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SITE CHARACTERIZATION REPORT
VERDESE CARTER PARK

OAKLAND, CALIFORNIA

Prepared for

City of Oakland
City Attorney's Office
505 14th Street, 12th Floor
Oakland, CA 94612
July 19, 1993

Prepared by

Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

July 19, 1993
93C0243A

Ms. Vivian O'Neal, Esq.
City of Oakland
City Attorney's Office
505 14th Avenue, 12th Floor
Oakland, CA 94612

Re: Site Characterization Report
Verdese Carter Park Site Characterization Project
98th and Bancroft Avenues, Oakland

Dear Ms. O'Neal:

Woodward-Clyde Consultants (WCC) is pleased to submit this report of our site characterization of Verdese Carter Park. The purpose of this investigation was to identify the general distribution of soil contamination, if any, in the shallow soil zone at the park.

It is a pleasure to be of service to the City. Please call me at 874-3288 if you have any questions.

Sincerely,

Michael McGuire, P.E.
Project Manager

Enclosure

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1.0
INTRODUCTION

1.1 PURPOSE

Woodward-Clyde Consultants (WCC) was retained by the City of Oakland to conduct a site characterization at the Verdese Carter Park site in Oakland, California. The site characterization generally consisted of a sampling and analysis program for the shallow soil zone beneath the site. Recent observations at the Park have raised concerns that lead or other chemicals possibly remaining in soils may present environmental and health threats. In March of 1993, citizens reported observing a yellow-white precipitate substance in cracks in the asphalt basketball court area.

In April 1993, because of recent, heightened concerns regarding apparent or suspected conditions at the park, the city requested WCC to plan and initiate an investigation of potential soil contamination at the park. This investigation was comprehensive in that it addressed the entire park area, and not just the portion formerly occupied by the battery factory.

The scope of work was conducted for the City Attorney in accordance with our proposals of May 19 and June 21, 1993 as subsequently approved and modified.

1.2 PROJECT BACKGROUND

1.2.1 Site History

Verdese Carter Park (the park) is located in Oakland, California between 98th and 96th Avenues, and Bancroft Avenue and Sunnyside Street. The park covers approximately 3 acres. Low knolls, up to about 6 feet high, of grass-covered and tree-planted fill generally line the north, east, and southern perimeters of the park. The south side of the park is bordered by a dirt covered, undeveloped strip of land approximately 40 feet wide along the 98th Avenue frontage.

The park currently consists of a grassy field area on the southern side of the park, while the northern side of the park contains two basketball courts, a children's sandbox/playground area, and a community center/maintenance structure. The general layout of the park is presented on Figure 1.

The southern half of Verdese Carter Park, i.e., fronting on 98th Avenue, was occupied by a wet cell battery factory from at least 1912 (the date of the earliest Sanborn Map of the site) until it was demolished in 1977 for construction of the park. Soil contaminants typically associated with wet cell battery manufacturing include acids, sulphur, lead, and to a lesser extent, other metals such as arsenic and zinc.

Aerial photos indicate that the factory ceased operations sometime between 1973 and 1975. For most of its operational life, the factory completely occupied the south half of the block, most of the footprint of the factory being located on a concrete slab floor. Sanborn maps and aerial photos show a variety of operation areas of the factory, including offices along the 98th Avenue frontage, loading facilities including a rail spur along Bancroft Avenue, sulfuric acid tanks at various locations but concentrated near the northeast corner of the factory area along Bancroft Avenue, and drum storage areas along the north border of the property, i.e., midway through the present park site.

The northern half of the park, i.e., fronting on 96th Avenue, was occupied by a commercial greenhouse nursery from at least 1912 until sometime between 1968 and 1973, according to aerial photos. Other greenhouse nurseries were also located in the neighborhood. Reportedly, the nursery operations at the park site were devoted to raising roses, and did not use pesticides other than nicotine. Soil contaminants that may be associated with commercial nursery operations include pesticides, herbicides, and fertilizer components, including associated component metals such as arsenic and zinc, and sulphur. A 1973 aerial photo of the site after the greenhouses were removed, shows drum storage surface scars on the ground near the battery factory area. This and the presence of parked automobiles on the former nursery area near the battery factory fence suggests that portions of the nursery area may have been used for activities related to the battery factory after the nursery ceased operation.

Construction plans for the park indicate that the landscaped knolls were to be built at least partially by cut and fill earthwork on the site, i.e., by excavating soil from one part of the site

and disposing it at another. The grading plans and specifications indicate that reuse onsite of strongly acidic, yellow stained soil underlying the battery factory was not allowed unless buried at depth to protect plant growth. The grading plans also show that even if all of the planned onsite excavated soil were reused to build the knolls, they would make up only about half of the needed volume of fill soil, the remainder being imported fill material.

Several soil sampling and analysis programs were performed at the former battery factory area in the 1970's to determine concentrations of lead in soil. Sampling was conducted by the City of Oakland (City), Alameda County Health Department (County), the California Department of Health Services (DHS), the University of California at Berkeley (UC), and by a private concerned citizens group. Elevated lead concentrations were measured in shallow soil samples collected in 1978 prior to the removal of contaminated soil discussed below. The approximate locations of these sampling activities are shown on Plate 1.

The City of Oakland (City) acquired the two adjacent properties circa 1975 and converted the site to a park in 1978. After acquisition of the land now occupied by the Park the City reportedly removed several thousand cubic yards of lead-contaminated soil from the site. In 1978, under the supervision of the DHS and County, approximately 1,700 yards of lead-contaminated soils located previously beneath the floor slab of the battery factory were reportedly removed to a depth of 12 inches, and replaced with 18 inches of clean soil. The approximate reported limits of the 1978 removal are indicated on Plate 1.

Recent observations at the Park have raised concerns that lead or other chemicals possibly remaining in soils may present environmental and health threats. In March of 1993, citizens reported observing a yellow-white precipitate substance in cracks in the asphalt basketball court area.

1.2.2 Scope of Site Characterization

The site characterization activities were performed to provide a more complete characterization of potential contamination in soils at Verdese Carter Park. Specific objectives of this investigation included:

- Investigate potentially elevated metals and acid concentrations in shallow soils and, if elevated metals concentrations are observed, initially define the vertical and lateral extent of contamination and apparent causes.

- Provide a screening-level investigation of shallow native soils for pesticides and herbicides, based on historic usage of the western portion of the site as a nursery.

1.3 REPORT ORGANIZATION

Section 2 of this report describes the site characterization activities that were conducted for this investigation, including site history research, and initial and supplemental soil sampling and analysis programs. Section 3 describes the physical characteristics of the site, including geotechnical characteristics relevant to this investigation. Section 4 discusses the nature and extent of contamination, including estimation of background concentrations, and a summary of the analytical data quality assurance/quality control (QA/QC) review. Section 5 presents a brief summary of the contaminant fate and transport characteristics of the site. Section 6 presents conclusions and recommendations including a summary of planned remedial activities.

2.0
SITE CHARACTERIZATION ACTIVITIES

2.1 SITE HISTORY RESEARCH

The site history research included review of City files regarding the construction and operation of the park, including design plans, review of archived aerial photos possessed by Pacific Aerial Surveys in Oakland, and review of historic Sanborn map data at the Bancroft Library, University of California at Berkeley, and from City sources.

2.2 INITIAL SOIL INVESTIGATION

The initial soil investigation was conducted in substantial accordance with the "Initial Soil Investigation Work Plan," dated April 29, 1993 and subsequently reviewed and approved by the Alameda County Department of Environmental Health (ACDEH).

For the purposes of this investigation, the park was divided into two areas, as indicated on Figure 1. The areas are distinguished from each other based primarily on historical usage and, consequently, potential contaminants of concern.

The southern portion of the park was the former site of a wet-cell battery factory and is referred to as the 'Battery Factory Area'. Potential contaminants/parameters of concern in this area included metals and pH.

The northern portion of the park is the site of a former nursery, and was referred to as the 'Nursery Area'. Potential contaminants/parameters of concern in this area included metals and pH (as a result of proximity to the former battery factory), pesticides and herbicides (the latter two potentially resulting from activities at the former nursery).

Twelve soil borings were advanced in the Nursery Area as shown on Figure 1. While some of the proposed boring locations within the Nursery Area were selected to provide general area coverage, WCB-2, -3, -5, and -9 were located in the area where a precipitate-like substance was observed in cracks in the basketball court pavement. WCB-6 and -7 were

specifically located in the sandbox area; a high use area for children. These two sampling locations were chosen because children are particularly sensitive potential receptors for contaminants, and the area may also serve as a collection point for possible upwelling or "wicking" of subsurface contamination due to the sandbox area's reportedly poor drainage.

Eight soil borings were advanced in the Battery Factory Area as shown on Figure 1. The boring locations within the Battery Factory Area, i.e., WCB-13 through -20, were selected in consideration of past and current site use, the results of previous sampling, and to provide appropriate area coverage. In terms of area coverage, the boring locations were biased away from the frontage along 98th Avenue, as Sanborn Map data shows that this area was occupied by "low-threat" office areas of the battery factory. The specific rationale for individual boring locations was:

WCB-13	located in the barbecue area, a high-use area of the park for potential human receptors;
WCB-14	located in an area that Sanborn Map data indicates as being formerly occupied by aboveground acid storage tanks, and located near homeplate at the baseball diamond, a high use area of the park for potential human receptors;
WCB-16	located where previous surface soil sampling detected a total lead concentration of 96,000 mg/kg, the highest ever detected at the site. The sampled soil was later removed, but this boring was proposed to confirm that the 1978 excavation was sufficiently deep; and
WCB-15	located to provide general area coverage.
WCB-17 to 20	located to provide general area coverage.

Soil samples were collected from each boring at one depth within the fill material and at the following depth intervals beneath the fill soil placed for development of the park: 0.5-1.0 ft, 2.0-2.5 ft, 5.0-5.5 ft, 7.0-7.5 ft, and 10.0-10.5 ft.

The 20 soil borings for the initial soil investigation were advanced using a truck-mounted drill rig operated by HEW Drilling of East Palo Alto, California under the observation of a WCC geologist. A total of 173 soil samples were collected from the twenty soil borings for possible chemical analysis. Soil samples were collected using a 2-inch I.D. split-spoon

sampler with clean stainless-steel or brass sample tubes for analytical testing and preparation of a detailed log of each boring. Logs of the borings are presented in Appendix A.

All drilling and sampling equipment was cleaned with a hot pressure washer between each boring. Sampling equipment was cleaned between sample drives with an alconox detergent wash, double rinsed in tap water, then double rinsed with deionized water to reduce the potential for cross-contamination. Soil samples collected for chemical analysis within the sample tubes were sealed with Teflon and plastic endcaps, labeled, placed on ice and transported under chain of custody procedures, via Federal Express, to CKY Laboratories in Torrance, California. CKY is a California certified analytical laboratory. Soil cuttings from each boring and decontamination wash water were placed in DOT approved 55-gallon drums, labeled and stored at the site for later disposal. At the completion of each boring advancement, the boring was backfilled with a cement bentonite grout mixture.

The samples from borings located in the former nursery area of the site (Borings WCB-1 through -12) that were obtained approximately 6 inches beneath the transition between the park and pre-park soil were analyzed for a wide range of pesticides and herbicides. This was to provide a screening-level assessment of potential contamination related to previous commercial nursery operations. One sample from each boring was analyzed by EPA Methods 8080, 8140, and 8150.

Possible metals contamination was the primary concern of this investigation. CAM 17 metals scans (also commonly called Title 22 or TTLC metals scans) by EPA Methods 6010/7000 series were performed during the initial soil investigation on samples collected approximately 6 inches below the transition between the park fill and underlying pre-park soil. One such sample from each boring was analyzed to provide a screening-level identification of specific metals for further investigation as contaminants of concern. The only metals that appeared to have significantly elevated concentrations in the screening-level assessment phase of the initial soil investigation were arsenic, lead, and zinc. On this basis lead and zinc, and to a somewhat lesser degree arsenic were the focus of subsequent analysis of the remaining soil samples obtained from each boring. Selected samples of soil were analyzed for pH by EPA Method 9045.

2.3 SUPPLEMENTAL SOIL INVESTIGATION

The supplemental investigation included installation and sampling of six additional borings in the vicinity of Borings WCB-13 and -14, the selective removal of asphalt at the play court area, sampling of the underlying aggregate base material, and sampling of the precipitate-like substance found in some of the pavement cracks.

The supplemental soil borings, WCB-21 through -26 were installed to better delineate the extent of soil contamination encountered in Borings WCB-13 and -14. The six supplemental borings were installed on July 24,1992 using a truck-mounted auger drilling rig operated by Great Sierra Exploration of Novato, California, under the supervision of a WCC geologist. Samples of soil were obtained at depths of approximately 0.5, 2, 5, and 7 feet beneath the bottom of the imported topsoil layer, aggregate base material, or imported soil backfill used in the 1978 removal action, as appropriate for the particular boring location. The design grading plans for the park construction and lithology encountered during the initial soil investigation program were consulted to guide the field sampling. The soil samples were forwarded to CKY laboratory for analysis for lead and zinc by Method 6010, arsenic by GFAA, and pH by Method 9045.

The selective removal of pavement was performed by WCC personnel on June 28, 1993. The purpose was to expose more of the precipitate-like substance in some of the pavement cracks and the soil staining observed in the aggregate base material penetrated by soil borings in pavement areas. A grab sample (Court 1) of the aggregate base material was obtained that day and forwarded to ATI Laboratory in San Diego, a California certified laboratory for a wide range of analyses. On July 8, a composite sample of the aggregate base material (Court 2) and of the precipitate substance (Crack 1) from the play court area was obtained and forwarded to ATI for a variety of total and soluble metals analyses.

3.0
PHYSICAL SITE CHARACTERISTICS

3.1 PRESENT SITE DEVELOPMENT

The park covers approximately 3 acres. Low knolls, up to about 6 feet high, of grass-covered and tree-planted fill generally line the north, east, and southern perimeters of the park. The south side of the park is bordered by a dirt covered, undeveloped strip of land approximately 40 feet wide along the 98th Avenue frontage.

The park currently consists of a grassy field area on the southern side of the park, while the northern side of the park contains two basketball courts, a children's sandbox/playground area, and a community center/maintenance structure. The general layout of the park is presented on Figure 1.

3.2 SOILS

The general subsurface conditions encountered in the borings within the former battery factory area consists of 3-inch thick lawn, underlain by 0.5 to 1 feet of clayey silt topsoil fill, which is underlain by 2 to 4 feet of dark brown to black gravelly clay fill containing wood and red brick debris fragments. The gravelly clay fill is underlain by 3 to 15 feet of brown to grayish olive brown, stiff silty clay that is interlayered with sandy clays and sandy silty clays.

The general surface/subsurface conditions encountered in the borings within the former nursery area consisted of either 3-inch thick lawn and associated 0.5 to 3 feet of clayey silt topsoil, or 2-inch thick asphalt underlain by 3-inch to 0.5 feet silty, sandy gravel aggregate base rock fill within the basketball courts area. The clayey silt topsoil and the gravel aggregate base rock are underlain by up to 3 feet of dark brown to black gravelly clay fill containing wood and brick debris. The gravelly clay fill is underlain in mound areas by 2 to 7 feet of very dark brown to black stiff silty clay fill containing broken glass and wood debris. The gravelly clay fill in the basketball and asphalt walkway areas is underlain by 1 to 2 feet of very dark gray to dark brown silty clay fill containing brick and concrete debris.

The two fill units in the former nursery area are underlain by 4 to 10 feet of brown to olive brown, stiff silty clay that is interlayered with sandy clays and sandy silty clays. This interlayered silty clay is underlain by 1 to 2 feet of yellowish brown to light yellowish brown stiff gravelly clay, which is underlain by up to 3 feet of light brown, moist gravelly clayey sand. The gravelly clayey sand is underlain at depth by a light yellow brown, stiff silty clay.

The aggregate base material underneath the play courts and path pavements consists of rhyolite rock fragments and residual silt. This material is a distinctive yellow color, but the internal color of the larger rock fragments is an even gray. Rhyolite is a volcanic rock common in the East Bay hills.

No visible contamination was observed in any of the borings in the former battery factory area and any of the borings in the former nursery area except borings except the distinctive yellow color of the aggregate base material.

3.3 GROUNDWATER

Groundwater was not a subject of this investigation. Groundwater was not encountered in any of the borings installed for this investigation. Reportedly, groundwater in the area is encountered at a depth of approximately 30 feet.

4.0
NATURE AND EXTENT OF CONTAMINATION

This section presents the results of contaminant characterization activities. It includes a discussion of the analytical data by contaminant or parameter type, the degree of contamination and its distribution across the site. This section also contains a summary of the analytical data quality assurance/quality control (QA/QC) review, estimated background levels, and discusses correlations between the data.

4.1 BACKGROUND LEVELS ESTIMATION

"Background" soil parameters or concentration levels can be defined two ways: levels due to the natural geologic composition of the soil, and levels including those due to human-related activity but not related to operations or activities specific to the site being studied. The first definition is often referred to a "natural" background and the second as "anthropogenic" background. As an example of natural background, soil naturally contains various metals such as arsenic, lead, and zinc. The concentrations of each individual metal will depend on the particular soil type. As an example of anthropogenic background, surficial and shallow soils in urban areas and near roads often contain relatively high concentrations of lead due in part to past air pollution from leaded gasoline.

Assessment of background concentrations for this investigation did not include collection of samples from off site. In part, this was due to the knowledge that a previous investigation by DHS in 1978 (see Plate 1) found high levels of lead in shallow soils at locations across the street from the park. These elevated concentrations of level could have been due to a variety of causes not necessarily related to the site and would be an unacceptable source of uncertainty if included in an anthropogenic background evaluation. Instead, the assessment of background levels relied on samples obtained from the site but at apparently uncontaminated locations.

The range of natural background levels was estimated by a semi-qualitative review of the distribution of the analytical results, review of literature regarding soil metals concentrations in the general region of the Bay Area and northern California, and by previous WCC

experience at other similar sites. The background level estimation did not employ geostatistical methods. This will be done in the near future and may require the analysis of additional samples. The natural background levels estimated are described below for arsenic, lead, zinc, and pH.

4.2 QA/QC REVIEW SUMMARY

An extensive Quality Assurance/Quality Control (QA/QC) review was performed of the analytical data. The results of the review are presented in Appendix B. The review concluded that the data is of acceptable analytical accuracy and precision, with some limitations of the utility of the metals data due to inherent contaminant stratification and soil matrix heterogeneity.

4.3 PESTICIDES AND HERBICIDES

Samples from borings located in the former nursery area of the site (Borings WCB-1 through -12) were obtained approximately 6 inches beneath the transition between fill soil that was placed to develop the park and the underlying pre-park soil. These samples were analyzed for a wide range of pesticides and herbicides. This was to provide a screening-level assessment of potential contamination related to previous commercial nursery operations. One sample from each boring was analyzed by EPA Methods 8080, 8140, and 8150.

No pesticides or herbicides were detected.

4.4 METALS

Possible metals contamination was the primary concern of this investigation. CAM 17 metals scans (also commonly called Title 22 or TTLC metals scans) by EPA Methods 6010/7000 series were performed during the initial soil investigation on samples collected approximately 6 inches below the transition between the park fill and underlying pre-park soil. One sample from each boring was analyzed to provide a screening-level identification of specific metals for further investigation as contaminants of concern. Also, two grab samples of the aggregate base material beneath the play courts collected during the supplemental soil investigation (samples Court-1 and -2) were analyzed for CAM 17 metals.

The results of the metals scans are presented in Table 1. The only metals that appeared to have significantly elevated concentrations, i.e., significantly above background, in the screening-level assessment phase of the initial soil investigation were arsenic, lead, and zinc. On this basis lead and zinc, and to a somewhat lesser degree arsenic, were the focus of subsequent analysis of the remaining soil samples obtained from each boring. Arsenic, lead, and zinc were the only metals analyzed from the "hot spot delineation" borings (WCB-21 through -26) of the supplemental soil investigation. The results of the arsenic, lead, and zinc analyses are presented in Table 2, and are discussed below. Some key concepts regarding the nature and extent of contamination are illustrated in the figures and are also discussed below.

4.4.1 Arsenic

Soil samples were analyzed for arsenic by the GFAA method. The results of the arsenic analyses are summarized on Table 2. Natural background for arsenic was estimated to range up to approximately 10 mg/kg. Arsenic concentrations above this estimated background level are graphically presented on Figure 2.

Highly elevated arsenic concentrations, typically on the order of 400 to 500 mg/kg were found in the imported aggregate base material beneath the asphalt pavement of play courts and pathways. The arsenic levels in the underlying soil generally decrease to near background levels within 6 to 12 inches beneath the bottom of the aggregate base layer. The slightly elevated arsenic concentration in the pre-park soil beneath the sandbox at WCB-7 (12 mg/kg at a depth of 18 inches) may be due to leachable arsenic in water runoff from the aggregate base material into the sandbox, the possible presence of this aggregate base material in subdrains beneath the sandbox, or may be an isolated occurrence. Arsenic concentrations in this boring returned to background levels within a depth of 3 feet. Elevated arsenic levels are a secondary contaminant at the lead "hot spot" around WCB-13, which appears to be associated with the former battery factory. Elevated arsenic concentrations in this area appear to be limited to a depth of 3 feet or less. The elevated arsenic concentration of 27 mg/kg at a depth of 18 inches WCB-11 appears to be an isolated occurrence.

The precipitate-like substance found in pavement cracks does contain elevated concentrations of arsenic (14 mg/kg in sample Crack 1). This concentration is significantly below those found in the underlying aggregate base.

The California non-RCRA criteria for definition of hazardous waste for disposal purposes based on total metal concentration is the Total Threshold Limit Concentration (TTLC) contained in CCR Title 22. The TTLC criteria for arsenic is 500 mg/Kg. Of all the samples obtained during this investigation, only the aggregate base material contained arsenic concentrations close to or exceeding the TTLC. Samples of the aggregate base material were generally in the range of 400 to 500 mg/kg with a highest sample concentration of 734 mg/Kg. On this basis, it appears that the aggregate base material likely exceeds TTLC criteria overall.

Soluble Arsenic

A sample of the aggregate base material (sample Court-2) was analyzed for soluble arsenic using the WET test for comparison to California CCR Title 22 Soluble Threshold Limit Concentration (STLC) criteria for identification of hazardous waste for disposal purposes. The soluble arsenic concentration in the aggregate base material by this test was 8.8 mg/L, above the STLC soluble arsenic criteria of 5 mg/L.

A Toxicity Characteristic Leaching Procedure (TCLP) test for soluble arsenic for comparison to federal RCRA classification of hazardous waste for disposal was not performed.

A modified WET test of sample Court-2 using deionized water was also performed to more realistically assess the in-place or in situ leachability of arsenic due to rainfall and watering of the adjacent lawn areas of the park. The soluble arsenic concentration was significantly less (less than 0.05 mg/L).

4.4.2 Lead

Soil samples were analyzed for lead by EPA Method 6010. The results of the lead analyses are summarized on Table 2. Natural background for lead was estimated to range up to 40 mg/kg. Based on the site's location in a highly urban area and next to major thoroughfares,

i.e., Bancroft and 98th Avenues it was anticipated that anthropogenic background lead levels in surface soil could be significantly higher. For this reason, "elevated" concentrations of lead for this investigation were defined as 100 mg/kg or higher.

Highly elevated lead concentrations were encountered beneath some of the landscape knolls, e.g., in the vicinity of Boring WCB-14. At other knolls no elevated lead concentrations were encountered, e.g., at WCB-10.

At the knoll in the vicinity of WCB-14 and WCB-23, along Bancroft Avenue in the general area of the former battery factory, the extent of contamination appears to include the entire knoll. Lead concentrations as high as 6,700 mg/kg were encountered, and were generally higher than the TTLC for lead of 1,000 mg/kg. The depth of contamination in this area ranges from 1 foot to approximately 6 feet beneath the ground surface, and includes the park fill material used to build up the knoll and appears to also extend into the pre-park fill zone underneath.

Boring WCB-15 at another knoll in the former battery factory area also encountered elevated lead, 1,520 mg/kg at a depth of 2 feet but not deeper than 3 feet. This high lead concentration was in the park fill material, and exceeds the TTLC for lead. Lead concentrations at this location were not elevated in the pre-park fill underneath. It is not possible on the basis of a single boring to assess whether the contamination encountered at this location encompasses the entire knoll.

Significantly elevated lead concentrations were also encountered in one knoll in the former nursery area, i.e., not within the battery factory area. Here, WCB-12 encountered elevated lead concentrations as high as 502 mg/kg at a depth of 4.5 feet in the park fill. WCB-11, also located on this knoll, but behind the building, did not encounter elevated lead concentrations.

Elevated lead concentrations were also encountered in the aggregate base material beneath the play courts and asphalt pathways. Lead concentrations in this material were generally in the range of 400 to 600 mg/kg, with a highest measured concentration of 734 mg/kg in sample Court-2. Overall, the lead levels in the aggregate base material approach but do not

exceed the TTLC. The depth of significant contamination in the underlying soil appears to be limited to a depth of less 6 to 12 inches beneath the bottom of the base material.

The sample of the precipitate-like substance found in the pavement cracks (Crack-1) contained 5.5 mg/kg of lead. This substance does not appear to contain significant concentrations of lead.

Soluble Lead

A sample of the aggregate base material (sample Court-2) was analyzed for soluble lead using the WET test for comparison to the STLC criteria for soluble lead for classification of hazardous waste for disposal purposes. The soluble lead concentration in the aggregate base material by this test was 0.4 mg/L, well below the STLC criteria of 5 mg/L.

A TCLP test for soluble lead for comparison to federal RCRA criteria for classification of hazardous waste for disposal was not performed, but given the results of the WET test, would likely not exceed the RCRA criteria for lead of 5 mg/l.

A modified WET test of sample Court-2 using deionized water was also performed to more realistically assess the in-place or insitu leachability of lead due to rainfall and watering of the adjacent lawn areas of the park. The soluble lead concentration was much less; less than 0.03 mg/L.

4.4.3 Zinc

Soil samples were analyzed for zinc by EPA Method 6010. The results of the zinc analyses are summarized on Table 2. Natural background for zinc was estimated to range up to 80 mg/kg.

Slightly elevated zinc concentrations up to approximately 150 mg/kg were encountered in some of the park fill soil in the knolls and in the pre-park fill material in the former battery factory area. A markedly higher zinc concentration of 515 mg/kg was detected at a depth of one foot in the pre-park fill at WCB-13.

Higher zinc concentrations were encountered in the aggregate base material beneath the play courts and asphalt pathways and in the underlying soil up to a depth of 18 inches to 3 feet. Zinc concentrations in the aggregate base and underlying soil were generally in the range of 300 to 600 mg/kg. The depth of significant contamination appears to be limited to a depth of 18 inches to 3 feet beneath the bottom of the base material.

The sample of the precipitate-like substance found in some of the pavement cracks (Crack-1) contained 7,450 mg/kg of zinc.

With the exception of the precipitate like substance, none of the samples contained zinc concentrations exceeding the TTLC for zinc of 5,000 mg/kg.

Soluble Zinc

Since none of the soil and aggregate base material samples contained total zinc concentrations close to or exceeding a level 10 times the nominal STLC for zinc of 250 mg/l, it is unlikely that these materials contain WET soluble zinc exceeding the STLC criteria.

A sample of the aggregate base material (sample Court-2) was analyzed for soluble zinc using the WET test and a modified WET test using deionized water to assess the insitu leachability of zinc due to rainfall and watering of the adjacent lawn areas of the park. The soluble zinc concentration by the WET test was 4.1 mg/L. The soluble zinc concentration using deionized water, supposedly a much less aggressive leaching procedure, was not significantly less (3.3 mg/L).

4.5 pH

Selected samples of soil were analyzed for pH by EPA Method 9045. A summary of the pH results are presented on Table 2. Background or natural soil pH was estimated to range approximately between about 6 and 8.5. pH was included as an analytical parameter for several reasons:

- to identify possible acids contaminated soil that might pose a health or environmental threat;

- to distinguish between different sources of soil metals contamination on the basis of their characteristic correlation with pH; and

- as a relatively inexpensive screening-level parameter indicating possible metals contamination associated with acid, e.g., battery acid.

The pH of the precipitate material in the pavement cracks was very low i.e., acidic, with a pH of 1.5 measured in sample Crack 1. The regulatory hazardous criteria for corrosivity for transport and disposal is pH 2 or below.

The pH of the aggregate base material and immediately underlying soil was generally 3 to 3.5, i.e., acidic, with pHs ranging from 2.8 in sample Court-2 to 4.1 in sample B24-1.

The pH of the other fill and native soil units at the park was generally within the apparent background range, with a few sample measurements well into the basic range (sample B14-3 with a pH of 11 and sample B16-1 with a pH of 9.5) and acidic range (B19-2 at pH 3.7, B19-4 at pH 4.1, and B22-4 at pH 3.6). The cause of the basic or high pH is suspected to be due to the presence of concrete debris in the fill material.

4.6 DATA CORRELATIONS

The aggregate base material is typified by the joint presence of significantly elevated concentrations of arsenic, lead, and zinc, and low pH in the 3 to 4 range. Soil beneath this material that appears to be impacted by leaching is generally typified by significantly elevated zinc and low pH in the 3.5 to 5 range, although not by significantly elevated arsenic and lead concentrations except in very close proximity to the base material.

Contamination in the pre-park fill material in the former battery factory area is typified by elevated lead concentrations with zinc and sometimes arsenic as distant secondary contaminants. The same is true of contaminated park fill material in the knolls across the park. This fill material in the knolls is also geotechnically similar to the identified pre-park fill.

With the exception of the aggregate base material and impacted underlying soil, pH does not correlate well with arsenic, lead, or zinc concentrations.

4.7 GENERAL CONTAMINATION DISTRIBUTION

There appear to be three distinct types or general patterns of contamination at the site. The first pattern is attributable to the aggregate base material beneath the play courts and pathways in the north half of the park. This material, which has tentatively been identified as a mixture of rhyolite rock fragments and residual silt, is distinctively yellow in color, is highly acidic, and contains significantly elevated concentrations of arsenic and lead, and to a lesser extent, zinc. This material preferentially leaches zinc and acid relative to arsenic and lead. The depth of lead and arsenic contamination in the underlying soil is generally limited to a depth of 6 to 12 inches, while the depth of zinc contamination is between 18 inches and 3 feet. The precipitate substance in found in some of the pavement cracks is derived from this material, and is itself distinctively yellow, very acidic, and contains very high concentrations of zinc but low concentrations of arsenic and lead.

The second pattern is lead contaminated soil in the pre-park soil zone in the battery factory area along a portion of Bancroft Avenue. This area corresponds to the former location of acid tanks noted in historic Sanborn maps and aerial photos. This area is now occupied by the knoll in the vicinity of Borings WCB-13, -14, -22, and -23, and apparently was not included in the 1978 soil removal activities. The contamination here is typified by elevated lead, slightly elevated arsenic and zinc, and normal soil pH. The depth of contamination between the park and pre-park soil interface is usually only a few feet.

The third pattern is lead contaminated soil in the fill material used to construct some of the landscaped knolls. This soils' contaminant profile and geotechnical characteristics are the same as the pre-park fill zone encountered beneath the former battery factory area. This suggests that this fill material was derived from "cut and fill" earthwork from the former battery factory area during grading construction of the park.

5.0
CONTAMINANT FATE AND TRANSPORT

Migration routes for the contamination in the soil beneath the eastern portion of the former battery factory area, in some of the knolls across the site, and within and underneath the aggregate base material include downward leaching of contamination dissolved in surface water through the soil column and potential resultant groundwater contamination and migration. Windborne migration and casual, direct human ingestion of contamination in the factory area and knolls is eased by the presence of 6 inches or more of clean, imported topsoil material. Although seemingly eased by the presence of the overlying asphalt pavement, windborne migration and direct human ingestion of the contaminated aggregate base material are potential migration routes through the crystalline material in some of the pavement cracks. This crystalline material is derived from the aggregate base material.

Metals contamination is not significantly degraded by sunlight or microorganism biodegradation.

In a typical soil environment, most metals generally are not mobile (they do not significantly dissolve or evaporate). Lead is a particularly immobile metal, however, the mobility of most metals is increased in an acidic environment, such as that found in the aggregate base material. The soil contamination information from this site suggest that metals contamination associated with the aggregate base material has not moved deeper than one to three feet for zinc, and less than two feet for arsenic and lead. This movement appears to be similar for the lead contamination associated with the knolls and the former battery factory area

6.0
CONCLUSIONS AND RECOMMENDATIONS

6.1 SUMMARY OF FINDINGS

There appear to be three distinct types or general patterns of contamination at the site. The first is attributable to the aggregate base material beneath the play courts and pathways in the north half of the park. This material, which has tentatively been identified as a mixture of rhyolite rock fragments and residual silt, is distinctively yellow in color, is highly acidic, and contains significantly elevated concentrations of arsenic and lead, and to a lesser extent, zinc. This material may, in fact, be mine tailings or waste ore that were subjected to acid treatment to remove commercially valuable minerals. This material preferentially leaches zinc and acid relative to arsenic and lead. The depth of lead and arsenic contamination in the underlying soil is generally limited to a depth of 6 to 12 inches, while the depth of zinc contamination is between 18 inches and 3 feet. The precipitate substance found in some of the pavement cracks is derived from this material, and is itself distinctively yellow, very acidic, and contains very high concentrations of zinc but low concentrations of arsenic and lead.

The second is lead contaminated soil beneath the existing knolls in the former battery factory area. These areas were not included in the 1978 soil removal activities. The contamination here is typified by elevated lead, generally slightly elevated arsenic and zinc, and normal soil pH. The depth of contamination between the park and pre-park soil interface is usually only a few feet.

Finally, the third is lead contaminated soil in the park fill material used to construct some of the landscaped knolls. Its contaminant profile and geotechnical characteristics are the same as the pre-park fill zone encountered beneath the former battery factory area. Based on the similar geotechnical and contaminant characteristics, and the park construction plans detailing planned earthwork, we conclude that at least some of the fill material in the knolls was derived from excavation of the soils beneath the battery factory or was otherwise impacted by factory operations. Since the lead levels measured do not correlate with soil staining or notably low pH, possible soil classification and segregation activities during park construction

based on soil staining or pH monitoring would have been ineffective in detecting lead contamination of the levels encountered during this investigation.

6.2 RECOMMENDATIONS FOR ADDITIONAL INVESTIGATION ACTIVITIES

Recommendations for additional investigations include:

- A geostatistical evaluation of background levels of arsenic, lead, and zinc at the site. This may require additional soil sample analyses.

- investigation of past and current quarry and mining operations in rhyolite formations in the area to identify likely sources of the aggregate base material.

- TCLP and/or WET solubility testing of the "hot spot" soil contamination to identify state and federal hazardous waste classification for disposal and pretreatment, if required.

- Solubility testing of "moderate" contamination levels not presenting a human health threat and associated in situ leachability evaluations to estimate contaminant concentration thresholds below which contaminated soil may be left in place and be protective of environmental concerns i.e., groundwater quality.

- Additional delineation of the lateral and vertical extent of lead contamination encountered in the knoll at WCB-15. This may most conveniently be done immediately prior to or concurrent with the planned excavation and offsite disposal activities (see below).

6.3 PLANNED REMEDIAL ACTIVITIES

The planned remedial activities are the excavation and offsite disposal of the aggregate base material under pathways and play courts, the overlaying asphalt pavement, and underlying soil containing arsenic or lead concentrations exceeding the cleanup criteria. Lead contaminated soil exceeding the cleanup criteria will also be removed from two of the knolls at the park; the knoll along Bancroft Avenue in the vicinity of Borings WCB-22 and -13, and

the knoll near the corner of Bancroft and 98th Avenue at the location of Boring WCB-15. At this time, the assumed cleanup criteria for shallow soils will be 200 mg/kg for lead and 20 mg/kg for arsenic. The project cleanup criteria will be finalized before the remedial activities are completed.

The remedial excavation will employ dust suppression measures, e.g., water sprays, and the City will set up air monitoring stations around the park to measure any potential dust emissions from the excavation and earthworking.

Sufficient removal of contaminated soil will be confirmed by soil sampling of the bottom and sides of the excavations.

7.0
LIMITATIONS AND CERTIFICATION

The findings, recommendations, specifications, or professional opinions are presented, within the limits prescribed by the client, after being prepared in accordance with generally accepted engineering practice in Northern California at the time this investigation was performed. No other warranty is either expressed or implied.

CERTIFICATION

This report was prepared under the supervision of:

Signature: 

Name: Michael P. McGuire, P.E.

Title: Project Engineer

Professional License Number: Registered Civil Engineer No. 42565

Table 1. Summary of Soil Results for pH and CAM 17 Metals (mg/kg).

Sample	pH	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
TTLC		500	500	1000	75	100	2500	8000	2500	1000	20	3500	2000	100	500	700	2400	5000
B-01-3	7.29	<15	5.09	194	<0.75	<1	44.6	8.31	25.4	88.7	0.1	<2.5	34	<15	<1	<20	56.8	72.3
B-02-1	6.26	<15	5.3	279	<0.75	<1	62.6	10.3	27	11.9	0.11	<2.5	51.7	<15	<1	<20	68.3	621
B-03-1	3.87	<15	18.8	224	<0.75	<1	59.1	4.78	78.3	13.2	<0.05	<2.5	30.6	<15	<1	<20	67.2	299
B-03-2	5.58	<15	8.1	244	<0.75	<1	60.5	9.2	38.5	10.9	0.06	<2.5	44.5	<15	<1	<20	66.7	326
B-04-2	3.41	<15	7.07	187	<0.75	1.51	53.6	7.05	84.6	10.9	<0.05	<2.5	37.4	<15	<1	<20	59.9	404
B-05-2	3.80	<15	5.02	106	<0.75	<1	57.8	12.6	29.9	12	<0.05	<2.5	52.5	<15	<1	<20	64	497
B-06-1	6.95	<15	<5	206	<0.75	<1	63.7	6.77	49	12.4	<0.05	<2.5	49.2	<15	<1	<20	75.1	62.7
B-07-1	6.85	<15	11.6	100	<0.75	<1	77.3	10.6	70.1	9.87	<0.05	<2.5	61.2	<15	<1	<20	72.1	76.5
B-08-2	4.79	<15	13.9	249	<0.75	1.09	56.2	13.4	30.9	13.7	<0.05	<2.5	50.2	<15	<1	<20	77.3	464
B-09-1	4.73	<15	7.24	160	<0.75	<1	56.8	9.42	24.9	8.14	<0.05	<2.5	48	<15	<1	<20	57.9	538
B-10-4	7.01	<15	6.64	176	<0.75	<1	55.6	6.98	30.7	13.8	<0.05	<2.5	36.5	<15	<1	<20	58.1	53.7
B-11-4	7.00	<15	9.38	222	<0.75	<1	51.8	10.3	30.8	41.6	0.17	<2.5	37.9	<15	<1	<20	64.1	67.1
B-12-3	7.44	<15	<5	260	<0.75	<1	53.8	19.9	33.5	95.1	0.11	<2.5	47.8	<15	<1	<20	67.2	103
B-13-1	7.66	<15	96.6	514	<0.75	1.13	49.6	7.86	49.4	1190	0.25	<2.5	35.7	<15	<1	<20	67.9	515
B-14-2	7.90	<15	5.89	239	<0.75	<1	50.9	4.79	34.5	484	0.07	<2.5	33.1	<15	<1	<20	49.6	65.6
B-15-4	7.43	<15	<5	156	<0.75	<1	64.3	12.4	81.4	9.61	<0.05	<2.5	57	<15	<1	<20	52.8	75
B-16-2	7.14	<15	<5	240	<0.75	<1	63	10.2	40.7	8.87	<0.05	<2.5	44.4	<15	<1	<20	62.5	52.4
B-16-3	6.99	<15	<5	148	<0.75	<1	52.4	8.91	38.7	6.97	<0.05	<2.5	39.2	<15	<1	<20	43.9	49.7
B-17-2	6.73	<15	<5	250	<0.75	<1	73.9	13.2	46.4	10.4	0.21	<2.5	73.3	<15	<1	<20	73.8	67
B-18-2	6.39	<15	<5	184	<0.75	<1	90.5	9.2	54	7.47	0.15	<2.5	54.7	<15	<1	<20	74.7	68.4
B-19-2	3.65	<15	<5	114	<0.75	1.8	72.5	8.12	58.7	20.2	0.11	<2.5	34.5	<15	<1	<20	64	72.4
B-20-2	7.37	<15	5.14	137	<0.75	<1	59.7	6.22	66.1	13.6	<0.05	<2.5	49.1	<15	<1	<20	51.7	73.2
COURT-1		10.7	397	612	<0.5	<0.5	3.2	<1.0	48.3	594	4.72	11.9	1.1	2.9	5.9	47.7	0.9	291
COURT-2	2.80	16.2	734	332	<0.5	<1.0	43.3	1.2	8.4	692	6.28	16.6	3.1	3.4	9.8	62.1	2.9	443

Note: Shading indicates result was greater than TTLC.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

Sample	Depth (feet)	pH	Arsenic	Lead	Zinc	Comments
TTLC			500	1000	5000	
B-01-1	0.5	7.25	11.1	116	94.7	PF
B-01-2	3		10.4	39.9	140	PF
B-01-3	4.5	7.29	5.09	88.7	72.3	OF
B-01-4	6	7.25		8.21	41.8	OF
B-01-5	7.5			<5	41.1	OF
B-01-6	10.5	8.23				
B-01-7	11	8.25		7.57	54.2	
B-01-8	13.5	8.30				
B-01-9	16					
B-01-10	19					
B-02-1	1	6.26	5.3	11.9	621	OF
B-02-2	3	7.25		5.78	44.1	
B-02-3	5.5	7.32		8.8	44.4	
B-02-4	6	7.30		8.94	48.3	
B-02-5	9	7.54		8.43	52.6	
B-02-6	11	7.94				
B-02-7	14					
B-03-1	0.5	3.87	18.8	13.2	299	AB
B-03-2	1	5.58	8.1	10.9	326	OF
B-03-3	3	7.08	<5	6.97	52.3	OF
B-03-4	4	7.59	<5	9.49	51.2	
B-03-5	4.5	7.66	<5	6.86	54.5	
B-03-6	8.5	7.72	<5	9.73	59.9	
B-03-7	10.5	7.78				
B-03-8	13.5					
B-04-1	0.5		458	144	432	AB?
B-04-2	1	3.41	7.07	10.9	404	OF
B-04-3	3	6.63		7.42	57.1	OF
B-04-4	4.5	7.05		9.85	44.6	OF
B-04-5	7.5	7.50		6.09	53	
B-04-6	8	7.36		6.37	62.9	
B-04-7	11	7.66				
B-04-8	13					
B-04-9	16					
B-05-1	0.5	3.31	388	496	328	AB?
B-05-2	1	3.80	5.02	12	497	OF

Note: Shading indicates result greater than TTLC.

AB= Aggregate Base Material
PF= Park Fill
OF= Intact Old Fill
1978= 1978 Fill
No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

Sample	Depth (feet)	pH	Arsenic	Lead	Zinc	Comments
TTLC			500	1000	5000	
B-05-3	2.5	7.11		7.45	36	OF
B-05-4	4.5					
B-05-5	6.5	8.14		10.1	49.7	
B-05-6	7	8.14		8.4	51.2	
B-05-7	10			9.02	63.3	
B-05-8	12	8.10				
B-05-9	15					
B-06GRB	0.5	6.44	<5	<5	26.7	SAND
B-06-1	1	6.95	<5	12.4	62.7	OF
B-06-2	3	7.59				
B-06-3	5.5	7.90				
B-06-4	6	7.87				
B-06-5	9	7.54				
B-06-6	11	7.80				
B-06-7	14					
B-07GRB	0.5	6.34	<5	5.52	27.6	SAND
B-07-1	1.5	6.85	11.6	9.87	76.5	OF
B-07-2	3	7.00	<5	5.39	62	OF
B-07-3	6	7.69	<5	<5	72.9	
B-07-4	6.5	7.71	<5	7.92	63.6	
B-07-5	9.5	7.51	<5	6.67	50.4	
B-07-6	11	7.50				
B-07-7	14					
B-08-1	0.5	3.25	450	481	309	AB?
B-08-2	1	4.79	13.9	13.7	464	OF
B-08-3	3	6.80	<5	6.49	38.4	OF
B-08-4	4.5	7.68	6.24	7.1	33	OF
B-08-5	7	8.01	5.45	6.16	40.7	
B-08-6	7.5					
B-08-7	10.5	7.78				
B-08-8	12.5					
B-08-9	15.5					
B-09-1	1	4.73	7.24	8.14	538	OF
B-09-2	3	6.94		5.71	36.8	OF
B-09-3	4.5	7.23		6.32	55.6	
B-09-4	7	7.37		7.14	43.3	

Note: Shading indicates result greater than TTLC.

AB= Aggregate Base Material
PF= Park Fill
OF= Intact Old Fill
1978= 1978 Fill
No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

Sample	Depth (feet)	pH	Arsenic	Lead	Zinc	Comments
TTLC			500	1000	5000	
B-09-5	9.5	7.66				
B-09-6	10					
B-09-7	12					
B-09-8	15					
B-10-1	0.5	7.21	10.2	52.7	164	PF
B-10-2	2.5					PF
B-10-3	4	7.23	7.43	37.6	75.7	PF
B-10-4	6	7.01	6.64	13.8	53.7	OF
B-10-5	7.5	7.07				OF
B-10-6	9					
B-10-7	10.5	7.84				
B-10-8	11					
B-10-9	14.5	7.70				
B-10-10	17	7.96				
B-10-11	20					
B-11-1	1					PF
B-11-2	1.5	6.71	27.4	46.3	108	PF
B-11-3	3					OF
B-11-4	3.5	7.00	9.38	41.6	67.1	OF
B-11-5	4					OF
B-11-6	6.5	7.16				OF
B-11-7	9	7.22				
B-11-8	11	7.77				
B-11-9	14	7.56				
B-12-1	0.5	6.87		29.1	61.7	PF
B-12-2	1.5	7.19	6.65	105	108	PF
B-12-3	3	7.44	<5	95.1	103	PF
B-12-4	4			185	127	PF
B-12-5	4.5	7.55		502	95.5	PF
B-12-6	6					OF
B-12-7	9	8.01		8.8	78.7	OF
B-12-8	11	7.94				
B-12-9	14	7.93				
B-13-1	1	7.66	96.6	1160	515	OF
B-13-2	3	7.56	<5	6.05	39.8	OF
B-13-3	4.5		<5	<5	42.6	OF

Note: Shading indicates result greater than TTLC.

AB= Aggregate Base Material
PF= Park Fill
OF= Intact Old Fill
1978= 1978 Fill
No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

Sample	Depth (feet)	pH	Arsenic	Lead	Zinc	Comments
TTLC			500	1000	5000	
B-13-4	7	7.93	<5	6.22	55.9	
B-13-5	8.5	8.05				
B-13-6	9	8.04				
B-13-7	12					
B-13-8	14					
B-13-9	17					
B-14-1	1	7.22		13.3	60.3	PF
B-14-2	3	7.90	5.89	484	65.6	OF
B-14-3	4.5	11.03		6700	132	OF
B-14-4	6.5	7.39		6.26	49.6	
B-14-5	8.5	7.57		7.6	51.7	
B-14-6	9	7.67				
B-14-7	12	7.74				
B-14-8	14					
B-14-9	16.5					
B-15-1	1					PF
B-15-2	1.5	7.10	8.4	1520	91.9	PF
B-15-3	3.5	6.35	<5	8.1	44	PF
B-15-4	4.5	7.43	<5	9.61	75	
B-15-5	5	7.58				
B-15-6	7	7.75				
B-15-7	10.5	7.49				
B-15-8	12	7.37				
B-15-9	15.5	7.26				
B-16-1	1	9.49		138	65.4	1978/OF
B-16-2	2.5	7.14	<5	8.87	52.4	OF
B-16-3	3	6.99	<5	6.97	49.7	OF
B-16-4	4	6.81				
B-16-5	4.5					
B-16-6	6.5	8.08				
B-16-7	10	7.59				
B-16-8	11.5	7.47				
B-16-9	15					
B-17-1	1	7.87				1978
B-17-2	2.5	6.73	<5	10.4	67	OF

Note: Shading indicates result greater than TTLC.

AB= Aggregate Base Material
PF= Park Fill
OF= Intact Old Fill
1978= 1978 Fill
No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

Sample	Depth (feet)	pH	Arsenic	Lead	Zinc	Comments
TTLC			500	1000	5000	
B-17-3	3					OF
B-17-4	4.5	7.76				
B-17-5	6	7.89				
B-17-6	9.5	7.94				
B-17-7	14.5					
B-18-1	1	8.08				1978
B-18-2	2.5	6.39	<5	7.47	68.4	OF
B-18-3	4					OF
B-18-4	4.5	7.03				
B-18-5	7.5	7.57				
B-18-6	10.5	7.43				
B-18-7	12.5	7.56				
B-18-8	15					
B-19-1	1	7.67	<5	11.6	64.4	1978
B-19-2	3	3.65	<5	20.2	72.4	OF
B-19-3	4.5					OF
B-19-4	5.5	4.10		7.48	61.5	OF
B-19-5	6					
B-19-6	8.5	7.10		8.22	44.3	
B-19-7	11	7.56				
B-19-8	13					
B-19-9	16					
B-20-1	0.5	7.61				OF
B-20-2	2	7.37	5.14	13.6	73.2	OF
B-20-3	3.5	7.48				
B-20-4	6	8.13				
B-20-5	6.5	8.10				
B-20-6	9.5	7.79				
B-20-7	11.5	7.92				
B-20-8	14.5					
B-21-1	0.5					PF
B-21-2	1.5	7.29	<5	91	56.7	OF
B-21-3	3	7.44	<5	111	60.1	OF
B-21-4	6	7.12	5.89	8.61	41.4	
B-21-5	6.5					

Note: Shading indicates result greater than TTLC.

AB= Aggregate Base Material
PF= Park Fill
OF= Intact Old Fill
1978= 1978 Fill
No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

Sample	Depth (feet)	pH	Arsenic	Lead	Zinc	Comments
TTLC			500	1000	5000	
B-21-6	8.5	7.49	<5	5.68	47	
B-22-1	0.5	6.93	6.81	115	133	PF
B-22-2	3	7.94	5.59	319	42.4	OF
B-22-3	3.5	7.86	<5	18	47.9	OF
B-22-4	7.5	3.63	8.81	<5	68.3	
B-22-5	8					
B-23-1	0.5	6.26	12.6	1100	113	PF
B-23-2	2.5	7.74	6.04	1310	73.1	PF
B-23-3	5.5	7.17	<5	10.4	38.7	OF
B-23-4	8	7.32	<5	6.21	37.8	
B-24-1	0.5	4.08	9.2	<5	177	AB?
B-24-2	2.5	5.27	34.2	10.7	51.7	
B-24-3	3	7.02	8.7	5.86	44.1	
B-24-4	5.5	7.12	6.5	5.87	46.8	
B-24-5	7.5	7.28	10.3	<5	52.1	
B-25-1	0.5	5.91	<5	8.0	65.5	AB?
B-25-2	1	6.85	<5	7.5	44.8	OF
B-25-3	2.5	7.20	<5	5.88	47.1	
B-25-4	3					
B-25-5	4.5*					
B-25-6	5	7.24	17.1	7.77	49.2	
B-25-7	7	7.70	6.04	6.62	53.8	
B-26-1	0.5	6.59	6.91	12.6	83	1978
B-26-2	3	7.30	<5	8.07	54.5	OF
B-26-3	6	7.73	<5	8.09	44.4	
B-26-4	8	7.52	<5	6.83	51.7	
COURT-1		7.5	397	594	291	AB
COURT-2		2.8	734	692	443	AB
CRACK-1		1.5	14.4	5.5	7450	PPT

Note: Shading indicates result greater than TTLC.

AB= Aggregate Base Material
PF= Park Fill
OF= Intact Old Fill
PPT=Precipitate
1978= 1978 Fill
No note for native soil.
* Sample contained slough from above; results are not representative of actual conditions.

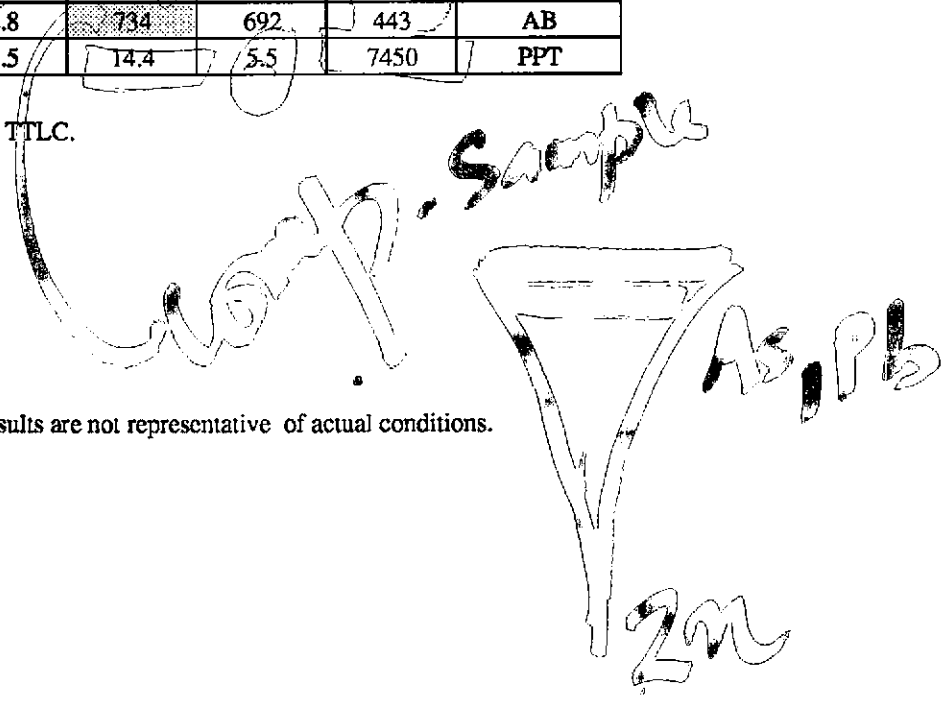
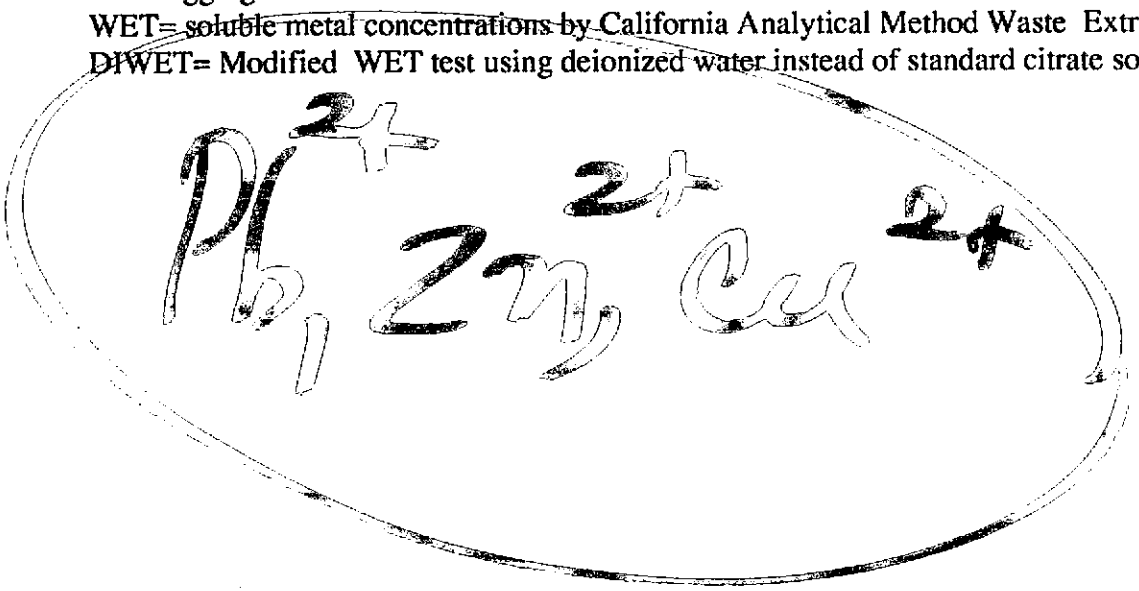
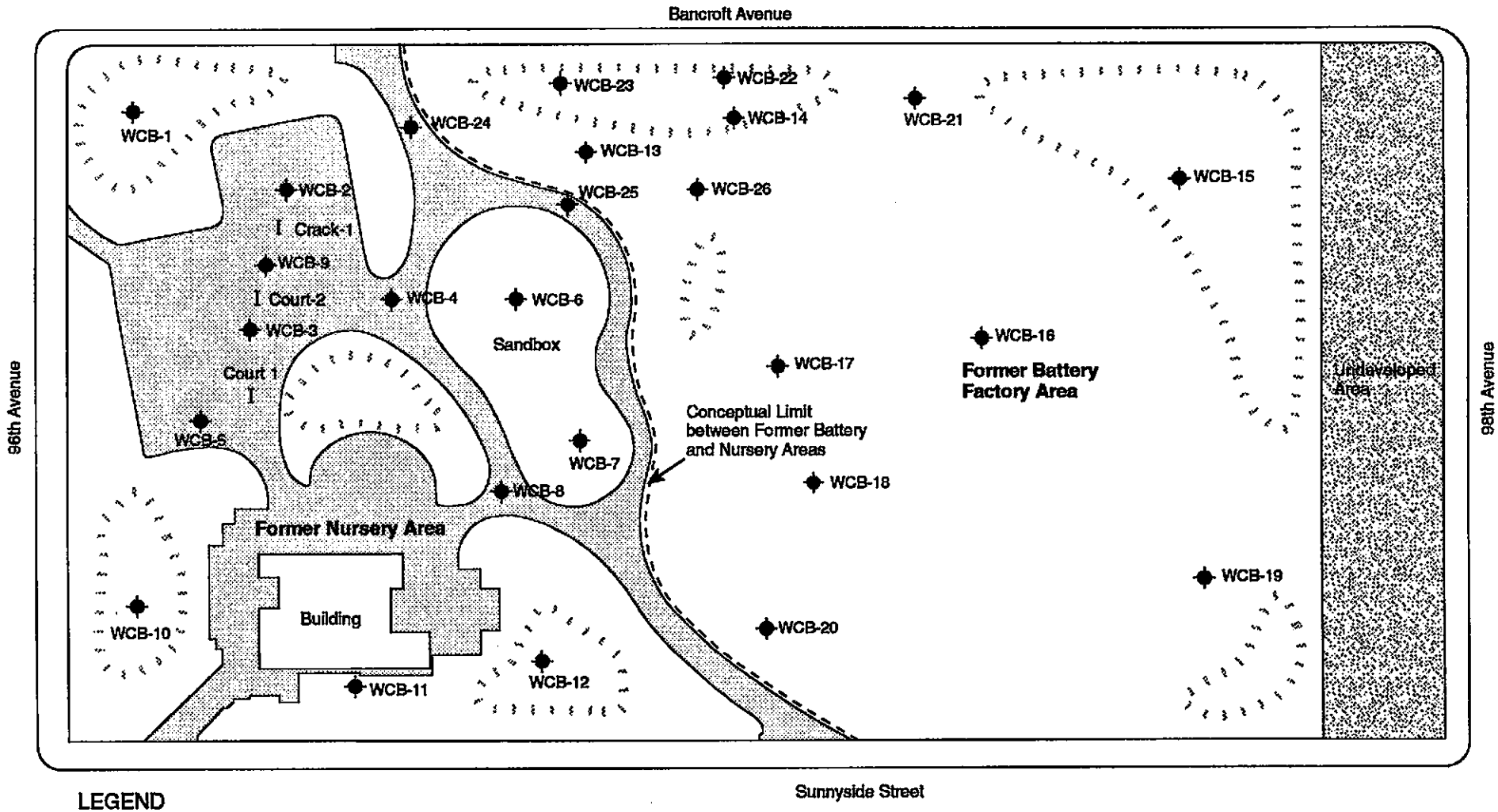


TABLE 3-SUMMARY OF SOIL RESULTS FOR SOLUBLE METALS (mg/L).

Sample	Arsenic	Lead	Mercury	Zinc	Comments
STLC	5	5	0.2	250	
COURT2/WET	8.8	0.4	<0.005	4.1	AB
COURT2/DIWET	<0.05	<0.03	<0.005	3.31	AB

Note: Shading indicates result greater than STLC.
AB= Aggregate Base Material
WET= soluble metal concentrations by California Analytical Method Waste Extraction Test (WET Test)
DIWET= Modified WET test using deionized water instead of standard citrate solution.





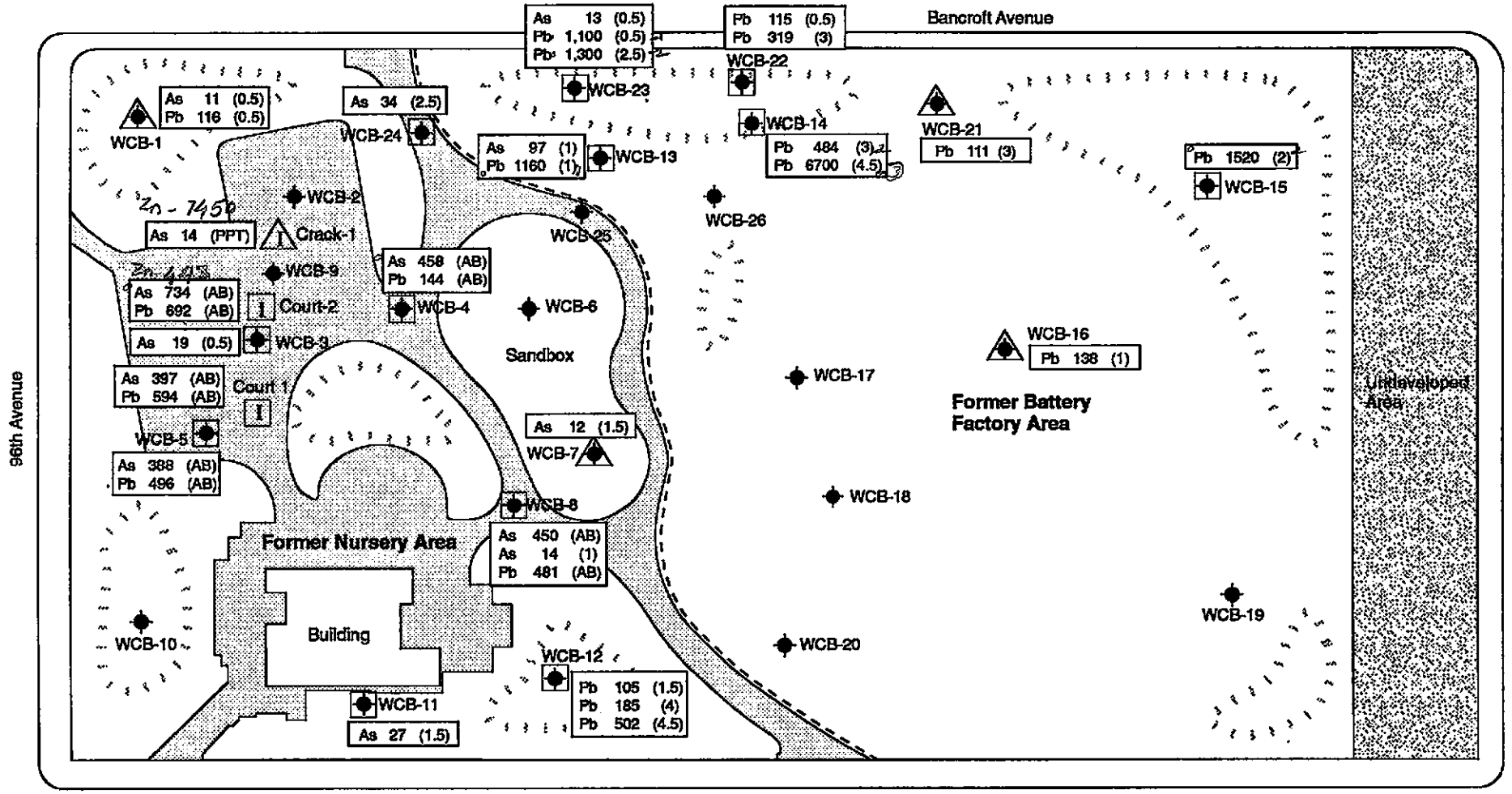
LEGEND

- Grassy areas unless otherwise noted
- Paved areas
- Knoll
- WCB-12: Approximate location of soil boring
- I: Aggregate base/precipitate material samples, Court-2 and Crack-1 composited from basketball court area

0 60 feet

Project No. 93C0243A	Verdese Carter Park Oakland, California	SITE AND SAMPLE LOCATION PLAN	Figure 1
Woodward-Clyde Consultants			

93C0243A-3000/071993



LEGEND

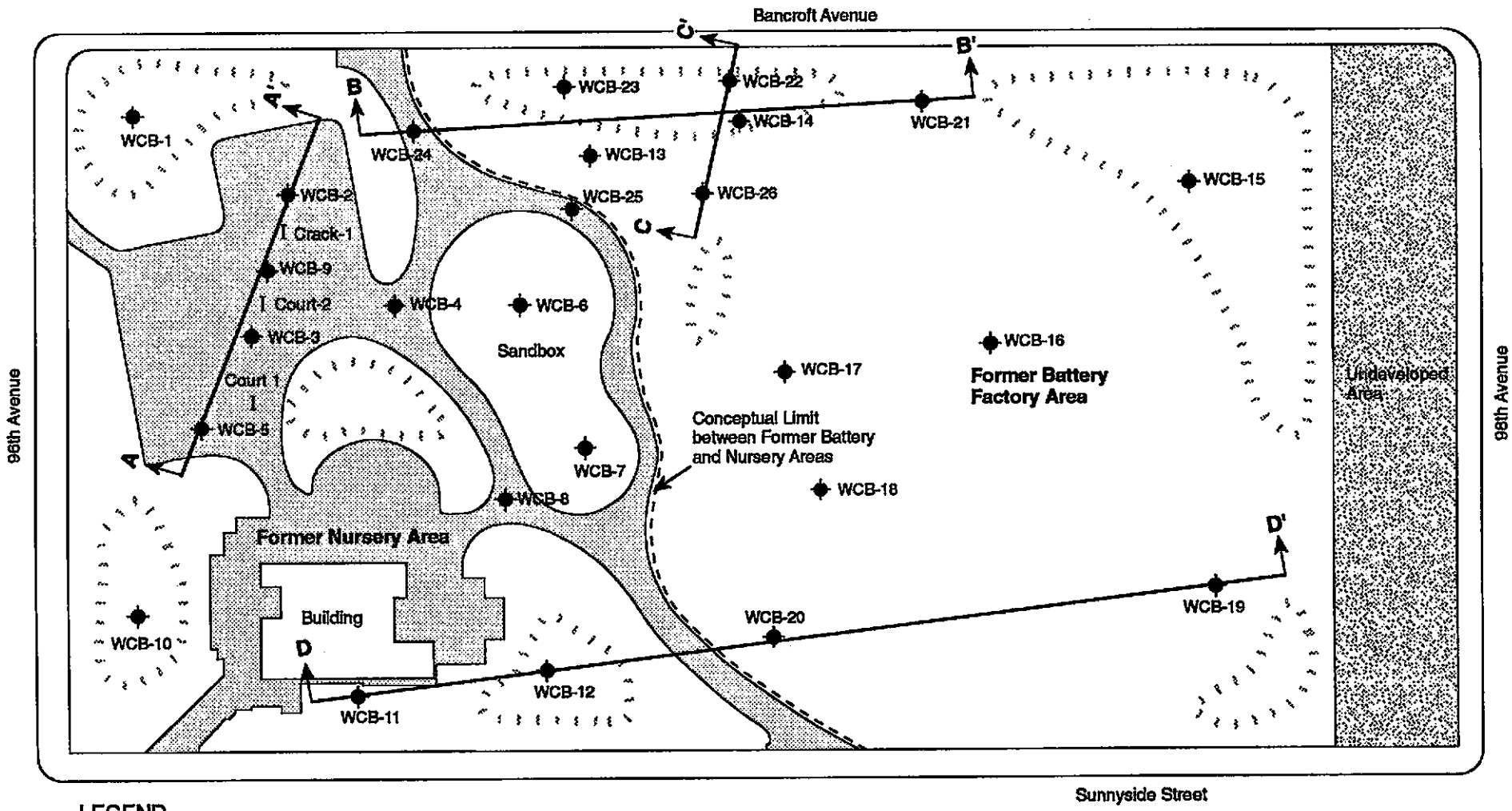
- Grassy areas unless otherwise noted
- Paved areas
- Knoll
- WCB-12 — Approximate location of soil boring
- I — Aggregate base/precipitate material samples, Court-2 and Crack-1 composited from basketball court area
- Maximum concentrations elevated (As >10 mg/Kg, Pb ≥ 100 mg/Kg) but less than anticipated clean up criteria (As <20 mg/Kg, Pb <200 mg/Kg)
- Maximum concentrations greater than anticipated clean up criteria (As ≥20 mg/Kg, Pb ≥200 mg/Kg)

Pb 1520 (2)
Analyte
Concentration in mg/Kg
Depth in feet
AB denotes aggregate base material
PPT denotes precipitate material

0 60
feet

Project No. 93C0243A	Verdese Carter Park Oakland, California	SUMMARY OF ELEVATED ARSENIC AND LEAD CONCENTRATIONS	Figure 2
Woodward-Clyde Consultants			

93C0243A-3000/071993



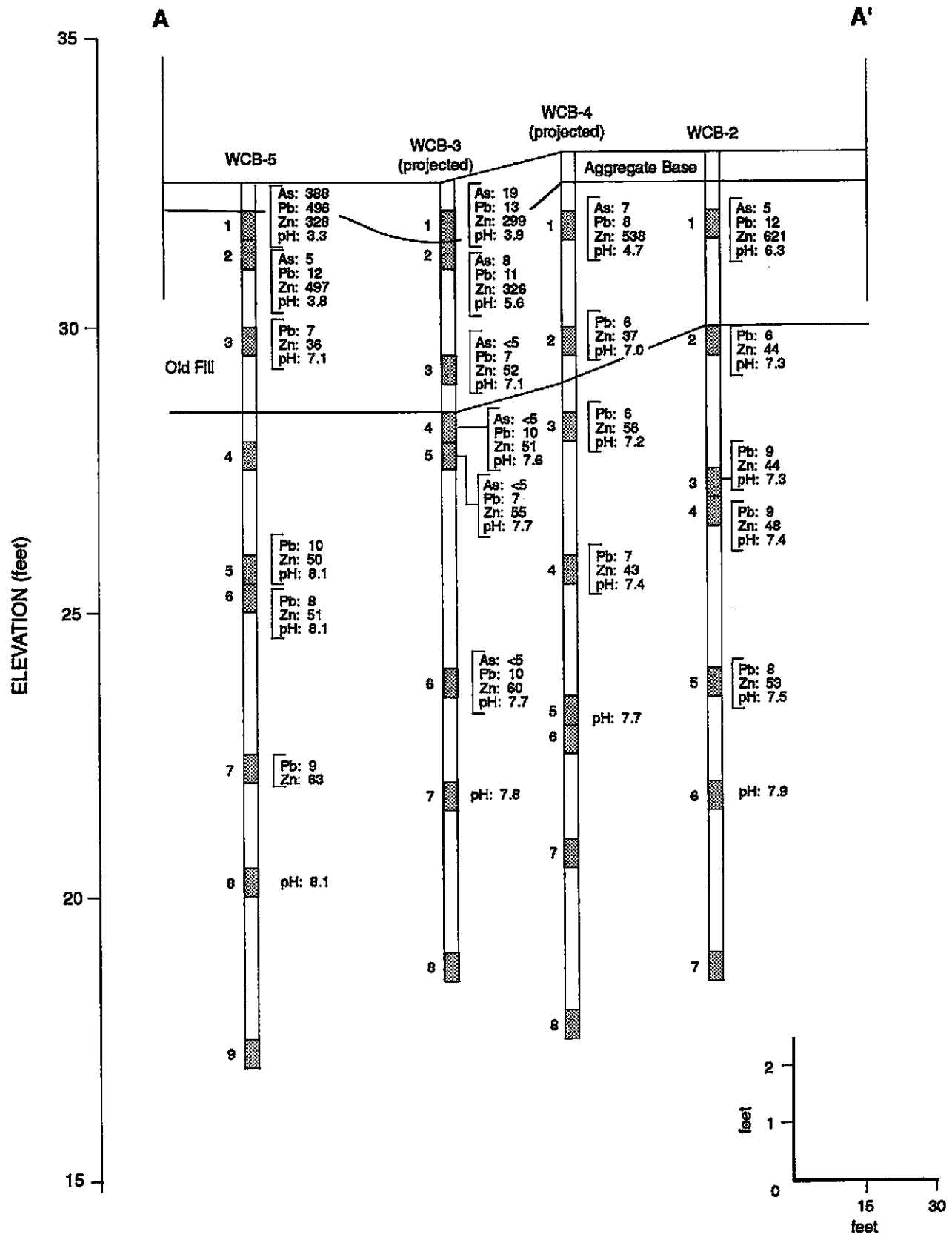
LEGEND

- Grassy areas unless otherwise noted
- Paved areas
- Knoll
- WCB-12 — Approximate location of soil boring
- I — Aggregate base/precipitate material samples, Court-2 and Crack-1 composited from basketball court area
- A — A' — Cross-Section location

0 60 feet

Project No. 93C0243A	Verdese Carter Park Oakland, California	LOCATIONS OF CROSS-SECTIONS	Figure 3
Woodward-Clyde Consultants			

93C0243A-3000/071993

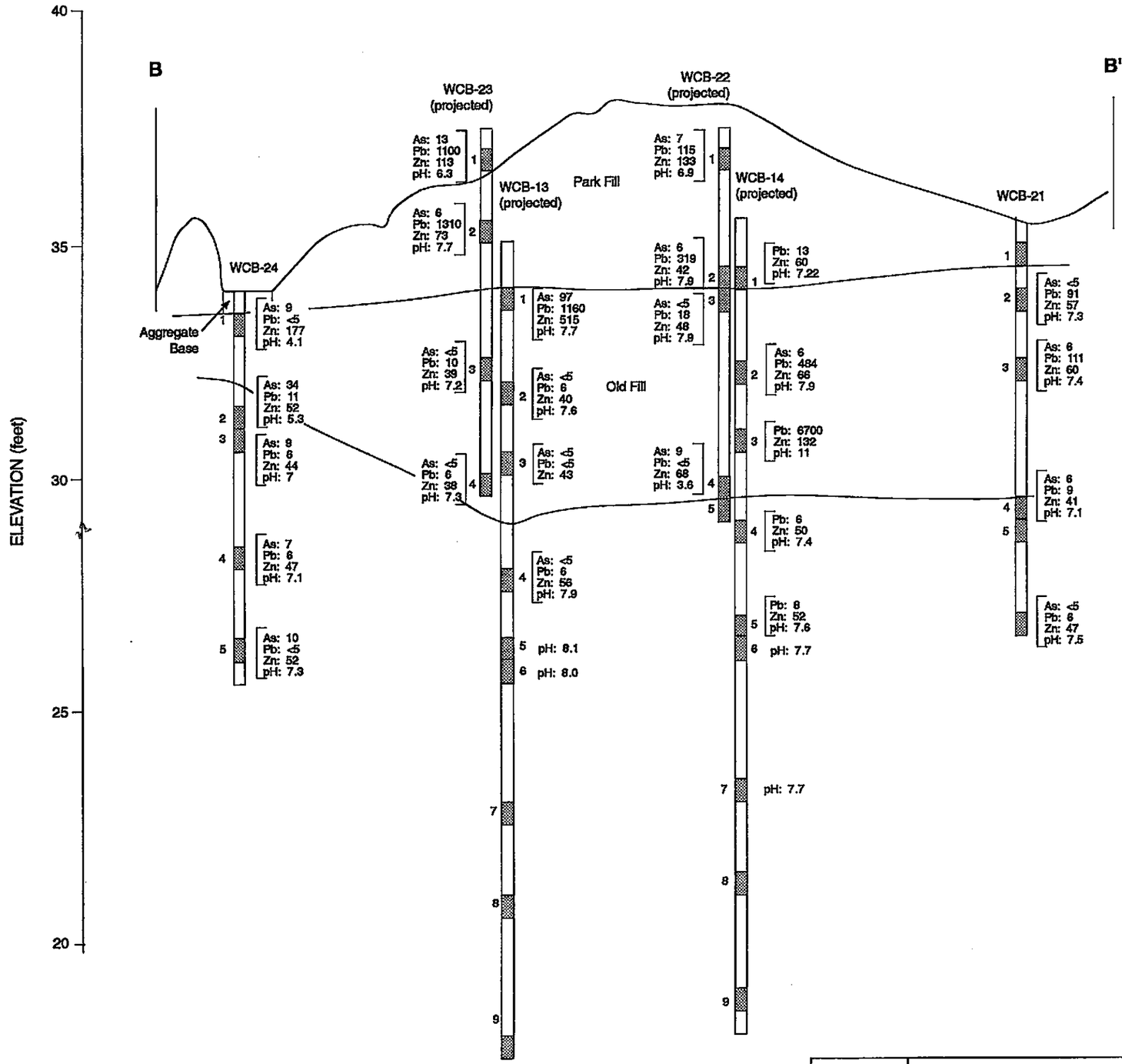


Note: Concentrations (in mg/Kg) have been rounded to the nearest whole number and pH to one decimal place.

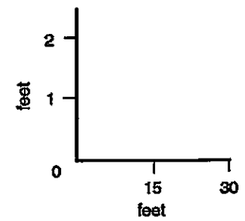
Vertical Scale: 1" = 2.5 ft
Horizontal Scale: 1" = 30 ft

Project No. 93C0243A	Verdese Carter Park Oakland, California	CROSS-SECTION A–A'	Figure 4
Woodward-Clyde Consultants			

93C0243A-3000/071993



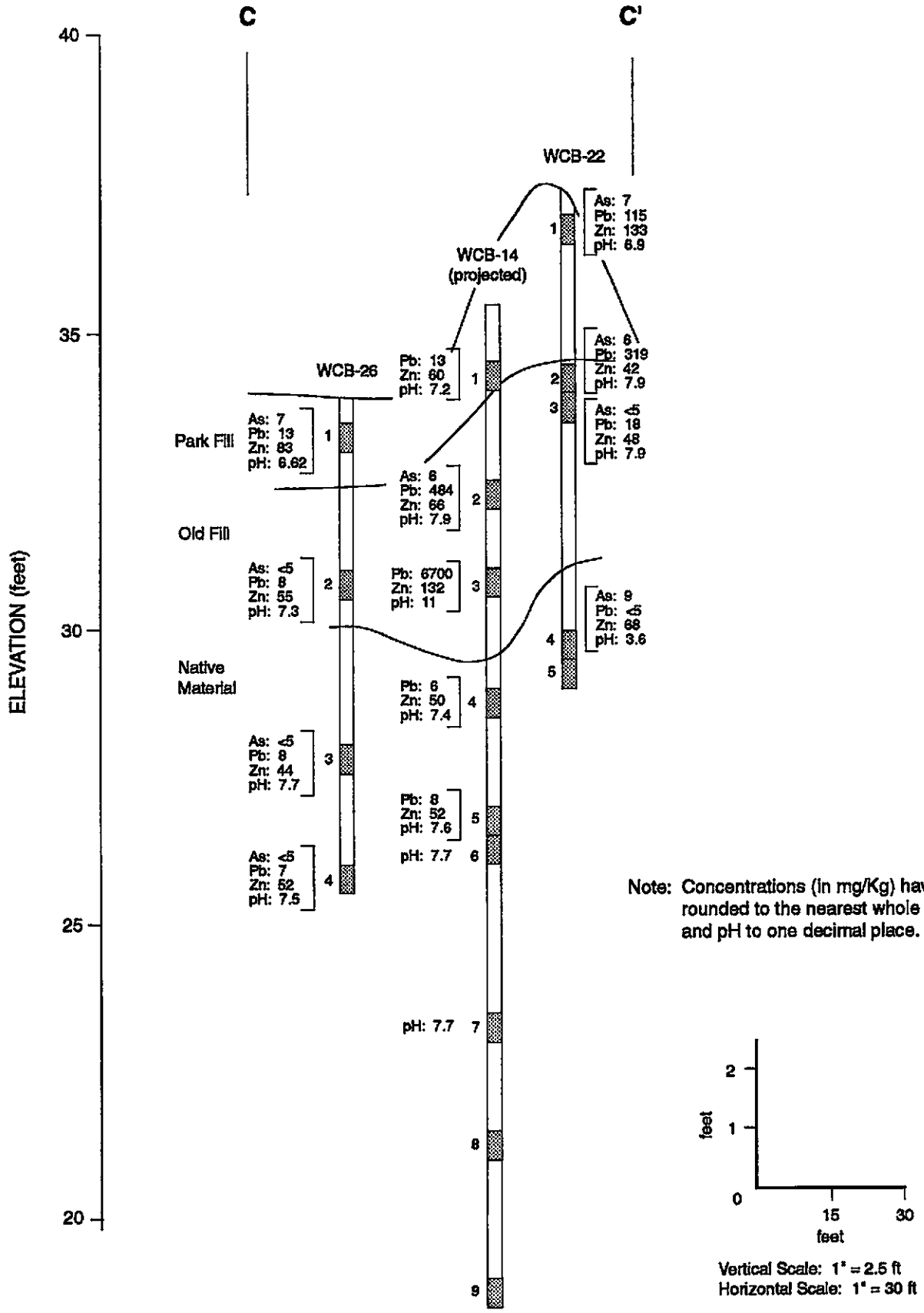
Note: Concentrations (in mg/Kg) have been rounded to the nearest whole number and pH to one decimal place.



Vertical Scale: 1" = 2.5 ft
Horizontal Scale: 1" = 30 ft

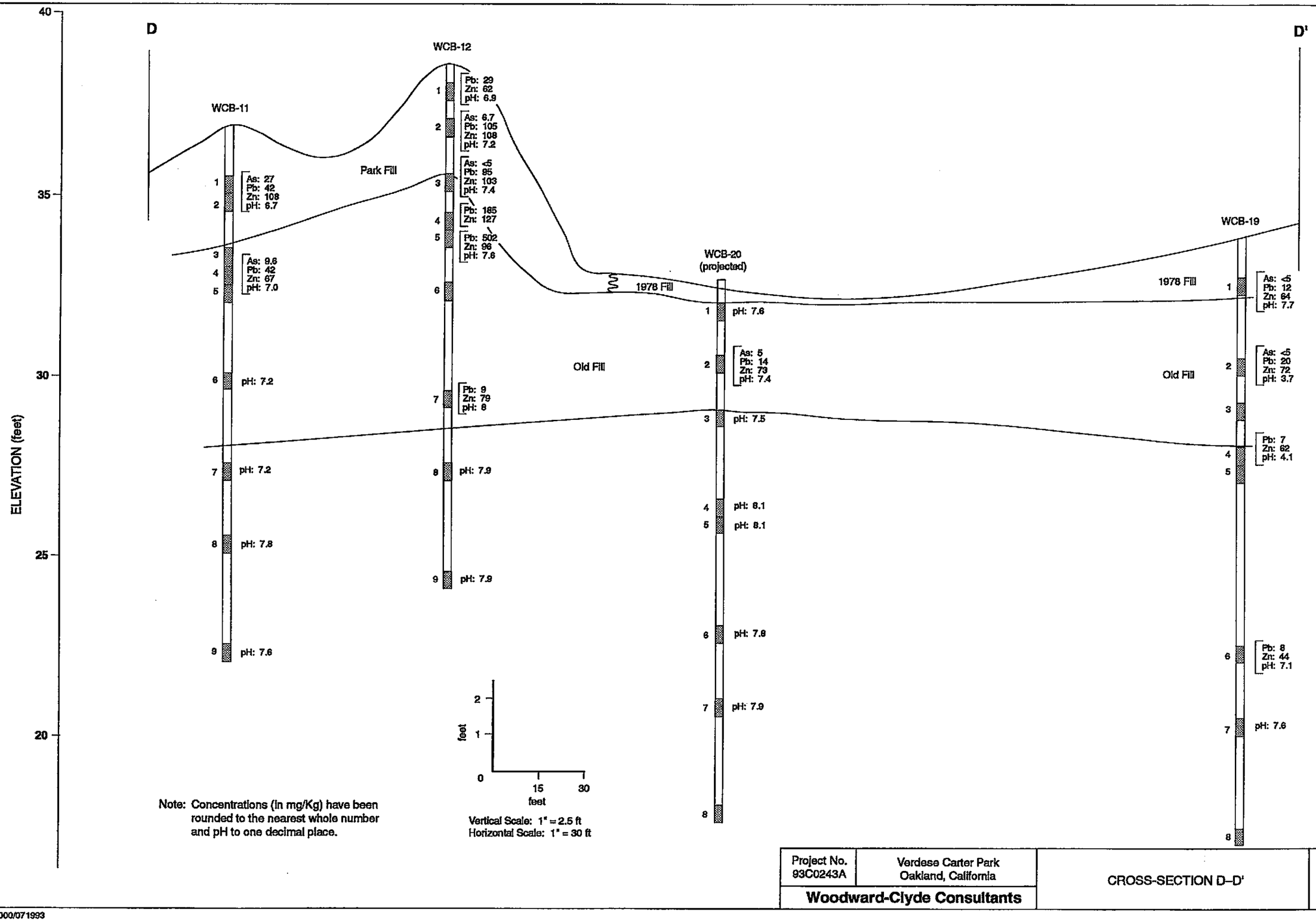
Project No. 93C0243A	Verdese Carter Park Oakland, California	CROSS-SECTION B–B'	Figure 5
Woodward-Clyde Consultants			

93C0243A-3000/071993



Project No. 93C0243A	Verdese Carter Park Oakland, California	CROSS-SECTION C–C'	Figure 6
Woodward-Clyde Consultants			

93C0243A-3000/071993

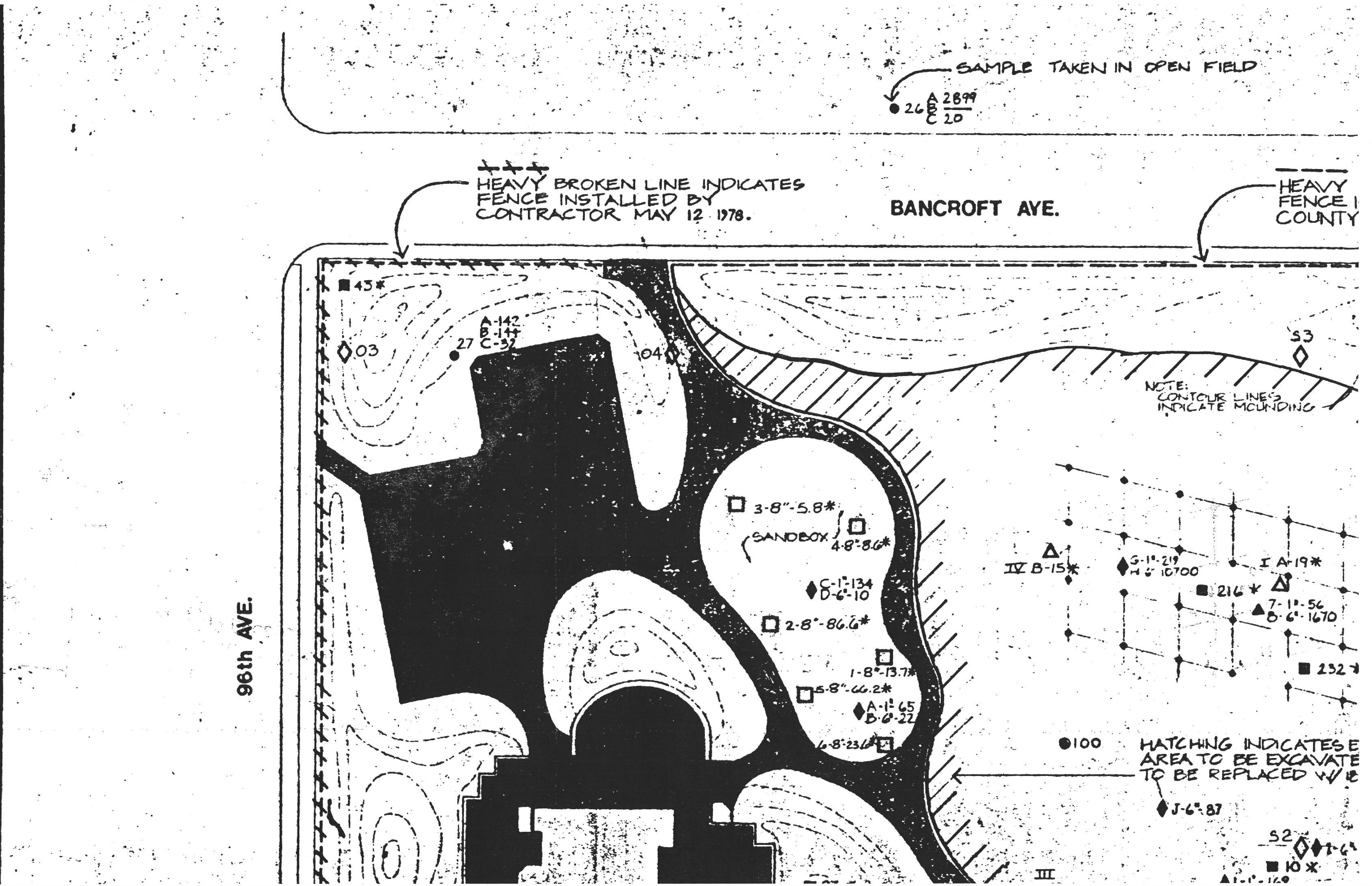


Note: Concentrations (in mg/Kg) have been rounded to the nearest whole number and pH to one decimal place.

Vertical Scale: 1" = 2.5 ft
Horizontal Scale: 1" = 30 ft

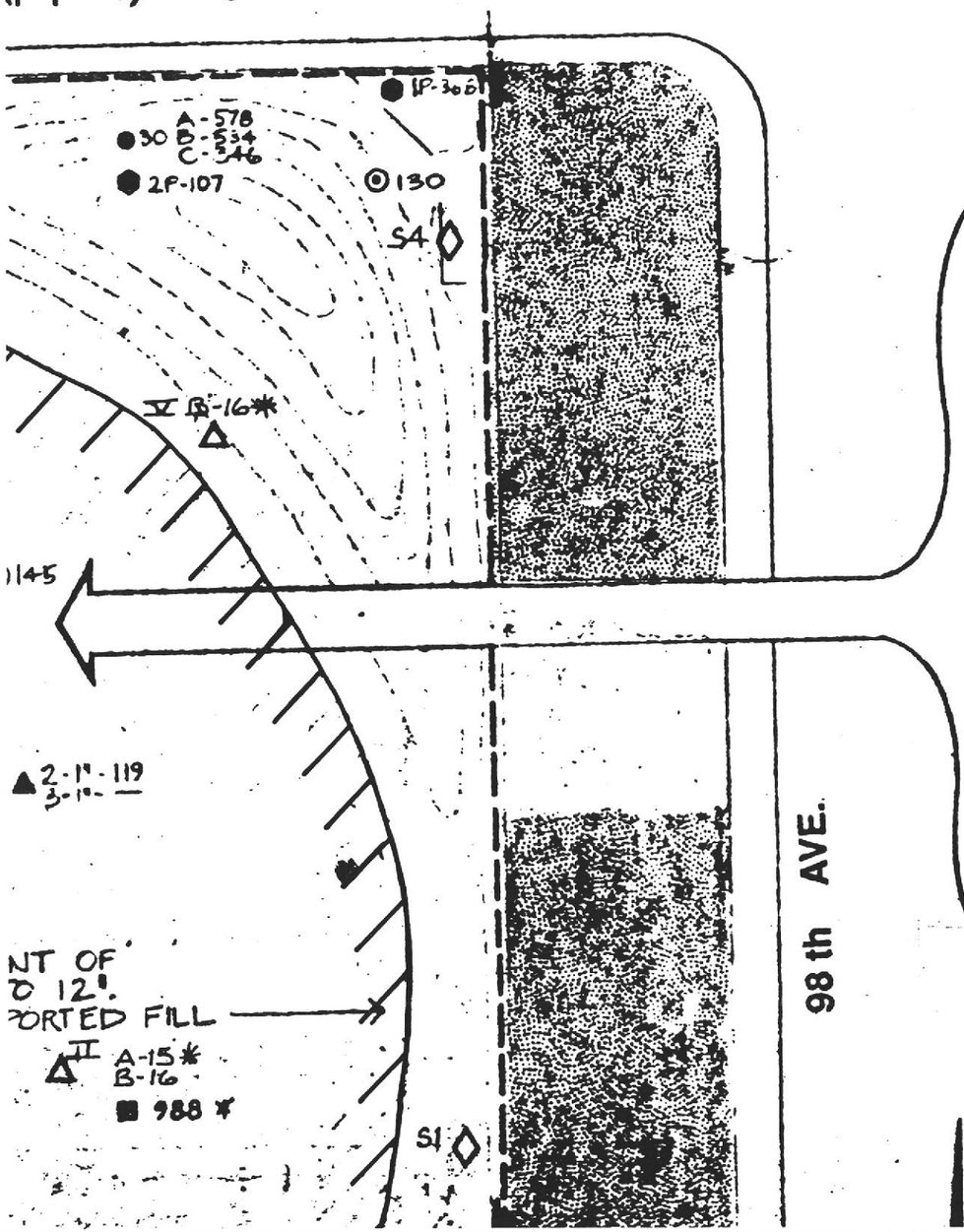
Project No. 93C0243A	Verdese Carter Park Oakland, California	CROSS-SECTION D–D'	Figure 7
Woodward-Clyde Consultants			

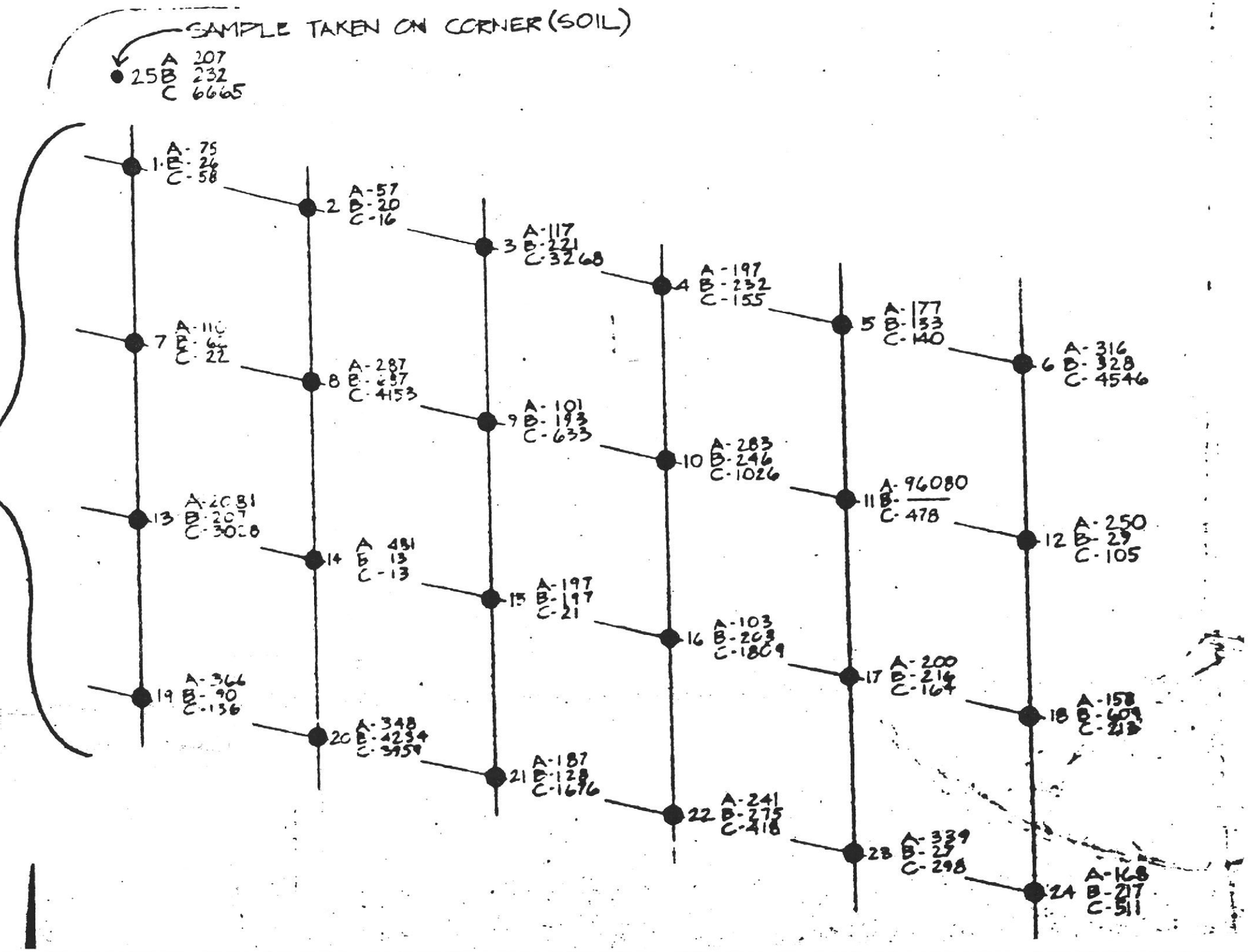
93C0243A-3000/071993

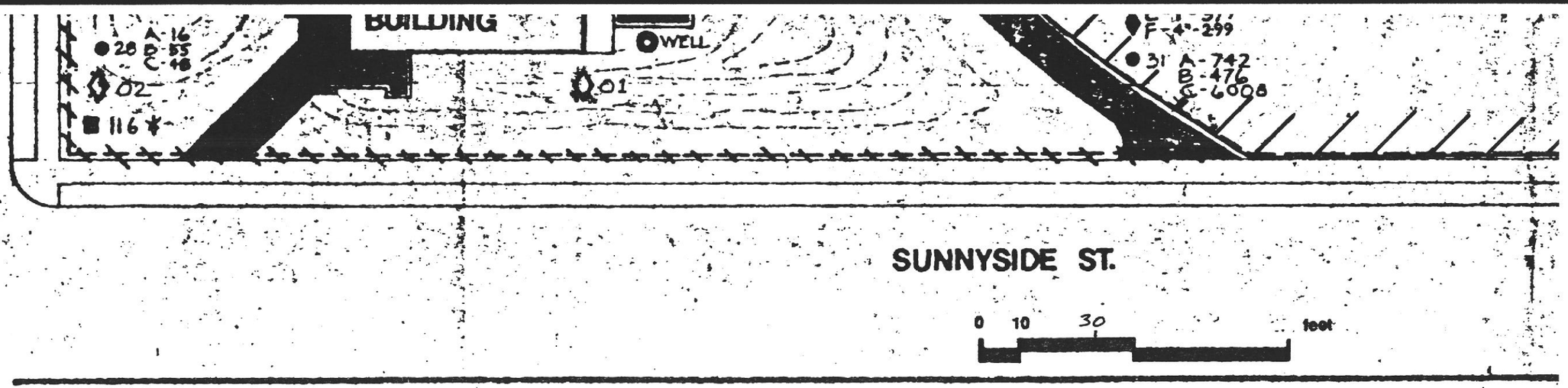


SAMPLE TAKEN IN OPEN FIELD
26 A 2899 B C 20
HEAVY BROKEN LINE INDICATES FENCE INSTALLED BY CONTRACTOR MAY 12 1978.
BANCROFT AVE.
HEAVY FENCE COUNTY
43*
27 A-142 B-144 C-32
03
04
S3
NOTE: CONTOUR LINES INDICATE MOUNDING
3-8"-5.8*
SANDBOX
4-8"-8.6*
C-1"-134 D-6"-10
2-8"-86.6*
1-8"-13.7*
5-8"-66.2*
A-1"-65 B-6"-22
IV B-15*
G-1"-219 H-6"-10700
216 *
I A-19*
7-1"-56 8-6"-1670
232
100
HATCHING INDICATES AREA TO BE EXCAVATE TO BE REPLACED W/
J-6"-87
S2
10 *
96th AVE.
III

KEN LINE INDICATES
LLED AT REQUEST OF
Y 1-4, 1978.







KEY TO LABELS

SYMBOL INDICATES SURVEY OF WHICH SAMPLE IS A PART

LAST NUMBER INDICATES PARTS PER MILLION LEAD

BLANK INDICATES TEST INCONCLUSIVE

ASTERISK INDICATES LOCATION APPROXIMATE

▲ 13 - 6" - 312 *

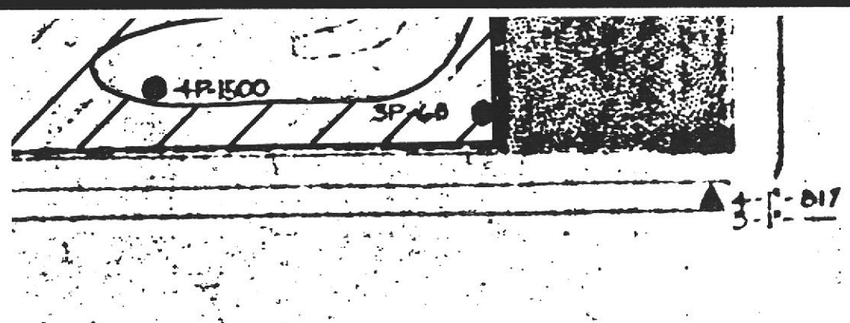
● 8 - B - 1003

SAMPLE NUMBER WITHIN SURVEY

DIMENSION OR LETTER INDICATES DEPTH AT WHICH SAMPLE WAS TAKEN.
A = 0"-1"
B = 5"-6"
C = 11"-12"

SYMBOL	AGENCY
◙	COMMUNITY
⊙	CITY OF OAKLAND
⬢	ALAMEDA COUNTY
▲	STATE OF CALIFORNIA
♦	STATE OF CALIFORNIA
●	STATE OF CALIFORNIA
◊	CITY OF OAKLAND
□	CITY OF OAKLAND
△	STATE OF CALIFORNIA

NOTES. MAP RECONSTRUCTED FROM CITY OF OAKLAND, OFFICE OF PUBLIC WORKS ARCHITECTURAL SERVICES DEPARTMENT MAP DATED 5-18-1978. LOCATIONS OF SAMPLES COLLECTED BY THE UNIVERSITY OF CALIFORNIA ON MAY 11, 1978, AIR AND INDUSTRIAL HYGENE LABORATORY ON MAY 17,1978, AND BY THE CITY ON MAY 31,1978 NOT SHOWN AS LOCATIONS WERE NOT DOCUMENTED. SAMPLES COLLECTED BY STATE DEPARTMENT OF HEALTH SERVICES ON JUNE 23, 1978 ARE OF EMPLACED CLEAN FILL.



N (City of Oakland Plant North)

	DATE
	FEB. 28, 1978
	APR. 7, 1978
	AUG. 16, 1977
	JAN. 26, 1978
	MAR. 13, 1978
	APR. 4, 1978
	MAY 17. 1976
	MAR. 30. 1990
	JUNE 23 1978

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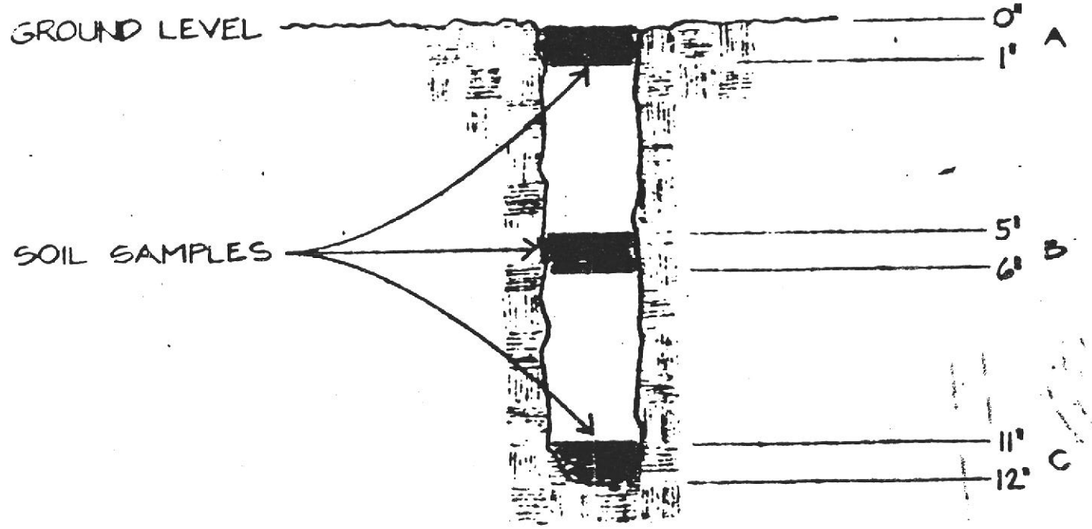
CORE SAMPLE DIAGRAM

NO SCALE



Project No. 93C0243A	Carter Park Oakland, CA	Sample Location Plan for Previous Investigations	Plate 1
Woodward-Clyde Consultants			

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-1

Sheet 1 of 1

Date(s) Drilled	5/13/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	19.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	39	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							0-2" LAWN 2"-4" SILTY SAND (SM) Fill, light yellow, dry, loose, very fine to fine grained 6" SANDY CLAYEY SILT (MH) (FILL) Very dark brown, dry, firm, rootlets, 30-40% clay					
			B-1-1									
			B-1-2									
	35						(PARK FILL) PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff, angular gravels pebble size 1/2" x 1/4" x 1/8", some debris clasts, rootlets					
5			B-1-3									
			B-1-4				SILTY CLAY (CL) Very dark brown, dry, stiff, trace to 5% pebbly gravels subangular to subrounded					
			B-1-5				(OLD FILL) SILTY CLAY (CL) Olive gray to olive brown, dry, very stiff, very fine grained sand, up to 5% pebbly gravels 1/8" x 1/8" subrounded, 5% rootlets					
	30											
10			B-1-6									
			B-1-7				SANDY SILTY CLAY (CL) Light yellow brown, dry, very stiff, 5% subrounded gravels, 20% very fine grained to fine grained sand					
			B-1-8									
	25						GRAVELLY CLAY (CL) Yellow brown, dry to damp, stiff to dense, 30% subangular gravels to 1/2" x 1/2" x 1" size GRAVELLY CLAYEY SAND (SC) Light brown, moist, medium dense, medium grained to coarse grained sand, 15-20% subrounded gravels to 1/2" x 1/2" size, 35-40% clay					
15			B-1-9									
	20		B-1-10				SILTY CLAY (CL) Light yellow brown, damp to moist, firm					
20							BOTTOM OF BORING					

7/16/93 1GL1A VCP2

Woodward-Clyde Consultants

Figure

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-2

Sheet 1 of 1

Date(s) Drilled	5/12/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	14.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-2-1				3" ASPHALT OVER 3" AB (PARK FILL) SILTY CLAY (CL) (FILL) Very dark brown, damp, stiff, 5-10% pebbly gravels					
			B-2-2				(OLD FILL) SILTY CLAY (CL) Dark olive gray, damp, stiff					
5	25		B-2-3				SANDY SILTY CLAY (CL) Light brown, moist, firm, 20% very fine grained sand					
			B-2-4									
			B-2-5				SILTY CLAY (CL) Brown to grayish brown, dry, stiff, black nodules					
10	20		B-2-6									
			B-2-7				BOTTOM OF BORING					
15	15											
20												

Woodward-Clyde Consultants

Figure

7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-3

Sheet 1 of 1

(s) Drilled	5/14/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	14.0
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-3-1				0-2" ASPHALT CLAYEY SANDY GRAVEL (GP)(AB) Yellow (PARK FILL)					
			B-3-2				SILTY CLAY (CL)(FILL) Very dark brown to black, firm to soft					
			B-3-3									
5	25		B-3-4				(OLD FILL)					
			B-3-5				SILTY CLAY (CL) Olive					
							SANDY CLAY (CL) Yellow brown					
			B-3-6				SILTY CLAY (CL) Yellow brown					
10	20		B-3-7				SANDY SILTY CLAY (CL) Light yellow brown, mottled					
			B-3-8									
15	15						BOTTOM OF BORING					

Figure

Woodward-Clyde Consultants

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-4

Sheet 1 of 1

Date(s) Drilled	5/13/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	16.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	34	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							2" ASPHALT					
			B-4-1				SANDY CLAYEY GRAVEL (GC) (AB) Yellow (PARK FILL)					
			B-4-2				SILTY CLAY (CL) (FILL) Black, damp, firm					
	30		B-4-3				GRAVELLY CLAY (CL) (FILL) Orange brown, damp, loose, angular gravel - subrounded gravels to 35%					
5			B-4-4				(OLD FILL) SILTY CLAY (CL) Olive gray, damp, firm					
			B-4-5									
	25		B-4-6									
10							SILTY SANDY CLAY (CL) Light yellow brown, mottled with gray clay, damp, stiff, 20 to 30% very fine grained sand					
			B-4-7									
	20		B-4-8				SANDY CLAY (CL) Yellow brown, damp, stiff, 20-30% very fine grained sand					
15							SILTY CLAY (CL) Light yellow brown, mottled with gray clay, moist, firm to stiff					
			B-4-9									
	15						BOTTOM OF BORING					
20												

Figure

Woodward-Clyde Consultants

7/18/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-5

Sheet 1 of 1

Date(s) Drilled	5/12/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	15.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							3" ASPHALT					
			B-5-1				SANDY SILTY GRAVEL (GC) (AB)					
			B-5-2				Yellow (PARK FILL)					
	30						SILTY CLAY (CL) (FILL) Very dark brown to black, moist, firm, with debris					
			B-5-3									
							(OLD FILL)					
			B-5-4				SILTY CLAY (CL) Very dark brown, moist, firm					
5							SANDY SILTY CLAY (CL) Yellow brown to light yellow brown, dry, stiff, 15% very fine grained sand					
			B-5-5									
			B-5-6									
	25											
							SILTY CLAY (CL) Brown, damp, stiff					
10			B-5-7				GRAVELLY CLAY (CL) Light brown, damp to moist, medium dense, up to 5% medium grained sand, 25% gravel up to 1/2" x 3/4" x 1/2" size					
			B-5-8				GRAVELLY CLAYEY SAND (CL) Brown, orange brown, moist to very moist, medium dense, 20-25% subrounded gravels 1' x 3/4" x 3/4' size, 35-40% clay					
	20											
15			B-5-9									
							BOTTOM OF BORING					
	15											
20												

Figure

Woodward-Clyde Consultants

7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-6

Sheet 1 of 1

Date(s) Drilled	5/14/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	14.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-6-1				SAND (SP) Light gray, dry, loose (SANDBOX FILL)					
							SILTY CLAY (CL) (FILL) Very dark brown					
			B-6-2				GRAVELLY CLAY (CL) (FILL) Very dark brown (OLD FILL)					
5	25		B-6-3				SILTY CLAY (CL) Dark olive brown, damp, firm to stiff					
			B-6-4				SANDY SILTY CLAY (CL) Brown to yellow brown, moist, firm					
10	20		B-6-5				SANDY CLAY (CL) Light yellow brown, damp, firm, 20-30% very fine grained to fine grained sand					
			B-6-6				SILTY CLAY (CL) yellow brown, mottled with gray clay, moist, firm					
15	15		B-6-7				BOTTOM OF BORING					
20												

Figure

Woodward-Clyde Consultants

7/16/93 1GL1 A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-7

Sheet 1 of 1

Date Drilled	5/14/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	14.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-7-1				SAND (SP) (SANDBOX FILL) GRAVELLY CLAY (CL) (FILL) Very dark brown, damp, firm to stiff, 35% subangular gravel 1/2" x 1/2" size					
			B-7-2				(OLD FILL) SILTY CLAY (CL) Olive gray to grayish brown, mottled, damp, firm to stiff					
5	25		B-7-3				SILTY SANDY CLAY (CL) Light yellow brown, damp to moist, stiff, 25-30% very fine to fine grained sand					
			B-7-4									
10	20		B-7-5				SILTY CLAY (CL) Yellow brown, damp to moist, firm					
			B-7-6				SANDY CLAY (CL) Light yellow brown, mottled with gray clay, damp, stiff, 20% very fine grained sand					
15	15		B-7-7				SILTY CLAY (CL) Yellow brown, damp to moist, firm					

Woodward-Clyde Consultants

Figure

7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-8

Sheet 1 of 1

Date(s) Drilled	5/13/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	16.0
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	34	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							2" ASPHALT SANDY SILTY GRAVEL (GC)(AB) yellow stained (PARK FILL)					
			B-8-1									
			B-8-2									
							PEBBLY CLAY (CL)(FILL) Very dark brown to black, damp, firm					
	30		B-8-3									
			B-8-4				SILTY CLAY (CL) (FILL) Dark olive gray, dry to damp, stiff, brick and concrete debris					
5							(OLD FILL)					
			B-8-5				SILTY SANDY CLAY (CL) Olive brown, damp, firm to stiff, 15-20% fine grained sand					
			B-8-6									
	25											
10							SANDY SILTY CLAY (CL) Olive brown to orange brown, mottled with saturated gray clay in burrows or rootlets, damp, firm, 15-20% very fine grained sand					
			B-8-7				SANDY CLAY (CL) Orange brown, damp, firm to stiff, 5% subrounded pebbly gravels to 1/8" x 1/8" in size, 25-30% fine grained to medium grained sand					
			B-8-8									
	20						SILTY CLAY (CL) Brown mottled with gray clay, moist, firm to stiff					
15			B-8-9									
							BOTTOM OF BORING					
	15											
20												

Figure

Woodward-Clyde Consultants

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-9

Sheet 1 of 1

Date(s) Drilled	5/12/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	15.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-9-1				3" ASPHALT OVER 4" AB (PARK FILL) SILTY CLAY (CL) (FILL) Very dark brown to black, damp, stiff, trace 1/4" x 1/8" subrounded pebbles, rootlets and burrows					
			B-9-2									
5			B-9-3				(OLD FILL) SILTY CLAY (CL) Yellow brown, damp, firm to stiff, mottled with brown clay, surfaces moist					
	25		B-9-4									
10			B-9-5				SANDY SILTY CLAY (CL) Brown, dry, stiff, 5-10% black nodules, 20% very fine grained sand					
			B-9-6									
	20		B-9-7									
15			B-9-8				GRAVELLY CLAY (CL) Light brown, very moist, 30% subangular-subrounded gravels to 1" x 1" x 1/2" size BOTTOM OF BORING					
	15											
20												

Figure

Woodward-Clyde Consultants

7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-10

Sheet 1 of 1

Date(s) Drilled	5/12/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	20.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	39	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0			B-10-1				0-2" LAWN 2"-4" SILTY SAND (FILL) CLAYEY SILTY SAND (SM) (FILL) Very dark brown to black, dry, medium dense, rootlets					
			B-10-2									
	35		B-10-3				PEBBLY CLAY (CL) (FILL) Dark brown, dry, stiff					
5							(PARK FILL) (RELOC. OLD FILL?)					
			B-10-4				SILTY CLAY (CL) Very dark brown to black, damp, stiff, trace pebbly gravels, rootlets, with small brick debris clasts					
			B-10-5									
	30		B-10-6				(OLD FILL) SILTY CLAY (CL) Dark olive gray, damp, firm to stiff, 5% subangular pebble gravels to 1/8" size					
10			B-10-7									
			B-10-8				SANDY SILTY CLAY (CL) Light yellow brown, dry, stiff					
	25											
15			B-10-9				SILTY CLAY (CL) Orange brown, mottled with light gray clay, stiff, damp to moist					
			B-10-10									
	20											
20			B-10-11									

Figure

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7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-11

Sheet 1 of 1

Date(s) Drilled	5/13/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	14.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	37	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							0-2" LAWN 2"-4" TOPSOIL					
	35		B-11-1				SILTY SAND (FILL) Dry, loose					
			B-11-2				PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff, angular gravels with debris					
			B-11-3				(PARK FILL) (RELOC. OLD FILL?)					
			B-11-4				SILTY CLAY (CL) (FILL) Very dark brown, damp, stiff, 5% pebbles, rootlets					
5			B-11-5									
	30		B-11-6									
							(OLD FILL)					
			B-11-7				SILTY CLAY (CL) Olive gray to dark olive gray, damp, very stiff, 5% pebbly gravels, black nodules					
10							SANDY CLAY (CL) Olive brown, damp, very stiff, 20% very fine grained sand, 5% black nodules					
	25		B-11-8									
							SILTY CLAY (CL) Light yellow brown, moist, firm to stiff					
			B-11-9									
15							BOTTOM OF BORING					
	20											
20												

Figure

Woodward-Clyde Consultants

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-12

Sheet 1 of 1

Date(s) Drilled	5/13/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	14.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	39	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	35		B-12-1				0-2" LAWN CLAYEY SILTY SAND (SM) (FILL)					
			B-12-2				PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff					
			B-12-3				SILTY CLAY (CL) (FILL) Very dark gray to black, damp, stiff					
5			B-12-4				glass and wood debris					
			B-12-5				(PARK FILL) (RELOC. OLD FILL)					
			B-12-6				SILTY CLAY (CL) (FILL) Very dark gray to black, damp, stiff wood debris					
10	30		B-12-7				wood debris (OLD FILL)					
			B-12-8				SILTY CLAY (CL) Olive, mottled with orange brown sandy clay, damp, firm					
15	25		B-12-9				BOTTOM OF BORING					
20	20											

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Figure

7/17/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-13

Sheet 1 of 1

Date(s) Drilled	5/11/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	17.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	35	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	SAMPLES Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	35		B-13-1				0-2" LAWN SILTY CLAYEY SAND (SC) (FILL) (PARK FILL) PEBBLY CLAY (CL) (FILL) Very dark brown to black, dry, stiff, 20-30% angular-subrounded gravels to 1/4" x 1/4" size					
			B-13-2				decrease gravels to 5-10%, with rootlets and small brick debris, angular pebbles					
5	30		B-13-3				debris from 5'-6'					
							(OLD FILL) SILTY CLAY (CL) Light brown, dry, very stiff, trace subrounded pebbly gravels to 1/8" x 1/4" size					
			B-13-4									
			B-13-5									
			B-13-6									
10	25											
			B-13-7									
			B-13-8				SANDY SILTY CLAY (CL) Light brown to olive brown, damp, stiff, damp, 20% very fine grained to fine grained sand					
15	20											
			B-13-9									
							BOTTOM OF BORING					
20	15											

Figure

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7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-14

Sheet 1 of 1

Date(s) Drilled	5/11/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	17.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	36	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	35		B-14-1				0-2" LAWN SILTY SAND (SM) (FILL) Light brown, very fine grained sand (PARK FILL)					
			B-14-2				PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff, 20-30% pebbly gravels					
			B-14-3				brick, concrete debris in fill from 4'-5'					
5	30						concrete debris, at 5' (OLD FILL)					
			B-14-4				SILTY CLAY (CL) Dark olive gray, mottled with small iron-oxide nodules, dry, stiff					
			B-14-5									
			B-14-6				SANDY SILTY CLAY (CL) Yellow brown, damp, stiff, 20% very fine grained sand					
10	25						moist					
			B-14-7									
			B-14-8									
15	20						SILTY CLAY (CL) Light yellow brown, moist, soft to firm					
			B-14-9									
20	15						BOTTOM OF BORING					

Figure

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7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-15

Sheet 1 of 1

Date(s) Drilled	5/10/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	16.0
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	38	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	38						0-4" LAWN 4"-6" SAND FILL (ML)					
			B-15-1				CLAYEY SILT (CL) Light brown, dry, very fine grained to fine grained, 20% clay					
			B-15-2									
	35						PEBBLY CLAY (CL) (FILL) Dark brown, dry, stiff, brick debris in matrix, concrete rubble at 2'-2.5' angular concrete clasts in clay matrix, fill material (PARK FILL) (RELOC. OLD FILL?)					
			B-15-3									
			B-15-4									
5			B-15-5				SILTY CLAY (CL) Brown, damp, stiff, pebbly gravel, 10% subrounded gravels 1/4" x 1/2" size					
	30		B-15-6									
10												
			B-15-7									
	25		B-15-8				SANDY CLAY (CL) Light yellow brown, dry, stiff, 20-30% very fine grained sand, trace pebbles					
15												
			B-15-9				SILTY CLAY (CL) Light brown, damp, firm to stiff, 5-10% pebbly gravel 1/4" x 1/2" subrounded gravels					
	20						BOTTOM OF BORING					
20												

Figure

Woodward-Clyde Consultants

7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-16

Sheet 1 of 1

Date(s) Drilled	5/10/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	15.5
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	34	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							0-2" LAWN SILTY SAND (SM) (FILL) Light brown, dry, firm, rootlets, very fine grained to fine grained sand					
			B-16-1				(1978 FILL)					
			B-16-2				PEBBLY CLAY (CL) (FILL) Dark brown, dry, stiff, fragments of brick debris, rootlets filled with iron-oxide, subangular pebbly gravel 1/4" x 1/4" x 1/2" size					
	30		B-16-3				(OLD FILL)					
5			B-16-4				SILTY CLAY (CL) Grayish-olive brown, damp, firm to stiff, 20% very fine grained to fine grained sand, trace rounded pebbles to 1/8" x 1/4" size					
			B-16-5									
			B-16-6									
	25											
10			B-16-7									
			B-16-8									
	20						SILTY SANDY CLAY (CL) Yellowish brown, damp, firm to stiff, 5% subrounded 1/4" size pebbles, 5% coarse grained sand, 20% very fine grained sand					
15			B-16-9				BOTTOM OF BORING					
	15											
20												

Figure

Woodward-Clyde Consultants

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-17

Sheet 1 of 1

Date(s) Drilled	5/11/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	15.0
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-17-1				0-2" LAWN CLAYEY SILTY SAND (SM) (FILL) Light brown, dry, loose, very fine grained sand, 20% clay					
			B-17-2				CLAYEY SILT (MH) (FILL) Dark brown, moist, soft, rootlets, worm burrows, wood debris, 30% clay (1978 FILL)					
			B-17-3				PEBBLY CLAY (CL) (FILL) Dark brown, damp, stiff, 35% subrounded pebbly gravels (OLD FILL)					
5			B-17-4				SILTY CLAY (CL) Olive brown, moist, firm to stiff, up to 5% subrounded pebbly gravels					
	25		B-17-5									
			B-17-6				SANDY SILTY CLAY (CL) Mottled olive with gray colored clay, damp, firm to stiff, trace subrounded pebbly gravels to 1/4" x 1/4" size					
10							becoming stiffer					
	20						SILTY CLAY (CL) Light yellow brown, moist, stiff, trace pebbles					
			B-17-7									
15							BOTTOM OF BORING					
	15											
20												

Figure

Woodward-Clyde Consultants

7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-18

Sheet 1 of 1

Date(s) Drilled	5/10/00	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	16.0
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							0-2" LAWN SAND (FILL) Brick debris					
			B-18-1				CLAYEY SILTY SAND (SM) Light brown, dry, very fine grained sand, 20% clay, 20% orange-red decomposed brick (1978 FILL)					
	30		B-18-2				PEBBLY CLAY (CL) Dark brown, to black, dry, stiff, pebbles to 1.2" size, 20-30% subangular-subrounded gravels (OLD FILL)					
			B-18-3									
			B-18-4				SILTY CLAY (CL) Olive brown, stiff, damp to moist, decomposed roots					
5												
	25		B-18-5				SANDY CLAY (CL) Olive gray, moist, firm, 20-30% very fine grained sand, rootlets turning to iron-oxide					
10												
			B-18-6				SILTY CLAY (CL) Brown, mottled with gray clay, moist, stiff					
	20		B-18-7									
15												
			B-18-8				CLAYEY SAND (CL) Dark green gray, very moist to wet, soft, fine grained to medium grained sand, 40% clay					
							BOTTOM OF BORING					
	15											
20												

Figure

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7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-19

Sheet 1 of 1

Date(s) Drilled	5/10/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	16.5
Drill Rig Type	CME 65	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	34	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							0-2" LAWN SANDY CLAYEY SILT (ML) (FILL)					
			B-19-1				(1978 FILL) PEBBLY CLAY (CL) (FILL) Dark brown to black, dry, stiff, 20-30% angular to rounded 1/4" x 1/2" x 1/2" pebbly gravels, some angular brick and concrete fragments					
	30		B-19-2									
			B-19-3									
5			B-19-4									
			B-19-5				(OLD FILL) SILTY SANDY CLAY (CL) Olive grayish brown, damp, stiff, 20% very fine grained sand, trace subrounded pebbly gravels 1/4" x 1/4" x 1/4" size					
	25		B-19-6									
10												
			B-19-7									
							SILTY CLAY (CL) Olive brown, mottled with gray					
	20		B-19-8									
15												
			B-19-9				SANDY CLAY (CL) Dark greenish gray, moist, firm to stiff, 35-40% very fine grained to fine grained sand					
							BOTTOM OF BORING					
	15											
20												

Woodward-Clyde Consultants

Figure

7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-20

Sheet 1 of 1

Date(s) Drilled	5/11/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	15.0
Drill Rig Type	CME 55	Drilled By	HEW	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-20-1				No lawn here, near water faucet 2" CLAYEY SILTY SAND (SM) (FILL) Light brown (1978 FILL)					
			B-20-2				PEBBLY CLAY (CL) (FILL) Very dark brown to black, damp, firm to stiff, small 1/4" x 1/4" subrounded pebbly gravels					
5			B-20-3				(OLD FILL) SILTY CLAY (CL) Yellowish brown, mottled slightly with gray, moist, firm, very fine grained, 5% small black nodules					
	25		B-20-4				SANDY SILTY CLAY (CL) Olive brown, mottled with gray, moist, stiff, 20% very fine grained sand					
			B-20-5									
10			B-20-6				SILTY SANDY CLAY (CL) Dark greenish gray, mottled with gray black clay, moist, firm, 25-30% very fine grained to fine grained sand					
	20		B-20-7				SILTY CLAY (CL) Brown to olive gray, mottled with saturated to wet gray caly in burrows,moist, stiff, trace to 5% small 1/4" x 1/4" subrounded pebbly gravels					
15			B-20-8				BOTTOM OF BORING					
	15											
20												

Figure

Woodward-Clyde Consultants

7/16/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-21

Sheet 1 of 1

Date(s) Drilled	6/24/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	9.0
Drill Rig Type	CME 75	Drilled By	Great Sierra	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	36	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	SAMPLES Number	SAMPLES Sampling Resistance	SAMPLES Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	35		B-21-1				0-4" LAWN CLAYEY SILT (MH) (FILL) Light brown, dry (PARK FILL)					
			B-21-2				PEBBLY CLAY (CL) (FILL) Black, dry, stiff with concrete debris fragments					
			B-21-3									
5	30		B-21-4				(OLD FILL) GRAVELLY CLAY (CL) Orange brown, soil stained gray with hydrocarbon odor					
			B-21-5									
			B-21-6				SILTY CLAY (CL) Dark greenish gray, damp to moist, stiff, slight hydrocarbon odor					
10	25						BOTTOM OF BORING					
15	20											
20	15											

Figure

Woodward-Clyde Consultants

7/17/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-22

Sheet 1 of 1

Date(s) Drilled	6/24/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	8.5
Drill Rig Type	CME 75	Drilled By	Great Sierra	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	38	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	35		B-22-1				0-4" LAWN PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff, nails, glass debris					
			B-22-2				(PARK FILL) (RELOC, OLD FILL?)					
5			B-22-3				PEBBLY CLAY (CL) (FILL) Very dark brown, same as above with brick and concrete debris					
							Cobble size fill debris (OLD FILL)					
	30		B-22-4				SANDY SILTY CLAY (CL) Light yellow brown, damp, stiff					
			B-22-5									
10							BOTTOM OF BORING					
15	25											
20	20											

7/17/93 1GL1A VCP2

Woodward-Clyde Consultants

Figure

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-23

Sheet 1 of 1

Date(s) Drilled	6/24/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	8.5
Drill Rig Type	CME 75	Drilled By	Great Sierra	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	38	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							0-21" LAWN CLAYEY SILT Brown to dark brown topsoil					
			B-23-1				PEBBLY CLAY (CL) (FILL) Black, dry, stiff, glass debris					
			B-23-2				SANDY GRAVELLY CLAY (CL) (FILL) Light gray to grayish brown, dry, hard, with glass debris					
	35						(PARK FILL) (RELOC. OLD FILL?)					
5							SILTY CLAY (CL) (FILL) Black, pebbly, dry, stiff					
			B-23-3				(OLD FILL)					
							SANDY SILTY CLAY (CL) Olive, dry, stiff					
	30		B-23-4									
							BOTTOM OF BORING					
10												
	25											
15												
	20											
20												

Woodward-Clyde Consultants

Figure

7/19/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-24

Sheet 1 of 1

Date(s) Drilled	6/24/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	8.5
Drill Rig Type	CME 75	Drilled By	Great Sierra	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	34	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-24-1				0-3" ASPHALT over 4" (AB) (YELLOW SILTY SANDY GRAVEL) (PARK FILL)					
							PEBBLY SILTY CLAY (CL) (FILL) Black, damp, firm (OLD FILL)					
			B-24-2				SILTY CLAY (CL) Light yellow brown, mottled with gray, dry, stiff					
			B-24-3									
5			B-24-4				SILTY CLAY (CL) Light yellow brown, mottled with gray, dry, stiff					
			B-24-5									
	25						BOTTOM OF BORING					
10												
	20											
15												
	15											
20												

Figure

Woodward-Clyde Consultants

7/19/93 1GL1A VCP2

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-25

Sheet 1 of 1

Date(s) Drilled	6/24/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	8.0
Drill Rig Type	CME 75	Drilled By	Great Sierra	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	___ ft ATD ___ ft after ___ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	33	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0							0-2" ASPHALT over 4" AB (YELLOW GRAVEL) (PARK FILL)					
			B-25-1				PEBBLY SILTY CLAY (CL) (FILL) Very dark brown, damp, firm to stiff					
			B-25-2									
	30		B-25-3				SILTY CLAY (CL) Olive brown, damp, stiff					
			B-25-4									
5			B-25-5									
			B-25-6				Sample 5 full of slough; data not used					
			B-25-7									
25							BOTTOM OF BORING					
10												
	20											
15												
	15											
20												

Figure

Woodward-Clyde Consultants

Project: Verdese Carter Park
Project Location: 98th and Bancroft, Oakland
Project Number: 93C0243A

Log of Boring WCB-26

Sheet 1 of 1

Date(s) Drilled	6/24/93	Logged By	W. Loskutoff	Checked By	M. McGuire
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth Drilled (feet)	8.5
Drill Rig Type	CME 75	Drilled By	Great Sierra	Borehole Backfill	Cement Grout
Apparent Groundwater Depth	____ ft ATD ____ ft after ____ days	Hammer Type		Hammer Weight/ Drop (lbs/in.)	
Comments	Mod. Cal Drive Sampler	Surface Elevation (feet)	34	Elevation Datum	

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Well Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Qu, psf	Liquid Limit, %	Plasticity Index, %
0	30		B-26-1				0-4" LAWN CLAYEY SILT (MH) Light brown, dry (1978 FILL) PEBBLY CLAY (CL) (FILL) Dark brown to black, dry, stiff					
5			B-26-2				(OLD FILL)					
			B-26-3				SILTY CLAY (CL) Brown, damp					
	25		B-26-4				BOTTOM OF BORING					
10	20											
15	15											
20												

Figure

Woodward-Clyde Consultants

7/19/93 1GL1A VCP2

Introduction

Soil and water samples collected for this investigation were analyzed by CKY Laboratory, located in Torrance, California and ATI Laboratory located in San Diego, California. The samples were analyzed for Title 22 metals (EPA Methods 6010/7000 series), pH (EPA Method 9045), organochlorine pesticides (EPA Method 8080), organophosphorus pesticides (EPA Method 8140), and chlorinated herbicides (EPA Method 8150). One sample was extracted using the WET citrate and the WET deionized water extraction method. The extracts were analyzed for arsenic, mercury, lead, and zinc. The soil and water analytical results for this project were submitted to a thorough QA/QC review. The review included the following:

- Holding Time Review - Check for exceedences of prescribed holding times.
- Blank Review - Review blank analyses for evidence of potential contaminants
- Spike Review - Review spike recoveries and spike duplicate relative percent differences as a check for analytical precision and accuracy.
- Duplicate Review - Review duplicate analyses for agreement of results as a check for analytical precision.
- Surrogate Review - Review surrogate recoveries for possible matrix interferences.

Each of the above QA/QC checks is discussed in detail in this section.

Holding Time Review

Analytical methods used for this study have an associated prescribed holding time, that is the maximum amount of time after collection that a sample may be held prior to extraction and/or analysis. Sample integrity becomes questionable for samples extracted and/or analyzed outside of the holding times owing to physical and chemical changes to the sample such as degradation or volatilization. Results of such analyses are suspect. The holding times for all samples for all analyses were reviewed. Holding times were met for each of the analyses.

Blank Review

Blank samples are analyzed in order to check for potential sample contamination. Information regarding the source of contamination may also be gained by analyzing a variety of blanks prepared at several points during sample collection and analysis. The blanks analyzed for this project included the following:

- Method Blanks - Deionized, distilled water that is extracted and analyzed as a sample. Analysis of the method blank indicates potential sources of contamination from laboratory sources (e.g. contaminated reagents, improperly cleaned laboratory equipment, or persistent contamination due to presence os certain compounds in the ambient laboratory air). method blank was analyzed for each analytical method at least once every day that the method was used.
- Equipment Blanks - A blank that is prepared in the field by pouring distilled water into sampling equipment, then into sample containers. Usually, the equipment blank is submitted to the laboratory 'blind' (under a fictitious location designation).

Analysis of the equipment blank indicates potential sources of contamination of samples from improperly cleaned sampling equipment or sample containers or from ambient air contamination. One equipment blank was collected with the groundwater samples. The equipment blanks were analyzed for full the suite of analyses.

The reported method blanks were ND for each of the analyses. Thus, laboratory conditions are considered acceptable. One equipment was collected and labeled VCPEQB. The equipment blank was analyzed for the full suite of analyses. The results for the equipment blank were ND. Thus, equipment decontamination procedures are considered acceptable.

Spike Review

Spikes are performed in order to evaluate the efficiency of the sample extraction and analysis procedures. Spikes are performed in the form of matrix spikes and reagent spikes. Matrix spikes are necessary as matrix interference (that is, interferences from the sample matrix - water, soil, or other) which may have widely varying impacts on the accuracy and precision of the extraction and analysis. The matrix spike is prepared by the addition of known quantities of target analytes to a sample. The sample is extracted and analyzed.The results of the analysis are compared with the known additions and a matrix spike recovery is calculated. The recovery gives an evaluation of the accuracy of the extraction and analysis procedures. Typically matrix spikes are performed in duplicate in order to also evaluate the precision of the methods. Matrix spike recoveries are reviewed to check that they are within acceptable range. However, the acceptable ranges vary widely according to analytical method and matrix. The reagent spike, sometimes referred to as Laboratory Control Sample (LCS) are necessary to monitor accuracy only. The reagent spike is prepared similarly to the matrix spike, except a control (contaminant free) matrix is used in place of the sample matrix. The recovery of the reagent spike gives an evaluation of laboratory accuracy independent of matrix interferences.

The matrix spike recoveries for metals ranged from 0 to 290 percent. Some recoveries were outside the project defined control limits. However, the laboratory noted that in each case where a matrix spike recovery was outside of the limits, the corresponding LCS recovery was within the limit. The laboratory therefore attributed each of the recoveries outside of the project accuracy limits to matrix interference. Samples with out of limit matrix spike recoveries listed on Table 1 should be viewed as estimated values, as the detected result may have been subject to matrix interference. The matrix spike recoveries for the organic analyses (Method 8080, 8140, and 8150) ranged from 0 to 128 percent. Sample B-9-1 Method 8150 matrix spike recovery for phorate was 0 percent and was outside control limits. The laboratory considered this to be an anomalous result because the associated LCS and surrogate recoveries were acceptable. The LCS recovery ranges were within the project established acceptable ranges, for each of the analyses as were the other matrix spike recoveries. Laboratory accuracy is considered acceptable.

Typically reagent spikes are performed in duplicate in order to also evaluate the precision of the methods using reagent spike duplicate recovery relative percent differences (RPDs) calculated as:

RPD = [(Result 1 - Result 2)/ (Average of Result 1 and Result 2)] X 100

The reported matrix spike duplicate recovery RPDs for organic analyses ranged from 7 to 25 percent. The RPD's indicate acceptable precision. It should be noted inorganic precision was assessed through laboratory duplicate analyses.

Duplicate Analyses

Analysis of duplicates gives an evaluation of sampling and analytical precision. Laboratory duplicates (duplicate analyses performed on two aliquots of the same sample) reflect analytical precision which field duplicates (two samples collected at the same time and the same station in the field) reflect both sampling and analytical precision as well as sample media heterogeneity. Field duplicates are generally submitted to the laboratory "blind" (with a fictitious name so that the laboratory does not know they are duplicates).

The laboratory performed metal and pH analyses in duplicate, to evaluate precision and matrix homogeneity. The metal RPD's ranged from 0 to 61 percent, see Table 2. The laboratory attributed the out of limit RPD's to matrix (soil) and target compound heterogeneity. The pH RPD's ranged from 0 to 2 percent, indicating acceptable precision and minimal to no heterogeneity for pH.

Eighteen blind duplicate soil samples were collected and analyzed for a variety of analyses. Each of the duplicate pairs are listed on Table 3. Also included on Table 3, are the detection limit, detected concentration, and calculated RPD. Blind duplicate metal RPD's ranged from 0 to 179 percent. Duplicate analyses again showed compound stratification and matrix heterogeneity. Data associated with an RPD above 30 percent should be viewed as an estimated value, as the compound is likely stratified within the matrix. The duplicate metal results indicate compound and matrix heterogeneity. The pH RPD's ranged from 0 to 36 percent. The RPD's above 20 percent represent heterogenous samples. The organic analysis results were each reported to be ND. Thus results are in agreement.

Surrogate Recoveries

Surrogates are organic compounds which are similar to the analytes of interest in chemical behavior, but which are not normally found in environmental samples. Surrogates are added to samples to monitor the effect of the matrix on the accuracy of the analysis. Surrogates are only used for organic analyses. Results are reported in terms of percent recovery. The reported surrogate recoveries for this investigation were within laboratory established limits. Matrix interferences should be considered minimal for the organic analyses.

QA/QC Summary

The data for the investigation has been subjected to an extensive QA/QC review, and has been found to be of satisfactory quality with limitations. Holding times were met for all sample analyses. No evidence of method blank contamination was found in any method blank analyses. Equipment blank sample VCPEQB was reported to be ND, thus equipment decontamination procedures are considered acceptable. The matrix spike analyses indicate matrix interference for metal analyses. Matrix spike and spike duplicate analyses for organic analyses indicate minimal to little matrix interference and acceptable accuracy. Laboratory and blind duplicate samples were not completely in agreement for metal analyses, indicating likely compound stratification and matrix heterogeneity. Surrogate recoveries were within laboratory established limits, indicating minimal to no matrix effect on the analysis results.

In summary, the results of the QA/QC review show that the data set has acceptable analytical accuracy and precision, with limitations to the use of the metals data due to compound stratication and matrix heterogeneity.

Table 1. Matrix Spike Recoveries Outside of Project Limits

Sample I.D.	Method	Compound	Recovery	Limit
B-25-1	EPA 6010/7000	Arsenic	40	75 - 125
	EPA 6010/7000	Lead	39	75 - 125
B-21-1	EPA 6010/7000	Arsenic	50	75 - 125
B-15-2	EPA 6010/7000	Lead	190	75 - 125
B-5-1	EPA 6010/7000	Arsenic	-25	75 - 125
	EPA 6010/7000	Lead	-100	75 - 125
	EPA 6010/7000	Zinc	163	75 - 125
B-7-1	EPA 6010/7000	Antimony	39	75 - 125
	EPA 6010/7000	Arsenic	138	75 - 125
	EPA 6010/7000	Barium	290	75 - 125
	EPA 6010/7000	Selenium	0	75 - 125
	EPA 8150	Phorate	0	40 - 140
B-15-4	EPA 6010/7000	Antimony	37	75 - 125
	EPA 6010/7000	Copper	48	75 - 125
	EPA 6010/7000	Selenium	41	75 - 125
B-21-2	EPA 6010/7000	Lead	61	75 - 125

Table 2. Laboratory RPDs Outside of Project Limits

Sample I.D.	Method	Compound	RPD (a)	Limit
B-5-1	EPA 6010/7000	Arsenic	41	20
	EPA 6010/7000	lead	81	20
B-8-4	EPA 6010/7000	Zinc	29	20
B-7-1	EPA 6010/7000	Arsenic	21	20
	EPA 6010/7000	Barium	61	20
	EPA 6010/7000	Chromium	25	20
	EPA 6010/7000	Vanadium	34	20
B-15-2	EPA 6010/7000	Lead	30	20
B-15-4	EPA 6010/7000	Cobalt	25	20
	EPA 6010/7000	Copper	47	20
	EPA 6010/7000	Zinc	23	20
B-25-1	EPA 6010/7000	Arsenic	40	20
	EPA 6010/7000	Lead	39	20
B-21-2	EPA 6010/7000	Arsenic	50	20

a - Relative percent difference

Table 3. Carter Park Blind Field Soil Duplicate RPDs

Sample I.D.s	Parameter	Detection Limit mg/kg	Detected Values mg/kg		RPD (a)
B-2-3/ B-2-4	pH	-	7.32	7.30	0
	Lead	5	5.78	8.8	2
	Zinc	5	44.1	44.4	8
B-5-5/ B-5-6	pH	-	8.14	8.14	0
	Lead	5	10.1	8.4	18
	Zinc	5	49.7	51.2	3
B-12-4/ B-12-5	Lead	5	185	502	92
	Zinc	5	127	95.5	28
B-4-5/ B-4-6	Lead	5	6.09	6.37	4
	Zinc	5	53	62.9	17
B-1-6/ B-1-7	pH	-	8.23	8.25	0
B-4-4/ B-4-5	pH	-	7.05	7.5	6
B-16-2/B-2-3	Antimony	15	ND	ND	-
	Arsenic	5	ND	ND	-
	Barium	2.5	240	148	47
	Berryllium	0.75	ND	ND	-
	Cadmium	1	ND	ND	-
	Chromium	2.5	6.3	52.4	157
	Cobalt	2.5	10.2	8.91	14
	Copper	1	40.7	38.7	5
	Lead	5	8.87	6.97	24
	Mercury	0.05	ND	ND	-
	Molybdenum	2.5	ND	ND	-
	Nickel	2.5	44.4	39.2	12
	Selenium	15	ND	ND	-
	Silver	1	ND	ND	-
	Thallium	20	ND	ND	-
	Vanadium	2.5	62.5	43.9	35
	Zinc	5	52.4	49.7	5
B-7-3/ B-7-4	pH	-	7.69	7.71	0
	Arsenic	5	ND	ND	-
	Lead	5	ND	7.92	-
	Zind	5	72.9	63.6	14
B-15-4 / B-15-5	pH	-	7.43	7.58	2
B-16-2 / B-16-3	pH	-	7.44	6.99	6
B-6-3 / B-6-4	pH	-	7.90	7.87	0

Table 3. Carter Park Blind Field Soil Duplicate RPDs, concluded

Sample I.D.s	Parameter	Detection Limit mg/kg	Detected Values mg/kg		RPD (a)
B-3-4/ B-3-5	pH	-	7.59	7.66	1
	Arsenic	5	ND	ND	-
	Lead	5	9.59	6.86	32
	Zind	5	51.2	54.5	6
B-3-1/ B-3-2	8080	0.010 - 0.10	ND	ND	-
	8140	0.050 - 0.10	ND	ND	-
	8150	0.005 - 4.0	ND	ND	-
	pH	-	3.87	5.58	36
	Antimony	15	ND	ND	-
	Arsenic	5	18.8	8.1	80
	Barium	2.5	224	244	90
	Berryllium	0.75	ND	-	-
	Cadmium	1	ND	-	-
	Chromium	2.5	59.1	60.5	2
	Cobalt	2.5	4.78	9.2	65
	Copper	1	78.3	38.5	68
	Lead	5	13.2	10.9	19
	Mercury	0.05	ND	0.06	-
	Molybdenum	2.5	ND	ND	-
	Nickel	2.5	30.6	44.5	37
	Selenium	15	ND	ND	-
	Silver	1	ND	ND	-
	Thallium	20	ND	ND	-
	Vanadium	2.5	67.2	66.7	1
	Zinc	5	299	326	9
B-24-2 / B-24-3	pH	-	5.27	8.7	28
	Arsenic	5	34.2	5.86	119
	Lead	5	10.7	44.1	58
	Zinc	5	51.7		16
B-22-2 / B-22-3	pH	-	7.94	7.86	1
	Arsenic	5	5.59	ND	-
	Lead	5	319	18	179
	Zinc	5	42.4	47.9	12
B-20-4 / B-20-5	pH	-	8.13	8.10	0
B-14-5 / B-14-6	pH	-	7.57	7.67	1
B-13-5 / B-13-6	pH	-	8.05	8.04	0

a - Relative percent difference
RPD = (difference between values)/(average of values)*100

cc: McGuire
Anita Q
Jackie L

C K Y incorporated
Analytical Laboratories

Date: 06/28/93
93E057

Woodward Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 946075

Attn: Mr. Michael McGuire

Subject: Additional Laboratory Report
Project: Carter Park/93C0243A.1

Enclosed is the additional laboratory report for samples received on 05/14/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. Additional analyses were requested on 06/11/93. The data reported includes:

Method	No. of Analysis
EPA 3050/6010 by ICP (Pb & Zn)	34 Soils
EPA 3050/6010 by GFAA (As)	12 Soils

The results are summarized on forty pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

K Y Pang

Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

630 Maple Ave., Torrance, Calif. 90503 • Telephone 310-618-8889 • Fax: 310-618-0818

CASE NARRATIVE

CLIENT: **WOODWARD-CLYDE CONSULTANTS**
PROJECT: **CARTER PARK**
CKY BATCH: **93E057**

Additional metal analyses for samples received on 05/14/93 were requested on 06/10/93. The analyses were in accordance with SW 846, USEPA 3rd Edition, 1986. Results were reported on wet weight basis.

1. Samples were homogenized before preparation for metal analyses according to instruction in the memo dated 06/10/93.

2. Metal analyses by Method 3050/6010/7000

   Arsenic was analyzed by GFAA in most samples except 93E057-16, 64, and 73. These samples were analyzed by ICP because of the high As concentration. Lead and Zinc were analyzed by ICP. Method blanks, lab control samples, and calibrations were all within the control limits. Two sets of matrix spikes were analyzed. Recoveries in one set (93E057-67) were all within QC limit. In another matrix spike (93E057-16), all recoveries were out of QC limit. Their post digestive spikes were within QC criteria. The inhomogeneous samples with high metal concentrations were probably the cause. No corrective action was taken.

   Two sets of duplicate samples were analyzed. As and Pb were outliners in sample 93E057-16 and Zn was an outliner in sample 93E057-67. The sample was re-analyzed and similar results were obtained. Since the method blank, lab control sample and lab control sample duplicates were all within control, no corrective action was taken.

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-9-2	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-02	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	5.71
Zinc	5	36.8

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-9-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-03	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	6.32
Zinc	5	55.6

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-9-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-04	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	7.14
Zinc	5	43.3

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-2-2	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-10	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	5.78
Zinc	5	44.1

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-2-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-11	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	8.8
Zinc	5	44.4

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-2-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-12	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	8.94
Zinc	5	48.3

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-2-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-13	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	8.43
Zinc	5	52.6

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-5-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-16	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic	5	388
Lead	5	496
Zinc	5	328

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-5-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-18	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	7.45
Zinc	5	36

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-5-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-20	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	10.1
Zinc	5	49.7

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-5-6	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-21	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	8.4
Zinc	5	51.2

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-5-7	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-22	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	9.02
Zinc	5	63.3

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-10-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-25	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	10.2
Lead	5	52.7
Zinc	5	164

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-10-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-27	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	7.43
Lead	5	37.6
Zinc	5	75.7

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-1-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-36	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	11.1
Lead	5	116
Zinc	5	94.7

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-1-2	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-37	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	10.4
Lead	5	39.9
Zinc	5	140

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-1-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-39	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	8.21
Zinc	5	41.8

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-1-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-40	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	ND
Zinc	5	41.1

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-1-7	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-42	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	7.57
Zinc	5	54.2

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-11-2	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-47	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	27.4
Lead	5	46.3
Zinc	5	108

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-12-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-55	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	29.1
Zinc	5	61.7

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-12-2	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-56	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	6.65
Lead	5	105
Zinc	5	108

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-12-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-58	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	185
Zinc	5	127

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-12-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-59	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	502
Zinc	5	95.5

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-12-7	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-61	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	8.8
Zinc	5	78.7

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-8-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-64	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic	5	450
Lead	5	481
Zinc	5	309

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-8-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-66	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	6.49
Zinc	5	38.4

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-8-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-67	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	6.24
Lead	5	7.1
Zinc	5	33

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-8-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-68	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	5.45
Lead	5	6.16
Zinc	5	40.7

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-4-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-73	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic	5	458
Lead	5	144
Zinc	5	432

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-4-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-75	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	7.42
Zinc	5	57.1

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-4-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-76	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	9.85
Zinc	5	44.6

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-4-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-77	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	6.09
Zinc	5	53

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/12/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/14/93
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	B-4-6	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E057-78	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	6.37
Zinc	5	62.9

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	NA
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	NA
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	METHOD BLANK 1	DATE ANALYZED:	06/24/93
CONTROL NO.:	933050 E057-BLK1	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	ND

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	NA
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	NA
BATCH NO.:	93E057	DATE EXTRACTED:	06/15/93
SAMPLE ID:	METHOD BLANK 2	DATE ANALYZED:	06/29/93
CONTROL NO.:	933050 E057-BLK2	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	ND

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E057 DATE RECEIVED: NA
SAMPLE ID: LCS 216 DATE EXTRACTED: 06/15/93
CONTROL NO.: 93E057-LCS1 and LCS2 DATE ANALYZED: 06/24/93

ACCESSION: 93E057

Parameter	TRUE VALUE (mg/kg)	LCS1 FOUND VALUE (mg/kg)	LCS2 FOUND VALUE (mg/kg)	RPD (%)	ACCEPTANCE RANG (mg/kg)
Arsenic	67.7	75.3	75.9	1	41 - 105
Lead	100	86.0	90.4	5	55 - 140
Zinc	197	173	182	5	98 - 280

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E057
SAMPLE ID: B-5-1
CONTROL NO.: 93E057-16

DATE RECEIVED: 05/12/93
DATE EXTRACTED: 06/15/93
DATE ANALYZED: 06/24/93

ACCESSION: 93E057

Parameter	SAMPLE RESULT (mg/kg)	DUP SAMPLE RESULT (mg/kg)	RPD RESULT (%)
Arsenic	388	257	41 +
Lead	496	211	81 +
Zinc	328	370	12

+ Outside control limit of 20%

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E057
SAMPLE ID: B-5-1
CONTROL NO.: 93E057-16

DATE RECEIVED: 05/12/93
DATE EXTRACTED: 06/15/93
DATE ANALYZED: 06/24/93

ACCESSION: 93E057

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
Arsenic	388	100	363	-25 +
Lead	496	100	396	-100 +
Zinc	328	100	491	163 +

+ Outside control limit of 75-125%

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

LIENT: Woodward-Clyde Consultants
ECT: Carter Park - 93C0243A
OD: EPA 3050/6010
ATRIX: Soil

ATCH NO.: 93E057
AMPLE ID: B-8-4
ONTROL NO.: 93E057-67

CCESSION: 93E057

DATE RECEIVED: 05/12/93
DATE EXTRACTED: 06/15/93
DATE ANALYZED: 06/24/93

arameter	SAMPLE RESULT (mg/kg)	DUP SAMPLE RESULT (mg/kg)	RPD RESULT (%)
rsenic**	6.24	6.02	4
ead	7.1	8.25	15
inc	33	44.4	29 +

*Analyzed by GFAA
Outside control limit of 20%

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E057 DATE RECEIVED: 05/12/93
SAMPLE ID: B-8-4 DATE EXTRACTED: 06/15/93
CONTROL NO.: 93E057-67 DATE ANALYZED: 06/24/93

ACCESSION: 93E057

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
Arsenic**	6.24	100	93.4	87
Lead	7.1	100	91.9	85
Zinc	33	100	125	92

*Analyzed by GFAA

cc McGuire
Anita Q
Jackie L

C K Y incorporated
Analytical Laboratories

Date: 06/29/93
93E048

Woodward-Clyde Consultants
500-12th Street, Suite 100
Oakland, CA 94607

Attn: Mr. Michael McGuire

Subject: Additional Laboratory Report
Project: Carter Park #93C0243A

Enclosed is the laboratory report for samples received on 05/12/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. Additional analyses were requested on 06/10/93. The data reported includes:

Method	No. of Analysis
EPA 3050/6010 by ICP (Pb & Zn)	13 Soils
EPA 3050/6010 by GFAA (As)	6 Soils

The results are summarized on seventeen pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed of after fifteen (15) days from the date of this report.

630 Maple Ave., Torrance, Calif. 90503 • Telephone 310-618-8889 • Fax: 310-618-0818

CASE NARRATIVE

CLIENT: **WOODWARD-CLYDE CONSULTANTS**
PROJECT: **CARTER PARK**
CKY BATCH: **93E048**

Additional metal analyses for samples received on 05/12/93 were requested on 06/10/93. The analyses were in accordance SW 846, USEPA 3rd Edition, 1986. Results were reported on wet weight basis.

1. Samples were homogenized before preparation for metal analyses according to instruction in the memo dated 06/10/93.

2. Metal analyses by Method 3050/6010/7000

   Arsenic was analyzed by GFAA. Lead and Zinc were analyzed by ICP. Method blanks, lab control samples and calibrations were all within the control limits. Matrix spike recovery of Lead was negative due to the high lead concentration in the sample. No corrective action was taken.

   In duplicate sample analyses, Arsenic and Lead were out of the project specific QC limit of 20%. The sample was re-analyzed and similar results were obtained. Since the method blank, lab control sample and lab control sample duplicates were all within control, no corrective action was taken.

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-15-2	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-02	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	8.4
Lead	5	1520
Zinc	5	91.9

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-15-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-03	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	8.1
Zinc	5	44

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-16-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-10	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	138
Zinc	5	65.4

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-19-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-19	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	11.6
Zinc	5	64.4

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-19-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-22	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	7.48
Zinc	5	61.5

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-19-6	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-24	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	8.22
Zinc	5	44.3

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-14-1	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-51	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	13.3
Zinc	5	60.3

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-14-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-53	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	6700
Zinc	5	132

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-14-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-54	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	6.26
Zinc	5	49.6

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-14-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-55	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Lead	5	7.6
Zinc	5	51.7

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-13-2	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-61	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	6.05
Zinc	5	39.8

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-13-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-62	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	42.6

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-13-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-63	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	6.22
Zinc	5	55.9

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	NA
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	NA
BATCH NO.:	93E048	DATE EXTRACTED:	06/14/93
SAMPLE ID:	METHOD BLANK	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E048-BLK	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	ND

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E048 DATE RECEIVED: NA
SAMPLE ID: LCS 216 DATE EXTRACTED: 06/14/93
CONTROL NO.: 93E048-LCS1 and LCS2 DATE ANALYZED: 06/24/93

ACCESSION: 93E048 93E064

Parameter	TRUE VALUE (mg/kg)	LCS1 FOUND VALUE (mg/kg)	LCS2 FOUND VALUE (mg/kg)	RPD (%)	ACCEPTANCE RANGE (mg/kg)
Arsenic	67.7	75.4	67.3	11	41 - 105
Lead	100	91.1	81.5	11	55 - 140
Zinc	197	180	167	8	98 - 280

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

LIENT: Woodward-Clyde Consultants
ECT: Carter Park - 93C0243A
OD: EPA 3050/6010
ATRIX: Soil

ATCH NO.: 93E048 DATE RECEIVED: 05/12/93
AMPLE ID: B-15-2 DATE EXTRACTED: 06/14/93
ONTROL NO.: 93E048-02 DATE ANALYZED: 06/24/93

CCESSION: 93E048 93E064

arameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
rsenic**	8.4	100	85.6	77
ead	1520	100	1330	-190 +
inc	91.9	100	191	99

*Analyzed by GFAA
Outside control limit of 75-125%

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

LIENT: Woodward-Clyde Consultants
ECT: Carter Park - 93C0243A
OD: EPA 3050/6010
ATRIX: Soil

ATCH NO.: 93E048 DATE RECEIVED: 05/12/93
AMPLE ID: B-15-2 DATE EXTRACTED: 06/14/93
ONTROL NO.: 93E048-02 DATE ANALYZED: 06/24/93

CCESSION: 93E048 93E064

arameter	SAMPLE RESULT (mg/kg)	DUP SAMPLE RESULT (mg/kg)	RPD RESULT (%)
rsenic**	8.4	ND	- +
ead	1520	1130	30 +
inc	91.9	110	18

*Analyzed by GFAA
Outside control limit of 20%

G3

DUE 6-17-93

ANALYSIS REQUEST FORM

CLIENT NAME: WCC / Eastern Park

CKY CONTROL NO.: 93 EC48

REQUESTED BY: M. McGuire

DATE: 6/10/93

LOGGED BY: Cecilia Chavez

CKY CONTROL NO.	CLIENT SAMPLE ID	COMMENTS
93EC48 - 2 ✓	B-15-2	Pb, Zn (ICP)/Arsenic (GFAA)
EC48 - 3 ✓	B-15-3	" "
EC48 - 10 ✓	B-16-1	Pb, Zn (ICP)
EC48 - 22 ✓	B-A-4	↓
EC48 - 24 ✓	B-19-6	
EC48 - 19 ✓	B-19-1	Pb, Zn (ICP)/Arsenic (GFAA)
~~EC48-25~~	~~B-14-5~~	Pb, Zn (ICP)
EC48 - 53 ✓	B-14-3	↓
EC48 - 54 ✓	B-14-4	↓
EC48 - 51 ✓	B-14-1	↓
EC48 - 55 ✓	B-14-5	
EC48 - 61 ✓	B-13-2	Pb, Zn (ICP)/Arsenic (GFAA)
EC48 - 62 ✓	B-13-3	↓ ↓
EC48 - 63 ✓	B-13-4	

Woodward-Clyde Consultants
500 12th Street, Suite 100, Oakland, CA 94607-[redacted]-4014
(415) 893-3600

Chain of Custody Record

PROJECT NO. 9360243A

SAMPLERS: (Signature) Bill [redacted]

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	HOLD pending analysis request	① Title 22 METALS	pH 9040/9045	② HOMOGENIZE	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
5/10/93	0940	B-15-1	S					X				1	All samples in brass or stainless steel 2"x6" or 2½"x6" liners
	0950	B-15-2	S					X		X		1	
	1010	B-15-3	S					X		X		1	HOLD Samples pending analysis request
	1020	B-15-4	S					X	X	X	X	1	
	1035	B-15-5	S					X		X		1	
	1045	B-15-6	S					X		X		1	
	1052	B-15-7	S					X		X		1	
	1101	B-15-8	S					X		X		1	
	1110	B-15-9	S					X		X		1	
	1238	B-16-1	S					X		X		1	3 week TAT
	1254	B-16-2	S					X	X	X	X	1	
	1258	B-16-3	S					X	X	X	X	1	
	1302	B-16-4	S					X		X		1	
	1310	B-16-5	S					X				1	Contact Mike McGuire (510) 874-3288
	1319	B-16-6	S					X		X		1	
	1328	B-16-7	S					X		X		1	
	1338	B-16-8	S					X		X		1	
	1347	B-16-9	S					X				1	
	1440	B-19-1	S					X		X		1	
	1450	B-19-2	S					X	X	X	X	1	
	1504	B-19-3	S					X				1	
	1512	B-19-4	S					X		X		1	
	1519	B-19-5	S					X				1	
	1528	B-19-6	S					X		X		1	
	1533	B-19-7	S					X		X		1	
	1543	B-19-8	S					X				1	
	1554	B-19-9	S					X				1	
	1635	B-18-1	S					X		X		1	T=6°C

TOTAL NUMBER OF CONTAINERS: 28

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Bill [redacted]	5/11/93 1845				

METHOD OF SHIPMENT	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
FED Express AIRBILL # 6258918463/6258918342	FOR FED EX			5-12-93

93E048 DUE 5- -93

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. CARTER PARK 930243A

SAMPLERS: (Signature) Bill [signature]

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	HOLD pending analysis request	(A) TITLE 22 METALS	pH 9040/9045	(B) HOMOGENIZE		Number of Containers
5/10/93	1646	B-18-2	S					X	X	X	X		1
	1654	B-18-3	S					X					1
	1659	B-18-4	S					X		X			1
	1707	B-18-5	S					X		X			1
	1713	B-18-6	S					X		X			1
	1723	B-18-7	S					X		X			1
	1730	B-18-8	S					X					1
5/11/93	0902	B-17-1	S					X		X			1
	0914	B-17-2	S					X	X	X	X		1
	0922	B-17-3	S					X					1
	0929	B-17-4	S					X		X			1
	0942	B-17-5	S					X		X			1
	0948	B-17-6	S					X		X			1
	0958	B-17-7	S					X					1
	1045	B-20-1	S					X					1
	1057	B-20-2	S					X	X	X	X		1
	1104	B-20-3	S					X		X			1
	1112	B-20-4	S					X		X			1
	1120	B-20-5	S					X		X			1
	1125	B-20-6	S					X		X			1
	1132	B-20-7	S					X		X			1
	1143	B-20-8	S					X					1
	1254	B-14-1	S					X		X			1
	1302	B-14-2	S					X	X	X	X		1
	1331	B-14-3	S					X					1
	1347	B-14-4	S					X		X			1
	1401	B-14-5	S					X		X			1
	1406	B-14-6	S					X		X			1

REMARKS (Sample preservation, handling procedures, etc.)

All samples in brass or SS liners

HOLD samples pending analysis request

3 week TAT

Contact Mike McGuire (510) 874-3288

T=6°C

TOTAL NUMBER OF CONTAINERS: 28

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Bill [signature]	5/11/93 1845	[signature]			

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
FED Express AIRBILL 6358918403/6358911392	[signature]		[signature]	5-12-93

CITY INC. ANALYTICAL LABORATORIES, 630 Maple Ave., Torrance, Calif 90503 Tel. (310) 618-8889 Fax (310) 618-0818

9360A

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-[redacted]
(415) 893-3600 —4014

Chain of Custody Record

PROJECT NO. Carter Park 9360243A

SAMPLERS: (Signature) Bill Ostrofe

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	HOLD pending analysis request	Ⓑ TITLE 22 METALS	pH 9040/9045	Ⓑ HOMOGENIZE	Number of Containers
5/11/93	1411	B-14-7	S					X		X		1
	1419	B-14-8	S					X				1
	1430	B-14-9	S					X				1
	1515	B-13-1	S					X	X	X	X	1
	1525	B-13-2	S					X		X		1
	1532	B-13-3	S					X				1
	1548	B-13-4	S					X		X		1
	1558	B-13-5	S					X		X		1
	1607	B-13-6	S					X		X		1
	1612	B-13-7	S					X				1
	1618	B-13-8	S					X				1
	1628	B-13-9	S					X				1

TOTAL NUMBER OF CONTAINERS: 12

REMARKS (Sample preservation, handling procedures, etc.)

All samples in brass or stainless steel 2"x6" or 2½"x6" liners

HOLD samples pending analysis request

3 week TAT

Contact Mike McGuire (510) 874-3288

T=4°C

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	5/11/93 1845				

METHOD OF SHIPMENT: Fed Ex AIRBILL # 635[redacted]8403/6358?1539?

SHIPPED BY: (Signature) FED EX

COURIER: (Signature)

RECEIVED FOR LAB BY: (Signature)

DATE/TIME: 5-12-93 2:55

C K Y incorporated
Analytical Laboratories

Date: 06/03/93
93E064

Woodward Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

Attn: Mr. Michael McGuire

Subject: Laboratory Report
Project: Carter Park

Enclosed is the laboratory report for samples received on 05/15/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

Method	No. of Analysis
EPA 608/8080	1 Water/4 Soils
EPA 8140	1 Water/4 Soils
EPA 8150	1 Water/4 Soils
EPA 3050/6010/7000	4 Soils
EPA 9045	21 Soils

The results are summarized on thirty-six pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

630 Maple Ave., Torrance, Calif. 90503 • Telephone 310-618-8889 • Fax: 310-618-0818

CASE NARRATIVE

CLIENT: WOODWARD CLYDE CONSULTANTS
PROJECT: CARTER PARK
CKY BATCH: 93E064

Twenty-four (24) soil and one (1) water samples were received on 05/15/93 for analyses by EPA methods 8080, 8140, 8150, 9045 and metals in accordance with SW 846, USEPA 3rd Edition, 1986. Results are reported on wet weight basis.

1. Samples were homogenized before preparation for various chemical analyses according to instruction in the memo dated 05/15/93.

2. EPA Method 8080 (Pesticides)

   Holding time, system performance, method blank, lab control sample, and surrogate recoveries were all within Quality Control limit. Matrix spike and matrix spike duplicate analyses were within QC limit.

3. EPA Method 8140

   Holding time, system performance, method blank, lab control sample, surrogate recoveries were all within Quality Control limit. Matrix spike of phorate had no recovery. However, recoveries of disulfoton and surrogate were within the recommended range and lab control sample was within control. No corrective action was taken. Matrix effect was suspected.

4. EPA Method 8150

   Holding time, system performance, method blank, lab control sample, surrogate recoveries, matrix spike and matrix spike duplicate analyses were all within QC limit.

5. Metal analyses by Method 3050/6010/7000

   Arsenic was analyzed by GFAA, Mercury was analyzed by cold vapor. All other elements were analyzed by ICP. Method blanks, lab control samples, blank spikes, and calibrations were all within control limit. Matrix spike recoveries of Antimony, Copper, Zinc and Selenium were out of the QC limit of 75-125%. Since the blank spike, lab control sample and post digestive spike results were within control, matrix effect or inhomogeneous samples were suspected. No corrective action was taken.

   In duplicate sample analyses, Arsenic, Barium, Chromium and Vanadium were out of the project specific QC limit of 20%. The sample was re-analyzed and similar results were obtained. Since the method blank and lab control sample were within control and only four out of seventeen metals were affected, the cause of discrepancy may be due to something other than the analytical process.

6. EPA Method 9045

   Calibration and duplicates were all within control.

EPA METHOD 608 - PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/19/93
SAMPLE ID:	VCPEQB	**DATE ANALYZED:**	05/24/93
CONTROL NO:	93E064-25	**MATRIX TYPE:**	Water

PARAMETERS (608)	RESULTS (ug/L)	DETECTION LIMIT (ug/L)
Alpha-BHC	ND	0.05
gama-BHC (Lindane)	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
beta-BHC	ND	0.05
delta-BHC	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.1
gamma-Chlordane	ND	0.5
alpha-Chlordane	ND	0.5
DDE	ND	0.1
Dieldrin	ND	0.1
Endrin	ND	0.1
DDD	ND	0.1
Endosulfan II	ND	0.1
DDT	ND	0.1
Endrin aldehyde	ND	0.1
Methoxychlor	ND	0.5
Endosulfan Sulfate	ND	0.1
Endrin Ketone	ND	0.1
Toxaphene	ND	1.0

% Surrogate Recovery		Acceptable Range
Tetrachloro-m-xylene	106	30-150
Decachlorobiphenyl	124	24-154

EPA METHOD 608 - PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/19/93
SAMPLE ID:	Method Blank	**DATE ANALYZED:**	05/24/93
CONTROL NO:	93E064	**MATRIX TYPE:**	Water

PARAMETERS (608)	RESULTS (ug/L)	DETECTION LIMIT (ug/L)
Alpha-BHC	ND	0.05
gama-BHC (Lindane)	ND	0.05
Heptachlor	ND	0.05
Aldrin	ND	0.05
beta-BHC	ND	0.05
delta-BHC	ND	0.05
Heptachlor Epoxide	ND	0.05
Endosulfan I	ND	0.1
gamma-Chlordane	ND	0.5
alpha-Chlordane	ND	0.5
DDE	ND	0.1
Dieldrin	ND	0.1
Endrin	ND	0.1
DDD	ND	0.1
Endosulfan II	ND	0.1
DDT	ND	0.1
Endrin aldehyde	ND	0.1
Methoxychlor	ND	0.5
Endosulfan Sulfate	ND	0.1
Endrin Ketone	ND	0.1
Toxaphene	ND	1.0

% Surrogate Recovery		Acceptable Range
Tetrachloro-m-xylene	89	30-150
Decachlorobiphenyl	142	24-154

EPA METHOD 8080 - PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	B-7-1	**DATE ANALYZED:**	05/24/93
CONTROL NO:	93E064-1	**MATRIX TYPE:**	Soil

PARAMETERS (8080)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Alpha-BHC	ND	10
gama-BHC (Lindane)	ND	10
Heptachlor	ND	20
Aldrin	ND	20
beta-BHC	ND	20
delta-BHC	ND	20
Heptachlor Epoxide	ND	20
Endosulfan I	ND	20
gamma-Chlordane	ND	50
alpha-Chlordane	ND	50
DDE	ND	20
Dieldrin	ND	20
Endrin	ND	20
DDD	ND	20
Endosulfan II	ND	50
DDT	ND	20
Endrin aldehyde	ND	50
Methoxychlor	ND	100
Endosulfan Sulfate	ND	50
Endrin Ketone	ND	50
Toxaphene	ND	100

% Surrogate Recovery		Acceptable Range
Tetrachloro-m-xylene	93	20-150
Decachlorobiphenyl	127	20-150

EPA METHOD 8080 - PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	B-6-1	**DATE ANALYZED:**	05/24/93
CONTROL NO:	93E064-10	**MATRIX TYPE:**	Soil

PARAMETERS (8080)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Alpha-BHC	ND	10
gama-BHC (Lindane)	ND	10
Heptachlor	ND	20
Aldrin	ND	20
beta-BHC	ND	20
delta-BHC	ND	20
Heptachlor Epoxide	ND	20
Endosulfan I	ND	20
gamma-Chlordane	ND	50
alpha-Chlordane	ND	50
DDE	ND	20
Dieldrin	ND	20
Endrin	ND	20
DDD	ND	20
Endosulfan II	ND	50
DDT	ND	20
Endrin aldehyde	ND	50
Methoxychlor	ND	100
Endosulfan Sulfate	ND	50
Endrin Ketone	ND	50
Toxaphene	ND	100

% Surrogate Recovery		Acceptable Range
Tetrachloro-m-xylene	92	20-150
Decachlorobiphenyl	126	20-150

EPA METHOD 8080 - PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	B-3-1	**DATE ANALYZED:**	05/24/93
CONTROL NO:	93E064-17	**MATRIX TYPE:**	Soil

PARAMETERS (8080)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Alpha-BHC	ND	10
gama-BHC (Lindane)	ND	10
Heptachlor	ND	20
Aldrin	ND	20
beta-BHC	ND	20
delta-BHC	ND	20
Heptachlor Epoxide	ND	20
Endosulfan I	ND	20
gamma-Chlordane	ND	50
alpha-Chlordane	ND	50
DDE	ND	20
Dieldrin	ND	20
Endrin	ND	20
DDD	ND	20
Endosulfan II	ND	50
DDT	ND	20
Endrin aldehyde	ND	50
Methoxychlor	ND	100
Endosulfan Sulfate	ND	50
Endrin Ketone	ND	50
Toxaphene	ND	100

% Surrogate Recovery		Acceptable Range
Tetrachloro-m-xylene	103	20-150
Decachlorobiphenyl	140	20-150

EPA METHOD 8080 - PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	B-3-2	**DATE ANALYZED:**	05/24/93
CONTROL NO:	93E064-18	**MATRIX TYPE:**	Soil

PARAMETERS (8080)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Alpha-BHC	ND	10
gama-BHC (Lindane)	ND	10
Heptachlor	ND	20
Aldrin	ND	20
beta-BHC	ND	20
delta-BHC	ND	20
Heptachlor Epoxide	ND	20
Endosulfan I	ND	20
gamma-Chlordane	ND	50
alpha-Chlordane	ND	50
DDE	ND	20
Dieldrin	ND	20
Endrin	ND	20
DDD	ND	20
Endosulfan II	ND	50
DDT	ND	20
Endrin aldehyde	ND	50
Methoxychlor	ND	100
Endosulfan Sulfate	ND	50
Endrin Ketone	ND	50
Toxaphene	ND	100

% Surrogate Recovery		Acceptable Range
Tetrachloro-m-xylene	88	20-150
Decachlorobiphenyl	130	20-150

EPA METHOD 8080 - PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	Method Blank	**DATE ANALYZED:**	05/24/93
CONTROL NO:	93E064	**MATRIX TYPE:**	Soil

PARAMETERS (8080)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Alpha-BHC	ND	10
gama-BHC (Lindane)	ND	10
Heptachlor	ND	20
Aldrin	ND	20
beta-BHC	ND	20
delta-BHC	ND	20
Heptachlor Epoxide	ND	20
Endosulfan I	ND	20
gamma-Chlordane	ND	50
alpha-Chlordane	ND	50
DDE	ND	20
Dieldrin	ND	20
Endrin	ND	20
DDD	ND	20
Endosulfan II	ND	50
DDT	ND	20
Endrin aldehyde	ND	50
Methoxychlor	ND	100
Endosulfan Sulfate	ND	50
Endrin Ketone	ND	50
Toxaphene	ND	100

% Surrogate Recovery		Acceptable Range
Tetrachloro-m-xylene	90	20-150
Decachlorobiphenyl	127	20-150

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/20/93
SAMPLE ID:	VCPEQB	**DATE ANALYZED:**	05/26/93
CONTROL NO:	93E064-25	**MATRIX:**	Water

PARAMETERS (8140)	RESULTS (ug/L)	DETECTION LIMIT (ug/L)
Dichlorovos	ND	50
Phosdrin	ND	50
Ethoprop	ND	50
Naled	ND	100
Phorate	ND	50
Demeton	ND	100
Diazinon	ND	50
Disulfoton	ND	50
Methyl parathion	ND	50
Ronnel	ND	50
Chlorpyriphos	ND	50
Fenthion	ND	50
Merphos	ND	50
Stirophos	ND	100
Tokuthion	ND	100
Fensulfothion	ND	100
Suprofos	ND	50
Azinphos Methyl	ND	500
Coumaphos	ND	100
% Surrogate Rec.		Accept. Range
Triphenol Phosphate	108	(20-140)

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/20/93
SAMPLE ID:	Method Blank	**DATE ANALYZED:**	05/26/93
CONTROL NO:	93E064-Blk	**MATRIX:**	Water

PARAMETERS (8140)	RESULTS (ug/L)	DETECTION LIMIT (ug/L)
Dichlorovos	ND	50
Phosdrin	ND	50
Ethoprop	ND	50
Naled	ND	100
Phorate	ND	50
Demeton	ND	100
Diazinon	ND	50
Disulfoton	ND	50
Methyl parathion	ND	50
Ronnel	ND	50
Chlorpyriphos	ND	50
Fenthion	ND	50
Merphos	ND	50
Stirophos	ND	100
Tokuthion	ND	100
Fensulfothion	ND	100
Suprofos	ND	50
Azinphos Methyl	ND	500
Coumaphos	ND	100
% Surrogate Rec.		Accept. Range
Triphenol Phosphate	82	(20-140)

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	B-7-1	**DATE ANALYZED:**	05/26/93
CONTROL NO:	93E064-1	**MATRIX:**	Soil

PARAMETERS (8140)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Dichlorovos	ND	50
Phosdrin	ND	50
Ethoprop	ND	50
Naled	ND	100
Phorate	ND	50
Demeton	ND	100
Diazinon	ND	50
Disulfoton	ND	50
Methyl parathion	ND	50
Ronnel	ND	50
Chlorpyriphos	ND	50
Fenthion	ND	50
Merphos	ND	50
Stirophos	ND	100
Tokuthion	ND	100
Fensulfothion	ND	100
Suprofos	ND	50
Azinphos Methyl	ND	500
Coumaphos	ND	100
% Surrogate Rec.		Accept. Range
Triphenol Phosphate	79	(20-140)

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	B-6-1	**DATE ANALYZED:**	05/26/93
CONTROL NO:	93E064-10	**MATRIX:**	Soil

PARAMETERS (8140)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Dichlorovos	ND	50
Phosdrin	ND	50
Ethoprop	ND	50
Naled	ND	100
Phorate	ND	50
Demeton	ND	100
Diazinon	ND	50
Disulfoton	ND	50
Methyl parathion	ND	50
Ronnel	ND	50
Chlorpyriphos	ND	50
Fenthion	ND	50
Merphos	ND	50
Stirophos	ND	100
Tokuthion	ND	100
Fensulfothion	ND	100
Suprofos	ND	50
Azinphos Methyl	ND	500
Coumaphos	ND	100
% Surrogate Rec.		Accept. Range
Triphenol Phosphate	77	(20-140)

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	B-3-1	**DATE ANALYZED:**	05/26/93
CONTROL NO:	93E064-17	**MATRIX:**	Soil

PARAMETERS (8140)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Dichlorovos	ND	50
Phosdrin	ND	50
Ethoprop	ND	50
Naled	ND	100
Phorate	ND	50
Demeton	ND	100
Diazinon	ND	50
Disulfoton	ND	50
Methyl parathion	ND	50
Ronnel	ND	50
Chlorpyriphos	ND	50
Fenthion	ND	50
Merphos	ND	50
Stirophos	ND	100
Tokuthion	ND	100
Fensulfothion	ND	100
Suprofos	ND	50
Azinphos Methyl	ND	500
Coumaphos	ND	100
% Surrogate Rec.		Accept. Range
Triphenol Phosphate	88	(20-140)

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	B-3-2	**DATE ANALYZED:**	05/26/93
CONTROL NO:	93E064-18	**MATRIX:**	Soil

PARAMETERS (8140)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Dichlorovos	ND	50
Phosdrin	ND	50
Ethoprop	ND	50
Naled	ND	100
Phorate	ND	50
Demeton	ND	100
Diazinon	ND	50
Disulfoton	ND	50
Methyl parathion	ND	50
Ronnel	ND	50
Chlorpyriphos	ND	50
Fenthion	ND	50
Merphos	ND	50
Stirophos	ND	100
Tokuthion	ND	100
Fensulfothion	ND	100
Suprofos	ND	50
Azinphos Methyl	ND	500
Coumaphos	ND	100
% Surrogate Rec.		Accept. Range
Triphenol Phosphate	65	(20-140)

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/18/93
SAMPLE ID:	Method Blank	**DATE ANALYZED:**	05/26/93
CONTROL NO:	93E064-Blk	**MATRIX:**	Soil

PARAMETERS (8140)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
Dichlorovos	ND	50
Phosdrin	ND	50
Ethoprop	ND	50
Naled	ND	100
Phorate	ND	50
Demeton	ND	100
Diazinon	ND	50
Disulfoton	ND	50
Methyl parathion	ND	50
Ronnel	ND	50
Chlorpyriphos	ND	50
Fenthion	ND	50
Merphos	ND	50
Stirophos	ND	100
Tokuthion	ND	100
Fensulfothion	ND	100
Suprofos	ND	50
Azinphos Methyl	ND	500
Coumaphos	ND	100
% Surrogate Rec.		Accept. Range
Triphenol Phosphate	106	(20-140)

EPA METHOD 8150
HERBICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/17/93
SAMPLE ID:	VCPEQB	**DATE ANALYZED:**	05/22/93
CONTROL NO:	93E064-25	**MATRIX:**	Water

PARAMETERS (8150)	**RESULTS (ug/L)**	**DETECTION LIMIT (ug/L)**
2,4-D	ND	0.5
2,4-DB	ND	0.5
2,4,5-T	ND	0.1
2,4,5-TP (Silvex)	ND	0.1
Dicamba	ND	0.5
Dichloroprop	ND	0.5
Dinoseb	ND	0.1
Dalapon	ND	1.0
MCPA	ND	200
MCPP	ND	200
% Surrogate Recovery	115	20-140

EPA METHOD 8150
HERBICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/17/93
SAMPLE ID:	Method Blank	**DATE ANALYZED:**	05/22/93
CONTROL NO:	93E064	**MATRIX:**	Water

PARAMETERS (8150)	**RESULTS (ug/L)**	**DETECTION LIMIT (ug/L)**
2,4-D	ND	0.5
2,4-DB	ND	0.5
2,4,5-T	ND	0.1
2,4,5-TP (Silvex)	ND	0.1
Dicamba	ND	0.5
Dichloroprop	ND	0.5
Dinoseb	ND	0.1
Dalapon	ND	1.0
MCPA	ND	200
MCPP	ND	200
% Surrogate Recovery	111	20-140

EPA METHOD 8150
HERBICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/19/93
SAMPLE ID:	B-7-1	**DATE ANALYZED:**	05/22/93
CONTROL NO:	93E064-1	**MATRIX:**	Soil

PARAMETERS (8150)	**RESULTS (ug/kg)**	**DETECTION LIMIT (ug/kg)**
2,4-D	ND	5
2,4-DB	ND	5
2,4,5-T	ND	2
2,4,5-TP (Silvex)	ND	2
Dicamba	ND	5
Dichloroprop	ND	5
Dinoseb	ND	2
Dalapon	ND	10
MCPA	ND	4000
MCPP	ND	4000
% Surrogate Recovery	122	20-140

EPA METHOD 8150
HERBICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/19/93
SAMPLE ID:	B-6-1	**DATE ANALYZED:**	05/22/93
CONTROL NO:	93E064-10	**MATRIX:**	Soil

PARAMETERS (8150)	**RESULTS (ug/kg)**	**DETECTION LIMIT (ug/kg)**
2,4-D	ND	5
2,4-DB	ND	5
2,4,5-T	ND	2
2,4,5-TP (Silvex)	ND	2
Dicamba	ND	5
Dichloroprop	ND	5
Dinoseb	ND	2
Dalapon	ND	10
MCPA	ND	4000
MCPP	ND	4000
% Surrogate Recovery	132	20-140

EPA METHOD 8150
HERBICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/19/93
SAMPLE ID:	B-3-1	**DATE ANALYZED:**	05/22/93
CONTROL NO:	93E064-17	**MATRIX:**	Soil

PARAMETERS (8150)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
2,4-D	ND	5
2,4-DB	ND	5
2,4,5-T	ND	2
2,4,5-TP (Silvex)	ND	2
Dicamba	ND	5
Dichloroprop	ND	5
Dinoseb	ND	2
Dalapon	ND	10
MCPA	ND	4000
MCPP	ND	4000
% Surrogate Recovery	132	20-140

EPA METHOD 8150
HERBICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/19/93
SAMPLE ID:	B-3-2	**DATE ANALYZED:**	05/22/93
CONTROL NO:	93E064-18	**MATRIX:**	Soil

PARAMETERS (8150)	RESULTS (ug/kg)	DETECTION LIMIT (ug/kg)
2,4-D	ND	5
2,4-DB	ND	5
2,4,5-T	ND	2
2,4,5-TP (Silvex)	ND	2
Dicamba	ND	5
Dichloroprop	ND	5
Dinoseb	ND	2
Dalapon	ND	10
MCPA	ND	4000
MCPP	ND	4000
% Surrogate Recovery	128	20-140

EPA METHOD 8150
HERBICIDES

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/19/93
SAMPLE ID:	Method Blank	**DATE ANALYZED:**	05/22/93
CONTROL NO:	93E064	**MATRIX:**	Soil

PARAMETERS (8150)	**RESULTS (ug/kg)**	**DETECTION LIMIT (ug/kg)**
2,4-D	ND	5
2,4-DB	ND	5
2,4,5-T	ND	2
2,4,5-TP (Silvex)	ND	2
Dicamba	ND	5
Dichloroprop	ND	5
Dinoseb	ND	2
Dalapon	ND	10
MCPA	ND	4000
MCPP	ND	4000
% Surrogate Recovery	60	20-140

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-7-1	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E064-01	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	11.6
Barium	2.5	100
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	77.3
Cobalt	2.5	10.6
Copper	1	70.1
Lead	5	9.87
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	61.2
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	72.1
Zinc	5	76.5

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-6-1	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E064-10	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	206
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	63.7
Cobalt	2.5	6.77
Copper	1	49
Lead	5	12.4
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	49.2
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	75.1
Zinc	5	62.7

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-3-1	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E064-17	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	18.8
Barium	2.5	224
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	59.1
Cobalt	2.5	4.78
Copper	1	78.3
Lead	5	13.2
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	30.6
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	67.2
Zinc	5	299

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-3-2	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E064-18	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	8.1
Barium	2.5	244
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	60.5
Cobalt	2.5	9.2
Copper	1	38.5
Lead	5	10.9
Mercury*	.05	0.06
Molybdenum	2.5	ND
Nickel	2.5	44.5
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	66.7
Zinc	5	326

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	NA
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	NA
BATCH NO.:	93E064	DATE EXTRACTED:	05/18/93
SAMPLE ID:	METHOD BLANK	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E064-BLK	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	ND
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	ND
Cobalt	2.5	ND
Copper	1	ND
Lead	5	ND
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	ND
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	ND
Zinc	5	ND

* EPA METHOD 7471
**Analyzed by GFAA

EPA 9045
pH

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	05/15/93
PROJECT:	Carter Park	**DATE EXTRACTED:**	05/24/91
CONTROL NO:	93E064	**DATE ANALYZED:**	05/24/93
MATRIX:	Soil		

SAMPLE ID:	CONTROL NO:	RESULTS (pH Unit)	DETECTION LIMIT (pH Unit)
B-7-1	93E064-1*	6.85	0.10
B-7-2	93E064-2*	7.00	0.10
B-7-3	93E064-3	7.69	0.10
B-7-4	93E064-4	7.71	0.10
B-7-5	93E064-5	7.51	0.10
B-7-6	93E064-6	7.50	0.10
B-7GRB	93E064-8	6.34	0.10
B-6GRB	93E064-9	6.44	0.10
B-6-1	93E064-10*	6.95	0.10
B-6-2	93E064-11*	7.59	0.10
B-6-3	93E064-12	7.90	0.10
B-6-4	93E064-13	7.87	0.10
B-6-5	93E064-14	7.54	0.10
B-6-6	93E064-15	7.80	0.10
B-3-1	93E064-17*	3.87	0.10
B-3-2	93E064-18*	5.58	0.10
B-3-3	93E064-19*	7.08	0.10
B-3-4	93E064-20	7.59	0.10
B-3-5	93E064-21	7.66	0.10
B-3-6	93E064-22	7.72	0.10
B-3-7	93E064-23	7.78	0.10

* Date Analyzed: 05/18/93

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064 DATE RECEIVED: NA
SAMPLE ID: METHOD BLANK DATE EXTRACTED: 05/18/93
CONTROL NO.: 93E048-BLK DATE ANALYZED: 05/19/93

ACCESSION: 93E048 93E057 93E064

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
Antimony	ND	100	96.8	97
Arsenic**	ND	100	107	107
Barium	ND	100	97.9	98
Beryllium	ND	100	96.3	96
Cadmium	ND	100	97.1	97
Chromium	ND	100	100	100
Cobalt	ND	100	99.5	99
Copper	ND	100	99.2	99
Lead	ND	100	97.9	98
Molybdenum	ND	100	98.8	99
Nickel	ND	100	99.3	99
Selenium	ND	100	104	104
Silver	ND	100	89.9	90
Thallium	ND	100	94.8	95
Vanadium	ND	100	99.7	100
Zinc	ND	100	96.9	97

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064
SAMPLE ID: B-7-1
CONTROL NO.: 93E064-01

DATE RECEIVED: 05/15/93
DATE EXTRACTED: 05/18/93
DATE ANALYZED: 05/19/93

ACCESSION: 93E057 93E064

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY (%)
Antimony	ND	100	38.7	39+
Arsenic**	11.6	100	150	138+
Barium	100	100	390	290+
Beryllium	ND	100	94	94
Cadmium	ND	100	93.2	93
Chromium	77.3	100	155	78
Cobalt	10.6	100	95.9	85
Copper	70.1	100	164	94
Lead	9.87	100	102	92
Mercury*	ND	0.87	0.95	109
Molybdenum	ND	100	82.4	82
Nickel	61.2	100	153	91
Selenium	ND	100	ND	0+
Silver	ND	100	89.7	90
Thallium	ND	100	115	115
Vanadium	72.1	100	155	83
Zinc	76.5	100	163	87

* EPA METHOD 7471
**Analyzed by GFAA
+ Outliner

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064
SAMPLE ID: B-7-1
CONTROL NO.: 93E064-01

DATE RECEIVED: 05/15/93
DATE EXTRACTED: 05/18/93
DATE ANALYZED: 05/19/93

ACCESSION: 93E057 93E064

Parameter	SAMPLE RESULT (mg/kg)	DUP SAMPLE RESULT (mg/kg)	RPD RESULT (%)
Antimony	ND	ND	0
Arsenic**	11.6	9.36	21+
Barium	100	187	61+
Beryllium	ND	ND	0
Cadmium	ND	ND	0
Chromium	77.3	60.1	25+
Cobalt	10.6	12.7	18
Copper	70.1	70.9	1
Lead	9.87	10.1	3
Mercury*	ND	ND	0
Molybdenum	ND	ND	0
Nickel	61.2	73.9	19
Selenium	ND	ND	0
Silver	ND	ND	0
Thallium	ND	ND	0
Vanadium	72.1	51.4	34+
Zinc	76.5	76	1

* EPA METHOD 7471
**Analyzed by GFAA
+ Outliner

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

LIENT: Woodward-Clyde Consultants
ECT: Carter Park - 93C0243A
HOD: EPA 3050/6010
ATRIX: Soil

ATCH NO.: 93E064 DATE RECEIVED: NA
AMPLE ID: ERA 215 DATE EXTRACTED: 05/18/93
ONTROL NO.: 93E048-LCS DATE ANALYZED: 05/19/93

CCESSION: 93E048 93E057 93E064

arameter	FOUND VALUE (mg/kg)	TRUE VALUE (mg/kg)	ACCEPTANCE RANGE (mg/kg)
ntimony	30.2	21.3	9.0 - 130
rsenic**	29.3	34.2	13 - 51
arium	106	97.4	68 - 127
eryllium	58.6	58.1	35 - 87
admium	78	70.3	35 - 112
hromium	202	182	82 - 255
obalt	124	120	66 - 180
opper	97.1	92.7	46 - 139
ead	44.6	44.5	20 - 65
ercury*	11.6	13.7	7.5 - 21
bdenum	53.3	45	25 - 74
el	141	137	68 - 212
elenium	30	33.1	17 - 53
ilver	72.1	64.4	26 - 113
hallium	118	140	70 - 210
anadium	44.7	40.1	28 - 54
inc	89.9	78.2	39 - 121

EPA METHOD 7471
*Analyzed by GFAA

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
PROJECT: Carter Park
CONTROL NO: 93E064

METHOD: EPA 9045
DATE ANALYZED: 05/24/93
MATRIX: Soil

SAMPLE ID: 93E064-9

PARAMETER	SAMPLE RESULT (pH unit)	DUP. SAMPLE RESULT (pH unit)	%RPD
pH	6.44	6.59	2

METHOD: EPA 9045
DATE ANALYZED: 05/24/93
MATRIX: Soil

SAMPLE ID: 93E064-23

PARAMETER	SAMPLE RESULT (pH unit)	DUP. SAMPLE RESULT (pH unit)	%RPD
pH	7.78	7.82	1

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
PROJECT: Carter Park
CONTROL NO: 93E064

METHOD EPA 8080
MATRIX: Soil
DATE ANALYZED: 05/24/93
SAMPLE ID: 93E064-1

PARAMETER	SAMPLE RESULTS (ug/kg)	AMOUNT SPIKED (ug/kg)	% REC.	DUP. % REC.	ACCEPT. CRITERIA	RPD	% RPD LIMITS
gamma-BHC	ND	16.67	100	81	46-127	21	50
Heptachlor	ND	16.67	125	97	35-130	25	31
Aldrin	ND	16.67	119	105	34-132	12	43
Dieldrin	ND	33.33	112	95	31-134	16	38
Endrin	ND	33.33	117	98	42-139	18	45
DDT	ND	33.33	120	102	23-134	16	50

METHOD EPA 8080
MATRIX: Soil
DATE ANALYZED: 05/24/93
SAMPLE ID: Method Blank

PARAMETER	AMOUNT SPIKED (ug/kg)	% REC.	ACCEPT. CRITERIA
gamma-BHC	16.67	93	50-150
Heptachlor	16.67	102	50-150
Aldrin	16.67	120	50-150
Dieldrin	33.33	119	50-150
Endrin	33.33	124	50-150
DDT	33.33	128	50-150

METHOD EPA 608
MATRIX: Water
DATE ANALYZED: 05/24/93
SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (ug/L)	AMOUNT SPIKED (ug/L)	% REC.	DUP. % REC.	ACCEPT. CRITERIA	RPD	%RPD LIMITS
gamma-BHC	ND	50	77	94	56-123	19	15
Heptachlor	ND	50	93	112	40-131	18	20
Aldrin	ND	50	92	112	40-120	19	22
Dieldrin	ND	100	108	114	52-126	5	18
Endrin	ND	100	112	113	56-121	1	21
DDT	ND	100	118	115	38-127	3	27

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
PROJECT: Carter Park
CONTROL NO: 93E064

METHOD EPA 8150
MATRIX: Soil
DATE ANALYZED: 05/15/93
SAMPLE ID: Method Blank

PARAMETER	AMOUNT SPIKED (ug/kg)	% REC.	ACCEPT. CRITERIA
2,4-D	250	75	20-140
Silvex	100	93	20-140

METHOD EPA 8150
MATRIX: Water
DATE ANALYZED: 05/22/93
SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (ug/L)	AMOUNT SPIKED (ug/L)	% REC.	ACCEPT. CRITERIA
2,4-D	ND	250	86	10-140
Silvex	ND	100	92	10-140

METHOD EPA 8150
MATRIX: Soil
DATE ANALYZED: 05/24/93
SAMPLE ID: 93E064-1

PARAMETER	SAMPLE RESULTS (ug/kg)	AMOUNT SPIKED (ug/kg)	% REC.	DUP. % REC.	ACCEPT. CRITERIA	RPD	%RPD LIMITS
2,4-D	ND	250	69	74	10-140	7	50
Silvex	ND	100	67	60	10-140	10	50

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
PROJECT: Carter Park
CONTROL NO: 93E064

METHOD EPA 8140
DATE ANALYZED: 05/26/93
MATRIX: Soil

SAMPLE ID: Method Blank

PARAMETER	AMOUNT SPIKED (ug/kg)	% REC.	ACCEPT. CRITERIA
Phorate	.67	109	40-140
Disulfoton	.67	100	40-140

METHOD EPA 8140
DATE ANALYZED: 05/26/93
MATRIX: Water

SAMPLE ID: Method Blank

PARAMETER	SAMPLE RESULTS (ug/L)	AMOUNT SPIKED (ug/L)	% REC.	DUP. % REC.	ACCEPT. CRITERIA	RPD	%RPD LIMITS
Phorate	ND	0.02	118	110	30-140	7	50
Disulfoton	ND	0.02	104	101	30-140	3	50

METHOD EPA 8140
DATE ANALYZED: 05/26/93
MATRIX: Soil

SAMPLE ID: 93E064-1

PARAMETER	SAMPLE RESULTS (ug/kg)	AMOUNT SPIKED (ug/kg)	% REC.	DUP. % REC.	ACCEPT. CRITERIA	RPD	%RPD LIMITS
Phorate*	ND	0.67	0	0	30-140	0	50
Disulfoton	ND	0.67	37	38	30-140	3	50
% Surrogate Rec.			105	89		16	

* Phorate was not recovered from the sample spike or spike duplicate. However, the surrogate recoveries were 105 and 89% respectively and LCS met the QC requirements. No corrective action was taken, matrix effect was suspected.

C K Y incorporated
Analytical Laboratories

Date: 05/26/93
93E048

Woodward-Clyde Consultants
500-12th Street, Suite 100
Oakland, CA 94607

Attn: Mr. Michael McGuire

Subject: Laboratory Report
Project: Carter Park #93C0243A

Enclosed is the laboratory report for samples received on 05/12/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

Method	No. of Analysis
EPA 9045	50 Soils
EPA 3050/6010	9 Soils

The results are summarized on eighteen pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed of after fifteen (15) days from the date of this report.

630 Maple Ave., Torrance, Calif. 90503 • Telephone 310-618-8889 • Fax: 310-618-0818

EPA 9045
pH

CLIENT:	Woodward-Clyde	**DATE REC'D:**	05/12/93
PROJECT:	Carter Park #93C0243A	**DATE EXTRACTED:**	05/17/93
CONTROL NO:	93E048	**DATE ANALYZED:**	05/17/93
MATRIX:	Soil		

SAMPLE ID:	CONTROL NO:	RESULTS (pH Unit)	DETECTION LIMIT (pH Unit)
B-15-2	93E048-02	7.10	0.10
B-15-3	93E048-03	6.35	0.10
B-15-4	93E048-04*	7.43	0.10
B-15-5	93E048-05	7.58	0.10
B-15-6	93E048-06	7.75	0.10
B-15-7	93E048-07	7.49	0.10
B-15-8	93E048-08	7.37	0.10
B-15-9	93E048-09	7.26	0.10
B-16-1	93E048-10	9.49	0.10
B-16-2	93E048-11*	7.14	0.10
B-16-3	93E048-12*	6.99	0.10
B-16-4	93E048-13	6.81	0.10
B-16-6	93E048-15	8.08	0.10
B-16-7	93E048-16	7.59	0.10
B-16-8	93E048-17	7.47	0.10
B-19-1	93E048-19	7.67	0.10
B-19-2	93E048-20*	3.65	0.10
B-19-4	93E048-22	4.10	0.10
B-19-6	93E048-24	7.10	0.10
B-19-7	93E048-25	7.56	0.10
B-18-1	93E048-28	8.08	0.10
B-18-2	93E048-29*	6.39	0.10
B-18-4	93E048-31	7.03	0.10
B-18-5	93E048-32	7.57	0.10
B-18-6	93E048-33	7.43	0.10
B-18-7	93E048-34	7.56	0.10
B-17-1	93E048-36	7.87	0.10
B-17-2	93E048-37*	6.73	0.10
B-17-4	93E048-39	7.76	0.10
B-17-5	93E048-40	7.89	0.10
B-17-6	93E048-41	7.94	0.10
B-20-1	93E048-43	7.61	0.10
B-20-2	93E048-44*	7.37	0.10

* Samples extracted & analyzed on 05/14/93

EPA 9045
pH

CLIENT:	Woodward-Clyde	**DATE REC'D:**	05/12/93
PROJECT:	Carter Park #93C0243A	**DATE EXTRACTED:**	05/17/93
CONTROL NO:	93E048	**DATE ANALYZED:**	05/17/93
MATRIX:	Soil		

SAMPLE ID:	CONTROL NO:	RESULTS (pH Unit)	DETECTION LIMIT (pH Unit)
B-20-3	93E048-45	7.48	0.10
B-20-4	93E048-46	8.13	0.10
B-20-5	93E048-47	8.10	0.10
B-20-6	93E048-48	7.79	0.10
B-20-7	93E048-49	7.92	0.10
B-14-1	93E048-51	7.22	0.10
B-14-2	93E048-52*	7.90	0.10
B-14-3	93E048-53	11.03	0.10
B-14-4	93E048-54	7.39	0.10
B-14-5	93E048-55	7.57	0.10
B-14-6	93E048-56	7.67	0.10
B-14-7	93E048-57	7.74	0.10
B-13-1	93E048-60*	7.66	0.10
B-13-2	93E048-61	7.56	0.10
B-13-4	93E048-63	7.93	0.10
B-13-5	93E048-64	8.05	0.10
B-13-6	93E048-65	8.04	0.10

* Samples extracted & analyzed on 05/14/93

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-15-4	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-04	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	156
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	64.3
Cobalt	2.5	12.4
Copper	1	81.4
Lead	5	9.61
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	57
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	52.8
Zinc	5	75

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-16-2	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-11	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	240
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	63
Cobalt	2.5	10.2
Copper	1	40.7
Lead	5	8.87
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	44.4
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	62.5
Zinc	5	52.4

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-16-3	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-12	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	148
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	52.4
Cobalt	2.5	8.91
Copper	1	38.7
Lead	5	6.97
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	39.2
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	43.9
Zinc	5	49.7

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-19-2	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-20	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	114
Beryllium	.75	ND
Cadmium	1	1.8
Chromium	2.5	72.5
Cobalt	2.5	8.12
Copper	1	58.7
Lead	5	20.2
Mercury*	.05	0.11
Molybdenum	2.5	ND
Nickel	2.5	34.5
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	64
Zinc	5	72.4

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/10/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-18-2	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-29	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	184
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	90.5
Cobalt	2.5	9.2
Copper	1	54
Lead	5	7.47
Mercury*	.05	0.15
Molybdenum	2.5	ND
Nickel	2.5	54.7
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	74.7
Zinc	5	68.4

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/11/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-17-2	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-37	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	250
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	73.9
Cobalt	2.5	13.2
Copper	1	46.4
Lead	5	10.4
Mercury*	.05	0.21
Molybdenum	2.5	ND
Nickel	2.5	73.3
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	73.8
Zinc	5	67

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/11/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-20-2	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-44	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	5.14
Barium	2.5	137
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	59.7
Cobalt	2.5	6.22
Copper	1	66.1
Lead	5	13.6
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	49.1
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	51.7
Zinc	5	73.2

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/11/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-14-2	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-52	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	5.89
Barium	2.5	239
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	50.9
Cobalt	2.5	4.79
Copper	1	34.5
Lead	5	484
Mercury*	.05	0.07
Molybdenum	2.5	ND
Nickel	2.5	33.1
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	49.6
Zinc	5	65.6

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/11/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/12/93
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	B-13-1	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-60	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	96.6
Barium	2.5	514
Beryllium	.75	ND
Cadmium	1	1.13
Chromium	2.5	49.6
Cobalt	2.5	7.86
Copper	1	49.4
Lead	5	1160
Mercury*	.05	0.25
Molybdenum	2.5	ND
Nickel	2.5	35.7
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	67.9
Zinc	5	515

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	NA
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	NA
BATCH NO.:	93E048	DATE EXTRACTED:	05/18/93
SAMPLE ID:	METHOD BLANK	DATE ANALYZED:	05/19/93
CONTROL NO.:	93E048-BLK	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Antimony	15	ND
Arsenic**	5	ND
Barium	2.5	ND
Beryllium	.75	ND
Cadmium	1	ND
Chromium	2.5	ND
Cobalt	2.5	ND
Copper	1	ND
Lead	5	ND
Mercury*	.05	ND
Molybdenum	2.5	ND
Nickel	2.5	ND
Selenium	15	ND
Silver	1	ND
Thallium	20	ND
Vanadium	2.5	ND
Zinc	5	ND

* EPA METHOD 7471
**Analyzed by GFAA

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E048
SAMPLE ID: B-15-4
CONTROL NO.: 93E048-04

DATE RECEIVED: 05/12/93
DATE EXTRACTED: 05/18/93
DATE ANALYZED: 05/19/93

ACCESSION: 93E048

Parameter	SAMPLE RESULT (mg/kg)	DUP SAMPLE RESULT (mg/kg)	RPD RESULT (%)
Antimony	ND	ND	0
Arsenic**	ND	ND	0
Barium	156	177	13
Beryllium	ND	ND	0
Cadmium	ND	ND	0
Chromium	64.3	67.1	4
Cobalt	12.4	9.61	25
Copper	81.4	50.6	47
Lead	9.61	9.89	3
Mercury*	ND	ND	0
Molybdenum	ND	ND	0
Nickel	57	53.2	7
Selenium	ND	ND	0
Silver	ND	ND	0
Thallium	ND	ND	0
Vanadium	52.8	52.4	1
Zinc	75	59.7	23

* EPA METHOD 7471
**Analyzed by GFAA

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E048
SAMPLE ID: B-15-4
CONTROL NO.: 93E048-04

DATE RECEIVED: 05/12/93
DATE EXTRACTED: 05/18/93
DATE ANALYZED: 05/19/93

ACCESSION: 93E048

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
Antimony	ND	100	37.2	37
Arsenic**	ND	100	112	112
Barium	156	100	266	110
Beryllium	ND	100	97.1	97
Cadmium	ND	100	95	95
Chromium	64.3	100	162	98
Cobalt	12.4	100	108	95
Copper	81.4	100	129	48
Lead	9.61	100	108	98
Mercury*	ND	0.83	0.78	94
Molybdenum	ND	100	84.1	84
Nickel	57	100	157	100
Selenium	ND	100	41.4	41
Silver	ND	100	88.1	88
Thallium	ND	100	108	108
Vanadium	52.8	100	151	99
Zinc	75	100	145	70

* EPA METHOD 7471
**Analyzed by GFAA

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E048
SAMPLE ID: METHOD BLANK
CONTROL NO.: 93E048-BLK

DATE RECEIVED: NA
DATE EXTRACTED: 05/18/93
DATE ANALYZED: 05/19/93

ACCESSION: 93E048 93E057 93E064

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
Antimony	ND	100	96.8	97
Arsenic**	ND	100	107	107
Barium	ND	100	97.9	98
Beryllium	ND	100	96.3	96
Cadmium	ND	100	97.1	97
Chromium	ND	100	100	100
Cobalt	ND	100	99.5	99
Copper	ND	100	99.2	99
Lead	ND	100	97.9	98
Molybdenum	ND	100	98.8	99
Nickel	ND	100	99.3	99
Selenium	ND	100	104	104
Silver	ND	100	89.9	90
Thallium	ND	100	94.8	95
Vanadium	ND	100	99.7	100
Zinc	ND	100	96.9	97

**Analyzed by GFAA

QUALITY CONTROL DATA

CLIENT: Woodward-Clyde
PROJECT: Carter Park #93C0243A
CONTROL NO: 93E048

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-10

COMPOUND	SAMPLE RESULTS (pH/units)	DUP. SAMPLE RESULTS (pH/units)	RPD %
pH	7.49	7.35	2

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-22

COMPOUND	SAMPLE RESULTS (pH/units)	DUP. SAMPLE RESULTS (pH/units)	RPD %
pH	4.10	4.08	0

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-31

COMPOUND	SAMPLE RESULTS (pH/units)	DUP. SAMPLE RESULTS (pH/units)	RPD %
pH	7.03	6.97	1

QUALITY CONTROL DATA

CLIENT: Woodward-Clyde
PROJECT: Carter Park #93C0243A
CONTROL NO: 93E048

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-40

COMPOUND	SAMPLE RESULTS (pH/units)	DUP. SAMPLE RESULTS (pH/units)	RPD %
pH	7.89	7.97	1

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-51

COMPOUND	SAMPLE RESULTS (pH/units)	DUP. SAMPLE RESULTS (pH/units)	RPD %
pH	7.22	7.11	2

QUALITY CONTROL DATA

CLIENT: Woodward-Clyde
PROJECT: Carter Park #93C0243A
CONTROL NO: 93E048

METHOD: EPA 9045
DATE ANALYZED: 05/14/93
MATRIX: Soil

SAMPLE ID: 93E048-12

COMPOUND	SAMPLE RESULTS (pH/units)	DUP. SAMPLE RESULTS (pH/units)	RPD %
pH	6.99	7.09	1

METHOD: EPA 9045
DATE ANALYZED: 05/14/93
MATRIX: Soil

SAMPLE ID: 93E048-29

COMPOUND	SAMPLE RESULTS (pH/units)	DUP. SAMPLE RESULTS (pH/units)	RPD %
pH	6.39	6.51	2

METHOD: EPA 9045
DATE ANALYZED: 05/14/93
MATRIX: Soil

SAMPLE ID: 93E048-60

COMPOUND	SAMPLE RESULTS (pH/units)	DUP. SAMPLE RESULTS (pH/units)	RPD %
pH	7.66	7.78	2

93E048 DUE 5- -93 CKT Lab 1 of 3 G3

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-[redacted]-4014
(415) 893-3600

Chain of Custody Record

PROJECT NO. 93C0243A

SAMPLERS: (Signature) Bill [redacted]

	DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	ANALYSES: EPA Method	EPA Method	EPA Method	EPA Method	HOLD pending analysis request	Analysis request @ TITLE 22 METALS	pH 9040/9045	@ HOMOGENIZE			Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
1	5/10/93	0940	B-15-1	S					X						1	All samples in brass or stainless steel 2"x6" or 2½"x6" liners
2		0950	B-15-2	S					X		X				1	
3		1010	B-15-3	S					X		X				1	HOLD samples pending analysis request
4		1020	B-15-4	S					X	X	X	X			1	
5		1035	B-15-5	S					X		X				1	
6		1045	B-15-6	S					X		X				1	
7		1052	B-15-7	S					X		X				1	
8		1101	B-15-8	S					X		X				1	
9		1110	B-15-9	S					X		X				1	
10		1238	B-16-1	S					X		X				1	3 week TAT
11		1254	B-16-2	S					X	X	X	X			1	
12		1258	B-16-3	S					X	X	X	X			1	
13		1302	B-16-4	S					X		X				1	Contact Mike McGuire (510) 874-3288
14		1310	B-16-5	S					X						1	
15		1319	B-16-6	S					X		X				1	
16		1328	B-16-7	S					X		X				1	
17		1338	B-16-8	S					X		X				1	
18		1347	B-16-9	S					X						1	
19		1440	B-19-1	S					X		X				1	
20		1450	B-19-2	S					X	X	X	X			1	
21		1504	B-19-3	S					X						1	
22		1512	B-19-4	S					X		X				1	
23		1519	B-19-5	S					X						1	
24		1525	B-19-6	S					X		X				1	
25		1533	B-19-7	S					X		X				1	
26		1543	B-19-8	S					X						1	
27		1554	B-19-9	S					X						1	
28		1635	B-18-1	S					X		X				1	T=6°C

TOTAL NUMBER OF CONTAINERS: 28

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Bill [redacted]	5/11/93 1845	[redacted]			

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
FED EXPRESS AIRBILL # 6258918463 / 6258918392	FOR FED EX		Cert	5-12-93

93E048 DUE 5- -93 CKY Lab 2 of 3 G3

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. CARTER PARK 930243A

SAMPLERS: (Signature) Bill Tafuya

	DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	HOLD pending analysis request	Ⓑ TITLE 22 METALS	pH 9040/9045	Ⓑ HOMOGENIZE			Number of Containers
29	5/10/93	1646	B-18-2	S					X	X	X	X			1
30		1654	B-18-3	S					X						1
31		1659	B-18-4	S					X		X				1
32		1707	B-18-5	S					X		X				1
33		1713	B-18-6	S					X		X				1
34		1723	B-18-7	S					X		X				1
35		1730	B-18-8	S					X						1
36	5/11/93	0902	B-17-1	S					X		X				1
37		0914	B-17-2	S					X	X	X	X			1
38		0922	B-17-3	S					X						1
39		0929	B-17-4	S					X		X				1
40		0942	B-17-5	S					X		X				1
41		0948	B-17-6	S					X		X				1
42		0958	B-17-7	S					X						1
43		1045	B-20-1	S					X		X				1
44		1057	B-20-2	S					X	X	X	X			1
45		1104	B-20-3	S					X		X				1
46		1112	B-20-4	S					X		X				1
47		1120	B-20-5	S					X		X				1
48		1125	B-20-6	S					X		X				1
49		1132	B-20-7	S					X		X				1
50		1143	B-20-8	S					X						1
51		1254	B-14-1	S					X		X				1
52		1302	B-14-2	S					X	X	X	X			1
53		1331	B-14-3	S					X		X				1
54		1347	B-14-4	S					X		X				1
55		1401	B-14-5	S					X		X				1
56		1406	B-14-6	S					X		X				1

TOTAL NUMBER OF CONTAINERS: 28

REMARKS (Sample preservation, handling procedures, etc.)

All samples in brass or SS liners

HOLD samples pending analysis request

3 week TAT

Contact Mike McGuire (510) 874-3288

T=6°C

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Bill Tafuya	5/11/93 1845				

METHOD OF SHIPMENT	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
FED Express AIRBILL 625891840 3/625891 8592	FOR: FED EX		CO	5-12-93 2:50 pm

93E088 DUE 5- -93 CKY Lab 3 of 3

G3

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607[redacted]
(415) 893-3600
—4014

Chain of Custody Record

PROJECT NO. Carter Park 93C0243A

SAMPLERS: (Signature) Bill [signature]

	DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	HOLD pending analysis request	(B) TITLE 22 METALS	pH 9040/9045	(B) HOMOGENIZE		Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
57	5/11/93	1411	B-14-7	S					X		X			1	
58	}	1419	B-14-8	S					X					1	All samples in brass or stainless steel 2"x6" or 2½"x6" liners
59	}	1430	B-14-9	S					X					1	
60	}	1515	B-13-1	S					X	X	X	X		1	
61	}	1525	B-13-2	S					X		X			1	
62	}	1532	B-13-3	S					X					1	HOLD samples pending analysis request
63	}	1548	B-13-4	S					X		X			1	
64	}	1558	B-13-5	S					X		X			1	
65	}	1607	B-13-6	S					X		X			1	
66	}	1612	B-13-7	S					X					1	
67	}	1618	B-13-8	S					X					1	3 week TAT
68	↓	1628	B-13-9	S					X					1	Contact Mike McGuire (510) 874-3288

T=6°C

TOTAL NUMBER OF CONTAINERS: 12

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Bill [signature]	5/11/93 1845	[signature]			

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
Fed Ex AIRBILL# 635891 8403/6358918392	for: FED EX		[signature]	5-12-93 2:50 pm

cc: McGuire
Anita Q
Jackie L

C K Y incorporated
Analytical Laboratories

Date: 06/29/93
93E064

Woodward Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

Attn: Mr. Michael McGuire

Subject: Additional Laboratory Report
Project: Carter Park #93C0243A

Enclosed is the laboratory report for samples received on 05/15/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. Additional analyses were requested on 06/10/93. The data reported includes:

Method	No. of Analysis
EPA 3050/6010 by ICP (Pb & Zn)	10 Soils
EPA 3050/6010 by GFAA (As)	10 Soils

The results are summarized on fourteen pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

630 Maple Ave., Torrance, Calif. 90503 • Telephone 310-618-8889 • Fax: 310-618-0818

CASE NARRATIVE

CLIENT: **WOODWARD-CLYDE CONSULTANTS**
PROJECT: **CARTER PARK**
CKY BATCH: **93E064**

Additional metal analyses for samples received on 05/15/93 were requested on 06/10/93. The analyses were in accordance with SW 846, USEPA 3rd Edition, 1986. Results were reported on wet weight basis.

1. Samples were homogenized before preparation for metal analyses according to instruction in the memo dated 06/10/93.

2. Metal analyses by Method 3050/6010/7000

   Arsenic was analyzed by GFAA. Lead and Zinc were analyzed by ICP. Method blanks, lab control samples and calibrations were all within the control limits. Matrix spike recovery of Lead was negative due to the high lead concentration in the sample. No corrective action was taken.

   In duplicate sample analyses, Arsenic and Lead were out of the project specific QC limit of 20%. The sample was re-analyzed and similar results were obtained. Since the method blank, lab control sample and lab control sample duplicates were all within control, no corrective action was taken.

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-7-2	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-02	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	5.39
Zinc	5	62

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-7-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-03	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	72.9

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-7-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-04	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	7.92
Zinc	5	63.6

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-7-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-05	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	6.67
Zinc	5	50.4

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-7-GRB	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-08	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	5.52
Zinc	5	27.6

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-6-GRB	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-09	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	26.7

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-3-3	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-19	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	6.97
Zinc	5	52.3

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-3-4	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-20	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	9.49
Zinc	5	51.2

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-3-5	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-21	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	6.86
Zinc	5	54.5

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	05/14/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	05/15/93
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	B-3-6	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-22	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	9.73
Zinc	5	59.9

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	NA
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	NA
BATCH NO.:	93E064	DATE EXTRACTED:	06/14/93
SAMPLE ID:	METHOD BLANK	DATE ANALYZED:	06/24/93
CONTROL NO.:	93E064-BLK	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	ND

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

LIENT: Woodward-Clyde Consultants
R[redacted]CT: Carter Park - 93C0243A
E[redacted]D: EPA 3050/6010
ATRIX: Soil

ATCH NO.: 93E064 DATE RECEIVED: NA
AMPLE ID: LCS 216 DATE EXTRACTED: 06/14/93
ONTROL NO.: 93E064-LCS1 and LCS2 DATE ANALYZED: 06/24/93

CCESSION: 93E048 93E064

arameter	TRUE VALUE (mg/kg)	LCS1 FOUND VALUE (mg/kg)	LCS2 FOUND VALUE (mg/kg)	RPD (%)	ACCEPTANCE RANGE (mg/kg)
rsenic	67.7	75.4	67.3	11	41 - 105
ead	100	91.1	81.5	11	55 - 140
inc	197	180	167	8	98 - 280

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064 DATE RECEIVED: 05/12/93
SAMPLE ID: B-15-2 DATE EXTRACTED: 06/14/93
CONTROL NO.: 93E048-02 DATE ANALYZED: 06/24/93

ACCESSION: 93E048 93E064

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
Arsenic**	8.4	100	85.6	77
Lead	1520	100	1330	-190 +
Zinc	91.9	100	191	99

**Analyzed by GFAA
+ Outside control limit of 75-125%

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

LIENT: Woodward-Clyde Consultants
RO ECT: Carter Park - 93C0243A
E D: EPA 3050/6010
ATRIX: Soil

ATCH NO.: 93E064
AMPLE ID: B-15-2
ONTROL NO.: 93E048-02

DATE RECEIVED: 05/12/93
DATE EXTRACTED: 06/14/93
DATE ANALYZED: 06/24/93

CCESSION: 93E048 93E064

arameter	SAMPLE RESULT (mg/kg)	DUP SAMPLE RESULT (mg/kg)	RPD RESULT (%)	
rsenic**	8.4	ND	-	+
ead	1520	1130	30	+
inc	91.9	110	18	

*Analyzed by GFAA
Outside control limit of 20%

…Consultants
500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO. 93602434 Carter Park

SAMPLERS: (Signature) [illegible signature]

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	Ⓐ EPA Method 8080 (PEST)	EPA Method 8140	EPA Method 8150	EPA Method 9040/5 pH	HOLD pending analysis request	Ⓑ E/H 8040/50	Ⓒ Title 22 METALS	Ⓓ HOMOGENIZE		Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
5/14/93	0830	B-7-1	S	X	X	X	X	X		X	X		1	
	0839	B-7-2	S				X	X	X		X		1	All samples in brass or stainless steel liners.
	0854	B-7-3	S				X	X					1	
	0859	B-7-4	S				X	X					1	
	0904	B-7-5	S				X	X					1	HOLD all samples pending analysis request
	0910	B-7-6	S				X	X					1	
	0922	B-7-7	S					X					1	
	0825	B-7GRB	S				X	X					1	
	1108	B6GRB	S				X	X					1	3 week TAT
	1115	B-6-1	S	X	X	X	X	X		X	X		1	
	1123	B-6-2	S				X	X	X		X		1	
	1133	B-6-3	S				X	X					1	
	1138	B-6-4	S				X	X					1	
	1143	B-6-5	S				X	X					1	Contact Mike McGuire (510) 874-3288
	1148	B-6-6	S				X	X					1	
	1156	B-6-7	S					X					1	
	1324	B-3-1	S	X	X	X	X	X		X	X		1	
	1328	B-3-2	S	X	X	X	X	X		X	X		1	All samples on ice in ice chests
	1330	B-3-3	S				X	X	X		X		1	
	1342	B-3-4	S				X	X					1	
	1346	B-3-5	S				X	X					1	Two ice chests Total
	1350	B-3-6	S				X	X					1	
	1356	B-3-7	S				X	X					1	
	1407	B-3-8	S					X					1	
	1420	VCPEQB	W	X	X	X		X					6	Amber Glass liters
	1420	VCPEQB	W					X					2	500ml plastic

T = 6°C

TOTAL NUMBER OF CONTAINERS: 32

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	5/14/93 1625				[signature]

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
Fed Express			[signature]	5/15/93

FEDEX AIRBILL # 6574051304

CKY INC., ANALYTICAL LABORATORIES, 630 Maple Ave., Torrance, Calif. 90503 Tel. (310) 618-8889 Fax: (310) 618-0818

G3

ANALYSIS REQUEST FORM

DUE 6-17-93

CLIENT NAME: WCC/ Carter Park

CKY CONTROL NO.: 93E064

REQUESTED BY: Y. McGuire

DATE: 6/10/93

LOGGED BY: Emilie Chavez

CKY CONTROL NO.	CLIENT SAMPLE ID	COMMENTS
93E064-2 ✓	B-7-2	% Zn (ICP). Arsenic (GFAA)
E064-3 ✓	B-7-3	
E064-4 ✓	B-7-4	
E064-5 ✓	B-7-5	
E064-20 ✓	B-3-4	
E064-21 ✓	B-3-5 ✓	
E064-22 ✓	B-3-6 ✓	
E064-19 ✓	B-3-3 ✓	
E064-8 ✓	B-7-GRB	
E064-9 ✓	B-6-GRB	

C K Y incorporated
Analytical Laboratories

Date: 07/01/93
93F128

Woodward Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 946075

Attn: Mr. Mike McGuire

Subject: Laboratory Report
Project: Carter Park/93C0243A-2000

Enclosed is the laboratory report for samples received on 06/25/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

Method	No. of Analysis
EPA 9045	27 Soils
EPA 3050/6010 (Metals)	27 Soils

The results are summarized on thirty-six pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

630 Maple Ave., Torrance, Calif. 90503 • Telephone 310-618-8889 • Fax: 310-618-0818

CASE NARRATIVE

CLIENT: WOODWARD-CLYDE CONSULTANTS
PROJECT: CARTER PARK
CKY BATCH: 93F128

Twenty seven (27) soil samples were received on 06/25/93 for analyses by EPA methods 9045 and metals in accordance with SW846, USEPA 3rd Edition, 1986. Results are reported on wet weight basis.

1. Metal analyses by Method 3050/6010/7000

   Arsenic was analyzed by GFAA with the exception of sample 93F128-05, which was analyzed by ICP. All other elements were analyzed by ICP. Method blank, lab control samples, RPD of lab control sample, and calibrations were all within control limit. Two sets of matrix spike were analyzed. Matrix spike recovery of Lead in sample 93F128-23 was out of the QC limit of 75-125%. Since lab control sample and post digestive spike results were within control, matrix effect or inhomogeneous sample were suspected. No corrective action was taken.

   Two sets of duplicates were analyzed. Arsenic and Lead in sample 93F128-01 and Arsenic in sample 93F128-23 were out of the project specific QC limit of 20%. The samples were re-analyzed and similar results were obtained. Since the method blank and RPD of lab control samples were within control, the cause of discrepancy may be due to something other than the analytical process.

2. EPA Method 9045

   Calibration and duplicates were all within control.

EPA 9045
pH

CLIENT:	Woodward Clyde Consultants	**DATE REC'D:**	06/25/93
PROJECT:	Carter Park/93C0243A-2000	**DATE EXTRACTED:**	06/28/93
CONTROL NO:	93F128	**DATE ANALYZED:**	06/28/93
MATRIX:	Soil		

SAMPLE ID:	CONTROL NO:	RESULTS (pH Unit)	DETECTION LIMIT (pH Unit)
B-25-1	93F128-1	5.91	0.1
B-25-2	93F128-2	6.85	0.1
B-25-3	93F128-3	7.20	0.1
B-25-5	93F128-5	4.48	0.1
B-25-6	93F128-6	7.24	0.1
B-25-7	93F128-7	7.70	0.1
B-24-1	93F128-8	4.08	0.1
B-24-2	93F128-9	5.27	0.1
B-24-3	93F128-10	7.02	0.1
B-24-4	93F128-11	7.12	0.1
B-24-5	93F128-12	7.28	0.1
B-23-1	93F128-13	6.26	0.1
B-23-2	93F128-14	7.74	0.1
B-23-3	93F128-15	7.17	0.1
B-23-4	93F128-16	7.32	0.1
B-22-1	93F128-17	6.93	0.1
B-22-2	93F128-18	7.94	0.1
B-22-3	93F128-19	7.86	0.1
B-22-4	93F128-20	3.63	0.1
B-21-2	93F128-23	7.29	0.1
B-21-3	93F128-24	7.44	0.1
B-21-4	93F128-25	7.12	0.1
B-21-6	93F128-27	7.49	0.1
B-26-1	93F128-28	6.59	0.1
B-26-2	93F128-29	7.30	0.1
B-26-3	93F128-30	7.73	0.1
B-26-4	93F128-31	7.52	0.1

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-25-1	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-01	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	8.0
Zinc	5	65.5

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-25-2	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-02	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	7.5
Zinc	5	44.8

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-25-3	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-03	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	5.88
Zinc	5	47.1

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-25-5	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-05	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic	5	300
Lead	5	732
Zinc	5	436

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-25-6	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-06	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	17.1
Lead	5	7.77
Zinc	5	49.2

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-25-7	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-07	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	6.04
Lead	5	6.62
Zinc	5	53.8

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-24-1	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-08	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	9.2
Lead	5	ND
Zinc	5	177

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-24-2	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-09	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	34.2
Lead	5	10.7
Zinc	5	51.7

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-24-3	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-10	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	8.7
Lead	5	5.86
Zinc	5	44.1

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-24-4	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-11	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	6.5
Lead	5	5.87
Zinc	5	46.8

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-24-5	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-12	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	10.3
Lead	5	ND
Zinc	5	52.1

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-23-1	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-13	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	12.6
Lead	5	1100
Zinc	5	113

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-23-2	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-14	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	6.04
Lead	5	1310
Zinc	5	73.1

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-23-3	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-15	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	10.4
Zinc	5	38.7

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-23-4	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-16	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	6.21
Zinc	5	37.8

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-22-1	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-17	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	6.81
Lead	5	115
Zinc	5	133

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-22-2	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-18	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	5.59
Lead	5	319
Zinc	5	42.4

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-22-3	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-19	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	18
Zinc	5	47.9

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-22-4	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-20	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	8.81
Lead	5	ND
Zinc	5	68.3

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-21-2	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-23	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	91
Zinc	5	56.7

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-21-3	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-24	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	111
Zinc	5	60.1

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-21-4	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-25	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	5.89
Lead	5	8.61
Zinc	5	41.4

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-21-6	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-27	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	5.68
Zinc	5	47

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-26-1	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-28	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	6.91
Lead	5	12.6
Zinc	5	83

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-26-2	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-29	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	8.07
Zinc	5	54.5

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-26-3	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-30	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	8.09
Zinc	5	44.4

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	06/24/93
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	06/25/93
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	B-26-4	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-31	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	6.83
Zinc	5	51.7

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	NA
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	NA
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	METHOD BLANK 1	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-BLK1	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	ND

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

CLIENT:	Woodward-Clyde Consultants	DATE COLLECTED:	NA
PROJECT:	Carter Park - 93C0243A	DATE RECEIVED:	NA
BATCH NO.:	93F128	DATE EXTRACTED:	06/28/93
SAMPLE ID:	METHOD BLANK 2	DATE ANALYZED:	06/29/93
CONTROL NO.:	93F128-BLK2	MATRIX:	Soil
% MOISTURE:	NA	DILUTION FACTOR:	1

Element	Det Limit (mg/kg)	RESULT (mg/kg)
Arsenic**	5	ND
Lead	5	ND
Zinc	5	ND

**Analyzed by GFAA

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
PROJECT: Carter Park/93C0243A-2000
CONTROL NO: 93F128

METHOD: EPA 9045
DATE ANALYZED: 06/28/93
MATRIX: Soil

SAMPLE ID: 93F128-23

PARAMETER	SAMPLE RESULT (pH unit)	DUP. SAMPLE RESULT (pH unit)	%RPD
pH	7.29	7.33	0

METHOD: EPA 9045
DATE ANALYZED: 06/28/93
MATRIX: Soil

SAMPLE ID: 93F128-23

PARAMETER	SAMPLE RESULT (pH unit)	DUP. SAMPLE RESULT (pH unit)	%RPD
pH	5.91	5.92	0

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93F128
SAMPLE ID: B-25-1
CONTROL NO.: 93F128-01

DATE RECEIVED: 06/25/93
DATE EXTRACTED: 06/28/93
DATE ANALYZED: 06/29/93

ACCESSION: 93F128

Parameter	SAMPLE RESULT (mg/kg)	DUP SAMPLE RESULT (mg/kg)	RPD RESULT (%)
Arsenic**	3.53	5.32	40 +
Lead	8.0	5.37	39 +
Zinc	65.5	54.9	18

** Analyzed by GFAA
+ Arsenic and Lead RPD's were out of the control limit of 20%. Either non-homogeneous samples or the fact that these results were very close to the detection limit would have created this error. Since the matrix spike and the RPD of laboratory control samples were within the QC limits. No corrective action.

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93F128
SAMPLE ID: B-21-2
CONTROL NO.: 93F128-23

DATE RECEIVED: 06/25/93
DATE EXTRACTED: 06/28/93
DATE ANALYZED: 06/29/93

ACCESSION: 93F128

Parameter	SAMPLE RESULT (mg/kg)	DUP SAMPLE RESULT (mg/kg)	RPD RESULT (%)
Arsenic**	4.65	7.75	50 +
Lead	91	88.7	3
Zinc	56.7	59.9	5

**Analyzed by GFAA
+ Arsenic RPD was out of the control limit of 20%. A non-homogeneous sample was suspected since the matrix spike and the RPD of laboratory control samples were within the QC limits. No corrective action.

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93F128
SAMPLE ID: B-21-2
CONTROL NO.: 93F128-23

DATE RECEIVED: 06/25/93
DATE EXTRACTED: 06/28/93
DATE ANALYZED: 06/29/93

ACCESSION: 93F128

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
Arsenic**	4.65	100	118	113
Lead	91	100	152	61 +
Zinc	56.7	100	149	92

**Analyzed by GFAA
+ Lead spike recovery was out of the control limit of 75 - 125%. A matrix effect was suspected since the other matrix spike and the laboratory control samples were within the QC limits. No corrective action.

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93F128
SAMPLE ID: B-25-1
CONTROL NO.: 93F128-01

DATE RECEIVED: 06/25/93
DATE EXTRACTED: 06/28/93
DATE ANALYZED: 06/29/93

ACCESSION: 93F128

Parameter	SAMPLE RESULT (mg/kg)	SPIKE CONC. (mg/kg)	SPIKE RESULT (mg/kg)	SPIKE RECRY. (%)
Arsenic**	3.53	100	111	107
Lead	8.0	100	97.7	90
Zinc	65.5	100	140	75

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93F128 DATE RECEIVED: NA
SAMPLE ID: LCS 216 DATE EXTRACTED: 06/28/93
CONTROL NO.: 93F128-LCS1 and LCS2 DATE ANALYZED: 06/29/93

ACCESSION: 93F128

Parameter	TRUE VALUE (mg/kg)	LCS1 FOUND VALUE (mg/kg)	LCS2 FOUND VALUE (mg/kg)	RPD (%)	ACCEPTANCE RANG (mg/kg)
Arsenic**	67.7	84.2	90.3	7	41 - 105
Lead	100	82.0	80.8	1	55 - 140
Zinc	197	163	162	1	98 - 280

** Analyzed by GFAA

1 - 93F128 DUE 7-1-93 CKY Lab. (#4) 1 of 2

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO. Carter Park 93C0243A-2000

SAMPLERS: (Signature) Bill Mahoney

	DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	HOLD sample pending analysis request	Pb, Zn (6010)	As (GFAA)	pH (9040/9045)	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
1	6/24/93	0934	B-25-1	S					X	X	X	X	1	All samples in brass or stainless steal 2"x6" liners
2		0938	B-25-2	S					X	X	X	X	1	
3		0942	B-25-3	S					X	X	X	X	1	
4		0946	B-25-4	S					X				1	
5		0950	B-25-5	S					X	X	X	X	1	
6		0954	B-25-6	S					X	X	X	X	1	Hold all samples pending analysis request
7		0958	B-25-7	S					X	X	X	X	1	
8		1031	B-24-1	S					X	X	X	X	1	
9		1036	B-24-2	S					X	X	X	X	1	
10		1041	B-24-3	S					X	X	X	X	1	
11		1052	B-24-4	S					X	X	X	X	1	Send Results to Mike McGuire (510) 874-3288
12		1059	B-24-5	S					X	X	X	X	1	
13		1131	B-23-1	S					X	X	X	X	1	
14		1140	B-23-2	S					X	X	X	X	1	
15		1205	B-23-3	S					X	X	X	X	1	
16		1216	B-23-4	S					X	X	X	X	1	
17		1308	B-22-1	S					X	X	X	X	1	5 day TAT
18		1332	B-22-2	S					X	X	X	X	1	
19		1336	B-22-3	S					X	X	X	X	1	
20		1340	B-22-4	S					X	X	X	X	1	
21		1403	B-22-5	S					X				1	
22		1434	B-21-1	S					X				1	
23		1438	B-21-2	S					X	X	X	X	1	All samples on ice in one ice chest.
24		1440	B-21-3	S					X	X	X	X	1	
25		1453	B-21-4	S					X	X	X	X	1	
26		1456	B-21-5	S					X				1	RUSH
27		1505	B-21-6	S					X	X	X	X	1	
28	↓	1537	B-26-1	S					X	X	X	X	1	

TOTAL NUMBER OF CONTAINERS: 28

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Bill Mahoney	6/24/93 1930				

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
FED EX AIRBILL #7510224013				6/25/93 11:00 Am

93F128 DUE 7-1-93 CKY lab. (HA) 2 of 2

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO: Carter Park 93L0243A-2000

SAMPLERS: (Signature) Bill Hoshijo

	DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	Hold Sample pending analysis request	Pb, Zn (6010)	As (GFAA)	pH (9040, 9045)	Number of Containers
29	6/24/93	1545	B-26-2	S					X	X	X	X	1
30	"	1553	B-26-3	S					X	X	X	X	1
31	"	1613	B-26-4	S					X	X	X	X	1

REMARKS (Sample preservation, handling procedures, etc.)

seeg 1.

Send Results to Mike McGuire (510) 874-3288

5 day TAT

RUSH

TOTAL NUMBER OF CONTAINERS: 3

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Bill Hoshijo	6/24/93 1930				

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
FED EX AIRBILL # 7510224013				6/29/93 11:01 AM

Analytical**Technologies,** Inc. Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

ATI I.D.: 306330

July 09, 1993

WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607

Project Name: NONE
Project # : 93C0243A

Attention: MICHAEL MCGUIRE

Analytical Technologies, Inc. has received the following sample(s):

Date Received	Quantity	Matrix
June 29, 1993	1	SOIL

The sample(s) were analyzed with EPA methodology or equivalent methods as specified in the enclosed analytical schedule. The symbol for "less than" indicates a value below the reportable detection limit. Please note that the Sample Condition Upon Receipt Checklist is included at the end of this report.

The results of these analyses and the quality control data are enclosed.

EVELYN H. HICKS
PROJECT MANAGER

M. E. Shigley
M. E. Shigley
LABORATORY MANAGER

Analytical Technologies, Inc.

SAMPLE CROSS REFERENCE

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

Report Date: July 09, 1993
ATI I.D. : 306330

ATI #	Client Description	Matrix	Date Collected
1	COURT-1	SOIL	28-JUN-93

---TOTALS---

Matrix	# Samples
SOIL	1

ATI STANDARD DISPOSAL PRACTICE

The sample(s) from this project will be disposed of in twenty-one (21) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D.: 306330

Analysis	Technique/Description
EPA 340.2 (FLUORIDE)	ELECTRODE
EPA 353.2 (NITRATE AS NITROGEN)	COLORIMETRIC
EPA 376.2 (SULFIDE)	COLORIMETRIC
EPA 6010 (ANTIMONY)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (BARIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (BERYLLIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (CALCIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (CHROMIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (COBALT)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (COPPER)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (IRON)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (LEAD)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (MAGNESIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (MOLYBDENUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (NICKEL)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (POTASSIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (SILVER)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (SODIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (VANADIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (ZINC)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 7060 (ARSENIC)	ATOMIC ABSORPTION/GRAPHITE FURNACE
EPA 7131 (CADMIUM)	ATOMIC ABSORPTION/GRAPHITE FURNACE
EPA 7471 (NON AQUEOUS MERCURY)	ATOMIC ABSORPTION/COLD VAPOR
EPA 7740 (SELENIUM)	ATOMIC ABSORPTION/GRAPHITE FURNACE
EPA 7841 (THALLIUM)	ATOMIC ABSORPTION/GRAPHITE FURNACE
EPA 9012 (TOTAL CYANIDE)	COLORIMETRIC
EPA 9038 (SULFATE)	TURBIDIMETRIC
EPA 9045 (pH SOIL)	ELECTRODE
EPA 9253 (CHLORIDE)	TITRIMETRIC, SILVER NITRATE
METHOD 7-2.2,METHODS OF SOIL ANALYSIS(% MOISTURE)	GRAVIMETRIC
MOD EPA 9050 (ELECTRICAL CONDUCTIVITY)	ELECTRODE

GENERAL CHEMISTRY RESULTS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D.: 306330

Sample #	Client ID	Matrix	Date Sampled	Date Received
1	COURT-1	SOIL	28-JUN-93	29-JUN-93

Parameter	Units	1
CHLORIDE	MG/KG	<5.0
TOTAL CYANIDE	MG/KG	<0.10
ELECTRICAL CONDUCTIVITY	UMHOS/CM	2720
FLUORIDE	MG/KG	<5
% MOISTURE	%	9.56
NITRATE AS NITROGEN	MG/KG	<0.50
pH	UNITS	3.0
SULFIDE	MG/KG	<0.20
SULFATE	MG/KG	2160

GENERAL CHEMISTRY - QUALITY CONTROL

DUP/MS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D. : 306330

Parameters	REF I.D.	Units	Sample Result	Dup Result	RPD	Spiked Sample	Spike Conc	% Rec
% MOISTURE	306330-01	%	9.56	10.6	10	N/A	N/A	N/A
CHLORIDE	306330-01	MG/KG	<5.0	<5.0	0	44.0	40.0	110
ELECTRICAL CONDUCTIVITY	306330-01	UMHOS/CM	2720	2870	5	N/A	N/A	N/A
FLUORIDE	306317-02	MG/KG	<5	<5	0	4.1	5.0	82
NITRATE AS NITROGEN	306261-10	MG/KG	<0.50	<0.50	0	10.9	10.0	109
SULFATE	306334-02	MG/KG	225	225	0	570	407	85
SULFIDE	306235-05	MG/KG	170	160	6	188	4.0	N/A*V
TOTAL CYANIDE	306309-19	MG/KG	<0.10	<0.10	0	2.3	2.2	105
pH	306317-02	UNITS	7.8	7.8	0	N/A	N/A	N/A

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

*V SAMPLE RESULT IS >4X SPIKED CONCENTRATION, THEREFORE SPIKE IS NOT DETECTABLE.

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

BLANK SPIKE

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D. : 306330

Parameters	Blank Spike ID#	Units	Blank Result	Spiked Sample	Spike Conc.	% Rec
CHLORIDE	37401	MG/KG	<5.0	42.0	40.0	105
FLUORIDE	37351	MG/KG	<5	4.9	5.0	98
NITRATE AS NITROGEN	37349	MG/KG	<0.50	11.7	10.0	117
SULFATE	37364	MG/KG	<100	212	200	106
SULFIDE	37318	MG/KG	<0.20	1.0	1.0	100
TOTAL CYANIDE	37315	MG/KG	<0.10	1.8	2.0	90

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

Analytical Technologies, Inc.

METALS RESULTS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D.: 306330

Sample #	Client ID	Matrix	Date Sampled	Date Received
1	COURT-1	SOIL	28-JUN-93	29-JUN-93

Parameter	Units	1
SILVER	MG/KG	5.9
ARSENIC	MG/KG	397
BARIUM	MG/KG	612
BERYLLIUM	MG/KG	<0.5
CALCIUM	MG/KG	730
CADMIUM	MG/KG	<0.5
COBALT	MG/KG	<1.0
CHROMIUM	MG/KG	3.2
COPPER	MG/KG	48.3
IRON	MG/KG	23400
MERCURY	MG/KG	4.72
POTASSIUM	MG/KG	1140
MAGNESIUM	MG/KG	157
MOLYBDENUM	MG/KG	11.9
SODIUM	MG/KG	525
NICKEL	MG/KG	1.1
LEAD	MG/KG	594
ANTIMONY	MG/KG	10.7
SELENIUM	MG/KG	2.9
THALLIUM	MG/KG	47.7
VANADIUM	MG/KG	0.9
ZINC	MG/KG	291

METALS - QUALITY CONTROL

DUP/MS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D. : 306330

Parameters	REF I.D.	Units	Sample Result	Dup Result	RPD	Spiked Sample	Spike Conc	% Rec
ANTIMONY	306309-10	MG/KG	6.7	11.5	53@R	50.5	49.1	89
ARSENIC	306317-02	MG/KG	1.7	1.8	6	46.7	49.8	90
BARIUM	306309-10	MG/KG	29.1	31.2	7	127	98.2	100
BERYLLIUM	306309-10	MG/KG	<0.5	<0.5	0	47.1	49.1	96
CADMIUM	306317-02	MG/KG	<0.5	<0.5	0	51.2	49.8	103
CALCIUM	306309-10	MG/KG	2200	2350	7	N/A	491	N/A*V
CHROMIUM	306309-10	MG/KG	8.3	8.7	5	54.5	49.1	94
COBALT	306309-10	MG/KG	4.0	4.6	14	95.8	98.2	93
COPPER	306309-10	MG/KG	35.0	34.1	3	81.9	49.1	96
IRON	306309-10	MG/KG	8720	9510	9	N/A	98.2	N/A*V
LEAD	306309-10	MG/KG	433	387	11	N/A	49.1	N/A*V
MAGNESIUM	306309-10	MG/KG	1540	1700	10	N/A	246	N/A*V
MERCURY	306330-01	MG/KG	4.72	3.78	22	5.64	0.95	97
MOLYBDENUM	306309-10	MG/KG	<1.0	1.0	0	93.5	98.2	95
NICKEL	306309-10	MG/KG	9.9	10.2	3	58.1	49.1	98
POTASSIUM	306309-10	MG/KG	252	279	10	520	246	109
SELENIUM	306317-02	MG/KG	2.4	2.5	4	31.1	29.9	96
SILVER	306309-10	MG/KG	<1.0	<1.0	0	40.5	49.1	82
SODIUM	306309-10	MG/KG	204	226	10	896	614	113
THALLIUM	306317-02	MG/KG	<1.0	<1.0	0	31.6	49.8	63
VANADIUM	306309-10	MG/KG	23.3	27.8	18	116	98.2	94
ZINC	306309-10	MG/KG	105	97.1	8	137	48.9	65

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

*V SAMPLE RESULT IS >4X SPIKED CONCENTRATION, THEREFORE SPIKE IS NOT DETECTABLE.
@R RPD LIMIT IS 67% FOR INORGANIC RESULTS LESS THAN TEN TIMES THE REPORTING DETECTION LIMIT.

Analytical Technologies, Inc.

METALS - QUALITY CONTROL

BLANK SPIKE

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D. : 306330

Parameters	Blank Spike ID#	Units	Blank Result	Spiked Sample	Spike Conc.	% Rec
ANTIMONY	37410	MG/KG	<3.0	44.2	50.0	88
ARSENIC	37316	MG/KG	<1.0	47.3	50.0	95
BARIUM	37410	MG/KG	<0.5	89.1	100	89
BERYLLIUM	37410	MG/KG	<0.5	44.8	50.0	90
CADMIUM	37333	MG/KG	<0.5	53.1	50.0	106
CALCIUM	37410	MG/KG	<2.5	443	500	89
CHROMIUM	37410	MG/KG	<0.5	42.9	50.0	86
COBALT	37410	MG/KG	<1.0	89.6	100	90
COPPER	37410	MG/KG	1.2	45.6	50.0	89
IRON	37410	MG/KG	3.7	92.8	100	89
LEAD	37410	MG/KG	<1.5	44.7	50.0	89
MAGNESIUM	37410	MG/KG	<0.5	222	250	89
MERCURY	37365	MG/KG	<0.25	0.89	1.00	89
MOLYBDENUM	37410	MG/KG	<1.0	91.8	100	92
NICKEL	37410	MG/KG	<1.0	45.6	50.0	91
POTASSIUM	37410	MG/KG	<5.0	223	250	89
SELENIUM	37310	MG/KG	<1.0	30.5	30.0	102
SILVER	37410	MG/KG	<1.0	44.2	50.0	88
SODIUM	37410	MG/KG	2.6	502	625	80
THALLIUM	37309	MG/KG	<1.0	43.4	50.0	87
VANADIUM	37410	MG/KG	<0.5	89.3	100	89
ZINC	37410	MG/KG	<1.0	42.4	50.0	85

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

ACCESSION #: 306330 INITIALS: SRK

SAMPLE CONDITION UPON RECEIPT CHECKLIST
(FOR RE-ACCESSIONS, COMPLETE #7 THRU #9)

1	Does this project require special handling according to NEESA Levels C, D, AFOEHL or CLP protocols? If yes, complete a) thru c) a) Cooler temperature _____ b) pH sample aliquoted: yes / no / n/a c) LOT #'s: _____	YES	(NO)
2	Are custody seals present on cooler?	YES	(NO)
	If yes, are seals intact? (NA)	YES	NO
3	Are custody seals present on sample containers?	YES	(NO)
	If yes, are seals intact? (NA)	YES	NO
4	Is there a Chain-Of-Custody (COC)*?	(YES)	NO
5	Is the COC* complete? Relinquished: yes/no Requested analysis: yes/no	(YES)	NO
6	Is the COC* in agreement with the samples received? # Samples: yes/no Sample ID's: yes/no Matrix: yes/no # containers: yes/no	(YES)	NO
7	Are the samples preserved correctly?	(YES)	NO
8	Is there enough sample for all the requested analyses?	(YES)	NO
9	Are all samples within holding times for the requested analyses?	(YES)	NO
10	Were the samples received cold?	YES	(NO)
11	Were all sample containers received intact (ie. not broken, leaking, etc.)?	(YES)	NO
12	Are samples requiring no headspace, headspace free? (N/A)	YES	NO
13	Are there special comments on the Chain of Custody which require client contact?	YES	(N/A)
14	If yes, was ATI Project Manager notified?	YES	NO

Describe "no" items: 9) Sample is limited. 10) Sample sent in box with no ice. Client aware of this per EH.

Was client contacted? yes / no

If yes, Date: _____ Name of Person contacted: _____

Describe actions taken or client instructions: _____

*Or other representative documents, letters, and/or shipping memos

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 93C0243A

SAMPLERS: (Signature)

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	Title 22 Metals	pH, SO_4, S	NO3, CN, Cl	E. MOISTURE	Ca, Mg, Na, K, Fe	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
10/28	1105	Court-1	S					X	X	X	X **	X	1	72 hour turn around. Results to Michael McGuire 510/874-3288 WCC-Oakland. See Evelyn for more detail on ~~other~~ other analyses. ** Test added by E Hicks per Mike McGuire

TOTAL NUMBER OF CONTAINERS: 1

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	10/29/93 4:30				

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
Federal Express			[signature]	[illegible]

Analytical Technologies, Inc. Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

ATI I.D.: 307084

July 16, 1993

WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607

Project Name: (NONE)
Project # : 93C0243A

Attention: MIKE McGUIRE

Analytical Technologies, Inc. has received the following sample(s):

Date Received	Quantity	Matrix
July 09, 1993	2	SOIL

The sample(s) were analyzed with EPA methodology or equivalent methods as specified in the enclosed analytical schedule. The symbol for "less than" indicates a value below the reportable detection limit. Please note that the Sample Condition Upon Receipt Checklist is included at the end of this report.

The results of these analyses and the quality control data are enclosed.

EVELYN H. HICKS
PROJECT MANAGER

for M. E. Shigley
LABORATORY MANAGER

Analytical Technologies, Inc.

SAMPLE CROSS REFERENCE

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: (NONE)

Report Date: July 16, 1993
ATI I.D. : 307084

ATI #	Client Description	Matrix	Date Collected
1	CRACK 1	SOIL	08-JUL-93
2	COURT 2	SOIL	08-JUL-93
3	COURT 2/WET 02	WET EXTRACT	08-JUL-93
4	COURT 2/DI WET 02	WET EXTRACT	08-JUL-93

---TOTALS---

Matrix	# Samples
SOIL	2
WET EXTRACT	2

ATI STANDARD DISPOSAL PRACTICE

The sample(s) from this project will be disposed of in twenty-one (21) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

ANALYTICAL SCHEDULE

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: (NONE)

ATI I.D.: 307084

Analysis	Technique/Description
EPA 6010 (ANTIMONY)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (ARSENIC)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (BARIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (BERYLLIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (CHROMIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (COBALT)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (COPPER)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (LEAD)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (MOLYBDENUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (NICKEL)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (SILVER)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (VANADIUM)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 6010 (ZINC)	INDUCTIVELY COUPLED ARGON PLASMA
EPA 7060 (ARSENIC)	ATOMIC ABSORPTION/GRAPHITE FURNACE
EPA 7131 (CADMIUM)	ATOMIC ABSORPTION/GRAPHITE FURNACE
EPA 7470 (AQUEOUS MERCURY)	ATOMIC ABSORPTION/COLD VAPOR
EPA 7471 (NON AQUEOUS MERCURY)	ATOMIC ABSORPTION/COLD VAPOR
EPA 7740 (SELENIUM)	ATOMIC ABSORPTION/GRAPHITE FURNACE
EPA 7841 (THALLIUM)	ATOMIC ABSORPTION/GRAPHITE FURNACE
EPA 9045 (pH SOIL)	ELECTRODE

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
ATI I.D.: 307084
Project Name: (NONE)

Sample #	Client ID	Matrix	Date Sampled	Date Received
1	CRACK 1	SOIL	08-JUL-93	09-JUL-93
2	COURT 2	SOIL	08-JUL-93	09-JUL-93

Parameter	Units	1	2
pH	UNITS	1.5	2.8

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

DUP/MS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A ATI I.D. : 307084
Project Name: (NONE)

Parameters	REF I.D.	Units	Sample Result	Dup Result	RPD	Spiked Sample	Spike Conc	% Rec
pH	307084-02	UNITS	2.8	2.8	0	N/A	N/A	N/A

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

Analytical Technologies, Inc.

METALS RESULTS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: (NONE)

ATI I.D.: 307084

Sample #	Client ID	Matrix	Date Sampled	Date Received
3	COURT 2/WET 02	WET EXTRACT	08-JUL-93	09-JUL-93
4	COURT 2/DI WET 02	WET EXTRACT	08-JUL-93	09-JUL-93

Parameter	Units	3	4
ARSENIC	MG/L	8.8	<0.05
MERCURY	MG/L	<0.005	<0.005
LEAD	MG/L	0.4	<0.03
ZINC	MG/L	4.1	3.3

Analytical Technologies, Inc.

METALS RESULTS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: (NONE)

ATI I.D.: 307084

Sample #	Client ID	Matrix	Date Sampled	Date Received
1	CRACK 1	SOIL	08-JUL-93	09-JUL-93
2	COURT 2	SOIL	08-JUL-93	09-JUL-93

Parameter	Units	1	2
SILVER	MG/KG	-	9.8
ARSENIC	MG/KG	14.4	734
BARIUM	MG/KG	-	332
BERYLLIUM	MG/KG	-	<0.5
CADMIUM	MG/KG	-	<1.0@H
COBALT	MG/KG	-	1.2
CHROMIUM	MG/KG	-	8.4
COPPER	MG/KG	-	43.3
MERCURY	MG/KG	<0.25	6.28
MOLYBDENUM	MG/KG	-	16.6
NICKEL	MG/KG	-	3.1
LEAD	MG/KG	5.5	692
ANTIMONY	MG/KG	-	16.2
[illegible]ENIUM	MG/KG	-	3.4
[illegible]ALLIUM	MG/KG	-	62.1
VANADIUM	MG/KG	-	2.9
ZINC	MG/KG	7450	443

@H DETECTION LIMIT ELEVATED DUE TO MATRIX INTERFERENCE

Analytical Technologies, Inc.

METALS - QUALITY CONTROL

DUP/MS

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: (NONE)

ATI I.D. : 307084

Parameters	REF I.D.	Units	Sample Result	Dup Result	RPD	Spiked Sample	Spike Conc	% Rec
ANTIMONY	307068-07	MG/KG	<3.0	<3.0	0	35.9	53.3	67
ARSENIC	307068-07	MG/KG	1.14	0.91	22@R	52.3	54.2	94
ARSENIC	307084-03	MG/L	8.8	8.5	3	57.6	50.0	98
ARSENIC	307084-04	MG/L	<0.05	<0.05	0	5.00	5.00	100
BARIUM	307068-07	MG/KG	14.2	14.6	3	119	107	98
BERYLLIUM	307068-07	MG/KG	<0.5	<0.5	0	48.5	53.3	91
CADMIUM	307068-07	MG/KG	<0.5	<0.5	0	53.2	49.7	107
CHROMIUM	307068-07	MG/KG	8.0	8.3	4	53.4	53.3	85
COBALT	307068-07	MG/KG	3.4	3.6	6	99.8	107	90
COPPER	307068-07	MG/KG	12.9	13.0	1	62.5	53.3	93
LEAD	307068-07	MG/KG	19.1	19.6	3	66.6	53.3	89
LEAD	307084-03	MG/L	0.4	0.5	22@R	50.8	50.0	101
LEAD	307084-04	MG/L	<0.03	<0.03	0	5.27	5.00	105
MERCURY	307084-01	MG/KG	<0.25	<0.25	0	0.86	0.94	91
MERCURY	307084-03	MG/L	<0.005	<0.005	0	0.019	0.020	95
MERCURY	307084-04	MG/L	<0.005	<0.005	0	0.016	0.020	80
MOLYBDENUM	307068-07	MG/KG	<1.0	<1.0	0	95.5	107	89
NICKEL	307068-07	MG/KG	5.2	5.3	2	53.0	53.3	90
SELENIUM	307068-07	MG/KG	1.8	1.8	0	34.5	32.5	101
SILVER	307068-07	MG/KG	<1.0	<1.0	0	40.1	53.3	75
THALLIUM	307068-07	MG/KG	<1.0	<1.0	0	58.4	54.2	108
VANADIUM	307068-07	MG/KG	28.5	28.2	1	123	107	88
ZINC	307068-07	MG/KG	37.9	38.5	2	83.2	53.3	85
ZINC	307084-03	MG/L	4.1	3.8	8	52.6	50.0	97
ZINC	307084-04	MG/L	3.3	3.5	6	8.2	5.0	99

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

@R RPD LIMIT IS 67% FOR INORGANIC RESULTS LESS THAN TEN TIMES THE REPORTING DETECTION LIMIT.

Analytical Technologies, Inc.

METALS - QUALITY CONTROL

BLANK SPIKE

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: (NONE)

ATI I.D. : 307084

Parameters	Blank Spike ID#	Units	Blank Result	Spiked Sample	Spike Conc.	% Rec
ANTIMONY	37666	MG/KG	<3.0	46.2	50.0	92
ARSENIC	37691	MG/KG	<1.0	49.6	50.0	99
ARSENIC	37729	MG/L	<0.5	49.5	50.0	99
ARSENIC	37731	MG/L	<0.05	4.93	5.00	99
BARIUM	37666	MG/KG	<0.5	95.4	100	95
BERYLLIUM	37666	MG/KG	<0.5	46.8	50.0	94
CADMIUM	37714	MG/KG	<0.5	52.1	50.0	104
CHROMIUM	37666	MG/KG	<0.5	44.5	50.0	89
COBALT	37666	MG/KG	<1.0	94.8	100	95
COPPER	37666	MG/KG	<1.0	48.1	50.0	96
LEAD	37666	MG/KG	<1.5	47.0	50.0	94
LEAD	37729	MG/L	<0.3	50.7	50.0	101
LEAD	37731	MG/L	<0.03	5.22	5.00	104
MERCURY	37723	MG/KG	<0.25	0.93	1.00	93
MERCURY	37724	MG/L	<0.005	0.018	0.020	90
MERCURY	37725	MG/L	<0.005	0.022	0.020	110
MOLYBDENUM	37666	MG/KG	<1.0	93.9	100	94
NICKEL	37666	MG/KG	<1.0	46.8	50.0	94
SELENIUM	37745	MG/KG	<0.25	28.1	30.0	94
SILVER	37666	MG/KG	<1.0	50.4	50.0	101
THALLIUM	37747	MG/KG	<1.0	45.7	50.0	91
VANADIUM	37666	MG/KG	<0.5	92.2	100	92
ZINC	37666	MG/KG	2.2	46.2	50.0	88
ZINC	37730	MG/L	<0.5	48.8	50.0	98
ZINC	37732	MG/L	<0.05	5.0	5.0	100

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

ACCESSION #: 307084 INITIALS:

SAMPLE CONDITION UPON RECEIPT CHECKLIST
(FOR RE-ACCESSIONS, COMPLETE #7 THRU #9)

1	Does this project require special handling according to NEESA Levels C, D, AFOEHL or CLP protocols? If yes, complete a) thru c) a) Cooler temperature _____ b) pH sample aliquoted: yes / no / n/a c) LOT #'s: _____	YES	(NO)
2	Are custody seals present on cooler?	YES	(NO)
	If yes, are seals intact? (N/A)	YES	NO
3	Are custody seals present on sample containers?	YES	(NO)
	If yes, are seals intact? (N/A)	YES	NO
4	Is there a Chain-Of-Custody (COC)*?	(YES)	NO
5	Is the COC* complete? Relinquished: (yes)/no Requested analysis: (yes)/no	(YES)	NO
6	Is the COC* in agreement with the samples received? # Samples: (yes)/no Sample ID's: (yes)/no Matrix: (yes)/no # containers: (yes)/no	(YES)	NO
7	Are the samples preserved correctly?	(YES)	NO
8	Is there enough sample for all the requested analyses?	(YES)	NO
9	Are all samples within holding times for the requested analyses?	(YES)	NO
10	Were the samples received cold?	(YES)	NO
11	Were all sample containers received intact (ie. not broken, leaking, etc.)?	(YES)	NO
12	Are samples requiring no headspace, headspace free? (N/A) 7/9/93	(YES)	NO
13	Are there special comments on the Chain of Custody which require client contact?	YES	(N/A)
14	If yes, was ATI Project Manager notified?	YES	NO

Describe "no" items: _____

Was client contacted? yes / no

If yes, Date: _____ Name of Person contacted: _____

Describe actions taken or client instructions: _____

*Or other representative documents, letters, and/or shipping memos

AT # 307084

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 93C0243A

SAMPLERS: (Signature) [signature]

	DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method 24	EPA Method Title 22 metals	EPA Method 10:1 citrate	EPA Method WET DI	As, Pb, Hg, Zn						Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
01	7/8	0800	Crack 1	S	X				X						1	* analyze WET extracts analyzed for As, Pb, Hg, Zn
02	7/8	0830	Crack 2	S	X	X	X	X							1	5-day turnaround
																Results to Mike McGuire ATI PM Evelyn Hicks

TOTAL NUMBER OF CONTAINERS: 2

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Anita Hernandez	7/8/93				

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
Federal Express			[signature]	7/9/93 945

depending upon the compound of arsenic. Inorganic arsenicals are more toxic than organics. Trivalent is more toxic than pentavalent. Acute arsenic poisoning (from ingestion) results in marked irritation of the stomach and intestines with nausea, vomiting, and diarrhea. In severe cases, the vomitus and stools are bloody and the patient goes into collapse and shock with weak, rapid pulse, cold sweats, coma, and death. Chronic arsenic poisoning, whether through ingestion or inhalation, may manifest itself in many different ways. There may be disturbances of the digestive system such as loss of appetite, cramps, nausea, constipation, or diarrhea. Liver damage may occur, resulting in jaundice. Disturbances of the blood, kidneys, and nervous system are not infrequent. Arsenic can cause a variety of skin abnormalities including itching, pigmentation, and even cancerous changes. A characteristic of arsenic poisoning is the great variety of symptoms that can be produced. A recognized carcinogen of the skin, lungs, liver. An experimental carcinogen of the mouth, esophagus, larynx, bladder and para nasal sinus. Dangerous; when heated to decomposition, or when metallic arsenic contacts acids or acid fumes, or when water solutions of arsenicals are in contact with active metals such as Fe; Al; Zn; they emits highly toxic fumes of arsenic. For further information, see Vol. 1, No. 3 of *DPIM Report*.

In treating acute poisoning from ingestion BAL (dimercaptol) is of questionable effectiveness for acute and chronic poisoning with trivalent arsenicals, such as As trioxide, arsine and arsenites. It is of no value for pentavalent arsenicals, such as cacodylic acid, methanearsonic acid, sodium, cacodylate, MSMA, DSMA, arsanilic acid, arsenic acid, and arsenates. Vomiting and gastric lavage are the preferred emergency treatments for acute arsenical poisoning. Modern medical treatment of arsenical poisoning uses exchange transfusion and dialysis (A. E. De Palma, *J. Occup Med.*, Vol. 11,582-587 (1969). Note: Arsenic compounds are common air contaminants.

ARG000 ***HR: 3***

ARSENIC DIETHYL

mf: $[As(C_2H_5)_2$ mw: 266.2

PROP: Liquid or oil. Bp: 185°-190°, d: about 1.

Arsenic and its compounds are on the Community Right To Know List.

THR: A poison. A dangerous fire hazard by spontaneous chemical reaction. Dangerous when heated. Incompatible with oxidizing materials. See also ARSENIC COMPOUNDS.

ARG250 ***HR: 3***

ARSENIC DIMETHYL

mf: $[As(CH_3)_2$ mw: 210.0

PROP: Colorless to yellow oily liquid. Mp: −6°; bp: 186°; d: 1.15.

Arsenic and its compounds are on the Community Right To Know List.

THR: Poison by inhalation and ingestion. See also ARSENIC COMPOUNDS. Flammable. Evolves dangerous fumes of As when heated.

ARG500 ***HR: 3***

ARSENIC HEMISELENIDE

mf: As_2Se mw: 228.78

Arsenic compounds and its compounds as well as selenium and its compounds are on the Community Right To Know List.

THR: See ARSENIC COMPOUNDS and SELENIUM COMPOUNDS. When heated to decomposition it emits fumes of As and Se. Incompatible with oxidizing materials. When heated to decomposition it emits highly toxic fumes of Se and As.

ARG750 ***HR: 3***

ARSENIC IODIDE

CAS: 7784-45-4 NIOSH: CG 1950000

DOT: 1557

mf: AsI_3 mw: 455.62

PROP: Red hexagonal crystals. Mp: 141.8°; bp: 403°; d: 4.38 @ 13°. Solubility: in water = 6/100 @ 25°, in CS_2 = 5.2/100.

SYNS:

ARSENIC TRIIODIDE
ARSENOUS IODIDE
ARSENOUS TRIIODIDE (9CI)
TRIIODOARSINE

Reported in EPA TSCA Inventory. Arsenic and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 0.01 mg(As)/m^3
ACGIH TLV: TWA 0.2 mg(As)/m^3
NIOSH REL: CL 2 μg(As)/m^3/15M

DOT Classification: Poison B, Label: Poison

THR: A poison. See also ARSENIC COMPOUNDS and IODIDES. Can form a shock sensitive compound with sodium or potassium. When heated to decomposition it emits very toxic fumes of I^- and As.

ARH000 ***HR: 3***

ARSENIC IODIDE MIXED WITH MERCURIC IODIDE

CAS: 8012-54-2 NIOSH: CG 1955000

PROP: A 100 mL solution contains 0.9 to 1.0 g arsenic iodide and 1.05 g mercuric iodide (27ZTAP 3,62,69).

SYN: DONOVAN'S SOLUTION

Arsenic and its compounds, as well as mercury and its compounds, are on the Community Right To Know List.

DOT Classification: Poison B, Label: Poison

NIOSH REL: CL 2 μg(As)/m^3/15M

THR: A poison. See also ARSENIC COMPOUNDS.

ARE750 ***HR: 3***
ARSENICAL FLUE DUST (DOT)
NIOSH: CG 1340000

Arsenic and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 0.01 mg(As)/m^3
ACGIH TLV: TWA 0.5 mg(As)/m^3
NIOSH REL: CL 2 μg(As)/m^3/15M

DOT Classification: Poison B, Label: Poison

THR: Poison by inhalation and ingestion. See also ARSENIC COMPOUNDS.

ARF000 ***HR: 3***
ARSENIC BISULFIDE
mf: As_2S_2 mw: 214

PROP: Red-brown crystals. Bp: 565°, mp: β = 307°, d: α = 3.506 @ 19°, β = 3.254 @ 19°.

SYNS:
ARSENIC SULFIDE REALGAR

Arsenic and its compounds are on the Community Right To Know List.

THR: A poison. See also ARSENIC COMPOUNDS and SULFIDES. Flammable in the form of dust when exposed to heat or flame. Explosion hazard when intimately mixed with powerful oxidizers such as Cl_2; KNO_3; chlorates. It will react with water or steam to produce toxic and flammable vapors.

ARF250 ***HR: 3***
ARSENIC(III) BROMIDE
CAS: 7784-33-0 NIOSH: CG 1375000
DOT: 1555
mf: $AsBr_3$ mw: 314.65

PROP: Colorless, rhombic crystals. Mp: 32.8°, bp: 220.0°, vap press: 1 mm @ 41.8°, d: 3.3972 @ 25°, (liq), 3.3282.

SYNS:
ARSENOUS TRIBROMIDE ARSENIC TRIBROMIDE
TRIBROMOARSINE ARSENOUS BROMIDE

Reported in EPA TSCA Inventory. Arsenic and its compounds are on the Community Right To Know List.

OSHA PEL: TWA 0.01 mg(As)/m^3
ACGIH TLV: TWA 0.2 mg(As)/m^3
NIOSH REL: CL 2 μg(As)/m^3/15M

DOT Classification: Poison B, Label: Poison

THR: A poison. See also ARSENIC COMPOUNDS and BROMIDES. When heated to decomposition it emits very toxic fumes of As and Br^-. For further information, see Arsenic Tribromide, Vol. 2, No. 3. of *DPIM Report*.

ARF500 ***HR: 3***
ARSENIC CHLORIDE
CAS: 7784-34-1 NIOSH: CG 1750000
DOT: 1560
mf: $AsCl_3$ mw: 181.28

PROP: Colorless, oily liquid. D: 2.15 @ 25°, mp: −16°, bp: 130°. Decomp in water and by UV light; misc in chloroform, CCl_4, ether, iodine, P, S, alkali iodides, oils and fats. Vap d: 6.25, vap press: 10 mm @ 23.5°.

SYNS:
ARSENOUS TRICHLORIDE (9CI) CHLORURE ARSENIEUX (FRENCH)
TRICHLOROARSINE CHLORURE D'ARSENIC (FRENCH)
ARSENIC BUTTER FUMING LIQUID ARSENIC
ARSENIC(III) CHLORIDE TRICHLORURE D'ARSENIC (FRENCH)
ARSENIOUS CHLORIDE
ARSENOUS CHLORIDE

TOXICITY DATA:
cyt-hmn:leu 600 nmol/L
mrc-bcs 30 μL/disc
otr-ham:emb 3 μmol/L
ihl-mus LCLo:338 ppm/10M
ihl-cat LCLo:100 mg/m^3/1H

CODEN:
MUREAV 88,73,81
MUREAV 77,109,80
CNREA8 39,193,79
HBTXAC 1,324,56
ZGEMAZ 13,523,21

Reported in EPA TSCA Inventory. Arsenic and its compounds are on the Community Right To Know List. EPA Extremely Hazardous Substances List.

OSHA PEL: TWA 0.01 mg(As)/m^3
ACGIH TLV: TWA 0.2 mg(As)/m^3
NIOSH REL: CL 2 μg(As)/m^3/15M

DOT Classification: Poison B, Label: Poison

THR: A poison via inhalation. See also ARSENIC COMPOUNDS and CHLORIDES. Very poisonous; fumes in air. Mutagenic test data. When heated to decomposition it emits very toxic fumes of As and Cl^-. Highly reactive. Explodes with Na; K; Al on impact.

ARF750 ***HR: 3***
ARSENIC COMPOUNDS

SYN: ARSENICALS

Arsenic and its compounds are on the Community Right To Know List.

Used as insecticides, herbicides, silvicides, defoliants, desiccants and rodenticides. Poisoning from arsenic compounds may be acute or chronic. Acute poisoning usually results from swallowing arsenic compounds; chronic poisoning from either swallowing or inhalaling. Acute allergic reactions to arsenic compounds used in medical therapy have been fairly common. The type and severity of reaction

THR: Mutagenic data.

ZBA500 ***HR: 3***

ZIMELIDINE

CAS: 56775-88-3 NIOSH: UC 6555000

mf: $C_{16}H_{17}BrN_2$ mw: 317.26

SYNS:

(Z)-3-(4'-BROMOPHENYL)-3-(3''-PYRIDYL)DIMETHYL-ALLYLAMINE
3-(p-BROMOPHENYL)-N,N-DIMETHYL-3-(3-PYRIDYL) ALLYLAMINE,
3-(4-BROMOPHENYL)-N,N-DIMETHYL-3-(3-PYRIDINYL)-2-PROPEN-1-AMINE
cis-H 102.09
cis-ZIMELIDINE
(Z)-ZIMELIDINE

TOXICITY DATA:	CODEN:
orl-wmn TDLo:56 mg/kg/14D: GIT,CNS	BMJOAE 285,1009,82
orl-rat LD50:900 mg/kg	DRUGAY 24,169,82
ivn-rat LD50:50 mg/kg	DRUGAY 24,169,82
orl-mus LD50:800 mg/kg	DRUGAY 24,169,82
ivn-mus LD50:60 mg/kg	DRUGAY 24,169,82

THR: Poison by intravenous route. Moderately toxic by ingestion. Human systemic effects by ingestion: muscle weakness, headache and nausea. When heated to decomposition it emits toxic fumes of Br^- and NO_x.

ZBA525 ***HR: 3***

ZIMELIDINE DIHYDROCHLORIDE

CAS: 60525-15-7 NIOSH: UC 6555200

mf: $C_{16}H_{17}BrN_2 \cdot 2ClH$ mw: 356.70

SYNS:

(Z)-3-(4-BROMOPHENYL)-N,N-DIMETHYL-3-(3-PYRIDINYL)-2-PROPEN-1-AMINE DIHYDROCHLORIDE
H102/09 HYDROCHLORIDE
ZIMELIDINE HYDROCHLORIDE

TOXICITY DATA:	CODEN:
orl-rat TDLo:120 mg/kg (6-17D preg):REP	KSRNAM 17,1833,83
orl-rat TDLo:12 mg/kg (6-17D preg):REP	KSRNAM 17,1833,83
orl-rat LD50:844 mg/kg	APSXAS 20,295,83
ipr-rat LD50:99800 µg/kg	APSXAS 20,295,83
scu-rat LD50:227 mg/kg	APSXAS 20,295,83
ivn-rat LD50:45800 µg/kg	KSRNAM 17,1833,83
orl-mus LD50:341 mg/kg	KSRNAM 17,1833,83
ipr-mus LD50:84400 µg/kg	APSXAS 20,295,83
scu-mus LD50:154 mg/kg	KSRNAM 17,1833,83
ivn-mus LD50:27700 µg/kg	KSRNAM 17,1833,83
orl-dog LD50:271 mg/kg	KSRNAM 17,1833,83
ivn-dog LD50:57 mg/kg	KSRNAM 17,1833,83
orl-cat LDLo:80 mg/kg	APSXAS 20,295,83
orl-rbt LD50:300 mg/kg	KSRNAM 17,1833,83
ivn-rbt LD50:50800 µg/kg	KSRNAM 17,1833,83

THR: Poison by ingestion, subcutaneous, intravenous and intraperitoneal routes. Experimental reproductive effects. When heated to decomposition it emits toxic fumes of Br^-, NO_x and HCl. See also ZIMELIDINE.

ZBJ000 ***HR: 3***

ZINC

CAS: 7440-66-6 NIOSH: ZG 8600000

DOT: 1383/1436

af: Zn aw: 65.37

PROP: Bluish-white, lustrous, metallic element. Mp: 419.8°, bp: 908°, d: 7.14 @ 25°, vap press: 1 mm @ 487°. Stable in dry air.

SYNS:

BLUE POWDER
C.I. 77945
C.I. PIGMENT BLACK 16
C.I. PIGMENT METAL 6
EMANAY ZINC DUST
GRANULAR ZINC
JASAD
MERRILLITE
PASCO
ZINC DUST
ZINC POWDER
ZINC, POWDER OR DUST, NON-PYROPHORIC (DOT)
ZINC, POWDER OR DUST, PYROPHORIC (DOT)

TOXICITY DATA:	CODEN:
skn-hmn 300 µg/3D-I:MLD	85DKA8 -,127,77
ihl-hmn TCLo:124 mg/m³/50M: PUL,SKN	AHYGAJ 72,358,10

Zinc and its compounds are on the Community Right To Know List. Reported in EPA TSCA Inventory. EPA Genetic Toxicology Program.

DOT Classification: Flammable Solid; Label: Dangerous When Wet, non-pyrophoric; Flammable Solid; Label: Spontaneously Combustible, pyrophoric

THR: Human systemic effects by ingestion: cough, dyspnea and sweating. A human skin irritant. Pure zinc powder, dust, fume is relatively non-toxic to humans by inhalation. The difficulty arises from oxidation of zinc fumes immediately prior to inhalation or presence of impurities such as Cd, Sb, As, Pb. Inhalation may cause sweet taste, throat dryness, cough, weakness, generalized aches, chills, fever, nausea, vomiting.

Flammable in the form of dust when exposed to heat or flame. May ignite spontaneously in air when dry. Explosive in the form of dust when reacted with acids. Incompatible with NH_4NO_3; BaO_2; $Ba(NO_3)_2$; Cd; CS_2; chlorates; Cl_2; ClF_3; CrO_3; (ethyl acetoacetate + tribromoneopentyl alcohol); F_2; hydrazine mononitrate; hydroxylamine; $Pb(N_3)_2$; (Mg + $Ba(NO_3)_2$ + BaO_2); $MnCl_2$; HNO_3; performic acid; $KClO_3$; KNO_3; K_2O_2; Se; $NaClO_3$; Na_2O_2; S; Te; H_2O; $(NH_4)_2S$; As_2O_3; CS_2; $CaCl_2$; NaOH; chlorinated rubber; catalytic metals; halocarbons; o-nitroanisole; nitrobenzene; non-metals; oxidants; paint primer base; pentacarbonyliron; transition metal halides; seleninyl bromide. To fight fire, use special mixtures of dry chemical. When heated to decomposition it emits toxic fumes of ZnO. See also ZINC COMPOUNDS. For further information, see Vol. 1, No. 7 of *DPIM Report*.