STRATUS
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September 17, 2009
2007-0057-01

Mr. Jerry Wickham, P.G.
Alameda County Health Care Services
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502
(via GeoTracker)

Subject: Work Plan for Soil Gas Survey
Former USA Service Station No. 57
10700 MacArthur Boulevard
Oakland, California

Dear Mr. Wickham:

Stratus Environmental, Inc. (Stratus) has prepared this *Work Plan for Soil Gas Survey (Work Plan)*, on behalf of Moller Investment Group, Inc. (MIGI), for Former USA Service Station No. 57 (the Site), located at 10700 MacArthur Boulevard, Oakland, California (see Figures 1 through 3). Petroleum hydrocarbon impact to soil and groundwater beneath the site has previously been documented. On behalf of MIGI, Stratus recently submitted a document entitled *Remedial Alternatives Evaluation and Proposed Site Specific Cleanup Objectives Report* for the site, dated August 12, 2009. This report summarized historical subsurface environmental activities at the subject property, including environmental assessment and remediation work, evaluated potential exposure risks to the petroleum hydrocarbons, and presented proposed risk based cleanup objectives to manage the environmental case at the site towards closure based on historical soil and groundwater analytical data.

After reviewing the August 12, 2009 report, Alameda County Health Care Services Agency (ACHCSA) personnel expressed concern regarding the evaluation of all potential exposure risks to the petroleum hydrocarbon impact. ACHCSA noted that an assessment of shallow soil gas contaminant concentration data was necessary to more fully evaluate petroleum hydrocarbon exposure risks at the property, in particular for indoor gas intrusion and inhalation. Stratus has subsequently prepared this *Work Plan* that proposes collection of shallow soil gas samples at the subject site. Details associated with completion of the proposed soil gas survey are presented in the following subsections of this document.

SITE BACKGROUND

Site Description

The subject property is located in a mixed residential and commercial neighborhood in southeast Oakland. The property is bounded to the northeast by Foothill Boulevard, and to the southeast by 108th Avenue, and is situated approximately 500 feet west-southwest of Interstate 580. The site occupies a relatively small portion of the Foothill Square shopping center (see Figure 3). This portion of the subject property formerly occupied by USA Station 57 is currently undeveloped. Areas adjacent to the site (to the southwest and northwest) are used as parking for the shopping center. A residential neighborhood is located south of the Foothill Square shopping center.

The site is situated approximately 80 feet above sea level, immediately west of the Oakland/San Leandro Hills and approximately 4 miles northeast of San Francisco Bay. The property is located on the eastern portion of the East Bay Plain. Topography at the site is relatively flat, with the ground surface typically sloping west-southwest towards San Francisco Bay. The Oakland/San Leandro Hills rise sharply out of the East Bay Plain east of the site and Interstate 580.

The former service station configuration included three 12,000-gallon gasoline and one 8,000-gallon diesel underground storage tanks (USTs) and three dispenser islands. The station was closed, and the USTs, dispensers, and associated product piping were removed in July 1994. The approximate location of the USTs and fuel dispensers are included on Figure 2.

It is our understanding that Jay-Phares Corporation intends to redevelop the Foothill Square shopping center, including the area formerly occupied by USA Station 57, in the near future. The current property redevelopment plan includes construction of a grocery store at the location of former USA Station 57. A map depicting the tentative redevelopment plan for the property, including the location of the grocery store, is illustrated on Figure 4.

Site Geology and Hydrogeology

The geology beneath the site predominately consists of fine grained soils (silt/clay mixtures) situated above an undulatory bedrock surface. Clayey sand, silty sand, and clayey gravel soils appear to be interbedded within the fine grained soils. The soil horizon thicknesses above bedrock, encountered during historical subsurface investigations, are variable, ranging from at least 10 feet to more than 44 feet below ground surface (bgs). Based on available information, sedimentary bedrock (siltstone/sandstone or similar) appears to be present beneath the soil strata. The upper

portion of the bedrock appears to be significantly weathered, allowing penetration by hollow stem auger drilling equipment and California split-spoon sampling equipment. The soil/bedrock interface appears to generally dip towards the north, at an apparent angle of approximately 25 degrees from horizontal.

Depth to groundwater has ranged from approximately 5 to 24.5 feet bgs in the site monitoring wells between 1995 and 2009. Recent depth to groundwater measurements in the site monitoring wells are near historically low levels. Groundwater flow beneath the site appears to be variable, with north and northeast groundwater flow predominately observed in the southern part of the site, and south and southeast groundwater flow predominately observed in the northern part of the site (general convergent groundwater flow pattern).

Extent of Petroleum Hydrocarbon Impact to the Subsurface

For the purposes of this *Work Plan*, the extent of petroleum hydrocarbon impact to shallow soil and groundwater are summarized below.

Petroleum Hydrocarbon Impact to Shallow Soil

Stratus has prepared an iso-concentration contour map that depicts the approximate lateral extent of petroleum hydrocarbon impact (total petroleum hydrocarbons as gasoline [TPHG]) to soil within the upper 12 feet of the subsurface. Figure 5 depicts the approximate extent of TPHG impact to soil between 0 and 7 feet bgs and 7 to 12 feet bgs based on available historical soil analytical data. Subsequent to collection of the analytical data used to generate these figures, dual phase extraction (DPE) and DPE/air sparging (AS) remediation (discussed below) has been completed at the site, which would almost certainly have resulted in contaminant concentration reductions and a redistribution of contaminants within the subsurface. Despite these remedial efforts and expectant reduction/redistribution of the contaminant mass concentrations, it is our opinion that this figure is useful for illustrative purposes to describe the extent of the petroleum hydrocarbon impact remaining at the site. Total petroleum hydrocarbons as diesel (TPHD), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds), and methyl tertiary butyl ether (MTBE) have also been reported in soil samples collected at the site; the distribution of these contaminants is generally similar to the distribution of TPHG.

Petroleum hydrocarbon impact to the shallow subsurface (above 7 feet bgs) appears to primarily be located near and directly beneath the former fuel pump islands, in the northern portion of the site. The highest concentrations of petroleum hydrocarbons in the fuel pump island area appear to be present immediately below surface grade, with concentrations generally decreasing with depth in this area. Maximum TPHG

concentrations of 4,500 milligrams per kilogram (mg/Kg) were historically reported. Excavation work to the south of the fuel dispenser island area (discussed below) likely removed the majority of the shallow petroleum hydrocarbon impact in this portion of the site.

The lateral extent of petroleum hydrocarbon impact to soil appears to encompass a larger area from 7 to 12 feet bgs relative to that observed from surface grade to 7 feet bgs, possibly due to 'smear zone' influence with the upper portion of the water table at times of high groundwater levels beneath the site. The highest concentration of TPHG and benzene in soil between 7 and 12 feet bgs, following excavation work, was detected at the southern limits of the excavation, at concentrations of 130 mg/Kg and 0.33 mg/Kg, respectively. TPHG was also detected in samples collected near the former diesel UST and southern fuel pump island at concentrations of 80 mg/Kg (boring AS-1) and 100 mg/Kg (sample TC2-5). Benzene and MTBE concentrations at this depth appear to be low.

Petroleum Hydrocarbon Impact to Groundwater

TPHG/gasoline range organics (GRO), TPHD, BTEX, MTBE, tertiary butyl alcohol (TBA), di-isopropyl ether (DIPE), and 1,2-dichloroethane (1,2-DCA) have historically been reported in groundwater samples beneath the site. The highest petroleum hydrocarbon concentrations appear situated in the southern portion of the site, near the former UST complex. At the time of the first quarter 2009 well sampling event, the highest concentrations of GRO and benzene were detected in the sample collected from well EX-2, at concentrations of 11,000 micrograms per liter (µg/L) and 5,400 µg/L, respectively. The highest concentration of MTBE at the time of the first quarter 2009 well sampling event was detected in well MW-3 (650 µg/L). A map depicting the approximate lateral extent of GRO, benzene, and MTBE impact to the subsurface, using first quarter 2009 analytical data, is presented as Figure 6.

Historical Remedial Efforts

For the purposes of this *Work Plan*, historical efforts to remediate petroleum hydrocarbon impact at the site are summarized below.

Excavation and Disposal of Soil

Approximately 775 cubic yards of soil were reportedly excavated at the time of UST removal in 1994. The approximate lateral limits of this excavation are included on Figure 2. Using the arithmetic mean of concentrations reported from samples collected from the soil stockpile generated during the excavation, an estimated 327.2 pounds of

TPHG, 41.3 pounds of TPHD, and 0.15 pounds of benzene were removed from the subsurface via excavation.

Dual Phase Extraction (DPE) and DPE/Air Sparging (AS)

Stratus conducted petroleum hydrocarbon mass reduction events using DPE and DPE/AS technology, under ACHCSA approval, intermittently between July 2004 and November 2007. Approximately 792 pounds of TPHG were removed in the vapor phase during these intermittent remedial events. Combined DPE and AS appears to have been more effective in removing petroleum hydrocarbon mass from the subsurface than by using DPE alone, as an estimated 694 pounds of the vapor phase TPHG were extracted via DPE/AS.

PROJECT APPROACH

The purpose of the proposed soil gas survey is to collect shallow soil gas samples across the area of historically documented petroleum hydrocarbon impact to soil and groundwater. The selection of the proposed soil gas sampling locations is based on our understanding of the distribution of the petroleum hydrocarbon impact to soil and groundwater, and may be further referenced in the August 12, 2009 report. Stratus is proposing to collect 40 soil gas samples, from 40 soil borings (SV-1 A/B through SV-20 A/B), situated at a spacing of approximately 30 feet from each other (see Figure 7).

According to the Jay-Phares Corporation, the current redevelopment plan at the site will require lowering of surface grade by approximately 5 feet; deeper excavations in other areas will likely be necessary in order to install a foundation for the proposed building to be constructed near the former service station. Given the likelihood of a change in surface grade at the subject property, as stated earlier in this document, we believe that it would be prudent to collect soil gas samples below the current ground surface, and also at a deeper interval below the elevation of the anticipated future ground surface level. As a standard practice at sites with petroleum hydrocarbon contamination, Stratus typically recommends collection of shallow soil gas samples at a depth of approximately 4 feet bgs. However, given the proposed redevelopment plan, Stratus is proposing to collect soil gas samples at approximately 4 bgs and also 9 feet bgs (approximately 4 feet below anticipated future surface grade). Collection of samples at these depths will allow for an evaluation of soil gas concentrations a few feet below the current, and anticipated future, ground surface elevation and should provide useful information to assess soil gas exposure risk at the site.

The scope of work has been subdivided into tasks 1 through 5. All geologic and soil gas survey work will be conducted under the direct supervision of a State of California Registered Geologist or Civil Engineer, and in accordance with standards established by the Department of Toxic Substances Control (DTSC), the California Regional Water Quality Control Board (Los Angeles Region, [LARWQCB]), ACHCSA, Alameda County Public Works Agency (ACPWA), and United States Environmental Protection Agency (USEPA) guidelines.

Task 1: Prefield Activities

Following approval of this document by ACHCSA, the following activities will be implemented:

- Retain a C-57 licensed well driller to complete the work,
- Update the site-specific Health and Safety Plan,
- Secure a drilling permit from ACPWA,
- Mark the proposed soil sample locations, and
- Notify Underground Service Alert, the property owner, ACPWA, and ACHCSA of the scheduled field activities.

Task 2: Soil Gas Sample Borings and Sampling

A C-57 licensed well driller will advance soil borings SV-1 A/B through SV-20 A/B using the direct push method, under the direction of a Stratus Geologist/Scientist. Upon reaching the base of the borehole, the drilling roads will be extracted from the borehole. The drilling contractor will then install a polyethylene soil vapor implant (Environmental Service Products Part No. SVPT-91, or similar) attached to 0.25-inch diameter Teflon tubing, or similar, near the base of the borehole. A filter pack of graded sand will be placed around the soil vapor implant, and approximately 2 feet of hydrated granular bentonite will be placed on top of the filter pack sand. The borings will not be completed as wells by grouting the remaining annular space within the boreholes; the annular space will remain open until the soil vapor samples can be collected and the boreholes properly destroyed.

Once the soil vapor implants have been installed, Stratus will wait approximately 48 hours until commencing with collection of the soil vapor samples. Prior to sampling, the approximate air volume situated inside of the Teflon tubing and the filter pack sand surrounding the soil vapor implant will be calculated. Stratus will use an expendable Summa Canister to purge this ambient air. Following purging of the ambient air, a

separate Summa Canister will be used to collect each soil gas sample. During filling of the canisters, the flowrate will be regulated to fill at a rate between 100 and 200 milliliters per minute (ml/min). A tracer gas leak check (using 1,1-difluoroethane [1,1-DFA] or isopropyl alcohol) will be used to assess potential leakage within the sampling train. If use of a soil gas sampling shroud is not required by ACHCSA, leak detection will be evaluated by spraying the outside of the sample train assembly with 1,1-DFA (method recommended by Stratus). If use of a soil gas sampling shroud is required by ACHCSA, leak detection will be evaluated by placing paper towels soaked in isopropyl alcohol within a clear plexiglass-type box installed around the Summa Canisters. Once the samples have been collected, the boreholes will be backfilled to surface grade with neat cement and the ground surface will be patched to match the surrounding area.

Following collection of the soil gas samples, the well drilling contractor will re-mobilize the site in order to properly abandon the boreholes. The soil vapor implants will be removed from the subsurface and the boreholes will be backfilled to surface grade with neat cement.

Drill cuttings and wastewater generated during the field activities will be contained in DOT-approved 55-gallon steel drums. The drums will be appropriately labeled and stored at the site pending proper disposal. A licensed contractor will transport the soil and wastewater to an appropriate facility for disposal.

Task 3: Laboratory Analysis

Air samples will be forwarded to a California state-certified laboratory for chemical analysis under strict chain-of-custody procedures. The soil gas samples will be analyzed for TPHG using USEPA Method TO-3, and for BTEX, MTBE, and for the leak detection tracer gas (1,1-DFA or isopropyl alcohol) using USEPA Method TO-15.

Task 4: Surveying

A California licensed land surveyor will be retained to survey the horizontal coordinates and elevations of each soil gas sampling boring location, as required by AB 2886 (GeoTracker). The survey will be tied to the previous well survey at the site. Survey data will be uploaded to the GeoTracker database.

Task 5: Report Preparation

A report will be prepared and submitted to document the findings of the soil gas survey. The report will include a scaled site plan illustrating soil gas sampling locations,

analytical data summary tables, certified analytical reports, and a discussion of the findings of the investigation.

The results of the soil gas survey will be used to evaluate the necessity of developing additional Site Specific Toxicity Levels (SSTLs) for the site. If contaminant concentrations in shallow soil gas are within, or slightly above, commercial property Environmental Screening Levels (ESLs) identified in *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (RWQCB, November 2007), additional SSTLs will not be prepared. However, if shallow soil gas concentrations are significantly higher than contaminant commercial property ESLs, additional SSTLs will be prepared for soil and groundwater based on the soil gas survey results.

SCHEDULE

Following approval of this *Work Plan*, Stratus will promptly forward a drilling permit application package to ACPWA for approval. Once the drilling permit package has been approved, approximately 5 days will be necessary until the soil gas survey work can be implemented (ACPWA requirement). A report will be submitted within approximately one week of receiving the analytical results of the soil gas samples.

If you have any questions or comments concerning this document, please contact Scott Bittinger at (530) 676-2062.

Sincerely,

STRATUS ENVIRONMENTAL, INC.

FOR

Scott G. Bittinger, P.G.
Project Manager

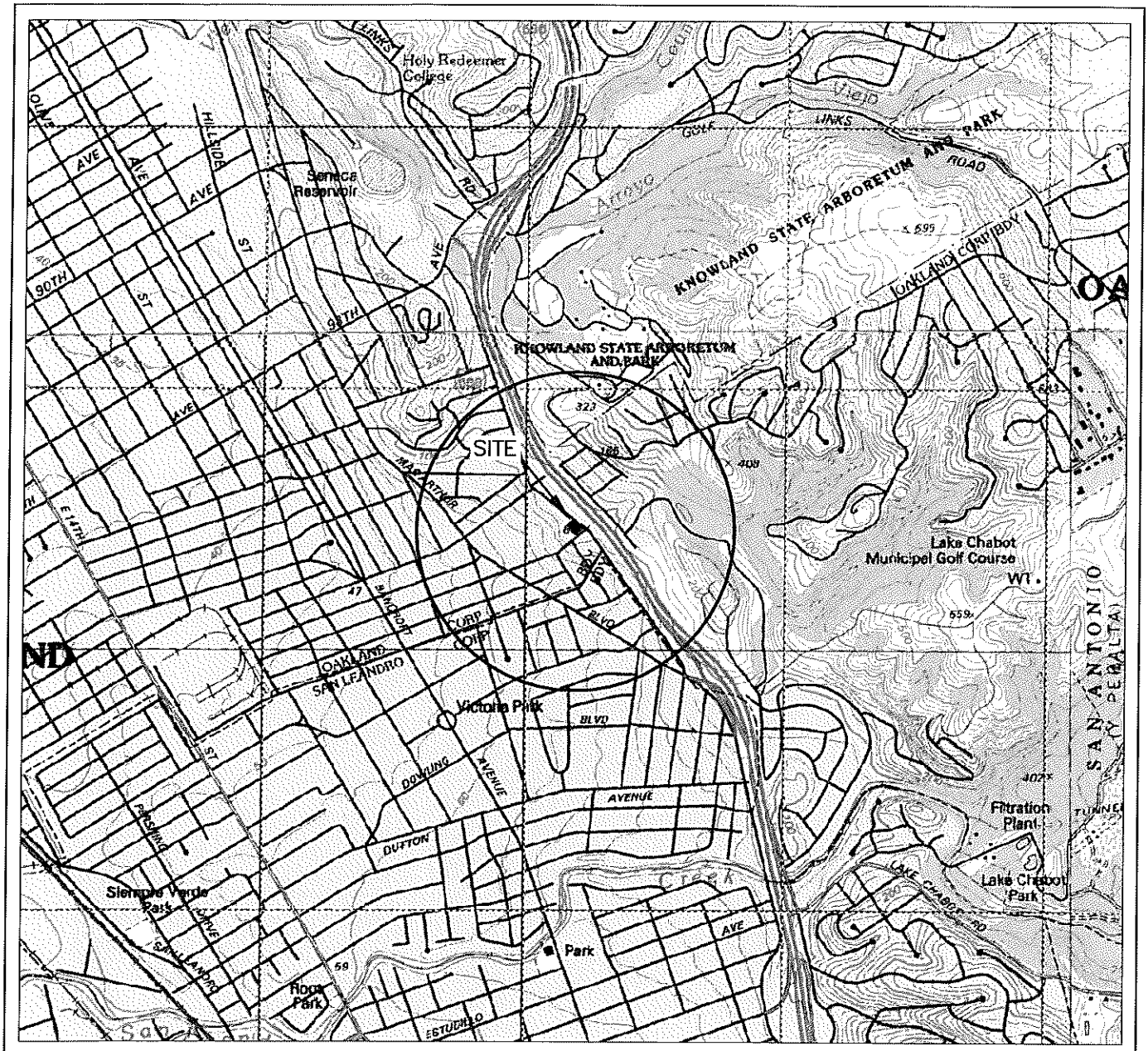
Gowri S. Kowtha, P.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
GOWRI SHANKAR KOWTHA
No. C 63413
Exp. 09/10
CIVIL
STATE OF CALIFORNIA

Attachments:

	Figure 1	Site Location Map
	Figure 2	Site Plan
	Figure 3	Site Vicinity Map
	Figure 4	Tentative Site Development Plan
	Figure 5	Approximate Lateral Extent of TPHG Impact to Soil (0 to 12 feet bgs)
	Figure 6	Approximate Lateral Extent of GRO, Benzene, and MTBE Impact to Groundwater
	Figure 7	Proposed Soil Vapor Sampling Boring Location Map

cc: Mr. Charles Miller, Moller Investment Group, Inc.
Mr. John Jay, Jay-Phares Corporation
Mr. Peter McIntyre, AEI Consultants



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
OAKLAND, CA
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1980

North

QUADRANGLE LOCATION

0 2000 FT

SCALE 1:24,000

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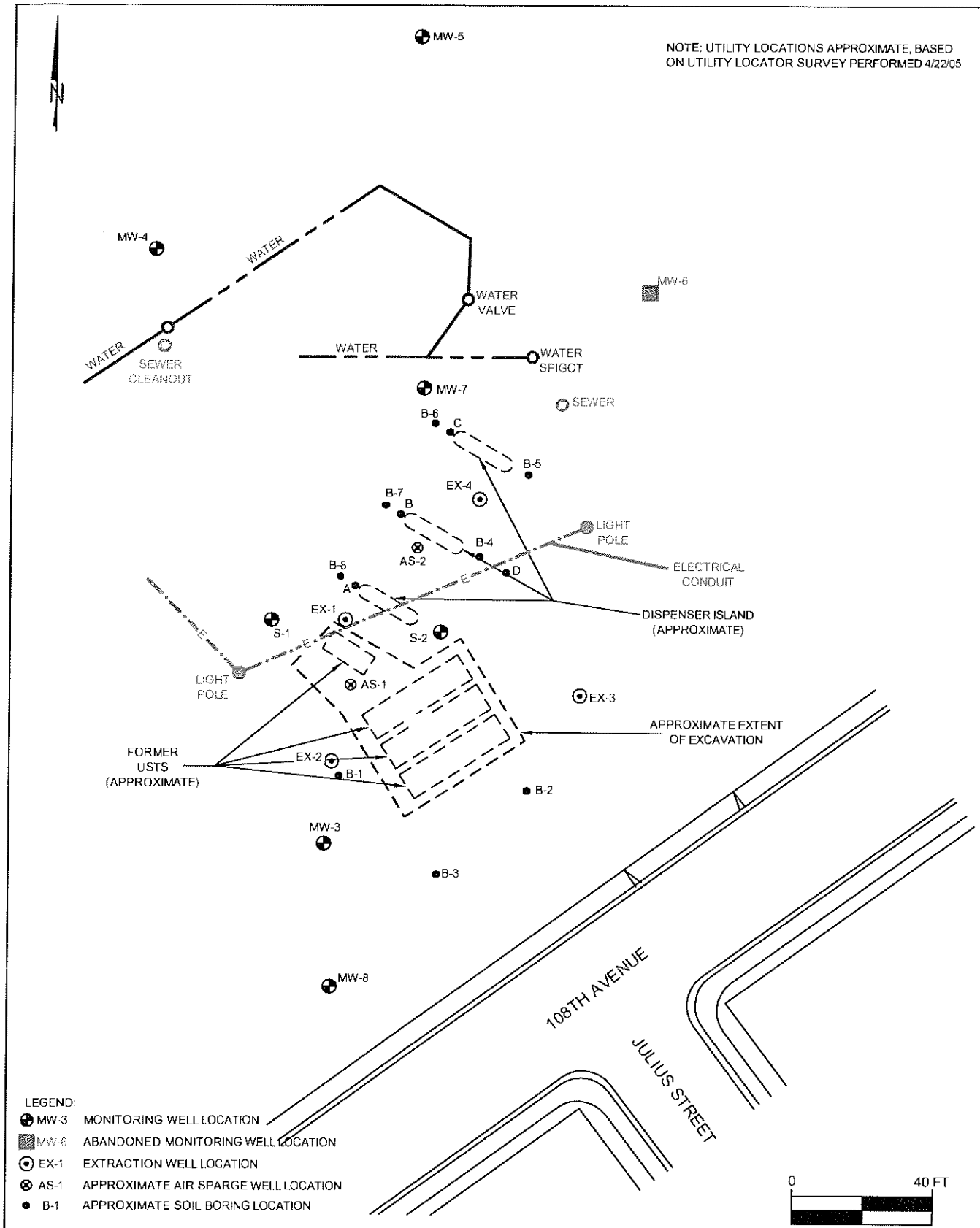
OAKLAND, CALIFORNIA

SITE LOCATION MAP

FIGURE
1
PROJECT NO.
2007-0057-01

USA\57\Quarterly JMP REV May 18, 2009 USA 57 Site Location Map



NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) & MORROW SURVEYING (2005) AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, AND GHH ENGINEERING.

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SITE PLAN

FIGURE
2

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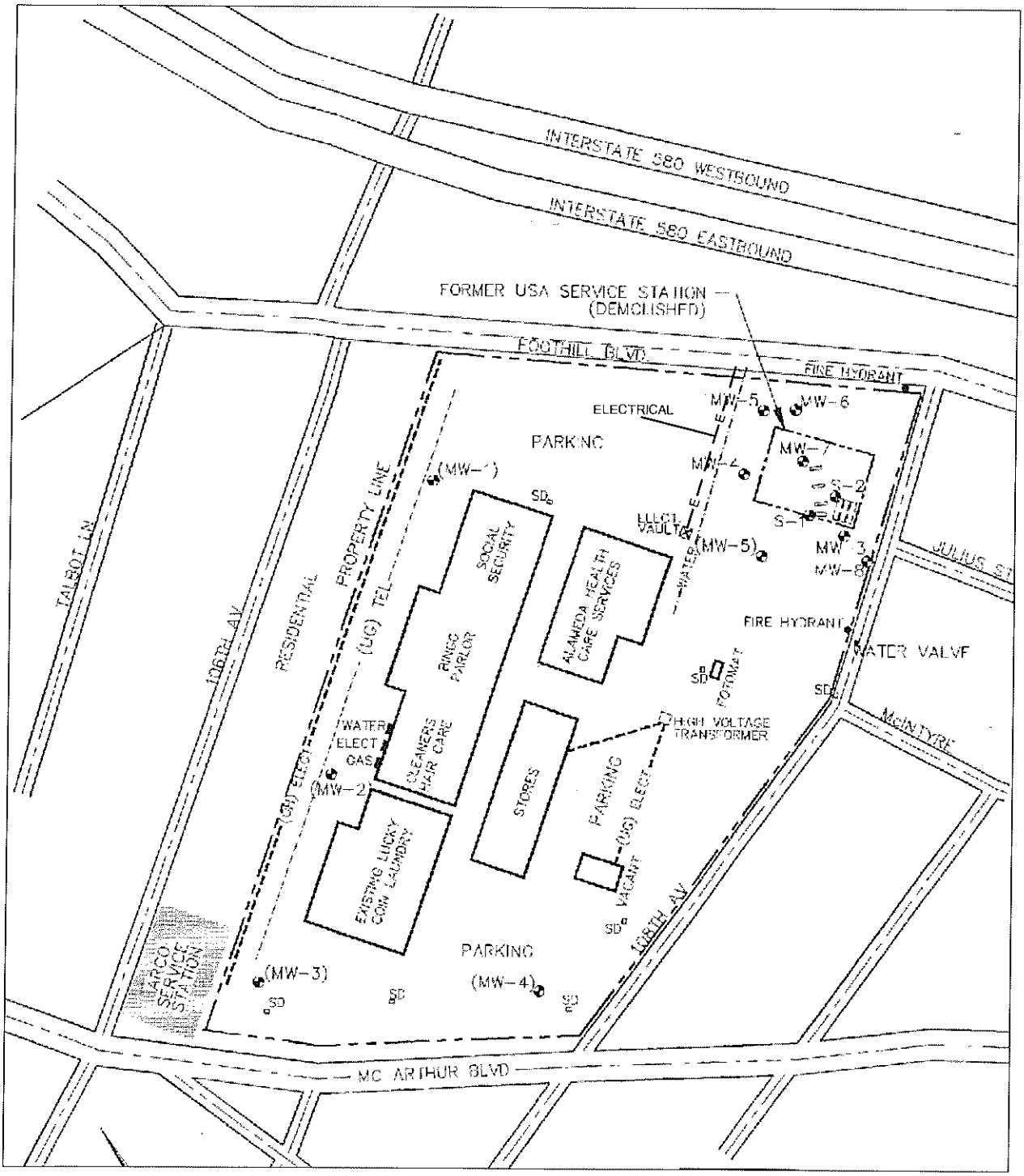
2007-0057-01



NOTES:

1. LOCATIONS OF UTILITIES BASED ON SURVEY PERFORMED BY OTHERS
2. BUILDING LOCATIONS AND PROPERTY BOUNDARIES APPROXIMATE
3. ADDITIONAL UNDERGROUND UTILITY LIKELY EXIST ON PROPERTY, HOWEVER AVAILABLE INFORMATION PROVIDED ON THIS FIGURE FOR REFERENCE PURPOSES.

0 200 FT

APPROXIMATE SCALE

BASED ON DRAWING FROM GHH ENGINEERING, INC. DATED 1/19/01

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SITE VICINITY MAP

FIGURE 3

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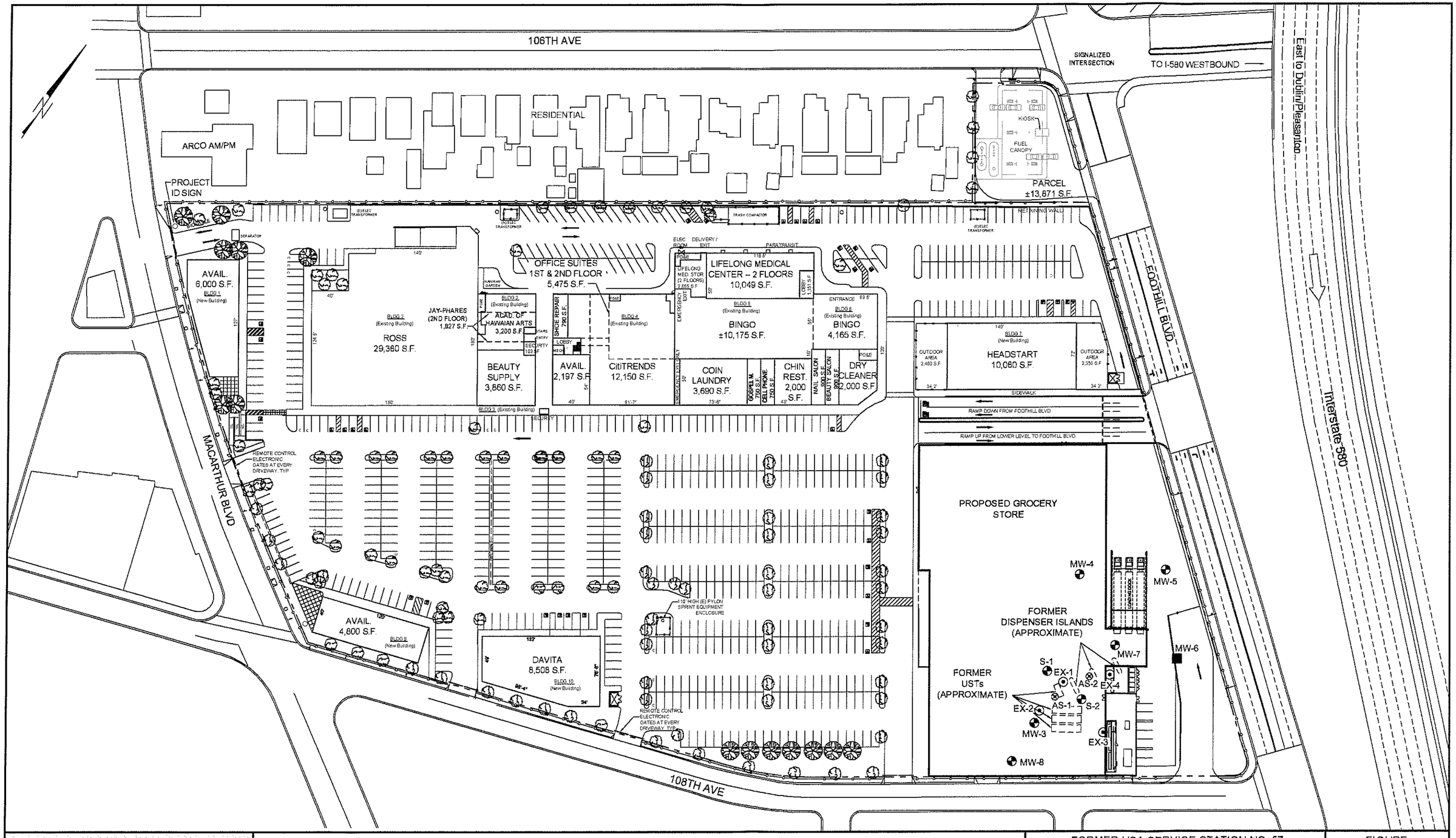

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0 1200 FT

SCALE

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TENTATIVE SITE DEVELOPMENT PLAN

FIGURE
4

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LEGEND

- MW-3 MONITORING WELL LOCATION
- EX-1 EXTRACTION WELL LOCATION
- MW-6 ABANDONED MONITORING WELL LOCATION
- AS-1 APPROXIMATE AIR SPARGE WELL LOCATION
- OUTER LIMITS OF TPHG IN SOIL (0'-7' bgs)
- OUTER LIMITS OF TPHG IN SOIL (7'-12' bgs)

FOOTHILL BLVD

MW-4

MW-5

FORMER
DISPENSER ISLANDS
(APPROXIMATE)

MW-7

MW-6

S-1

EX-1

AS-2

EX-4

FORMER
USTs
(APPROXIMATE)

AS-1

S-2

EX-2

MW-3

EX-3

MW-8

108TH AVE

0 60 FT

SCALE

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APPROXIMATE LATERAL EXTENT OF
TPHG IMPACT TO SOIL (0' - 12' bgs)

FIGURE
5

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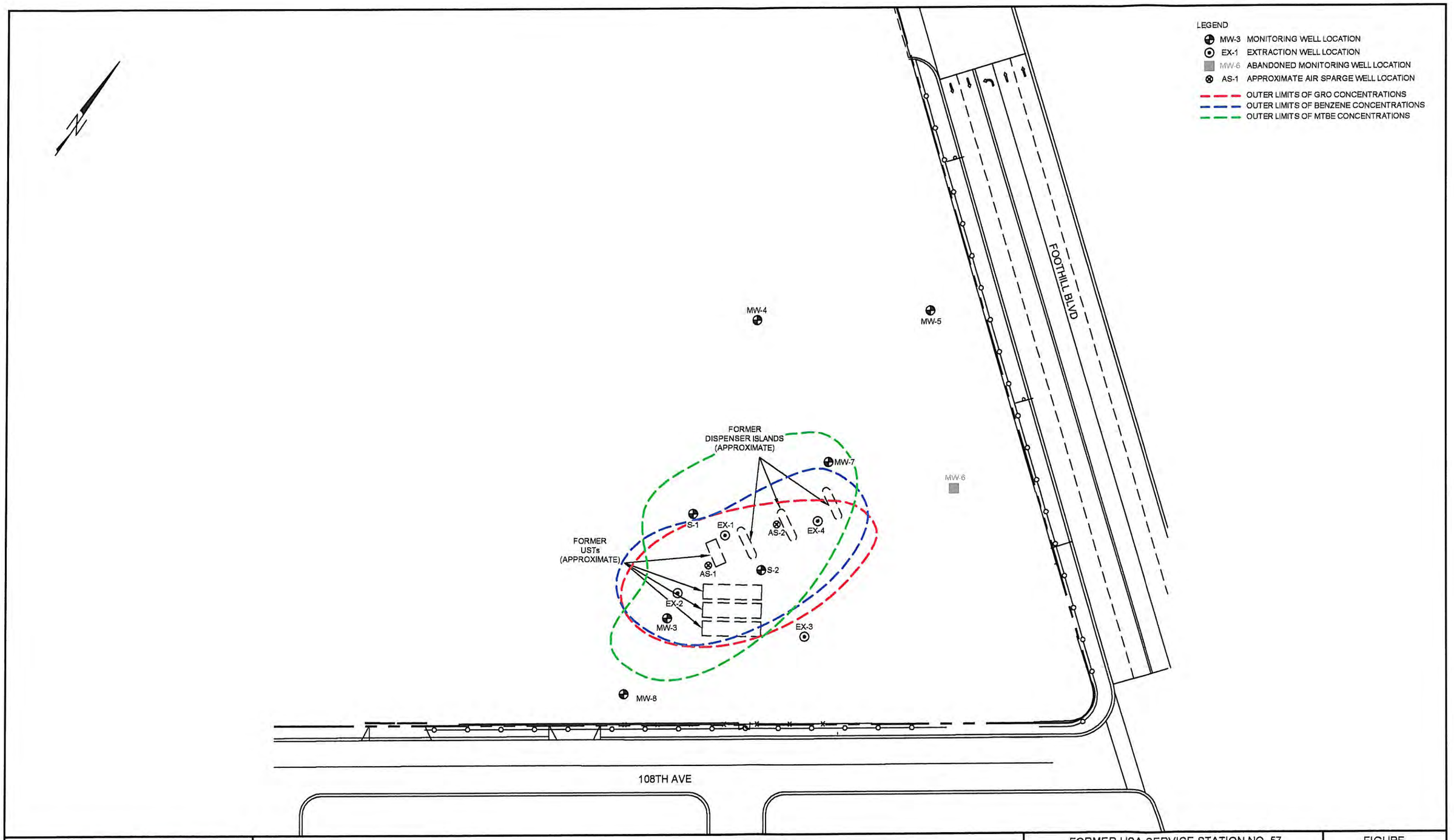

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0 60 FT
SCALE

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APPROXIMATE LATERAL EXTENT OF GRO,
BENZENE & MTBE IMPACT TO GROUNDWATER

FIGURE
6

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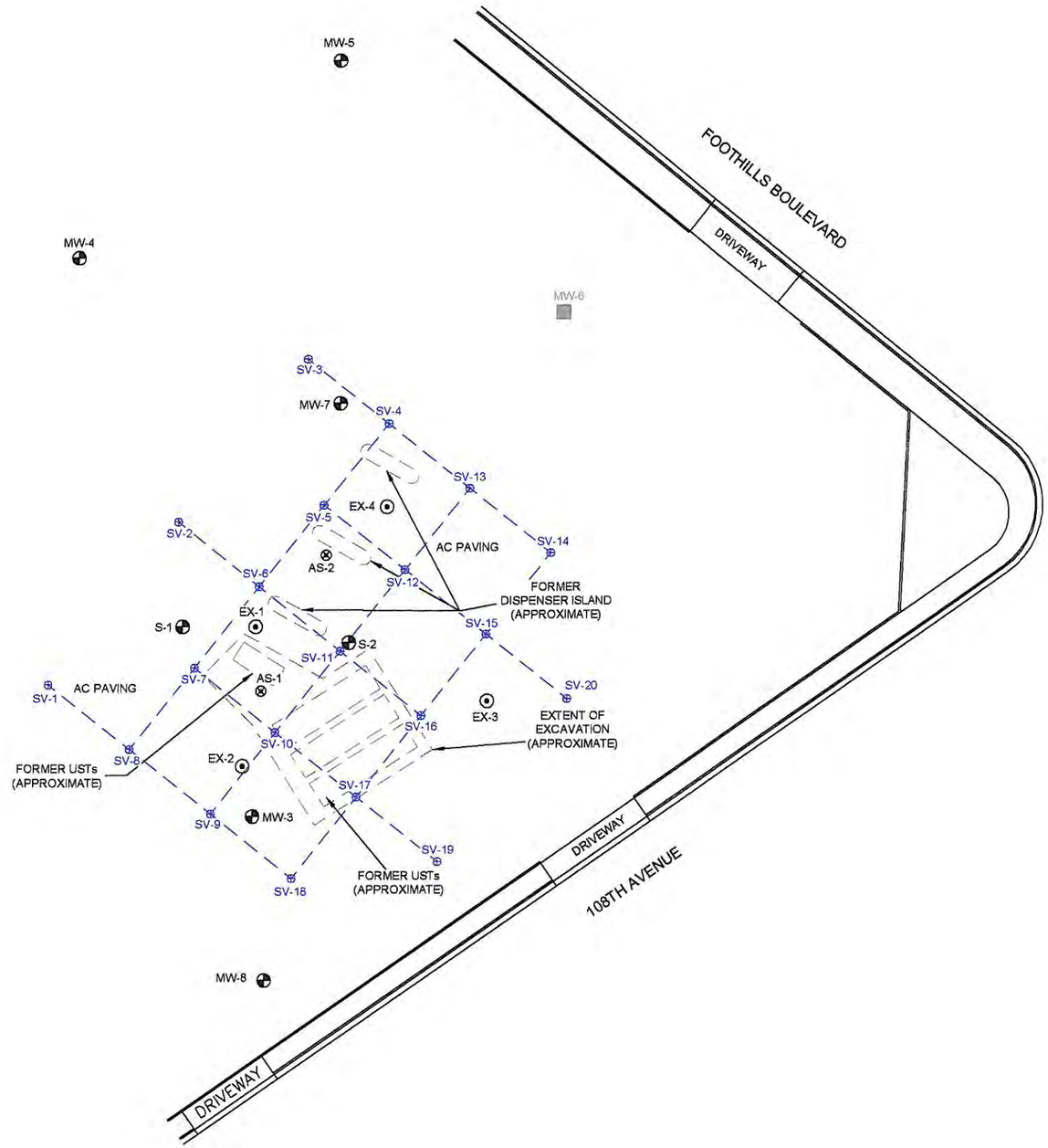
LEGEND

- MW-3 MONITORING WELL LOCATION
- EX-1 EXTRACTION WELL LOCATION
- MW-6 ABANDONED MONITORING WELL LOCATION
- AS-1 APPROXIMATE AIR SPARGE WELL LOCATION
- SV-1 PROPOSED SOIL VAPOR SAMPLING BORING



JMP REV April 15, 2009 USA 57 1Q09

USA\57\SCM

STRATUS
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0 40 FT
SCALE

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OAKLAND, CALIFORNIA

PROPOSED SOIL VAPOR SAMPLING
BORING LOCATION MAP

FIGURE
7

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