Final Report

Remedial Action Plan for the APS Grant Street Yard Former Manufactured Gas Plant, Phoenix, Arizona ADEQ VRP Site Code 504477-00

Prepared for

Arizona Public Service

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ch2m

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Voluntary Remediation Program Work Plan Checklist

Complete Shaded Areas and Submit with Work Plan

Site Name:	APS Grant Street Former MGP	VRP Site Code:	504477-00
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Reference	Summary of Statutory Requirement (please review all statutes in their entirety to ensure compliance)	Page(s) Where Addressed in Work Plan (write N/A if not applicable)	VRP Use Only
§49-175A.1	Summary of existing site characterization and assessment information; information regarding any remediation previously conducted; copies of referenced reports not previously submitted;	Sections 1.2 and 2.0, Pages 1-5 to 1-12 and 2-1 to 2-9	☐
§49-175A.2	If the site has not been characterized, a plan to conduct site characterization and a schedule for completion.	Not Applicable	☐
§49-175A.3.a	If site characterization is completed, a description of how the remediation will comply with §49-175B ("Work Plans") and how the completion of remediation will be verified. A schedule for completion must be included.	Section 6, Page 6-1 to 6-30 (Schedule in 6.7, page 6-30 and 6-31)	☐
§49-175A.3.b	If site characterization is completed, the work plan may provide for the remediation to be conducted in phases or tasks. A schedule for completion must be included.	Section 6.7, Page 6-30 and 6-31	☐
§49-175A.4	Schedule for submission of progress reports.	Section 6.6.3, Page 6-30	☐
§49-175A.5	A proposal for community involvement as prescribed by §49-176 ("Community Involvement Requirements")	Section 6.3.3, Page 6-8	☐
§49-175A.6	If known, a list of institutional or engineering controls necessary during remediation and after completion of the proposed remediation to control exposure to contaminants.	Not Applicable	☐
§49-175A.7	A proposal for monitoring during remediation and after the remediation if necessary to verify whether the approved remediation levels or controls have been attained and will be maintained.	Section 6.5.1 and 6.5.2, Pages 6-20 to 6-22	☐
§49-175A.8	A list of any permits or legal requirements known to apply to the work or already performed by the applicant.	Section 6.3.2, Pages 6-6 to 6-8	☐
§49-175A.9	If requested by the department, information regarding the financial capability of the applicant to conduct the work identified in the application. *(IF APPLICABLE)*	Section 6.1, Page 6-1	☐

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§49-175B	Remediation levels or controls for remediation conducted pursuant to this article shall be established in accordance with rules adopted pursuant to §49-282.06 unless one or more of the following applies: see §49-175B.1 through §49-175B.4, below.	Section 6.2, Pages 6-3 to 6-6	☐
§49-175B.1	The applicant demonstrates that remediation levels, institutional controls, or engineering controls for remediation of contaminated soil comply with §49-152 and the rules adopted.	Section 6.2, Pages 6-3 to 6-6	☐
§49-175B.2	The applicant demonstrates that remediation levels, institutional controls, or engineering controls for remediation of landfills or other facilities that contain materials that are not subject to §49-152 (i.e.: asbestos) do not exceed a cumulative excess lifetime cancer risk between $1X10^{-4}$ to $1X10^{-6}$, and a hazard index of no greater than 1.	Section 6.2, Pages 6-3 to 6-6	☐
§49-175B.3	The applicant demonstrates that on achieving remediation levels or controls for a source or potential source of contamination to a navigable water, the source of contamination will not cause or contribute to an exceedance of surface water quality standards, or if a permit is required pursuant to 33 United States Code §1342 for any discharge from the source, that any discharges from the source will comply with the permit.	Not Applicable	☐
§49-175B.4	The applicant demonstrates that, on achieving remediation levels or controls for a source of contamination to an aquifer, the source will not cause or contribute to an exceedance of aquifer water quality standards (AWQS) beyond the boundary of the facility where the source is located.	Section 4, Pages 4-1 to 4-5 and Section 6.2, Pages 6-3 to 6-6	☐
§49-175C	The VRP may waive any work plan requirement under this section that it determines to be unnecessary to make any of the determinations required under §49-177. *If any waivers are requested in the Work Plan or have been previously requested and approved by the VRP, cite them in the Work Plan, including a citation of the statute for which the waiver applies.*	Not Applicable	☐

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To support the prerequisites established by A.R.S. §49-177 and §49-180, the VRP expects certain documentation to accompany a Work Plan. The following provides a list of attachments/exhibits which are recommended for submittal with a Work Plan to provide the information required by the statutes.

Work Plan Information	Title of Figure/Table/Attachment/Exhibit Where Requested Information is Cited (write N/A if not applicable)	Figure/Table/ Attachment or Report Page Number (write N/A if not applicable)	VRP Use Only
Site Location Map *(topographic or aerial)*	Site Location Map	Figure 1-1	☐
Site Map *(to scale)*	Site Plan	Figure 1-2	☐
Historical Sampling Data Table	Tables of Historical Data in Tables Section	Tables 1-2 to 1-7 and 2-1 to 2-14	☐
Historical Sample Location Map (to scale)	Figure 1-5 (Previous Investigation Soil Sampling Locations), Figure 1-6 (Previous Investigation Soil Vapor Sampling Locations, Figure 2-1 (Pre-design Testing Boring Locations)	Figures 1-5,1-6, 2-1	☐
Proposed Sample Location Map (to scale)	Not Applicable - Samples will be collected from excavated areas based on SW-846 for sample frequency	Not Applicable	☐
Sampling and Analysis Plan (includes Field Sampling Plan & Quality Assurance Plan)	Section 6.5 Sampling and Analysis Procedures	Section 6.5, Pages 6-20 through 6-29	☐
Proposed Remediation System Location Map	Proposed Excavation Plan	Figure 6-1	☐
Proposed Remediation System Layout (Design Drawings)	Proposed Excavation Plan	Figure 6-1	☐
Schedule for Implementation of Project Activities* (Gantt Style Chart)	Section 6.7 Schedule	Section 6.7, Page 6-30	☐
*Project Activities are defined in A.R.S. §§49-175A.2 through 49-175A.4, and 49-176A.2 (Community Involvement).			
Proposed Language for Public Notification of Remediation (i.e.: example signage)	Section 6.3.3 Public Notice and Participation	Section 6.3.3, Page 6-8	☐
Plan for Investigative Derived Waste (IDW)	6.3.2 Regulatory Review and Permitting 6.4.8 Soil Segregating	Section 6.3.2, Pages 6-6 to 6-8 Section 6.4.8, Pages 6-15 to 6-18	☐
Evaluation of Remedial Alternatives (i.e: for Feasibility Study Work Plan)	Section 5 Feasibility Screening	Section 5, Pages 5-1 to 5-5	☐

DOES THE WORK PLAN PROPOSE IMPLEMENTING SITE-SPECIFIC REMEDIATION LEVELS?

Yes ☐ No ☑

DOES THE WORK PLAN PROPOSE EVALUATION OF BACKGROUND LEVELS?

Yes ☐ No ☑

NOTE: When reports are submitted which document any type of sampling activity, the submittal of Electronic Data per ADEQ's *Groundwater Data Submittal Guidance (V3.4)* is strongly recommended.

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Acronyms and Abbreviations

°C	degrees Celsius
µg/L	microgram(s) per liter
501/505 Property	501/505 South Second Avenue Manufactured Gas Plant
A.A.C.	Arizona Administrative Code
A.R.S.	Arizona Revised Statutes
ACM	asbestos-containing material
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
AHERA	Asbestos Hazard Emergency Response Act
APP	Aquifer Protection Program
APS	Arizona Public Service
AST	aboveground storage tank
ASTM	American Society of Testing and Materials
Atlantic	Atlantic Environmental Services, Inc.
AWQS	Aquifer Water Quality Standards
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CFR	*Code of Federal Regulations*
CH2M	CH2M HILL, Inc.
COC	contaminant of concern
COP	City of Phoenix
COPC	chemical of potential concern
CSM	conceptual site model
CWG	carbureted water gas
DEUR	Declaration of Environmental Use Restriction
DO	dissolved oxygen
DQO	data quality objective
EDR	Environmental Data Resources, Inc.
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
ERI	Environmental Response, Inc.
FID	flame ionization detector
f_{oc}	fraction of organic carbon

GC	gas chromatography
GPL	groundwater protection level
HASP	Health and Safety Plan
HHRA	human health risk assessment
HI	hazard index
HIVOL	high volume
HPLC	high-performance liquid chromatography
HQ	hazard quotient
IC	institutional control
LAU	Lower Alluvial Unit
LUST	leaking underground storage tank
K_H	Henry's Law Constant
K_{oc}	partition coefficient
MAU	Middle Alluvial Unit
MCL	maximum contaminant level
mg/kg	milligram(s) per kilogram
mg/kg-day	milligram(s) per kilogram per day
mg/L	milligram(s) per liter
MGP	manufactured gas plant
MS	mass spectrometry
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute for Occupational Safety and Health
ORP	oxidation-reduction potential
OU3	Operable Unit 3
OVA	organic vapor analyzer
OVM	organic vapor monitor
oz	ounce(s)
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCS	Petroleum-Contaminated Soil
PCP	pentachlorophenol
pg/kg	picograms per kilogram
PID	photoionization detection
POTW	publicly owned treatment works
PPE	personal protective equipment

PUF	polyurethane foam
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RAO	Remedial Action Objective
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act of 1976
RPD	relative percent difference
Site	Grant Street Site (331 West Grant Street, Phoenix, Arizona)
sq. ft.	square feet
SRL	soil remediation level
SSC	Site Safety Coordinator
SVOC	semivolatile organic compound
SVMW	soil vapor monitoring well
SWPPP	Stormwater Pollution Prevention Plan
TAT	turnaround time
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
TSDF	treatment, storage, and disposal facility
UAU	Upper Alluvial Unit
USACE	U.S. Army Corps of Engineers
USCS	Uniform Soil Classification System
UST	underground storage tank
VEPT	vapor extraction pilot test
VOC	volatile organic compound
VRP	Voluntary Remediation Program
WQARF	Water Quality Assurance Revolving Fund
WVB	West Van Buren

SECTION 1

Introduction

The Grant Street Site (Site) is owned by Arizona Public Service (APS). Settling ponds for byproducts, primarily lampblack, produced at the 501/505 South Second Avenue Manufactured Gas Plant (MGP; 501/505 Property) owned by APS were located at the Site from approximately 1917 until the 1930s.

The Site is located at 331 West Grant Street, Phoenix, Arizona, and occupies approximately 2 acres at the southwest corner of Grant Street and Montezuma Street. The Site is located in Maricopa County, Section 8, Township 1 North, Range 3 East of the Phoenix, Arizona U.S. Geological Survey 7.5-Minute Topographic Quadrangle. The Site is bounded on the north by Grant Street, on the west by Fourth Avenue, on the south by Sherman Street, and on the east by Montezuma Street.

A site location map is presented on Figure 1-1 (figures are located at the end of this document). Between 1973 and 2016, a two-story building with 52 apartments surrounding an interior courtyard was located at the Site. The apartment building was demolished in 2016 prior to the site investigation, and the site is currently vacant.

Based on the results of previous investigations, as summarized in this section, compounds related to former MGP operations have impacted subsurface soil, and the Site requires remedial activities. Additionally, other industrial activities, including wood preservation activities, have been located at the Site. The remediation goals are to reduce contaminant concentrations in the soil to levels below appropriate risk-based cleanup criteria and remove source material that could potentially impact the groundwater to the extent technically feasible.

The purpose of this Remedial Action Plan (RAP) is to summarize the evaluation of physical and analytical information collected at the Site and present the recommended alternatives for remediating the Site. APS is conducting the remediation activities under the Arizona Department of Environmental Quality's (ADEQ's) Voluntary Remediation Program (VRP). The VRP site code for the Site is 504477-00.

1.1 Grant Street Site History

The history of the Site, including MGP processes and waste and surrounding environmental issues, is described in this section.

1.1.1 Site History

Historical information about the subject property and adjacent properties was primarily obtained from the *Addendum to the Site Investigation Work Plan* (Atlantic Environmental Services, Inc. [Atlantic], 1990) and the *Amended Interim Remedial Action Plan at the Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona* (Amended Interim RAP; Brown and Caldwell, 2000). Site ownership information was provided by APS. Copies of the following Sanborn fire insurance maps and aerial photographs were obtained from Environmental Data Resources, Inc. (EDR) in December 2013 and are presented in Appendixes A and B, respectively:

- Sanborn Fire Insurance Maps – 1901, 1911, 1915, 1946, 1949, and 1968
- Aerial Photographs – 1930, 1937, 1949, 1958, 1961, 1964, 1973, 1979, 1989, 1992, 1997, 2005, 2007, and 2010

Additional aerial photographs from 1934, 1940, and 1954 were obtained from the *Final Focused Remedial Investigation Report, APS 501, 502 and 505 South 2nd Avenue Properties, Motorola 52nd Street Superfund Site, OU3* (AMEC, 2010). Table 1-1 (tables are located at the end of this document) presents a summary of the history of the Site, including operations discussed in this section and structures at the Site.

Atlantic reviewed Sanborn fire insurance maps, aerial photographs, and APS company records to develop an operational history of the Site. Sanborn maps (1901, 1911, and 1915) indicate that the site was undeveloped prior to 1915. According to APS company records, the Site was developed as a lampblack storage area in September 1917. The Site served as a lampblack storage area from 1917 until the early 1920s. Lampblack was separated and dried at the 501/505 Property, and excess lampblack was transported to the Site by horse and wagon. In the early 1920s, a pipeline to carry lampblack-water slurry from the 501/505 Property to the Site was constructed. Settling ponds were constructed at the Site as slurry containment and/or drying areas. In 1923, a 15,000-barrel (approximately 50,000-gallon) aboveground storage tank (AST) was constructed in the southwest corner of the site, and a pipeline was installed to transport oil to the 501/505 Property. The tank, pipelines, and settling ponds were used until MGP processes ceased at the 501/505 Property in early 1934 (Atlantic, 1990).

A 1930 aerial photograph obtained from EDR shows the outline of four to five settling basins along the east side of the Site, an excavated area or basin in the northwest corner of the Site, and a possible settling pond along the west-central side of the Site. The 1934 photograph shows apparent storage of waste material throughout the site, and the outline of the settling basins on the east side (AMEC, 2010). A portion of the site is visible on the 1940 photograph, which shows the excavated area/basin in the northwest corner and the settling basins along the east side of the Site (AMEC, 2010). A 1942 aerial photograph shows the outline of the four settling ponds, an excavated area in the northwest corner, the concrete foundation pad for the AST, and a smaller square lagoon and/or settling pond between the foundation pad and the excavated area (Atlantic, 1990).

The 1946 Sanborn map shows that the Site had been converted to a creosoting yard for utility poles. An AST for creosote storage was located in the area of the former oil AST. The 1949 aerial photograph obtained from EDR shows that the AST had been removed, and the excavated area/basin was still present in the northwest corner of the Site. A building was located on the east side of the Site. Table 1-1 summarizes the structures that were present at the Site based on the 1954 and 1958 aerial photographs.

The 1968 Sanborn map indicates that the Site had been converted to a pipe yard and supply area by this time. The creosote AST was no longer located at the site in 1968. Onsite structures shown in the 1968 map include a repair shop, several pipe storage sheds along Montezuma Street, a storage building on West Grant Street, and a small office building.

APS sold the property in 1971, and the Grant Park Apartments building, a two-story structure with 52 apartments surrounding an interior courtyard, was constructed in 1973. APS re-purchased the property on December 26, 2001, and subsequently donated the property to two non-profit organizations which formed the Grant Street Apartments, Inc. APS re-purchased the property in 2015 from Grant Street Apartments, Inc., which at that time was composed of The Greater Phoenix Urban League. In March and April 2016, APS demolished the apartment building and other aboveground fences and structures at the site. Concrete and asphalt ground cover and the foundation of the apartment buildings are still located at the Site, as shown on Figure 1-2.

Environmental investigations at the site, beginning in 1993, have found elevated concentrations of MGP-related compounds at the Site. Some of these compounds, primarily polynuclear aromatic hydrocarbons (PAHs), can also be related to wood treating operations involving creosote, which appeared to occur at the Site after MGP operations ceased. Figure 1-3 presents the approximate locations of known former structures and activities related to MGP operations at the Site. The location of former creosoting operations is not known, although the aboveground storage tank shown on Figure 1-3, or another tank located in the same area, appears to have been used to store creosote as discussed in Section 1.1.4.

1.1.2 Description of MGP Processes

This section presents the history of MGPs in the United States and a description of the processes that generated the byproducts placed in the settling ponds at the Site. The information in this section was

obtained from the Amended Interim RAP (Brown and Caldwell, 2000) and the *Remedial Action Plan for the APS Former Manufactured Gas Plant, 501 and 505 South 2nd Avenue, Phoenix, Arizona* (CH2M HILL, Inc. [CH2M], 2012).

The first uses of manufactured gas for lighting were reported in Philadelphia in 1796 and in Richmond, Virginia in 1803. Manufactured gas was produced by the following three primary processes:

- Coal carbonization (coal gas)
- Carbureted water gas (CWG)
- Oil gas

1.1.2.1 Coal Carbonization

The earliest MGPs used coal carbonization to produce gas. Coal gas was used exclusively from 1816 to 1875, when the CWG process was developed. Coal was used as a feedstock to produce gas in various types of retorts with coke generated as a byproduct. Based on historical records, coal gas was not associated with operations at the Site.

1.1.2.2 Carbureted Water Gas

The CWG process was used at the 501/505 Property until 1906, when the plant was converted to oil gas production. CWG involves the enhancement of water gas (blue gas) by spraying oil into the hot vessel that contains the water gas, thereby increasing the calorific value of the water gas. Blue gas was an abundant byproduct of the petroleum industry, which made CWG the most important manufactured gas process in the United States at the time.

The CWG process is intermittent, with alternating "blows" or blast periods and "runs" or gas-making periods. The typical CWG-generating equipment consisted of three brick-lined cylindrical steel vessels: the generator, the carburetor, and the superheater. During a blow, air is passed through an incandescent mass of coke or anthracite in the generator to form a producer gas that is high in carbon dioxide. This gas is burned by secondary air. The hot products of combustion heat the carburetor checkbrick and then pass from the top of the superheater to the stack. During a run, water gas is made in the generator and then passed into the top of the carburetor, where oil is sprayed. This mixture is passed down through the carburetor and up through the superheater. As it passes the hot checkbrick, the mixture is thermally cracked and fixed into gases. The CWG, a mixture of blue and oil gases, is passed from the top of the superheater through a water-sealed wash box, where the gas is initially cooled and some of the heavy tars are condensed and removed.

The gas is passed through additional condensers to cool it to ambient temperatures. Direct contact with water cools and scrubs the gas. The gas is then sent to a relief holder, which provides constant pressure for gas outflow to the purifying systems during blows and runs. Larger plants featured tar extractors, naphthalene scrubbers, and liquid purification systems to remove the bulk of the hydrogen sulfide prior to passing the gas through the dry purification systems. After hydrogen sulfide removal at these larger plants, the gas was metered and sent to the storage holders pending distribution to the customers. The Site was not in use at the time the CWG process was in operation at the 501/505 Property.

1.1.2.3 Oil Gas

The oil gas process was used at the 501/505 Property from 1906 through 1934 (CH2M, 2012). The oil gas process consists of thermocracking oil in a steam atmosphere. The generating equipment is similar to that used by CWG production: the generator was replaced by a vaporizer similar to the carburetor, filled with checkbrick, and equipped with an oil spray; the carburetor is replaced by a vaporizer followed by a superheater, as in the CWG process.

The process is cyclical and consisted of blows and runs. During a blow, oil is combusted in the vaporizers, and the products of combustion heat the checkbrick of the vaporizers and superheater, and then pass from the top of the superheater to the stack. During a run, oil is sprayed into the vaporizer in the absence of air and in the presence of steam. As the mixture passes the hot checkbrick, it is thermally cracked and fixed into

gases. During the run, the stack valve is closed and the oil gas passes to the wash box. The remainder of the process is the same as the CWG process. Waste products from the oil gas process at the 501/505 Property were managed at the Site.

1.1.3 Description of MGP Waste

The information in this section was obtained from the *Site Investigation Report for the 501/505 Property* (Atlantic, 1992) and from historical information available regarding MGP processes.

The process of manufacturing gas resulted in the production of residuals and byproducts. Because of changes in the production processes at the 501/505 Property, the classes of byproducts and residuals generated and the location of their generation, handling, and storage may have changed during the facility's operation.

The residual byproducts formed during the manufacture of oil gas were iron oxide purifier waste, light oils, tar, and lampblack. The light oils and tars were generally recovered during condensing or scrubbing operations.

Lampblack. The formation of large amounts of lampblack was unique to the oil gas processes. Lampblack resulted from the high temperature of the gas-making operation, and the amount of lampblack recovered depended on the manufacturing process used. In most plants, lampblack was regarded as a valuable byproduct and was the source of additional revenue or was used as fuel. Depending on the process, approximately 20 pounds of lampblack were formed for every 1,000 cubic feet of gas manufactured, with the majority of the lampblack removed from the gas stream in the wash box. The water from the wash box containing this lampblack in suspension passed through large overflow pipes. The chemical constituents of lampblack are primarily PAHs (Hayes et.al., 1996).

In addition to lampblack, the oil gas process also generated tar, fuel oil, and iron oxide purifier waste. Based on available information for the 501/505 Property and the Site, these wastes were not stored at the Site. However, the following provides a brief description of each:

- **Tar** – Tar would have been produced by oil gas processes and consisted of complex hydrocarbons that were removed from the gas stream immediately after generation during cooling, condensed during gas cooling in the relief holder, or removed during secondary purification. Chemical constituents of tar include volatile aromatic hydrocarbons and PAHs. The tar was primarily reused as a supplement to boiler fuels, although a small fraction was sold.
- **Fuel Oil** – Fuel oil was used as the primary feedstock material for the oil gas process. Oil was sprayed into the gas-generating apparatus and cracked into lighter hydrocarbon fractions during gas production. Various grades of fuel oil were probably used throughout the 501/505 plant's history, with increased use of heavy fuel oil or residual oils during peak production years.
- **Iron Oxide Purifier Waste** – Wood chips saturated with ferric hydrate were used to remove the hydrogen sulfide from the gas during the final purification process. Some tars or lampblack may also have been removed in the purifiers. It was necessary to periodically replace the wood chips as they became depleted or "spent." Constituents of interest include metals, sulfur, sulfates, cyanide compounds, and PAHs. The primary areas of interest associated with iron oxide purifier waste would be in the area of the former purifiers.

Based on historical information and previous investigations at the site, lampblack was the primary waste product handled at the Site. The lampblack was transferred to the Site from the 501/505 Property via a horse and wagon until the early 1920s, and was subsequently transferred via an underground pipeline as a slurry.

1.1.4 Other Industrial Operations at the Site

Based on the historical research summarized in the Work Plan, other industrial activities at the site under APS ownership include a creosoting yard for telegraph poles and a pipe storage yard (CH2M, 2015). During operation as a pipe storage yard, a repair shop was located on the eastern side of the Site. Based on a 1946 Sanborn Map, the Site appears to have operated as a creosoting yard for the treatment and preservation of telegraph poles with a creosote-storage AST located in the southwest corner of the Site. Creosote is derived from coal and has a similar chemical footprint to MGP-related waste, including lampblack.

Other forms of wood treatment and preservative compounds including pentachlorophenol (PCP) and aqueous-based metal salt solutions have also been used historically for wood treatment; however, available information does not indicate the use of these other methods at the Site. PCP became more widely used after 1950. Dioxins, furans, and phenols (including PCP) have been identified as potential contaminants of concern (COCs) associated with PCP treatment (U.S. Congress, Office of Technology Assessment, 1995). Aqueous-based metal salt solutions were beginning to be used in the late 1940s and early 1950s (Freeman et.al., 2003). The 1949 Sanborn map indicates that at that time the Site was being used as a pipe storage yard, and the AST is no longer present on the 1949 aerial photograph. Therefore, it does not appear that wood treatment was occurring at the Site after 1949.

1.1.5 Surrounding Environmental Issues

1.1.5.1 Superfund and Water Quality Assurance Revolving Fund Sites

The Site is located approximately 1/4-mile south of Operable Unit 3 (OU3) of the Motorola 52nd Street Superfund Site and approximately 1/4-mile south of the West Van Buren (WVB) Water Quality Assurance Revolving Fund (WQARF) site. COCs in these two areas are primarily chlorinated hydrocarbons that are not MGP-related compounds. The closed East Washington Fluff WQARF area is located approximately 3/4-mile southeast of the Site.

Additionally, a former APS-owned property, identified as the 320 West Lincoln Street Facility (located north of the Site), has been identified as a responsible party for the WVB site. The 320 West Lincoln Street Facility is also the former location of Southwest Solvents, a solvent recycler, and is currently owned by Maricopa County Materials Management. COCs in the WVB WQARF area include chlorinated compounds such as tetrachloroethene and trichloroethene, as well as chromium. A map showing the surrounding Superfund and WQARF sites is presented on Figure 1-4.

1.1.5.2 Records Search

The December 2013 EDR report included an environmental database search for the Site and the surrounding area. The only databases in which the Site was identified were the ADEQ VRP database and the EDR proprietary former MGP sites database. However, multiple surrounding properties within 1 mile of the Site were identified in several databases. Several sites were located within 1/8 to 1/4 mile of the Site. Sites identified include, but are not limited to, sites with corrective or cleanup actions, WQARF and Superfund sites, former dry cleaners, Resource Conservation and Recovery Act (RCRA) generators, leaking underground storage tanks (LUSTs), and registered underground storage tanks (USTs). The EDR report also included a Geocheck Physical Source Setting Summary identifying hydrogeologic conditions near the Site, including groundwater wells within 1 mile of the Site. Appendix C includes a copy of the entire EDR Report.

1.2 Review of Previous Investigations and HHRAs

Multiple site investigations and human health risk assessments (HHRAs) have been conducted at the Site since 1992. These investigations and HHRAs are summarized in this section. For additional detail, refer to the original reports.

1.2.1 Previous Site Investigations

Site investigations and historical research on previous activities at the Site began in 1990. The following site investigations have been performed at the Site:

- From September 1993 through June 1994, Geraghty and Miller conducted a two-phase investigation at the Site. The Phase I investigation included one surface soil sampling event, three indoor air sampling events, and a soil vapor survey. Phase II of the investigation included one subsurface soil sampling event, four additional indoor air sampling events, soil vapor surveys, and a vapor extraction pilot test (VEPT). A summary of the Phase I investigation is presented in *Summary of Phase I Investigation of the Former Grant Street Yard Site, Phoenix, Arizona* (Geraghty and Miller, 1993). The results and conclusions from the overall investigation (Phase I and Phase II) are presented in *Site Investigation, Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona* (Geraghty and Miller, 1994).
- In May and July 1998, Brown and Caldwell performed a two-phase site investigation that included the collection of subsurface and surface soil samples in the courtyard at the Site and the collection of additional indoor and outdoor air quality samples. The results and conclusions from this investigation are presented in the *Site Investigation Report at the Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, Volumes I and II* (Brown and Caldwell, 1998a).

In addition, the following additional evaluations and remedial activities associated with Site have been performed:

- In 1990, Atlantic prepared an addendum to a site investigation work plan for the 501/505 Property to address potential contamination at the Grant Street Site. The addendum includes a review of Sanborn fire insurance maps, aerial photographs, and APS company records for the Grant Street Site (Atlantic, 1990).
- In 1995, Geraghty and Miller performed VLEACH modeling to estimate leaching of benzene and benzo(a)pyrene from lampblack material in the subsurface below a portion of the Site. The results of the VLEACH modeling are presented in the *Vadose Zone Leaching Model, Former Grant Street Yard, Phoenix, Arizona* (Geraghty and Miller, 1995b).
- In 2001, Brown and Caldwell removed a lampblack pipeline that ran from the 501/505 Property along Grant Street to the Site. Piping and soil along the eastern half of the northern border of the Site was removed, and confirmation soil samples were collected. A summary of the removal activities and confirmation sampling is presented in the *Lincoln Street Lampblack Pipeline Removal Construction Report, Pinnacle West Capital Corporation, Phoenix, Arizona* (Brown and Caldwell, 2002a).
- From April 2003 through August 2003, Brown and Caldwell conducted a remedial action to prevent or restrict access to the shallow soil in the courtyard of the Site by placing a cap over the affected soil. The remedial action is described in the *Former Grant Street Yard, Amended Interim Remedial Action Plan Implementation Report* (Brown and Caldwell, 2004). Samples were not collected during the remedial action.

The site investigations and associated evaluations and remedial activities included evaluating the presence and extent of MGP-related compounds in soil and evaluating indoor and outdoor air quality to evaluate potential risks to residents and workers at the Site. For additional information on sampling rationales, methodologies, or results included in the initial and additional site investigations or remedial activities, refer to the original reports. The air quality evaluations were used in the HHRAs that are described in Section 1.2.2.

In December 1997, Chapter 7, Article 2 of the Arizona Administrative Code (A.A.C.) was amended to establish predetermined residential and nonresidential soil remediation levels (SRLs) to protect human health and the environment that were consistent with the methodology used by U.S. Environmental Protection Agency (EPA) and Region 9 EPA guidance for calculation of risk-based screening levels. ADEQ revised these SRLs, effective May 5, 2007. Some of the previous investigations occurred before SRLs were promulgated or used the 1997 SRLs for comparison during investigative activities. To ensure consistency, this section compares the results of previous investigations to the 2007 SRLs. Most of the compounds

identified in the 2007 SRLs as carcinogens include residential SRL values for both 1 x 10^{-5} and 1 x 10^{-6} excess lifetime cancer risks (ELCRs). The 1 x 10^{-5} risk value may be used during remediation to residential levels unless a future use of the site is a childcare facility or school where children below the age of 18 are reasonably expected to be in frequent, repeated contact with the soil.

The following sections present a general overview of each investigation and the specific results with respect to the Site.

1.2.1.1 Soil Investigations

Soil sampling was conducted during two prior investigations by Geraghty and Miller from 1993 to 1994 and by Brown and Caldwell in 1998. Additionally, sampling was conducted during the lampblack pipeline removal action (Brown and Caldwell, 2002a). Table 1-2 and Figure 1-5 present the locations of surface and subsurface soil samples that were collected during each of the previous investigations. Tables 1-3 through 1-6 summarize the analytical results for soil sampling activities conducted during each investigation. Table 1-7 summarizes the soil vapor analytical results. Appendix D presents available soil boring logs from previous investigations.

Each of the previous soil investigations evaluated the presence of MGP-related compounds in soil, including PAHs, total petroleum hydrocarbons (TPH), and benzene, toluene, ethylbenzene, and xylenes (BTEX). The investigations and Site activities have included soil vapor surveys, soil vapor extraction pilot testing, surface and subsurface soil sampling, vapor diffusion modeling, and a vadose zone leaching simulation using VLEACH modeling techniques. The following paragraphs briefly describe the scope and the results of each investigation and associated activities. Tables 1-3 through 1-7 present the analytical results for PAHs, TPH, volatile organic compounds (VOCs), and RCRA metals from previous soil investigations at the Site.

1993 – 1994 Site Investigation - Geraghty and Miller

Surface Soil Sampling

In September 1993, eight surface samples (less than 0.5 foot below ground surface [bgs]) were collected at the Site. Additionally, two surface samples were collected approximately three blocks southeast and southwest of the Site to establish background concentrations. Four of the surface samples were collected within the courtyard and four were collected around the perimeter of the Site. The locations of the eight onsite surface samples are presented on Figure 1-5. The samples were analyzed for PAHs, BTEX, total cyanide, and metals. As presented in Table 1-3, two samples (SS-5 and SS-8) exceeded residential and/or non-residential SRLs for benzo(a)pyrene. Cyanide and BTEX compounds were not detected in any of the onsite samples. No metals were detected above residential SRLs.

Subsurface Soil Sampling

In December 1993, February 1994, and March 1994, subsurface soil samples were collected from seven soil borings in the parking lots surrounding the apartment building at depths ranging from 15 to 60 feet bgs. Additionally, in December 1993, four shallow soil borings were advanced in the courtyard to a maximum depth of 7 feet bgs. Samples from the soil borings were analyzed for PAHs, BTEX, TPH, metals, and total cyanide. In January 1994, additional shallow subsurface soil samples were collected at depths of up to 5 feet in the northeast corner of the courtyard and the northeast portion of the Site and analyzed for TPH.

Residential and nonresidential SRLs for PAHs were exceeded at sample location HA3 in the northeast corner of the courtyard at a depth of 8 feet. A sample was also collected at this location from 4 feet bgs; however, the minimum detection limit in this sample was above the residential SRLs for PAHs.

Six PAHs were detected above residential SRLs in three of the deep soil borings (GB-3, GB-4, and GB-5). Two PAHs were detected above nonresidential SRLs in the same three borings. The highest concentrations were observed in the sample collected from 5 to 7 feet bgs in GB-3 in the northeast corner of the Site, an area reported to contain lampblack material (Geraghty and Miller, 1994). The sample from GB-3 at 28 feet bgs also contained the PAHs benzo(a)pyrene and indeno(1,2,3-cd)pyrene above residential and/or

nonresidential SRLs. GB-4 and GB-5 are located at the north end and northwest corner of the Site, respectively. Table 1-3 presents the PAH analytical results for previous soil sampling activities.

TPH was detected in 31 samples collected from 11 different locations during the site investigation. The maximum concentration of total TPH was 179,000 mg/kg in boring GB-3 at a depth of 7 feet. TPH was detected in GB-3 at depths of up to 60 feet (10 mg/kg). Additionally, boring DH-5 had total TPH concentrations of 163,400 mg/kg at 5 feet bgs, and HA3 had concentrations of 14,500 mg/kg at 8 feet bgs. All three sampling locations are in the northeast portion of the Site. Only HA3 is within the courtyard. There is no SRL for TPH. Table 1-4 presents the TPH analytical results for previous soil sampling activities.

Benzene, toluene, and xylenes were all detected above the residential and nonresidential SRLs in the sample from 7 feet bgs in boring GB-3. Metals did not exceed SRLs in any samples. Table 1-5 presents the VOC analytical results (BTEX only) and Table 1-6 presents the total metals analytical results for previous soil sampling activities (Geraghty and Miller, 1994).

Soil Vapor Sampling

Three soil vapor (also referred to as soil gas) surveys were conducted at the Site (October 1993, December 1993, and January 1994) and the results were used to evaluate the potential influence of soil vapor on indoor air quality. Soil vapor sample locations are presented on Figure 1-6, and analytical results are presented in Table 1-7. During the October 1993 sampling event, 14 soil vapor samples were collected at 3.5 feet bgs at locations throughout the Site and analyzed for BTEX. None of the samples exhibited concentrations above the laboratory detection limit of 0.5 microgram per liter (µg/L). In December 1993, 13 additional samples were collected at 3.5 feet bgs near the original locations. These samples were analyzed for benzene and toluene with a detection limit of 0.25 µg/L. None of the samples exhibited detectable concentrations.

A third soil vapor survey conducted in January 1994 included 17 additional samples, primarily in the northeast corner of the Site. Samples were collected from 3 and 6 feet bgs and analyzed for BTEX, with a laboratory detection limit of 0.02 µg/L. Eleven of the samples had detections of BTEX compounds at concentrations of up to 1,100 µg/L (benzene in SG-27) (Geraghty and Miller, 1994).

Vapor Extraction Pilot Test

A VEPT was conducted during the site investigation to provide site-specific information to evaluate the need for and feasibility of implementing a full-scale soil vapor extraction system, confirm the soil-vapor results, and verify that the lampblack material encountered in the subsurface does not pose a health risk to residents of the Site (Geraghty and Miller, 1994). Seven vapor extraction and monitor wells were installed adjacent to and around the northeastern portion of the existing apartment building complex. During the installation of the wells, soil samples were collected from four of the borings at depths of up to 10 feet and analyzed for TPH and BTEX. TPH was detected in all samples, with the maximum total TPH concentration of 158,000 mg/kg observed at 6.5 feet bgs in boring MP-2. Additionally, benzene was detected in the same sample at a concentration of 94 mg/kg, exceeding the residential and nonresidential SRLs of 0.65 and 1.4 mg/kg, respectively. Analytical results for TPH and BTEX are provided in Tables 1-4 and 1-5, respectively.

The soil vapor extraction pilot test indicated that the soil has low permeability, based on the low extraction flow rates and poor vacuum response. In addition, because of the presence of a high percentage of organic carbon (lampblack in the subsurface), volatile hydrocarbons such as benzene would adsorb to the organic carbon and would not readily partition into the vapor phase. Based on the poor performance of the pilot test, a full-scale soil vapor extraction system was determined not to be a viable remedial option (Geraghty and Miller, 1994).

1995 Vapor Diffusion Modeling – Geraghty and Miller

A vapor diffusion model was prepared in 1995 using the soil vapor data from the 1993–1994 site investigation. The vapor diffusion model was used to estimate the flux of vapor-phase constituents from the

soil into the apartments. Based on the results of the modeling, Geraghty and Miller concluded that the former MGP byproduct storage area was unlikely to have been the source of the BTEX detected in indoor air samples collected from inside several apartments (Geraghty and Miller, 1995a). Based on the analytical results of the soil vapor samples collected from 3 feet bgs and 6 feet bgs (within the lampblack material) and vapor diffusion modeling, the soil vapor containing detectable concentrations of BTEX was confined to the samples collected from approximately 6 feet bgs and was not migrating from deeper zones toward the surface (Geraghty and Miller, 1995a).

1998 Two-Phase Site Investigation – Brown and Caldwell

In May and July 1998, Brown and Caldwell conducted two phases of a site investigation that included surface and shallow subsurface soil samples (Brown and Caldwell, 1998a). The objectives of this site investigation were to assess shallow soil in the courtyard for PAHs and collect additional surface soil samples to assess PAH concentrations in high-use areas of the Site. A total of 89 soil samples were collected from 45 locations at depths of up to 1.5 feet. Three of the samples were collected outside the courtyard area in the southwest and northeast areas of the Site. Forty-eight samples exceeded residential SRLs and 37 samples exceeded nonresidential SRLs for at least 1 PAH compound. The five PAH compounds that were detected in at least one sample above residential SRLs included benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene as presented in Table 1-3. The two samples collected in the southwest corner of the Site (near the area of the former AST) did not exceed SRLs for any PAH compounds.

Twelve of the 20 samples analyzed for TPH exhibited detectable concentrations of total TPH, as shown in Table 1-4. The highest concentration of TPH of 18,000 mg/kg was detected in GY-14 at 0.5 foot bgs. The sample from 1.5 feet bgs from this same location did not have detectable levels of TPH. TPH analytical results are presented in Table 1-4.

2001 Lampblack Pipeline Removal – Brown and Caldwell

From March through May 2001, Brown and Caldwell removed 1,250 feet of lampblack pipeline, its contents, and surrounding soil impacted by lampblack material (Brown and Caldwell, 2002a). The lampblack pipeline extended from the 501/505 Property to the Site. Approximately three verification soil samples were collected every 20 linear feet of trenching/pipeline removal and analyzed for PAHs and TPH. Analytical results were compared to residential SRLs in place at the time. Ten verification soil samples were collected on the eastern half of the northern border of the Site during removal activities as presented on Figure 1-5. None of the samples had detectable concentrations of PAHs or TPH.

1.2.1.2 Ambient Air Evaluations

1993 – 1994 Site Investigation

Seven air sampling events were conducted at the Site to investigate indoor air quality during the first site investigation. Geraghty and Miller conducted the first air sampling event in September 1993 and Muranko & Associates conducted all subsequent air sampling events (Geraghty and Miller, 1994). Air sampling was performed as follows:

- The first indoor air sampling event was conducted in September 1993. Air samples were collected in the six first floor apartments. In addition, several quality control (QC) samples were collected at outdoor and offsite locations. Samples were analyzed for BTEX and PAHs.
- The second indoor air sampling event was conducted in October 1993 to confirm the results of the first sampling event.
- The third indoor air sampling event was conducted in late October 1993 to further evaluate BTEX levels detected in the apartments during the two previous sampling events.
- The fourth indoor air sampling event was conducted in December 1993 to evaluate the air quality throughout the apartment complex, including second floor apartments, and seasonal trends in air

quality. Air samples were collected from 33 apartments, 11 outdoor locations onsite, and two offsite locations (St. Andrews rectory kitchen and courtyard) and analyzed for benzene and toluene.

- The fifth air sampling event was conducted in January 1994. Air samples were collected from eight apartments, five outdoor locations onsite, and two offsite locations (St. Andrews rectory kitchen and courtyard) and analyzed for benzene and toluene.
- The sixth air sampling event was conducted in February 1994. Air samples were collected from the same locations as the samples collected during the January 1994 sampling event (fifth sampling event) and analyzed for benzene and toluene.
- The seventh air sampling event was conducted in June 1994. Air samples were collected from 10 apartments, four onsite outdoor locations, and one offsite outdoor location adjacent to St. Anthony's rectory courtyard and analyzed for benzene and toluene.

During select sampling events, benzene, toluene, and xylenes were present in the apartments at higher concentrations than those observed in onsite and offsite outdoor samples (Geraghty and Miller, 1994). The samples collected during the first air sampling event were also analyzed for PAHs, and all results were nondetect for PAHs. However, as described in the previous section, based on the results of vapor diffusion modeling, Geraghty and Miller concluded that the former MGP byproduct storage area was unlikely to have been the source of the BTEX detected in indoor air samples collected from inside several apartments (Geraghty and Miller, 1995a). For additional detail on the indoor air evaluation, see the 1994 Site Investigation Report (Geraghty and Miller, 1994).

1998 Site Investigation

Brown and Caldwell collected additional air samples inside representative apartments throughout the complex in July 1998 (Brown and Caldwell, 1998a). Two outdoor air samples were also collected at the Site. Two samples were collected at each sampling location. One sample was analyzed using EPA Method TO-3 for comparison with previous air sampling results. The second sample was analyzed using EPA Method TO-14 to allow detection of MGP-related compounds at a lower concentration and to identify other chemicals that may be present and were associated with urban environments. BTEX and 1,2,4-trimethylbenzene were identified as compounds that may be associated with MGP activities. Each of these compounds was detected in the samples. However, the concentrations of these compounds in indoor air samples and outdoor samples were considered to be comparable (Brown and Caldwell, 1998a). Only the samples analyzed with EPA Method TO-14 were evaluated because of irregularities identified with the TO-3 results during data validation that rendered the data unusable. Additional compounds, including chlorinated hydrocarbons, were detected in the indoor and outdoor air samples; however, these compounds were not identified as potentially being associated with former MGP activities.

1.2.1.3 Remedial Activities

From April through August 2003, Brown and Caldwell conducted a remedial action to prevent or restrict access to the shallow soil in the courtyard of the Site (Brown and Caldwell, 2004). The remedial approach involved placing a cap over all exposed soil within the courtyard area and relocation of all underground utilities to above ground. The cap was designed in a manner that prevents human contact with native soil and enhances the aesthetic appearance and livability for the apartment residents. A concrete cap was installed on the northern half of the property and a soil cap was placed over the southern portion of the courtyard. Underground utilities (water supply and heating/cooling lines) present beneath courtyard soil were rerouted onto the apartment complex roof to eliminate the need to access shallow or deeper impacted soil during maintenance activities in the courtyard. The soil cap in the southeast portion of the courtyard was constructed by installing a geomembrane isolation barrier over the impacted soil, covered with 6 inches of clean top soil, and planted with turf. The southwest portion of the courtyard was prepared the same as the southeast portion with the addition of the concrete pad used to install the playground structure. The concrete cap was used in the northern half of the courtyard to limit infiltration and provide a

substantial physical barrier to areas where elevated concentrations of MGP-related compounds are present. In addition, a restriction was attached to the deed that prohibited property owners and residents from disturbing the cap or excavating soil on the property.

1.2.2 Human Health Risk Assessments

The HHRAs that have been conducted at the site include the following:

- In 1992, Geraghty and Miller conducted a preliminary health assessment study to determine if past industrial uses currently pose a health risk to building residents or neighbors based on potential exposure pathways at the Site (Geraghty and Miller, 1992).
- In 1994, Geraghty and Miller performed a risk assessment for the Site to evaluate the potential threat to human health for constituents detected in soil and soil vapor at the Site based on the results of the 1993 and 1994 subsurface investigations (Geraghty and Miller, 1995a).
- In 1996, Arizona Department of Health Services (ADHS) conducted a health assessment for the Grant Park Neighborhood in response to public health concerns from the Grant Street Neighborhood Area (ADHS, 1996).
- In 1998, Brown and Caldwell conducted an HHRA for the Site to evaluate the potential risk to apartment residents or workers from exposure to MGP-related compounds that had been detected at the Site. This HHRA incorporated soil and soil vapor data collected in 1998 at the Site (Brown and Caldwell, 1998b). An addendum to this report was prepared in March 2002 to reevaluate the impact on the 1998 risk conclusions based on a proposed revision to EPA dermal absorption levels for MGP-related chemicals (Brown and Caldwell, 2002b).
- In May 2002, Brown and Caldwell prepared a Revised Risk Assessment Report to combine the information in previous risk assessments and present additional risk estimates for potential exposures to chemicals associated with historical MGP activities at Site (Brown and Caldwell, 2002c).

The risk posed to residents by the MGP-related compounds in the soil at the Site were evaluated in preliminary risk assessments performed by Geraghty and Miller in 1992 and 1995, and by the ADHS Office of Environmental Health in 1996. Additionally, Brown and Caldwell performed an updated Risk Assessment using the 1998 soil analytical data. The results of each of these assessments are summarized in the Amended Interim Remedial Action Plan (Brown and Caldwell, 2000) and presented below.

1.2.3 1992 Preliminary Health Assessment Study – Geraghty and Miller

A preliminary health assessment study was conducted in 1992 by Geraghty and Miller. At the time of the study, no environmental data had been collected at the Site. The study used data from a comparable former MGP site in the southwestern United States to identify potential chemicals of potential concern (COPCs) that may be present at the Site. Based on Site observations and data from the other former MGP site, the report concluded that exposure to soil containing lampblack, oil, or creosote would not be expected to occur and that there were no unacceptable MGP-related risks associated with this Site under the observed conditions. In addition, any possible exposure to the constituents would occur only if future subgrade construction were undertaken at the Site. Therefore, the study evaluated the potential exposure to a construction worker and concluded that the lifetime cancer risks were within EPA's guidance risk range of 1×10^{-4} (1 in 10,000) to 1×10^{-6} (1 in 1,000,000 and non-carcinogenic hazard index of less than the EPA guidance level of 1 (Geraghty and Miller, 1992).

1.2.4 1995 Risk Assessment – Geraghty and Miller

A deterministic risk assessment was conducted in 1995 using the air sampling results, soil vapor surveys, and the subsurface investigations conducted at the Site from September 1993 through February 1994. Based on these data, this risk assessment concluded that no remedial action was necessary for the property's current use (Geraghty and Miller, 1995a). ADHS reviewed the risk assessment and concluded in a letter regarding

the review of the risk assessment for the Former Grant Street Yard (ADHS, 1995) that "*The exposure assessment, toxicity assessment, and risk characterization presented in the document are generally in accordance with current risk assessment guidance. The document generally supports the conclusion that exposure to hydrocarbons in soil, soil gas, and air at the site are unlikely to result in adverse health effects.*"

1.2.5 1996 Health Assessment – ADHS

In 1996, the ADHS conducted an epidemiologic review of mortality rates in the census tract that included the Grant Park Apartments. The review was conducted based on concerns expressed by the residents of the Grant Park Apartments to the ADHS. The residents were concerned that the lampblack in the area and the overhead power lines located adjacent to the apartment complex caused an increase in the occurrence of cancer, heart disease, congenital anomalies, leukemia, or other illnesses. The results of the study indicated there was no statistically significant increase in age-specific mortality rates when compared to similar residential areas in Maricopa County (ADHS, 1996).

1.2.6 1998 Additional Risk Assessment – Brown and Caldwell

Based on the results of the additional courtyard soil characterization conducted in 1988, an additional risk assessment was performed using probabilistic techniques by Brown and Caldwell, dated October 14, 1998. The assessment focused on the risk to human health posed by exposure to soil from surface to 3 feet bgs and exposure to soil below 3 feet bgs. Based on the results of the risk calculations for the surface to 3 feet bgs soil interval, and the assumptions for potential receptors at the Site, a resident or maintenance worker at the Grant Street Apartments had no measurably greater risk of cancer than a person who did not live at the Site. It was also determined that chronic exposure to soil below 3 feet bgs may pose a potential human health concern because of elevated concentrations of the MGP-related compounds (Brown and Caldwell, 1998b).

1.2.7 2002 Revised Risk Assessment – Brown and Caldwell

The Revised Risk Assessment (Brown and Caldwell, 2002c) combined the information in previous risk assessments and presented additional risk estimates for potential exposures to chemicals associated with MGP activities at the Site. The risk assessment determined that the calculation of risk for the Site and the previous risk assessments are valid and represent the most realistic evaluation of the potential risk to the residents and workers at the Site. All cumulative individual cancer risks fell within the target acceptable risk range adopted by ADEQ. The risks associated with soil were calculated assuming exposure in the upper 3 feet of soil.

1.3 Building Demolition and Disposal

The two-story apartment building at the site was demolished in 2016. Demolition activities began on October 13, 2015 and were completed on April 6, 2016. Activities included:

- Utility survey
- Hazardous materials survey
- Demolition permitting
- Asbestos abatement
- Utility disconnect
- Building demolition and material disposal

1.3.1 Utility Survey

In preparation for the remedial actions at the site, a utility survey was conducted by AZTEC Engineering Group, Inc. (AZTEC). AZTEC contacted all known utility owners within the area of the project site to obtain utility location information. AZTEC located utilities in the area using electronic locating equipment and plans provided by the utilities. The located utilities were marked using color coding per the Arizona Blue Stake

system. The utility marks were surveyed using Arizona state plane coordinates. This utility survey is further described in Section 2.1.

1.3.2 Hazardous Material Survey

Prior to demolition, Hutzel & Associates, Inc. (Hutzel) conducted a comprehensive asbestos, lead paint, polychlorinated biphenyl (PCB), mercury, and hazardous materials survey of the apartment building. This survey was conducted from October 13 through October 20, 2015 by Asbestos Hazard Emergency Response Act (AHERA)-certified inspectors (Hutzel, 2015). The purpose of the survey was to identify asbestos containing materials, lead paint, PCBs, mercury, and hazardous materials prior to demolition activities.

Asbestos-containing materials (ACMs) identified during this survey included ceiling sprayed-on texture, floor mastic (black), roofing materials, cinder block wall expansion joint caulk, and stove flue seam tape. Lead was detected in several paints including the off-white paint on cinder block walls, blue handicap parking lot paint, brown exterior door frame paint, yellow parking lot stripes, and apartment unit door numbers. Mercury containing items identified included 12 4-foot fluorescent tube light bulbs, and 25 compact fluorescent light bulbs. No mercury thermostats or thermometers were observed. PCBs were not detected in two materials suspected of containing PCBs. No other hazardous materials were identified at the property during this survey. The results of the survey are included in Appendix E.

1.3.3 Demolition Permitting

A demolition permit was obtained from the City of Phoenix for the asbestos abatement and demolition of the apartment buildings. The demolition permit was issued to demolition contractor, Environmental Response, Inc. (ERI) on March 11, 2016 and was satisfactorily closed on April 11, 2016. A copy of the original and closed permit is included in Appendix E.

Appropriate National Emission Standards for Hazardous Air Pollutant (NESHAP) notifications were filed with the Maricopa County Air Quality Department (MCAQD) prior to both asbestos abatement and building demolition. Copies of these notifications are presented in Appendix E.

On December 23, 2015 during the asbestos abatement activities MCAQD conducted an inspection at the site. No violations were noted during the inspection. A copy of the inspection report is included in Appendix E.

1.3.4 Asbestos Abatement

Asbestos abatement and hazardous materials removal were completed by Spray Systems Environmental (SSE) and between December 7, 2015 and January 29, 2016 (Hutzel, 2016). The abatement included approximately 20,000 square feet (sq. ft.) of sprayed-on ceiling acoustical texture, 25,000 sq. ft. of black floor mastic, 13,000 sq. ft. of roofing material, 100 sq. ft. of expansion joint caulk, and 150 sq. ft. of flue tape. All ACM was adequately wetted and placed in properly labeled and placarded double-polyethylene-lined, leak-tight 40 cubic yard dumpsters. In addition, all contaminated waste materials, including polyethylene sheeting, rags, respirator cartridges, and worker disposable coveralls, were also properly labeled and placed in the ACM dumpster for proper disposal at Waste Management's Butterfield Station asbestos landfill located in Mobile, Arizona.

Hutzel observed and monitored all abatement activities. In addition, Hutzel collected area and final clearance air samples outside and inside the abatement enclosures during and after abatement. Phase contrast microscopy (PCM) and transmission electron microscopy (TEM) were used to determine that the airborne concentrations of asbestos fibers outside and inside of the abatement enclosures were equal to or less than the EPA’s asbestos background level of 0.01 fibers per cubic centimeter (f/cc).

Two bulk samples of the buildings' representative building materials were collected during this survey for toxicity characteristic leaching procedure (TCLP) analysis using EPA Method SW1311l6010B for lead as the constituent of concern. Laboratory TCLP analysis indicated no detectable levels of lead above the reporting limit of 0.450 milligrams per liter [mg/L]). The analysis results for both samples were less than the EPA's

regulatory limit for lead of 5.0 mg/L; therefore, the waste stream generated by the demolition of the Grant Street Site building was not be classified as hazardous waste.

As report summarizing the abatement activities and presenting the sampling results is included in Appendix E.

1.3.5 Utility Disconnect

After completion of abatement work and prior to demolition, all utilities at the site were disconnected from the building. These included:

- Electrical, including transformer by Arizona Public Service
- Natural gas piping and valves to the site by Southwest Gas
- Potable water by City of Phoenix
- Communication by U.S. West and Cox Communications
- Sewer pipes were plugged at the concrete building slab by ERI at the direction of the City of Phoenix

1.3.6 Building Demolition

ERI mobilized to the site on March 14, 2016 to conduct the building demolition. Prior to the start of demolition activities, privacy screen was installed on the existing perimeter fence, perimeter erosion control established, interior fences and handrails removed, and bushes and trees cleared. Building demolition began on March 21, 2016 and concluded on April 4, 2016. The demolition was conducted using two excavators, one of which was equipped with a grapple attachment, and one front end loader. After the building sections were demolished, and to the extent possible, the recyclable materials were separated from the general debris. The non-recyclable materials were loaded onto trucks with 80 cubic yard boxes and transported to Waste Management's Butterfield Station Landfill for disposal. The recyclable materials were loaded into 40 cubic yard roll off boxes and taken to either Hendrix Salvage Company Inc. or Happy Metal, both located in Phoenix, Arizona. A total of 11.18 tons of metallic debris was recycled, and a total of 1602.30 tons of debris was transported and disposed of at Butterfield Station. Fugitive dust was controlled by pre-wetting of the building and by continuous application of water during demolition. Hutzel also performed continuous perimeter air monitoring during the demolition activities to monitor for fugitive dust and to ensure permit compliance. After demolition was complete, the apartment complex foundation and surrounding hard surfaces were cleaned with water and a street sweeper, and all surficial utility penetrations grouted. ERI demobilized from the site on April 6, 2016.

1.4 Site Descriptions

The following sections describe the geology, hydrogeology, and hydrology of the Site.

1.4.1 Geology

Geologic information in this section was obtained from the 2010 Focused Remedial Investigation Report for the nearby 501/505 Property (AMEC, 2010) and the CH2M pre-design testing investigation (Section 2).

The Site lies within the Basin and Range physiographic province in central Arizona. In this area, mountains generally composed of crystalline rock separate broad alluvial valleys. Mountains represent upthrown fault blocks from which sediments have been eroded and deposited in basins below. In the centers of these basins, depths to bedrock can exceed 10,000 feet.

The Site is located in the West Salt River Valley sub-basin of the Phoenix Active Management Area, a groundwater basin established by state statute. Subsurface geology beneath the Site is typical for the West Salt River Valley and for the Phoenix area. In the subsurface, sedimentary units that overlie the bedrock in the area of the Site are the Upper Alluvial Unit (UAU), the Middle Alluvial Unit (MAU), and the Lower Alluvial Unit (LAU). These units are composed of alluvial deposits associated with surface fluvial/alluvial deposition processes. The UAU consists mostly of unconsolidated gravel, sand, and silt deposited in alluvial channel, terrace, and floodplain deposits (Corell and Corkhill, 1994). The MAU consists of unconsolidated to semi-

consolidated clay, silt, silty sands, and gravels deposited in playa, alluvial fan, and fluvial environments. The MAU is significantly finer grained than the UAU in most areas. The LAU is below the MAU and is subdivided into two parts in the area of the Site. The upper part is composed of semi-consolidated sand, gravel, and silt, and the lower part consists of evaporate deposits (gypsum and anhydrite) interbedded with sand, gravel, and basaltic rocks.

Specific geological and geotechnical data from the CH2M pre-design testing investigation is presented in Section 2.

1.4.2 Hydrogeology

Hydrogeologic information in this section was obtained from the 2010 Focused Remedial Investigation Report for the nearby 501/505 Property (AMEC, 2010). Data regarding the current groundwater levels at the Site were collected during the CH2M pre-design testing investigation and are presented in Section 2.

Before development in the general vicinity of the Site, the Salt River was a gaining perennial stream and flow in the groundwater system was in the same general direction as surface flows, from east to west. Roosevelt Dam impounded the Salt River in 1912. Around this time, extensive groundwater development and dewatering began in central Phoenix. Seasonal irrigation and municipal groundwater pumping have resulted in seasonal declines of water levels throughout the Phoenix metropolitan area. The regional decline of groundwater levels and seasonal changes to groundwater levels have also been seen at the Site. Seasonal variations and the general water-level decline seen on the upgradient side of the Site are similar in magnitude to those on the downgradient side. Thus, water levels and water-level responses across the Site are relatively consistent at any given time. This consistency is reflected in the similar groundwater gradients and flow directions that have been measured near the Site at the 501/505 Property over time.

Since the 1900s, groundwater flows in the region have been west-southwestern according to historical water-level contour maps (Corell and Corkhill, 1994). Additional groundwater elevation data specific to the central Phoenix area also indicate groundwater has flowed to the west for the past 30 years (Weston, 2000). These analyses are consistent with data collected from the monitoring wells in the general area of the site. There is no current or historical evidence that groundwater flow has ever been to the north, northeast, or east of the Site.

Specific geological and geotechnical data from the CH2M pre-design testing investigation is presented in Section 2

1.4.3 Hydrology

The climate of Phoenix, Arizona is desert type with low annual rainfall and low relative humidity. The average rainfall in Phoenix is 7.7 inches. Most of the rainfall occurs during two separate rainfall seasons. These seasons include the winter months from November through March and the monsoon season, primarily July and August (National Oceanic and Atmospheric Administration [NOAA], 1996).

The ground surface of the Site is primarily asphalt pavement and concrete building foundation with some areas of gravel and/or dirt and concrete pads. No storm drain inlets are present on the Site.

SECTION 2

Pre-design Testing Investigation

CH2M completed a pre-design testing investigation between April 29, 2016 and November 7, 2016. The purpose of this investigation was to (1) evaluate Site engineering properties prior to the full-scale remediation design, (2) evaluate subsurface soil contamination, and (3) evaluate current groundwater conditions. The initial phase of the investigation was completed on May 23, 2016. Based on results from the initial phase of investigation, additional soil and groundwater investigation was completed from November 1, 2016 through November 7, 2016.

Prior to conducting the pre-design testing investigation, CH2M prepared a work plan identifying the activities to be accomplished and the methodologies to be used during the investigation. The work plan was reviewed by ADEQ. ADEQ provided comments, and APS provided a response on June 29, 2015. ADEQ approved the work plan in a letter dated August 11, 2015. The work plan is provided in Appendix F. Prior to conducting additional investigation activities in November 2016, APS notified ADEQ. The activities performed during the pre-design testing investigation are summarized as follows:

- **Utility Evaluation.** The utility evaluation identified utility locations and underground structures that could impact the investigation and/or remedial activities.
- **Property Ownership Evaluation and Surveying**. A site survey and evaluation were performed to identify property boundaries and complete an accurate map of the Site.
- **Subsurface Soil Investigation.** Twenty soil borings, including 4 borings advanced to groundwater, were drilled in April and May 2016 to obtain the necessary engineering design parameters for the full-scale remediation and further define the vertical and horizontal extent of contamination. Based on results from these borings, four additional borings, including one boring for a monitoring well, were drilled in November 2016 in the northeast corner of the Site.
- **Groundwater Investigation**. In May 2016, four groundwater soil borings (1D, 3D, 5D, and 8D) were sampled using the Hydropunch technique to evaluate the groundwater conditions. In November 2016, a groundwater monitoring well was installed and sampled in the northeast corner of the Site.

2.1 Utility Evaluation

AZTEC, a private utility locating and surveying firm in Phoenix, Arizona, evaluated the Site utilities prior to the subsurface soil investigation. The objective of the utility evaluation was to identify utility locations and potential issues, such as underground structures, that could impact the soil investigation and remedial design. These data are useful to clear boring locations and reveal utility conditions that may need to be addressed during the full-scale remedy. Available as-built utility drawings were reviewed. Both private and Blue Stake utility marking services were called to locate and mark all functional and abandoned utilities. After the utilities were located, they were surveyed by AZTEC.

2.2 Property Ownership and Surveying

AZTEC was contracted to survey the Site to identify utilities, locations of former and current structures, and topographical features. AZTEC also identified approximate property boundaries and subsequently mapped the Site, including approximate boundaries, site structures, and utilities. Site maps, based on the survey and historical data, are presented on Figures 1-2 and 1-3.

2.3 Subsurface Soil Investigation

The subsurface soil investigation had the following objectives:

- Confirm the vertical and lateral extent of contamination at the Site.
- Obtain engineering parameters for use in evaluating treatment options.
- Determine methods of excavation for remedial activities.
- Collect data to complete the risk assessment and groundwater protection level (GPL) modeling.
- Evaluate treatment options and select a final remedy.

Table 2-1 summarizes the sampling locations from the pre-design testing investigation.

2.3.1 Soil Boring Activities

Twenty-four borings, including four borings advanced to groundwater and a boring for installation of the groundwater monitoring well, were drilled during the subsurface soil investigation. The following borings were drilled, logged, and sampled for geotechnical and analytical purposes (see Figure 2-1 for boring locations):

- Borings 1D, 3D, 5D, and 8D – These borings were each drilled to a total depth of approximately 110 feet, except for 3D, which was drilled to a total depth of approximately 106 feet. The borings were drilled in areas of the Site where previous sampling and/or previous structures at the Site indicated the potential for subsurface contamination. Soil samples for chemical and geotechnical analysis were collected at these locations. These borings were also advanced to the water bearing zone beneath the Site. Groundwater samples were collected from these boring locations at approximately 105 feet.
- Borings 2D, 4D, 6D, and 7D – These borings were each drilled to a total depth of approximately 80 feet. The borings were drilled in areas of the Site where previous sampling and/or previous structures at the Site indicated the potential for subsurface contamination. Soil samples for chemical and geotechnical analysis were collected at these locations.
- Borings 9S through 20S – These borings were each drilled to a total depth of approximately 30 feet. The borings were drilled in areas of the Site where previous sampling and/or previous structures at the Site indicated the potential for subsurface contamination and to evaluate the lateral extent of contamination at the Site. Soil samples for chemical analysis were collected at these locations. No geotechnical samples were collected from these borings.
- Borings 21D and 22D – These borings were drilled to a total depth of 55-60 feet. The borings were drilled in the northeast corner of the Site to further delineate the vertical and horizontal extent of contamination. The borings were located in the area that exhibited detectable concentrations of MGP-related compounds exceeding proposed cleanup levels at depths up to 40 feet during the initial phase of pre-design testing.
- Boring 23D – This boring was drilled to a total depth of 40 feet in the northeast corner of the Site to further delineate the vertical and horizontal extent of contamination. The boring was located in the area that exhibited detectable concentrations of MGP-related compounds exceeding proposed cleanup levels at depths up to 40 feet bgs during the initial phase of pre-design testing.
- Boring GW1 (groundwater monitoring well) – This boring was drilled to a total depth of 130 feet. The purpose of this boring was groundwater monitoring well installation to evaluate the quality of groundwater beneath the Site. Soil samples were collected from this boring.

The borings were drilled by Yellow Jacket Drilling Services of Phoenix, Arizona, using Terra Sonic TSi 150T truck-mounted and TSi 150CC limited-access Sonic drill rigs. A CH2M field geologist specified the locations, depths, and sampling intervals of the borings, logged the materials encountered, and observed the drilling operations.

All borings, except GW1, were backfilled with cement grout slurry to the existing grade. Cuttings from each boring were placed in a roll-off container and stored onsite pending laboratory analysis. Waste characterization and disposal are discussed in Section 2.4.

2.3.2 Sampling Methods

Relatively undisturbed samples of materials encountered in the soil borings were typically obtained at approximately 3 or 5, 10, and 15 feet bgs, then at 10-foot intervals to the total depth of the boring. Samples were collected with a 2.0-inch-inside-diameter split-spoon (sleeve split-barrel) sampler, following the requirements of the Standard Penetration Test American Society of Testing and Materials (ASTM) Standard D-1586. This test is used to characterize the consistency (or density) of in-place soil by measuring the penetration resistance expressed as “blow counts.” The blow count is the number of blows required to advance the split-spoon sampler 6 inches using a 140-pound hammer falling 30 inches. The sampler is driven 18 inches, and the blow count is recorded for each 6-inch increment. The sum of the blows for the second and third increments is referred to as the N-value. Low N-values indicate soft or loose deposits, while high N-values are evidence of hard or dense materials. After the sampler has been driven and the blow counts recorded, the sampler is withdrawn from the boring to recover a relatively undisturbed sample.

Generally, empirical relationships relating N-values to engineering properties of soil are determined from penetration resistances obtained using a 1.5-inch-outside-diameter “standard” split-spoon sampler (that is, Standard Penetration Distance). Therefore, when using a 2.0-inch split-spoon sampler, the N-values must be corrected for the larger sampler to relate results to the 1.5-inch Standard Penetration Distance. The relationship between the penetration resistance obtained with the larger sampler and the Standard Penetration Resistance is determined by the sampling personnel on a case-by-case basis.

The samples were visually classified in the field following the Uniform Soil Classification System (USCS) in general accordance with ASTM D-2488. Sampling intervals, classifications of the soil samples, and related information were recorded on the soil boring logs. The materials encountered during the subsurface exploration typically consisted of silty or clayey sands, sands and gravels, and clayey gravels. Soil in the upper 15 feet was generally silty or clayey sands with trace gravel. From 15 feet bgs to approximately 110 feet bgs, sands and gravels, including clayey gravels, predominated.

Selected geotechnical samples were submitted for laboratory analysis of pertinent index and engineering properties to aid in the evaluation of remedial options at the Site, as described in Section 2.3.4.1. Environmental samples were also collected from each boring for analysis of chemical constituents, including, but not limited to, TPH, PAHs, metals, and VOCs, as described in Section 2.3.4.2.

2.3.3 Decontamination Procedures

The split-spoon and core barrel samplers and sleeves used for sample collection were decontaminated prior to use. Samplers and sleeves were scrubbed using Alconox® and distilled water, followed by a series of distilled water rinses and pressure washing. The samplers and sleeves were then allowed to air-dry before using.

2.3.4 Results of Subsurface Soil Investigation

2.3.4.1 Geotechnical Analysis

Selected samples were analyzed for geotechnical parameters. Laboratory tests to determine pertinent index and engineering properties were performed by Hoque & Associates, Inc. in Phoenix, Arizona. The purpose of the index testing program was to classify soil in areas potentially needing shoring and to aid in developing engineering parameters for the materials.

Samples were analyzed using the following geotechnical tests:

- ASTM C128 Specific Gravity and Absorption of Fine Aggregate
- ASTM D2216 Moisture Content
- ASTM C117 Material Finer than No. 200 Sieve in Mineral Aggregates by Washing

- ASTM D2937 Density of Soil in Place by the Drive-cylinder Method (In situ Density and Unit Weight)
- ASTM D4318 Liquid Limit, Plastic Limit, and Plastic Index of Soil (Atterberg Limits)
- ASTM C128 Dry Bulk Density

A summary of selected geotechnical test results is presented in Table 2-2, and geotechnical laboratory results are included in Appendix G. Additional geotechnical results were used for evaluation of groundwater protection levels and are presented in Table 4-2.

2.3.4.2 Environmental Analysis

Samples for environmental analysis from the initial phase of the pre-design investigation were submitted to SGS Accutest Laboratories and analyzed for the following:

- VOCs using EPA Test Method 8260B
- PAHs using EPA Method SW846 8270C-SIM
- Petroleum hydrocarbons using ADHS Method 8015AZR1 – Analytical results were provided for TPH-diesel range organics (C10–C22), TPH-oil range organics (C22–C32), and TPH (C10–C32); results were also provided for volatile fuel hydrocarbons or gasoline range organics (C6–C10)
- Semivolatile organic compounds (SVOCs) using EPA SW846 8270C
- Dioxins and furans using EPA Method 8290A
- Polychlorinated biphenyls (PCBs) using EPA Method SW846 8082
- Total RCRA 8 Metals using EPA Method SW846 6010B/7471A
- Total cyanide using EPA Method SW846 9013/9014
- Fractional organic carbon using ASTM Method D2974

All samples were analyzed for PAHs. However, for other samples, analyses were selected based on the location of the borings and to collect a data set that provided information at varying depths throughout the Site. Borings that were drilled during in November 2016 were submitted to TestAmerica Laboratories and only analyzed for PAHs, TPH, and VOCs.

Soil sample analytical results for PAHs, TPH, VOCs, detected VOCs, metals, SVOCs, and dioxins and furan compounds are provided in Tables 2-3 through 2-9, respectively. Laboratory reports are presented in Appendix G. The data evaluation for the pre-design testing investigation samples is presented in Appendix H.

PAHs. PAHs were detected in every boring sampled, except boring 21D, at depths ranging from 3 to 90 feet. Concentrations exceeded residential and non-residential SRLs in samples collected at depths of up to 40 feet (boring 8D). Table 2-3 presents the PAHs analytical results compared to their respective SRLs and the calculated GPLs, if applicable. The results are summarized as follows:

- Benzo(a)pyrene was detected above the residential (0.69 mg/kg) and/or nonresidential (21 mg/kg) SRLs in 26 samples (16 borings) collected at up to 40 feet bgs (boring 8D).
- Four PAHs, including benzo(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene, were detected above SRLs in over 10 samples.
- Five additional PAHs, including benzo(k)fluoranthene, chrysene, fluoranthene, naphthalene, and pyrene, were detected above their respective residential and/or nonresidential SRLs in at least two borings.
- The highest concentrations of all PAHs exceeding SRLs, except for naphthalene and pyrene, were detected in boring 11S at 8 feet bgs.
- The highest concentrations of naphthalene and pyrene were detected in boring 8D at 5 feet bgs.

VOCs. VOCs were detected in 5 of the 24 borings at depths of up to 70 feet. VOCs included 1,2,4-trimethylbenzene, ethylbenzene, methyl ethyl ketone, sec-butylbenzene, and toluene. The 1,2,4-trimethylbenzene concentration in the boring 8D sample from 5 feet bgs exceeded the residential SRL of 52 mg/kg. None of the other VOCs exceeded their respective SRLs or GPLs during the pre-design testing investigation.

TPH. TPH was detected in nine of the borings in samples collected up to 45 feet bgs. The maximum concentration of TPH reported by the laboratory (4,680,000 mg/kg TPH [C10-C32]) was in the sample collected from 5 feet bgs in boring 8D. There is no SRL or GPL for TPH. The reported concentration indicates an unrealistic value (>1 kg of TPH per kg of soil), and is likely due to equipment interference during analysis due to the very high levels of contaminants in the sample.

SVOCs. Detected SVOCs did not exceed any of the established residential or nonresidential SRLs or GPLs. PCBs were not detected in any of the sampled borings.

Metals. Arsenic, barium, cadmium, chromium, lead, and selenium were detected in all 15 borings sampled for metals. Arsenic exceeded the residential and nonresidential SRL of 10 mg/kg in 14 of the soil borings at sample depths between 3 and 65 feet. None of the concentrations exceeded their respective minimum GPL (ADEQ, 1996).

Cyanide. Cyanide was not detected in the sample collected from boring 11S at 8 feet bgs (cyanide was analyzed only from the sample collected at this location).

Dioxins and Furans. Dioxins and furans were detected in all 16 of the borings tested. Various dioxins and/or furans were detected in samples ranging from depths of 3 feet to 45 feet bgs. The highest concentration of a dioxin compound observed was 1,000 picograms per kilogram (pg/kg) of octochlorodibenzodioxin (OCDD) in boring 19S at a depth of 15 feet in the northeast corner of the Site. Samples from 5 feet bgs in borings 5D and 6D, located along the eastern edge of the Site, exhibited concentrations of OCDD above 100 pg/kg and detections of multiple other dioxin and furan compounds. A concentration of 600 pg/kg of OCDD, as well as detections of multiple other dioxin and furan compounds, were detected at a depth of 3 feet bgs in boring 9S in the northwest corner of the Site. Detections of dioxins and furans were most prevalent in samples collected from depths up to 15 feet. With the exception of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), there are no SRLs for dioxins and furans. Neither the residential or nonresidential SRLs for 2,3,7,8-TCDD were exceeded in any samples. ADEQ has not established a GPL for dioxins. The locations and depths of the dioxin and furan compound detections do not appear to correlate with elevated levels of other COCs.

2.4 Waste Characterization from Soil Sampling Activities

Cuttings from each boring were placed in roll-off containers and stored onsite pending laboratory analysis. During the initial phase of the investigation, samples from the roll-off containers and from depths of 3 or 10 feet bgs at boring locations 1D, 3D, 8D, 9S, 12S, 14S, and 18S were analyzed to identify proper waste disposal for the cuttings and to evaluate potential waste disposal requirements during remedial activities. During the second phase of investigation (November 2016), one sample from the roll-off container was analyzed to identify proper waste disposal. In addition to the chemical analyses specified in Section 2.3.4.2, waste characterization samples were analyzed for VOCs and RCRA metals in accordance with EPA Method 1311 (TCLP extraction). Additionally, the samples were analyzed for physical parameters to aid in evaluation of remedial alternatives and assist in evaluating potential requirements for waste disposal during remedial actions. These included corrosivity (pH) in accordance with EPA Method SW846 9045B, the Paint Filter Test in accordance with EPA Method SW846 9095 to evaluate free liquids, and ignitability by EPA Method SW846 1010A. Waste characterization analytical results are presented in Table 2-10.

Upon receipt of analytical results, the soil in the roll-off containers was transported and disposed of at Butterfield Landfill as an Arizona special waste – petroleum-contaminated soil.

2.5 Groundwater Investigation

Groundwater samples were collected from four deep boring locations (1D, 3D, 5D, and 8D) that were advanced to the water bearing zone underneath the Site during the initial phase of the pre-design testing investigation to screen for COCs in the groundwater. However, as described in Section 2.6.2, Hydropunch groundwater samples were used as a screening method since they are susceptible to cross-contamination from the soil and may not yield reproducible analytical results indicative of the actual groundwater quality beneath the Site. Based on the Hydropunch sampling results, APS elected to install and sample a groundwater monitoring well at the Site in November 2016 to obtain data that was representative of actual groundwater quality beneath the Site. Each method, the associated data, and the validity of that data are discussed below.

2.5.1 Hydropunch Sampling

The top of the water table was encountered at approximately 105 feet bgs. Groundwater samples from borings 1D, 3D, 5D, and 8D, were collected using the Hydropunch sampling technique in which a sampling device is driven into undisturbed materials below the bottom of the borehole and a sample is collected using a disposable bailer. The samples appeared turbid even after being allowed to settle for more than 15 minutes, indicating that suspended fine-grained sediment was present. The samples were not filtered prior to analysis.

Groundwater samples were analyzed by SGS Accutest Laboratories for the following:

- TPH using ADHS 8015AZR1
- PAHs using EPA Method SW846 8270C-SIM
- VOCs using EPA Method SW846 8260B
- Total RCRA 8 Metals using EPA Method SW846 6010B/7471A

Groundwater analytical results for VOCs, TPH, PAHs, and metals are presented in Tables 2-11 through 2-14, respectively.

PAHs. PAHs were detected in all four of the Hydropunch groundwater samples, with a maximum concentration of 5.6 µg/L of naphthalene observed in boring 8D, located in the northeast corner of the Site. Among PAHs only benzo(a)pyrene has an established Aquifer Water Quality Standard (AWQS). None of the results exceeded the AWQS.

TPH. TPH was detected in each of the Hydropunch groundwater samples.

VOCs. Acetone and chloroform, which are common laboratory contaminants, were each detected in samples collected from three of the four borings. 2-Butanone was also detected in one of the samples. TPH was detected in all of the groundwater samples. AWQS have not been established for any of these compounds.

Metals. Arsenic, barium, cadmium, chromium, lead, mercury, and selenium were detected in groundwater samples. The barium, cadmium, mercury, and selenium concentrations were below their respective AWQS. Arsenic, chromium, and lead concentrations of 88.3, 192, and 54.6 µg/L, respectively, exceeded their respective AWQS of 50, 100, and 50 µg/L in the sample collected from boring 5D, located in the southeast corner of the Site. Chromium was also detected above the AWQS in boring 3D, located in the southwest corner of the Site, at concentrations lower than those detected from boring 5D.

The southeast portion of the Site, where the highest concentrations of metals in the Hydropunch samples were observed in Boring 5D, previously contained a lampblack basin (Figure 1-3). The primary COCs associated with this basin are PAHs. VOCs and PAHs were not detected above the laboratory reporting limits (except for acetone, which is not considered to be related to historical Site activities) in the Hydropunch groundwater sample collected from this boring. Concentrations of metals measured in soil samples collected during the pre-design testing investigation did not exceed the minimum GPLs and did not exceed residential

SRLs except for arsenic, which is naturally occurring in Arizona soils. Therefore, the elevated concentrations of metals in the Hydropunch groundwater are not likely to be associated with historical Site activities. Also, as previously described, the groundwater samples were turbid and were not filtered prior to analysis. Therefore, the elevated concentrations of metals in the samples are likely due to the presence of sediment and are not representative of groundwater quality at the Site. In addition, the Hydropunch sampling method is susceptible to cross-contamination from the surface.

2.5.2 Groundwater Monitoring Well Installation and Sampling

Based on results from Hydropunch sampling, APS installed a groundwater monitoring well in the northeast corner of the Site, which is the area with concentrations of COCs exceeding proposed remediation levels at depths up to 40 feet bgs. As described in Section 2.5.1, Hydropunch groundwater samples may not be representative of actual groundwater quality due to cross-contamination from soil in the boring and surface soils. Therefore, the groundwater monitoring well was installed to obtain an accurate representation of groundwater quality beneath the Site.

2.5.2.1 Monitoring Well Installation Procedures

Monitoring well GW1 was installed on November 2 and 3, 2016. The well was installed in a 9 and 5/8-inch borehole drilled using a limited access Rotosonic drill rig. The casing is composed of 4-inch-diameter schedule 40 polyvinyl chloride (PVC). Monitoring well GW1 is 130 feet in depth with a 40-foot screen interval with a 0.020-inch slot size from 90 to 130 feet bgs and is secured at the surface by a 12-inch, traffic-rated, flush-mount well vault. A well completion diagram is provided in Appendix D.

Monitoring well GW1 was developed on November 7, 2016 by Yellow Jacket with a well development rig, using a combination of surging, bailing, and pumping. The bentonite and grout seal was allowed to set overnight prior to well development. To begin development, the well was bailed to remove sediment that had settled within it during installation. After this sediment was removed, the well was surged using a surge block for a minimum of 20 minutes at 10-foot intervals along the 40-foot well screen to draw fine sediment out of the adjacent annular space and formation, and into the well. After surging, the well was again bailed to remove any generated sediment. Finally, the well was pumped with a submersible pump for a half hour, which was sufficient to eliminate any groundwater turbidity. Both well depth and the firmness of the well bottom were monitored with a tag line throughout development to track the amount of sediment present and to verify its removal during bailing. During pumping, groundwater parameters, including temperature, specific conductance, dissolved oxygen (DO), pH, and oxidation-reduction potential (ORP), were monitored with a water quality meter by a CH2M geologist.

2.5.2.2 Monitoring Well Sampling

Groundwater samples were collected after well development at monitoring well GW1 using the submersible pump groundwater sampling technique. Samples were collected by lowering a decontaminated 2-inch Grundfos submersible pump with dedicated discharge tubing into the well and positioning the pump in the middle of the well screen interval. A minimum of three casing volumes were pumped from the well. During pumping, groundwater parameters, including temperature, specific conductance, DO, pH, and ORP were monitored with a water quality meter by a CH2M geologist. Groundwater samples were collected directly from the discharge tubing (one original and one duplicate). Collected groundwater was transferred to appropriate sample containers, placed in a cooler with ice, and submitted to TestAmerica for laboratory analysis for the following parameters:

- TPH using ADHS 8015AZR1
- PAHs using EPA Method SW846 8270C-SIM
- VOCs using EPA Method SW846 8260B
- Total RCRA 8 Metals using EPA Method SW846 6010B/7471A

2.5.2.3 Results of Groundwater Sampling

PAH and VOC compounds were not detected in the samples from Monitoring Well GW1. Arsenic, chromium, barium, and silver were detected, but were below the applicable AWQS. Based on the results from these samples, groundwater beneath the Site does not appear to be impacted by former industrial activities.

2.6 Known Extent of Site Impacts

The following subsections discuss the impact and extent of contamination in the soil and groundwater at the Site. Information from previous investigations summarized in Section 1 and data from the pre-design testing investigation were used for the evaluations discussed in this section. Section 6 presents the Site COCs that were identified at the Site based on former industrial operations, investigations at the site, and the risk and groundwater threat assessments that were performed.

2.6.1 Extent of Impacts to Soil at the Site

PAHs. PAHs were observed throughout the Site at concentrations exceeding residential and non-residential SRLs. The results of sampling and analysis for PAHs as shown on Figure 2-2 indicated the following general distribution of PAHs:

- The deepest detected concentrations of PAHs were observed in the northeast portion of the Site in boring 8D, at depths up to 90 feet bgs. Samples from this boring at a depth of 40 feet bgs exceeded the residential and non-residential SRLs for PAHs.
- The maximum concentrations of most PAHs at the Site were detected in boring 11S at a depth of 8 feet bgs. This boring is located northeast of the approximate former location of the oil and creosote storage tank(s) in the southwest portion of the site.
- Non-residential SRLs for PAHs were typically exceeded at depths less than 10 feet bgs, except for the northeast corner of the property where four borings exhibited concentrations above non-residential SRLS at depths of 15 feet or deeper, and one boring located in the north-central portion of the site, (16 feet bgs in boring 17S)
- PAH concentrations in the southeast corner of the Site are below SRLs at depths greater than 5 feet bgs in all of the borings, and several samples from this portion of the Site did not exhibit detectable concentrations of PAHs.
- All of the borings except HA-4 and 21D in the northern third of the property had detectable concentration of PAHs.

TPH. TPH-impacted soil was observed in multiple samples at varying depths throughout the Site, up to 20 feet bgs, with the exception of a single detection of 3.11 mg/kg in boring 7D at 45 feet bgs. The maximum concentration observed was 4,680,000 mg/kg in boring 8D at 5 feet bgs. An SRL does not exist for TPH. The highest concentrations of TPH were also observed in the northeast portion of the Site.

VOCs. 1,2,4-Trimethylbenzene was detected above the residential SRL in the northeast corner of the site (boring 8D at 5 feet bgs) where high concentrations of PAH and TPH were also observed. Benzene was detected above nonresidential SRLs in borings GB-3 and MP-2 at depths of approximately 7 feet. Toluene and total xylenes were also detected above nonresidential SRLs in boring GB-3 at 7 feet bgs.

Metals. Arsenic can be a byproduct of MGP operations and certain types of wood treatment and was observed above the SRL of 10 mg/kg in 23 of the samples collected during the pre-design testing investigation, at a maximum concentration of 16.4 mg/kg. However, a review of Arizona background arsenic levels, a statistical evaluation of the arsenic concentrations, and the site history indicates that's the arsenic concentrations observed are likely background concentrations and not related to former industrial activities as presented below:

- The arsenic concentrations observed at the Site are within the range of background arsenic concentrations presented in the *Evaluation of Background Metal Concentrations in Arizona Soil* (Earth Technology Corporation, 1991), which range between 1.4 mg/kg to 97 mg/kg.
- APS statistically evaluated the arsenic concentrations observed during historical and pre-design investigations. The data appeared to be normally distributed with no apparent outliers. Concentrations ranged from nondetect to 16.4 mg/kg, with a mean concentration of 8.68 mg/kg. A 95 percent upper confidence limit (95UCL) on the mean concentration was estimated using USEPA's ProUCL software to be 9.40 mg/kg. These calculations conservatively assume that the four (out of 64 samples) censored, or nondetect, results are equal to their respective detection limit. A one-sided, upper-tailed hypothesis test also was performed to compare the arsenic concentration in soil at the site with the soil remediation level of 10 mg/kg. Single-sample hypothesis tests generally are used to compare a site's contaminant concentration data with a pre-established reference value such as a regulatory screening level, background threshold value, or other specified standard (USEPA, 2015). The results of the hypothesis test indicate that at the assumed significance level of 0.05, the population mean concentration of arsenic in soil at the site is equal to or less than the SRL of 10 mg/kg. Therefore, graphical inspection of the distribution, range, and skewness of the arsenic data do not indicate that soil contamination is associated with arsenic at the site. This is confirmed by the 95UCL and the results of formal hypothesis testing.
- There does not appear to be a correlation between the borings that exhibited higher concentrations of arsenic and those that exhibited significant levels of MGP or other industrial activity-related compounds.
- Based on the Site History presented in Section 1.1, the Site only operated as a waste storage location while the oil gas process was in operation at the 501/505 Property and primarily handled waste lampblack, which does not typically contain metals constituents (Hayes, et.al, 1996). Historical information does not indicate that MGP-related wastes that may have contained arsenic were managed at the Site. Additionally, wood treatment operations utilizing metal salt solutions began to be more frequently used after 1950 when wood treatment operations at the Site appear to have ceased (Freeman, 2003).

Therefore, based on information presented above, the arsenic identified in the soil at the Site is likely naturally occurring and is not related to MGP or other former industrial operations.

Figures 2-2 through 2-4 present the locations where COCs were detected in soil and locations where any compounds exceeded the current residential or nonresidential SRLs. The only GPL that was lower than the non-residential SRL for a compound was for naphthalene at a concentration of 65.4 mg/kg. However, this is still higher than the residential SRL of 56 mg/kg. Therefore, exceedances of the GPLs are not identified on the figures.

2.6.2 Extent of Impacts to Groundwater at the Site

Multiple PAHs and TPH were detected in all four of the Hydropunch groundwater samples collected at the Site. Only benzo(a)pyrene has an established AWQS, which was not exceeded. Metals, including arsenic, chromium, and lead, were detected in groundwater at the Site at concentrations exceeding their respective AWQS. However, as previously discussed, the elevated concentrations of metals are likely due to the sampling method and do not represent impacts from historical Site activities. These data indicate that historical operations at the Site have not caused or contributed to an exceedance of an AWQS.

The groundwater monitoring well (GW1) was installed and sampled in November 2016. PAH and VOC compounds were not detected in this well. Metals including arsenic, chromium, barium and silver were detected at concentrations well below the AWQS. Therefore, there appears to be no impact to groundwater from previous Site operations.

SECTION 3

Human Health Risk Assessment

Multiple human health risk assessments (HHRAs) were performed at the Site from 1992 through 2002 to evaluate health risks due to the presence of COCs in the soil. As described in Section 1.2.3, no unacceptable risks to residents of the Site were identified as summarized below:

- A preliminary health assessment study was conducted in 1992 by Geraghty and Miller. The report concluded that exposure to soil containing lampblack, oil, or creosote would not be expected to occur and that there were no unacceptable MGP-related risks associated with this Site under the observed conditions (Geraghty and Miller, 1992).
- A deterministic risk assessment was conducted in 1995 by Geraghty and Miller using data from subsurface investigations which concluded that no remedial actions were necessary. ADHS reviewed the risk assessment and concluded in a letter regarding the review of the risk assessment for the Former Grant Street Yard (ADHS, 1995) that "*The exposure assessment, toxicity assessment, and risk characterization presented in the document are generally in accordance with current risk assessment guidance. The document generally supports the conclusion that exposure to hydrocarbons in soil, soil gas, and air at the site are unlikely to result in adverse health effects." (Geraghty and Miller, 1995).*
- In 1996, the ADHS conducted an epidemiologic review of mortality rates in the census tract that included the Grant Park Apartments. The results of the study indicated there was no statistically significant increase in age-specific mortality rates when compared to similar residential areas in Maricopa County (ADHS, 1996).
- Based on the results of the additional courtyard soil characterization, an additional risk assessment was performed by Brown and Caldwell in 1988. Based on the results of the risk calculations for the surface to 3 feet bgs, and the assumptions for potential receptors at the Site, a resident or maintenance worker at the Grant Street Apartments had no measurably greater risk of cancer than a person who did not live at the Site. (Brown and Caldwell, 1998b).
- The Revised Risk Assessment prepared by Brown and Caldwell in 2002 used the information in previous risk assessments and presented additional risk estimates for potential exposures to chemicals associated with MGP activities at the Site. All cumulative individual cancer risks fell within the target acceptable risk range adopted by ADEQ. The risks associated with soil were calculated assuming exposure in the upper 3 feet of soil (Brown and Caldwell, 2002c).

The proposed remediation activities in this RAP include excavating soil at the Site that is contaminated with COCs. The proposed remedial activities will reduce concentrations of COCs in the subsurface to levels below residential SRLs.

The SRLs are predetermined risk-based remediation levels derived from toxicity data using defined assumptions for possible exposure and are developed by the ADHS Office of Environmental Health for the ADEQ. SRLs are based on the following:

- EPA Region 9 Preliminary Remediation Goals
- Ingestion, inhalation, and dermal contact risk criteria
- An ELCR of 1×10^{-6} for Class A (known human) carcinogens, and 1×10^{-5} for Class B and C carcinogens
- An HI no greater than 1 for noncancer-causing contaminants

Because of the varied application of the SRLs, the underlying assumptions for their development are very conservative.

Since the Site will be remediated to residential SRLs, which are risk-based standards, a site-specific risk assessment is not be required for the Site. However, if site conditions are encountered that indicate that remediation to residential SRLs cannot be achieved, APS will evaluate the need for a Human Health Risk Assessment.

SECTION 4

GPL Modeling – Potential Threat to Groundwater from Soil Contaminants

This section presents the rationale for using ADEQ's GPL screening method presented in *A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality* (ADEQ, 1996) and *GPL Spreadsheet* (ADEQ, 2013) to determine if residual contaminant concentrations left in place could cause or threaten to cause contamination of groundwater. This section also presents the physical and chemical inputs into the GPL model (Section 4.5) and the modeling outputs for the applicable minimum and/or calculated (site-specific) GPLs (Section 4.6).

4.1 Applicable Cleanup Standards

ADEQ has established the following types of predetermined soil cleanup standards:

- Minimum GPLs represent soil concentrations protective of groundwater quality. The minimum GPLs were developed by ADEQ (1996) to represent a theoretical "worst-case" scenario in which soil is assumed to be contaminated from surface to groundwater.
- SRLs are soil concentrations that are protective of human health, either under residential or nonresidential exposure scenarios.

In addition to these soil cleanup standards, ADEQ's GPL one-dimensional model for vadose zone contaminant fate and transport can be used to calculate an alternative site-specific GPL (calculated GPLs). This is achieved by inputting site-specific characteristics that impact fate and transport, such as depth to water, depth of detectable contamination, soil porosity, and fraction of organic carbon in soil, along with chemical-specific physical properties such as solubility and ability to adsorb to organic materials in the soil. This model was used to calculate GPLs for selected compounds as described in the following subsections. The GPLs (minimum GPLs or calculated GPLs) were compared to the residential SRLs and the lowest applicable soil regulatory standard was selected as the applicable cleanup standard for the Site.

A compound must have a water quality standard in order to have a GPL. Typically, the AWQS is used as the water quality standard. However, ADEQ has also established risk-based standards for compounds that do not have an AWQS (ADEQ, 1996), as is the case for most PAHs. To more completely assess the potential for contaminants in soil to impact groundwater, compounds with a risk-based standard, in addition to those compounds with an AWQS, were also modeled.

4.2 Selection of Modeled Contaminants

Potential contaminants requiring further evaluation were identified based on compounds detected during current and previous investigations and compounds that are typical of MGP operations. For example, although acetone and methyl ethyl ketone were detected at low concentrations in soil samples, these compounds are not typically associated with MGP operations and may be field or laboratory contaminants.

Metals were not modeled for a GPL since the sample results indicated their concentrations were all below their respective minimum GPLs. The organic compounds acenaphthylene, benzo(g,h,i)perylene, carbazole, 4-chloroaniline, 1-methylnaphthalene, 2-methylnaphthalene, phenanthrene, and TPH were not modeled because they do not have an ADEQ guidance level for water quality, which is necessary to establish a minimum GPL. Dioxins and furans were not modeled because these compounds are not expected to leach in soil (EPA, 1995). The remaining compounds are contaminants for which either an ADEQ minimum GPL does not exist, as is the case for most PAHs, or their concentrations in soil exceeded the predetermined minimum GPL. These include:

acenaphthene	chloroform	indeno(1,2,3-c,d)pyrene
anthracene	chrysene	pyrene
benzo(a)anthracene	dibenzo(a,h)anthracene	naphthalene
benzo(a)pyrene	dibenzofuran	1,2,4-trimethylbenzene
benzo(b)fluoranthene	diethyl phthalate	2,4-dinitrotoluene
benzo(k)fluoranthene	ethylbenzene	benzene
bis(2-ethylhexyl)phthalate	fluoranthene	toluene
sec-butylbenzene	fluorene	total xylenes

These compounds were modeled as described in the following subsections to determine site-specific GPLs, which are listed in Table 4-1. The table also presents groundwater standards or goals that could be referenced as levels that provide the basis for selecting the appropriate GPL (that is, the AWQS, health-based guidance level, or risk-based standard.

4.3 Model Selection

ADEQ's GPL one-dimensional model was used for the fate and transport modeling of select compounds detected at the Site. The rationale for choosing the GPL model is as follows:

- GPL model provides direct output of the quantity of interest (for example, GPL as a soil concentration).
- GPL model is conservative in that it predicts rapid transport compared to what would be expected (for example, no vadose zone dispersion, constant recharge rate, and homogeneous contaminant distribution).
- ADEQ is familiar with the use and interpretation of results from the GPL model.
- GPL model predicts GPLs for a range of depths of contamination and groundwater, based on field conditions.
- The GPL model incorporates a mixing cell for groundwater that includes a simple simulation of variable degradation and dispersion rates.

During the model selection phase, two- and three-dimensional models for the vadose zone were considered and found to be unnecessary for simulating the fate and transport of the compounds within the context of estimating GPLs, primarily because the water table is relatively shallow at the Site and the vadose zone characteristics do not vary significantly across the Site or with depth. In addition, recharge at the Site is relatively low as a result of the low precipitation in the Phoenix area and the presence of an asphalt surface that covers the majority of the Site. Based on information collected regarding the Site, CH2M concluded that the ADEQ GPL model is appropriate for modeling the fate and transport of the compounds in the soil at the Site for the depth-specific GPLs presented in this report. The model results and input parameters are presented in Appendix I.

4.4 Conceptual Site Model

For purposes of this report, the conceptual site model (CSM) is the representation of the environmental system and the physical and chemical processes that affect the transport of the compounds through the environmental media. The CSM for the transport of the compounds is based on site-specific data collected during investigations at the Site and from literature cited in this report.

4.4.1 Vadose Zone

The CSM for the vadose zone is based on the results of lithologic logging (Appendix D), geotechnical soil samples collected during investigations at the Site (Table 2-2), and literature cited in this report. Table 4-2 summarizes the results of the geotechnical samples collected at the Site. Data indicate that the vadose zone is composed of unconsolidated, poorly sorted basin-fill and alluvial deposits, which is consistent with the

CSM presented in *A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality* (ADEQ, 1996).

For the purposes of this model, the compounds are assumed to occur from ground surface to some variable depth below the ground surface, or depth of incorporation. The release of the compounds is assumed to occur along a horizontal dimension, or release width, that lies parallel to the direction of groundwater flow. The main processes assumed to affect the transport of the compounds in the vadose zone CSM are primarily dissolved-phase advection with a minimal impact from vapor-phase diffusion. The following paragraphs describe each of these processes as they relate to the vadose zone CSM.

4.4.1.1 Dissolved-phase Advection

Conceptually, as water slowly infiltrates through the zone of contamination, it is likely that equilibrium is established between the solid and dissolved phases according to the solubility of compounds. In solution, the compounds are carried downward by advective flow of recharge water. Compounds with a lower solubility may not readily dissociate into solution and will be carried downward at a slower rate.

4.4.1.2 Vapor-phase Diffusion

Once in solution, volatile compounds create a liquid-vapor equilibrium, which is proportional to pressure in units of atmospheres at a constant temperature. This equilibrium between the liquid and gas phases is known as Henry's Law and is calculated using the Molar concentration of the compound in water divided by the pressure. In an open system, this equilibrium is difficult to attain, resulting in the formation of vapor-phase compounds. The greater the volatility of the compound, the higher the likelihood that the compound will form a vapor phase and be transported through soil via vapor-phase diffusion.

4.4.1.3 Degradation of the COCs

For the purposes of estimating the GPLs, the organic compounds in the vadose zone are assumed to have a conservatively long half-life ($t_{½}$) of 100,000 days (273 years) for most compounds and 1,000 days (2.7 years) for the BTEX compounds. The half-life values are the default reference value for persistent compounds in a soil column as defined in *A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality* (ADEQ, 1996).

4.5 Input Parameters

The soil sample input parameters collected during the 2016 pre-design testing investigation and calculated average values used in the GPL model are summarized in Table 4-2. Table 4-3 contains a summary of all input parameters, including the ADEQ default values used during the modeling process. Appendix I includes model input and output summaries for each compound.

4.5.1 Vadose Zone Parameters

This section presents the vadose zone parameters used in the model. These parameters include the default values presented in *A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality* (ADEQ, 1996), as well as site-specific parameters obtained from geotechnical samples.

4.5.1.1 Soil Type

The soil type "New Soil Type" was selected for the GPL modeling because this allowed input of site-specific values of soil properties. Site-specific properties are described in the following subsections and are summarized in Table 4-3.

4.5.1.2 Depth to Groundwater and Depth of Incorporation

The depth of incorporation is the maximum depth at which the concentrations meet or exceed minimum GPLs (ADEQ, 1996). The current depth to groundwater below the Site is approximately 105 feet (32 meters) bgs. The model was run assuming a groundwater depth of 105 feet bgs and an incorporation of contamination of 105 feet bgs, which assumes the worst-case scenario for the predetermined minimum GPL. The worst-case scenario as described by ADEQ is where the "whole soil profile is contaminated from

the surface to the groundwater" (ADEQ, 1996). Alternative or calculated site-specific GPLs are simulated based on the maximum depth of a compound at a concentration that exceeds the minimum GPL. An alternative GPL using a site-specific depth of incorporation was calculated for naphthalene (Table 4-3).

4.5.1.3 Release Width

The release width is the horizontal distance of the contaminated zone parallel to the direction of groundwater movement (ADEQ, 1996). The default value of the GPL Model of 32.8 feet (10 meters) (ADEQ, 1996) was used for the modeling.

4.5.1.4 Bulk Density

The dry bulk density expresses the ratio of mass of dry solids to the total soil volume. The dry bulk density used as an input to the GPL model was the average of dry bulk densities measured from geotechnical soil samples analyzed during the pre-design testing investigation. The average dry bulk density of the geotechnical samples was 1.77 grams per cubic centimeter. Bulk density values used for the GPL model are presented in Table 4-2.

4.5.1.5 Porosity

The porosity expresses the ratio of pore volume to total soil volume. The data generated during site investigations were not sufficient to generate an average porosity value for the Site. Therefore, the porosity value used as an input to the GPL model was the default porosity of 0.25.

4.5.1.6 Fraction of Organic Carbon in Soil

The fraction of organic carbon (f_{oc}) is the relative amount of organic carbon present in the soil. The f_{oc} value used as an input to the GPL model was the average of f_{oc} values measured from soil samples analyzed during the pre-design testing investigation. The average f_{oc} of the soil samples was 0.0119. Values of f_{oc} used for the GPL model are presented in Table 4-2.

4.5.1.7 Soil Moisture Content

The soil moisture content expresses the ratio of liquid volume to total soil volume. The soil moisture content used as an input to the GPL model was the average of measured volumetric water contents in the samples collected during the pre-design testing investigation. The average soil moisture content from the results of geotechnical samples was 8 percent. Soil moisture content values used for the GPL model are presented in Table 4-2.

4.5.1.8 Diffusion Layer Thickness

The GPL model simulates the transfer of chemical vapor in the vadose zone to the atmosphere by using a diffusion layer (ADEQ, 1996). The ADEQ minimum GPL default value of 0.5 centimeter was used as input for this model.

4.5.1.9 Soil Remediation Level

The SRL is the predetermined risk-based standard developed by the ADHS pursuant to Arizona Revised Statutes (A.R.S.) Section 49-152(A)(1)(a). The value was not used for modeling, but was used for comparison with the GPLs calculated by the model. A.A.C. Title 18, Chapter 7, Article 2, lists the SRLs for many of the compounds. SRL values used for comparison to the GPL model output are presented in Table 4-1.

4.5.2 Chemical-specific Parameters

This section presents the parameters that were input into the model for each compound. These values were obtained either from *A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality* (ADEQ, 1996) or various reference literature. Appendix I provides summary tables for each COC modeled and identifies the reference literature for the chemical-specific parameters.

4.5.2.1 Adsorption Constant

The partition coefficient (K_{oc}) is defined as the hypothetical partition coefficient for a sorbent that is 100 percent organic carbon. The K_{oc} expresses the ratio of adsorbed chemical volume to a specific mass of soil. A

conservative transport value (that is, no adsorption), would be 0.0 cubic centimeters per gram. K_{oc} values used for the GPL model are presented in Table 4-3.

4.5.2.2 Henry's Law Constant

The Henry's Law Constant (K_H) is a partitioning coefficient that expresses the concentration ratio of a chemical compound in vapor form to the dissolved chemical in aqueous form. The dimensionless K_H values for each compound were used to run the GPL. K_H values used for the GPL model are presented in Table 4-3.

4.5.2.3 Solubility

The solubility of a compound is defined as the mass of a compound that will dissolve in a unit volume of solution (in this case, water). Units for solubility are milligrams per liter (mg/L). The solubility values used in the GPL model are presented in Table 4-3.

4.6 Potential Threat to Groundwater – GPL Modeling Results

GPL modeling was performed for organic compounds detected at the Site that exceeded the predetermined minimum GPL and for compounds for which an ADEQ minimum GPL does not exist. Compounds that were modeled include the following:

Acenaphthene	chloroform	fluorene
anthracene	chrysene	indeno(1,2,3-c,d)pyrene
benzo(a)anthracene	dibenzo(a,h)anthracene	pyrene
benzo(a)pyrene	dibenzofuran	naphthalene
benzo(b)fluoranthene	ethylbenzene	benzene
benzo(k)fluoranthene	diethyl phthalate	toluene
bis(2-ethylhexyl)phthalate	2,4-dinitrotoluene	total xylenes
sec-butylbenzene	fluoranthene	1,2,4-trimethylbenzene

Based on modeling results for anthracene, benzo(a)pyrene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, pyrene, and total xylenes, the calculated GPLs were greater than 1.0 x 10+6 mg/kg (also equal to 1 kg/kg), which exceeds unity. This means that the mass of the contaminant present in the soil would need to exceed the total mass of soil, which is not possible. Similar results were obtained for benzo(a)anthracene, benzo(k)fluoranthene, and indeno(1,2,3-c,d)pyrene. For these compounds, the calculated GPL would have been a number that is larger than the GPL spreadsheet can calculate. These high values obviously exceed unity, and therefore the threat to groundwater is extremely low for these compounds.

Concentrations of naphthalene in soil exceeded the minimum GPL to a depth of 40 feet at soil boring 8D. An alternate GPL was calculated for naphthalene using a depth of incorporation of 40 feet, and the resulting alternate GPL exceeded the capacity of the GPL spreadsheet to calculate, indicating that the threat to groundwater is extremely limited for this compound. A second alternate GPL was calculated assuming a depth of incorporation of 70 feet, which is the next depth from which a sample was collected at soil boring 8D. This alternate GPL exceeded unity, indicating that the threat to groundwater is extremely low for naphthalene at the Site.

The model results are presented in Appendix I and summarized in Table 4-4.

SECTION 5

Feasibility Screening

This section describes the site-specific remedial action objectives (RAOs) and the screening and evaluation processes for remediation of soil that is protective of human health and groundwater at the Site. Remediation options are screened based on site-specific factors to eliminate technologies that constrain effectiveness, implementability, or cost-effectiveness at the Site and to streamline the evaluation process for the technologies retained for a detailed evaluation.

5.1 Remedial Action Objectives

The objectives of this remedial action are to reduce concentrations of COCs, primarily PAHs, in soil to levels below appropriate risk-based cleanup criteria and to remove source material that may potentially impact the groundwater, to the extent technically feasible. To achieve the objectives, the Site will be remediated so that concentrations remaining in the soil are protective of human health and the environment.

The following RAOs are based on specific constituents, potential exposure, and future Site uses:

- Reduce the concentration of COCs in soil to below regulatory risk-based levels (residential SRLs) where feasible.
- Reduce the concentration of COCs in soil to below levels that could potentially impact groundwater above water quality standards.
- Restore the site, to the extent necessary, to support proposed future uses.

5.2 Remediation Technology Screening

To meet the site-specific RAOs, a range of remediation options was considered for the Site.

5.2.1 No Action

The no action response is considered during the development and analysis of alternatives as the baseline against which other technologies are evaluated. The no action response does not provide any additional remediation, containment, or security measures to reduce the potential risk to human health or the environment at the Site.

5.2.2 Institutional Controls

Institutional controls (ICs) are restrictive measures placed on the use of the Site to prevent or limit exposure to hazardous substances left in place at the Site. Typically, ICs are implemented as engineering and/or legal controls that are often used in conjunction with active remediation activities, such as treatment or containment. Often, it is necessary to implement multiple ICs to provide overlapping assurances of protection of future receptors. ICs result in restrictions that effectively limit the manner in which the Site can be used in the future.

5.2.3 Ex Situ Response Actions

Ex situ response actions for MGP sites consist of the removal of impacted soil or groundwater followed by treatment and/or disposal. For impacted soil, the response includes excavation of the impacted soil. The excavated soil is disposed of offsite at a permitted facility or can be treated onsite or offsite using enhanced biological or thermal treatment technologies. For impacted groundwater, this response may include pumping, treating, and disposing of Site groundwater to prevent migration offsite.

5.2.4 In Situ Response Actions

Several in situ response actions were considered for the Site, as presented in this section.

5.2.4.1 Monitored Natural Attenuation

The monitored natural attenuation response action provides no additional active remediation. It relies on natural chemical, physical, and biological processes to degrade contaminants in the soil and groundwater. This alternative requires ongoing periodic sampling and analysis of the soil and/or groundwater samples to monitor the degradation process.

5.2.4.2 Containment

Containment of elevated concentrations of PAHs in soil is a potential response that could be implemented to prevent exposure. Containment actions would be implemented to prevent potential human and/or ecological contact by constructing an engineered cover system over areas of elevated concentrations of PAHs in soil.

5.2.4.3 Thermal Desorption

In situ thermal desorption uses a series of subsurface or in-well heaters that cause the applicable chemicals to volatize. These contaminated vapors are captured and treated/oxidized prior to being released into the atmosphere.

5.2.4.4 Chemical Oxidation

In situ chemical oxidation (ISCO) mineralizes contaminants in place through the addition of a chemical oxidant, such as hydrogen peroxide, ozone, or sodium persulfate. The chemical oxidant is typically introduced into groundwater or saturated soil by injection into wells or the use of in-place soil mixing. Oxidants such as ozone can be introduced into the vadose zone through injections wells.

5.2.4.5 Soil Stabilization and/or Solidification

In situ soil stabilization uses chemical and pozzolan additives to immobilize and/or encapsulate contaminants in the soil. These chemical and pozzolan additives (cementitious material used in cements and concretes) are typically added to the soil by in-place soil mixing.

5.2.4.6 Bioventing

Bioventing enhances the natural biological activity through the introduction of atmospheric oxygen. Air is pumped into the soil through injection wells using low-pressure pumps. The injected air increases the oxygen level, allowing an increased rate of degradation of lighter and mobile fractions of organic contaminants in the soil. Bioventing is typically combined with monitored natural attenuation by measuring the oxygen depletion, and generation of carbon dioxide and other degradation products, in monitoring wells near the injection well.

5.3 Remediation Technology Screening Results

The remedial action for the Site is intended to meet the RAOs by addressing elevated concentrations of COCs in soil so that the threat of re-contamination and exposure at the Site is reduced or eliminated. To achieve this objective, soil remediation alternatives were selected during the screening process for further evaluation, which is described in Section 5.4.

5.3.1 Soil Remediation Alternatives

A summary of the remediation technology screening results is presented in Table 5-1. The screening evaluation for the additional excavated soil treatment options is presented in Table 5-2.

The remediation alternatives are evaluated in detail based on their effectiveness at achieving RAOs, implementability, and cost.

To evaluate effectiveness, consideration was given to the overall protection of human health and the environment; reduction in toxicity, mobility, and volume; compliance with ADEQ requirements; and the long-term and short-term effectiveness of the alternative.

To evaluate the implementability of each alternative, the technical feasibility; commercial and administrative feasibility; and ADEQ, City of Phoenix (COP), and public acceptance were considered.

Previously conducted feasibility cost estimates were used to evaluate remedial action costs. The costs were evaluated in ranges of low, mid-range, and high cost based on both capital and operational cost.

5.3.2 Soil Remediation Alternatives

5.3.2.1 Alternative 1 – No Action

Under Alternative 1, the no action alternative, no physical remedial actions would be performed to reduce the toxicity, mobility, or volume of contaminants identified in soil at the Site, and no land use controls or land use restrictions would be implemented at the Site. The no action alternative is presented to provide a baseline for comparison with other alternatives that provide a greater level of response.

Effectiveness: Because contaminants would remain at the Site under this alternative, future human health and environmental risks would continue to be present.

Implementability: The no action alternative would be technically easy to implement, but it is unacceptable because it does not protect human health and the environment.

Cost: No costs are associated with Alternative 1.

5.3.2.2 Alternative 2 – Institutional Controls

ICs under Alternative 2 include administrative land use controls (LUCs), Site access restrictions, and other restrictions to minimize potential exposure from Site contaminants. The Site is already secured by a fence and gates and has a full-time security monitoring system. Other ICs would include a Declaration of Environmental Use Restriction (DEUR) on the property title and inclusion of the facility in the Terradex LandWatch Service to prevent unauthorized activities onsite.

Effectiveness: If properly implemented and maintained, ICs would be effective in limiting human exposure to contaminated soil and potential pathways of concern (for example, dermal contact). Continued monitoring of ICs would be required to verify their continued effectiveness and ensure that the exposure pathways are being controlled. This alternative does not prevent the potential pathway of contamination from soil to groundwater.

Implementability: The difficulty would be moderate; while regulatory agencies may not find ICs favorable as a standalone remedy for the Site, ICs can effectively address risks associated with the dermal contact pathway. The use of ICs, while allowing continued use of the facility, severely limits APS's future uses of the Site. Because contaminants would remain at the Site under this alternative, any future changes to land use would require addressing contamination.

Cost: The cost range is estimated to be low. The total cost for Alternative 2 includes the administrative costs associated with implementing a Site DEUR, inspecting land use covenant implementation, performing annual monitoring to ensure the fencing is effective in preventing Site access, and training staff who work onsite.

5.3.2.3 Alternative 3 – Excavation and Offsite Disposal

Alternative 3 includes the excavation of soil exceeding Site cleanup goals. Asphalt pavement and concrete structures would be removed and disposed of offsite. Soil would be excavated using heavy equipment, loaded into trailers and hauled to a licensed offsite disposal facility. The Site would be backfilled with imported clean soil and the surface covered with landscape gravel.

Effectiveness: The excavation and disposal alternative would be an effective and permanent remedial action. This alternative would reduce potential risks to human health and the environment by eliminating contaminants above residential SRLs. The contaminated soil would be removed from the Site and transported to an offsite disposal facility, eliminating contact with potential receptors. The physical removal of the soil would eliminate the exposure of contaminants to receptors and eliminate the mobility of contaminants.

Implementability: This alternative would be difficult to implement. Removal of the soil would require mobilization and utilization of heavy equipment. To remove all soil exceeding SRLs, the excavation would need to be extended to the existing Site boundary. There is one area on Site, near boring 8D, where the soil exceeds cleanup goals to a depth of more than 40 feet. Excavation of soil to that depth would require the design and installation of a substantial earth support system and/ or the use of cased auger borings.

Furthermore, a substantial amount of active utilities exist at the Site, including a natural gas main and electrical, water, sewer, and communication utilities. These utilities would need to be protected in place or removed and replaced during excavation activities. Either option adds significant cost, and in some cases, additional safety considerations that must be considered and addressed to the project.

Excavation activities would result in significant disturbance both onsite and offsite. Surrounding streets may need to be closed during excavation and would have additional truck traffic during hauling of soil for disposal.

Cost: The cost of Alternative 3 is high. The alternative would include excavation, transportation, disposal, utility replacement, and deep soil removal with support system.

5.3.2.4 Alternative 4 – Containment by Capping and Institutional Controls

Alternative 4 includes the construction of an engineered cover system over the Site along with ICs as described in Alternative 2. The cover system would consist of the existing concrete slabs and asphalt pavement. New concrete asphalt pavement would be placed where asphalt is currently missing or damaged.

Effectiveness: If properly implemented and maintained, a cover system with ICs would be effective in limiting human exposure to contaminated soil and potential pathways of concern (for example, dermal contact). Annual inspection of the cover system, along with continued monitoring of ICs, would be required to verify the continued effectiveness and control of exposure pathways. This alternative would also reduce the potential of contamination from soil to groundwater by reducing or eliminating infiltration of water.

Implementability: The difficulty in implementing this alternative would be moderate. Regulatory agencies may not find the cover system with ICs favorable as a standalone remedy for the Site. The cover system and ICs can effectively address risks to the dermal contact pathway. While the use of a cover system would expand APS's use of the Site, future uses are still limited. Because contaminants would remain at the Site under a cover system, any future subsurface work, including replacement or repairs to utilities, would require breaching the cover system to perform the work. Also, any future changes to land use would require addressing contamination.

Cost: The cost range of Alternative 4 is estimated to be low to moderate. The total cost for Alternative 4 includes the capital cost of installing the asphalt and the administrative costs of implementing a Site DEUR; inspecting the covers system and fencing; conducting maintenance and repairs; and training staff who work onsite.

5.3.2.5 Alternative 5 – ISCO

This alternative consists of injecting a chemical oxidant into the impacted soil zones at the site. Because the impacted soil is located in the vadose zone, a gas-phase oxidant such as ozone could be used to achieve greater contact with impacted soil. The system would require the installation of an ozone generator and one or more new onsite injection wells. Several soil vapor monitoring wells (SVMW) would also be required to evaluate the effectiveness of the system. The SVMWs may be used for soil vapor extraction. The system

would be operated to maintain high levels of ozone in the subsurface over a relatively short period of time. The operation of the system would be monitored by measuring the soil vapor concentrations, the consumption of oxygen, and the production of carbon dioxide and degradation products (including methane) in SVMWs around the Site.

Effectiveness: The use of ISCO with ozone in the vadose zone has been effective with some high molecular weight compounds although it may not be possible to achieve levels below SRLs. The use of a gas increases the potential of oxidant contact with impacted soil. This alternative does have the ability to prevent the potential pathway of contamination from the soil to groundwater. However, it does not address potential soil contamination from lampblack located near the surface onsite.

Implementability: The difficulty of implementing the ISCO system is moderate to high because of its limited reach to deeper onsite soil. Regulatory agencies would not likely accept ISCO as a standalone remedy. The system requires the design and installation of an ozone generating system, installation of one or more injections wells, and installation of several SVMWs. The use of a system with a corrosive gas in a residential area may cause safety concerns and require inclusion of process safety systems. Also, installation of this system will likely require a special use permit from the COP. If soil vapor extraction is used, a county air permit may also be required. The injected ozone is highly corrosive. While the injection system could be designed for the corrosive environment, the impacts on the existing utilities in the area would need to be evaluated.

Cost: Cost of the ISCO system would be moderate to high. Capital cost of the ISCO system would include installation of an ozone generation system and one or more injection wells. Several SVMWs also would need to be installed to monitor system operation. The system would require ongoing long term operation, maintenance, monitoring, and repairs. Soil vapor monitoring would also likely need to continue for several months until the remediation is complete.

5.3.2.6 Alternative 6 – Bioventing

This alternative consists of installing a bioventing system to pump atmospheric air into one or more new onsite injection wells. The system would be operated to maintain oxygen levels in the subsurface near atmospheric levels. The operation of the system would be monitored by measuring the consumption of oxygen, as well as the production of carbon dioxide and degradation products, including methane in SVMWs around the Site.

Effectiveness: The effectiveness of a bioventing system would be limited. Most of the Site PAH compounds have high molecular weights, and remediation effectiveness would be limited and very slow. This alternative does have the ability to prevent the potential pathway of contamination from soil to groundwater.

Implementability: The difficulty of implementing the bioventing system is low to moderate because of its limited onsite use. Regulatory agencies would not likely accept bioventing as a standalone remedy. The system would be relatively easy to install onsite. The system would require the installation of soil vapor injection wells and SVMWs.

Cost: Cost of the bioventing system would be moderate. Capital cost of the bioventing system would include a small blower unit and wells. The system would require ongoing operation, maintenance, monitoring, and repairs. Also, soil vapor monitoring would likely need to continue for several years until the remediation is complete.

SECTION 6

Recommended Remedial Alternative

This section of the RAP describes the goals and objectives for the proposed remedial action and presents detailed descriptions of the planned remedial activities. This section includes details of the regulatory cleanup requirements; pre-remediation and remediation activities; sampling and analysis procedures; Site restoration; and post-remediation activities.

Based on the technology evaluation presented in Section 5.4, the recommended remedial action to meet RAOs is Alternative 3, Excavation and Offsite Disposal. The excavation depths will generally be up to 5 feet over the entire site and up to 40 feet in specific hot spot areas as shown in Figure 6-1. This remedial action will reduce the concentration of PAHs and VOCs in soil at the Site to below residential SRLs. A detailed discussion of the proposed excavation areas and how the recommended remedial action will meet the RAOs is provided in Section 6.4.6.

A project-specific Health and Safety Plan (HASP) will be submitted for the remedial activities of the project. The HASP will outline the minimum health and safety requirements for personnel working on the Site remediation. The HASP will include the following:

- Description of the project Site
- Project organization and tasks to be performed
- Hazard evaluation and control
- Personnel training and requirement
- Personal protective equipment (PPE)
- Air monitoring specifications
- Decontamination
- Emergency response plan and contacts

The Quality Assurance Project Plan (QAPP; CH2M, 2016) for APS's MGP sites was revised in May 2016. The document was reviewed and approved by ADEQ in a letter dated June 3, 2016. The QAPP was developed as specified in *EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations* (EPA, 2001a). The QAPP provides a description of the analytical methods to be used, the applicable laboratory Practical Quantitation Limits for each analytical method, and sample handling and storing procedures.

6.1 Cost Recovery

The remedial actions to be implemented based on this RAP will be undertaken by APS. APS will not seek to recover any of the costs associated with the implementation of the RAP from any other responsible party.

The undersigned hereby certifies that to his/her knowledge cost recovery from another responsible party will not be made.

State of Arizona)
) SS:
County of Maricopa)

Signed this 13th day of March, 2017.

Judith Heyesel
Signature [APS Representative]

Remediation Project Manager
Title

SUBSCRIBED AND SWORN TO before me this 13th day of March, 2017.

Christine A Krantz
Notary Public

My Commission Expires: 06/15/2018

CHRISTINE A. KRANTZ
Notary Public - Arizona
Maricopa County
Expires 06/15/2018

6.2 Cleanup Criteria

The following sections present the selected Site cleanup criteria for the remedial action. The purpose of the cleanup is to allow residential and non-residential use of the property after remedial activities are complete and to protect the groundwater from potential impacts.

6.2.1 Contaminants of Concern

Based on former Site operations, results of previous and pre-design testing investigations, and the results of groundwater modeling, CH2M identified final COCs at the Site. The MGP-related COCs, primarily PAHs, can also be associated with creosote, which appears to have been stored at the Site, based on historical Site information. Additional potential COCs identified during the site investigations and/or groundwater modeling may not be related to MGPs or other known industrial operations at the site, but had analytical results that indicated further evaluation of the compound was required. These include 2,4-dinitrotoluene and diethylphthalate. Arsenic was also identified in the soil at the Site above SRLs, however, as discussed in Section 2.6, arsenic is naturally occurring in soils throughout Arizona and does not appear to be related to previous known industrial operations at the Site. Table 6-1 lists the compounds that were evaluated as potential COCs for the remedial activities. Table 6-2 presents the final COCs identified at the Site and the associated cleanup criteria.

6.2.2 Goal of Remediation

APS is conducting the remediation activities under the ADEQ's VRP oversight. The goal of this remediation is to reduce COC concentrations in the soil to levels below applicable regulatory cleanup criteria, as discussed in Section 6.2.3. The site COCs that will require remediation are primarily PAHs, but also include selected VOCs (Table 6-2).

6.2.3 Applicable Regulatory Cleanup Criteria

This section discusses both soil remediation criteria and water quality criteria (AWQS). Table 6-2 presents the COCs and applicable Site cleanup criteria for each compound.

6.2.3.1 Soil Remediation Criteria

Numeric soil cleanup regulatory criteria are established by ADEQ as SRLs and GPLs, which are described in the following sections.

Soil Remediation Levels

The SRLs are predetermined risk-based remediation levels derived from toxicity data using defined assumptions for possible exposure and are developed by the ADHS Office of Environmental Health for the ADEQ. SRLs are based on the following:

- EPA Region 9 Preliminary Remediation Goals
- Ingestion, inhalation, and dermal contact risk criteria
- An ELCR of 1×10^{-6} for Class A (known human) carcinogens, and 1×10^{-5} for Class B and C carcinogens
- An HI no greater than 1 for noncancer-causing contaminants

Because of the varied application of the SRLs, the underlying assumptions for their development are very conservative.

Application of the SRLs is based on future land use and the potential for contaminated soil to impact human health. Contaminated soil can be remediated to background concentrations, the predetermined SRLs (A.A.C. Title 18, Chapter 7, Article 2), or site-specific remediation standards. SRLs are established for both residential and nonresidential uses. Where soil is remediated to the nonresidential SRL, but above the residential SRL, the property owner must attach a DEUR to the property deed. Many of the compounds identified in the 2007 SRLs as carcinogens include residential SRL values for both 1×10^{-5} and 1×10^{-6} excess lifetime cancer risks (ELCRs). The Arizona Administrative Code (AAC), R18-8-205 states, "*a person who elects*

to remediate to a residential SRL may utilize a 1 x 10-5 excess lifetime cancer risk for any carcinogen other than a known human carcinogen. If the current or currently intended future use of the contaminated site is a child care facility or school where children below the age of 18 are reasonably expected to be in frequent, repeated contact with the soil, the person conducting remediation shall remediate to a 1 x 10-6 excess lifetime cancer risk."

The SRLs are generally applied in cases where there is little or no threat of contaminant migration to groundwater or surface water, because SRLs do not consider the potential for contaminants to leach to groundwater from soil. ADEQ has developed a screening model that provides numeric concentration estimates for contaminants in soil, below which groundwater quality can be maintained. These values are referred to as GPLs, which are discussed below.

Groundwater Protection Levels

In cases where impacted soil may pose a threat to groundwater, ADEQ has developed a model for determining soil concentrations protective of groundwater quality using mathematical calculations of contaminant partitioning between soil and groundwater to estimate GPLs. The modeling result is a projection of the leaching potential of COCs from impacted soil to groundwater. GPLs can be calculated for the site-specific conditions or a predetermined worst-case scenario may be applied. The worst-case scenario is referred to as the minimum GPLs, which are soil concentrations that are protective of groundwater quality under a condition where contaminated soil is in contact with groundwater. Site-specific GPLs are calculated using geotechnical data and physical properties of the compounds, as described in Section 4.

6.2.3.2 Water Quality Criteria

ADEQ has adopted AWQS that are generally used as discharge limits, but they also provide a guideline for water quality cleanup criteria. The AWQS are set forth in A.A.C. Title 18, Chapter 11, Article 4. These regulatory criteria are described in the following section.

Aquifer Water Quality Standards

For the protection of groundwater resources, Arizona has established the Aquifer Protection Program (APP), which includes established AWQS. The APP provides that any discharge to groundwater must not cause or contribute to a violation of applicable AWQS at a point of compliance. AWQS for drinking water-protected aquifers are the same as the federal maximum contaminant levels (MCLs) and currently all groundwater resources in the state are designated for drinking-water-protected use. Therefore, the AWQS that apply to groundwater remediation activities at the Site would be identical to the MCLs. Table 6-3 provides a listing of the applicable AWQS.

6.2.4 Soil Site Cleanup Criteria

The Site cleanup criteria are based on remediating accessible soil to concentrations that are protective of human health and the environment. Residential SRLs (utilizing a 1 x 10^{-5} ELCR), nonresidential SRLs, and site-specific GPLs were compared for the Site, and the lowest appropriate remediation level, based on future land use, was selected by APS. To allow future residential and non-residential use of the Site property, the residential SRLs will be used as the soil cleanup criteria. Residential SRLs were lower than the calculated GPLs for all COCs, as shown in Table 6-2. The following sections summarize current COC concentrations that were identified at the Site compared to the Site cleanup criteria (i.e., residential SRLs).

6.2.4.1 PAHs

Concentrations of the following PAH constituents exceeded the residential and/or the nonresidential SRL in one or more samples at the Site:

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene

- Chrysene
- Dibenz(a,h)anthracene
- Fluoranthene (did not exceed non-residential SRL)
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Pyrene (did not exceed non-residential SRL)

For the compounds listed above, benzo(a)pyrene and dibenz(a,h)anthracene have the lowest residential SRL (0.69 mg/kg) and nonresidential SRL (21 mg/kg).

The PAH constituents exceeding the nonresidential SRL were detected in samples collected throughout the site up to 40 feet (in boring 8D). The deepest samples exhibiting concentrations above residential and nonresidential SRLs were located in the northeast corner of the Site. Samples from 16 to 17 feet in borings GB-5 and 17S in the northwest portion of the Site also contained PAHs above residential and/or non-residential SRLs. Throughout the southern portion of site, concentrations of PAHs above SRLs were confined to the upper 8 feet. However, the highest concentrations of many of the PAHs detected at the Site were detected in boring 11S at a depth of 8 feet in the southern portion of the Site.

As discussed in the GPL modeling section (Section 4), site-specific GPLs were calculated for several PAH constituents. The calculated site-specific GPLs for the COCs were higher than the residential SRL for all COCs, and were typically orders of magnitude higher than the nonresidential SRLs. Only naphthalene was detected in samples at concentrations greater than the minimum GPLs (not site-specific) but not above calculated site-specific GPLs.

6.2.4.2 VOCs

VOCs exceeding the residential and/or nonresidential SRLs were observed in three samples at the Site. Two of the samples were collected during the previous investigations from sample locations GB-3 and MP-2 in the northeast portion of the Site at a depth of approximately 7 feet. Benzene was detected above nonresidential SRLs in both locations. Toluene and total xylenes also exceeded nonresidential SRLs in the sample from 7 feet in boring GB-3. During the pre-design testing investigation, 1,2,4-trimethylbenzene exceeded the residential SRL in one sample (boring 8D at 5 feet), also located in the northeast corner of the Site. Additionally, samples from borings 7D, 8D, and 19s in the northeast portion of the site and boring 11S had laboratory detection limits above the nonresidential SRL for benzene.

None of the detected compounds in samples from the pre-design testing investigation exceeded a calculated GPL for VOCs. However, samples from 5 feet bgs in boring 8D and 15 feet bgs in boring 7D had laboratory detection limits above the SRL and calculated GPL for benzene. Two samples from previous investigations (GB-3 and MP-2 at approximately 7 feet bgs) also exceeded the calculated GPL for benzene of 12 mg/kg.

6.2.4.3 TPH

The SRLs do not include a standard for TPH, and rely on petroleum constituents such as benzene, ethylbenzene, toluene, and total xylenes. Because TPH represents a group of individual hydrocarbon compounds, no specific GPL can be calculated using the ADEQ model. However, site investigations have indicated that the TPH detected on the Site is generally a “heavier” fraction (carbon chains greater than 10; for example, > C10) of TPH that has low mobility in soil and low partitioning into groundwater. TPH has been detected at concentrations as high as 4,680,000 mg/kg at a depth of 5 feet in soil that appeared to be primarily lampblack material. The deepest detections of TPH were in a sample collected from boring 7D at a depth of 45 feet bgs (3.11 mg/kg) and in boring GB-3 at 60 feet bgs (10 mg/kg).

6.2.4.4 Metals

Arsenic has been reported at the Site in concentrations greater than the residential and nonresidential SRL. Arsenic exceedances were found in 23 samples from 14 different borings at depths ranging from 3 to 65

feet. Concentrations above the residential and nonresidential SRL of 10 mg/kg ranged from 10.1 to 16.4 mg/kg. Arsenic is not typically associated with the types of processes used at the Site, and arsenic concentrations soil samples was representative of concentrations typically found in soil in Arizona as described in Section 2.6.1.

6.2.5 Groundwater Site Cleanup Criteria

As presented in Section 2.5.2, groundwater quality was evaluated in comparison to the applicable Arizona AWQS presented in Table 6-3. A groundwater monitoring well was installed during the second phase of the pre-design testing to evaluate groundwater quality beneath the Site. PAHs were not detected in samples collected from this well, and metals concentrations in the groundwater were below the applicable AQWS. Therefore, the groundwater beneath the Site does not appear to be impacted from previous industrial activities, and groundwater cleanup activities are not included in the remedial activities.

6.3 Pre-remediation Activities

To meet its remediation goals for the Site, APS will perform several pre-remediation activities in advance of the contractor's start of work. These activities include the following, which are detailed in this section:

- Property Ownership Review and Coordination
- Regulatory Review and Permitting
- Public Notice and Public Participation
- Utility Clearance

6.3.1 Property Ownership Review and Coordination

The entire Site property is owned by APS. No access agreements will be required unless the work extends onto the public right-of-way. If required, right-of-way permits will be obtained from the City of Phoenix.

6.3.2 Regulatory Review and Permitting

As part of the remedial construction activities, federal, state, and local laws require that APS obtain certain environmental- and engineering-related permits. APS has begun work on several of these permits, however, many cannot be completed until the remedial design is approved and a contractor is selected. The following permits have been identified as necessary to implement the RAP.

Discharge Permit to City's Publicly Owned Treatment Works

A small amount of water is expected to be generated from decontamination and cleaning activities. There may also be onsite stormwater that comes into contact with impacted soil. Contact stormwater and any water from decontamination or cleaning will be pumped into a storage container and, depending on the analytical results, either discharged into the COP sewer for further treatment at the publicly owned treatment works (POTW) or disposed of at an offsite disposal facility. Discharge into the POTW will require a permit from COP. Information needed for the permit includes quantity of water, time frame for discharge, chemical compounds in the water, and monitoring requirements.

Dust Control Permit

A dust control permit will be required from the Maricopa County Air Quality Department. The dust control plan for the Site will be provided to Maricopa County and COP. At minimum, dust control plans will address requirements specified in Maricopa County Rules.

Approved Haul Routes/Street Closure/Easements

A construction haul plan will be required by COP and the Arizona Department of Transportation prior to the beginning of remedial activities. Haul permits are typically obtained by the transportation contractor. APS will obtain preapproval by COP and Arizona Department of Transportation of haul routes prior to the selection, based on anticipated destination and estimated trucking activities.

Section 404 Permit; Threatened and Endangered Species Assessment; and Cultural and Historical Resources Assessment

Construction activities that result in discharge of dredged or fill material into the waters of the United States require a Clean Water Act, Section 404 Permit, issued by the U.S. Army Corps of Engineers (USACE) and 401 Certification by ADEQ. Since the project will not impact any waters of the United States or wetlands, no consultation with USACE will be required.

Excavation and related activity at the Site is anticipated to have no effect on threatened and endangered species or their habitat. This assessment is based on the lack of suitable habitat for any special-status plant or wildlife species as identified by the U.S. Fish and Wildlife Service or Arizona Game and Fish Department. Therefore, no Endangered Species Act consultations will be necessary.

The only building that was located on the site was constructed in 1972, and therefore, was not considered a historical structure.

Arizona Department of Water Resources Permit for Dewatering Activities

It is not expected that the excavation activities at the Site will require dewatering for completion based on current groundwater levels. However, if dewatering is required, the final dewatering system design will be prepared by the remediation contractor in accordance with requirements in the project specifications. APS will obtain the required Arizona Department of Water Resources permit to meet permit conditions and reporting requirements.

City of Phoenix Grading and Drainage Permit and Stormwater Management Plan

A COP grading and drainage permit may be required for excavations at the Site during remedial activities. Drainage plans and the associated checklist must be submitted to COP unless it can be demonstrated that the Site qualifies for one of the following exceptions:

- Grading in an isolated, self-contained area if the Planning and Development Director finds that no apparent danger to private or public property can now or thereafter result from the grading operations.
- Grading in public rights-of-way and easements done under a permit issued by the Planning and Development Director.
- Grading by a public utility company in private easements which does not obstruct a natural watercourse.

A stormwater management plan must accompany the grading and drainage plan if the excavated or graded area exceeds 1 acre, which applies for the Site.

Arizona Pollutant Discharge Elimination System Construction General Permit

The proposed remediation activities will not result in a discharge of process waters to waters of the United States, and therefore, will not require coverage under an individual Arizona Pollutant Discharge Elimination System permit. If the anticipated area of disturbance at the Site during the remedial activities exceeds 1 acre, a general construction permit will be required per A.A.C. R18-9-A905 and 40 *Code of Federal Regulations* (CFR) 122.26(b)(15). A Notice of Intent must be submitted to ADEQ to obtain coverage under the general permit. Additionally, a stormwater pollution prevention plan (SWPPP) will need to be prepared for the Site. The SWPPP will include best management practices and inspection procedures during all construction activities.

Special and Hazardous Waste Requirements

The soil to be excavated from the Site meets the definition of an Arizona Special Waste petroleum-contaminated soil (Special Waste PCS) since soil sampling has indicated that PAHs and selected VOCs are present in the soil above residential and non-residential SRLs. Therefore, offsite disposal of the soil requires that the generator have a Special Waste Generator ID Number and that the transporter is registered with ADEQ as a Special Waste Shipper. If soil excavated from the Site contains contaminants in concentrations

exceeding hazardous waste TCLP levels, the soil will be transported to a facility licensed to receive hazardous waste, but will be transported as a Special Waste PCS per the MGP exemption discussed in Section 6.4.8, therefore, a hazardous waste generator ID number will not be required.

APS will use a qualified contractor or contractors to transport materials for offsite disposal. APS will verify that any contractor used has the appropriate authorization from ADEQ or EPA to transport the waste materials.

If the soil exhibits the hazardous waste characteristics of corrosivity, reactivity, or ignitability, based on analytical results for these parameters, it will be managed as a hazardous waste and will be properly manifested. Copies of manifests will be submitted to ADEQ.

Special Waste PCS and/or hazardous waste will be transported to a facility permitted for disposal of these wastes. The soil will be stored prior to disposal in accordance with the requirements for Special Waste PCS or the requirements for hazardous waste, if applicable. APS will report quantities of special waste shipped from the Site via ADEQ's Special Waste Generator Annual Report Form.

National Emissions Standards for Hazardous Air Pollutants Notification and Demolition Permit

There is a potential for asbestos-containing materials (ACM) to be present on subsurface structures or pipelines located within the limits of the excavation. If suspected ACM is encountered and/or is planned to be removed, a certified AHERA inspector will evaluate the structure and collected any required samples. If the presence of ACM is verified, an asbestos abatement contractor will be used to complete the removal, and the appropriate NESHAP notifications will be made to Maricopa County at least 10 days before removal of the ACM.

6.3.3 Public Notice and Public Participation

APS has a community relations and ongoing public involvement program planned for the Site. APS will perform the ADEQ-required public notice as specified in A.R.S. Section 49-176 in addition to other proactive public participation activities. APS will prepare Site status newsletters in both English and Spanish. The newsletters will be distributed to the neighboring residents, businesses, and community leaders. A mailing list will be developed to include community leaders, media outlets, neighboring businesses, residents, and interested community members

As part of APS's continuing public involvement program, once the RAP is completed and approved by ADEQ, additional outreach measures will be taken, including the following:

- Develop a specific community relations program that includes state and local participants.
- Update the newsletter to include RAP information and distribute to interested parties.
- Conduct a community leader briefing.
- Post a sign at the Site with the name and telephone number of a person who may be contacted for information regarding the field work in accordance with A.R.S. Section 49-176(A)(2)(a).
- Provide construction updates to the community once the work at the Site has begun.
- Hold a neighborhood meeting that will be noticed with a door hanger, newsletter and coordinated with ADEQ VRP
- Post a legal notice in the Arizona Republic regarding the availability of the RAP and comment period
- Provide a public comment period (30 days) as required in Section §49-176. The comment period will run concurrent with the activities above.

The remediation at the Site is anticipated to take approximately 9 months. During this time, APS will develop a construction progress newsletter for periodic distribution to the community.

6.3.4 Utility Clearance

During the pre-design testing investigation, known utilities were located with the assistance of Blue Stake and utility personnel. AZTEC was also hired to designate utility lines using signal line generators and ferrous magnetic locator method, and to survey the locations of the utilities. The objective of the utility evaluation was to identify utility locations and potential issues that may have impacted the soil investigation and the remedial design. Figure 6-2 shows the location of detected utilities.

Several utilities will require support, removal, or relocation during planned excavation. The major public utilities are within the city's right-of-way, with some adjacent or extending onto the site. The major utilities include the following:

- Several sanitary sewer pipeline connections between the building foundation and the sanitary sewer main in Montezuma Street and South Fourth Avenue
- Buried communication lines along the north boundary of the site.
- Natural gas supply lines along the north and east boundaries of the site.
- Four-inch-diameter steel water pipeline running east from the building to the supply line along the east side of Montezuma Street.
- Overhead high voltage electrical power line along the south boundary of the site.
- Overhead electric service lines along the east and west boundary of the site.

The proposed remedial action is to excavate impacted soil around these utilities on the Site. Existing utility lines that supplied service to the building will be removed and capped. Existing utilities will be supported or relocated as necessary. If the utilities require temporary relocation, APS will work with the appropriate utility company to determine the technical feasibility of relocating the utility as well as other possible alternatives to relocation. If additional utilities or structures are unearthed, it may be necessary to have a private utility locator trace and map them before the excavation proceeds.

Because of the presence of the underground and overhead utilities in the proposed excavation areas, an updated Blue Stake ticket will be maintained at all times throughout the project.

6.3.5 Access Agreements

Prior to the start of remediation activities, APS will obtain required access agreements or permits with COP for any work in the City's right-of-way.

6.4 Remediation Activities

APS will select a contractor to perform remediation activities at the Site. This section presents the proposed plan for the Site remediation. The activities include the following:

- Mobilization
- Site security and access
- Site preparation
- Protection of existing Site features
- Work, decontamination, and support areas
- Dust and odor control
- Excavation activities
- Air quality monitoring
- Soil Segregating
- Transportation of waste and borrow fill

6.4.1 Mobilization

The contractor selected by APS will be responsible for mobilization to the Site. APS will gain prior approval from COP for Site access locations, construction trailer locations, and utility hookups such as water, sewer, electrical, and phone. The following activities will be performed as part of mobilization:

- Construction trailers and the required utility hookups will be placed (CH2M/APS trailer and contractor trailer). Trailers will be equipped with all equipment listed in the contract specifications, including heater, air conditioning, lighting, electrical, telephone service, fax machine, and copier.
- Equipment mobilization will include excavators, loaders, pressure washers, sampling equipment, air monitoring equipment, and health and safety equipment.
- Runon/runoff control measures will be established that may include silt fences, hay bales, and silt curtains.
- A preconstruction meeting will be conducted to review all aspects of the project, including health and safety, access, authorized personnel, construction schedule, change orders, odor and dust control, storm water management, and soil and debris segregation.
- Video and photographs will be used to document the preconstruction condition of all equipment, roads, driveways, buildings, and any features that might be affected by the remedial activities. This documentation will be conducted prior to the initiation of any construction activities at the Site and updated as Site conditions change.

6.4.2 Site Security and Site Access

The site is currently enclosed by a 6-foot chain-link fence with access controlled by full-time security monitoring. Additional fencing will be placed around any work areas that extend beyond the existing fence. The configuration of the perimeter fence and Site access is presented on Figure 6-1.

Access to the project Site will be limited to APS, CH2M, and contractor personnel. All other visitors, including utility and COP personnel, will need to be escorted on the Site by a designated person selected by APS. All employees and visitors will be required to check-in and sign a visitor's log located in the contractor's trailer. Only personnel with the proper training and safety equipment who have reviewed and signed the project HASP will be allowed access to the work area. The contractor will supply, install, and maintain all road markings, signs, and barriers to prevent vehicle traffic access to certain areas. During nonworking hours, the contractor will secure the Site to ensure that no unauthorized personnel, such as trespassers, vagrants, children, or animals, enter the Site.

6.4.3 Site Preparation

The following is a summary of the tasks will be implemented during the Site preparation phase of the project. These activities are detailed in other sections of this RAP.

1. Contractor will mobilize to the Site and prepare the Site for work activities.
2. Site is enclosed by a 6-foot chain-link temporary fence. The fence is covered with fence fabric to limit visibility into the work area and minimize dust migration from the work area. If necessary, misters will be installed on the top of the fence to help prevent dust from migrating offsite.
3. Work, decontamination, and support areas will be identified and clearly marked.
4. Temporary facilities and utilities, such as office trailers, sanitation facilities, power, lighting, and telephones will be installed, as necessary, for use by the onsite personnel.
5. Existing utility lines affected by the planned work activities will be located, secured, and temporarily supported, if necessary.

6. Asphalt paving and concrete slabs located within the excavation area will be removed.
7. Existing trees within the excavation area will be removed.

6.4.4 Protection of Existing Site Features

All necessary precautions will be taken to protect the existing above- and below-ground structures surrounding the Site. Site features requiring protection during remedial activities will be identified and the necessary protective controls installed prior to excavation. The main features of concern are the buried gas, communication, and water lines along the site perimeter and the overhead electrical power lines.

6.4.5 Work, Decontamination, and Support Areas

Prior to beginning remedial activities, the Site will be divided into work, decontamination, and support areas as defined by the HASP. This section outlines the three areas to be established by APS, CH2M, and the contractor.

6.4.5.1 Work Area

The work area is the portion of the Site where excavation activities will be performed. The planned excavation will be performed in small sections to minimize the possibility of adverse effects caused by a significant rain event. Barricades with caution ribbon will be installed within the work area to designate an exclusion zone. To minimize the potential for cross contamination from the excavation area, the following procedures will be followed:

- Personnel not directly involved with the work activities will not be allowed within this zone.
- All personnel and personal vehicles will park in a designated lot outside the project work area. All personnel will enter near the construction trailers and sign-in daily.
- All personnel entering the exclusion zone will be required to wear appropriate PPE.
- Personnel leaving the exclusion zone will be decontaminated prior to exit.
- All PPE will be collected and disposed of properly.
- All trucks loaded for off-haul of impacted material will be dry decontaminated before the truck leaves the Site. This includes the truck, trailer, and tires. All loads will be covered before leaving the Site. Tracking out material will be prevented by loading trucks on clean asphalt. Asphalt will be removed only as necessary and as the excavation proceeds and the truck loading area may have to be adjusted to accommodate the excavation and prevent track out. If it is necessary to load the trucks in areas where the asphalt has been removed and in the event of rain, one of two options will be implemented:
  - **Option 1** – Suspend loading operations and off-hauling of impacted material.
  - **Option 2** – Place ¾-inch gravel on the ground between the loading point and the Site access point.
- All equipment used for excavation of impacted soil will stay within the exclusion zone. If the equipment leaves the exclusion zone or will come into contact with clean soil, the equipment will be decontaminated.

Impacted material will be segregated as described in Section 6.4.8. The contractor will only excavate the soil that can be loaded and hauled out the same day or placed in a lined stockpile area or in roll-off containers to minimize the amount of soil potentially causing fugitive odors and dust. Soil stockpiles or roll-off containers will be covered each night when not in use.

6.4.5.2 Support Area

The support area is located outside the exclusion zone where no PPE is required. This area includes the construction trailers, designated eating and smoking areas, parking lot, material storage, visitors' area, and vehicle access.

6.4.5.3 Decontamination Area

The decontamination area will be located between the work area and the support area. All personnel will be required to enter and leave the work area through this access. If necessary, the contractor will set up a three-stage decontamination area with plastic bins that will be lined with plastic sheeting. The workers will be required to remove all PPE and equipment that was used within the work area. Boots will be rinsed and scrubbed with brushes to remove any residual contamination. All PPE will be disposed of properly. No smoking or eating will be allowed in the work or decontamination areas.

6.4.6 Excavation Activities

This excavation plan was designed to manage the possible uncertainties that typically accompany remediation of a Site with a lengthy history of multiple activities. The planned excavation is to accomplish the RAOs. The specific excavations include:

- Remove soil to up to 5 feet in depth over the entire site.
- Remove PAH and VOC-impacted soil in specific hot-spot areas that exceed residential SRLs. The proposed excavation areas include:
  - Excavate soil up to 10 feet in depth in northwest and central areas of the site (shown as Excavation areas 2, 3, 5, 6 and 7).
  - Excavate soil up to 20 feet in depth in selected northern areas of the site [shown as Excavation Area 1 (boring GB-5), Area 4 (boring 17S), Area 8 (boring 7D), and Area 10 (boring 23D)].
  - Remove deep-impacted soil to approximately 40 feet in depth in northeast area of the site. [shown as Excavation Area 9 (borings 19S, 8D, MP-2 and GB-3)].

The proposed excavation locations are shown on Figure 6-1.

6.4.6.1 Excavation

Based on previous investigations and the pre-design testing investigation, CH2M estimates that approximately 43,000 tons of impacted soil will be removed by the contractor and off-hauled to a special waste landfill or for thermal treatment at an APS-approved offsite treatment facility. APS will develop an excavation plan with the contractor based on the following criteria:

- Health and safety requirements will be adhered to for the protection of workers, Site personnel, and the community (monitoring, odor and dust control, noise).
- Underground and overhead lines will be supported, rerouted, or taken out of service prior to excavation.
- Excavation will be performed to remove the maximum amount of material that exists at concentrations above the cleanup criteria for the Site.

The excavation plan will be based on the following criteria:

- Contractor hours: 5 days per week, 10 hours per day
- Excavation rate: 100 to 300 tons per day
- Material off-haul: 5 to 15 trucks per day (average tonnage: 20 tons per truck)

6.4.6.2 Debris Cleaning and Processing

Construction debris, such as buried concrete, abandoned utilities, and brick, will be removed and segregated during the excavation activities. This material will be visually inspected to evaluate whether the material is appropriate for disposal at a recycling facility or an APS-approved, local permitted solid waste landfill. Debris that cannot go to a recycling facility or a local permitted solid waste landfill because it is contaminated will be manifested as special waste and off-hauled to a licensed landfill.

If material that appears to be composed of ACM, or if transite (asbestos) pipe is encountered during the remedial activities, an AHERA-certified asbestos inspector will be called to the Site to inspect the material or piping and collect samples. In the event asbestos is found, a licensed asbestos abatement contractor will be contacted to remove and dispose of the asbestos. Depending on the amount and condition of the piping, encapsulation of the area may be required before the material can be removed. All necessary demolition permits and NESHAP notifications will be made. The material will be double-bagged, labeled, manifested, and disposed of at an APS-approved disposal facility.

6.4.7 Air Quality Monitoring

Air quality monitoring will be performed during the remedial activities in accordance with the project HASP. Air monitoring is designed to identify and quantify airborne contaminants and evaluate the impact of Site activities on the worker, and to reduce and/or eliminate the migration of dust and odors offsite. Real-time air monitoring will be required during trenching, excavating, and loading of impacted soil. At no time will the contractor perform these activities without a designated Site Safety Coordinator (SSC) overseeing the work area. Daily safety meetings will be conducted to review air monitoring results with workers and discuss the planned work schedule for that day's activities. The SSC will be responsible for determining appropriate PPE and decontamination procedures. In addition, the SSC will conduct hourly air monitoring of the Site perimeter and document readings for VOCs, carbon monoxide, hydrogen sulfide, oxygen, lower explosive limit, dust, and noise. A copy of the perimeter logs will be kept in the contractors' trailer, which will be available upon request and will become a part of the RAP documentation record.

6.4.7.1 Dust and Odor Control

Dust and odor controls will be implemented at the Site to ensure worker safety and minimize offsite emissions. The following mitigation measures will be implemented at the Site to control emissions:

- Continuously monitor wind direction with a wind flag for changes. Wind direction, wind speed, barometric pressure, and temperature will also be downloaded daily from http://www.wunderground.com/US/AZ/COP weather station and recorded in the Site log.
- Minimize the size of excavations.
- Cover stockpile and roll-off containers with plastic sheeting or a tarp when not in use.
- Install water misters at the fence line to intercept the dust and odors prior to leaving the excavation area.
- Apply water alone or water with environmentally safe additives (for example, Envirotech Vapor Suppression, Simple Green, or equivalent) on the excavation area, haul roads, and roll-off containers to control dust and other emissions.
- Apply environmentally safe chemical suppressants or foams (for example, Eco Sorb, Citriclean, Rusmar© or equivalent).
- Cover exposed areas with clean fill.
- Stop the excavation activities if Site conditions are such that other mitigation measures prove unsuccessful in controlling emissions.

The contractor will be responsible for performing all dust and odor controls during the remedial action. The effectiveness of the dust and odor controls will be determined by the results of the air monitoring. Dust control activities will be performed in accordance with the Dust Control Plan and Maricopa County Regulations.

6.4.7.2 Air Monitoring

Health and Safety Air Monitoring (Active Work Areas)

A detailed description of the practices and procedures used will be included in a site-specific HASP. The contractor will be responsible for monitoring its employees. At a minimum, each employee should have completed a 40-hour training course for hazardous waste site workers (Occupational Safety and Health Administration 29 CFR 1910.120) and all appropriate refresher courses, be part of a medical monitoring program, and be certified to wear a respirator. Health and safety monitoring will be performed using the following equipment:

- Flame ionization detector (FID) or photoionization detector (PID) for monitoring VOC levels in air.
- Colorimetric tubes to identify specific types and concentrations of VOCs in the air.
- Combustible gas indicator for monitoring oxygen, carbon monoxide, hydrogen sulfide, and explosivity levels.
- Miniram dust meter (PDM-3 or equivalent) for real-time dust level monitoring.
- Decibel meter to monitor noise levels.

The contractor will monitor the work area at all times while excavation activities are being conducted. Additionally, the contractor will monitor the perimeter of the work area on an hourly basis during work activities. The results of the work area and perimeter monitoring will be immediately documented and maintained onsite for the duration of the project. At the conclusion of the project, the records will be turned over to APS.

Baseline (Background) Air Monitoring

Baseline (background) monitoring will be conducted at all monitoring locations as specified for perimeter air sampling. Samples will be collected with HIVOL samplers and SUMMA® canisters and analyzed using EPA Compendium Method TO13A and EPA Compendium Method TO-14, respectively. Samples will be collected prior to any excavation at the Site during the mobilization activities. The background samples will be submitted to a qualified ADHS-licensed laboratory for analysis. Background sample results will be compared to air analytical results obtained during the remedial activities.

Background samples will also be collected using hand-held monitoring equipment as specified in the HASP for air monitoring. The data will be collected within the Site and at the upwind and downwind perimeter of the Site. The data will be recorded and stored onsite for comparison during the remedial activities.

Perimeter Air Monitoring

During remedial activities with the potential to generate air emissions, perimeter air monitoring will be conducted continuously. This air monitoring will be performed to ensure compliance with project action levels, which are calculated based on a 6-month and a 1-year exposure duration. The EPA Regional Screening Levels for air quality (see https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016) were used to calculate the action levels, based on an assumed 26 year residential exposure duration. This is the relevant update to the EPA Region 9 Preliminary Remediation Goals, Ambient Air Values, which were previously used. Because of the short duration anticipated for the excavation activities, maximum allowable ambient air concentration values for a 6-month exposure duration were calculated and included on Table 6-4.

The typical air monitoring positions will include one upwind sampler and one downwind sampler with respect to the prevailing wind direction, predominantly from the west or east. Because of the site's proximity to surrounding business, four perimeter air monitoring stations will be used during excavation. Figure 6-3 presents the proposed air monitoring locations. Detailed procedures, analytical methods and quality assurance (QA) and QC are contained in the QAPP (CH2M, 2016).

Each sampling location will be equipped with a modified high volume (HIVOL) sampler that will consist of a sampling pump system with a flow range greater than 200 liters per minute, an orifice and magnehelic gauge to document continuous flow rate, and a sample module that includes a polyurethane foam (PUF) and/or XAD-2 cartridge and quartz filter. Air samples will be collected on a 24-hour basis during excavation and waste loading/hauling activities. Each sample will be analyzed for SVOCs by EPA Compendium Method TO13A high-performance liquid chromatography (HPLC).

If volatile emissions are suspected based on FID/PID results, previous sampling results, or significant odor sources, additional air samples will be collected at all monitoring locations. Air samples will be collected in SUMMA® canisters over an 8-hour period or the duration of the work day and analyzed by EPA Compendium Method TO15. All air samples will be submitted to a qualified ADHS-licensed laboratory for analysis.

If significant amounts of asbestos pipe need to be removed from the Site, and there is a chance of it being broken during removal, the abatement contractor will be required to perform air monitoring. This monitoring may be conducted using phase contrast microscopy methods.

All air monitoring results will be immediately documented and maintained onsite for the duration of the project. At a minimum, documentation will include equipment calibration data, background concentrations, date of monitoring, monitoring results, monitoring locations, source description, air temperature, relative humidity, and wind direction.

Optional Real-Time Perimeter Air Monitoring

As an alternative to the HIVOL sampling, APS may select to use real-time monitoring in place of the HIVOL samplers using the following:

1. Up to four individual weather-tight monitoring stations installed around the perimeter of the site, each equipped with a gas chromatograph (GC) for the measurement of VOCs and an aerosol meter for the measurement of PM_{10}
2. A meteorological system for the continuous monitoring and collection of weather-related data
3. A computer control system to integrate system components and log monitoring/sampling data
4. An alarm system linked to the analytical instrumentation by an integrated communication package.

The GCs will measure total VOCs by passing the air sample over an analytical detector and electronically measuring the response. If the total VOC value exceeds 0.5 ppm, the GC will switch to a compound specific analysis for individual MGP constituents, including benzene. Direct-reading, real time MIE DataRam meters, or equivalent, will be used to monitor for dust in the upwind and downwind locations. Dust meters will be configured to respond to PM_{10}.

Readings from the upwind location and the downwind locations will be compared to the action level. The computer control and alarm systems will be used for the interpretation of the real-time dust monitoring results. The alarm system will immediately notify onsite personnel if action levels are exceeded so that corrective actions may be taken.

Confirmatory PAH samples will be collected weekly using high-volume polyurethane foam samplers in accordance with U.S. Environmental Protection Agency Method TO-13. These PAH results will also be used to calibrate PAHs with the real-time particulate monitoring Confirmatory VOC samples will also be collected to verify the results of real-time monitoring when working in area of VOC impacted soil.

6.4.8 Soil Segregating

This section provides a summary of waste characteristics from previous sampling; the goals of waste segregation and waste types; and a summary of soil segregation methods and field screening protocols to follow to appropriately classify the excavated soil.

In April 2000, the United States Court of Appeals for the District of Columbia Circuit vacated the use of the TCLP for the evaluation of MGP waste. Therefore, MGP waste is not considered a hazardous waste unless it exhibits the characteristics of ignitability, corrosivity, or reactivity. This was confirmed by ADEQ in a letter to APS, dated April 16, 2001 (ADEQ, 2001). This letter is included in Appendix J. Regardless of the regulatory definition, APS has elected to dispose of any soil exceeding 0.5 mg/L TCLP benzene or 5 mg/L TCLP lead at a hazardous waste facility as a Special Waste PCS , in accordance with Arizona special waste generator and transportation requirements and utilizing Arizona Special Waste manifests.

6.4.8.1 Summary of Waste Characteristics from Previous Sampling

Waste characterization data were collected during the pre-design testing investigation. As presented in Table 2-10, all waste characterization analytical results for the soil were below the regulatory limits for hazardous waste (including TCLP limits for the characteristic of toxicity).

In addition to waste characterization samples, multiple soil samples have been collected and analyzed for total VOCs and/or metals during the previous site investigations and the pre-design testing investigation. The total concentrations of various compounds were also compared to the TCLP limits to evaluate the potential for generated waste from that area to exceed a TCLP limit. If the total concentration of a compound in the soil exceeded the TCLP regulatory limit by 20 times or more, the soil was considered to have the potential to exceed the TCLP limit, and may need to be disposed of as if were a hazardous waste. Based on this evaluation, there is a very low potential that the excavated soil at the Site will exceed the TCLP limits established for hazardous waste for most of the Site. However, in one sample (boring 9S at 3 feet bgs), lead exceeded the TCLP limit by more than 20 times. Soil from the area where total lead exceeded the TCLP limit by 20 times or more will be segregated to ensure proper waste characterization and disposal. Additionally, samples from borings GB-3 and MP-2 exhibited concentrations of benzene exceeding 20 times the TCLP limit of 0.5 mg/L. Soil from this area will also be segregated to ensure proper waste disposal and characterization.

6.4.8.2 Waste Segregation and Waste Types

The goal of the waste segregation program will be to effectively and efficiently identify and segregate the excavated soil into one of the five site-specific waste classifications. In general, the majority of the excavated soil will meet the requirements to be classified as a Special Waste PCS and transported offsite to a licensed landfill. In areas where soil has the potential to exceed 0.5 mg/L TCLP benzene (based on high TPH or total VOC results) or 5 mg/L TCLP lead (based on total lead results), special procedures will be implemented to ensure that the excavated soil is properly classified and managed. Special Waste PCS that exceeds the TCLP regulatory limits for benzene or lead will be disposed of at an APS-approved and EPA-permitted hazardous waste treatment, storage, and disposal facility (TSDF) under an Arizona Special Waste manifest.

For the purposes of waste classification at the Site, excavated soil will be segregated into the following five classifications:

- Non-impacted soil
- Construction debris
- Asbestos-containing material
- Special Waste PCS
- Special Waste PCS that exceeds 0.5 mg/L TCLP benzene or 5 mg/L TCLP lead

Non-impacted Soil

Non-impacted soil is soil that contains concentrations of indicator compounds below cleanup criteria, as described in Section 6.2. An example of non-impacted soil would be topsoil overlying impacted soil that does not contain MGP-related compounds. Soil that is classified as non-impacted may be used as backfill.

Construction Debris

Construction debris at the Site will consist of old concrete slabs, abandoned pipe, steel, and possibly asbestos pipe. This material, if visually free of contamination, and with the exception of asbestos, will be separated from the soil and disposed of or recycled at an approved facility. Construction debris that is not visually free of contaminants will be handled as an Arizona special waste and transported to an approved landfill for disposal.

Asbestos Containing Material

Any ACM will be handled according to regulatory requirements by a licensed asbestos abatement contractor, as described in Section 6.4.6.2, Debris Cleaning and Processing, and disposed of at an approved facility.

Special Waste PCS

Soil with concentrations of PAHs or BTEX compounds above non-residential SRLs will be classified as an Arizona Special Waste PCS. Special Waste PCS will be transported offsite for disposal to a landfill licensed to receive Special Waste PCS. Soil with concentrations above residential SRLs, but below non-residential SRLs, can be classified as n Arizona Solid Waste PCS and transported off-site to a solid waste landfill, in accordance with Arizona Special Waste requirements. However, since soil throughout the site has exceeded non-residential SRLS, APS will likely dispose of all excavated soil exceeding residential or non-residential SRLs as a Special Waste PCS.

Special Waste Soil that Exceeds 0.5 mg/L TCLP Benzene or 5 mg/L TCLP Lead

Soil that exceeds 0.5 mg/L TCLP benzene of 5 mg/L TCLP lead will be managed as a Special Waste PCS, but will be segregated from the other soil and disposed of at a hazardous waste facility. Soil that has the potential to contain greater than 0.5 mg/L TCLP benzene or 5 mg/L TCLP lead will be stored in roll-off containers separate from other wastes, pending analysis.

6.4.8.3 Methods of Soil Segregation

Soil segregation will occur through use of several methods during remedial activities. To achieve the goals of the soil segregation process, the following soil segregation procedures will be used:

1. Field evaluation of physical characteristics
2. Direct read field measurements
3. Fixed-base laboratory prescreening
4. TCLP determination for benzene and/or lead at a fixed-base laboratory

A flow chart for the segregation process is presented on Figure 6-4. The soil segregation process has been developed based on the results of the previous investigations and the pre-design testing investigation. The segregation process has been designed so that field staff will make the appropriate classification of excavated materials, while minimizing the generation of dust and odors and the addition of water to the soil.

Field Evaluation of Physical Characteristics

APS's consultant will preliminarily classify the physical characteristics of the soil using visual indicators. The presence of coal tar or lampblack and lead can be detected by a black or dark brown staining of the soil. Based on previous remediation at other MGP sites, the tar-impacted soil exhibits a very strong odor. Physical characteristic screening will be performed at a minimum sampling frequency of every 5 to 10 tons.

Direct Read Field Measurement

Field physical characteristics screening will be supplemented with field monitoring using direct-read instruments. Soil that is visibly stained will be tested by headspace using an organic vapor analyzer or organic vapor monitor. Direct-read field measurements will be collected at a frequency of approximately every 30 to 50 tons. The direct-read instruments will be calibrated to benzene because it has the highest

likelihood of being present in concentrations that exceed the 0.5 mg/L TCLP limit. Headspace analysis will also be performed on a portion of the soil samples that do not appear to be visibly stained to support the identification of soil impacted by MGP-related compounds.

Fixed-Base Laboratory Prescreening

During soil remediation activities at the Site, the waste determination of excavated soil will need to be accurately and efficiently performed. The field method for waste determination of excavated soil may use fixed-base laboratory with a 24- to 48-hour turnaround-time (TAT) to determine the total concentrations of BTEX, PAHs, and lead.

In accordance with EPA Test Method 1311 Section 1.2 for TCLP analysis, a total constituent analysis will be used to prescreen soil identified as potentially containing lead and/or benzene above TCLP limits to determine which soil will be further analyzed for TCLP benzene and/or TCLP lead. Composite samples will be collected from the excavated soil placed in roll-off containers and analyzed at a fixed-base laboratory for benzene and/or lead with a 24- to 48-hour TAT. The total benzene and/or total lead concentration will be divided by 20 to calculate the maximum leachable concentration for unsaturated soil. Soil that has a calculated maximum leachable benzene and/or lead level of less than the regulatory benzene and/or lead level for toxicity characteristic for a hazardous waste (0.5 mg/L and 5 mg/L, respectively) will be classified as a Special Waste PCS.

Benzene and/or Lead TCLP Confirmation at Fixed-Base Laboratory

If results from the fixed-base laboratory for either total benzene or total lead indicate that the soil potentially contains a concentration that may exceed the TCLP limit, a waste determination sample will be collected and submitted to a fixed-base laboratory for TCLP analysis. The TCLP analysis will be performed on a rush basis, and results are anticipated to be received within approximately 3 to 5 days.

Based on the results of the TCLP analysis, the soil will be disposed of at a facility licensed to receive hazardous waste if concentrations exceed the TCLP level, or managed as a Special Waste PCS for disposal at a licensed landfill if the results do not exceed the TCLP level.

6.4.8.4 Onsite Storage and Handling

Soil will be segregated into roll-off containers or small stockpiles based upon visual, odor, and PID readings. Stockpile volumes will coincide with the volume of material planned for off-haul on a daily basis. Non-impacted material will be placed outside the work area and may be used as backfill material at the completion of the excavation. Excavated soil evaluated to be Special Waste PCS may be excavated and directly loaded into trucks. Excavated soils with the potential of exceeding 0.5 mg/L TCLP benzene or 5 mg/L TCLP lead will be placed in lined roll-off containers. Any stockpiles, including debris, will be bermed and covered daily with 6-mil plastic sheeting to prevent air emissions and to control run-on/run-off in the storage area.

6.4.8.5 Load Out of Excavated Soil and Import of Borrow Fill

Special Waste PCS may be direct loaded as the soil is excavated unless the soil has the potential to exceed a TCLP concentration for benzene or lead. Soil that exceeds or has the potential to exceed a TCLP limit will be segregated and stored in roll-off containers until receipt of waste characterization analytical data. The Special Waste PCS will be loaded in the trucks and off-hauled daily to a special waste landfill. The off-hauled material will be weighed prior to entering the facility. The truck will then be weighed after dumping prior to leaving the facility. The gross, tare, and net weight will be recorded by the facility and submitted with the treatment/disposal invoice.

Borrow fill imported to the Site for backfill will be required to be weighed by the contractor as documentation for payment. The weight tickets from the waste and borrow fill hauling will be used to estimate the volume of material removed from the excavation.

6.4.9 Transportation of Waste and Borrow Fill

Transportation of waste to offsite disposal facilities or transportation of imported borrow fill will be conducted on an approved haul route. Neither the disposal facilities (that is the recycling facility, APS-approved local permitted solid waste landfill, special waste landfill, or EPA-permitted TSDF) nor the borrow site have been determined for this project at this time. Therefore, the transportation routes for the borrow fill have not been established. Before transportation activities begin, a transportation plan that details the hauling routes for both offsite waste disposal and imported borrow fill will be submitted by APS to COP for approval. The objective of this plan is to handle and transport imported borrow fill and to handle, transport, treat, and/or dispose of all materials according to the pertinent regulations and in an environmentally safe manner. All waste materials will only be handled with personnel and equipment in strict compliance with all federal, state, and local regulations, statutes, and ordinances.

The current transportation plan is to bring trucks in from the north from Lincoln Street to South Fourth Avenue onto the Site. The trucks will enter the Site and be loaded adjacent to the work area. The trucks will exit the same way, travel north on 4th Avenue, then east or west along Lincoln Street, then proceed south on Seventh Street or Seventh Avenue to Interstate 17. Trucks used for the offsite transportation of contaminated soil and debris will remain on clean areas at all times to minimize the need to decontaminate the truck tires. If necessary, the truck tires will be dry-decontaminated with brushes by the contractor prior to leaving the Site. During loading, dust and odor emissions will be monitored and mitigated as necessary according to Section 6.4.7.1. The hauling truck trailers will be fully covered prior to leaving Site. All Special Waste PCS will be manifested and transported to a special waste landfill, such as Butterfield Landfill. Material that exceeds 0.5 mg/L TCLP benzene or 5 mg/L TCLP lead will be trucked to an EPA-permitted TSDF.

Each disposal facility will be required to submit a certified weight ticket for each load received from the Site. The facility will fax a load count to APS daily that includes the date and time the shipment arrived, the manifest number, the truck and trailer number, and weights for tracking purposes.

In the event of an emergency or spill during waste transportation, the driver of the waste hauling truck will use the following procedures:

- Park the vehicle in the most secure area available, away from homes, traffic, waterways, and businesses.
- Stay with the vehicle until appropriate support has arrived; move a safe distance away from vehicle or spill material if imminent danger exists.
- Notify the appropriate emergency contacts. The following information should be available to the emergency contacts:
  - Location of accident/emergency
  - Quantity and type of spill
  - Nature and extent of injuries or property damage
  - Manifest number
  - Locations of nearby receptors, such as people and water channels
  - Contact number for the driver (that is, a cell phone or radio)

6.4.10 Groundwater Sampling

Groundwater samples will be collected from the monitoring well that was installed during the Pre-design Testing Investigation (GW-1). Groundwater sampling will be conducted quarterly. The first sampling event will occur prior to beginning remedial activities at the Site. Groundwater will be analyzed for the following constituents:

- PAHs using EPA Method 8310
- VOCs (BTEX) using EPA Method 8260B
- TPH using EPA Method 8015D

- Total Metals using EPA Method 200.7 or 6010B

If the first two quarters of groundwater sampling indicate that COCs are not present in the groundwater above the MCLs, no additional groundwater sampling will be conducted.

6.5 Sampling and Analysis Procedures

Detailed sampling procedures for soil, water, air, and waste, the laboratory analytical methods, and QA/QC procedures are located in the QAPP (CH2M, 2016).

6.5.1 Verification Sampling

Decision units (DUs) were established for the Site to assist with remedial decision-making. A DU is an area or volume that is defined according to the environmental concerns posed by the contaminants present and the intended use of the site and is implicit in grid sampling approaches using discrete samples. Considerations in identifying DUs for the Site included the following:

- Site physical characteristics that could influence the distribution of contaminant
- Sampling and analytical results from Site investigations
- Site cleanup criteria
- Planned depths of excavation throughout the Site

After DUs are selected, representative sampling methods are used, and contaminant exposure point concentrations (EPCs) are calculated across each DU. The exposure point concentrations are compared with applicable action levels to make decisions regarding the need for any subsequent remedial action (i.e., excavation) within that particular DU.

6.5.1.1 DU Selection and Size

DU selection for the Site was based on a consideration of the relevant Site data and is defined as an area where a decision is to be made regarding remedial activities and the extent of excavation required in that area. The DUs were laid out to logically divide the known or suspected areas of PAH contamination. A preliminary DU size of approximately ¼-acre was targeted, although this size was reduced in some areas based on known areas of higher PAH concentrations and depths of excavation.

The Site was divided into nine primary remedial decision making areas, as shown on Figure 6-5. For each of these areas, the bottom and the sidewall of the excavation will be managed as individual DUs. The bottom of area will be a single DU (e.g., DU-1B) and the sidewall of the excavation will also be a DU (e.g., DU-1S). Area DU-6 does not have a sidewall since the excavation is in the center of the Site and does not have any excavated areas below 5 feet, therefore area DU-6 only has an excavation bottom DU (i.e., DU-6B).

6.5.1.2 Sampling Frequency and Excavation Rationale

Excavation Bottom

A minimum of 8 discrete soil samples will be collected from each excavation bottom DU. The EPC for each DU will be calculated as the 95% upper confidence limit (UCL) of the arithmetic mean concentration using U.S. EPA's ProUCL Version 5.1 statistical software package (USEPA, 2015). No additional excavation will be necessary if the 95% UCL for the first set of samples is below the residential SRL. If the 95% UCL calculation result is above the residential SRL, the entire DU will be excavated further, and additional samples will be collected. A 95% UCL will be calculated for the new samples and compared to the residential SRL.

Excavation Sidewall

The minimum number of samples collected from sidewall DUs will be based on the total perimeter of the DU and the guidance provided in Table 2 of the Wyoming Department of Environmental Quality (WDEQ) VRP Fact Sheet #10, Soil Confirmation Sampling Guidelines (WDEQ, 2016).) as presented below:

Total Linear Ft. of Sidewalls	Number of Samples
X < 100	4
100 ≤ X < 200	5
200 ≤ X < 300	6
300 ≤ X < 500	7
500 ≤ X	8

The EPC for each DU will be calculated as the 95% upper confidence limit (UCL) of the arithmetic mean concentration using U.S. EPA's ProUCL Version 5.1 statistical software package (USEPA, 2015). No additional excavation will be necessary if the 95% UCL for the first set of samples is below the residential SRL. If the 95% UCL calculation result is above the residential SRL, the entire DU will be excavated further, and additional samples will be collected. A 95% UCL will be calculated for the new samples and compared to the residential SRL.

Verification Sampling Analysis

Verification/confirmation samples will be analyzed for the following constituents and compared to the residential SRLs:

- PAHs using EPA Method 8310 or 8270C SIM
- VOCs (BTEX) using EPA Method 8021B for DU-4

6.5.2 Soil Sampling Collection Methods

Soil samples will be collected using several sampling techniques. The sampling method used will depend on the location of the sample, the depth of the excavation, and the type of sample required. This section describes each of the sampling methods that will be used.

6.5.2.1 Hand-Driven Samples

When bottom or sidewall samples are required and access is available, drive samples will be collected and submitted to the fixed-base laboratory. The following describes the drive sample method:

- Excavation bottom or sidewall will be cleared of any loose or disturbed soil.
- Decontaminated sampler will be opened and a decontaminated 2-inch-wide by 6-inch-long brass or stainless-steel sleeve will be inserted.
- Sampler will be closed and the drive shoe hand-tightened. No lubricants will be used on the end cap or drive shoe threads.
- Sample collection will be verified by looking into the sampler drive shoe.
- If no sample is obtained because of groundwater or similar condition, the sample will be collected with a decontaminated stainless-steel scoop or disposal sampler and will be placed directly into a pre-cleaned 8-ounce (oz) jar.
- If a sample had been collected, the drive shoe, end cap, and sleeve will be removed.
- Use of encore samplers or a methanol extraction will be performed if VOC analysis is required. The fixed-base laboratory will supply amber jars that contain a measured volume of methanol. The jar will be weighed on a portable scale to establish an initial mass. The lid will be removed from the jar and approximately 10 grams or 20 grams of soil, depending on the amount of methanol, will be placed in the jar using the scale to measure the increase in mass. The lid will be replaced, and the jar will be shaken gently back and forth for approximately 10 seconds.

- Sleeve ends will then be covered with Teflon® sheeting and aluminum-foil squares. Each sample sleeve will be capped with plastic end caps, labeled, logged on a chain-of-custody form, and placed on ice in a cooler or in a sample refrigerator and maintained at approximately 4 degrees Celsius (°C).

6.5.2.2 Backhoe Bucket and Auger Samples

During excavation activities, backhoe bucket and auger samples may be collected to determine the extent of contamination. It also may be necessary to collect verification samples from a backhoe bucket or auger flights if the geometry of the excavation prohibits safe access of personnel. The following process describes the sampling technique to be used to collect backhoe bucket samples during the remedial activities:

- Soil samples will be collected from the backhoe bucket flights using a decontaminated stainless-steel scoop or a disposable sampler. The soil will be placed directly into a pre-cleaned 8-oz sample jar.
- Use of encore samplers or methanol extraction will be performed as necessary.
- Each sample will be labeled, logged on a chain-of-custody form, and placed on ice in a cooler or in a sample refrigerator and maintained at approximately 4°C.

6.5.2.3 Stockpile or Roll-off Container Samples

When soil samples are to be collected from stockpile or roll-off containers, they will be collected as a composite sample. The composite sample will be composed of soil that is collected from a minimum of four separate locations in the stockpile or roll-off container.

- An equal volume of soil will be collected from each of the stockpile or roll-off container sample locations using a decontaminated stainless-steel scoop or a disposable sampler and placed directly into a pre-cleaned 8-oz jar.
- For stockpile and roll-off container samples, a special note on the chain of custody will be made to “thoroughly mix sample.” This will notify the laboratory to homogenize the sample prior to extraction and analysis.
- When VOC analysis is required from a roll-off container sample, each sampling location will be collected individually. The laboratory will be notified on the chain of custody to “composite all VOC samples” prior to analysis.
- Sample will be labeled, logged on a chain-of-custody form, and placed on ice in a cooler or in a sample refrigerator and maintained at approximately 4°C.

6.5.3 Air Sampling Procedures

Air samples will be collected from ambient air at the each of the perimeter monitoring stations prior to any excavation or remedial activities at the Site. The samples will be used to establish baseline concentrations in the ambient air. Baseline data will be obtained for PAHs using EPA Compendium Method TO-13 HPLC, VOCs by EPA Compendium Method TO-15, and lead by National Institute for Occupational Safety and Health (NIOSH) 7300.

6.5.3.1 HIVOL Sampling

Continuous air sampling during remedial activities will be achieved using HIVOL sampling. HIVOL sampling shall be conducted as follows:

- If the HIVOL unit is not running (typically on Monday mornings), turn on the unit and allow it to warm up for 2 to 3 minutes before logging any information.
- If the HIVOL unit is running (Tuesday through Friday), record the final magnehelic, timer reading, and time, and then turn off the HIVOL unit.
- Remove the PUF tube and quartz filter from the HIVOL unit.

- Calibrate the airflow through the HIVOL unit per the manufacturer's specifications.
- Put on a pair of powder-free nitrile gloves.
- Decontaminate all parts up-flow of the PUF tube using pesticide-grade hexane.
- Install a virgin PUF tube and quartz filter on the HIVOL unit.
- Turn on the HIVOL unit and record the magnehelic gauge reading, time, timer reading, and location in the logbook.
- Ship the PUF tubes and quartz filters to the fixed-base laboratory within 24 hours.

6.5.3.2 Summa Canister Sampling

Air sampling using Summa canisters will be performed when VOCs are believed to be present in the excavation. Six-liter Summa canisters will be used to collect the samples for TO-15 analysis. The Summa canisters will be filled using a regulator calibrated at the fixed-base laboratory, allowing a constant flow of air into the canister over the course of the workday. Both 8-hour and 12-hour regulators are available. The regulator used will depend on the length of time needed to handle the source material. The sampling shall be carried out as follows:

- Attach the regulator to a 6-liter Summa canister.
- Place one Summa canister at each HIVOL sampling location approximately 4 feet off the ground and note the location in the logbook.
- Open the regulator and record the initial vacuum reading and start time.
- When the sampling period is over, record the final vacuum reading, close the regulator, and record the stop time.
- Remove the regulator.
- Secure the Summa canister with a brass or stainless-steel nut provided by the laboratory.
- Ship the Summa canisters to the fixed-base laboratory within 24 hours.

6.5.3.3 Direct-Read Instruments

Direct-read instruments will be used during the remedial investigation to protect workers, check for hazardous environments, and screen soil samples. The equipment will include a PID and hydrogen sulfide, oxygen, carbon monoxide, and percent-lower explosive limit sensors. Calibration of these sensors shall occur once per day when in regular use. Periodic cleaning of the PID lamp and use of water traps will prolong lamp and sensor life, as well as improve the accuracy of the readings. Detailed descriptions of the procedures and methods to use for direct-read instruments are located in the site-specific HASP.

6.5.4 Water Sampling Procedures for Discharge into COP POTW

Water from decontamination or contact stormwater may be pumped into an onsite storage tank pending analytical results. Samples will be collected as follows to ensure compliance if water will be discharged to the POTW:

- Water samples will be collected via a sampling apparatus attached to the tank or by using a disposable bailer. The frequency of sampling will be determined by permit requirements.
- Sample bottles will be kept sealed, out of the sun, and cool before sampling.
- Samples will be collected and analyzed according to the procedures identified in the QAPP (CH2M, 2016).

- Samples will be logged on a chain-of-custody form and stored in a cooler or refrigerator and maintained at approximately 4°C until submittal to the laboratory.

At a minimum, samples will be analyzed for the following compounds:

- PAHs
- VOCs
- TPH
- Total cyanide
- Total RCRA 8 Metals
- Total suspended solids
- pH

If analytical results have been received and meet the requirements of the POTW wastewater discharge permit, the water stored in the tank will be discharged under permit to the POTW. The discharge rate will be monitored using a flow regulator to determine the total and instantaneous flows to the POTW. A monthly or quarterly discharge report will be submitted to the COP. At a minimum, the report will include the total volume discharged, the dates and times of discharge, and the analytical results. If the analytical results are not within the limits of the permit, the water will be transported by an APS-approved waste disposal contractor to an APS-approved disposal facility.

6.5.5 Groundwater Sampling Collection Methods

6.5.5.1 Water Level Measurement

The following text describes the standard procedure for accurately measuring the depth to groundwater in a monitoring well using a water level meter.

The initial step in acquiring an accurate depth-to-groundwater measurement is to remove the well cap and allow the well to equilibrate in the unlikely event that water table fluctuations induced negative or positive pressure within the unsaturated portion of the well casing. Once the well cap has been removed and the atmosphere inside the casing has equilibrated, proceed as follows:

- Identify the established measuring reference point indicated by a mark or notch in the well casing. If indication of a reference point cannot be seen and documentation of its original location is not available, then mark or notch the outside edge of the northernmost side of the well casing; use the reference point for your measurement and all future measurements at this location. Be sure to document such variances in the log book and any field forms being used to record water level data.

- Ensure that the sounder is turned on and confirm operation by pressing the test button.

- Sound each well twice for depth to water. Variations between the two measurements must be less than 0.02 feet. Once the approximate water level is established, continue making water level measurements until a difference of less than 0.02 feet between consecutive measurements is obtained.

- Record the measurement to the nearest 0.01 of a foot along with the well identifier, date, and time of measurement. If available, previous measurements at the same well should be compared to verify consistency.

- Record the total depth to the bottom of the well on at least an annual basis. This measurement can be obtained with the water level tape, or with a separate measuring tape if the presence of free product or depth of the well precludes using the water level tape. This measurement serves to document that the well construction has not been physically compromised and that an unacceptable amount of silt is not accumulating in the bottom of the well. The total depth measurement in conjunction with the depth-to-water measurement will also provide the information needed to calculate the minimum volume of water to be purged if the well is to be sampled.

- Extreme care should be taken to minimize disturbance to sediment that may persist in the bottom of the well. Disturbed sediment may increase the turbidity of the water and subsequently compromise samples collected from the well. If the well is scheduled for sample collection and if a total depth measurement for the well is available from a recent (less than one year) sample event, it is recommended that a new total depth measurement be taken after groundwater sampling is completed. Otherwise, if no historical data are available, a total depth measurement should be obtained so that the casing volume can be accurately calculated.

Water level measurements will be recorded in the field notebook or a standard water level measurement form. The reported data will include depth to water in feet below the measuring point, the date and time of the measurement, sounder type and number, and the field personnel's initials. Water level measurements will be reported to the nearest 0.01 foot.

Note: Water level sounders are labeled in tenths of a foot whereas standard tape measures are labeled in inches. Care should be taken to avoid producing erroneous data by incorrectly reading and recording measurements.

Water level meters will be decontaminated between uses in accordance with decontamination procedures.

6.5.5.2 Three-well Volume Purge

Prior to collecting a groundwater sample, monitoring wells will be purged. If the well casing volume is known, a minimum of three casing volumes will be purged using a decontaminated, oil-free, stainless pump (or equivalent alternative). If a submersible pump is used, it should be placed 2 to 3 feet from the bottom of the well to permit reasonable drawdown while minimizing the potential for cascading conditions. Purging is done to minimize the bias associated with stagnant water in the well, which generally does not accurately reflect ambient groundwater chemistry.

Casing volumes will be calculated based on the total well depth, standing water level, and casing diameter. Total purge volume will be calculated as follows:

$$V = 3\left(\pi r^2 h\right)7.48 \qquad (1)$$

where:

V = purge volume, in gallons.
3 = number of casing volumes.
π = pi.
r = radius of well casing, in feet.
h = height of water column in well, in feet.
7.48 = conversion factor, in gallons per cubic foot.

The rate of discharge from monitoring wells with discharge that can be containerized for measurement will be measured by discharging directly from the well into the container and starting a stopwatch. When the container is full, the stopwatch will be turned off, and the time will be converted to gallons per minute. Field personnel will record the time of measurement, the discharge rate, and atmospheric or well head conditions that may affect the discharge measurements in the field notebook.

During well purging, field measurements will be collected using a multi-parameter probe to monitor water quality for the following parameters:

- Temperature
- pH
- Electrical conductivity
- Dissolved oxygen
- Oxidation reduction potential

6.5.5.3 Groundwater Sample Collection

Sampling will commence once an adequate purge volume has been achieved and after field parameters have stabilized, defined as when two consecutive measurements differ by less than 5 percent.

Groundwater samples will be collected in clean, pre-preserved sampling containers using a decontaminated submersible pump with disposable tubing. To minimize aeration of the sample, the sample flow rate will be reduced to approximately 100 milliliters per minute. Sample bottles should be filled in the following order: VOCs, (2) TPH, (3) PAHs, and (4) metals samples. During collection samples for volatiles, no air bubbles should pass through the sample as the sample container is filled or be trapped in the sample when the sample container is sealed. The sample container will be sealed and inverted. If an air bubble is present after inverting the sample container, the sample and container will be discarded and another will be collected.

Field parameters, pumping rate, and volume purged will be recorded during sampling in the field. Observations made during sampling will be logged in the field notebook in indelible ink.

Upon collection, groundwater samples will be properly labeled, logged, and placed in a cooler filled with an adequate amount of ice to maintain 4±2°C.

Sampling equipment should be made of inert material, precluding alteration of analyte concentration caused by sorption, desorption, degradation, or corrosion. Disposable polyethylene tubing will be used for groundwater purging and sampling.

Equipment such as portable submersible pumps will be decontaminated in accordance with decontamination procedures.

6.5.6 Quality Assurance/Quality Control Sample Collection Procedures

In accordance with the QAPP (CH2M, 2016), QA/QC samples will be collected in the following manner:

- Field or rinsate blanks will be collected using distilled or deionized water. The sample will be collected by pouring the water into the sample containers while onsite.
- Equipment blanks will be collected by pouring distilled or deionized water over the decontaminated shoe of the soil sampler or other sampling device and into the appropriate bottles.
- Soil and water blind field duplicate samples will be collected at a frequency of 1 duplicate sample per 10 samples to assess laboratory precision. The duplicate samples will be collected following the same method as described for the field samples.
- Appropriate sample volume will be provided to the laboratory to allow matrix spike/matrix spike duplicate analysis to be performed on all the verification samples.

Trip blanks will be provided by the fixed-base laboratory and shall accompany shipments of samples for VOC or BTEX analysis. Temperature blanks will accompany all environmental samples submitted to the laboratory for chemical analysis.

6.5.7 Fixed-base Laboratory Analyses

6.5.7.1 Soil Screening Analyses

A local ADHS-licensed fixed-base laboratory may be used for screening. The fixed-base laboratory would screen samples using the following methods:

- PAHs using EPA Method 8310 or 8270C SIM
- BTEX using EPA Method 8021B
- VOCs using EPA Method 8260B
- Metals using EPA Method 6010B/7471A

6.5.7.2 Soil Verification Analyses

Verification analyses will be completed by an ADHS-licensed, fixed-base laboratory. The verification samples will be collected from the excavation bottom and perimeter sidewalls, as applicable, in areas that have been screened by the mobile or local fixed-base laboratory or that show no visual signs of impact from MGP-related compounds. The fixed-base laboratory would perform verification analysis using the some or all of the following methods:

- PAHs using EPA Method 8310
- BTEX using EPA Method 8021B (Benzene is specific to the northeast corner of the site 7D, 8D, MP-2, GB-3)
- VOCs using EPA Method 8260B
- Metals using EPA Method 6010B/7471A (lead is specific to the portion of the Site near test pit 9S)

6.5.7.3 Water Analyses

Water samples may be collected to ensure compliance with a COP sewer discharge permit or for other purposes. Water samples may be submitted to the ADHS-licensed fixed-base laboratory. Analyses may include:

- VOCs using EPA Gas Chromatography (GC) Method 601/602, 8021B or GC/MS (mass spectrometry) Method 8260B
- PAHs using EPA HPLC Method 8310
- Total RCRA 8 Metals using EPA Groundwater Methods 6010B/7470A or EPA Wastewater Methods 245.1/200.7/200.9/206.2/213.2/239.2/270.2/272.2
- TPH using ADHS Method 8015 AZR1
- Oil and grease using EPA Method 413.1
- Total cyanide using Standard Methods 4500-CN-E
- Amenable cyanide using SM4500-CN-G (analyzed only if total cyanide is above the sample quantitation limit)
- Weak acid dissociable cyanide using SM4500-CN-I (analyzed only if total cyanide is above the sample quantitation limit)
- Nitrate/nitrite using combined methods EPA Method 353.2 or SM4500NO_3
- Nitrate and nitrite using EPA Method 300.0
- Ammonia using EPA Method 350.3
- Total suspended solids using EPA Method 160.2

6.5.7.4 Air Sampling Analyses

Throughout the remediation activities, various air samples will be collected. The types of materials encountered will dictate the analyses performed on these samples. Air samples may be submitted to the ADHS-licensed fixed-base laboratory for the following analyses:

- PAHs using EPA Compendium Method TO-13
- VOCs using EPA Compendium TO-15
- Lead and arsenic using NIOSH 7300

6.5.7.5 Waste Characterization Analyses

In addition to verification sampling, soil samples will also be submitted to the fixed-base laboratory for waste characterization to ensure the proper handling of waste material. Depending on the sample location and former analytical results, some or all of the following analyses will be used for waste characterization:

- PAHs using EPA 8270C SIM
- TCLP RCRA 8 Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) using EPA Method 1311/6010B/7471A
- Total VOCs using EPA GC Method 8021B or GC/MS Method 8260B
- TPH using ADHS Method 8015AZR1
- PCB using EPA 8082
- TCLP VOCs using EPA Method 1311/8021B or 8260B
- Paint filter using EPA Method 9095
- Ignitability as defined in SW-846 Chapter 7.1.2
- pH using EPA Method 9045B (soil containing free liquids)
- Total cyanide using EPA Method 9014

If the constituents analyzed for total VOCs meet or exceed 20 times the RCRA characteristics levels, then TCLP VOCs will be analyzed.

6.5.8 Data Verification and Data Validation

Data verification and data validation will be performed throughout the project on the analytical data reported by the laboratories. Data verification and data validation will be used to ensure, through examination and objective evidence, that data are of sufficient quality to support decisions based on data quality objectives (DQOs) presented herein and in the QAPP (CH2M, 2016). Data verification will used to evaluate the data for completeness, correctness, and conformance according to the method, procedural, and/or contractual requirements between the laboratory and APS. Data validation is an analyte-specific and sample-specific data evaluation process used to confirm that particular requirements for the specific intended use of the data are met.

The project chemist will have responsibility for oversight of the data verification and validation effort. Data verification and validation will be performed in accordance with the ADEQ data verification and data validation checklists included in the QAPP and will follow the QA/QC documentation outlined in the EPA Region 9 *Laboratory Documentation Required for Data Evaluation R9QA/00*, dated August 2001 (EPA, 2001b). The use of these checklists and appropriate laboratory documentation will standardize the data verification and validation process and minimize any discrepancy that may result between different data validators.

Data validation will be carried out when the data packages are received from the laboratory and will be performed per analytical batch using the summary results of calibration and laboratory QA/QC, as well as those of the associated field samples. Data validation procedures will include the following:

- Review of the data package for completeness.
- Review of chain of custody records for discrepancies that might impact data quality.
- Review for compliance with holding time and QC frequency requirements.
- Evaluation of all calibration and QC summary results against the project requirements

- Qualification of the data using appropriate qualifier flags, as necessary, to reflect data usability limitations.
- Initiation of corrective actions, as necessary, based on the data review findings.

DQOs will be used as a guide for data validation. The examination will focus on validating the degree to which the DQOs have been achieved, particularly the QA/QC analytical results. The DQO guidelines allow for assessment of the confidence in the soil, air, and groundwater sample data sets. The DQOs are precision, accuracy, representativeness, completeness, and comparability, and represent qualitative and quantitative objectives that ensure the data generated during this investigation meet the needs of the project. For this project, the DQOs are defined as follows:

- **Precision** is a measure of the reproducibility of concentrations reported for duplicate soil and groundwater samples collected from the same location. Precision is calculated by determining the relative percent difference (RPD) between duplicate samples. The proposed precision objective for groundwater is an RPD of 20 percent for field duplicates. The proposed precision objective for soil is an RPD of 35 percent for field duplicates.
- **Accuracy** is the degree to which the measurement data approaches the “true” value for each analyte. For soil samples, accuracy is assessed by calculating the percent recovery for a sample spiked with the analyte of concern (matrix spike). For soil, air, and groundwater samples, the accuracy objective will vary by analysis and compound. The accuracy objectives for this project are presented in Tables 3-4 through 3-7 in the QAPP for APS Arizona MGP sites.
- **Representativeness** refers to the comparability of the sample collection procedures to those delineated in the RAP and to the degree which the analytical data represent the subsurface contaminant concentrations. Representativeness will be accomplished by using consistent field sampling and analytical procedures for soil, air, and groundwater samples.
- **Completeness** is defined as the ratio of acceptable validated laboratory measurements to the total number of planned measurements for this investigation. The completeness objective for the soil, air, and groundwater samples collected during this investigation is at least 90 percent.
- **Comparability** is an evaluation of the relative consistency of the laboratory measurement data. Since comparability cannot be measured quantitatively, professional judgment is relied upon. Internal comparability will be achieved for soil by adhering to consistent sample collection procedures and analyses methods throughout the remediation.

6.6 Site Restoration and Post-remediation Activities

Site restoration and post-remediation activities include backfilling and restoring the Site, demobilization, post-closure monitoring, and preparation of a report documenting the remediation activities.

6.6.1 Excavation Backfilling

The contractor will be responsible for identifying a fill source of suitable import material free of contamination. Prior to starting excavation activities, APS will review and approve the originating source of the clean fill. All clean fill will be obtained from an off-site source. The soil to be used as backfill at the site will be sampled and analyzed to confirm that it does not contain contaminants of concern associated with the Site or other likely contaminants. The soil used as backfill will be sampled and analyzed for the following constituents:

- PAHs EPA 8270C SIM
- PCBs using EPA Method 8082
- Pesticides using EPA Method 8081A or 8081B
- Herbicides using EPA Method 8151A

- Total VOCs using EPA GC Method 8021B or GC/MS Method 8260B
- TPH using ADHS Method 8015AZR1
- Total Metals using EPA Method 6010B/7170A

The backfill will be considered acceptable for use if concentrations of the listed analytes, except for metals, are not detected above the Reporting Limits (RLs) listed in the Quality Assurance Project Plan (QAPP, CH2M 2016). Metals concentrations must be within the ranges identified in the Evaluation of Background Metal Concentrations in Arizona Soil (Earth Technology, 1991) and also below the residential SRLs and GPLs.

Upon approval, the contractor will schedule delivery of the import material to the Site for backfill purposes. APS will periodically collect soil samples from the import source and submit samples to a fixed-base laboratory for analysis. Approximately 12 samples will be collected for the first 5000 cubic yards of fill material and one sample for each additional 1000 cubic yards(CTSCD, 2001). The constituents analyzed and sample frequency may be adjusted based on the source of the backfill (i.e. existing commercial gravel pits). The location from which the backfill originated will also be documented in the site logbook.

The contractor will backfill excavation areas as soon as practical to limit the amount of open excavation. The excavation can only be backfilled after confirmation sampling verifies that Site cleanup criteria are met. The backfill final ground will be close to the existing topography in accordance with the COP approved grading plan. The site surface will be covered with landscape gravel to control dust and erosion.

6.6.2 Demobilization

Following the completion of remedial activities, the contractor will demobilize from the Site. The following activities will be performed as part of demobilization:

- Removal of construction trailer(s) on the Site.
- Removal of the Site security fence.
- Demobilization of excavation and material processing equipment, decontamination equipment, safety equipment, sampling equipment, and monitoring equipment.
- Performance of a final review of the work and the Site, which will include a meeting between the contractor, CH2M, and APS to assess the scope of work and to identify and resolve any potential conflicts or questions that may remain.

6.6.3 Reporting

A report will be prepared to document the remedial activities conducted at the Site. The report will include a detailed description of the volume of soil that was excavated, the disposition of the soil, and excavation backfilling and Site restoration activities. The report will include sampling location maps, all analytical data, data validation reports, waste manifests, bills of lading, certificates of destruction, a copy of all applicable permits that were obtained, and copies of discharge and other reports generated during the remedial activities. The report will also document all sample collection methods, soil segregation procedures, dewatering activities, if any, and the disposition of water generated during the remedial activities, including decontamination water, storm runoff, and groundwater. The report will provide a discussion regarding the cleanup criteria, describe areas in which the criteria were not met, if any, and describe any additional recommendations if cleanup criteria were not met. The report will also document all discussions with regulatory agencies.

6.7 Site Remediation Schedule

The schedule for major site remediation activities is anticipated as follows:

- Approval of RAP by ADEQ - January 2017
- Preparation of Remedial Design – January through March 2017
- Public Comment/Community Involvement - February/March 2017

- Remediation Contractor Procurement – April/May 2017
- Remedial Construction – May through December 2017
- Closure Report – January/February 2018

SECTION 7

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Tables

TABLE 1-1
Summary of Operational History
APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Year	Site Structure[1]	Site Activities[2]
1901	Site is vacant and undeveloped.	No structures or activities
1906	Site is vacant and undeveloped.	Coal Gas process, which creates lampblack waste, begins on 501/505 Property.
1917	No Sanborn maps or aerial photographs available	Site begins operation as a lampblack storage area for dry lampblack waste transferred from 501/505 Property via horse and wagon. Site is acquired by Pacific Gas and Electric Company.
1920	Not available	Site is acquired by Central Arizona Light and Power, a predecessor company of APS.
Early 1920s	Settling ponds	Settling ponds constructed at the Site as slurry containment/drying areas. Lampblack begins being transferred to site as a slurry from 501/505 Property via underground pipeline.
1923	Oil storage tank and settling basins	50,000-gallon oil tank constructed on southwest corner of Site. Oil storage tank installed and settling basins located on-site for storage of lampblack slurry.
1934	Oil storage tank, four to five settling basins on east side of Site, excavated area or basin in northwest corner, possible basin between tank and excavated area on west side.	MGP production ceases at 501/505 Property. Transfer of lampblack waste to Site ceases.
1942	Settling basins, an excavated area in the northwest corner, and the concrete foundation pad for the AST located on-site (Atlantic, 1990).	No information on facility activities
1946	AST for creosote storage located on foundation pad in southwest corner of Site.	Site operating as a creosoting yard
1949	Building along eastern edge of Site and excavated area/basin located in northwest corner of Site. AST has been removed.	No information available on operations, area in northwest corner identified as "conc. vat."
1954	Building along eastern edge and small building in southeast corner. Excavated area/basin no longer visible in northwest corner. Central area of Site appears to be parking/driving area.	No information available on operations, appears to be a service yard for APS operations
1958	Building along eastern edge, building on northern end, and two buildings in southeast corner of Site.	No information available on operations, appears to be a service yard for APS operations
1968	Repair shop, several pipe storage sheds on eastern half of Site, storage building north end of Site, and a small office building.	Site is a pipe yard and supply area.
1971	Aerial photo not available.	Site ownership is transferred from APS to National Housing Industries, Inc.

TABLE 1-1
Summary of Operational History
APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Year	Site Structure[1]	Site Activities[2]
1972	Aerial photo not available.	Site ownership is transferred to Grant Street Properties
1973	Apartment building	Apartment building constructed on-site
2001	Apartment building	APS re-purchases property and subsequently donates to two non-profit organizations which formed Grant Street Apartments, Inc.
2003	Apartment building	Subsurface utilities (water lines) rerouted to aboveground (building roof) in April/May 2003. Geomembrane and soil cap installed in south portion of the Courtyard and concrete cap in north portion of the Courtyard in June-August 2003.
2015	Apartment building	APS re-purchases property.
2016	Apartment building foundation	Apartment building and other above-ground structures have been removed. Building foundation, asphalt, and concrete ground cover remain.

Notes:
1. Based on available Sanborn maps and aerial photographs. Additional information based on a review of APS historical records (Atlantic Environmental, 1990), information provided by EDR, and the AMEC FRI for the 501/505 Property (AMEC, 2010).
2. Based on available Sanborn maps and APS historical records (Atlantic, 1990).

TABLE 1-2

Soil Sampling Locations from Previous Investigations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
SS-1	Surface Soil Sample	Not Applicable	Onsite (West section of property)	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-2	Surface Soil Sample	Not Applicable	Onsite (Southwest section of property)	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-3	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-4	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-5	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-6	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-7	Surface Soil Sample	Not Applicable	Site Perimeter (North of property)	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-8	Surface Soil Sample	Not Applicable	Site Perimeter (East of property)	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-9	Surface Soil Sample	Not Applicable	Offsite background sample	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
SS-10	Surface Soil Sample	Not Applicable	Offsite background sample	9/29/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
GB1	Soil Boring	15	Onsite (Southeast section of property)	12/21/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
GB2	Soil Boring	20	Onsite (Southeast section of property)	12/21/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
GB3	Soil Boring	60	Onsite (Northwest section of property)	12/21/1993 and 3/25/94	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
HA1	Hand Auger Soil Boring	5	Onsite (Courtyard)	12/22/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
HA2	Hand Auger Soil Boring	5	Onsite (Courtyard)	12/22/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
HA3	Hand Auger Soil Boring	7	Onsite (Courtyard)	12/22/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
HA4	Hand Auger Soil Boring	5	Onsite (Courtyard)	12/22/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
GB4	Soil Boring	20	Onsite (North section of property)	12/23/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.

TABLE 1-2

Soil Sampling Locations from Previous Investigations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
GB5	Soil Boring	32	Onsite (Northwest section of property)	12/23/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
GB6	Soil Boring	20	Onsite (West section of property)	12/23/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
GB7	Soil Boring	21	Onsite (Southwest section of property)	12/23/1993	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-1	Shallow Hand Auger/Soil Boring	4.5	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-2	Shallow Hand Auger/Soil Boring	4.5	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-3	Shallow Hand Auger/Soil Boring	4.5	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-4	Shallow Hand Auger/Soil Boring	4.5	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-5	Shallow Hand Auger/Soil Boring	5.0	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-6	Shallow Hand Auger/Soil Boring	4.5	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-7	Shallow Hand Auger/Soil Boring	4.5	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-8	Shallow Hand Auger/Soil Boring	5.0	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
DH-9	Shallow Hand Auger/Soil Boring	2.5	Onsite (Northeast section of property)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
HA-3B	Shallow Hand Auger/Soil Boring	5	Onsite (Courtyard)	1/20/1994	Geraghty and Miller, Inc., 1994. Site Investigation Former Grant Street Yard, 331 West Grant Street, Phoenix, Arizona, September 6.
EW-3	Extraction Well	10	Onsite (Northeast section of property)	5/9/1994	Geraghty and Miller, Inc., 1994. Results and Findings, Vapor Extraction Pilot Test, Former Grant Street Yard Site, Phoenix, Arizona, June 29.
EW-4	Extraction Well	10	Onsite (Northeast section of property)	5/9/1994	Geraghty and Miller, Inc., 1994. Results and Findings, Vapor Extraction Pilot Test, Former Grant Street Yard Site, Phoenix, Arizona, June 29.
EW-5	Extraction Well	10	Onsite (Northeast section of property)	5/9/1994	Geraghty and Miller, Inc., 1994. Results and Findings, Vapor Extraction Pilot Test, Former Grant Street Yard Site, Phoenix, Arizona, June 29.

TABLE 1-2

Soil Sampling Locations from Previous Investigations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
MP-2	Monitoring Point	6.5	Onsite (Northeast section of property)	5/9/1994	Geraghty and Miller, Inc., 1994. Results and Findings, Vapor Extraction Pilot Test, Former Grant Street Yard Site, Phoenix, Arizona, June 29.
GY1	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY2	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY3	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY4	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY5	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY6	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY7	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY8	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY9	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY10	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY21	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.

TABLE 1-2

Soil Sampling Locations from Previous Investigations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
GY22	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY23	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/26/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY11	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY12	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY13	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY14	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY15	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY16	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY17	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY18	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY19	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
GY20	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.

TABLE 1-2

Soil Sampling Locations from Previous Investigations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
GY24	Shallow Soil Boring	1.5	Onsite (Courtyard)	5/27/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
BC-1	Surface Soil Sample	Not Applicable	Onsite (Southwest section of property)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
BC-2	Surface Soil Sample	Not Applicable	Onsite (Southwest section of property)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
BP-1	Surface Soil Sample	Not Applicable	Onsite (Northwest Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
BP-2	Surface Soil Sample	Not Applicable	Onsite (Northwest Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
BP-3	Surface Soil Sample	Not Applicable	Onsite (Northwest Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
BP-4	Surface Soil Sample	Not Applicable	Onsite (Northwest Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
DS-1	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
DS-2	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
DS-3	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
DS-4	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
DS-5	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.

TABLE 1-2

Soil Sampling Locations from Previous Investigations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
DS-6	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
NE-1	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
NE-3	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
PT-1	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
PT-2	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
PT-3	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
PT-4	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
SE-1	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
SE-2	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
SSB	Surface Soil Sample	Not Applicable	Onsite (Northeast section of property)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
SW-1	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
SW-2	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.

TABLE 1-2

Soil Sampling Locations from Previous Investigations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
TS-1	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
TS-2	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
TS-3	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
TS-4	Surface Soil Sample	Not Applicable	Onsite (Courtyard)	7/13/1998	Brown and Caldwell, 1998. Site Investigation Report at the Former Grant Street Yard Site, 331 West Grant Street, Phoenix, Arizona, October 1.
TB-22	Lampblack Pipeline Removal, Soil Sample	5.1	West Grant Street (Trench Bottom)	4/3/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.
TB-24	Lampblack Pipeline Removal, Soil Sample	5.6	West Grant Street (Trench Bottom)	4/3/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.
TS-23	Lampblack Pipeline Removal, Soil Sample	4	West Grant Street (Trench Side Wall)	4/3/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.
TS-25	Lampblack Pipeline Removal, Soil Sample	4.4	West Grant Street (Trench Side Wall)	4/3/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.
TB-41	Lampblack Pipeline Removal, Soil Sample	6.6	West Grant Street (Trench Bottom)	4/10/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.
TS-40	Lampblack Pipeline Removal, Soil Sample	4	West Grant Street (Trench Side Wall)	4/10/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.
TS-42	Lampblack Pipeline Removal, Soil Sample	4	West Grant Street (Trench Side Wall)	4/11/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.
TB-55	Lampblack Pipeline Removal, Soil Sample	5.9	West Grant Street (Trench Bottom)	5/3/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.

TABLE 1-2

Soil Sampling Locations from Previous Investigations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
TB-57	Lampblack Pipeline Removal, Soil Sample	6.4	West Grant Street (Trench Bottom)	5/3/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.
TS-56	Lampblack Pipeline Removal, Soil Sample	3.5	West Grant Street (Trench Side Wall)	5/3/2001	Brown and Caldwell, 2002. Lincoln Street Lampblack Pipeline Removal Construction Report, February 4.

TABLE 1-3

Summary of Historical Analytical Data for Soil, Polynuclear Aromatic Hydrocarbons (PAHs)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Date	Depth (ft bgs)[1]	Units[2]	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Residential SRL[3,4]					**NE[7]**	**NE**	**3700**	**22000**	**6.9**	**0.69**	**6.9**	**NE**	**69**	**680**	**0.69**	**2300**	**2700**	**6.9**	**56**	**NE**	**2300**
Non-Residential SRL[5]					**NE**	**NE**	**29000**	**240000**	**21**	**2.1**	**21**	**NE**	**210**	**2000**	**2.1**	**22000**	**26000**	**21**	**190**	**NE**	**29000**
Groundwater Protection Level					**NE**	**NE**	**38500**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**578000**	**>1E06**	**>1E06**	**NE**	**>1E06**
SS-1	SS-1	9/29/93	Surface	mg/kg	0.05U	0.05U	0.85U	0.0415U	0.085U	0.13	0.1	0.18	0.085U	0.092	0.17U	0.2	0.085U	0.16	0.415U	0.067	0.2
SS-2	SS-2	9/29/93	Surface	mg/kg	0.05U	0.05U	0.85U	0.0415U	0.088	0.19	0.14	0.31	0.085U	0.12	0.17U	0.29	0.085U	0.28	0.415U	0.1	0.34
SS-3	SS-3	9/29/93	Surface	mg/kg	0.2U	0.2U	3.4U	0.166U	0.34U	0.41	0.34U	0.52	0.34U	0.34	0.68U	0.74	0.34U	0.45	1.66U	0.26	1
SS-4	SS-4	9/29/93	Surface	mg/kg	0.2U	0.2U	3.4U	0.166U	0.34U	0.48	0.39	0.56	0.34U	0.34U	0.68U	0.67	0.34U	0.52	1.66U	0.35	0.67
SS-5	SS-5	9/29/93	Surface	mg/kg	1U	1U	17U	0.83U	2.4	4.5	2.4	4.6	1.7	1.7	3.4U	7.1	1.7U	4.9	8.3U	3.7	8.9
SS-6	SS-6	9/29/93	Surface	mg/kg	0.05U	0.05U	0.85U	0.0415U	0.091	0.13	0.1	0.18	0.088	0.085U	0.17U	0.21	0.085U	0.15	0.415U	0.1	0.22
SS-6	SS-11	9/29/93	Surface	mg/kg	0.05U	0.05U	0.85U	0.0415U	0.091	0.14	0.1	0.16	0.085U	0.085U	0.17U	0.22	0.085U	0.15	0.415U	0.13	0.2
SS-7	SS-7	9/29/93	Surface	mg/kg	1U	1U	17U	0.83U	1.7U	1.7U	1.7U	1.8	1.7U	1.7U	3.4U	2.6	1.7U	1.7	8.3U	1.3	2.7
SS-8	SS-8	9/29/93	Surface	mg/kg	0.5U	0.5U	8.5U	0.415U	0.85U	0.99	0.85	1.6	0.85U	0.85U	1.7U	2.2	0.85U	1.4	4.15U	0.8	2.3
SS-9 Offsite	SS-9	9/29/93	Surface	mg/kg	0.05U	0.05U	0.85U	0.85U	0.088	0.12	0.1	0.14	0.085U	0.085U	0.170U	0.25	0.085U	0.15	0.415U	0.10	0.23
SS-10 Offsite	SS-10	9/29/93	Surface	mg/kg	0.05U	0.05U	0.85U	0.85U	0.088	0.11	0.11	0.13	0.085U	0.12	0.170U	0.24	0.085U	0.14	0.415U	0.075	0.22
GB1	GB1 10-12.5	12/21/93	10-12.5	mg/kg[3]	0.01U	0.01U	0.17U	0.0083U	0.017U	0.017U	0.017U	0.017U	0.017U	0.017U	0.034U	0.017U	0.017U	0.017U	0.083U	0.0083U	0.017U
GB2	GB2 8-10	12/21/93	8-10	mg/kg	0.01U	0.01U	0.17U	0.0083U	0.017U	0.017U	0.017U	0.017U	0.017U	0.017U	0.034U	0.017U	0.017U	0.017U	0.083U	0.0083U	0.017U
GB3	GB3 5-7	12/21/93	5-7	mg/kg	1500U	1500U	26000U	840J	2600U	2600U	2600U	2600U	2600U	2600U	5100U	3600	2600U	2600U	9700J	6000	4000
GB3	GB3 7-9	12/21/93	7-9	mg/kg	0.5U	0.5U	8.5U	0.415U	0.85U	6.6	4.2U	6.6	4.2U	0.85U	1.7U	0.85U	0.85U	11	4.15U	0.415U	1.7
GB3	GB3 13-15	12/21/93	13-15	mg/kg	0.5U	0.5U	8.5U	0.415U	0.85U	2.3	1.5	2.4	0.85U	0.85U	1.7U	0.92	0.85U	3.7	4.15U	0.36J	1
GB3	GB3 19-20	12/21/93	19-20	mg/kg	5U	5U	85U	4.15U	8.5U	6.9J	8.5U	7.2J	8.5U	8.5U	17U	13	8.5U	6.1J	41.5U	19	15
GB3	GB3 28	12/21/93	28	mg/kg	2.5U	2.5U	42.5U	2.07U	4.25U	6.7	3J	11	4.25U	4.25U	8.5U	4.5	4.25U	7.6	20.75U	4.6	7.9
GB4	GB4 5-6.5	12/23/93	5-6.5	mg/kg	2.5U	2.5U	42.5U	2.07U	5.6	18	7.9	25	4.3	6.8	8.5U	22	4.25U	18	20.75U	16	34
GB4	GB4 8-10	12/23/93	8-10	mg/kg	0.01U	0.01U	0.17U	0.0083U	0.017U	0.017U	0.017U	0.017U	0.017U	0.017U	0.034U	0.017U	0.017U	0.017U	0.083U	0.0083U	0.017U
GB5	GB5 7-9	12/22/93	7-9	mg/kg	0.1U	0.1U	1.7U	0.13	0.18	0.27	0.11J	0.24	0.17U	0.18	0.34U	0.81	0.17	0.2	0.83U	1.2	0.89
GB5	GB5 16-17	12/22/93	16-17	mg/kg	0.5U	0.5U	8.5U	0.78	0.9	1.3	0.65J	1.1	0.85U	1	1.7U	4.4	1.2	0.92	4.15U	5.8	4.5
GB5	GB5 25-26	12/22/93	25-26	mg/kg	0.1U	0.1U	1.7U	0.051J	0.1J	0.15J	0.17U	0.12J	0.17U	0.13J	0.34U	0.39	0.17U	0.1J	0.83U	0.5	0.48
GB5	GB5 31-32	12/22/93	31-32	mg/kg	0.05U	0.05U	0.85U	0.0415U	0.085U	0.085U	0.085U	0.085U	0.085U	0.085U	0.17U	0.13	0.085U	0.085U	0.415U	0.13	0.097
GB6	GB6 10-12	12/22/93	10-12	mg/kg	0.01U	0.01U	0.17U	0.0083U	0.017U	0.017U	0.017U	0.017U	0.017U	0.017U	0.034U	0.017U	0.017U	0.017U	0.083U	0.0083U	0.017U
GB7	GB7 8.5-10	12/22/93	8.5-10	mg/kg	0.01U	0.01U	0.17U	0.0083U	0.012J	0.014J	0.012J	0.021	0.017U	0.017U	0.034U	0.032	0.017U	0.016J	0.083U	0.018	0.027
GB7	GB7 20-21	12/22/93	20-21	mg/kg	0.01U	0.01U	0.17U	0.0083U	0.017U	0.017U	0.017U	0.017U	0.017U	0.017U	0.034U	0.017U	0.017U	0.017U	0.083U	0.009	0.017U
HA1	HA1-5	12/22/93	5-5.5	mg/kg	0.01U	0.01U	0.17U	0.0083U	0.017U	0.017U	0.017U	0.017U	0.017U	0.017U	0.034U	0.017U	0.017U	0.017U	0.083U	0.0083U	0.017U
HA2	HA2-5	12/22/93	5-5.5	mg/kg	0.01U	0.01U	0.17U	0.0083U	0.017U	0.017U	0.017U	0.017U	0.017U	0.017U	0.034U	0.017U	0.017U	0.017U	0.083U	0.0083U	0.017U
HA3	HA3 3.5-4	12/22/93	3.5-4	mg/kg	50U	50U	850U	41.5U	85U	85U	85U	85U	85U	85U	170U	240	85U	85U	415U	260	180
HA3	HA3 7-8	12/22/93	7-8	mg/kg	10U	10U	170U	8.3U	17U	82	31	90	12J	17U	34U	22	17U	92	83U	8.3U	17U
HA4	HA4-5	12/22/93	5-5.5	mg/kg	0.1U	0.1U	1.7U	0.083U	0.14J	0.17U	0.17U	0.21	0.17U	0.15J	0.34U	0.29	0.17U	0.22	0.83U	0.083U	0.4
GY1	GY-1-0.5	5/26/98	0.5	mg/kg	--[8]	--	0.1U	0.004U	0.015	0.021	0.01	0.01U	0.0082	0.022	0.011	0.035	0.04U	0.017	0.04U	0.02	0.035
GY1	GY-1-1.5	5/26/98	1.5	mg/kg	--	--	0.05U	0.002U	0.002U	0.002U	0.002U	0.005U	0.002U	0.005U	0.005U	0.005U	0.02U	0.005U	0.038	0.005U	0.005U
GY2	GY-2-0.5	5/26/98	0.5	mg/kg	--	--	0.2U	0.008U	0.008U	0.008U	0.008U	0.027	0.008U	0.02U	0.02	0.02U	0.08U	0.02U	0.08U	0.02U	0.02U
GY2	GY-2-1.5	5/26/98	1.5	mg/kg	--	--	100U	4U	5.2	21	7.7	19	6	12	10U	22	40U	14	40U	10U	68
GY3	GY-3-0.5	5/26/98	0.5	mg/kg	--	--	10U	0.4U	1.3	2	0.85	1U	0.76	2	2.1	3.9	4U	1.5	4U	2.7	3.3
GY3	GY-3-1.5	5/26/98	1.5	mg/kg	--	--	5U	0.2U	0.45	0.73	0.39	0.5U	0.31	0.66	0.57	1	2U	0.78	2U	0.55	1.1
GY4	GY-4-0.5	5/26/98	0.5	mg/kg	--	--	5U	0.2U	0.26	0.41	0.2U	0.5U	0.2U	0.5U	0.5U	0.75	2U	0.5U	2U	0.5U	0.86
GY4	GY-4-1.5	5/26/98	1.5	mg/kg	--	--	50U	5.2	13	15	7	12	6.6	22	22	41	20U	11	20U	26	29
GY5	GY-5-0.5	5/26/98	0.5	mg/kg	--	--	50U	2U	12	4.1	2U	5.8	2U	5U	7.7	8.3	20U	5U	20U	5.2	11
GY5	GY-5-1.5	5/26/98	1.5	mg/kg	--	--	2.5U	0.1U	0.1U	0.25	0.1U	0.43	0.1U	0.25U	0.53	0.25U	1U	0.29	1U	0.25U	0.32
GY6	GY-6-0.5	5/26/98	0.5	mg/kg	--	--	0.5U	0.02U	0.035	0.088	0.031	0.13	0.026	0.052	0.16	0.11	0.2U	0.11	0.2U	0.12	0.18
GY6	GY-6-1.5	5/26/98	1.5	mg/kg	--	--	5U	0.2U	0.21	0.56	0.24	1	0.2U	0.5U	1.7	0.84	2U	0.63	2U	0.5U	0.87
GY7	GY-7-0.5	5/26/98	0.5	mg/kg	--	--	50U	2U	2U	4.2	2U	5.4	2U	5U	6.2	7.9	20U	5U	20U	5.5	11
GY7	GY-7-1.5	5/26/98	1.5	mg/kg	--	--	50U	2U	2U	6.4	2.3	6.4	2	5	8.5	12	20U	5U	20U	8.8	16
GY8	GY-8-0.5	5/26/98	0.5	mg/kg	--	--	0.05U	0.002U	0.0033	0.0039UJ	0.0023	0.006UJ	0.0021	0.005U	0.007	0.005U	0.02U	0.005U	0.02U	0.005U	0.0053UJ

See last page for notes.

TABLE 1-3

Summary of Historical Analytical Data for Soil, Polynuclear Aromatic Hydrocarbons (PAHs)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Date	Depth (ft bgs)[1]	Units[2]	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Residential SRL[3,4]					**NE[7]**	**NE**	**3700**	**22000**	**6.9**	**0.69**	**6.9**	**NE**	**69**	**680**	**0.69**	**2300**	**2700**	**6.9**	**56**	**NE**	**2300**
Non-Residential SRL[5]					**NE**	**NE**	**29000**	**240000**	**21**	**2.1**	**21**	**NE**	**210**	**2000**	**2.1**	**22000**	**26000**	**21**	**190**	**NE**	**29000**
Groundwater Protection Level					**NE**	**NE**	**38500**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**578000**	**>1E06**	**>1E06**	**NE**	**>1E06**
GY8	GY-8-1.5	5/26/98	1.5	mg/kg	--	--	0.2U	0.008U	0.016	0.039	0.016	0.054	0.012	0.032	0.067	0.06	0.08U	0.041	0.08U	0.034	0.075
GY9	GY-9-0.5	5/26/98	0.5	mg/kg	--	--	50U	2U	9.1	14	6	14	4.5	13	5U	44	20U	11	20U	31	50
GY9	GY-9-0.5	5/26/98	0.5	mg/kg	--	--	50U	2.8	9.9	17	7	22	5.8	15	10	34	20U	17	20U	21	37
GY9	GY-9-1.5	5/26/98	1.5	mg/kg	--	--	0.05U	0.002U	0.0087	0.0028UJ	0.002U	0.005U	0.002U	0.005U	0.005U	0.005U	0.02U	0.005U	0.02U	0.005U	0.005U
GY9	GY-9-1.5	5/26/98	1.5	mg/kg	--	--	0.5U	0.02U	0.022	0.1	0.032	0.14	0.026	0.05U	0.21	0.05U	0.2U	0.12	0.2U	0.05U	0.084
GY10	GY-10-0.5	5/26/98	0.5	mg/kg	--	--	25U	1U	1U	1.4	1U	2.5U	1U	2.5U	2.5U	2.9	10U	2.5U	10U	2.5U	3.2
GY10	GY-10-1.5	5/26/98	1.5	mg/kg	--	--	50U	2U	4.5	10	3.9	20	2.9	5U	5U	20	20U	9.9	20U	11	26
GY11	GY-11-0.5	5/27/98	0.5	mg/kg	--	--	50U	2U	6.7	11	3.4	13	3.2	5U	15	12	20U	12	20U	5.8	9.3
GY11	GY-11-1.5	5/27/98	1.5	mg/kg	--	--	25U	1U	1U	1.7	1U	4.1	1U	2.5U	3.9	2.5	10U	2.5U	10U	2.5U	2.5
GY12	GY-12-0.5	5/27/98	0.5	mg/kg	--	--	50U	2U	4.3	8.5	2.7	11	2.6	5U	18	6.7	20U	7.2	20U	5U	5.1
GY12	GY-12-1.5	5/27/98	1.5	mg/kg	--	--	10U	0.4U	2	2	1.1	2.1	0.95	3	3	5.2	4U	1.8	4U	1.4	3.9
GY12	GY-12S	5/27/98	Surface	mg/kg	--	--	50U	2U	2U	3.1	2U	7.8	2U	5U	5.1	7.3	20U	5U	20U	5	8.2
GY13	GY-13-0.5	5/27/98	0.5	mg/kg	--	--	0.05U	0.002U	0.002U	0.0021	0.0032	0.0086	0.002U	0.005U	0.011	0.005U	0.02U	0.005U	0.02U	0.005U	0.005U
GY13	GY-13-1.5	5/27/98	1.5	mg/kg	--	--	5U	0.2U	0.6	0.7	0.3	0.75	0.27	0.7	1.1	1.3	2U	0.5U	2U	0.86	1.6
GY14	GY-14-0.5	5/27/98	0.5	mg/kg	--	--	100U	7.5	28	27	12	25	11	35	10U	82	40U	16	40U	43	56
GY14	GY-14-0.5	5/27/98	0.5	mg/kg	--	--	10U	0.4U	1.1	1.1	0.61	1.4	0.53	1.3	1.8	2.2	4U	1U	4U	1U	1.4
GY14	GY-14-1.5	5/27/98	1.5	mg/kg	--	--	0.05U	0.0054	0.012	0.011	0.0056	0.011	0.0049	0.0058	0.019	0.037	0.02U	0.0075	0.02U	0.031	0.029
GY14	GY-14-1.5	5/27/98	1.5	mg/kg	--	--	0.2U	0.008U	0.008U	0.019	0.0084	0.026	0.008U	0.036	0.037	0.02U	0.08U	0.02U	0.08U	0.02U	0.026
GY15	GY-15-0.5	5/27/98	0.5	mg/kg	--	--	50U	2U	2.2	6.8	2.1	11	2	5U	15	7	20U	8.2	20U	5U	10
GY15	GY-15-0.5	5/27/98	0.5	mg/kg	--	--	100U	4.5	14	22	5.9	20	6.2	17	45	42	40U	14	40U	41	32
GY15	GY-15-1.5	5/27/98	1.5	mg/kg	--	--	50U	2U	2.6	2.5	2U	5U	2U	13	5U	5.7	20U	5U	20U	5U	5U
GY15	GY-15-1.5	5/27/98	1.5	mg/kg	--	--	10U	0.4U	0.4U	0.7	0.4U	1.9	0.4U	1U	2.6	1U	4U	1.3	4U	1U	1U
GY16	GY-16-0.5	5/27/98	0.5	mg/kg	--	--	50U	2U	2.1	4.9	2U	7	2U	5U	5U	8.1	20U	5U	20U	5U	8
GY16	GY-16-1.5	5/27/98	1.5	mg/kg	--	--	50U	2U	3.1	8.6	2.6	10	2.4	5U	5U	12	20U	6.6	20U	5U	20
GY17	GY-17-0.5	5/27/98	0.5	mg/kg	--	--	5U	0.2U	0.2U	0.39	0.2U	0.64	0.2U	0.5U	0.73	0.68	2U	0.5U	2U	0.5U	0.73
GY17	GY-17-1.5	5/27/98	1.5	mg/kg	--	--	10U	0.4U	0.97	1.6	0.82	2.7	0.67	1.4	3.9	3.4	4U	2.4	4U	2.5	4.5
GY18	GY-18-0.5	5/27/98	0.5	mg/kg	--	--	5U	0.2U	0.25	0.82	0.28	1.5	0.23	0.5U	1.8	1.3	2U	0.98	2U	0.87	1.3
GY18	GY-18-1.5	5/27/98	1.5	mg/kg	--	--	50U	2U	2.9	4.2	2	6.3	2U	5U	5U	11	20U	5U	20U	5.8	11
GY19	GY-19-0.5	5/27/98	0.5	mg/kg	--	--	50U	2U	2U	2.8	2U	5U	2U	5U	5U	6.5	20U	5U	20U	5U	7.2
GY19	GY-19-1.5	5/27/98	1.5	mg/kg	--	--	10U	0.4U	1.1	2.1	0.74	2.5	0.68	1.6	3.5	4.5	4U	1.8	4U	2.8	4.7
GY20	GY-20-0.5	5/27/98	0.5	mg/kg	--	--	50U	5.1	13	11	5.1	10	5.2	17	14	35	20U	9	20U	26	24
GY20	GY-20-0.5	5/27/98	0.5	mg/kg	--	--	10U	0.4U	1.2	1.8	0.66	1.8	0.62	1.6	2.5	4	4U	1.3	4U	2	4.1
GY20	GY-20-1.5	5/27/98	1.5	mg/kg	--	--	50U	2U	5.1	14	4.3	17	4	8.2	5U	23	20U	14	20U	23	27
GY20	GY-20-1.5	5/27/98	1.5	mg/kg	--	--	50U	2U	2.5	11	2.9	13	2.8	5U	18	8.8	20U	10	20U	5.8	12
GY21	GY-21-0.5	5/26/98	0.5	mg/kg	--	--	5U	0.4	0.96	1.1	0.52	0.5U	0.51	1.6	1.9	2	2U	0.74	2U	2.1	1.7
GY21	GY-21-1.5	5/26/98	1.5	mg/kg	--	--	25U	1U	5.8	5.5	3.5	2.5U	3.1	6.4	3.7	7.6	10U	2.5U	10U	3.5	8.5
GY22	GY-22-0.5	5/26/98	0.5	mg/kg	--	--	10U	0.64	1.9	2.2	1.2	2	1	3.1	3.8	5.4	4U	1.5	4U	3.4	4
GY22	GY-22-1.5	5/26/98	1.5	mg/kg	--	--	5U	0.2U	0.47	0.57	0.29	0.75	0.27	0.55	1.5	0.74	2U	0.5U	2U	0.91	0.66
GY23	GY-23-0.5	5/26/98	0.5	mg/kg	--	--	5U	0.2U	0.43	1.1	1.6	1.6	0.37	0.5U	2.1	1.3	2U	0.5U	2U	0.5U	1.8
GY23	GY-23-1.5	5/26/98	1.5	mg/kg	--	--	10U	0.4U	16	2.4	1.3	3.4	1	2.3	4.6	4.3	4U	3.1	4U	2.8	4.7
GY24	GY-24-0.5	5/27/98	0.5	mg/kg	--	--	0.5U	0.02U	0.033	0.094	0.033	0.15	0.029	0.057	0.19	0.13	0.2U	0.12	0.2U	0.067	0.18
GY24	GY-24-1.5	5/27/98	1.5	mg/kg	--	--	0.5U	0.02U	0.024	0.06	0.022	0.082	0.02U	0.05U	0.12	0.086	0.2U	0.06	0.2U	0.05U	0.12
BC-1	GY-BC-1	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.05U	0.051	0.057	0.13U	0.05U	0.13U	0.16	0.13U	0.5U	0.13U	0.5U	0.13U	0.13U
BC-2	GY-BC-2	7/13/98	Surface	mg/kg	--	--	0.05U	0.002U	0.002U	0.0028	0.0038	0.005U	0.002U	0.005U	0.012	0.0078	0.02U	0.005U	0.023	0.0072	0.0052
BP-1	GY-BP-1	7/13/98	Surface	mg/kg	--	--	0.05U	0.002U	0.0034	0.0058	0.0068	0.011	0.0034	0.0088	0.01	0.018	0.02U	0.0076	0.02U	0.0099	0.013
BP-2	GY-BP-2	7/13/98	Surface	mg/kg	--	--	0.5U	0.02U	0.025	0.033	0.033	0.054	0.02U	0.05U	0.074	0.068	0.2U	0.05U	0.2U	0.05U	0.073
BP-3	GY-BP-3	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.079	0.13	0.11	0.21	0.059	0.13U	0.29	0.27	0.5U	0.15	0.5U	0.14	0.27

See last page for notes.

TABLE 1-3

Summary of Historical Analytical Data for Soil, Polynuclear Aromatic Hydrocarbons (PAHs)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Date	Depth (ft bgs)[1]	Units[2]	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Residential SRL[3,4]					**NE[7]**	**NE**	**3700**	**22000**	**6.9**	**0.69**	**6.9**	**NE**	**69**	**680**	**0.69**	**2300**	**2700**	**6.9**	**56**	**NE**	**2300**
Non-Residential SRL[5]					**NE**	**NE**	**29000**	**240000**	**21**	**2.1**	**21**	**NE**	**210**	**2000**	**2.1**	**22000**	**26000**	**21**	**190**	**NE**	**29000**
Groundwater Protection Level					**NE**	**NE**	**38500**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**578000**	**>1E06**	**>1E06**	**NE**	**>1E06**
BP-4	GY-BP-4	7/13/98	Surface	mg/kg	--	--	5U	0.2U	0.2U	0.29	0.25	0.5	0.2U	0.5U	0.67	0.82	2U	0.5U	2U	0.73	0.86
DS-1	GY-DS-1	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.093	0.12	0.1	0.16	0.058	0.13U	0.21	0.3	0.5U	0.13U	0.5U	0.15	0.27
DS-2	GY-DS-2	7/13/98	Surface	mg/kg	--	--	25U	0.23J	0.74J	2.3	1.5	3.3	0.83J	1.2J	4.7	2J	10U	2.2J	10U	1J	2.4J
DS-3	GY-DS-3	7/13/98	Surface	mg/kg	--	--	25U	0.28J	0.74J	2	1.4	3.1	0.78J	1.1J	4.5	1.8J	10U	2.1J	10U	1.1J	1.6J
DS-3	GY-DS-3	7/13/98	Surface	mg/kg	--	--	5U	0.2U	0.23	1.9	1.3	3.5	0.56	0.5U	4.2	0.64	2U	2.9	2U	0.5U	1
DS-4	GY-DS-4	7/13/98	Surface	mg/kg	--	--	10U	0.4U	0.97	1	0.76	1U	0.47	1.1	1.4	2	4U	1U	4U	1.4	1.6
DS-5	GY-DS-5	7/13/98	Surface	mg/kg	--	--	0.05U	0.002U	0.0069	0.013	0.011	0.02	0.005	0.013	0.061	0.021	0.02U	0.0089	0.02U	0.011	0.021
DS-6	GY-DS-6	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.12	0.17	0.14	0.22	0.074	0.15	0.25	0.37	0.5U	0.15	0.5U	0.18	0.35
DW-2	GY-SW-2	7/13/98	Surface	mg/kg	--	--	0.2U	0.008U	0.012	0.023	0.025	0.02U	0.011	0.02U	0.042	0.044	0.08U	0.02U	0.08U	0.02U	0.039
NE-1	GY-NE-1	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.12	0.2	0.16	0.33	0.08	0.16	0.44	0.48	0.5U	0.26	0.5U	0.28	0.56
NE-1	GY-NE-1	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.059	0.12	0.1	0.23	0.05	0.13U	0.29	0.23	0.5U	0.15	0.5U	0.13U	0.29
NE-3	GY-NE-3	7/13/98	Surface	mg/kg	--	--	5U	0.2U	0.2U	0.26	0.22	0.5U	0.2U	0.5U	0.5U	0.61	2U	0.5U	2U	0.5U	0.53
PT-1	GY-PT-1	7/13/98	Surface	mg/kg	--	--	0.5U	0.033	0.12	0.18	0.14	0.2	0.069	0.17	0.28	0.33	0.2U	0.14	0.2U	0.19	0.3
PT-2	GY-PT-2	7/13/98	Surface	mg/kg	--	--	1.3U	0.05	0.25	0.36	0.27	0.42	0.14	0.34	0.59	0.76	0.5U	0.34	0.5U	0.49	0.78
PT-3	GY-PT-3	7/13/98	Surface	mg/kg	--	--	0.5U	0.02U	0.068	0.1	0.075	0.13	0.043	0.1	0.18	0.17	0.2U	0.11	0.2U	0.085	0.16
PT-4	GY-PT-4	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.1	0.13	0.11	0.17	0.063	0.15	0.25	0.25	0.5U	0.13U	0.5U	0.14	0.24
SE-1	GY-SE-1	7/13/98	Surface	mg/kg	--	--	25U	2.4	6	6	4.9	6.8	3.1	7.1	0.89	16	10U	5.3	10U	11	13
SE-2	GY-SE-2	7/13/98	Surface	mg/kg	--	--	0.5U	0.02U	0.07	0.13	0.079	0.15	0.045	0.058	0.17	0.18	0.2U	0.09	0.2U	0.08	0.19
SSB	GY-SSB-0.2	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.067	0.13	0.12	0.29	0.055	0.13U	0.3	0.26	0.5U	0.19	0.5U	0.13U	0.27
SW-1	GY-SW-1	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.05U	0.1	0.093	0.19	0.05U	0.13U	0.25	0.14	0.5U	0.13	0.5U	0.13U	0.14
TS-1	GY-TS-1	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.073	0.14	0.11	0.13U	0.059	0.13U	0.31	0.24	0.5U	0.13U	0.5U	0.13U	0.28
TS-2	GY-TS-2	7/13/98	Surface	mg/kg	--	--	1.3U	0.073	0.34	0.34	0.27	0.41	0.17	0.41	0.51	0.84	0.5U	0.31	0.5U	0.42	0.76
TS-3	GY-TS-3	7/13/98	Surface	mg/kg	--	--	25U	0.06J	0.5J	1.2	1	3	0.51J	0.79J	3.1	2.5U	10U	1.9J	10U	0.76J	2.7
TS-4	GY-TS-4	7/13/98	Surface	mg/kg	--	--	1.3U	0.05U	0.056	0.072	0.067	0.13U	0.05U	0.13U	0.15	0.14	0.5U	0.13U	0.5U	0.13U	0.14
TB-22	TB-22	4/2/01	5.1	mg/Kg	--	--	0.1U	0.01U	0.01U	0.005U	0.01U	0.01U	0.01U	0.01U	0.02U	0.01U	0.01U	0.01U	0.1U	0.005U	0.01U
TB-24	TB-24	4/3/01	5.6	mg/Kg	--	--	0.1U	0.01U	0.01U	0.005U	0.01U	0.01U	0.01U	0.01U	0.02U	0.01U	0.01U	0.01U	0.1U	0.005UJ	0.01U
TB-41	TB-41	4/10/01	6.6	mg/Kg	--	--	0.1UJ	0.01UJ	0.01UJ	0.005UJ	0.01UJ	0.01J	0.01UJ	0.01UJ	0.02UJ	0.01UJ	0.01UJ	0.01J	0.1UJ	0.005UJ	0.01UJ
TB-55	TB-55	5/3/01	5.9	mg/Kg	--	--	0.1UJ	0.01UJ	0.01UJ	0.005UJ	0.01UJ	0.01UJ	0.01UJ	0.01UJ	0.02UJ	0.01UJ	0.01UJ	0.01UJ	0.1UJ	0.005UJ	0.01UJ
TB-57	TB-57	5/3/01	6.4	mg/Kg	--	--	0.1UJ	0.01UJ	0.01UJ	0.005UJ	0.01UJ	0.01UJ	0.01UJ	0.01UJ	0.02UJ	0.01UJ	0.01UJ	0.01UJ	0.1UJ	0.005UJ	0.01UJ
TS-23	TS-23	4/3/01	4	mg/Kg	--	--	0.1U	0.01U	0.01U	0.005U	0.01U	0.01U	0.01U	0.01U	0.02U	0.01U	0.01U	0.01U	0.1U	0.005UJ	0.01U
TS-25	TS-25	4/3/01	4.4	mg/Kg	--	--	0.1U	0.01U	0.01U	0.005U	0.01U	0.01U	0.01U	0.01U	0.02U	0.01U	0.01U	0.01U	0.1U	0.005UJ	0.01U
TS-40	TS-40	4/10/01	4	mg/Kg	--	--	0.1UJ	0.01UJ	0.01UJ	0.005UJ	0.01UJ	0.01UJ	0.01UJ	0.01UJ	0.02UJ	0.01UJ	0.01UJ	0.01UJ	0.1UJ	0.005UJ	0.01UJ
TS-42	TS-42	4/11/01	4	mg/Kg	--	--	0.1U	0.01U	0.01U	0.005UJ	0.01U	0.01U	0.01U	0.01U	0.02U	0.01U	0.01U	0.01U	0.1U	0.005UJ	0.01U
TS-56	TS-56	5/3/01	3.5	mg/Kg	--	--	0.1UJ	0.01UJ	0.01UJ	0.005UJ	0.01UJ	0.01UJ	0.01UJ	0.01UJ	0.02UJ	0.01UJ	0.01UJ	0.01UJ	0.1UJ	0.005UJ	0.01UJ

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Residential SRLs are values based on a 1 x 10-5 excess lifetime cancer risk for any carcinogen other than a known human carcinogen.
4. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential soil remediation level.
5. Cells highlighted in **red** indicate the compound exceeded the 2007 non-residential SRL.
6, Groundwater Protection Levels for COCs. Calculated GPLs witwh a value above 1,000,000 are presented as >1E06
7. NE = Standard not established
8. -- = Sample not analyzed for this compound

U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.

UJ = The analyte was analyzed for but was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

TABLE 1-4

Summary of Historical Analytical Data for Soil, Petroleum Hydrocarbons (TPH)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample Name	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Total TPH[3]	Extractable Fuel Hydrocarbons (C10-C32)	TPH Diesel Range (C10-C22)	TPH Oil Range (C22-C32)[4]	Extractable Fuel Hydrocarbons (C6-C10)	Total Petroleum Hydrocarbons	TRPH (EPA Method 418.1)[5]
GB1	GB1 10-12.5	10-12.5	12/21/93	mg/kg	--[6]	--	--	--	--	--	20U
GB2	GB2 8-10	8-10	12/22/93	mg/kg	--	--	--	--	--	--	20U
GB3	GB3 5-7	5-7	12/21/93	mg/kg	179000	--	140000	25000	14000	--	130000
GB3	GB3 7-9	7-9	12/21/93	mg/kg	1150	--	630	520	10U	--	380
GB3	GB3 13-15	13-15	12/21/93	mg/kg	220	--	100	120	5U	--	170
GB3	GB3 19-20	19-20	12/21/93	mg/kg	1500	--	1200	300	25U	--	--
GB3	GB3 40	40	03/25/94	mg/kg	20	--	8	12	5U	--	--
GB3	GB3 50	50	03/25/94	mg/kg	24	--	10	14	5U	--	--
GB3	GB3 60	60	03/25/94	mg/kg	10	--	5U	10	5U	--	--
GB4	GB4 5-6.5	5-6.5	12/23/93	mg/kg	3400	--	1300	2100	25U	--	370
GB4	GB4 8-10	8-10	12/23/93	mg/kg	--	--	--	--	--	--	20U
GB5	GB5 16-17	16-17	12/22/93	mg/kg	132	--	95	37	5U	--	--
GB5	GB5 25-26	25-26	12/22/93	mg/kg	--	--	--	--	--	--	25
GB5	GB5 31-32	31-32	12/22/93	mg/kg	--	--	--	--	--	--	20U
GB6	GB6 10-12	10-12	12/22/93	mg/kg	--	--	--	--	--	--	20U
GB6	GB6 20-22	20-22	12/22/93	mg/kg	--	--	--	--	--	--	20U
GB7	GB7 8.5-10	8.5-10	12/22/93	mg/kg	9		5U	9	5U	--	290
GB7	GB7 20-21	20-21	12/22/93	mg/kg	--	--	--	--	--	--	80
HA3	HA3 3.5-4	3.5-4	12/22/93	mg/kg	17150	--	8100	8900	150	--	2100
HA3	HA3 7-8	7-8	12/22/93	mg/kg	14500	--	10000	4500	100U	--	2900
HA3B	HA-3B-3	3	01/20/94	mg/kg	1780	--	480	1300	50U	--	--
HA3B	HA-3B-5	5	01/20/94	mg/kg	5U	--	5U	5U	5U	--	--
DH-1	DH-1	4.5	01/20/94	mg/kg	2050	--	950	1100	25U	--	--
DH-2	DH-2	4.5	01/20/94	mg/kg	5U	--	5U	5U	5U	--	--
DH-3	DH-3	4.5	01/20/94	mg/kg	45	--	8	37	5U	--	--
DH-4	DH-4	4.5	01/20/94	mg/kg	5U	--	5U	5U	5U	--	--
DH-5	DH-5	5.0	01/20/94	mg/kg	163400	--	140000	20000	3400	--	--
DH-6	DH-6	4.5	01/20/94	mg/kg	5U	--	5U	5U	5U	--	--
DH-7	DH-7	4.5	01/20/94	mg/kg	5U	--	5U	5U	5U	--	--
DH-8	DH-8	5	01/20/94	mg/kg	5	--	5	5U	5U	--	--
DH-9	DH-9	2.5	01/20/94	mg/kg	1180	--	290	890	50U	--	--
EW-3	EW-3 5-6	5-6	05/09/94	mg/kg	500	--	240	260	10U	--	--
EW-4	EW-4 5-6	5-6	05/09/94	mg/kg	499	--	99	400	10U	--	--
EW-4	EW-4 6-7	6-7	05/09/94	mg/kg	2560	--	860	1700	100U	--	--
EW-5	EW-5 5	5	05/09/94	mg/kg	2940	--	940	2000	100U	--	--
EW-5	EW-5 10	10	05/09/94	mg/kg	20	--	6	14	5U	--	--
MP-2	MP-2 5-6.5	5-6.5	05/09/94	mg/kg	158000	--	130000	28000	5000U	--	--
GY-9	GY-9-0.5	0.5	05/26/98	mg/kg	1100	1100	450	690	--	20U	--
GY-9	GY-9A-0.5	0.5	05/26/98	mg/kg	2800	2800	950	1800	--	20U	--
GY-10	GY-10-0.5	0.5	05/26/98	mg/kg	12000	12000	3800	7900	--	20U	--
GY-12	GY-12-0.5	0.5	05/27/98	mg/kg	3600	3600	30U	3600	--	20U	--
GY-14	GY-14-0.5	0.5	05/27/98	mg/kg	18000	18000	6600	11000	--	20U	--
GY-14	GY-14-1.5	1.5	05/27/98	mg/kg	80U	80U	30U	50U	--	20U	--
GY-15	GY-15-0.5	0.5	05/27/98	mg/kg	1300	1300	450	810	--	20U	--
GY-15	GY-15-1.5	1.5	05/27/98	mg/kg	530	530	180	350	--	20U	--
GY-20	GY-20-0.5	0.5	05/27/98	mg/kg	2300	2300	870	1400	--	20U	--
GY-20	GY-20-1.5	1.5	05/27/98	mg/kg	5200	5200	2300	2900	--	20U	--
GY-24	GY-24-0.5	0.5	05/27/98	mg/kg	80U	80U	30U	50U	--	20U	--
GY-24	GY-24-1.5	1.5	05/27/98	mg/kg	80U	80U	30U	50U	--	20U	--
BC-2	GY-BC-2	Surface	07/13/98	mg/kg	80U	80U	30U	50U	--	20U	--
BP-4	GY-BP-4	Surface	07/13/98	mg/kg	80U	80U	30U	50U	--	20U	--
DS-3	GY-DS-3	Surface	07/13/98	mg/kg	190	190	58	130	--	20U	--

See last page for notes.

TABLE 1-4

Summary of Historical Analytical Data for Soil, Petroleum Hydrocarbons (TPH)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample Name	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Total TPH[3]	Extractable Fuel Hydrocarbons (C10-C32)	TPH Diesel Range (C10-C22)	TPH Oil Range (C22-C32)[4]	Extractable Fuel Hydrocarbons (C6-C10)	Total Petroleum Hydrocarbons	TRPH (EPA Method 418.1)[5]
NE-1	GY-NE-1	Surface	07/13/98	mg/kg	80U	80U	30U	50U	--	20U	--
NE-1	GY-NE-2	Surface	07/13/98	mg/kg	130	130	30U	130	--	20U	--
PT-1	GY-PT-1	Surface	07/13/98	mg/kg	80U	80U	30U	69	--	20U	--
SE-2	GY-SE-2	Surface	07/13/98	mg/kg	80U	80U	30U	50U	--	20U	--
SSB	GY-SSB-0.2	Surface	07/13/98	mg/kg	190	190	30U	190	--	--	--
SW-2	GY-SW-2	Surface	07/13/98	mg/kg	80U	80U	30U	50U	--	20U	--
TS-4	GY-TS-4	Surface	07/13/98	mg/kg	80U	80U	30U	50U	--	20U	--
TB-22	TB-22	5.1	04/02/01	mg/kg	130U	130U	30U	100U	--	--	--
TB-24	TB-24	5.6	04/03/01	mg/kg	130U	130U	30U	100U	--	--	--
TS-23	TS-23	4	04/03/01	mg/kg	130U	130U	30U	100U	--	--	--
TS-25	TS-25	4.4	04/03/01	mg/kg	130U	130U	30U	100U	--	--	--
TB-41	TB-41	6.6	04/10/01	mg/kg	130U	130U	30U	100U	--	--	--
TS-40	TS-40	4	04/10/01	mg/kg	130U	130U	30U	100U	--	--	--
TS-42	TS-42	4	04/11/01	mg/kg	130U	130U	30U	100U	--	--	--
TB-55	TB-55	5.9	05/03/01	mg/kg	130U	130U	30U	100U	--	--	--
TB-57	TB-57	6.4	05/03/01	mg/kg	130U	130U	30U	100U	--	--	--
TS-56	TS-56	3.5	05/03/01	mg/kg	130U	130U	30U	100U	--	--	--

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Total TPH results from 1993 and 1994 are C6-C36. All other total TPH results are C10-C32.
4. TPH Oil Range results from December 1993 and January 1994 reported as C22-C36.
5. Total recoverable petroleum hydrocarbons analyzed with EPA Method 418.1. All other TPH results used a modified 8015 method for analysis.
6. -- = Sample not analyzed for this compound

U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.

UJ = The analyte was analyzed for but was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

TABLE 1-5

Summary of Historical Analytical Data for Soil, Volatile Organic Compounds (VOCs) - BTEX Only

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample Name	Depth (ft bgs)[1]	Sample Date	Units[2]	Benzene	Ethylbenzene	Toluene	Xylenes, total
Residential SRL[3]				**mg/Kg**	**0.65**	**400**	**650**	**270**
Non Residential SRL[4]				**mg/Kg**	**1.4**	**400**	**650**	**420**
Groundwater Protection Levels[5]				**mg/Kg**	**12[6]**	**>1E+06**	**1.31E+05**	**3.21E+08**
SS-1	SS-1	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-2	SS-2	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-3	SS-3	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-4	SS-4	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-5	SS-5	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-6	SS-6	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-6	SS-11	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-7	SS-7	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-8	SS-8	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-9 Offsite	SS-9	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
SS-10 Offsite	SS-10	Surface	9/29/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB1	GB1 10-12.5	10-12.5	12/21/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB2	GB2 8-10	8-10	12/21/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB3	GB3 7-9	7-9	12/21/93	mg/Kg	0.025U	0.025U	0.025U	0.04
GB3	GB3 13-15	13-15	12/21/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB3	GB3 5-7	5-7	12/21/93	mg/Kg	650	300	650	460
GB3	GB3 19-20	19-20	12/21/93	mg/Kg	0.025U	0.11	0.04	0.37
GB3	GB3 28	28	12/21/93	mg/Kg	0.025U	0.09	0.03	0.08
GB4	GB4 5-6.5	5-6.5	12/23/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB4	GB4 8-10	8-10	12/23/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB5	GB5 7-9	7-9	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB5	GB5 16-17	16-17	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB5	GB5 25-26	25-26	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB5	GB5 31-32	31-32	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.04
GB6	GB6 10-12	10-12	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
GB7	GB7 8.5-10	8.5-10	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
HA1	HA1-5	5-5.5	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
HA2	HA2-5	5-5.5	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.19
HA3	HA3 3.5-4	3.5-4	12/22/93	mg/Kg	0.06	0.025U	0.025U	0.13
HA3	HA3 7-8	7-8	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
HA4	HA4-5	5-5.5	12/22/93	mg/Kg	0.025U	0.025U	0.025U	0.025U
EW-3	EW3 5-6	5-6	5/9/94	mg/Kg	0.025U	0.025U	0.025U	0.025U
EW-4	EW4 5-6	5-6	5/9/94	mg/Kg	0.025U	0.025U	0.025U	0.025U
EW-4	EW4 6-7	6-7	5/9/94	mg/Kg	0.025U	0.025U	0.03	0.025U
EW-5	EW5 5	5	5/9/94	mg/Kg	0.04	0.025U	0.04	0.03
EW-5	EW5 10	10	5/9/94	mg/Kg	0.025U	0.025U	0.04	0.025U
MP-2	MP2 5-6.5	5-6.5	5/9/94	mg/Kg	94	50	120	220
SSB	GY-SSB-0.2	Surface	7/13/98	mg/Kg	0.05U	0.05U	0.05U	0.15U

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential soil remediation level.
4. Cells highlighted in **red** indicate the compound exceeded the 2007 non-residential SRL.
5. Calcualted GPLs for COCs (See Table 4-4). Calculated GPLs witwh a value above 1,000,000 are presented as >1E06.
6. Samples that exceeded for non-residential SRL for benzene also exceeded for the calcualted GPL of 12.

U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.

UJ = The analyte was analyzed for but was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

TABLE 1-6

Summary of Historical Analytical Data for Soil, Total RCRA Metals and Cyanide

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample Name	Depth (ft bgs)[1]	Sample Date	Units[2]	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Cyanide
Residential SRLs[3]				**mg/Kg**	**10**	**15000**	**39**	**120000**	**400**	**23**	**390**	**390**	**1200**
Non-Residential SRLs[4]				**mg/Kg**	**10**	**170000**	**510**	**1000000**	**800**	**310**	**5100**	**5100**	**12000**
SS-1	SS-1	Surface	9/29/93	mg/Kg	5U	--[5]	0.3	15.8	55	0.1U	5U	0.5U	0.5U
SS-2	SS-2	Surface	9/29/93	mg/Kg	5U	--	0.3U	14.4	75	0.1U	5U	0.5U	0.5U
SS-3	SS-3	Surface	9/29/93	mg/Kg	5U	--	0.3U	17.1	9	0.1U	5U	0.5U	0.5U
SS-4	SS-4	Surface	9/29/93	mg/Kg	5	--	0.5	17.6	27	0.2	5U	2.2	0.5U
SS-5	SS-5	Surface	9/29/93	mg/Kg	5U	--	0.3	12.1	28	0.1U	5U	0.5U	0.5U
SS-6	SS-11	Surface	9/29/93	mg/Kg	6	--	0.3U	11.2	20	0.1U	5U	0.5U	0.5U
SS-6	SS-6	Surface	9/29/93	mg/Kg	6	--	0.3	11	20	0.1U	5U	0.5U	0.5U
SS-7	SS-7	Surface	9/29/93	mg/Kg	5U	--	0.3	13.6	24	0.1U	5U	0.5U	0.5U
SS-8	SS-8	Surface	9/29/93	mg/Kg	5U	--	0.3U	15.3	35	0.1U	5U	0.5U	0.5U
SS-9 Offsite	SS-9	Surface	9/29/93	mg/Kg	6	--	0.4	21.3	117	0.1U	5U	0.5U	0.6
SS-10 Offsite	SS-10	Surface	9/29/93	mg/Kg	5U	--	0.5	12.4	111	0.1U	5U	0.5U	0.6
GB1	GB1 10-12.5	10-12.5	12/21/93	mg/Kg	7	75.2	0.3U	18.5	8	0.1U	5U	0.5U	0.5U
GB2	GB2 8-10	8-10	12/21/93	mg/Kg	5U	80.2	0.3U	19	8	0.1U	5U	0.5U	0.5U
GB3	GB3 5-7	5-7	12/21/93	mg/Kg	5U	4.6	0.3U	1.3	10	0.1U	5U	0.5U	1.2
GB4	GB4 5-6.5	5-6.5	12/23/93	mg/Kg	5	86.9	0.4	7.8	231	0.9	5U	0.5U	0.5U
GB5	GB5 7-9	7-9	12/22/93	mg/Kg	8	83.2	0.3U	17.7	6	0.1U	5U	0.5U	0.5U
GB5	GB5 16-17	16-17	12/22/93	mg/Kg	6	87.1	0.3U	19.3	9	0.1U	5U	0.5U	0.5U
GB6	GB6 10-12	10-12	12/22/93	mg/Kg	5	99.4	0.3U	19.3	6	0.1U	5U	0.5U	0.5U
GB7	GB7 8.5-10	8.5-10	12/22/93	mg/Kg	6	87.3	0.3U	20.3	19	0.1U	5U	0.5U	0.5U
HA1	HA1-5	5-5.5	12/22/93	mg/Kg	6	136	0.3U	23.6	12	0.1U	5U	0.5U	0.5U
HA2	HA2-5	5-5.5	12/22/93	mg/Kg	7	145	0.3U	20.9	12	0.1U	5U	0.5U	0.5U
HA3	HA3 3.5-4	3.5-4	12/22/93	mg/Kg	5U	69.8	0.3U	11.8	34	0.1U	5U	0.5U	0.5U
HA3	HA3 7-8	7-8	12/22/93	mg/Kg	5U	73.6	0.3U	10.8	32	0.1U	5U	0.5U	0.5U
HA4	HA4-5	5-5.5	12/22/93	mg/Kg	6	124	0.3U	22.7	12	0.1U	5U	0.5U	0.5U

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential soil remediation level.
4. Cells highlighted in **red** indicate the compound exceeded the 2007 non-residential SRL.
5. -- = Sample not analyzed for this compound.
6. GPLs were not calculated for metal compounds since no metals were detected above the minimum GPL.

U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.

UJ = The analyte was analyzed for but was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

TABLE 1-7

Summary of Historical Soil Vapor Survey Results

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

		October 13, 1993				December 21-22, 1993				January 20, 1994			
Sample Location	**Depth (feet)**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**
SG-1	3	NS[1]	NS	NS	NS	NS	NS	NS	NS	0.02U	0.03U	0.05U	0.07U
SG-1	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-1	6	NS	NS	NS	NS	NS	NS	NS	NS	0.02U	0.03	0.05U	0.07U
SG-2	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-3	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-4	3.5	0.50U	50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-5	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-6	3.5	0.50U	0.50U	0.50U	0.50U	NS	NS	NS	NS	NS	NS	NS	NS
SG-7	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-8	3.5	0.50U	0.50U	0.50U	0.50U	NS	NS	NS	NS	NS	. NS	NS	NS
SG-9	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-10	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-11	3.5	0.50U	50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-12	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-13	3	NS	NS	NS	NS	NS	NS	NS	NS	0.02U	0.03U	0.05U	0.07U
SG-13	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-14	3.5	0.50U	0.50U	0.50U	0.50U	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-15	3	NS	NS	NS	NS	NS	NS	NS	NS	0.1	0.03U	0.05U	0.07U
SG-15	3.5	NS	NS	NS	NS	0.25U	0.25U	NS	NS	NS	NS	NS	NS
SG-15	6	NS	NS	NS	NS	NS	NS	NS	NS	0.5	1	0.1	5
SG-17	2.5	NS	NS	NS	NS	NS	NS	NS	NS	0.02	0.1	0.05U	0.07U
SG-18	2.5	NS	NS	NS	NS	NS	NS	NS	NS	0.02U	0.03U	0.05U	0.07U
SG-19	2.5	NS	NS	NS	NS	NS	NS	NS	NS	0.02U	0.03U	0.05U	0.07U
SG-20	6	NS	NS	NS	NS	NS	NS	NS	NS	0.06	0.03U	0.05U	0.07U
SG-21	6	NS	NS	NS	NS	NS	NS	NS	NS	0.02U	0.03U	0.05U	0.07U
SG-22	6	NS	NS	NS	NS	NS	NS	NS	NS	31	13	3	5
SG-23	3	NS	NS	NS	NS	NS	NS	NS	NS	330	100	59	70
SG-24	6	NS	NS	NS	NS	NS	NS	NS	NS	0.2U	0.3U	0.5U	<0.7
SG-25	6	NS	NS	NS	NS	NS	NS	NS	NS	0.03	0.03U	0.05U	0.07U
SG-26	2	NS	NS	NS	NS	NS	NS	NS	NS	0.04	0.06	0.05U	0.07U
SG-27	6	NS	NS	NS	NS	NS	NS	NS	NS	0.02U	0.03U	0.05U	0.07U
SG-28	6	NS	NS	NS	NS	NS	NS	NS	NS	1100	460	170	210
SG-29	6	NS	NS	NS	NS	NS	NS	NS	NS	0.3	0.3	0.5U	0.7
SG-30	3	NS	NS	NS	NS	NS	NS	NS	NS	0.2	0.1	0.05U	0.07U
Ambient Air		NS	NS	NS	NS	NS	NS	NS	NS	0.07	0.1	0.05U	0.07U

Notes:

1. NS = Not Sampled
2. Concentrations in µg/L (micrograms per liter)

U = The analyte was analyzed but not detected above the reported sample quantitation limit.

TABLE 2-1
Boring Locations During Pre-Design Testing Investigation
APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
1D	Deep Soil Boring w/ Hydropunch	75 (soil sample) 110 (GW sample)	Northwest corner of site near former lampblack basins and "conc vat"	5/5/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
2D	Deep Soil Boring	65	Central western area of property	5/4/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
3D	Deep Soil Boring w/ Hydropunch	75 (soil sample) 106 (GW sample)	Southwest area of site, under former apartment building. Downgradient GW location.	5/10/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
4D	Deep Soil Boring	70	Southern area of site, under former apartment building	5/13/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
5D	Deep Soil Boring w/ Hydropunch	65 (soil) 110 (GW Sample)	Southeast Corner of Site	5/17/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
6D	Deep Soil Boring	70	Eastern boundary of Site	5/16/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
7D	Deep Soil Boring	65	Northeast area of Site under former apartment building	5/20/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
8D	Deep Soil Boring w/ Hydropunch	90 (soil sample) 110 (GW sample)	Northeast corner of Site near areas where lampblack has been observed. Upgradient groundwater location.	5/19/2016 to 5/20/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
9S	Shallow Soil Boring	20	Northwest corner of Site, near former "conc vat"	5/3/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*

TABLE 2-1
Boring Locations During Pre-Design Testing Investigation
APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
10S	Shallow Soil Boring	30	Southwest corner of Site	5/9/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
11S	Shallow Soil Boring	20	South central area of site, under former apartment building	5/12/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
12S	Shallow Soil Boring	30	Central area of site in courtyard	5/23/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
13S	Shallow Soil Boring	20	East central area of Site, under former apartment building	5/232/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
14S	Shallow Soil Boring	30	Eastern boundary of Site	5/23/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
15S	Shallow Soil Boring	30	North central area of Site in former courtyard under concrete pavers	5/17/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
16S	Shallow Soil Boring	30	West central area of Site, under former apartment building	5/12/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
17S	Shallow Soil Boring	30	Northwest area of Site, under former apartment building	5/12/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
18S	Shallow Soil Boring	30	North central area of property	5/12/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*

TABLE 2-1
Boring Locations During Pre-Design Testing Investigation
APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location ID	Sample Type	Total Depth of Boring	Sample Location	Date	Reference/Site Investigation
19S	Shallow Soil Boring	30	Northeast corner of Site under former apartment building near areas where lampblack has been observed	5/16/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
20S	Shallow Soil Boring	30	Southeast area of Site, under former apartment building	5/23/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
21D	Deep Soil Boring	60	Northeast corner of Site along northern boundary north of area where lampblack has been observed and high PAH concentrations were detected	11/3/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
22D	Deep Soil Boring	55	Northeast corner of Site along northern boundary southeast of area where lampblack has been observed and high PAH concentrations were detected	11/4/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
23D	Deep Soil Boring	40	Far northeast corner of Site where lampblack has been observed and high PAH concentrations were detected	11/4/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*
GW1	Groundwater Monitor Well	130	Northeast corner of Site under former apartment building near areas where lampblack has been observed and high PAH concentrations were detected	11/1-2/2016	Pre-design Investigation to prepare *Remedial Action Plan for the APS Grant Street Former Manufactured Gas Plant, 331 West Grant Street*

TABLE 2-2

Summary of Pre-design Testing Geotechnical Results

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Date	Depth (ft bgs)	Passing No. 200 (%)	Liquid Limit	Plastic Limit	Plasticity Index
1D	GS-1D5-050516	5/5/2016	5	NA[1]	29	19	10
1D	GS-1D25-050516	5/5/2016	25	36.6	NA	NA	NP[3]
1D	GS-1D35-050516	5/5/2016	35	10.8	NV[2]	NA	NP
1D	GS-1D55-050516	5/5/2016	55	7.8	NV	NA	NP
1D	GS-1D75-050516	5/5/2016	75	NA	NV	NA	NP
2D	GS-2D25-050416	5/4/2016	25	19.5	NA	NA	NA
2D	GS-2D45-050416	5/4/2016	45	NA	NA	NA	NA
2D	GS-2D65-050416	5/4/2016	65	6.2	NA	NA	NA
3D	GS-3D15-051016	5/10/2016	15	39.3	NV	NA	NP
3D	GS-3D55-051016	5/10/2016	55	NA	NA	NA	NA
3D	GS-3D75-051016	5/10/2016	75	20.8	NA	NA	NA
4D	GS-4D10-051316	5/13/2016	10	65.3	23	17	6
4D	GS-4D20-051316	5/13/2016	20	NA	NA	NA	NA
4D	GS-4D40-051316	5/13/2016	40	22.7	NV	NA	NP
4D	GS-4D60-051316	5/13/2016	60	4.5	NV	NA	NP
5D	GS-5D05-051716	5/17/2016	5	NA	NA	NA	NA
5D	GS-5D15-051716	5/17/2016	15	NA	NV	NA	NP
5D	GS-5D25-051716	5/17/2016	25	22.5	NV	NA	NP
5D	GS-5D55-051716	5/17/2016	55	26.0	29	22	7
6D	GS-6D5-051316	5/13/2016	5	NA	NA	NA	NA
6D	GS-6D10-051316	5/13/2016	10	NA	NA	NA	NA
6D	GS-6D30-051616	5/16/2016	30	10.9	NV	NA	NP
7D	GS-7D05-052016	5/20/2016	5	NA	NA	NA	NA
7D	GS-7D15-052016	5/20/2016	15	69.2	NV	NA	NP
7D	GS-7D35-052016	5/20/2016	35	14.3	NA	NA	NA
7D	GS-7D65-052016	5/20/2016	65	13.2	NA	NA	NA
8D	GS-8D10-051916	5/19/2016	10	NA	NA	NA	NA
8D	GS-8D20-051916	5/19/2016	20	NA	NV	NA	NP
8D	GS-8D50-051916	5/19/2016	50	18.8	NA	NA	NA

Notes:

1. NA = Not analyzed
2. NV = Non-viscous
3. NP = Non-plastic

TABLE 2-3

Summary of Pre-design Testing Analytical Data for Soil, Polynuclear Aromatic Hydrocarbons (PAHs)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE[7]**	**NE**	**3700**	**NE**	**22000**	**6.9**	**0.69**	**6.9**	**NE**	**69**	**680**	**0.69**	**2300**	**2700**	**6.9**	**56**	**NE**	**2300**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**NE**	**29000**	**NE**	**240000**	**21**	**2.1**	**21**	**NE**	**210**	**2000**	**2.1**	**22000**	**26000**	**21**	**190**	**NE**	**29000**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**38500**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**578000**	**>1E06**	**>1E06**	**NE**	**>1E06**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.00063 U	0.00045 U	0.0005 U	**0.0054**	**0.0014 J**	**0.27 J**	**0.788**	**0.72**	**1.34**	**0.471**	**0.483**	**0.0124**	**0.868**	**0.00097 J**	**1.09**	**0.0023 J**	**0.0145**	**1.4**
1D	GS-1D10-050516	10	5/5/2016	mg/kg	0.00062 U	0.00044 U	0.00049 U	0.00064 U	0.00052 U	**0.00047 J**	**0.00062 J**	**0.00063 J**	**0.0014 J**	0.00058 U	0.0006 U	0.00075 U	**0.00074 J**	0.00054 U	**0.001 J**	0.00055 U	0.0004 U	**0.001 J**
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.00061 U	0.00044 U	0.00049 U	0.00063 U	0.00051 U	0.00034 U	**0.00055 J**	0.00062 U	**0.0012 J**	0.00057 U	0.00059 U	0.00074 U	**0.00095 J**	0.00054 U	**0.00094 J**	0.00054 U	**0.00056 J**	**0.0011 J**
1D	GS-1D25-050516	25	5/5/2016	mg/kg	**0.0022 J**	**0.0025 J**	**0.001 J**	**0.0109**	**0.0072**	**0.0555**	**0.129**	**0.111**	**0.215**	**0.0848**	**0.089**	**0.0032 J**	**0.26**	**0.0076**	**0.181**	**0.0209**	**0.15**	**0.297**
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.00056 U	0.0004 U	0.00045 U	0.00058 U	0.00047 U	0.00032 U	**0.00067 J**	**0.00066 J**	**0.0014 J**	**0.00061 J**	0.00055 U	0.00068 U	**0.00078 J**	0.0005 U	**0.0011 J**	0.0005 U	0.00037 U	**0.00088 J**
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.00058 U	0.00042 U	0.00047 U	0.0006 U	0.00049 U	0.00033 U	0.0003 U	0.00059 U	**0.00071 J**	0.00055 U	0.00057 U	0.00071 U	0.00056 U	0.00051 U	0.00072 U	0.00052 U	0.00038 U	0.00089 U
1D	GS-1D75-050516	75	5/5/2016	mg/kg	0.00059 U	0.00042 U	0.00047 U	0.00061 U	0.00049 U	0.00033 U	0.0003 U	0.00059 U	0.00068 U	0.00055 U	0.00057 U	0.00071 U	0.00056 U	0.00052 U	0.00072 U	0.00052 U	0.00038 U	0.00089 U
2D	GS-2D5-050416	5	5/4/2016	mg/kg	**0.0625**	**0.0701**	**0.246**	**0.121**	**0.554**	**2.67**	**2.56**	**2.85**	**2.82**	**2.15**	**2.68**	**0.472**	**5.41**	**0.171**	**2.77**	**0.475**	**2.88**	**5.02**
2D	GS-2D15-050416	15	5/4/2016	mg/kg	0.00065 U	0.00047 U	0.00052 U	0.00067 U	0.00055 U	0.00037 U	0.00034 U	0.00066 U	0.00076 U	0.00061 U	0.00063 U	0.00079 U	0.00063 U	0.00057 U	0.0008 U	0.00058 U	**0.00052 J**	0.00099 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	**0.0011 J**	**0.0013 J**	**0.0051 J**	**0.0053 J**	**0.0186**	**0.117 J**	**0.102 J**	**0.117 J**	**0.0915 J**	**0.0827**	**0.116 J**	**0.0207 J**	**0.256 J**	**0.0073 J**	**0.0986 J**	**0.0039 J**	**0.145 J**	**0.236 J**
2D	GS-FD01-050416	25	5/4/2016	mg/kg	**0.0011 J**	**0.0013 J**	**0.0034 J**	**0.0034 J**	**0.0118**	**0.0775 J**	**0.0744 J**	**0.0817 J**	**0.0716 J**	**0.068 J**	**0.0892 J**	**0.0137 J**	**0.167 J**	**0.0051 J**	**0.0689 J**	**0.0064 J**	**0.105 J**	**0.167 J**
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.00058 U	0.00042 U	0.00047 U	0.0006 U	0.00049 U	0.00033 U	0.0003 U	0.00059 U	0.00068 U	0.00055 U	0.00057 U	0.00071 U	0.00056 U	0.00051 U	0.00072 U	0.00052 U	0.00038 U	0.00089 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.00063 U	0.00045 U	0.0005 U	0.00065 U	0.00053 U	0.00035 U	0.00033 U	0.00064 U	0.00073 U	0.00059 U	0.00061 U	0.00076 U	0.00061 U	0.00055 U	0.00077 U	0.00056 U	0.00041 U	0.00096 U
3D	GS-3D5-051016	5	5/10/2016	mg/kg	0.0029 U	**0.0024 J**	**0.0099 J**	**0.017 J**	**0.0232 J**	**0.212 J**	**0.478 J**	**0.385 J**	**0.83 J**	**0.288 J**	**0.283 J**	**0.0514 J**	**0.501 J**	**0.0067 J**	**0.8 J**	**0.62**	**0.103 J**	**0.672 J**
3D	GS-FD02-051016	5	5/10/2016	mg/kg	0.00061 U	**0.0006 J**	**0.0024 J**	**0.0083 J**	**0.0066 J**	**0.0944 J**	**0.232 J**	**0.222 J**	**0.406 J**	**0.114 J**	**0.128 J**	**0.0257 J**	**0.238 J**	**0.0016 J**	**0.379 J**	**0.578**	**0.0294 J**	**0.318 J**
3D	GS-3D15-051016	15	5/10/2016	mg/kg	0.0006 U	0.00043 U	0.00048 U	**0.0039**	**0.0043**	**0.0726**	**0.108 J**	**0.216**	**0.302**	**0.12 J**	**0.186**	**0.018**	**0.516**	0.00053 U	**0.318**	**0.0025 J**	**0.117 J**	**0.292**
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.00058 U	0.00041 U	0.00046 U	0.0006 U	0.00048 U	0.00032 U	0.0003 U	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.0007 U	0.00056 U	0.00051 U	0.00071 U	0.00051 U	0.00038 U	0.00088 U
3D	GS-3D55-051016	55	5/10/2016	mg/kg	0.00065 U	0.00046 U	0.00052 U	0.00067 U	0.00055 U	0.00036 U	0.00034 U	0.00066 U	0.00076 U	0.00061 U	0.00063 U	0.00079 U	0.00063 U	0.00057 U	0.0008 U	0.00058 U	0.00042 U	0.00099 U
3D	GS-3D75-051016	75	5/10/2016	mg/kg	0.00059 U	0.00042 U	0.00047 U	0.00061 U	0.0005 U	0.00033 U	0.00031 U	0.0006 U	0.00069 U	0.00056 U	0.00058 U	0.00072 U	0.00057 U	0.00052 U	0.00073 U	0.00053 U	0.00039 U	0.00091 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.00067 U	0.00048 U	**0.00058 J**	0.00069 U	**0.0012 J**	**0.009**	**0.0136**	**0.018**	**0.0229**	**0.0118**	**0.0115**	**0.0024 J**	**0.0156**	0.00059 U	**0.021**	**0.0011 J**	**0.0062**	**0.0164**
4D	GS-4D10-051316	10	5/13/2016	mg/kg	0.00065 U	0.00047 U	0.00052 U	0.00067 U	0.00055 U	0.00037 U	0.00034 U	0.00066 U	0.00076 U	0.00061 U	0.00064 U	0.00079 U	0.00063 U	0.00057 U	0.0008 U	**0.0014 J**	**0.00047 J**	0.00099 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.00058 U	0.00041 U	0.00046 U	0.0006 U	0.00048 U	0.00032 U	**0.00043 J**	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.0007 U	0.00056 U	0.00051 U	0.00071 U	0.00051 U	0.00038 U	0.00088 U
4D	GS-4D30-051316	30	5/13/2016	mg/kg	0.00058 U	0.00041 U	0.00046 U	0.0006 U	0.00048 U	0.00032 U	0.0003 U	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.0007 U	0.00055 U	0.00051 U	0.00071 U	0.00051 U	0.00037 U	0.00088 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.00058 U	0.00042 U	0.00046 U	0.0006 U	0.00049 U	0.00033 U	0.0003 U	0.00059 U	0.00068 U	0.00055 U	0.00057 U	0.00071 U	0.00056 U	0.00051 U	0.00072 U	0.00052 U	0.00038 U	0.00089 U
4D	GS-4D70-051316	70	5/13/2016	mg/kg	0.0006 U	0.00043 U	0.00048 U	0.00062 U	0.0005 U	0.00034 U	0.00031 U	0.0006 U	0.0007 U	0.00056 U	0.00058 U	0.00072 U	0.00058 U	0.00053 U	0.00074 U	0.00053 U	0.00039 U	0.00091 U
4D	GS-FD04-051316	70	5/13/2016	mg/kg	0.0006 U	0.00043 U	0.00048 U	0.00062 U	0.0005 U	0.00034 U	0.00031 U	0.0006 U	0.00069 U	0.00056 U	0.00058 U	0.00072 U	0.00057 U	0.00053 U	0.00073 U	0.00053 U	0.00039 U	0.00091 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.019 U	0.014 U	**0.0458 J**	**0.0236 J**	**0.0639 J**	**0.873 J**	**1.86**	**1.86**	**2.36**	**1.18 J**	**1.14 J**	**0.144**	**2.06**	**0.0178 J**	**2.09**	**0.0453 J**	**0.848 J**	**2.41**
5D	GS-5D15-051716	15	5/17/2016	mg/kg	0.00064 U	0.00046 U	0.00051 U	0.00067 U	0.00054 U	0.00036 U	**0.0023 J**	**0.0016 J**	**0.0029 J**	**0.0011 J**	**0.00067 J**	0.00078 U	**0.0011 J**	0.00057 U	**0.0025 J**	0.00057 U	**0.0011 J**	**0.0019 J**
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.00057 U	0.00041 U	0.00046 U	0.00059 U	0.00048 U	0.00032 U	**0.00053 J**	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.00069 U	0.00055 U	0.0005 U	0.0007 U	0.00051 U	0.00037 U	0.00087 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.0006 U	0.00043 U	0.00048 U	0.00062 U	0.0005 U	0.00034 U	0.00031 U	0.00061 U	0.0007 U	0.00056 U	0.00058 U	0.00073 U	0.00058 U	0.00053 U	0.00074 U	0.00053 U	0.00039 U	0.00091 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	**0.0014 J**	**0.0011 J**	**0.0019 J**	0.00061 U	0.00049 U	0.00033 U	0.00031 U	0.0006 U	0.00069 U	0.00055 U	0.00058 U	0.00071 U	0.00057 U	**0.00074 J**	0.00072 U	**0.0022 J**	**0.0011 J**	0.0009 U
5D	GS-5D65-051716	65	5/17/2016	mg/kg	**0.0029 J**	**0.0024 J**	**0.0044**	0.00062 U	0.0005 U	0.00034 U	0.00031 U	0.00061 U	0.0007 U	0.00056 U	0.00059 U	0.00073 U	0.00058 U	**0.0016 J**	0.00074 U	**0.0045**	**0.0032 J**	0.00092 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.0064 U	0.0046 U	**0.0099 J**	**0.0565**	**0.0511**	**0.91**	**2.11**	**1.69**	**2.68**	**1.37**	**1.39**	**0.124**	**2.57**	**0.0094 J**	**2.31**	**0.0201 J**	**0.635**	**3.17**
6D	GS-6D10-051316	10	5/13/2016	mg/kg	0.00064 U	0.00046 U	0.00051 U	0.00066 U	0.00053 U	0.00036 U	0.00033 U	0.00064 U	0.00074 U	0.0006 U	0.00062 U	0.00077 U	0.00061 U	0.00056 U	0.00078 U	0.00057 U	0.00041 U	0.00097 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.00057 U	0.00041 U	0.00046 U	0.0006 U	0.00048 U	0.00032 U	**0.00039 J**	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.0007 U	0.00055 U	0.00051 U	0.00071 U	0.00051 U	0.00037 U	0.00088 U
6D	GS-6D30-051616	30	5/16/2016	mg/kg	**0.0032 J**	**0.0023 J**	**0.0022 J**	0.0006 U	0.00048 U	0.00032 U	0.0003 U	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.0007 U	0.00056 U	**0.00069 J**	0.00071 U	**0.0032 J**	**0.0015 J**	0.00088 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	**0.0017 J**	**0.0012 J**	**0.00085 J**	0.00061 U	0.00049 U	0.00033 U	0.00031 U	0.0006 U	0.00069 U	0.00055 U	0.00057 U	0.00071 U	0.00057 U	0.00052 U	0.00072 U	**0.0016 J**	**0.00045 J**	0.0009 U

See last page for notes.

TABLE 2-3

Summary of Pre-design Testing Analytical Data for Soil, Polynuclear Aromatic Hydrocarbons (PAHs)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE[7]**	**NE**	**3700**	**NE**	**22000**	**6.9**	**0.69**	**6.9**	**NE**	**69**	**680**	**0.69**	**2300**	**2700**	**6.9**	**56**	**NE**	**2300**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**NE**	**29000**	**NE**	**240000**	**21**	**2.1**	**21**	**NE**	**210**	**2000**	**2.1**	**22000**	**26000**	**21**	**190**	**NE**	**29000**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**38500**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**578000**	**>1E06**	**>1E06**	**NE**	**>1E06**
6D	GS-6D70-051616	70	5/16/2016	mg/kg	0.00058 U	0.00041 U	0.00046 U	0.0006 U	0.00048 U	0.00032 U	0.0003 U	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.0007 U	0.00056 U	0.00051 U	0.00071 U	0.00051 U	0.00038 U	0.00088 U
7D	GS-7D05-052016	5	5/20/2016	mg/kg	**0.0222 J**	**0.037 J**	**0.0959**	**0.462**	**0.555**	**1.85**	**2.21**	**1.84**	**1.8**	**1.41**	**1.9**	**0.227**	**4.23**	**0.0872**	**1.73**	**0.186 J**	1.92 U	**6.71 J**
7D	GS-7D15-052016	15	5/20/2016	mg/kg	**359**	**543**	**35.2**	**183**	**107**	**87.3**	**113**	**55.3**	**63.7**	**61.6**	**88.6**	**9.9**	**320**	**136**	**60.7**	**2,830**	**704**	**412**
7D	GS-7D19-052016	19	5/20/2016	mg/kg	**0.134 J**	**0.193**	**0.0243**	**0.126**	**0.114**	**0.178**	**0.182**	**0.145**	**0.151**	**0.117**	**0.173**	**0.0209**	**0.452**	**0.123**	**0.146**	**0.375 J**	**0.588 J**	**0.603 J**
7D	GS-7D25-052016	25	5/20/2016	mg/kg	**0.0362 J**	**0.0559 J**	0.00046 U	**0.0018 J**	**0.0017 J**	**0.0023 J**	**0.002 J**	**0.0011 J**	**0.0019 J**	**0.0019 J**	**0.0024 J**	0.00069 U	**0.006**	**0.0012 J**	**0.0019 J**	**0.189**	0.0105 U	**0.0089**
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.0006 U	0.00043 U	0.00048 U	0.00062 U	0.00051 U	**0.001 J**	**0.00045 J**	0.00061 U	0.0007 U	**0.00061 J**	**0.00091 J**	0.00073 U	**0.0015 J**	0.00053 U	0.00074 U	**0.123 J**	0.0016 U	**0.0021 J**
7D	GS-7D65-052016	65	5/20/2016	mg/kg	**0.146 J**	**0.231**	0.00048 U	**0.0496 J**	0.00051 U	0.00034 U	0.00031 U	0.00061 U	0.0007 U	0.00057 U	0.00059 U	0.00073 U	0.00058 U	0.00053 U	0.00074 U	**0.728**	0.0011 U	0.00092 U
8D	GS-8D05-051916	5	5/19/2016	mg/kg	**4,750**	**6,580**	**684**	**2,190**	**1,440**	**1,010**	**1,040**	**448**	**761**	**762**	**1,210**	**56.4 J**	**3,460**	**1,690**	**451**	**17,300**	**8,590**	**5,210**
8D	GS-8D10-051916	10	5/19/2016	mg/kg	**10.1**	**14.4**	**1.18**	**5.12**	**3.75**	**3.6**	**4.32**	**2.18**	**3.09**	**2.53**	**3.64**	**0.389 J**	**11.2**	**3.78**	**2.74**	**187**	**24.7**	**17.2**
8D	GS-8D16-052016	16	5/20/2016	mg/kg	**23.2**	**31.2**	**8.18**	**22.7**	**25.2**	**25.6**	**33**	**16**	**18.7**	**19.9**	**26.5**	**2.57**	**82.7**	**33.3**	**15.9**	**460**	**169**	**104**
8D	GS-8D20-051916	20	5/19/2016	mg/kg	0.043 U	**0.0779 J**	0.034 U	**3.44**	**0.95**	**0.618**	**4.5**	**3.23**	**14.6**	**2.33**	**0.78**	**0.684**	**0.741**	**0.166 J**	**7.65**	**0.127 J**	**0.182 J**	**1.74**
8D	GS-8D40-051916	40	5/19/2016	mg/kg	**123**	**177**	**12**	**8.17**	**40.4**	**28.6**	**29.8**	**14.7**	**23**	**20.2**	**28.9**	**2.95**	**92.6**	**37.3**	**19.1**	**494**	**217**	**140**
8D	GS-8D70-051916	70	5/19/2016	mg/kg	0.0006 U	0.00043 U	0.00048 U	0.00063 U	0.00051 U	0.00034 U	0.00031 U	0.00061 U	0.0007 U	0.00057 U	0.00059 U	0.00073 U	0.00058 U	0.00053 U	0.00074 U	0.00054 U	0.00039 U	0.00092 U
8D	GS-8D90-052016	90	5/20/2016	mg/kg	**0.0515 J**	**0.0809 J**	0.028 U	0.027 U	0.021 U	0.012 U	0.013 U	0.015 U	0.032 U	0.015 U	0.014 U	0.027 U	0.019 U	0.023 U	0.029 U	**0.294**	0.021 U	0.022 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	**0.0728 J**	**0.0925**	**0.936 J**	**0.0768**	**2.22 J**	**8.27**	**8.18**	**8.35**	**4.09**	**7**	**8.34**	**1.04 J**	**17.9**	**0.374**	**5.39**	**1.05 J**	**9.71**	**13.6**
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.00063 U	0.00045 U	0.00051 U	0.00066 U	**0.00054 J**	**0.00091 J**	**0.0009 J**	**0.00081 J**	**0.0013 J**	**0.00099 J**	**0.0012 J**	**0.00092 J**	**0.0029 J**	0.00056 U	**0.0012 J**	0.00056 U	**0.0047**	**0.0034 J**
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.00058 U	0.00042 U	0.00047 U	0.00061 U	0.00049 U	0.00033 U	0.0003 U	0.00059 U	0.00068 U	0.00055 U	0.00057 U	0.00071 U	**0.00092 J**	0.00052 U	0.00072 U	0.00052 U	**0.0012 J**	**0.00099 J**
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.00064 U[8]	0.00046 U	0.00051 U	0.00066 U	0.00054 U	0.00036 U	0.00033 U	0.00065 U	0.00075 U	0.0006 U	0.00062 U	0.00078 U	0.00062 U	0.00056 U	0.00079 U	0.00057 U	0.00042 U	0.00098 U
10S	GS-10S15-050916	15	5/9/2016	mg/kg	0.00067 U	0.00048 U	0.00053 U	0.00069 U	0.00056 U	0.00038 U	0.00035 U	0.00068 U	0.00078 U	0.00063 U	0.00065 U	0.00081 U	0.00064 U	0.00059 U	0.00082 U	0.00059 U	0.00044 U	0.001 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.00059 U	0.00042 U	**0.0012 J**	0.00061 U	**0.0033 J**	**0.072 J**	**0.0676 J**	**0.0779 J**	**0.0542 J**	**0.0626 J**	**0.0918 J**	**0.0049**	**0.147 J**	**0.00067 J**	**0.0558 J**	**0.00067 J**	**0.0452 J**	**0.135 J**
10S	GS-10S30-050916	30	5/9/2016	mg/kg	0.00058 U	0.00042 U	0.00047 U	0.0006 U	0.00049 U	0.00033 U	0.0003 U	0.00059 U	0.00068 U	0.00055 U	0.00057 U	0.00071 U	0.00056 U	0.00051 U	0.00072 U	0.00052 U	0.00038 U	0.00089 U
11S	GS-11S5-051216	5	5/12/2016	mg/kg	**0.0657 J**	**0.105**	**0.371**	**0.0746**	**0.564**	**2.08**	**2.77**	**2.58**	**3.04**	**1.53**	**2.05**	**0.441**	**4.25**	**0.255**	**3.37**	**0.599**	**2.34**	**3.62**
11S	GS-11S8-051216	8	5/12/2016	mg/kg	**115 J**	**215 J**	**1100 J**	3.6 U	**1340 J**	**3290 J**	**3290 J**	**2880 J**	**1,920 J**	**2250 J**	**2800 J**	**744 J**	**6390 J**	**831 J**	**2630 J**	**1,010 J**	**5,300 J**	**3780 J**
11S	GS-11S10-051216	10	5/12/2016	mg/kg	**0.0052**	**0.0094**	**0.0563**	0.00066 U	**0.0707**	**0.185**	**0.191**	**0.168**	**0.117**	**0.133**	**0.154**	**0.0376**	**0.323**	**0.0384**	**0.178**	**0.0405**	**0.234**	**0.22**
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.00064 U	0.00046 U	**0.00078 J**	0.00066 U	**0.00074 J**	**0.0022 J**	**0.0018 J**	**0.0019 J**	**0.0013 J**	**0.0014 J**	**0.0019 J**	0.00078 U	**0.0035 J**	0.00057 U	**0.0018 J**	**0.00095 J**	**0.0027 J**	**0.0025 J**
11S	GS-11S15-051216	15	5/12/2016	mg/kg	0.00067 U	0.00048 U	0.00054 U	0.0007 U	0.00057 U	0.00038 U	0.00035 U	0.00068 U	0.00078 U	0.00063 U	0.00066 U	0.00082 U	0.00065 U	0.00059 U	0.00083 U	0.0006 U	0.00044 U	0.001 U
11S	GS-11S20-051216	20	5/12/2016	mg/kg	0.00058 U	0.00041 U	**0.0012 J**	0.0006 U	**0.0026 J**	**0.0127 J**	**0.0126 J**	**0.0129 J**	**0.0093 J**	**0.0097 J**	**0.0128 J**	**0.0028 J**	**0.0195 J**	**0.0012 J**	**0.0129 J**	**0.00082 J**	**0.0099 J**	**0.0133 J**
12S	GS-12S03-052316	3	5/23/2016	mg/kg	**0.0246 J**	**0.0268 J**	**0.0705 J**	**0.208**	**0.206**	**1.67**	**2.99**	**3.26**	**5.45**	**2.1**	**2.18**	**0.391**	**3.76**	**0.0598 J**	**4.52**	**0.421**	0.943 U	**5.92 J**
12S	GS-12S10-052316	10	5/23/2016	mg/kg	0.00063 U	0.00045 U	0.0005 U	0.00065 U	0.00053 U	**0.00076 J**	**0.00041 J**	0.00064 U	**0.0009 J**	**0.00079 J**	**0.00076 J**	0.00076 U	0.00061 U	0.00056 U	**0.00085 J**	0.00056 U	**0.00046 J**	0.00096 U
12S	GS-12S15-052316	15	5/23/2016	mg/kg	0.038 U	0.035 U	0.032 U	0.03 U	0.024 U	0.014 U	0.015 U	0.017 U	0.036 U	0.017 U	0.016 U	0.03 U	0.021 U	0.026 U	0.033 U	0.033 U	0.024 U	0.025 U
12S	GS-FD08-052316	15	5/23/2016	mg/kg	0.039 U	0.035 U	0.032 U	0.031 U	0.024 U	0.014 U	0.015 U	0.017 U	0.037 U	0.017 U	0.016 U	0.031 U	0.021 U	0.026 U	0.034 U	0.033 U	0.025 U	0.026 U
12S	GS-12S20-052316	20	5/23/2016	mg/kg	0.00056 U	0.0004 U	0.00045 U	**0.0011 J**	0.00047 U	0.00032 U	0.00029 U	0.00057 U	0.00066 U	0.00053 U	0.00055 U	0.00068 U	0.00054 U	0.0005 U	0.00069 U	**0.0177**	0.00061 U	0.00086 U
12S	GS-12S30-052316	30	5/23/2016	mg/kg	0.00062 U	0.00044 U	0.00049 U	0.00064 U	0.00052 U	0.00035 U	0.00032 U	0.00062 U	0.00072 U	0.00058 U	0.0006 U	0.00075 U	0.00059 U	0.00054 U	0.00076 U	0.00055 U	0.0004 U	0.00094 U
13S	GS-13S05-052316	5	5/23/2016	mg/kg	0.00066 U	0.00048 U	0.00053 U	0.00069 U	0.00056 U	0.00037 U	0.00035 U	0.00067 U	0.00077 U	0.00063 U	0.00065 U	0.00081 U	0.00064 U	0.00059 U	0.00082 U	0.00059 U	0.00045 U	0.001 U
13S	GS-13S10-052316	10	5/23/2016	mg/kg	0.00064 U	0.00046 U	0.00051 U	0.00066 U	0.00053 U	**0.0021 J**	**0.0018 J**	**0.0015 J**	**0.0019 J**	**0.002 J**	**0.002 J**	0.00077 U	**0.0029 J**	0.00056 U	**0.0018 J**	0.00056 U	0.0015 U	**0.0028 J**
13S	GS-FD09-052316	10	5/23/2016	mg/kg	0.00064 U	0.00046 U	0.00051 U	0.00066 U	0.00054 U	**0.0005 J**	**0.00055 J**	0.00065 U	0.00074 U	**0.00069 J**	**0.00072 J**	0.00077 U	**0.001 J**	0.00056 U	0.00078 U	0.00057 U	0.00055 U	**0.0011 J**
13S	GS-13S20-052316	20	5/23/2016	mg/kg	0.00058 U	0.00041 U	0.00046 U	0.0006 U	0.00048 U	0.00032 U	0.0003 U	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.0007 U	0.00056 U	0.00051 U	0.00071 U	0.00051 U	0.00038 U	0.00088 U

See last page for notes.

TABLE 2-3

Summary of Pre-design Testing Analytical Data for Soil, Polynuclear Aromatic Hydrocarbons (PAHs)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE[7]**	**NE**	**3700**	**NE**	**22000**	**6.9**	**0.69**	**6.9**	**NE**	**69**	**680**	**0.69**	**2300**	**2700**	**6.9**	**56**	**NE**	**2300**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**NE**	**29000**	**NE**	**240000**	**21**	**2.1**	**21**	**NE**	**210**	**2000**	**2.1**	**22000**	**26000**	**21**	**190**	**NE**	**29000**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**38500**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**578000**	**>1E06**	**>1E06**	**NE**	**>1E06**
14S	GS-14S03-052316	3	5/23/2016	mg/kg	0.00068 U	0.00048 U	0.00054 U	0.0007 U	0.00057 U	**0.007**	**0.0105**	**0.011**	**0.0253**	**0.0105**	**0.0106**	0.00082 U	**0.0148**	0.0006 U	**0.023**	0.0006 U	**0.0035 J**	**0.0231**
14S	GS-14S10-052316	10	5/23/2016	mg/kg	0.00063 U	0.00045 U	0.0005 U	0.00065 U	0.00053 U	0.00036 U	0.00033 U	0.00064 U	0.00074 U	0.00059 U	0.00062 U	0.00077 U	0.00061 U	0.00056 U	0.00078 U	0.00056 U	0.00067 U	0.00096 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.00057 U	0.00041 U	0.00045 U	0.00059 U	0.00048 U	0.00032 U	0.0003 U	0.00057 U	0.00066 U	0.00053 U	0.00055 U	0.00069 U	0.00055 U	0.0005 U	0.0007 U	0.0005 U	0.00049 U	0.00087 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.00058 U	0.00041 U	0.00046 U	0.0006 U	0.00049 U	0.00033 U	0.0003 U	0.00059 U	0.00068 U	0.00055 U	0.00057 U	0.0007 U	0.00056 U	0.00051 U	0.00071 U	0.00051 U	0.00051 U	0.00088 U
14S	GS-14S20-052316	20	5/23/2016	mg/kg	0.00059 U	**0.00046 J**	0.00047 U	0.00062 U	0.0005 U	0.00033 U	0.00031 U	0.0006 U	0.00069 U	0.00056 U	0.00058 U	0.00072 U	0.00057 U	0.00052 U	0.00073 U	**0.00066 J**	0.00066 U	0.00091 U
14S	GS-FD11-052316	20	5/23/2016	mg/kg	**0.0007 J**	**0.00078 J**	0.00045 U	0.00058 U	0.00047 U	**0.0014 J**	**0.0012 J**	**0.0014 J**	**0.0019 J**	**0.0019 J**	**0.0013 J**	**0.0014 J**	0.00054 U	0.0005 U	**0.0016 J**	**0.0011 J**	0.00067 U	0.00086 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.0006 U	0.00043 U	0.00048 U	0.00062 U	0.0005 U	0.00033 U	0.00031 U	0.0006 U	0.00069 U	0.00056 U	0.00058 U	0.00072 U	0.00057 U	0.00052 U	0.00073 U	0.00053 U	0.00043 U	0.00091 U
15S	GS-15S5-051716	5	5/17/2016	mg/kg	**0.133 J**	**0.133 J**	**0.0801 J**	**1.26**	**0.536**	**4.15**	**19**	**17.9**	**32.2**	**11.2**	**8.24**	**2.34**	**18.4**	**0.282**	**25.7**	**1.13**	**6.15**	**22.1**
15S	GS-15S10-051716	10	5/17/2016	mg/kg	0.00062 U	0.00045 U	0.0005 U	0.00065 U	0.00052 U	**0.00054 J**	**0.0025 J**	**0.0024 J**	**0.0048 J**	**0.002 J**	**0.0011 J**	0.00076 U	**0.002 J**	0.00055 U	**0.0033 J**	0.00055 U	**0.00081 J**	**0.0027 J**
15S	GS-FD05-051716	10	5/17/2016	mg/kg	0.00062 U	0.00044 U	0.00049 U	**0.0019 J**	**0.0007 J**	**0.0082 J**	**0.0694 J**	**0.0518 J**	**0.113 J**	**0.0539 J**	**0.016 J**	**0.0032 J**	**0.0709 J**	**0.00068 J**	**0.0946 J**	**0.0027 J**	**0.0085 J**	**0.102 J**
15S	GS-15S15-051716	15	5/17/2016	mg/kg	0.00064 U	0.00046 U	0.00051 U	0.00066 U	0.00053 U	0.00036 U	**0.00055 J**	0.00064 U	0.00074 U	0.0006 U	0.00062 U	0.00077 U	0.00061 U	0.00056 U	0.00078 U	0.00056 U	**0.00052 J**	0.00097 U
15S	GS-15S20-051716	20	5/17/2016	mg/kg	0.033 U	0.03 U	0.027 U	0.026 U	0.021 U	0.012 U	0.013 U	0.015 U	0.031 U	0.015 U	0.014 U	0.026 U	0.018 U	0.022 U	0.029 U	0.028 U	0.021 U	0.022 U
15S	GS-15S30-051716	30	5/17/2016	mg/kg	0.00058 U	0.00042 U	0.00046 U	0.0006 U	0.00049 U	0.00033 U	**0.00047 J**	0.00059 U	**0.00086 J**	0.00055 U	0.00057 U	0.0007 U	0.00056 U	0.00051 U	0.00072 U	0.00052 U	**0.00049 J**	0.00089 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	**0.0051 J**	**0.0053 J**	**0.0095 J**	**0.327 J**	**0.147 J**	**0.416**	**1.41**	**0.869**	**1.27**	**0.689**	**0.519**	**0.132 J**	**1.0**	**0.0102 J**	**1.19**	**0.308**	**0.461**	**1.07**
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.00067 U	0.00048 U	**0.00057 J**	0.00069 U	0.00056 U	**0.0012 J**	**0.00055 J**	**0.00071 J**	0.00078 U	0.00063 U	**0.00069 J**	0.00081 U	**0.0016 J**	0.00059 U	0.00082 U	**0.0423 J**	**0.0017 J**	**0.0012 J**
16S	GS-16S30-0510216	30	5/12/2016	mg/kg	**0.0022 J**	**0.0026 J**	**0.001 J**	**0.0011 J**	**0.00077 J**	**0.0012 J**	**0.00093 J**	**0.0008 J**	**0.00096 J**	**0.00093 J**	**0.00089 J**	0.00069 U	**0.0021 J**	**0.0012 J**	**0.0011 J**	**0.0065**	**0.0043**	**0.0016 J**
17S	GS-17S10-051216	10	5/12/2016	mg/kg	**0.0261 J**	**0.041 J**	**0.3**	**0.0374 J**	**0.426**	**2.01**	**1.97**	**1.95**	**1.55**	**1.55**	**1.88**	**0.443**	**3.67**	**0.167**	**2.17**	**0.213**	**1.76**	**2.58**
17S	GS-17S16-051216	16	5/12/2016	mg/kg	**68.7**	**69.9**	**14.8**	**57.1**	**43.3**	**63.3**	**69.3**	**50.6**	**59.7**	**36.5**	**62.3**	**8.52**	**198**	**43.5**	**69**	**88.9**	**264**	**208**
17S	GS-17S20-051216	20	5/12/2016	mg/kg	**0.0376 J**	**0.046 J**	**0.0178**	**0.0021 J**	**0.0271**	**0.0715**	**0.0707**	**0.0664**	**0.0453**	**0.0479**	**0.0645**	**0.0138**	**0.134**	**0.0145**	**0.0639**	**0.098 J**	**0.095**	**0.0923**
17S	GS-17S30-05116	30	5/12/2016	mg/kg	**0.0007 J**	**0.00084 J**	0.00046 U	0.0006 U	0.00048 U	**0.0011 J**	**0.00063 J**	0.00058 U	0.00067 U	**0.00082 J**	**0.00073 J**	0.0007 U	**0.0014 J**	0.00051 U	0.00071 U	**0.001 J**	**0.0014 J**	**0.001 J**
18S	GS-18S3-051216	3	5/12/2016	mg/kg	**0.147 J**	**0.154 J**	0.077 U	**1.58**	**0.953**	**7.49**	**21.7**	**17.9**	**38.8**	**11.2**	**12.3**	**1.26**	**30**	**0.314 J**	**28.2**	**2.52**	**11.6**	**38.3**
18S	GS-18S10-051216	10	5/12/2016	mg/kg	0.00067 U	0.00048 U	0.00053 U	**0.0029 J**	**0.0019 J**	**0.0118**	**0.0287**	**0.0274**	**0.0705**	**0.0184**	**0.0194**	**0.0029 J**	**0.0432**	**0.00084 J**	**0.0479**	**0.0063**	**0.0211**	**0.0537**
18S	GS-18S15-051216	15	5/12/2016	mg/kg	0.00068 U	0.00048 U	0.00054 U	0.0007 U	0.00057 U	**0.00042 J**	**0.0012 J**	**0.0013 J**	**0.0026 J**	**0.0015 J**	**0.0012 J**	0.00082 U	**0.0019 J**	0.0006 U	**0.0018 J**	**0.00093 J**	**0.0021 J**	**0.0024 J**
18S	GS-18S20-051216	20	5/12/2016	mg/kg	**0.00057 J**	**0.00052 J**	0.00046 U	**0.0015 J**	0.00048 U	**0.00068 J**	**0.0024 J**	**0.0017 J**	**0.0065**	**0.002 J**	**0.001 J**	0.0007 U	**0.00076 J**	0.00051 U	**0.0048**	**0.00082 J**	**0.0007 J**	**0.00088 J**
18S	GS-18S30-051216	30	5/12/2016	mg/kg	**0.00079 J**	**0.0007 J**	**0.00053 J**	**0.00065 J**	0.00048 U	0.00032 U	**0.00033 J**	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.0007 U	0.00056 U	0.00051 U	0.00071 U	**0.00095 J**	**0.00045 J**	0.00088 U
19S	GS-19S05-051616	5	5/16/2016	mg/kg	**0.0522**	**0.0577**	**0.128**	**0.266**	**0.313**	**1.46**	**2.6**	**2.22**	**3.69**	**1.85**	**1.92**	**0.42**	**3.81**	**0.114**	**2.72**	**0.172**	**1.96**	**3.96**
19S	GS-19S10-051616	10	5/16/2016	mg/kg	0.13 U	**0.795**	0.1 U	**9.58**	**1.37**	**0.939**	**21.1**	**10.5**	**38.7**	**8.95**	**1.5**	**4.19**	**0.417 J**	**0.491 J**	**28.5**	0.11 U	**0.117 J**	**0.814**
19S	GS-19S15-051616	15	5/16/2016	mg/kg	**244 J**	**145 J**	**361 J**	**50.7**	**125 J**	**111 J**	**135**	**80**	**68.2 J**	**81.9 J**	**118 J**	**12 J**	**422 J**	**172 J**	**63.2 J**	**242**	**876 J**	**562 J**
19S	GS-19S30-051616	30	5/16/2016	mg/kg	**0.0569 J**	**0.0367 J**	**0.0388 J**	**0.0024 J**	**0.0066**	**0.0075**	**0.0071**	**0.004**	**0.0052**	**0.0055**	**0.0078**	0.0007 U	**0.0267**	**0.0092**	**0.0043**	**0.0468 J**	**0.0525**	**0.0301**
19S	GS-19S17-051716	17	5/17/2016	mg/kg	**7.95**	**6.65**	**18.9**	**24.2**	**9.51**	**13.8**	**71.1**	**42.9**	**59.9**	**19**	**17.7**	**6.97**	**50.1**	**10**	**56**	**6.98**	**53.1**	**74.3**
20S	GS-20S05-052316	5	5/23/2016	mg/kg	**0.022 J**	**0.0233 J**	**0.144**	**0.0868**	**0.382**	**1.61**	**2.09**	**2.07**	**2.04**	**1.61**	**1.96**	**0.287**	**3.62**	**0.0851**	**1.79**	**0.168 J**	1.74 U	**3.46 J**
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.00057 U	**0.00046 J**	0.00046 U	0.00059 U	0.00048 U	0.00032 U	0.0003 U	0.00058 U	0.00067 U	0.00054 U	0.00056 U	0.00069 U	0.00055 U	0.0005 U	0.0007 U	**0.00064 J**	0.00037 U	0.00087 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.00065 U	0.00047 U	0.00052 U	0.00067 U	0.00055 U	0.00037 U	0.00034 U	0.00066 U	0.00076 U	0.00061 U	0.00064 U	0.00079 U	0.00063 U	0.00057 U	0.0008 U	0.00058 U	0.00042 U	0.00099 U
21D	GS-21D10-110316	10	11/3/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.00049 U	**0.016 J**	0.00041 U	0.003 U
21D	GS-21D20-110316	20	11/3/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U
21D	GS-21D30-110316	30	11/3/2016	mg/Kg	--	--	0.016 U	0.014 U	0.005 U	0.0005 U	0.0005 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.0005 U	0.0047 U	0.00042 U	0.003 U
21D	GS-21D40-110316	40	11/3/2016	mg/Kg	--	--	0.016 U	0.014 U	0.005 U	0.0005 U	0.0005 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.0005 U	0.0047 U	0.00042 U	0.003 U
21D	GS-FD02-110316	40	11/3/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.00049 U	0.0046 U	0.00041 U	0.003 U

See last page for notes.

TABLE 2-3

Summary of Pre-design Testing Analytical Data for Soil, Polynuclear Aromatic Hydrocarbons (PAHs)

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE[7]**	**NE**	**3700**	**NE**	**22000**	**6.9**	**0.69**	**6.9**	**NE**	**69**	**680**	**0.69**	**2300**	**2700**	**6.9**	**56**	**NE**	**2300**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**NE**	**29000**	**NE**	**240000**	**21**	**2.1**	**21**	**NE**	**210**	**2000**	**2.1**	**22000**	**26000**	**21**	**190**	**NE**	**29000**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**38500**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**NE**	**>1E06**	**>1E06**	**>1E06**	**>1E06**	**578000**	**>1E06**	**>1E06**	**NE**	**>1E06**
21D	GS-21D50-110416	50	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U
21D	GS-21D60-110416	60	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U
22D	GS-22D08-110416	8	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	**0.017**	**0.0082 J**	**0.02 J**	**0.002 J**	0.0016 U	**0.013**	0.0029 U	0.0029 U	**0.027**	0.0046 U	0.00041 U	0.0029 U
22D	GS-22D15-110416	15	11/4/2016	mg/Kg	--	--	0.024 U	0.021 U	0.0074 U	0.00074 U	0.00074 U	0.0049 U	**0.0051 J**	0.0024 U	0.0024 U	0.0045 U	0.0045 U	0.0045 U	**0.0058 J**	0.007 U	0.00062 U	0.0045 U
22D	GS-22D25-110416	25	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.005 U	0.0005 U	0.0005 U	0.0033 U	0.0033 U	**0.0016 J**	0.0016 U	0.003 U	0.003 U	0.003 U	0.0005 U	0.0047 U	0.00042 U	0.003 U
22D	GS-22D35-110416	35	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.005 U	0.0005 U	0.0005 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.0005 U	0.0047 U	0.00042 U	0.003 U
22D	GS-22D45-110416	45	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.00049 U	0.0046 U	0.00041 U	0.003 U
22D	GS-FD03-110416	45	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U
22D	GS-22D55-110416	55	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.005 U	0.0005 U	0.0005 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.0005 U	0.0047 U	0.00042 U	0.003 U
23D	GS-23D10-110416	10	11/4/2016	mg/Kg	--	--	0.16 U	**1.9 J**	**2.1**	**0.26**	**8.5**	**5.1**	**17**	**1.3**	**0.60**	**13**	**0.31**	**0.092 J**	**17 J**	**1.3 J**	0.0042 U	**1.0**
23D	GS-23D20-110416	20	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U
23D	GS-23D30-110416	30	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.00049 U	0.0046 U	0.00041 U	0.003 U
23D	GS-23D40-110416	40	11/4/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0033 U	**0.015 J**	0.0016 U	0.0016 U	**0.01 J**	0.003 U	0.003 U	**0.013 J**	0.0046 U	0.00041 U	0.003 U
GW1	GS-GW1010-110116	10	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.00049 U	0.0046 U	0.00042 U	0.003 U
GW1	GS-GW1020-110116	20	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	**0.0045 J**	**0.0044 J**	**0.0099 J**	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	**0.0099**	0.0046 U	0.00041 U	0.0029 U
GW1	GS-GW1030-110116	30	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	**0.0052 J**	0.00049 U	**0.003 J**	0.0032 U	**0.0047 J**	0.0016 U	**0.0079 J**	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	**0.0027 J**	**0.0056 J**
GW1	GS-GW1040-110116	40	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U
GW1	GS-GW1050-110116	50	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	0.005 U	0.0005 U	0.0005 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.0005 U	0.0047 U	0.00042 U	0.003 U
GW1	GS-GW1060-110116	60	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U
GW1	GS-GW1070-110116	70	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U
GW1	GS-GW1080-110116	80	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	0.005 U	0.0005 U	0.0005 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.0005 U	0.0047 U	0.00042 U	0.003 U
GW1	GS-GW1090-110116	90	11/1/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.00049 U	0.0047 U	0.00042 U	0.003 U
GW1	GS-GW1100-110216	100	11/2/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0033 U	0.0033 U	0.0016 U	0.0016 U	0.003 U	0.003 U	0.003 U	0.00049 U	0.0047 U	0.00042 U	0.003 U
GW1	GS-GW1110-110216	110	11/2/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	**0.0022 J**	0.0029 U
GW1	GS-FD01-110216	110	11/2/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0048 U	0.00048 U	0.00048 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00048 U	0.0046 U	0.00041 U	0.0029 U
GW1	GS-GW1120-110216	120	11/2/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0048 U	0.00048 U	0.00048 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00048 U	0.0046 U	0.00041 U	0.0029 U
GW1	GS-GW1130-110216	130	11/2/2016	mg/Kg	--	--	0.016 U	0.014 U	0.0049 U	0.00049 U	0.00049 U	0.0032 U	0.0032 U	0.0016 U	0.0016 U	0.0029 U	0.0029 U	0.0029 U	0.00049 U	0.0046 U	0.00041 U	0.0029 U

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Residential Soil Remediation Levels (SRLs) are values based on a 1 x 10-5 excess lifetime cancer risk for any carcinogen other than a known human carcinogen.
4. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential SRL.
5. Cells highlighted in red indicate the compound exceeded the 2007 non-residential SRL.
6. Calculated Groundwater Protection Levels (See Table 4-4). Calculated GPLs with a value above 1,000,000 were presented as >1E06.
7. NE - Not Established
8. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10, 2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   UJ = Analyte was not detected, and the specified detection limit might not be accurate or precise.
   J = Analyte is present but the reported value might not be accurate or precise (estimate).
   R = The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
   -- = Analyte not analyzed for this compound
9. Detected results are bolded.
10. PAH compounds were analzyed using 8270SIM or 8260B. The table reflects the maximum detected value for each compound.

TABLE 2-4

Summary of Pre-design Testing Analytical Data for Soil, Total Petroleum Hydrocarbons (TPHs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	TPH (C6-C10)	TPH (C10-C22)	TPH (C10-C32)	TPH (C22-C32)
1D	GS-1D10-050516	10	5/5/2016	mg/kg	4.1 U	27 U	82 U	54 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	3.3 U	26 U	79 U	53 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	2.2 U	25 U	74 U	50 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	2.8 U	26 U	77 U	52 U
1D	GS-1D75-050516	75	5/5/2016	mg/kg	2.7 U	26 U	77 U	52 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	2.6 U	25 U	76 U	51 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	2.4 U	25 U	76 U	51 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	3.1 U	26 U	77 U	52 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	3.5 U	28 U	84 U	56 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	3.3 U	27 U	81 U	54 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	3.1 U	25 U	76 U	51 U
3D	GS-3D75-051016	75	5/10/2016	mg/kg	2.8 U	26 U	78 U	52 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	3.6 U	30 U	90 U	60 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	2.8 U	26 U	77 U	51 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	2.7 U	26 U	78 U	52 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	3.4 U	**281**	**1,320**	**1,040**
5D	GS-5D25-051716	25	5/17/2016	mg/kg	2.5 U	25 U	76 U	51 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	2.7 U	26 U	79 U	53 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	2.6 U	26 U	79 U	53 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	3.4 U	29 U	86 U	57 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	3 U	25 U	76 U	51 U
7D	GS-7D05-052016	5	5/20/2016	mg/kg	3.6 U	**181**	**419**	**238**
7D	GS-7D15-052016	15	5/20/2016	mg/kg	**79**	**29,600 J**	**38,200 J**	**8,640 J**
7D	GS-7D19-052016	19	5/20/2016	mg/kg	3 U	25 U	74 U	50 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	2.6 U	25 U	74 U	49 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	**3.11 J**	27 U	80 U	53 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	2.9 U	26 U	79 U	53 U
8D	GS-8D05-051916	5	5/19/2016	mg/kg	**5,230**	**3,890,000**	**4,680,000**	**787,000**
8D	GS-8D10-051916	10	5/19/2016	mg/kg	**32**	**886**	**1,150**	**267**
8D	GS-8D16-052016	16	5/20/2016	mg/kg	**8.18**	**5,340 J**	**7,760 J**	**2,420 J**
8D	GS-8D20-051916	20	5/19/2016	mg/kg	2.6 U	**269**	**826**	**557**
9S	GS-9S10-050316	10	5/3/2016	mg/kg	3.1 U	28 UJ	83 UJ	56 UJ
9S	GS-9S20-050316	20	5/3/2016	mg/kg	2.8 U	26 UJ	77 UJ	51 UJ
10S	GS-10S10-050916	10	5/9/2016	mg/kg	2.6 U	28 U	84 U	56 U
11S	GS-11S8-051216	8	5/12/2016	mg/kg	**8.07 J**	**55,500 J**	**189,000 J**	**134,000 J**
11S	GS-11S10-051216	10	5/12/2016	mg/kg	3.2 U	28 U	83 U	55 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	3.4 U	28 U	85 U	57 U
11S	GS-11S20-051216	20	5/12/2016	mg/kg	2.7 U	26 U	77 U	52 U
12S	GS-12S03-052316	3	5/23/2016	mg/kg	3.4 U	**63.5**	**442**	**378**

See last page for notes.

TABLE 2-4

Summary of Pre-design Testing Analytical Data for Soil, Total Petroleum Hydrocarbons (TPHs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	TPH (C6-C10)	TPH (C10-C22)	TPH (C10-C32)	TPH (C22-C32)
14S	GS-14S03-052316	3	5/23/2016	mg/kg	3.2 U	30 U	90 U	60 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	3.2 U	27 U	82 U	55 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	3.8 U	30 U	90 U	60 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	3.2 U	**44.4 J**	**153 J**	**109 J**
17S	GS-17S16-051216	16	5/12/2016	mg/kg	**6.24 J**	**6,250**	**9,780**	**3,530**
17S	GS-17S20-051216	20	5/12/2016	mg/kg	3.1 U	26 U	78 U	52 U
18S	GS-18S3-051216	3	5/12/2016	mg/kg	3 U	**634**	**3,090**	**2,460**
18S	GS-18S15-051216	15	5/12/2016	mg/kg	3.6 U	30 U	89 U	59 U
19S	GS-19S05-051616	5	5/16/2016	mg/kg	3.1 U	**122**	**560**	**438**
19S	GS-19S15-051616	15	5/16/2016	mg/kg	**27.2**	**26,500 J**	**34,800 J**	**8,330 J**
19S	GS-19S17-051716	17	5/17/2016	mg/kg	3.1 U	**2,710**	**6,130**	**3,410**
20S	GS-20S15-052316	15	5/23/2016	mg/kg	2.5 U	26 U	77 U	51 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	3.3 U	29 U	87 U	58 U
21D	GS-21D10-110316	10	11/3/2016	mg/Kg	--	29 U	130 U	97 U
21D	GS-21D20-110316	20	11/3/2016	mg/Kg	--	30 U	130 U	100 U
21D	GS-21D30-110316	30	11/3/2016	mg/Kg	--	29 U	120 U	96 U
21D	GS-21D40-110316	40	11/3/2016	mg/Kg	--	30 U	130 U	99 U
21D	GS-FD02-110316	40	11/3/2016	mg/Kg	--	30 U	130 U	99 U
21D	GS-21D50-110416	50	11/4/2016	mg/Kg	--	30 U	130 U	100 U
21D	GS-21D60-110416	60	11/4/2016	mg/Kg	--	30 U	130 U	99 U
22D	GS-22D15-110416	15	11/4/2016	mg/Kg	--	29 U	130 U	98 U
22D	GS-22D25-110416	25	11/4/2016	mg/Kg	--	30 U	130 U	100 U
22D	GS-22D35-110416	35	11/4/2016	mg/Kg	--	30 U	130 U	99 U
22D	GS-22D45-110416	45	11/4/2016	mg/Kg	--	29 U	130 U	98 U
22D	GS-FD03-110416	45	11/4/2016	mg/Kg	--	29 U	130 U	97 U
22D	GS-22D55-110416	55	11/4/2016	mg/Kg	--	29 U	130 U	97 U
23D	GS-23D10-110416	10	11/4/2016	mg/Kg	--	**580**	**1600**	**1000**
23D	GS-23D20-110416	20	11/4/2016	mg/Kg	--	29 U	130 U	98 U
23D	GS-23D30-110416	30	11/4/2016	mg/Kg	--	30 U	130 U	99 U
23D	GS-23D40-110416	40	11/4/2016	mg/Kg	--	29 U	130 U	98 U
GW1	GS-GW1010-110116	10	11/1/2016	mg/Kg	--	30 U	130 U	99 U
GW1	GS-GW1020-110116	20	11/1/2016	mg/Kg	--	30 U	130 U	99 U
GW1	GS-GW1030-110116	30	11/1/2016	mg/Kg	--	30 U	130 U	99 U
GW1	GS-GW1040-110116	40	11/1/2016	mg/Kg	--	30 U	130 U	99 U
GW1	GS-GW1050-110116	50	11/1/2016	mg/Kg	--	30 U	130 U	99 U
GW1	GS-GW1060-110116	60	11/1/2016	mg/Kg	--	30 U	130 U	98 U
GW1	GS-GW1070-110116	70	11/1/2016	mg/Kg	--	30 U	130 U	99 U
GW1	GS-GW1080-110116	80	11/1/2016	mg/Kg	--	29 U	130 U	97 U
GW1	GS-GW1090-110116	90	11/1/2016	mg/Kg	--	29 U	130 U	97 U

See last page for notes.

TABLE 2-4

Summary of Pre-design Testing Analytical Data for Soil, Total Petroleum Hydrocarbons (TPHs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	TPH (C6-C10)	TPH (C10-C22)	TPH (C10-C32)	TPH (C22-C32)
GW1	GS-GW1100-110216	100	11/2/2016	mg/Kg	--	30 U	130 U	100 U
GW1	GS-GW1110-110216	110	11/2/2016	mg/Kg	--	29 U	130 U	98 U
GW1	GS-FD01-110216	110	11/2/2016	mg/Kg	--	29 U	130 U	97 U
GW1	GS-GW1120-110216	120	11/2/2016	mg/Kg	--	29 U	130 U	98 U
GW1	GS-GW1130-110216	130	11/2/2016	mg/Kg	--	30 U	130 U	100 U

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Soil Remediation Levels are not estalished for TPH.
4. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10,2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   UJ = Analyte was not detected, and the specified detection limit might not be accurate or precise.
   J = Analyte is present but the reported value might not be accurate or precise (estimate).
   R = The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
5. Detected results are bolded.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dichloroethane	1,2-Dichlorobenzene	1,2-Dibromo-3-Chloropropane	1,2-Dibromoethane	1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane
Residential Soil Remediation Level[3,4]				**mg/kg**	**32**	**1200**	**4.2**	**7.4**	**510**	**120**	**NE**	**NE**	**0.05**	**62**	**52**	**2.8**	**600**	**5.3**	**0.029**	**3.4**	**21**	**530**	**100**	**35**	**NE**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**73**	**1200**	**9.3**	**16**	**1700**	**410**	**NE[7]**	**NE**	**0.11**	**220**	**170**	**6**	**600**	**6.5**	**0.63**	**7.4**	**70**	**600**	**360**	**79**	**NE**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**1.0**	**NE**	**NE**	**NE**	**0.81**	**NE**	**NE**	**NE**	**NE**	**720**	**0.21**	**72**	**0.015**	**NE**	**0.28**	**NE**	**NE**	**NE**	**9.3**	**NE**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.061 U	0.03 U	0.061 U	0.03 U	0.03 U	0.085 U	0.03 U	0.03 U	0.061 U	0.03 U	0.03 U	0.03 U	0.03 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.066 U	0.03 U	0.066 U	0.033 U	0.027 U	0.092 U	0.033 U	0.033 U	0.066 U	0.028 U	0.033 U	0.029 U	0.033 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.045 U	0.023 U	0.045 U	0.023 U	0.023 U	0.063 U	0.023 U	0.023 U	0.045 U	0.023 U	0.023 U	0.023 U	0.023 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.053 U	0.027 U	0.026 U	0.075 U	0.027 U	0.027 U	0.053 U	0.026 U	0.027 U	0.027 U	0.027 U
2D	GS-2D5-050416	5	5/4/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.031 U	0.031 U	0.087 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.031 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.048 U	0.024 U	0.048 U	0.024 U	0.024 U	0.067 U	0.024 U	0.024 U	0.048 U	0.024 U	0.024 U	0.024 U	0.024 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.045 U	0.023 U	0.045 U	0.023 U	0.023 U	0.063 U	0.023 U	0.023 U	0.045 U	0.023 U	0.023 U	0.023 U	0.023 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.056 U	0.028 U	0.026 U	0.079 U	0.028 U	0.028 U	0.056 U	0.026 U	0.028 U	0.027 U	0.028 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.057 U	0.028 U	0.028 U	0.08 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.028 U	0.028 U
3D	GS-3D5-051016	5	5/10/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.057 U	0.028 U	0.028 U	0.08 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.028 U	0.028 U
3D	GS-FD02-051016	5	5/10/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U	0.03 U	0.085 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.03 U	0.062 U	0.031 U	0.027 U	0.087 U	0.031 U	0.031 U	0.062 U	0.027 U	0.031 U	0.028 U	0.031 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.05 U	0.025 U	0.025 U	0.07 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U
3D	GS-3D55-051016	55	5/10/2016	mg/kg	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.065 U	0.032 U	0.065 U	0.033 U	0.029 U	0.091 U	0.033 U	0.033 U	0.065 U	0.029 U	0.033 U	0.03 U	0.033 U
3D	GS-3D75-051016	75	5/10/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.053 U	0.027 U	0.027 U	0.075 U	0.027 U	0.027 U	0.053 U	0.027 U	0.027 U	0.027 U	0.027 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.069 U	0.034 U	0.069 U	0.034 U	0.03 U	0.096 U	0.034 U	0.034 U	0.069 U	0.03 U	0.034 U	0.031 U	0.034 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.051 U	0.025 U	0.051 U	0.025 U	0.025 U	0.071 U	0.025 U	0.025 U	0.051 U	0.025 U	0.025 U	0.025 U	0.025 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.054 U	0.027 U	0.026 U	0.075 U	0.027 U	0.027 U	0.054 U	0.026 U	0.027 U	0.027 U	0.027 U
4D	GS-4D70-051316	70	5/13/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.055 U	0.028 U	0.028 U	0.077 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.028 U	0.028 U
4D	GS-FD04-051316	70	5/13/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.058 U	0.029 U	0.029 U	0.082 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.029 U	0.029 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.065 U	0.032 U	0.065 U	0.032 U	0.032 U	0.091 U	0.032 U	0.032 U	0.065 U	0.032 U	0.032 U	0.032 U	0.032 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.053 U	0.026 U	0.025 U	0.074 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.026 U	0.026 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.05 U	0.025 U	0.025 U	0.07 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.054 U	0.027 U	0.026 U	0.076 U	0.027 U	0.027 U	0.054 U	0.027 U	0.027 U	0.027 U	0.027 U
5D	GS-5D65-051716	65	5/17/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.053 U	0.026 U	0.026 U	0.074 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.026 U	0.026 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U	0.03 U	0.083 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U
6D	GS-6D10-051316	10	5/13/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U	0.03 U	0.084 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.053 U	0.027 U	0.025 U	0.074 U	0.027 U	0.027 U	0.053 U	0.026 U	0.027 U	0.027 U	0.027 U
6D	GS-6D30-051616	30	5/16/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.058 U	0.029 U	0.029 U	0.081 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.029 U	0.029 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.055 U	0.028 U	0.026 U	0.078 U	0.028 U	0.028 U	0.055 U	0.027 U	0.028 U	0.028 U	0.028 U
6D	GS-6D70-051616	70	5/16/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.059 U	0.03 U	0.03 U	0.083 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.03 U	0.03 U
7D	GS-7D05-052016	5	5/20/2016	mg/kg	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.068 U	0.034 U	0.068 U	0.034 U	0.034 U	0.095 U	0.034 U	0.034 U	0.068 U	0.034 U	0.034 U	0.034 U	0.034 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	32 U	32 U	32 U	32 U	32 U	32 U	32 U	32 U	63 U	1.6 U	63 U	32 U	1.4 U	89 U	32 U	32 U	63 U	1.5 U	32 U	1.5 U	32 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.055 U	0.028 U	0.025 U	0.077 U	0.028 U	0.028 U	0.055 U	0.026 U	0.028 U	0.027 U	0.028 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	0.028 U	0.059 U	0.03 U	0.025 U	0.083 U	0.03 U	0.03 U	0.059 U	0.026 U	0.03 U	0.027 U	0.03 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.055 U	0.027 U	0.055 U	0.027 U	0.027 U	0.076 U	0.027 U	0.027 U	0.055 U	0.027 U	0.027 U	0.027 U	0.027 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.063 U	0.03 U	0.063 U	0.031 U	0.027 U	0.088 U	0.031 U	0.031 U	0.063 U	0.027 U	0.031 U	0.028 U	0.031 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dichloroethane	1,2-Dichlorobenzene	1,2-Dibromo-3-Chloropropane	1,2-Dibromoethane	1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane
Residential Soil Remediation Level[3,4]				**mg/kg**	**32**	**1200**	**4.2**	**7.4**	**510**	**120**	**NE**	**NE**	**0.05**	**62**	**52**	**2.8**	**600**	**5.3**	**0.029**	**3.4**	**21**	**530**	**100**	**35**	**NE**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**73**	**1200**	**9.3**	**16**	**1700**	**410**	**NE[7]**	**NE**	**0.11**	**220**	**170**	**6**	**600**	**6.5**	**0.63**	**7.4**	**70**	**600**	**360**	**79**	**NE**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**1.0**	**NE**	**NE**	**NE**	**0.81**	**NE**	**NE**	**NE**	**NE**	**720**	**0.21**	**72**	**0.015**	**NE**	**0.28**	**NE**	**NE**	**NE**	**9.3**	**NE**
8D	GS-8D05-051916	5	5/19/2016	mg/kg	35 U	35 U	35 U	35 U	35 U	35 U	35 U	35 U	70 U	35 U	75.5 J	35 U	35 U	98 U	35 U	35 U	70 U	35 U	35 U	35 U	35 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	6.2 U	0.13 U	6.2 U	3.1 U	0.12 U	8.6 U	3.1 U	3.1 U	6.2 U	0.12 U	3.1 U	0.12 U	3.1 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	12 U	0.53 U	12 U	6.2 U	0.47 U	17 U	6.2 U	6.2 U	12 U	0.47 U	6.2 U	0.49 U	6.2 U
8D	GS-8D20-051916	20	5/19/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.058 U	0.029 U	0.029 U	0.081 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.029 U	0.029 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	5.5 U	0.29 U	5.5 U	2.7 U	0.26 U	7.6 U	2.7 U	2.7 U	5.5 U	0.26 U	2.7 U	0.27 U	2.7 U
8D	GS-8D70-051916	70	5/19/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.031 U	0.031 U	0.087 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.031 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.056 U	0.028 U	0.028 U	0.079 U	0.028 U	0.028 U	0.056 U	0.028 U	0.028 U	0.028 U	0.028 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.065 U	0.032 U	0.065 U	0.033 U	0.028 U	0.091 U	0.033 U	0.033 U	0.065 U	0.028 U	0.033 U	0.03 U	0.033 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.056 U	0.028 U	0.026 U	0.079 U	0.028 U	0.028 U	0.056 U	0.027 U	0.028 U	0.028 U	0.028 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.027 U[8]	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.054 U	0.027 U	0.027 U	0.075 U	0.027 U	0.027 U	0.054 U	0.027 U	0.027 U	0.027 U	0.027 U
10S	GS-10S15-050916	15	5/9/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.059 U	0.03 U	0.03 U	0.083 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.03 U	0.03 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.057 U	0.029 U	0.057 U	0.029 U	0.026 U	0.08 U	0.029 U	0.029 U	0.057 U	0.026 U	0.029 U	0.027 U	0.029 U
10S	GS-10S30-050916	30	5/9/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U	0.03 U	0.084 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U
11S	GS-11S5-051216	5	5/12/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.055 U	0.028 U	0.028 U	0.077 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.028 U	0.028 U
11S	GS-11S8-051216	8	5/12/2016	mg/kg	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	4.5 U	2.3 U	4.5 U	2.3 U	2.3 U	6.3 U	2.3 U	2.3 U	4.5 U	2.3 U	2.3 U	2.3 U	2.3 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.031 U	0.028 U	0.087 U	0.031 U	0.031 U	0.062 U	0.029 U	0.031 U	0.03 U	0.031 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.059 U	0.03 U	0.029 U	0.083 U	0.03 U	0.03 U	0.059 U	0.029 U	0.03 U	0.03 U	0.03 U
11S	GS-11S20-051216	20	5/12/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.051 U	0.026 U	0.051 U	0.026 U	0.026 U	0.072 U	0.026 U	0.026 U	0.051 U	0.026 U	0.026 U	0.026 U	0.026 U
12S	GS-12S03-052316	3	5/23/2016	mg/kg	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.067 U	0.034 U	0.067 U	0.034 U	0.034 U	0.094 U	0.034 U	0.034 U	0.067 U	0.034 U	0.034 U	0.034 U	0.034 U
14S	GS-14S03-052316	3	5/23/2016	mg/kg	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.064 U	0.032 U	0.064 U	0.032 U	0.032 U	0.09 U	0.032 U	0.032 U	0.064 U	0.032 U	0.032 U	0.032 U	0.032 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.05 U	0.025 U	0.025 U	0.07 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.051 U	0.025 U	0.051 U	0.025 U	0.025 U	0.071 U	0.025 U	0.025 U	0.051 U	0.025 U	0.025 U	0.025 U	0.025 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.05 U	0.025 U	0.025 U	0.07 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.025 U	0.025 U
15S	GS-15S5-051716	5	5/17/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.053 U	0.026 U	0.026 U	0.074 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.026 U	0.026 U
15S	GS-15S15-051716	15	5/17/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.059 U	0.029 U	0.059 U	0.029 U	0.029 U	0.082 U	0.029 U	0.029 U	0.059 U	0.029 U	0.029 U	0.029 U	0.029 U
15S	GS-15S30-051716	30	5/17/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.049 U	0.025 U	0.049 U	0.025 U	0.025 U	0.069 U	0.025 U	0.025 U	0.049 U	0.025 U	0.025 U	0.025 U	0.025 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U	0.03 U	0.084 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.068 U	0.034 U	0.068 U	0.034 U	0.03 U	0.096 U	0.034 U	0.034 U	0.068 U	0.03 U	0.034 U	0.031 U	0.034 U
16S	GS-16S30-0510216	30	5/12/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.055 U	0.027 U	0.055 U	0.027 U	0.027 U	0.076 U	0.027 U	0.027 U	0.055 U	0.027 U	0.027 U	0.027 U	0.027 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.031 U	0.031 U	0.087 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.031 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	3.2 U	0.94 U	3.2 U	1.6 U	0.84 U	4.5 U	1.6 U	1.6 U	3.2 U	0.85 U	1.6 U	0.88 U	1.6 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.03 U	0.062 U	0.031 U	0.026 U	0.087 U	0.031 U	0.031 U	0.062 U	0.027 U	0.031 U	0.028 U	0.031 U
18S	GS-18S3-051216	3	5/12/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.058 U	0.029 U	0.029 U	0.081 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.029 U	0.029 U
19S	GS-19S05-051616	5	5/16/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U	0.03 U	0.085 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	11 U	1.6 U	11 U	5.7 U	1.4 U	16 U	5.7 U	5.7 U	11 U	1.4 U	5.7 U	1.5 U	5.7 U
19S	GS-19S17-051716	17	5/17/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U	0.03 U	0.084 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U
20S	GS-20S05-052316	5	5/23/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.057 U	0.028 U	0.028 U	0.079 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.028 U	0.028 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U	0.029 U	0.084 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.052 U	0.026 U	0.052 U	0.026 U	0.025 U	0.072 U	0.026 U	0.026 U	0.052 U	0.026 U	0.026 U	0.026 U	0.026 U
21D	GS-21D10-110316	10	11/3/2016	mg/kg	0.014 U	0.015 U	0.015 U	0.026 U	0.011 U	0.017 U	0.012 U	0.015 U	0.014 U	0.013 U	0.012 U	0.022 U	0.0085 U	0.086 U	0.013 U	0.013 U	0.008 U	0.0094 U	0.013 U	0.0086 U	0.019 U
21D	GS-21D20-110316	20	11/3/2016	mg/kg	0.016 U	0.016 U	0.016 U	0.029 U	0.012 U	0.018 U	0.013 U	0.016 U	0.015 U	0.014 U	0.013 U	0.025 U	0.0094 U	0.094 U	0.014 U	0.014 U	0.0088 U	0.01 U	0.014 U	0.0094 U	0.021 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dichloroethane	1,2-Dichlorobenzene	1,2-Dibromo-3-Chloropropane	1,2-Dibromoethane	1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane
Residential Soil Remediation Level[3,4]				**mg/kg**	**32**	**1200**	**4.2**	**7.4**	**510**	**120**	**NE**	**NE**	**0.05**	**62**	**52**	**2.8**	**600**	**5.3**	**0.029**	**3.4**	**21**	**530**	**100**	**35**	**NE**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**73**	**1200**	**9.3**	**16**	**1700**	**410**	**NE[7]**	**NE**	**0.11**	**220**	**170**	**6**	**600**	**6.5**	**0.63**	**7.4**	**70**	**600**	**360**	**79**	**NE**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**1.0**	**NE**	**NE**	**NE**	**0.81**	**NE**	**NE**	**NE**	**NE**	**720**	**0.21**	**72**	**0.015**	**NE**	**0.28**	**NE**	**NE**	**NE**	**9.3**	**NE**
21D	GS-21D30-110316	30	11/3/2016	mg/kg	0.014 U	0.015 U	0.015 U	0.026 U	0.011 U	0.017 U	0.012 U	0.015 U	0.014 U	0.013 U	0.012 U	0.022 U	0.0086 U	0.086 U	0.013 U	0.013 U	0.008 U	0.0094 U	0.013 U	0.0086 U	0.019 U
21D	GS-21D40-110316	40	11/3/2016	mg/kg	0.014 U	0.014 U	0.014 U	0.025 U	0.011 U	0.016 U	0.012 U	0.015 U	0.014 U	0.012 U	0.012 U	0.022 U	0.0083 U	0.084 U	0.012 U	0.013 U	0.0078 U	0.0092 U	0.013 U	0.0084 U	0.019 U
21D	GS-FD02-110316	40	11/3/2016	mg/kg	0.012 U	0.012 U	0.012 U	0.022 U	0.0093 U	0.014 U	0.01 U	0.013 U	0.012 U	0.011 U	0.01 U	0.019 U	0.0072 U	0.072 U	0.011 U	0.011 U	0.0067 U	0.0079 U	0.011 U	0.0072 U	0.016 U
21D	GS-21D50-110416	50	11/4/2016	mg/kg	0.014 U	0.015 U	0.014 U	0.026 U	0.011 U	0.016 U	0.012 U	0.015 U	0.014 U	0.013 U	0.012 U	0.022 U	0.0084 U	0.084 U	0.012 U	0.013 U	0.0079 U	0.0093 U	0.013 U	0.0084 U	0.019 U
21D	GS-21D60-110416	60	11/4/2016	mg/kg	0.013 U	0.014 U	0.013 U	0.024 U	0.01 U	0.015 U	0.011 U	0.014 U	0.013 U	0.012 U	0.011 U	0.021 U	0.0079 U	0.079 U	0.012 U	0.012 U	0.0074 U	0.0087 U	0.012 U	0.0079 U	0.018 U
22D	GS-22D15-110416	15	11/4/2016	mg/kg	0.015 U	0.015 U	0.015 U	0.027 U	0.011 U	0.017 U	0.013 U	0.015 U	0.014 U	0.013 U	0.012 U	0.023 U	0.0087 U	0.088 U	0.013 U	0.013 U	0.0082 U	0.0096 U	0.013 U	0.0088 U	0.02 U
22D	GS-22D25-110416	25	11/4/2016	mg/kg	0.012 U	0.013 U	0.013 U	0.023 U	0.0097 U	0.014 U	0.011 U	0.013 U	0.012 U	0.011 U	0.011 U	0.02 U	0.0075 U	0.075 U	0.011 U	0.012 U	0.007 U	0.0082 U	0.011 U	0.0075 U	0.017 U
22D	GS-22D35-110416	35	11/4/2016	mg/kg	0.014 U	0.014 U	0.014 U	0.025 U	0.011 U	0.016 U	0.012 U	0.015 U	0.013 U	0.012 U	0.012 U	0.022 U	0.0083 U	0.083 U	0.012 U	0.013 U	0.0077 U	0.0091 U	0.012 U	0.0083 U	0.019 U
22D	GS-22D45-110416	45	11/4/2016	mg/kg	0.014 U	0.014 U	0.014 U	0.025 U	0.01 U	0.016 U	0.012 U	0.014 U	0.013 U	0.012 U	0.011 U	0.021 U	0.0081 U	0.081 U	0.012 U	0.013 U	0.0076 U	0.0089 U	0.012 U	0.0081 U	0.018 U
22D	GS-FD03-110416	45	11/4/2016	mg/kg	0.016 U	0.016 U	0.016 U	0.029 U	0.012 U	0.018 U	0.014 U	0.017 U	0.015 U	0.014 U	0.013 U	0.025 U	0.0095 U	0.095 U	0.014 U	0.015 U	0.0088 U	0.01 U	0.014 U	0.0095 U	0.021 U
22D	GS-22D55-110416	55	11/4/2016	mg/kg	0.014 U	0.015 U	0.015 U	0.026 U	0.011 U	0.016 U	0.012 U	0.015 U	0.014 U	0.013 U	0.012 U	0.022 U	0.0085 U	0.085 U	0.013 U	0.013 U	0.008 U	0.0094 U	0.013 U	0.0085 U	0.019 U
23D	GS-23D10-110416	10	11/4/2016	mg/kg	0.012 U	0.013 U	0.013 U	0.023 U	0.0097 U	0.014 U	0.011 U	0.013 U	0.012 U	0.011 U	0.011 U	0.02 U	0.0075 U	0.075 U	0.011 U	0.012 U	0.007 U	0.0082 U	0.011 U	0.0075 U	0.017 U
23D	GS-23D20-110416	20	11/4/2016	mg/kg	0.015 U	0.015 U	0.015 U	0.027 U	0.012 U	0.017 U	0.013 U	0.016 U	0.014 U	0.013 U	0.013 U	0.023 U	0.0089 U	0.089 U	0.013 U	0.014 U	0.0083 U	0.0098 U	0.013 U	0.0089 U	0.02 U
23D	GS-23D30-110416	30	11/4/2016	mg/kg	0.012 U	0.013 U	0.013 U	0.023 U	0.0096 U	0.014 U	0.011 U	0.013 U	0.012 U	0.011 U	0.01 U	0.019 U	0.0074 U	0.074 U	0.011 U	0.011 U	0.0069 U	0.0081 U	0.011 U	0.0074 U	0.017 U
23D	GS-23D40-110416	40	11/4/2016	mg/kg	0.013 U	0.014 U	0.014 U	0.024 U	0.01 U	0.015 U	0.011 U	0.014 U	0.013 U	0.012 U	0.011 U	0.021 U	0.008 U	0.08 U	0.012 U	0.012 U	0.0074 U	0.0087 U	0.012 U	0.008 U	0.018 U
GW1	GS-GW1010-110116	10	11/1/2016	mg/kg	0.013 U	0.013 U	0.013 U	0.023 U	0.0099 U	0.015 U	0.011 U	0.013 U	0.012 U	0.011 U	0.011 U	0.02 U	0.0077 U	0.077 U	0.011 U	0.012 U	0.0072 U	0.0084 U	0.012 U	0.0077 U	0.017 U
GW1	GS-GW1020-110116	20	11/1/2016	mg/kg	0.015 U	0.016 U	0.016 U	0.028 U	0.012 U	0.018 U	0.013 U	0.016 U	0.015 U	0.014 U	0.013 U	0.024 U	0.0093 U	0.093 U	0.014 U	0.014 U	0.0087 U	0.01 U	0.014 U	0.0093 U	0.021 U
GW1	GS-GW1030-110116	30	11/1/2016	mg/kg	0.015 U	0.016 U	0.015 U	0.028 U	0.012 U	0.017 U	0.013 U	0.016 U	0.015 U	0.014 U	0.013 U	0.024 U	0.009 U	0.091 U	0.013 U	0.014 U	0.0084 U	0.0099 U	0.014 U	0.0091 U	0.02 U
GW1	GS-GW1040-110116	40	11/1/2016	mg/kg	0.014 U	0.014 U	0.014 U	0.025 U	0.011 U	0.016 U	0.012 U	0.015 U	0.014 U	0.012 U	0.012 U	0.022 U	0.0083 U	0.083 U	0.012 U	0.013 U	0.0078 U	0.0092 U	0.012 U	0.0083 U	0.019 U
GW1	GS-GW1050-110116	50	11/1/2016	mg/kg	0.014 U	0.015 U	0.015 U	0.026 U	0.011 U	0.017 U	0.012 U	0.015 U	0.014 U	0.013 U	0.012 U	0.022 U	0.0086 U	0.086 U	0.013 U	0.013 U	0.008 U	0.0094 U	0.013 U	0.0086 U	0.019 U
GW1	GS-GW1060-110116	60	11/1/2016	mg/kg	0.012 U	0.013 U	0.013 U	0.022 U	0.0095 U	0.014 U	0.011 U	0.013 U	0.012 U	0.011 U	0.01 U	0.019 U	0.0073 U	0.074 U	0.011 U	0.011 U	0.0069 U	0.0081 U	0.011 U	0.0074 U	0.017 U
GW1	GS-GW1070-110116	70	11/1/2016	mg/kg	0.013 U	0.013 U	0.013 U	0.023 U	0.0099 U	0.015 U	0.011 U	0.013 U	0.012 U	0.011 U	0.011 U	0.02 U	0.0076 U	0.077 U	0.011 U	0.012 U	0.0071 U	0.0084 U	0.011 U	0.0077 U	0.017 U
GW1	GS-GW1080-110116	80	11/1/2016	mg/kg	0.013 U	0.013 U	0.013 U	0.024 U	0.01 U	0.015 U	0.011 U	0.014 U	0.013 U	0.012 U	0.011 U	0.02 U	0.0077 U	0.077 U	0.011 U	0.012 U	0.0072 U	0.0085 U	0.012 U	0.0077 U	0.017 U
GW1	GS-GW1090-110116	90	11/1/2016	mg/kg	0.015 U	0.015 U	0.015 U	0.027 U	0.011 U	0.017 U	0.013 U	0.015 U	0.014 U	0.013 U	0.012 U	0.023 U	0.0087 U	0.087 U	0.013 U	0.013 U	0.0081 U	0.0096 U	0.013 U	0.0087 U	0.02 U
GW1	GS-GW1100-110216	100	11/2/2016	mg/kg	0.014 U	0.015 U	0.015 U	0.026 U	0.011 U	0.017 U	0.012 U	0.015 U	0.014 U	0.013 U	0.012 U	0.023 U	0.0086 U	0.086 U	0.013 U	0.013 U	0.008 U	0.0095 U	0.013 U	0.0086 U	0.019 U
GW1	GS-GW1110-110216	110	11/2/2016	mg/kg	0.012 U	0.012 U	0.012 U	0.022 U	0.0093 U	0.014 U	0.01 U	0.013 U	0.012 U	0.011 U	0.01 U	0.019 U	0.0072 U	0.072 U	0.011 U	0.011 U	0.0067 U	0.0079 U	0.011 U	0.0072 U	0.016 U
GW1	GS-FD01-110216	110	11/2/2016	mg/kg	0.013 U	0.014 U	0.014 U	0.024 U	0.01 U	0.015 U	0.012 U	0.014 U	0.013 U	0.012 U	0.011 U	0.021 U	0.008 U	0.08 U	0.012 U	0.012 U	0.0075 U	0.0088 U	0.012 U	0.008 U	0.018 U
GW1	GS-GW1120-110216	120	11/2/2016	mg/kg	0.012 U	0.012 U	0.012 U	0.022 U	0.0092 U	0.014 U	0.01 U	0.012 U	0.012 U	0.011 U	0.01 U	0.019 U	0.0071 U	0.071 U	0.01 U	0.011 U	0.0066 U	0.0078 U	0.011 U	0.0071 U	0.016 U
GW1	GS-GW1130-110216	130	11/2/2016	mg/kg	0.013 U	0.014 U	0.014 U	0.024 U	0.01 U	0.015 U	0.011 U	0.014 U	0.013 U	0.012 U	0.011 U	0.021 U	0.008 U	0.08 U	0.012 U	0.012 U	0.0074 U	0.0087 U	0.012 U	0.008 U	0.018 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	2-Chloroethyl vinyl ether	2-Chlorotoluene	2-Hexanone	4-Chlorotoluene	p-Cymene	Acetone	Acrolein	Acrylonitrile	Benzene	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,2-Dichloroethene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE**	**160**	**NE**	**NE**	**NE**	**14000**	**0.1**	**2.1**	**0.65**	**28**	**NE**	**8.3**	**690**	**3.9**	**360**	**2.5**	**150**	**30**	**9.4**	**48**	**43**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**510**	**NE**	**NE**	**NE**	**54000**	**0.34**	**4.9**	**1.4**	**92**	**NE**	**18**	**2200**	**13**	**720**	**5.5**	**530**	**65**	**20**	**160**	**150**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**12**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1.6**	**22**	**NE**	**23.9**	**NE**	**4.9**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.061 U	0.03 U	0.12 U	0.03 U	0.03 U	0.61 U	0.11 U	0.061 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.061 U	0.03 U	0.03 U	0.03 U	0.061 U	0.03 U	0.061 U	0.067 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.066 U	0.033 U	0.13 U	0.033 U	0.033 U	0.66 U	0.12 U	0.066 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.066 U	0.033 U	0.033 U	0.033 U	0.066 U	0.033 U	0.066 U	0.072 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.045 U	0.023 U	0.09 U	0.023 U	0.023 U	0.45 U	0.081 U	0.045 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.045 U	0.023 U	0.023 U	0.023 U	0.045 U	0.023 U	0.045 U	0.05 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.053 U	0.027 U	0.11 U	0.027 U	0.027 U	0.53 U	0.096 U	0.053 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.053 U	0.059 U
2D	GS-2D5-050416	5	5/4/2016	mg/kg	0.062 U	0.031 U	0.12 U	0.031 U	0.031 U	0.62 U	0.11 U	0.062 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.069 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.048 U	0.024 U	0.095 U	0.024 U	0.024 U	0.48 U	0.086 U	0.048 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.048 U	0.024 U	0.024 U	0.024 U	0.048 U	0.024 U	0.048 U	0.052 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.045 U	0.023 U	0.09 U	0.023 U	0.023 U	0.45 U	0.081 U	0.045 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.045 U	0.023 U	0.023 U	0.023 U	0.045 U	0.023 U	0.045 U	0.05 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.056 U	0.028 U	0.11 U	0.028 U	0.028 U	0.56 U	0.1 U	0.056 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.056 U	0.062 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.057 U	0.028 U	0.11 U	0.028 U	0.028 U	0.57 U	0.1 U	0.057 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.057 U	0.063 U
3D	GS-3D5-051016	5	5/10/2016	mg/kg	NA	0.028 U	0.11 U	0.028 U	0.028 U	0.57 U	NA	NA	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.057 U	0.063 U
3D	GS-FD02-051016	5	5/10/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.6 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.066 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	NA	0.031 U	0.12 U	0.031 U	0.031 U	0.62 U	NA	NA	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.069 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	NA	0.025 U	0.1 U	0.025 U	0.025 U	0.5 U	NA	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.05 U	0.055 U
3D	GS-3D55-051016	55	5/10/2016	mg/kg	NA	0.033 U	0.13 U	0.033 U	0.033 U	0.65 U	NA	NA	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.065 U	0.033 U	0.033 U	0.033 U	0.065 U	0.033 U	0.065 U	0.072 U
3D	GS-3D75-051016	75	5/10/2016	mg/kg	NA	0.027 U	0.11 U	0.027 U	0.027 U	0.53 U	NA	NA	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.053 U	0.059 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	NA	0.034 U	0.14 U	0.034 U	0.034 U	0.69 U	NA	NA	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.069 U	0.034 U	0.034 U	0.034 U	0.069 U	0.034 U	0.069 U	0.075 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	NA	0.025 U	0.1 U	0.025 U	0.025 U	0.51 U	NA	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.051 U	0.025 U	0.025 U	0.025 U	0.051 U	0.025 U	0.051 U	0.056 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	NA	0.027 U	0.11 U	0.027 U	0.027 U	0.54 U	NA	NA	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.054 U	0.059 U
4D	GS-4D70-051316	70	5/13/2016	mg/kg	NA	0.028 U	0.11 U	0.028 U	0.028 U	0.55 U	NA	NA	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.055 U	0.061 U
4D	GS-FD04-051316	70	5/13/2016	mg/kg	NA	0.029 U	0.12 U	0.029 U	0.029 U	0.58 U	NA	NA	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.058 U	0.064 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	NA	0.032 U	0.13 U	0.032 U	0.032 U	0.65 U	NA	NA	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.065 U	0.032 U	0.032 U	0.032 U	0.065 U	0.032 U	0.065 U	0.071 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	NA	0.026 U	0.11 U	0.026 U	0.026 U	0.53 U	NA	NA	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.053 U	0.058 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	NA	0.025 U	0.1 U	0.025 U	0.025 U	0.5 U	NA	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.05 U	0.055 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	NA	0.027 U	0.11 U	0.027 U	0.027 U	0.54 U	NA	NA	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.054 U	0.059 U
5D	GS-5D65-051716	65	5/17/2016	mg/kg	NA	0.026 U	0.11 U	0.026 U	0.026 U	0.53 U	NA	NA	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.053 U	0.058 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.6 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.066 U
6D	GS-6D10-051316	10	5/13/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.6 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.066 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	NA	0.027 U	0.11 U	0.027 U	0.027 U	0.53 U	NA	NA	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.053 U	0.058 U
6D	GS-6D30-051616	30	5/16/2016	mg/kg	NA	0.029 U	0.12 U	0.029 U	0.029 U	0.58 U	NA	NA	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.058 U	0.064 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	NA	0.028 U	0.11 U	0.028 U	0.028 U	0.55 U	NA	NA	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.055 U	0.061 U
6D	GS-6D70-051616	70	5/16/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.59 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.059 U	0.065 U
7D	GS-7D05-052016	5	5/20/2016	mg/kg	NA	0.034 U	0.14 U	0.034 U	0.034 U	0.68 U	NA	NA	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.068 U	0.034 U	0.034 U	0.034 U	0.068 U	0.034 U	0.068 U	0.075 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	NA	32 U	130 U	32 U	32 U	630 U	NA	NA	32 U	32 U	32 U	32 U	32 U	63 U	32 U	32 U	32 U	63 U	32 U	63 U	70 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	NA	0.028 U	0.11 U	0.028 U	0.028 U	0.55 U	NA	NA	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.055 U	0.061 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.59 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.059 U	0.065 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	NA	0.027 U	0.11 U	0.027 U	0.027 U	0.55 U	NA	NA	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.055 U	0.027 U	0.027 U	0.027 U	0.055 U	0.027 U	0.055 U	0.06 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	NA	0.031 U	0.13 U	0.031 U	0.031 U	0.63 U	NA	NA	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.063 U	0.031 U	0.031 U	0.031 U	0.063 U	0.031 U	0.063 U	0.069 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	2-Chloroethyl vinyl ether	2-Chlorotoluene	2-Hexanone	4-Chlorotoluene	p-Cymene	Acetone	Acrolein	Acrylonitrile	Benzene	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,2-Dichloroethene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE**	**160**	**NE**	**NE**	**NE**	**14000**	**0.1**	**2.1**	**0.65**	**28**	**NE**	**8.3**	**690**	**3.9**	**360**	**2.5**	**150**	**30**	**9.4**	**48**	**43**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**510**	**NE**	**NE**	**NE**	**54000**	**0.34**	**4.9**	**1.4**	**92**	**NE**	**18**	**2200**	**13**	**720**	**5.5**	**530**	**65**	**20**	**160**	**150**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**12**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1.6**	**22**	**NE**	**23.9**	**NE**	**4.9**
8D	GS-8D05-051916	5	5/19/2016	mg/kg	NA	35 U	140 U	35 U	35 U	700 U	NA	NA	35 U	35 U	35 U	35 U	35 U	70 U	35 U	35 U	35 U	70 U	35 U	70 U	77 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	NA	3.1 U	12 U	3.1 U	3.1 U	62 U	NA	NA	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	6.2 U	3.1 U	3.1 U	3.1 U	6.2 U	3.1 U	6.2 U	6.8 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	NA	6.2 U	25 U	6.2 U	6.2 U	120 U	NA	NA	6.2 U	6.2 U	6.2 U	6.2 U	6.2 U	12 U	6.2 U	6.2 U	6.2 U	12 U	6.2 U	12 U	14 U
8D	GS-8D20-051916	20	5/19/2016	mg/kg	NA	0.029 U	0.12 U	0.029 U	0.029 U	0.58 U	NA	NA	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.058 U	0.064 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	NA	2.7 U	11 U	2.7 U	2.7 U	55 U	NA	NA	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	5.5 U	2.7 U	2.7 U	2.7 U	5.5 U	2.7 U	5.5 U	6 U
8D	GS-8D70-051916	70	5/19/2016	mg/kg	NA	0.031 U	0.12 U	0.031 U	0.031 U	0.62 U	NA	NA	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.068 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	0.056 U	0.028 U	0.11 U	0.028 U	0.028 U	0.56 U	0.1 U	0.056 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.056 U	0.062 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.065 U	0.033 U	0.13 U	0.033 U	0.033 U	0.65 U	0.12 U	0.065 U	0.033 U	0.033 U	0.033 U	0.033 U	0.033 U	0.065 U	0.033 U	0.033 U	0.033 U	0.065 U	0.033 U	0.065 U	0.072 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.056 U	0.028 U	0.11 U	0.028 U	0.028 U	0.56 U	0.1 U	0.056 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.056 U	0.062 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	NA	0.027 U	0.11 U	0.027 U	0.027 U	0.54 U	NA	NA	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.054 U	0.059 U
10S	GS-10S15-050916	15	5/9/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.59 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.059 U	0.065 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	NA	0.029 U	0.11 U	0.029 U	0.029 U	0.57 U	NA	NA	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.057 U	0.029 U	0.029 U	0.029 U	0.057 U	0.029 U	0.057 U	0.063 U
10S	GS-10S30-050916	30	5/9/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.6 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.066 U
11S	GS-11S5-051216	5	5/12/2016	mg/kg	NA	0.028 U	0.11 U	0.028 U	0.028 U	0.55 U	NA	NA	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.055 U	0.061 U
11S	GS-11S8-051216	8	5/12/2016	mg/kg	NA	2.3 U	9 U	2.3 U	2.3 U	45 U	NA	NA	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	4.5 U	2.3 U	2.3 U	2.3 U	4.5 U	2.3 U	4.5 U	5 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	NA	0.031 U	0.12 U	0.031 U	0.031 U	0.62 U	NA	NA	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.068 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.59 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.059 U	0.065 U
11S	GS-11S20-051216	20	5/12/2016	mg/kg	NA	0.026 U	0.1 U	0.026 U	0.026 U	0.51 U	NA	NA	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.051 U	0.026 U	0.026 U	0.026 U	0.051 U	0.026 U	0.051 U	0.057 U
12S	GS-12S03-052316	3	5/23/2016	mg/kg	NA	0.034 U	0.13 U	0.034 U	0.034 U	0.67 U	NA	NA	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.067 U	0.034 U	0.034 U	0.034 U	0.067 U	0.034 U	0.067 U	0.074 U
14S	GS-14S03-052316	3	5/23/2016	mg/kg	NA	0.032 U	0.13 U	0.032 U	0.032 U	0.64 U	NA	NA	0.032 U	0.032 U	0.032 U	0.032 U	0.032 U	0.064 U	0.032 U	0.032 U	0.032 U	0.064 U	0.032 U	0.064 U	0.071 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	NA	0.025 U	0.1 U	0.025 U	0.025 U	0.5 U	NA	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.05 U	0.055 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	NA	0.025 U	0.1 U	0.025 U	0.025 U	0.51 U	NA	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.051 U	0.025 U	0.025 U	0.025 U	0.051 U	0.025 U	0.051 U	0.056 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	NA	0.025 U	0.1 U	0.025 U	0.025 U	0.5 U	NA	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.05 U	0.055 U
15S	GS-15S5-051716	5	5/17/2016	mg/kg	NA	0.026 U	0.11 U	0.026 U	0.026 U	0.53 U	NA	NA	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.053 U	0.058 U
15S	GS-15S15-051716	15	5/17/2016	mg/kg	NA	0.029 U	0.12 U	0.029 U	0.029 U	0.59 U	NA	NA	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.059 U	0.029 U	0.029 U	0.029 U	0.059 U	0.029 U	0.059 U	0.065 U
15S	GS-15S30-051716	30	5/17/2016	mg/kg	NA	0.025 U	0.099 U	0.025 U	0.025 U	0.49 U	NA	NA	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.049 U	0.025 U	0.025 U	0.025 U	0.049 U	0.025 U	0.049 U	0.054 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.6 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.066 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	NA	0.034 U	0.14 U	0.034 U	0.034 U	0.68 U	NA	NA	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.068 U	0.034 U	0.034 U	0.034 U	0.068 U	0.034 U	0.068 U	0.075 U
16S	GS-16S30-0510216	30	5/12/2016	mg/kg	NA	0.027 U	0.11 U	0.027 U	0.027 U	0.55 U	NA	NA	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.055 U	0.027 U	0.027 U	0.027 U	0.055 U	0.027 U	0.055 U	0.06 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	NA	0.031 U	0.12 U	0.031 U	0.031 U	0.62 U	NA	NA	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.068 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	NA	1.6 U	6.4 U	1.6 U	1.6 U	32 U	NA	NA	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	3.2 U	1.6 U	1.6 U	1.6 U	3.2 U	1.6 U	3.2 U	3.5 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	NA	0.031 U	0.12 U	0.031 U	0.031 U	0.62 U	NA	NA	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.062 U	0.068 U
18S	GS-18S3-051216	3	5/12/2016	mg/kg	NA	0.029 U	0.12 U	0.029 U	0.029 U	0.58 U	NA	NA	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.058 U	0.063 U
19S	GS-19S05-051616	5	5/16/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.6 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.067 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	NA	5.7 U	23 U	5.7 U	5.7 U	110 U	NA	NA	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	11 U	5.7 U	5.7 U	5.7 U	11 U	5.7 U	11 U	12 U
19S	GS-19S17-051716	17	5/17/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.6 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.066 U
20S	GS-20S05-052316	5	5/23/2016	mg/kg	NA	0.028 U	0.11 U	0.028 U	0.028 U	0.57 U	NA	NA	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.057 U	0.062 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	NA	0.03 U	0.12 U	0.03 U	0.03 U	0.6 U	NA	NA	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.06 U	0.066 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	NA	0.026 U	0.1 U	0.026 U	0.026 U	0.52 U	NA	NA	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.052 U	0.026 U	0.026 U	0.026 U	0.052 U	0.026 U	0.052 U	0.057 U
21D	GS-21D10-110316	10	11/3/2016	mg/kg	NA	0.0089 U	0.066 U	0.01 U	0.0098 U	0.47 U	NA	NA	0.011 U	0.013 U	0.017 U	0.016 U	0.027 U	0.035 U	0.022 U	0.014 U	0.01 U	0.018 U	0.009 U	0.024 U	0.013 U
21D	GS-21D20-110316	20	11/3/2016	mg/kg	NA	0.0097 U	0.072 U	0.011 U	0.011 U	0.51 U	NA	NA	0.012 U	0.014 U	0.019 U	0.018 U	0.03 U	0.038 U	0.024 U	0.015 U	0.011 U	0.02 U	0.0098 U	0.026 U	0.014 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	2-Chloroethyl vinyl ether	2-Chlorotoluene	2-Hexanone	4-Chlorotoluene	p-Cymene	Acetone	Acrolein	Acrylonitrile	Benzene	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,2-Dichloroethene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE**	**160**	**NE**	**NE**	**NE**	**14000**	**0.1**	**2.1**	**0.65**	**28**	**NE**	**8.3**	**690**	**3.9**	**360**	**2.5**	**150**	**30**	**9.4**	**48**	**43**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**510**	**NE**	**NE**	**NE**	**54000**	**0.34**	**4.9**	**1.4**	**92**	**NE**	**18**	**2200**	**13**	**720**	**5.5**	**530**	**65**	**20**	**160**	**150**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**12**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1.6**	**22**	**NE**	**23.9**	**NE**	**4.9**
21D	GS-21D30-110316	30	11/3/2016	mg/kg	NA	0.0089 U	0.066 U	0.01 U	0.0098 U	0.47 U	NA	NA	0.011 U	0.013 U	0.017 U	0.016 U	0.027 U	0.035 U	0.022 U	0.014 U	0.01 U	0.018 U	0.009 U	0.024 U	0.013 U
21D	GS-21D40-110316	40	11/3/2016	mg/kg	NA	0.0087 U	0.064 U	0.0098 U	0.0095 U	0.46 U	NA	NA	0.011 U	0.012 U	0.017 U	0.016 U	0.027 U	0.034 U	0.021 U	0.014 U	0.0097 U	0.017 U	0.0088 U	0.023 U	0.013 U
21D	GS-FD02-110316	40	11/3/2016	mg/kg	NA	0.0075 U	0.055 U	0.0084 U	0.0082 U	0.39 U	NA	NA	0.0095 U	0.011 U	0.015 U	0.014 U	0.023 U	0.029 U	0.018 U	0.012 U	0.0084 U	0.015 U	0.0076 U	0.02 U	0.011 U
21D	GS-21D50-110416	50	11/4/2016	mg/kg	NA	0.0087 U	0.065 U	0.0099 U	0.0096 U	0.46 U	NA	NA	0.011 U	0.012 U	0.017 U	0.016 U	0.027 U	0.034 U	0.022 U	0.014 U	0.0098 U	0.018 U	0.0088 U	0.024 U	0.013 U
21D	GS-21D60-110416	60	11/4/2016	mg/kg	NA	0.0082 U	0.06 U	0.0092 U	0.009 U	0.43 U	NA	NA	0.01 U	0.012 U	0.016 U	0.015 U	0.025 U	0.032 U	0.02 U	0.013 U	0.0092 U	0.017 U	0.0083 U	0.022 U	0.012 U
22D	GS-22D15-110416	15	11/4/2016	mg/kg	NA	0.0091 U	0.067 U	0.01 U	0.01 U	0.48 U	NA	NA	0.012 U	0.013 U	0.018 U	0.017 U	0.028 U	0.035 U	0.022 U	0.014 U	0.01 U	0.018 U	0.0092 U	0.025 U	0.013 U
22D	GS-22D25-110416	25	11/4/2016	mg/kg	NA	0.0077 U	0.057 U	0.0088 U	0.0085 U	0.41 U	NA	NA	0.0099 U	0.011 U	0.015 U	0.014 U	0.024 U	0.03 U	0.019 U	0.012 U	0.0087 U	0.016 U	0.0078 U	0.021 U	0.011 U
22D	GS-22D35-110416	35	11/4/2016	mg/kg	NA	0.0086 U	0.064 U	0.0097 U	0.0095 U	0.45 U	NA	NA	0.011 U	0.012 U	0.017 U	0.016 U	0.027 U	0.033 U	0.021 U	0.014 U	0.0097 U	0.017 U	0.0087 U	0.023 U	0.012 U
22D	GS-22D45-110416	45	11/4/2016	mg/kg	NA	0.0084 U	0.062 U	0.0095 U	0.0092 U	0.44 U	NA	NA	0.011 U	0.012 U	0.016 U	0.015 U	0.026 U	0.033 U	0.021 U	0.013 U	0.0095 U	0.017 U	0.0085 U	0.023 U	0.012 U
22D	GS-FD03-110416	45	11/4/2016	mg/kg	NA	0.0098 U	0.073 U	0.011 U	0.011 U	0.52 U	NA	NA	0.013 U	0.014 U	0.019 U	0.018 U	0.03 U	0.038 U	0.024 U	0.016 U	0.011 U	0.02 U	0.0099 U	0.027 U	0.014 U
22D	GS-22D55-110416	55	11/4/2016	mg/kg	NA	0.0088 U	0.065 U	0.01 U	0.0097 U	0.47 U	NA	NA	0.011 U	0.012 U	0.017 U	0.016 U	0.027 U	0.034 U	0.022 U	0.014 U	0.0099 U	0.018 U	0.0089 U	0.024 U	0.013 U
23D	GS-23D10-110416	10	11/4/2016	mg/kg	NA	0.0078 U	0.057 U	0.0088 U	0.0085 U	0.41 U	NA	NA	0.0099 U	0.011 U	0.015 U	0.014 U	0.024 U	0.03 U	0.019 U	0.012 U	0.0087 U	0.016 U	0.0078 U	0.021 U	0.011 U
23D	GS-23D20-110416	20	11/4/2016	mg/kg	NA	0.0092 U	0.068 U	0.01 U	0.01 U	0.49 U	NA	NA	0.012 U	0.013 U	0.018 U	0.017 U	0.028 U	0.036 U	0.023 U	0.015 U	0.01 U	0.019 U	0.0093 U	0.025 U	0.013 U
23D	GS-23D30-110416	30	11/4/2016	mg/kg	NA	0.0077 U	0.057 U	0.0087 U	0.0084 U	0.41 U	NA	NA	0.0098 U	0.011 U	0.015 U	0.014 U	0.024 U	0.03 U	0.019 U	0.012 U	0.0086 U	0.016 U	0.0078 U	0.021 U	0.011 U
23D	GS-23D40-110416	40	11/4/2016	mg/kg	NA	0.0083 U	0.061 U	0.0093 U	0.0091 U	0.44 U	NA	NA	0.011 U	0.012 U	0.016 U	0.015 U	0.025 U	0.032 U	0.02 U	0.013 U	0.0093 U	0.017 U	0.0083 U	0.022 U	0.012 U
GW1	GS-GW1010-110116	10	11/1/2016	mg/kg	NA	0.008 U	0.059 U	0.009 U	0.0088 U	0.42 U	NA	NA	0.01 U	0.011 U	0.016 U	0.015 U	0.025 U	0.031 U	0.02 U	0.013 U	0.0089 U	0.016 U	0.0081 U	0.022 U	0.012 U
GW1	GS-GW1020-110116	20	11/1/2016	mg/kg	NA	0.0096 U	0.071 U	0.011 U	0.011 U	0.51 U	NA	NA	0.012 U	0.014 U	0.019 U	0.018 U	0.03 U	0.037 U	0.024 U	0.015 U	0.011 U	0.019 U	0.0097 U	0.026 U	0.014 U
GW1	GS-GW1030-110116	30	11/1/2016	mg/kg	NA	0.0094 U	0.069 U	0.011 U	0.01 U	0.5 U	NA	NA	0.012 U	0.013 U	0.018 U	0.017 U	0.029 U	0.036 U	0.023 U	0.015 U	0.011 U	0.019 U	0.0095 U	0.025 U	0.014 U
GW1	GS-GW1040-110116	40	11/1/2016	mg/kg	NA	0.0086 U	0.064 U	0.0098 U	0.0095 U	0.46 U	NA	NA	0.011 U	0.012 U	0.017 U	0.016 U	0.027 U	0.034 U	0.021 U	0.014 U	0.0097 U	0.017 U	0.0087 U	0.023 U	0.013 U
GW1	GS-GW1050-110116	50	11/1/2016	mg/kg	NA	0.0089 U	0.066 U	0.01 U	0.0098 U	0.47 U	NA	NA	0.011 U	0.013 U	0.017 U	0.016 U	0.027 U	0.035 U	0.022 U	0.014 U	0.01 U	0.018 U	0.009 U	0.024 U	0.013 U
GW1	GS-GW1060-110116	60	11/1/2016	mg/kg	NA	0.0076 U	0.056 U	0.0086 U	0.0084 U	0.4 U	NA	NA	0.0097 U	0.011 U	0.015 U	0.014 U	0.023 U	0.03 U	0.019 U	0.012 U	0.0086 U	0.015 U	0.0077 U	0.021 U	0.011 U
GW1	GS-GW1070-110116	70	11/1/2016	mg/kg	NA	0.0079 U	0.059 U	0.009 U	0.0087 U	0.42 U	NA	NA	0.01 U	0.011 U	0.016 U	0.015 U	0.024 U	0.031 U	0.02 U	0.013 U	0.0089 U	0.016 U	0.008 U	0.021 U	0.012 U
GW1	GS-GW1080-110116	80	11/1/2016	mg/kg	NA	0.008 U	0.059 U	0.0091 U	0.0088 U	0.42 U	NA	NA	0.01 U	0.011 U	0.016 U	0.015 U	0.025 U	0.031 U	0.02 U	0.013 U	0.009 U	0.016 U	0.0081 U	0.022 U	0.012 U
GW1	GS-GW1090-110116	90	11/1/2016	mg/kg	NA	0.009 U	0.067 U	0.01 U	0.0099 U	0.48 U	NA	NA	0.012 U	0.013 U	0.018 U	0.017 U	0.028 U	0.035 U	0.022 U	0.014 U	0.01 U	0.018 U	0.0091 U	0.024 U	0.013 U
GW1	GS-GW1100-110216	100	11/2/2016	mg/kg	NA	0.0089 U	0.066 U	0.01 U	0.0098 U	0.47 U	NA	NA	0.011 U	0.013 U	0.018 U	0.016 U	0.028 U	0.035 U	0.022 U	0.014 U	0.01 U	0.018 U	0.0091 U	0.024 U	0.013 U
GW1	GS-GW1110-110216	110	11/2/2016	mg/kg	NA	0.0075 U	0.055 U	0.0084 U	0.0082 U	0.39 U	NA	NA	0.0095 U	0.011 U	0.015 U	0.014 U	0.023 U	0.029 U	0.018 U	0.012 U	0.0084 U	0.015 U	0.0075 U	0.02 U	0.011 U
GW1	GS-FD01-110216	110	11/2/2016	mg/kg	NA	0.0083 U	0.061 U	0.0094 U	0.0091 U	0.44 U	NA	NA	0.011 U	0.012 U	0.016 U	0.015 U	0.026 U	0.032 U	0.021 U	0.013 U	0.0093 U	0.017 U	0.0084 U	0.023 U	0.012 U
GW1	GS-GW1120-110216	120	11/2/2016	mg/kg	NA	0.0073 U	0.054 U	0.0083 U	0.0081 U	0.39 U	NA	NA	0.0094 U	0.01 U	0.014 U	0.013 U	0.023 U	0.029 U	0.018 U	0.012 U	0.0083 U	0.015 U	0.0074 U	0.02 U	0.011 U
GW1	GS-GW1130-110216	130	11/2/2016	mg/kg	NA	0.0083 U	0.061 U	0.0093 U	0.0091 U	0.44 U	NA	NA	0.011 U	0.012 U	0.016 U	0.015 U	0.025 U	0.032 U	0.02 U	0.013 U	0.0093 U	0.017 U	0.0083 U	0.022 U	0.012 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	cis-1,3-Dichloropropene	Dibromochloromethane	Dibromomethane	Dichlorodifluoromethane	Ethyl tert-butyl ether	Ethylbenzene	Hexachlorobutadiene	Iodomethane	Isopropylbenzene	m,p-Xylenes	2-Butanone	4-Methyl-2-pentanone	Methyl tert-butyl ether	Methylene chloride	n-Butylbenzene	n-Propylbenzene	p-Cymene	o-Xylene	Tetrachloroethene	sec-Butylbenzene	Styrene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE**	**11**	**67**	**94**	**NE**	**400**	**3.4**	**NE**	**92**	**NE**	**23000**	**5300**	**320**	**93**	**240**	**240**	**NE**	**NE**	**5.1**	**220**	**1500**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**26**	**230**	**310**	**NE**	**400**	**180**	**NE**	**92**	**NE**	**34000**	**17000**	**710**	**210**	**240**	**240**	**NE**	**NE**	**13**	**220**	**1500**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**120**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1.3**	**5760**	**36**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.061 U	0.03 U	0.03 U	0.061 U	NA	0.03 U	NA	0.12 U	0.12 U	0.061 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.033 U	0.033 U	0.033 U	0.066 U	0.033 U	0.033 U	0.035 U	NA	0.033 U	NA	0.13 U	0.13 U	0.066 U	0.33 U	0.033 U	0.033 U	0.033 U	NA	0.039 U	0.033 U	0.033 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.023 U	0.023 U	0.023 U	0.045 U	0.023 U	0.023 U	0.032 U	NA	0.023 U	NA	0.09 U	0.09 U	0.045 U	0.23 U	0.023 U	0.023 U	0.023 U	NA	0.027 U	0.023 U	0.023 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.027 U	0.033 U	NA	0.027 U	NA	0.11 U	0.11 U	0.053 U	0.27 U	0.027 U	0.027 U	0.027 U	NA	0.032 U	0.027 U	0.027 U
2D	GS-2D5-050416	5	5/4/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.062 U	NA	0.031 U	NA	0.12 U	0.12 U	0.062 U	0.31 U	0.031 U	0.031 U	0.031 U	NA	0.037 U	0.031 U	0.031 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.024 U	0.024 U	0.024 U	0.048 U	0.024 U	0.024 U	0.033 U	NA	0.024 U	NA	0.095 U	0.095 U	0.048 U	0.24 U	0.024 U	0.024 U	0.024 U	NA	0.029 U	0.024 U	0.024 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.023 U	0.023 U	0.023 U	0.045 U	0.023 U	0.023 U	0.032 U	NA	0.023 U	NA	0.09 U	0.09 U	0.045 U	0.23 U	0.023 U	0.023 U	0.023 U	NA	0.027 U	0.023 U	0.023 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.028 U	0.033 U	NA	0.028 U	NA	0.11 U	0.11 U	0.056 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.034 U	0.028 U	0.028 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.036 U	NA	0.028 U	NA	0.11 U	0.11 U	0.057 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.034 U	0.028 U	0.028 U
3D	GS-3D5-051016	5	5/10/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.057 U	NA	0.028 U	NA	0.11 U	0.11 U	0.057 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.034 U	0.028 U	0.028 U
3D	GS-FD02-051016	5	5/10/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.06 U	NA	0.03 U	NA	0.12 U	0.12 U	0.06 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.035 U	NA	0.031 U	NA	0.12 U	0.12 U	0.062 U	0.31 U	0.031 U	0.031 U	0.031 U	NA	0.037 U	0.031 U	0.031 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.033 U	NA	0.025 U	NA	0.1 U	0.1 U	0.05 U	0.25 U	0.025 U	0.025 U	0.025 U	NA	0.03 U	0.025 U	0.025 U
3D	GS-3D55-051016	55	5/10/2016	mg/kg	0.033 U	0.033 U	0.033 U	0.065 U	0.033 U	0.033 U	0.037 U	NA	0.033 U	NA	0.13 U	0.13 U	0.065 U	0.33 U	0.033 U	0.033 U	0.033 U	NA	0.039 U	0.033 U	0.033 U
3D	GS-3D75-051016	75	5/10/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.027 U	0.053 U	NA	0.027 U	NA	0.11 U	0.11 U	0.053 U	0.27 U	0.027 U	0.027 U	0.027 U	NA	0.032 U	0.027 U	0.027 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.034 U	0.034 U	0.034 U	0.069 U	0.034 U	0.034 U	0.039 U	NA	0.034 U	NA	0.14 U	0.14 U	0.069 U	0.34 U	0.034 U	0.034 U	0.034 U	NA	0.041 U	0.034 U	0.034 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.051 U	0.025 U	0.025 U	0.033 U	NA	0.025 U	NA	**0.343 J**	0.1 U	0.051 U	0.25 U	0.025 U	0.025 U	0.025 U	NA	0.031 U	0.025 U	0.025 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.027 U	0.034 U	NA	0.027 U	NA	**0.301 J**	0.11 U	0.054 U	0.27 U	0.027 U	0.027 U	0.027 U	NA	0.032 U	0.027 U	0.027 U
4D	GS-4D70-051316	70	5/13/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.055 U	NA	0.028 U	NA	0.11 U	0.11 U	0.055 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.033 U	0.028 U	0.028 U
4D	GS-FD04-051316	70	5/13/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.058 U	NA	0.029 U	NA	**0.432 J**	0.12 U	0.058 U	0.29 U	0.029 U	0.029 U	0.029 U	NA	0.035 U	0.029 U	0.029 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.032 U	0.032 U	0.032 U	0.065 U	0.032 U	0.032 U	0.065 U	NA	0.032 U	NA	**0.334 J**	0.13 U	0.065 U	0.32 U	0.032 U	0.032 U	0.032 U	NA	0.039 U	0.032 U	0.032 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.033 U	NA	0.026 U	NA	0.11 U	0.11 U	0.053 U	0.26 U	0.026 U	0.026 U	0.026 U	NA	0.032 U	0.026 U	0.026 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.034 U	NA	0.025 U	NA	**0.196 J**	0.1 U	0.05 U	0.25 U	0.025 U	0.025 U	0.025 U	NA	0.03 U	0.025 U	0.025 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.027 U	0.034 U	NA	0.027 U	NA	0.11 U	0.11 U	0.054 U	0.27 U	0.027 U	0.027 U	0.027 U	NA	0.032 U	0.027 U	0.027 U
5D	GS-5D65-051716	65	5/17/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.053 U	NA	0.026 U	NA	**0.321 J**	0.11 U	0.053 U	0.26 U	0.026 U	0.026 U	0.026 U	NA	0.032 U	0.026 U	0.026 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.06 U	NA	0.03 U	NA	**0.148 J**	0.12 U	0.06 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
6D	GS-6D10-051316	10	5/13/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.06 U	NA	0.03 U	NA	0.12 U	0.12 U	0.06 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.053 U	0.027 U	0.027 U	0.033 U	NA	0.027 U	NA	0.11 U	0.11 U	0.053 U	0.27 U	0.027 U	0.027 U	0.027 U	NA	0.032 U	0.027 U	0.027 U
6D	GS-6D30-051616	30	5/16/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.058 U	NA	0.029 U	NA	0.12 U	0.12 U	0.058 U	0.29 U	0.029 U	0.029 U	0.029 U	NA	0.035 U	0.029 U	0.029 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.034 U	NA	0.028 U	NA	0.11 U	0.11 U	0.055 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.033 U	0.028 U	0.028 U
6D	GS-6D70-051616	70	5/16/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.059 U	NA	0.03 U	NA	**0.541 J**	0.12 U	0.059 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.035 U	0.03 U	0.03 U
7D	GS-7D05-052016	5	5/20/2016	mg/kg	0.034 U	0.034 U	0.034 U	0.068 U	0.034 U	0.034 U	0.068 U	NA	0.034 U	NA	0.14 U	0.14 U	0.068 U	0.34 U	0.034 U	0.034 U	0.034 U	NA	0.041 U	0.034 U	0.034 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	32 U	32 U	32 U	63 U	32 U	32 U	1.9 U	NA	32 U	NA	130 U	130 U	63 U	320 U	32 U	32 U	32 U	NA	38 U	32 U	32 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.033 U	NA	0.028 U	NA	0.11 U	0.11 U	0.055 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.033 U	0.028 U	0.028 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.033 U	NA	0.03 U	NA	0.12 U	0.12 U	0.059 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.055 U	0.027 U	0.027 U	0.035 U	NA	0.027 U	NA	0.11 U	0.11 U	0.055 U	0.27 U	0.027 U	0.027 U	0.027 U	NA	0.033 U	0.027 U	0.027 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.063 U	0.031 U	0.031 U	0.035 U	NA	0.031 U	NA	0.13 U	0.13 U	0.063 U	0.31 U	0.031 U	0.031 U	0.031 U	NA	0.038 U	0.031 U	0.031 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	cis-1,3-Dichloropropene	Dibromochloromethane	Dibromomethane	Dichlorodifluoromethane	Ethyl tert-butyl ether	Ethylbenzene	Hexachlorobutadiene	Iodomethane	Isopropylbenzene	m,p-Xylenes	2-Butanone	4-Methyl-2-pentanone	Methyl tert-butyl ether	Methylene chloride	n-Butylbenzene	n-Propylbenzene	p-Cymene	o-Xylene	Tetrachloroethene	sec-Butylbenzene	Styrene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE**	**11**	**67**	**94**	**NE**	**400**	**3.4**	**NE**	**92**	**NE**	**23000**	**5300**	**320**	**93**	**240**	**240**	**NE**	**NE**	**5.1**	**220**	**1500**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**26**	**230**	**310**	**NE**	**400**	**180**	**NE**	**92**	**NE**	**34000**	**17000**	**710**	**210**	**240**	**240**	**NE**	**NE**	**13**	**220**	**1500**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**120**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1.3**	**5760**	**36**
8D	GS-8D05-051916	5	5/19/2016	mg/kg	35 U	35 U	35 U	70 U	35 U	**40 J**	70 U	NA	35 U	NA	140 U	140 U	70 U	350 U	35 U	35 U	35 U	NA	42 U	35 U	35 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	3.1 U	3.1 U	3.1 U	6.2 U	3.1 U	**3.74 J**	0.15 U	NA	3.1 U	NA	12 U	12 U	6.2 U	31 U	3.1 U	3.1 U	3.1 U	NA	3.7 U	3.1 U	3.1 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	6.2 U	6.2 U	6.2 U	12 U	6.2 U	6.2 U	0.6 U	NA	6.2 U	NA	25 U	25 U	12 U	62 U	6.2 U	6.2 U	6.2 U	NA	7.5 U	6.2 U	6.2 U
8D	GS-8D20-051916	20	5/19/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.058 U	NA	0.029 U	NA	0.12 U	0.12 U	0.058 U	0.29 U	0.029 U	0.029 U	0.029 U	NA	0.035 U	0.029 U	0.029 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	2.7 U	2.7 U	2.7 U	5.5 U	2.7 U	2.7 U	0.34 U	NA	2.7 U	NA	11 U	11 U	5.5 U	27 U	2.7 U	2.7 U	2.7 U	NA	3.3 U	2.7 U	2.7 U
8D	GS-8D70-051916	70	5/19/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.062 U	NA	0.031 U	NA	0.12 U	0.12 U	0.062 U	0.31 U	0.031 U	0.031 U	0.031 U	NA	0.037 U	0.031 U	0.031 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.028 U	0.056 U	NA	0.028 U	NA	0.11 U	0.11 U	0.056 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.034 U	0.028 U	0.028 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.033 U	0.033 U	0.033 U	0.065 U	0.033 U	0.033 U	0.036 U	NA	0.033 U	NA	0.13 U	0.13 U	0.065 U	0.33 U	0.033 U	0.033 U	0.033 U	NA	0.039 U	0.033 U	0.033 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.056 U	0.028 U	0.028 U	0.034 U	NA	0.028 U	NA	0.11 U	0.11 U	0.056 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.034 U	0.028 U	0.028 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.054 U	0.027 U	0.027 U	0.037 U	NA	0.027 U	NA	0.11 U	0.11 U	0.054 U	0.27 U	0.027 U	0.027 U	0.027 U	NA	0.032 U	0.027 U	0.027 U
10S	GS-10S15-050916	15	5/9/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.059 U	NA	0.03 U	NA	0.12 U	0.12 U	0.059 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.057 U	0.029 U	0.029 U	0.034 U	NA	0.029 U	NA	0.11 U	0.11 U	0.057 U	0.29 U	0.029 U	0.029 U	0.029 U	NA	0.034 U	0.029 U	0.029 U
10S	GS-10S30-050916	30	5/9/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.06 U	NA	0.03 U	NA	0.12 U	0.12 U	0.06 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
11S	GS-11S5-051216	5	5/12/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.055 U	0.028 U	0.028 U	0.055 U	NA	0.028 U	NA	0.11 U	0.11 U	0.055 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.033 U	0.028 U	0.028 U
11S	GS-11S8-051216	8	5/12/2016	mg/kg	2.3 U	2.3 U	2.3 U	4.5 U	2.3 U	2.3 U	4.5 U	NA	2.3 U	NA	9 U	9 U	4.5 U	23 U	2.3 U	2.3 U	2.3 U	NA	2.7 U	2.3 U	2.3 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.036 U	NA	0.031 U	NA	0.12 U	0.12 U	0.062 U	0.31 U	0.031 U	0.031 U	0.031 U	NA	0.037 U	0.031 U	0.031 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.059 U	0.03 U	0.03 U	0.037 U	NA	0.03 U	NA	0.12 U	0.12 U	0.059 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.035 U	0.03 U	0.03 U
11S	GS-11S20-051216	20	5/12/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.051 U	0.026 U	0.026 U	0.033 U	NA	0.026 U	NA	0.1 U	0.1 U	0.051 U	0.26 U	0.026 U	0.026 U	0.026 U	NA	0.031 U	0.026 U	0.026 U
12S	GS-12S03-052316	3	5/23/2016	mg/kg	0.034 U	0.034 U	0.034 U	0.067 U	0.034 U	0.034 U	0.067 U	NA	0.034 U	NA	0.13 U	0.13 U	0.067 U	0.34 U	0.034 U	0.034 U	0.034 U	NA	0.04 U	0.034 U	0.034 U
14S	GS-14S03-052316	3	5/23/2016	mg/kg	0.032 U	0.032 U	0.032 U	0.064 U	0.032 U	0.032 U	0.064 U	NA	0.032 U	NA	0.13 U	0.13 U	0.064 U	0.32 U	0.032 U	0.032 U	0.032 U	NA	0.039 U	0.032 U	0.032 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.033 U	NA	0.025 U	NA	0.1 U	0.1 U	0.05 U	0.25 U	0.025 U	0.025 U	0.025 U	NA	0.03 U	0.025 U	0.025 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.051 U	0.025 U	0.025 U	0.033 U	NA	0.025 U	NA	0.1 U	0.1 U	0.051 U	0.25 U	0.025 U	0.025 U	0.025 U	NA	0.03 U	0.025 U	0.025 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.05 U	0.025 U	0.025 U	0.034 U	NA	0.025 U	NA	0.1 U	0.1 U	0.05 U	0.25 U	0.025 U	0.025 U	0.025 U	NA	0.03 U	0.025 U	0.025 U
15S	GS-15S5-051716	5	5/17/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.053 U	0.026 U	0.026 U	0.053 U	NA	0.026 U	NA	0.11 U	0.11 U	0.053 U	0.26 U	0.026 U	0.026 U	0.026 U	NA	0.032 U	0.026 U	0.026 U
15S	GS-15S15-051716	15	5/17/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.059 U	0.029 U	0.029 U	0.059 U	NA	0.029 U	NA	0.12 U	0.12 U	0.059 U	0.29 U	0.029 U	0.029 U	0.029 U	NA	0.035 U	0.029 U	0.029 U
15S	GS-15S30-051716	30	5/17/2016	mg/kg	0.025 U	0.025 U	0.025 U	0.049 U	0.025 U	0.025 U	0.049 U	NA	0.025 U	NA	0.099 U	0.099 U	0.049 U	0.25 U	0.025 U	0.025 U	0.025 U	NA	0.03 U	0.025 U	0.025 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.06 U	NA	0.03 U	NA	0.12 U	0.12 U	0.06 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.034 U	0.034 U	0.034 U	0.068 U	0.034 U	0.034 U	0.039 U	NA	0.034 U	NA	0.14 U	0.14 U	0.068 U	0.34 U	0.034 U	0.034 U	0.034 U	NA	0.041 U	0.034 U	0.034 U
16S	GS-16S30-0510216	30	5/12/2016	mg/kg	0.027 U	0.027 U	0.027 U	0.055 U	0.027 U	0.027 U	0.055 U	NA	0.027 U	NA	0.11 U	0.11 U	0.055 U	0.27 U	0.027 U	0.027 U	0.027 U	NA	0.033 U	0.027 U	0.027 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.062 U	NA	0.031 U	NA	0.12 U	0.12 U	0.062 U	0.31 U	0.031 U	0.031 U	0.031 U	NA	0.037 U	0.031 U	0.031 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	1.6 U	1.6 U	1.6 U	3.2 U	1.6 U	1.6 U	1.1 U	NA	1.6 U	NA	6.4 U	6.4 U	3.2 U	16 U	1.6 U	1.6 U	1.6 U	NA	1.9 U	1.6 U	1.6 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	0.031 U	0.031 U	0.031 U	0.062 U	0.031 U	0.031 U	0.034 U	NA	0.031 U	NA	0.12 U	0.12 U	0.062 U	0.31 U	0.031 U	0.031 U	0.031 U	NA	0.037 U	0.031 U	0.031 U
18S	GS-18S3-051216	3	5/12/2016	mg/kg	0.029 U	0.029 U	0.029 U	0.058 U	0.029 U	0.029 U	0.058 U	NA	0.029 U	NA	0.12 U	0.12 U	0.058 U	0.29 U	0.029 U	0.029 U	0.029 U	NA	0.035 U	0.029 U	0.029 U
19S	GS-19S05-051616	5	5/16/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.06 U	NA	0.03 U	NA	0.12 U	0.12 U	0.06 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	5.7 U	5.7 U	5.7 U	11 U	5.7 U	5.7 U	1.8 U	NA	5.7 U	NA	23 U	23 U	11 U	57 U	5.7 U	5.7 U	5.7 U	NA	6.8 U	5.7 U	5.7 U
19S	GS-19S17-051716	17	5/17/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.06 U	NA	0.03 U	NA	0.12 U	0.12 U	0.06 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	**0.0485 J**	0.03 U
20S	GS-20S05-052316	5	5/23/2016	mg/kg	0.028 U	0.028 U	0.028 U	0.057 U	0.028 U	0.028 U	0.057 U	NA	0.028 U	NA	0.11 U	0.11 U	0.057 U	0.28 U	0.028 U	0.028 U	0.028 U	NA	0.034 U	0.028 U	0.028 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.038 U	NA	0.03 U	NA	0.12 U	0.12 U	0.06 U	0.3 U	0.03 U	0.03 U	0.03 U	NA	0.036 U	0.03 U	0.03 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.026 U	0.026 U	0.026 U	0.052 U	0.026 U	0.026 U	0.033 U	NA	0.026 U	NA	0.1 U	0.1 U	0.052 U	0.26 U	0.026 U	0.026 U	0.026 U	NA	0.031 U	0.026 U	0.026 U
21D	GS-21D10-110316	10	11/3/2016	mg/kg	0.016 U	0.01 U	0.02 U	0.021 U	NA	0.0097 U	0.013 U	0.014 U	0.013 U	0.011 U	0.15 U	0.063 U	0.019 U	0.057 U	0.011 U	0.013 U	0.0098 U	0.013 U	0.012 U	0.0078 U	0.0061 U
21D	GS-21D20-110316	20	11/3/2016	mg/kg	0.018 U	0.011 U	0.022 U	0.023 U	NA	0.011 U	0.014 U	0.016 U	0.014 U	0.013 U	0.17 U	0.069 U	0.02 U	0.063 U	0.012 U	0.014 U	0.011 U	0.015 U	0.013 U	0.0085 U	0.0067 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	cis-1,3-Dichloropropene	Dibromochloromethane	Dibromomethane	Dichlorodifluoromethane	Ethyl tert-butyl ether	Ethylbenzene	Hexachlorobutadiene	Iodomethane	Isopropylbenzene	m,p-Xylenes	2-Butanone	4-Methyl-2-pentanone	Methyl tert-butyl ether	Methylene chloride	n-Butylbenzene	n-Propylbenzene	p-Cymene	o-Xylene	Tetrachloroethene	sec-Butylbenzene	Styrene
Residential Soil Remediation Level[3,4]				**mg/kg**	**NE**	**11**	**67**	**94**	**NE**	**400**	**3.4**	**NE**	**92**	**NE**	**23000**	**5300**	**320**	**93**	**240**	**240**	**NE**	**NE**	**5.1**	**220**	**1500**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**NE**	**26**	**230**	**310**	**NE**	**400**	**180**	**NE**	**92**	**NE**	**34000**	**17000**	**710**	**210**	**240**	**240**	**NE**	**NE**	**13**	**220**	**1500**
Groundwater Protection Level[6]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**120**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1.3**	**5760**	**36**
21D	GS-21D30-110316	30	11/3/2016	mg/kg	0.016 U	0.01 U	0.02 U	0.021 U	NA	0.0097 U	0.013 U	0.014 U	0.013 U	0.011 U	0.15 U	0.063 U	0.019 U	0.058 U	0.011 U	0.013 U	0.0098 U	0.013 U	0.012 U	0.0078 U	0.0061 U
21D	GS-21D40-110316	40	11/3/2016	mg/kg	0.016 U	0.01 U	0.02 U	0.02 U	NA	0.0094 U	0.013 U	0.014 U	0.013 U	0.011 U	0.15 U	0.061 U	0.018 U	0.056 U	0.011 U	0.012 U	0.0095 U	0.013 U	0.012 U	0.0076 U	0.006 U
21D	GS-FD02-110316	40	11/3/2016	mg/kg	0.014 U	0.0086 U	0.017 U	0.018 U	NA	0.0081 U	0.011 U	0.012 U	0.011 U	0.0096 U	0.13 U	0.053 U	0.016 U	0.048 U	0.0091 U	0.011 U	0.0082 U	0.011 U	0.01 U	0.0066 U	0.0051 U
21D	GS-21D50-110416	50	11/4/2016	mg/kg	0.016 U	0.01 U	0.02 U	0.021 U	NA	0.0095 U	0.013 U	0.014 U	0.013 U	0.011 U	0.15 U	0.062 U	0.018 U	0.057 U	0.011 U	0.012 U	0.0096 U	0.013 U	0.012 U	0.0077 U	0.006 U
21D	GS-21D60-110416	60	11/4/2016	mg/kg	0.015 U	0.0094 U	0.018 U	0.019 U	NA	0.0089 U	0.012 U	0.013 U	0.012 U	0.011 U	0.14 U	0.058 U	0.017 U	0.053 U	0.0099 U	0.012 U	0.009 U	0.012 U	0.011 U	0.0072 U	0.0056 U
22D	GS-22D15-110416	15	11/4/2016	mg/kg	0.017 U	0.01 U	0.02 U	0.021 U	NA	0.0099 U	0.013 U	0.015 U	0.013 U	0.012 U	0.16 U	0.064 U	0.019 U	0.059 U	0.011 U	0.013 U	0.01 U	0.014 U	0.012 U	0.008 U	0.0062 U
22D	GS-22D25-110416	25	11/4/2016	mg/kg	0.014 U	0.0089 U	0.017 U	0.018 U	NA	0.0085 U	0.011 U	0.012 U	0.011 U	0.01 U	0.13 U	0.055 U	0.016 U	0.05 U	0.0094 U	0.011 U	0.0085 U	0.012 U	0.01 U	0.0068 U	0.0053 U
22D	GS-22D35-110416	35	11/4/2016	mg/kg	0.016 U	0.0099 U	0.019 U	0.02 U	NA	0.0094 U	0.012 U	0.014 U	0.013 U	0.011 U	0.15 U	0.061 U	0.018 U	0.056 U	0.01 U	0.012 U	0.0095 U	0.013 U	0.012 U	0.0076 U	0.0059 U
22D	GS-22D45-110416	45	11/4/2016	mg/kg	0.015 U	0.0097 U	0.019 U	0.02 U	NA	0.0092 U	0.012 U	0.014 U	0.012 U	0.011 U	0.14 U	0.059 U	0.018 U	0.054 U	0.01 U	0.012 U	0.0092 U	0.013 U	0.011 U	0.0074 U	0.0058 U
22D	GS-FD03-110416	45	11/4/2016	mg/kg	0.018 U	0.011 U	0.022 U	0.023 U	NA	0.011 U	0.014 U	0.016 U	0.014 U	0.013 U	0.17 U	0.069 U	0.021 U	0.064 U	0.012 U	0.014 U	0.011 U	0.015 U	0.013 U	0.0086 U	0.0068 U
22D	GS-22D55-110416	55	11/4/2016	mg/kg	0.016 U	0.01 U	0.02 U	0.021 U	NA	0.0097 U	0.013 U	0.014 U	0.013 U	0.011 U	0.15 U	0.062 U	0.019 U	0.057 U	0.011 U	0.012 U	0.0097 U	0.013 U	0.012 U	0.0078 U	0.0061 U
23D	GS-23D10-110416	10	11/4/2016	mg/kg	0.014 U	0.0089 U	0.018 U	0.018 U	NA	0.0085 U	0.011 U	0.013 U	0.011 U	0.01 U	0.13 U	0.055 U	0.016 U	0.05 U	0.0094 U	0.011 U	0.0085 U	0.012 U	0.01 U	0.0068 U	0.0053 U
23D	GS-23D20-110416	20	11/4/2016	mg/kg	0.017 U	0.011 U	0.021 U	0.022 U	NA	0.01 U	0.013 U	0.015 U	0.014 U	0.012 U	0.16 U	0.065 U	0.019 U	0.06 U	0.011 U	0.013 U	0.01 U	0.014 U	0.012 U	0.0081 U	0.0064 U
23D	GS-23D30-110416	30	11/4/2016	mg/kg	0.014 U	0.0088 U	0.017 U	0.018 U	NA	0.0084 U	0.011 U	0.012 U	0.011 U	0.0099 U	0.13 U	0.054 U	0.016 U	0.05 U	0.0093 U	0.011 U	0.0084 U	0.011 U	0.01 U	0.0067 U	0.0053 U
23D	GS-23D40-110416	40	11/4/2016	mg/kg	0.015 U	0.0095 U	0.019 U	0.019 U	NA	0.009 U	0.012 U	0.013 U	0.012 U	0.011 U	0.14 U	0.058 U	0.017 U	0.053 U	0.01 U	0.012 U	0.0091 U	0.012 U	0.011 U	0.0072 U	0.0057 U
GW1	GS-GW1010-110116	10	11/1/2016	mg/kg	0.015 U	0.0092 U	0.018 U	0.019 U	NA	0.0087 U	0.012 U	0.013 U	0.012 U	0.01 U	0.14 U	0.056 U	0.017 U	0.052 U	0.0097 U	0.011 U	0.0088 U	0.012 U	0.011 U	0.007 U	0.0055 U
GW1	GS-GW1020-110116	20	11/1/2016	mg/kg	0.018 U	0.011 U	0.022 U	0.023 U	NA	0.011 U	0.014 U	0.016 U	0.014 U	0.012 U	0.17 U	0.068 U	0.02 U	0.062 U	0.012 U	0.014 U	0.011 U	0.014 U	0.013 U	0.0085 U	0.0066 U
GW1	GS-GW1030-110116	30	11/1/2016	mg/kg	0.017 U	0.011 U	0.021 U	0.022 U	NA	0.01 U	0.014 U	0.015 U	0.014 U	0.012 U	0.16 U	0.066 U	0.02 U	0.061 U	0.011 U	0.013 U	0.01 U	0.014 U	0.013 U	0.0082 U	0.0065 U
GW1	GS-GW1040-110116	40	11/1/2016	mg/kg	0.016 U	0.01 U	0.019 U	0.02 U	NA	0.0094 U	0.012 U	0.014 U	0.013 U	0.011 U	0.15 U	0.061 U	0.018 U	0.056 U	0.01 U	0.012 U	0.0095 U	0.013 U	0.012 U	0.0076 U	0.0059 U
GW1	GS-GW1050-110116	50	11/1/2016	mg/kg	0.016 U	0.01 U	0.02 U	0.021 U	NA	0.0097 U	0.013 U	0.014 U	0.013 U	0.011 U	0.15 U	0.063 U	0.019 U	0.058 U	0.011 U	0.013 U	0.0098 U	0.013 U	0.012 U	0.0078 U	0.0061 U
GW1	GS-GW1060-110116	60	11/1/2016	mg/kg	0.014 U	0.0088 U	0.017 U	0.018 U	NA	0.0083 U	0.011 U	0.012 U	0.011 U	0.0099 U	0.13 U	0.054 U	0.016 U	0.049 U	0.0093 U	0.011 U	0.0084 U	0.011 U	0.01 U	0.0067 U	0.0053 U
GW1	GS-GW1070-110116	70	11/1/2016	mg/kg	0.014 U	0.0091 U	0.018 U	0.019 U	NA	0.0087 U	0.011 U	0.013 U	0.012 U	0.01 U	0.14 U	0.056 U	0.017 U	0.051 U	0.0096 U	0.011 U	0.0087 U	0.012 U	0.011 U	0.007 U	0.0055 U
GW1	GS-GW1080-110116	80	11/1/2016	mg/kg	0.015 U	0.0092 U	0.018 U	0.019 U	NA	0.0087 U	0.012 U	0.013 U	0.012 U	0.01 U	0.14 U	0.057 U	0.017 U	0.052 U	0.0097 U	0.011 U	0.0088 U	0.012 U	0.011 U	0.007 U	0.0055 U
GW1	GS-GW1090-110116	90	11/1/2016	mg/kg	0.017 U	0.01 U	0.02 U	0.021 U	NA	0.0099 U	0.013 U	0.015 U	0.013 U	0.012 U	0.16 U	0.064 U	0.019 U	0.059 U	0.011 U	0.013 U	0.0099 U	0.013 U	0.012 U	0.0079 U	0.0062 U
GW1	GS-GW1100-110216	100	11/2/2016	mg/kg	0.016 U	0.01 U	0.02 U	0.021 U	NA	0.0098 U	0.013 U	0.014 U	0.013 U	0.012 U	0.15 U	0.063 U	0.019 U	0.058 U	0.011 U	0.013 U	0.0098 U	0.013 U	0.012 U	0.0079 U	0.0062 U
GW1	GS-GW1110-110216	110	11/2/2016	mg/kg	0.014 U	0.0086 U	0.017 U	0.018 U	NA	0.0081 U	0.011 U	0.012 U	0.011 U	0.0096 U	0.13 U	0.053 U	0.016 U	0.048 U	0.0091 U	0.011 U	0.0082 U	0.011 U	0.01 U	0.0065 U	0.0051 U
GW1	GS-FD01-110216	110	11/2/2016	mg/kg	0.015 U	0.0096 U	0.019 U	0.02 U	NA	0.0091 U	0.012 U	0.013 U	0.012 U	0.011 U	0.14 U	0.059 U	0.018 U	0.054 U	0.01 U	0.012 U	0.0091 U	0.012 U	0.011 U	0.0073 U	0.0057 U
GW1	GS-GW1120-110216	120	11/2/2016	mg/kg	0.013 U	0.0085 U	0.017 U	0.017 U	NA	0.008 U	0.011 U	0.012 U	0.011 U	0.0095 U	0.13 U	0.052 U	0.015 U	0.048 U	0.0089 U	0.01 U	0.0081 U	0.011 U	0.0099 U	0.0065 U	0.0051 U
GW1	GS-GW1130-110216	130	11/2/2016	mg/kg	0.015 U	0.0095 U	0.019 U	0.019 U	NA	0.009 U	0.012 U	0.013 U	0.012 U	0.011 U	0.14 U	0.058 U	0.017 U	0.053 U	0.01 U	0.012 U	0.0091 U	0.012 U	0.011 U	0.0072 U	0.0057 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Trichloroethene	tert-Butyl alcohol	tert-Butylbenzene	Toluene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	Trichlorofluoromethane	Vinyl Acetate	Vinyl chloride	Total Xylene
Residential Soil Remediation Level[3,4]				**mg/kg**	**30**	**NE**	**390**	**650**	**69**	**NE**	**390**	**430**	**0.085**	**270**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**65**	**NE**	**390**	**650**	**230**	**NE**	**1300**	**1400**	**0.75**	**420**
Groundwater Protection Level[6]				**mg/kg**	**0.61**	**NE**	**NE**	**1.31E+05**	**8.4**	**NE**	**NE**	**NE**	**NE**	**>1E+06**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.03 U	0.61 U	0.03 U	0.03 U	0.03 U	0.03 U	0.061 U	NA	0.061 U	0.061 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.033 U	0.66 U	0.033 U	0.033 U	0.033 U	0.033 U	0.066 U	NA	0.066 U	0.066 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.023 U	0.45 U	0.023 U	0.023 U	0.023 U	0.023 U	0.045 U	NA	0.045 U	0.045 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.027 U	0.53 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	NA	0.053 U	0.053 U
2D	GS-2D5-050416	5	5/4/2016	mg/kg	0.031 U	0.62 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	NA	0.062 U	0.062 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.024 U	0.48 U	0.024 U	0.024 U	0.024 U	0.024 U	0.048 U	NA	0.048 U	0.048 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.023 U	0.45 U	0.023 U	0.023 U	0.023 U	0.023 U	0.045 U	NA	0.045 U	0.045 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.028 U	0.56 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	NA	0.056 U	0.056 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.028 U	0.57 U	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	NA	0.057 U	0.057 U
3D	GS-3D5-051016	5	5/10/2016	mg/kg	0.028 U	0.57 U	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	NA	0.057 U	0.057 U
3D	GS-FD02-051016	5	5/10/2016	mg/kg	0.03 U	0.6 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	NA	0.06 U	0.06 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	0.031 U	0.62 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	NA	0.062 U	0.062 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.025 U	0.5 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	NA	0.05 U	0.05 U
3D	GS-3D55-051016	55	5/10/2016	mg/kg	0.033 U	0.65 U	0.033 U	0.033 U	0.033 U	0.033 U	0.065 U	NA	0.065 U	0.065 U
3D	GS-3D75-051016	75	5/10/2016	mg/kg	0.027 U	0.53 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	NA	0.053 U	0.053 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.034 U	0.69 U	0.034 U	0.034 U	0.034 U	0.034 U	0.069 U	NA	0.069 U	0.069 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.025 U	0.51 U	0.025 U	0.025 U	0.025 U	0.025 U	0.051 U	NA	0.051 U	0.051 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.027 U	0.54 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	NA	0.054 U	0.054 U
4D	GS-4D70-051316	70	5/13/2016	mg/kg	0.028 U	0.55 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	NA	0.055 U	0.055 U
4D	GS-FD04-051316	70	5/13/2016	mg/kg	0.029 U	0.58 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	NA	0.058 U	0.058 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.032 U	0.65 U	0.032 U	0.032 U	0.032 U	0.032 U	0.065 U	NA	0.065 U	0.065 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.026 U	0.53 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	NA	0.053 U	0.053 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.025 U	0.5 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	NA	0.05 U	0.05 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	0.027 U	0.54 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	NA	0.054 U	0.054 U
5D	GS-5D65-051716	65	5/17/2016	mg/kg	0.026 U	0.53 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	NA	0.053 U	0.053 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.03 U	0.6 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	NA	0.06 U	0.06 U
6D	GS-6D10-051316	10	5/13/2016	mg/kg	0.03 U	0.6 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	NA	0.06 U	0.06 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.027 U	0.53 U	0.027 U	0.027 U	0.027 U	0.027 U	0.053 U	NA	0.053 U	0.053 U
6D	GS-6D30-051616	30	5/16/2016	mg/kg	0.029 U	0.58 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	NA	0.058 U	0.058 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	0.028 U	0.55 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	NA	0.055 U	0.055 U
6D	GS-6D70-051616	70	5/16/2016	mg/kg	0.03 U	0.59 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	NA	0.059 U	0.059 U
7D	GS-7D05-052016	5	5/20/2016	mg/kg	0.034 U	0.68 U	0.034 U	0.034 U	0.034 U	0.034 U	0.068 U	NA	0.068 U	0.068 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	32 U	630 U	32 U	32 U	32 U	32 U	63 U	NA	63 U	63 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	0.028 U	0.55 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	NA	0.055 U	0.055 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	0.03 U	0.59 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	NA	0.059 U	0.059 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.027 U	0.55 U	0.027 U	0.027 U	0.027 U	0.027 U	0.055 U	NA	0.055 U	0.055 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	0.031 U	0.63 U	0.031 U	0.031 U	0.031 U	0.031 U	0.063 U	NA	0.063 U	0.063 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Trichloroethene	tert-Butyl alcohol	tert-Butylbenzene	Toluene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	Trichlorofluoromethane	Vinyl Acetate	Vinyl chloride	Total Xylene
Residential Soil Remediation Level[3,4]				**mg/kg**	**30**	**NE**	**390**	**650**	**69**	**NE**	**390**	**430**	**0.085**	**270**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**65**	**NE**	**390**	**650**	**230**	**NE**	**1300**	**1400**	**0.75**	**420**
Groundwater Protection Level[6]				**mg/kg**	**0.61**	**NE**	**NE**	**1.31E+05**	**8.4**	**NE**	**NE**	**NE**	**NE**	**>1E+06**
8D	GS-8D05-051916	5	5/19/2016	mg/kg	35 U	700 U	35 U	**36.2 J**	35 U	35 U	70 U	NA	70 U	70 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	3.1 U	62 U	3.1 U	3.1 U	3.1 U	3.1 U	6.2 U	NA	6.2 U	6.2 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	6.2 U	120 U	6.2 U	6.2 U	6.2 U	6.2 U	12 U	NA	12 U	12 U
8D	GS-8D20-051916	20	5/19/2016	mg/kg	0.029 U	0.58 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	NA	0.058 U	0.058 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	2.7 U	55 U	2.7 U	2.7 U	2.7 U	2.7 U	5.5 U	NA	5.5 U	5.5 U
8D	GS-8D70-051916	70	5/19/2016	mg/kg	0.031 U	0.62 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	NA	0.062 U	0.062 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	0.028 U	0.56 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	NA	0.056 U	0.056 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.033 U	0.65 U	0.033 U	0.033 U	0.033 U	0.033 U	0.065 U	NA	0.065 U	0.065 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.028 U	0.56 U	0.028 U	0.028 U	0.028 U	0.028 U	0.056 U	NA	0.056 U	0.056 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.027 U	0.54 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	NA	0.054 U	0.054 U
10S	GS-10S15-050916	15	5/9/2016	mg/kg	0.03 U	0.59 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	NA	0.059 U	0.059 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.029 U	0.57 U	0.029 U	0.029 U	0.029 U	0.029 U	0.057 U	NA	0.057 U	0.057 U
10S	GS-10S30-050916	30	5/9/2016	mg/kg	0.03 U	0.6 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	NA	0.06 U	0.06 U
11S	GS-11S5-051216	5	5/12/2016	mg/kg	0.028 U	0.55 U	0.028 U	0.028 U	0.028 U	0.028 U	0.055 U	NA	0.055 U	0.055 U
11S	GS-11S8-051216	8	5/12/2016	mg/kg	2.3 U	45 U	2.3 U	2.3 U	2.3 U	2.3 U	4.5 U	NA	4.5 U	4.5 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	0.031 U	0.62 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	NA	0.062 U	0.062 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.03 U	0.59 U	0.03 U	0.03 U	0.03 U	0.03 U	0.059 U	NA	0.059 U	0.059 U
11S	GS-11S20-051216	20	5/12/2016	mg/kg	0.026 U	0.51 U	0.026 U	0.026 U	0.026 U	0.026 U	0.051 U	NA	0.051 U	0.051 U
12S	GS-12S03-052316	3	5/23/2016	mg/kg	0.034 U	0.67 UJ	0.034 U	0.034 U	0.034 U	0.034 U	0.067 U	NA	0.067 U	0.067 U
14S	GS-14S03-052316	3	5/23/2016	mg/kg	0.032 U	0.64 UJ	0.032 U	0.032 U	0.032 U	0.032 U	0.064 U	NA	0.064 U	0.064 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.025 U	0.5 UJ	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	NA	0.05 U	0.05 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.025 U	0.51 UJ	0.025 U	0.025 U	0.025 U	0.025 U	0.051 U	NA	0.051 U	0.051 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.025 U	0.5 UJ	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	NA	0.05 U	0.05 U
15S	GS-15S5-051716	5	5/17/2016	mg/kg	0.026 U	0.53 U	0.026 U	0.026 U	0.026 U	0.026 U	0.053 U	NA	0.053 U	0.053 U
15S	GS-15S15-051716	15	5/17/2016	mg/kg	0.029 U	0.59 U	0.029 U	0.029 U	0.029 U	0.029 U	0.059 U	NA	0.059 U	0.059 U
15S	GS-15S30-051716	30	5/17/2016	mg/kg	0.025 U	0.49 U	0.025 U	0.025 U	0.025 U	0.025 U	0.049 U	NA	0.049 U	0.049 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	0.03 U	0.6 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	NA	0.06 U	0.06 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.034 U	0.68 U	0.034 U	0.034 U	0.034 U	0.034 U	0.068 U	NA	0.068 U	0.068 U
16S	GS-16S30-0510216	30	5/12/2016	mg/kg	0.027 U	0.55 U	0.027 U	0.027 U	0.027 U	0.027 U	0.055 U	NA	0.055 U	0.055 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	0.031 U	0.62 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	NA	0.062 U	0.062 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	1.6 U	32 U	1.6 U	1.6 U	1.6 U	1.6 U	3.2 U	NA	3.2 U	3.2 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	0.031 U	0.62 U	0.031 U	0.031 U	0.031 U	0.031 U	0.062 U	NA	0.062 U	0.062 U
18S	GS-18S3-051216	3	5/12/2016	mg/kg	0.029 U	0.58 U	0.029 U	0.029 U	0.029 U	0.029 U	0.058 U	NA	0.058 U	0.058 U
19S	GS-19S05-051616	5	5/16/2016	mg/kg	0.03 U	0.6 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	NA	0.06 U	0.06 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	5.7 U	110 U	5.7 U	5.7 U	5.7 U	5.7 U	11 U	NA	11 U	11 U
19S	GS-19S17-051716	17	5/17/2016	mg/kg	0.03 U	0.6 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	NA	0.06 U	0.06 U
20S	GS-20S05-052316	5	5/23/2016	mg/kg	0.028 U	0.57 UJ	0.028 U	0.028 U	0.028 U	0.028 U	0.057 U	NA	0.057 U	0.057 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.03 U	0.6 UJ	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	NA	0.06 U	0.06 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.026 U	0.52 UJ	0.026 U	0.026 U	0.026 U	0.026 U	0.052 U	NA	0.052 U	0.052 U
21D	GS-21D10-110316	10	11/3/2016	mg/kg	0.0096 U	NA	0.0092 U	0.013 U	0.011 U	0.011 U	0.011 U	0.036 U	0.0093 U	0.025 U
21D	GS-21D20-110316	20	11/3/2016	mg/kg	0.01 U	NA	0.01 U	0.014 U	0.012 U	0.012 U	0.012 U	0.04 U	0.01 U	0.027 U

See last page for notes.

TABLE 2-5

Summary of Pre-design Testing Analytical Data for Soil, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Trichloroethene	tert-Butyl alcohol	tert-Butylbenzene	Toluene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	Trichlorofluoromethane	Vinyl Acetate	Vinyl chloride	Total Xylene
Residential Soil Remediation Level[3,4]				**mg/kg**	**30**	**NE**	**390**	**650**	**69**	**NE**	**390**	**430**	**0.085**	**270**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**65**	**NE**	**390**	**650**	**230**	**NE**	**1300**	**1400**	**0.75**	**420**
Groundwater Protection Level[6]				**mg/kg**	**0.61**	**NE**	**NE**	**1.31E+05**	**8.4**	**NE**	**NE**	**NE**	**NE**	**>1E+06**
21D	GS-21D30-110316	30	11/3/2016	mg/kg	0.0096 U	NA	0.0092 U	0.013 U	0.011 U	0.011 U	0.011 U	0.037 U	0.0093 U	0.025 U
21D	GS-21D40-110316	40	11/3/2016	mg/kg	0.0093 U	NA	0.0089 U	0.012 U	0.011 U	0.011 U	0.011 U	0.036 U	0.009 U	0.024 U
21D	GS-FD02-110316	40	11/3/2016	mg/kg	0.008 U	NA	0.0077 U	0.011 U	0.0094 U	0.0093 U	0.0093 U	0.031 U	0.0078 U	0.021 U
21D	GS-21D50-110416	50	11/4/2016	mg/kg	0.0094 U	NA	0.009 U	0.012 U	0.011 U	0.011 U	0.011 U	0.036 U	0.0091 U	0.024 U
21D	GS-21D60-110416	60	11/4/2016	mg/kg	0.0088 U	NA	0.0084 U	0.012 U	0.01 U	0.01 U	0.01 U	0.034 U	0.0085 U	0.023 U
22D	GS-22D15-110416	15	11/4/2016	mg/kg	0.0098 U	NA	0.0093 U	0.013 U	0.011 U	0.011 U	0.011 U	0.037 U	0.0095 U	0.025 U
22D	GS-22D25-110416	25	11/4/2016	mg/kg	0.0084 U	NA	0.008 U	0.011 U	0.0097 U	0.0097 U	0.0096 U	0.032 U	0.0081 U	0.022 U
22D	GS-22D35-110416	35	11/4/2016	mg/kg	0.0093 U	NA	0.0089 U	0.012 U	0.011 U	0.011 U	0.011 U	0.035 U	0.009 U	0.024 U
22D	GS-22D45-110416	45	11/4/2016	mg/kg	0.0091 U	NA	0.0087 U	0.012 U	0.011 U	0.011 U	0.01 U	0.035 U	0.0088 U	0.023 U
22D	GS-FD03-110416	45	11/4/2016	mg/kg	0.011 U	NA	0.01 U	0.014 U	0.012 U	0.012 U	0.012 U	0.04 U	0.01 U	0.027 U
22D	GS-22D55-110416	55	11/4/2016	mg/kg	0.0095 U	NA	0.0091 U	0.013 U	0.011 U	0.011 U	0.011 U	0.036 U	0.0092 U	0.025 U
23D	GS-23D10-110416	10	11/4/2016	mg/kg	0.0084 U	NA	0.008 U	0.011 U	0.0098 U	0.0097 U	0.0096 U	0.032 U	0.0081 U	0.022 U
23D	GS-23D20-110416	20	11/4/2016	mg/kg	0.01 U	NA	0.0095 U	0.013 U	0.012 U	0.012 U	0.011 U	0.038 U	0.0097 U	0.026 U
23D	GS-23D30-110416	30	11/4/2016	mg/kg	0.0083 U	NA	0.0079 U	0.011 U	0.0097 U	0.0096 U	0.0095 U	0.032 U	0.008 U	0.021 U
23D	GS-23D40-110416	40	11/4/2016	mg/kg	0.0089 U	NA	0.0085 U	0.012 U	0.01 U	0.01 U	0.01 U	0.034 U	0.0086 U	0.023 U
GW1	GS-GW1010-110116	10	11/1/2016	mg/kg	0.0086 U	NA	0.0082 U	0.011 U	0.01 U	0.0099 U	0.0099 U	0.033 U	0.0083 U	0.022 U
GW1	GS-GW1020-110116	20	11/1/2016	mg/kg	0.01 U	NA	0.0099 U	0.014 U	0.012 U	0.012 U	0.012 U	0.04 U	0.01 U	0.027 U
GW1	GS-GW1030-110116	30	11/1/2016	mg/kg	0.01 U	NA	0.0097 U	0.013 U	0.012 U	0.012 U	0.012 U	0.039 U	0.0098 U	0.026 U
GW1	GS-GW1040-110116	40	11/1/2016	mg/kg	0.0093 U	NA	0.0089 U	0.012 U	0.011 U	0.011 U	0.011 U	0.035 U	0.009 U	0.024 U
GW1	GS-GW1050-110116	50	11/1/2016	mg/kg	0.0096 U	NA	0.0092 U	0.013 U	0.011 U	0.011 U	0.011 U	0.037 U	0.0093 U	0.025 U
GW1	GS-GW1060-110116	60	11/1/2016	mg/kg	0.0082 U	NA	0.0079 U	0.011 U	0.0096 U	0.0095 U	0.0095 U	0.031 U	0.008 U	0.021 U
GW1	GS-GW1070-110116	70	11/1/2016	mg/kg	0.0085 U	NA	0.0082 U	0.011 U	0.01 U	0.0099 U	0.0098 U	0.033 U	0.0083 U	0.022 U
GW1	GS-GW1080-110116	80	11/1/2016	mg/kg	0.0086 U	NA	0.0083 U	0.011 U	0.01 U	0.01 U	0.0099 U	0.033 U	0.0084 U	0.022 U
GW1	GS-GW1090-110116	90	11/1/2016	mg/kg	0.0098 U	NA	0.0093 U	0.013 U	0.011 U	0.011 U	0.011 U	0.037 U	0.0095 U	0.025 U
GW1	GS-GW1100-110216	100	11/2/2016	mg/kg	0.0096 U	NA	0.0092 U	0.013 U	0.011 U	0.011 U	0.011 U	0.037 U	0.0094 U	0.025 U
GW1	GS-GW1110-110216	110	11/2/2016	mg/kg	0.008 U	NA	0.0077 U	0.011 U	0.0094 U	0.0093 U	0.0092 U	0.031 U	0.0078 U	0.021 U
GW1	GS-FD01-110216	110	11/2/2016	mg/kg	0.009 U	NA	0.0086 U	0.012 U	0.01 U	0.01 U	0.01 U	0.034 U	0.0087 U	0.023 U
GW1	GS-GW1120-110216	120	11/2/2016	mg/kg	0.0079 U	NA	0.0076 U	0.01 U	0.0093 U	0.0092 U	0.0091 U	0.03 U	0.0077 U	0.02 U
GW1	GS-GW1130-110216	130	11/2/2016	mg/kg	0.0089 U	NA	0.0085 U	0.012 U	0.01 U	0.01 U	0.01 U	0.034 U	0.0086 U	0.023 U

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Residential Soil Remediation Levels (SRLs) represent the lowest available residential SRL.
4. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential SRL.
5. Cells highlighted in red indicate the compound exceeded the 2007 non-residential SRL.
6. GPLs established in ADEQ (1996), except those calculated and summarized in Table 4-4.
7. NE = Not established
8. NA = Not analyzed.
9. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10,2012. These data qualifiers are included in the lab reports presented in Appendix G.
   Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   UJ = Analyte was not detected, and the specified detection limit might not be accurate or precise.
   J = Analyte is present but the reported value might not be accurate or precise (estimate).
   R = The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
10. Detected results are bolded.

TABLE 2-6

Summary of Pre-design Testing Analytical Data for Soil, BTEX and Detected Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1,2,4-Trimethylbenzene	Ethylbenzene	2-Butanone	sec-Butylbenzene	Toluene	Benzene[3]	Total Xylene
Residential Soil Remediation Level[4,5]				**mg/kg**	**52**	**400**	**23000**	**220**	**650**	**0.65**	**270**
Non-Residential Soil Remediation Level[6]				**mg/kg**	**170**	**400**	**34000**	**220**	**650**	**1.4**	**420**
Groundwater Protection Level[7]				**mg/kg**	**720**	**>1E+06**	**NE**	**5760**	**1.31E+05**	**12**	**>1E+06**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.061 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.061 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.066 U	0.033 U	0.13 U	0.033 U	0.033 U	0.033 U	0.066 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.045 U	0.023 U	0.09 U	0.023 U	0.023 U	0.023 U	0.045 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.053 U	0.027 U	0.11 U	0.027 U	0.027 U	0.027 U	0.053 U
2D	GS-2D5-050416	5	5/4/2016	mg/kg	0.062 U	0.031 U	0.12 U	0.031 U	0.031 U	0.031 U	0.062 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.048 U	0.024 U	0.095 U	0.024 U	0.024 U	0.024 U	0.048 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.045 U	0.023 U	0.09 U	0.023 U	0.023 U	0.023 U	0.045 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.056 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.056 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.057 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.057 U
3D	GS-3D5-051016	5	5/10/2016	mg/kg	0.057 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.057 U
3D	GS-FD02-051016	5	5/10/2016	mg/kg	0.06 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.06 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	0.062 U	0.031 U	0.12 U	0.031 U	0.031 U	0.031 U	0.062 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.05 U	0.025 U	0.1 U	0.025 U	0.025 U	0.025 U	0.05 U
3D	GS-3D55-051016	55	5/10/2016	mg/kg	0.065 U	0.033 U	0.13 U	0.033 U	0.033 U	0.033 U	0.065 U
3D	GS-3D75-051016	75	5/10/2016	mg/kg	0.053 U	0.027 U	0.11 U	0.027 U	0.027 U	0.027 U	0.053 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.069 U	0.034 U	0.14 U	0.034 U	0.034 U	0.034 U	0.069 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.051 U	0.025 U	**0.343 J**	0.025 U	0.025 U	0.025 U	0.051 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.054 U	0.027 U	**0.301 J**	0.027 U	0.027 U	0.027 U	0.054 U
4D	GS-4D70-051316	70	5/13/2016	mg/kg	0.055 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.055 U
4D	GS-FD04-051316	70	5/13/2016	mg/kg	0.058 U	0.029 U	**0.432 J**	0.029 U	0.029 U	0.029 U	0.058 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.065 U	0.032 U	**0.334 J**	0.032 U	0.032 U	0.032 U	0.065 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.053 U	0.026 U	0.11 U	0.026 U	0.026 U	0.026 U	0.053 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.05 U	0.025 U	**0.196 J**	0.025 U	0.025 U	0.025 U	0.05 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	0.054 U	0.027 U	0.11 U	0.027 U	0.027 U	0.027 U	0.054 U
5D	GS-5D65-051716	65	5/17/2016	mg/kg	0.053 U	0.026 U	**0.321 J**	0.026 U	0.026 U	0.026 U	0.053 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.06 U	0.03 U	**0.148 J**	0.03 U	0.03 U	0.03 U	0.06 U
6D	GS-6D10-051316	10	5/13/2016	mg/kg	0.06 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.06 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.053 U	0.027 U	0.11 U	0.027 U	0.027 U	0.027 U	0.053 U
6D	GS-6D30-051616	30	5/16/2016	mg/kg	0.058 U	0.029 U	0.12 U	0.029 U	0.029 U	0.029 U	0.058 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	0.055 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.055 U
6D	GS-6D70-051616	70	5/16/2016	mg/kg	0.059 U	0.03 U	**0.541 J**	0.03 U	0.03 U	0.03 U	0.059 U
7D	GS-7D05-052016	5	5/20/2016	mg/kg	0.068 U	0.034 U	0.14 U	0.034 U	0.034 U	0.034 U	0.068 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	63 U	32 U	130 U	32 U	32 U	32 U	63 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	0.055 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.055 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	0.059 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.059 U

See last page for notes.

TABLE 2-6

Summary of Pre-design Testing Analytical Data for Soil, BTEX and Detected Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1,2,4-Trimethylbenzene	Ethylbenzene	2-Butanone	sec-Butylbenzene	Toluene	Benzene[3]	Total Xylene
Residential Soil Remediation Level[4,5]				**mg/kg**	**52**	**400**	**23000**	**220**	**650**	**0.65**	**270**
Non-Residential Soil Remediation Level[6]				**mg/kg**	**170**	**400**	**34000**	**220**	**650**	**1.4**	**420**
Groundwater Protection Level[7]				**mg/kg**	**720**	**>1E+06**	**NE**	**5760**	**1.31E+05**	**12**	**>1E+06**
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.055 U	0.027 U	0.11 U	0.027 U	0.027 U	0.027 U	0.055 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	0.063 U	0.031 U	0.13 U	0.031 U	0.031 U	0.031 U	0.063 U
8D	GS-8D05-051916	5	5/19/2016	mg/kg	**75.5 J**	**40 J**	140 U	35 U	**36.2 J**	35 U	70 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	6.2 U	**3.74 J**	12 U	3.1 U	3.1 U	3.1 U	6.2 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	12 U	6.2 U	25 U	6.2 U	6.2 U	6.2 U	12 U
8D	GS-8D20-051916	20	5/19/2016	mg/kg	0.058 U	0.029 U	0.12 U	0.029 U	0.029 U	0.029 U	0.058 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	5.5 U	2.7 U	11 U	2.7 U	2.7 U	2.7 U	5.5 U
8D	GS-8D70-051916	70	5/19/2016	mg/kg	0.062 U	0.031 U	0.12 U	0.031 U	0.031 U	0.031 U	0.062 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	0.056 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.056 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.065 U	0.033 U	0.13 U	0.033 U	0.033 U	0.033 U	0.065 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.056 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.056 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.054 U[8]	0.027 U	0.11 U	0.027 U	0.027 U	0.027 U	0.054 U
10S	GS-10S15-050916	15	5/9/2016	mg/kg	0.059 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.059 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.057 U	0.029 U	0.11 U	0.029 U	0.029 U	0.029 U	0.057 U
10S	GS-10S30-050916	30	5/9/2016	mg/kg	0.06 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.06 U
11S	GS-11S5-051216	5	5/12/2016	mg/kg	0.055 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.055 U
11S	GS-11S8-051216	8	5/12/2016	mg/kg	4.5 U	2.3 U	9 U	2.3 U	2.3 U	2.3 U	4.5 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	0.062 U	0.031 U	0.12 U	0.031 U	0.031 U	0.031 U	0.062 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.059 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.059 U
11S	GS-11S20-051216	20	5/12/2016	mg/kg	0.051 U	0.026 U	0.1 U	0.026 U	0.026 U	0.026 U	0.051 U
12S	GS-12S03-052316	3	5/23/2016	mg/kg	0.067 U	0.034 U	0.13 U	0.034 U	0.034 U	0.034 U	0.067 U
14S	GS-14S03-052316	3	5/23/2016	mg/kg	0.064 U	0.032 U	0.13 U	0.032 U	0.032 U	0.032 U	0.064 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.05 U	0.025 U	0.1 U	0.025 U	0.025 U	0.025 U	0.05 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.051 U	0.025 U	0.1 U	0.025 U	0.025 U	0.025 U	0.051 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.05 U	0.025 U	0.1 U	0.025 U	0.025 U	0.025 U	0.05 U
15S	GS-15S5-051716	5	5/17/2016	mg/kg	0.053 U	0.026 U	0.11 U	0.026 U	0.026 U	0.026 U	0.053 U
15S	GS-15S15-051716	15	5/17/2016	mg/kg	0.059 U	0.029 U	0.12 U	0.029 U	0.029 U	0.029 U	0.059 U
15S	GS-15S30-051716	30	5/17/2016	mg/kg	0.049 U	0.025 U	0.099 U	0.025 U	0.025 U	0.025 U	0.049 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	0.06 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.06 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.068 U	0.034 U	0.14 U	0.034 U	0.034 U	0.034 U	0.068 U
16S	GS-16S30-0510216	30	5/12/2016	mg/kg	0.055 U	0.027 U	0.11 U	0.027 U	0.027 U	0.027 U	0.055 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	0.062 U	0.031 U	0.12 U	0.031 U	0.031 U	0.031 U	0.062 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	3.2 U	1.6 U	6.4 U	1.6 U	1.6 U	1.6 U	3.2 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	0.062 U	0.031 U	0.12 U	0.031 U	0.031 U	0.031 U	0.062 U
18S	GS-18S3-051216	3	5/12/2016	mg/kg	0.058 U	0.029 U	0.12 U	0.029 U	0.029 U	0.029 U	0.058 U

See last page for notes.

TABLE 2-6

Summary of Pre-design Testing Analytical Data for Soil, BTEX and Detected Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1,2,4-Trimethylbenzene	Ethylbenzene	2-Butanone	sec-Butylbenzene	Toluene	Benzene[3]	Total Xylene
Residential Soil Remediation Level[4,5]				**mg/kg**	**52**	**400**	**23000**	**220**	**650**	**0.65**	**270**
Non-Residential Soil Remediation Level[6]				**mg/kg**	**170**	**400**	**34000**	**220**	**650**	**1.4**	**420**
Groundwater Protection Level[7]				**mg/kg**	**720**	**>1E+06**	**NE**	**5760**	**1.31E+05**	**12**	**>1E+06**
19S	GS-19S05-051616	5	5/16/2016	mg/kg	0.06 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.06 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	11 U	5.7 U	23 U	5.7 U	5.7 U	5.7 U	11 U
19S	GS-19S17-051716	17	5/17/2016	mg/kg	0.06 U	0.03 U	0.12 U	**0.0485 J**	0.03 U	0.03 U	0.06 U
20S	GS-20S05-052316	5	5/23/2016	mg/kg	0.057 U	0.028 U	0.11 U	0.028 U	0.028 U	0.028 U	0.057 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.052 U	0.026 U	0.1 U	0.026 U	0.026 U	0.026 U	0.052 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.06 U	0.03 U	0.12 U	0.03 U	0.03 U	0.03 U	0.06 U

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Detection limits in some samples for benzene were above the Soil Remediation Level (SRL) and/or Groundwater Protection Level (GPL) due to required dilutions at the analytical laboratory.
4. Residential SRLs represent the lowest available residential SRL.
5. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential SRL.
6. Cells highlighted in red indicate the compound exceeded the 2007 non-residential SRL.
7. GPLs established in ADEQ (1996), except those calculated and summarized in Table 4-4.
8. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10,2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   UJ = Analyte was not detected, and the specified detection limit might not be accurate or precise.
   J = Analyte is present but the reported value might not be accurate or precise (estimate).
   R = The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
9. Only compounds that were detected in at last one sample and all BTEX compounds are included in this table.
10. Detected results are bolded.

TABLE 2-7

Summary of Pre-design Testing Analytical Data for Soil, Total Metals

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Residential Soil Remediation Level[3,4]				**mg/kg**	10	15000	39	NE	400	23	390	390
Non-Residential Soil Remediation Level[5]				**mg/kg**	10	170000	510	NE[6]	800	310	5100	5100
Minimum Groundwater Protection Level				**mg/kg**	290	12000	29	590	290	12	290	NE
1D	GS-1D15-050516	15	5/5/2016	mg/kg	**11.2**	**116**	**0.18 J**	**28.6**	**8.1**	0.0077 U	**1.1 J**	0.07 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	**11.9**	**115**	**0.14 J**	**29.1**	**3.6**	0.014 U	**0.71 J**	0.062 U
2D	GS-2D5-050416	5	5/4/2016	mg/kg	**12.5**	**164**	**0.31 J**	**29.6**	**39.2**	**0.048**	**0.45 J**	0.065 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	**8.1 J**	**68.6 J**	**0.062 J**	**23.4 J**	**4.6 J**	0.0071 U	**0.97 J**	0.06 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	**7.9 J**	**78.5 J**	**0.064 J**	**26.4 J**	**4.9 J**	0.0086 U	**0.67 J**	0.061 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	**5.7**	**37.8**	**0.079 J**	**14.1**	**4.3**	0.012 U	**0.85 J**	0.066 U
3D	GS-3D5-051016	5	5/10/2016	mg/kg	**9.8**	**129**	**0.16 J**	**19.4**	**8 J**	**0.017**	**0.45 J**	0.063 U
3D	GS-FD02-051016	5	5/10/2016	mg/kg	**7.6**	**123**	**0.16 J**	**17.2**	**4.9 J**	**0.022**	**0.59 J**	0.068 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	**4.3**	**97.6**	**0.1 J**	**11.7**	**7.8**	**0.0061 J**	**0.59 J**	0.063 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	**11.2**	**75**	**0.07 J**	**9.6**	**3.5**	**0.0078 J**	**0.61 J**	0.067 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	**15.7**	**245**	**0.3 J**	**39.3**	**14.2**	**0.016 J**	0.37 U	0.075 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	**6.2**	**64.1**	**0.097 J**	**14.6**	**4.5**	**0.0067 J**	**0.65 J**	0.059 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	**5.3**	**53.5**	**0.12 J**	**10.6**	**6.7**	**0.01 J**	**0.39 J**	0.065 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	**12.4**	**373**	**0.32 J**	**33.6**	**13**	**0.039**	**2**	0.066 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	**10.4**	**85.4**	**0.25 J**	**17.2**	**7.6 J**	**0.013 J**	**1.5 J**	0.059 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	**11.6**	**94.1**	**0.26 J**	**20.3**	**4.8 J**	**0.011 J**	**1.5 J**	0.059 U
5D	GS-5D65-051716	65	5/17/2016	mg/kg	**12**	**70.5**	**0.18 J**	**14.1**	**5.1**	**0.016**	**1.4 J**	0.066 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	**14.4**	**176**	**0.31 J**	**31.4**	**19.8**	**0.014 J**	**0.6 J**	0.064 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	**4.9**	**48.3**	**0.063 J**	**12.7**	**2.9**	**0.005 J**	**0.68 J**	0.061 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	**8.2**	**59.5**	0.03 U	**12.1**	0.13 U	**0.011 J**	**2.4**	0.064 U
6D	GS-6D70-051616	70	5/16/2016	mg/kg	**6.3**	**39 J**	**0.063 J**	**10 J**	**2.3**	**0.012 J**	**0.63 J**	0.061 U
7D	GS-7D05-052016	5	5/20/2016	mg/kg	**9.5**	**162**	**0.24 J**	**30.4**	**12.3**	**0.026**	**1.1 J**	0.069 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	**9.7**	**88.7**	**0.2 J**	**26.2**	**7.1**	**0.0075 J**	**1.1 J**	0.07 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	**3.9**	**78.4**	**0.07 J**	**9.8**	**2.7**	**0.005 J**	**0.56 J**	0.059 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	**5.7**	**80.6**	**0.082 J**	**18**	**2.4**	**0.0047 J**	**0.63 J**	0.061 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	**7.2**	**40.4**	**0.084 J**	**17.6**	**2.6**	**0.0081 J**	**0.69 J**	0.063 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	**10.1**	**76.2**	**0.099 J**	**22.5**	**3.2**	**0.017**	**0.91 J**	0.06 U
8D	GS-8D05-051916	5	5/19/2016	mg/kg	**0.92 J**	**13.1 J**	**0.11 J**	**1.8**	**30.9**	0.0044 U	**0.61 J**	0.079 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	**15.4**	**139**	**0.25 J**	**34.1**	**9.3**	**0.012 J**	**1.6 J**	0.075 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	**8**	**90.2**	**0.2 J**	**30.5**	**7.1**	**0.0083 J**	**0.97 J**	0.069 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	**9.1**	**53.1**	**0.15 J**	**13.3**	**9.6**	**0.0093 J**	**0.97 J**	0.06 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	**7.6**	**510**	**1 J**	**23**	**284**	**0.085**	**0.57 J**	0.07 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	**8.9**	**71.6 J**	0.029 U	**21.7**	**5.3**	0.0051 U	0.31 U	0.062 U
12S	GS-12S15-052316	15	5/23/2016	mg/kg	**11.6**	**233**	**0.15 J**	**27.4**	**6.8**	**0.0079 J[8]**	**0.63 J**	0.073 U
12S	GS-FD08-052316	15	5/23/2016	mg/kg	**12.1**	**250**	**0.16 J**	**29.4**	**8.1**	**0.0086 J**	**0.84 J**	0.068 U
12S	GS-12S30-052316	30	5/23/2016	mg/kg	**16.4**	**64.7**	**0.097 J**	**13.5**	**6.7**	**0.0095 J**	**0.33 J**	0.065 U
14S	GS-14S03-052316	3	5/23/2016	mg/kg	**12.5**	**143**	**0.22 J**	**33.4**	**11.1**	**0.014 J**	**0.74 J**	0.071 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	**4.7**	**60**	**0.044 J**	**12.3**	**3.2**	**0.0057 J**	**0.52 J**	0.06 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	**5.6**	**58.3**	**0.045 J**	**12.1**	**3.6**	**0.0057 J**	**0.5 J**	0.06 U

See last page for notes.

TABLE 2-7

Summary of Pre-design Testing Analytical Data for Soil, Total Metals

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Residential Soil Remediation Level[3,4]				**mg/kg**	10	15000	39	NE	400	23	390	390
Non-Residential Soil Remediation Level[5]				**mg/kg**	10	170000	510	NE[6]	800	310	5100	5100
14S	GS-14S30-052316	30	5/23/2016	mg/kg	**15.5**	**79.9**	**0.1 J**	**19.5**	**6.7**	**0.025**	**0.55 J**	0.068 U
15S	GS-15S5-051716	5	5/17/2016	mg/kg	**7.5**	**108**	**0.44 J**	**21.8**	**18**	0.02 U	**1.7 J**	0.062 U
15S	GS-15S15-051716	15	5/17/2016	mg/kg	**11.8**	**267**	**0.25 J**	**33.5**	**8.5**	**0.014 J**	**2 J**	0.073 U
15S	GS-15S30-051716	30	5/17/2016	mg/kg	**12.3**	**110**	**0.16 J**	**23.1**	**4.7**	**0.0091 J**	**1.4 J**	0.066 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	**8.7**	**120**	**0.17 J**	**22**	**8.7**	**0.026**	**0.4 J**	0.062 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	**13.5**	**160**	**0.23 J**	**31.5**	**9.6**	**0.008 J**	0.33 U	0.067 U
16S	GS-16S30-0510216	30	5/12/2016	mg/kg	**12**	**77.5**	**0.13 J**	**19.6**	**4.5**	**0.012 J**	**0.45 J**	0.061 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	**11.8**	**163**	**0.25 J**	**30.7**	**13.6**	**0.03**	**0.56 J**	0.071 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	**6.6**	**91**	**0.33 J**	**19.6**	**52.6**	**0.077**	0.31 U	0.063 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	**5.6**	**69.2 J**	**0.074 J**	**18.2 J**	**4.2**	0.0039 U	**0.36 J**	0.062 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	**7.7**	**58**	**0.052 J**	**12.9**	**2.7**	**0.0098 J**	**0.43 J**	0.059 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	**10.2**	**96.2**	**0.2 J**	**30.8**	**10.4**	**0.011 J**	**0.84 J**	0.073 U

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Residential Soil Remediation Levels (SRLs) represent the value for 10^{-5} carcinogenic risk. SRLs are also available for 10^{-6} carcinogenic risk.
4. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential SRL.
5. Cells highlighted in red indicate the compound exceeded the 2007 non-residential SRL.
6. GPLs established in ADEQ (1996), except those calculated and summarized in Table 4-4.
7. NE = Not Established
8. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10,2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   UJ = Analyte was not detected, and the specified detection limit might not be accurate or precise.
   J = Analyte is present but the reported value might not be accurate or precise (estimate).
   R = The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
9. Detected values are bolded.

TABLE 2-8

Summary of Pre-design Testing Analytical Data for Soil, Semivolatile Organic Compounds (SVOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-dinitrophenol	2,4-Dinitrotoluene	1,2,4-Trichlorobenzene	2,6-Dinitrotoluene	1,2-Dichlorobenzene	2-Chloronaphthalene	2-Chlorophenol	2-Methylphenol	2-Nitroaniline	2-Nitrophenol	1,3-Dichlorobenzene
Residential Soil Remediation Level[6]				**mg/kg**	**6100**	**6.1**	**180**	**1200**	**120**	**120**	**62**	**61**	**600**	**110**	**63**	**3100**	**180**	**NE**	**530**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**62000**	**62**	**1800**	**12000**	**1200**	**1200**	**220**	**620**	**600**	**110**	**240**	**31000**	**1800**	**NE**	**600**
Groundwater Protection Level[b]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**18**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.065 U	0.088 U	0.065 U	0.11 U	0.094 U	0.05 U	0.03 U	0.055 U	0.03 U	0.059 U	0.05 U	0.042 U	0.059 U	0.064 U	0.03 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.031 U	0.043 U	0.031 U	0.052 U	0.046 U	0.024 U	0.03 U	0.027 U	0.027 U	0.029 U	0.024 U	0.021 U	0.029 U	0.031 U	0.028 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.029 U	0.039 U	0.029 U	0.048 U	0.042 U	0.022 U	0.023 U	0.025 U	0.023 U	0.027 U	0.022 U	0.019 U	0.026 U	0.029 U	0.023 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.049 U	0.044 U	0.023 U	0.027 U	0.025 U	0.026 U	0.027 U	0.023 U	0.02 U	0.027 U	0.03 U	0.026 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.03 U	0.04 U	0.03 U	0.049 U	0.043 U	0.023 U	0.024 U	0.025 U	0.024 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.024 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.029 U	0.039 U	0.029 U	0.048 U	0.042 U	0.022 U	0.023 U	0.025 U	0.023 U	0.027 U	0.022 U	0.019 U	0.026 U	0.029 U	0.023 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.049 U	0.044 U	0.023 U	0.028 U	0.025 U	0.026 U	0.027 U	0.023 U	0.02 U	0.027 U	0.03 U	0.026 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.032 U	0.044 U	0.032 U	0.053 U	0.047 U	0.025 U	0.028 U	0.027 U	0.028 U	0.029 U	0.025 U	0.021 U	0.029 U	0.032 U	0.028 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	R	R	R	R	R	0.024 U	0.03 U	0.026 U	0.027 U	0.029 U	R	R	0.028 U	R	0.027 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.03 U	0.04 U	0.03 U	0.049 U	0.043 U	0.023 U	0.025 U	0.025 U	0.025 U	0.027 U	0.023 U	0.02 U	0.027 U	0.029 U	0.025 U
3D	GS-3D55-051016	555	5/10/2016	mg/kg	0.033 U	0.045 U	0.033 U	0.055 U	0.049 U	0.026 U	0.032 U	0.028 U	0.029 U	0.031 U	0.026 U	0.022 U	0.03 U	0.033 U	0.029 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.035 U	0.047 U	0.035 U	0.057 U	0.05 U	0.027 U	0.034 U	0.029 U	0.03 U	0.032 U	0.027 U	0.023 U	0.031 U	0.034 U	0.03 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.03 U	0.04 U	0.03 U	0.049 U	0.044 U	0.023 U	0.025 U	0.025 U	0.025 U	0.027 U	0.023 U	0.02 U	0.027 U	0.029 U	0.025 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.05 U	0.044 U	0.023 U	0.027 U	0.026 U	0.026 U	0.028 U	0.023 U	0.02 U	0.027 U	0.03 U	0.026 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.24 U	0.33 U	0.24 U	0.4 U	0.36 U	0.19 U	0.032 U	0.21 U	0.032 U	0.22 U	0.19 U	0.16 U	0.22 U	0.24 U	0.032 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.029 U	0.04 U	0.029 U	0.048 U	0.043 U	0.023 U	0.026 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.026 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.031 U	0.041 U	0.031 U	0.05 U	0.045 U	0.024 U	0.025 U	0.026 U	0.025 U	0.028 U	0.024 U	0.02 U	0.028 U	0.03 U	0.025 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	0.031 U	0.041 U	0.031 U	0.05 U	0.045 U	0.024 U	0.027 U	0.026 U	0.026 U	0.028 U	0.024 U	0.02 U	0.028 U	0.03 U	0.027 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.067 U	0.091 U	0.067 U	0.11 U	0.097 U	0.052 U	0.03 U	0.057 U	0.03 U	0.061 U	0.052 U	0.044 U	0.061 U	0.066 U	0.03 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.03 U	0.04 U	0.03 U	0.049 U	0.043 U	0.023 U	0.027 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.026 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	0.031 U	0.041 U	0.03 U	0.05 U	0.044 U	0.024 U	0.028 U	0.026 U	0.026 U	0.028 U	0.024 U	0.02 U	0.028 U	0.03 U	0.027 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	1.7 U	2.3 U	1.7 U	2.7 U	2.4 U	1.3 U	1.6 U	1.4 U	1.4 U	1.5 U	1.3 U	1.1 U	1.5 U	1.6 U	1.5 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	0.029 U	0.04 U	0.029 U	0.048 U	0.043 U	0.023 U	0.028 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.026 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	0.029 U	0.04 U	0.029 U	0.048 U	0.043 U	0.023 U	0.028 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.026 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.031 U	0.042 U	0.031 U	0.051 U	0.045 U	0.024 U	0.027 U	0.026 U	0.027 U	0.028 U	0.024 U	0.02 U	0.028 U	0.031 U	0.027 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	0.031 U	0.042 U	0.031 U	0.051 U	0.045 U	0.024 U	0.03 U	0.026 U	0.027 U	0.028 U	0.024 U	0.02 U	0.028 U	0.031 U	0.027 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	0.13 U	0.18 U	0.13 U	0.22 U	0.2 U	0.1 U	0.13 U	0.11 U	0.12 U	0.12 U	0.1 U	0.088 U	0.12 U	0.13 U	0.12 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	0.54 U	0.73 U	0.54 U	0.89 U	0.79 U	**1.76 J**	0.53 U	0.46 U	0.47 U	0.5 U	0.42 U	0.36 U	0.49 U	0.53 U	0.47 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	0.3 U	0.41 U	0.3 U	0.5 U	0.44 U	0.23 U	0.29 U	0.26 U	0.26 U	0.28 U	0.23 U	0.2 U	0.27 U	0.3 U	0.26 U
8D	GS-8D90-052016	90	5/20/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.049 U	0.044 U	0.023 U	0.029 U	0.025 U	0.026 U	0.027 U	0.023 U	0.02 U	0.027 U	0.029 U	0.026 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	0.65 U	0.88 U	0.65 U	1.1 U	0.95 U	0.5 U	0.028 U	0.55 U	0.028 U	0.6 U	0.5 U	0.43 U	0.59 U	0.64 U	0.028 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.033 U	0.044 U	0.032 U	0.053 U	0.047 U	0.025 U	0.032 U	0.028 U	0.028 U	0.03 U	0.025 U	0.021 U	0.029 U	0.032 U	0.028 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.05 U	0.044 U	0.024 U	0.028 U	0.026 U	0.026 U	0.028 U	0.024 U	0.02 U	0.028 U	0.03 U	0.027 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.033 U	0.045 U	0.033 U	0.054 U	0.048 U	0.025 U	0.027 U	0.028 U	0.027 U	0.03 U	0.025 U	0.022 U	0.03 U	0.032 U	0.027 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.049 U	0.044 U	0.023 U	0.029 U	0.026 U	0.026 U	0.028 U	0.023 U	0.02 U	0.027 U	0.03 U	0.026 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	0.033 U	0.044 U	0.033 U	0.054 U	0.048 U	0.025 U	0.031 U	0.028 U	0.028 U	0.03 U	0.025 U	0.021 U	0.03 U	0.032 U	0.029 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.033 U	0.045 U	0.033 U	0.055 U	0.048 U	0.026 U	0.03 U	0.028 U	0.029 U	0.03 U	0.026 U	0.022 U	0.03 U	0.033 U	0.029 U

See notes on last page.

TABLE 2-8

Summary of Pre-design Testing Analytical Data for Soil, Semivolatile Organic Compounds (SVOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2,4-dinitrophenol	2,4-Dinitrotoluene	1,2,4-Trichlorobenzene	2,6-Dinitrotoluene	1,2-Dichlorobenzene	2-Chloronaphthalene	2-Chlorophenol	2-Methylphenol	2-Nitroaniline	2-Nitrophenol	1,3-Dichlorobenzene
Residential Soil Remediation Level[6]				**mg/kg**	**6100**	**6.1**	**180**	**1200**	**120**	**120**	**62**	**61**	**600**	**110**	**63**	**3100**	**180**	**NE**	**530**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**62000**	**62**	**1800**	**12000**	**1200**	**1200**	**220**	**620**	**600**	**110**	**240**	**31000**	**1800**	**NE**	**600**
Groundwater Protection Level[b]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**18**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
11S	GS-11S20-051216	20	5/12/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.049 U	0.044 U	0.023 U	0.026 U	0.025 U	0.026 U	0.027 U	0.023 U	0.02 U	0.027 U	0.029 U	0.026 U
12S	GS-12S15-052316	15	5/23/2016	mg/kg	0.034 U	0.046 U	0.034 U	0.056 U	0.05 U	0.026 U	0.033 U	0.029 U	0.029 U	0.031 U	0.026 U	0.022 U	0.031 U	0.034 U	0.03 U
12S	GS-FD08-052316	15	5/23/2016	mg/kg	0.034 U	0.047 U	0.034 U	0.057 U	0.05 U	0.027 U	0.033 U	0.029 U	0.03 U	0.032 U	0.027 U	0.023 U	0.031 U	0.034 U	0.03 U
12S	GS-12S30-052316	30	5/23/2016	mg/kg	0.032 U	0.044 U	0.032 U	0.053 U	0.047 U	0.025 U	0.031 U	0.027 U	0.028 U	0.03 U	0.025 U	0.021 U	0.029 U	0.032 U	0.028 U
13S	GS-13S10-052316	10	5/23/2016	mg/kg	0.033 U	0.045 U	0.033 U	0.055 U	0.049 U	0.026 U	0.032 U	0.028 U	0.029 U	0.031 U	0.026 U	0.022 U	0.03 U	0.033 U	0.029 U
13S	GS-FD09-052316	10	5/23/2016	mg/kg	0.033 U	0.045 U	0.033 U	0.055 U	0.048 U	0.026 U	0.032 U	0.028 U	0.029 U	0.03 U	0.026 U	0.022 U	0.03 U	0.033 U	0.029 U
13S	GS-13S20-052316	20	5/23/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.049 U	0.044 U	0.023 U	0.029 U	0.025 U	0.026 U	0.027 U	0.023 U	0.02 U	0.027 U	0.03 U	0.026 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.029 U	0.04 U	0.029 U	0.048 U	0.043 U	0.023 U	0.025 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.025 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.049 U	0.044 UJ	0.023 U	0.025 U	0.025 U	0.025 U	0.027 U	0.023 U	0.02 U	0.027 U	0.029 U	0.025 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.031 U	0.042 U	0.031 U	0.05 U	0.045 UJ	0.024 U	0.025 U	0.026 U	0.025 U	0.028 U	0.024 U	0.02 U	0.028 U	0.03 U	0.025 U
15S	GS-15S10-051716	10	5/17/2016	mg/kg	0.032 U	0.043 U	0.032 U	0.052 U	0.046 U	0.025 U	0.031 U	0.027 U	0.027 U	0.029 U	0.025 U	0.021 U	0.029 U	0.031 U	0.028 U
15S	GS-FD05-051716	10	5/17/2016	mg/kg	0.032 U	0.043 U	0.032 U	0.052 U	0.047 U	0.025 U	0.031 U	0.027 U	0.027 U	0.029 U	0.025 U	0.021 U	0.029 U	0.031 U	0.028 U
15S	GS-15S20-051716	20	5/17/2016	mg/kg	0.029 U	0.04 U	0.029 U	0.048 U	0.043 U	0.023 U	0.028 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.026 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	0.064 U	0.086 U	0.063 U	0.1 U	0.093 U	0.049 U	0.03 U	0.054 U	0.03 U	0.058 U	0.049 U	0.042 U	0.058 U	0.063 U	0.03 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.035 U	0.047 U	0.035 U	0.057 U	0.051 U	0.027 U	0.034 U	0.029 U	0.03 U	0.032 U	0.027 U	0.023 U	0.031 U	0.034 U	0.03 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	0.066 U	0.089 U	0.066 U	0.11 U	0.096 U	0.051 U	0.031 U	0.056 U	0.031 U	0.06 U	0.051 U	0.043 U	0.06 U	0.065 U	0.031 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	0.97 U	1.3 U	0.97 U	1.6 U	1.4 U	0.75 U	0.94 U	0.82 U	0.84 U	0.89 U	0.75 U	0.64 U	0.88 U	0.96 U	0.85 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	0.03 U	0.041 U	0.03 U	0.05 U	0.044 U	0.024 U	0.03 U	0.026 U	0.026 U	0.028 U	0.024 U	0.02 U	0.028 U	0.03 U	0.027 U
18S	GS-18S10-051216	10	5/12/2016	mg/kg	0.034 U	0.047 U	0.034 U	0.057 U	0.05 U	0.027 U	0.033 U	0.029 U	0.03 U	0.032 U	0.027 U	0.023 U	0.031 U	0.034 U	0.03 U
18S	GS-18S20-051216	20	5/12/2016	mg/kg	0.03 U	0.04 U	0.029 U	0.049 U	0.043 U	0.023 U	0.029 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.026 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	1.6 U	2.2 U	1.6 U	2.7 U	2.4 U	1.3 U	1.6 U	1.4 U	1.4 U	1.5 U	1.3 U	1.1 U	1.5 U	1.6 U	1.4 U
19S	GS-19S30-051616	30	5/16/2016	mg/kg	0.03 U	0.04 U	0.03 U	0.049 U	0.043 U	0.023 U	0.029 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.026 U
19S	GS-19S17-051716	17 - 17	5/17/2016	mg/kg	0.9 U	1.2 U	0.9 U	1.5 U	1.3 U	0.7 U	0.03 U	0.76 U	0.03 U	0.83 U	0.7 U	0.59 U	0.82 U	0.89 U	0.03 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.029 U	0.04 U	0.029 U	0.048 U	0.043 U	0.023 U	0.026 U	0.025 U	0.025 U	0.027 U	0.023 U	0.019 U	0.027 U	0.029 U	0.026 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.034 U	0.046 U	0.034 U	0.055 U	0.049 U	0.026 U	0.03 U	0.029 U	0.029 U	0.031 U	0.026 U	0.022 U	0.031 U	0.033 U	0.03 U

See notes on last page.

TABLE 2-8

Summary of Pre-design Testing Analytical Data for Soil, Semivolatile Organic Compounds (SVOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	3,3-Dichlorobenzidine	3,4-Methylphenol	1,4-Dichlorobenzene	3-Nitroaniline	4,6-Dinitro-2-methylphenol	4-Bromophenyl phenyl ether	4-Chloro-3-methylphenol	4-Chloroaniline	4-Chlorophenyl phenyl ether	4-Nitroaniline	4-Nitrophenol	Aniline	Azobenzene	Benzidine	Benzoic Acid
Residential Soil Remediation Level[6]				**mg/kg**	**12**	**NE**	**35**	**18**	**NE**	**NE**	**NE**	**240**	**NE**	**260**	**NE**	**960**	**50**	**0.0024**	**240000**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**38**	**NE**	**79**	**180**	**NE**	**NE**	**NE**	**2500**	**NE**	**820**	**NE**	**3000**	**160**	**0.0075**	**1000000**
Groundwater Protection Level[b]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.12 U	0.037 U	0.03 U	0.062 U	0.097 U	0.053 U	0.049 U	0.064 U	0.06 U	0.079 U	0.061 U	0.05 U	0.052 U	0.53 U	0.096 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.057 U	0.018 U	0.029 U	0.03 U	0.047 U	0.026 U	0.024 U	0.031 U	0.029 U	0.038 U	0.03 U	0.024 U	0.026 U	0.26 U	0.047 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.053 U	0.017 U	0.023 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.035 U	0.027 U	0.022 U	0.024 U	0.24 U	0.043 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.055 U	0.017 U	0.027 U	0.029 U	0.045 U	0.024 U	0.023 U	0.03 U	0.028 U	0.036 U	0.028 U	0.023 U	0.024 U	0.25 UJ	0.044 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.054 U	0.017 U	0.024 U	0.028 U	0.045 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.044 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.053 U	0.017 U	0.023 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.035 U	0.027 U	0.022 U	0.024 U	0.24 U	0.043 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.055 U	0.017 U	0.027 U	0.029 U	0.045 U	0.024 U	0.023 U	0.03 U	0.028 U	0.036 U	0.028 U	0.023 U	0.024 U	0.25 U	0.044 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.059 U	0.018 U	0.028 U	0.031 U	0.048 U	0.026 U	0.025 U	0.032 U	0.03 U	0.039 U	0.03 U	0.025 U	0.026 U	0.27 U	0.048 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	0.057 U	R	0.028 U	0.03 U	R	0.025 U	R	0.031 U	0.029 U	0.038 U	R	0.024 U	0.025 U	0.26 U	R
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.054 U	0.017 U	0.025 U	0.029 U	0.045 U	0.024 U	0.023 U	0.03 U	0.028 U	0.036 U	0.028 U	0.023 U	0.024 U	0.25 U	0.044 U
3D	GS-3D55-051016	555	5/10/2016	mg/kg	0.061 U	0.019 U	0.03 U	0.032 U	0.05 U	0.027 U	0.025 U	0.033 U	0.031 U	0.041 U	0.032 U	0.026 U	0.027 U	0.28 U	0.05 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.063 U	0.02 U	0.031 U	0.033 U	0.052 U	0.028 U	0.026 U	0.034 U	0.032 U	0.042 U	0.033 U	0.027 U	0.028 U	0.29 U	0.051 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.055 U	0.017 U	0.025 U	0.029 U	0.045 U	0.024 U	0.023 U	0.03 U	0.028 U	0.036 U	0.028 U	0.023 U	0.024 U	0.25 U	0.044 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.055 U	0.017 U	0.027 U	0.029 U	0.045 U	0.025 U	0.023 U	0.03 U	0.028 U	0.037 U	0.029 U	0.023 U	0.025 U	0.25 U	0.045 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.45 U	0.14 U	0.032 U	0.23 U	0.37 U	0.2 U	0.19 U	0.24 U	0.23 U	0.3 U	0.23 U	0.19 U	0.2 U	2 U	0.36 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.054 U	0.017 U	0.026 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.044 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.056 U	0.018 U	0.025 U	0.029 U	0.046 U	0.025 U	0.023 U	0.03 U	0.028 U	0.037 U	0.029 U	0.023 U	0.025 U	0.25 U	0.045 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	0.056 U	0.018 U	0.027 U	0.029 U	0.046 U	0.025 U	0.023 U	0.03 U	0.028 U	0.037 U	0.029 U	0.024 U	0.025 U	0.25 U	0.045 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.12 U	0.038 U	0.03 U	0.064 U	0.1 U	0.054 U	0.051 U	0.067 U	0.062 U	0.081 U	0.063 U	0.051 U	0.054 U	0.55 UJ	0.099 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.054 U	0.017 U	0.027 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.044 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	0.056 U	0.017 U	0.028 U	0.029 U	0.046 U	0.025 U	0.023 U	0.03 U	0.028 U	0.037 U	0.029 U	0.023 U	0.025 U	0.25 U	0.045 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	3 U	0.95 U	1.5 U	1.6 U	2.5 U	1.4 U	1.3 U	1.7 U	1.5 U	2 U	1.6 U	1.3 U	1.3 U	14 U	2.5 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	0.054 U	0.017 U	0.027 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.043 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	0.054 U	0.017 U	0.027 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.043 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.057 U	0.018 U	0.027 U	0.03 U	0.047 U	0.025 U	0.024 U	0.031 U	0.029 U	0.038 U	0.029 U	0.024 U	0.025 U	0.26 U	0.046 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	0.057 U	0.018 U	0.028 U	0.03 U	0.047 U	0.025 U	0.024 U	0.031 U	0.029 U	0.038 U	0.029 U	0.024 U	0.025 U	0.26 U	0.046 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	0.24 U	0.077 U	0.12 U	0.13 U	0.2 U	0.11 U	0.1 U	0.13 U	0.12 U	0.16 U	0.13 U	0.1 U	0.11 U	1.1 U	0.2 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	0.99 U	0.31 U	0.49 U	0.52 U	0.82 U	0.44 U	0.41 U	0.54 U	0.5 U	0.66 U	0.51 U	0.42 U	0.44 U	4.5 U	0.8 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	0.55 U	0.17 U	0.27 U	0.29 U	0.45 U	0.25 U	0.23 U	0.3 U	0.28 U	0.37 U	0.29 U	0.23 U	0.25 U	2.5 U	0.45 U
8D	GS-8D90-052016	90	5/20/2016	mg/kg	0.055 U	0.017 U	0.027 U	0.029 U	0.045 U	0.024 U	0.023 U	0.03 U	0.028 U	0.036 U	0.028 U	0.023 U	0.024 U	0.25 U	0.044 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	1.2 U	0.37 U	0.028 U	0.62 U	0.98 U	0.53 U	0.5 U	0.65 U	0.6 U	0.79 U	0.61 U	0.5 U	0.53 U	5.4 U	0.97 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.059 U	0.019 U	0.03 U	0.031 U	0.049 U	0.027 U	0.025 U	0.032 U	0.03 U	0.04 U	0.031 U	0.025 U	0.026 U	0.27 U	0.048 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.055 U	0.017 U	0.028 U	0.029 U	0.046 U	0.025 U	0.023 U	0.03 U	0.028 U	0.037 U	0.029 U	0.023 U	0.025 U	0.25 U	0.045 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.06 U	0.019 U	0.027 U	0.032 U	0.05 U	0.027 U	0.025 U	0.033 U	0.031 U	0.04 U	0.031 U	0.025 U	0.027 U	0.27 U	0.049 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.055 U	0.017 U	0.027 U	0.029 U	0.045 U	0.025 U	0.023 U	0.03 U	0.028 U	0.037 U	0.028 U	0.023 U	0.024 U	0.25 U	0.045 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	0.06 U	0.019 U	0.03 U	0.031 U	0.049 U	0.027 U	0.025 U	0.033 U	0.03 U	0.04 U	0.031 U	0.025 U	0.026 U	0.27 U	0.048 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.061 U	0.019 U	0.03 U	0.032 U	0.05 U	0.027 U	0.025 U	0.033 U	0.031 U	0.04 U	0.031 U	0.026 U	0.027 U	0.27 U	0.049 U

See notes on last page.

TABLE 2-8

Summary of Pre-design Testing Analytical Data for Soil, Semivolatile Organic Compounds (SVOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	3,3-Dichlorobenzidine	3,4-Methylphenol	1,4-Dichlorobenzene	3-Nitroaniline	4,6-Dinitro-2-methylphenol	4-Bromophenyl phenyl ether	4-Chloro-3-methylphenol	4-Chloroaniline	4-Chlorophenyl phenyl ether	4-Nitroaniline	4-Nitrophenol	Aniline	Azobenzene	Benzidine	Benzoic Acid
Residential Soil Remediation Level[6]				**mg/kg**	**12**	**NE**	**35**	**18**	**NE**	**NE**	**NE**	**240**	**NE**	**260**	**NE**	**960**	**50**	**0.0024**	**240000**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**38**	**NE**	**79**	**180**	**NE**	**NE**	**NE**	**2500**	**NE**	**820**	**NE**	**3000**	**160**	**0.0075**	**1000000**
Groundwater Protection Level[b]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
11S	GS-11S20-051216	20	5/12/2016	mg/kg	0.055 U	0.017 U	0.026 U	0.029 U	0.045 U	0.024 U	0.023 U	0.03 U	0.028 U	0.036 U	0.028 U	0.023 U	0.024 U	0.25 U	0.044 U
12S	GS-12S15-052316	15	5/23/2016	mg/kg	0.062 U	0.019 U	0.031 U	0.033 U	0.051 U	0.028 U	0.026 U	0.034 U	0.032 U	0.041 U	0.032 U	0.026 U	0.028 U	0.28 U	0.05 U
12S	GS-FD08-052316	15	5/23/2016	mg/kg	0.063 U	0.02 U	0.031 U	0.033 U	0.052 U	0.028 U	0.026 U	0.034 U	0.032 U	0.042 U	0.033 U	0.026 U	0.028 U	0.28 U	0.051 U
12S	GS-12S30-052316	30	5/23/2016	mg/kg	0.059 U	0.018 U	0.029 U	0.031 U	0.049 U	0.026 U	0.025 U	0.032 U	0.03 U	0.039 U	0.03 U	0.025 U	0.026 U	0.27 U	0.048 U
13S	GS-13S10-052316	10	5/23/2016	mg/kg	0.061 U	0.019 U	0.03 U	0.032 U	0.05 U	0.027 U	0.025 U	0.033 U	0.031 U	0.041 U	0.032 U	0.026 U	0.027 U	0.28 U	0.049 U
13S	GS-FD09-052316	10	5/23/2016	mg/kg	0.061 U	0.019 U	0.03 U	0.032 U	0.05 U	0.027 U	0.025 U	0.033 U	0.031 U	0.04 U	0.031 U	0.026 U	0.027 U	0.27 U	0.049 U
13S	GS-13S20-052316	20	5/23/2016	mg/kg	0.055 U	0.017 U	0.027 U	0.029 U	0.045 U	0.024 U	0.023 U	0.03 U	0.028 U	0.036 U	0.028 U	0.023 U	0.024 U	0.25 U	0.044 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.054 U	0.017 U	0.025 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.043 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.055 U	0.017 U	0.025 U	0.029 U	0.045 UJ	0.024 U	0.023 U	0.03 U	0.028 U	0.036 U	0.028 U	0.023 U	0.024 U	0.25 U	0.044 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.056 U	0.018 U	0.025 U	0.029 U	0.046 UJ	0.025 U	0.023 U	0.031 U	0.029 U	0.037 U	0.029 U	0.024 U	0.025 U	0.25 U	0.046 U
15S	GS-15S10-051716	10	5/17/2016	mg/kg	0.058 U	0.018 U	0.029 U	0.031 U	0.048 U	0.026 U	0.024 U	0.032 U	0.03 U	0.039 U	0.03 U	0.024 U	0.026 U	0.26 U	0.047 U
15S	GS-FD05-051716	10	5/17/2016	mg/kg	0.058 U	0.018 U	0.029 U	0.031 U	0.048 U	0.026 U	0.024 U	0.032 U	0.03 U	0.039 U	0.03 U	0.025 U	0.026 U	0.26 U	0.047 U
15S	GS-15S20-051716	20	5/17/2016	mg/kg	0.053 U	0.017 U	0.027 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.022 U	0.024 U	0.24 U	0.043 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	0.12 U	0.036 U	0.03 U	0.061 U	0.096 U	0.052 U	0.048 U	0.063 U	0.059 U	0.077 U	0.06 U	0.049 U	0.052 U	0.53 U	0.094 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.063 U	0.02 U	0.031 U	0.033 U	0.052 U	0.028 U	0.026 U	0.035 U	0.032 U	0.042 U	0.033 U	0.027 U	0.028 U	0.29 U	0.051 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	0.12 U	0.038 U	0.031 U	0.063 U	0.099 U	0.054 U	0.05 U	0.066 U	0.061 U	0.08 U	0.062 U	0.051 U	0.053 U	0.54 U	0.097 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	1.8 U	0.56 U	0.88 U	0.93 U	1.5 U	0.79 U	0.74 U	**15.7**	0.9 U	1.2 U	0.92 U	0.75 U	0.79 U	8 U	1.4 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	0.056 U	0.017 U	0.028 U	0.029 U	0.046 U	0.025 U	0.023 U	0.03 U	0.028 U	0.037 U	0.029 U	0.023 U	0.025 U	0.25 U	0.045 U
18S	GS-18S10-051216	10	5/12/2016	mg/kg	0.063 U	0.02 U	0.031 U	0.033 U	0.052 U	0.028 U	0.026 U	0.034 U	0.032 U	0.042 U	0.033 U	0.026 U	0.028 U	0.28 U	0.051 U
18S	GS-18S20-051216	20	5/12/2016	mg/kg	0.054 U	0.017 U	0.027 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.044 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	3 U	0.93 U	1.5 U	1.5 U	2.4 U	1.3 U	1.2 U	1.6 U	1.5 U	2 U	1.5 U	1.2 U	1.3 U	13 U	2.4 U
19S	GS-19S30-051616	30	5/16/2016	mg/kg	0.054 U	0.017 U	0.027 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.044 U
19S	GS-19S17-051716	17 - 17	5/17/2016	mg/kg	1.6 U	0.52 U	0.03 U	0.86 U	1.4 U	0.73 U	0.69 U	0.9 U	0.84 U	1.1 U	0.85 U	0.69 U	0.73 U	7.4 U	1.3 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.054 U	0.017 U	0.026 U	0.028 U	0.044 U	0.024 U	0.022 U	0.029 U	0.027 U	0.036 U	0.028 U	0.023 U	0.024 U	0.24 U	0.044 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.062 U	0.019 U	0.03 U	0.032 U	0.051 U	0.027 U	0.026 U	0.034 U	0.031 U	0.041 U	0.032 U	0.026 U	0.027 U	0.28 U	0.05 U

See notes on last page.

TABLE 2-8

Summary of Pre-design Testing Analytical Data for Soil, Semivolatile Organic Compounds (SVOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Benzyl alcohol	Bis (2-chloroethoxy) methane	Bis (2-chloroethyl) ether	Bis (2-ethylhexyl) phthalate	Bis(2-chloroisopropyl) ether	Butyl benzylphthalate	Carbazole	Di-n-butylphthalate	Di-n-octylphthalate	Dibenzofuran	Diethyl phthalate	Dimethyl phthalate	Diphenyl amine	Hexachlorobenzene	Hexachlorocyclo-pentadiene
Residential Soil Remediation Level[6]				**mg/kg**	**18000**	**NE**	**2.3**	**390**	**30**	**12000**	**270**	**6100**	**2400**	**140**	**49000**	**610000**	**1500**	**34**	**370**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**180000**	**NE**	**5.8**	**1200**	**74**	**120000**	**860**	**62000**	**25000**	**140**	**490000**	**1000000**	**15000**	**11**	**3700**
Groundwater Protection Level[b]				**mg/kg**	**NE**	**NE**	**NE**	**7.59E+19**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**2280**	**NE**	**NE**	**NE**	**NE**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.042 U	0.065 U	0.063 U	0.079 U	0.056 U	0.076 U	0.066 U	0.057 U	0.073 U	0.059 U	0.07 U	0.096 U	0.051 U	0.039 U	0.068 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.02 U	0.032 U	0.031 U	0.038 U	0.027 U	0.037 U	0.032 U	0.028 U	0.035 U	0.029 U	0.034 U	0.047 U	0.025 U	0.019 U	0.033 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.019 U	0.029 U	0.028 U	0.035 U	0.025 U	0.034 U	0.029 U	0.026 U	0.033 U	0.026 U	0.032 U	0.043 U	0.023 U	0.017 U	0.031 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.034 U	0.027 U	0.033 U	0.044 U	0.023 U	0.018 U	0.032 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.019 U	0.03 U	0.029 U	**0.0454 J**	0.026 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	**0.041 J**	0.044 U	0.023 U	0.018 U	0.031 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.019 U	0.029 U	0.028 U	**0.0759 J**	0.025 U	0.034 U	0.029 U	0.026 U	0.033 U	0.026 U	0.032 U	0.043 U	0.023 U	0.017 U	0.031 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.034 U	0.027 U	0.033 U	0.044 U	0.023 U	0.018 U	0.031 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.021 U	0.033 U	0.031 U	0.039 U	0.028 U	0.038 U	0.033 U	0.028 U	0.036 U	0.029 U	0.035 U	0.048 U	0.025 U	0.019 U	0.034 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	0.02 U	0.032 U	0.03 U	0.038 U	0.027 U	0.037 U	0.032 U	0.028 U	0.035 U	0.028 U	0.0553 U	0.046 U	0.024 U	0.019 U	0.033 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.044 U	0.023 U	0.018 U	0.031 U
3D	GS-3D55-051016	555	5/10/2016	mg/kg	0.022 U	0.034 U	0.033 U	0.041 U	0.029 U	0.04 U	0.034 U	0.03 U	0.038 U	0.03 U	0.036 U	0.05 U	0.026 U	0.02 U	0.035 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.022 U	0.035 U	0.034 U	0.042 U	0.03 U	0.041 U	0.035 U	0.031 U	0.039 U	0.031 U	0.038 U	0.051 U	0.027 U	0.021 U	0.036 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.034 U	0.027 U	0.032 U	0.044 U	0.023 U	0.018 U	0.031 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.02 U	0.031 U	0.029 U	0.037 U	0.026 U	0.036 U	0.031 U	0.027 U	0.034 U	0.027 U	0.033 U	0.045 U	0.024 U	0.018 U	0.032 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.16 U	0.25 U	0.24 U	0.3 U	0.21 U	0.29 U	0.25 U	0.22 U	0.28 U	0.22 U	0.27 U	0.36 U	0.19 U	0.15 U	0.26 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.044 U	0.023 U	0.018 U	0.031 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.02 U	0.031 U	0.03 U	0.037 U	0.027 U	0.036 U	0.031 U	0.027 U	0.034 U	0.028 U	0.033 U	0.045 U	0.024 U	0.018 U	0.032 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	0.02 U	0.031 U	0.03 U	0.037 U	0.027 U	0.036 U	0.031 U	0.027 U	0.034 U	0.028 U	0.033 U	0.045 U	0.024 U	0.018 U	0.032 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.043 U	0.068 U	0.065 U	0.081 U	0.058 U	0.079 U	0.068 U	0.059 U	0.075 U	0.061 U	0.073 U	0.099 U	0.052 U	0.04 U	0.07 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.044 U	0.023 U	0.018 U	0.031 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	0.02 U	0.031 U	0.03 U	0.037 U	0.026 U	0.036 U	0.031 U	0.027 U	0.034 U	0.028 U	0.033 U	0.045 U	0.024 U	0.018 U	0.032 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	1.1 U	1.7 U	1.6 U	2 U	1.4 U	2 U	**9.43 J**	1.5 U	1.9 U	**12.7**	1.8 U	2.5 U	1.3 U	1 U	1.7 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.025 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.0387 U	0.043 U	0.023 U	0.018 U	0.031 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.025 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.043 U	0.023 U	0.018 U	0.031 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.02 U	0.031 U	0.03 U	0.038 U	0.027 U	0.037 U	0.032 U	0.027 U	0.035 U	0.028 U	0.034 U	0.046 U	0.024 U	0.019 U	0.033 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	0.02 U	0.031 U	0.03 U	0.038 U	0.027 U	0.037 U	0.032 U	0.027 U	0.035 U	0.028 U	0.034 U	0.046 U	0.024 U	0.019 U	0.033 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	0.087 U	0.14 U	0.13 U	0.16 U	0.12 U	0.16 U	**0.174 J**	0.12 U	0.15 U	**0.445 J**	0.15 U	0.2 U	0.1 U	0.08 U	0.14 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	0.35 U	0.55 U	0.53 U	0.66 U	0.47 U	0.64 U	**0.685 J**	0.48 U	0.61 U	**2.01 J**	0.59 U	0.8 U	0.42 U	0.33 U	0.57 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	0.2 U	0.31 U	0.29 U	0.37 U	0.26 U	0.36 U	**1.2 J**	0.27 U	0.34 U	**2.59**	0.33 U	0.45 U	0.24 U	0.18 U	0.32 U
8D	GS-8D90-052016	90	5/20/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.034 U	0.027 U	0.033 U	0.044 U	0.023 U	0.018 U	0.031 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	0.42 U	0.66 U	0.63 U	0.79 U	0.56 U	0.77 U	**1.39 J**	0.58 U	0.73 U	0.59 U	0.71 U	0.97 U	0.51 U	0.39 U	0.69 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.021 U	0.033 U	0.032 U	0.04 U	0.028 U	0.039 U	0.033 U	0.029 U	0.037 U	0.03 U	0.035 U	0.048 U	0.025 U	0.02 U	0.034 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.02 U	0.031 U	0.03 U	0.037 U	0.026 U	0.036 U	0.031 U	0.027 U	0.034 U	0.028 U	0.033 U	0.045 U	0.024 U	0.018 U	0.032 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.021 U	0.033 U	0.032 U	0.04 U	0.029 U	0.039 U	0.033 U	0.029 U	0.037 U	0.03 U	0.036 U	0.049 U	0.026 U	0.02 U	0.035 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.02 U	0.03 U	0.029 U	0.037 U	0.026 U	0.036 U	0.031 U	0.027 U	0.034 U	0.027 U	0.033 U	0.045 U	0.024 U	0.018 U	0.032 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	0.021 U	0.033 U	0.032 U	0.04 U	0.028 U	0.039 U	0.033 U	0.029 U	0.037 U	0.03 U	0.0414 U	0.048 U	0.026 U	0.02 U	0.034 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.022 U	0.034 U	0.032 U	0.04 U	0.029 U	0.039 U	0.034 U	0.029 U	0.037 U	0.03 U	0.036 U	0.049 U	0.026 U	0.02 U	0.035 U

See notes on last page.

TABLE 2-8

Summary of Pre-design Testing Analytical Data for Soil, Semivolatile Organic Compounds (SVOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Benzyl alcohol	Bis (2-chloroethoxy) methane	Bis (2-chloroethyl) ether	Bis (2-ethylhexyl) phthalate	Bis(2-chloroisopropyl) ether	Butyl benzylphthalate	Carbazole	Di-n-butylphthalate	Di-n-octylphthalate	Dibenzofuran	Diethyl phthalate	Dimethyl phthalate	Diphenyl amine	Hexachlorobenzene	Hexachlorocyclo-pentadiene
Residential Soil Remediation Level[6]				**mg/kg**	**18000**	**NE**	**2.3**	**390**	**30**	**12000**	**270**	**6100**	**2400**	**140**	**49000**	**610000**	**1500**	**34**	**370**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**180000**	**NE**	**5.8**	**1200**	**74**	**120000**	**860**	**62000**	**25000**	**140**	**490000**	**1000000**	**15000**	**11**	**3700**
Groundwater Protection Level[b]				**mg/kg**	**NE**	**NE**	**NE**	**7.59E+19**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**2280**	**NE**	**NE**	**NE**	**NE**
11S	GS-11S20-051216	20	5/12/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.034 U	0.027 U	0.033 U	0.044 U	0.023 U	0.018 U	0.031 U
12S	GS-12S15-052316	15	5/23/2016	mg/kg	0.022 U	0.034 U	0.033 U	0.041 U	0.029 U	0.04 U	0.034 U	0.03 U	0.038 U	0.031 U	0.037 U	0.05 U	0.027 U	0.02 U	0.036 U
12S	GS-FD08-052316	15	5/23/2016	mg/kg	0.022 U	0.035 U	0.034 U	0.042 U	0.03 U	0.041 U	0.035 U	0.03 U	0.039 U	0.031 U	0.037 U	0.051 U	0.027 U	0.021 U	0.036 U
12S	GS-12S30-052316	30	5/23/2016	mg/kg	0.021 U	0.033 U	0.031 U	0.039 U	0.028 U	0.038 U	0.033 U	0.029 U	0.036 U	0.029 U	0.035 U	0.048 U	0.025 U	0.019 U	0.034 U
13S	GS-13S10-052316	10	5/23/2016	mg/kg	0.022 U	0.034 U	0.032 U	0.041 U	0.029 U	0.039 U	0.034 U	0.029 U	0.038 U	0.03 U	0.036 U	0.049 U	0.026 U	0.02 U	0.035 U
13S	GS-FD09-052316	10	5/23/2016	mg/kg	0.022 U	0.034 U	0.032 U	0.04 U	0.029 U	0.039 U	0.034 U	0.029 U	0.037 U	0.03 U	0.036 U	0.049 U	0.026 U	0.02 U	0.035 U
13S	GS-13S20-052316	20	5/23/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.034 U	0.027 U	0.033 U	0.044 U	0.023 U	0.018 U	0.031 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.025 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.043 U	0.023 U	0.018 U	0.031 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.034 U	0.027 U	0.033 U	0.044 U	0.023 U	0.018 U	0.031 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.02 U	0.031 U	0.03 U	0.037 U	0.027 U	0.036 U	0.031 U	0.027 U	0.035 U	0.028 U	0.033 U	0.046 U	0.024 U	0.018 U	0.032 U
15S	GS-15S10-051716	10	5/17/2016	mg/kg	0.021 U	0.032 U	0.031 U	0.039 U	0.028 U	0.038 U	0.032 U	0.028 U	0.036 U	0.029 U	0.035 U	0.047 U	0.025 U	0.019 U	0.034 U
15S	GS-FD05-051716	10	5/17/2016	mg/kg	0.021 U	0.032 U	0.031 U	0.039 U	0.028 U	0.038 U	0.032 U	0.028 U	0.036 U	0.029 U	0.035 U	0.047 U	0.025 U	0.019 U	0.034 U
15S	GS-15S20-051716	20	5/17/2016	mg/kg	0.019 U	0.03 U	0.028 U	0.036 U	0.025 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.043 U	0.023 U	0.018 U	0.031 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	0.041 U	0.064 U	0.062 U	0.077 U	0.055 U	0.075 U	0.065 U	0.056 U	0.072 U	0.058 U	0.069 U	0.094 U	0.05 U	0.038 U	0.067 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.023 U	0.035 U	0.034 U	0.042 U	0.03 U	0.041 U	0.035 U	0.031 U	0.039 U	0.031 U	0.038 U	0.051 U	0.027 U	0.021 U	0.036 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	0.043 U	0.067 U	0.064 U	0.08 U	0.057 U	0.078 U	0.067 U	0.058 U	0.074 U	0.06 U	0.072 U	0.097 U	0.052 U	0.04 U	0.069 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	0.63 U	0.98 U	0.94 U	1.2 U	0.84 U	1.1 U	**3.85 J**	0.86 U	1.1 U	**3.64 J**	1.1 U	1.4 U	0.76 U	0.58 U	1 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	0.02 U	0.031 U	0.03 U	0.037 U	0.026 U	0.036 U	0.031 U	0.027 U	0.034 U	0.028 U	0.033 U	0.045 U	0.024 U	0.018 U	0.032 U
18S	GS-18S10-051216	10	5/12/2016	mg/kg	0.022 U	0.035 U	0.034 U	0.042 U	0.03 U	0.041 U	0.035 U	0.03 U	0.039 U	0.031 U	0.037 U	0.051 U	0.027 U	0.021 U	0.036 U
18S	GS-18S20-051216	20	5/12/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.044 U	0.023 U	0.018 U	0.031 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	1.1 U	1.6 U	1.6 U	2 U	1.4 U	1.9 U	**7.56 J**	1.4 U	1.8 U	**12 J**	1.8 U	2.4 U	1.3 U	0.97 U	1.7 U
19S	GS-19S30-051616	30	5/16/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.044 U	0.023 U	0.018 U	0.031 U
19S	GS-19S17-051716	17 - 17	5/17/2016	mg/kg	0.59 U	0.91 U	0.88 U	1.1 U	0.78 U	1.1 U	0.91 U	0.8 U	1 U	0.82 U	0.98 U	1.3 U	0.71 U	0.54 U	0.95 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.019 U	0.03 U	0.029 U	0.036 U	0.026 U	0.035 U	0.03 U	0.026 U	0.033 U	0.027 U	0.032 U	0.044 U	0.023 U	0.018 U	0.031 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.022 U	0.034 U	0.033 U	0.041 U	0.029 U	0.04 U	0.034 U	0.03 U	0.038 U	0.031 U	0.037 U	0.05 U	0.026 U	0.02 U	0.036 U

See notes on last page.

TABLE 2-8

Summary of Pre-design Testing Analytical Data for Soil, Semivolatile Organic Compounds (SVOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Hexachloroethane	Isophorone	Hexachlorobutadiene	N-Nitrosodi-n-propylamine	N-nitrosodimethylamine	Nitrobenzene	Pentachlorophenol	Phenol	Pyridine
Residential Soil Remediation Level[6]				**mg/kg**	**390**	**5800**	**70**	**0.078**	**0.11**	**20**	**32**	**18000**	**61**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**620**	**18000**	**180**	**2.5**	**0.34**	**100**	**90**	**180000**	**620**
Groundwater Protection Level[b]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
1D	GS-1D5-050516	5	5/5/2016	mg/kg	0.056 U	0.066 U	0.061 U	0.072 U	0.037 U	0.066 U	0.11 U	0.019 U	0.028 U
1D	GS-1D15-050516	15	5/5/2016	mg/kg	0.027 U	0.032 U	0.035 U	0.035 U	0.018 U	0.032 U	0.051 U	0.009 U	0.014 U
1D	GS-1D35-050516	35	5/5/2016	mg/kg	0.025 U	0.029 U	0.032 U	0.032 U	0.016 U	0.03 U	0.047 U	0.0083 U	0.013 U
1D	GS-1D55-050516	55	5/5/2016	mg/kg	0.026 U	0.03 U	0.033 U	0.033 U	0.017 U	0.031 U	0.049 U	0.0086 U	0.013 U
2D	GS-2D25-050416	25	5/4/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0085 U	0.013 U
2D	GS-FD01-050416	25	5/4/2016	mg/kg	0.025 U	0.03 U	0.032 U	0.032 U	0.016 U	0.03 U	0.047 U	0.0083 U	0.013 U
2D	GS-2D45-050416	45	5/4/2016	mg/kg	0.026 U	0.03 U	0.033 U	0.033 U	0.017 U	0.031 U	0.049 U	0.0086 U	0.013 U
2D	GS-2D65-050416	65	5/4/2016	mg/kg	0.028 U	0.033 U	0.036 U	0.036 U	0.018 U	0.033 U	0.053 U	0.0093 U	0.014 U
3D	GS-3D15-051016	15	5/10/2016	mg/kg	0.027 U	0.032 U	0.035 U	0.035 U	0.018 U	0.032 U	R	R	0.014 U
3D	GS-3D35-051016	35	5/10/2016	mg/kg	0.026 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.049 U	0.0085 U	0.013 U
3D	GS-3D55-051016	555	5/10/2016	mg/kg	0.029 U	0.034 U	0.037 U	0.037 U	0.019 U	0.034 U	0.055 U	0.0096 U	0.015 U
4D	GS-4D5-051316	5	5/13/2016	mg/kg	0.03 U	0.035 U	0.039 U	0.038 U	0.02 U	0.035 U	0.056 U	0.0099 U	0.015 U
4D	GS-4D20-051316	20	5/13/2016	mg/kg	0.026 U	0.03 U	0.033 U	0.033 U	0.017 U	0.031 U	0.049 U	0.0086 U	0.013 U
4D	GS-4D50-051316	50	5/13/2016	mg/kg	0.026 U	0.031 U	0.034 U	0.034 U	0.017 U	0.031 U	0.049 U	0.0087 U	0.013 U
5D	GS-5D05-051716	5	5/17/2016	mg/kg	0.21 U	0.25 U	0.065 U	0.27 U	0.14 U	0.25 U	0.4 U	0.07 U	0.11 U
5D	GS-5D25-051716	25	5/17/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0085 U	0.013 U
5D	GS-5D45-051716	45	5/17/2016	mg/kg	0.026 U	0.031 U	0.034 U	0.034 U	0.017 U	0.031 U	0.05 U	0.0088 U	0.013 U
5D	GS-FD06-051716	45	5/17/2016	mg/kg	0.026 U	0.031 U	0.034 U	0.034 U	0.017 U	0.031 U	0.05 U	0.0088 U	0.013 U
6D	GS-6D5-051316	5	5/13/2016	mg/kg	0.057 U	0.068 U	0.06 U	0.074 U	0.038 U	0.068 U	0.11 U	0.019 U	0.029 U
6D	GS-6D20-051316	20	5/13/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0085 U	0.013 U
6D	GS-6D50-051616	50	5/16/2016	mg/kg	0.026 U	0.031 U	0.034 U	0.034 U	0.017 U	0.031 U	0.05 U	0.0088 U	0.013 U
7D	GS-7D15-052016	15	5/20/2016	mg/kg	1.4 U	1.7 U	1.9 U	1.8 U	0.94 U	1.7 U	2.7 U	0.48 U	0.72 U
7D	GS-7D19-052016	19	5/20/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0084 U	0.013 U
7D	GS-7D25-052016	25	5/20/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0084 U	0.013 U
7D	GS-7D45-052016	45	5/20/2016	mg/kg	0.027 U	0.032 U	0.035 U	0.035 U	0.018 U	0.032 U	0.051 U	0.0089 U	0.013 U
7D	GS-7D65-052016	65	5/20/2016	mg/kg	0.027 U	0.032 U	0.035 U	0.035 U	0.018 U	0.032 U	0.051 U	0.0089 U	0.014 U
8D	GS-8D10-051916	10	5/19/2016	mg/kg	0.12 U	0.14 U	0.15 U	0.15 U	0.076 U	0.14 U	0.22 U	0.038 U	0.058 U
8D	GS-8D16-052016	16	5/20/2016	mg/kg	0.47 U	0.55 U	0.6 U	0.6 U	0.31 U	0.56 U	0.88 U	0.16 U	0.24 U
8D	GS-8D40-051916	40	5/19/2016	mg/kg	0.26 U	0.31 U	0.34 U	0.34 U	0.17 U	0.31 U	0.49 U	0.087 U	0.13 U
8D	GS-8D90-052016	90	5/20/2016	mg/kg	0.026 U	0.03 U	0.033 U	0.033 U	0.017 U	0.031 U	0.049 U	0.0086 U	0.013 U
9S	GS-9S03-050316	3	5/3/2016	mg/kg	0.56 U	0.66 U	0.056 U	0.72 U	0.37 U	0.67 U	1.1 U	0.19 U	0.28 U
9S	GS-9S10-050316	10	5/3/2016	mg/kg	0.028 U	0.033 U	0.036 U	0.036 U	0.018 U	0.033 U	0.053 U	0.0093 U	0.014 U
9S	GS-9S20-050316	20	5/3/2016	mg/kg	0.026 U	0.031 U	0.034 U	0.034 U	0.017 U	0.031 U	0.05 U	0.0087 U	0.013 U
10S	GS-10S10-050916	10	5/9/2016	mg/kg	0.028 U	0.033 U	0.037 U	0.037 U	0.019 U	0.034 U	0.054 U	0.0095 U	0.014 U
10S	GS-10S20-050916	20	5/9/2016	mg/kg	0.026 U	0.031 U	0.034 U	0.034 U	0.017 U	0.031 U	0.049 U	0.0087 U	0.013 U
11S	GS-11S10-051216	10	5/12/2016	mg/kg	0.028 U	0.033 U	0.036 U	0.036 U	0.018 U	0.033 U	0.053 U	0.0094 U	0.014 U
11S	GS-FD03-051216	10	5/12/2016	mg/kg	0.029 U	0.034 U	0.037 U	0.037 U	0.019 U	0.034 U	0.054 U	0.0095 U	0.014 U

See notes on last page.

TABLE 2-8

Summary of Pre-design Testing Analytical Data for Soil, Semivolatile Organic Compounds (SVOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	Hexachloroethane	Isophorone	Hexachlorobutadiene	N-Nitrosodi-n-propylamine	N-nitrosodimethylamine	Nitrobenzene	Pentachlorophenol	Phenol	Pyridine
Residential Soil Remediation Level[6]				**mg/kg**	**390**	**5800**	**70**	**0.078**	**0.11**	**20**	**32**	**18000**	**61**
Non-Residential Soil Remediation Level[5]				**mg/kg**	**620**	**18000**	**180**	**2.5**	**0.34**	**100**	**90**	**180000**	**620**
Groundwater Protection Level[b]				**mg/kg**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
12S	GS-12S15-052316	15	5/23/2016	mg/kg	0.029 U	0.035 U	0.038 U	0.038 U	0.019 U	0.035 U	0.055 U	0.0098 U	0.015 U
12S	GS-FD08-052316	15	5/23/2016	mg/kg	0.03 U	0.035 U	0.038 U	0.038 U	0.02 U	0.035 U	0.056 U	0.0099 U	0.015 U
12S	GS-12S30-052316	30	5/23/2016	mg/kg	0.028 U	0.033 U	0.036 U	0.036 U	0.018 U	0.033 U	0.053 U	0.0093 U	0.014 U
13S	GS-13S10-052316	10	5/23/2016	mg/kg	0.029 U	0.034 U	0.037 U	0.037 U	0.019 U	0.034 U	0.054 U	0.0096 U	0.014 U
13S	GS-FD09-052316	10	5/23/2016	mg/kg	0.029 U	0.034 U	0.037 U	0.037 U	0.019 U	0.034 U	0.054 U	0.0095 U	0.014 U
13S	GS-13S20-052316	20	5/23/2016	mg/kg	0.026 U	0.03 U	0.033 U	0.033 U	0.017 U	0.031 U	0.049 U	0.0086 U	0.013 U
14S	GS-14S15-052316	15	5/23/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0084 U	0.013 U
14S	GS-FD10-052316	15	5/23/2016	mg/kg	0.026 U	0.03 U	0.033 U	0.033 U	0.017 U	0.031 U	0.049 U	0.0086 U	0.013 U
14S	GS-14S30-052316	30	5/23/2016	mg/kg	0.026 U	0.031 U	0.034 U	0.034 U	0.017 U	0.031 U	0.05 U	0.0088 U	0.013 U
15S	GS-15S10-051716	10	5/17/2016	mg/kg	0.027 U	0.032 U	0.036 U	0.035 U	0.018 U	0.033 U	0.052 U	0.0091 U	0.014 U
15S	GS-FD05-051716	10	5/17/2016	mg/kg	0.027 U	0.032 U	0.036 U	0.035 U	0.018 U	0.033 U	0.052 U	0.0092 U	0.014 U
15S	GS-15S20-051716	20	5/17/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0084 U	0.013 U
16S	GS-16S5-051216	5	5/12/2016	mg/kg	0.055 U	0.065 U	0.06 U	0.071 U	0.036 U	0.065 U	0.1 U	0.018 U	0.028 U
16S	GS-16S15-051216	15	5/12/2016	mg/kg	0.03 U	0.035 U	0.039 U	0.039 U	0.02 U	0.036 U	0.057 U	0.01 U	0.015 U
17S	GS-17S10-051216	10	5/12/2016	mg/kg	0.057 U	0.067 U	0.062 U	0.073 U	0.037 U	0.067 U	0.11 U	0.019 U	0.029 U
17S	GS-17S16-051216	16	5/12/2016	mg/kg	0.84 U	0.99 U	1.1 U	1.1 U	0.55 U	0.99 U	1.6 U	0.28 U	0.42 U
17S	GS-17S20-051216	20	5/12/2016	mg/kg	0.026 U	0.031 U	0.034 U	0.034 U	0.017 U	0.031 U	0.05 U	0.0088 U	0.013 U
18S	GS-18S10-051216	10	5/12/2016	mg/kg	0.03 U	0.035 U	0.038 U	0.038 U	0.02 U	0.035 U	0.056 U	0.0099 U	0.015 U
18S	GS-18S20-051216	20	5/12/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0085 U	0.013 U
19S	GS-19S15-051616	15	5/16/2016	mg/kg	1.4 U	1.6 U	1.8 U	1.8 U	0.91 U	1.7 U	2.6 U	0.46 U	0.7 U
19S	GS-19S30-051616	30	5/16/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0085 U	0.013 U
19S	GS-19S17-051716	17 - 17	5/17/2016	mg/kg	0.78 U	0.92 U	0.06 U	1 U	0.51 U	0.92 U	1.5 U	0.26 U	0.39 U
20S	GS-20S15-052316	15	5/23/2016	mg/kg	0.025 U	0.03 U	0.033 U	0.033 U	0.017 U	0.03 U	0.048 U	0.0085 U	0.013 U
20S	GS-20S30-052316	30	5/23/2016	mg/kg	0.029 U	0.034 U	0.038 U	0.038 U	0.019 U	0.035 U	0.055 U	0.0097 U	0.015 U

Notes:

1. ft bgs = feet below ground surface
2. mg/kg = milligram per kilogram
3. Residential Soil Remediation Levels (SRLs) represent the lowest available residential SRL.
4. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential SRL.
5. Cells highlighted in red indicate the compound exceeded the 2007 non-residential SRL.
6. GPLs established in ADEQ (1996), except those calculated and summarized in Table 4-4.
7. NE = Not Establisheed
8. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10, 2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   UJ = Analyte was not detected, and the specified detection lmit might not be accurate or precise
   J = Analyte is present but the reported value might not be accurate or precise (estimate).
   R = The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
9. Detected results are bolded.

TABLE 2-9

Summary of Pre-design Testing Analytical Data for Soil, Dioxin and Furan Compounds

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1,2,3,4,6,7,8-HPCDD	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	1,2,3,4,7,8-HXCDD	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDD	1,2,3,6,7,8-HXCDF	1,2,3,7,8,9-HXCDD	1,2,3,7,8,9-HXCDF	1,2,3,7,8-PECDD	1,2,3,7,8-PECDF	2,3,4,6,7,8-HXCDF	2,3,4,7,8-PECDF	2,3,7,8-TCDD	2,3,7,8-TCDF
Residential Soil Remediation Level[3,4]				pg/g	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	45	NE
Non-Residential Soil Remediation Level[5]				pg/g	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	160	NE
1D	GS-1D5-050516	5	5/5/2016	pg/g	2.1 U	0.46 U	0.081 U	0.055 U	**0.18 J**	**0.16 J**	0.051 U	**0.18 J**	**0.082 J**	0.055 U	0.055 U	0.042 U	0.056 U	0.057 U	0.043 U
1D	GS-1D15-050516	15	5/5/2016	pg/g	0.24 U	0.064 U	0.082 U	0.059 U	0.044 U	0.057 U	0.041 U	0.05 U	0.045 U	0.07 U	0.044 U	0.043 U	0.044 U	0.052 U	0.039 U
1D	GS-1D35-050516	35	5/5/2016	pg/g	0.17 U	0.045 U	0.058 U	0.038 U	**0.063 J**	0.037 U	0.022 U	0.032 U	0.025 U	0.037 U	0.031 U	0.024 U	0.032 U	0.03 U	0.022 U
1D	GS-1D55-050516	55	5/5/2016	pg/g	0.13 U	0.043 U	0.055 U	0.035 U	**0.045 J**	0.034 U	0.026 U	**0.071 J**	0.029 U	0.043 U	0.033 U	0.028 U	0.034 U	0.042 U	0.02 U
2D	GS-2D25-050416	25	5/4/2016	pg/g	0.94 U	0.17 U	0.06 U	0.04 U	**0.084 J**	0.038 U	0.065 U	**0.064 J**	0.04 U	0.051 U	0.039 U	0.038 U	0.04 U	0.044 U	0.032 U
2D	GS-FD01-050416	25	5/4/2016	pg/g	1.3 U	0.16 U	0.061 U	0.043 U	0.044 U	**0.073 J**	0.04 U	0.036 U	0.045 U	0.043 U	0.043 U	0.043 U	0.044 U	0.042 U	0.031 U
2D	GS-2D45-050416	45	5/4/2016	pg/g	0.13 U	0.058 U	0.074 U	0.046 U	0.03 U	0.044 U	0.028 U	0.039 U	0.031 U	0.045 U	0.033 U	0.03 U	0.033 U	0.041 U	0.022 U
2D	GS-2D65-050416	65	5/4/2016	pg/g	0.12 U	0.058 U	0.074 U	0.05 U	0.04 U	0.048 U	0.037 U	0.042 U	0.041 U	0.054 U	0.048 U	0.039 U	0.049 U	0.05 U	0.033 U
3D	GS-3D15-051016	15	5/10/2016	pg/g	0.39 U	0.13 U	0.058 U	0.058 U	0.035 U	0.056 U	0.032 U	0.049 U	0.035 U	0.043 U	0.045 U	0.034 U	0.045 U	0.037 U	**0.074 J**
3D	GS-3D35-051016	35	5/10/2016	pg/g	0.1 U	0.034 U	0.043 U	0.041 U	0.028 U	0.04 U	0.026 U	0.035 U	0.028 U	0.037 U	0.029 U	0.027 U	0.029 U	0.031 U	0.022 U
4D	GS-4D5-051316	5	5/13/2016	pg/g	3.2 U	0.089 U	0.03 U	**0.083 J**	**0.044 J**	**0.13 J**	0.054 U	**0.21 J**	**0.063 J**	0.051 U	0.041 U	0.034 U	0.042 U	0.037 U	**0.044 J**
4D	GS-4D20-051316	20	5/13/2016	pg/g	0.032 U	0.044 U	0.023 U	0.026 U	0.021 U	0.024 U	0.019 U	0.02 U	0.02 U	0.033 U	0.027 U	0.02 U	0.028 U	0.029 U	0.018 U
4D	GS-4D50-051316	50	5/13/2016	pg/g	0.039 U	0.027 U	0.032 U	0.033 U	0.027 U	0.03 U	0.024 U	0.026 U	0.026 U	0.042 U	0.026 U	0.026 U	0.027 U	0.028 U	0.02 U
5D	GS-5D05-051716	5	5/17/2016	pg/g	**67**	**7.5**	**0.54 J**	**0.41 J**	**0.7 J**	**1.9 J**	1.6 U	**1.2 J**	0.18 U	**0.22 J**	0.22 U	**1.7 J**	**0.76 J**	0.066 U	**0.42 J**
5D	GS-5D25-051716	25	5/17/2016	pg/g	0.17 U	0.042 U	0.054 U	0.037 U	0.033 U	0.036 U	0.03 U	0.031 U	0.033 U	0.057 U	0.053 U	0.032 U	0.054 U	0.041 U	0.027 U
5D	GS-5D45-051716	45	5/17/2016	pg/g	0.29 U	0.2 U	**0.23 J**	**0.14 J**	**0.17 J**	**0.2 J**	0.15 U	**0.24 J**	**0.22 J**	**0.19 J**	**0.23 J**	**0.18 J**	**0.16 J**	0.04 U	**0.04 J**
5D	GS-FD06-051716	45	5/17/2016	pg/g	0.12 U	0.043 U	0.056 U	0.043 U	0.029 U	0.041 U	0.026 U	0.036 U	0.029 U	0.052 U	0.046 U	0.028 U	0.046 U	0.036 U	0.026 U
6D	GS-6D5-051316	5	5/13/2016	pg/g	**9**	**0.65 J**	**0.12 J**	**0.19 J**	**0.12 J**	**0.46 J**	0.24 U	**0.56 J**	**0.18 J**	**0.14 J**	0.083 U	**0.3 J**	**0.21 J**	0.041 U	**0.24 J**
6D	GS-6D20-051316	20	5/13/2016	pg/g	0.22 U	0.095 U	0.053 U	0.032 U	**0.058 J**	0.029 U	0.047 U	**0.053 J**	**0.099 J**	0.037 U	0.025 U	**0.033 J**	0.026 U	0.027 U	0.017 U
6D	GS-6D50-051616	50	5/16/2016	pg/g	0.24 U	0.061 U	0.077 U	0.057 U	0.044 U	0.056 U	0.04 U	0.049 U	0.045 U	0.076 U	0.065 U	0.043 U	0.066 U	0.058 U	0.043 U
7D	GS-7D15-052016	15	5/20/2016	pg/g	1.8 U	0.4 U	0.47 U	0.57 U	0.77 U	0.52 U	0.7 U	0.45 U	0.74 U	0.79 U	0.74 U	0.75 U	0.77 U	0.81 U	0.73 U
7D	GS-7D19-052016	19	5/20/2016	pg/g	0.88 U	0.075 U	0.028 U	0.027 U	0.03 U	0.025 U	0.027 U	**0.042 J**	0.028 U	0.038 U	0.033 U	0.029 U	0.035 U	0.029 U	0.028 U
7D	GS-7D25-052016	25	5/20/2016	pg/g	0.6 U	0.078 U	0.03 U	0.034 U	0.03 U	0.031 U	0.027 U	0.027 U	0.029 U	0.035 U	0.027 U	0.029 U	0.028 U	0.038 U	0.034 U
7D	GS-7D45-052016	45	5/20/2016	pg/g	0.037 U	0.062 U	0.08 U	0.076 U	0.039 U	0.074 U	0.035 U	0.064 U	0.039 U	0.047 U	0.044 U	0.038 U	0.045 U	0.036 U	0.023 U
7D	GS-7D65-052016	65	5/20/2016	pg/g	2.6 U	0.26 U	0.089 U	0.1 U	**0.09 J**	**0.41 J**	0.058 U	0.088 U	0.041 U	0.058 U	0.049 U	**0.077 J**	0.05 U	0.03 U	0.024 U
8D	GS-8D10-051916	10	5/19/2016	pg/g	1.1 U	**0.33 J**	**0.25 J**	**0.11 J**	**0.13 J**	**0.16 J**	0.11 U	**0.32 J**	**0.23 J**	**0.094 J**	0.048 U	**0.14 J**	0.049 U	0.053 U	**0.13 J**
8D	GS-8D16-052016	16	5/20/2016	pg/g	0.61 U	0.13 U	0.16 U	0.22 U	0.21 U	0.2 U	0.19 U	0.17 U	0.2 U	0.3 U	0.23 U	0.21 U	0.24 U	0.34 U	0.32 U
8D	GS-8D40-051916	40	5/19/2016	pg/g	1.2 U	0.35 U	0.096 U	0.15 U	0.17 U	0.14 U	0.16 U	0.12 U	0.17 U	0.22 U	0.17 U	0.17 U	0.18 U	0.23 U	0.21 U
9S	GS-9S03-050316	3	5/3/2016	pg/g	**74**	**15**	**1.7 J**	**0.9 J**	**3.7 J**	**2.6 J**	**4.2 J**	**2.1 J**	0.63 U	**0.63 J**	**2.4 J**	**3.9 J**	**3.6 J**	**0.21 J**	**2.9**
9S	GS-9S10-050316	10	5/3/2016	pg/g	1.5 U	0.13 U	0.062 U	0.054 U	0.038 U	**0.23 J**	0.035 U	**0.19 J**	**0.13 J**	0.054 U	0.039 U	0.037 U	0.04 U	0.043 U	0.036 U
9S	GS-9S20-050316	20	5/3/2016	pg/g	0.26 U	0.039 U	0.05 U	0.042 U	0.027 U	0.041 U	0.024 U	0.035 U	0.027 U	0.042 U	0.029 U	0.026 U	0.029 U	0.042 U	0.03 U
10S	GS-10S10-050916	10	5/9/2016	pg/g	1.6 U[6]	0.065 U	0.083 U	0.065 U	0.047 U	**0.26 J**	0.043 U	**0.23 J**	**0.12 J**	0.06 U	0.054 U	0.046 U	0.055 U	0.047 U	0.029 U
10S	GS-10S20-050916	20	5/9/2016	pg/g	0.86 U	0.42 U	0.21 U	0.059 U	**0.1 J**	**0.14 J**	0.12 U	**0.15 J**	**0.14 J**	0.055 U	0.057 U	**0.19 J**	0.058 U	0.037 U	0.032 U
12S	GS-12S15-052316	15	5/23/2016	pg/g	0.47 U	0.17 U	0.054 U	0.044 U	**0.041 J**	**0.16 J**	0.038 U	**0.15 J**	**0.065 J**	0.064 U	0.049 U	0.03 U	0.05 U	0.041 U	0.038 U
12S	GS-FD08-052316	15	5/23/2016	pg/g	0.45 U	0.14 U	0.056 U	0.041 U	**0.05 J**	0.039 U	0.024 U	**0.13 J**	0.027 U	0.057 U	0.044 U	0.026 U	0.045 U	0.042 U	0.03 U
12S	GS-12S30-052316	30	5/23/2016	pg/g	0.12 U	0.081 U	0.034 U	0.028 U	**0.025 J**	0.027 U	0.019 U	0.024 U	0.021 U	0.044 U	0.031 U	0.02 U	0.032 U	0.03 U	0.018 U
13S	GS-13S10-052316	10	5/23/2016	pg/g	3.7 U	0.12 U	0.057 U	**0.13 J**	0.024 U	**0.25 J**	0.07 U	**0.32 J**	**0.21 J**	0.057 U	0.035 U	**0.08 J**	0.036 U	0.035 U	0.021 U

See notes on last page.

TABLE 2-9

Summary of Pre-design Testing Analytical Data for Soil, Dioxin and Furan Compounds

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	1,2,3,4,6,7,8-HPCDD	1,2,3,4,6,7,8-HPCDF	1,2,3,4,7,8,9-HPCDF	1,2,3,4,7,8-HXCDD	1,2,3,4,7,8-HXCDF	1,2,3,6,7,8-HXCDD	1,2,3,6,7,8-HXCDF	1,2,3,7,8,9-HXCDD	1,2,3,7,8,9-HXCDF	1,2,3,7,8-PECDD	1,2,3,7,8-PECDF	2,3,4,6,7,8-HXCDF	2,3,4,7,8-PECDF	2,3,7,8-TCDD	2,3,7,8-TCDF
Residential Soil Remediation Level[3,4]				pg/g	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	45	NE
Non-Residential Soil Remediation Level[5]				pg/g	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	160	NE
13S	GS-FD09-052316	10	5/23/2016	pg/g	3 U	0.18 U	0.063 U	**0.15 J**	**0.052 J**	**0.23 J**	0.055 U	**0.35 J**	**0.16 J**	0.065 U	0.05 U	**0.066 J**	0.051 U	0.039 U	0.026 U
13S	GS-13S20-052316	20	5/23/2016	pg/g	0.18 U	0.047 U	0.06 U	0.036 U	0.026 U	0.035 U	0.024 U	0.031 U	**0.054 J**	0.049 U	0.039 U	0.025 U	0.04 U	0.031 U	0.021 U
14S	GS-14S15-052316	15	5/23/2016	pg/g	0.39 U	0.078 U	0.055 U	0.037 U	0.032 U	0.036 U	0.03 U	0.031 U	0.033 U	0.075 U	0.045 U	0.031 U	0.046 U	0.047 U	0.04 U
14S	GS-FD10-052316	15	5/23/2016	pg/g	0.27 U	0.058 U	0.047 U	0.04 U	0.026 U	0.039 U	0.024 U	0.034 U	0.027 U	0.063 U	0.04 U	0.026 U	0.04 U	0.056 U	0.039 U
14S	GS-14S30-052316	30	5/23/2016	pg/g	0.19 U	0.13 U	0.047 U	0.043 U	**0.065 J**	0.042 U	0.027 U	**0.065 J**	**0.051 J**	0.057 U	0.058 U	**0.046 J**	0.059 U	0.051 U	0.038 U
15S	GS-15S10-051716	10	5/17/2016	pg/g	1.1 U	0.092 U	0.04 U	0.067 U	0.033 U	0.061 U	0.03 U	**0.096 J**	0.032 U	0.062 U	0.048 U	0.032 U	0.05 U	0.041 U	0.035 U
15S	GS-FD05-051716	10	5/17/2016	pg/g	3.9 U	0.36 U	0.43 U	0.22 U	0.1 U	0.2 U	0.092 U	0.17 U	0.097 U	0.12 U	0.049 U	0.098 U	0.051 U	0.064 U	0.029 U
15S	GS-15S20-051716	20	5/17/2016	pg/g	0.41 U	0.18 U	0.21 U	0.12 U	0.057 U	0.11 U	0.052 U	0.096 U	0.055 U	0.13 U	0.034 U	0.056 U	0.035 U	0.048 U	0.022 U
19S	GS-19S15-051616	15	5/16/2016	pg/g	30 U	**5.4 J**	2.4 U	1.1 U	**1.6 J**	1.1 U	1 U	**3.6 J**	**1.5 J**	0.9 U	0.86 U	**1.1 J**	0.87 U	0.8 U	**0.65 J**
19S	GS-19S17-051716	17	5/17/2016	pg/g	0.67 U	**0.22 J**	**0.17 J**	0.058 U	**0.12 J**	0.056 U	0.087 U	0.049 U	0.04 U	0.071 U	0.05 U	**0.11 J**	0.051 U	0.065 U	0.053 U
19S	GS-19S30-051616	30	5/16/2016	pg/g	0.21 U	0.064 U	0.081 U	0.067 U	0.051 U	0.065 U	0.047 U	0.057 U	0.052 U	0.095 U	0.077 U	0.05 U	0.078 U	0.11 U	0.058 U
20S	GS-20S15-052316	15	5/23/2016	pg/g	0.9 U	0.24 U	0.074 U	0.069 U	0.071 U	**0.24 J**	0.065 U	0.058 U	0.072 U	0.097 U	0.085 U	0.069 U	0.086 U	0.076 U	0.076 U
20S	GS-20S30-052316	30	5/23/2016	pg/g	0.58 U	0.16 U	0.054 U	0.057 U	**0.073 J**	0.055 U	0.09 U	**0.14 J**	**0.15 J**	0.081 U	0.053 U	0.032 U	0.054 U	0.051 U	0.043 U

See notes on last page.

TABLE 2-9

Summary of Pre-design Testing Analytical Data for Soil, Dioxin and Furan Compounds

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	OCDD	OCDF	Total HPCDD	Total HPCDF	Total HXCDD	Total HXCDF	Total PECDD	Total PECDF	Total TCDD	Total TCDF
Residential Soil Remediation Level[3,4]				pg/g	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Non-Residential Soil Remediation Level[5]				pg/g	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
1D	GS-1D5-050516	5	5/5/2016	pg/g	**37**	1 U	4.9 U	0.46 U	**0.97 J**	0.31 U	**0.061 J**	**0.34 J**	**0.11 J**	**0.14 J**
1D	GS-1D15-050516	15	5/5/2016	pg/g	1.7 U	0.35 U	0.47 U	0.082 U	0.059 U	0.045 U	0.07 U	0.044 U	0.052 U	0.039 U
1D	GS-1D35-050516	35	5/5/2016	pg/g	1.7 U	0.21 U	0.37 U	0.058 U	0.038 U	0.063 U	0.037 U	0.032 U	0.03 U	0.022 U
1D	GS-1D55-050516	55	5/5/2016	pg/g	0.86 U	0.2 U	0.29 U	0.055 U	**0.071 J**	0.045 U	0.043 U	0.034 U	0.042 U	0.02 U
2D	GS-2D25-050416	25	5/4/2016	pg/g	13 U	0.36 U	2.1 U	0.33 U	**0.16 J**	0.3 U	0.051 U	**0.42 J**	0.044 U	0.032 U
2D	GS-FD01-050416	25	5/4/2016	pg/g	16 U	0.43 U	2.7 U	0.38 U	**0.19 J**	0.27 U	0.043 U	**0.33 J**	**0.052 J**	0.031 U
2D	GS-2D45-050416	45	5/4/2016	pg/g	1.1 U	0.28 U	0.29 U	0.074 U	0.046 U	0.031 U	0.045 U	0.033 U	**0.12 J**	0.022 U
2D	GS-2D65-050416	65	5/4/2016	pg/g	1.1 U	0.29 U	0.25 U	0.074 U	0.05 U	0.041 U	0.054 U	0.049 U	0.05 U	0.033 U
3D	GS-3D15-051016	15	5/10/2016	pg/g	3.7 U	0.23 U	0.82 U	0.13 U	0.058 U	0.035 U	0.043 U	0.045 U	0.037 U	**0.074 J**
3D	GS-3D35-051016	35	5/10/2016	pg/g	0.76 U	0.18 U	0.24 U	0.043 U	0.041 U	0.028 U	0.037 U	0.029 U	0.031 U	0.022 U
4D	GS-4D5-051316	5	5/13/2016	pg/g	**68**	0.22 U	8.7 U	0.15 U	**1.7 J**	0.16 U	0.051 U	**0.47 J**	**0.15 J**	**0.12 J**
4D	GS-4D20-051316	20	5/13/2016	pg/g	1.2 U	0.12 U	0.13 U	0.044 U	0.061 U	0.021 U	0.033 U	0.028 U	0.029 U	0.018 U
4D	GS-4D50-051316	50	5/13/2016	pg/g	0.58 U	0.21 U	0.11 U	0.032 U	0.033 U	0.027 U	0.042 U	0.027 U	0.028 U	0.02 U
5D	GS-5D05-051716	5	5/17/2016	pg/g	**410**	**15**	**130**	**23**	**15 J**	**49**	**2 J**	**37**	**1.1 J**	**6.3 J**
5D	GS-5D25-051716	25	5/17/2016	pg/g	1.3 U	0.041 U	0.32 U	0.054 U	0.037 U	0.033 U	0.057 U	0.054 U	0.041 U	0.027 U
5D	GS-5D45-051716	45	5/17/2016	pg/g	2 U	1.3 U	0.44 U	**0.44 J**	**0.58 J**	0.72 U	**0.19 J**	**0.39 J**	0.04 U	**0.04 J**
5D	GS-FD06-051716	45	5/17/2016	pg/g	0.86 U	0.13 U	0.25 U	0.056 U	0.043 U	0.029 U	0.052 U	0.046 U	0.036 U	0.026 U
6D	GS-6D5-051316	5	5/13/2016	pg/g	**130**	1.3 U	**22**	**1.7 J**	**4 J**	**6.6 J**	**0.5 J**	**6.9 J**	**0.51 J**	**1.6 J**
6D	GS-6D20-051316	20	5/13/2016	pg/g	1 U	0.61 U	0.34 U	0.095 U	**0.053 J**	0.24 U	0.037 U	0.026 U	0.027 U	0.017 U
6D	GS-6D50-051616	50	5/16/2016	pg/g	2.1 U	0.31 U	0.44 U	0.077 U	0.057 U	0.045 U	0.076 U	0.066 U	0.058 U	0.043 U
7D	GS-7D15-052016	15	5/20/2016	pg/g	13 U	0.96 U	1.8 U	0.47 U	0.57 U	3.3 U	0.79 U	**5.3 J**	0.81 U	0.73 U
7D	GS-7D19-052016	19	5/20/2016	pg/g	7.1 U	0.29 U	1.8 U	0.15 U	**0.042 J**	0.049 U	0.038 U	0.035 U	0.029 U	0.028 U
7D	GS-7D25-052016	25	5/20/2016	pg/g	2.4 U	0.13 U	1.2 U	0.078 U	0.034 U	0.03 U	0.035 U	0.028 U	0.038 U	0.034 U
7D	GS-7D45-052016	45	5/20/2016	pg/g	1.1 U	0.038 U	0.17 U	0.08 U	0.076 U	0.039 U	0.047 U	0.045 U	0.036 U	0.023 U
7D	GS-7D65-052016	65	5/20/2016	pg/g	14 U	0.69 U	5.6 U	**0.53 J**	**1.1 J**	0.23 U	0.058 U	0.05 U	**0.081 J**	0.024 U
8D	GS-8D10-051916	10	5/19/2016	pg/g	16 U	0.62 U	2.2 U	**0.58 J**	**0.91 J**	0.87 U	**0.3 J**	**0.34 J**	0.053 U	**0.37 J**
8D	GS-8D16-052016	16	5/20/2016	pg/g	8.4 U	0.25 U	1.4 U	0.16 U	0.22 U	0.21 U	0.3 U	**0.28 J**	0.34 U	**0.86 J**
8D	GS-8D40-051916	40	5/19/2016	pg/g	7.1 U	0.78 U	2.1 U	0.35 U	0.15 U	0.17 U	0.22 U	0.18 U	0.23 U	0.21 U
9S	GS-9S03-050316	3	5/3/2016	pg/g	**600**	**43**	**520**	**56**	**37**	**98**	**3.6 J**	**140**	**2.3 J**	**49 J**
9S	GS-9S10-050316	10	5/3/2016	pg/g	33 U	0.56 U	3.6 U	0.27 U	**0.6 J**	0.13 U	0.054 U	0.04 U	0.043 U	0.036 U
9S	GS-9S20-050316	20	5/3/2016	pg/g	5.9 U	0.25 U	0.66 U	0.05 U	0.042 U	0.027 U	0.042 U	0.029 U	0.042 U	0.03 U
10S	GS-10S10-050916	10	5/9/2016	pg/g	30 U	0.063 U	3.5 U	0.083 U	**0.81 J**	0.12 U	0.06 U	0.055 U	0.047 U	0.029 U
10S	GS-10S20-050916	20	5/9/2016	pg/g	7.4 U	0.81 U	1.8 U	0.92 U	**0.39 J**	1.1 U	0.055 U	**1.6 J**	0.037 U	**0.35 J**
12S	GS-12S15-052316	15	5/23/2016	pg/g	8.1 U	0.38 U	1 U	0.17 U	**0.32 J**	0.14 U	0.064 U	0.05 U	0.041 U	0.038 U
12S	GS-FD08-052316	15	5/23/2016	pg/g	7.2 U	0.28 U	0.92 U	0.14 U	**0.2 J**	0.05 U	0.057 U	0.045 U	0.042 U	0.03 U
12S	GS-12S30-052316	30	5/23/2016	pg/g	0.59 U	0.14 U	0.26 U	0.081 U	0.028 U	0.025 U	0.044 U	0.032 U	0.03 U	0.018 U
13S	GS-13S10-052316	10	5/23/2016	pg/g	**77 J**	0.29 U	8.8 U	0.12 U	**1.7 J**	0.36 U	0.057 U	0.048 U	**0.081 J**	0.021 U

See notes on last page.

TABLE 2-9

Summary of Pre-design Testing Analytical Data for Soil, Dioxin and Furan Compounds

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Sample Depth (ft bgs)[1]	Sample Date	Units[2]	OCDD	OCDF	Total HPCDD	Total HPCDF	Total HXCDD	Total HXCDF	Total PECDD	Total PECDF	Total TCDD	Total TCDF
Residential Soil Remediation Level[3,4]				pg/g	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Non-Residential Soil Remediation Level[5]				pg/g	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
13S	GS-FD09-052316	10	5/23/2016	pg/g	**50 J**	0.23 U	7.3 U	0.18 U	**1.5 J**	0.33 U	0.065 U	0.051 U	0.039 U	0.026 U
13S	GS-13S20-052316	20	5/23/2016	pg/g	1.1 U	0.16 U	0.34 U	0.06 U	0.036 U	0.054 U	0.049 U	0.04 U	0.031 U	0.021 U
14S	GS-14S15-052316	15	5/23/2016	pg/g	2.6 U	0.19 U	0.87 U	0.078 U	**0.073 J**	0.033 U	0.075 U	0.046 U	0.047 U	0.04 U
14S	GS-FD10-052316	15	5/23/2016	pg/g	3.5 U	0.14 U	0.52 U	0.058 U	0.04 U	0.027 U	0.063 U	0.04 U	0.056 U	0.039 U
14S	GS-14S30-052316	30	5/23/2016	pg/g	0.9 U	0.31 U	0.33 U	0.13 U	**0.065 J**	0.16 U	0.057 U	0.059 U	0.051 U	0.038 U
15S	GS-15S10-051716	10	5/17/2016	pg/g	16 U	0.23 U	2.1 U	0.092 U	**0.096 J**	0.033 U	0.062 U	0.05 U	0.041 U	0.035 U
15S	GS-FD05-051716	10	5/17/2016	pg/g	**48 J**	0.37 U	7.4 U	0.43 U	0.22 U	0.1 U	0.12 U	0.051 U	0.064 U	0.029 U
15S	GS-15S20-051716	20	5/17/2016	pg/g	3.1 U	0.14 U	0.41 U	0.21 U	0.12 U	0.057 U	0.13 U	0.035 U	0.048 U	0.022 U
19S	GS-19S15-051616	15	5/16/2016	pg/g	**1,000 J**	25 U	61 U	**5.4 J**	**3.6 J**	5.3 U	0.9 U	0.87 U	0.8 U	**1.3 J**
19S	GS-19S17-051716	17	5/17/2016	pg/g	5.7 U	0.52 U	1.3 U	**0.39 J**	**0.63 J**	0.89 U	0.071 U	**0.54 J**	0.065 U	**0.32 J**
19S	GS-19S30-051616	30	5/16/2016	pg/g	1.7 U	0.23 U	0.4 U	0.081 U	0.067 U	0.052 U	0.095 U	0.078 U	0.11 U	0.058 U
20S	GS-20S15-052316	15	5/23/2016	pg/g	2.3 U	0.31 U	1.9 U	0.24 U	**1 J**	0.072 U	0.097 U	0.086 U	0.076 U	0.076 U
20S	GS-20S30-052316	30	5/23/2016	pg/g	5.4 U	0.39 U	1.1 U	0.16 U	**0.14 J**	0.32 U	0.081 U	0.054 U	0.051 U	0.043 U

Notes:

1. ft bgs = feet below ground surface
2. pg/kg = picogram per kilogram
3. Residential Soil Remediation Levels (SRLs) represent the lowest available residential SRL.
4. Cells highlighted in yellow indicate that the compound exceeded the 2007 residential SRL.
5. Cells highlighted in red indicate the compound exceeded the 2007 non-residential SRL.
6. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10, 2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   UJ = Analyte was not detected, and the specified detection limit might not be accurate or precise.
   J = Analyte is present but the reported value might not be accurate or precise (estimate).
   R = The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
7. Detected results are bolded.

TABLE 2-10

Summary of Waste Characterization Results - Pre-design Testing Investigation

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	11S	12S	14S	18S	1D	8D		9S	IDW		IDW
Sample ID	GS-11S8-051216	GS-12S03-052316	GS-14S03-052316	GS-18S3-051216	GS-1D10-050516	GS-8D1-050616	GS-8D10-051916	GS-9S03-050316	GW-IDW-BIN56112-	GW-IDW-BIN56113-	BIN56111-111016
Sample Depth (ft)	8	3	3	3	10	1	10	3	--	--	--
Sample Date	5/12/2016	5/23/2016	5/23/2016	5/12/2016	5/5/2016	5/6/2016	5/19/2016	5/3/2016	5/24/2016	5/24/2016	11/10/2016
Cyanide (mg/kg)											
Cyanide	0.052 U	NA	NA	NA	NA	NA	NA	NA	**0.13 J**	**0.16 J**	**0.23 J**
PCBs (mg/kg)											
Aroclor-1260	0.38 U	0.037 U	0.008 U	0.19 U	0.0072 U	NA	0.077 U	0.15 U	0.014 U	0.0071 U	0.019 U
Aroclor-1254	0.94 U	0.092 U	0.02 U	0.47 U	0.018 U	NA	0.19 U	0.37 U	0.035 U	0.018 U	0.019 U
Aroclor-1221	0.94 U	0.092 U	0.02 U	0.47 U	0.018 U	NA	0.19 U	0.37 U	0.035 U	0.018 U	0.023 U
Aroclor-1232	0.94 U	0.092 U	0.02 U	0.47 U	0.018 U	NA	0.19 U	0.37 U	0.035 U	0.018 U	0.02 U
Aroclor-1248	0.94 U	0.092 U	0.02 U	0.47 U	0.018 U	NA	0.19 U	0.37 U	0.035 U	0.018 U	0.02 U
Aroclor-1016	0.38 U	0.037 U	0.008 U	0.19 U	0.0072 U	NA	0.077 U	0.15 U	0.014 U	0.0071 U	0.02 U
Aroclor-1242	0.94 U	0.092 U	0.02 U	0.47 U	0.018 U	NA	0.19 U	0.37 U	0.035 U	0.018 U	0.02 U
VOCs (mg/kg)											
1,1,1,2-Tetrachloroethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.012 U
1,1,1-Trichloroethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.013 U
1,1,2,2-Tetrachloroethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.013 U
1,1,2-Trichloroethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.023 U
1,1-Dichloroethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0096 U
1,1-Dichloroethene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.014 U
1,1-Dichloropropene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.011 U
1,2,3-Trichlorobenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.013 U
1,2,3-Trichloropropane	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.012 U
1,2,4-Trichlorobenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	0.13 U	0.028 U	0.031 U	0.029 U	0.011 U
1,2,4-Trimethylbenzene	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.01 U
1,2-Dichloroethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.019 U
1,2-Dichlorobenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	0.12 U	0.028 U	0.031 U	0.029 U	**0.016 J**
1,2-Dibromo-3-Chloropropane	6.3 U	0.094 U	0.09 U	0.081 U	NA	NA	8.6 U	0.079 U	0.088 U	0.082 U	0.074 U
1,2-Dibromoethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.011 U
1,2-Dichloropropane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.011 U
1,3,5-Trimethylbenzene	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.0069 U
1,3-Dichlorobenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	0.12 U	0.028 U	0.031 U	0.029 U	0.0081 U
1,3-Dichloropropane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.011 U
1,4-Dichlorobenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	0.12 U	0.028 U	0.031 U	0.029 U	0.0074 U
2,2-Dichloropropane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.017 U

See last page for notes.

TABLE 2-10

Summary of Waste Characterization Results - Pre-design Testing Investigation

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	11S	12S	14S	18S	1D	8D		9S	IDW		IDW
Sample ID	GS-11S8-051216	GS-12S03-052316	GS-14S03-052316	GS-18S3-051216	GS-1D10-050516	GS-8D1-050616	GS-8D10-051916	GS-9S03-050316	GW-IDW-BIN56112-	GW-IDW-BIN56113-	BIN56111-111016
Sample Depth (ft)	8	3	3	3	10	1	10	3	--	--	--
Sample Date	5/12/2016	5/23/2016	5/23/2016	5/12/2016	5/5/2016	5/6/2016	5/19/2016	5/3/2016	5/24/2016	5/24/2016	11/10/2016
2-Chloroethyl vinyl ether	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA
2-Chlorotoluene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0077 U
2-Hexanone	9 U	0.13 U	0.13 U	0.12 U	NA	NA	12 U	0.11 U	0.13 U	0.12 U	0.057 U
4-Chlorotoluene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0087 U
p-Cymene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	**0.014 J**
Acetone	45 U	0.67 U	0.64 U	0.58 U	NA	NA	62 U	0.56 U	0.63 U	0.59 U	0.4 U
Acrolein	NA	NA	NA	NA	NA	NA	NA	0.1 U	NA	NA	NA
Acrylonitrile	NA	NA	NA	NA	NA	NA	NA	0.056 U	NA	NA	NA
Benzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0098 U
Bromobenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.011 U
Bromochloromethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.015 U
Bromodichloromethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.014 U
Bromoform	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.024 U
Bromomethane	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.03 U
Carbon disulfide	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.019 U
Carbon tetrachloride	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.012 U
Chlorobenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0086 U
Chloroethane	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.015 U
Chloroform	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0077 U
Chloromethane	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.021 U
cis-1,2-Dichloroethene	5 U	0.074 U	0.071 U	0.063 U	NA	NA	6.8 U	0.062 U	0.069 U	0.065 U	0.011 U
cis-1,3-Dichloropropene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.014 U
Dibromochloromethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0088 U
Dibromomethane	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.017 U
Dichlorodifluoromethane	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.018 U
Ethyl tert-butyl ether	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	NA
Ethylbenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	**3.74 J**	0.028 U	0.031 U	0.029 U	0.0084 U
Hexachlorobutadiene	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	0.15 U	0.056 U	0.063 U	0.059 U	0.011 U
Isopropylbenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.011 U
2-Butanone	9 U	0.13 U	0.13 U	0.12 U	NA	NA	12 U	0.11 U	0.13 U	0.12 U	0.13 U
4-Methyl-2-pentanone	9 U	0.13 U	0.13 U	0.12 U	NA	NA	12 U	0.11 U	0.13 U	0.12 U	0.054 U
Methyl tert-butyl ether	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.016 U

See last page for notes.

TABLE 2-10

Summary of Waste Characterization Results - Pre-design Testing Investigation

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	11S	12S	14S	18S	1D	8D		9S	IDW		IDW
Sample ID	GS-11S8-051216	GS-12S03-052316	GS-14S03-052316	GS-18S3-051216	GS-1D10-050516	GS-8D1-050616	GS-8D10-051916	GS-9S03-050316	GW-IDW-BIN56112-	GW-IDW-BIN56113-	BIN56111-111016
Sample Depth (ft)	8	3	3	3	10	1	10	3	--	--	--
Sample Date	5/12/2016	5/23/2016	5/23/2016	5/12/2016	5/5/2016	5/6/2016	5/19/2016	5/3/2016	5/24/2016	5/24/2016	11/10/2016
Methylene chloride	23 U	0.34 U	0.32 U	0.29 U	NA	NA	31 U	0.28 U	0.31 U	0.29 U	0.05 U
n-Butylbenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	**0.019 J**
n-Propylbenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	**0.022 J**
p-Cymene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	**0.014 J**
Tetrachloroethene	2.7 U	0.04 U	0.039 U	0.035 U	NA	NA	3.7 U	0.034 U	0.038 U	0.035 U	0.01 U
sec-Butylbenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0067 U
Styrene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0053 U
Trichloroethene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0083 U
tert-Butyl alcohol	45 U	0.67 UJ	0.64 UJ	0.58 U	NA	NA	62 U	0.56 U	0.63 U	0.59 U	NA
tert-Butylbenzene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0079 U
Toluene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.011 U
trans-1,2-Dichloroethene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0096 U
trans-1,3-Dichloropropene	2.3 U	0.034 U	0.032 U	0.029 U	NA	NA	3.1 U	0.028 U	0.031 U	0.029 U	0.0096 U
Trichlorofluoromethane	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.0095 U
Vinyl chloride	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.008 U
Total Xylenes	4.5 U	0.067 U	0.064 U	0.058 U	NA	NA	6.2 U	0.056 U	0.063 U	0.059 U	0.021 U
SVOCs (mg/kg)											
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	0.13 U	0.65 U	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	0.18 U	0.88 U	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	0.13 U	0.65 U	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	0.22 U	1.1 U	NA	NA	NA
2,4-dinitrophenol	NA	NA	NA	NA	NA	NA	0.2 U	0.95 U	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	0.1 U	0.5 U	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	0.11 U	0.55 U	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	0.12 U	0.6 U	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	0.1 U	0.5 U	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	0.088 U	0.43 U	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	0.12 U	0.59 U	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	0.13 U	0.64 U	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	0.24 U	1.2 U	NA	NA	NA
3,4-Methylphenol	NA	NA	NA	NA	NA	NA	0.077 U	0.37 U	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	0.13 U	0.62 U	NA	NA	NA

See last page for notes.

TABLE 2-10

Summary of Waste Characterization Results - Pre-design Testing Investigation

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	11S	12S	14S	18S	1D	8D		9S	IDW		IDW
Sample ID	GS-11S8-051216	GS-12S03-052316	GS-14S03-052316	GS-18S3-051216	GS-1D10-050516	GS-8D1-050616	GS-8D10-051916	GS-9S03-050316	GW-IDW-BIN56112-	GW-IDW-BIN56113-	BIN56111-111016
Sample Depth (ft)	8	3	3	3	10	1	10	3	--	--	--
Sample Date	5/12/2016	5/23/2016	5/23/2016	5/12/2016	5/5/2016	5/6/2016	5/19/2016	5/3/2016	5/24/2016	5/24/2016	11/10/2016
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	0.2 U	0.98 U	NA	NA	NA
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	0.11 U	0.53 U	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	0.1 U	0.5 U	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	0.13 U	0.65 U	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	0.12 U	0.6 U	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	0.16 U	0.79 U	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA	NA	0.13 U	0.61 U	NA	NA	NA
Aniline	NA	NA	NA	NA	NA	NA	0.1 U	0.5 U	NA	NA	NA
Azobenzene	NA	NA	NA	NA	NA	NA	0.11 U	0.53 U	NA	NA	NA
Benzidine	NA	NA	NA	NA	NA	NA	1.1 U	5.4 U	NA	NA	NA
Benzoic Acid	NA	NA	NA	NA	NA	NA	0.2 U	0.97 U	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA	NA	0.087 U	0.42 U	NA	NA	NA
Bis (2-chloroethoxy) methane	NA	NA	NA	NA	NA	NA	0.14 U	0.66 U	NA	NA	NA
Bis (2-chloroethyl) ether	NA	NA	NA	NA	NA	NA	0.13 U	0.63 U	NA	NA	NA
Bis (2-ethylhexyl) phthalate	NA	NA	NA	NA	NA	NA	0.16 U	0.79 U	NA	NA	NA
Bis(2-chloroisopropyl) ether	NA	NA	NA	NA	NA	NA	0.12 U	0.56 U	NA	NA	NA
Butyl benzylphthalate	NA	NA	NA	NA	NA	NA	0.16 U	0.77 U	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	**0.174 J**	**1.39 J**	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	0.12 U	0.58 U	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	0.15 U	0.73 U	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	**0.445 J**	0.59 U	NA	NA	NA
Diethyl phthalate	NA	NA	NA	NA	NA	NA	0.15 U	0.71 U	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	0.2 U	0.97 U	NA	NA	NA
Diphenyl amine	NA	NA	NA	NA	NA	NA	0.1 U	0.51 U	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	0.08 U	0.39 U	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	0.14 U	0.69 U	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	0.12 U	0.56 U	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	0.14 U	0.66 U	NA	NA	NA
N-Nitrosodi-n-propylamine	NA	NA	NA	NA	NA	NA	0.15 U	0.72 U	NA	NA	NA
N-nitrosodimethylamine	NA	NA	NA	NA	NA	NA	0.076 U	0.37 U	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	0.14 U	0.67 U	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	0.22 U	1.1 U	NA	NA	NA

See last page for notes.

TABLE 2-10

Summary of Waste Characterization Results - Pre-design Testing Investigation

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	11S	12S	14S	18S	1D	8D		9S	IDW		IDW
Sample ID	GS-11S8-051216	GS-12S03-052316	GS-14S03-052316	GS-18S3-051216	GS-1D10-050516	GS-8D1-050616	GS-8D10-051916	GS-9S03-050316	GW-IDW-BIN56112-	GW-IDW-BIN56113-	BIN56111-111016
Sample Depth (ft)	8	3	3	3	10	1	10	3	--	--	--
Sample Date	5/12/2016	5/23/2016	5/23/2016	5/12/2016	5/5/2016	5/6/2016	5/19/2016	5/3/2016	5/24/2016	5/24/2016	11/10/2016
Phenol	NA	NA	NA	NA	NA	NA	0.038 U	0.19 U	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA	0.058 U	0.28 U	NA	NA	NA
PAHs (mg/kg)											
1-Methylnaphthalene	**115 J**	**0.0246 J**	0.00068 U	**0.147 J**	0.00062 U	NA	**10.1**	**0.0728 J**	**0.0732**	**0.0202**	NA
2-Methylnaphthalene	**215 J**	**0.0268 J**	0.00048 U	**0.154 J**	0.00044 U	NA	**14.4**	**0.0925**	**0.0958**	**0.0169**	NA
Acenaphthene	**1100 J**	**0.0705 J**	0.00054 U	0.077 U	0.00049 U	NA	**1.18**	**0.936 J**	**0.0141**	**0.0591**	0.008 U
Acenaphthylene	3.6 U	**0.208**	0.0007 U	**1.58**	0.00064 U	NA	**5.12**	**0.0768**	**0.08**	**0.108**	0.008 U
Anthracene	**1340 J**	**0.206**	0.00057 U	**0.953**	0.00052 U	NA	**3.75**	**2.22 J**	**0.0419**	**0.241**	0.008 U
Benzo(a)anthracene	**3290 J**	**1.67**	**0.007**	**7.49**	**0.00047 J**	NA	**3.6**	**8.27**	**0.0904**	**0.421**	**0.044 J**
Benzo(a)pyrene	**3290 J**	**2.99**	**0.0105**	**21.7**	**0.00062 J**	NA	**4.32**	**8.18**	**0.165**	**0.442**	**0.069 J**
Benzo(b)fluoranthene	**2880 J**	**3.26**	**0.011**	**17.9**	**0.00063 J**	NA	**2.18**	**8.35**	**0.149**	**0.338**	**0.087 J**
Benzo(g,h,i)perylene	**1920 J**	**5.45**	**0.0253**	**38.8**	**0.0014 J**	NA	**3.09**	**4.09**	**0.383**	**0.4**	**0.11 J**
Benzo(k)fluoranthene	**2250 J**	**2.1**	**0.0105**	**11.2**	0.00058 U	NA	**2.53**	**7**	**0.113**	**0.294**	**0.031 J**
Chrysene	**2800 J**	**2.18**	**0.0106**	**12.3**	0.0006 U	NA	**3.64**	**8.34**	**0.118**	**0.402**	**0.052 J**
Dibenzo(a,h)anthracene	**744 J**	**0.391**	0.00082 U	**1.26**	0.00075 U	NA	**0.389 J**	**1.04 J**	**0.0243**	**0.0508**	**0.016 J**
Fluoranthene	**6390 J**	**3.76**	**0.0148**	**30**	**0.00074 J**	NA	**11.2**	**17.9**	**0.235**	**1.15**	**0.11 J**
Fluorene	**831 J**	**0.0598 J**	0.0006 U	**0.314 J**	0.00054 U	NA	**3.78**	**0.374**	**0.0455**	**0.111**	0.008 U
Indeno(1,2,3-c,d)pyrene	**2630 J**	**4.52**	**0.023**	**28.2**	**0.001 J**	NA	**2.74**	**5.39**	**0.302**	**0.381**	**0.084 J**
Naphthalene	**1010 J**	**0.421**	0.0006 U	**2.52**	0.00055 U	NA	**187**	**1.05 J**	**1.71**	**0.0826 J**	0.008 U
Phenanthrene	**5300 J**	0.943 U	**0.0035 J**	**11.6**	0.0004 U	NA	**24.7**	**9.71**	**0.257**	**1.24**	**0.057 J**
Pyrene	**3780 J**	**5.92 J**	**0.0231**	**38.3**	**0.001 J**	NA	**17.2**	**13.6**	**0.291**	**1.3**	**0.12 J**
Petroleum Hydrocarbons (mg/kg)											
TPH (C6-C10)	**8.07 J**	3.4 U	3.2 U	3 U	4.1 U	NA	**32**	NA	2.8 U	2.7 U	NA
TPH (C10-C22)	**55500 J**	**63.5**	30 U	**634**	27 U	NA	**886**	NA	27 U	26 U	29 U
TPH (C10-C32)	**189000 J**	**442**	90 U	**3090**	82 U	NA	**1150**	NA	**146 J**	79 U	130 U
TPH (C22-C32)	**134000 J**	**378**	60 U	**2460**	54 U	NA	**267**	NA	**121**	53 U	97 U
TCLP VOCs (mg/L)											
1,1-DCE_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	.023 U
1,2-DCA_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.031 U
1,4-DCB_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.017 U
Benzene_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.012 U
Carbon tetrachloride_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.015 U

See last page for notes.

TABLE 2-10

Summary of Waste Characterization Results - Pre-design Testing Investigation

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	11S	12S	14S	18S	1D	8D		9S	IDW		IDW
Sample ID	GS-11S8-051216	GS-12S03-052316	GS-14S03-052316	GS-18S3-051216	GS-1D10-050516	GS-8D1-050616	GS-8D10-051916	GS-9S03-050316	GW-IDW-BIN56112-	GW-IDW-BIN56113-	BIN56111-111016
Sample Depth (ft)	8	3	3	3	10	1	10	3	--	--	--
Sample Date	5/12/2016	5/23/2016	5/23/2016	5/12/2016	5/5/2016	5/6/2016	5/19/2016	5/3/2016	5/24/2016	5/24/2016	11/10/2016
Chlorobenzene_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.017 U
Chloroform_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.013 U
Methyl ethyl ketone_TCLP	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.22 U
PCE_TCLP	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.018 U
TCE_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.024 U
Vinyl chloride_TCLP	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.018 U
TCLP Metals (mg/lL)											
Arsenic_TCLP	0.026 U	**0.022 J**	**0.029 J**	0.018 U	**0.021 J**	**0.023 J**	0.013 U	**0.018 J**	0.013 U	0.013 U	0.028 U
Barium_TCLP	**0.4 J**	**0.72 J**	**0.42 J**	**0.16 J**	**0.48 J**	**0.18 J**	**1.2**	**0.21 J**	**0.51 J**	**0.49 J**	**0.77 J**
Cadmium_TCLP	**0.0035 J**	0.0015 U	0.0015 U	**0.011**	0.0015 U	0.0015 U	0.0015 U	**0.018**	0.0015 U	0.0015 U	0.003 U
Chromium_TCLP	0.0045 U	0.003 U	**0.0035 J**	0.0055 U	0.003 U	0.003 U	0.003 U	0.003 U	**0.006 J**	**0.0045 J**	0.0059 U
Lead_TCLP	**0.36**	0.0085 U	0.0085 U	**0.29**	0.0085 U	**0.012 J**	0.0085 U	**0.89**	0.0085 U	0.0085 U	0.019 U
Mercury_TCLP	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.00007 U
Selenium_TCLP	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.026 U
Silver_TCLP	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.007 U
Dioxins (pg/g)											
1,2,3,4,6,7,8-HPCDD	NA	NA	NA	NA	NA	NA	1.1 U	**74**	NA	NA	NA
1,2,3,4,6,7,8-HPCDF	NA	NA	NA	NA	NA	NA	**0.33 J**	**15**	NA	NA	NA
1,2,3,4,7,8,9-HPCDF	NA	NA	NA	NA	NA	NA	**0.25 J**	**1.7 J**	NA	NA	NA
1,2,3,4,7,8-HXCDD	NA	NA	NA	NA	NA	NA	**0.11 J**	**0.9 J**	NA	NA	NA
1,2,3,4,7,8-HXCDF	NA	NA	NA	NA	NA	NA	**0.13 J**	**3.7 J**	NA	NA	NA
1,2,3,6,7,8-HXCDD	NA	NA	NA	NA	NA	NA	**0.16 J**	**2.6 J**	NA	NA	NA
1,2,3,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	0.11 U	**4.2 J**	NA	NA	NA
1,2,3,7,8,9-HXCDD	NA	NA	NA	NA	NA	NA	**0.32 J**	**2.1 J**	NA	NA	NA
1,2,3,7,8,9-HXCDF	NA	NA	NA	NA	NA	NA	**0.23 J**	0.63 U	NA	NA	NA
1,2,3,7,8-PECDD	NA	NA	NA	NA	NA	NA	**0.094 J**	**0.63 J**	NA	NA	NA
1,2,3,7,8-PECDF	NA	NA	NA	NA	NA	NA	0.048 U	**2.4 J**	NA	NA	NA
2,3,4,6,7,8-HXCDF	NA	NA	NA	NA	NA	NA	**0.14 J**	**3.9 J**	NA	NA	NA
2,3,4,7,8-PECDF	NA	NA	NA	NA	NA	NA	0.049 U	**3.6 J**	NA	NA	NA
2,3,7,8-TCDD	NA	NA	NA	NA	NA	NA	0.053 U	**0.21 J**	NA	NA	NA
2,3,7,8-TCDF	NA	NA	NA	NA	NA	NA	**0.13 J**	**2.9**	NA	NA	NA
OCDD	NA	NA	NA	NA	NA	NA	16 U	**600**	NA	NA	NA

See last page for notes.

TABLE 2-10

Summary of Waste Characterization Results - Pre-design Testing Investigation

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Location	11S	12S	14S	18S	1D	8D		9S	IDW		IDW
Sample ID	GS-11S8-051216	GS-12S03-052316	GS-14S03-052316	GS-18S3-051216	GS-1D10-050516	GS-8D1-050616	GS-8D10-051916	GS-9S03-050316	GW-IDW-BIN56112-	GW-IDW-BIN56113-	BIN56111-111016
Sample Depth (ft)	8	3	3	3	10	1	10	3	--	--	--
Sample Date	5/12/2016	5/23/2016	5/23/2016	5/12/2016	5/5/2016	5/6/2016	5/19/2016	5/3/2016	5/24/2016	5/24/2016	11/10/2016
OCDF	NA	NA	NA	NA	NA	NA	0.62 U	**43**	NA	NA	NA
Total HPCDD	NA	NA	NA	NA	NA	NA	2.2 U	**520**	NA	NA	NA
Total HPCDF	NA	NA	NA	NA	NA	NA	**0.58 J**	**56**	NA	NA	NA
Total HXCDD	NA	NA	NA	NA	NA	NA	**0.91 J**	**37**	NA	NA	NA
Total HXCDF	NA	NA	NA	NA	NA	NA	0.87 U	**98**	NA	NA	NA
Total PECDD	NA	NA	NA	NA	NA	NA	**0.3 J**	**3.6 J**	NA	NA	NA
Total PECDF	NA	NA	NA	NA	NA	NA	**0.34 J**	**140**	NA	NA	NA
Total TCDD	NA	NA	NA	NA	NA	NA	0.053 U	**2.3 J**	NA	NA	NA
Total TCDF	NA	NA	NA	NA	NA	NA	**0.37 J**	**49 J**	NA	NA	NA
CHEM (pH units)											
Corrosivity/pH	**9.09**	NA	NA	NA	NA	NA	NA	NA	**9.3**	**11.1**	9.1 J
CHEM (ml/100g)											
Free Liquids	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0 U
CHEM (F)											
Ignitability	> 200	> 200	> 200	> 200	> 200	NA	> 200	> 200	> 200	> 200	0 U
CHEM (PERCENT)											
Moisture	**4.4**	**10**	**17**	**12.2**	**8.5**	NA	**13.8**	**11.1**	**6.7**	**6.4**	NA

Notes:

NA = Not analyzed

J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

mg/kg = Milligrams per Kilogram

mg/l = Milligrams per Liter

ml/100g = milliliter per 100 grams

F = Fahrenheit

pg/g = Picograms per Gram

Bold indicates the analyte was detected

TABLE 2-11

Summary of Pre-design Testing Analytical Data for Groundwater, Polynuclear Aromatic Hydrocarbons (PAHs)

APS Former Grant Street Yard MGP, Phoenix, Arizona

Location	Sample ID	Depth (ft bgs)	Sample ID	Units	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene
ADEQ Aquifer Water Quality Standards					NE	NE	NE	NE	NE	NE	0.2	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
1D	GS-1D110-050616	110	5/6/2016	µg/L	0.011 U	**0.014 J**	0.012 U	0.011 U	0.012 U	0.017 U	0.024 U	0.018 U	0.019 U	0.023 U	0.017 U	0.015 U	0.017 U	0.017 U	0.015 U	0.015 U	**0.021 J**	0.023 U
3D	GS-3D106-051116	106	5/11/2016	µg/L	**0.012 J**	**0.017 J**	0.012 UJ	0.011 UJ	0.012 UJ	0.017 UJ	0.024 UJ	0.018 UJ	0.019 UJ	0.023 UJ	0.017 UJ	0.015 UJ	0.017 UJ	0.017 UJ	0.015 UJ	**0.018 J**	0.017 UJ	0.023 UJ
5D	GS-5D110-051816	110	5/18/2016	µg/L	**0.021 J**	**0.035 J**	0.012 UJ	**0.035 J**	0.012 UJ	**0.04 J**	**0.16 J**	**0.11 J**	**0.17 J**	**0.051 J**	**0.039 J**	**0.019 J**	**0.036 J**	0.017 UJ	**0.13 J**	**0.05 J**	**0.028 J**	**0.066 J**
8D	GS-8D110-052016	110	5/20/2016	µg/L	**0.9 J**	**1.2 J**	**0.14 J**	**0.14 J**	**0.11 J**	0.017 UJ	0.024 UJ	0.018 UJ	0.019 UJ	0.023 UJ	0.017 UJ	0.015 UJ	**0.18 J**	**0.29 J**	0.015 UJ	**5.6**	**1.1 J**	**0.21 J**
8D	GS-FD07-052016	110	5/20/2016	µg/L	**1 J**	**1.4 J**	**0.16 J**	**0.15 J**	**0.14 J**	0.017 UJ	0.024 UJ	0.018 UJ	0.019 UJ	0.023 UJ	0.017 UJ	0.015 UJ	**0.21 J**	**0.34 J**	0.015 UJ	**4.4 J**	**1.2 J**	**0.25 J**
GW1	GS-GW1120-111016	120	11/10/2016	µg/L	**NA**	**NA**	0.32 U	**0.7 U**	0.035 U	0.031 U	0.018 U	0.028 U	0.031 U	0.02 U	0.017 U	0.043 U	0.085 U	0.094 U	0.026 U	0.48 U	**0.1 U**	0.048 U
GW1	GS-FD04-111016	120	11/10/2016	µg/L	**NA**	**NA**	0.31 U	0.69 U	0.034 U	0.031 U	0.017 U	0.027 U	0.03 U	0.02 U	0.016 U	0.042 U	0.083 U	0.092 U	0.025 U	0.47 U	0.099 U	0.047 U

Notes:

1. ft bgs = feet below ground surface
2. NE = Standard not established
3. µg/L = microgram per liter
4. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10, 2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   J = Analyte is present but the reported value might not be accurate or precise (estimated).
   UJ = = Analyte was not detected, and the specified detection limit might not be accurate or precise (estimated).
5. **Detected values are bolded**

TABLE 2-12

Summary of Pre-design Testing Analytical Data for Groundwater, Total Petroleum Hydrocarbon (TPH)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Depth (ft bgs)	Sample ID	Units	TPH (C6-C10)	TPH (C10-C22)	TPH (C10-C32)	TPH (C22-C32)	TPH (C10-C28)	TPH (C25-C40)
ADEQ Aquifer Water Quality Standards					**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
1D	GS-1D110-050616	110	5/6/2016	mg/L	**0.0656**	**2.95 J**	**4.96**	**2.01**	**NA**	**NA**
3D	GS-3D106-051116	106	5/11/2016	mg/L	**0.0366 J**	**0.155**	**0.473**	**0.318**	**NA**	**NA**
5D	GS-5D110-051816	110	5/18/2016	mg/L	**0.073**	**4.53**	**12.2**	**7.69**	**NA**	**NA**
8D	GS-8D110-052016	110	5/20/2016	mg/L	**0.0331 J**	**0.168**	**0.449**	**0.28**	**NA**	**NA**
8D	GS-FD07-052016	110	5/20/2016	mg/L	**0.0331 J**	**0.13**	**0.315**	**0.184**	**NA**	**NA**
GW1	GS-GW1120-111016	120	11/10/2016	mg/L	**NA**	**NA**	**NA**	**NA**	**0.049U**	**0.049U**
GW1	GS-FD04-111016	120	11/10/2016	mg/L	**NA**	**NA**	**NA**	**NA**	**0.049U**	**0.049U**

1. ft bgs = feet below ground surface
2. NE = Standard not established
3. mg/L = milligram per liter
4. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10,2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:

   U = Analyte was not detected at the specified detection limit.

TABLE 2-13

Summary of Pre-design Testing Analytical Data for Groundwater, Volatile Organic Compounds (VOCs)

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Depth (ft bgs)	Sample ID	Units	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dichloroethane	1,2-Dichlorobenzene	1,2-Dibromo-3-Chloropropane	1,2-Dibromoethane	1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane	2-Chloroethyl vinyl ether	2-Chlorotoluene
ADEQ Aquifer Water Quality Standards					**NE**	**200**	**NE**	**5**	**NE**	**7**	**NE**	**NE**	**NE**	**70**	**NE**	**5**	**600**	**0.2**	**0.05**	**5**	**NE**	**NE**	**NE**	**75**	**NE**	**NE**	**NE**
1D	GS-1D110-050616	110	5/6/2016	µg/L	0.3 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U
3D	GS-3D106-051116	106	5/11/2016	µg/L	0.3 UJ	0.2 UJ	0.2 UJ	0.22 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.4 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	NA	0.2 UJ
5D	GS-5D110-051816	110	5/18/2016	µg/L	0.3 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U
8D	GS-8D110-052016	110	5/20/2016	µg/L	0.3 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U
8D	GS-FD07-052016	110	5/20/2016	µg/L	0.3 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U
GW1	GS-GW1120-111016	120	11/10/2016	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW1	GS-FD04-111016	120	11/10/2016	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	Sample ID	Depth (ft bgs)	Sample ID	Units	2-Hexanone	4-Chlorotoluene	p-Cymene	Acetone	Acrolein	Acrylonitrile	Benzene	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Dibromochloromethane	Dibromomethane	Dichlorodifluoromethane
ADEQ Aquifer Water Quality Standards					**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**5**	**100**	**NE**	**NE**	**NE**	**70**	**NE**	**NE**	**NE**	**NE**
1D	GS-1D110-050616	110	5/6/2016	µg/L	2 U	0.26 U	0.2 U	4 U	1 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.47 J**	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
3D	GS-3D106-051116	106	5/11/2016	µg/L	2 UJ	0.26 UJ	0.2 UJ	**18.2 J**	NA	NA	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.22 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	**0.51 J**	0.3 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ
5D	GS-5D110-051816	110	5/18/2016	µg/L	2 U	0.26 U	0.2 U	**27.1**	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.71 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
8D	GS-8D110-052016	110	5/20/2016	µg/L	2 U	0.26 U	0.2 U	4 U	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.45 J**	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
8D	GS-FD07-052016	110	5/20/2016	µg/L	2 U	0.26 U	0.2 U	**6.9 J**	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.22 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.36 J**	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
GW1	GS-GW1120-111016	120	11/10/2016	µg/L	NA	NA	NA	NA	NA	NA	0.12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GW1	GS-FD04-111016	120	11/10/2016	µg/L	NA	NA	NA	NA	NA	NA	0.12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	Sample ID	Depth (ft bgs)	Sample ID	Units	Ethyl tert-butyl ether	Ethylbenzene	Hexachlorobutadiene	Isopropylbenzene	2-Butanone	4-Methyl-2-pentanone	Methyl tert-butyl ether	Methylene chloride	n-Butylbenzene	n-Propylbenzene	p-Cymene	Tetrachloroethene	sec-Butylbenzene	Styrene	Trichloroethene	tert-Butyl alcohol	tert-Butylbenzene	Toluene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	Trichlorofluoromethane	Vinyl chloride	Total Xylene
ADEQ Aquifer Water Quality Standards					**NE**	**700**	**NE**	**NE**	**NE**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**5**	**NE**	**NE**	**5**	**NE**	**NE**	**1000**	**100**	**NE**	**NE**	**2**	**10000**
1D	GS-1D110-050616	110	5/6/2016	µg/L	0.22 U	0.2 U	0.2 U	0.2 U	2 U	1 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U	2.4 U	0.28 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.46 U
3D	GS-3D106-051116	106	5/11/2016	µg/L	0.22 UJ	0.2 UJ	0.2 UJ	0.2 UJ	**2.6 J**	1 UJ	0.2 UJ	2 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.3 UJ	0.2 UJ	0.2 UJ	0.2 UJ	2.4 UJ	0.28 UJ	0.2 UJ	0.2 UJ	0.3 UJ	0.2 UJ	0.2 UJ	0.46 UJ
5D	GS-5D110-051816	110	5/18/2016	µg/L	0.22 U	0.2 U	0.2 U	0.2 U	2 U	1 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U	2.4 U	0.28 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.46 U
8D	GS-8D110-052016	110	5/20/2016	µg/L	0.22 U	0.2 U	0.2 U	0.2 U	2 U	1 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U	2.4 U	0.28 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.46 U
8D	GS-FD07-052016	110	5/20/2016	µg/L	0.22 U	0.2 U	0.2 U	0.2 U	2 U	1 U	0.2 U	2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U	2.4 U	0.28 U	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.46 U
GW1	GS-GW1120-111016	120	11/10/2016	µg/L	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	NA	NA	NA	0.86 U
GW1	GS-FD04-111016	120	11/10/2016	µg/L	NA	0.32 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	NA	NA	NA	NA	0.86 U

Notes:

1. ft bgs = feet below ground surface
2. NE = Standard not established
3. µg/L = microgram per liter
4. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10, 2012.
   These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:
   U = Analyte was not detected at the specified detection limit.
   J = Analyte is present but the reported value might not be accurate or precise (estimated).
   UJ = = Analyte was not detected, and the specified detection limit might not be accurate or precise (estimated).
5. NA = Not analyzed
6. **Detected values are bolded**

TABLE 2-14

Summary of Pre-design Testing Analytical Data for Groundwater, Metals

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Depth (ft bgs)	Sample ID	Units	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
ADEQ Aquifer Water Quality Standards					**50**	**2000**	**5**	**100**	**50**	**2**	**50**	**NE**
1D	GS-1D110-050616	110 - 110	5/6/2016	µg/L	**10.9**	**362**	0.3 U	**31.4**	**7.2 J**	0.02 U	3.3 U	1.5 U
3D	GS-3D106-051116	106 - 106	5/11/2016	µg/L	**38**	**604**	**1.7 J**	**163**	**29.3**	**0.18 J**	**6.3 J**	1.5 U
5D	GS-5D110-051816	110 - 110	5/18/2016	µg/L	**88.3**	**895**	**1.7 J**	**192**	**54.6**	0.02 U	17 U	1.5 U
8D	GS-8D110-052016	110 - 110	5/20/2016	µg/L	**3.6 J**	**409 J**	**0.6 J**	**12.3 J**	**6 J**	**0.054 J**	**4.8 J**	1.5 U
8D	GS-FD07-052016	110 - 110	5/20/2016	µg/L	**11.1 J**	**513 J**	**0.8 J**	**27.2 J**	**11.9 J**	**0.046 J**	**4.2 J**	1.5 U
GW1	GS-GW1120-111016	120	11/10/2016	µg/L	**7.6 J**	**95**	0.8 U	**4.2 J**	**3.0 U**	NA	8.6 U	0.7 U
GW1	GS-FD04-111016	120	11/10/2016	µg/L	**4.8 J**	**99**	0.8 U	**4.2 J**	3.0 U	NA	8.6 U	0.79 U

Notes:

1. ft bgs = feet below ground surface
2. NE = Standard not established
3. µg/L = microgram per liter
4. Data qualifiers were used by the laboratory in accordance with the Arizona Data Qualifiers Revision 4.0 dated October 10,2012. These data qualifiers are included in the lab reports presented in Appendix G. Data validation flags used in this table are:

   U = Analyte was not detected at the specified detection limit.

   J = Analyte is present but the reported value might not be accurate or precise (estimated).

   UJ = = Analyte was not detected, and the specified detection limit might not be accurate or precise (estimated).
5. Values exceeding Aquifer Water Quality Standards are shaded **green.**
6. **Detected values are bolded**

TABLE 4-1

Regulatory Standards

APS Former Grant Street MGP Site, Phoenix, Arizona

Compound	Minimum GPL Value (mg/Kg)	AWQS (mg/L)	Ingestion HBGL Water (mg/L)	Risk-Based Standard for Groundwater (mg/L)	Non-Residential SRL (mg/kg)	Residential SRL (mg/Kg) Carcinogen 10E-6 Risk[b]	Residential SRL (mg/Kg) Carcinogen 10E-5 Risk	Residential SRL (mg/Kg) Non-Carcinogen
1,2,4-Trimethylbenzene	NE	NE	NE	0.012	170	NE	NE	52
2,4-Dinitrotoluene	NE	NE	0.00005	0.012	1,200	NE	NE	120
Acenaphthene	NE	NE	NE	0.37	29,000	NE	NE	3,700
Anthracene	NE	NE	2.1	1.8	240,000	NE	NE	22,000
Benzene	0.70	0.005	0.0012	NE	1.4	0.65	NE	NE
Benzo(a)anthracene	NE	NE	3E-06	NE	21	0.69	6.9	NE
Benzo(a)pyrene	NE	0.0002	3E-06	NE	2.1	0.069	0.69	NE
Benzo(b)fluoranthene	NE	NE	3E-06	NE	2.1	0.69	6.9	NE
Benzo(k)fluoranthene	NE	NE	3E-06	NE	210	6.9	69	NE
bis(2-Ethylhexyl)phthalate	NE	NE	NE	0.0008	1,200	39	390	NE
Chloroform	NE	0.1[a]	0.0057	NE	20	0.94	9.4	NE
Chrysene	NE	NE	3E-06	0.0015	2,000	68	680	NE
Dibenz(a,h)anthracene	NE	NE	3E-06	NE	2.1	0.069	0.69	NE
Dibenzofuran	NE	NE	NE	0.012	140	NE	NE	140
Diethyl phthalate	NE	NE	5.6	NE	490,000	NE	NE	49,000
Ethylbenzene	82	700	NE	NE	400	NE	NE	400
Fluoranthene	NE	NE	0.28	NE	22,000	NE	NE	2,300
Fluorene	NE	NE	0.28	0.24	26,000	NE	NE	2,700
Indeno(1,2,3-c,d)pyrene	NE	NE	3E-06	NE	21	0.69	6.9	NE
Naphthalene	NE	NE	0.028	0.0062	190	NE	NE	56
Pyrene	NE	NE	0.21	0.18	29,000	NE	NE	2,300
sec-Butylbenzene	NE	NE	NE	0.24	220	NE	NE	220
Toluene	159	1	1.4	NE	650	NE	NE	650
Total Xylenes	31	10	14	NE	420	NE	NE	270

Notes:

NE = Standard not Established

mg/L = milligrams per liter

mg/kg = milligrams per kilogram

AWQS = Aquifer Water Quality Standard

HBGL = Health Based Guidance Level (ADEQ, 1992)

SRL = Soil Remediation Level

GPL = Groundwater Protection Level (ADEQ, 2013)

[a] The AWQS value listed for chloroform is the value for total trihalomethanes

[b] If the current or currently intended future use of the contaminated site is a child care facility or school where children below the age of 18 are reasonably expected to be in frequent, repeated contact with the soil, the person conducting remediation shall remediate to a 1 x 10-6 excess lifetime cancer risk.

The Risk-Based Standards for Groundwater were obtained from the GPL model spreadsheets (ADEQ, 2013)

TABLE 4-2

Pre-design Testing Geotechnical Soil Sampling Results Used for the Groundwater Protection Level Model

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Depth (feet)	Volumetric Water Content q_v (%)	Dry Bulk Density (g/cm^3)	Specific Gravity	Fraction Organic Carbon
1D	GS-1D5-050516	5	10.9	--	--	--
1D	GS-1D10-050516	10	8.5	--	--	--
1D	GS-1D15-050516	15	8.2	--	--	0.0065
1D	GS-1D25-050516	25	0.6	1.860	2.898	--
1D	GS-1D35-050516	35	0.3	2.037	2.383	0.0035
1D	GS-1D55-050516	55	3.8	--	2.495	0.0045
1D	GS-1D75-050516	75	4.3	--	--	0.0065
2D	GS-2D5-050416	5	10.0	--	--	--
2D	GS-2D15-050416	15	13.9	--	--	--
2D	GS-2D25-050416	25	2.4	--	2.559	0.0036
2D	GS-FD01-050416	25	1.2	--	--	0.0034
2D	GS-2D45-050416	45	3.9	--	2.355	0.0014
2D	GS-2D65-050416	65	10.5	--	2.366	0.0062
3D	GS-3D5-051016	5	4.2	--	--	--
3D	GS-FD02-051016	5	8.1	--	--	--
3D	GS-3D15-051016	15	7.2	1.719	--	0.013
3D	GS-3D35-051016	35	2.6	--	--	--
3D	GS-3D55-051016	55	13.6	--	--	0.0062
3D	GS-3D75-051016	75	5.4	--	2.400	0.007
4D	GS-4D5-051316	**5**	16.7	--	--	--
4D	GS-4D10-051316	10	13.8	1.669	--	0.0077
4D	GS-4D20-051316	20	2.80	--	--	--
4D	GS-4D30-051316	30	2.5	--	--	--
4D	GS-4D40-051316	40	8.5	2.063	--	0.0037
4D	GS-4D50-051316	50	4	--	--	--
4D	GS-4D60-051316	60	19.8	1.908	--	0.0047
4D	GS-4D70-051316	70	6.5	--	--	--
4D	GS-FD04-051316	70	5.9	--	--	--
5D	GS-5D05-051716	5	11.4	1.514	--	--
5D	GS-5D15-051716	15	12.8	1.605	--	--
5D	GS-5D25-051716	25	1.7	1.709	--	0.0032
5D	GS-5D45-051716	45	6	--	--	--
5D	GS-FD06-051716	45	5.5	--	--	--
5D	GS-5D55-051716	55	13.1	1.941	--	0.0046
5D	GS-5D65-051716	65	6.3	--	--	--
6D	GS-6D5-051316	5	13.3	1.706	--	--
6D	GS-6D10-051316	10	11.9	1.600	--	--
6D	GS-6D20-051316	20	2.3	--	--	--
6D	GS-6D30-051616	30	2.5	1.949	--	--
6D	GS-6D50-051616	50	5.2	--	--	--
6D	GS-6D70-051616	70	3.3	--	--	--
7D	GS-7D05-052016	5	13.5	1.877	--	--
7D	GS-7D15-052016	15	12.7	1.591	--	0.027

See last page for notes.

TABLE 4-2

Pre-design Testing Geotechnical Soil Sampling Results Used for the Groundwater Protection Level Model

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Depth (feet)	Volumetric Water Content q_v (%)	Dry Bulk Density (g/cm^3)	Specific Gravity	Fraction Organic Carbon
7D	GS-7D19-052016	19	1.4	--	--	0.0074
7D	GS-7D25-052016	25	1.2	--	--	--
7D	GS-7D35-052016	35	4.2	1.917	--	0.1
7D	GS-7D45-052016	45	7.2	--	--	--
7D	GS-7D65-052016	65	7.1	1.901	--	0.016
8D	GS-8D05-051916	5	22.8	--	--	--
8D	GS-8D10-051916	10	13.8	1.302	--	--
8D	GS-8D16-052016	16	19.7	--	--	0.024
8D	GS-8D20-051916	20	2.2	1.821	--	0.0039
8D	GS-8D40-051916	40	4.6	--	--	--
8D	GS-8D50-051916	50	6.9	1.640	--	0.0089
8D	GS-8D70-051916	70	8	--	--	--
8D	GS-8D90-052016	90	3.3	--	--	--
9S	GS-9S03-050316	3	11.1	--	--	--
9S	GS-9S10-050316	10	11.2	--	--	--
9S	GS-9S20-050316	20	4.5	--	--	--
10S	GS-10S10-050916	10	12.3	--	--	--
10S	GS-10S15-050916	15	16.6	--	--	--
10S	GS-10S20-050916	20	4.2	--	--	--
10S	GS-10S30-050916	30	4.1	--	--	--
11S	GS-11S5-051216	5	6.4	--	--	--
11S	GS-11S8-051216	8	4.4	--	--	--
11S	GS-11S10-051216	10	11.1	--	--	--
11S	GS-FD03-051216	10	13	--	--	--
11S	GS-11S15-051216	15	16.9	--	--	--
11S	GS-11S20-051216	20	3.1	--	--	--
15S	GS-15S5-051716	5	9.5	--	--	--
15S	GS-15S10-051716	10	9.7	--	--	--
15S	GS-FD05-051716	10	9.3	--	--	--
15S	GS-15S15-051716	15	12	--	--	--
15S	GS-15S20-051716	20	1	--	--	--
15S	GS-15S30-051716	30	3.9	--	--	--
16S	GS-16S5-051216	5	9.4	--	--	--
16S	GS-16S15-051216	15	16.7	--	--	--
16S	GS-16S30-0510216	30	1.7	--	--	--
17S	GS-17S10-051216	10	12.5	--	--	--
17S	GS-17S16-051216	16	10.4	--	--	--
17S	GS-17S20-051216	20	4.9	--	--	--
17S	GS-17S30-05116	30	2.4	--	--	--
18S	GS-18S3-051216	3	12.2	--	--	--
18S	GS-18S10-051216	10	15.9	--	--	--
18S	GS-18S15-051216	15	17.2	--	--	--
18S	GS-18S20-051216	20	2.3	--	--	--
18S	GS-18S30-051216	30	2.8	--	--	--
19S	GS-19S05-051616	5	14.4	--	--	--

See last page for notes.

TABLE 4-2

Pre-design Testing Geotechnical Soil Sampling Results Used for the Groundwater Protection Level Model

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Location	Sample ID	Depth (feet)	Volumetric Water Content q_v (%)	Dry Bulk Density (g/cm^3)	Specific Gravity	Fraction Organic Carbon
19S	GS-19S10-051616	10	11	--	--	--
19S	GS-19S15-051616	15	10.5	--	--	--
19S	GS-19S17-051716	17	3.7	--	--	--
19S	GS-19S30-051616	30	2.1	--	--	--
Maximum			22.80	2.06	2.90	0.1000
Minimum			0.30	1.30	2.36	0.0014
Arithmetic Mean			**8.03**	**1.77**	**2.49**	**0.0119**
Harmonic Mean			3.83	1.74	2.48	0.0052
Median			7.15	1.77	2.40	0.0062
Standard Deviation			5.23	0.19	0.19	
Confidence			3.24	0.12	0.12	
95% UCL			11.26	1.89	2.61	

Notes:

g/cm^3 = grams per cubic centimeter

UCL = Upper Confidence Limit

-- = Not available

Bold arithmetic mean values were used as input parameters for the GPL model.

[a]The average calculated porosity for the Site is based on native soils and not the fill materials present at the Site

TABLE 4-3

Summary of Groundwater Protection Level Model Input Parameters

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Compound	K_{OC} (cm^3/g)	K_H (dim)	Solubility (mg/L)	$T_{1/2}$ Saturated Zone (day)	Groundwater Regulatory Standard Used (mg/L)	Soil Regulatory Standard Used[d] (mg/kg)	Depth to Groundwater (meters)	Distance to Compliance Point (meters)	Average Dry Bulk Density (g/cm^3)	Average Porosity	Average f_{oc}	Groundwater Velocity (cm/day)	Diffusion Layer Thickness (cm)	Depth of Incorporation (meters)	Release Width (meters)	Air Diffusion Coefficient (cm^2/day)	Water Diffusion Coefficient (cm^2/day)	Initial Contaminant Concentration in Soil (mg/kg)
1,2,4-Trimethylbenzene	3.72E+03	2.34E-01	5.70E+01	100,000	0.012[c]	52	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
2,4-Dinitrotoluene	3.64E+02	2.21E-06	2.70E+02	100,000	0.012[c]	120	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Acenaphthene	4.90E+03	6.36E-03	4.24E+00	100,000	0.37[c]	29,000	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Anthracene	2.35E+04	2.67E-03	4.34E-02	100,000	1.8[c]	22,000	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Benzene	5.89E+01	2.28E-01	1.80E+03	1,000	0.005[a]	0.65	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Benzo(a)anthracene	3.50E+06	1.25E-05	9.40E-03	100,000	0.000003[b]	6.9	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Benzo(a)pyrene	9.10E+05	1.40E-05	3.80E-03	100,000	0.0002[a]	0.69	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Benzo(b)fluoranthene	5.50E+05	5.08E-04	1.20E-03	100,000	0.000003[b]	6.9	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Benzo(k)fluoranthene	4.40E+06	1.77E-05	5.50E-04	100,000	0.000003[b]	69	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
bis(2-Ethylhexyl)phthalate	1.65E+05	1.10E-05	2.70E-01	100,000	0.0008[c]	39	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Chloroform	3.98E+01	1.50E-01	7.90E+03	100,000	0.08[c]	9.4	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Chrysene	3.98E+05	3.88E-03	1.60E-03	100,000	0.0015[c]	680	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Dibenz(a,h)anthracene	1.80E+06	7.08E-05	6.00E-04	100,000	0.000003[b]	0.69	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Dibenzofuran	7.76E+03	5.33E-04	3.10E+00	100,000	0.012[c]	140	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Diethyl phthalate	1.05E+02	2.49E-05	1.08E+03	100,000	5.6[b]	49,000	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Ethylbenzene	3.63E+02	3.23E-01	1.70E+02	1,000	0.7	400	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Fluoranthene	5.55E+04	3.62E-04	8.86E-06	100,000	0.28[b]	2,300	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Fluorene	1.38E+04	3.16E-03	1.90E+00	100,000	0.24[c]	2,700	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Indeno(1,2,3-c,d)pyrene	3.10E+07	1.19E-05	1.90E-04	100,000	0.000003[b]	6.9	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Naphthalene (base case)	1.19E+03	1.98E-02	3.10E+01	100,000	0.0062[c]	56	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Naphthalene (alternate 40 feet)	1.19E+03	1.98E-02	3.10E+01	100,000	0.0062[c]	56	32	30.5	1.77	0.25	0.0119	10	0.5	12	10	7,000	0.7	1
Naphthalene (alternate 70 feet)	1.19E+03	1.98E-02	3.10E+01	100,000	0.0062[c]	56	32	30.5	1.77	0.25	0.0119	10	0.5	21	10	7,000	0.7	1
Pyrene	1.05E+05	4.51E-04	1.35E-01	100,000	0.180[c]	2,300	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
sec-Butylbenzene	2.15E+03	7.67E-01	1.70E+01	100,000	0.24[c]	220	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Toluene	1.82E+02	2.72E-01	5.30E+02	1,000	1[a]	650	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1
Total Xylenes	3.86E+02	2.76E-01	1.60E+02	1,000	10[a]	270	32	30.5	1.77	0.25	0.0119	10	0.5	32	10	7,000	0.7	1

Notes:

cm/day = centimeter per day

cm^2/day = centimeter squared per day

g/cm^3 = grams per cubic centimeter

mg/L = milligrams per liter

mg/kg = milligrams per kilogram

dim = Dimensionless

K_{oc} = Partition Coefficient for Organic Carbon

K_H = Henry's Law Coefficient

f_{oc} = Fraction Organic Carbon

$T_{1/2}$ = Half-Life

[a] Arizona Aquifer Water Quality Standard (AWQS) Used

[b] Former Arizona Health Based Guidance Level for Drinking Water Used (where an AWQS was not established)

[c] Risk-Based Standard Used (ADEQ, 2013)

[d] Arizona Residential Soil Remediation Levels (SRL) Used

TABLE 4-4

Groundwater Protection Level Modeling Results

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Compound	Saturation Concentration (mg/Kg)	Calculated GPL (mg/Kg)	Notes
1,2,4-Trimethylbenzene	2527	720	
2,4-Dinitrotoluene	1181	18	
Acenaphthene	247	3.85E+04	Calculated GPL exceeds saturation concentration
Anthracene	12.1	7.32E+07	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Benzene	1382	12	
Benzo(a)anthracene	392	Not calculated	Compound mobility too low to threaten groundwater; see text
Benzo(a)pyrene	41.2	3.44E+96	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Benzo(b)fluoranthene	7.85	3.35E+57	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Benzo(k)fluoranthene	28.8	Not calculated	Compound mobility too low to threaten groundwater; see text
bis(2-Ethylhexyl)phthalate	530	7.59E+19	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Chloroform	4,212	23.9	
Chrysene	7.58	2.98E+44	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Dibenz(a,h)anthracene	12.9	2.57E+186	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Dibenzofuran	286	3.83E+03	Calculated GPL exceeds saturation concentration
Diethyl phthalate	1398	2.28E+03	Calculated GPL exceeds saturation concentration
Ethylbenzene	747	1.23E+07	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Fluoranthene	0.01	5.18E+10	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Fluorene	312	5.78E+05	Calculated GPL exceeds saturation concentration
Indeno(1,2,3-c,d)pyrene	70.1	Not calculated	Compound mobility too low to threaten groundwater; see text
Naphthalene (base case)	441	65.4	
Naphthalene (alternate - 40 feet)	441	Not calculated	Compound mobility too low to threaten groundwater; see text
Naphthalene (alternate - 70 feet)	441	1.53E+258	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
Pyrene	169	7.66E+15	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater
sec-Butylbenzene	437	5.76E+03	Calculated GPL exceeds saturation concentration
Toluene	1186	1.31E+05	Calculated GPL exceeds saturation concentration
Total Xylenes	746	3.21E+08	Calculated GPL exceeds unity indicating compound mobility too low to threaten groundwater

Notes:

mg/Kg = milligrams per kilogram

GPL = Groundwater Protection Level

TABLE 5-1
MGP Site Remediation: Feasibility Screening Matrix for Soil Remediation Options
APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Remediation Options	Method Description	Applicability to Grant Street MGP Site	Advantages	Limitations
1. No Action	No active remediation activities. Relies on continued existing biological activities	No – high molecular weight compounds do not naturally degrade or degrade very slowly. Will not meet Soil Remediation Levels (SRLs). Does not reduce onsite risk. Does not prevent the potential pathway of contamination from soil to groundwater.	• Low cost • Easily implemented on this APS controlled site.	• Would likely require institutional controls that would limit future use of the site. • Does not reduce risk to groundwater. • Would require significant future soil and groundwater sampling • Would not likely meet regulatory requirements
2. Institutional Controls (ICs)	administrative land use controls (LUCs), Site access restrictions, and other restrictions to minimize potential exposure from Site contaminants	Yes – although it does not meet SRLs, it will limit direct exposure to the contaminated soil.	• Low cost • Easily implemented on this APS controlled site.	• Continued monitoring of ICs would be required to verify their continued effectiveness and ensure that the exposure pathways are being controlled. • Does not prevent the potential pathway of contamination from soil to groundwater.
3. Excavation and Off-Site Removal	Remove and treat excavated impacted soils on site. Treat or dispose of soils on or offsite.	Yes – soil can be removed over a portion of the site. Some soil will be inaccessible, (i.e under structures that cannot be removed). Some areas of soil are too deep for typical excavation methods.	• Protective of human health and environment. • Proven technology to address soil contamination • Will meet cleanup objectives, regulatory support • Few limitations on future site use	• Soils that are not feasible for removal (i.e., under structures or very deep) will remain in place and require future action • Existing onsite utilities need to be maintained during remediation increasing risk from excavation • Excavated soil treatment options are limited to offsite disposal • Very high cost – requires significant excavation system to protect buildings and utilities, non-standard excavation methods for deep soil removal. Significant disposal and site restoration cost.
4. Containment by Capping and Institutional Controls	Use physical barrier, (i.e. surface cap) to limit exposure to contaminated soils. Capping materials can include geotextiles, soil, asphalt, or other materials. Includes administrative land use controls (LUCs), Site access restrictions, and other restrictions to minimize potential exposure from Site contaminants	Yes – although it does not meet SRLs, it will limit direct exposure to the contaminated soil. Does not prevent the potential pathway of contamination from soil to groundwater.	• Lower cost • Existing pavement currently acts as a cap • Protective of human health and environment.	• Does not destroy the contamination, so that contamination will remain, and potential to be a continuing liability. • Continued monitoring of ICs would be required to verify their continued effectiveness and ensure that the exposure pathways are being controlled. • Does not prevent the potential pathway of contamination from soil to groundwater.
5. In Situ Chemical Oxidization (ISCO)	Mineralizes contaminants in place through the addition of a chemical oxidant such as hydrogen peroxide or sodium persulfate.	Limited – applicable with standard chemical delivery systems since the target soils are unsaturated. May be able to use gas phase oxidant injections (Ozone) for deeper unsaturated zones. Also soil mixing with ISCO can be effective in vadose zone.	• Should result in destruction of much of the contamination.	• Laboratory testing required to determine the required dose and extent of destruction that can be achieved. • Ozone highly corrosive to existing utilities. • Soil vapor extraction required to control and monitor system. Additional permitting required. • Mixing approach is relatively messy. • Cost may be relatively high.
6. Bioventing	Biological activity would be enhanced through the introduction of atmospheric oxygen.	Limited to the lighter molecular weight poly aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH). Pilot test indicated biological activity possible in southeastern section of site	• Easy to implement. • Relatively low cost. • Minimal disturbance to site during operation	• Not applicable for soils with lampblack • Limited biodegradability of the high molecular weight PAHs. • May take a number of years to complete.

TABLE 5-2
MGP Site Remediation: Feasibility Screening Matrix for Treatment Options
APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Treatment options	Method description	Applicability to APS Grant Street MGP	Advantages	Limitations
1. Landfill	Haul excavated soil to landfill for disposal, backfill with imported clean soil	Yes – can landfill special waste at local landfill, high transportation cost	• Can be cost effective if appropriate landfill can be identified	• Non hazardous soil only • Liability tied to landfill • Backfill soil costs
2. Enhanced Bioremediation	Introduce biological nutrients to aid in biological breakdown and treatment of excavated soil	No – not useful for treating lamp black affected soil, and does not work with project timeline and site working area requirements	• Inexpensive treatment • Long history of success with petroleum wastes	• Little control of schedule and endpoint • Requires large off-site area • Produces off-gas odors • Still requires soil disposal and backfill to continue on-site operations
3. On-site Thermal Desorption	Use on-site thermal desorption to treat excavated soil prior to backfill	No – requires mobile source air permit for on-site unit, and large working area for soil handling	• Treatment of soils to Soil Remediation Levels (SRLs) or Groundwater Protection Levels (GPLs) • Proven technology • No off-site trucking of soils • Can use treated soil for backfill	• Difficult to permit in residential areas • Hazardous waste needs to be sent to appropriate landfill for disposal • Large on Site space requirement; public acceptance
4. Off-Site Thermal Desorption Fixed Location	Use off-site thermal desorption to treat excavated soil prior to backfill	Yes – requires mobile source air permit for either unit at a near-site location or fixed location; no near-site location has been identified at this time, fixed unit in California.	• Treatment of soils to SRLs or GPLs • Proven technology • Can use treated soil for backfill	• Requires trucking to and from location • More costly than landfill disposal • Hazardous waste needs to be sent to appropriate facility for treatment

TABLE 6-1

Compounds Evaluated Against Screening Criteria and Selected COCs

APS Former Grant Street Yard MGP Site, Phoenix, Arizona

Evaluated Compounds	GPLs[1]		SRLs[2]		Site COCs[4]
	Compounds Selected for GPL Modeling	GPL COCs	Residential SRL COC	Non-residential SRL COC	
Acenaphthene	X				
Anthracene	X				
Benzo(a)anthracene	X		√	√	√
Benzo(a)pyrene	X		√	√	√
Benzo(b)fluoranthene	X		√	√	√
Benzo(k)fluoranthene	X		√	√	√
Benzo(g,h,i)perylene					
bis(2--ethylhexyl)phthalate	X				
sec-Butylbenzene	X				
Chloroform	X				
Chrysene	X		√	√	√
Dibenz(a,h)anthracene	X		√	√	√
Ethylbenzene	X				
Fluoranthene	X		√		√
Fluorene	X				
Indeno(1,2,3-c,d)pyrene	X		√	√	√
Pyrene	X		√		√
Naphthalene	X	√	√	√	√
Benzene	X	√	√	√	√
Ethylbenzene	X				
Toluene	X		√	√	√
Total Xylenes	X		√	√	√
1,2,4-Trimethylbenzene	X		√		√
diethyl phthalate	X				
Arsenic			√	√	√
dibenzofuran	X				
2,4-Dinitrotoluene	X				

Notes:

1. GPL - Groundwater protection levels are either 1) established minimum ADEQ GPLs or 2) site-specific GPLs calculated using ADEQ's GPL one-dimensional model for vadose zone contaminant fate and transport

   Compounds Selected for GPL Modeling - Section 4.2 descibes the rationale for excluding specific compounds from site-specific GPL modeling.

   GPL COC - A compound that had concentrations in soil exceeding the minimum or site-specific calculated GPL, whichever is higher

2. SRL - Soil Remediation Levels for residential and non-residential activities

   Residential SRL COC - A compound that exceeded the residential SRL.(using a 1 X 10-5 ELCR for most carconogens)

   Non-residential SRL COC - A compound that exceeded the non-residential SRL.

3. Site COCs are compounds that are MGPor other industrial activity-related compounds identified as a GPL COC or an SRL COC

TABLE 6-2

Applicable Site Cleanup Criteria for COCs

APS Former Grant Yard Street MGP Site, Phoenix, Arizona

Compound	Calculated GPL Value (mg/kg)	Residential SRL (mg/kg)			Non-Residential SRL (mg/kg)	Selected Soil Remediation Critera[3] (mg/kg)
		Carcinogen				
		10E-6 Risk[1]	10E-5 Risk	Non-Carcinogen		
PAH						
Benzo(a)anthracene	Groundwater is not threatened	0.69	6.9	NA[1]	21	**6.9**
Benzo(a)pyrene	Groundwater is not threatened	0.069	0.69	NA	2.1	**0.69**
Benzo(b)fluoranthene	Groundwater is not threatened	0.69	6.9	NA	21	**6.9**
Benzo(k)fluoranthene	Groundwater is not threatened	6.9	69	NA	210	**69**
Dibenz(a,h)anthracene	Groundwater is not threatened	0.069	0.69	NA	2.1	**0.69**
Indeno(1,2,3-c,d)pyrene	Groundwater is not threatened	0.69	6.9	NA	21	**6.9**
Chrysene	Groundwater is not threatened	68	680	NA	2,000	**680**
Fluoronthene	Groundwater is not threatened	NE[2]	NE	NA	22,000	**NE**
Pyrene	Groundwater is not threatened	NE	NE	NA	29,000	**NE**
Naphthalene	Groundwater is not threatened	NA	NA	56	190	**56**
VOCs						
1,2,4-Trimethylbenzene	720	NA	NA	52	170	**52**
Benzene	12	0.65	NE	NA	1.4	**0.65**
Ethylbenzene	Groundwater is not threatened	NA	NA	400	400	**400**
Toluene	Groundwater is not threatened	NA	NA	650	650	**650**
Total Xylenes	Groundwater is not threatened	NA	NA	270	420	**270**
TPH						
Total Petroleum Hydrocarbons	Not modeled	NE	NE	NE	NE	**NE**

Notes:

1. NE = Standard not Established
2. NA = Not applicable (for example, compound has not been identified as a carcinogen)
3. Since the current or currently intended future use of the contaminated site is not a child care facility or school where children below the age of 18 are reasonably expected to be in frequent, repeated contact with the soil, APS has elected to remediate to a 1×10^{-5} excess lifetime cancer risk as stated in AAC R18-7-205.
4. mg/kg = milligrams per kilogram

TABLE 6-3

Aquifer Water Quality Standards

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Analyte	Regulatory Level (mg/L)
Organics	
Benzo(a)pyrene	0.0002
Benzene	0.005
Ethylbenzene	0.7
Toluene	1
Total Xylenes	10
Inorganics	
Arsenic	0.05
Barium	2
Cadmium	0.005
Chromium	0.1
Lead	0.05
Mercury	0.002
Selenium	0.05
Cyanide (As Free Cyanide)	0.2

Notes:

1. mg/L - milligrams per liter

2. Source: A.A.C., Title 18, Chapter 11, Article 4, R18-11-406 Numeric Aquifer Water Quality Standards: Drinking Water Protected Use, adopted May 26, 1994.

TABLE 6-4

Ambient Air Action Levels and Maximum Allowable Ambient Air Concentrations

APS Grant Street Yard Former MGP Site, Phoenix, Arizona

Constituent	Ambient Air Action Level Regional Screening Levels (RSL)[1] Residential Air (ng/m^3)	Six-month Maximum Allowable Ambient Air Concentrations Site Specific[2] (ng/m^3)	One Year Maximum Allowable Ambient Air Concentrations Site Specific[3] (ng/m^3)
Volatile Organic Compounds			
Benzene	36	1,872	936
Metals			
Arsenic	0.065	3	2
Lead	NA	NA	NA
Polyaromatic Hydrocarbons (PAHs)			
Acenaphthene	NA	NA	NA
Acenaphthylene	NA	NA	NA
Anthracene	NA	NA	NA
Benzo(a)anthracene	0.92	48	24
Benzo(a)pyrene	0.092	5	2
Benzo(b fluoranthene	0.92	48	24
Benzo(g,h,i)perylene	NA	NA	NA
Benzo(k)fluoranthene	0.92	48	24
Chrysene	9.2	478	239
Dibenz(a,h)anthracene	0.084	4	2
Fluoranthene	NA	NA	NA
Fluorene	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.92	48	24
Naphthalene	8.3	432	216
Phenathrene	NA	NA	NA
Pyrene	NA	NA	NA

Notes:

NA = Not Applicable, no RSL listed for constituent

ng/m^3 = nanogram per cubic meter

1. United States Environmental Protection Agency Residential Air Regional Screening Levels (May 2016). Assume 10% of RSL as action level.

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016

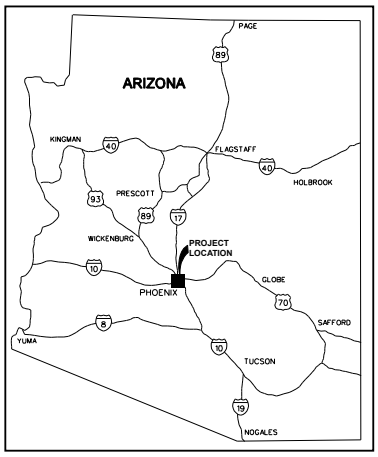
2. Site Specific Maximum Allowable Concentrations based on the RSLs assuming an exposure duration of six months for offsite residential receptors based on 26 year exposure duration.

The 6 month Maximum Allowable Concentration assumes 1/52nd exposure so the RSL is multiplied by 52.

3. Site Specific Maximum Allowable Concentrations based on the RSLs assuming an exposure duration of one year for offsite residential receptors based on 26 year exposure duration.

The 1 year Maximum Allowable Concentration assumes 1/26th exposure so the RSL is multiplied by 26.

Figures



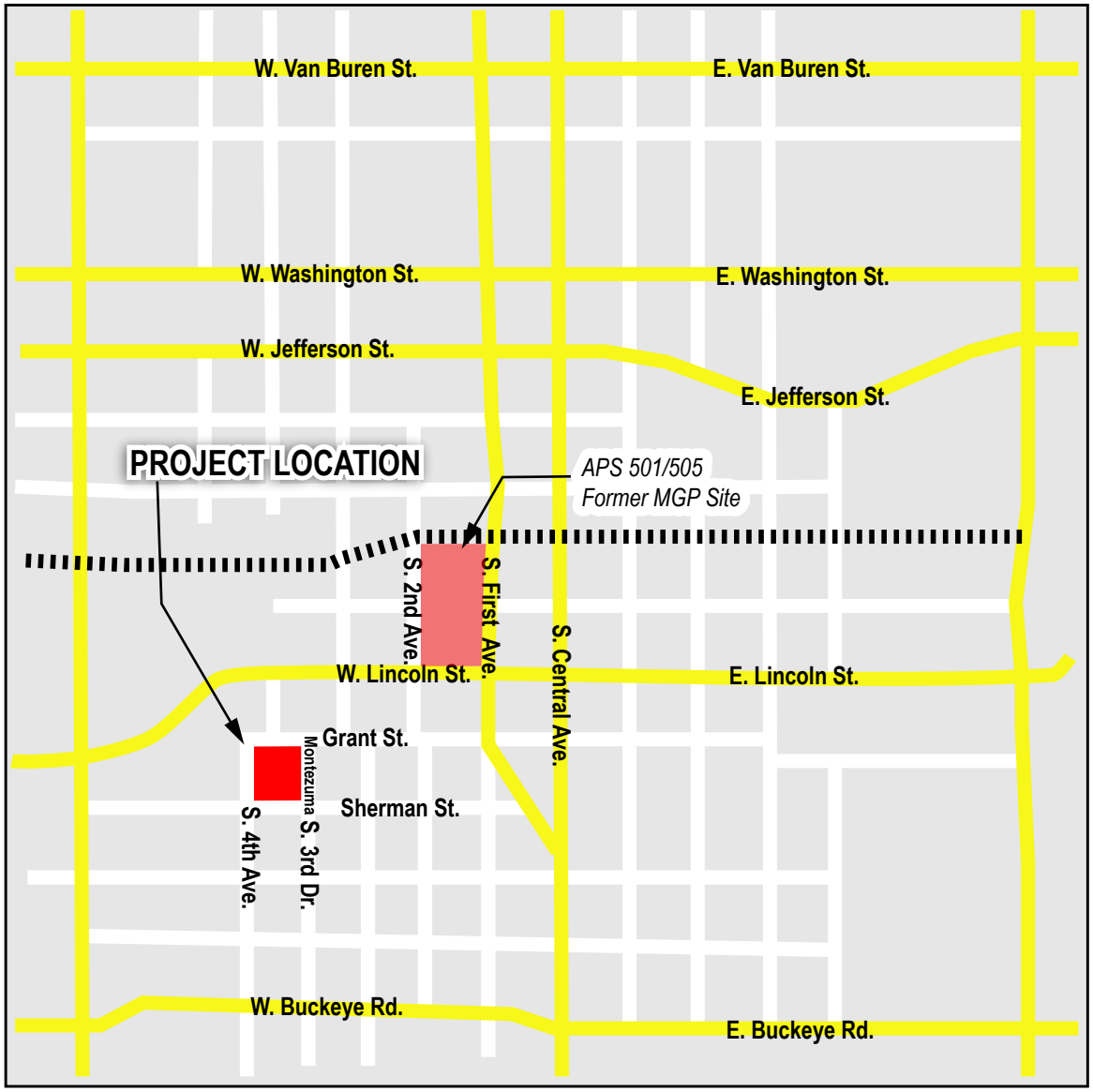
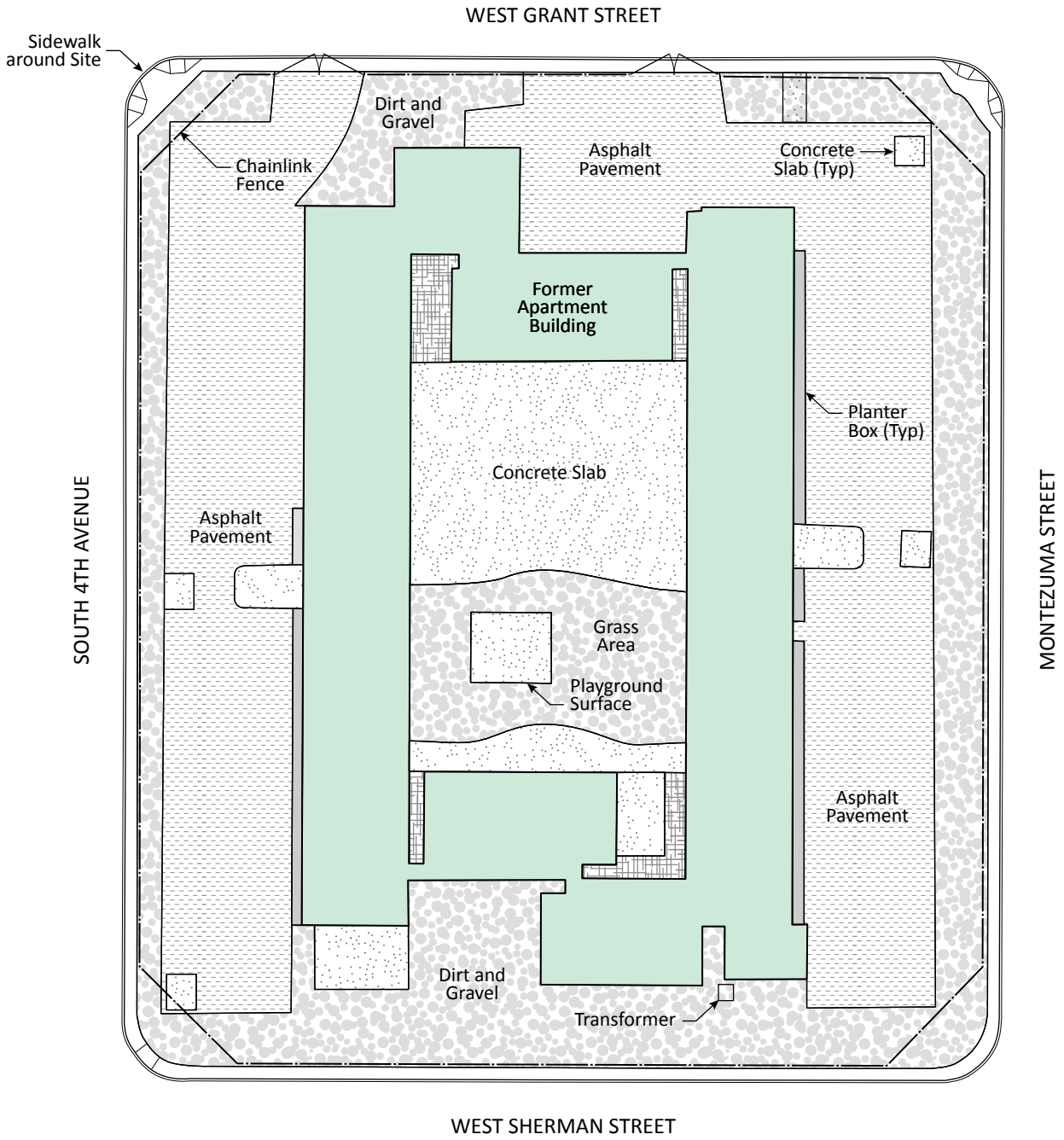


FIGURE 1-1
Site Location Map
APS Grant Street Yard Former MGP Site
Phoenix, Arizona



LEGEND

- Concrete foundation of former apartment building
- Former planter box
- Brick pavers
- Concrete
- Asphalt
- Dirt and gravel/grass
- Chainlink fence

North

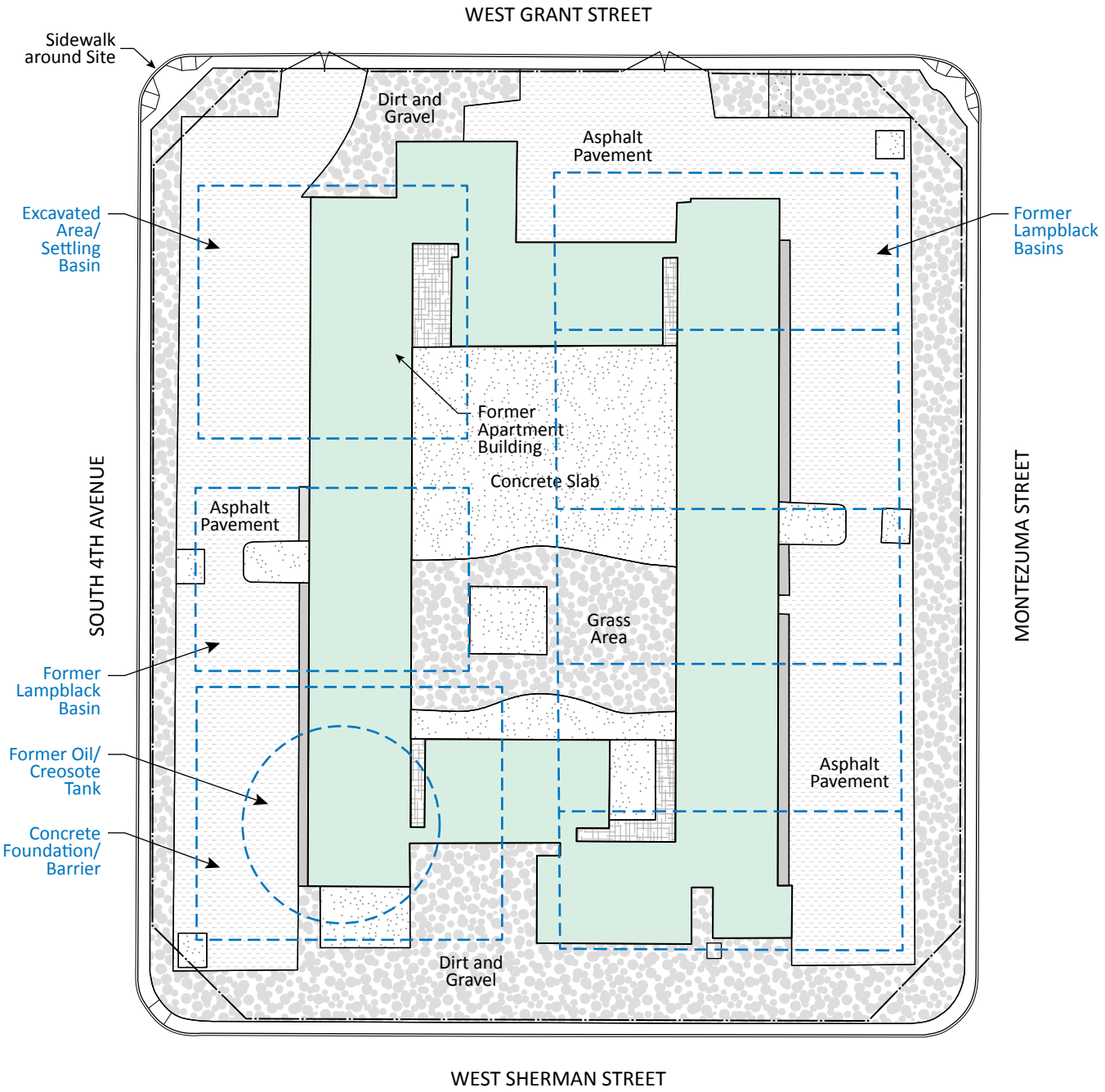
0 25 50

Approximate scale in feet

FIGURE 1-2
Site Plan
APS Grant Street Yard Former MGP Site
Phoenix, Arizona

ch2m

EN0630161136PHX Figure_1-2_SitePlan_v5_12-01-16



LEGEND

- Former Structure
- Concrete foundation of former apartment building
- Former planter box
- Brick pavers
- Concrete
- Asphalt
- Dirt and gravel/grass
- Chainlink fence

North

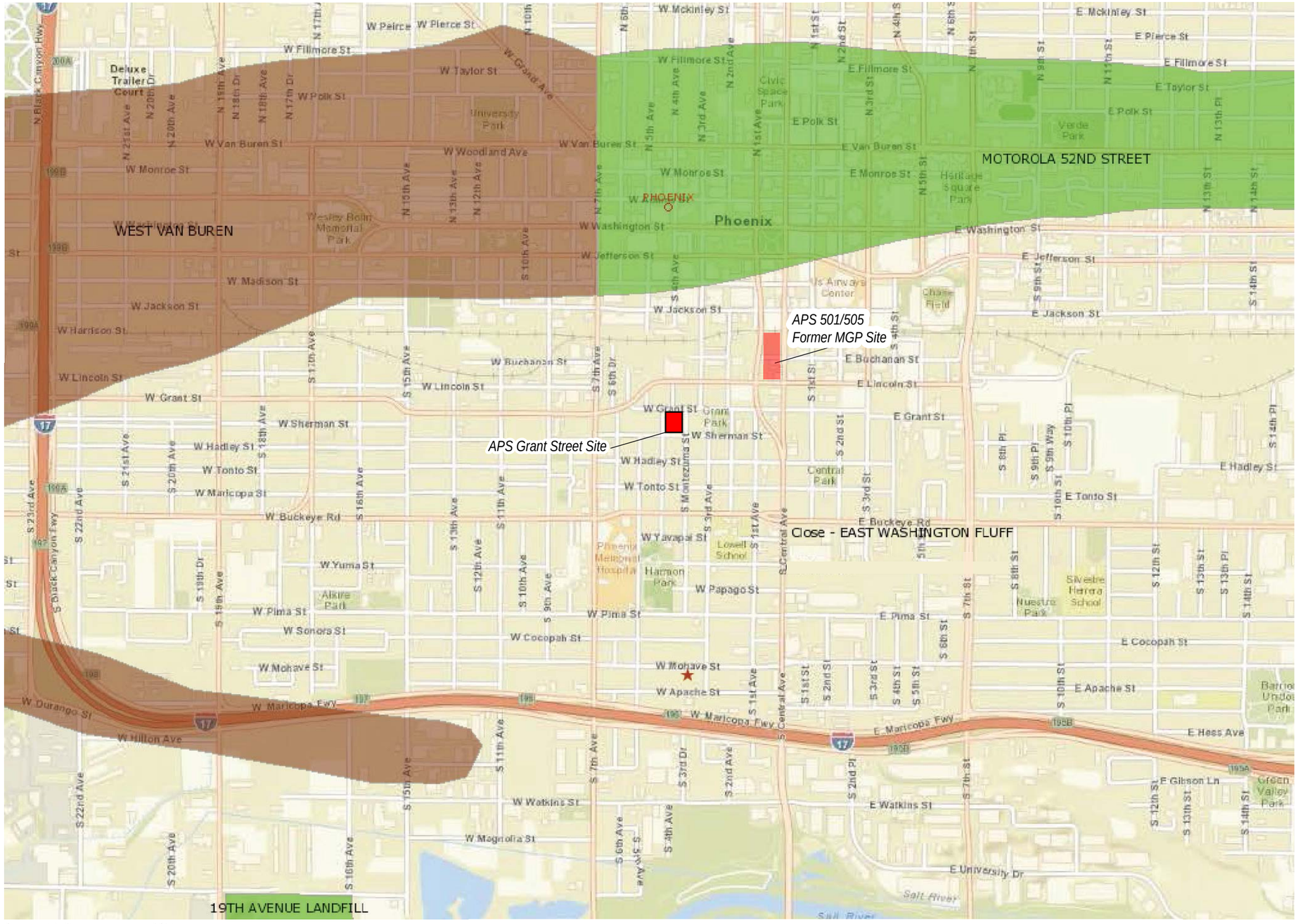
0 25 50

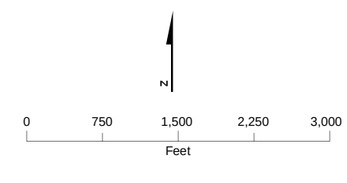
Approximate scale in feet

FIGURE 1-3
Former Structures
APS Grant Street Yard Former MGP Site
Phoenix, Arizona

ch2m

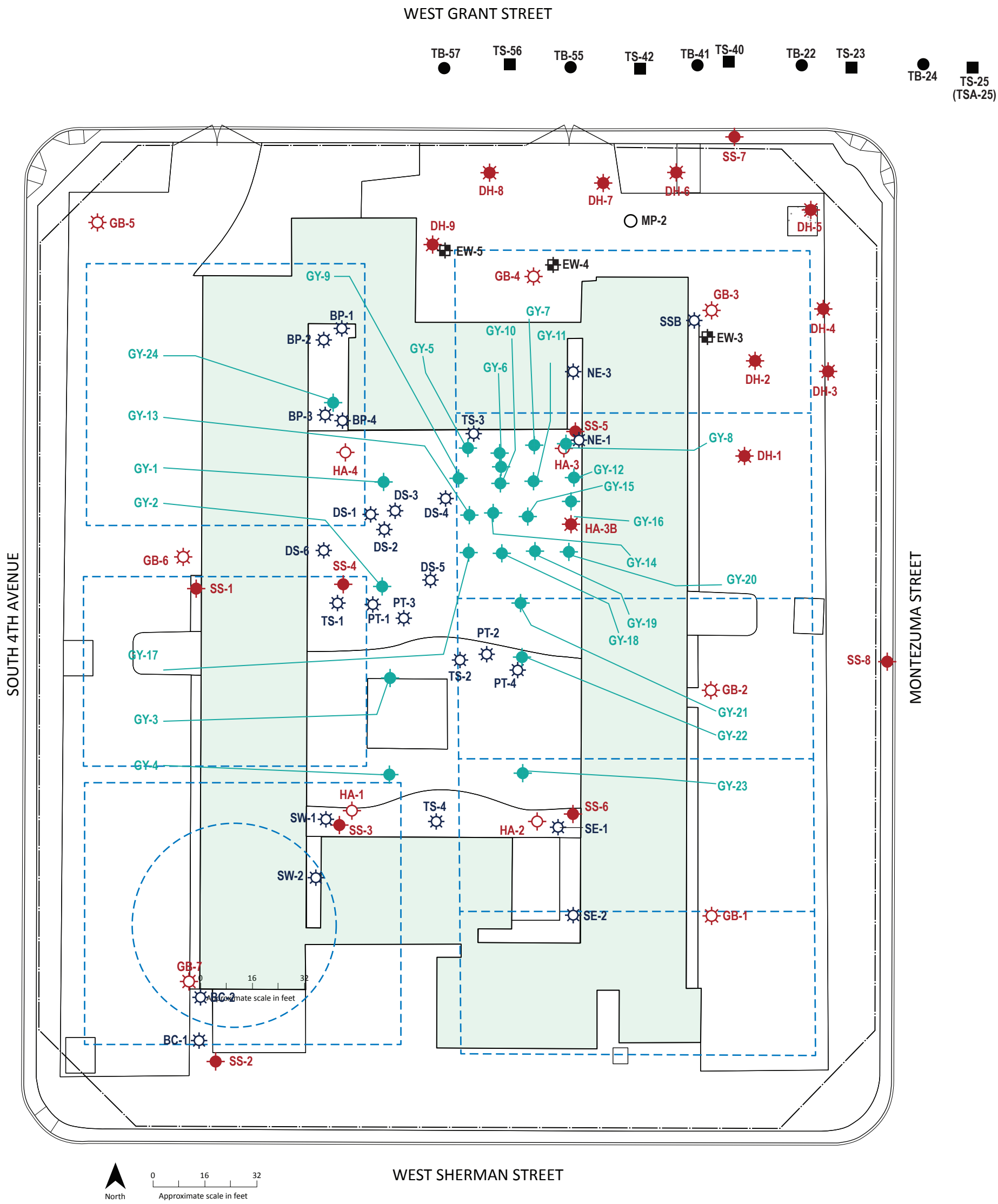
EN0630161136PHX Figure_1-3_FormerStructures_12-01-16





Source: ADEQ eMaps, January 2014.

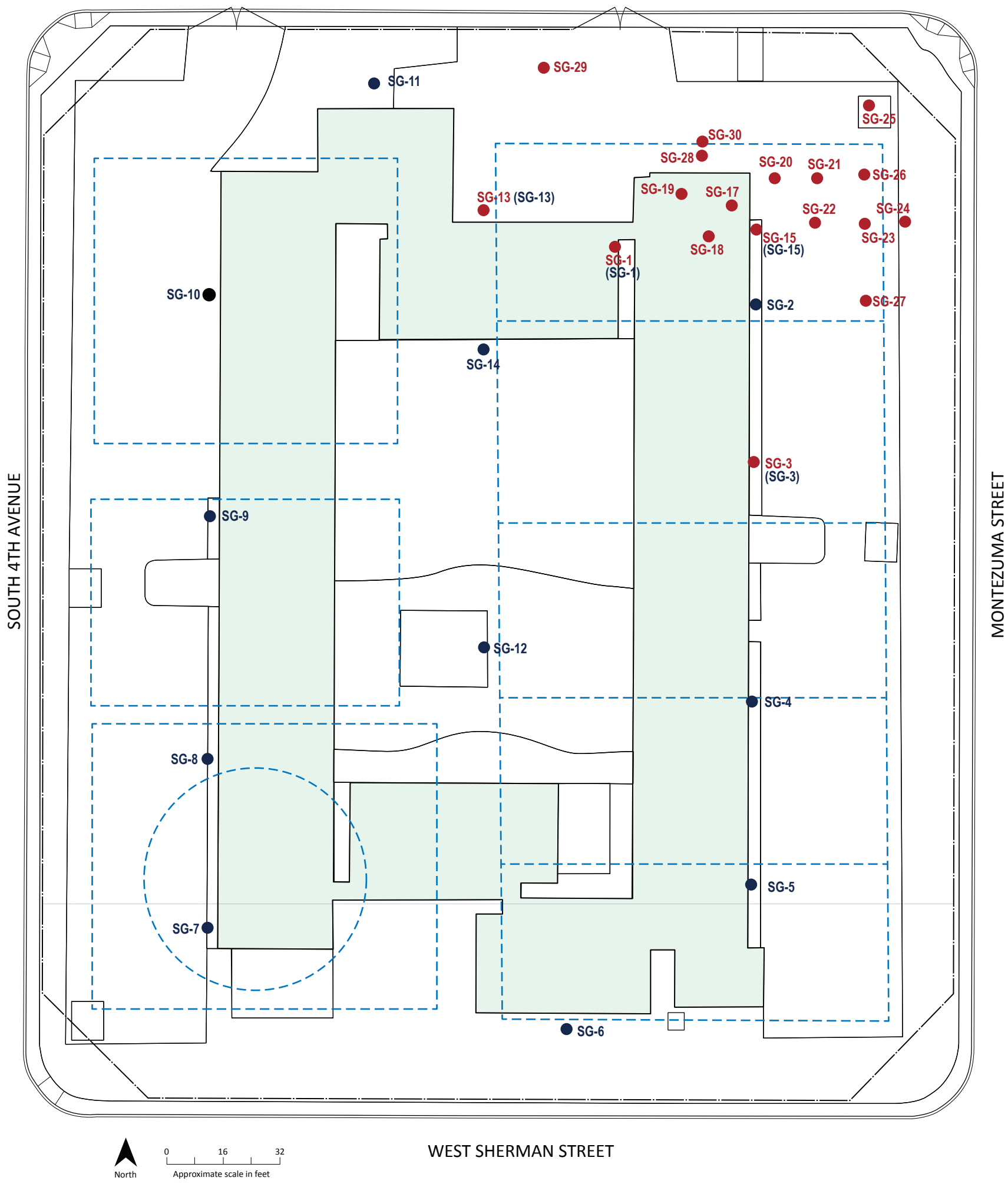
FIGURE 1-4
Nearby WQARF and Superfund Sites
APS Grant Street Former MGP Site
Phoenix, Arizona



LEGEND

- Current foundation of former apartment building
- Former MGP-related Structures
- SS-2 — Surface sample collected 1993.
- GB-7 — Soil Boring. Sampling conducted 1993.
- HA-7 — Hand Auger Soil Borings. Sampling 1993.
- DH-1 — Shallow Hand Auger/Soil Borings. Sampling conducted 1994.
- Shallow soil samples collected 1998.
- BC-1 — Surface soil samples 1998.
- Sample taken during Lampblack pipeline removal from trench bottom 2001.
- Sample taken during Lampblack pipeline removal from trench sidewall 2001.
- Extraction Well Location. Collected during vapor extraction pilot test 1994.
- Monitoring Point Location. Soil sample collected during vapor extraction pilot test 1994.

FIGURE 1-5
Previous Investigation Soil Sampling Locations
APS Grant Street Yard Former MGP Site
Phoenix, Arizona



LEGEND

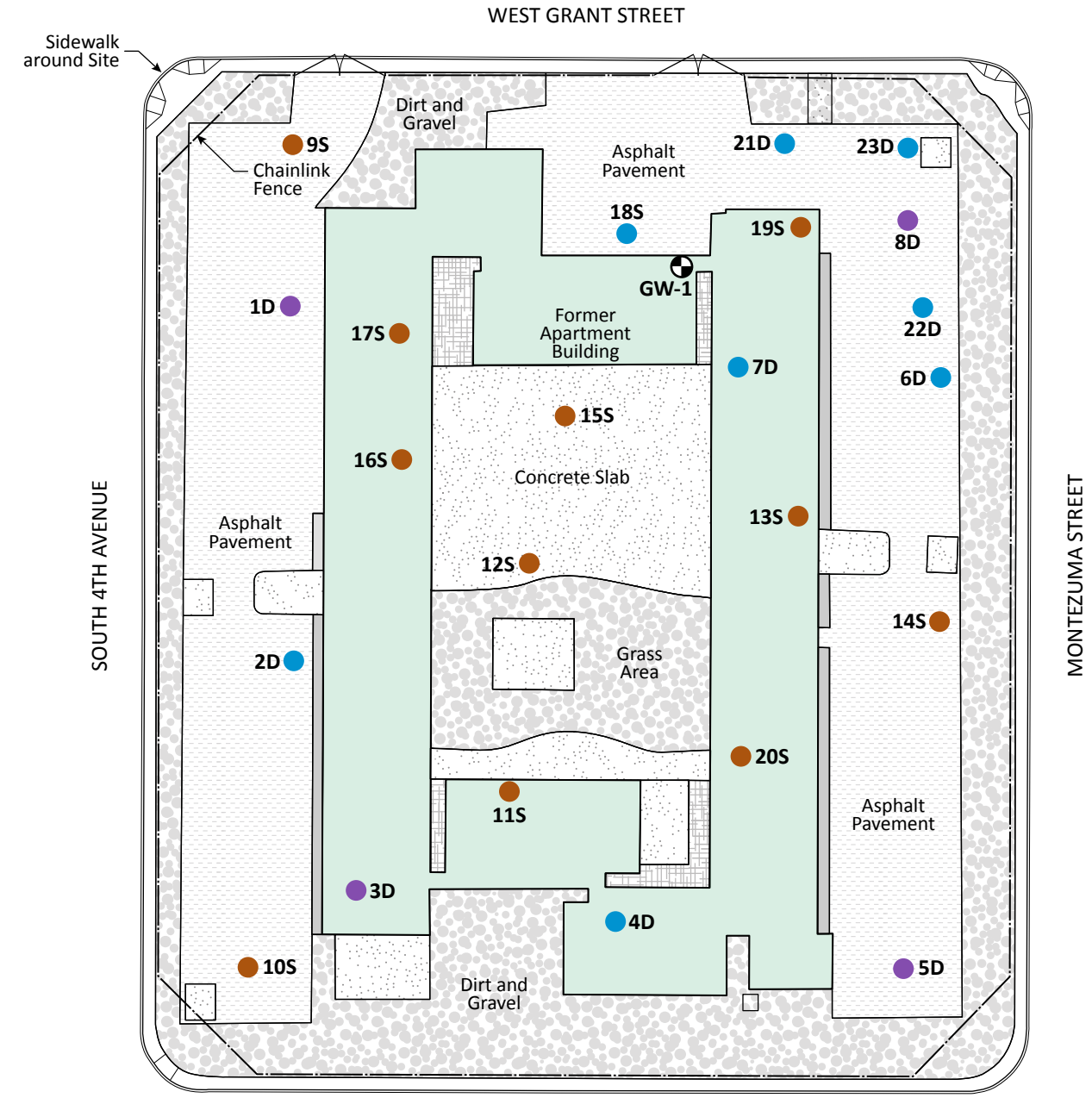
Current foundation of former apartment building

Former MGP-related Structures

SG-6 Soil Gas Samples collected by Geraghty and Miller. Samples collected 1993.

SG-29 Soil Gas Samples collected by Geraghty and Miller. Samples collected 1994.

FIGURE 1-6
Previous Investigation Soil Vapor Sampling Locations
APS Grant Street Yard Former MGP Site
Phoenix, Arizona



LEGEND

- 1S — Shallow soil boring with depths up to 20 feet below ground surface (bgs)
- 2D — Deep soil boring with depths up to 75 feet bgs
- 1D — Deep soil boring to the water table (approximately 110 feet bgs, Hydropunch sample location)
- GW-1 — Groundwater Monitoring Well
- Concrete foundation of former apartment building
- Former planter box
- Brick pavers
- Concrete
- Asphalt
- Dirt and gravel/grass
- Chainlink fence

North

0 25 50
Approximate scale in feet

FIGURE 2-1
Pre-Design Testing Soil Boring Locations
APS Grant Street Yard Former MGP Site
Phoenix, Arizona

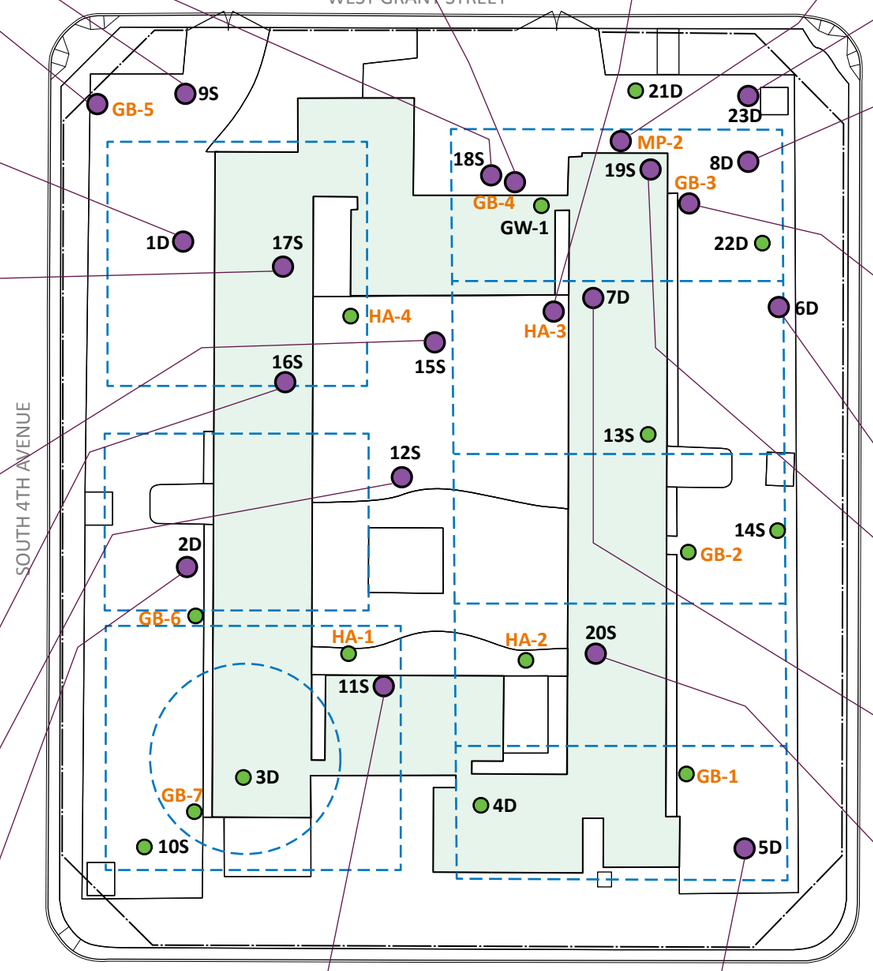
ch2m

Boring	Depth Sampled
1D	5, 10, 15, 25, 35, 55, 75
2D	5, 15, 25, 45, 65
3D	5, 15, 35, 55, 75
4D	5, 10, 20, 30, 50, 70
5D	5, 15, 25, 45, 65
6D	5, 10, 20, 30, 50, 70
7D	5, 15, 19, 25 ,45 ,65
8D	5, 10, 16, 20 ,40, 70, 90
9S	3, 10, 20
10S	10, 15, 20 ,30
11S	5, 8, 10, 15, 20
12S	3, 10, 15, 20, 30
13S	5, 10, 20
14S	3, 10, 15, 20, 30
15S	5, 10, 15, 20, 30
16S	5, 15 ,30
17S	10, 16, 20, 30
18S	3, 10, 15, 20, 30
19S	5, 10, 15, 17, 30
20S	5, 15, 30
21D	10, 20, 30, 40, 50, 60
22D	8, 15, 25, 35, 45, 55
23S	10, 20, 30, 40
HA-1	5-5.5
HA-2	5-5.5
HA-3	4, 8
HA-4	5-5.5
GB-3	7, 9, 15, 20, 28
GB-4	6.5, 10
GB-5	9, 17, 26, 32
GW-1	10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130

This table presents samples at 3 ft bgs or deeper that were analyzed for PAHs.

Boring	Depth Sampled
1D	15, 55
2D	5, 25, 65
3D	5, 15, 35
4D	5, 20, 50
5D	5, 45, 65
6D	5, 20, 50, 70
7D	5, 15, 19, 25, 45, 65
8D	5, 10, 16, 40
9S	3, 20
12S	15, 30
14S	3, 15, 30
15S	5, 15, 30
16S	5, 15, 30
17S	10, 16, 20
20S	15 ,30
21D	10, 20, 30, 40, 50, 60
22D	15, 25, 35, 45, 55
23S	10, 20, 30, 40
MP-2	6.5
GB-3	7, 9, 15, 20, 28
GW-1	10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130

This table presents samples at 3 ft bgs or deeper that were analyzed for VOCs.



9S

Sample Depth (ft bgs)	3	10
Benzo(a)anthracene	8.27	0.00091 J
Benzo(a)pyrene	8.18	0.0009 J
Benzo(b)fluoranthene	8.35	0.00081 J
Dibenzo(a,h)anthracene	1.04 J	0.00092 J

18S

Sample Depth (ft bgs)	3	10
Benzo(a)anthracene	7.49	0.0118
Benzo(a)pyrene	21.7	0.0287
Benzo(b)fluoranthene	17.9	0.0274
Dibenzo(a,h)anthracene	1.26	0.0029 J
Fluoranthene	30	0.0432
Indeno(1,2,3-c,d)pyrene	28.2	0.0479

GB-4

Sample Depth (ft bgs)	6.5	10
Benzo(a)pyrene	18	ND
Benzo(b)fluoranthene	7.9	ND
Indeno(1,2,3-c,d)pyrene	18	ND

HA-3

Sample Depth (ft bgs)	8
Benzo(a)pyrene	82
Benzo(b)fluoranthene	31
Benzo(k)fluoranthene	12J
Fluoranthene	22
Indeno(1,2,3-c,d)pyrene	92

MP-2

Sample Depth (ft bgs)	6.5
Benzene	94

GB-5

Sample Depth (ft bgs)	9	17	26
Benzo(a)pyrene	0.27	1.3	0.15J
Benzo(b)fluoranthene	0.11J	0.65J	0.1J

23S

Sample Depth (ft bgs)	10	20
Benzo(a)pyrene	8.5	0.0097 U
Dibenzo(a,h)anthracene	13	0.0097 U
Indeno(1,2,3-c,d)pyrene	17	0.0097 U

8D

Sample Depth (ft bgs)	5	10	16	20	40	70
Benzo(a)anthracene	1,010	3.6	25.6	0.618	28.6	ND
Benzo(a)pyrene	1,040	4.32	33	4.5	29.8	ND
Benzo(b)fluoranthene	448	2.18	16	3.23	14.7	ND
Benzo(k)fluoranthene	762	2.53	19.9	2.33	20.2	ND
Chrysene	1,210	3.64	26.5	0.78	28.9	ND
Dibenzo(a,h)anthracene	56.4 J	0.389 J	2.57	0.684	2.95	ND
Fluoranthene	3,460	11.2	82.7	0.741	92.6	ND
Indeno(1,2,3-c,d)pyrene	451	2.74	15.9	7.65	19.1	ND
Naphthalene	17,300	187	460	0.127 J	494	ND
Pyrene	5,210	17.2	104	1.74	140	ND
1,2,4 Trimethylbenzene	75.5 J	ND	ND	ND	ND	ND

1D

Sample Depth (ft bgs)	5	10
Benzo(a)pyrene	0.788	0.00062 J

GB-3

Sample Depth (ft bgs)	7	9	15	20	28
Benzo(a)pyrene	ND	6.6	2.3	6.9J	6.7
Benzo(b)fluoranthene	ND	ND	1.5	ND	3J
Fluoranthene	3600	ND	0.92	13	4.5
Indeno(1,2,3-c,d)pyrene	ND	11	3.7	6.1J	7.6
Naphthalene	9700J	ND	ND	ND	ND
Pyrene	4000	1.7	1	15	7.9
Benzene	650	ND	ND	ND	ND
Toluene	650	ND	ND	0.04	0.03
Total Xylenes	460	0.04	ND	0.37	0.08

17S

Sample Depth (ft bgs)	10	16	20
Benzo(a)anthracene	2.01	63.3	0.0715
Benzo(a)pyrene	1.97	69.3	0.0707
Benzo(b)fluoranthene	1.95	50.6	0.0664
Dibenzo(a,h)anthracene	0.443	8.52	0.0138
Indeno(1,2,3-c,d)pyrene	2.17	69	0.0639
Naphthalene	0.213	88.9	0.098 J

6D

Sample Depth (ft bgs)	5	10
Benzo(a)pyrene	2.11	ND

15S

Sample Depth (ft bgs)	5	10
Benzo(a)pyrene	19	0.0694 J
Benzo(b)fluoranthene	17.9	0.0518 J
Dibenzo(a,h)anthracene	2.34	0.0032 J
Indeno(1,2,3-c,d)pyrene	25.7	0.0946 J

19S

Sample Depth (ft bgs)	5	10	15	17	30
Benzo(a)anthracene	1.46	0.939	111 J	13.8	0.0075
Benzo(a)pyrene	2.6	21.1	135	71.1	0.0071
Benzo(b)fluoranthene	2.22	10.5	80	42.9	0.004
Benzo(k)fluoranthene	1.85	8.95	81.9 J	19	0.0055
Dibenzo(a,h)anthracene	0.42	4.19	12 J	6.97	ND
Indeno(1,2,3-c,d)pyrene	2.72	28.5	63.2 J	56	0.0043
Naphthalene	0.172	ND	242	6.98	0.0468 J

16S

Sample Depth (ft bgs)	5	15
Benzo(a)pyrene	1.41	0.00055 J

7D

Sample Depth (ft bgs)	5	15	19
Benzo(a)anthracene	1.85	87.3	0.178
Benzo(a)pyrene	2.21	113	0.182
Benzo(b)fluoranthene	1.84	55.3	0.145
Dibenzo(a,h)anthracene	0.227	9.9	0.0209
Indeno(1,2,3-c,d)pyrene	1.73	60.7	0.146
Naphthalene	0.186 J	2,830	0.375 J

12S

Sample Depth (ft bgs)	3	10
Benzo(a)pyrene	2.99	0.00041 J

20S

Sample Depth (ft bgs)	5	15
Benzo(a)pyrene	2.09	ND

2D

Sample Depth (ft bgs)	5	15
Benzo(a)pyrene	2.56	ND

11S

Sample Depth (ft bgs)	5	8	10
Benzo(a)anthracene	2.08	3290 J	0.185
Benzo(a)pyrene	2.77	3290 J	0.191
Benzo(b)fluoranthene	2.58	2880 J	0.168
Benzo(k)fluoranthene	1.53	2250 J	0.133
Chrysene	2.05	2800 J	0.154
Dibenzo(a,h)anthracene	0.441	744 J	0.0376
Fluoranthene	4.25	6390 J	0.323
Indeno(1,2,3-c,d)pyrene	3.37	2630 J	0.178
Naphthalene	0.599	1,010 J	0.0405
Pyrene	3.62	3780 J	0.22

5D

Sample Depth (ft bgs)	5	15
Benzo(a)pyrene	1.86	0.0023 J

LEGEND

- Sampling locations analyzed for PAHs and/or VOCs at 3 ft bgs or deeper. Result did not exceed residential or non-residential Soil Remediation Limits (SRLs).
- Sampling location analyzed for PAHs and/or VOCs at 3 ft bgs or deeper that exceeded residential or non- residential SRLs. Results are only presented for samples that exceeded residential or non-residential Soil Remediation Limits and the next deepest sample, if available.
- Concrete foundation of former apartment building
- Former Structure

Notes:

1. All results in milligrams per kilogram (mg/kg).
2. GB-3 = Sub-surface sampling location from previous investigations.
3. **10S** = Sampling location from pre-design testing investigation.
4. Concentrations above non-residential SRLs are shaded in red ■.
   Concentrations above residential SRLs are shaded in yellow ■.
5. ND = compound not detected at laboratory detection limit. See Tables 1-3, 1-5, 2-3 and 2-5 for laboratory detection limit.
6. J = Analyte is present but the reported value might not be accurate or precise (estimate).
7. Compounds that do not have SRLs are not shown.

FIGURE 2-2

Detected Polynuclear Aromatic Hydrocarbons (PAHs) and VOCs in Soil

APS Grant Street Yard Former MGP Site

Phoenix, Arizona

ch2m

Boring	Depth Sampled
1D	10, 15, 35, 55, 75
2D	25, 45, 65
3D	15, 35, 75
4D	5, 20, 50
5D	5, 25, 45
6D	5, 20
7D	5, 15, 19, 25, 45, 65
8D	5, 10, 16, 20
9S	10, 20
10S	10
11S	8, 10, 20
12S	3
14S	3
16S	5, 15
17S	10, 16, 20
18S	3, 15
19S	5, 15, 17
20S	15, 30
21D	10, 20, 30, 40, 50, 60
22D	15, 25, 35, 45, 55
23S	10, 20, 30, 40
DH-1	4.5
DH-2	4.5
DH-3	4.5
DH-4	4.5
DH-5	5
DH-6	4.5
DH-7	4.5
MP-2	6.5
EW-3	6
EW-4	6, 7
EW-5	5, 10
HA-3	4, 8
HA-3B	3, 5
GB-3	7, 9, 15, 20, 40, 50, 60
GB-4	6.5, 10
GB-5	17, 26, 32
GB-7	10, 21
GW-1	10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130

This table presents samples at 3 ft bgs or deeper that were analyzed for TPHs.

LEGEND

- Concentration of TPH > 10,000 mg/kg
- Concentration of TPH 4,100 - 10,000 mg/kg
- Concentration of TPH between ND - 4,100 mg/kg
- Sample location analyzed for TPH with no detection of TPH

All depths sampled are listed. Results are only presented for samples with detectable levels of TPH and the next deepest sample, if available.

- Concrete foundation of former apartment building
- Former Structure

Notes:

1. All results in milligrams per kilogram (mg/kg).
2. GB-3 = Sub-surface sampling location from previous investigations.
3. 10S = Sampling location from pre-design testing investigation.
4. ND = compound not detected at laboratory detection limit. See Tables 1-4 and 2-4 for laboratory detection limit.
5. NA = not analyzed.
6. J = Analyte is present but the reported value might not be accurate or precise (estimate).

18S

Sample Depth (ft bgs)	3	15
TPH Gasoline Range (C6-C10)	ND	ND
TPH Diesel Range (C10-C22)	634	ND
Total TPH (C10-C32)	3,090	ND
TPH Oil Range (C22-C32)	2,460	ND

DH-8

Sample Depth (ft bgs)	5
TPH Diesel Range (C10-C22)	5
TPH Oil Range (C22-C32)	ND
Total TPH	5

GB-4

Sample Depth (ft bgs)	6.5	10
TPH Diesel Range (C10-C22)	1300	NA
TPH Oil Range (C22-C32)	2100	NA
TRPH (EPA Method 418.1)	370	ND
Total TPH	3400	NA

EW-4

Location	EW-4	EW-4
Sample Depth (ft bgs)	5	10
TPH Diesel Range (C10-C22)	99	860
TPH Oil Range (C22-C32)	400	1700
Total TPH	499	2560

MP-2

Sample Depth (ft bgs)	6.5
TPH Diesel Range (C10-C22)	130000
TPH Oil Range (C22-C32)	28000
Total TPH	158000

EW-5

Sample Depth (ft bgs)	5	10
TPH Diesel Range (C10-C22)	940	6
TPH Oil Range (C22-C32)	2000	14
Total TPH	2940	20

GB-5

Sample Depth (ft bgs)	17	26	32
TPH Diesel Range (C10-C22)	95	NA	NA
TPH Oil range (C22-C32)	32	NA	NA
TRPH (EPA Method 418.1)	NA	25	NA
Total TPH	132	NA	20U

17S

Sample Depth (ft bgs)	10	16	20
TPH Gasline Range (C6-C10)	ND	6.24 J	ND
TPH Diesel Range (C10-C22)	44.4 J	6,250	ND
TPH Oil range (C22-C32)	109 J	3,530	ND
Total TPH (C10-C32)	153 J	9,780	ND

HA-3

Sample Depth (ft bgs)	4	8
TPH Diesel Range (C10-C22)	8100	10000
TPH Oil Range (C22-C32)	8900	4500
TRPH (EPA Method 418.1)	2100	2900
Total TPH	17150	14500

HA-3B

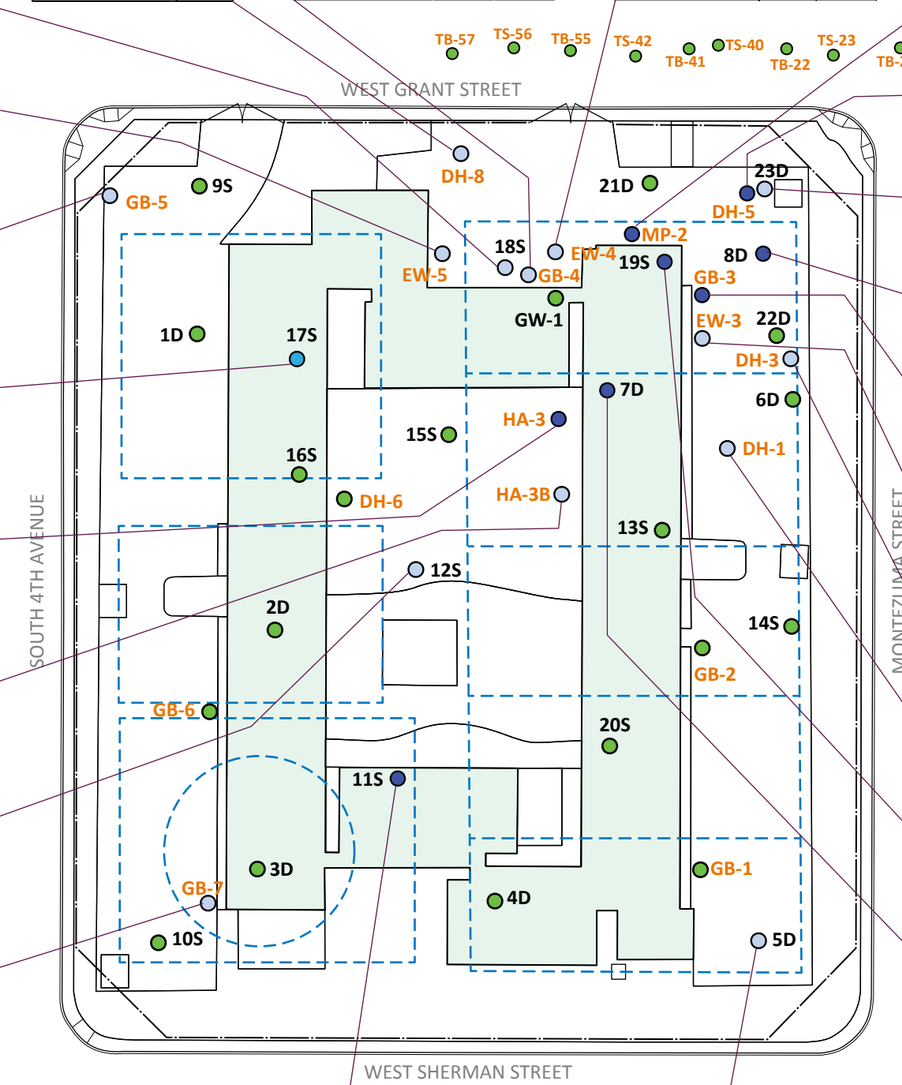
Sample Depth (ft bgs)	3	5
TPH Diesel Range (C10-C22)	480	ND
TPH Oil Range (C22-C32)	1300	ND
Total TPH	1780	ND

12S

Sample Depth (ft bgs)	3
TPH Gasoline Range (C6-C10)	ND
TPH Diesel Range (C10-C22)	63.5
Total TPH (C10-C32)	442
TPH Oil range(C22-C32)	378

GB-7

Sample Depth (ft bgs)	10	21
TPH Diesel Range (C10-C22)	ND	NA
TPH Oil Range (C22-C32)	9	NA
TRPH (EPA Method 418.1)	290	80
Total TPH	9	NA



23S

Sample Depth (ft bgs)	10
TPH Diesel Range (C10-C22)	580
TPH Oil Range (C22-C32)	1000
Total TPH	1600

DH-5

Sample Depth (ft bgs)	5
TPH Diesel Range (C10-C22)	140000
TPH Oil Range (C22-C32)	20000
Total TPH	163400

8D

Sample Depth (ft bgs)	5	10	16	20
TPH Gasoline Range vv(C6-C10)	5,230	32	8.18	ND
TPH Diesel Range (C10-C22)	3,890,000	886	5,340 J	269
Total TPH (C10-C32)	4,680,000	1,150	7,760 J	826
TPH Oil Range (C22-C32)	787,000	267	2,420 J	557

GB-3

Sample Depth (ft bgs)	7	9	15	20	40	50	60
TPH Diesel Range (C10-C22)	140000	630	100	1200	8	10	ND
TPH Oil Range (C22-C32)	25000	520	120	300	12	14	10
TRPH (EPA Method 418.1)	130000	380	170	NA	NA	NA	NA
Total TPH	179000	1150	220	1500	20	24	10

EW-3

Sample Depth (ft bgs)	6
TPH Diesel Range (C10-C22)	440
TPH Oil range (C22-C32)	260
Total TPH	500

DH-3

Sample Depth (ft bgs)	4.5
TPH Diesel Range (C10-C22)	8
TPH Oil range (C22-C32)	37
Total TPH	45

DH-1

Sample Depth (ft bgs)	4.5
TPH Diesel Range (C10-C22)	950
TPH Oil range (C22-C32)	1100
Total TPH	2050

19S

Sample Depth (ft bgs)	5	15	17
TPH Gasoline Range (C6-C10)	ND	27.2	ND
TPH Diesel Range (C10-C22)	122	26,500 J	2,710
Total TPH (C10-C32)	560	34,800 J	6,130
TPH Oil Range (C22-C32)	438	8,330 J	3,410

7D

Sample Depth (ft bgs)	5	15	45	65
TPH Gasoline Range (C6-C10)	ND	79	3.11J	ND
TPH Diesel Range (C10-C22)	181	29,600 J	ND	ND
Total TPH (C10-C32)	419	38,200 J	ND	ND
TPH Oil Range (C22-C32)	238	8,640 J	ND	ND

11S

Sample Depth (ft bgs)	8	10
TPH Gasoline Range (C6-C10)	8.07 J	ND
TPH Diesel Range (C10-C22)	55,500 J	ND
Total TPH (C10-C32)	189,000 J	ND
TPH Oil Range (C22-C32)	134,000 J	ND

5D

Sample Depth (ft bgs)	5	25
TPH Gasoline Range (C6-C10)	ND	ND
TPH Diesel Range (C10-C22)	281	ND
Total TPH (C10-C32)	1,320	ND
TPH Oil Range (C22-C32)	1,040	ND

FIGURE 2-3

Detected Total Petroleum Hydrocarbons (TPHs) in Soil

APS Grant Street Yard Former MGP Site
Phoenix, Arizona

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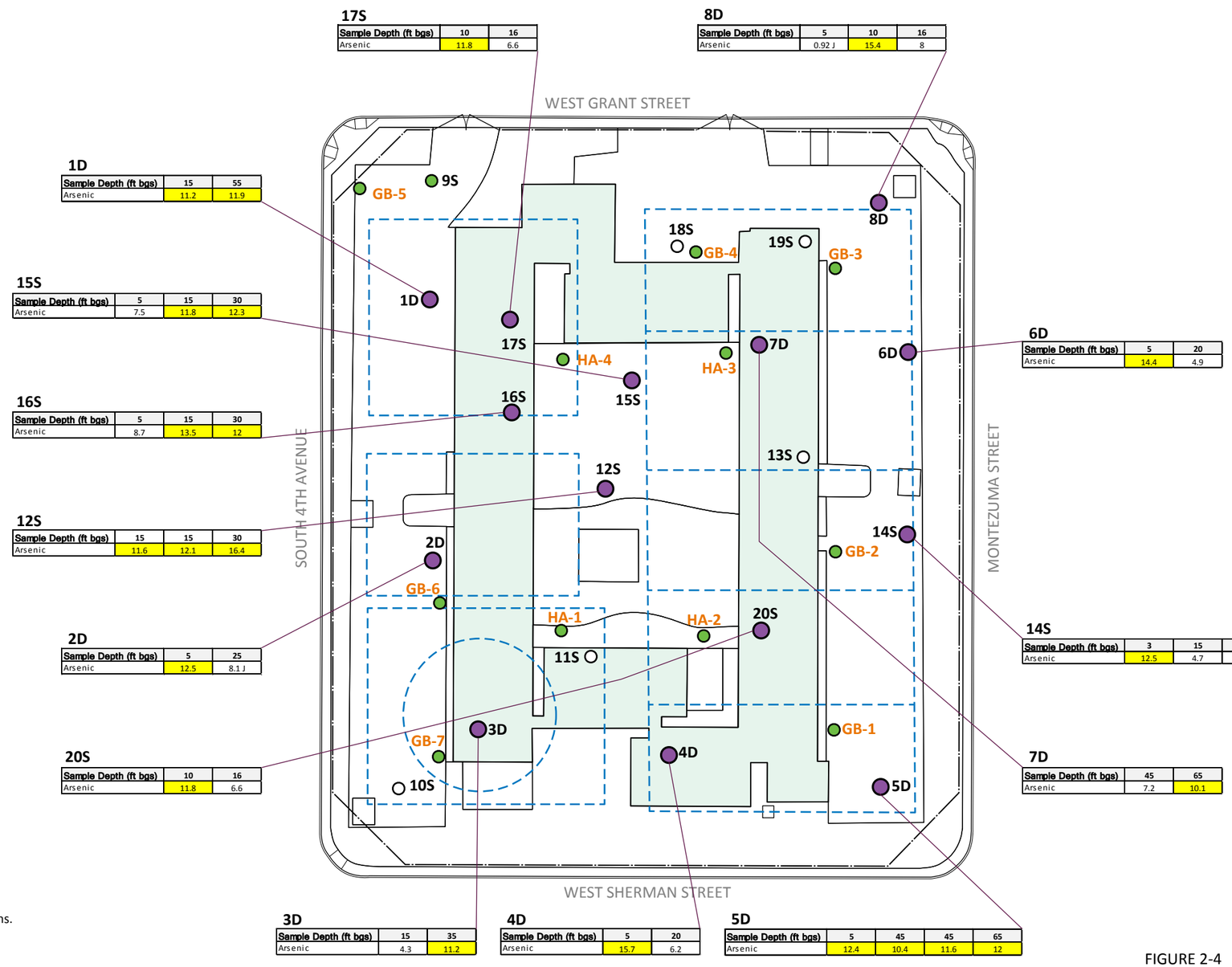
Boring	Depth Sampled
1D	15, 55
2D	5, 25 ,65
3D	5, 15, 35
4D	5, 20, 50
5D	5, 45 ,65
6D	5, 20, 50, 70
7D	5, 15, 19, 25, 45, 65
8D	5, 10, 16 ,40
9S	3, 20
12S	15, 30
14S	3, 15, 30
15S	5, 15, 30
16S	5, 15, 30
17S	10, 16, 20
20S	15, 30
HA-1	5.5
HA-2	5.5
HA-3	4, 8
HA-4	5.5
GB-1	10-12.5
GB-2	8-10
GB-3	5-7
GB-4	5-6.5
GB-5	7-9, 16-17
GB-6	10-12
GB-7	8.5-10

This table presents samples at 3 ft bgs or deeper that were analyzed for metals.



17S

Sample Depth (ft bgs)	10	16
Arsenic	11.8	6.6

8D

Sample Depth (ft bgs)	5	10	16
Arsenic	0.92 J	15.4	8

1D

Sample Depth (ft bgs)	15	55
Arsenic	11.2	11.9

15S

Sample Depth (ft bgs)	5	15	30
Arsenic	7.5	11.8	12.3

6D

Sample Depth (ft bgs)	5	20
Arsenic	14.4	4.9

16S

Sample Depth (ft bgs)	5	15	30
Arsenic	8.7	13.5	12

12S

Sample Depth (ft bgs)	15	15	30
Arsenic	11.6	12.1	16.4

14S

Sample Depth (ft bgs)	3	15	15	30
Arsenic	12.5	4.7	5.6	15.5

2D

Sample Depth (ft bgs)	5	25
Arsenic	12.5	8.1 J

20S

Sample Depth (ft bgs)	10	16
Arsenic	11.8	6.6

7D

Sample Depth (ft bgs)	45	65
Arsenic	7.2	10.1

3D

Sample Depth (ft bgs)	15	35
Arsenic	4.3	11.2

4D

Sample Depth (ft bgs)	5	20
Arsenic	15.7	6.2

5D

Sample Depth (ft bgs)	5	45	45	65
Arsenic	12.4	10.4	11.6	12

LEGEND

- Boring not sampled for metal compounds.
- Boring sampled for metal compounds at 3 ft bgs or deeper. Results did not exceed residential or non-residential Soil Remediation Limits (SRLs).
- Boring sampled for metal compounds at 3 ft bgs or deeper. Results are presented for samples that exceeded residential or non-residential Soil Remediation Limits (SRLs) and the next deepest sample, if available.
- Concrete foundation of former apartment building
- Former Structure

Notes:

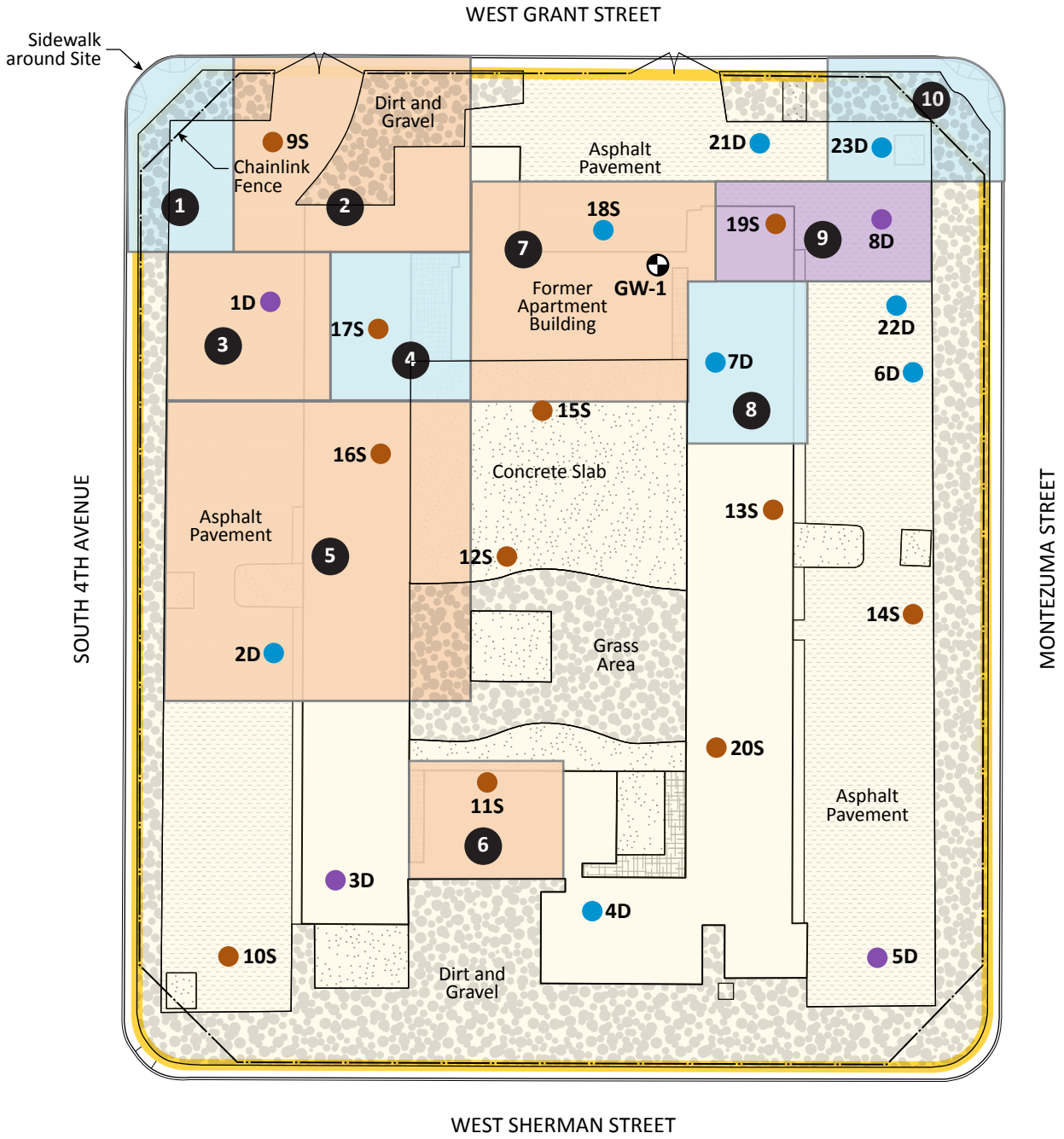
1. All results in milligrams per kilogram (mg/kg).
2. GB-3 = Sub-surface sampling location from previous investigations.
3. **10S** = Sampling location from pre-design testing investigation.
4. Concentrations above residential SRLs are shaded in yellow .
5. ND = compound not detected at laboratory detection limit. See Tables 1-6, and 2-7 for laboratory detection limit.
6. J = Analyte is present but the reported value might not be accurate or precise (estimate).
7. Based on background levels and other analytical results from the borings, arsenic is believed to be naturally occurring and not MGP-related.

FIGURE 2-4

Detected RCRA Metals in Soil

APS Grant Street Yard Former MGP Site

Phoenix, Arizona



LEGEND

- 1S — Shallow soil boring with depths up to 20 feet below ground surface (bgs)
- 2D — Deep soil boring with depths up to 75 feet bgs
- 1D — Deep soil boring to the water table (approximately 110 feet bgs, Hydropunch sample location)
- New Groundwater Monitoring Well
- Former planter box
- Brick pavers
- Concrete
- Asphalt
- Dirt and gravel/grass
- Chainlink fence

Approximate Excavation Depth

- up to 40 feet
- up to 20 feet
- up to 10 feet
- up to 5 feet

North

0 25 50
Approximate scale in feet

FIGURE 6-1
Proposed Excavation Plan
APS Grant Street Yard Former MGP Site
Phoenix, Arizona

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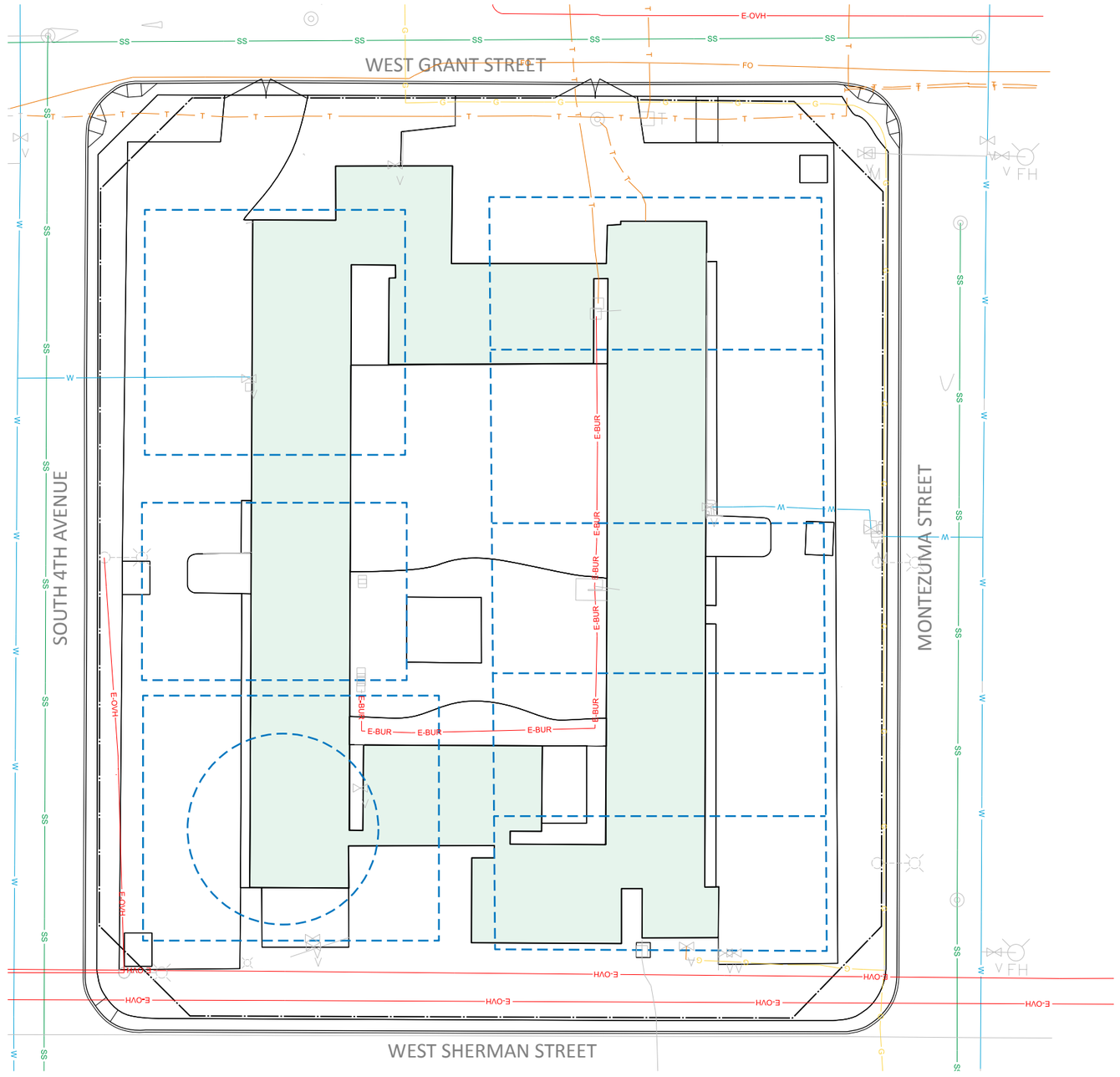
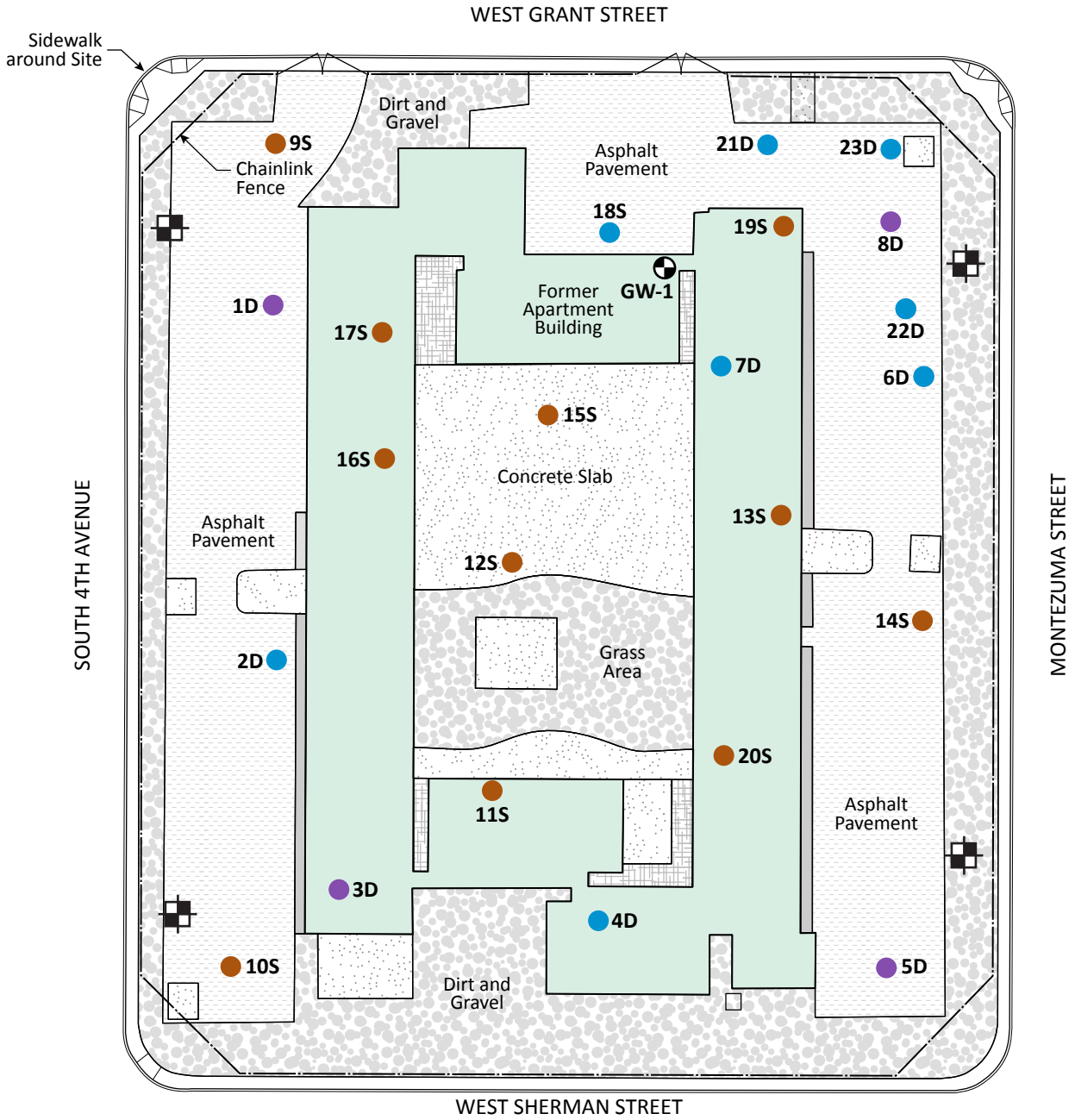
EN0630161136PHX Figure_6-1_PropExcavationMap_v4_Mar17



LEGEND

- Concrete foundation of former apartment building
- Former Structure
- FIRE HYDRANT
- LIGHT POLE
- MANHOLE
- VALVE
- E-OVH — OVER HEAD ELECTRIC
- E-BUR — BURRIED ELECTRIC
- G — GAS
- W — WATER
- SS — SEWER
- T — COMMUNICATION
- FO — FIBER OPTIC

FIGURE 6-2
Utility Locations Map
APS Grant Street Yard Former MGP Site
Phoenix, Arizona



LEGEND

- 1S — Shallow soil boring with depths up to 20 feet below ground surface (bgs)
- 2D — Deep soil boring with depths up to 75 feet bgs
- 1D — Deep soil boring to the water table (approximately 110 feet bgs, Hydropunch sample location)
- Proposed air monitoring location (locations may change based on wind direction and site activities)
- Concrete foundation of former apartment building
- Former planter box
- Brick pavers
- Concrete
- Asphalt
- Dirt and gravel/grass
- Chainlink fence

North

0 25 50
Approximate scale in feet

FIGURE 6-3
Proposed Air Monitoring Locations
APS Grant Street Yard Former MGP Site
Phoenix, Arizona

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EN0630161136PHX Figure_6-3_PropAirMonLocations_v4_Mar17

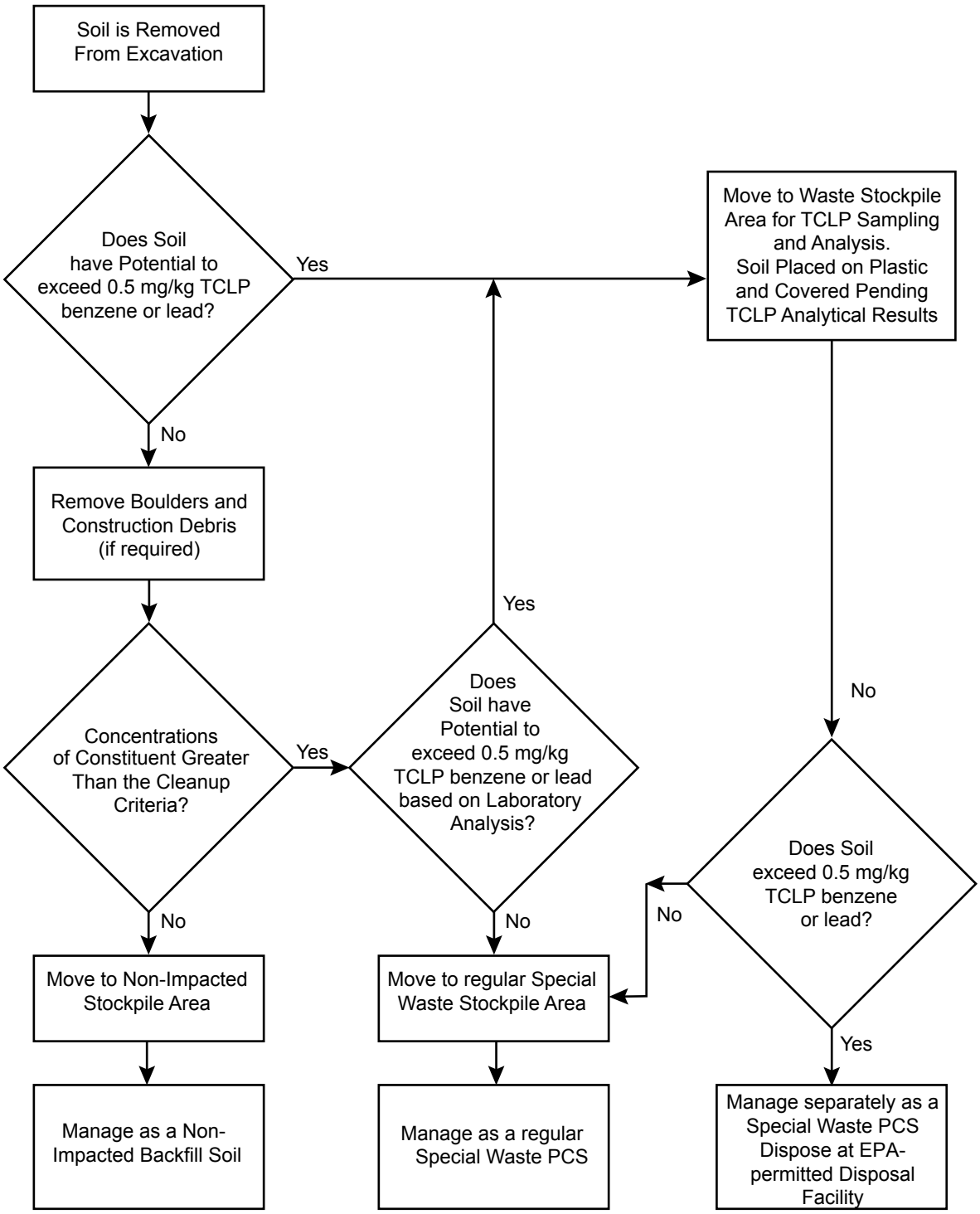
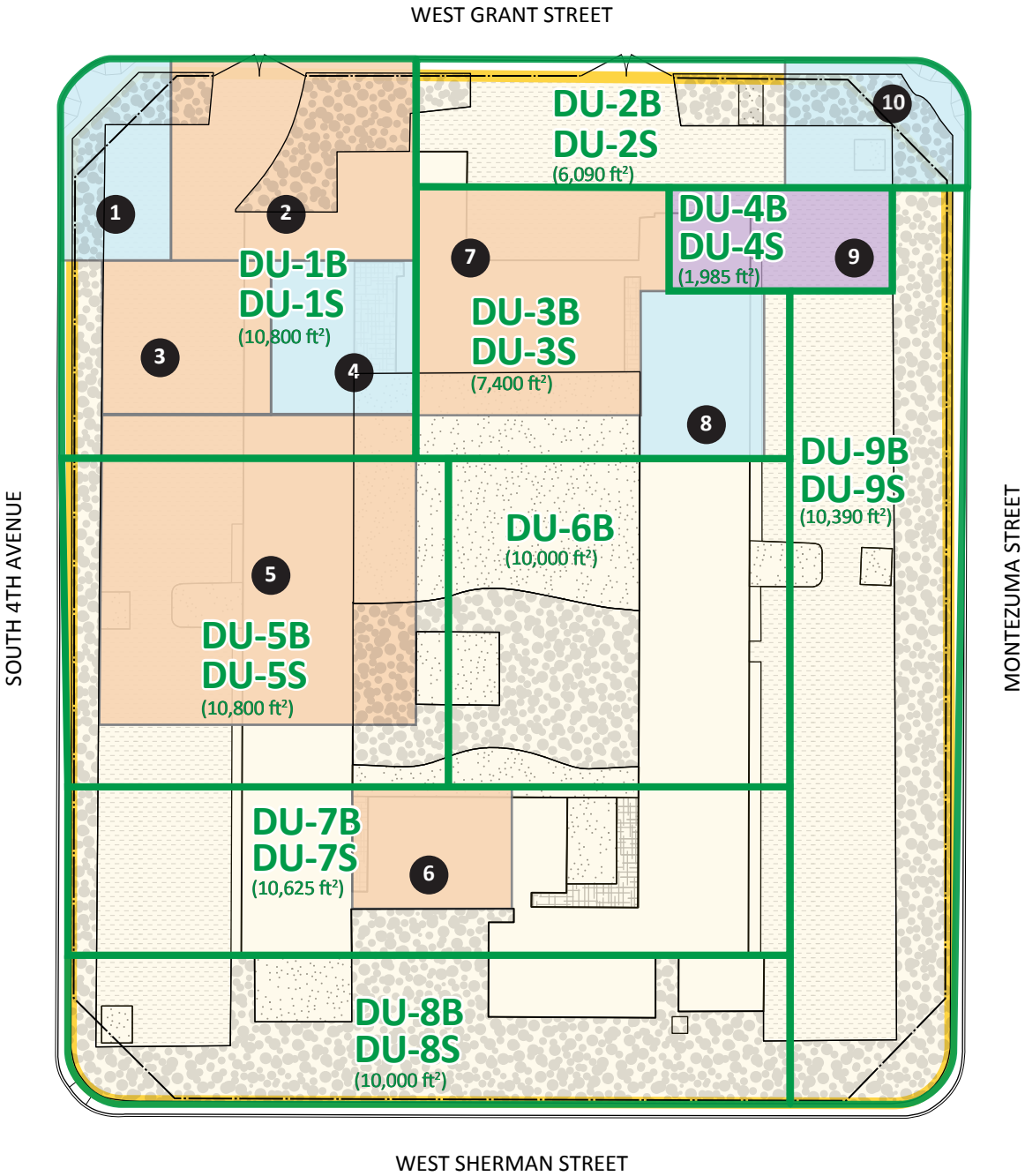


FIGURE 6-4
Waste Segregation Flow Chart
APS Grant Street Yard Former MGP Site
Phoenix, Arizona



Notes:

1. Decision Unit boundaries are approximate and may be modified based on conditions encountered during excavation. Decision units will not exceed ¼- acre (10,890 ft²) in area.

DU-1B (Decision Unit 1 with bottom)

DU-1S (Decision Unit 1 with sidewall)

North

0 25 50

Approximate scale in feet

FIGURE 6-5

Proposed Decision Units

APS Grant Street Yard Former MGP Site

Phoenix, Arizona

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Appendix A
Sanborn Fire Insurance Maps

Appendix B
Aerial Photographs

Appendix C
EDR Report

Appendix D
Soil Boring Logs

Appendix E
Building Demolition Documentation

Appendix F
Pre-design Testing Investigation Work Plan

Appendix G
Laboratory Results

Appendix H
Pre-design Testing Investigation Data Evaluation

Appendix I
Groundwater Protection Level Modeling Input and Output

Appendix J
ADEQ 2001 Letter re: MGP Remediation Waste