RECORD OF DECISION
7TH STREET AND MISSOURI AVENUE
WQARF REGISTRY SITE
PHOENIX, ARIZONA

October 2021

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APPROVAL PAGE

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A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
A.R.S.	Arizona Revised Statue
AS	Air Sparge
AWQS	Aquifer Water Quality Standard
bgs	Below Ground Surface
CAB	Community Advisory Board
COCs	Contaminants of Concern
DEUR	Declaration of Environmental Use Restriction
ERA	Early Response Action(s)
FS	Feasibility Study
GETS	Groundwater Extraction Treatment System
GPL	Groundwater Protection Level(s)
GPM	Gallons per Minute
LGAC	Liquid-Phase Granular Activated Carbon
mg/kg	Milligrams per Kilogram
MNA	Monitored Natural Attenuation
nrSRL	Non-Residential Soil Remediation Level(s)
PCE	Tetrachloroethene
PRAP	Proposed Remedial Action Plan
RI	Remedial Investigation
RO	Remedial Objective(s)
ROD	Record of Decision
rSRL	Residential Soil Remediation Level(s)
SRP	Salt River Project
SVE	Soil Vapor Extraction
TCE	Trichloroethene
VOCs	Volatile Organic Compounds
WQARF	Water Quality Assurance Revolving Fund
µg/L	Micrograms per Liter

1.0 DECLARATION

1.1 Site Name and Location

This Record of Decision (ROD) is for the 7th Street and Missouri Avenue Water Quality Assurance Revolving Fund (WQARF) Registry Site (Site) located in Phoenix, Maricopa County, Arizona. The Site is located in a mixed residential and commercial area of north-central Phoenix and is bounded by the north by East Montebello Avenue, to the south by East Georgia Avenue, to the west by North 6th Street, and to the east by North 10th Street. (Figure 1).

The Site was added to the WQARF registry in 2016, with an Eligibility and Evaluation score of 42 out of 120.

1.2 Basis and Purpose

This ROD presents the Selected Remedy for the Site, chosen in accordance with applicable requirements in Title 18, Chapter 16 of the Arizona Administrative Code (A.A.C.). The process for selecting the remedy complied with Arizona Revised Statute (A.R.S.) §49-287.04. The Arizona Department of Environmental Quality (ADEQ), as the lead agency, has reviewed the remedy and determined that Site completion criteria used to evaluate the selected remedial action for Contaminants of Concern (COCs) in groundwater and soil at the Site and Remedial Objectives (ROs) will be satisfied. This ROD describes the basis for the Selected Remedy and addresses all elements of A.A.C. R18-16-410 under the WQARF Program. The decision in this ROD is based upon previous activities and investigations performed for this Site that are documented and located in ADEQ's Administrative Record file. The State of Arizona, acting by and through ADEQ, has selected the remedy detailed in this document.

1.3 Site Assessment

Tetrachloroethene (PCE) and trichloroethene (TCE) are volatile organic compounds (VOCs) and the COCs at the Site. PCE and TCE have been have been identified as COCs in groundwater. PCE has been identified as a COC in soils. The Remedial Investigation (RI) Report (Pinyon, 2018) and the Feasibility Study (FS) report (Geosyntec, 2019) also identified the VOCs 1,2-*cis*-dichloroethene (1,2-*cis*-DCE), vinyl chloride, and benzene as COCs in groundwater. These VOCs are no longer considered COCs because:

- 1,2-*cis*-DCE and vinyl chloride have not been detected over Aquifer Water Quality Standards (AWQS) in sampling since the RI; and
- Benzene was determined to be from an underground storage tank release, and therefore cannot be remediated under WQARF pursuant to §49-283.02.

Releases of COCs to the environment occurred through historical dry cleaning at the former Kino's Drapery Dry Cleaning (Kino) facility, located at the historical address 5342 N. 7th Street, which was located within the footprint of the current Missouri Falls building at 645 E Missouri Avenue. The location of this source area is presented on Figure 1.

The COCs have been detected in groundwater and soil at concentrations exceeding their respective regulatory standards. PCE and TCE have been detected in groundwater at concentrations exceeding the AWQS of 5 micrograms per liter (µg/L). Results from the most recent groundwater monitoring, conducted in April 2021, indicated that the highest detected concentration of PCE at the Site was 1,300 µg/L, occurring in monitoring well MW-106, and that TCE exceeded the AWQS in only one well, MVW-03, at a concentration of 55 µg/L. PCE has been detected above the AWQS in a nearby Salt River Project (SRP) well 14.0E-9.6N (Arizona Department of Water Resources [ADWR] Well Registry # 55-608424). COCs were previously detected within 0.25 miles upgradient of the currently inactive City of Phoenix (COP) well #57 (ADWR # 55-626548), but recent sampling indicates that source area treatment and natural attenuation processes have reduced the COC concentrations in this area, and the plume boundary is currently estimated to have receded to approximately 0.50 miles away from the COP well (Figure 2b). A sentinel monitoring well, MW-210, was installed to ensure protection of the COP well.

PCE has been detected in soils in the source area under the Missouri Falls building at concentrations exceeding the non-residential Soil Remediation Level (nrSRL) of 13 milligrams per kilogram (mg/kg). The highest recorded detection of PCE in soils at the Site was 10,400 mg/kg in 2018 (Figure 2a).

Several Early Response Actions (ERAs) have been implemented at the Site. These include:

- The operation of a soil vapor extraction (SVE) remediation system to decrease COC mass in the vadose zone under the Missouri Falls building. Operation of the system began in October 2018 and continues as of the date of this ROD. The system has removed an estimated mass of approximately 800 pounds of VOCs since startup through the date of this ROD.

- The operation of an In Situ Chemical Oxidation (ISCO) ozone sparge system to treat the PCE in groundwater in the source area. The ozone sparge system operated as a small-scale pilot test from November 2018 to July 2019, and again from January 2020 to June 2020. It is estimated that the pilot system removed approximately 100 pounds of PCE from the groundwater.

- An expanded ISCO ozone sparge system, in conjunction with the pilot system, began operation as an ERA in July 2020, and both systems continue to operate as of the date of this ROD.

1.4 Selected Remedy

The Selected Remedy was identified as the Reference Remedy in the FS Report (Geosyntec, 2019) and proposed in the Proposed Remedial Action Plan (PRAP) (ADEQ, 2020). The Selected Remedy will remediate the soil and groundwater at the Site using the following technologies:

- Three years of SVE treatment to clean up the impacted soil/soil vapor within the source area under the Missouri Falls building.

- Four years of ISCO treatment via ozone sparge in the source area to remediate PCE and TCE in the groundwater.

- Twenty years of monitored natural attenuation (MNA) to verify the natural degradation of the COCs in the diffuse groundwater plume at the Site.

The Selected Remedy includes the following contingencies:

- Additional SVE Operation Time – If COC analytical results from soil and/or soil vapor confirmation sampling exceed nrSRLs, minimum Groundwater Protection Levels (GPLs), or Site-specific soil vapor screening levels after three years of SVE operations, then the SVE system may be operated for up to three additional years. This additional run time is more than the one year outlined in the PRAP; efficiency testing during the pilot phase indicated that possible vapor rebound may necessitate additional SVE runtime.

- Declaration of Environmental Use Restriction (DEUR) – If COC soil/soil vapor analytical results from SVE confirmation sampling exceed rSRLs after all remedial actions, including the Additional SVE Operation Time contingency above, and if no groundwater impacts above the AWQS remain at the Site, a request may be made for the property owner to implement a DEUR to be used in conjunction with engineering or administrative controls to ensure the continued protection of human health and the environment.

- Additional Ozone Sparge Operation Time – If evaluations such as COC concentration trend analysis, degradation isotope analysis, modelling, or other best practice evaluations of COC analytical results show that source area COCs will exceed concentrations that could be addressed by MNA at the end of the four-year ozone sparge period, additional operation time of up to three years is included.

- Plume Hot Spot/Well Protection ISCO System – If groundwater monitoring results indicate that COC concentrations in the plume downgradient of the source area increase to greater than the historical trend of less than 100 µg/L, one of the current source area ozone sparge systems may be moved to remediate groundwater at that downgradient area. This contingency may also be triggered as treatment for protecting the area around the SRP

production well (Figure 2b) if: 1) at the end of the four-year operation period of the source area system, site COCs are threatening production from the SRP supply well that is necessary to produce drinking water; and 2) that this contingency is evaluated to be more effective than the wellhead treatment contingency. Costs in this contingency include installation of five new duel-nested injection wells.

- Wellhead Treatment – This contingency would be triggered if production from the SRP or COP supply wells (Figure 2b) is necessary to produce drinking water and PCE concentrations in groundwater extracted from the well exceed the AWQS of 5 µg/L at a regulatory point of compliance.

The remedial equipment and the wells associated with the Site will be abandoned in accordance with applicable ADWR requirements, including A.A.C. R12-15-816, upon completion of the remedial actions. ADEQ will delist the Site in accordance with A.R.S. §49-287.01(K) upon completion of the abandonment activities.

A detailed description of the Selected Remedy is provided in Section 3.0 of this ROD.

1.5 Statutory Determinations

In November 2018, ADEQ issued the RI Report pursuant to A.R.S. §49-287.03(E) and A.A.C. 18-16-406. The RI report:

- Established the nature and extent of the contamination and the sources thereof.
- Identified current and potential impacts to public health, welfare, and the environment.
- Identified current and reasonably foreseeable uses of land and waters of the state.
- Obtained and evaluated information necessary for identification and comparison of alternative remedial actions.

In September 2019, ADEQ issued the FS Report pursuant to A.R.S. §49-287.03(F) and A.A.C. 18-16-407. The FS Report, based on information obtained during the RI, evaluated three remedial alternatives and identified a recommended remedy for the Site. The FS Report:

- Provided for the development of a Reference Remedy and at least two alternative remedies which were capable of achieving all of the ROs.
- Confirmed that the Reference Remedy was based upon best engineering, geological, and hydrogeological judgement.
- Provided one alternative remedy that was more aggressive than the Reference Remedy.

- Provided one alternative remedy that was less aggressive than the Reference Remedy.

In March 2020, ADEQ issued the PRAP pursuant to A.R.S. §49-287.04 and A.A.C. 18-16-408. The PRAP presented the remedy recommended by the FS (Reference Remedy), selected the remedy, and provided costs to implement the remedy. Public comments on the Selected Remedy (Reference Remedy) were solicited and received (Appendix A). The PRAP:

- Identified the boundaries of the Site.
- Summarized the results of the RI and FS Reports.
- Proposed the Selected Remedy and its cost.
- Described how the remedial goals and selection factors were evaluated.

Pursuant to A.R.S. §49-287.04 and A.A.C. 18-16-410, this ROD is the final administrative decision as defined under A.R.S. §41-1092. The Selected Remedy meets the following criteria as stipulated in A.R.S. §49-282.06:

- Assures the protection of public health and welfare and the environment.
- To the extent practicable, provides for the control, management or cleanup of the hazardous substances in order to allow the maximum beneficial use of the waters of the state.
- Is reasonable, necessary, cost-effective, and technically feasible.

2.0 SITE BACKGROUND

2.1 Site Description

The Site is located near the intersection of 7th Street and Missouri Avenue in Phoenix, Arizona. The boundaries of the Site subject to remedial action include the area located between Montebello Avenue to the north, East Georgia Avenue to the south, North 6th Street to the west, and North 10th Street to the east. (Figure 1). The Site boundaries are defined by the extent of the PCE-contaminated soil over rSRLs (Figure 2a) and the extent of the PCE groundwater plume exceeding the AWQS of 5 µg/L (Figure 2b). The groundwater plume underlies an area that is a mix of commercial and residential land uses.

The vadose zone and groundwater impacts associated with the Site are primarily attributed to historical releases originating from a source area identified at the former Kino facility, located at the historical address 5342 N. 7th Street, which is currently addressed as 645 E Missouri Avenue (Figure 1). The former Kino facility conducted dry cleaning from approximately 1969 to 1980. By 1986, the building that had previously been occupied by the former Kino was demolished and the current Missouri Falls building was constructed on the site, including a three-story underground parking garage. Currently, the Missouri Falls building is used as commercial office space. In June 2016, the Site was placed on the WQARF Registry with an Eligibility and Evaluation score of 42 out of a possible 120.

2.2 Source of Release

The source of COC contamination at the Site is historical releases of VOCs that occurred at the former Kino facility which resulted in subsurface impacts to soil, soil vapor, and groundwater. The only area of soil contamination found was within the footprint of the former Kino facility building.

2.3 Need for Remedial Action

2.3.1 Soil/Soil Vapor

PCE is present in the soil and soil vapor within the source area at concentrations that exceed Arizona's remediation standards for soil. A soil vapor plume with the potential to impact groundwater is present at the source area. Thus, remedial action is needed at the Site to remediate impacted soil and soil vapor at the source area.

2.3.2 Groundwater

PCE and TCE are present in the groundwater at concentrations that exceed the AWQS. Although groundwater is not currently used as a drinking water supply, the aquifer is considered a water

supply for well owners in the vicinity of the Site. Therefore, the aquifer must be protected and a remedial action for groundwater is required.

2.4 Chronology of Site Activities

A detailed history of the remedial investigations and ERAs conducted at the Site is presented in the RI Report, the FS Report, and the PRAP. A brief summary of these activities is presented below:

1995: COCs were detected in groundwater at concentrations above applicable AWQS in nearby leaking underground storage tank site monitoring wells.

1998: COCs were detected in groundwater at concentrations above applicable AWQS in a nearby SRP well.

1995 to 2015: Groundwater and soil-gas investigations were conducted. Results from the investigations indicated concentrations of PCE as high as 850 µg/L in groundwater, and soil-gas concentrations up to 91,500 micrograms per cubic meter (µg/m^3) in the soils under the Missouri Falls underground parking garage.

2016: The Site was placed on the WQARF Registry with an Eligibility and Evaluation score of 42 out of a possible 120.

2016 to 2018: RI work continued with additional characterization of soil, soil vapor, and groundwater.

2018: An ERA evaluation was conducted, resulting in an SVE pilot test performed in June. Full scale SVE was implemented and an ISCO ozone sparge pilot test was initiated in November. The RI report was finalized.

2019: Groundwater was further characterized. The SVE system continued to operate, and a second ozone sparge pilot test was conducted. The FS report was finalized.

2020: An ERA with an expanded ISCO ozone sparge system and five additional injection wells was installed. SVE system efficiency was evaluated while the SVE system continued operating. The PRAP was finalized.

2.5 Source Area and Plume Extent

Data collected during the RI confirmed that contaminants were released into the soil and groundwater at the Site. COCs detected above regulatory levels during the RI included PCE and TCE in groundwater and PCE in source area soils. Currently, Site COCs are PCE and TCE in groundwater and PCE in source area soils. The source of the soil and groundwater contamination is the former Kino facility. The soil contamination is confined to the area under the current Missouri Falls building (Figure 2a), while the groundwater contamination extends across the Site (Figure 2b). A description of the soil and groundwater contamination at the Site is presented in the following sections.

2.5.1 Soil and Soil Vapor Contamination

The source of PCE contamination was found under the footprint of the former Kino facility. The highest recorded concentration of PCE in soils was 10,400 mg/kg, detected in a soil sample collected at 36 feet below ground surface (bgs) from boring SVE-5 (10 feet below the floor of the lowest parking garage level of the Missouri Falls building) in 2018. This detection exceeded the minimum GPL (1.3 mg/kg) and the nrSRL (13 mg/kg) for PCE. PCE was also detected above GPLs and nrSRLs in the 46 feet bgs sample from this boring location. SVE was initiated in 2018 to remove COCs from soil and soil vapor under the Missouri Falls parking garage. The soil vapor contamination is mainly contained under the footprint of the Missouri Falls building. The results from the SVE system show a decrease in PCE influent concentrations over time, from the initial 1,354,052 µg/m^3 in October 2018 to 19,500 µg/m^3 in June 2021.

2.5.2 Groundwater Contamination

PCE and TCE are the COCs in groundwater at the Site. Based on groundwater monitoring data, the predominant COC in groundwater is PCE, whereas TCE is less prevalent. Concentrations of PCE in groundwater consistently exceed the AWQS of 5 µg/L. The highest recorded detection of PCE in groundwater was 6,400 µg/L detected in a groundwater sample collected from monitoring well MW-201 in 2017. The highest recorded detection of TCE in groundwater was 270 µg/L detected in a groundwater sample collected from monitoring well MW-8 in 2012. The areal extent of TCE contamination in groundwater is encompassed entirely within that of PCE. Therefore, the lateral boundary of the groundwater plume is defined by groundwater exceeding the AWQS of 5 µg/L for PCE (Figure 2b).

Monitoring wells MW-202S, -202M, and-202D are three co-located wells screened from 85-135, 170-180, and 225-235 feet bgs, respectively. Groundwater monitoring data from these wells and grab samples collected during the installation of MW-201 indicate that the bulk of PCE contamination is limited in depth from the groundwater surface (about 100 feet bgs) to about 200 feet bgs. The plume narrows in depth and dives as it moves downgradient.

The April 2021 groundwater PCE concentrations are shown on Figure 2b. Groundwater elevation contours presented on Figure 3 were developed using data collected in April 2021 from wells within and near the Site. A summary of the groundwater sample results is presented below:

- PCE concentrations ranged from non-detect to a maximum of 1,300 µg/L.
- TCE was only detected in samples collected from MVW-3 at a concentration of 55 µg/L.
- Groundwater generally flowed northeast in the immediate area of the Site with a gradient of 0.004 feet/foot.
- Groundwater gradient flattens out further to the northeast of the Site.

In brief, the concentrations of COCs in the groundwater have declined over time, but still exceed the AWQS. The decreasing PCE and TCE concentrations indicate that the source area ERAs have successfully diminished COC impacts to groundwater.

3.0 SELECTED REMEDY

The FS Report evaluated remedial alternatives for COCs in soil and groundwater at the Site. The remedial alternatives were developed to meet the ROs described in the RO Report (ADEQ, 2018). The Selected Remedy proposed by the FS Report and carried forward to the PRAP includes the following components:

- SVE – Upgrading the SVE blower from its current capacity of 75 cubic feet per minute (cfm) to 300 cfm. Up to three years operation of this upgraded SVE system to provide source control through the removal of COC mass in the vadose zone, which will mitigate the potential for ongoing groundwater impacts from the residual COCs.

- ISCO Ozone Sparge – Up to four years of continued ozone injection in the seven existing injection wells at and near the source area to provide the complete breakdown of site COCs, which will prevent the high source-area COC concentrations from moving downgradient, and allow for the diffuse plume to be remediated via MNA. This is one extra year of operation over what was stated in the PRAP; this change is due to additional data showing the estimated time to achieve the AWQS in the source wells ranges up to four years.

- MNA – Up to 10 years of continued annual groundwater sampling, followed by 10 additional years of sampling every two years, for a total of 20 years MNA sampling. The sampling would occur from the current monitoring well network, plus the installation of two additional wells to evaluate the performance of MNA on groundwater impacts, as well as plume stability and COC concentration trends. The time-span differs from the PRAP to account for variability in the estimates of the timeframe of the plume remediation.

- The Selected Remedy includes the following contingencies:

    - Additional SVE – If COC analytical results from the soil and/or soil vapor confirmation sampling exceed nrSRLs, minimum GPLs, or Site-specific soil vapor screening levels, then the SVE system may be operated for up to an additional three years.

    - Declaration of Environmental Use Restriction (DEUR)– If COC soil/soil vapor analytical results from SVE confirmation sampling exceed rSRLs after all remedial actions, including the Additional SVE Operation Time contingency above, and if no groundwater impacts remain at the Site, a request may be made to the property owner to implement a DEUR to be used in conjunction with engineering or administrative controls to ensure the continued protection of human health and the environment.

- Additional ISCO Ozone Sparge Operation Time – If evaluations such as COC concentration trend analysis, degradation isotope analysis, modelling, or other best practice evaluations of COC analytical results show that source area COCs will exceed concentrations that could be addressed by MNA at the end of the four-year ozone sparge period, an additional operation time up to three years is included.

- Plume Hot Spot/Wellhead Protection ISCO System – If analytical results indicate that COC concentrations in the diffuse plume have increased to greater than 100 µg/L, or if the plume trends indicate the diffuse plume will not decrease to below the AWQS in the timeframe allowed by MNA, then one of the source area ozone sparge systems (depending on source-zone concentrations) may be moved to that downgradient area. This contingency may also be triggered as treatment for protecting the area around the SRP production well if: 1) at the end of the four-year operation period of the source area system, site COCs are threatening production from the SRP supply well that is necessary to produce drinking water, and 2) that this contingency is evaluated to be more effective than the wellhead treatment contingency. Costs in this contingency include the installation of five new duel-nested injection wells.

- Wellhead Treatment – If production from the SRP or COP supply wells is necessary to produce drinking water and PCE concentrations in groundwater extracted from the well exceed the AWQS of 5 µg/L at a regulatory point of compliance, the wellhead treatment contingency will be implemented for that well.

3.1 Selected Remedy Summary

Source Area Vadose Zone SVE

SVE remediates contaminated soil by extracting soil vapors from the subsurface, treating them at the surface, and then discharging the treated vapors to the atmosphere. SVE has been demonstrated as an effective ERA at the Site and is anticipated to be highly effective remedy for COC source control in the vadose zone.

The existing SVE system at the source area will be upgraded from a 75 cfm blower to a 300 cfm blower. This upgrade was determined to be necessary per an efficiency evaluation of the system, which showed additional COC mass could be recovered from the vadose zone with a stronger vacuum. The system will continue to use vapor-phase granular activated carbon to treat the extracted soil vapor. The SVE system consists of eight SVE wells drilled to various depths within the vadose zone under the Missouri Falls building within and around the former footprint of the former Kino building source area (the primary source of COC release to the subsurface). This remedial measure will focus on source control through the removal of COC mass in the vadose zone, which will mitigate the potential for ongoing groundwater impacts from residual COCs desorbing from fine-grained soils. The layout of the SVE system is shown on Figures 4 a- c.

As the system continues to operate, it will be optimized, as necessary, to maximize the COC removal efficiency of the system. Measurements of operational parameters will be used to assess system performance and for system optimization. SVE system optimization will be conducted throughout the operational lifetime of the system and operational schedules may be adjusted to enhance COC removal efficiency. Operation of the SVE system will be conducted in compliance with air quality permit requirements, including quarterly reporting.

The duration of SVE system operation is up to three years. The actual duration will be based on achievement of soil ROs, SVE system performance, and COC monitoring data collected during system operation.

Operation of the SVE system will be terminated based upon the following criteria:

- Demonstration of COC concentrations in soil/soil vapor below applicable standards by post-rebound test confirmation sampling.
- Demonstration that COCs in soil vapor no longer contribute to groundwater COC exceedances.

The termination of the SVE system will include removal of all equipment, abandonment of all remediation wells in accordance with applicable ADWR requirements, and abandonment of associated piping. The estimated cost for the SVE remedy is $325,690.

Source Area and Near Source Area ISCO Ozone Sparge

ISCO is a remedial measure by which COCs are treated in situ by a chemical reagent with the capability to completely break down the contaminant. Ozone breaks down PCE and other organic compounds by breaking the bonds between the carbon atoms within the molecule. In the case of PCE and other chlorinated compounds, the by-products of the breakdown are carbon dioxide, oxygen, chlorine ions, and water. A larger radius of influence can be obtained from each injection well by injecting ozone gas into the groundwater (i.e. sparging), compared to injecting a liquid ISCO reagent.

The remedy consists of treating the source area and near-source area groundwater via ISCO using ozone injection (Figure 5a). The current ERA system, consisting of seven dual-nested sparge wells and two ozone generators to inject approximately 5.5 lbs per day per well of ozone will be used for remedial actions.

As the system continues to operate, it will be optimized, as necessary, to maximize the efficiency of the system. Measurements of operational parameters will be used to assess system performance and for system optimization. Ozone sparge system optimization will be conducted throughout the operational lifetime of the system and operational schedules may be adjusted to enhance COC removal efficiency.

The duration of the ozone sparge in the source area is up to four years. This is based on calculations from decreases of COCs in the source area indicating that the source area groundwater could be below AWQS after four years of ozone sparging. The actual duration of sparging will be based on reduction of source-area COC concentrations, ozone sparge system performance, and COC monitoring data collected during system operation.

Operation of the ozone sparging system will be terminated based upon the following criteria:

- Demonstration of COC concentrations in groundwater that either meet groundwater ROs or be demonstrated that they will meet groundwater ROs within the MNA time-frame;

- Demonstration that source-zone concentrations no longer contribute higher concentrations to the diffuse-plume groundwater COC exceedances; and

- Demonstration that the source-area ozone treatment will not be effective in removing any significant additional COC mass from the groundwater.

Terminating ozone sparging operations includes removal of any ozone generators, and abandonment of all associated sparge wells and piping. The estimated cost for the ozone sparge remedy is $791,129.

Groundwater MNA

MNA is a remedial measure that involves routine groundwater sampling and analysis to monitor the results of one or more naturally occurring physical, chemical, or biological processes that reduce the mass, toxicity, volume, or concentration of chemicals in groundwater. MNA is a mechanism by which COCs are reduced by natural means without other control, removal, treatment, or aquifer-modifying activities. These in situ processes may include dilution, adsorption, volatilization, precipitation, and biological degradation of the contaminants in the groundwater.

MNA at the Site will consist of routine groundwater monitoring and sampling to evaluate changes in groundwater contamination over time. Groundwater monitoring data will be used to evaluate plume migration, stability, and natural attenuation. MNA will continue until the concentrations of COCs in groundwater are below AWQS. Calculations based on current trends indicates that COC concentrations in the diffuse plume groundwater will fall below AWQS within 10 years. However, this estimation has uncertainties due to natural variability of sampling results.

The MNA program will include annual water level monitoring and collection of groundwater samples for COC analysis from up to 20 wells within the current monitoring well network, and two additional monitoring wells to be installed to support MNA monitoring. One well may be installed to ensure the plume is fully defined to the north. As the concentration of COCs in groundwater decreases over time, the monitoring frequency may be reduced, and the number of wells selected for groundwater monitoring and sampling may be decreased. The number of wells monitored and the frequency of monitoring will be evaluated after MNA monitoring events, with changes documented in the Periodic Reviews of remedy results.

The total duration of the MNA program is up to 20 years. It is assumed that the sampling will be performed on an annual basis for 10 years, and every two years thereafter. The termination of MNA will be based on:

- Concentrations of Site COCs falling below AWQS in all monitoring wells.
- After the determination that all monitoring wells are below AWQS, semi-annual groundwater samples will be collected for one year to confirm MNA can be discontinued.
- The achievement of ROs for groundwater.

Monitoring wells included in the MNA well network are listed in Table 1 and shown on Figure 2b. The estimated cost for the MNA remedy is $1,312,894.

Table 1 – Monitored Natural Attenuation Monitoring Well Network

WELL I.D.	ADWR Number (55-)	Well Diameter (in)	Total Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (1)	Location Coordinates (1)	
						Latitude	Longitude
MVW-3	550232	1	113	83-103 / 108-113	1150.32	33.5166281	-112.0652160
MW-101	219874	4	125	79-119	1152.93	33.516839	-112.062992
MW-102	219875	4	126	80-120	1151.80	33.5167394	-112.0637523
MW-103	219876	4	126	80-120	1150.81	33.5162330	-112.0628940
MW-104	222084	4	125	75-120	1151.75	33.5173859	-112.0644915
MW-105	222085	4	125	75-120	1152.12	33.5170287	-112.0642305
MW-106	915526	4	125	75-120	1150.15	33.5163099	-112.0647652
MW-107	916068	4	125	80-120	1149.34	33.5152682	-112.0659357
MW-108	222086	4	125	80-120	1149.65	33.5163357	-112.0651466
MW-201	226462	4	160	80-160	1149.35	33.5158992	-112.0651448
MW-202d	226462	2	135	82-135	1151.02	33.5174089	-112.0647797
MW-202m	226462	2	190	170-190	1151.23	33.5174089	-112.0647797
MW-202s	226463	2	235	225-235	1151.09	33.5174089	-112.0647797
MW-203	226464	4	201.2	77-201.2	1148.75	33.5171370	-112.0666328
MW-204	226467	4	260	100-260	1175.10	33.5259544	-112.0592026
MW-205	920617	4	260	120-260	1178.47	33.5263491	-112.0550665
MW-207	922033	4	195	100-195	1158.38	33.5203526	-112.0628642
MW-208	922034	4	260	100-260	1159.09	33.5193669	-112.0604313
MW-209	922038	4	260	100-260	1161.78	33.5219593	-112.0633988
MW-210	923086	4	260	190-215	1167.80	33.5222741	-112.0575491
MW-301	924158	4	180	160-180	1052.23	33.5163732	-112.0638929
MW-302	NA	NA	NA	NA	NA	NA	NA
MW-303	NA	NA	NA	NA	NA	NA	NA

Notes:

ADWR – Arizona Department of Water Resources
amsl - above mean sea level
bgs - below ground surface
ft – feet
in - inches
I.D. - identification
NA – not applicable (future well)
(1) NAVD 88, ft amsl

3.2 Selected Contingencies Summary

Additional Soil Vapor Extraction

The SVE system may be operated for up to an additional three years if COC analytical results from soil and/or soil vapor confirmation sampling exceed nrSRLs, minimum GPLs, or Site-specific soil vapor screening levels. This contingency includes vapor rebound testing periods. The need for additional runtime will be evaluated by the influent data of the system and data from vapor rebound testing at the end of the original three-year run-time period. This contingency may also be triggered if fugitive ozone from the ozone sparge systems are determined to be building up in the vadose zone near to the SVE system. The estimated cost for this contingency is $241,154.

Contingency DEUR

A DEUR is a restrictive covenant designed to document engineering and institutional controls and allow closure of a site with contamination above rSRLs while ensuring appropriate future use of a contaminated site. A DEUR must be agreed to by the owner of a parcel, and is attached to the deed of the parcel it affects.

If COC soil/soil vapor analytical results from SVE confirmation sampling exceed rSRLs but the COCs in groundwater at the Site is no longer above AWQS, the ADEQ may ask the property owner to implement a DEUR in conjunction with engineering and/or administrative controls to ensure the protection of human health and the environment. It is assumed that this contingency would not be incurred until the end of the 20-year estimated timeframe for the groundwater to be below AWQS. The estimated cost for this contingency is $10,730 based on the requirements of A.A.C. R18-7-601.

Additional Ozone Sparge

A contingency for up to three additional years of ozone sparge system operation would be implemented if COC concentrations in groundwater near to the source zone continue to exceed AWQS after the projected four-year runtime. However, if calculated estimations show that little additional mass would be removed via continued efforts and that the remaining contamination would likely naturally attenuate within the MNA timeframe, this contingency would not be activated. The estimated cost for this contingency is $596,269.

One of the current source area ozone sparge systems may be moved and installed downgradient of the current system area. This system would be used to treat downgradient hot spots if sampling indicates PCE concentrations in the diffuse plume has increased to greater than 100 µg/L. The contingency may also be implemented if the plume trends indicate the diffuse plume will not decrease to below the AWQS in the timeframe allowed by MNA. This contingency may also be triggered as treatment for protecting the area around the SRP production well (Figure 2b) if site

COCs are threatening production from the SRP supply well that is necessary to produce drinking water, and this contingency is evaluated to be more efficient than the wellhead treatment contingency. Costs in this contingency include installation of five new duel-nested injection wells. It is assumed that this contingency would not be triggered until after the four-year projected operation time of the remedy in the source area. The estimated operation of the moved system is three years. The estimated cost for this contingency is $1,165,777.

Wellhead Treatment

The contingency for wellhead treatment would be implemented if production from the SRP or COP supply wells is necessary to produce drinking water and PCE concentrations in groundwater extracted from the well exceed the AWQS of 5 µg/L at a regulatory point of compliance. The most likely candidates for wellhead treatment are SRP supply wells 14.0E-9.6N (ADWR# 55-608424) and City of Phoenix (COP) well #57 (ADWR # 55-626548), both of which are near the Site (Figure 2b).

For cost estimating purposes, it was also assumed that the land surrounding the wellhead is appropriately sized to allow the treatment system to be built. Wellhead treatment would consist of a liquid-phase granular activated carbon (LGAC) treatment system to remove COCs from extracted groundwater from the production well. As the COP well currently has no pump or infrastructure, the flow rate specification of the SRP production well 14.0E-9.6N was used. The wellhead treatment system would therefore be designed for a maximum flow rate of approximately 3,600 gallons per minute (gpm), due to the registered production capacity of 3,598 gpm. Treated groundwater from the system would then be pumped into the water provider's existing conveyance system.

The estimated cost for the contingency of implementing wellhead treatment at the SRP or COP well is $5,255,012 for up to 15 years, assuming this contingency may be triggered if needed at the end of the ozone remedy in the source area. This timeframe is based on the estimated time for the selected remedy at the Site to remediate the groundwater plume. Estimated costs associated with wellhead COC treatment include design, permitting, treatment system construction, start-up and operation and maintenance (including LGAC changeouts), and project management.

3.3 Achievement of Remedial Objectives and Remedial Action Criteria

In accordance with A.A.C. R18-16-406(I), ADEQ prepared a Remedial Objectives Report that established ROs for the current and reasonably foreseeable uses of land and waters of the State of Arizona that have been or are threatened to be affected by a release of a hazardous substance. In accordance with A.A.C. R18-16-407, the ROs were evaluated in the FS Report and, according to A.A.C. R18-16-408 and A.R.S. §49-287.04, considered in development of the remedial action alternatives presented in the PRAP Report.

The RO for soil at the Site is:

To restore soil conditions at the site to remediation standards for nonresidential use as specified in A.A.C. R18-7-204 (background remediation standards), A.A.C. R18-7-205 (pre-determined remediation standards), or A.A.C. R18-7-206 (site-specific remediation standards) that are applicable to the hazardous substances identified which are. [sic] The concentrations remaining in soil after remediation standards are met will not cause or threaten to cause a violation of groundwater remediation standards specified in A.A.C. R18-7-203. This action is needed for the present time and for as long as the level of soil contamination exceeds applicable cleanup standards.

SVE has been demonstrated effective at remediating soil contamination in the vicinity of the source area. Only soils under the Missouri Falls building currently contain COCs at concentrations which do not meet the RO for soils. Therefore, the Selected Remedy, which includes continued operation of the SVE system at the source area, will meet the RO for soils.

The RO for groundwater at the Site is:

To restore, replace, or otherwise provide for water for its designated municipal use that is lost or impaired by contamination associated with the 7th Street and Missouri Avenue WQARF site. This action is needed for the present time and for as long as the need for the water exists, the resource remains available and the contamination associated with the 7th Street and Missouri Avenue WQARF site prohibits or limits the designated municipal use of groundwater.

ISCO via ozone sparging has been demonstrated effective at remediating groundwater contamination in the source area, which acts as the source for the diffuse plume. The Selected Remedy will achieve ROs for groundwater use by treating the groundwater in and near the source area with ozone sparging and using MNA to remediate the diffuse groundwater plume until COC concentrations are less than the AWQS. The wellhead treatment contingency protects future groundwater use at the Site for the SRP or COP well, should it become impaired or lost.

The land and water use evaluation section of the RI Report identified no uses of surface water in the area of the site. Therefore, no ROs for surface water were included in the RO Report.

Although no ROs for surface water exist, the water from the SRP production well present within the vicinity of the Site is conveyed through a system of laterals and canals, wherein it is subject to regulation as surface water. The current use of this water as irrigation is not impacted by Site COCs, but the contingency for wellhead treatment encompasses this well and therefore provides protection for future use should the well be required for drinking water supply.

Based on these determinations, the Selected Remedy demonstrates:

- The ability to achieve the ROs with regard to both land use and groundwater use;

- Consistency with plans of affected water providers and the general land use plans of the local government(s); and

- Compatibility with regard to practicability, cost, risk, and benefit.

3.4 Compliance with Arizona Administrative Code and Arizona Revised Statutes

In 2016, the Site was placed on the WQARF Registry by ADEQ with a score of 42 out of 120. In 2018, ADEQ issued the Draft RI Report for public comment to meet the requirements under A.A.C. R18-16-404(C)(1)(b) and A.A.C. R18-16-406(F). The report documented the results of the field investigation activities that were conducted between 2008 and 2018. Solicitation for ROs for the RO Report was conducted per A.A.C. R18-16-406(I). Based on the solicitation, Land and Water Use Study, and water management plans of water providers, a Proposed RO Report was prepared and submitted for public comment prior to finalizing the RI Report. The RO Report was finalized in 2018 and included as an appendix to the Final RI Report. The Final RI Report addressed the public comments on the Draft RI Report, and included responsiveness summaries for the comments on the Proposed RO Report and the Draft RI Report.

An FS Work Plan was prepared in November 2018 and a public notice was issued in accordance with the requirements outlined in A.A.C. R18-16-404(C)(1)(d). An FS Report was prepared documenting the development and evaluation of alternatives for remediation of the Site and providing a recommendation for a final remedy capable of achieving the ROs developed for the Site.

A PRAP was prepared based on the work executed under the FS Work Plan and contained in the FS Report. The PRAP documented the results of the FS and evaluated the selected remedy. SVE, ISCO, and MNA were selected as the remedy for the Site. The Selected Remedy satisfies A.R.S. §49-282.06, as it:

- Adequately assures the protection of public health, welfare, and the environment.

- To the extent practicable, provides for the control, management and cleanup of COC contamination, maximizing beneficial use of the groundwater use; and

- Is reasonable, necessary, cost-effective, and technically feasible.

3.5 Community Involvement and Public Comment Requirements

The Site was added to the Central Phoenix Community Advisory Board (CAB) in 2016, which met on a regular basis to discuss the issues and status of investigation and cleanup activities conducted at the Site. These meetings were open to the public. The most recent CAB meeting was held on June 11, 2020. A Community Involvement Plan was established for the Site in 2016 and regularly updated in subsequent years. The specific public participation activities that have been completed for the Site are presented in Table 2.

Table 2 - Community Involvement Activities

Community Involvement Activity	Regulatory Citation/Rule	Date
Notice of the Site listing on the Registry	A.R.S. § 49-287.01(C) A.R.S. § 49-289.03(A)(1)	June 2016
Establish a preliminary community involvement area and provide written notice to the community on hazardous substance contamination in the area	A.R.S. § 49-289.02	July 2016
Establish a Community Involvement Plan	A.R.S. § 49-287.03(D) A.R.S. § 49-289.03(B) A.R.S. § 49-289.03(C) A.A.C.R18-16-404(C)(1)(i) A.A.C. R18-16-404(C)(1)(j) A.A.C. R18-16-404(C)(1)(k) A.A.C. R18-16-404(C)(1)(o)	August 2016
Notice of Remedial Investigation scope of work, fact sheet, and outline of Community Involvement Plan availability	A.R.S. § 49-287.03(B) A.R.S. § 49-287.03(C) A.A.C. R18-16-301(C) A.A.C. R18-16-403(F) A.A.C. R18-16-403(G) A.A.C. R18-16-404(C)(1)(a) A.A.C. R18-16-406(B) A.A.C. R18-16-406(D)	August 2016
Establish a selection committee to choose Community Advisory Board members	A.R.S. § 49-289.03(D)	No selection committee – merged with existing CAB August 2016
Establish a Community Advisory Board	A.R.S. § 49-289.03(C) A.R.S. § 49-289.03 (E) A.R.S. § 49-289.03(F)	Merged with existing CAB August 2016
Notice of Draft Remedial Investigation Report for review and hold a public meeting to solicit Remedial Objectives	A.A.C. R18-16-301(C) A.A.C. R18-16-404(C)(1)(b) A.A.C. R18-16-406(F) A.A.C. R18-16-406(I)(1) A.A.C. R18-16-406(I)(2)	May 2018
Notice of Proposed Remedial Objectives Report for public comment and Final Remedial Investigation Report availability	A.A.C. R18-16-301(C) A.A.C. R18-16-404(C)(1)(c) A.A.C. R18-16-406(I)(5) A.A.C. R18-16-406(J)	August & November 2018
Notice of Feasibility Study Work Plan availability	A.A.C. R18-16-404(C)(1)(d) A.A.C. R18-16-407(B)	November 2018
Notice of the Feasibility Study availability	Not Required	September 2019
Notice of the Proposed Remedial Action Plan for public comment	A.R.S. § 49-287.04(B) A.R.S. § 49-289.03(A)(2) A.A.C. R18-16-301(C) A.A.C.R18-16-404(C)(1)(e) A.A.C. R18-16-408(A)	March 2020
Notice of the Record of Decision and Responsiveness Summary availability	A.R.S. § 49-287.04(G) A.A.C. R18-16-404(C)(1)(f) A.A.C. R18-16-410	TBD

Notes:

A.A.C. - Arizona Administrative Code

A.R.S. - Arizona Revised Statute

3.6 Schedule

The schedule for implementing the Selected Remedy will be dictated by the WQARF program priorities and available funding after the ROD has been executed and entered into the Administrative Record. SVE is scheduled to continue for up to three years, and ozone sparge is scheduled to continue for up to four years. MNA will be conducted until the COCs are no longer present above their respective AWQS or the Director determines that the conditions of A.R.S. §49-282.06(D) have been met. Based on current groundwater data trends, ADEQ estimates groundwater remediation at the Site, including MNA, will be needed for up to 20 years.

During implementation of the Selected Remedy, Periodic Site Reviews will be performed at a minimum of every five years to determine the viability of the remedy. These evaluations may be conducted more frequently, as needed.

Contingencies to implement additional years of SVE for soils and ozone sparge for groundwater are included should these be determined to be necessary based on intermediate monitoring results and Periodic Site Reviews. In addition, a contingency for wellhead treatment by ADEQ is included if production from nearby supply wells is necessary to produce drinking water and PCE concentrations in groundwater extracted from the well exceed the AWQS of 5 µg/L at a regulatory point of compliance.

Upon completion of remedial actions, all remedial equipment and wells associated with the Site will be abandoned in accordance with applicable ADWR requirements as promulgated in A.A.C. R12-15-816. After completion of the above actions, ADEQ will delist the Site in accordance with A.R.S. §49-287.01(K).

4.0 RESPONSIVENESS SUMMARY

In accordance with A.A.C. R18-16-410(B)(2) and A.R.S. §49-287.04(F), a comprehensive responsiveness summary was prepared to identify and respond to all comments received on the PRAP at the conclusion of the public comment period. A 90-day comment period for the PRAP was held starting on March 26, 2020 and ending on June 23, 2020.

Three communications containing comments were received during the comment period, as follows:

- One letter from Ms. Julie Riemenschneider with the City of Phoenix, dated June 15, 2020.
- One letter from Ms. Andrea Martinez with SRP dated, June 23, 2020.

No other comments were received regarding the PRAP. A copy of the comment letters, a transcription of the CAB comments, and the ADEQ response to the comments are presented in Appendix A.

5.0 COST

As required in A.A.C. R18-16-410(C), this section presents the costs (excluding non-recoverable costs) previously incurred by ADEQ during Site characterization and implementation of the ERAs and presents the costs of the Selected Remedy.

5.1 Historic Costs

The Site was placed on the WQARF Registry in 2016 due to the discovery of soil and groundwater contamination. Investigation and remediation of the Site by ADEQ began in 2016 and will continue as the Selected Remedy is implemented. ERAs were conducted starting in 2018 and were instrumental in reducing contaminant concentrations and risk of exposure. Significant costs have been incurred by ADEQ during characterization and implementation of the ERAs. These activities to date have cost ADEQ $2,835,862.

5.2 Future Costs

The estimated life cycle cost for implementing the Selected Remedy is estimated to be $2,429,713 and is summarized in Table 3. The estimated costs for the remedy contingencies are estimated to be $7,268,942**.** All costs are summarized in Table 4, and detailed costs are available in Appendix B.

Table 3 – Selected Remedy Cost Summary

Year	Description	Cost
1	Soil Vapor Extraction Blower and Operation & Maintenance, Ozone Sparge Operation & Maintenance and Monitored Natural Attenuation, MNA Monitoring Well Install	$478,000
2	Soil Vapor Extraction Operation & Maintenance, Ozone Sparge Operation & Maintenance and Monitored Natural Attenuation	$312,090
3	Soil Vapor Extraction Operation & Maintenance, Ozone Sparge Operation & Maintenance and Monitored Natural Attenuation	$321,453
4	Ozone Sparge Operation & Maintenance and Monitored Natural Attenuation, SVE Abandonment	$343,116
5	Ozone Sparge System Abandonment, Monitored Natural Attenuation	$122,682
6	Monitored Natural Attenuation	$44,053
7	Monitored Natural Attenuation	$45,375
8	Monitored Natural Attenuation	$46,736
9	Monitored Natural Attenuation	$48,138
10	Monitored Natural Attenuation	$49,582
11	No Actions	$0
12	Monitored Natural Attenuation	$52,602
13	No Actions	$0
14	Monitored Natural Attenuation	$55,805
15	No Actions	$0
16	Monitored Natural Attenuation	$59,204
17	No Actions	$0
18	Monitored Natural Attenuation	$62,809
19	No Actions	$0
20	Monitored Natural Attenuation	$66,634
21	MNA Confirmation Sampling and Monitoring Well Abandonment	$321,435
TOTAL SELECTED REMEDY COST		**$2,429,713**

Notes:

Costs assumes inflation rate of 3%

Table 4 – Contingency Cost Summary

Description	Cost
Up to 3 Years Additional Soil Vapor Extraction	$241,154
ADEQ costs for Declaration of Environmental Use Restriction	$10,730
Up to 3 Years Additional Ozone Sparge	$596,269
Downgradient Sparge System	$1,165,777
15 Years Wellhead Treatment	$5,255,012
TOTAL CONTINGENCY COST	**$7,268,942**

Notes:
Costs assume inflation rate of 3%

6.0 CONCLUSIONS

The Selected Remedy chosen for the Site consists of SVE for the soils and ozone sparge for the groundwater at the source area, and MNA within the diffuse groundwater contaminant plume. Contingencies include additional SVE, additional ozone sparge, a DEUR, and wellhead treatment. Per the Selected Remedy, SVE will be conducted for up to 3 years or until the RO for soil has been met. Ozone sparge will be conducted for up to four years, or until the concentrations in the source area meet ROs or will meet ROs within the MNA timeframe. MNA will be conducted for up to 20 years or until the RO for groundwater has been met. At such time, remedial and monitoring activities will cease and all equipment (i.e., treatment wells, monitoring wells, etc.) associated with the Site investigation and remediation will be abandoned in accordance with ADWR requirements as stated in A.A.C. R12-15-816. At such time there will be no need to protect human health and the environment and the Site will be delisted as stated in A.R.S. §49-287.01(K). At any time prior to completion of the ROD, a portion of the Site may be issued a No Further Action in accordance with A.R.S. §49-287.01(F) & (G).

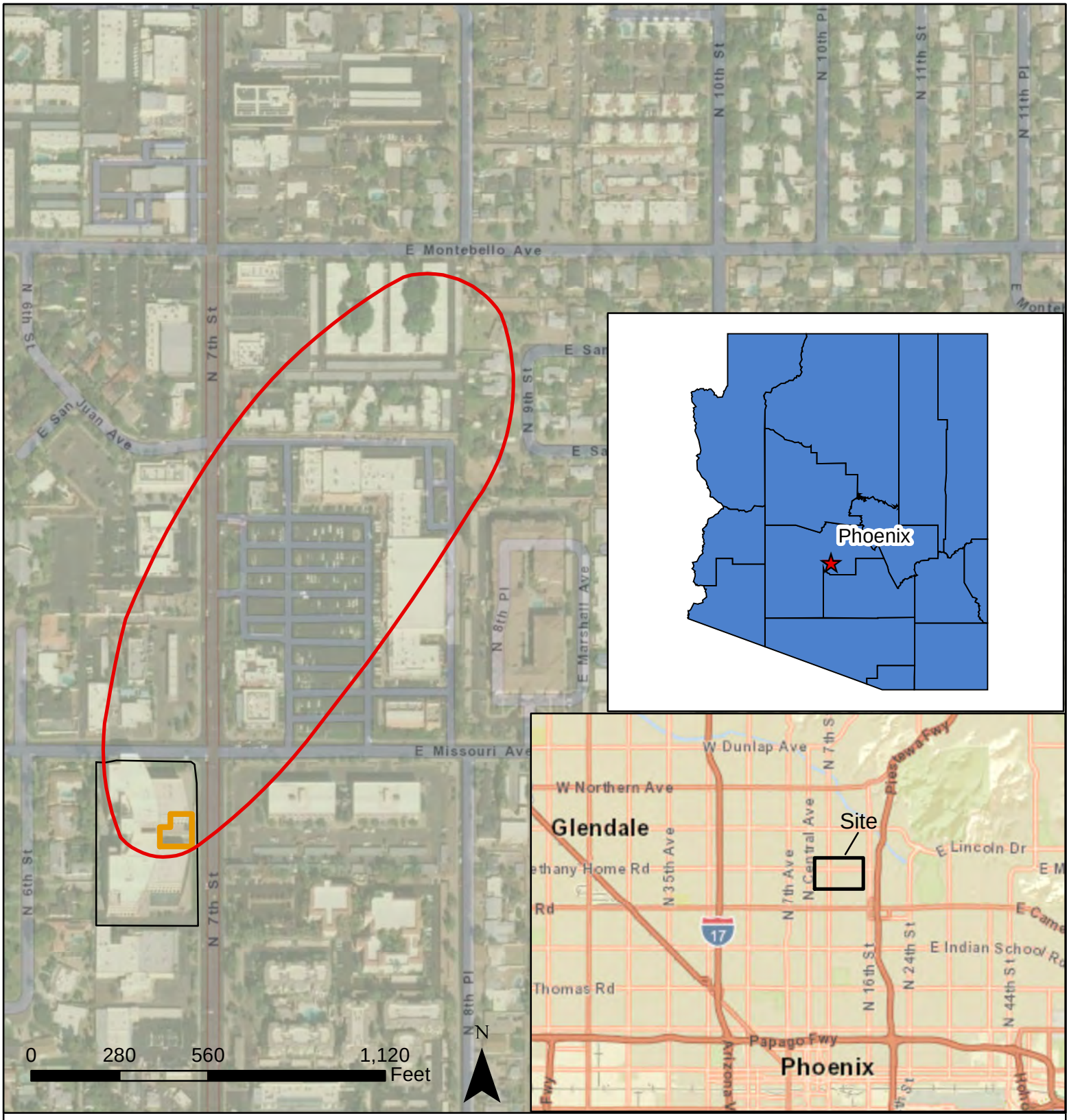
7.0 REFERENCES

ADEQ, 2020. Proposed Remedial Action Plan, 7th Street and Missouri Avenue WQARF Registry Site, Phoenix, Arizona. March 13, 2020

Geosyntec, 2019. Feasibility Study, 7th Street and Missouri Avenue Water Quality Assurance Revolving Fund Registry Site, Phoenix, Arizona. September 29, 2019.

Pinyon, 2018. Remedial Investigation Report, North 7th Street and East Missouri Avenue, Phoenix, Arizona. November 21, 2018

FIGURES



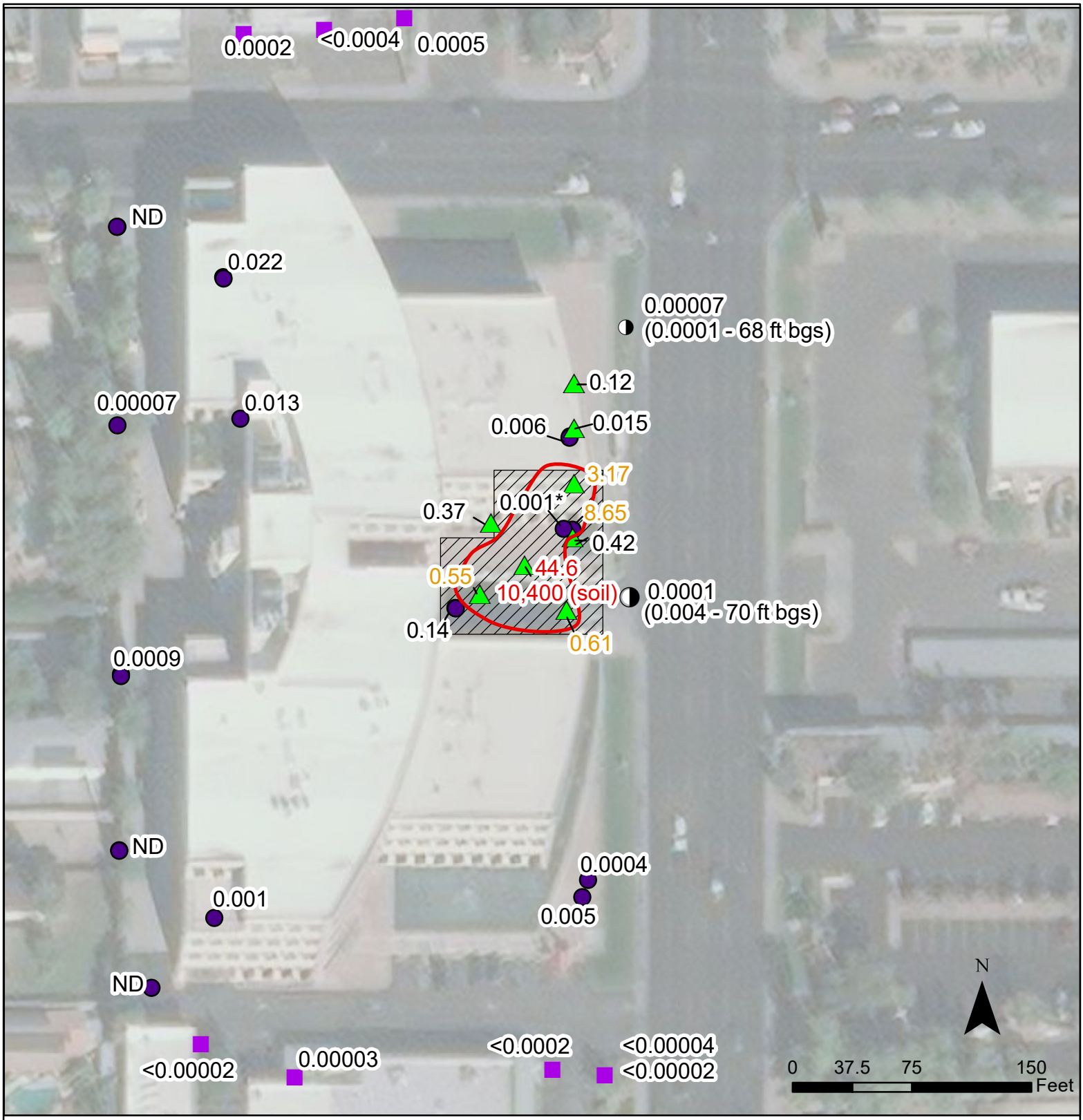
Legend

- Site Boundary
- Former Kino Drapery Dry Cleaning
- Missouri Falls Building

Figure 1

Site Location
7th St. and Missouri Ave.
Phoenix, Arizona
Record of Decision

ADEQ
Arizona Department
of Environmental Quality



Legend

- Nov 2018, 20 ft bgs (highest concentration and depth in parenthesis)
- June 2018 - ~35 ft bgs
- 2017 - 5-15 ft bgs
- 2014 - 20-35 ft bgs
- Approximate area above SRLs
- Former dry cleaner location

Notes:

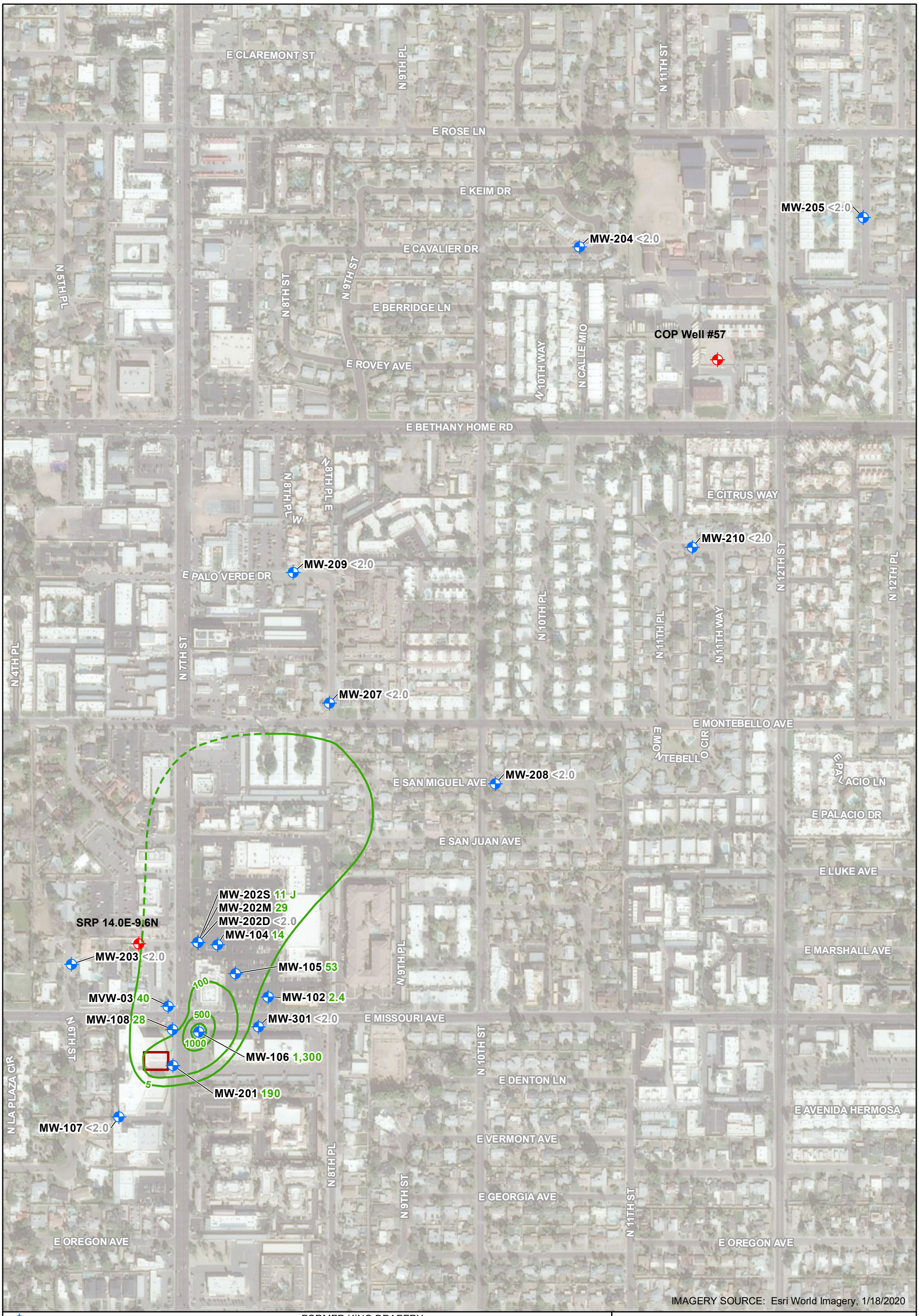
All numbers in mg/kg
Values from converting soil-gas into soil equivalents unless otherwise noted
Red indicates above non-residential SRL
Orange indicates above residential SRL
* Not used for contouring

Figure 2a

Site PCE Concentrations In Soil

7th St. and Missouri Ave.
Phoenix, Arizona
Record of Decision

ADEQ Arizona Department of Environmental Quality



GROUNDWATER MONITORING WELL

PCE CONCENTRATION CONTOUR

PCE CONCENTRATION CONTOUR, INFERRED

FORMER KINO DRAPERY CLEANERS

PRODUCTION WELL

- PCE samples were collected on 4/21/2021 and 4/22/2021
- Results in grey indicate a sample that was not detected above reporting limit of 1.0 µg/L
- For locations with duplicate detections or multiple sample depths, the maximum result is shown

µg/L: micrograms per Liter

J: Estimated concentration

LOCATION ID

MW-201 190

PCE CONCENTRATION (µg/L)

N

0 200 400 800

Feet

Site PCE Concentrations in Groundwater

Record of Decision

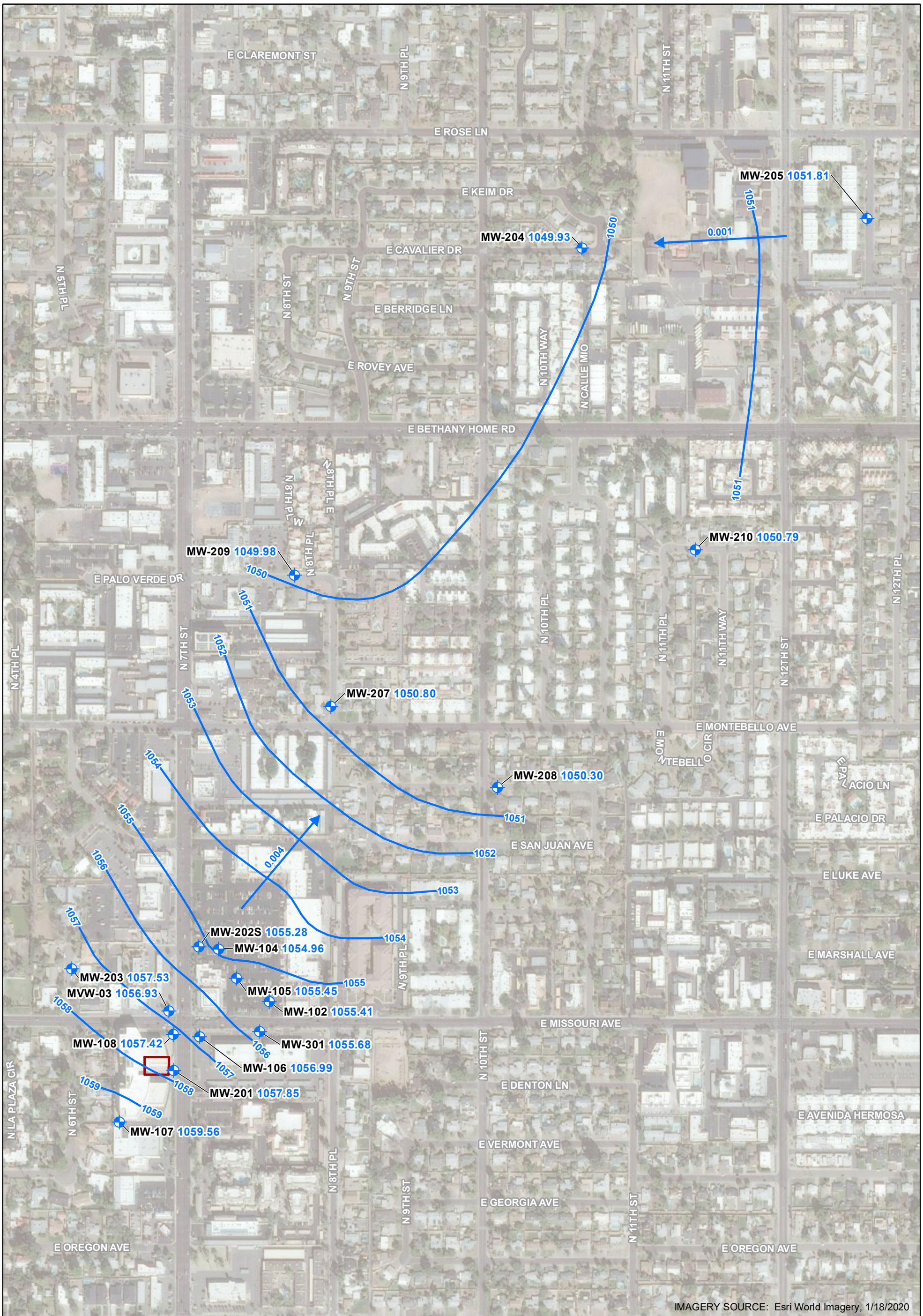
7th Street and Missouri Avenue WQARD Site
Phoenix, Arizona

Geosyntec consultants

Phoenix | June 2021

Figure **2b**

\\SanDiego-01\Data\GIS_SanDiego01\ADEQ\SP0172_WQARF_7M\MXD\2021\Q2\ADEQ_7M_Fig3_PCE.mxd 6/17/2021 SWolfskill



GROUNDWATER MONITORING WELL

GROUNDWATER ELEVATION CONTOUR

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

FORMER KINO DRAPERY CLEANERS

LOCATION ID

MW-208 1050.30

GROUNDWATER ELEVATION (feet amsl)

- Groundwater measurements were taken on 4/20/2021
- MW-202S, MW-202M, and MW-202D were not used for contouring

amsl: above mean sea level

N

0 200 400 800

Feet

Site Groundwater Elevations 2021

7th St. and Missouri Ave., Phoenix, Arizona
Record of Decision

Geosyntec consultants

Phoenix | June 2021

Figure **3**

MISSOURI AVENUE

Ventilation Fan

SVE-3

SVE-1

SVE-4

SVE-7

SVE-2

SVE-5

SVE-8

SVE-6

Storage Rooms

Vehicle Ramps

Estimated Footprint of Former Kino Drapery Cleaners Building

Elevators

WEST ALLEY

Ventilation Fan

7TH STREET

Concrete Pillar (typ.)

Vehicle Ramps

Stairs (typ.)

Ventilation Fan

LAST SAVED: 6/27/2019 5:03 PM

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LEGEND

- Soil Vapor Extraction Well Location
- SVE Trenching/Piping
- SVE System
- Estimated Footprint of Former Kino Drapery Cleaners Building

N

NOTE:
Installation on B-3 Level of Parking Garage
(Approximately 26.5 Feet Below Ground Surface)

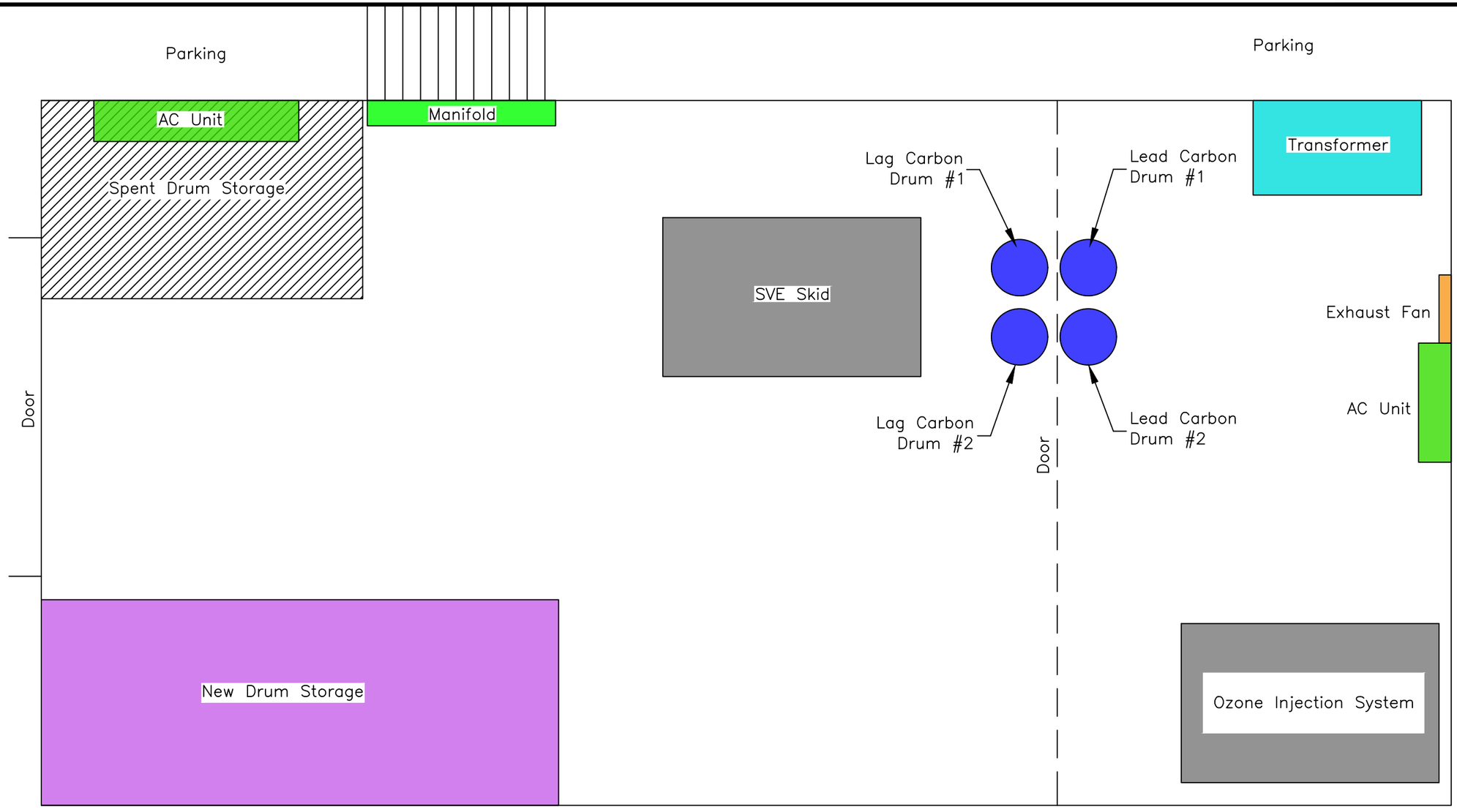
0 15 30
Scale: 1" = 30'

Pinyon Environmental, Inc.

SOIL VAPOR EXTRACTION WELL LOCATIONS

7th St. and Missouri Ave., Phoenix, Arizona
Record of Decision

Site Location: North 7th Street and East Missouri Avenue, Phoenix, Arizona	Drawn By: SJA	Figure: 4a
Pinyon Project Number: 7/17-1006-03.REM001.6	Reviewed By: AMG	Date: 6/27/2019



N

0 2' 4'

SCALE: 1" = 2'

Pinyon Environmental, Inc.

SOIL VAPOR EXTRACTION SYSTEM LAYOUT

7th St. and Missouri Ave., Phoenix, Arizona
Record of Decision

Site Location: North 7th Street and East Missouri Avenue, Phoenix, Arizona	Drawn By: SJA	Figure: 4b
Pinyon Project Number: 7/17-1006-03.REM001.4	Reviewed By: AMG	Date: 5/21/2021

PLOT DATE: 5/24/2021

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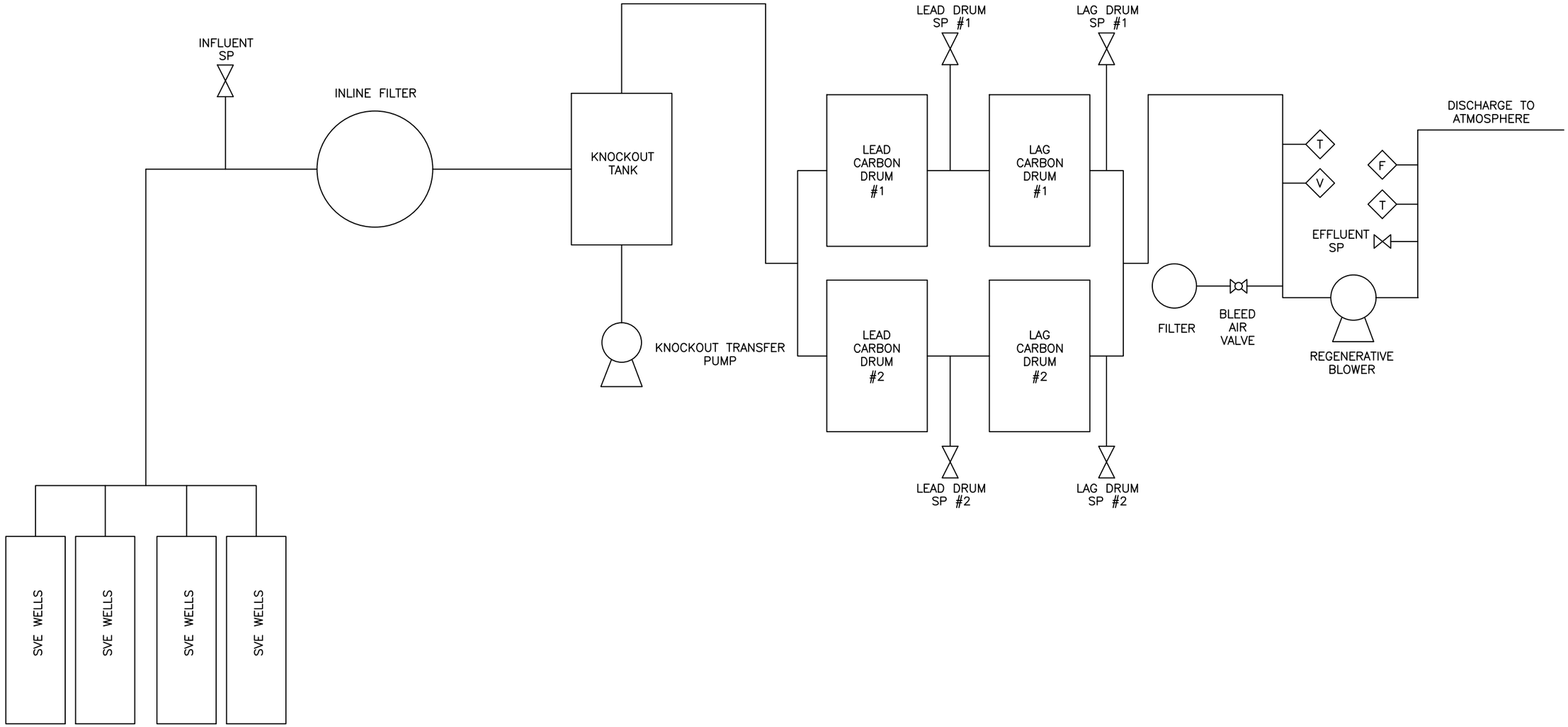

LEGEND

- SP — Sample Port
- T — Temperature Sensor
- V — Vacuum Sensor
- F — Flow Sensor
- Piping

Pinyon Environmental, Inc.

SOIL VAPOR EXTRACTION PROCESS FLOW DIAGRAM

7th St. and Missouri Ave., Phoenix, Arizona
Record of Decision

Site Location: North 7th Street and East Missouri Avenue, Phoenix, Arizona	Drawn By: SJA	Figure: 4c
Pinyon Project Number: 7/17-1006-03.REM001.6	Reviewed By: AMG	Date: 5/24/2021

PLOT DATE: 5/24/2021

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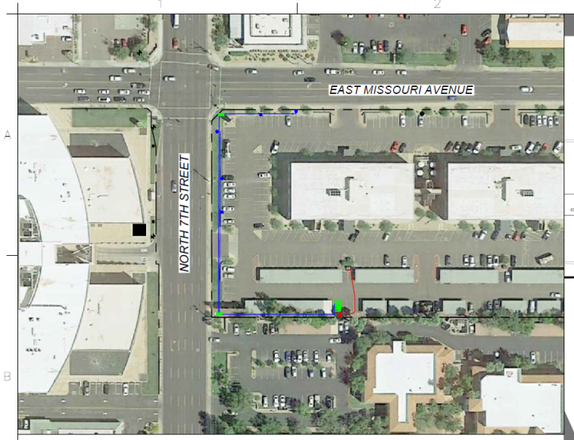


SITE MAP

0 100 200

SCALE IN FEET

LEGEND

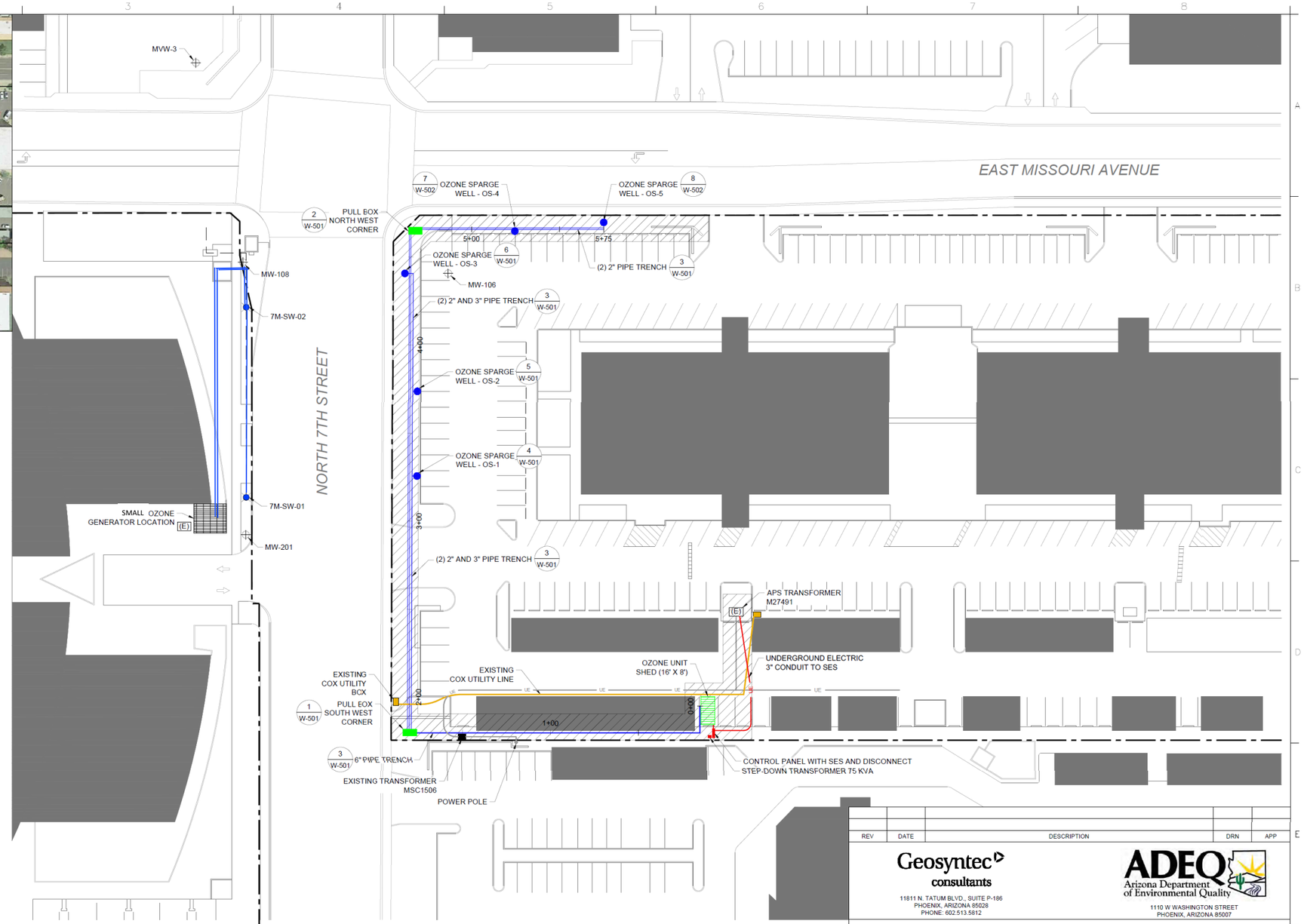
- OZONE SPARGE WELL
- OZONE PIPING PULL BOX (SCALE EXAGGERATED)
- PIPE
- CONTROL PANEL AND STEP-DOWN TRANSFORMER
- EXISTING UNDERGROUND PIPE
- UE — UNDERGROUND ELECTRIC
- UE — UNDERGROUND ELECTRIC (EXISTING)
- COX UTILITY LINE (EXISTING)
- PROPERTY LINE
- TEMPORARY CONSTRUCTION EASEMENT

OS-WELL	ESTIMATED DISTANCE FROM OZONE UNIT TRAILER (L.F.)
OS-1	325
OS-2	375
OS-3	441
OS-4	525
OS-5	575

N

0 30 60

SCALE IN FEET



REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
11811 N. TATUM BLVD., SUITE P-186
PHOENIX, ARIZONA 85028
PHONE: 602.513.5812

ADEQ Arizona Department of Environmental Quality
1110 W WASHINGTON STREET
PHOENIX, ARIZONA 85007

Ozone Sparge System Locations
7th St. and Missouri Ave.
Record of Decision

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

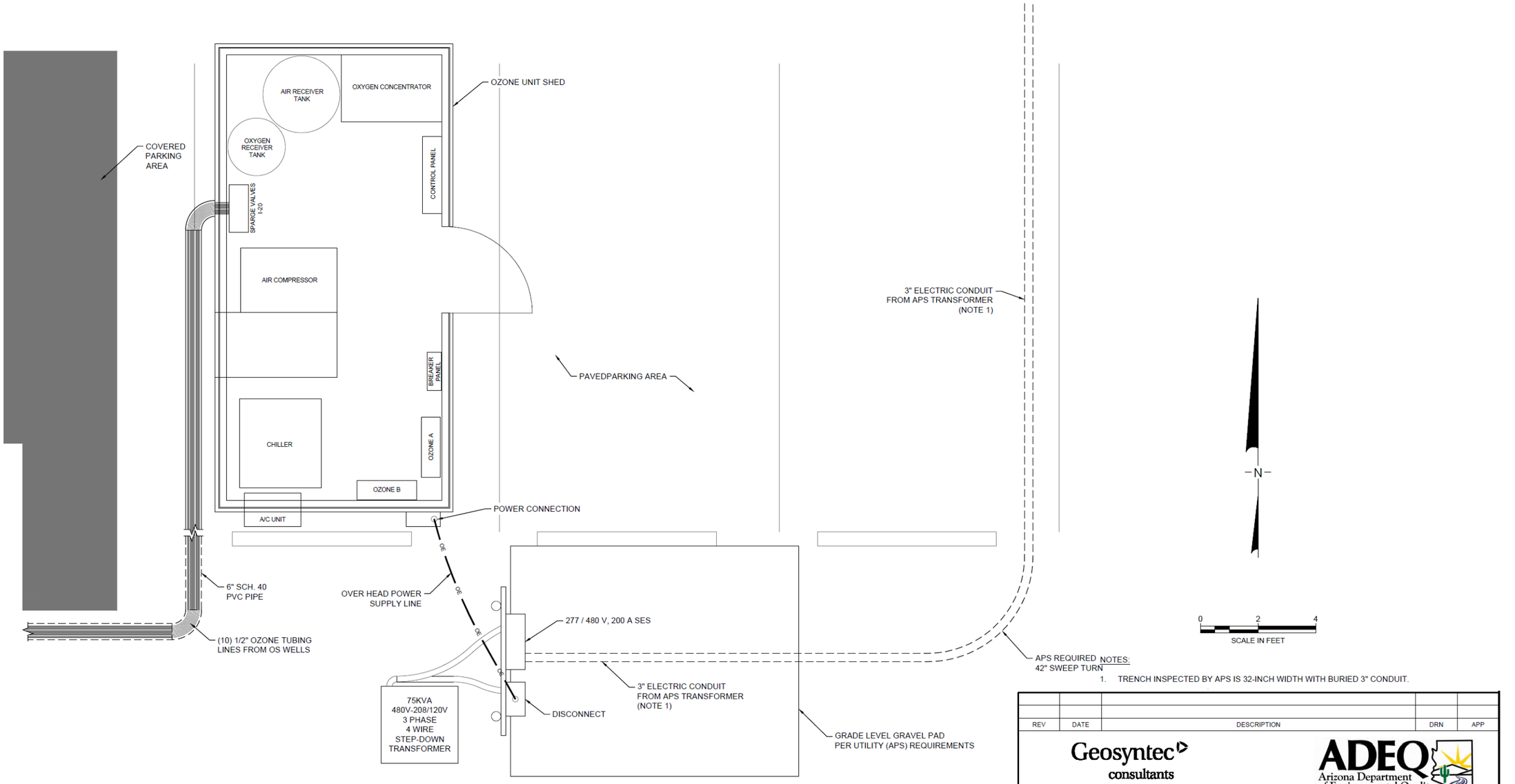
DATE

Registered Professional Engineer (Civil) CERTIFICATE 58701 DERAN M. PURSOO ARIZONA U.S.A. Date Signed 6/10/20 Expires 12/31/20

DESIGN BY:	ADR	DATE:	JUNE 2020
DRAWN BY:	BKF	PROJECT NO.:	SP0172
CHECKED BY:	DP	FILE:	

Figure 5a

AS-BUILT DRAWINGS



NOTES:

1. TRENCH INSPECTED BY APS IS 32-INCH WIDTH WITH BURIED 3" CONDUIT.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
11811 N. TATUM BLVD., SUITE P-186
PHOENIX, ARIZONA 85028
PHONE: 602.513.5812

ADEQ Arizona Department of Environmental Quality
1110 W WASHINGTON STREET
PHOENIX, ARIZONA 85007

Ozone Sparge System Detail
7th St. and Missouri Ave.
Record of Decision

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

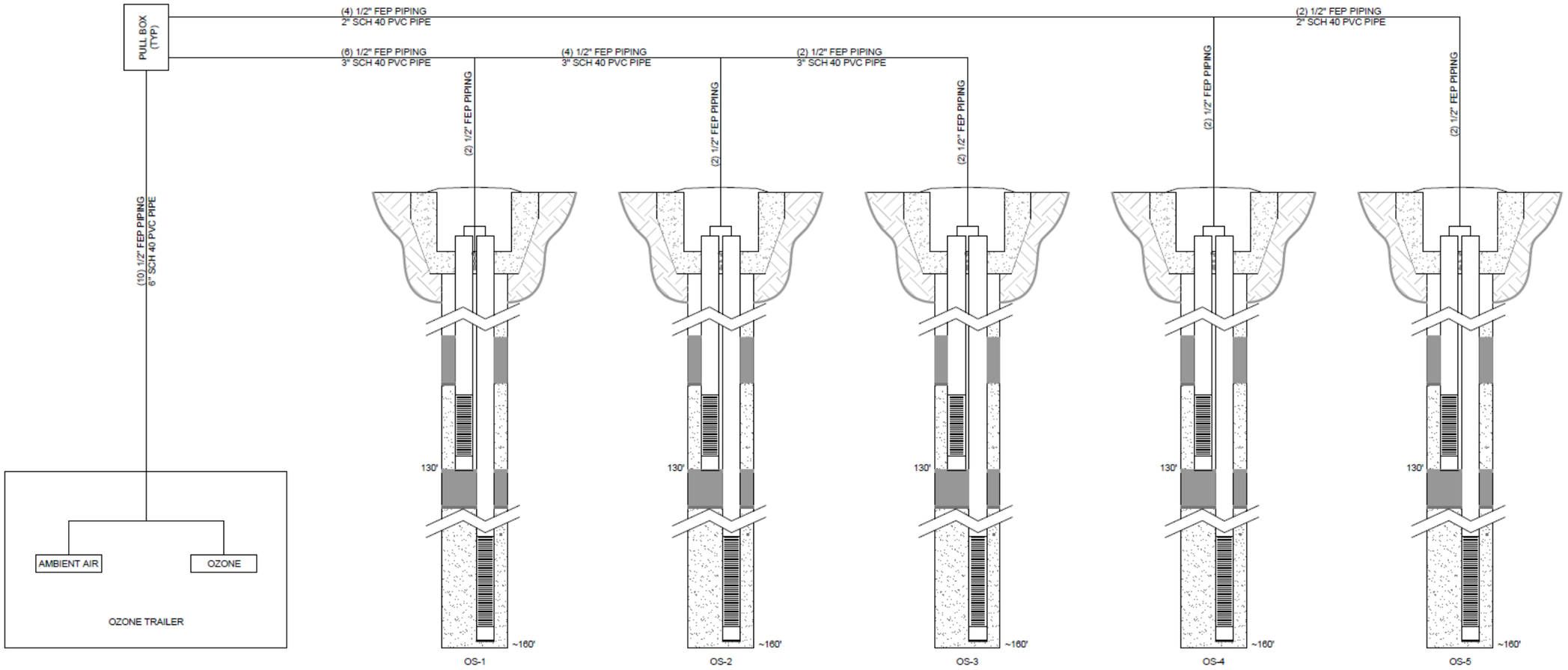
DATE

Registered Professional Engineer CERTIFICATE 58709 DERAN M. PURSOO Date Signed 6/19/20 ARIZONA U.S.A. Expires 12/31/20

DESIGN BY:	ADR	DATE:	JUNE 2020
DRAWN BY:	BKF	PROJECT NO.:	SP0172
CHECKED BY:	DP	FILE:	

AS-BUILT DRAWINGS

Figure 5b



NOTES:

1. SPARE 2" LINE NOT SHOWN.

REV	DATE	DESCRIPTION	DRN	APP

Geosyntec consultants
1881 N. TATUM BLVD., SUITE P-186
PHOENIX, ARIZONA 85028
PHONE: 602.513.5812

ADEQ Arizona Department of Environmental Quality
1110 W WASHINGTON STREET
PHOENIX, ARIZONA 85007

Ozone Sparge System Process Flow Diagram
7th St. and Missouri Ave.
Record of Decision

THIS DRAWING MAY NOT BE ISSUED FOR PROJECT TENDER OR CONSTRUCTION, UNLESS SEALED.

SIGNATURE

DATE

REGISTERED PROFESSIONAL ENGINEER 58701 DIERAN M. PURSOO ARIZONA U.S.A. Expires 6/30/20

DESIGN BY:	ADR	DATE:	JUNE 2020
DRAWN BY:	BKF	PROJECT NO.:	SP0172
CHECKED BY:	DP	FILE:	

AS-BUILT DRAWINGS

Figure 5c

APPENDIX A

RESPONSIVENESS SUMMARY

PROPOSED REMEDIAL ACTION PLAN COMMENTS

RESPONSIVENESS SUMMARY

In accordance with A.A.C. R18-16-410(B)(2) and A.R.S. 49-287.04(F), this comprehensive responsiveness summary has been prepared to identify and respond to all comments received on the PRAP after the conclusion of the public comment period. A 90-day comment period for the PRAP was held starting on March 26, 2020 through June 23, 2020. A virtual CAB meeting was held on June 11 2020 to discuss the PRAP. No verbal comments were received during this meeting. Two letters containing written comments were received during the comment period. One from Julie Riemenschneider with the City of Phoenix (City) and one from Andrea Martinez with Salt River Project (SRP). No other comments were received on the PRAP. The letters are summarized below with ADEQ responses.

WRITTEN COMMENTS

Julie Riemenschneider with City of Phoenix:

Ms. Riemenschneider wrote:

1. The City supports the reference remedy that ADEQ has chosen for this site; vadose zone source control by soil vapor extraction (SVE) and saturated zone source by In Situ Chemical Oxidation (ISCO) - ozone injection with monitored nature attention (MNA).

ADEQ Response:

ADEQ appreciates the City's support.

Ms. Riemenschneider wrote:

2. The City supports and appreciaties [sic] that ADEQ has added several contingencies including a well-head treatment contingency for a "SRP or COP well" into the remedy and has included costs for such treatment should the "SRP or COP well need to be used for potable use and finding PCE above AWQS at the point of compliance of the well."

ADEQ Response:

ADEQ appreciates the City's support.

Andrea Martinez with SRP:

Ms. Martinez wrote:

> SRP has reviewed the Report and supports the selection of the Reference Remedy (Remedy) and its associated contingencies. However, SRP has identified a potential concern with the implementation of the Remedy – the anticipated timing of the Remedy versus the proximate start-up of the future City of Goodyear Water Treatment Plant (WTP). In addition, SRP would like to revisit the remedial objectives (ROs) for the Site and address the estimated remedial costs.
>
> In 2017, SRP entered into an Agreement with the City of Goodyear to wheel Goodyear's surface water supplies to the future Goodyear WTP via the Grand Canal and its associated laterals. It is our current understanding that the Goodyear WTP is anticipated to go online by December 31, 2021. As a result, SRP production wells that pump groundwater to the Grand Canal (either directly or via laterals) will transition from irrigation use to drinking water use within the next 18 months. Once the end-use changes from irrigation to potable, the water will be required to meet applicable drinking water standards prior to discharge to the Grand Canal. SRP maintains a policy that prohibits wells from discharging into canals that feed municipal drinking water systems if drinking water standards for volatile organic compounds are exceeded.
>
> As ADEQ is aware, SRP well 14.0E-9.6N is located along the southwest perimeter of the PCE plume and is used for irrigation purposes. Levels of PCE in the well exceed the Aquifer Water Quality Standards (AWQS). Once the Goodyear WTP goes online, it may become necessary to pump water from 14.0E-9.6N to meet demand. As a result, 14.0E-9.6N will transition from an irrigation supply to a potable water supply, and the water may become part of the raw drinking water delivered to the Goodyear WTP.
>
> SRP is concerned that the schedules for the Goodyear WTP start-up and Site remediation will not be sufficiently synchronized to satisfy SRP's water production and delivery needs. Currently, it is unclear how much time will be needed before PCE levels consistently fall below the AWQS at the Site. It is our concern that the Goodyear WTP will go online prior to the Remedy achieving levels of PCE that are compliant with our discharge policy, and thereby precluding 14.0E-9.6N from being used as a raw drinking water source. As such, SRP believes it will be necessary to sample 14.0E-9.6N at least six months prior to the start-up of the Goodyear WTP in order to determine whether ADEQ should preemptively implement the proposed contingencies (i.e., mobile ozone sparge system or wellhead treatment) at 14.0E-9.6N. Treating the groundwater near to or installing wellhead treatment at 14.0E-9.6N prior to the completion of the Remedy will ensure that SRP remains whole.

SRP encourages ADEQ to reconsider the wording of the following statement included in Section 5.2, as it implies that contingencies will not be implemented until after the Goodyear WTP goes online and 14.0E-9.6N has officially transitioned to a potable source:

> *A contingency of wellhead treatment for the SRP and the COP wells is included (Figure 4c). This contingency will be triggered by water from either well being used for a potable source and finding PCE above AWQS at the point of compliance of the well.*

SRP recommends the following language that allows flexibility to implement contingency actions at 14.0E-9.6N prior to the completion of the Remedy and/or prior to the start-up of the Goodyear WTP:

> *A contingency of wellhead treatment for the SRP and the COP wells is included (Figure 4c). For COP, this contingency may be triggered if the water is being used as a potable source and PCE concentrations are above AWQS at the point of compliance of the well.*
>
> ***For SRP, this contingency may be triggered if the water is pending transition from irrigation to potable source and PCE concentrations are above AWQS at the point of compliance.***

ADEQ Response:

Thank you for the information. ADEQ understand that currently the water treatment plant is not requiring water from the 14.0E-9.6N SRP well. The contingency for wellhead treatment would be implemented if production from this SRP well is necessary to produce drinking water and PCE concentrations in groundwater extracted from the well exceed the AWQS of 5 µg/L at a regulatory point of compliance.

Ms. Martinez wrote:

Remedial Objectives

In 2018, SRP provided comments on the Draft Remedial Objective Report for the Site.2 In this letter, SRP mentioned that according to Arizona Administrative Code R-18-16-401, the term "remedial objective" is defined to include four necessary elements, but the proposed groundwater RO only included three of the four. SRP considered "Protecting against the loss

or impairment of identified uses of land and waters of the State" as the missing element. The Remedial Objectives Responsiveness Summary, included as an attachment to the final Remedial Investigation Report for North 7th Street and East Missouri Avenue, Phoenix, Arizona, dated November 21, 2018, addressed our comment by stating: "The RO as written explicitly states, "To restore, replace, or otherwise provide for water for its designated use that *is lost or impaired* by contamination" (italics added for emphasis)." While we understood that the RO addressed 'lost or impaired waters', the intent of our comment was to explicitly include 'protect' in the RO. It is important that all SRP assets within any WQARF site be proactively protected. As such, SRP requests the following change to the final groundwater RO that is included in the Proposed Revised Remedial Action Plan Report:

> To ***protect***, restore, replace, or otherwise provide for water for its designated municipal use that is lost or impaired by contamination associated with the 7th Street and Missouri Avenue WQARF site. This action is needed for the present time and for as long as the need for the water exists, the resource remains available and the contamination associated with the 7th Street and Missouri Avenue WQARF site prohibits or limits the designated municipal use of groundwater.

ADEQ Response:

ADEQ feels that the RO does provide for protection of lost or impaired water as written.

Ms. Martinez wrote:

Estimated Remedial Costs

The table included in Appendix A of the Report (Proposed Remedy Detailed Cost Summary) indicates that the Installation of Wellhead Treatment "Includes permitting, drilling, oversight, waste management." However, there are no details regarding the treatment equipment for the SRP and COP wells or what is included in the O&M costs. Please consider including these details.

ADEQ Response:

The costing of the contingencies in additional detail is presented in Appendix B of the ROD, including O&M costs.

APPENDIX B

DETAILED FUTURE COST SUMMARY

Table B-1 Summary of Costs - No Contingency
7th St and Missouri Ave
Record of Decision

Year	SVE	Ozone Sparge	Monitoring	Subtotal
1	$ 94,000	$ 170,000	$ 214,000	$ 478,000
2	$ 71,070	$ 175,100	$ 65,920	$ 312,090
3	$ 73,202	$ 180,353	$ 67,898	$ 321,453
4	$ 87,418	$ 185,764	$ 69,935	$ 343,116
5	$ -	$ 79,912	$ 42,770	$ 122,682
6	$ -	$ -	$ 44,053	$ 44,053
7	$ -	$ -	$ 45,375	$ 45,375
8	$ -	$ -	$ 46,736	$ 46,736
9	$ -	$ -	$ 48,138	$ 48,138
10	$ -	$ -	$ 49,582	$ 49,582
11	$ -	$ -	$ -	$ -
12	$ -	$ -	$ 52,602	$ 52,602
13	$ -	$ -	$ -	$ -
14	$ -	$ -	$ 55,805	$ 55,805
15	$ -	$ -	$ -	$ -
16	$ -	$ -	$ 59,204	$ 59,204
17	$ -	$ -	$ -	$ -
18	$ -	$ -	$ 62,809	$ 62,809
19	$ -	$ -	$ -	$ -
20	$ -	$ -	$ 66,634	$ 66,634
21	$ -	$ -	$ 321,435	$ 321,435
TOTAL	**$ 325,690**	**$ 791,129**	**$ 1,312,894**	**$ 2,429,713**

Table B-2 Summary of Contigency Costs
7th St and Missouri Ave
Record of Decision

Year	Additional SVE OMM	DEUR	Additional Ozone OMM	Downgradient Sparge Capital and OMM	Wellhead Treatment Capital and OMM	Subtotal
1	$ -	$ -	$ -	$ -	$ -	$ -
2	$ -	$ -	$ -	$ -	$ -	$ -
3	$ -	$ -	$ -	$ -	$ -	$ -
4	$ 75,398	$ -	$ -	$ -	$ -	$ 75,398
5	$ 77,660	$ -	$ 191,336	$ 680,933	$ 2,406,338	$ 3,356,267
6	$ 79,990	$ -	$ 197,077	$ 197,077	$ 144,909	$ 619,052
7	$ 8,106	$ -	$ 202,989	$ 202,989	$ 149,257	$ 563,340
8	$ -	$ -	$ 4,867	$ 84,779	$ 153,734	$ 243,380
9	$ -	$ -	$ -	$ -	$ 158,346	$ 158,346
10	$ -	$ -	$ -	$ -	$ 163,097	$ 163,097
11	$ -	$ -	$ -	$ -	$ 167,990	$ 167,990
12	$ -	$ -	$ -	$ -	$ 173,029	$ 173,029
13	$ -	$ -	$ -	$ -	$ 178,220	$ 178,220
14	$ -	$ -	$ -	$ -	$ 183,567	$ 183,567
15	$ -	$ -	$ -	$ -	$ 189,074	$ 189,074
16	$ -	$ -	$ -	$ -	$ 194,746	$ 194,746
17	$ -	$ -	$ -	$ -	$ 200,588	$ 200,588
18	$ -	$ -	$ -	$ -	$ 206,606	$ 206,606
19	$ -	$ -	$ -	$ -	$ 212,804	$ 212,804
20	$ -	$ -	$ -	$ -	$ 219,188	$ 219,188
21	$ -	$ 10,730	$ -	$ -	$ 153,519	$ 164,249
TOTAL	**$ 241,154**	**$ 10,730**	**$ 596,269**	**$ 1,165,777**	**$ 5,255,012**	**$ 7,268,942**

Table B-3 Detail Costs - Vadose Zone Remedy
7th St and Missouri Ave
Record of Decision

Soil Vapor Extraction - Capital Costs		***Total Cost***
300 CFM SVE Unit	$	25,000
Subtotal	**$**	**25,000**

Soil Vapor Extraction - Annual Costs		***Total Cost***
Routine Monitoring/Sampling/Reporting	$	45,000
Repair and Maintenance	$	7,000
Utilities (Electric)	$	12,000
VGAC Changeout	$	5,000
Subtotal (Cost per year)	**$**	**69,000**

Total Annual SVE OMM Costs (with 3% inflation)		***Total Cost***
Year 1	$	94,000
Year 2	$	71,070
Year 3	$	73,202
Total SVE costs for three years	**$**	**238,272**

System Abandonment (Year 4)		***Total Cost***
Abandon SVE extraction wells	$	39,000
VGAC disposal	$	5,000
SVE piping/backfill trenches	$	12,000
Coordination/Oversight of decommissioning activities	$	24,000
Closure Costs	**$**	**80,000**
Total Closure Costs (Year 4 with 3% Inflation per Year)	**$**	**87,418**

Table B-4 Detail Costs - Groundwater Remedy
7th St and Missouri Ave
Record of Decision

Ozone Sparge OMM Annual Costs		***Total Cost***
General Operation and Maintenance and Reporting	$	117,200
Air Conditioner Maintenance	$	13,000
Twice-Annual Preventative Maintenance	$	9,000
Utilities (Electric)	$	10,800
Wellhead Maintenance	$	12,000
Replacement Ozone Diffusers and Pump Fittings	$	8,000
Subtotal (Cost per year)	**$**	**170,000**

Total Annual Ozone Sparge OMM Costs (with 3% inflation)		***Total Cost***
Year 1	$	170,000
Year 2	$	175,100
Year 3	$	180,353
Year 4	$	185,764
Total Ozone Sparge for Four Years	**$**	**711,217**

MNA Capital Costs		***Total Cost***
Two Additional Monitoring Well Installations (Includes vertical profiling sampling)	$	150,000
Total for Two Additional Monitoring Wells	**$**	**150,000**

Groundwater Monitoring and Reporting Costs		***Total Cost***
Quarterly Performance Monitoring (6 wells for VOCs, Metals, and Ozone)	$	36,000
Year 1-4 Groundwater Sampling (13 wells for VOCs, Metals, and Ozone)	$	20,000
Year 5-20 Groundwater Sampling (19 wells, VOCs)	$	30,000
Monitoring Reporting	$	8,000
Subtotal for Years 1 to 4 (Cost per year)	**$**	**64,000**
Subtotal for Years 5 to 20 (Cost per year)	**$**	**38,000**

Total MNA/Performance Monitoring (Year 1 -10, with 3% inflation)		***Total Cost***
Year 1 Performance Monitoring and MNA	$	64,000
Year 2 Performance Monitoring and MNA	$	65,920
Year 3 Performance Monitoring and MNA	$	67,898
Year 4 Performance Monitoring and MNA	$	69,935
Year 5 Annual MNA	$	42,770
Year 6 Annual MNA	$	44,053
Year 7 Annual MNA	$	45,375
Year 8 Annual MNA	$	46,736
Year 9 Annual MNA	$	48,138
Year 10 Annual MNA	$	49,582
Year 12 Biannual MNA	$	52,602
Year 14 Biannual MNA	$	55,805
Year 16 Biannual MNA	$	59,204
Year 18 Biannual MNA	$	62,809
Year 20 Biannual MNA	$	66,634
Year 21 MNA Confirmation Sampling	$	137,266
Total Groundwater Sampling for 20 Years and Confirmation Sampling	**$**	**978,725**

Ozone Sparge System Abandonment (Year 5)		***Total Cost***
Well/Piping Abandonment	$	43,000
System Removal	$	18,000
Asphalt/Concrete Repair	$	3,000
Reporting & Close Out	$	7,000
Subtotal for Ozone Sparge System Abandonment	**$**	**71,000**
Total for Ozone Sparge System Abandonment (Year 5 with 3% Inflation per Year)	**$**	**79,912**

Monitoring Well Abandonment (Year 21)		***Total Cost***
Well/Piping Abandonment	$	83,000
Asphalt/Concrete Repair	$	5,000
Reporting & Close Out	$	11,000
Subtotal for Monitoring Well Abandonment	**$**	**99,000**
Total for Monitoring Well Abandonment (Year 22 with 3% Inflation per Year)	**$**	**184,169**

Table B- 5 Detail Costs - Vadose Zone Contigencies
7th St and Missouri Ave
Record of Decision

Additional Soil Vapor Extraction (Year 4 to 6)		***Total Cost***
Year 4	$	75,398
Year 5	$	77,660
Year 6	$	79,990
Add'tl Year 7 decomissioning costs (due to 3% inflation)	$	8,106
Total SVE costs for three additional years	**$**	**241,154**

Contingency DEUR		***Total Cost***
ADEQ Costs	$	10,730

Table B-6 Detail Costs - Groundwater Contingencies
7th St and Missouri Ave
Record of Decision

Additional Operation Costs for Current Ozone Sparge System OMM		***Total Cost***
Year 5	$	191,336
Year 6	$	197,077
Year 7	$	202,989
Add'tl Year 8 decomissioning costs (due to 3% inflation)	$	4,867
Total Ozone Sparge for Three Additional Years	**$**	**591,402**

Movement of Sparge System Downgradient and 5 Addt'l Sparge Wells - Capital Costs		***Total Cost***
5 Duel Nested Sparge Wells and IDW Disposal	$	260,000
Earthwork, Trenching, Pipe Installation, Asphalt Repair	$	75,000
Equipment Removal/Install/Repairs	$	100,000
Subtotal	**$**	**435,000**
Total Costs With 3% Inflation (Year 5)	**$**	**489,596**

Contingency Additional Downgradient Ozone Sparge System OMM Costs		***Total Cost***
Year 5	$	191,336
Year 6	$	197,077
Year 7	$	202,989
Year 8 Decomissioning Costs	$	84,779
Total Ozone Sparge Downgradient Area System for Three Years	**$**	**676,181**

Wellhead Treatment - Capital Costs		***Total Cost***
Engineering Design/Procurement Services	$	230,000
Treatment Compound (Foundation, Fencing, Instrumentation and Controls, etc.)	$	500,000
2000 gpm Treatment System (Install, Two LGAC Vessels, Filtration System, Piping, etc.)	$	985,000
Conveyance Piping Modifications	$	30,000
System Commissioning and Startup	$	35,000
Construction Services (System Installation, Oversight, etc.)	$	233,000
Total for Wellhead Treatment Install	**$**	**2,013,000**
Total for Wellhead Treatment With 3% Inflation (Year 5)	**$**	**2,265,649**

Wellhead Treatment - Annual OMM Costs		***Total Cost***
Routine Monitoring/Sampling/Reporting	$	45,000
Repair and Maintenance	$	40,000
LGAC Changeout (2 vessles)	$	40,000
Subtotal (Cost per year)	**$**	**125,000**
Subtotal (Cost per year) Starting Year 5 with 3% Inflation	**$**	**140,689**

Table B-6 Detail Costs - Groundwater Contingencies - Continued
7th St and Missouri Ave
Record of Decision

Total Annual Wellhead Treatment OMM Costs (with 3% inflation)	***Total Cost***
Year 5	$ 140,689
Year 6	$ 144,909
Year 7	$ 149,257
Year 8	$ 153,734
Year 9	$ 158,346
Year 10	$ 163,097
Year 11	$ 167,990
Year 12	$ 173,029
Year 13	$ 178,220
Year 14	$ 183,567
Year 15	$ 189,074
Year 16	$ 194,746
Year 17	$ 200,588
Year 18	$ 206,606
Year 19	$ 212,804
Year 20	$ 219,188
Total Wellhead Treatment OMM Costs for 15 Years	**$ 2,835,843**

Wellhead Treatment System Abandonment	***Total Cost***
VGAC disposal	$ 20,000
Coordination/Oversight of decommissioning activities	$ 65,000
Subtotal	**$ 85,000**
Total Costs With 3% Inflation (Year 21)	**$ 153,519**