

**RECORD OF DECISION
STONE AVENUE AND GRANT ROAD
WQARF REGISTRY SITE
TUCSON, ARIZONA**



29 June 2020

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LIST OF ACRONYMS

AAC	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
ARS	Arizona Revised Statute
AWQS	Aquifer Water Quality Standard
CAB	Community Advisory Board
CIP	Community Involvement Plan
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ERA	Early Response Action
FS	Feasibility Study
ft	feet
ft bgs	feet below ground surface
ft/ft	feet per foot
GAC	granular activated carbon
GPL	Groundwater Protection Level
IAQ	Indoor Air Quality
lbs	pounds
LWUS	Land Water Use Study
mg/kg	milligrams per kilogram
PCE	tetrachloroethene
PRAP	Proposed Remedial Action Plan
RI	Remedial Investigation
RO	Remedial Objective
ROD	Record of Decision
RSL	Regional Screening Level
SRL	Soil Remediation Level
SVE	Soil Vapor Extraction
TCE	trichloroethene
VISL	Vapor Intrusion Screening Level
VOC	volatile organic compounds
WQARF	Water Quality Assurance Revolving Fund
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter

1.0 DECLARATION

1.1 Site Name and Location

This Record of Decision (ROD) is for the Stone Avenue and Grant Road Water Quality Assurance Revolving Fund (WQARF) Registry Site (Site) located in Tucson, a city within Pima County, Arizona. The Site is located in a mixed commercial and light industrial area along a main thoroughfare, West Grant Road, of Tucson and surrounded by residential homes on secondary streets. The Site investigation area encompasses two areas identified for remedial actions, it is bounded to the north by West Jacinto Street, to the south by East Sahuaro Street, to the east by North Estrella Avenue and to the west by North Oracle Road (Figure 1). The Site was added to the WQARF registry in 2017, with an eligibility and evaluation score of 45 out of 120.

1.2 Basis and Purpose

The purpose of this ROD is to describe the Selected Remedy for the Site, chosen in accordance with applicable requirements in Title 18, Chapter 16 of the Arizona Administrative Code (AAC) and compliance with Arizona Revised Statute (ARS) §49-282.06 and §49-287.04. The Arizona Department of Environmental Quality (ADEQ) has reviewed the proposed remedy and determined that the selected remedial actions for the Contaminant of Concern (COC) in soil and soil gas will achieve the Remedial Objectives (ROs) for the Site. Therefore this ROD will present the Selected Remedy pursuant to the criteria under AAC R18-16-410, based upon the data collected and evaluated during the Remedial Investigation (RI), Feasibility Study (FS), and Proposed Remedial Action Plan (PRAP). Copies of all finalized reports are maintained in ADEQ's Records Center located at 1110 West Washington Street in Phoenix, AZ 85007. The State of Arizona, acting by and through ADEQ, has selected and approved the remedy detailed in this document.

1.3 Site Assessment

Tetrachloroethene (PCE) is the primary COC at the Site in soil and soil gas. Trichloroethene (TCE), a degradation product of PCE, has also been detected in soil gas across the Site but is not above Soil Remediation Levels (SRLs). Neither PCE nor TCE have been detected in regional groundwater at the Site. Releases to the environment primarily occurred at two locations at the Site, on Property A and B respectively. The locations of these properties are presented on Figure 1.

The COC has been detected in soil gas at a maximum concentration of 3,170,000 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) at Property A and 560,000 $\mu\text{g}/\text{m}^3$ at Property B. When converted to soil equivalents this is approximately 4.92 and 0.87 milligrams per kilogram (mg/kg) respectively, above the residential SRL of 0.51 mg/kg. These concentrations have been detected areas near former dry cleaning operations on both properties.

An Early Response Action (ERA) has been implemented at Property A (Figure 2). This includes the installation and operation of a Soil Vapor Extraction (SVE) system within the source area in 2017. The SVE system operates periodically and between November 2017 and March 2020 removed approximately 28.3 pounds of PCE. It last operated in March 2020 and is currently shutdown for a rebound period of approximately 90 days.

1.4 Selected Remedy

The Selected Remedy, identified in the FS (ADEQ, 2020a) and proposed in the PRAP (ADEQ, 2020b), to remediate the soil at the Site includes the following remedial technologies:

- Installation / Continued operation of mobile SVE Systems to clean-up the impacted soil/soil gas
- Annual monitoring of regional groundwater and subsurface soil-gas across the Site

The Selected Remedy includes the following contingencies:

- Additional 5 years of operations and monitoring
- Monitoring of indoor air quality (IAQ)
- Installation of a residence or business specific vapor intrusion mitigation system
- Installation of additional SVE monitoring and or extraction wells
- Land use restrictions pursuant to ARS §49-152
- Air Quality Permitting under Pima County Department of Environmental Quality (PDEQ)

A detailed description of the Selected Remedy is provided in Section 3.0 of this ROD. The remedial equipment and the wells associated with the Site will be abandoned in accordance with the applicable Arizona Department of Water Resources (ADWR) requirements including AAC R12-15-816 upon completion of the remedial actions. ADEQ will delist the Site in accordance with ARS §49-287.01(K) upon completion of the abandonment activities.

1.5 Statutory Determinations

In October 2019, ADEQ completed the RI (CCA, 2019) pursuant to ARS §49-287.03(E) and AAC 18-16-406. The RI:

- 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 February 2020, ADEQ completed the FS (ADEQ, 2020a) pursuant to ARS §49-287.03(F) and AAC 18-16-407(C). The FS, based on information obtained during the RI (CCA, 2019), evaluated remedial technologies and identified the remedy for the Site. The FS:

- Provided for the development of a proposed remedy that was in compliance with ARS §49-152, AAC R-18-16-2, ARS §49-282.06 and which would achieve ROs.
- Confirmed that the proposed remedy was based upon best engineering, geological, and hydrogeological judgement.

In February 2020, ADEQ completed the PRAP (ADEQ, 2020b) pursuant to ARS §49-287.04 and AAC 18-16-408. The PRAP presented the remedy recommended by the FS (ADEQ, 2020a) and provided costs to implement the remedy. Public comments on the selected remedy was solicited in a 90-Day public comment period. The PRAP:

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

Pursuant to ARS §49-287.04 and AAC 18-16-410, this ROD is the final administrative decision as defined under ARS §41-1092. The Selected Remedy meets the following criteria as stipulated in ARS §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 in a developed area with commercial, light industrial, and residential mixed use in Tucson, AZ. The boundaries of the Site subject to remedial action include two areas located at the intersection of North Stone Avenue and West Grant Road (Figure 1).

Historic dry cleaning operations at the Site occurred from approximately 1948 to 2000. The nearest residential areas are located on secondary streets North and South of the Site. Residential areas located to the North are located within the observed PCE and TCE shallow soil-gas plumes.

2.2 Source of Release

The sources of contamination at the Site are from historic releases of PCE from Property A and B, respectively.

Historically, Property A had dry cleaning facilities that operated from 1948 to 1975. In 1963, a natural gas line explosion occurred at the facility. The facility reopened under new ownership but ultimately dry cleaning operations discontinued after 1975.

2332 / 2314 N. Stone Avenue, Tucson, Arizona

- 1948 to 1951: Philip Salonic Cleaners (later becomes Supreme Cleaners)
- 1951 to 1965, 1975: Supreme Cleaners
- 1970 to 1975: Lance Alworth's Dry Cleaning

Historically, Property B also had several dry cleaning facilities that operated onsite from 1960 to 2000 in Suite 20 of the Grant-Stone Shopping Plaza. Prior to 1989, Suite 20 extended into the parking lot but was remodeled into a smaller suite.

20 W. Grant Road, Tucson, Arizona

- 1960 to 1965: Buttons Faultless Laundry and Dry Cleaning
- 1966 to 1987: Jim Dandy's Laundry and Dry Cleaners
- 1984 to 1986: Family Cleaners, Inc. (Secondary name for Jim Dandy's)
- 1986: Classic Cleaners
- 1990, 1991 to 1998: Home Laundry and Dry Cleaning
- 1990, 1999 to 2000: Grant & Stone Laundromat (Secondary name for Home Laundry)

- Unknown: Ace Cleaners

2.3 Need for Remedial Action

2.3.1 Soil

The subsurface has been confirmed as being impacted by PCE in soil. Using the three-phase partitioning equation in ADEQ Soil Vapor Sampling Guidance (ADEQ, 2017), soil-gas concentrations were converted to soil equivalents to be compared to the SRLs. PCE concentrations at the two respective source areas, Property A and B, were determined to exceed the residential SRL of 0.51 mg/kg (Figure 3). There were no exceedances of TCE above the SRLs when converted to soil equivalents.

Property A

In SV-1, a temporary soil-gas probe, and in SVP-02, a soil-gas monitoring probe, PCE contamination was detected up to 10 ft bgs (Figure 3). In SV-1, PCE was detected at 450,000 $\mu\text{g}/\text{m}^3$ at 5 ft bgs or 0.7 mg/kg in soil equivalents (Figure 3). The highest recorded concentrations of PCE was detected in SVP-02 at 3,170,000 $\mu\text{g}/\text{m}^3$ at 5 ft bgs and 2,240,000 $\mu\text{g}/\text{m}^3$ at 10 ft bgs. This equates to soil equivalents of 4.92 mg/kg and 3.48 mg/kg respectively (Figure 3). These concentrations are above the residential SRL of 0.51 mg/kg. Concentrations of TCE were also detected in SVP-02 at 2,690 $\mu\text{g}/\text{m}^3$ at a depth of 5 ft bgs and 11,700 $\mu\text{g}/\text{m}^3$ at a depth of 10 ft bgs. TCE concentrations were not above SRLs when converted to soil equivalents.

Property B

In B-3, a temporary soil-gas probe, PCE was detected at a concentration of 560,000 $\mu\text{g}/\text{m}^3$ or 0.87 mg/kg in soil equivalents at 5 ft bgs (Figure 3). This is above the residential SRL of 0.51 mg/kg. This area of soil contamination is located just outside the dialysis center located onsite. Dialysis patients are considered a sensitive population due to their compromised immune systems. TCE was also detected in B-3 at 16,000 $\mu\text{g}/\text{m}^3$, however, this is not above SRLs when converted to soil equivalents.

2.3.1.1 Soil Gas

Both PCE and TCE exceeded the residential and non-residential vapor intrusion screening levels (VISLs) at the Site (Figure 4). The residential and non-residential VISLs for PCE are 367 and 1,567 $\mu\text{g}/\text{m}^3$ and for TCE they are 16 and 100 $\mu\text{g}/\text{m}^3$, respectively. VISLs are calculated by applying a 0.03 attenuation factor on Regional Screening Levels (RSLs) for indoor air. The current RSLs for PCE and TCE for resident indoor air are 11 $\mu\text{g}/\text{m}^3$ and 0.48 $\mu\text{g}/\text{m}^3$, respectively. For composite worker indoor air, PCE and TCE RSLs are 47 $\mu\text{g}/\text{m}^3$ and 3 $\mu\text{g}/\text{m}^3$, respectively.

Property A

The shallow subsurface has PCE and TCE detections in soil gas above residential and non-residential VISLs in the southwest corner of the current facility up to 10 ft bgs (Figure 4).

Property B

The shallow subsurface has PCE and TCE in soil gas above residential and non-residential VISLs up to 5 ft bgs (Figure 4). PCE and TCE soil-gas plumes extend further off Property B, approximately 1,562 ft northwest towards the intersection of North Oracle Road and West Alturas Street (Figure 4). The TCE soil-gas plume is limited to a smaller area within the PCE soil-gas plume as detailed in the RI (CCA, 2019). PCE in deeper soil gas was also detected above residential and non-residential VISLs to an approximate depth of 100 ft bgs in SG-5 and SG-6 (CCA, 2019). The vertical and lateral extent is consistent with the previous perched groundwater conditions. Perched groundwater, now non-existent, mobilized PCE to the northwest causing a smear zone in subsurface soil gas from 5 to 100 ft bgs (CCA, 2019). However, deeper soil-gas is not directly impacting indoor air and was not above SRLs when converted to soil equivalents. Groundwater is not impacted by the deeper soil-gas concentrations due to a clayey confining layer at approximately 100 ft bgs across the Site (CCA, 2019). Therefore, areas where PCE and TCE exceed the residential and non-residential VISL in shallow soil gas are concerns for impacts to indoor air.

2.3.1.2 Indoor Air

Detections of PCE in multiple residences and businesses were found at the Site above and below RSLs. TCE was only detected in one residence below the resident indoor air RSL and likely due to indoor sources (CCA, 2019). The current RSLs for PCE and TCE for resident indoor air are 11 $\mu\text{g}/\text{m}^3$ and 0.48 $\mu\text{g}/\text{m}^3$, respectively. For composite worker indoor air, the RSLs for PCE and TCE are 47 $\mu\text{g}/\text{m}^3$ and 3 $\mu\text{g}/\text{m}^3$, respectively.

Property A

Shallow soil contamination and non-residential soil-gas VISL exceedances of PCE and TCE up to 10 ft bgs has led to vapor intrusion to indoor air concerns. However, the current facility involves automotive and industrial paint sales and distribution and indoor air quality (IAQ) sampling could not be conducted. Therefore, out an abundance of caution ADEQ implemented the ERA of an SVE system to mitigate indoor air concerns to the current facility (CCA, 2019).

Property B

Shallow soil-gas exceedances of the residential and non-residential VISLs for PCE and TCE up to 5 ft bgs has led to vapor intrusion to indoor air concerns both on and off property (CCA, 2019). IAQ sampling was conducted on Property B in January and June 2018 and off property in May, June, and December 2019.

In January 2018, PCE was detected at a maximum concentration of 15 $\mu\text{g}/\text{m}^3$ inside Suite 20 of the shopping plaza on Property B. Suite 20 is located immediately next to a dialysis center which has been identified as a sensitive population for this Site. This is above the resident indoor air RSL for PCE of 11 $\mu\text{g}/\text{m}^3$ but not above the composite worker indoor air RSL of 47 $\mu\text{g}/\text{m}^3$ (CCA, 2019). In June 2018, IAQ sampling results for PCE were below RSLs (CCA, 2019). TCE was not detected in either IAQ sampling event in Suite 20.

IAQ sampling conducted off property in May 2019 indicated that in one residence PCE was at 17 $\mu\text{g}/\text{m}^3$, above the resident indoor air RSL of 11 $\mu\text{g}/\text{m}^3$ (CCA, 2019). Two additional samples were collected in June at the same residence. Concentrations of PCE were detected at 22 and 18 $\mu\text{g}/\text{m}^3$ or an average of 20 $\mu\text{g}/\text{m}^3$, above the resident indoor air RSL (CCA, 2019). During the second seasonal IAQ sampling event in December 2019 five samples were collected at this residence, concentrations averaged at 10.24 $\mu\text{g}/\text{m}^3$, below the resident indoor air RSL. The maximum concentration of the five samples collected was 12 $\mu\text{g}/\text{m}^3$, above the RSL (HGC, 2020). TCE was not detected above RSLs in any residence or business sampled off of Property B.

Thus, remedial action is needed to remediate the contaminated soils to mitigate soil-gas and indoor air impacts at the Site.

2.3.2 Groundwater

Although the regional aquifer is considered a water supply for municipal and private well owners in the Tucson Basin, there are no impacts of the COC or its degradation products to the aquifer from the Site. Therefore, remedial actions in the groundwater are not necessary.

2.4 Chronology of Site Activities

A detailed history of the remedial investigation conducted at the Site is presented in the RI (CCA, 2019), the FS (ADEQ, 2020a), and the PRAP (ADEQ, 2020b). A brief summary of these activities is presented below:

2014: City of Tucson contractors, Terracon, conducted an Environmental Phase I Assessment at Property A and recommended a subsurface soil investigation. Terracon conducted a limited site investigation to collect soil and soil-gas samples. The maximum concentration of PCE in the four soil-gas samples collected was in SV-1 at 450,000 $\mu\text{g}/\text{m}^3$, above the residential VISL and the residential SRL when converted to soil equivalents. The Site was recommended to ADEQ for further investigation.

2015: ADEQ begins a Preliminary Investigation (PI) of the Stone Avenue and Grant Road area regarding possible PCE (including degradation products) contamination in perched groundwater and soil.

2016: ADEQ completes the PI (ADEQ, 2016).

2017: ADEQ lists the Site on the WQARF Registry with a score of 45 out of 120. The RI begins and an ERA is implemented at Property A to mitigate vapor intrusion risk to indoor air utilizing a SVE System (GCI, 2017a-d).

2018: During the RI, a second source area was discovered at the northwest corner of West Grant Road and North Stone Avenue (Property B). Characterization of impacts were conducted both on and off of Property B. The ERA continues at Property A (GCI, 2018).

2019: The RI (CCA, 2019) is finalized and the FS Work Plan (ADEQ, 2019b) is completed in October. Both documents were noticed to the public in November. RI data gaps were addressed in

the FS (ADEQ, 2020a). The ERA continues at Property A and a soil vapor extraction well test is conducted on Property B (GCI, 2020; HGC, 2019).

2020: The FS (ADEQ, 2020a) and PRAP (ADEQ, 2020b) are completed in February. Public comment for the PRAP begins in March and ends in June. An additional SVE well, SVE-03, is installed on Property A as part of remedial optimization efforts onsite (GCI, 2020). The system runs from January to March, with minor interruptions. An estimated total of 28.3 lbs of PCE is removed as of March. The most current system layout is presented on Figure 2.

2.5 Source Area Definition

There are two identified sources of soil contamination at the Site by historic dry cleaner operations on Property A and Property B (Figure 3 and 4). Data collected during the RI confirmed that contaminants were released into the soil and the previously existing perched groundwater aquifer. Data collected during site characterization indicated that the perched aquifer is no longer present (CCA, 2019). PCE was detected above the residential SRL, when converted to soil equivalents, at both Property A and B. A description of contamination at each respective source area at the Site is included below.

2.5.1 Soil Contamination

Property A

The former dry cleaner is the source of PCE contamination on Property A. Soil contamination on Property A is centered near the southwest corner of the current facility to a depth of approximately 10 ft bgs at an approximate 30 ft radius (Figure 3). In SV-1, a temporary soil-gas probe, PCE was detected at 450,000 $\mu\text{g}/\text{m}^3$ at 5 ft bgs or 0.7 mg/kg in soil equivalents (Figure 3). In SVP-02, the highest recorded concentrations of PCE was detected at 3,170,000 $\mu\text{g}/\text{m}^3$ at 5 ft bgs and 2,240,000 $\mu\text{g}/\text{m}^3$ at 10 ft bgs. These concentrations equate to soil equivalents of 4.92 mg/kg and 3.48 mg/kg respectively (Figure 3). These concentrations are above the residential SRL of 0.51 mg/kg. TCE concentrations were not above SRLs when converting to soil equivalents.

Property B

The former dry cleaner is also the source of PCE contamination on Property B. Soil contamination on Property B is located to a depth of 5ft bgs at an approximate 50 ft radius directly in front of the current facility where the historic dry cleaners was in operation. In B-3, a temporary soil-gas probe, PCE was detected at a concentration of 560,000 $\mu\text{g}/\text{m}^3$ or 0.87 mg/kg in soil equivalents (Figure 3). This is above the residential SRL of 0.51 mg/kg. This area of soil contamination is located just outside the dialysis center located onsite. Dialysis patients are considered a sensitive population due to their compromised immune systems. TCE concentrations were not above SRLs when converting to soil equivalents.

2.5.2 Groundwater Contamination

Based on data from a nearby Leaking Underground Storage Tank (UST) facility on the Northeast corner of North Stone Avenue and West Grant Road, the Site had a perched aquifer from

approximately 50 to 80 ft bgs that flowed to the northwest. However, during the RI it was confirmed that the perched aquifer was no longer intact in this area (CCA, 2019). The regional aquifer that serves as a drinking water supply to the Tucson Basin is located much deeper at approximately 195 ft bgs.

In April 2019, groundwater sampling conducted in Site monitoring wells (SG-1, SG-3D, SG-5D, SG-6D) confirmed that neither the COC nor its degradation products are impacting the regional aquifer.

3.0 SELECTED REMEDY

The FS (ADEQ, 2020a) evaluated appropriate remedial technologies for VOCs in soil and soil gas at the Site that could achieve the ROs. The Selected Remedy proposed by the FS and carried forward to the PRAP (ADEQ, 2020b) includes the following components:

- Continued operation of the existing SVE system at Property A for a period of up to five years. Removal of COC mass in the vadose zone will mitigate the potential for vapor intrusion. Operations will be evaluated periodically to optimize the system to effectively eliminate or reduce concentrations to achieve ROs.
- SVE system will be installed on Property B that will include up to five SVE wells and two soil-gas monitoring wells. The SVE system will continue operation for a period of up to five years.
- Annual Monitoring will include annual groundwater monitoring at existing monitoring wells for a period of up to five years to confirm the COC or its degradation products are not impacting the regional aquifer. The soil-gas plume will also be monitored by sampling from the existing shallow screened (50 – 80 ft bgs) wells (Figure 5).
- The Selected Remedy includes the following contingencies:
 - Additional installation of up to six extraction and five soil-gas monitoring probes.
 - Additional five years of SVE operations which will also prolong the annual groundwater monitoring by five years.
 - Additional optimization costs, rebound sampling, and reporting costs.
 - Additional two IAQ sampling events off property in residential areas.
 - Possible installation of two vapor intrusion mitigation method (sub-slab depressurization), if necessary.
 - Institutional Controls in the form of land use restrictions agreed to by current property owners.
 - Air Quality permitting for two SVE systems through PDEQ, if necessary.

The Selected Remedy presented in this ROD differs slightly than what was proposed in the PRAP. The differences are summarized below:

- Site closure activities have been included as part of the remedy in the final year, or year five of the remedial schedule. This includes removal of equipment and abandonment of site extraction and monitoring wells pursuant to AAC R12-15-816. Should the contingency of an additional five years come into effect, site closure activities will be postponed to year

10. Conversely, if the site should be determined for early or partial closure then site closure activities may occur at an earlier time. The cost for year five has been amended to \$544,279 in Table 2, with the added note that these costs may occur in year 10.

3.1 Selected Remedy Summary

A summary of how the Selected Remedy will be implemented at the Site respective to the source areas is included below.

Property A

The mobile SVE system at Property A will continue to be operated. Currently, the system includes three dual nested (shallow and deep) extraction wells and two dual nested soil-gas monitoring probes. The layout of the system is presented on Figure 2. The system has undergone optimization reviews to evaluate SVE efficiency since initial operations. Based upon these evaluations the following techniques have been implemented:

Focused Extraction: The existing SVE system has been optimized to enhance the removal of the remaining mass by focusing extraction on existing wells that are more effective at extracting source area VOCs (as evidenced by regular field monitoring) and by shutting off extraction wells that no longer appear to be effective in removing VOCs. Routine monitoring will allow periodic shifting of active wells to maximize source removal. Additionally, selected SVE wells could be used as air infiltration points to change the vapor flow paths to further optimize the SVE system.

Pulsed Operation: As the remaining VOC mass becomes more diffusion-limited, SVE operation can be transitioned to a periodic or “pulsed” operation such that active extraction occurs in intervals separated by periods of no extraction or “Rebound”. Pulsed extraction is unlikely to increase the mass removal rate but may significantly decrease the operating expense (for a reduced, but sufficiently effective, mass removal rate).

SVE termination criteria will consider general VOC mass transfer limitations and site-specific performance limitations of SVE in the context of the site ROs. Termination of the SVE system will be based on the following criteria:

- As specified in the ROs, concentrations of PCE in soil-gas must be below the non-residential SRL. Samples will be collected from the SVE influent and monitoring probes to determine current concentrations. When concentrations are observed to be below non-residential SRLs and VISLs and concentrations decline asymptotically, termination of the SVE system will be evaluated. To be considered asymptotic concentrations must remain below the non-residential VISL of $1,567 \mu\text{g}/\text{m}^3$ for three consecutive rebound sampling events of at least 90 days without any rebounding concentrations.
- Soil equivalents calculated from soil-gas concentrations may be used instead of the VISL and must be below the calculated GPL of 0.20 mg/kg. This GPL was generated using the ADEQ Groundwater Protection Leaching Model. Concentrations will need to remain below the GPL for three consecutive rebound periods of at least 90 days without any rebounding concentrations.

Property B

A mobile SVE system will be installed and operated at Property B to remediate the identified source area. The system will include a network of extraction wells placed in and around the source area with monitoring probes strategically placed to monitor soil-gas plume concentrations in the shallow subsurface. Existing monitoring wells located on Property B (Figure 5), if appropriate, may be used as soil-gas monitoring probes in conjunction with SVE operations. Initial operations of the SVE will be continuous until such time that the concentrations in the sub-surface have reached a plateau. After which, operations will temporarily shut down to monitor rebound concentrations. Operations will commence after concentrations have increased or display upwards trending. This pattern will be followed until ROs are achieved and contamination no longer threatens to exceed VISLs.

SVE termination criteria will consider general VOC mass transfer limitations and site-specific performance limitations of SVE in the context of the site ROs. Termination of the SVE system will be based on the following criteria:

- As specified in the ROs, concentrations of PCE in soil-gas must be below the residential SRL. Samples will be collected from the SVE influent and monitoring probes to determine current concentrations. When concentrations are observed to be below non-residential SRLs and VISLs and concentrations decline asymptotically, termination of the SVE system will be evaluated. To be considered asymptotic concentrations must remain below the residential VISL of $367 \mu\text{g}/\text{m}^3$ for three consecutive rebound sampling events of at least 90 days without any rebounding concentrations.
- Soil equivalents calculated from soil-gas concentrations may be used instead of the VISL and must be below the calculated GPL of 0.20 mg/kg. This GPL was generated using the ADEQ Groundwater Protection Leaching Model. Concentrations will need to remain below the GPL for three consecutive rebound periods of at least 90 days without any rebounding concentrations.

Annual Groundwater and Soil-Gas Monitoring

Site wide monitoring of groundwater and soil-gas will be conducted on an annual basis at existing monitor well locations (Figure 5). Monitoring will cease when SVE operations are terminated at the Site.

Contingencies

There are several contingencies associated with the Selected Remedy that may be necessary throughout the duration of remedial activities onsite. Primarily, if site conditions require longer timeframes to meet ROs an additional five years may be necessary. This will be determined by evaluating soil-gas concentrations from monitoring probes as well as influent concentrations associated with the SVE systems. If asymptotic concentrations are not reached, or not below VISLs, or soil equivalent concentrations are not below the GPL then continued operations may be necessary. Site wide monitoring will also continue for the duration of remedial activities at the Site. Meaning that if an additional five years of SVE operations is needed then so is annual

monitoring of groundwater and soil-gas. With this, there may be additional sampling and reporting costs.

Also, dependent on site conditions it may be necessary to install up to 6 soil vapor extraction and 5 soil-gas monitoring probes beyond that of the planned initial capital costs. This could be a result of new information or remedy evaluation and optimization. With this, there may be additional sampling and reporting costs.

In addition to site wide monitoring, it may be necessary to conduct additional IAQ sampling in residences living within the soil-gas plume area to monitor vapor intrusion impacts. This determination would be dependent on Property B soil-gas concentrations as well as off property soil-gas concentrations within the soil-gas plume. Consequently, if there is determined to be a significant impact to residences from PCE via vapor intrusion to indoor air, it may be necessary to install vapor intrusion mitigation systems (VIMS). The decision to install a residence specific VIMS will depend on property owner permissions to do so. If permitted, it will be necessary when indoor air concentrations exceed the RSL of $11 \mu\text{g}/\text{m}^3$ for resident air. An exceedance will be based on the average of at least three indoor air samples taken throughout the residence during the same sampling event.

At any time property owners at Property A and B may elect to agree to institutional controls or land use restrictions, to ensure that the properties will remain as non-residential use only.

As an added precaution, a contingency for Air Quality permitting of the SVE systems through PDEQ is included. This would only be necessary if the systems were to remain on Property A and B continuously, respectively, for longer than five years and have any one time exceedance of the emissions thresholds for Hazardous Air Pollutants (HAPs). In Pima County these thresholds are as follows: Volatile Organic Compounds (VOCs) greater than 40 tons, Single HAP greater than 10 tons, and Combined HAPs greater than 25 tons.

3.2 Achievement of Remedial Objections and Remedial Action Criteria

In accordance with AAC R18-16-406(I), ADEQ prepared the Remedial Objectives Report included in the RI 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 AAC R18-16-407, the ROs were evaluated in the FS Report and, according to AAC R18-16-408 and ARS §49-287.04, considered in development of the remedial action alternatives presented in the PRAP Report.

Soil Remedial Objective for Non-Residential Land Use with a Sensitive Population

- To restore soil conditions at Property B to remediation standards for non-residential use with a sensitive population to residential SRLs as specified in AAC R18-7-203 (specifically background remediation standards prescribed in AAC R18-7-204, pre-determined remediation standards in R18-7-205, or site-specific standards in R18-7-206). This action is needed for the present time and for as long as the contaminant level in the soil threatens the use at the Site.

Soil Remedial Objective for Non-Residential Land Use without a Sensitive Population

- To restore soil conditions at Property A to remediation standards for non-residential use to non-residential SRLs as specified in AAC R18-7-203 (specifically background remediation standards prescribed in AAC R18-7-204, pre-determined remediation standards in R18-7-205, or site-specific standards in R18-7-206). This action is needed for the present time and for as long as the contaminant level in the soil threatens the use at the Site.

There are no identified surface water at the Site as well as no groundwater impacts. Therefore no surface water or groundwater remedial objectives are applicable to this Site.

Based on these determinations, the Selected Remedy demonstrates:

- The ability to achieve the ROs
- Consistency with plans of affected water providers and the general land use plans of the local government(s)
- Compatibility with regard to practicability, cost, risk, and benefit.

3.3 Compliance with Arizona Administrative Code and Arizona Revised Statutes

In 2017, the Site was placed on the WQARF Registry by ADEQ with a score of 45 out of 120. In 2019, ADEQ issued the RI Report (CCA, 2019) for public comment to meet the requirements under AAC R18-16-404(C)(1)(b) and AAC R18-16-406(H). The report documented the results of the field investigation activities that were conducted between 2017 and 2019. The RO Report (ADEQ, 2019a) was finalized in October 2019 and included as an appendix to the RI Report (CCA, 2019).

A FS Work Plan (ADEQ, 2019b) was finalized in October 2019 and a public notice was issued in accordance with the requirements outlined in AAC R18-16-404(C)(1)(d). A FS (ADEQ, 2020a) was prepared documenting the evaluation of remedial technologies for the Site and development of a proposed remedy capable of achieving the ROs developed for the Site.

A PRAP (ADEQ, 2020b) was prepared based on the work executed under the FS Work Plan (ADEQ, 2019b) and contained in the FS (ADEQ, 2020a). The PRAP documented the results of the FS and evaluated the Selected Remedy. SVE and Monitoring were selected as the remedy for the Site. The Selected Remedy:

- 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.

The Selected Remedy is consistent with ARS §49-282.06 as it provides protection to the public by providing control of hazardous substances with contingencies. Future use of groundwater by private or municipal well owners in the area will not be affected by the Site.

3.4 Community Involvement and Public Comment Requirements

A CAB was formed that 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 April 28, 2020. A Community Involvement Plan (CIP) was also developed and regularly updated for the Site. The specific public participation activities that have been completed for the Site are presented in Table 1 below.

Table 1 - Community Involvement Activities

Community Involvement Activity	Regulatory Citation/Rule	Date
Establish Community Involvement Area	ARS §49-289.02(A)	March – June 2017
Notice of the Site listing on the Registry	ARS §49-287.01 ARS §49-289.03(A)	January 2017
Hazardous substance contamination notice and fact sheet	ARS §49-289.02(B) ARS §49-287.03(B) AAC R18-16-404(C)(1)(i)	March 2017
Notice of RI scope of work, fact sheet, and outline of CIP	ARS §49-287.03(B) ARS §49-287.03(C) AAC R18-16-403(F) AAC R18-16-403(G)	June 2017
Establish CAB selection committee	ARS §49-289.03(D)	March 2017
Establish CAB	ARS §49-289.03(C) ARS §49-289.03(F)(1)	March 2017
Prepare and update CIP	ARS §49-287.03(D) ARS §49-289.03(C) AAC R18-16-403(E) AAC R18-16-404(C)	June 2017 June 2019
Land and Water Use Study Questionnaires mailed	AAC R18-16-404(C)(1)(a)	May 2019
Notice of opportunity to comment on Draft RI Report	AAC R18-16-404(C)(1)(b) AAC R18-16-406(F)	September 2019
Public notice for solicitation of ROs	AAC R18-16-404(C)(1)(b) AAC R18-16-406(I)(2)	NA
Notice of opportunity to comment on Proposed RO Report	AAC R18-16-404(C)(1)(c) AAC R18-16-406(I)(5)	NA
Public meeting(s) to discuss proposed/revised RO Report (if needed)	AAC R18-16-406(I)(5)	NA
Notice of availability of Final RI and RO Reports	AAC R18-16-406(J)	November 2019
Notice of availability of the FS Work Plan	AAC R18-16-404(C)(1)(d)	November 2019
Notice of availability of the FS Report	Not Required	February 2020
Issue notice of availability and opportunity to comment on the PRAP.	ARS §49-287.04(B) AAC R18-16-404(C)(1)(e) AAC R18-16-408(C)(1)	March 2020
Notice of ROD & Responsiveness Summary Availability	ARS §49-287.04 (G) AAC R18-16-404(C)(1)(f)	TBD – July 2020

3.5 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 be conducted for up to five years with an additional five year contingency. Site wide monitoring will also be conducted on an annual or as needed basis. Remedial actions will be conducted until ROs are satisfied or the Director determines that the conditions of ARS §49-282.06(D) have been met.

During implementation of the Selected Remedy, periodic site reviews will be performed to determine the progress and efficiency of the remedy.

Contingencies may be implemented to expedite clean up based on intermediate monitoring results and periodic site reviews. Upon completion of remedial actions, all remedial equipment and wells associated with the Site will be abandoned in accordance with the PRAP and applicable ADWR requirements as promulgated in AAC R12-15-816. After completion of the above actions, ADEQ will delist the Site in accordance with ARS §49-287.01(K).

4.0 RESPONSIVENESS SUMMARY

In accordance with AAC R18-16-410(B)(2) and ARS §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 all the public comment period. A 90-day comment period for the PRAP was held starting on March 13, 2020 through June 11, 2020. One comment letter was received during the comment period.

- City of Tucson, Tucson Water, June 10, 2020

The responsiveness summary, including copies of letters received and ADEQ responses, is included in Appendix A.

5.0 COST

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

5.1 Historic Costs

The Site was placed on the WQARF Registry in 2017 due to the discovery of potential soil, soil gas, and groundwater contamination at the Site. Investigation and remediation of the Site by ADEQ began in 2017 and will continue as the Selected Remedy is implemented. An ERA was conducted at the Site starting in 2017 and was instrumental in reducing contaminant concentrations and risk of exposure at Property A. Significant costs have been incurred by ADEQ during characterization of the Site and implementation of the ERA. The total recoverable costs associated with site activities is \$1,184,035.48.

5.2 Future Costs

The estimated life cycle costs for the Selected Remedy and contingencies are in Table 2 below.

Table 2 – Selected Remedy Cost Summary

Year	Description	Cost
1	Installation of SVE at Property B, SVE O&M at Property A, Annual Monitoring, Contingency A and D	\$426,884
2	SVE O&M, Annual GW and SG Monitoring, Contingency D and G	\$252,104
3	SVE O&M, Annual GW and SG Monitoring, Contingency B, E, G, and H	\$234,314
4	SVE O&M, Annual GW and SG Monitoring, Contingency H	\$200,607
5	SVE O&M, Annual GW and SG Monitoring, Site Closure Activities, Contingency C and F	\$544,279
TOTAL COST INCLUDING CONTINGENCIES AFTER 5 YEARS		\$1,658,188
Additional Five-Year O&M Contingency Description		
6	SVE O&M, Annual GW and SG Monitoring, Contingency D and I	\$269,519
7	SVE O&M, Annual GW and SG Monitoring, Contingency B and E	\$245,424
8	SVE O&M, Annual GW and SG Monitoring	\$220,158
9	SVE O&M, Annual GW and SG Monitoring	\$226,763
10	SVE O&M, Annual GW and SG Monitoring, Site Closure Activities (from Year 5)	\$233,565
TOTAL COSTS INCLUDING ALL CONTINGENCIES AFTER 10 YEARS		\$2,853,616
Contingencies Description		Cost
A	Property A – One Additional SVE Well	\$11,125
B	Property A – Additional Optimization, Rebound Sampling, Reporting	\$31,356
C	Property A – Institutional Control	\$10,730
D	Property B – Five Additional SVE and Five Additional Soil-Gas Monitoring Probes	\$150,000
E	Property B – Additional Optimization, Rebound Sampling, Reporting	\$32,000
F	Property B – Institutional Control	\$10,730
G	Two Indoor Air Quality Sampling Events and Reporting	\$15,450
H	Two Residential Sub-Slab Depressurization System (Vapor Intrusion Mitigation System)	\$10,000
I	Air Quality Permitting for Two SVE Systems	\$32,000
<u>Notes:</u> Costs assumes inflation rate of 3% Soil vapor Extraction (SVE), Operations and Maintenance (O&M), Groundwater (GW), Soil-Gas (SG)		

6.0 CONCLUSIONS

ADEQ concludes that pursuant to ARS §49-287.04 and AAC 18-16-410, this ROD is the final administrative decision as defined under ARS §41-1092. The Selected Remedy meets the remedial action criteria as stipulated in ARS §49-282.06 and is therefore approved. Upon fulfillment of the ROs, remedial and monitoring activities will cease and all equipment associated with the Selected Remedy will be abandoned in accordance with ADWR requirements as stated in AAC 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 ARS §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 (NFA) in accordance with ARS §49-287.01(F) and (G).

7.0 REFERENCES

- Arizona Department of Environmental Quality (ADEQ), 2016. Preliminary Investigation Report. Stone Avenue and Grant Road, Tucson, Arizona. 29 February.
- ADEQ, 2017. Soil Vapor Sampling Guidance, 10 July 2008 revised 19 May 2011 and 21 April.
- ADEQ, 2019a. Remedial Objectives Report. Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 28 October.
- ADEQ, 2019b. Feasibility Study Work Plan. Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 30 October.
- ADEQ, 2020a. Feasibility Study, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 3 February.
- ADEQ, 2020b. Proposed Remedial Action Plan, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 27 February.
- Clear Creek Associates (CCA), 2019. Final Remedial Investigation Report, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 31 October.
- Geosyntec Consultants, Inc. (GCI), 2017a. Technical Memorandum Limited Soil Vapor Survey, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 28 April.
- GCI, 2017b. Technical Memorandum Vadose Zone Vertical Profiling, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 15 June.
- GCI, 2017c. Technical Memorandum Indoor Soil Vapor Extraction Well and Soil Vapor Point Installation, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 11 November.
- GCI, 2017d. Technical Memorandum Soil Vapor Extraction System Installation, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 15 December.
- GCI, 2018. Technical Memorandum Soil Vapor Extraction Operations and Rebound Evaluation, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 29 August.
- GCI, 2020. Technical Memorandum Soil Vapor Extraction Operations and Rebound Evaluation, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 7 February.
- Hydro Geo Chem (HGC), 2019. Technical Memorandum SVE-01 Pilot Test, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 15 November.
- HGC, 2020. Technical Memorandum Indoor Air Quality Sampling, Stone Avenue and Grant Road WQARF Site, Tucson, Arizona. 6 February.

FIGURES

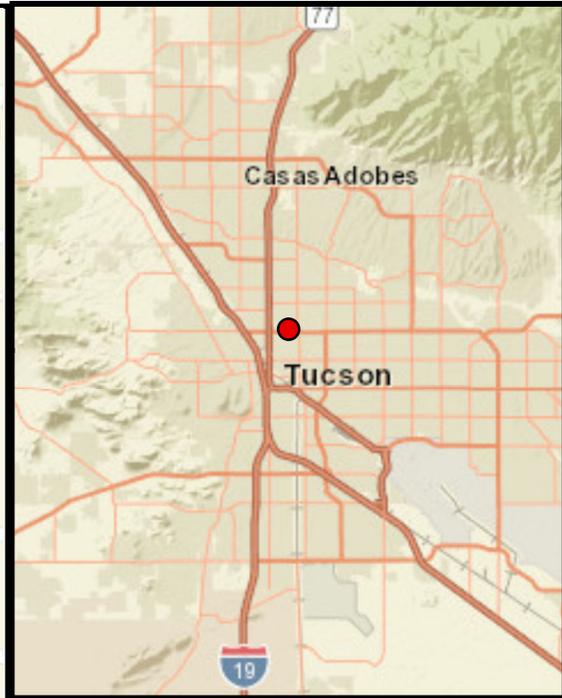
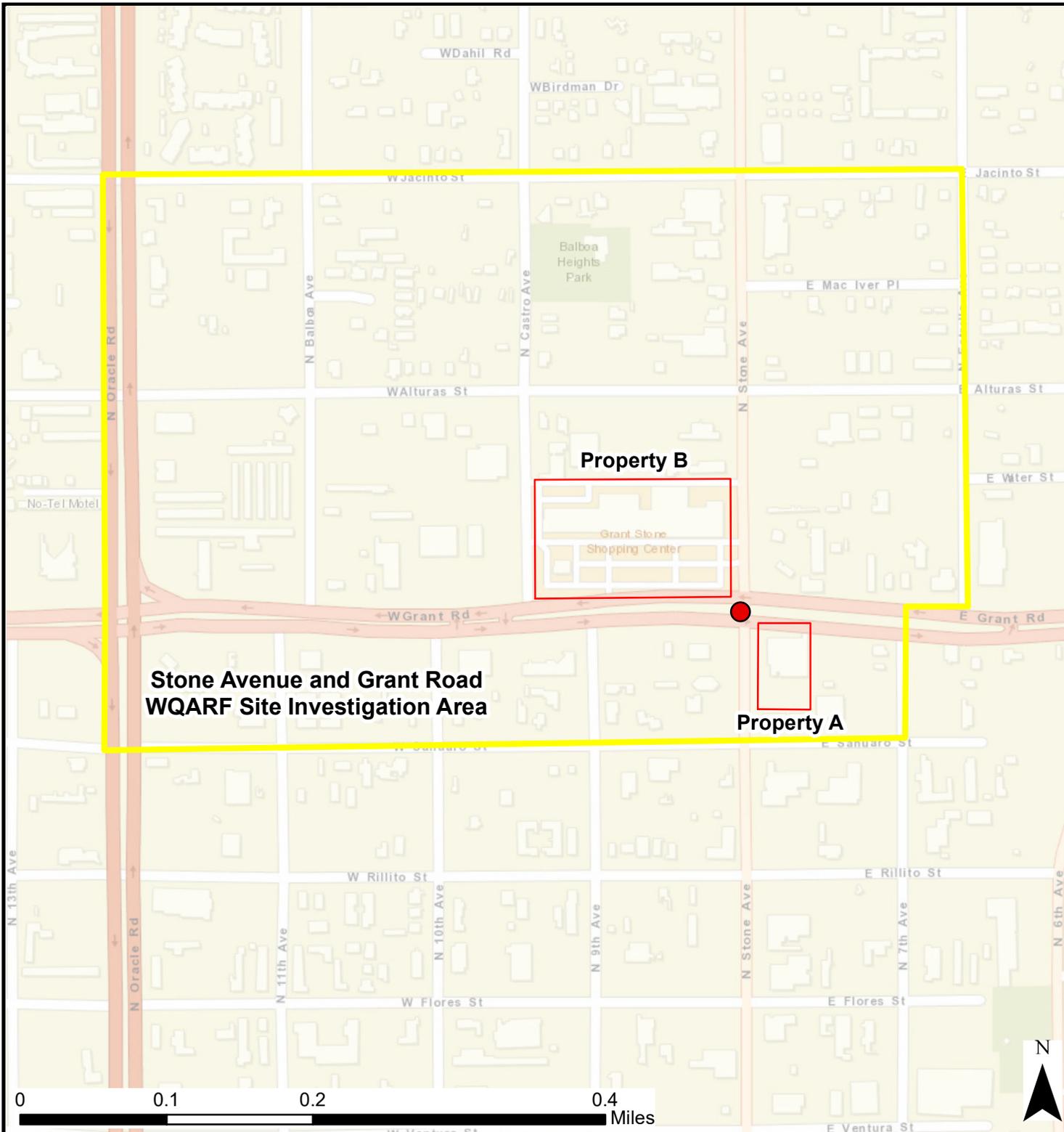


Figure 1

Site Location
Stone Avenue and Grant Road WQARF Site, Tucson, AZ

ADEQ
 Arizona Department of Environmental Quality



Legend

- Soil Vapor Extraction Well
- Soil Vapor Probe
- Piping
- Exterior Wall



Property A, SVE Layout

Stone & Grant WQARF Site
Tucson, Arizona

Geosyntec
consultants

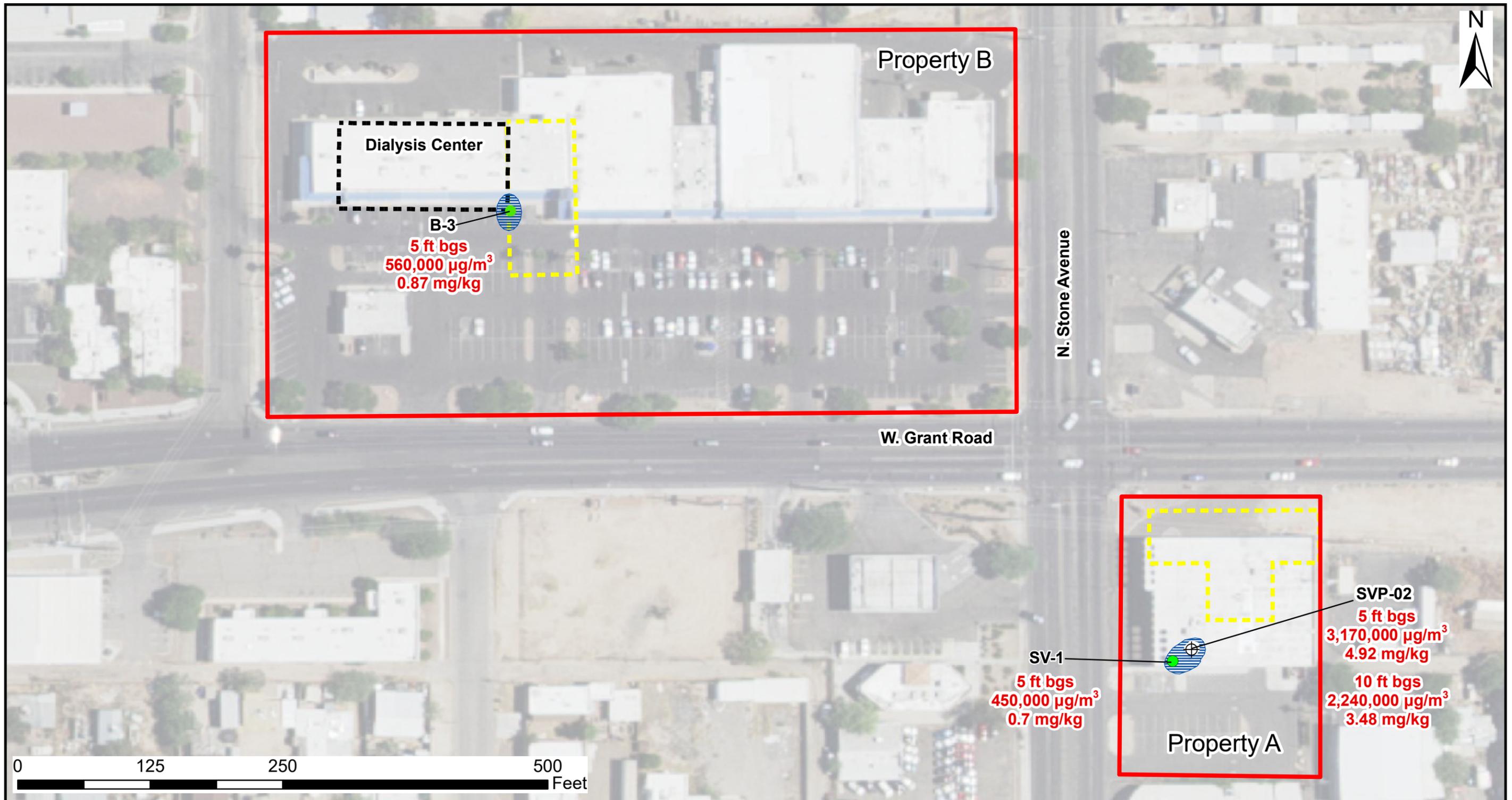


Figure

2

Phoenix, Arizona

February 2020



Legend

- Property Boundary
- Residential SRL Exceedance (Soil Equivalents) for PCE
- Sensitive Population
- Historic Dry Cleaner Locations
- Temporary Soil-Gas Sampling Location
- ⊕ Dedicated Soil-Gas Monitor

Figure 3
Soil Contamination
Stone Avenue and Grant Road WQARF Site
Tucson, Arizona



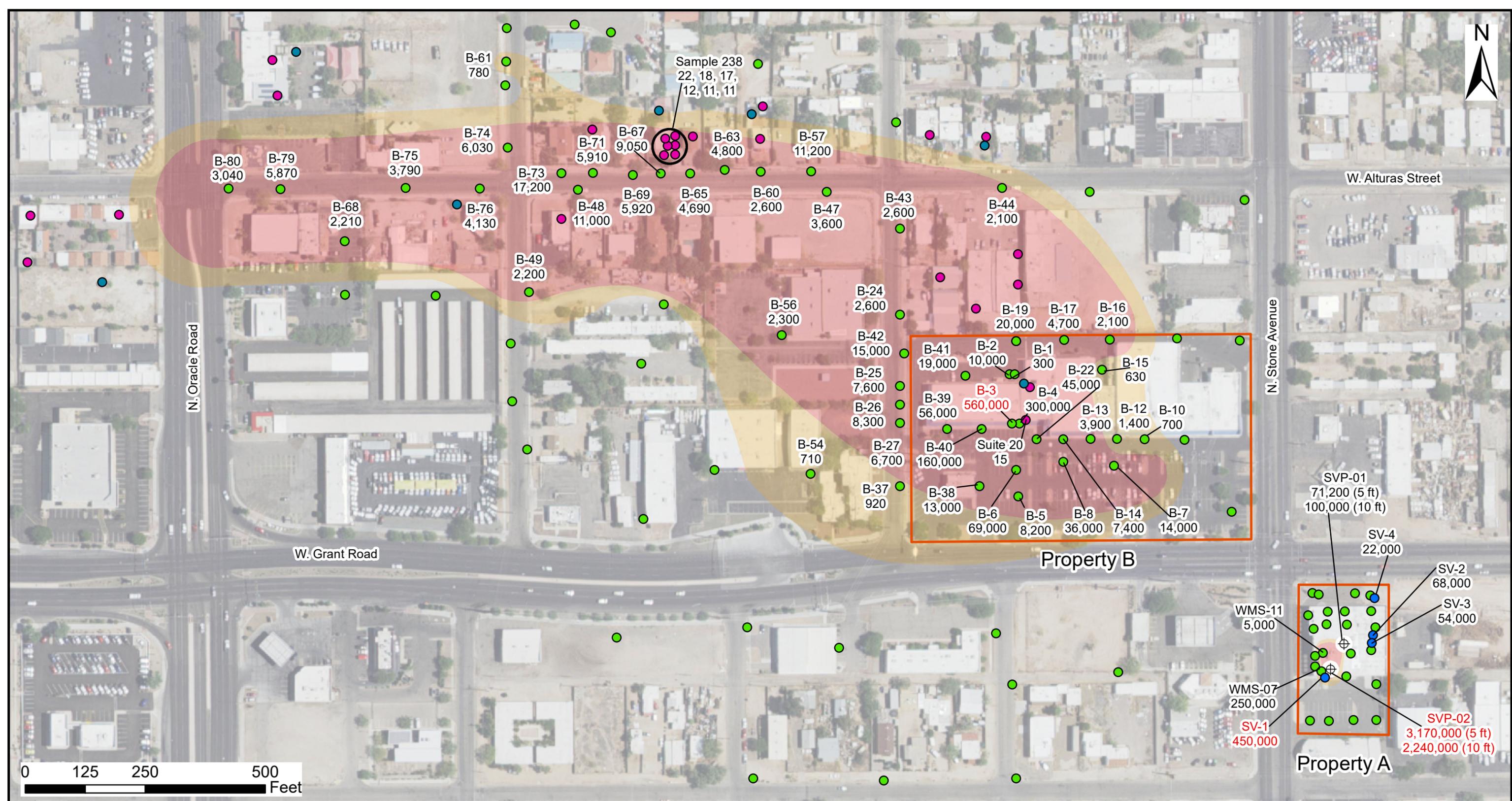
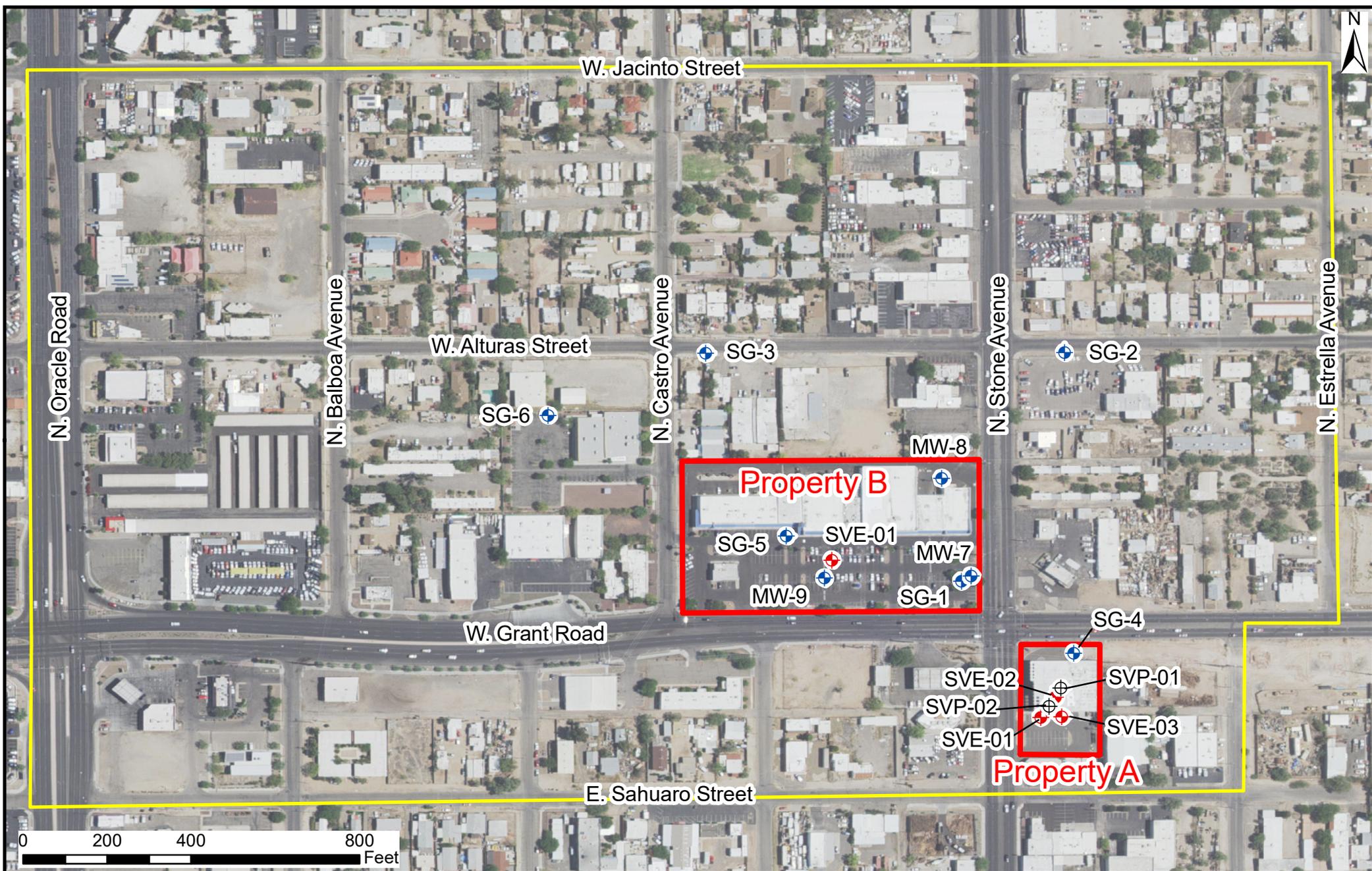


Figure 4

**Shallow Soil-Gas and Indoor Air Exceedances
Stone Avenue Grant Road WQARF Site
Tucson, Arizona**





Legend

- Site Investigation Area
- Property Boundary
- ⊕ Dedicated Soil-Gas Monitor for SVE system
- ⊕ Extraction Wells associated with SVE system or Pilot Test
- ⊕ Monitoring Wells (Shallow and Dual Nested) not associated with SVE systems

Figure 5
Monitoring Locations
Stone Avenue and Grant Road WQARF Site
Tucson, Arizona



APPENDIX A

RESPONSIVENESS SUMMARY

PROPOSED REMEDIAL ACTION PLAN COMMENTS

RESPONSIVENESS SUMMARY

In accordance with Arizona Administrative Code (AAC) R18-16-410(B)(2) and Arizona Revised Statute (ARS) §49-287.04(F), this comprehensive responsiveness summary has been prepared to identify and respond to all comments received on the Proposed Remedial Action Plan (PRAP) after the conclusion of the public comment period. A 90-day comment period for the PRAP was held starting on March 13, 2020 through June 11, 2020. ADEQ received one response letter containing written comments during the public comment period as follows:

1. City of Tucson, Tucson Water, June 10, 2020

All comments are summarized below with Arizona Department of Environmental Quality (ADEQ) responses. Copies of the letters follow the summaries and responses.

WRITTEN COMMENTS

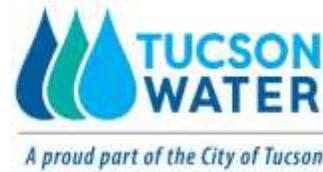
TUCSON WATER, CITY OF TUCSON

1. *The City of Tucson/ Tucson Water appreciates the opportunity to review and provide comment on the Proposed Remedial Action Plan (PRAP) for the Stone Avenue and Grant Road WQARF Site dated February 27, 2020.*

Tucson Water is confident the remedy presented in the PRAP will protect the perched and regional aquifer. Operation and monitoring of the soil vapor extraction (SVE) systems will remove the tetrachloroethene (PCE) in perched groundwater and prevent downward migration of PCE in soils. We also believe that continued monitoring of the regional aquifer is an important piece of the remedy, as it should reflect the effectiveness of the SVE system.

Should the SVE system not meet remedial objectives and PCE is found in regional groundwater, Tucson Water recommends a monitoring well be placed in the northwest area of the site near Oracle Road to determine downgradient extent of impacts. This is an area previously identified to contain data gaps concerning regional groundwater.

ADEQ Response: Thank you for your comment. In the event that tetrachloroethene (PCE) is discovered in the regional groundwater or in future perched groundwater (currently non-existent) at the Site, ADEQ will re-evaluate the remedy and amend the Record of Decision (ROD) pursuant to Arizona Administrative Code (AAC) R18-16-410(E) as necessary.



June 10, 2020

Ms. Gianna Trujillo
Remedial Projects Section
Arizona Department of Environmental Quality
400 W. Congress St. #433
Tucson, AZ 85701

Subject: Comments on the Proposed Remedial Action Plan (PRAP), Stone Avenue and Grant Road Water Quality Assurance Revolving Fund (WQARF) Site, Tucson, Arizona.

Dear Ms. Trujillo:

The City of Tucson/ Tucson Water appreciates the opportunity to review and provide comment on the Proposed Remedial Action Plan (PRAP) for the Stone Avenue and Grant Road WQARF Site dated February 27, 2020.

Tucson Water is confident the remedy presented in the PRAP will protect the perched and regional aquifer. Operation and monitoring of the soil vapor extraction (SVE) systems will remove the tetrachloroethene (PCE) in perched groundwater and prevent downward migration of PCE in soils. We also believe that continued monitoring of the regional aquifer is an important piece of the remedy, as it should reflect the effectiveness of the SVE system.

Should the SVE system not meet remedial objectives and PCE is found in regional groundwater, Tucson Water recommends a monitoring well be placed in the northwest area of the site near Oracle Road to determine downgradient extent of impacts. This is an area previously identified to contain data gaps concerning regional groundwater.

Should you need clarification on these comments, please contact Beth Scully at 520-837-2227, or Beth.Scully@tucsonaz.gov.

Sincerely,

Dee Korich
Chief Hydrologist
Tucson Water

Source Water Division • P.O. Box 27210 • Tucson, AZ 85726-7210
520.791.4331 • tucsonaz.gov/water

S:\WRM\HYDRO\WQARF Sites\Downtown Sites\7th and AZ Ave





CC:

Timothy Thomure, P.E., Director
John Kmiec, Deputy Director
Jeff Biggs, Administrator
Chris Avery, Chief Water Counsel
Molly Collins, Lead Hydrologist
Beth Scully, Lead Hydrologist

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