2023

Site Monitoring Report

North
Indian Bend Wash
Superfund Site

Prepared for:

U.S. Environmental Protection Agency

Region IX

Prepared by:

NIBW Participating Companies

Issued April 30, 2024

North Indian Bend Wash Superfund Site

SITE MONITORING REPORT

January - December 2023

North Indian Bend Wash Superfund Site
Scottsdale, Arizona

Issued April 30, 2024

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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 2023 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). The updated CSM Report (NIBW PCs, 2023b) focused on data collected over the 20-year period after the Feasibility Study Addendum was released (NIBW PCs, 2000). 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. Remediation of the three aquifer units is being conducted under two operable units (OU), which require specific actions. The MAU and LAU comprise Operable Unit I; the UAU comprises Operable Unit II.

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 source areas where SVE was conducted was below the Cleanup Standards, EPA approved closure of SVE operations as well as Area 7 UAU groundwater extraction. The UAU was initially the unit at the site with the highest VOC concentrations, exceeding those currently observed in the MAU or LAU in the 1980s. Since 2022, TCE concentrations have remained 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 TCE 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 TCE 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 downgradient LAU extraction wells. Capture by LAU extraction wells is demonstrated using water level data and simulated particle tracks generated using the NIBW groundwater flow model. The model underwent a comprehensive update by the PCs through a collaborative process with the NIBW Technical Committee in 2021. For this SMR, pumping data in the model was updated through 2023 for interpretation of capture in the LAU. A report documenting recent model updates will be finalized in 2024.

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 2023, as follows:

- UAU Program: Based on the 2023 5-year running average, UAU VOC mass is decreasing with time compared to the 2022 5-year running average.
- MAU/LAU Program: The direction of groundwater movement along the periphery of the MAU/LAU plume is toward either extraction wells or the Western Margin based on contoured October 2023 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 2023 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 2023 monitoring rounds.
- Source Control Programs: The combined 5-year running average TCE concentration metric was achieved for Area 7 but since average concentrations were identical for 2022 and 2023 this metric was not strictly achieved for Area 12 indicator wells for 2023. Short-term TCE concentration increases due to downtime for extraction well issues/maintenance within the last 5 years are responsible for the lack of compliance with this metric. Capture to the vicinity of PA-12MA was not demonstrated at Area 7; however, 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 reinjected into 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 2023. Completion of the City of Scottsdale’s Thomas Groundwater Treatment Facility (TGTF) in 2023, which was originally designed to treat inorganic constituents in groundwater using reverse Osmosis (RO), is a critical element of the plan to bring COS-71A back online at a higher pumping priority. The importance of the TGTF has been highlighted by the recently issued (April 2024) per-and polyfluoroalkyl substances (PFAS) drinking water standard. RO is a Best Available Demonstrated Control Technology for PFAS and, therefore, the need for the TGTF has broadened. Operation of the TGTF will allow the City of Scottsdale to better balance the needs of the NIBW remedy with the need to serve water that complies with drinking water standards for inorganics and PFAS.

2 DOCUMENT CONTENT & PURPOSE

The 2023 Site Monitoring Report (SMR) summarizes remedial activities performed and data collected by the North Indian Bend Wash (NIBW) Participating Companies (PCs) (which include Motorola Solutions, Inc., Siemens, and GlaxoSmithKline) pursuant to the Amended Consent Decree (Amended CD), CV-91-1835-PHX-FJM, entered by the U.S. District Court for the District of Arizona on June 5, 2003. A detailed summary of the components and work requirements of the remedial action program can be found in the Record of Decision Amendment – Final Operable Unit (OU), Indian Bend Wash Area (Amended ROD), dated September 27, 2001, and Statement of Work (SOW), Appendix A to the Amended CD. An organizational chart identifying the key parties involved at the NIBW Superfund Site (the Site) is provided in **Appendix J**, along with contact information for current NIBW team members. Additional information describing remedial activities conducted at the NIBW Site in 2023 was provided in quarterly reports submitted to the U.S. Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ), dated May 30, August 29, and November 29, 2023. Consistent with requirements defined in the Amended CD and SOW (2003), operational summaries and updates for fourth quarter 2023 were submitted under a separate cover. Documents and data submitted to EPA during 2023 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 2023 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 collection and evaluation conducted in 2023.
- 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 2 and 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 2023.
- Level 2 and 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 2023.
- Level 2 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 the Area 12 Groundwater Extraction and Treatment System (GWETS).
- 2023 air sampling summary and Eurofins Air Toxics laboratory reports for the Area 7 GWETS and Area 12 GWETS.
- 2023 supplemental sample data not required for compliance but used for evaluation purposes in the SMR.
- 2023 well rehabilitation and modification at COS71A and fluid movement investigation and sampling at COS-71A and COS-75A.
- 2023 formal abandonment of Area 7 MAU extraction well 7EX-4MA, which was no longer functional.

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

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

Timeframe	Historical Document and/or Major Event
2011	First Five-Year Review ○ Remedy deemed protective of human health and environment ○ Groundwater plume containment demonstrated
2012	Explanation of Significant Differences for treating PCX-1 at NIBW Granular Activated Carbon Treatment Facility
2013	NIBW Granular Activated Carbon Treatment Facility start-up
2015	EPA approved close out and decommissioning of final soil vapor extraction system (Area 7) to address threat to groundwater
2016	Second Five-Year Review ○ Remedy protectiveness determination deferred to evaluate potential exposure related to treatment facility emissions and soil vapor intrusion at historical sources ○ Groundwater plume containment demonstrated
2016-2020	Post Second Five-Year Review evaluations ○ Developed air dispersion model and conducted confirmatory sampling to demonstrate concentrations in vicinity of treatment systems are below applicable risk levels ○ Conducted vapor intrusion investigations at multiple historical source areas and indoor air investigations and mitigation at Area 7 where concentrations exceeded screening levels
2021-2022	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
2023	Extraction Well Changes o Modification of Well COS-71A to pump only from the MAU in April 2023 o Abandonment of Area 7 extraction well 7EX-4MA in December 2023 Final Conceptual Site Model Update Report (July 2023) Draft NIBW Groundwater Flow and Particle Tracking Model Update Report (August 2023)

<u>EXPLANATION:</u>
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 except for 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.

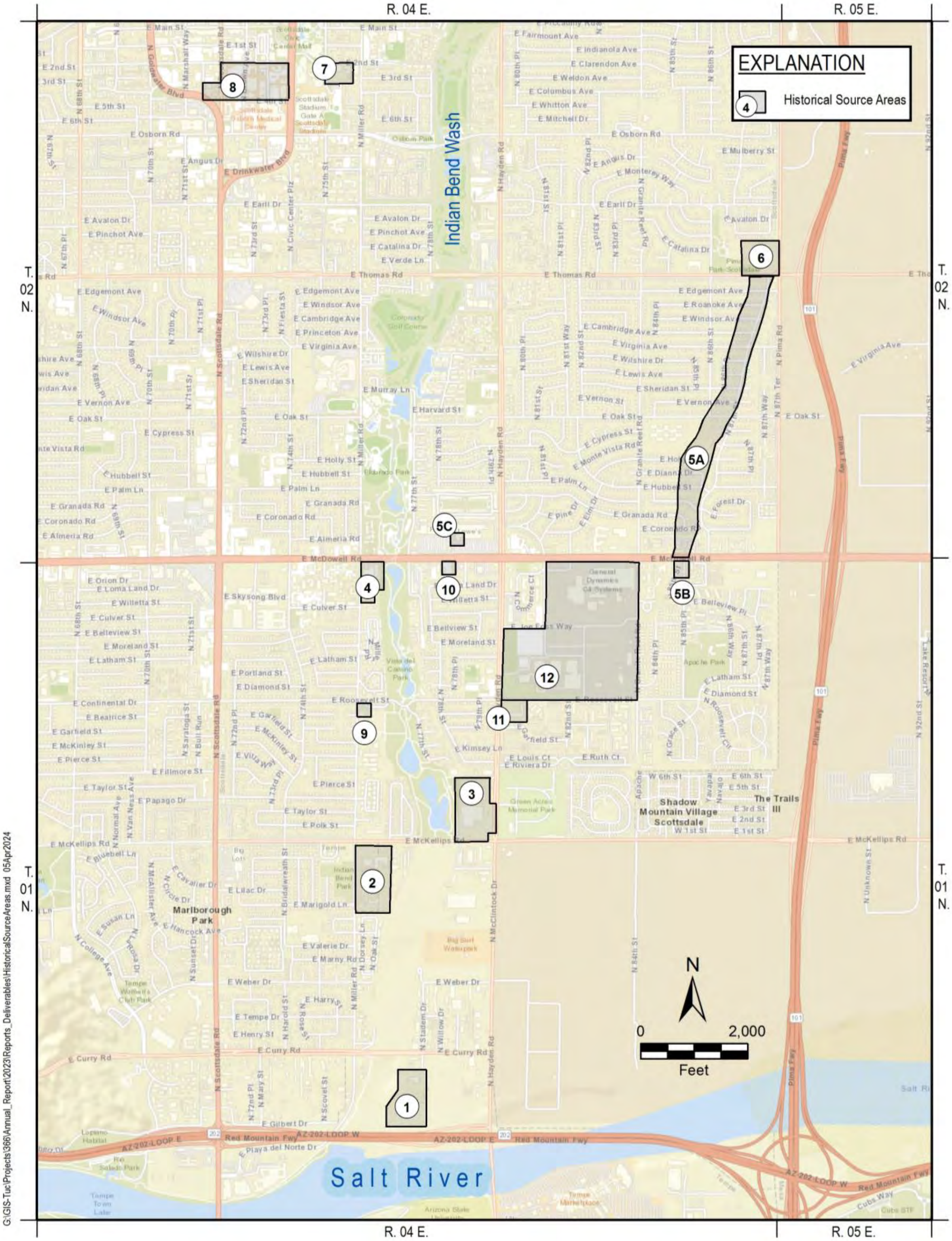

Figure 1. Location of Historical Source Areas at the NIBW Superfund Site

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 TCE 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 outside of the Source Control capture migrates into the LAU, principally along the Western Margin, and is captured by downgradient 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). The NIBW groundwater flow model underwent a comprehensive update by the PCs through a collaborative process with the NIBW Technical Committee in 2021. Capture interpretations were updated most recently in 2022 for inclusion in the *Draft NIBW Groundwater Flow and Particle Tracking Model Update Report*, submitted to EPA in August 2023 and planned for finalization in 2024.

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**.

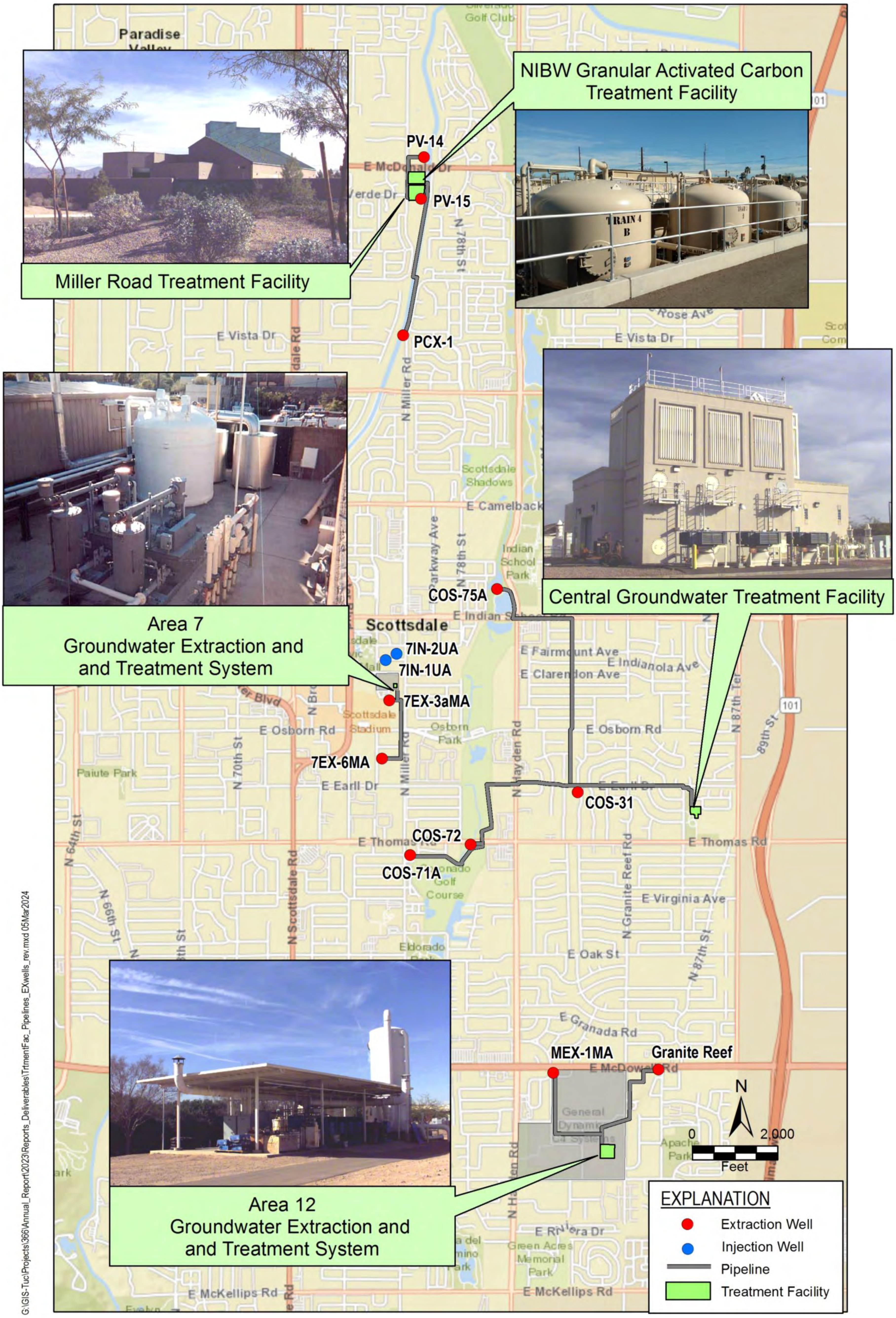

Figure 2. Location of Extraction Wells, Pipelines, and Treatment Facilities at the NIBW Superfund Site

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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) COS-72 (MAU/LAU) COS-31 (MAU/LAU)	PV-14 (LAU)* PV-15 (LAU)*	PCX-1 (LAU)*	7EX-3aMA (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.

** 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 not using well COS-71A at all. Since well COS-71A is a critical extraction well for the NIBW MAU remedy, a well rehabilitation and modification program was conducted at COS-71A in 2023 with the objective of extracting a lower volume of water from the MAU. These modifications allow groundwater from COS-71A to be more readily integrated into the 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) in 2023, which was originally 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. Since coming online, the importance of the TGTF has also been highlighted in relation to the EPA per-and polyfluoroalkyl substances (PFAS) drinking water standard. Reverse osmosis (RO) is a Best Available Demonstrated Control Technology for PFAS and, because CGTF extractions wells COS-71A, COS-72, and COS-75A all have PFAS above the standard, the need for the TGTF has broadened. Since the TGTF will be needed to provide treatment to allow these wells to continue operation, ongoing evaluation by the City of Scottsdale of the ability of the TGTF to treat both inorganic and PFAS compounds in multiple wells is required, along with a determination of the potential need for an expansion.

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 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 (PVARF) 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 GAC treatment. 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 treated water from PCX-1, it is discharged to the adjacent Arizona Canal for SRP's use. During 2023, 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. A well site development design for extraction of approximately 750 gallons per minute (gpm) was completed in 2023. Property access and permitting activities continue into 2024. In its current configuration, the NGTF has additional treatment capacity to accommodate treatment of up to approximately 1,000 gpm. Treated groundwater from the NGTF has consistently met NIBW Cleanup Standards and AZPDES permit requirements.

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 (See **Figure 5** for location). 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 was decommissioned in December 2023 with EPA approval (**Appendix I**). 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 upgradient 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 continued to be evaluated in 2023, details of which are provided in **Section 10**, Supplemental Activities. 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 and EPA provided comments on the draft in December 2021. After submitting responses to comments in April 2022, the PCs submitted a final CSM in July 2023. Information provided in this section is largely excerpted from the 2023 CSM update, which comprises the definitive current regional and local hydrogeologic reference (PCs, 2023).

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 2023 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 68th Street to the west, as shown on **Figure 3** and referred to in the SMR as the Site Boundary. East of the Site, occupying most of the land between the NIBW Site and the McDowell Mountains, are the Salt River Pima-Maricopa Indian Community (SRPMIC) lands, which are primarily used for agriculture or are undeveloped.

Land surface in the region generally slopes southward toward the Salt River floodplain. Principal surface-water features in the vicinity of the Site include the Indian Bend Wash, the Salt River, the Salt River Project (SRP) canal system, Tempe Town Lake, McKellips Lake, and several artificial recharge projects. Groundwater recharge within and surrounding the Site, 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.

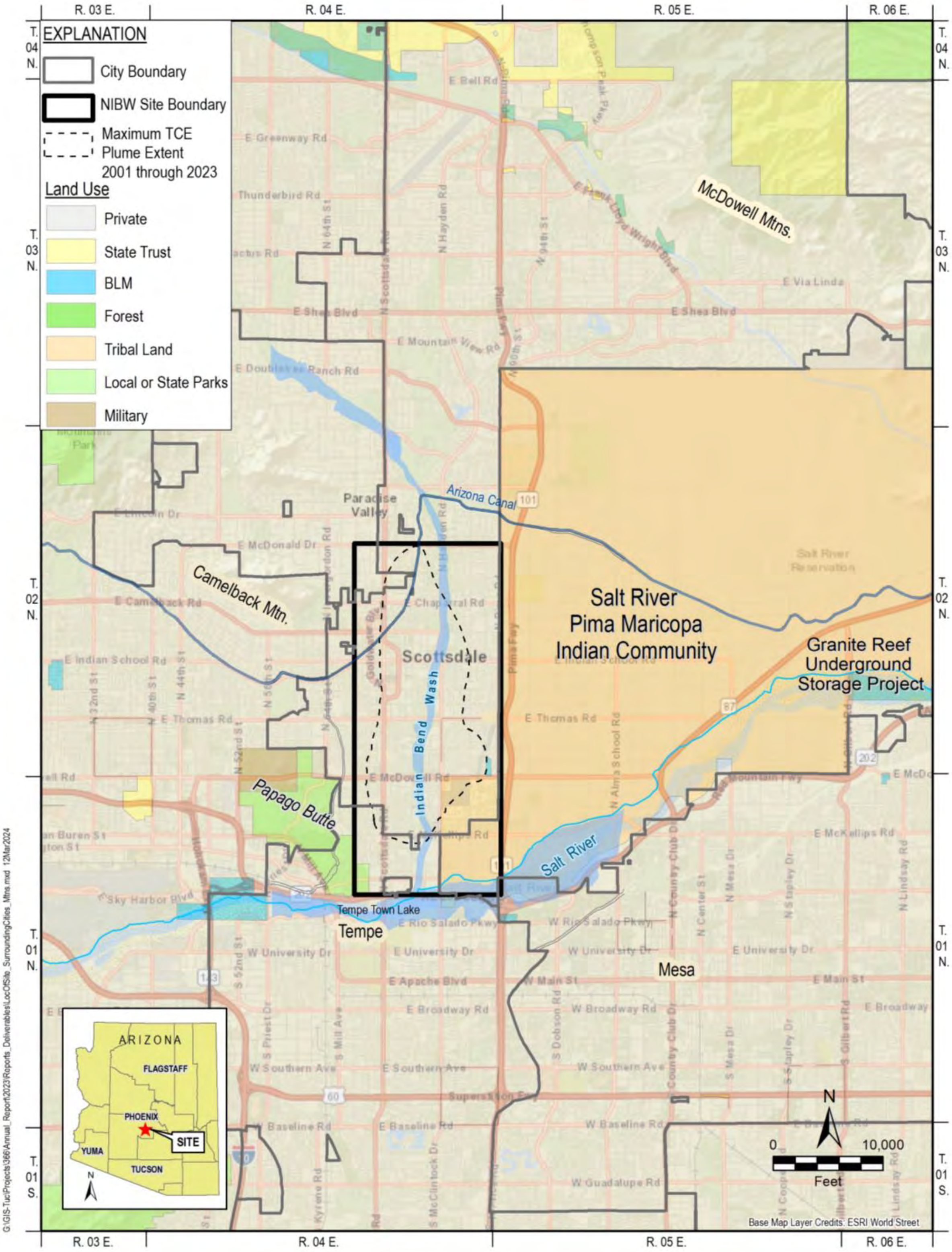


Figure 3. Location of the NIBW Superfund Site and Surrounding Land Area

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.

While hydraulic properties and patterns of groundwater movement are unique in each of the aquifers, patterns of water level decline and recovery over time are similar in the UAU, MAU, and LAU. Overall, the three units have experienced significant recovery since the early RI/FS investigations due to reduced pumping, increased recharge, and use of imported water sources.

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 approximately 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 approximately 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 approximately 600 feet, averaging approximately 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 approximately 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.

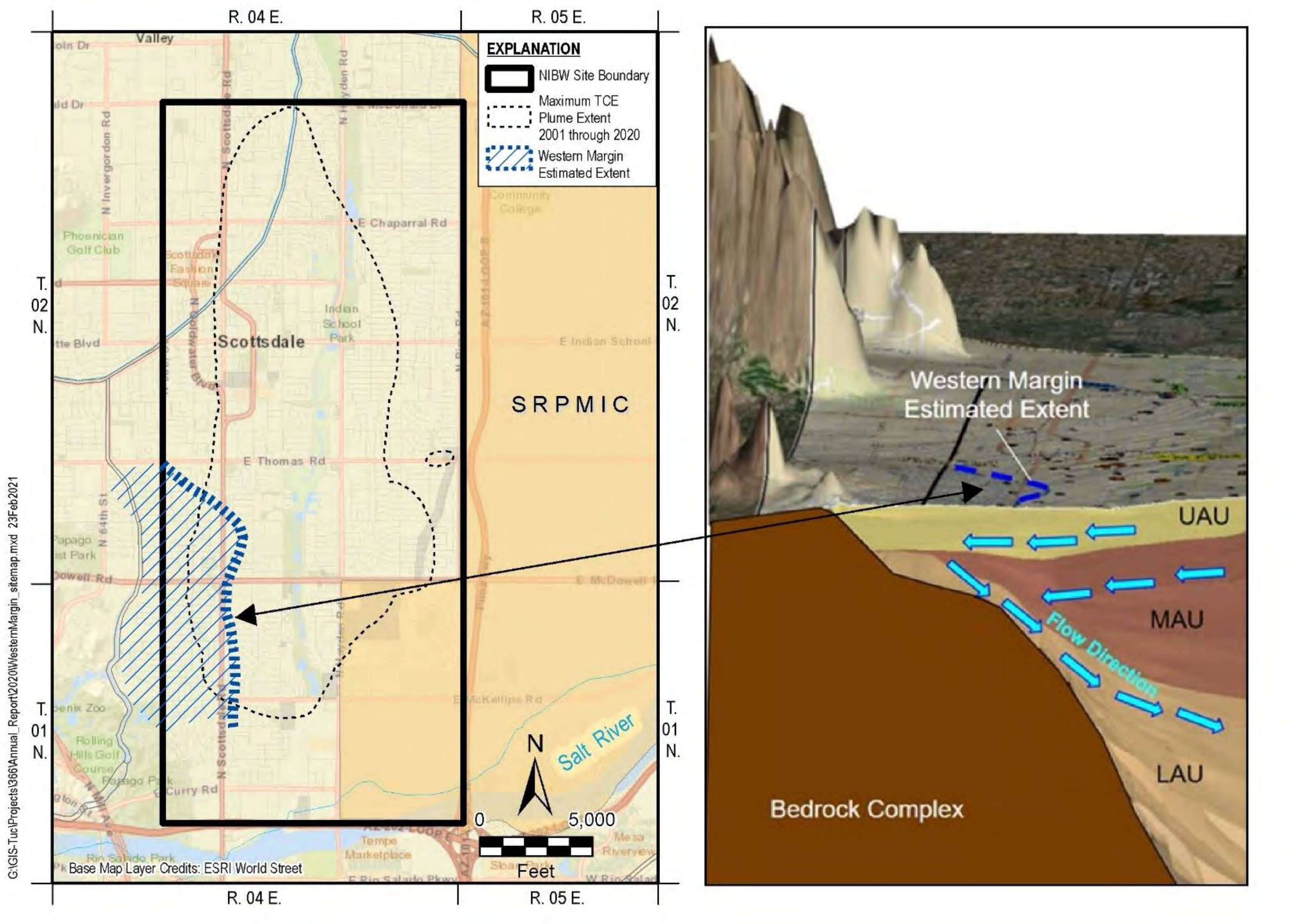


Figure 4. Western Margin Estimated Extent and Conceptual Diagram

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 the Site Groundwater Monitoring and Evaluation Plan (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. Conduit wells were evaluated comprehensively in 1998 during the final remedy selection process to determine if they were an important mechanism for vertical movement of mass between units. Although concentrations were higher and the plume footprint was larger in all units at the time, the report concluded that mass flux via conduits was not a significant issue. Since that time, conduits have not been a focus for the CSM.

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. Beginning in October 2022, TCE concentrations have been consistently 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 timeframe for remediation of COCs in the MAU is anticipated to be substantially longer than the UAU or LAU.

The highest TCE concentrations at the Site are currently observed in the Upper MAU, specifically near historical source Area 7 and, 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 the Area 7 GWETS extraction wells and the Area 12 GWETS extraction wells began voluntarily in 1999 and were officially incorporated into the selected remedy in the 2001 Amended ROD. The Area 7 GWETS extraction wells are screened only in the Upper MAU, whereas the Area 12 GWETS extraction wells are also screened 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. TCE concentrations at the Granite Reef well have reduced by an order of magnitude since the 1980s.

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 screened 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.

4.3.3 Lower Alluvial Unit

While the TCE plume in the LAU grew as it advanced to the north toward extraction wells in the 1990s, it has had the largest footprint of the three units at the Site since 2001. Prior to voluntary implementation of Source Control containment in the MAU in 1999, the entire UAU plume and the portion of the MAU plume not contained by extraction at the CGTF wells moved into the LAU via the Western Margin. In fact, most of the LAU plume is 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 and occurred in the southern part of the Site. Maximum concentrations in the LAU have reduced by two thirds, with most LAU monitoring wells now showing decreasing or stable concentration trends. The highest concentrations in the LAU now occur in the north, just south from extraction well PCX-1, and the southern part of the LAU TCE plume shows consistent reductions in magnitude and extent from year to year.

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 was also located in the area north of the Arizona Canal near the AWC wellfield. During the former Prestige Cleaners Phase II Investigation conducted in 1994, PCE was reported to be present in subsurface soil gas/soils and in groundwater at nearby production well AWC-9A. PCE concentrations in irrigation supply well AWC-9A 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 2023 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.

The NIBW Technical Committee was previously engaged in a process of reviewing the GM&EP performance metrics. As part of this process the PCs proposed targeted updates to the GM&EP to align the performance metrics more directly to the Site RAOs and Performance Standards. Specifically, the PCs are committed to evaluation and updating the GM&EP metric based on new data and using new tools, including the groundwater flow model and three-dimensional (3D) visualization model. Until there is consensus around updated metrics, 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 the 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 the 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). One monitoring program change that occurred in 2023 with approval from EPA was the replacement of the Lower MAU well PG-49MA for annual sampling with the Lower MAU well PG-53MA, as detailed 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 VOC 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 I 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 I SAP, dated October 28, 2015, was prepared by the NIBW PCs and submitted to EPA to document protocols for sampling at selected monitoring wells using the HydraSleeve^{TM} technology method (HydraSleeve). HydraSleeve sampling was pilot tested on eight monitoring wells during the October 2015 monitoring round and results compared favorably with anticipated ranges. Comments received from EPA on the draft document on November 17, 2015, were incorporated into the final Phase I SAP Addendum, dated March 7, 2016 (PCs, 2016).

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. 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 generally 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 occasionally 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 at the four CGTF extraction wells, two MRTF extraction wells, and one NGTF extraction well (when operating).
- Quarterly sampling at the three Area 7 extraction wells and two Area 12 extraction wells (when operating), 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 I SAP for the NIBW Site, developed by SRP and approved by EPA in 2003. The Sitewide SAP consists of the Phase I and Phase II SAPs. The Phase I SAP covers all groundwater sampling activities as identified in the GM&EP and includes the Field Sampling and QAPPs.

Consistent with the original Phase I 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 I 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. In October 2015, the PCs submitted to EPA a draft addendum to the Phase I SAP to describe standard operating procedures for collection of groundwater samples at monitoring wells using the HydraSleeve sampling method. Comments received from EPA were incorporated into the final Phase I SAP Addendum, dated March 7, 2016 (PCs, 2016). 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 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 I SAP is currently underway and will incorporate the 2016 SAP Addendum. The EPA-approved 2006 Sitewide Operations & Maintenance (O&M) Plan (with updates in 2014, 2016, 2020, and 2021, see **Section 7.7**) presents methods and procedures for O&M associated with the groundwater monitoring and extraction wells and the 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.

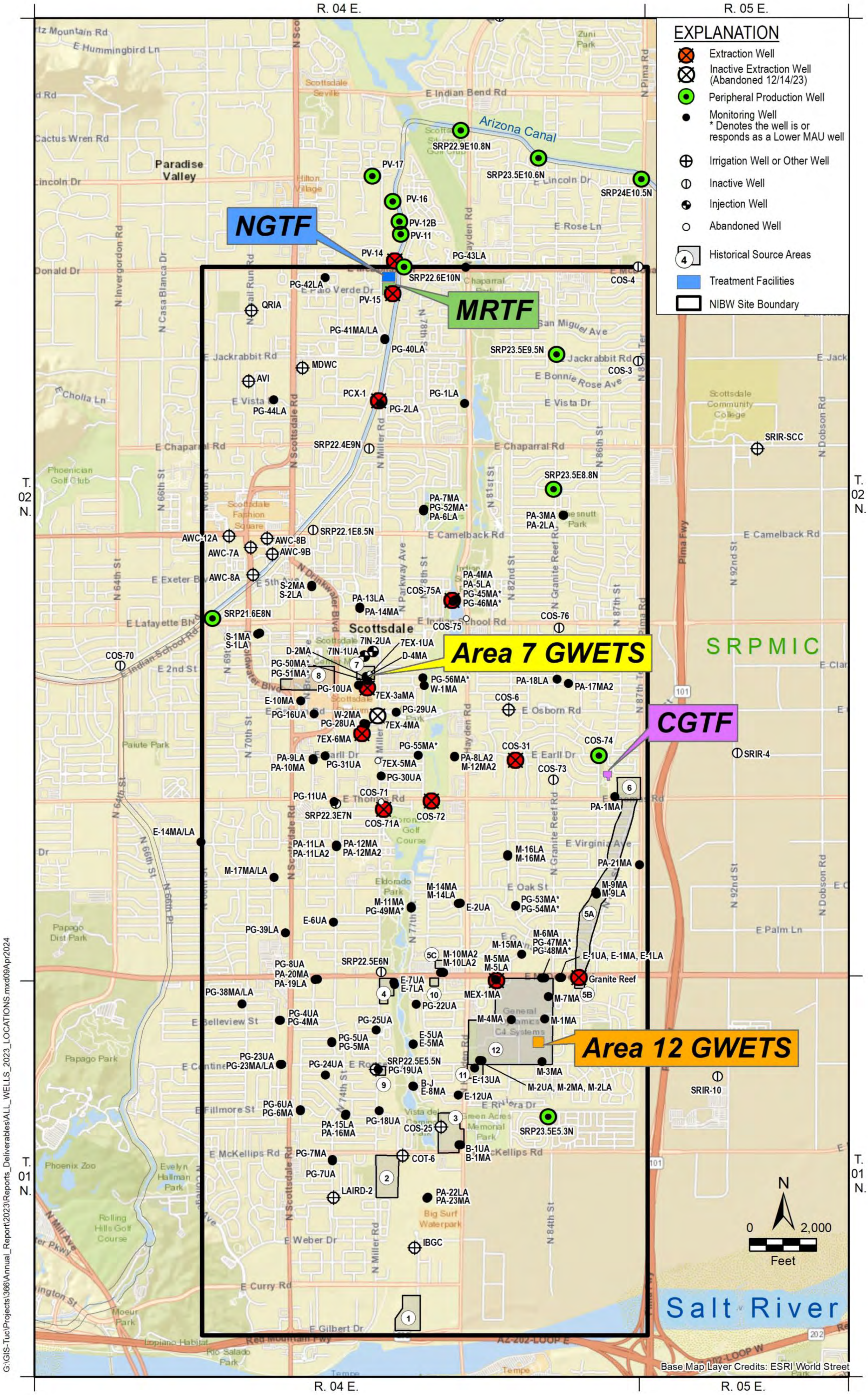


Figure 5. Well Locations and Identifiers in the NIBW Superfund Site Vicinity

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 periodic comprehensive 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 II 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 (Air Stripper eff) Tower 2 (Air Stripper eff) Tower 3 (Air Stripper eff)	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
AZCO = SRP Arizona Canal Outfall Location
*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 the 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 water 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 water samples for the MRTF, Area 7 GWETS, and Area 12 GWETS are collected by EnSolutions. Process and treated water samples for the NGTF are collected by the City of Scottsdale; influent samples for the NGTF are collected by EnSolutions. Process and treated water 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 PV14 and PV-15 (when operational). The MRTF extraction well samples are considered air stripper influent samples, since water from those wells are treated separately at the MRTF. 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 I SAP (including the draft 2016 HydraSleeve Addendum). Treatment system performance data are collected in accordance with the Phase II SAP.
- Primary and backup laboratories are designated and certified by 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's 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-sampling is conducted 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 unique and 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 and 2023 annual 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 2023 are summarized in **Appendix C, Table C-2** and treatment system sample results are shown in **Appendix C, Table C-3**. The 2023 Site Inspection Report is provided in **Appendix H**.

Mass removal estimates for individual extraction wells are computed 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. To the extent possible, the treatment systems and associated wells are operated year-round, except during annual and periodically required maintenance. Discussion of unplanned downtime of the treatment systems and associated extraction wells is provided in the following sections. Results of samples obtained by the NIBW PCs are used where available for mass removal estimates; 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 2023 at the NIBW Superfund Site

			UNITS	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	TOTALS	ANNUAL PUMPAGE (in acre-feet)	ANNUAL PUMPAGE (in gpm)
CGTF	COS-31	Pumpage	x 1,000 gal	68.1	-	9,497.5	82,748.9	111,568.8	35,539.3	21,893.3	-	27,235.6	5,820.8	-	27.5	294,400	903	560
		Operating time	%	0.1%	0%	8.5%	75.6%	99.0%	32.6%	19.9%	3.5%	25.7%	5.1%	0%	0%	22%		
		[TCE conc.]	µg/L	*8.5*	-	4.5	8.4	11	10	8.5	-	*8.5*	*8.5*	-	*8.5*	9		
		Est. TCE mass	pounds	0	-	0.4	5.8	10.2	3	1.6	-	1.9	0.4	-	0	23		
	COS-71A	Pumpage	x 1,000 gal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Operating time	%	-	-	-	-	-	-	-	-	-	-	-	-	-		
		[TCE conc.]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Est. TCE mass	pounds	-	-	-	-	-	-	-	-	-	-	-	-	-		
	COS-72	Pumpage	x 1,000 gal	48,896.1	-	-	15,197.6	8,672.3	24,780.7	79,311.7	78,902.8	51,854.1	-	689	58,658	366,962	1,126	698
		Operating time	%	52.1%	0%	0%	16.9%	10.1%	32.1%	99.9%	100.0%	69.2%	0%	1%	83.9%	39%		
		[TCE conc.]	µg/L	9.3	-	-	8.3	7.6	8.1	8	7.7	7.9	-	7.9	7.2	8		
		Est. TCE mass	pounds	3.8	-	-	1.1	0.6	1.7	5.3	5.1	3.4	-	0	3.5	24		
	COS-75A	Pumpage	x 1,000 gal	86,868.8	75,055.9	74,486.3	5,397.3	-	2,928	-	-	638.4	28,507.4	-	-	273,882	841	521
		Operating time	%	100.0%	99.6%	86.8%	6.5%	0%	3.8%	0%	0%	0.8%	32.7%	0%	0%	27%		
		[TCE conc.]	µg/L	29	27	31	*31*	-	*29*	-	-	*29*	*29*	-	-	29		
		Est. TCE mass	pounds	21	16.9	19.3	1.4	-	0.7	-	-	0.2	6.9	-	-	66		
	TOTAL	Pumpage	x 1,000 gal	135,833	75,055.9	83,983.8	103,343.8	120,241.1	63,248	101,205	78,902.8	79,728.2	34,328.2	689	58,685.5	935,244	2,870	1,779
		Est. TCE mass	pounds	24.8	16.9	19.6	8.2	10.8	5.3	6.8	5.1	5.5	7.3	0	3.5	114		
MRTF	PV-14	Pumpage	x 1,000 gal	56,268	71,406	14,863	41,013	92,060	92,037	95,200	93,926	92,193	94,465	86,597	91,371	921,399	2,828	1,753
		Operating time	%	70.0%	96.4%	22.6%	43.3%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	90.0%	100.0%	85%		
		[TCE conc.]	µg/L	<0.50	<0.50	<0.50	*<0.50*	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1		
		Est. TCE mass	pounds	0.2	0.3	0.1	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	4		
	PV-15	Pumpage	x 1,000 gal	95,460	85,156	93,460	91,932	94,437	92,822	95,799	96,859	93,675	94,039	84,143	94,930	1,112,712	3,415	2,117
		Operating time	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	93.3%	100.0%	99%		
		[TCE conc.]	µg/L	4.2	3.6	4.1	3.8	3.8	4.1	4.2	4.5	5	4.6	4.6	4.4	4		
		Est. TCE mass	pounds	3.3	2.6	3.2	2.9	3	3.2	3.4	3.6	3.9	3.6	3.2	3.5	39		
	TOTAL	Pumpage	x 1,000 gal	151,728	156,562	108,323	132,945	186,497	184,859	190,999	190,785	185,868	188,504	170,740	186,301	2,034,111	6,242	3,870
		Est. TCE mass	pounds	3.6	2.9	3.3	3.1	3.4	3.6	3.8	4	4.3	4	3.6	3.9	43		
NGTF	PCX-1	Pumpage	x 1,000 gal	89,826.6	80,700.1	90,178	79,633.8	83,296.6	61,747.9	73,301.2	91,579.3	25,359.7	95,209.1	93,792.6	95,900.3	960,525	2,948	1,827
		Operating time	%	100.0%	100.0%	100.0%	92.5%	89.9%	68.8%	78.9%	100.0%	27.8%	96.8%	100.0%	100.0%	88%		
		Discharge$_{\text{Canal}}$	x 1,000 gal	161	172.4	41,067.4	10,565	10,068.9	305	582.4	13.6	11,498.6	15,762.5	183	376.3	90,756	279	173
		Discharge$_{\text{CWTP}}$	x 1,000 gal	89,325.4	80,161.6	48,711.6	68,676.1	72,542.9	60,979.1	72,022.5	90,831	13,311.2	78,518.7	92,563.4	94,326.8	861,950	2,645	1,640
		[TCE conc.]	µg/L	46	36	46	48	41	38	45	44	46	41	40	38	42		
		Est. TCE mass	pounds	34.5	24.2	34.6	31.9	28.5	19.6	27.5	33.6	9.7	32.6	31.3	30.4	339		
AREA 7 GWETS	7EX-3aMA	Pumpage	x 1,000 gal	5,556.8	4,250.8	4,925.1	4,868.4	5,515.5	5,542.5	4,303.8	6,462.1	6,542.5	6,434.9	6,185.6	6,615.8	67,204	206	128
		Operating time	%	99.4%	82.8%	89.7%	94.6%	98.8%	97.2%	68.5%	85.8%	95.4%	98.9%	100.0%	99.9%	93%		
		[TCE conc.]	µg/L	510	*510*	*510*	540	*540*	*540*	500	*500*	*500*	490	*490*	*490*	509		
		Est. TCE mass	pounds	23.6	18.1	21	21.9	24.9	25	18	27	27.3	26.3	25.3	27.1	285		
	7EX-4MA	Pumpage	x 1,000 gal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Operating time	%	-	-	-	-	-	-	-	-	-	-	-	-	-		
		[TCE conc.]	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Est. TCE mass	pounds	-	-	-	-	-	-	-	-	-	-	-	-	-		
	7EX-6MA	Pumpage	x 1,000 gal	6,941.8	4,811	9,019.3	10,293.8	10,623.6	9,838.5	3,806.9	-	6,508.8	10,271.3	9,733.6	8,090.5	89,939	276	171
		Operating time	%	70.3%	50.3%	75.8%	92.7%	96.7%	90.0%	28.4%	0%	53.4%	97.1%	93.8%	77.9%	69%		
		[TCE conc.]	µg/L	610	*610*	*610*	480	*480*	*480*	*430*	-	*430*	430	*430*	*430*	489		
		Est. TCE mass	pounds	35.3	24.5	45.9	41.2	42.6	39.4	13.7	-	23.4	36.9	34.9	29	367		
	TOTAL	Pumpage	x 1,000 gal	12,498.6	9,061.8	13,944.4	15,162.2	16,139.1	15,381	8,110.8	6,462.1	13,051.2	16,706.2	15,919.2	14,706.3	157,143	482	299
		Est. TCE mass	pounds	59	42.6	66.9	63.2	67.4	64.4	31.6	27	50.7	63.2	60.2	56.1	652		

			UNITS	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	TOTALS	ANNUAL PUMPAGE (in acre-feet)	ANNUAL PUMPAGE (in gpm)
AREA 12 GWETS	MEX-1MA (SRP 23.1E6N)	Pumpage	x 1,000 gal	-	-	40,397.8	39,724.9	40,687.2	39,592	36,178.2	40,535.2	38,180.7	41,122.8	39,591.5	30,232.2	386,243	1,185	735
		Operating time	%	-	-	97.2%	99.4%	99.7%	100.0%	88.6%	99.4%	95.8%	99.8%	100.0%	74.1%	80%		
		[TCE conc.]	µg/L	-	-	57	47	46	42	45	43	47	44	46	44	46		
		Est. TCE mass	pounds	-	-	19.2	15.6	15.6	13.9	13.6	14.5	15	15.1	15.2	11.1	149		
	Granite Reef (SRP 23.6E6N)	Pumpage	x 1,000 gal	-	-	34,099.5	33,651.9	34,326.8	33,519.2	29,628.1	34,429.1	33,559.3	34,567.4	33,099.3	23,953.4	324,834	997	618
		Operating time	%	-	-	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	-	-	97	110	100	88	98	93	120	97	100	91	100		
		Est. TCE mass	pounds	-	-	27.6	30.9	28.6	24.6	24.2	26.7	33.6	28	27.6	18.2	270		
	TOTAL	Pumpage	x 1,000 gal	-	-	74,497.3	73,376.8	75,014.1	73,111.2	65,806.3	74,964.3	71,740	75,690.1	72,690.8	54,185.6	711,077	2,182	1,353
		Est. TCE mass	pounds	-	-	46.8	46.5	44.3	38.5	37.8	41.3	48.6	43.1	42.8	29.3	419		

Total Pumping (in million gallons):	4,798	--	--
TCE Mass Removal (in pounds):	1,567	--	--
Total Pumping (in gpm):	--	--	9,129

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 Eurofins; 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 could not 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 2,870 acre-feet (AF) (or 935 million gallons [MG]) of groundwater were pumped and treated at the CGTF in 2023. Of the total, 294 MG were extracted from well COS-31, 367 MG from well COS-72, and 274 MG from well COS-75A (**Table 6**). CGTF extraction well COS-71A has not been operated for any duration of consequence since 2016 due to elevated concentrations of inorganic constituents (**Table 6**). In 2023, this well was rehabilitated and modified to pump only from the MAU to help balance objectives of the NIBW remedy with the City of Scottsdale's inorganics concerns (refer to **Section 10.1** for details). Well COS-75A was offline in the spring and summer of 2023 for well rehabilitation, testing, and pump replacement. It resumed operation in September but was shut down in October for routine column cleaning, which was extended through December due to work on the CGTF pipelines. The City of Scottsdale added access ports at several locations along the CGTF pipeline during 2023. The access ports will be used in the assessment of the current and future pipeline condition. While COS-75A was offline, well COS-31 and, to a much lesser extent, well COS-72 were operated to supply the water demand at CGTF. Production at well COS-72 had been decreasing for unknown reasons, so the well was shut off in October 2023 for assessment. Based on extraction well data presented in **Table 6**, an estimated 114 pounds of TCE were removed from groundwater and treated by the CGTF during 2023.

The CGTF operated consistently during 2023 except for maintenance and assessment periods. Downtime was primarily attributed to column cleaning, routine maintenance, and maintenance specific to the CGTF pipeline assessment and upgrades. The treatment system and associated wells were offline for 8 weeks in 2023—from October 13 to December 5—for annual column cleaning and CGTF pipeline upgrades.

The City of Scottsdale reports results of laboratory testing and plant operations directly to EPA and ADEQ. A detailed report of the 2023 operational status, laboratory data, and system performance was provided by the City of Scottsdale in CGTF Compliance Monitoring Reports (CMRs) submitted on May 17, August 23, and November 17, 2022, and February 28, 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 2023.

7.2 MRTF

Approximately 6,242 AF (or 2,034 MG) of groundwater were pumped and treated at the MRTF in 2023. Of the total, 921 MG were extracted from well PV-14 and 1,113 MG were extracted from well PV-15 (**Table 6**). Well PV-15 is the highest priority EPCOR well for the MRTF and was operated 99% of the time in 2023. Well PV-14 is the second highest priority well for the MRTF and was available for use throughout 2023 with the exception of downtime in March and April to conduct a treated water effluent pipeline repair from the MRTF to the PVARF.

Extraction well PV-14 operated 85% of 2023, with a reduction in pumping hours in January 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. A leak was discovered on EPCOR's treated water pipeline to PVARF on Cattletrack Road in February 2023. To minimize leaking of the treated water, the pipeline was operated at a reduced flow rate to maintain a reduced pipeline pressure. As such, PV-14 was kept offline between late February and April until repairs were completed. Extraction well PV-15 was operated 99% of 2023. Based on extraction well data presented in **Table 6**, an estimated 43 pounds of TCE were removed from groundwater treated by the MRTF during 2023.

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. No treated water from the MRTF was delivered to the SRP Arizona Canal in 2023.

7.3 NGTF

Approximately 2,948 AF (or 961 MG) of groundwater were pumped from PCX-1 and treated at the NGTF during 2023, with approximately 91 MG (11%) of the total volume discharged to the Arizona Canal and 862 MG (89%) to the CWTP (**Table 6**). Well PCX-1 was available for use and operational 88% of the time in 2023. Downtime for PCX-1 occurred in September when the pump motor failed. SRP worked quickly to replace the motor and the system was back online before the end of September. Based on extraction well data presented in **Table 6**, an estimated 339 pounds of TCE were removed from groundwater treated by the NGTF in 2023. 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 results of AZPDES sample analyses were summarized in monthly Discharge Monitoring Reports (DMRs) and submitted to ADEQ under separate cover during 2023.

7.4 Area 7 GWETS

Approximately 482 AF (or 157 MG) of groundwater were pumped and treated at the Area 7 GWETS in 2023. Of the total, approximately 67 MG were extracted from well 7EX-3aMA and 90 MG from well 7EX-6MA (**Table 6**).

GWETS downtime was due to severe weather and electrical storms in the area. The monsoon events periodically initiate alarms on the UV/Ox system due to the sensitive electrical nature of the high voltage equipment. Other downtime of the Area 7 GWETS included maintenance on the process pumps and upgrading the control system interface. Well 7EX-6MA was offline for brief intermittent periods throughout 2023 due to communications issues between the well and the system controls at Area 7. Cellular communications between the well and the Area 7 system were set up and tested in 2022. However, momentary disruptions have been shown to cause the well to shut down. The operator and the cellular carrier have indicated that the well is located in a commercial area of Scottsdale with many wireless and cellular communications devices that may cause interference. The operator and the carrier will continue work into 2024 to find a solution to the communications issues.

Well 7EX-6MA was offline for an extended period of time in August and September 2023 due to the failure of the air conditioning unit on the local control panel. The air conditioner was replaced in September 2023 and the well was returned to service.

In July of 2022, an attempt at extraction well 7EX-4MA to seal a breach in the casing was unsuccessful, rendering it unsuitable for groundwater extraction or monitoring purposes. Well 7EX-4MA was decommissioned on December 14, 2023. Additional details regarding the 7EX-4MA abandonment are provided in the Well Abandonment Report in **Appendix I**.

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 652 pounds of TCE were removed from groundwater treated by the Area 7 GWETS in 2023 (**Table 6**).

As part of Site QA procedures, PE samples (designated with sample ID SP-104) were submitted to Eurofins during January and July 2023, 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 2,182 AF (or 711 MG) of groundwater were pumped and treated at the Area 12 GWETS in 2023. Of the total, 386 MG were extracted from well MEX-1MA and 325 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. Although SRP dry-up ended in early February, the system was restarted on March 1, 2023, due to delays in disposal of the spent column cleaning solution that was collected in the air stripper sump. In June, July, August, and September the system was offline periodically due to severe weather conditions. Treatment system performance data provided by the Area 12 GWETS operator based on monthly sampling of extraction wells (when operating) indicates an estimated 419 pounds of TCE were removed from groundwater treated by the Area 12 GWETS in 2023 (**Table 6**).

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 submitted samples in 2023 to Eurofins (designated as the primary analytical laboratory), located in Phoenix, Arizona, and PACE (designated as the back-up analytical laboratory), located in Mt. Juliet, Tennessee. Eurofins and PACE are licensed by ADHS under analytical laboratory license numbers AZ0728 and AZ0612, respectively.

The City of Scottsdale and NIBW PCs conducted the annual audit of Eurofins on December 12, 2023. The objective of the annual audit is to ensure laboratory performance and data quality and 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 NIBW treatment systems in accordance with Section VI.B.4.d of the Amended CD SOW. The field inspections for the NGTF, CGTF, and Area 12 GWETS were conducted on December 6, 2023. Field inspections for the MRTF and Area 7 GWETS were conducted on December 7, 2023. In accordance with the SOW, the schedule of site inspections was coordinated 2 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 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 **Appendix H**.

7.7 Status of Site Plans

The Sitewide O&M Plan consists of the individual treatment system O&M Plans as well as the O&M Plans for the groundwater monitoring wells and the groundwater extraction wells. Other plans critical to each of the treatment systems include Contingency and Emergency Response Plans (CERPs). **Table 7** summarizes the history of O&M Plan and CERP submittals, reviews, and approvals. As noted, the last Sitewide O&M Plan officially approved by EPA was in 2006, and the most recent submittal of updated plans was in 2020 and 2021. The NIBW PCs responded to EPA comments and submitted final documents, which are being used to guide activities at the Site pending EPA approval.

Table 7. Summary of Site Plan Submittals and Approvals

Date	Description of Site Plan Submittals & Approvals
2006	Sitewide O&M Plan, consisting of individual treatment system O&M Plans and O&M Plans for groundwater monitoring and extraction wells, last officially approved by EPA
January 2007	City of Scottsdale submitted CERP for CGTF
2013	NIBW PCs submitted O&M Plan and CERP for newly constructed NGTF; upon approval by EPA, NGTF O&M Plan became part of Sitewide O&M Plan
2014	NIBW PCs submitted updated O&M Plans and CERPs for Area 7 GWETS, Area 12 GWETS, and MRTF
2016	NIBW PCs submitted updated NGTF O&M Plan for operation of three treatment trains
February 28, 2020	NIBW PCs updated and submitted treatment system O&M Plans for Area 7 GWETS, Area 12 GWETS, MRTF, and NGTF
April 30, 2020	EPA provided comments on NIBW PCs' treatment system O&M Plans and City of Scottsdale's 2018 CGTF O&M Plan
June 19, 2020	NIBW PCs and City of Scottsdale revised and resubmitted treatment system O&M Plans
August 28, 2020	NIBW Groundwater Extraction Well O&M Plan submitted to EPA
August 31, 2020	NIBW PCs updated and submitted treatment system CERPs for Area 7 GWETS, Area 12 GWETS, MRTF, and NGTF
September 3, 2020	City of Scottsdale submitted updated CGTF CERP
October 5, 2020	EPA provided comments on treatment system CERPs
October 28, 2020	EPA provided Final Agency Comments to the PCs Response to Comments, dated September 30, 2020
November 2020	Gilbane (EPA oversight contractor) indicated that they had no further comments on revised treatment system O&M Plans
December 31, 2020	CERPs for Area 7 GWETS, Area 12 GWETS, MRTF, and NGTF revised by NIBW PCs and resubmitted to EPA
January 26, 2021	EPA provided additional comments on Area 7 O&M Plan and CERP
February 2, 2021	Revisions made to NIBW Groundwater Extraction Well O&M Plan based on EPA's comments and document resubmitted to EPA
February 9, 2021	EPA provided additional comments on Area 12 O&M Plan and CERP
March 11, 2021	NIBW Groundwater Monitoring Well O&M Plan submitted to EPA

The NIBW PCs plan to finalize the treatment system O&M Plans in 2024 and submit the final documents to EPA for final approval to ensure that an updated Sitewide O&M Plan is available for use at the site.

8 DATA PRESENTATION AND ANALYSES

8.1 Groundwater Pumping

Groundwater pumping trends in the vicinity of the NIBW Site are summarized in **Table 8**. Monthly groundwater pumping data for 2023 are summarized in **Table 9**. Annual groundwater pumping data for 2014 through 2023 are summarized in **Table 10**; historic annual groundwater pumping data for 1991 through 2013 are summarized in **Appendix E, Table E-1**. Groundwater pumping data for 2023 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 identified by color on **Figure 6** (in percentages) and summarized in **Table 9** (in AF). **Appendix E** shows historical groundwater extraction graphed over the last 10-year period along with TCE concentrations.

Review of monthly groundwater pumping data (**Table 9**) 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 2023, combined monthly pumping for all wells tracked at the NIBW Site ranged from an annual minimum of approximately 1,065 AF (347 MG) in January 2023, to an annual maximum of 2,411 AF (approximately 786 MG) in July 2023 (**Table 9**).

Review of the spatial distribution of groundwater pumping for 2023 (**Figure 6**) indicates the presence of several pumping centers. The predominant pumping center is associated with the PV EPCOR wellfield, located along the Arizona Canal in the vicinity of McDonald Road and to the north. Total groundwater pumping for 2023 at the six PV wells was 9,845 AF (3,208 MG). This pumping is principally from the LAU. NGTF extraction well SRP22.5E9.3N (also known as PCX-1) pumped a total of 2,948 AF (961 MG) from the LAU in 2023 (**Table 9**). 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 was modified in 2023 to pump exclusively 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. Total groundwater pumping for 2023 at the CGTF extraction wells was 2,870 AF (935 MG). Due to an extended period of downtime at well COS-75A, CGTF pumping in 2023 was divided between three extraction wells (**Table 9**). Well COS-75A accounted for approximately 29% of CGTF extraction, with approximately 274 MG of the 935 MG pumped. Well COS-72 accounted for approximately 39% of CGTF extraction, with approximately 367 MG of the 935 MG pumped. Well COS-31 accounted for approximately 31% of CGTF extraction, with approximately 294 MG of the 935 MG pumped.

Pumping associated with the Area 7 GWETS and Area 12 GWETS is also fairly substantial, totaling 482 AF (157 MG) and 2,182 AF (711 MG) for 2023, respectively. 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 2023 at the five AWC wells, which pump from the MAU and LAU, was 1,807 AF (589 MG). When operating, well COT-6 comprises another significant pumping center to the south. Well COT-6 pumps from both the MAU and LAU. In 2023, COT-6 was operated from April through August for a total of 931.4 AF (304 MG).

Overall trends in pumping from 1991 through present are summarized in **Table 8**. Annual groundwater pumping in the vicinity of the NIBW Site for 2023 totaled 21,306 AF (6,943 MG) which is consistent with the average since 2017.

Table 8. 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 2023	The City of Scottsdale balancing inorganics not related to Site - pumping decreased to an average of approximately 23,249 AF (7,576 MG)

Table 9. 2023 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	5,557	4,251	4,925	4,868	5,516	5,543	4,304	6,462	6,542	6,435	6,186	6,616	67,204	206.2	0.0	206.2	0.0
7EX-4MA	0	100	0	0	0	0	0	0	0	0	0	0	0	0	AB	0	0	0.0	0.0	0.0
7EX-6MA [a]	0	100	0	6,942	4,811	9,019	10,294	10,624	9,838	3,807	0	6,509	10,271	9,734	8,090	89,939	276.0	0.0	276.0	0.0
PV-11	0	3	97	35	2,488	59,974	85,661	79,159	90,599	104,244	104,588	88,605	93,527	66,883	26,193	801,956	2,461.1	0.0	73.8	2,387.3
PV-12B [b]	0	3	97	0	255	2,659	13,599	24,504	40,702	75,118	76,187	43,907	36,316	17,477	858	331,582	1,017.6	0.0	30.5	987.1
PV-14	0	0	100	56,268	71,406	14,863	41,013	92,060	92,037	95,200	93,926	92,193	94,465	86,597	91,371	921,399	2,827.7	0.0	0.0	2,827.7
PV-15	0	6	94	95,460	85,156	93,460	91,932	94,437	92,822	95,799	96,859	93,675	94,039	84,143	94,930	1,112,712	3,414.8	0.0	204.9	3,209.9
PV-16	0	0	100	0	0	410	566	269	203	336	117	162	116	1,696	166	4,041	12.4	0.0	0.0	12.4
PV-17	0	0	100	0	0	816	783	2,172	823	4,707	7,153	1,562	9,996	8,042	341	36,395	111.7	0.0	0.0	111.7
AVI **	0	100	0	2,091	2,091	2,091	2,091	2,091	2,091	2,091	2,091	2,091	2,091	2,091	2,091	25,093	77.0	0.0	77.0	0.0
AWC-7A **	0	14	86	0	6,597	2,231	14,213	19,951	15,592	9,254	22,641	11,972	12,000	7,415	7,909	129,776	398.3	0.0	55.8	342.5
AWC-8B [c] **	0	4	96	1,813	5,344	3,588	21,577	22,603	15,771	18,567	19,863	17,911	13,506	7,666	8,177	156,386	479.9	0.0	19.2	460.7
AWC-8A **	0	18	82	1,414	3,325	2,582	12,012	12,939	11,152	13,749	11,548	12,557	9,120	5,050	5,386	100,834	309.4	0.0	55.7	253.7
AWC-9A/9B **	0	16	84	3,013	2,259	5,184	5,062	30,559	14,096	22,381	23,433	11,231	6,931	1,594	1,700	127,442	391.1	0.0	62.6	328.5
AWC-12A **	0	11	89	0	0	0	15,050	369	9,476	2,959	0	6,095	16,088	11,702	12,482	74,220	227.8	0.0	25.1	202.7
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	6	10	87	1,239	1,980	1,458	1,552	666	806	65	0	7,869	24.2	0.0	4.8	19.3
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	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
COS-72	0	48	52	48,896	0	0	15,198	8,672	24,781	79,312	78,903	51,854	0	689	58,658	366,962	1,126.2	0.0	540.6	585.6
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	903	0	0	903	2.8	0.0	0.0	2.8
COS-75A	0	0	100	86,869	75,056	74,486	5,397	0	2,928	0	0	638	28,507	0	0	273,882	840.5	0.0	0.0	840.5
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	85	15	0	0	0	10,760	81,600	74,720	82,090	54,333	0	0	0	0	303,503	931.4	0.0	791.70	139.71
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	1,473	1,306	1,381	1,581	3,016	1,567	5,283	3,342	1,804	4,628	1,685	1,511	28,579	87.7	0.0	10.5	77.2
MEX-1MA	0	100	0	0	0	40,398	39,725	40,687	39,592	36,178	40,535	38,181	41,123	39,592	30,232	386,243	1,185.3	0.0	1,185.3	0.0
QRIA	0	12	88	0	0	0	945	1,121	1,215	1,229	1,107	1,161	702	0	0	7,479	23.0	0.0	2.8	20.2
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	0	906	0	0	156	303	551	228	0	0	13	0	2,157	6.6	0.0	1.9	4.7
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	89,827	80,700	90,178	79,634	83,297	61,748	73,301	91,579	25,360	95,209	93,793	95,900	960,525	2,947.7	0.0	0.0	2,947.7
SRP22.6E10N	0	5	95	0	0	0	0	313	551	1,346	489	0	0	277	0	2,975	9.1	0.0	0.5	8.7
SRP22.9E10.8N [g]	0	8	92	0	0	13	0	186	297	759	319	0	0	156	0	1,730	5.3	0.0	0.4	4.9
COS-31 (SRP23.3E7.3N)	0	30	70	68	0	9,497	82,749	111,569	35,539	21,893	0	27,236	5,821	0	28	294,400	903.5	0.0	271.0	632.4
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	0	978	26	0	150	209	0	202	0	0	81	0	1,646	5.1	0.0	0.5	4.6
Granite Reef (SRP23.6E6N)	0	100	0	0	0	34,099	33,652	34,327	33,519	29,628	34,429	33,559	34,567	33,099	23,953	324,834	996.9	0.0	996.9	0.0
SRP24E10.5N	0	18	82	0	0	0	0	0	7	0	0	0	55	0	0	62	0.2	0.0	0.0	0.2
Total Monthly Discharge (Gallons x 1,000)				399,725	346,935	451,892	588,449	763,584	679,699	785,544	771,887	575,471	617,224	485,725	476,594	6,942,728				
Total Monthly Discharge (Acre-Feet)				1,227	1,065	1,387	1,806	2,343	2,086	2,411	2,369	1,766	1,894	1,491	1,463	21,306	21,306	0	4,894	16,413

EXPLANATION:

7EX =	Area 7 Extraction Wells	COT =	City of Tempe	NA =	Not Available
AB =	Well Abandoned	IBGC =	Indian Bend (Rio Salado) Golf Course	N.I.S. =	Not in Service
AVI =	Arcadia Vista Improvement	LAIRD =	Tempe School District well	QRIA =	Quail Run Irrigation Association
AWC =	Arcadia Water Company	MDWC =	McDowell Water Company	SRIR =	Salt River Indian Reservation
COS =	City of Scottsdale	MEX =	Motorola Extraction Well	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.

(1) Extraction well 7EX-4MA was inactive in 2023 and was abandoned December 14, 2023.

[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 connected to the SRPMIC community water system; well SRIR-SCC is no longer in use.

[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 10. Annual Groundwater Pumping in the NIBW Superfund Site Vicinity from 2014 through 2023

Well ID	Gallons (x1000)									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
7EX-1UA (1)	0	0	AB	AB	AB	AB	AB	AB	AB	AB
7EX-3aMA (2)	85,411	75,046	50,426	55,354	54,202	52,783	73,716	31,126	33,592	67,204
7EX-4MA (2)	35,461	28,280	16,720	0	0	0	0	0	0	AB
7EX-5MA (3)	0	0	0	AB	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	89,939
PV-11	610,793	587,317	667,557	673,419	574,889	433,655	623,004	596,102	242,710	801,956
PV-12	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
PV-12B[b]	438,959	422,165	809,273	558,911	452,431	835,263	741,792	833,931	762,807	331,582
PV-14	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	921,399
PV-15	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	1,112,712
PV-16	89,102	84,721	125,342	156,143	74,120	5,198	25,923	11,738	1,484	4,041
PV-17	12,581	12,304	31,554	10,217	173,515	156,611	122,929	180,423	108,994	36,395
AVI	48,633	44,140	43,214	40,492	37,393	32,484	34,637	30,255	22,821	25,093
AWC-7A	280,630	299,937	221,472	236,670	246,750	220,338	159,909	121,876	107,184	129,776
AWC-8/8B (5)	129,982	138,410	83,095	130,116	241,356	159,780	186,375	152,142	205,982	156,386
AWC-8A	44,916	67,315	106,568	99,776	101,678	71,389	64,861	110,329	73,257	100,834
AWC-9A	263,003	229,236	233,041	196,193	135,204	227,470	148,082	61,501	130,529	127,442
AWC-12A	309,414	274,882	297,279	231,665	191,707	135,610	174,663	208,879	140,398	74,220
COS-2	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS-3	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	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	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	9,929	11,903	11,450	13,771	12,834	9,678	12,555	9,851	11,087	7,869
COS-69	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS-70	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	12,211	AB	AB	AB	AB	AB	AB	AB	AB	AB

Well ID	Gallons (x1000)									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
COS-71A[c]	52,797	505,229	559,816	4,064	7,011	0	6,075	0	527	0
COS-72	16,847	285,438	380,588	13,068	151,031	263,425	407,248	313,782	347,992	366,962
COS-73	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	193,017	65	0	0	0	0	0	0	0	903
COS-75A	987,970	777,406	933,858	977,609	1,062,801	1,012,888	715,078	1,002,880	976,529	273,882
COS-76	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	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS-78	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COT-6	369,685	385,707	417,507	536,592	33,524	24,030	258,834	8,200	148,223	303,503
IBGC	119	0	0	0	0	0	0	NA	NA	NA
LAIRD-2	412	119	0	104	207	65	0	105	NA	NA
MDWC	36,964	39,853	54,486	51,438	39,710	36,020	30,139	28,962	29,073	28,579
MEX-1MA (6)	223,710	200,600	283,710	164,430	240,280	393,191	423,872	423,468	396,889	386,243
QRIA	10,510	10,921	9,382	9,234	7,450	8,370	10,044	8,357	7,169	7,479
SRIR-SCC[d]	65,405	60,768	56,972	61,068	60,161	45,217	33,014	NA	NA	NA
SRIR-4	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	AB	AB	AB	AB	AB
SRIR-10	N.I.S.	N.I.S.	N.I.S.	N.I.S.	N.I.S.	AB	AB	AB	AB	AB
SRP21.5E8N	208,382	73,131	18,104	AB	AB	AB	AB	AB	AB	AB
SRP21.6E8N[e]	---	---	---	---	---	---	---	11,392	55,841	2,157
SRP22.1E8.5N	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.
SRP22.3E7N	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.
SRP22.4E9N	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	88	212	0	101	7	0	0	N.I.S.	N.I.S.
SRP22.5E6N	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)	478,633	1,076,158	1,194,001	1,293,066	1,248,095	718,730	910,084	952,336	1,069,121	960,525
SRP22.6E10N	228,571	63,629	6,207	81	21,288	0	8,840	14,126	139,269	2,975
SRP22.9E10.8N[f]	305,492	183,239	29,066	91	16,957	2,222	150	2,483	13,816	1,730

Well ID	Gallons (x1000)									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
SRP23E10.8N (COS-5W)	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
COS-31 (SRP23.3E7.3N)	489,661	208,113	372,149	143,659	189,906	312,312	74,153	142,009	2,953	294,400
COS-6 (SRP23.3E7.5N)	0	7,723	4,054	0	1,082	4,920	1,457	681	0	0
SRP23.4E10.6N (COS-5E)	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
SRP23.5E5.3N	7	6,194	1,776	0	0	518	13	0	0	0
SRP23.5E8.8N	3	101	935	0	0	0	528	10,404	0	0
SRP23.5E9.5N	163	0	352	0	0	0	65	27,577	0	0
SRP23.5E10.6N[g]	217,193	115,912	20,369	0	33,374	251	78	854	38,125	1,646
Granite Reef (SRP23.6E6N)	195,150	305,880	348,810	184,350	304,370	150,273	140,744	369,948	344,732	324,834
SRP24E10.5N	332,586	138,399	34,931	173	79,524	2,014	1,261	25,064	76,930	62
Total Discharge (Gallons x1000)	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	6,942,728
Total Discharge (Acre-Feet)	27,296	27,159	28,202	24,744	24,784	22,457	23,065	22,719	23,670	21,306

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-4MA was inactive in 2023 and was abandoned December 14, 2023.
(4) Extraction well 7EX-5MA went into service in February 2002.
(5) Extraction well 7EX-6MA went into service on October 13, 2015.
(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 connected to the SRPMIC community water system; well SRIR-SCC is no longer in use.
[e] Replacement well for SRP21.5E8N
[f] Replacement well for SRP23E10.8N
[g] Replacement well for SRP23.4E10.6N

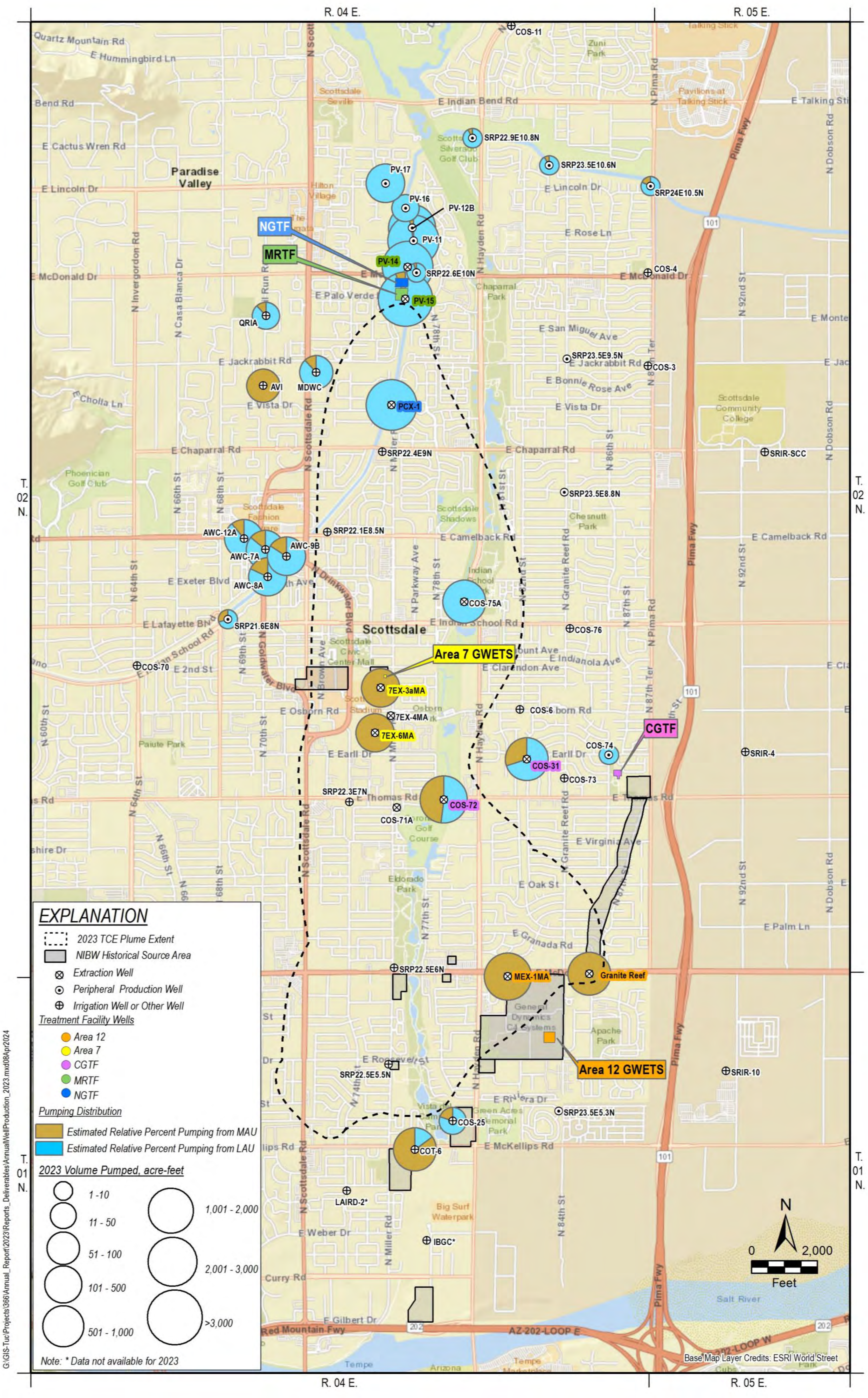


Figure 6. Annual Groundwater Pumping in the NIBW Superfund Site Vicinity

8.2 Groundwater Levels

Water level measurements were obtained by Montgomery & Associates in April and October 2023 and are summarized in **Appendix B**, **Table B-1 and Table B-2**, respectively. MAU and LAU water level monitoring is conducted bi-annually (April and October) and UAU monitoring is conducted annually (October), as reflected in referenced tables. April 2023 water level contour maps for the MAU and LAU are shown on **Figure 7**. October 2023 water level contour maps for the UAU, MAU, and LAU are shown on **Figure 8**.

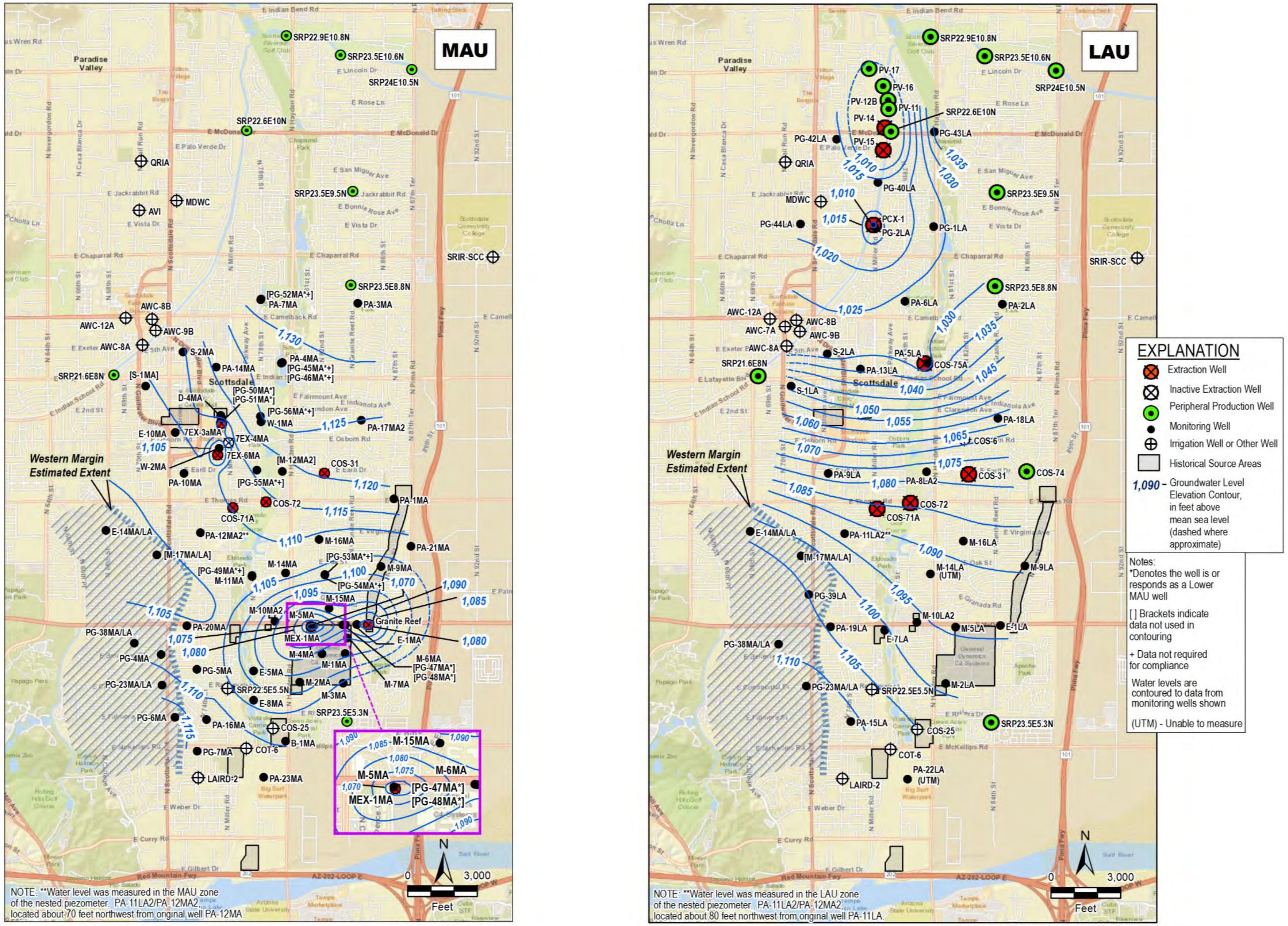
Hydrographs showing continuous water level data for wells in the Northern LAU monitoring program are provided in **Appendix B**. The PCs also collect supplemental continuous water level data (not required per the GM&EP) at additional MAU and LAU monitoring wells. While not included in this SMR, these supplemental data help interpret water level trends and pumping responses (See **Section 10.1.3**).

Pumping primarily occurs in the MAU and LAU and influences groundwater movement in the three alluvial unit aquifers. The principal pumping centers are discussed in **Section 8.1** and monthly pumping rates for 2023 are summarized in **Table 9**. **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 2023 April and October compliance water level monitoring events. Where appropriate, the pumping status of wells within or close to the Site during the April and/or October 2023 water level rounds is detailed in the following sections in relation to patterns of groundwater movement in each of the alluvial units.

8.2.1 2023 Groundwater Elevations

Based on the October 2023 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. In general, horizontal hydraulic gradients in the UAU 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 where the MAU thins and coarsens. Downward vertical hydraulic gradients exist across the Site and the CSM 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 level recovery in the LAU compared to the MAU. Recent monitoring in the lowermost interval of the MAU shows upward gradients in localized areas of the Site, depending on the pumping status of nearby wells. To facilitate evaluation of vertical gradients, the PCs have supplemented compliance Lower MAU monitoring with water level data collection from several additional Lower MAU wells since 2022.



NOTE: **Water level was measured in the MAU zone of the nested piezometer PA-11LA2/PA-12MA2 located about 70 feet northwest from original well PA-12MA.

NOTE: **Water level was measured in the LAU zone of the nested piezometer PA-11LA2/PA-12MA2 located about 80 feet northwest from original well PA-11LA.

EXPLANATION

- Extraction Well
- Inactive Extraction Well
- Peripheral Production Well
- Monitoring Well
- Irrigation Well or Other Well
- Historical Source Areas
- 1,090 - Groundwater Level Elevation Contour, in feet above mean sea level (dashed where approximate)

Notes:
*Denotes the well is or responds as a Lower MAU well

[ ] Brackets indicate data not used in contouring

+ Data not required for compliance

Water levels are contoured to data from monitoring wells shown

(UTM) - Unable to measure

Base Map Layer Credits: ESRI World Street

Base Map Layer Credits: ESRI World Street

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Figure 7. Groundwater Level Contours for the MAU and LAU from April 2023

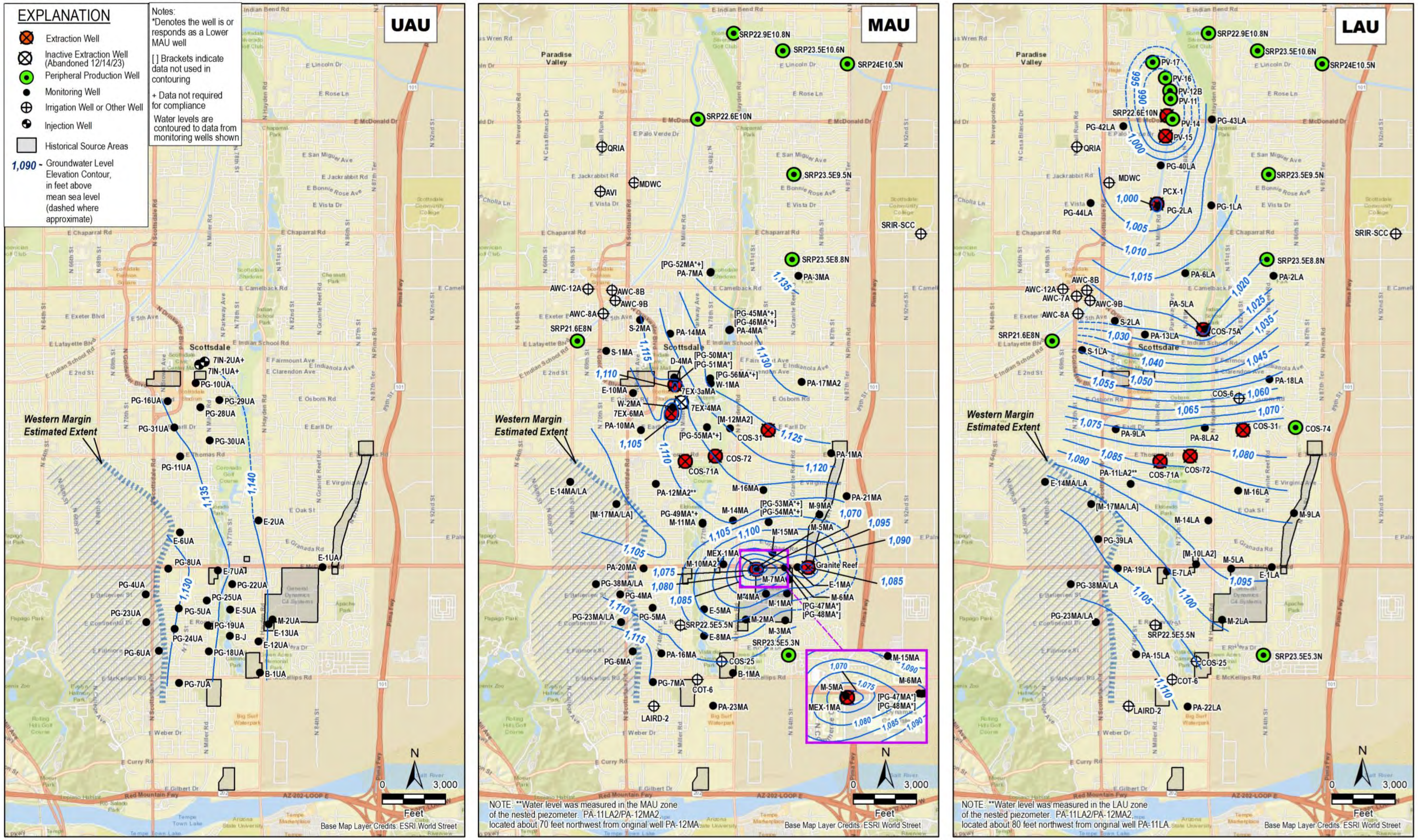

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Figure 8. Groundwater Level Contours for the UAU, MAU, and LAU from October 2023

The complex pattern of groundwater movement observed in the MAU is a 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 2023 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, the Granite Reef well and MEX-1MA; and 2) Area 7 GWETS wells, 7EX-3aMA and 7EX-6MA. Based on October 2023 conditions (**Figure 8**), cones of depression are apparent in the MAU in the vicinity of both the Area 7 and Area 12 extraction wells. Water level data from the following wells were excluded from MAU contouring and bracketed on **Figure 7** and **Figure 8** in 2023 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 been lower than the Upper MAU. In recent years, pumping reductions have resulted in disproportionate recovery in the Lower MAU and LAU compared to the Upper MAU, causing localized gradient reversals in some locations. Changes in vertical gradients are further evaluated using supplemental water level data collected at the following Lower MAU wells in April and October 2023: PG-45MA, PG-46MA, PG-49MA, PG-52MA, PG-53MA, PG-54MA, PG-55MA, and PG-56MA. No water level measurement was collected at PG-49MA in October, as EPA had approved abandonment (due to the presence of a well obstruction and anomalous data) and replacement as a compliance monitoring point with nearby well PG-53MA via e-mail on August 23, 2023. 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**.
- M-12MA2 – The NIBW PCs discontinued use of water level data from M-12MA2 for contouring in the Upper MAU in 2015, after concluding that data were inconsistent with 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 evaluation of water level responses to pumping continues to support the conclusion that M-12MA2 does not represent hydraulic conditions in the Upper MAU.
- 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 – Continued evaluation of high-frequency water level data collected in the well pairs S-1MA/LA and S-2MA/LA in 2023 supports previous conclusions that S-1MA water level data are incongruent with the Upper MAU. The pumping signature from Area 7 is clearly visible at S-2MA; whereas responses to local and regional pumping stresses at S-1MA are significantly muted. The supplemental high-frequency data further supports use of water level measurements from S-2MA over those from S-1MA (**Appendix B**). Both S-1MA and S-2MAs are cross-gradient of Area 7 extraction wells and TCE concentrations continued to be below the laboratory detection limit in 2023.

In both April and October, horizontal hydraulic gradients in the MAU increased in all directions toward the Area 7 GWETS and Area 12 GWETS pumping centers (**Figure 7** and **Figure 8**). Horizontal hydraulic gradients decrease significantly in the area outside of these pumping centers.

Water level data from one well was excluded from LAU contouring and bracketed on **Figure 7** and **Figure 8** in 2023 for the reason given:

- M-10LA2 – Beginning in early 2023, water level data at M-10LA2 has been inconsistent with the trends observed in other nearby LAU monitoring wells in all directions. Water level response is dampened compared to neighboring wells. NIBW PCs will continue to monitor this well to determine the extent to which water level data from M-10LA2 can be considered representative for the LAU. In the meantime, water level data from M-10LA2 were not contoured in April or October.

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 2023 on **Figure 7** and **Figure 8**, respectively. CGTF extraction well COS-75A, one of the upgradient LAU extraction wells for the remedy, was operating for both the April and October 2023 water level monitoring rounds, as was key LAU extraction well PCX-1. Northern LAU extraction wells PV-14 and PV-15 were both pumping continuously during the October water level round but only well PV-15 was pumping during the April water level round. Other wells pumping from the LAU during the two monitoring rounds include selected AWC wells and Paradise Valley wells PV-11 and PV-12B. Minor sporadic pumping also occurred at Paradise Valley wells PV-16 and PV-17.

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 2023 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 changes 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.

Demonstration of performance criteria and consistency of hydraulic gradients with the overall capture of the VOC plumes in the MAU and LAU are discussed in **Section 9.3**.

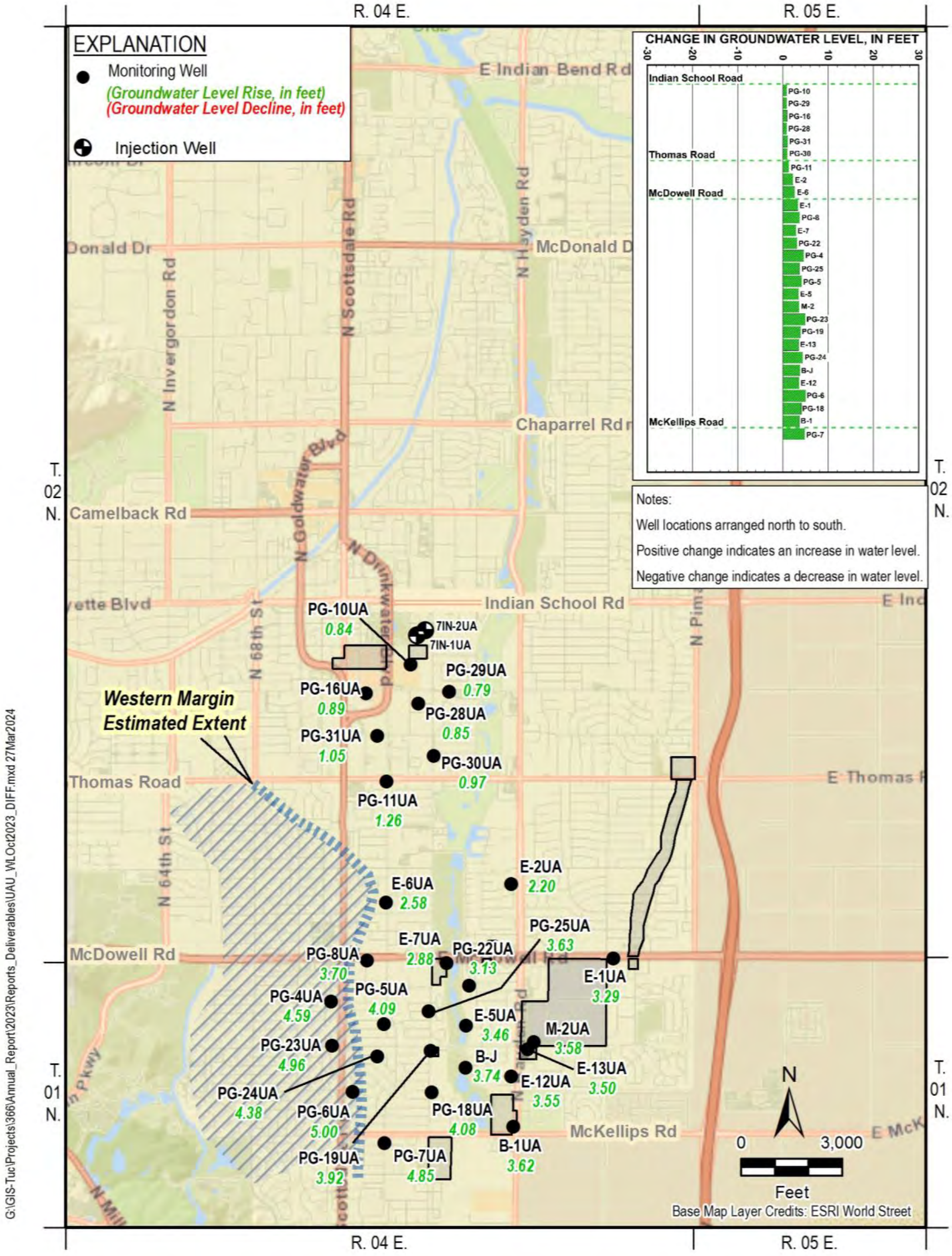
8.2.2 Annual Changes in Groundwater Elevation

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 2022 and October 2023 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 2022 and October 2023 data may not be reflective of long-term trends. In addition, water level changes of approximately 10 feet or more observed in monitoring wells adjacent to extraction wells are usually attributed to cycling of pumping 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.

Water levels rose in all UAU monitoring wells between October 2022 and October 2023, and the observed rise was in all cases less than 5.00 feet (**Figure 9**). Rise in water levels during this period is primarily interpreted to be regional background rise in the UAU. The magnitude of rise in the UAU to the north was generally smaller than to the south, ranging from 0.79 to 1.05 feet north of Thomas Road to 1.26 to 5.00 feet south of Thomas Road (**Figure 9**). The largest magnitude of rise of 5.00 feet was observed near the Western Margin at well PG-6UA.

Water levels rose in all MAU monitoring wells between October 2022 and October 2023 (**Figure 10**). Similar to the UAU, the magnitude of rise in the MAU to the north was generally smaller than to the south, ranging from 1.22 to 10.29 feet north of Thomas Road to 6.67 to 20.63 feet south of Thomas Road (**Figure 10**). Rise in water levels during this period is primarily interpreted to be regional background rise in the MAU. The largest magnitude of rise of 20.63 feet was observed near Area 7 in Lower MAU well PG-47MA.

Water levels rose in all LAU monitoring wells between October 2022 and October 2023 (**Figure 11**). The magnitude of rise in the LAU north of Thomas Road was generally larger than to the south, ranging from 7.48 to 18.38 feet, while the magnitude of rise in the LAU south of Thomas Road ranged from 6.30 to 12.97 feet (**Figure 11**). Rise in water levels during this period is primarily interpreted to be regional background rise in the LAU. However, the increased magnitude of rise north of Thomas Road is attributed to prolonged cessation of pumping at well COS-75A from March 29 to December 31, 2023, with only brief periods of uptime during that period. The largest magnitude of rise of 18.38 feet was observed near the AWC wellfield at well S-2LA and is attributed to slightly decreased pumping of the AWC wellfield as well as the decreased pumping of COS-75A, along with regional rise.



Notes:

Well locations arranged north to south.

Positive change indicates an increase in water level.

Negative change indicates a decrease in water level.

Figure 9. Change in UAU Groundwater Level from October 2022 to October 2023

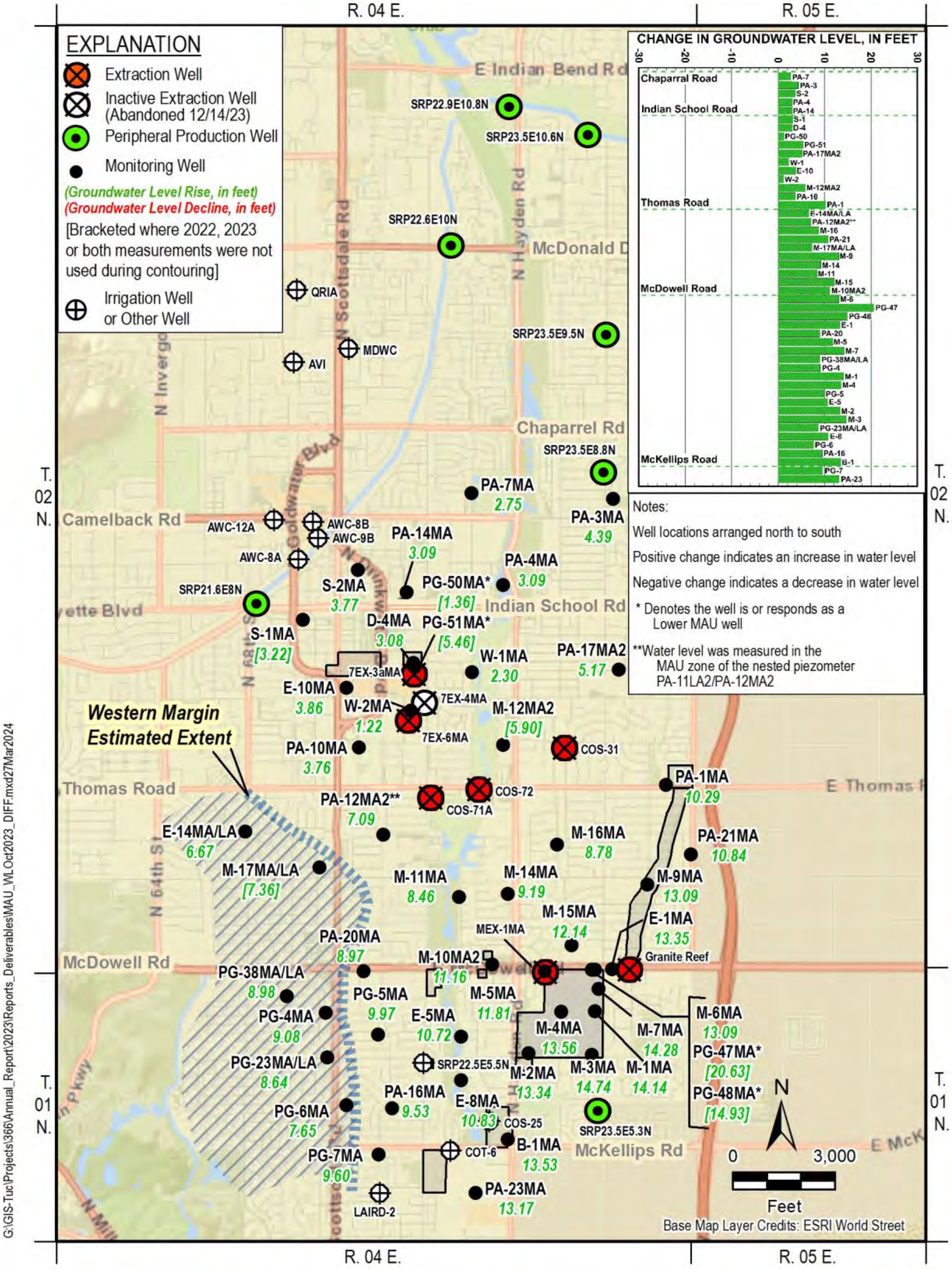


Figure 10. Change in MAU Groundwater Level from October 2022 to October 2023

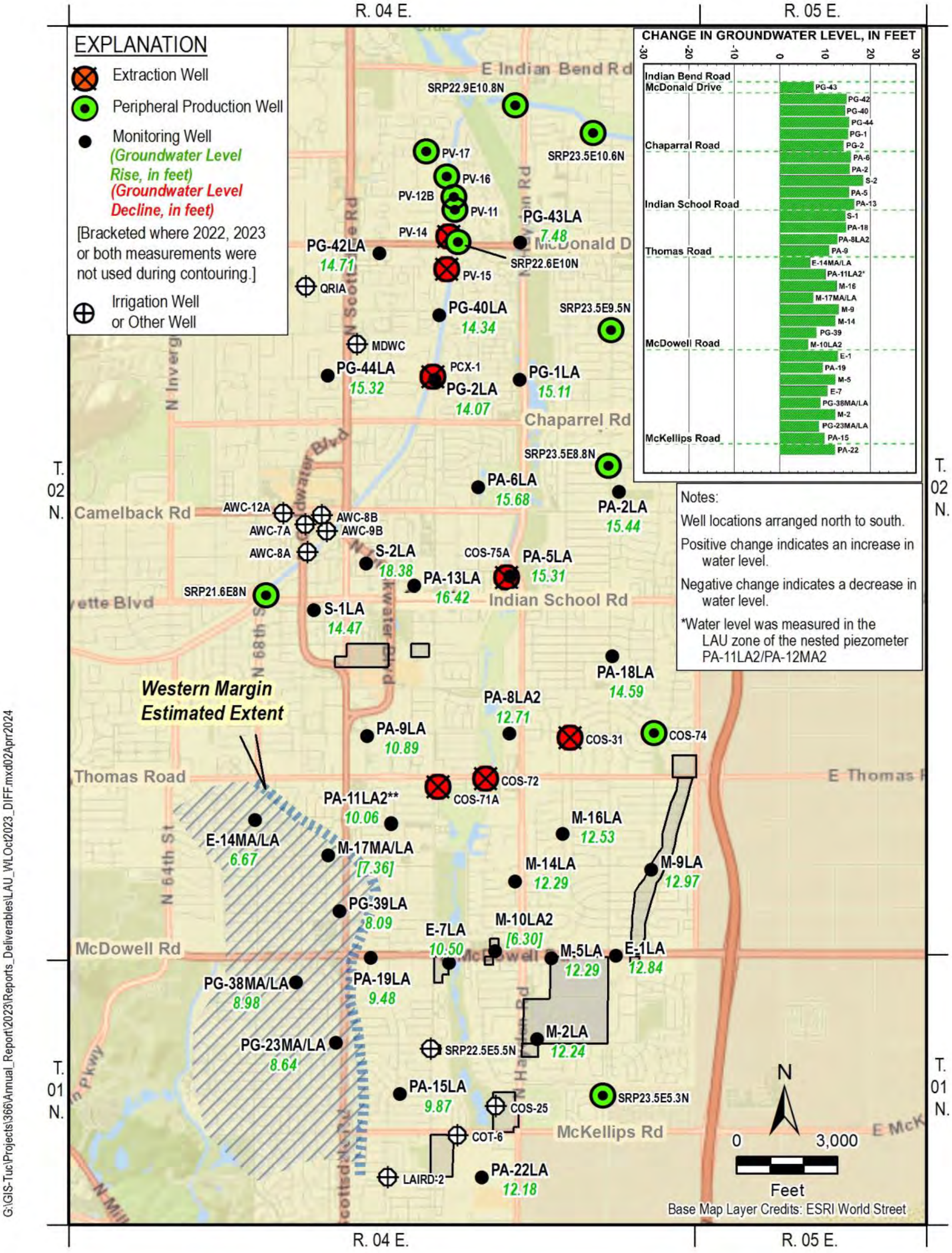


Figure 11. Change in LAU Groundwater Level from October 2022 to October 2023

8.3 Water Quality

During 2023, Montgomery & Associates coordinated activities by both the analytical laboratory, Eurofins, Inc., and the principal groundwater sampling contractor, Confluence Environmental. HydraSleeve samples are collected by Montgomery & Associates. EnSolutions collects samples from NIBW extraction wells and treatment systems.

8.3.1 2023 COC Concentrations

A summary of COC laboratory results for NIBW monitoring wells for 2023 is provided in **Appendix C, Table C-1**. Extraction well COC results for 2023 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 2023 plume contours are compared to 2001 plume contours, and a statistical trend analysis is conducted for individual wells for the most recent 10- and 5-year periods. 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 2023 TCE Magnitude & Extent

TCE concentration contours for October 2023 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 2023 are shown for all monitoring wells included in the monitoring program in **Appendix D**.

Results from the October 2023 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 4.4 µg/L at monitoring well E-5UA in October 2023. A small plume is shown in the UAU with dashed contours on **Figure 12** based on the interpretation that TCE concentrations are anticipated to remain above Cleanup Standards in a limited area between monitoring wells.

TCE concentrations in MAU groundwater are generally higher than in the other two units, with a 2023 maximum concentration of 1,000 µg/L detected in July 2023 at monitoring well W-2MA, located downgradient from Area 7 (**Appendix C, Table C-1**). TCE detected at monitoring well W-2MA declined to 640 µg/L in October 2023. The maximum concentration of TCE detected in a monitoring well in the vicinity of Area 12 was 57 µg/L at M-10MA2, located cross-gradient from Area 12, in February 2023. However, TCE concentrations through the remainder of 2023 at M-10MA2 ranged between 33 and 43 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 47 µg/L in April 2023. The Area 12 Granite Reef extraction well, located at historical source Area 5B, had a maximum TCE concentration of 120 µg/L in September 2023 (**Appendix C, Table C-2**). Area 12 extraction well MEX-1MA had a maximum TCE concentration of 57 µg/L in March 2023. 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 110 µg/L in October 2023.

TCE concentrations in LAU groundwater are generally intermediate between the UAU and the MAU, with a maximum concentration of 100 µg/L detected in April 2023 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**).

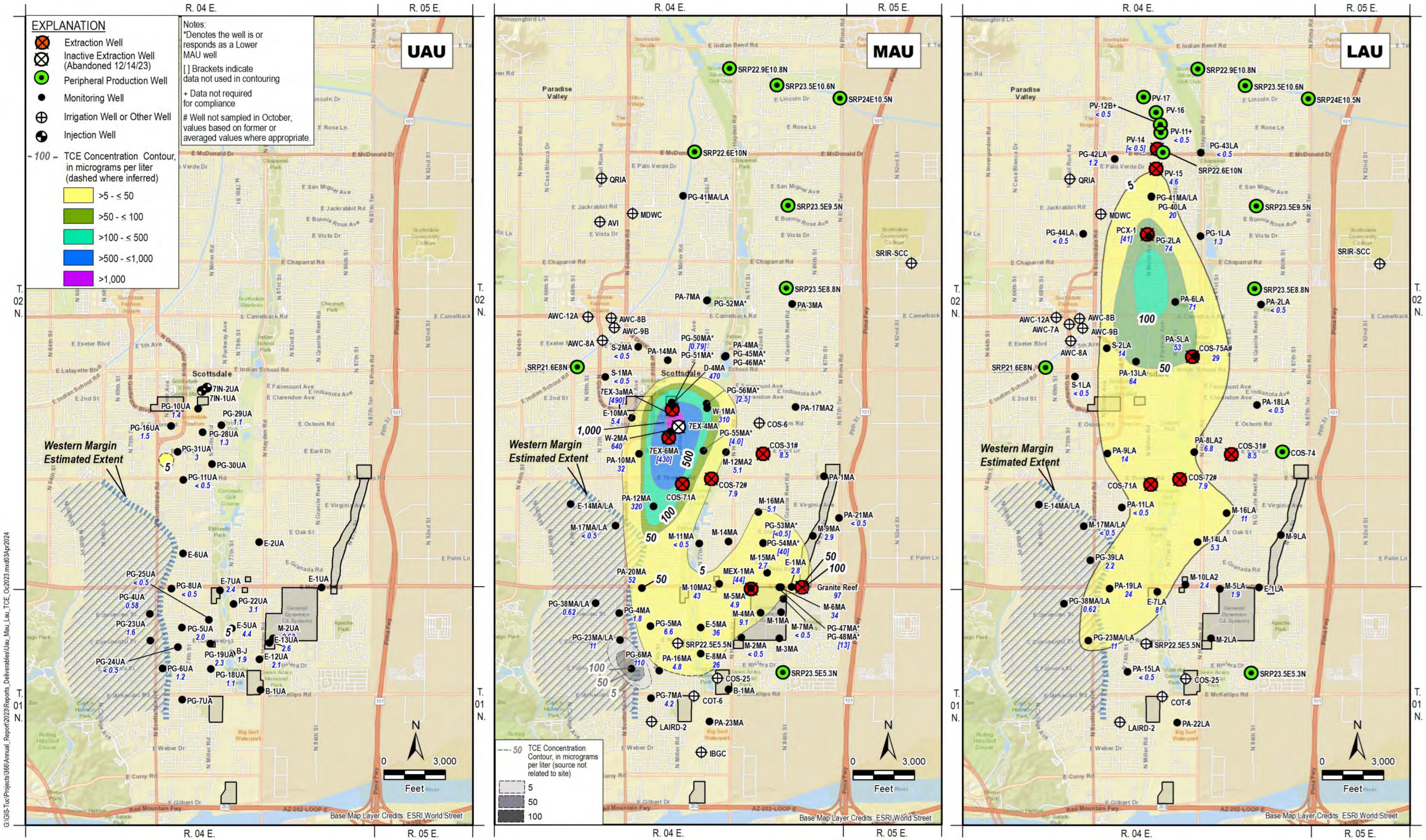


Figure 12. Concentrations of TCE in the UAU, MAU, and LAU from October 2023

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 2023. 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 approximately 99% from October 2001 to October 2023. 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, there is minimal reduction in the overall extent of the TCE plumes in the MAU and LAU between October 2001 and October 2023, as illustrated on **Figure 13**. The only area of plume expansion is in relation to the predictable migration of the LAU plume to the north in response to regional hydraulic gradients (**Figure 8**) and LAU remedial 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 2023 are generally small (**Figure 13**). However, review of inner MAU and LAU plume contours demonstrates that the magnitude and extent of higher TCE concentration areas have been reduced significantly over time through groundwater extraction and treatment.

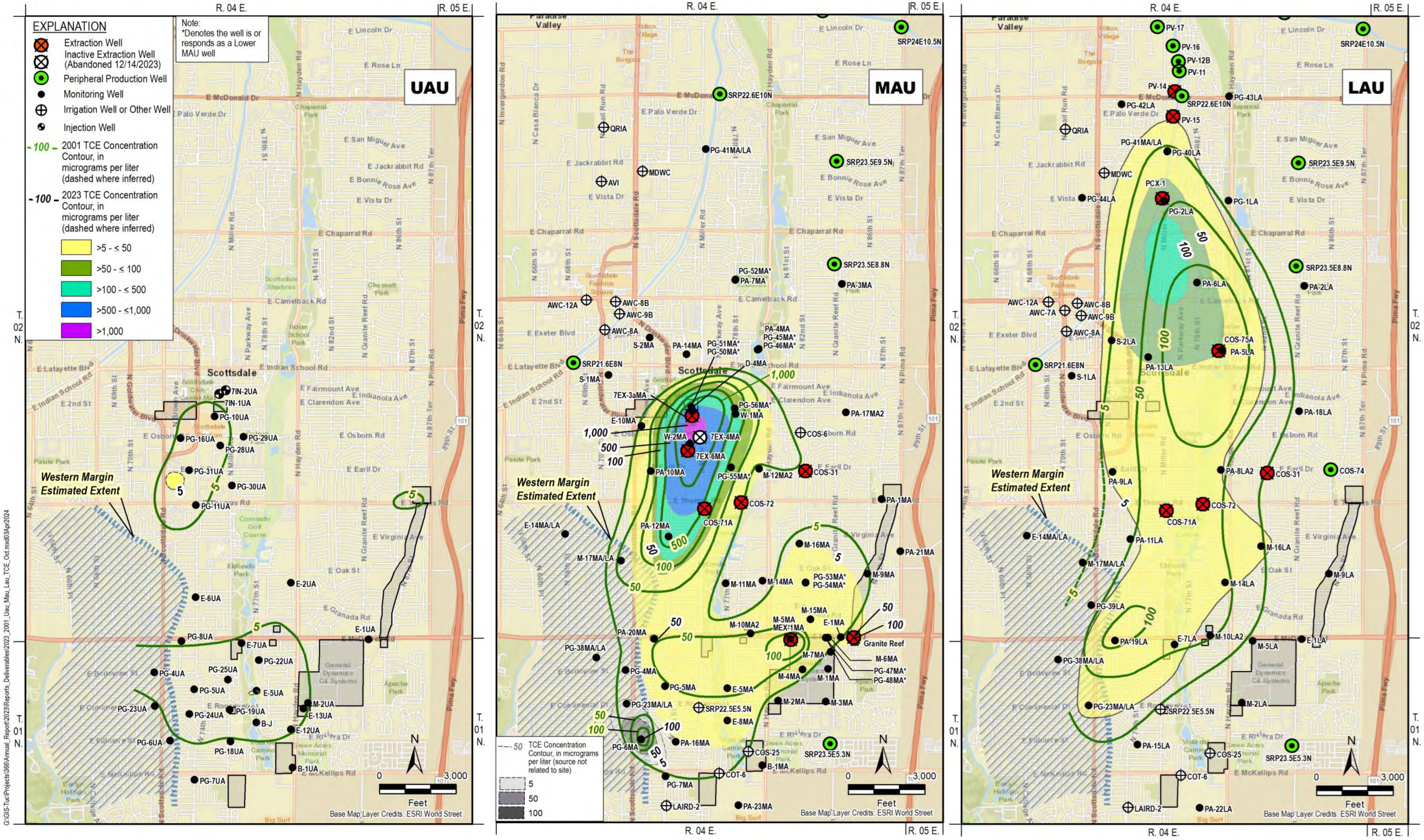


Figure 13. Concentrations of TCE in the UAU, MAU, and LAU for October 2001 and October 2023

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, which 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 2023 SMR are consistent with the methodology used in EPA's 2021 Five-Year Review.

TCE data from 2019 through 2023 (5 years) were used for analyzing trends for recent time. TCE data from 2014 through 2023 (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 fewer than four samples in the last 5 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 11**.

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, PG-16UA, over the 10-year period (**Figure 14**). TCE concentrations at PG-16UA have been consistently low and well below the 5 µg/L MCL over the 10-year period. The TCE concentration at PG-16-UA in 2023 was 1.5 µg/L (**Appendix C, Table C-1**). One UAU well (E-7UA) has an increasing trend over the 5-year period (**Figure 15**). E-7UA has also shown consistently low concentrations, with a TCE concentration of 2.4 µg/L in 2023. These minor 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 three MAU monitoring wells over the 10-year period and four over the 5-year period. The increasing trends over the 10-year period at PA-10MA and E-10MA are attributed to the 2017 concurrent failure of extraction well 7EX-4MA and significant reductions in pumping at COS-71A, both located further to the east, and increased pumping at 7EX-6MA, located further to the west (**Table 10** and **Figure 14**). The TCE concentration at monitoring well PA-10MA was 32 µg/L in October 2023 and the TCE concentration at E-10MA was 5.4 µg/L in October 2023. The 10-year increasing concentration at M-6MA is due to downtimes that occurred at the Granite Reef well, located immediately upgradient from M-6MA in 2017, 2019, and 2020. The Granite Reef well is located at historical source Area 5B and has consistently had the highest TCE concentrations in the southern part of the MAU. The TCE concentration at M-6MA was 34 µg/L in October 2023. Monitoring wells M-10MA2, PG-7MA, E-10MA, and E-5MA 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 10**). 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 5-year period, as shown in **Table 11**, and on **Figure 14** and **Figure 15**. However, for the 10-year period an increasing trend at PG-54MA was observed and may be attributable to downtime at the Granite Reef well in 2017, 2019, and 2020. PG-54MA had a TCE concentration of 40 µg/L in October 2023.

TCE concentrations in the LAU are mostly decreasing or stable. Increasing TCE concentration trends are observed at three LAU monitoring wells for the 10-year period and four monitoring wells for the 5-year period. The Mann-Kendall analysis indicates that monitoring wells PG-2LA, M-5LA, and PG-1LA 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-40LA has an increasing trend over the 5-year period. Concentrations at both PG-1LA and M-5LA were below the 5 µg/L NIBW Cleanup Standard for TCE in 2023. 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 11**).

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 a stable trend both over recent time and the longer term. Well COS-71A has been removed from the remedial pumping priority list in 2016 due to inorganic water quality, and 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 11**).

TCE concentration trends for NGTF extraction well PCX-1 are decreasing for recent time (5 years) as well as over the longer term (10 years) (**Table 11**).

TCE concentration trends for Area 7 extraction well 7EX-3aMA show no statistically significant trend for recent time (5 years) and 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 11**).

TCE concentration trends for Area 12 Granite Reef and MEX-1MA extraction wells have no trend in recent time (5 years) and show a decreasing trend over the longer term (10 years) (**Table 11)**.

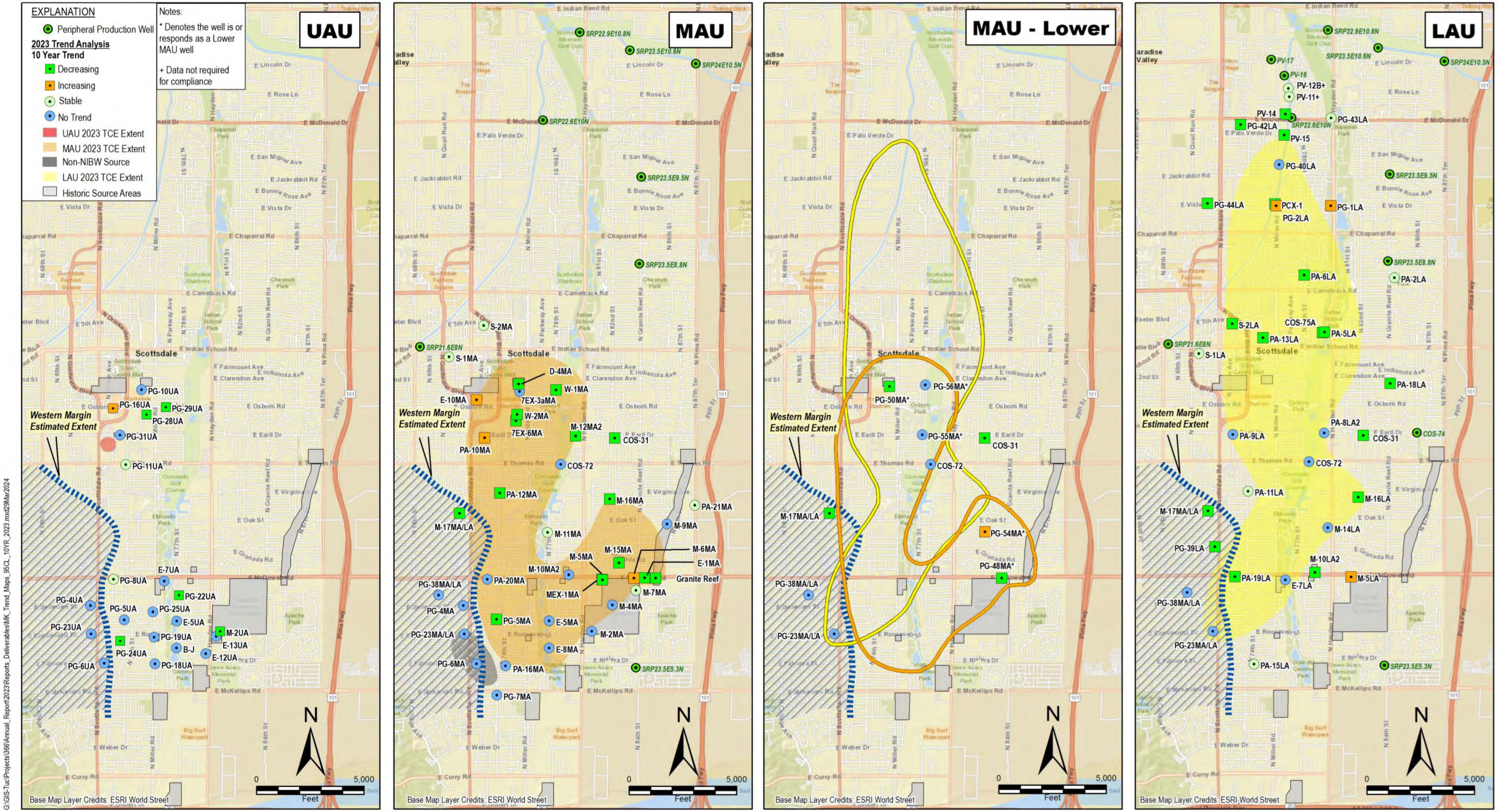


Figure 14. 10-Year Mann-Kendall TCE Trend or Stability Results for the UAU, MAU, MAU-Lower, and LAU

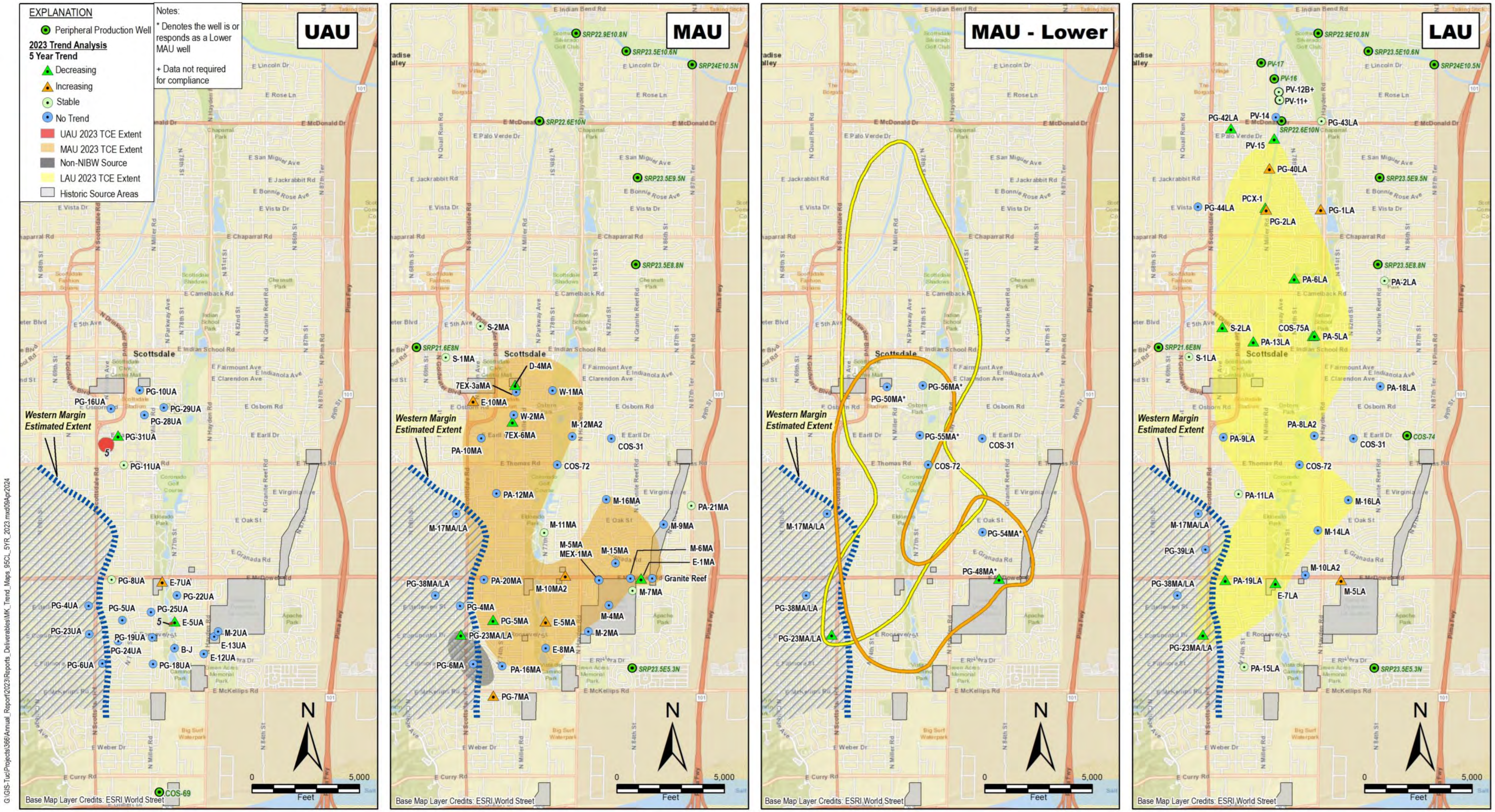


Figure 15. 5-Year Mann-Kendall TCE Trend or Stability Results for the UAU, MAU, MAU-Lower, and LAU

Table 11. 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	10-Year Maximum Concentration
7EX-3aMA	MAU	Extraction	No Trend	No Trend	260	670
7EX-6MA	MAU	Extraction	Decreasing	Decreasing	290	700
B-J	UAU	Monitoring	No Trend	No Trend	0.66	2.7
COS-31	MAU/LAU	Extraction	Decreasing	No Trend	3.4	17
COS-72	MAU/LAU	Extraction	No Trend	No Trend	5.8	12
COS-75A	LAU	Extraction	Decreasing	Decreasing	27	75
D-4MA	MAU	Monitoring	Decreasing	Decreasing	470	1,000
E-1MA	MAU	Monitoring	Decreasing	Decreasing	<0.50	110
E-5MA	MAU	Monitoring	No Trend	Increasing	1.8	76
E-5UA	UAU	Monitoring	No Trend	Decreasing	2.5	5.8
E-7LA	LAU	Monitoring	No Trend	Decreasing	8.0	21
E-7UA	UAU	Monitoring	No Trend	Increasing	<0.50	2.4
E-8MA	MAU	Monitoring	No Trend	No Trend	17	47
E-10MA	MAU	Monitoring	Increasing	Increasing	2.8	8.4
E-12UA	UAU	Monitoring	No Trend	No Trend	1.5	6.7
E-13UA	UAU	Monitoring	No Trend	No Trend	0.93	3.0
Granite Reef	MAU	Extraction	Decreasing	No Trend	34	170
M-2MA	MAU	Monitoring	No Trend	No Trend	<0.50	30
M-2UA	UAU	Monitoring	Decreasing	No Trend	0.58	1.8
M-4MA	MAU	Monitoring	No Trend	No Trend	3.3	46
M-5LA	LAU	Monitoring	Increasing	Increasing	1.1	1.9
M-5MA	MAU	Monitoring	Decreasing	No Trend	3.1	44
M-6MA	MAU	Monitoring	Increasing	No Trend	4.3	100
M-7MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
M-9MA	MAU	Monitoring	No Trend	No Trend	2.4	5.8
M-10LA2	LAU	Monitoring	Decreasing	No Trend	2.4	11
M-10MA2	MAU	Monitoring	No Trend	Increasing	15	59
M-11MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
M-12MA2	MAU	Monitoring	Decreasing	No Trend	5.0	17
M-14LA	LAU	Monitoring	No Trend	No Trend	5.3	22
M-15MA	MAU	Monitoring	Decreasing	No Trend	2.4	10
M-16LA	LAU	Monitoring	Decreasing	No Trend	8.4	26
M-16MA	MAU	Monitoring	Decreasing	No Trend	3.7	11
M-17MA/LA	MAU/LAU	Monitoring	Decreasing	No Trend	<0.50	8.4
MEX-1MA	MAU	Extraction	Decreasing	No Trend	32	77
PA-2LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PA-5LA	LAU	Monitoring	Decreasing	Decreasing	33	150
PA-6LA	LAU	Monitoring	Decreasing	Decreasing	20	260
PA-8LA2	LAU	Monitoring	No Trend	No Trend	3.8	16
PA-9LA	LAU	Monitoring	No Trend	No Trend	<0.50	21
PA-10MA	MAU	Monitoring	Increasing	No Trend	9.3	87
PA-11LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PA-12MA	MAU	Monitoring	Decreasing	No Trend	190	370
PA-13LA	LAU	Monitoring	Decreasing	Decreasing	17	190
PA-15LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PA-16MA	MAU	Monitoring	No Trend	No Trend	0.61	11
PA-18LA	LAU	Monitoring	Decreasing	No Trend	<0.50	1.2
PA-19LA	LAU	Monitoring	Decreasing	Decreasing	24	94
PA-20MA	MAU	Monitoring	No Trend	No Trend	35	71
PA-21MA	MAU	Monitoring	Stable	Stable	<0.50	<0.50
PCX-1	LAU	Extraction	Decreasing	Decreasing	36	75
PG-1LA	LAU	Monitoring	Increasing	Increasing	<0.50	1.3
PG-2LA	LAU	Monitoring	Increasing	Increasing	41	100
PG-4MA	MAU	Monitoring	No Trend	No Trend	1.5	2.6
PG-4UA	UAU	Monitoring	No Trend	No Trend	<0.50	0.95
PG-5MA	MAU	Monitoring	Decreasing	Decreasing	6.6	26
PG-5UA	UAU	Monitoring	No Trend	No Trend	1.6	2.8
PG-6MA	MAU	Monitoring	No Trend	No Trend	82	110
PG-6UA	UAU	Monitoring	No Trend	No Trend	<0.50	2.3
PG-7MA	MAU	Monitoring	No Trend	Increasing	<0.50	5.5
PG-8UA	UAU	Monitoring	Stable	Stable	<0.50	<0.50
PG-10UA	UAU	Monitoring	No Trend	No Trend	0.69	1.4
PG-11UA	UAU	Monitoring	Stable	Stable	<0.50	<0.50
PG-16UA	UAU	Monitoring	Increasing	No Trend	<0.50	1.7
PG-18UA	UAU	Monitoring	No Trend	No Trend	0.71	3.0
PG-19UA	UAU	Monitoring	No Trend	No Trend	1.8	3.7
PG-22UA	UAU	Monitoring	Decreasing	No Trend	2.4	6.3
PG-23MA/LA	MAU/LAU	Monitoring	No Trend	Decreasing	10	15
PG-23UA	UAU	Monitoring	No Trend	No Trend	<0.50	2.2
PG-24UA	UAU	Monitoring	Decreasing	No Trend	<0.50	5.9
PG-25UA	UAU	Monitoring	No Trend	No Trend	<0.50	3.3
PG-28UA	UAU	Monitoring	Decreasing	No Trend	0.73	5.1
PG-29UA	UAU	Monitoring	Decreasing	No Trend	<0.50	2.9
PG-31UA	UAU	Monitoring	No Trend	Decreasing	3.0	36
PG-38MA/LA	MAU/LAU	Monitoring	No Trend	No Trend	<0.50	1.1
PG-39LA	LAU	Monitoring	Decreasing	No Trend	2.2	5.3
PG-40LA	LAU	Monitoring	No Trend	Increasing	7.4	25
PG-42LA	LAU	Monitoring	Decreasing	Decreasing	<0.50	3.7
PG-43LA	LAU	Monitoring	Stable	Stable	<0.50	<0.50
PG-44LA	LAU	Monitoring	Decreasing	No Trend	<0.50	1.6
PG-48MA	MAU - Lower	Monitoring	Decreasing	Decreasing	9.3	110
PG-50MA	MAU - Lower	Monitoring	Decreasing	No Trend	<0.50	12
PG-54MA	MAU - Lower	Monitoring	Increasing	No Trend	2.0	40
PG-55MA	MAU - Lower	Monitoring	No Trend	No Trend	0.78	6.9
PG-56MA	MAU - Lower	Monitoring	No Trend	No Trend	2.2	3.3
** 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	2.0
PV-15	LAU	Extraction	Decreasing	Decreasing	1.9	8.4
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	Decreasing	No Trend	290	690
W-2MA	MAU	Monitoring	Decreasing	No Trend	630	4,400

EXPLANATION:

<0.50 = Below Detection at 0.50 µg/L

* = Sample not collected in 2023

** = 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 2023 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 Amended CD 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 2023. 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 2023, samples of treated groundwater were collected by the City of Scottsdale 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 in 2023. Although the City of Scottsdale submits results under separate cover, Level 4 analytical reports are included as part of the supplemental data reports submitted with the SMR.

9.1.2 MRTF Evaluation

Throughout 2023, 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 in

2023. Sample results summarized in **Appendix C, Table C-3** demonstrate that the MRTF consistently achieved the Cleanup Standards for treated groundwater in 2023.

9.1.3 NGTF Evaluation

Throughout 2023, 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 in 2023. Sample results summarized in **Appendix C, Table C-3** demonstrate that the NGTF consistently achieved the Cleanup Standards for treated groundwater in 2023. 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 2023, 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 in 2023. Sample results summarized in **Appendix C, Table C-3** demonstrate that the Area 7 GWETS consistently achieved the Cleanup Standards for treated groundwater in 2023.

9.1.5 Area 12 GWETS Evaluation

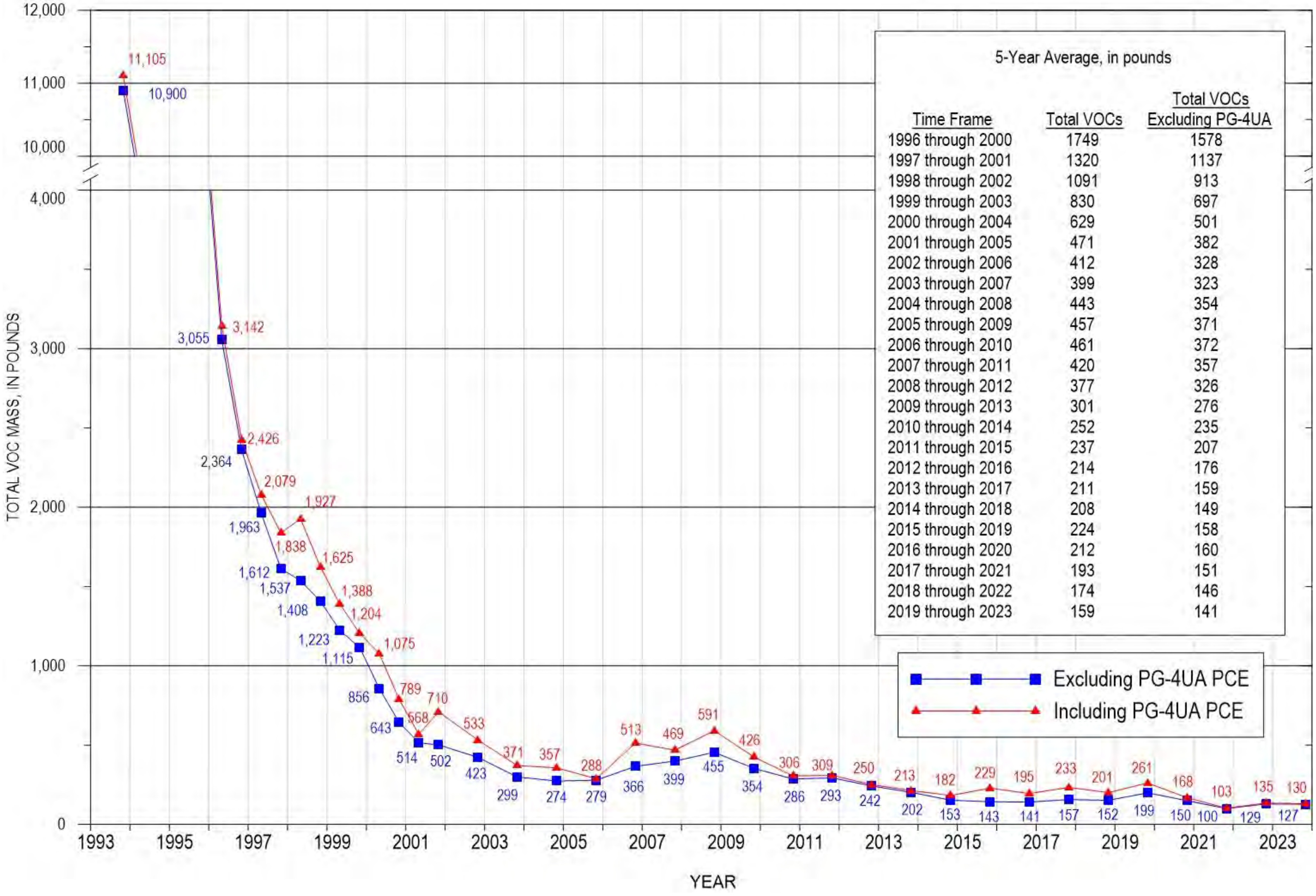
Throughout 2023, samples of treated groundwater were collected from air stripper effluent (WSP-2) at the Area 12 GWETS and analyzed for NIBW COCs on a monthly basis when the treatment system was in operation. The results of sampling and analysis are included in **Appendix C, Table C-3**. As evidenced 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 in 2023. Sample results summarized in **Appendix C, Table C-3** demonstrate that the Area 12 GWETS consistently achieved the Cleanup Standards for treated groundwater in 2023. 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. The GM&EP refers to the calculation of average change in mass over time in the UAU as the "mass flux" analysis. For the 2023 VOC mass flux analysis, total mass of VOCs present in UAU groundwater was computed using data for saturated thickness from the October 2023 water level monitoring round and VOC concentration data from the October 2023 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 EPA and ADEQ acknowledge is unrelated to the Site. **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 30 years, declining from a high of over 11,000 pounds in 1993 to the 2023 estimate of 130 pounds. In recent years, the VOC mass reduction with time has become fairly asymptotic. The mass calculation is for dissolved VOC mass only and does not account for any sorbed phase mass that may be present.

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 159 pounds represents a decrease relative to the previous 5-year average of 174 pounds, indicating the performance measure for UAU mass reduction has been achieved for 2023.

Table 12 summarizes VOC mass estimates for UAU groundwater for 2023. Based on 2023 data, a total of approximately 10.8 gallons, or 130 pounds, of VOCs are estimated to remain in the saturated portion of the UAU (**Table 12**).



5-Year Average, in pounds

Time Frame	Total VOCs	Total VOCs Excluding PG-4UA
1996 through 2000	1749	1578
1997 through 2001	1320	1137
1998 through 2002	1091	913
1999 through 2003	830	697
2000 through 2004	629	501
2001 through 2005	471	382
2002 through 2006	412	328
2003 through 2007	399	323
2004 through 2008	443	354
2005 through 2009	457	371
2006 through 2010	461	372
2007 through 2011	420	357
2008 through 2012	377	326
2009 through 2013	301	276
2010 through 2014	252	235
2011 through 2015	237	207
2012 through 2016	214	176
2013 through 2017	211	159
2014 through 2018	208	149
2015 through 2019	224	158
2016 through 2020	212	160
2017 through 2021	193	151
2018 through 2022	174	146
2019 through 2023	159	141

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

Table 12. Summary of VOC Mass Estimates in UAU

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)[b]	VOC VOLUME (gallons)	VOC MASS (pounds)[c]
B-J	3.3	1,065	1,136.56	72	1,312,017	93,887,937	797,643,742	0.48	5.80
E-5UA	5.0	1,067	1,136.38	69	1,563,483	108,474,451	921,566,389	0.84	10.08
E-7UA	3.1	1,079	1,132.16	53	2,135,156	113,504,893	964,303,519	0.56	6.68
E-12UA	2.8	1,075	1,139.64	65	1,868,432	120,775,444	1,026,071,944	0.53	6.38
E-13UA	3.8	1,080	1,140.01	60	851,113	51,075,291	433,920,351	0.30	3.64
M-2UA	1.9	1,081	1,140.27	59	1,081,841	64,120,716	544,750,368	0.19	2.31
PG-4UA	2.4	1,055	1,126.37	71	2,867,709	204,668,391	1,738,801,252	0.76	9.16
PG-5UA	2.7	1,036	1,130.27	94	1,729,659	163,054,954	1,385,265,972	0.68	8.19
PG-6UA	2.2	1,043	1,128.93	86	2,363,199	203,069,690	1,725,219,166	0.70	8.37
PG-8UA	0.8	1,060	1,128.35	68	1,631,115	111,486,710	947,157,644	0.13	1.59
PG-10UA	2.1	1,089	1,138.18	49	693,947	34,128,313	289,943,913	0.11	1.31
PG-11UA	1.3	1,076	1,134.12	58	2,167,731	125,988,526	1,070,360,718	0.26	3.07
PG-16UA	2.2	1,079	1,135.62	57	1,327,719	75,175,450	638,668,069	0.25	3.04
PG-18UA	2.6	1,045	1,134.26	89	1,953,438	174,363,876	1,481,343,180	0.71	8.49
PG-19UA	3.1	1,049	1,133.51	85	1,407,810	118,974,023	1,010,767,608	0.57	6.89
PG-22UA	3.8	1,067	1,136.85	70	1,764,305	123,236,704	1,046,982,068	0.74	8.84
PG-23UA	2.5	1,055	1,126.83	72	1,753,035	125,920,504	1,069,782,826	0.49	5.92
PG-24UA	0.0	1,054	1,130.09	76	1,535,896	116,866,327	992,861,251	0.00	0.00
PG-25UA	0.6	1,056	1,133.55	78	1,538,241	119,290,590	1,013,457,062	0.11	1.36
PG-28UA	3.4	1,061	1,137.05	76	1,669,714	126,981,750	1,078,798,851	0.67	8.09
PG-29UA	1.9	1,080	1,137.90	58	1,345,997	77,933,226	662,097,311	0.23	2.72
PG-31UA	6.5	1,081	1,135.08	54	2,706,853	146,386,610	1,243,656,725	1.49	17.82
TOTALS							22,083,419,929	10.82	129.74

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 2023 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] Porosity value of 0.30 assumed for pore volume calculation.

[c] Formula for calculation of VOC mass in pounds: Total VOCs [µg/L] * Saturated Pore Volume [liters] * 0.000000002205 [conversion from micrograms to pounds]

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 (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 2023, as discussed in this section.

The primary objective of containment of the MAU and LAU plumes is to ensure protection of unimpacted potable supply wells. These wells are shown on figures and referred to as peripheral production wells. One measure of capture specified in the GM&EP 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 2023, 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 2023 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 further discussed in **Section 9.5**.

For the MAU, October 2023 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 COT-6 was not pumping during the October 2023 monitoring round, 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 2023 than in 2022, approximately 304 MG compared to approximately 148 MG (**Table 10**). 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**.

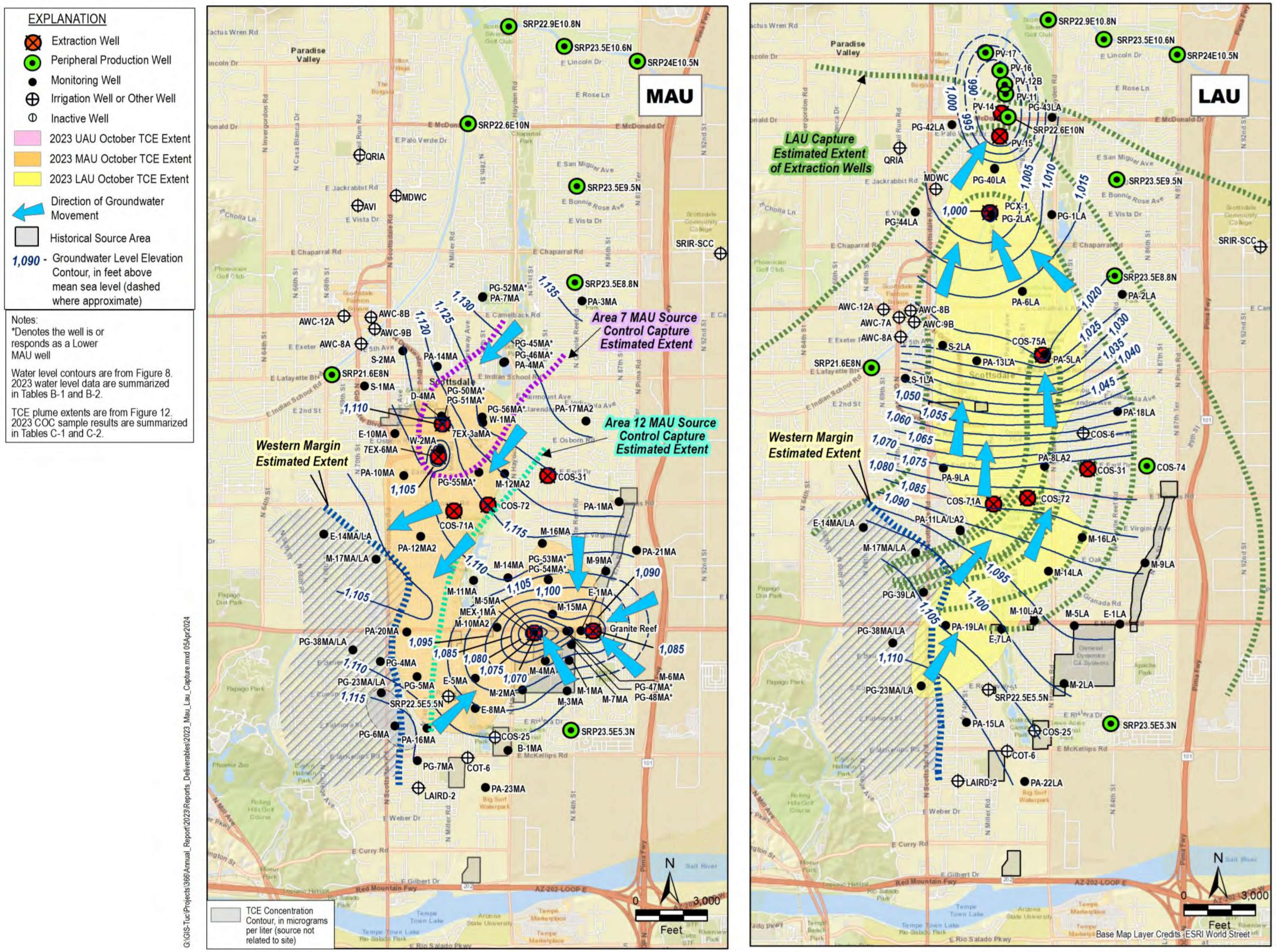


Figure 17. Estimated Hydraulic Capture of TCE Plume by MAU Source Control and Northernmost LAU Extraction Wells for October 2023

For the LAU, flow patterns interpreted from October 2023 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 mostly showing declining 10-year trends (**Table 11** and **Figure 14**). The AWC wells are designated for irrigation end use and have been 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 2023 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 2023 relative to baseline (2001) conditions, there are no outward shifts in the location of the 5 µg/L TCE contour in either the MAU or LAU exceeding the 1,000-foot performance measure. The anticipated exception is the LAU plume migration to the north toward extraction well PV-15 (**Figure 13**). Over the last 5 years, TCE concentrations in wells in the northern part of the LAU show encouraging trends. TCE concentration trends are either decreasing (S-2LA, PA-5LA, PA-6LA, PA-13LA, PG-42LA, and PV-15) or indicate no trend (PG-44LA 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 11**). 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/LAU peripheral monitoring wells, along with concentrations reported for the October 2023 sampling round, are summarized in **Table 13**. In all cases, TCE concentrations are less than or equal to specified achievement measures.

Table 13. GM&EP Achievement Measures and Observed TCE Concentrations in Selected MAU/LAU Monitoring Wells

Well Name	TCE Concentration (in µg/L)	
	Achievement Measure	October 2023 Sampling Round Results
MAU Monitoring Wells		
M-2MA	10	<0.50
M-7MA	10	<0.50
S-1MA	2	<0.50
S-2MA	3	<0.50/<0.50*
LAU Monitoring Wells		
M-5LA	10	1.9
PA-2LA	3	<0.50
PA-15LA	10	<0.50
PA-18LA	10	<0.50
PG-1LA	15	1.3
PG-44LA	5	<0.50
S-1LA	3	<0.50
S-2LA	15	14

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

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 2023, compliance with all of these achievement measures was attained, as discussed in this section.

Based on interpretation of flow directions using October 2023 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 2023 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 2023 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**. The model projects broad capture by the LAU extraction well network that extends far beyond the LAU plume footprint for sustained operation at the 2023 annual pumping rates. TCE concentration achievement measures specified in the GM&EP are compared to 2023 values for specified Northern LAU monitoring wells in **Table 14**.

Table 14. GM&EP Achievement Measures and Observed TCE Concentrations in Selected Northern LAU Program Wells

Well Name	TCE Concentration (in µg/L)	
	Achievement Measure	October 2023 Sampling Round Results
Northern LAU Program Wells		
PG-42LA	2	1.2*
PG-43LA	2	<0.50
PV-14	2	<0.50

EXPLANATION:

< = Not detected at concentration listed

* Sample obtained in February 2023 reported TCE concentration of 2.8 µg/L, with a sample re-analysis result of 1.7 µg/L (with holding time flag). A confirmation sample was obtained on April 10, 2023, with sample and duplicate results of 1.5/1.4 µg/L. As such this well is interpreted to have achieved the 2 µg/L performance metric.

As indicated in **Table 14** and in **Appendix D**, TCE concentrations in 2023 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 TCE concentrations over time at well PV-14, which were all less than the 0.50 µg/L detection limit in 2023 and display a statistically significant decreasing 10-year trend (**Figure 14**). TCE concentrations at well PV-15 have generally been detected near the MCL of 5 µg/L during both 2022 and 2023 (**Appendix E,**

Figure E-2), and 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 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 2023. 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 to visually display the occasional pumping that occurs from this northern production well. 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, which has been shown through model projections to optimize plume containment, was successfully followed in 2023.

Comparison of TCE mass removed 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 2023, extraction from well PCX-1 was responsible for 89% 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.

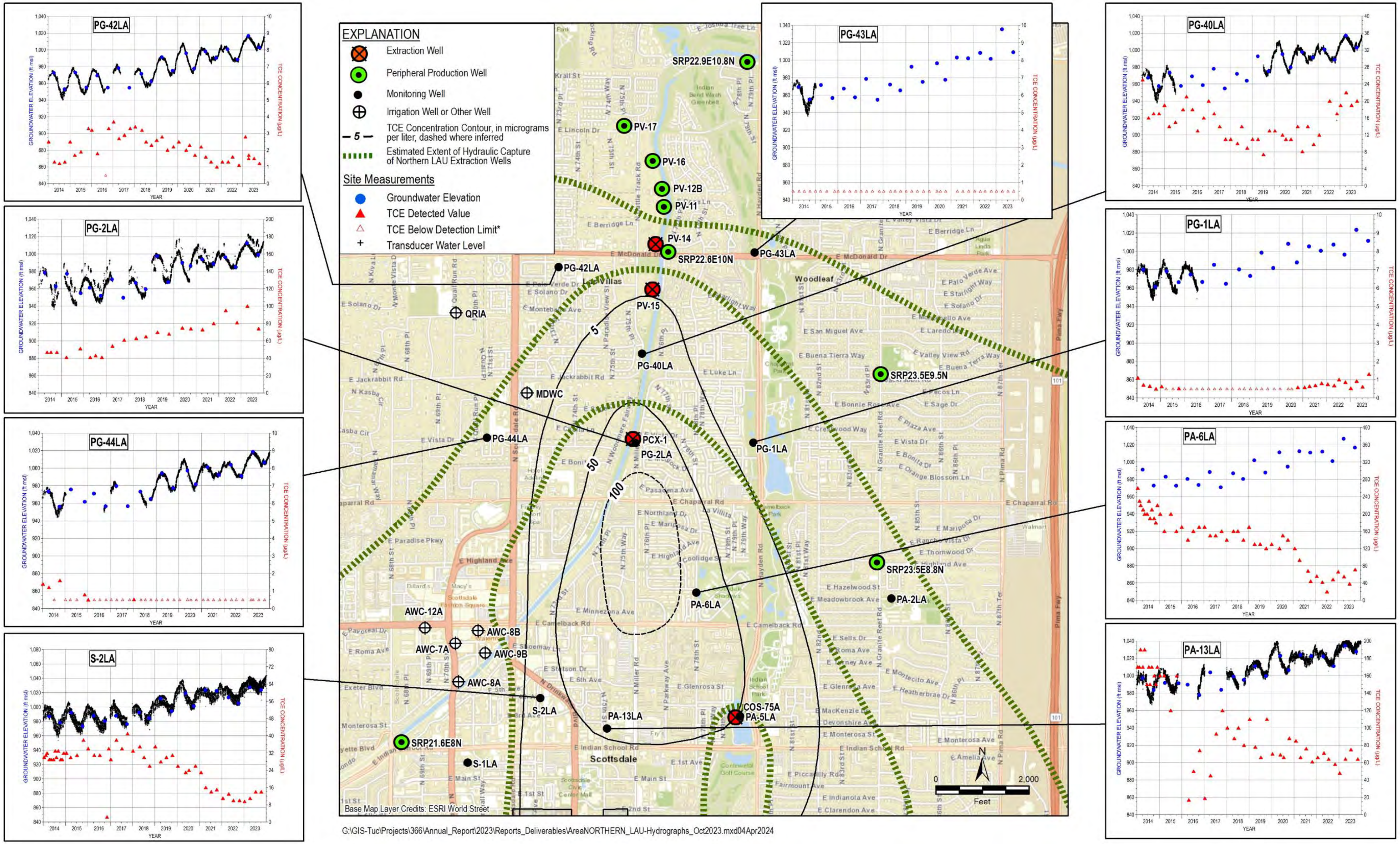


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Figure 18. Water Levels, TCE Concentrations, and Estimated Hydraulic Capture for the Northernmost LAU Extraction Wells - Northern LAU

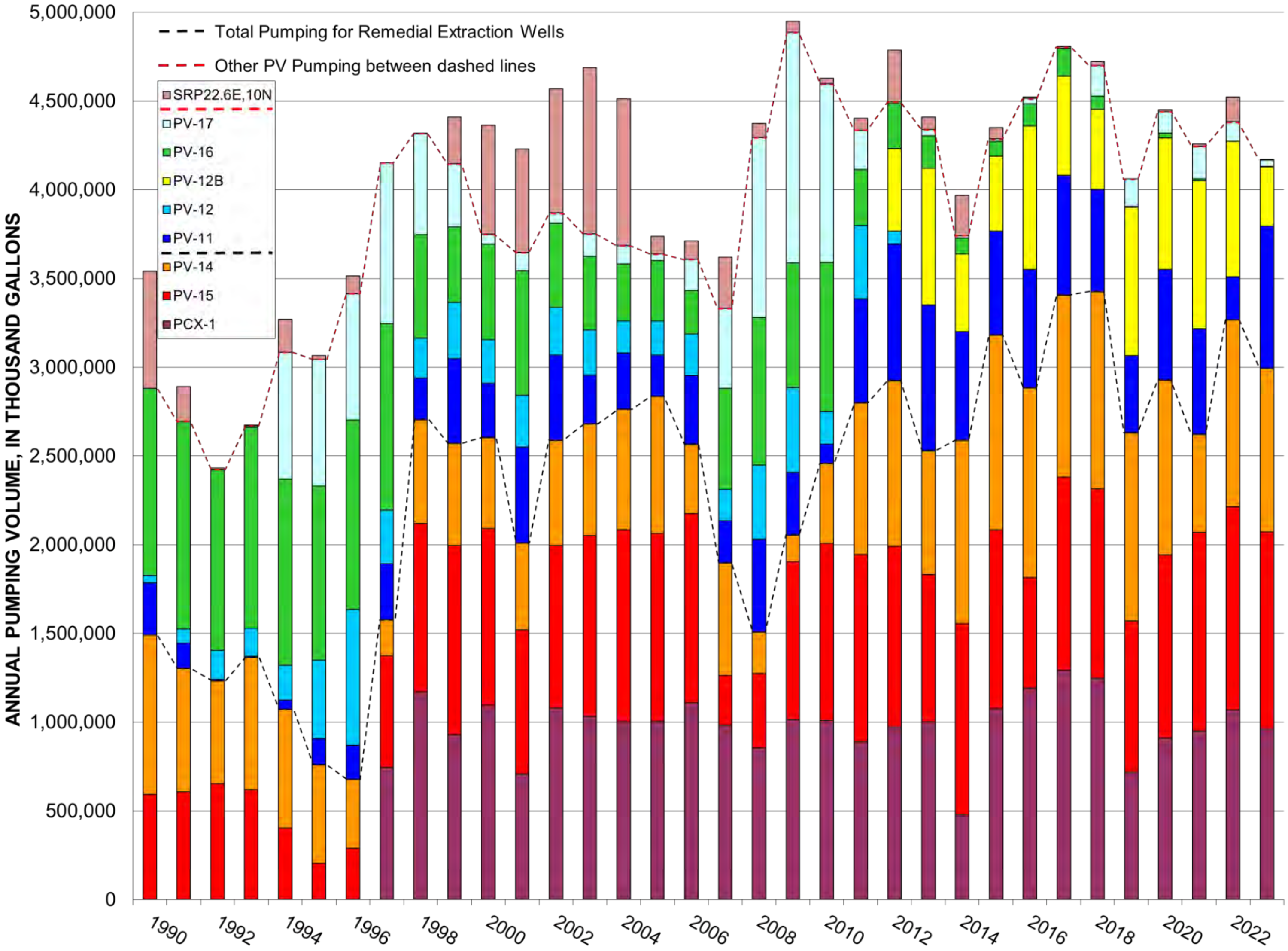


Figure 19. Distribution of Pumping in Northern LAU

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 in groundwater. In addition, they are 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 migrates 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 2023. The PCs have discussed this situation with EPA and ADEQ and continue to conclude that the Area 7 remedy 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 Performance Standard and do not consider the 3-dimensional nature of the plume. The NIBW PCs believe that compliance should be more holistically evaluated using 3-dimensional plume visualization and capture tools. The PCs have presented preliminary proposals and look forward to continued discussion of appropriate GM&EP metrics 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 2023, compliance with one of the two achievement measures was 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 increasing to 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. Four of the six Area 7 indicator wells show decreasing or no trend for the most recent 5- and 10-year periods. One well (PA-10MA) shows an increasing 5-year trend and a second (E-10MA) shows an increasing trend for both the most recent 5- and 10-year periods (**Figure 15** and **Table 11**). TCE concentrations at both PA-10MA and E-10MA are relatively low and these increasing trends, which are attributed to shifts in pumping from 7EX-4MA and COS-71A to 7EX-6MA, are not a concern in relation to performance of the Area 7 remedy. Critical higher concentration Area 7 indicator wells (D-2MA/D-4MA, W-1MA, W-2MA and PA-12MA) all show declining 10-year concentration trends (**Figure 14**). Variable TCE concentrations at W-2MA in response to pumping changes at nearby extraction well 7EX-6MA have caused W-2MA, which previously showed a declining 5-year trend, to now show no trend for the most recent 5-year period. However, review of data from 2023 for W-2MA is encouraging and suggests consistent pumping at 7EX-6MA is having a positive impact.

Figure 20 also shows the estimated extent of hydraulic capture associated with MAU extraction in the vicinity of Area 7 for October 2023. MAU water level contours are shown with the interpretation of MAU hydraulic capture for the Area 7 GWETS for October 2023 on **Figure 17**. 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 preventing migration away from the source area of MAU groundwater with COC concentrations that are 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 2023 data, hydraulic capture for the Area 7 GWETS encompasses more than half of the MAU plume area 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 2023 or for several years prior. In fact, this metric 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.

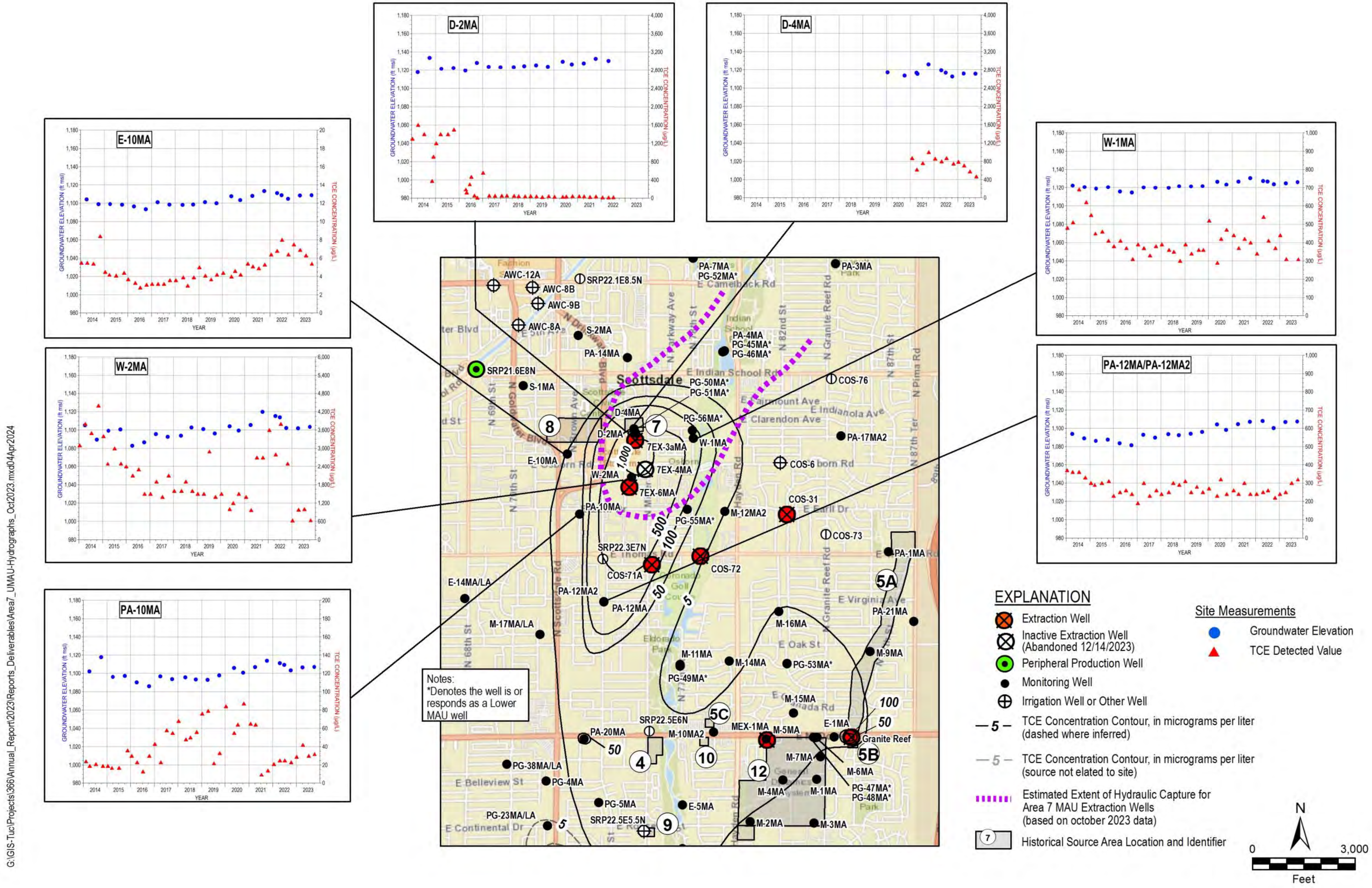


Figure 20. Water Levels, TCE Concentrations, and Estimated Hydraulic Capture from Area 7 MAU Extraction Wells

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 15** summarizes annual average TCE concentrations for the period 1995 through 2023 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 in 2022, the NIBW PCs have replaced D-2MA, which had anomalously low TCE concentrations, 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 2023. 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 beginning in 2021. As shown in **Table 15**, the overall 2023 average TCE concentration for the six Area 7 indicator wells of 353 µg/L was significantly lower than the annual average of 780 µg/L for 2022. The 5-year average TCE concentration that was calculated for the period 2019 through 2023 of 587 µg/L was lower than the average for the previous 5-year period of 640 µg/L. Accordingly, compliance with the mass reduction component of the Area 7 remedy performance was achieved in 2023.

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 the three periods mentioned 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 at this well can have a substantial effect on combined annual averages. TCE concentrations at W-2MA have varied considerably over time in response to changes in pumping at nearby extraction well 7EX-6MA. However, data continue to show a declining long-term (10-year) trend and suggest re-establishment of an encouraging shorter-term trend with more consistent pumping at 7EX-6MA (**Figure 14**).

In conclusion, the performance measure involving a decline in 5-year running average TCE concentrations was achieved at Area 7 in 2023. However, as with previous years, demonstration of hydraulic capture such that the direction of groundwater movement from the vicinity of PA-12MA is toward the cone of depression associated with Area 7 pumping was not achieved in 2023. See **Section 9.6** for further discussion.

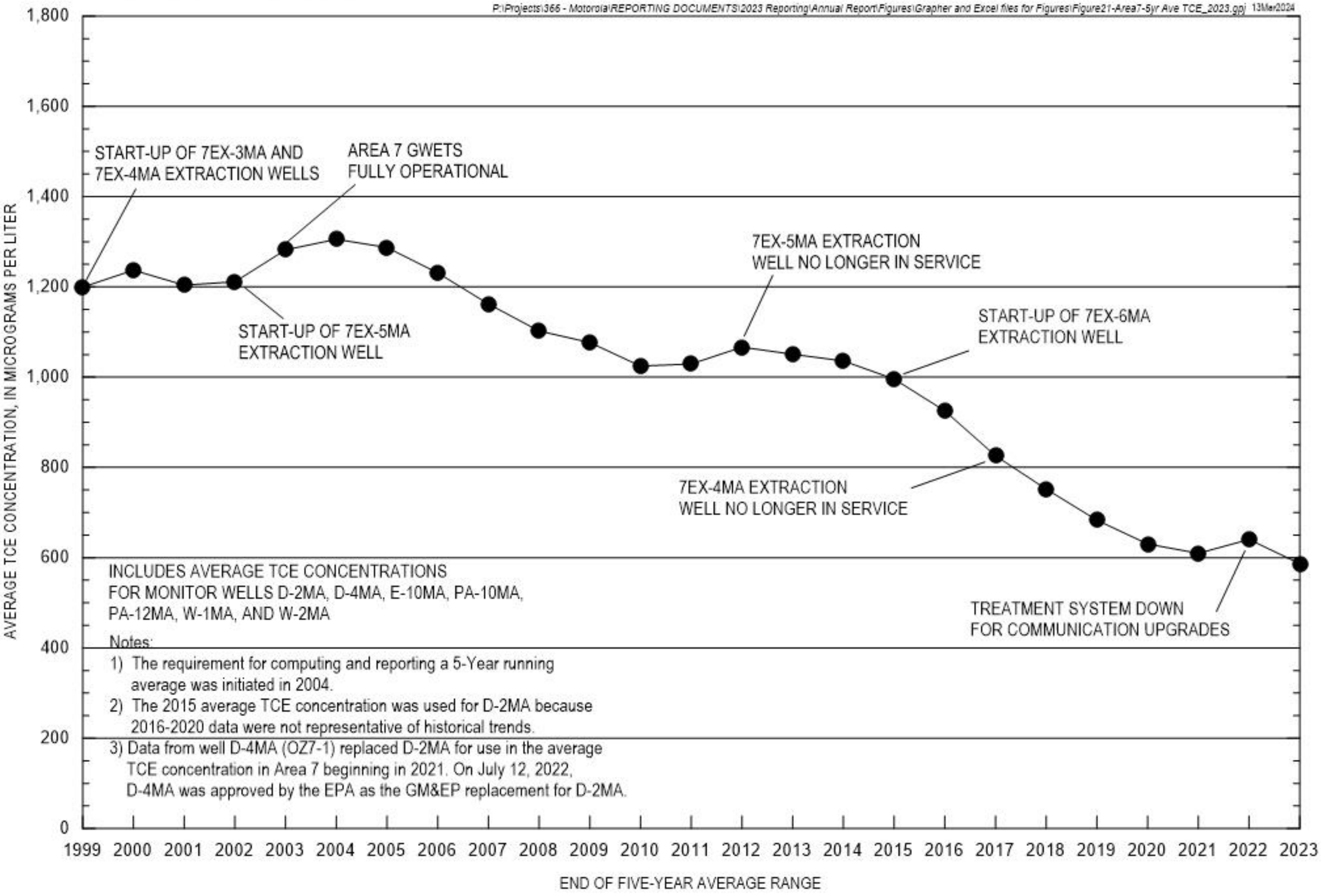
Table 15. Average TCE Concentrations for MAU Monitoring Wells - Vicinity of Area 7

YEAR	AVERAGE TCE CONCENTRATIONS (μg/L)							
	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
2023	---	638	7	33	278	353	813	353

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 Replaced D-2MA for Use in Average TCE Calculation
2018-2022	640	Treatment System Down for Communication Upgrades
2019-2023	587	December 2023 7EX-4MA Extraction Well Abandoned



INCLUDES AVERAGE TCE CONCENTRATIONS FOR MONITOR WELLS D-2MA, D-4MA, E-10MA, PA-10MA, PA-12MA, W-1MA, AND W-2MA

Notes:

1) The requirement for computing and reporting a 5-Year running average was initiated in 2004.
2) The 2015 average TCE concentration was used for D-2MA because 2016-2020 data were not representative of historical trends.
3) Data from well D-4MA (OZ7-1) replaced D-2MA for use in the average TCE concentration in Area 7 beginning in 2021. On July 12, 2022, D-4MA was approved by the EPA as the GM&EP replacement for D-2MA.

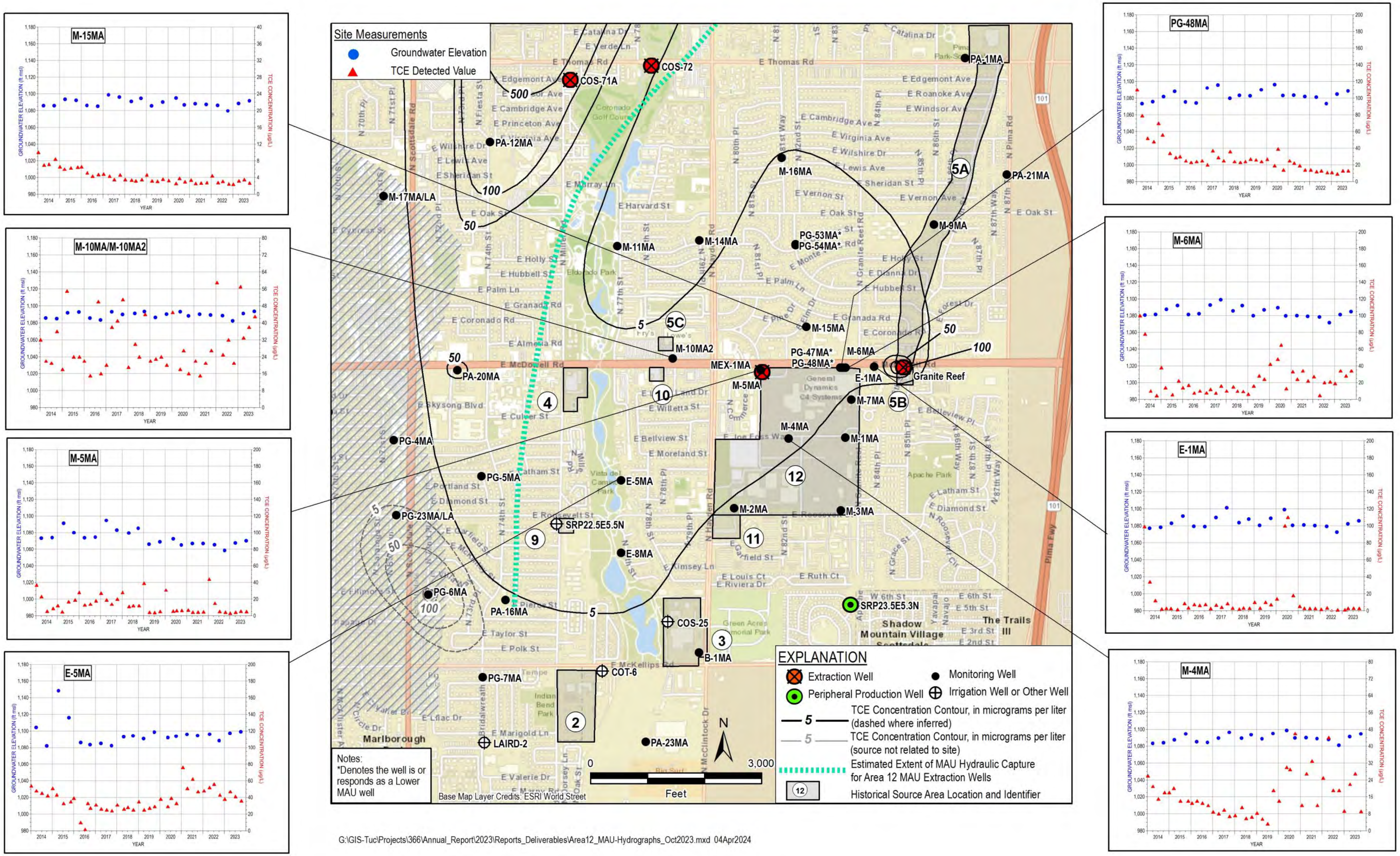
Figure 21. 5-Year Running Average of TCE Concentrations in the MAU - Vicinity of Area 7

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 2023, 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 stable over the last 10 years, as shown on **Figure 22**. With the exception of one well (M-6MA) that shows an increasing long term (10-year) trend, TCE concentration trends at all Area 12 MAU indicator wells are stable, no trend, or declining over both the long term (10-year) and the short term (5 years) (**Table 11**). The increasing 10-year trend at M-6MA is linked to variability of pumping patterns at the Area 12 GWETS Granite Reef well and at well COT-6. Specifically, pump maintenance issues resulted in curtailed extraction at the Granite Reef well (2019 and 2020) and pumping was increased over historical rates at well COT-6 (2020 and 2022) to the southwest (**Table 10**). The switch from an increasing 10-year trend to no trend over the most recent 5-year period for M-6MA is encouraging.

Figure 22 also shows MAU TCE concentration contours for October 2023 and the estimated extent of hydraulic capture associated with Area 12 MAU extraction. MAU water level contours are shown with the interpretation of MAU hydraulic capture for the Area 12 GWETS for October 2023 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 2023.



Notes:
*Denotes the well is or responds as a Lower MAU well

Base Map Layer Credits: ESRI World Street

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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 16** summarizes annual average TCE concentrations for 1994 through 2023 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 2023 was 7 µg/L, which is lower than the annual average of 9 µg/L for 2022. Using the 2023 combined annual average TCE value, a 5-year average of 10 µg/L was computed for the period 2019 through 2023 (**Table 16**). This value is identical to the average computed for the previous 5-year period. As such, compliance with the mass reduction component of the Area 12 remedy performance, which specifies a decreasing 5-year average, was not strictly achieved in 2023. 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 the three periods mentioned were all small and appear to be attributable to a sequence of years with lower pumping at the Granite Reef well and potentially higher pumping at well COT-6 (**Table 10**). The stable rather than declining concentration average for the most recent 5-year period is likely attributable to variable concentrations at monitoring wells located downgradient from the higher concentration area centered on the Granite Reef extraction well, located at historical source Area 5B.

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 2023. Although the average TCE concentration from Area 12 wells has consistently declined for the last 3 years, the 5-year running average is the same as last year. Therefore, the performance measure involving a decline in 5-year running average TCE concentrations was not strictly achieved at Area 12 in 2023. See **Section 9.6** for further discussion.

Table 16. 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
2023	2	17	4	29	0	3	3	0	7

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	26	
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 Operating Intermittently Due to Maintenance and Testing
2017-2021	9	
2018-2022	10	
2019-2023	10	

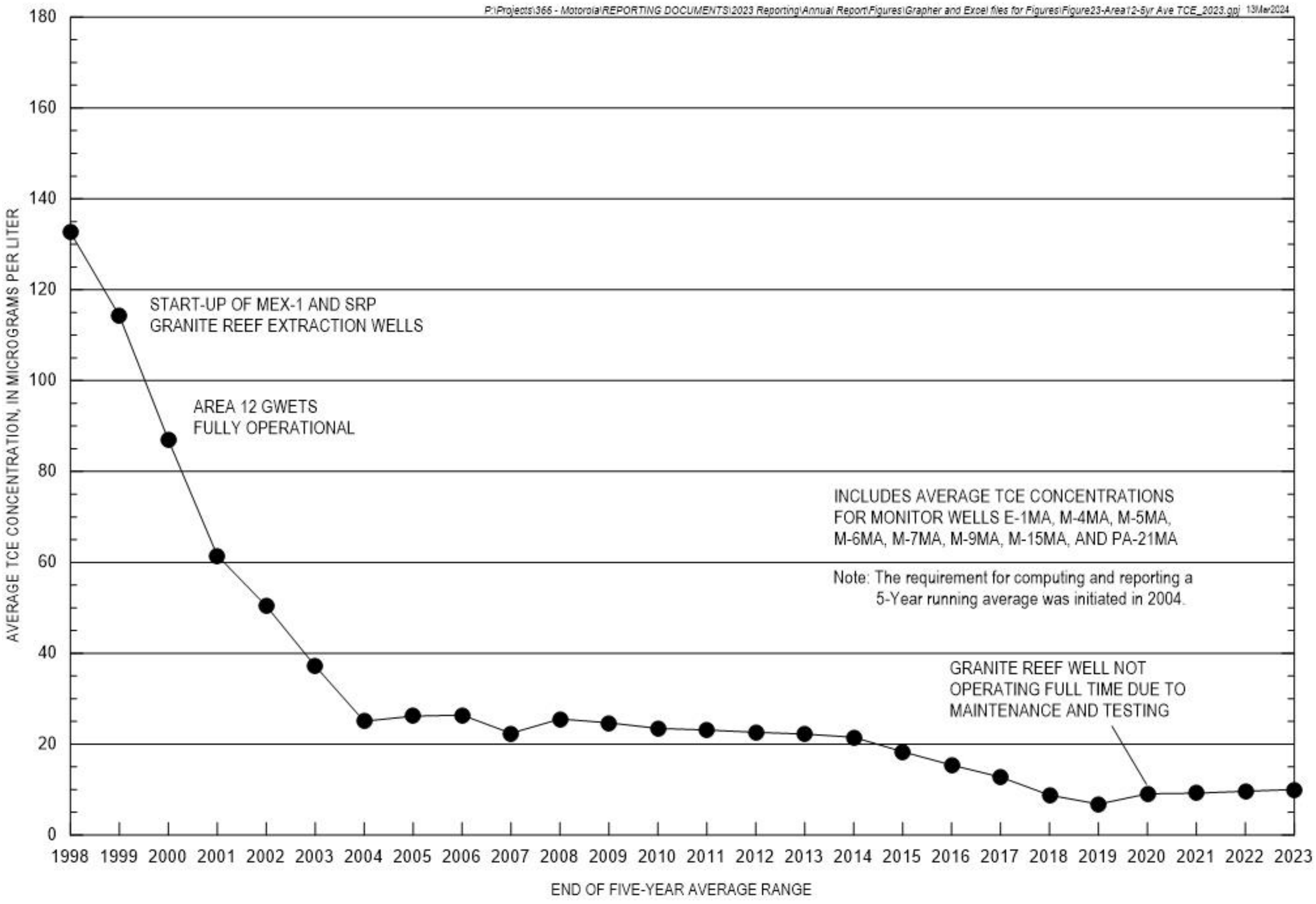

Figure 23. 5-Year Running Average of TCE Concentrations in the MAU - Vicinity of Area 12

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 2023. 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 2023, the PCs in coordination with the City of Scottsdale conducted testing, rehabilitation, and modification operations at well COS-71A, converting it to an MAU-only extraction well. This work was undertaken to focus future pumping at COS-71A on the portion of the aquifer most critical to the remedy (the MAU) at a rate that will allow the City of Scottsdale to prioritize pumping at COS-71A and COS-75A going forward. The City of Scottsdale is working through associated agreements and system changes to accomplish this pumping configuration. Modeling analyses show that adding MAU extraction at COS-71A will enhance the efficiency of the remedy by increasing local capture of mass in the Upper MAU that would otherwise take a longer flow path toward the Western Margin for capture in the Lower MAU and LAU.

9.6.2 Area 12 Five-Year Running Average

In 2023, 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 2019 through 2023 is identical to the 10 µg/L average for the previous 5-year period (**Table 16**). The recent stability in running average TCE concentrations near Area 12 is likely linked to variable pumping patterns during the last 5 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 10**). Annual average TCE concentrations at monitoring wells downgradient from the higher concentration center at the Granite Reef well (E-1MA, M-4MA, M-5MA, and M-6MA) showed the most substantial increases (**Figure 15**). TCE concentration trends at all Area 12 MAU indicator wells except M-6MA, located directly downgradient from the Granite Reef extraction well, show stable, no trend, or declining trends over both the short term (5-year) and 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 2023. 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 ï 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 2023, the NIBW remedial actions resulted in the extraction and treatment of approximately 4.8 billion gallons of groundwater and removal of approximately 1,570 pounds of TCE, as shown in **Table 6**. From the inception of the NIBW groundwater remedy in 1994, approximately 150 billion gallons of groundwater have been extracted to remove an estimated 100,775 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 approximately 11,100 pounds in 1993 to approximately 130 pounds in 2023, representing a decrease of 99% in the past 30 years (**Figure 16**). For 2 years in a row, data from the annual monitoring round in October show that the Cleanup Standard for TCE was not exceeded at any of the UAU monitoring wells and there are only small areas downgradient of Area 7 and Area 12 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 in **Appendix D**. Based on the last 5 years of TCE concentration data, no trends, stable trends, or decreasing trends are observed in all but four MAU monitoring wells (**Table 11**). Longer-term (10-year) increasing trends are observed in only four MAU monitoring wells. These data indicate the impact of significant mass removal that has occurred since initiation of the MAU Source Control Programs. In the LAU, only two monitoring wells within the TCE plume area show increasing 5-year trends (PG-2LA and PG-40LA) and only one of these is increasing over the most recent 10 years (PG-2LA). These wells are both located in the northern LAU where mass is moving north for capture and treatment. These data demonstrate that coordinated and consistent operation of key LAU extraction wells—particularly 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 2023 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 70 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. Completion of the City of Scottsdale’s TGTF in 2023, which was originally 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. In 2023, the PCs worked 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. Since coming online, the importance of the TGTF has been further highlighted in relation to the EPA PFAS drinking water standard. RO is a Best Available Demonstrated Control Technology for PFAS. Because CGTF extraction wells COS-71A, COS-72, and COS-75A all have detectable concentrations of PFAS above the recently established MCLs for PFAS compounds, the need for the TGTF has broadened.

On a parallel path, the PCs are working with both SRP and the City of Scottsdale to equip monitoring well PG-41MA/LA for extraction and tie it into 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 offline. The PCs will continue to work with the City of Scottsdale in 2024 to implement these high-value enhancements 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. Most monitoring wells located near the edge or along the periphery of the MAU/LAU plume show non-increasing TCE trends over both the shorter (5-year) and longer term (10-years). In addition, in 2023, 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 Arizonaôs 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 2023, 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 inorganics and PFAS 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.

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. TCE concentrations for the remaining 28 UAU monitoring wells have remained below the MCL of 5 µg/L for the last 2 years (**Appendix C, Table C-1**). The PCs will continue to collect data from the UAU monitoring well network in 2024.

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 124 wells, 111 of which are monitoring wells (28 UAU wells, 49 MAU wells, 4 MAU/LAU wells, and 30 LAU wells), 11 of which are extraction wells, and 2 of which are production wells. Planned changes to the monitoring network for 2024 include following through on EPA-approved abandonment of Lower MAU compliance monitoring well PG-49MA, which EPA approved to be replaced by Lower MAU well PG-53MA after a casing breach in PG-49MA compromised data from that well. The PCs will also change the status of PG-41MA/LA from a monitoring well to an extraction well after completion of required pumping and conveyance infrastructure.

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. A draft report documenting 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 was submitted in August 2023 (M&A, 2023). Comments on the draft report were received from EPA in November 2023. Work to address EPA comments and develop and final modeling report is in progress and targeted for completion in 2024.

During 2023, the groundwater flow model was used to support annual assessments of hydraulic capture of the LAU plume for the Site Monitoring Report. In addition, the groundwater flow model was used to evaluate impacts from planned use by the City of Tempe of existing production well COT-6 as an injection well and use of a nearby, newly-constructed production well, COT-6R, as a replacement pumping well. The PCs developed modeling assumptions through discussions with the City of Tempe's hydrogeologic consultant, Leonard Rice Engineers, and shared results of associated particle tracking runs to evaluate potential impacts on the remedy with the Technical Committee. ADEQ is tasked with conducting an independent evaluation of Site impacts from the planned injection and extraction program as part of the State permitting process. The PCs evaluated end-point potential future COT-6/COT-6R pumping and injection scenarios and compared results with projections for average and maximum historical usage of existing production well COT-6. As reported to the Technical Committee, changes were most notable to groundwater flow patterns and capture in the southern part of the MAU at the NIBW Site. While impacts were noted, planned actions by the City of Tempe were not deemed to be inconsistent with the remedy. COT-6 is not a peripheral production well and the City of Tempe has a blending plan in place for any TCE pumped during routine operations. The PCs plan to continue to coordinate sharing of information on operations and data collection with the City of Tempe in 2024 and will review details of the ADWR permit once issued for comment.

9.10 CSM Evaluation

Interpretation of data from 2023 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 begun to stabilize, particularly in the UAU and LAU (**Appendix D**). 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 in response to specific pumping conditions. The PCs will continue to evaluate consistency of data collected during 2024 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 worked on a CSM update in 2020 in anticipation of the 2021 Five-Year Review. A draft report was delivered to EPA, ADEQ, and other members of the Technical Committee for review on February 1, 2021. EPA provided comments on the draft report on December 17, 2021, and the PCs responded to EPA's comments on April 29, 2022. The final CSM Update, which provides a consensus framework for evaluating new data and making sound technical decisions regarding the remedy, was transmitted to EPA and the Technical Committee in July 2023 (PCs, 2023). No changes are proposed to the CSM based on data for 2023. The PCs propose to conduct the next comprehensive CSM update in advance of the 2026 Five-Year Review.

10 SUPPLEMENTAL ACTIVITIES

10.1 Supplemental Data Collection

In 2023, supplemental data collected by the PCs included the following:

- Sampling at monitoring well PG-53MA prior to EPA's concurrence with incorporation of this Lower MAU well into the compliance monitoring program as a replacement for 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 City of Scottsdale extraction wells COS-71A and COS-75A to assess the vertical flow and TCE concentration distribution in the plume.

Information about these activities is summarized in the following sections.

10.1.1 Monitoring Well Sampling

In 2023, an obstruction was detected in the Lower MAU monitoring well PG-49MA and the data indicated there was a breach in the casing. Data collected from this well was presented to the Technical Committee on October 31, 2022, and included in the 2022 SMR (NIBW PCs, 2023a). The NIBW PCs recommended abandonment of this well and its replacement in the compliance monitoring program with Lower MAU well PG-53MA. The PCs voluntarily collected water quality data during 2023 from Lower MAU monitoring well PG-53MA in lieu of sampling at compliance Lower MAU monitoring well PG-49MA, until EPA concurred with the PC's request on August 23, 2023.

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. Downgradient 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 gradients and differences in hydraulic responses. Hydrographs showing high-frequency water level data collected at compliance and selected supplemental monitoring locations are 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 2023 include the installation of continuous monitoring equipment in monitoring well E-5MA for the M-2MA evaluation described in **Section 10.1.4**.

Beginning in 2022 and continuing through 2023, continuous water level monitoring has been conducted at the well pairs S-1MA/LA and S-2MA/LA to better understand MAU and LAU groundwater flow patterns near and outside the western edges of the MAU and LAU plumes. The goal is 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 are 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. The PCs previously understood from manual measurements that one of the two Upper MAU wells was problematic; however, 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 exhibits a significantly muted response, whereas water level data from well S-2MA demonstrate the well responds 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 LAU wells from the S-1MA/LA and S-2MA/LA well pairs show a strong response to pumping from the AWC wellfield. This pattern was continually observed throughout 2023 monitoring.

High-frequency water level monitoring was also initiated in 2022 and continued through 2023 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 and into the LAU, whereas the Area 7 extraction wells only pump from the Upper MAU. Data collected from M-12MA2 in 2023 continues to support the interpretation that this well is influenced primarily by Lower MAU and potentially LAU pumping and is therefore not representative of Upper MAU water levels. Additional continuous monitoring at this well through 2024 will further clarify hydraulic responses, specifically the response to pumping from COS-71A once it comes back online.

10.1.4 Indicator Well M-2MA Evaluation

An evaluation was conducted at MAU indicator well M-2MA in 2023 following an observed increase in TCE concentration in October 2022. TCE was detected above the GM&EP contingency initiation level of 10 µg/L; however, results of the original and duplicate confirmation sample were both below the contingency criteria. Because M-2MA confirmation results were below the GM&EP response action criteria, contingency conditions at M-2MA were not verified and a contingency response action plan was not required. However, the PCs notified EPA of actions taken, sampling results, and interim conclusions in the December 2022 Technical Committee meeting. To further evaluate the mechanism behind TCE concentration fluctuations observed at indicator well M-2MA and nearby wells, the PCs voluntarily conducted the following data collection and analysis in 2023:

- Enhanced monitoring data collection.
    - Increased frequency of M-2MA monitoring to quarterly for water quality and water levels and vertical profile sampling at three different depths under variable pumping conditions.
    - Increased water level monitoring at surrounding wells (E-5MA, E-8MA, PA-23MA, PA-16MA, B-1MA) from semi-annual to quarterly.
    - Quarterly supplemental sampling at E-5MA and E-8MA for analysis of the NIBW COCs.
    - Installed a transducer at E-5MA between the Area 12 and the COT-6 pumping centers to collect continuous water level data.
    - Continued to sample MEX-1MA and Granite Reef on a monthly basis (quarterly sampling is required per the GM&EP).
- Continued to operate both Area 12 extraction wells simultaneously, subject to water demands by SRP.
- Requested information on the status of pumping at well COT-6 from the City of Tempe prior to monitoring events.
- Considered appropriate revisions to GM&EP criteria for M-2MA as part of the GM&EP update process.
- Prepared a summary of the M-2MA evaluation for inclusion in the 2023 SMR.

Results from the M-2MA evaluation are provided in **Appendix K**.

10.1.5 COS-71A Rehabilitation, Modification, and Testing

In collaboration with the City of Scottsdale, the PCs conducted well rehabilitation, modification, and fluid movement investigations at extraction well COS-71A in March and April of 2023. Modification at COS-71A was conducted to isolate groundwater extraction to the MAU only, temporarily sealing off the LAU portion of the well. Pumping solely from the MAU at COS-71A has been demonstrated through monitoring and modeling to increase remedy efficiency by capturing higher concentration Area 7 MAU mass locally before it reaches the Western Margin. Equipping the modified COS-71A at a lower pumping rate also facilitates the City of Scottsdale's plans to return this well to a more consistent, higher pumping priority. Repeated fluid movement investigations at key extraction wells are an excellent source of data to supplement the monitoring well network to track changes in the vertical distribution of COCs over time.

Prior to modification, COS-71A was jetted to remove encrustation and open blocked perforations in the MAU portion of the well. After modification, the well was developed using swabbing and airlift pumping, in addition to pumping with a submersible pump. The depth of modified well COS-71A is 516 feet below land surface (bls) with effective screened intervals extending from 220 to 402 feet bls and 422 to 507 feet bls.

After modification and rehabilitation, fluid-movement investigations were conducted at COS-71A to evaluate the vertical distribution of NIBW COCs as well as inorganic constituents unrelated to the Site in the MAU under pumping conditions. Spinner-flowmeter surveys conducted under pumping conditions showed approximately 80% of the pumped water entered the well from 211 to 402 feet bls, and the remaining 20% entered the well from 422 to 455 feet bls within the MAU. A volume of water below the threshold of measurement tools enters the well below 455 feet bls.

Results from depth-specific sampling showed that calculated interval-specific TCE concentrations increased with depth, with the highest TCE concentrations occurring in the interval from 270 to 375 feet bls. TCE concentrations generally decreased with depth below this interval, with the lowest TCE concentrations being detected in the interval from 422 to 455 feet bls. Wellhead concentrations of TCE in samples collected before and after depth specific sampling were 60 and 65 µg/L, respectively. TCE concentrations were significantly higher than during investigations conducted in 2014, which showed wellhead TCE concentrations at around 20 µg/L. This increase in TCE concentrations was anticipated, as the well modification restricted pumping to the MAU where the highest concentrations occur. Nitrate concentrations were relatively uniform with depth and were 11 mg/L at the wellhead. Wellhead and depth-interval nitrate concentrations do not appear to have changed significantly over time.

A report detailing the results of fluid movement investigations and the work completed at extraction well COS-71A in 2023 is included in **Appendix L.**

10.1.6 COS-75A Rehabilitation and Testing

In collaboration with the City of Scottsdale, the PCs conducted well rehabilitation and fluid movement investigations at LAU extraction well COS-75A in May and June of 2023. Well rehabilitation included brushing the casing and bailing fill from the bottom of the well, and fluid movement investigations consisted of spinner-flowmeter surveys and depth-specific sampling. Repeated fluid movement investigations at key extraction wells are an excellent source of data to supplement the monitoring well network to track changes in the vertical distribution of COCs over time.

Fluid-movement investigations at COS-75A were conducted to evaluate the vertical distribution of NIBW COCs and inorganic constituents unrelated to the Site in the LAU under both pumping and non-pumping conditions. Spinner-flowmeter surveys conducted under pumping conditions showed water entering the well near the top of the screen, as well as near the mid-to-lower portion of the screen (with the exception of the bottom 30 feet). Fluid movement investigations conducted in 1996, 1998, 2003, and 2011 all had similar flow profiles. Spinner-flowmeter surveys conducted under non-pumping conditions showed no measurable flow; however, temperature logs indicated there may be some downward flow.

Results from depth-specific sampling under pumping conditions showed a general decreasing TCE concentration trend with depth. The highest TCE concentration was 38 µg/L in the interval from 840 to 950 feet bls and the lowest concentration (excluding zones of no flow) was 23 µg/L in the interval from 950 to 1,220 feet bls. PCE was also detected above the MCL during sampling under pumping conditions. The highest concentration of PCE was 10 µg/L in the interval from 840 to 950 feet bls, and the lowest PCE concentration was 6 µg/L in the interval from 1,185 to 1,220 feet bls. PCE concentrations follow the same general decreasing trend with depth as TCE. Under non-pumping conditions, TCE concentrations followed a similar decreasing trend with depth, but displayed more heterogeneity, varying from a high of 46 µg/L to a low of 8 µg/L. PCE concentrations under non-pumping conditions followed the same decreasing trend with depth, and were lower than during pumping conditions sampling, ranging from 5 to 1 µg/L. TCE concentrations at the wellhead and in all depth intervals were lower during the 2023 fluid movement investigations than those calculated from sampling during any of the previous investigations. Nitrate concentrations were generally uniform with depth and were 8 mg/L at the wellhead. Nitrate concentrations have decreased significantly since 1996, with interval concentrations ranging between 20 and 30 mg/L.

Extraction well COS-75A was also sampled for select PFAS compounds during the 2023 fluid movement investigations. Samples were analyzed for perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluorobutane sulfonic acid (PFBS), hexafluoropropylene oxide dimer acid (HFPO-DA), and 4,8-dioxa-3H-perfluorononanoate (ADONA). Results reported for PFOA, PFOS, PFHxS, and PFBS were above the laboratory detection limit of 2 parts per trillion (ppt), but only PFOS was detected above the recently established MCL of 4 ppt. PFOS concentration at the wellhead was 7 ppt and concentrations were fairly uniform with depth.

A technical memorandum detailing rehabilitation and fluid movement investigations at COS-75A is included 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 and summarized in the PCs draft model update report (M&A, 2023). Simulations demonstrated: 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 Lower MAU and 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. Actions have been ongoing since 2021 to implement both of these enhancements.

In 2023, the PCs in coordination with the City of Scottsdale conducted testing, rehabilitation, and modification operations at well COS-71A, converting it to an MAU-only extraction well. This work was undertaken to focus pumping at COS-71A on the portion of the aquifer most critical to the remedy (the MAU) at a rate intended to allow the City of Scottsdale to prioritize pumping at COS-71A and COS-75A going forward. On a parallel path, the PCs continued working with the City of Scottsdale and SRP in 2023 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. A well site development design for extraction of approximately 750 gpm was completed in 2023. Property access and permitting activities will continue into 2024.

10.3 Optimization Review

The NIBW PCs have supported the EPA Remedy Optimization Evaluation, which began in 2020, 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. During the more than 3-year process, the NIBW PCs have expressed concern regarding scope, including development by the Optimization team of an independent 3D visualization model, anticipated costs, and repeated delays in delivery of a draft work product. However, the NIBW PCs look forward to reviewing the Remedy Optimization Evaluation report once it becomes available and working with the team to evaluate potentially beneficial recommendations. The Remedy Optimization Evaluation report was first anticipated to be released in advance of the Five-Year Review in 2021, and later amended to 2022 and then to 2023. EPA has communicated in Technical Committee meetings that the delays are, in part, due to implications of PFAS being detected within the NIBW Site at concentrations above the MCL of 4 ppt for PFOS and PFOA. The PCs have requested that any optimization recommendations not directly influenced by the potential presence of PFAS chemicals in groundwater be released for consideration.

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 conducted activities to evaluate and address potential vapor intrusion risk at the Site in coordination with EPA between 2016 and 2018, with follow up activities focused on vapor intrusion risk ongoing at Area 7 between 2018 and 2023. On September 19, 2023, EPA sent Siemens and the City of Scottsdale a draft Administrative Order on Consent Letter and draft Statement of Work for a vapor intrusion RI/FS at Area 7. Following receipt of these draft documents, the PCs have been coordinating with the City of Scottsdale and EPA to develop an approach for the Area 7 RI/FS, with efforts anticipated to continue into 2024.

The PCs have conducted the following activities pertaining to the evaluation of vapor intrusion risk at the Site since 2016:

- 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: Proactively installed a sub-slab vapor depressurization system below four of the apartment units in a complex located southeast of 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: Conducted a Human Health Risk Assessment (HHRA) (Hazardous Substance & Waste Management Research, Inc. (HSWMR) 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 2023: Supported Vapor Mitigation Systems (VMS) work to conduct annual operation and maintenance inspections on vapor mitigation systems in the four apartments in the northwest quadrant of the apartment complex located southeast from historical Area 7, most recently in November 2023. VMS verified that vacuum is consistently maintained beneath the floors of the four apartments. The 2023 annual vapor mitigation system inspection report was submitted to EPA under a separate cover in February 2024.
- 2019 through 2023: Conducted annual indoor air sampling at the apartments with mitigation systems, most recently in November 2023. Results of the indoor air monitoring reported no detectable TCE within any of the four apartments with mitigation systems. The laboratory detection limit was below the EPA residential screening level of 0.48 micrograms per cubic meter (µg/m^3). Indoor air data collected in November 2023 was submitted to EPA under separate cover in February 2024.

In addition to work being conducted by the PCs, EPA has taken the lead on assessing and mitigating TCE indoor air concentrations in an event center located on the northern portion of the historical Area 7. When soil gas in nearby soil gas sampling points showed elevated concentrations of TCE (NIBW PCs, 2018b, EPA requested indoor air sampling be conducted in the event center. The property owner declined during winter 2017/2018 sampling by the PCs; however, the event center was assessed in April 2017 with the EPA's Trace Atmospheric Gas Analyzer (NIBW PCs, 2018a; Lockheed, 2017). TCE concentrations were above the commercial Accelerated Response Action Level (ARAL) but below the Urgent Response Action Level (URAL), indicating that further investigation was required. EPA conducted indoor air monitoring at the event center on a regular basis from 2018 through 2020. There was a hiatus in sampling during the global Covid pandemic, and sampling resumed in January 2023. TCE concentrations were fairly consistent from year to year; however, the January 2023 results reported an increase in TCE concentrations at some of the sample locations in the eastern portion of the building, with two samples with indoor TCE concentrations at 20 and 21 µg/m^3. No sample locations have exceeded the 24 µg/m^3 URAL for commercial use since indoor air sampling began in the event center. Based on these results, EPA directed the owner to install a vapor mitigation system to address vapor intrusion issues, which was completed in April 2023. Post-mitigation system sampling was reported to show TCE concentrations were reduced below the long-term indoor air regional screening level of 3 µg/m^3 for commercial use.

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 PFAS in groundwater. While neither has been linked to historical NIBW Site operations that resulted in VOC impacts, the NIBW PCs have cooperated with EPA to investigate 1,4-DX and PFAS compounds at the NIBW Site. Previous sampling documented that 1,4-DX was not a COC at the Site, and no further sampling for 1,4-DX is planned. Details on the 1,4-DX investigation are included in the 2022 SMR. Work conducted since 2016 to evaluate PFAS compounds at the Site is summarized below.

EPA established a health advisory level of 70 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 was 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. Results were all 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.

On June 15, 2022, EPA released four drinking water health advisories for PFAS-related chemicals, which included PFOA; PFOS; GenX chemicals (hexafluoropropylene), dimer acid and its ammonium salt; and perfluorobutane sulfonic acid (PFBS) and its related compound potassium perfluorobutane sulfonate. In response, the City of Scottsdale sampled active extraction wells COS-75A, COS-72, and PCX-1 for PFOA, PFOS, and PFBS in 2022. The results for PFOA and PFOS at each of the wells sampled exceeded the new EPA health advisories.

All of the CGTF and NGTF wells were again tested for PFAS in 2023. Results showed that three of the CGTF extraction wells were above the new MCLs for PFAS promulgated by EPA on April 10, 2024. The MCL for PFOA and PFOS is 4 ppt and the MCL for PFHxS, PFNA, and HFPO-DA is 10 ppt. For mixtures containing two or more of PFHxS, PFNA, HFPO-DA and PFBS, the MCL is a Hazard Index of 1. CGTF extraction wells COS-72 and COS-75A showed exceedances for PFOS (6.10 and 7.02 ppt, respectively), and CGTF extraction wells COS-71A and COS-72 were found to be above the MCL for PFOA (5.28 and 4.32 ppt, respectively). None of the wells were above the Hazard Index of 1 for PFHxS, PFNA, HFPO-DA and PFBS. The treated water from both the CGTF and NGTF showed non-detect results for PFAS as it entered the drinking water system for the City of Scottsdale.

11 CONCLUSIONS AND RECOMMENDATIONS

Data collected and evaluated throughout 2023 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 decrease 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 2023, all GM&EP metrics were achieved in the UAU Program, the MAU/LAU Program, and the Northern LAU program, and half were achieved for the Source Control Programs. Exceptions are discussed in **Section 9.6** and tracked carefully to ensure ongoing protectiveness of the remedy. 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 2024 include:

- Finalize the NIBW Groundwater Flow Model Update Report, addressing comments from EPA.
- Review and provide comments on the pending EPA Remedy Optimization Team’s final report, if submitted in 2024.
- Support efforts to bring modified extraction well COS-71A back online as an MAU-only extraction well in a high-priority pumping position to augment capture of the MAU plume associated with Area 7.
- Continue to support property access, permitting, design, and implementation efforts at monitoring well PG-41MA/LA to facilitate equipping this well for extraction and tie-in to treatment at the NGTF.
- Engage with EPA and the Technical Committee on revised metrics that better reflect the status and needs of the Site as part of a comprehensive update to the GM&EP.
- Finalize the treatment system and well O&M Plans into the Sitewide O&M Plan in accordance with the NIBW Amended CD Statement of Work.
- Update the Phase II Health & Safety Plan for the NIBW treatment systems.

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13 ACRONYMS & ABBREVIATIONS

% ....percent
µg/L................micrograms per liter
µg/m^3..............micrograms per cubic meter
1,1-DCE 1,1-dichloroethene
1,1,1-TCA 1,1,1-Trichloroethane
1,4-DX 1,4-dioxane
3D...................three-dimensional
AB ....abandoned
ADEQ ....Arizona Department of Environmental Quality
ADHS.............Arizona Department of Health Services
ADONA 4,8-dioxa-3H-perfluorononanoate
ADWR ....Arizona Department of Water Resources
AF ....acre-feet
amsl ....above mean sea level
APP ....Aquifer Protection Permit
ARAL.............Accelerated Response Action Level
AVI ....Arcadia Vista Improvement
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
CERP..............Contingency and Emergency Response Plan
CGTF ....Central Groundwater Treatment Facility
CMR...............Compliance Monitoring Report
COCs..............Constituent of Concern
COS ....City of Scottsdale
COT................City of Tempe
CSM ....Conceptual Site Model
CWTP ....Chaparral Water Treatment Plant
DMR ....Discharge Monitoring Reports
eff...................effluent
EPA ................U.S. Environmental Protection Agency
EPCOR...........EPCOR Water USA
FSA ....Feasibility Study Addendum
GAC ....Granular Activated Carbon
GM&EP ....Groundwater Monitoring and Evaluation Plan

gpm	gallons per minute
GRUSP	Granite Reef Underground Storage Project
GWETS	Groundwater Extraction and Treatment System
HFPO-DA	hexafluoropropylene oxide dimer acid
HHRA	Human Health Risk Assessment
IBGC	Indian Bend Golf Course
ID	identifier
inf	influent
LAU	Lower Alluvial Unit
M&A	Montgomery & Associates
MAU	Middle Alluvial Unit
MCL	Maximum Contaminant Level
MDWC	McDowell Mountain Water Company
MG	Million Gallons
MRL	Method Reporting Limit
MRTF	Miller Road Treatment Facility
NA	Not available
NGTF	NIBW Granular Activated Carbon Treatment Facility
NGTF-CP	NGTF Effluent Chaparral Compliance Point Sample Identifier
NIBW	North Indian Bend Wash
NIS	Not in service
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
PFBS	perfluorobutane sulfonic acid
PFHxS	perfluorohexane sulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
ppt	parts per trillion
PV	Paradise Valley
PVARF	Paradise Valley Arsenic Removal Facility
QA	quality assurance
QAPP	quality assurance project plan
QRIA	Quail Run Irrigation District
RAOs	Remedial Action Objective

RI/FS	Remedial Investigation Feasibility Study
RO	reverse osmosis
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SGS	Soil Gas Sampling
SMR	Site Monitoring Report
SOW	Statement of Work
SRIR	Salt River Indian Reservation
SRP	Salt River Project
SRPMIC	Salt River Pima-Maricopa Indian Community
SVE	Soil Vapor Extraction
TCE	Trichloroethene
TCM	chloroform
TGTF	Thomas Groundwater Treatment Facility
UAU	Upper Alluvial Unit
UIC	Underground Injection Control
URAL	Urgent Response Action Level
USACE	U.S. Army Corps of Engineers
UV/OX	Ultraviolet Oxidation
VMS	Vapor Mitigation Systems
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	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-14	Extraction	LAU	Monthly	Continuous
PV-15	Extraction	MAU/LAU	Monthly	Continuous
PV-11	Production	LAU	---	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

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-6MA	Monitoring	MAU	Quarterly	Semi-Annually
M-7MA	Monitoring	MAU	Annually	Semi-Annually
M-9LA	Monitoring	LAU	---	Semi-Annually
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

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-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
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-53MA*	Monitoring	MAU-Lower	Annually	---
PG-54MA	Monitoring	MAU-Lower	Annually	---
PG-55MA	Monitoring	MAU-Lower	Annually	---
PG-56MA	Monitoring	MAU-Lower	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
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
MAU-Lower = Lower Middle Alluvium Unit

NOTES:

= In April 2023, the PCs in collaboration with the City of Scottsdale temporarily modified the construction of COS-71A. The screen has been converted from MAU/LAU to MAU only.

* = On April 7, 2023, the PCs formally requested the replacement of monitoring well PG-49MA per the GM&EP schedule with monitoring well PG-53MA. This request was approved by EPA on August 23, 2023.

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**	**Borehole Depth (ft, bls)**	**Well Total Depth (ft, bls)**	**Diameter (inches)**	**Type**	**Depth Interval (ft, bls)**	**Perforated Interval (ft, bls)**	**Sampling Method**	**Pump Intake (ft, bls)**	**Latitude[1]**	**Longitude[1]**	**Land Surface Elevation (ft)[2]**
MONITORING WELLS:														
B-1MA	(A-1-4) 2ddd1	55-510690	04/19/85	305	300	14 8 5	steel	0-20 +1-250 +1.2-300	--- --- 250-300	Not Sampled	---	33.451897	-111.909709	1191.63
B-1UA	(A-1-4) 2ddd2	55-510691	05/01/85	122	122	6 4	steel	0-21 0-122	--- 72-122	Not Sampled	Unknown	33.451900	-111.909567	1191.71
B-J	(A-1-4) 2dbd1	55-510693	05/20/85	114	114	8 4	steel	0-20 0-114	--- 64-114	Pump	Unknown	33.456741	-111.914229	1192.23
D-4MA	(A-2-4) 26bda	55-240174	01/25/99	250	250	4	PVC	0-249.5	163.5-175 184-189.5 214.5-224 230-249.5	Pump	221	33.490465	-111.918839	1240.03
E-1LA	(A-1-4) 1abb1	55-510220	05/14/85	749	749	10 6 4	steel	+1-20 0-695 0-749	--- --- 689-749 [3]	Not Sampled	280	33.465686	-111.899727	1215
E-1MA	(A-1-4) 1abb2	55-510221	05/23/85	300	300	10 6 4	steel	+1-20 0-250 0-300	--- --- 250-300	Pump	Unknown	33.465689	-111.899631	1214.36
E-1UA	(A-1-4) 1abb3	55-510222	05/24/85	150	128	6 4	steel	+1-20 0-128	--- 78-128	Not Sampled	117	33.465689	-111.899799	1215.36
E-2UA	(A-2-4) 35daa1	55-510208	05/29/85	161	150	6 4	steel	+1-20 0-150	--- 97-150	Not Sampled	---	33.471792	-111.909791	1226.55
E-5MA	(A-1-4) 2acd2	55-520077	09/30/88	305	300	10 6 4	steel	+11-21 +1-250 +0.5-300	--- --- 250-300	Pump	210	33.460212	-111.914192	1199.43
E-5UA	(A-1-4) 2acd1	55-510210	06/02/85	132	132	6 4	steel	0-20 0-132	--- 78-132	HydraSleeve	---	33.460180	-111.914195	1199.55
E-6UA	(A-2-4) 35cbd	55-520079	09/02/88	167	160	10 4	steel	+1-21 +0.5-160	--- 120-160	Not Sampled	147	33.470253	-111.922033	1222.29
E-7LA	(A-1-4) 2abb2	55-520076	09/23/88	632	600	10 6 4	steel	+1-21 +1-530 +0.5-600	--- --- 550-600	Pump	Unknown	33.465112	-111.916059	1197.79
E-7UA	(A-1-4) 2abb3	55-520078	10/18/88	143	130	10 4	steel	+1-21 +0.5-130	--- 100-130	HydraSleeve	---	33.465297	-111.916109	1197.4
E-8MA	(A-1-4) 2dbd2	55-520075	10/24/88	315	300	10 6 4	steel	+1-21 +1-250 +1-300	--- --- 250-300	Pump	Unknown	33.456716	-111.914187	1192.89
E-10MA	(A-2-4) 26bcc	55-521791	07/23/88	369	300	10 4	steel	0-20 0-300	--- 250-300	HydraSleeve	---	33.488454	-111.925249	1243.86
E-12UA	(A-1-4) 2dad	55-523247	01/26/89	125	120	6 4	steel	0-20 0-125	--- 90-120	HydraSleeve	---	33.456015	-111.909780	1203.62
E-13UA	(A-1-4) 1cbb	55-523302	03/15/89	121	120	6 4	steel	0-20 20-121	--- 90-120	HydraSleeve	---	33.458239	-111.908174	1208.62
E-14LA	(A-2-4) 34bad	55-521514	06/26/88	310	310	4	steel	0-310	290-310	Not Sampled	---	33.476826	-111.935063	1253.95
M-1MA	(A-1-4) 1bad2	55-507300	04/03/84	302	302	10 6 4	steel	+1-20 0-252 0-302	--- --- 252-302	Not Sampled	---	33.462270	-111.901285	1210.89
M-2LA	(A-1-4) 1bcc3	55-518239	09/29/87	710	710	10 6 4	steel	+1-20 0-659 0-710	--- --- 659-710	Not Sampled	Unknown	33.458837	-111.907445	1210.22

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**	**Borehole Depth (ft, bls)**	**Well Total Depth (ft, bls)**	**Diameter (inches)**	**Type**	**Depth Interval (ft, bls)**	**Perforated Interval (ft, bls)**	**Sampling Method**	**Pump Intake (ft, bls)**	**Latitude[1]**	**Longitude[1]**	**Land Surface Elevation (ft)[2]**
M-2MA	(A-1-4) 1bcc1	55-507296	04/09/84	303	303	10 6 4	steel	+1-21 0-251 0-303	--- --- 251-303	HydraSleeve	---	33.458873	-111.907681	1210.05
M-2UA	(A-1-4) 1bcc2	55-507303	04/12/84	125	121	6 4	steel	+1.5-21 0-121	--- 79-121	HydraSleeve	---	33.458864	-111.907596	1210.17
M-3MA	(A-1-4) 1bdd1	55-507294	04/19/84	303	303	10 6 4	steel	+1.5-21 0-250 0-303	--- --- 250-303	Not Sampled	Unknown	33.458762	-111.901552	1205.54
M-4MA	(A-1-4) 1bdb2	55-507295	04/26/84	302	302	10 6 4	steel	+1.5-19 0-251 0-302	--- --- 251-302	HydraSleeve	---	33.462226	-111.904554	1214.89
M-5LA	(A-1-4) 1bba3	55-518240	10/07/87	750	750	10 6 4	steel	+1-20 0-702 0-748	--- --- 700-750	Pump	Unknown	33.465492	-111.906038	1217.45
M-5MA	(A-1-4) 1bba1	55-507304	04/30/84	302	302	10 6 4	steel	+1.5-19 0-251 0-302	--- --- 250-302	Pump	260	33.465528	-111.906146	1217.42
M-6MA	(A-1-4) 1baa1	55-507298	05/09/84	302	302	10 6 4	steel	+1.5-19 0-251 0-302	--- --- 249-302 [3]	Pump	260	33.465651	-111.901275	1216.98
M-7MA	(A-1-4) 1bad3	55-507299	05/18/84	300	300	10 6 4	steel	+1-10 0-250 0-300	--- --- 258-300	Pump	Unknown	33.464102	-111.900938	1213.87
M-9LA	(A-2-4) 36dba3	55-518243	08/27/87	835	835	10 6 4	steel	+1-20 0-777 0-835	--- --- 777-835	Not Sampled	Unknown	33.472741	-111.896258	1220.52
M-9MA	(A-2-4) 36dba1	55-509772	03/27/85	302	302	10 4	steel	0-20 0-302	--- 249-302	Pump	260	33.472553	-111.896187	1220.51
M-10LA2	(A-2-4) 35ddc5	55-905027	10/23/06	720	700	5	steel	0.5-700	650-700	HydraSleeve	---	33.466086	-111.911519	1219.7
M-10MA2	(A-2-4) 35ddc4	55-905026	10/23/06	310	300	5	steel	0.5-300	250-300	Pump	210.5	33.466088	-111.911211	1220.05
M-11MA	(A-2-4) 35dba	55-509773	04/11/85	300	300	10 4	steel	0-18 0-300	--- 245-300	Pump	260	33.471516	-111.914409	1211.58
M-12MA2	(A-2-4) 26dda4	55-906269	02/07/07	301	299	5	steel	0-299	250-299	HydraSleeve	---	33.483832	-111.910129	1227.92
M-14LA	(A-2-4) 35daa2	55-518241	10/19/87	721	720	10 6 4	steel	+1-20 0-670 0-721	--- --- 679-720	HydraSleeve	---	33.471794	-111.909596	1226.22
M-14MA	(A-2-4) 35daa3	55-518242	10/22/87	302	302	10 6 4	steel	+1-20 0-251 0-302	--- --- 251-302	Not Sampled	---	33.471793	-111.909696	1226.34
M-15MA	(A-2-4) 36cdc1	55-518802	10/28/87	300	300	10 6 4	steel	+1-20 0-251 0-300	--- --- 251-300	Pump	210	33.467612	-111.903534	1218.9
M-16LA	(A-2-4) 36bca1	55-518799	11/11/87	779	779	10 6 4	steel	+1-20 0-729 0-779	--- --- 729-779	HydraSleeve	---	33.475689	-111.904934	1228
M-16MA	(A-2-4) 36bca2	55-518800	11/19/87	300	300	10 6 4	steel	+1-20 0-250 0-300	--- --- 250-300	Pump	Unknown	33.475782	-111.904940	1228.14
M-17MA/LA	(A-2-4) 34aca	55-594864	10/31/02	301	300	4	steel	0-300	250-300	HydraSleeve	---	33.473933	-111.927866	1237.7
PA-1MA	(A-2-4) 25ddc1	55-526966	03/23/90	301	301	10 6 4	steel	0-20 0-251 0-301	--- --- 241-301 [3]	Not Sampled	Unknown	33.480586	-111.894394	1225.5

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	Borehole Depth (ft, bls)	Well Total Depth (ft, bls)	Casing				Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]	Land Surface Elevation (ft)[2]
						Diameter (inches)	Type	Depth Interval (ft, bls)	Perforated Interval (ft, bls)					
PA-2LA	(A-2-4) 24acb1	55-526957	04/04/90	898	898	10 6 4	steel	0-20 0-845 0-898	--- --- 835-898[3]	Pump	477	33.503743	-111.899419	1253.75
PA-3MA	(A-2-4) 24acb2	55-526956	04/10/90	300	300	10 6 4	steel	0-20 0-250 0-300	--- --- 240-300[3]	Not Sampled	Unknown	33.503743	-111.899489	1253.44
PA-4MA	(A-2-4) 23ddd3	55-526954	04/13/90	300	300	10 6 4	steel	0-20 0-250 0-300	--- --- 240-300[3]	Not Sampled	252	33.496748	-111.910162	1230.91
PA-5LA	(A-2-4) 23ddd4	55-526955	04/25/90	802	802	10 6 4	steel	0-20 0-750 0-802	--- --- 742-802[3]	Pump	441	33.496804	-111.910083	1229.44
PA-6LA	(A-2-4) 23adb1	55-526949	05/07/90	770	770	10 6 4	steel	0-20 0-730 0-770	--- --- 720-770[3]	HydraSleeve	---	33.504101	-111.913175	1252.92
PA-7MA	(A-2-4) 23adb2	55-526948	05/11/90	302	302	10 6 4	steel	0-20 0-252 0-302	--- --- 252-302[3]	Not Sampled	Unknown	33.504191	-111.913175	1253.06
PA-8LA2	(A-2-4) 26dda5	55-906270	02/12/07	754	751	5	steel	0-751	700-751	Pump	365	33.483905	-111.910128	1228.33
PA-9LA	(A-2-4) 26ccb1	55-526951	06/01/90	681	681	10 6 4	steel	0-20 0-630 0-681	--- --- 630-681	HydraSleeve	---	33.483704	-111.924057	1236.78
PA-10MA	(A-2-4) 26ccb2	55-526950	06/06/90	300	300	10 6 4	steel	0-20 0-250 0-300	--- --- 240-300[3]	HydraSleeve	---	33.483601	-111.924053	1236.79
PA-11LA	(A-2-4) 35bdb1	55-526961	06/15/90	585	585	10 6 4	steel	0-20 0-535 0-585	--- --- 525-585[3]	Pump	273	33.476466	-111.921734	1223.19
PA-11LA2	(A-2-4) 35bdb3	55-906271	05/01/07	590	585	2	PVC	585	525-585	Not Sampled	---	33.476586	-111.921734	1224.95
PA-12MA	(A-2-4) 35bdb2	55-526960	06/21/90	300	300	10 6 4	PVC	0-20 0-250 0-300	--- --- 240-300[3]	Pump	231	33.476540	-111.921733	1223.29
PA-12MA2	(A-2-4) 35bdb3	55-906271	05/01/07	590	301	2	steel	301	240-301	Not Sampled	---	33.476586	-111.921734	1224.95
PA-13LA	(A-2-4) 23cdd1	55-526953	07/23/90	710	710	6 4	steel	0-660 0-710	--- 650-710[3]	Pump	462	33.496065	-111.919461	1248.98
PA-14MA	(A-2-4) 23cdd2	55-526952	07/27/90	306	305	10 6 4	steel	+0.5-20 0-255 0-305	--- --- 245-305[3]	Not Sampled	---	33.496181	-111.919460	1249.08
PA-15LA	(A-1-4) 2cdb2	55-526965	08/03/90	525	525	10 6 4	steel	+1-20 0-475 0-525	--- --- 465-525[3]	HydraSleeve	---	33.454336	-111.920851	1204.27
PA-16MA	(A-1-4) 2cdb3	55-526964	08/10/90	302	302	10 6 4	steel	+1-20 0-250 0-302	--- --- 242-302[3]	HydraSleeve	---	33.454439	-111.920845	1204.47
PA-17MA2	(A-2-4) 25acc1	55-223679	07/10/14	305	303	2.375	PVC	0-303	243-303	Not Sampled	---	33.489903	-111.898958	1238.7
PA-18LA	(A-2-4) 25acc2	55-526963	08/28/90	840	840	10 6 4	steel	+0.5-20 0-795 0-845	--- --- 780-840[3]	HydraSleeve	---	33.490250	-111.900068	1238.86

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	Borehole Depth (ft, bls)	Well Total Depth (ft, bls)	Diameter (inches)	Type	Depth Interval (ft, bls)	Perforated Interval (ft, bls)	Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]	Land Surface Elevation (ft)[2]
PA-19LA	(A-1-4) 2bba3	55-526959	09/13/90	405	405	10 6 4	steel	+1-20 0-355 0-405	--- --- 345-405 [3]	Pump	240	33.465528	-111.923724	1221.46
PA-20MA	(A-1-4) 2bba2	55-526958	09/19/90	260	260	10 6 4	steel	+1-20 0-210 0-260	--- --- 200-260 [3]	Pump	220	33.465528	-111.923618	1221.28
PA-21MA	(A-2-4) 36add	55-526967	09/28/90	302	302	10 6 4	steel	+1-20 0-250 0-302	--- --- 242-302 [3]	HydraSleeve	---	33.474963	-111.891986	1225.19
PA-22LA	(A-1-4) 11adb1	55-526969	10/01/90	635	635	6 4	steel	0-584 0-635	--- 574-635 [3]	Not Sampled	---	33.447509	-111.912847	1183.99
PA-23MA	(A-1-4) 11adb2	55-526968	10/19/90	300	300	10 6 4	steel	+1-20 0-250 0-300	--- --- 240-300 [3]	Not Sampled	Unknown	33.447595	-111.912772	1184.42
PG-1LA	(A-2-4) 14dda	55-533846	12/30/91	810	809	10 6 4	steel	0-20 0-757 0-809	--- --- 754-809 [3]	Pump	483	33.512941	-111.909137	1249.66
PG-2LA	(A-2-4) 14cda1	55-533845	01/14/92	763	762	10 6 4	steel	0-20 0-710 0-762	--- --- 710-762	Pump	483	33.512932	-111.917459	1271.05
PG-4MA	(A-1-4) 3aad1	55-534407	03/05/92	303	225	10 4	steel	0-20 0-225	--- 183-225	Pump	200	33.462157	-111.927272	1227.47
PG-4UA	(A-1-4) 3aad2	55-534408	03/10/92	172	172	6 4	steel	0-20 0-172	--- 140-172	HydraSleeve	---	33.462154	-111.927351	1227.68
PG-5MA	(A-1-4) 2bca1	55-534411	03/18/92	503	301	10 6 4	steel	0-20 0-250 0-300	--- --- 249-300 [3]	HydraSleeve	---	33.460405	-111.922224	1214.21
PG-5UA	(A-1-4) 2bca2	55-534412	03/20/92	180	178	6 4	steel	0-20 0-178	--- 115-178	HydraSleeve	---	33.460321	-111.922194	1214.2
PG-6MA	(A-1-4) 2ccb2	55-534410	03/25/92	400	245	10 6 4	steel	0-20 0-195 0-245	--- --- 185-245 [3]	Pump	210	33.454703	-111.925289	1212.69
PG-6UA	(A-1-4) 2ccb1	55-534409	04/02/92	170	170	6 4	steel	+1-20 0-170	--- 107-170	Pump	140	33.454793	-111.925289	1212.83
PG-7MA	(A-1-4) 11bab	55-534413	04/08/92	435	300	10 6 4	steel	0-20 0-250 0-300	--- --- 250-300 [3]	Pump	Unknown	33.450711	-111.922152	1197.65
PG-7UA	(A-1-4) 11bba	55-534414	04/16/92	156	156	6 4	steel	+1-20 0-156	--- 72-156	Not Sampled	136	33.450591	-111.922153	1197.42
PG-8UA	(A-1-4) 2bba1	55-534415	04/24/92	162	162	6 4	steel	+1-20 0-162	--- 122-162	Pump	160	33.465526	-111.923863	1222.56
PG-10UA	(A-2-4) 26bdb	55-535829	06/25/92	154	154	8 6	steel	+1-20 +1-154	--- 130-152	Pump	144	33.489743	-111.919585	1240.83
PG-11UA	(A-2-4) 35bba2	55-535459	06/25/92	157	157	8 6	steel	+1-20 0-157	--- 124-154	HydraSleeve	---	33.480162	-111.921979	1230.4
PG-16UA	(A-2-4) 26cbb	55-535458	07/18/92	166	166	8 6	steel	+1-20 0-166	--- 130-163	Pump	153.5	33.487392	-111.923954	1241.89
PG-18UA	(A-1-4) 2dcb	55-535470	07/28/92	160	160	8 6	steel	+1-20 0-160	--- 75-155	Pump	140	33.454715	-111.917537	1202.13
PG-19UA	(A-1-4) 2dbb2	55-535474	07/30/92	158	158	8 6	steel	+1-20 0-158	--- 82-155	Pump	140	33.458113	-111.917641	1204.3

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	Borehole Depth (ft, bls)	Well Total Depth (ft, bls)	Casing				Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]	Land Surface Elevation (ft)[2]
						Diameter (inches)	Type	Depth Interval (ft, bls)	Perforated Interval (ft, bls)					
PG-22UA	(A-1-4) 2abd	55-535467	08/07/92	148	147	8 6	steel	+1-20 0-147	--- 83-143	HydraSleeve	---	33.463474	-111.913899	1210.29
PG-23MA/LA	(A-1-4) 3add2	NA	10/15/93	300	300	11 4	steel	0-20 0-300	--- 250-300	Pump	Unknown	33.458535	-111.927121	1222.52
PG-23UA	(A-1-4) 3add1	55-535473	08/12/92	174	174	8 6	steel	+1-20 0-174	--- 118-168	HydraSleeve	---	33.458535	-111.927269	1222.77
PG-24UA	(A-1-4) 2cba	55-535471	08/13/92	163	163	8 6	steel	+1-20 0-163	--- 96-158	HydraSleeve	---	33.457657	-111.922843	1212.09
PG-25UA	(A-1-4) 2bda	55-535468	08/18/92	153	153	8 6	steel	+1-20 0-153	--- 87-150	HydraSleeve	---	33.461354	-111.917861	1206.19
PG-28UA	(A-2-4) 26caa2	55-539541	08/ /93	176	173	4	steel	0-173	113-173	Pump	163	33.486571	-111.918858	1234.94
PG-29UA	(A-2-4) 26acc	55-539540	07/16/93	155	152	8 4	steel	0-20 0-152	--- 92-152	Pump	135	33.487523	-111.915867	1233.03
PG-30UA	(A-2-4) 26dcb	55-539542	08/01/93	157	152	4	steel	0-152	107-152	Not Sampled	144	33.482279	-111.917370	1226.26
PG-31UA	(A-2-4) 26ccb3	55-539539	08/01/93	156	154	8 4	steel	0-20 0-154	--- 114-154	HydraSleeve	---	33.483932	-111.922877	1235.37
PG-38MA/LA	(A-1-4) 3abd2	55-540382	10/01/93	250	250	10 6 4	steel	0-20 0-200 0-250	--- --- 200-250	HydraSleeve	---	33.463494	-111.931033	1237.24
PG-39LA	(A-2-4) 34dad1	55-540380	11/07/93	300	300	8 4	steel	0-20 0-300	--- 250-300	Pump	252	33.469351	-111.926777	1232.58
PG-40LA	(A-2-4) 14acb3	55-544386	08/01/94	1,400	1,400	12 8 6	steel	0-20 0-900 856-1,400	--- --- 900-1,400	Pump	445	33.518203	-111.917000	1275.33
PG-41MA/LA	(A-2-4) 14acb4	55-550401	08/01/95	900	900	10 6	steel	0-503 492-900	--- 503-890	Not Sampled	---	33.518283	-111.916985	1275.48
PG-42LA	(A-2-4) 11ccd	55-557440	06/21/96	830	759	8 4	steel	0-20 0-759	--- 597-759	Pump	420	33.523318	-111.922877	1292.31
PG-43LA	(A-2-4) 11ddd	55-557441	07/15/96	907	900	8 4	steel	0-22 0-900	--- 720-900	HydraSleeve	---	33.524172	-111.909065	1265
PG-44LA	(A-2-4) 15dad	55-558952	08/01/96	869	759	8 4	steel	0-20 0-759	--- 633-759	HydraSleeve	---	33.513244	-111.927936	1297.59
PG-47MA	(A-1-4) 1baa4	55-566511	07/02/96	690	560	4	steel	0-560	510-560	Not Sampled	232	33.465645	-111.901429	1216.68
PG-48MA	(A-1-4) 1baa5	55-566512	07/12/96	450	430	4	steel	0-430	380-430	Pump	232	33.465649	-111.901578	1216.84
PG-49MA	(A-2-4) 35dba3	55-566513	07/26/96	609	574	4	steel	0-574	524-574	HydraSleeve	---	33.471383	-111.914415	1210.48
PG-50MA	(A-2-4) 26bda5	55-556193	08/08/96	638	562	4	steel	0-562	522-562	HydraSleeve	---	33.490186	-111.918715	1240.96
PG-51MA	(A-2-4) 26bda6	55-556194	08/16/96	481	480	4	steel	0-480	460-480	Not Sampled	463	33.490134	-111.918714	1240.9
PG-53MA	(A-2-4)36cab	55-566514	09/13/96	690	585	4	steel	0-585	535-585	HydraSleeve	---	33.471612	-111.904163	1224.96
PG-54MA	(A-2-4) 36cab3	55-566515	09/27/96	444	424	4	steel	0-424	389-424	Pump	232	33.471566	-111.904151	1224.82
PG-55MA	(A-2-4) 26dca	55-559965	10/10/96	660	570	4	steel	0-570	520-570	Pump	274	33.483996	-111.913721	1225.77
PG-56MA	(A-2-4) 26aca2	55-560235	10/29/96	690	580	4	steel	0-580	530-580	Pump	253	33.490350	-111.913239	1231.85
S-1LA	(A-2-4) 27aab1	55-525290	08/26/89	660	657	10 6 4	steel	0-20 0-600 0-658	--- --- 607-657	Pump	Unknown	33.494044	-111.929281	1260.44
S-1MA	(A-2-4) 27aab2	55-525291	08/31/89	274	274	10 6 4	steel	+2-20 0-174 0-273	--- --- 254-274	HydraSleeve	---	33.493951	-111.929480	1260.34

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**	**Borehole Depth (ft, bls)**	**Well Total Depth (ft, bls)**	**Diameter (inches)**	**Type**	**Depth Interval (ft, bls)**	**Perforated Interval (ft, bls)**	**Sampling Method**	**Pump Intake (ft, bls)**	**Latitude[1]**	**Longitude[1]**	**Land Surface Elevation (ft)[2]**
S-2LA	(A-2-4) 23ccb1	55-525292	08/07/89	682	668	10 6 4	steel	+2-20 0-618 0-668	--- --- 618-668	Pump	Unknown	33.497868	-111.924166	1259.97
S-2MA	(A-2-4) 23ccb2	55-525293	08/14/89	304	280	10 4	steel	+2-20 0-280	--- 230-280	HydraSleeve	---	33.497976	-111.924191	1260.48
W-1MA	(A-2-4) 26aca1	55-530928	03/04/91	290	290	4	steel	0-290	240-290	Pump	140	33.489720	-111.913139	1230.38
W-2MA	(A-2-4) 26caa1	55-530929	03/04/91	290	290	4	steel	0-290	240-290	Pump	280	33.486586	-111.919062	1235.08
EXTRACTION WELLS:														
7EX-3aMA	(A-2-4) 26bda7	55-577372	09/24/99	355	355	6	stainless steel	0-354.5	165-354.5	Pump	212	33.489537	-111.918722	1238.74
7EX-4MA[4]	(A-2-4) 26caa3	55-400132	10/01/96	370	304	6	stainless steel	0-304	190-244	Pump	240	33.487221	-111.917712	1231.32
7EX-6MA	(A-2-4) 26cad	55-224306	07/02/15	381	362	8	stainless steel	0-362	200-362	Pump	300	33.485782	-111.919273	1232.32
COS-31	(A-2-4) 25cdb2	55-608435	08/02/57	1,300	1,300	20 16	steel	0-695 695-1,300	300-692 705-1,288	Pump	462	33.483906	-111.904478	1,228
COS-71A	(A-2-4) 35abb	55-222760	03/17/14	1,100	802	20	steel stainless steel	0-211 211-802	--- 211-402 422-507 552-687 713-792	Pump	406	33.479533	-111.917114	1229
COS-72	(A-2-4) 35aab2	55-626542	08/21/51	985	985	20	steel	0-985	200-970	Pump	483	33.480214	-111.912430	1220
COS-75A	(A-2-4) 23ddd5	55-546469	05/01/95	1,413	1,278	20	steel	0-1,278	658-1,258	Pump	402	33.496731	-111.910389	1237
Granite Reef	(A-1-4) 01aba1	55-617830	01/01/41	493	482	24 18 16	steel	0-482 0-199 0-472	199-465 --- 192-472	Pump	312	33.465672	-111.898427	1211
MEX-1MA	(A-2-4) 01bba4	55-566405	01/01/98	666	656	20	steel	0-656	140-544	Pump	415	33.465437	-111.906054	1224
PCX-1	(A-2-4) 14cda2	55-564426	05/01/95	1,350	1,245	20	steel	0-1,245	720-1,151	Pump	562	33.513160	-111.917630	1279
PV-14	(A-2-4) 11dcc3	55-624807	02/22/65	1,743	1,732	20 8	steel	0-1,400 1,400-1,730	700-1,400 1,400-1,730	Pump	580	33.524682	-111.916032	1280.43
PV-15	(A-2-4) 14abc1	55-624808	02/11/69	1,430	1,425	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	1282.1
PRODUCTION WELLS:														
AVI	(A-2-4) 14dab	55-800928	04/01/46	N/A	798	16	steel	0-798	165-798	Not Sampled	Unknown	33.513836	-111.931379	1310
AWC-7A	(A-2-4) 22dab5	55-608782	11/23/71	801	620	14	steel	0-620	300-620	Not Sampled	Unknown	33.501092	-111.930144	1275
AWC-8A	(A-2-4) 22dac	55-536833	02/05/94	630	625	20 16	steel	0-625 0-610	335-611 340-610	Not Sampled	Unknown	33.498840	-111.929952	1284
AWC-8B	(A-2-4) 22dab	55-585033	04/02/01	785	774	18	steel	0-774	460-760	Not Sampled	Unknown	33.501781	-111.928658	1275
AWC-9B	(A-2-4) 22daa	55-201729	06/16/04	1,210	1,200	18	steel	0-1200	500-1180	Not Sampled	Unknown	33.500603	-111.928328	1276
AWC-12A	(A-2-4) 22dba3	55-540859	02/27/94	696	650	20	steel	0-650	345-645	Not Sampled	Unknown	33.501991	-111.932343	1285
COS-6	(A-2-4) 25bcd	55-607686	11/09/53	1295	1295	20 16	steel	0-465 465-1295	Unknown	Not Sampled	Unknown	33.487725	-111.904850	1240.72
COS-25	(A-1-4) 02dda	55-626824	09/15/77	700	700	16 14	steel	0-500 500-700	Unknown	Not Sampled	Unknown	33.453681	-111.911635	1196
COS-74	(A-2-4) 25ddb	55-626615	03/13/74	1,200	1,200	20 16	steel	0-800 800-1,200	--- 800-1,200	Not Sampled	Unknown	33.483686	-111.895762	1228
COT-6	(A-1-4) 11aba	55-628167	12/12/60	1,054	1,050	16	steel	0-1,050	300-980	Not Sampled	Unknown	33.450762	-111.914432	1193
IBGC	(A-2-4) 11dba	55-527102	07/16/90	622	622	16	steel	0-622	300-610	Not Sampled	Unknown	33.443418	-111.914123	1179
Laird 2	(A-1-4) 11bdb	55-603767	11/01/73	492	445	16	steel	0-445	155-430	Not Sampled	Unknown	33.447134	-111.922291	1185

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	Borehole Depth (ft, bls)	Well Total Depth (ft, bls)	Diameter (inches)	Type	Depth Interval (ft, bls)	Perforated Interval (ft, bls)	Sampling Method	Pump Intake (ft, bls)	Latitude[1]	Longitude[1]	Land Surface Elevation (ft)[2]
MDWC	(A-2-4) 14cbb	55-600523	02/23/50	750	750	20 12	steel	0-500 500-750	Unknown	Not Sampled	Unknown	33.516398	-111.925694	1299
PV-11	(A-2-4) 11dcb	55-624805	07/01/59	1,372	1,342	20 16	steel	0-1,020 1,000-1,342	509-1,020 1,000-1,225	Pump	Unknown	33.526793	-111.915422	1281.2
PV-12B	(A-2-4) 11dcb	55-220510	09/09/11	1,150	1,130	20	steel	0-1,130	716-1,130	Pump	Unknown	33.527877	-111.915644	1278
PV-16	(A-2-4) 11dbb	55-624809	03/27/80	1,505	1,500	18	steel	0-1,500	650-1,500	Not Sampled	Unknown	33.529599	-111.916200	1282.1
PV-17	(A-2-4) 11bdd	55-537967	04/20/93	1,590	1,145	20 16	steel	0-582 582-1,145	--- 582-1,125	Not Sampled	Unknown	33.531626	-111.918256	1286
SRIR SCC	(A-2-5) 19aba	Not Registered	03/01/58	1,106	984	20	steel	0-984	450-984	Not Sampled	Unknown	33.508377	-111.879310	1259
QRIA	(A-2-4) 15aa	55-802113	04/09/05	601	601	16 14	steel	0-450 450-601	Unknown	Not Sampled	Unknown	33.519280	-111.929246	1313
Radisson	(A-2-4) 11abb	55-609565	01/01/76	684	684	10	steel	0-684	Unknown	Not Sampled	Unknown	33.537541	-111.916236	1282
SRP21.5E,8N	(A-2-4) 22dcc	55-226628	03/15/17	630	630	20	steel	0-630	300-610	Not Sampled	Unknown	33.494956	-111.933857	1268
SRP22.5E,5.5N	(A-1-4) 02dbb	55-608363	11/16/48	610	520	20	steel	0-520	Unknown	Not Sampled	Unknown	33.457799	-111.917339	1204
SRP22.6E,10N	(A-2-4) 11dcc1	55-617843	12/01/40	1,003	996	20	steel	0-996	348-996	Pump	Unknown	33.523920	-111.915105	1275
SRP22.9E,10.8N	(A-2-4) 11aad2	55-202099	09/25/04	1,210	1,200	20	steel	0-1,200	400-540 640-760 840-1,180	Not Sampled	Unknown	33.534954	-111.908941	1276
SRP23.5E,5.3N	(A-1-4) 01cda	55-608365	07/06/52	850	840	20	steel	0-840	Unknown	Not Sampled	Unknown	33.454212	-111.900806	1192
SRP23.5E,8.8N	(A-2-4) 24bad	55-607687	01/28/49	1,300	1,300	24 20 16	steel	0-460 460-1,012 1,012-1,300	Unknown	Not Sampled	Unknown	33.505549	-111.900505	1252
SRP23.5E,9.5N	(A-2-4) 13caa	55-607716	04/03/52	1,020	1,020	20 16	steel	0-742 742-1,020	Unknown	Not Sampled	Unknown	33.515424	-111.901059	1264
SRP23.5E,10.6N	(A-2-4) 12bdd	55-214647	11/20/07	1,005	1,000	20	steel	0-1,000	380-630 730-980	Not Sampled	Unknown	33.532846	-111.902218	1280
SRP24E,10.5N	(A-2-4) 12add2	55-607710	05/06/49	1,200	1,200	24 20	steel	0-770 770-1,200	Unknown	Not Sampled	Unknown	33.531248	-111.891981	1284

EXPLANATION:

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

NOTES:

[1] Coordinates of well locations use datum NAD 1983.

[2] Surveyed land surface elevation shown where available; land surface elevation is approximated to the nearest foot from google earth or other where surveyed results are unavailable.

[3] 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.

[4] 7EX-4MA abandoned on 12/14/23.

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

APPENDIX B
WATER LEVEL TABLES

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2023

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	04/07/2023 10:13	81.81	1109.82
D-4MA	04/05/2023 17:32	124.23	1115.80
E-1MA	04/06/2023 17:07	132.11	1082.26
E-5MA	04/04/2023 15:30	102.20	1097.23
E-8MA	04/04/2023 15:15	88.91	1103.98
E-10MA	04/07/2023 13:04	135.51	1,108.35
M-1MA	04/07/2023 11:58	118.05	1,092.84
M-2MA	04/04/2023 11:11	113.11	1,096.95
M-3MA	04/07/2023 12:16	99.87	1,105.68
M-4MA	04/04/2023 10:34	123.70	1,091.20
M-5MA	04/04/2023 11:50	149.89	1,067.54
M-6MA	04/04/2023 13:41	135.77	1,081.21
M-7MA	04/07/2023 11:41	123.87	1,090.00

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2023

Monitoring Well Identifier	Measurement Date	Depth to Water (feet, bls)	Groundwater Altitude (feet, amsl)
M-9MA	04/04/2023 11:44	118.28	1,102.24
M-10MA2	04/05/2023 14:58	129.00	1,091.05
M-11MA	04/06/2023 17:35	105.15	1,106.44
M-12MA2	04/05/2023 09:17	124.18	1,103.74
M-14MA	04/07/2023 12:41	118.92	1,107.42
M-15MA	04/06/2023 16:47	130.32	1,088.59
M-16MA	04/04/2023 16:26	119.06	1,109.09
PA-1MA	04/06/2023 15:15	106.13	1,119.37
PA-3MA	04/05/2023 14:51	119.27	1,134.17
PA-4MA	04/05/2023 13:33	104.17	1,126.75
PA-7MA	04/05/2023 15:24	120.67	1,132.39
PA-10MA	04/05/2023 08:43	130.40	1,106.40
PA-12MA2 (A)	04/05/2023 08:46	118.03	1,106.93
PA-14MA	04/05/2023 16:42	128.26	1,120.83
PA-16MA	04/04/2023 14:57	93.39	1,111.09
PA-17MA2	04/04/2023 11:17	113.70	1,125.00
PA-20MA	04/04/2023 13:27	114.97	1,106.31
PA-21MA	04/06/2023 15:30	115.57	1,109.62
PA-23MA	No access to well during April monitoring event; no water level measurement taken		
PG-4MA	04/04/2023 14:10	119.45	1,108.09
PG-5MA	04/04/2023 15:45	106.80	1,107.47
PG-6MA	04/04/2023 14:40	94.93	1,117.77
PG-7MA	04/04/2023 10:28	84.76	1,113.10
S-1MA	04/05/2023 17:04	140.26	1,120.08
S-2MA	04/05/2023 16:01	145.61	1,114.88
W-1MA	04/06/2023 12:40	105.45	1,124.93
W-2MA	04/05/2023 09:04	133.17	1,101.91
PG-45MA (B)	04/05/2023 14:05	117.70	1,114.56
PG-46MA (B)	04/05/2023 14:17	118.38	1,114.93
PG-47MA	04/04/2023 13:34	112.67	1,104.02
PG-48MA	04/04/2023 13:08	132.02	1,084.82
PG-49MA (B)	04/04/2023 16:06	76.47	1,134.01
PG-50MA	04/06/2023 11:05	106.98	1,133.98
PG-51MA	04/06/2023 11:20	134.12	1,106.79
PG-52MA (B)	04/05/2023 15:34	142.22	1,110.99
PG-53MA (B)	04/06/2023 15:59	117.77	1,107.20
PG-54MA (B)	04/06/2023 16:18	127.54	1,097.31
PG-55MA (B)	04/04/2023 16:29	131.51	1,094.26
PG-56MA (B)	04/06/2023 11:53	123.54	1,108.32
E-14MA/LA	04/04/2023 12:47	150.08	1,103.87

Table B-1. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
April 2023

Monitoring Well Identifier	Measurement Date	Depth to Water (feet, bls)	Groundwater Altitude (feet, amsl)
M-17MA/LA	04/04/2023 15:40	130.82	1,106.88
PG-23MA/LA	04/04/2023 14:27	110.03	1112.50
PG-38MA/LA	04/04/2023 13:53	128.86	1,108.38
E-1LA	04/04/2023 14:25	120.38	1,094.62
E-7LA	04/07/2023 10:45	96.90	1,100.89
M-2LA	04/07/2023 11:25	110.89	1,099.34
M-5LA	04/07/2023 11:21	123.44	1,094.02
M-9LA	04/04/2023 11:55	130.83	1,089.69
M-10LA2	04/05/2023 14:45	125.20	1,094.50
M-14LA	No access to well during April monitoring event; no water level measurement taken		
M-16LA	04/04/2023 16:32	140.11	1,087.97
PA-2LA	04/05/2023 14:40	221.54	1,032.22
PA-5LA	04/05/2023 13:53	201.83	1,027.62
PA-6LA	04/05/2023 15:14	225.98	1,026.95
PA-8LA2	04/05/2023 09:12	149.57	1,078.76
PA-9LA	04/05/2023 08:56	158.31	1,078.47
PA-11LA2 (C)	04/05/2023 08:48	131.86	1,093.10
PA-13LA	04/05/2023 16:34	214.58	1,034.41
PA-15LA	04/04/2023 14:50	93.80	1,110.48
PA-18LA	04/04/2023 11:00	177.38	1,061.48
PA-19LA	04/04/2023 13:37	116.72	1,104.74
PA-22LA	No access to well during April monitoring event; no water level measurement taken		
PG-1LA	04/05/2023 12:23	226.16	1,023.50
PG-2LA	04/05/2023 11:50	258.57	1,012.49
PG-39LA	04/04/2023 13:09	127.56	1,105.02
PG-40LA	04/05/2023 10:10	258.32	1,017.01
PG-42LA	04/05/2023 10:44	275.55	1,016.76
PG-43LA	04/05/2023 11:40	229.60	1,035.41
PG-44LA	04/05/2023 11:21	279.08	1,018.51
S-1LA	04/05/2023 16:55	211.46	1,048.99
S-2LA	04/05/2023 17:52	232.67	1,027.30

EXPLANATION:

feet, bls = feet below land surface
feet, amsl = feet above mean sea level
GM&EP = Groundwater Monitoring & Extraction Plan

NOTES:

(A) = 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.

(B) = 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 2023 annual supplemental report.

(C) = 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 2023

Monitoring Well Identifier	Measurement Date & Time	Depth to Water (feet, bls)	Groundwater Level (feet, amsl)
B-1UA	10/05/2023 11:58	52.17	1,139.54
B-J	10/05/2023 16:17	55.68	1,136.56
E-1UA	10/05/2023 10:48	71.69	1,143.67
E-2UA	10/05/2023 17:47	85.49	1,141.06
E-5UA	10/05/2023 15:51	63.18	1,136.38
E-6UA	10/04/2023 16:01	90.78	1,131.52
E-7UA	10/05/2023 11:33	65.25	1,132.16
E-12UA	10/05/2023 11:41	63.99	1,139.64
E-13UA	10/05/2023 11:20	68.62	1,140.01
M-2UA	10/06/2023 12:57	69.90	1,140.27
PG-4UA	10/05/2023 13:36	101.46	1,126.37
PG-5UA	10/05/2023 14:00	83.93	1,130.27
PG-6UA	10/05/2023 12:41	84.16	1,128.93
PG-7UA	10/05/2023 12:23	65.82	1,131.74
PG-8UA	10/05/2023 14:19	93.66	1,128.35
PG-10UA	10/04/2023 11:59	102.66	1,138.18
PG-11UA	10/05/2023 10:25	96.28	1,134.12
PG-16UA	10/04/2023 14:37	106.27	1,135.62
PG-18UA	10/05/2023 16:48	67.87	1,134.26
PG-19UA	10/05/2023 09:57	70.79	1,133.51
PG-22UA	10/05/2023 15:21	73.44	1,136.85
PG-23UA	10/05/2023 13:22	96.13	1,126.83
PG-24UA	10/05/2023 12:58	82.13	1,130.09
PG-25UA	10/05/2023 14:38	72.99	1,133.55
PG-28UA	10/04/2023 13:43	97.90	1,137.05
PG-29UA	10/04/2023 12:40	95.13	1,137.90
PG-30UA	10/04/2023 13:15	90.07	1,136.29
PG-31UA	10/06/2023 12:32	100.37	1,135.08
B-1MA	10/06/2023 11:25	79.27	1,112.36
D-4MA	10/04/2023 15:12	124.39	1,115.64
E-1MA	10/05/2023 15:14	128.51	1,085.86
E-5MA	10/06/2023 11:59	100.32	1,099.11
E-8MA	10/05/2023 15:48	87.07	1,105.82
E-10MA	10/05/2023 07:56	135.23	1,108.63
M-1MA	10/06/2023 09:18	114.50	1,096.39
M-2MA	10/06/2023 09:33	109.98	1,100.08
M-3MA	10/06/2023 09:43	96.34	1,109.21
M-4MA	10/06/2023 11:10	120.32	1,094.58
M-5MA	10/06/2023 08:16	147.20	1,070.23
M-6MA	10/06/2023 09:07	132.24	1,084.74
M-7MA	10/06/2023 12:27	120.15	1,093.72
M-9MA	10/06/2023 12:15	114.15	1,106.37

Table B-2. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
October 2023

Monitoring Well Identifier	Measurement Date & Time	Depth to Water (feet, bls)	Groundwater Level (feet, amsl)
M-10MA2	10/05/2023 14:29	126.49	1,093.56
M-11MA	10/05/2023 12:02	102.92	1,108.67
M-12MA2	10/05/2023 12:29	117.90	1,110.02
M-14MA	10/05/2023 12:25	115.85	1,110.49
M-15MA	10/05/2023 12:41	127.12	1,091.79
M-16MA	10/05/2023 13:44	114.00	1,114.15
PA-1MA	10/05/2023 14:00	101.40	1,124.10
PA-3MA	10/04/2023 10:35	117.69	1,135.75
PA-4MA	10/04/2023 13:25	103.01	1,127.91
PA-7MA	10/05/2023 15:51	120.73	1,132.33
PA-10MA	10/05/2023 08:56	129.82	1,106.98
PA-12MA2 (A)	10/05/2023 09:52	117.55	1,107.41
PA-14MA	10/04/2023 15:02	128.19	1,120.90
PA-16MA	10/06/2023 10:24	92.18	1,112.30
PA-17MA2	10/04/2023 10:51	107.11	1,131.59
PA-20MA	10/05/2023 11:05	114.98	1,106.30
PA-21MA	10/05/2023 14:21	114.15	1,111.04
PA-23MA	10/04/2023 17:20	69.45	1,114.97
PG-4MA	10/05/2023 15:09	119.55	1,107.99
PG-5MA	10/09/2023 10:41	106.21	1,108.06
PG-6MA	10/06/2023 10:12	93.62	1,119.08
PG-7MA	10/06/2023 07:18	83.16	1,114.70
S-1MA	10/04/2023 16:15	140.45	1,119.89
S-2MA	10/04/2023 15:42	145.69	1,114.80
W-1MA	10/05/2023 11:04	104.13	1,126.25
W-2MA	10/05/2023 08:33	131.62	1,103.46
PG-45MA (B)	10/4/23 13:38	116.05	1,116.21
PG-46MA (B)	10/4/23 14:19	119.58	1,113.73
PG-47MA	10/06/2023 08:56	104.27	1,112.42
PG-48MA	10/06/2023 08:44	128.33	1,088.51
PG-50MA	10/04/2023 15:50	106.90	1,134.06
PG-51MA	10/04/2023 15:40	138.25	1,102.66
PG-52MA (B)	10/5/23 16:04	131.74	1,121.47
PG-53MA (B)	10/5/23 13:08	113.21	1,111.76
PG-54MA (B)	10/5/23 13:14	124.21	1,100.64
PG-55MA (B)	10/5/23 9:27	119.14	1,106.63
PG-56MA (B)	10/4/23 16:11	120.96	1,110.90
E-14MA/LA	10/05/2023 09:56	151.92	1,102.03
M-17MA/LA	10/05/2023 10:22	124.42	1,113.28
PG-23MA/LA	10/06/2023 11:02	109.77	1,112.76
PG-38MA/LA	10/05/2023 14:52	129.22	1,108.02

Table B-2. Summary of Groundwater Level Measurements Taken by Montgomery Associates
North Indian Bend Wash Area, Scottsdale, Arizona
October 2023

Monitoring Well Identifier	Measurement Date & Time	Depth to Water (feet, bls)	Groundwater Level (feet, amsl)
E-1LA	10/05/2023 15:03	120.83	1,094.17
E-7LA	10/05/2023 11:39	97.23	1,100.56
M-2LA	10/06/2023 10:23	111.07	1,099.16
M-5LA	10/06/2023 08:27	123.89	1,093.57
M-9LA	10/06/2023 12:21	131.52	1,089.00
M-10LA2	10/05/2023 14:17	129.35	1,090.35
M-14LA	10/10/2023 15:55	132.74	1,093.48
M-16LA	10/05/2023 13:34	141.63	1,086.45
PA-2LA	10/04/2023 10:46	230.95	1,022.81
PA-5LA	10/04/2023 14:04	211.05	1,018.40
PA-6LA	10/05/2023 15:45	236.20	1,016.73
PA-8LA2	10/05/2023 12:37	152.24	1,076.09
PA-9LA	10/05/2023 08:46	161.32	1,075.46
PA-11LA2 (C)	10/05/2023 09:59	133.44	1,091.52
PA-13LA	10/04/2023 15:13	221.46	1,027.53
PA-15LA	10/06/2023 10:38	93.03	1,111.25
PA-18LA	10/04/2023 09:08	183.55	1,055.31
PA-19LA	10/05/2023 11:12	116.93	1,104.53
PA-22LA	10/04/2023 17:40	74.64	1,109.36
PG-1LA	10/04/2023 13:00	238.20	1,011.46
PG-2LA	10/04/2023 14:37	272.13	998.93
PG-39LA	10/05/2023 10:39	128.11	1,104.47
PG-40LA	10/04/2023 11:38	272.28	1,003.05
PG-42LA	10/04/2023 13:42	289.21	1,003.10
PG-43LA	10/04/2023 11:24	255.92	1,009.09
PG-44LA	10/04/2023 14:15	291.07	1,006.52
S-1LA	10/04/2023 15:56	215.85	1,044.60
S-2LA	10/05/2023 16:07	236.31	1,023.66

EXPLANATION:

feet, bls = feet below land surface
feet, amsl = feet above mean sea level
GM&EP = Groundwater Monitoring & Extraction Plan

NOTES:

(A) = 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.
(B) = 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 2023 annual supplemental report.
(C) = 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 2022 and October 2023
North Indian Bend Wash Area, Scottsdale, Arizona

Alluvium Unit	Monitoring Well Identifier	October 2022 Depth to Groundwater Level (feet, bls)	October 2023 Depth to Groundwater Level (feet, bls)	Change in Depth to Groundwater Level (feet)
UAU	B-1UA	55.79	52.17	3.62
	B-J	59.42	55.68	3.74
	E-1UA	74.98	71.69	3.29
	E-2UA	87.69	85.49	2.20
	E-5UA	66.64	63.18	3.46
	E-6UA	93.36	90.78	2.58
	E-7UA	68.13	65.25	2.88
	E-12UA	67.54	63.99	3.55
	E-13UA	72.12	68.62	3.50
	M-2UA	73.48	69.90	3.58
	PG-4UA	106.05	101.46	4.59
	PG-5UA	88.02	83.93	4.09
	PG-6UA	89.16	84.16	5.00
	PG-7UA	70.67	65.82	4.85
	PG-8UA	97.36	93.66	3.70
	PG-10UA	103.50	102.66	0.84
	PG-11UA	97.54	96.28	1.26
	PG-16UA	107.16	106.27	0.89
	PG-18UA	71.95	67.87	4.08
	PG-19UA	74.71	70.79	3.92
	PG-22UA	76.57	73.44	3.13
	PG-23UA	101.09	96.13	4.96
	PG-24UA	86.51	82.13	4.38
	PG-25UA	76.62	72.99	3.63
	PG-28UA	98.75	97.90	0.85
	PG-29UA	95.92	95.13	0.79
	PG-30UA	91.04	90.07	0.97
	PG-31UA	101.42	100.37	1.05
MAU	B-1MA	92.80	79.27	13.53
	D-4MA	127.47	124.39	3.08
	E-1MA	141.86	128.51	13.35
	E-5MA	111.04	100.32	10.72
	E-8MA	97.90	87.07	10.83
	E-10MA	139.09	135.23	3.86
	M-1MA	128.64	114.50	14.14
	M-2MA	123.32	109.98	13.34
	M-3MA	111.08	96.34	14.74
	M-4MA	133.88	120.32	13.56
	M-5MA	159.01	147.20	11.81
	M-6MA	145.33	132.24	13.09
	M-7MA	134.43	120.15	14.28
	M-9MA	127.24	114.15	13.09
	M-10MA2	137.65	126.49	11.16
	M-11MA	111.38	102.92	8.46
	M-12MA2	123.80	117.90	5.90
	M-14MA	125.04	115.85	9.19
	M-15MA	139.26	127.12	12.14

Table B-3. Summary of Groundwater Level Difference Between October 2022 and October 2023
North Indian Bend Wash Area, Scottsdale, Arizona

Alluvium Unit	Monitoring Well Identifier	October 2022 Depth to Groundwater Level (feet, bls)	October 2023 Depth to Groundwater Level (feet, bls)	Change in Depth to Groundwater Level (feet)
MAU	M-16MA	122.78	114.00	8.78
	PA-1MA	111.69	101.40	10.29
	PA-3MA	122.08	117.69	4.39
	PA-4MA	106.10	103.01	3.09
	PA-7MA	123.48	120.73	2.75
	PA-10MA	133.58	129.82	3.76
	PA-12MA2 (A)	124.64	117.55	7.09
	PA-14MA	131.28	128.19	3.09
	PA-16MA	101.71	92.18	9.53
	PA-17MA2	112.28	107.11	5.17
	PA-20MA	123.95	114.98	8.97
	PA-21MA	124.99	114.15	10.84
	PA-23MA	82.62	69.45	13.17
	PG-4MA	128.63	119.55	9.08
	PG-5MA	116.18	106.21	9.97
	PG-6MA	101.27	93.62	7.65
	PG-7MA	92.76	83.16	9.60
	S-1MA	143.67	140.45	3.22
	S-2MA	149.46	145.69	3.77
	W-1MA	106.43	104.13	2.30
	W-2MA	132.84	131.62	1.22
Lower MAU	PG-47MA	124.90	104.27	20.63
	PG-48MA	143.26	128.33	14.93
	PG-50MA	108.26	106.90	1.36
	PG-51MA	143.71	138.25	5.46
MAU/LAU	E-14MA/LA	158.59	151.92	6.67
	M-17MA/LA	131.78	124.42	7.36
	PG-23MA/LA	118.41	109.77	8.64
	PG-38MA/LA	138.20	129.22	8.98
LAU	E-1LA	133.67	120.83	12.84
	E-7LA	107.73	97.23	10.50
	M-2LA	123.31	111.07	12.24
	M-5LA	136.18	123.89	12.29
	M-9LA	144.49	131.52	12.97
	M-10LA2	135.65	129.35	6.30
	M-14LA	145.03	132.74	12.29
	M-16LA	154.16	141.63	12.53
	PA-2LA	246.39	230.95	15.44
	PA-5LA	226.36	211.05	15.31
	PA-6LA	251.88	236.20	15.68
	PA-8LA2	164.95	152.24	12.71
	PA-9LA	172.21	161.32	10.89
	PA-11LA2 (B)	143.50	133.44	10.06
	PA-13LA	237.88	221.46	16.42
	PA-15LA	102.90	93.03	9.87
	PA-18LA	198.14	183.55	14.59
	PA-19LA	126.41	116.93	9.48

Table B-3. Summary of Groundwater Level Difference Between October 2022 and October 2023
North Indian Bend Wash Area, Scottsdale, Arizona

Alluvium Unit	Monitoring Well Identifier	October 2022 Depth to Groundwater Level (feet, bls)	October 2023 Depth to Groundwater Level (feet, bls)	Change in Depth to Groundwater Level (feet)
LAU	PA-22LA	86.82	74.64	12.18
	PG-1LA	253.31	238.20	15.11
	PG-2LA	286.20	272.13	14.07
	PG-39LA	136.20	128.11	8.09
	PG-40LA	286.62	272.28	14.34
	PG-42LA	303.92	289.21	14.71
	PG-43LA	263.40	255.92	7.48
	PG-44LA	306.39	291.07	15.32
	S-1LA	230.32	215.85	14.47
	S-2LA	254.69	236.31	18.38

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

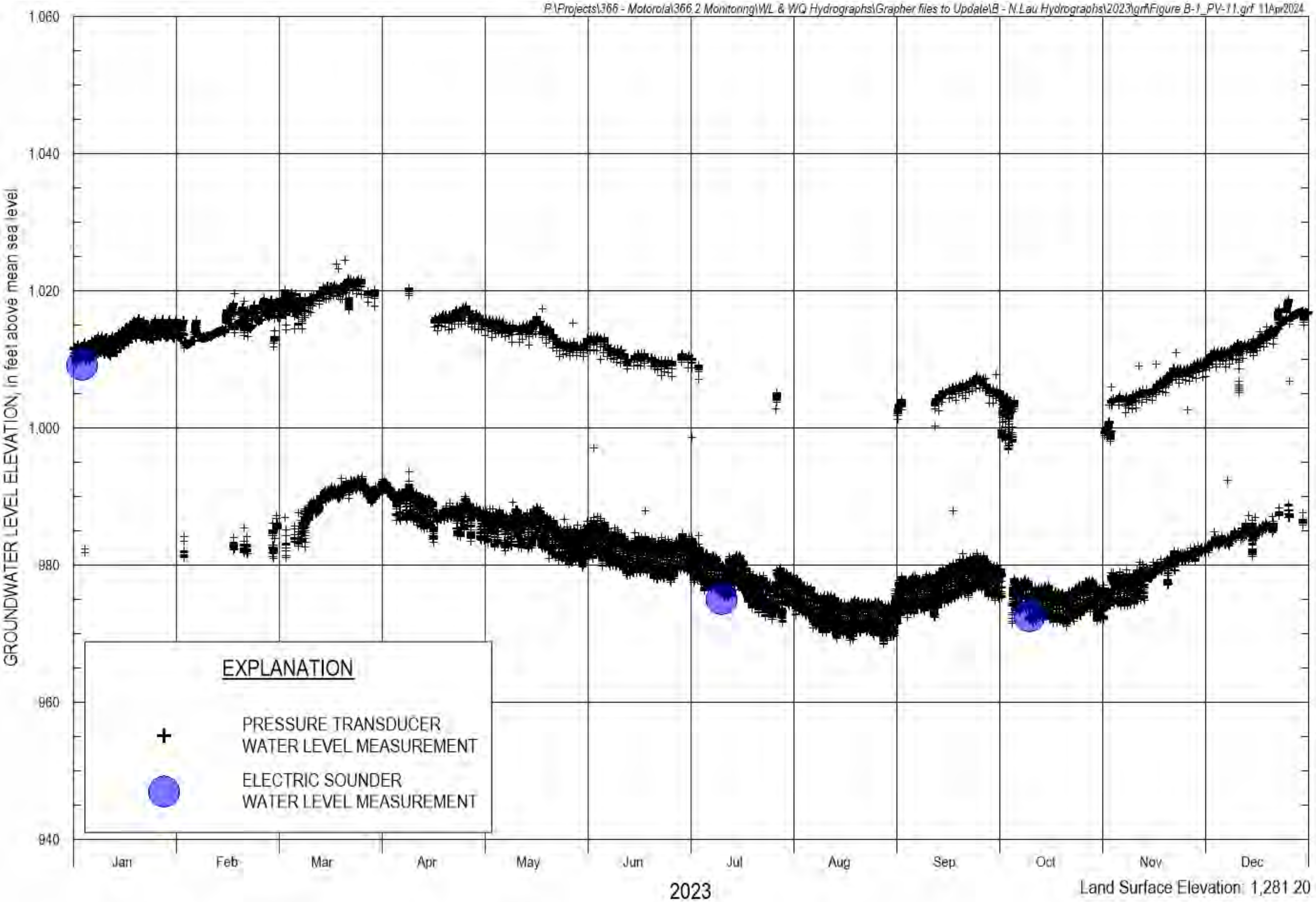
NOTES:

(A) = 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

(B) = 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

APPENDIX B
COMPLIANCE CONTINUOUS WATER LEVEL GRAPHS

P:\Projects\366 - Motorola\366.2 Monitoring\WL & WQ Hydrographs\Grapher files to Update\B - N.Lau Hydrographs\2023\grf\Figure B-1_PV-11.grf 11Apr2024



Land Surface Elevation: 1,281.20

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

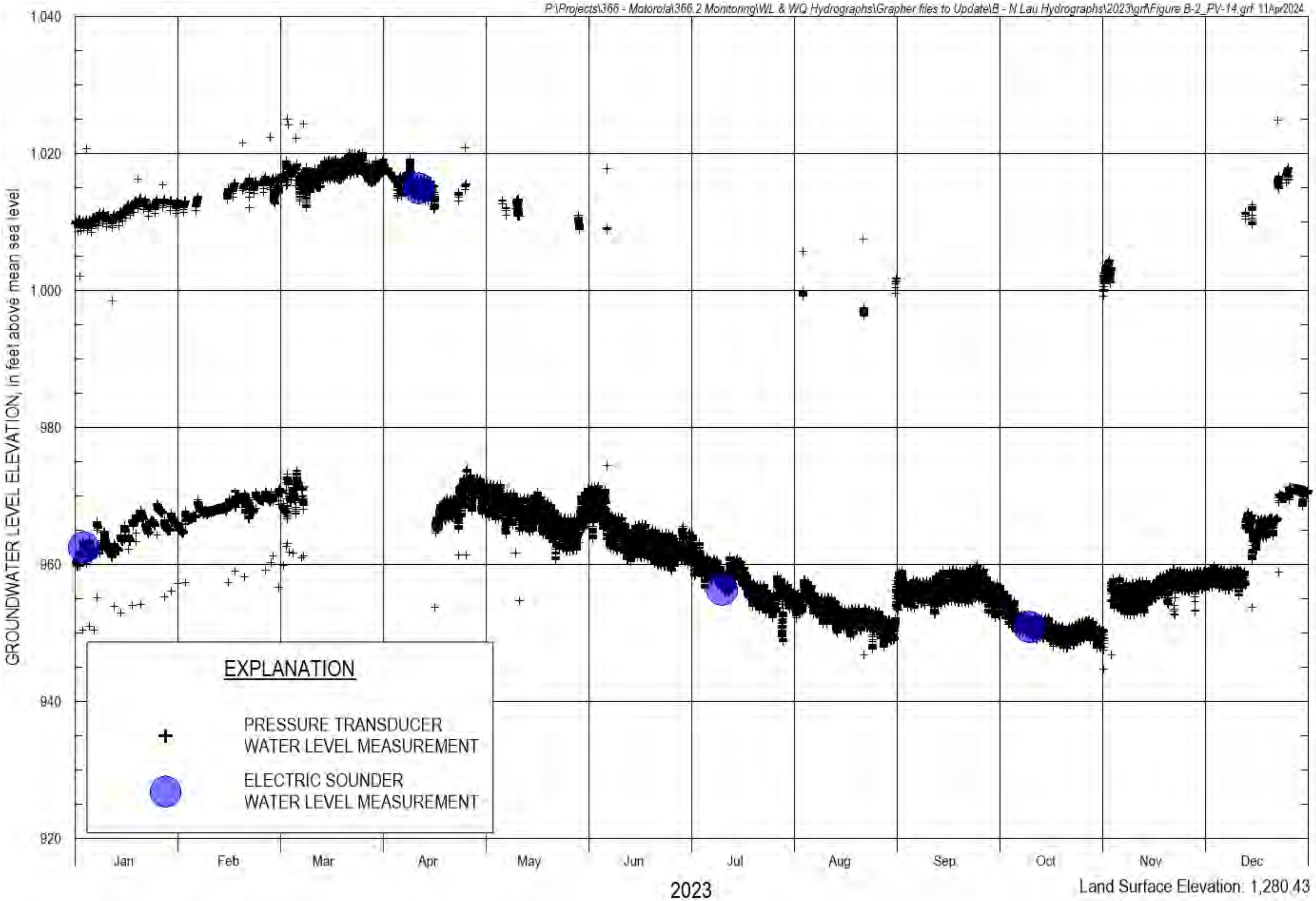


FIGURE B-2. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-14

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

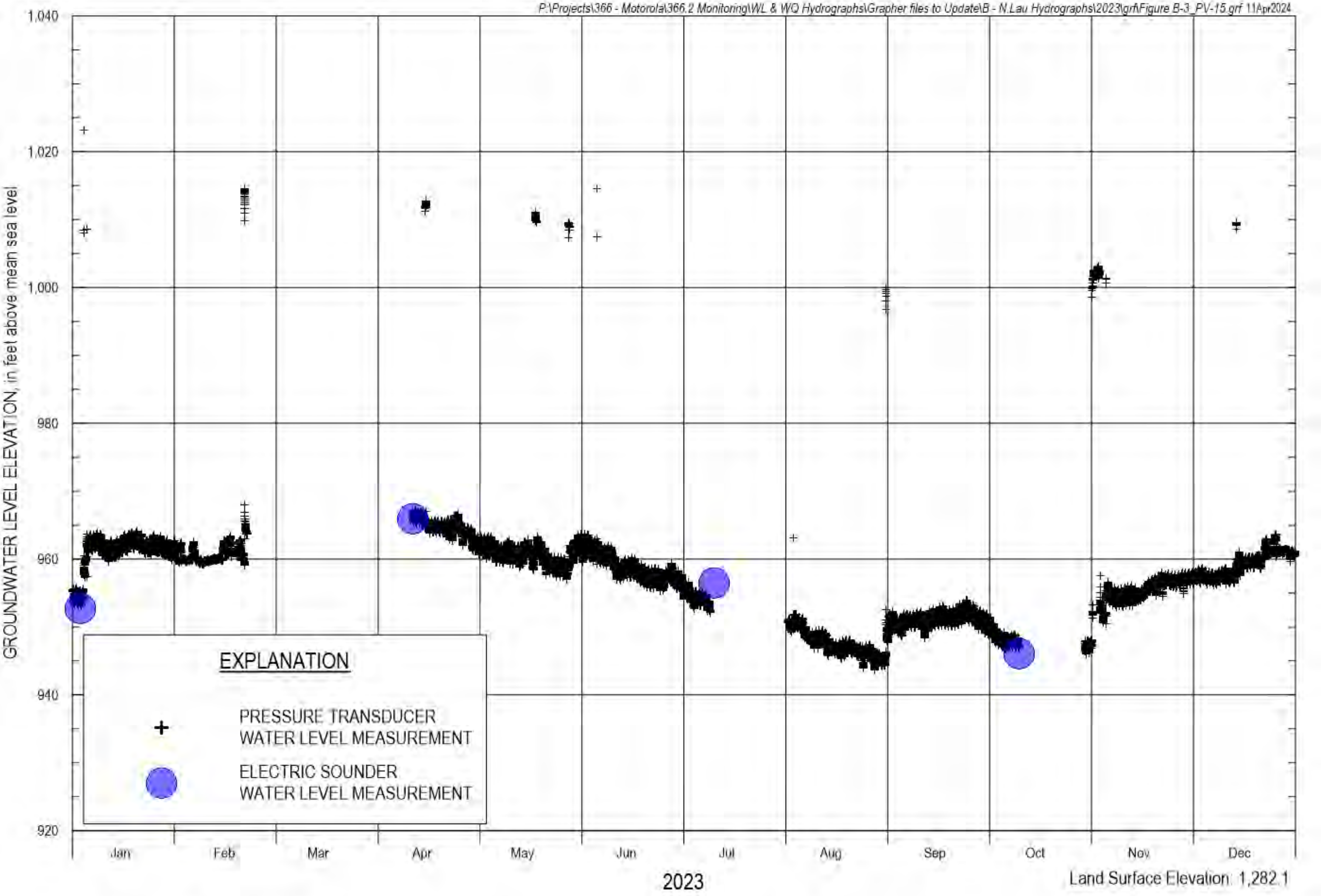


FIGURE B-3. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-15

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

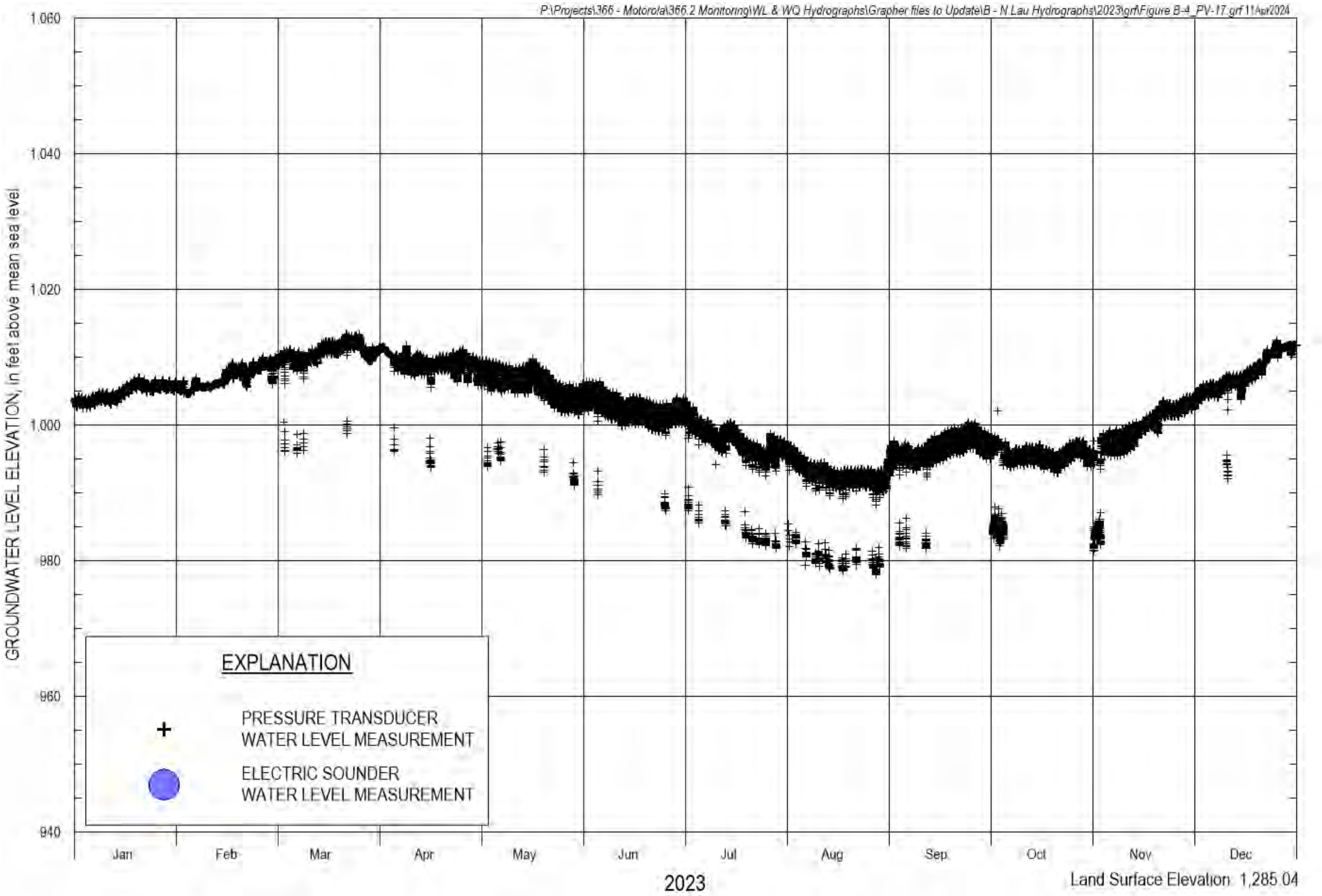


FIGURE B-4. GROUNDWATER LEVEL HYDROGRAPH FOR EXTRACTION WELL PV-17

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

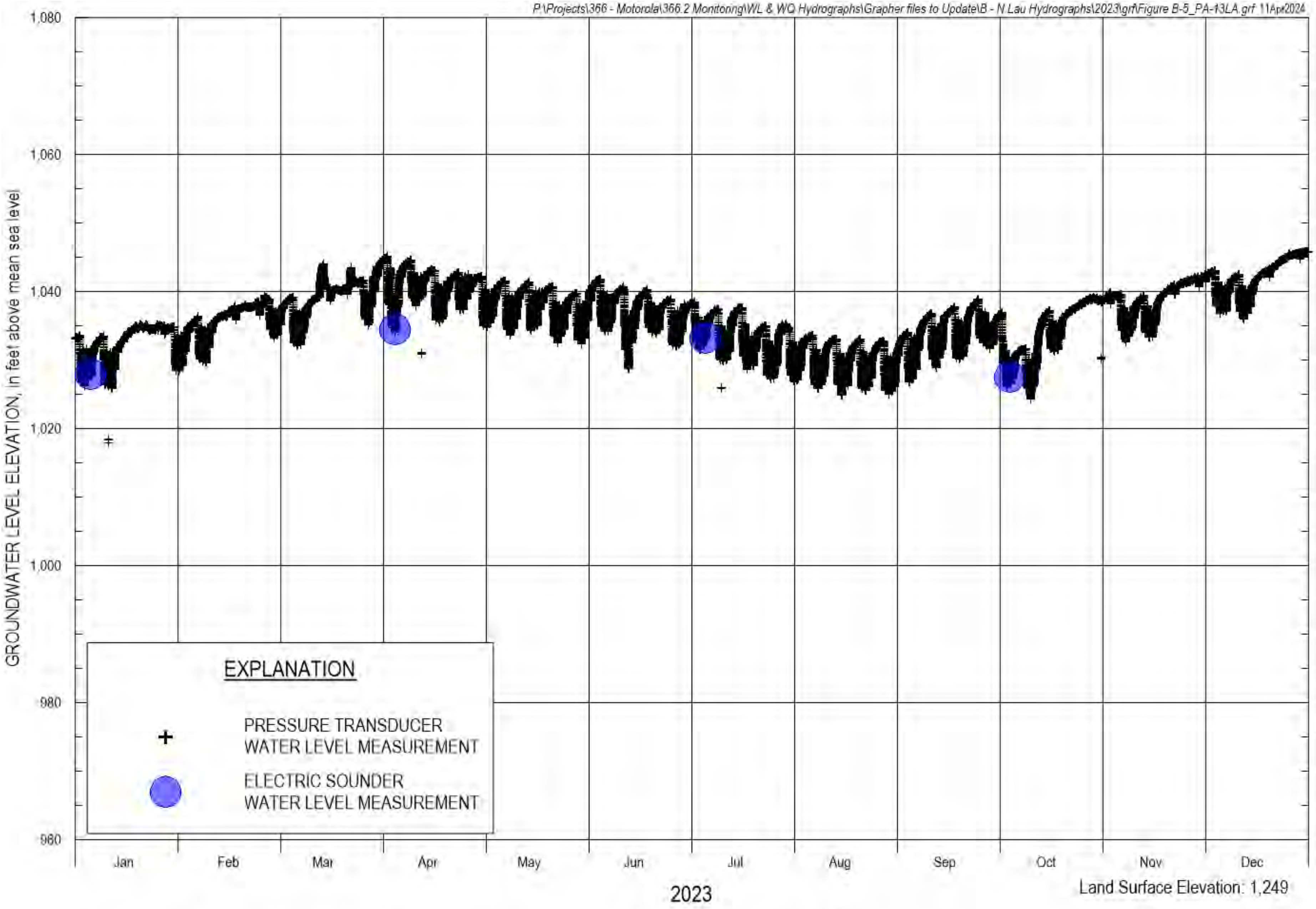


FIGURE B-5. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PA-13LA

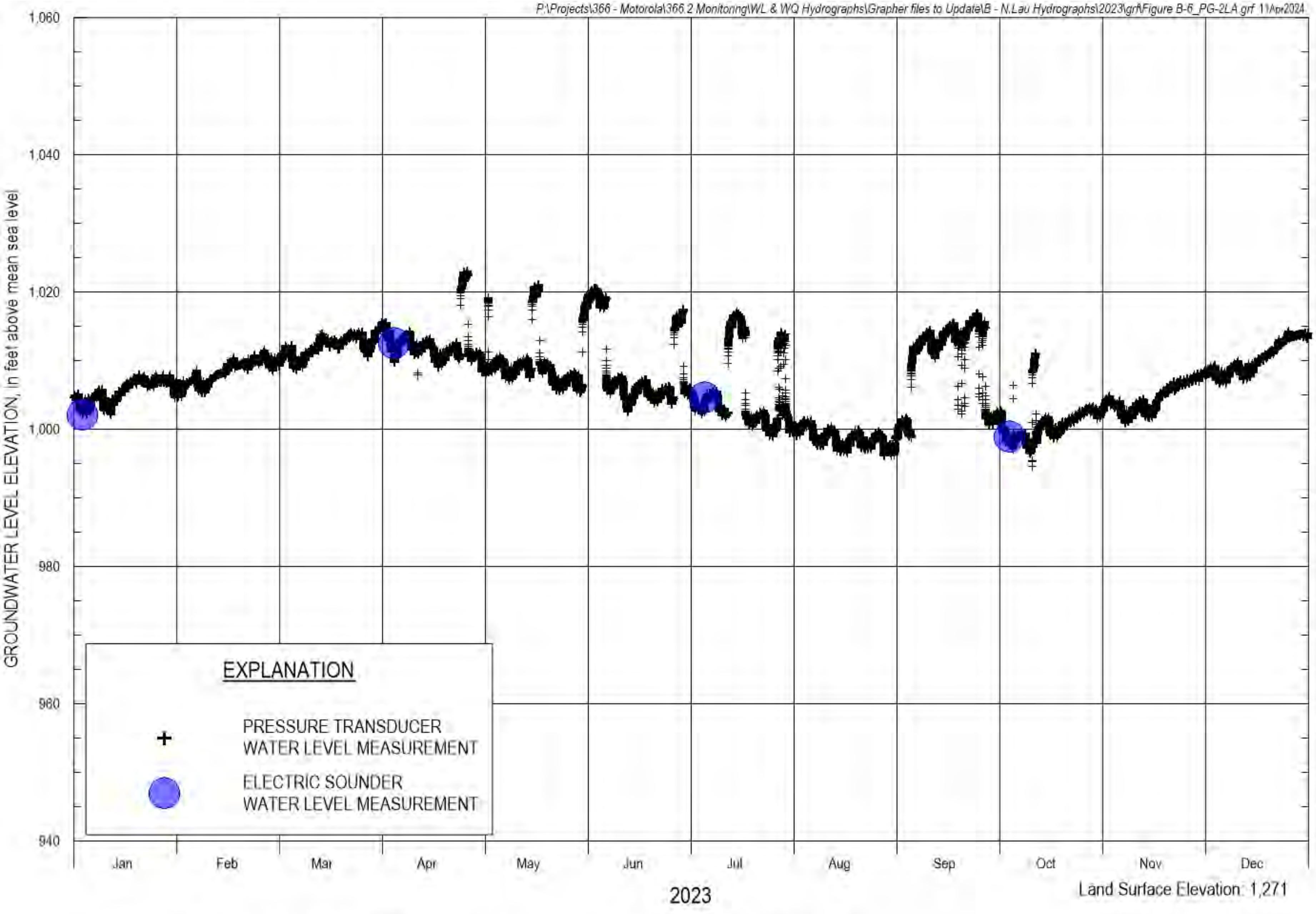


FIGURE B-6. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-2LA

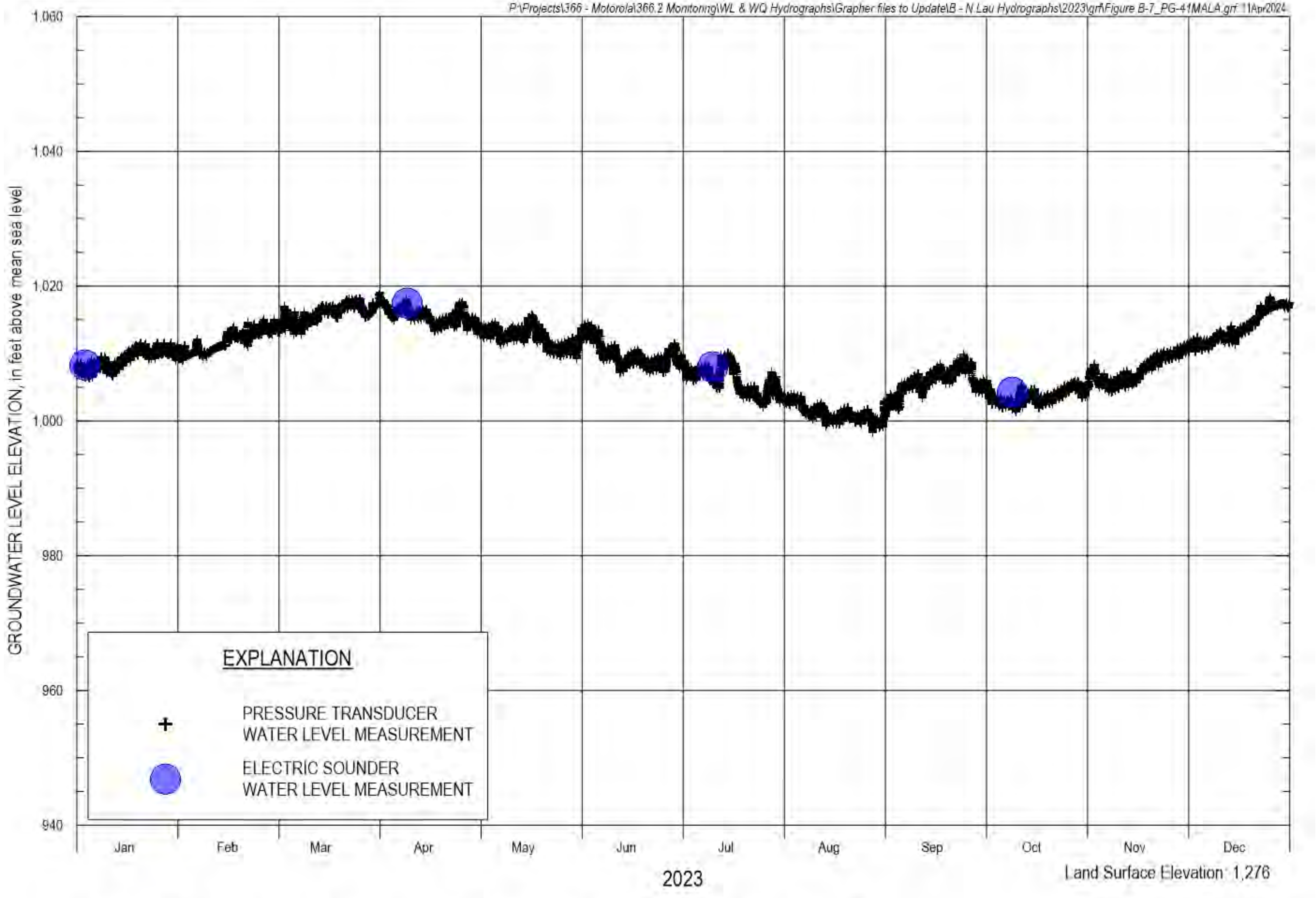


FIGURE B-7. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-41MA/LA

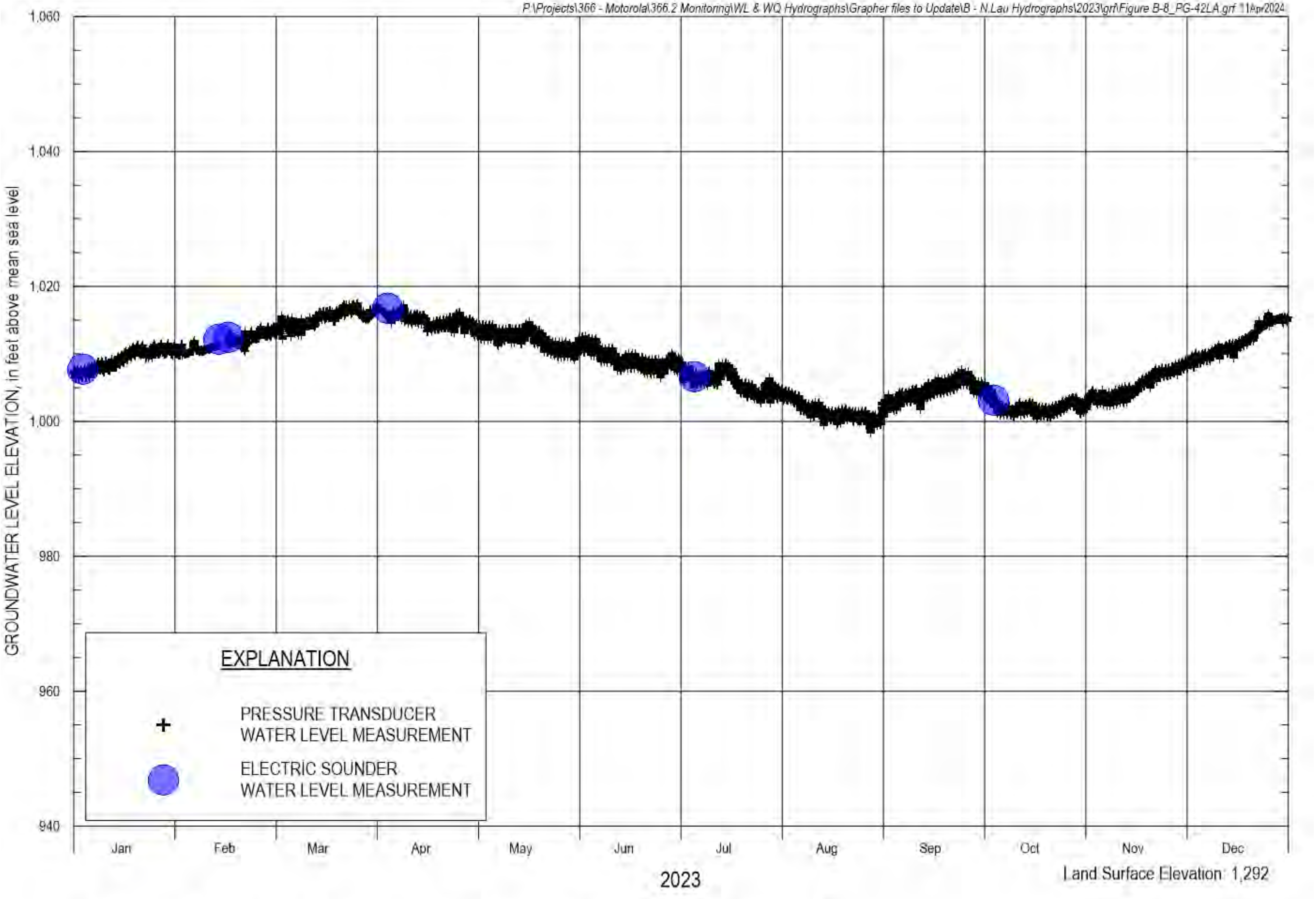


FIGURE B-8. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-42LA

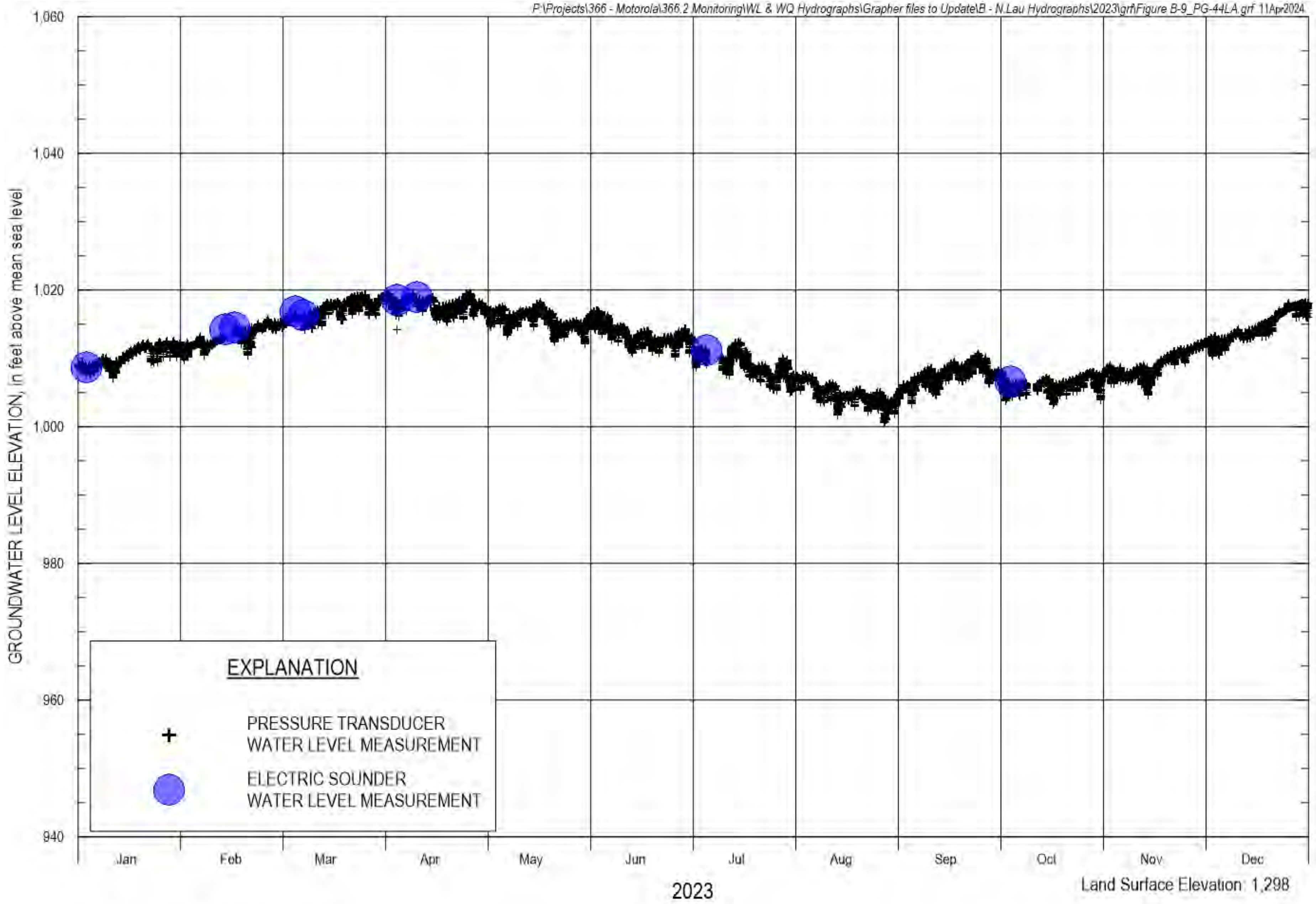


FIGURE B-9. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL PG-44LA

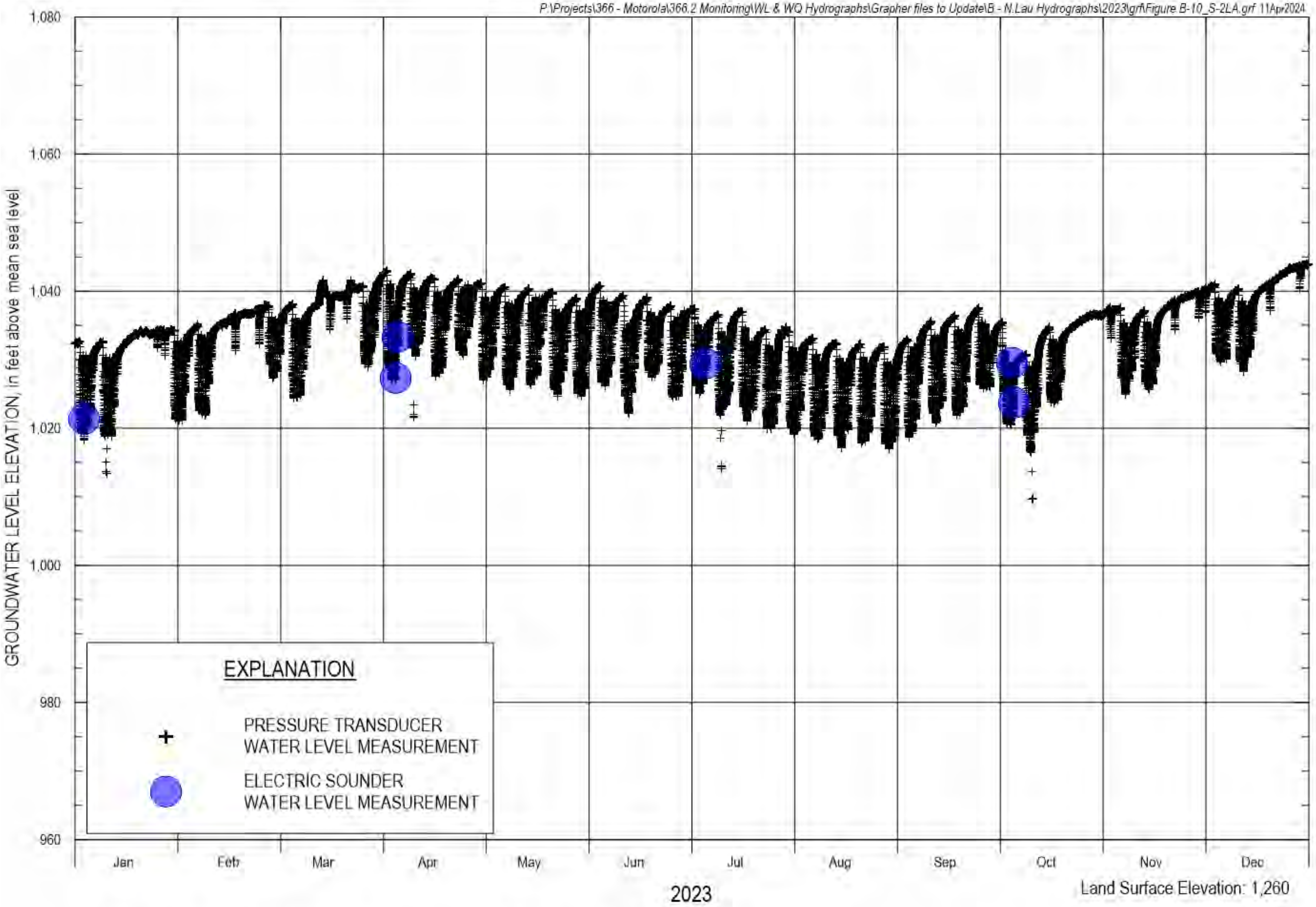


FIGURE B-10. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-2LA

North Indian Bend Wash Superfund Site

APPENDIX B

SUPPLEMENTAL CONTINUOUS WATER LEVEL GRAPHS

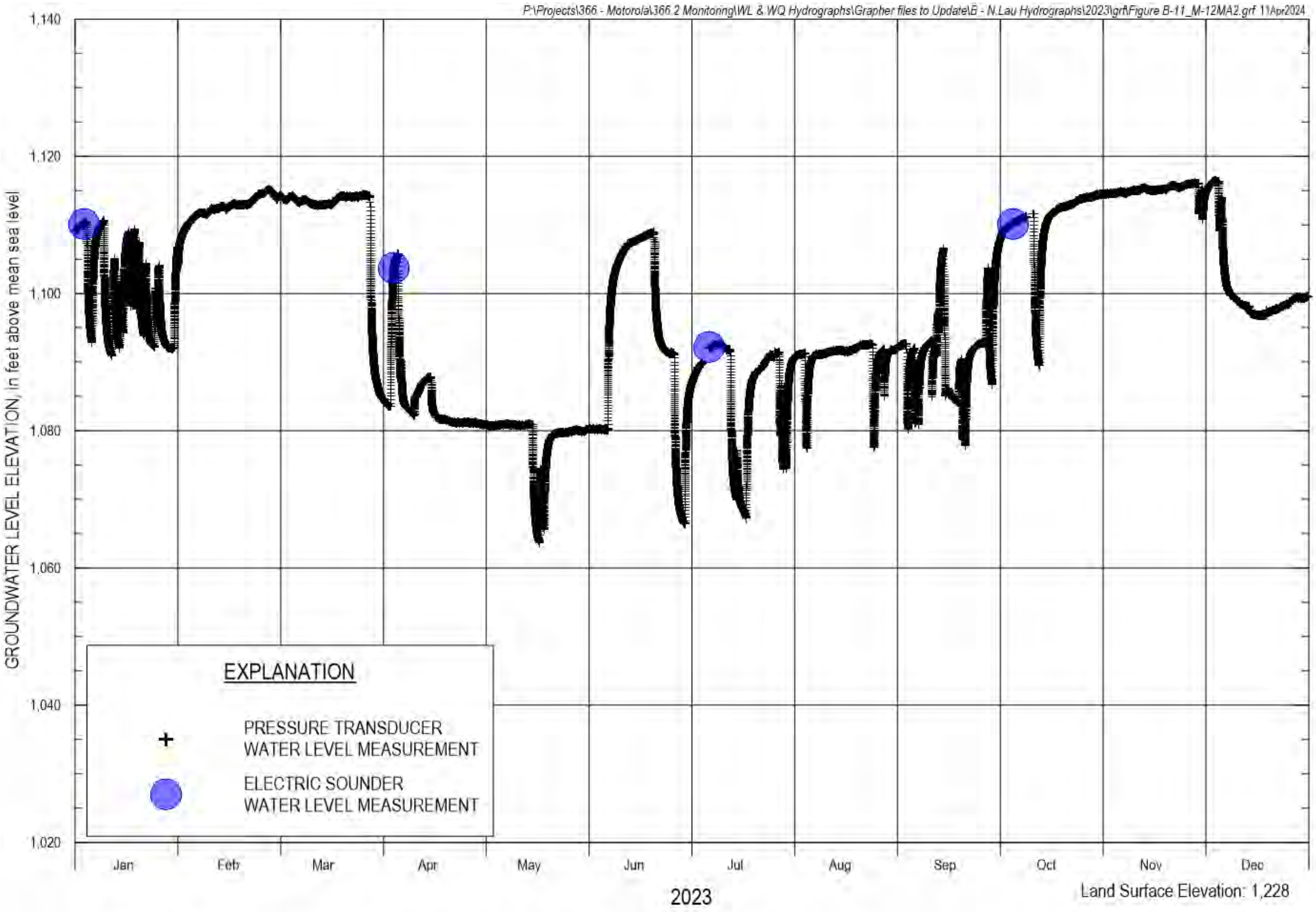


FIGURE B-11. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL M-12MA2

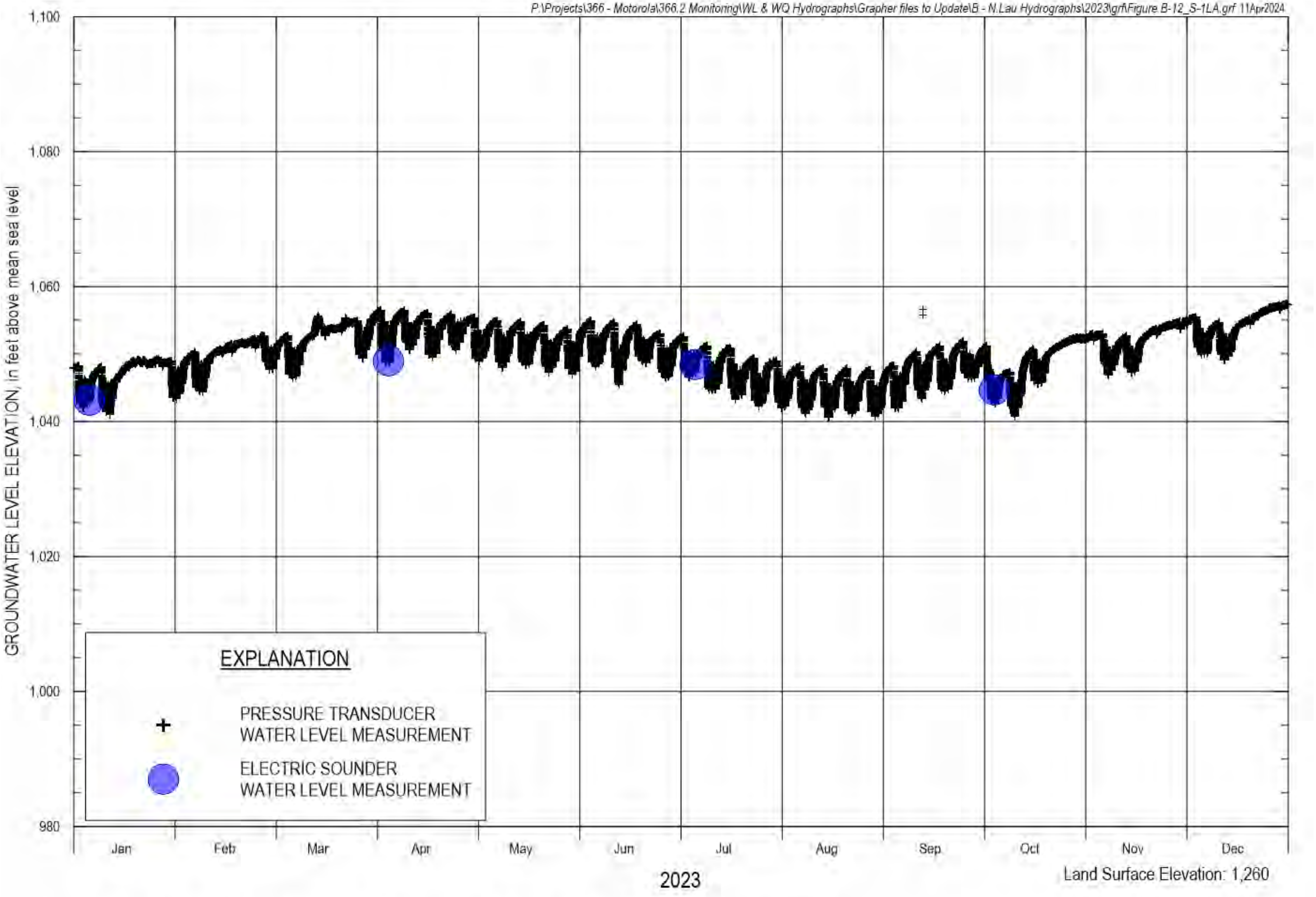
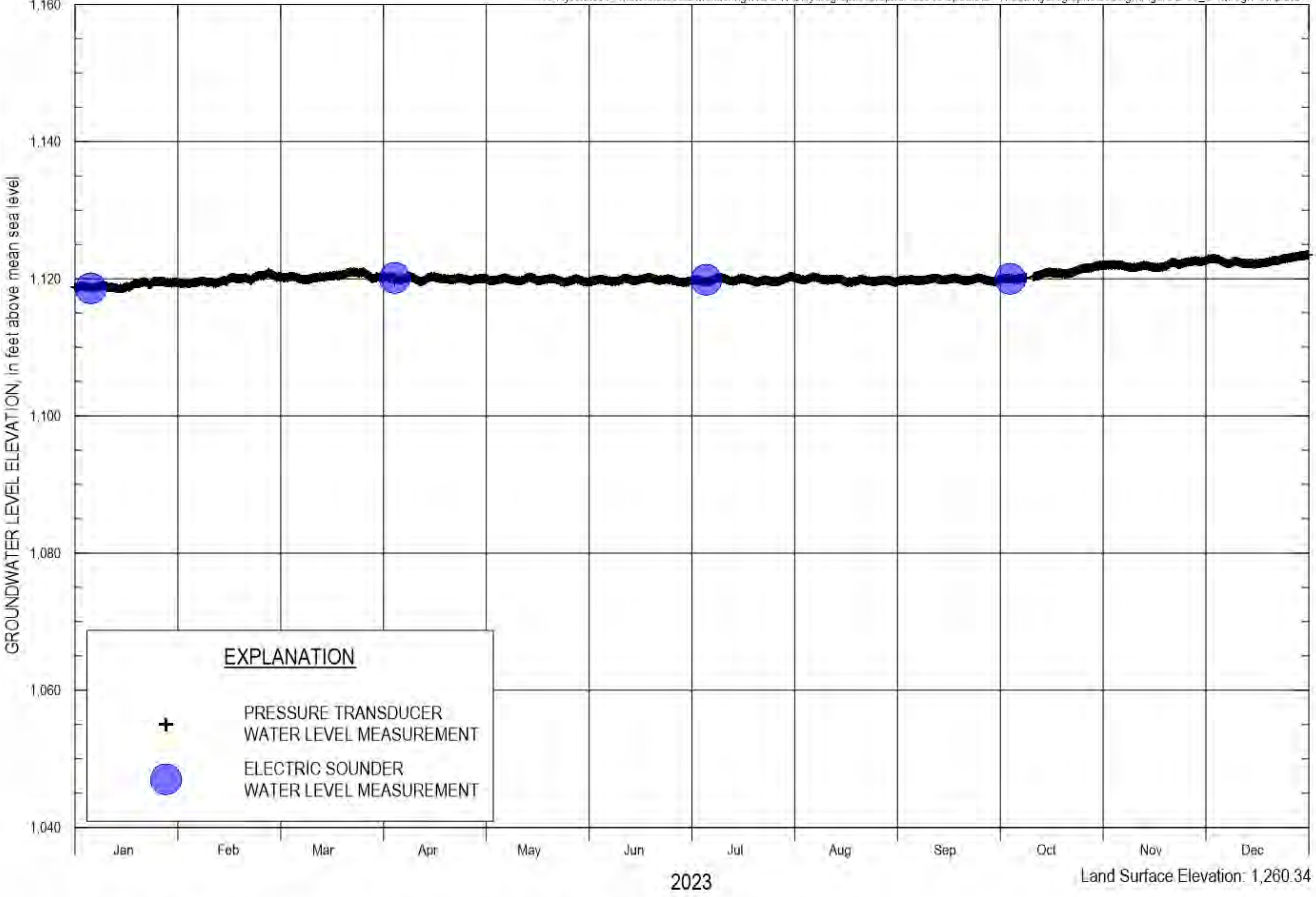


FIGURE B-12. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-1LA

P:\Projects\366 - Motorola\366.2 Monitoring\WL & WQ Hydrographs\Grapher files to Update\B - N.Lau Hydrographs\2023\grf\Figure B-13_S-1MA.grf 11Apr2024



Land Surface Elevation: 1,260.34

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

North Indian Bend Wash Superfund Site

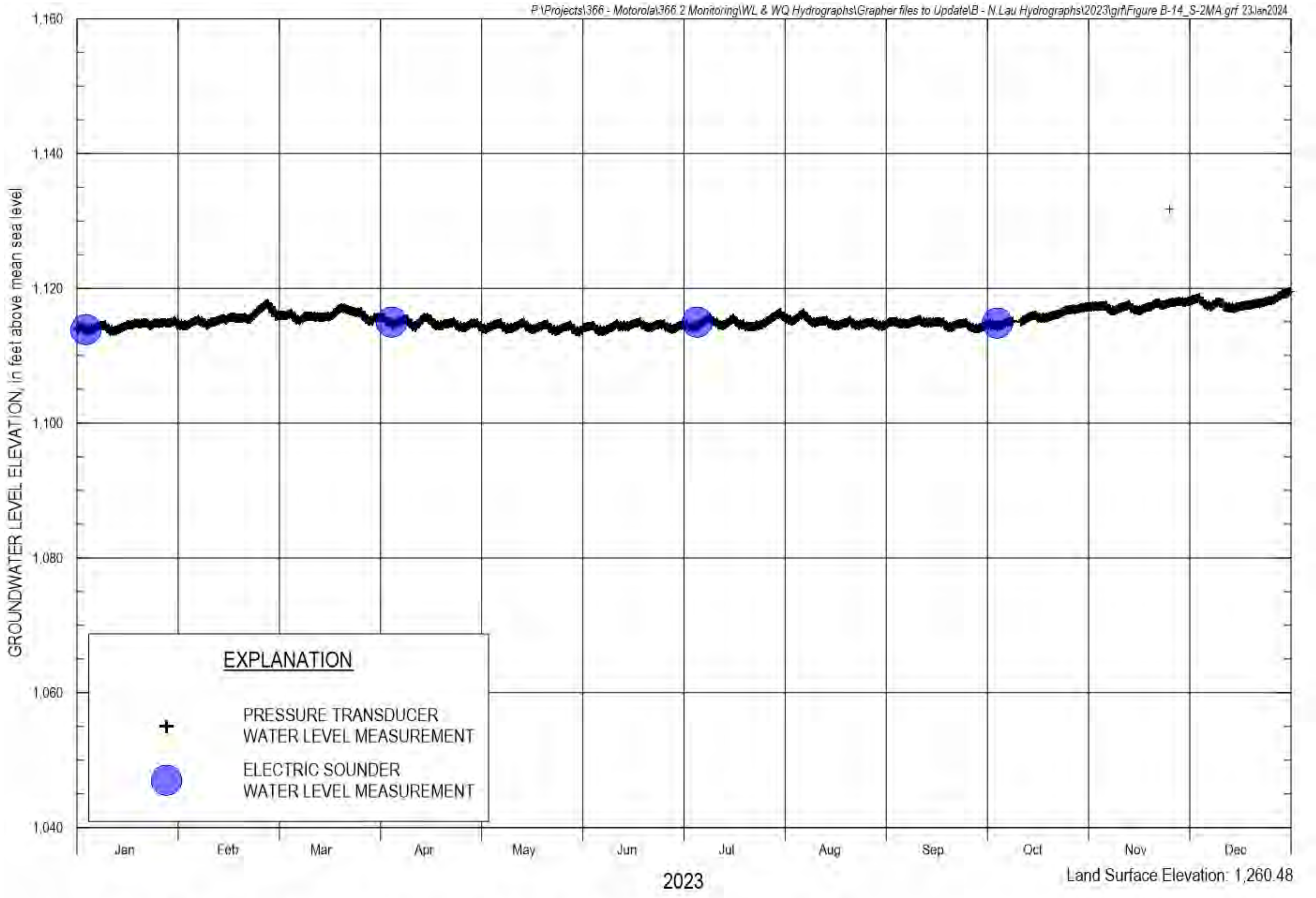


FIGURE B-14. GROUNDWATER LEVEL HYDROGRAPH FOR MONITOR WELL S-2MA

APPENDIX C
LABORATORY RESULTS FOR VOLATILE ORGANIC COMPOUNDS, 2023

Table C-1. 2023 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	B-J	B-J	10/16/2023	Original	<0.50	<0.50	1.4	<0.50	1.9	550-209176
MON	D-4MA	D-4MA	1/11/2023	Original	<0.50	<0.50	1.3	6.8	790	550-196118
MON	D-4MA	D-4MA	4/13/2023	Original	<0.50	<0.50	1.7	7.3	710	550-200728
MON	D-4MA	D-4MA	7/12/2023	Original	<0.50	<0.50	1.2	5.6	580	550-204676
MON	D-4MA	D-4MA	10/18/2023	Original	<0.50	<0.50	1.4	6.1	470	550-209316
MON	E-1MA	E-1MA	2/16/2023	Original	<0.50	<0.50	<0.50	<0.50	1.1	550-197912
MON	E-1MA	G	2/16/2023	Duplicate	<0.50	<0.50	<0.50	<0.50	1.1	550-197912
MON	E-1MA	E-1MA	4/11/2023	Original	<0.50	<0.50	<0.50	<0.50	2.9	550-200555
MON	E-1MA	E-1MA	7/11/2023	Original	<0.50	<0.50	<0.50	<0.50	3.0	550-204580
MON	E-1MA	E-1MA	10/12/2023	Original	<0.50	<0.50	<0.50	<0.50	2.8	550-209065
MON	E-5MA	E-5MA	1/9/2023	Original	<0.50	<0.50	2.0	0.60	38	550-195933
MON	E-5MA	E-5MA	4/11/2023	Original	<0.50	<0.50	2.8	0.83	47	550-200555
MON	E-5MA	E-5MA	7/11/2023	Original	<0.50	<0.50	2.5	0.89	41	550-204580
MON	E-5MA	E-5MA	10/17/2023	Original	<0.50	<0.50	2.4	0.71	36	550-209219
MON	E-5UA	E-5UAHS	10/11/2023	Original	<0.50	<0.50	0.56	<0.50	4.4	550-208982
MON	E-7LA	E-7LA	10/18/2023	Original	<0.50	<0.50	1.3	4.2	8.0	550-209316
MON	E-7UA	E-7UAHS	10/12/2023	Original	<0.50	<0.50	0.74	<0.50	2.4	550-209061
MON	E-8MA	E-8MA	10/16/2023	Original	<0.50	<0.50	1.4	<0.50	26	550-209176
MON	E-10MA	E-10MAHS	1/5/2023	Original	<0.50	<0.50	0.90	3.1	7.5	550-195809
MON	E-10MA	E-10MAHS	4/11/2023	Original	<0.50	<0.50	0.92	3.3	6.9	550-200556
MON	E-10MA	E-10MAHS	7/10/2023	Original	<0.50	<0.50	0.82	3.2	6.3	550-204515
MON	E-10MA	E-10MAHS	10/11/2023	Original	<0.50	<0.50	0.81	3.0	5.4	550-208984
MON	E-12UA	E-12UAHS	10/10/2023	Original	<0.50	<0.50	0.72	<0.50	2.1	550-208905
MON	E-13UA	E-13UAHS	10/12/2023	Original	<0.50	<0.50	1.2	<0.50	2.6	550-209062
MON	M-2MA	M-2MAHS-275	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208982
MON	M-2UA	M-2UAHS	10/11/2023	Original	<0.50	<0.50	1.3	<0.50	0.62	550-208982
MON	M-4MA	M-4MAHS	1/5/2023	Original	<0.50	<0.50	<0.50	<0.50	9.3 (A)	550-195809
MON	M-4MA	A	1/5/2023	Duplicate	<0.50	<0.50	<0.50	0.52	12 (A)	550-195809
MON	M-4MA	M-4MAHS	4/11/2023	Original	<0.50	0.58	<0.50	0.99	22	550-200556
MON	M-4MA	M-4MAHS	7/7/2023	Original	<0.50	0.76	<0.50	1.4	27	550-204446
MON	M-4MA	M-4MAHS	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	9.1	550-208982
MON	M-4MA	BB	10/11/2023	Duplicate	<0.50	<0.50	<0.50	<0.50	9.1	550-208982
MON	M-5LA	M-5LA	10/13/2023	Original	<0.50	<0.50	1.6	<0.50	1.9	550-209144
MON	M-5MA	M-5MA	1/11/2023	Original	<0.50	<0.50	<0.50	<0.50	3.1	550-196118
MON	M-5MA	E	1/11/2023	Duplicate	<0.50	<0.50	<0.50	<0.50	3.1	550-196118
MON	M-5MA	M-5MA	4/11/2023	Original	<0.50	<0.50	<0.50	<0.50	4.2	550-200555
MON	M-5MA	M-5MA	7/12/2023	Original	<0.50	<0.50	<0.50	<0.50	5.4	550-204676
MON	M-5MA	M-5MA	10/13/2023	Original	<0.50	<0.50	<0.50	<0.50	4.9	550-209144
MON	M-6MA	M-6MA	1/11/2023	Original	<0.50	<0.50	1.1	0.56	19	550-196118
MON	M-6MA	M-6MA	4/11/2023	Original	<0.50	<0.50	2.0	0.94	34	550-200555
MON	M-6MA	M-6MA	7/12/2023	Original	<0.50	<0.50	1.6	0.73	28	550-204676
MON	M-6MA	M-6MA	10/13/2023	Original	<0.50	<0.50	1.8	0.93	34	550-209144
MON	M-7MA	M-7MA	10/13/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-209144
MON	M-9MA	M-9MA	10/18/2023	Original	<0.50	<0.50	<0.50	<0.50	2.9	550-209316
MON	M-10LA2	M-10LA2HS	10/12/2023	Original	<0.50	<0.50	<0.50	<0.50	2.4 (B)	550-209063
MON	M-10LA2	DD	10/12/2023	Duplicate	<1.0	<1.0	<1.0	<1.0	6.5 (B)	550-209063
MON	M-10MA2	M-10MA2	2/15/2023	Original	<0.50	1.1	1.4	1.5	57	550-197912
MON	M-10MA2	M-10MA2	4/11/2023	Original	<0.50	0.94	0.97	1.1	33	550-200555

Table C-1. 2023 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-10MA2	M-10MA2	7/11/2023	Original	<0.50	0.65	1.2	1.2	38	550-204580
MON	M-10MA2	M-10MA2	10/17/2023	Original	<0.50	1.2	1.2	1.6	43	550-209219
MON	M-11MA	M-11MA	10/13/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-209144
MON	M-11MA	V	10/13/2023	Duplicate	<0.50	<0.50	<0.50	<0.50	<0.50	550-209144
MON	M-12MA2	M-12MA2HS	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	5.1	550-208982
MON	M-14LA	M-14LAHS	10/12/2023	Original	<0.50	<0.50	<0.50	2.3	5.3 (C)	550-209061
MON	M-14LA	EE	10/12/2023	Duplicate	<0.50	<0.50	<0.50	1.4	3.8 (C)	550-209061
MON	M-15MA	M-15MA	1/9/2023	Original	<0.50	<0.50	<0.50	<0.50	2.4	550-195933
MON	M-15MA	M-15MA	4/12/2023	Original	<0.50	<0.50	<0.50	<0.50	3.2	550-200616
MON	M-15MA	M-15MA	7/11/2023	Original	<0.50	<0.50	<0.50	<0.50	3.5	550-204580
MON	M-15MA	M-15MA	10/10/2023	Original	<0.50	<0.50	<0.50	<0.50	2.7	550-208903
MON	M-15MA	S	10/10/2023	Duplicate	<0.50	<0.50	<0.50	<0.50	2.7	550-208903
MON	M-16LA	M-16LAHS	10/12/2023	Original	<0.50	<0.50	<0.50	0.96	11	550-209061
MON	M-16MA	M-16MA	10/17/2023	Original	<0.50	<0.50	<0.50	<0.50	5.1	550-209219
MON	M-16MA	X	10/17/2023	Duplicate	<0.50	<0.50	<0.50	<0.50	5.2	550-209219
MON	M-17MA/LA	M-17MA/LAHS	1/5/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-195809
MON	M-17MA/LA	M-17MA/LAHS	4/11/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-200556
MON	M-17MA/LA	M-17MALAHS	7/7/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-204446
MON	M-17MA/LA	M-17MA/LAHS	10/10/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208905
MON	PA-2LA	PA-2LA	10/17/2023	Original	<0.50	<0.50	2.1	<0.50	<0.50	550-209219
MON	PA-5LA	PA-5LA	1/9/2023	Original	<0.50	<0.50	2.1	2.6	33	550-195934
MON	PA-5LA	PA-5LA	4/12/2023	Original	<0.50	0.60	3.0	3.8	48	550-200616
MON	PA-5LA	PA-5LA	7/11/2023	Original	<0.50	0.69	2.7	5.4	49	550-204580
MON	PA-5LA	PA-5LA	10/16/2023	Original	<0.50	0.71	2.7	5.6	53	550-209176
MON	PA-6LA	PA-6LAHS	1/5/2023	Original	<0.50	1.5	1.1	4.3	66	550-195810
MON	PA-6LA	PA-6LAHS	4/11/2023	Original	<0.50	1.6	1.0	4.0	55	550-200556
MON	PA-6LA	K	4/11/2023	Duplicate	<0.50	1.8	0.98	4.0	57	550-200556
MON	PA-6LA	PA-6LAHS	7/10/2023	Original	<0.50	1.1	0.63	2.7	38	550-204515
MON	PA-6LA	PA-6LAHS	10/11/2023	Original	<0.50	2.1	1.4	4.6	71	550-208984
MON	PA-8LA2	PA-8LA2	10/11/2023	Original	<0.50	<0.50	1.0	0.77	6.8	550-208983
MON	PA-9LA	PA-9LAHS	10/11/2023	Original	<0.50	<0.50	2.1	<0.50	14	550-208984
MON	PA-10MA	PA-10MAHS	1/5/2023	Original	<0.50	<0.50	<0.50	0.52	29	550-195809
MON	PA-10MA	PA-10MAHS	4/11/2023	Original	<0.50	<0.50	<0.50	0.68	42	550-200556
MON	PA-10MA	PA-10MAHS	7/10/2023	Original	<0.50	<0.50	<0.50	0.60	30	550-204515
MON	PA-10MA	O	7/10/2023	Duplicate	<0.50	<0.50	<0.50	0.57	29	550-204515
MON	PA-10MA	PA-10MAHS	10/11/2023	Original	<0.50	<0.50	<0.50	0.67	32	550-208984
MON	PA-11LA	PA-11LA	10/16/2023	Original	<0.50	<0.50	2.0	<0.50	<0.50	550-209176
MON	PA-11LA	W	10/16/2023	Duplicate	<0.50	<0.50	2.1	<0.50	<0.50	550-209176
MON	PA-12MA	PA-12MA	1/11/2023	Original	<0.50	<0.50	0.65	3.0	240	550-196118
MON	PA-12MA	PA-12MA	4/10/2023	Original	<0.50	<0.50	0.74	3.3	250	550-200482
MON	PA-12MA	PA-12MA	7/11/2023	Original	<0.50 (1)	<0.50 (1)	0.59 (1)	2.1 (1)	300	550-204580
MON	PA-12MA	PA-12MA	10/16/2023	Original	<0.50	<0.50	0.84	4.1	320	550-209176
MON	PA-13LA	PA-13LA	1/10/2023	Original	<0.50	<0.50	1.2	0.69	48	550-196118
MON	PA-13LA	PA-13LA	4/13/2023	Original	<0.50	<0.50 (2)	1.6	0.84	64	550-200728
MON	PA-13LA	PA-13LA	7/11/2023	Original	<0.50	<0.50	2.1	1.0	75	550-204580
MON	PA-13LA	PA-13LA	10/31/2023	Original	<0.50	<0.50	1.7	0.94	64	550-209867
MON	PA-13LA	Z	10/31/2023	Duplicate	<0.50	<0.50	1.7	0.87	62	550-209867
MON	PA-15LA	PA-15LAHS	10/12/2023	Original	<0.50	<0.50	0.60	<0.50	<0.50	550-209063
MON	PA-16MA	PA-16MAHS	10/12/2023	Original	<0.50	<0.50	0.70	<0.50	4.8	550-209063

Table C-1. 2023 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	PA-18LA	PA-18LAHS	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208982
MON	PA-19LA	PA-19LA	10/12/2023	Original	<0.50	<0.50	1.2	1.4	24	550-209065
MON	PA-20MA	PA-20MA	10/12/2023	Original	<0.50	0.78	1.4	3.3	52	550-209065
MON	PA-21MA	PA-21MAHS	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208982
MON	PG-1LA	PG-1LA	1/10/2023	Original	<0.50	<0.50	1.0	<0.50	0.53	550-196024
MON	PG-1LA	PG-1LA	4/10/2023	Original	<0.50	<0.50	1.7	<0.50	0.92	550-200482
MON	PG-1LA	PG-1LA	7/10/2023	Original	<0.50	<0.50	1.1	<0.50	0.61	550-204580
MON	PG-1LA	PG-1LA	10/17/2023	Original	<0.50	<0.50	2.3	<0.50	1.3	550-209219
MON	PG-2LA	PG-2LA	4/12/2023	Original	<0.50	<0.50	1.6	1.7	100	550-200616
MON	PG-2LA	PG-2LA	10/11/2023	Original	<0.50	<0.50	1.4	1.2	74	550-208983
MON	PG-2LA	T	10/11/2023	Duplicate	<0.50	<0.50	1.4	1.2	74	550-208983
MON	PG-4MA	PG-4MA	10/11/2023	Original	<0.50	<0.50	0.89	<0.50	1.8	550-208983
MON	PG-4UA	PG-4UAHS	10/12/2023	Original	<0.50	<0.50	1.1	0.71	0.58	550-209063
MON	PG-5MA	PG-5MAHS	10/10/2023	Original	<0.50	<0.50	0.62	<0.50	6.6	550-208905
MON	PG-5UA	PG-5UAHS	10/10/2023	Original	<0.50	<0.50	0.68	<0.50	2.0 (C)	550-208905
MON	PG-5UA	AA	10/10/2023	Duplicate	<0.50	<0.50	<0.50	<0.50	0.93 (C)	550-208905
MON	PG-6MA	PG-6MA	10/11/2023	Original	<0.50	1.4	3.0	3.7	110	550-208983
MON	PG-6UA	PG-6UA	10/11/2023	Original	<0.50	<0.50	1.0	<0.50	1.2	550-208983
MON	PG-7MA	PG-7MA	10/17/2023	Original	<0.50	<0.50	1.1	<0.50	4.2	550-209219
MON	PG-8UA	PG-8UA	10/12/2023	Original	<0.50	<0.50	0.76	<0.50	<0.50	550-209065
MON	PG-8UA	U	10/12/2023	Duplicate	<0.50	<0.50	0.74	<0.50	<0.50	550-209065
MON	PG-10UA	PG-10UA	10/17/2023	Original	<0.50	<0.50	0.65	<0.50	1.4	550-209219
MON	PG-11UA	PG-11UAHS	10/12/2023	Original	<0.50	<0.50	1.3	<0.50	<0.50	550-209061
MON	PG-16UA	PG-16UA	10/16/2023	Original	<0.50	<0.50	0.66	<0.50	1.5	550-209176
MON	PG-18UA	PG-18UA	10/13/2023	Original	<0.50	<0.50	1.5	<0.50	1.1	550-209144
MON	PG-19UA	PG-19UA	10/12/2023	Original	<0.50	<0.50	0.79	<0.50	2.3	550-209065
MON	PG-22UA	PG-22UAHS	10/12/2023	Original	<0.50	<0.50	<0.50	0.73	3.1	550-209061
MON	PG-23MA/LA	PG-23MA/LA	10/11/2023	Original	<0.50	<0.50	1.1	0.96	11	550-208983
MON	PG-23UA	PG-23UAHS	10/12/2023	Original	<0.50	<0.50	0.91	<0.50	1.6	550-209063
MON	PG-24UA	PG-24UAHS	10/12/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-209063
MON	PG-25UA	PG-25UAHS	10/12/2023	Original	<0.50	<0.50	0.61	<0.50	<0.50	550-209063
			10/12/2023	*Lab dup*	<0.50 (3)	<0.50	0.72 (4)	<0.50 (3)	<0.50 (3)	
			10/12/2023	*Lab dup*	<0.50 (3)	<0.50	0.71 (4)	<0.50 (3)	<0.50 (3)	
MON	PG-28UA	PG-28UA	10/16/2023	Original	<0.50	<0.50	2.1	<0.50	1.3	550-209176
MON	PG-29UA	PG-29UA	10/16/2023	Original	<0.50	<0.50	0.76	<0.50	1.1	550-209176
MON	PG-31UA	PG-31UAHS	10/11/2023	Original	<0.50	<0.50	3.5	<0.50	3.0	550-208984
MON	PG-38MA/LA	PG-38MA/LAHS	10/10/2023	Original	<0.50	<0.50	0.69	0.99	0.62	550-208905
MON	PG-39LA	PG-39LA	10/17/2023	Original	<0.50	<0.50	1.2	1.5	2.2	550-209219
MON	PG-40LA	PG-40LA	1/10/2023	Original	<0.50	<0.50	0.73	0.60	19	550-196024
MON	PG-40LA	D	1/10/2023	Duplicate	<0.50	<0.50	0.71	0.60	18	550-196024
MON	PG-40LA	PG-40LA	4/12/2023	Original	<0.50	<0.50	1.0	0.70	22	550-200616
MON	PG-40LA	L	4/12/2023	Duplicate	<0.50	<0.50	1.1	0.79	23	550-200616
MON	PG-40LA	PG-40LA	7/10/2023	Original	<0.50	<0.50	0.80	0.62	19	550-204503
MON	PG-40LA	PG-40LA	10/10/2023	Original	<0.50	<0.50	0.91	0.67	20	550-208903
MON	PG-42LA	PG-42LA	2/15/2023	Original	<0.50	<0.50	0.57	<0.50	2.8	550-197912
				Lab dup	<0.50 (5)	<0.50 (5)	0.66 (5)	<0.50 (5),(3)	1.7 (5)	
MON	PG-42LA	PG-42LA	4/10/2023	Original	<0.50	<0.50	0.71	<0.50	1.5	550-200482

Table C-1. 2023 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-42LA	I	4/10/2023	Duplicate	<0.50	<0.50	0.71	<0.50	1.4	550-200482
MON	PG-42LA	PG-42LA	4/13/2023	Original	<0.50	<0.50	0.76	<0.50	1.7	550-200728
MON	PG-42LA	PG-42LA	7/10/2023	Original	<0.50	<0.50	0.64	<0.50	1.5	550-204503
MON	PG-42LA	PG-42LA	10/9/2023	Original	<0.50	<0.50	0.55	<0.50	1.2	550-208835
MON	PG-43LA	PG-43LAHS	1/5/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-195810
MON	PG-43LA	PG-43LAHS	4/11/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-200556
MON	PG-43LA	PG-43LAHS	7/10/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-204515
MON	PG-43LA	PG-43LAHS	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208984
MON	PG-44LA	PG-44LAHS	3/8/2023	Original	<0.50	<0.50	3.3	<0.50	<0.50	550-198866
MON	PG-44LA	H	3/8/2023	Duplicate	<0.50	<0.50	2.3	<0.50	<0.50	550-198866
MON	PG-44LA	PG-44LAHS	4/11/2023	Original	<0.50	<0.50	3.1	<0.50	<0.50	550-200556
MON	PG-44LA	PG-44LAHS	7/10/2023	Original	<0.50	<0.50	3.5	<0.50	<0.50	550-204515
MON	PG-44LA	PG-44LAHS	10/12/2023	Original	<0.50	<0.50	1.2	<0.50	<0.50	550-209063
MON	PG-48MA	PG-48MA	1/11/2023	Original	<0.50	<0.50	0.50	<0.50	11	550-196118
MON	PG-48MA	PG-48MA	4/11/2023	Original	<0.50	<0.50	<0.50	<0.50	9.3	550-200555
MON	PG-48MA	PG-48MA	7/12/2023	Original	<0.50	<0.50	0.60	<0.50	13	550-204676
MON	PG-48MA	PG-48MA	10/13/2023	Original	<0.50	<0.50	0.59	<0.50	13	550-209144
MON	PG-50MA	PG-50MAHS	10/12/2023	Original	<0.50	<0.50	0.81	<0.50	0.79	550-209063
MON	PG-53MA	PG-53MAHS	10/12/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-209061
MON	PG-54MA	PG-54MA	10/13/2023	Original	<0.50	<0.50	1.7	1.2	40	550-209144
MON	PG-55MA	PG-55MA	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	4.0	550-208983
MON	PG-56MA	PG-56MA	10/10/2023	Original	<0.50	<0.50	0.66	<0.50	2.5	550-208903
MON	S-1LA	S-1LA	10/10/2023	Original	<0.50	<0.50	1.7	57	<0.50	550-208903
MON	S-1MA	S-1MAHS	10/11/2023	Original	<0.50	<0.50	<0.50	4.4	<0.50	550-208982
MON	S-2LA	S-2LA	1/10/2023	Original	<0.50	<0.50	<0.50	<0.50	9.5	550-196024
MON	S-2LA	S-2LA	4/11/2023	Original	<0.50	<0.50	0.52	<0.50	11	550-200555
MON	S-2LA	S-2LA	7/11/2023	Original	<0.50	<0.50	0.56	<0.50	14	550-204580
MON	S-2LA	S-2LA	10/11/2023	Original	<0.50	<0.50	0.50	<0.50	14	550-208983
MON	S-2MA	S-2MAHS	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208982
MON	S-2MA	CC	10/11/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208982
MON	W-1MA	W-1MA	1/11/2023	Original	<0.50	<0.50	1.1	1.9	440	550-196118
MON	W-1MA	W-1MA	4/13/2023	Original	<0.50	<0.50	1.3	1.9	310	550-200728
MON	W-1MA	M	4/13/2023	Duplicate	<0.50	<0.50 (2)	1.2	1.8	280 (6)	550-200728
MON	W-1MA	W-1MA	10/18/2023	Original	<0.50	<0.50	1.4	2.3	310	550-209316
MON	W-1MA	Y	10/18/2023	Duplicate	<0.50	<0.50	1.4	2.4	320	550-209316
MON	W-2MA	W-2MA	1/11/2023	Original	<0.50	<0.50	<0.50	3.2	630	550-196118
MON	W-2MA	W-2MA	4/13/2023	Original	<0.50	<0.50 (2)	0.57	3.3	980 (6)	550-200728
MON	W-2MA	W-2MA	7/12/2023	Original	<0.50	<0.50	0.75	5.2	1000	550-204676
MON	W-2MA	Q	7/12/2023	Duplicate	<0.50	<0.50	0.72	4.9	990	550-204676
MON	W-2MA	W-2MA	10/18/2023	Original	<0.50	<0.50	0.57	3.4	640	550-209316
Trip/Field Blanks										
--	QC	FRB (Trip)	1/5/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195809
--	QC	FRB (Trip)	1/6/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195846
--	QC	FRB (trip)	1/9/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195933
--	QC	FRB (trip)	1/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-196024
--	QC	FRB (Trip)	1/11/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-196118
--	QC	FRB (Trip)	2/15/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-197912
--	QC	FRB (Trip)	3/8/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198866
--	QC	FRB (Trip)	4/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200482

Table C-1. 2023 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)	4/11/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200555
--	QC	FRB (Trip)	4/11/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200556
--	QC	FRB (Trip)	4/12/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200616
--	QC	FRB (Trip)	4/13/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200728
--	QC	FRB(Trip)	7/7/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204446
--	QC	FRB (Trip)	7/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204503
--	QC	FRB (Trip)	7/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204515
--	QC	FRB (TRIP)	7/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204580
--	QC	FRB (Trip)	7/12/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204676
--	QC	FRB (Trip)	8/15/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-206405
--	QC	FRB (Trip)	10/9/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208835
--	QC	FRB (Trip)	10/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208903
--	QC	FRB (Trip)	10/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208905
--	QC	FRB (Trip)	10/11/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208982
--	QC	FRB (Trip)	10/11/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208983
--	QC	FRB (Trip)	10/11/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208984
--	QC	Trip Blank	10/12/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209061
--	QC	FRB (Trip)	10/12/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209062
--	QC	FRB (Trip)	10/12/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209063
--	QC	FRB (Trip)	10/12/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209065
--	QC	FRB (Trip)	10/13/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209144
--	QC	FRB (Trip)	10/16/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209176
--	QC	FRB (Trip)	10/17/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209219
--	QC	FRB (Trip)	10/18/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209316
--	QC	FRB (Trip)	10/31/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209867

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene

FRB = Field Reagent Blank (Trip Blank)
ID = Identifier
Lab dup = Laboratory duplicate
MON = Monitoring
QC = Quality Control

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

(B) Original and field duplicate sample results had >20% RPD. Re-analysis not requested due to low concentration range of analyte. PC's inquired why sample DD was diluted, and lab indicated in e-mail reply that sample DD had an odor.

(C) RPD greater than 20%; re-analysis not requested due to low concentrations of less than 5x the reporting limit.

(D) Replacement well for PG-49MA; EPA approved replacement via e-mail on August 23, 2023, after which this well became part of the GM&EP. Groundwater data collected from this well are included in the 2023 annual report.

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

(1) N1 Flag: The following sample was re-analyzed with headspace in the sample vial due to internal standard in continuing calibration verification internal standard (CCVIS) failed in original analysis: PA-12MA (550-204580-3). The sample results will be reported with an N1 qualifier.

(2) N1 Flag: The initial calibration verification (ICV) result for batch 550-299051 was above the upper control limit for 1,1-Dichloroethene. Sample results were non-detects and have been reported as N1 qualified data.

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

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

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

(6) H2 Flag: Initial analysis within holding time. Reanalysis for the required dilution was past holding time.

Table C-2. 2023 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	1/3/2023	Original	<0.50	<0.50	0.88	3.2	510	550-195601
Extraction	7EX-3aMA	7EX-3aMA	4/3/2023	Original	<0.50	<0.50	0.99	3.5	540	550-200031
Extraction	7EX-3aMA	7EX-3aMA	7/3/2023	Original	<0.50	<0.50	0.77	3.3	500	550-204148
Extraction	7EX-3aMA	7EX-3aMA	10/2/2023	Original	<0.50	<0.50	0.79	3.4	490	550-208476
Extraction	7EX-6MA	7EX-6MA	1/3/2023	Original	<0.50	<0.50	0.77	2.6	610	550-195601
Extraction	7EX-6MA	7EX-6MA	4/3/2023	Original	<0.50	<0.50	0.87	2.5	480	550-200031
Extraction	7EX-6MA	7EX-6MA	10/2/2023	Original	<0.50	<0.50	0.83	2.5	430	550-208476
CGTF										
Extraction	COS-31	COS-31	3/30/2023	Original	<0.50	<0.50	<0.50	<0.50	4.5	550-199895
Extraction	COS-31	COS-31	4/3/2023	Original	<0.50	<0.50	<0.50	0.89	8.4	550-200028
Extraction	COS-31	EXT-1A-04032023	4/3/2023	Duplicate	<0.50	<0.50	<0.50	0.93	8.5	550-200028
Extraction	COS-31	COS-31	5/1/2023	Original	<0.50	<0.50 (1)	0.59	1.6	11	550-201528
Extraction	COS-31	EXT-1A-05012023	5/1/2023	Duplicate	<0.50	<0.50 (1)	0.65	1.5	11	550-201528
Extraction	COS-31	COS-31	6/1/2023	Original	<0.50	<0.50	0.56	1.6	10	550-202901
Extraction	COS-31	EXT-1A-06012023	6/1/2023	Duplicate	<0.50	<0.50	0.66	1.7	11	550-202901
Extraction	COS-72	COS-72	7/3/2023	Original	<0.50	<0.50	0.87	0.71	8.0	550-204147
Extraction	COS-72	EXT-1A-07032023	7/3/2023	Duplicate	<0.50	<0.50	0.92	0.79	8.8	550-204147
Extraction	COS-72	COS-72	8/1/2023	Original	<0.50	<0.50	0.77	0.71	7.7	550-205707
Extraction	COS-72	EXT-1A-08012023	8/1/2023	Duplicate	<0.50	<0.50	0.79	0.74	8.0	550-205707
Extraction	COS-72	COS-72	9/1/2023	Original	<0.50	<0.50	0.78	0.72	7.9	550-207202
Extraction	COS-72	EXT-1A-09012023	9/1/2023	Duplicate	<0.50	<0.50	0.82	0.91	9.1	550-207202
Extraction	COS-72	COS-72	12/11/2023	Original	<0.50	<0.50	0.67	<0.50	7.2	550-211592
Extraction	COS-72	EXT-1A-12112023	12/11/2023	Duplicate	<0.50	<0.50	0.65	<0.50	7.0	550-211592
Extraction	COS-75A	COS-75A	1/3/2023	Original	<0.50	<0.50	1.6	5.3	29	550-195605
Extraction	COS-75A	EXT-1A-01032023	1/3/2023	Duplicate	<0.50	0.52	1.7	5.3	30	550-195605
Extraction	COS-75A	COS-75A	2/1/2023	Original	<0.50	<0.50	1.5	5.1	27	550-197103
Extraction	COS-75A	EXT-1A-02012023	2/1/2023	Duplicate	<0.50	<0.50	1.6	4.9	27	550-197103
Extraction	COS-75A	COS-75A	3/2/2023	Original	<0.50	0.59	1.9	5.5	31	550-198546
Extraction	COS-75A	EXT-1A-03022023	3/2/2023	Duplicate	<0.50	0.61	1.8	5.8	33	550-198546
AREA 12 GWETS										
Extraction	MEX-1MA	MEX-1-1A-03022023	3/2/2023	Original	<0.50	2.4	1.8	4.8	57	550-198553
Extraction	MEX-1MA	MEX-1-1A-04032023	4/3/2023	Original	<0.50	1.4	1.7	2.4	47	550-200027
Extraction	MEX-1MA	MEX-1-1A- 05012023	5/1/2023	Original	<0.50	1.1	1.6	2.2	46	550-201536
Extraction	MEX-1MA	MEX-1-1A-06012023	6/1/2023	Original	<0.50	1.4	1.5	2.3	42	550-202899
Extraction	MEX-1MA	MEX-1-1A-07032023	7/3/2023	Original	<0.50	1.4	1.6	2.3	45	550-204155

Table C-2. 2023 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-08012023	8/1/2023	Original	<0.50	1.4	1.6	2.2	43	550-205710
Extraction	MEX-1MA	MEX-1-1A-09012023	9/1/2023	Original	<0.50	1.7	1.6	2.6	47	550-207197
Extraction	MEX-1MA	MEX-1-1A-10022023	10/2/2023	Original	<0.50	1.3	1.6	2.1	44	550-208475
Extraction	MEX-1MA	MEX-1-1A-11012023	11/1/2023	Original	<0.50	1.2	1.6	2.2	46	550-209897
Extraction	MEX-1MA	MEX-1-1A-12012023	12/1/2023	Original	<0.50	1.2	1.6	2.5	44	550-211207
Extraction	Granite Reef	GR-1-1A-03022023	3/2/2023	Original	<0.50	1.3	4.0	2.5	97	550-198553
Extraction	Granite Reef	GR-1-1A-04032023	4/3/2023	Original	<0.50	1.7	4.3	2.6	110	550-200027
Extraction	Granite Reef	GR-1-1A- 05012023	5/1/2023	Original	<0.50	1.5	4.2	2.5	100	550-201536
Extraction	Granite Reef	GR-1-1A-06012023	6/1/2023	Original	<0.50	1.8	3.8	2.3	88	550-202899
Extraction	Granite Reef	GR-1-1A-07032023	7/3/2023	Original	<0.50	1.7	4.0	2.5	98	550-204155
Extraction	Granite Reef	GR-1-1A-08012023	8/1/2023	Original	<0.50	1.7	4.1	2.2	93	550-205710
Extraction	Granite Reef	GR-1-1A-09012023	9/1/2023	Original	<0.50	2.1	4.3	2.6	120	550-207197
Extraction	Granite Reef	GR-1-1A-10022023	10/2/2023	Original	<0.50	1.8	4.3	2.5	97	550-208475
Extraction	Granite Reef	GR-1-1A-11012023	11/1/2023	Original	<0.50	1.5	4.0	2.5	100	550-209897
Extraction	Granite Reef	GR-1-1A-12012023	12/1/2023	Original	<0.50	1.6	4.2	2.6	91	550-211207
NGTF										
Extraction	PCX-1	PCX-1	1/18/2023	Original	<0.50	0.62	1.9	3.7	46	550-196481
Extraction	PCX-1	PCX-1	2/20/2023	Original	<0.50	<0.50	1.7	2.8	36	550-198031
Extraction	PCX-1	PCX-1	3/9/2023	Original	<0.50	0.77	2.3	3.5	46	550-198937
Extraction	PCX-1	PCX-1	4/6/2023	Original	<0.50	0.76	2.3	3.7	48	550-200307
Extraction	PCX-1	PCX-1	5/1/2023	Original	<0.50	0.53	1.8	3.1	41	550-201532
Extraction	PCX-1	PCX-1	6/7/2023	Original	<0.50	0.68	1.7	3.1	38	550-203169
Extraction	PCX-1	PCX-1	7/6/2023	Original	<0.50	0.57	1.9	3.2	45	550-204324
Extraction	PCX-1	PCX-1	8/3/2023	Original	<0.50	0.70	2.0	3.3	44	550-205884
Extraction	PCX-1	PCX-1	9/5/2023	Original	<0.50	0.65	1.8	3.0	46	550-207251
Extraction	PCX-1	PCX-1	10/2/2023	Original	<0.50	0.51	1.8	2.6	41	550-208483
Extraction	PCX-1	PCX-1	11/9/2023	Original	<0.50	0.51	1.7	2.8	40	550-210338
Extraction	PCX-1	PCX-1	12/11/2023	Original	<0.50	0.55	1.7	3.0	38	550-211593
MRTF										
Extraction	PV-14	PV 14	1/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-195609
Extraction	PV-14	PV 14	2/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-197117
Extraction	PV-14	PV 14	3/2/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-198545
Extraction	PV-14	PV 14	5/1/2023	Original	<0.50	<0.50	0.55	<0.50	<0.50	550-201531
Extraction	PV-14	PV 14	6/1/2023	Original	<0.50	<0.50	0.50	<0.50	<0.50	550-202898
Extraction	PV-14	PV 14	7/3/2023	Original	<0.50	<0.50	0.50	<0.50	<0.50	550-204153
Extraction	PV-14	PV 14	8/1/2023	Original	<0.50	<0.50	0.51	<0.50	<0.50	550-205712

Table C-2. 2023 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	9/1/2023	Original	<0.50 (2)	<0.50 (2)	<0.50	<0.50 (2)	<0.50	550-207195
Extraction	PV-14	PV 14	10/2/2023	Original	<0.50	<0.50	0.52	<0.50	<0.50	550-208460
Extraction	PV-14	PV 14	11/1/2023	Original	<0.50	<0.50	0.50	<0.50	<0.50	550-209899
Extraction	PV-14	PV 14	12/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-211203
Extraction	PV-15	PV 15	1/3/2023	Original	<0.50	<0.50	0.64	<0.50	4.2	550-195609
Extraction	PV-15	PV 15	2/1/2023	Original	<0.50	<0.50	0.58	<0.50	3.6	550-197117
Extraction	PV-15	PV 15	3/2/2023	Original	<0.50	<0.50	0.70	<0.50	4.1	550-198545
Extraction	PV-15	PV 15	4/3/2023	Original	<0.50	<0.50	0.69	<0.50	3.8	550-200033
Extraction	PV-15	PV 15	5/1/2023	Original	<0.50	<0.50	0.67	<0.50	3.8	550-201531
Extraction	PV-15	PV 15	6/1/2023	Original	<0.50	<0.50	0.72	<0.50	4.1	550-202898
Extraction	PV-15	PV 15	7/3/2023	Original	<0.50	<0.50	0.74	<0.50	4.2	550-204153
Extraction	PV-15	PV 15	8/1/2023	Original	<0.50	<0.50	0.78	<0.50	4.5	550-205712
Extraction	PV-15	PV 15	9/1/2023	Original	<0.50 (2)	<0.50 (2)	0.85	<0.50 (2)	5.0	550-207195
Extraction	PV-15	PV 15	10/2/2023	Original	<0.50	<0.50	0.85	<0.50	4.6	550-208460
Extraction	PV-15	PV 15	11/1/2023	Original	<0.50	<0.50	0.81	<0.50	4.6	550-209899
Extraction	PV-15	PV 15	12/1/2023	Original	<0.50	<0.50	0.80	<0.50	4.4	550-211203
Trip/Field Blanks										
--	EX-QC (A)	FRB (TRIP)	1/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195606
--	EX-QC (A)	FRB (TRIP)	1/18/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-196483
--	EX-QC (A)	FRB (TRIP)	2/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-197106
--	EX-QC (A)	FRB (TRIP)	2/20/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198029
--	EX-QC (A)	FRB (TRIP)	3/2/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198544
--	EX-QC (A)	FRB (TRIP)	3/9/2023	TB	<0.50	<0.50	<0.50	<0.50 (2)	<0.50 (2)	550-198939
--	EX-QC (A)	FRB-Trip	3/30/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-199895
--	EX-QC (A)	FRB (TRIP)	4/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200035
--	EX-QC (A)	FRB (TRIP)	4/6/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200308
--	EX-QC (A)	FRB (TRIP)	5/1/2023	TB	<0.50	<0.50 (1)	<0.50	<0.50	<0.50	550-201527
--	EX-QC (A)	FRB (TRIP)	6/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-202907
--	EX-QC (A)	TB-2-1A-06072023	6/7/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-203171
--	EX-QC (A)	FRB (TRIP)	7/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204144
--	EX-QC (A)	FRB (Trip)	7/6/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204321
--	EX-QC (A)	FRB (TRIP)	8/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205701
--	EX-QC (A)	FRB (TRIP)	8/3/2023	TB	(B)	(B)	(B)	(B)	(B)	550-205882
--	EX-QC (A)	TB-2-1A-08032023	8/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205883
--	EX-QC (A)	FRB (TRIP)	9/1/2023	TB	<0.50 (2)	<0.50 (2)	<0.50 (2)	<0.50 (2)	<0.50 (2)	550-207192
--	EX-QC (A)	TB-2-1A-09052023	9/5/2023	TB	(C)	(C)	(C)	(C)	(C)	550-207252

Table C-2. 2023 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 (A)	FRB (TRIP)	10/2/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208466
--	EX-QC (A)	FRB (TRIP)	11/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209895
--	EX-QC (A)	FRB(Trip)	11/9/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-210338
--	EX-QC (A)	FRB (TRIP)	12/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211182
--	EX-QC (A)	FRB (TRIP)	12/11/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211590

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 cancelled due to internal standard failure at laboratory and no additional sample volume to reanalyze.

(C) Sample cancelled by lab because the QC that was run with the 524.2 trip blank was not spiked. There was insufficient sample volume to rerun the trip blank; the data for the trip blank was not reportable (see case narrative).

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

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(1) N1 Flag: The initial calibration verification (ICV) result for batch 550-299631 was above the upper control limit for 1,1-Dichloroethene. Sample results were non-detects and have been reported as N1 qualified data.

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

Table C-3. 2023 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 7 GWETS									
SP-102 (influent)	SP-102	1/3/2023	Original	<0.50	<0.50	0.85	3.0	470 (A)	550-195602
			Lab dup	<0.50 (1)	<0.50 (1)	0.97 (1)	3.2 (1)	540 (1),(A)	
SP-102 (influent)	TS-2-1A-01032023	1/3/2023	Duplicate	<0.50	<0.50	0.85	3.2	650 (A)	550-195602
			Lab dup	<0.50 (1)	<0.50 (1)	0.94 (1)	3.3 (1)	610 (1),(A)	
SP-102 (influent)	SP-102	2/1/2023	Original	<2.5	<2.5	<2.5	3.2	470	550-197105
SP-102 (influent)	TS-2-1A-02012023	2/1/2023	Duplicate	<2.5	<2.5	<2.5	3.2	480	550-197105
SP-102 (influent)	SP-102	3/2/2023	Original	<0.50	<0.50	0.87	3.1	500	550-198551
SP-102 (influent)	TS-2-1A-03022023	3/2/2023	Duplicate	<0.50	<0.50	0.92	3.2	510	550-198551
SP-102 (influent)	SP-102	4/3/2023	Original	<0.50	<0.50	0.87	3.0	480	550-200030
SP-102 (influent)	TS-2-1A-04032023	4/3/2023	Duplicate	<0.50	<0.50	0.95	2.9	540	550-200030
SP-102 (influent)	SP-102	5/1/2023	Original	<0.50	<0.50	0.87	3.2	540	550-201534
SP-102 (influent)	TS-2-1A-05012023	5/1/2023	Duplicate	<0.50	<0.50	0.92	3.2	510	550-201534
SP-102 (influent)	SP-102	6/6/2023	Original	<0.500	<0.500	0.891	4.34	493	L1623313
SP-102 (influent)	TS-2A-06062023	6/6/2023	Duplicate	<0.500	<0.500	0.873	4.59	536	L1623313
SP-102 (influent)	SP-102	7/3/2023	Original	<0.50	<0.50	0.81	3.5	510	550-204149
SP-102 (influent)	TS-2-1A-07032023	7/3/2023	Duplicate	<0.50	<0.50	0.78	3.5	480	550-204149
SP-102 (influent)	SP-102	8/1/2023	Original	<0.50	<0.50	0.84	3.1	380	550-205709
SP-102 (influent)	TS-2-1A-08012023	8/1/2023	Duplicate	<0.50	<0.50	0.81	3.1	380	550-205709
SP-102 (influent)	SP-102	9/1/2023	Original	<0.50	<0.50	0.78	3.6	590 (A)	550-207198
SP-102 (influent)	TS-2-1A-09012023	9/1/2023	Duplicate	<0.50	<0.50	0.77	3.7	340 (A)	550-207198
			Lab dup	<0.50 (1)	<0.50 (1),(2),(3)	0.72 (1)	2.6 (1)	430 (1),(A)	
SP-102 (influent)	SP-102	10/2/2023	Original	<0.50	<0.50	0.85	3.0	450	550-208482
SP-102 (influent)	TS-2-1A-10022023	10/2/2023	Duplicate	<0.50	<0.50	0.86	3.0	460	550-208482
SP-102 (influent)	SP-102	11/1/2023	Original	<0.50	<0.50	0.87	3.3	450	550-209893
SP-102 (influent)	TS-2-1A-11012023	11/1/2023	Duplicate	<0.50	<0.50	0.93	3.4	460	550-209893
SP-102 (influent)	SP-102	12/1/2023	Original	<0.50	<0.50	0.82	3.2	440	550-211208
SP-102 (influent)	TS-2-1A-12012023	12/1/2023	Duplicate	<0.50	<0.50	0.78	3.1	430	550-211208
SP-103 (UV/Ox effluent)	SP-103	1/3/2023	Original	<0.50	<0.50	0.80	0.96	74	550-195602
SP-103 (UV/Ox effluent)	SP-103	2/1/2023	Original	<0.50	<0.50	0.73	1.7	320	550-197105
SP-103 (UV/Ox effluent)	SP-103	3/2/2023	Original	<0.50	<0.50	0.82	0.96	70	550-198551
SP-103 (UV/Ox effluent)	SP-103	4/3/2023	Original	<0.50	<0.50	0.81	1.1	81	550-200030
SP-103 (UV/Ox effluent)	SP-103	5/1/2023	Original	<0.50	<0.50	0.79	1.0	91	550-201534
SP-103 (UV/Ox effluent)	SP-103	6/6/2023	Original	<0.500	<0.500	0.949	1.74	126	L1623313
SP-103 (UV/Ox effluent)	SP-103	7/3/2023	Original	<0.50	<0.50	0.80	<0.50	3.3	550-204149
SP-103 (UV/Ox effluent)	SP-103	8/1/2023	Original	<0.50	<0.50	0.75	<0.50	8.4	550-205709
SP-103 (UV/Ox effluent)	SP-103	9/1/2023	Original	<0.50	<0.50	0.79	1.6	330	550-207198
SP-103 (UV/Ox effluent)	SP-103	10/2/2023	Original	<0.50	<0.50	0.80	1.3	140	550-208482
SP-103 (UV/Ox effluent)	SP-103	11/1/2023	Original	<0.50	<0.50	0.81	1.3	91	550-209893
SP-103 (UV/Ox effluent)	SP-103	12/1/2023	Original	<0.50	<0.50	0.72	1.2	77	550-211208
SP-105 (Air Stripper Effluent)	SP-105	1/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-195604
SP-105 (Air Stripper Effluent)	SP-105	2/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-197104
SP-105 (Air Stripper Effluent)	SP-105	3/2/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-198550
SP-105 (Air Stripper Effluent)	SP-105	4/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-200029
SP-105 (Air Stripper Effluent)	SP-105	5/1/2023	Original	<0.50	<0.50	<0.50	<0.50	0.66	550-201535
SP-105 (Air Stripper Effluent)	SP-105	6/6/2023	Original	<0.500	<0.500	<0.500	<0.500	<0.500	L1623313
SP-105 (Air Stripper Effluent)	SP-105	7/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-204151
SP-105 (Air Stripper Effluent)	SP-105	8/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-205708
SP-105 (Air Stripper Effluent)	SP-105	9/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-207199
SP-105 (Air Stripper Effluent)	SP-105	10/2/2023	Original	<0.50	<0.50	<0.50	<0.50	0.67	550-208481
SP-105 (Air Stripper Effluent)	SP-105	11/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-209893

Table C-3. 2023 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	
SP-105 (Air Stripper Effluent)	SP-105	12/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-211208
AREA 12 GWETS									
WSP-1 (Influent)	WSP-1-1A-03022023	3/2/2023	Original	<0.50	2.4	3.6	4.7	97	550-198547
WSP-1 (Influent)	TS-1-1A-03022023	3/2/2023	Duplicate	<0.50	2.5	3.5	4.8	97	550-198547
WSP-1 (Influent)	WSP-1-1A-04032023	4/3/2023	Original	<0.50	1.5	3.1	2.5	74	550-200025
WSP-1 (Influent)	TS-1-1A-04032023	4/3/2023	Duplicate	<0.50	1.6	3.0	2.6	75	550-200025
WSP-1 (Influent)	WSP-1-1A- 05012023	5/1/2023	Original	<0.50	1.4	2.8	2.3	70	550-201537
WSP-1 (Influent)	TS-1-1A- 05012023	5/1/2023	Duplicate	<0.50	1.4	2.9	2.2	72	550-201537
WSP-1 (Influent)	WSP-1-1A-06012023	6/1/2023	Original	<0.50	1.6	2.5	2.3	63	550-202904
WSP-1 (Influent)	TS-1-1A-06012023	6/1/2023	Duplicate	<0.50	1.7	2.7	2.4	67	550-202904
WSP-1 (Influent)	WSP-1-1A-07032023	7/3/2023	Original	<0.50	1.5	2.8	2.3	70	550-204156
WSP-1 (Influent)	TS-1-1A-07032023	7/3/2023	Duplicate	<0.50	1.6	2.8	2.3	70	550-204156
WSP-1 (Influent)	WSP-1-1A-08012023	8/1/2023	Original	<0.50	1.5	2.8	2.3	68	550-205705
WSP-1 (Influent)	TS-1-1A-08012023	8/1/2023	Duplicate	<0.50	1.6	2.7	2.4	69	550-205705
WSP-1 (Influent)	WSP-1-1A-09012023	9/1/2023	Original	<0.50	1.5	3.0	2.6	79	550-207201
WSP-1 (Influent)	TS-1-1A-09012023	9/1/2023	Duplicate	<0.50	1.5	2.9	2.8	79	550-207201
WSP-1 (Influent)	WSP-1-1A-10022023	10/2/2023	Original	<0.50	1.8	3.1	2.5	77	550-208462
WSP-1 (Influent)	TS-1-1A-10022023	10/2/2023	Duplicate	<0.50	1.6	3.1	2.4	75	550-208462
WSP-1 (Influent)	WSP-1-1A- 11012023	11/1/2023	Original	<0.50	1.6	3.1	2.8	80	550-209889
WSP-1 (Influent)	TS-1-1A- 11012023	11/1/2023	Duplicate	<0.50	1.6	3.1	2.6	78	550-209889
WSP-1 (Influent)	WSP-1-1A-12012023	12/1/2023	Original	<0.50	1.5	2.8	2.7	68	550-211199
WSP-1 (Influent)	TS-1-1A-12012023	12/1/2023	Duplicate	<0.50	1.5	2.8	2.7	68	550-211199
WSP-2 (Air Stripper Effluent)	WSP-2-1A-03022023	3/2/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-198548
WSP-2 (Air Stripper Effluent)	WSp-2-1A-04032023	4/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-200024
WSP-2 (Air Stripper Effluent)	WSP-2-1A 05012023	5/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-201538
WSP-2 (Air Stripper Effluent)	WSP-2-1A-06012023	6/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-202903
WSP-2 (Air Stripper Effluent)	WSP-2-1A-07032023	7/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-204158
WSP-2 (Air Stripper Effluent)	WSP-2-1A-08012023	8/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-205706
WSP-2 (Air Stripper Effluent)	WSP-2-1A-09012023	9/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-207200
WSP-2 (Air Stripper Effluent)	WSP-2-1A 10022023	10/2/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208474
WSP-2 (Air Stripper Effluent)	WSP-2-1A 11012023	11/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-209898
WSP-2 (Air Stripper Effluent)	WSP-2-1A 12012023	12/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-211204
MRTF									
Tower 1 Effluent	Tower 1	1/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-195608
Tower 1 Effluent	Tower 1	10/2/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208458
Tower 2 Effluent	Tower 2	2/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-197118
Tower 2 Effluent	Tower 2	3/2/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-198549
Tower 2 Effluent	Tower 2	4/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-200034
Tower 2 Effluent	Tower 2	5/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-201529
Tower 2 Effluent	Tower 2	6/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-202900
Tower 2 Effluent	Tower 2	7/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-204152
Tower 2 Effluent	Tower 2	8/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-205711
Tower 2 Effluent	Tower 2	9/1/2023	Original	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	550-207194
Tower 2 Effluent	Tower 2	11/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-209900
Tower 2 Effluent	Tower 2	12/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-211206
Tower 3 Effluent	Tower 3	1/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-195608
Tower 3 Effluent	Tower 3	2/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-197118
Tower 3 Effluent	Tower 3	3/2/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-198549
Tower 3 Effluent	Tower 3	5/1/2023	Original	<0.50	<0.50 (5)	<0.50	<0.50	<0.50	550-201529
Tower 3 Effluent	Tower 3	6/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-202900
Tower 3 Effluent	Tower 3	7/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-204152

Table C-3. 2023 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	
Tower 3 Effluent	Tower 3	8/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-205711
Tower 3 Effluent	Tower 3	9/1/2023	Original	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	550-207194
Tower 3 Effluent	Tower 3	10/2/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208458
Tower 3 Effluent	Tower 3	11/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-209900
Tower 3 Effluent	Tower 3	12/1/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-211206
NGTF									
Outfall 001 (Effluent)	NGTF-CP	1/3/2023	Original	<0.50	<0.50	1.3	<0.50	<0.50	550-195595
Outfall 001 (Effluent)	NGTF-CP	1/9/2023	Original	<0.50	<0.50	0.81	<0.50	<0.50	550-195925
Outfall 001 (Effluent)	NGTF-CP	1/17/2023	Original	<0.50	<0.50	1.4	<0.50	<0.50	550-196475
Outfall 001 (Effluent)	NGTF-CP	1/23/2023	Original	<0.50	<0.50	0.74	<0.50	<0.50	550-196697
Outfall 001 (Effluent)	NGTF-CP	1/30/2023	Original	<0.50	<0.50	1.0	<0.50	<0.50	550-197002
Outfall 001 (Effluent)	NGTF-CP	2/6/2023	Original	<0.50	<0.50	0.55	<0.50	<0.50	550-197326
Outfall 001 (Effluent)	NGTF-CP	2/13/2023	Original	<0.50	<0.50	0.83	<0.50	<0.50	550-197733
Outfall 001 (Effluent)	NGTF-CP	2/21/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-198119
Outfall 001 (Effluent)	NGTF-CP	2/27/2023	Original	<0.50	<0.50	0.68	<0.50	<0.50	550-198349
Outfall 001 (Effluent)	NGTF-CP	3/6/2023	Original	<0.50	<0.50	1.1	<0.50	<0.50	550-198707
Outfall 001 (Effluent)	NGTF-CP	3/13/2023	Original	<0.50	<0.50	0.65	<0.50	<0.50	550-199113
Outfall 001 (Effluent)	NGTF-CP	3/20/2023	Original	<0.50	<0.50	1.2	<0.50	<0.50	550-199434
Outfall 001 (Effluent)	NGTF-CP	3/27/2023	Original	<0.50	<0.50	0.57	<0.50	<0.50	550-199742
Outfall 001 (Effluent)	NGTF-CP	4/3/2023	Original	<0.50	<0.50	0.99	<0.50	<0.50	550-200043
Outfall 001 (Effluent)	NGTF-CP	4/10/2023	Original	<0.50	<0.50	0.50	<0.50	<0.50	550-200485
Outfall 001 (Effluent)	NGTF-CP	4/17/2023	Original	<0.50	<0.50 (6)	0.86	<0.50	<0.50	550-200848
Outfall 001 (Effluent)	NGTF-CP	4/24/2023	Original	<0.50	<0.50 (7)	1.2	<0.50	<0.50	550-201200
Outfall 001 (Effluent)	NGTF-CP	5/1/2023	Original	<0.50	<0.50	0.62	<0.50	<0.50	550-201549
Outfall 001 (Effluent)	NGTF-CP	5/8/2023	Original	<0.50	<0.50	0.88	<0.50	<0.50	550-201902
			Lab Dup	<0.50 (1),(8),(B)	<0.50 (1),(8),(B)	0.85 (1),(8),(B)	<0.50 (1),(8),(B)	<0.50 (1),(8),(B)	
Outfall 001 (Effluent)	NGTF-CP	5/15/2023	Original	<0.50 (1)	<0.50 (1),(4)	1.1 (1)	<0.50 (1)	<0.50 (1)	550-202233
Outfall 001 (Effluent)	NGTF-CP	5/22/2023	Original	<0.50 (1)	<0.50 (1),(4)	0.60 (1)	<0.50 (1)	<0.50 (1)	550-202544
Outfall 001 (Effluent)	NGTF-CP	5/30/2023	Original	<0.50	<0.50	0.85	<0.50	<0.50	550-202798
Outfall 001 (Effluent)	NGTF-CP	6/8/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-203279
Outfall 001 (Effluent)	NGTF-CP	6/12/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-203386
Outfall 001 (Effluent)	NGTF-CP	6/20/2023	Original	<0.50	<0.50	0.54	<0.50	<0.50	550-203699
			Lab Dup	<0.50	<0.50	<0.50	<0.50	<0.50	
Outfall 001 (Effluent)	NGTF-CP	6/26/2023	Original	<0.50	<0.50	0.73	<0.50	<0.50	550-203893
Outfall 001 (Effluent)	NGTF-CP	7/3/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-204176
Outfall 001 (Effluent)	NGTF-CP	7/10/2023	Original	<0.50	<0.50	0.60	<0.50	<0.50	550-204506
Outfall 001 (Effluent)	NGTF-CP	7/19/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-205175
Outfall 001 (Effluent)	NGTF-CP	7/24/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-205299
Outfall 001 (Effluent)	NGTF-CP	7/31/2023	Original	<0.50	<0.50	0.51	<0.50	<0.50	550-205649
Outfall 001 (Effluent)	NGTF-CP	8/7/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-206024
Outfall 001 (Effluent)	NGTF-CP	8/14/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-206339
Outfall 001 (Effluent)	NGTF-CP	8/21/2023	Original	<0.50	<0.50 (4),(9),(10)	0.58	<0.50	<0.50	550-206636
Outfall 001 (Effluent)	NGTF-CP	8/28/2023	Original	<0.50	<0.50	0.80	<0.50	<0.50	550-206952
Outfall 001 (Effluent)	NGTF-CP	9/5/2023	Original	<0.50	<0.50 (4),(11),(12)	1.2	<0.50	<0.50	550-207257
Outfall 001 (Effluent)	NGTF-CP	9/28/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-208411
Outfall 001 (Effluent)	NGTF-CP	10/2/2023	Original	<0.50	<0.50	0.75	<0.50	<0.50	550-208470
Outfall 001 (Effluent)	NGTF-CP	10/9/2023	Original	<0.50	<0.50	0.99	<0.50	<0.50	550-208830
Outfall 001 (Effluent)	NGTF-CP	10/16/2023	Original	<0.50	<0.50	0.70	<0.50	<0.50	550-209172
Outfall 001 (Effluent)	NGTF-CP	10/23/2023	Original	<0.50	<0.50	0.71	<0.50	<0.50	550-209522
Outfall 001 (Effluent)	NGTF-CP	10/30/2023	Original	<0.50	<0.50	0.71	<0.50	<0.50	550-209814
Outfall 001 (Effluent)	NGTF-CP	11/6/2023	Original	<0.50	<0.50	<0.50	<0.50	<0.50	550-210066

Table C-3. 2023 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	11/13/2023	Original	<0.50	<0.50	0.69	<0.50	<0.50	550-210457
Outfall 001 (Effluent)	NGTF-CP	11/20/2023	Original	<0.50	<0.50	0.81	<0.50	<0.50	550-210806
Outfall 001 (Effluent)	NGTF-CP	11/27/2023	Original	<0.50	<0.50	0.56	<0.50	<0.50	550-210989
Outfall 001 (Effluent)	NGTF-CP	12/4/2023	Original	<0.50	<0.50	0.85	<0.50	<0.50	550-211246
Outfall 001 (Effluent)	NGTF-CP	12/11/2023	Original	<0.50	<0.50	1.2	<0.50	<0.50	550-211595
Outfall 001 (Effluent)	NGTF-CP	12/18/2023	Original	<0.50	<0.50	0.66	<0.50	<0.50	550-211869
Outfall 001 (Effluent)	NGTF-CP	12/26/2023	Original	<0.50	<0.50	1.0	<0.50	<0.50	550-212132
Trip/Field Blanks									
QC - Area 12	FB-1-1A-03022023	3/2/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198543
QC - Area 12	TB-1-1A-03022023	3/2/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198543
QC - Area 12	FB-1-1A-04032023	4/3/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200037
QC - Area 12	TB-1-1A-04032023	4/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200037
QC - Area 12	FB-1-1A-05012023	5/1/2023	FB	<0.50	<0.50 (6)	<0.50	<0.50	<0.50	550-201525
QC - Area 12	TB-1-1A-05012023	5/1/2023	TB	<0.50	<0.50 (6)	<0.50	<0.50	<0.50	550-201525
QC - Area 12	FB-1-1A-06012023	6/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-202905
QC - Area 12	TB-1-1A-06012023	6/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-202905
QC - Area 12	FB-1-1A-07032023	7/3/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204146
QC - Area 12	TB-1-1A-07032023	7/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204146
QC - Area 12	FB-1-1A-08012023	8/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205700
QC - Area 12	TB-1-1A-08012023	8/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205700
QC - Area 12	FB-1-1A-09012023	9/1/2023	FB	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	550-207193
QC - Area 12	TB-1-1A-09012023	9/1/2023	TB	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	550-207193
QC - Area 12	FB-1-1A-10022023	10/2/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208463
QC - Area 12	TB-1-1A-10022023	10/2/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208463
QC - Area 12	FB-1-1A-11012023	11/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209896
QC - Area 12	TB-1-1A-11012023	11/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209896
QC - Area 12	FB-1-1A-12012023	12/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211200
QC - Area 12	TB-1-1A-12012023	12/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211200
QC - NGTF	TB	1/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195595
QC - NGTF	TB	1/9/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195925
QC - NGTF	TB	1/17/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-196475
QC - NGTF	TB	1/23/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-196697
QC - NGTF	TB	1/30/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-197002
QC - NGTF	TB	2/6/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-197326
QC - NGTF	TB	2/13/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-197733
QC - NGTF	TB	2/21/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198119
QC - NGTF	TB	2/27/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198349
QC - NGTF	TB	3/6/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198707
QC - NGTF	TB	3/13/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-199113
QC - NGTF	TB	3/20/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-199434
QC - NGTF	TB	3/27/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-199742
QC - NGTF	TB	4/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200043
QC - NGTF	TB	4/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200485
QC - NGTF	TB	4/17/2023	TB	<0.50	<0.50 (6)	<0.50	<0.50	<0.50	550-200848
QC - NGTF	TB	4/24/2023	TB	<0.50	<0.50 (7)	<0.50	<0.50	<0.50	550-201200
QC - NGTF	TB	5/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-201549
QC - NGTF	TB	5/8/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-201902
			Lab Dup	<0.50 (1),(8),(B)	<0.50 (1),(8),(B)	<0.50 (1),(8),(B)	<0.50 (1),(8),(B)	<0.50 (1),(8),(B)	
QC - NGTF	TB	5/15/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-202233
QC - NGTF	TB	5/22/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-202544
QC - NGTF	TB	5/30/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-202798

Table C-3. 2023 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 - NGTF	TB	6/8/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-203279
QC - NGTF	TB	6/12/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-203386
QC - NGTF	TB	6/20/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-203699
QC - NGTF	TB	6/26/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-203893
QC - NGTF	TB	7/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204176
QC - NGTF	TB	7/10/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204506
QC - NGTF	TB	7/19/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205175
QC - NGTF	TB	7/24/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205299
QC - NGTF	TB	7/31/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205649
QC - NGTF	TB	8/7/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-206024
QC - NGTF	TB	8/14/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-206339
QC - NGTF	TB	8/21/2023	TB	<0.50	<0.50 (4),(9),(10)	<0.50	<0.50	<0.50	550-206636
QC - NGTF	TB	8/28/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-206952
QC - NGTF	TB	9/5/2023	TB	<0.50	<0.50 (4),(11),(12)	<0.50	<0.50	<0.50	550-207257
QC - NGTF	TB	9/28/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208411
QC - NGTF	TB	10/2/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208470
QC - NGTF	TB	10/9/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208830
QC - NGTF	TB	10/16/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209172
QC - NGTF	TB	10/23/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209522
QC - NGTF	TB	10/30/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209814
QC - NGTF	TB	11/6/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-210066
QC - NGTF	TB	11/13/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-210457
QC - NGTF	TB	11/20/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-210806
QC - NGTF	TB	11/27/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-210989
QC - NGTF	TB	12/4/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211246
QC - NGTF	TB	12/11/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211595
QC - NGTF	TB	12/18/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211869
QC - NGTF	TB	12/26/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-212132
QC-TS (A)	FB-2-1A-01032023	1/3/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195607
QC-TS (A)	TB-2-1A-01032023	1/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-195607
QC-TS (A)	FB-2-1A-02012023	2/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-197107
QC-TS (A)	TB-2-1A-02012023	2/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-197107
QC-TS (A)	FB-2-1A-03022023	3/2/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198542
QC-TS (A)	TB-2-1A-03022023	3/2/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-198542
QC-TS (A)	FB-2-1A-04032023	4/3/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200036
QC-TS (A)	TB-2-1A-04032023	4/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-200036
QC-TS (A)	FB-2-1A-05012023	5/1/2023	FB	<0.50	<0.50 (5)	<0.50	<0.50	<0.50	550-201526
QC-TS (A)	TB-2-1A-05012023	5/1/2023	TB	<0.50	<0.50 (5)	<0.50	<0.50	<0.50	550-201526
QC-TS (A)	FB-2-1A-06012023	6/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-202906
QC-TS (A)	TB-2-1A-06012023	6/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-202906
QC-TS (A)	FB-2-1A-06062023	6/6/2023	FB	<0.500	<0.500	<0.500	<0.500	<0.500	L1623313
QC-TS (A)	TB-2-1A-06062023	6/6/2023	TB	<0.500	<0.500	<0.500	<0.500	<0.500	L1623313
QC-TS (A)	FB-2-1A-07032023	7/3/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204145
QC-TS (A)	TB-2-1A-07032023	7/3/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-204145
QC-TS (A)	FB-2-1A-08012023	8/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205699
QC-TS (A)	TB-2-1A-08012023	8/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-205699
QC-TS (A)	FB-2-1A-09012023	9/1/2023	FB	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	550-207187
QC-TS (A)	TB-2-1A-09012023	9/1/2023	TB	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	<0.50 (4)	550-207187
QC-TS (A)	FB-2-1A-10022023	10/2/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208464
QC-TS (A)	TB-2-1A-10022023	10/2/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-208464
QC-TS (A)	FB-2-1A-1112023	11/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209895

Table C-3. 2023 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 (A)	TB-2-1A-1112023	11/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-209895
QC-TS (A)	FB-2-1A-12012023	12/1/2023	FB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211182
QC-TS (A)	TB-2-1A-12012023	12/1/2023	TB	<0.50	<0.50	<0.50	<0.50	<0.50	550-211182

EXPLANATION:

TCA = 1,1,1-Trichloroethane
DCE = 1,1-Dichloroethene
TCM = Chloroform
PCE = Tetrachloroethene
TCE = Trichloroethene
AZCO = Arizona Canal Outfall
CP = Chaparral Compliance Point
FB = Field Blank
GWETS = Groundwater Extraction and Treatment System

ID = Identifier
MRTF = Miller Road Treatment Facility
NGTF = NIBW Granular Activated Carbon Treatment Facility
RPD = Relative Percent Difference
QC = Quality Control
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.

(B) Q2 report was issued without re-analysis results and correct footnotes.

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

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

(2) L4 Flag: The associated blank spike recovery was below method acceptance limits.

(3) R6 Flag: LFB/LFBD RPD exceeded method control limit. Recovery met acceptance criteria.

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

(5) N1 Flag: The initial calibration verification (ICV) result for batch 550-299631 was above the upper control limit for 1,1-Dichloroethene. Sample results were non-detects and have been reported as N1 qualified data.

(6) N1 Flag: The initial calibration verification (ICV) result for batch 550-299356 was above the upper control limit for 1,1-Dichloroethene. Sample results were non-detects and have been reported as N1 qualified data.

(7) N1 Flag: The initial calibration verification (ICV) result for batch 550-299462 was above the upper control limit for 1,1-Dichloroethene. Sample results were non-detects and have been reported as N1 qualified data.

(8) N1 Flag: The following sample required confirmation (CON) per the client's request; T 1-A lag (550-201902-1), T 1-B lead (550-201902-2), T 3-A lead (550-201902-5), T 3-B lag (550-201902-6), NGTF-CP (550-201902-7) and TB (550-201902-8). The reanalyzed result confirmed with the original reported data. As such, the reanalyzed result has been qualified with an N1 flag.

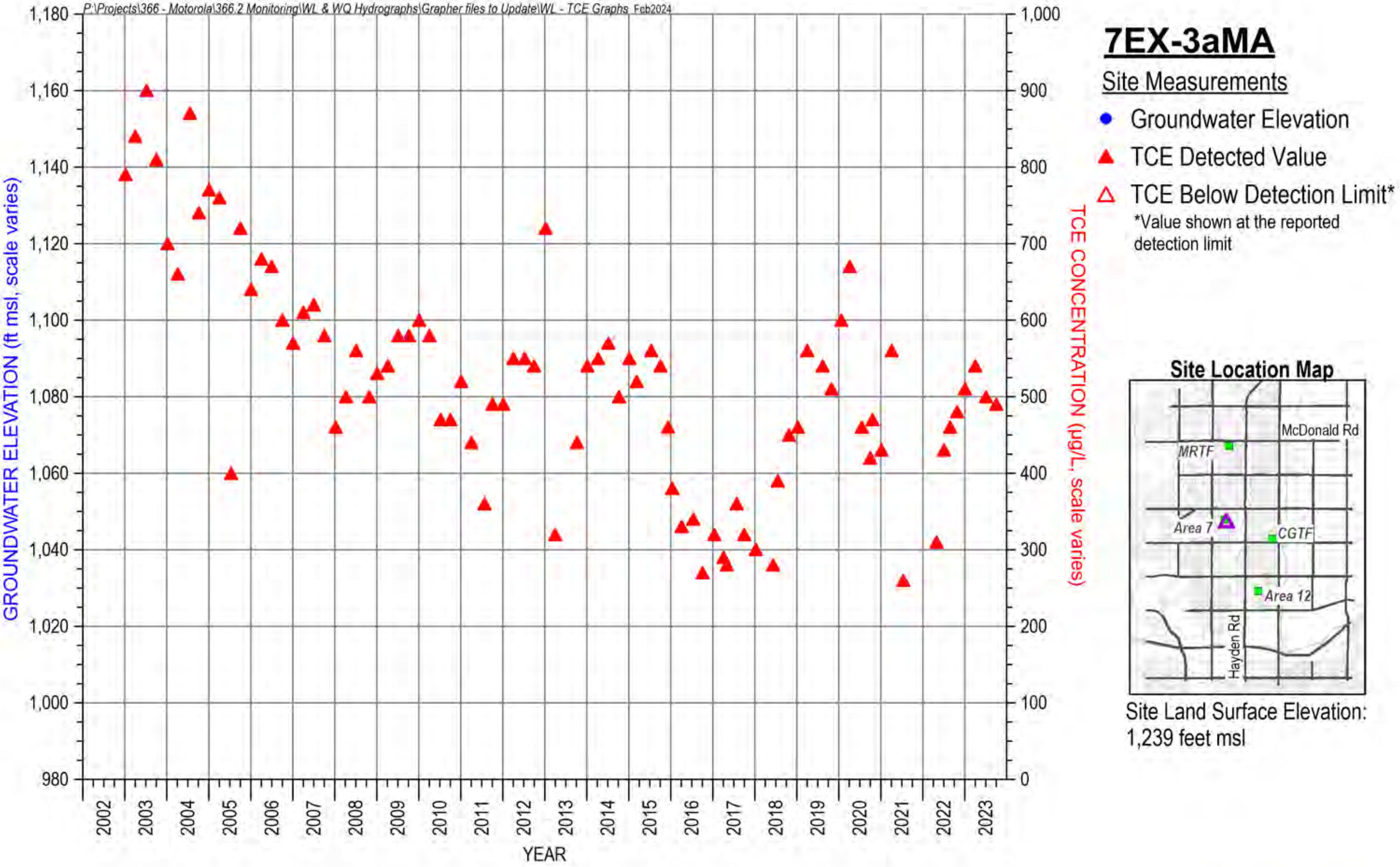
(9) N1 Flag: The initial calibration verification (ICV) result for batch 550-306279 was above the upper control limit for 1,1-Dichloroethene. Sample results were non-detects, and have been reported as N1 qualified data.

(10) V1 Flag: CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

(11) N1 Flag: The initial calibration verification (ICV) result for batch 550-307247 was above the upper control limit for 1,1-Dichloroethene. Sample results were non-detects and have been reported as N1 qualified data.

(12) R1 Flag: RPD/RSD exceeded the method acceptance limit. See case narrative.

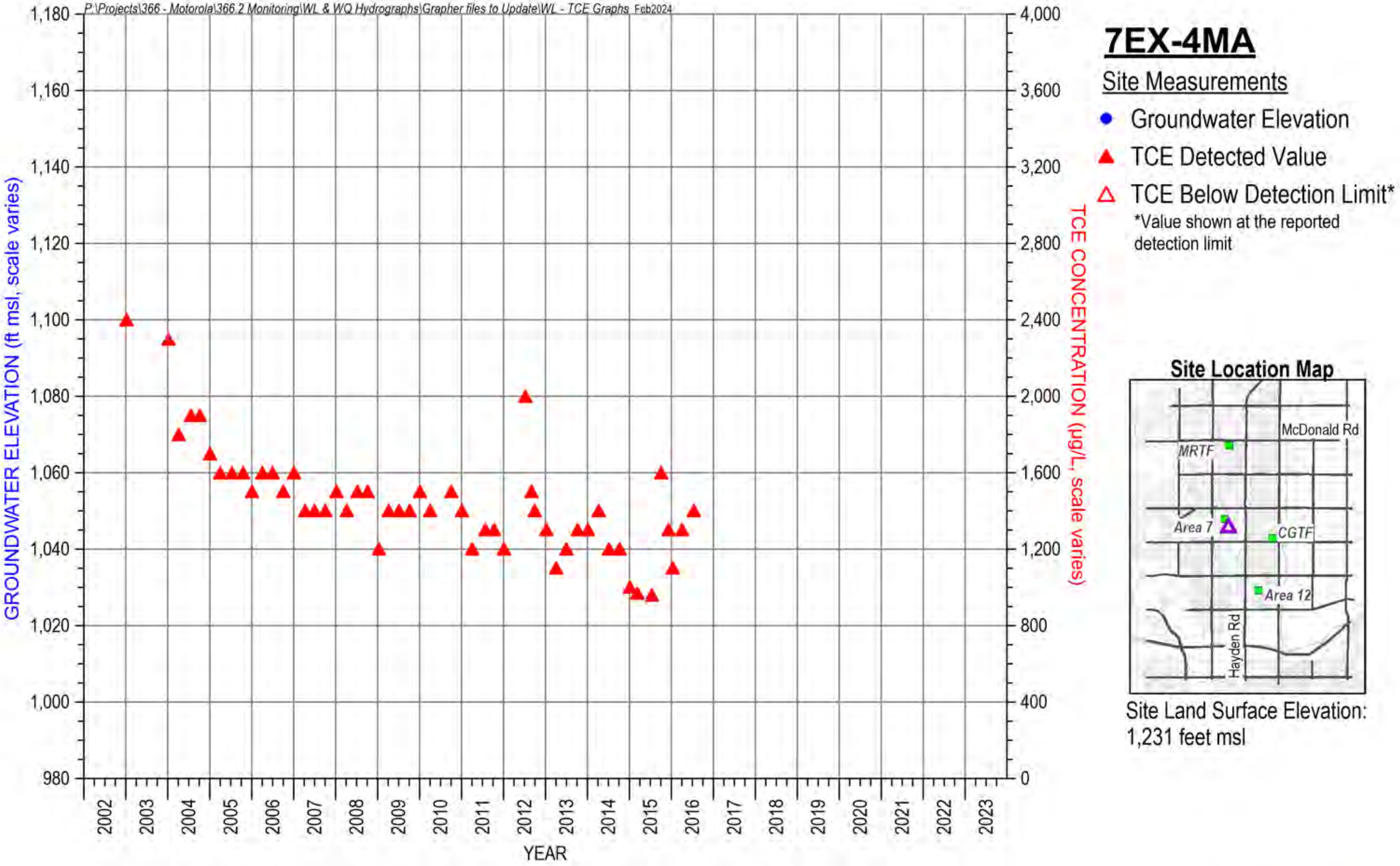
APPENDIX D
WATER LEVEL/TCE TIME-SERIES HYDROGRAPHS FOR NIBW WELLS



Site Land Surface Elevation:
1,239 feet msl

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

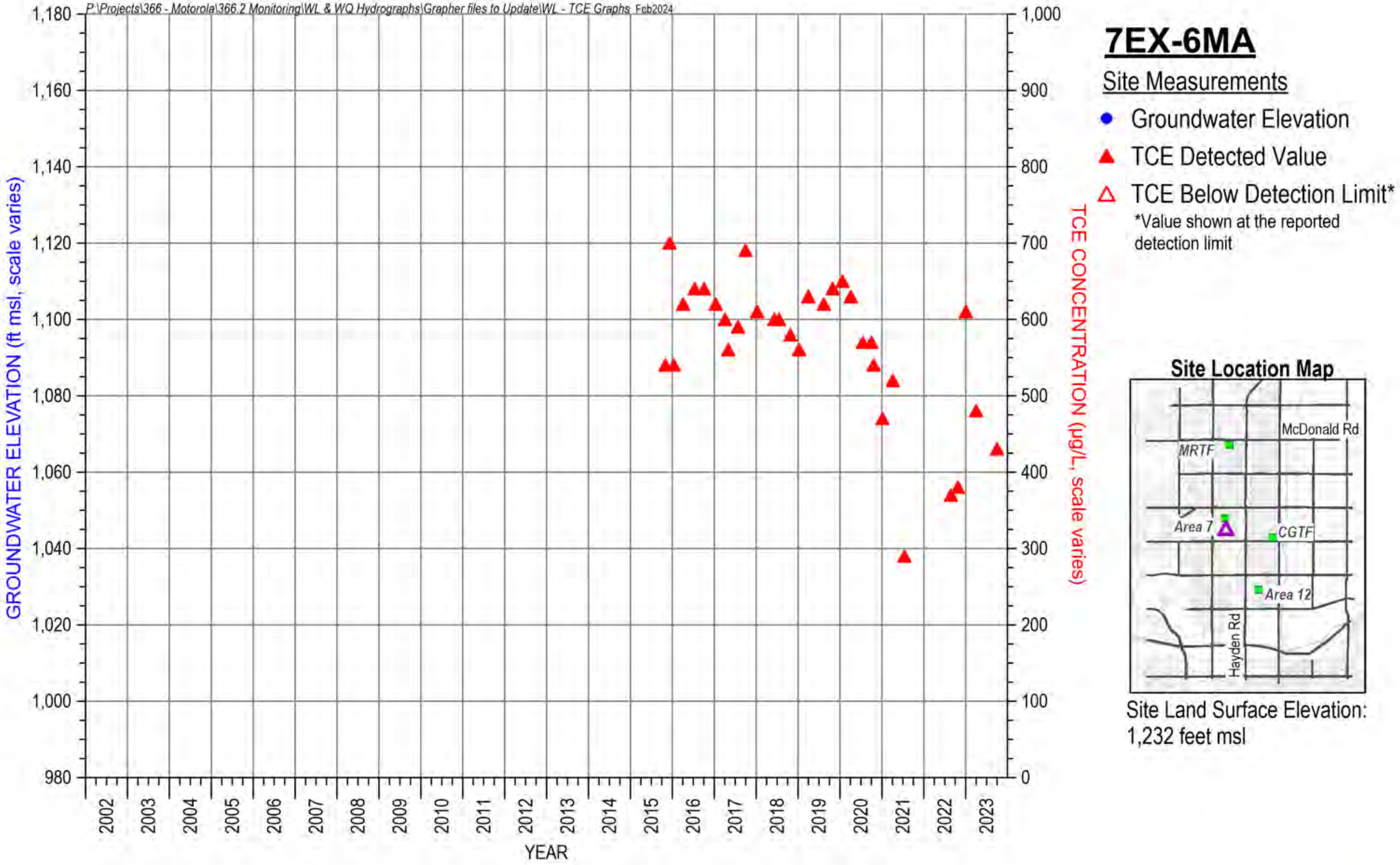
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,231 feet msl

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

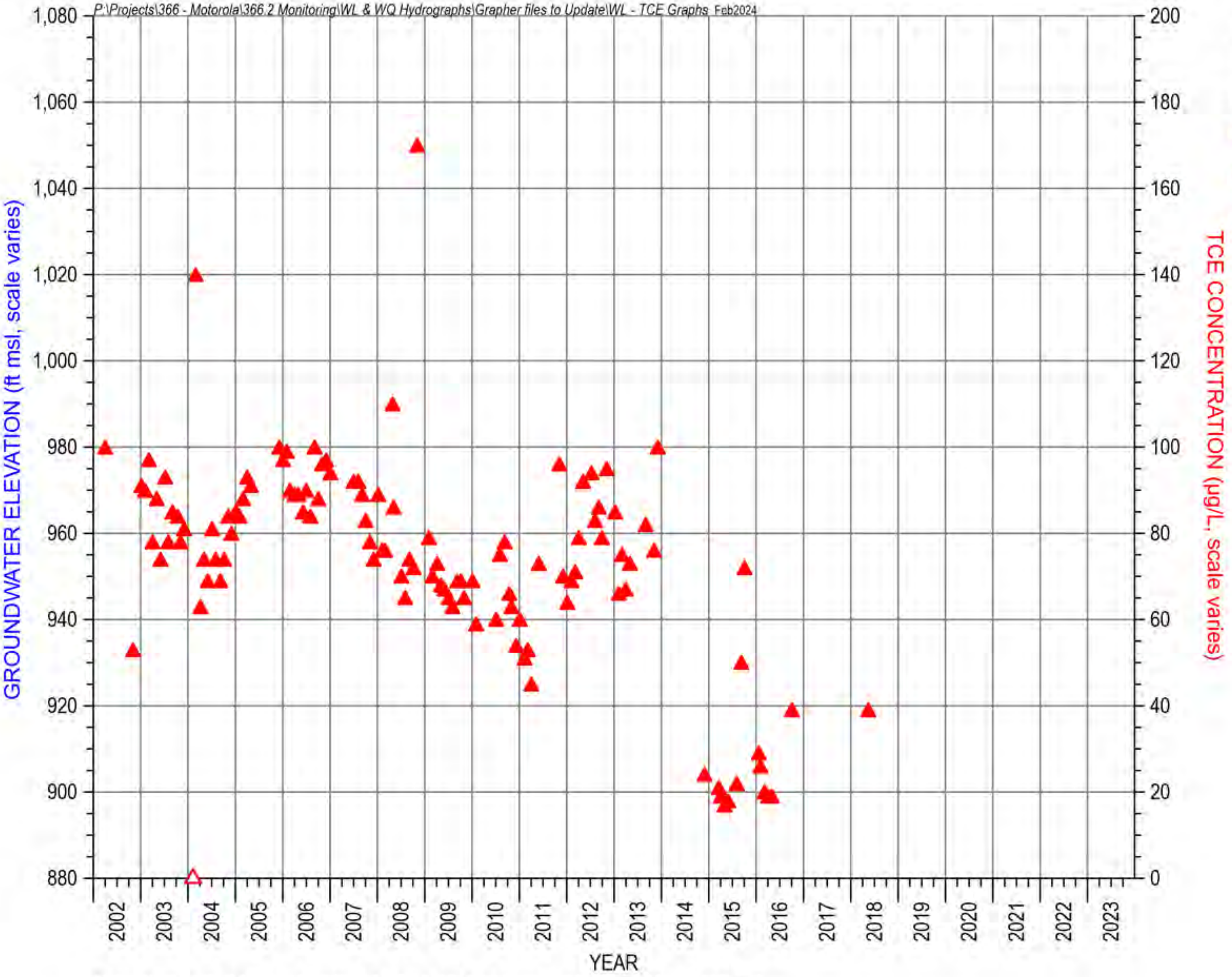
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,232 feet msl

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.

COS-71/COS-71A

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

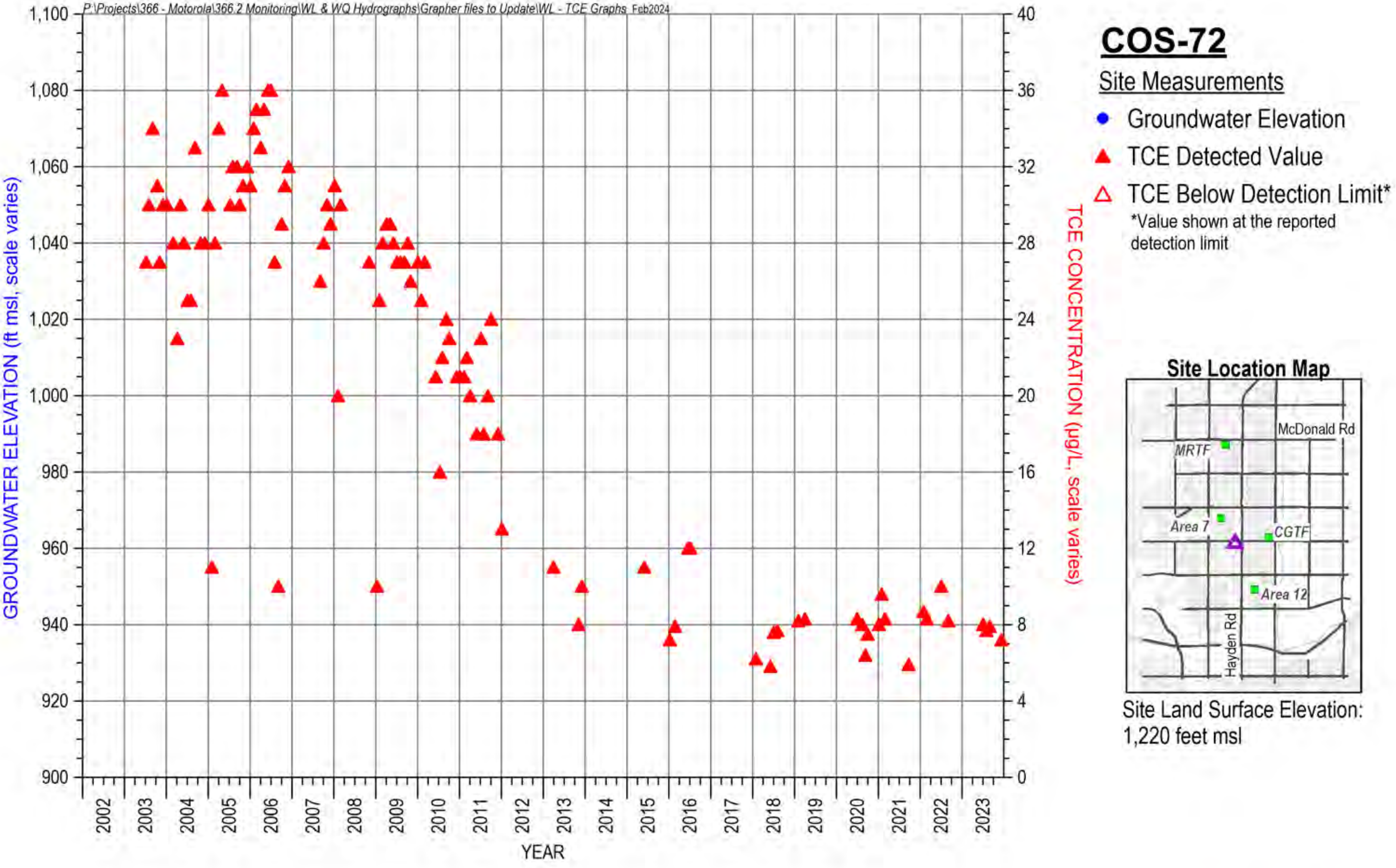
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,229 feet msl

North Indian Bend Wash Superfund Site

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

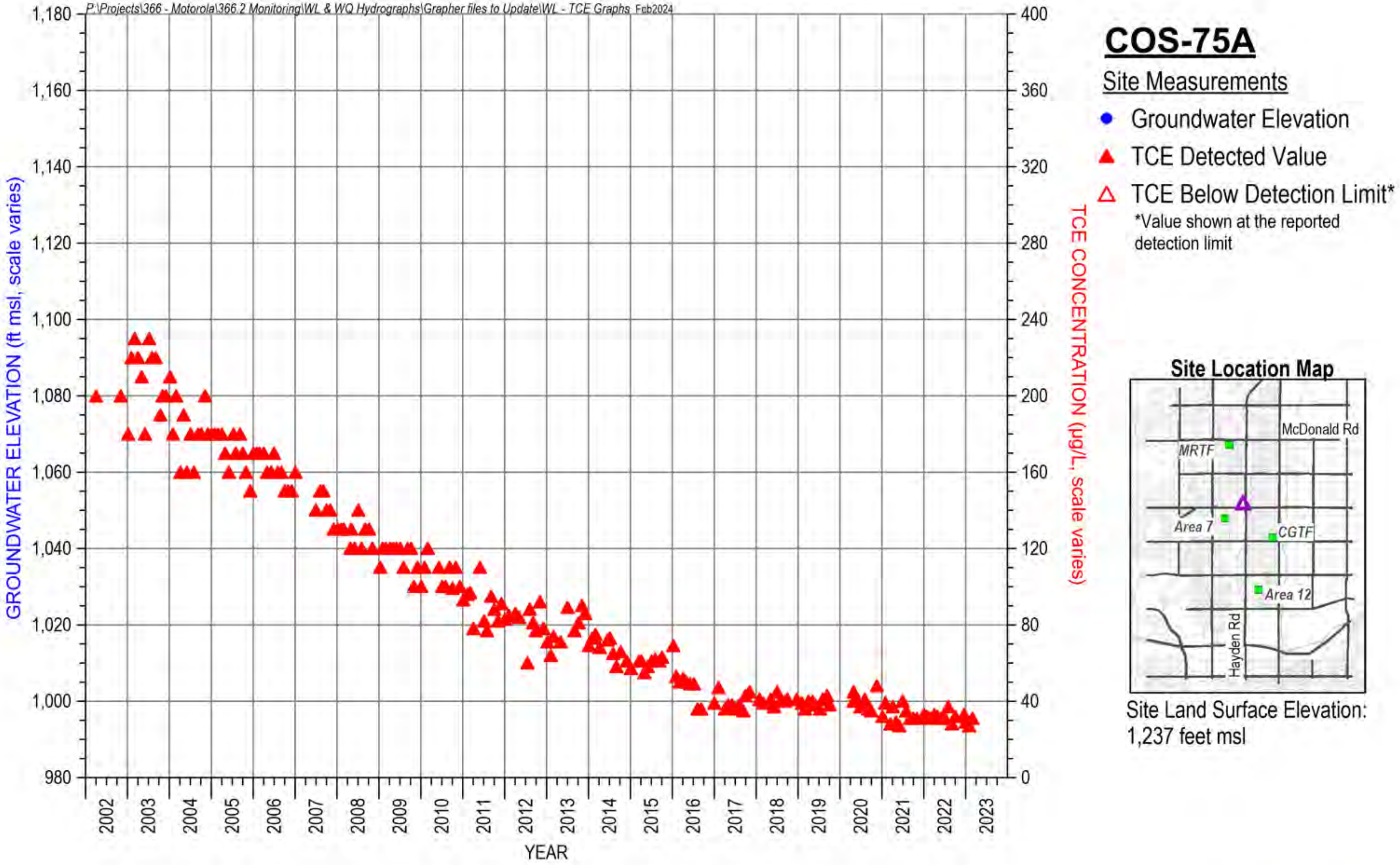


FIGURE D-006. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL COS-75A

North Indian Bend Wash Superfund Site

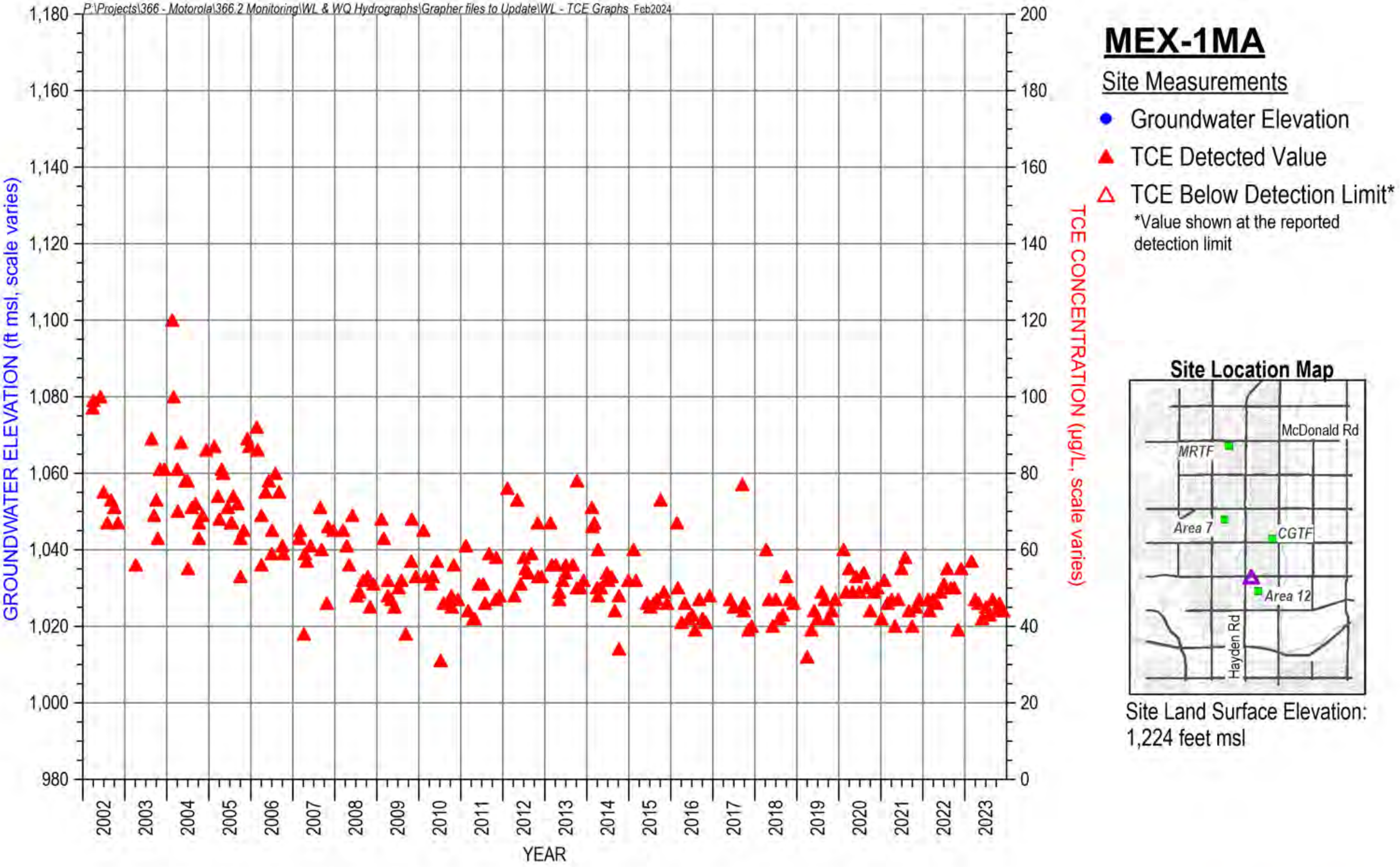
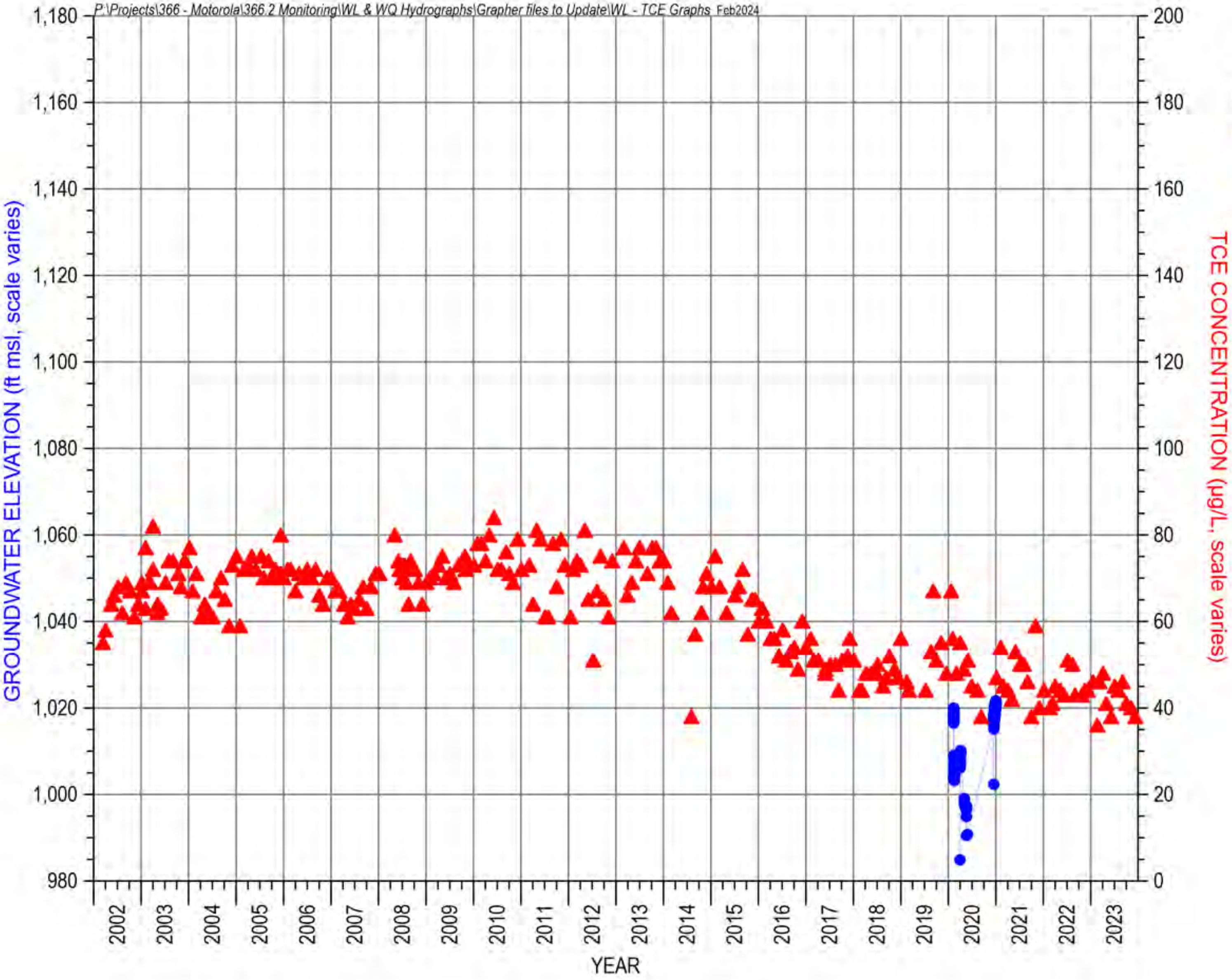


FIGURE D-007. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR EXTRACTION WELL MEX-1MA

North Indian Bend Wash Superfund Site



PCX-1

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

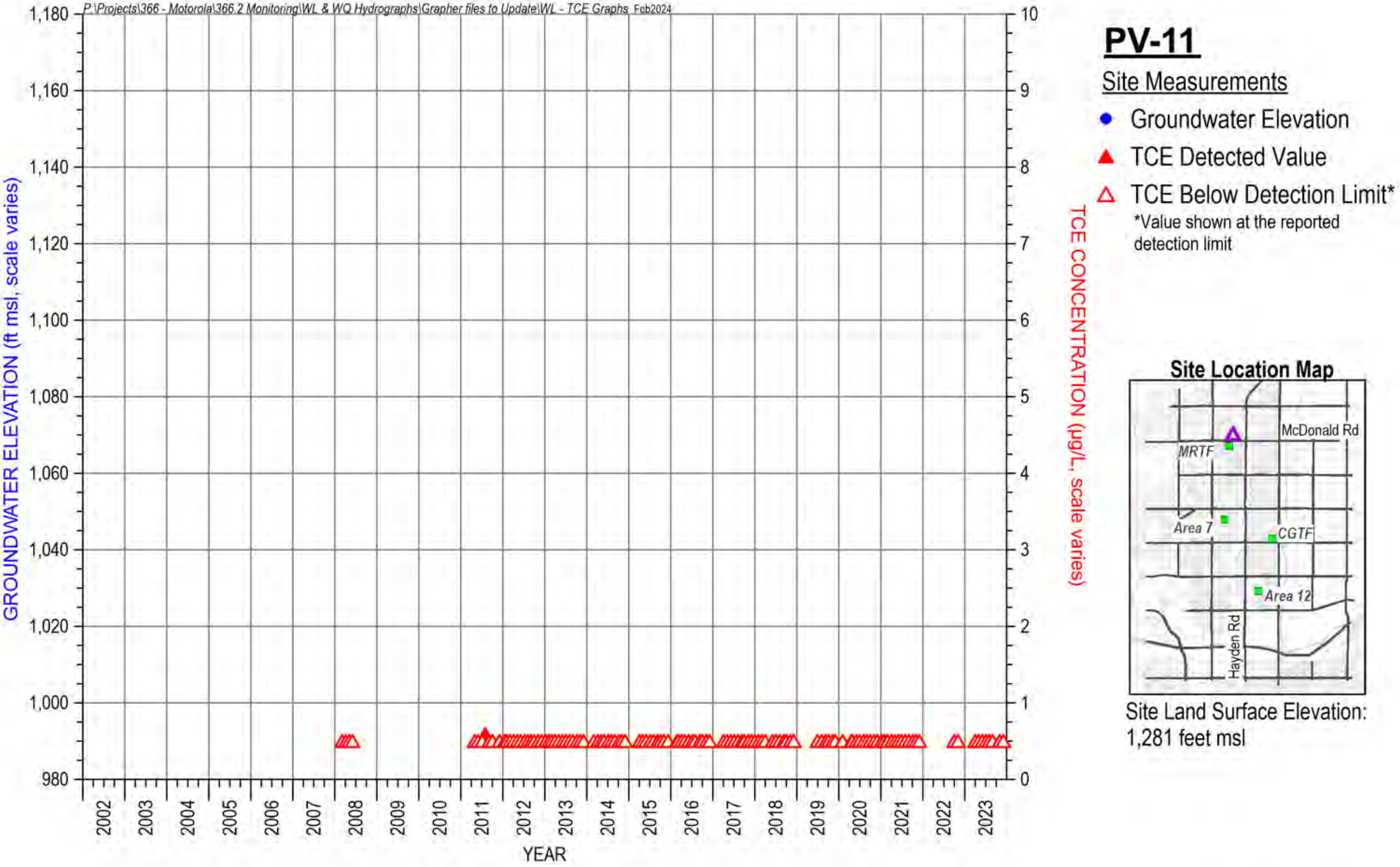
*Value shown at the reported detection limit

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

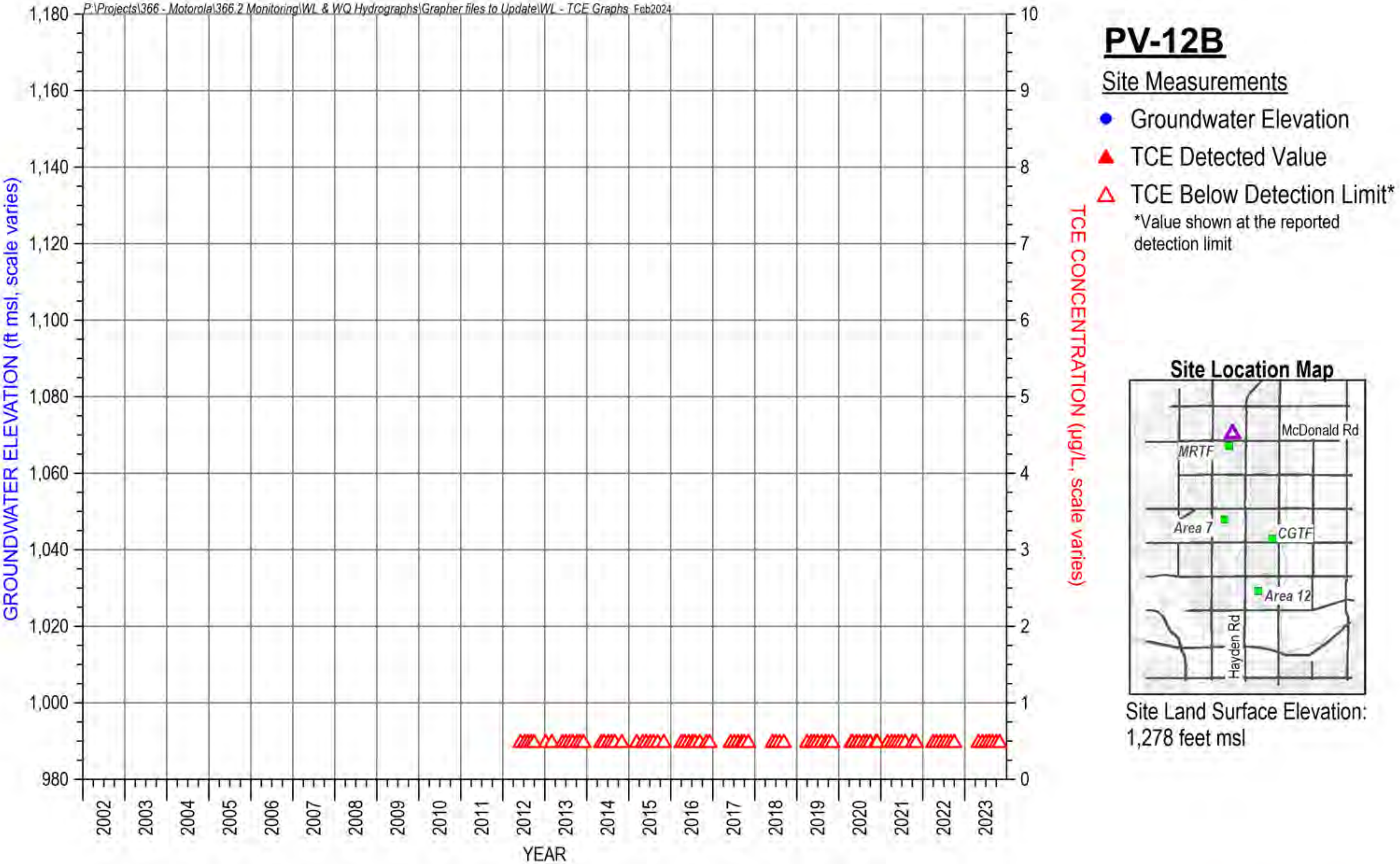
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,281 feet msl

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

North Indian Bend Wash Superfund Site

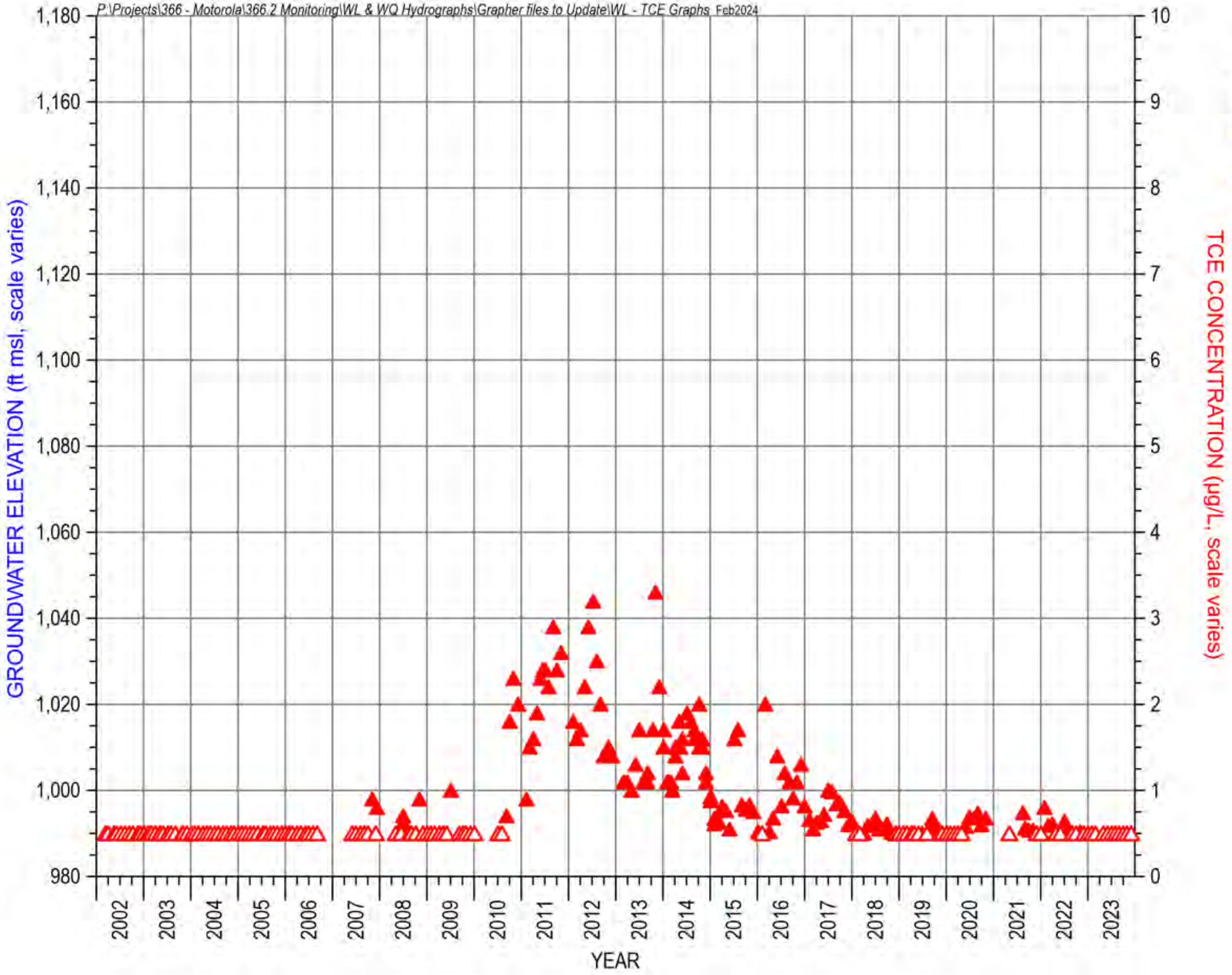


Site Land Surface Elevation:
1,278 feet msl

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

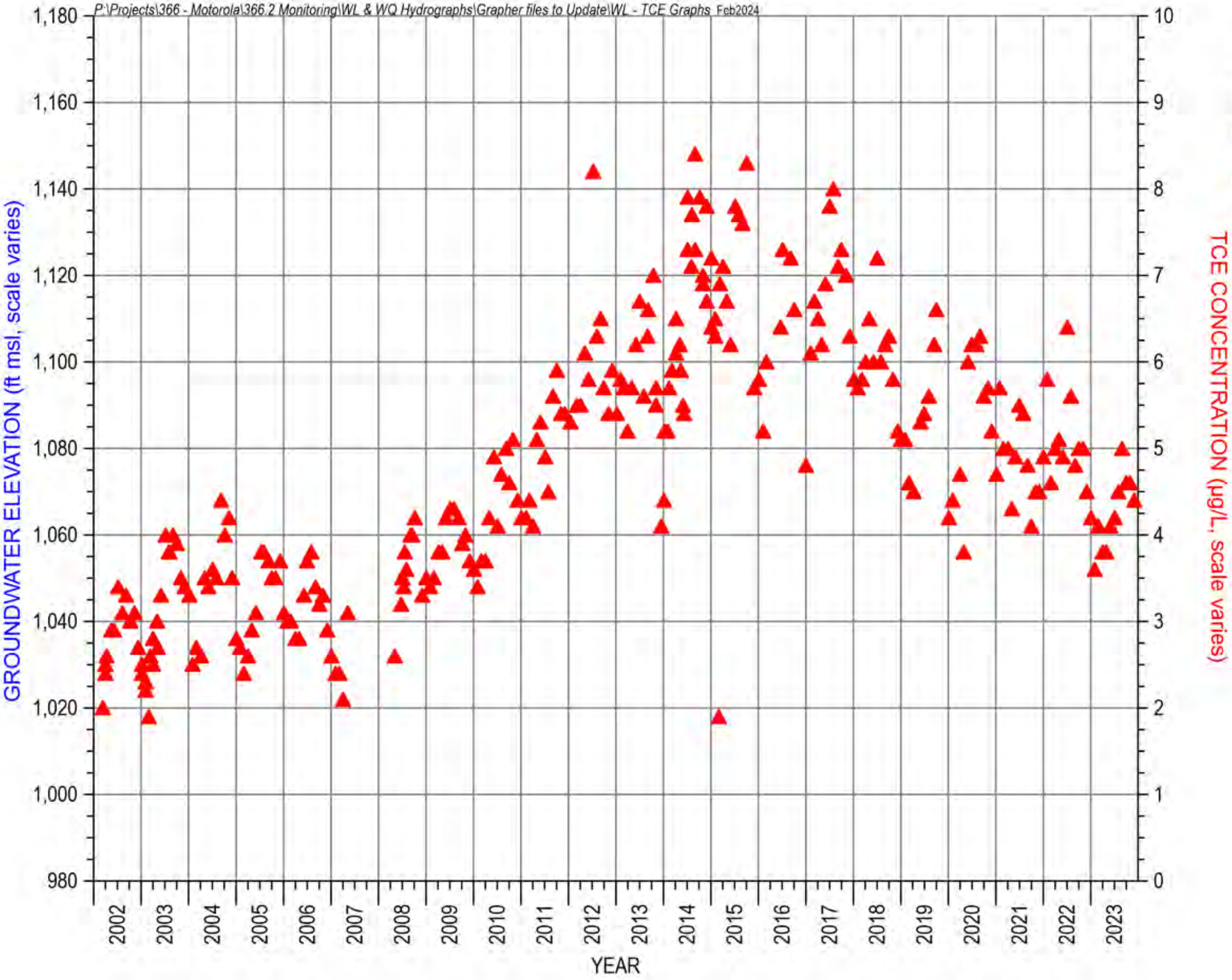
- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,280 feet msl

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

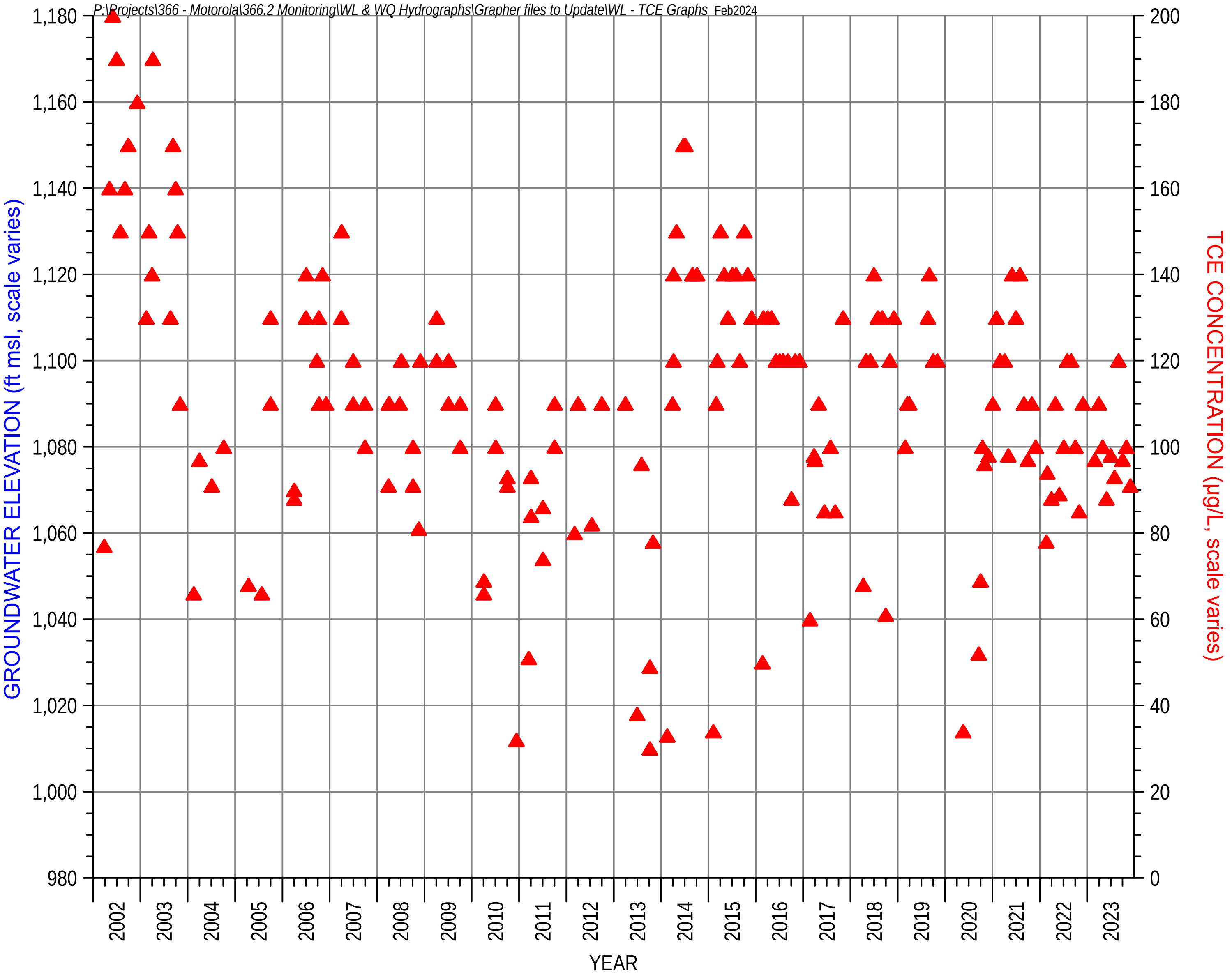
Site Location Map

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

SRP23.6E6N (Granite Reef)



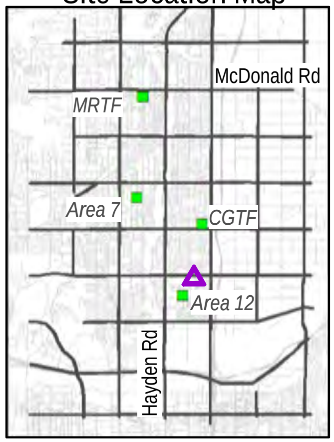
● Groundwater Elevation

▲ TCE Detected Value

△ TCE Below Detection Limit*

*Value shown at the reported detection limit

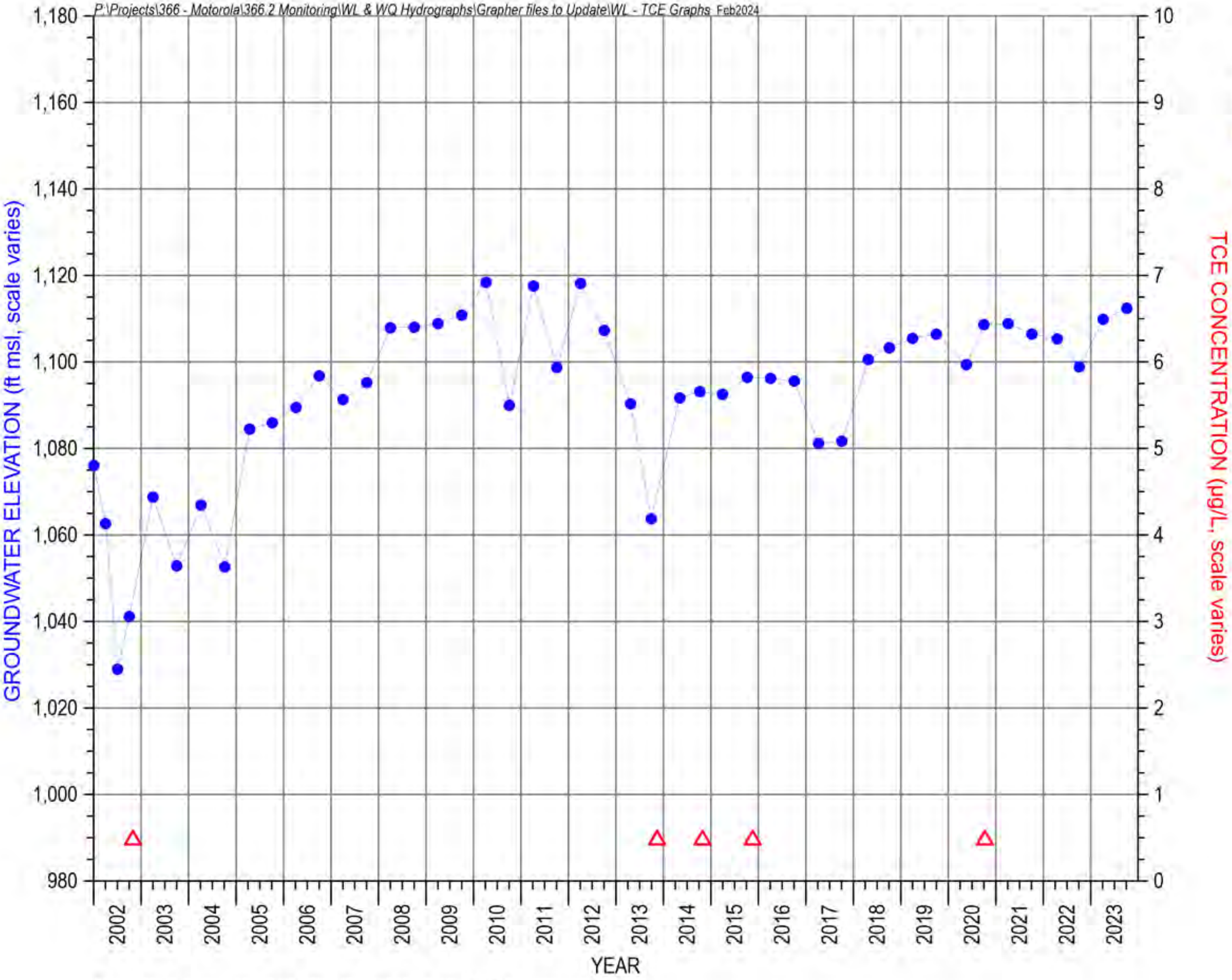
Site Location Map



Site Land Surface Elevation:
1,211 feet msl

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)



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

B-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:
1,190 feet msl

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

North Indian Bend Wash Superfund Site

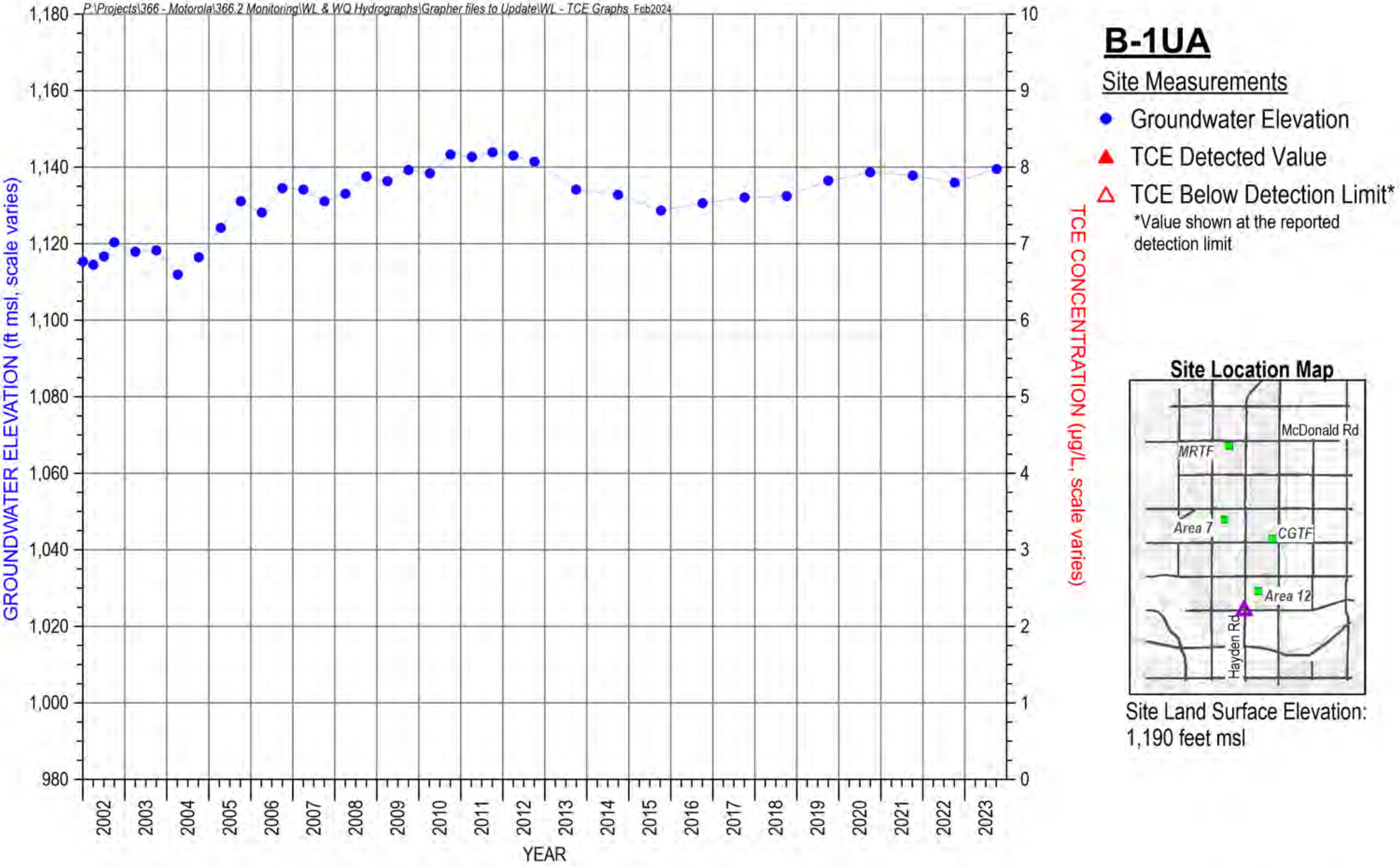
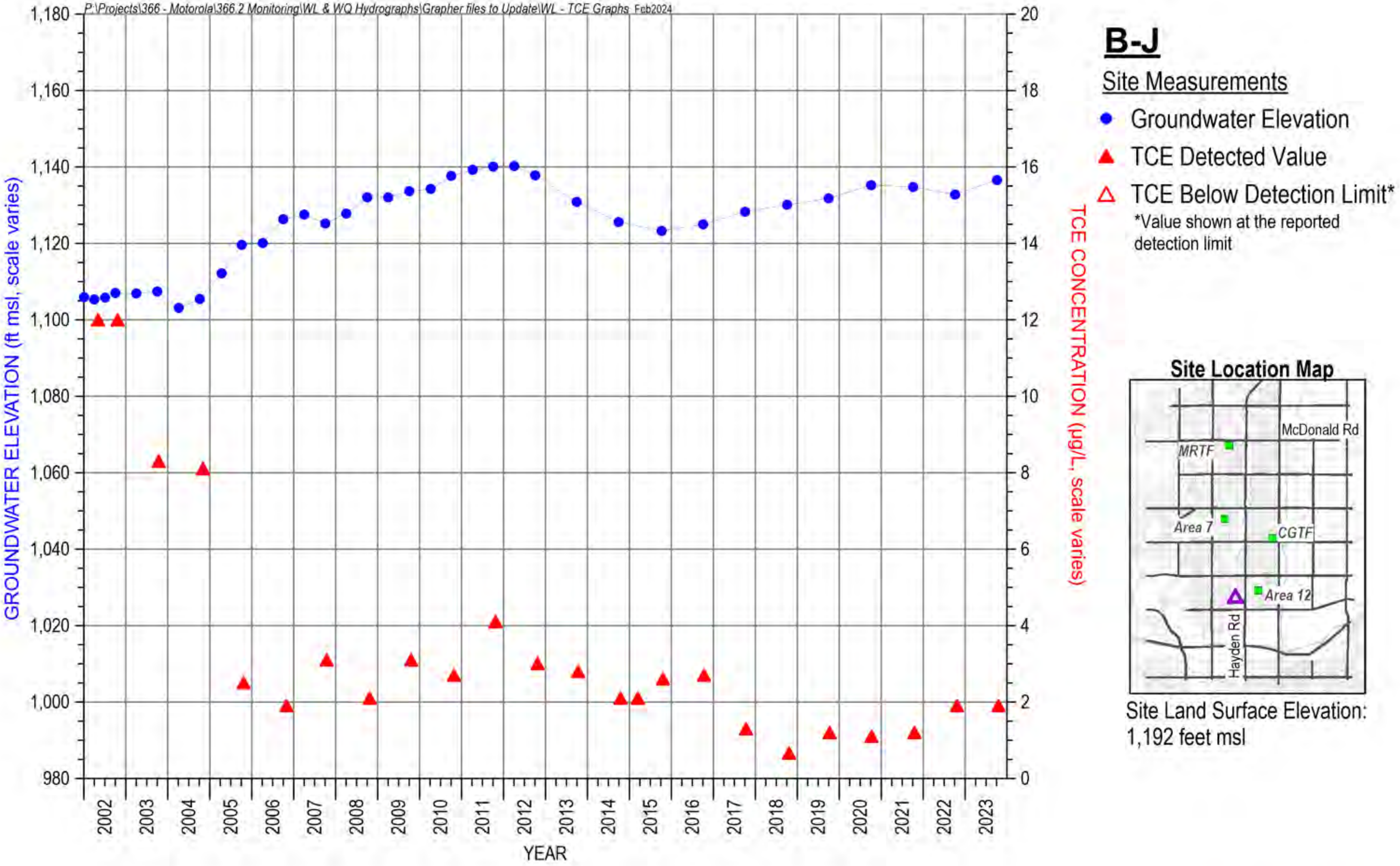


FIGURE D-015. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL B-1UA

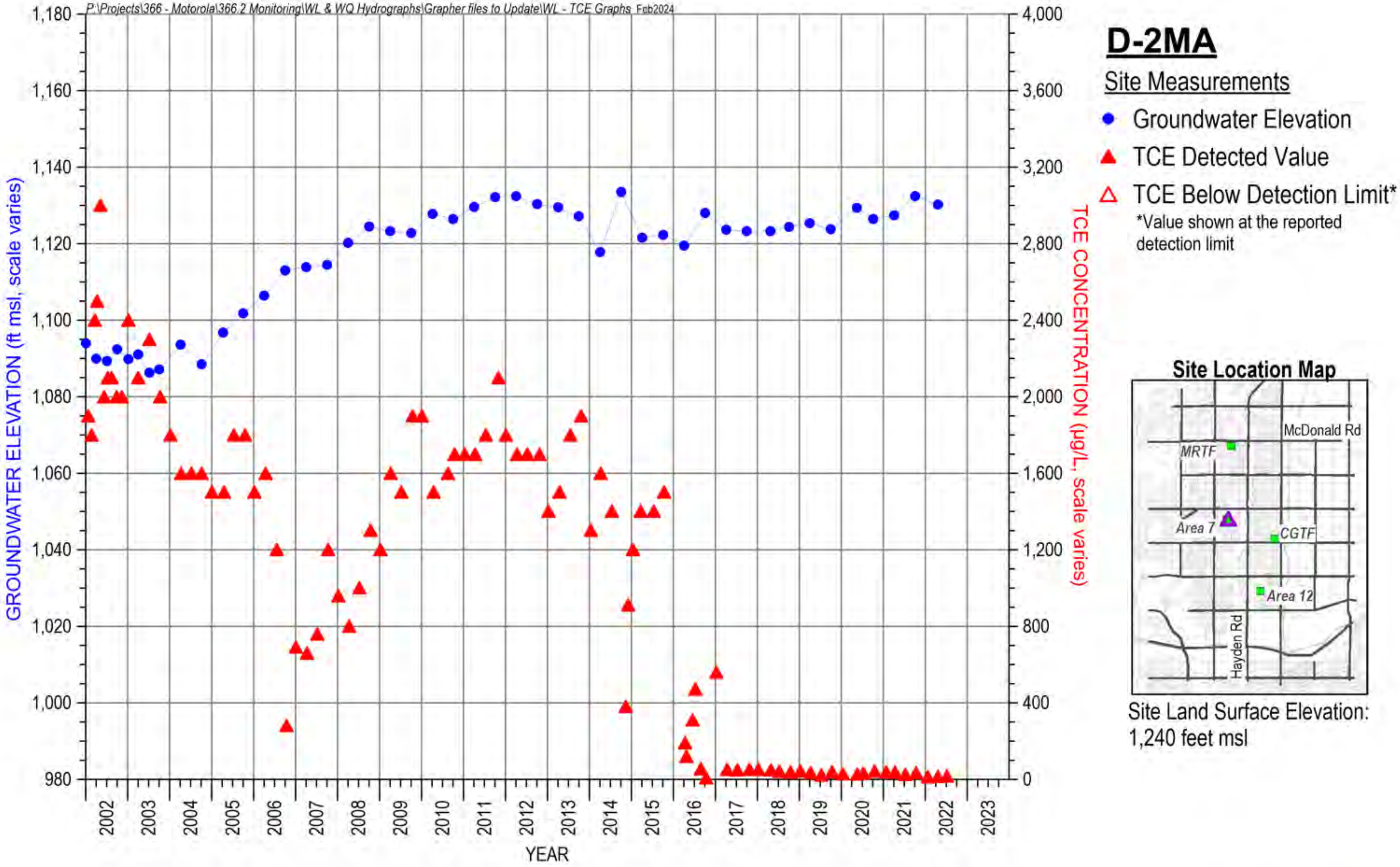
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,192 feet msl

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

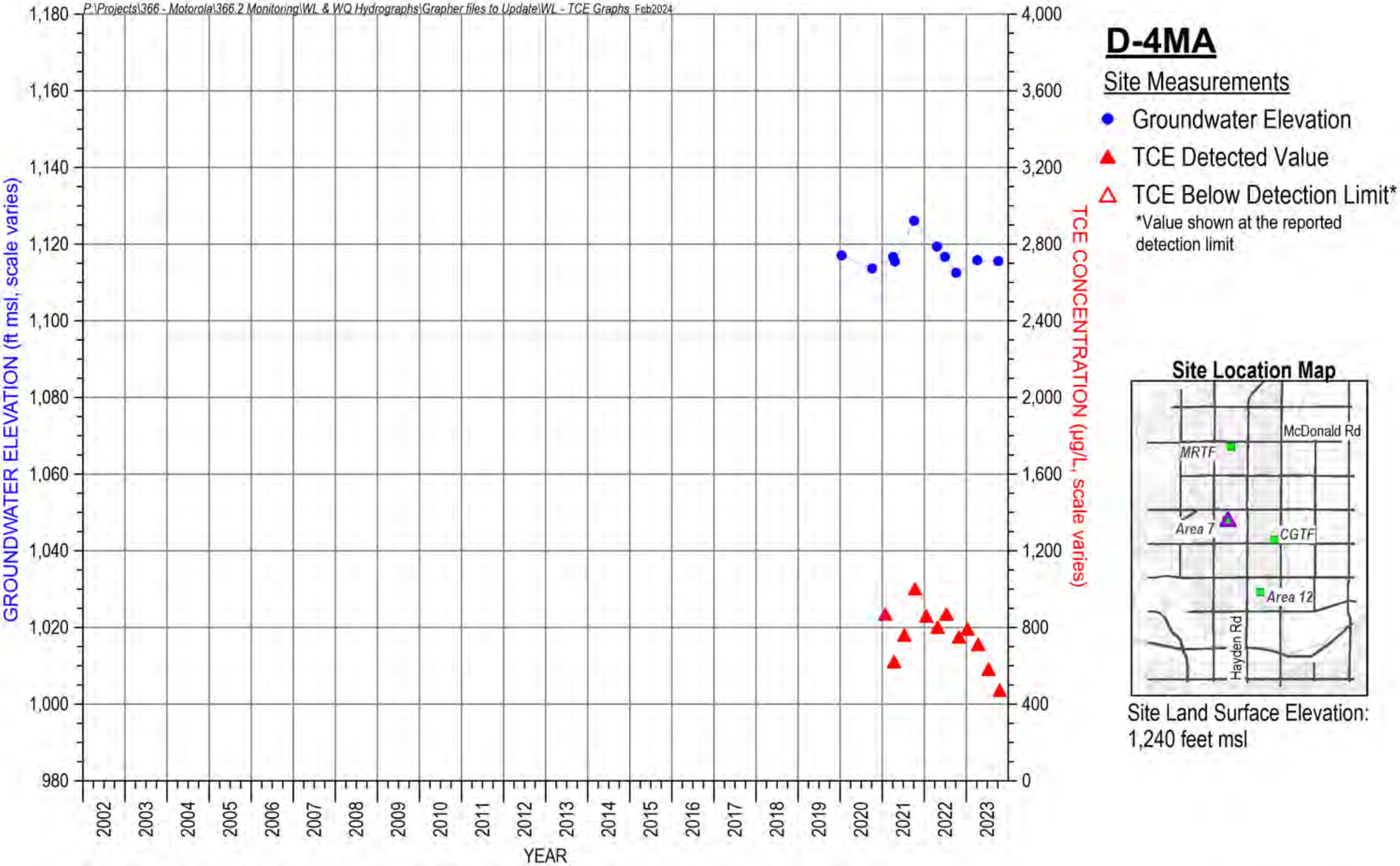
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,240 feet msl

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

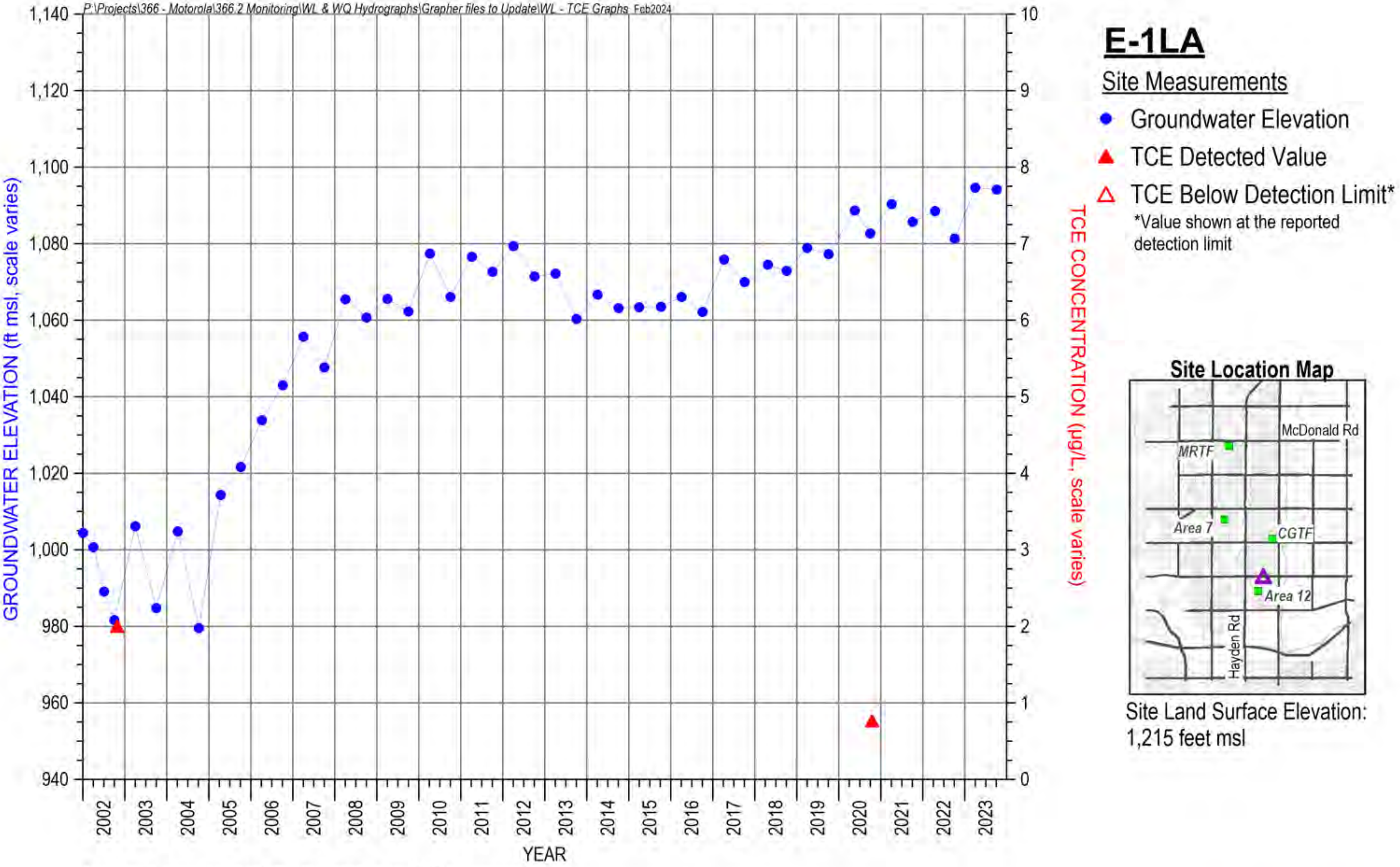
North Indian Bend Wash Superfund Site



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

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

North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,215 feet msl

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

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

North Indian Bend Wash Superfund Site

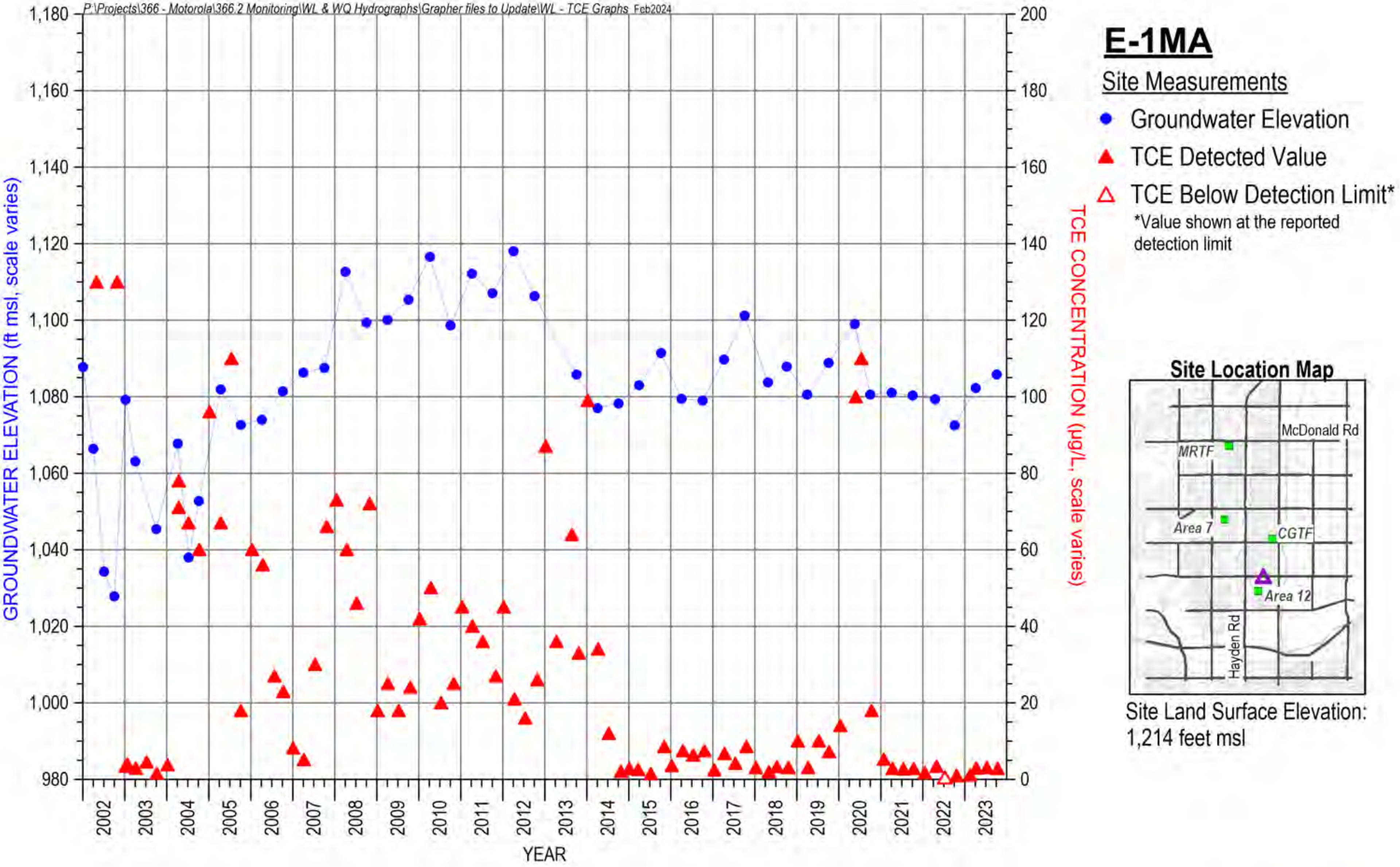


FIGURE D-020. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-1MA

North Indian Bend Wash Superfund Site

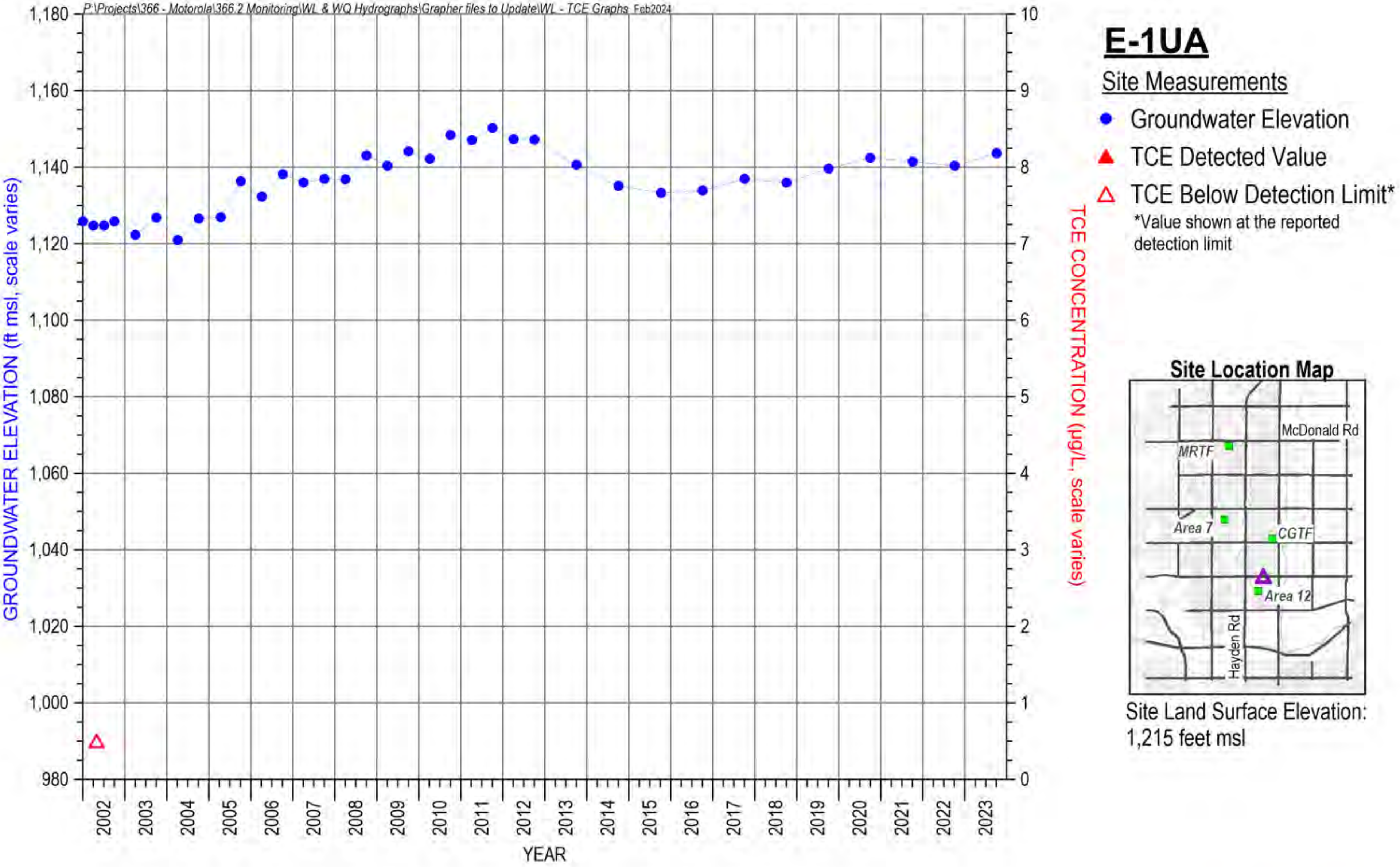


FIGURE D-021. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-1UA

North Indian Bend Wash Superfund Site

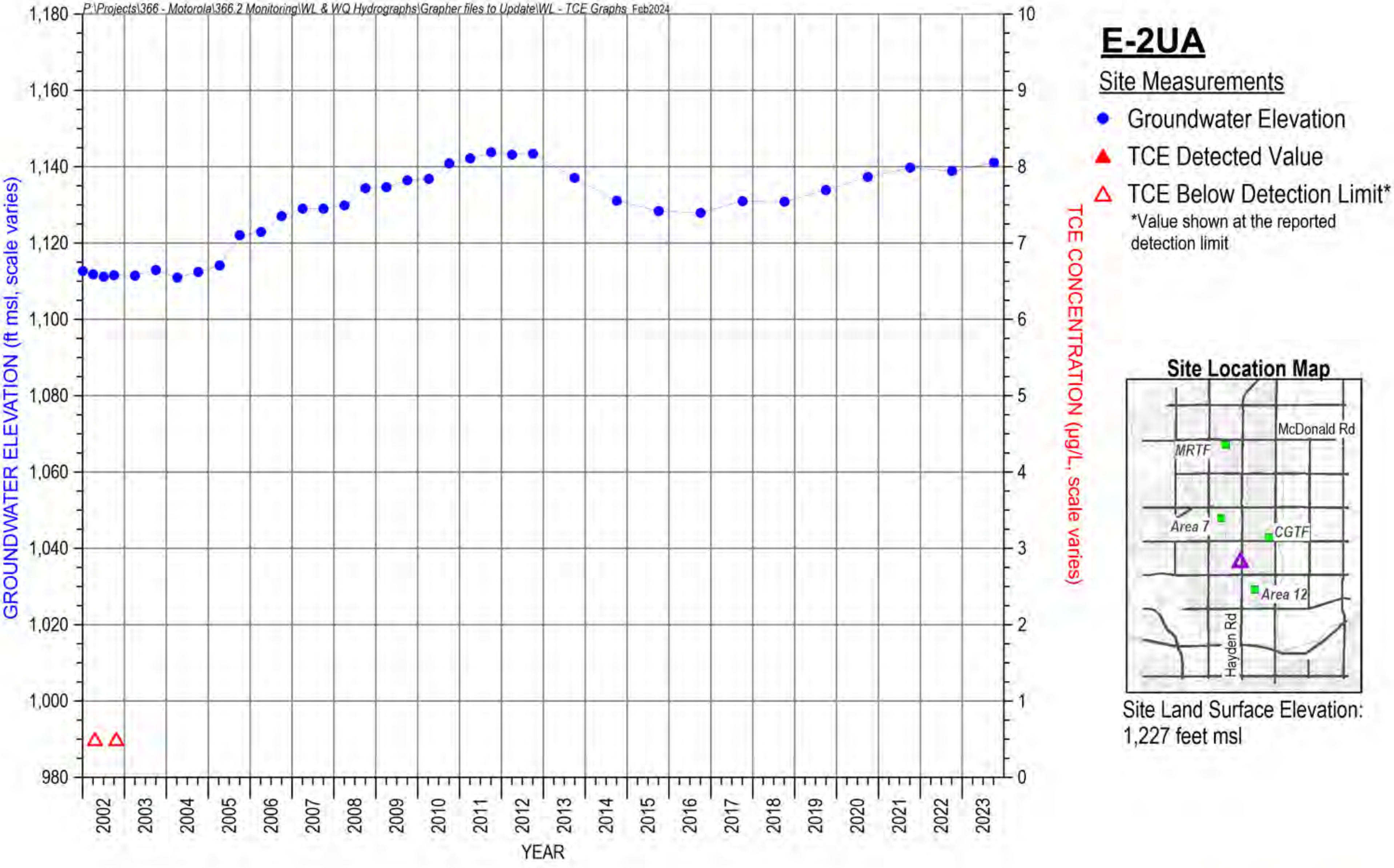


FIGURE D-022. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-2UA

North Indian Bend Wash Superfund Site

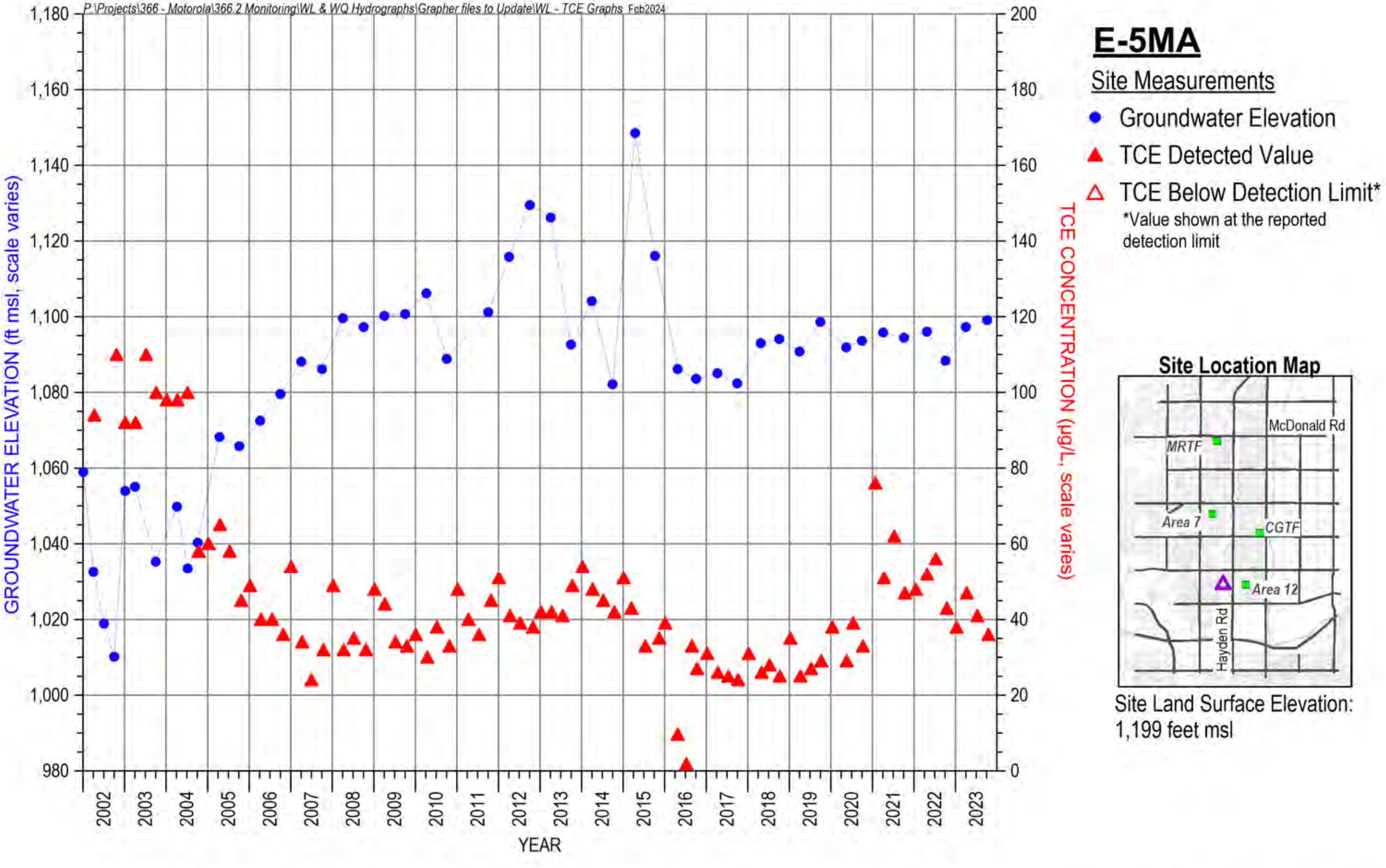


FIGURE D-023. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-5MA

North Indian Bend Wash Superfund Site

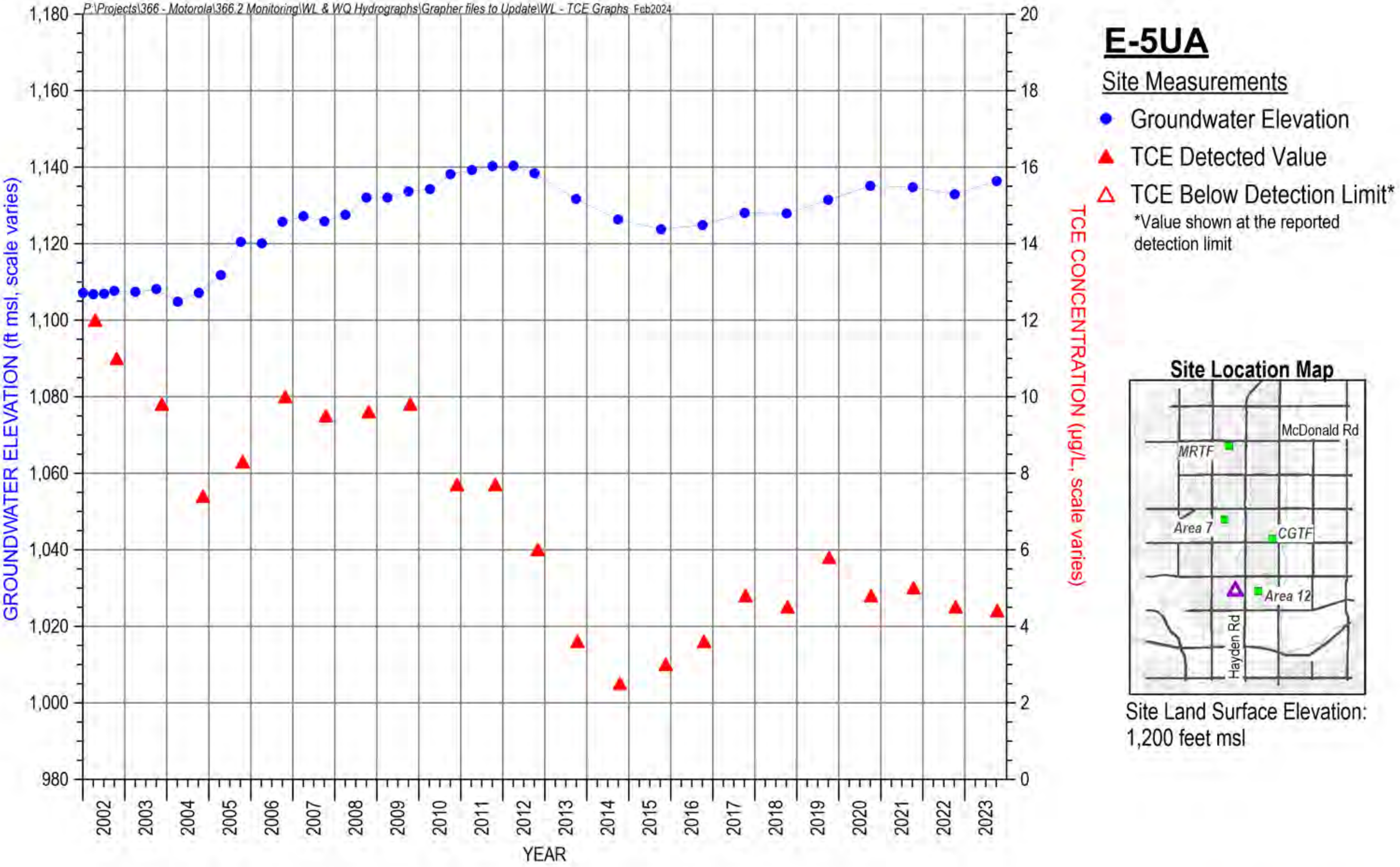
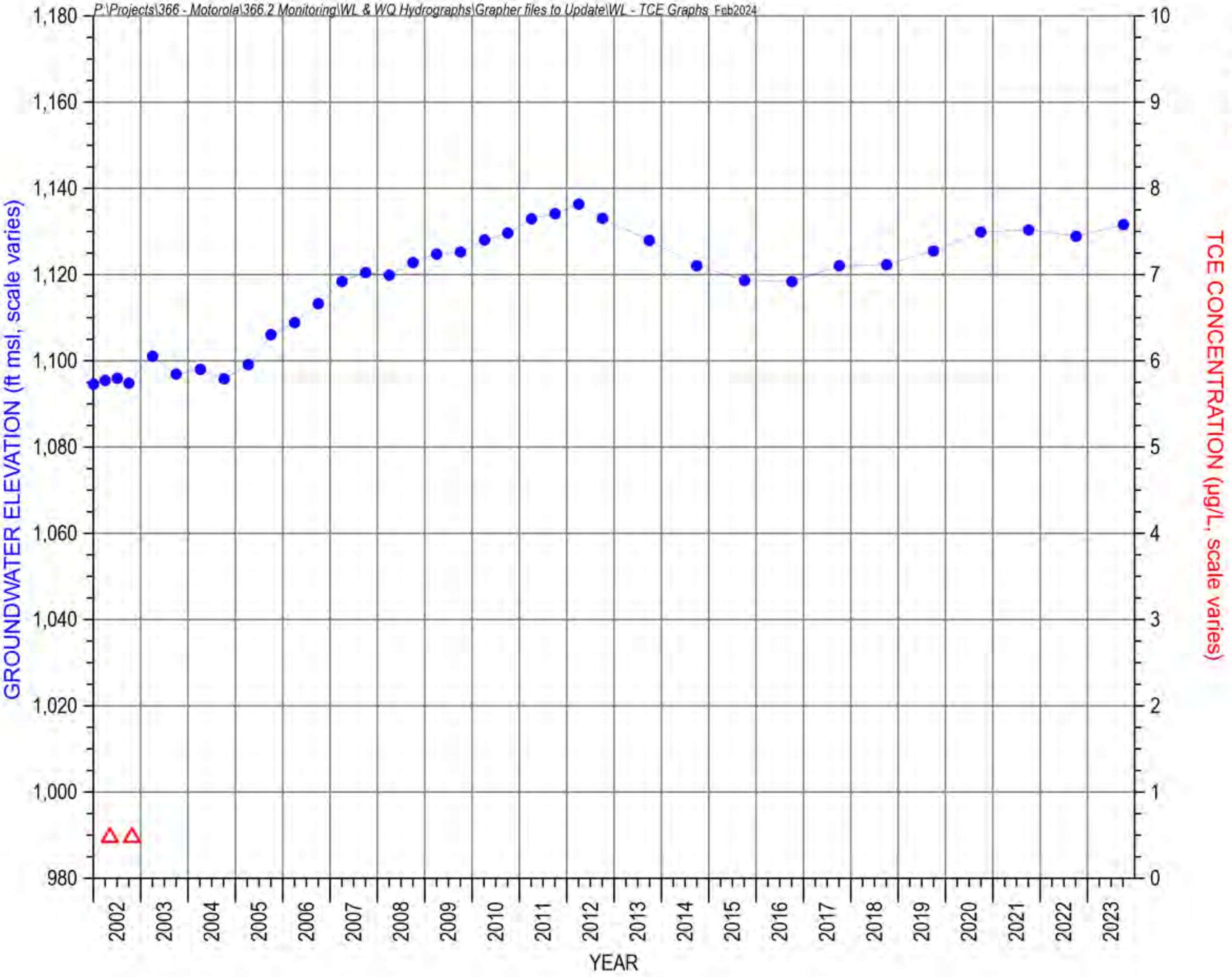


FIGURE D-024. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-5UA

North Indian Bend Wash Superfund Site



E-6UA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

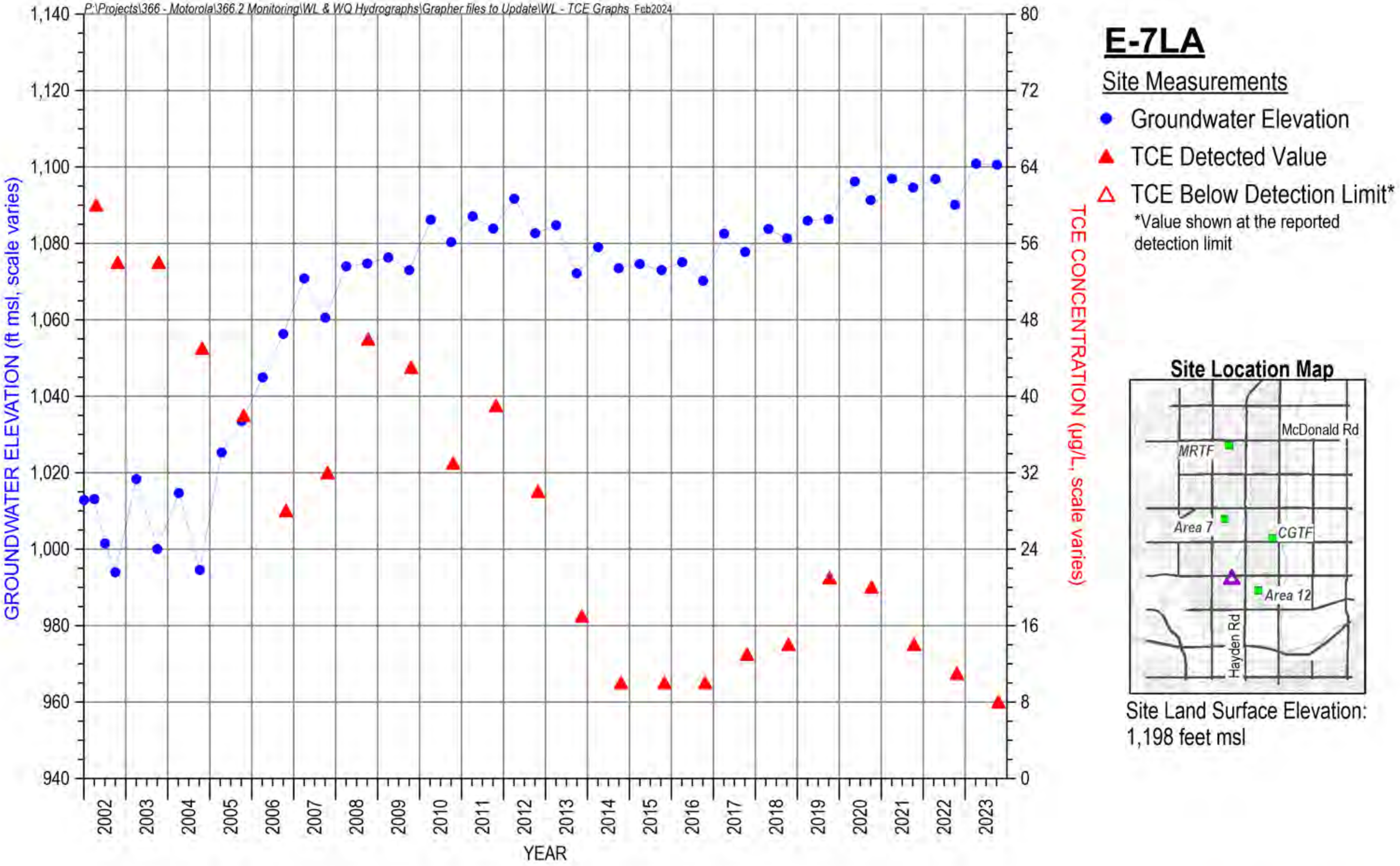
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,222 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



Site Land Surface Elevation:
1,198 feet msl

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

North Indian Bend Wash Superfund Site

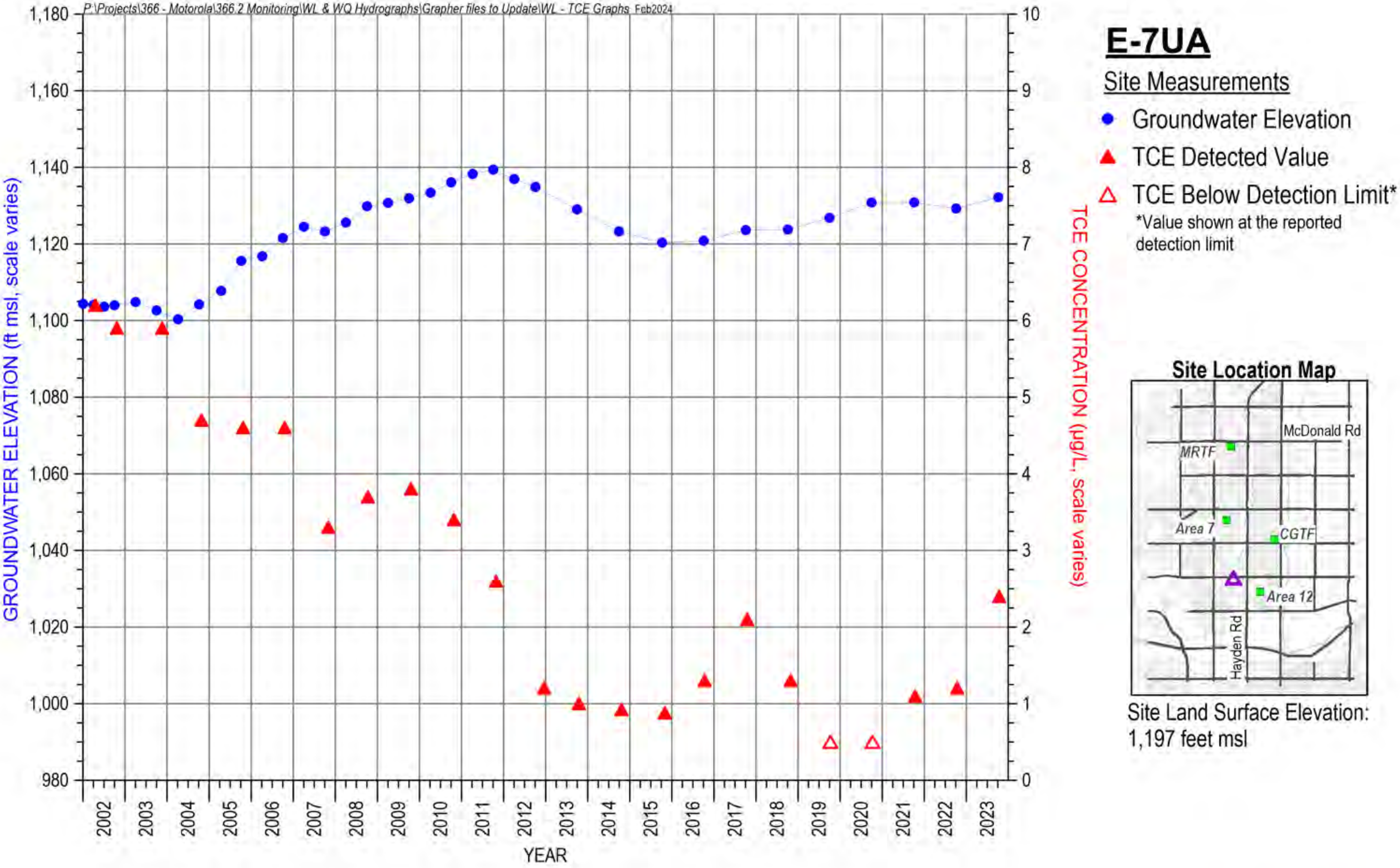
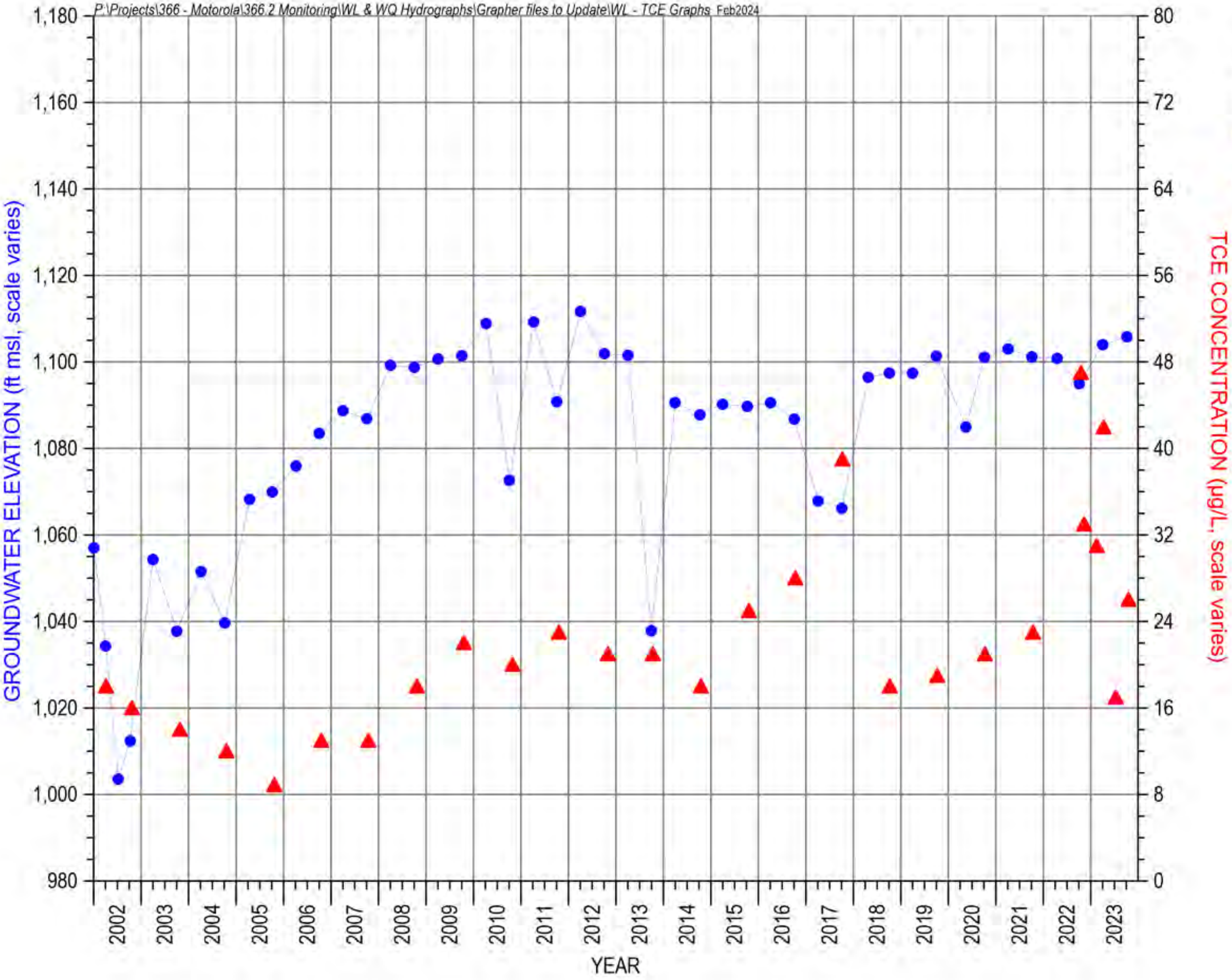


FIGURE D-027. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-7UA

North Indian Bend Wash Superfund Site



E-8MA

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:
1,193 feet msl

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

North Indian Bend Wash Superfund Site

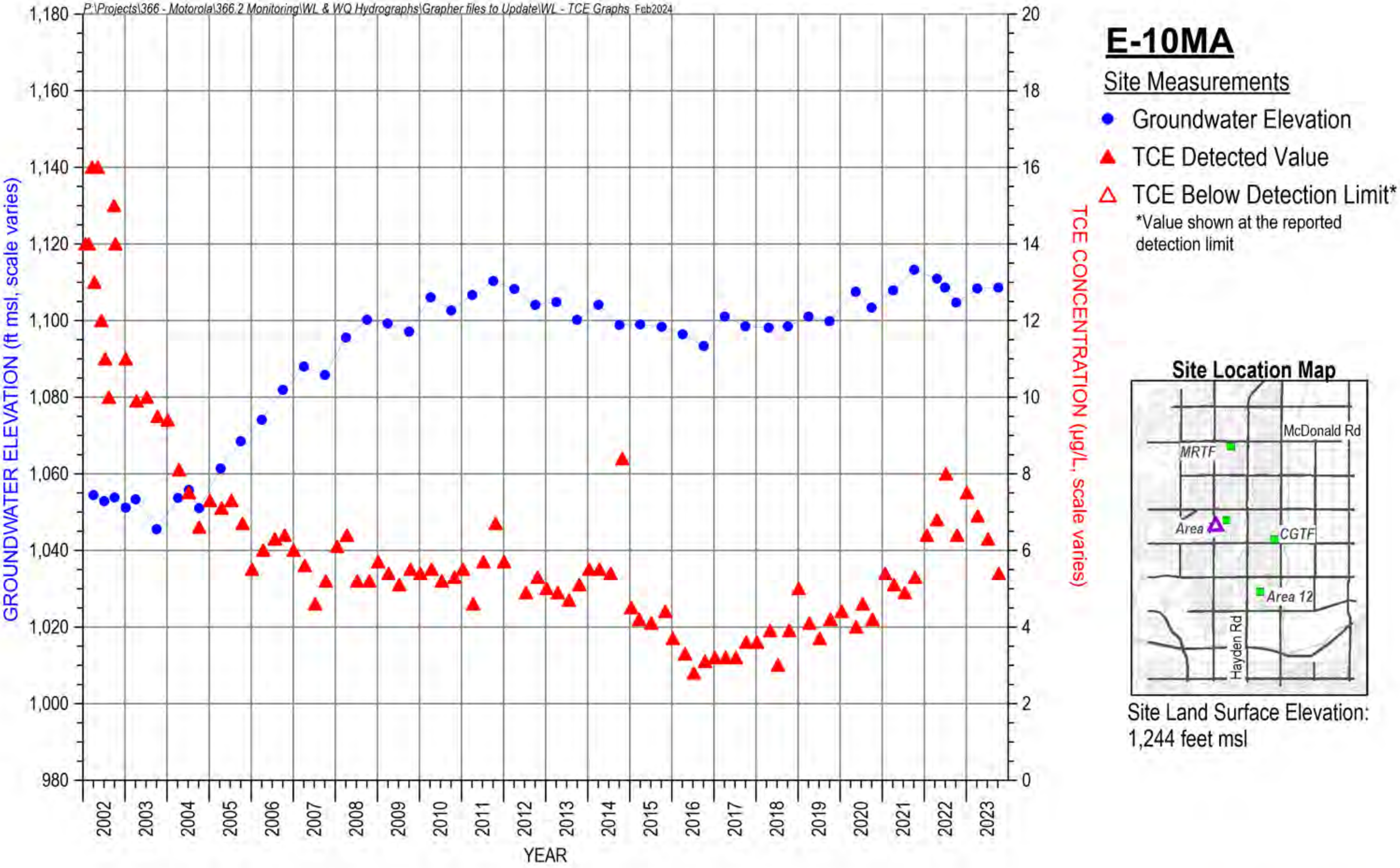


FIGURE D-029. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-10MA

North Indian Bend Wash Superfund Site

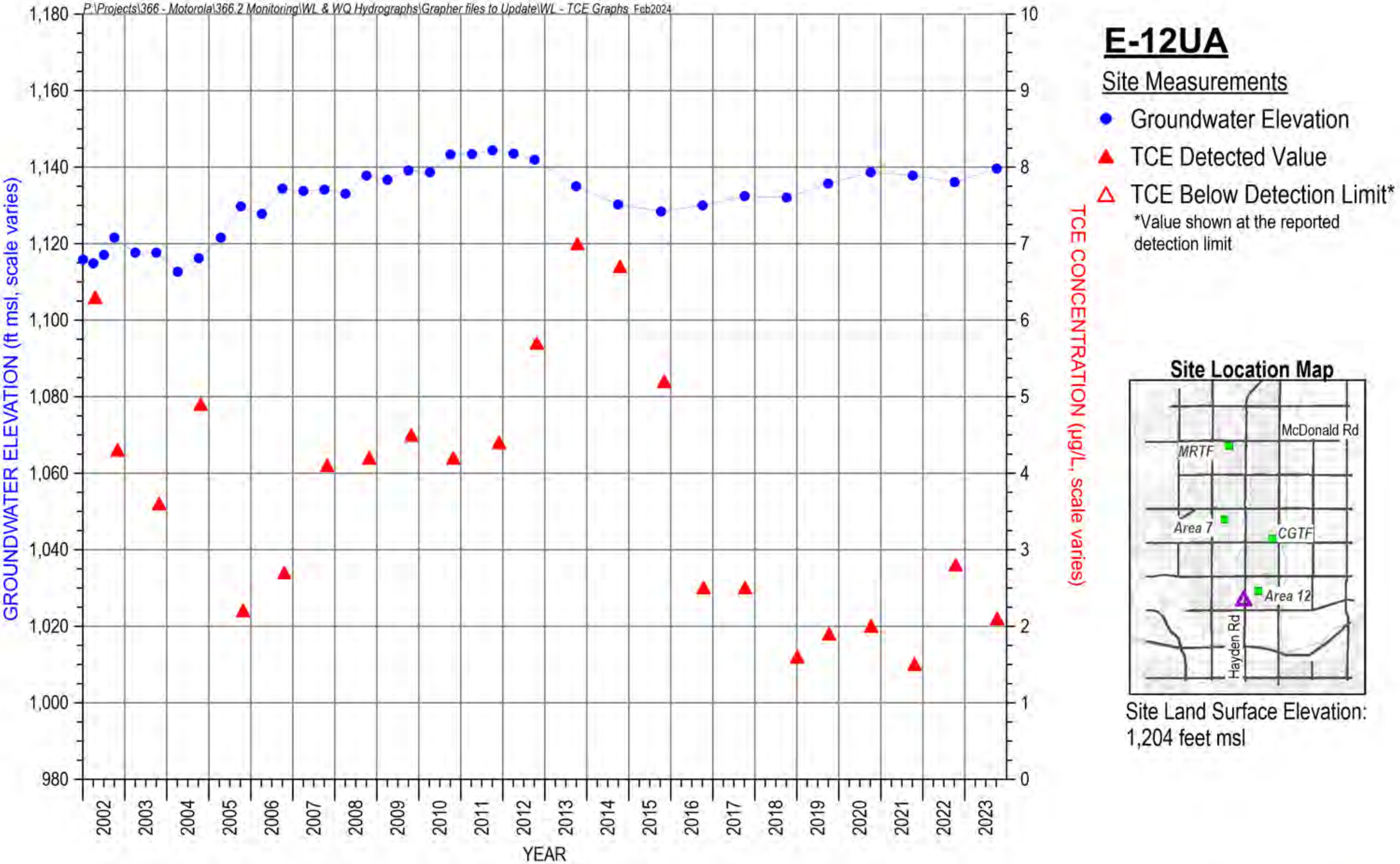


FIGURE D-030. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-12UA

North Indian Bend Wash Superfund Site

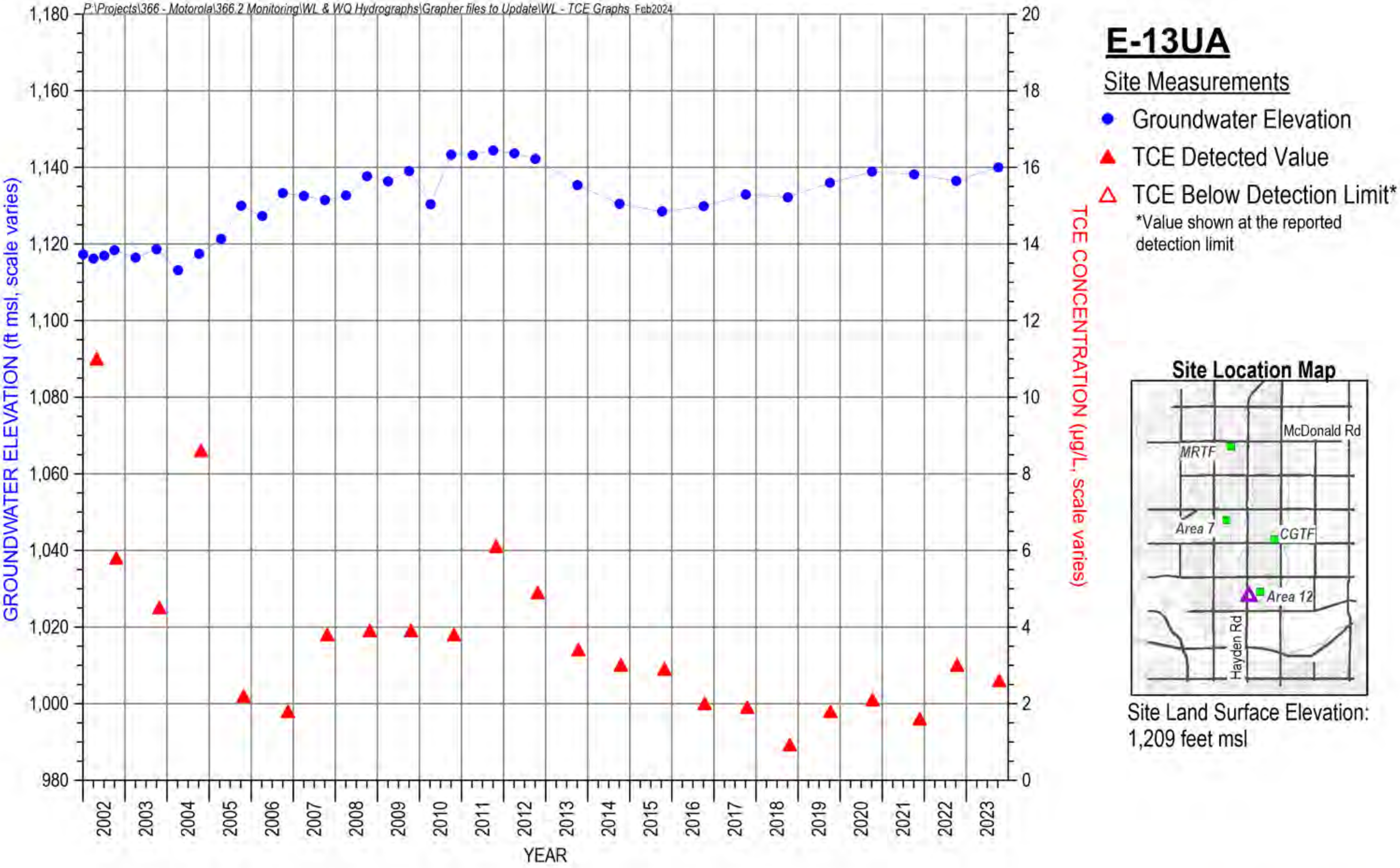
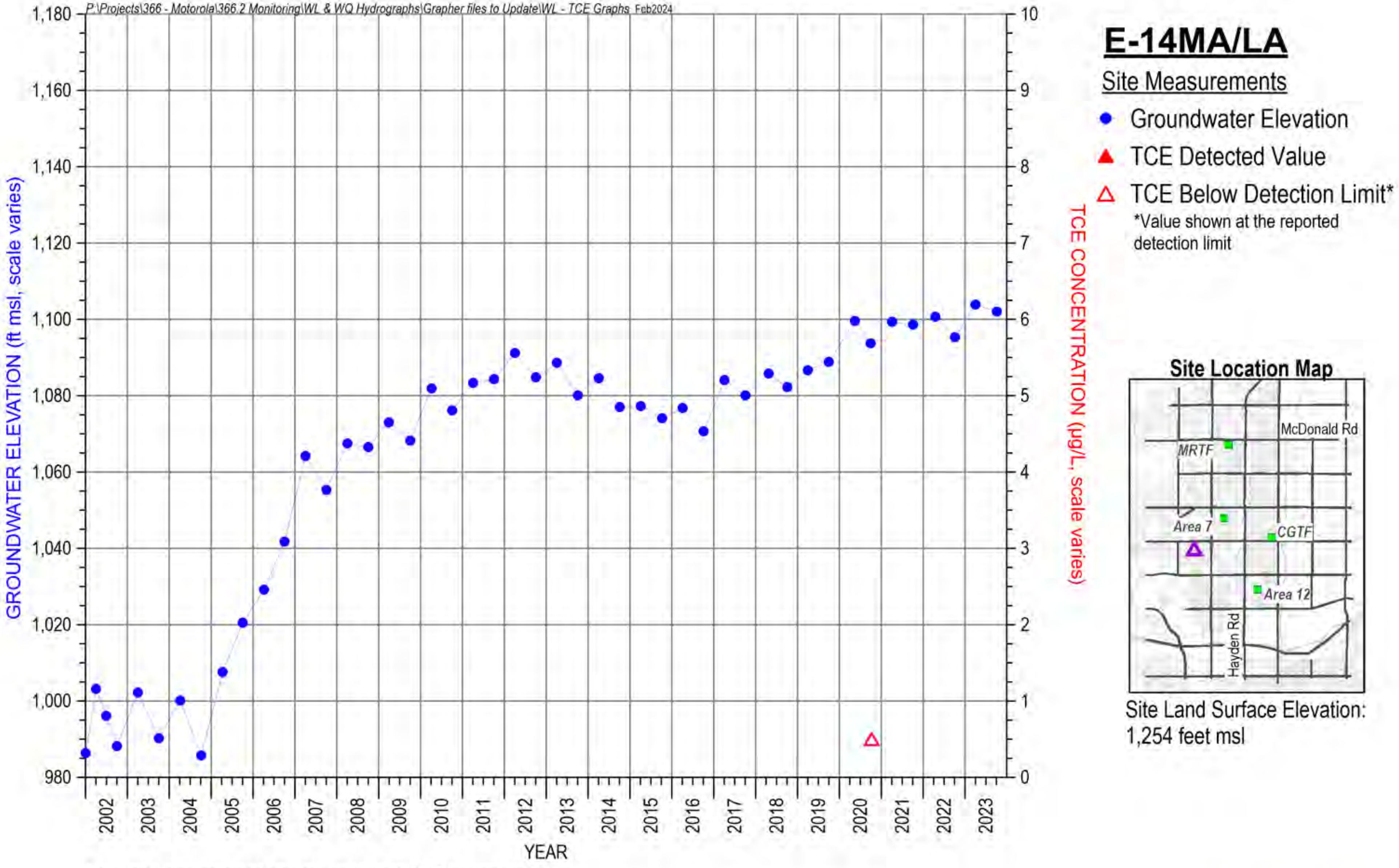


FIGURE D-031. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL E-13UA

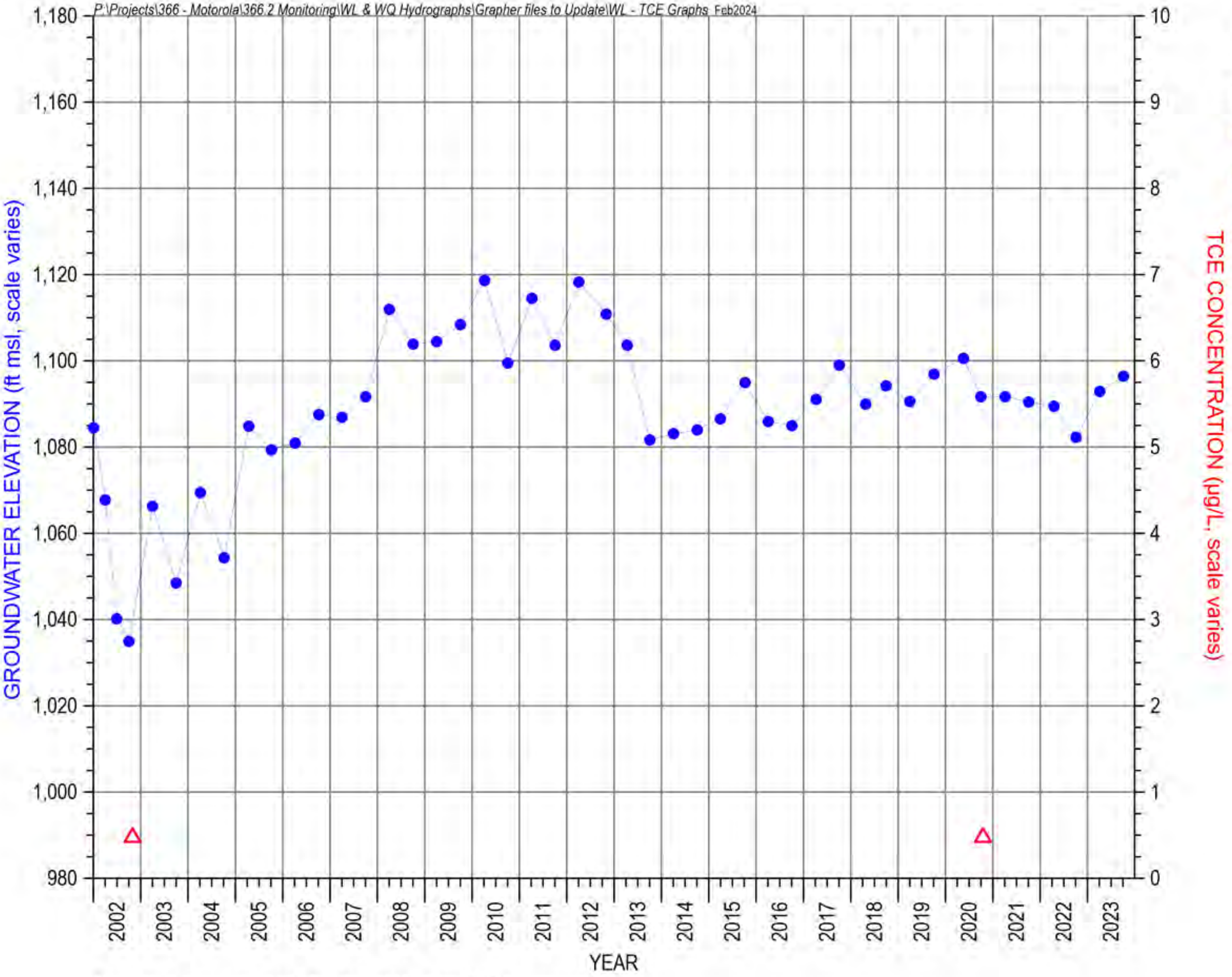
North Indian Bend Wash Superfund Site



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



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

M-1MA

Site Measurements

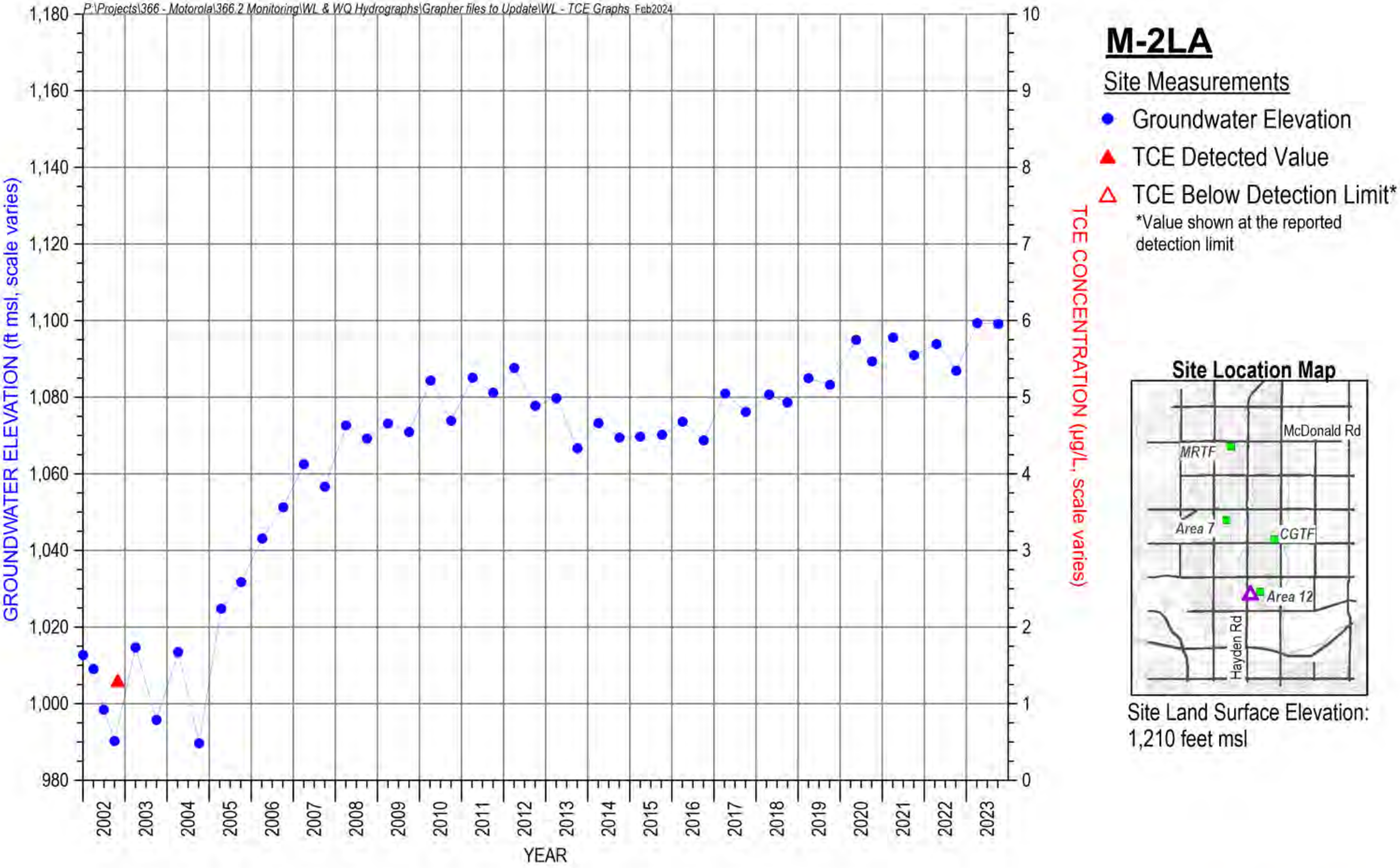
- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Land Surface Elevation:
1,211 feet msl

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

North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,210 feet msl

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

North Indian Bend Wash Superfund Site

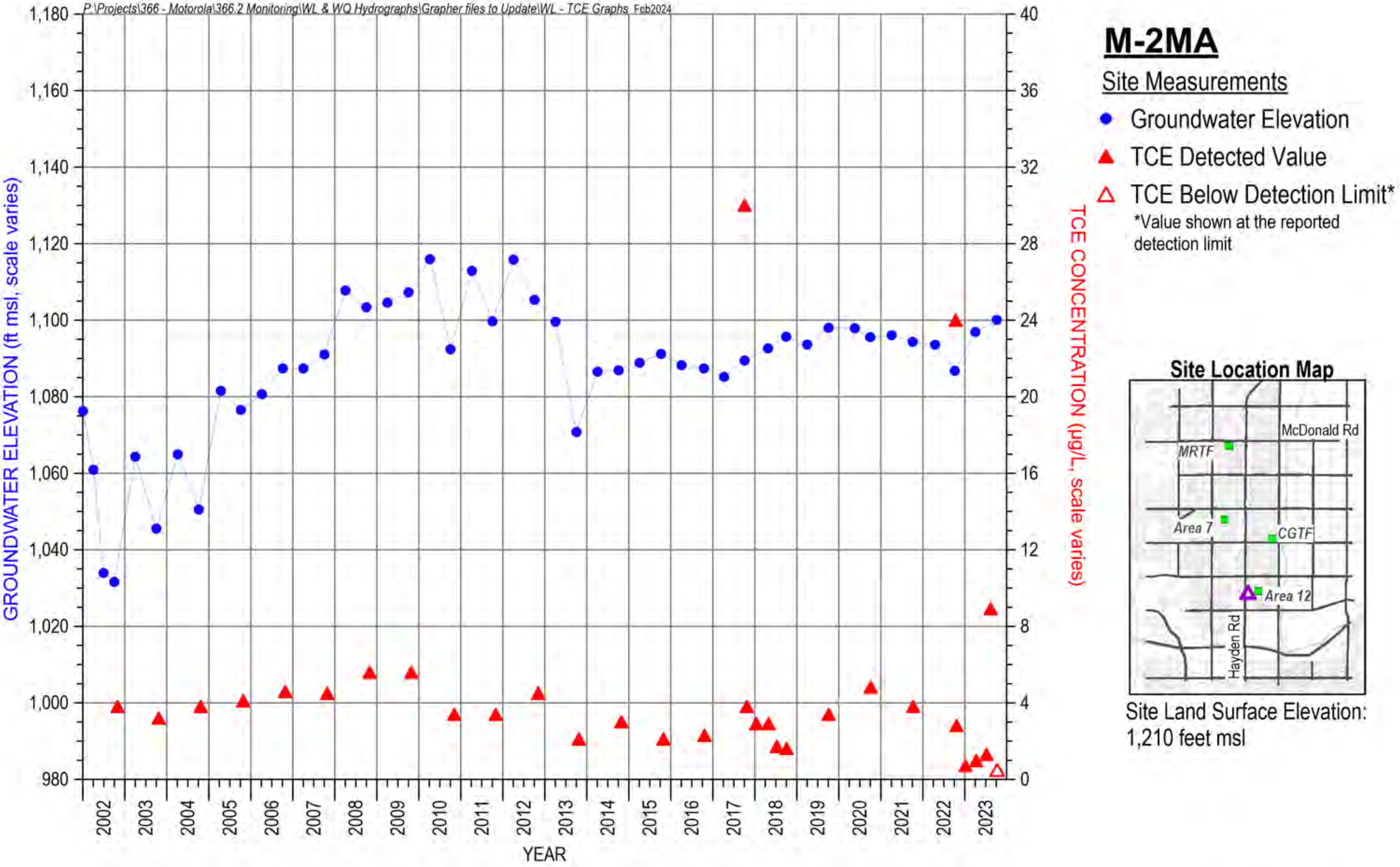


FIGURE D-035. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-2MA

North Indian Bend Wash Superfund Site

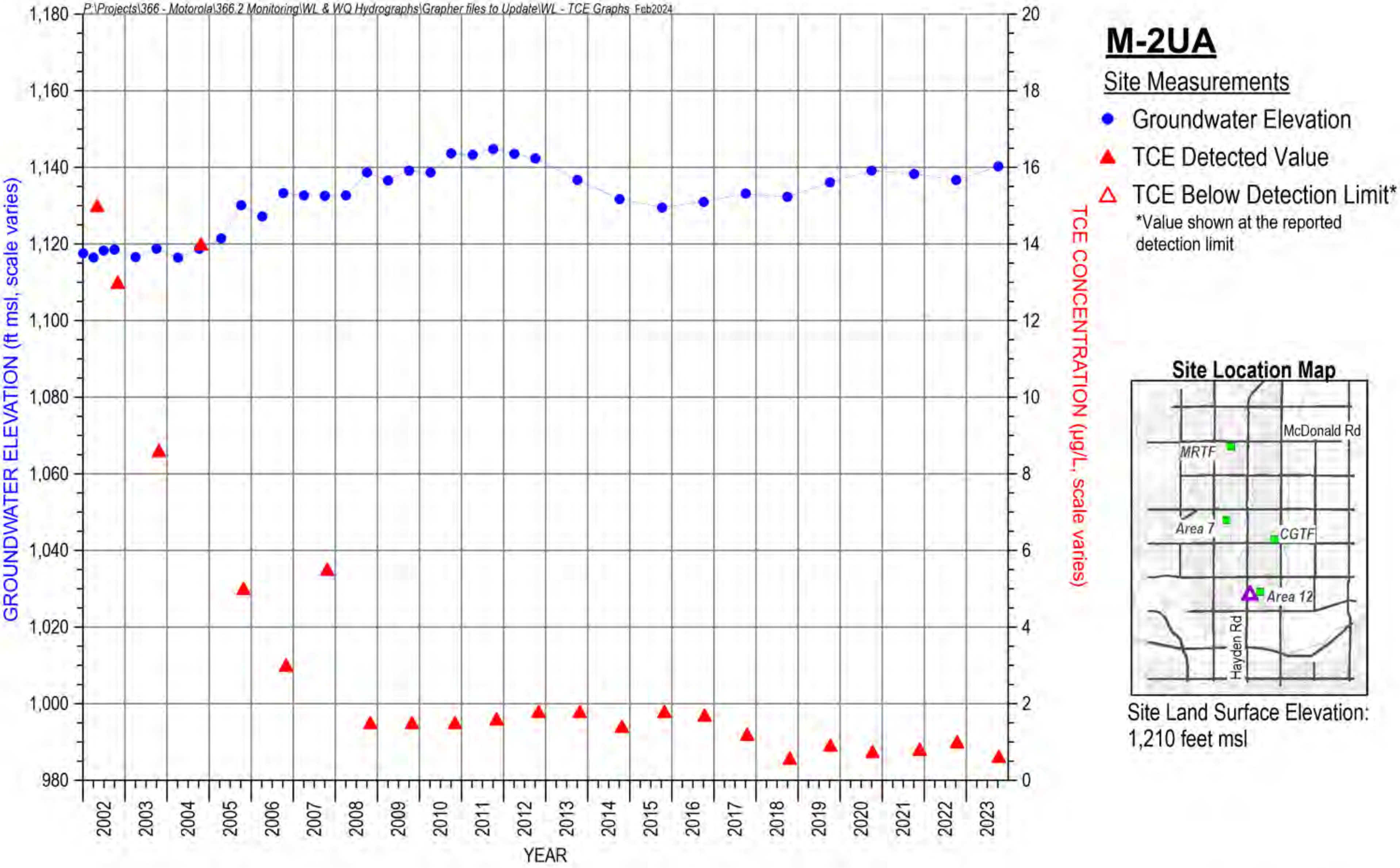


FIGURE D-036. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-2UA

North Indian Bend Wash Superfund Site

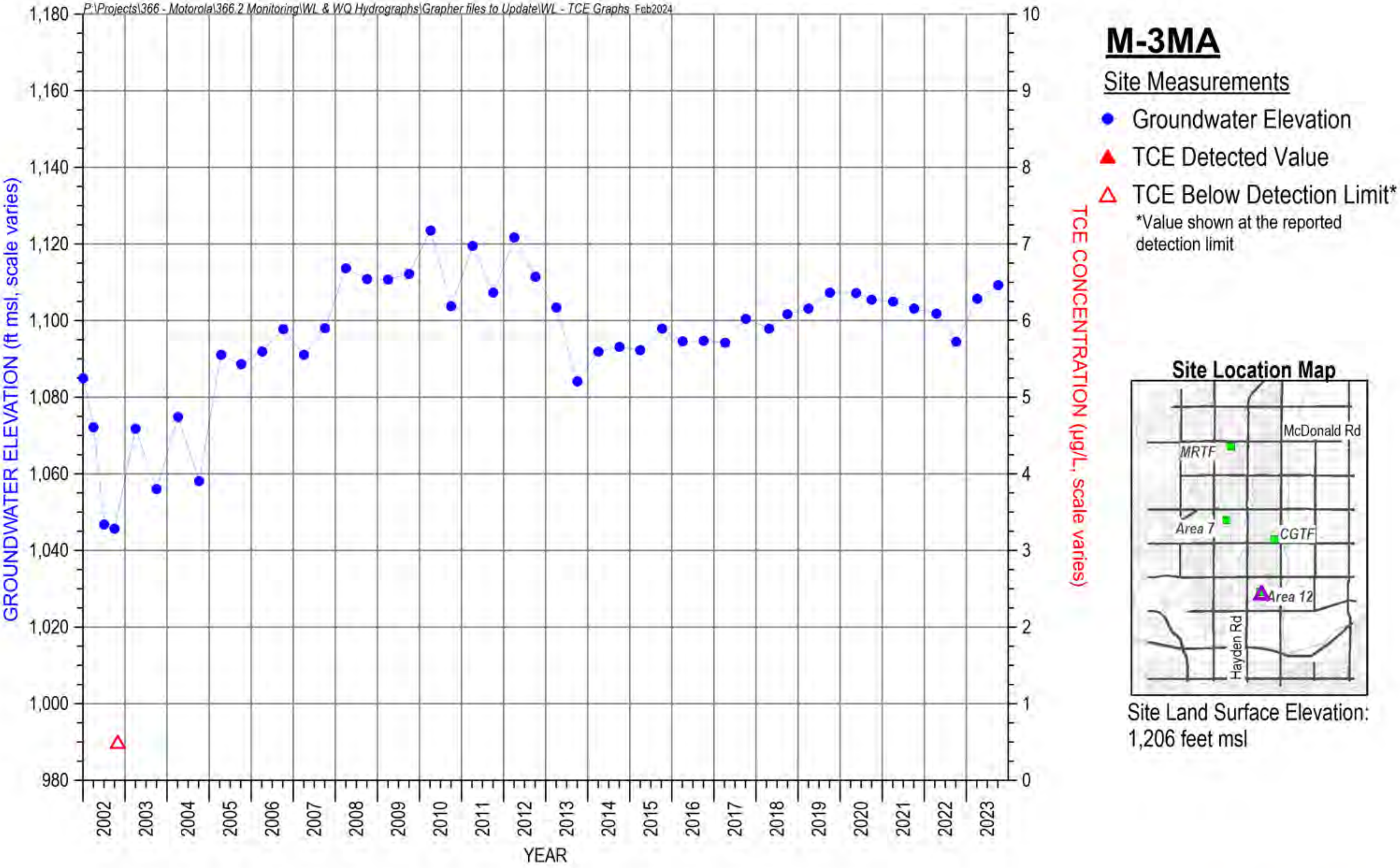


FIGURE D-037. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-3MA

North Indian Bend Wash Superfund Site

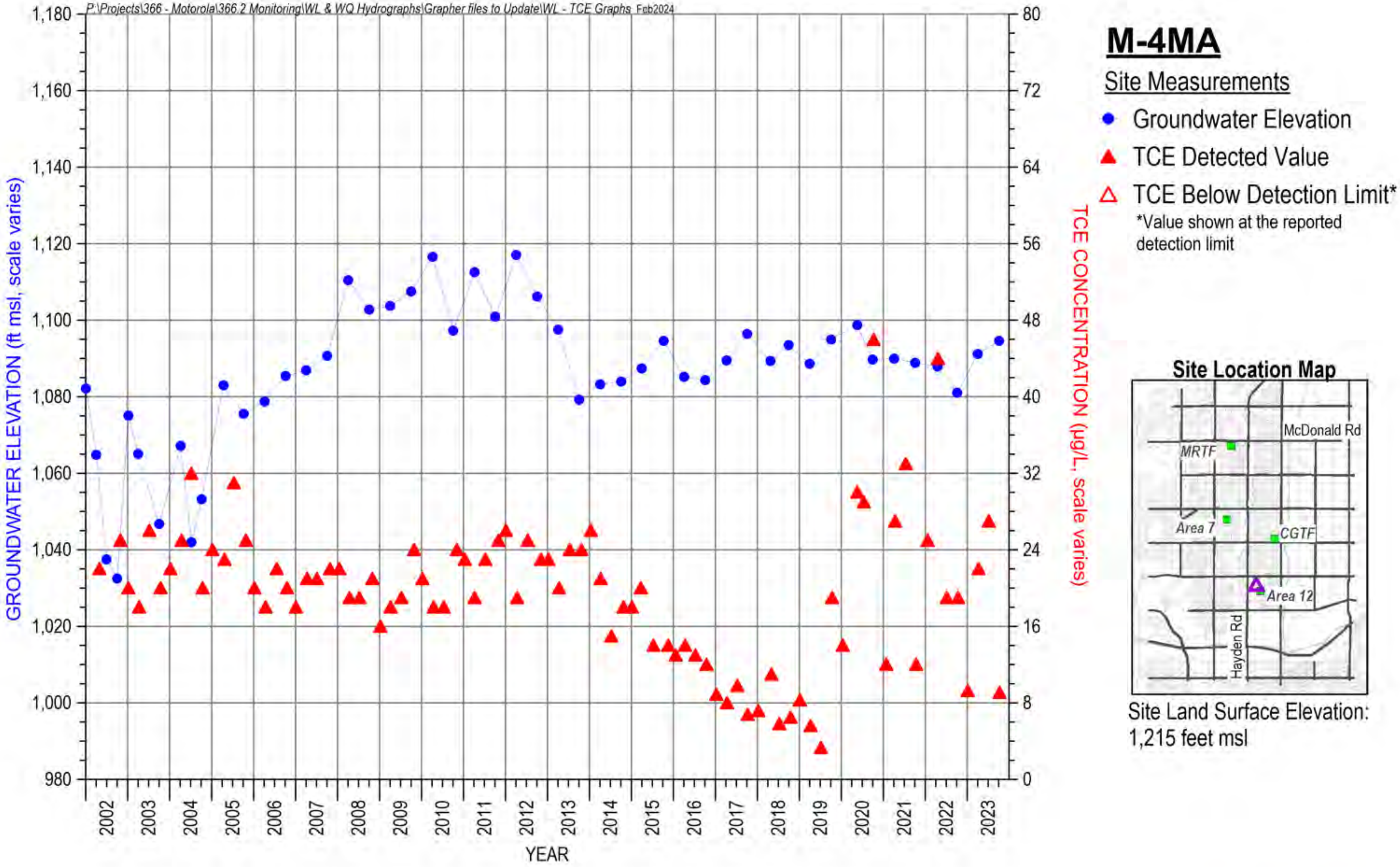


FIGURE D-038. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-4MA

North Indian Bend Wash Superfund Site

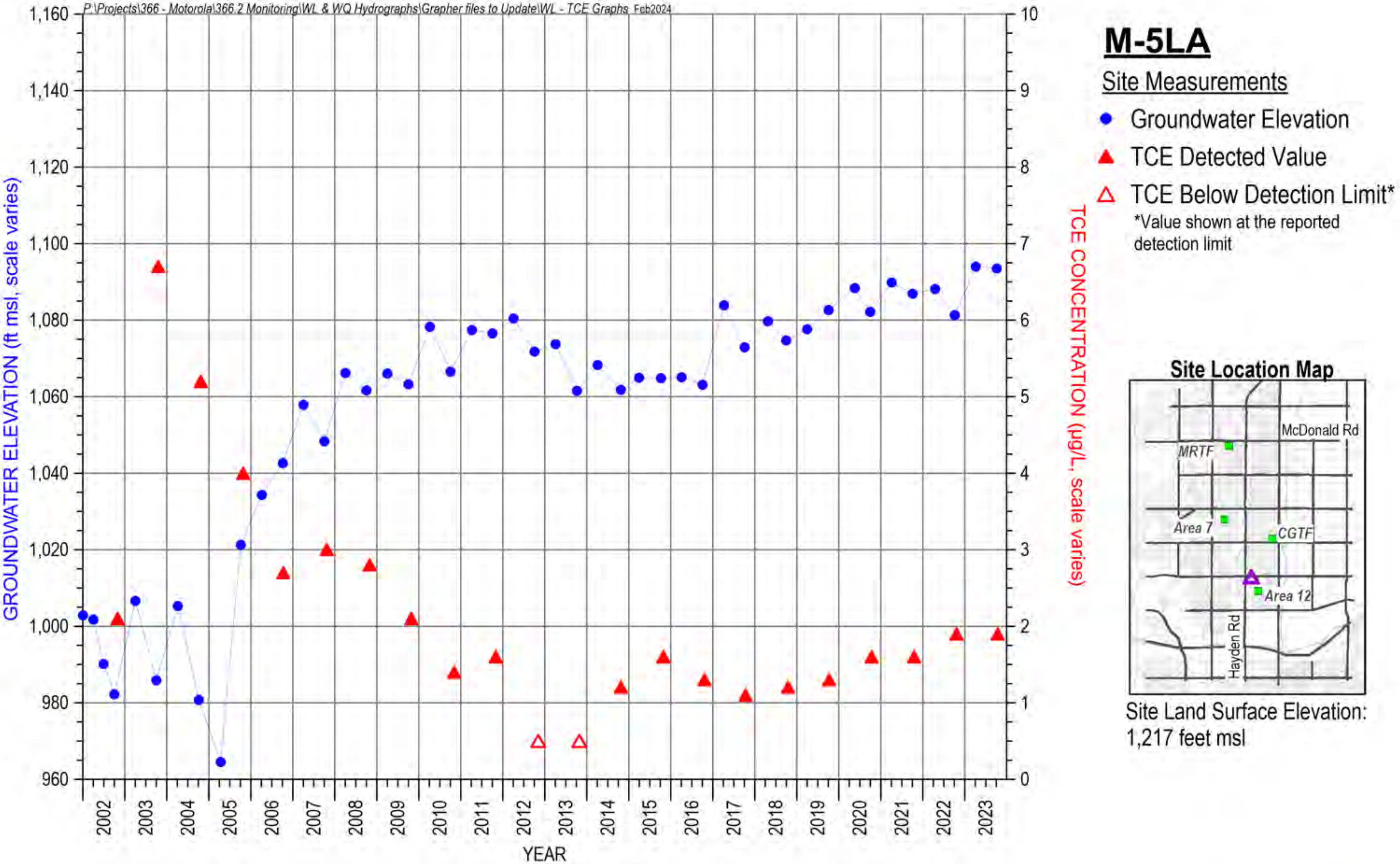


FIGURE D-039. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-5LA

North Indian Bend Wash Superfund Site

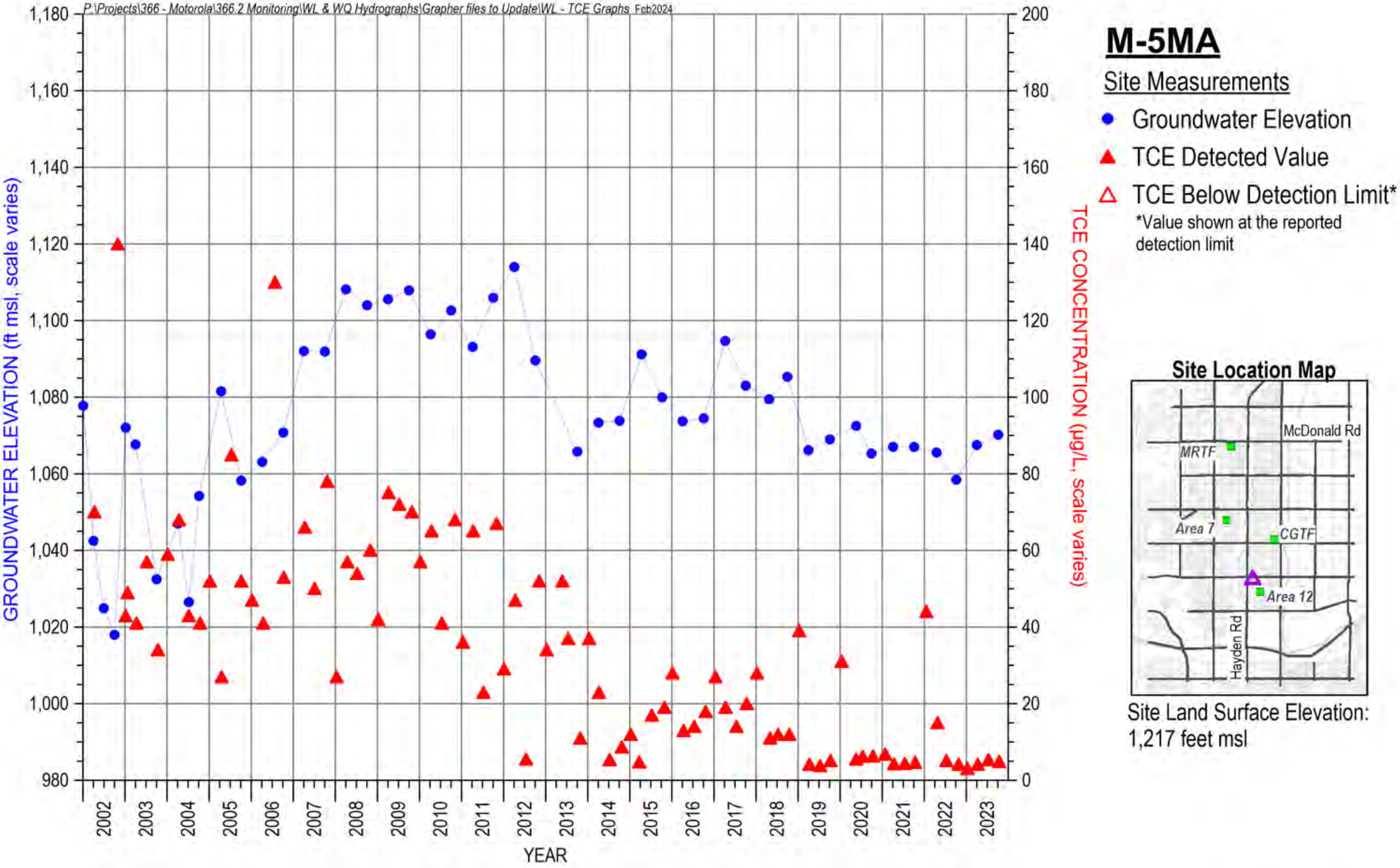
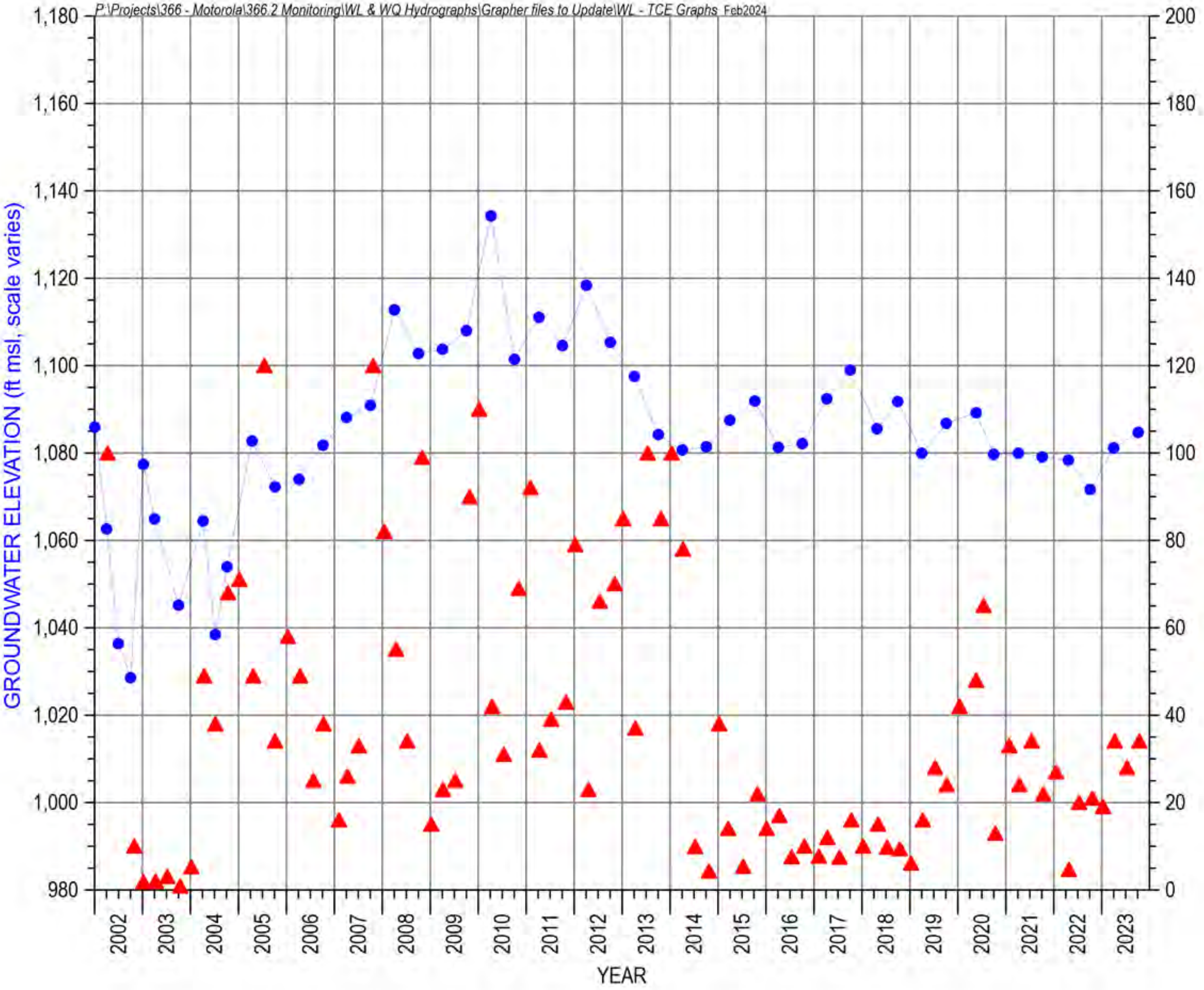


FIGURE D-040. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-5MA

North Indian Bend Wash Superfund Site



M-6MA

Site Measurements

● Groundwater Elevation

▲ TCE Detected Value

△ TCE Below Detection Limit*

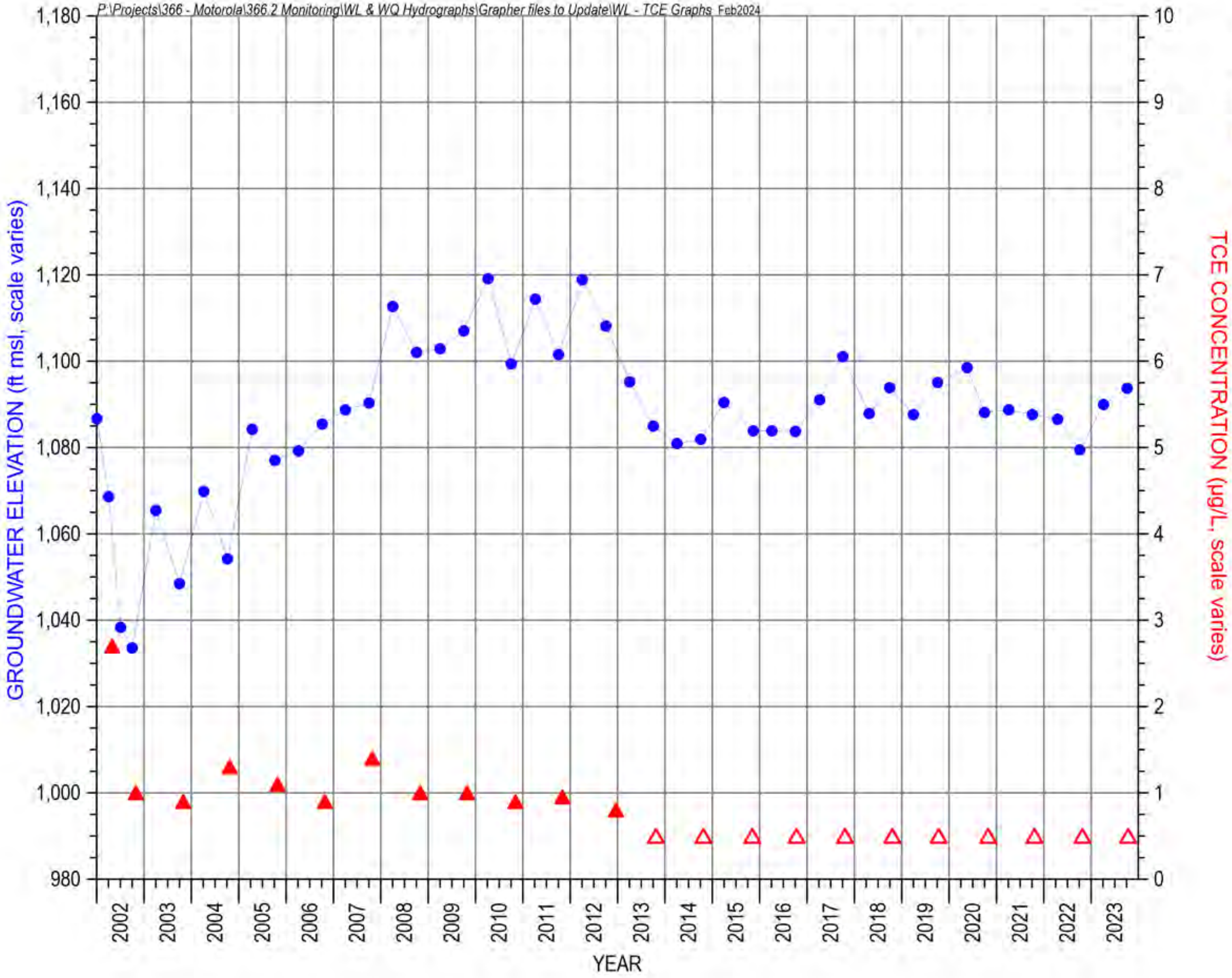
*Value shown at the reported
detection limit

Site Location Map

Site Land Surface Elevation:
1,217 feet msl

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

North Indian Bend Wash Superfund Site



M-7MA

Site Measurements

● Groundwater Elevation

▲ TCE Detected Value

△ TCE Below Detection Limit*

*Value shown at the reported detection limit

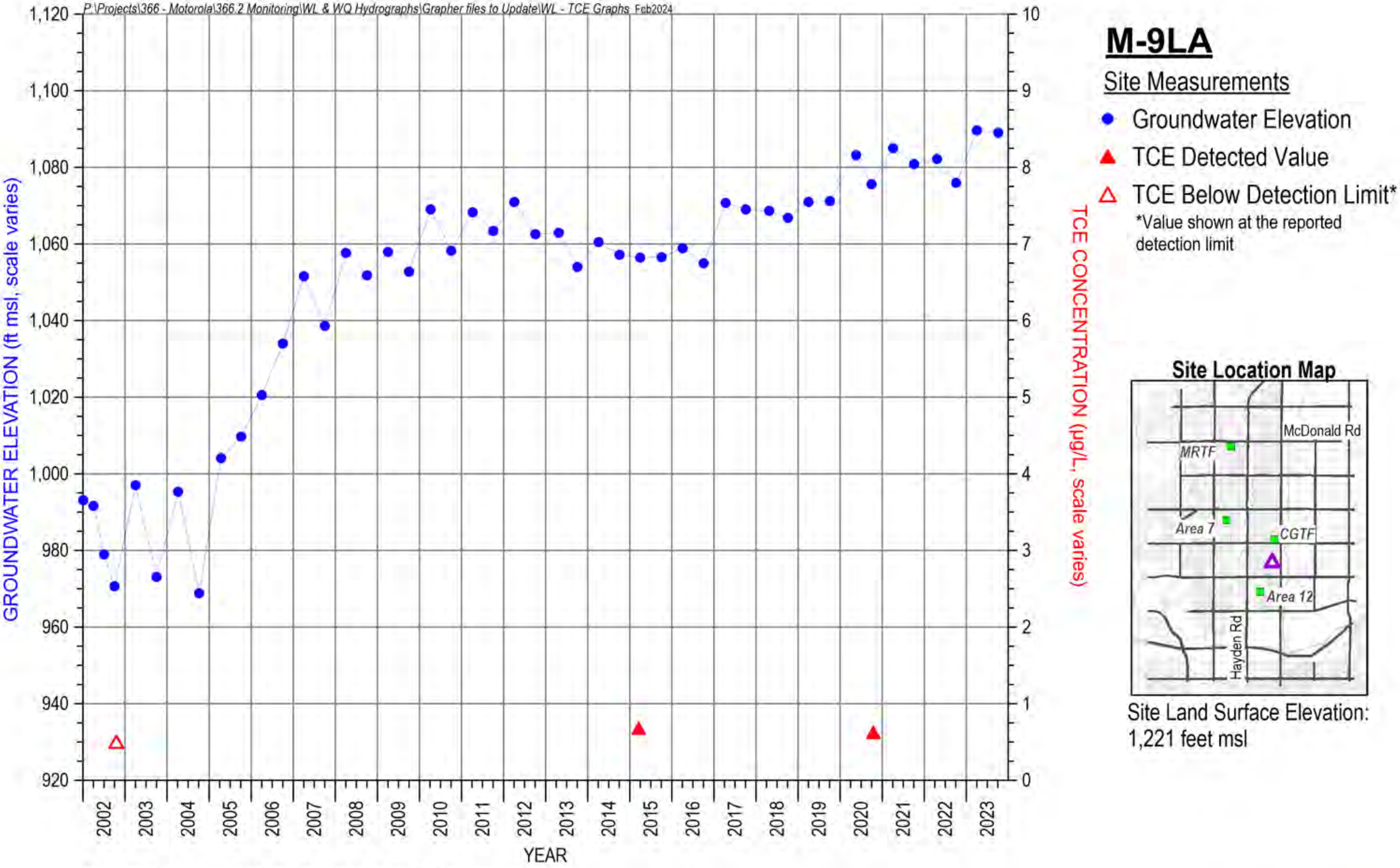
Site Location Map

Site Land Surface Elevation:
1,214 feet msl

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

North Indian Bend Wash Superfund Site

P:\Projects\366 - Motorola\366.2 Monitoring\WL & WQ Hydrographs\Grapher files to Update\WL - TCE Graphs Feb2024

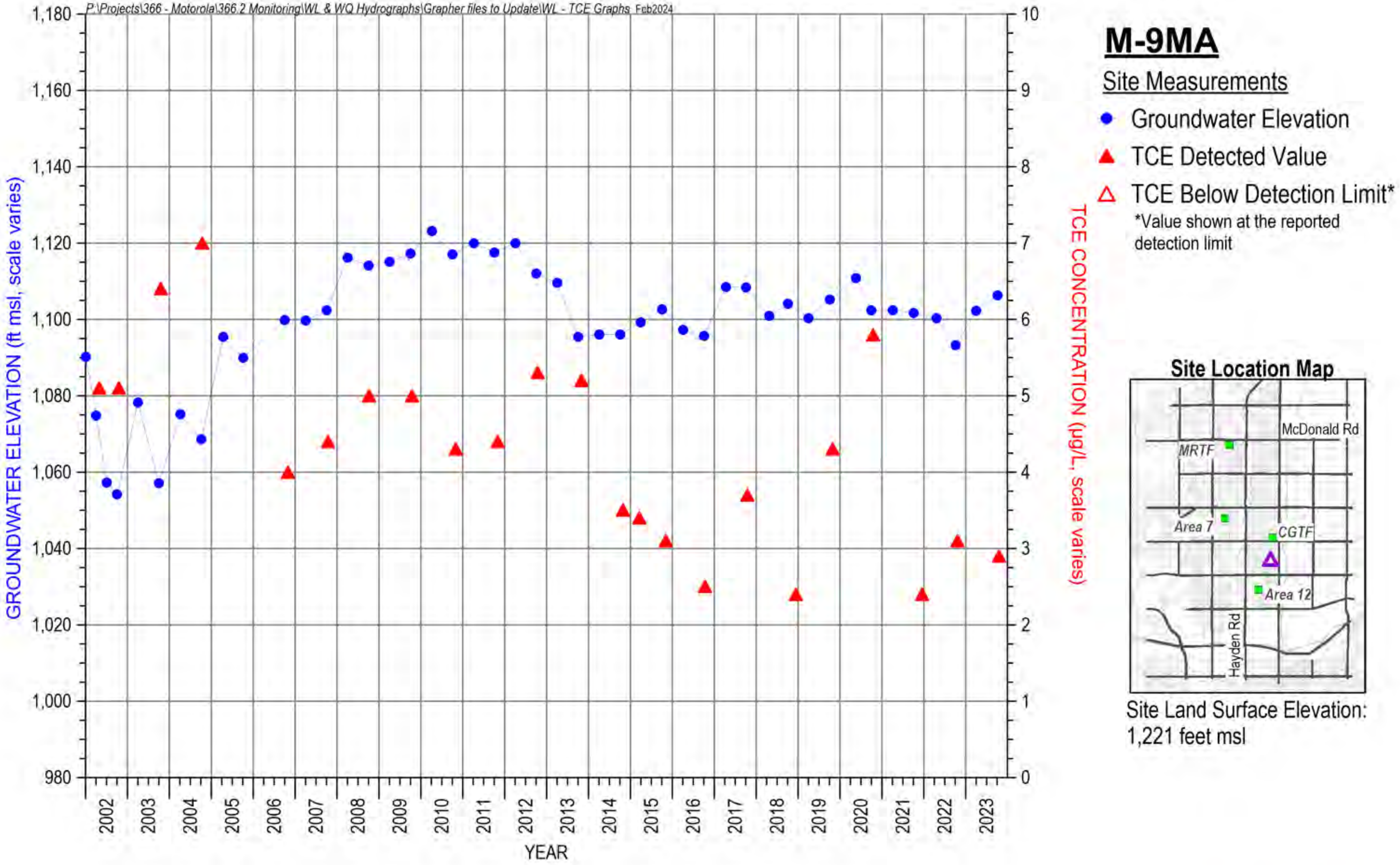


Site Land Surface Elevation:
1,221 feet msl

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

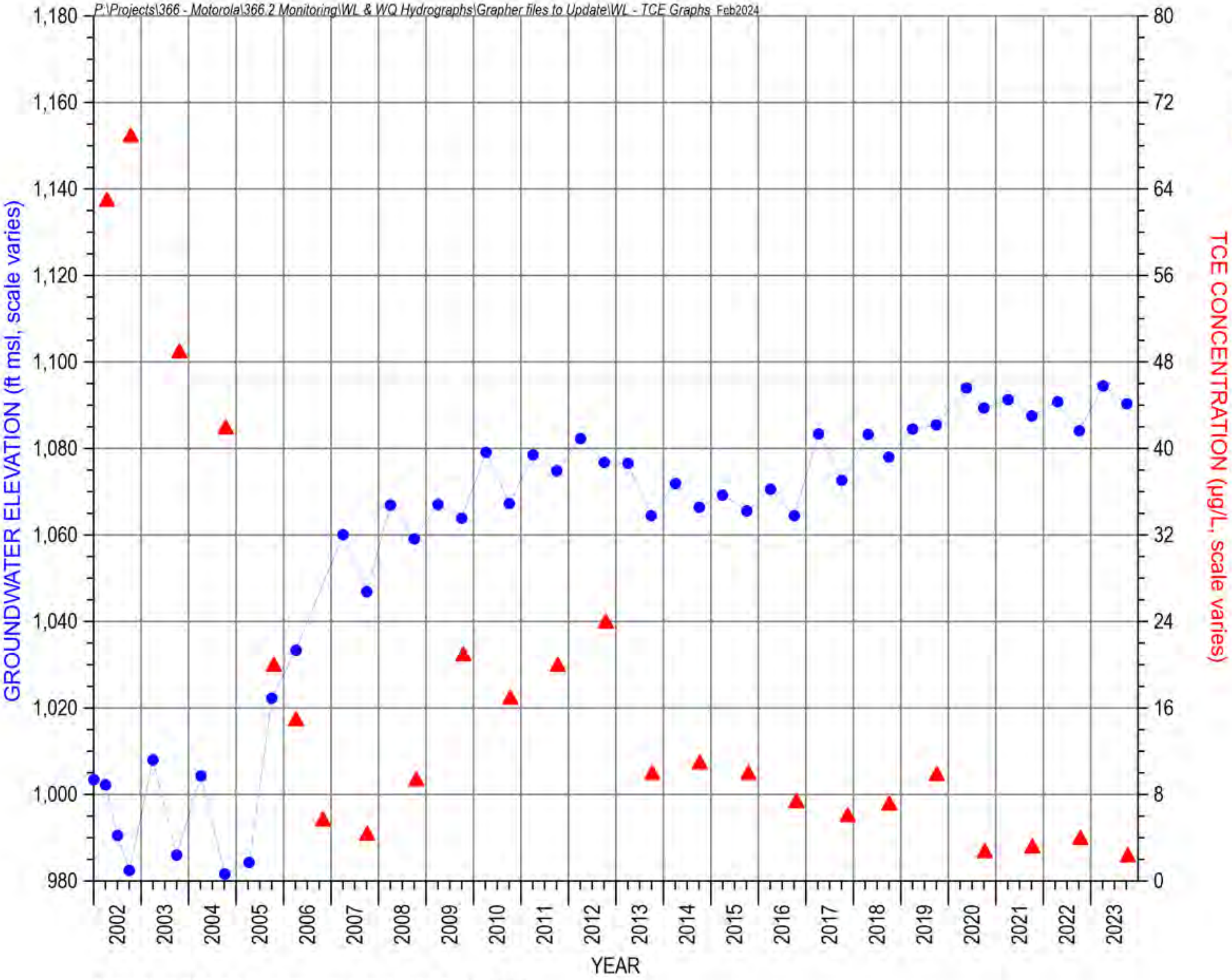
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,221 feet msl

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

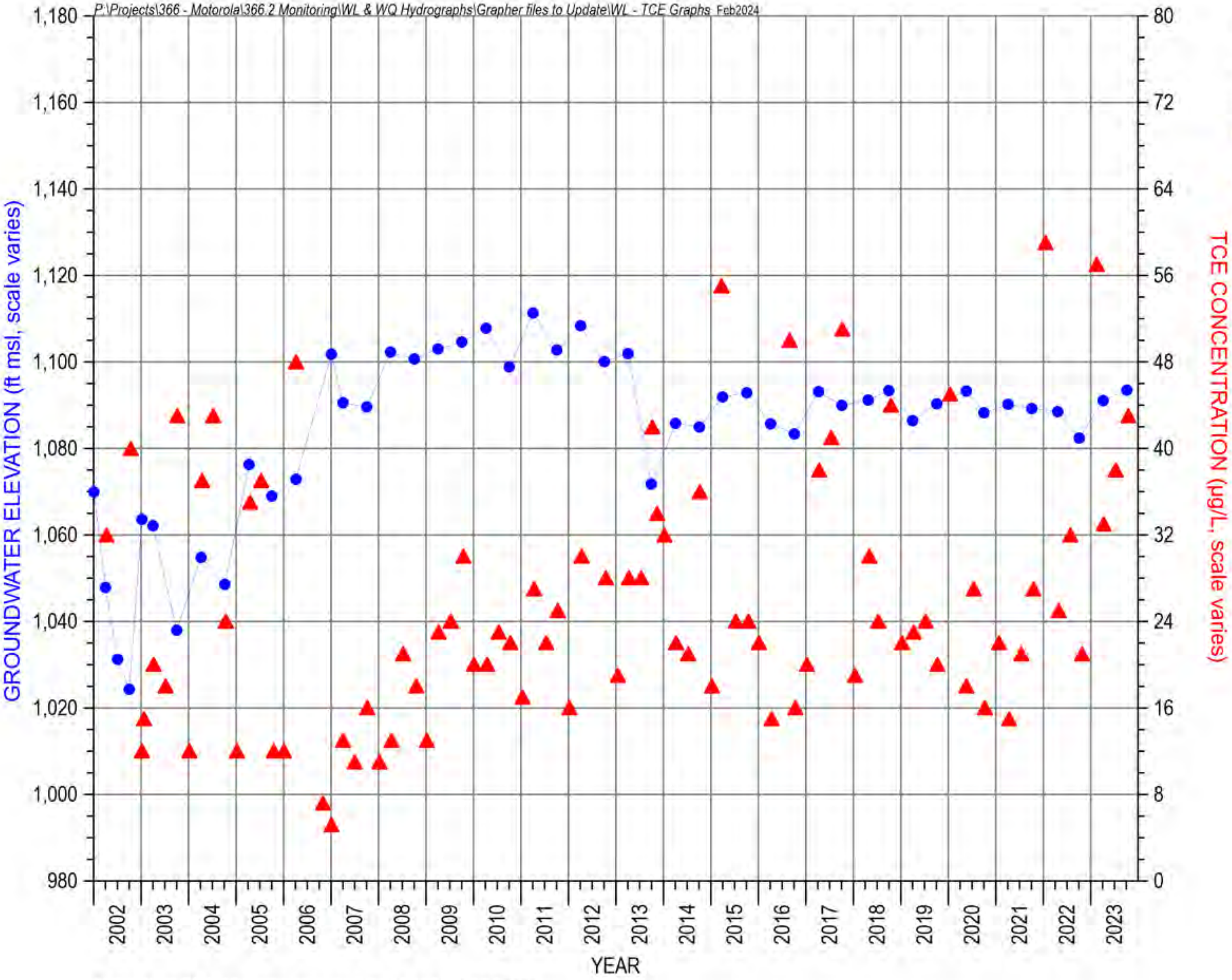
Site Location Map

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 Location Map

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

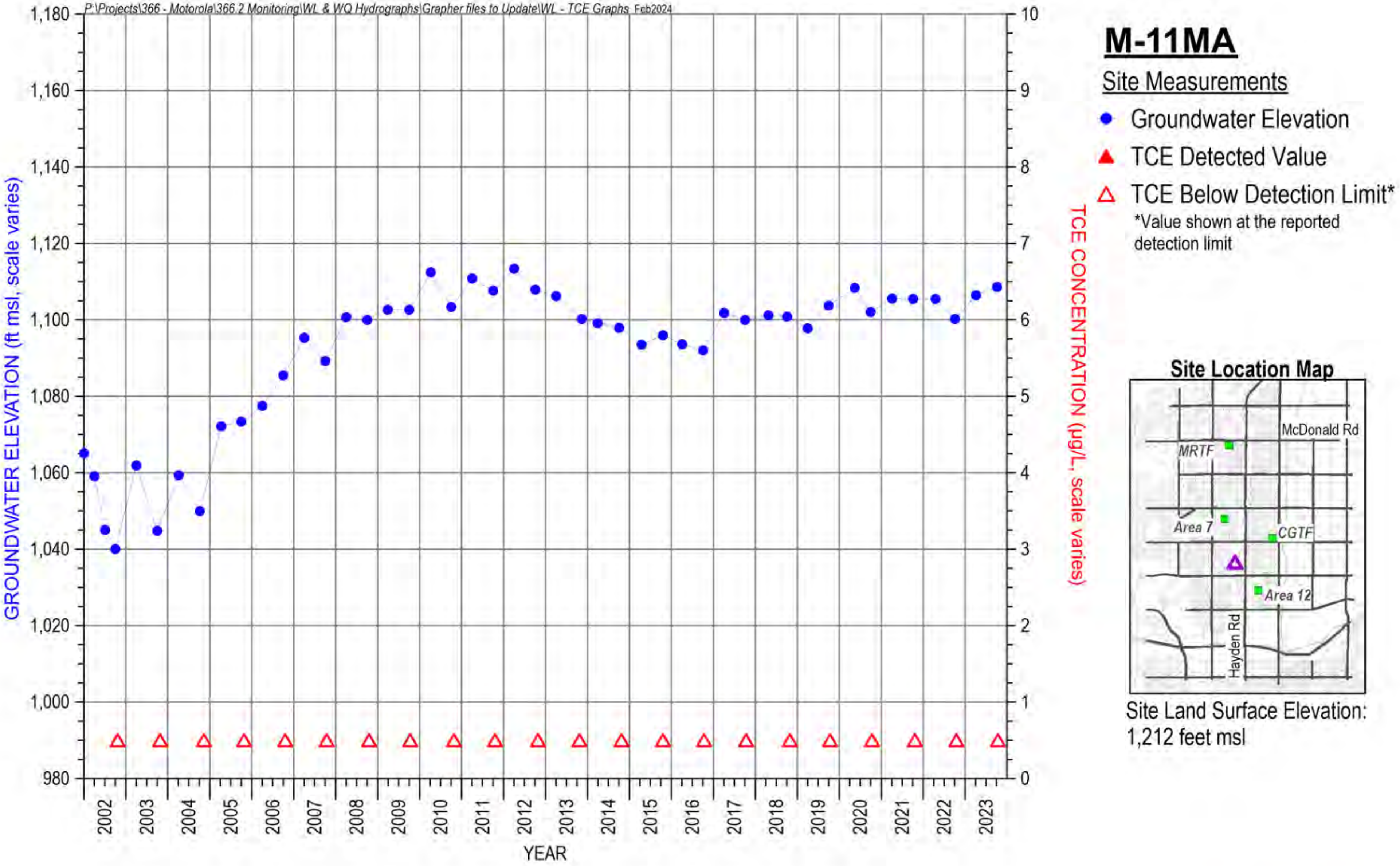
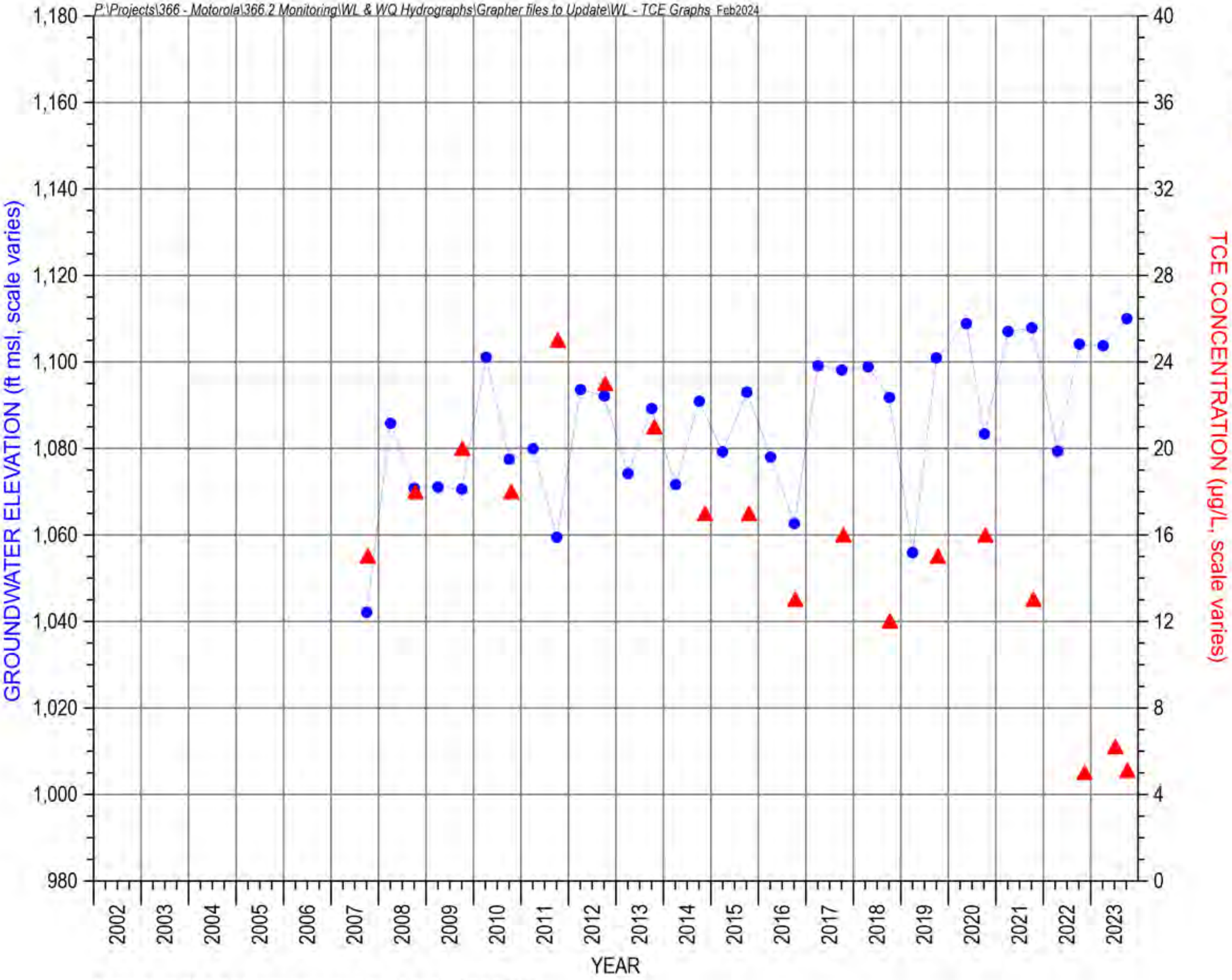


FIGURE D-047. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-11MA

North Indian Bend Wash Superfund Site



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

M-12MA/M-12MA2

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:
1,228 feet msl

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

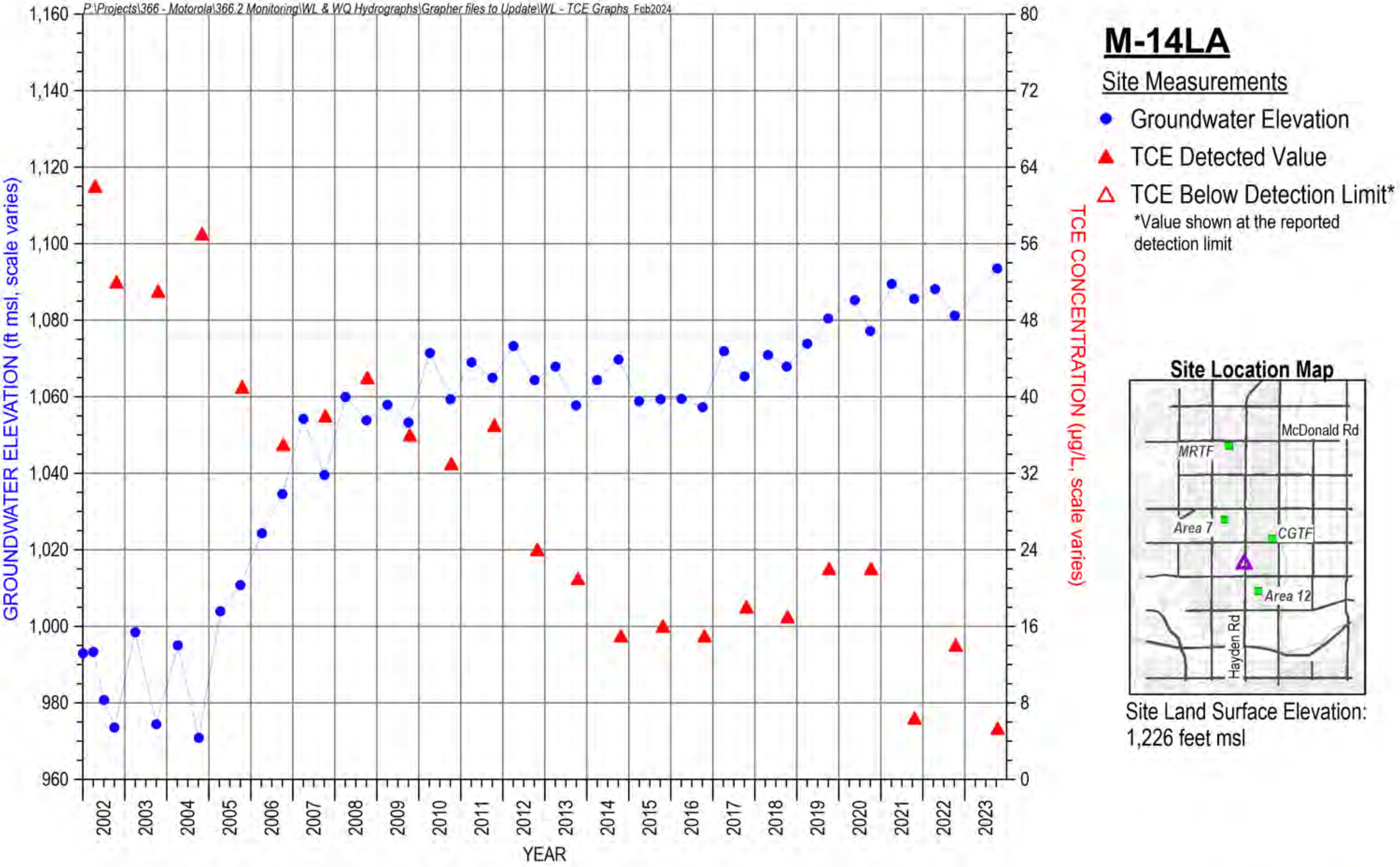
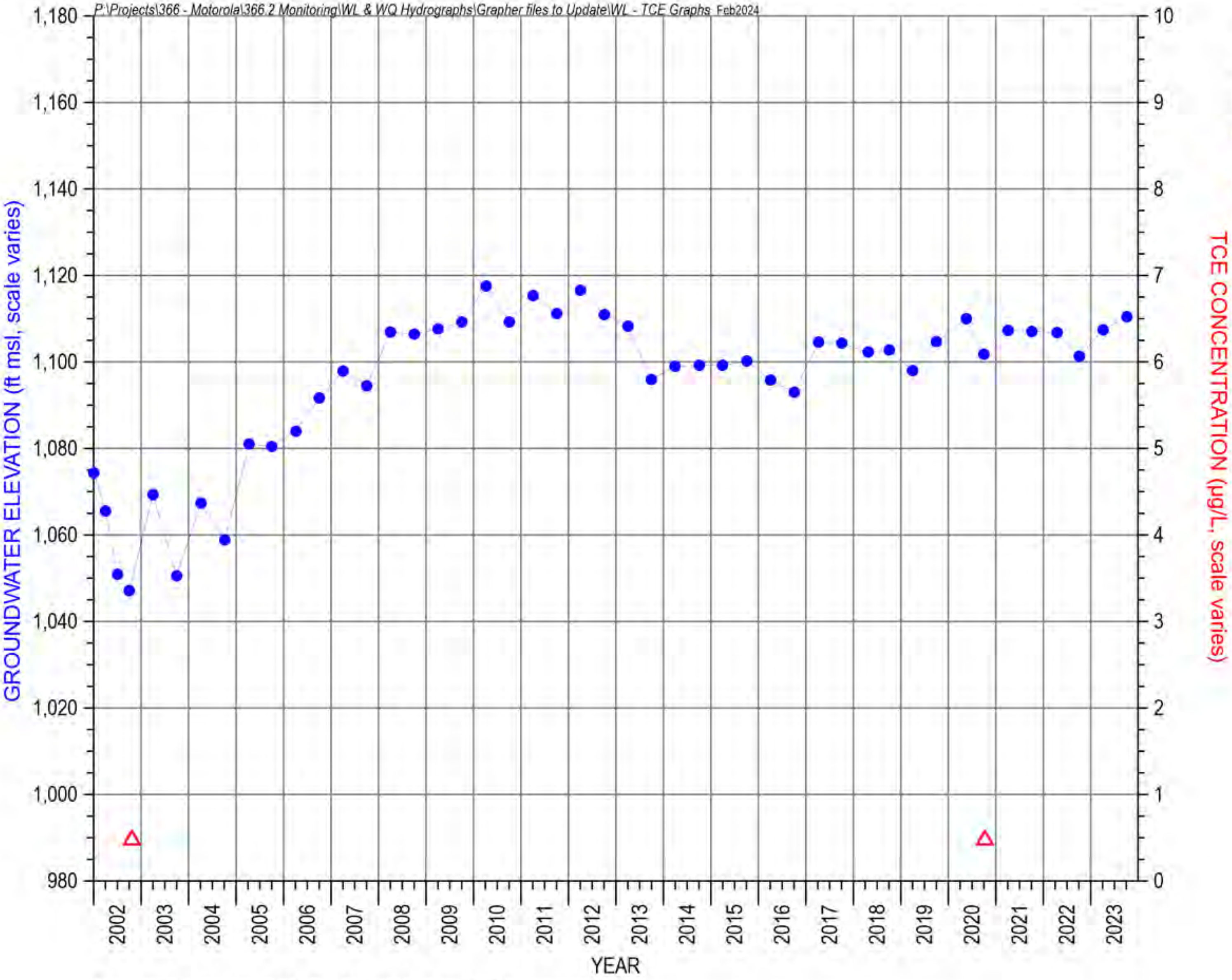


FIGURE D-049. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-14LA

North Indian Bend Wash Superfund Site



M-14MA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

*Value shown at the reported detection limit

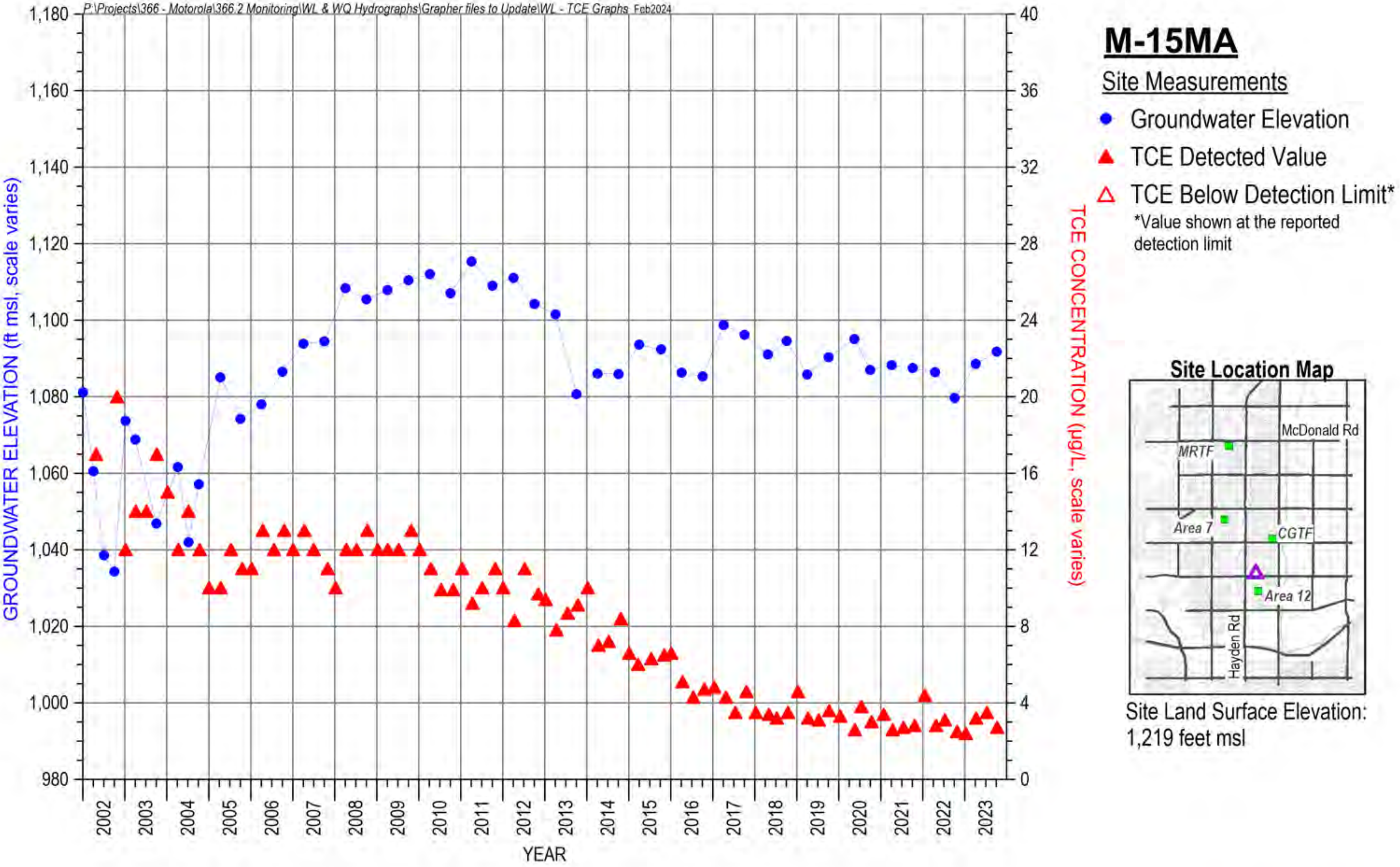
Site Location Map

Site Land Surface Elevation:
1,226 feet msl

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

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

North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,219 feet msl

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

North Indian Bend Wash Superfund Site

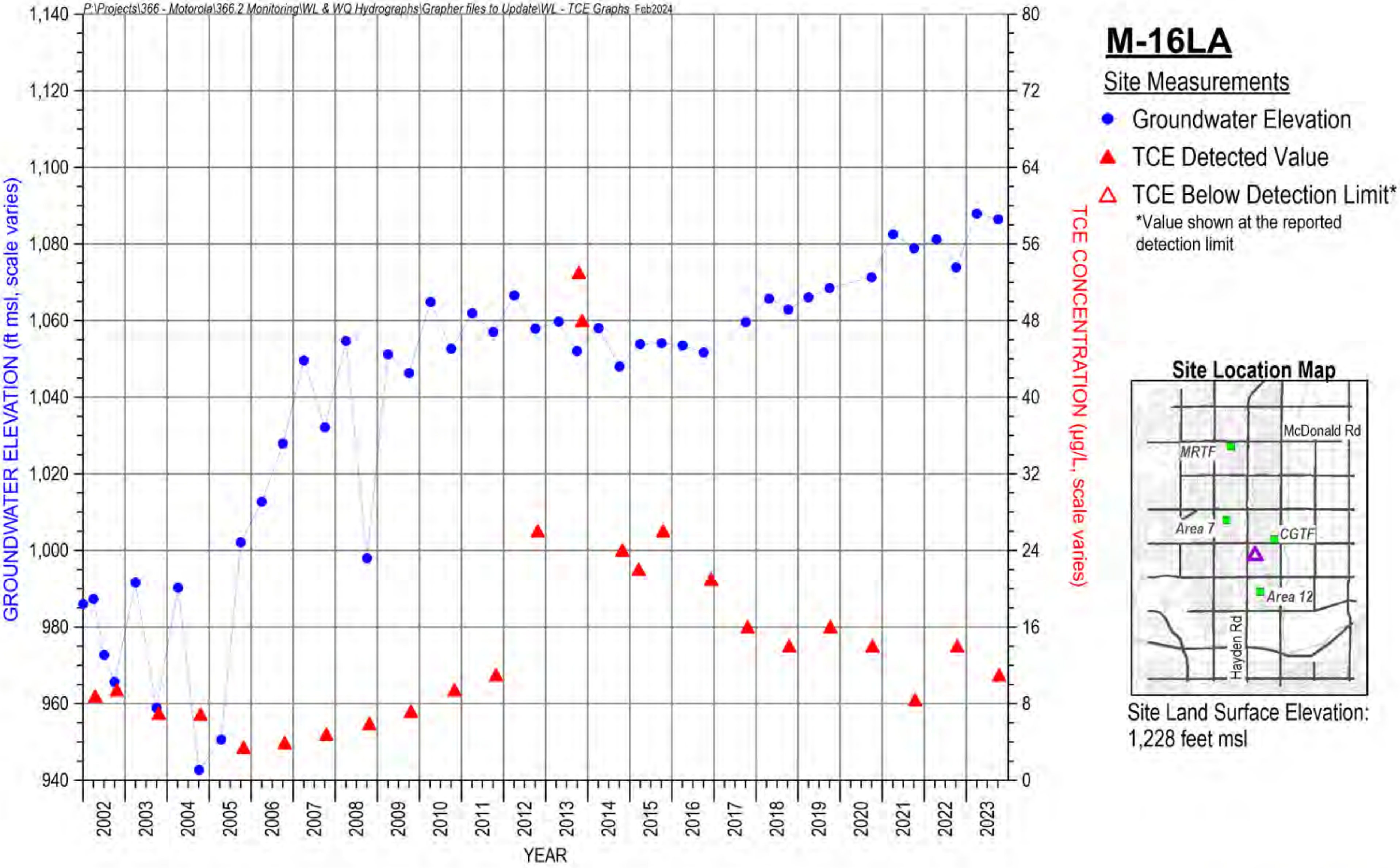


FIGURE D-052. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-16LA

North Indian Bend Wash Superfund Site

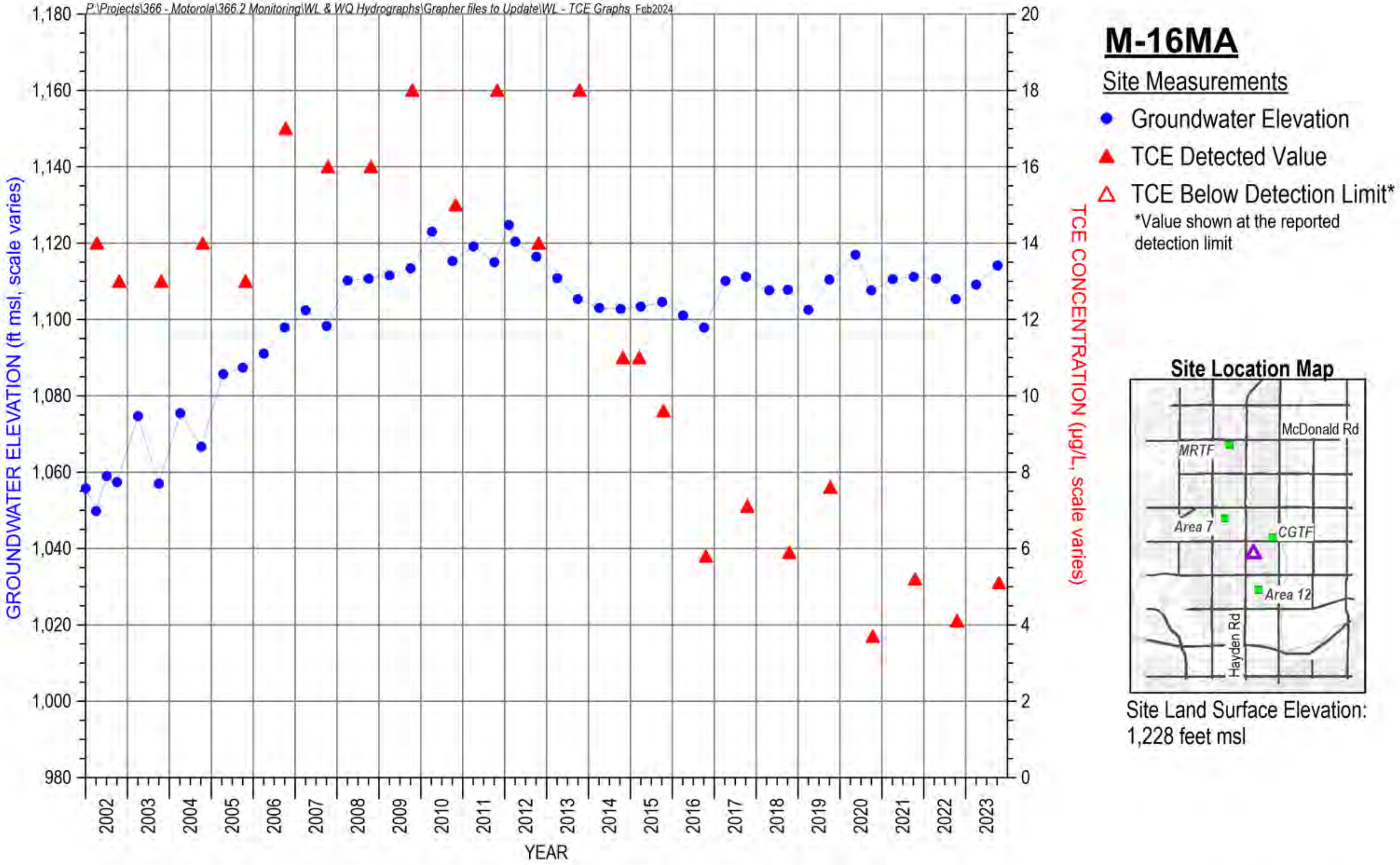
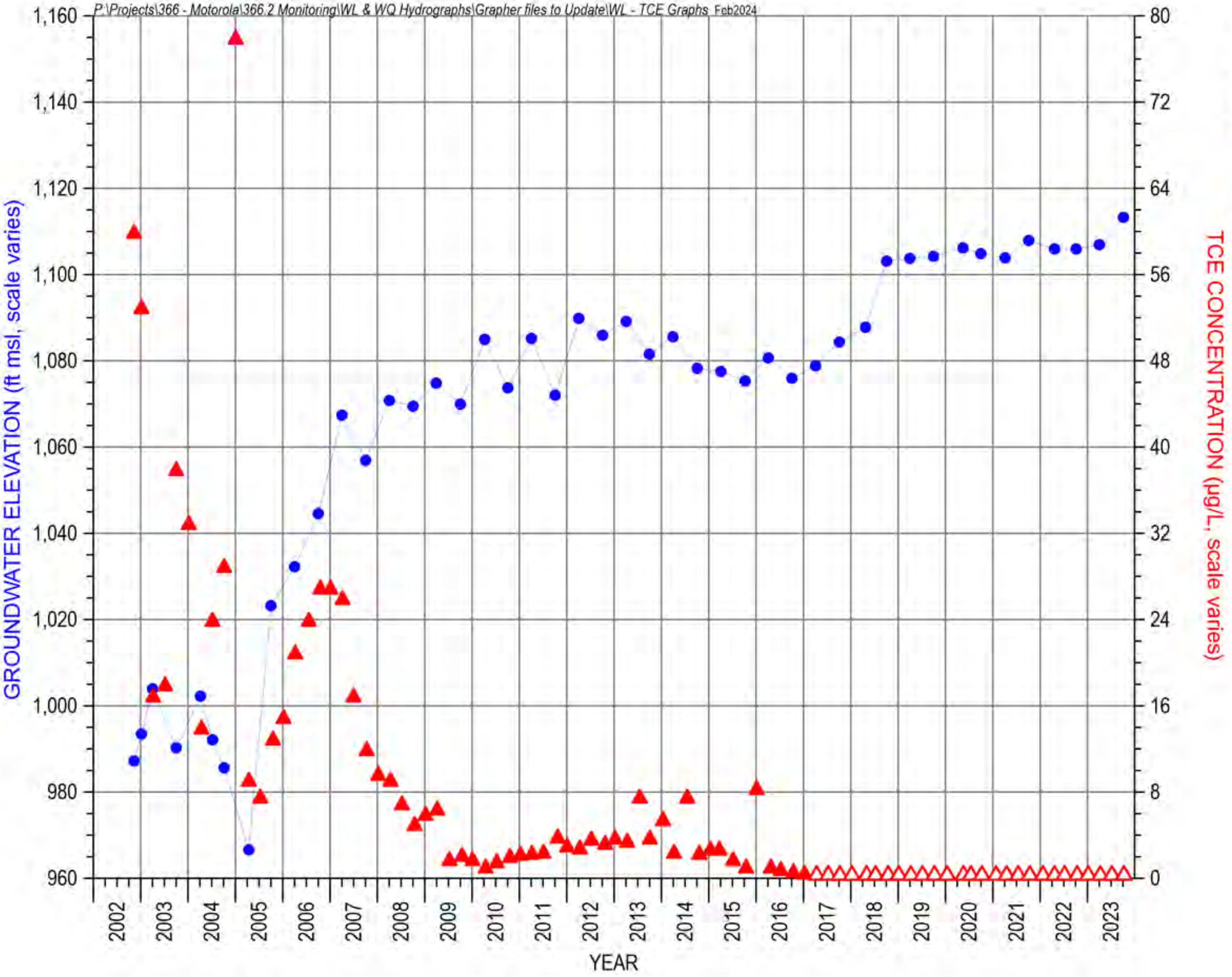


FIGURE D-053. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL M-16MA

North Indian Bend Wash Superfund Site

M-17MA/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:
1,238 feet msl

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

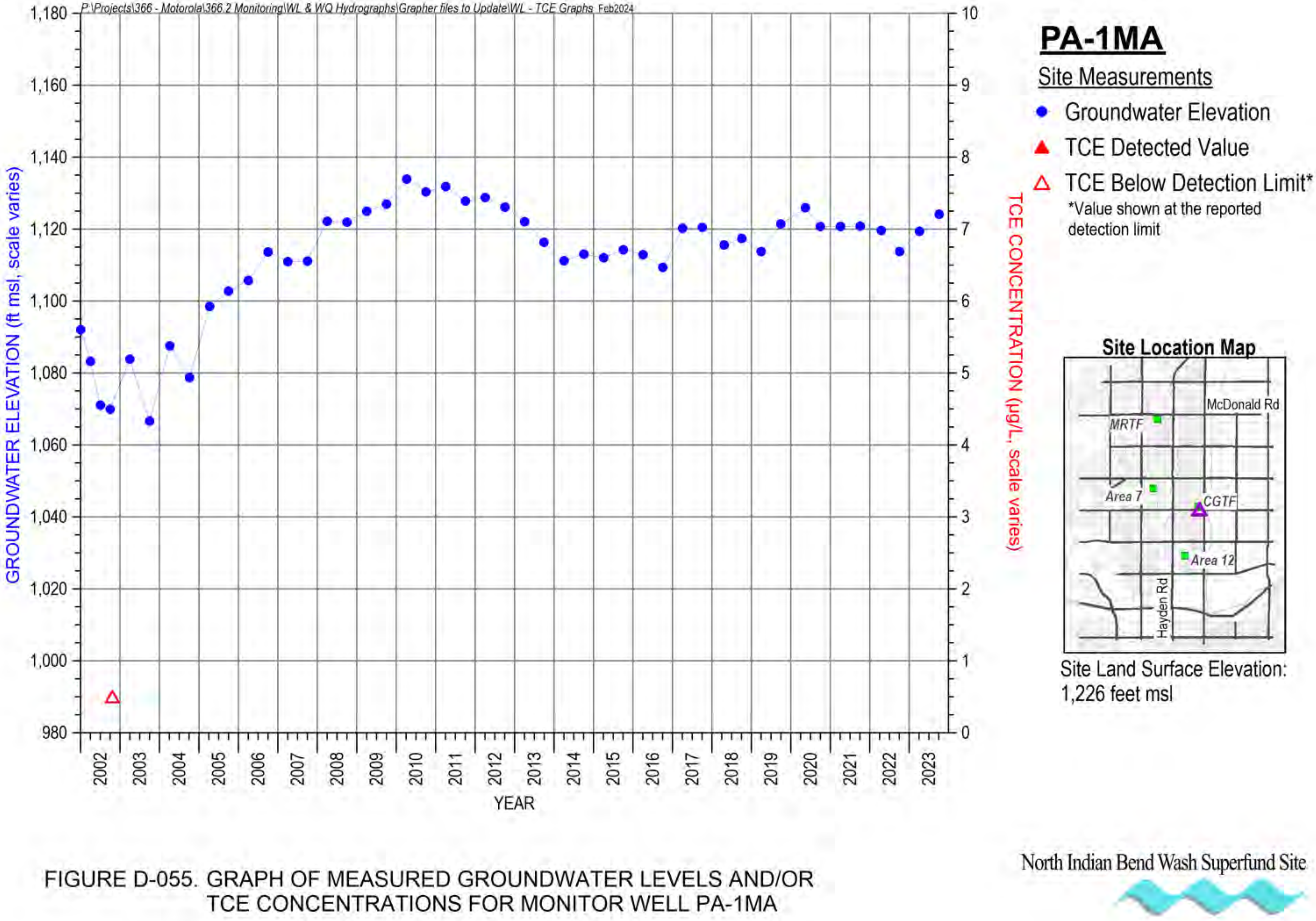


FIGURE D-055. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-1MA

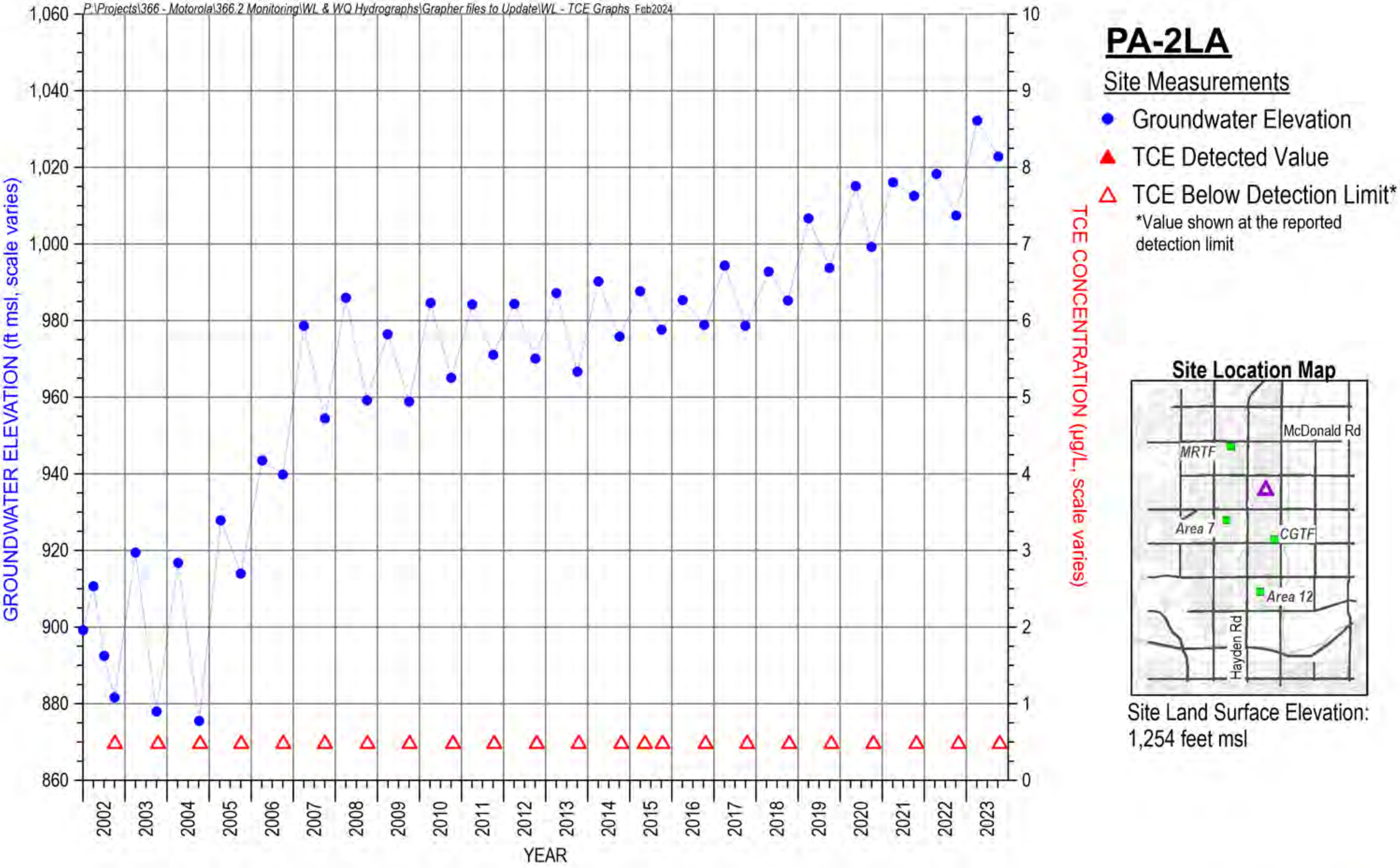
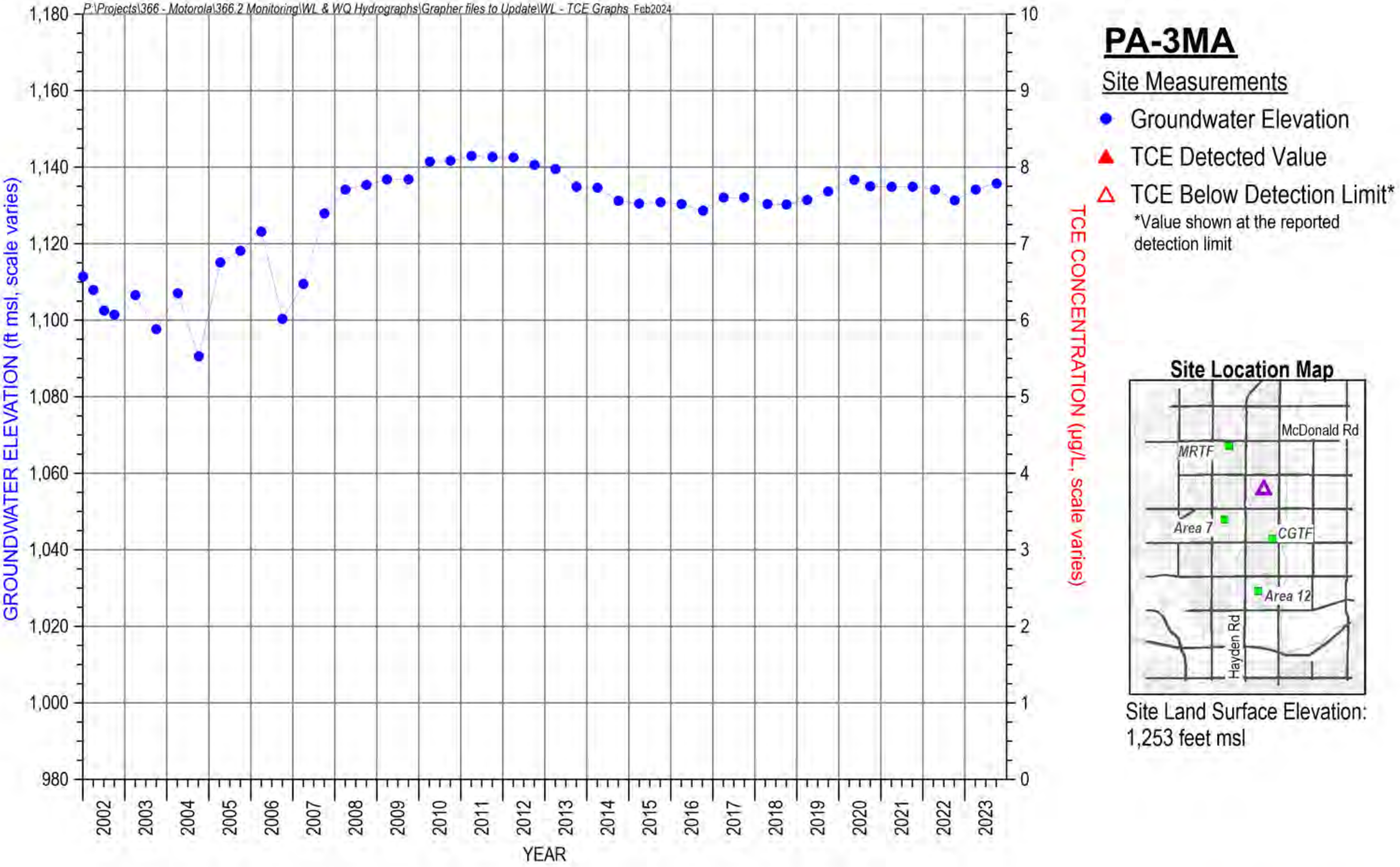


FIGURE D-056. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-2LA

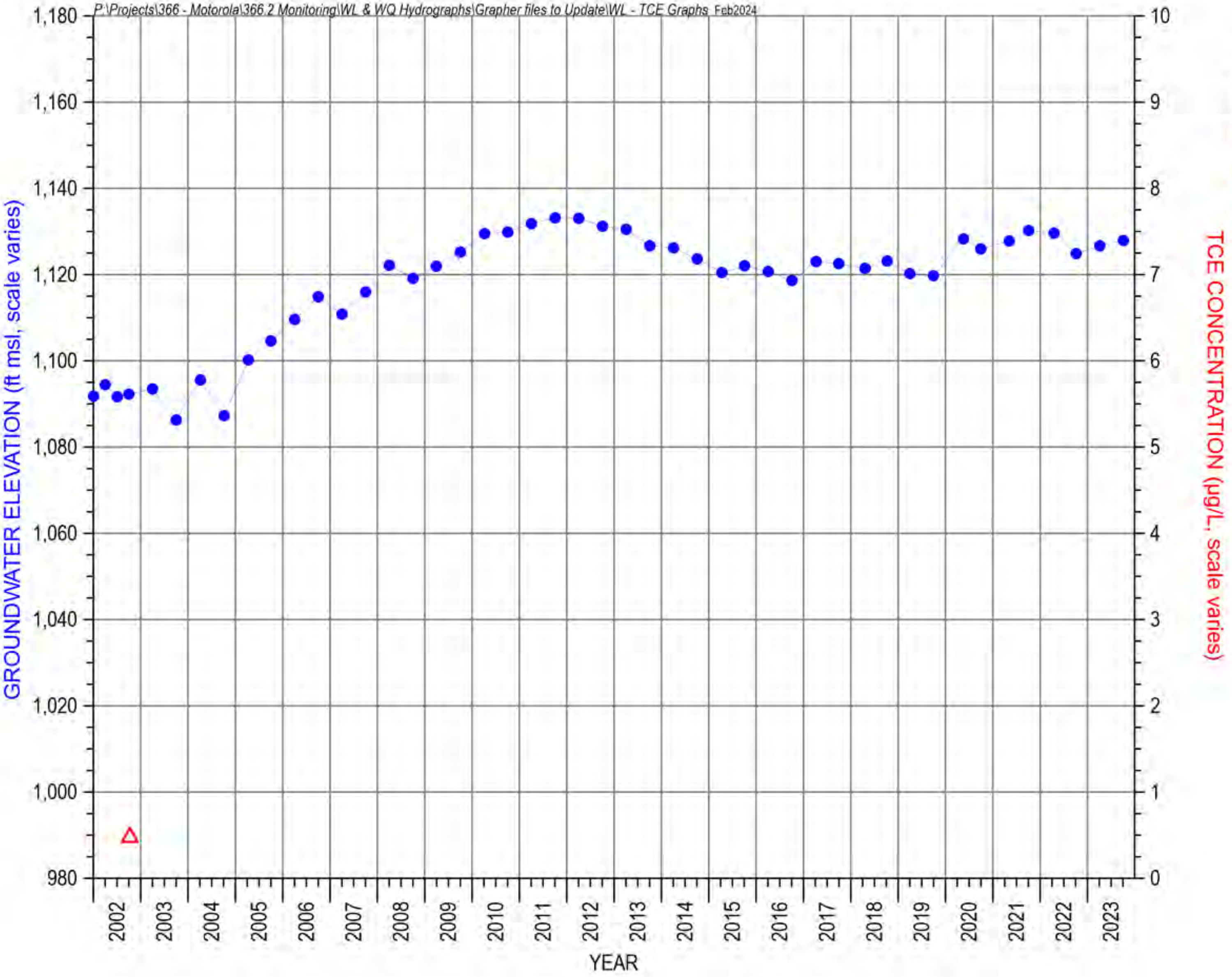
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,253 feet msl

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

North Indian Bend Wash Superfund Site



PA-4MA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

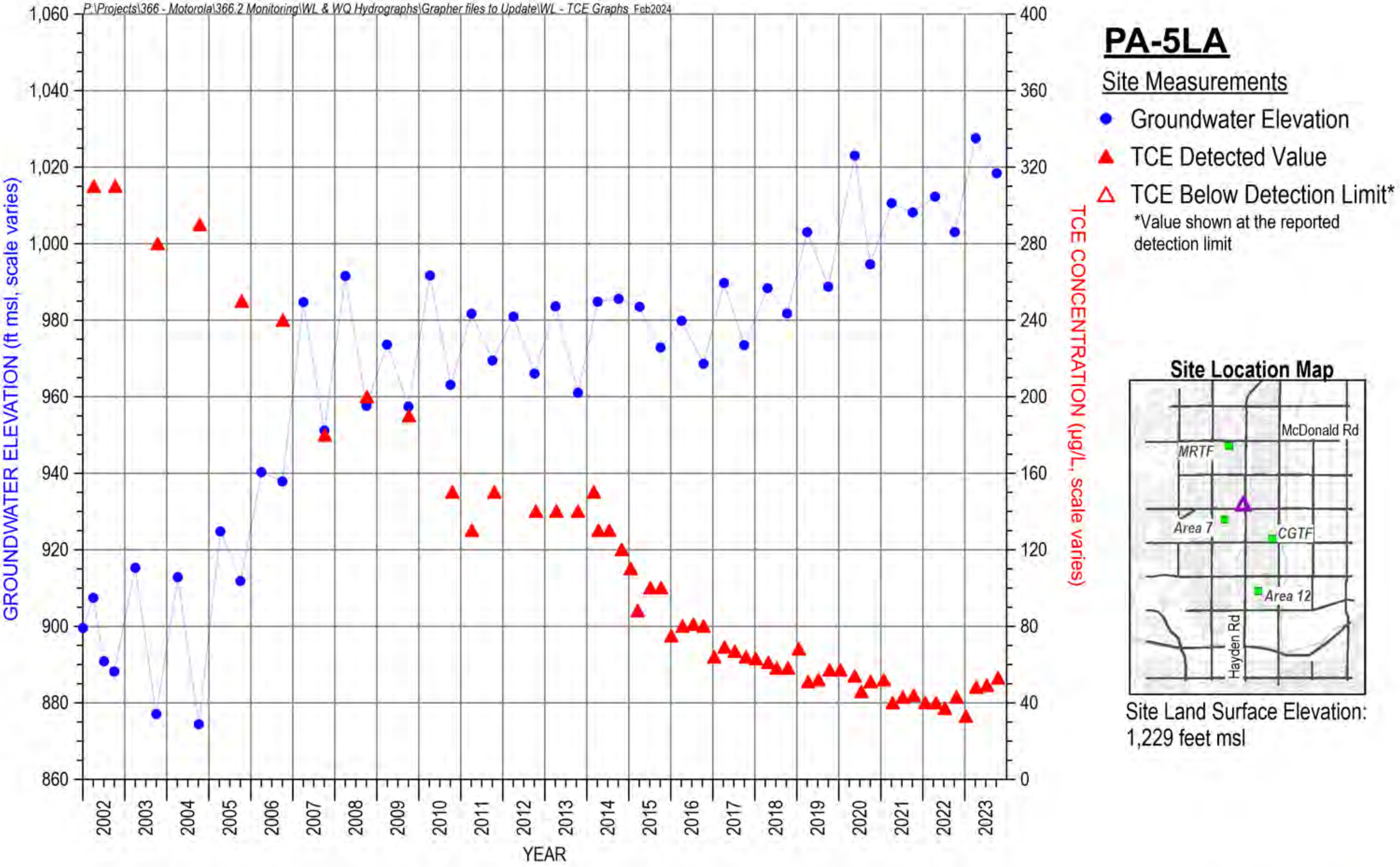
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,231 feet msl

North Indian Bend Wash Superfund Site

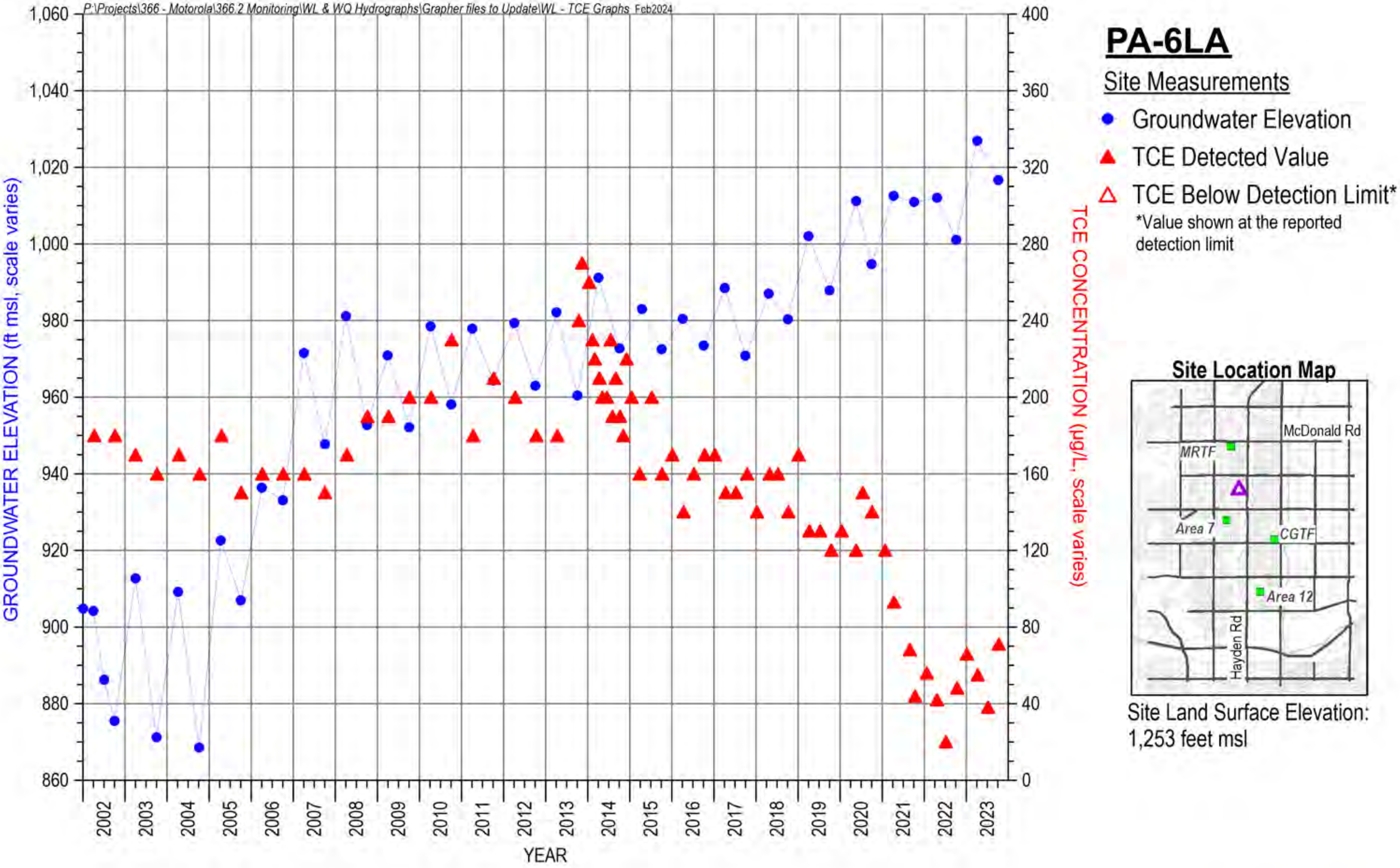
FIGURE D-058. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-4MA



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

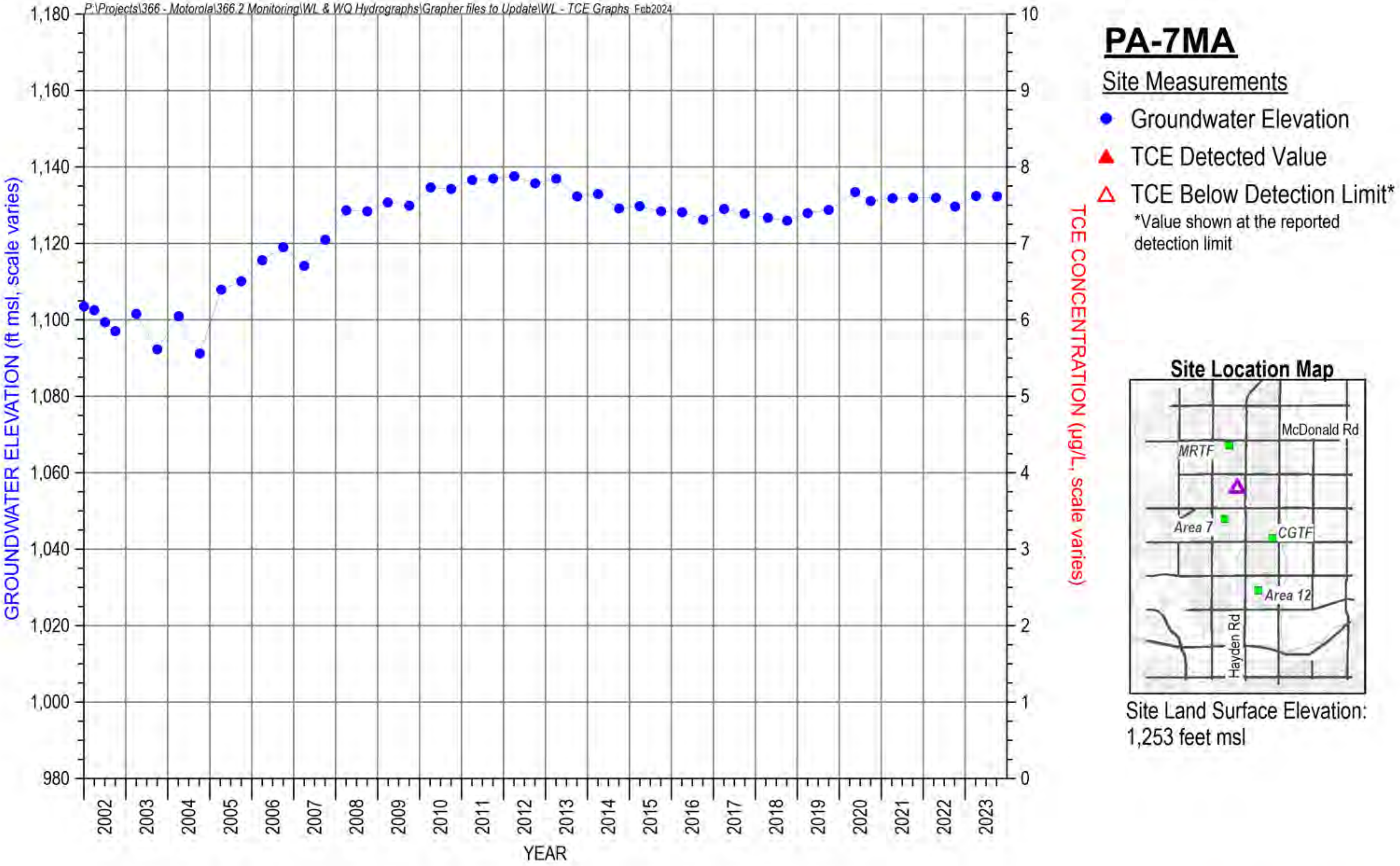
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,253 feet msl

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

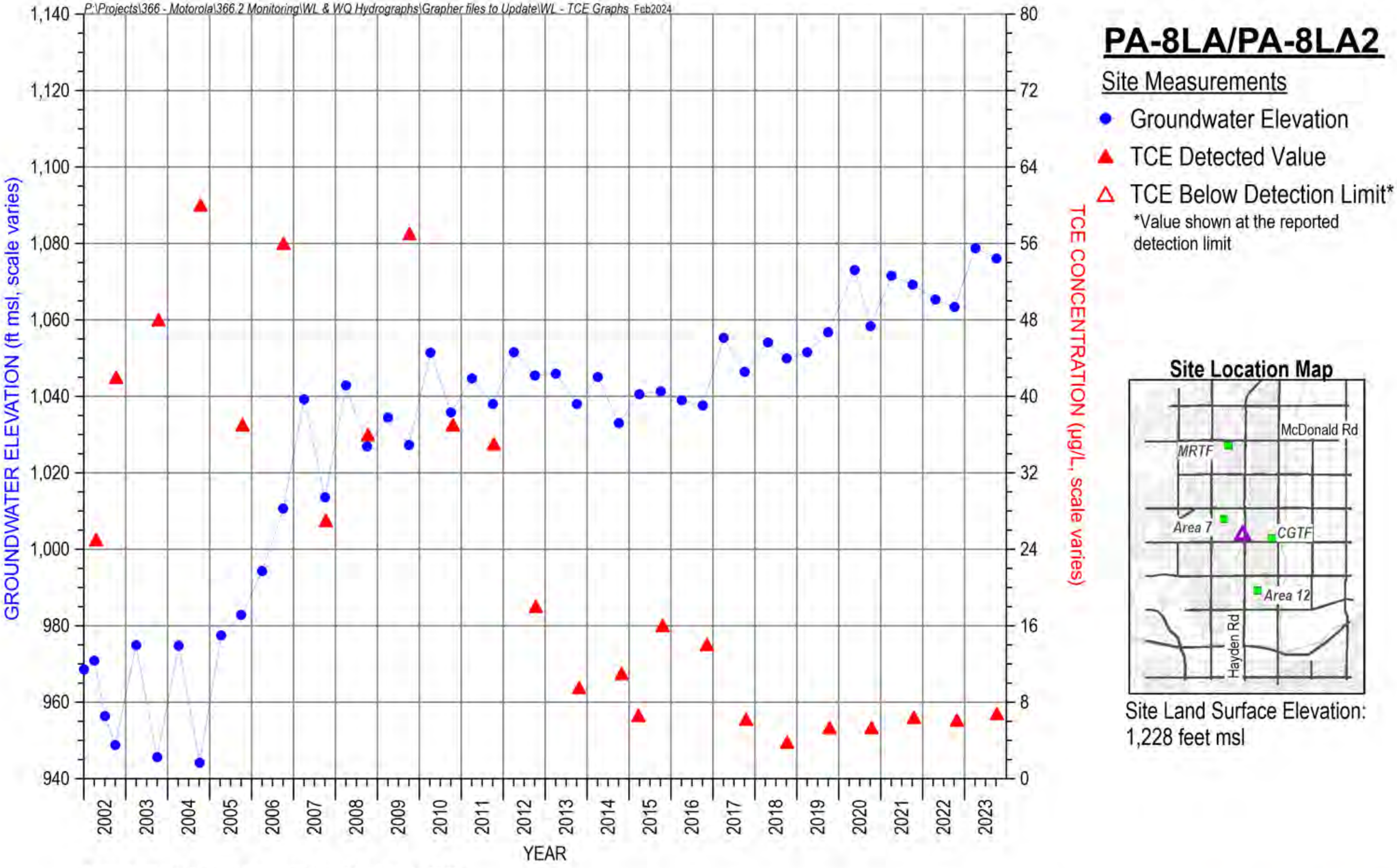
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,253 feet msl

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

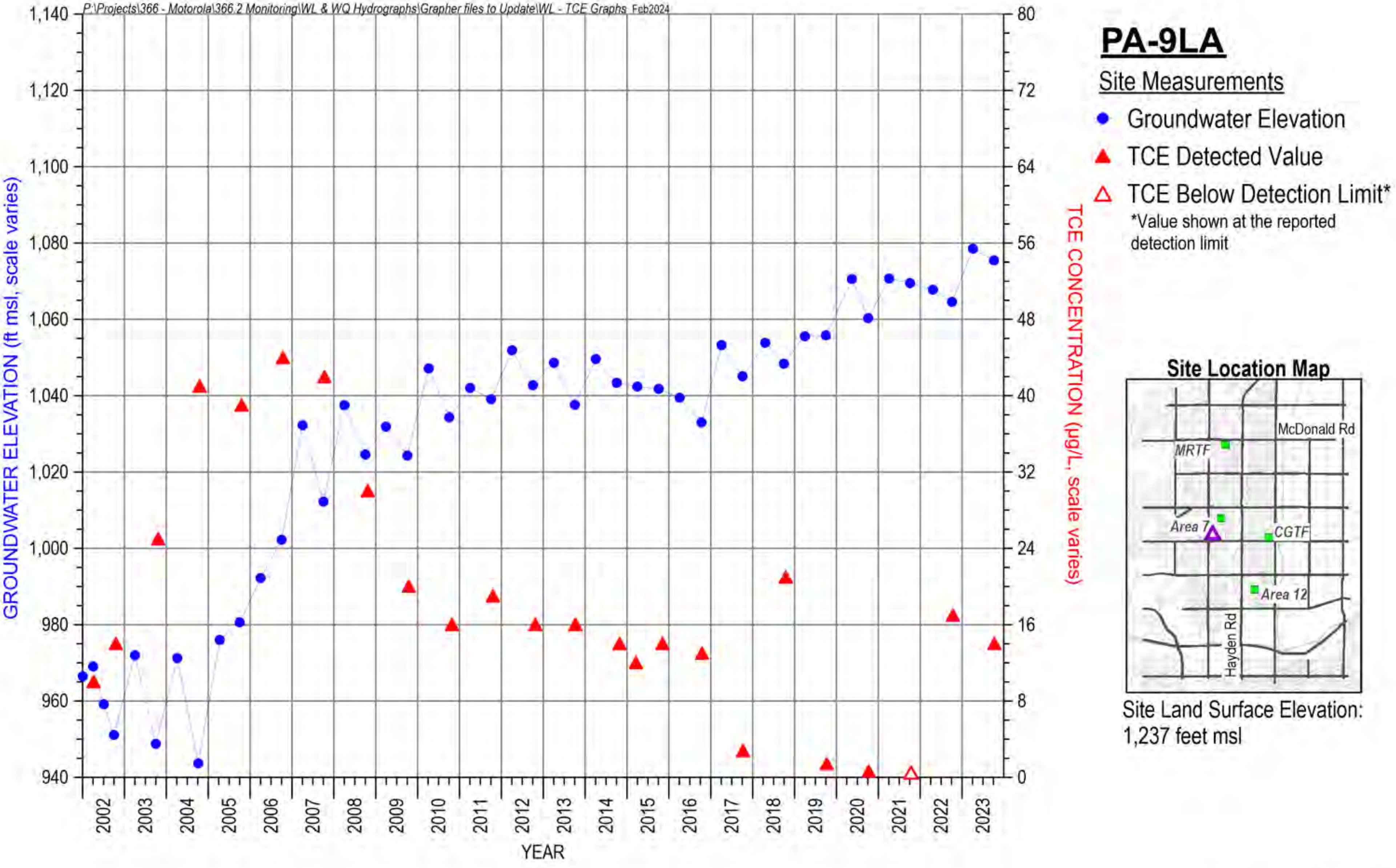
North Indian Bend Wash Superfund Site



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



North Indian Bend Wash Superfund Site

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

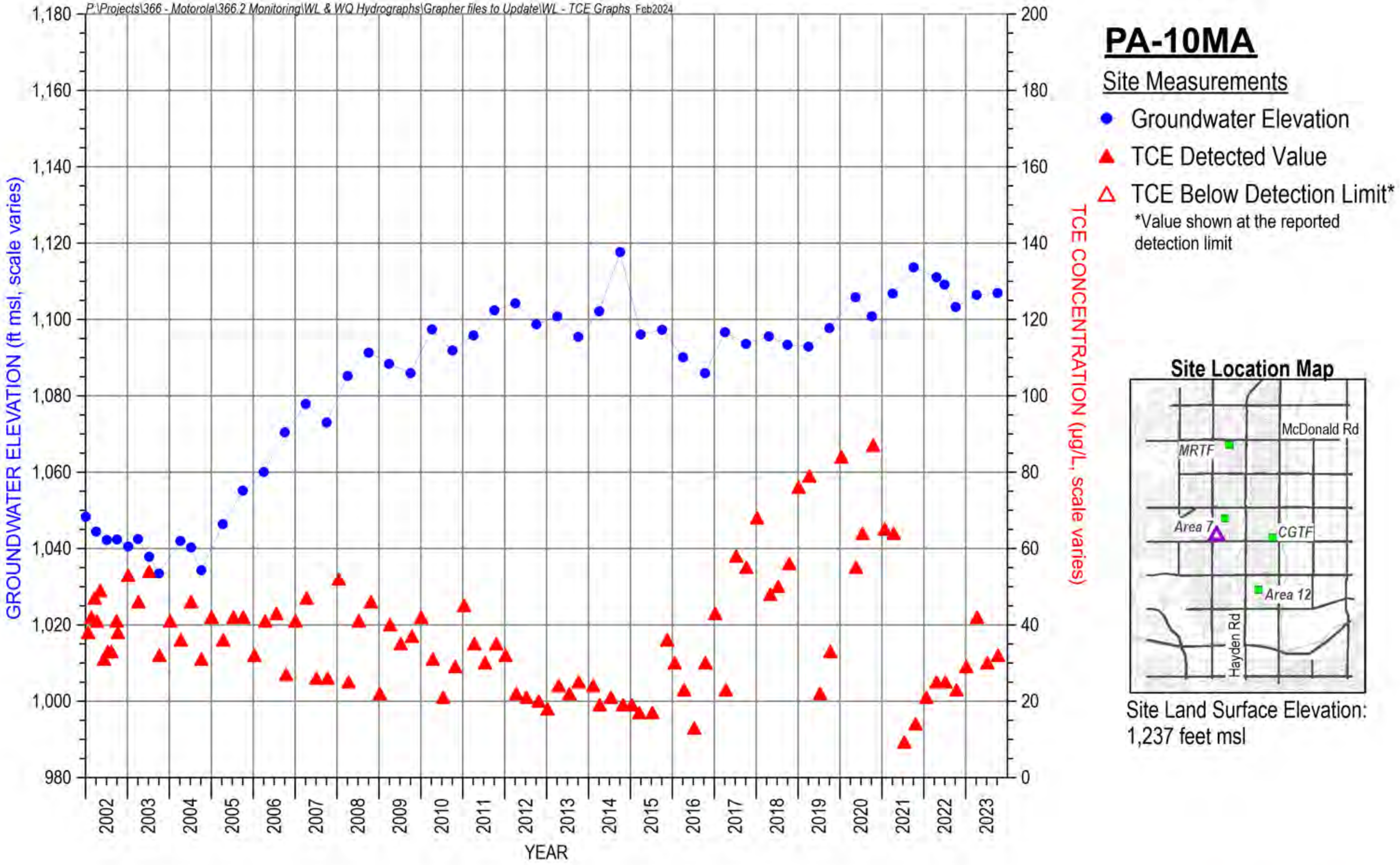
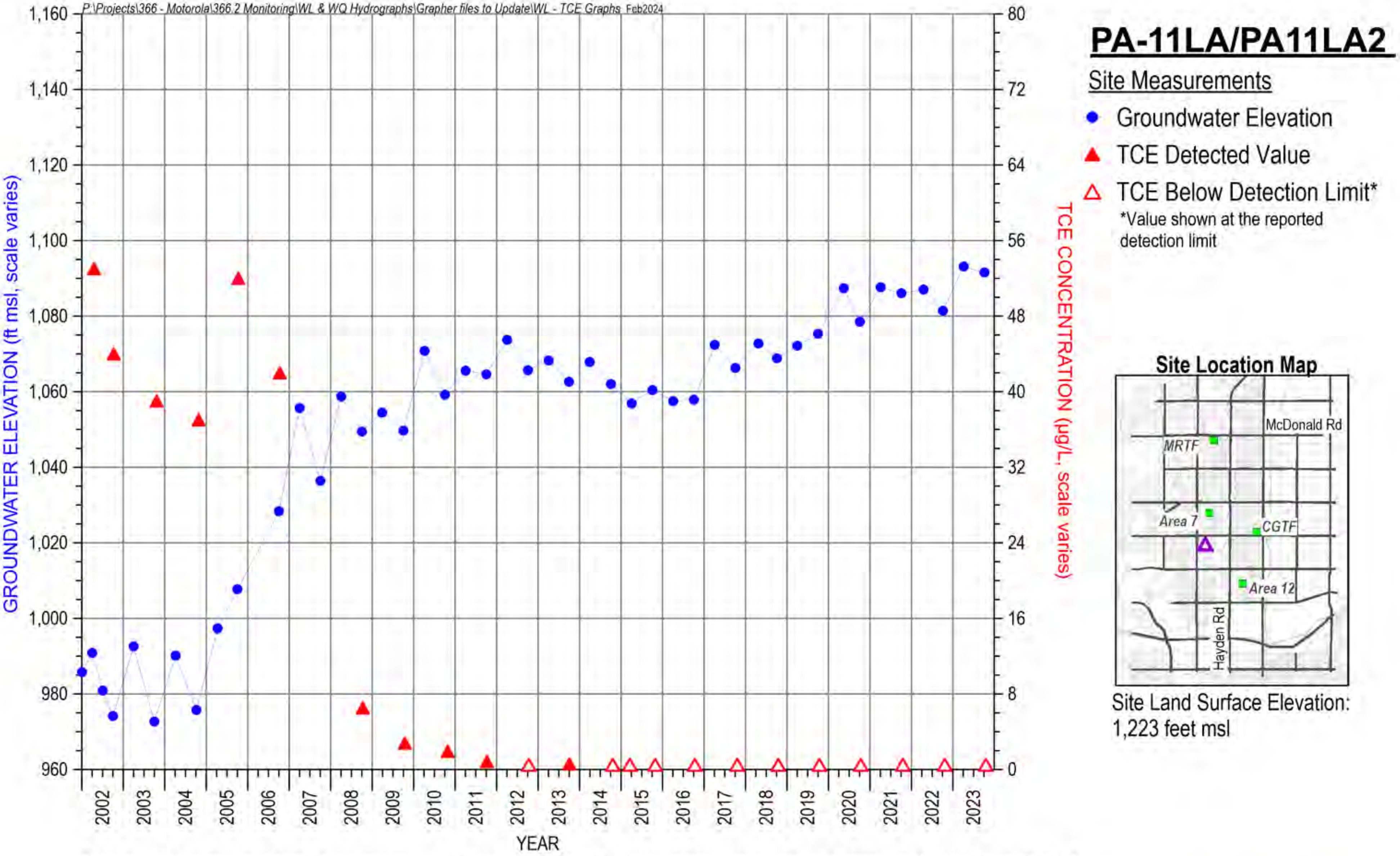


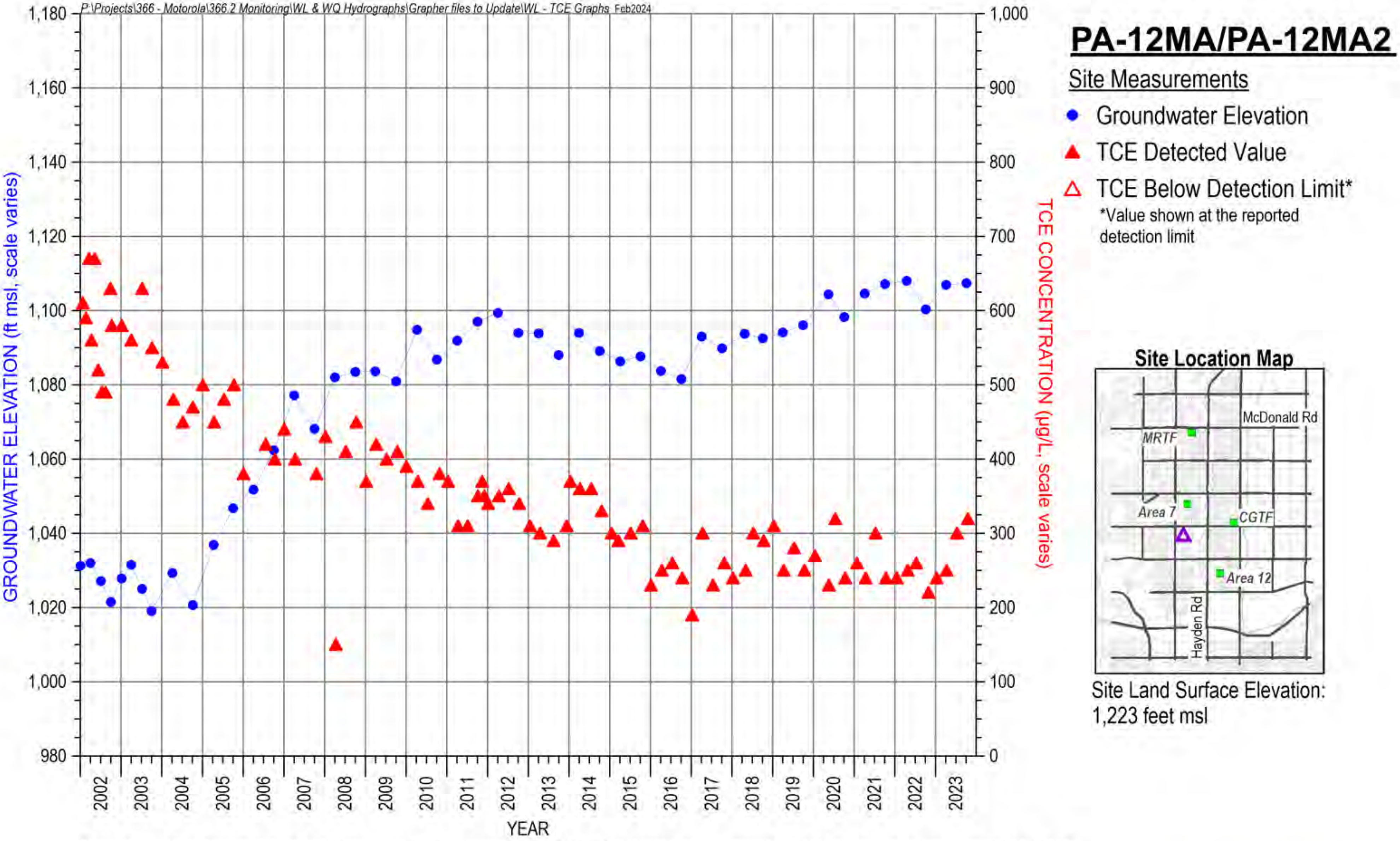
FIGURE D-064. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-10MA



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 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.

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

North Indian Bend Wash Superfund Site

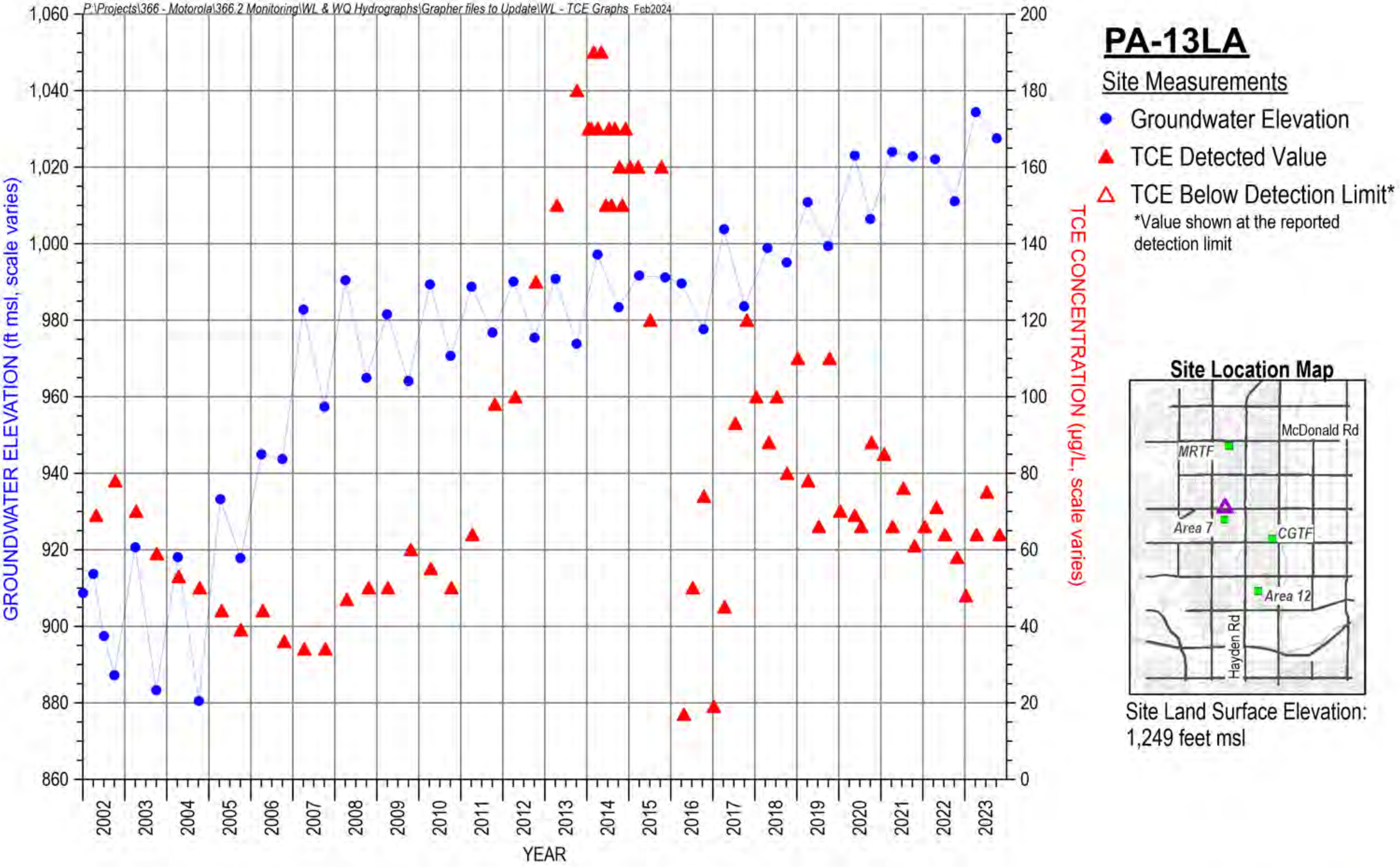
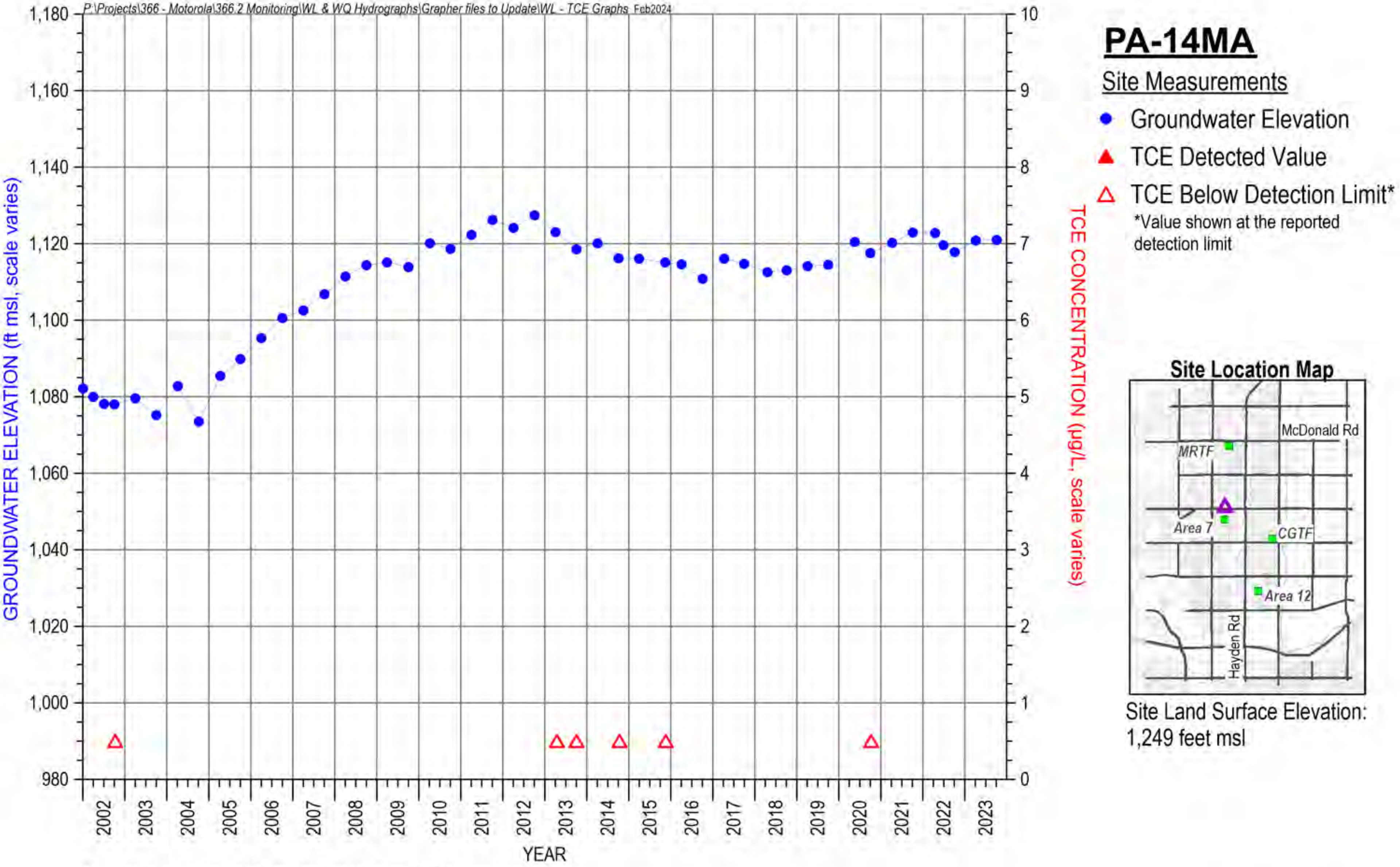


FIGURE D-067. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-13LA

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

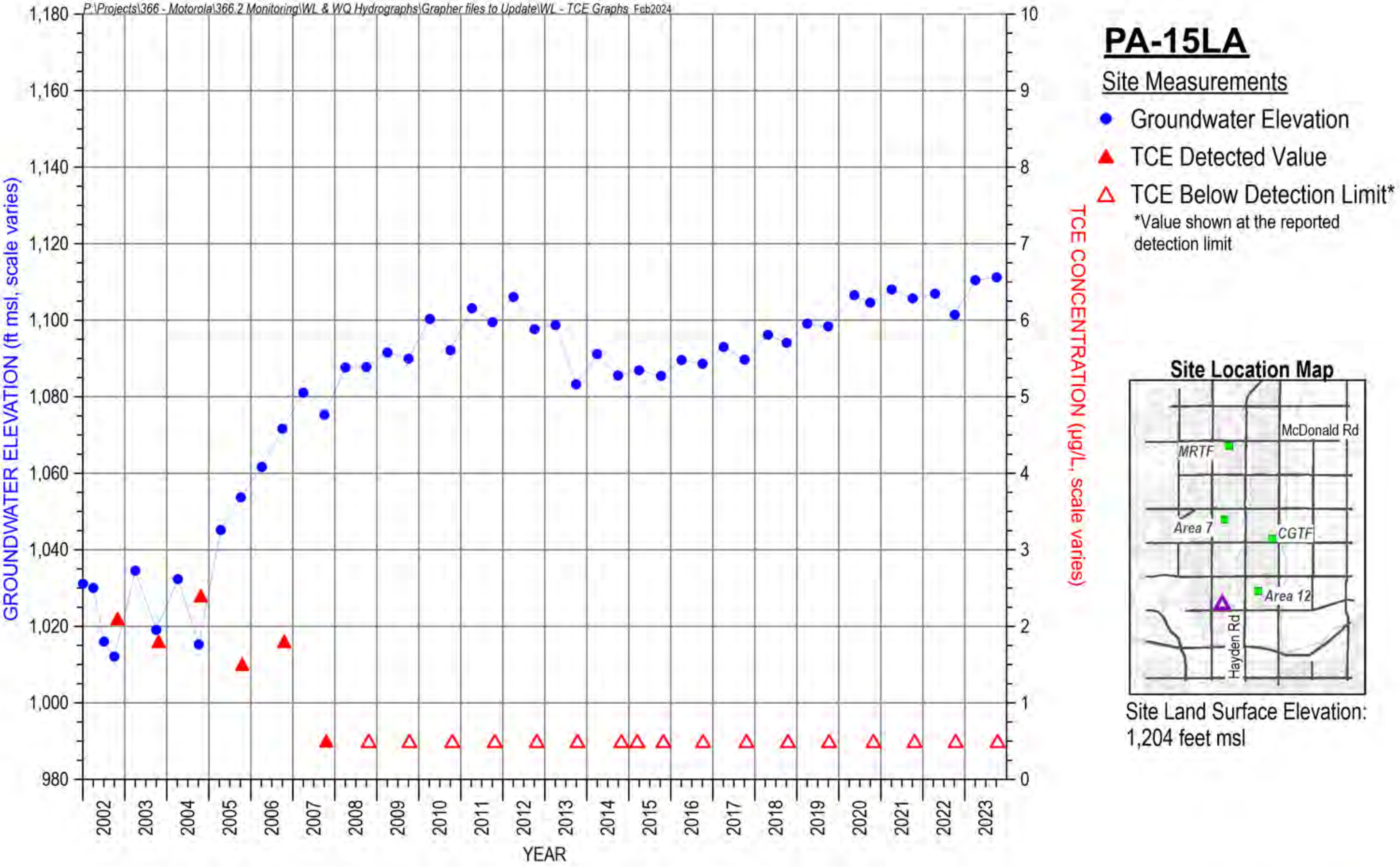


FIGURE D-069. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-15LA

North Indian Bend Wash Superfund Site

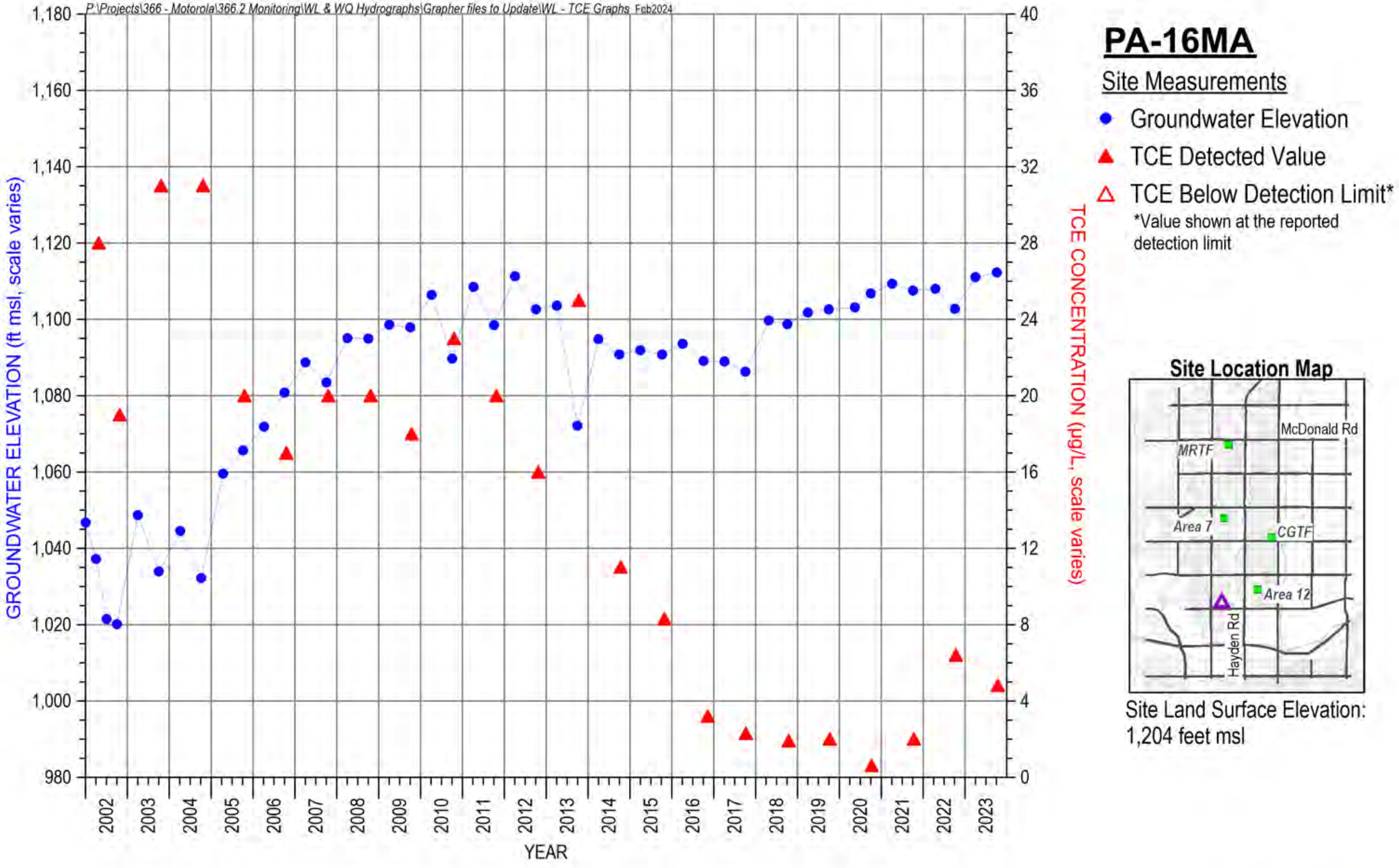
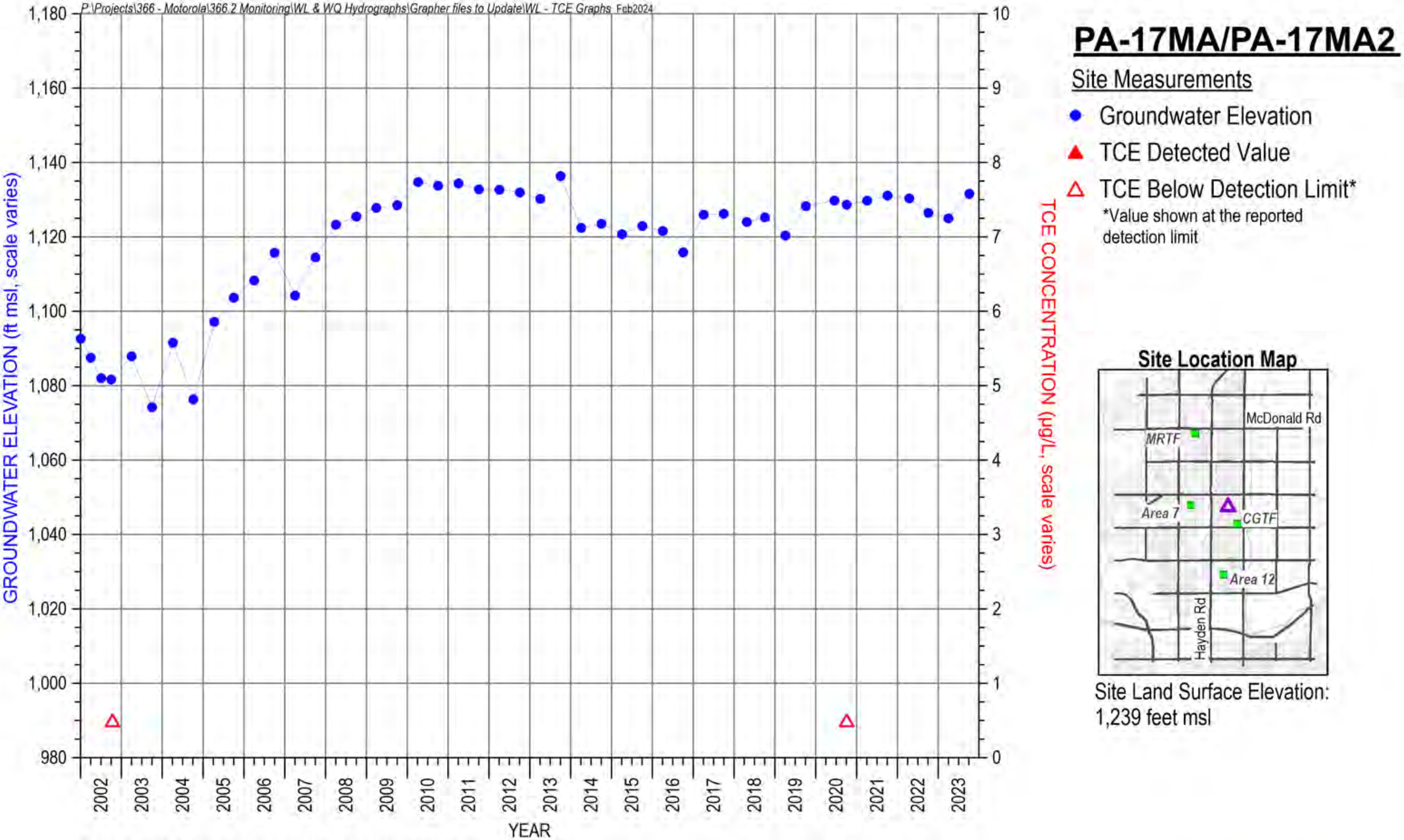


FIGURE D-070. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-16MA



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

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

North Indian Bend Wash Superfund Site

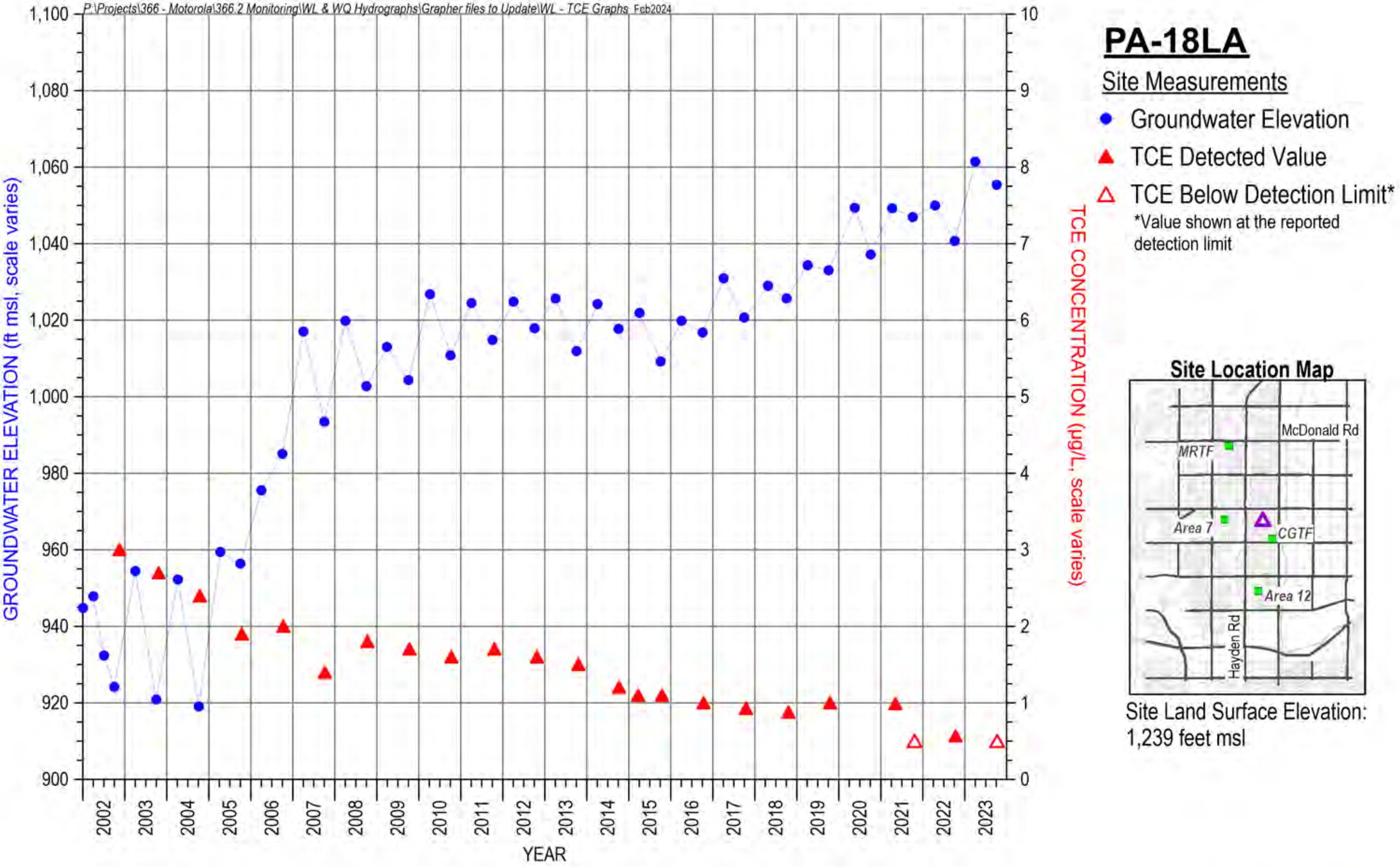


FIGURE D-072. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-18LA

North Indian Bend Wash Superfund Site

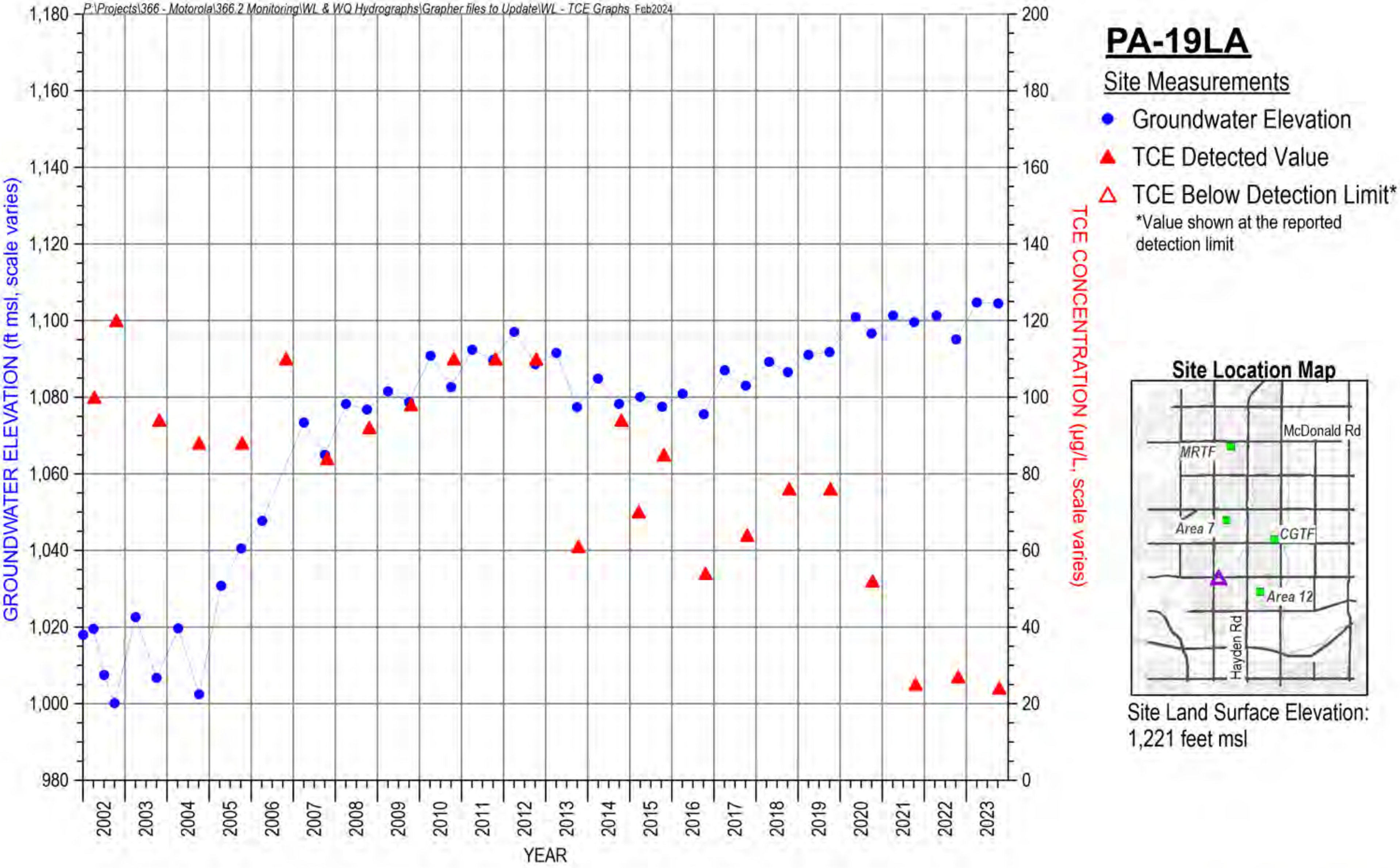


FIGURE D-073. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-19LA

North Indian Bend Wash Superfund Site

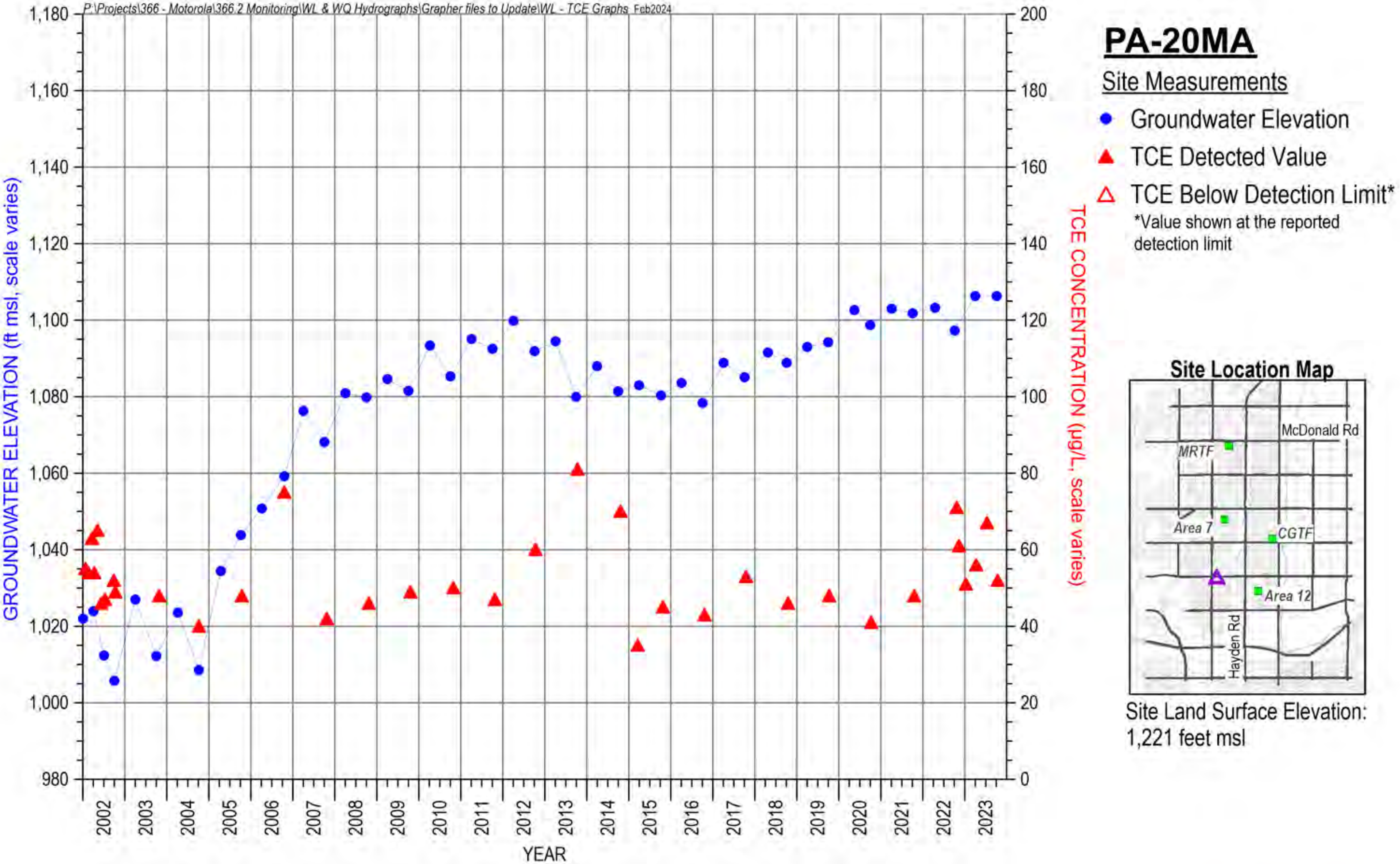


FIGURE D-074. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PA-20MA

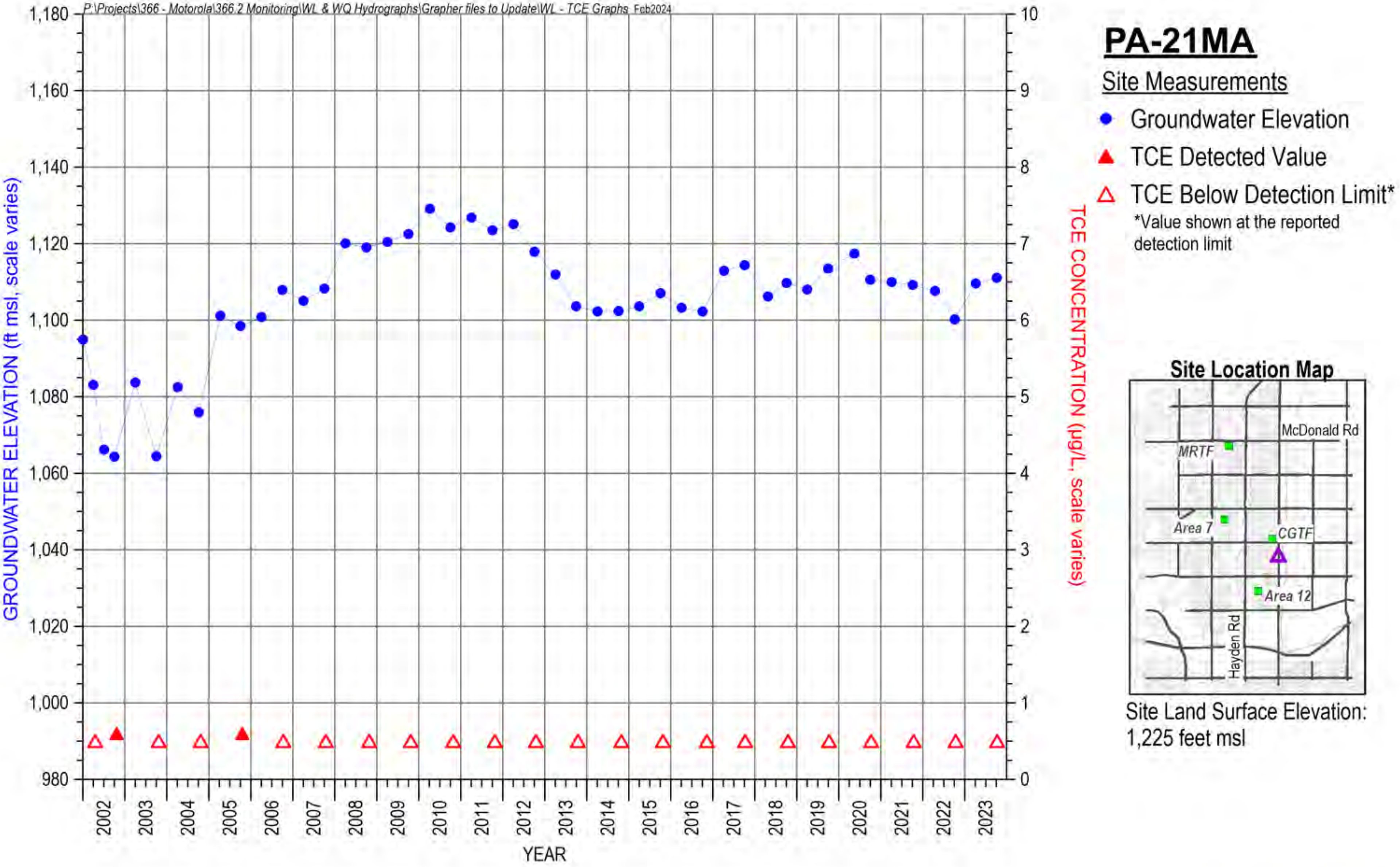
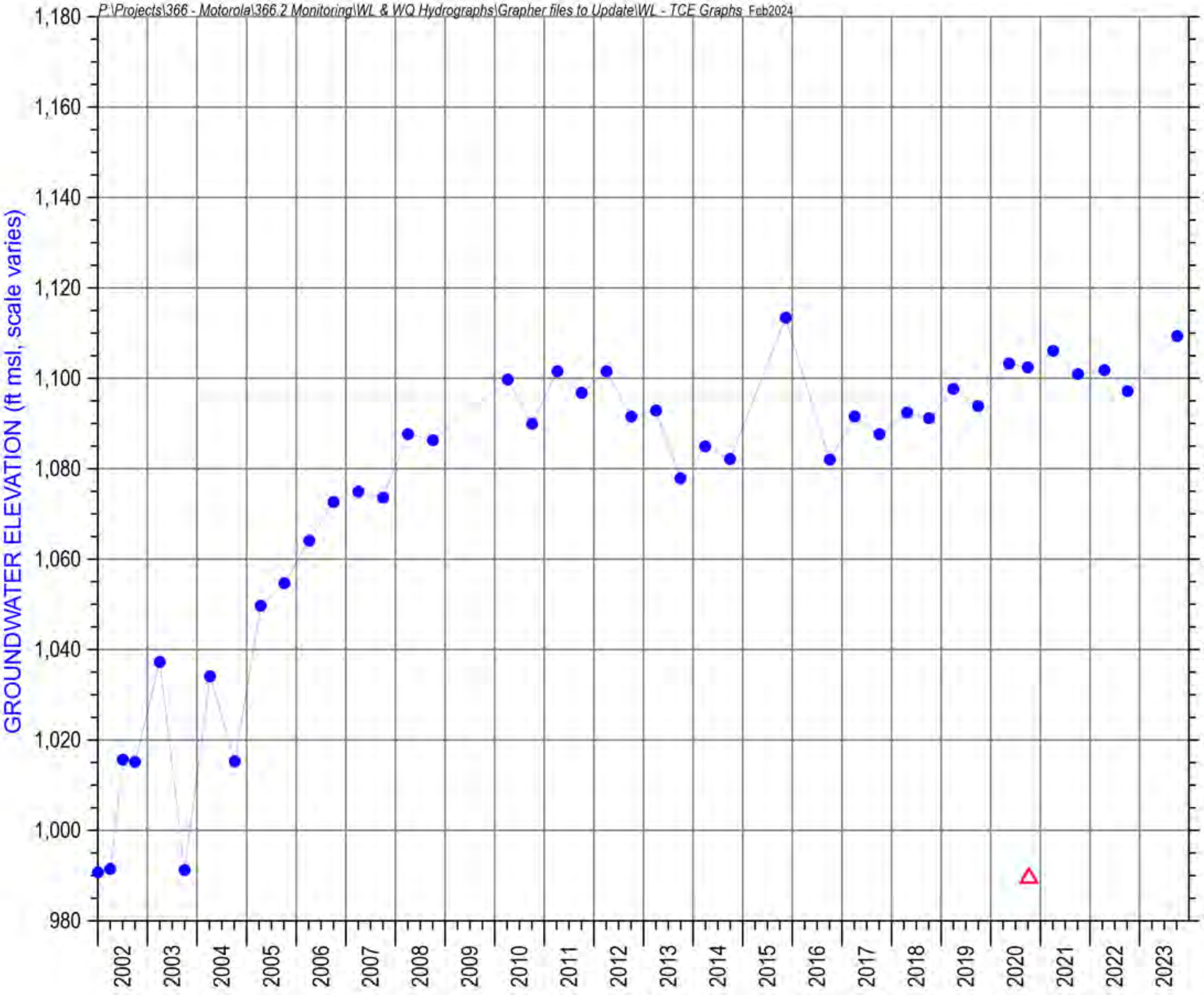


FIGURE D-075. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR
TCE CONCENTRATIONS FOR MONITOR WELL PA-21MA



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

PA-22LA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

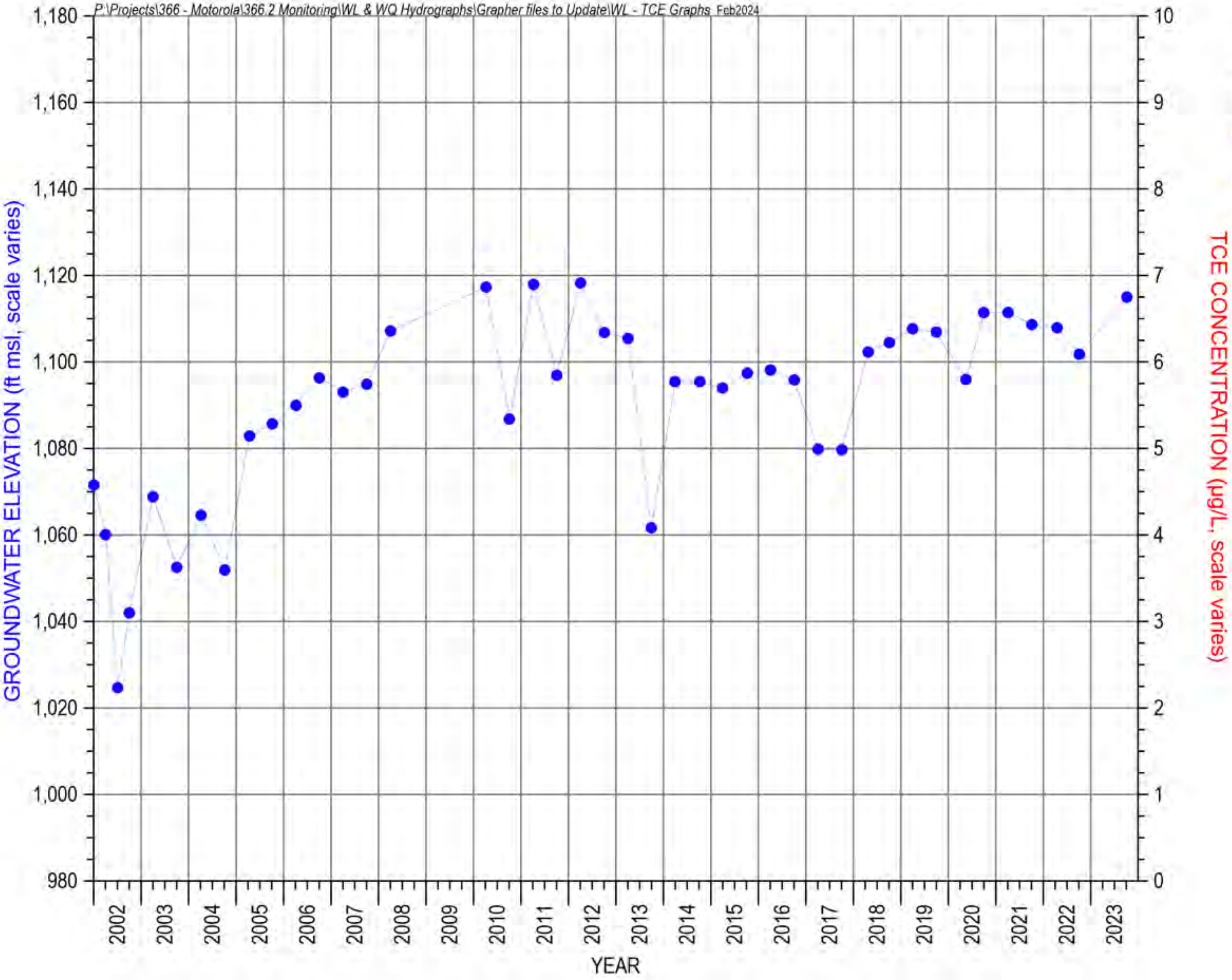
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,184 feet msl

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

North Indian Bend Wash Superfund Site



PA-23MA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

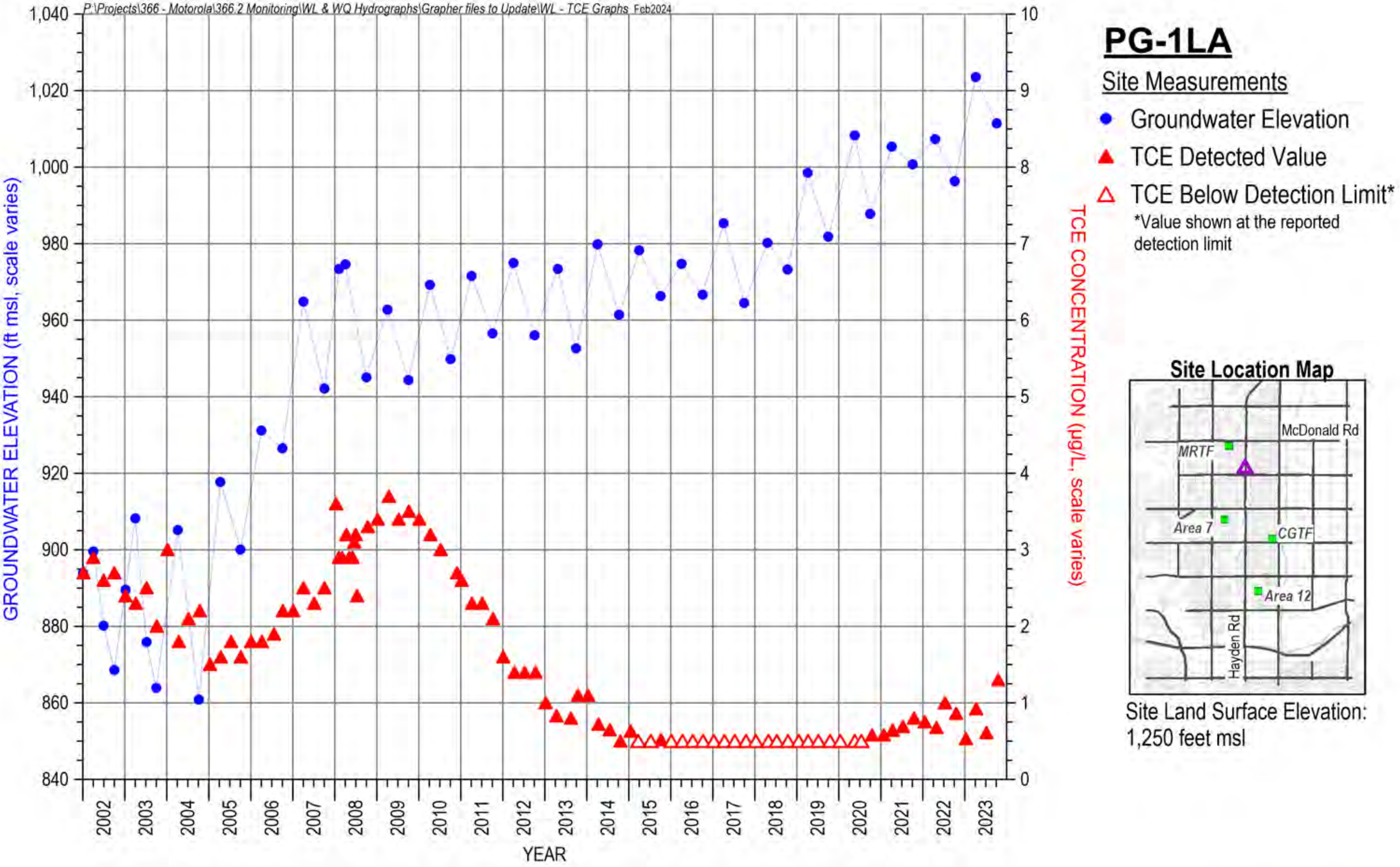
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,184 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

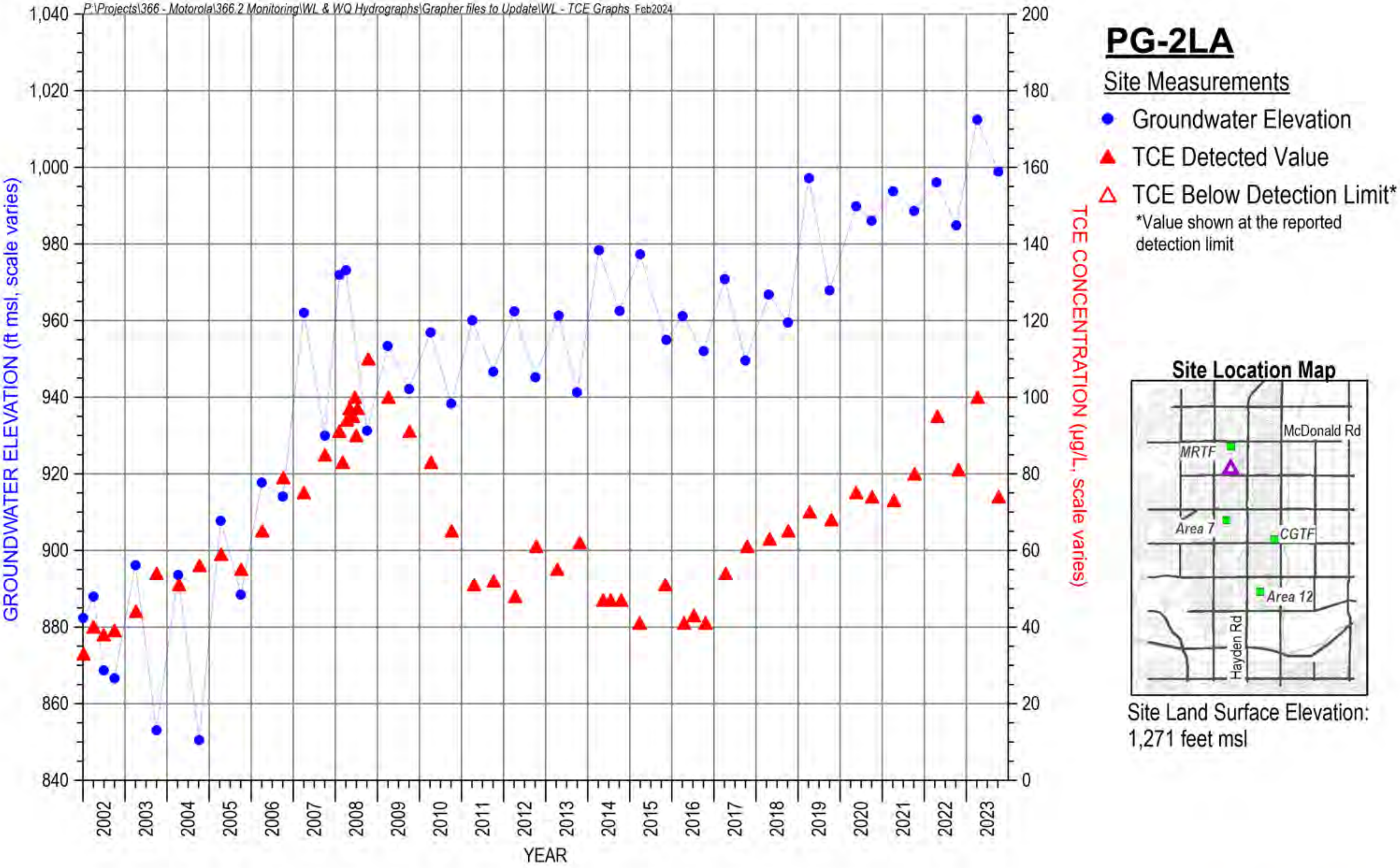
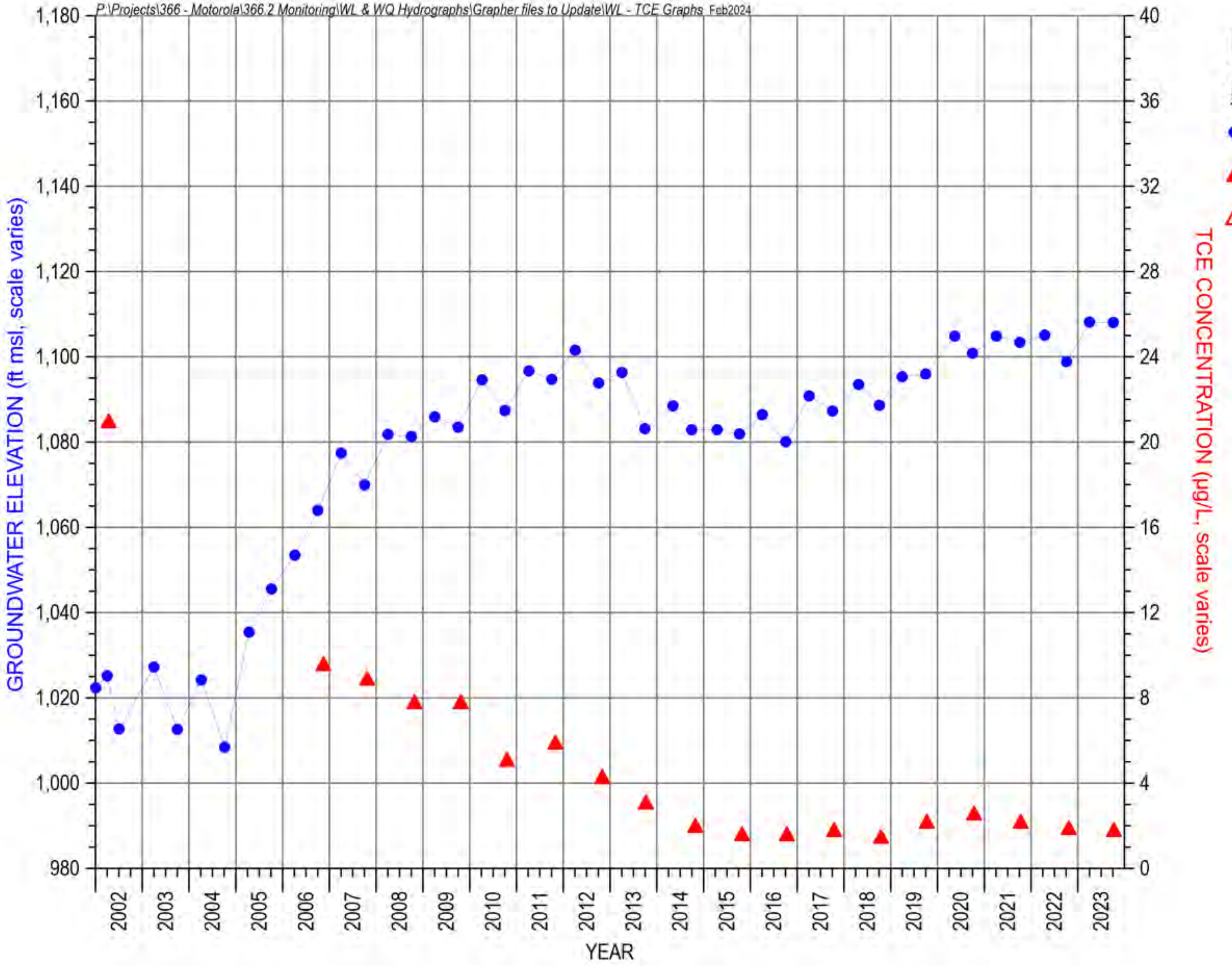


FIGURE D-079. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-2LA

North Indian Bend Wash Superfund Site



PG-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:
1,227 feet msl

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

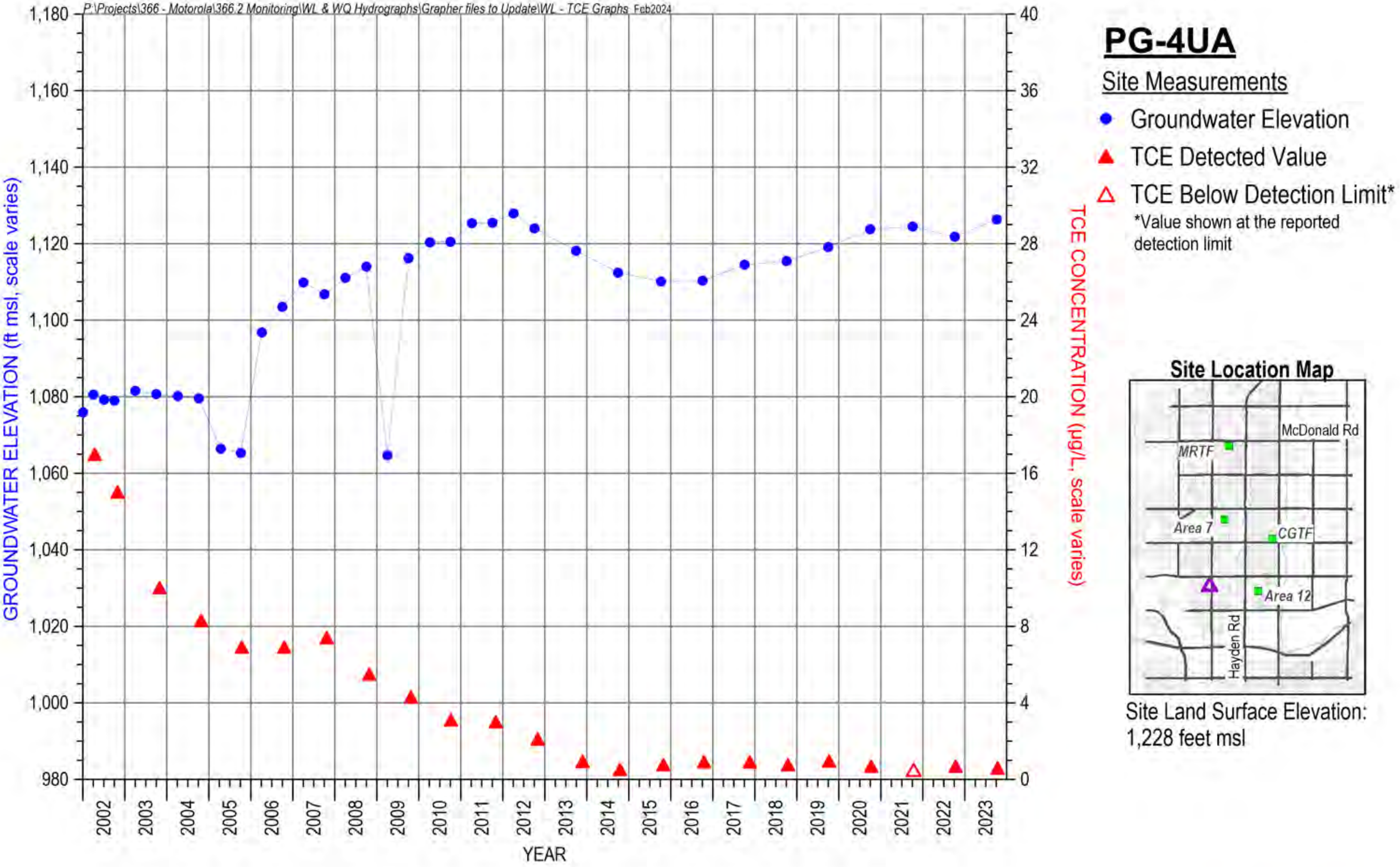
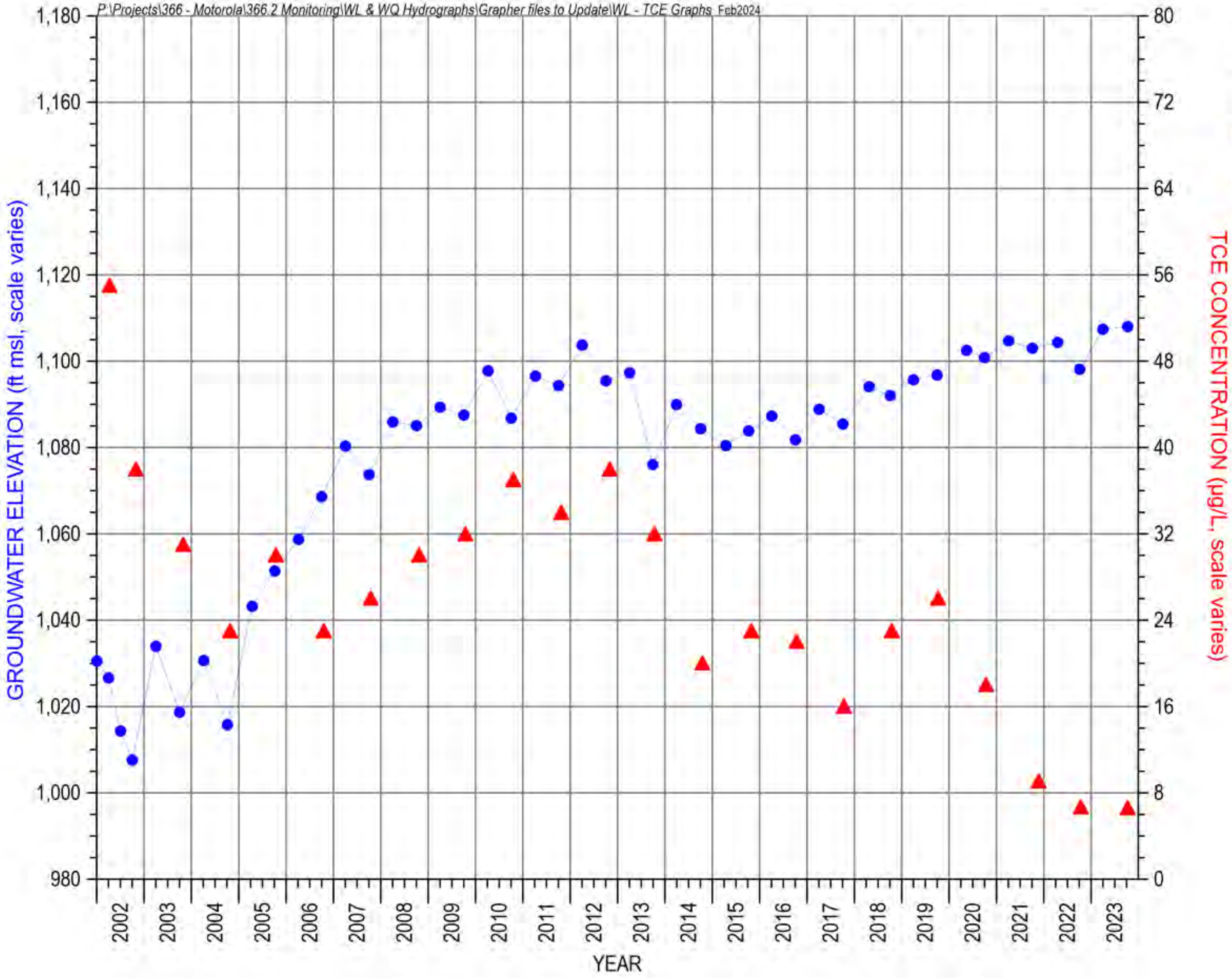


FIGURE D-081. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-4UA



PG-5MA

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:
1,214 feet msl

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

North Indian Bend Wash Superfund Site

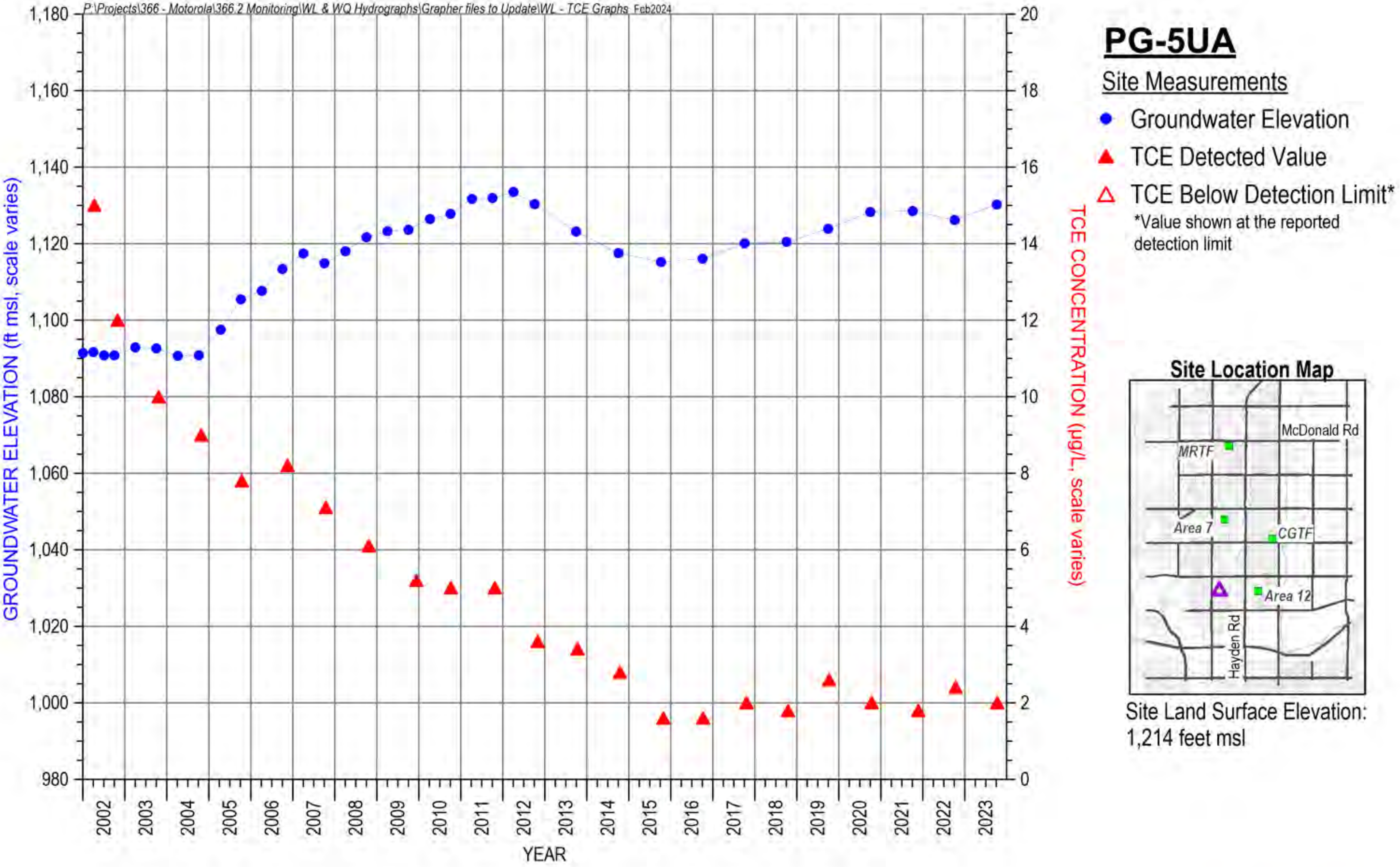
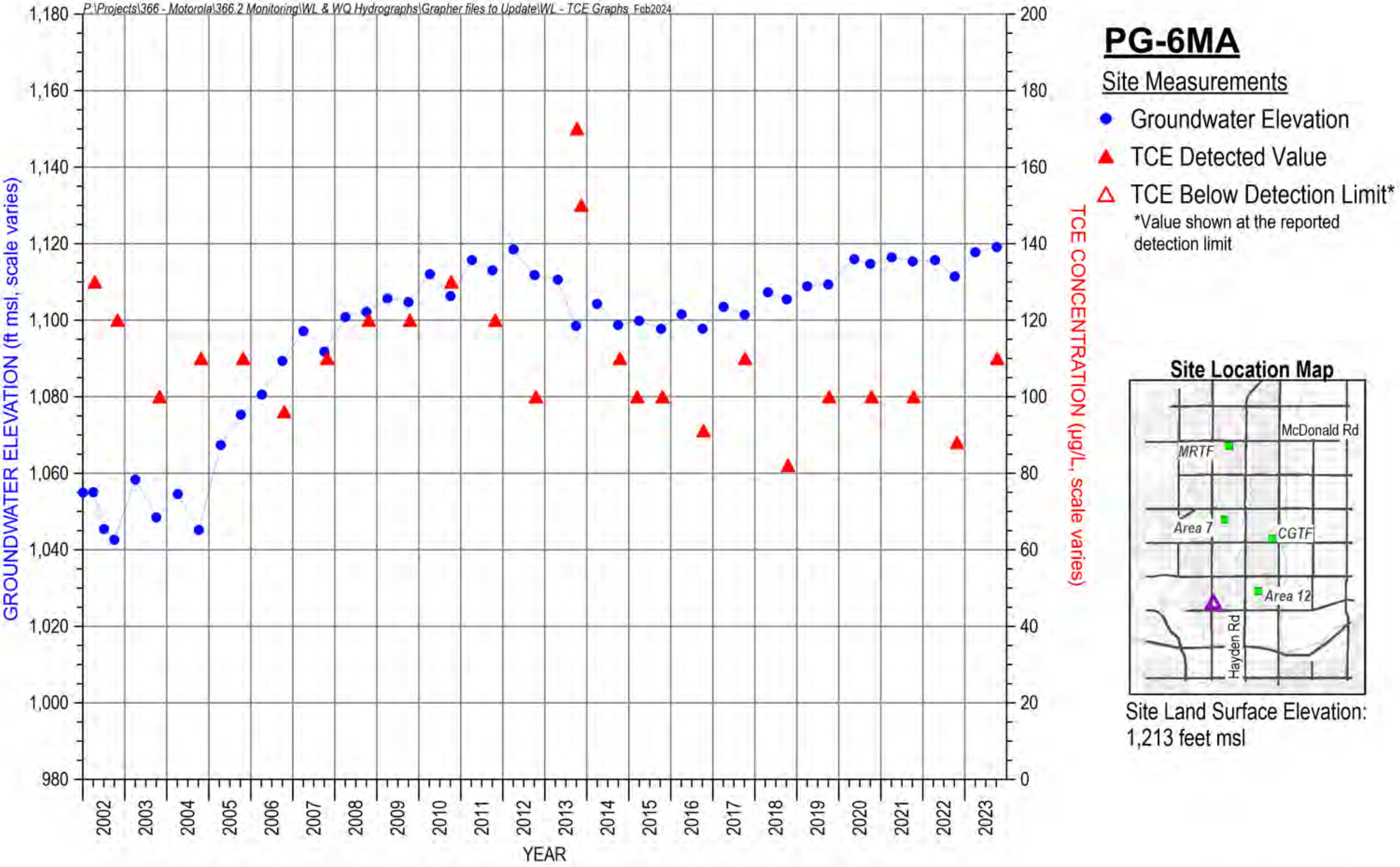


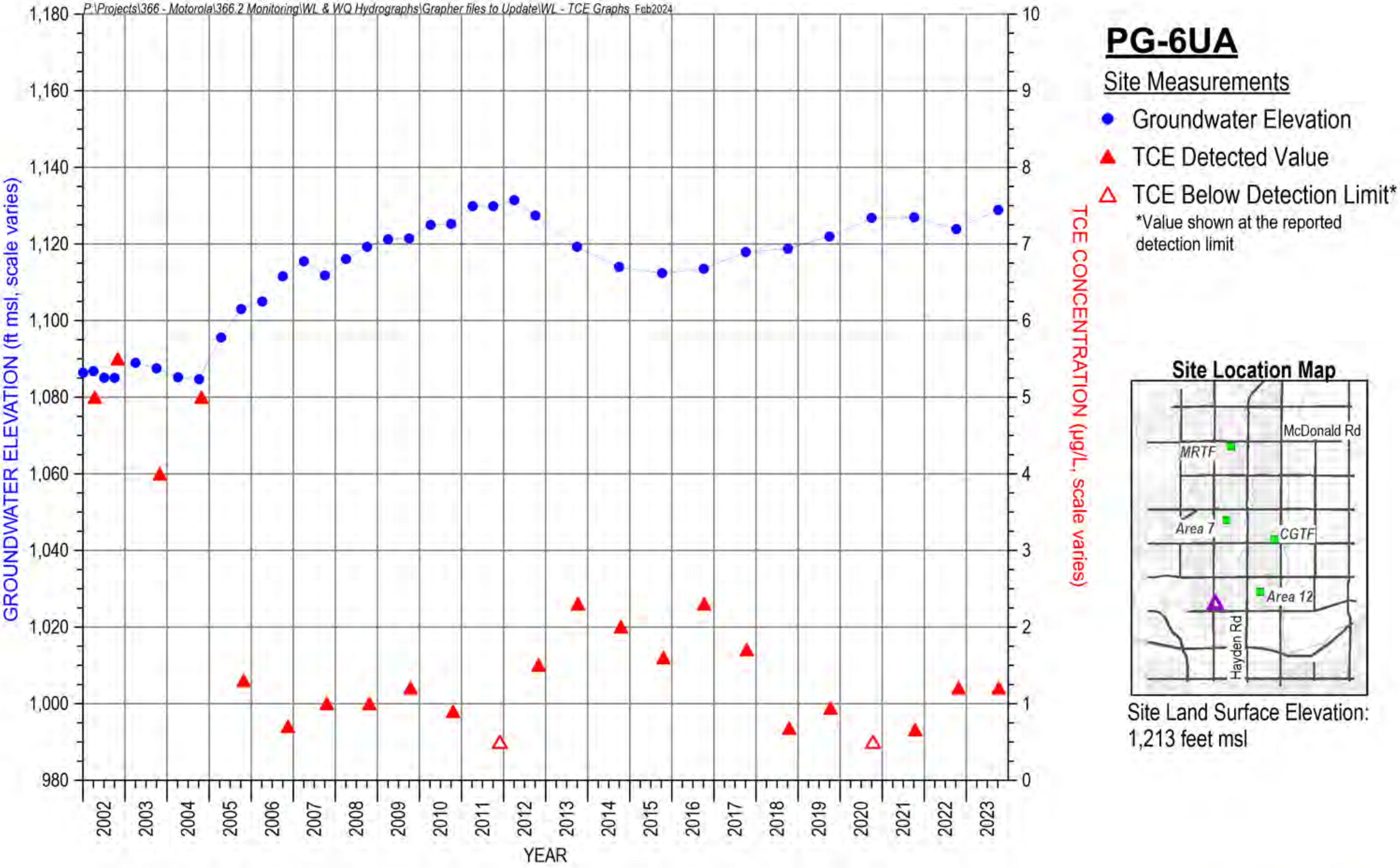
FIGURE D-083. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-5UA



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



North Indian Bend Wash Superfund Site

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

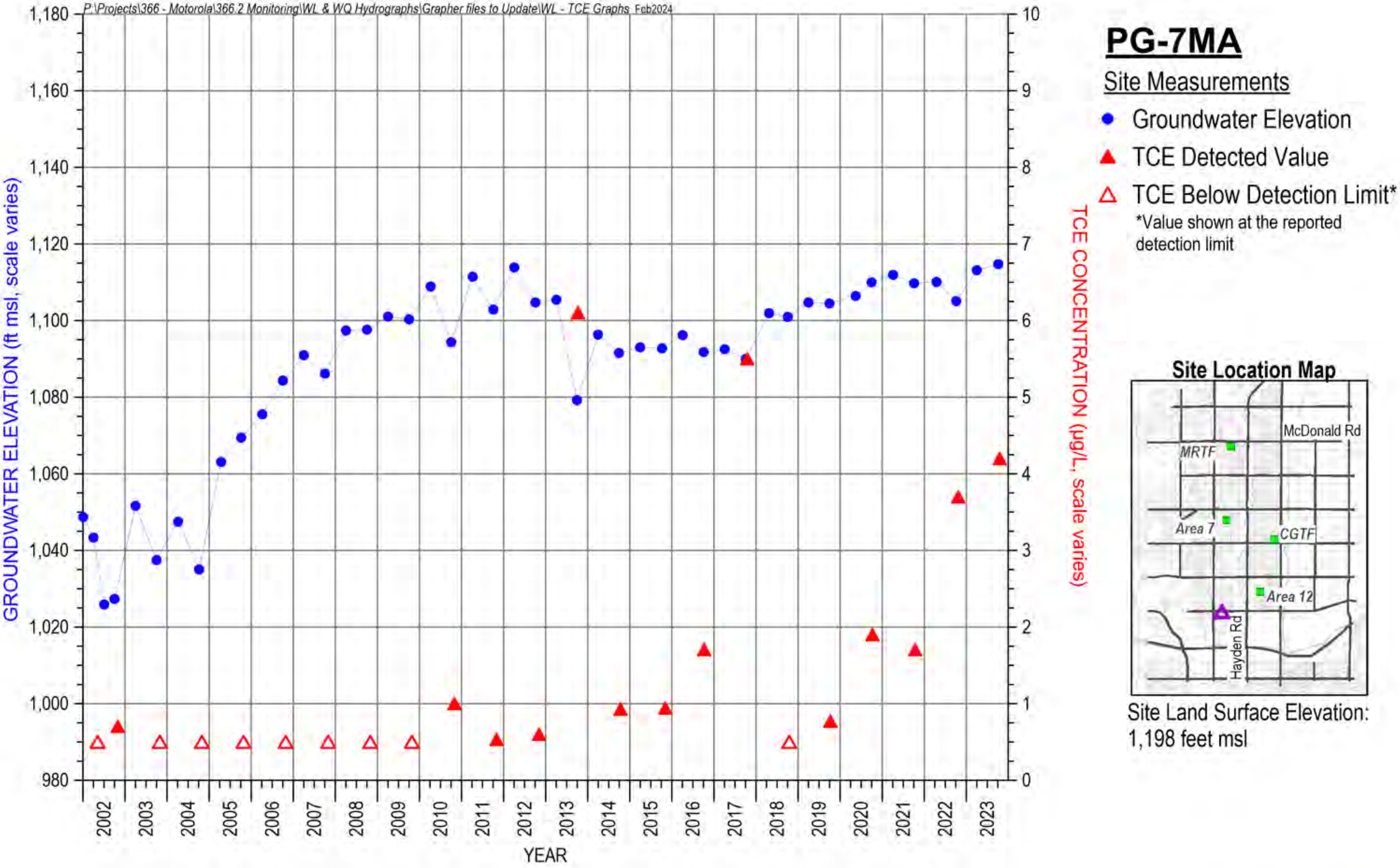


FIGURE D-086. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-7MA

North Indian Bend Wash Superfund Site

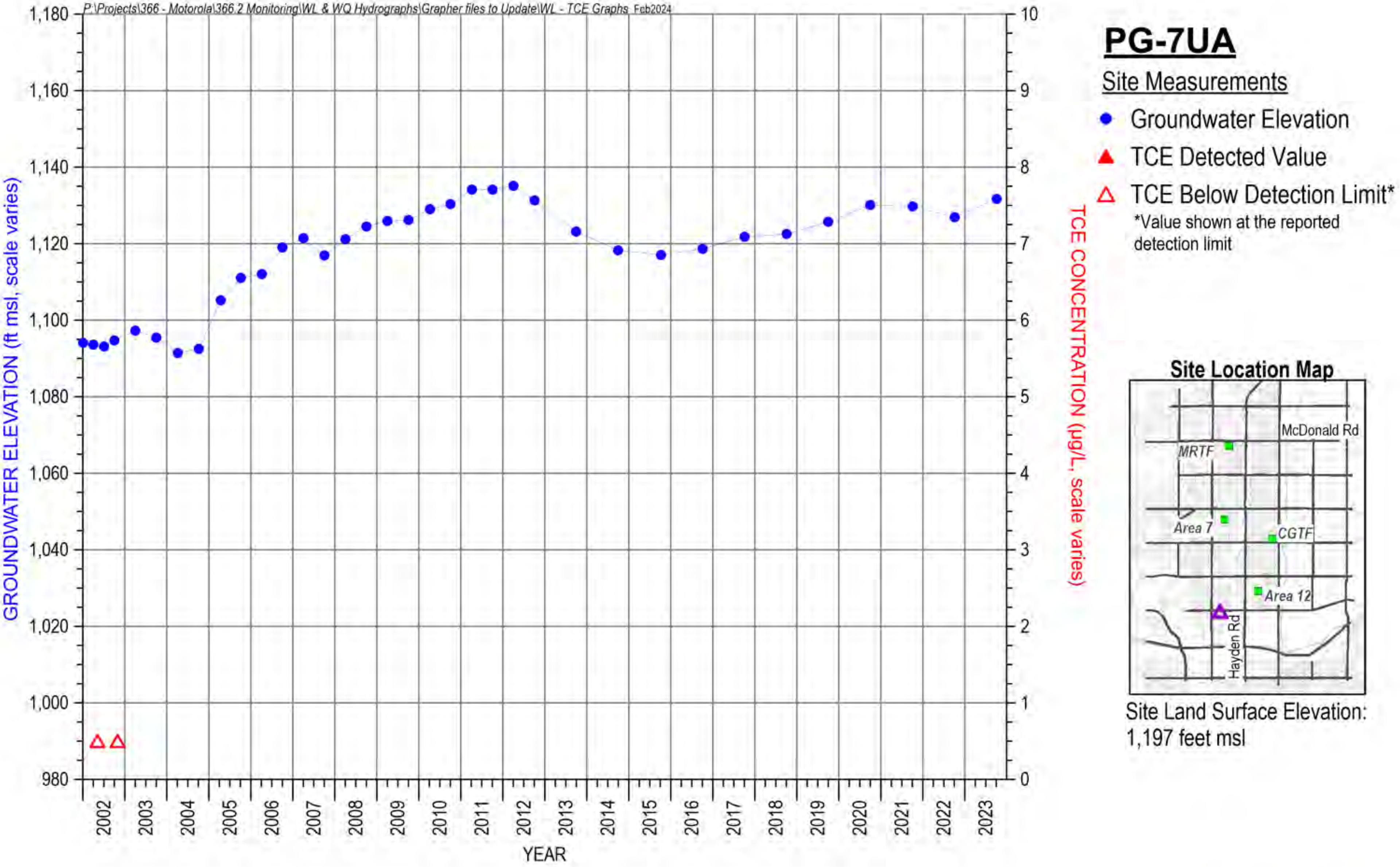


FIGURE D-087. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-7UA

North Indian Bend Wash Superfund Site

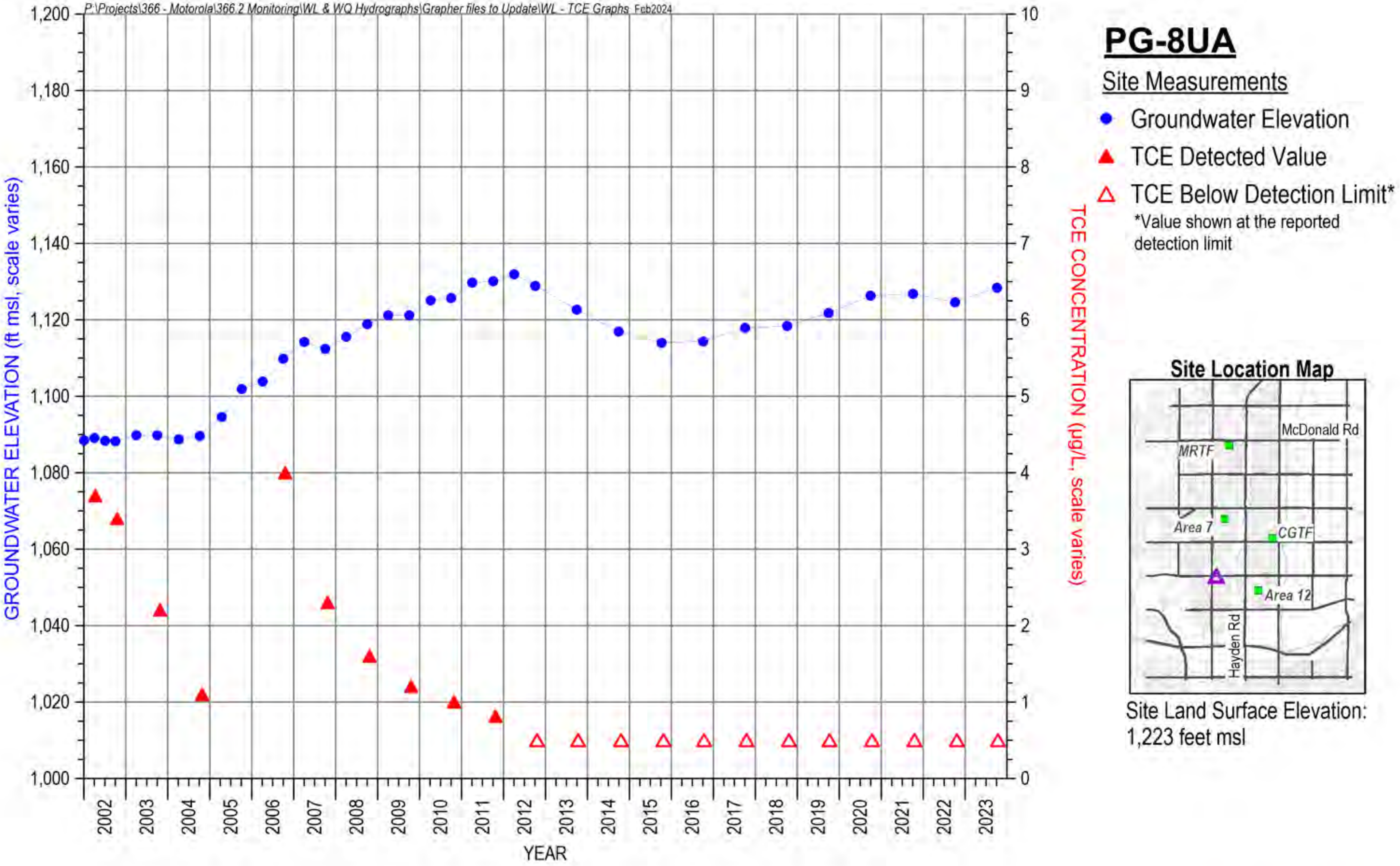


FIGURE D-088. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-8UA

North Indian Bend Wash Superfund Site

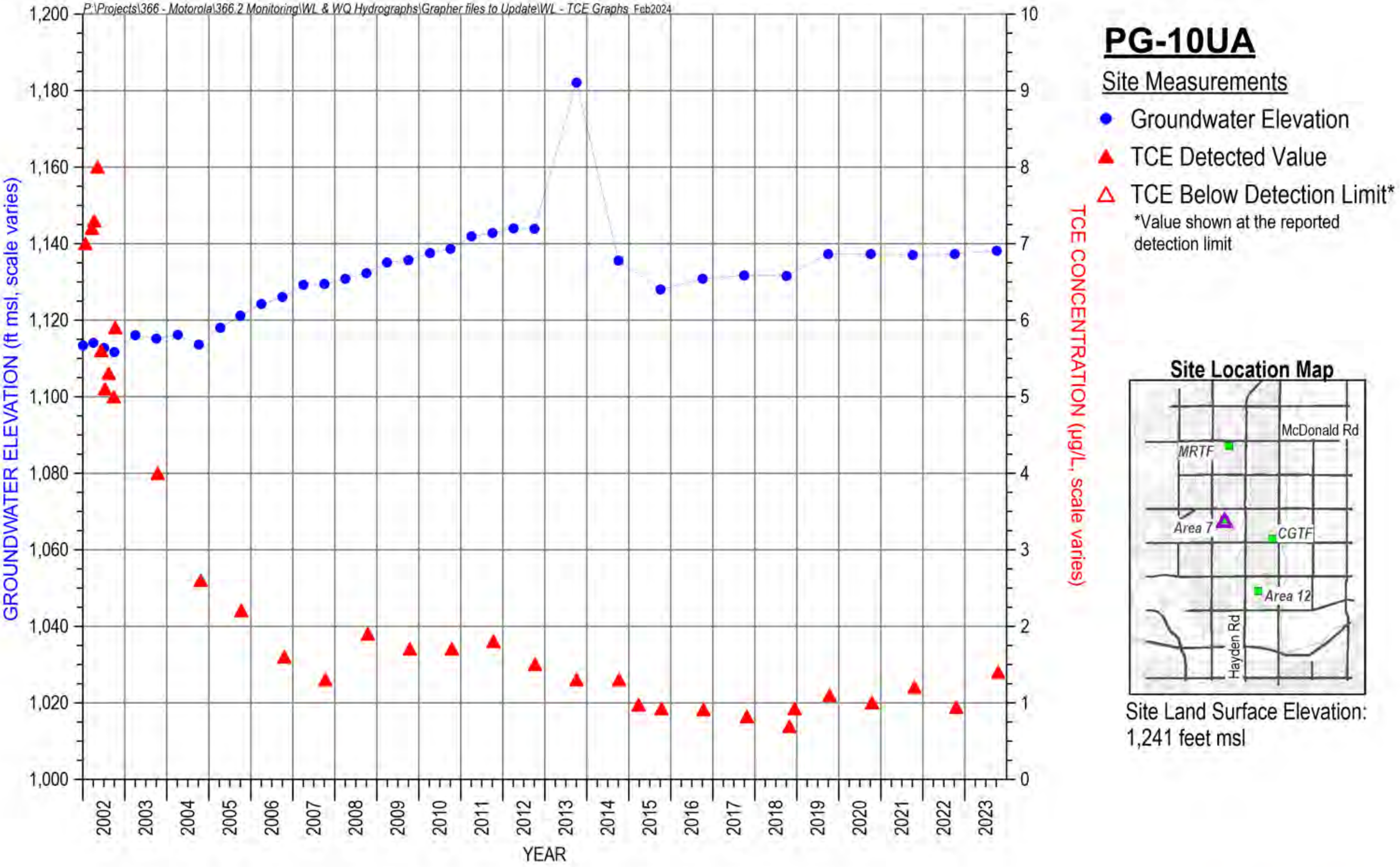


FIGURE D-089. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-10UA

North Indian Bend Wash Superfund Site

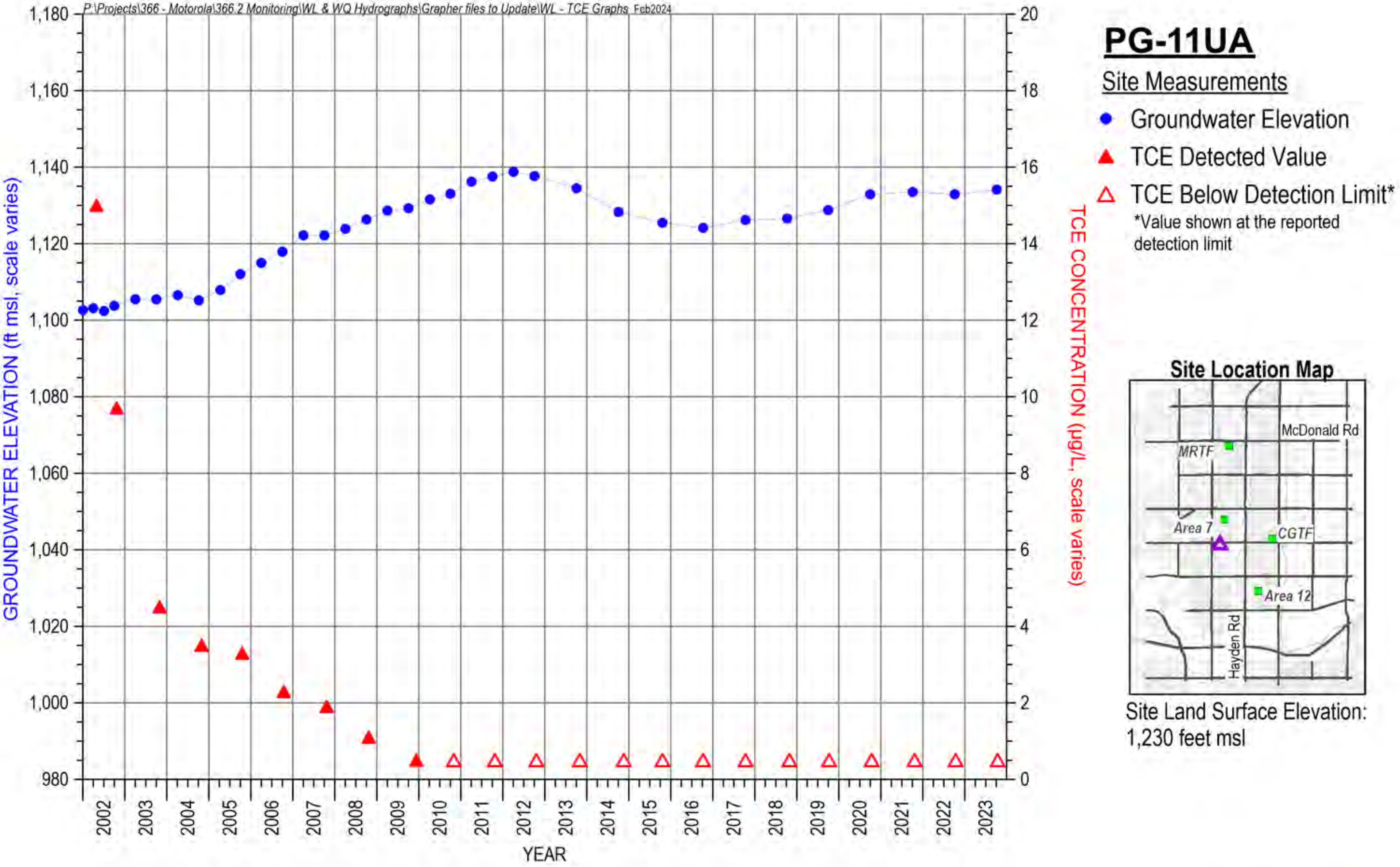
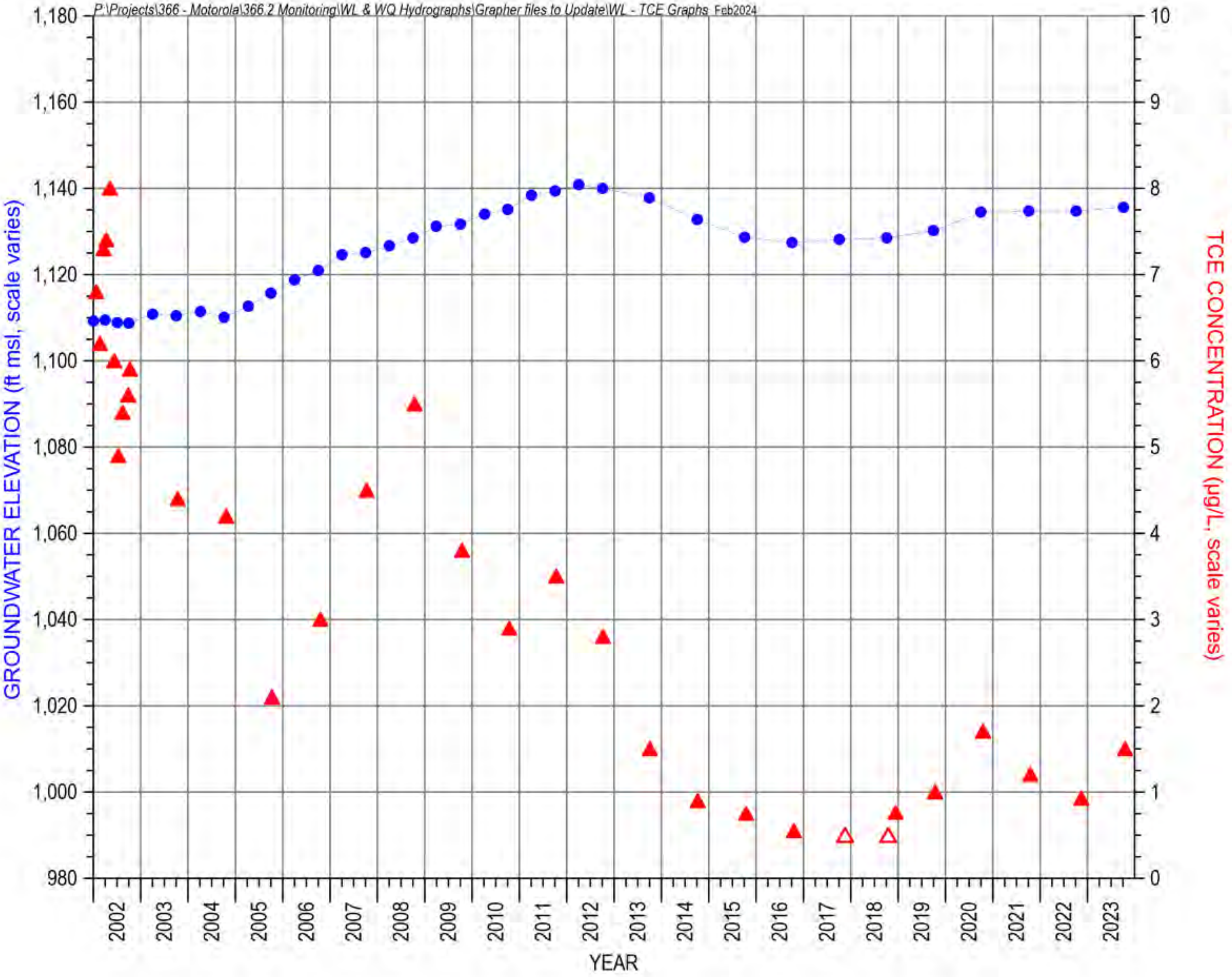


FIGURE D-090. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-11UA

North Indian Bend Wash Superfund Site



PG-16UA

Site Measurements

● Groundwater Elevation

▲ TCE Detected Value

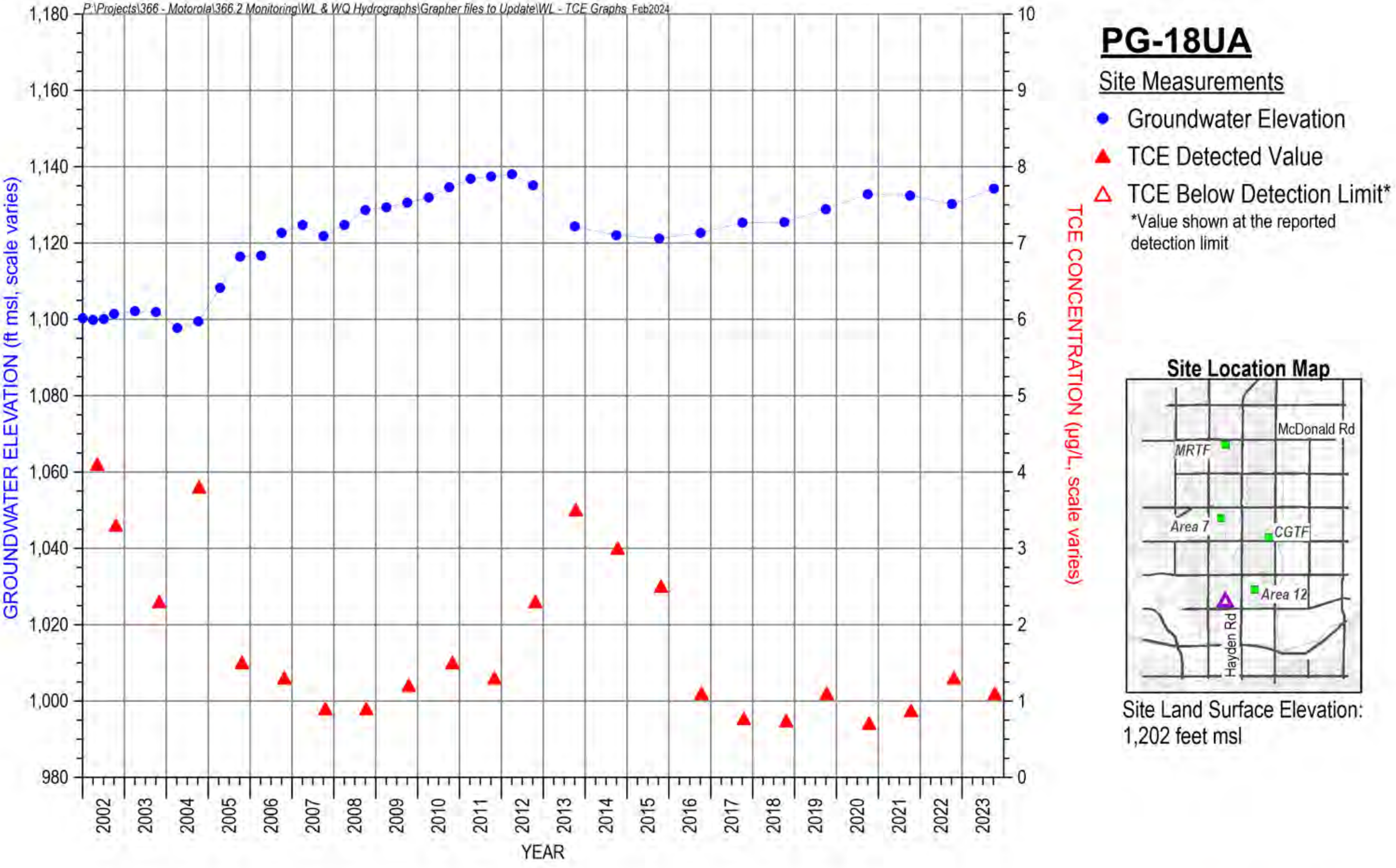
△ TCE Below Detection Limit*

*Value shown at the reported detection limit

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

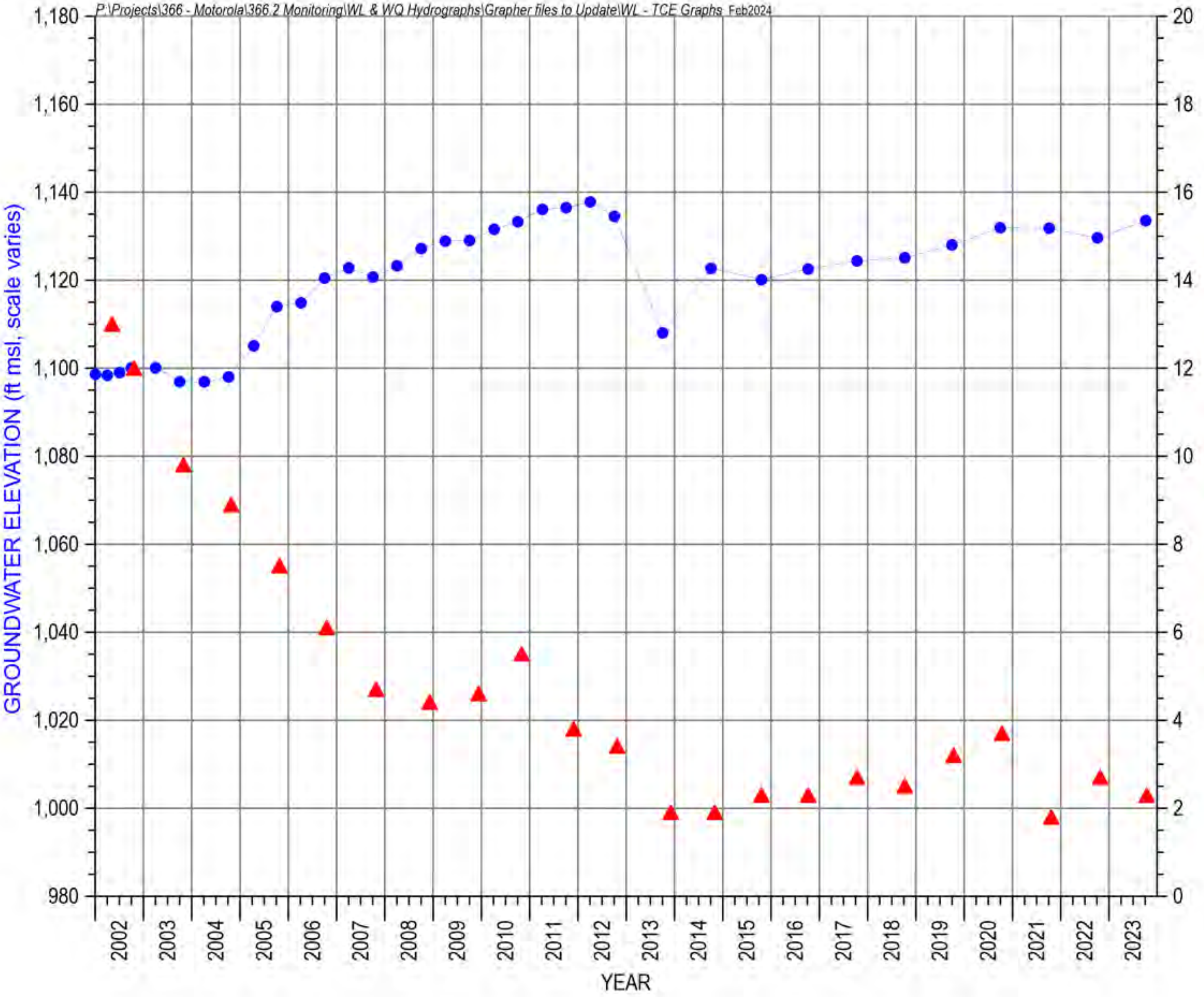
North Indian Bend Wash Superfund Site



Site Land Surface Elevation:
1,202 feet msl

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

North Indian Bend Wash Superfund Site



PG-19UA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

*Value shown at the reported detection limit

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

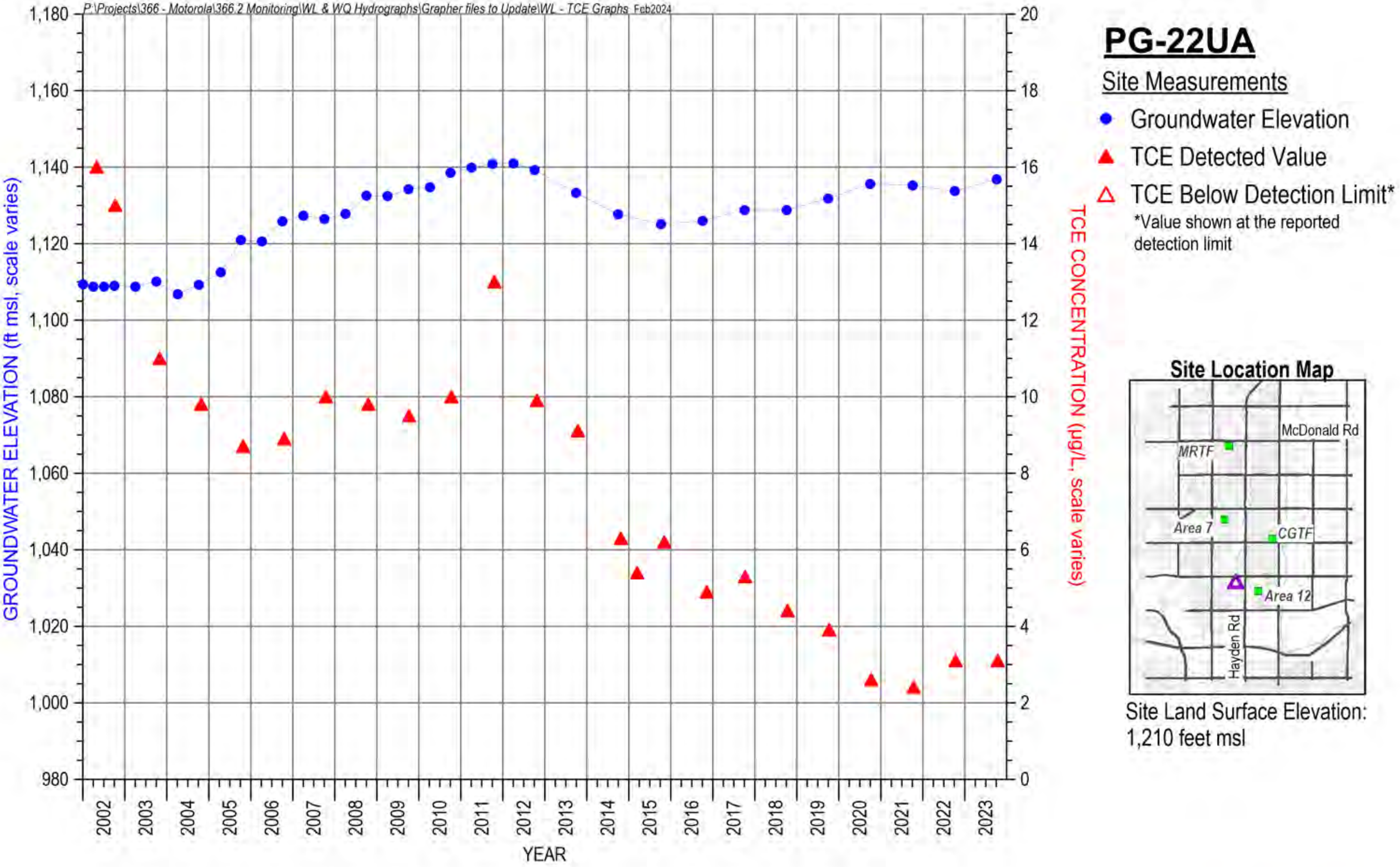


FIGURE D-094. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-22UA

North Indian Bend Wash Superfund Site

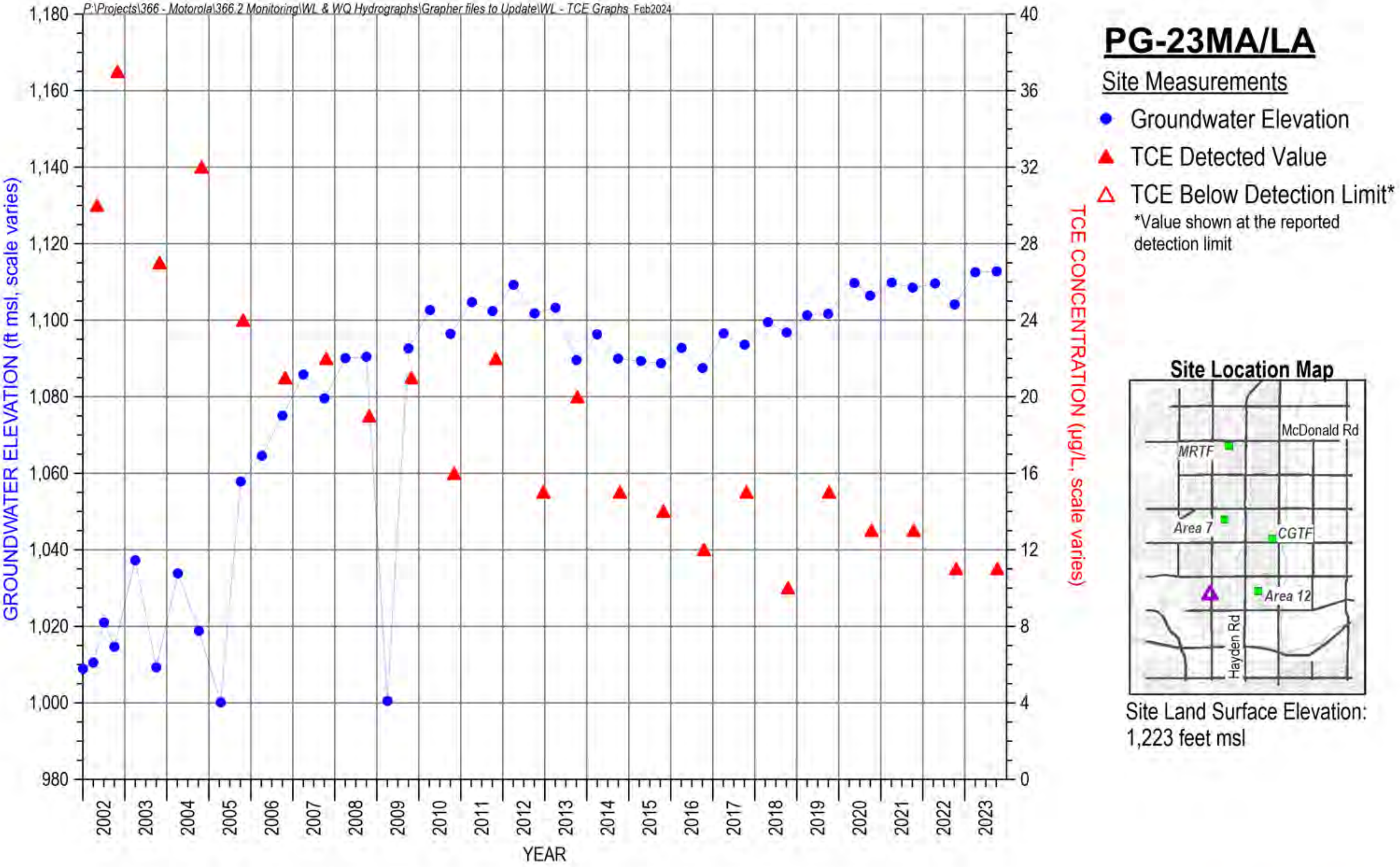


FIGURE D-095. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-23MA/LA

North Indian Bend Wash Superfund Site

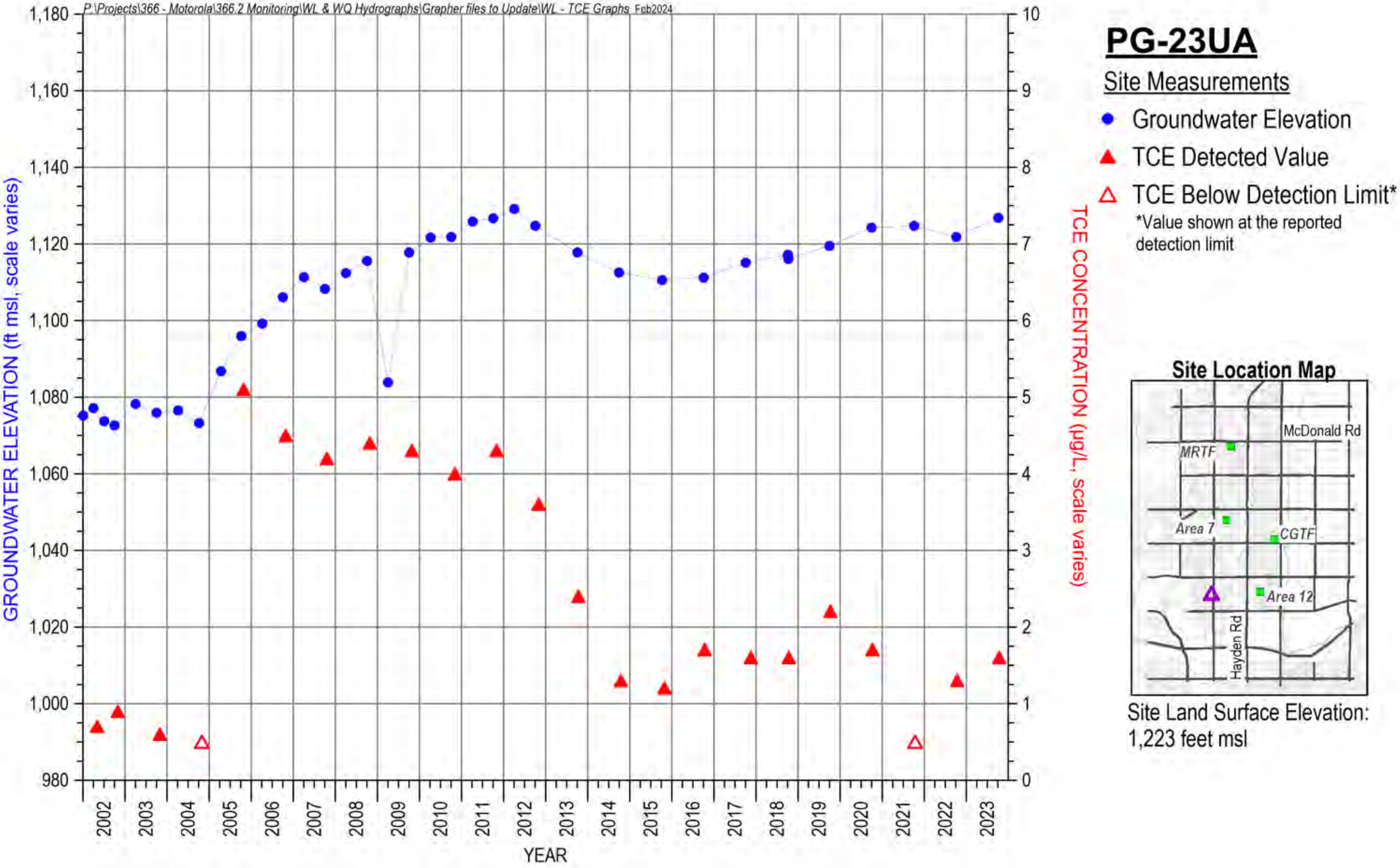
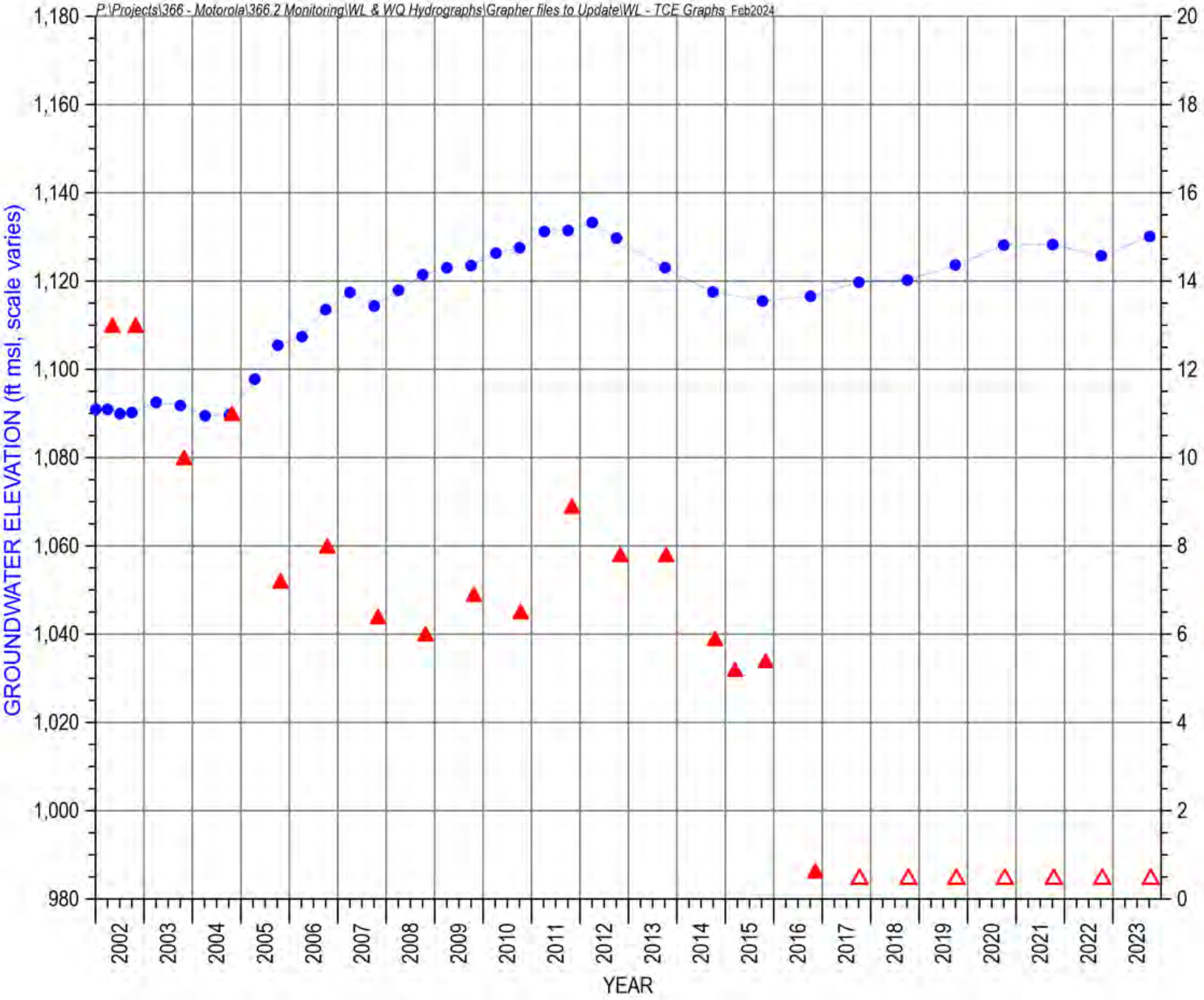


FIGURE D-096. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-23UA

North Indian Bend Wash Superfund Site



PG-24UA

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:
1,212 feet msl

North Indian Bend Wash Superfund Site

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

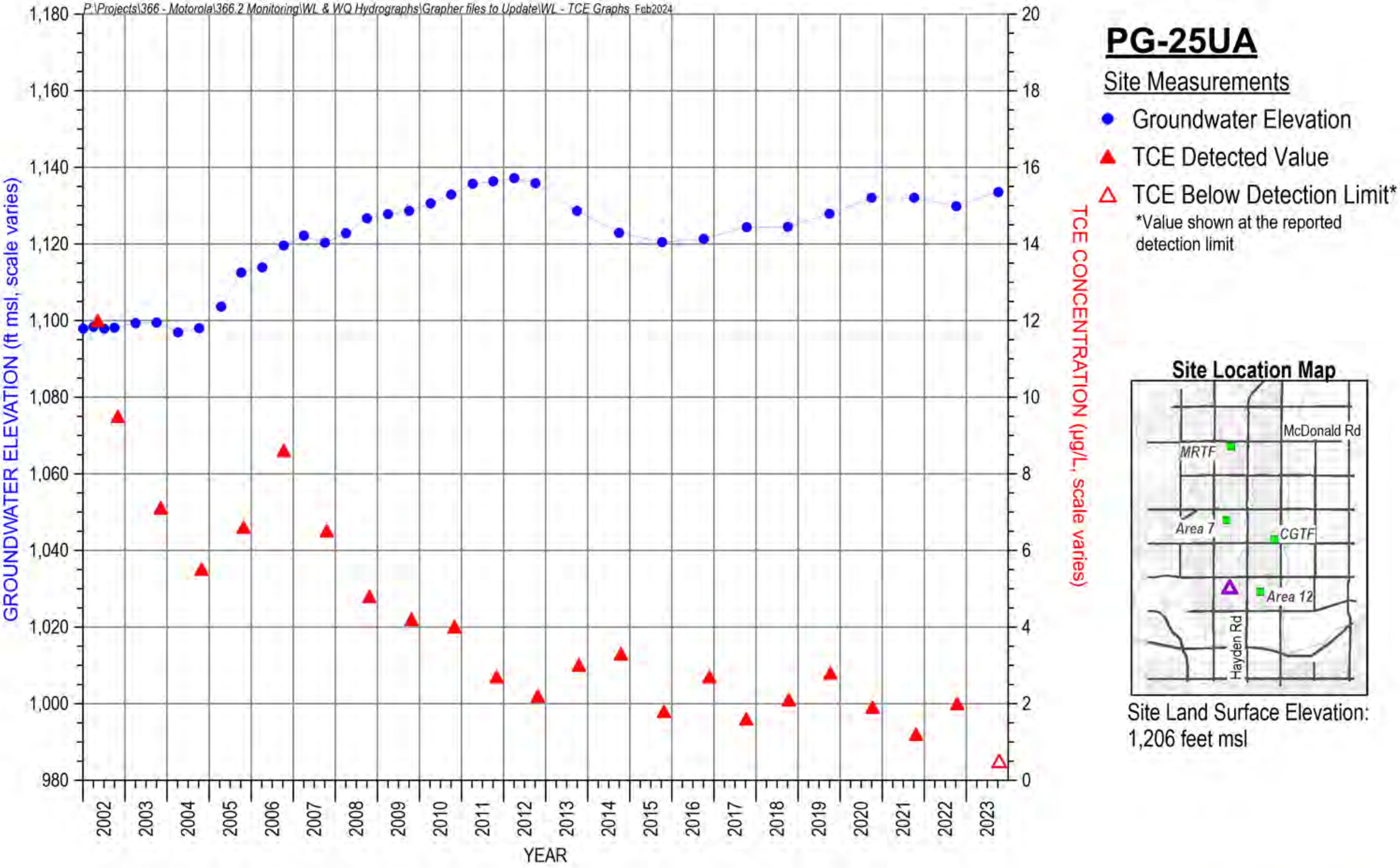


FIGURE D-098. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-25UA

North Indian Bend Wash Superfund Site

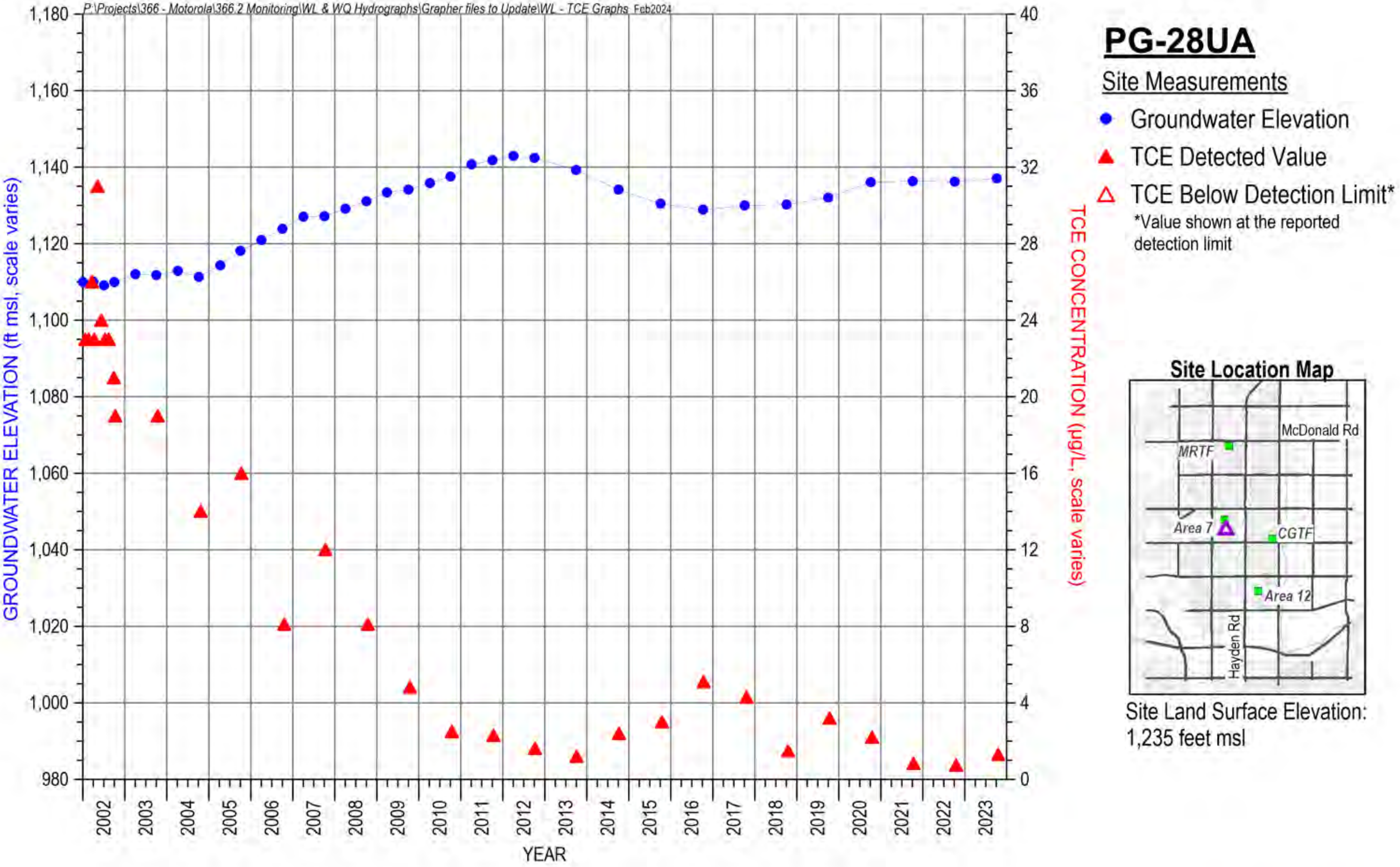
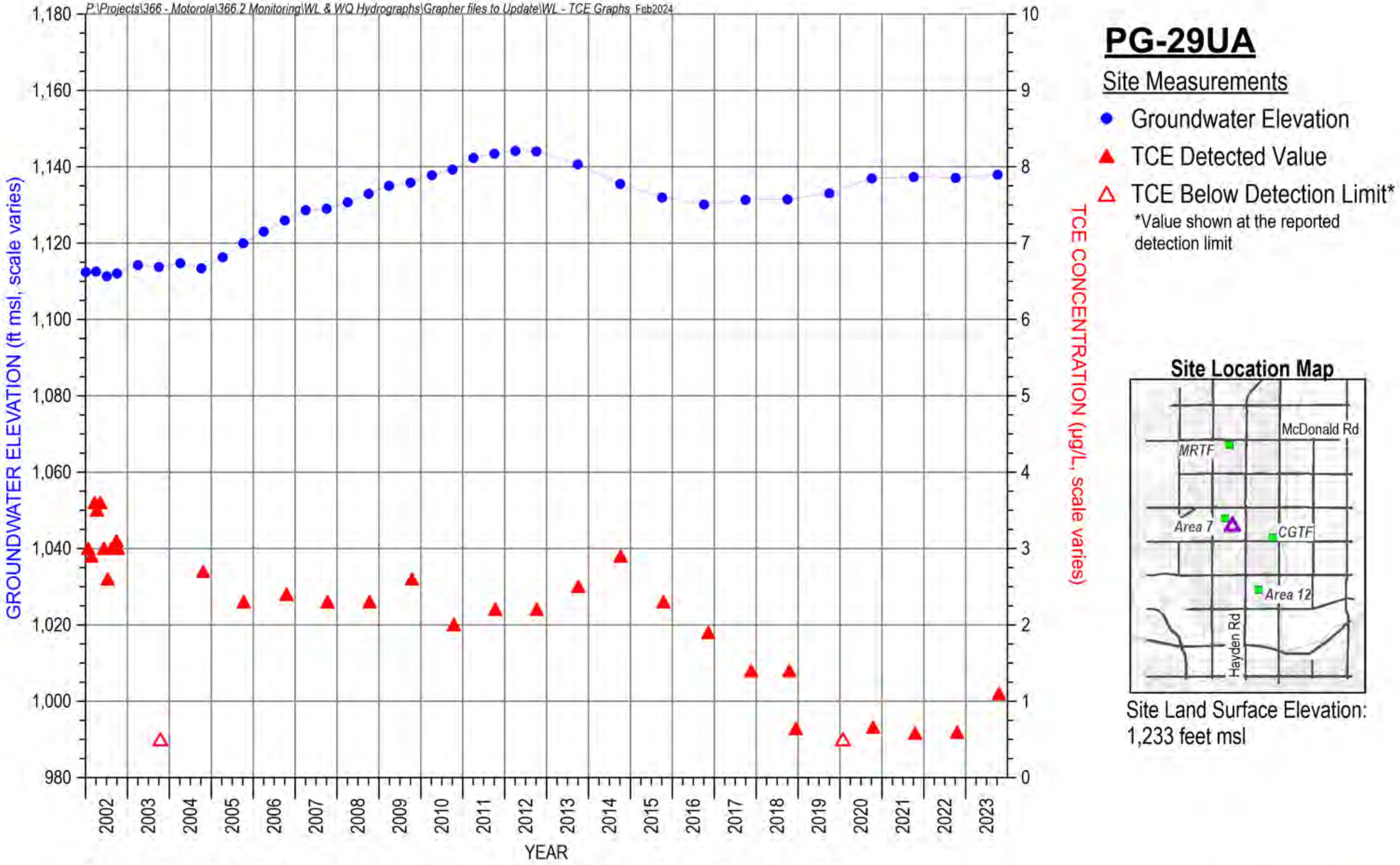


FIGURE D-099. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-28UA

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

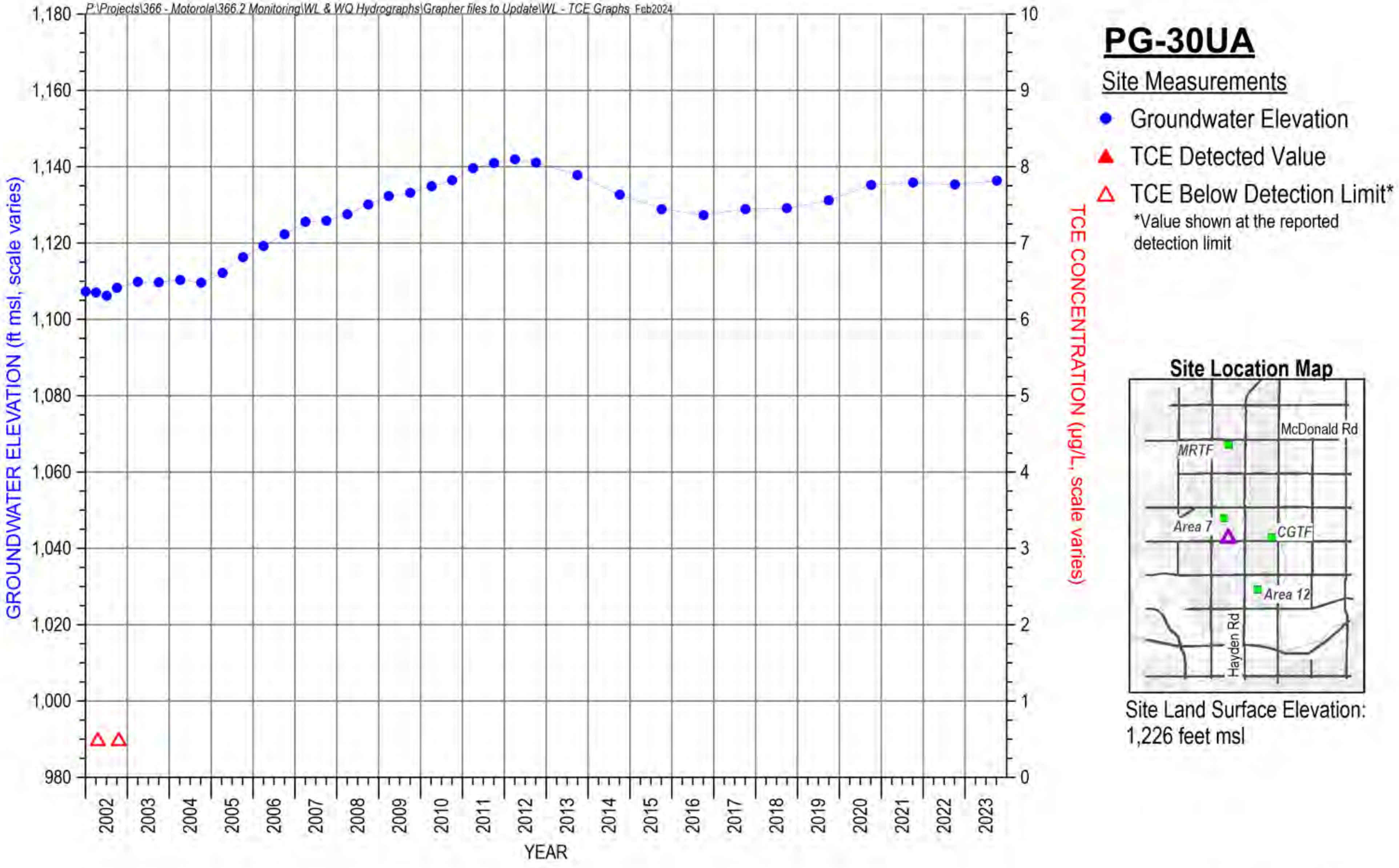
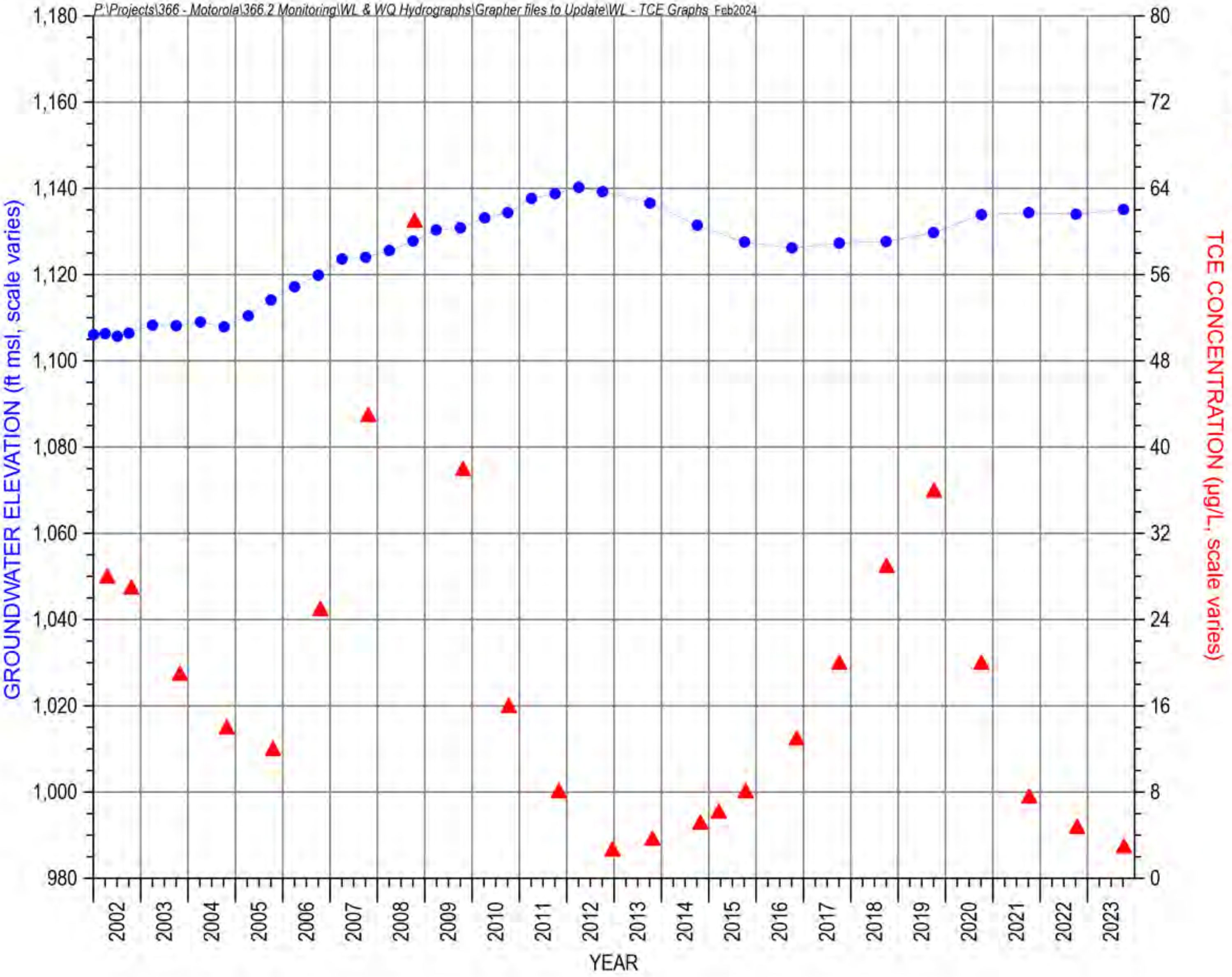


FIGURE D-101. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-30UA

North Indian Bend Wash Superfund Site



PG-31UA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

*Value shown at the reported detection limit

Site Land Surface Elevation:
1,235 feet msl

North Indian Bend Wash Superfund Site

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

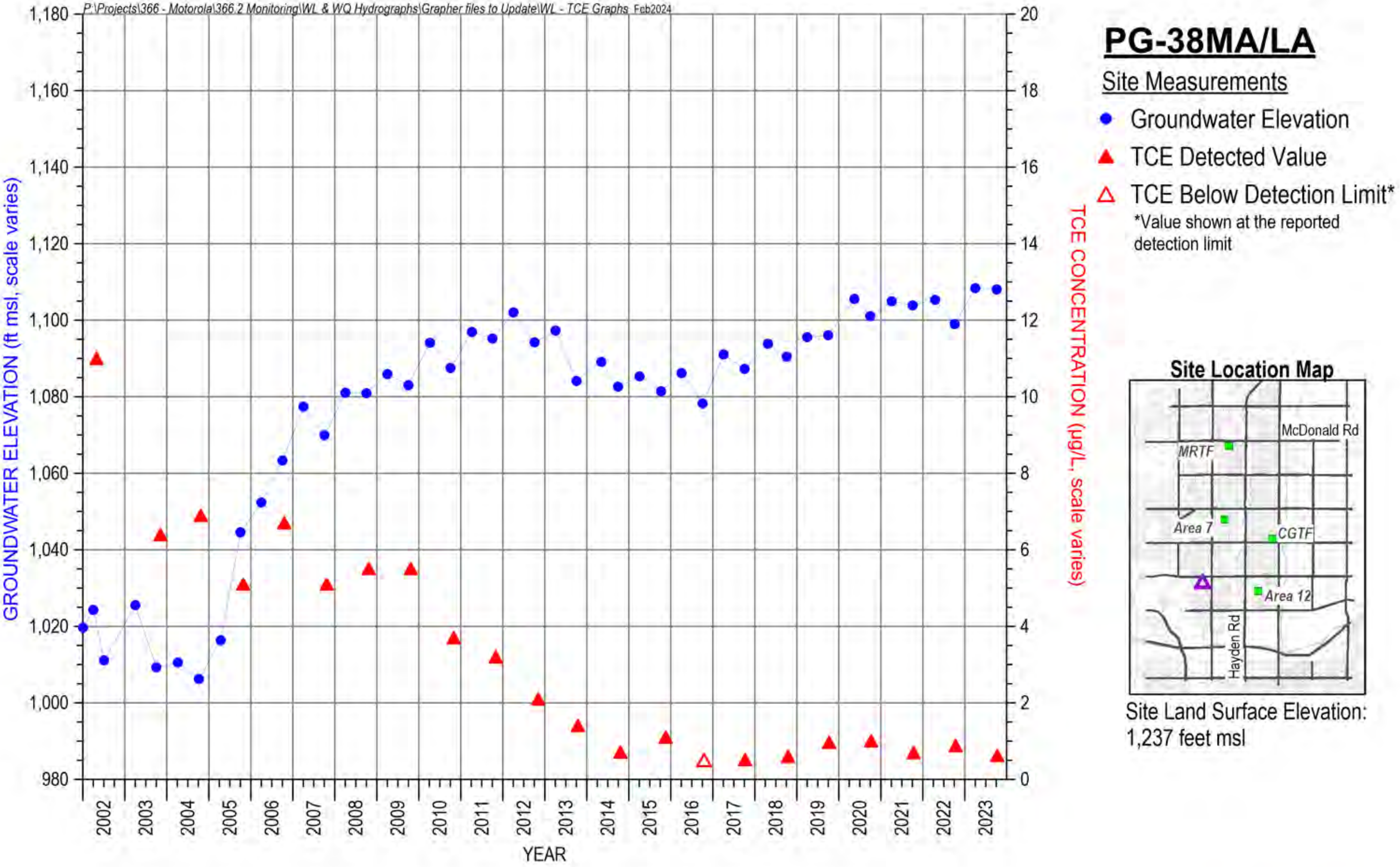


FIGURE D-103. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-38MA/LA

North Indian Bend Wash Superfund Site

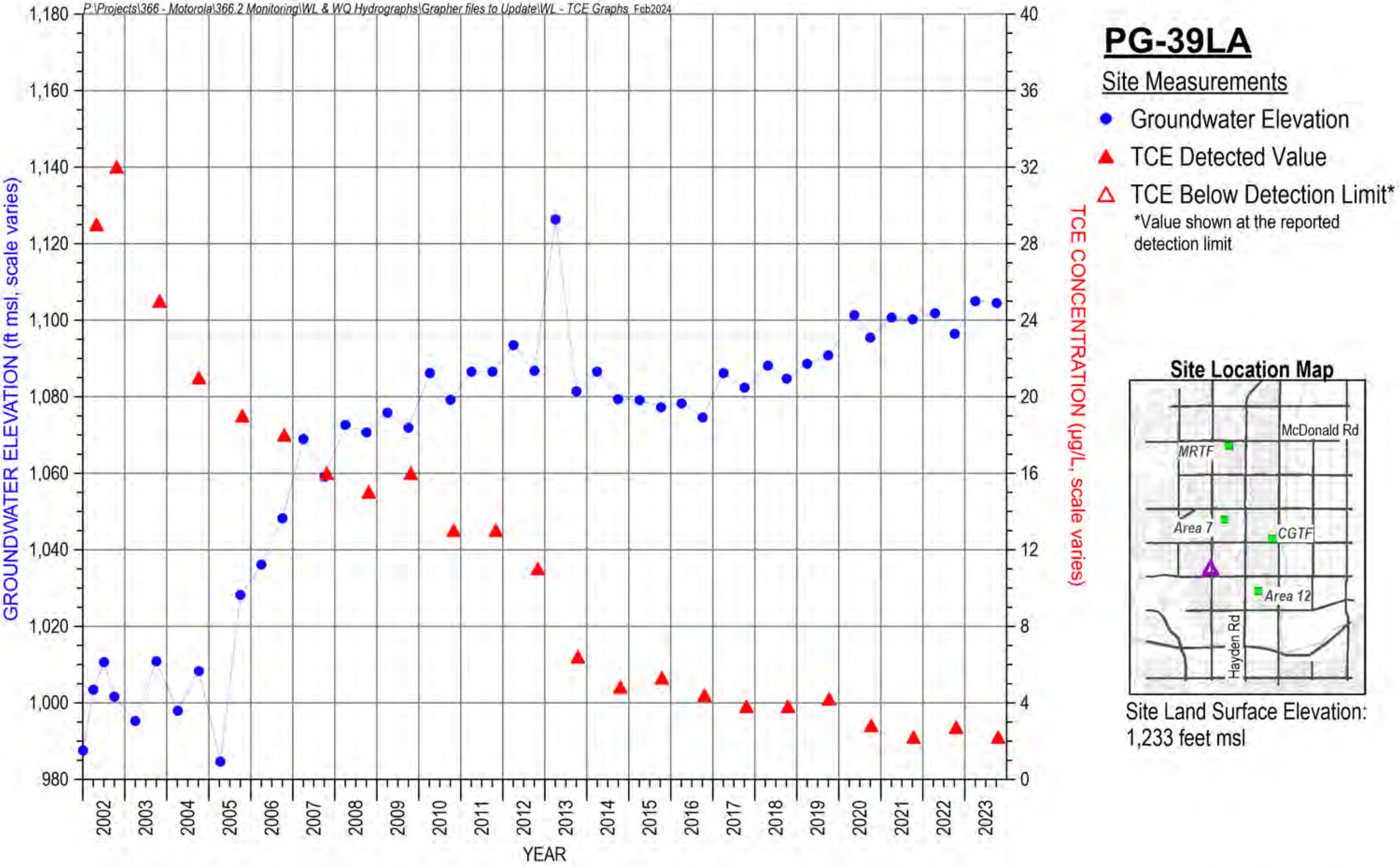
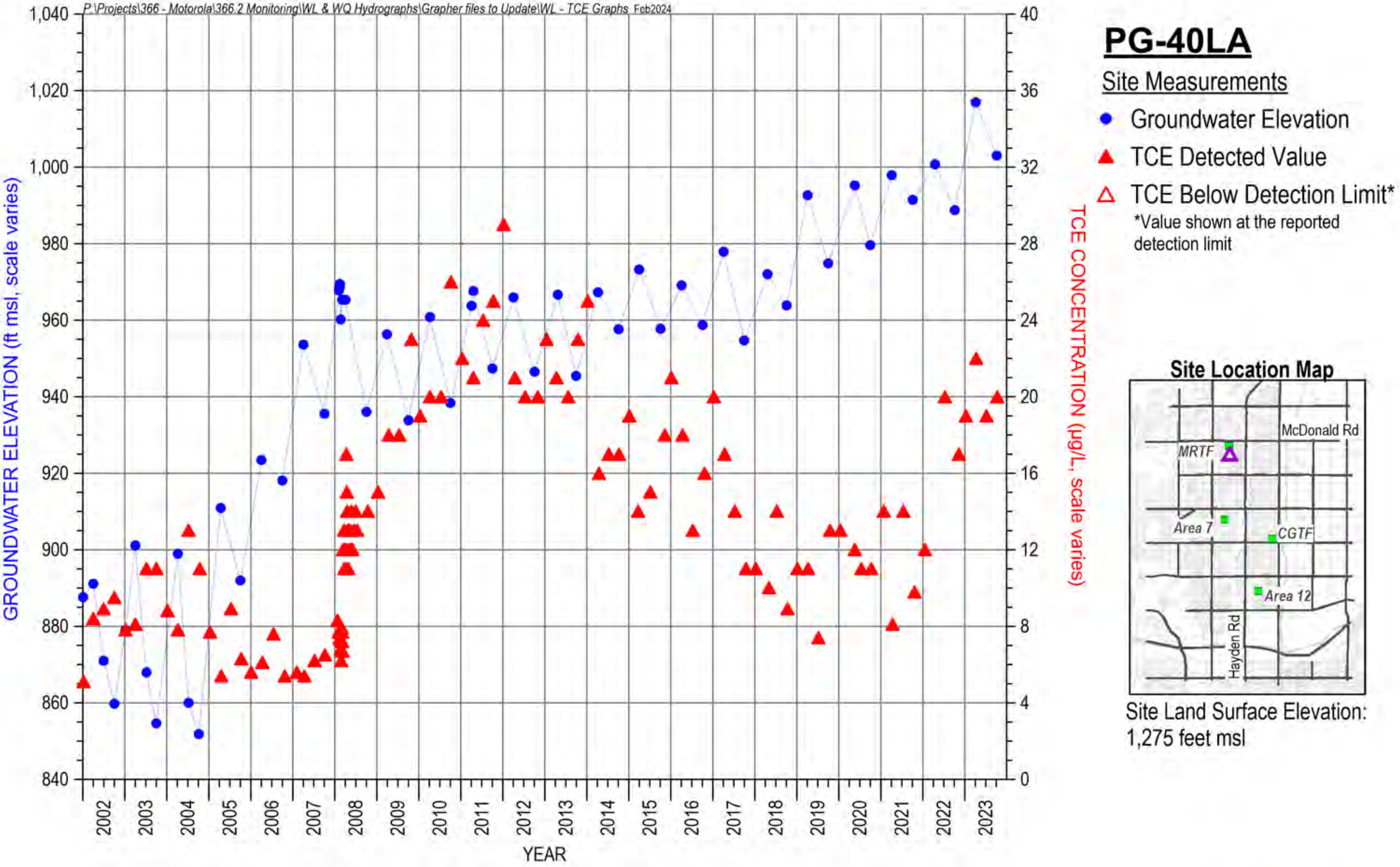


FIGURE D-104. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-39LA

North Indian Bend Wash Superfund Site

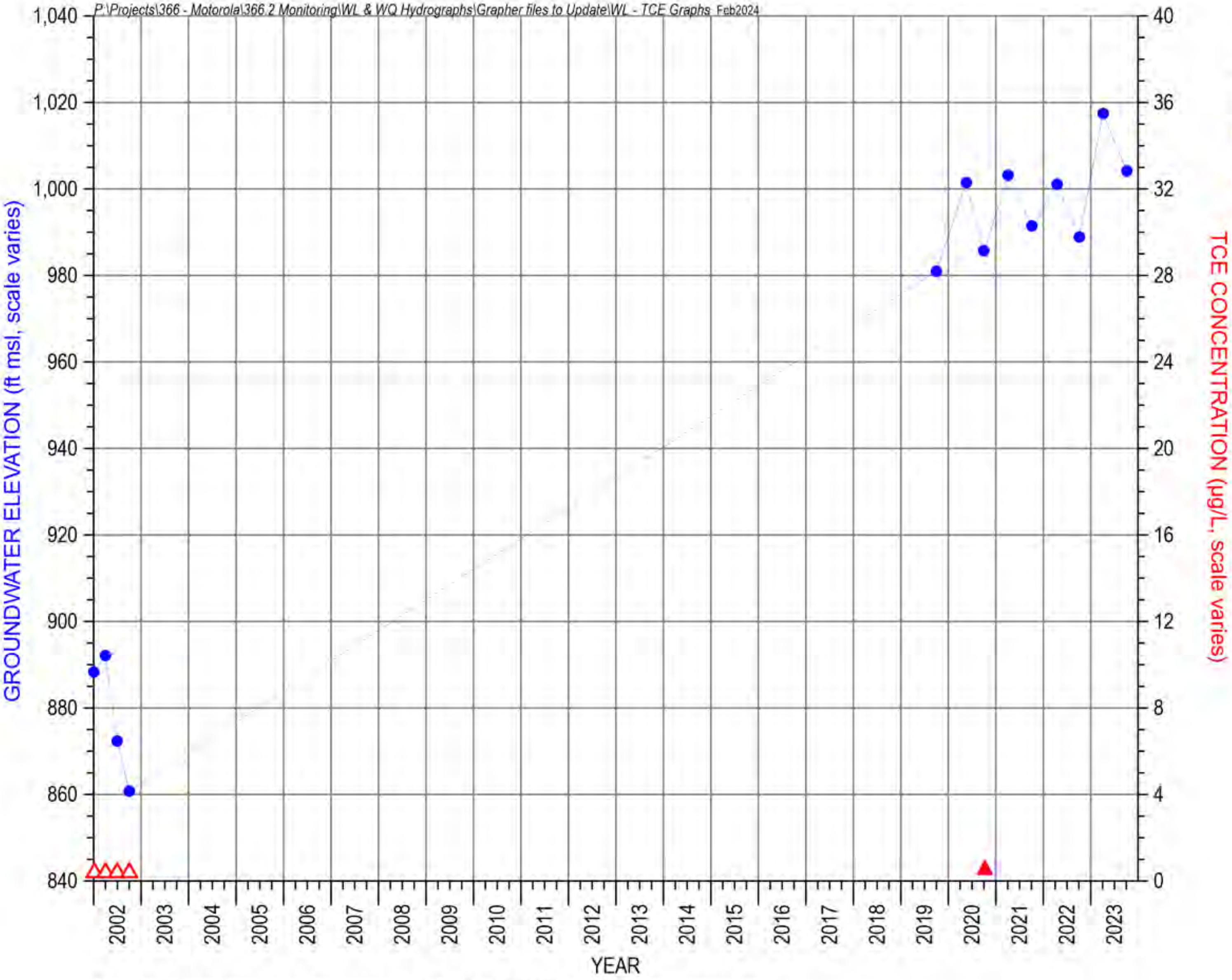


Site Land Surface Elevation:
1,275 feet msl

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

North Indian Bend Wash Superfund Site

PG-41MA/LA



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

Site Location Map

Site Land Surface Elevation:
1,275 feet msl

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

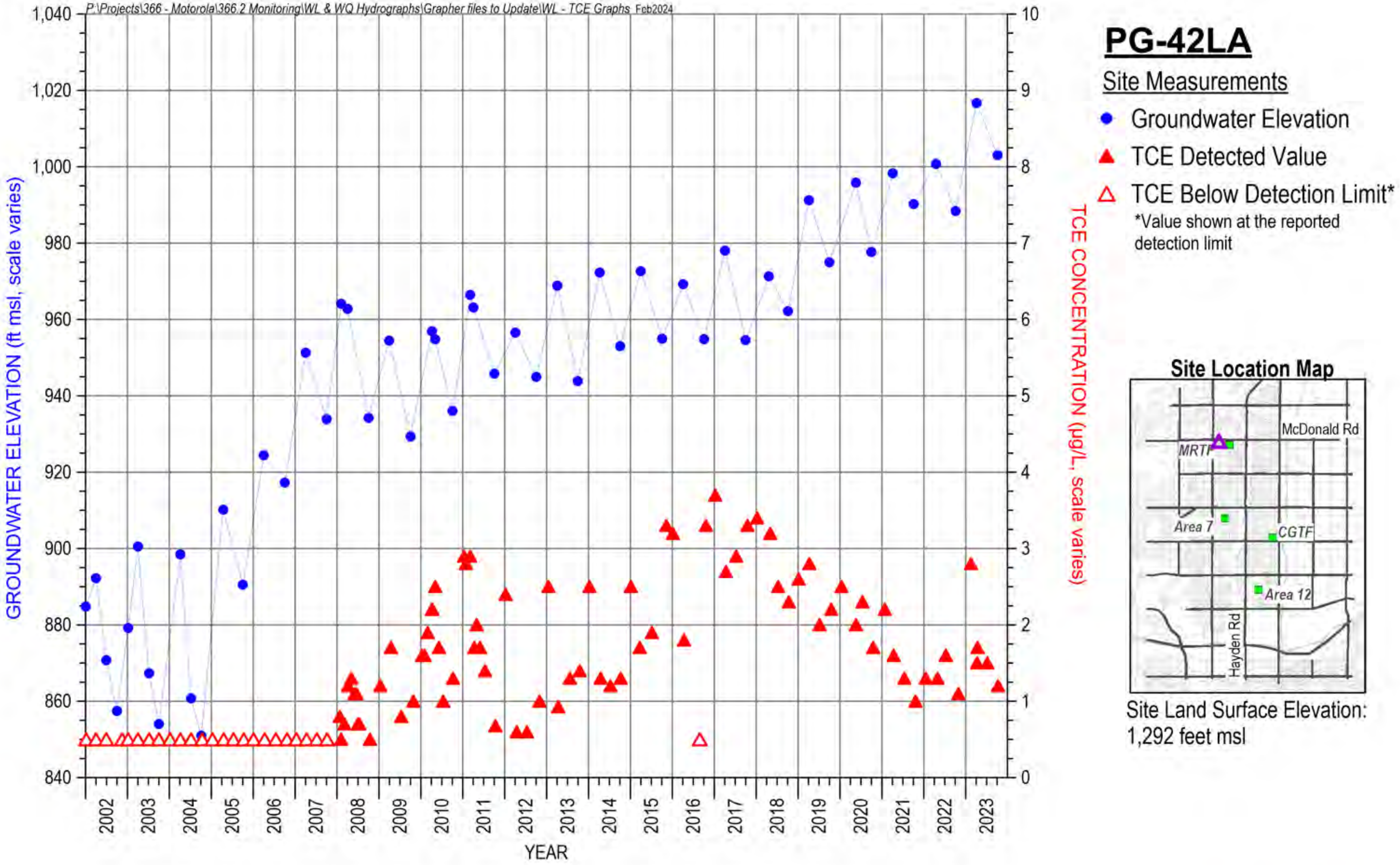


FIGURE D-107. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-42LA

North Indian Bend Wash Superfund Site

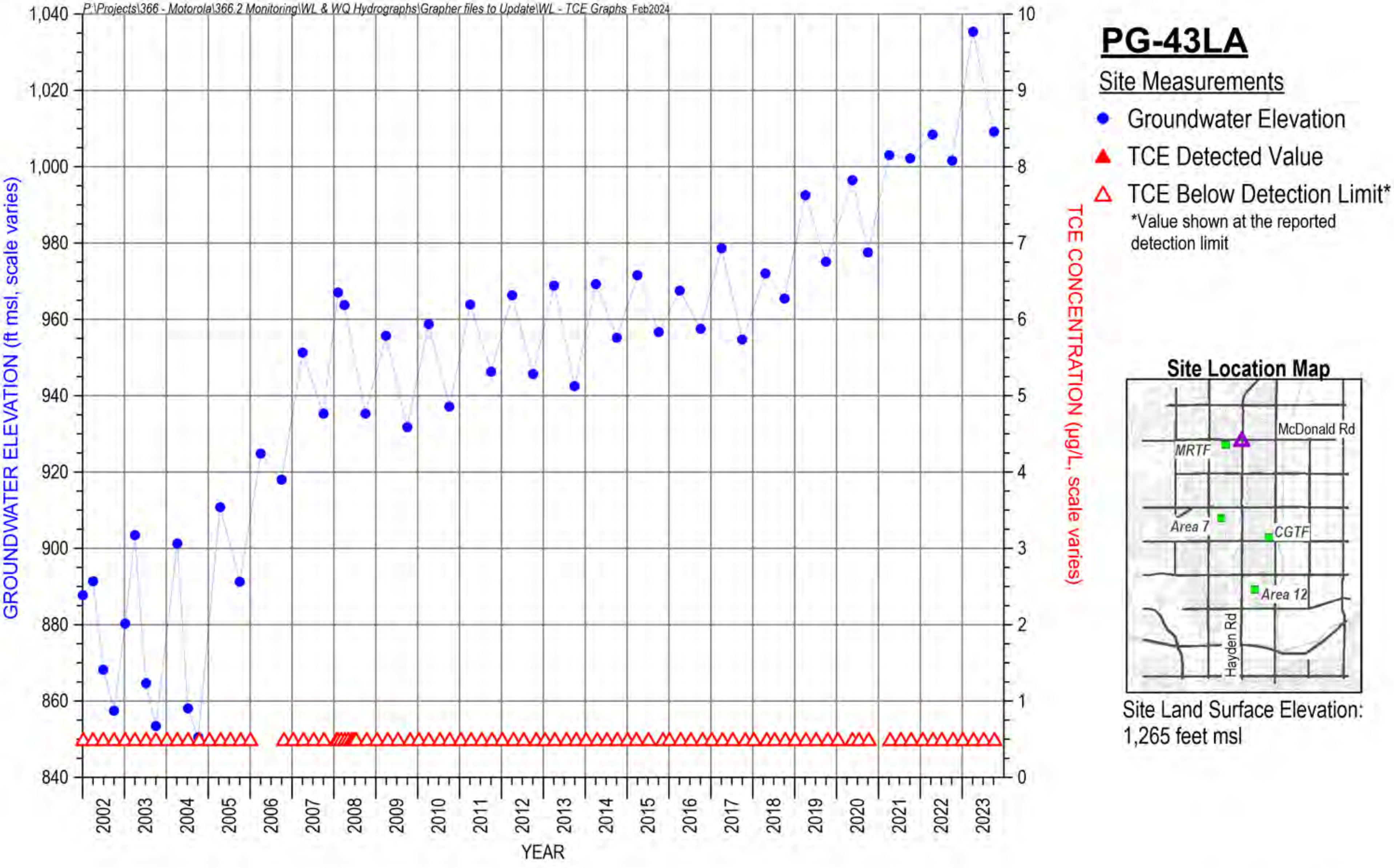
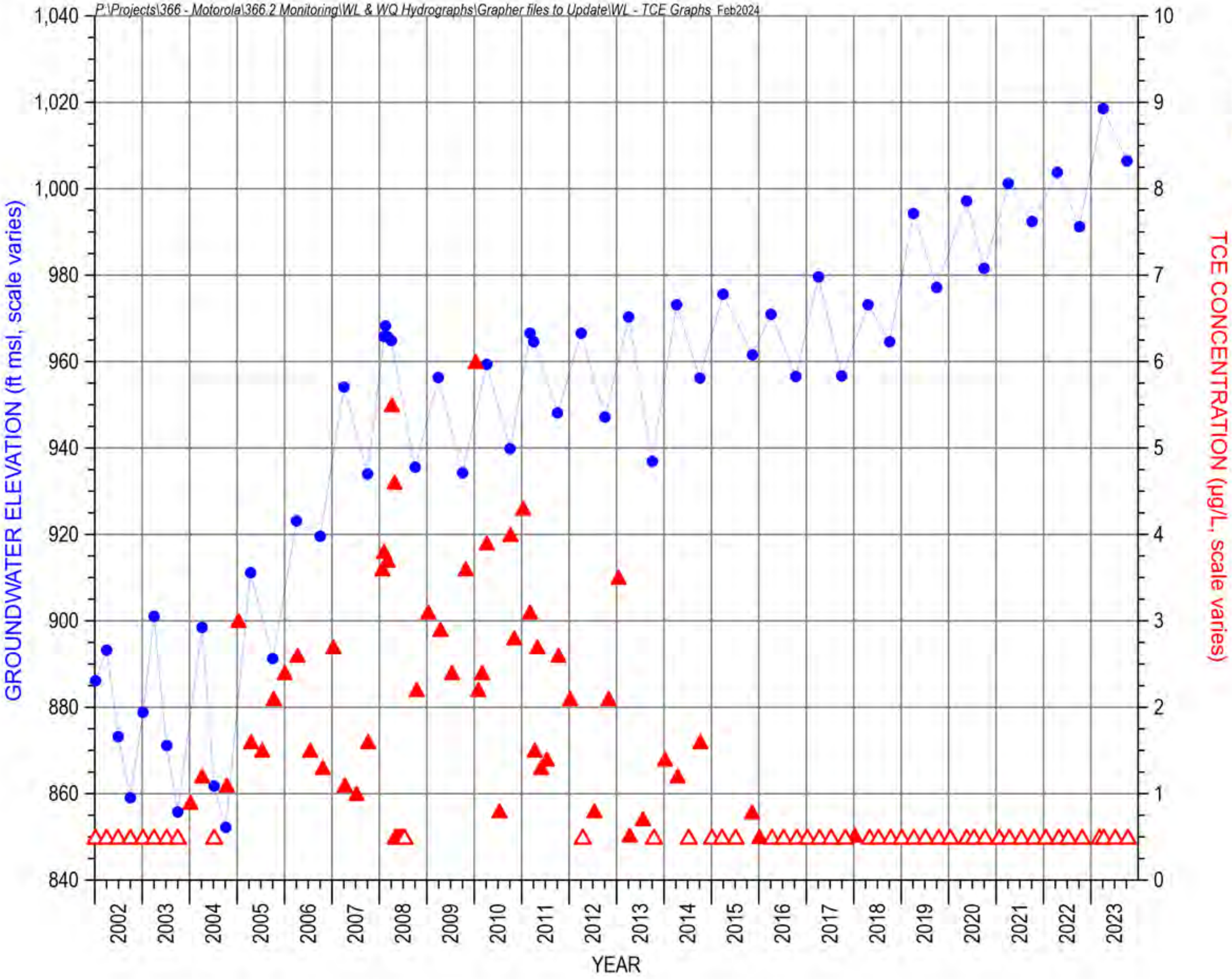


FIGURE D-108. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-43LA

North Indian Bend Wash Superfund Site

PG-44LA



Site Measurements

● Groundwater Elevation

▲ TCE Detected Value

△ TCE Below Detection Limit*

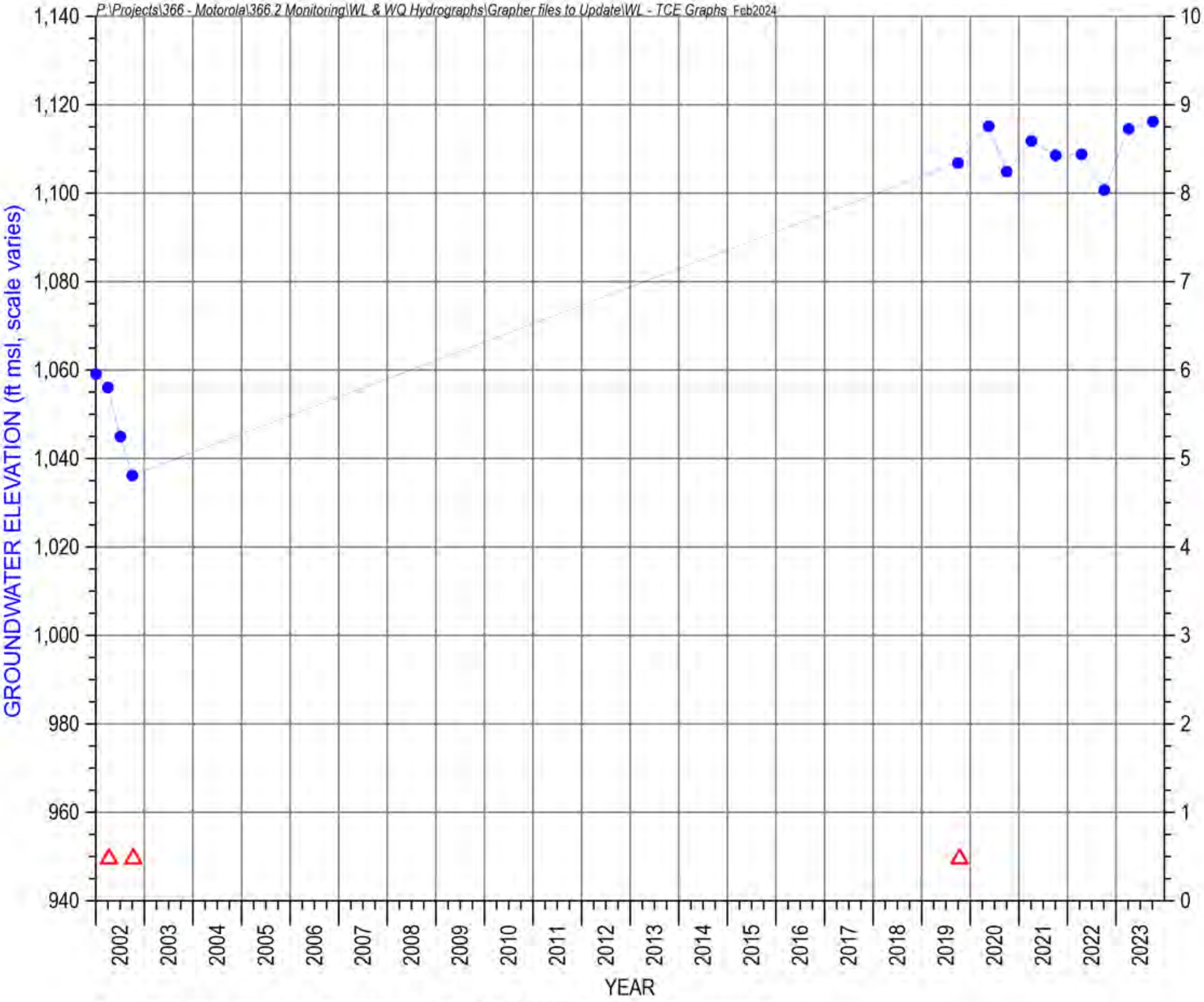
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,298 feet msl

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

North Indian Bend Wash Superfund Site



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

PG-45MA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

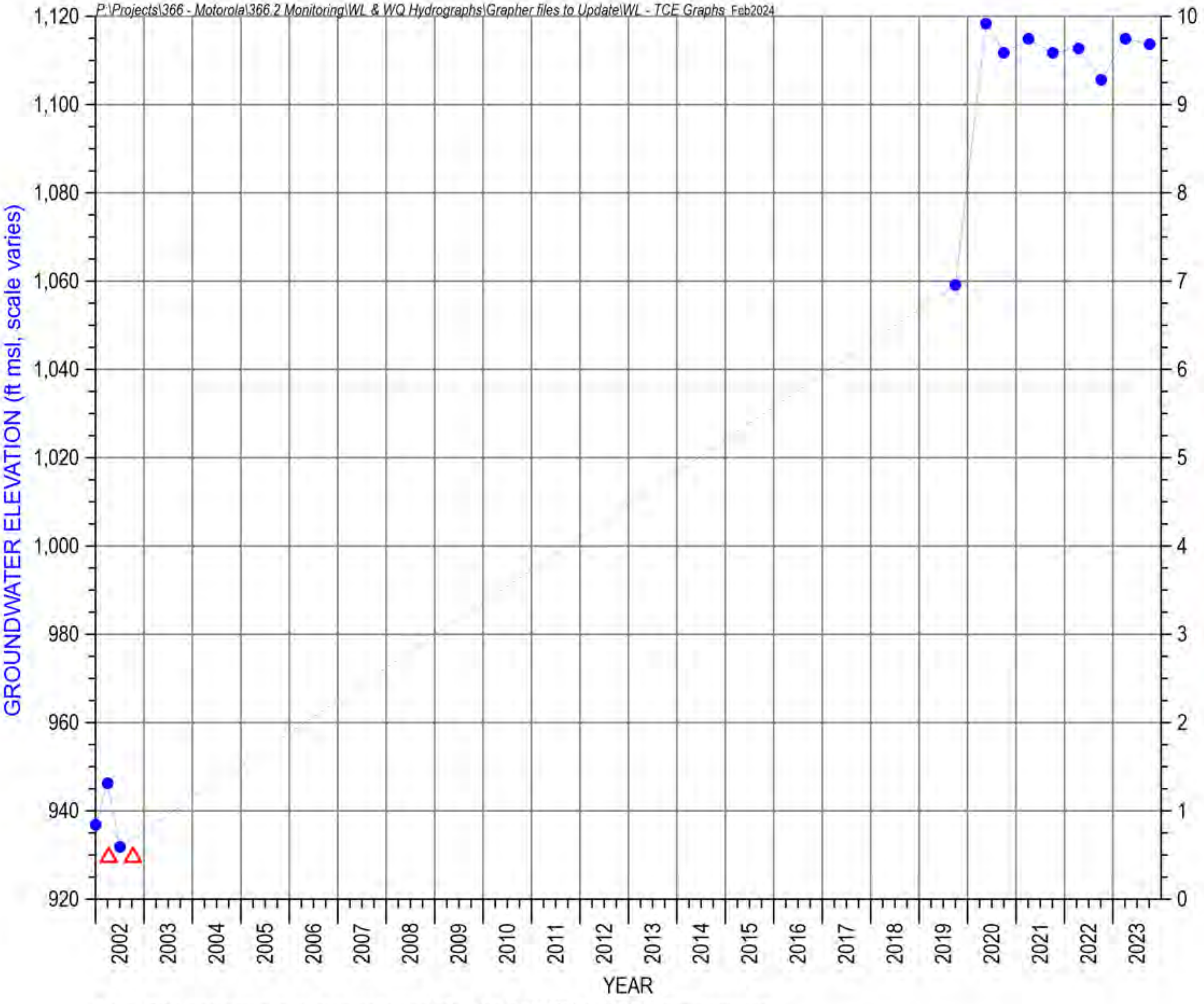
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,232 feet msl

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

PG-46MA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

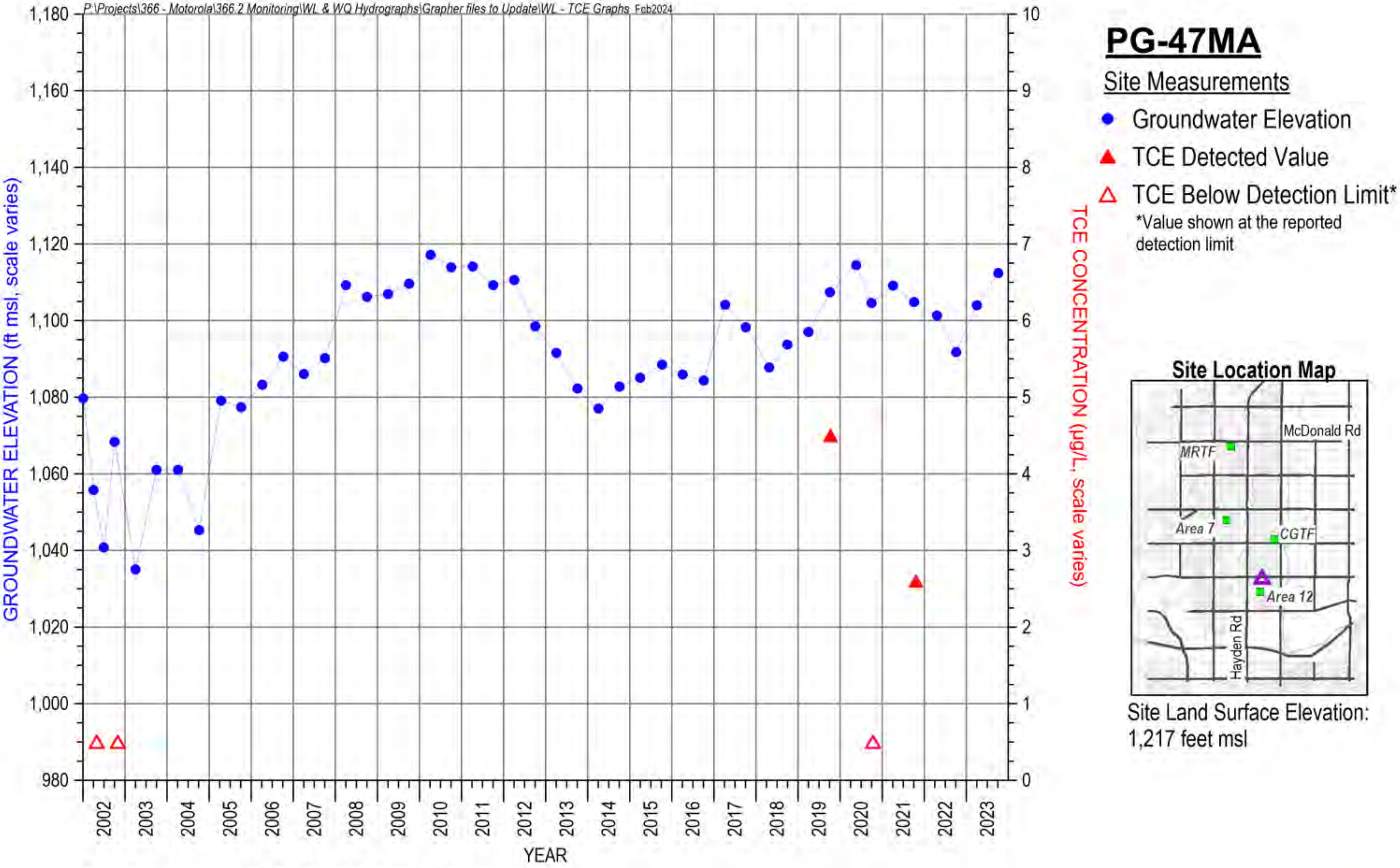
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,233 feet msl

North Indian Bend Wash Superfund Site

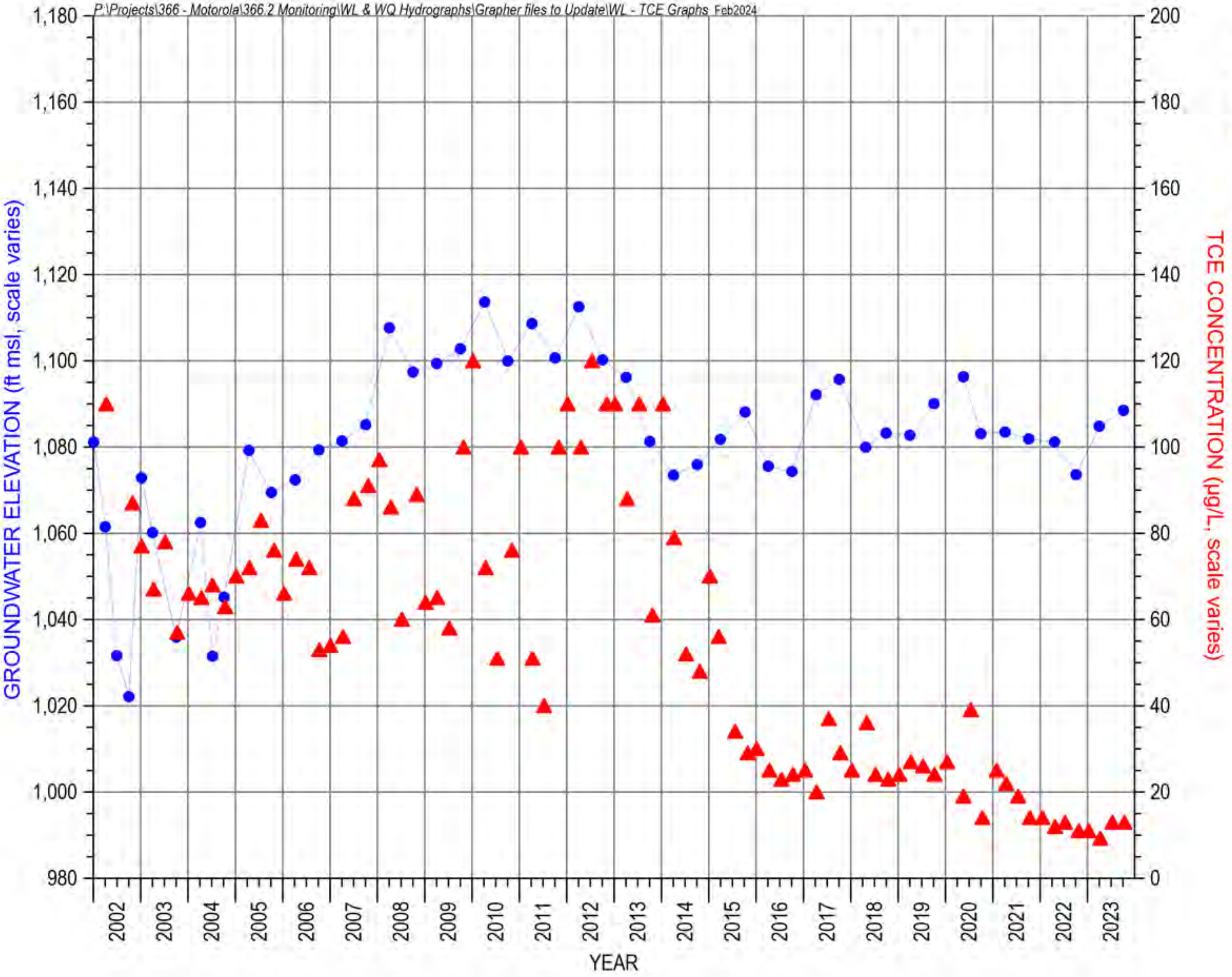
FIGURE D-111. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-46MA



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



PG-48MA

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:
1,217 feet msl

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

North Indian Bend Wash Superfund Site

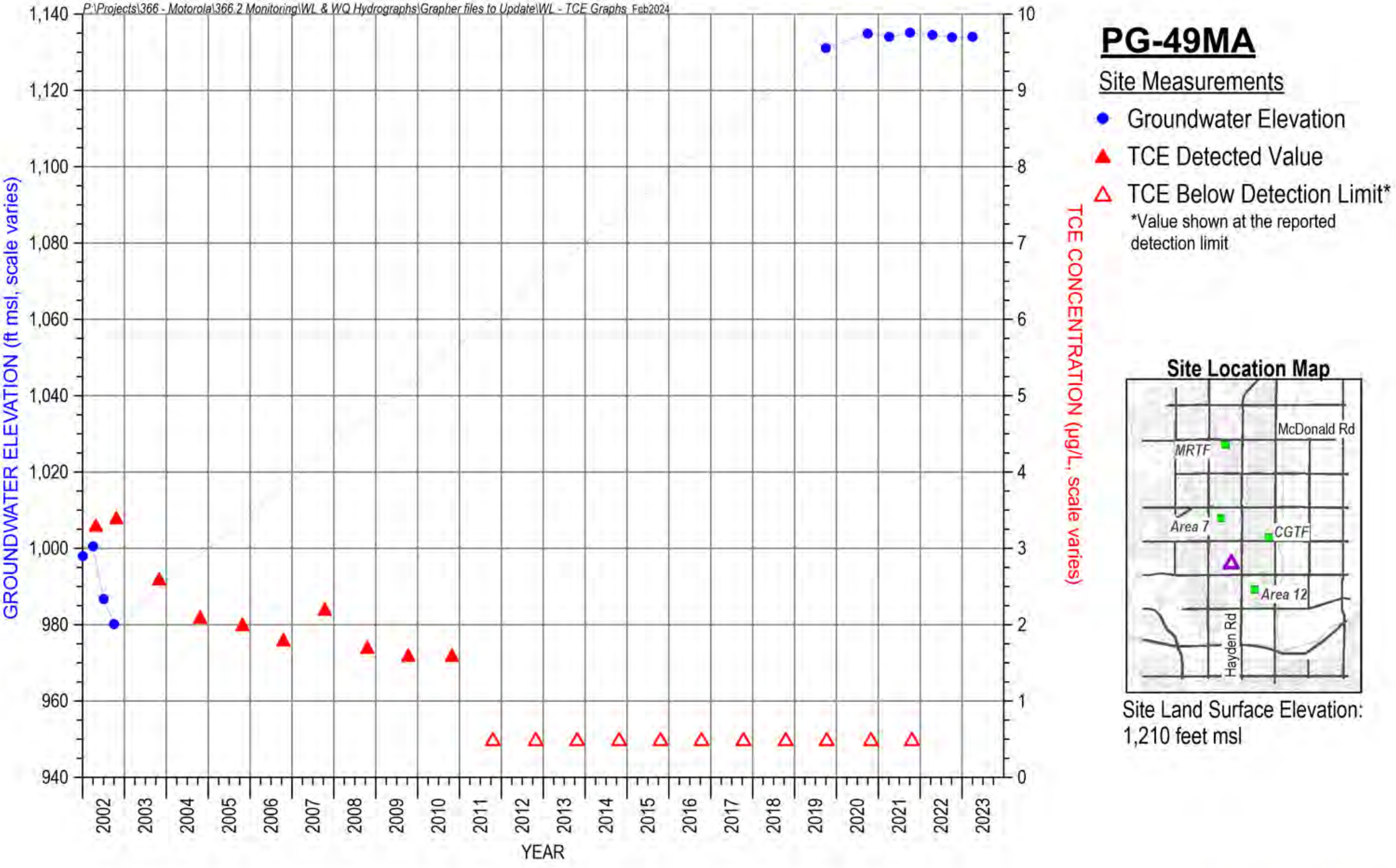
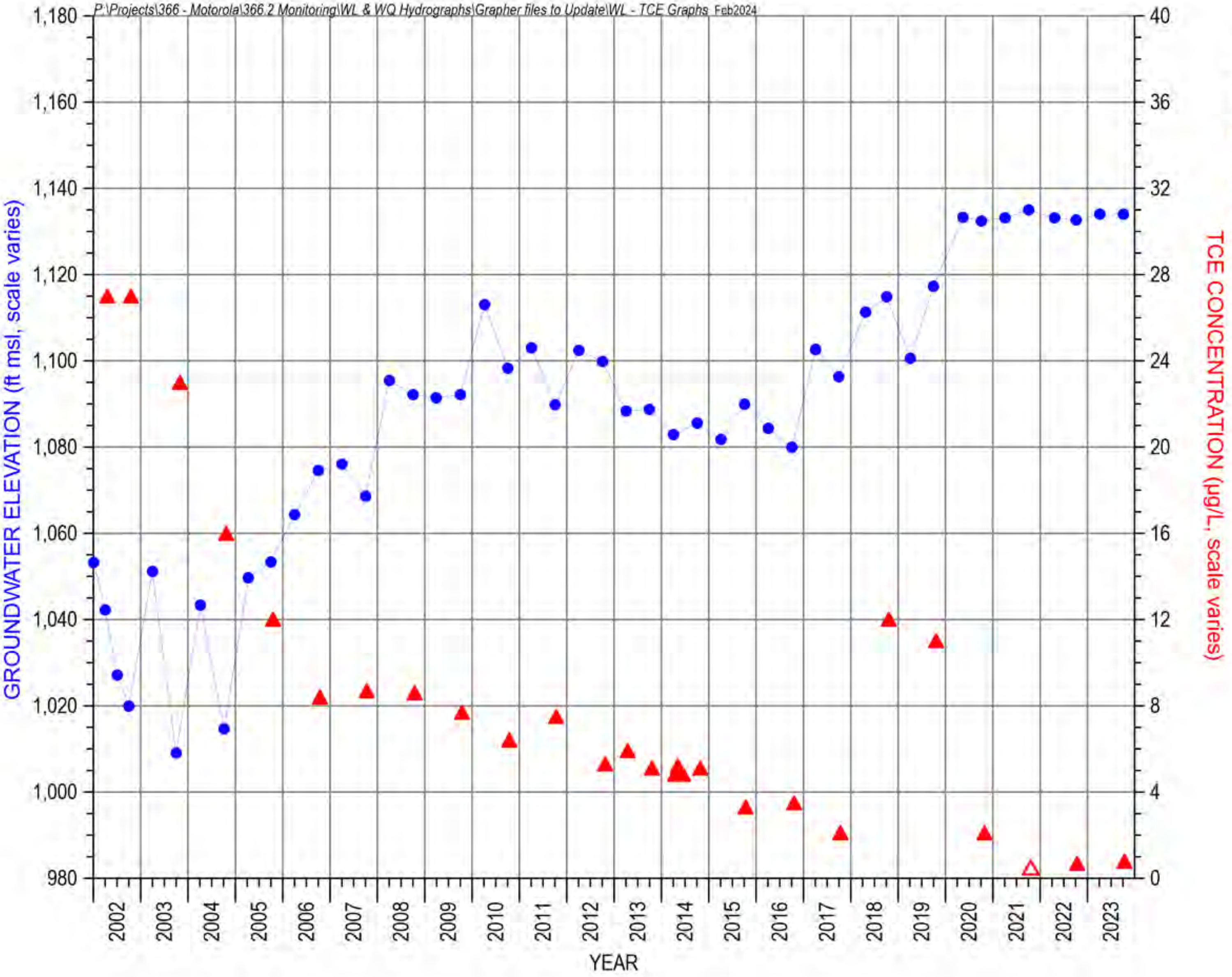


FIGURE D-114. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL PG-49MA

North Indian Bend Wash Superfund Site



PG-50MA

Site Measurements

● Groundwater Elevation

▲ TCE Detected Value

△ TCE Below Detection Limit*

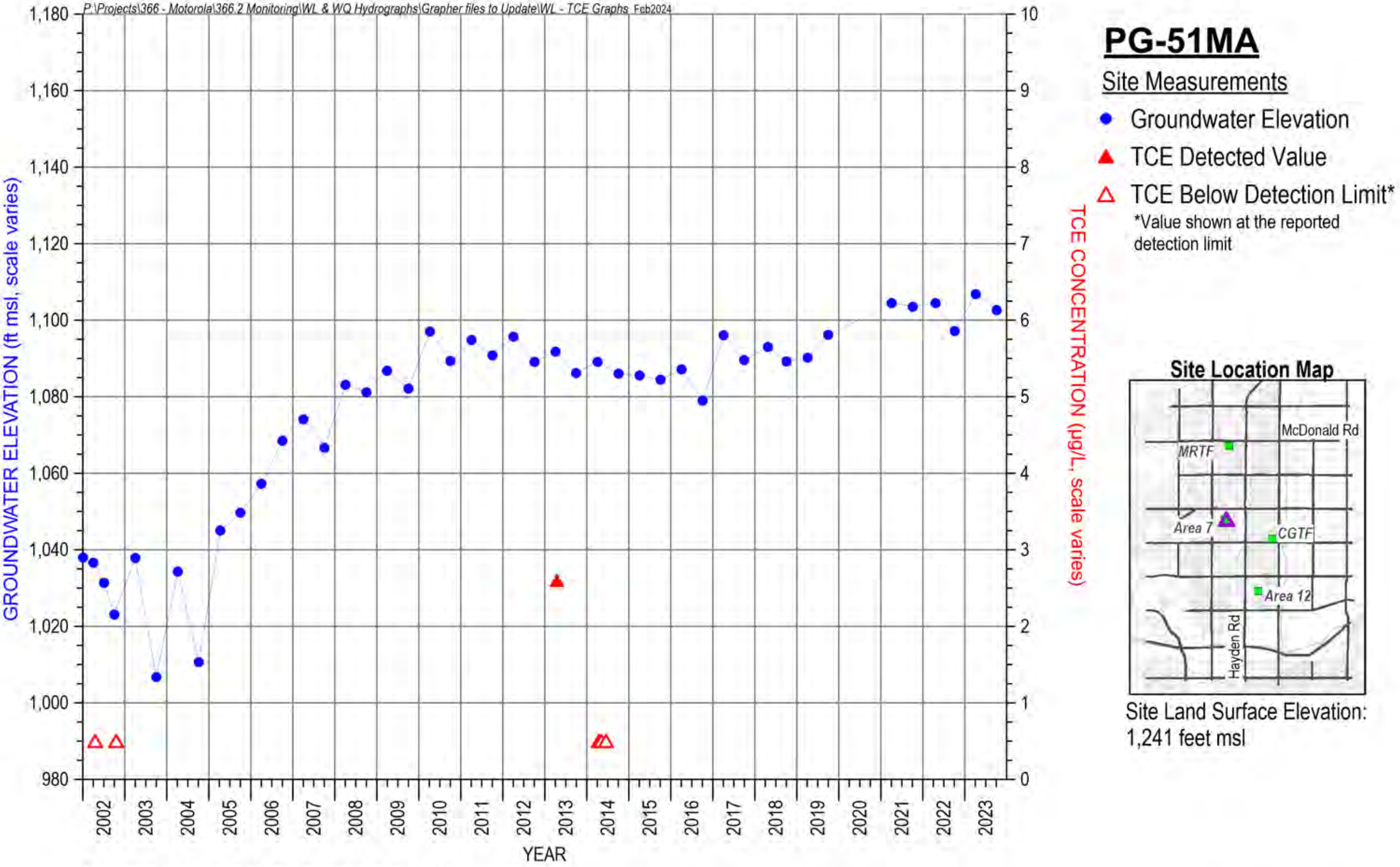
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,241 feet msl

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

North Indian Bend Wash Superfund Site

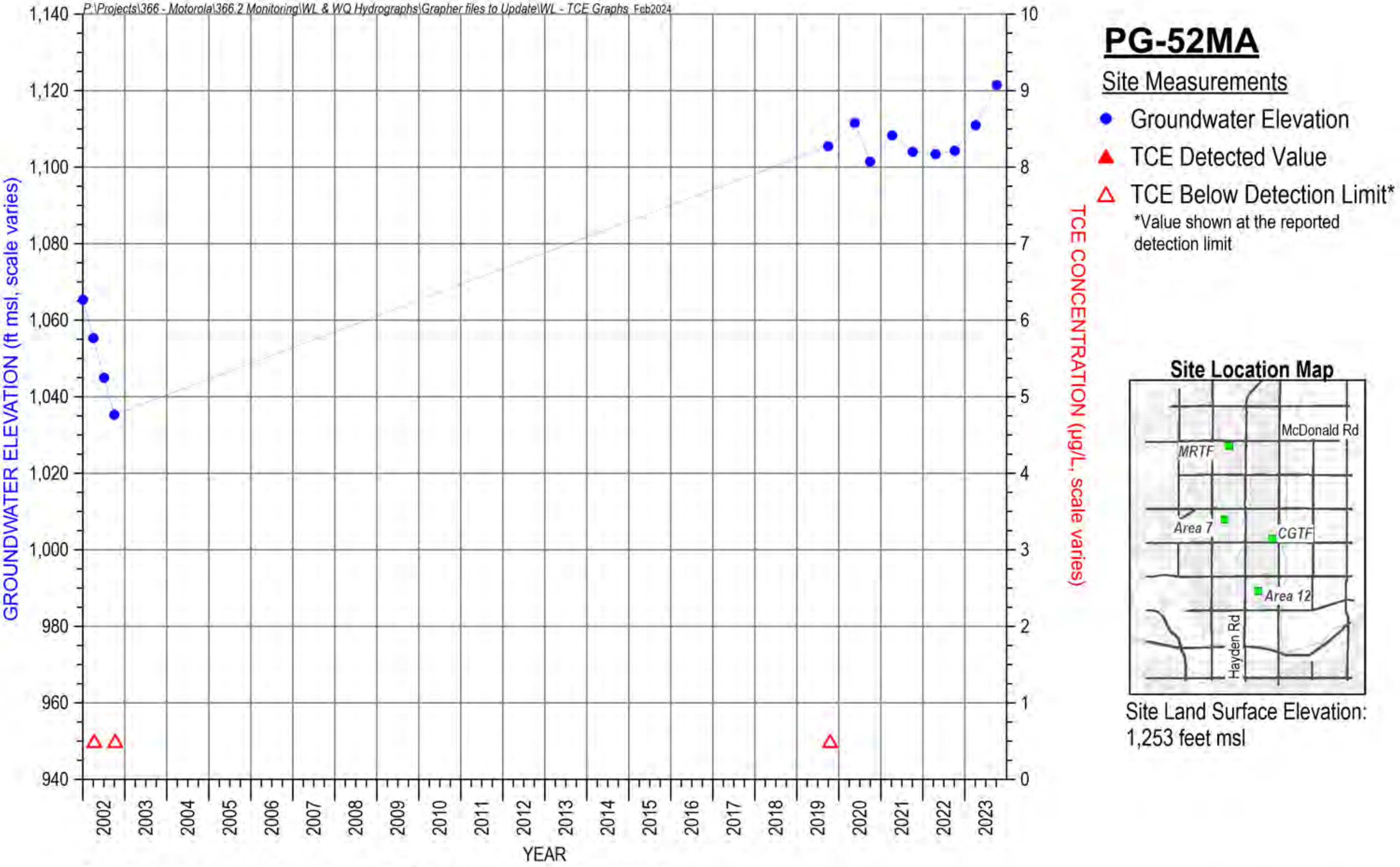


Site Land Surface Elevation:
1,241 feet msl

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

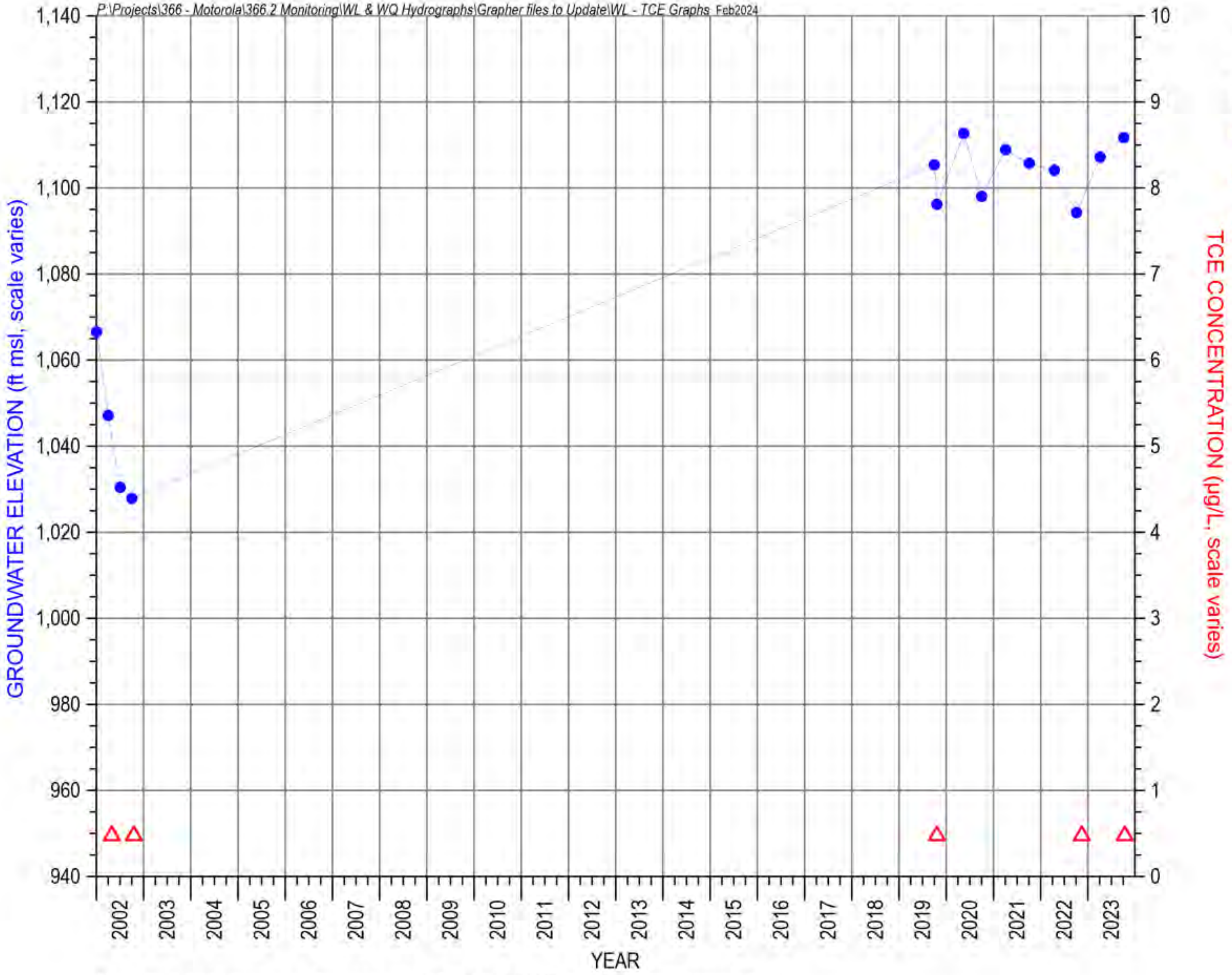
North Indian Bend Wash Superfund Site



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

PG-53MA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

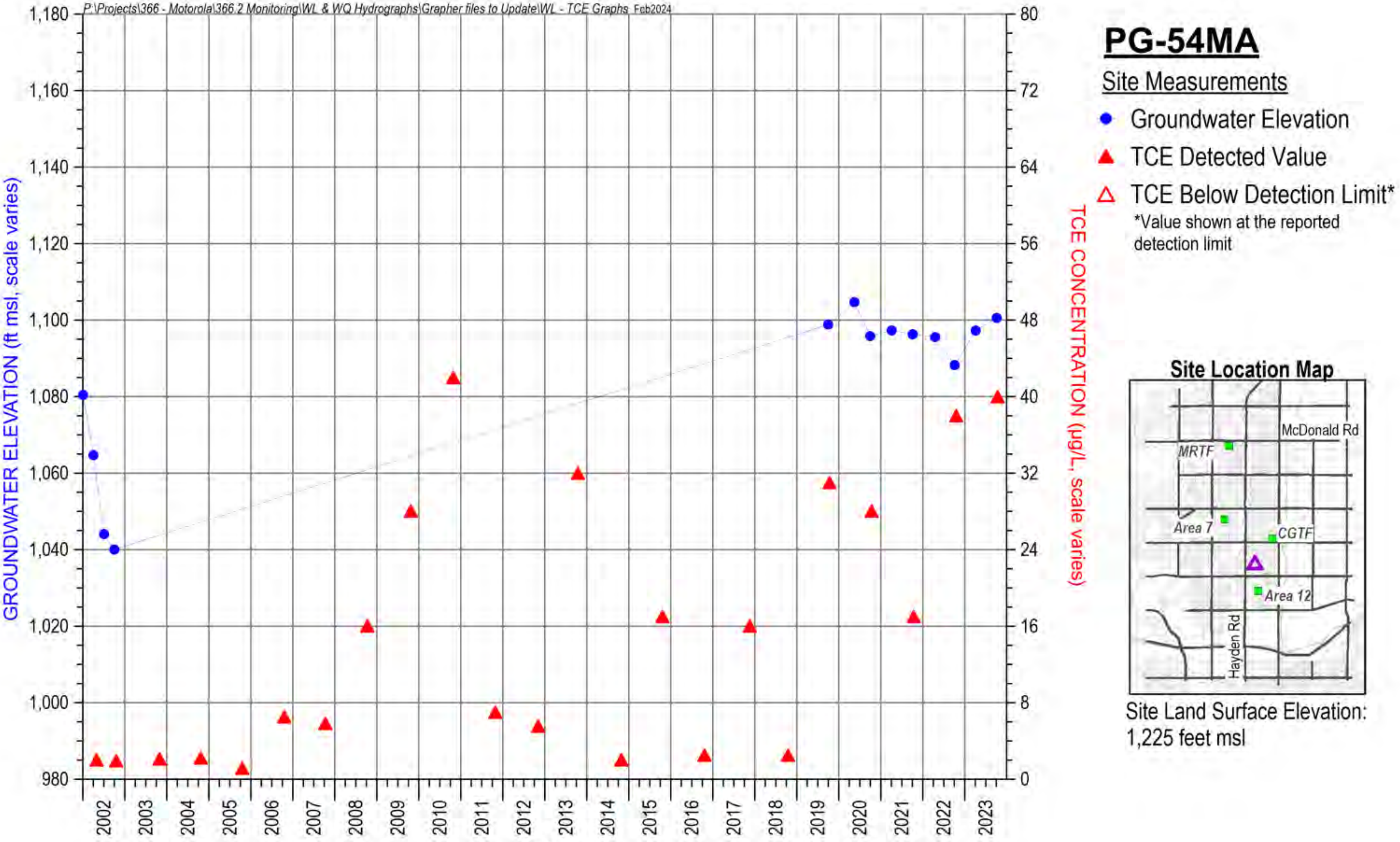
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,225 feet msl

North Indian Bend Wash Superfund Site

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

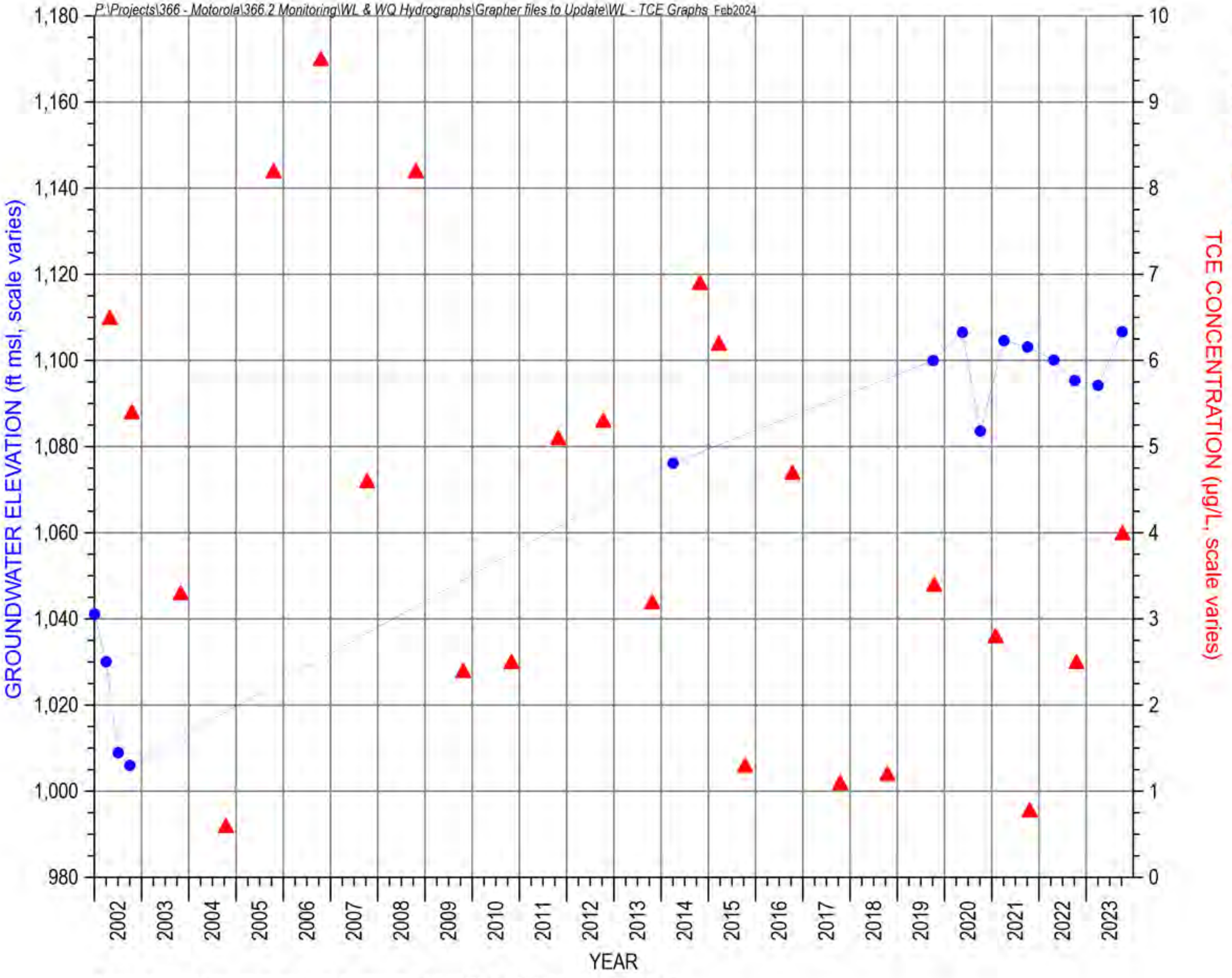


Site Land Surface Elevation:
1,225 feet msl

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



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

PG-55MA

Site Measurements

● Groundwater Elevation

▲ TCE Detected Value

△ TCE Below Detection Limit*

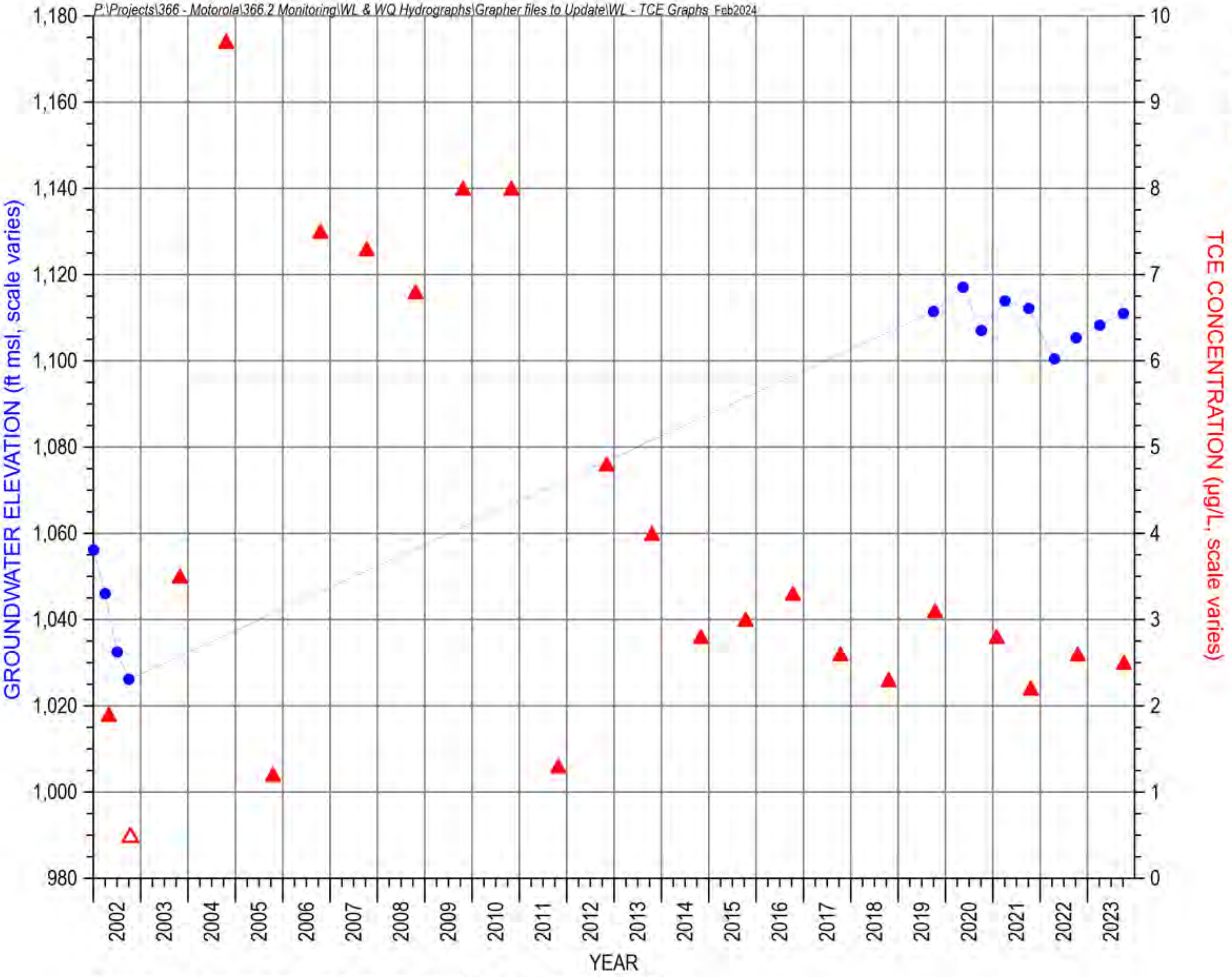
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,226 feet msl

North Indian Bend Wash Superfund Site

FIGURE D-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

PG-56MA

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:
1,232 feet msl

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

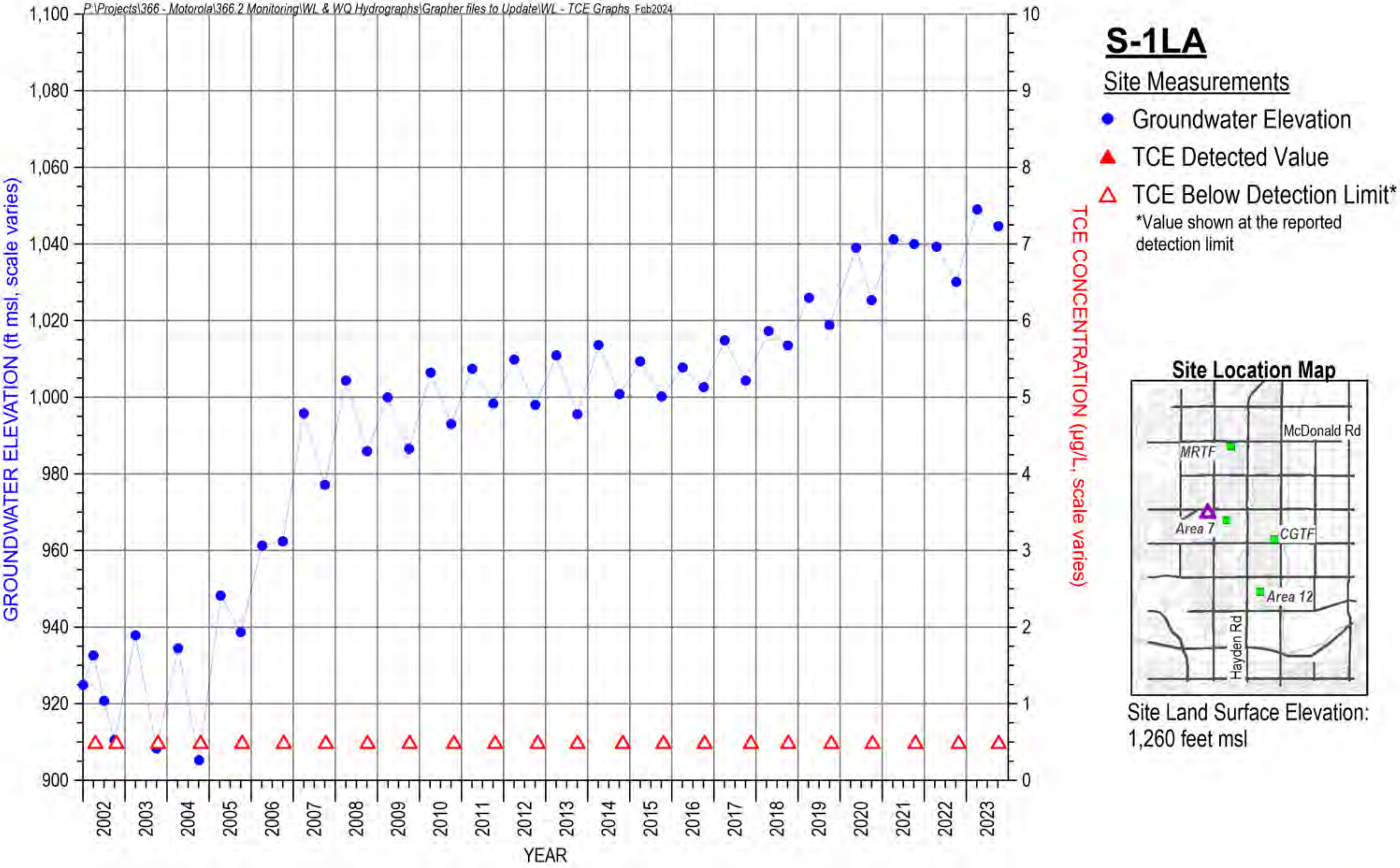
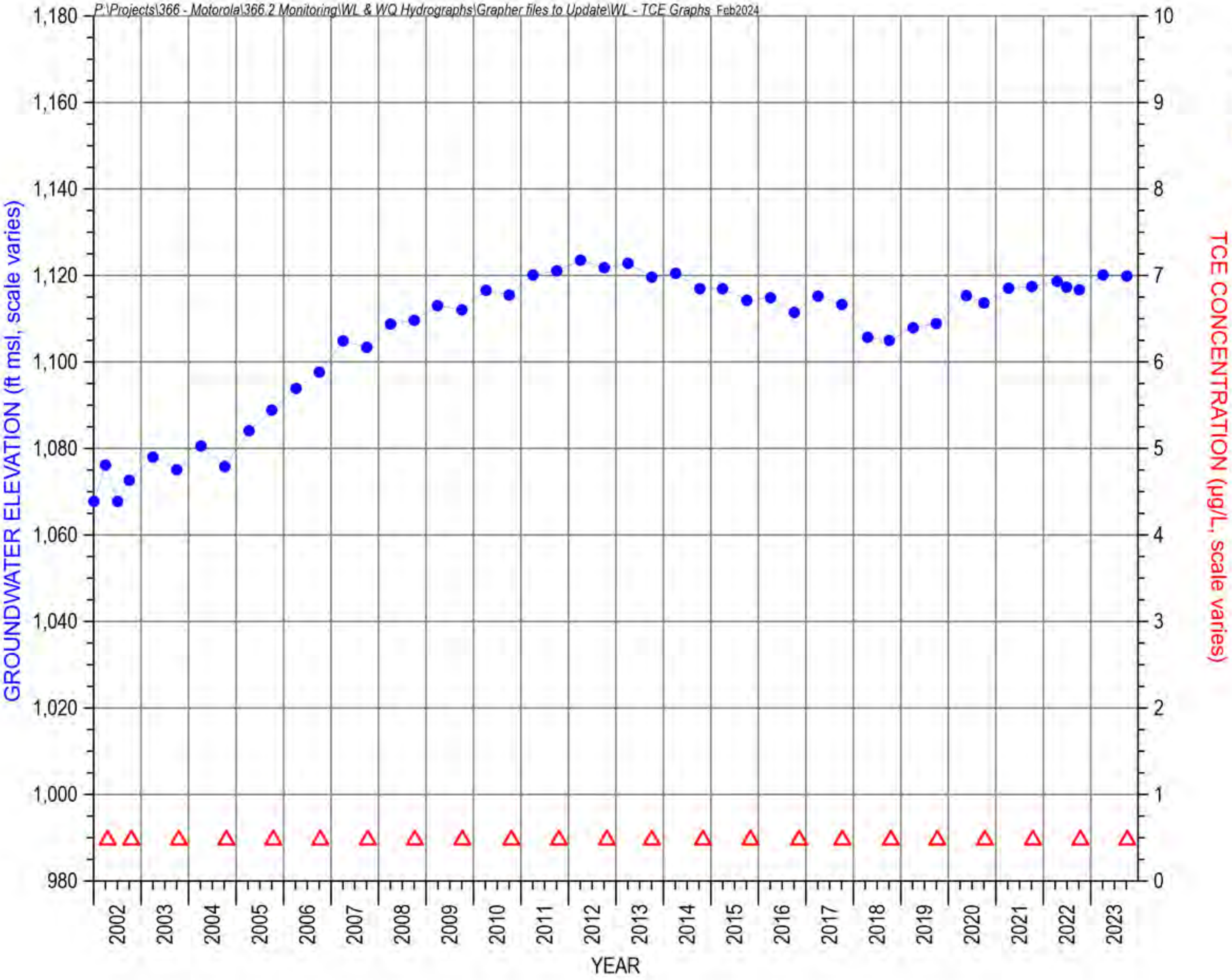


FIGURE D-122. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL S-1LA

North Indian Bend Wash Superfund Site



S-1MA

Site Measurements

- ● Groundwater Elevation
- ▲ TCE Detected Value
- △ TCE Below Detection Limit*

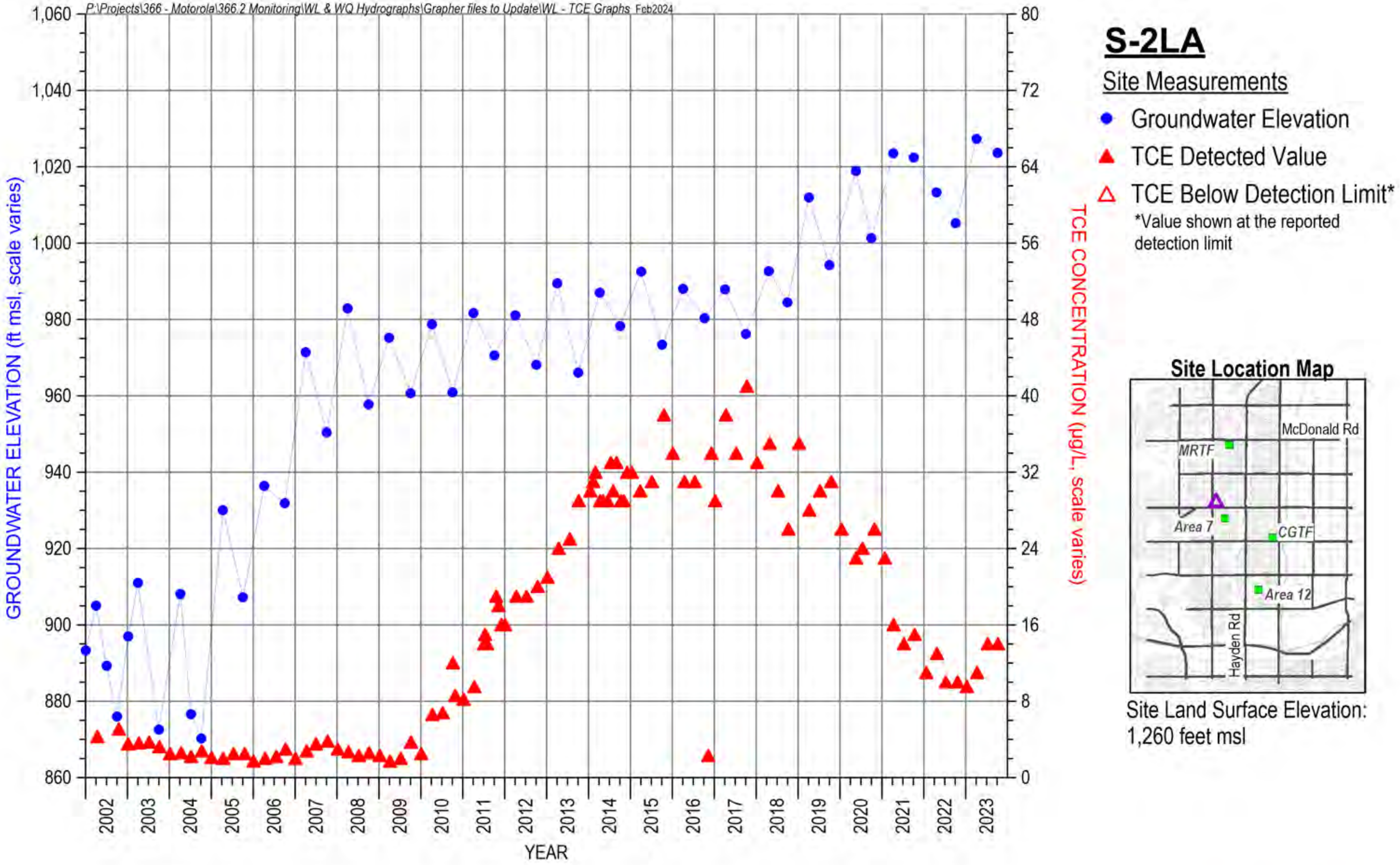
*Value shown at the reported detection limit

Site Location Map

Site Land Surface Elevation:
1,260 feet msl

North Indian Bend Wash Superfund Site

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



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

North Indian Bend Wash Superfund Site

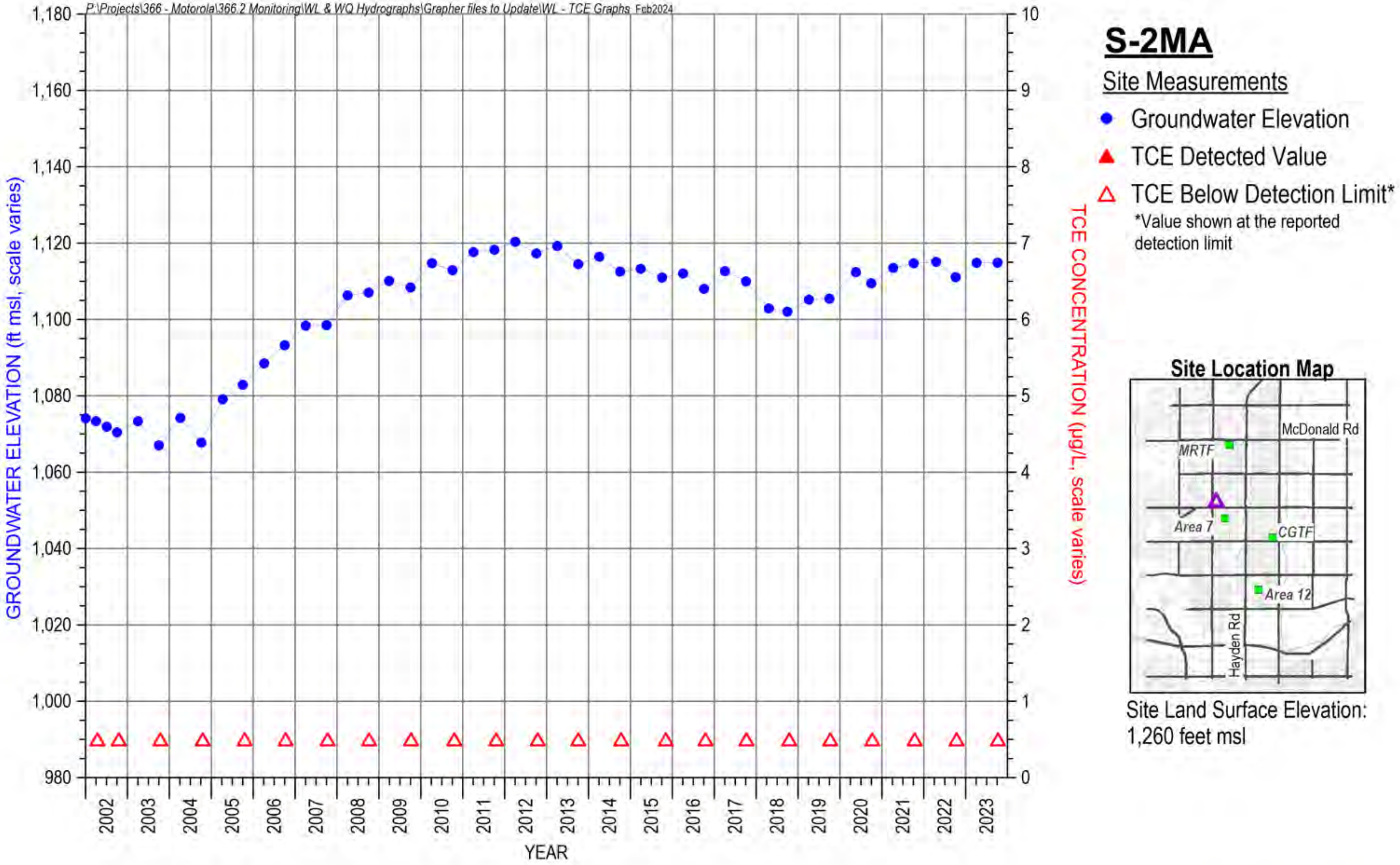


FIGURE D-125. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL S-2MA

North Indian Bend Wash Superfund Site

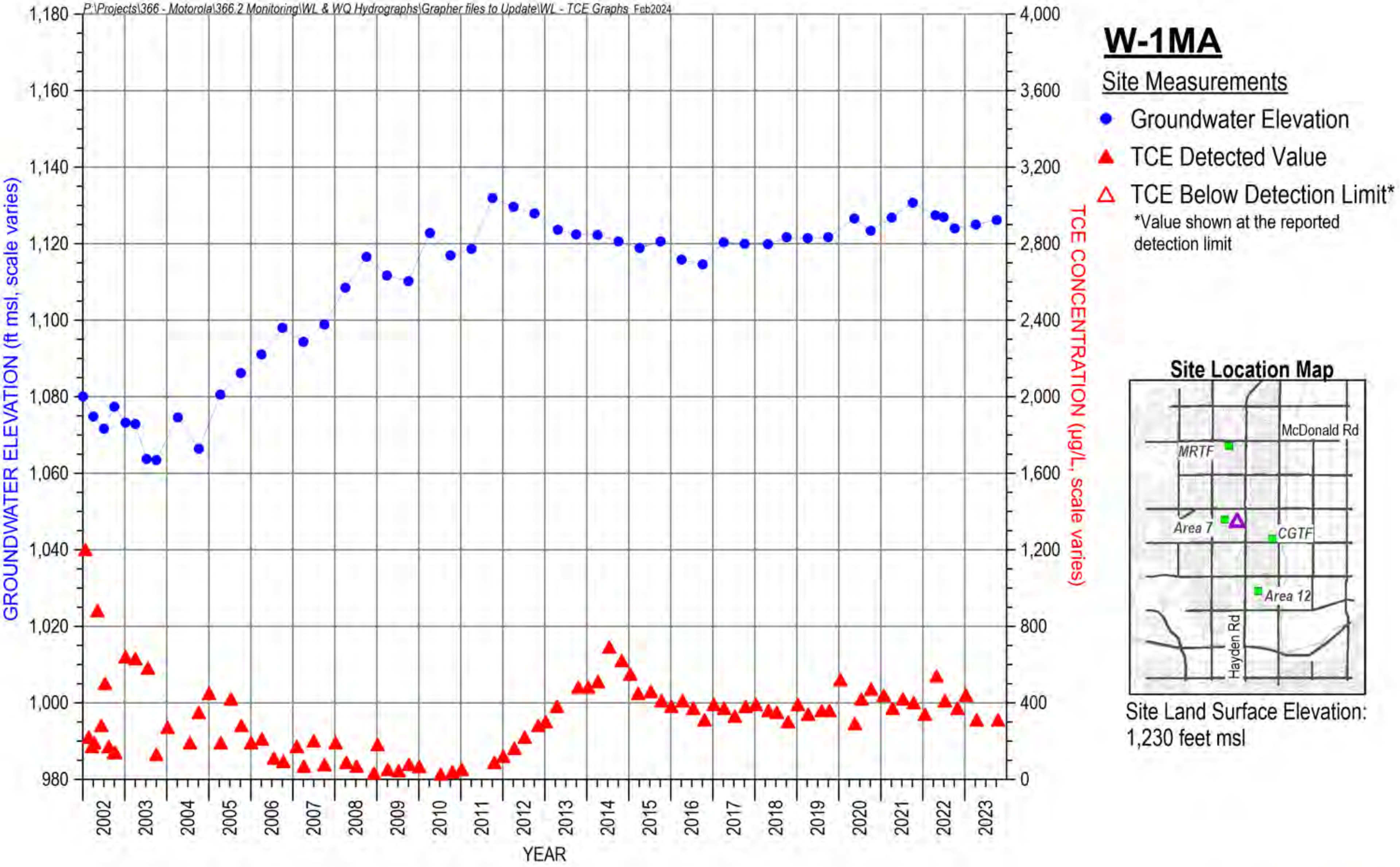


FIGURE D-126. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL W-1MA

North Indian Bend Wash Superfund Site

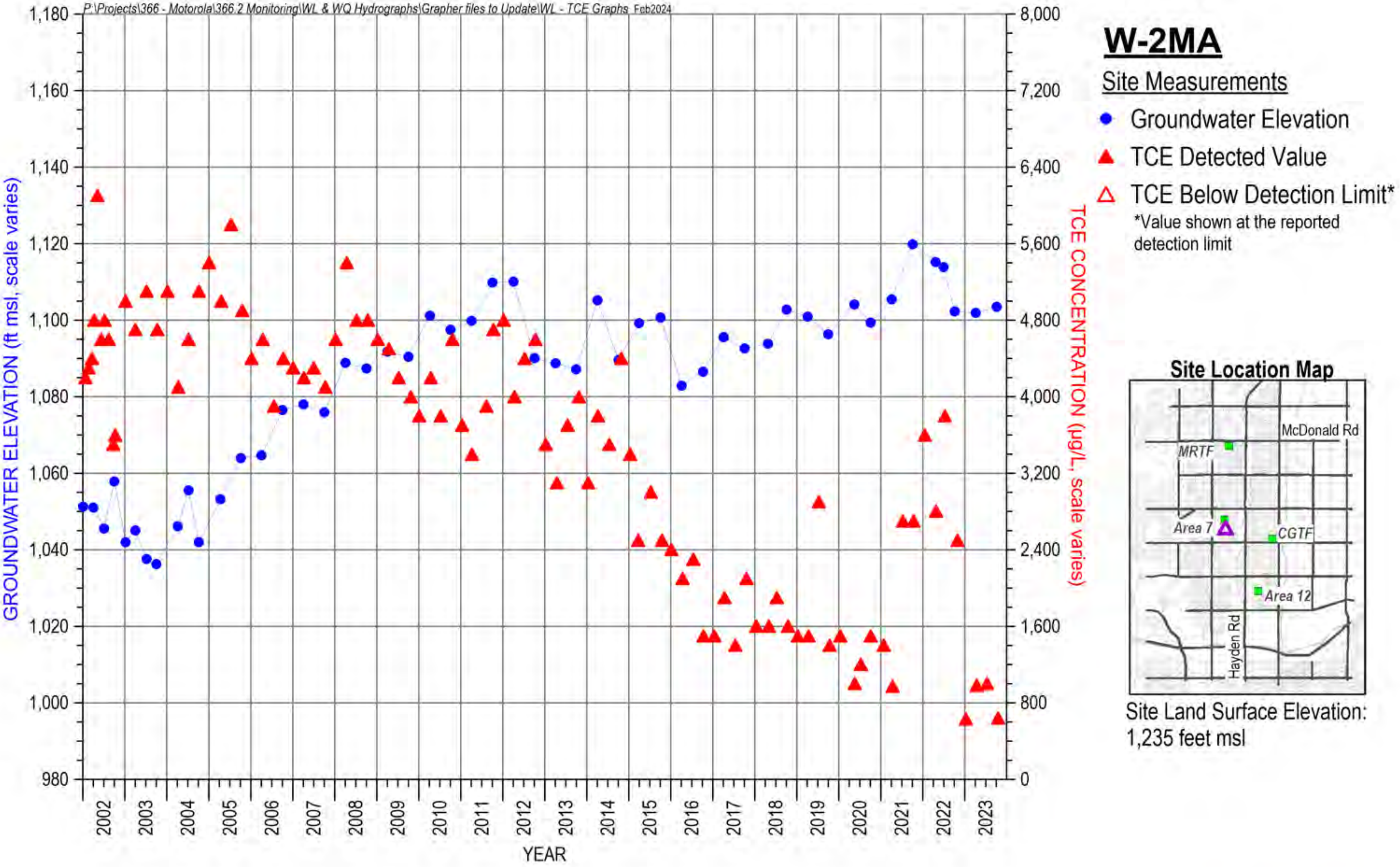


FIGURE D-127. GRAPH OF MEASURED GROUNDWATER LEVELS AND/OR TCE CONCENTRATIONS FOR MONITOR WELL W-2MA

APPENDIX E

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

APPENDIX E

HISTORIC GROUNDWATER PUMPING TABLE

TABLE E-1. SUMMARY OF HISTORICAL ANNUAL GROUNDWATER PRODUCTION
FROM 1991 THROUGH 2013
NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

Production 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
7EX-1UA (1)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13,514	13,654	14,585	12,966	12,627	0
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
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
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
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
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
PV-12B[a]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	464,884	769,618
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
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
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
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
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
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
AWC 8	363,078	418,945	410,874	417,285	233,147	341,332	270,555	370,570	319,651	292,498	138,800	279,501	212,209	321,431	293,885	254,674	365,994	353,379	326,794	313,350	311,522	323,744	153,290
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
AWC 9B	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
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
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
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.
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.
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.
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
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
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.
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
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
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.
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
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
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.
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
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
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
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
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
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
MEX-1MA (4)	---	---	---	---	---	---	---	---	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
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
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
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.
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.

TABLE E-1. SUMMARY OF HISTORICAL ANNUAL GROUNDWATER PRODUCTION FROM 1991 THROUGH 2013 NORTH INDIAN BEND WASH AREA, SCOTTSDALE, ARIZONA

Production 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
SRP 21.5E,8N	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
SRP 22.1E,8.5N	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
SRP 22.3E,7N	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
SRP 22.4E,9N	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.
SRP 22.5E,5.5N	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
SRP 22.5E,6N	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.
SRP 22.5E,9.3N (PCX 1)(5)	---	---	---	---	---	---	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
SRP 22.6E,10N	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
SRP 22.9E,10.8N[b]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	128,034	173,499
SRP 23E,10.8N (COS5W)	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
SRP 23.3E,7.3N (COS 31)	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
SRP 23.3E,7.5N (COS 6)	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
SRP 23.4E,10.6N (COS5E)	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
SRP 23.5E,5.3N	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
SRP 23.5E,8.8N	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
SRP 23.5E,9.5N	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
SRP 23.5E,10.6N[c]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	83,907	191,216
SRP 23.6E,6N (Granite Reef)	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
SRP 24E,10.5N	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
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
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

ABBREVIATIONS:

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

NOTES:

(1) Extraction well 7EX-1UA went into service in 2008.
(2) Extraction wells 7EX-3MA and 7EX-4MA went into service in September 1999.
(3) Extraction well 7EX-5MA went into service in February 2002.
(4) Well MEX-1MA went into service in October 1999.
(5) Well 22.5E,9.3N (PCX-1) went into service in April 1997.

[a] Replacement well for PV-12
[b] Replacement well for SRP 23E,10.8N
[c] Replacement well for SRP 23.4E,10.6N

APPENDIX E

GROUNDWATER PUMPING AND TCE TIME-SERIES GRAPHS

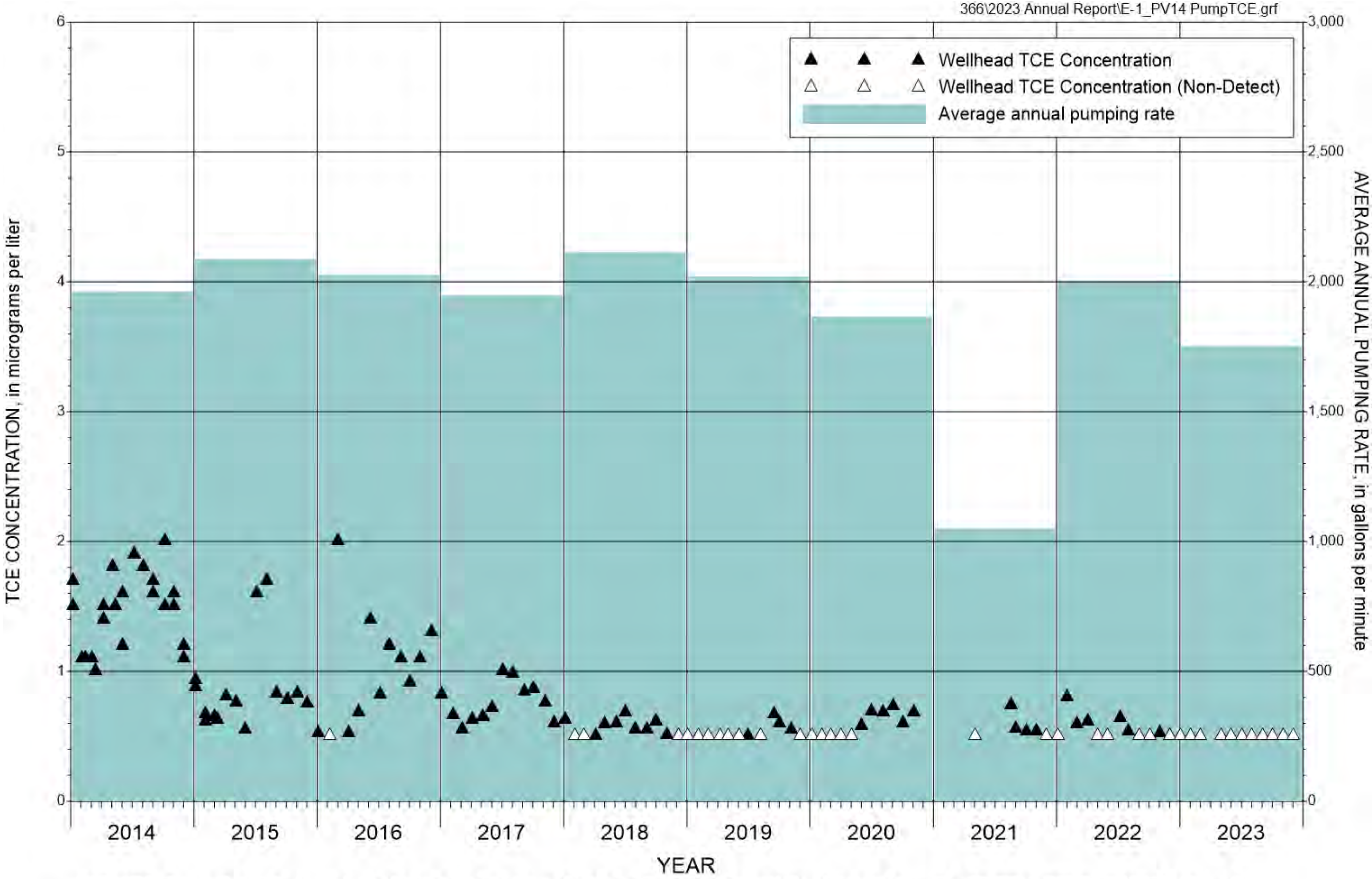


FIGURE E-1. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PV-14
2014 THROUGH 2023

North Indian Bend Wash Superfund Site

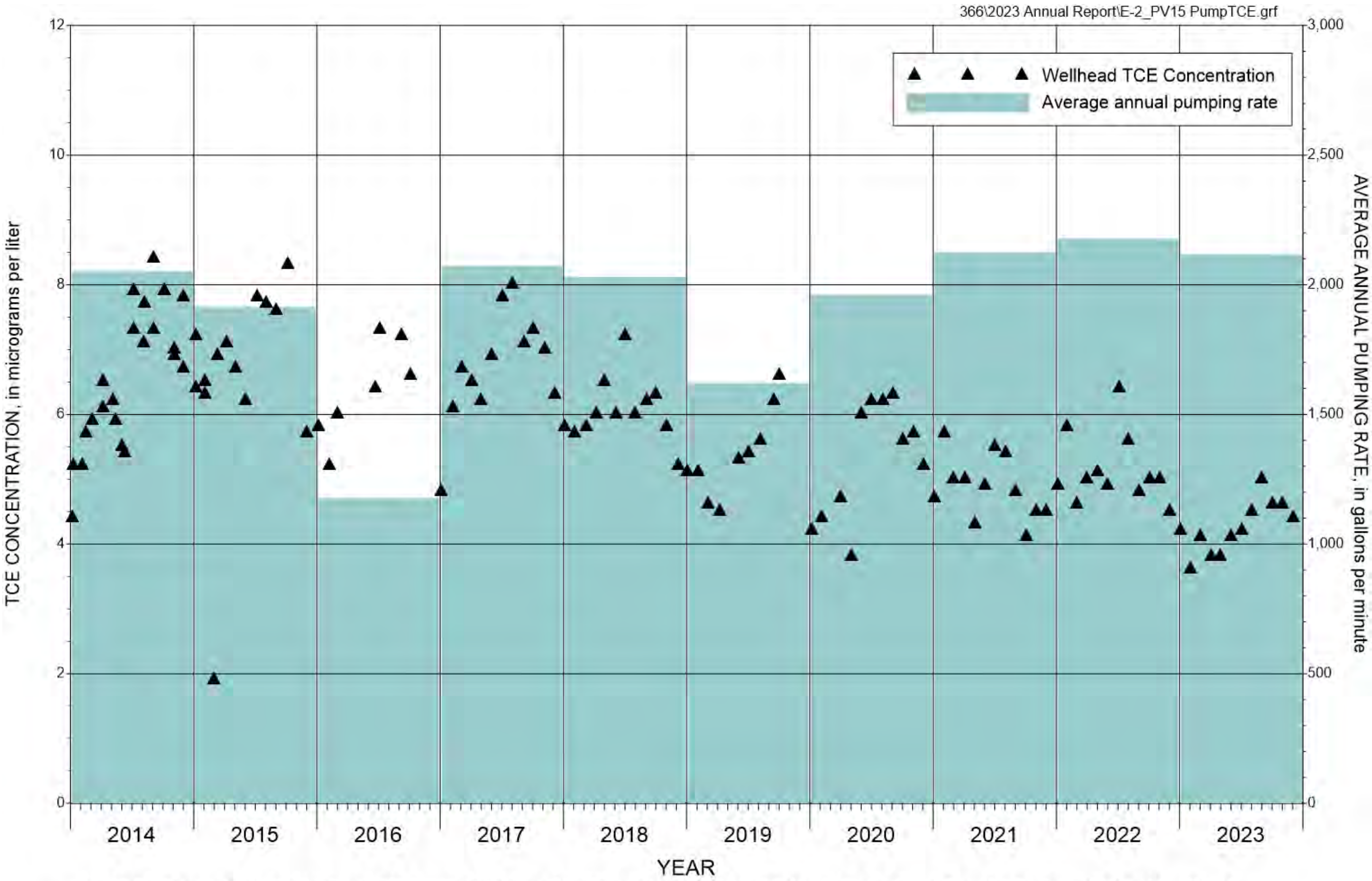


FIGURE E-2. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PV-15
2014 THROUGH 2023

North Indian Bend Wash Superfund Site

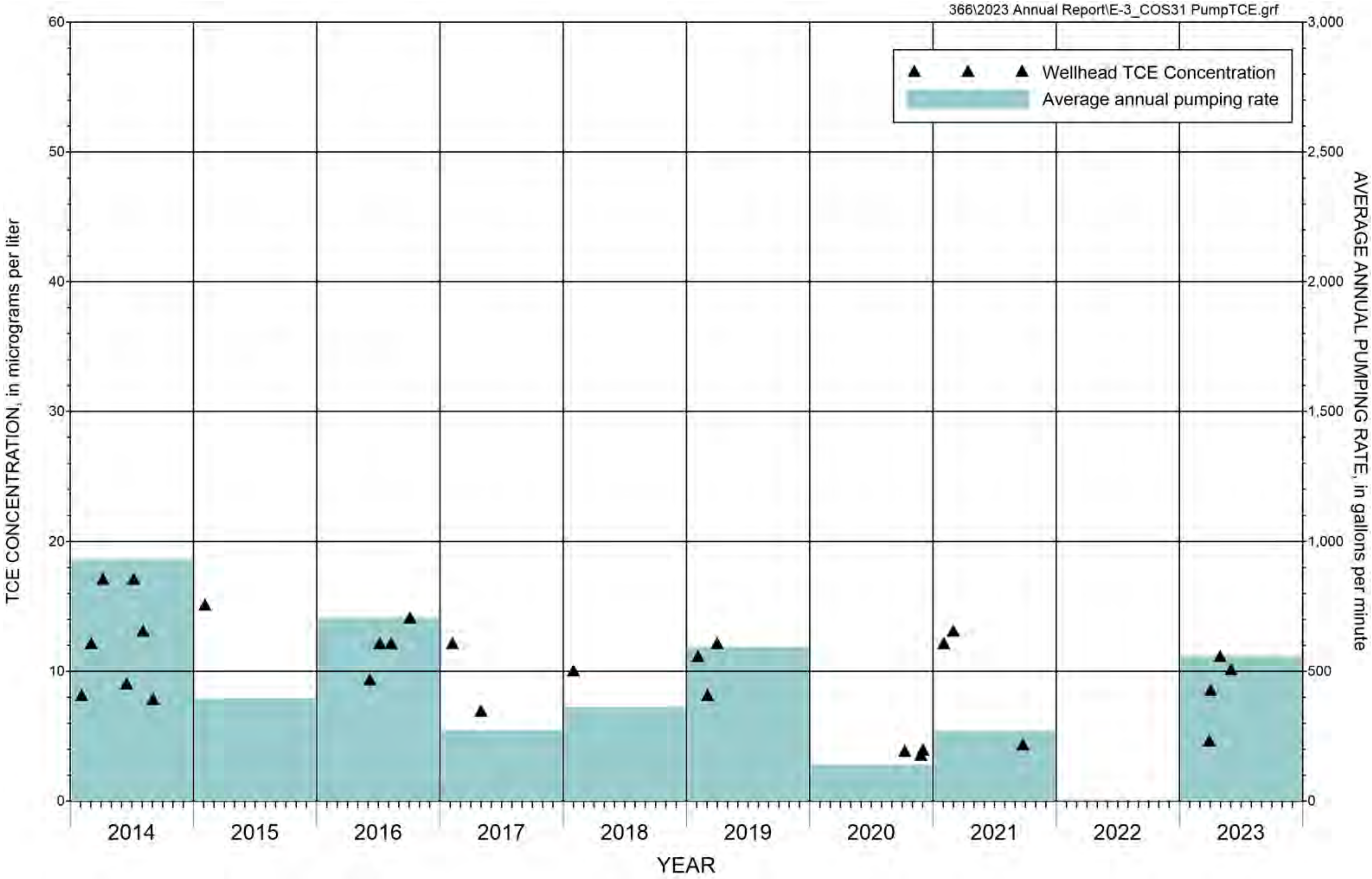


FIGURE E-3. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-31 2014 THROUGH 2023

North Indian Bend Wash Superfund Site

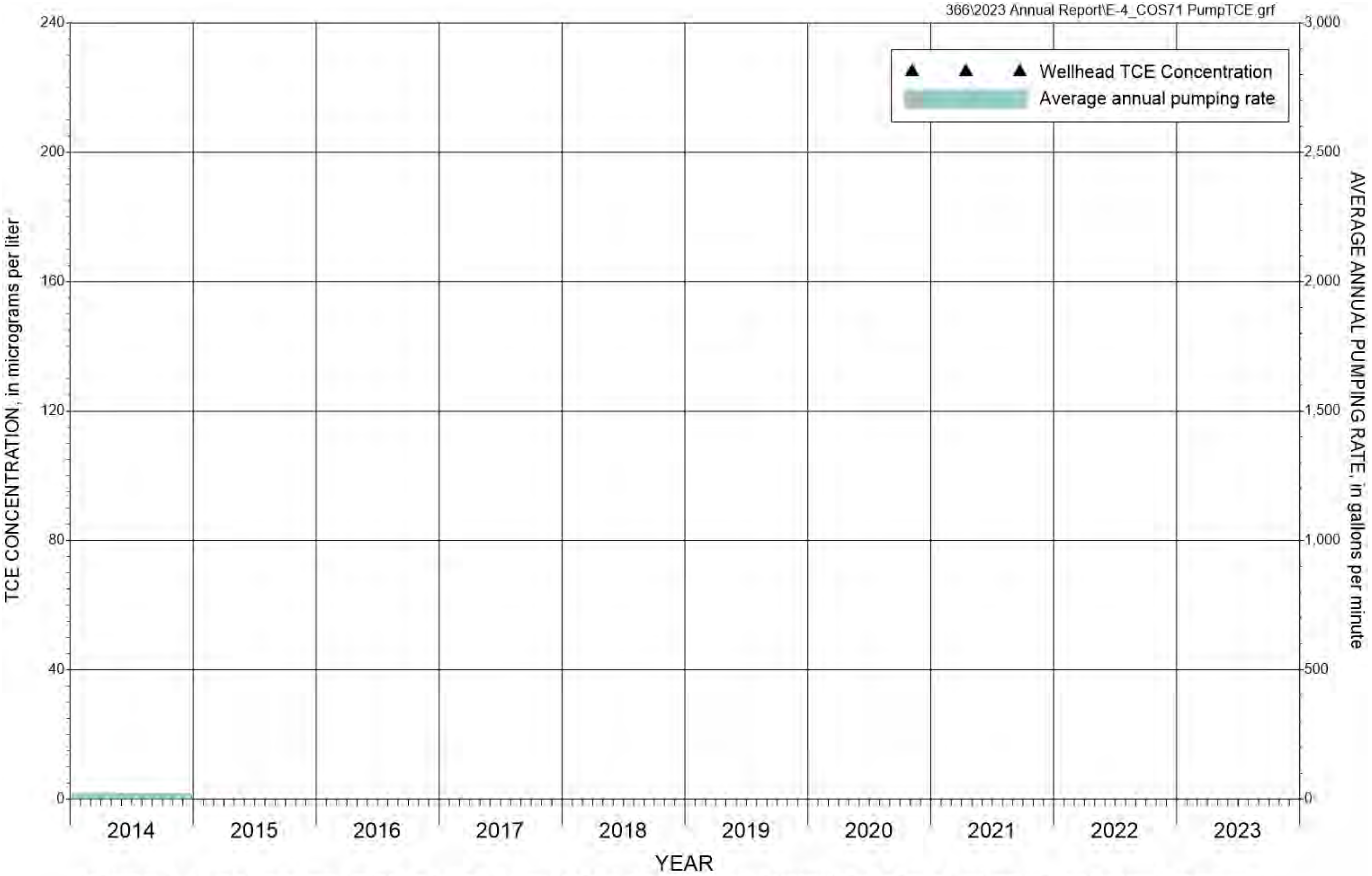


FIGURE E-4. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-71 2014 THROUGH 2023

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

North Indian Bend Wash Superfund Site

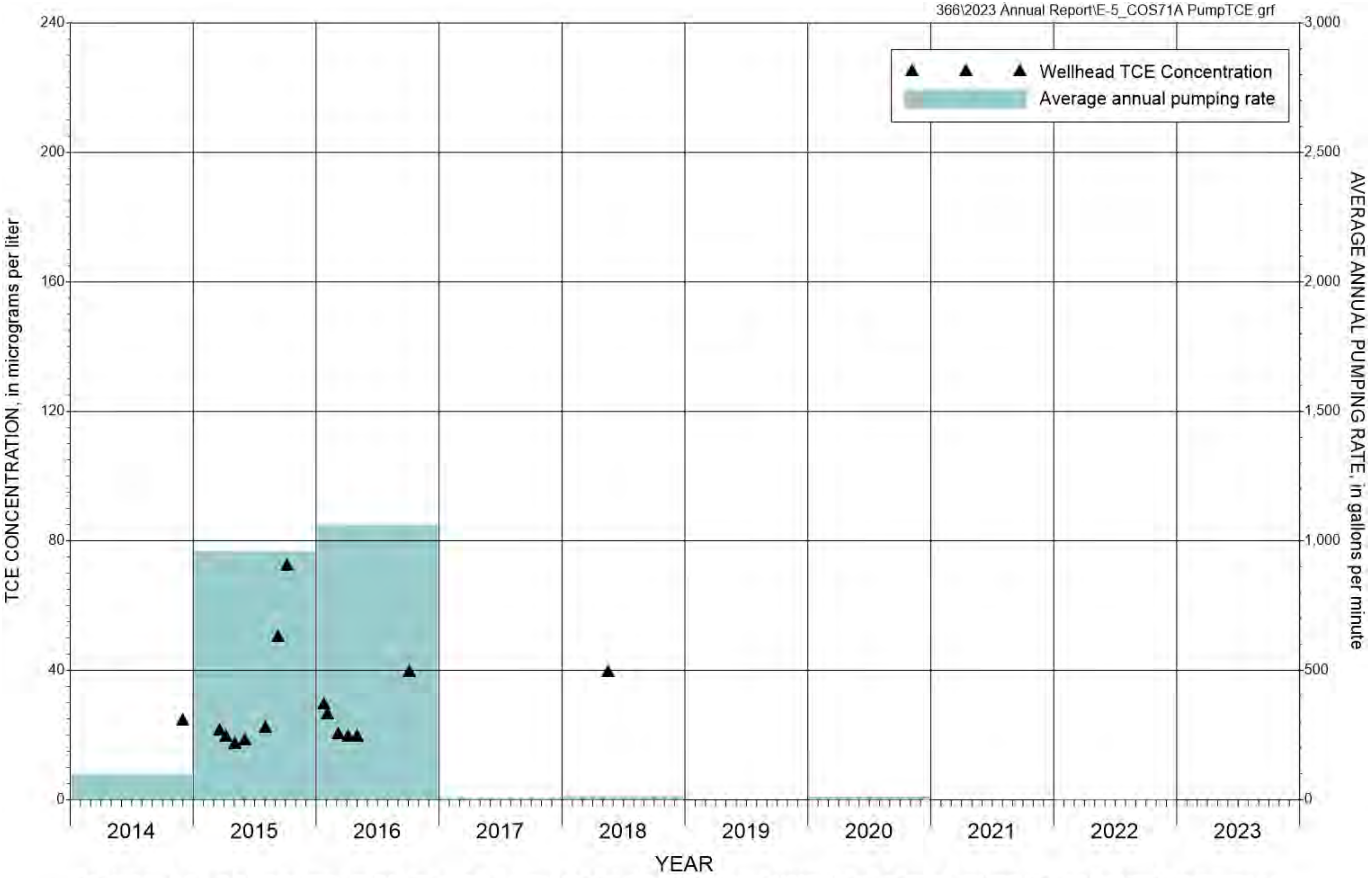


FIGURE E-5. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-71A 2014 THROUGH 2023

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

North Indian Bend Wash Superfund Site

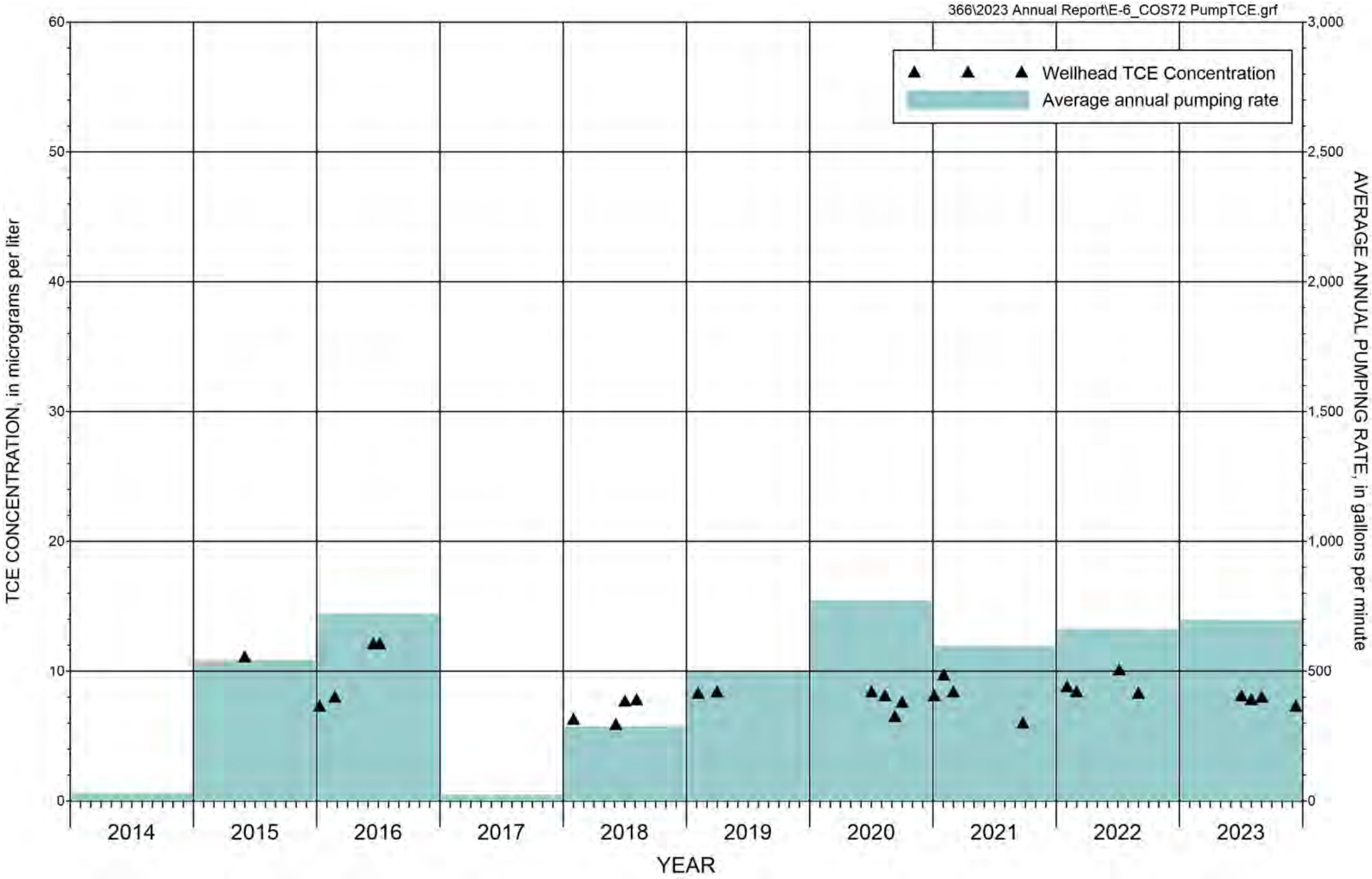


FIGURE E-6. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-72 2014 THROUGH 2023

North Indian Bend Wash Superfund Site

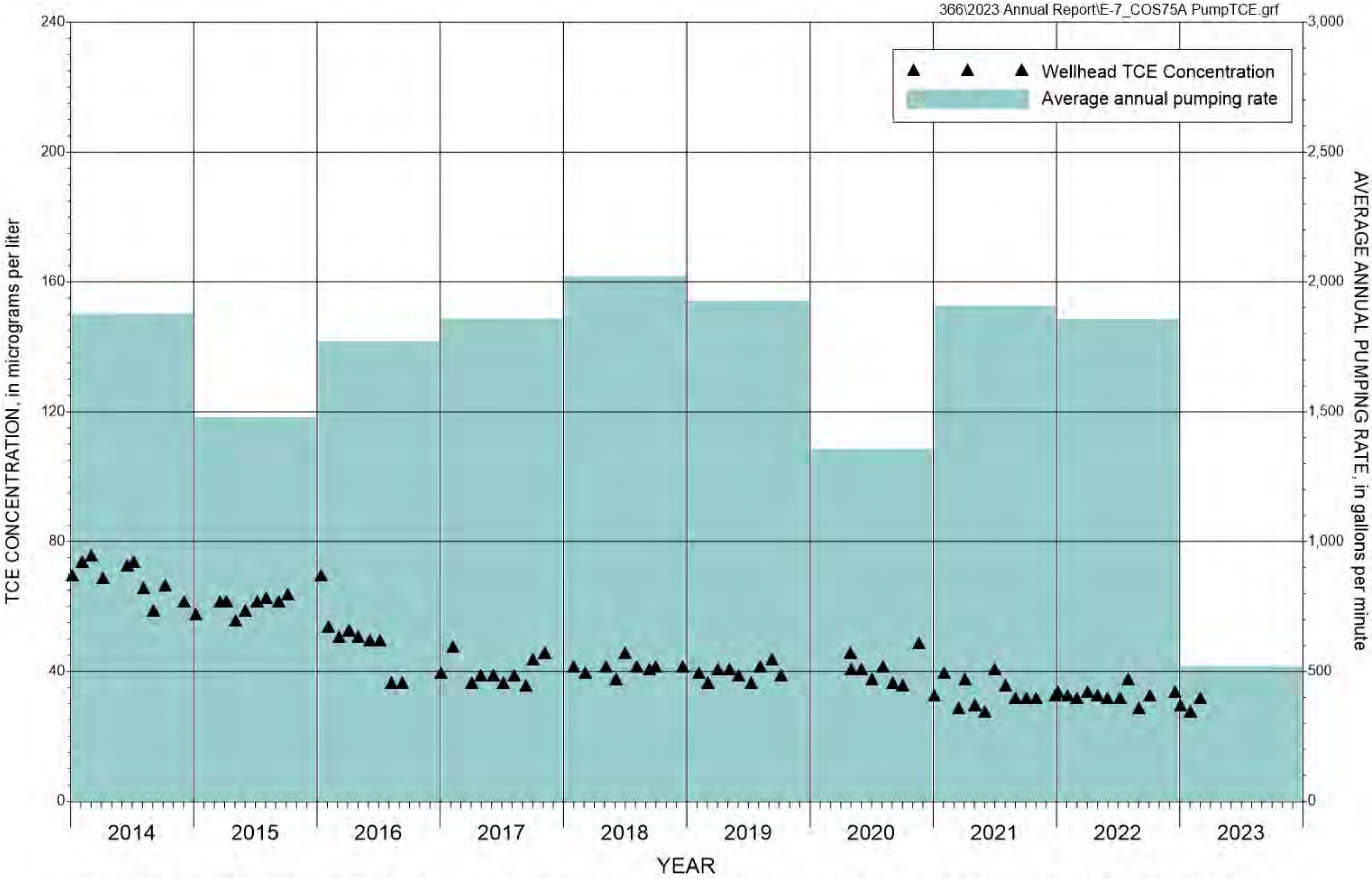


FIGURE E-7. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL COS-75A 2014 THROUGH 2023

North Indian Bend Wash Superfund Site

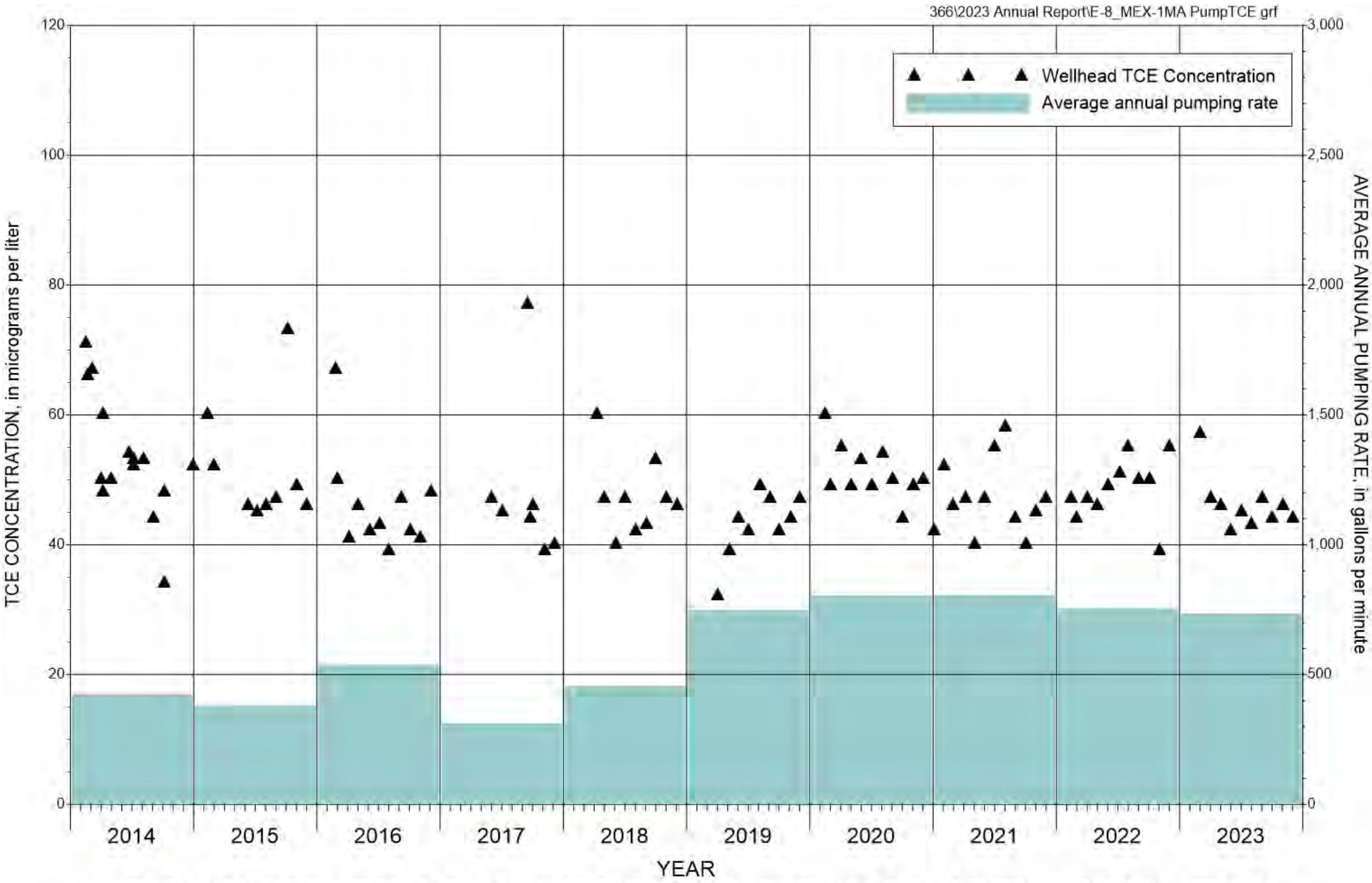


FIGURE E-8. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL MEX-1MA 2014 THROUGH 2023

North Indian Bend Wash Superfund Site

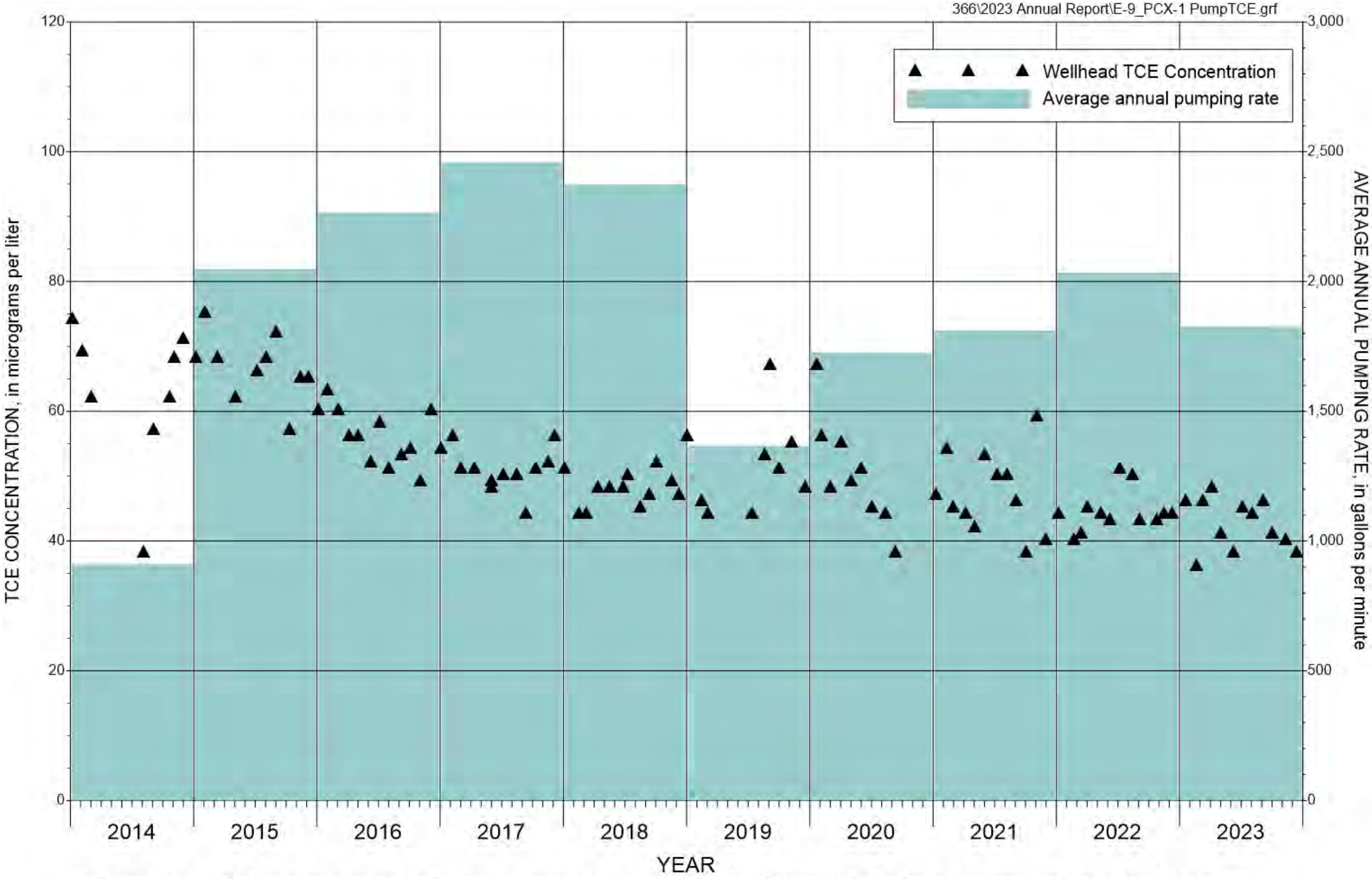


FIGURE E-9. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL PCX-1 2014 THROUGH 2023

North Indian Bend Wash Superfund Site

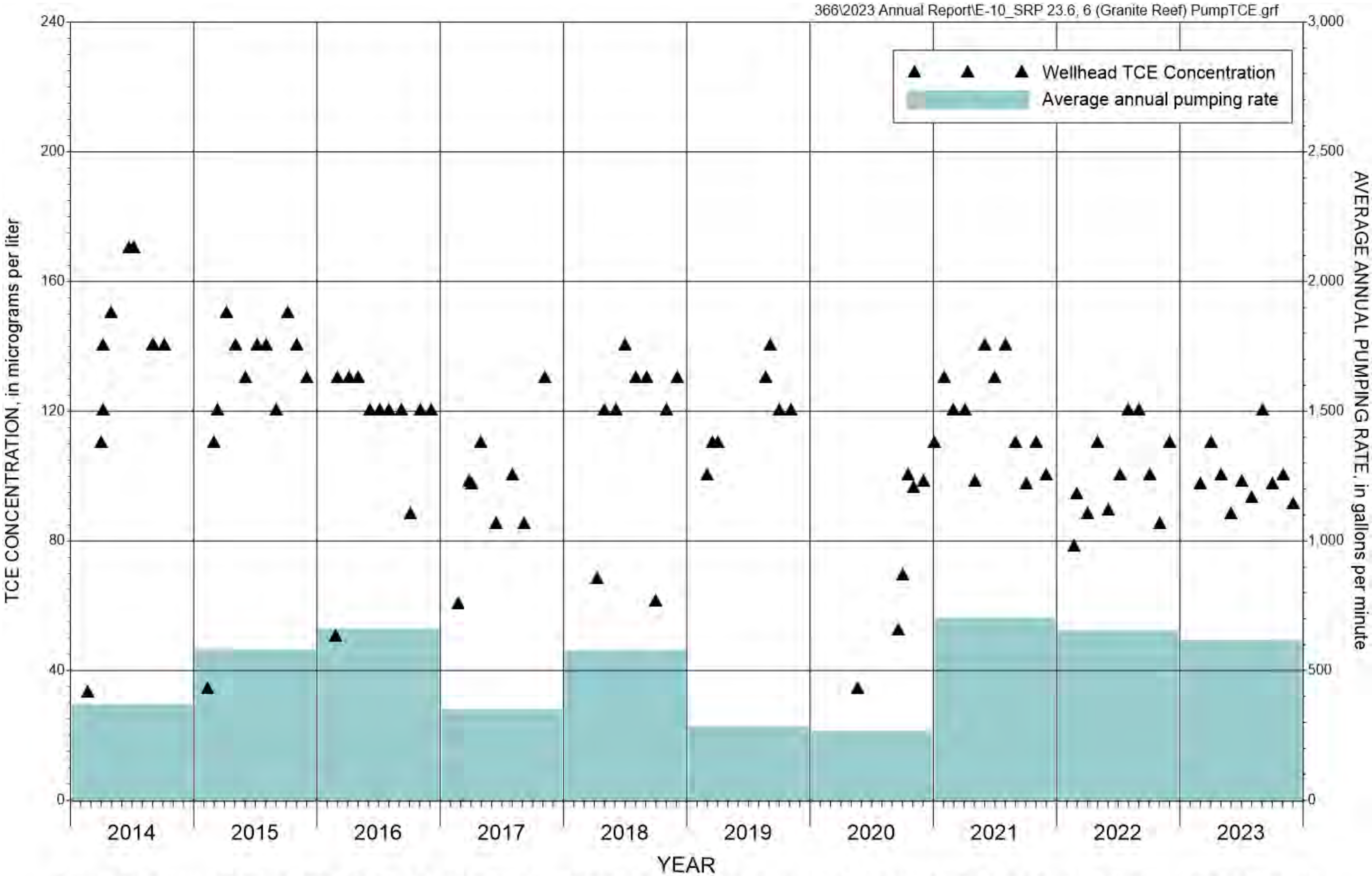


FIGURE E-10. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL SRP 23.6E, 6N (GRANITE REEF), 2014 THROUGH 2023

North Indian Bend Wash Superfund Site

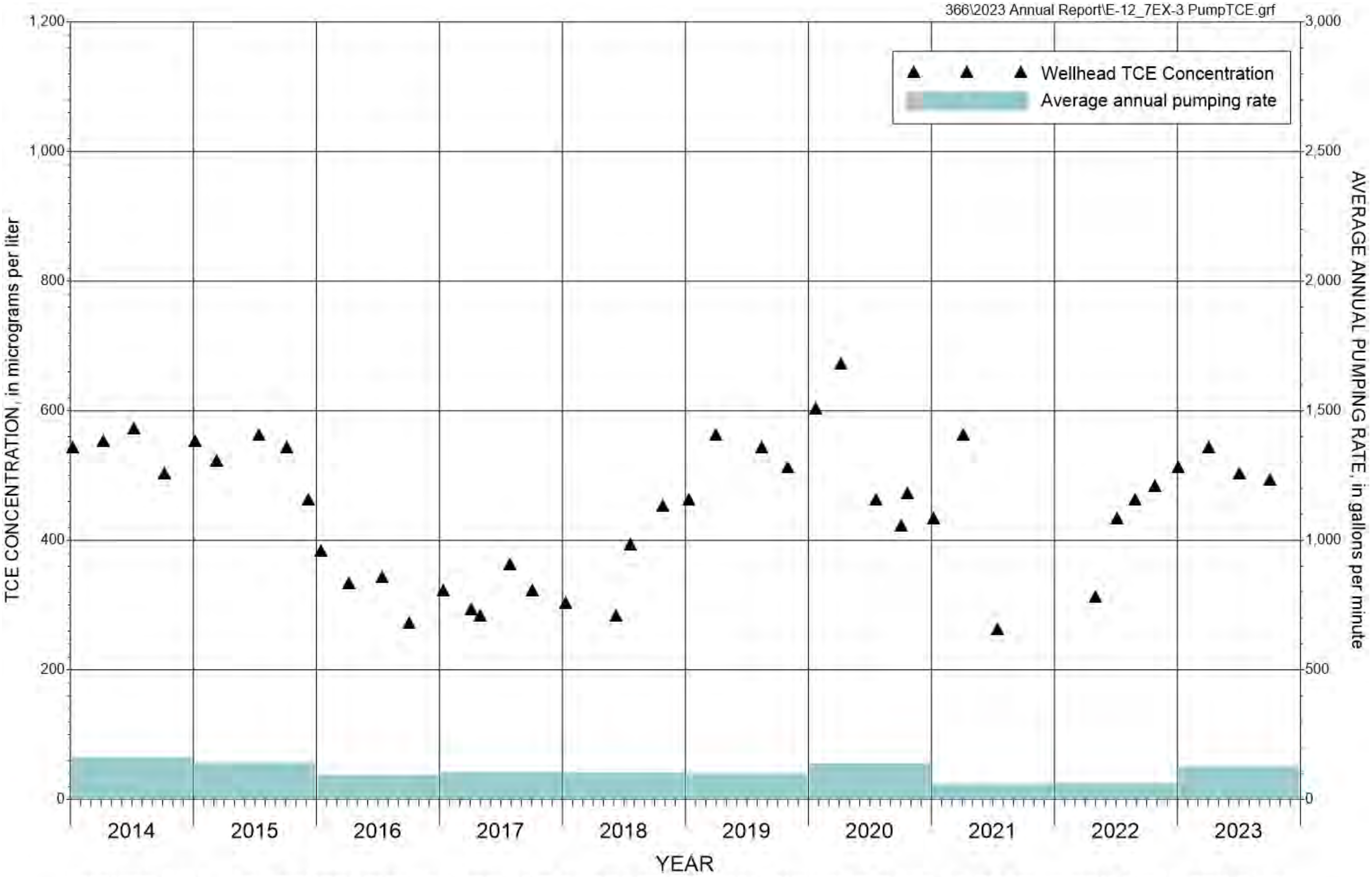


FIGURE E-11. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-3aMA 2014 THROUGH 2023

North Indian Bend Wash Superfund Site

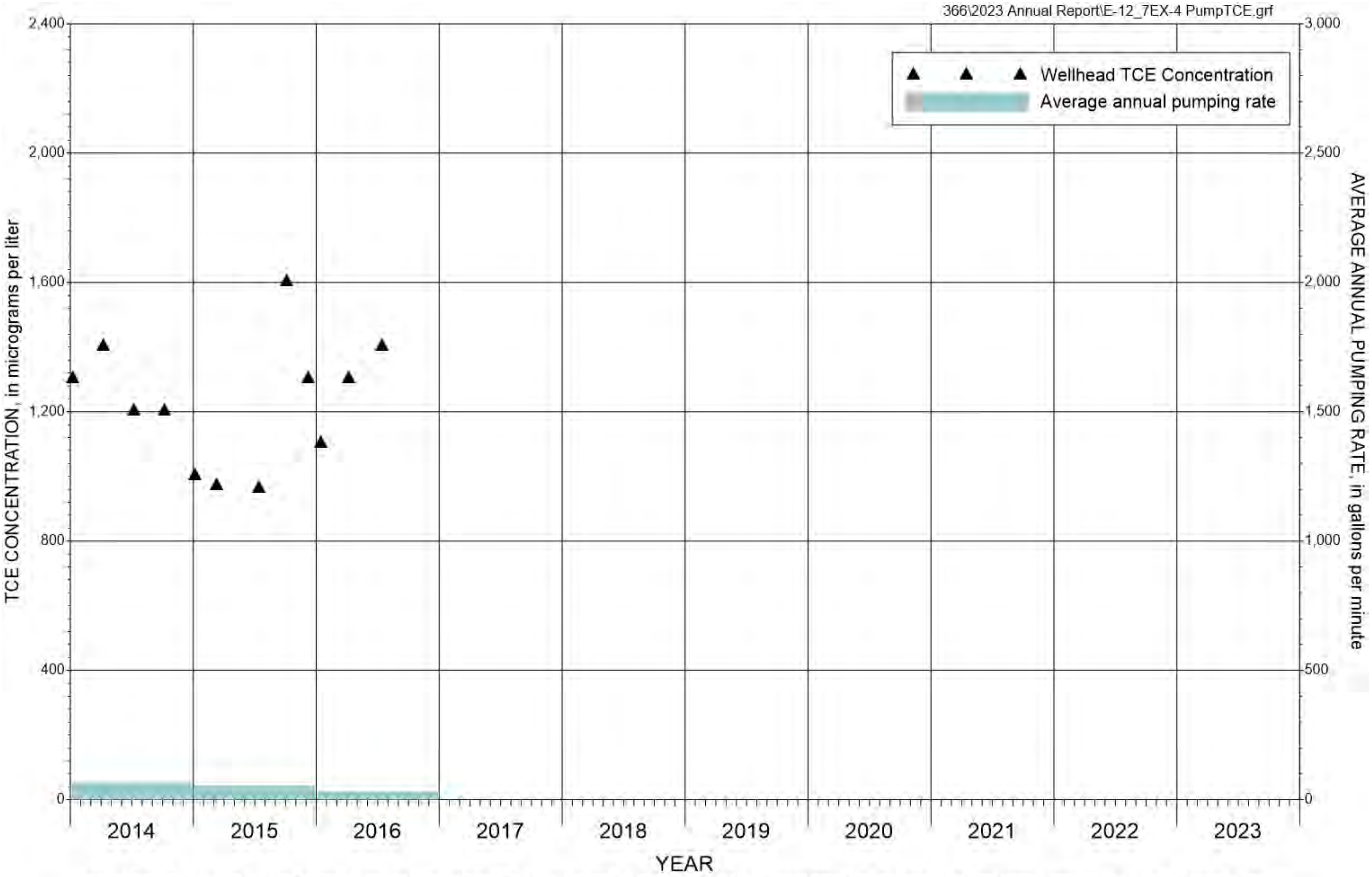


FIGURE E-12. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-4MA
2014 THROUGH 2023

North Indian Bend Wash Superfund Site

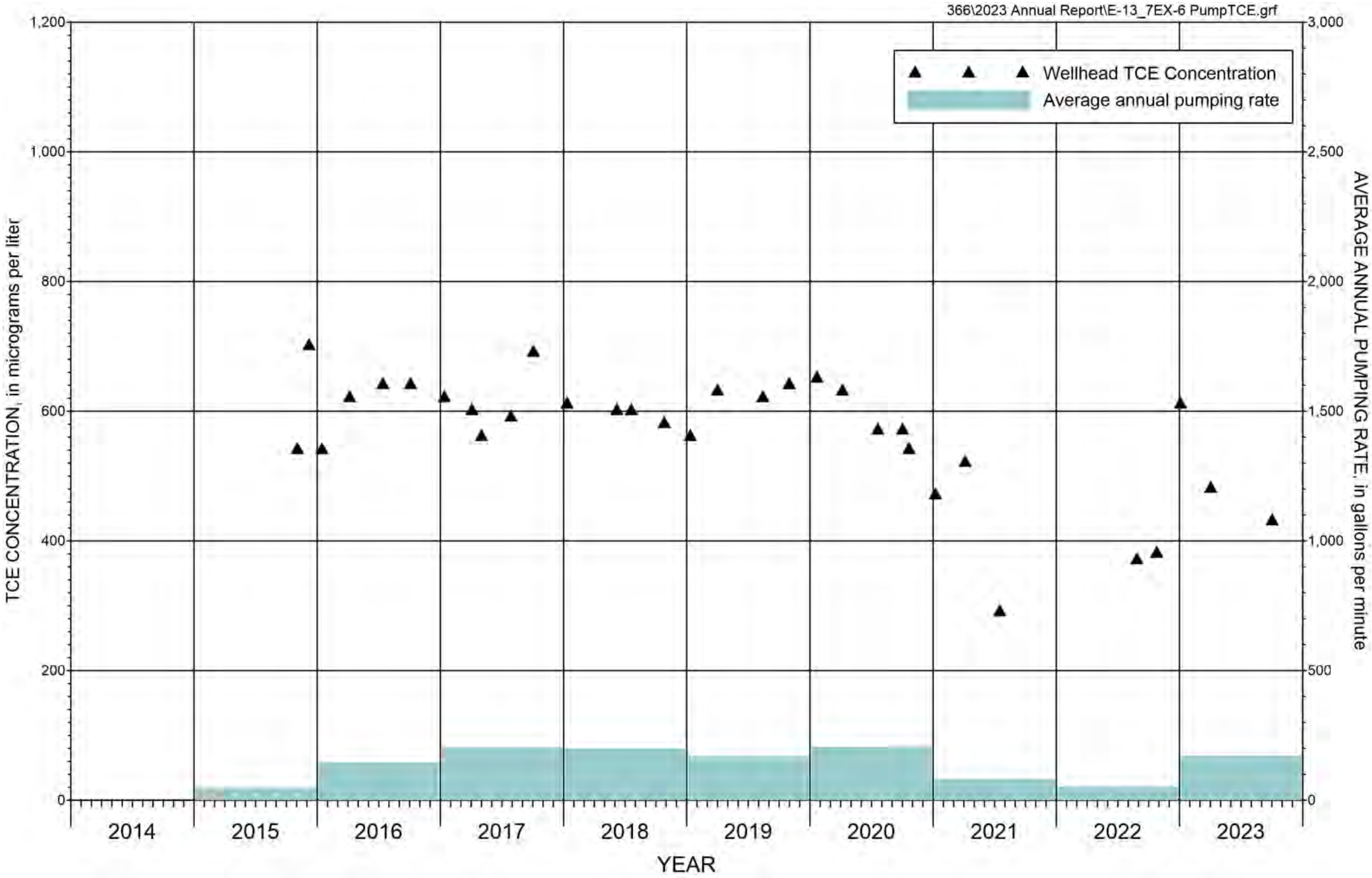


FIGURE E-13. CONCENTRATION OF TCE AND AVERAGE ANNUAL PUMPING RATE AT EXTRACTION WELL 7EX-6MA 2014 THROUGH 2023

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 2023 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 NGTF, CGTF, and Area 12 GWETS, on December 6, 2023, and MRTF and Area 7 GWETS, on December 7, 2023, 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 (with appropriate refresher) in compliance with OSHA standard 29CFR 1910.120. The NIBW PCs and treatment system supervisors and operators maintain training records in compliance with OSHA standard 29CFR 1910.120 and the SOW.

Additionally, in 2023, the City of Scottsdale provided training to its appropriate staff for emergency response and incident management for an untreated groundwater release for CGTF and NGTF. EPCOR supervisors and operators reviewed emergency response procedures and incident management specific to the MRTF, associated extraction wells, and raw water pipelines. Similarly, Arcadis and EnSolutions supervisors and operators reviewed the procedures outlined in the respective Area 7 and Area 12 GWETS Contingency and Emergency Response Plans (CERPs).

The 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 January 2024, 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

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:

SRP and City of Scottsdale did not abandon any extraction or production wells associated with the NIBW project in 2023. NIBW PCs properly abandoned extraction well 7EX-4MA on December 14, 2023, after the well was determined during rehabilitation efforts not to be salvageable due to numerous breaches in the well casing.

There were no facility closure activities in 2023.

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 2023

APPENDIX G. DOCUMENTS SUBMITTED IN 2023

During the period January through December 2023, the NIBW PCs provided the following documents to EPA and ADEQ:

Area 7 Vadose Zone and VI Presentation, presentation delivered to Technical Committee regarding history of vadose zone and vapor intrusion investigation, mitigation, and remediation activities at Area 7, submitted via electronic mail on February 3, 2023.

NIBW Indoor Air and VI Mitigation Reports to EPA ï 2022, letter report, location map, and tabulated air sampling results related to on-going vapor intrusion (VI) mitigation activities at The One property, submitted via electronic mail on February 21, 2023.

NIBW PCsô Response to EPA Comments on 2021 Site Monitoring Report, electronic mail submittal by NIBW PCs on February 28, 2023.

2022 Site Monitoring Report, North Indian Bend Wash Superfund Site, technical report submitted via CloudShare on February 28, 2023.

Groundwater Monitoring Program Supplemental Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 28, 2023.

Groundwater Extraction and Treatment System Supplemental Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 28, 2023.

NIBW Quarterly Report ï October through December 2022, as Appendix I of the 2022 Site Monitoring Report, submitted by NIBW PCs via electronic mail on February 28, 2023.

Summary of 2022 Air Sampling Data, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 28, 2023.

Supplemental Data Collection at the Area 7 GWETS During October 2022, NIBW Superfund Site, data submitted on February 28, 2023.

Supplemental Data Collection Not Required for Compliance During 2022, North Indian Bend Wash Superfund Site, electronic mail data submittal by NIBW PCs on February 28, 2023.

NIBW PCs Request to Replace PG-49MA with PG-53MA, electronic mail submitted by NIBW PCs on April 7, 2023. Concurrence received from EPA on August 23, 2023.

2022 Site Monitoring Report Overview Presentation, North Indian Bend Wash Superfund Site, presentation delivered to Technical Committee summarizing data and findings for 2022 Site Monitoring Report, sent with meeting calendar invitation on May 10, 2023.

NIBW Plume Animations for the MAU and LAU, electronic mail submitted by NIBW PCs on May 16, 2023.

NIBW Quarterly Report ï January through March 2023, electronic mail submitted by NIBW PCs on May 30, 2023.

EPCOR Paradise Valley and City of Scottsdale Water Quality Reports for 2022 (ñConsumer Confidence Reportsò), electronic mail submitted by NIBW PCs on June 12, 2023.

2022 Annual Financial Reports for Motorola Solutions Inc., Siemens, and Glaxo-SmithKline (Demonstration of Financial Ability), electronic mail submitted by NIBW PCs on June 12, 2023.

NIBW Quarterly Report ï April through June 2023, electronic mail submitted by NIBW PCs on August 29, 2023.

Evaluation of COT-6 & COT-6R Operation Changes Presentation, presentation delivered to Technical Committee regarding data and modeling analyses conducted to evaluate impacts of planned COT-6/COT-6R injection/extraction operations, submitted via electronic mail on September 20, 2023.

NIBW Technical Committee Meeting Presentation, presentation delivered to Technical Committee regarding evaluation of issues at PG-49MA and recommendation to replace with PG-53MA in compliance monitoring program, submitted via electronic mail on September 20, 2023.

NIBW Quarterly Report ï July through September 2023, electronic mail submitted by NIBW PCs on November 29, 2023.

2023 NIBW Technical Committee Meeting Minutes

NIBW Technical Committee Meeting Minutes ï December 5, 2022, electronic mail submitted by NIBW PCs on January 27, 2023.

NIBW Technical Committee Meeting Minutes ï January 10, 2023, electronic mail submitted by NIBW PCs on March 23, 2023.

NIBW Technical Committee Meeting Minutes ï February 16, 2023, electronic mail submitted by NIBW PCs on March 23, 2023.

NIBW Technical Committee Meeting Minutes ï March 13, 2023, electronic mail submitted by NIBW PCs on April 13, 2023.

NIBW Technical Committee Meeting Minutes ï April 10, 2023, electronic mail submitted by NIBW PCs on April 26, 2023.

NIBW Technical Committee Meeting Minutes ï May 15, 2023, electronic mail submitted by NIBW PCs on June 12, 2023.

NIBW Technical Committee Meeting Minutes ï June 20, 2023, electronic mail submitted by NIBW PCs on July 27, 2023.

NIBW Technical Committee Meeting Minutes ï July 17, 2023, electronic mail submitted by NIBW PCs on August 30, 2023.

NIBW Technical Committee Meeting Minutes ï August 23, 2023, electronic mail submitted by NIBW PCs on September 8, 2023.

NIBW Technical Committee Meeting Minutes ï September 18, 2023, electronic mail submitted by NIBW PCs on November 20, 2023.

NIBW Technical Committee Meeting Minutes ï October 25, 2023, electronic mail submitted by NIBW PCs on November 20, 2023.

APPENDIX H
2023 SITE INSPECTION REPORT

2023 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

April 30, 2024

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).

2 OVERVIEW

The groundwater remedy for the North Indian Bend Wash (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 (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and chloroform (TCM). 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 Participating Companies (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 Statement of Work (SOW) and Amended CD. The field inspections for the NGTF, CGTF, and Area 12 GWETS were conducted on December 6, 2023. The field inspections for the MRTF and Area 7 GWETS were conducted on December 7, 2023. A pre-field inspection conference call between the NIBW PCs and HydroGeoLogic, Inc. (HGL) was held on December 5, 2023 to discuss the planned field activities and provide a summary of the treatment systems and how they integrate into the remedy.

In accordance with the SOW, the schedule of site inspections was coordinated 2 weeks in advance with U.S. Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ) to provide an opportunity for regulatory agency participation. Representing EPA, HGL 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. 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 Middle Alluvial Unit (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 6-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 2-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 Alluvial Unit (UAU).

In 2023, the typical water flow rate to the Area 7 GWETS ranged from approximately 300 to 425 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 can accept approximately 450 gpm.

4.1.1 Notable Events at Area 7 in 2023

A significant amount of work was performed on the Area 7 GWETS and extraction wells in 2022. As such, only minor upgrades and maintenance work were required in 2023. This work included pump and seal replacement and upgrades to the HMI in addition to routine activities such as lubricating bearings, replacement of the UV lamps, and chemical deliveries.

Work on the treatment system included replacement of the pump seal on process pump P-2 in May 2023 and replacement of the chemical pump P-171 in August 2023. The HMI was upgraded beginning in December 2023.

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. When operating, the process pumps are inspected weekly and serviced monthly. The operator also maintains operations logs and data spreadsheets at Area 7. The logs, spreadsheets, and media and chemical service records 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 logbook 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.

At the time of the inspection, the facility appeared clean with no apparent leaks or significant deterioration. The equipment was clean, labeled, and well maintained. The UV/Ox system appeared in good condition during the inspection.

The blower is direct drive and operated via a variable frequency drive (VFD) which maintains fan speed. During the inspection, the operator indicated that the blower has performed well, and no non-routine 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. Enhanced visual inspections using an insertable camera are performed as necessary. 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 if 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 new communication system in November 2022. No programming changes to the control logic were made when the system network architecture and communications system were upgraded. No programming changes to the interlocks in the control system were made in 2023. Control system testing was performed during the HMI upgrades that occurred during annual maintenance in December 2023.

4.1.3 Results

Based on the 2023 inspection and a review of operating and monitoring data, the Area 7 GWETS 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 2023.

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 General Dynamics’ 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 Salt River Project (SRP) well 23.6E-6.0N, also known as the Granite Reef well, located at historical source 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 Area 12 GWETS provides treatment using 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 which removes COCs as groundwater passes through the column. The treated groundwater is delivered to SRP's irrigation distribution system through a connection to an SRP lateral pipeline located along Granite Reef Road and is discharged 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 wells remotely. 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 2023 were approximately 905 gpm and 820 gpm, respectively. In 2023, 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 on December 31, 2022. The system was restarted on March 1, 2023, following disposal of the spent cleaning wash water from the column sump. 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 in 2023

No significant operational events occurred at Area 12 in 2023. 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 high water level at the discharge receiving location at McKellips Lake.

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 the Area 12 GWETS. The operator also maintains operations logs and data spreadsheets at the facility. The logs, spreadsheets, and media service records were presented for review by the inspection team during the site inspection.

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 2023. The control program was updated in November 2023. All of the interlocks were tested following that control system update. 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.

4.2.3 Results

Based on the 2023 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 2023.

4.3 Miller Road Treatment Facility

The MRTF is located at 5975 North Cattletrack Road, south of the intersection of Cattletrack Road and McDonald Drive in Scottsdale, Arizona. The facility is owned and operated by 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 each of the two wells is treated through a specific column. Each well produces approximately 2,100 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 Towers 1 or 2. EPCOR periodically switches treatment of water from the wells between the towers. During low demand periods, typically between December and March, EPCOR prioritizes pumping of well PV-15. Well PV-14 is used between 12 and 20 hours a day during the low demand winter months 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 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 2023

No noteworthy events occurred at the MRTF in 2023.

4.3.2 MRTF Maintenance and Condition

EPCOR made available during the inspection relevant operating, monitoring, and safety documents, as well as operating data and maintenance logs for the MRTF. 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, 7 days a week. The operator makes daily inspections of the equipment and grounds at the MRTF. EPCOR also maintains operations logs and data spreadsheets on its servers. The logs, spreadsheets, and equipment, chemical, and media service records were available for review at MRTF by the inspection team during the site inspection.

Column cleaning to remove calcium carbonate scale from the air strippers was performed in December 2022 and continued into January 2023. The treatment system can be 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. 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. Control system interlocks are tested once per year and were last checked in mid-December 2023.

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 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 2023 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 2023.

4.4 Central Groundwater Treatment Facility

The CGTF is located at 8650 East 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 (following further treatment by the City of Scottsdale) 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 City of Scottsdale has completed several CGTF O&M Plan updates since that time, with 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 includes 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 COS-75A, COS-71A, COS-72, and COS-31 through transmission pipelines to the CGTF. Currently, only well COS-75A is routinely pumped to and treated at the CGTF. Extracted groundwater from well COS-72 may be used as back-up if water from other sources is not available. Well COS-31 is operated infrequently. Due to inorganic water quality, the City of Scottsdale has removed well COS-71A from service. Typical flow rates range from approximately 2,100 gpm at well COS-72 to approximately 2,600 gpm at well COS-31.

Influent water combines in a common raw water header and is evenly distributed into the available columns, where it flows top to bottom through the column packing while airflow is pulled through the tower in a counter-current direction. The blower air flow rates range from approximately 11,500 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 to enhance 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 2023

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 2023.

4.4.2 CGTF Maintenance and Condition

The CGTF is operated and maintained by a City of Scottsdale water treatment operator. The 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. They maintain operations logs and data spreadsheets on the facility’s server. The logs, spreadsheets, and equipment, chemical, and media service records were available for review at the CGTF 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 in operation at the time of the inspection appeared to run smoothly. Service is performed on the blowers as needed, as well as 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 relatively clean packing material. The trays at the top of each column are visually inspected by the operator on a monthly basis for even water distribution and for accumulation of debris produced from the wells. Column cleaning was performed beginning in mid-October 2023 and was completed by early December 2023. Column cleaning activities at the CGTF require the system to be offline.

The process control system is monitored continuously. The 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.

4.4.3 Results

Based on the 2023 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 2023.

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 the 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 2023 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 the 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 6 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 the City of Scottsdale and delivered to the CWTP finished water reservoir through a dedicated 16-inch pipeline between the facilities. Chlorination is required by the City of Scottsdale to meet drinking water standards associated with the CWTP. The disinfection system at the NGTF is owned and operated by the City of Scottsdale Water Resources Department and 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 under a permit issued by the City of Scottsdale.

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 the City of Scottsdale's city-wide supervisory control and data acquisition (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 authorization is provided by the 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 NGTF 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 2023

No significant events occurred at NGTF in 2023. A small leak was discovered in Tank T-4A in early April 2023. Treatment Train 4 was offline until July 2023 while repairs to the tank were made.

4.5.2 NGTF Maintenance and Condition

The NGTF is maintained by a City of Scottsdale water treatment operators. 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 and maintain operations logs and data spreadsheets on the facility's servers. The logs, spreadsheets, and equipment, chemical, and media service records were available for review at NGTF by the inspection team during the site inspection.

During the inspection, the facility appeared clean and well maintained with no apparent leaks or deterioration. 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 the City of Scottsdale's city-wide preventive maintenance system.

4.5.3 Results

Based on the 2023 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 2023.

5 REFERENCES

North Indian Bend Wash Participating Companies (NIBW PCs), 2023. 2022 Site Monitoring Report, North Indian Bend Wash Superfund Site: dated February 28, 2023.

_____, 2024. 2023 Site Monitoring Report, North Indian Bend Wash Superfund Site: dated April 30, 2024.

6 ACRONYMS & ABBREVIATIONS

1,1,1-TCA	1,1,1-trichloroethane
1,1-DCE	1,1-dichloroethene
ADEQ	Arizona Department of Environmental Quality
CD	Consent Decree
CERP	Contingency and Emergency Response Plan
cfm	cubic feet per minute
CGTF	Central Groundwater Treatment Facility
COCs	constituents of concern
CWTP	Chaparral Water Treatment Plant
EPA	United States Environmental Protection Agency
EPCOR	EPCOR Water USA
FSA	Feasibility Study Addendum
GAC	granular activated carbon
gpm	gallons per minute
GWETS	Groundwater Extraction and Treatment System
HGL	HydroGeoLogic, Inc.
HMI	human machine interface
MAU	Middle Alluvial Unit
MCC	motor control center
MRTF	Miller Road Treatment Facility
MSI	Motorola Solutions, Inc.
NGTF	North Indian Bend Wash Groundwater Activated Carbon Treatment Facility
NIBW	North Indian Bend Wash
O&M	Operation & Maintenance
PCs	Participating Companies
PCE	tetrachloroethene
PLC	programmable logic controller
RIO	Remote Input/Output
ROD	Record of Decision
RTU	Remote Terminal Unit
SCADA	supervisory control and data acquisition
SOW	Statement of Work
SRP	Salt River Project
TCE	trichloroethene
TCM	chloroform
UAU	Upper Alluvial Unit
UV/Ox	Ultraviolet Oxidation

VFD	variable frequency drive
VOCs	volatile organic compounds

APPENDIX I

AREA 7 EXTRACTION WELL 7EX-4MA ABANDONMENT REPORT

Arcadis U.S., Inc.
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www.arcadis.com

Mr. John Pekala, PG, CEM
Motorola Solutions NIBW Programs
3332 East Broadway Road
Phoenix, Arizona 85040

Date: February 8, 2024
Our Ref: 30167159.300
Subject: Groundwater Extraction Well 7EX-4MA Abandonment, North Indian Bend Wash Superfund Site, Scottsdale, Arizona

Dear Mr. Pekala,

Arcadis U.S., Inc. (Arcadis) is pleased to submit this well abandonment report. Motorola Solutions, Inc. (Motorola) requested to have Arcadis proceed with abandonment activities for groundwater extraction well 7EX-4MA at the Area 7 Groundwater Extraction and Treatment System (GWETS), North Indian Bend Wash (NIBW) Superfund Site; Scottsdale, Arizona. Well 7EX-4MA was located within the Memorial Medical Plaza facility at 7555 East Osborn Road, Scottsdale, Arizona 85251.

If you have any questions about this report, please contact me.

Sincerely,
Arcadis U.S., Inc.

Ryan O'Keefe, PE
Senior Environmental Engineer, Project Manager

Email: ryan.okeefe@arcadis.com
Direct Line: 480 535 1968
Mobile: 602 295 6708

CC. James A. Lutton, PE (electronic only)
Francisco Brown-Muñoz, PE (electronic only)

Enclosures: Well Abandonment Report – Groundwater Extraction Well 7EX-4MA

Motorola Solutions, Inc.

Well Abandonment Report

Groundwater Extraction Well 7EX-4MA

February 8, 2024

Well Abandonment Report

Groundwater Extraction Well 7EX-4MA

February 8, 2024

Prepared By:
Arcadis U.S., Inc.
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Phoenix, AZ 85008
United States
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Prepared For:
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Environmental Remediation Program Manager
Motorola Solutions, Inc.
3332 East Broadway Road
Phoenix, AZ 85040
Phone: 602 353 5547

Our Ref:
30167159.303

Brown Muñoz

Francisco Brown-Muñoz, PE
Staff Engineer

Ryan M. O'Keefe, PE
Senior Engineer, Project Manager

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1 Introduction

On behalf of Motorola Solutions, Inc. (Motorola), Arcadis U.S. Inc. (Arcadis) has prepared this *Well Abandonment Report* (Report) for well 7EX-4MA, located within the Memorial Medical Plaza facility at 7555 East Osborn Road, Scottsdale, Arizona 85251 (Memorial Medical Plaza). This well was part of the North Indian Bend Wash (NIBW) Superfund Site – Area 7, located at 3703 North 75th Street, Scottsdale, Arizona, 85251 (the Site). In accordance with the previous instructions from Motorola Solutions, Inc. (Motorola), Arcadis and Cascade Drilling LLP (Cascade, subcontractor) concluded the abandonment of well 7EX-4MA, which includes the coordination and filing of necessary well abandonment permits, well abandonment activities in accordance with Arizona Department of Water Resources (ADWR) regulations. This Report summarizes the completed groundwater extraction well 7EX-4MA abandonment activities. The work was conducted in accordance with ADWR standards and the *Proposal for Area 7 Groundwater Extraction Well 7EX-4MA Abandonment* (Proposal; Arcadis 2023) dated August 24, 2023.

2 Pre-Field Activities

The following activities were completed prior to conducting well abandonment activities:

- Coordinated well abandonment activities with local onsite staff at the Memorial Medical Plaza.
- Preparation and filing of an electronic Notice of Intent to Abandon (NOIA) well permit in coordination with Cascade Environmental (Cascade) and ADWR.
- Received approval from the ADWR to abandon well.
- Secured work zone within the vicinity of well 7EX-4MA within the Memorial Medical Plaza parking area.

3 Well Abandonment Activities

Groundwater extraction well 7EX-4MA abandonment activities were conducted in accordance with the Arizona well abandonment regulations specified by Arizona Administrative Code (A.A.C.) R12-15-816 and the Alternative 4 method as described in the *ADWR Well Abandonment Handbook*[1] (ADWR Handbook; ADWR 2008). A site map showing the former location of the abandoned groundwater extraction well is presented on Figure 1.

Based on field observations from the attempt to rehabilitate well 7EX-4MA in June 2022, the downhole equipment and well casing cannot be dislodged or extracted from the well, as it is grouted in-place. Therefore, overdrilling the well casing is not practicable. Consequently, groundwater extraction well 7EX-4MA abandonment entailed grouting the void space within the well casing, per ADWR standards.

First, Cascade removed approximately 2 feet of protruding well casing and extraction well piping in the well vault. In accordance with the ADWR-approved NOIA permit and the ADWR Handbook, Cascade filled the void space within the well casing from depths 190 feet to 245 feet below ground surface (bgs) with well packing #3 sand. Then, Cascade sealed the annular void space with bentonite grout from depths 185 feet to 190 feet bgs. Finally, Cascade abandoned the remaining annular space by mixing water, Type I Portland® cement, and bentonite in

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[1] ADWR. 2008. Well Abandonment Handbook. September

accordance with the ADWR Handbook and grouted through a tremie pipe from 185 feet bgs to the well vault surface. All construction debris and recyclables were segregated and disposed of in accordance with local, state, and federal regulations. No groundwater, grout, or hazardous waste generation was reported.

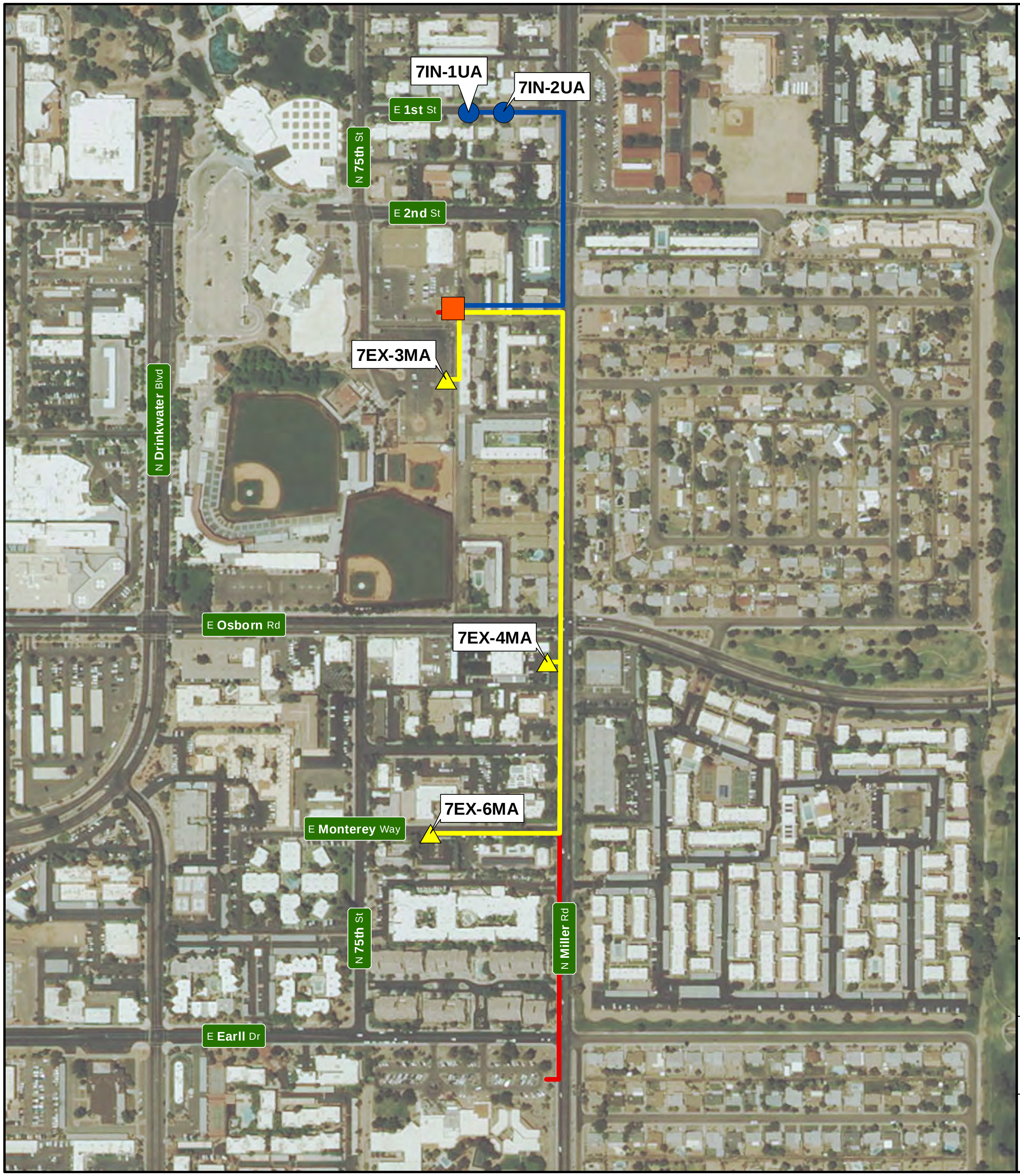
A copy of the ADWR Well Abandonment Completion Report is provided in Attachment 1. Attachment 2 includes the Well Abandonment Authorization and Notification of Intention to Abandon a Well documentation.

4 References

Arcadis. 2023. Proposal for Area 7 Groundwater Extraction Well 7EX-4MA Abandonment, North Indian Bend Wash Superfund Site, Scottsdale, Arizona. August 24.

ADWR. 2008. Well Abandonment Handbook. September

Figure



LEGEND

🟧 Area 7 GWETS

● Groundwater injection well (existing)

— GWETS injection piping (existing)

▲ Groundwater extraction well (existing)

— GWETS extraction piping (existing)

— GWETS extraction piping (abandoned)

NOTES

· Aerial photo source: ESRI World Imagery.
· GWETS = Groundwater extraction and treatment system.

N

Feet
0 250 500
Scale: 1" = 500'

NORTH INDIAN BEND WASH - AREA 7
SCOTTSDALE, ARIZONA

SITE FEATURES MAP

ARCADIS

FIGURE
1

Attachment 1

Well #55-236897 Abandonment Completion Report

Arizona Department of Water Resources
Groundwater Permitting and Wells Section
1802 W Jackson St. Box 79, Phoenix, AZ 85007
(602) 771-8527 • www.azwater.gov

Well Abandonment Completion Report

- Review instructions prior to completing form in black or blue ink.
- The drilling firm or single well licensee must file this report within 30 days of completion of abandonment. (A.R.S. § 45-594, A.A.C. R12-15-816)

** PLEASE PRINT CLEARLY **

FILE NUMBER

WELL REGISTRATION NUMBER
55 - 236897

SECTION 1. ABANDONMENT AUTHORIZATION

Drilling Firm

Mail To:

NAME Cascade Drilling, LP	DWR LICENSE NUMBER 226
ADDRESS 7773 W. Seldon Lane	TELEPHONE NUMBER 623-935-0124
CITY / STATE / ZIP Peoria, AZ 85345-7973	FAX

SECTION 2. REGISTRY INFORMATION

Well Owner Information

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL Motorola Solutions, Inc.	CONTACT PERSON NAME AND TITLE John Pekala, Environmental Remediation Program Manager
MAILING ADDRESS 3332 East Broadway Rd.	TELEPHONE NUMBER 602-353-5547
CITY / STATE / ZIP CODE Phoenix, AZ 85040	FAX

Location of Well

WELL LOCATION ADDRESS (IF ANY)
7555 E. Osborne Rd., Scottsdale, AZ 85251

LATITUDE			LONGITUDE		
33 ° Degrees	29 ' Minutes	14.12" N Seconds	111 ° Degrees	55 ' Minutes	3.29" W Seconds

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
2.0 N	4.0 E	26	SW ¼	NE ¼	NE ¼

COUNTY ASSESSOR'S PARCEL ID NUMBER

BOOK	MAP	PARCEL
130	20	001R

LAND SURFACE ELEVATION AT WELL
Feet Above Sea Level

METHOD OF LATITUDE/LONGITUDE (CHECK ONE) ☐ *GPS: Hand-Held
☐ USGS Quad Map ☐ Conventional Survey ☐ *GPS: Survey-Grade

*IF GPS WAS USED, GEOGRAPHIC COORDINATE DATUM (CHECK ONE)
☐ NAD-83 ☐ Other (*please specify*):

SECTION 3.

Questions	Yes	No	Explanation:
1. To your knowledge, is there any information that exists which indicates that the water in this well has been, may be or is contaminated?	X		IF YES, EXPLAIN (ATTACH ADDITIONAL PAGE IF NECESSARY) Indian Bend Wash Superfund Site, Area 7
2. Is there another well name or identification number associated with this well? (e.g., MW-1, PZ-4, Lot 29 Well, Smith Well, etc.)	X		IF YES, PLEASE STATE 7EX-4MA
3. Prior to abandonment, did the well have 20' of surface casing AND 20' of grout in the annular space surrounding the casing?		X	If no, was the top 20' of casing removed prior to setting the cement plug? ☐ Yes ☑ No
4. Was the well backfilled above the cement plug?	X		
5. Was the well casing video logged?		X	
6. Why was the well abandoned?	The well is damaged, non-operational, and cannot be fixed. A replacement well (7EX-^MA) was drilled and installed.		

Well Abandonment Completion Report

WELL REGISTRATION NUMBER
55 - 236897

SECTION 4. ORIGINAL WELL CONSTRUCTION DESIGN (attach additional page if needed)

Existing Borehole			Existing Casing (to the best of your knowledge)													
DEPTH FROM SURFACE			DEPTH FROM SURFACE			MATERIAL TYPE (T)				PERFORATION TYPE (T)						
FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)	FROM (feet)	TO (feet)	OUTER DIAMETER (inches)	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE IF ANY (inches)
0	245	6" Casing	0	190	4.5"		X			X						
		Liner Install	190	245	5"		X			X					Prepack	0.020

Condition of casing: ☒ Good ☐ Fair ☐ Poor

Existing Annular Material (to the best of your knowledge)

DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (T)								FILTER PACK		
						BENTONITE						
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	185			X								
185	190					X						
190	245									X		#3

SECTION 5. ACTUAL WELL ABANDONMENT DESIGN (attach additional page if needed)

Refer to ADWR's Well Abandonment Handbook for additional information.

DEPTH TO WATER
169 Feet Below Land Surface

DATE ABANDONMENT COMPLETED
12/14/2023

Casing Treatment

DEPTH FROM SURFACE		TREATMENT TYPE (T)				
FROM (feet)	TO (feet)	SONAR JET	BRUSH OR SCRAPE	MILLS KNIFE	CASING REMOVAL (explain in Remarks)	IF OTHER TYPE, DESCRIBE OR IF CASING WAS PERFORATED, DESCRIBE SPACING AND SIZE OF PERFORATIONS THAT WERE ADDED
0	2				X	

Sealing or Fill Material

DEPTH FROM SURFACE		MATERIAL TYPE (T)										
							HIGH SOLIDS BENTONITE					
FROM (feet)	TO (feet)	NEAT CEMENT	CONCRETE	SAND-CEMENT GROUT	CEMENT-BENTONITE GROUT	SAND-BENTONITE GROUT	GROUT	CHIPS	PELLETS	SAND	MIXING RATIO by (check one) ☐ Weight ☐ Volume	VOLUME OF MATERIAL USED (cubic feet)
2	245				X							45

Actual Abandonment Method (See Well Abandonment Handbook)

CHECK ONE

- ☐ Standard Method
- ☐ Alternative 1
- ☐ Alternative 2
- ☑ Alternative 3
- ☐ Alternative 4:
  - ☐ Variance Option
- ☐ Alternative 5:
  - ☐ Variance Option 1
  - ☐ Variance Option 2
- ☐ Other *(please specify)*:

Emplacement Method of Sealing or Fill Material

CHECK ONE

- ☐ Gravity
- ☐ Pressure Grouting
- ☑ Tremie Pumped
- ☐ Other *(please specify)*:

REMARKS

I state that this notice is filed in compliance with A.R.S. § 45-594 and A.A.C. R12-15-816 and is complete and correct to the best of my knowledge and belief.

TYPE OR PRINT NAME AND TITLE
Shawn Cain, VP of Operations

SIGNATURE OF QUALIFYING PARTY

DATE
1-12-24

Attachment 2

Well #55-236897 Abandonment Authorization

ARIZONA DEPARTMENT OF WATER RESOURCES
1110 W. Washington St. Suite 310
Phoenix, Arizona 85007

ABANDON

ANY DEVIATION IN WELL LOCATION FROM THE PLOT PLAN APPROVED FROM THE COUNTY OR LOCAL HEALTH AUTHORITY MUST BE RE-SUBMITTED FOR APPROVAL

NOTICE! This well is located in or near an area of groundwater contamination (WQARF/CERCLA/DOD or Other). Be advised that **special requirements may apply**.

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: **55-236897** WELL OWNER ID: 7EX-4MA

AUTHORIZED DRILLER: **CASCADE DRILLING, LP** LICENSE NO: **226**

NOTICE OF INTENTION TO ABANDON NON-EXEMPT WELL(S) HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: **MOTOROLA SOLUTIONS 3332 E BROADWAY RD PHOENIX, AZ, 85040**

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

NE 1/4 of the **NE** 1/4 of the **SW** 1/4 Section **26** Township **2.0** **NORTH** Range **4.0** **EAST**

NO. OF WELLS IN THIS PROJECT: ASSESSOR'S PARCEL NO: **130-20-001R**

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF

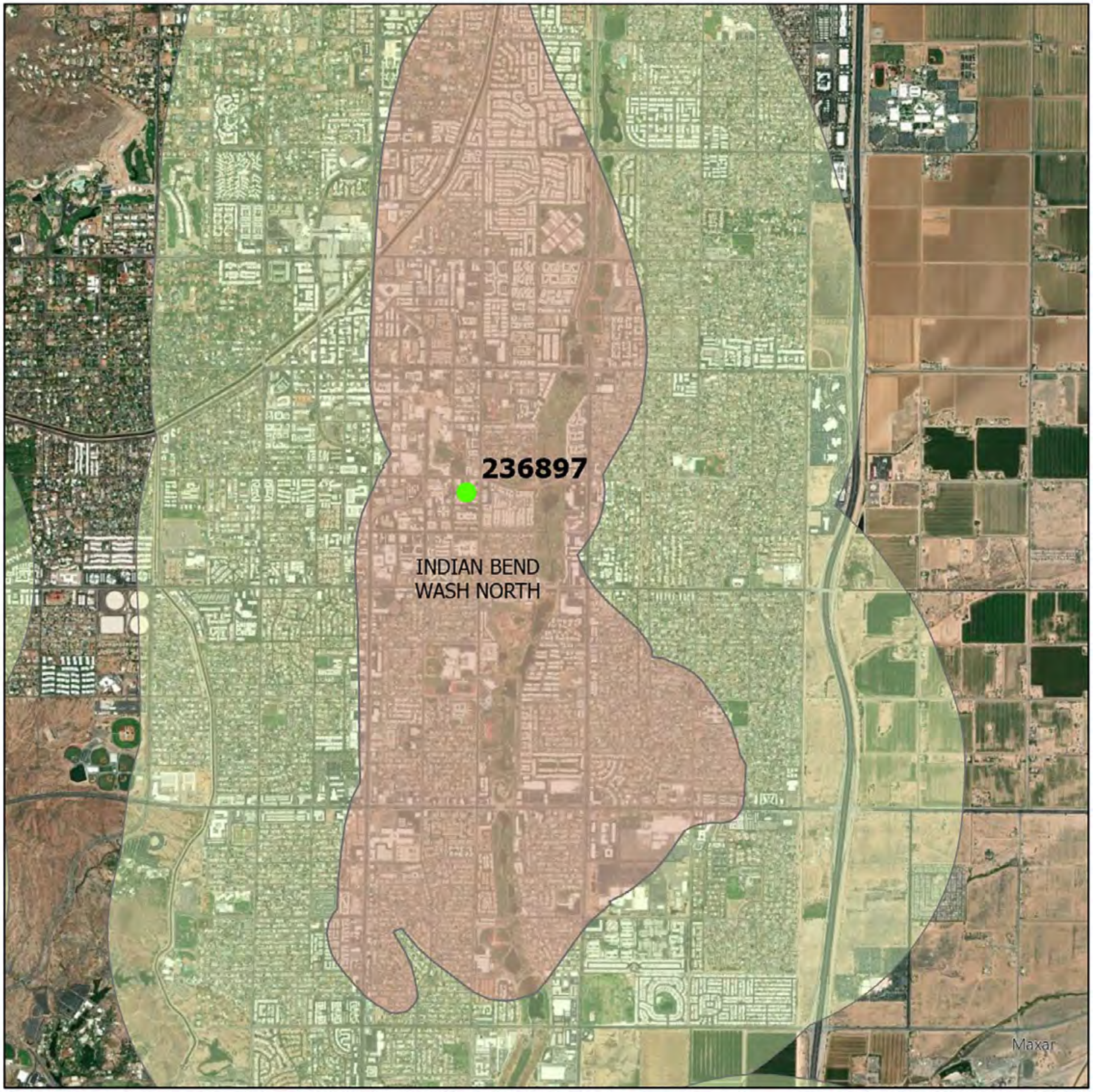
Stella Murillo

GROUNDWATER PERMITTING AND WELLS

THE DRILLER MUST FILE A WELL ABANDONMENT COMPLETION REPORT WITHIN 30 DAYS OF ABANDONMENT.

1912

Proposed Abandonment Well #55-236897 Phoenix AMA



Legend

● Subject Well(s)

☐ Remedial Action Site (Buffer)

▨ Remedial Action Site (Plume)

Feet

0 3,000 6,000

N

ARIZONA DEPARTMENT of WATER RESOURCES
1110 W. Washington St. Suite 310
Engineering and Permits Division
Phoenix, AZ 85007
602-771-8500

NOTICE TO WELL DRILLERS

This is a reminder that a valid drill card must be present for the drilling of each and every well constructed on a site. During the construction of a well, if an unexpected problem occurs; the hole collapses, the hole is dry, or a drill bit is lost and can't be recovered, or any number of other situations where the driller feels they need to move over and start another well. Please be aware drillers do not have the authority to start another well without first obtaining drilling authority for the new well. Please note the following statutes and regulations pertaining to well drilling and construction:

ARIZONA REVISED STATUTE (A.R.S.)

A.R.S. § 45-592.A.

A person may construct, replace or deepen a well in this state only pursuant to this article and section 45-834.01. The drilling of a well may not begin until all requirements of this article and section 45-834.01, as applicable, are met.

***

A.R.S. § 594.A.

The director shall adopt rules establishing construction standards for new wells and replacement wells, the deepening and abandonment of existing wells and the capping of open wells.

***

A.R.S. § 600.A

A well driller shall maintain a complete and accurate log of each well drilled.

ARIZONA ADMINISTRATIVE CODE (A.A.C.)

A.A.C. R12-15-803.A.

A person shall not drill or abandon a well, or cause a well to be drilled or abandoned, in a manner which is not in compliance with A.R.S. Title 45, Chapter 2, Article 10, and the rules adopted thereunder.

***

A.A.C. R12-15-810.A.

A well drilling contractor or single well licensee may commence drilling a well only if the well drilling contractor or licensee has possession of a drilling card at the well site issued by the Director in the name of the well drilling contractor or licensee, authorizing the drilling of the specific well in the specific location.

***

A.A.C. R12-15-816.F.

In the course of drilling a new well, the well may be abandoned without first filing a notice of intent to abandon and without an abandonment card.

*** THIS REQUIREMENT DOES NOT PERTAIN TO THE DRILLING OF MINERAL EXPLORATION, GEOTECHNICAL OR HEAT PUMP BOREHOLES**

DWR 37-61 (02-13)

Arizona Department of Water Resources
Groundwater Permitting and Wells
1802 W Jacksor Phoenix, Arizona 85007
(602) 771-8527 1-800-352-8488

Well Abandonment Completion Report

FILE NUMBER	**A(2-4) 26 CAA**
WELL REGISTRATION NUMBER	**55 -** 236897

v Review instructions prior to completing form
v The drilling firm or single well licensee must file this report withing 30 days of completion of abandonment. (A.R.S. § 45-594, A.A.C. R12-15-816)

** PLEASE PRINT CLEARLY **

SECTION 1. ABANDONMENT AUTHORIZATION

Drilling Firm

Mail To:

NAME CASCADE DRILLING, LP	DWR LICENSE NUMBER 226
ADDRESS 7773 W. SELDON LANE.	TELEPHONE NUMBER 623-935-0124
CITY / STATE / ZIP PEORIA, AZ 85345-7973	FAX

SECTION 2. REGISTRY INFORMATION

Well Owner Information

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL MOTOROLA SOLUTIONS	CONTACT PERSON NAME AND TITLE
MAILING ADDRESS 3332 E BROADWAY RD	TELEPHONE NUMBER
CITY / STATE / ZIP PHOENIX, AZ 85040	FAX

Location of Well

WELL LOCATION ADDRESS (IF ANY)

LATITUDE ° ' " N — Degrees | Minutes | Seconds

LONGITUDE ° ' " W — Degrees | Minutes | Seconds

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
			1/4	1/4	1/4

LAND SURFACE ELEVATION AT WELL
Feet Above Sea Level

METHOD OF LATITIDE / LONGITUDE (Check One) ☐ *GPS: Hand-Held
☐ USGS Quad Map ☐ Conventional Survey ☐ *GPS: Survey-Grade

COUNTY ASSESSOR'S PARCEL ID NUMBER

BOOK	MAP	PARCEL
130	20	001R

*If GPS WAS USED, GEOGRAPHIC COORDINATE DATUM (Check One)
☐ NAD-83 ☐ Other *(please specify):*

SECTION 3.

Questions	Yes	No	Explanation:
1. To your knowledge, is there any information that exists which indicates that the water in this well has been, may be or is contaminated?			IF YES, EXPLAIN (Attach additional page if nesessary)
2. Is there another well name or identification number associated with this well? (e.g., MW-1, PZ-4, Lot 29 Well, Smith Well, etc.)			IF YES, PLEASE STATE
3. Prior to abandonment, did the well have 20' of surface casing and 20' of grout in the annular space surrounding the casing?			If no, was the top 20' of casing removed prior to setting the cement plug? ☐ Yes ☐ No
4. Was the well backfilled above the cement plug?			
5. Was the well casing video logged?			

6. Why was the well abandoned?

Well Abandonment Completion Report

WELL REGISTRATION NUMBER
55 - 236897

SECTION 4. ORIGINAL WELL CONSTRUCTION DESIGN (attach additional page if needed)

Existing Borehole			**Existing Casing** (to the best of your knowledge)													
DEPTH FROM SURFACE			DEPTH FROM SURFACE			MATERIAL TYPE (T)				PERFORATION TYPE (T)						
FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)	FROM (feet)	TO (feet)	OUTER DIAMETER (inches)	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE IF ANY (inches)

Condition of casing: ☐ Good ☐ Fair ☐ Poor

Existing Annular Material (to the best of your knowledge)												
DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (T)								FILTER PACK		
						BENTONITE						
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL DESCRIBE	SAND	GRAVEL	SIZE

SECTION 5. ACTUAL WELL ABANDONMENT DESIGN (attach additional page if needed)

Refer to ADWR's Well Abandonment Hanbook for additional information

DEPTH TO WATER
Feet Below Land Surface

DATE ABANDOMENT COMPLETED

Casing Treatment						
DEPTH FROM SURFACE		TREATMENT TYPE (T)				
FROM (feet)	TO (feet)	SONAR JET	BRUSH OR SCRAPE	MILLS KNIFE	CASING REMOVAL (explain in Remarks)	IF OTHER TYPE, DESCRIBE OR IF CASING WAS PERFORATED, DESCRIBE SPACING AND PERFORATIONS THAT WERE ADDED

Sealing or Fill Material												
DEPTH FROM SURFACE		MATERIAL TYPE (T)										
							HIGH SOLIDS					
FROM (feet)	TO (feet)	NEAT CEMENT	CONCRETE	SAND-CEMENT GROUT	CEMENT-BENTONITE GROUT	SAND-BENTONITE GROUT	GROUT	CHIPS	PELLETS	SAND	MIXING RATIO by (check one) ☐ Weight ☐ Volume	VOLUME OF MATERIAL USED (cubic feet)

Actual Abandonment Method (See Well Abandonment Handbook)

CHECK ONE
- ☐ Standard Method
- ☐ Alternative 1
- ☐ Alternative 2
- ☐ Alternative 3
- ☐ Alternative 4
  - ☐ *Variance Option*
- ☐ Alternative 5
  - ☐ *Variance Option 1*
  - ☐ *Variance Option 2*
- ☐ Other *(please specify)*

Emplacement Method of Sealing or Fill Material

CHECK ONE
- ☐ Gravity
- ☐ Pressure Grouting
- ☐ Tremie Pumped
- ☐ Other *(please specify)*

REMARKS

I state that this is filed in compliance with A.R.S. § 45-594 and A.A.C. R12-15-816 and is complete and correct to the best of my knowledge and

TYPE OR PRINT NAME AND TITLE

SIGNATURE OF QUALIFYING PARTY

DATE

Form 55-58 Instructions

Well Abandonment Completion Report

Introduction

These instructions are a guide to filling out Form DWR 55-58 (Rev. 06/15/2010), entitled "Well Abandonment Completion Report." Please review the instructions prior to completing the form in black or blue ink. Forms may be obtained at any Arizona Department of Water Resources (ADWR) office and at ADWR's web site, http://www.azwater.gov. For information about the form or these instructions, contact the Supervisor of the Notice of Intent Program at (602) 771-8500. There is no fee for filing this form.

When Form DWR 55-58 Must be Filed

A Well Abandonment Completion Report must be filed within 30 days after a well is abandoned. The report must be filed by the drilling contractor or single well licensee that abandoned the well. A report must be filed for the abandonment of any type of well, including groundwater production wells, monitor wells, exploration wells, geotechnical wells and cathodic protection wells.

Instructions for Filling out the Form

Well Registration Number

Fill in the registration number of the well in the space in the upper right-hand corner of both pages of the form. This is the number ADWR assigned to the well when the well was registered or when an application to drill the well was filed.

Section 1 - Abandonment Authorization

Fill in the name, DWR license number and telephone and fax numbers of the drilling firm that abandoned the well.

Section 2 - Registry Information

Well Owner Information

Fill in the name, mailing address and telephone and fax numbers of the owner of the abandoned well. If the well owner is a corporation, governmental unit or other entity, provide the name of a contact person.

Location of Well

Fill in the following information relating to the location of the well:

- The street address of the property where the well was located. For monitor wells or other wells associated with contaminant investigations or remedial projects, this will usually be the same as the facility address.
- The legal description of the abandoned well location. The legal description is the township, range, section, and in decreasing order, the quarters of that section so that the well location falls in a 10-acre block somewhere in that section. This information may be obtained from the county tax assessor's office.
- The county tax assessor's parcel identification number for the land where the well was located. This information can normally be taken from the original Notice of Intent to drill the well, and may also be obtained from the county tax assessor's office. Federal or State land will not have a parcel identification number.
- The latitude and longitude (in degrees-minutes-seconds format) and land surface elevation at the abandoned well location, and the method used to determine these data. Use of a Global Positioning System (GPS) receiver or a conventional survey is the preferred method, although the data may also be obtained through estimation from a USGS quadrangle map. If a GPS unit is used, the unit should be adjusted to use the NAD-83 datum. Please indicate if the geographic coordinate datum used was NAD-83, and if not, which datum was used.

Section 3 - Questions

Check the appropriate boxes and fill in information indicating the following:

1. Whether any information exists indicating that water in the well has historically been contaminated, is currently contaminated, or may be contaminated. If yes, provide an explanation.
2. Whether there is any other name or identification number for the well.
3. Whether the well had a surface casing of at least 20 feet and grout in the annular space surrounding the casing for at least 20 feet prior to abandonment. If not, indicate whether the top 20 feet of casing was removed prior to setting the cement plug.
4. Whether the well was backfilled above the cement

plug.

5. Whether the well casing was video logged.
6. The reason the well was abandoned.

Section 4 - Original Well Construction Design

Section 4 contains three tables for filling in information on the original well construction design. ADWR recognizes that this information will not always be available, particularly for older irrigation, stockwater or domestic wells. It should be available for monitor and remediation wells, or more modern wells with good records. Fill in as much information as possible.

In the **Existing Borehole** table, fill in the diameter of the existing borehole in inches, and indicate the depth interval for each change in diameter. In the **Existing Casing** table, fill in the outer diameter of the casing in inches, check the appropriate boxes indicating the type of casing material and the type of perforations and fill in the slot size of any perforations. Fill in the depth interval for each change in information. Please note that not every interval will be perforated. Check the "Blank or None" box for non-perforated depth intervals. If the type of casing material or perforations is not listed, describe the type in the appropriate box. Finally, check the appropriate box indicating whether the existing casing is in good, fair or poor condition.

In the **Existing Annular Material** table, check the appropriate boxes indicating the type of annular material or filter pack installed at each depth interval. Fill in the size of the filter pack used. Provide the depth interval for each change in information. If the type of annular material is not listed, describe the material in the appropriate box.

Section 5 - Actual Well Abandonment Design

Section 5 requires information on the actual well abandonment design. In the boxes in the upper right-hand corner, fill in the depth to water and the date when abandonment was completed. The two tables below that box require information on the casing treatment and the sealing or fill material.

In the **Casing Treatment** table, check the appropriate box indicating the type of casing treatment that was used. If the casing was removed, check the "casing removal" box and provide a description of the removal technique in "Remarks." If the type of casing treatment that was used is not listed, explain the treatment in the appropriate box. If the casing was perforated during treatment, describe the size and frequency of perforations for each interval. The casing treatment must be indicated by depth interval, and the depth interval must be filled in.

In the **Sealing or Fill Materials** table, check the appropriate box indicating the sealing or fill material that was used. Note any changes by depth interval. Also, fill in the mixing ratio of the material and check the appropriate box indicating whether the ratio is by weight or volume. Finally, fill in the volume of material used for each depth interval.

Below the two tables, fill in information on the actual abandonment method and the emplacement method of sealing or fill material. The Department's Well Abandonment Handbook must be consulted before filling in the actual abandonment method. The standard method and the five alternative methods are described in the handbook. Check only one abandonment method. If "Other" is checked, provide a description of the method in "Remarks."

Signature Block

The form must be signed and dated by the drilling firm's qualified party. The name and title of the person signing the form must be typed or printed in the space above the signature.

Where to File Form

Completed forms may be mailed to ADWR at the following address:

Arizona Department of Water Resources
Groundwater Permitting and Wells
1802 W Jackson St. Box #79
Phoenix, AZ 85007

Completed forms may also be submitted to ADWR's main office in at 1110 W. Washington St. Suite 310., Phoenix , AZ 85007

The completed form must be legible and of good quality when received by ADWR so that it can be scanned into ADWR's permanent records.

RECEIVED
NOV 15 2023
ARIZONA DEPARTMENT OF WATER RESOURCES

Arizona Department of Water Resources
Groundwater Permitting and Wells Section
1802 W Jackson St. Box 79, Phoenix, AZ 85007
(602) 771-8527 • www.azwater.gov

Notice of Intention to Abandon a Well

FEE $150.00

- Review instructions and the Well Abandonment Handbook prior to completing form with black or blue ink.
- You must include with your Notice:
  - Well construction diagram showing all existing well construction features listed in Section 5 and the proposed abandonment specifications listed in Section 6.
- Authority for fee: A.R.S. § 45-113 and A.A.C. R12-15-104

TO BE COMPLETED BY ADWR			FILE NUMBER
AMA/INA	BASIN	SUBBASIN	
RECEIVED DATE	WATERSHED		WELL REGISTRATION NUMBER
ISSUED DATE	REMEDIAL ACTION SITE		55-236897

SECTION 1. REGISTRY INFORMATION

To determine the location of well, please refer to the Well Registry Map (https://gisweb.azwater.gov/WellRegistry/Default.aspx) and Google Earth (http://www.earthpoint.us/Townships.aspx)

Well Type

CHECK ONE

☐ Domestic
☐ Stock
☐ Irrigation
☐ Municipal
☐ Monitor / Piezometer
☐ Geotechnical
☐ Mineral Exploration
☒ Other (*please specify*): Remediation

ORIGINAL WELL OWNER (IF KNOWN)
Motorola Solutions, INC

ORIGINAL WELL DRILLING FIRM (IF KNOWN)	DRILL DATE (IF KNOWN)
Layne Christensen Company	2000

Location of Well

WELL LOCATION ADDRESS (IF ANY) OR CROSS STREETS
7555 E Osborne Rd, Scottsdale, AZ 85251

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
2.0 N	4.0 E	26	SW ¼	NE ¼	NE ¼

COUNTY ASSESSOR'S PARCEL ID NUMBER BOOK	MAP	PARCEL	COUNTY WHERE WELL IS LOCATED
130	20	001R	MARICOPA

LATITUDE			LONGITUDE		
33 °	29 '	14.12 " N	111 °	55 '	3.29 " W
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds

METHOD OF LATITUDE/LONGITUDE (*check one*)
☐ *GPS: Hand-Held
☐ Google Earth ☐ Conventional Survey ☐ *GPS: Survey-Grade

*IF GPS WAS USED, GEOGRAPHIC COORDINATE DATUM (*check one*)
☐ NAD-83 ☐ Other (*please specify*):

SECTION 2. OWNER INFORMATION

Land Owner	Well Owner (*check this box if Land Owner and Well Owner are same*) ☐
FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL 1819 Osborn LLC	FULL NAME OF COMPANY, GOVERNMENT AGENCY, OR INDIVIDUAL Motorola Solutions, Inc.
MAILING ADDRESS 4414 North Civic Center Plaza, Suite 100	MAILING ADDRESS 3332 East Broadway Road
CITY / STATE / ZIP CODE Scottsdale, Arizona 85251	CITY / STATE / ZIP CODE Phoenix, Arizona 85040
CONTACT PERSON NAME AND TITLE Venus Morrow, Property Manager	CONTACT PERSON NAME AND TITLE John Pekala, Environmental Remediation Program Manager
TELEPHONE NUMBER 480-294-6000	TELEPHONE NUMBER 602-353-5547
EMAIL vmorrow@modecommercial.com	EMAIL john.pekala@motorolasolutions.com

SECTION 3. ABANDONMENT AUTHORIZATION

Drilling Firm	Consultant (*if applicable*)
NAME Cascade Drilling	CONSULTING FIRM Arcadis
DWR LICENSE NUMBER 226	CONTACT PERSON NAME Francisco Brown-Munoz
ROC LICENSE CATEGORY A-04 / 286627	
TELEPHONE NUMBER (623) 935-0124	TELEPHONE NUMBER (602) 797-4557
EMAIL ADDRESS LHerron@cascade-env.com	EMAIL ADDRESS Francisco.BrownMunoz@arcadis.com

SECTION 4.

Questions	Yes	No	If Yes:
1. To your knowledge, is there any information that exists which indicates that the water in this well has been, may be, or is contaminated?	☒	☐	EXPLAIN (*attach additional page if necessary*) Indian Bend Wash Superfund Site, Area 7
2. Is there another well name or identification number associated with this well? (*e.g., Lot 3 Well, MW-1, etc.*)	☒	☐	(*please state*) 7EX-4MA
3. Was the well casing video logged?	☐	☒	INCLUDE CD OR DVD OF VIDEO LOG WITH NOTICE OF INTENT
4. Why is the well being abandoned?	The well is damaged, non-operational, and cannot be fixed. A replacement well (7EX-6MA) was drilled and installed.		

RN

WELL REGISTRATION NUMBER
55 - 236897

SECTION 5. ORIGINAL WELL CONSTRUCTION DESIGN *(attach additional page if needed)*

Existing Borehole			Existing Casing *(to the best of your knowledge)*													
DEPTH FROM SURFACE			DEPTH FROM SURFACE			MATERIAL TYPE				PERFORATION TYPE						
FROM *(feet)*	TO *(feet)*	BOREHOLE DIAMETER *(inches)*	FROM *(feet)*	TO *(feet)*	OUTER DIAMETER *(inches)*	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE IF ANY *(inches)*
0	245	6" Casing	0	190	4.5"	☐	☒	☐		☒	☐	☐	☐	☐		
		Liner Install	190	245	5"	☐	☒	☐		☒	☐	☐	☐	☐	Prepack	0.020
						☐	☐	☐		☐	☐	☐	☐	☐		

Condition of casing: (good, fair, poor, unknown) GOOD

DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE								FILTER PACK		
						BENTONITE						
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	185	☐	☐	☒	☐	☐	☐	☐		☐	☐	
185	190	☐	☐	☐	☐	☒	☐	☐		☐	☐	
190	245	☐	☐	☐	☐	☐	☐	☐		☒	☐	#3

SECTION 6. PROPOSED WELL ABANDONMENT DESIGN *(attach additional page if needed)*

Refer to ADWR's Well Abandonment Handbook for additional information.

DATE ABANDONMENT IS TO BEGIN
10/31/2023

Casing Treatment							Sealing or Fill Material													
DEPTH FROM SURFACE		TREATMENT TYPE					DEPTH FROM SURFACE		MATERIAL TYPE											
														HIGH SOLIDS BENTONITE						
FROM *(feet)*	TO *(feet)*	SONAR JET	BRUSH OR SCRAPE	MILLS KNIFE	CASING REMOVAL (explain in Remarks)	IF OTHER TYPE, DESCRIBE OR IF CASING IS TO BE PERFORATED, DESCRIBE SPACING AND SIZE OF PERFORATIONS TO BE ADDED	FROM *(feet)*	TO *(feet)*	NEAT CEMENT	CONCRETE	SAND-CEMENT GROUT	CEMENT-BENTONITE GROUT	SAND-BENTONITE GROUT	GROUT	CHIPS	PELLETS	SAND	MIXING RATIO by *(check one)* ☐ Weight ☐ Volume	ESTIMATED VOLUME OF MATERIAL *(cubic feet)*
0	2	☐	☐	☐	☒		2	96.2	☐	☐	☐	☒	☐	☐	☐	☐	☐		7
		☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐		
		☐	☐	☐	☐				☐	☐	☐	☐	☐	☐	☐	☐	☐		

Proposed Abandonment Method *(See Well Abandonment Handbook)*

CHECK ONE

- ☐ Standard Method
- ☐ Alternative 1
- ☐ Alternative 2
- ☒ Alternative 3
- ☐ Alternative 4:
  - ☐ Variance Option *
- ☐ Alternative 5:
  - ☐ Variance Option 1*
  - ☐ Variance Option 2*
- ☐ Other *(please specify)*:

* requires a letter requesting a variance

Emplacement Method of Sealing or Fill Material

CHECK ONE

- ☒ Tremie Pumped *(Recommended)*
- ☐ Gravity
- ☐ Pressure Grouting
- ☐ Other *(please specify)*:

APPLICATION CONTINUES ON PAGE 3

Notice of Intent to Abandon a Well

WELL REGISTRATION NUMBER
55 - 236987

SECTION 7. Well Abandonment Diagram

Please use the space below to provide a well abandonment diagram showing all existing well construction features listed in Section 5 and the proposed abandonment specifications listed in Section 6.

Please refer to Attachment 1 - Section 7: Well Abandonment Diagram and Site Map

SECTION 8. LAND OWNER AND WELL OWNER SIGNATURE

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

Land Owner		**Well Owner** *(complete if Land Owner/Well Owner are NOT the same)*	
PRINT NAME AND TITLE	Venus Morrow, Property Manager	PRINT NAME AND TITLE	John Pekala, Environmental Remediation Program Manager
SIGNATURE OF LAND OWNER	Venus Morrow	SIGNATURE OF WELL OWNER	
DATE	11/6/2023	DATE	11/6/2023
☐ By checking this box, you agree to allow ADWR to contact you via electronic mail.		☑ By checking this box, you agree to allow ADWR to contact you via electronic mail.	
EMAIL ADDRESS	vmorrow@modecommercial.com	EMAIL ADDRESS	john.pekala@motorolasolutions.com

NOTICE

A.R.S. § 41-1030(B), (D), (E) and (F) provide as follows:

B. An agency shall not base a licensing decision in whole or in part on a licensing requirement or condition that is not specifically authorized by statute, rule or state tribal gaming compact. A general grant of authority in statute does not constitute a basis for imposing a licensing requirement or condition unless a rule is made pursuant to that general grant of authority that specifically authorizes the requirement or condition.

D. This section may be enforced in a private civil action and relief may be awarded against the state. The court may award reasonable attorney fees, damages and all fees associated with the license application to a party that prevails in an action against the state for a violation of this section.

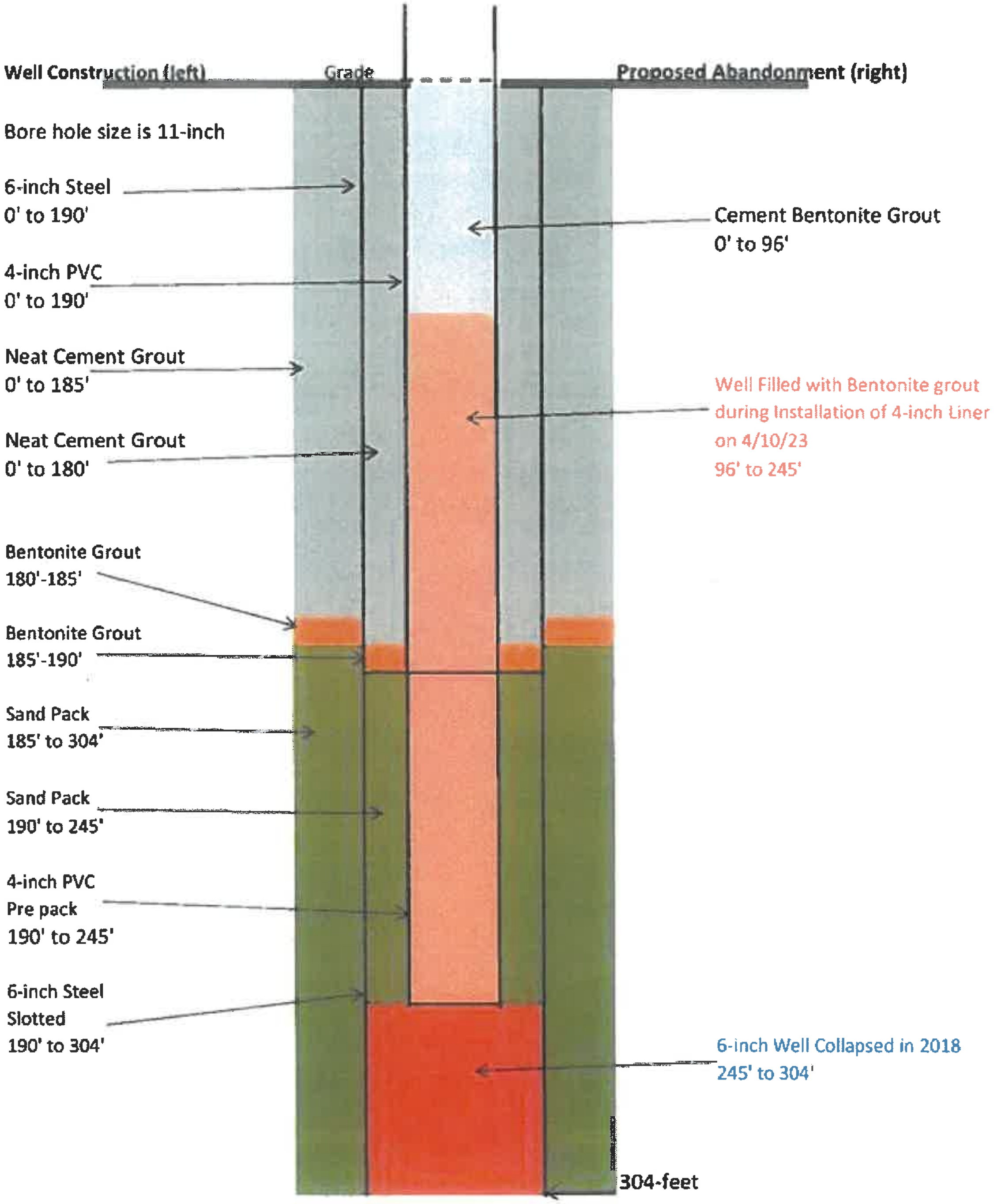
E. A state employee may not intentionally or knowingly violate this section. A violation of this section is cause for disciplinary action or dismissal pursuant to the agency's adopted personnel policy.

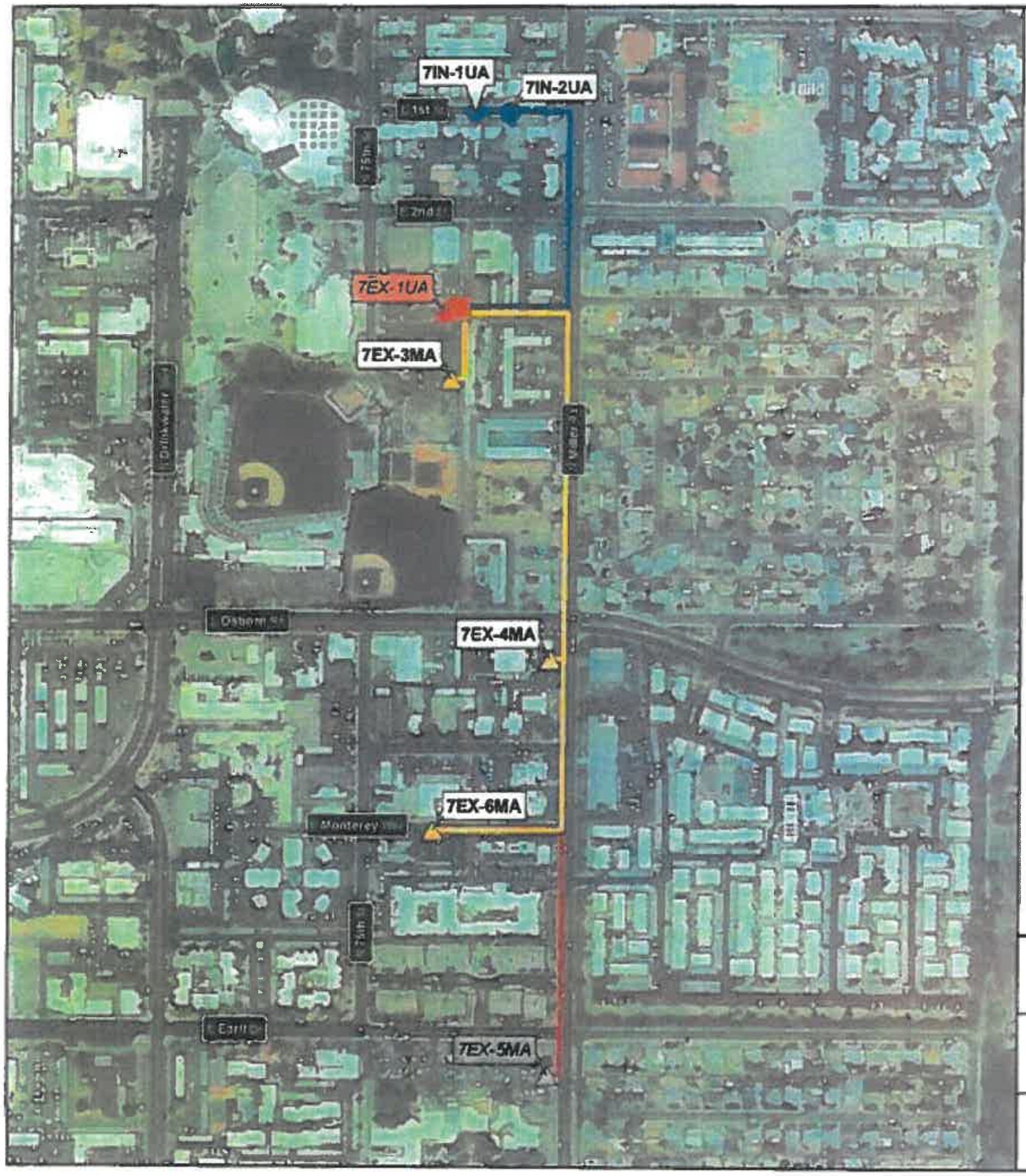
F. This section does not abrogate the immunity provided by section 12-820.01 or 12-820.02.

Attachment 1

Section 7: Well Abandonment Diagram and Site Map

7EX-4MA
55-236897





LEGEND

- 🟥 Area 7 GWETS
- ● Groundwater injection well (existing)
- ╲ GWETS injection piping (existing)
- △ Groundwater extraction well (existing)
- △ Groundwater extraction well (abandoned)
- ▲ Groundwater extraction well (abandoned)
- ╲ GWETS extraction piping (existing)
- ╲ GWETS extraction piping (abandoned)

NOTES

- Aerial photo source: ESRI World Imagery
- GWETS = Groundwater extraction and treatment system.

Feet
0 250 500
Scale 1" = 500'

NORTH INDIAN BEND WASH - AREA 7
SCOTTSDALE, ARIZONA

SITE FEATURES MAP

ARCADIS

FIGURE
1

Printed: 11/15/2023 2:39:53 PM

Arizona Department of Water Resources

1110 West Washington Street, Suite 310
Phoenix AZ 85007

Customer:

CASCADE DRILLING L.P.
PO BOX 1184
WOODINVILLE, WA 98072

Receipt #:	24-103294
Office:	MAIN OFFICE
Receipt Date:	11/15/2023
Sale Type:	IN_PERSON
Cashier:	Cassandra McVeigh

Item No.	Function Code	AOBJ	Description	Ref ID	Qty	Unit Price	Ext Price
67487	122221	4439-TT	Notice of intention to abandon a well	236897	1	150.00	150.00
						RECEIPT TOTAL:	**150.00**

Payment type: CHECK
Amount Paid: $150.00
Payment Received Date: 11/15/2023

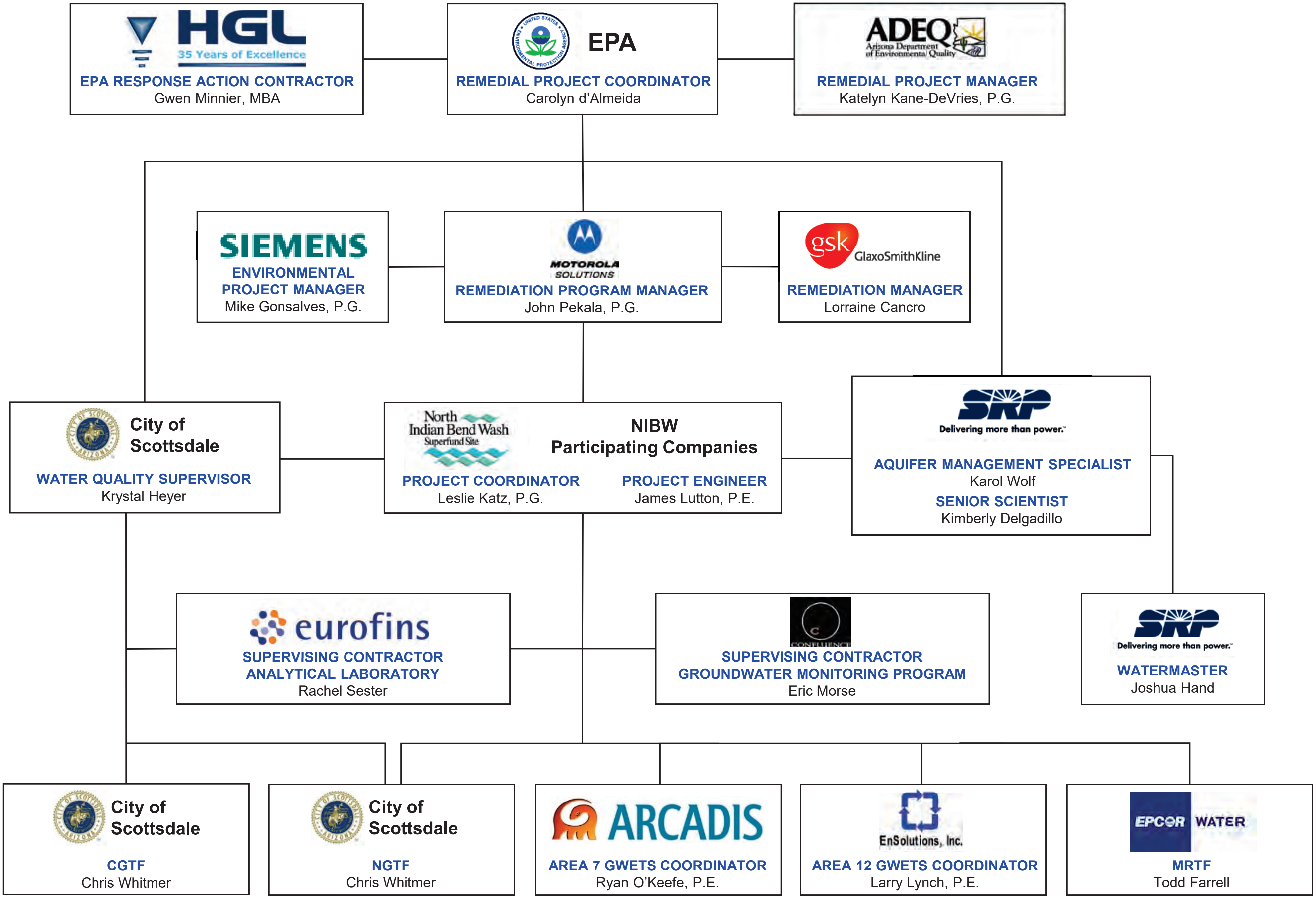
Check # 240672

Notes: FROM TTA.

No refund without valid receipt

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

APPENDIX J
CONTACT LIST FOR NIBW SUPERFUND SITE AND REMEDIAL ACTIONS



HGL
35 Years of Excellence
EPA RESPONSE ACTION CONTRACTOR
Gwen Minnier, MBA

EPA
REMEDIAL PROJECT COORDINATOR
Carolyn d'Almeida

ADEQ
Arizona Department of Environmental Quality
REMEDIAL PROJECT MANAGER
Katelyn Kane-DeVries, P.G.

SIEMENS
ENVIRONMENTAL PROJECT MANAGER
Mike Gonsalves, P.G.

MOTOROLA SOLUTIONS
REMEDIATION PROGRAM MANAGER
John Pekala, P.G.

gsk GlaxoSmithKline
REMEDIATION MANAGER
Lorraine Cancro

City of Scottsdale
WATER QUALITY SUPERVISOR
Krystal Heyer

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 SCIENTIST
Kimberly Delgadillo

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 J-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	Montgomery & Associates	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912	520-245-4802	lkatz@elmontgomery.com
James Lutton	NIBW Project Engineer	NIBW Participating Companies	4222 E. Thomas Road, Suite 320, Phoenix, AZ 85018	480-442-9234	480-442-9234	james.lutton@jalpe.net
Amanda Beam	Project Manager	Montgomery & Associates	4222 E. Thomas Road, Suite 320, Phoenix, AZ 85018	480-948-7747	619-254-8749	abeam@elmontgomery.com
Alyssa Kirk	Senior Hydrologist	Montgomery & Associates	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912	928-699-6405	akirk@elmontgomery.com
Marla Odom	Data Manager	Montgomery & Associates	1550 E. Prince Road, Tucson, AZ 85719	520-881-4912		modom@elmontgomery.com
Brady Nock	Groundwater Modeler	Montgomery & Associates	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
Krystal Heyer	Water Quality Supervisor	City of Scottsdale	P.O. Box 25089, 8787 East Hualapai Drive, Scottsdale, AZ 85255	480-312-8712		kheyer@Scottsdaleaz.gov
Salt River Project						
Karol Wolf	Aquifer Management Specialist	Salt River Project	P.O. Box 52025, Mail Station PAB 38W, Phoenix, AZ 85072-2025	602-236-5767	602-236-3407	karol.wolf@srpnet.com
Kimberly Delgadillo	Senior Scientist	Salt River Project	P.O. Box 52025, Mail Station PAB 359, Phoenix, AZ 85072-2025	602-236-4132	602-509-4185	kimberly.delgadillo@srpnet.com
Treatment Systems						
NGTF and CGTF						
Chris Whitmer	CGTF & NGTF Senior Operator and Incident Coordinator	City of Scottsdale	8650 East Thomas Road, Scottsdale, AZ 85251	480-312-0390	602-402-3223	cwhitmer@scottsdaleaz.gov
	Treatment Manager	City of Scottsdale	8650 East Thomas Road, Scottsdale, AZ 85251			
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 K
INDICATOR WELL M-2MA EVALUATION

Indicator Well M-2MA Evaluation

North
Indian Bend Wash
Superfund Site

Prepared for:

U.S. Environmental Protection Agency

Region IX

Prepared by:

NIBW Participating Companies

April 30, 2024

CONTENTS

1 INTRODUCTION

The North Indian Bend Wash Participating Companies (NIBW PCs) conducted an evaluation was conducted on Middle Alluvial Unit (MAU) indicator well M-2MA in 2023 in response to an increase in trichloroethene (TCE) concentration in October 2022. TCE was detected above the Groundwater Monitoring & Evaluation Plan (GM&EP) contingency initiation level of 10 micrograms per liter (µg/L), at a concentration of 24 µg/L (PCs, 2023). The results of the original and duplicate confirmation sample were both below the contingency criteria. Because M-2MA confirmation results showed TCE concentrations below the GM&EP response action criteria, contingency conditions at M-2MA were not verified and a contingency response action plan was not required. The PCs, nevertheless, notified U.S. Environmental Protection Agency (EPA) of response actions, sampling results, and interim conclusions in the December 2022 Technical Committee meeting, which included review of the following information:

- Historical TCE data and the previous (2017) M-2MA Contingency Action Evaluation (PCs, 2017).
- Water level and water quality data for nearby wells.
- Results for a confirmation sample obtained at E-8MA; TCE concentrations showed a similar pattern as M-2MA with a concentration increase followed by a decrease.
- Pumping data obtained from the City of Tempe for well COT-6 to evaluate pumping status prior to and during the two sampling events.
- Area 12 pumping data to evaluate pumping status prior to and during the two sampling events.

To further evaluate the mechanism behind TCE concentration fluctuations observed at indicator well M-2MA and nearby wells, the PCs voluntarily conducted the following data collection and analysis in 2023, meeting and exceeding actions recommended in the 2022 NIBW Site Monitoring Report (SMR) (PCs, 2023):

- Enhanced monitoring data collection including:
  - Increased frequency of M-2MA monitoring to quarterly for water quality and water levels with vertical profile sampling at three different depths under variable pumping conditions.
  - Increased water level monitoring at surrounding wells (E-5MA, E-8MA, PA-23MA, PA-16MA, and B-1MA) from semi-annual to quarterly.
  - Collected quarterly supplemental samples from E-5MA and E-8MA for analysis of the NIBW constituents of concern (COCs).
  - Installed a transducer at E-5MA located between the Area 12 and COT-6 pumping centers to collect continuous water level data.

  - Continued to sample MEX-1MA and Granite Reef on a monthly basis (quarterly sampling is required per the GM&EP).
- Continued to operate the Area 12 extraction wells simultaneously, subject to water demands by Salt River Project (SRP) and maintenance requirements.
- Requested information on the status of pumping at well COT-6 from the City of Tempe prior to monitoring events.
- Considered appropriate revisions to the GM&EP criteria for M-2MA as part of the GM&EP update process.
- Prepared a summary of the M-2MA evaluation for inclusion in the 2023 SMR (Appendix K of 2023 SMR).

2 2023 DATA COLLECTION

As part of this M-2MA evaluation, supplemental monitoring occurred during five quarters (from January 2023 through January 2024) to collect additional water level and water quality data from indicator well M-2MA and surrounding wells. Data were assessed with the historical and recent pumping data from production well COT-6 and Area 12 extraction wells, MEX-1MA and Granite Reef. Supplemental water quality data from monitoring wells M-2MA, E-5MA, and E-8MA and water level data from monitoring wells M-2MA, B-1MA, E-5MA, E-8MA, PA-16MA, and PA-23MA are summarized in **Table 1** and **Table 2**, respectively.

In addition to the sample collected from the mid-point of the screen in January 2023, vertical profile sampling was conducted at monitoring well M-2MA in April, July, August, and October 2023 and January 2024 to characterize any vertical variability that might exist across the 50-foot screen. HydraSleeves^{TM} were set at three depths: 1) top of screen (256 feet below land surface [bls]), 2) mid-screen (275 feet bls), and 3) bottom of screen (290 feet bls). The mid-screen sample remained the same as the historical set depth for comparison purposes. Monitoring wells M-2MA, E-5MA, and E-8MA were sampled quarterly in 2023 and analyzed for the NIBW constituents of concern (COCs) including: trichloroethene (TCE), tetrachloroethene (PCE), 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and chloroform (TCM).

Water level measurements were collected from monitoring wells M-2MA, B-1MA, E-5MA, E-8MA, PA-16MA, and PA-23MA on a quarterly basis in 2023, when accessible. Monitor well PA-23MA was inaccessible for the first half of 2023 due to a change in ownership requiring a new access agreement. Pressure transducers already in place in monitoring well M-2MA and installed in E-5MA recorded continuous water level data for more detailed evaluation of the drawdown effects from COT-6 and Area 12 extraction well pumping.

Table 1. M-2MA Evaluation - Water Quality Samples

Sample Location	Sample Depth (feet, bls)	Sample Date	TCA	DCE	TCM	PCE	TCE
			200	6	6	5	5
M-2MA	275	10/12/2022	<0.50	<0.50	1.1	<0.50	24
M-2MA	275	10/20/2022	<0.50 / <0.50	<0.50 / <0.50	<0.50 / <0.50	<0.50 / <0.50	2.8 / 7.1
M-2MA	275	1/6/2023	<0.50 / <0.50	<0.50 / <0.50	<0.50 / <0.50	<0.50 / <0.50	0.71 / 0.72
M-2MA	256	4/11/2023	<0.50	<0.50	<0.50	<0.50	2.5
M-2MA	275	4/11/2023	<0.50	<0.50	<0.50	<0.50	0.98
M-2MA	290	4/11/2023	<0.50	<0.50	<0.50	<0.50	1.2
M-2MA	256	7/7/2023	<0.50	<0.50	0.90	<0.50	17
M-2MA	275	7/7/2023	<0.50 / <0.50	<0.50 / <0.50	<0.50 / <0.50	<0.50 / <0.50	1.3 / 1.1
M-2MA	290	7/7/2023	<0.50	<0.50	<0.50	<0.50	0.87
M-2MA	256	8/15/2023	<0.50	<0.50	0.54	<0.50	9.9
M-2MA	275	8/15/2023	<0.50 / <0.50	<0.50 / <0.50	0.58/0.55	<0.50 / <0.50	8.9 / 9.8
M-2MA	290	8/15/2023	<0.50	<0.50	<0.50	<0.50	1.4
M-2MA	256	10/11/2023	<0.50	<0.50	<0.50	<0.50	<0.50
M-2MA	275	10/11/2023	<0.50	<0.50	<0.50	<0.50	<0.50
M-2MA	290	10/11/2023	<0.50	<0.50	<0.50	<0.50	0.74
M-2MA	256	1/10/2024	<0.50	<0.50	<0.50	<0.50	1.7
M-2MA	275	1/10/2024	<0.50 / <0.50	<0.50 / <0.50	<0.50 / <0.50	<0.50 / <0.50	0.88 / 0.88
M-2MA	290	1/10/2024	<0.50	<0.50	<0.50	<0.50	0.62
E-5MA	---	1/19/2022	<0.50	<0.50	2.7	0.87	48
E-5MA	---	4/27/2022	<0.50	<0.50	2.8	0.63	52
E-5MA	---	7/12/2022	<0.50	<0.50	2.9	1.1	56
E-5MA	---	10/18/2022	<0.50	<0.50	2.4	0.67	43
E-5MA	---	1/9/2023	<0.50	<0.50	2.0	0.60	38
E-5MA	---	4/11/2023	<0.50	<0.50	2.8	0.83	47
E-5MA	---	7/11/2023	<0.50	<0.50	2.5	0.89	41
E-5MA	---	10/17/2023	<0.50	<0.50	2.4	0.71	36
E-5MA	---	1/9/2024	<0.50	<0.50	2.1	0.72	30
E-8MA	---	10/18/2022	<0.50 / <0.50	<0.50 / <0.50	2.0/2.0	<0.50 / <0.50	47 / 48
E-8MA	---	11/11/2022	<0.50 / <0.50	<0.50 / <0.50	1.5/1.5	<0.50 / <0.50	33 / 31
E-8MA	---	2/15/2023	<0.50 / <0.50	<0.50 / <0.50	1.4/1.4	<0.50 / <0.50	31 / 30
E-8MA	---	4/11/2023	<0.50 / <0.50	<0.50 / <0.50	1.9/2.0	<0.50 / <0.50	42 / 41
E-8MA	---	7/11/2023	<0.50 / <0.50	<0.50 / <0.50	1.2/1.1	<0.50 / <0.50	17 / 16
E-8MA	---	10/16/2023	<0.50	<0.50	1.4	<0.50	26
E-8MA	---	1/9/2024	<0.50	<0.50	1.4	<0.50	27

<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
24	Results in **bold red** exceed Groundwater Monitoring & Evaluation Plan (GM&EP) contingency initiation level of 10 µg/L
0.71 / 0.72	Original sample result / Duplicate sample result

Table 2. M-2MA Evaluation - Water Level Elevations

Monitoring Well Identifier	Measurement Date	Depth to Water (feet, bls)	Groundwater Altitude (feet, amsl)	Nearby Well Pumping
B-1MA	04/07/2023 10:13	81.81	1,109.82	MEX-1MA; Granite Reef
	08/15/2023 11:00	102.23	1,089.40	MEX-1MA; Granite Reef
	10/06/2023 11:25	79.27	1,112.36	COT-6; MEX-1MA; Granite Reef
	01/10/2024 11:11	71.95	1,119.68	MEX-1MA; Granite Reef
E-5MA	02/16/2023 13:50	85.39	1,114.04	MEX-1MA; Granite Reef
	04/04/2023 15:30	102.22	1,097.21	MEX-1MA; Granite Reef
	07/10/2023 13:38	109.98	1,089.45	COT-6; MEX-1MA; Granite Reef
	08/15/2023 11:39	115.30	1,084.13	COT-6; MEX-1MA; Granite Reef
	10/06/2023 11:59	100.32	1,099.11	MEX-1MA; Granite Reef
	01/05/2024 15:00	84.28	1,115.15	---
	01/10/2024 10:44	82.92	1,116.51	---
E-8MA	04/04/2023 15:15	88.91	1,103.98	MEX-1MA; Granite Reef
	08/15/2023 11:29	116.00	1,076.89	COT-6; MEX-1MA; Granite Reef
	10/05/2023 15:48	87.07	1,105.82	MEX-1MA; Granite Reef
	01/10/2024 10:49	77.12	1,115.77	---
M-2MA	01/05/2023 10:27	101.44	1,110.02	MEX-1MA; Granite Reef
	01/06/2023 10:40	100.56	1,110.90	MEX-1MA; Granite Reef
	04/04/2023 11:11	114.51	1,096.95	MEX-1MA; Granite Reef
	04/11/2023 14:35	113.96	1,097.50	MEX-1MA; Granite Reef
	07/05/2023 10:20	116.97	1,094.49	COT-6; MEX-1MA; Granite Reef
	07/07/2023 9:51	119.89	1,091.57	COT-6; MEX-1MA; Granite Reef
	08/15/2023 9:28	127.57	1,083.89	COT-6; MEX-1MA; Granite Reef
	08/15/2023 15:21	127.50	1,083.96	COT-6; MEX-1MA; Granite Reef
	08/15/2023 15:33	127.51	1,083.95	COT-6; MEX-1MA; Granite Reef
	10/06/2023 9:33	111.38	1,100.08	MEX-1MA; Granite Reef
	01/05/2024 10:30	93.09	1,118.37	---
	01/10/2024 10:10	90.97	1,120.49	---
PA-16MA	04/04/2023 14:57	93.39	1,111.09	MEX-1MA; Granite Reef
	08/15/2023 11:17	104.78	1,099.70	COT-6; MEX-1MA; Granite Reef
	10/06/2023 10:24	92.18	1,112.30	MEX-1MA; Granite Reef
	01/10/2024 11:00	88.53	1,115.95	---
PA-23MA	08/15/2023 10:29	93.42	1,091.00	COT-6; MEX-1MA; Granite Reef
	10/04/2023 17:20	69.45	1,114.97	MEX-1MA; Granite Reef
	01/10/2024 11:28	65.66	1,118.76	---
M-2LA	04/07/2023 11:25	111.70	1,099.34	MEX-1MA; Granite Reef
	04/10/2023 15:19	111.64	1,099.40	MEX-1MA; Granite Reef
	07/05/2023 10:30	115.31	1,095.73	COT-6; MEX-1MA; Granite Reef
	10/06/2023 10:23	111.88	1,099.16	MEX-1MA; Granite Reef
	01/05/2024 10:15	112.15	1,098.89	---

EXPLANATION:

--- = Denotes no nearby wells were pumping
▨ Denotes upward vertical gradient between MAU and Lower Alluvial Unit (LAU)

3 ANALYSIS OF RESULTS

Historical and recent TCE data obtained from indicator well M-2MA and surrounding wells are shown with COT-6 pumping data on **Figure 1** and **Figure 2**, respectively. The latter also shows the operational status of Area 12 extraction wells MEX-1MA and the Granite Reef well along the top of the graph.

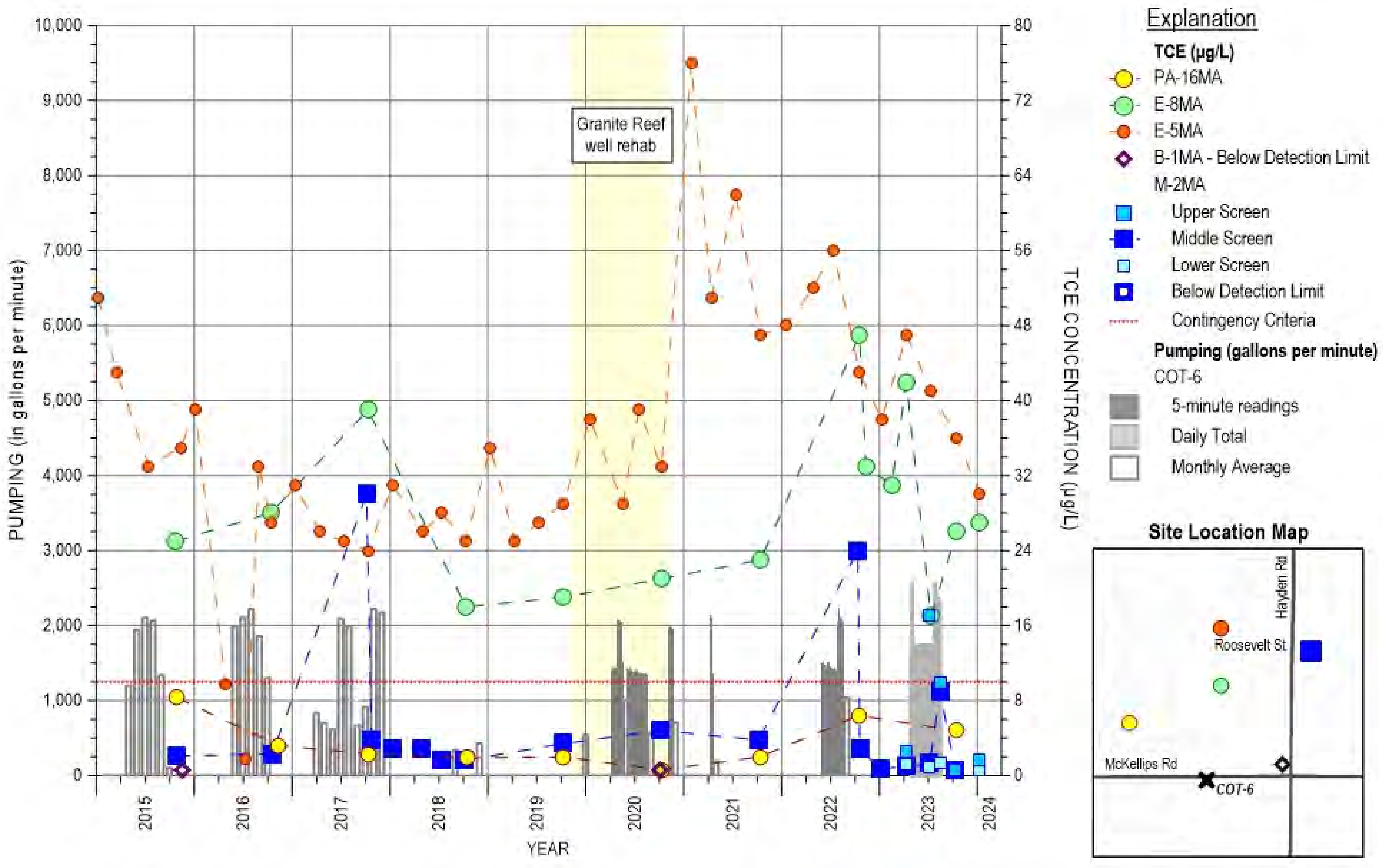


Figure 1. M-2MA Evaluation - TCE Historical Data

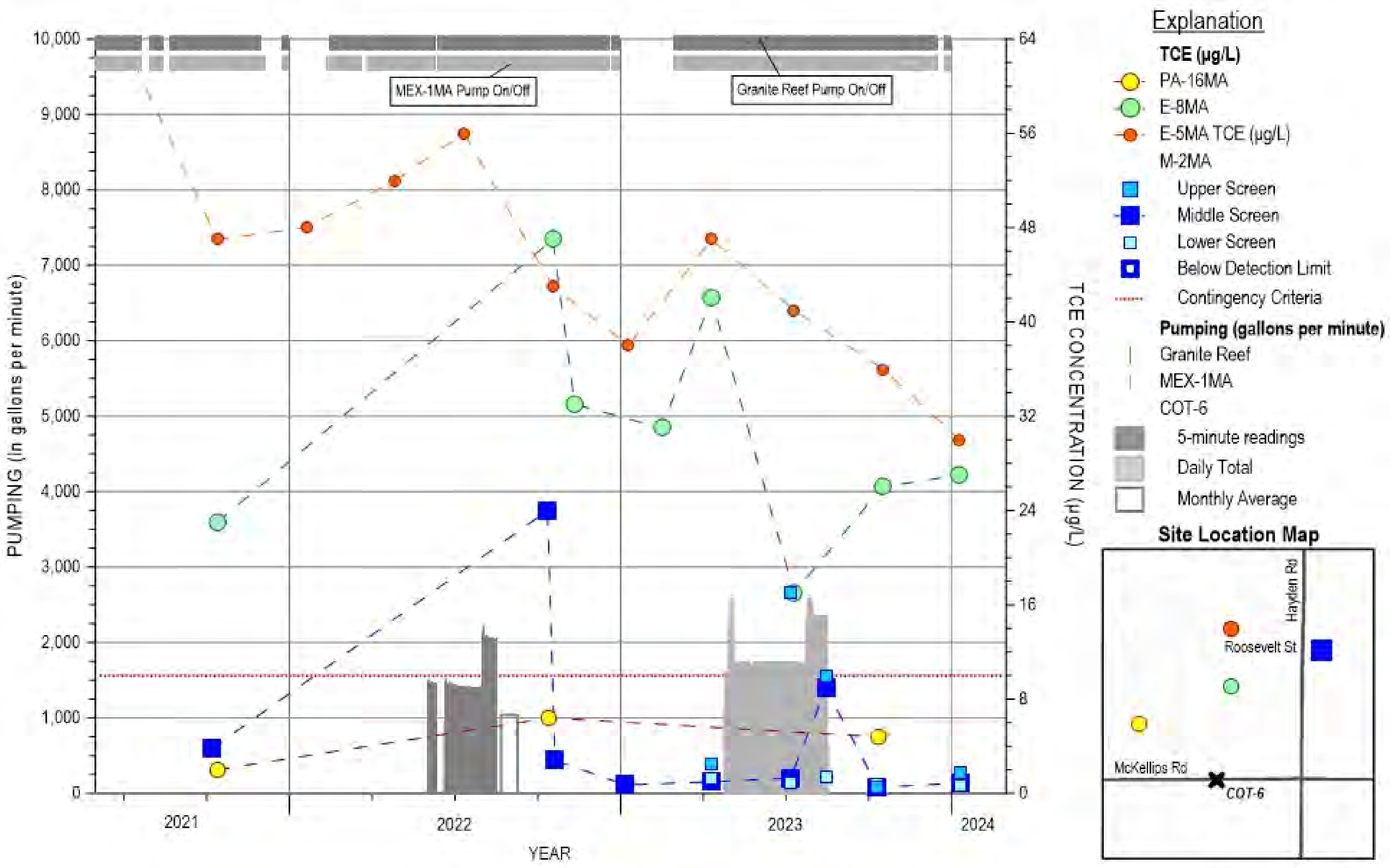


Figure 2. M-2MA Evaluation - TCE Recent Data

Within the limits of available data, review of **Figure 1** and **Figure 2** indicates that prolonged pumping of COT-6 is generally linked to increasing TCE concentrations in monitoring wells located north/northeast from COT-6, including E-5MA, E-8MA, and M-2MA. TCE concentration impacts in response to COT-6 pumping are less clear at monitoring well PA-16MA, located northwest of COT-6. Results of sampling at three different depths (upper, middle, and lower) across the 50-foot screened interval at M-2MA show that while there may be TCE concentration variability across the screen when COT-6 is pumping, the three interval samples are fairly uniform under non-pumping conditions. Further, the middle and upper samples appear to respond most significantly to COT-6 pumping conditions, with the typical sampling location in the middle of the screened interval representing a general average. The lower interval sample consistently shows lower TCE concentrations and is not responsive to COT-6 pumping.

Historical and recent water level data obtained from indicator well M-2MA and surrounding wells are shown with COT-6 pumping data on **Figure 3** and **Figure 4**, respectively. The latter also shows the operational status of Area 12 extraction wells MEX-1MA and the Granite Reef well along the top of the graph. High-frequency water level data are shown for M-2MA, M-2LA, and E-5MA where applicable.

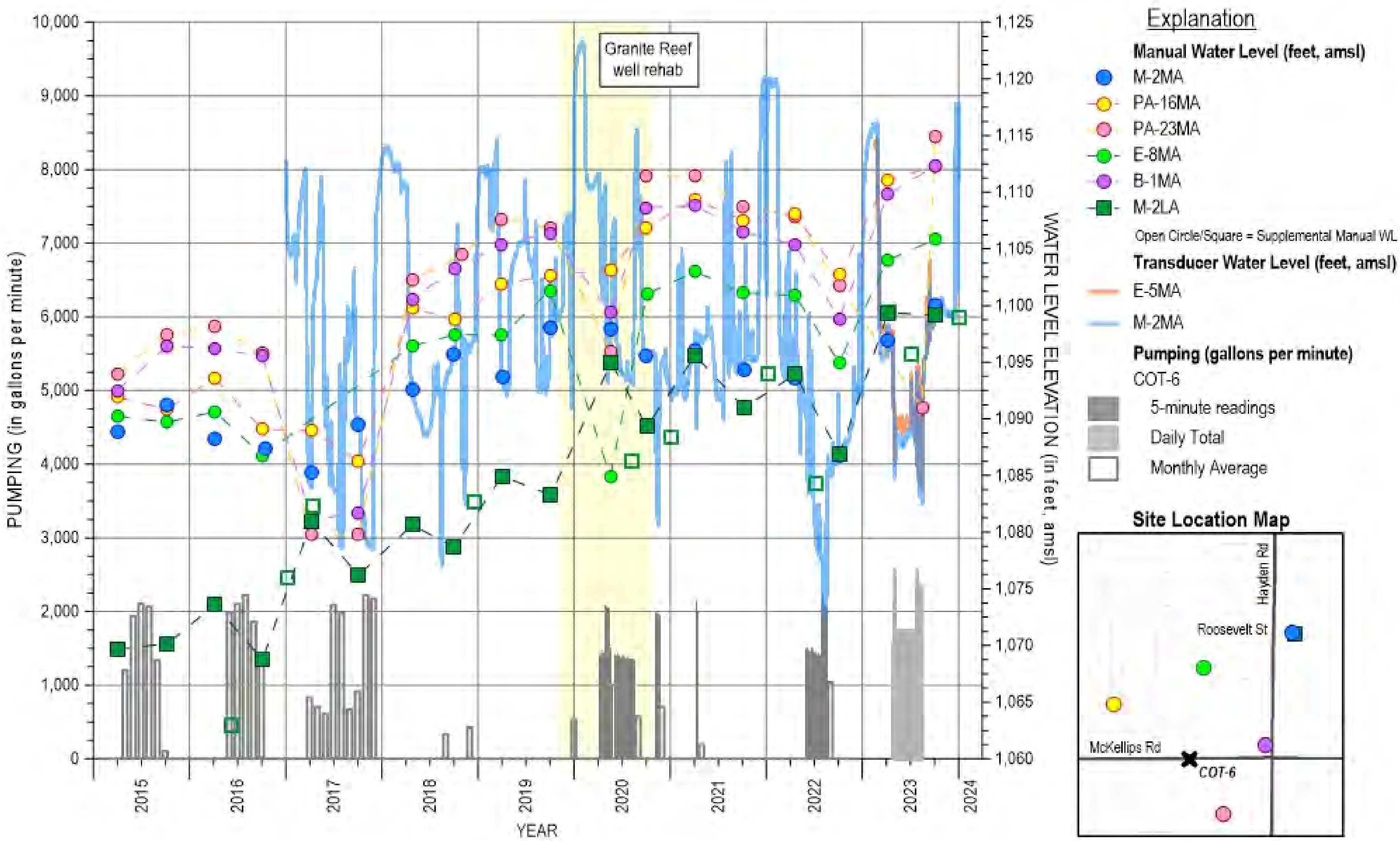


Figure 3. M-2MA Evaluation - Water Level Elevation Historical Data

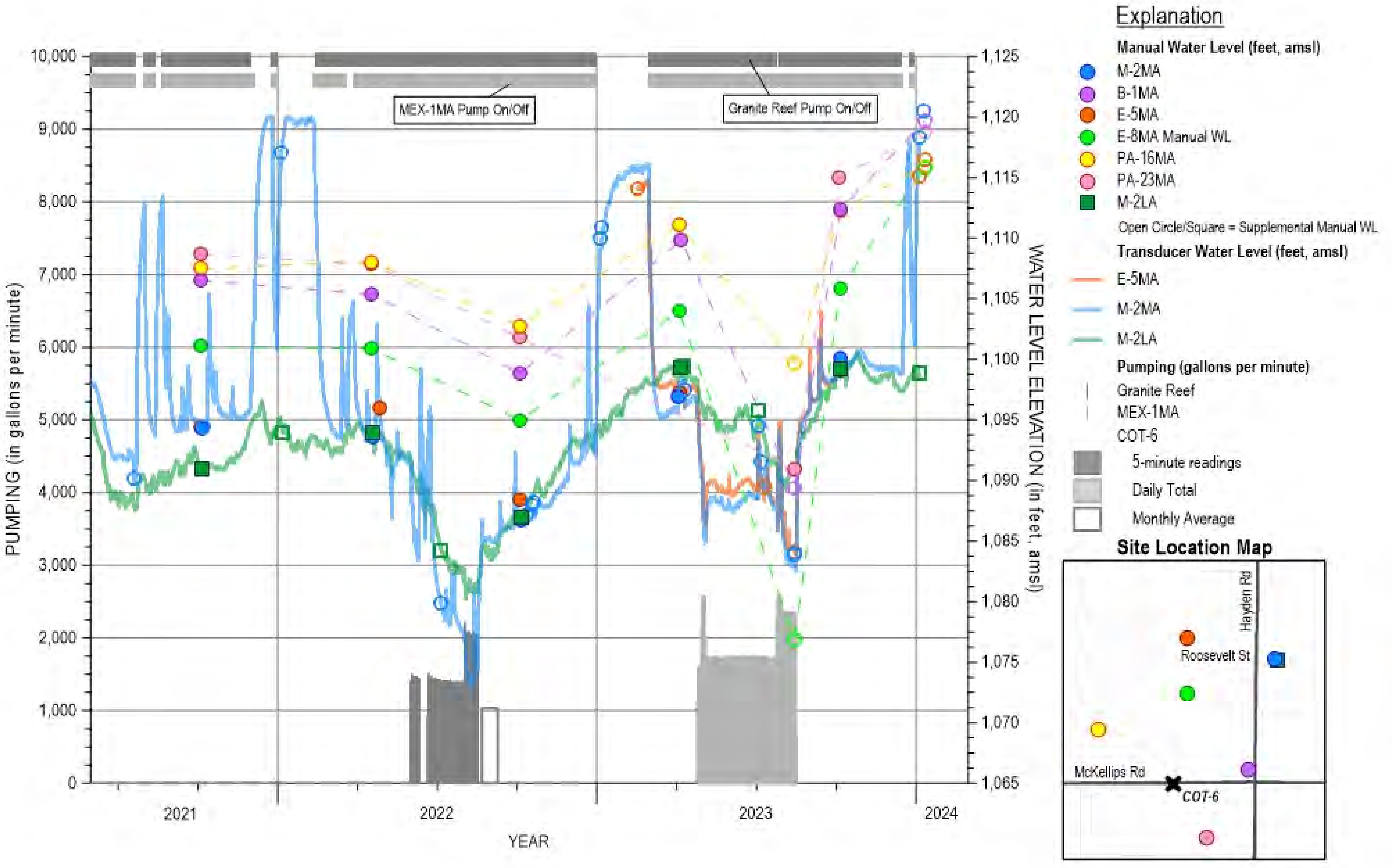


Figure 4. M-2MA Evaluation - Water Level Elevation Recent Data

Review of **Figure 3** and **Figure 4** shows that a broad set of MAU wells in the southern part of the Site show a distinct response to pumping at well COT-6. Depending on pumping at Area 12 extraction wells, cumulative drawdown of 10 feet to almost 40 feet was observed in southern MAU wells associated with summer/fall pumping at COT-6. LAU declines were smaller but discernible. The value of high-frequency water level data is apparent on these graphs, as routine semi-annual monitoring does not capture the maximum and minimum water levels that control patterns of groundwater movement in response to changes in pumping patterns between the Area 12 extraction wells and COT-6.

When comparing the MAU and LAU water levels at the M-2 location over time (**Figure 3**) the differential recovery between the two units, which is observed site-wide and exaggerated locally near MAU pumping centers, is notable. With greater reductions in regional pumping occurring in the LAU relative to the MAU, water level rise (recovery) in the LAU has outpaced the MAU. While the predominant gradient has been downward between the MAU and LAU historically, in 2022, the pressure head in the LAU at the M-2 location converged with and was at times above the pressure head in the MAU. As such, water level elevations for the MAU and LAU indicate vertical gradient reversals occurred between the MAU and LAU at M-2MA/M-2LA beginning in 2022 when both the Area 12 extraction wells and COT-6 were pumping (**Table 2**, **Figure 4**). The exception to this condition of upward gradients between the LAU and overlying MAU appears to be linked to down times at the Area 12 extraction wells. MAU water levels in M-2MA, and to a lesser extent other MAU monitoring wells to the south, show a notable recovery in response to shutdown of the Area 12 extraction wells. In recent times, this rapid MAU water level rise means that the gradient can return to the regionally predominant downward direction between the MAU and LAU at the M-2 location when the Area 12 extraction wells are not operational.

Within the limits of available data, combined review of water level and water quality data sets indicates prolonged pumping at COT-6 causes gradient changes linked to increased TCE concentrations in M-2MA, E-5MA, and E-8MA. As the southern MAU plume shifts to the south, higher concentration portions of the MAU plume are shifted toward these monitoring wells. This shift is mitigated, but not prevented, by consistent pumping of Area 12 extraction wells. Observed concentration increases in the middle and upper sampling intervals during COT-6 pumping in 2023 and 2024 suggest that the upper approximately 30 feet of the 50-foot screened interval at M-2MA coincides with a preferential pathway for TCE transport that is hydraulically connected to the two pumping centers (Area 12 and COT-6). This is consistent with water level response data collected during 2000-2002 and 2010-2011 pumping tests conducted at COT-6.

4 CONCLUSIONS AND RECOMMENDATIONS

Conclusions from these datasets provide the basis for the historical understanding of how shifts in the flow regime affect NIBW plume migration in the southern area of the site, supporting the following conclusions and observations:

- Water level responses to changes in production well COT-6 pumping are the primary mechanism affecting short-term changes in 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; these changes are anticipated to create contingency conditions at M-2MA on a regular basis if pumping is prolonged in advance of M-2MA sampling events.
- Replacement of COT-6 by COT-6R is not anticipated to significantly change hydraulic conditions, since the two wells are constructed in a generally consistent manner. However, if there is an increased rate and/or frequency of pumping at the replacement well relative to the original well, associated shifts in the MAU plume could lead to more frequent and significant short-term increases in TCE concentrations at monitoring wells M-2MA, E-5MA, and E-8MA, as well as at production well COT-6R.
- Well COT-6 (and by extension well COT-6R) are not peripheral production wells, as this area was impacted prior to the Amended Consent Decree and associated impacts are the subject of a separate agreement. No peripheral production wells are impacted or threatened to be impacted by shifts in the MAU TCE plume by current or planned COT-6/COT-6R operations, and the City of Tempe reportedly addresses volatile organic compound (VOC) impacts at this location by blending with available treated surface water supplies.

As described in Section 9.9 of the 2023 SMR, Montgomery & Associates conducted particle tracking analyses using the recently updated NIBW groundwater flow model to evaluate impacts from planned future operations of replacement production well COT-6R and proposed future use of well COT-6 for periodic injection. Specifically, the City of Tempe is seeking a permit from the State of Arizona to inject excess treated surface water into well COT-6 once replacement production well COT-6R is available. As part of the reinjection permit process, the NIBW PCs coordinated with the City of Tempe and Arizona Department of Environmental Quality (ADEQ) to understand proposed operations and design model scenarios to evaluate potential impacts of pumping at COT-6R and reinjection at COT-6 compared with historical operations. Results were shared with EPA and ADEQ on January 10, 2023. While the PCs plan to provide input during the public comment period for the COT-6 injection permitting process, there is general support for proposed actions. The PCs believe that planned actions by the City of Tempe are not inconsistent with remedy operations.

5 REFERENCES

North Indian Bend Wash Participating Companies (NIBW PCs), 2002. Groundwater Monitoring and Evaluation Plan: dated October 8, 2002.

_____, 2017. M-2MA Monitoring and Contingency Evaluation: dated November 10, 2017.

_____, 2023. 2022 Site Monitoring Report, North Indian Bend Wash Superfund Site: dated February 28, 2023.

6 ACRONYMS & ABBREVIATIONS

µg/L	micrograms per liter
1,1,1-TCA	1,1,1-trichloroethane
1,1-DCE	1,1-dichloroethene
ADEQ	Arizona Department of Environmental Quality
COCs	constituents of concern
EPA	United States Environmental Protection Agency
feet bls	feet below land surface
GM&EP	Groundwater Monitoring and Evaluation Plan
LAU	Lower Alluvial Unit
MAU	Middle Alluvial Unit
NIBW	North Indian Bend Wash
PCs	Participating Companies
PCE	tetrachloroethene
SMR	Site Monitoring Report
SRP	Salt River Project
TCE	trichloroethene
TCM	chloroform
VOCs	volatile organic compounds

APPENDIX L

SUMMARY OF WELL MODIFICATION AT EXTRACTION WELL COS-71A AND FLUID-MOVEMENT INVESTIGATIONS AT EXTRACTION WELLS COS-71A AND COS-75A

North Indian Bend Wash Superfund Site

April 30, 2024

SUMMARY OF 2023 FLUID-MOVEMENT INVESTIGATIONS AND REHABILITATION AT EXTRACTION WELLS COS-71A AND COS-75A, NORTH INDIAN BEND WASH SUPERFUND SITE, SCOTTSDALE, ARIZONA

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09/30/2026

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1 INTRODUCTION

The North Indian Bend Wash (NIBW) Participating Companies (NIBW PCs) have prepared this report to document field activities conducted at the City of Scottsdale (COS) extraction wells COS-71A and COS-75A. The wells are located within the NIBW Superfund Site (Site) in Scottsdale, Arizona. COS-71A is located in the central part of the Site near the southeast corner of Miller and Thomas Roads (**Figure 1**); COS-75A is located in the northern part of the Site near the northwest corner of Hayden and Indian School Roads (**Figure 2**).

The wells serve a dual purpose as a municipal water supply well and an extraction well for the NIBW groundwater remedy. The NIBW constituents of concern (COCs) include the following volatile organic compounds (VOCs): trichloroethene (TCE), the primary COC; tetrachloroethene (PCE); 1,1-dichloroethene (1,1-DCE); 1,1,1-trichloroethane (1,1,1-TCA); and trichloromethane (also known as chloroform). Extracted groundwater is treated to remove the NIBW COCs at the Central Groundwater Treatment Facility (CGTF) and delivered to COS for potable supply or to the Salt River Project (SRP) distribution system.

Well COS-71A was temporarily modified in March 2023 to convert the well from an extraction well completed in both the Middle Alluvial Unit (MAU) and the Lower Alluvial Unit (LAU) to a well extracting groundwater solely from the MAU. Well COS-75A was tested to evaluate current conditions to assess the appropriateness of modifying the well to eliminate a part of the deeper LAU perforated interval to focus extraction on the shallower depth intervals that previously had higher concentrations of COCs.

This report summarizes field activities at these wells including well rehabilitation, well modifications, testing procedures, and data gathered during the fluid-movement investigations. COS, as the property and well owner, prepared an access license agreement for the PCs and their representatives and contractors to conduct the well rehabilitation and testing activities at each well location. COS personnel were present as needed during field activities and pumping operations to ensure water disposal and/or treatment was conducted properly and to oversee transport of the waste as the waste generator. Montgomery & Associates (M&A) coordinated schedules and tasks with the COS and the PCs' contractors; observed well modification, rehabilitation, and logging operations, assisted with acquisition of groundwater samples, and conducted the data analysis. Subcontracted work included installation/removal of sound panels, jetting, brushing, bailing, well modification, test pump installation/removal, video surveys, geophysical logging and, depth-specific sampling.

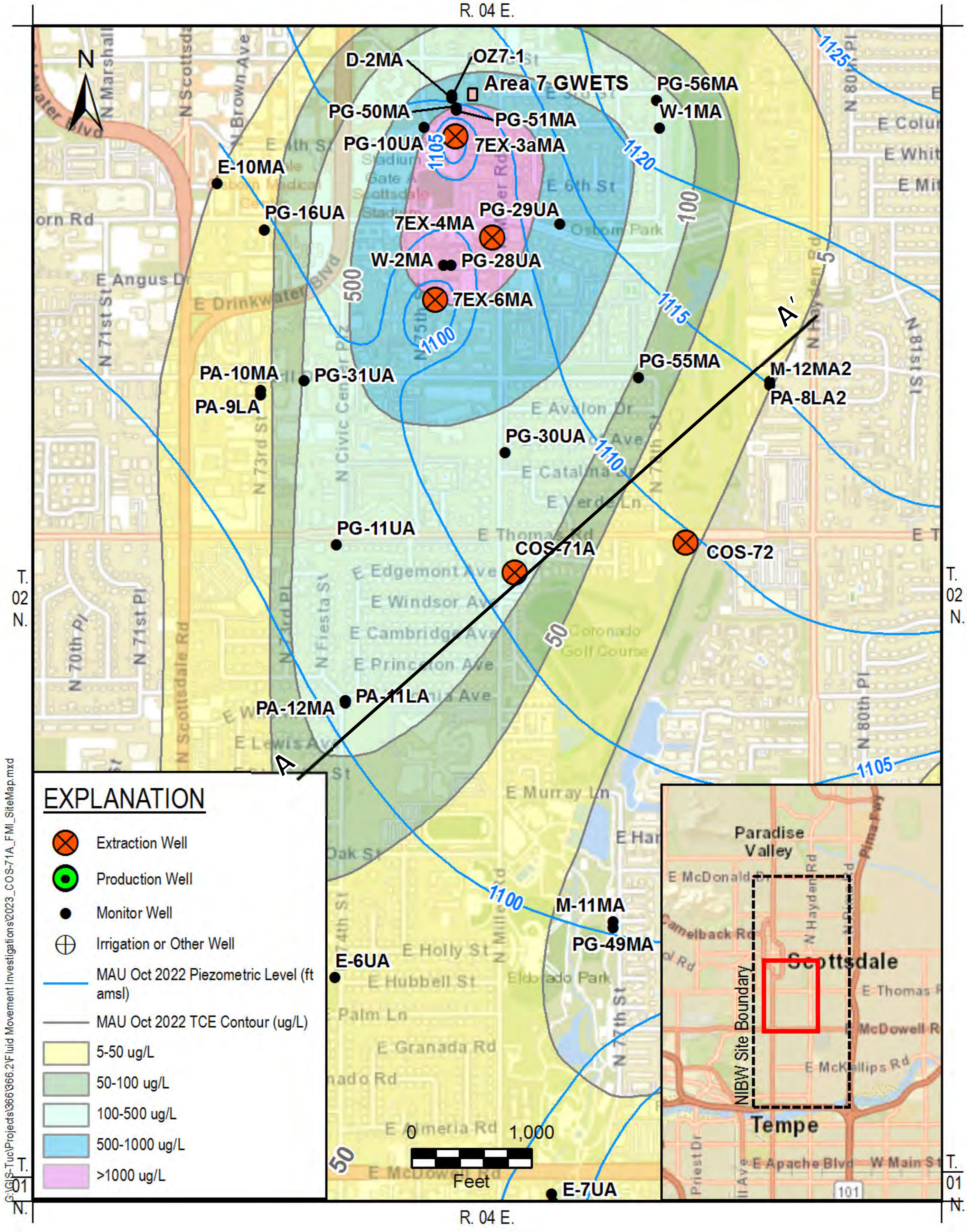


Figure 1. COS-71A Well Site Map

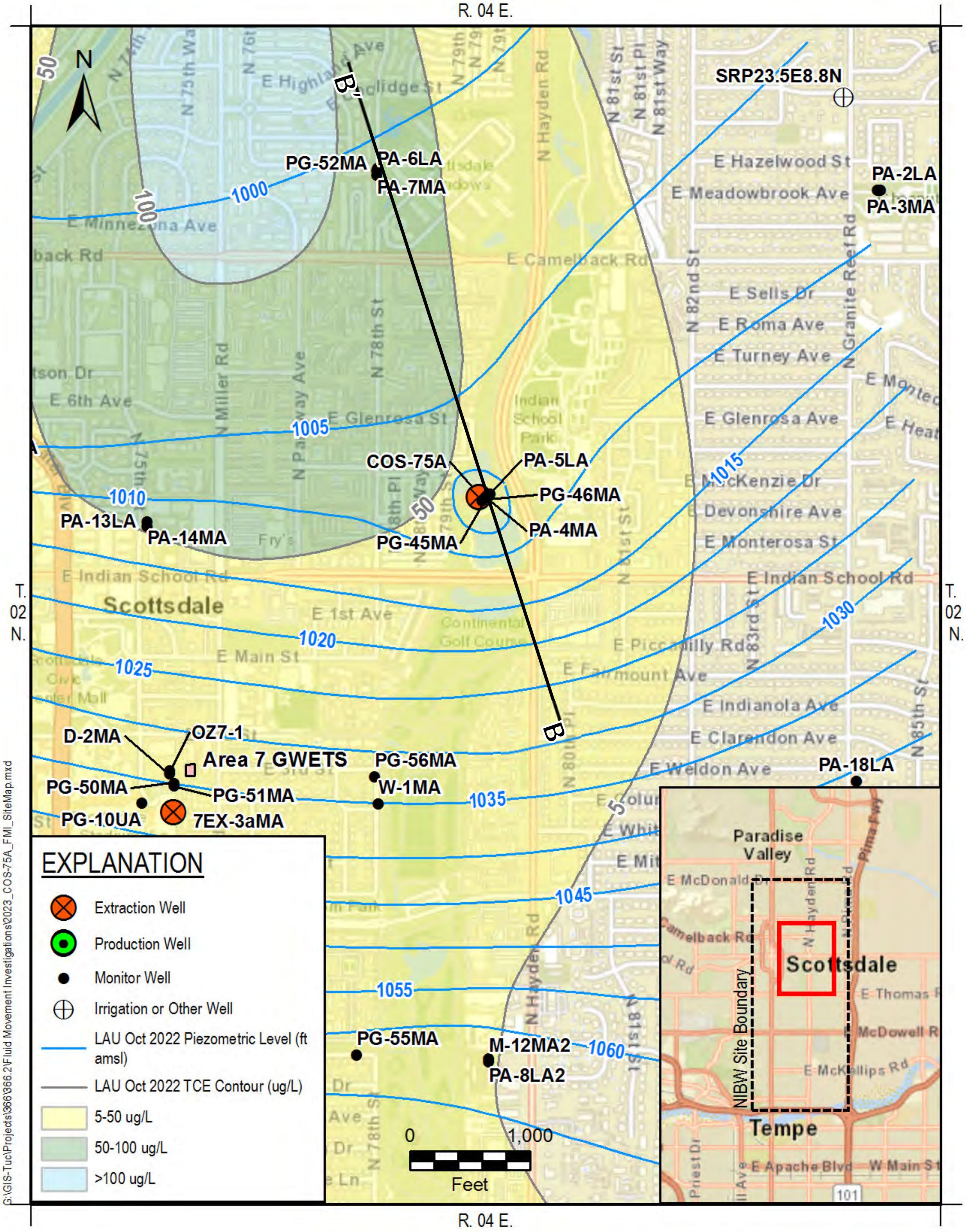


Figure 2. COS-75A Well Site Map

2 FIELD ACTIVITES

Rehabilitation was conducted at wells COS-71A and COS-75A to remove encrustation from the casing and reopen plugged perforations. Each well was subject to different rehabilitation activities. COS-71A rehabilitation consisted of water jetting and bailing, whereas COS-75A rehabilitation included brushing and bailing. Both wells underwent the final step of pump development. Modification of COS-71A was conducted prior to rehabilitation and well testing. Field activities were conducted under the supervision of a M&A hydrogeologist in accordance with the COS-71A Fluid Movement Investigation and Construction Modification Work Plan and Technical Specifications for Construction Modification, Development, and Testing of the City of Scottsdale Well No. 71A, dated March 10, 2023, and the COS-75A Fluid Movement Investigation Work Plan, dated May 17, 2023.

Fluid-movement investigations were conducted to evaluate the vertical distribution of groundwater flow and water quality under pumping and non-pumping conditions. Fluid movement investigations consisted of depth-specific sampling, temperature, fluid conductivity, and spinner-flowmeter surveys. The purpose of the latest fluid-movement investigations was to measure any changes (compared to previous investigations) in the flow and water quality with depth under pumping and non-pumping conditions.

2.1 COS-71A

2.1.1 Well Rehabilitation and Modification

On March 16, 2023, Environmental Noise Control (ENC) installed sound barrier equipment for the rehabilitation and pumping. Southwest Exploration (SWE) conducted the initial video survey. Light encrustation was detected from 98 feet below land surface (feet bls) to the bottom of the well, and the perforations appeared mostly plugged. Static water level was encountered at 134.2 feet bls. M&A determined the integrity of the well casing is generally good. At 250 feet bls, there was a dark spot observed on the casing, which was likely buildup or discoloration, but could have been a small hole. The bottom of the well was tagged at 787.4 feet bls.

On March 20, 2023, WellJet by Hydropressure Cleaning, Inc. (WellJet) conducted water jetting activities to open the perforations in the screened intervals within the MAU. The initial jetting was conducted at 17,000 pounds per square inch (PSI) and 35 gallons per minute (gpm). Jetting started at 507 feet bls (the proposed modification total depth) and the jetting tool was raised at one foot per minute. At 255 feet bls, the pressure was decreased to 6,000 PSI as a precaution due to potential well deterioration at 250 feet bls observed in the video survey (subsequent well videos did not show signs of deterioration at this depth). On March 21, 2023, WellJet finished jetting to 211 feet bls. Following jetting activities, Yellow Jacket Drilling, Inc. (Yellow Jacket) removed approximately 165 gallons of fill from the bottom of the well using a bailer. At the end of bailing activities, the bottom of the well was tagged at 794 feet bls.

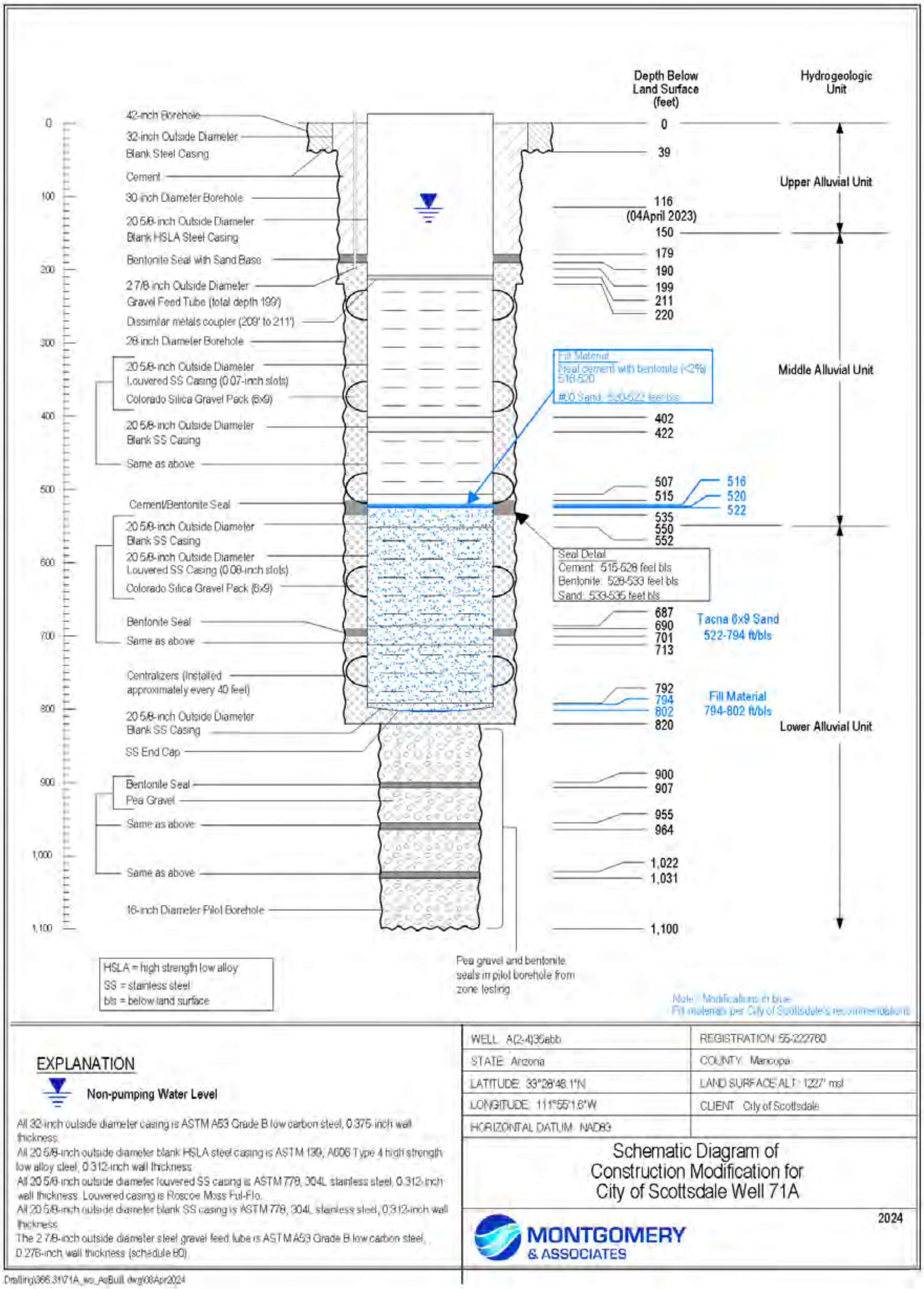
On March 23, 2023, SWE conducted a post rehabilitation video survey. The static water level was encountered at 118.8 feet bls. Significantly less encrustation was detected within the jetted interval between 211 and 507 feet bls, and the perforations appeared to be mostly open. The top of soft fill at the bottom of the well was observed at 784.1 feet bls.

Yellow Jacket Drilling of Phoenix Arizona submitted a Notice of Intent (NOI) to Arizona Department of Water Resources (ADWR) for the modification of COS-71A to reduce the effective screen interval and temporarily seal off the LAU, included in **Appendix A**. Following the receipt of a driller's card issued by ADWR, Yellow Jacket began COS-71A well modifications on March 23, 2023. A temporary tremie pipe and a diesel-powered centrifugal pump were utilized to install fill material inside the well casing. Approximately 21 cubic yards of 4x8 Tacna sand (coarse sand) were installed from 522 to 794 feet bls. Following coarse sand installation, 20 gallons of Gillibrand #60 silver sand was installed from 519.7 to 522 feet bls. As approved by the City of Scottsdale prior to implementation, a dart bailer was used to install 45 gallons of cement with less than 2% bentonite added from 515.5 to 519.7 feet bls. The dart bailer was deployed twice, as the first deployment did not release the cement. The second deployment released the cement at the targeted depth. The post-modification well schematic is shown on **Figure 3**. The pre-modification schematic can be found in **Appendix B**.

Well development was conducted after the cement had cured for 72 hours. The screen was simultaneously swabbed and developed via airlift pumping for 22 hours total from March 29, 2023, to April 3, 2023. Water pumped from the well during rehabilitation and testing activities was discharged into the City of Scottsdale sanitary sewer system under an approved industrial wastewater discharge permit for temporary discharge (**Appendix C**). In total, 133,500 gallons of water were discharged to the COS sanitary sewer system; average pumping rate was approximately 100 gpm. At the end of swab and airlift development, the swab tool was oscillated at the bottom of the well and airlift pumping continued to clean out any fill that settled from development.

After swab and airlift development, Yellow Jacket installed a submersible pump (Type: P10-1100-03-1250) with the pump intake set at 409 feet bls, within the blank casing pump chamber. A 3-inch diameter polyvinyl chloride (PVC) access pipe was installed to 415.65 feet bls for passage of the wireline geophysical equipment. The access pipe was perforated from 206 feet bls to the bottom of the pipe with six 0.5-inch diameter perforations per foot. A 1.25-inch diameter PVC sounding tube was installed to 377 feet bls for the manual water level sounder and the pressure transducer. A variable frequency driver (VFD) was installed to allow precise control of flow rates.

On April 5, 2023, the well was further developed via pumping and surging at rates varying from 300 to 1,000 gpm. Initial water pumped was discharged into two 20-cubic-yard tanks to allow the solids to settle so the discharge to the sanitary sewer met the COS requirement for sand content. A total volume of 163,403 gallons was discharged into the sanitary sewer over 6 hours. During both swab and airlift and pump development, M&A personnel measured water level, pumping rate, and the following parameters for the discharge water: turbidity, temperature, specific electrical conductance, pH, and sand production.



All 32-inch outside diameter casing is ASTM A53 Grade B low carbon steel, 0.375-inch wall thickness.
All 20 5/8-inch outside diameter blank HSLA steel casing is ASTM 139, A606 Type 4 high strength low alloy steel, 0.312-inch wall thickness.
All 20 5/8-inch outside diameter louvered SS casing is ASTM 778, 304L stainless steel, 0.312-inch wall thickness. Louvered casing is Roscoe Moss Ful-Flo.
All 20 5/8-inch outside diameter blank SS casing is ASTM 778, 304L stainless steel, 0.312-inch wall thickness.
The 2 7/8-inch outside diameter steel gravel feed tube is ASTM A53 Grade B low carbon steel, 0.276-inch wall thickness (schedule 80).

WELL: A(2-4)35abb	REGISTRATION: 55-222760
STATE: Arizona	COUNTY: Maricopa
LATITUDE: 33°28'48.1"N	LAND SURFACE ALT: 1227' msl
LONGITUDE: 111°55'1.6"W	CLIENT: City of Scottsdale
HORIZONTAL DATUM: NAD83	

Schematic Diagram of
Construction Modification for
City of Scottsdale Well 71A

Drafting\366.31\71A_ws_AsBuilt.dwg\08Apr2024

Figure 3. Post-Modification COS-71A Well Schematic

2.1.2 Step Test and Constant Rate Test

After development, the water level equilibrated overnight prior to the step-rate pumping test. The static depth to water level prior to the step test was 116.02 feet bls. On April 6, 2023, a step test was conducted from 300 to 600 gpm for 9 hours. The test was conducted at four different flow rates (steps) and the flow rate increased with each step. The average flow rates for the steps were: 300, 400, 500, and 600 gpm. A total of 254,470 gallons of water was pumped to the sanitary sewer during the step test. Step test depth to water measurements and pumping rates are shown on **Figure 4**.

Spinner logging under pumping conditions was conducted during the constant-rate pumping test. The constant-rate test for well COS-71A began on April 11, 2023, and was approximately 6.5 hours in duration. Pre-pumping water level was 117.11 feet bls. The pumping rate was held approximately constant at an average of 500 gpm. Maximum drawdown observed during the test was 118.48 feet (pumping water level of 235.59 feet bls). Measurements for depth to water level and pumping rate during the constant-rate test are shown on **Figure 5**.

During the step-rate test, M&A personnel measured water level, pumping rate, and the following parameters for the discharge water: turbidity, temperature, specific electrical conductance, pH, and sand production. During the constant-rate test, only pumping rate and depth to water level were measured because spinner flowmeter surveys and depth specific sampling were conducted concurrently.

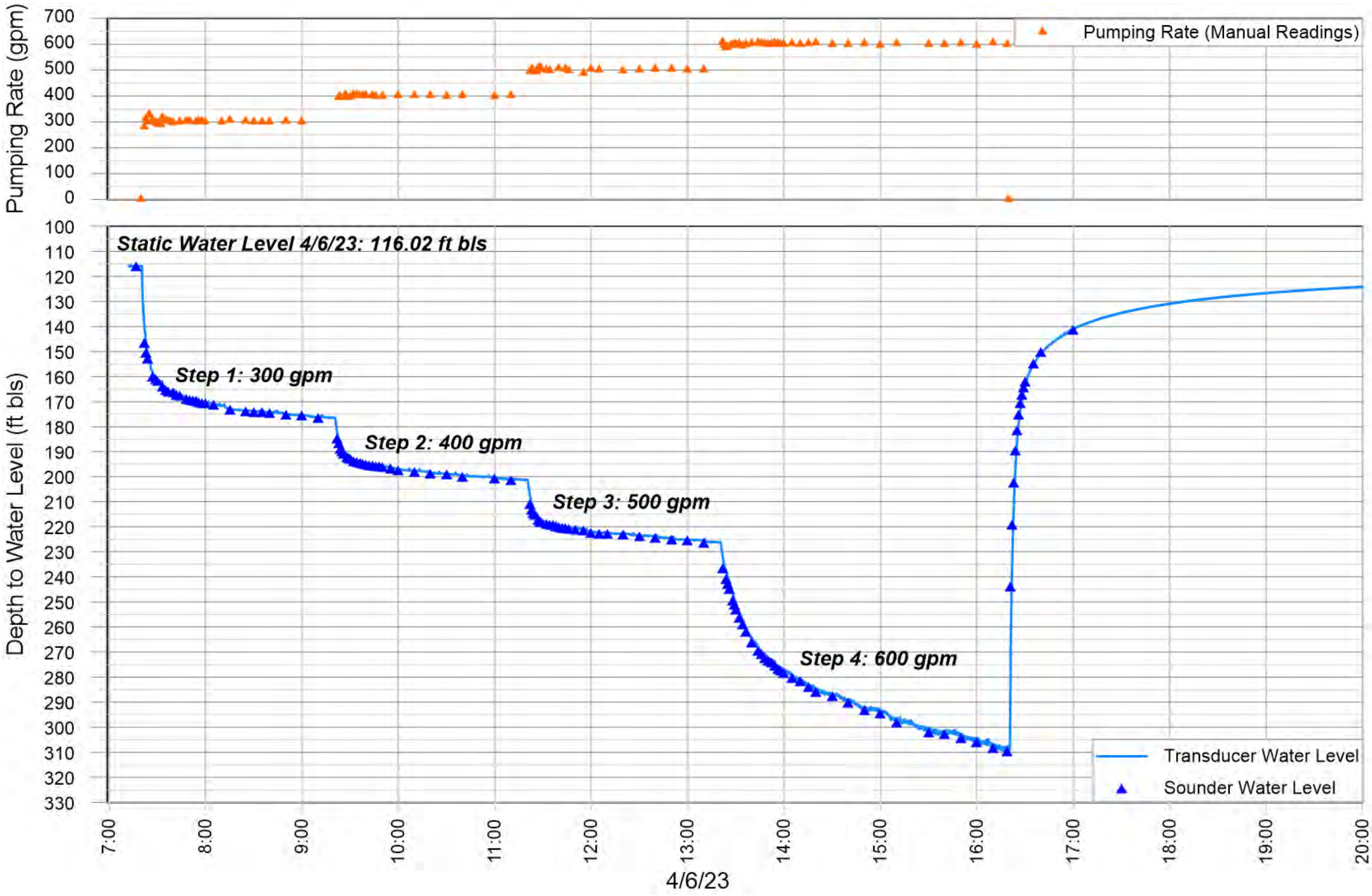


Figure 4. Pumping Water Level and Pumping Rate During COS-71A Step-rate Pumping Test

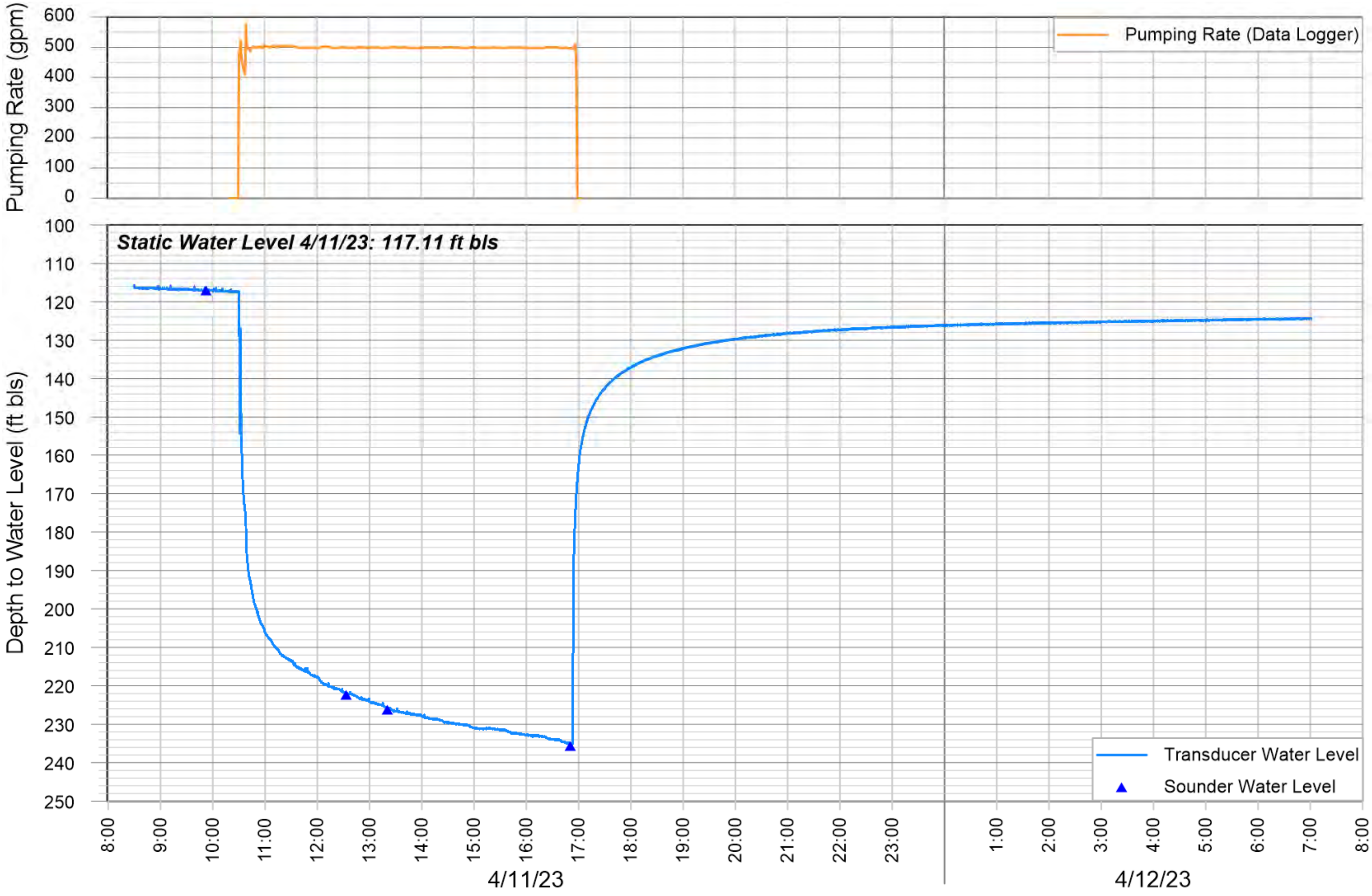


Figure 5. Pumping Water Level and Pumping Rate During COS-71A Constant Rate Test and Fluid Movement Investigations

2.1.3 Fluid Movement Investigations

On April 7, 2023, temperature, fluid conductivity, and spinner-flowmeter surveys were conducted by SWE under pumping conditions. The well was pumped for 2 hours prior to starting the spinner-flowmeter survey. During the spinner-flowmeter survey, the spinner tool became stuck at the bottom of the access pipe. The tool was eventually freed, but there was not enough time remaining in the day for sampling. Pumping water level varied between 223.01 and 229.57 feet bls during geophysical logging. Approximately 264,873 gallons were discharged to the sanitary sewer during pumping conditions.

On April 11, 2023, temperature, fluid conductivity, and spinner-flowmeter surveys were conducted by GeoLog under non-pumping conditions. Prior to logging, the static water level was measured at 117.66 feet bls. Following static logging, the pump was started and geophysical logging and depth-specific sampling were conducted under pumping conditions. The pump was operated for 3.5 hours prior to sampling. The flow rate was approximately 500 gpm and pumping water level varied between 221.77 and 235.06 feet bls for the duration of the pumping investigation. Water quality samples were collected at depths of 270, 375, 405, 420, and 455 feet bls. These depths were selected based on inflection points in the spinner-flowmeter data and depths previously sampled in 2014. Additionally, wellhead samples were collected before and after depth-specific sampling. Approximately 192,905 gallons were discharged to the sanitary sewer during testing.

Groundwater samples were analyzed for the NIBW COCs, trace metals, anions, cations, total hardness, total alkalinity, SiO_2, and total dissolved solids (TDS). In addition, the following field parameters were collected: pH, temperature, electrical conductivity, and turbidity.

2.1.4 Post-Testing Activities

After the fluid movement investigations were completed, Yellow Jacket removed the submersible pump and ancillary equipment. ENC removed the sound barriers. The site was cleaned after all field equipment was removed. The City of Scottsdale sewer discharge permit was closed out. In total, approximately 1,009,000 gallons of water was pumped to the sanitary sewer during development and testing.

A final video survey after modification and testing was conducted by SWE on April 19, 2023. Static water level was encountered at 116.8 feet bls. At 440.5 feet bls, either plugged perforations or settled debris in the louvers was observed. The top of soft fill at the bottom of the modified well was tagged at 509.4 feet bls.

Four drums of sediment waste generated during field activities were stored onsite. A composite sample was collected by the waste contractor, MP Environmental Services (MPE) and analyzed by Pace Analytical Services. The waste was characterized as non-hazardous. The non-hazardous waste profile was signed by the City of Scottsdale on May 31, 2023 and the drums were transported offsite by MPE to the Northwest Regional Landfill in Surprise, Arizona. The waste manifest is included in **Appendix D**.

A Driller's Report was submitted to ADWR on May 5, 2023 (**Appendix A**). A final site walk was conducted with the City of Scottsdale, M&A and Motorola Solutions, Inc. on July 6, 2023. No site concerns were identified.

2.2 COS-75A

2.2.1 Well Rehabilitation

Prior to rehabilitation, an initial video survey was conducted in April 2023 following removal of the dedicated pump. The static water level was encountered at 198.30 feet bls. From 204 feet bls to the bottom of the blank casing at 658 feet bls, moderate scaling and encrustations were observed. From the top of perforations at 658 feet bls to the observed bottom of the well at 1,261.60 feet bls, encrustations were visible with heavier buildup occurring with increasing depth. At multiple depths from 213.5 feet bls to the bottom of the well, metal bands from the pump were stuck on the side of the casing. The COS-75A well schematic is shown on **Figure 6**.

On May 30, 2023, Empire Pump began brushing the well screen from 658 to 1,250 feet bls. After brushing, 28 feet of material accumulated at the bottom of the well. On May 31, 2023, approximately 250 gallons of scale, sediment, water, and the metal bands were bailed from the well. Water quality parameters, including temperature, pH, specific conductance, oxidation reduction potential (ORP), and turbidity, were collected from the bailed water. Brushing and bailing continued until June 1, 2023.

2.2.2 Static Fluid Movement Investigations

On June 5, 2023, SWE conducted geophysical logging, including caliper, temperature, fluid conductivity, and spinner-flowmeter surveys under non-pumping conditions. Following spinner log analysis, groundwater samples were collected at depths of 620, 675, 950, 1,050, and 1,220 feet bls. These depths were selected based on depths sampled during previous fluid movement investigations and minor inflection points from the logs.

Groundwater samples were analyzed for NIBW COCs, organic compounds, inorganic compounds, and metals. Field parameters monitored included temperature, pH, specific conductance, ORP, turbidity, and dissolved oxygen.

2.2.3 Dynamic Fluid Movement Investigations

From June 6 to June 7, 2023, Empire Pump installed a line shaft turbine pump (Goulds DWT-14RJHC) with the intake set at 333 feet bls. A 3-inch PVC access pipe was installed to 336 feet bls for wireline geophysical tooling access. A 1.5-inch steel sounding tube was installed to 330 feet bls for the water level sounder and pressure transducer. A variable frequency driver VFD was installed to allow precise control of flow rates. Due to electrical malfunctions with the VFD, pumping started on June 12, 2023.

Overnight pumping was conducted from June 12 to June 13, 2023, at an average rate of 1,866 gpm. Because the pumped water could not be allocated into the distribution system for sanitation reasons, CGTF utilized a connection to the SRP network that discharges into the Indian Bend Pump Ditch (IBPD). COS coordinated with SRP and COS's Parks Group to discharge treated water from the CGTF to SRP's IBPD discharge point overnight. Pumping rates were measured using an in-line electromagnetic flowmeter and recorded manually. Prior to pumping, static water level was 200.87 feet bls. While onsite, M&A personnel measured water level, pumping rate, and the following parameters for the discharge water: turbidity, temperature, specific electrical conductance, pH, and sand production. Initial discharge was released into two 20-yard Baker tanks to reduce sand being introduced into the COS production line. Water level measurements and the pumping rate are shown on **Figure 7**.

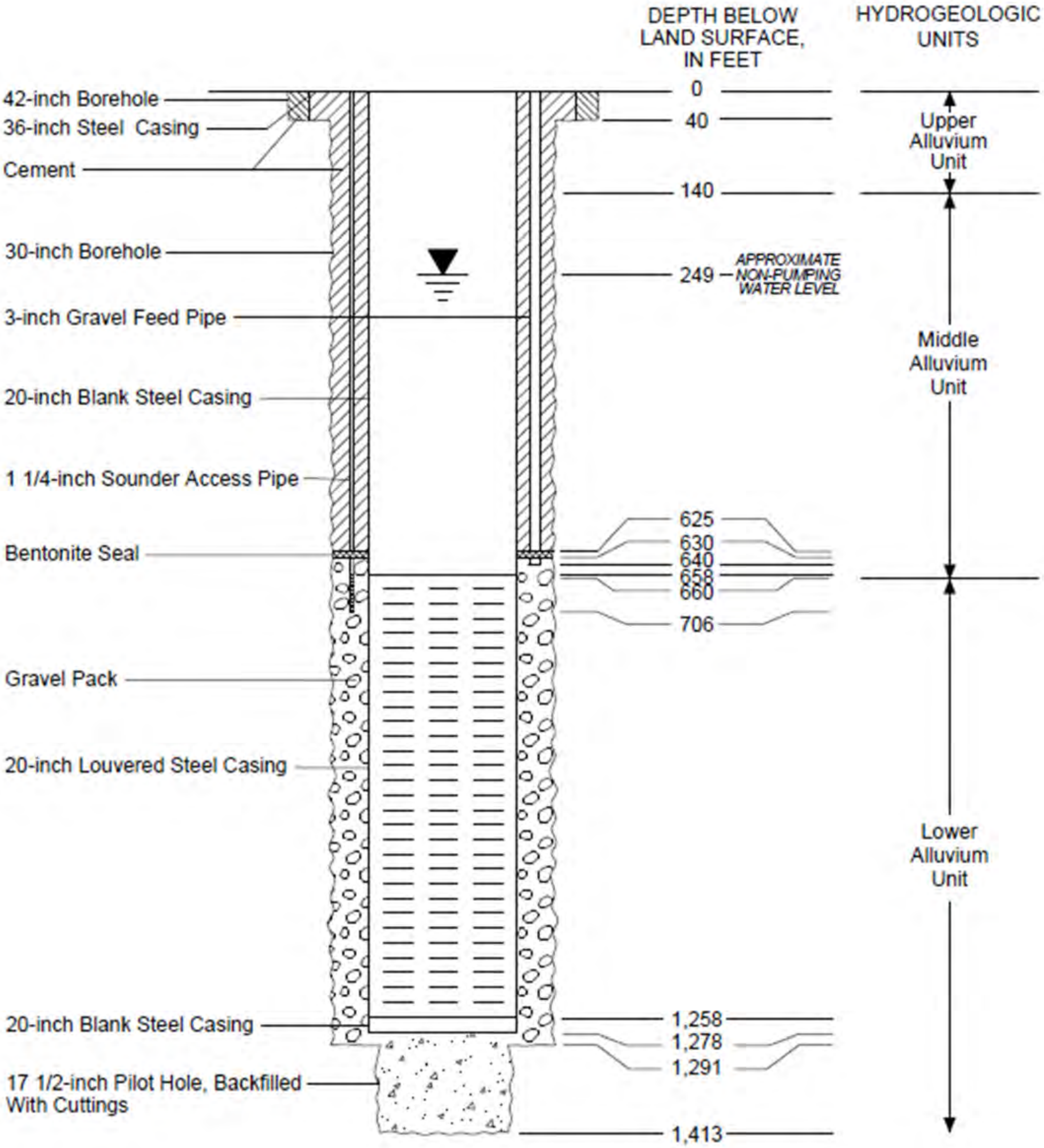


Figure 6. COS-75A Well Schematic

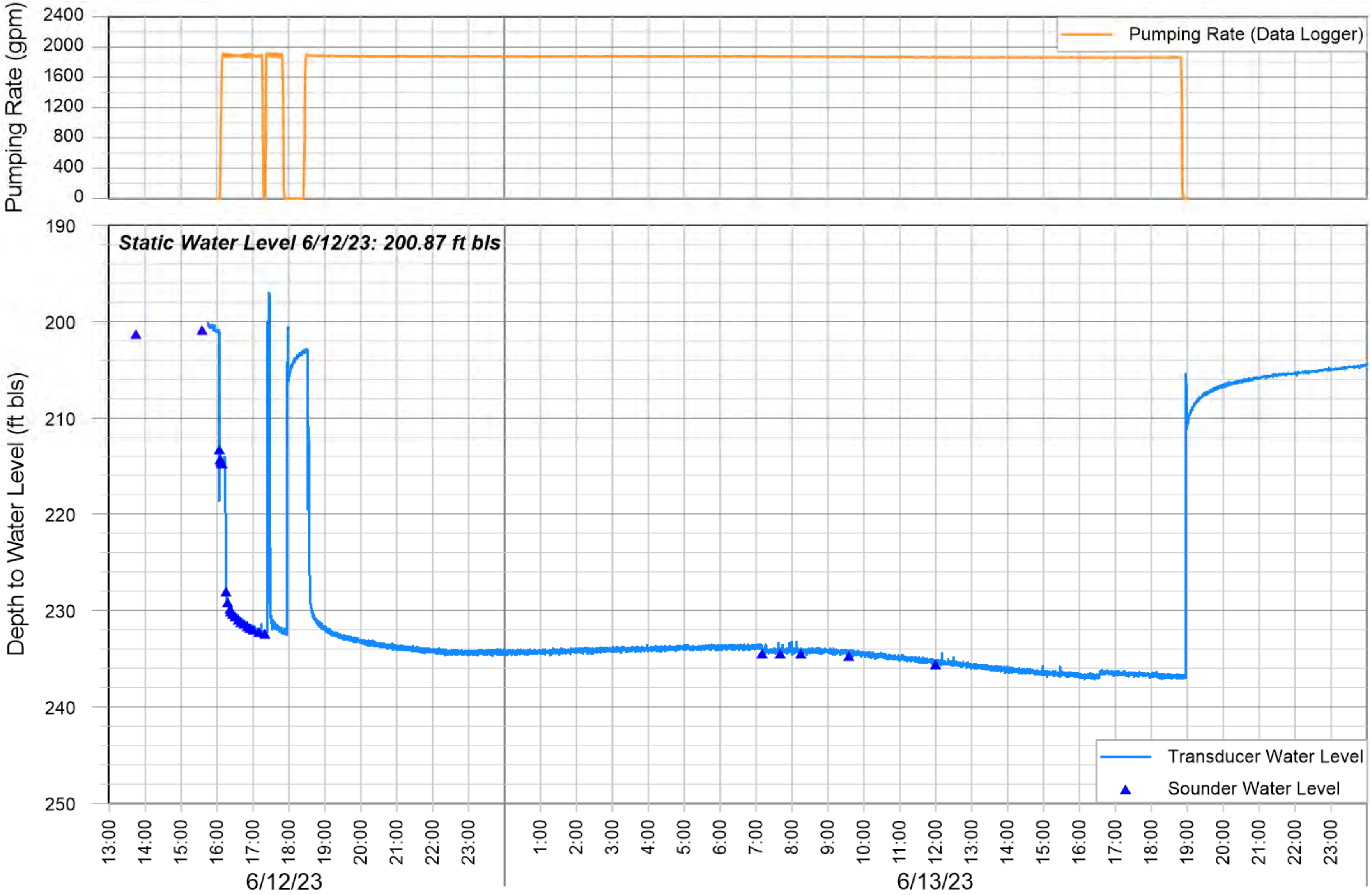


Figure 7. Pumping Water Level and Pumping Rate During COS-75A Fluid Movement Investigations

On the morning of June 13, geophysical logging including caliper, temperature, fluid conductivity, and spinner-flowmeter surveys was completed by GeoLog. Pumping water level varied between 234.27 and 236.87 feet bls during fluid movement investigations. Following log analysis, samples were collected at depths of 620, 675, 840, 950, 1,072, 1,185, and 1,220 feet bls. These depths were selected based on depths sampled during previous fluid movement investigations and minor inflection points from the logs. Additionally, wellhead samples were collected before and after depth-specific sampling.

Groundwater samples were analyzed for NIBW COCs, inorganic compounds, metals, and per- and polyfluoroalkyl substances (PFAS). Field parameters monitored included temperature, pH, specific electrical conductance, ORP, turbidity, and dissolved oxygen.

2.2.4 Post-Testing Activities

After the fluid movement investigations were completed, Empire Pump pumped water from the tanks back into the well while measuring turbidity. Sediment was given time to settle to the bottom of the tank prior to pumping. Approximately 2,929,000 total gallons of water was pumped to the COS-75A pipeline during rehabilitation and testing activities. The pump and ancillary equipment was removed and any residual oil in the well introduced by the turbine pump was removed by bailing. The site was cleaned after all field equipment was removed. A final site walk was conducted with the City of Scottsdale, M&A and Motorola Solutions, Inc. on July 6, 2023. No site concerns were identified.

Eight drums of sediment waste generated during field activities were stored onsite. A composite sample was collected by the waste contractor, MPE and analyzed by Eurofins in Phoenix. The waste was characterized as non-hazardous. The non-hazardous waste profile was signed by the City of Scottsdale on October 27, 2023 and the drums were transported offsite by MPE to the Northwest Regional Landfill in Surprise, Arizona. The waste manifest is included in **Appendix D**.

A final video survey was conducted by SWE on June 26, 2023. The static water level was encountered at 201.3 feet bls. Despite the long period of undisturbed conditions in the well, the water was relatively cloudy, making casing inspection difficult. Casing condition appears to have improved with brushing, but scale and encrustations are still present. The top of soft fill at the bottom of the well was tagged at 1,273.7 feet bls.

3 COS-71A PUMPING TEST RESULTS AND ANALYSES

Drawdown data collected for each step during the step-rate pumping test were adjusted to remove the residual drawdown from pumping during the previous steps. The specific capacity using the adjusted drawdown remained nearly constant for the first three steps but decreased significantly during the last step. Specific capacities after 2 hours of pumping were 4.98, 4.82, 4.92, and 3.58 gpm per foot of drawdown for the 300, 400, 500, and 600 gpm steps, respectively. Turbidity remained below 5 nephalometric turbidity units (NTUs) for most of the test and did not change with flow rate. Average sand production for the entire step test was 0.3 parts per million.

Specific capacity after 6.5 hours of pumping at the end of the 500 gpm constant rate test was 4.22 gpm per foot of drawdown. Field parameters throughout the test were not monitored at the wellhead, but the final turbidity at the wellhead at the end of the constant rate test was 1.95 NTU.

3.1 Aquifer Hydraulic Properties

Aquifer hydraulic properties that control rate of groundwater movement and amount of groundwater storage in the aquifer include transmissivity, specific yield, specific storage, and storage coefficient. Transmissivity is defined as the rate of groundwater movement under a 1:1 hydraulic gradient through a vertical section of an aquifer 1 foot wide and extending the full saturated thickness of the aquifer (Theis, 1935). Units for transmissivity are feet squared per day (ft^2/day). Specific yield is defined as the volume of water that would drain under gravity from a unit volume of aquifer material and is dimensionless; this term is applicable to unconfined or “water table” aquifers. Specific storage is defined as the volume of water that a unit volume of aquifer releases from storage under a unit decline in hydraulic head; this term has units of $foot^{-1}$ (ft^{-1}) and is generally applied to confined aquifers. Storage coefficient is defined as the product of specific storage and saturated thickness of the aquifer and is dimensionless.

Results of testing indicate that the sediments yielding groundwater to COS-71A exhibit characteristics of a confined aquifer. Water level data obtained during the constant-rate pumping test were analyzed for transmissivity using multiple methods, including: a) drawdown data were analyzed using the semi-logarithmic graphical method developed by Cooper and Jacob (1946) for an confined aquifer; and b) water level recovery data were analyzed for transmissivity using the Theis (1935) recovery method, by which the residual drawdown remaining is plotted versus the ratio t/t', where "t" is the time after pumping started and "t’" is the time after pumping stopped. Analyses were conducted via the software program AQTESOLV (HydroSOLVE, 2012). Calculated transmissivity was approximately 550 and 700 ft^2/day using the Cooper and Jacob (1946) drawdown analysis and the Theis (1935) recovery method, respectively. AQTESOLV results are provided in **Appendix E**.

4 GEOPHYSICAL LOGGING RESULTS

In addition to the most recent fluid-movement investigation conducted in 2023 at wells COS-71A and COS-75A, similar investigations were also completed at well COS-71A in May 2014 (M&A, 2015), and at well COS-75A in February 1996, October 1998, October 2003, and April 2011 (M&A, 2011).

4.1 COS-71A Survey Results

During the previous fluid movement investigation in 2014, the bottom of the casing was 802 feet bls and perforated in both the MAU and LAU. The 2014 investigation was conducted at three different flow rates: 1,000 gpm, 2,000 gpm, and 3,000 gpm. The pump intake was set at 537 feet bls, so all water from the MAU was travelling down toward the pump, and all water from the LAU was travelling up toward the pump.

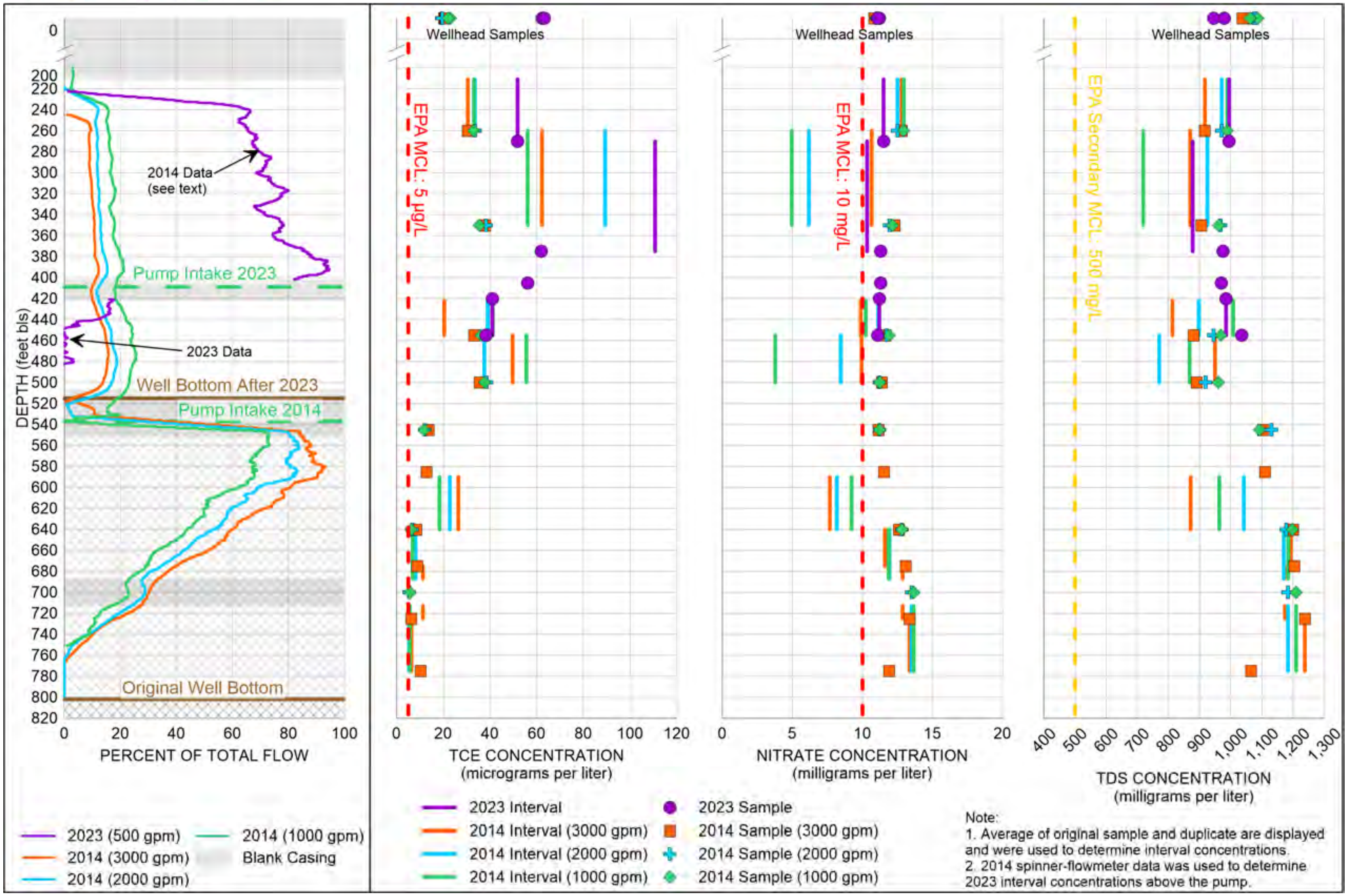
During the 2014 investigation, most of the flow entered the well from the LAU from 585 to 760 feet bls, which contributed between 75% and 84% of the total flow into the well depending on the flow rate. In the MAU, most of the flow was from 220 to 240 feet bls. Some flow entered the well from 422 to 455 feet bls, and from 240 to 402 feet bls. No measurable flow entered the well from 455 to 507 feet bls. Percent of total flow into the well with depth during all fluid movement investigations is shown on **Figure 8**.

Because of the 2023 modification, during the 2023 fluid movement investigation the well was only pumping from the MAU. The pump intake was set at 409 feet bls, therefore water above the pump from 211 to 402 feet bls travelled down toward the pump. Water below the pump from 422 to 507 feet bls travelled up toward the pump.

For the 2023 investigation, the SWE data were used for analysis because tool line speeds were more consistent than GeoLog. During the 2023 investigation most of the flow (about 300 gpm, unit flow rate of about 10 gpm per foot of screen) entered the well in the uppermost interval from 211 to 240 feet bls. From 240 to 402 feet bls, about 110 gpm entered the well, with a unit flow rate of about 0.68 gpm per foot of screen. From 422 to 455 feet bls, approximately 90 gpm entered the well, with a unit flow rate of approximately 2.7 gpm per foot of screen. There was no measurable flow entering the well from 455 to 507 feet bls. Flow into the well and temperature with depth during the 2023 investigations is shown on **Figure 9**. Flow into the well with depth had not changed significantly between the 2014 and 2023 investigations, as the flow profile in 2023 is comparable to the profiles from 2014. Spinner-flowmeter surveys under non-pumping conditions in 2023 showed no measurable vertical flow within the MAU in the well. This indicates vertical flow is either not occurring within the well or is occurring below the flowmeter detection limit, which is about 80 gpm in a 20-inch inside diameter well.

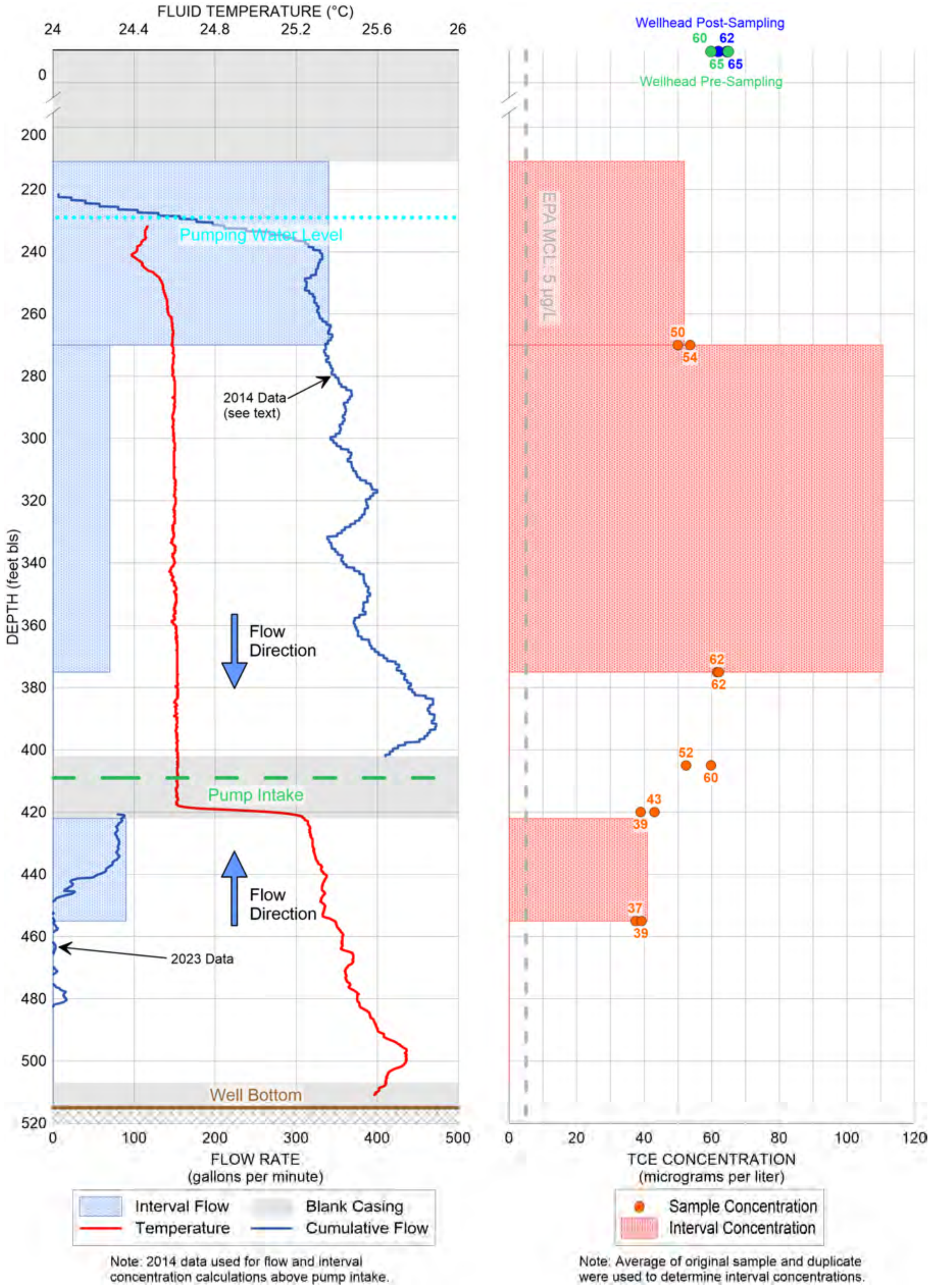
Results from both pumping and non-pumping geophysical logging during the 2023 investigations can be found in **Appendix F**.

Trends in the spinner-flowmeter data above the pump from the 2023 investigation indicated the data were likely not representative of actual total flow rate within the well. This may have been due to an insufficient number of perforations in the access pipe, and/or the access pipe was not large enough in diameter. Because of the poor quality of the 2023 data within the access pipe, the 2014 data was used for interpretation of flow above the pump.



Note:
1. Average of original sample and duplicate are displayed and were used to determine interval concentrations.
2. 2014 spinner-flowmeter data was used to determine 2023 interval concentrations above the pump.

Figure 8. Concentration of Select Constituents and Percent of Total Flow with Depth at COS-71A for 2023 and 2014 Fluid Movement Investigations During Pumping



Note: 2014 data used for flow and interval concentration calculations above pump intake.

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

Figure 9. Interpretation of COS-71A Interval Specific Flow Rates and TCE Concentrations, April 2023

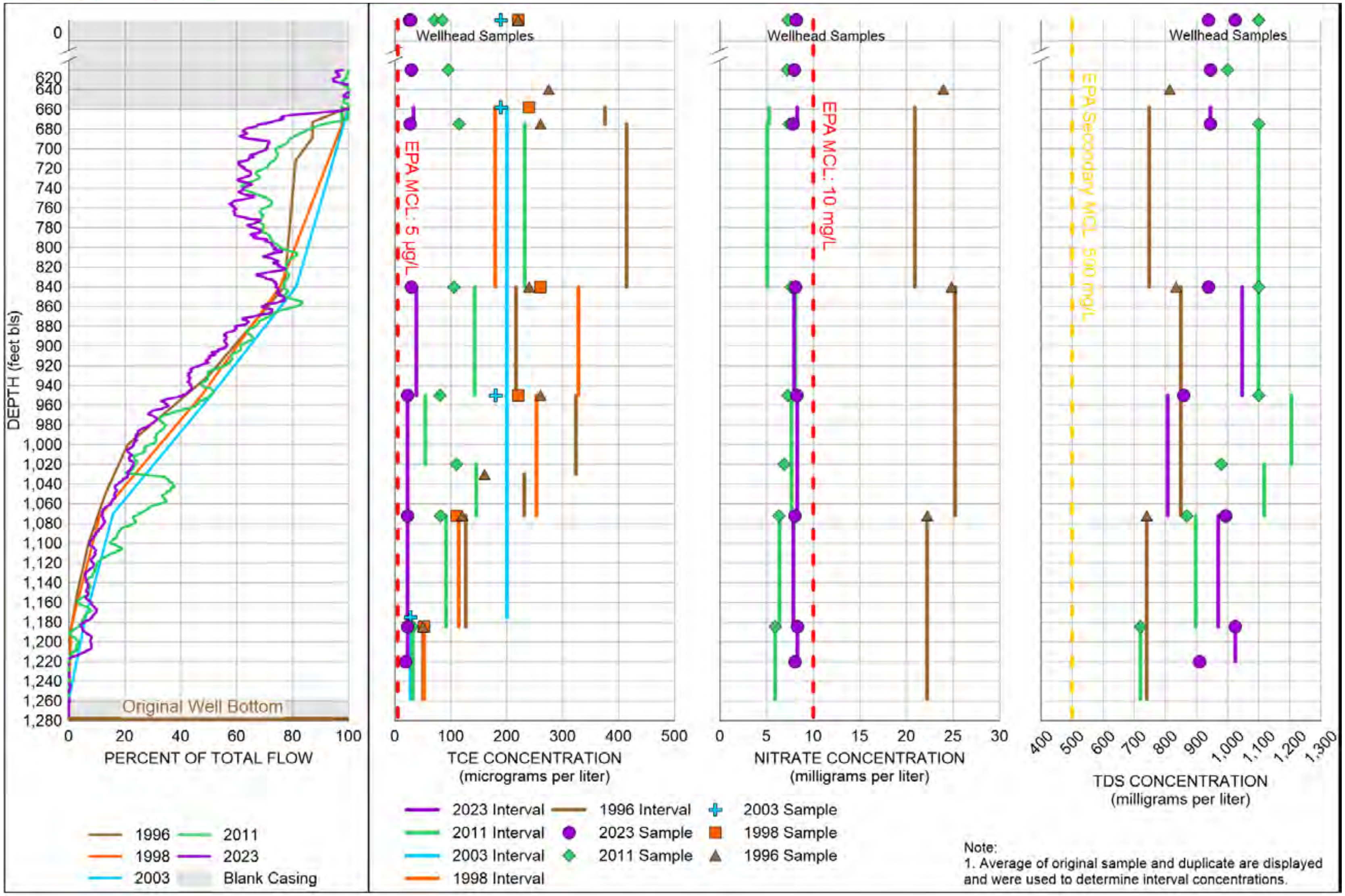
4.2 COS-75A Survey Results

There have been no modifications to the perforated interval of well COS-75A; thus all fluid movement investigations were conducted within the LAU. The pump was set above the perforations during each investigation, so all water entering the well was travelling up toward the pump.

The flow profiles of all the fluid movement investigations during pumping conditions are very similar, except the interval between 658 and 840 feet bls, which is further discussed below. From 658 to 675 feet bls there was flow consistently entering the well at a unit flow rate of about 29 gpm per foot of screen. From 675 to 850 feet bls there was little to no flow during the 2023, 2011, and 1996 investigations, but there appears to have been flow during the 2003 and 1998 investigations. However, this apparent flow is likely due to the 675 to 850 feet bls interval being combined with the 658 to 675 feet bls interval during the 2003 and 1998 investigations. From 850 to 1,220 feet bls, flow entered the well at a decreasing rate with increasing depth. For example, during the 2023 investigations the unit inflow flow rate between 850 and 950 feet bls was 5.9 gpm per foot of screen, compared to 1.5 gpm per foot of screen between 1,072 and 1,220 feet bls. From 1,220 feet bls down to the bottom of the screen at 1,258 feet bls, no measurable flow entered the well. The percentage of total flow into the well with depth during all fluid movement investigations is shown on **Figure 10**. Flow into the well and temperature with depth during the 2023 investigation is shown on **Figure 11**.

Spinner-flowmeter surveys conducted under non-pumping conditions in both 2011 and 2023 did not show measurable vertical flow within the well. However, temperature logs collected during the 2011 and 2023 fluid movement investigations may indicate the presence of some downward vertical flow. In a well with no vertical flow, the temperature of water typically increases at a consistent rate with depth, due to the geothermal gradient. Any variations in this increasing temperature may indicate vertical flow within the well. At COS-75A, temperature increases from static water level to the top of the perforations at 658 feet bls, likely due to the geothermal gradient. Temperature from 658 to 950 feet bls remains relatively constant, which may indicate water entering the well near the top of the perforations and travelling downward, with little to no water entering the well in the rest of the interval. There is an increase in temperature from 950 to 1,050 feet bls which may indicate water entering the well in this interval and travelling downward to 1,225 feet bls, due to a constant temperature between 1,050 and 1,225 feet bls.

Results from both pumping and non-pumping geophysical logging during the 2023 investigation can be found in **Appendix G**.



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

Figure 10. Concentration of Select Constituents and Percent of Total Flow with Depth at COS-75A for 2023, 2011, 2003, 1998, and 1996 Fluid Movement Investigations During Pumping

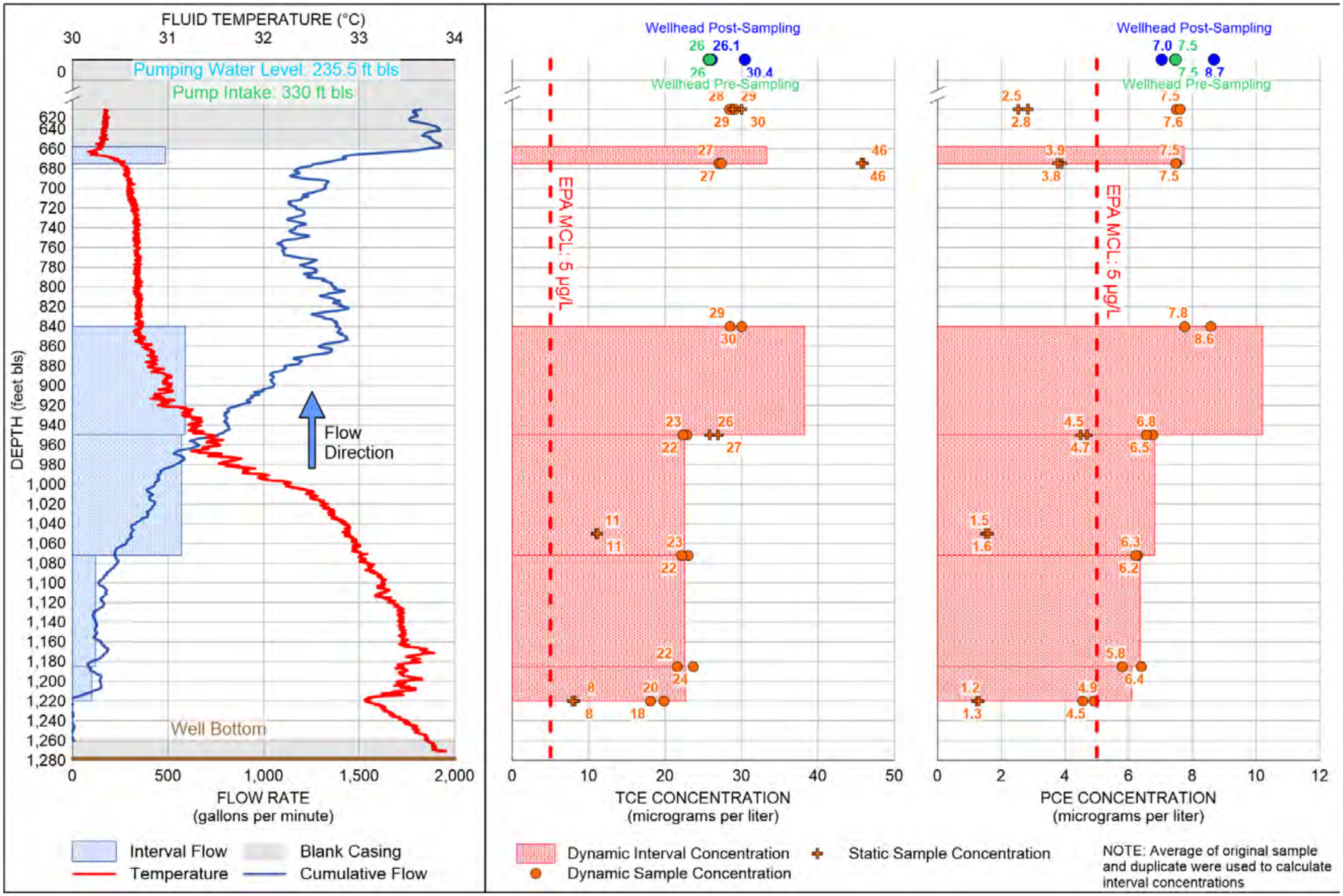


Figure 11. Interpretation of COS-75A Interval Specific Flow Rates and Concentrations of TCE and PCE, June 2023

5 DEPTH SPECIFIC GROUNDWATER SAMPLING

During fluid movement investigations, samples were collected at COS-71A and COS-75A using a depth-specific sampling tool. Field parameters of each sample are shown in **Table 1**.

Table 1. Field Water Quality Parameters at COS-71A and COS-75A during 2023 Fluid Movement Investigations

Sample Information				Parameter Values				
Well ID	Pumping Condition	Sample Depth (feet bls)	Sample Date and Time	pH [Field] (s.u.)	Temperature [Field] (ºC)	Specific Conductance [Field] (µS/cm)	TDS [Lab] (mg/L)	Turbidity (NTU)
COS-71A	Pumping	Wellhead	4/11/23 13:50	7.6	28	1,764	945	7.7
		Wellhead	4/11/23 16:45	7.6	25	1,740	980	2.0
		270	4/11/23 16:25	7.8	26	1,750	995	3.5
		375	4/11/23 15:55	7.8	27	1,737	975	5.2
		405	4/11/23 15:20	7.8	27	1,737	970	4.2
		420	4/11/23 14:55	7.8	26	1,790	985	4.0
		455	4/11/23 14:15	7.7	26	1,809	1,035	6.1
COS-75A	Non-Pumping	620	6/5/23 17:55	7.3	29	1,339	128	95
		675	6/5/23 17:10	7.4	31	1,283	110	450
		950	6/5/23 16:25	7.4	32	1,707	166	120
		1,050	6/5/23 15:30	7.4	34	1,656	148	140
		1,220	6/5/23 14:40	7.4	35	1,760	172	55
	Pumping	Wellhead	6/13/23 13:25	7.4	32	1,707	940	1.8
		Wellhead	6/13/23 18:30	7.4	30	1,185	1,025	2.4
		620	6/13/23 13:30	7.6	33	1,693	945	7.8
		675	6/13/23 14:25	7.4	32	1,703	945	9.6
		840	6/13/23 15:15	7.3	31	1,693	940	5.1
		950	6/13/23 17:50	7.6	31	1,678	860	7.0
		1,072	6/13/23 16:10	7.7	31	1,682	995	7.1
		1,185	6/13/23 18:55	7.5	30	1,672	1,025	6.2
		1,220	6/13/23 17:00	7.5	32	1,679	910	11

EXPLANATION:

s.u. = standard units
ºC = degrees Celsius
µS/cm = microSiemens per centimeter
mg/L = milligrams per liter

5.1 Interval Analysis

Discrete samples were collected during pumping conditions at COS-71A and COS-75A, and non-pumping conditions at COS-75A. During non-pumping conditions, where no vertical flow is documented, discrete depth samples are considered representative for groundwater in the aquifer at their specific depths. However, during pumping conditions, a sample collected below the pump intake is assumed to be a mixture of all water from the sample point and below, whereas a sample collected above the pump intake is assumed to be a mixture of all water from the sample point and above. Concentrations of a given constituent in these cumulative samples can be divided into interval concentrations using the constituent concentration of an adjacent sample. 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 (upstream) depth sampled

C_m = concentration at the adjacent (upstream) depth sampled

Each interval is bounded by samples obtained at the top and bottom of the interval. The COS-71A pump was set at 409 feet bls, so any sample above would be a mixture of the water at and above that sampling depth. Whereas any sample below the pump would be a mixture of the water at and below that sampling depth. In COS-75A, the pump intake was above all the depth-specific samples collected and all water entering the well was assumed to be flowing upward, so each sample is a mixture of all water that has entered the well at and below that sampling depth. In this analysis, original and duplicate depth specific samples were averaged.

Where interval flow rates were negligible, interval concentrations were not calculated. It is assumed that the mass of constituents added to the well in these zones of little to no flow is negligible.

5.2 COS-71A Sample Results

COS-71A had samples analyzed for the following key constituents: NIBW COCs; anions; cations; metals; and alkalinity. In the sections below, concentrations detected above the Environmental Protection Agency (EPA) primary Maximum Contamination Level (MCL) for constituents analyzed are further discussed. Primary MCLs are enforceable standards, while secondary MCLs are unenforceable aesthetic considerations that affect taste, color, odor, etc.

5.2.1 Volatile Organic Compounds

The NIBW COCs analyzed include the following volatile organic compounds: 1,1,1-TCA, 1,1-DCE, chloroform, PCE, and TCE. There were no detections of 1,1,1-TCA and 1,1-DCE. chloroform and PCE were detected below the EPA MCL for each sample depth. Results of lab analyses for COCs are shown in **Table 2**.

In all samples collected, TCE was detected above the EPA MCL of 5.0 micrograms per liter (µg/L). TCE concentration calculated for the interval from 270 to 375 feet bls was the highest, at 111 µg/L. Of the zones that contributed flow, the zone with the lowest interval TCE concentration was from 422 to 455 feet bls, at 41.0 µg/L. Calculated interval TCE concentrations for the 2023 fluid movement investigations are shown on **Figure 9** and in **Table 3**.

Because the pump was set within the screened interval, there was no single depth-specific sample that could be collected that would be a mixture of all water within the well to compare to the wellhead sample. To compare depth-specific samples with wellhead samples, a mass balance was conducted to calculate the concentration of the mixture of all water within the well from the depth-specific samples. Concentrations and cumulative flow rates at the sample depths 405 and 420 feet bls were used for the mass balance, which is assumed to represent all water entering the well from above the pump and all water entering the well from below the pump, respectively. The calculated concentration of the mixture of all water within the well was 53.3 µg/L, whereas the wellhead concentration was 62.3 µg/L prior to depth-specific sampling, and 63.3 µg/L after depth-specific sampling. This difference may be a result of lab variability, as the original sample at 405 feet bls had a concentration of 52.4 µg/L, whereas the duplicate had a concentration of 59.8 µg/L.

Interval TCE concentrations during the 2014 investigation have a similar trend with depth but were lower than for the 2023 investigation. Due to the well modification, samples were not obtained in 2023 at depths greater than 507 feet bls. Wellhead concentrations of TCE are significantly higher during the 2023 investigation compared to the 2014 investigation because the modification constrained pumping to the MAU, where TCE concentrations are higher than in the LAU. Interval TCE concentrations during all fluid movement investigations are shown on **Figure 8**.

Table 2. Results of Lab Analysis for COCs during COS-71A Fluid Movement Investigations, April 2023

Sample Information			COCs (µg/L)				
Sample Depth (feet bls)	Sample Date and Time	Sample Type	1,1,1-Trichloroethane (TCA)	1,1- Dichloroethene (1,1-DCE)	Chloroform	Tetrachloroethylene (PCE)	Trichloroethylene (TCE)
Wellhead	4/11/23 13:50	Original	<0.50	<0.50	0.76	0.82	59.8
		Duplicate	<0.50	<0.50	0.82	0.87	64.8
Wellhead	4/11/23 16:45	Original	<0.50	<0.50	0.81	0.81	62.0
		Duplicate	<0.50	<0.50	0.80	0.83	64.5
270	4/11/23 16:25	Original	<0.50	<0.50	0.80	0.60	50.0
		Duplicate	<0.50	<0.50	0.87	0.60	53.6
375	4/11/23 15:55	Original	<0.50	<0.50	0.83	0.71	61.6
		Duplicate	<0.50	<0.50	0.80	0.81	62.1
405	4/11/23 15:20	Original	<0.50	<0.50	0.76	0.70	52.4
		Duplicate	<0.50	<0.50	0.89	0.74	59.8
420	4/11/23 14:55	Original	<0.50	<0.50	1.06	0.67	43.0
		Duplicate	<0.50	<0.50	1.05	0.69	38.9
455	4/11/23 14:15	Original	<0.50	<0.50	1.05	0.68	37.4
		Duplicate	<0.50	<0.50	1.06	0.65	39.1

NOTE:

1) Concentrations above the EPA primary MCL are noted in **bold**

Table 3. Calculated Interval Concentrations of Select Constituents during 2023 COS-71A Fluid Movement Investigations

Interval (feet bls)	Sample Depth[(1)] (feet bls)	Interval Flow Rate (gpm)	Interval TCE (µg/L)	Interval Nitrate	Interval TDS (mg/L)
211 - 507	Wellhead Pre-sampling	500	62.3	11.2	945
211 - 507	Wellhead Post-sampling	500	63.3	11.1	980
211 - 270	270	340	51.8	11.5	995
270 - 375	375	70	111	10.3	878
375 - 402	405	0	NA	NA	NA
422 - 455	420	90	41.0	11.2	985
455 - 507	455	0	NA	NA	NA

NOTE:

NA = not applicable

5.2.2 Inorganic Compounds

COS-71A samples were analyzed for inorganic compounds and metals (total and dissolved). The following analytes were below laboratory reporting limits in any wellhead or depth-specific samples:

- carbonate alkalinity (as $CaCO_3$)
- nitrite (as N) {total}
- aluminum {dissolved}
- antimony {total & dissolved}
- beryllium {total & dissolved}
- cadmium {total & dissolved}
- cobalt {total & dissolved}
- iron {dissolved}
- lead {dissolved}
- molybdenum {total & dissolved}
- thallium {total & dissolved}
- thorium {total & dissolved}
- vanadium {dissolved}

All other constituents had results above the laboratory's reporting limit and are shown in **Table 4**. Select constituents of interest for COS water supply are discussed in the following subsections.

Table 4. Results of Lab Analysis for Inorganic Compounds and Metals during COS-71A Fluid Movement Investigations, April 2023

Sample Information		Detected Inorganics and Metals (mg/L)																					
Sample Depth (feet bls)	Sample Date and Time	Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity	Hardness (as $CaCO_3$)	Calcium		Magnesium		Sodium		Potassium		Chloride	Fluoride	Nitrate (as N)	Sulfate	Aluminum	Arsenic		Barium		Boron	
					TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	TOT	TOT	TOT	TOT	TOT	DIS	TOT	DIS	TOT	DIS
Wellhead	4/11/2023 13:50	190	190	367	69.0	72.7	47.4	47.8	187	217	6	6	339	0.47	11.2	141	0.024	0.0043	0.0038	0.0794	0.0795	0.53	0.55
Wellhead	4/11/2023 16:45	194	194	361	68.7	71.5	46.0	46.0	188	195	6	6	345	0.47	11.1	141	0.051	0.0042	0.0039	0.0854	0.0779	0.52	0.55
270	4/11/2023 16:25	196	196	373	70.8	73.0	47.7	47.4	184	191	6	6	347	0.46	11.5	144	0.076	0.0052	0.0043	0.0851	0.0831	0.53	0.58
375	4/11/2023 15:55	194	194	367	69.6	71.8	46.9	47.1	185	193	6	6	345	0.47	11.3	143	0.079	0.0062	0.0044	0.0856	0.0823	0.52	0.55
405	4/11/2023 15:20	198	198	371	70.4	72.0	47.5	47.5	186	196	6	6	346	0.47	11.3	142	0.034	0.0051	0.0043	0.0821	0.0807	0.51	0.53
420	4/11/2023 14:55	212	212	414	76.9	73.1	54.0	50.2	226	200	7	6	341	0.46	11.2	147	0.048	0.0037	0.0039	0.0859	0.0827	0.58	0.60
455	4/11/2023 14:15	224	224	382	69.4	72.7	50.6	50.5	192	221	6	6	343	0.46	11.1	150	0.065	0.0043	0.0029	0.0873	0.0851	0.62	0.64

Sample Information		Detected Inorganics and Metals (mg/L)																					
Sample Depth (feet bls)	Sample Date and Time	Bromide	Chromium		Copper		Iron	Lead	Manganese		Nickel		Selenium		Silica		Strontium		Uranium		Vanadium	Zinc	
		TOT	DIS	TOT	TOT	DIS	TOT	TOT	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	TOT	DIS
Wellhead	4/11/2023 13:50	0.53	0.55	0.25	0.0061	0.0026	0.127	0.0012	0.0033	0.0031	0.0055	0.0044	0.0029	0.0028	30.2	31.9	1.25	1.27	0.0161	0.0159	<0.010	0.085	0.059
Wellhead	4/11/2023 16:45	0.52	0.55	0.25	0.0084	0.0030	0.567	0.0021	0.0113	0.0023	0.0044	0.0030	0.0027	0.0028	30.0	30.9	1.23	1.25	0.0159	0.0150	<0.010	0.101	0.046
270	4/11/2023 16:25	0.53	0.58	0.25	0.0117	0.0038	0.252	0.0253	0.0108	0.0052	0.0043	0.0014	0.0029	0.0028	30.7	31.5	1.27	1.28	0.0162	0.0162	<0.010	0.560	0.033
375	4/11/2023 15:55	0.52	0.55	0.25	0.0143	0.0040	0.450	0.0346	0.0201	0.0061	0.0048	0.0016	0.0028	0.0027	30.4	31.2	1.25	1.26	0.0159	0.0157	0.010	0.759	0.034
405	4/11/2023 15:20	0.51	0.53	0.25	0.0119	0.0039	0.321	0.0042	0.0207	0.0072	0.0045	0.0020	0.0027	0.0028	30.9	31.4	1.26	1.26	0.0158	0.0158	<0.010	0.121	0.034
420	4/11/2023 14:55	0.58	0.6	0.25	0.0131	0.0026	0.323	0.0100	0.0277	0.0131	0.0160	0.0105	0.0021	0.0028	35.1	32.4	1.39	1.33	0.0186	0.0170	<0.010	0.210	0.045
455	4/11/2023 14:15	0.62	0.64	0.24	0.0252	0.0021	0.461	0.0123	0.0389	0.0288	0.0485	0.0430	0.0029	0.0028	31.5	32.7	1.37	1.35	0.0186	0.0181	<0.010	0.247	0.070

EXPLANATION:

TOT = total
DIS = dissolved

NOTES:

1) Non-detect samples are denoted with "<" and the laboratory's minimum detection limit. Non-detects are also shown in gray.
2) Concentrations above the EPA primary MCL are noted in bold.
3) All samples are originals and no duplicates were collected for inorganics. All COS-71A samples were collected under pumping conditions.

5.2.2.1 Nitrate

During the 2023 investigations, nitrate concentrations at all sample depths were greater than the EPA MCL of 10 mg/L. The maximum calculated interval concentration was 11.5 mg/L from 211 to 270 feet bls and the minimum calculated interval concentration was 10.3 mg/L from 270 to 375 feet bls. Nitrate concentrations were relatively homogeneous with depth. Any slight differences in nitrate concentrations with depth are likely within the margin of error of the survey and laboratory analysis methods. Interval concentrations of nitrate for the 2023 investigation are presented in **Table 3**.

Nitrate concentrations at the wellhead were similar during the 2014 investigation but were slightly less homogeneous with depth. The maximum calculated interval concentration was 13.5 mg/L from 713 to 775 feet bls, and the minimum calculated interval concentration was 3.8 mg/L from 455 to 500 feet bls. Nitrate concentrations in groundwater from well COS-71A has been above the EPA MCL since the well was constructed in 2014 Interval concentrations of nitrate for all fluid movement investigations are shown on **Figure 8**.

5.2.2.2 Lead

During the 2023 investigation, total lead was detected above the EPA MCL of 0.015 mg/L in the samples obtained from 270 and 375 feet bls. The maximum concentration detected was 0.0346 mg/L at 375 feet bls, whereas the minimum concentration detected was 0.0012 mg/L at the pre-sampling wellhead; however, the minimum sample depth concentration was 0.0042 mg/L at 405 feet bls. Both samples that exceeded the MCL were collected above the pump intake, but there is not a clear trend in concentration with depth. Dissolved lead concentrations were non-detect for all sample depths and at the wellhead.

Total lead concentrations in 2014 were non-detect in all wellhead and depth-specific samples, except the sample collected at 211 feet bls while the well was pumping at 1,000 gpm. In this sample, lead was detected at a concentration of 0.0024 mg/L.

5.2.2.3 TDS

During the 2023 investigation, TDS concentration was above the EPA secondary MCL of 500 mg/L at all sample depths. The maximum calculated interval concentration was 995 mg/L from 211 to 270 feet bls, and the minimum calculated interval concentration was 878 mg/L from 270 to 375 feet bls. Interval concentrations of TDS for the 2023 investigation are given in **Table 3**.

TDS concentrations are similar and show a similar trend during the 2014 investigation. The highest interval TDS concentration was 1,238 mg/L from 725 to 775 feet bls within the LAU, which was sealed from the well during the 2023 modification. Interval concentrations of TDS for all fluid movement investigations are shown on **Figure 8**.

5.3 COS-71A Comparison with Nearby Wells

There are no MAU monitoring wells in the direct vicinity of COS-71A; the nearest MAU monitoring wells are PA-12MA, PG-55MA, and M-12MA2. **Figure 12** shows the perforated intervals of PA-12MA, PG-55MA, M-12MA2, and COS-71A along a SW to NE section (Location of section is shown on **Figure 1**).

PA-12MA is approximately 1,800 feet hydraulically downgradient from and to the southwest of COS-71A and is perforated from 983 to 923 feet above mean sea level (amsl) (60-foot screen). TCE concentration at PA-12MA on April 4, 2023 was 250 µg/L. PG-55MA is approximately 1,900 feet to the northeast of COS-71A and is perforated from 706 to 656 feet amsl (50-foot screen). PG-55MA is hydraulically upgradient from COS-71A. TCE concentration at PG-55MA on October 17, 2022 was 2.5 µg/L. M-12MA2 is approximately 2,700 feet hydraulically upgradient from and to the northeast of COS-71A and is perforated from 978 to 929 feet amsl (49-foot screen). TCE concentration at M-12MA2 on July 7, 2023 was 6.2 µg/L. After the 2023 modification, COS-71A is perforated from 1,016 to 720 feet amsl (296-foot screen). The April 11, 2023 calculated TCE concentration was 111 µg/L in the 957 to 852 feet amsl interval at COS-71A.

The interval in COS-71A from 957 to 852 feet amsl is projected to be in a similar hydrogeologic position as the perforated intervals of PA-12MA and M-12MA2, and TCE concentrations within this interval in COS-71A support the lateral concentration gradient shown on **Figure 1** along cross section A-A'. However, the variability of interval concentrations with depth in COS-71A and concentrations in PG-55MA compared with those in PA-12MA and M-12MA2 highlights the vertical heterogeneity of the MAU plume.

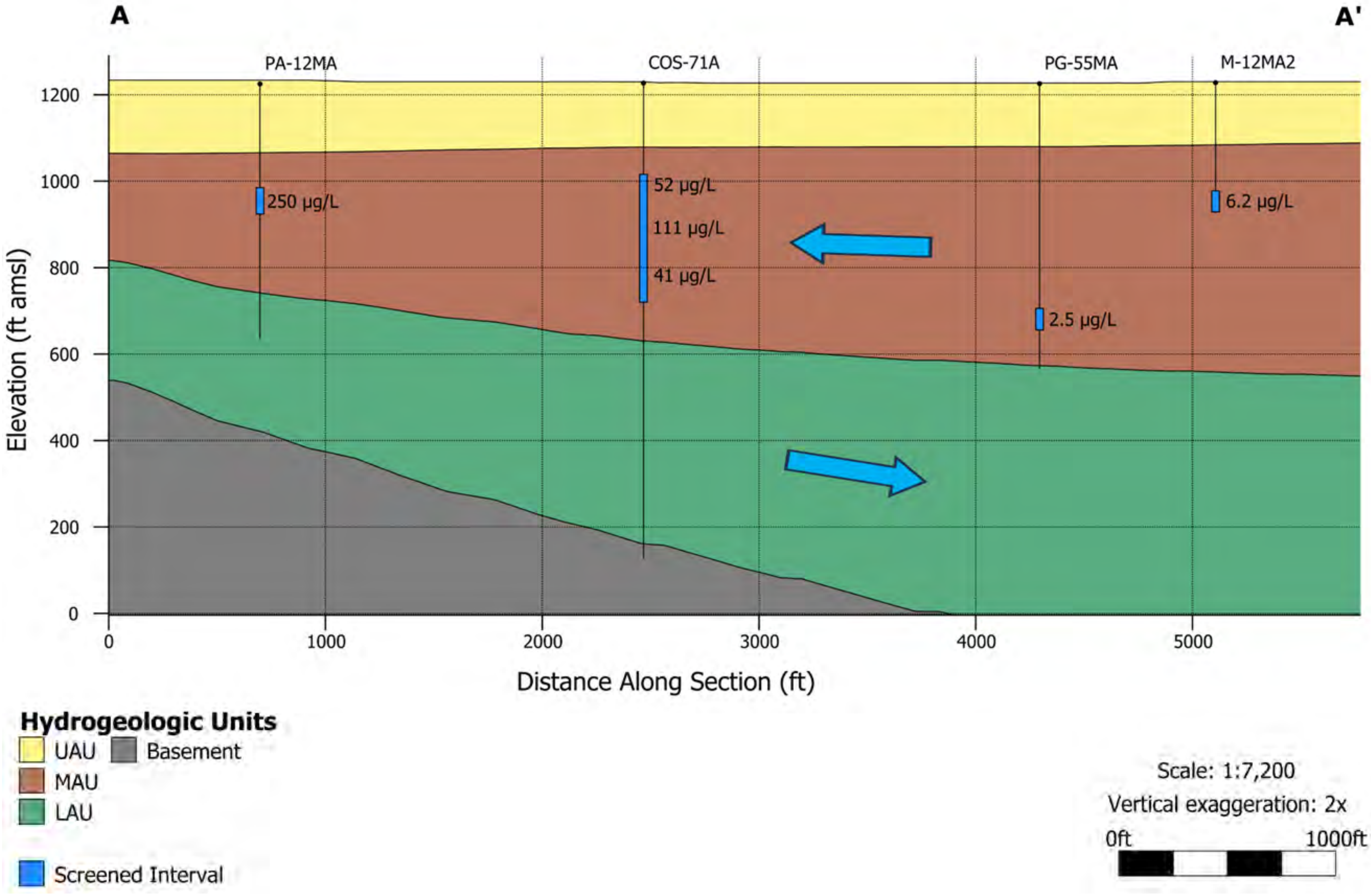


Figure 12. Cross Section through MAU Wells near COS-71A with interval TCE Concentrations and Groundwater Flow Direction.

5.4 COS-75A Sample Results

COS-75A samples were analyzed for the following constituents: NIBW COCs; anions; cations; metals; alkalinity; and PFAS compounds. In the sections below, the concentrations above the EPA primary MCL and other constituents of interest are further discussed.

5.4.1 Volatile Organic Compounds

The NIBW COCs include the VOCs 1,1,1-TCA, 1,1-DCE, chloroform, PCE, and TCE. There were no detections for 1,1,1-TCA. Chloroform and 1,1-DCE were detected below the EPA MCL for each sample depth. COC sample results are summarized in **Table 5**.

PCE was detected in samples obtained during non-pumping conditions, but below the EPA MCL of 5 µg/L for each sample depth. However, PCE was detected at concentrations higher than the EPA MCL at all samples obtained during pumping conditions (both depth-specific and wellhead samples), excluding the sample at 1,220 feet bls. The maximum pumping PCE concentration was 8.67 µg/L at the wellhead sample obtained after depth-specific sampling, whereas the maximum PCE concentration detected in depth-specific samples was 8.58 µg/L at 840 feet bls. The minimum pumping PCE concentration was 4.55 µg/L at 1,220 feet bls, exhibiting slightly decreasing concentration with increasing depth. Calculated interval PCE concentrations for the 2023 fluid movement investigation are shown on **Figure 11** and **Table 6**.

TCE was detected above the EPA MCL at all pumping and non-pumping sample depths and in all wellhead samples. During pumping conditions, the maximum calculated interval TCE concentration was 38.2 µg/L from 840 to 950 feet bls. The minimum calculated interval TCE concentrations were about 22.5 µg/L from 950 to 1,220 feet bls. Concentrations increase from the 658 to 675 feet bls interval to the 840 to 950 feet bls interval. Concentrations decrease below the 840 to 950 feet bls interval and remain constant moving downward to 1,220 feet bls, which is the lowermost depth of significant flow contribution to the well. The sample at 620 feet bls, which is in the blank casing above the perforated interval and assumed to be a mixture of all groundwater entering the well, had a concentration of 28.8 µg/L. Wellhead concentrations were comparable, which were 25.8 and 28.3 µg/L for before and after depth-specific sampling, respectively. Calculated interval TCE concentrations for the 2023 fluid movement investigation are shown on **Figure 11** and **Table 6**.

TCE concentrations were more variable under non-pumping conditions. The maximum sample concentration was 45.9 µg/L at 675 feet bls, and the minimum sample concentration was 7.95 µg/L at 1,220 feet bls. Concentrations decrease with increasing depth within the perforated interval. The differences in concentration seen between pumping and non-pumping conditions could be a result of lateral as well as vertical differences in TCE concentrations within the LAU, as a pumping well captures water from a larger area than water passively flowing through a non-pumping well. Sample concentrations under non-pumping conditions can be found in **Table 5**.

TCE concentrations show a similar decreasing trend with increasing depth in all fluid movement investigations. TCE concentrations in wellhead samples and in all depth intervals have decreased overall with time. The highest interval TCE concentration was 414 µg/L from 675 to 840 feet bls in 1996, and the lowest interval TCE concentration was 22.5 µg/L from 950 to 1,072 feet bls in 2023. Interval concentrations for all fluid movement investigations can be found on **Figure 10**.

Table 5. Results of Lab Analysis for COCs during COS-75A Fluid Movement Investigations, June 2023

Sample Information				COCs Concentrations (µg/L)				
Pumping Condition	Sample Depth (feet bls)	Sample Date and Time	Sample Type	1,1,1-Trichloroethane (TCA)	1,1- Dichloroethene (1,1-DCE)	Chloroform	Tetrachloroethylene (PCE)	Trichloroethylene (TCE)
Non-Pumping	620	6/5/23 17:55	Original	<0.50	<0.50	1.64	2.53	28.8
			Duplicate	<0.50	<0.50	1.75	2.83	30.0
	675	6/5/23 17:10	Original	<0.50	0.63	1.86	3.90	45.9
			Duplicate	<0.50	0.58	1.80	3.77	45.7
	950	6/5/23 16:25	Original	<0.50	<0.50	1.72	4.49	25.8
			Duplicate	<0.50	<0.50	1.66	4.69	26.9
	1,050	6/5/23 15:30	Original	<0.50	<0.50	1.52	1.52	11.0
			Duplicate	<0.50	<0.50	1.52	1.60	11.2
	1,220	6/5/23 14:40	Original	<0.50	<0.50	1.64	1.23	8.19
			Duplicate	<0.50	<0.50	1.64	1.29	7.95
Pumping	Wellhead	6/13/23 13:25	Original	<0.50	<0.50	1.59	7.46	25.7
			Duplicate	<0.50	<0.50	1.58	7.47	25.8
	Wellhead	6/13/23 18:30	Original	<0.50	0.55	1.61	8.67	30.4
			Duplicate	<0.50	0.54	1.32	7.03	26.1
	620	6/13/23 13:30	Original	<0.50	<0.50	1.86	7.50	28.4
			Duplicate	<0.50	<0.50	1.82	7.61	29.1
	675	6/13/23 14:25	Original	<0.50	<0.50	1.75	7.50	27.0
			Duplicate	<0.50	<0.50	1.76	7.48	27.3
	840	6/13/23 15:15	Original	<0.50	<0.50	1.82	7.76	28.5
			Duplicate	<0.50	<0.50	1.87	8.58	30.0
	950	6/13/23 17:50	Original	<0.50	<0.50	1.69	6.76	22.8
			Duplicate	<0.50	<0.50	1.63	6.55	22.3
	1,072	6/13/23 16:10	Original	<0.50	<0.50	1.70	6.27	23.0
			Duplicate	<0.50	<0.50	1.64	6.21	22.2
	1,185	6/13/23 18:55	Original	<0.50	<0.50	1.60	5.80	21.6
			Duplicate	<0.50	<0.50	1.64	6.39	23.7
	1,220	6/13/23 17:00	Original	<0.50	<0.50	1.68	4.92	19.8
			Duplicate	<0.50	<0.50	1.53	4.55	18.1

NOTE:

1) Concentrations above the EPA primary MCL are noted in bold

Table 6. Calculated Interval Concentrations of Select Constituents during 2023 COS-75A Fluid Movement Investigations

Interval (feet bls)	Sample Depth(1) (feet bls)	Interval Flow Rate (gpm)	Interval TCE (µg/L)	Interval PCE (µg/L)	Interval Nitrate (mg/L)	Interval TDS (mg/L)	Interval PFOS (ng/L)	Interval PFOA (ng/L)
658 - 1,258	Wellhead Pre-sampling	1,866	25.8	7.47	8.18	940	6.76	2.88
658 - 1,258	Wellhead Post-sampling	1,866	28.3	8.67	8.17	1,025	6.75	2.93
658 - 675	620	486	33.3	7.73	8.28	945	7.80	2.87
675 - 840	675	0	NA	NA	NA	NA	NA	NA
840 - 950	840	590	38.2	10.2	7.94	1,047	5.62	2.65
950 - 1,072	950	570	22.5	6.82	8.28	808	7.12	2.76
1,072 - 1,185	1,072	120	22.6	6.36	7.86	970	6.60	3.16
1,185 - 1,220	1,185	100	22.7	6.10	8.3	1,025	6.98	3.05
1,220 - 1,258	1,220	0	NA	NA	NA	NA	NA	NA

EXPLANATION:

NA = Not Applicable

5.4.2 Inorganic Compounds

COS-75A samples were analyzed for inorganic compounds and metals (total and dissolved). The following analytes were not detected in any wellhead or depth-specific samples:

- carbonate alkalinity (as $CaCO_3$)
- nitrite (as N) {total}
- aluminum {dissolved}
- antimony {total & dissolved}
- beryllium {total & dissolved}
- cadmium {total & dissolved}
- cobalt {total & dissolved}
- iron {dissolved}
- lead {dissolved}
- molybdenum {total & dissolved}
- thallium {total & dissolved}
- thorium {total & dissolved}

All other constituents had results above the laboratory's detection limit and are shown in **Table 7**. Select constituents of interest for COS water supply are discussed in the following subsections.

Table 7. Results of Lab Analysis for Inorganic Compounds and Metals during COS-75A Fluid Movement Investigations, June 2023

Sample Information			Detected Inorganic Concentrations (mg/L)																					
Pumping Condition	Sample Depth (feet bls)	Sample Date and Time	Alkalinity (as $CaCO_3$)	Bicarbonate Alkalinity	Hardness (as $CaCO_3$)	Calcium		Magnesium		Sodium		Potassium		Chloride	Fluoride	Nitrate (as N)	Sulfate	Aluminum	Arsenic		Barium		Boron	
						TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	TOT	TOT	TOT	TOT	TOT	DIS	TOT	DIS	TOT	DIS
Non-Pumping	620	6/5/2023 17:55	144	144	340	51.7	51.9	51.1	51.0	120	114	5	4	267	<1.0	<1.0	87	0.021	0.0018	<0.0010	0.0459	0.0401	0.25	0.25
	675	6/5/2023 17:10	150	150	348	51.8	51.1	53.1	52.6	106	101	5	4	246	<1.0	2.02	82	0.045	0.0048	<0.0010	0.0503	0.0430	0.20	0.22
	950	6/5/2023 16:25	212	212	499	76.1	75.8	75.1	75.0	130	128	5	5	307	<1.0	7.37	124	0.056	0.0083	<0.0010	0.0572	0.0485	0.39	0.42
	1050	6/5/2023 15:30	212	212	561	82.0	80.9	86.6	85.9	100	98	5	5	268	<1.0	7.83	158	0.044	0.0100	<0.0010	0.0736	0.0623	0.53	0.57
	1220	6/5/2023 14:40	240	240	632	93.5	91.5	96.8	95.1	116	116	6	5	291	<1.0	8.83	184	0.038	0.0091	0.0016	0.0885	0.0813	0.69	0.71
Pumping	Wellhead	6/13/2023 13:25	222	222	548	83.0	84.6	82.7	85.6	99	100	5	5	294	0.23	8.18	126	<0.010	0.0052	0.0037	0.0475	0.0475	0.41	0.38
	Wellhead	6/13/2023 18:30	224	224	549	82.9	84.5	83.1	84.2	99	99	5	5	296	0.23	8.17	127	<0.010	0.0053	0.0039	0.0470	0.0478	0.41	0.39
	620	6/13/2023 13:30	220	220	571	86.1	83.0	86.5	83.0	106	99	5	5	289	0.23	7.94	127	0.045	0.0048	0.0039	0.0524	0.0485	0.42	0.38
	675	6/13/2023 14:25	220	220	581	87.3	83.1	88.2	83.8	103	96	5	5	284	0.23	7.82	126	0.023	0.0057	0.0039	0.0489	0.0489	0.42	0.39
	840	6/13/2023 15:15	222	222	570	85.8	83.5	86.3	83.6	100	96	5	5	297	0.23	8.10	126	0.041	0.0043	0.0039	0.0505	0.0467	0.41	0.38
	950	6/13/2023 17:50	220	220	574	85.9	84.0	87.2	85.6	100	97	5	5	295	0.23	8.22	127	0.047	0.0048	0.0042	0.0486	0.0471	0.42	0.39
	1072	6/13/2023 16:10	222	222	560	83.5	85.1	85.3	86.9	97	100	5	5	289	0.23	8.06	130	0.039	0.0042	0.0040	0.0456	0.0474	0.42	0.40
	1185	6/13/2023 18:55	220	220	579	86.5	83.6	88.2	84.6	100	97	5	5	297	0.23	8.30	128	0.055	0.0046	0.0039	0.0477	0.0475	0.42	0.39
	1220	6/13/202 17:00	226	226	568	85.5	83.0	86.1	83.7	102	99	5	5	287	0.23	8.05	135	0.060	0.0050	0.0040	0.0565	0.0556	0.45	0.45

Sample Information			Detected Inorganic Concentrations (mg/L)																						
Pumping Condition	Sample Depth (feet bls)	Sample Date and Time	Bromide	Chromium		Copper		Iron	Lead	Manganese		Nickel		Selenium		Silica		Strontium		Uranium		Vanadium		Zinc	
			TOT	TOT	DIS	TOT	DIS	TOT	TOT	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
Non-Pumping	620	6/5/2023 17:55	0.25	0.0059	<0.0010	0.0045	<0.0010	9.42	<0.0010	1.30	1.42	0.0017	<0.0010	<0.0010	0.0011	10.8	9.8	1.13	1.09	0.0015	0.0012	<0.010	<0.010	0.094	0.025
	675	6/5/2023 17:10	0.24	0.0152	<0.0010	0.0093	<0.0010	11.0	<0.0010	0.696	0.675	0.0025	0.0014	<0.0010	0.0015	18.7	17.0	1.14	1.10	0.0026	0.0021	<0.010	<0.010	0.169	0.081
	950	6/5/2023 16:25	0.29	0.0180	<0.0010	0.0120	0.0015	13.9	<0.0010	0.328	0.262	0.0031	0.0016	0.0010	0.0027	29.3	26.6	1.70	1.65	0.0070	0.0061	0.016	<0.010	0.175	0.095
	1050	6/5/2023 15:30	0.34	0.0208	<0.0010	0.0173	0.0024	19.8	<0.0010	0.250	0.172	0.0028	0.0012	0.0038	0.0051	29.3	25.6	2.19	2.12	0.0118	0.0106	0.021	<0.010	0.094	0.043
	1220	6/5/2023 14:40	0.38	0.0203	<0.0010	0.0185	0.0028	10.5	<0.0010	0.189	0.141	0.0029	0.0010	0.0043	0.0061	29.2	26.6	2.74	2.61	0.0140	0.0138	0.021	<0.010	0.024	<0.010
Pumping	Wellhead	6/13/2023 13:25	0.26	0.0060	<0.0010	0.0069	0.0033	0.184	<0.0010	0.0136	0.0136	0.0029	<0.0010	0.0028	0.0027	30.1	30.8	1.77	1.78	0.0083	0.0084	0.013	0.012	0.019	0.014
	Wellhead	6/13/2023 18:30	0.25	0.0061	<0.0010	0.0109	0.002	0.204	<0.0010	0.0117	0.0110	0.0031	<0.0010	0.0029	0.0028	30.0	30.3	1.76	1.79	0.0083	0.0083	0.013	0.012	0.028	0.011
	620	6/13/2023 13:30	0.26	0.0119	0.0022	0.0060	0.0021	2.04	0.0015	0.0810	0.0645	0.0096	0.0063	0.0023	0.0027	31.6	30.0	1.80	1.75	0.0087	0.0076	0.014	0.011	0.458	0.329
	675	6/13/2023 14:25	0.26	0.0129	0.0014	0.0036	0.0012	1.73	<0.0010	0.0535	0.0426	0.0053	0.0032	0.0022	0.0027	31.8	30.0	1.83	1.76	0.0089	0.0082	0.015	0.011	0.190	0.149
	840	6/13/2023 15:15	0.25	0.0076	0.0023	0.0045	0.0016	0.786	0.0011	0.0770	0.0723	0.0049	0.0027	0.0022	0.0027	31.0	29.6	1.80	1.76	0.0088	0.0075	0.013	0.011	0.597	0.428
	950	6/13/2023 17:50	0.26	0.0115	0.0025	0.0045	0.0018	0.746	0.0011	0.0435	0.0321	0.0057	0.0015	0.0022	0.0029	31.2	30.0	1.81	1.79	0.0089	0.0085	0.013	0.011	0.416	0.254
	1072	6/13/2023 16:10	0.26	0.0081	0.0024	0.0037	0.0017	0.816	<0.0010	0.0499	0.0474	0.0042	0.0022	0.0022	0.0029	30.1	30.3	1.77	1.82	0.0086	0.0083	0.013	0.011	0.323	0.266
	1185	6/13/2023 18:55	0.28	0.0210	0.0024	0.0047	0.0021	0.716	<0.0010	0.0331	0.0343	0.0089	0.0023	0.0022	0.0029	31.3	29.9	1.83	1.79	0.0089	0.0081	0.014	0.011	0.383	0.298
	1220	6/13/202 17:00	0.27	0.0108	0.0023	0.0130	0.0021	1.59	0.0017	0.0669	0.0547	0.0045	0.0019	0.0026	0.0035	30.7	29.0	1.96	1.97	0.0097	0.0091	0.014	0.011	0.490	0.315

NOTES:

1) Non-detect samples are denoted with "<" and the laboratory's minimum detection limit. Non-detects are also shown in gray.
2) All samples are originals and no duplicates were collected for inorganics
3) Pumping conditions are highlighted blue.

5.4.2.1 Nitrate

During the 2023 investigation, nitrate concentrations at all sample depths during pumping conditions were below the EPA MCL of 10 mg/L. Eight out of 14 total samples were at or above 8 mg/L of nitrate (80% of the MCL), which is COS's internal limit that initiates treatment prior to distribution in the municipal water supply. The maximum calculated interval concentration was 8.30 mg/L from 1,185 to 1,220 feet bls and the minimum calculated interval concentration was 7.86 mg/L from 1,072 to 1,185 feet bls. Nitrate concentrations were relatively homogeneous with depth. Any slight differences seen in nitrate concentrations with depth are likely within the margin of error of the survey and laboratory analysis methods.

During non-pumping conditions, nitrate concentrations increased with depth. The 620 feet bls sample was non-detect, and the 675 feet bls sample concentration was 2.02 mg/L. Concentrations from all other sample depths were comparable to those during pumping conditions. Interval concentrations of nitrate for the 2023 investigations are given in **Table 6**.

Nitrate concentrations were at their highest during the 1996 investigation, with a maximum calculated interval concentration of 25.2 mg/L from 840 to 1,072 feet bls. The minimum calculated interval concentration was 5.05 mg/L from 675 to 840 feet bls during the 2011 investigation. Overall concentrations in 2023 are slightly higher than those in 2011, with wellhead concentrations of 8.18 and 7.30 mg/L, respectively. Interval concentrations of nitrate for all fluid movement investigations are shown on **Figure 10**.

5.4.2.2 TDS

During the 2023 investigation, TDS concentration was above the EPA secondary MCL of 500 mg/L at all sample depths. The maximum calculated interval concentration was 1,047 mg/L from 840 to 950 feet bls and the minimum calculated interval concentration was 808 mg/L from 950 to 1,072 feet bls. There is no trend in TDS concentration with depth.

TDS concentrations are significantly lower during non-pumping conditions. The highest concentration during non-pumping conditions is 172 mg/L at 1,220 feet bls. During non-pumping conditions, TDS concentrations do not change significantly with depth. Interval concentrations of TDS for the 2023 investigation are given in **Table 6**.

TDS concentrations do not show an apparent trend with time. Concentrations were lowest in 1996 and highest in 2011. The highest interval concentration was 1,206 mg/L from 950 to 1,020 feet bls and the lowest interval concentration was 740 mg/L from 1,072 to 1,258 feet bls. An anomalously low interval concentration of 26.4 mg/L was calculated for the 658 to 675 feet bls interval in 2011. This is due to a low TDS concentration at 620 feet bls in comparison to the sample below. The sample at 620 feet bls is significantly lower concentration (1,000 mg/L) than both wellhead samples and the sample directly below at 675 feet bls (1,100 mg/L) and is likely a lab error. Interval concentrations of TDS for all fluid movement investigations are shown on **Figure 10**.

5.4.3 PFAS

PFAS is a class of emerging contaminants. Thus, the City of Scottsdale and PCs voluntarily conducted examination of 7 PFAS chemicals during the 2023 fluid movement investigation. Samples were collected only during pumping conditions and are summarized in **Table 8**. Due to the low concentration of EPA's PFAS MCL and the variety of PFAS within industrial, commercial, and personal products, certain protocols were required when handling and sampling for these chemicals. Stringent sampling guidelines were used to reduce the potential for cross-contamination and improve data reliability. Non-detect values in quality assurance and quality control (QA/QC) samples and rinse water samples demonstrate the validity of sample results.

On April 10, 2024, the EPA announced final National Primary Drinking Water Regulations for six PFAS, including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA), and perfluorobutane sulfonic acid (PFBS). The MCL for PFOA and PFOS is 4 nanograms per liter (ng/L), and 10 ng/L for PFHxS, PFNA, and HFPO-DA. Additionally, the MCL for mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS is a hazard index of 1. The following compounds were not detected in wellhead or depth specific samples: PFNA; HFPO-DA; and 4,8-dioxa-3H-perfluorononanoate (ADONA). The following compounds were detected at concentrations below the MCL at all sample depths and wellhead samples: PFBS; PFOA; and PFHxS.

PFOS was detected above the MCL at all sample depths and at the wellhead during the fluid movement investigation under pumping conditions. The maximum calculated interval concentration was 7.80 ng/L from 658 to 675 feet bls, whereas the minimum calculated interval concentration was 5.62 ng/L from 840 to 950 feet bls. PFOS concentrations were relatively homogeneous with depth. Any slight differences in calculated PFOS concentrations with depth are likely within the margin of error of the survey and laboratory analysis methods. PFAS was not sampled or analyzed under non-pumping conditions so results cannot be compared with natural concentration gradients. Interval concentrations of PFOS are shown on **Figure 13** and **Table 6**.

PFOA concentrations at all sample depths during pumping conditions were below the EPA MCL, but above 50% of the MCL. The maximum calculated interval concentration was 3.16 ng/L from 1,072 to 1,185 feet bls, and the minimum calculated interval concentration was 2.65 ng/L from 840 to 950 ng/L. Like PFOS, PFOA concentrations were relatively homogeneous with depth. Any slight differences in calculated PFOA concentrations with depth are likely within the margin of error of the survey and laboratory analysis methods. PFAS was not sampled or analyzed under non-pumping conditions so results cannot be compared with natural concentration gradients. Interval concentrations of PFOA are shown on **Figure 13** and in **Table 6**.

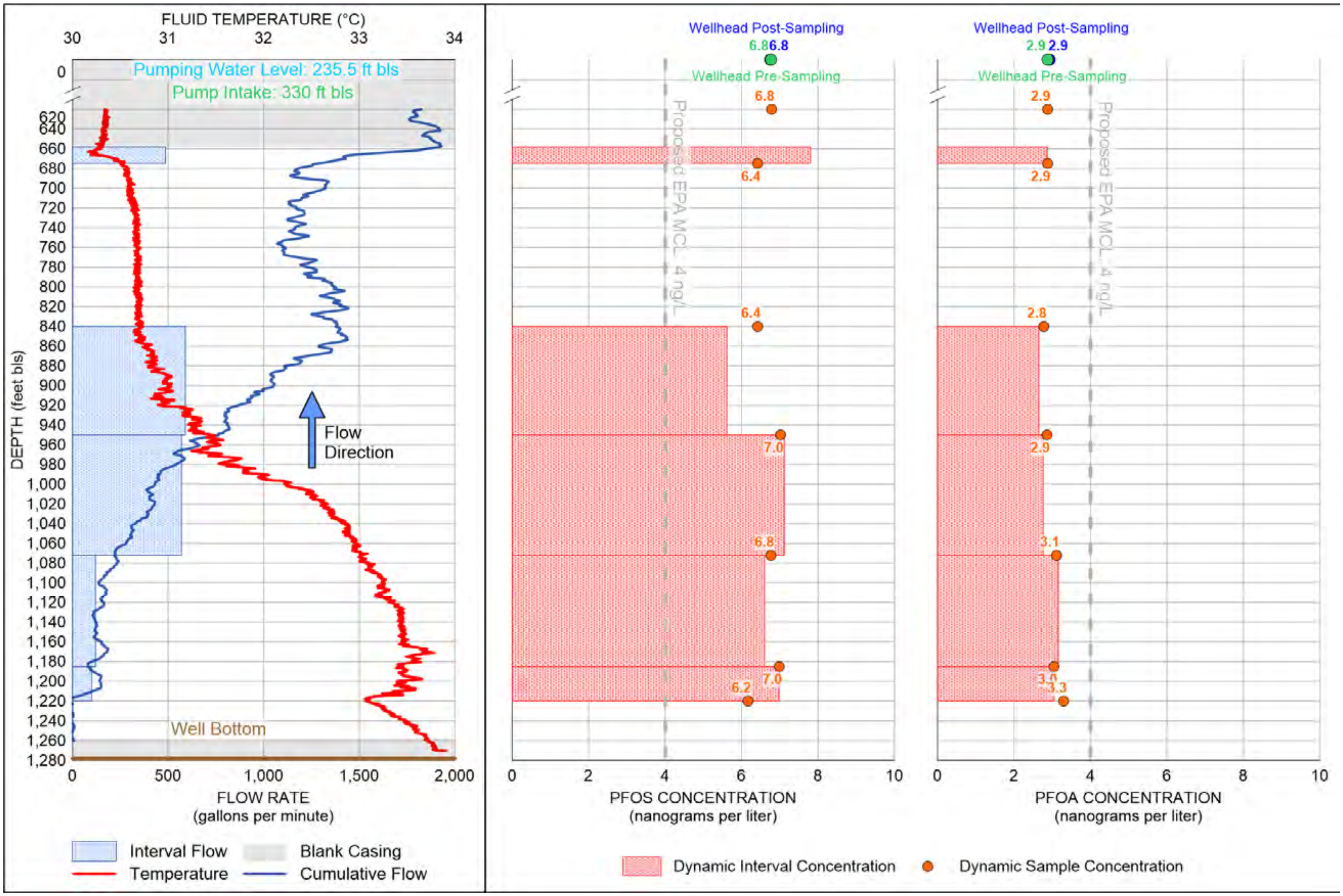


Figure 13. Interpretation of COS-75A Interval Specific Flow Rates and Concentrations of Select PFAS, June 2023

Table 8. Results of Lab Analyses for PFAS during COS-75A Fluid Movement Investigations, June 2023

Sample Information				PFAS Chemical Compounds (ng/L)						
Sample Identifier	Sample Depth (feet bls)	Sample Date and Time	Sample Type	PFOA	PFOS	PFHxS	PFNA	PFBS	HFPO-DA	ADONA
WELL-75A	Wellhead	6/13/23 13:25	Original	2.88	6.76	3.30	<2.0	2.09	<2.0	<2.0
	Wellhead	6/13/23 18:30	Original	2.93	6.75	3.34	<2.0	2.12	<2.0	<2.0
	620	6/13/23 13:30	Original	2.87	6.78	3.52	<2.0	2.30	<2.0	<2.0
	675	6/13/23 14:25	Original	2.87	6.42	3.43	<2.0	2.24	<2.0	<2.0
	840	6/13/23 15:15	Original	2.77	6.42	3.30	<2.0	2.05	<2.0	<2.0
	950	6/13/23 17:50	Original	2.86	7.02	3.46	<2.0	2.33	<2.0	<2.0
	1,072	6/13/23 16:10	Original	3.11	6.77	3.55	<2.0	2.12	<2.0	<2.0
	1,185	6/13/23 18:55	Original	3.05	6.98	3.52	<2.0	2.29	<2.0	<2.0
	1,220	6/13/23 17:00	Original	3.30	6.17	3.59	<2.0	2.18	<2.0	<2.0
EQUIP-BLANK	N/A	6/13/23 14:30	QA/QC Blank	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
FIELD-BLANK	N/A	6/13/23 16:15	QA/QC Blank	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
SPECIAL	N/A	6/13/23 16:15	N/A	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

NOTE:

1) Concentrations above the EPA primary MCL are noted in bold.

5.5 COS-75A Comparison with Nearby Wells

The nearest LAU monitoring wells to COS-75A are PA-5LA and PA-6LA. **Figure 14** shows the perforated intervals of these wells along a SE to NW section (Location of section shown on **Figure 2**).

PA-5LA is approximately 100 feet hydraulically cross-gradient from and to the east of COS-75A and is perforated from 489 to 427 feet amsl (62-foot screen). TCE concentration at PA-5LA on July 11, 2023 was 49 µg/L. PA-6LA is approximately 2,800 feet hydraulically downgradient from and to the northwest of COS-75A and is perforated from 532 to 482 feet amsl (50-foot screen). TCE concentration at PA-6LA on July 10, 2023 was 38 µg/L. COS-75A is perforated from 579 to -21 feet amsl (600-foot screen). The 562 to 397 feet amsl interval in COS-75A that correlates with the perforated intervals in PA-5LA and PA-6LA had no calculated interval TCE concentration because it contributed little to no flow to the well during pumping conditions. The COS-75A interval closest to that of PA-5LA is the interval below, from 397 to 287 feet amsl. The June 13, 2023 calculated TCE concentration within this interval was 38.2 µg/L. The interval above from 579 to 562 feet amsl had a TCE concentration of 33.3 µg/L.

The 397 to 287 feet amsl interval TCE concentration in COS-75A is slightly lower than the TCE concentration in nearby well PA-5LA. This small discrepancy could be due to the intervals in the two wells being slightly different or the larger capture zone of COS-75A capturing water of lower TCE concentration. The TCE concentration in COS-75A at 562 feet amsl during non-pumping conditions was 46 µg/L, which is comparable to the TCE concentration at PA-5LA. This supports the theory that COS-75A is capturing water with lower TCE concentration while pumping. The variability of interval concentrations with depth in COS-75A compared with the concentrations in PA-5LA and PA-6LA highlights the vertical heterogeneity of the LAU plume that could not be gleaned from monitoring well data alone, as COS-75A is significantly deeper than LAU monitoring wells in this area.

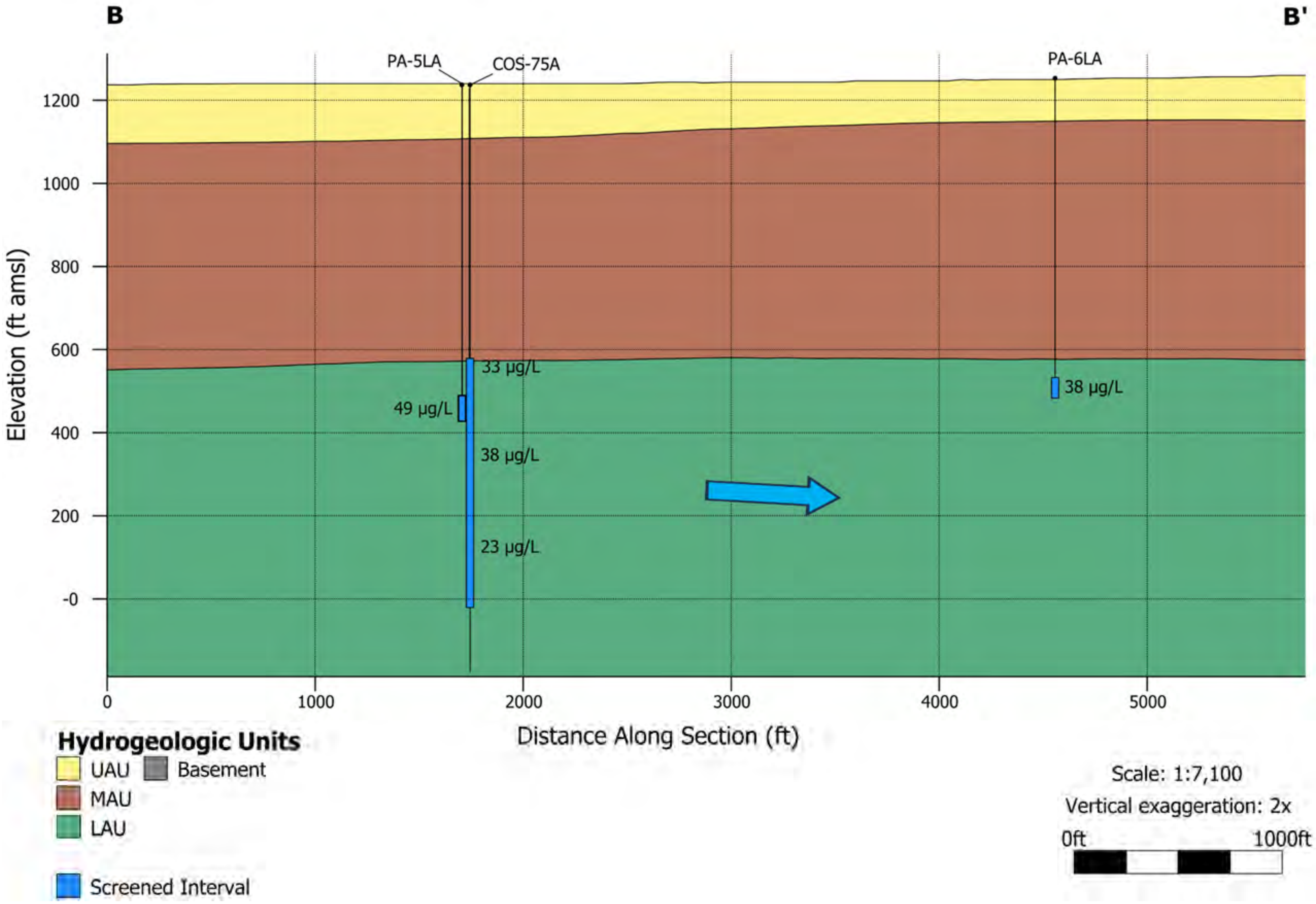


Figure 14. Cross Section through LAU Wells near COS-75A with interval TCE Concentrations and Groundwater Flow Direction.

6 SUMMARY AND CONCLUSIONS

Rehabilitation and fluid movement investigations including spinner-flowmeter surveys and depth-specific sampling were conducted at wells COS-71A and COS-75A. At COS-71A, the well was modified, and step-rate and constant-rate pumping tests were completed.

At COS-71A, modification involved filling the well with coarse sand followed by transition fine sand and cement with less than 2% bentonite, making the new bottom of the well 515.5 feet bls. The temporary modification inhibits flow within the LAU to the pump; therefore, COS-71A now only extracts water from the MAU. Based on the results of the pumping tests, the recommended sustainable maximum long-term pumping rate for well COS-71A is approximately 500 gpm. Pumping water level after 2 years of constant operation at 500 gpm is estimated to be about 320 feet bls. This estimated pumping water level does not account for any nearby wells which may further impact drawdown in COS-71A.

Fluid movement investigations at COS-71A showed approximately 80% of inflow entered the well above the pump, most of which is coming from the uppermost screened portion of the well from 211 to 240 feet bls. The highest TCE concentrations are in the interval from 270 to 375 feet bls, which decrease with increasing depth. Trends in TCE concentration have not changed significantly since the 2014 investigation. Maximum nitrate concentration at the wellhead during the 2023 investigation was 11.2 mg/L, above the EPA MCL. Nitrate concentration did not change with depth during the 2023 investigation; whereas, during the 2014 investigation, they generally decreased with depth within the MAU and increased with depth within the LAU. Wellhead nitrate concentrations have not changed significantly over time. Wellhead concentrations of total lead are substantially below the EPA MCL but are above the MCL in several of the depth-specific samples. The source of the lead is unknown. Field data, testing results, data analysis, and copies of the video surveys and applicable permits for COS-71A were provided by the PCs to the City of Scottsdale.

Fluid movement investigations at COS-75A showed a zone of inflow from 658 to 675 feet bls, a zone of little to no flow from 675 to 850 feet bls, followed by another zone of inflow from 850 to 1,220 feet bls. TCE concentrations were the highest in the interval from 840 to 950 feet bls. From 950 to 1,220 feet bls, TCE concentrations do not change with depth, but concentrations were significantly lower than those above this interval. There was more variability in TCE concentrations during non-pumping conditions, which decreased consistently with depth. The overall decreasing trend in TCE concentrations with depth has not changed over time, but since investigations began in 1996, concentrations were lowest in each interval during the 2023 investigation. Maximum nitrate concentration at the wellhead during the 2023 investigation was 8.18 mg/L, just below the EPA MCL. Nitrate concentrations did not change significantly with depth during all investigations, but were substantially lower overall during the 2023 investigation compared to the 1996 investigation. During the 2023 investigation, wellhead PFOS and PFOA concentrations were 6.8 and 2.9 ng/L, respectively. PFOS is above the EPA MCL, and PFOA is just under. Concentrations of PFOS and PFOA did not change significantly with depth under pumping conditions. Analysis of PFAS was not conducted under non-pumping conditions therefore a comparison could not be made. Field data, testing results, data analysis, and copies of the video surveys for COS-75A were provided by the PCs to the City of Scottsdale.

Results from fluid movement investigations in both COS-71A and COS-75A highlight the value of periodic investigations conducted in these and other extraction/production wells. These investigations enhance the water quality data collected from the monitoring well network and provide the data necessary to better characterize the vertical extent of the plume and how it changes over time.

7 REFERENCES

Cooper, H.H. and C.E. Jacob, 1946. A generalized graphical method for evaluating formation constants and summarizing well field history, Am. Geophys. Union Trans., vol. 27, pp. 526-534.

HydroSOLVE, Inc., 2012, AQTESOLV for Windows 95/98/NT/2000/XP/Vista: HydroSOLVE,Inc., Reston, Virginia, version 4.51.005 – Professional.

Montgomery and Associates (M&A), 2011. Updated Characterization of Groundwater Conditions and Plume Containment in the Northern Lower Alluvial Unit, North Indian Bend Wash Superfund Site, Scottsdale Arizona.

_____, 2015. Results of Construction, Development, and Testing of Replacement Well COS-71A City of Scottsdale Maricopa County, Arizona.

Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

8 ACRONYMS & ABBREVIATIONS

µg/L	micrograms per liter
µS/cm	microSiemens per centimeter
1,1,1-TCA	1,1,1-trichloroethane
1,1-DCE	1,1-dichloroethene
ADONA	4,8-dioxa-3H-perfluorononanoate
ADWR	Arizona Department of Water Resources
° C	degrees Celsius
CGTF	Central Groundwater Treatment Facility
COCs	constituents of concern
COS	City of Scottsdale
ENC	Environmental Noise Control
EPA	United States Environmental Protection Agency
feet amsl	feet above mean sea level
feet bls	feet below land surface
ft^{-1}	foot^{-1}
ft^{2}/day	feet squared per day
gpm	gallons per minute
HFPO-DA	hexafluoropropylene oxide dimer acid
IBPD	Indian Bend Pump Ditch
LAU	Lower Alluvial Unit
M&A	Montgomery & Associates
MAU	Middle Alluvial Unit
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MPE	MP Environmental Services
ng/L	nanograms per liter
NIBW PCs	Participating Companies
NIBW	North Indian Bend Wash
NOI	Notice of Intent
NTUs	nephalometric turbidity units
ORP	oxidation reduction potential
PCE	tetrachloroethene
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutane sulfonic acid
PFHxS	perfluorohexane sulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid

PFOS	perfluorooctane sulfonic acid
psi	pounds per square inch
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
SiO_2	Silica
s.u.	standard units
SRP	Salt River Project
SWE	Southwest Exploration
TCE	trichloroethene
TDS	total dissolved solids
VFD	variable frequency driver
VOCs	volatile organic compounds
WellJet	WellJet by Hydropressure Cleaning, Inc.
Yellow Jacket	Yellow Jacket Drilling, Inc.

APPENDIX A
COS-71A NOI AND DRILLER'S REPORT

Arizona Department of Water Resources
Groundwater Permitting and Wells
1802 W Jackson St. Box #79
Phoenix, Arizona 85007
(602) 771-8527 • www.azwater.gov

Well Driller Report and Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL. PURSUANT TO ARIZONA REVISED STATUTE 45-600 AND A.A.C. RULE R12-15-808.

WELL DRILLER LOGS AND REPORTS CAN ALSO BE DONE ONLINE AT:
http://www.azwater.gov/eForms/Forms/DL/DWR_DL.aspx

FILE NUMBER
A(2-4) 35 ABB

WELL REGISTRATION NUMBER
55 - 222760

PERMIT NUMBER (IF ISSUED)

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:

NAME YELLOW JACKET DRILLING SERVICES, LLC	DWR LICENSE NUMBER 78
ADDRESS 3922 E UNIVERSITY DR., SUITE 1	TELEPHONE NUMBER 602-453-3252
CITY / STATE / ZIP PHOENIX, AZ, 85034	FAX

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
CITY OF SCOTTSDALE WATER RESOURCES

MAILING ADDRESS
9379 E SAN SALVADOR DR ATTN: MAURICE TATLOW

CITY / STATE / ZIP
SCOTTSDALE, AZ, 85258

CONTACT PERSON NAME AND TITLE

TELEPHONE NUMBER
480 312-5628

FAX

WELL NAME (e.g., MW-1, PZ-3, lot 25 Well, Smith Well, etc.)
71A

COUNTY	ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
	BOOK	MAP	PARCEL
MARICOPA	131	25	132

Location of Well

WELL LOCATION ADDRESS (IF ANY)

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
2N	4E	35	NE 1/4	NW 1/4	NW 1/4

LATITUDE			LONGITUDE		
33 °	28 '	46.1 "N	111 °	55 '	1.6 "W
DEGREES	MINUTES	SECONDS	DEGREES	MINUTES	SECONDS

METHOD OF LATITUDE/LONGITUDE (CHECK ONE)
☒ *GPS: Hand-Held ☐ *GPS: Survey-Grade ☐ TOPO

*LATITUDE/LONGITUDE DATUM, GPS (CHECK ONE)
☐ NAD83 ☐ NAD27 ☐ WGS84 ☐ Other ____________

METHOD OF ELEVATION (CHECK ONE)
☐ *GPS: Hand-Held ☐ *GPS: Survey-Grade ☐ TOPO

LAND SURFACE ELEVATION AT WELL
ELEVATION ____________ Feet Above Sea Level

*ELEVATION DATUM (CHECK ONE)
☐ NAVD88 ☐ NGVD29 ☐ OTHER ____________

SECTION 3. WELL CONSTRUCTION DETAILS

Drilling Method

CHECK ONE

- ☐ Air Rotary
- ☐ Bored or Augered
- ☐ Cable Tool
- ☐ Dual Rotary
- ☐ Mud Rotary
- ☐ Reverse Circulation
- ☐ Driven
- ☐ Jetted
- ☐ Air Percussion / Odex Tubing
- ☐ Other (please specify)

Method of Well Development

CHECK ONE

- ☐ Airlift
- ☐ Bail
- ☐ Surge Block
- ☐ Surge Pump
- ☐ Other (please specify)

Method of Sealing at Reduction Points

CHECK ONE

- ☐ None
- ☐ Packed
- ☐ Swedged
- ☐ Welded
- ☐ Other (please specify)

Condition of Well

CHECK ONE

- ☐ Capped
- ☐ Pump Installed
- ☐ Abandoned
- ☐ **Not Drilled**

Construction Dates

DATE WELL CONSTRUCTION STARTED
3/20/23

DATE WELL CONSTRUCTION COMPLETED
4/12/23

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY

DATE
5/5/23

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 222760

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILD) (attach additional page if needed)

Depth

DEPTH OF BORING	DEPTH OF COMPLETED WELL
Feet Below Land Surface	Feet Below Land Surface

Water Level Information

STATIC WATER LEVEL	DATE MEASURED	TIME MEASURED	IF FLOWING WELL, METHOD OF FLOW REGULATION
Feet Below Land Surface			☐ Valve ☐ Other:

Borehole

DEPTH FROM SURFACE		
FROM (feet)	TO (feet)	BOREHOLE DIAMETER (inches)

Installed Casing

DEPTH FROM SURFACE			MATERIAL TYPE (X)				PERFORATION TYPE (X)						
FROM (feet)	TO (feet)	OUTER (inches)	STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	SLOT SIZE (inches)

Installed Annular Material

DEPTH FROM SURFACE		~~ANNULAR~~ MATERIAL TYPE (X)				BENTONITE				FILTER PACK		
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
515	519				X							
519	524									X		#60
524	798									X		4X8 Tacna
									All materials Installed in interior			
									of well casing.			

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 222760

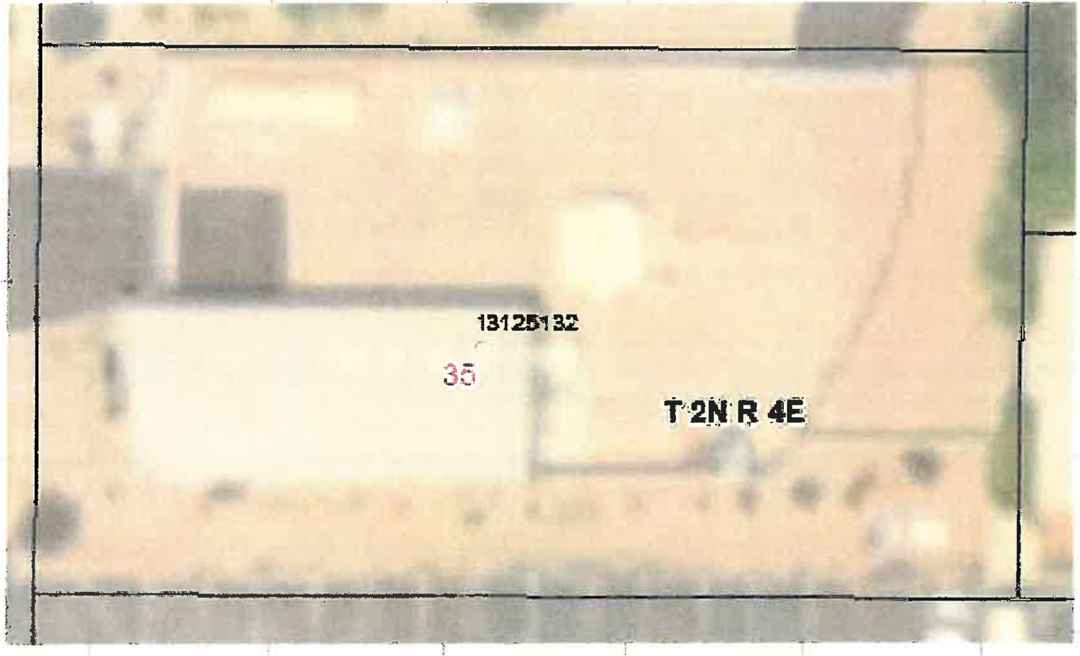
SECTION 6. WELL SITE PLAN

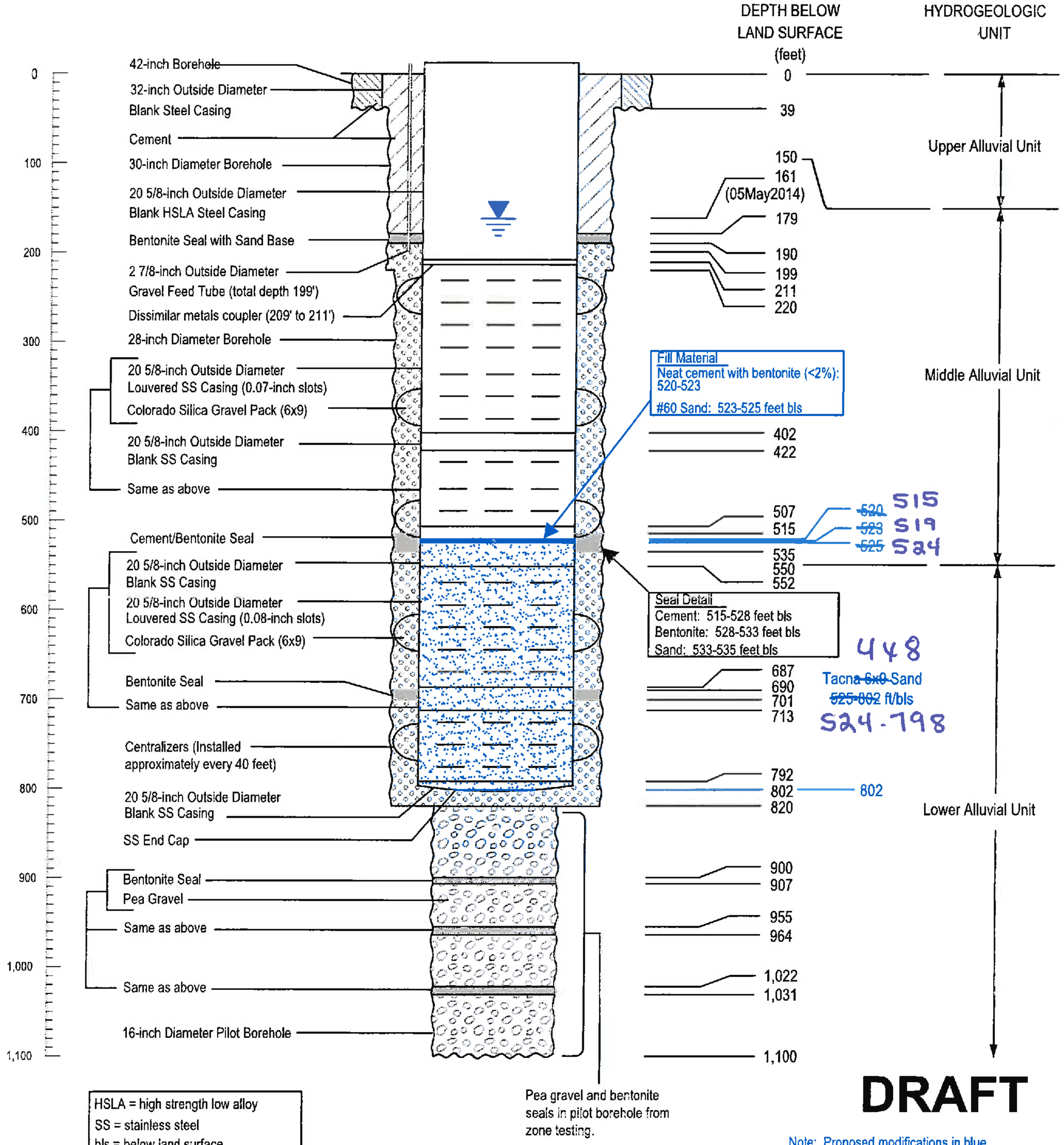
NAME OF WELL OWNER	COUNTY ASSESSOR'S PARCEL ID NUMBER (MOST RECENT)		
	BOOK	MAP	PARCEL
CITY OF SCOTTSDALE WATER RESOURCES	131	25	132

- Required for all wells, please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- Please indicate the distance between the well location and any septic tank system or sewer system.

1" = ______ ft

Please place an "X" where the well is drilled.





Fill Material
Neat cement with bentonite (<2%): 520-523
#60 Sand: 523-525 feet bls

Seal Detail
Cement: 515-528 feet bls
Bentonite: 528-533 feet bls
Sand: 533-535 feet bls

448
Tacna ~~6x9~~ Sand
~~525-802~~ ft/bls
524-798

HSLA = high strength low alloy
SS = stainless steel
bls = below land surface

Pea gravel and bentonite seals in pilot borehole from zone testing.

DRAFT

Note: Proposed modifications in blue.
Fill materials per City of Scottsdale's recommendations

EXPLANATION

▽ Non-pumping Water Level

All 32-inch outside diameter casing is ASTM A53 Grade B low carbon steel, 0.375-inch wall thickness.
All 20 5/8-inch outside diameter blank HSLA steel casing is ASTM 139, A606 Type 4 high strength low alloy steel, 0.312-inch wall thickness.
All 20 5/8-inch outside diameter louvered SS casing is ASTM 778, 304L stainless steel, 0.312-inch wall thickness. Louvered casing is Roscoe Moss Ful-Flo.
All 20 5/8-inch outside diameter blank SS casing is ASTM 778, 304L stainless steel, 0.312-inch wall thickness.
The 2 7/8-inch outside diameter steel gravel feed tube is ASTM A53 Grade B low carbon steel, 0.276-inch wall thickness (schedule 80).

WELL: A(2-4)35abb	REGISTRATION: 55-222760
STATE: Arizona	COUNTY: Maricopa
LATITUDE: 33°28'46.1"N	LAND SURFACE ALT: 1227' msl
LONGITUDE: 111°55'1.6"W	CLIENT: City of Scottsdale
HORIZONTAL DATUM: NAD83	

Schematic Diagram of Proposed Construction Modification for City of Scottsdale Well 71A

MONTGOMERY
& ASSOCIATES

2022

FIGURE 2A

Drafting\366.31\71A_ws_PropMod.dwg\28Nov2022

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 222760

SECTION 5. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE		Description Describe material, grain size, color, etc.	Check (X) every interval where water was encountered (if known)
FROM (feet)	TO (feet)		
		N/A	

ARIZONA DEPARTMENT OF WATER RESOURCES
1110 W. Washington St. Suite 310
Phoenix, Arizona 85007

ANY DEVIATION IN WELL LOCATION FROM THE PLOT PLAN APPROVED FROM THE COUNTY OR LOCAL HEALTH AUTHORITY MUST BE RE-SUBMITTED FOR APPROVAL.

NOTICE! This well is located in or near an area of groundwater contamination (WQARF/CERCLA/DOD or Other). Be advised that **special requirements may apply.**

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: **55-222760** WELL OWNER ID: 71A REPLACING WELL REGISTRATION NO: 55-626543

AUTHORIZED DRILLER: **YELLOW JACKET DRILLING SERVICES, LLC** LICENSE NO: **78**

NOTICE OF INTENTION TO MODIFY NON-EXEMPT WELL(S) HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: **CITY OF SCOTTSDALE WATER RESOURCES 9379 E SAN SALVADOR DR ATTN: MAURICE TATLOW SCOTTSDALE AZ, 85258**

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

NW 1/4 of the **NW** 1/4 of the **NE** 1/4 Section **35** Township **2.0 NORTH** Range **4.0 EAST**

NO. OF WELLS IN THIS PROJECT: **1** ASSESSOR'S PARCEL NO: **131-25-132**

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF **February 16, 2024**

Stella Murillo

GROUNDWATER PERMITTING AND WELLS

THE DRILLER MUST FILE A LOG OF THE WELL WITHIN 30 DAYS OF COMPLETION OF DRILLING.

1912

ARIZONA DEPARTMENTofWATER RESOURCES
1110 W. Washington St. Suite 310
Engineering and Permits Division
Phoenix, AZ 85007
602-771-8500

NOTICE TO WELL DRILLERS

This is a reminder that a valid drill card must be present for the drilling of each and every well constructed on a site. During the construction of a well, if an unexpected problem occurs; the hole collapses, the hole is dry, or a drill bit is lost and can't be recovered, or any number of other situations where the driller feels they need to move over and start another well. Please be aware drillers do not have the authority to start another well without first obtaining drilling authority for the new well. Please note the following statutes and regulations pertaining to well drilling and construction:

ARIZONA REVISED STATUTE (A.R.S.)

A.R.S. § 45-592.A.

A person may construct, replace or deepen a well in this state only pursuant to this article and section 45-834.01. The drilling of a well may not begin until all requirements of this article and section 45-834.01, as applicable, are met.

***

A.R.S. § 594.A.

The director shall adopt rules establishing construction standards for new wells and replacement wells, the deepening and abandonment of existing wells and the capping of open wells.

***

A.R.S. § 600.A

A well driller shall maintain a complete and accurate log of each well drilled.

ARIZONA ADMINISTRATIVE CODE (A.A.C.)

A.A.C. R12-15-803.A.

A person shall not drill or abandon a well, or cause a well to be drilled or abandoned, in a manner which is not in compliance with A.R.S. Title 45, Chapter 2, Article 10, and the rules adopted thereunder.

***

A.A.C. R12-15-810.A.

A well drilling contractor or single well licensee may commence drilling a well only if the well drilling contractor or licensee has possession of a drilling card at the well site issued by the Director in the name of the well drilling contractor or licensee, authorizing the drilling of the specific well in the specific location.

***

A.A.C. R12-15-816.F.

In the course of drilling a new well, the well may be abandoned without first filing a notice of intent to abandon and without an abandonment card.

*** THIS REQUIREMENT DOES NOT PERTAIN TO THE DRILLING OF MINERAL EXPLORATION, GEOTECHNICAL OR HEAT PUMP BOREHOLES**

DWR 37-61 (02-13)

ARIZONA DEPARTMENTofWATER RESOURCES
1110 W. Washington St. Suite 310
Phoenix, AZ 85007
602-771-8500
azwater.gov

KATIE M. HOBBS
Governor

THOMAS BUSCHATZKE
Director

2/27/2023

Registration No. 55- 222760
File Number: A(2-4) 35 ABB

Attn Well Owner and Well Driller:

The Department of Water Resources has approved the Notice of Intent (NOI) to drill your well(s) that you recently submitted. The proposed well(s) is/are located in or near an area of known groundwater contamination referred to as a remedial action site, as shown on the enclosed map. Please be aware that groundwater produced from the proposed well(s) may not meet applicable federal, state, county or local water quality standards.

If your NOI was filed using paper forms, the drilling authorization for your well(s) was granted based on a determination that the proposed well design indicated on the NOI complies with the Department's minimum well construction standards and any special well construction standards that prevent the spread of existing groundwater contamination or other special aquifer conditions.

If your NOI was filed using the electronic (e-NOI) system, the drilling authorization for your well(s) was based on your driller's certification that your well(s) shall be constructed in compliance with the Department's minimum well construction standards and any special well construction requirements that prevent the spread of existing groundwater contamination or other special aquifer conditions.

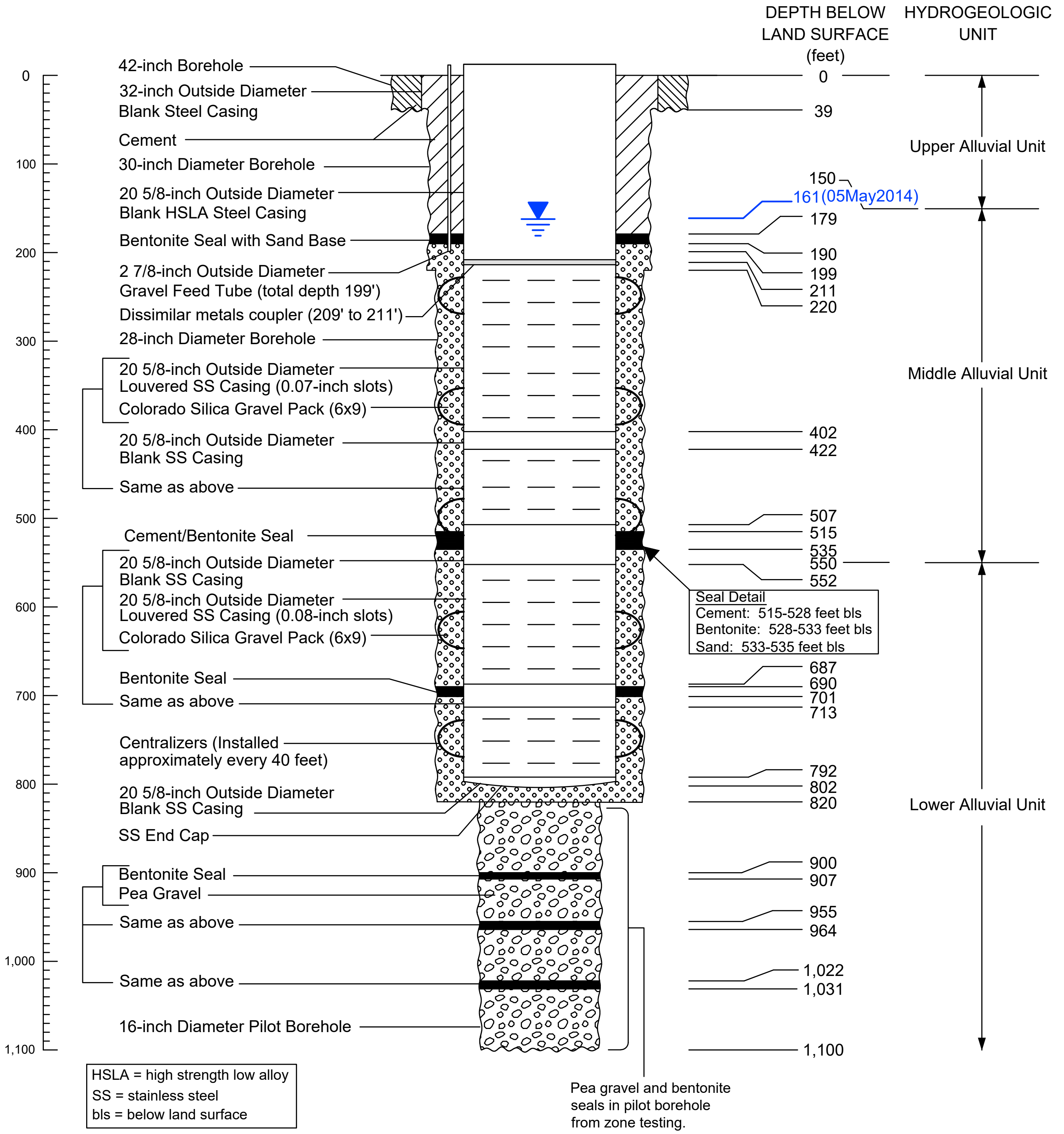
You are required to construct the well(s) as shown in the proposed design, unless the Department has approved a modification to the proposed design. A request to modify the proposed design must be submitted in writing to the Department for approval.

Mailing Address:
Arizona Department of Water Resources
Groundwater Permitting and Well Section
1110 W. Washington St. Suite 310 * Phoenix, Arizona 85007

Facsimile Number:
602-771-8681

If you have any questions, please contact us at (602) 771-8527

APPENDIX B
2014 COS-71A WELL SCHEMATIC AS-BUILT (PRE-MODIFICATION)



HSLA = high strength low alloy
SS = stainless steel
bls = below land surface

EXPLANATION

▼ Non-pumping Water Level

All 32-inch outside diameter casing is ASTM A53 Grade B low carbon steel, 0.375-inch wall thickness.
All 20 5/8-inch outside diameter blank HSLA steel casing is ASTM 139, A606 Type 4 high strength low alloy steel, 0.312-inch wall thickness.
All 20 5/8-inch outside diameter louvered SS casing is ASTM 778, 304L stainless steel, 0.312-inch wall thickness. Louvered casing is Roscoe Moss Ful-Flo.
All 20 5/8-inch outside diameter blank SS casing is ASTM 778, 304L stainless steel, 0.312-inch wall thickness.
The 2 7/8-inch outside diameter steel gravel feed tube is ASTM A53 Grade B low carbon steel, 0.276-inch wall thickness (schedule 80).

WELL: A(2-4)35abb	REGISTRATION: 55-222760
STATE: Arizona	COUNTY: Maricopa
LATITUDE: 33°28'46.1"N	LAND SURFACE ALT: 1227' msl
LONGITUDE: 111°55'1.6"W	CLIENT: City of Scottsdale
HORIZONTAL DATUM: NAD83	CHECKED BY: A. Scott & E. Mora

SCHEMATIC DIAGRAM OF CONSTRUCTION FOR CITY OF SCOTTSDALE WELL 71A

North Indian Bend Wash Superfund Site

FIGURE 6

GIS-Tuc\Drafting\366.1508\71A_ws\20Jan2021

APPENDIX C
CITY OF SCOTTSDALE SANITARY SEWER DISCHARGE PERMIT

SCOTTSDALE
WATER

City of Scottsdale Water Resources Department
Water Quality - Pretreatment Program
8787 East Hualapai Drive
P.O. Box 25089
Scottsdale, AZ 85255-0176

PHONE 480-312-8732
FAX 480-312-8728
WEB www.ScottsdaleAZ.gov

March 13, 2023

Subject: **Wastewater Discharge Permit for Temporary Discharge into the City's Sanitary Sewer System**
Project Name: Motorola Solutions Inc. Site 71/Well 71A Groundwater Discharge
Location or Address: 2839 North Miller Road | Scottsdale, AZ 85257

We, the undersigned, hereby agree to the following:

1. That we shall indemnify and hold the city of Scottsdale free and harmless from all suits and actions resulting from our operations.

2. That we shall provide the appropriate pretreatment methods and/or devices to remove pollutants, as indicated in our application, such that the effluent complies with the City of Scottsdale Revised Code 49 Article IV. Wastewater Collection, Pretreatment and Treatment Requirements, as amended, and applicable to City, State and Federal regulations. In addition, for the discharge of chlorinated water, the discharge level of chlorine residual shall not exceed 5 ppm.

3. That we understand that we are responsible for ensuring that anyone working under this permit understands all permit terms and conditions. We understand that failure to comply with the terms and conditions of this approval may subject us to additional civil and/or criminal penalties under City, State, and Federal laws. We understand that the responsibility for this permit and its conditions are non-transferable, without the written consent of the director.

4. That we have investigated all other legal means of discharging the effluent, including landscaping, watering, municipal separate storm sewer system (MS4), etc.

5. That we understand that we may be required to conduct effluent analysis as directed by any City, State or Federal official, in the event there are indications that the effluent may cause a potential problem within the sewer system, a non-compliance with discharge limits or present a public health or environmental hazard.

6. That we shall cease all discharge activities should sewer system problems occur, violations of the permit conditions, hazardous conditions to the general public, or as directed by City, State or Federal officials. Upon ceasing all activities, notification to the City's Industrial Pretreatment Program (480-312-8732) shall be made, detailing the circumstances of the event. Approval to resume discharge activities shall be obtained from the appropriate City official. In addition, in the event that hazardous waste is discharged into the sewer system, we shall make the proper notifications to City, State, and Federal agencies.

7. That we shall submit, within 20 days of the completion of the discharge event, a self-monitoring report **certifying the flow rate of discharge, the exact time and date of discharge, total volume discharged, and laboratory analyses (if required)**. We, or our authorized representative, shall be on-site during the discharge and shall submit and certify the report with the following statement:

"I hereby certify that the event was witnessed by myself, and all information is based on the actual facts during discharge."

8. That we may be assessed a user charge upon notification of the discharge event, based upon the approved volume, maximum discharge per day, and/or duration of the discharge event. The fee will be assessed in accordance with our sewer rate schedule.

9. That we shall not discharge the effluent water above the maximum allowable flow rate of **1,000 gallons per minute** into the manhole on south side of site.

10. That we shall closely monitor all discharges to the city's sanitary sewer system to prevent a surcharge condition. The permittee is required to monitor and inspect the discharge assembly and receiving sewer line while equipment is in operation.

11. That we shall not exceed the maximum allowable discharge per day of approximately **n/a.**

12. That we shall not exceed the total approved volume of **n/a.** (Estimated total volume is 3.9 million gallons.)

13. That we shall discharge any day of the week, including weekends, **only when the discharge assembly is monitored by a qualified person.**

14. That we shall conduct sampling and analysis for the following pollutants: **n/a. Sampling will occur with well testing.**

15. Discharge under this permit may begin on March 15, 2023. This permit will expire at midnight on April 15, 2023, or when deemed necessary by the Director or Manager.

Authorization to discharge wastewater into the City of Scottsdale Publicly Owned Treatment Works (POTW) must be in compliance with all Pretreatment Standards (discharge limits) and Pretreatment Requirements (permit conditions) stated and set forth within this document and any other applicable conditions within the Clean Water Act; the General Pretreatment Regulations (40 CFR § 403); City of Scottsdale Revised Code (SRC) Chapter 49 Article IV; or other applicable provision(s) of federal, state, or local law, regulation, or policy. Any noncompliance constitutes a violation and is grounds for possible enforcement action.

3/13/2023
Signature of Applicant Date

John Pekala
Print Name

Env. Remediation Program Mgr. 602-859-9294
Title Phone Number

APPROVAL RECOMMENDED:

3/14/2023
Water Quality Supervisor Date

APPROVAL:

3/14/2023
Water Quality Manager/Director Date

SCOTTSDALE WATER

Water Quality | Industrial Pretreatment Program
8787 E. Hualapai Dr
PO Box 25089
Scottsdale, AZ 85255-0176

PHONE: 480-312-8732
FAX: 480-312-9083
WEB: ScottsdaleAZ.gov

Industrial Wastewater Discharge Permit Application for Temporary Discharge to the City's Sewer System

Please complete the following information regarding the need to discharge to the city's sewer system. Completed form should be sent to Pretreatment@scottsdaleaz.gov at least 30 days prior to intended discharge.

A. Name or Entity of Applicant: Motorola Solutions Inc. (MSI), John Pekala (PM)

B. Street Address of Applicant: 3332 E Broadway Road Phoenix, AZ 85040

C. Location of Project or Site: N. Miller Road & Thomas Road

Facility Name: Well 71A

Address: 2839 N Miller Rd, Scottsdale, AZ 85257

D. Contact Person MSI Contractor - Montgomery & Associates, Inc.

Name: Amanda Beam Title: Senior Hydrogeologist

Address: 4222 E Thomas Road Ste 315

Telephone Number: 619-254-8749 Email address: abeam@elmontgomery.com

E. Discharge characteristics and operation description

1. Effluent Type (e.g., chlorinated, cooling tower, grey water, etc.): Groundwater
2. Total volume (gallons) of all effluent to be discharged: 3.9 MG (approximate)
3. Describe location of discharge site (manhole location and/or map) into the city's sewer system: Sewer manhole located on southwest corner of parcel (see attached plans).
4. Characteristics of the wastewater, including any known pollutants (attach laboratory analysis, if applicable): TCE (61 ug/L 10/5/20), arsenic (5.8 ug/L) and nitrate (12 ug/L) (attached spreadsheet of October 2020 analysis)

F. Description of pretreatment method or pretreatment device(s): N/A

G. Describe other discharge means that have been investigated: CGTF and TRTF were considered but ruled out due to the anticipated high solids expected from this water

H. Proposed date(s) of discharge: March 17 - March 30

Applicant Name (print): John Pekala

Applicant Signature: JMPd Date: 2/21/2023

LF# 5967358

APPENDIX D
WASTE MANIFESTS

WM
WASTE MANAGEMENT

PLEASE CALL LANDFILL 24 HRS. IN ADVANCE WITH SHIPPING NOTICE.

NON-HAZARDOUS WASTE MANIFEST

FOR OFFICE USE ONLY
Customer Acct. No. ____
Ticket No. ____

GENERATOR

WM- 12130764

Name: City of Scottsdale
Address: 9379 E. San Salvador Dr
Scottsdale, Az. 85258
Phone No.: 480 312 5628

Generating Location: City of Scottsdale
2839 N. Miller Rd
Scottsdale, Az 85257
I.D. No.: ____

PROFILE APPROVAL NO.		WASTE DESCRIPTION	QUANTITY	UNITS
NWR	448292AZ	Soil	~~6~~ 4	D
			(2,520 lbs)	

UNIT
- D - DRUM
- B - BAG
- C - CARTON
- T - TONS
- Y - YARDS
- O - OTHER

I hereby certify that the above listed material(s), is (are) not a hazardous waste as defined by 40CFR Part 261: That each waste has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulation.

AUTHORIZED AGENT'S NAME (PRINT): Maurice A. Tatlow
DATE: 5/31/2023
SIGNATURE: Maurice A. Tatlow

CONTRACTOR

Name: ____
Phone No.: ____
Address: ____

I hereby certify that the above listed material(s), is (are) not a hazardous waste as defined by 40CFR Part 261 or any applicable state law: That each waste has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulation.

AUTHORIZED AGENT'S NAME (PRINT): ____
DATE: ____
SIGNATURE: ____

TRANSPORTER

Name: MP Environmental
Address: 3045 S. 51st Ave
Phoenix, Az 85043

Phone No.: 602 278 6233
Driver's Name: Caon Fran
Vehicle's No.: 987

I hereby certify that the above listed material(s), is (are) not a hazardous waste as defined by 40CFR Part 261 or any applicable state law: That each waste has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulation.

SHIPMENT DATE: 5/31/23
DRIVER'S SIGNATURE:
DELIVERY DATE: 5/31/23
DRIVER'S SIGNATURE:

DISPOSAL FACILITY

☐ **BUTTERFIELD STATION FACILITY** • 40404 South 99th Avenue • Mobile, Arizona 85239 • (602) 256-0630
☑ **NORTHWEST REGIONAL LANDFILL** • 19401 West Deer Valley Road • Surprise, Arizona 85387 • (623) 546-5171
☐ **PAINTED DESERT LANDFILL** • 9001 North Porter Avenue • Joseph City, Arizona 86032 • (928) 288-3605
☐ **GRAY WOLF LANDFILL** • 23355 East Highway 169 • Mile Post 11 • Dewey, Arizona 86327 • (928) 925-6249
☐ **MARANA REGIONAL LANDFILL** • 14508 West Avra Valley Road • Marana, Arizona 85653 • (520) 471-7682

☐ ____

I hereby certify that the above material has been accepted and that information presented on this document are true and accurate.

NAME (PRINT): CM Dunevent
DATE: 53123
SIGNATURE: CM Dunevent

111-005 / AZ ORIGINAL - WHITE DISPOSAL FACILITY - YELLOW TRANSPORTER - PINK GENERATOR - GOLDENROD

WASTE MANAGEMENT

PLEASE CALL LANDFILL 24 HRS. IN ADVANCE WITH SHIPPING NOTICE.

NON-HAZARDOUS WASTE MANIFEST

FOR OFFICE USE ONLY

Customer Acct. No. ______

Ticket No. ______

GENERATOR

WM- 12130550

Name City of Scottsdale

Address 9379 E. San Salvador Dr.
Scottsdale Az 85258

Phone No. 480 312 5628

Generating Location City of Scottsdale
4244 N. Hayden Rd
Scottsdale, Az 85251

I.D. No. ______

PROFILE APPROVAL NO.	WASTE DESCRIPTION	QUANTITY	UNITS
NWR 44840SAZ	Drill Cuttings	8	D
	5580		

UNIT
[✓ D] - DRUM
B - BAG
C - CARTON
T - TONS
Y - YARDS
O - OTHER

I hereby certify that the above listed material(s), is (are) not a hazardous waste as defined by 40CFR Part 261: That each waste has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulation.

Maurice A. Tatlow — AUTHORIZED AGENT'S NAME (PRINT)
10/27/2023 — DATE
Maurice A. Tatlow — SIGNATURE

CONTRACTOR

Name ______

Phone No. ______

Address ______

I hereby certify that the above listed material(s), is (are) not a hazardous waste as defined by 40CFR Part 261 or any applicable state law: That each waste has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulation.

______ AUTHORIZED AGENT'S NAME (PRINT)
______ DATE
______ SIGNATURE

TRANSPORTER

Name MP Environmental

Address 3045 S. 51st Ave.
Phoenix Az 85043

Phone No. 602 278 6233

Driver's Name Larry Brennan

Vehicle's No. 967

I hereby certify that the above listed material(s), is (are) not a hazardous waste as defined by 40CFR Part 261 or any applicable state law: That each waste has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulation.

10-27-23 — SHIPMENT DATE
______ DRIVER'S SIGNATURE
10-27-23 — DELIVERY DATE
______ DRIVER'S SIGNATURE

DISPOSAL FACILITY

☐ **BUTTERFIELD STATION FACILITY • 40404 South 99th Avenue • Mobile, Arizona 85239 • (602) 256-0630**
☒ **NORTHWEST REGIONAL LANDFILL • 19401 West Deer Valley Road • Surprise, Arizona 85387 • (623) 546-5171**
☐ **PAINTED DESERT LANDFILL • 9001 North Porter Avenue • Joseph City, Arizona 86032 • (928) 288-3605**
☐ **GRAY WOLF LANDFILL • 23355 East Highway 169 • Mile Post 11 • Dewey, Arizona 86327 • (928) 925-6249**
☐ **MARANA REGIONAL LANDFILL • 14508 West Avra Valley Road • Marana, Arizona 85653 • (520) 471-7682**

☐ ______

I hereby certify that the above material has been accepted and that information presented on this document are true and accurate.

Ch. Dinecent — NAME (PRINT)
10 27 23 — DATE
Ch. Dinecent — SIGNATURE

111-005 / AZ ORIGINAL - WHITE DISPOSAL FACILITY - YELLOW TRANSPORTER - PINK GENERATOR - GOLDENROD

WASTE MANAGEMENT

Northwest Regional Landfill
19401 Deer Valley Road
Surprise, AZ, 85387
Ph: 6235846065

Original
Ticket# 1514318

Customer Name MPEnviro MP Environmental
Ticket Date 10/27/2023
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code
Manifest 12130550
Destination
PO
Profile 448405AZ (DRILL CUTTINGS)
Generator 160-CITYOFSCOTTSDALE4244 CITY OF SCOTTSDALE (4244 N HAYDEN RD)

Carrier MP Environmental
Vehicle# 987
Container
Driver
Check#
Billing # 0000086
Gen EPA ID
Grid

Volume

	Time	Scale	Operator	Inbound		
In	10/27/2023 10:13:07	Inbound	cduneven		Gross	19700 lb
Out	10/27/2023 10:49:38	Outbound	cduneven		Tare	14120 lb
					Net	5580 lb
					Tons	2.79

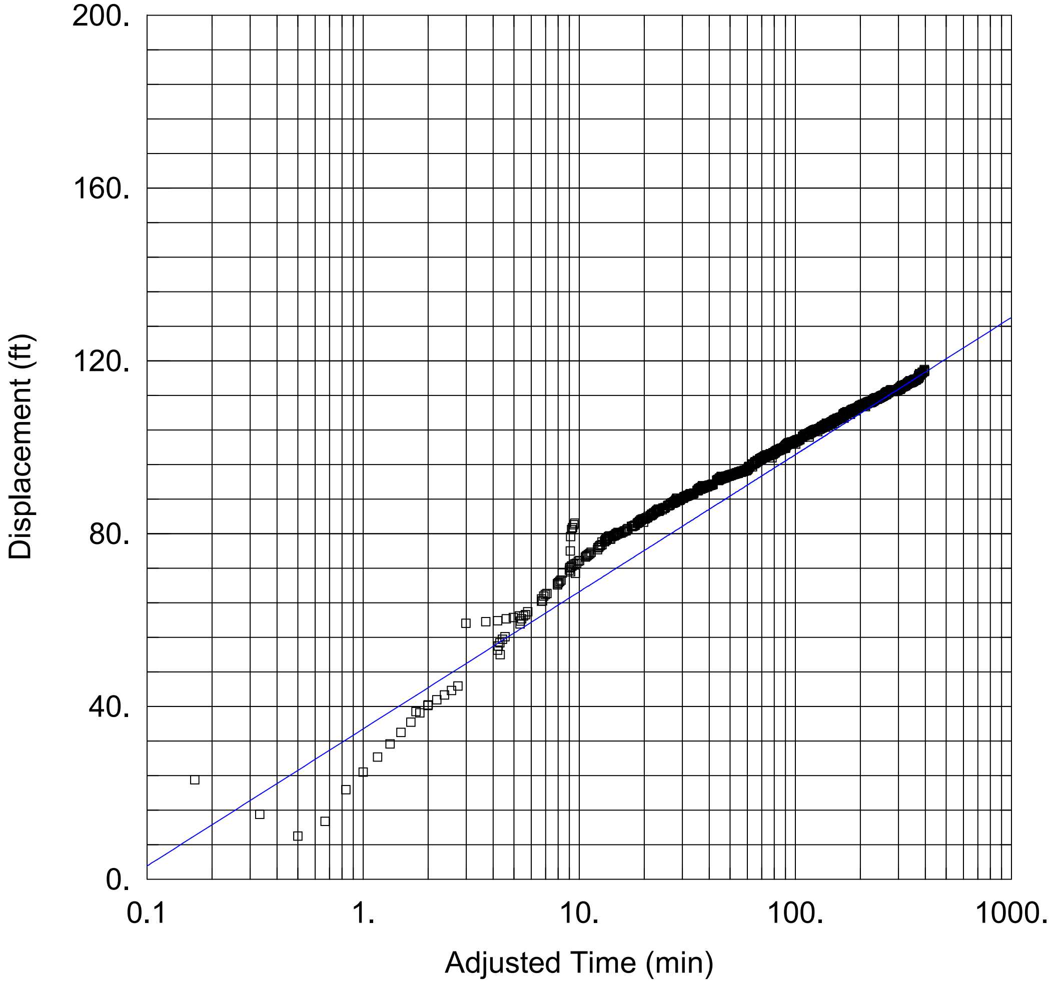
Comments

Product		LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	Spwaste Solid Oth-	100	8.00	Each				
2	ENERGY-Energy Surc	100		%				
3	WWM-P-Waste Water	100		%				
4	ADE-ADEQ Fee	100	2.79	Tons				

Total Tax
Total Ticket

Driver's Signature

APPENDIX E
COS-71A AQTESOLV RESULTS



WELL TEST ANALYSIS

Data Set: P:\...\COS-71A_CRTest_DD_CJ_confined.aqt
Date: 05/01/23 Time: 13:18:36

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Motorola
Project: 366
Location: Scottsdale, AZ
Test Well: COS-71A

AQUIFER DATA

Saturated Thickness: 434. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
COS-71A	0	0

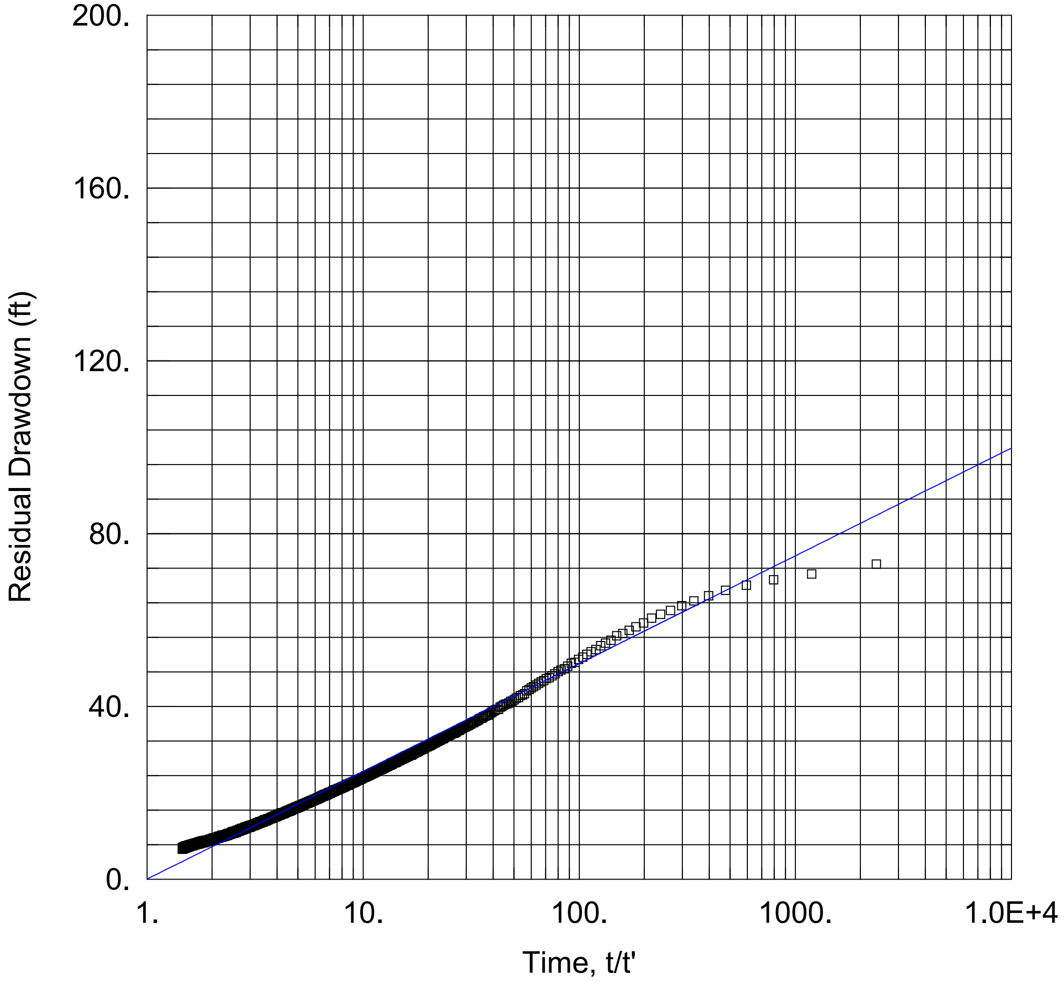
Observation Wells

Well Name	X (ft)	Y (ft)
□ COS-71A	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 550. ft^2/day S = 0.1



WELL TEST ANALYSIS

Data Set: P:\...\COS-71A_CRTest_Recovery_Theis_confined.aqt
Date: 05/01/23 Time: 13:19:56

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Motorola
Project: 366
Location: Scottsdale, AZ
Test Well: COS-71A

AQUIFER DATA

Saturated Thickness: 434. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
COS-71A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
□ COS-71A	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 700. ft^2/day S/S' = 1.

APPENDIX F
COS-71A GEOPHYSICAL LOGS

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY MONTGOMERY & ASSOCIATES
WELL ID COS-71A
FIELD MILLER RD/THOMAS RD - SCOTTSDALE
COUNTY MARICOPA STATE ARIZONA

TYPE OF LOGS: GAMMA - CALIPER
MORE: TEMP / FLUID COND.

OTHER SERVICES
SPINNER

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	4-7-23	TYPE FLUID IN HOLE	WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA-CALIPER-FTC	VISCOSITY	N/A
DEPTH-DRILLER	514.0 FT	LEVEL	~ 216 FT
DEPTH-LOGGER	513.0 FT	MAX. REC. TEMP.	25.7 DEG. C
BTM LOGGED INTERVAL	513.0 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.1 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	J. ZELINSKI / T. FERRIS	TOOL STRING/SN	QL COMBO TOOL SN 6641
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	8:00 AM 6:00 PM

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

COMMENTS:

.

Tool Summary:

Date	4-7-23	**Date**	4-7-23	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SFM SPINNER	**Tool Model**	
Tool SN	6641	**Tool SN**	6618	**Tool SN**	
From	SURFACE	**From**	210.0 FT	**From**	
To	513.0 FT	**To**	490.0 FT	**To**	
Recorded By	J. ZELINSKI	**Recorded By**	J. ZELINSKI	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	4-7-23	**Operation Check**	4-7-23	**Operation Check**	
Calibration Check	4-7-23	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	8:30 AM	**Time Logged**	9:45 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: 16"

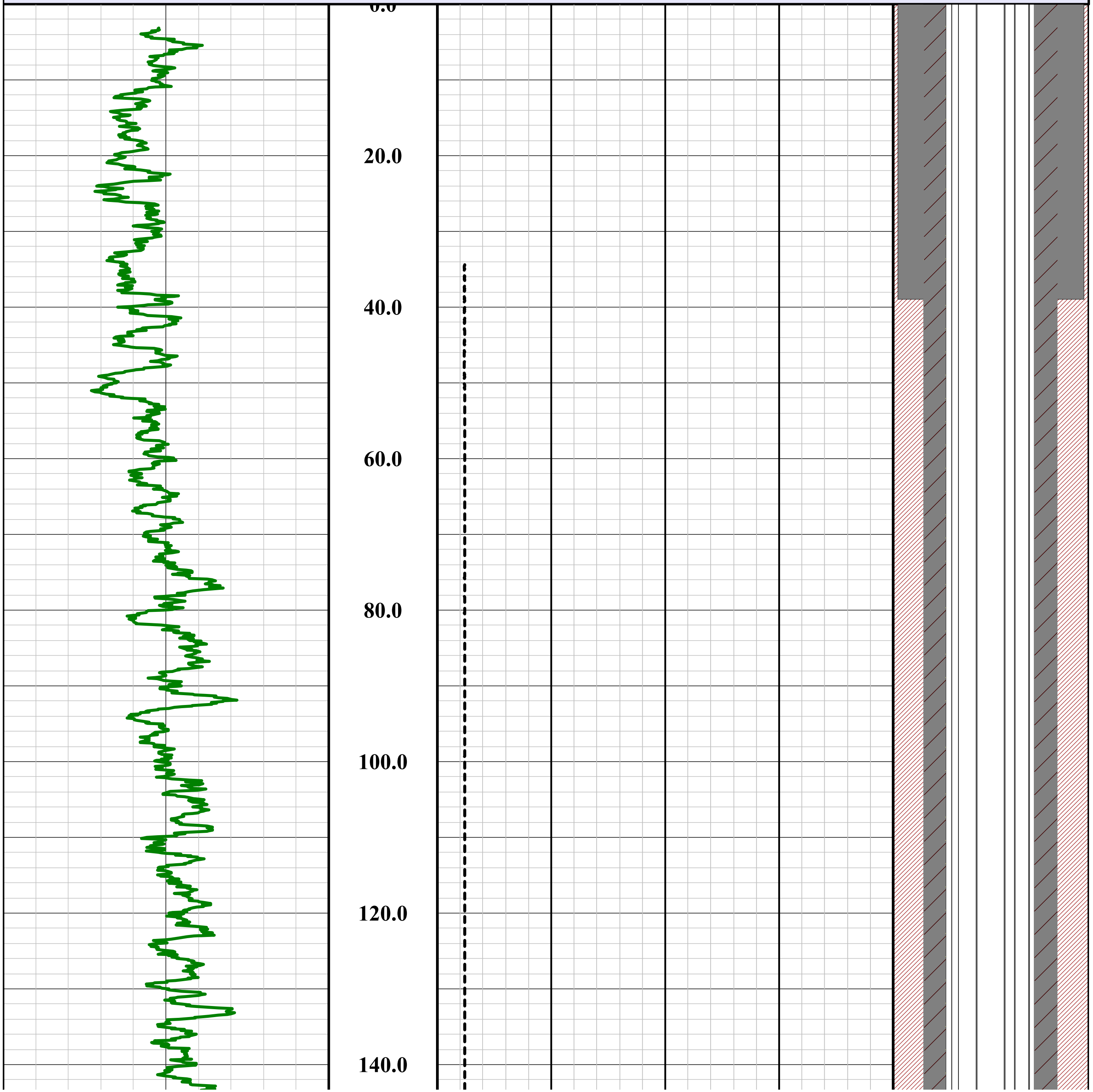
Calibration Points: 16" & 20"

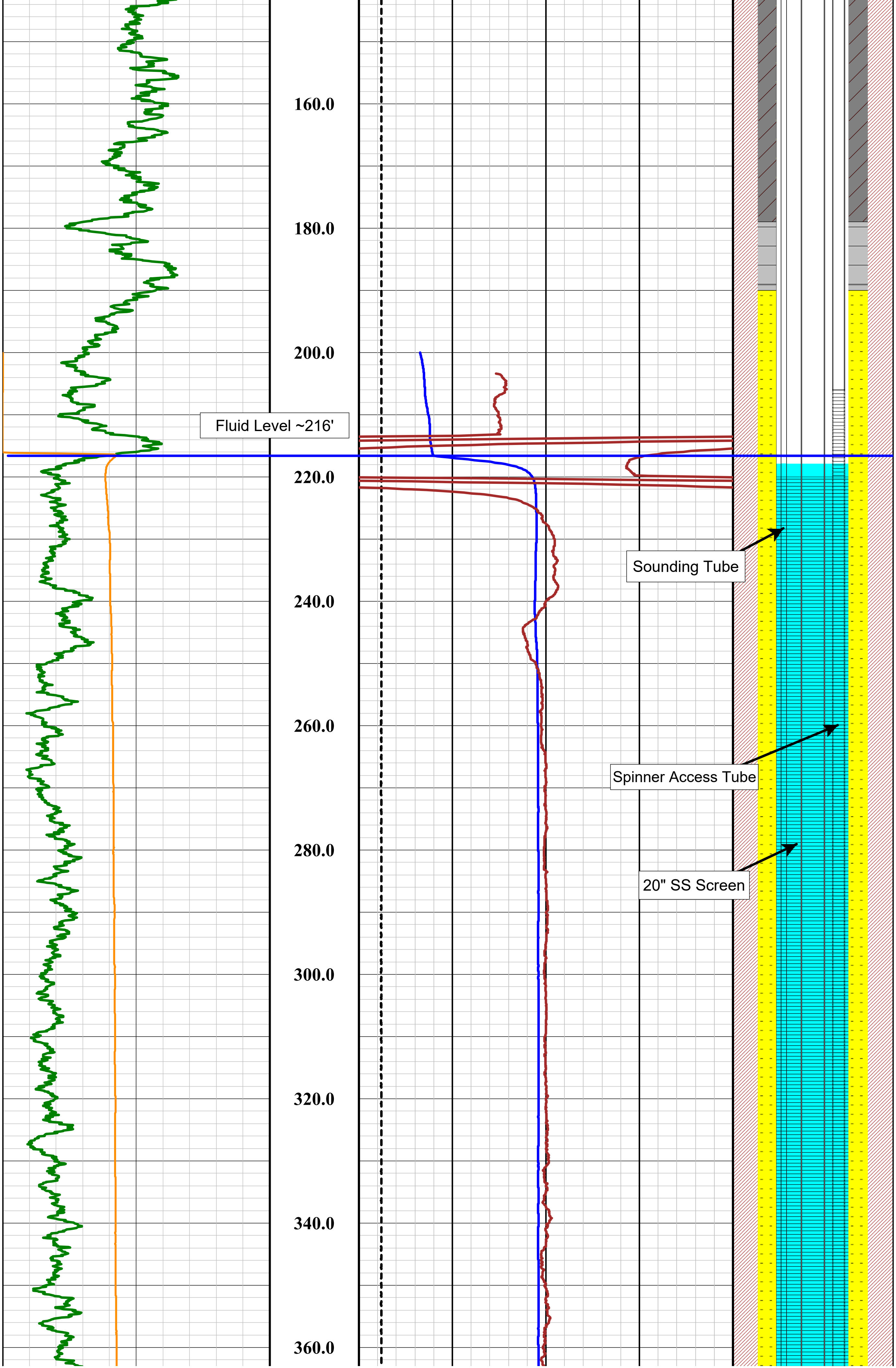
E-Log Calibration Range: N/A **Calibration Points:** N/A

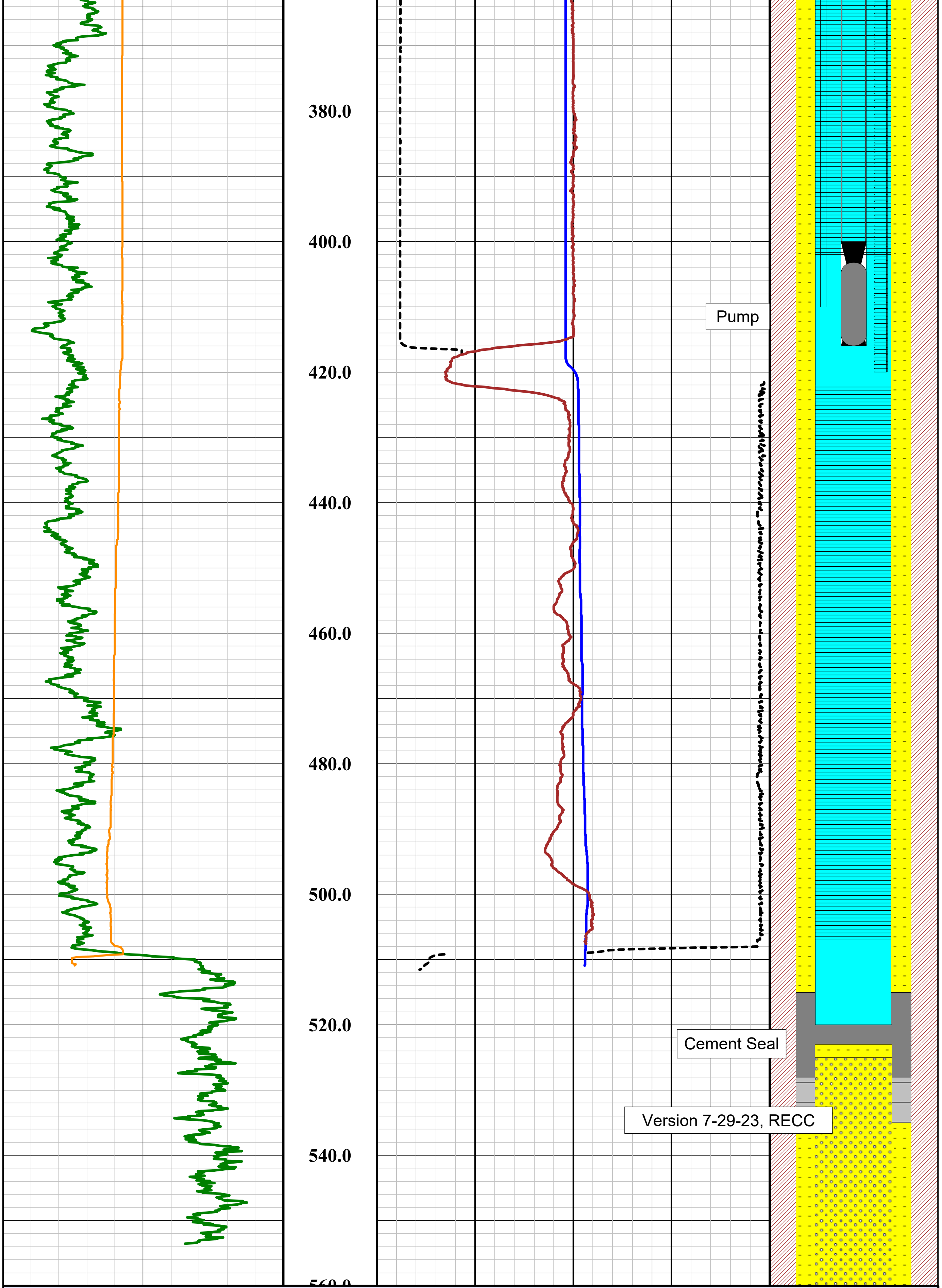
Disclaimer:

Nat. Gamma 0 API 100	**Depth** 1in:20ft	**3-Arm Caliper** 1 Inches 21	**Well Diag.**
Fluid Conductivity 25'C 0 uS/cm 4000		**Temperature** 15 Deg C 35	
		2-Ft Diff. Temp. -1 Deg C 1	

Well COS-71A GCTFC Summary Surface to ~553.5'_4-7-23




160.0
180.0
200.0
Fluid Level ~216'
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0
Sounding Tube
Spinner Access Tube
20" SS Screen



Well COS-71A GCTFC Summary Surface to ~553.5'_4-7-23

-1	Deg C	1
	2-Ft Diff. Temp.	
15	Deg C	35

0	uS/cm	4000

Fluid Conductivity 25'C		Temperature	
0 API 100	1in:20ft	1 Inches 21	Well Diag.
Nat. Gamma	Depth	3-Arm Caliper	

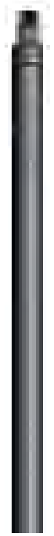
Legend

Mnemonics	**Description**
Nat. Gamma	Natural gamma ray log plotted 0 to 100 API (green line).
Fluid Conductivity 25˚C	Fluid Conductivity is the reciprocal of Fluid Resistivity. Normalized to 25˚C. It provides data of the disolved solids concentrations in fluid column (orange line).
3-Arm Caliper	3-arm mechanical caliper of hole diameter plotted from 1 to 21 inches (black dashed line).
Temperature	Borehole fluid temperature plotted from 15 to 35 deg C (blue line)
2-Ft Diff. Temp.	Differential temperature over 2-ft spacing (brown line).
Well Diag.	Well Construction Diagram from information provided by M&A.

Mnemonics prepared by Robert E. Crowder
Version 7-30-23

QL Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.



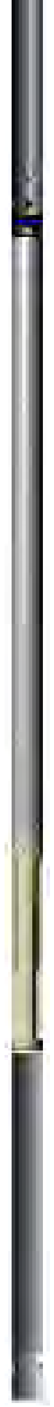
Tool SN: 5613, 5979, 6161, 6292, 6517, 6587, 6641, 6798, 6799, 6973 & 6969

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)



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	COS-71A
Field	INDIAN SCHOOL PARK - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Final

GCFTC Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES
WELL ID	COS-71A
FIELD	MILLER RD / THOMAS RD
COUNTY	MARICOPA
STATE	ARIZONA

TYPE OF LOGS: DYNAMIC SPINNER
MORE: TEMP / FLUID COND.

OTHER SERVICES
GAMMA
CALIPER

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	4-7-23	TYPE FLUID IN HOLE	WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	DYNAMIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	514.0 FT	LEVEL	~ 216 FT
DEPTH-LOGGER	513.0 FT	MAX. REC. TEMP.	25.7 DEG. C
BTM LOGGED INTERVAL	513.0 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.	J. ZELINSKI / T. FERRIS	TOOL STRING/SN	QL SFM SPINNER SN 6618
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	8:00 AM 6:00 PM

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

COMMENTS:

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Tool Summary:

Date	4-7-23	**Date**	4-7-23	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SFM SPINNER	**Tool Model**	
Tool SN	6641	**Tool SN**	6618	**Tool SN**	
From	SURFACE	**From**	210.0 FT	**From**	
To	513.0 FT	**To**	490.0 FT	**To**	
Recorded By	J. ZELINSKI	**Recorded By**	J. ZELINSKI	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	4-7-23	**Operation Check**	4-7-23	**Operation Check**	
Calibration Check	4-7-23	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	8:30 AM	**Time Logged**	9:45 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: 16"

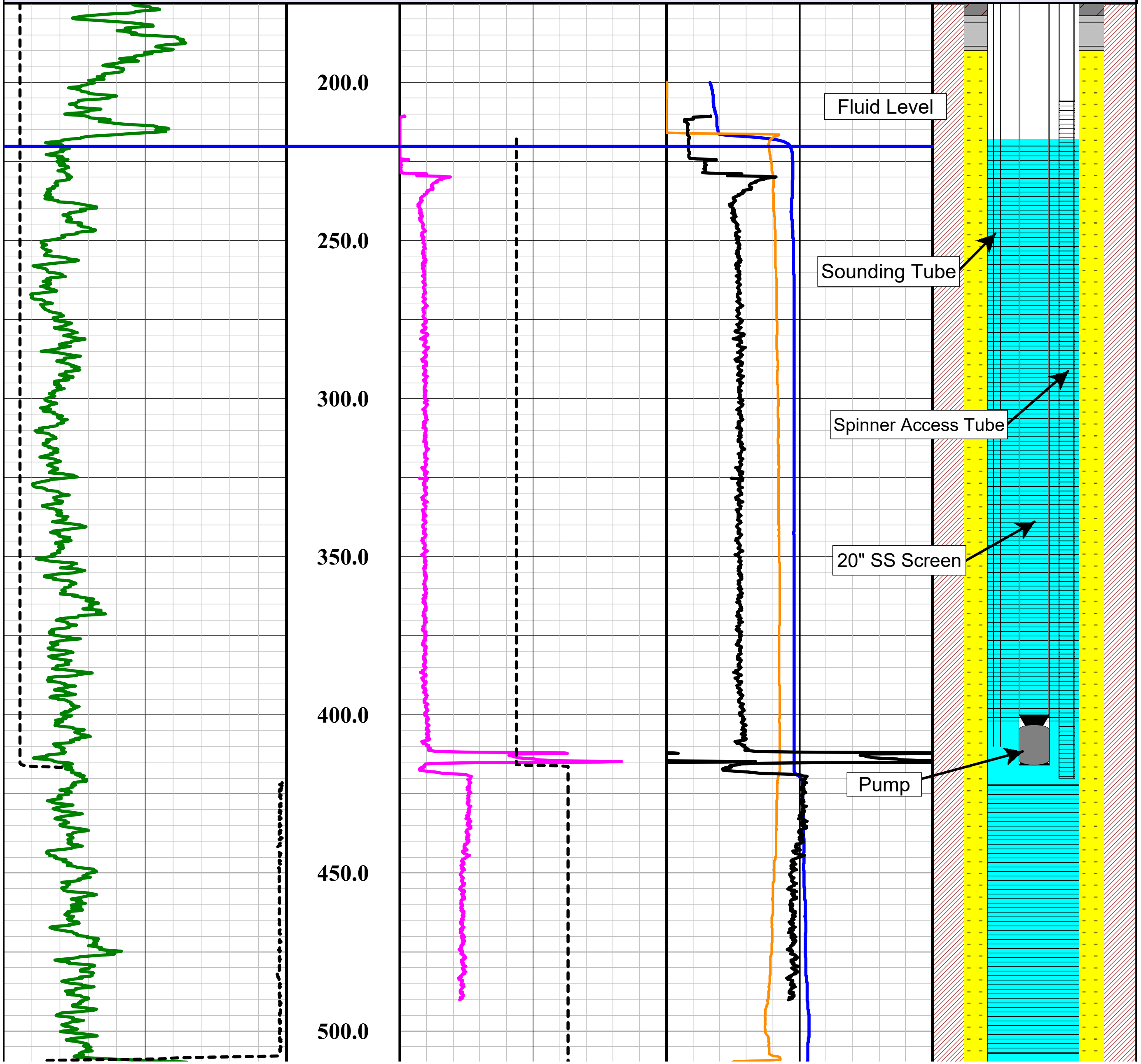
Calibration Points: 16" & 20"

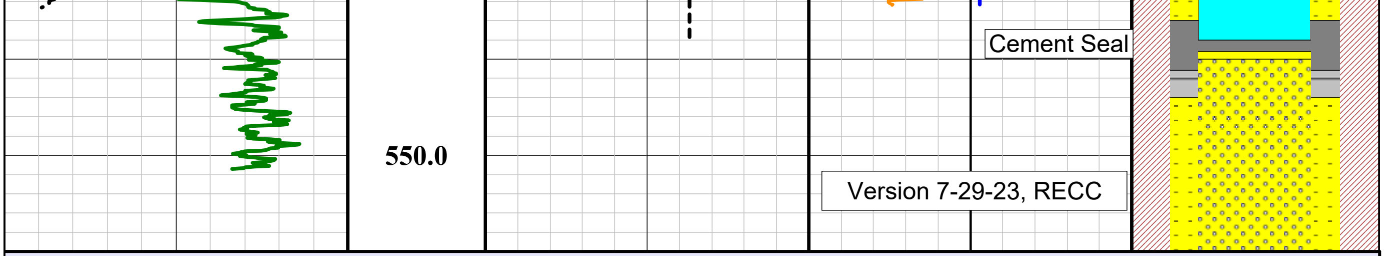
E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

Nat. Gamma 0 API 100	**Depth** 1in:50ft	**Ave Net Velocity Dn** -50 fpm 150	**Temperature** 15 Deg C 35	**Well Diag.**
3-Arm Caliper 1 Inches 21		**Ave Net Velocity Up** -50 fpm 150	**Fluid Conductivity 25'C** 0 uS/cm 4000	
		Est. Hole Volume 10 Gal/Ft 20	**Ave Net Flow Trolling Dn** -1000 GPM 1000	
			Ave Net Flow Trolling Up -1000 GPM 1000	

Well COS-71A Net Flow Summary Pumping 500 GPM_4-7-23





Well COS-71A Net Flow Summary Pumping 500 GPM_4-7-23

			-1000 GPM 1000 Ave Net Flow Trolling Up	
		10 Gal/Ft 20 Est. Hole Volume	-1000 GPM 1000 Ave Net Flow Trolling Dn	
1 Inches 21 3-Arm Caliper		-50 fpm 150 Ave Net Velocity Up	0 uS/cm 4000 Fluid Conductivity 25'C	
0 API 100 Nat. Gamma	1in:50ft Depth	-50 fpm 150 Ave Net Velocity Dn	15 Deg C 35 Temperature	Well Diag.

Legend

Mnemonics	Description
Nat. Gamma	Natural gamma ray log plotted 0 to 100 API (green line).
3-Arm Caliper	3-arm mechanical caliper of hole diameter plotted from 10 to 30 inches (dashed black line).
Ave Net Velocity Dn	Average net velocity calculated from the three down trolling speeds (magenta line).
Ave Net Velocity Up	Average net velocity calculated from the three up trolling speeds (dashed magenta line)
Est. Hole Volume	Estimated Hole Volume calculated from caliper and corrected for column pipe, sounder access pipe, and spinner access pipe (dashed black line).
Fluid Conductivity 25˚C	Fluid Conductivity is the reciprocal of Fluid Resistivity. Normalized to 25˚C. It provides data of the disolved solids concentrations in fluid column (orange line).
Temperature	Borehole fluid temperature plotted from 15 to 35 deg C (blue line).
Ave Net Flow Trolling Dn	Ave Net flow calculated from the Estimated Hole Diameter and the average net velocity while trolling down (black line).
Ave Net Flow Trolling Up	Ave Net flow calculated from the Estimated hole diameter and the average net velocity while trolling down (dashed black line). Turned offf.
Well Diag.	Reference Well Construction Diagram from information provided by M&A.
	Mnemonics prepared by Robert E. Crowder Version 08-06-23

QL Spinner Flowmeter (SFM)

Probe Top = Depth Ref.

Tool SN: 5726 & 6618

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

Maximum Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Three impeller cage sizes: 1.5", 3" and 4"

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

Can be used under static (non-pumping) or dynamic (pumping) conditions

Measures both upflow and downflow

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

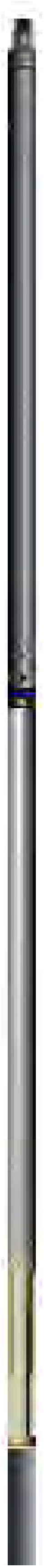
Flow rate (velocity)
- **Static: ~5-7 ft/min**
- **Dynamic: +/- 1 ft/min**

1.57" or 40 mm Diameter (Cage dependent)

QL Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517, 6587, 6641, 6798, 6799, 6973 & 6969



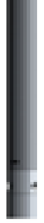
Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

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"



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	COS-71A
Field	MILLER RD / THOMAS RD
County	MARICOPA
State	ARIZONA

Final Flow Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	COS-71A		
FIELD	MILLER RD / THOMAS RD		
COUNTY	MARICOPA	STATE	ARIZONA

TYPE OF LOGS: DYNAMIC SPINNER
MORE: TEMP / FLUID COND.

OTHER SERVICES
GAMMA
CALIPER

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	4-7-23	TYPE FLUID IN HOLE	WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	DYNAMIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	514.0 FT	LEVEL	~ 216 FT
DEPTH-LOGGER	513.0 FT	MAX. REC. TEMP.	25.7 DEG. C
BTM LOGGED INTERVAL	513.0 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.	J. ZELINSKI / T. FERRIS	TOOL STRING/SN	QL SFM SPINNER SN 6618
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	8:00 AM 6:00 PM

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

COMMENTS:

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Tool Summary:

Date	4-7-23	**Date**	4-7-23	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SFM SPINNER	**Tool Model**	
Tool SN	6641	**Tool SN**	6618	**Tool SN**	
From	SURFACE	**From**	210.0 FT	**From**	
To	513.0 FT	**To**	490.0 FT	**To**	
Recorded By	J. ZELINSKI	**Recorded By**	J. ZELINSKI	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	4-7-23	**Operation Check**	4-7-23	**Operation Check**	
Calibration Check	4-7-23	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	8:30 AM	**Time Logged**	9:45 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: 16"

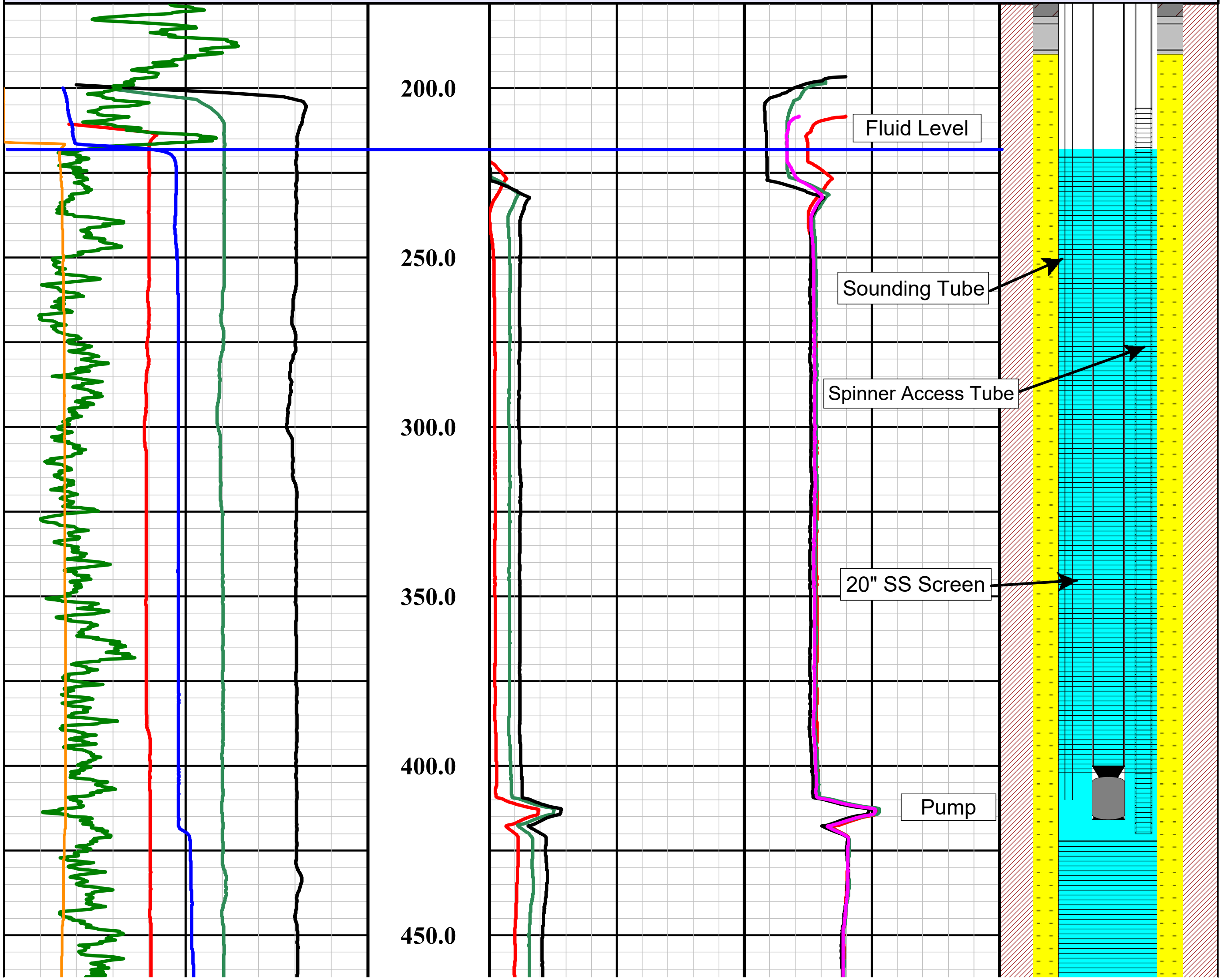
Calibration Points: 16" & 20"

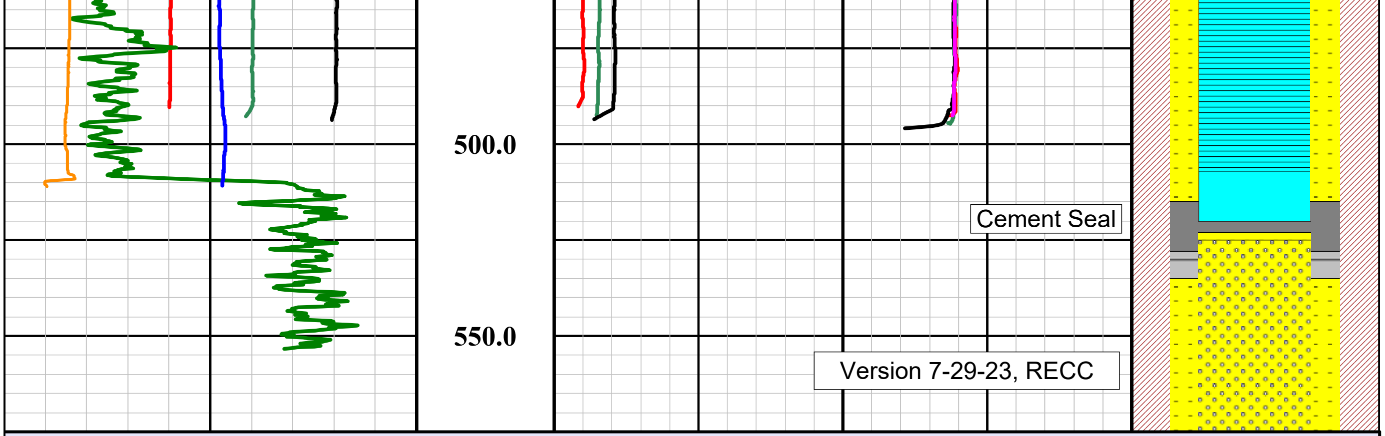
E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

Speed 40 Dn 0 ft/min 100	**Depth** 1in:50ft	**Spinner 40 Dn** 0 cps 20000	**Net Vecocity 40 Dn** -100 fpm 150	**Well Diag.**
Speed 60 Dn 0 ft/min 100		**Spinner 60 Dn** 0 cps 20000	**Net Velocity 60 Dn** -100 fpm 150	
Speed 80 Dn 0 ft/min 100		**Spinner 80 Dn** 0 cps 20000	**Net Velocity 80 Dn** -100 fpm 150	
Nat. Gamma 0 API 100			**Ave Net Velocity Dn** -100 fpm 150	
Temperature 15 Deg C 35				
Fluid Conductivity 25'C 0 uS/cm 10000				

Well COS-71A Net Velocity Summary Pumping 500 GPM Trolling Dn_4-7-23





Well COS-71A Net Velocity Summary Pumping 500 GPM Trolling Dn_4-7-23

0 uS/cm 10000
Fluid Conductivity 25'C

15 Deg C 35
Temperature

0 API 100
Nat. Gamma

0 ft/min 100
Speed 80 Dn

0 ft/min 100
Speed 60 Dn

0 ft/min 100
Speed 40 Dn

1in:50ft
Depth

0 cps 20000
Spinner 80 Dn

0 cps 20000
Spinner 60 Dn

0 cps 20000
Spinner 40 Dn

-100 fpm 150
Ave Net Velocity Dn

-100 fpm 150
Net Velocity 80 Dn

-100 fpm 150
Net Velocity 60 Dn

-100 fpm 150
Net Veocity 40 Dn

Well Diag.

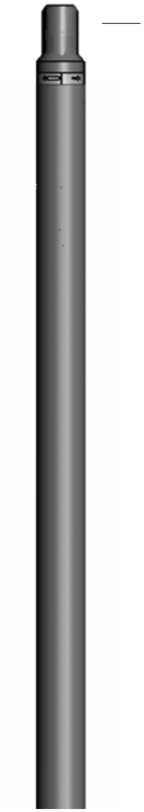
Legend

Mnemonics	**Description**
Nat. Gamma	Natural gamma ray log plotted 0 to 100 API (green line).
Fluid Conductivity 25˚C	Fluid Conductivity is the reciprocal of Fluid Resistivity. Normalized to 25˚C. It provides data of the disolved solids concentrations in fluid column (orange line).
Temperature	Borehole fluid temperature plotted from 15 to 35 deg C (blue line).
Speed 40 Dn	Trolling speed and direction (red line).
Speed 60 Dn	Trolling speed and direction (green line).
Speed 80 Dn	Trolling speed and direction (black line).
Spinner 40 Dn	Spinner response in cps trolling down at 40 fpm (red line).
Spinner 60 Dn	Spinner response in cps trolling down at 60 fpm (green line).
Spinner 80 Dn	Spinner response in cps trolling down at 80 fpm (black line).
Net Velocity 40 Dn	Net velocity calculated from spinner cal data & corrected for trolling speed (red line).

Net Velocity 60 Dn	Net velocity calculated from spinner cal data & corrected for trolling speed (green line).
Net Velocity 80 Dn	Net velocity calculated from spinner cal data & corrected for trolling speed (black line).
Ave Net Velocity Dn	Average net velocity calculated from the three trolling speeds (magenta line).
Well Diag.	Well Construction Diagram from information provided by M&A.
	Mnemonics prepared by Robert E. Crowder Version 7-31-23

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

Minimum Flow Rate: [illegible] gpm

Maximum Flow Rate: 5000 gpm

1.57" or 40 mm Diameter (Cage dependent)

QL Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517, 6587, 6641, 6798, 6799, 6973 & 6969

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

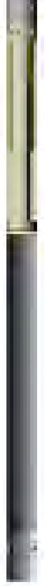
Temperature Rating: 80 Deg C (176 Deg F)

Pressure 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"



Southwest Exploration Services, LLC
borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	COS-71A
Field	MILLER RD / THOMAS RD
County	MARICOPA
State	ARIZONA

Final Spinner Velocity Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES
WELL ID	COS-71A
FIELD	MILLER RD / THOMAS RD
COUNTY	MARICOPA
STATE	ARIZONA

TYPE OF LOGS: DYNAMIC SPINNER
MORE: TEMP / FLUID COND.

OTHER SERVICES
GAMMA
CALIPER

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	4-7-23	TYPE FLUID IN HOLE	WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	DYNAMIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	514.0 FT	LEVEL	~ 216 FT
DEPTH-LOGGER	513.0 FT	MAX. REC. TEMP.	25.7 DEG. C
BTM LOGGED INTERVAL	513.0 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.	J. ZELINSKI / T. FERRIS	TOOL STRING/SN	QL SFM SPINNER SN 6618
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	8:00 AM 6:00 PM

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

COMMENTS:

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Tool Summary:

Date	4-7-23	**Date**	4-7-23	**Date**	
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SFM SPINNER	**Tool Model**	
Tool SN	6641	**Tool SN**	6618	**Tool SN**	
From	SURFACE	**From**	210.0 FT	**From**	
To	513.0 FT	**To**	490.0 FT	**To**	
Recorded By	J. ZELINSKI	**Recorded By**	J. ZELINSKI	**Recorded By**	
Truck No	200	**Truck No**	200	**Truck No**	
Operation Check	4-7-23	**Operation Check**	4-7-23	**Operation Check**	
Calibration Check	4-7-23	**Calibration Check**	N/A	**Calibration Check**	
Time Logged	8:30 AM	**Time Logged**	9:45 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: 16"

Calibration Points: 16" & 20"

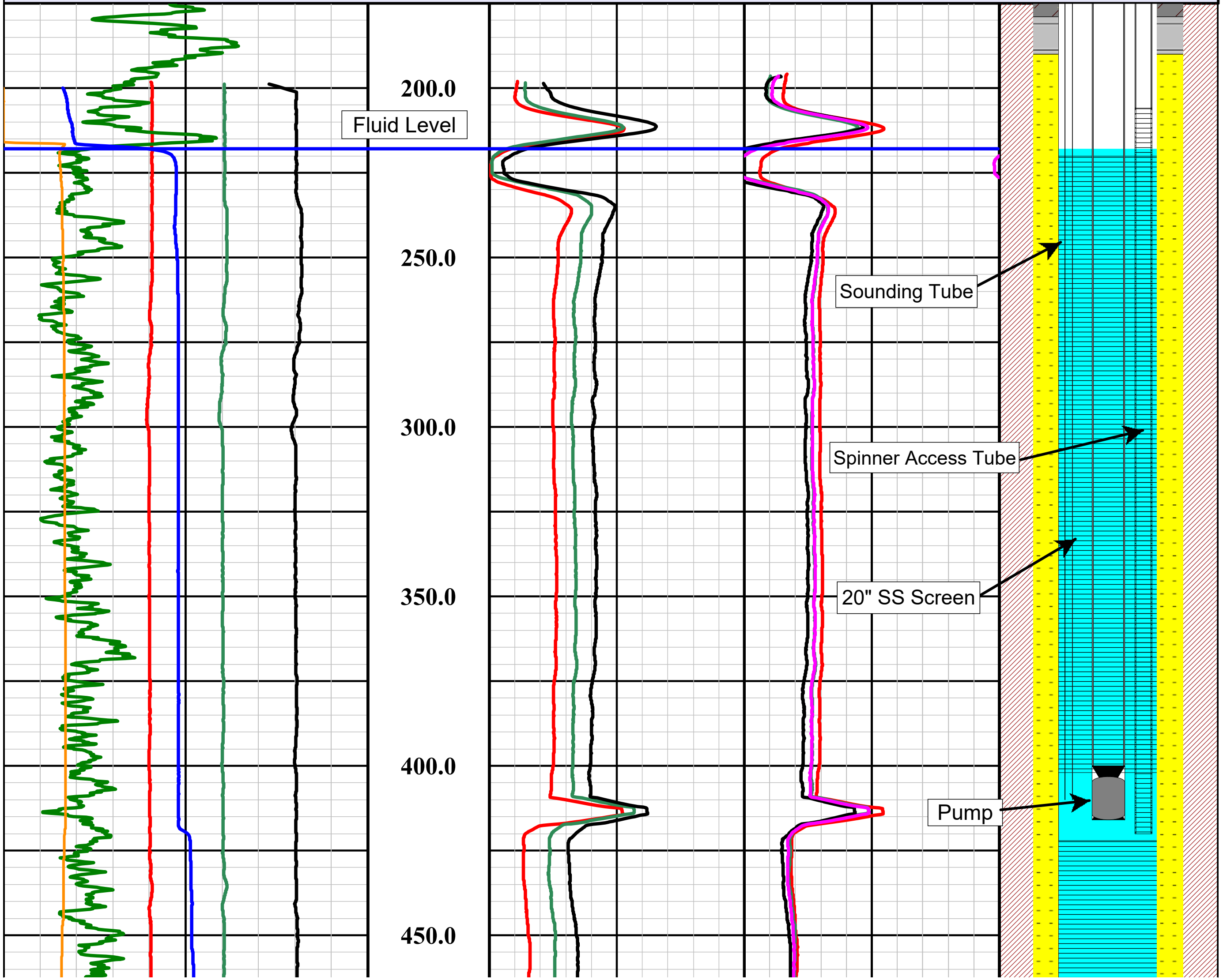
E-Log Calibration Range: N/A **Calibration Points:** N/A

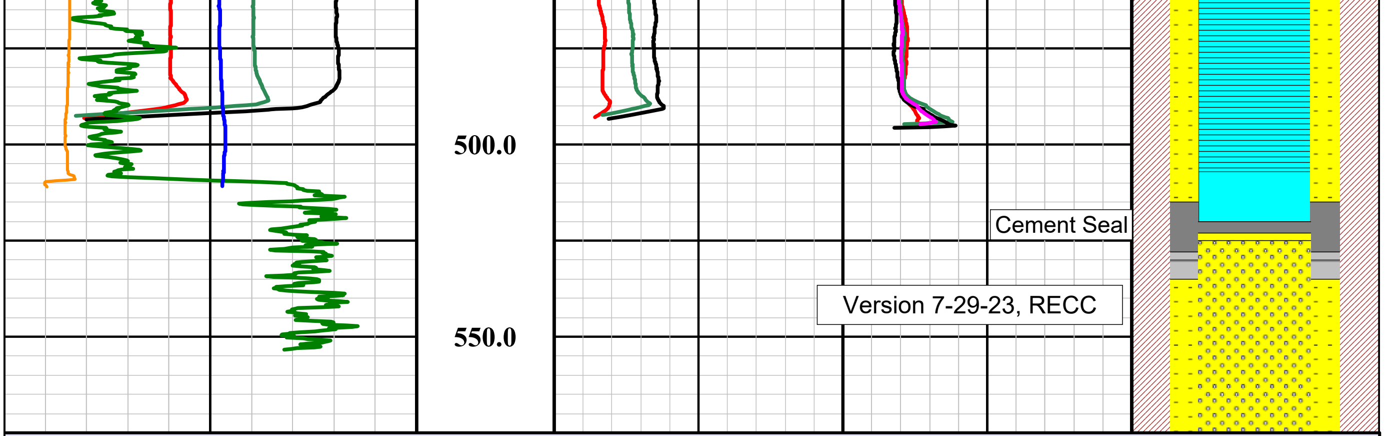
Disclaimer:

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.

Speed 40 Up 0 ft/min 100	**Depth** 1in:50ft	**Spinner 40 Up** 0 cps 10000	**Net Velocity 40 Up** -50 fpm 150	**Well Diag.**
Speed 60 Up 0 ft/min 100		**Spinner Up 60** 0 cps 10000	**Net Velocity 60 Up** -50 fpm 150	
Speed 80 Up 0 ft/min 100		**Spinner Up 80** 0 cps 10000	**Net Velocity 80 Up** -50 fpm 150	
Nat. Gamma 0 API 100			**Ave Net Velocity Up** -50 fpm 150	
Temperature 15 Deg C 35				
Fluid Conductivity 25'C 0 uS/cm 10000				

Well COS-71A Net Velocity Summary Pumping 500 GPM Trolling Up_4-7-23





Well COS-71A Net Velocity Summary Pumping 500 GPM Trolling Up_4-7-23

0 uS/cm 10000
Fluid Conductivity 25'C

15 Deg C 35
Temperature

0 API 100
Nat. Gamma

0 ft/min 100
Speed 80 Up

0 ft/min 100
Speed 60 Up

0 ft/min 100
Speed 40 Up

1in:50ft
Depth

0 cps 10000
Spinner Up 80

0 cps 10000
Spinner Up 60

0 cps 10000
Spinner 40 Up

-50 fpm 150
Ave Net Velocity Up

-50 fpm 150
Net Velocity 80 Up

-50 fpm 150
Net Velocity 60 Up

-50 fpm 150
Net Velocity 40 Up

Well Diag.

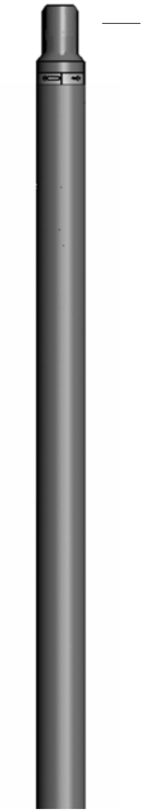
Legend

Mnemonics	Description
Nat. Gamma	Natural gamma ray log plotted 0 to 100 API (green line).
Fluid Conductivity 25˚C	Fluid Conductivity is the reciprocal of Fluid Resistivity. Normalized to 25˚C. It provides data of the disolved solids concentrations in fluid column (orange line).
Temperature	Borehole fluid temperature plotted from 15 to 35 deg C (blue line).
Speed 40 Up	Trolling speed and direction (red line).
Speed 60 Up	Trolling speed and direction (green line).
Speed 80 Up	Trolling speed and direction (black line).
Spinner 40 Up	Spinner response in cps trolling up at 40 fpm (red line).
Spinner 60 Up	Spinner response in cps trolling up at 60 fpm (green line).
Spinner 80 Up	Spinner response in cps trolling up at 80 fpm (black line).
Net Velocity 40 Up	Net velocity calculated from spinner cal data & corrected for trolling speed (red line).

Net Velocity 60 Up	Net velocity calculated from spinner cal data & corrected for trolling speed (green line).
Net Velocity 80 Up	Net velocity calculated from spinner cal data & corrected for trolling speed (black line).
Ave Net Velocity Up	Average net velocity calculated from the three trolling speeds (magenta line).
Well Diag.	Well Construction Diagram from information provided by M&A. Mnemonics prepared by Robert E. Crowder Version 7-31-23

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)

QL Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517, 6587, 6641, 6798, 6799, 6973 & 6969

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)
Pressure 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"

Southwest Exploration Services, LLC
borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	COS-71A
Field	MILLER RD / THOMAS RD
County	MARICOPA
State	ARIZONA

Final Spinner Velocity Summary

WELL Motorola

TYPE of LOGS Dynamic Spin Dn

Date 04-11-23

SYSTEM NAME

GeoLog, LLC

P.O. Box 2571 Cottonwood AZ. 86326
(928) 899-6491
ccatalano@geologaz.com

CLIENT Yellow Jacket Drilling
WELL ID Motorola
PROJECT Motorola
COUNTY Maricopa STATE Arizona

DYNAMIC SPINNER DOWN

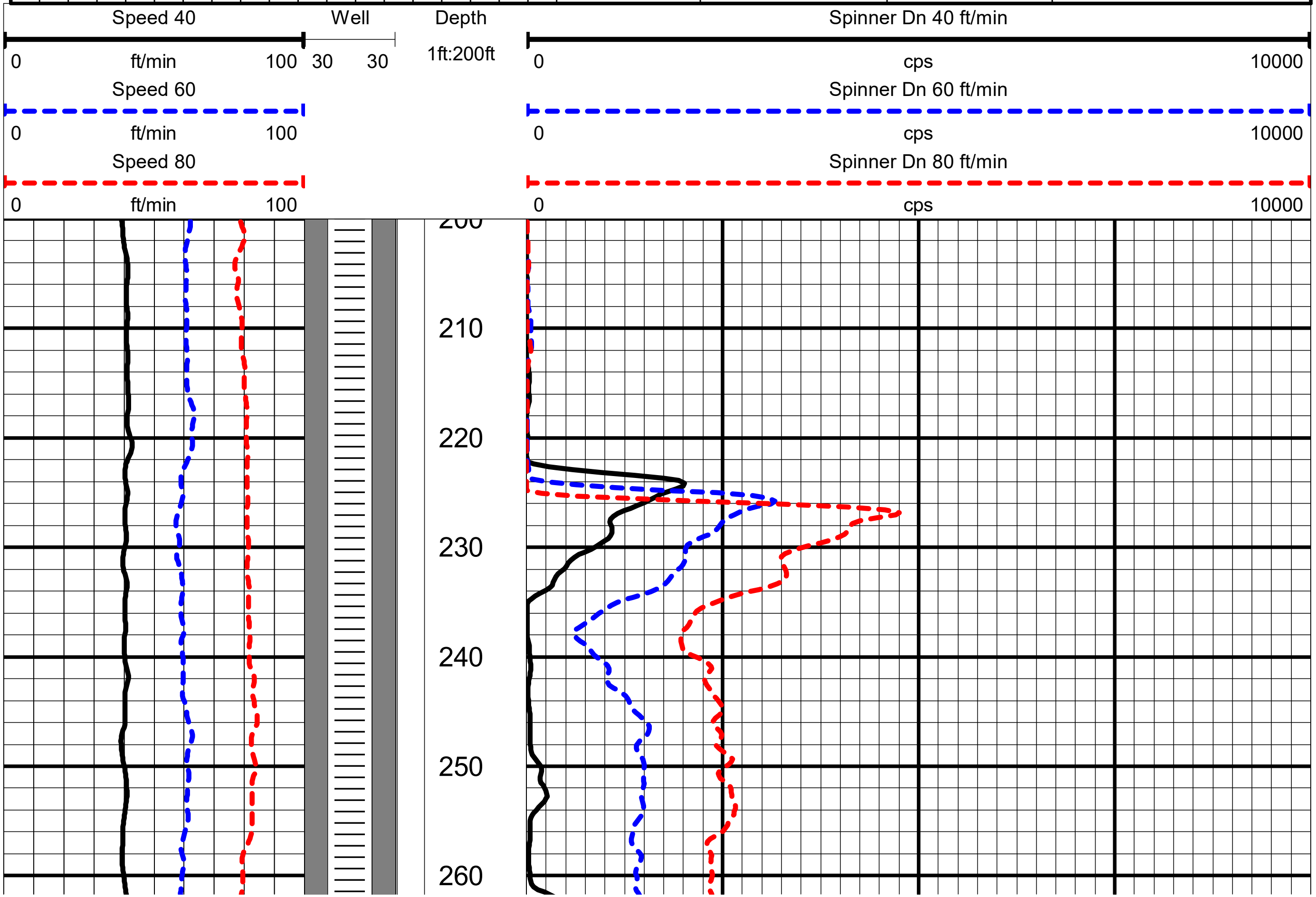
LOCATION N 33 deg 28 min 46.4 sec W 111 deg 55 min 1.4 sec

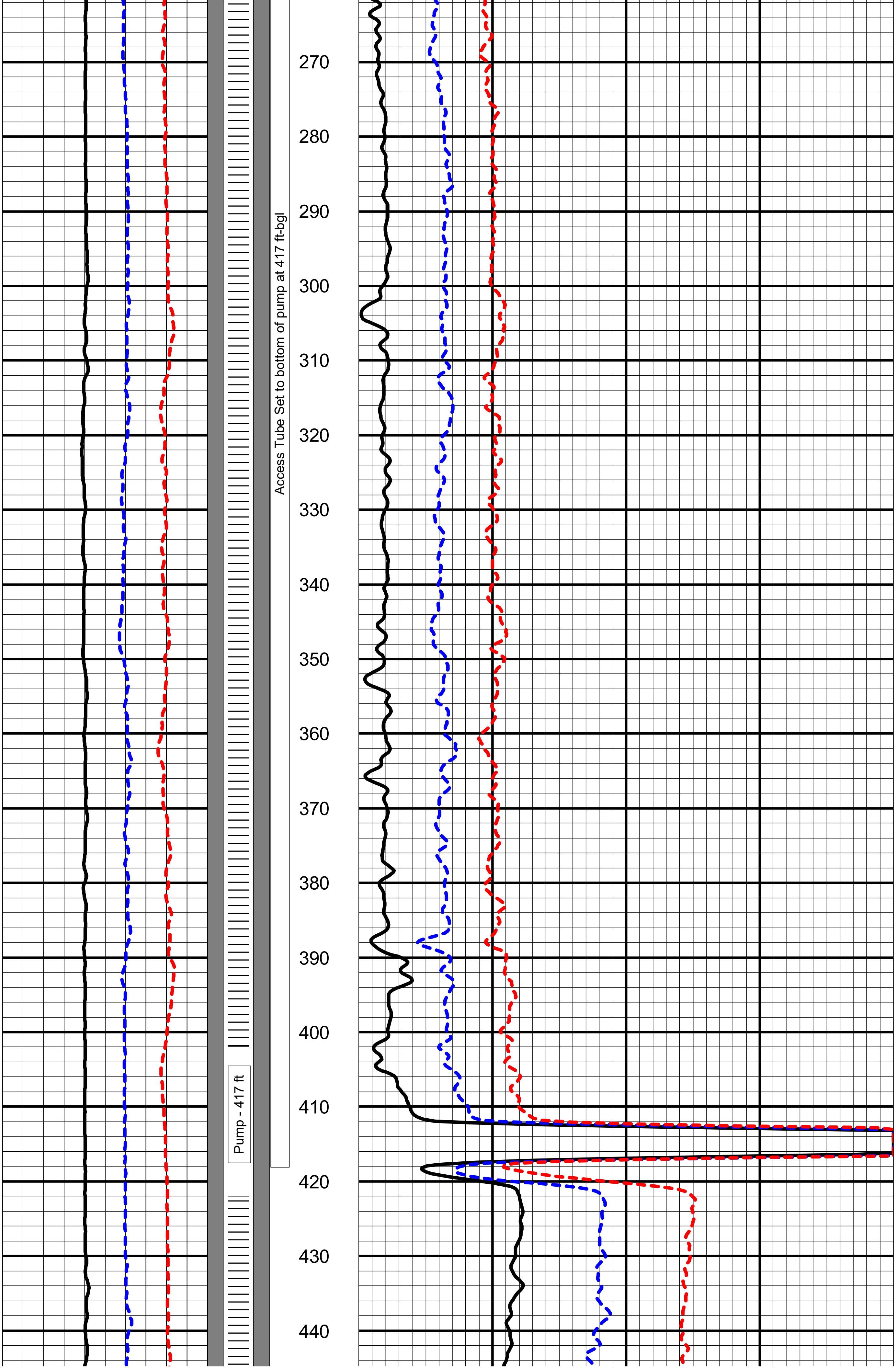
OTHER SERVICES
Static Spinner
Depth Specific Sampling

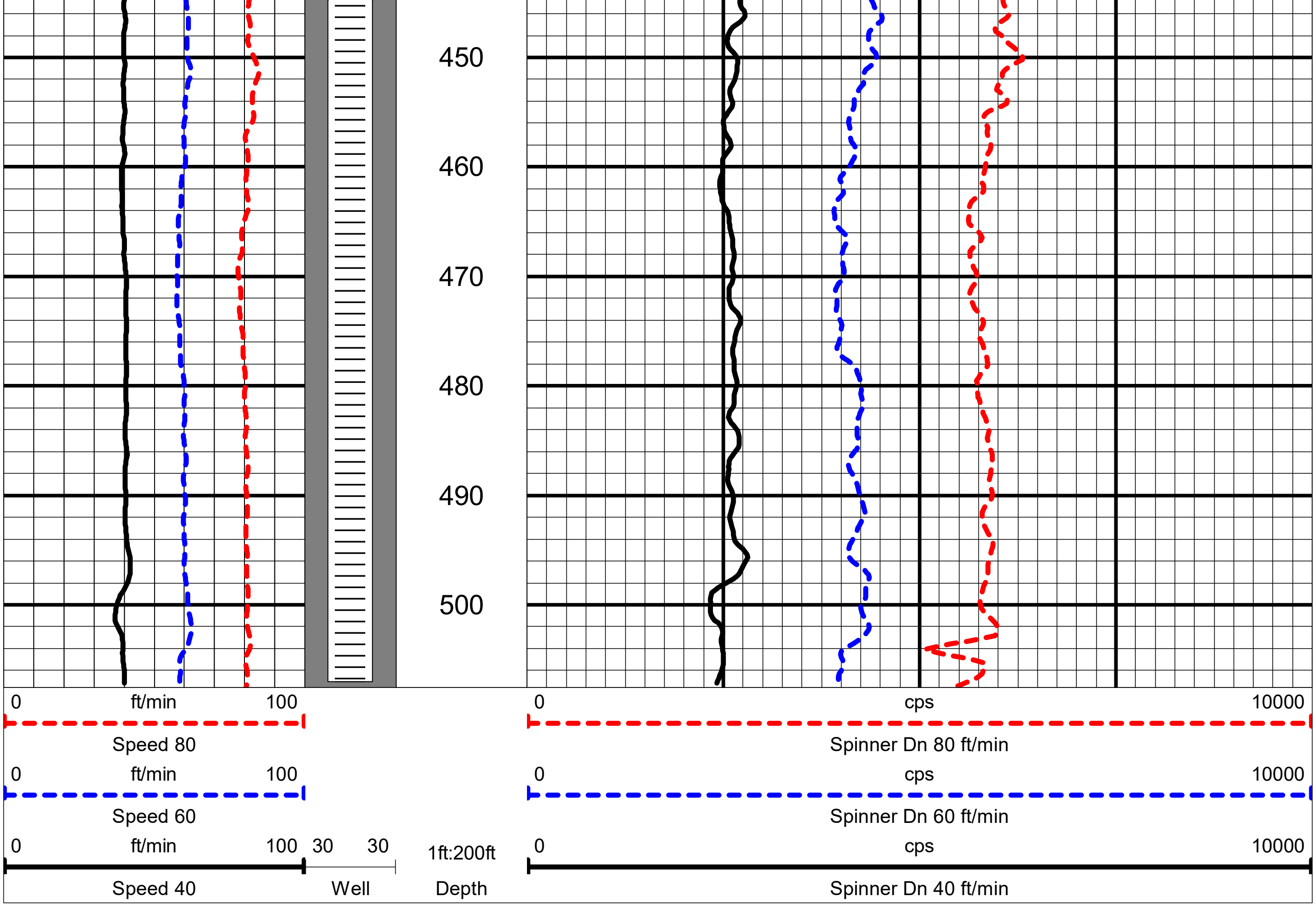
SEC TWP RGE

PERMANENT DATUM	Ground Level	ELEVATION G.L. 1,143 ft-amsl		K.B.
LOGS MEAS. FROM	Ground Level	SURFACE CONDUCTOR N/A		D.F.
DRILLING MEAS. FROM	Ground Level			G.L.
DATE	04-11-23	TYPE FLUID IN HOLE	Water	
RUN No	1	RES MUD		
WELL TYPE	Water Production	RES MUD FILTRATE		
DEPTH-DRILLER	N/A	RES WALL CAKE		
DEPTH-LOGGER	507 ft-bgl	MAX. REC. TEMP.		
ADDITIVES	N/A	Pump Setting	417 ft-bgl	
BIT TYPE	N/A	Pumping Rate	498 gpm	
DRILLING METHOD	Flooded R/C	Pumping Water Level	228 ft-bgl	
RECORDED BY	Yovanni Rosas			
WITNESSED BY	Montgomery & Associates			

RUN	Logging Tools Used / Century System VI			CASING RECORD / BIT RECORD			
NO.	TOOL S/N	FROM	TO	SIZE	WGT.	FROM	TO
RUN 1	Static Spinner	150 ft-bgl	507 ft-bgl			0	
RUN 2	Dynamic Spinner	200 ft-bgl	507 ft-bgl				
RUN 3	Depth Spec Samples 270,375,405,420, 455 ft-bgl						
RUN 4							
RUN 5				CAL DATE			
RUN 6							




Access Tube Set to bottom of pump at 417 ft-bgl
Pump - 417 ft
270
280
290
300
310
320
330
340
350
360
370
380
390
400
410
420
430
440


450
460
470
480
490
500
0
ft/min
100
Speed 80
0
ft/min
100
Speed 60
0
ft/min
100
Speed 40
30
30
Well
1ft:200ft
Depth
0
cps
10000
Spinner Dn 80 ft/min
0
cps
10000
Spinner Dn 60 ft/min
0
cps
10000
Spinner Dn 40 ft/min

GeoLog, LLC

P.O. Box 2571 Cottonwood AZ. 86326
(928) 899-6491
ccatalano@geologaz.com

WELL Motorola
TYPE of LOGS Dynamic Spin Up
Date 04-11-23
SYSTEM NAME

CLIENT Yellow Jacket Drilling
WELL ID Motorola
PROJECT Motorola
COUNTY Maricopa
STATE Arizona

DYNAMIC SPINNER UP

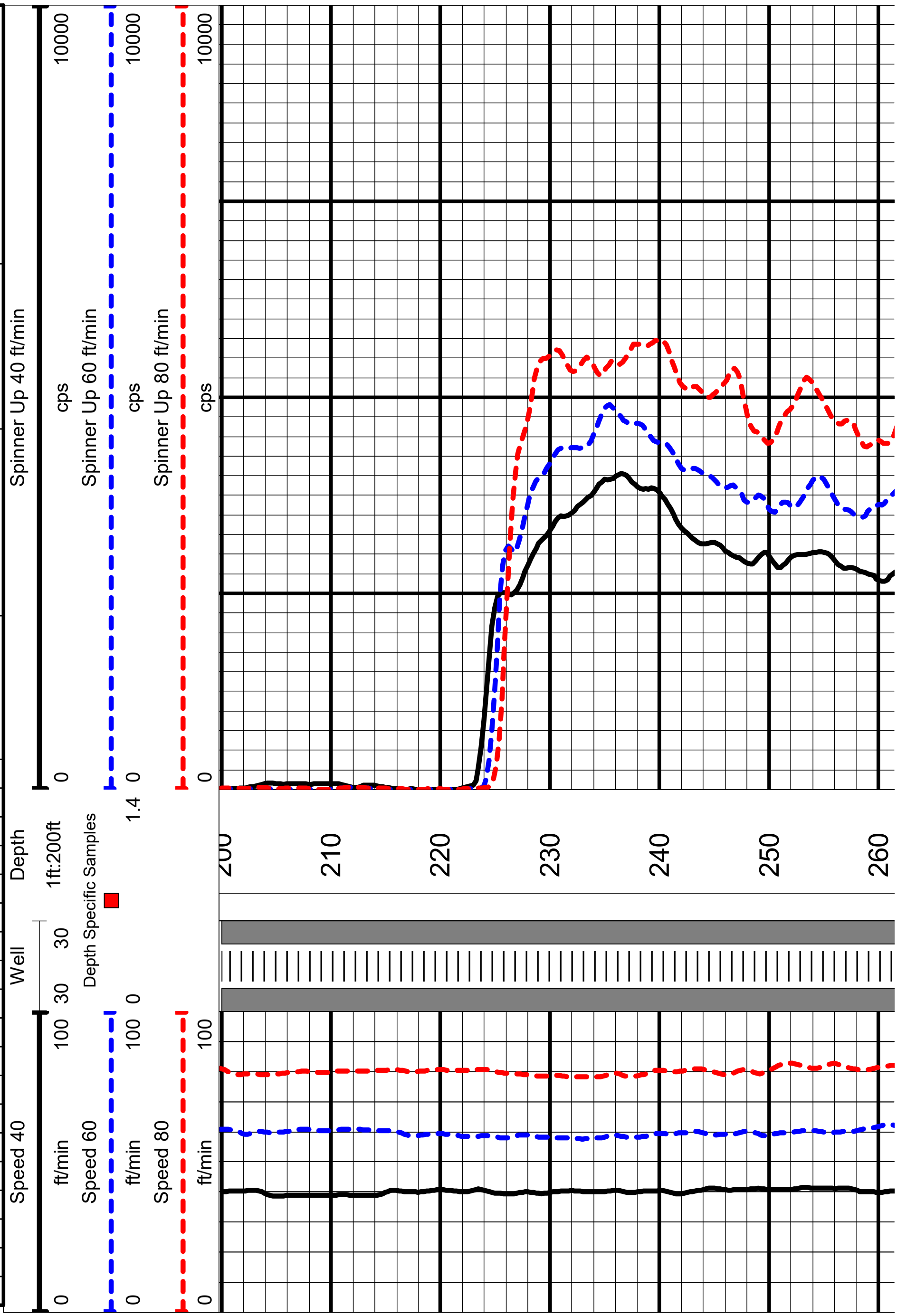
LOCATION
N 33 deg 28 min 46.4 sec
W 111 deg 55 min 1.4 sec
SEC
TWP
RGE

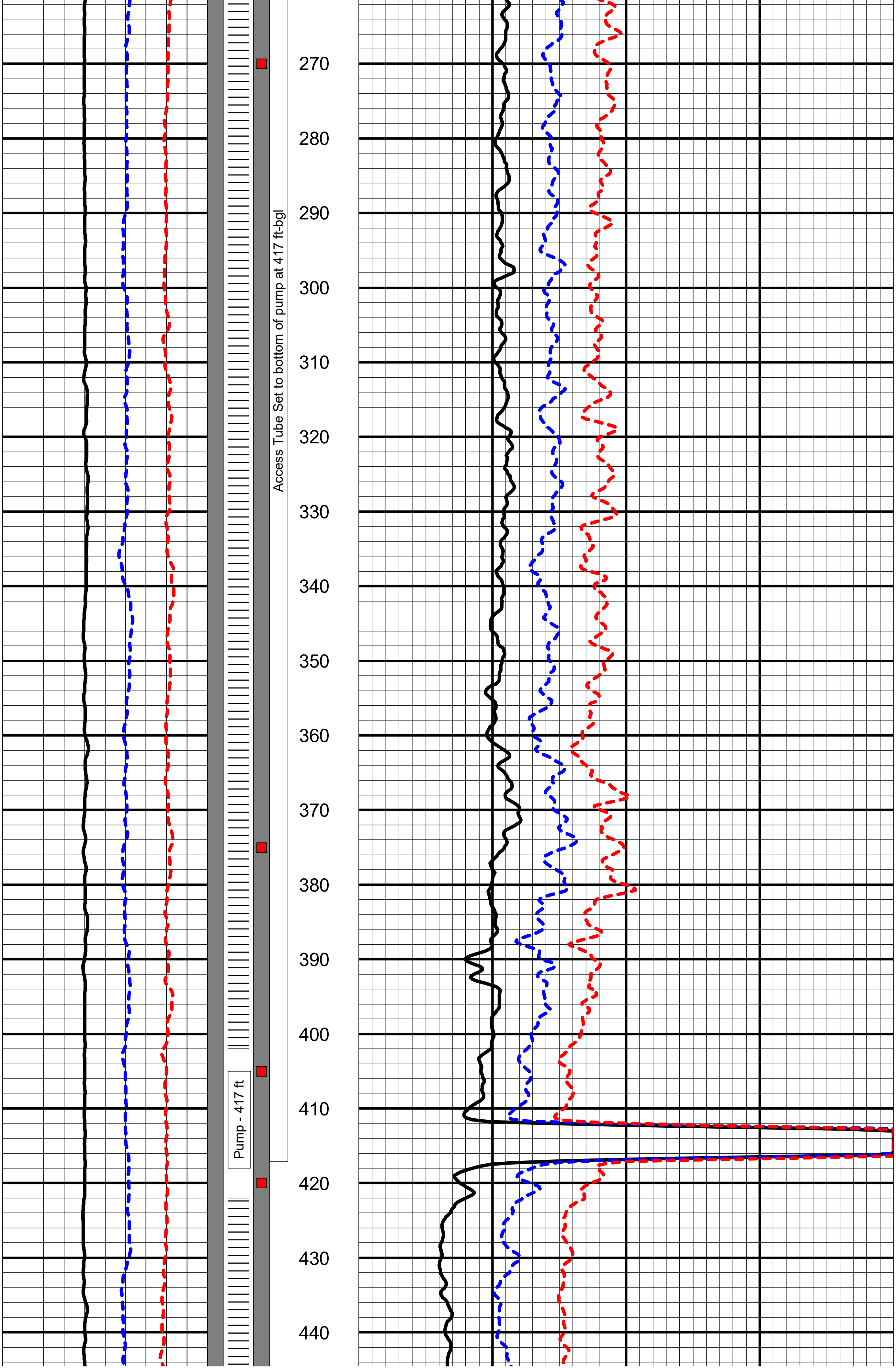
OTHER SERVICES
Static Spinner
Depth Specific Sampling

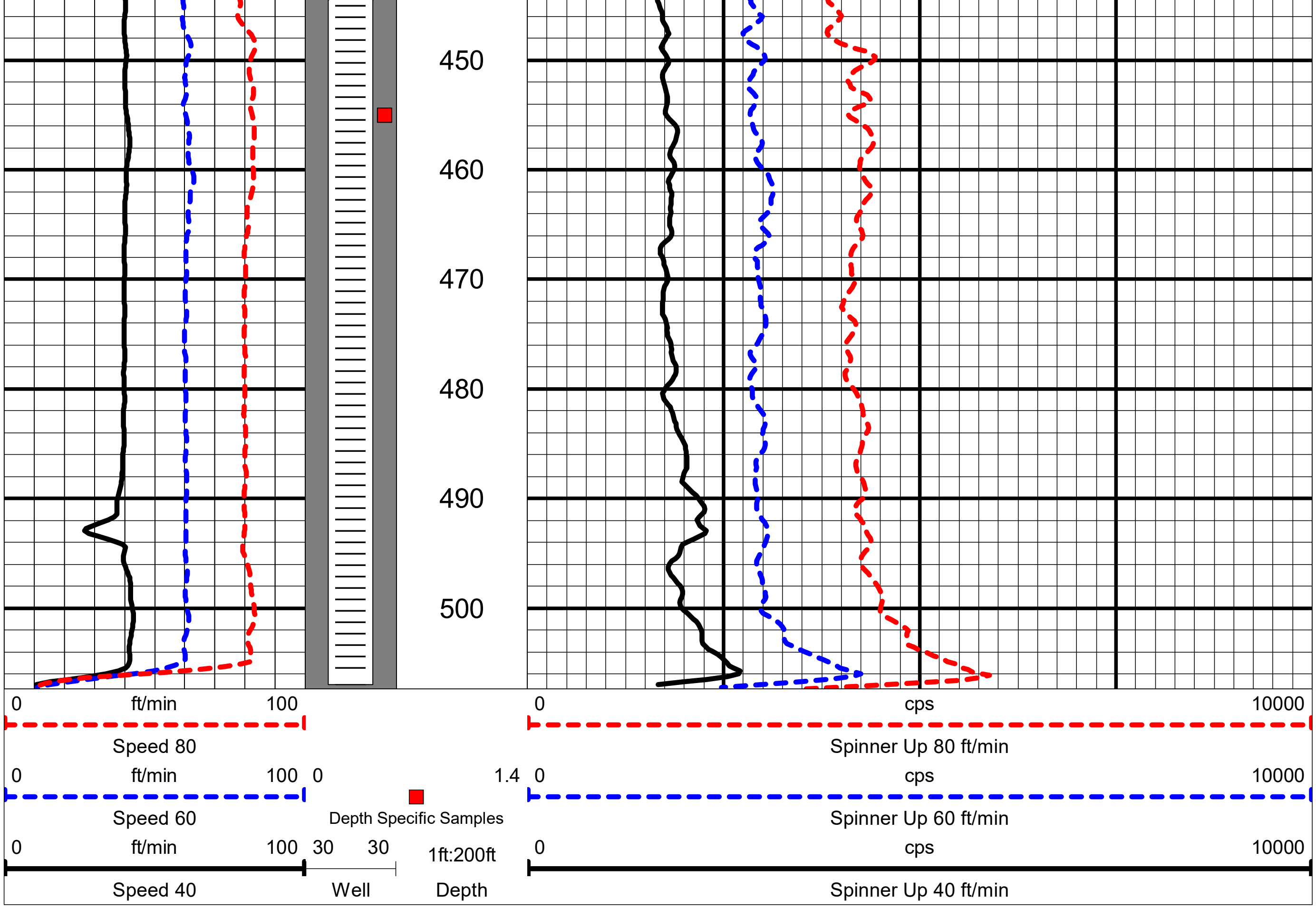
PERMANENT DATUM Ground Level
ELEVATION G.L. 1,143 ft-amsl
K.B.
LOGS MEAS. FROM Ground Level
SURFACE CONDUCTOR N/A
D.F.
DRILLING MEAS. FROM Ground Level
G.L.

DATE	04-11-23	TYPE FLUID IN HOLE	Water
RUN No	1	RES MUD	
WELL TYPE	Water Production	RES MUD FILTRATE	
DEPTH-DRILLER	N/A	RES WALL CAKE	
DEPTH-LOGGER	507 ft-bgl	MAX. REC. TEMP.	
ADDITIVES	N/A	Pump Setting	417 ft-bgl
BIT TYPE	N/A	Pumping Rate	498 gpm
DRILLING METHOD	N/A	Pumping Water Level	228 ft-bgl
RECORDED BY	Yovanni Rosas		
WITNESSED BY	Montgomery & Associates		

RUN	Logging Tools Used / Century System VI			CASING RECORD / BIT RECORD			
NO.	TOOL S/N	FROM	TO	SIZE	WGT.	FROM	TO
RUN 1	Static Spinner	150 ft-bgl	507 ft-bgl			0	
RUN 2	Dynamic Spinner	200 ft-bgl	507 ft-bgl				
RUN 3	Depth Spec Samples	270,375,405,420,	455 ft-bgl				
RUN 4							
RUN 5				CAL DATE			
RUN 6							




Access Tube Set to bottom of pump at 417 ft-bgl
Pump - 417 ft
270
280
290
300
310
320
330
340
350
360
370
380
390
400
410
420
430
440


450
460
470
480
490
500
0
ft/min
100
Speed 80
0
ft/min
100
Speed 60
0
ft/min
100
Speed 40
0
1.4
Depth Specific Samples
30
30
Well
1ft:200ft
Depth
0
cps
10000
Spinner Up 80 ft/min
0
cps
10000
Spinner Up 60 ft/min
0
cps
10000
Spinner Up 40 ft/min

GeoLog, LLC

P.O. Box 2571 Cottonwood AZ. 86326
(928) 899-6491
ccatalano@geologaz.com

WELL Motorola
TYPE of LOGS Static Spin Dn
Date 04-11-23
SYSTEM NAME

CLIENT Yellow Jacket Drilling
WELL ID Motorola
PROJECT Motorola
COUNTY Maricopa

STATIC SPINNER DOWN

STATE Arizona

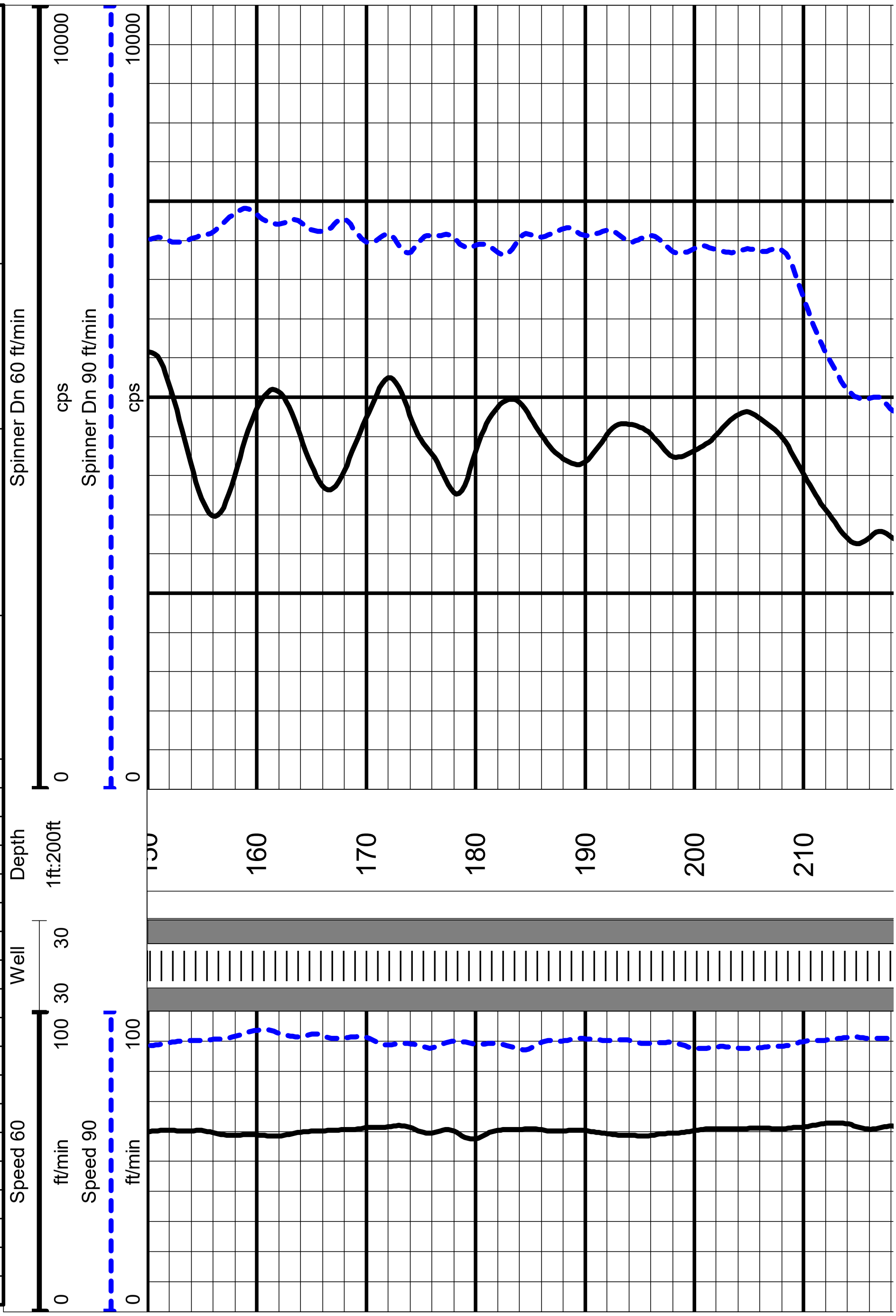
LOCATION
N 33 deg 28 min 46.4 sec
W 111 deg 55 min 1.4 sec
SEC TWP RGE

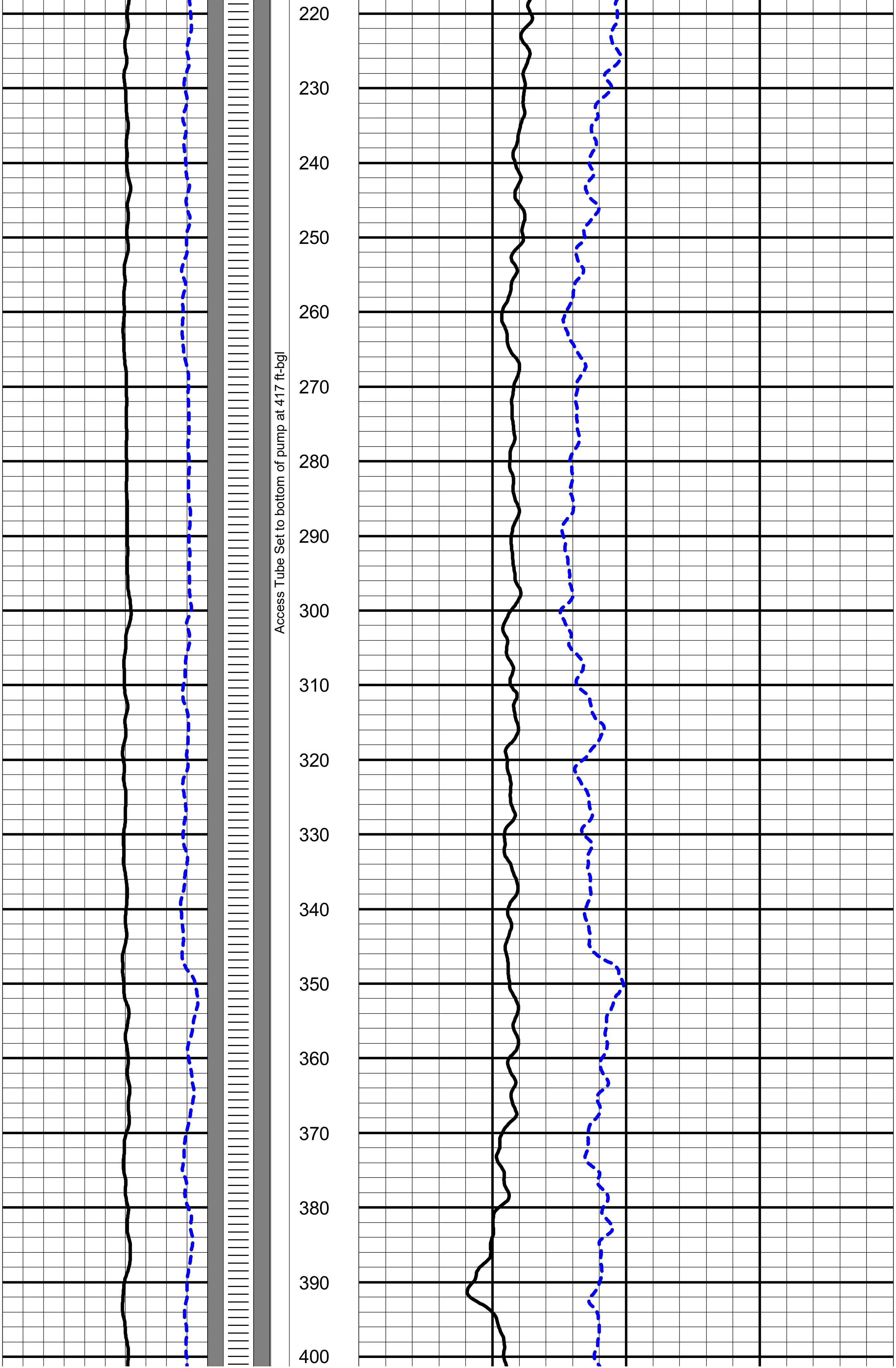
OTHER SERVICES
Dynamic Spinner
Depth Specific Sampling

PERMANENT DATUM Ground Level
ELEVATION G.L. 1,143 ft-amsl
K.B.
LOGS MEAS. FROM Ground Level
SURFACE CONDUCTOR N/A
D.F.
DRILLING MEAS. FROM Ground Level
G.L.

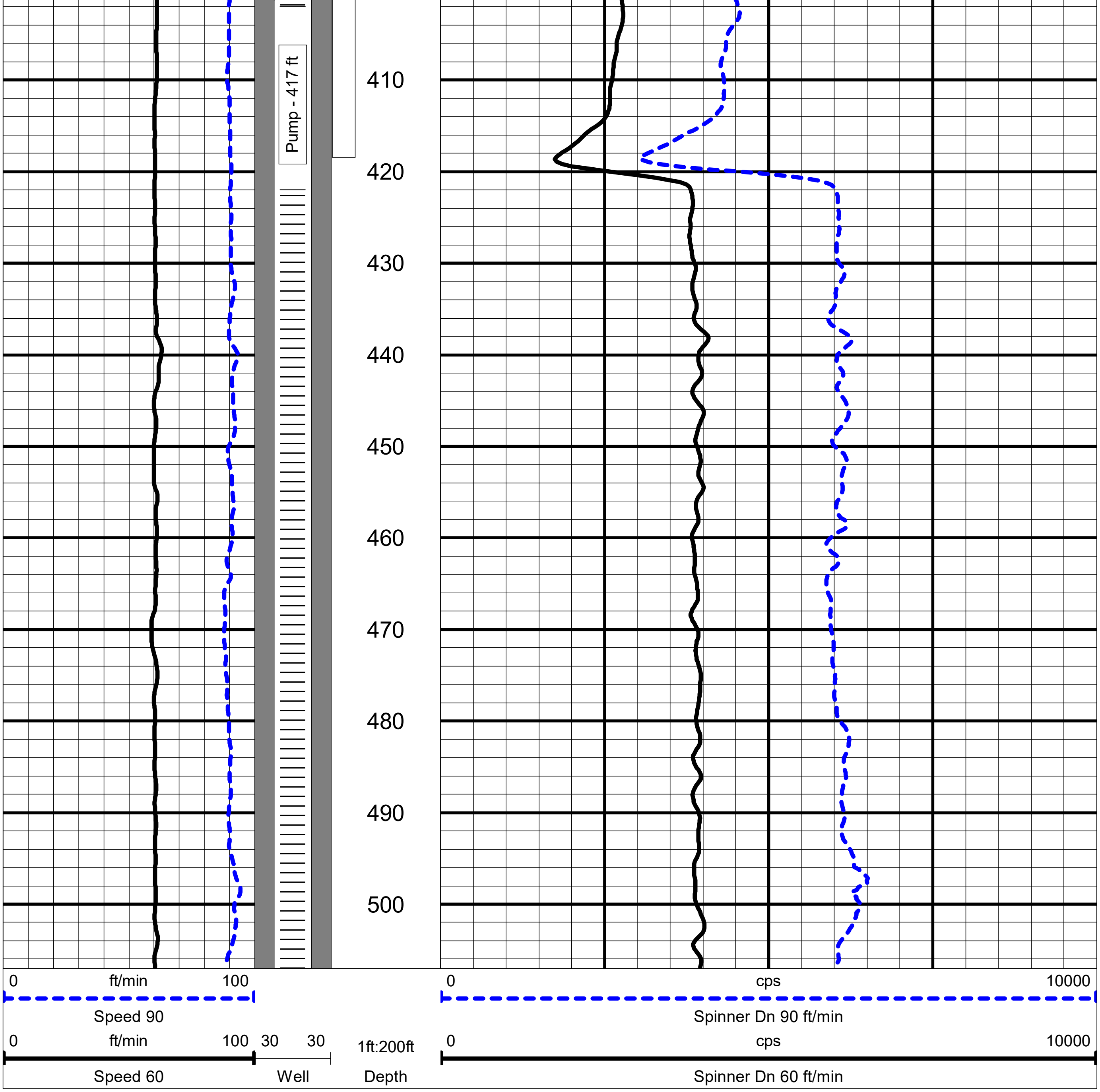
DATE	04-11-23	TYPE FLUID IN HOLE	Water
RUN No	1	RES MUD	
WELL TYPE	Water Production	RES MUD FILTRATE	
DEPTH-DRILLER	N/A	RES WALL CAKE	
DEPTH-LOGGER	507 ft-bgl	MAX. REC. TEMP.	
ADDITIVES	N/A	Pump Setting	417 ft-bgl
BIT TYPE	N/A	Pumping Rate	0 gpm
DRILLING METHOD	N/A	Static Water Level	110 ft-bgl
RECORDED BY	Yovanni Rosas		
WITNESSED BY	Montgomery & Associates		

RUN	Logging Tools Used / Century System VI			CASING RECORD / BIT RECORD			
NO.	TOOL S/N	FROM	TO	SIZE	WGT.	FROM	TO
RUN 1	Static Spinner	150 ft-bgl	507 ft-bgl			0	
RUN 2	Dynamic Spinner	200 ft-bgl	507 ft-bgl				
RUN 3	Depth Spec Samples	270,375,405,420,	455 ft-bgl				
RUN 4							
RUN 5				CAL DATE			
RUN 6							





Access Tube Set to bottom of pump at 417 ft-bgl


Pump - 417 ft
410
420
430
440
450
460
470
480
490
500
0
ft/min
100
Speed 90
0
ft/min
100
Speed 60
30
30
Well
1ft:200ft
Depth
0
cps
10000
Spinner Dn 90 ft/min
0
cps
10000
Spinner Dn 60 ft/min

GeoLog, LLC

P.O. Box 2571 Cottonwood AZ. 86326
(928) 899-6491
ccatalano@geologaz.com

WELL Motorola
TYPE of LOGS Static Spin Up
Date 04-11-23
SYSTEM NAME

CLIENT	Yellow Jacket Drilling		
WELL ID	Motorola	STATIC SPINNER UP	
PROJECT	Motorola		
COUNTY	Maricopa	STATE	Arizona

LOCATION
N 33 deg 28 min 46.4 sec
W 111 deg 55 min 1.4 sec

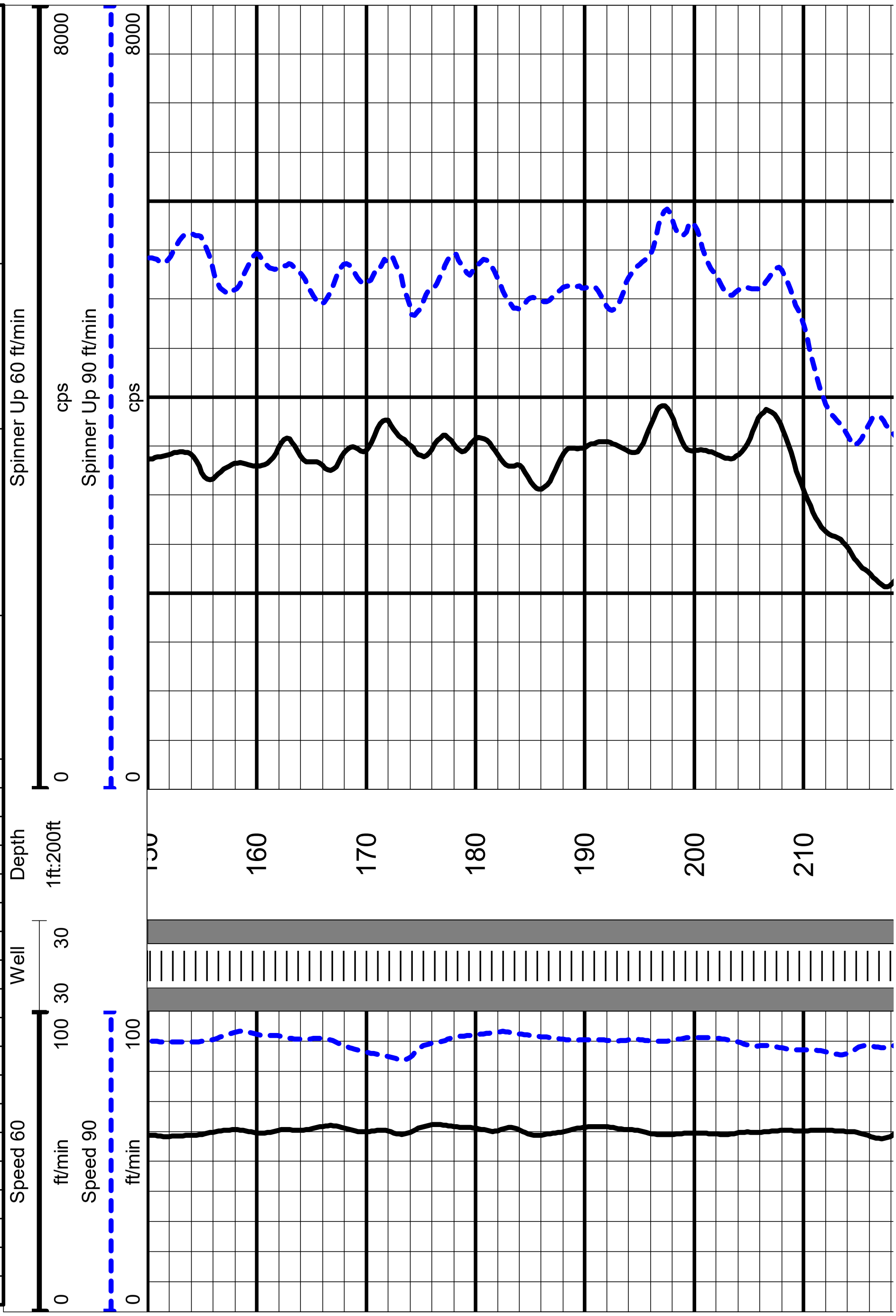
SEC TWP RGE

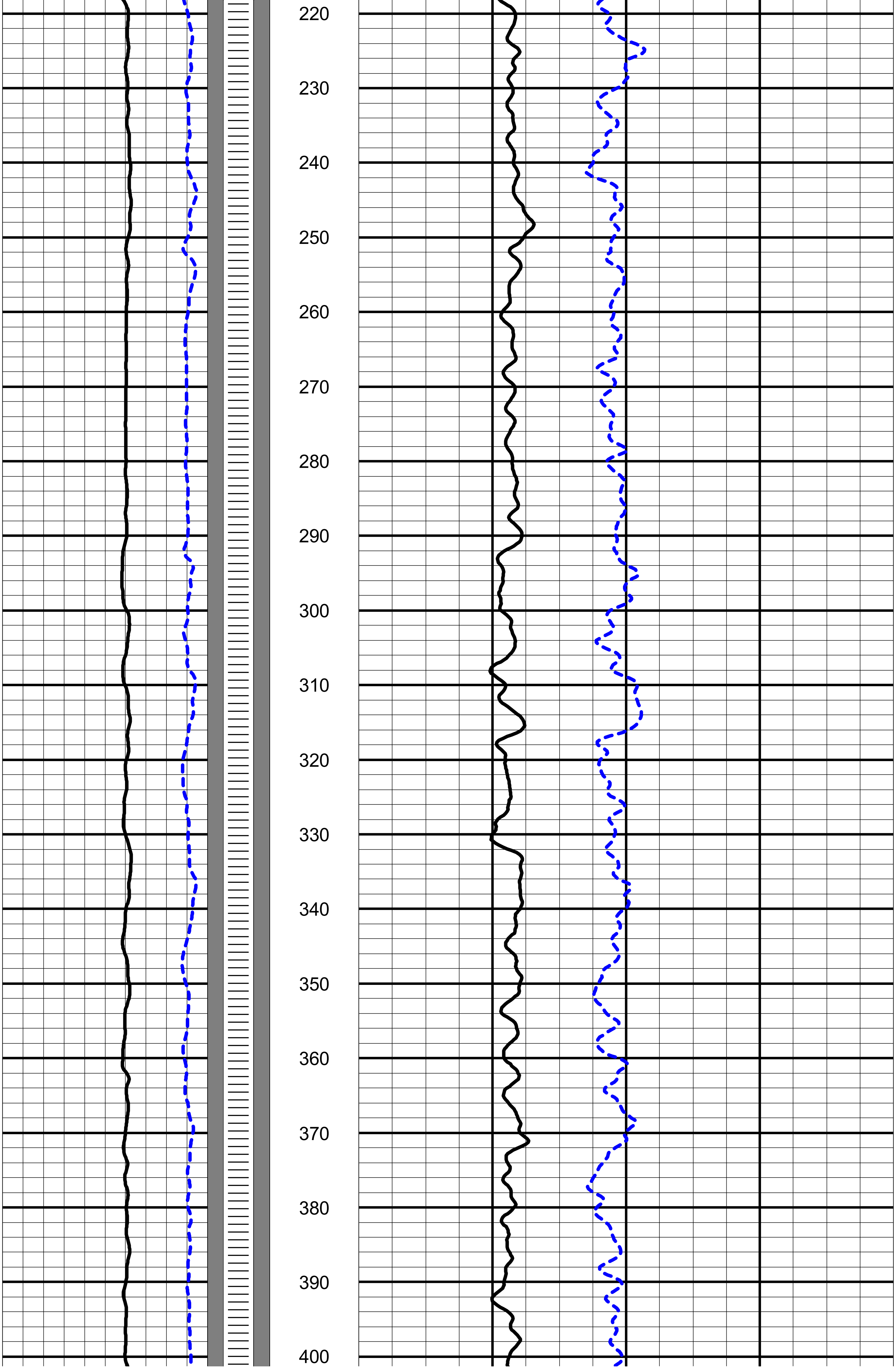
OTHER SERVICES
Static Spinner Down
Depth Specific Samples

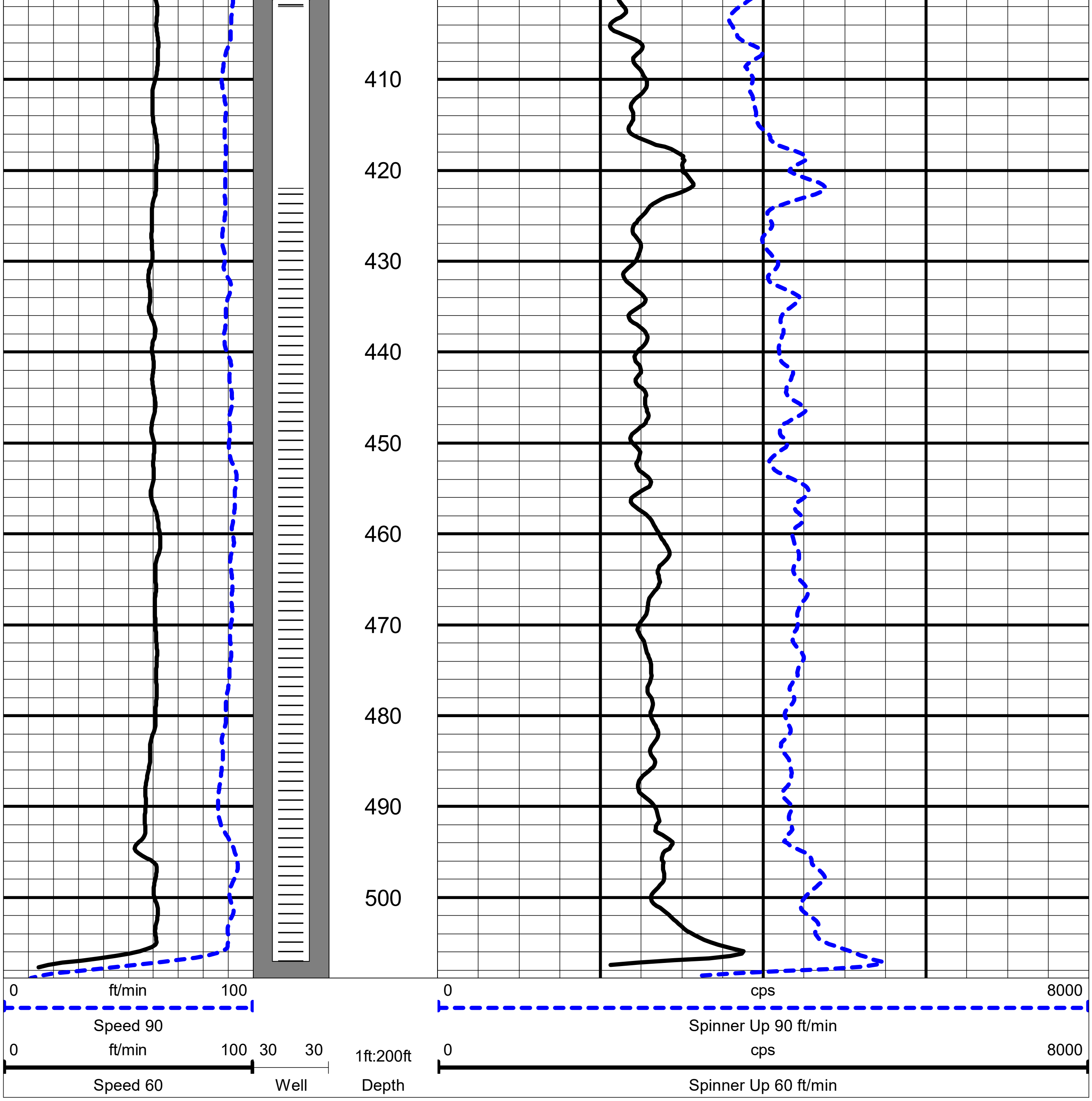
PERMANENT DATUM	Ground Level	ELEVATION G.L. 1,143 ft-amsl	K.B.
LOGS MEAS. FROM	Ground Level	SURFACE CONDUCTOR N/A	D.F.
DRILLING MEAS. FROM	Ground Level		G.L.

DATE	04-11-23	TYPE FLUID IN HOLE	Water
RUN No	1	RES MUD	
WELL TYPE	Water Production	RES MUD FILTRATE	
DEPTH-DRILLER	N/A	RES WALL CAKE	
DEPTH-LOGGER	507 ft-bgl	MAX. REC. TEMP.	
ADDITIVES	N/A	Pump Setting	417 ft-bgl
BIT TYPE	N/A	Pumping Rate	0 gpm
DRILLING METHOD	N/A	Static Water Level	110 ft-bgl
RECORDED BY	Yovanni Rosas		
WITNESSED BY	Montgomery & Associates		

RUN	Logging Tools Used / Century System VI			CASING RECORD / BIT RECORD			
NO.	TOOL S/N	FROM	TO	SIZE	WGT.	FROM	TO
RUN 1	Static Spinner	150 ft-bgl	507 ft-bgl			0	
RUN 2	Dynamic Spinner	200 ft-bgl	507 ft-bgl				
RUN 3	Depth Spec Samples	270,375,405,420,	455 ft-bgl				
RUN 4							
RUN 5				CAL DATE			
RUN 6							




220
230
240
250
260
270
280
290
300
310
320
330
340
350
360
370
380
390
400


410
420
430
440
450
460
470
480
490
500
0
ft/min
100
Speed 90
0
ft/min
100
Speed 60
30
30
Well
1ft:200ft
Depth
0
cps
8000
Spinner Up 90 ft/min
0
cps
8000
Spinner Up 60 ft/min

APPENDIX G

COS-75A GEOPHYSICAL LOGS

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES		
WELL ID	COS-75A		
FIELD	INDIAN SCHOOL PARK - SCOTTSDALE		
COUNTY	MARICOPA	STATE	ARIZONA

TYPE OF LOGS: GAMMA - CALIPER
MORE: TEMP / FLUID COND.

OTHER SERVICES
SPINNER
WATER 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	6-5-23	TYPE FLUID IN HOLE	WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA-CALIPER-FTC	VISCOSITY	N/A
DEPTH-DRILLER	1275.0 FT	LEVEL	~ 196 FT
DEPTH-LOGGER	1275.0 FT	MAX. REC. TEMP.	34.8 DEG. C
BTM LOGGED INTERVAL	1275.0 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.1 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	J. ZELINSKI / T. FERRIS	TOOL STRING/SN	QL COMBO TOOL SN 6641
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:30 AM

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

COMMENTS:

.

Tool Summary:

Date	6-5-23	**Date**	6-5-23	**Date**	6-5-23
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	WATER SAMPLER
Tool SN	6641	**Tool SN**	6618	**Tool SN**	N/A
From	SURFACE	**From**	190.0 FT	**From**	N/A
To	1275.0 FT	**To**	1250.0 FT	**To**	N/A
Recorded By	J. ZELINSKI	**Recorded By**	J. ZELINSKI	**Recorded By**	J. ZELINSKI
Truck No	200	**Truck No**	200	**Truck No**	200
Operation Check	6-4-23	**Operation Check**	6-4-23	**Operation Check**	6-4-23
Calibration Check	6-4-23	**Calibration Check**	N/A	**Calibration Check**	N/A
Time Logged	7:30 AM	**Time Logged**	10:25 AM	**Time Logged**	3:00 PM

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: 16"

Calibration Points: 16" & 24"

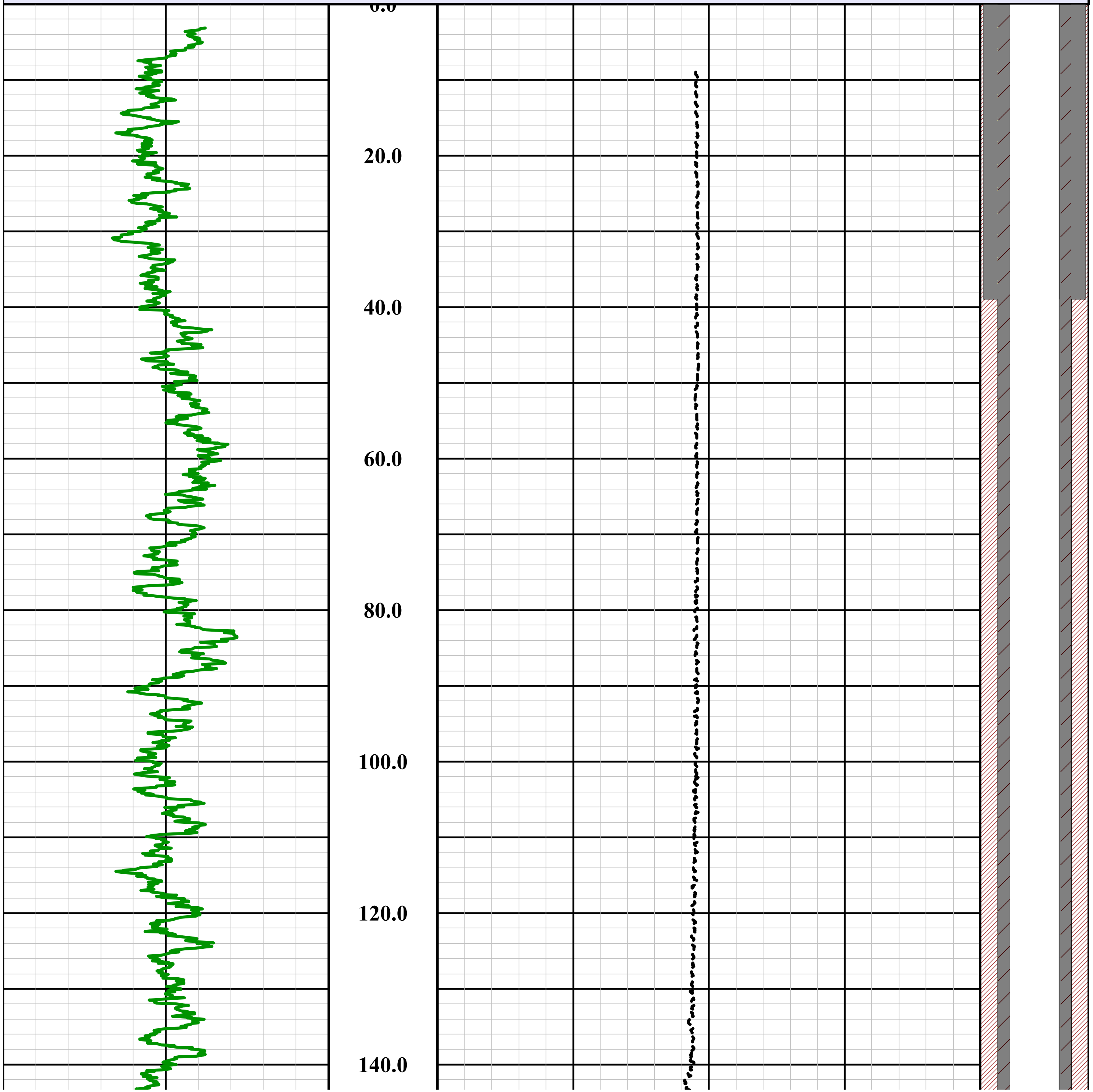
E-Log Calibration Range: N/A **Calibration Points:** N/A

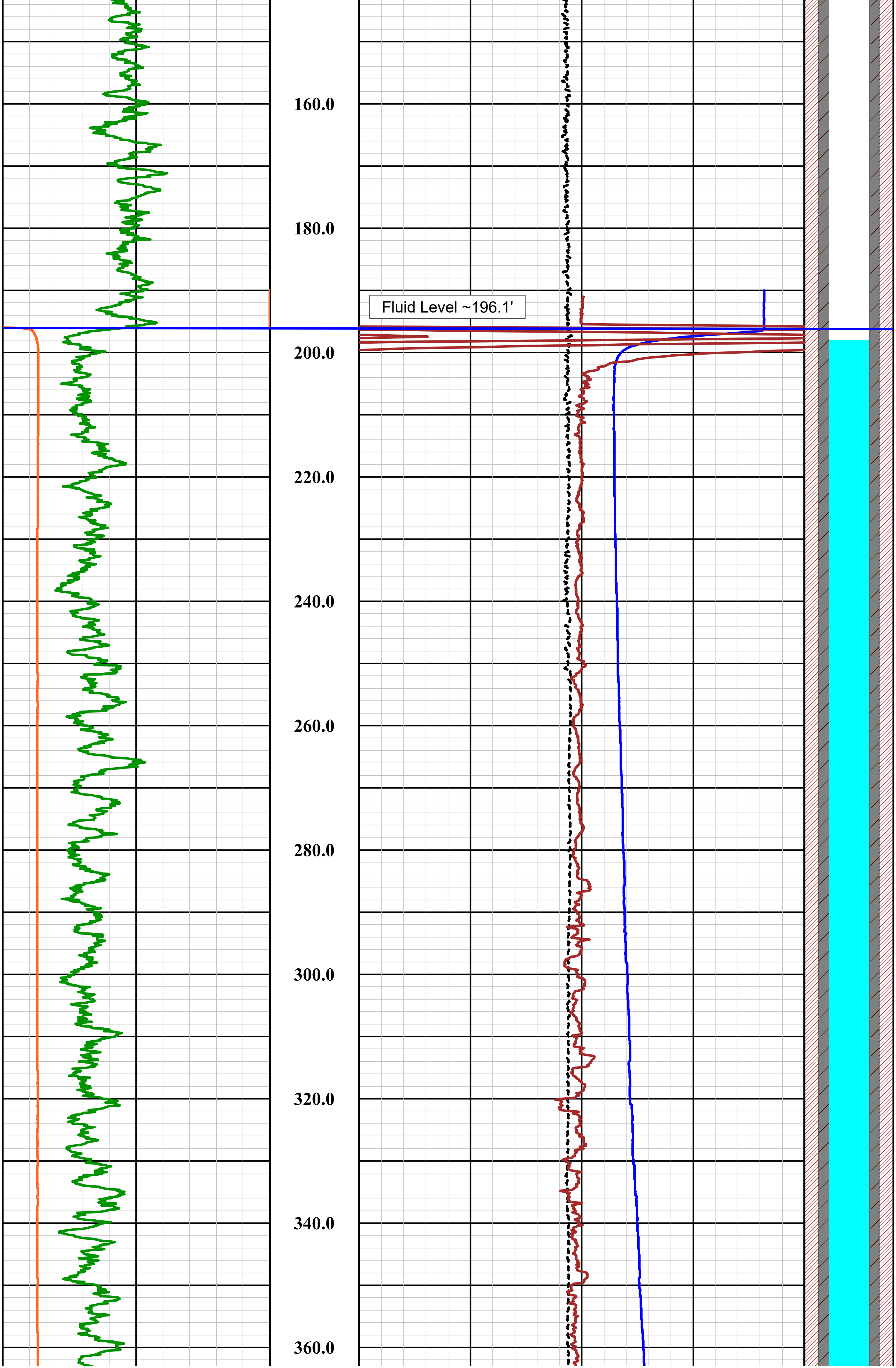
Disclaimer:

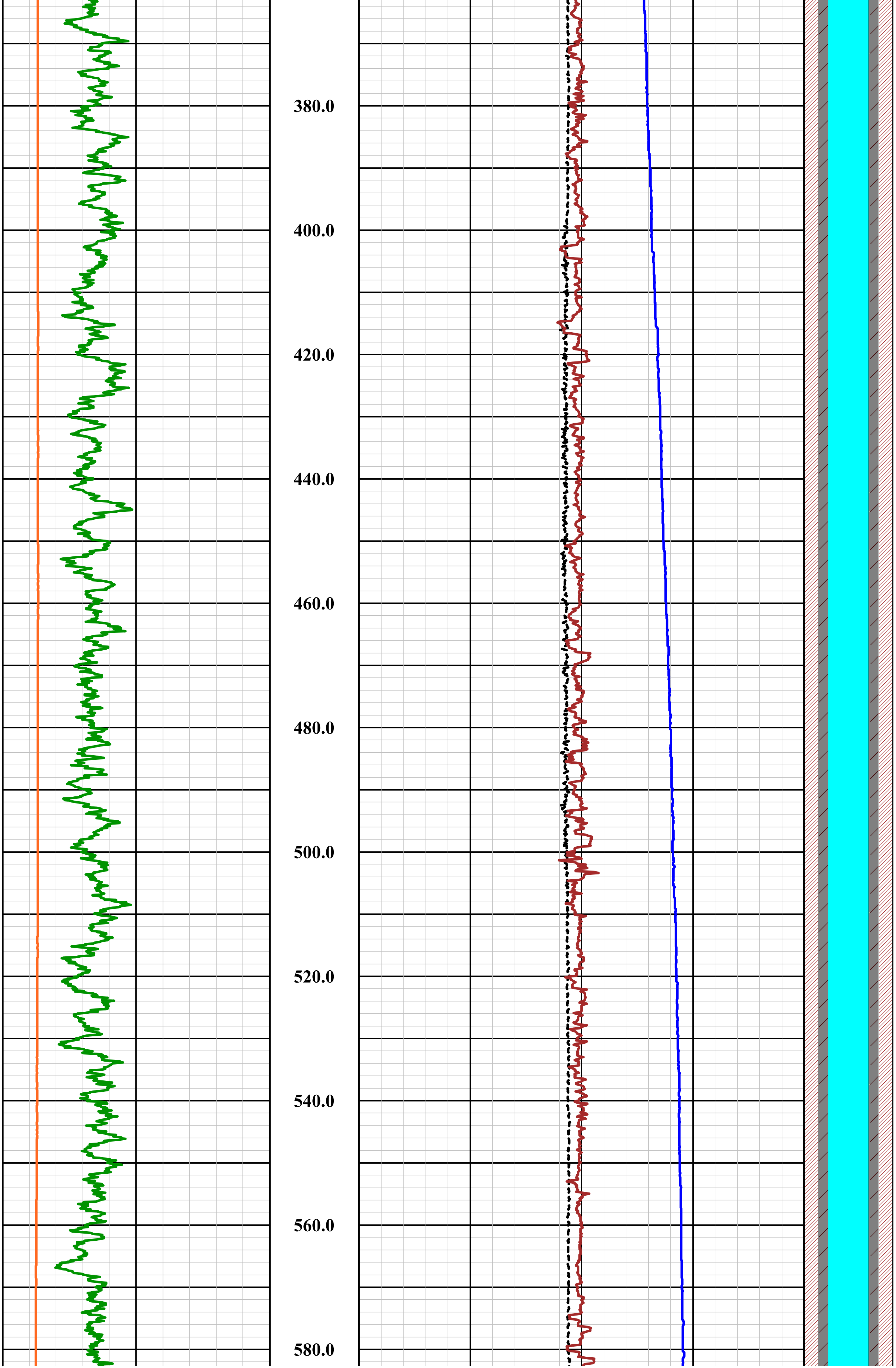
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone 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.

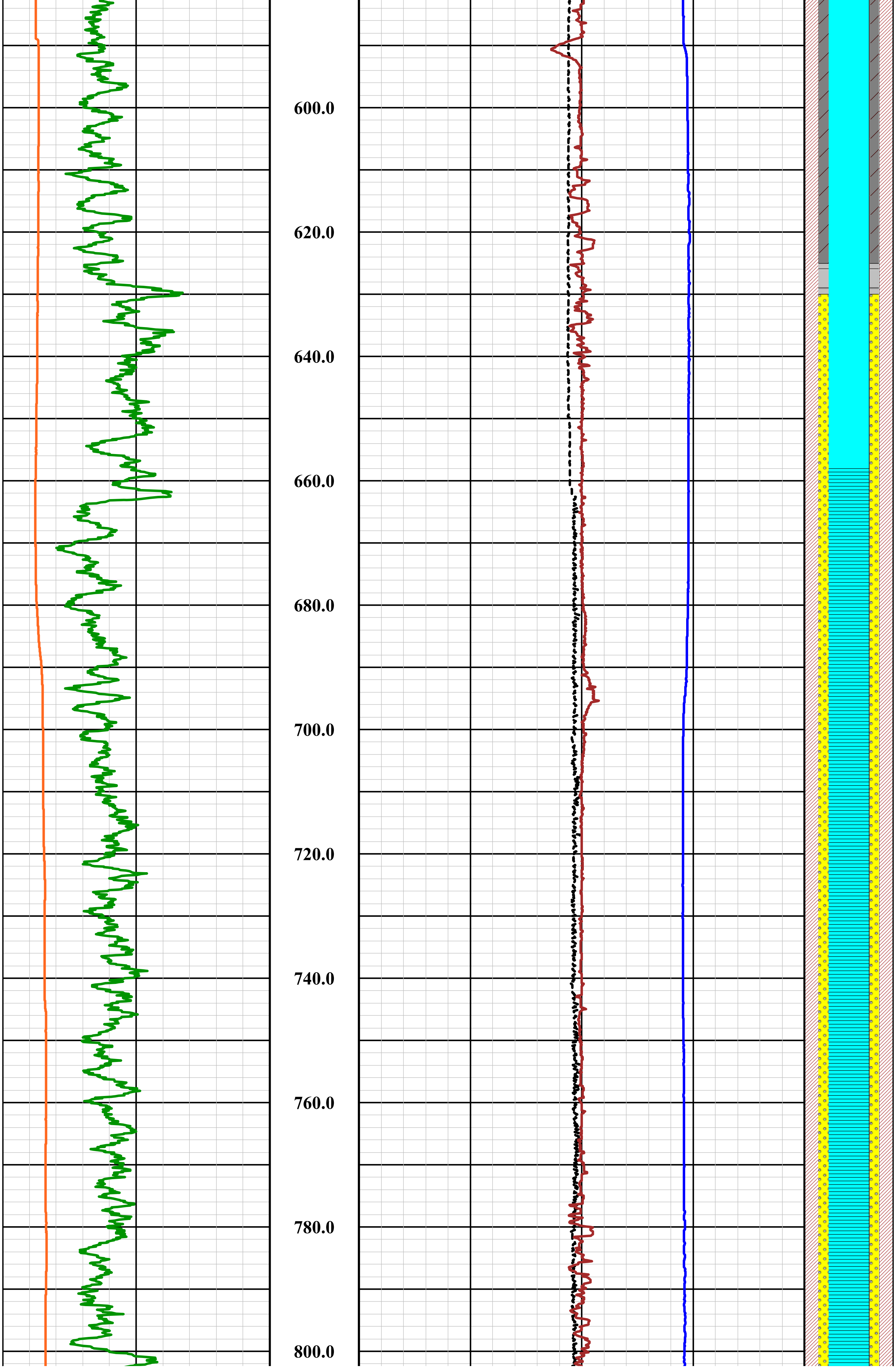
Nat. Gamma 0 API 100	Depth 1in:20ft	3-Arm Caliper 10 Inches 30	Well Diag.
Fluid Conductivity 25'C 0 uS/cm 10000		Temperature 15 Deg C 35	
		2-Ft Diff. Temp. -1 Deg C 1	

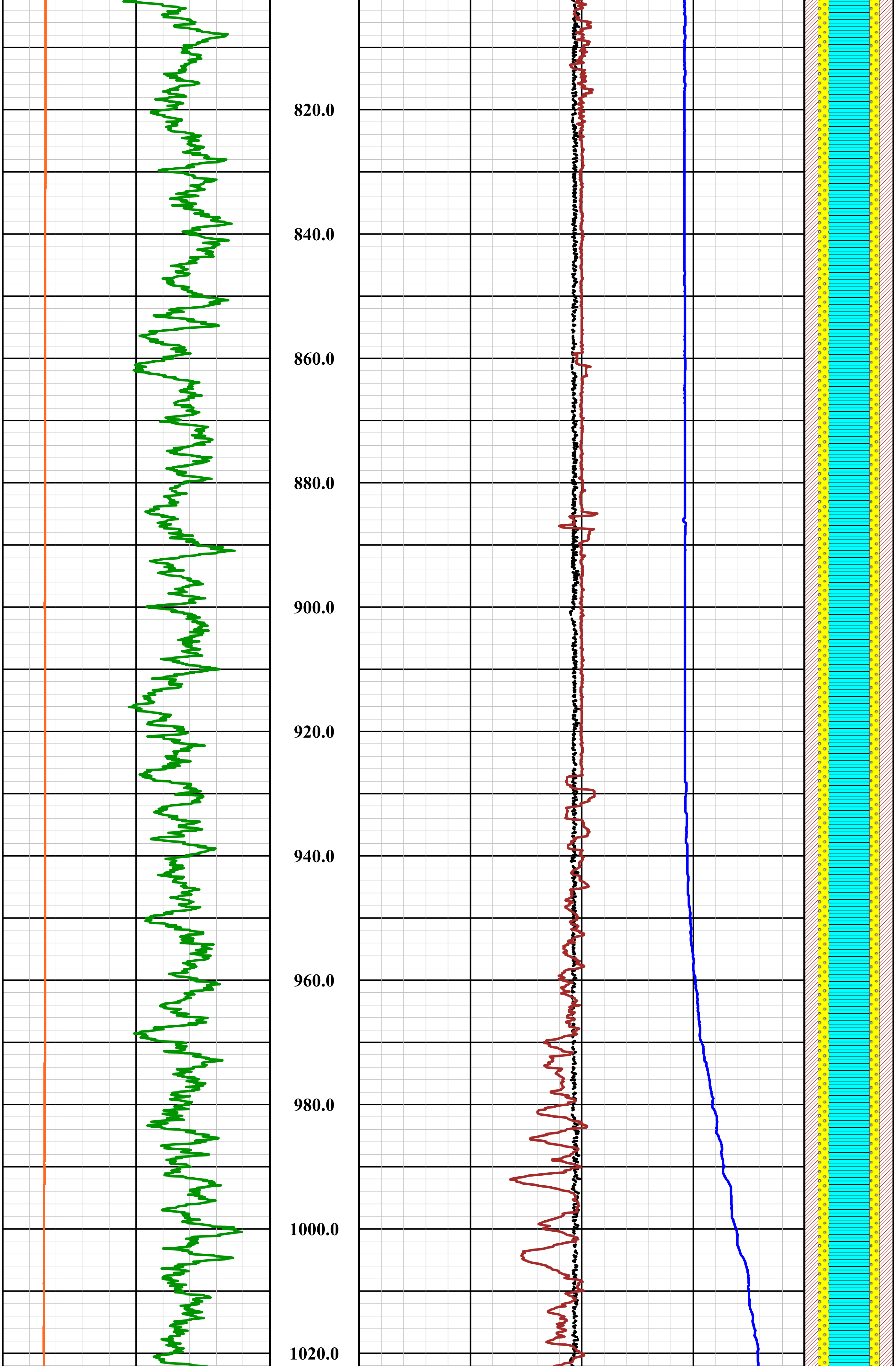
Well COS-75A GCFTC Summary Surface to ~1277.2'_6-5-23



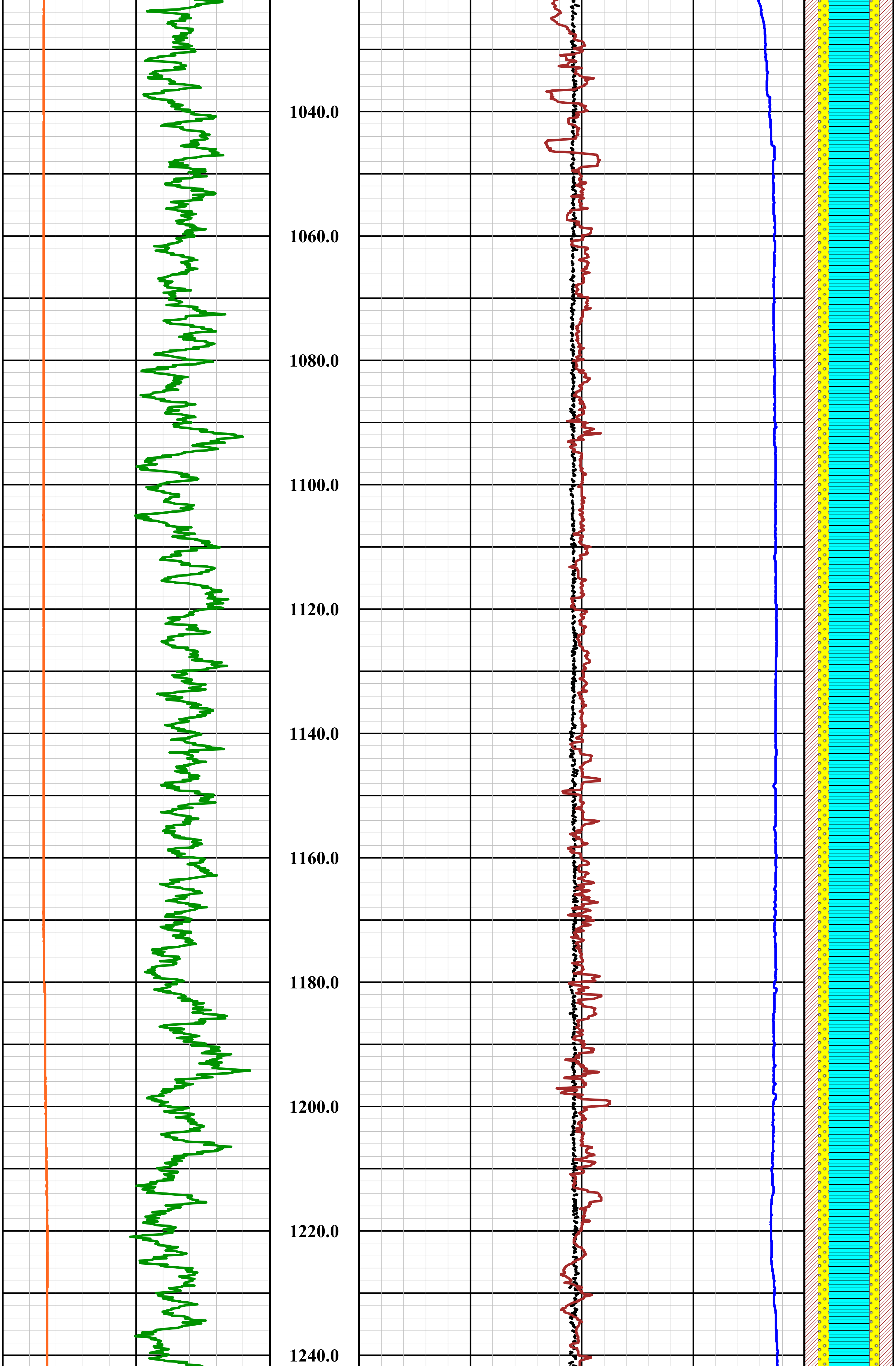

160.0
180.0
Fluid Level ~196.1'
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0

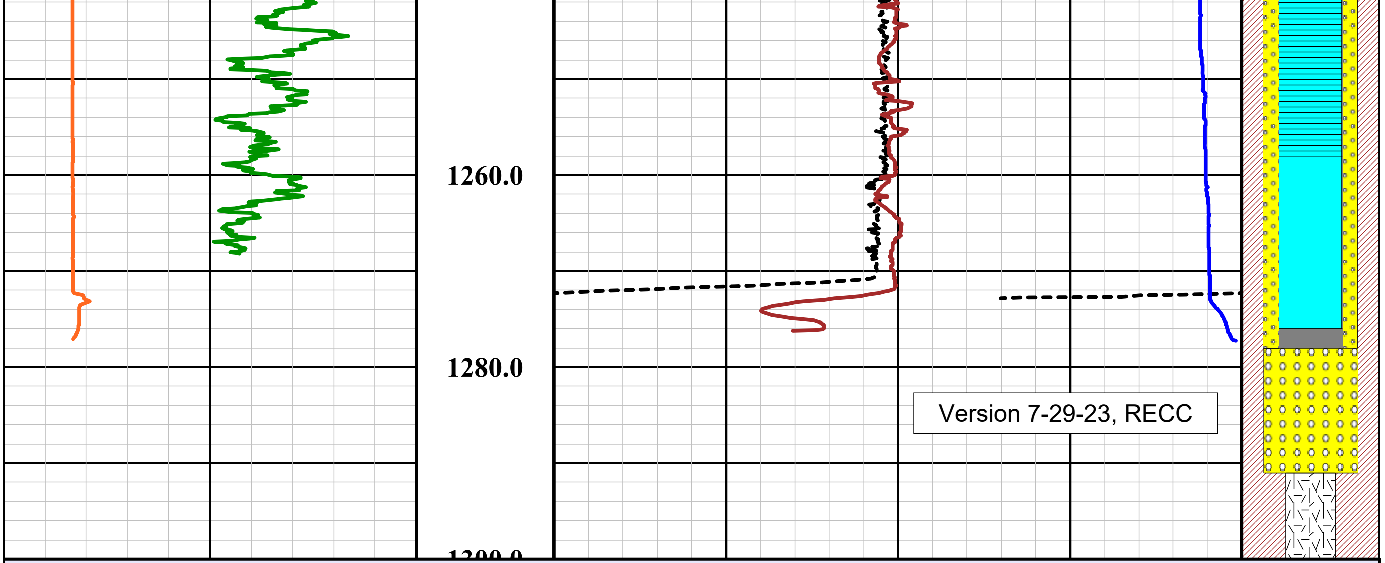

380.0
400.0
420.0
440.0
460.0
480.0
500.0
520.0
540.0
560.0
580.0


600.0
620.0
640.0
660.0
680.0
700.0
720.0
740.0
760.0
780.0
800.0



820.0
840.0
860.0
880.0
900.0
920.0
940.0
960.0
980.0
1000.0
1020.0


1040.0
1060.0
1080.0
1100.0
1120.0
1140.0
1160.0
1180.0
1200.0
1220.0
1240.0



Well COS-75A GCFTC Summary Surface to ~1277.2'_6-5-23

		-1 Deg C 1 **2-Ft Diff. Temp.**	
0 uS/cm 10000 **Fluid Conductivity 25'C**		15 Deg C 35 **Temperature**	
0 API 100 **Nat. Gamma**	1in:20ft **Depth**	10 Inches 30 **3-Arm Caliper**	**Well Diag.**

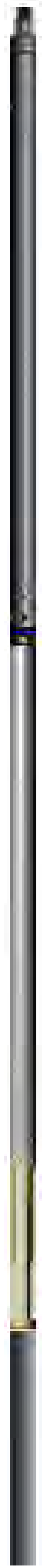
Legend

Mnemonics	Description
Nat. Gamma	Natural gamma ray log plotted 0 to 100 API (green line).
Fluid Conductivity 25˚C	Fluid Conductivity is the reciprocal of Fluid Resistivity. Normalized to 25˚C. It provides data of the disolved solids concentrations in fluid column (orange line).
3-Arm Caliper	3-arm mechanical caliper of hole diameter plotted from 10 to 30 inches (black dashed line).
Temperature	Borehole fluid temperature plotted from 15 to 35 deg C (blue line)
2-Ft Diff. Temp.	Differential temperature over 2-ft spacing (brown line).
Well Diag.	Well Construction Diagram from information provided by M&A.
	Mnemonics prepared by Robert E. Crowder Version 08-06-23

QL Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517, 6587,
6641, 6798, 6799, 6973 & 6969



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)

Pressure 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	COS-75A
Field	INDIAN SCHOOL PARK - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Final GCFTC Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY MONTGOMERY & ASSOCIATES
WELL ID COS-75A
FIELD INDIAN SCHOOL PARK - SCOTTSDALE
COUNTY MARICOPA STATE ARIZONA

TYPE OF LOGS: STATIC SPINNER
MORE: TEMP / FLUID COND.

LOCATION
OTHER SERVICES
GAMMA
CALIPER
WATER 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	6-5-23	TYPE FLUID IN HOLE	WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	STATIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	1275.0 FT	LEVEL	~ 196 FT
DEPTH-LOGGER	1275.0 FT	MAX. REC. TEMP.	34.8 DEG. C
BTM LOGGED INTERVAL	1275.0 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.1 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	J. ZELINSKI / T. FERRIS	TOOL STRING/SN	QL SFM SPINNER SN 6618
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:30 AM

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

COMMENTS:

.

Tool Summary:

Date	6-5-23	**Date**	6-5-23	**Date**	6-5-23
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	WATER SAMPLER
Tool SN	6641	**Tool SN**	6618	**Tool SN**	N/A
From	SURFACE	**From**	190.0 FT	**From**	N/A
To	1275.0 FT	**To**	1250.0 FT	**To**	N/A
Recorded By	J. ZELINSKI	**Recorded By**	J. ZELINSKI	**Recorded By**	J. ZELINSKI
Truck No	200	**Truck No**	200	**Truck No**	200
Operation Check	6-4-23	**Operation Check**	6-4-23	**Operation Check**	6-4-23
Calibration Check	6-4-23	**Calibration Check**	N/A	**Calibration Check**	N/A
Time Logged	7:30 AM	**Time Logged**	10:25 AM	**Time Logged**	3:00 PM

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: 16" **Calibration Points:** 16" & 24"

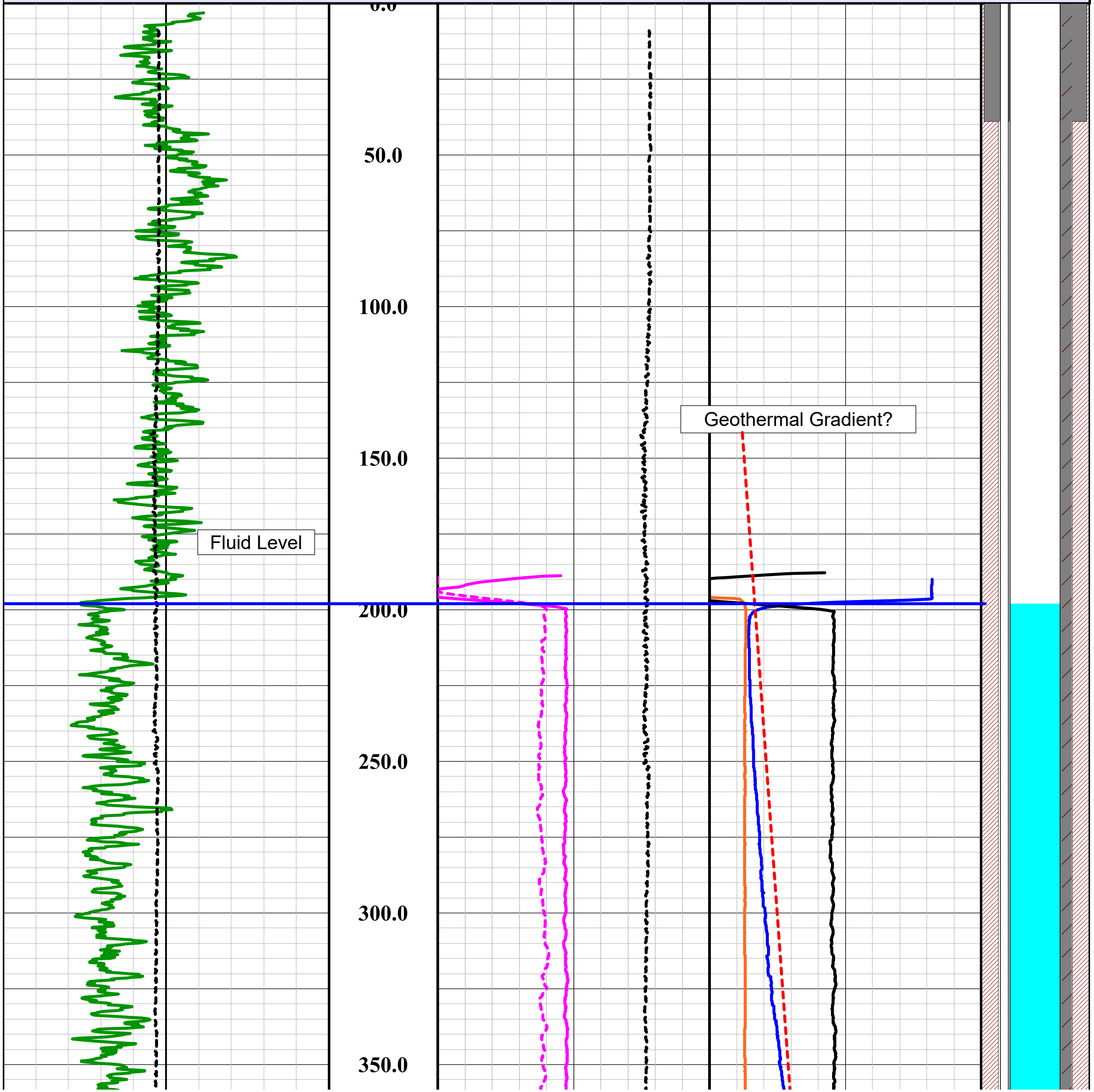
E-Log Calibration Range: N/A **Calibration Points:** N/A

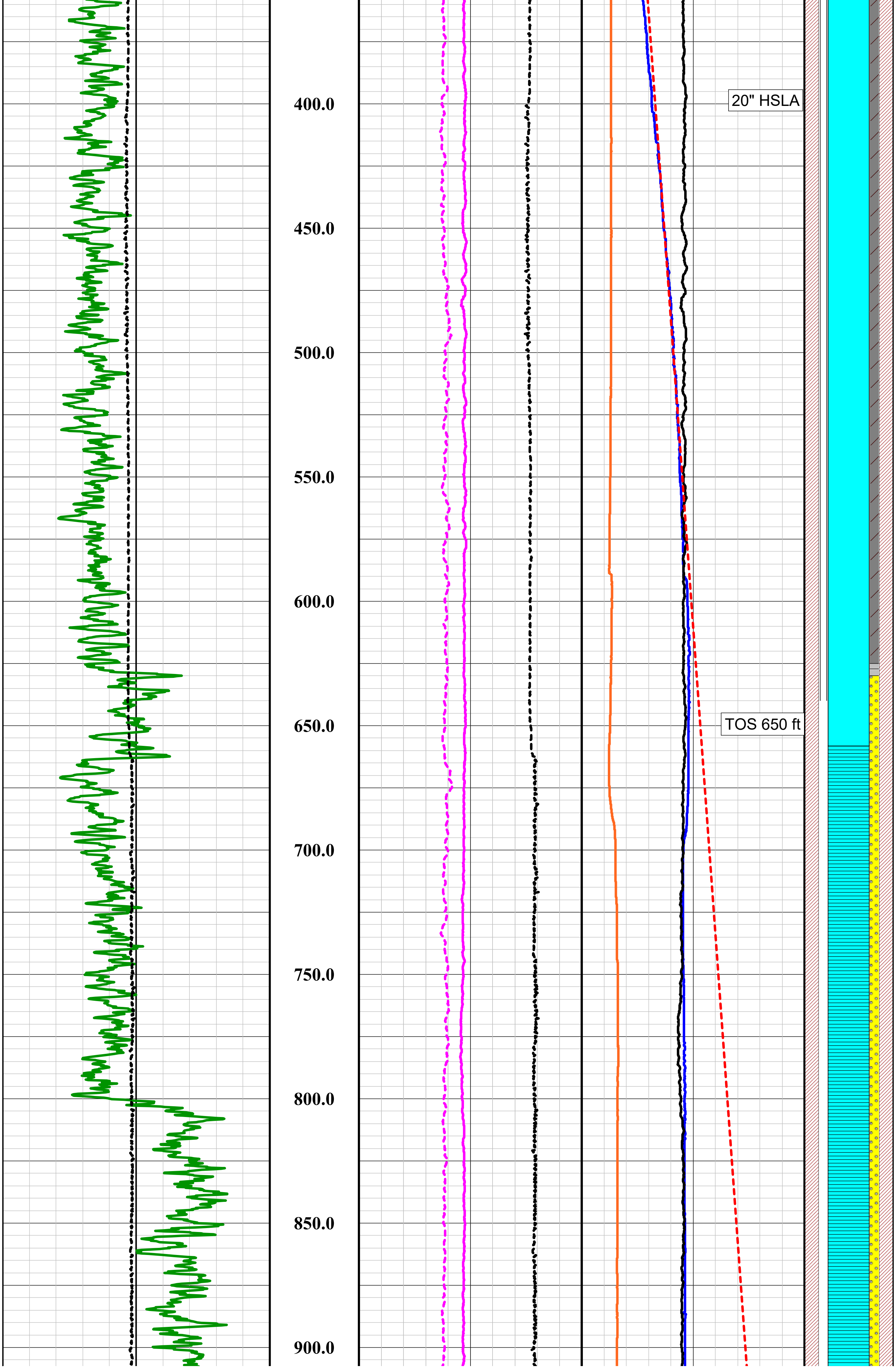
Disclaimer:

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.

Nat. Gamma 0 API 100	Depth 1in:50ft	Ave Net Velocity Dn -50 fpm 50	Temperature 25 Deg C 35	Well Diag.
3-Arm Caliper 10 Inches 30		Ave Net Velocity Up -50 fpm 50	Fluid Conductivity 25'C 0 uS/cm 10000	
		Est. Hole Volume 0 Gal/Ft 20	Ave Net Flow Trolling Dn -500 GPM 500	

Well COS-75A Net Flow Summary Non-Pumping_6-5-23

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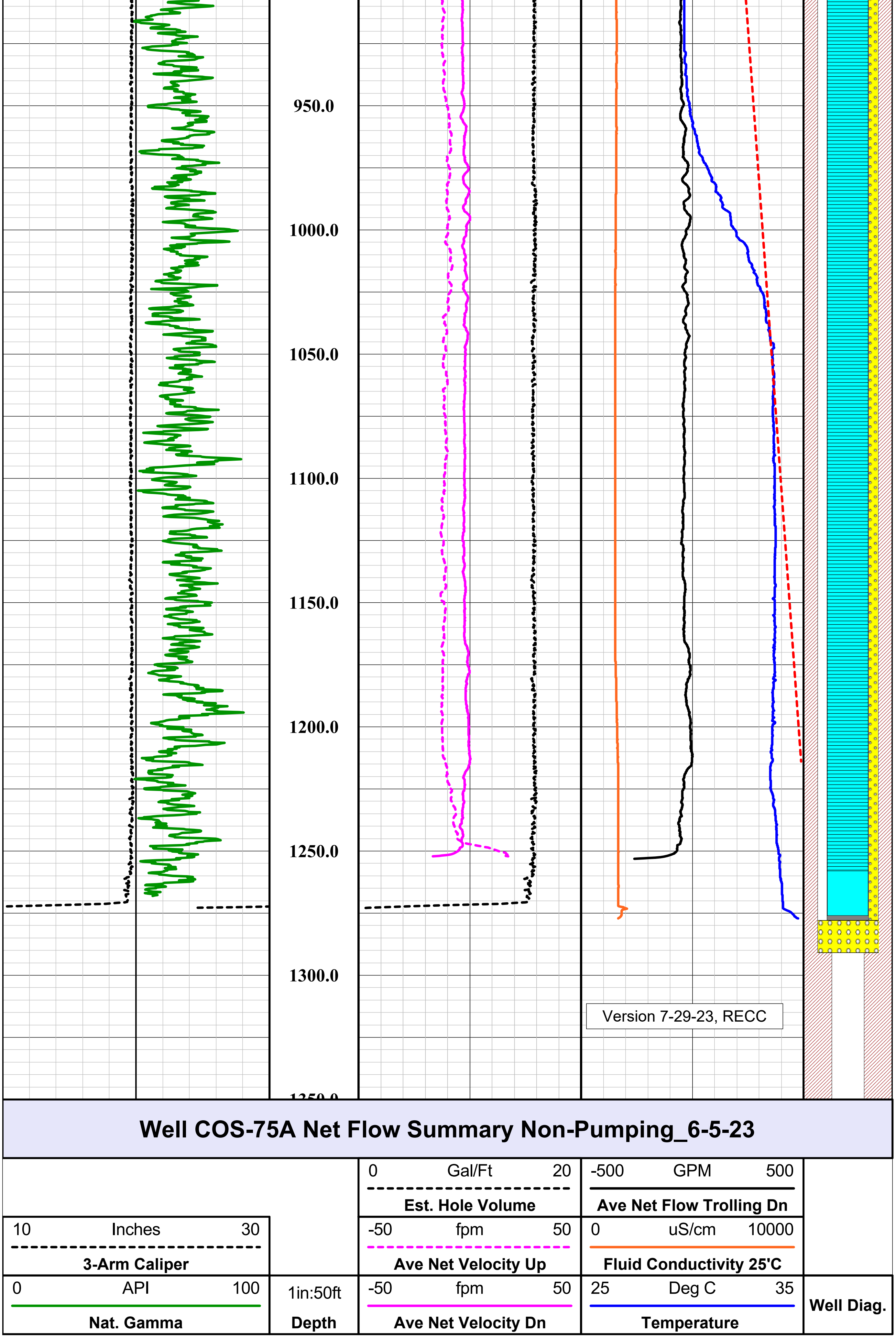
20" HSLA
TOS 650 ft



Well COS-75A Net Flow Summary Non-Pumping_6-5-23

Legend

Mnemonics	Description
Nat. Gamma	Natural gamma ray log plotted 0 to 100 API (green line).
3-Arm Caliper	3-arm mechanical caliper of hole diameter plotted from 10 to 30 inches (dashed black line).
Ave Net Velocity Dn	Average net velocity calculated from the three down trolling speeds (magenta line).
Ave Net Velocity Up	Average net velocity calculated from the three up trolling speeds (dashed magenta line)
Est. Hole Volume	Estimated Hole Volume calculated from caliper and corrected for column pipe, sounder access pipe, and spinner access pipe (dashed black line).
Fluid Conductivity 25˚C	Fluid Conductivity is the reciprocal of Fluid Resistivity. Normalized to 25˚C. It provides data of the disolved solids concentrations in fluid column (orange line).
Temperature	Borehole fluid temperature plotted from 15 to 35 deg C (blue line).
Ave Net Flow Trolling Dn	Ave Net flow calculated from the Estimated Hole Diameter and the average net velocity while trolling down (black line).
Well Diag.	Reference Well Construction Diagram from information provided by M&A.

Mnemonics prepared by Robert E. Crowder
Version 08-06-23

QL Spinner Flowmeter (SFM)

QL Spinner Flowmeter (SFM)

Probe Top = Depth Ref.

Tool SN: 5726 & 6618

Single or Four Conductor Probe Top

Probe Length = 0.90 m or 2.95 ft

Probe Weight = 3.25 kg or 7.2 lbs

Maximum Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Three impeller cage sizes: 1.5", 3" and 4"

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

Can be used under static (non-pumping) or dynamic (pumping) conditions

Measures both upflow and downflow

Minimum Flow Rate: 3-5 gpm

Maximum Flow Rate: 5000 gpm

Flow rate (velocity)

Static: ~5-7 ft/min

Dynamic: +/- 1 ft/min

Measure Point

1.57" or 40 mm Diameter (Cage dependent)

QL Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.

Tool SN: 5613, 5979, 6161, 6292, 6517, 6587,
6641, 6798, 6799, 6973 & 6969

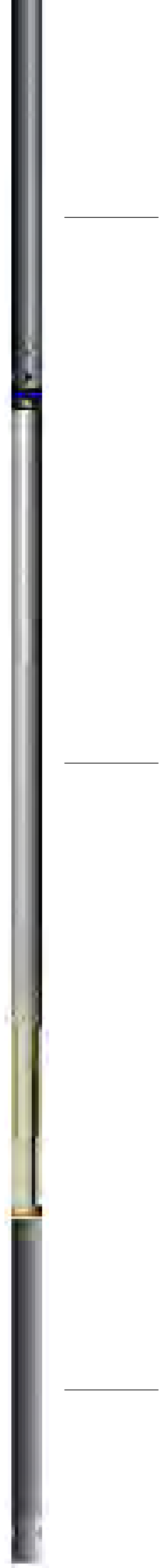
Four Conductor MSI Probe Top

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



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)

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	COS-75A
Field	INDIAN SCHOOL PARK - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Final **Spinner Flow Summary**

Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	MONTGOMERY & ASSOCIATES
WELL ID	COS-75A
FIELD	INDIAN SCHOOL PARK - SCOTTSDALE
COUNTY	MARICOPA STATE ARIZONA

TYPE OF LOGS: STATIC SPINNER

MORE: TEMP / FLUID COND.

LOCATION

SEC TWP RGE

OTHER SERVICES
GAMMA
CALIPER
WATER SAMPLES

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

DATE	6-5-23	TYPE FLUID IN HOLE	WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	STATIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	1275.0 FT	LEVEL	~ 196 FT
DEPTH-LOGGER	1275.0 FT	MAX. REC. TEMP.	34.8 DEG. C
BTM LOGGED INTERVAL	1275.0 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.1 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	J. ZELINSKI / T. FERRIS	TOOL STRING/SN	QL SFM SPINNER SN 6618
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:30 AM

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

COMMENTS:

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Tool Summary:

Date	6-5-23	**Date**	6-5-23	**Date**	6-5-23
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	WATER SAMPLER
Tool SN	6641	**Tool SN**	6618	**Tool SN**	N/A
From	SURFACE	**From**	190.0 FT	**From**	N/A
To	1275.0 FT	**To**	1250.0 FT	**To**	N/A
Recorded By	J. ZELINSKI	**Recorded By**	J. ZELINSKI	**Recorded By**	J. ZELINSKI
Truck No	200	**Truck No**	200	**Truck No**	200
Operation Check	6-4-23	**Operation Check**	6-4-23	**Operation Check**	6-4-23
Calibration Check	6-4-23	**Calibration Check**	N/A	**Calibration Check**	N/A
Time Logged	7:30 AM	**Time Logged**	10:25 AM	**Time Logged**	3:00 PM

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: 16"

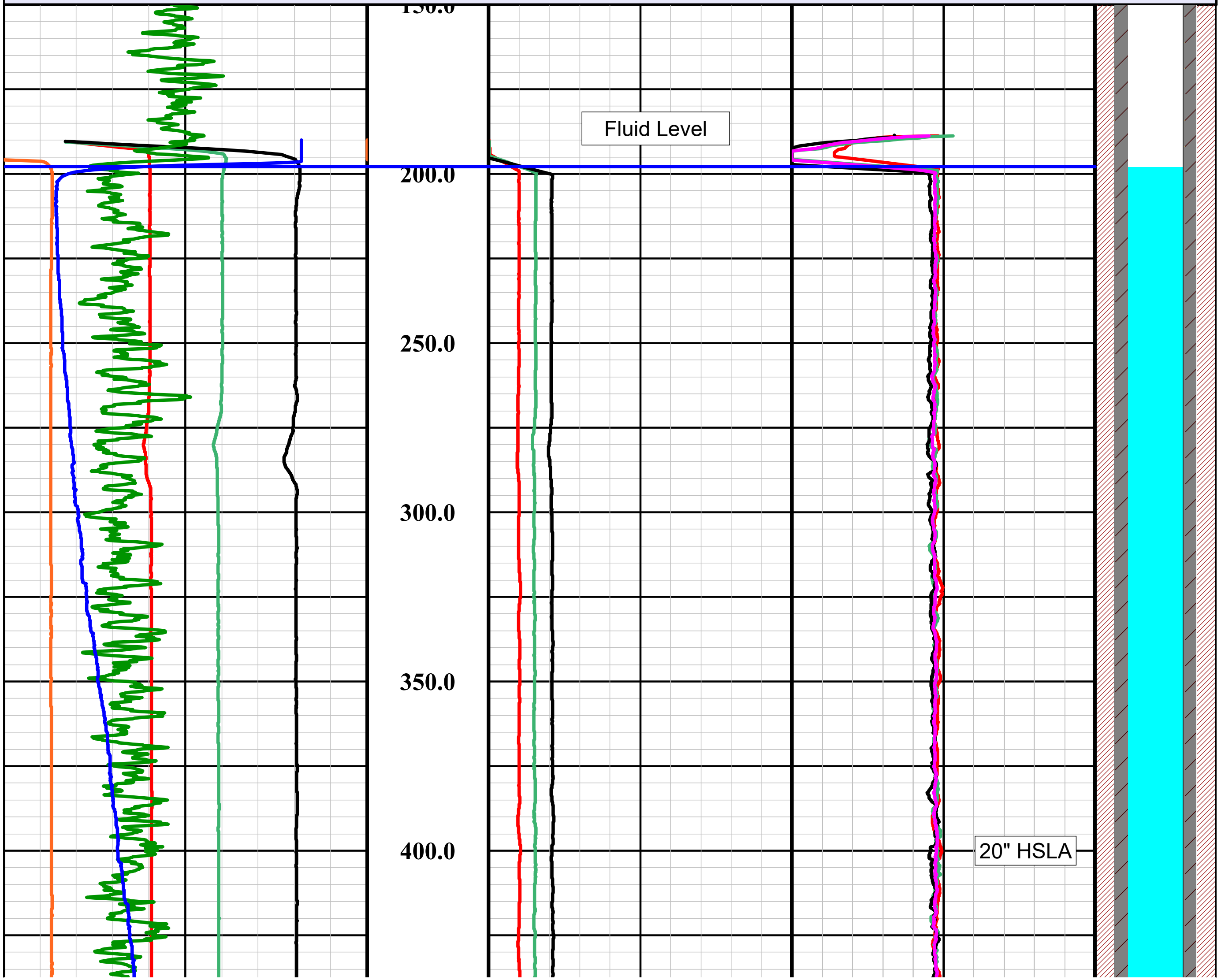
Calibration Points: 16" & 24"

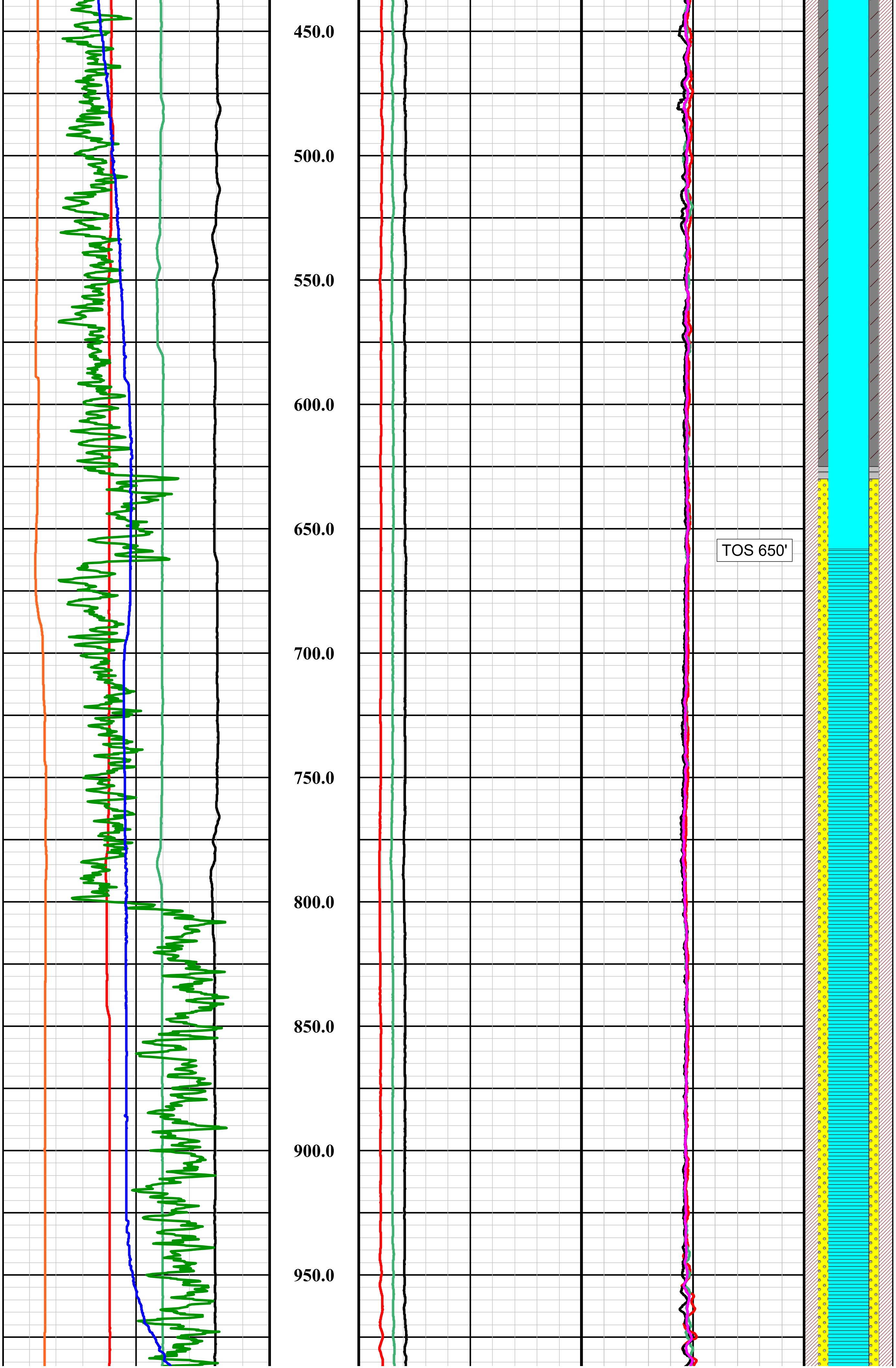
E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

Speed 40 Dn 0 ft/min 100	**Depth** 1in:50ft	**Spinner 40 Dn** 0 cps 20000	**Net Velocity 40 Dn** -50 fpm 50	**Well Diag.**
Speed 60 Dn 0 ft/min 100		**Spinner 60 Dn** 0 cps 20000	**Net Velocity 60 Dn** -50 fpm 50	
Speed 80 Dn 0 ft/min 100		**Spinner 80 Dn** 0 cps 20000	**Net Velocity 80 Dn** -50 fpm 50	
Nat. Gamma 0 API 100			**Ave Net Velocity Dn** -50 fpm 50	
Temperature 25 Deg C 35				
Fluid Conductivity 25'C 0 uS/cm 10000				

Well COS-75A Net Velocity Summary Non-Pumping Trolling Dn_6-5-23

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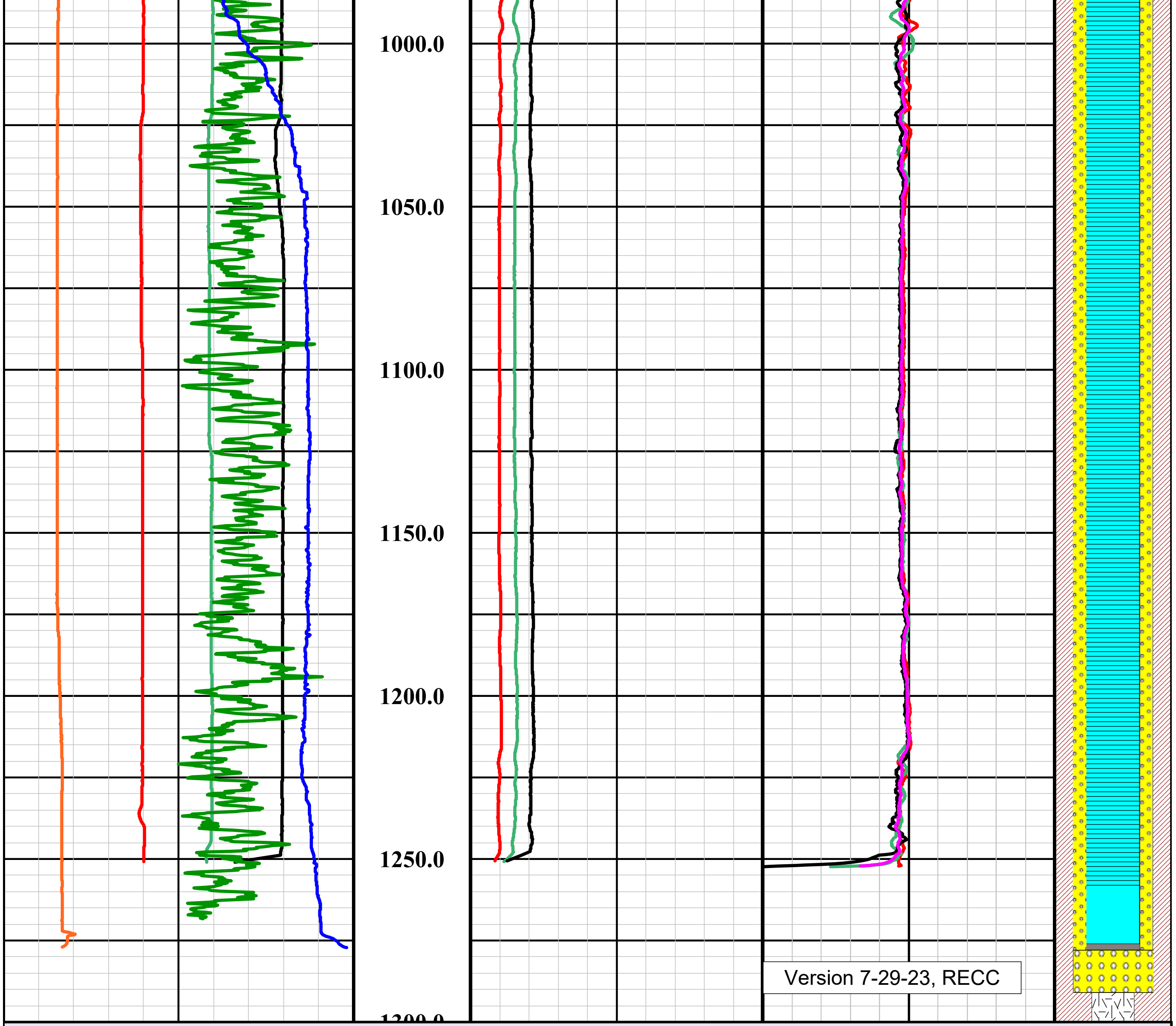
950.0



Well COS-75A Net Velocity Summary Non-Pumping Trolling Dn_6-5-23

0 uS/cm 10000
Fluid Conductivity 25'C

25 Deg C 35
Temperature

0 API 100
Nat. Gamma

0 ft/min 100
Speed 80 Dn

0 ft/min 100
Speed 60 Dn

0 ft/min 100
Speed 40 Dn

1in:50ft
Depth

0 cps 20000
Spinner 80 Dn

0 cps 20000
Spinner 60 Dn

0 cps 20000
Spinner 40 Dn

-50 fpm 50
Ave Net Velocity Dn

-50 fpm 50
Net Velocity 80 Dn

-50 fpm 50
Net Velocity 60 Dn

-50 fpm 50
Net Velocity 40 Dn

Well Diag.

Legend

Mnemonics	**Description**
Nat. Gamma	Natural gamma ray log plotted 0 to 100 API (green line).

Fluid Conductivity 25˚C	Fluid Conductivity is the reciprocal of Fluid Resistivity. Normalized to 25˚C. It provides data of the disolved solids concentrations in fluid column (orange line).
Temperature	Borehole fluid temperature plotted from 15 to 35 deg C (blue line).
Speed 40 Dn	Trolling speed and direction (red line).
Speed 60 Dn	Trolling speed and direction (green line).
Speed 80 Dn	Trolling speed and direction (black line).
Spinner 40 Dn	Spinner response in cps trolling down at 40 fpm (red line).
Spinner 60 Dn	Spinner response in cps trolling down at 60 fpm (green line).
Spinner 80 Dn	Spinner response in cps trolling down at 80 fpm (black line).
Net Velocity 40 Dn	Net velocity calculated from spinner cal data & corrected for trolling speed (red line).
Net Velocity 60 Dn	Net velocity calculated from spinner cal data & corrected for trolling speed (green line).
Net Velocity 80 Dn	Net velocity calculated from spinner cal data & corrected for trolling speed (black line).
Ave Net Velocity Dn	Average net velocity calculated from the three trolling speeds (magenta line).
Well Diag.	Well Construction Diagram from information provided by M&A. Mnemonics prepared by Robert E. Crowder Version 08-06-23

QL Spinner Flowmeter (SFM)

Probe Top = Depth Ref.

Tool SN: 5726 & 6618

Probe Length = 0.90 m or 2.95 ft

Probe Weight = 3.25 kg or 7.2 lbs

Maximum Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Three impeller cage sizes: 1.5", 3" and 4"

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

Can be used under static (non-pumping) or dynamic (pumping) conditions

Measures both upflow and downflow

Minimum Flow Rate: 3-5 gpm

Maximum Flow Rate: 5000 gpm

Flow rate (velocity)

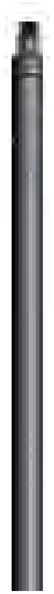
- Static: ~5-7 ft/min
- Dynamic: +/- 1 ft/min

Measure Point

1.57" or 40 mm Diameter (Cage dependent)

QL Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.



Four Conductor MSI Probe Top

Tool SN: 5613, 5979, 6161, 6292, 6517, 6587,
6641, 6798, 6799, 6973 & 6969

Probe Length = 3.69 m or 12.12 ft

Probe Weight = 18.195 kg or 40.11 lbs

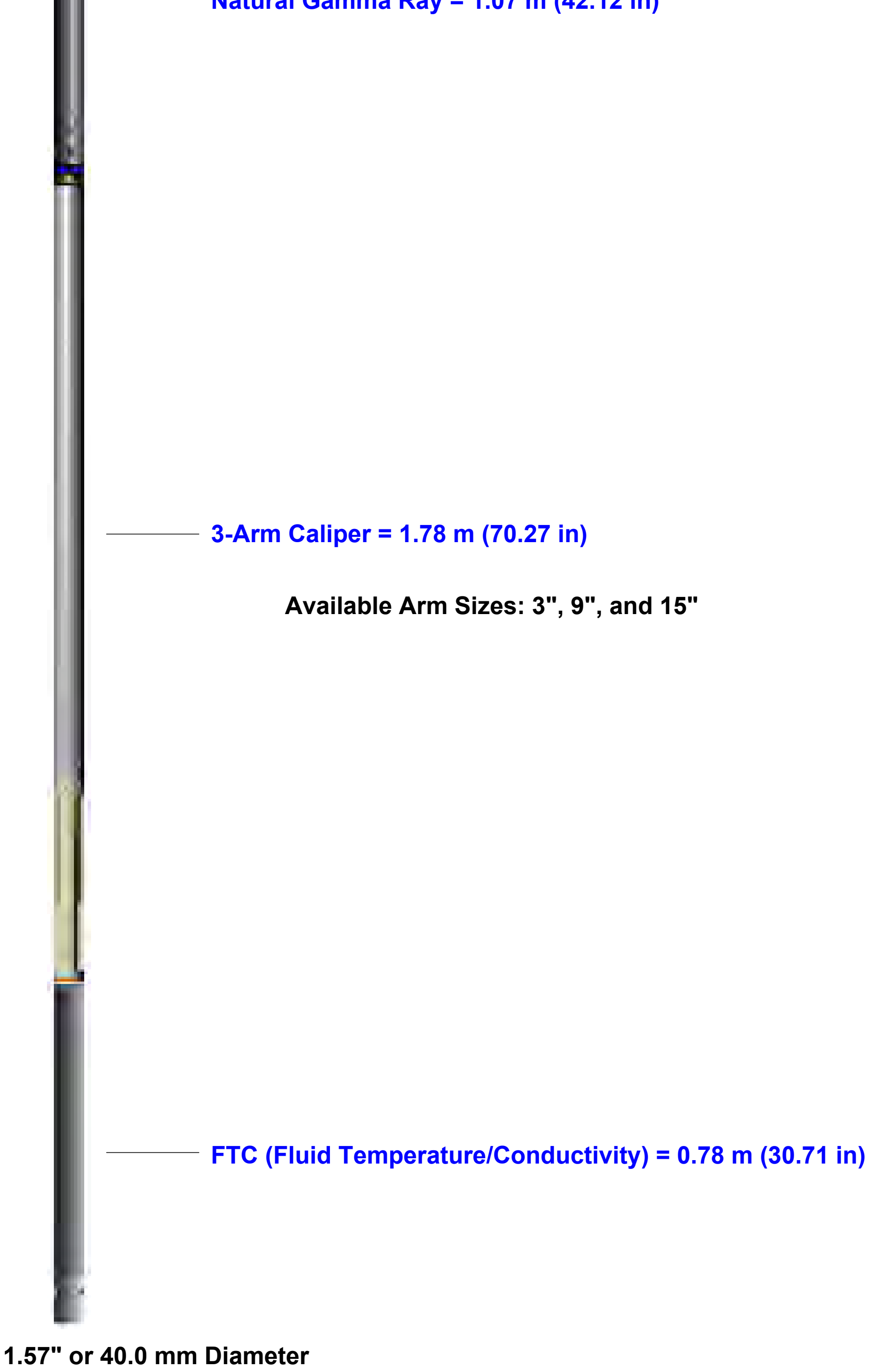
Caliper arms can only collect data logging up hole

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)

Natural Gamma Ray = 1.07 m (42.12 in)



Southwest Exploration Services, LLC
borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	COS-75A
Field	INDIAN SCHOOL PARK - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Final Spinner Velocity Summary

Southwest Exploration Services, LLC
borehole geophysics & video services

COMPANY MONTGOMERY & ASSOCIATES
WELL ID COS-75A
FIELD INDIAN SCHOOL PARK - SCOTTSDALE
COUNTY MARICOPA STATE ARIZONA

TYPE OF LOGS: STATIC SPINNER
MORE: TEMP / FLUID COND.

OTHER SERVICES
GAMMA
CALIPER
WATER 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	6-5-23	TYPE FLUID IN HOLE	WATER
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	STATIC SPINNER	VISCOSITY	N/A
DEPTH-DRILLER	1275.0 FT	LEVEL	~ 196 FT
DEPTH-LOGGER	1275.0 FT	MAX. REC. TEMP.	34.8 DEG. C
BTM LOGGED INTERVAL	1275.0 FT	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.1 FT
DRILLER / RIG#	N/A	LOGGING TRUCK	TRUCK #200
RECORDED BY / Logging Eng.	J. ZELINSKI / T. FERRIS	TOOL STRING/SN	QL SFM SPINNER SN 6618
WITNESSED BY	ANDREW - M&A	LOG TIME:ON SITE/OFF SITE	7:30 AM

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

COMMENTS:

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Tool Summary:

Date	6-5-23	**Date**	6-5-23	**Date**	6-5-23
Run No.	1	**Run No.**	2	**Run No.**	3
Tool Model	QL COMBO TOOL	**Tool Model**	QL SPINNER	**Tool Model**	WATER SAMPLER
Tool SN	6641	**Tool SN**	6618	**Tool SN**	N/A
From	SURFACE	**From**	190.0 FT	**From**	N/A
To	1275.0 FT	**To**	1250.0 FT	**To**	N/A
Recorded By	J. ZELINSKI	**Recorded By**	J. ZELINSKI	**Recorded By**	J. ZELINSKI
Truck No	200	**Truck No**	200	**Truck No**	200
Operation Check	6-4-23	**Operation Check**	6-4-23	**Operation Check**	6-4-23
Calibration Check	6-4-23	**Calibration Check**	N/A	**Calibration Check**	N/A
Time Logged	7:30 AM	**Time Logged**	10:25 AM	**Time Logged**	3:00 PM

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: 16"

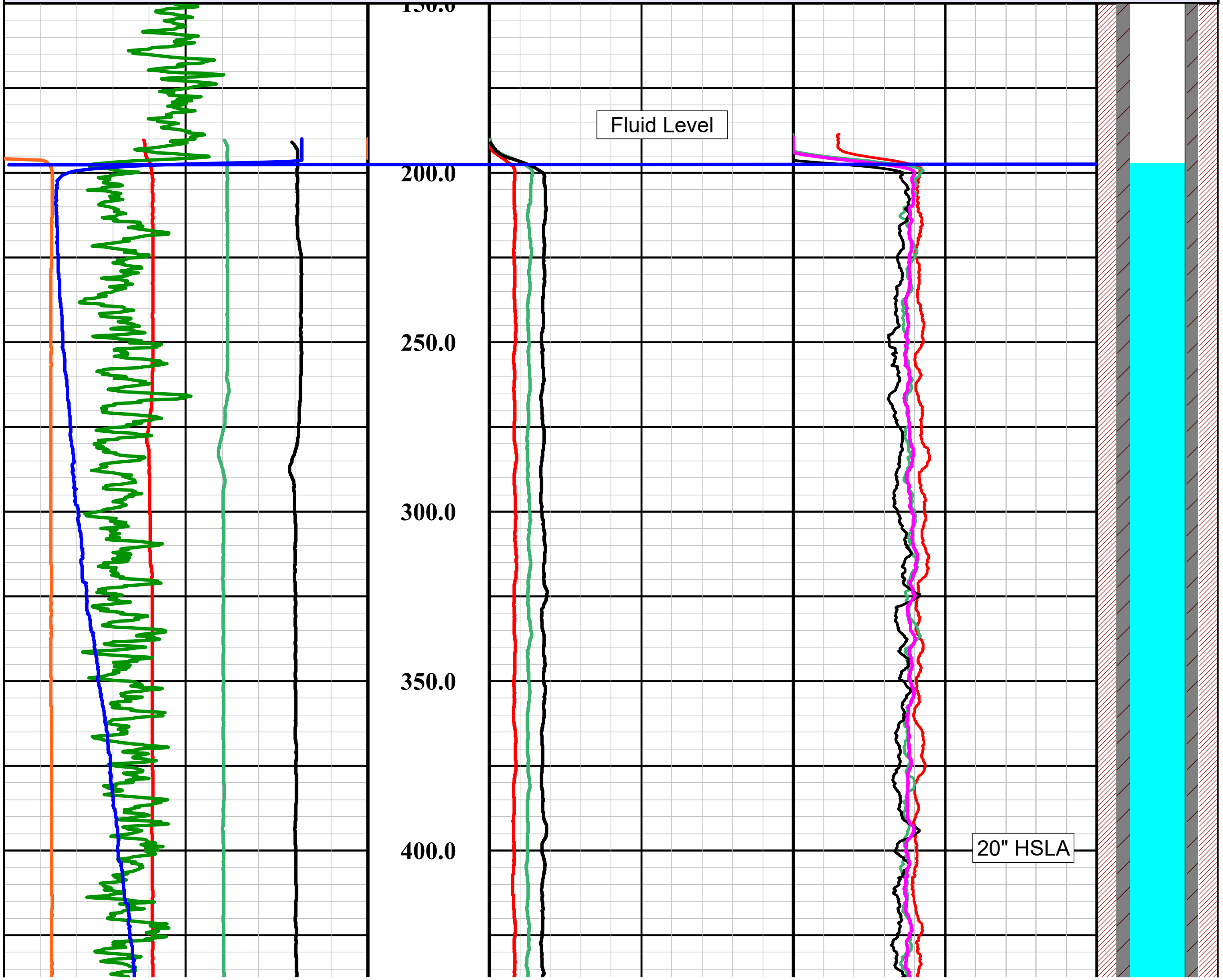
Calibration Points: 16" & 24"

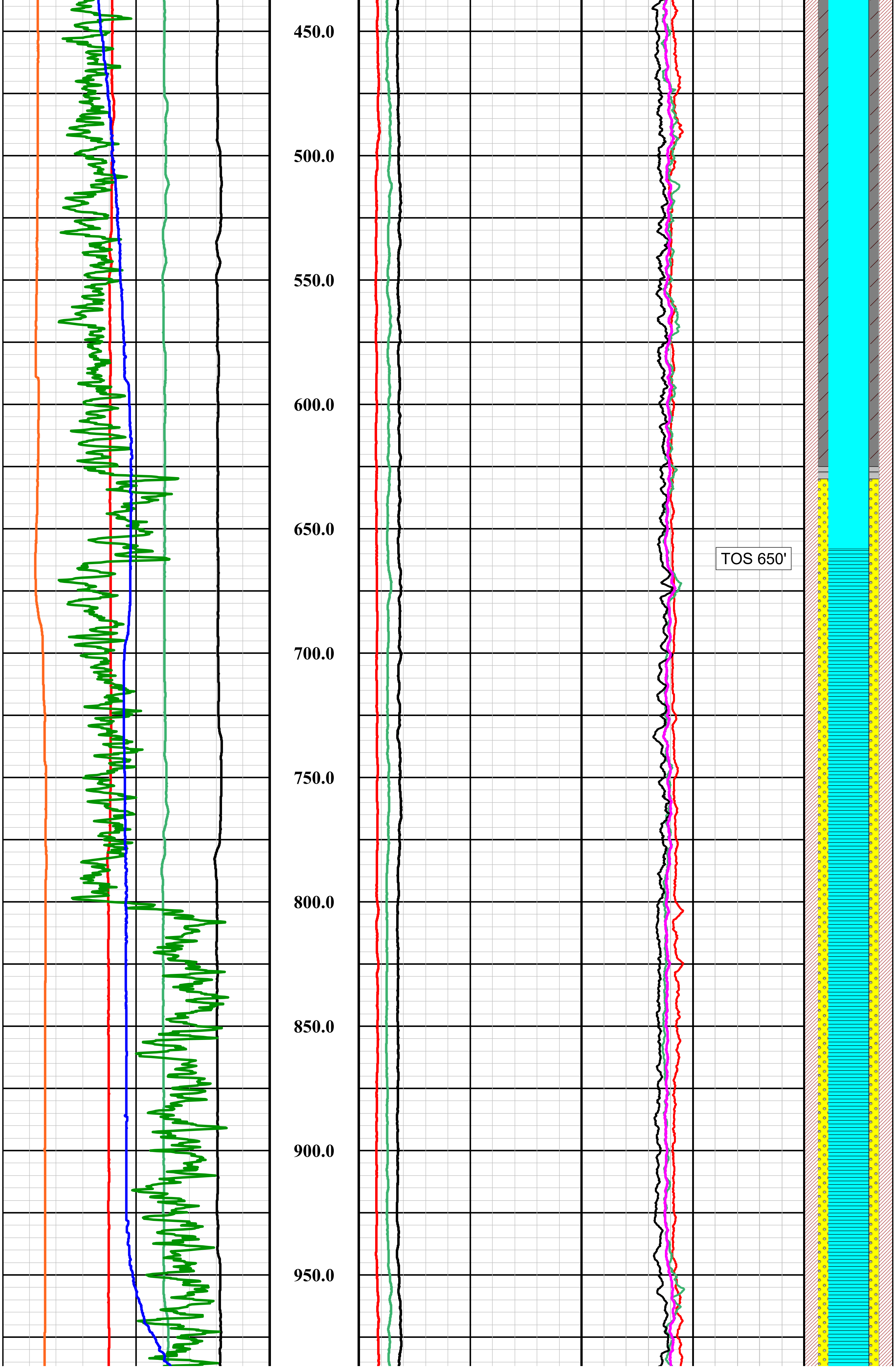
E-Log Calibration Range: N/A **Calibration Points:** N/A

Disclaimer:

Speed 40 Up 0 ft/min 100	**Depth** 1in:50ft	**Spinner 40 Up** 0 cps 20000	**Net Velocity 40 Up** -50 fpm 50	**Well Diag.**
Speed 60 Up 0 ft/min 100		**Spinner 60 Up** 0 cps 20000	**Net Velocity 60 Up** -50 fpm 50	
Speed 80 Up 0 ft/min 100		**Spinner 80 Up** 0 cps 20000	**Net Velocity 80 Up** -50 fpm 50	
Nat. Gamma 0 API 100			**Ave Net Velocity Up** -50 fpm 50	
Temperature 25 Deg C 35				
Fluid Conductivity 25'C 0 uS/cm 10000				

Well COS-75A Net Velocity Summary Non-Pumping Trolling Up_6-5-23

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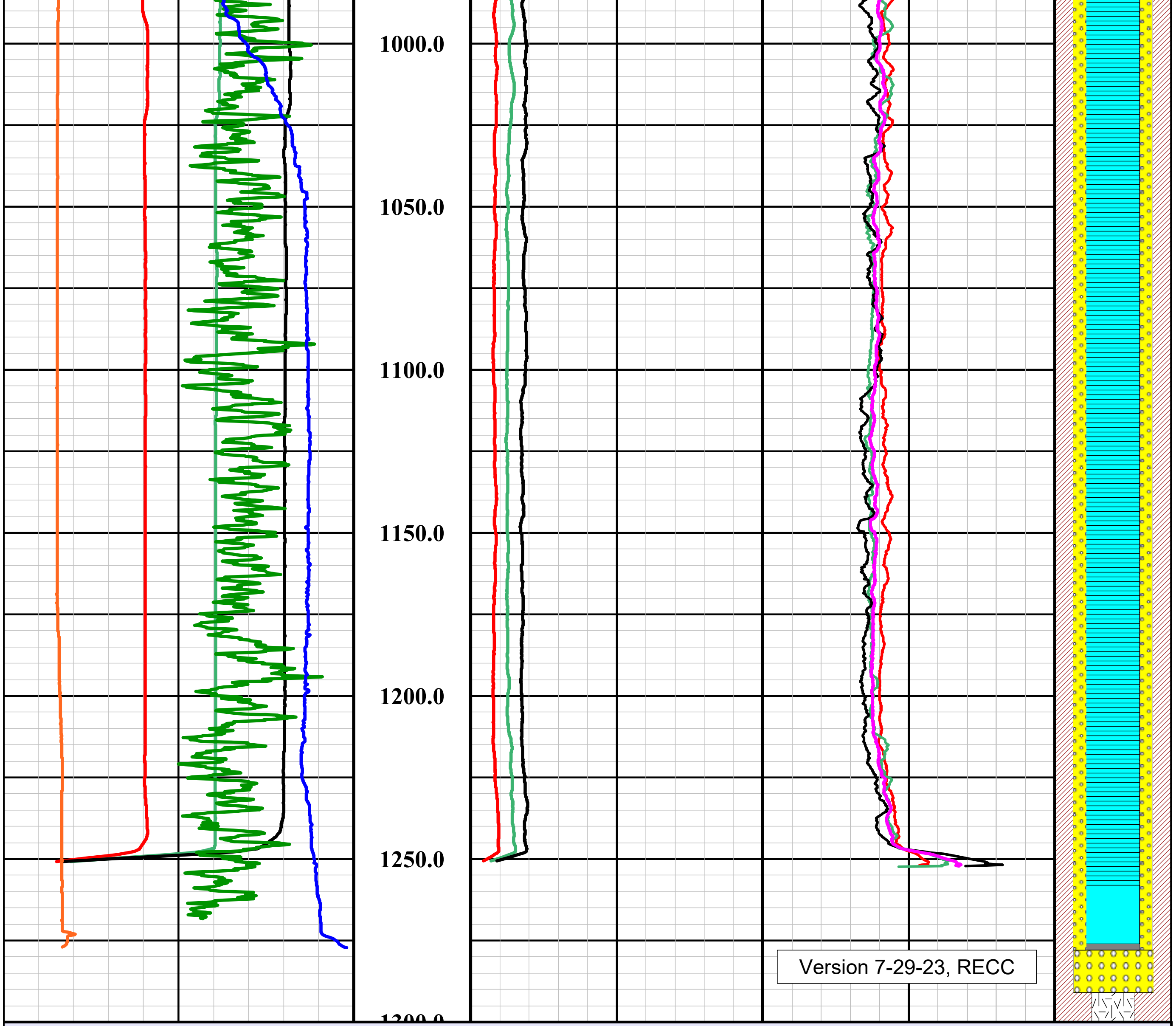
TOS 650'



Well COS-75A Net Velocity Summary Non-Pumping Trolling Up_6-5-23

0 uS/cm 10000 **Fluid Conductivity 25'C**				
25 Deg C 35 **Temperature**				
0 API 100 **Nat. Gamma**			-50 fpm 50 **Ave Net Velocity Up**	
0 ft/min 100 **Speed 80 Up**		0 cps 20000 **Spinner 80 Up**	-50 fpm 50 **Net Velocity 80 Up**	
0 ft/min 100 **Speed 60 Up**		0 cps 20000 **Spinner 60 Up**	-50 fpm 50 **Net Velocity 60 Up**	
0 ft/min 100 **Speed 40 Up**	1in:50ft **Depth**	0 cps 20000 **Spinner 40 Up**	-50 fpm 50 **Net Velocity 40 Up**	**Well Diag.**

Legend

Mnemonics	**Description**
Nat. Gamma	Natural gamma ray log plotted 0 to 100 API (green line).

Fluid Conductivity 25°C	Fluid Conductivity is the reciprocal of Fluid Resistivity. Normalized to 25°C. It provides data of the disolved solids concentrations in fluid column (orange line).
Temperature	Borehole fluid temperature plotted from 15 to 35 deg C (blue line).
Speed 40 Up	Trolling speed and direction (red line).
Speed 60 Up	Trolling speed and direction (green line).
Speed 80 Up	Trolling speed and direction (black line).
Spinner 40 Up	Spinner response in cps trolling up at 40 fpm (red line).
Spinner 60 Up	Spinner response in cps trolling up at 60 fpm (green line).
Spinner 80 Up	Spinner response in cps trolling up at 80 fpm (black line).
Net Velocity 40 Up	Net velocity calculated from spinner cal data & corrected for trolling speed (red line).
Net Velocity 60 Up	Net velocity calculated from spinner cal data & corrected for trolling speed (green line).
Net Velocity 80 Up	Net velocity calculated from spinner cal data & corrected for trolling speed (black line).
Ave Net Velocity Up	Average net velocity calculated from the three trolling speeds (magenta line).
Well Diag.	Well Construction Diagram from information provided by M&A.

Mnemonics prepared by Robert E. Crowder
Version 7-31-23

QL Spinner Flowmeter (SFM)

Probe Top = Depth Ref.

Tool SN: 5726 & 6618

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

Maximum Operating Temperature: 80 Deg C (176 Deg F)

Presure Rating: 200 bar (2900 psi)

Three impeller cage sizes: 1.5", 3" and 4"

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

Can be used under static (non-pumping) or dynamic (pumping) conditions

Measures both upflow and downflow

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

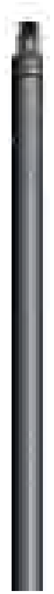
Flow rate (velocity)
  Static: ~5-7 ft/min
  Dynamic: +/- 1 ft/min

Measure Point

1.57" or 40 mm Diameter (Cage dependent)

QL Gamma-Caliper-Temperature-Fluid Conductivity

Probe Top = Depth Ref.



Four Conductor MSI Probe Top

Tool SN: 5613, 5979, 6161, 6292, 6517, 6587, 6641, 6798, 6799, 6973 & 6969

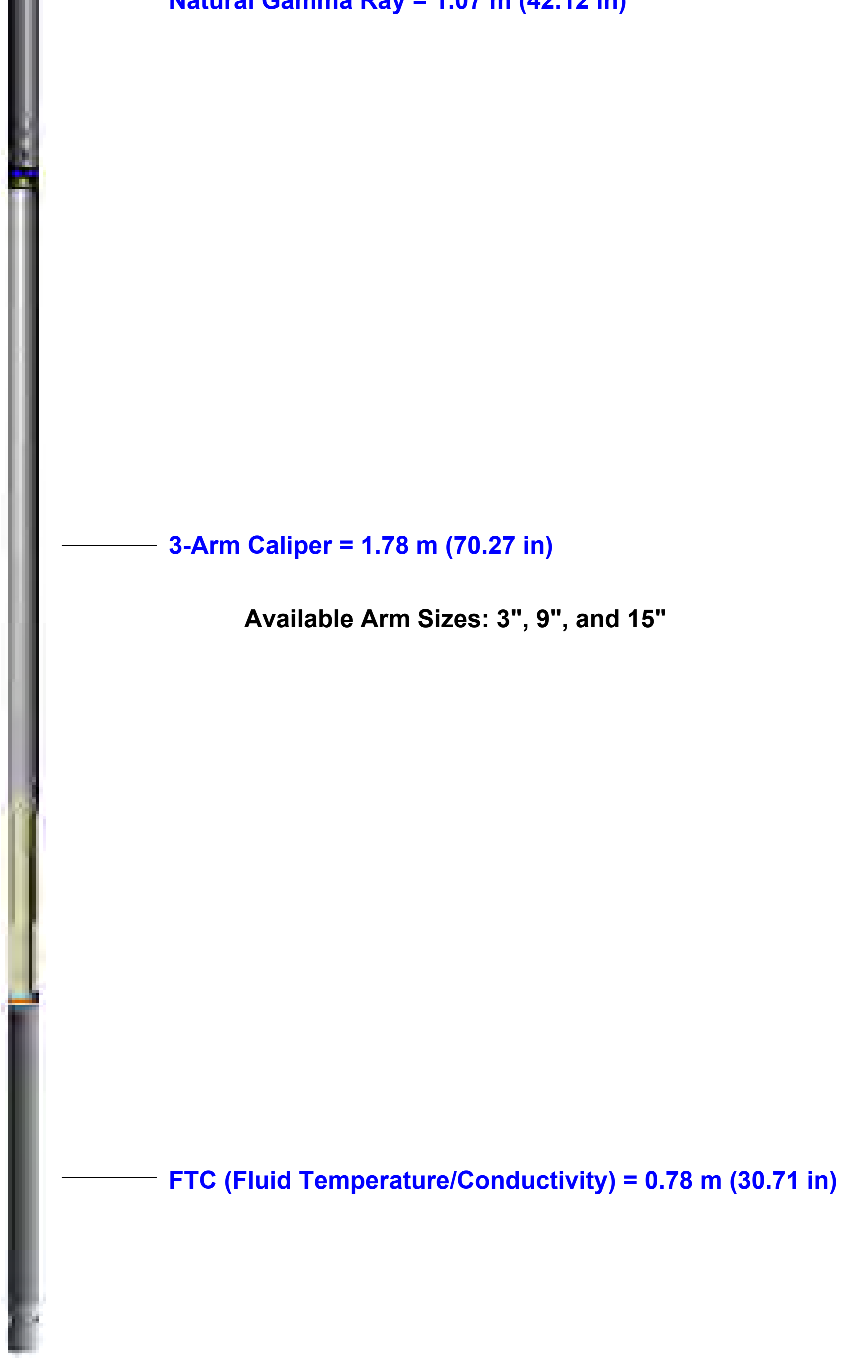
Probe Length = 3.69 m or 12.12 ft
Probe Weight = 18.195 kg or 40.11 lbs

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)

Natural Gamma Ray = 1.07 m (42.12 in)



1.57" or 40.0 mm Diameter

Southwest Exploration Services, LLC

borehole geophysics & video services

Company	MONTGOMERY & ASSOCIATES
Well	COS-75A
Field	INDIAN SCHOOL PARK - SCOTTSDALE
County	MARICOPA
State	ARIZONA

Final **Spinner Velocity Summary**

GeoLog, LLC

P.O. Box 2571 Cottonwood AZ. 86326
(928) 899-6491
ccatalano@geologaz.com

WELL 75A
TYPE of LOGS Dynamic Spin Dn
Date 06-13-23
SYSTEM NAME

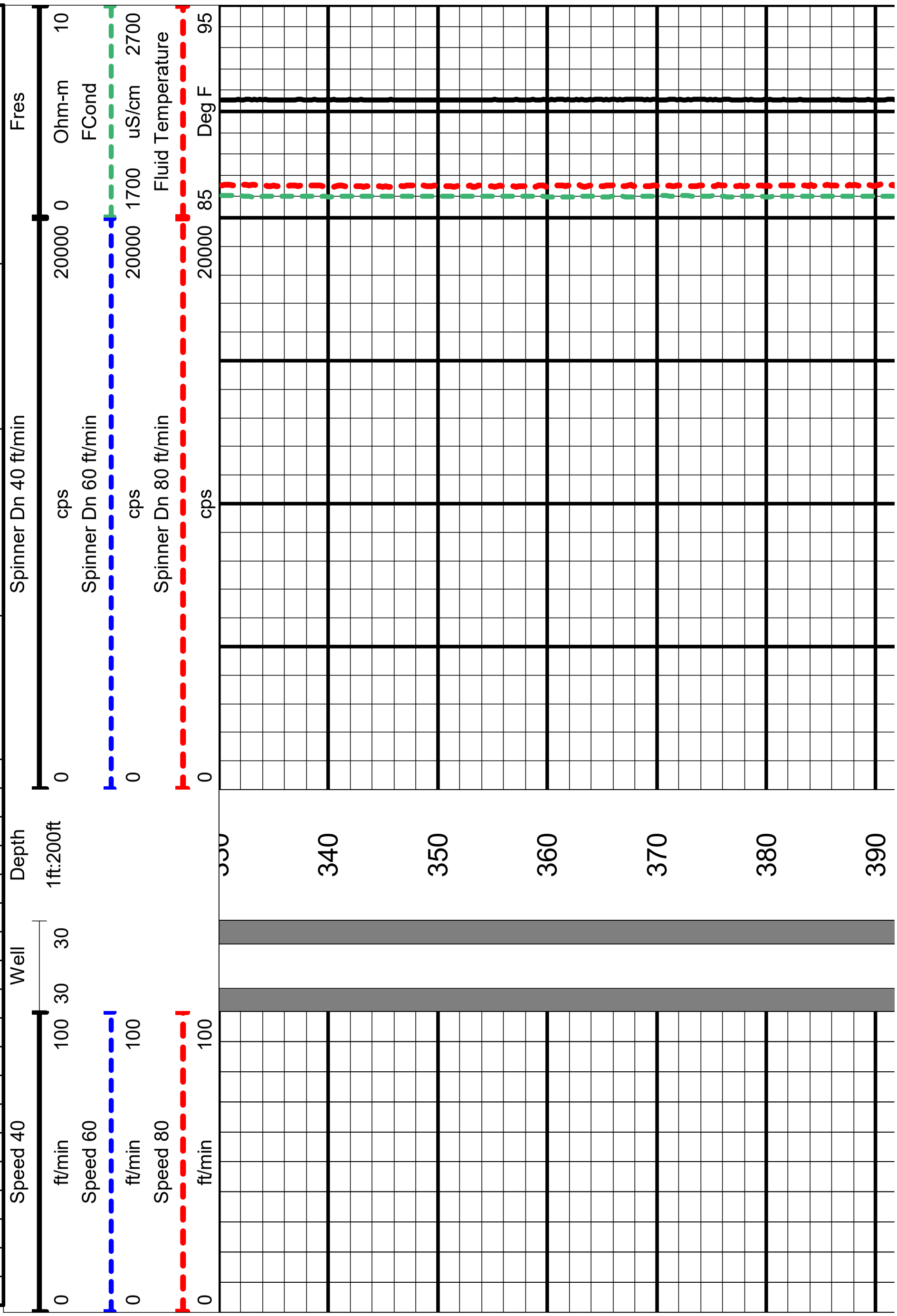
CLIENT	Empire Pump			
WELL ID	75A	DYNAMIC SPINNER DOWN		
PROJECT	City of Scottsdale			
COUNTY	Maricopa		STATE	Arizona

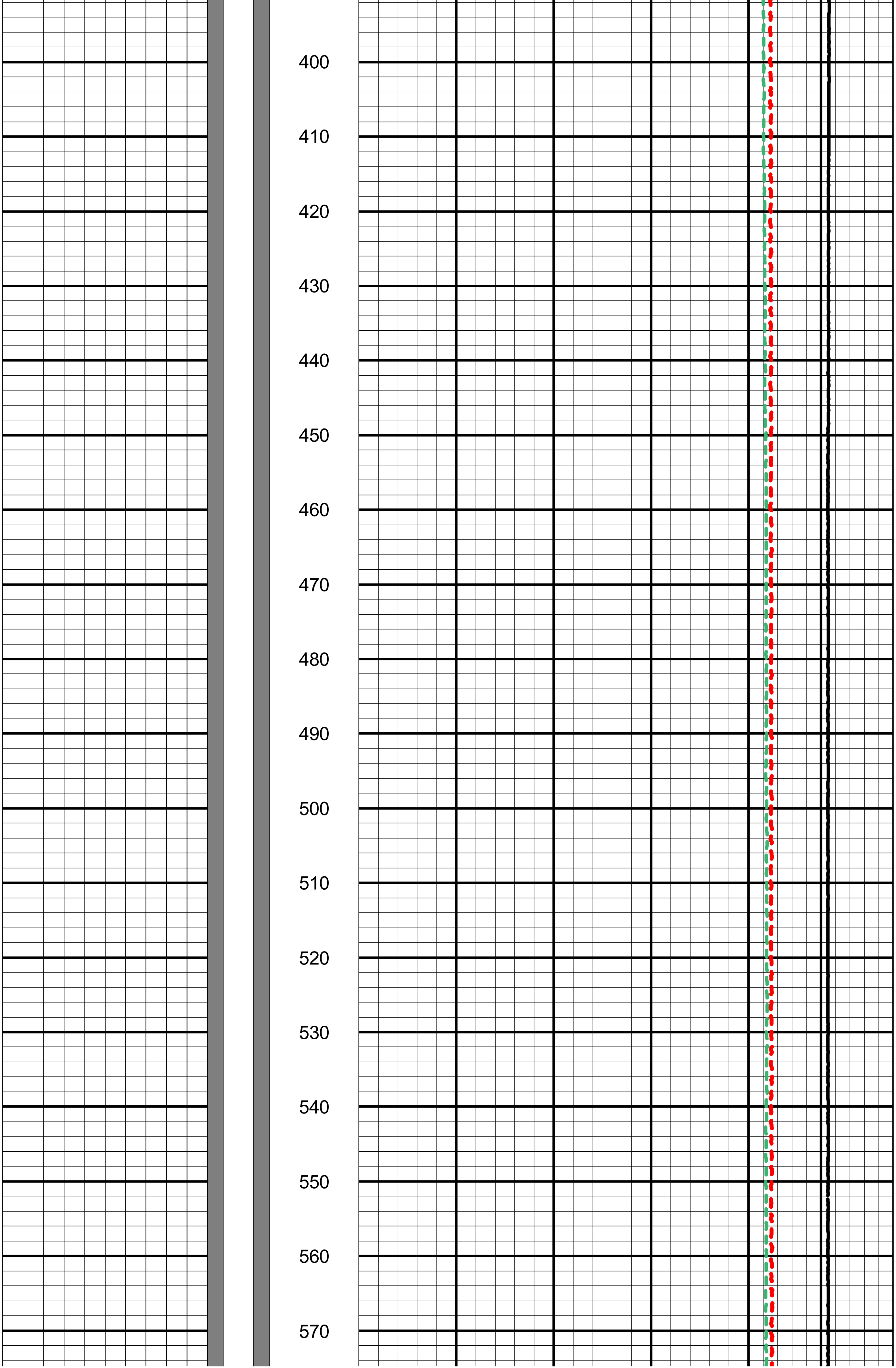
LOCATION N 33 deg 29 min 48.5 sec W 111 deg 54 min 37.3 sec SEC TWP RGE	OTHER SERVICES Fluid Depth Specific Sampling

PERMANENT DATUM	Ground Level	ELEVATION G.L.	1,164 ft-amsl	K.B.
LOGS MEAS. FROM	Ground Level	SURFACE CONDUCTOR	N/A	D.F.
DRILLING MEAS. FROM	Ground Level			G.L.

DATE	06-13-23	TYPE FLUID IN HOLE	Water
RUN No	1	RES MUD	
WELL TYPE	Water Production	RES MUD FILTRATE	
DEPTH-DRILLER	N/A	RES WALL CAKE	
DEPTH-LOGGER	1,278 ft-bgl	MAX. REC. TEMP.	
ADDITIVES	N/A	Pump Setting	330 ft-bgl
BIT TYPE	N/A	Pumping Rate	1,870 gpm
DRILLING METHOD	N/A	Pumping Water Level	236 ft-bgl
RECORDED BY	Yovanni Rosas		
WITNESSED BY	Montgomery and Associates		

RUN	Logging Tools Used / Century System VI			CASING RECORD / BIT RECORD			
NO.	TOOL S/N	FROM	TO	SIZE	WGT.	FROM	TO
RUN 1	Fluid	600 ft-bgl	1,260 ft-bgl			0	
RUN 2	Dynamic Spinner	600 ft-bgl	1,260 ft-bgl				
RUN 3	Depth Spec Sample						
RUN 4							
RUN 5				CAL DATE			
RUN 6							

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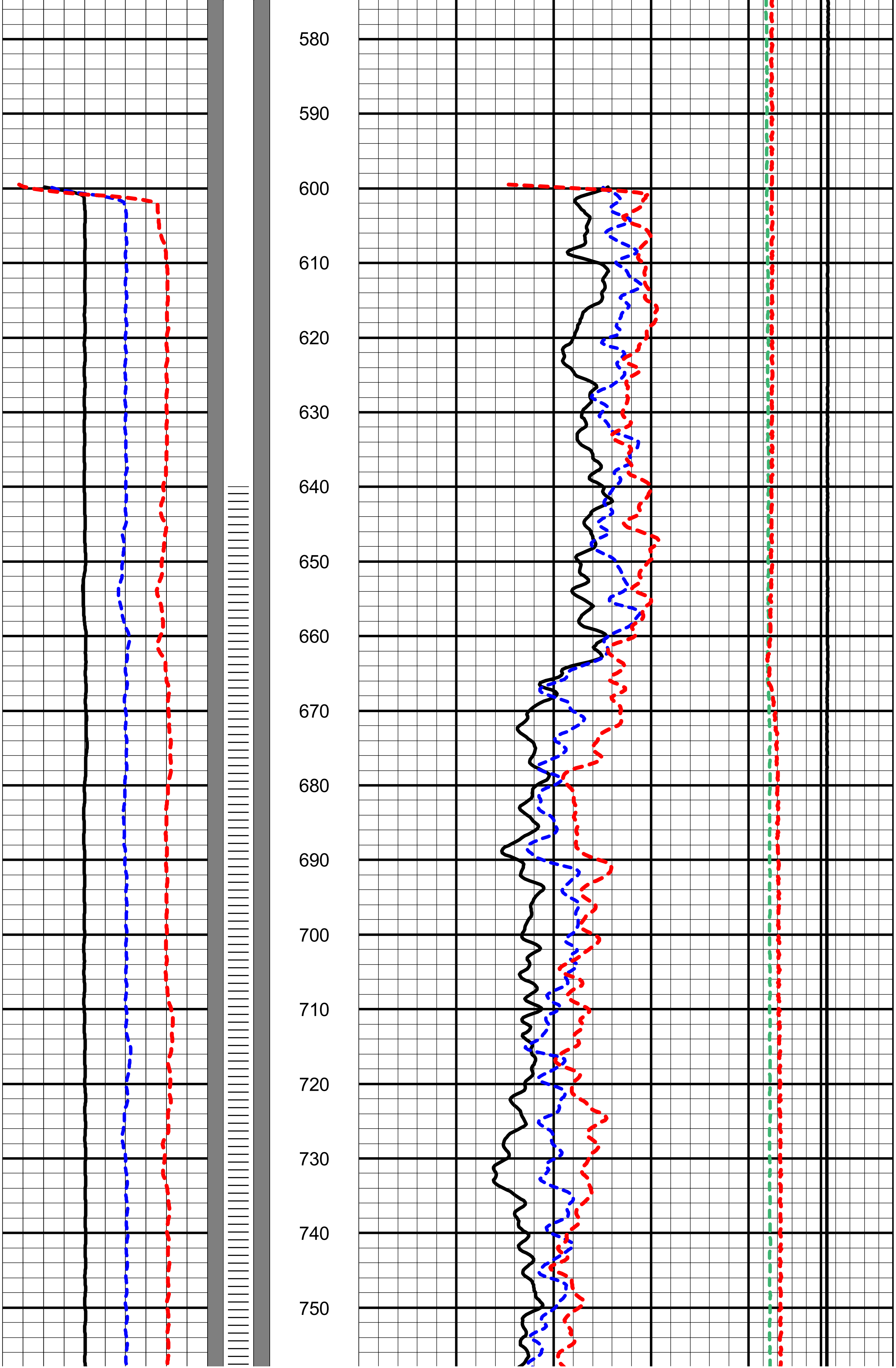

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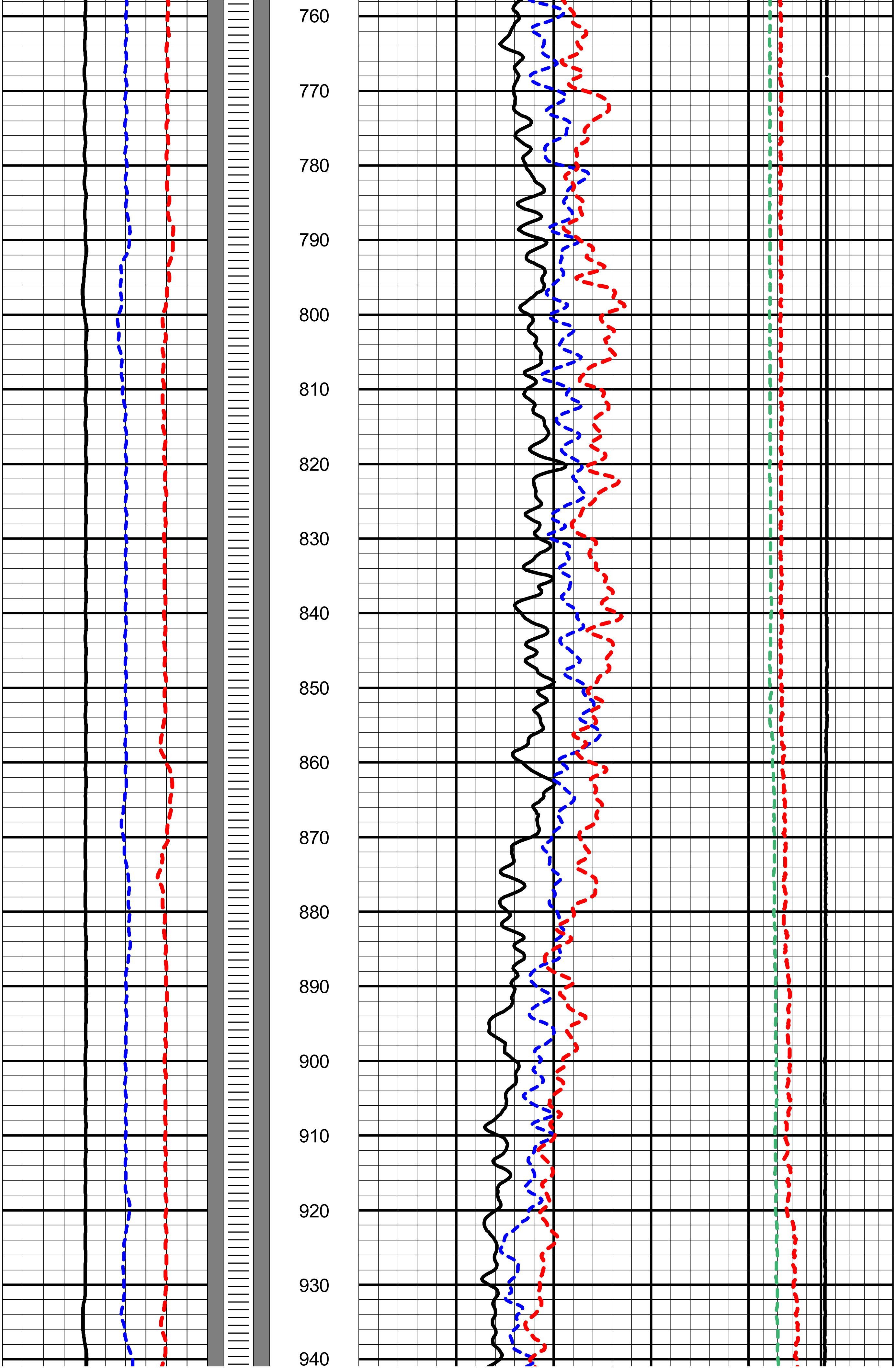
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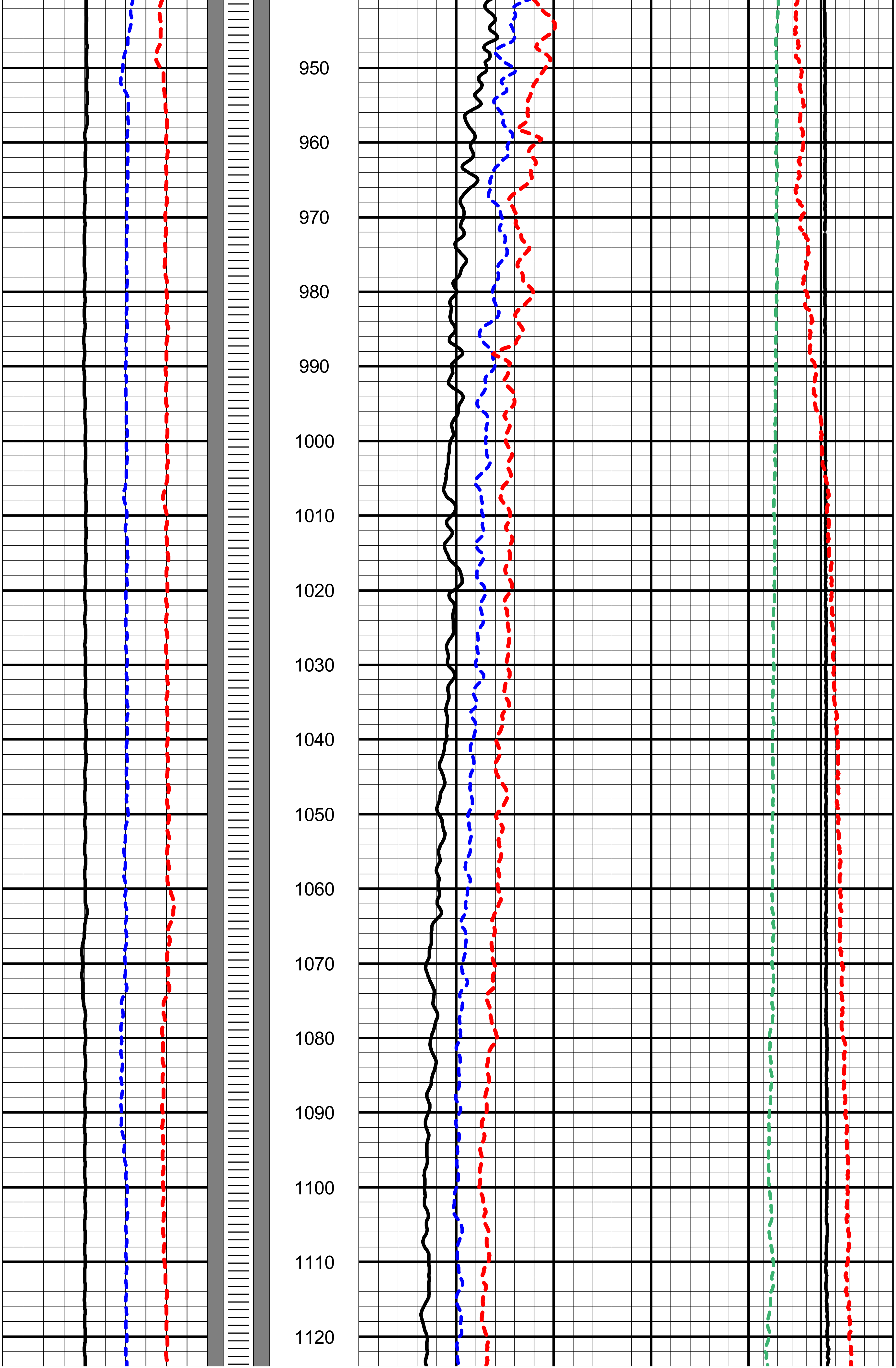
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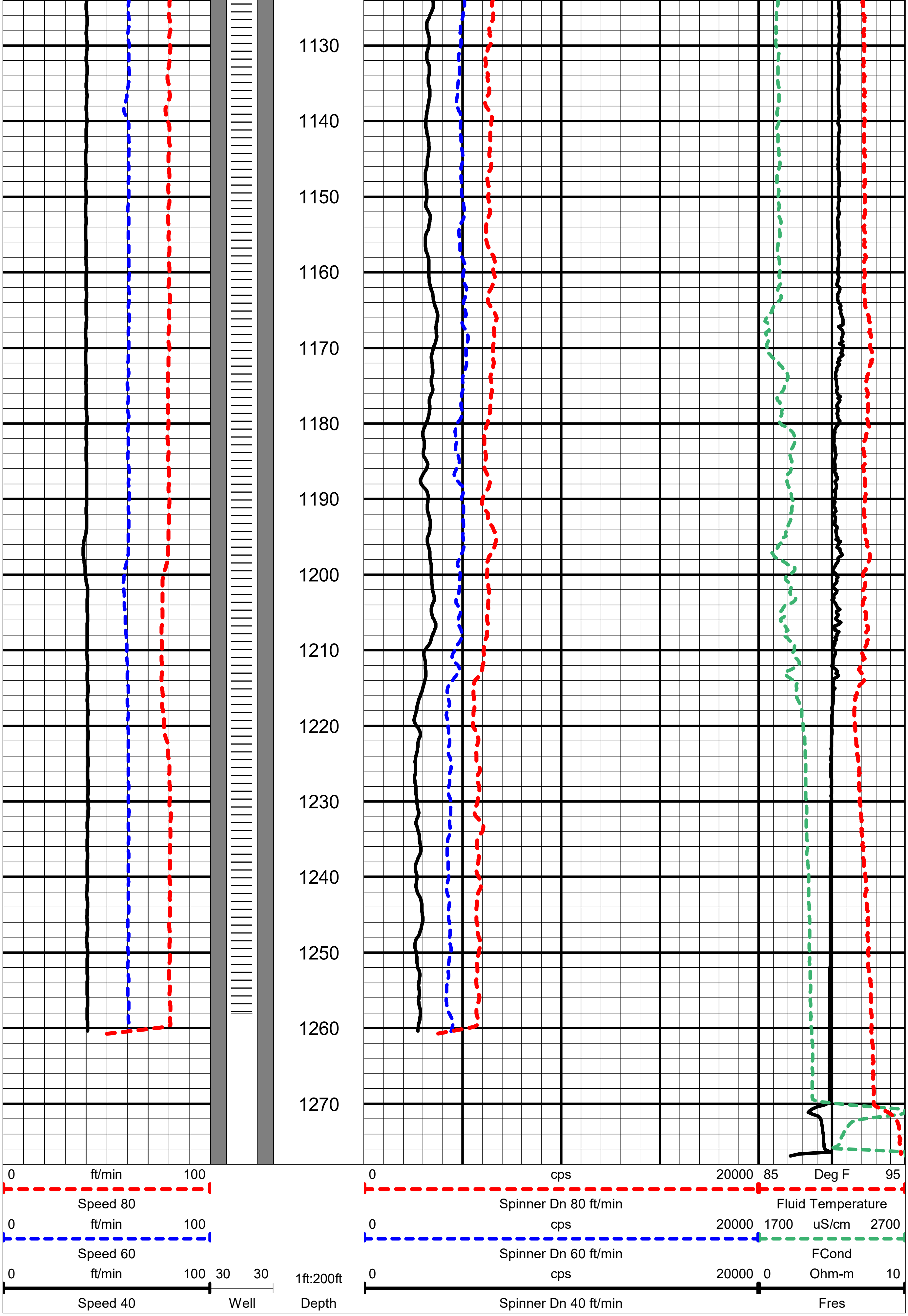

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1270
0 ft/min 100
Speed 80
0 ft/min 100
Speed 60
0 ft/min 100
Speed 40
30 30
Well
1ft:200ft
Depth
0 cps 20000
Spinner Dn 80 ft/min
0 cps 20000
Spinner Dn 60 ft/min
0 cps 20000
Spinner Dn 40 ft/min
85 Deg F 95
Fluid Temperature
1700 uS/cm 2700
FCond
0 Ohm-m 10
Fres

GeoLog, LLC

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(928) 899-6491
ccatalano@geologaz.com

WELL 75A
TYPE of LOGS Fluid Velocity
Date 06-13-23
SYSTEM NAME

CLIENT Empire Pump
WELL ID 75A DYNAMIC SPINNER - FLUID VELOCITY
PROJECT City of Scottsdale
COUNTY Maricopa STATE Arizona

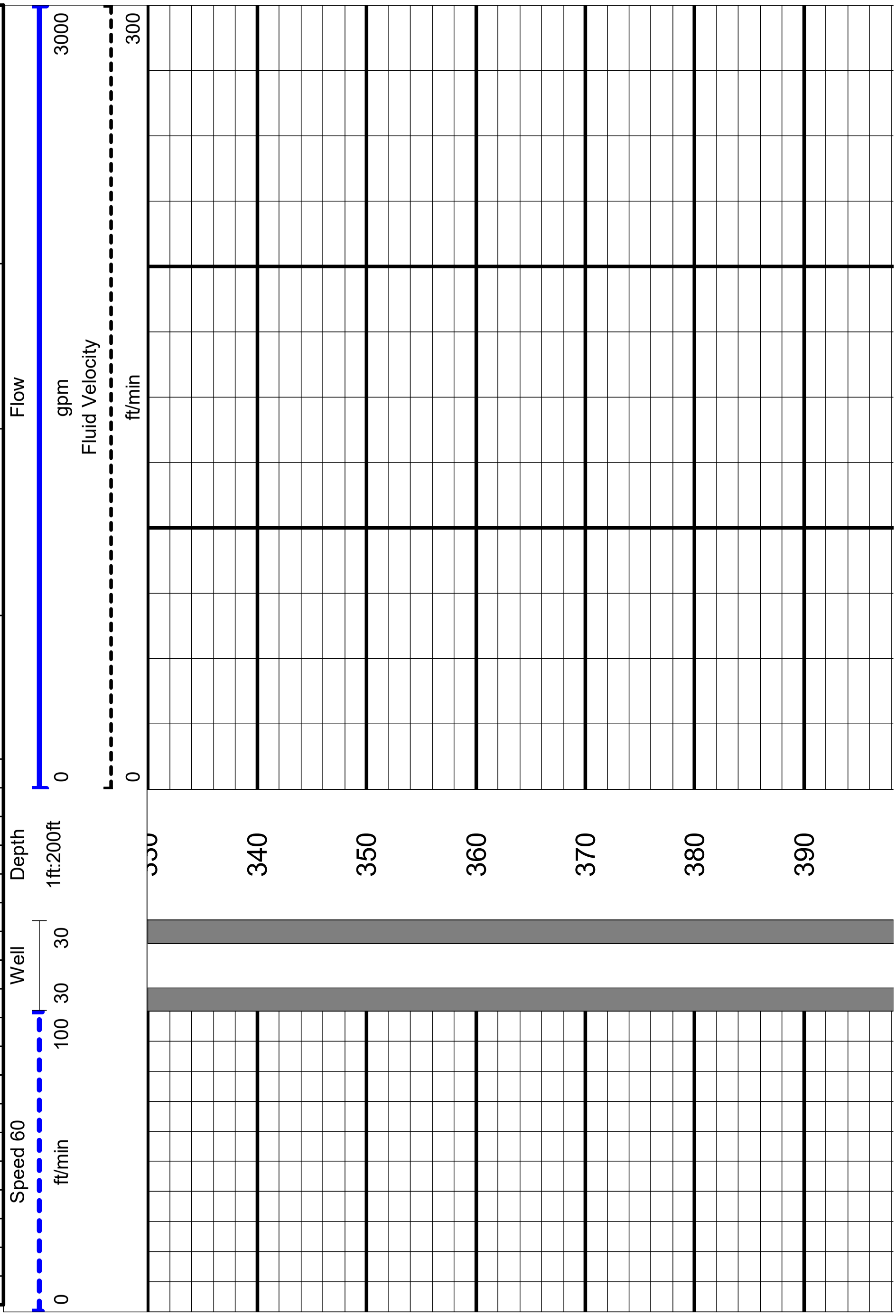
LOCATION
N 33 deg 29 min 48.5 sec
W 111 deg 54 min 37.3 sec
SEC TWP RGE

OTHER SERVICES
Fluid
Depth Specific Sampling

PERMANENT DATUM Ground Level ELEVATION G.L. 1,164 ft-amsl K.B.
LOGS MEAS. FROM Ground Level SURFACE CONDUCTOR N/A D.F.
DRILLING MEAS. FROM Ground Level G.L.

DATE	06-13-23	TYPE FLUID IN HOLE	Water
RUN No	1	RES MUD	
WELL TYPE	Water Production	RES MUD FILTRATE	
DEPTH-DRILLER	N/A	RES WALL CAKE	
DEPTH-LOGGER	1,278 ft-bgl	MAX. REC. TEMP.	
ADDITIVES	N/A	Pump Setting	330 ft-bgl
BIT TYPE	N/A	Pumping Rate	1,870 gpm
DRILLING METHOD	N/A	Pumping Water Level	236 ft-bgl
RECORDED BY	Yovanni Rosas		
WITNESSED BY	Montgomery and Associates		

RUN	Logging Tools Used / Century System VI			CASING RECORD / BIT RECORD			
NO.	TOOL S/N	FROM	TO	SIZE	WGT.	FROM	TO
RUN 1	Fluid	600 ft-bgl	1,260 ft-bgl			0	
RUN 2	Dynamic Spinner	600 ft-bgl	1,260 ft-bgl				
RUN 3	Depth Spec Sample						
RUN 4							
RUN 5				CAL DATE			
RUN 6							



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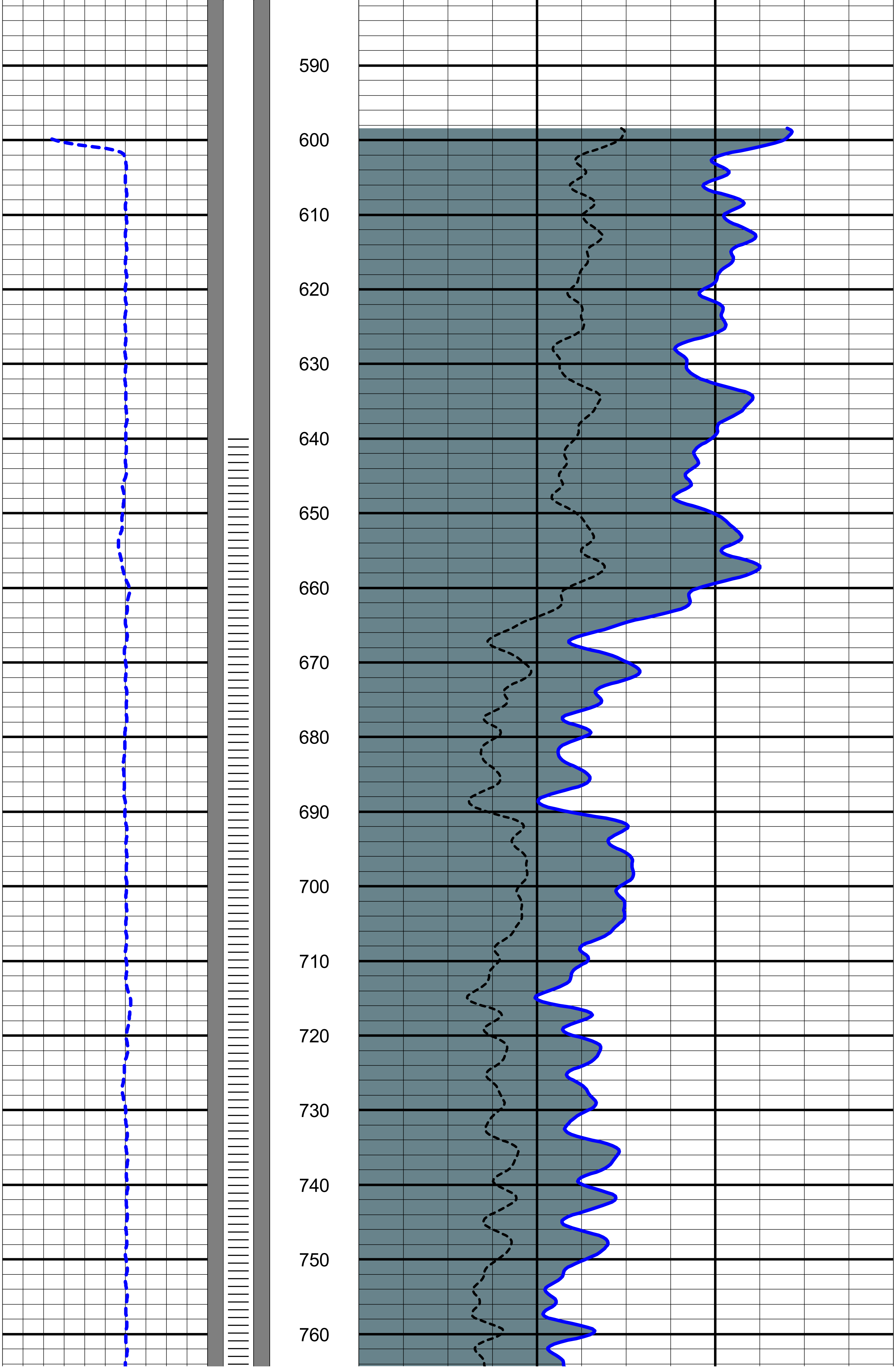
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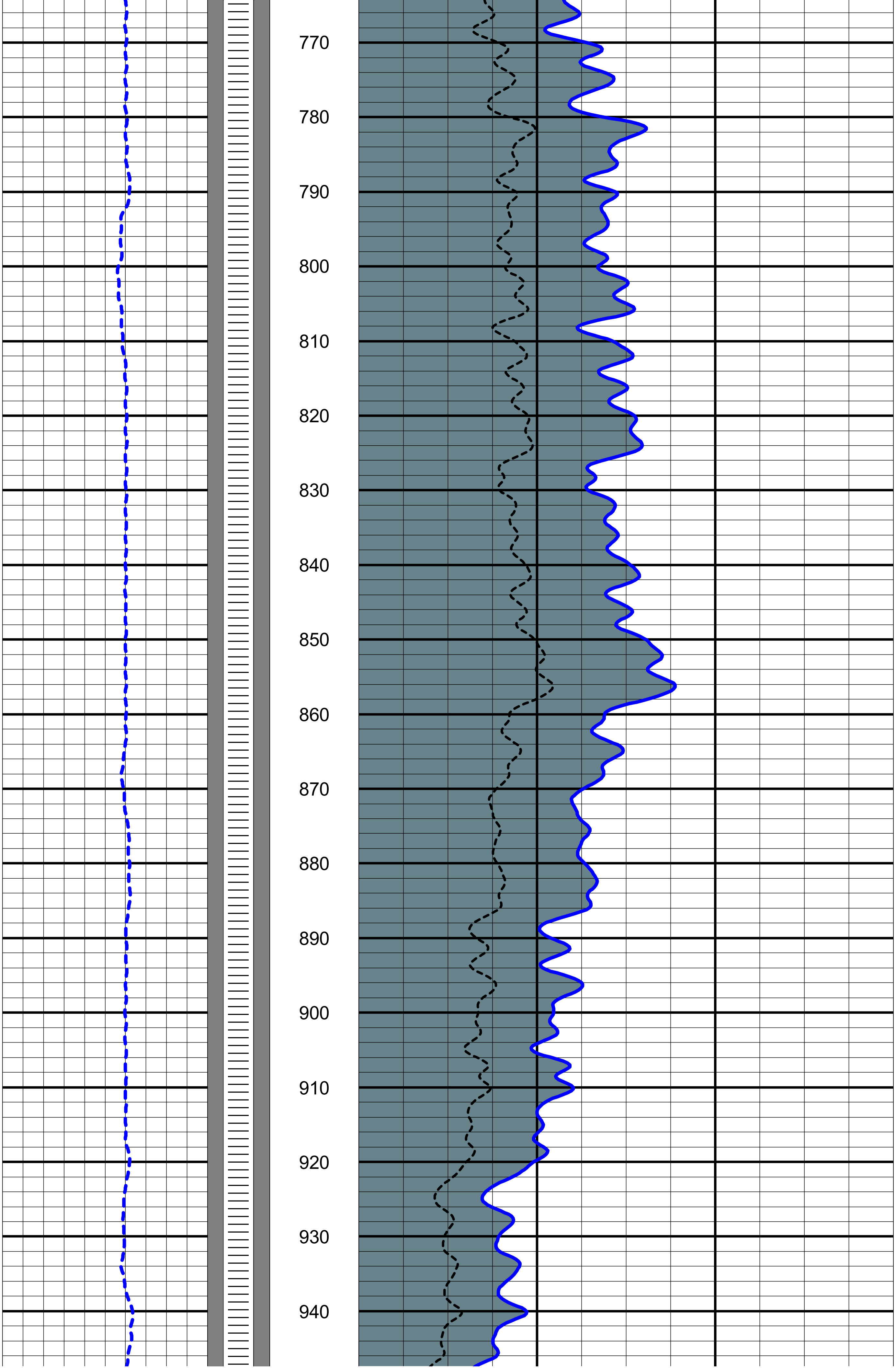
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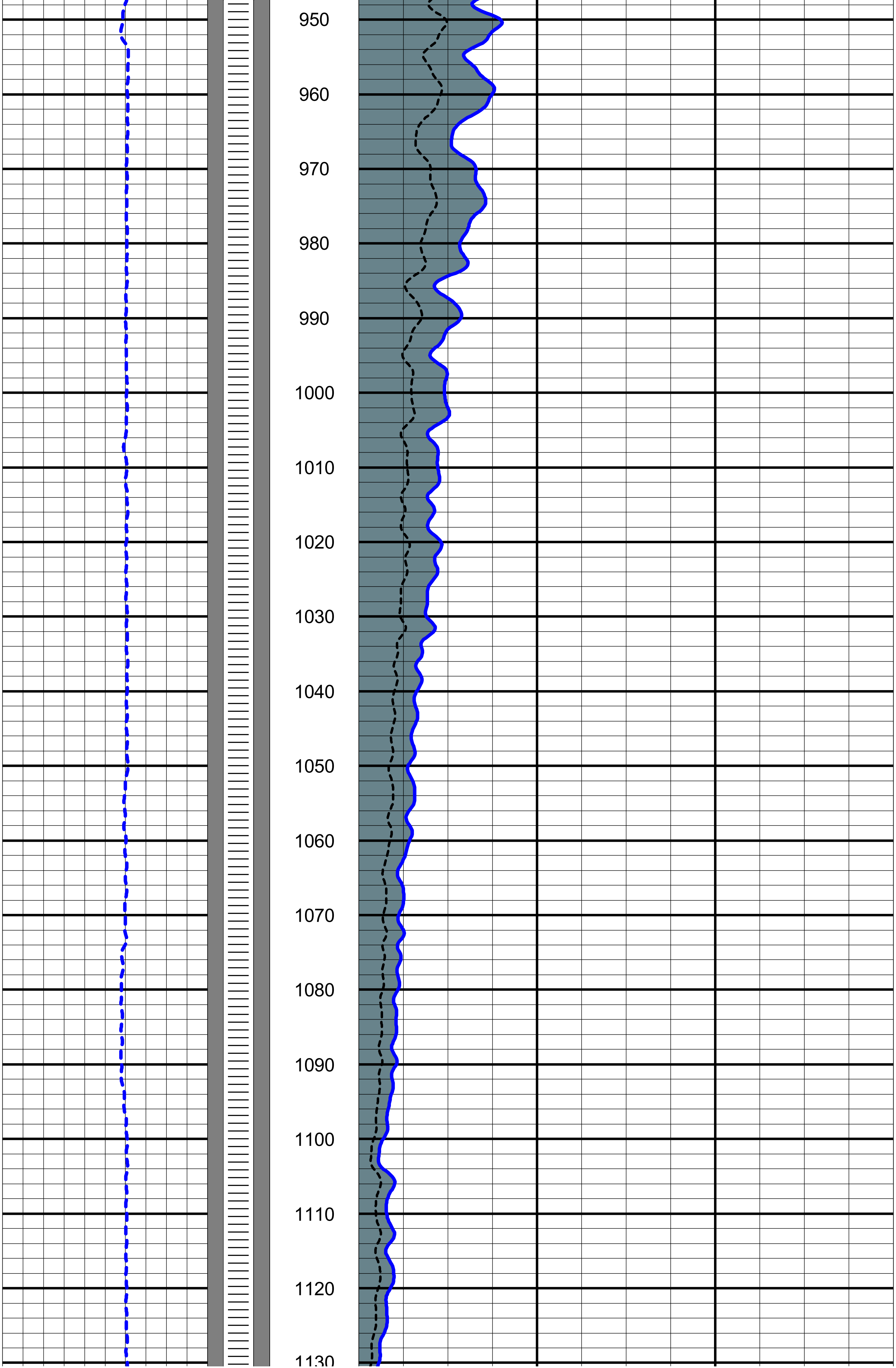
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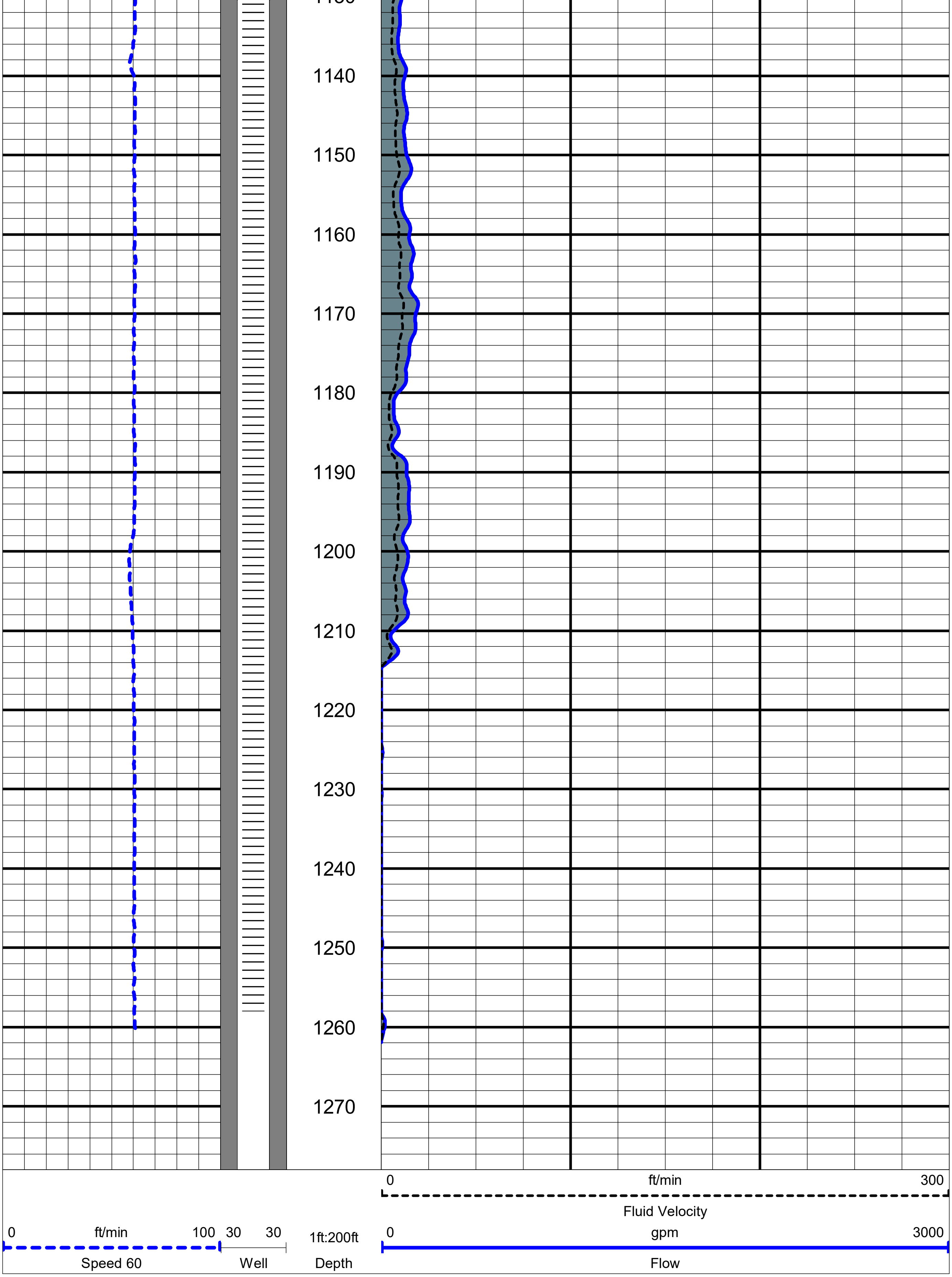
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0
ft/min
300
Fluid Velocity
0
ft/min
100
Speed 60
30
30
Well
1ft:200ft
Depth
0
gpm
3000
Flow

GeoLog, LLC

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WELL 75A
TYPE of LOGS Dynamic Spin Up
Date 06-13-23
SYSTEM NAME

CLIENT	Empire Pump			
WELL ID	75A	DYNAMIC SPINNER UP		
PROJECT	City of Scottsdale			
COUNTY	Maricopa		STATE	Arizona

LOCATION
N 33 deg 29 min 48.5 sec
W 111 deg 54 min 37.3 sec

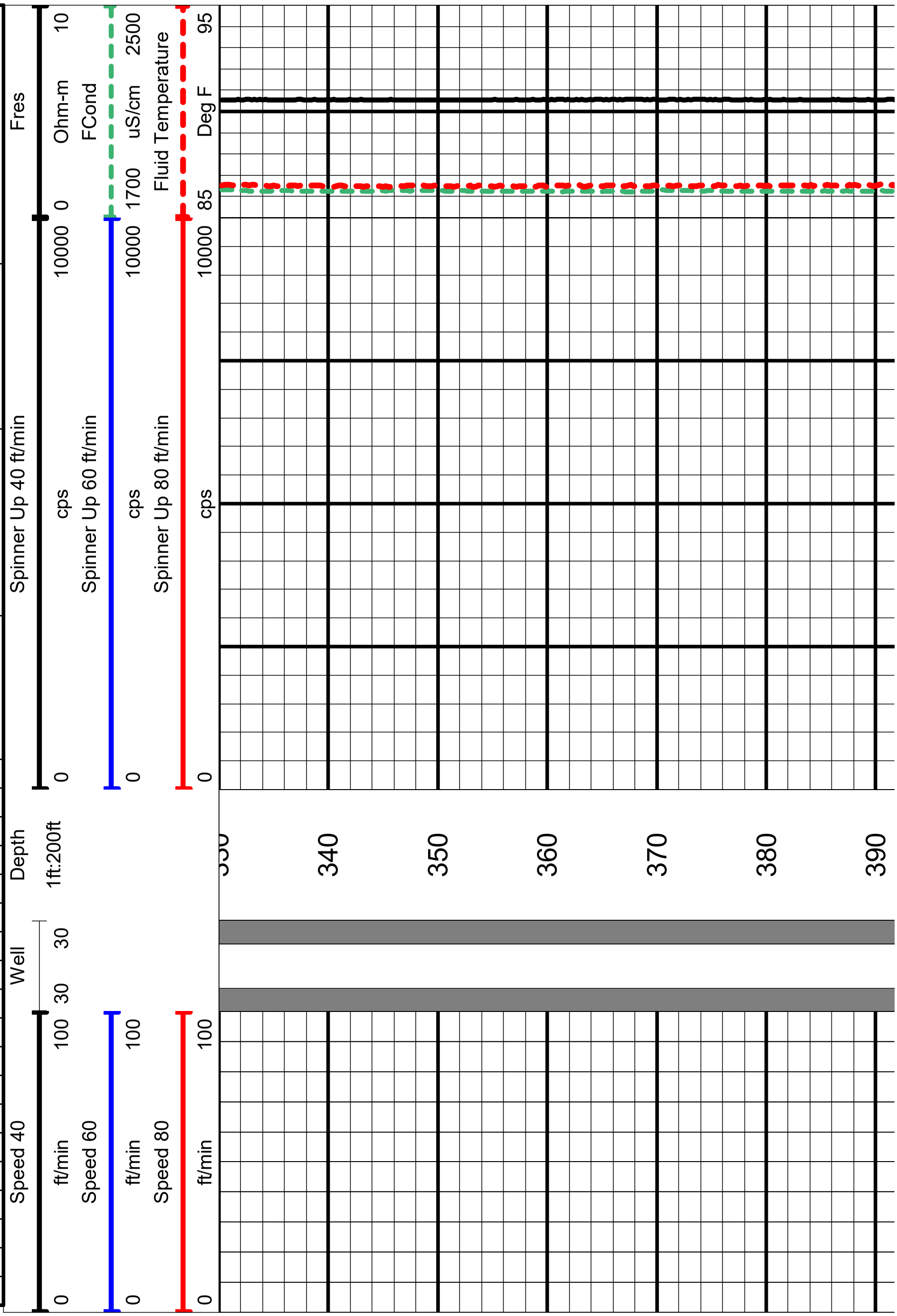
SEC TWP RGE

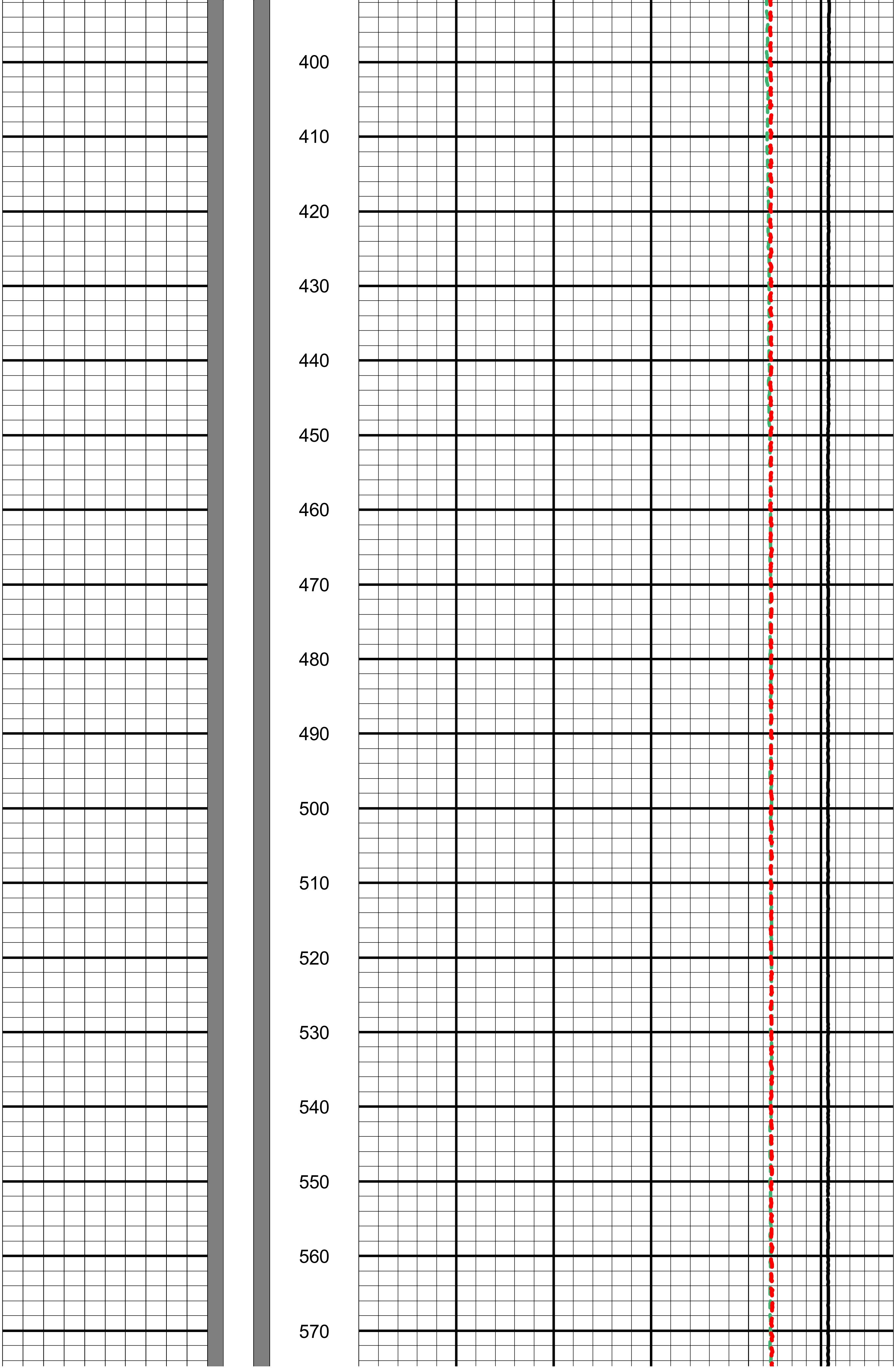
OTHER SERVICES
Fluid
Depth Specific Sampling

PERMANENT DATUM	Ground Level	ELEVATION G.L. 1,164 ft-amsl	K.B.
LOGS MEAS. FROM	Ground Level	SURFACE CONDUCTOR N/A	D.F.
DRILLING MEAS. FROM	Ground Level		G.L.

DATE	06-13-23	TYPE FLUID IN HOLE	Water
RUN No	1	RES MUD	
WELL TYPE	Water Production	RES MUD FILTRATE	
DEPTH-DRILLER	N/A	RES WALL CAKE	
DEPTH-LOGGER	1,278 ft-bgl	MAX. REC. TEMP.	
ADDITIVES	N/A	Pump Setting	330 ft-bgl
BIT TYPE	N/A	Pumping Rate	1,870 gpm
DRILLING METHOD	N/A	Pumping Water Level	236 ft-bgl
RECORDED BY	Yovanni Rosas		
WITNESSED BY	Montgomery and Associates		

RUN	Logging Tools Used / Century System VI			CASING RECORD / BIT RECORD			
NO.	TOOL S/N	FROM	TO	SIZE	WGT.	FROM	TO
RUN 1	Fluid	600 ft-bgl	1,260 ft-bgl			0	
RUN 2	Dynamic Spinner	600 ft-bgl	1,260 ft-bgl				
RUN 3	Depth Spec Sample						
RUN 4							
RUN 5				CAL DATE			
RUN 6							

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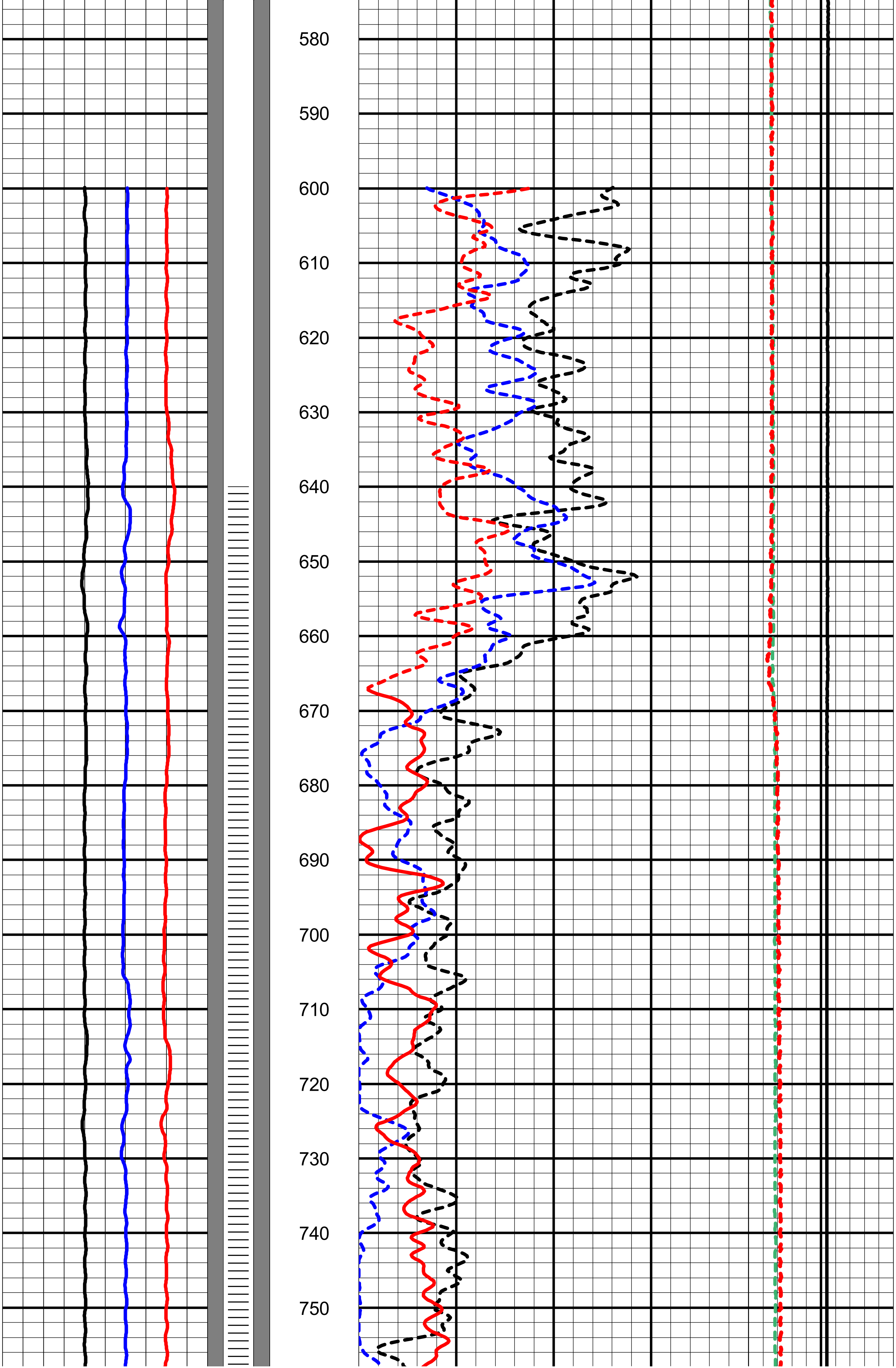
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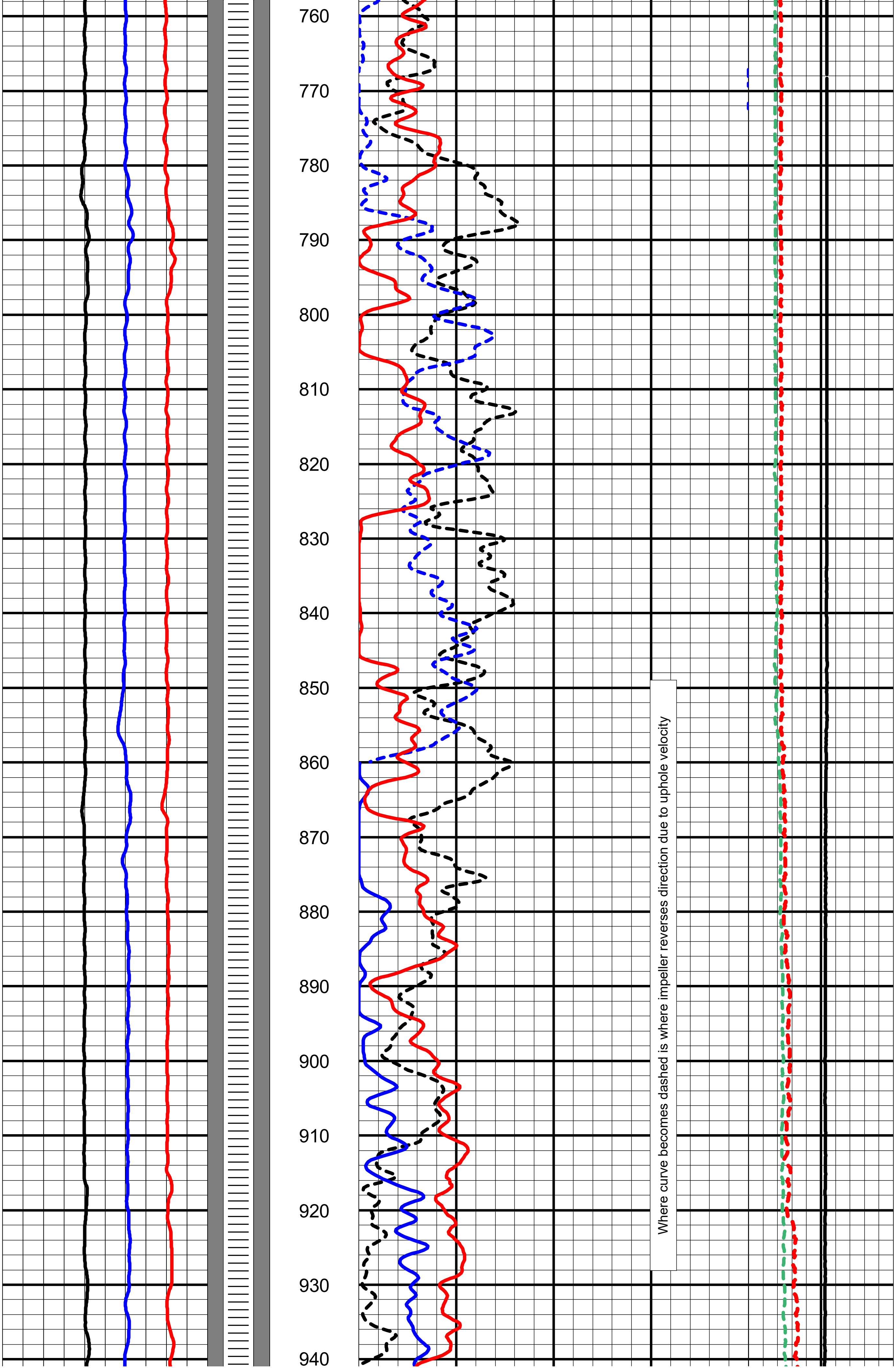
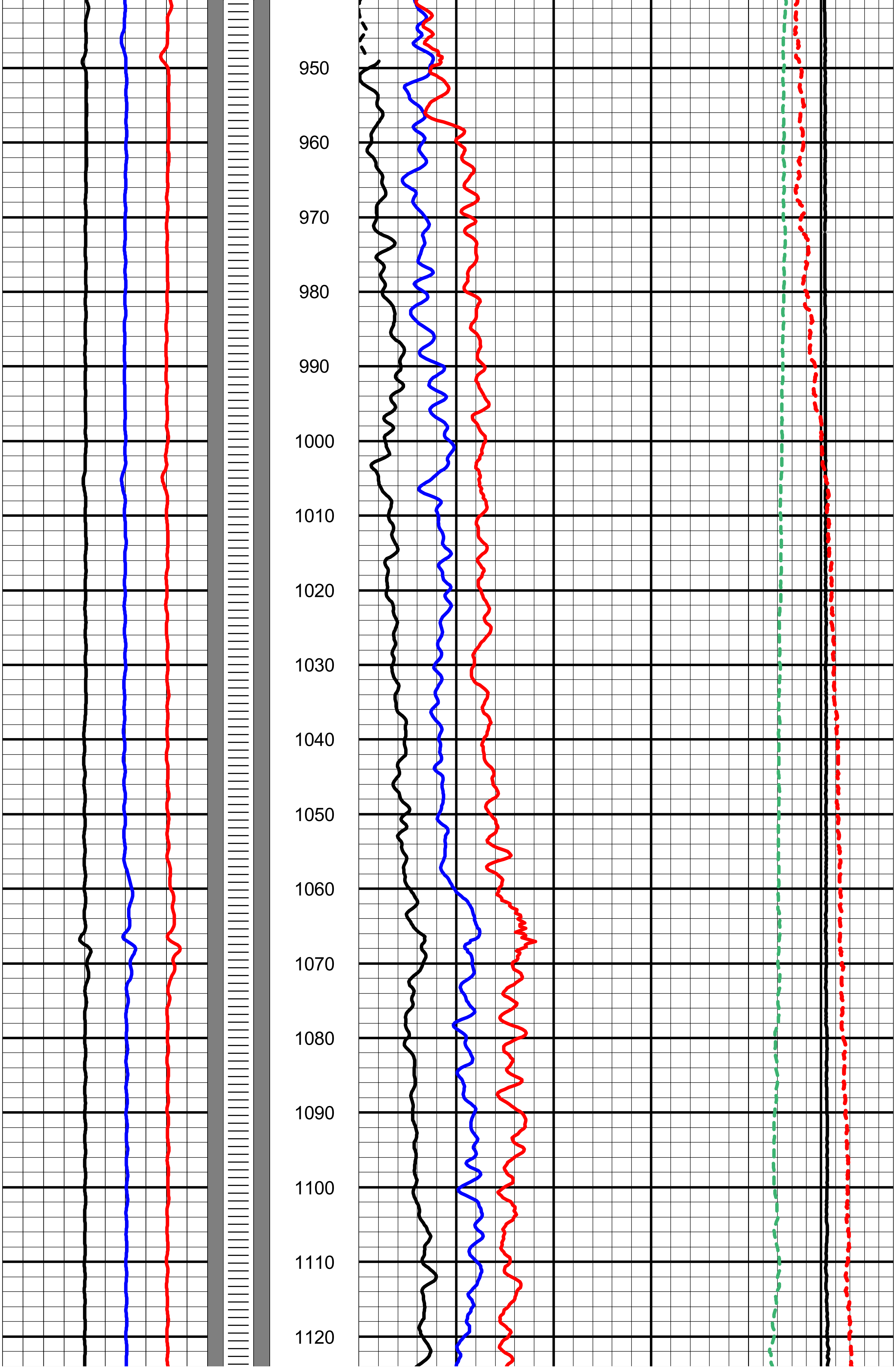


Where curve becomes dashed is where impeller reverses direction due to uphole velocity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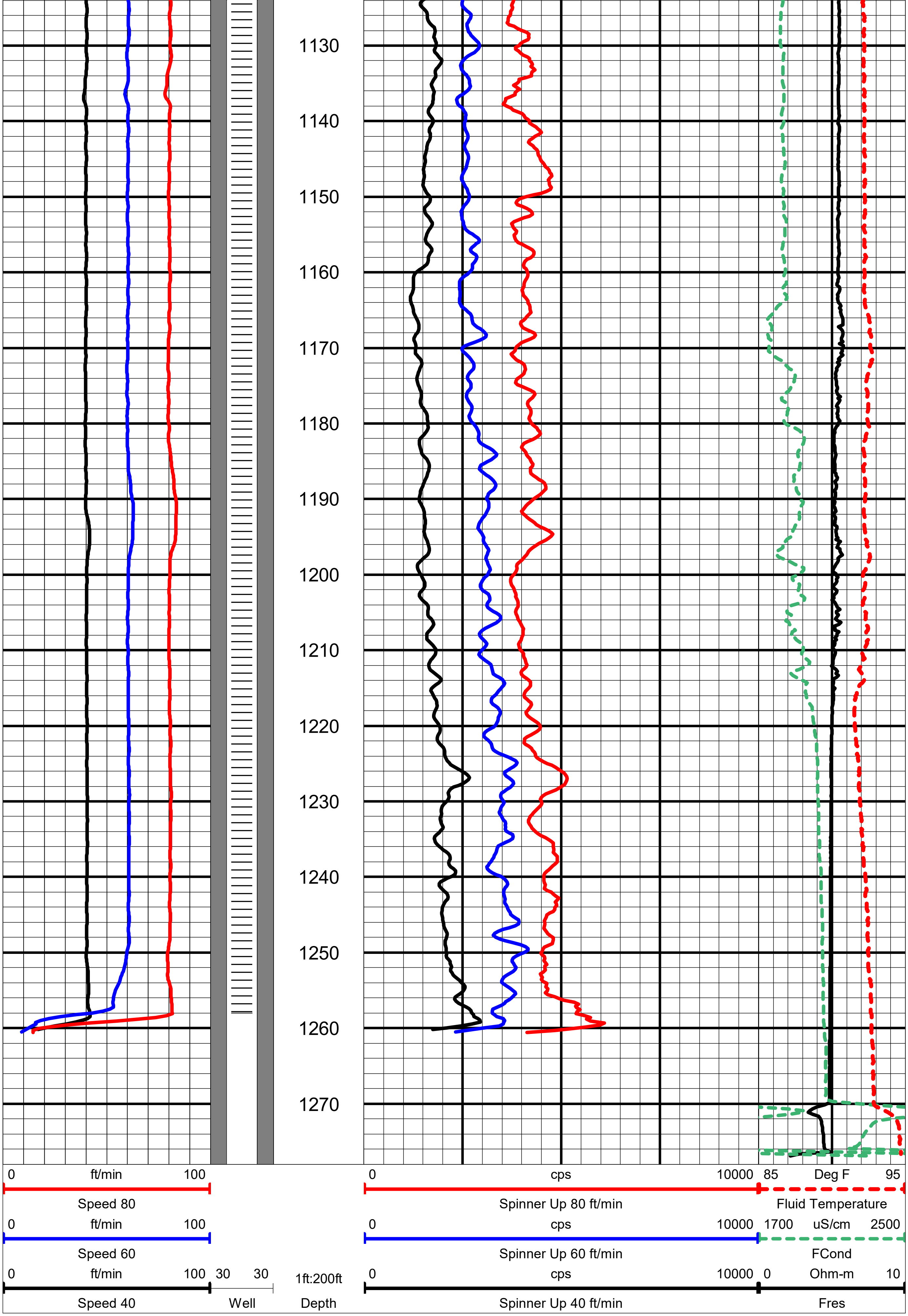
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0 ft/min 100
Speed 80
0 ft/min 100
Speed 60
0 ft/min 100
Speed 40
30 30
Well
1ft:200ft
Depth
0 cps 10000
Spinner Up 80 ft/min
0 cps 10000
Spinner Up 60 ft/min
0 cps 10000
Spinner Up 40 ft/min
85 Deg F 95
Fluid Temperature
1700 uS/cm 2500
FCond
0 Ohm-m 10
Fres