Figure 6**). Calculated interval TDS concentrations are summarized in **Table 2** and do not vary significantly with depth except for the uppermost interval from 720 to 800 feet bls and the interval from 870 to 950 feet bls. TDS concentration in the uppermost interval is approximately 300 mg/L higher than other intervals. Wellhead TDS concentration is relatively consistent with depth-specific sample concentrations except the samples collected at 700 and 725 feet bls. The sample collected at 700 feet bls had a RPD that exceeded the laboratory method acceptance limit and is likely biased high. However, the sample collected at 725 feet bls, is also elevated compared to the wellhead sample concentration. The high calculated TDS concentration of the uppermost interval is a result of this elevated value. During non-pumping conditions, TDS concentrations are fairly stable throughout the water column with the exception of the bottom most intervals (1,025 feet bls, representing the minimum concentration, and 1,065 feet bls, representing the maximum concentration). TDS concentrations are also generally lower during non-pumping conditions except for samples collected at 950 and 1,065 feet bls.

TDS concentration with depth has a more uniform distribution in 2022 compared with 2011 (**Figure 6**). TDS concentrations are higher in the upper portion of the perforated interval and lower in the lower portion of the perforated interval in 2011. Wellhead TDS concentrations are higher in 2011 compared with 2022.

Iron and Manganese

Iron concentrations in all depth intervals and manganese concentrations in a few depth intervals are above their secondary MCLs. However, iron and manganese were not detected in wellhead samples. These high concentrations in the depth-specific samples are likely a result of the sampling and lab methodology (i.e., total metals). Turbidity values follow the same trend as iron and manganese concentrations, which may indicate iron and manganese are coming from suspended solids in the sample. Consequently, the total iron and manganese concentrations reported in 2022 may not be representative of groundwater concentrations within the aquifer.

Iron and manganese concentrations in 2011 were non-detect in all wellhead and depth-specific samples except for the sample collected at 1,082 feet bls which had a manganese concentration of 0.011 mg/L, below the secondary MCL for manganese.

Figure 6. TDS Concentration and Percent of Total Flow with Depth for 2011 and 2022 Fluid-Movement Investigations During Pumping

Comparison with Nearby Wells

Monitor well PG-2LA is approximately 80 feet to the southeast of PCX-1 and is perforated from 561 to 509 feet above mean sea level (amsl) (50-foot screen). PCX-1 is perforated from 559 to 128 feet amsl (431-foot screen). **Figure 7** shows the perforated interval of wells near PCX-1 along a north-south section. PG-2LA is hydraulically upgradient from PCX-1. The most recent sample collected at PG-2LA on October 25, 2022, had a TCE concentration of 81 µg/L (**Figure 8**). The calculated TCE concentration in 2022 for the uppermost interval of PCX-1 (559 to 479 feet amsl) was 43 µg/L. TCE concentrations in these wells have generally been similar throughout the period of record with a few exceptions (**Figure 8**). Between 2007 and 2010 the TCE concentration in PG-2LA increased to a high of 110 µg/L, while the concentration in extraction well PCX-1 stayed relatively stable (between 60 to 74 µg/L). Subsequently, the TCE concentration in PG-2LA declined to below the level reported in PCX-1 and remained stable until 2018, when it exceeded the TCE concentration in PCX-1. Since then, TCE has exhibited an increasing trend in PG-2LA, while the concentration at extraction well PCX-1 has declined.

PCX-1 has a 431-foot-long screen which results in the vertical mixing and dilution from deeper relatively lower TCE concentration zones of the LAU whereas the shorter screen at PG-2LA represents a more discrete interval. Additionally, the upper LAU is known to have higher horizontal hydraulic conductivity and higher concentrations of TCE. However, this does not fully explain the divergence observed in TCE in these close-proximity wells. Continued monitoring of trends in TCE concentration at PCX-1 and PG-2LA may provide an explanation of this divergence in the future.

Monitor well PA-6LA is about 3,600 feet southeast of PCX-1 and is perforated from 533 to 483 feet amsl (**Figure 7**). PA-6LA is hydraulically upgradient from PCX-1. TCE concentrations in PA-6LA are currently lower than those in PCX-1 but have historically been much higher (**Figure 8**). By remedial design, the center of mass of the plume is migrating north from PA-6LA (concentrations have declined significantly in this upgradient well), towards PG-2LA and PCX-1.

Monitor well PG-40LA is approximately 1,800 feet north of PCX-1 and has a 500-foot long screen perforated from 375 feet above msl to 125 feet below msl (**Figure 7**). PG-40LA is hydraulically downgradient from PCX-1. TCE concentrations in PG-40LA have been consistently lower than concentrations in PCX-1 and have exhibited similar trends (**Figure 8**).

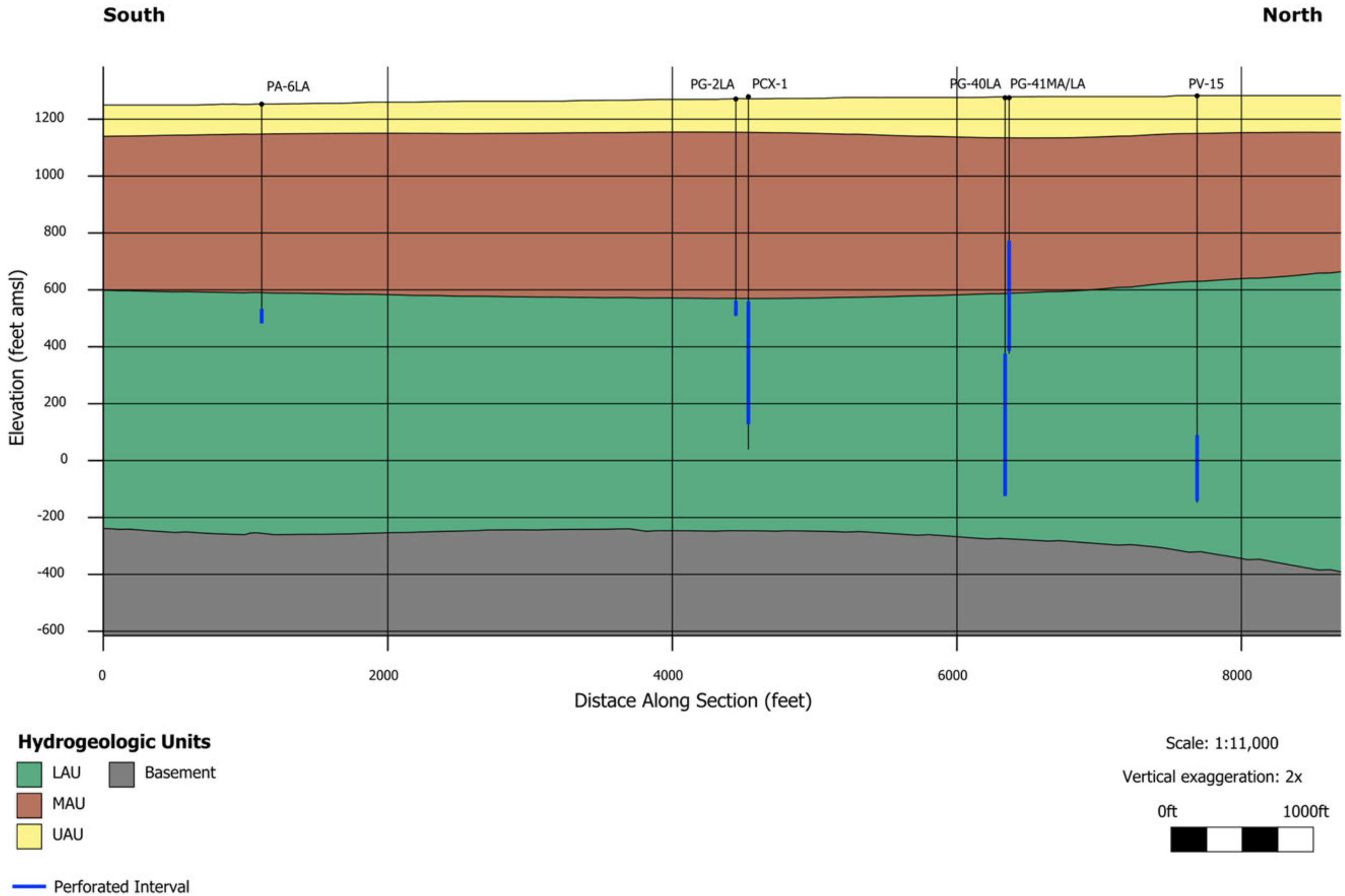


Figure 7. Cross Section through Wells near PCX-1

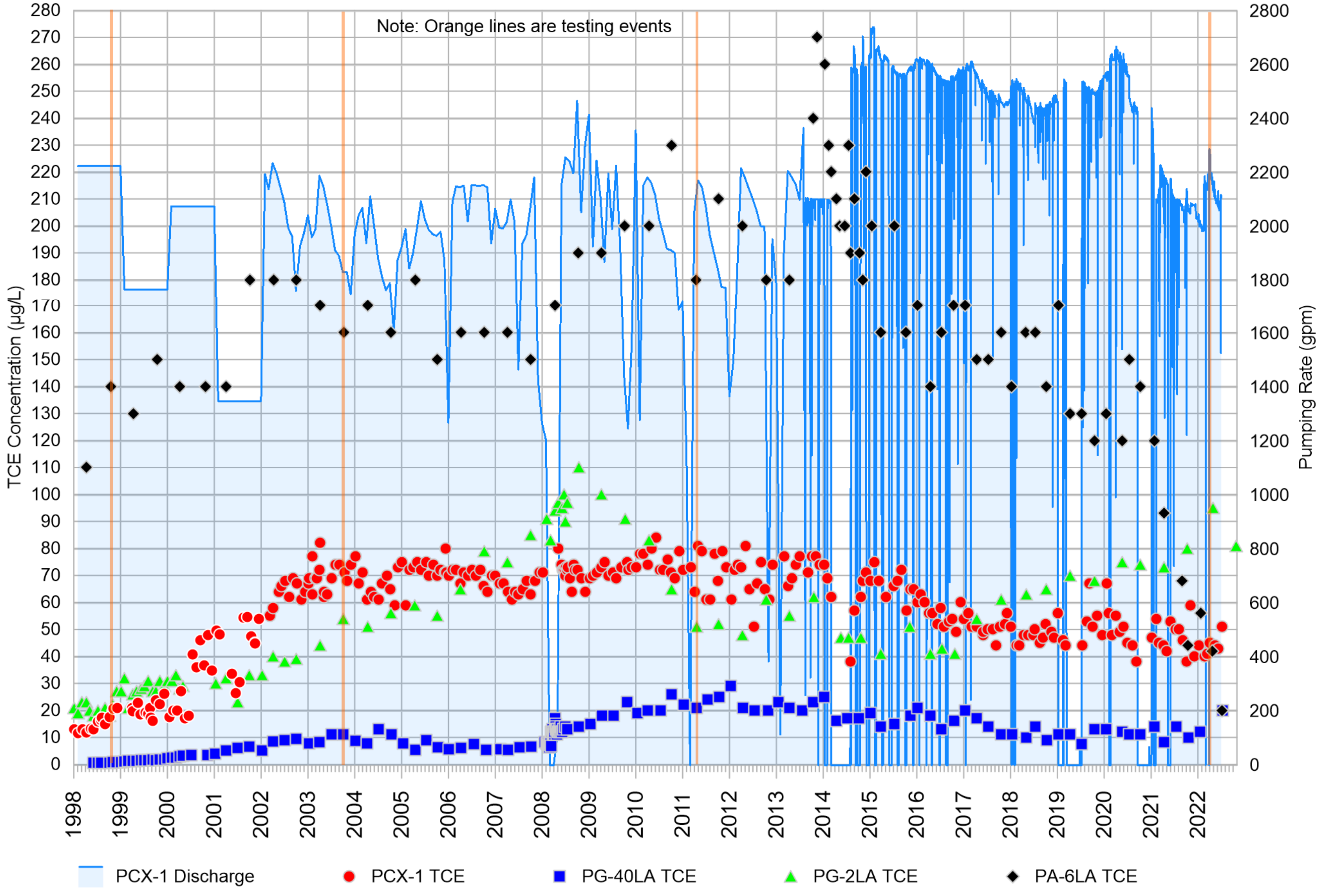


Figure 8. Pumping Rate and TCE Concentration at PCX-1 and Nearby Monitoring Wells Since 1998

SUMMARY AND CONCLUSIONS

Fluid-movement investigations including spinner-flowmeter surveys and depth-specific sampling during pumping and non-pumping conditions were completed at PCX-1 in March 2022. Spinner-flowmeter surveys while pumping showed most inflow from about 1,065 feet bls to the top of the perforated interval at 720 feet bls. Similar to prior investigations, depth-specific sampling during pumping conditions showed TCE concentration generally decreases with depth. However, there is not as much variation in TCE concentration with depth in comparison to past investigations, most notably the investigation conducted in 2011. This investigation showed TCE concentrations have decreased in most depth intervals except the lowermost interval, which may indicate the plume is becoming more vertically homogeneous over time as mass migrates from the western margin to extraction at well PCX-1. Spinner-flowmeter surveys during non-pumping conditions showed no measurable vertical flow within the well. However, differences in arsenic, TCE, and TDS concentrations collected at the same depths between pumping and non-pumping conditions are likely indicative of some variation in flow, whether it be vertical (below the threshold of instrument detection), horizontal, or some combination of both.

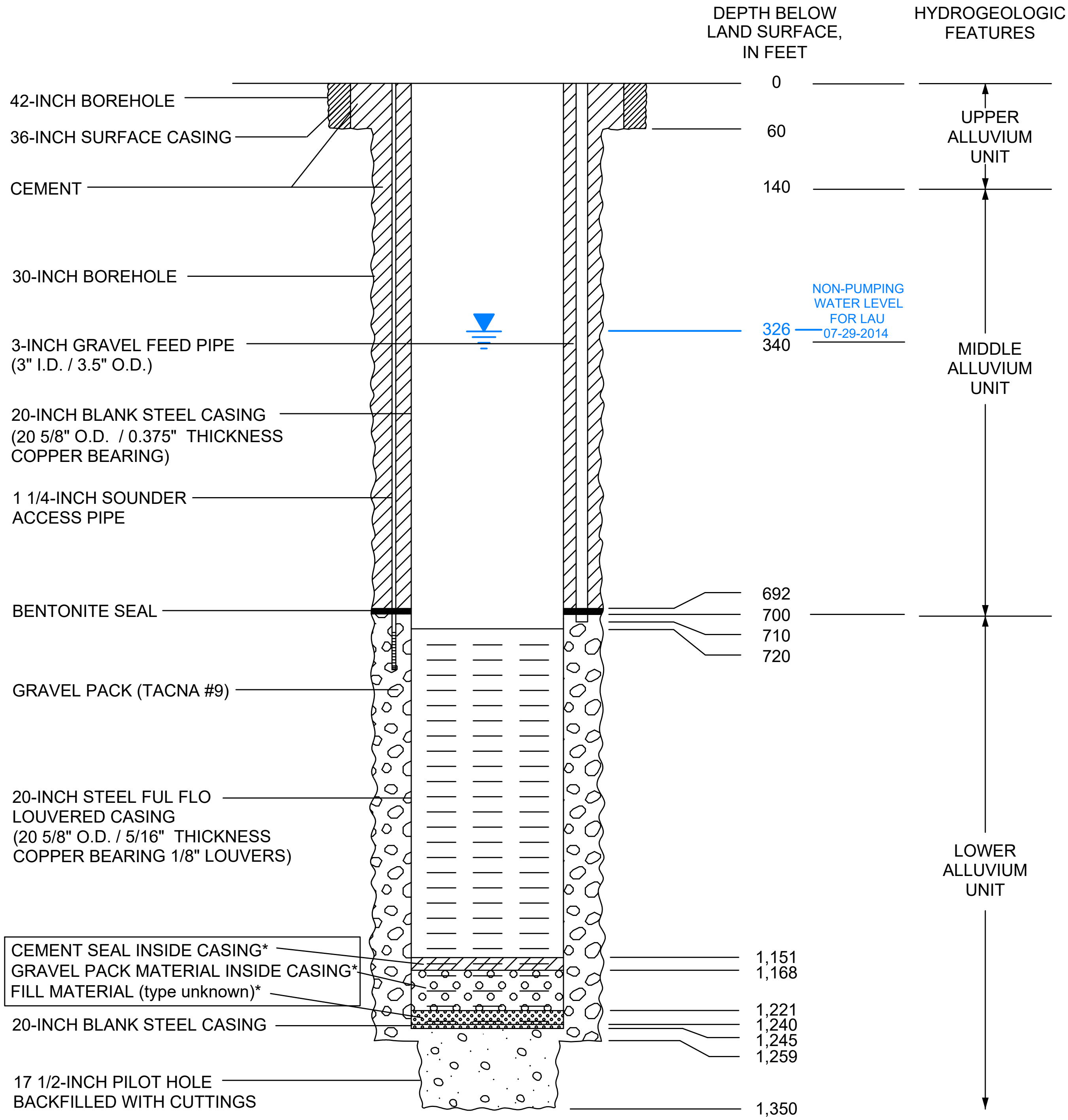
Similar to TCE, concentrations of arsenic, nitrate, and TDS show less variation with depth in 2022 compared to 2011. The 2022 investigations show there are no zones with significantly higher concentrations of arsenic and nitrate relative to other zones within the well during pumping conditions, so modification of the perforated interval will not reduce arsenic or nitrate concentrations.

Based on results of the 2022 fluid-movement investigations, the PCs recommend that similar investigations be conducted periodically to provide temporal documentation of depth-specific TCE concentrations within the screened interval of the LAU at PCX-1. These data will provide further vertical characterization of TCE in the region and are instrumental in updating the conceptual site model.

REFERENCES

North Indian Bend Wash Participating Companies, 2022. 2021 Site Monitoring Report North Indian Bend Wash Superfund Site, revised March 18, 2022.

APPENDIX A
PCX-1 WELL CONSTRUCTION DIAGRAM



* Information from Salt River Project and date reported:

TOP OF 20-INCH CASING (TOC) is 6.5 feet below land surface. Values below from SRP are adjusted by 6 feet to reference land surface rather than TOC.
CEMENT SEAL INSIDE CASING (1,151' to 1,168'; July 22, 2014)
GRAVEL PACK MATERIAL INSIDE CASING (1,168' to 1,221'; July 22, 2014)
(Source of gravel pack not determined)
FILL MATERIAL (type unknown) (1,221' to 1,245'; February 24, 2011)

FIGURE 11. SCHEMATIC DIAGRAM OF CONSTRUCTION FOR EXTRACTION WELL (A-2-4)14cda2 [PCX-1; 22.5E,9.3N]

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North Indian Bend Wash Superfund Site

APPENDIX B
PCX-1 GEOPHYSICAL LOGS

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	PCX-1		
FIELD	NIBW - SCOTTSDALE		
COUNTY	MARICOPA	STATE	ARIZONA

TYPE OF LOGS: SPINNER - DOWN
MORE: PUMPING 2200 GPM

OTHER SERVICES: NAT. GAMMA, CALIPER, SAMPLES

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-29-2022	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1,2	MUD WEIGHT	N/A
TYPE LOG	SPINNER-FTC	VISCOSITY	N/A
DEPTH-DRILLER	1151 FT	LEVEL	~ 396.5 FT
DEPTH-LOGGER	1152 FT	MAX. REC. TEMP.	36.47 DEG. C
BTM LOGGED INTERVAL	1130 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	390 FT	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	E. TURNER/ C. MORRISON	TOOL STRING/SN	QL SFM TOOL SN 5726
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:00 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	42 IN.	SURFACE	60 FT	36 IN.	STEEL	SURFACE	60 FT
2	30 IN.	60 FT	TOTAL DEPTH	20 IN.	STEEL	60 FT	TOTAL DEPTH
3							

COMMENTS: PUMP SET @ 566 FT. - DROP TUBE @ 590 FT. - PERFORATIONS FROM 720 FT TO TOTAL DEPTH

Tool Summary:

Date	3-29-2022	Date	3-29-2022	Date	
Run No.	1	Run No.	2	Run No.	3
Tool Model	QL COMBO TOOL	Tool Model	QL SPINNER	Tool Model	
Tool SN	6161	Tool SN	5726	Tool SN	
From	SURFACE	From	390 FT	From	
To	1152 FT	To	1130 FT	To	
Recorded By	E. TURNER	Recorded By	E. TURNER	Recorded By	
Truck No	200	Truck No	200	Truck No	
Operation Check	3-23-2022	Operation Check	3-23-2022	Operation Check	
Calibration Check	3-23-2022	Calibration Check	N/A	Calibration Check	
Time Logged	7:45 AM	Time Logged	8:25 AM	Time Logged	

Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

Additional Comments:

Caliper Arms Used: 27 IN. Calibration Points: 12 IN. & 36 IN.

E-Log Calibration Range: N/A Calibration Points: N/A

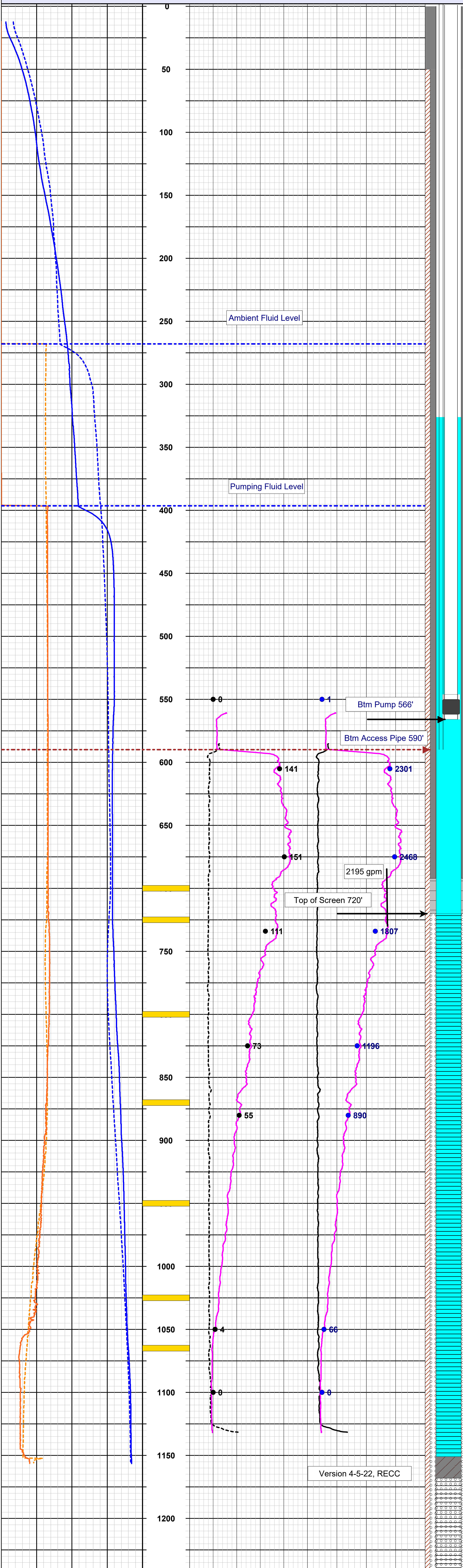
Disclaimer:

All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Track	Curve	Condition	Scale
1	Temperature-Amb	Ambient Flow	18 – 38 Deg C
1	Fluid Conductivity-Amb	Ambient Flow	0 – 5000 uS/cm
1	Temperature-Dyn	Pumping ~2200 gom	18 – 38 Deg C
1	Fluid Conductivity-Dyn	Pumping ~2200 gom	0 – 5000 uS/cm
Depth	Depth 1in:50ft	Discrete Interval x 1.5 L Sampler	0 L 2
2	Avg Net Vel Trolling Up	Ambient Flow	-50 – 200 fpm
2	Avg Flow Vel Trolling Dn	Pumping ~2200 gpm	-50 – 200 fpm
2	Stop Cnts	Pumping ~2200 gpm	-50 – 200 fpm
3	Ambient Flow		-500 – 3500 gpm
3	Pumping Flow		-500 – 3500 gpm
3	Station Flow	Pumping ~2200 gpm	-500 – 3500 gpm

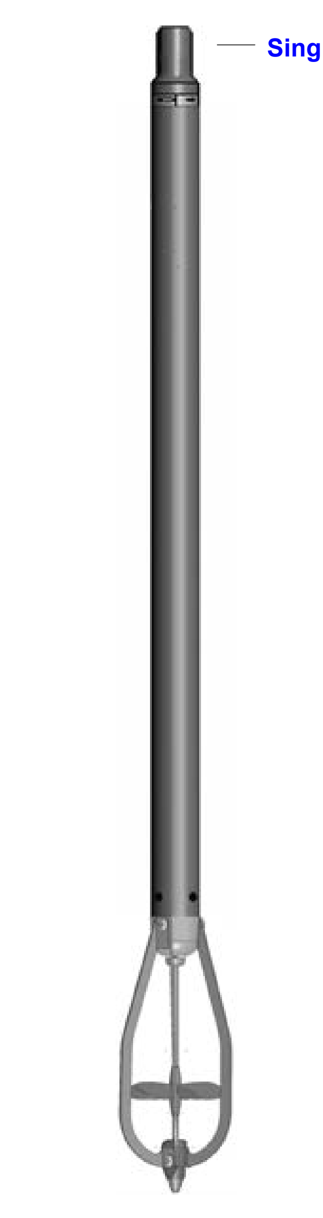
PCX-1

Well PCX-1 Net Flow Summary_3-31-22



MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diameter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

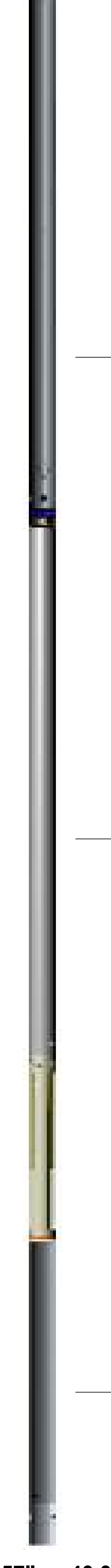
Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587



Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)
Pressure Rating: 200 bar (2900 psi)

Available Arm Sizes: 3", 9", and 15"

1.57" or 40.0 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	PCX-1
Field	NIBW - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Final **NET FLOW SUMMARY**

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	PCX-1		
FIELD	NIBW - SCOTTSDALE		
COUNTY	MARICOPA	STATE	ARIZONA
TYPE OF LOGS: SPINNER - DOWN		OTHER SERVICES	
MORE: PUMPING 2200 GPM		NAT. GAMMA CALIPER SAMPLES	
LOCATION			
SEC	TWP	RGE	
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.
DATE	3-29-2022	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1,2	MUD WEIGHT	N/A
TYPE LOG	SPINNER-FTC	VISCOSITY	N/A
DEPTH-DRILLER	1151 FT	LEVEL	~ 396.5 FT
DEPTH-LOGGER	1152 FT	MAX. REC. TEMP.	36.47 DEG. C
BTM LOGGED INTERVAL	1130 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	390 FT	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	E. TURNER/ C. MORRISON	TOOL STRING/SN	QL SFM TOOL SN 5726
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:00 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	42 IN.	SURFACE	60 FT	36 IN.	STEEL	SURFACE	60 FT
2	30 IN.	60 FT	TOTAL DEPTH	20 IN.	STEEL	60 FT	TOTAL DEPTH
3							

COMMENTS: PUMP SET @ 566 FT. - DROP TUBE @ 590 FT. - PERFORATIONS FROM 720 FT TO TOTAL DEPTH

Tool Summary:

Date	3-29-2022	Date	3-29-2022	Date	
Run No.	1	Run No.	2	Run No.	3
Tool Model	QL COMBO TOOL	Tool Model	QL SPINNER	Tool Model	
Tool SN	6161	Tool SN	5726	Tool SN	
From	SURFACE	From	390 FT	From	
To	1152 FT	To	1130 FT	To	
Recorded By	E. TURNER	Recorded By	E. TURNER	Recorded By	
Truck No	200	Truck No	200	Truck No	
Operation Check	3-23-2022	Operation Check	3-23-2022	Operation Check	
Calibration Check	3-23-2022	Calibration Check	N/A	Calibration Check	
Time Logged	7:45 AM	Time Logged	8:25 AM	Time Logged	

Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

Additional Comments:

Caliper Arms Used: 27 IN. **Calibration Points:** 12 IN. & 36 IN.

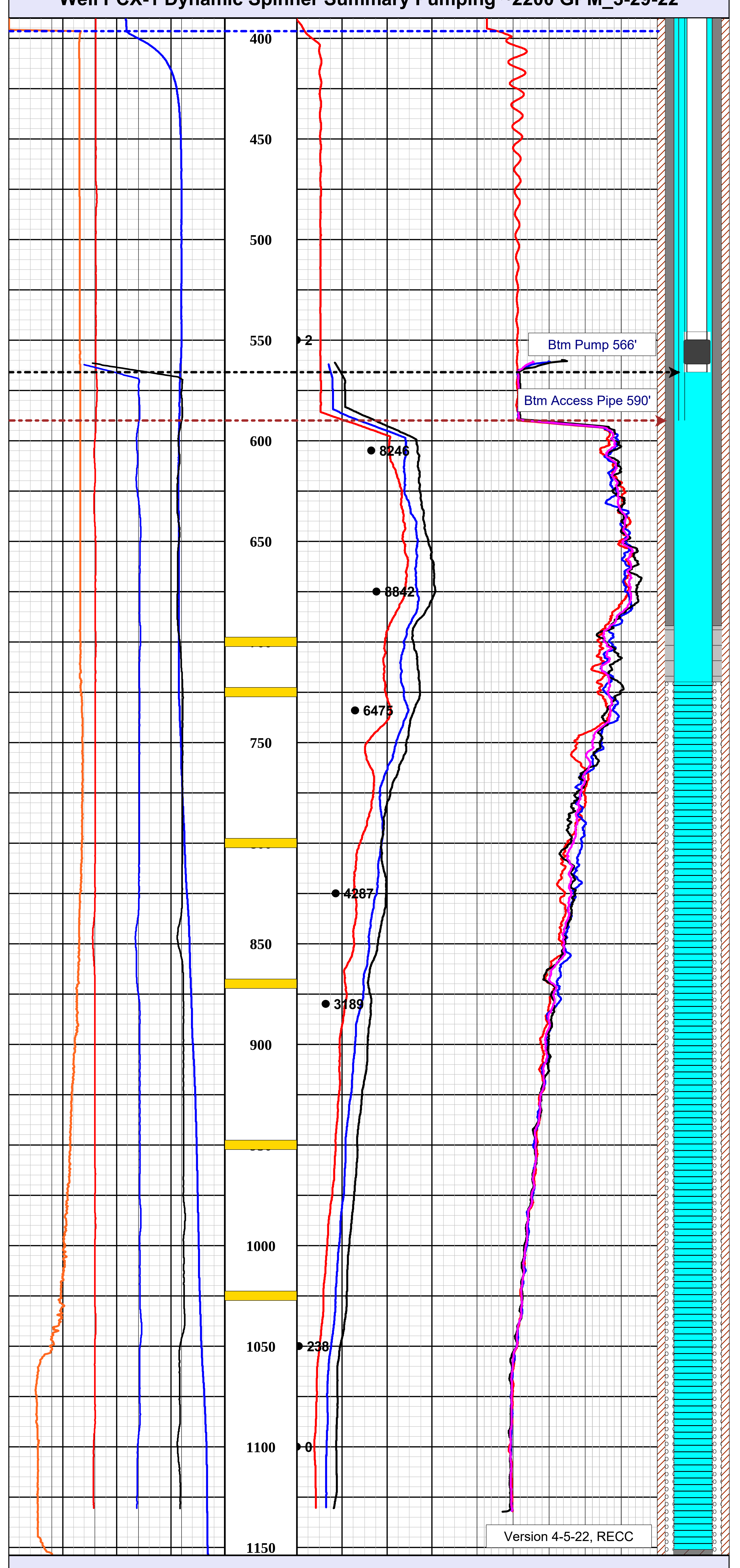
E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

Temperature	Depth	Spinner 40 Dn	Flow Velocity 40 Dn	PCX-1
18 Deg C 38	1in:50ft	0 cps 20000	-50 fpm 200	
Fluid Conductivity	Discrete Interval x 1.5 L Sampler	Spinner 60 DN	Flow Velocityl 60 Dn	
0 uS/cm 5000		0 cps 20000	-50 fpm 200	
Speed 40 DN		Spinner 80 Dn	Flow Velocity 80 Dn	
0 ft/min 100		0 cps 20000	-50 fpm 200	
Speed 60 DN		Stop Counts	Avg Flow Vel Trolling Dn	
0 ft/min 100	0 L 2	0 cps 20000	-50 fpm 200	
Speed 80 DN				
0 ft/min 100				

Well PCX-1 Dynamic Spinner Summary Pumping ~2200 GPM_3-29-22

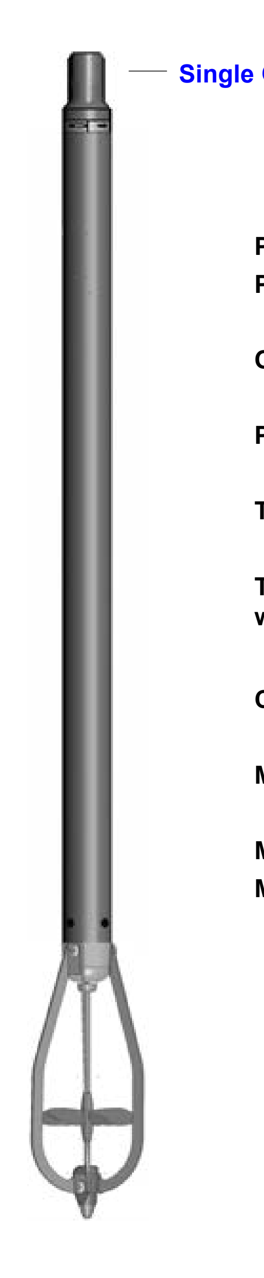


Well PCX-1 Dynamic Spinner Summary Pumping ~2200 GPM_3-29-22

Speed 80 DN				
0 ft/min 100				
Speed 60 DN	0 L 2	Stop Counts	Avg Flow Vel Trolling Dn	
0 ft/min 100		0 cps 20000	-50 fpm 200	
Speed 40 DN		Spinner 80 Dn	Flow Velocity 80 Dn	
0 uS/cm 5000	Discrete Interval x 1.5 L Sampler	0 cps 20000	-50 fpm 200	
Fluid Conductivity		Spinner 60 DN	Flow Velocityl 60 Dn	
18 Deg C 38	1in:50ft	0 cps 20000	-50 fpm 200	PCX-1
Temperature	Depth	Spinner 40 Dn	Flow Velocity 40 Dn	

MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

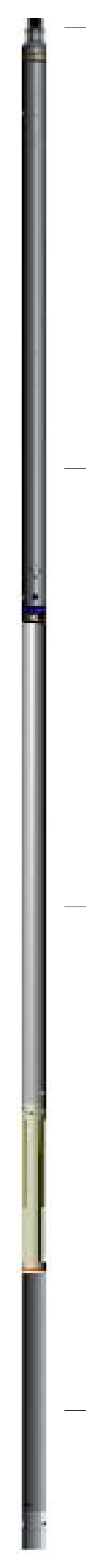
Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587



Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 1.07 m (42.12 in)

3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	PCX-1
Field	NIBW - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Final **DYNAMIC SPINNER (DOWN) SUMMARY**

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES
WELL ID	PCX-1
FIELD	NIBW - SCOTTSDALE
COUNTY	MARICOPA
STATE	ARIZONA

TYPE OF LOGS: SPINNER - DOWN
MORE: PUMPING 2200 GPM

LOCATION

SEC TWP RGE

OTHER SERVICES
NAT. GAMMA
CALIPER
SAMPLES

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-29-2022	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1,2	MUD WEIGHT	N/A
TYPE LOG	SPINNER-FTC	VISCOSITY	N/A
DEPTH-DRILLER	1151 FT	LEVEL	~ 396.5 FT
DEPTH-LOGGER	1152 FT	MAX. REC. TEMP.	36.47 DEG. C
BTM LOGGED INTERVAL	1130 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	390 FT	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	E. TURNER/ C. MORRISON	TOOL STRING/SN	QL SFM TOOL SN 5726
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:00 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	42 IN.	SURFACE	60 FT	36 IN.	STEEL	SURFACE	60 FT
2	30 IN.	60 FT	TOTAL DEPTH	20 IN.	STEEL	60 FT	TOTAL DEPTH
3							

COMMENTS: PUMP SET @ 566 FT. - DROP TUBE @ 590 FT. - PERFORATIONS FROM 720 FT TO TOTAL DEPTH

Tool Summary:

Date	3-29-2022	**Date**	3-29-2022	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	
Tool SN	6161	**Tool SN**	5726	**Tool SN**	
From	SURFACE	**From**	390 FT	**From**	
To	1152 FT	**To**	1130 FT	**To**	
Recorded By	E. TURNER	**Recorded By**	E. TURNER	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	3-23-2022	**Operation Check**	3-23-2022	**Operation Check**	
Calibration Check	3-23-2022	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	7:45 AM	**Time Logged**	8:25 AM	**Time Logged**	

Date		**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model		**Tool Model**		**Tool Model**	
Tool SN		**Tool SN**		**Tool SN**	
From		**From**		**From**	
To		**To**		**To**	
Recorded By		**Recorded By**		**Recorded By**	
Truck No		**Truck No**		**Truck No**	
Operation Check		**Operation Check**		**Operation Check**	
Calibration Check		**Calibration Check**		**Calibration Check**	
Time Logged		**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 27 IN. **Calibration Points:** 12 IN. & 36 IN.

E-Log Calibration Range: N/A **Calibration Points:** N/A

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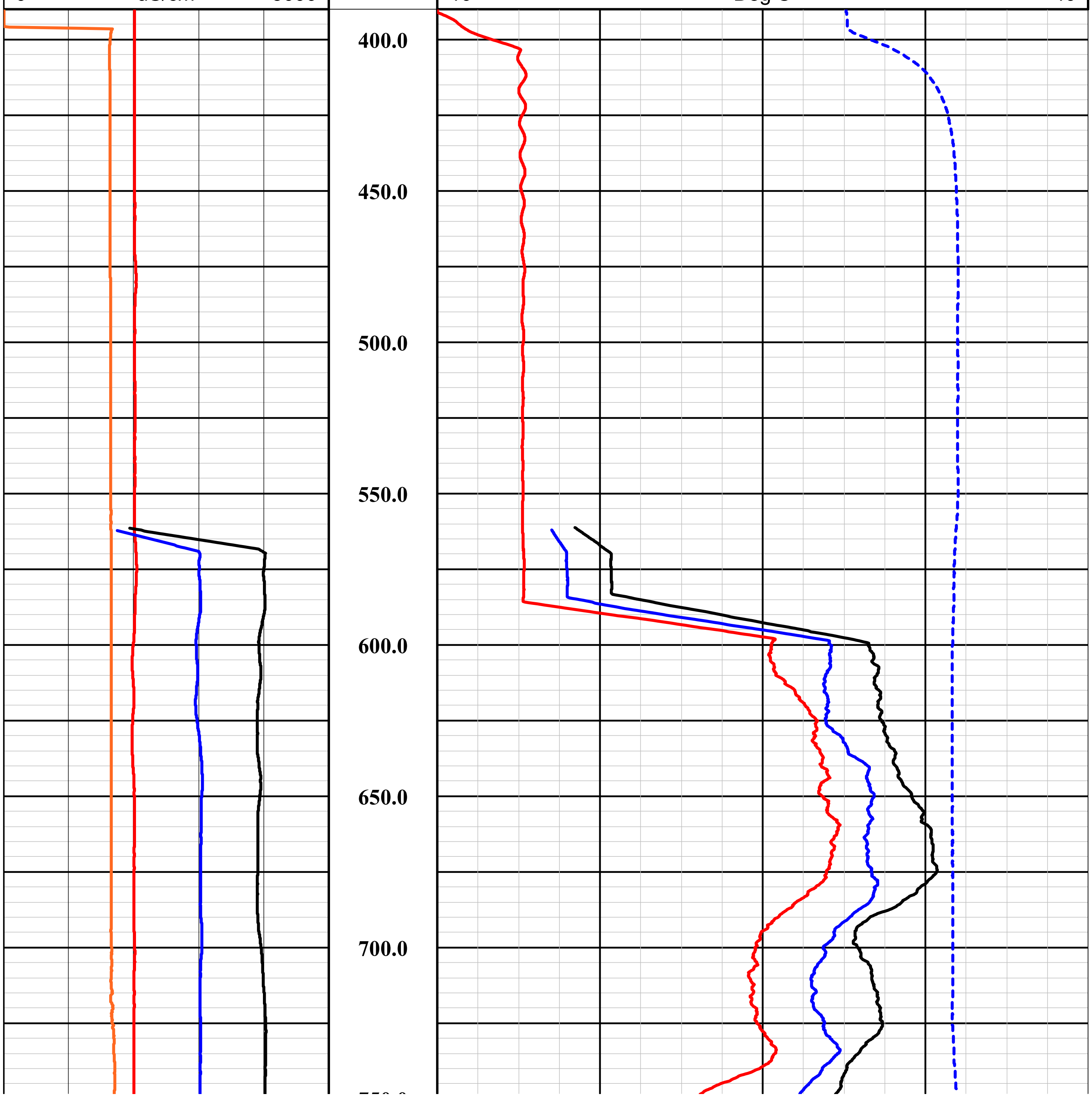
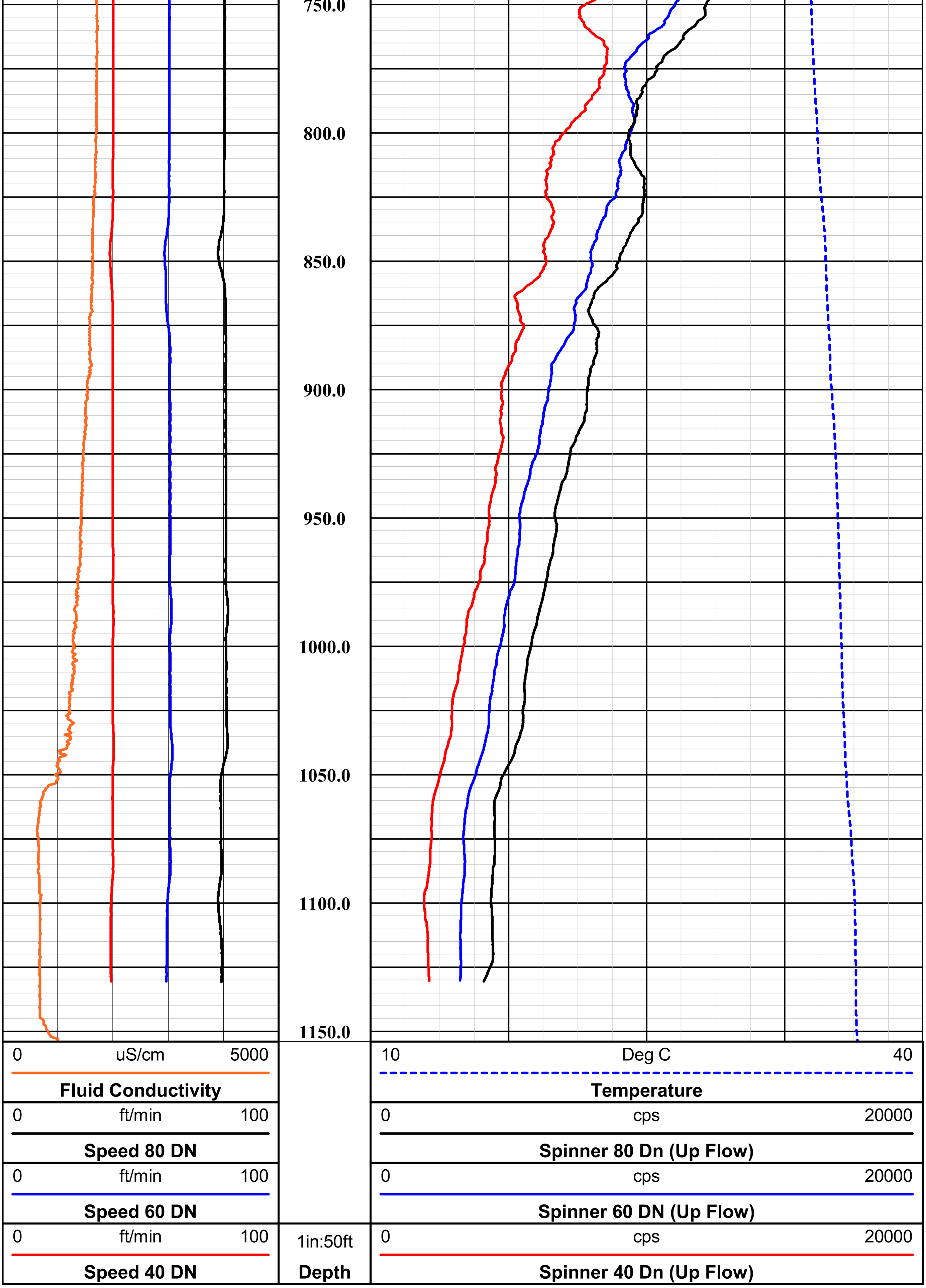
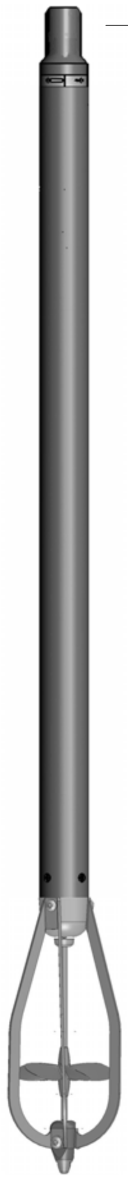
Speed 40 DN 0 ft/min 100	**Depth** 1in:50ft	**Spinner 40 Dn (Up Flow)** 0 cps 20000
Speed 60 DN 0 ft/min 100		**Spinner 60 DN (Up Flow)** 0 cps 20000
Speed 80 DN 0 ft/min 100		**Spinner 80 Dn (Up Flow)** 0 cps 20000
Fluid Conductivity 0 uS/cm 5000		**Temperature** 10 Deg C 40





MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

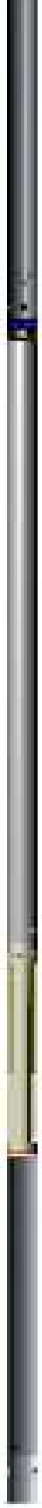
Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587

Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma can be collected logging up and down hole



Temperature Rating: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 1.07 m (42.12 in)

3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	PCX-1
Field	NIBW - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Preliminary **DYNAMIC SPINNER (DOWN) SUMMARY**

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	PCX-1		
FIELD	NIBW - SCOTTSDALE		
COUNTY	MARICOPA	STATE	ARIZONA

TYPE OF LOGS: SPINNER - UP
MORE: PUMPING 2200 GPM

LOCATION

OTHER SERVICES
NAT. GAMMA
CALIPER
SAMPLES

SEC　TWP　RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-29-2022	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1,2	MUD WEIGHT	N/A
TYPE LOG	SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	1151 FT	LEVEL	~ 396.5 FT
DEPTH-LOGGER	1152 FT	MAX. REC. TEMP.	36.47 DEG. C
BTM LOGGED INTERVAL	1130 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	390 FT	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	E. TURNER/ C. MORRISON	TOOL STRING/SN	QL SFM TOOL SN 5726
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:00 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	42 IN.	SURFACE	60 FT	36 IN.	STEEL	SURFACE	60 FT
2	30 IN.	60 FT	TOTAL DEPTH	20 IN.	STEEL	60 FT	TOTAL DEPTH
3							

COMMENTS: PUMP SET @ 566 FT. - DROP TUBE @ 590 FT. - PERFORATIONS FROM 720 FT TO TOTAL DEPTH

Tool Summary:

Date	3-29-2022	**Date**	3-29-2022	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	
Tool SN	6161	**Tool SN**	5726	**Tool SN**	
From	SURFACE	**From**	390 FT	**From**	
To	1152 FT	**To**	1130 FT	**To**	
Recorded By	E. TURNER	**Recorded By**	E. TURNER	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	3-23-2022	**Operation Check**	3-23-2022	**Operation Check**	
Calibration Check	3-23-2022	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	7:45 AM	**Time Logged**	8:25 AM	**Time Logged**	

Date		**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model		**Tool Model**		**Tool Model**	
Tool SN		**Tool SN**		**Tool SN**	
From		**From**		**From**	
To		**To**		**To**	
Recorded By		**Recorded By**		**Recorded By**	
Truck No		**Truck No**		**Truck No**	
Operation Check		**Operation Check**		**Operation Check**	
Calibration Check		**Calibration Check**		**Calibration Check**	
Time Logged		**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 27 IN.　**Calibration Points:** 12 IN. & 36 IN.

E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

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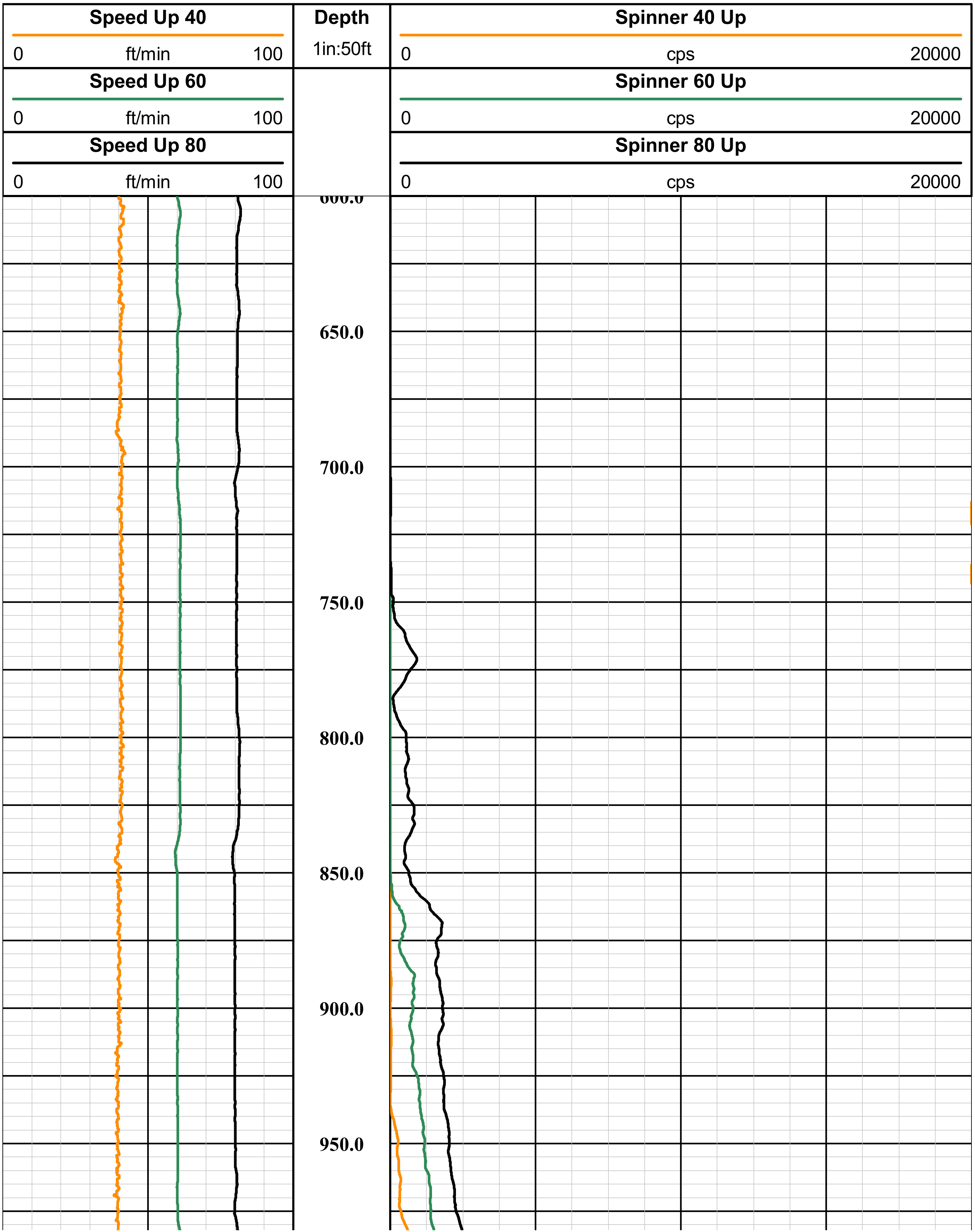

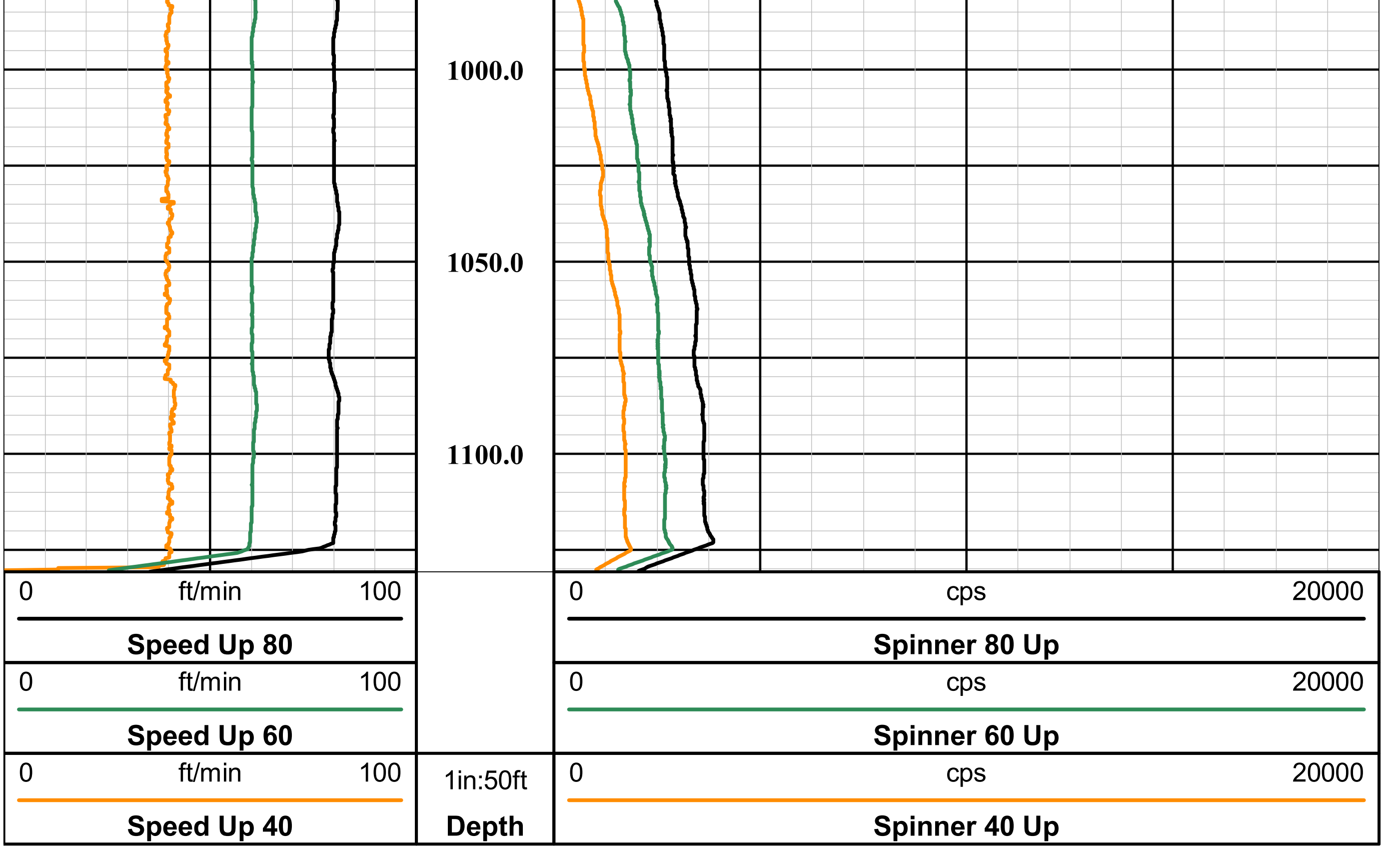

MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.

Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

Southwest Exploration Services, LLC borehole geophysics & video services	Company	MONTGOMERY & ASSOCIATES
	Well	PCX-1
	Field	NIBW - SCOTTSDALE
	County	MARICOPA
	State	ARIZONA

Preliminary **DYNAMIC SPINNER (UP) SUMMARY**

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	PCX-1		
FIELD	NIBW - SCOTTSDALE		
COUNTY	MARICOPA	STATE	ARIZONA

TYPE OF LOGS: GAMMA-CALIPER-FTC

MORE: PUMPING 2200 GPM

OTHER SERVICES
SPINNER
SAMPLES

LOCATION

SEC TWP RGE

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-29-2022	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAM-CAL-FTC	VISCOSITY	N/A
DEPTH-DRILLER	1151 FT	LEVEL	~ 396.5 FT
DEPTH-LOGGER	1152 FT	MAX. REC. TEMP.	36.47 DEG. C
BTM LOGGED INTERVAL	1152 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	E. TURNER/ C. MORRISON	TOOL STRING/SN	QL COMBO TOOL SN 6161
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:00 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	42 IN.	SURFACE	60 FT	36 IN.	STEEL	SURFACE	60 FT
2	30 IN.	60 FT	TOTAL DEPTH	20 IN.	STEEL	60 FT	TOTAL DEPTH
3							

COMMENTS: PUMP SET @ 566 FT. - DROP TUBE @ 590 FT. - PERFORATIONS FROM 720 FT TO TOTAL DEPTH

.

Tool Summary:

Date	3-29-2022	**Date**	3-29-2022	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	
Tool SN	6161	**Tool SN**	5726	**Tool SN**	
From	SURFACE	**From**	390 FT	**From**	
To	1152 FT	**To**	1130 FT	**To**	
Recorded By	E. TURNER	**Recorded By**	E. TURNER	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	3-23-2022	**Operation Check**	3-23-2022	**Operation Check**	
Calibration Check	3-23-2022	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	7:45 AM	**Time Logged**	8:25 AM	**Time Logged**	

Date		**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model		**Tool Model**		**Tool Model**	
Tool SN		**Tool SN**		**Tool SN**	
From		**From**		**From**	
To		**To**		**To**	
Recorded By		**Recorded By**		**Recorded By**	
Truck No		**Truck No**		**Truck No**	
Operation Check		**Operation Check**		**Operation Check**	
Calibration Check		**Calibration Check**		**Calibration Check**	
Time Logged		**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 27 IN. **Calibration Points:** 12 IN. & 36 IN.

E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

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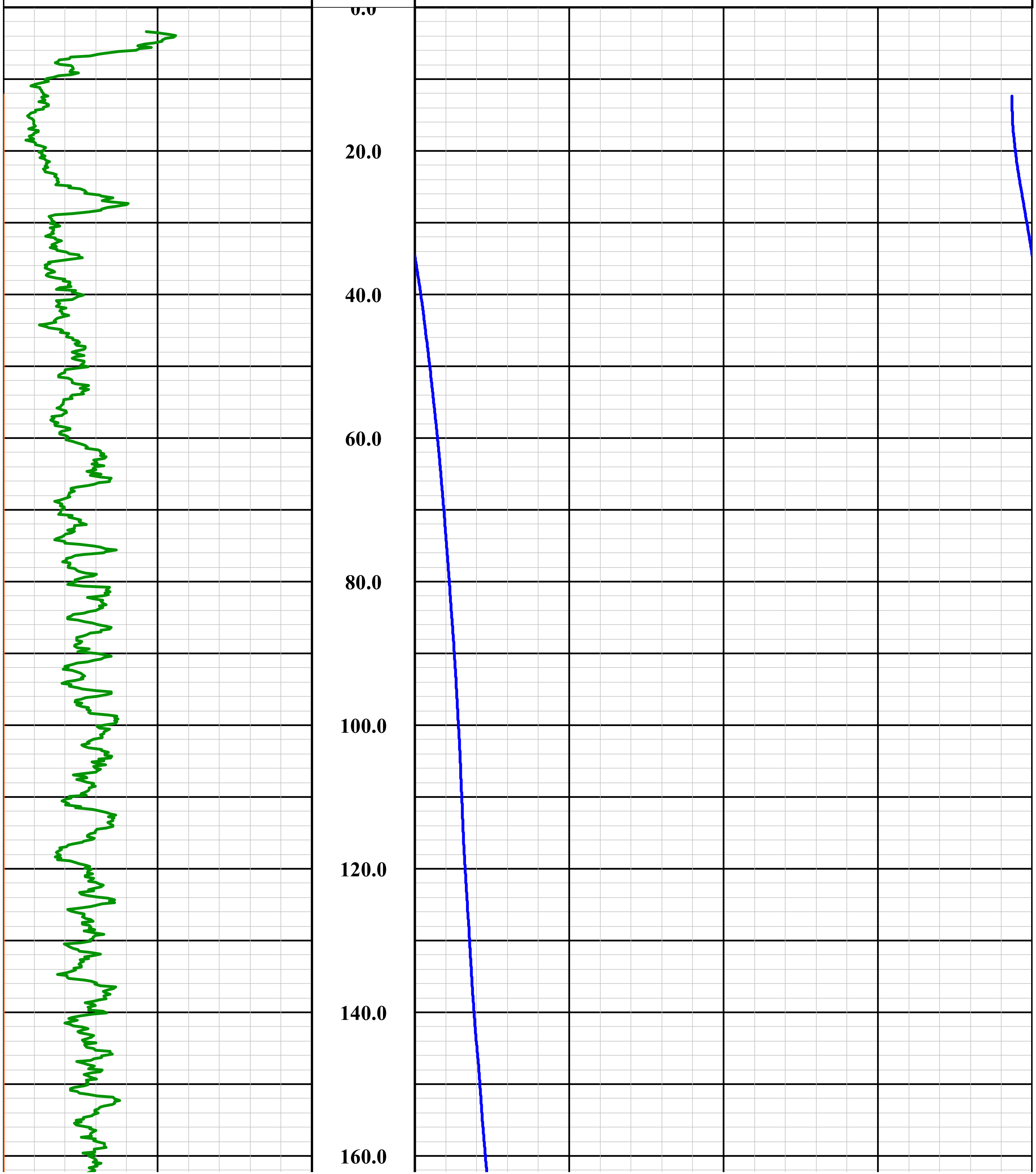
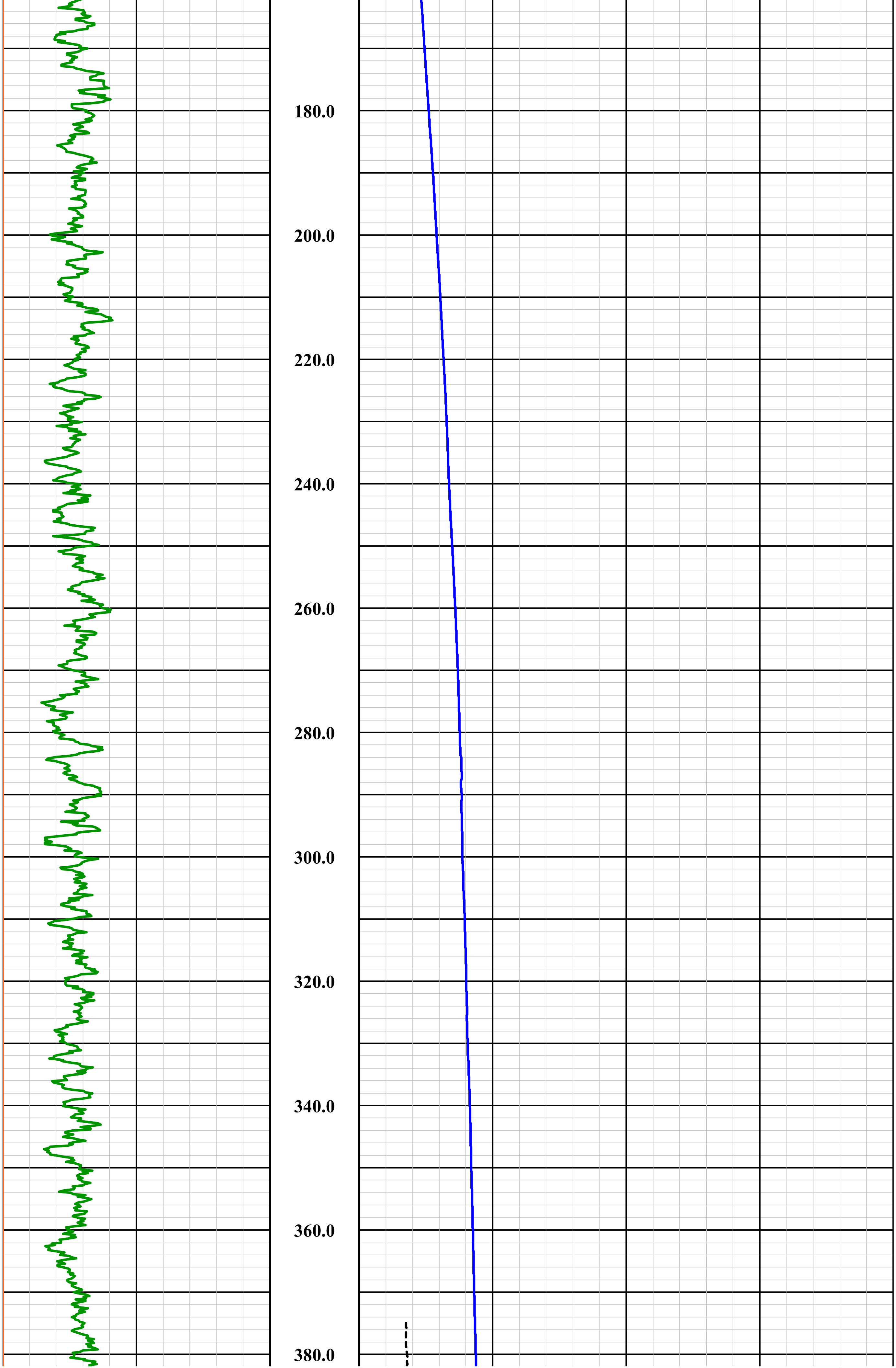
Nat. Gamma	Depth	Temperature
0 API 200	1in:20ft	20 Deg C 60
Fluid Conductivity		3-Arm Caliper
0 uS/cm 5000		0 in 30

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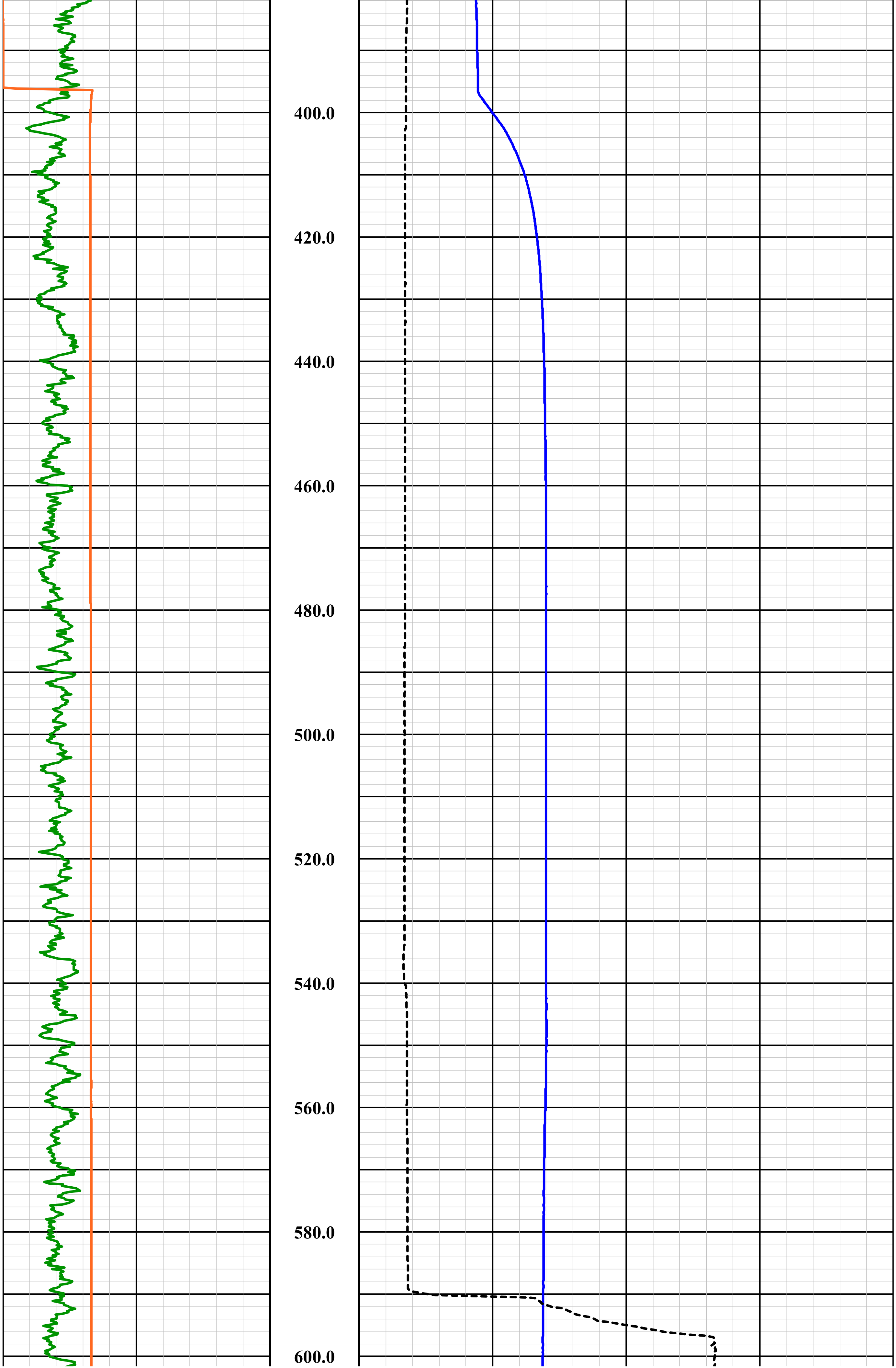
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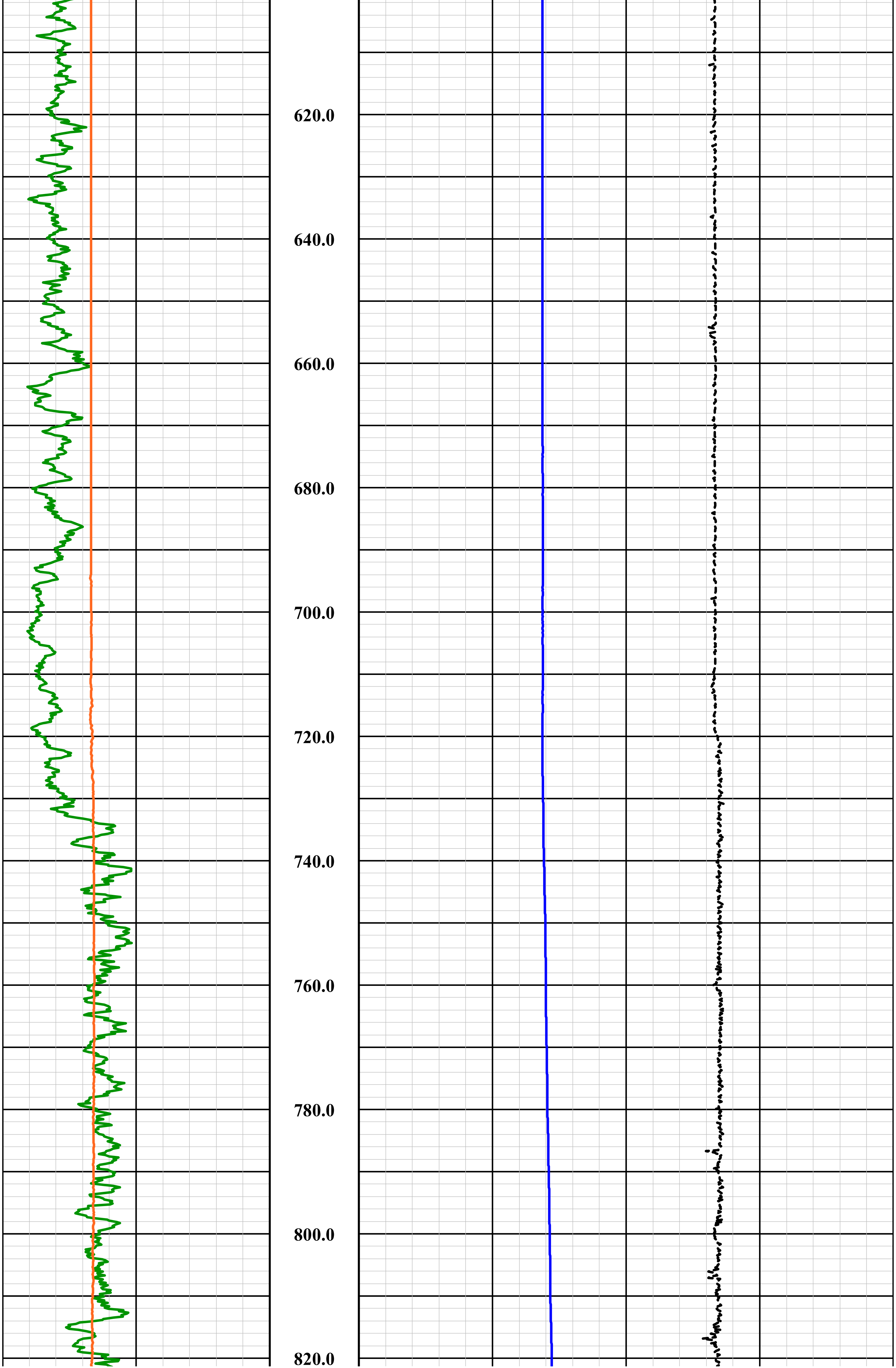
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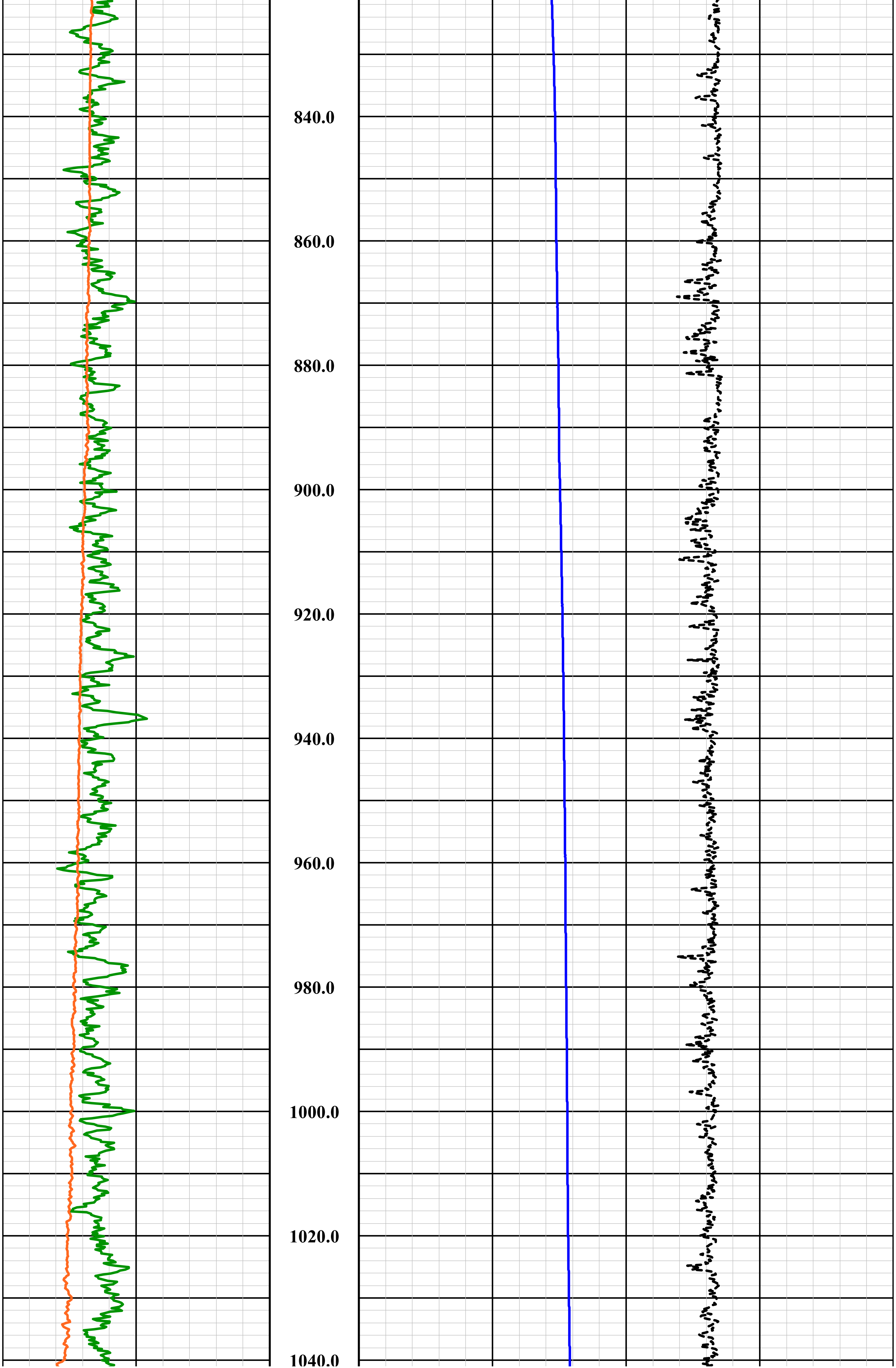
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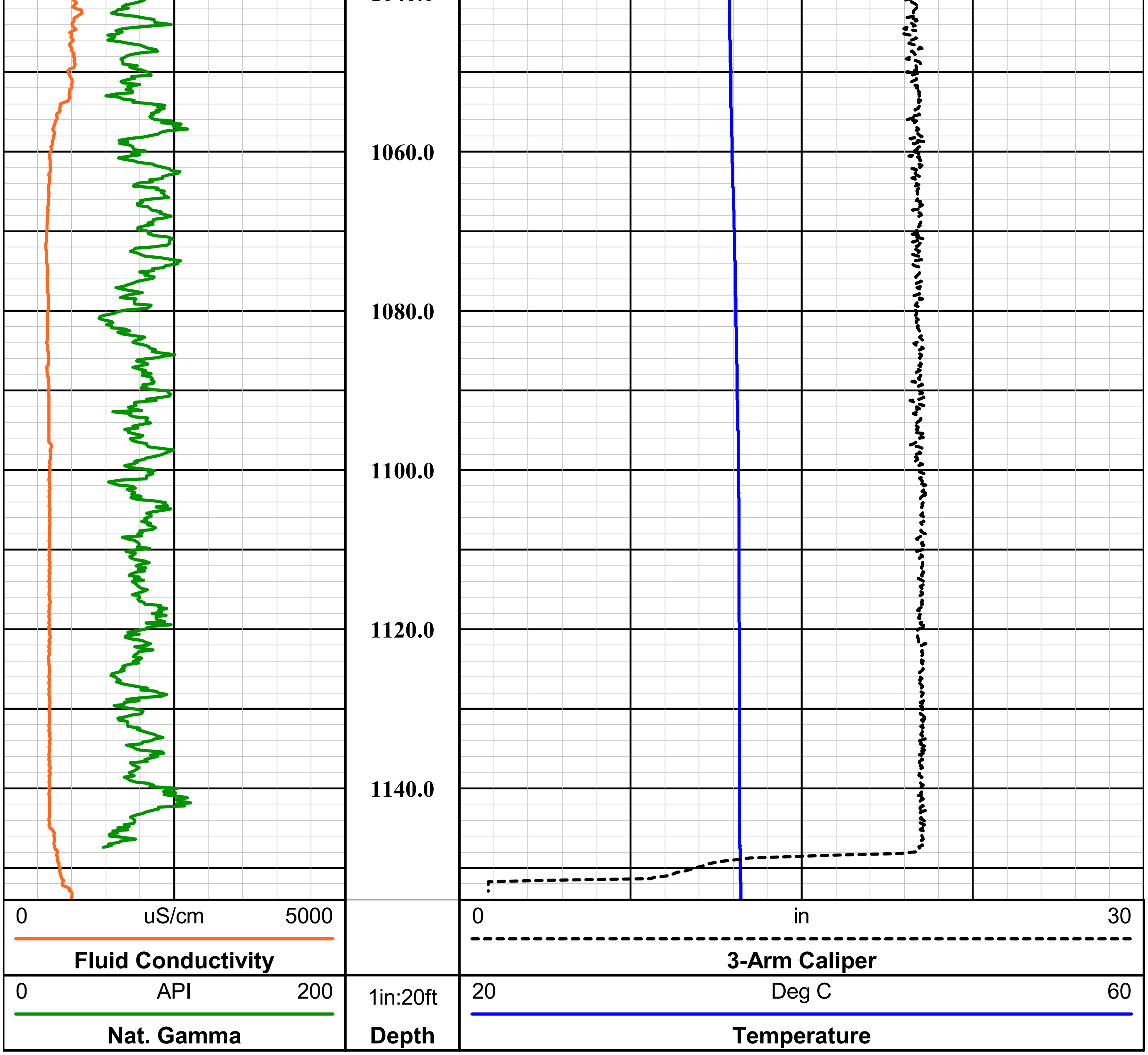
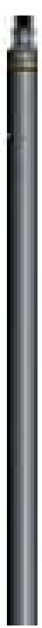


QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587



Four Conductor MSI Probe Top

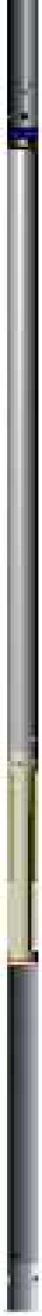
Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 1.07 m (42.12 in)



Southwest Exploration Services, LLC
borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	PCX-1
Field	NIBW - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Preliminary GCFTC SUMMARY

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	PCX-1		
FIELD	NIBW - SCOTTSDALE		
COUNTY	MARICOPA	STATE	ARIZONA
TYPE OF LOGS:	SPINNER - DOWN	OTHER SERVICES	NAT. GAMMA CALIPER SAMPLES
MORE:	STATIC		
LOCATION			
SEC	TWP	RGE	

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-31-2022	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1,2	MUD WEIGHT	N/A
TYPE LOG	SPINNER-FTC	VISCOSITY	N/A
DEPTH-DRILLER	1151 FT	LEVEL	~268 FT
DEPTH-LOGGER	1152 FT	MAX. REC. TEMP.	36.35 DEG. C
BTM LOGGED INTERVAL	1130 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	390 FT	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	E. TURNER / C. MORRISON	TOOL STRING/SN	QL SFM TOOL SN 5726
WITNESSED BY	ANDREW - M&A	LOG-TIME ON SITE/OFF SITE	06:45 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	42 IN	SURFACE	60 FT	36 IN	STEEL	SURFACE	60 FT
2	30 IN	60 FT	TOTAL DEPTH	20 IN	STEEL	60 FT	TOTAL DEPTH
3							

COMMENTS: DROP TUBE @ 390 FT. - PERFORATIONS FROM 720 FT TO TOTAL DEPTH

Tool Summary:

Date	3-31-2022	Date	3-31-2022	Date	
Run No.	1	Run No.	2	Run No.	3
Tool Model	QL COMBO TOOL	Tool Model	QL SPINNER	Tool Model	
Tool SN	6161	Tool SN	5726	Tool SN	
From	SURFACE	From	390 FT	From	
To	1152 FT	To	1130 FT	To	
Recorded By	E. TURNER	Recorded By	E. TURNER	Recorded By	
Truck No	200	Truck No	200	Truck No	
Operation Check	3-23-2022	Operation Check	3-23-2022	Operation Check	
Calibration Check	3-23-2022	Calibration Check	N/A	Calibration Check	
Time Logged	7:45 AM	Time Logged	8:25 AM	Time Logged	

Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

Additional Comments:

Caliper Arms Used: 27 IN
Calibration Points: 12 IN. & 36 IN.
E-Log Calibration Range: N/A
Calibration Points: N/A

Disclaimer:
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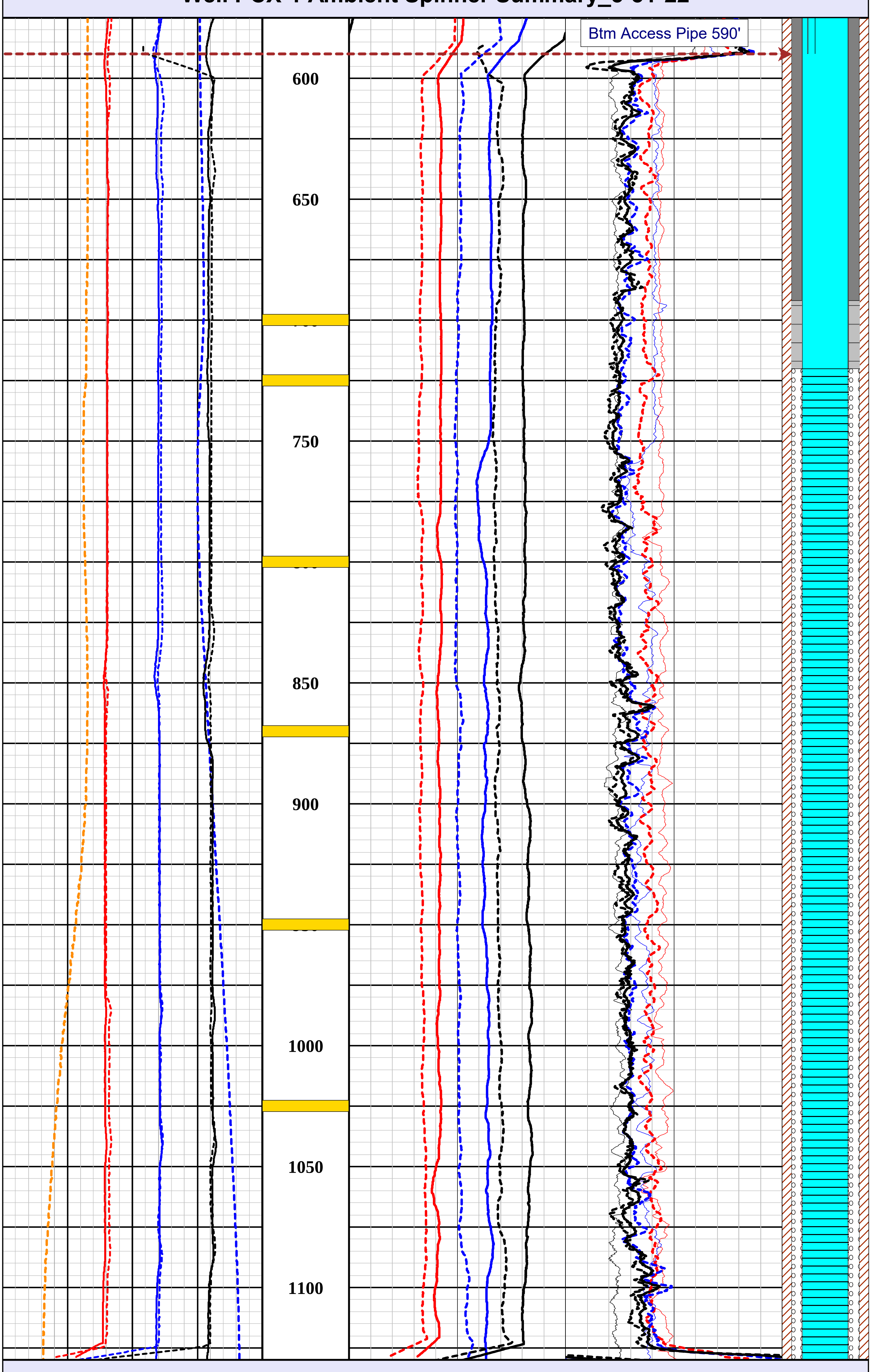
Temperature	Depth	Spinner 40 Dn	Flow Velocity 40 Dn-5726	PCX-1
18 Deg C 38	1in:50ft	0 cps 5000	-20 fpm 20	
Fluid Conductivity	Discrete Interval x 1.5 L Sampler	Spinner 60 Dn	Flow Velocity 60 Dn-5726	
0 uS/cm 5000	0 L 2	0 cps 5000	-20 fpm 20	
Speed 40 Dn		Spinner 80 Dn	Flow Velocity 80 Dn-5726	
0 ft/min 100		0 cps 5000	-20 fpm 20	
Speed 60 Dn		Spinner Up 40	Flow Velocity 40 Up-5726	
0 ft/min 100		0 cps 5000	-20 fpm 20	
Speed 80 Dn		Spinner Up 60	Flow Velocity 60 Up-5726	
0 ft/min 100		0 cps 5000	-20 fpm 20	
Speed 40 Up		Spinner Up 80	Flow Velocity 80 Up-5726	
0 ft/min 100		0 cps 5000	-20 fpm 20	
Speed 60 Up			Avg Net Velocity Trolling Up	
0 ft/min 100			-20 fpm 20	
Speed 80 Up				
0 ft/min 100				

Well PCX-1 Ambient Spinner Summary_3-31-22

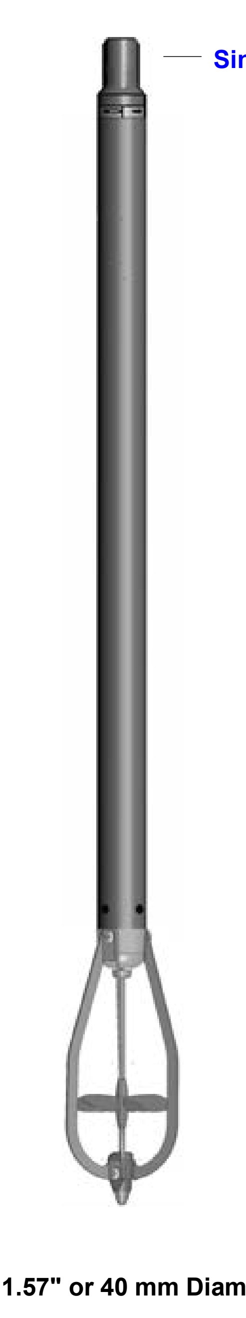


Well PCX-1 Ambient Spinner Summary_3-31-22

0 ft/min 100				
Speed 80 Up				
0 ft/min 100			-20 fpm 20	
Speed 60 Up			Avg Net Velocity Trolling Up	
0 ft/min 100		0 cps 5000	-20 fpm 20	
Speed 40 Up		Spinner Up 80	Flow Velocity 80 Up-5726	
0 ft/min 100		0 cps 5000	-20 fpm 20	
Speed 80 Dn		Spinner Up 60	Flow Velocity 60 Up-5726	
0 ft/min 100	0 L 2	0 cps 5000	-20 fpm 20	
Speed 60 Dn	Discrete Interval x 1.5 L Sampler	Spinner Up 40	Flow Velocity 40 Up-5726	
0 ft/min 100		0 cps 5000	-20 fpm 20	
Speed 40 Dn		Spinner 80 Dn	Flow Velocity 80 Dn-5726	
0 uS/cm 5000		0 cps 5000	-20 fpm 20	
Fluid Conductivity		Spinner 60 Dn	Flow Velocity 60 Dn-5726	
18 Deg C 38	1in:50ft	0 cps 5000	-20 fpm 20	PCX-1
Temperature	Depth	Spinner 40 Dn	Flow Velocity 40 Dn-5726	

MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

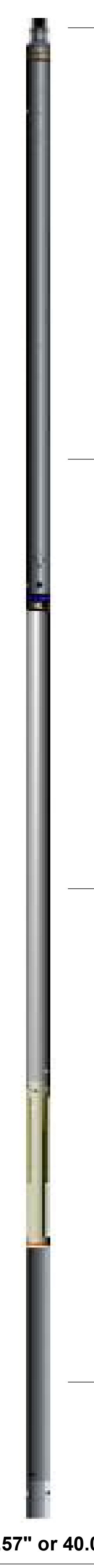
Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587



Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

Available Arm Sizes: 3", 9", and 15"

1.57" or 40.0 mm Diameter

Southwest Exploration Services, LLC borehole geophysics & video services	Company	MONTGOMERY & ASSOCIATES
	Well	PCX-1
	Field	NIBW - SCOTTSDALE
	County	MARICOPA
	State	ARIZONA

Final **STATIC SPINNER (DOWN) SUMMARY**

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	PCX-1		
FIELD	NIBW - SCOTTSDALE		
COUNTY	MARICOPA	STATE	ARIZONA

TYPE OF LOGS: SPINNER - DOWN

MORE: STATIC

LOCATION			OTHER SERVICES NAT. GAMMA CALIPER SAMPLES
SEC	TWP	RGE	
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-31-2022	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1,2	MUD WEIGHT	N/A
TYPE LOG	SPINNER-FTC	VISCOSITY	N/A
DEPTH-DRILLER	1151 FT	LEVEL	~ 268 FT
DEPTH-LOGGER	1152 FT	MAX. REC. TEMP.	36.35 DEG. C
BTM LOGGED INTERVAL	1130 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	390 FT	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	E. TURNER/ C. MORRISON	TOOL STRING/SN	QL SFM TOOL SN 5726
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	06:45 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	42 IN.	SURFACE	60 FT	36 IN.	STEEL	SURFACE	60 FT
2	30 IN.	60 FT	TOTAL DEPTH	20 IN.	STEEL	60 FT	TOTAL DEPTH
3							

COMMENTS: DROP TUBE @ 590 FT. - PERFORATIONS FROM 720 FT TO TOTAL DEPTH

Tool Summary:

Date	3-31-2022	**Date**	3-31-2022	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	
Tool SN	6161	**Tool SN**	5726	**Tool SN**	
From	SURFACE	**From**	390 FT	**From**	
To	1152 FT	**To**	1130 FT	**To**	
Recorded By	E. TURNER	**Recorded By**	E. TURNER	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	3-23-2022	**Operation Check**	3-23-2022	**Operation Check**	
Calibration Check	3-23-2022	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	7:45 AM	**Time Logged**	8:25 AM	**Time Logged**	

Date		**Date**		**Date**	
Run No.	4	**Run No.**	5	**Run No.**	6
Tool Model		**Tool Model**		**Tool Model**	
Tool SN		**Tool SN**		**Tool SN**	
From		**From**		**From**	
To		**To**		**To**	
Recorded By		**Recorded By**		**Recorded By**	
Truck No		**Truck No**		**Truck No**	
Operation Check		**Operation Check**		**Operation Check**	
Calibration Check		**Calibration Check**		**Calibration Check**	
Time Logged		**Time Logged**		**Time Logged**	

Additional Comments:

Caliper Arms Used: 27 IN. **Calibration Points:** 12 IN. & 36 IN.

E-Log Calibration Range: N/A **Calibration Points:** N/A

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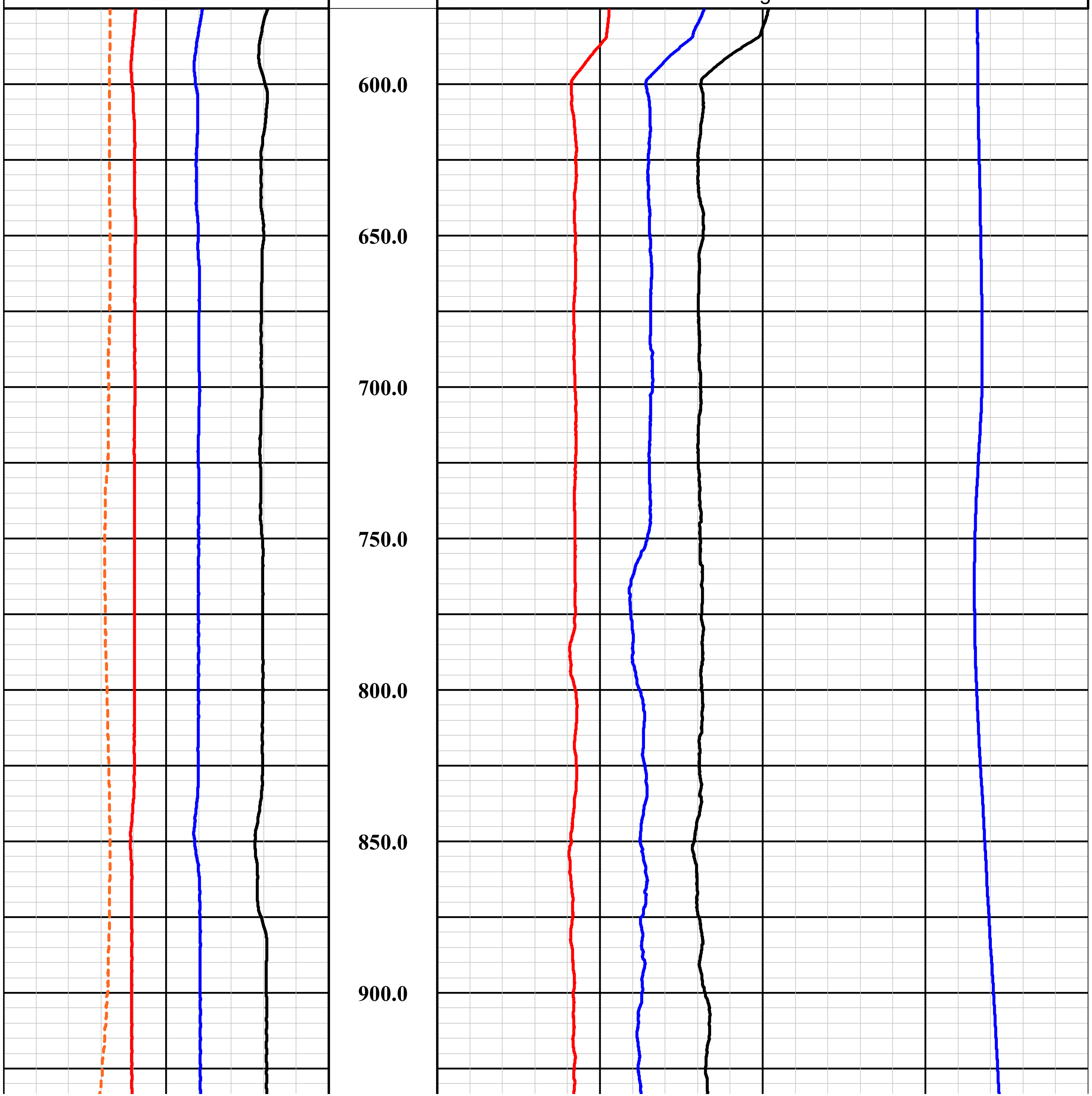
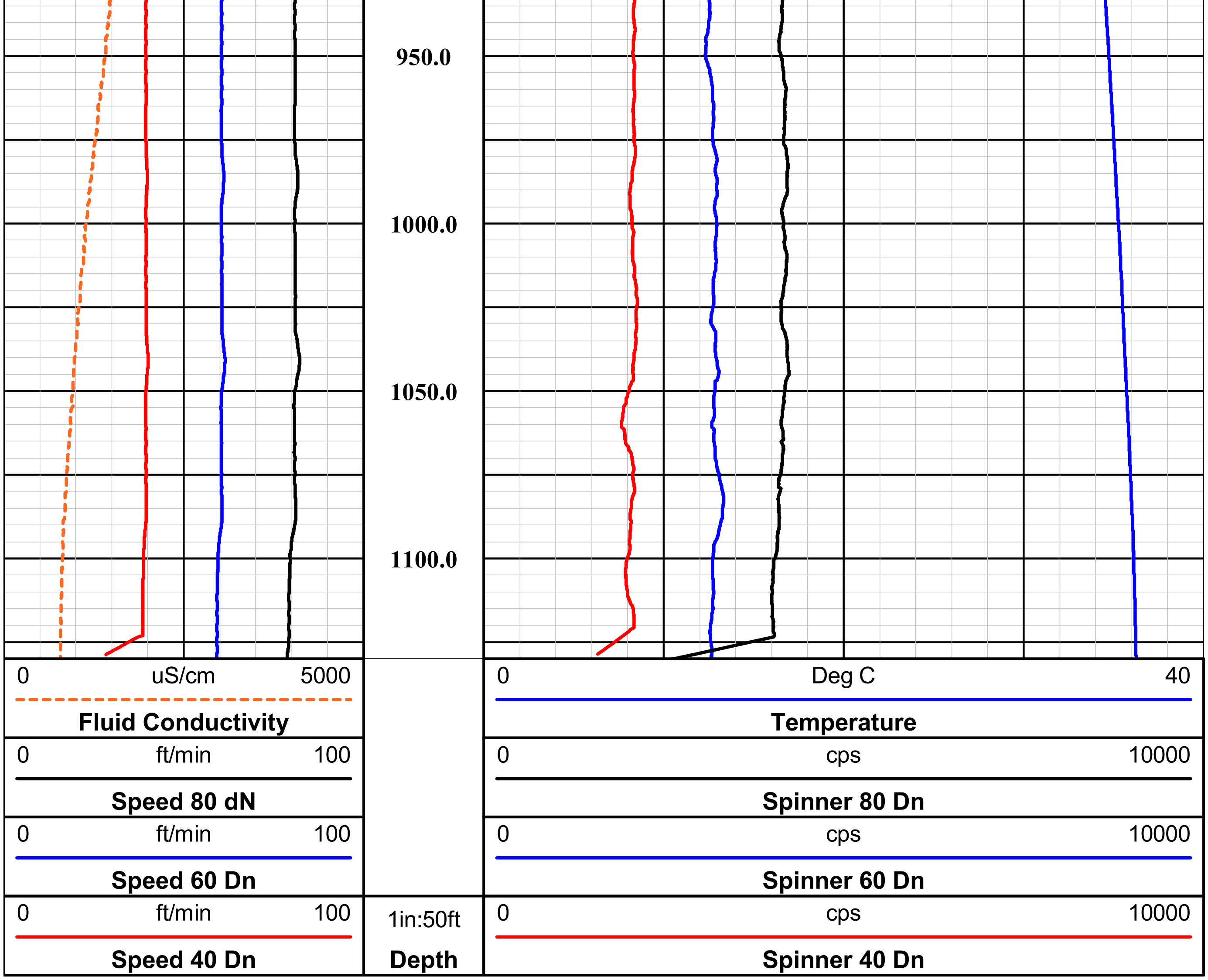
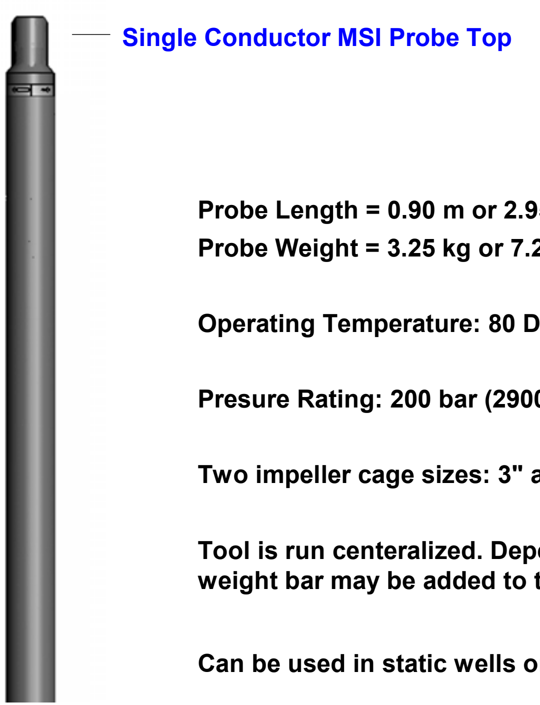
Track 1	Depth	Track 2
Speed 40 Dn 0 ft/min 100	**Depth** 1in:50ft	**Spinner 40 Dn** 0 cps 10000
Speed 60 Dn 0 ft/min 100		**Spinner 60 Dn** 0 cps 10000
Speed 80 dN 0 ft/min 100		**Spinner 80 Dn** 0 cps 10000
Fluid Conductivity 0 uS/cm 5000		**Temperature** 0 Deg C 40





MSI QL-40 Spinner Flowmeter (SFM) SN 5726

Probe Top = Depth Ref.



Probe Length = 0.90 m or 2.95 ft
Probe Weight = 3.25 kg or 7.2 lbs

Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Two impeller cage sizes: 3" and 4"

Tool is run centeralized. Depending on well diamter, a weight bar may be added to the assembly.

Can be used in static wells or under pumping conditions.

Measures both upflow and downflow.

Minimum Flow Rate: 3-5 gpm
Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587

Four Conductor MSI Probe Top

Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 1.07 m (42.12 in)

3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter

Southwest Exploration Services, LLC

borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	PCX-1
Field	NIBW - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Preliminary STATIC SPINNER (DOWN) SUMMARY

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	PCX-1		
FIELD	NIBW - SCOTTSDALE		
COUNTY	MARICOPA	STATE	ARIZONA

TYPE OF LOGS: GCFTC - DOWN
MORE: STATIC

LOCATION

SEC TWP RGE

OTHER SERVICES
NAT. GAMMA
CALIPER
SAMPLES

PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND LEVEL		G.L.

DATE	3-31-2022	TYPE FLUID IN HOLE	FORMATION WATER
RUN No	1,2	MUD WEIGHT	N/A
TYPE LOG	GCFTC	VISCOSITY	N/A
DEPTH-DRILLER	1151 FT	LEVEL	~ 268 FT
DEPTH-LOGGER	1152 FT	MAX. REC. TEMP.	36.35 DEG. C
BTM LOGGED INTERVAL	1130 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	E. TURNER/ C. MORRISON	TOOL STRING/SN	QL SFM TOOL SN 5726
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	06:45 AM

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	42 IN.	SURFACE	60 FT	36 IN.	STEEL	SURFACE	60 FT
2	30 IN.	60 FT	TOTAL DEPTH	20 IN.	STEEL	60 FT	TOTAL DEPTH
3							

COMMENTS: DROP TUBE @ 590 FT. - PERFORATIONS FROM 720 FT TO TOTAL DEPTH

.

Tool Summary:

Date	3-31-2022	**Date**	3-31-2022	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	
Tool SN	6161	**Tool SN**	5726	**Tool SN**	
From	SURFACE	**From**	390 FT	**From**	
To	1152 FT	**To**	1130 FT	**To**	
Recorded By	E. TURNER	**Recorded By**	E. TURNER	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	3-23-2022	**Operation Check**	3-23-2022	**Operation Check**	
Calibration Check	3-23-2022	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	7:45 AM	**Time Logged**	8:25 AM	**Time Logged**	

Date		Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model		Tool Model		Tool Model	
Tool SN		Tool SN		Tool SN	
From		From		From	
To		To		To	
Recorded By		Recorded By		Recorded By	
Truck No		Truck No		Truck No	
Operation Check		Operation Check		Operation Check	
Calibration Check		Calibration Check		Calibration Check	
Time Logged		Time Logged		Time Logged	

Additional Comments:

Caliper Arms Used: 27 IN. **Calibration Points:** 12 IN. & 36 IN.

E-Log Calibration Range: N/A **Calibration Points:** N/A

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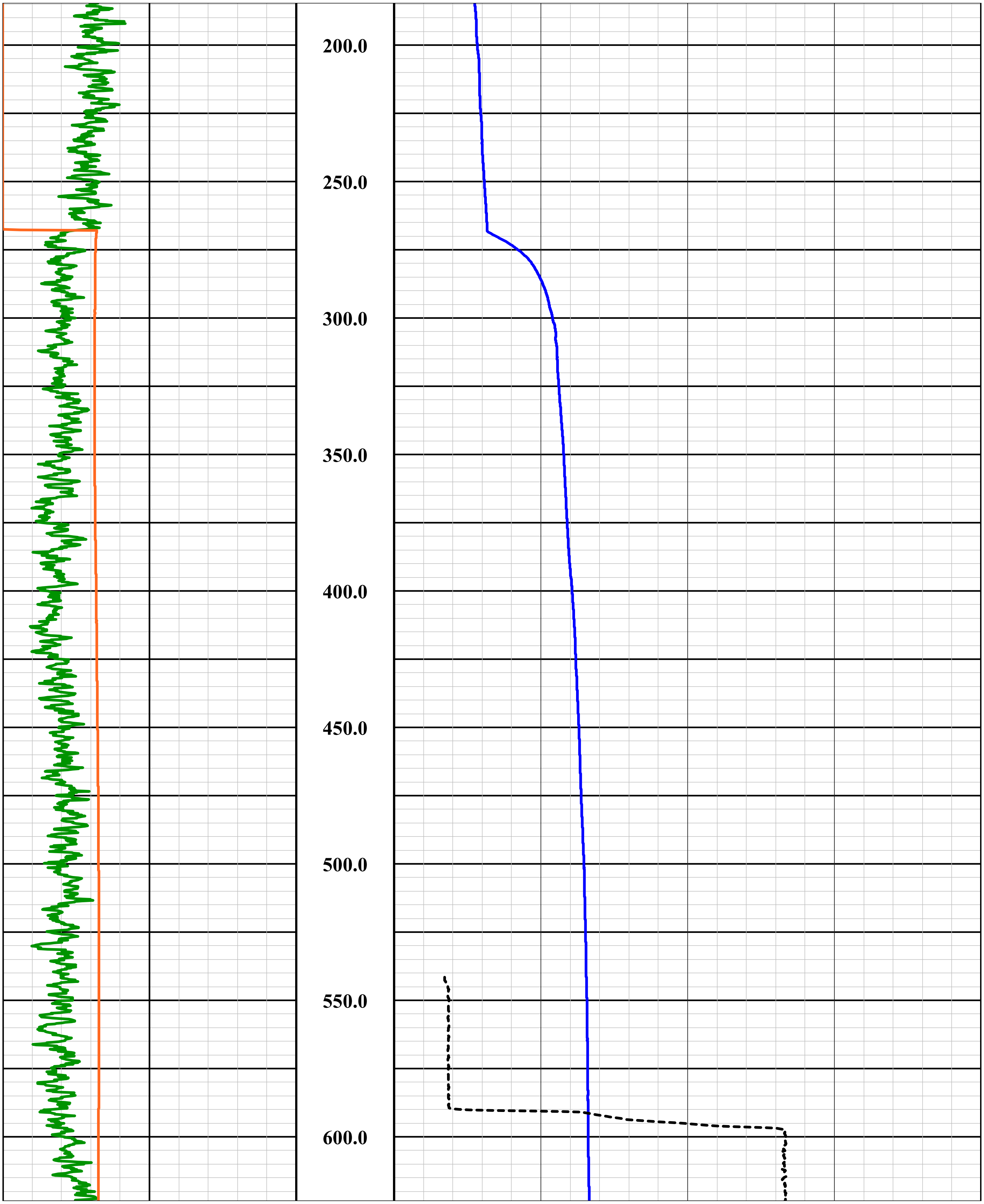
Nat. Gamma (0 API 200)	Depth (1in:50ft)	Temperature (20 Deg C 60)
Fluid Conductivity (0 uS/cm 5000)		3-Arm Caliper (0 in 30)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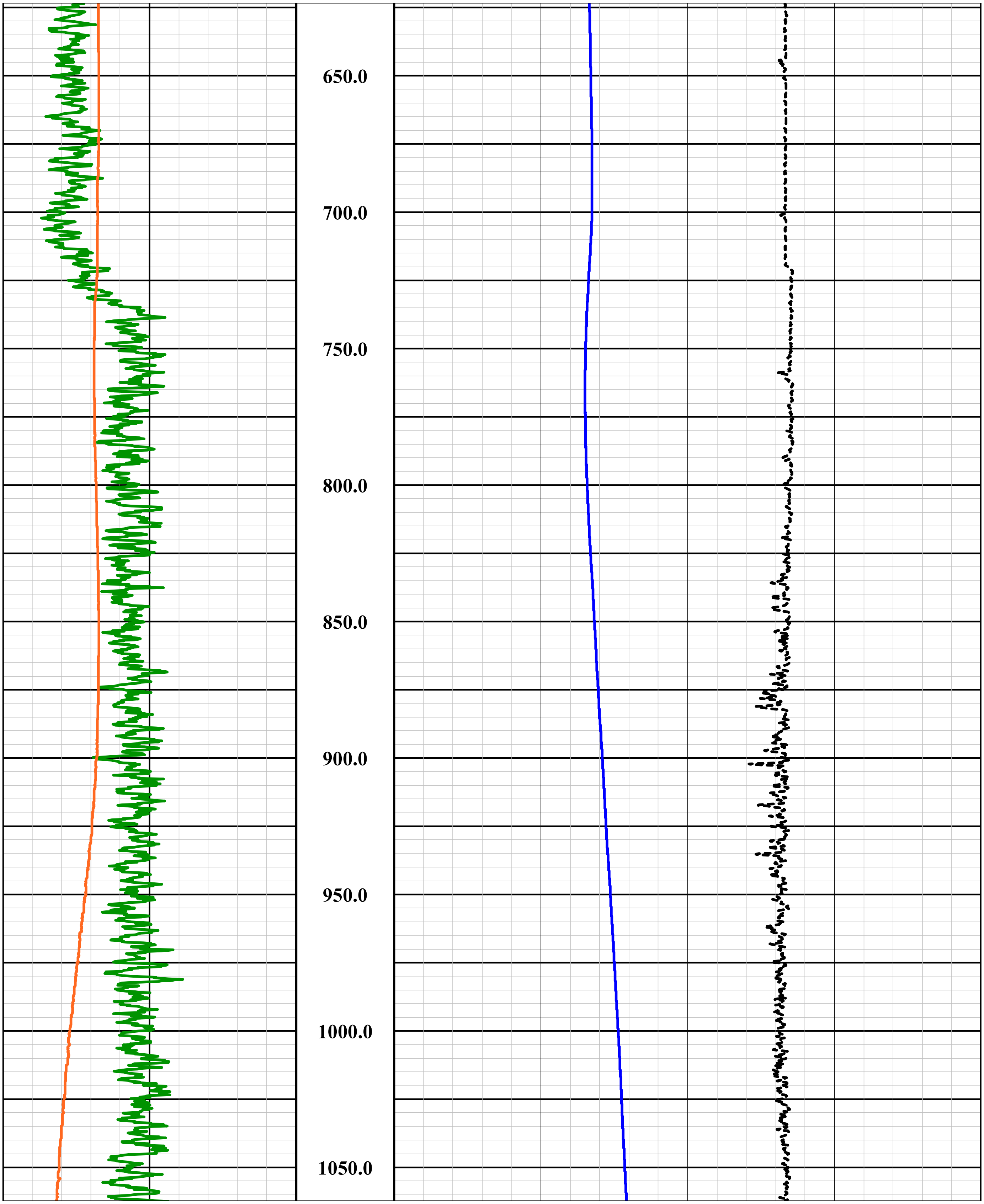
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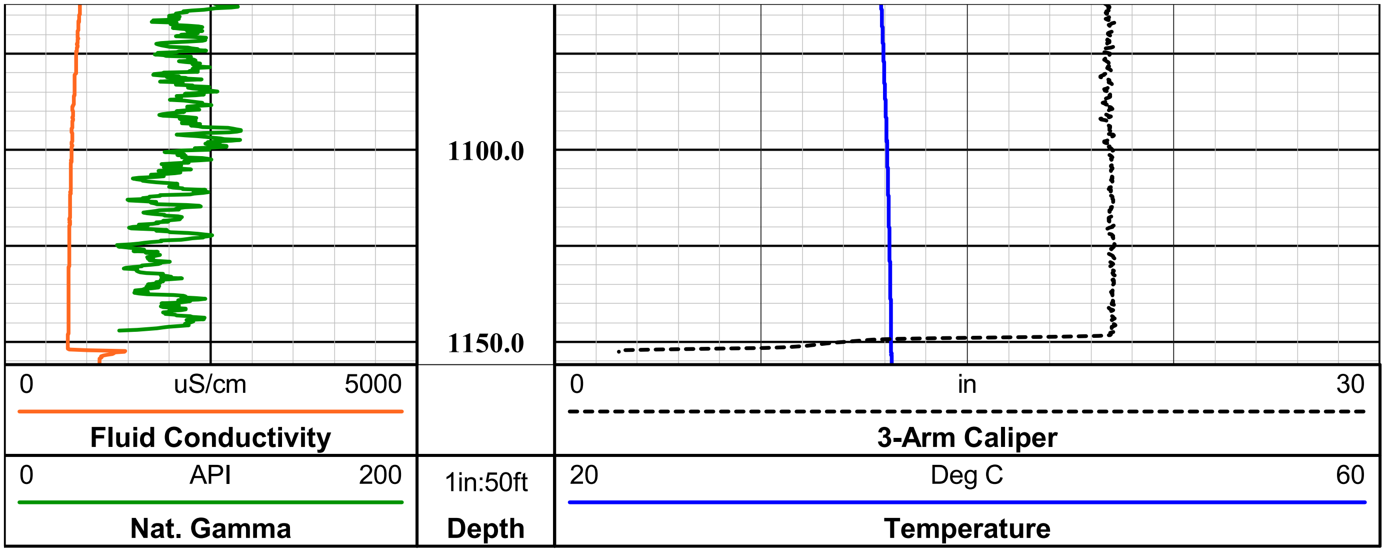


QL40 Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517 & 6587

Four Conductor MSI Probe Top

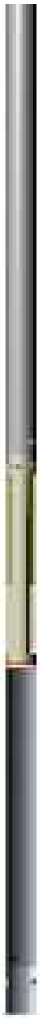
Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

Caliper arms can only collect data logging up hole

Fluid Temperature/Conductivity and Natural Gamma can be collected logging up and down hole

Temperature Rating: 80 Deg C (176 Deg F)
Presure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 1.07 m (42.12 in)



3-Arm Caliper = 1.78 m (70.27 in)

Available Arm Sizes: 3", 9", and 15"

FTC (Fluid Temperature/Conductivity) = 0.78 m (30.71 in)

1.57" or 40.0 mm Diameter

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	PCX-1
Field	NIBW - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Preliminary STATIC SPINNER (DOWN) SUMMARY