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PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT
Design Section 7 - Salt River Channelization
East Papago - Hohokam - Sky Harbor Freeways
ADOT Project Nos. RAM 600-5-305,
RAM 600-3-309 & 601-0-302
Arizona Department of Transportation
Maricopa County, Arizona

SHB Job No. E87-56CH
Letter No. 168

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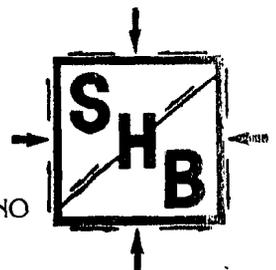


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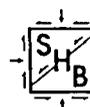
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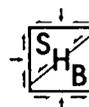
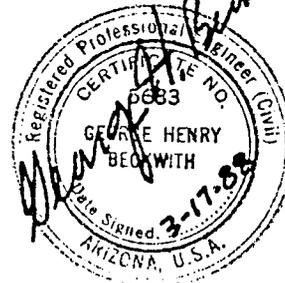
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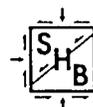
1. INTRODUCTION

This report presents the results of our Preliminary Geotechnical Investigation for Design Section 7 (Salt River Channelization) of the East Papago - Hohokam - Sky Harbor Freeways and provides preliminary recommendations for the design of bank protection and grade control structures. This preliminary geotechnical evaluation will need to be supplemented with a final geotechnical investigation by the Section Designer after the locations for the grade control structures are established. A supplementary investigation will also be required to delineate the western and northern extent of the landfill under the existing south flood control dike between 40th and 48th Streets.

Additional information on the landfills in the western area of the proposed channelization is presented in our Letter No. 132 (February 8, 1988).

2. PROJECT DESCRIPTION

Preliminary details of Design Section 7 of the East Papago - Hohokam - Sky Harbor Freeways Project were provided by DMJM.



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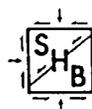
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Design Section 7 of the project includes the channelization of the Salt River from Mill Avenue to 40th Street. The proposed channel will be approximately 1,000 feet wide and have a maximum depth of about 26 feet at the centerline. The alignment of the channel will be set so as to avoid intercepting the landfills in the area. The banks of the channel will be approximately 20 feet high and will require erosion and scour protection. Four grade control structures are proposed for stabilizing the vertical profile of the channelized reach. The exact locations of these structures have not been determined; however, one grade control structure will be sited close to the downstream side of each of the three bridges (existing Southern Pacific Railroad, and proposed Priest Drive and State Route 153 bridges) crossing the channel. The fourth grade control structure will be located at the western end of the project near 40th Street. These structures will be set flush to the proposed channel profile and will extend to approximately 26 feet below the proposed initial channel invert.

Approximately 3.5 million cubic yards of material will be excavated in constructing the channel invert grade. The depth of this excavation will generally be between 5 and 15 feet below existing grade. However, approximately 24 feet of material will be removed near the



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proposed Hohokam Expresssway, and about 2 feet of fill will be required near the western edge of the project for the initial channel invert.

3. INVESTIGATION

3.1 Review of Existing Data

Existing geologic, geotechnical and hydrologic data pertaining to Design Section 7 were reviewed. Included in this review were U.S. Geological Survey topographic maps, aerial photographs, geologic and geotechnical feasibility studies performed for the referenced project by the Earth Technology Corporation and previous geotechnical investigations performed in the general area by Sergent, Hauskins & Beckwith Geotechnical Engineers, Inc. (SHB).

3.2 Subsurface Exploration

A total of 40 borings and 112 test pits were excavated, and 13 gas monitor wells were installed for Design Section 7. The borings were advanced to depths ranging from 25 to 49 feet utilizing a Becker Hammer drill equipped with a top-head, 8,000-foot-pound diesel-driven hammer, advancing a 9-inch open-ended drive pipe at a

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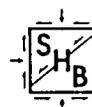
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rate 40 to 90 blows per minute. The test pits were excavated to depths ranging from 3 to 12 feet utilizing a Case 580E backhoe.

Two gas probes were installed at different depths within each of the gas monitor wells following the acquisition of the geotechnical information from the borings. These probes were installed in Borings CH-9, CH-16, CH-53, CH-65, CH-76, CH-102, CH-113, CH-114, CH-115, CH-122, CH-135, CH-137 and CH-155.

A Foxboro Organic Vapor Analyzer (OVA Model 128) was utilized to monitor ambient air quality in the area of the landfills during the field investigations.

Logs of all the borings and test pits conducted for Design Section 7 are presented in Appendix A. Appendix A also includes a brief description of drilling and sampling equipment and procedures. Boring and test pit locations are shown in Drawing 515 (four sheets in map pocket). The coordinates defining the hole locations and boring/test pit elevations were provided by DMJM; these are shown on the logs and also are tabulated in Appendix A. Test borings CH-98, CH-113 and CH-138, and Test Pits CH-27 and CH-40 have not been surveyed; however, their approximate locations are shown on Drawing



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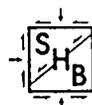
515. Coordinates and surface elevations for these borings will be provided after they have been surveyed by DMJM.

3.3 Laboratory Analysis

To aid in the classification of the soils, grain-size distribution and moisture content determinations were performed on selected soil samples. Because part of the excavated material from the Salt River will be used for roadway embankments, R-value tests were also performed on selected samples. Results of the laboratory tests are presented in Appendix B.

Water and gas samples retrieved from the borings and gas monitor wells were tested by SCS Engineers (SCS) at their laboratories in Long Beach, California to determine the presence of potentially hazardous materials in the landfill. Results of these tests are provided in Appendix C.

Soil samples from 1 to 3 feet below the landfill were also collected by SCS field personnel from selected test borings in the RS60, SRP56 and ES40 landfills. These samples were submitted to SCS Analytical Laboratory in Long Beach, California, where they were tested for pH,



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electrical conductivity, chloride, metals and PCBs. The soils were tested to determine the presence of the following metals: cadmium (Cd), nickel (Ni), lead (Pb), zinc (Zn), copper (Cu) and hexavalent chromium. Results of these tests are also presented in Appendix C.

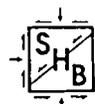
Selected rock cores from test borings conducted by Woodward-Clyde Consultants Consulting Engineers & Geologists (1987)* for the geotechnical investigation of the Salt River Project Corporate Headquarters building site near 56th Street were obtained from Sundt Corp. At the request of Charles K. Eaton, P.E., of the Arizona Department of Transportation (ADOT), laboratory tests were performed by SHB on selected samples of these rock cores to determine the durability and competency of the rock for use as riprap for channel bank protection. Results of these tests are presented in Appendix D.

4. SITE CONDITIONS & GEOTECHNICAL PROFILE

4.1 Topography & Surface Features

The general area of Design Section 7 lies within the Salt River floodplain and slopes gently in a westerly

*References are listed at the end of this report.



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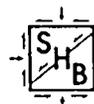
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direction from an approximate elevation of 1140 near Mill Avenue to an elevation of about 1098 at 40th Street. Two bridges and two at-grade roadways cross the Salt River channel between 40th Street and Mill Avenue. These crossings include the bridges for the Hohokam Expressway and Southern Pacific Railroad (SPRR), and the at-grade crossings for Priest Drive and the southbound lane of Mill Avenue.

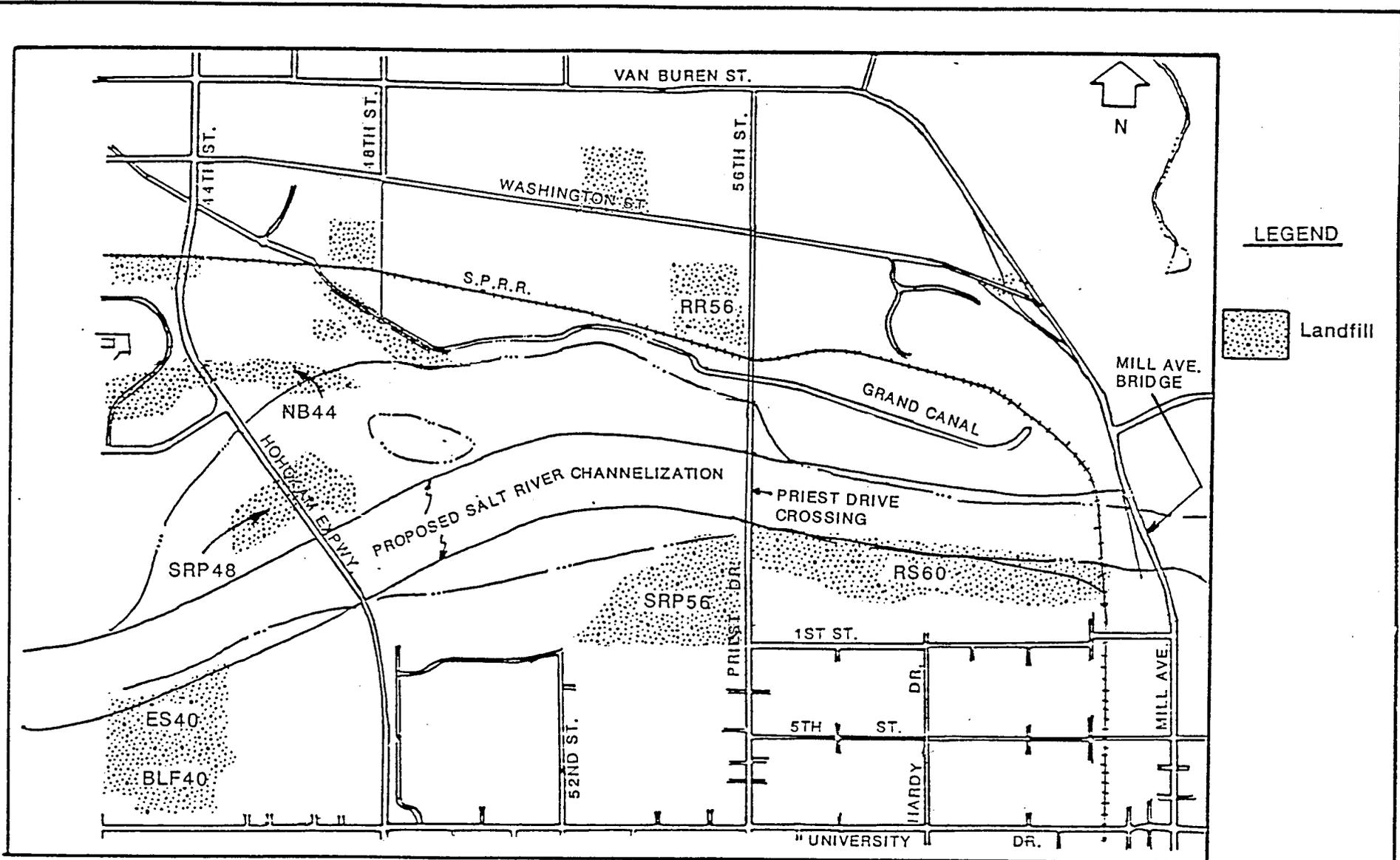
Four landfills, RS60, SRP56, SRP48 and ES40, have been identified along the proposed channelization. The approximate locations of these landfills are shown in Figure 1. The RS60, SRP56 and ES40 landfills are located along the south bank of the river. RS60 is located between Priest Drive and the SPRR Bridge, SRP56 is located between Priest Drive and 52nd Street, and ES40 is located between 40th and 44th Streets. The SRP48 landfill is located along the alignment of the existing Hohokam Expressway, approximately in the central area of the modern floodplain of the Salt River.

A 15 to 20-foot high dike is located along the south side of the existing Salt River channel. This dike is protected with gabions placed on a geotextile filter fabric and extends westward from approximately 700 feet east of Priest Drive to well beyond the western end of



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APPROXIMATE LOCATIONS OF LANDFILLS
FIGURE 1

After Earth Technology Corporation (1987).

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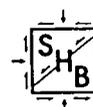
the proposed channelization. Local breaks occur in this dike at the crossings for Priest Drive and the Hohokam Expressway. A 10-foot wide blanket of cobbles and boulders extends horizontally from the toe of the dike towards the channel. This blanket serves as scour protection for the dike. The cobbles and boulders in the blanket are tied together with galvanized wire to form the gabion bank protection.

A significant amount of construction debris, household refuse, dried and decomposing vegetation, wrecked automobiles and mechanical parts is present on the surface in isolated areas within the project site, and there is obvious evidence of continuing illegal dumping of these materials in the area.

4.2 Site Geology

The project site lies in the Basin and Range Physiographic Province, which is characterized by elongated mountain ranges separated by broad basins. The mountain ranges represent uplifted structural blocks and generally consist of Precambrian to Tertiary bedrock. The basins are filled with Tertiary to Quaternary sediments.

The study area for this report is bounded on the north by the Grand Canal, on the south by University Drive, on



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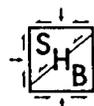
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the east by Mill Avenue and on the west by 40th Street. The geologic units exposed in the study area are presented in Figure 2 and include bedrock consisting of granite of Precambrian age, and unconsolidated alluvium and pediment colluvium-alluvium of Quaternary age.

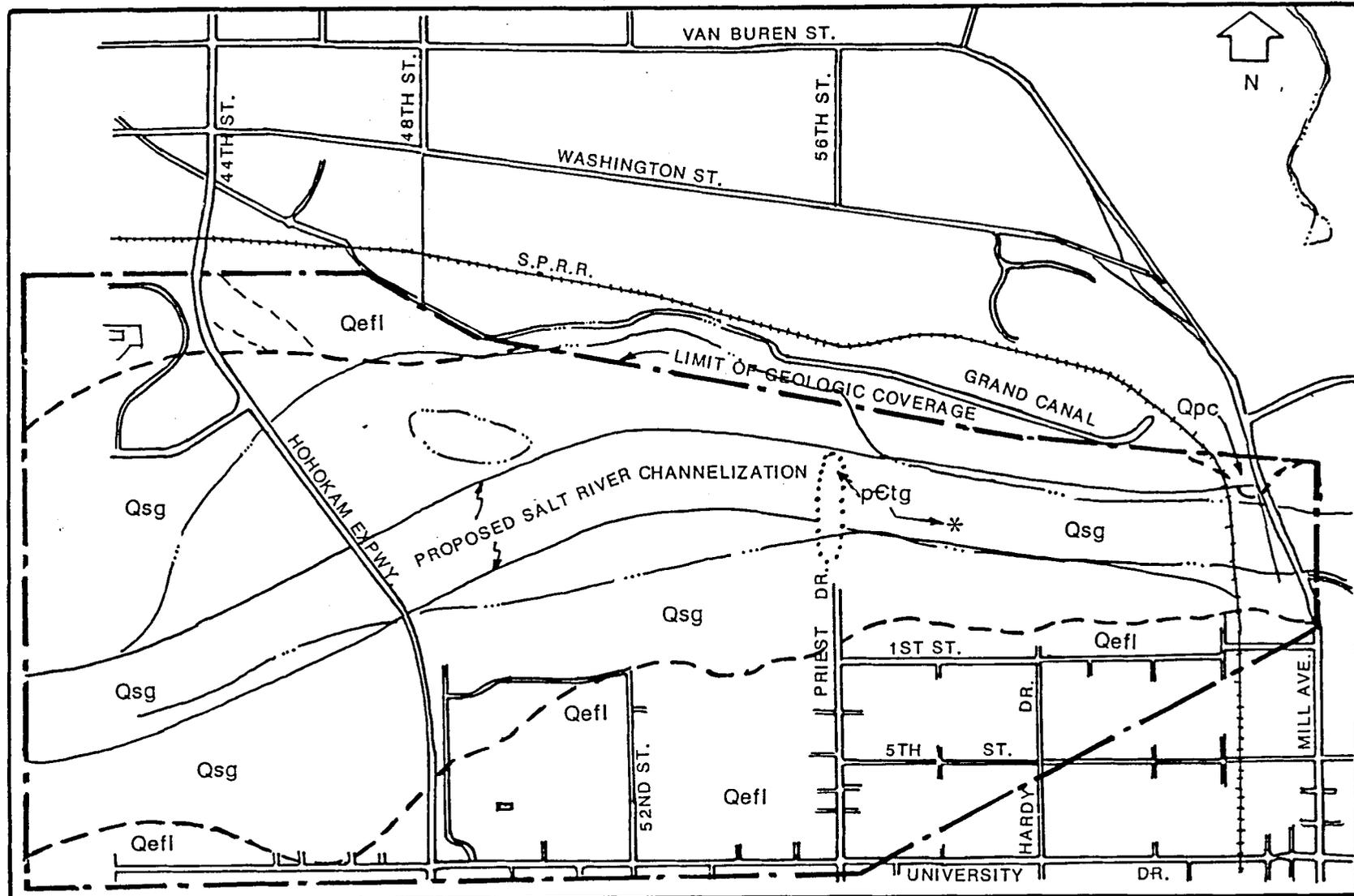
The Precambrian granite, known locally as the Tovrea granite, is exposed as discontinuous outcrops along the Grand Canal and along the proposed channelization near the Priest Drive crossing over the Salt River. Pewe and others (1986) depict an outcrop 1,400 feet long in a north-south direction and 300 feet wide in an east-west direction at the Priest Drive crossing. In reality, the rock is concealed by shallow deposits of recent alluvium in this area. West of Priest Drive, the depth to the granite bedrock increases to about 135 feet along the south bank of the river at 48th Street. East of Priest Drive, the depth to bedrock varied from 11 feet at Boring CH-138 to 33 feet at Boring CH-61. An approximate 15- by 10-foot outcrop of the granite bedrock is exposed in the center of the proposed channel, approximately 1,600 feet east of Priest Drive. The approximate location of this outcrop is shown in Figure 2.

The Tovrea granite consists of gray, coarse grained quartzbiotite granite with large, rounded crystals of



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- LEGEND**
- Qsg - Salt River Sand & Gravel
 - Qefl - Extremely Fine Alluvium Over Lehi Gravel
 - Qpc - Pediment Colluvium - Alluvium
 - pEtg - Tovrea Granite
 - - - - - Contact, Dashed Where Approximated, Dotted Where Concealed.
 - * 10' x 15' Outcrop

NOTE: Geology From Pewe & Others, 1986.

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GENERAL GEOLOGIC MAP OF THE PROPOSED SALT RIVER CHANNELIZATION
FIGURE 2

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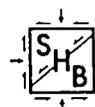
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gray quartz and segregations of ferro-magnesium minerals altered to epidote and chlorite. The granite is also cut by greenstone and aplite dikes (Pewe and others, 1986).

Although the Tovrea granite is the only bedrock exposed at or near the surface in the area of the proposed channelization, volcanic rocks, sandstones, breccias and conglomerates of Tertiary age and metarhyolite of Precambrian age have been encountered in deep borings near the Hohokam Expressway crossing over the Salt River. These rocks may be present at shallow depths on the north side of the Mill Avenue crossing.

The pediment colluvium-alluvium is exposed at the northeast corner of the proposed channelized reach near the north abutment of the SPRR bridge. The thickness of this unit is not known; however, it probably is less than 30 feet in this area. The pediment colluvium-alluvium consists of gray to white, very poorly sorted, stratified, strongly lime cemented silty gravel. The rock fragments are angular to subangular and commonly measure 1/4 to 8 inches in diameter (Pewe and others 1986).

Fluvial deposits of Quarternary age occur within the modern floodplain of the Salt River and almost entirely



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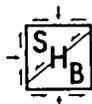
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comprise the geologic unit exposed along the proposed Salt River channelization. As encountered in boreholes, the thickness of this deposit ranges from 29 to 68 feet on the north side of the floodplain, 0 to 100 feet in the center of the channel and is as thick as 135 feet on the south side of the floodplain. The fluvial deposit consists of sand, gravel and cobbles with some boulders, locally interbedded with finer material. The deposit is poorly to moderately sorted and well stratified. This material is locally termed river-run and is described in detail in Section 4.4. The gravels and cobbles consist primarily of Tertiary volcanic rocks, Precambrian metasedimentary and metavolcanic rocks, and Precambrian granitic rocks.

Four paired terraces occur along the Salt River (Pewe, 1978), but only one of these, the Lehi Terrace, falls within the study area. The Lehi Terrace is exposed along the northwest part of the area between the Grand Canal and Sky Harbor Airport, and along the southern part between 48th Street and Mill Avenue, but is not exposed within the proposed channelized reach. This terrace represents a former floodplain level of the Salt River and has sharp scarps, a large percentage of Precambrian granitic rocks, less calcrete cementation, and less desert pavement than the older terraces outside the study area.



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4.3 Hydrogeologic Conditions

Prior to extensive groundwater development, the Salt River Valley was part of a region of groundwater discharge. Groundwater moved towards the river from the north and south, then flowed parallel to the river channel. Under natural conditions, the Salt River was a perennial stream flowing westward from its headwaters in the White Mountains in eastern Arizona. The Salt River Project currently operates four water conservation reservoirs on the Salt River, which are in upstream to downstream order: Roosevelt, Apache, Canyon and Saguaro Lakes. The Granite Reef Dam was built below Saguaro Lake, past the confluence of the Verde and Salt River. The dam diverts water into canals for agricultural, industrial and municipal use throughout the Salt River Valley. Flows in the Verde River are regulated by the Horseshoe and Bartlett Dams. Except for periods of major floods and periodic controlled releases from the reservoir system, the Salt River channel is dry for the major part of the year.

4.3.1 Groundwater Level Fluctuations

During periods of flow in the Salt River, the groundwater system of the Salt River Valley is recharged. This recharge process creates a water table mound

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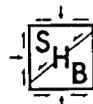
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below the riverbed near the Priest Drive bedrock high, with components of flow to the north and south.

In general, historic water table fluctuations have occurred because of pumping, irrigation seepage, canal seepage and periodic releases from the reservoir system into the Salt River. Since 1965, periodic flooding of the Salt River has caused the water table near 44th Street and University Drive to fluctuate between about 20 and 80 feet below ground surface. Groundwater levels measured in test borings and test pits conducted within the Salt River floodplain for this project were at 3 to 34 feet below existing grade. However, it should be noted that groundwater fluctuations of as much as 40 feet can be expected within the floodplain because of the reasons cited above.

4.3.2 Groundwater Quality

The groundwater quality in the project site has been affected by the municipal landfills in the area. Graf (1986) reports that high levels of contaminants have been found in groundwater samples obtained from test wells located near the south side of the western extent of the proposed channelized reach. The



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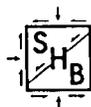
contaminants encountered include dichloroethylene, vinyl chloride, trichloroethylene, benzene, toluene, xylenes, dichlorobenzene, ethyl benzene, and high concentrations of iron, manganese and barium. A detailed discussion of the groundwater quality in this area was presented in our Letter No. 132, Interim Report, State Route 153 - Remediation of Bradley Landfill (February 8, 1988).

Trichloroethylene was detected by SCS in the groundwater samples retrieved from the area of the RS60 landfill. The pH of these samples varied from 6.8 to 6.96.

4.4 Geotechnical Characteristics of Soils

As discussed above, the soils in the area of Design Section 7 are coarse grained fluvial deposits which are within the modern floodplain boundary. This deposit consists of dense to very dense sand, gravel and cobble (SGC) mixtures with some boulders and occasional lenses of silty and clayey gravel. In a few isolated sections, silty sands and gravel extend from the surface to a depth of approximately 5 feet.

The gravel and cobble-sized particles in this material are generally subrounded to rounded, while the sand



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fraction is angular to subangular. Because these materials are composed primarily of quartzite, granitics, volcanics and other metamorphic rock particles, they are very hard and durable. The deposit contains numerous cobbles of up to about 12 inches in nominal diameter and occasional boulders of up to as much as 24 inches maximum dimension. Because of the predominance of quartzite, the particles tend to be relatively elongated with the greatest dimension being 2 to 3 times the smallest dimension.

Geotechnical investigations for bridges have generally indicated that, for the SGC beneath the Salt River channel, the upper 20 to 30 feet of SGC materials are uncemented or weakly cemented and are relatively clean. The SGC materials contain more silt and clay below about 30 feet which are generally weakly cemented. Strongly cemented material was not encountered in any of the borings or test pits conducted in the floodplain.

As discussed above, depth to bedrock within the proposed channelized reach varies from 0 to 135 feet, and groundwater depths vary from 3 to 34 feet below existing grade. Details of the bedrock profile and groundwater conditions are given in Sections 4.2 and 4.3, respectively.

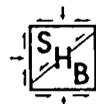
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4.5 Characteristics of Landfills

Three landfills (RS60, SRP56 and ES40) were identified along the south bank of the Salt River floodplain. Drawing 516 in the map pocket shows the approximate northern boundaries of the RS60 and SRP56 landfills as interpreted from the borings and test pits.

At present, the Salt River is channelized between 40th and 48th Streets, and the banks of this channel are protected with gabions. In our discussions with representatives of the City of Phoenix Engineering Department in early 1987, there was no indication of incomplete remediation of that part of the Estes Landfill (ES40) in the area of the south bank of this channelized reach. It was subsequently assumed that the south dike of the channel was constructed over clean backfill after the removal of all deleterious material (such as domestic refuse, construction debris, industrial wastes, etc.) from the area. However, we encountered landfill material in Test Borings CH-9, CH-119, CH-122, CH-124 and CH-127 and Test Pits CH-1, CH-4, CH-8 and CH-117 which were excavated adjacent to and on the crest of the existing south dike of the channelized reach between 40th and 48th Streets. The eastern extent of the landfill material encountered under the south dike is



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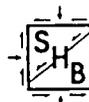
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shown in Drawing 516 in the map pocket. The thickness of the landfill in this area varied between 11 feet at Boring CH-122 to 29 feet at Boring CH-119. The soil cover over the landfill material varied from 1 foot at Test Pit CH-8 to 20 feet at Boring CH-124.

The landfill materials encountered in the test pits and borings in the area of ES40 and RS60 contained domestic, industrial and construction refuse. Rubber tires, automobile and other industrial machine parts, decomposing organic matter, palm fronds, tree trunks, newspaper, plastic bottles, plastic bags and concrete rubble were predominant among the items observed in the refuse.

Test pits and borings conducted within the area of the SRP48 and SRP56 landfills indicated the presence of construction debris. Domestic and industrial refuse was not encountered in these borings and test pits, and the Organic Vapor Analyzer did not detect the presence of potentially hazardous gases in the air around these landfills.

Gas samples retrieved from the RS60 and ES40 landfills indicated the presence of potentially hazardous compounds. Trichloroethane, benzene and toluene were detected in the gas samples from the RS60 landfill,



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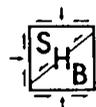
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while benzene and chlorobenzene were detected in gas samples from ES40 landfill.

A significant concentration of heavy metals such as lead, nickel, cadmium, zinc, and copper also was detected in the soil samples retrieved from within and below the ES40 and RS60 landfills. The pH value of the ES40 soils varied between 8.4 and 8.7, while the pH value of the RS60 soils varied between 8.0 and 11.9. The soils below the SRP56 landfill showed a pH value ranging between 8.4 and 9.0.

4.5 Geotechnical Characteristics of SRP Rock

The rock in the area of the SRP Corporate Headquarters site, as described by Woodward-Clyde Consultants Consulting Engineers & Geologists (1987), consists of fine crystalline basalt interlayered with a sequence of siltstone, sandstone and shales of the Tempe Beds. Laboratory tests conducted by SHB on selected samples of this rock formation indicate that the specific gravity varies between 2.7 and 2.9; the degree of absorption varies between 4.89 and 5.46 percent; and the compressive strength, as indicated by the Point Load Index test, varies between 501 and 3,390 psi. Sodium sulphate soundness and wetting and drying tests could not be



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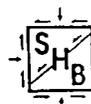
performed on the rock cores because the samples disintegrated when submerged in water.

5. DISCUSSION & RECOMMENDATIONS

5.1 Channel Alignment

Drawing 516 in the map pocket shows the northern boundary of the RS60 and SRP56 landfill. An earlier version of this drawing was submitted to DMJM (Letter No. 99, December 3, 1987) for setting the alignment of the channel so that the south bank of the channel could be located well beyond the landfill boundary. It is of critical importance that, because of the potential presence of deleterious material within these landfills, the south bank of the channel should be located a clear distance of at least 20 feet from the landfill boundaries shown on the drawing.

Although we made more test borings and test pits than originally proposed for our geotechnical investigation in the area of the ES40 landfill, we were unable to define the northern and western extent of the landfill material. Therefore, additional test borings and test pits should be conducted to delineate the boundary of the landfill. We were informed by Michael Ports, P.E.,



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of DMJM that the additional work to delineate these boundaries will be conducted after the approval of ADOT.,

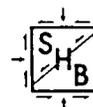
5.2 Bank Protection

Erosion protection of channel banks has been accomplished by utilizing dumped riprap, grouted riprap, gabions, soil-cement, roller-compacted concrete and other similar and innovative techniques. The selection of the type of bank protection for the referenced project will be influenced by construction cost, aesthetics and ease of maintenance. Alternative methods of bank protection are discussed below.

5.2.1 Riprap

Often, dumped riprap provides the most economical method of bank protection; however, no competent riprap material is available near the project site. The boulders and cobbles encountered within the floodplain are very hard and durable, but they do not satisfy the angularity requirement of ADOT Specification 913-2.01 (ADOT, 1987).

The specific gravity of the shot rock from the SRP Corporate Headquarters site complies with ADOT Specification 913-2.01; however, the percent of absorption



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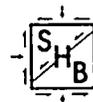
water is significantly greater than the maximum of 2.1 percent recommended for acceptance criteria for riprap material (Walters, 1982). Also, samples of this material disintegrated when submerged in water during wetting and drying tests, confirming that the material is highly susceptible to weathering and is, therefore, unacceptable for bank protection.

5.2.2 Gabions

The boulders and large cobbles in the river-run are excellent for gabion construction; gabions may prove to be the bank protection alternative with the lowest construction cost for channelization of the Salt River. However, the required removal of growing vegetation and trash from the gabions may create relatively high maintenance costs. Gabions are also thought by many to lack aesthetic appeal.

5.2.3 Cement Stabilized Bank Protection

Soil-cement and roller-compacted concrete (RCC) can also be used for bank protection; however, availability of the required type of aggregate for these two alternatives governs construction costs. The fines (finer than no. 40 sieve) content of the river-run does not meet the conventional requirements for



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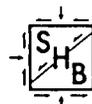
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both soil-cement and RCC construction; if either of these alternatives are to be used, fines will have to be imported from a borrow source to achieve a conventional mix.

It is our opinion that the Salt River alluvium can provide adequate bank protection without the addition of fines if plant mixed on the site with approximately 9 percent of Type I P Portland Cement, according to the specifications given in Table 1. As shown in Table 1, the alluvium would be screened to remove all material greater than 3 inches in size. Although laboratory tests have not been performed on the proposed design mix, we anticipate that this mix would develop a 28-day compressive strength of 1,000 psi. The cement content given in Table 1 may be reduced if the fines (finer than sieve no. 40) fraction of the alluvium proves to be higher than anticipated.

Because of the high cement content, the cemented alluvium will have a potential for shrinkage cracks, but these cracks will not impair the integrity of the bank protection.

Mixing and placing of the cemented alluvium may be carried out according to conventional procedures used for RCC.



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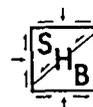
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TABLE 1

Cemented Alluvium Mix Design

365 lbs. Type I P Portland Cement	=	1.86 cu. ft.
150 lbs. (+) Water	=	2.40 cu. ft.
5 Percent Air	=	1.35 cu. ft.
3,537 lbs. Granular Alluvium (<3 in.)	=	21.39 cu. ft.
2 oz. Water-Reducing Agent	=	<hr/>
		27.00 cu. ft.



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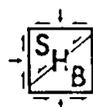
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Figure 3 shows a typical cross section which can be used for channel bank protection with the cemented alluvium described above. The slope of 1 1/2:1 (horizontal to vertical) for the banks shown in Figure 3 approximates the natural angle of repose of the on-site material; therefore, overexcavation and backfilling will not be required if this slope is used for the channel banks. It should be noted that the 5-foot toe-down shown in Figure 3 is not adequate for scour protection of the channel banks. According to Simons Li & Associates, Inc. (1987), the toe-down for the bank will be set 5 feet below the general scour elevation. The final toe-down elevations for the channel banks will be provided by DMJM.

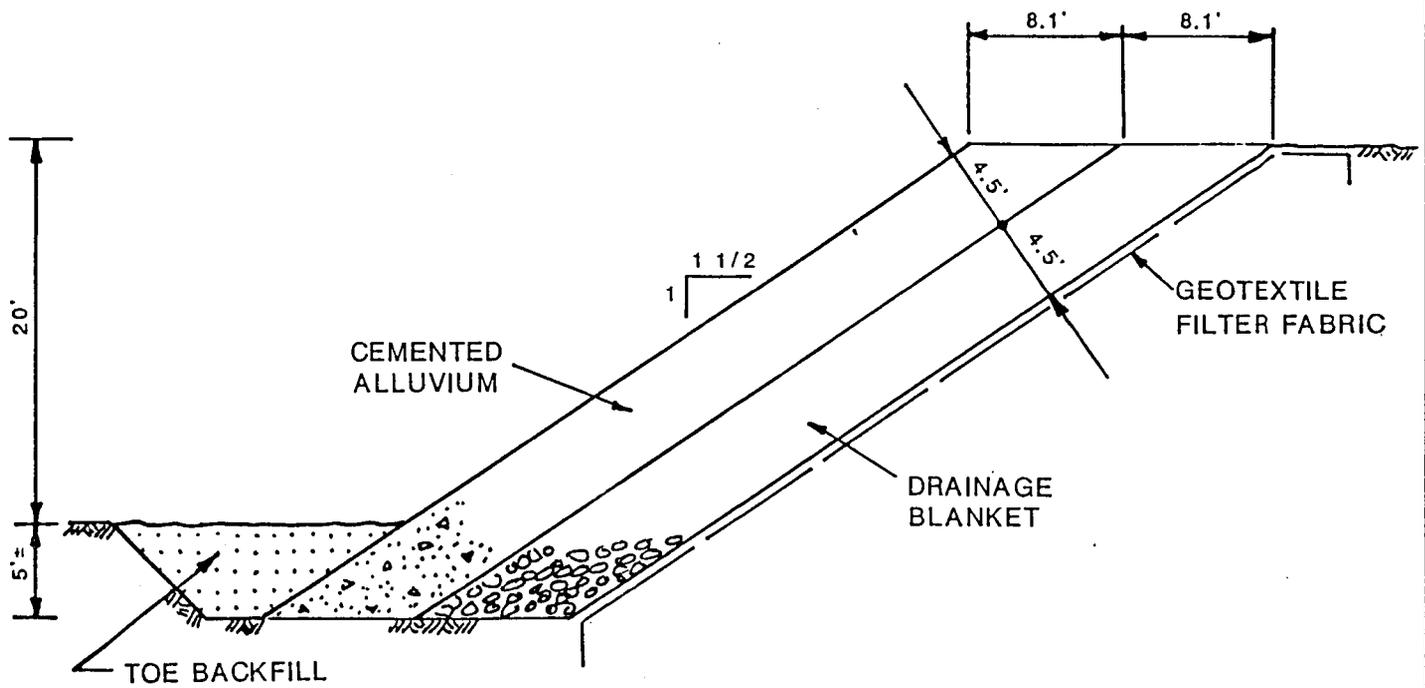
The on-site material is relatively free draining and, with a minimum of processing, can be used for the drainage blanket shown in Figure 3.

The cemented alluvium and drainage blanket can be placed simultaneously in 1-foot thick lifts prior to compaction with a steel drum vibratory roller. To facilitate the use of construction equipment, a minimum combined width of 10 feet should be maintained.



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ITEM	QUANTITY	UNIT PRICE	AMOUNT
CEMENTED ALLUVIUM	7.51 CY/LF	\$34.00 / CY	\$255 / LF
DRAINAGE BLANKET	7.1 CY / LF	15.00 / CY	113 / LF
GEOTEXTILE FILTER	6.11 SY / LF	2.00 / SY	12 / LF
TOE BACKFILL	1.67 CY / LF	5.00 / CY	8 / LF

\$388 / LF
PLUS EXCAVATION

SCHMATIC OF CEMENTED ALLUVIUM BANK PROTECTION

FIGURE 3



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Figure 3 also shows a cost analysis of the cemented alluvium. The prices shown reflect current market values and do not include cost escalations. The excavation costs also have not been included in this cost estimate.

5.3 Grade Control Structures

Two different techniques are recommended for consideration for the construction of the grade control structures. Excavations can be carried out with scrapers and front-end loaders to the required depth of the grade control structures. Side slopes of 1 1/2:1 will be adequate for these temporary excavations. The grade control structures can then be constructed with conventional roller-compacted concrete methods. The excess excavation on the sides of the structure can be backfilled with the excavated material. The concrete mix recommended for the construction of the bank protection can also be used for the grade control structures. However, because of the problems associated with dewatering the SGC, it may be difficult and uneconomical to use this method of construction if groundwater is encountered above the bottom of the structure.

The grade control structures also can be constructed by slurry-assisted excavation similar to that used for

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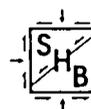
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construction of conventional slurry walls. The main drawbacks of this technique are the potential for loss of slurry in the highly permeable SGC and the need for a high-quality structural concrete mix. Because the concrete would be tremied in-place below the slurry, the mix recommended for the bank protection will not be adequate for this method of construction.

5.4 Special Considerations for Landfills

Although it is anticipated that the final alignment of the channel will not intercept the landfills, the design of the channel banks needs to be analyzed to ensure that the methane expulsion process from the landfills is not inhibited.

Ponding of water on top of the landfill may promote undesirable leaching of contaminants from the landfill into the groundwater. If the channel banks alter the surface drainage characteristics of the landfill, provisions should be made for positive drainage. The channel bank protection structure should not induce any ponding, and overflows to the channel should be provided, if necessary.



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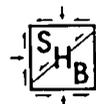
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5.5 Contaminated Groundwater & Health Safety

Because of the close proximity of municipal landfills (RS60 and ES40) to the project site, there is a high probability of encountering contaminated groundwater during the excavations for the proposed channelization. It is recommended that an adequate health and safety plan be developed to safeguard the field personnel from the potential harmful effects of the contaminated water during construction of the channel.

5.6 Reclamation of South Dike Adjacent to ES40

Additional field and laboratory investigations are required to evaluate the volume and characteristics of the landfill material under the existing south dike of the channel adjacent to ES40. There is a high probability of encountering hazardous material and contaminated groundwater in this area, and special procedures, as outlined in our Letter No. 132, may be required for the removal of this material.



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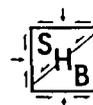
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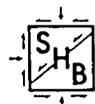
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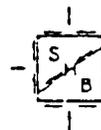
TEST DRILLING EQUIPMENT & PROCEDURES

Drilling Equipment Truck-mounted CME-55 drill rigs powered with 4 or 6 cylinder Ford industrial engines are used in advancing test borings. The 4 cylinder and 6 cylinder engines are capable of delivering about 4,350 and 6,500 foot/pounds torque to the drill spindle, respectively. The spindle is advanced with twin hydraulic rams capable of exerting 12,000 pounds downward force. Drilling through soil or softer rock is performed with 6 1/2 O.D., 3 1/4 I.D. hollow stem auger or 4 1/2 inch continuous flight auger. Carbide insert teeth are normally used on the auger bits so they can often penetrate rock or very strongly cemented soils which require blasting or very heavy equipment for excavation. Where refusal is experienced in auger drilling, the holes are sometimes advanced with tricone gear bits and NX rods using water or air as a drilling fluid. Where auger and tricone gear bits cannot be used to advance the hole due to cobbles or caving conditions, the ODEX (overburden drilling with the eccentric method) is used. A percussion down-the-hole hammer underreams the hole and 5 inch steel casing is introduced into the hole during drilling. The drill bit is eccentric and can be removed from the center of the casing to allow sampling of the material below the bit penetration depth.

Sampling Procedures Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 procedure. In many cases, 2" O.D., 1 3/8" I.D. samplers are used to obtain the standard penetration resistance. "Undisturbed" samples of firmer soils are often obtained with 3" O.D. samplers lined with 2.42" I.D. brass rings. The driving energy is generally recorded as the number of blows of a 140 pound 30 inch free fall drop hammer required to advance the samplers in 6 inch increments. However, in stratified soils, driving resistance is sometimes recorded in 2 or 3 inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. These values are expressed in blows per foot on the logs. "Undisturbed" sampling of softer soils is sometimes performed with thin walled Shelby tubes (ASTM D1587). Where samples of rock are required, they are obtained by NX diamond core drilling (ASTM D2113). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings.

Continuous Penetration Tests Continuous penetration tests are performed by driving a 2" O.D. blunt nosed penetrometer adjacent to or in the bottom of borings. The penetrometer is attached to 1 5/8" O.D. drill rods to provide clearance to minimize side friction so that penetration values are as nearly as possible a measure of end resistance. Penetration values are recorded as the number of blows of a 140 pound 30 inch free fall drop hammer required to advance the penetrometer in one foot increments or less.

Boring Records Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487) with appropriate group symbols being shown on the logs.



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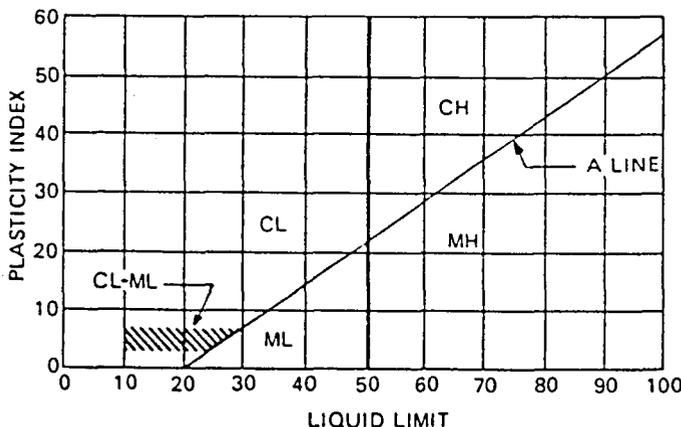
UNIFIED SOIL CLASSIFICATION SYSTEM

Soils are visually classified by the Unified Soil Classification system on the boring logs presented in this report. Grain-size analysis and Atterberg Limits Tests are often performed on selected samples to aid in classification. The classification system is briefly outlined on this chart. For a more detailed description of the system, see "The Unified Soil Classification System" Corp of Engineers, US Army Technical Memorandum No. 3-357 (Revised April 1960) or ASTM Designation: D2487-66T.

MAJOR DIVISIONS		GRAPHIC SYMBOL	GROUP SYMBOL	TYPICAL NAMES
COARSE-GRAINED SOILS (Less than 50% passes No. 200 sieve)	GRAVELS (50% or less of coarse fraction passes No. 4 sieve)	CLEAN GRAVELS (Less than 5% passes No. 200 sieve)	GW	Well graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures.
		GRAVELS WITH FINES (More than 12% passes No. 200 sieve)	GP	Poorly graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures.
		Limits plot below "A" line & hatched zone on plasticity chart	GM	Silty gravels, gravel-sand-silt mixtures.
		Limits plot above "A" line & hatched zone on plasticity chart	GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction passes No. 4 sieve)	CLEAN SANDS (Less than 5% passes No. 200 sieve)	SW	Well graded sands, gravelly sands.
		SANDS WITH FINES (More than 12% passes No. 200 sieve)	SP	Poorly graded sands, gravelly sands.
		Limits plot below "A" line & hatched zone on plasticity chart	SM	Silty sands, sand-silt mixtures.
		Limits plot above "A" line & hatched zone on plasticity chart	SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)	SILTS (LIMITS PLOT BELOW "A" LINE & HATCHED ZONE ON PLASTICITY CHART)	SILTS OF LOW PLASTICITY (Liquid Limit Less Than 50)	ML	Inorganic silts, clayey silts with slight plasticity.
		SILTS OF HIGH PLASTICITY (Liquid Limit More Than 50)	MH	Inorganic silts, micaceous or diatomaceous silty soils, elastic silts.
	CLAYS (LIMITS PLOT ABOVE "A" LINE & HATCHED ZONE ON PLASTICITY CHART)	CLAYS OF LOW PLASTICITY (Liquid Limit Less Than 50)	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		CLAYS OF HIGH PLASTICITY (Liquid Limit More Than 50)	CH	Inorganic clays of high plasticity, fat clays, sandy clays of high plasticity.

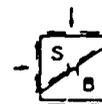
NOTE: Coarse grained soils with between 5% & 12% passing the No. 200 sieve and fine grained soils with limits plotting in the hatched zone on the plasticity chart to have double symbol.

PLASTICITY CHART



DEFINITIONS OF SOIL FRACTIONS

SOIL COMPONENT	PARTICLE SIZE RANGE
Cobbles	Above 3 in.
Gravel	3 in. to No. 4 sieve
Coarse gravel	3 in. to ¾ in.
Fine gravel	¾ in. to No. 4 sieve
Sand	No. 4 to No. 200
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Fines (silt or clay)	Below No. 200 sieve



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TERMINOLOGY USED TO DESCRIBE THE RELATIVE DENSITY,
CONSISTENCY OR FIRMNESS OF SOILS

The terminology used on the boring logs to describe the relative density, consistency or firmness of soils relative to the standard penetration resistance is presented below. The standard penetration resistance (N) in blows per foot is obtained by the ASTM D1586 procedure using 2" O.D., 1 3/8" I.D. samplers.

1. Relative Density. Terms for description of relative density of cohesionless, uncemented sands and sand-gravel mixtures.

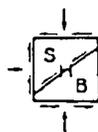
<u>N</u>	<u>Relative Density</u>
0-4	Very loose
5-10	Loose
11-30	Medium dense
31-50	Dense
50+	Very dense

2. Relative Consistency. Terms for description of clays which are saturated or near saturation.

<u>N</u>	<u>Relative Consistency</u>	<u>Remarks</u>
0-2	Very soft	Easily penetrated several inches with fist.
3-4	Soft	Easily penetrated several inches with thumb.
5-8	Medium stiff	Can be penetrated several inches with thumb with moderate effort.
9-15	Stiff	Readily indented with thumb, but penetrated only with great effort.
16-30	Very stiff	Readily indented with thumbnail.
30+	Hard	Indented only with difficulty by thumbnail.

3. Relative Firmness. Terms for description of partially saturated and/or cemented soils which commonly occur in the Southwest including clays, cemented granular materials, silts and silty and clayey granular soils.

<u>N</u>	<u>Relative Firmness</u>
0-4	Very soft
5-8	Soft
9-15	Moderately firm
16-30	Firm
31-50	Very firm
50+	Hard



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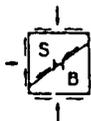
PROJECT _____
JOB NO. E87-56 DATE 9-25-87

LOG OF TEST PIT NO. CH-1

Backhoe Type Case 580E
Location N882764.3, E476573.4
Elevation 1104.6 ft.
Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION	
						DEPTH	HOUR	DATE			
0											
5								slightly moist dense	SANDY GRAVEL, some silt & cobbles, well graded, rounded to well rounded, nonplastic, brown note: trace of refuse (metal, con- struction debris & wood)		
10						GW			REFUSE, mostly wood, car parts, metal & construction debris mixed with sand & gravel		
										Stopped backhoe at 9'6"	

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT East Papago - Hohokam - Sky Harbor Freeways

LOG OF TEST PIT NO. CH-5

JOB NO. E87-56 DATE 9-30-87

Backhoe Type Case 580E

Location N883828.9, E477097.8

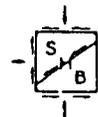
Elevation 1107.1 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0		X	D	5	GP	slightly moist		SAND & GRAVEL, some cobbles, predominantly fine to medium grained sand, subangular to subrounded, nonplastic, brown & gray	
5						loose to medium dense			
10		X	D		GW	slightly moist to moist		SAND, GRAVEL & COBBLES, occasional small boulders (12" to 16" in diameter), well graded, subangular to subrounded, nonplastic, brown & gray	
15						medium dense to loose			
								Stopped backhoe at 11'	

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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LOG OF TEST PIT NO. CH-8

JOB NO. E87-56 DATE 9-24-87

Backhoe Type Case 580E

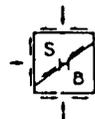
Location N882954.8, E477550.2

Elevation 1106.4 ft.

Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE		
0					SP				slightly moist very loose	SAND, predominantly fine to medium grained, subangular to subrounded, nonplastic, light brown to brown
5										REFUSE, predominantly concrete & cobbles with some sand & gravel
										Backhoe refused at 3'

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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PROJECT Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-30-87

LOG OF TEST BORING NO. CH-9

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1123.2 ft.
 DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb., 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0	17	●●●●●●●●●●							dry to slightly moist hard	FILL SILTY GRAVEL, considerable sand, some to trace of cobbles, well graded, subrounded to rounded, weakly lime cemented, nonplastic to low plasticity, dark brownish gray
32										
32										
21										
35										
29										
25										
24										
18										
15										
10	16	○●○●○●○●○●○●							dry to slightly moist medium dense	FILL SAND, predominantly fine grained, angular to subangular, nonplastic, gray
19										
18										
20										
17										
15										
15										
14										
13										
12										
20	13	X X X X X X X X X X							slightly moist medium dense to dense	FILL SILTY SAND, some gravel, predominantly fine grained, subangular, nonplastic to low plasticity, dark brownish gray note: some refuse (mostly newspaper)
12										
12										
12										
12										
13										
13										
11										
13										
14										
30	13	X X X X X X X X X X							very dense	LANDFILL, predominantly newspaper, wood, vegetation, plastic, tires
18										
18										
11										
13										
14										
12										
12										
24										
81										
40	51	○●○●○●○●○●○●	X	S	120				slightly moist very dense	SANDY GRAVEL, some cobbles, well graded, rounded to well rounded, nonplastic, gray note: some sand lenses from 40' to 43'
60										
31										
42										
131										
191										
45										Stopped hammer at 44'

DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.


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PROJECT _____
JOB NO. E87-56 DATE 9-30-87

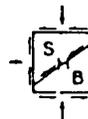
LOG OF TEST PIT NO. CH-10

Backhoe Type Case 580E
Location N883916.2, E477516.9
Elevation 1108.5 ft.
Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS				
						VISUAL CLASSIFICATION				
0		X	D		GP	slightly moist	SAND, GRAVEL & COBBLES, poorly graded, subrounded to rounded, moderately stratified, nonplastic, brown & gray			
5						loose				
10						slightly moist		SP	SAND, trace of cobbles & fine to medium grained gravel, poorly graded, angular, nonplastic, brown & gray	
						loose				
										Stopped backhoe at 10'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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 JOB NO. E87-56 DATE 9-24-87

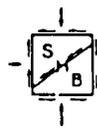
LOG OF TEST PIT NO. CH-13

Backhoe Type Case 580E
 Location N883286.6, E478676.7
 Elevation 1128.9 ft.
 Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			D		GM	slightly moist hard	FILL SILTY GRAVEL, considerable sand, trace of cobbles, well graded, rounded to well rounded, nonplastic to low plasticity, brown to grayish brown note: compacted fill with trace of refuse; considerable cobbles below 5' Stopped backhoe at 8'
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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PROJECT Sky Harbor Freeways

LOG OF TEST BORING NO. CH-16

JOB NO. E87-56 DATE 9-30-87

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1130.5 ft.
 DATUM _____

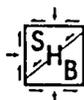
Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb., 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION	
0	16								dry to slightly moist	FILL SILTY GRAVEL, considerable sand, trace of clay & cobbles, well graded, subrounded to well rounded, weakly lime cemented, nonplastic to low plasticity, dark gray to brownish gray	
5	26							GM			
	34								hard		
	27										
	26								SM		
	42										
	34								SP		
	48										
	56								SM		
10	61										
	60								SM		
	42										
	26								SP		
	22										
15	20								SM	slightly moist dense to very dense	FILL SILTY SAND, some gravel, predominantly fine grained, subangular, nonplastic to low plasticity, dark brownish gray to gray
	19										
	15								SM		
	16										
	18							SM			
20	18										
	17							SM			
	47										
	37							SM			
	40										
25	49							SM	dry to slightly moist dense	FILL SAND, some gravel, predominantly fine grained, angular to subangular, nonplastic, gray	
	68										
	70							GW			
	71										
	67							GW	slightly moist medium dense to dense	FILL SILTY SAND, trace of gravel, predominantly fine grained, subangular, low plasticity, dark brown to dark grayish brown note: increase of gravel with depth	
30	98										
	101							GM			
	103										
	72							GM			
	86										
35	91							GW			
	91										
	152							GW			
	201										
40	174								dry to slightly moist very dense	FILL SANDY GRAVEL, some cobbles, trace to some silt, well graded, rounded to well rounded, nonplastic, gray note: part of rubber tire at 27'	

GROUND WATER

DEPTH	HOUR	DATE
	none	

SAMPLE TYPE

- A - Auger cuttings. B - Block sample
- S - 2" O.D. 1.38" I.D. tube sample.
- U - 3" O.D. 2.42" I.D. tube sample.
- T - 3" O.D. thin-walled Shelby tube.



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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-30-87

LOG OF TEST BORING NO. CH-16

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1130.5 ft.
 DATUM _____

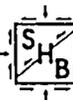
Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
									slightly moist very dense	(depth 32' to 34') FILL SILTY GRAVEL, considerable sand, some clay, well graded, rounded to well rounded, nonplastic to low plasticity, brown to dark grayish brown note: possibly bottom of old landfill
									slightly moist very dense	(depth 34' to 39') SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, gray
										Stopped hammer at 39'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

- A - Auger cuttings. B - Block sample
- S - 2" O.D. 1.38" I.D. tube sample.
- U - 3" O.D. 2.42" I.D. tube sample.
- T - 3" O.D. thin-walled Shelby tube.



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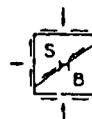
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-30-87

LOG OF TEST PIT NO. CH-19
 Backhoe Type Case 580E
 Location N884620.8, E478926.1
 Elevation 1113.4 ft.
 Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
						REMARKS	VISUAL CLASSIFICATION		
0						slightly moist	SAND & GRAVEL, some silt, clay & cobbles, occasional boulders, well graded, subangular to subrounded, low plasticity, brown & gray		
5			D	7	GM	loose to medium dense	note: trace of debris (wood & asphaltic concrete)		
10								Stopped backhoe at 10'	

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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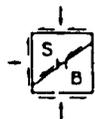
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-30-87

LOG OF TEST PIT NO. CH-21
 Backhoe Type Case 580E
 Location N884273.4, E479365.0
 Elevation 1113.8 ft.
 Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					SP	slightly moist loose	FILL SAND, trace of silt, predominantly fine to medium grained sand, nonplastic, brown note: trace of miscellaneous debris (wood, plastic)
5		D			SP		
10						slightly moist to dry very loose	SAND, trace of gravel (lens 2" thick at 1'6"), predominantly medium grained, angular, nonplastic, grayish brown
							Stopped backhoe at 8'

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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PROJECT _____

JOB NO. E87-56 DATE 9-24-87

LOG OF TEST PIT NO. CH-25

Backhoe Type Case 580E

Location N884102.0, E480248.1

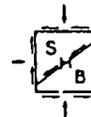
Elevation 1118.0 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0			D		SM	slightly moist		SILTY SAND, considerable gravel, predominantly fine grained, subangular to subrounded, uncemented to weakly lime cemented, nonplastic, brown	
5					GW	firm			
						slightly moist		SANDY GRAVEL, considerable cobbles, trace to some silt, well graded, rounded to well rounded, nonplastic, brown	
10						very firm to hard			
									Stopped backhoe at 7'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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A-29

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PROJECT _____
JOB NO. E87-56 DATE 9-30-87

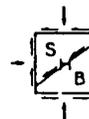
LOG OF TEST PIT NO. CH-26

Backhoe Type Case 580E
Location N884663.1, E480240.6
Elevation 1118.3 ft.
Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0						slightly moist to moist	SAND & GRAVEL, some cobbles, well graded, subrounded to rounded, non- plastic, brown & gray		
5						medium dense			
10						moist dense	SAND, GRAVEL & COBBLES, trace of boulders (to 15" in diameter), well graded, subrounded to rounded, non- plastic, gray & brown		
							Stopped backhoe at 9'		

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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A-30

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Sky Harbor Freeways

PROJECT _____
JOB NO. E87-56 DATE 9-25-87

LOG OF TEST PIT NO. CH-27

Backhoe Type Case 580E

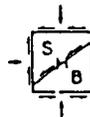
Location _____

Elevation _____

Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE		
0			D		GW				slightly moist dense to very dense	SANDY GRAVEL, some to considerable cobbles, well graded, rounded to well rounded, nonplastic, brown note: increase of cobbles with depth
5										
10									Stopped backhoe at 9'	

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____

JOB NO. E87-56 DATE 9-30-87

LOG OF TEST PIT NO. CH-28

Backhoe Type Case 580E

Location N884248.7, E480692.1

Elevation 1121.7 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
						REMARKS	VISUAL CLASSIFICATION		
0	●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●● ●●●●●●●●●●	X	D		SP	slightly moist	SAND & GRAVEL, some to considerable cobbles, trace of silt, poorly graded, subrounded to rounded, nonplastic, brown & gray		
5						medium dense			
10	●●●●●●●●●●				SP	slightly moist to moist	SAND, trace of gravel, fine to medium grained, nonplastic, brown		
						medium dense			
							Stopped backhoe at 10'		

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample

East Papago - Hohokam -
Sky Harbor Freeways

PROJECT _____

LOG OF TEST PIT NO. CH-30

JOB NO. E87-56 DATE 9-30-87

Backhoe Type Case 580E

Location N884322.7, E481104.3

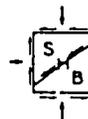
Elevation 1122.9 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS							
						VISUAL CLASSIFICATION							
0			D		SP	slightly moist medium dense	SAND, some to considerable gravel, trace of cobbles (to 12" in diameter), poorly graded, subangular to sub- rounded, nonplastic, brown & gray						
5													
10								Stopped backhoe at 10'					

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT Sky Harbor Freeways

LOG OF TEST PIT NO. CH-31

JOB NO. E87-56 DATE 9-30-87

Backhoe Type Case 580E

Location N884862.4, E481207.8

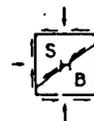
Elevation 1127.8 ft.

Datum

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
						REMARKS	VISUAL CLASSIFICATION		
0			D		SP SW	slightly moist medium dense	SAND, trace of gravel, fine to medium grained, angular, nonplastic, brown to grayish brown		
5			D		SP	slightly moist medium dense to loose	SAND & GRAVEL, well graded, subangular to subrounded, nonplastic, brown & gray		
10						slightly moist loose to medium dense	SAND, some gravel, trace of cobbles, poorly graded, angular to subangular, nonplastic, brown & gray		
									Stopped backhoe at 9'

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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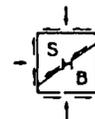
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-25-87

LOG OF TEST PIT NO. CH-32
 Backhoe Type Case 580E
 Location N885428.2, E481343.9
 Elevation 1128.4 ft.
 Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					GW	slightly moist	SANDY GRAVEL, well graded, rounded to well rounded, nonplastic, brown
			D		SP	medium dense	
5					GW	slightly moist	SAND, considerable silt, trace of gravel, predominantly fine grained, angular to subangular, nonplastic, brown
						loose	
10						slightly moist	SANDY GRAVEL, some cobbles, well graded, rounded to well rounded, nonplastic, brown
						dense	
							Stopped backhoe at 10'

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 11-2-87

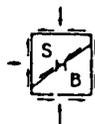
LOG OF TEST PIT NO. CH-33

Backhoe Type Case 580E
 Location N884479.9, E482044.0
 Elevation 1122.6 ft.
 Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content, Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0					GP			FILL SAND, GRAVEL & COBBLES, trace of silt, predominantly fine to medium grained sand, poorly graded gravel, subrounded to rounded, nonplastic, light brown note: wire mesh & geotextile from channel berm construction at 2'6"	
		X	D	6		moist			
5						GP			
10						moist		SAND, GRAVEL & COBBLES, trace of silt, poorly graded, subrounded to rounded, nonplastic, light brown	
								Stopped backhoe at 7'6"	

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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PROJECT _____

LOG OF TEST PIT NO. CH-34

JOB NO. E87-56 DATE 11-16-87

Backhoe Type Case 580E

Location N885496.8, E481952.0

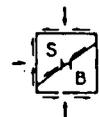
Elevation 1128.9 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0			D	4	SP	slightly moist loose	SANDY GRAVEL, well graded, rounded to well rounded, nonplastic, grayish brown		
5					GW	slightly moist loose	SAND, predominantly fine grained, angular to subangular, nonplastic, light brown to brown		
10						slightly moist medium dense to dense	SANDY GRAVEL, trace of cobbles, well graded, rounded to well rounded, nonplastic, grayish brown		
									Stopped backhoe at 9'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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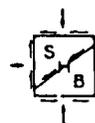
PROJECT _____
JOB NO. E87-56 DATE 11-2-87

LOG OF TEST PIT NO. CH-36

Backhoe Type Case 580E
Location N884577.8, E482644.6
Elevation 1125.7 ft.
Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE		
0										
5		X	D		SP			moist	FILL SAND & GRAVEL, trace to some cobbles, poorly graded, subrounded to rounded, nonplastic, light brown note: some silt from 0 to 6"; wood & pipe fragments at 2'6"	
10					GP			moist	SAND, GRAVEL & COBBLES, predominantly fine to medium grained sand, poorly graded gravel, subrounded to rounded, nonplastic, light brown	
										Stopped backhoe at 9'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____
JOB NO. E87-56 DATE 11-16-87

LOG OF TEST PIT NO. CH-39

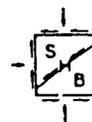
Backhoe Type Case 580E
Location N885930.3, E483006.8
Elevation 1128.9 ft.
Datum _____

GROUND WATER

DEPTH	HOUR	DATE
	none	

Depth in feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER	REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE
0					SP		slightly moist	SAND & GRAVEL, trace of cobbles, predominantly fine to medium grained sand, well graded gravel, rounded to well rounded, nonplastic, brownish gray to grayish brown
5			D	5	GW		loose to medium dense	
							slightly moist to moist	SANDY GRAVEL, some cobbles, well graded, rounded to well rounded, nonplastic, brown to grayish brown
10							medium dense to dense	
								Stopped backhoe at 10'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____
JOB NO. E87-56 DATE 11-2-87

LOG OF TEST PIT NO. CH-42

Backhoe Type Case 580E

Location N885968.9, E483294.1

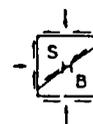
Elevation 1130.2 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
						REMARKS	VISUAL CLASSIFICATION		
0					GP	moist	SAND, GRAVEL & COBBLES, predominantly fine to medium grained sand, poorly graded gravel, subrounded to rounded, nonplastic, brown to light brown		
				SP					
5		D	GP						
						moist	SAND, trace to some fine grained gravel, predominantly fine to medium grained, nonplastic, light brown		
10						moist	SAND, GRAVEL & COBBLES, fine to medium grained sand, poorly graded gravel, subrounded to rounded, nonplastic, light brown to brown		
									Stopped backhoe at 7'6"

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____
JOB NO. E87-56 DATE 11-2-87

LOG OF TEST PIT NO. CH-43

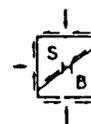
Backhoe Type Case 580E
Location N884856.8, E484183.6
Elevation 1133.1 ft.
Datum _____

GROUND WATER

DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0		X	D	6	SP-SM	very moist	FILL SAND, trace to some silt & gravel, predominantly fine to medium grained, nonplastic, brown
5					GP	very moist	SAND & GRAVEL, trace of cobbles, predominantly fine to medium grained sand & gravel, subrounded to rounded, nonplastic, light brown
10						very moist	GRAVELLY SAND, predominantly fine to medium grained sand, poorly graded gravel, subrounded to rounded, nonplastic, light brown
						very moist	SAND, GRAVEL & COBBLES, poorly graded sand & gravel, subrounded to rounded, nonplastic, light brown to brown
							Stopped backhoe at 9'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____
JOB NO. E87-56 DATE 11-2-87

LOG OF TEST PIT NO. CH-47

Backhoe Type Case 580E

Location N884965.4, E484658.1

Elevation 1132.4 ft.

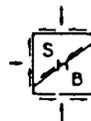
Datum _____

GROUND WATER

DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
						REMARKS	VISUAL CLASSIFICATION		
0					GP			FILL	
5		X	D		GP	very moist to moist loose		SAND, GRAVEL & COBBLES, predominantly fine to medium grained sand, poorly graded gravel, subrounded to rounded, nonplastic, brown to light brown note: geotextile & wire mesh at 3'	
10						very moist to moist loose		SAND, GRAVEL & COBBLES, poorly graded, subrounded to rounded, nonplastic, brown to light brown	
								Stopped backhoe at 8'	

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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East Papago - Hohokam -
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PROJECT _____
JOB NO. E87-56 DATE 11-16-87

LOG OF TEST PIT NO. CH-48

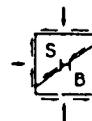
Backhoe Type Case 580E
Location N886142.7, E484434.3
Elevation 1132.3 ft.
Datum _____

GROUND WATER

DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					SP	slightly moist	SAND & GRAVEL, trace of cobbles, predominantly fine to medium grained sand, well graded gravel, rounded to well rounded, nonplastic, grayish brown to brownish gray
5			D		SP	medium dense	
10					GW	slightly moist loose	SAND, some gravel, predominantly fine to medium grained sand, subangular to subrounded, nonplastic, light brown to brown
						slightly moist medium dense to dense	SANDY GRAVEL, some to considerable cobbles, well graded, rounded to well rounded, nonplastic, brown to grayish brown
							Stopped backhoe at 10'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____

LOG OF TEST PIT NO. CH-52

JOB NO. E87-56 DATE 11-16-87

Backhoe Type Case 580E

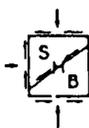
Location N885475.7, E485024.5

Elevation 1130.6 ft.

Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE		
0			D	3	GW				slightly moist to moist medium dense to very dense	SANDY GRAVEL, some cobbles, well graded, rounded to well rounded, non-plastic, brown to grayish brown note: considerable cobbles from 5'6" to 8'
5										
10										
										Stopped backhoe at 9'6"

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____

JOB NO. E87-56 DATE 11-16-87

LOG OF TEST PIT NO. CH-54

Backhoe Type Case 580E

Location N886279.4, E485463.7

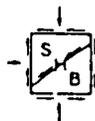
Elevation 1134.4 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0			D		GW	slightly moist	SANDY GRAVEL, trace to some cobbles, well graded, rounded to well rounded, nonplastic, brown to grayish brown
5						medium dense to dense	
10							
							Stopped backhoe at 10'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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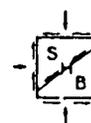
PROJECT _____
JOB NO. E87-56 DATE 11-16-87

LOG OF TEST PIT NO. CH-56

Backhoe Type Case 560E
Location _____
Elevation _____
Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE		
0					GW				slightly moist	SANDY GRAVEL, trace of cobbles, well graded, rounded to well rounded, non-plastic, grayish brown to brownish gray
								medium dense		
5			D	3	SP				slightly moist	SAND, trace of fine grained gravel, predominantly fine to medium grained, angular to subangular, nonplastic, light brown
					GW			loose		
10									slightly moist	SANDY GRAVEL, trace of cobbles, well graded, rounded to well rounded, non-plastic, grayish brown
									medium dense to dense	
										Stopped backhoe at 9'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT Sky Harbor Freeways

JOB NO. E87-56 DATE 10-8-87

LOG OF TEST BORING NO. CH-61

RIG TYPE Becker Hammer Drill

BORING TYPE 9" Drive Pipe

SURFACE ELEV. 1139.6 ft.

DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION	
0	17								dry to slightly moist	SILTY GRAVEL, considerable sand, some cobbles, well graded, subrounded to well rounded, uncemented to weakly lime cemented, nonplastic, grayish brown	
5	25							GM			
	18								very firm		
	20										
	10										
	19								SM		
	24										
	29									slightly moist	SILTY SAND, some gravel, predominantly fine grained, subangular, nonplastic to low plasticity, brown
10	30										
	23										
	33										
	54							dense			
	50										
	65								slightly moist to saturated	SANDY GRAVEL, considerable cobbles, some silt, well graded, nonplastic, brownish gray	
15	39										
	53										
	52										
	38							very dense			
	24										
20	27							GW			
	33										
	44										
	80										
	74										
	34										
	64										
	41										
	58										
	73										
30	67										
	44										
	38										
	48										
	73							GW			
35	98										
	56										
	81										
	96								GRANITE, moderately to slightly weathered, hard, gray to light gray		
	119										
40									Stopped hammer at 39'		

GROUND WATER

DEPTH	HOUR	DATE
25'	1:55p	10-8

SAMPLE TYPE

- A - Auger cuttings. B - Block sample
- S - 2" O.D. 1.38" I.D. tube sample.
- U - 3" O.D. 2.42" I.D. tube sample.
- T - 3" O.D. thin-walled Shelby tube.



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PROJECT _____
JOB NO. E87-56 DATE 9-17-87

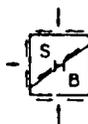
LOG OF TEST PIT NO. CH-64

Backhoe Type Case 580E
Location N885898.9, E487181.1
Elevation 1127.5 ft.
Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
7'	9:15a	9-17

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
						0	
5	GP						
4	D						
10						Stopped backhoe at 9'	

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-24-87

LOG OF TEST BORING NO. CH-65

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1197.2 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb, 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0	0	•••••								FILL SAND, small amount of gravel, predominantly fine to medium grained, nonplastic, light brown
0	0	•••••								
38		•••••								
19		•••••								
5	24	•••••								
26		•••••								
22		•••••								
33		•••••						SP		
26		•••••								
10	20	•••••								
24		•••••								
32		•••••								
23		•••••								
23		•••••								
15	21	○ ○ ○ ○ ○								
24		○ ○ ○ ○ ○								
22		○ ○ ○ ○ ○								
15	15	○ ○ ○ ○ ○								
10	7	○ ○ ○ ○ ○								
20	15	○ ○ ○ ○ ○								
19		○ ○ ○ ○ ○								
24		○ ○ ○ ○ ○								
29		○ ○ ○ ○ ○								
25	36	○ ○ ○ ○ ○						SM		
17		○ ○ ○ ○ ○								
110		○ ○ ○ ○ ○								
86		○ ○ ○ ○ ○								
82		○ ○ ○ ○ ○								
30	31	○ ○ ○ ○ ○								
45		○ ○ ○ ○ ○								
35	90	⊗	⊗							dry GRANITE, coarse grained, hard, pinkish gray
195		⊗	⊗							
325		⊗	⊗							
35	360	⊗	⊗							
370		⊗	⊗							
40										Stopped hammer at 36'

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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Sky Harbor Freeways

PROJECT _____
JOB NO. E87-56 DATE 9-22-87

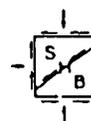
LOG OF TEST PIT NO. CH-68

Backhoe Type Case 580E
Location N885381.0, E487494.7
Elevation 1148.7 ft.
Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
7'6"	9:05a	9-22
6'6"	9:30a	9-22

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					SP	dry to moist below 4' medium dense	FILL GRAVELLY SAND, trace to some cobbles, predominantly fine to medium grained, subangular to subrounded, nonplastic, brownish gray to grayish brown note: refuse from 3' to 5' (domestic & construction debris, considerable wood, wire, rags & pipe)
5					GW		
10						moist to saturated dense	SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, grayish brown
							Stopped backhoe at 8'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-25-87

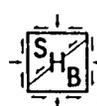
LOG OF TEST BORING NO. CH-76

RIG TYPE Böcker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1153.3 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
									0	0
0	0								slightly moist	6"± of SILTY SAND, considerable gravel, non-plastic, light brown over
0	13									
5	4									FILL
0	0									GARBAGE, mixed with SILTY SAND, light brown to dark gray
0	4									
6	6									
10	4									
0	10									
5	5									
4	4									
5	5									
15	9									
0	12									
9	9									
7	7									
20	0									
0	0									
12	12									
27	27									
32	32									
24	24									
25	26									
32	32									
29	29									
38	38									
30	41							GM	dry to very moist	SILTY SAND & GRAVEL, occasional cobbles, angular to subrounded, nonplastic, light brown note: contact is ± 3'
40	40									
47	47									
59	59									
35										Stopped hammer at 33'

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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PROJECT _____
JOB NO. E87-56 DATE 9-21-87

LOG OF TEST PIT NO. CH-79

Backhoe Type Case 580E
Location N885091.3, E488900.2
Elevation 1129.6 ft.
Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
8'	1:20p	9-21
6'	1:40p	9-21

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
						0	
0-5			D		SP	dry to slightly moist very loose	SAND, predominantly fine to medium grained, subangular to subrounded, nonplastic, light brown to brown
5-10					GW	slightly moist to saturated loose	GRAVELLY SAND, trace to considerable cobbles, predominantly fine to medium grained, subangular to subrounded, nonplastic, light brown to brown note: trace of cobbles above 4'; considerable cobbles below 4'; trace to some refuse (containing both domestic refuse & construction debris, i.e. large 1'x2'x4" blocks of concrete)
10						saturated medium dense	SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, grayish brown
							Stopped backhoe at 8'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample

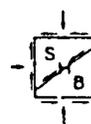
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-22-87

LOG OF TEST PIT NO. CH-80
 Backhoe Type Case 580E
 Location N885079.3, E489092.2
 Elevation 1127.9 ft.
 Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
5'	12:25p	9-22

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
						0	
10							Stopped backhoe at 7'

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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PROJECT _____
JOB NO. E87-56 DATE 9-18-87

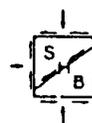
LOG OF TEST PIT NO. CH-81

Backhoe Type Case 580E
Location N885974.1, E488971.4
Elevation 1142.4 ft.
Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content, Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0							
			D	5	SM	slightly moist	FILL SAND, some silt & gravel, small amount of cobbles, trace of clay, poorly graded, subangular to sub-rounded, nonplastic to low plasticity, brown
5						firm to very firm	
			D		SP-SM	slightly moist	SAND, small amount of silt & gravel, well graded, subangular, nonplastic, brown
10						loose to medium dense	
							Stopped backhoe at 10'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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JOB NO. E87-56 DATE 9-22-87

LOG OF TEST PIT NO. CH-83

Backhoe Type Case 580E

Location N885002.8, E489353.4

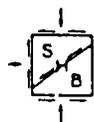
Elevation 1131.4 ft.

Datum

GROUND WATER		
DEPTH	HOUR	DATE
9'6"	1:05p	9-22

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION		
						0			
5								moist to saturated medium dense to dense	SANDY GRAVEL, poorly graded, nonplastic, brownish gray to grayish brown note: increase of gravel & cobbles with depth
10									Stopped backhoe at 10'

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample



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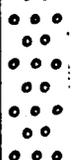
PROJECT _____
JOB NO. E87-56 DATE 9-17-87

LOG OF TEST PIT NO. CH-84

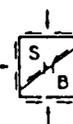
Backhoe Type Case 580E
Location N885532.5, E489474.1
Elevation 1132.2 ft.
Datum _____

GROUND WATER

DEPTH	HOUR	DATE
9'	11:30a	9-17

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	
						VISUAL CLASSIFICATION	
0		 	D		GW	slightly moist loose	SAND, GRAVEL & COBBLES, trace of silt & clay, well graded, subrounded, non-plastic, brown & gray
5		 	D		SW	slightly moist to moist medium dense	SAND, occasional silt, clay & gravel, predominantly medium to fine grained, subangular, nonplastic, brown
10		 					Stopped backhoe at 11'
15							

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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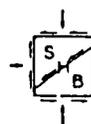
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PROJECT _____
JOB NO. E87-56 DATE 9-22-87

LOG OF TEST PIT NO. CH-85
Backhoe Type Case 580E
Location N885000.3, E489459.0
Elevation 1132.1 ft.
Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION				
						DEPTH	HOUR	DATE						
0			D		SM				dry to slightly moist medium dense slightly moist to saturated dense	SILTY SAND, predominantly fine grained, nonplastic, brownish gray note: small amount of refuse (mostly rugs) SANDY GRAVEL, some cobbles, well graded, rounded to well rounded, nonplastic, brown				
5														
10												GW		
15										Stopped backhoe at 10'6"				

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT Sky Harbor Freeways

LOG OF TEST BORING NO. CH-87

JOB NO. E87-56 DATE 10-7-87

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1155.3 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0	7	[Diagonal Hatching]						CL	slightly moist	FILL GRAVELLY CLAY, considerable sand, trace of silt, weakly lime cemented, low to medium plasticity, light brown to brown note: increase of gravel with depth
	14									
	17									
5	17	[Diagonal Hatching]						CL	moderately firm	
	17									
	10									
10	9	[Cross-hatching]							slightly moist moderately firm	FILL SANDY CLAY, considerable gravel, weakly lime cemented, low to medium plasticity, brown note: some cobbles below 10'
	7									
	10									
	11									
	11									
	8									
	14									
	17									
15	8									
	5									
	6									
	5									
20	5									
	7									
	7									
	6									
	7									
25	8									
	6									
	5									
	8									
	7									
30	7									
	6									
	6									
	7									
	8									
35	6									
	13									
	31	[Dotted Pattern]						GW	saturated very dense	SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, gray
	35									
	65									
	63									
40	27	[Vertical Hatching]						ML	slightly moist to moist hard	SANDY SILT, trace of gravel, moderately to strongly lime cemented, low plasticity, brown
	22									
	20									
	34									
45	115									
	71									
	67									
	44									
	61									
50										Stopped hammer at 49'

GROUND WATER		
DEPTH	HOUR	DATE
34'	7:10a	10-7
34'	10:05a	10-8

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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PROJECT _____

JOB NO. E87-56 DATE 9-18-87

LOG OF TEST PIT NO. CH-88

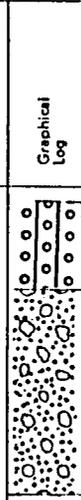
Backhoe Type Case 580E

Location N886041.4, E489656.4

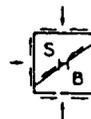
Elevation 1143.7 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0		X	D		SM	slightly moist	FILL	SAND, some silt & gravel, trace of cobbles, poorly graded, nonplastic, brown	
5		X				firm to very firm		note: trace of refuse (plastics)	
10		X	D		GW	slightly moist		SAND, GRAVEL & COBBLES, well graded, subrounded, nonplastic, brown & gray	
						loose			
									Stopped backhoe at 10'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-22-87

LOG OF TEST PIT NO. CH-91

Backhoe Type Case 580E
 Location N884865.0, E490058.2
 Elevation 1133.7 ft.
 Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
10'	3:15p	9-22

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION						
0			D			slightly moist to saturated loose to medium dense	SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, brown to grayish brown note: trace of refuse (wood, tire); increase of cobbles with depth						
5									GW				
10							Stopped backhoe at 10'						

SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample

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PROJECT _____
JOB NO. E87-56 DATE 9-18-87

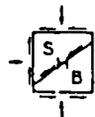
LOG OF TEST PIT NO. CH-93

Backhoe Type Case 580E
Location N885880.8, E490156.9
Elevation 1140.9 ft.
Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
0		X	D		GW	slightly moist		SAND, GRAVEL & COBBLES, well graded, subrounded to rounded, nonplastic, brown & gray	
		X	D		CL	loose			
5		X				slightly moist		SILTY CLAY, weakly lime cemented, medium plasticity, dark brown	
		X	D		GW	firm			
10		X				slightly moist to moist		SAND, GRAVEL & COBBLES, well graded, subrounded to rounded, nonplastic, yellowish brown	
						loose			
									Stopped backhoe at 10'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____
JOB NO. E87-56 DATE 9-23-87

LOG OF TEST PIT NO. CH-100

Backhoe Type Case 580E
Location N884868.0, E490781.9
Elevation 1141.5 ft.
Datum _____

GROUND WATER

DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER	REMARKS	VISUAL CLASSIFICATION		
						DEPTH	HOUR	DATE		
0							slightly moist to moist dense	SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, brown to grayish brown		
5					GW					
10										
15										Stopped backhoe at 12'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample


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PROJECT _____
JOB NO. E87-56 DATE 9-23-87

LOG OF TEST PIT NO. CH-103

Backhoe Type Case 580E

Location N884864.6, E491358.7

Elevation 1138.2'

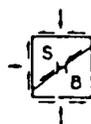
Datum _____

GROUND WATER

DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER	REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE
0			D		SP		slightly moist	GRAVELLY SAND, predominantly fine to medium grained, subangular to sub-rounded, nonplastic, grayish brown to brown note: some construction debris on surface
5						medium dense		
10								Stopped backhoe at 7'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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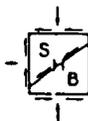
PROJECT _____
JOB NO. E87-56 DATE 9-23-87

LOG OF TEST PIT NO. CH-106

Backhoe Type Case 580E
Location N884694.0, E491422.7
Elevation 1141.1 ft.
Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE		
0			D		SP				slightly moist loose	GRAVELLY SAND, trace of cobbles, predominantly fine to medium grained, subangular to subrounded, weakly lime cemented, nonplastic, brown note: trace to some domestic refuse from 2' to 6'
5										
10										Stopped backhoe at 8'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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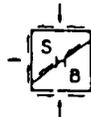
PROJECT _____
JOB NO. E87-56 DATE 9-23-87

LOG OF TEST PIT NO. CH-108

Backhoe Type Case 580E
Location N884836.6, E491722.8
Elevation 1140.3 ft.
Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE		
0			D		SP				slightly moist loose to medium dense	SAND, trace to some gravel, predomi- nantly fine to medium grained, sub- angular to subrounded, nonplastic, brown note: trace of trash on surface & upper 1' of pit
5										
10										Stopped backhoe at 8'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT Sky Harbor Freeways

JOB NO. E87-56 DATE 9-24-87

LOG OF TEST BORING NO. CH-113

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	RIG TYPE _____ Becker Hammer Drill	
									BORING TYPE _____ 9" Drive Pipe	
									SURFACE ELEV. _____	
									DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0	0	○							dry to slightly moist	FILL SILTY SAND, some refuse, predominantly fine grained, low plasticity, brown to dark brown note: no hammer, core only to 6'
0	0	○								
0	0	○								
0	0	○								
5	0	○								
0	0	○								
5	0	○								
10	2	○								
2	2	○								
6	2	○								
7	2	○								
9	2	○								
10	2	○								
13	5	○								
9	5	○								
13	5	○								
14	5	○								
20	5	○								
5	5	○								
14	5	○								
19	5	○								
12	5	○								
25	8	○								
9	8	○								
8	8	○								
6	8	○								
4	8	○								
30	6	○								
6	6	○								
39	6	○								
30	6	○								
33	6	○								
28	6	○								
35	26	○	⊗							
26	26	○								
32	26	○								
56	26	○								
40	58	○								
62	58	○								
32	58	○								
20	58	○								
106	58	○								
45										Stopped hammer at 43'

GROUND WATER		
DEPTH	HOUR	DATE
27'	1:00p	9-24

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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PROJECT Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-25-87

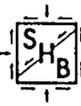
LOG OF TEST BORING NO. CH-114

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1154.8 ft.
 DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb, 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION	
0	6								slightly moist	LANDFILL (cloth, paper, concrete, wood, palm fronds) note: some silty sand & gravel mixed in with refuse	
	14										
	13										
	13										
5	9										
	13										
	10										
	12										
	14										
10	10										
	9										
	6										
	9										
	10										
15	20										
	13										
	10										
	10										
	9										
20	9										
	14										
	15										
	26										
	13										
25	9										
	7										
	9										
	9										
	11										
30	8										
	9										
	10										
	16										
	36								saturated dense	GM SILTY SAND & GRAVEL, occasional cobbles, well graded, subrounded to subangular, nonplastic, light brown	
35	39										
	35										
	30										
	40										
	61										
40										Stopped hammer at 39'	

GROUND WATER		
DEPTH	HOUR	DATE
33'	11:00a	9-25

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



SERGEANT, HAUSKINS & BECKWITH A-111
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East Papago - Hohokam -
 PROJECT Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-28-87

LOG OF TEST BORING NO. CH-115

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1137.1 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0	6								dry to slightly moist dense	SANDY GRAVEL, considerable cobbles, some silt, well graded, rounded to well rounded, nonplastic, gray to brownish gray
16										
20										
12										
5										
8										
9										
8										
8										
7										
10										
8										
6	7							slightly moist to saturated medium dense	GRAVELLY SAND, some cobbles, predominantly fine grained, nonplastic, gray to brownish gray note: some gravel lenses	
7										
15										
12										
11										
9										
15										
15										
20										
14										
8										
12										
15	15								saturated dense to very dense	SANDY GRAVEL, considerable cobbles, some silt, well graded, rounded to well rounded, nonplastic, brownish gray
31										
40										
45										
40										
38										
48										
30									Stopped hammer at 29'	

GROUND WATER		
DEPTH	HOUR	DATE
11'	2:10p	9-28
8' 6"	2:20p	9-28

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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Sky Harbor Freeways

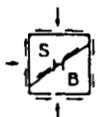
PROJECT _____
JOB NO. E87-56 DATE 9-25-87

LOG OF TEST PIT NO. CH-117

Backhoe Type Case 580E
Location N882704.4, E477089.2
Elevation 1120.1 ft.
Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION	
						DEPTH	HOUR	DATE			
0					GM				slightly moist medium dense to dense	SILTY GRAVEL, considerable sand, trace of cobbles, well graded, rounded to well rounded, uncemented to weakly lime cemented, nonplastic to low plasticity, brown note: trace of refuse	
5					SM						
10									slightly moist dense to very dense	SILTY SAND, considerable gravel, predominantly fine grained, angular to subangular, nonplastic to low plasticity, brown note: trace to some refuse (mostly wood & vegetation)	
15										REFUSE (wood, wire, cardboard, paper, plastic, bottles, etc.)	
											Stopped backhoe at 12'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-30-87

LOG OF TEST BORING NO. CH-118

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	RIG TYPE _____ Becker Hammer Drill		
									BORING TYPE _____ 9" Drive Pipe		
									SURFACE ELEV. _____ 1122.2 ft.		
									DATUM _____		
									REMARKS	VISUAL CLASSIFICATION	
0	11										
	35										
	44										
	67										
5	39										
	30										
	25										
	9										
	12										
10	14										
	9										
	10										
	17										
	15										
15	12										
	15										
	13										
	15										
	10										
20	6										
	8										
	12										
	11										
	8										
25	14										
	5										
	11										
	12										
	15										
30	15										
	23										
	43										
	28										
	32										
35	45										
	153										
	210										
	171										
	156										
40	284										
	256										
	163										
	233										
45											

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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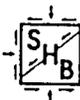
East Papago - Hohokam -
 PROJECT Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-30-87

CH-
 LOG OF TEST BORING NO. 119

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	Remarks	Visual Classification
0	15									
	26									
	28									
	26									
5	25								dry to slightly moist very firm	FILL SILTY GRAVEL, considerable sand, trace of cobbles, well graded, sub-angular to well rounded, weakly lime cemented, nonplastic, grayish brown to brownish gray
	33									
	28									
	24									
	15									
10	15									
	14									
	16									
	12									
	9									
15	25									
	7									
	7									
	10									
	15									
20	12									
	13									
	16									
	14									
	20									
25	21									
	22									
	25									
	21									
	28									
	26									
	20									
	20									
	11									
	14									
35	23									
	18									
	18									
	16									
	27									
40	24									
	25									
	34									
	121									
45	173									
	112									
	113									
	122									
	133									
	159									
50										

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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A-116

PROJECT
JOB NO. E87-56 DATE 10-1-87

LOG OF TEST BORING NO.

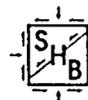
RIG TYPE Becker Hammer Drill
BORING TYPE 9" Drive Pipe
SURFACE ELEV. 1129.9 ft.
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb., 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0	22							GW		FILL
	22								dry to slightly moist	SANDY GRAVEL, some silt, trace of cobbles, well graded, subrounded to well rounded, weakly lime cemented, nonplastic, gray to brownish gray
	28								very firm	
5	30									
	28									
	43									
	15									
	24									
	32							GM		
10	17									
	18									
	19									
	14									
	15							SM		
15	15									
	30									
	42									
	44									
	27									
20	35									
	28									
	29									
	35									
	43									
25	48							GM		
	30									
	31									
	28									
	23									
30	10									
	42									
	32									
	29									
	29									
35	28									
	39									
	14									
	22									
	74							GW		
40	60									
	85									
	74									
	53									
	41									
45										

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE

- A - Auger cuttings. B - Block sample
- S - 2" O.D. 1.38" I.D. tube sample.
- U - 3" O.D. 2.42" I.D. tube sample.
- T - 3" O.D. thin-walled Shelby tube.



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Stopped hammer at 44'

note: silty gravel lens from 36' to 38'; increase of silt below 40'

SANDY GRAVEL, some cobbles, trace to some silt, well graded, rounded to well rounded, nonplastic, brownish gray

FILL
SILTY GRAVEL, considerable sand, some cobbles, well graded, subrounded to well rounded, nonplastic to low plasticity, gray to brownish gray

FILL
SILTY SAND, trace to considerable gravel, predominantly fine grained, low plasticity, dark brownish gray
note: contains some glass pieces

FILL
SILTY GRAVEL, considerable sand, some cobbles, trace of clay, well graded, rounded to well rounded, uncemented to weakly lime cemented, low plasticity, dark grayish brown

FILL
SANDY GRAVEL, some silt, trace of cobbles, well graded, subrounded to well rounded, weakly lime cemented, nonplastic, gray to brownish gray

PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 10-1-87

LOG OF TEST BORING NO. CH-124

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1128.1 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb, 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
50									slightly moist very dense	(depth 45' to 49') SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, gray to light brownish gray
										Stopped hammer at 49'

GROUND WATER

DEPTH	HOUR	DATE

SAMPLE TYPE

- A - Auger cuttings. B - Block sample
- S - 2" O.D. 1.38" I.D. tube sample.
- U - 3" O.D. 2.42" I.D. tube sample.
- T - 3" O.D. thin-walled Shelby tube.



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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 10-5-87

LOG OF TEST BORING NO. CH-125

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1108.5 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0	1									
15	27									COBBLES (Gabions 0-1'6")
27	22									FILL
5	19							GW	dry to slightly moist	SANDY GRAVEL, considerable cobbles, some silt, well graded, subrounded to well rounded, non-plastic, gray to brownish gray
18	84								dense to very dense	
72	35									
10	65									
15	32									FILL
53	36								slightly moist	SILTY GRAVEL, considerable sand & cobbles, well graded, rounded to well rounded, dark gray to brownish gray
15	43							GM	dense to very dense	
51	30									
41	26									
20	24									note: some refuse (plastic, paper) from 20' to 23'
21	14									
14	20									
25	46									
61	80								slightly moist to saturated	SANDY GRAVEL, considerable silt & cobbles, well graded, rounded to well rounded, nonplastic, gray to light grayish brown
72	39								very dense	
43	27							GW		
30	26									
34	36									
35										Stopped hammer at 33'

GROUND WATER

DEPTH	HOUR	DATE
31'	3:25p	10-5
31'	3:30p	10-5

SAMPLE TYPE

- A - Auger cuttings. B - Block sample
- S - 2" O.D. 1.38" I.D. tube sample.
- U - 3" O.D. 2.42" I.D. tube sample.
- T - 3" O.D. thin-walled Shelby tube.



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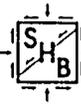
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 10-6-87

LOG OF TEST BORING NO. CH-126

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb., 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	RIG TYPE <u>Becker Hammer Drill</u>	
									BORING TYPE <u>9" Drive Pipe</u>	
									SURFACE ELEV. <u>1105.4 ft.</u>	
									DATUM _____	
									REMARKS	VISUAL CLASSIFICATION
0	3									
5	25 30 25 48 45 45 42									COBBLES (Gabions 0-1'6") FILL dry to slightly moist very dense
10	17 11 14 15							SP		slightly moist
15	24 27 66							GW		dense
20	51 42 66 71 77							GM		slightly moist dense to very dense
25	62 51 37							GW		slightly moist very dense
										slightly moist very dense
										Stopped hammer at 25'

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



SERGENT, HAUSKINS & BECKWITH A-124
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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 10-6-87

LOG OF TEST BORING NO. CH-127

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb., 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
									RIG TYPE <u>Becker Hammer Drill</u>	
0	3									
5	19							dry to slightly moist medium dense to very dense	COBBLES (Gabions 0-1') SANDY GRAVEL, considerable silt & cobbles, well graded, rounded to well rounded, nonplastic, gray to grayish brown	
	31									
	26									
	19									
	16									
	21									
	10									
	13									
10	16									
	27									
	34									
	28									
	19									
	14									
15	11							slightly moist	CLAYEY SILT, considerable sand, low plasticity, dark brown to dark grayish brown	
	10									
	11									
	15									
	10									
20	16							LANDFILL (wood, vegetation, glass, newspaper, plastic)		
	20									
	18									
	13									
25	17									
	16									
	10									
	15									
	14									
30	10									
	14									
35	186							slightly moist to saturated very dense	SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, gray to brownish gray	
	125									
	61									
	40									
	36									
	22									
	54									
	63									
40										
									Stopped hammer at 39'	

GROUND WATER		
DEPTH	HOUR	DATE
35'	8:30a	10-6

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.

PROJECT _____
 JOB NO. E87-56 DATE 10-6-87

LOG OF TEST BORING NO.

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1108.3 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0	6								dry to slightly moist dense to very dense	FILL SILTY GRAVEL, considerable sand, trace to some cobbles, well graded, rounded to well rounded, nonplastic, grayish brown note: some silty sand lenses from 5' to 10'
5	30							GM		
	21									
	18									
	15									
	12									
	15									
	17									
	14									
	15									
10	20								slightly moist dense	FILL SANDY GRAVEL, some silt, trace to some cobbles, well graded, rounded to well rounded, nonplastic, grayish brown to gray
	21									
	18									
	18							GW		
	18									
15	17								slightly moist very dense	SILTY GRAVEL, considerable sand & cobbles, well graded, subrounded to well rounded, nonplastic, grayish brown
	19									
	103									
	84									
	27									
	80									
	69							GM		
	134									
	65									
	46									
25	60								slightly moist to saturated very dense	SANDY GRAVEL, considerable silt & cobbles, well graded, rounded to well rounded, nonplastic, gray to brownish gray
	130									
	47							GW		
	76									
30										Stopped hammer at 29'

GROUND WATER

DEPTH	HOUR	DATE
28' 6"	12:40P	10-6

SAMPLE TYPE

- A - Auger cuttings.
- B - Block sample
- S - 2" O.D. 1.38" I.D. tube sample.
- U - 3" O.D. 2.42" I.D. tube sample.
- T - 3" O.D. thin-walled Shelby tube.



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PROJECT East Papago - Hohokam Sky Harbor Freeways

CH-

LOG OF TEST BORING NO. 134

JOB NO. E87-56 DATE 10-7-87

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1155.1 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION			
0	8								dry to slightly moist dense to very dense	FILL SANDY GRAVEL, some cobbles, well graded, angular, nonplastic, brownish red			
11													
9													
10													
11													
15													
18													
13													
12													
10	12												
16													
17													
15	6											slightly moist	LANDFILL (vegetation, some paper, rubber & plastic)
10													
15													
15													
13													
15													
20	8								slightly moist to saturated very dense	SANDY GRAVEL, considerable cobbles, some silt, well graded, rounded to well rounded, nonplastic, brownish gray			
16													
33													
43													
31													
30													
25	23												
31													
27													
30													
34													
30	40												
44													
59													
69													
50													
35	34								slightly moist to moist medium dense to very dense	SANDY CLAY, considerable gravel, trace of silt, weakly to strongly lime cemented, low to medium plasticity, brownish red			
36													
37													
40	32												
13													
30													
29													
18													
15													
14													
45	12												
35													
80													
67													
50										Stopped hammer at 49'			

GROUND WATER		
DEPTH	HOUR	DATE
38'	9:05a	10-7

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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East Papago - Hohokam -
 PROJECT Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-28-87

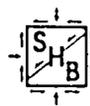
CH-
 LOG OF TEST BORING NO. 135

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1156.5 ft.
 DATUM

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION	
0	2								dry to slightly moist medium dense to dense	FILL SILTY GRAVEL, considerable sand, trace of boulders, well graded, angular, nonplastic, brownish red to reddish brown	
5	6							GM			
	8										
	9										
	10										
	10										
	17										
	19										
	15										
10	7									LANDFILL (partially decomposed vegetation)	
	9										
	10										
	12										
	11										
	7										
15	10										
	12										
	9										
	11										
20	15		⊗	S	32						
	18										
	20		⊗	S	37				slightly moist dense	GRAVELLY SAND, considerable silt, predominantly fine grained, sub-angular, nonplastic, grayish brown to brownish gray	
	22										
	24		⊗	S	48						
25	30										
	35		⊗	S							
	34										
	30										
	32										
30										Stopped hammer at 29'	

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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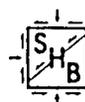
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 9-28-87

CH-
 LOG OF TEST BORING NO. 137

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	Remarks	Visual Classification	
0	4						CL		FILL	
18								dry to slightly moist medium dense	SILTY CLAY, some sand & gravel, weakly lime cemented, medium plasticity, grayish brown to brown	
13										
12										
10										
12										
20										
23										
20										
10	12									LANDFILL (palm tree trunks, considerable concrete, trace of glass & plastic)
12										
16										
13										
8										
15	9									
10	10									
22								dry to slightly moist dense to very dense	SANDY GRAVEL, considerable cobbles, some silt, well graded, rounded to well rounded, nonplastic, grayish brown to gray	
20	25									
24										
17	17									
25	37		A				GW			
56										
65										
25	75									
45										
28	28		A				ML			
30	30									
28	28									
30								slightly moist medium dense to dense	CLAYEY SILT, some sand & gravel, weakly lime cemented, low to medium plasticity, brownish gray to dark gray	
									Stopped hammer at 29'	

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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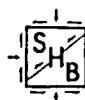
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 10-2-87

LOG OF TEST BORING NO. CH-139

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	RIG TYPE - <u>Becker Hammer Drill</u>	
									REMARKS	VISUAL CLASSIFICATION
0	1	o o o o								
	1	o o o o						SM		
	12	o o o o								
5	28	o o o o							slightly moist	FILL SILTY SAND, predominantly fine to medium grained, subangular, nonplastic, brown
	24	o o o o							loose	
	30	o o o o								
	43	o o o o								
	53	o o o o								
10	23	o o o o							slightly moist to saturated	FILL SANDY GRAVEL, considerable silt & cobbles, well graded, rounded to well rounded, nonplastic, gray to light brownish gray
	13	o o o o								
	30	o o o o						GW	dense to very dense	
	24	o o o o								
	30	o o o o								
	28	o o o o								
15	33	o o o o								
	24	o o o o								
	17	o o o o								
	12	o o o o								
	15	o o o o								
20	14	o o o o								
	21	o o o o								
	90	o o o o								
	106	o o o o								
25	153	o o o o								GRANITE, moderately to highly weathered, moderately hard to very hard, brownish red to gray
	45	o o o o								note: brownish red from 21' to 25'; gray below 25'
	80	o o o o								note: decrease in weathering with depth
	78	o o o o								
	142	o o o o								
	181	o o o o								
30										Stopped hammer at 29'

GROUND WATER		
DEPTH	HOUR	DATE
18'	10:05a	10-2
14'	10:30a	10-2

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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PROJECT _____
JOB NO. E87-56 DATE 10-2-87

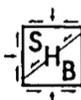
LOG OF TEST BORING NO.

RIG TYPE Becker Hammer Drill
BORING TYPE 9" Drive Pipe
SURFACE ELEV. 1131.7 ft.
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION	
0	7									FILL	
9	7										SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, gray to brownish gray
15	15										
16	16										
5	12										
14	14										
11	11										
10	10										
5	5										
2	2										
2	2										
3	3										
20	20										
15	39										
26	26										
29	29										
36	36										
53	53										
20	38										
28	28										
40	40										
51	51										
31	31										
25	22										
41	41										
21	21										
8	8										
30	7										
11	11										
13	13										
10	10										
35	31										
36	36										
45	45										
68	68										
67	67										
91	91										
93	93										
40											

GROUND WATER		
DEPTH	HOUR	DATE
10'	2:30a	10-2

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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East Papago - Hohokam -
Sky Harbor Freeways

CH-141

PROJECT _____
JOB NO. E87-56 DATE 10-5-87

LOG OF TEST BORING NO. _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification
0	3							SM
15	15							
20	20							
18	18							GW
13	13							
5	14							
	11							
	13							
	11							
10	6							
	0							
	0							
	0							SM
	0							
15	0							
	0							
20	37							SC
	36							
	40							
25	50							
	51							
	43							
	46							
	51							
	31							
	28							
	58							
30	71							GM
	94							
	84							
	93							
	71							
	65							
35	40							
	33							
	35							SW
	37							
	31							
40								

RIG TYPE Becker Hammer Drill
BORING TYPE 9" Drive Pipe
SURFACE ELEV. 1133.3 ft.
DATUM _____

REMARKS	VISUAL CLASSIFICATION
	FILL
dry to slightly moist	SILTY SAND, predominantly fine grained, subangular, nonplastic, gray to light brownish gray
loose to medium dense	
	FILL
dry to slightly moist	SANDY GRAVEL, some silt, trace of cobbles, well graded, subrounded to well rounded, nonplastic, brownish gray
medium dense	
	FILL
slightly moist to saturated	SILTY SAND, predominantly fine grained, subangular, nonplastic, brown to dark brown
very loose	
	CLAYEY SAND, some gravel, predominantly fine to medium grained, angular to subangular, low plasticity, brown
dense to very dense	
	SILTY GRAVEL, considerable sand, some clay, well graded, subangular to subrounded, weakly to moderately lime cemented, low plasticity, brown
saturated hard	
	GRAVELLY SAND, considerable clay, well graded, angular to subangular, weakly lime cemented, low plasticity, brown to dark brown
saturated hard	
	Stopped hammer at 39'

GROUND WATER

DEPTH	HOUR	DATE
13'	8:25a	10-5

SAMPLE TYPE

- A - Auger cuttings.
- B - Block sample
- S - 2" O.D. 1.38" I.D. tube sample.
- U - 3" O.D. 2.42" I.D. tube sample.
- T - 3" O.D. thin-walled Shelby tube.



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A-140

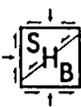
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 10-5-87

LOG OF TEST BORING NO. CH-142

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb., 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	RIG TYPE <u>Becker Hammer Drill</u>		
									BORING TYPE <u>9" Drive Pipe</u>		
									SURFACE ELEV. <u>1130.5 ft.</u>		
									DATUM _____		
									REMARKS	VISUAL CLASSIFICATION	
0	1								SM	dry to slightly moist loose	SILTY SAND, trace of gravel, predominantly fine grained, angular to subangular, nonplastic, light gray to light brown
1	1										
2	2										
8	8										
5	29										
28	28										
23	23										
23	23										
10	9								GM	slightly moist to saturated medium dense to dense	SILTY GRAVEL, considerable sand, trace of cobbles, well graded, subrounded to well rounded, nonplastic, brownish gray
3	3										
15	15										
29	29										
40	40										
48	48										
15	33								GC	moist to saturated very firm to hard	CLAYEY GRAVEL, considerable sand, some silt & cobbles, well graded, subangular to rounded, weakly to moderately lime cemented, low plasticity, brown to reddish brown
56	56										
35	35										
26	26										
34	34										
46	46										
20	63								SC	saturated hard	CLAYEY SAND, some gravel, predominantly fine to medium grained, angular to subangular, weakly to moderately lime cemented, low plasticity, reddish brown
80	80										
39	39										
41	41										
40	40										
45	45										
25	63								ML	saturated hard	SANDY SILT, some gravel & clay, weakly to moderately lime cemented, low plasticity, light brown to brown
39	39										
103	103										
78	78										
81	81										
90	90										
30	33										
41	41										
31	31										
30	30										
47	47										
73	73										
35	43										
43	43										
75	75										
68	68										
47	47										
69	69										
40	81										
81	81										
58	58										
42	42										
83	83										
101	101										
45											Stopped hammer at 49'
50											

GROUND WATER		
DEPTH	HOUR	DATE
13'	11:45a	10-5

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 11-2-87

LOG OF TEST BORING NO. CH-147

RIG TYPE Becker Hammer Drill
 BORING TYPE 9" Drive Pipe
 SURFACE ELEV. 1130.2 ft.
 DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION		
0	8								slightly moist firm to hard	SANDY GRAVEL, some to considerable cobbles, well graded, rounded to well rounded, nonplastic, brown to grayish brown note: some vegetation		
13												
15												
27												
18												
5	11										GW	
11												
15												
9												
10												
10												
9												
8												
16												
29												LANDFILL, predominantly domestic refuse (vegetation, paper, plastic, metal, rubber tire) & construction debris (concrete & wire)
15	41											
31												
41												
60												
52												
20	86											
114										GRANITE, decomposed to slightly weathered, soft to hard, grayish brown to brownish gray note: becomes slightly weathered & hard below about 25'		
97												
127												
114												
25	128											
106												
30									Stopped hammer at 26'			

GROUND WATER		
DEPTH	HOUR	DATE
11'	2:15p	11-2

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.

PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 11-2-87

CH-
LOG OF TEST BORING NO. 148

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	RIG TYPE <u>Becker Hammer Drill</u>	
									REMARKS	VISUAL CLASSIFICATION
0	5								slightly moist to saturated firm to hard	SANDY GRAVEL, trace to considerable cobbles, well graded, rounded to well rounded, nonplastic, brown
6										
8										
12										
20										
5	14									
20										
19										
17										
10	12									
15										
22										
35										
20										
15	16									
14										
16										
19										
38										
58										
20	58									
57										
148										
240										
191										
25	119									
59										
65										
64										
79										
30										GRANITE, decomposed to moderately weathered, moderately soft to moderately hard, brownish gray note: increase of hardness & decrease in weathering with depth
										Stopped hammer at 29'

GROUND WATER		
DEPTH	HOUR	DATE
8'6"	4:25p	11-2

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.

East Papago - Hohokam -
Sky Harbor Freeways

PROJECT _____
JOB NO. E87-56 DATE 11-2-87

LOG OF TEST PIT NO. CH-149

Backhoe Type Case 500C

Location N885134.8, E485520.7

Elevation 1129.4 ft.

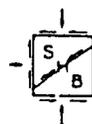
Datum _____

GROUND WATER

DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
						REMARKS	VISUAL CLASSIFICATION		
0	●●●●●●●●				SP	slightly moist to moist	GRAVELLY SAND to SANDY GRAVEL, trace of cobbles, predominantly fine grained sand, angular to subangular, well graded gravel, rounded to well rounded, nonplastic, brown		
5	●●●●●●●●				SP	firm			
	●●●●●●●●					slightly moist	SAND, trace to considerable gravel, predominantly fine grained, angular to subangular, nonplastic, light brown to brown		
10	●●●●●●●●					moderately firm to firm			
									Stopped backhoe at 8'6"

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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PROJECT _____
JOB NO. E87-56 DATE 11-2-87

LOG OF TEST PIT NO. CH-151

Backhoe Type Case 500C

Location N885247.7, E486139.8

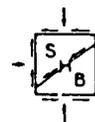
Elevation 1128.8 ft.

Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					GW	slightly moist to moist	SANDY GRAVEL, considerable cobbles, well graded, rounded to subrounded, nonplastic, brown note: some construction debris (wire, concrete, wood)
5					SP	slightly moist to moist	GRAVELLY SAND, predominantly fine to medium grained, angular to subangular, nonplastic, brown note: trace of concrete
10					GW	slightly moist to moist	SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, brown
							Stopped backhoe at 10'

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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A-149

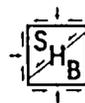
PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 11-18-87

CH-
LOG OF TEST BORING NO. 153

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb, 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	RIG TYPE <u>Becker Hammer Drill</u>		
									REMARKS	VISUAL CLASSIFICATION	
0	4										
	14										
	24										
	30										
5	15								SM	slightly moist	FILL SILTY SAND, considerable gravel, some cobbles, predominantly fine grained, angular to subrounded, nonplastic, brown to dark grayish brown
	15										
	22										
	22										
	16										
10	31									saturated	SANDY GRAVEL, considerable cobbles, well graded, rounded to well rounded, nonplastic, brown to grayish brown
	32										
	49										
	38										
	27										
15	35								GW	dense to very dense	
	42										
	46										
	16										
	33										
20	25										
	49										
	81										
	150										
	182										
25	111									GRANITE, decomposed to highly weathered, soft to moderately soft, brownish gray	
	206									note: becomes harder & less weathered with depth	
30										Stopped hammer at 26'	

GROUND WATER		
DEPTH	HOUR	DATE
12'	8:50a	11-18

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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LOG OF TEST BORING NO. CH-154

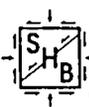
PROJECT _____
JOB NO. E87-56 DATE 11-19-87

RIG TYPE Becker Hammer Drill
BORING TYPE 9" Drive Pipe
SURFACE ELEV. 1148.3 ft.
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
50										(depth 41' to 45') GRANITE, highly to moderately weathered, moderately soft to hard, brownish gray note: increase of hardness & decrease in weathering with depth
										Stopped hammer at 45'

GROUND WATER		
DEPTH	HOUR	DATE

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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Sky Harbor Freeways

CH-
155

PROJECT _____
JOB NO. E87-56 DATE 11-19-87

LOG OF TEST BORING NO.

RIG TYPE Becker Hammer Drill
BORING TYPE 9" Drive Pipe
SURFACE ELEV. 1148.3 ft.
DATUM _____

Depth in Feet	Continuous Penetration Resistance	Graphical Log	Sample	Sample Type	Blows per foot 140 lb. 30" free-fall drop hammer	Dry Density Lbs. per cu. ft.	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0	8	o								FILL
	19	o							slightly moist	SILTY SAND, some to considerable gravel, occasional cobbles, predominantly fine grained, angular to subangular, nonplastic, dark grayish brown
	18	o								
	24	o								
5	29	o								
	30	o								
	31	o						SM		
	38	o								
	34	o								
10	33	o								
	29	o								
	21	o							slightly moist	FILL SAND, considerable gravel, some silt, occasional to trace of cobbles, predominantly fine grained, angular to subangular, nonplastic, grayish brown
	20	o								
	32	o								
15	40	o								
	21	o								
	27	o								
	25	o								
	18	o								
20	18	o								
	16	o								
	17	o								
	15	o								
	19	o						SP		
25	27	o								
	33	o								
	28	o								
	31	o								
	22	o								
30										Stopped hammer at 29'

GROUND WATER		
DEPTH	HOUR	DATE
	none	

SAMPLE TYPE
 A - Auger cuttings. B - Block sample
 S - 2" O.D. 1.38" I.D. tube sample.
 U - 3" O.D. 2.42" I.D. tube sample.
 T - 3" O.D. thin-walled Shelby tube.



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East Papago - Hohokam -
Sky Harbor Freeways

PROJECT _____

JOB NO. ER7-56 DATE 11-16-87

LOG OF TEST PIT NO. CH-160

Backhoe Type Case 580E

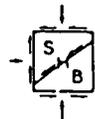
Location N884526.7, E492029.2

Elevation 1148.7 ft.

Datum _____

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	GROUND WATER			REMARKS	VISUAL CLASSIFICATION
						DEPTH	HOUR	DATE		
0		D	10	SM	GW				slightly moist firm	SILTY SAND, weakly lime cemented, low plasticity, brown
5										
10									slightly moist loose to medium dense	SILTY GRAVEL, considerable sand, trace of cobbles, well graded, rounded to well rounded, nonplastic, brown to grayish brown
										Stopped backhoe at 8'6"

SAMPLE TYPE
B - Undisturbed Block Sample
D - Disturbed Bulk Sample



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A-155

PROJECT East Papago - Hohokam - Sky Harbor Freeways
 JOB NO. E87-56 DATE 11-16-87

LOG OF TEST PIT NO. CH-162
 Backhoe Type Case 580E
 Location N884763.2, E491598.7
 Elevation 1138.5 ft.
 Datum _____

GROUND WATER		
DEPTH	HOUR	DATE
	none	

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					SW	slightly moist	GRAVELLY SAND, well graded, rounded to well rounded gravel, angular to subrounded sand, nonplastic, brown
5					SP	loose to medium dense	
10							SAND, predominantly fine grained, angular to subangular, nonplastic, gray note: considerable roots & a piece of hose at 3'
							Stopped backhoe at 7'6"

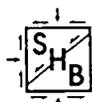
SAMPLE TYPE
 B - Undisturbed Block Sample
 D - Disturbed Bulk Sample

LOCATION & SURFACE ELEVATION OF BORINGS & TEST PITS *

BORING #	NORTHING	EASTING	ELEVATION	DEPTH	TYPE	REMARKS
CH-1	882764.3	476573.4	1104.59	9'6"	TP ¹	
CH-2	883243.4	476576.0	1098.44	10'	TP	
CH-3	883749.9	476709.5	1104.95	10'	TP	
CH-4	882833.5	477085.2	1105.41	11'	TP	
CH-5	883828.9	477097.8	1107.05	11'	TP	
CH-6	882828.2	477588.3	1124.95	11'	TP	
CH-7	883481.6	477398.3	1110.85	11'6"	TP	
CH-8	882954.8	477550.2	1106.36	3'	TP	
CH-9	882941.5	477814.2	1123.2	44'	B ²	
CH-10	883916.2	477516.9	1108.5	10'	TP	
CH-11	883046.7	478136.4	1124.65	7'	TP	
CH-12	884160.0	478012.2	1103	10'	TP	
CH-13	883286.6	478676.7	1128.93	8'	TP	
CH-14	883881.1	478390.3	1110.49	9'6"	TP	
CH-15	884370.8	478430.0	1105.21	4'	TP	
CH-16	883464.6	479095.7	1130.47	39'	B	
CH-17	883446.6	479063.9	1131.68	7'	TP	
CH-18	883539.4	479360.6	1132.71	6'6"	TP	
CH-19	884620.8	478926.1	1113.41	10'	TP	
CH-20	883465.0	478815.9	1112.24	7'	TP	
CH-21	884273.4	479365.0	1113.8	8'	TP	
CH-22	884848.7	479358.2	1114.91	10'	TP	
CH-23	883909.6	479784.7	1116.46	7'	TP	
CH-24	885088.6	479791.2	1117.7	10'	TP	
CH-25	884101.9	480248.0	1118	7'	TP	
CH-26	884663.1	480240.5	1118.27	9'	TP	
CH-27				9'	TP	TO BE SURVEYED
CH-28	884248.7	480692.0	1121.71	10'	TP	
CH-29	885282.5	480838.7	1128.55	7'	TP	
CH-30	884322.7	481104.3	1122.86	10'	TP	
CH-31	884862.3	481207.8	1127.76	9'	TP	
CH-32	885428.2	481343.8	1128.44	10'	TP	
CH-33	884479.9	482044.0	1122.58	7'6"	TP	
CH-34	885496.7	481951.9	1128.92	9'	TP	
CH-35	885045.9	482184.4	1126.76	8'	TP	
CH-36	884577.8	482644.5	1125.71	9'	TP	
CH-37	885834.5	482514.8	1128.11	9'6"	TP	
CH-38	884675.7	483165.0	1128.77	7'	TP	
CH-39	885930.2	483006.7	1128.88	10'	TP	
CH-40				7'6"	TP	TO BE SURVEYED
CH-41	884764.7	483686.4	1131.51	8'6"	TP	
CH-42	885968.9	483294.1	1130.18	7'6"	TP	
CH-43	884856.8	484183.6	1133.06	9'	TP	
CH-44	885955.5	483794.3	1135.42	11'	TP	
CH-45	885390.6	484295.9	1135.02	8'	TP	
CH-46	-	-	-	-	-	NOT USED
CH-47	884965.4	484658.1	1132.38	8'	TP	
CH-48	886142.6	484434.2	1132.34	10'	TP	
CH-49	885057.1	485120.0	1129.09	8'6"	TP	
CH-50	-	-	-	-	-	NOT USED
CH-51	886206.1	484955.6	1130.65	9'6"	TP	
CH-52	885475.7	485024.4	1130.57	9'6"	TP	
CH-53	885128.1	485839.7	1147.65	29'	B	

*AS PROVIDED BY DMJM

1. TP - TEST PIT
2. B - TEST BORING



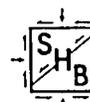
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LOCATION & SURFACE ELEVATION OF BORINGS & TEST PITS*

BORING #	NORTHING	EASTING	ELEVATION	DEPTH	TYPE	REMARKS
CH-54	886279.4	485463.7	1134.38	10'	TP	
CH-55	-	-	-	-	-	NOT USED
CH-56	886361.1	485961.0	1139.37	9'	TP	
CH-57	885304.3	486407.4	1131.73	8'	TP	
CH-58	885735.8	486182.6	1130.42	8'6"	TP	
CH-59	885311.6	486604.5	1135.96	7'6"	TP	
CH-60	886505.1	486453.8	1133	9'6"	TP	
CH-61	885237.5	486771.0	1139.57	39'	B	
CH-62	-	-	-	-	-	NOT USED
CH-63	886436.4	486795.0	1132.61	9'	TP	
CH-64	885898.9	487181.1	1127.48	9'	TP	
CH-65	885144.3	487133.5	1144.46	36'	B	
CH-66	-	-	-	-	-	NOT USED
CH-67	886405.5	487193.4	1135.95	10'	TP	
CH-68	885381.0	487494.6	1148.74	8'	TP	
CH-69	885311.6	487669.3	1149.11	6'	TP	
CH-70	886359.8	488098.9	1142.09	11'	TP	
CH-71	885295.7	487955.2	1148.54	6'	TP	
CH-72	885773.8	488092.9	1142.75	10'6"	TP	
CH-73	885235.4	488205.6	1148.54	5'	TP	
CH-74	885199.8	488354.5	1148.82	5'	TP	
CH-75	886196.5	488525.0	1142.52	10'6"	TP	
CH-76	885034.6	488719.7	1153.29	33'	B	
CH-77	885682.1	488314.3	1133.63	8'	TP	
CH-78	885597.4	486073.8	1131.77	6'6"	TP	
CH-79	885091.2	488900.1	1129.56	8'	TP	
CH-80	885079.2	489092.2	1127.85	7'	TP	
CH-81	885974.1	488971.4	1142.41	10'	TP	
CH-82	884640.9	489376.1	1154.86	8'	TP	
CH-83	885002.7	489353.4	1131.44	10'	TP	
CH-84	885532.5	489474.1	1132.34	11'	TP	
CH-85	885000.3	489458.9	1132.09	10'6"	TP	
CH-86	885019.3	489614.6	1127.54	5'6"	TP	
CH-87	884899.5	489611.3	1155.29	49'	B	
CH-88	886041.4	489656.4	1143.72	10'	TP	
CH-89	884964.7	489777.5	1128.63	7'	TP	
CH-90	884767.0	489662.5	1155.34	5'	TP	
CH-91	884864.9	490058.2	1133.71	10'	TP	
CH-92	884857.4	490234.5	1132.76	12'	TP	
CH-93	885880.8	490156.9	1140.86	10'	TP	
CH-94	885296.6	490436.2	1137.38	10'	TP	
CH-95	884857.9	490399.5	1137.54	7'	TP	
CH-96	884603.3	490427.2	1153.79	8'	TP	
CH-97	884854.2	490583.3	1142.38	7'	TP	
CH-98				30'6"	B	TO BE SURVEYED
CH-99	885924.5	491018.3	1141.76	10'	TP	
CH-100	884868.0	490781.9	1141.48	12'	TP	
CH-101	884635.5	490885.9	1143.02	6'6"	TP	
CH-102	884615.1	491217.3	1139.75	6'6"	TP	
CH-103	884864.6	491358.7	1138.17	7'	TP	
CH-104	885862.5	491630.7	1141.03	11'	TP	
CH-105	885318.7	491454.9	1135.59	9'	TP	
CH-106	884694.0	491422.7	1141.06	8'	TP	

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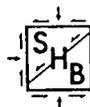
LOCATION & SURFACE ELEVATION OF BORINGS & TEST PITS*

BORING #	NORTHING	EASTING	ELEVATION	DEPTH	TYPE	REMARKS
CH-107	884607.1	491435.4	1142.17	29'	B	
CH-108	884836.6	491722.8	1140.29	8'	TP	
CH-109	884744.5	491797.2	1139.43	9'	TP	
CH-110	-	-	-	-	-	NOT USED
CH-111	883006.0	477696.8	1106.14	29'	B	
CH-112	-	-	-	-	-	NOT USED
CH-113	-	-	-	43'	B	TO BE SURVEYED
CH-114	884909.1	489386.6	1154.83	39'	B	
CH-115	884913.5	491556.9	1137.1	29'	B	
CH-116	882622.9	476622.5	1119.69	7'6"	TP	
CH-117	882704.4	477089.2	1120.12	12'	TP	
CH-118	882801.0	477361.4	1122.23	43'	B	
CH-119	883150.3	478365.6	1127.37	49'	B	
CH-120	882687.5	476757.6	1122.18	44'	B	
CH-121	883059.0	478079.2	1124.53	47'	B	
CH-122	882675.7	477050.2	1120.47	29'	B	
CH-123	883352.7	478764.6	1129.92	44'	B	
CH-124	883265.3	478580.7	1128.14	49'	B	
CH-125	883140.0	478163.0	1108.53	33'	B	
CH-126	882831.9	477137.9	1105.41	25'	B	
CH-127	883273.0	478466.9	1111	39'	B	
CH-128	883450.1	478832.3	1111.88	31'	B	
CH-129	883365.4	478517.8	1108.34	29'	B	
CH-130	883631.6	479228.3	1113.23	29'	B	
CH-131	885203.6	487560.1	1144.68	5'6"	TP	
CH-132	885247.6	488075.3	1148.62	5'	TP	
CH-133	884846.8	488551.5	1154.32	11'	TP	
CH-134	884810.9	490047.1	1155.1	49'	B	
CH-135	884808.0	490297.9	1156.51	29'	B	
CH-136	884512.1	490960.8	1141.63	3'	TP	
CH-137	884625.3	490928.3	1143	29'	B	
CH-138	-	-	-	17'	B	TO BE SURVEYED
CH-139	885390.5	487175.4	1133.82	29'	B	
CH-140	884893.6	490152.1	1131.74	39'	B	
CH-141	884890.5	490748.4	1133.28	39'	B	
CH-142	885019.8	489417.2	1130.54	49'	B	
CH-143	-	-	-	-	-	NOT USED
CH-144	885609.5	480701.2	1125.27	10'6"	TP	
CH-145	885759.7	481194.0	1128.13	9'6"	TP	
CH-146	884898.7	491061.8	1135.66	3'6"	TP	
CH-147	885263.6	486158.4	1129.05	26'	B	
CH-148	885295.7	486329.5	1130.22	29'	B	
CH-149	885134.8	485520.7	1129.41	8'6"	TP	
CH-150	885182.0	485771.1	1128.58	8'6"	TP	
CH-151	885247.7	486139.8	1128.77	10'	TP	
CH-152	885358.9	486144.9	1129.76	29'	B	
CH-153	885302.7	486070.8	1129.51	26'	B	
CH-154	885199.2	486218.8	1148.27	45'	B	
CH-155	885198.3	486214.9	1148.28	29'	B	
CH-156	-	-	-	-	-	NOT USED
CH-157	-	-	-	-	-	NOT USED
CH-158	-	-	-	-	-	NOT USED
CH-159	-	-	-	-	-	NOT USED

*AS PROVIDED BY DMJM

LOCATION & SURFACE ELEVATION OF BORINGS & TEST PITS *

BORING #	NORTHING	EASTING	ELEVATION	DEPTH	TYPE	REMARKS
CH-160	884526.6	492029.2	1148.66	8'6"	TF	
CH-161	884752.4	491828.8	1139.13	10'	TF	
CH-162	884763.2	491598.7	1138.51	7'6"	TF	
CH-163	884798.6	491303.2	1138.51	9'	TF	
CH-164	884904.4	491259.3	1132.02	8'	TF	



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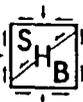
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TABULATION OF TEST RESULTS

Job No. EB7-56

HOLE NO	DEPTH	UNIFIED			SIEVE ANALYSIS-ACCUM % PASSING													LAB NO
		CLASS	L.L.	P.I.	#200 .75"	#100 1"	#50 1.5"	#40 2"	#30 2.5"	#16 3"	#10 3.5"	#8 4"	#4 6"	.25" 8"	.375" 10"	.5" 12"		
CH-2	0-5'	GW	NV	NP	0.7 41	1 47	2 57	3 66	7 84	18 92	23 100	24	28	28	32	35	7-56-409	
CH-5	0-5'	GP	NV	NP	2.6 65	7 71	16 80	23 84	30 87	40 100	46	48	51	53	57	60	7-56-405	
CH-7	0-4'	GP	NV	NP	0.9 54	2 60	4 68	7 76	14 91	30 100	36	37	40	41	45	48	7-56-411	
CH-7	5'-10'	GW	NV	NP	0.7 35	1 41	2 47	3 51	6 61	14 75	17	17	22	23	27	30	7-56-412	
CH-12	2'-8'	GW	NV	NP	0.9 42	2 47	5 53	8 61	11 75	17	21	22	26	27	32	36	7-56-413	
CH-14	0-5'	GP	NV	NP	1.3 57	3 64	7 76	11 80	16 93	25 100	28	29	34	38	44	49	7-56-798	
CH-19	2'-8'	GM	22	1	16 71	22 75	27 81	31 87	35 98	42 100	45	46	50	53	59	64	7-56-417	
CH-33	2'-4'	GP	NV	NP	3.0 34	5 38	8 43	10 45	12 56	18	20	22	24	26	28	31	7-56-428	
CH-34	6"-4'6"	SP	NV	NP	2.4	11	39	69	92								7-56-439	
CH-35	4'-6'	GP	NV	NP	0.6 28	1 33	2 40	3 46	5 57	11	14	15	18	19	21	24	7-56-429	
CH-38	4'-6'	SP	NV	NP	0.5 73	3 74	11 88	22 100	39	59	64	65	67	68	69	71	7-56-432	
CH-39	2'-10'	GW	NV	NP	0.9 40	1 45	3 59	.5 72	8 92	15 100	19	22	26	28	32	35	7-56-441	
CH-40	4'-6'	SP	NV	NP	1.3 92	7 100	32	50	65	80	83	84	85	86	88	89	7-56-430	



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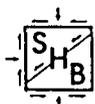
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SERGEANT, HAUSKINS & BECKWITH

TABULATION OF TEST RESULTS

Job No. EB7-56

HOLE NO	DEPTH	UNIFIED			SIEVE ANALYSIS-ACCUM % PASSING													LAB NO
		CLASS	L.L.	P.I.	#200	#100	#50	#40	#30	#16	#10	#8	#4	.25"	.375"	.5"		
					.75"	1"	1.5"	2"	2.5"	3"	3.5"	4"	6"	8"	10"	12"		
CH-43	0-2'	SP-SM	NV	NP	7.3 68	16 68	29 75	38 100	51	63	65	65	66	66	66	67	7-56-436	
CH-45	3'-5'	GP	NV	NP	2.0 57	4 62	12 72	20 82	28 95	38 100	43	44	46	48	50	53	7-56-433	
CH-51	0-9.5'	GM	NV	NP	0.7 40	1 46	3 53	6 60	9 68	16	21 83	22 100	27	29	32	36	7-56-444	
CH-52	2'-5'	GM	NV	NP	1.8 38	3 42	5 59	6 76	8 100	14	20	22	27	29	32	35	7-56-450	
CH-56	2.5'-5'	SP	NV	NP	0.9 96	2 96	11 98	35 100	66	89	91	92	93	93	94	94	7-56-446	
CH-60	4'-9.5'	SP	NV	NP	2.6 72	5 73	14 81	27 100	42	54	59	60	63	65	69	70	7-56-448	
CH-64	0-5'	GP	NV	NP	0.9 26	1 29	3 34	4 43	7	11	15 52	16	19 62	20 100	22	23	7-56-307	
CH-67	0-5'	SP	NV	NP	1.3 84	5 87	17 92	27 100	41	64	71	73	76	77	79	81	7-56-321	
CH-70	1'-5'	SP	NV	NP	3.2 93	13 95	36 96	49 100	62	77	82	84	87	88	89	91	7-56-801	
CH-77	0-5'	GP	NV	NP	0.5 45	1 56	4 67	7 87	10 92	14 100	18	19	24	27	32	37	7-56-311	
CH-81	0-4'	SM	NV	NP	17 75	33 80	46 87	51 100	54	59	62	63	65	66	69	71	7-56-327	
CH-81	5'-10'	SP-SM	NV	NP	7.5 96	17 98	34 100	49	65	83	86	87	89	90	92	93	7-56-328	



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SERGEANT, HAUSKINS & BECKWITH

TABULATION OF TEST RESULTS

Job No. EB7-56

HOLE NO	DEPTH	UNIFIED			SIEVE ANALYSIS-ACCUM % PASSING													LAB NO
		CLASS	L.L.	P.I.	#200 .75"	#100 1"	#50 1.5"	#40 2"	#30 2.5"	#16 3"	#10 3.5"	#8 4"	#4 6"	.25" 8"	.375" 10"	.5" 12"		
CH-94	0-5'	GP	NV	NP	0.4 39	1 49	3 62	7 81	11 89	18 100	20	20	23	24	27	31	7-56-315	
CH-94	5'-10'	GM	NV	NP	0.3 37	1 41	4 47	7 58	12	19	22 71	23 80	27 100	28	31	33	7-56-316	
CH-104	7'-10'	SP	NV	NP	1.5 74	3 80	7 89	12 95	20 100	36	43	46	55	59	64	69	7-56-802	
CH-160	0-6'	SM	NV	NP	45	72	91	95	97	99	99	100					7-56-438	
CH-164	0-8.5'	SP	NV	NP	2.1	19	70	89	95	99	99	99					7-56-437	



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R VALUE CALCULATION
ASTM D-2844

PROJECT: EAST PAPAGO/HOHOKAM
LOCATION: CH-14 @ 0-5'

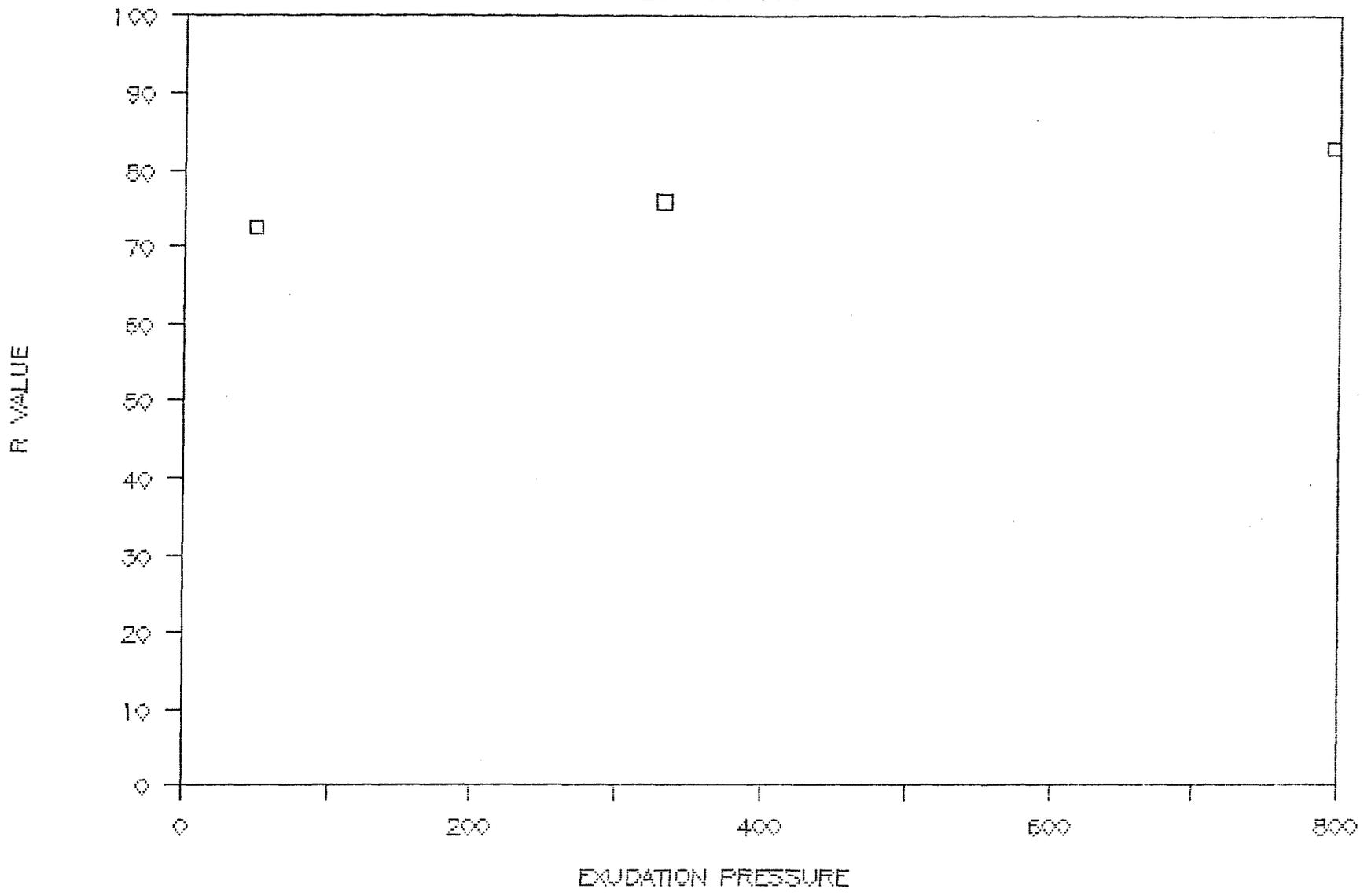
JOB NO. E87-56
W.O. NO. 20
LAB NO. 798
DATE 3/2/88

=====

SPECIMEN I. D.	A	B	C
Moisture Content	6.5%	6.8%	8.2%
Compaction Foot PSI	150	75	50
Specimen Height, inches	2.51	2.53	2.51
Dry Density, PCF	131.4	130.0	130.5
Ph @ 1000 lb	10	14	16
Ph @2000 lb	17	25	28
Displacement	4.30	4.27	4.47
Expansion Pressure PSI	0.0	0.0	0.0
Exudation Pressure PSI	796	331	49
R Value	83	76	73
R Value at 300 PSI =	75		

R VALUE

E87-56-798



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CONSULTING GEOTECHNICAL ENGINEERS

R VALUE CALCULATION
ASTM D-2844

JOB NO. E87-56

W.O. NO. 20

LAB NO. 800

DATE 3/2/88

PROJECT: EAST PAPAGO/HOHOKAM

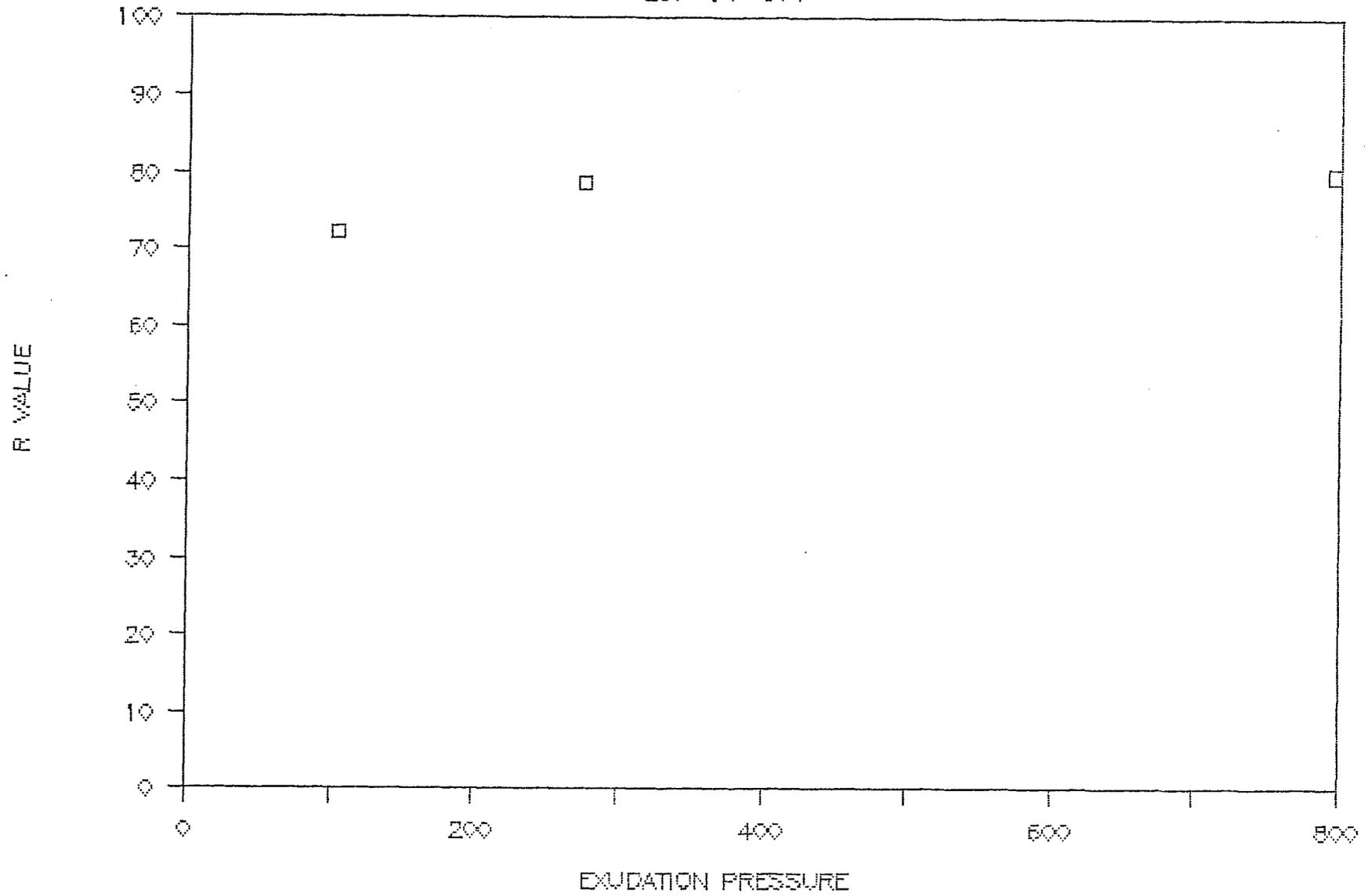
LOCATION: CH-43 @ 0'-2'

=====

SPECIMEN I. D.	A	B	C
Moisture Content	9.5%	11.3%	10.9%
Compaction Foot PSI	200	125	125
Specimen Height, inches	2.43	2.49	2.53
Dry Density, PCF	120.6	119.9	119.6
Ph @ 1000 lb	12	18	14
Ph @2000 lb	20	32	23
Displacement	4.12	3.84	4.01
Expansion Pressure PSI	0.0	0.0	0.0
Exudation Pressure PSI	796	103	275
R Value	80	72	79
R Value at 300 PSI =	79		

R VALUE

EB7-56-800



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CONSULTING GEOTECHNICAL ENGINEERS

R VALUE CALCULATION
ASTM D-2844

JOB NO. E87-56

W.O. NO. 20

LAB NO. 801

DATE 3/2/88

PROJECT: EAST PAPAGO/HOHOKAM

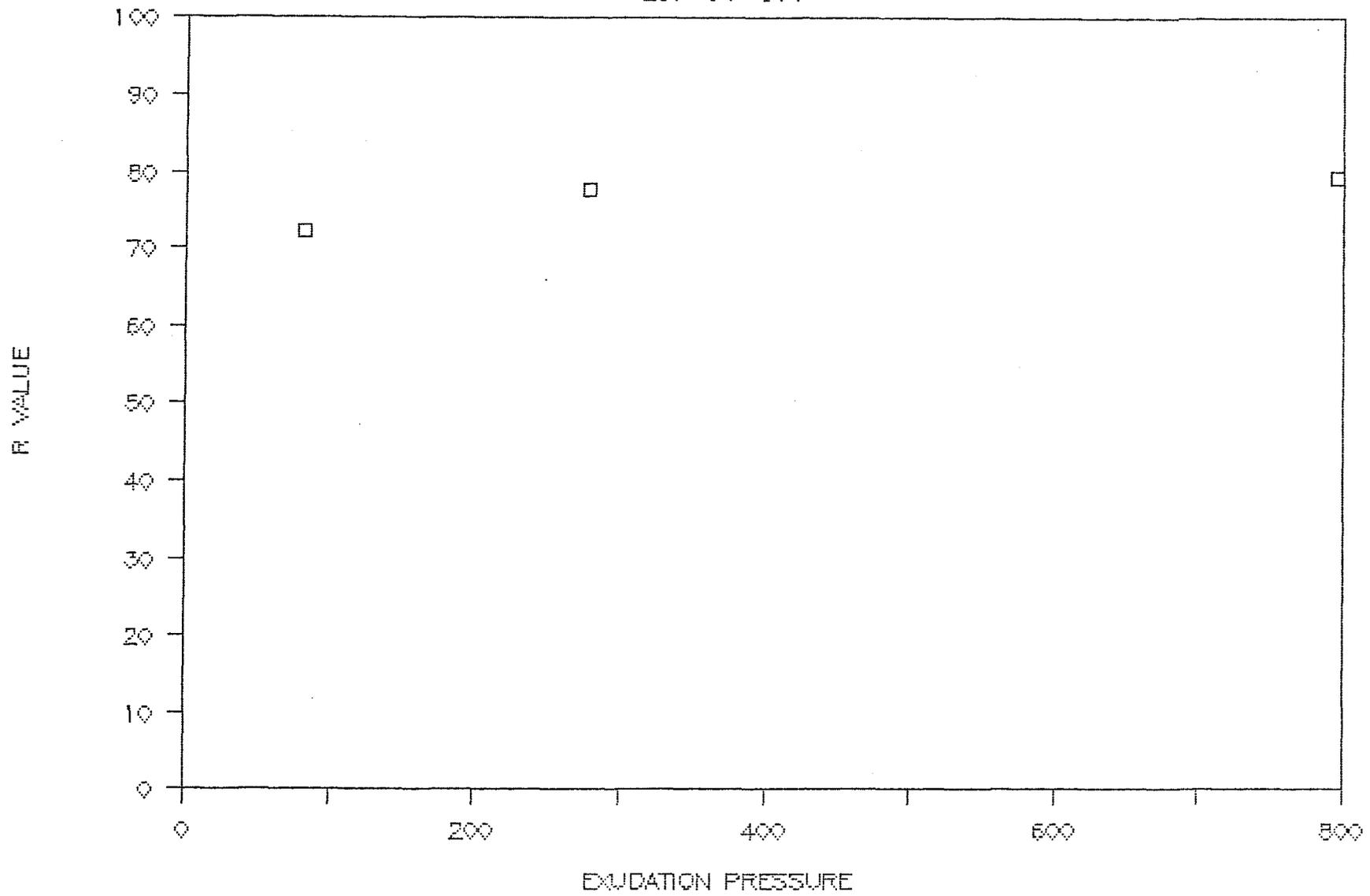
LOCATION: CH-70 @ 1'-5'

=====

SPECIMEN I. D.	A	B	C
Moisture Content	12.5%	11.0%	9.5%
Compaction Foot PSI	50	100	125
Specimen Height, inches	2.54	2.54	2.58
Dry Density, PCF	113.1	116.0	115.2
Ph @ 1000 lb	17	14	12
Ph @2000 lb	31	24	23
Displacement	4.00	4.04	4.23
Expansion Pressure PSI	0.0	0.0	0.0
Exudation Pressure PSI	81	278	796
R Value	72	78	79
R Value at 300 PSI =	78		

R VALUE

E87-56-801



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CONSULTING GEOTECHNICAL ENGINEERS

R VALUE CALCULATION
ASTM D-2844

JOB NO. E87-56

W.O.NO. 20

LAB NO. 802

DATE 3/2/88

PROJECT: EAST PAPAGO/HOHOKAM

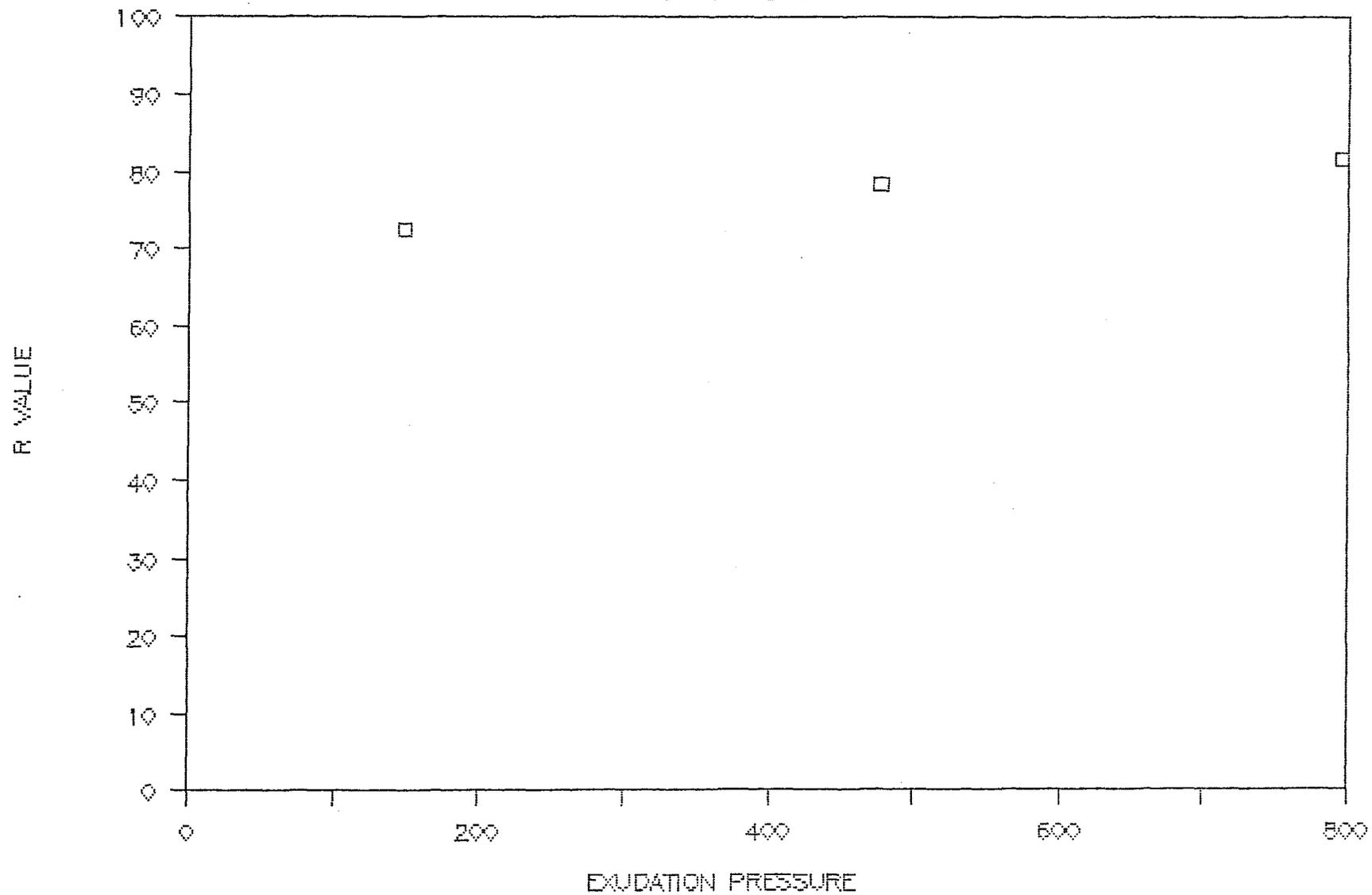
LOCATION: CH-104 @ 7'-10'

=====

SPECIMEN I. D.	A	B	C
Moisture Content	6.9%	8.5%	10.0%
Compaction Foot PSI	25	0	0
Specimen Height, inches	2.59	2.56	2.51
Dry Density, PCF	123.8	122.0	120.2
Ph @ 1000 lb	11	11	14
Ph @2000 lb	18	21	27
Displacement	4.87	4.86	4.67
Expansion Pressure PSI	0.0	0.0	0.0
Exudation Pressure PSI	796	477	148
R Value	82	78	73
R Value at 300 PSI =	76		

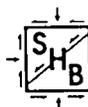
R VALUE

E87-56-802



SCS LABORATORY TEST RESULTS

ES40 Landfill



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LABORATORY TESTS - GAS SAMPLES

ES40 LANDFILL

SCS ANALYTICAL LABORATORY
2860 Walnut Avenue
Long Beach, CA 90806-1834
(213) 595-9324

MEMO

To: Mark Beizer

From: Curtis B. Jenkins

October 23, 1987

Job No.: 18694

Page 1 of 13

LABORATORY REPORT

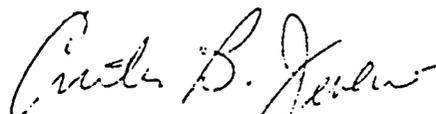
Samples: Seven (7) gas samples from Arizona Department of Transportation. Received 10/9/87, analyzed 10/17/87.

Sample ID (ES40)	CH ₄	CO ₂	N ₂	O ₂
	-----% v/v-----			
CH-9 9'/1624	55.1	35.1	7.8	3.0
CH-9 26'/1646	46.6	23.9	23.1	6.4
CH-16 12'/1599	33.6	14.1	42.8	9.5
CH-16 33'/1656	33.8	7.7	54.9	3.6
CH-122 4'/1649	53.2	40.2	6.3	0.3
CH-122 12'/1661	50.9	41.6	7.2	0.3
ES-40 Field Blank	0.0	2.3	76.3	21.4

See attached sheets for volatile organics.



David Mikesell
Chemist



Curtis B. Jenkins
Laboratory Director

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 2 of 13

Sample I.D.: CH-9 9'/1624
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropene	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
 Addendum Report, Volatile Organic Analysis
 Page 3 of 13

Sample I.D.: CH-9 26'/1646
 Date: 10/23/87
 Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
 ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 4 of 13

Sample I.D.: CH-16 12'/1599
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 5 of 13

Sample I.D.: CH-16 33'/1656
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 6 of 13

Sample I.D.: CH-122 4'/1649
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,1,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 7 of 13

Sample I.D.: CH-122 12'/1661
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 8 of 13

Sample I.D.: CH-9 9'/1624
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	540	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 9 of 13

Sample I.D.: CH-9 267/1646
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 10 of 13

Sample I.D.: CH-16 12'/1599
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 11 of 13

Sample I.D.: CH-16 33'/1656
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 12 of 13

Sample I.D.: CH-122 47/1649
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	1120	50
Chlorobenzene	6400	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, Volatile Organic Analysis
Page 13 of 13

Sample I.D.: CH-122 12'/1661
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	1630	50
Chlorobenzene	7300	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

LABORATORY TESTS - SOIL SAMPLES

ES40 LANDFILL

SOS ANALYTICAL LABORATORY
 2860 Walnut Avenue
 Long Beach, CA 90806-1864
 (213) 595-9324

MEMO:

To: Mark Beizer

From: Curtis B. Jenkins

October 14, 1987

Job No.: 16694

Page 1 of 4

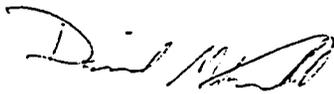
LABORATORY REPORT

Samples: Five (5) soil samples from Arizona Department of Transportation. Received 10/1/87, analyzed 10/14/87.

Sample ID (ES40)	pH	EC umhos/cm	Cl ⁻	Cd	Ni	Pb	Zn	Cu
-----mg/kg-----								
1603/ CH-122/178.6		270	36.2	<0.1	32.3	<1	42.4	9.3
1645/ CH-122/238.5		270	27.2	18.3	14.6	13.9	164	3.2
1602/CH-9/39'	8.6	400	39.9	<0.1	12.5	<1	19.8	19.0
1567/CH-9/44'	8.7	350	32.6	<0.1	11.2	<1	38.6	14.8
1676/CH-16/33'	8.4	390	63.4	14.7	20.4	27.3	84.8	22.0

Sample ID (ES40)	Hex. Chromium ---mg/kg---
1603/ CH-122	<0.5
1645/ CH-122	<0.5
1602/CH-9	<0.5
1567/CH-9	<0.5
1676/CH-16	<0.5

EPA 8080 (PCB's only) - see attached sheets.



David Mikesell
 Chemist



Curtis B. Jenkins
 Laboratory Director

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
Page 2 of 4

Sample I.D.: CH-122 (1603 & 1645)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
Page 3 of 4

Sample I.D.: CH-9 (1502 & 1567)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
Page 4 of 4

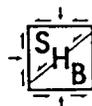
Sample I.D.: CH-16 (1676)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS LABORATORY TEST RESULTS

RS60 Landfill



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LABORATORY TESTS - GAS SAMPLES

RS60 LANDFILL

SCS ANALYTICAL LABORATORY
 2860 Walnut Avenue
 Long Beach, CA 90806-1834
 (213) 595-9324

MEMO

To: Mark Beizer

From: Curtis B. Jenkins

October 23, 1987

Job No.: 18694

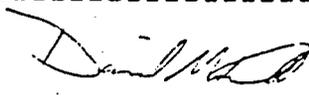
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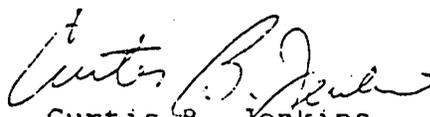
LABORATORY REPORT

Samples: Fifteen (15) gas samples from Arizona Department of Transportation. Received 10/9/87, analyzed 10/17/87.

Sample ID (RS-60)	CH ₄	CO ₂	N ₂	O ₂
	-----% v/v-----			
CH65-9'/1600	8.4	11.3	64.1	16.2
CH65-27'/1609	53.3	38.2	6.8	1.7
CH76-7'/1669	0.6	7.9	76.5	15.0
CH76-25'/1693	13.7	8.3	66.0	12.0
CH-135-3'/1681	2.8	9.9	72.9	14.4
CH-135-17'/1672	31.1	31.0	33.1	4.8
CH107-12'/1675	0.0	5.1	77.4	17.5
CH-137-7'/1673	20.4	37.0	41.9	0.7
CH-137-20'/1674	35.5	43.0	21.0	0.5
CH113-8'/1604	1.5	19.5	77.1	1.9
CH113-20'/1660	53.9	13.7	31.8	0.6
CH115-10'/1667	0.0	0.6	78.2	21.2
RS60/Field Blank/1668	0.3	4.4	77.2	18.1
CH114-8'/1662	48.0	37.3	14.2	0.5
CH114-25'/1663	23.0	25.1	46.4	5.5

See attached sheets for volatile organics.


 David Mikesell
 Chemist


 Curtis B. Jenkins
 Laboratory Director

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Sample I.D.: CH65-9/1600
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-Chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-Dichloroethane	ND	100
1,2-Dichloroethane	ND	100
1,1-Dichloroethene	ND	100
trans-1,2-Dichloroethene	ND	100
1,2-Dichloropropane	ND	100
cis-1,3-Dichloropropene	ND	100
trans-1,3-Dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-Tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-Trichloroethane	ND	10
1,1,2-Trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH65-27'/1609
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH76-25'/1693
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH-135-3'/1681
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	470	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH-135-17/1672
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH-137-7'/1673
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH-137-20'/1674
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH113-87/1604
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	30	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH113-20//1660
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	260	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: RS60-Field Blank
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH114-8'/1662
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH114-25'/1663
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Bromomethane	ND	100
Bromodichloromethane	ND	10
Bromoform	ND	10
Carbon Tetrachloride	ND	10
Chlorobenzene	ND	50
Chloroethane	ND	100
2-chloroethylvinyl ether	ND	100
Chloroform	ND	10
Chloromethane	ND	100
Dibromochloromethane	ND	10
1,2-dichlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50
Dichlorodifluoromethane	ND	100
1,1-dichloroethane	ND	100
1,2-dichloroethane	ND	100
1,1-dichloroethene	ND	100
trans-1,2-dichloroethene	ND	100
1,2-dichloropropane	ND	100
cis-1,3-dichloropropene	ND	100
trans-1,3-dichloropropene	ND	100
Methylene Chloride	ND	100
1,1,2,2-tetrachloroethane	ND	50
Tetrachloroethene	ND	10
1,1,1-trichloroethane	ND	10
1,1,2-trichloroethane	ND	100
Trichloroethene	ND	10
Trichlorofluoromethane	ND	100
Vinyl Chloride	ND	100

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH65-9'/1600
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH65-27'/1609
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH76-257/1693
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH-135-3'/1681
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	1520	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	1220	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH-135-17//1672
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH-137-77/1673
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH-137-20/1674
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	110	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH113-87/1604
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH113-20//1660
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: RS-60/Field Blank
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH114-87/1662
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

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Sample I.D.: CH114-25/1663
Date: 10/23/87
Matrix: Gas

Compound	Result	D.L. ppm v/v
Benzene	ND	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Toluene	ND	50
Xylenes	ND	50
1,2-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50

D.L. = Detection Limit
ND = Not Detected

LABORATORY TESTS - SOIL SAMPLES

RS60 LANDFILL

SCS ANALYTICAL LABORATORY
 2860 Walnut Avenue
 Long Beach, CA 90806-1834
 (213) 595-9324

MEMO

To: Mark Beizer

From: Curtis B. Jenkins

October 14, 1987

Job No.: 18694

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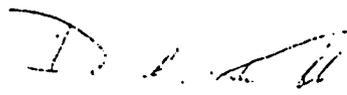
LABORATORY REPORT

Samples: Seven (7) soil samples from Arizona Department of Transportation. Received 10/1/87, analyzed 10/14/87.

Sample ID (RS60)	pH	EC umhos/cm	Cl ⁻	Cd	Ni mg/kg	Pb	Zn	Cu
1568/CH-135/23'	8.0	490	72.5	<0.1	2.2	12.3	48.6	14.8
1573/CH-135/27'	8.0	260	38.1	<0.1	6.4	5.5	39.1	13.9
1572/CH-137/24'	8.1	290	25.4	4.7	13.1	9.4	77.6	9.2
1575/CH-137/21'	8.2	260	25.4	6.0	13.5	8.2	60.6	9.7
1576/CH-115/5'	8.6	210	15.4	<0.1	17.0	22.2	35.2	10.9
1565/CH-107/27'	8.2	280	38.1	<0.1	12.9	<1	24.1	9.8
1658/CH-135/23'	8.2	290	11.8	7.9	18.3	12.9	38.8	6.9

Sample ID (RS60)	Hex. Chromium ---mg/kg---
1568/CH-135	<0.5
1573/CH-135	<0.5
1572/CH-137	<0.5
1575/CH-137	<0.5
1576/CH-115	<0.5
1565/CH-107	<0.5
1658/CH-135	<0.5

EPA 8080 (PCB's only) - see attached sheets.



David Mikesell
 Chemist



Curtis B. Jenkins
 Laboratory Director

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
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Sample I.D.: CH-135 (1568 & 1573)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
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Sample I.D.: CH-1374 (1572 & 1575)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
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Sample I.D.: CH-115 (1576)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
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Sample I.D.: CH-107 (1565)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
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Sample I.D.: CH-135 (1658)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
2860 Walnut Avenue
Long Beach, CA 90806-1834
(213) 595-9324

MEMO

To: Mark Beizer

From: Curtis B. Jenkins

October 14, 1987

Job No.: 18694

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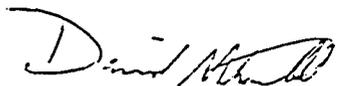
LABORATORY REPORT

Samples: Seven (7) soil samples from Arizona Department of Transportation. Received 9/29/87, analyzed 10/13/87.

Sample ID (RS60)	pH	EC umhos/cm	Cl ⁻	Cd	Ni	Pb	Zn	Cu
1589	11.9	1750	16.3	<0.1	11.2	8.8	26.8	3.6
1593/1'	8.4	340	18.1	<0.1	2.8	4.0	7.6	2.4
1592/5'	11.3	790	32.6	<0.1	9.9	4.5	16.8	7.8
0066/5'	8.1	440	48.9	0.49	10.1	9.9	28.5	16.6
1590/5'	11.9	1560	10.0	<0.1	7.2	<1	25.1	4.1
1562/5'	7.3	370	29.9	<0.1	10.3	5.9	38.7	9.7
1557/1'	8.4	310	22.7	0.68	6.4	4.3	17.9	1.7

Sample ID (RS60)	Hex. Chromium ---mg/kg---
1589	<0.5
1593/1'	<0.5
1592/5'	<0.5
0066/5'	<0.5
1590/5'	<0.5
1562/5'	<0.5
1557/1'	<0.5

EPA 8080 (PCB's only) - see attached sheets.



David Mikesell
Chemist



Curtis B. Jenkins
Laboratory Director

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
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Sample I.D.: CH 114 (1592 & 1593)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
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Sample I.D.: CH 76 (1589 & 1590)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
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Sample I.D.: CH 65 (1562 & 1557)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
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Sample I.D.: CH 113 (0066)
Date: 10/14/87
Matrix: Soil

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

WATER SAMPLING RECORD

Project Name East Papago - Hohokam Date October 12, 1987
 SHB Job No. E87-56 Weather Partly cloudy
 Well No. CH-87 Temp. 85° - 90° F
 Location Rio Salado Landfill Field Obs. Rich Bansberg
 Static Water Level 33.80 Feet M.F. Top of steel casing (1.0')

Well Information

Total Depth 49 Feet Screened Interval(s) 19' - 49'
 Casing Size/Type 2" Stainless steel (+1' to 19'); SCH 90 PVC Screen (19' - 49')
 Well Development Tried air surge development on 10-9-87, but water would not blow out top of well. 10-12-87 Started pumping at 11:03 a.m., pumping at about 1 P.M.

Remarks Water cleared up after approximately 1/2 hour.

Field Measurements

Time	Temp. °C	Salinity ppt	pH	Alkalinity mg/l CaCO ₃ at pH 4.8	Specific Conductance umhos	Comments
11:15am	28	1/4	6.96	--	420	v. cloudy
11:45am	25	1/4	6.90	--	750	clear
12:10pm	26	1/4	6.92	--	790	clear
12:45pm	26 1/2	1/4	6.92	--	750	clear
1:00pm	25 1/2	1/4	6.93	--	800	clear

Sample Collection

Method of Sampling ISCO Gas Pump Sampling Depth 44 Feet
 Time of Sampling 1:50pm to 1:55pm

Determination	Container Size/Type	Preservation	Filtered	Other
Metals	IL/Plastic	From lab	No	--
601/602	40ml/glass	--	No	Teflon Membrane
601/602	40ml/glass	--	No	Teflon Membrane
601/602	40ml/glass	--	No	Teflon Membrane
Cyanide	IL/Plastic	--	No	Amber

Lab Shipped to SCS Date Shipped October 12, 1987
 Method of Shipment Hand delivered
 Comments _____

WATER SAMPLING RECORD

Project Name East Papago - Hohokam Date October 12, 1987
 SHB Job No. E87-56 Weather Cloudy
 Well No. CH-61 Temp. about 90° F
 Location Rio Salado Landfill Field Obs. Rich Bansberg
 Static Water Level 25.07' M.F. Top of Steel Casing (1.95')

Well Information

Total Depth 39 Feet Screened Interval(s) 19' to 39'
 Casing Size/Type 2" Stainless Steel to 19', SCH 90 PVC Screen 19' to 39'
 Well Development Tried air surge development on 10-9-87, but water would not
blow out top of well. 10-12-87 Started pumping at 1:25pm, pumping at about 1 gpm.

Remarks

Field Measurements

Time	Temp. °C	Salinity ppt	pH	Alkalinity mg/l CaCO ₃ at pH 4.8	Specific Conductance umhos	COMMENTS
1:40pm	26½	1/4	6.80	--	590	v. cloudy
2:10pm	27	1/4	6.91	--	610	sl. cloudy
2:40pm	27	1/4	6.88	--	620	clear
3:05pm	27	1/4	6.90	--	610	clear

Sample Collection

Method of Sampling gas pump Sampling Depth 34 Feet
 Time of Sampling 2:55pm - 3:00pm

Determination	Container Size/Type	Preservation	Filtered	Other
Metals	IL/Plastic	From Lab	No	--
601/602	40ml/Glass	--	No	Teflon Membrane
601/602	40ml/Glass	--	No	Teflon Membrane
601/602	40ml/Glass	--	No	Teflon Membrane
Cyanide	IL/Glass	--	No	Amber

Lab Shipped to SCS Date Shipped 10-12-87
 Method of Shipment Hand Delivered
 Comments _____

LABORATORY TESTS - WATER SAMPLES

RS60 LANDFILL

SCS ANALYTICAL LABORATORY
 2860 Walnut Avenue
 Long Beach, CA 90806-1834
 (213) 595-9324

MEMO

To: Mark Beizer

From: Curtis B. Jenkins

October 30, 1987

Job No.: 18694

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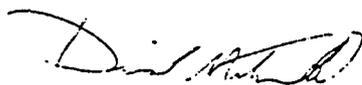
LABORATORY REPORT

Samples: Ten (10) water samples from Arizona Department of Transportation. Received 10/13/87, analyzed 10/26/87.

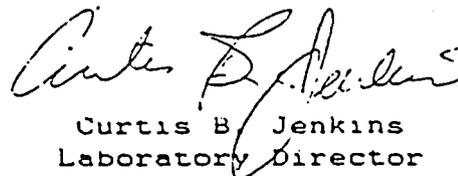
Sample ID	As	Ba	Cd	Cr	Pb	Hg	Se
	-----mg/L-----						
18694/401	1.9	<0.5	<0.03	<0.05	<0.5	<0.02	1.68
CH61-18694 /402	0.25	<0.5	<0.03	<0.05	<0.5	<0.02	0.62

Sample ID	Ag	CN ⁻
	-----mg/L-----	
18694/401	<0.06	1.57
CH-61/18694	<0.06	2.35

EPA 601 and EPA 602 - see attached sheets.



David Mikesell
 Chemist



Curtis B. Jenkins
 Laboratory Director

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 601
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Sample I.D.: 18694/320
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Bromomethane	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Carbon Tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
2-Chloroethylvinyl Ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
trans-1,2-Dichloroethene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Methylene Chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	1.5	1
Trichlorofluoromethane	ND	1
Vinyl Chloride	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 601
Page 3 of 13

Sample I.D.: 18694/327
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Bromomethane	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Carbon Tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
2-Chloroethylvinyl Ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
trans-1,2-Dichloroethene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Methylene Chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl Chloride	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 601
Page 4 of 13

Sample I.D.: 18694/321
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Bromomethane	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Carbon Tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
2-Chloroethylvinyl Ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
trans-1,2-Dichloroethene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Methylene Chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl Chloride	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 601
Page 5 of 13

Sample I.D.: CH-61-18694/323
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Bromomethane	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Carbon Tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
2-Chloroethylvinyl Ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
trans-1,2-Dichloroethene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Methylene Chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl Chloride	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 601
Page 6 of 13

Sample I.D.: CH-61-18694/325
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Bromomethane	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Carbon Tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
2-Chloroethylvinyl Ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
trans-1,2-Dichloroethene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Methylene Chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl Chloride	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 601
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Sample I.D.: CH-61-18694/326
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Bromomethane	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Carbon Tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1
2-Chloroethylvinyl Ether	ND	1
Chloroform	ND	1
Chloromethane	ND	1
Dibromochloromethane	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1
1,1-Dichloroethane	ND	1
1,2-Dichloroethane	ND	1
1,1-Dichloroethene	ND	1
trans-1,2-Dichloroethene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Methylene Chloride	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	1
Vinyl Chloride	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 602
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Sample I.D.: 18694/320
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Benzene	ND	0.7
Chlorobenzene	ND	1
Ethylbenzene	ND	1
Toluene	ND	1
Xylenes	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1

D.L. = Detection Limit
ND = Not Detected

SOS ANALYTICAL LABORATORY
Addendum Report, EPA 602
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Sample I.D.: 18694/327
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Benzene	ND	0.7
Chlorobenzene	ND	1
Ethylbenzene	ND	1
Toluene	ND	1
Xylenes	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1

D.L. = Detection Limit
ND = Not Detected

SUS ANALYTICAL LABORATORY
Addendum Report, EPA 602
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Sample I.D.: 18694/321
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Benzene	ND	0.7
Chlorobenzene	ND	1
Ethylbenzene	ND	1
Toluene	ND	1
Xylenes	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 602
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Sample I.D.: CH-61-18694/323
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Benzene	ND	0.7
Chlorobenzene	ND	1
Ethylbenzene	ND	1
Toluene	ND	1
Xylenes	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 602
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Sample I.D.: CH-61-18694/325
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Benzene	ND	0.7
Chlorobenzene	ND	1
Ethylbenzene	ND	1
Toluene	ND	1
Xylenes	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 602
Page 13 of 13

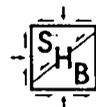
Sample I.D.: CH-61-18694/326
Date: 10/30/87
Matrix: Water

Compound	Result	D.L. ug/l
Benzene	ND	0.7
Chlorobenzene	ND	1
Ethylbenzene	ND	1
Toluene	ND	1
Xylenes	ND	1
1,2-Dichlorobenzene	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1

D.L. = Detection Limit
ND = Not Detected

SCS LABORATORY TEST RESULTS

SRP56 Landfill



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CONSULTING GEOTECHNICAL ENGINEERS
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LABORATORY TESTS - SOIL SAMPLES

SRP56 LANDFILL

SCS ANALYTICAL LABORATORY
 2860 Walnut Avenue
 Long Beach, CA 90806-1834
 (213) 595-9324

MEMO

To: Mark Beizer

From: Curtis B. Jenkins

December 8, 1987

Job No.: 18694

Page 1 of 3

LABORATORY REPORT

Samples: Four (4) soil samples from Arizona Department of Transportation. Received 11/20/87, analyzed 12/7/87.

Sample ID (SRP-56)	Cl ⁻	Cd	Ni	Pb	Zn	Cu
	-----mg/kg-----					
CH153-15'/1654	9.6	<0.1	12.7	<1	26.0	<0.2
CH153-25'/1605	15.0	<0.1	15.9	<1	23.6	6.5
CH155-15'/1607	16.0	<0.1	7.8	7.8	93.7	52.3
CH153-25'/1606	14.5	<0.1	9.2	<1	58.6	18.8

Sample ID (SRP-56)	Cr ⁺⁶ mg/kg	EC umhos/cm	pH
CH153-15'/1654	<0.5	140	8.8
CH153-25'/1605	<0.5	130	9.0
CH155-15'/1607	<0.5	180	8.4
CH155-25'/1606	<0.5	120	8.9

See attached sheets for PCB's.

David Mikesell
 David Mikesell
 Chemist

Curtis B. Jenkins
 Curtis B. Jenkins
 Laboratory Director

SCS ANALYTICAL LABORATORY
Addendum Report, EPA 8080
Page 2 of 3

Sample I.D.: CH153 Composite (SRP-56)
Date: 12/8/87
Matrix: Soil
Project #: 18694
File #: sdot8.rep29

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

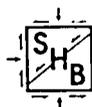
SCS ANALYTICAL LABORATORY
Addendum Report. EPA 8080
Page 3 of 3

Sample I.D.: CH155 Composite (SRP-56)
Date: 12/8/87
Matrix: Soil
Project #: 18694
File #: adot8.rep29

Compound	Result	D.L. mg/kg
PCB-1016	ND	1
PCB-1221	ND	1
PCB-1232	ND	1
PCB-1242	ND	1
PCB-1248	ND	1
PCB-1254	ND	1
PCB-1260	ND	1

D.L. = Detection Limit
ND = Not Detected

CHAIN OF CUSTODY RECORDS FOR
GAS, SOIL & WATER SAMPLES



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CHAIN OF CUSTODY RECORD



SCS ENGINEERS

4014 Long Beach Blvd
Long Beach, CA
90807

(213) 428 9544

PERSONNEL

SITE INFORMATION

Sampler (Signature) Steve Felt
 Phone (213) 426-9544
 Field Crew Supervisor _____
 Field Company _____
 Project Geologist/Engineer ZIEGLER/STEINISLUYER

Job Name ADDT
 Job Number 18694
 Sample Location RS-60
 P.O. Number _____

Relinquished by (Signature) <u>Steve Felt</u>	Received by (Signature) <u>Arthur B. ...</u>	Date <u>10/9/87</u>	Time <u>10:00</u>
Relinquished by (Signature) _____	Received by (Signature) _____	Date _____	Time _____

Analysis laboratory should complete "sample cond. upon receipt" section below, sign, and return copy to Shipper

Sample Number	Sample Type	No. of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
1600	GAS	1	CH-65 9FT	10/6/87	MAJORS E	
1609	GAS	1	CH-65 21FT	10/6	VO. ATIVE ORGANICS	
1669		1	CH-76 7FT	10/6		
1653		1	CH-76 25FT	10/6		
1681		1	CH-98A 3FT	10/6		
1672		1	CH-98A 17FT	10/6		
1675		1	CH-107 12FT	10/7 (OIE PROBE)		
1673		1	CH-107A 7FT	10/7		
1674		1	CH-107A 20FT	10/7		
1604		1	CH-113 8FT	10/7		
1660		1	CH-113 20FT	10/7		
1667		1	CH-115 10FT	10/7 (OIE PROBE)		
1668		1	RS-60 FIELD BLANK	10/6		
1662		1	CH-114 8FT	10/8		
1663		1	CH-114 25FT	10/8		

Remarks: _____

CHAIN OF CUSTODY RECORD



SCS ENGINEERS

4014 Long Beach Blvd
Long Beach, CA
90807
(213) 428-9544

PERSONNEL

SITE INFORMATION

Sampler (Signature) Richard Benders
Phone _____

Job Name AIXT
Job Number 18694 CO
Sample Location CH-87 site RS-60

Field Crew Supervisor _____

Field Company _____

Project Geologist/Engineer _____

P.O. Number _____

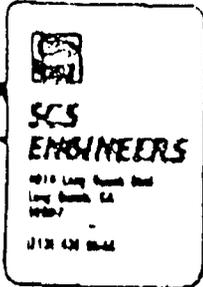
Relinquished by (Signature) <u>[Signature]</u>	Received by (Signature) <u>[Signature]</u>	Date <u>10-13-87</u>	Time <u>0815</u>
Relinquished by (Signature)	Received by (Signature)	Date	Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign, and return copy to Shipper

Sample Number	Sample Type	No. of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
<u>320</u>	<u>GW</u>	<u>1</u>	<u>18694</u>	<u>10-12</u>	<u>601/602 ✓</u>	<u>601/602</u>
<u>327</u>	<u>GW</u>	<u>1</u>	<u>18694</u>	<u>10-12</u>	<u>601/602 A</u>	<u>601/602</u>
<u>321</u>	<u>GW</u>	<u>1</u>	<u>18694</u>	<u>10-12</u>	<u>601/602 A</u>	<u>601/602</u>
<u>324</u>	<u>GW</u>	<u>1</u>	<u>18694</u>	<u>10-12</u>	<u>Total Cyanide ✓</u>	<u>601/602</u>
<u>401</u>	<u>GW</u>	<u>1</u>	<u>18694</u>	<u>10-12</u>	<u>RCRA Metals ✓</u>	<u>601/602</u>
<u>1111</u>	<u>11</u>	<u>1111</u>	<u>1111</u>	<u>11</u>	<u>111111</u>	<u>601/602</u>
<u>323</u>	<u>GW</u>	<u>1</u>	<u>CH-61-18694</u>	<u>10-12</u>	<u>601/602 ✓</u>	<u>601/602</u>
<u>325</u>	<u>GW</u>	<u>1</u>	<u>CH-61-18694</u>	<u>10-12</u>	<u>601/602 A</u>	<u>601/602</u>
<u>326</u>	<u>GW</u>	<u>1</u>	<u>CH-61-18694</u>	<u>10-12</u>	<u>601/602 * ✓</u>	<u>601/602</u>
<u>402</u>	<u>GW</u>	<u>1</u>	<u>CH-61-18694</u>	<u>10-12</u>	<u>RCRA Metals ✓</u>	<u>601/602</u>
<u>322</u>	<u>GW</u>	<u>1</u>	<u>CH-61-18694</u>	<u>10-12</u>	<u>Total Cyanide ✓</u>	<u>601/602</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Remarks: _____

CHAIN OF CUSTODY RECORD



PERSONNEL

SITE INFORMATION

Sampler (Signature) Michael Wiese
 Phone (713) 435-8749
 Field Crew Supervisor _____
 Field Company _____
 Project Geologist/Engineer RICHARD SHIB
(C.A.P.D.), 2107

Job Name ADOT
 Job Number 18694.00
 Sample Location ES40
 P.O. Number _____

Relinquished by (Signature) <u>Mike Kelly</u>	Received by (Signature) <u>[Signature]</u>	Date <u>10-1</u>	Time <u>1330</u>
Relinquished by (Signature)	Received by (Signature)	Date	Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign, and return copy to Shipper

Sample Number	Sample Type	No. of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
<u>1663</u>	<u>SOIL</u>	<u>1</u>	<u>ES40 CH11A</u>	<u>9-30</u>		
<u>1645</u>	<u>SOIL</u>	<u>1</u>	<u>ES40 CH11A</u>	<u>9-30</u>		
<u>1602</u>	<u>S.L.</u>	<u>1</u>	<u>ES40 CH9 #1</u>	<u>9-30</u>		
<u>1567</u>	<u>SOIL</u>	<u>1</u>	<u>ES40 CH9 #2</u>	<u>9-30</u>		
<u>1676</u>	<u>SOIL</u>	<u>1</u>	<u>ES40 2416</u>	<u>9-30</u>		

Remarks: _____

CHAIN OF CUSTODY RECORD



PERSONNEL

SITE INFORMATION

Sampler (Signature) Steve King
 Phone (213) 426-6149
 Field Crew Supervisor _____
 Field Company _____
 Project Geologist/Engineer RICHARD (SHR) FACIPIER D.O. Number _____

Job Name ADOT
 Job Number 186-94
 Sample Location R6-60

Relinquished by (Signature) <u>Steve King</u>	Received by (Signature) <u>11/6</u>	Date <u>11-1</u>	Time <u>12:30</u>
Relinquished by (Signature)	Received by (Signature)	Date	Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign, and return copy to Shipper

Sample Number	Sample Type	No. of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
<u>1568</u>	<u>SOIL</u>	<u>1</u>	<u>S.S. R5-60 CH-98A</u>	<u>9/28/87</u>	<u>(1 FT BELOW REFUSE)</u>	
<u>1573</u>	<u>SOIL</u>	<u>1</u>	<u>S.S. " "</u>	<u>9/28/87</u>	<u>(5 FT " ")</u>	
<u>1572</u>	<u>SOIL</u>	<u>1</u>	<u>" CH-107A</u>	<u>9/28/87</u>	<u>(1 FT BELOW R</u>	
<u>1575</u>	<u>SOIL</u>	<u>1</u>	<u>" "</u>	<u>9/28</u>	<u>(5 FT BELOW REFUSE)</u>	
<u>1576</u>	<u>SOIL</u>	<u>1</u>	<u>" CH-115</u>	<u>9/28</u>	<u>(1 FT BELOW REFUSE)</u>	
<u>1565</u>	<u>SOIL</u>	<u>1</u>	<u>" CH-107A</u>	<u>9/28</u>	<u>(5 FT BELOW REFUSE)</u>	
<u>1658</u>	<u>SOIL</u>	<u>1</u>	<u>" CH-98A</u>	<u>9/28</u>	<u>(5 FT BELOW REFUSE)</u>	

Remarks: _____

* S.S. INDICATES SPLIT SPECIM SAMPLE.

CHAIN OF CUSTODY RECORD



PERSONNEL

SITE INFORMATION

Sampler (Signature) [Signature]
 Phone _____
 Field Crew Supervisor _____
 Field Company _____
 Project Geologist/Engineer WRIC-09

Job Name ADOH
 Job Number 156-9400
 Sample Location SR60
 P.O. Number _____

Relinquished by (Signature) <u>[Signature]</u>	Received by (Signature) <u>[Signature]</u>	Date <u>9-29-97</u>	Time <u>11:00</u>
Relinquished by (Signature) _____	Received by (Signature) _____	Date _____	Time _____

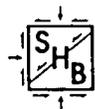
Analysis laboratory should complete "sample cond. upon receipt" section below, sign, and return copy to Shipper

Sample Number	Sample Type	No. of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
1591	Soil	1	RS 60	9-25	CH76	OK
1593	Soil	1	RS60-1'	9-24	CH114	OK
1592	Soil	1	RS60-5'	9-24	CH114	OK
1594	Soil	1	RS60-5'	9-24	CH113	OK
1590	Soil	1	RS60-5'	9-24	CH76	OK
1562	Soil	1	RS60-5'	9-24	CH65	OK
1557	Soil	1	RS60-5'	9-24	CH65	OK

Remarks: _____

SHB LABORATORY TEST RESULTS

Rock Cores - SRP Corporate Headquarters Site



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SERGEANT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

JOB NO. E87-56
W.O. No. 18
DATE 2/17/88

PROJECT: EAST PAPAGO/HOHOKAM/SKY HARBOR FREEWAYS
SOURCE: WCC-9 (52.9'-57.2') RUN 9

=====

SPECIFIC GRAVITY REPORT

SPECIFIC GRAVITY OF ROCK CORE

WEIGHT O.D IN AIR	2015.6
WEIGHT SSD IN AIR	2125.6
WEIGHT IN WATER	1327.0
BULK SF GR SSD	2.662
BULK SF GR	2.524
APPARENT SF GR	2.927
ABBSORPTION	5.46

SERGEANT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

JOB NO. E87-56
W.O. No. 18
DATE 2/17/88

PROJECT: EAST PAPAGO/HOHOKAM/SKY HARBOR FREEWAYS
SOURCE: WCC-11 (35'-40') RUN 8

=====

SPECIFIC GRAVITY REPORT

SPECIFIC GRAVITY OF ROCK CORE

WEIGHT O.D IN AIR	1655.8
WEIGHT SSD IN AIR	1736.7
WEIGHT IN WATER	1045.4
BULK SP GR SSD	2.512
BULK SP GR	2.395
APPARENT SP GR	2.713
ABBSORPTION	4.89

SERGEANT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS

JOB NO. E87-56
W.O. No. 18
DATE 2/17/88

PROJECT: EAST PAPAGO/HOHOKAM/SKY HARBOR FREEWAYS
SOURCE: WCC-13 (30'-35') RUN 7

=====

SPECIFIC GRAVITY REPORT

SPECIFIC GRAVITY OF ROCK CORE

WEIGHT O.D IN AIR	1197.4

WEIGHT SSD IN AIR	1272.6

WEIGHT IN WATER	775.5

BULK SP GR SSD	2.560
BULK SP GR	2.409
APPARENT SP GR	2.838
ABBSORPTION	6.28

SERGEANT, HAUSKINS & BECKWITH

POINT LOAD INDEX TEST

JOB NO E87-56
 DATE 2/10/88
 W.O. NO. 18

PROJECT EAST PAPAGO/HOHOKAM
 LOCATION

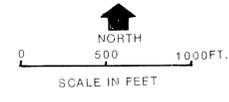
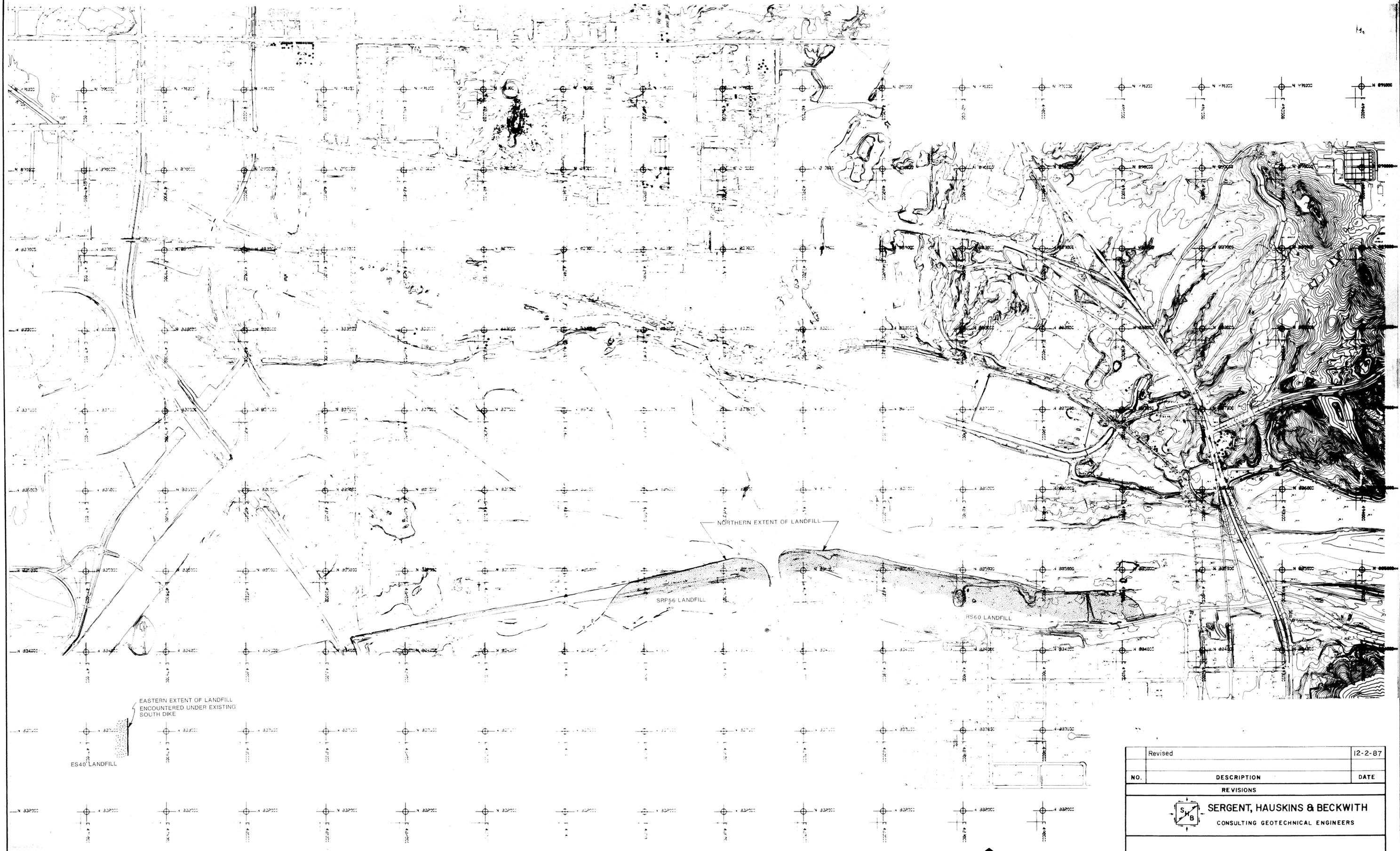
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TYPE OF TEST: DIAMETRAL

LAB NO	BORING NO	DEPTH	D (CM)	L (CM)	P (LB)	T * (PSI)	C ** (PSI)
680	WCC-6	44'	6.100	7.750	740	212	2649
681	WCC-9	54'	4.500	5.735	600	271	3390
682	WCC-11	39.5'	5.240	5.700	500	180	2248
683	WCC-13	31'	6.100	6.335	140	40	501
684	WCC-15	32.5'	6.100	7.305	580	166	2076

* AFTER: INTERNATIONAL SOCIETY OF ROCK MECHANICS,
 DOC NO. 1, OCTOBER, 1972

**AFTER: INTERNATIONAL JOURNAL OF ROCK MECHANICS &
 MINING SCIENCES, VOL. 17, NO. 4, AUGUST, 1980



Revised						12-2-87
NO.	DESCRIPTION					DATE
REVISIONS						
SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS						
LANDFILL BOUNDARIES						
JOB NO.	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	SHEET NO	
E87-56	3-88	A.H.	CAW	A.H.	1	



E 476,000

E 477,000

E 478,000

E 480,000

E 481,000

N 883,000

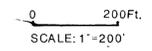
N 882,000

N 881,000

LEGEND

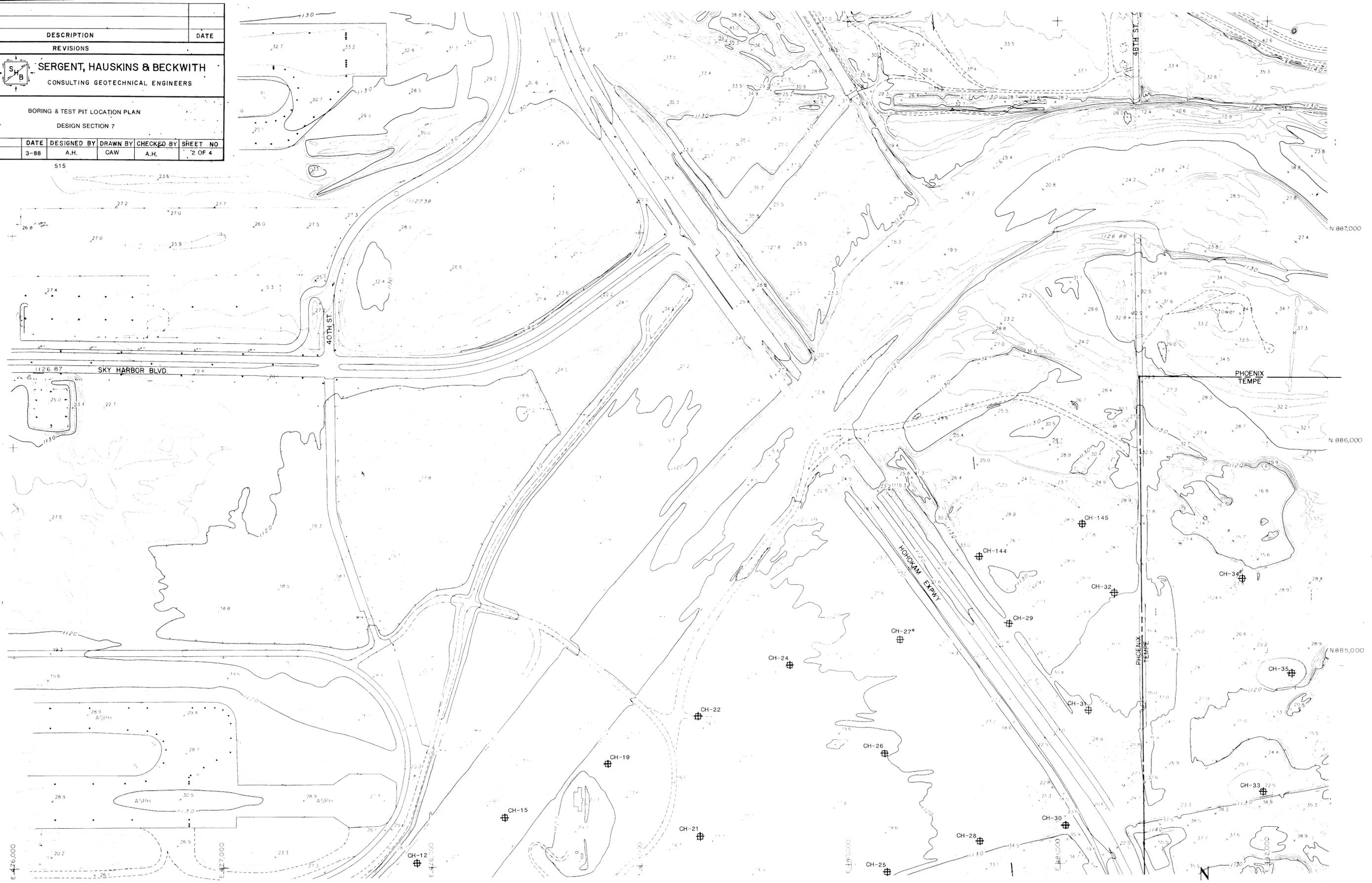
- ⊕ - TEST PIT & NO.
- ⊙ - BORING & NO.
- * - TO BE SURVEYED

NOTE: This Map Shows Grid Coordinates



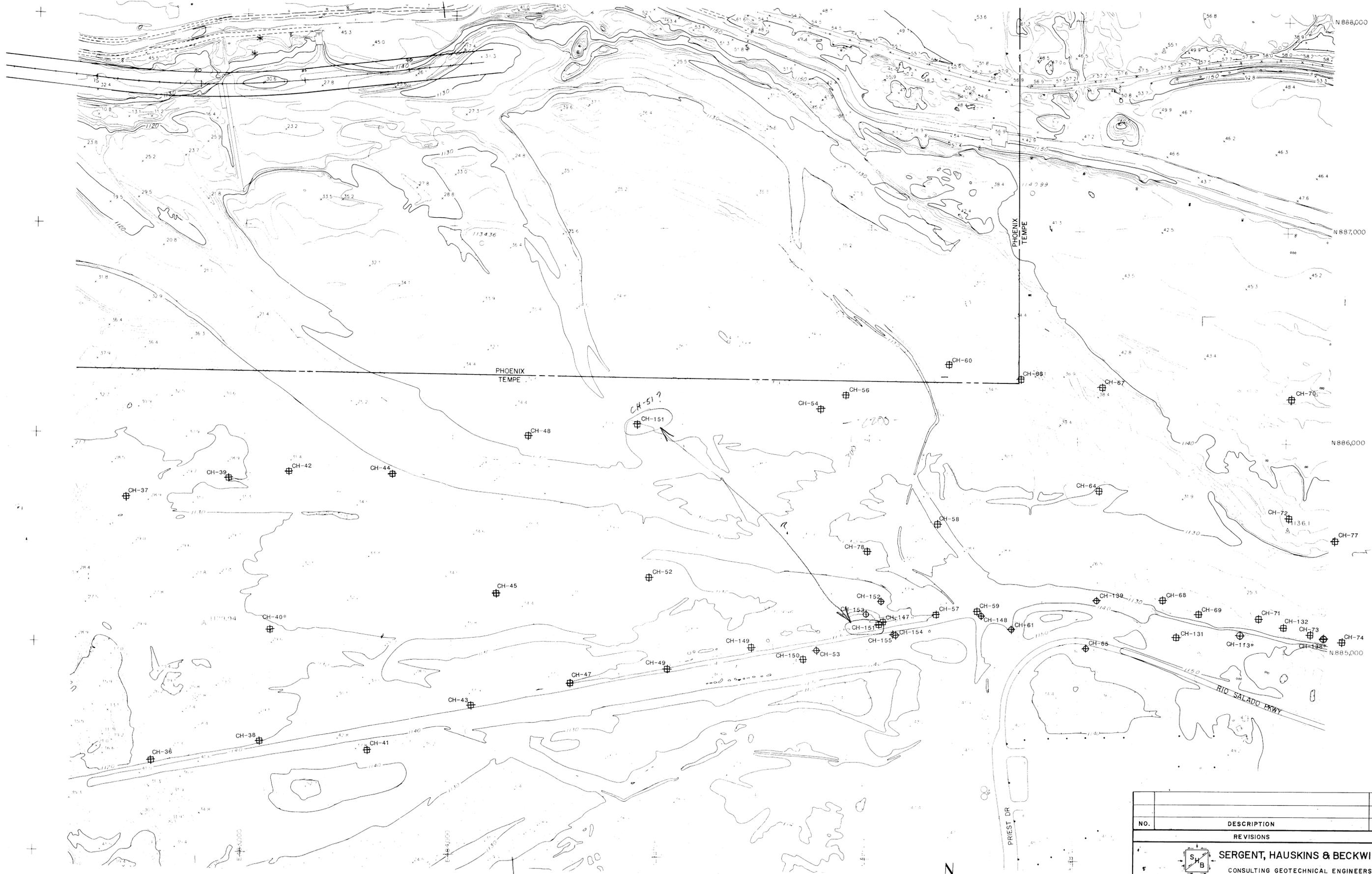
NO.	DESCRIPTION	DATE			
REVISIONS					
SERGEANT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS					
BORING & TEST PIT LOCATION PLAN DESIGN SECTION 7					
JOB NO.	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	SHEET NO.
E87-56	3-88	A.H.	CAW	A.H.	1 OF 4

NO.	DESCRIPTION	DATE			
REVISIONS					
 SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS					
BORING & TEST PIT LOCATION PLAN					
DESIGN SECTION 7					
JOB NO.	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	SHEET NO.
E87-56	3-88	A.H.	CAW	A.H.	2 OF 4



LEGEND
 ⊕ - TEST PIT & NO.
 ⊕ - BORING & NO.
 * - TO BE SURVEYED

NOTE: This Map Shows Grid Coordinates
 0 200 Ft.
 SCALE: 1"=200'



LEGEND
 ⊕ - TEST PIT & NO.
 ⊕ - BORING & NO.
 * - TO BE SURVEYED

NOTE: This Map Shows Grid Coordinates

0 200 Ft.
 SCALE: 1"=200'



NO.	DESCRIPTION	DATE			
REVISIONS					
 SERGEANT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS					
BORING & TEST PIT LOCATION PLAN DESIGN SECTION 7					
JOB NO.	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	SHEET NO
E87-56	3-88	A.H.	CAW	A.H.	3 OF 4



N 886,000

N 885,000

N 884,000

N 883,000

LEGEND

- ⊕ - TEST PIT & NO.
- ⊕ - BORING & NO.
- * - TO BE SURVEYED

NOTE: This Map Shows Grid Coordinates

0 200 Ft.
SCALE: 1"=200'



NO.	DESCRIPTION	DATE			
REVISIONS					
 SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS					
BORING & TEST PIT LOCATION PLAN DESIGN SECTION 7					
JOB NO.	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	SHEET NO
E07-56	3-88	A.H.	CAW	A.H.	4 OF 4



ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

206 South Seventeenth Avenue Phoenix, Arizona 85007

ROSE MOFFORD
Governor

CHARLES L. MILLER
Director

W.O. FORD
State Engineer

July 1, 1988

Mr. Richard Perreault
Project Manager
Flood Control District of Maricopa County
3335 W. Durango Street
Phoenix, Arizona 85009

RE: Salt River Channelization
Preliminary Geotechnical Investigation Report

Dear Dick:

Attached is a copy of the preliminary Geotechnical Investigations Report for the Salt River Channelization. Please review and comment.

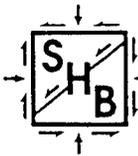
Very truly yours,

Charles K. Eaton
Charles K. Eaton
Corridor Engineer *TCB*
Urban Highway Section

Nick, mpe 8 July 88
- Attached is the geotech report for the Salt River Channel.
- Please return to me when you have completed your review.
Thanks
Dick

FLOOD CONTROL DISTRICT RECEIVED	
JUL 07 1988	
CH ENG	REP & FILE
DEF	INWORD
DESIGN	FILED
FINANCE	FILE
C & O	RECD 7/8
ENGR	
REMARKS	





SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS

APPLIED SOIL MECHANICS • ENGINEERING GEOLOGY • MATERIALS ENGINEERING • HYDROLOGY

B. DWAIN SERGENT, P.E.
LAWRENCE A. HANSEN, PH.D., P.E.
RALPH E. WEEKS, P.G.
DARREL L. BUFFINGTON, P.E.
DONALD VAN BUSKIRK, P.G.
DALE V. BEDENKOP, P.E.

JOHN B. HAUSKINS, P.E.
MICHAEL L. RUCKER, P.E.
ROBERT W. CROSSLEY, P.E.
JONATHAN A. CRYSTAL, P.E.
PAUL V. SMITH, P.G.
NORMAN H. WETZ, P.E.

GEORGE H. BECKWITH, P.E.
ROBERT L. FREW
JAMES H. CLARY, C.P.G.
NICHOLAS T. KORECKI, P.E.
GERALD P. LINDSEY, P.G.
RONALD E. RAGER, P.G.

ROBERT D. BOOTH, P.E.
SUANG CHENG, P.E.
JAMES R. FAHY, P.E.
MICHAEL HULPKE, P.G.
DAVID E. PETERSON, P.G.
ALBERT C. RUCKMAN, P.E.
PAUL KAPLAN, P.E.

March 17, 1988

DMJM
300 West Clarendon Avenue
Suite 335
Phoenix, Arizona 85013-3499

SHB Job No. E87-56CH
Letter No. 168

Attention: Turan Ceran, P.E.
Project Manager

Re: East Papago - Hohokam -
Sky Harbor Freeways
ADOT Project Nos. RAM 600-5-305,
RAM 600-3-309 & RAM 601-0-302
Arizona Department of Transportation
Maricopa County, Arizona

Gentlemen:

Our Preliminary Geotechnical Investigation Report for Design Section 7, Salt River Channelization, of the referenced project is submitted herewith. This report includes results of test drilling and laboratory analysis, and provides preliminary recommendations for the design of grade control structures and channel bank protection.

Should any questions arise concerning this report, we would be pleased to discuss them with you.

Respectfully submitted,
Sergent, Hauskins & Beckwith Engineers

By Anwar Hirany
Project Manager

And Norman H. Wetz, P.E.

Reviewed by George H. Beckwith, P.E.

Copies: Addressee (5)

REPLY TO: 3232 W. VIRGINIA, PHOENIX, ARIZONA 85009