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June 10, 2003

Alameda County
JUN 13 2003
Environmental Health

Ignacio Dayrit
CITY OF EMERYVILLE
1333 Park Avenue
Emeryville, California 94608

Clayton Project No. 70-03739.00

Subject: DRAFT Engineering Evaluation and Cost Analysis (EE/CA)
Former Dunne Paints Facility
1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California

Dear Mr. Dayrit:

As requested, Clayton Group Services (Clayton) has completed the Draft Engineering Evaluation and Cost Analysis (EE/CA) for the above-referenced subject property. The purpose of the EE/CA is to present site and regional background information, evaluate removal alternatives, and select one of the removal alternatives.

The EE/CA was prepared in general conformance with the United States Environmental Protection Agency (EPA) Publication 9360.0-32, titled "Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA."

If you have any questions, please call Michael Zimmerman at (925) 426-2681 or Jon Rosso at (925) 426-2676.

Sincerely,

Michael Zimmerman, P.E., R.E.A.
Senior Project Manager
Environmental Services

Jon Rosso, P.E.
Director
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MJZ/mjz

cc: Barney Chan, Alameda County Health Care Service Agency (ACHCSA), 1131 Harbor Bay Parkway, Alameda, CA 94502-6577

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Clayton GROUP SERVICES

DRAFT Engineering Evaluation/Cost Analysis

Former Dunne Paints Facility
1007 41st Street and 4050 Adeline Street
Emeryville/Oakland, California 94608

Clayton Project No. 70-03739.00
June 10, 2003

Prepared for:
CITY OF EMERYVILLE
Emeryville, California 94608

Prepared by:
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Executive Summary

Green City Lofts, LLC is planning to complete residential development activities on the property at 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California (the Site), under a permit from the cities of Emeryville and Oakland. Green City Lofts has requested a Capital Incentives for Emeryville's Redevelopment and Remediation (CIERRA) loan from the City of Emeryville. An Engineering Evaluation and Cost Analysis (EE/CA) is necessary for this loan process. The City of Emeryville retained Clayton Group Services (Clayton) to complete this EE/CA to review activities by Green City Lofts in association with the development project. This EE/CA report was prepared in general conformance with United States Environmental Protection Agency (EPA) Publication 9360.0-32, Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA (EPA 1993).

The Site formerly had a paint manufacturing facility that operated from at least 1923 to around 1991. The Site currently consists of several interconnecting warehouse-type buildings, an asphalt-paved parking lot, and concrete loading docks. The Site buildings are currently not in use.

Soil and groundwater at the Site are contaminated with total petroleum hydrocarbons (mineral spirits), volatile organic compounds (VOCs), and lead from prior activities at the Site and adjacent properties. Since the late 1980s, the Alameda County Health Care Service Agency (ACHCSA) has provided oversight for investigating and remediating the Site and two adjoining properties with common contamination issues as its owners try to achieve closure.

The Site will be redeveloped in the near future with five buildings containing 62 loft-style residential condominiums. The height of these buildings will be between three and five stories (maximum height of around 75 feet). The existing buildings will be demolished and a virtually zero lot-line excavation of the underlying soil will be conducted in order to allow for an approximately 11-foot tall half-basement garage structure underneath the future buildings. The garage structure will be built below grade to meet the overall building structure height limitations and design review requirements established by the City of Emeryville. The excavation for the garage structure will remove much of the contaminated material, approximately 13,550 cubic yards of soil, underlying the Site. In addition, dewatering activities will most likely be conducted, as the planned excavation will encounter groundwater, which has historically been found to occur at depths of about seven feet below ground surface (bgs). This dewatering action will also most likely remove a significant quantity of contaminated groundwater underneath the Site.

This EE/CA concerns the soil removal action and groundwater dewatering events that will occur during the residential development of the Site. The proposed excavation for the residential development provides a unique opportunity to remove contaminated soils, clean up groundwater, improve the environment in the area, and work towards closure with ACHCSA. There are options available to properly manage the contaminated soils that will be excavated. This EE/CA evaluated three alternatives for managing the excavated soils.

- <u>Alternative 1</u> - Excavate and treat the excavated soil near the Site using a low temperature thermal desorption system. Due to the geotechnical characteristics of the soil, it is not feasible to reuse the soil offsite after treatment; therefore, this Alternative assumes the treated soil will be transported to a local municipal landfill and used as daily cover.
- <u>Alternative 2</u> - Excavate and transport the soil to a permitted offsite thermal desorption treatment facility. After treating the soil, the treatment facility will dispose of the treated soil in an appropriate landfill.
- <u>Alternative 3</u> - Excavate the soil and dispose at an appropriate offsite landfill.

After completing a comparative analysis, Alternative 3 was selected as the preferred removal alternative along with the dewatering and the indirect installation of the cap (condominium and parking garage structures). The majority of the excavated soil will be disposed offsite in landfills. A smaller portion of the soil has lead contamination that will require disposal at a Class 1 (hazardous) landfill. The selected alternative meets each of the project objectives and can be completed in a cost effective and timely manner.

1.0 INTRODUCTION

Green City Lofts, LLC is planning to complete residential development activities on the property at 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California (the Site), under a permit from the cities of Emeryville and Oakland. Green City Lofts has requested a Capital Incentives for Emeryville's Redevelopment and Remediation (CIERRA) loan from the City of Emeryville. An Engineering Evaluation and Cost Analysis (EE/CA) is necessary for this loan process. The City of Emeryville retained Clayton Group Services (Clayton) to complete this EE/CA to review activities by Green City Lofts in association with the development project.

Prior activities by others at the Site and adjacent properties resulted in soils and groundwater affected by total petroleum hydrocarbons (mineral spirits), volatile organic compounds (VOCs), and lead. To complete the residential development, which includes a below grade parking garage, soil containing elevated concentrations of petroleum hydrocarbons, VOCs, and lead will be excavated from the Site. This document evaluates possible methods of treating or disposing of the excavated soil. Contaminated soil and groundwater within the excavation limits of the new construction will be included in this removal action.

1.1 PURPOSE

The purpose of this EE/CA is to identify and evaluate alternatives for handling and remediating contaminated soil excavated during the planned construction activity at the Site.

1.2 LIMITING CONDITIONS AND METHODOLOGY

This evaluation is based solely on information provided in previous site investigations, and as such, no additional site-specific data were collected for the preparation of this EE/CA.

Although the planned remedial actions for this Site are not regulated by CERCLA, this EE/CA generally follows the methodology and format for Engineering Evaluations and Cost Analyses as described in the U.S. Environmental Protection Agency Publication 9360.0-32, *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (EPA 1993). This methodology was chosen as an appropriate and efficient approach to evaluate and select a remedial alternative for the contaminated soil at this Site. However, use of this methodology does not imply that this removal action or other Site activities will be conducted under CERCLA guidance.

2.0 SITE CHARACTERIZATION

This section provides a Site description and summary of available information regarding the Site and the contaminants present. Further details about the Site and its contamination are provided in the investigation reports listed in Section 2.2. The two most recent investigation reports are included in Appendix A.

2.1 SITE DESCRIPTION AND BACKGROUND

2.1.1 Site Location

The Site is located at 1007 41st Street in the City of Emeryville and Oakland and at 4050 Adeline Street in the City of Emeryville, County of Alameda, State of California. Figure 1 is a USGS topographic map showing the Site location. The Site latitude and longitude are as follows: 37 degrees 49 minutes 55 seconds North and 122 degrees 16 minutes 36 seconds West, respectively.

2.1.2 Type of Facility and Operational Status

From 1923 to 1991, the eastern portions of the Site were developed with paint manufacturing buildings. From 1903 to 1952, the Site was residentially developed in the central and western portions. Additional paint manufacturing facilities were added to the west after the residential structures were removed.

Paint manufacturing activities were conducted onsite by Frank W. Dunne Company/Dunne Quality Paints that included (Figure 2):

- Paint manufacturing (including solvent mixing) in the eastern portion,
- Latex manufacturing and blending towards the central portion,
- Varnish production in the southern portion,
- Warehousing in the western portion, and
- General office space in the northeastern portion.

The paint manufacturing operations included the use of 6 paint thinner underground storage tanks (USTs), multiple aboveground storage tanks (ASTs), solvent mixing, and brick ovens for varnish production.

The six USTs were removed in 1988 (see Section 2.3). The four westernmost USTs were located in a common pit and used from the late 1960s to 1988. Two additional USTs, each with a capacity of 4,000-gallons, were located under the sidewalk in another common pit, towards the northeastern end of the Site. These two USTs were not used for over 35 years prior to their removal in 1988.

The Site consists of several interconnecting warehouse-type buildings, an asphalt-paved parking lot present in the western portion, and concrete loading docks located along the southern portion (access from Adeline Street) and in the northern portion (access from 41st Street).

Since the late 1980s, the Alameda County Health Care Service Agency (ACHCSA) has provided oversight for investigating and remediating the Site and two adjoining properties with common contamination issues. Regulatory requirements to date have been associated with the leaking USTs, and the regulatory case remains active.

ACHCSA has agreed that no further active remediation will be required if the proposed excavation and dewatering is performed and their technical comments listed in Section 3.2 are addressed. Recent letters from ACHCSA regarding the Site are included in Appendix B.

2.1.3 Planned Residential Development Summary

Residential development for the Site includes removing all existing structures and constructing five buildings containing 62 loft-style residential condominiums. The height of these buildings will be between three and five stories (maximum height of 75 feet) (Figure 3). The existing buildings will be demolished and a virtually zero lot-line excavation of the underlying soil will be conducted in order to allow for an approximately 11-foot tall below grade parking garage underneath the buildings (Figures 3 and 4). The garage structure will be built below grade to meet the overall building structure height limitations and design review requirements established by the City of Emeryville.

The base of the planned excavation is set at approximately 39 feet above mean sea level (amsl) across the Site. Most of the existing buildings and the eastern portions of the Site are at an elevation of about 51 feet amsl. Soil will be excavated to a depth of four to five feet below groundwater level, which has historically been found to occur at depths of about seven feet below ground surface (bgs). Shoring will be installed along the Site perimeter, and a waterproof membrane will be installed over the shoring. This removal action will remove the majority of the contaminated soil underlying the Site.

In addition, dewatering activities will be conducted as necessary since the excavation should encounter groundwater. Groundwater encountered during the excavation will be treated and discharged or disposed offsite. This dewatering action is anticipated to remove a significant quantity of contaminated groundwater underneath the Site.

Ultimately, the remaining soils onsite will be capped by the residential development building foundations. The basement garage structure and buildings will be constructed over a bentonite waterproofing membrane system, which will be used to prevent groundwater intrusion into the structure. Furthermore, the basement garage will separate the overlying residential buildings from the underlying soil and will be naturally ventilated.

2.1.4 Structures/Topography

The Site is approximately 1-acre. The Site currently consists of several interconnecting warehouse-type buildings that occupy a total area of 35,600 square feet. Multiple drains and sumps are present in the southern portion of the Site, near the former brick-lined varnish kettles (Figure 2). Abandoned piping (possibly associated with the former paint thinner dispensing pump) is present outside the southern portion of the central building on the Site. Several large brick ovens with interconnecting piping and brick smokestacks are present in the southern portion. A floor trough or spillway covered with dried paint extends from the third floor to the second floor of the former paint mill building in the eastern portion of the Site. The underground dispenser piping from the former USTs to the southern portion of the Site may remain buried below grade.

2.1.5 Geology/Soils Information

Previous investigations have revealed that the Site is underlain by a layer of approximately three to four feet of fill of unknown origin that contains some debris, such as glass fragments. Underlying the fill are various alluvial deposits of clayey sands and silts. The alluvial deposits contain sand and gravel deposits at some locations.

2.1.5.1 Local Geology

The Site is located along the eastern San Francisco Bay margin (approximately 0.75 miles east of the existing bay shoreline). The elevation of this area is very near sea level and has been frequently inundated by the San Francisco Bay during deposition and formation of the native subsurface materials at the Site. The uplands (Berkeley Hills) approximately 3 miles to the east are most likely the source of the geologic material (alluvium and colluvium) presently found at the Site. The uplands to the east are the result of local uplift along the Hayward Fault.

Based on information from nearby sites and general geological studies performed by the United States Geological Survey (USGS), the shallow subsurface (upper 30 feet) most likely is composed of unconsolidated layers of fine-grain material such as sand, silt and clay. Because this Site is located within a heavily developed area, several feet of artificial fill material are present overlying the native soil.

2.1.5.2 Hydrogeology

In general, the local groundwater flow at the Site should be to the west or southwest, from the Berkeley Hills towards the San Francisco Bay. Site-specific conditions, such as buried stream channels, fill material, or deep utility corridors could locally influence the groundwater flow immediately beneath, or adjacent to the Site. Additionally, the Site is located approximately 0.75 miles from the San Francisco Bay margin, and the shallow groundwater flow direction and gradient is not thought to be influenced by tidal fluctuation. The site-specific direction of groundwater flow has not been well defined but has been reported to flow in westerly to southwesterly directions. Due to the extensive presence of low permeability clay in the subsurface, very little groundwater has been encountered at the Site during previous investigations. Based on the previous soil sampling activities, shallow groundwater at the Site is anticipated to be at a depth of seven feet bgs.

2.1.6 Surrounding Land Use

Surrounding properties generally consist of residential and light industrial-type properties.

2.2 PREVIOUS STUDIES

Limited soil and groundwater investigations have been conducted at the Site to evaluate the presence and distribution of contamination caused by the former USTs. Those investigations are:

- 1988 *Underground Tank Removal Report, Dunne Quality Paint, 1007 41st Street, Oakland, California.* Prepared by Hunter/Gregg for Dunne Quality Paints.
- March 1990 *Ground Water Sampling From Monitoring Wells at 1007 41st Street, Oakland, California.* Prepared by Environmental Science & Engineering, Inc. for Dunne Quality Paints.
- June 1992 *Report of Limited Soil Investigation, Frank W. Dunne Company, 1007 41st Street, Oakland, California.* Prepared by Hageman-Aguiar, Inc.
- June 1992 *Groundwater Sampling Report, Frank W. Dunne Company, 1007 41st Street, Oakland, California.* Prepared by Hageman-Aguiar, Inc.
- November 1993 *Groundwater Sampling Report for Frank W. Dunne Company, 1007 41st Street, Oakland, California.* Prepared by Hageman-Aguiar, Inc.
- February 1999 *Evaluation of Site Contamination and Recent Groundwater Sampling, ONE, Dunne Paints, California Linen, Oakland/Emeryville, California.* Prepared by BES for O.N.E. Color Communications.
- July 2000 *Groundwater, Soil, & Air Sampling Results, ONE, Dunne Paints, and California Linen in Oakland/Emeryville, California.* Prepared by Block Environmental Services (BES) for O.N.E. Color Communications.
- December 2000 *Environmental Site Assessment, Former Dunne Paints, Oakland/Emeryville, California.* Prepared by BES for Green City Lofts.
- September 2002, *Phase I Environmental Site Assessment Report for the Former Dunne Paint Facility at 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California.* Prepared by Clayton Group Services.
- December 2002 *Predevelopment Investigation Report of the Former Dunne Paint Facility at 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California.* Prepared by Clayton Group Services.
- May 2003 *Supplemental Investigation of the Former Dunne Paints Facility, 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California.* Prepared by Clayton Group Services.

Copies of the two most recent investigation reports completed in 2002 and 2003 are included in this EE/CA as Appendix A.

2.3 PREVIOUS REMOVAL ACTIONS

In 1988, six USTs were removed from under the northern sidewalk; approximately 60 cubic yards of contaminated soil from the UST excavation pit were disposed offsite. The USTs were removed under the oversight of the ACHCSA. Following the UST removal, ACHCSA required installation of two groundwater monitoring wells in the UST pits under the sidewalk adjacent to the Site, MW-D1 and MW-D2 (Figure 2).

2.4 SOURCE, NATURE, AND EXTENT OF CONTAMINATION

The detected soil and groundwater contaminants at the Site consist of petroleum hydrocarbons (mineral spirits), various volatile organic compounds (VOCs), and metals (primarily lead). The sources of Site contamination are apparently from previous industrial activities at this Site or from adjacent properties dating back to the early 1900s. Remediation has not occurred at the Site other than the removal of approximately 60 cubic yards of soil during the 1988 UST removal. On a conceptual level and based on the previous investigations, the subsurface contamination related to petroleum hydrocarbons is predominately located at and below the groundwater fluctuation zone/capillary fringe (depth of about six feet bgs) with near surface contamination in the central portions of the Site.

During the recent investigations, the soil that is to be excavated was strategically tested to allow profiling of the soil for waste disposal options. This results of this testing indicate that all excavated soil would require controlled disposal or treatment, with a portion of fill requiring disposal as hazardous waste due to elevated lead concentrations. Similarly, the extracted groundwater will require permit-controlled discharge or disposal.

2.4.1 Potential Offsite Sources of Groundwater Contamination

The extent of the petroleum hydrocarbon groundwater contamination at the Site appears to extend offsite to the west and possibly to the south and is currently being delineated. Due to their upgradient locations, two offsite properties are potential sources for some of the groundwater contamination present beneath the Site:

- The former Oakland National Engravers (ONE), located north of the Site at 1001 41st Street, was involved in paint manufacturing (by Boysen Paint) from at least 1933 to 1990 and by ONE from around 1990 to the present. Two paint thinner USTs were located onsite and removed in 1987. The soil and groundwater quality at this property has been evaluated since 1991, including the installation and monitoring of three onsite wells and three offsite wells located in 41st Street. Elevated concentrations of total petroleum hydrocarbons as mineral spirits (TPH-ms) have been detected at this property.
- California Linen, located east of the Site at 989 41st Street has been developed as a commercial laundry facility since at least 1924 to the present. An UST was removed in 1989 and elevated concentrations of petroleum products, including TPH as gasoline (TPH-g) and related compounds were found in groundwater.

ACHCSA) is providing oversight for investigating and remediating the Site and these two adjoining properties with common contamination issues. An offsite groundwater investigation will be completed at the Site to address technical comments by ACHCSA (Appendix B). The purpose of the offsite groundwater investigation is to define the down and cross gradient extent of petroleum hydrocarbons that may be emanating from the Site. Groundwater downgradient of the Site is most likely co-mingled with contaminants from the two upgradient properties and the Site based on the immediate proximity of the three properties. Data from this investigation will be used to locate a future permanent groundwater monitoring well network for the three properties.

2.5 ANALYTICAL DATA

A summary of soil and groundwater data from the two most recent investigations in 2002 and 2003 is presented below. For more details related to the investigations, refer to the copies of these investigation reports included in Appendix A.

2.5.1 Predevelopment Investigation (November 2002 Sampling/December 2002 Report)

Sixteen borings were completed during the Predevelopment Investigation (Clayton 2002b) with samples collected at various depths ranging from 3 to 25 feet bgs. A groundwater sample was attempted at each of the 16 boring locations; however, only four borings on the west portion of the Site yielded enough water to allow a grab sample to be collected from each. The purpose of the Predevelopment Investigation was to provide an independent, professional opinion regarding the recognized environmental conditions (RECs) associated with the Site identified during the most recent Phase I Environmental Site Assessment (Clayton 2002a).

Composite soil samples were also collected to facilitate the offsite disposal of excavated material during the residential development. Furthermore, soil and groundwater data were used to evaluate potential human health risks for the residential development after the removal action and construction are completed. The highest TPH concentrations in soil samples during the investigation ranged up to 4,300 milligrams per kilogram (mg/kg). The highest TPH concentrations in groundwater samples during the investigation ranged up to 1,200,000 micrograms per liter (ug/L).

2.5.2 Supplemental Investigation (March 2002 Sampling/May 2003 Report)

Twelve borings were completed during the Supplemental Investigation (Clayton 2003) with samples collected at depths ranging from 7 to 16 feet bgs. The purpose of this Supplemental Investigation was to define areas below the western portion of the planned excavation area where petroleum hydrocarbons in soil exceeded 5,000 mg/kg[1] as required by ACHCSA (Appendix B). If soils exceed 5,000 mg/kg TPH, they will be overexcavated during the residential development. The investigation was completed prior to the remedial action to prevent delays required for soil analysis and profiling during the construction project. All of the soils samples collected and analyzed were below the 5,000 mg/kg excavation target level except for one. Boring B-18 had a TPH-ms concentration of 6,800 mg/kg at 12 feet bgs. The subsequent sample in boring B-18 at 14 ft bgs contained TPH-ms at 99 mg/kg. Soil in the area of boring B-18 will be overexcavated during the removal action.

2.6 STREAMLINED RISK EVALUATION

A Health Risk Assessment was completed during the Predevelopment Investigation (Clayton 2002b) to evaluate whether future use of the property would contribute excess

[1] The following units are equivalent for soil concentrations: milligrams per kilogram (mg/kg) and parts per million (ppm).

risk to the residential receptors. A copy of the Health Risk Assessment is included in Appendix C to the Predevelopment Investigation.

There will be no direct exposure pathways to soil or groundwater at the Site following completion of the residential condominium project because contaminated material above 10.5 feet bgs will be removed, and a foundation and surface cap will eliminate direct contact exposure pathways. Therefore, the only potentially complete exposure pathway remaining is likely to be exposure to VOCs in indoor air.

The Health Risk Assessment concluded that the indoor air pathway, based on a groundwater source, was the only pathway for which a significant risk or hazard may exist. Direct exposures to VOCs in groundwater onsite are not likely to be complete due to the depth to groundwater and the fact that groundwater is not used for potable purposes at this Site.

The Health Risk Assessment concluded that neither the carcinogenic risk, nor non-carcinogenic Hazard Index, exceed the de minimus levels of 1.0×10^{-6} or unity (1), respectively. These values are typically taken to be levels that are acceptable for risk management decision-making regarding residential property use. The Health Risk Assessment concluded that the risk to the Site's future residents are below commonly accepted risk levels for residential scenarios.

3.0 REMOVAL ACTION OBJECTIVES

3.1 STATUTORY LIMITS ON REMOVAL ACTIONS

The proposed excavation for the residential development provides a unique opportunity to do the following at the Site: remove source soils, clean up groundwater, improve the environment in the area, and work towards closure with ACHCSA. Based on the quantification of gasoline in composite samples, more than 10,000 pounds of petroleum hydrocarbon source materials would be removed from the Site during this removal action. There are no statutory limits establishing or guiding the excavation and remediation extent of the planned construction; however, ACHCSA has established a risk-based guidance limit of 5,000 mg/kg for contamination at the base of the excavation (ACHCSA 2003).

Soil excavated during this project will contain detectable concentrations of petroleum hydrocarbons, VOCs, and lead. Management of the excavated soil may be regulated by the Federal Hazardous Waste Management Act of 1986 (HWMA), the California Porter Cologne Act, and Bay Area Air Quality Management District (BAAQMD) regulations.

The excavated soil may be handled in one or more of the following manners depending on the concentrations:

- Dispose of soil at specialized non-hazardous landfills if it is below the characteristic hazardous waste limits.
- Dispose of soil at a Class 1 hazardous waste landfill if it is above the characteristic hazardous waste limits.
- Treat soil onsite or offsite and dispose of the treated soil offsite in a local municipal landfill.

3.2 DETERMINATION OF REMOVAL SCOPE

Currently, there are no regulatory orders for this removal action. The extent of soil being excavated and remediated has been determined by (1) the design of the garage structure required to meet the overall building structure height limitations and design review requirements established by the City of Emeryville and (2) negotiations with the ACHCSA and the City of Emeryville. Based on those specifications, the criteria below were established for this project:

1. The removal action proposed during the residential development (excavation to an average depth of 10.5 ft bgs) will be completed.
2. Soils in the west portion of the Site that exceed 5,000 mg/kg of TPH will be overexcavated up to a maximum depth of 15.5 ft bgs.
3. A groundwater delineation and monitoring program will be completed after the removal action is performed.
4. An appropriate Health and Safety Plan will be completed and observed by the construction workers during the project, and a Risk Management Plan will be completed for notification of future utilities workers.
5. A Risk Assessment Addendum will be completed after the removal action to reflect contaminants found during the removal action.

Items numbered 2 through 5 were technical comments provided by ACHCSA (ACHCSA 2003). The letter from ACHCSA is included in Appendix B.

3.3 DETERMINATION OF REMOVAL SCHEDULE

The CIERRA loan process limits the removal action to 12 months. There is no regulatory-imposed schedule with deadlines for the project. Green City Builders has to initiate construction in accordance with the schedule established under the permits from the cities of Emeryville and Oakland. The estimated duration for the residential development project is 12 months. The contaminated soil excavation and subsequent handling will occur within the first two months of construction. The removal action alternatives were evaluated to determine whether each was capable of complying with the project's accelerated schedule (Section 5).

4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The residential development will result in the mass excavation of contaminated soils, which are primarily above 10.5 feet bgs. This Identification and Analysis of Removal Action Alternatives is based on excavating approximately 13,550 cubic yards of soil or 23,033 tons (assuming 1.7 tons/cubic yard). Based on the Preliminary Investigation (Clayton 2002b) and Supplemental Investigation (Clayton 2003),

- Approximately 1,250 cubic yards (2,125 tons) of lead-impacted soil would be classified as hazardous (Class 1) waste due to lead concentrations above California's hazardous waste solubility limit, and
- Approximately 12,300 cubic yards (20,908 tons) of the soil would be acceptable for disposal at specialized non-hazardous waste landfills.

Three removal action alternatives were selected based on the contaminants present at the Site and the ability of each alternative to meet the goals and objectives of the residential development project. Evaluation of each removal action alternative assumes the lead-impacted soil will require stabilization and offsite disposal at a Class 1 landfill and the extracted groundwater will be discharged or disposed offsite. The remaining VOC-impacted soil will be handled using one of the following removal action alternatives:

- Alternative 1 - Excavate and treat the excavated soil near the Site using a low temperature thermal desorption system. Due to the geotechnical characteristics of the soil, it is not feasible to reuse the soil offsite after treatment; therefore, this Alternative assumes the treated soil will be transported to a local municipal landfill and used as daily cover.
- Alternative 2 - Excavate and transport the soil to a permitted offsite thermal desorption treatment facility. After treating the soil, the treatment facility will dispose of the treated soil in an appropriate landfill.
- Alternative 3 - Excavate the soil and dispose at an appropriate offsite landfill.

The following alternatives were determined to be infeasible for the reasons below:

- No Action – This alternative is not feasible since the City of Emeryville is moving ahead with the residential development project with its current design. The garage structure will be built below grade to meet the overall building structure height limitations and design review requirements established by the City of Emeryville. The development requires removal of approximately 13,550 cubic yards of soil to build the below grade parking garage. The soil will be excavated and a proper management method will be necessary.
- Excavate and Treat Onsite – Onsite treatment would not be feasible to implement from a logistical standpoint. The residential development will encompass the majority of the Site footprint. During construction, contractors and equipment will require use of the entire Site; therefore, there will be no space available to set up a treatment system onsite.

- Excavate and Reuse Onsite - It will not be feasible to reuse excavated soils onsite based on the required volume to be removed and the limited area available for reusing soil due to the large footprint of the buildings and the below grade parking garage.
- Excavate and Reuse Offsite – Reuse offsite will not be feasible because this Class II waste requires disposal outside the limits of the BAAQMD that includes seven counties in the greater Bay Area (Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara and Napa), and portions of two others—southwestern Solano and southern Sonoma.

5.0 COMPARISON OF ALTERNATIVES

5.1 EFFECTIVENESS OF ALTERNATIVES 1, 2 AND 3

Each alternative includes excavating contaminated soil up to 10.5 ft bgs across the Site and eventually removing it offsite. Alternatives 1, 2, and 3 have identical long-term effects for the Site of reducing the amount of contamination in the project area and reducing long-term health risks at the Site. Each alternative also includes relocating the excavated soil, either with or without treatment, to landfills specifically designed to hold and contain contaminated soil while protecting human health and the environment.

The buildings and a watertight barrier will provide an effective cap that will be constructed independent of which removal action alternative is selected. These barriers will effectively prevent direct contact with contaminated soil that remains below the development and minimize infiltration of VOCs into the indoor air of the planned buildings. Additionally, the dewatering action is anticipated to remove a significant quantity of contaminated groundwater underneath the Site.

Each of the alternatives would provide effective, long-term protection to human health and the environment at the Site.

5.2 IMPLEMENTABILITY

5.2.1 Alternative 1 – Excavate, Treat Near Site, and Transport Treated Soil Offsite to a Local Municipal Landfill

5.2.1.1 Technology Issues

The technology to treat TPH-ms and VOCs in soils using low temperature thermal treatment systems is available from several companies. Therefore, the technology to perform the treatment for Alternative 1 is technically implementable. Thermal treatment could require up to three months or longer.

Technical factors that may limit the applicability and effectiveness of Alternative 1 include:

- There are specific requirements related to particle size and material handling that can impact applicability or cost of the treatment at specific sites. Generally, soils are screened to remove large particles and debris prior to transferring them to the thermal treatment system.

- Dewatering may be necessary to achieve acceptable soil moisture content levels.
- A highly abrasive feed can potentially damage the treatment unit.
- Heavy metals in the feed may produce a treated solid residue that requires stabilization. Heavy metals, such as lead and copper, were detected in previous Site investigations.
- Soils with clay, silt and high humic content increase the reaction treatment time as a result of the binding of contaminants. The Site soil would require additional treatment time due to its low permeability and high clay content.

5.2.1.2 Logistics Issues

Alternative 1 would be feasible to implement from a logistical standpoint. The developer could rent land on another site to perform the ex-situ thermal treatment. This would include additional costs for renting the land and added handling of the material.

5.2.1.3 Administrative Issues

Administrative issues associated with the implementation of Alternative 1 would include compliance with air quality regulations. The BAAQMD may require an air permit for the treatment system if air emissions exceeded permittable quantities or the system operated for specific time periods. The permit could require several months to obtain, and a public notification may be required since there is a sensitive receptor, Anna Yates Elementary School, located less than 1,000 feet from the Site. In addition, implementation of Alternative 1 would require compliance with California's transportation requirements while transferring the soils to the nearby property for treatment. The material to be treated would not be a hazardous waste, but a properly licensed waste hauler would be required to move this non-hazardous waste.

5.2.2 Alternative 2 – Excavate, Treat Offsite, and Treatment Facility Disposes of Treated Soil in an Offsite Landfill

5.2.2.1 Technology Issues

The technology to treat TPH-ms and VOCs in soils using low temperature thermal treatment systems is available from at least one company in Southern California. Several companies that once performed this treatment have left the Bay Area. The technology to perform the treatment for Alternative 2 is technically implementable. Offsite treatment facilities are experienced in managing the factors that may limit the applicability and effectiveness of thermal treatment as listed in 5.2.1.1. above. These facilities have the advantage of being able to blend soils from multiple sites to overcome site-specific soil characteristics, such as low permeability clays or high moisture content.

5.2.2.2 Logistics Issues

Alternative 2 could be implemented with minimal impact on the construction project at the Site. The soil would be excavated and removed from the Site in an initial construction stage allowing other construction tasks to occur with no limitations to their maneuverability onsite. Excavation and offsite thermal treatment of the soils is logistically implementable.

5.2.2.3 Administrative Issues

Administrative issues associated with the implementation of Alternative 2 would include obtaining excavation permits and coordinating offsite shipment with an appropriate hauler and treatment facility. In addition, implementation of Alternative 2 would require compliance with California's transportation requirements during the transfer of the soils to the offsite treatment facility. This soil is not a hazardous waste, but a properly licensed waste hauler would be required to move the non-hazardous waste. Companies are readily available with the trained personnel to perform all necessary administrative activities required for this alternative.

5.2.3 Alternative 3 – Excavate and Dispose of Soil Offsite

5.2.3.1 Technology Issues

Alternative 3 would be implementable from a technical standpoint. Planning the excavation and offsite disposal would not be technically complex. Several companies are readily available with the trained personnel, equipment, and materials to perform all necessary construction activities required for this alternative. Several landfills are available that are specifically designed to hold and contain contaminated soil while protecting human health and the environment. Therefore, excavation and offsite disposal of the soils is technically implementable.

5.2.3.2 Logistics Issues

Alternative 3 could be implemented with minimal impact on the construction project at the Site. The soil would be excavated and removed from the Site in an initial construction stage allowing other construction tasks to occur with no limitations to their maneuverability onsite. Excavation and disposal of the soils is logistically implementable.

5.2.3.3 Administrative Issues

Administrative issues associated with the implementation of Alternative 3 would include obtaining excavation permits and coordinating disposal with an appropriate landfill. In addition, implementation of Alternative 2 would require compliance with California's transportation requirements during the transfer of the soils to the offsite treatment facility. This soil is not a hazardous waste, but a properly licensed waste hauler would be required to move the non-hazardous waste. Several companies are readily available with the trained personnel to perform all necessary administrative activities required for this alternative.

5.3 COST

The duration of the removal action project is anticipated to be less than one year, so present net worth cost analyses are not required, and thus were not developed, for this EE/CA.

5.3.1 Costs that Apply to Each Alternative

Each alternative will include excavation of the soil from its existing location. The costs vary after the initial excavation depending on the number of times the material is handled, whether it is transported offsite, etc. Each alternative will include costs for disposing of 2,125 tons of lead-impacted soil as hazardous waste at a Class 1 landfill. The unit cost for loading, transporting, and disposing of the lead-impacted soil is $66.56/ton. The disposal costs for the lead-impacted soil are as follows: $66.56/ton x 2,125 tons = $141,440. In addition, the State of California Board of Equalization imposes taxes/fees of $65,000 for disposing of greater than 2,000 tons of hazardous waste. A cost of $206,440 will be included in the cost estimate for each alternative to account for disposing of the lead-impacted soil in a Class 1 hazardous waste landfill.

A cost of $100,000 will be included in the cost estimate for each alternative to account for dewatering, treatment and discharge of groundwater encountered during the construction.

In addition to the removal, treatment and disposal costs, each alternative has other project costs typically associated with working with and handling hazardous materials, and not directly related to the volume of soil excavated. These costs include at a minimum: preparing health and safety plans and waste sampling and analysis plans, permitting (air emissions), additional site controls (i.e., to prevent public access and surface water runoff during construction), additional chemical analyses for waste profiling and confirmation, using certified hazardous waste professionals and contractors, and reporting. These additional costs are estimated at approximately $40,000 for a project of this scope. Therefore, $40,000 will be included in the cost estimate for each alternative to account for these miscellaneous project costs.

5.3.2 Alternative 1 – Excavate, Treat Near Site, and Transport Treated Soil Offsite to a Local Municipal Landfill

Costs associated with Alternative 1 will include (1) renting a nearby property, (2) loading the soil, (3) paying a thermal treatment contractor to bring their equipment to the rented property and operate it, (4) paying utilities to run the treatment system, and (5) paying treated soil hauling and disposal charges.

Typical unit costs for Alternative 1 are as follows:

- $50,000 to rent a nearby property for using the treatment system due to space limitations at the Site

- $100,000 for the contractor to mobilize the equipment to the rented property
- $40/ton to treat the material at the rented property
- $10/ton handling costs at the rented property
- $20/ton to transport the treated soil as inert material to be used as landfill cover

Overall estimated costs for Alternative 1 including lead-impacted soil, groundwater dewatering, and miscellaneous project costs =

$50,000 + $100,000 + ($70/ton x 20,908 tons) + $206,440 +$100,000 + $40,000 = $1,960,000

5.3.3 Alternative 2 – Excavate, Treat Offsite, and Treatment Facility Disposes of Treated Soil in an Offsite Landfill

Costs associated with Alternative 2 will include (1) paying a hauler to load and transport the material offsite, and (2) paying treatment/disposal charges for the thermal treatment facility.

Typical unit costs for Alternative 2 are as follows:

- $59/ton to load and transport the soil to a thermal treatment facility (TPS, Adelanto, California)
- $28/ton for the offsite thermal treatment facility to treat the soil and dispose of the treated soil in a landfill

Overall estimated costs for Alternative 2 including lead-impacted soil, groundwater dewatering, and miscellaneous project costs =

($87/ton x 20,908 tons) + $206,440 +$100,000 + $40,000 = $2,165,436

5.3.4 Alternative 3 – Excavate and Dispose of Soil Offsite

Costs associated with Alternative 3 will include (1) soil loading and hauling charges, and (2) disposal charges.

Typical unit costs for Alternative 3 are as follows:

- $25/ton to load, transport, and dispose of the soil in a landfill facility

Overall estimated costs for Alternative 3 including lead-impacted soil, groundwater dewatering, and miscellaneous project costs =

($25/ton x 20,908 tons) + $206,440 +$100,000 + $40,000 = $869,140

6.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

A comparative analysis was performed based on the criterion discussed in Section 5: effectiveness, technology issues, logistics, administrative issues, and costs. This comparative analysis qualitatively ranked each alternative using the criteria discussed in Section 5. The evaluation criteria were given a score for each alternative of 1, 2, or 3, with 1 being poor, 2 being average, and 3 being good (Table 1). The individual scores were summed for each alternative to give a total score. The larger the score, the better the ranking. The evaluation of remedial alternatives and this comparative analysis were performed based on existing data. Additional data may have the potential to alter the outcome.

The total score for each alternative was as follows: Alternative 1 – 35 points, Alternative 2 – 41 points, and Alternative 3 – 44 points. Alternative 3 had the highest score during the comparative analysis because it is an effective remedial alternative and is the most practical of the three alternatives with the least impact to the schedule and logistics for the overall residential development project. In addition, the cost to implement Alternative 3 is much less than half of the cost for the other two alternatives.

Based on the results of the comparative analysis, Alternative 3 with excavation and offsite disposal is the preferred removal action technology. Excavation and offsite disposal is a long established and effective removal alternative for contaminated soils under these circumstances. Advantages of using Alternative 3 are as follows:

- It can provide rapid and permanent clean-up of source areas,
- The required equipment for excavation, loading and transport is readily available,
- The volume, mobility and toxicity are reduced by contaminant mass removal,
- It is effective in all soil types, including fill and miscellaneous debris, and
- It does not require extensive design, pilot or bench scale testing, or long term operation, and maintenance.

Alternative 3 is the best Removal Action Alternative available to meet the removal action objectives and to complete the residential development project in a timely manner. This alternative is protective of future Site tenants and the general public. This alternative will eventually remove the source of groundwater contamination at the project Site and provide for the permanent offsite isolation and containment of that material excavated. In addition, groundwater concentrations beneath the Site should decrease due to the source removal and groundwater treatment during construction dewatering. In addition, the buildings and a watertight barrier will provide an effective cap that will be constructed for the residential development.

7.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

Alternative 3 is selected and recommended as the preferred Removal Action Alternative. The anticipated scope for the selected Removal Action Alternative is summarized below:

- The excavation sidewalls will be shored with soldier beam and lagging to prevent infiltration of groundwater during the construction project. Groundwater encountered during the excavation activities will be dewatered, contained, treated, and discharged or disposed offsite.
- The area proposed for construction will be excavated to an average depth of 10.5 ft bgs. Overexcavation will occur in the area of boring B-18 to remove soil with TPH concentrations greater than 5,000 mg/kg meeting the remedial objectives

Clayton (Clayton 2002b). *Predevelopment Investigation Report of the Former Dunne Paint Facility at 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California,* December 2002.

Clayton (Clayton 2003). *Supplemental Investigation of the Former Dunne Paints Facility, 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California.* May 2003.

United States Environmental Protection Agency (EPA 1993). *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA.* EPA/540-R-93-057, Publication 9360.0-32, August 1993.

Report prepared by: ______________________________

Michael J. Zimmerman, P.E., R.E.A.
Senior Project Manager
Environmental Services

Report reviewed by: ______________________________

Jon A. Rosso, P.E.
Director
Environmental Services

June 10, 2003

TABLES

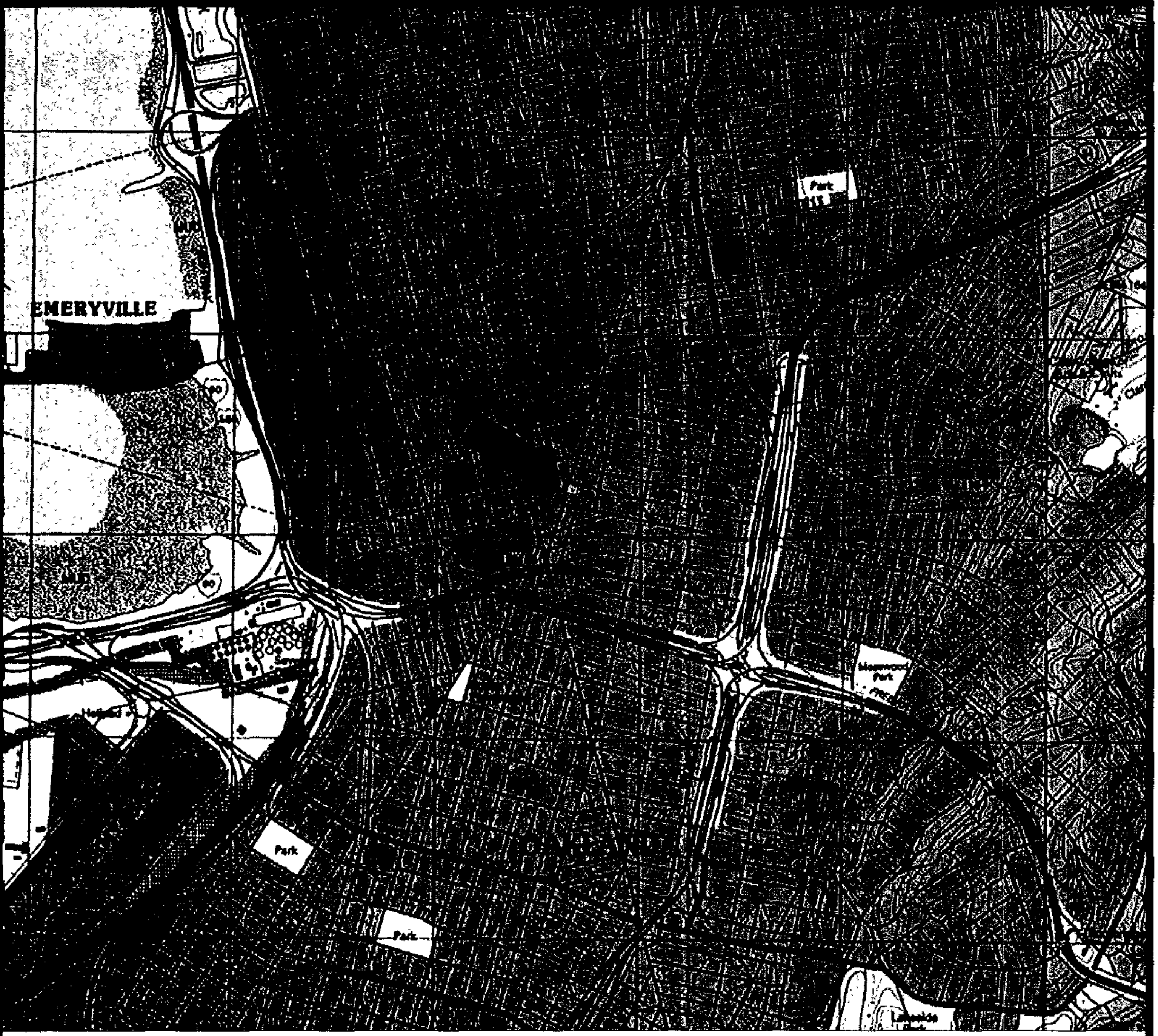
TABLE 1
Comparative Analysis Of Removal Action Alternatives
Draft Engineering Evaluation/Cost Analysis
Former Dunne Paints Facility
Emeryville, California

EVALUATION CRITERION	ALTERNATIVE NO.		
	1	2	3
Effectiveness	**SCORE**		
Protectiveness			
Protective of public health and community	3	3	3
Protective of workers during implementation	1	1	1
Protective of the environment	2	2	2
Complies with County-required ARARs	3	3	3
Ability to Achieve Removal Action Objectives			
No residual effect concerns	3	3	3
Will maintain control until long-term solution implemented	N/A	N/A	N/A
Implementability	**SCORE**		
Technical Feasibility			
Construction and operational considerations	1	3	3
Demonstrated performance/useful life	3	3	3
Adaptable to environmental conditions	1	2	2
Contributes to remedial performance	3	3	3
Can be implemented in 1 year	N/A	N/A	N/A
Availability			
Equipment	2	2	2
Personnel and Services	2	2	2
Outside laboratory testing capacity	2	2	2
Off-site treatment and disposal capacity	N/A	1	3
Post removal site control	3	3	3
Administrative Feasibility			
Permits required	1	2	2
Easements or rights-of-way required	N/A	N/A	N/A
Impact on adjoining property	2	2	2
Ability to impose institutional controls	N/A	N/A	N/A
Likelihood of exceeding statutory 12-month limit	N/A	N/A	N/A
Cost	**SCORE**		
Capital cost	1	2	3
Post removal site cost	2	2	2
Present worth cost	N/A	N/A	N/A
TOTAL SCORE	**35**	**41**	**44**

NOTES:
Alternative 1 Excavate, Thermal Treatment Near Site, Dispose of Treated Soil Offsite
Alternative 2 Excavate, Treat Offsite, Treatment Facility Disposes of Treated Soil Offsite in a Landfill
Alternative 3 Excavate and Dispose of Soil Offsite in a Landfill
Evaluation Scores: 1 = poor, 2 = average, 3 = good

Clayton
GROUP SERVICES

FIGURES



Map Source: TOPO! © 2000 National Geographic Holdings

Note: Boundaries and Location Information is Approximate

1 — 1/2 — 0 — 1 MILE

1000 — 0 — 1000 — 2000 — 3000 — 4000 — 5000 — 6000 — 7000 FEET

Portion of the 7.5-Minute Series Oakland West, California
Quadrangle Topographic Map (Datum: NAD 27)
United States Department of the Interior
Geological Survey
1997

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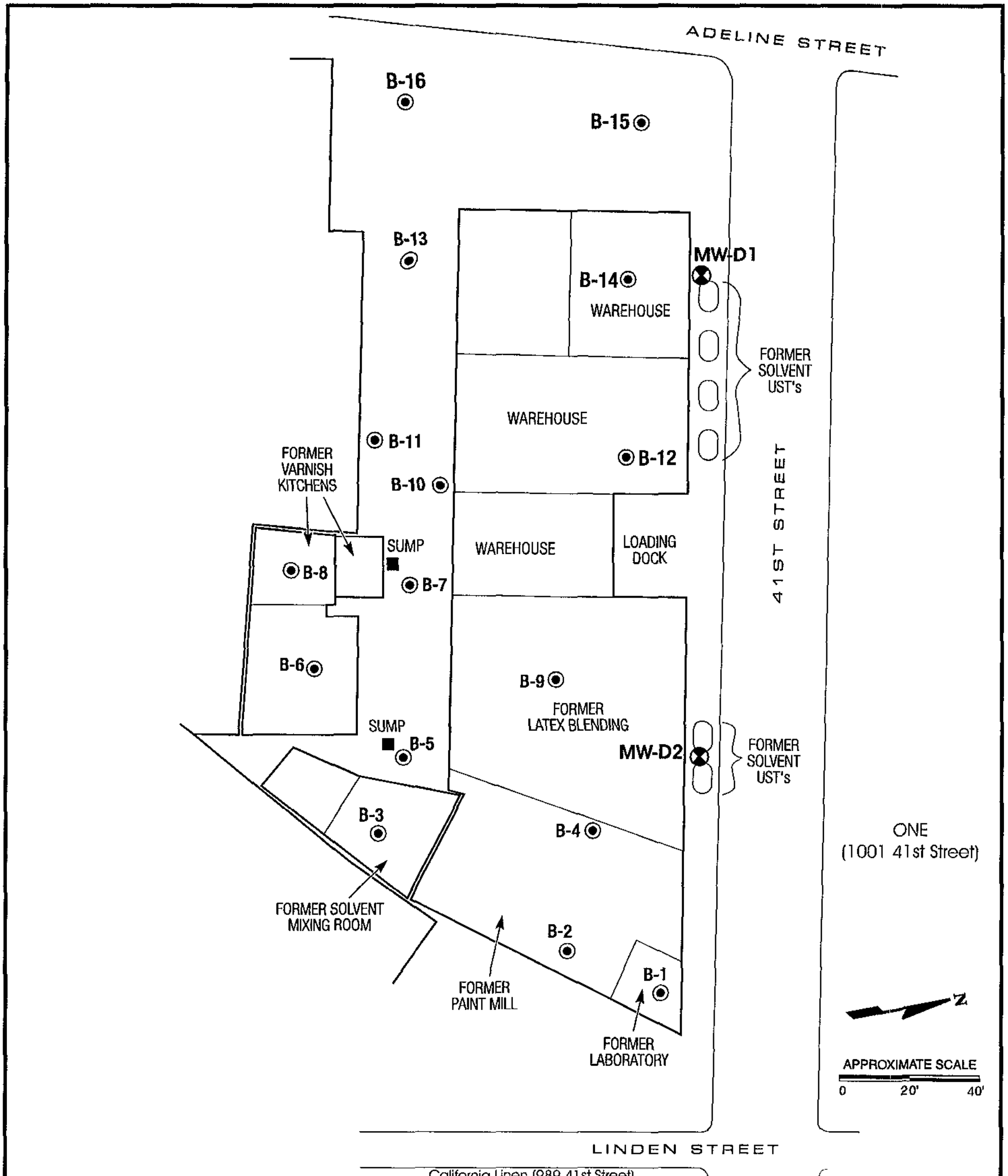
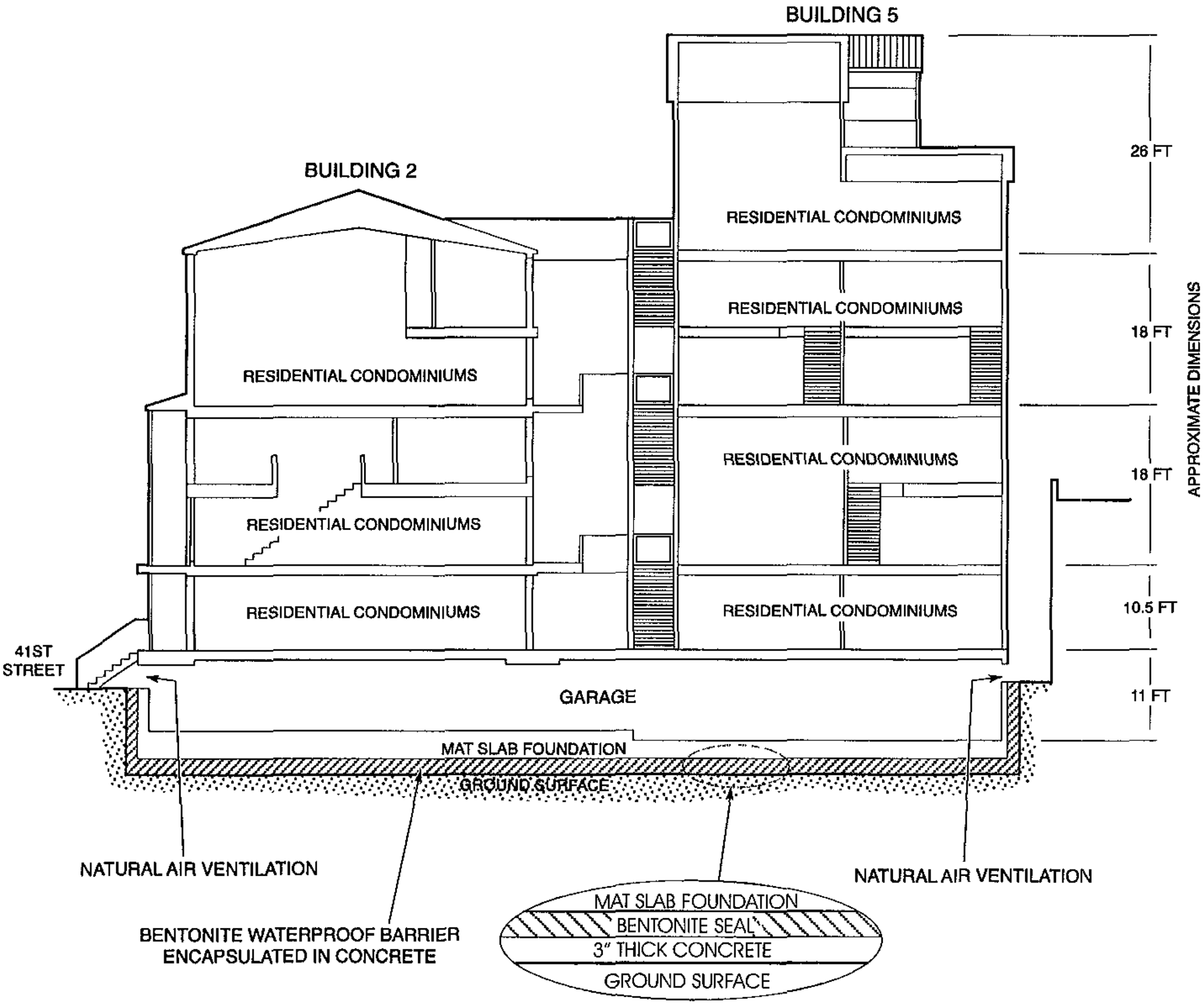
QUADRANGLE LOCATION

PROPERTY LOCATION MAP 1007 41st Street Emeryville/Oakland, California and 4050 Adeline Street Emeryville, California Clayton Project No. 70-03365.00	Figure 1	Clayton GROUP SERVICES

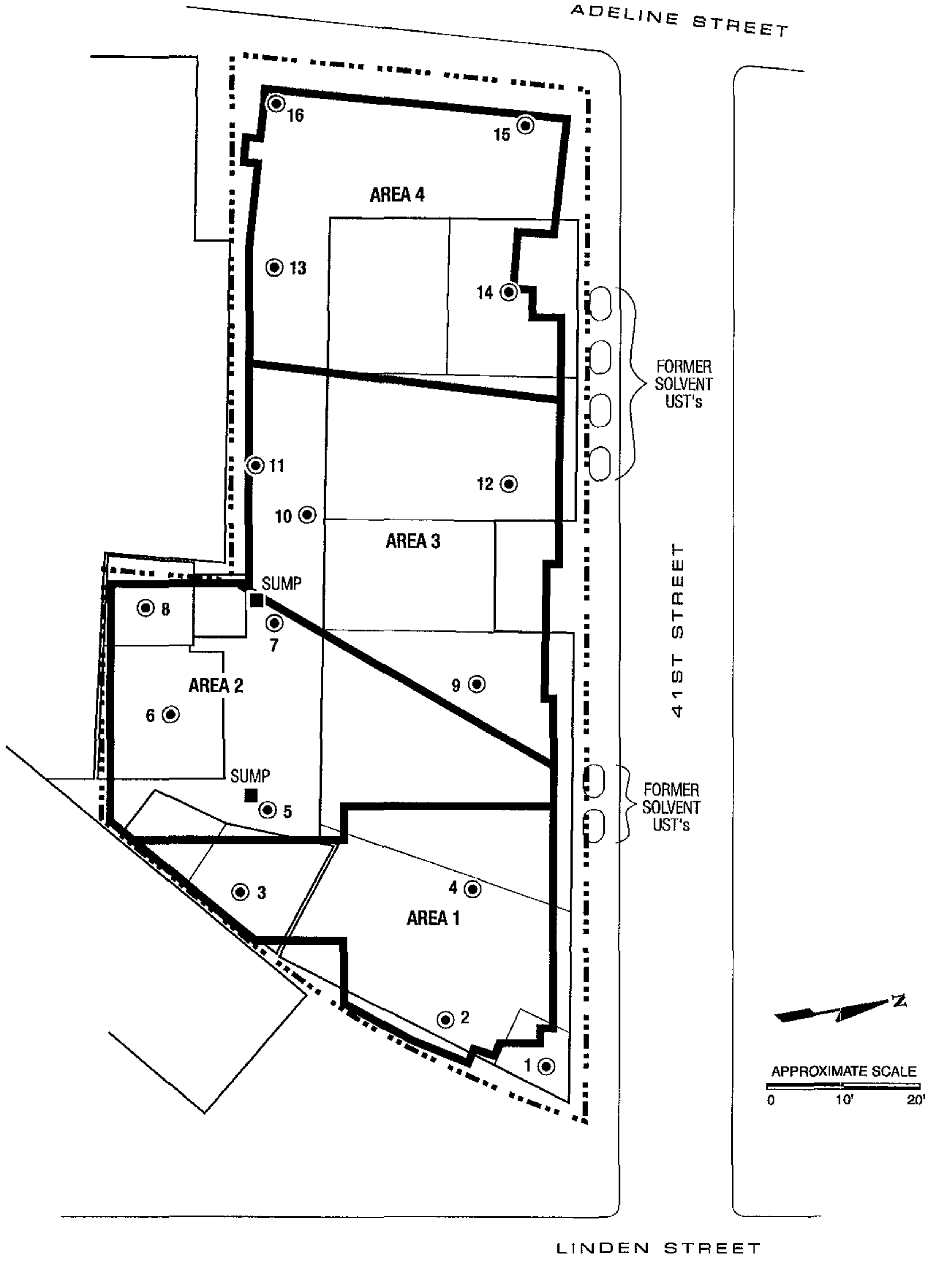


LEGEND	SITE PLAN WITH BORING LOCATIONS		
◉ Boring Location ⊗ Monitoring Well	Former Dunne Paints 1007 41st Street, Oakland and 4050 Adeline Street, Emeryville, California Clayton Project No.: 70-03365.01	Figure 2	Clayton GROUP SERVICES



PROPOSED BUILDING ELEVATION 1007 41ST Street and 4050 Adeline Street Oakland/Emeryville, California Clayton Project No.: 70-03365.01	Figure 3 12/11/02	Clayton GROUP SERVICES

70-03365.01/TechGraphic



70-03365.01/TechGraphic

LEGEND	SITE PLAN SHOWING THE EXCAVATION AREA	Figure	
Property Boundary	Former Dunne Paints	4	Clayton GROUP SERVICES
Excavation Boundary	1007 41st Street, Oakland and 4050 Adeline Street, Emeryville, California Clayton Project No.: 70-03365.01	12/11/02	

APPENDIX A

2002 AND 2003 INVESTIGATION REPORTS

6920 Koll Center Parkway
Suite 216
Pleasanton, CA 94566
925.426.2600
Fax 925.426.0106

Clayton GROUP SERVICES

May 23, 2003

Barney Chan
Hazardous Materials Specialist
ALAMEDA COUNTY ENVIRONMENTAL HEALTH DEPARTMENT
1131 Harbor Bay Parkway
Alameda, CA 94502-6577

Clayton Project No. 70-03365.02

Subject: Supplemental Investigation of the Former Dunne Paints Facility, 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California

Dear Mr. Chan:

Clayton Group Services, Inc. (Clayton) is pleased to present this report documenting the results from a recent Supplemental Investigation conducted at the above-referenced subject property (Figure 1). Several previous site investigations have been performed at the site and their results along with a description of the site history were recently presented in the Clayton report *"Predevelopment Investigation Report of the Former Dunne Paint facility at 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California"* dated December 23, 2002.

Mr. Barney Chan of the Alameda County Health Care Service Agency (ACHCSA), in a letter dated March 21, 2003 listed four technical comments and stated that no further active remediation will be required at this property if the technical comments are adequately addressed. This supplemental investigation was performed in response to the ACHCSA's Technical Comment #1:

"We concur with the proposed excavation of this site to an average depth of 10.5' and the removal of groundwater if encountered. Based upon previous results, post-excavation soil sampling is required in the west portion of the site, near the areas of borings B-11, B-12, and B-14-B-16. If post-excavation soil concentrations exceed 5000 ppm TPH in these areas, we request that additional soil excavation up to a maximum depth of 15.5' bgs be performed to remove the highly impacted soil."

As such, the aim of this investigation was to define areas within the western portion of the planned excavation area where Total Petroleum Hydrocarbons as Mineral Spirits (TPH-ms) in soil exceeded 5,000 kilograms per kilogram (mg/kg). This report presents a description of field investigation procedures, a site map showing sample locations, a summary of analytical results, and conclusions and recommendations as necessary.

SCOPE OF WORK

The sampling for the investigation was based on the recommendations of the ACHCSA; where vertical soil samples every 1,000-square feet throughout the western portion of the subject property would be sufficient to adequately characterize the TPH-ms concentration at and below the base of the proposed excavation. Therefore, this supplemental soil sampling prior to excavation was performed in lieu of the post-excavation soil sampling in order to avoid delays in the construction program.

The scope of work for this investigation involve the following tasks:

- Project management,
- Prefield Activities,
- Field Sampling Activities,
- Laboratory Analysis, and
- Report Preparation.

Work performed to complete the above listed tasks is described in the following discussion.

PRE-FIELD ACTIVITIES

The purpose of the pre-field activities was to appropriately plan the work and to ensure that onsite personnel are prepared for potential safety hazards at the property. The pre-field activities included the following:

- Development of a workplan to conduct the investigation. The workplan dated April 7, 2003 was submitted to the ACHCSA for review and approval. The workplan was approved by ACHCSA, with comments, in a letter dated April 9, 2003.

- Prepared a Site Safety and Health Plan (SSHP) to reflect the work proposed at the subject property. The SSHP detailed the work to be performed, safety precautions, emergency response procedures, nearest hospital information, and onsite personnel responsible for managing emergency situations.

- Marked the site boundaries with white paint and notifying Underground Service Alert (USA) at least 48 hours prior to performing field activities, as required by law, and employed a private utility locating service to identify onsite subsurface utilities prior to conducting subsurface field activities.

- Obtained a drilling permit, as necessary, from the Alameda County Department of Public Works (ACDPW).

SAMPLING RATIONALE

A total of 12 borings (B-17 through B-28) were advanced in the western portion of the subject property, at the locations shown in Figure 2. Each boring was located centrally within a 1,000-square feet grid across the western portion of the subject property. The target soil sampling depth for the investigation was the base of the planned excavation, which is presently set at approximately 39 feet above mean sea level (amsl) across the subject property. However, since the ground surface elevations at the subject property are variable, the soil sampling depths varied within boreholes. For example, ground surface elevations near the western end of the property near Adeline Street vary between about 46 and 48 feet amsl, while most of the building and the eastern portions of the subject property are at an elevation of about 51 feet amsl.

Therefore, the subsurface borings were advanced both inside and outside of the current buildings to depths between 7 and 16 feet below ground surface (bgs), based on ground surface elevations. In order to appropriately characterize the near surface soil that will remain following excavation, soil samples were collected at depth corresponding to 39 feet, 37 feet, and 35 feet amsl from each of the 12 borings.

The soil sampling depth in each boring is listed below, and determined from existing ground surface elevations at each borehole location and the proposed post-development elevation of 39 feet amsl:

Boring ID	Sample Depth Interval (feet bgs)
B-17-B-24	12, 14, 16
B-25	11, 13, 15
B-26	9, 11, 13
B-27	8, 10, 12
B-28	7, 9, 11

FIELD SAMPLING ACTIVITIES

A Clayton geologist supervised Environmental Control Associates, Inc. of Aptos, California to advance the borings using Geoprobe® direct-push drilling equipment. Limited access drilling equipment was used to collect soil samples from within the onsite buildings. Del Secco Diamond Core and Saw of Hayward, California, removed concrete cores in eight locations prior to drilling

Soil cores were recovered within a 2-inch diameter macro-core lined with an acetate tube. Soil core were examined to determine subsurface soil types and physical evidence of contamination (*e.g.*, odors, discoloration, chemical sheen). An organic vapor analyzer (OVA) was used to screen soil for volatile compounds. Soil descriptions and OVA reading were recorded onto field logs, which are presented in Attachment 1.

A 6-inch long section of the acetate tube containing soil for laboratory analysis was cut at intervals corresponding to the required test depths. The soil sample tube was sealed with Teflon tape, capped, labeled, and placed in a pre-chilled ice chest. Collected soil samples were transported to a State of California-certified laboratory under formal chain-of-custody documentation.

Prior to abandoning boreholes, an electric water level meter was lowered in to each borehole to determine the static water level within the borehole. The depth to water measurements are presented on boring logs (Attachment 1). Once the fieldwork was completed, boreholes were filled to the ground surface with cement grout.

Downhole equipment was cleaned prior to advancing each boring and prior to collecting samples. Waste soil cuttings and decontamination water were containerized in a 55-gallon drum, labeled with identifying information and stored onsite pending appropriate disposal following the completion of field activities.

SUBSURFACE CONDITIONS

The site is predominantly underlain by clay or silty clay soils. Sand and gravel horizons that vary from gravelly clay to clayey gravel generally occur at depths of 10 to 11 feet bgs. The depth to water below the building floor surface occurred at approximately 7 to 10 feet bgs, and at shallower depth along the Adeline Street. Free water was found in boreholes that encountered more porous sand and gravel soils; free water was not found in boreholes that encountered predominantly clay soil.

The distribution of impacted soil, as indicated from OVA reading was variable within the upper (non-saturated) portion of the site. However, a distinctive green coloration of the clayey soil corresponded to high OVA readings. The green color soil had a thickness of approximately 5-feet in most locations.

Below the green soil, the clayey soils were typical reddish to orange brown and had noticeably lower OVA readings associated with them.

LABORATORY ANALYSIS AND RESULTS

A total of 36 soil samples were submitted to the State of California-certified Curtis and Tompkins Ltd. of Berkeley, California for analysis. Only those soil samples corresponding to the 39-foot amsl elevation were initially tested. Also, at the request of ACHCSA, all samples from boreholes B-17, B-23, and B-28 were analyzed.

The soil samples were analyzed using the following United States Environmental Protection Agency (USEPA)-approved method:

- USEPA Method 8015M for Total Petroleum Hydrocarbons quantified for mineral spirits (TPH-ms)

The certified laboratory data sheets and chain-of-custody documentation for samples submitted for analysis are presented in Attachment 2. A summary of the analytical results is presented in Table 1.

Only at one sample location, borehole B-18 at the sample depth of 12 feet bgs was TPH-ms found to be above the 5,000 mg/kg excavation target level. The subsequent sample B-18@14 contained TPH-ms at 99 mg/kg. All other soil samples collected and analyzed from within the area of investigation were below the 5,000 mg/kg excavation target level.

CONCLUSIONS AND RECOMMENDATIONS

The results of this investigation indicate that slight over-excavation in the vicinity of Borehole B-18 will be required to meet the remedial objectives outlined by ACHCSA. The over excavation will require an additional 2-feet of soil to be removed in the 1,000 square foot area in the vicinity of borehole B-18 (see Figure 2). The analytical results from other test locations indicated that the planned soil excavation for the remaining portion of the site will meet the remedial objectives of removing soil with greater than 5,000 mg/kg TPH.

If you have any questions or need additional information, please contact us at (925) 426-2600.

Sincerely,

Warren B. Chamberlain, R.G., C.HG, P.E.
Project Geologist
Environmental Services

John A. Rosso, P. E.
Director
Environmental Services

TABLES

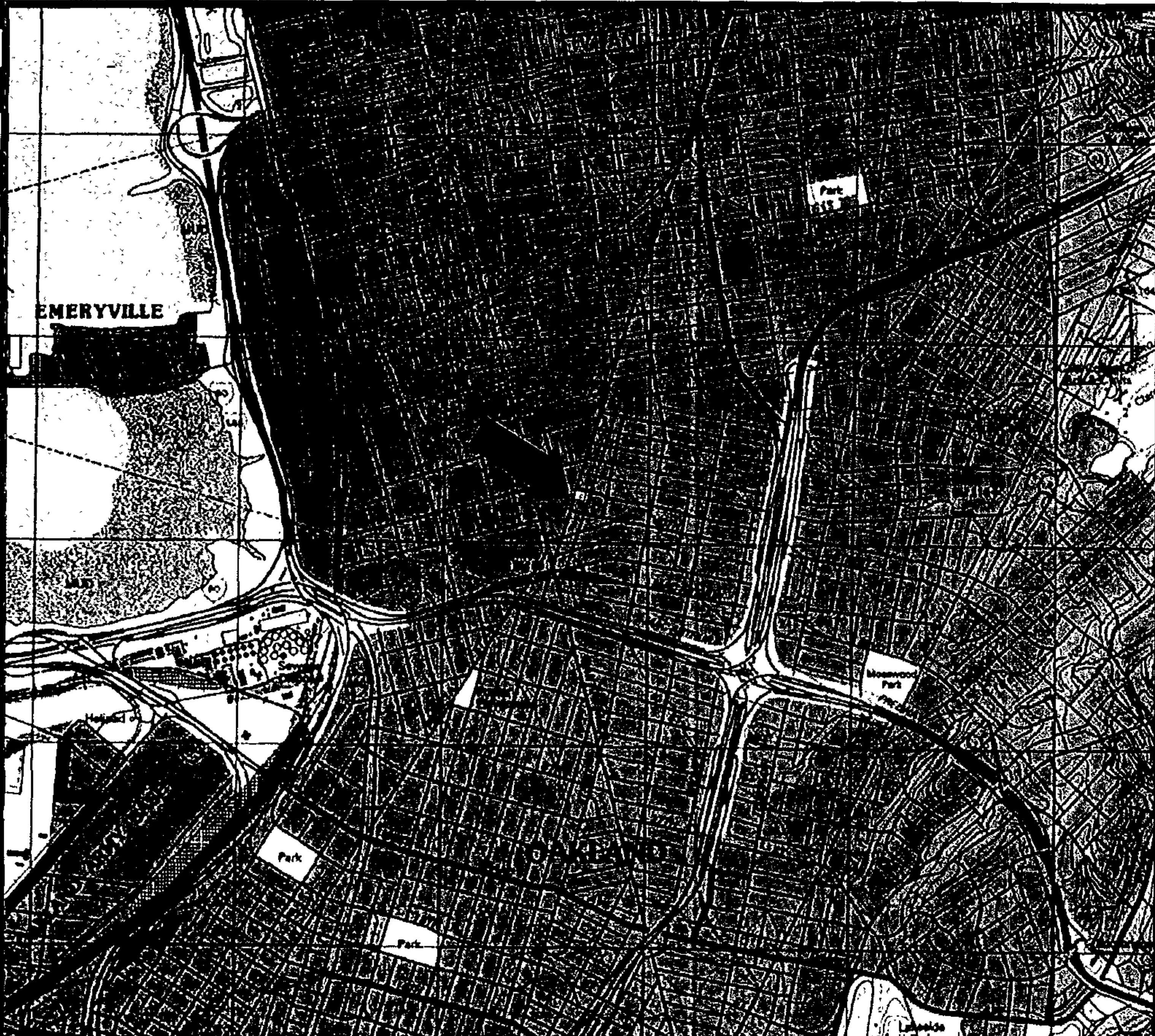
TABLE 1

Summary of Discrete Soil Sample Analytical Results - TPH as mineral spirits
Former Dunne Paints
Oakland/Emeryville, California

BOREHOLE	Sample Depth (feet bgs)	Sample Elevation (feet , amsl)	TPH-ms (mg/kg)
B-17	11.5	39.5	16
B-17	14	37	16
B-17	15.5	35.5	420
B-18	12	39	6,800
B-18	14	37	99
B-19-1	12	39	800
B-19-2	14	37	3
B-20	11.5	39.5	2
B-21	12	39	1,100
B-22	11.5	39.5	13
B-23	12	39	2.3
B-23	14	37	11
B-23	16	35	810
B-24	12	39	400
B-25	11	39	27
B-26	11	37	<1.0
B-27	8	40	<0.92
B-28	7	41	3,600
B-28	9	39	290
B-28	11	37	220

Notes:
<# = analyte not detected at or above the indicated laboratory method reporting limit
mg/kg = milligrams per kilogram
Sampling date: March 27, 2003
TPH-ms, = Total petroleum hydrocarbons quantified as mineral spirits

FIGURES



Map Source: TOPO! © 2000 National Geographic Holdings

Note: Boundaries and Location Information is Approximate

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

Portion of the 7.5-Minute Series Oakland West, California
Quadrangle Topographic Map (Datum: NAD 27)
United States Department of the Interior
Geological Survey
1997

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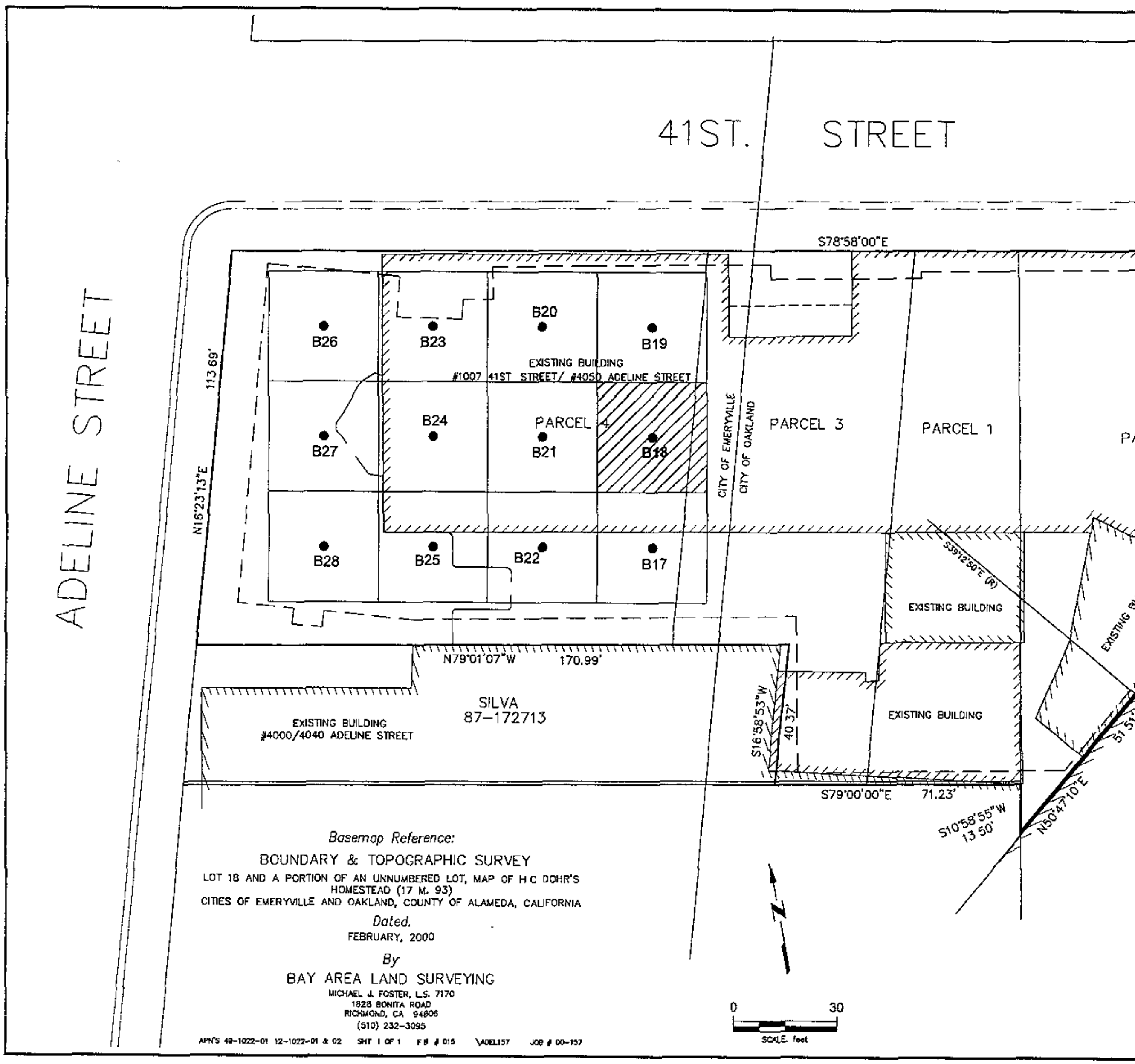
QUADRANGLE LOCATION

PROPERTY LOCATION MAP 1007 41st Street Emeryville/Oakland, California and 4050 Adeline Street Emeryville, California Clayton Project No. 70-03365.00	Figure 1	Clayton GROUP SERVICES



SOIL BORING LOCATIONS

FORMER DUNNE PAINTS
1007 41ST STREET, OAKLAND
AND 4050 ADELINE STREET, EMERYVILLE

Clayton Project No. 70-03365.02

Figure 2

04/28/03
SITE0403 DWG

Clayton Group Services

Clayton
GROUP SERVICES

ATTACHMENT 1

BORING PERMITS AND LOGS

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
399 ELMHURST ST. HAYWARD CA. 94544-1395
PHONE (510) 670-5575 670-6633 James Yoo
FAX (510)782-1939

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 1007 41st Street, OAKLAND
4050 Adeline Street, Emeryville

CLIENT
Name Green City Lofts
Address 3675 Belmont Ave Phone 510.527.1360
City Oakland Zip 94605

APPLICANT
Name Clayton Group Services - Jesse Edmands
Fax 925.426.0106
Address 6920 Koll Ctr. Parkwy Phone 925.426.2636
City Pleasanton Zip 94566

TYPE OF PROJECT
Well Construction
Cathodic Protection ☐
Water Supply ☐
Monitoring ☐
Geotechnical Investigation
General ☐
Contamination ✓
Well Destruction ☐

PROPOSED WATER SUPPLY WELL USE
New Domestic ☐ Replacement Domestic ☐
Municipal ☐ Irrigation ☐
Industrial ☐ Other ______ ☐

DRILLING METHOD:
Mud Rotary ☐ Air Rotary ☐ Auger ☐
Cable ☐ Other ✓ Geoprobe

DRILLER'S NAME Environmental Control Associates

DRILLER'S LICENSE NO. 695970

WELL PROJECTS
Drill Hole Diameter ___ in. Maximum
Casing Diameter ___ in. Depth ___ ft.
Surface Seal Depth ___ ft. Owner's Well Number ___

GEOTECHNICAL PROJECTS / Contamination
Number of Borings 12
Hole Diameter 2 in. Maximum Depth 16 ft.

ESTIMATED STARTING DATE April 21
ESTIMATED COMPLETION DATE April 22

FOR OFFICE USE

PERMIT NUMBER W03-0287
WELL NUMBER
APN

PERMIT CONDITIONS
Circled Permit Requirements Apply

A. GENERAL
1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted original Department of Water Resources-Well Completion Report.
3. Permit is void if project not begun within 90 days of approval date

B. WATER SUPPLY WELLS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

(D.) GEOTECHNICAL / Contamination
Backfill bore hole by tremie with cement grout or cement grout/sand mixture. ~~Upper two-three feet replaced in kind or with compacted cuttings.~~

E. CATHODIC
Fill hole anode zone with concrete placed by tremie.

F. WELL DESTRUCTION
Send a map of work site. A separate permit is required for wells deeper than 45 feet.

G. SPECIAL CONDITIONS

NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable for geotechnical and contamination investigations.

APPROVED [signature] DATE 4-7-03

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] DATE 4-4-03

PLEASE PRINT NAME Jesse Edmands

Rev.5-13-00

Clayton GROUP SERVICES

LOG OF BORING B-17

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Warren Chamberlain
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					concrete
					Silty Clay (CL) black, soft, moist
	☐	96			poor sample recovery 4 to 6 feet bgs
5					
	☐	380			Silty Sand (SM) black, loose, saturated
					Silty Clay (CL) black, medium stiff, wet
			▽		
	☐	162			
					Clayey Gravel (GC) black, loose, saturated
10					
					Silty Clay (CL) black, stiff, wet
	☒	272			
					occassional sand stringer
	☒	159			transitions to brown clay, very stiff
15					
	☒	132			
20					

Total Depth of Boring = 16 feet

Notes:
Static water level at 7.20 feet bgs.
Borehole abandoned with neat cement grout.

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Clayton GROUP SERVICES

LOG OF BORING B-18

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Matt Reimer
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					concrete
	☐	124			Gravelly Clay (CL) dark grey, soft, dry
	☐	148			
5					Silty Gravel (GM) light brown, loose, dry
					Gravelly Clay (CL) light grey, soft, dry
	☐	463	▽		
10					Gravelly Sandy Clay, light brown, soft, dry
	☒	281			Gravelly Clay, dark green, soft, wet
	☒				
15	☒				
20					

Total Depth of Boring = 16 feet

Notes:
Static water level at 9.70 feet bgs.
Borehole abandoned with neat cement grout.

Clayton GROUP SERVICES

LOG OF BORING B-19

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Matt Reimer
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					concrete
	☐	5			Gravelly Clay (CL) light brown to dark grey, soft, dry, hydrocarbon odor
	☐	3			
5					Silty Clay, dark grey, soft, moist
	☐	0			Silty Clay, greenish brown to green, stiff, moist
			▽		Gravelly Sand (SW) with fines, grey, loose, saturated subrounded gravels, sub angular sands
10					
	☒	509			Gravelly Clay (CL) greenish grey, soft, wet
	☒				
15					
	☒				

Total Depth of Boring = 16 feet

20

Notes:
Static water level at 9.30 feet bgs.
Borehole abandoned with neat cement grout.

LOG OF BORING B-20

Clayton GROUP SERVICES

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Warren Chamberlain
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					concrete
					Silty Clay (CL) reddish brown, soft, dry, rootlets
	☐	0			
	☐	0			
5	☐	0			
	☐	0			becomes moist color change to black
10	☐	1			
					color change to green
	☒	26			
					Clayey Gravel (GC) angular gravel in green clay matrix, dense/soft, saturated
	☒	372			
15	☒	501	▽		refusal at 15.5 feet bgs
20					

Total Depth of Boring = 15.5 feet

Notes:
Static water only at base of borehole.
Borehole abandoned with neat cement grout.

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LOG OF BORING B-21

Clayton GROUP SERVICES

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Matt Reimer
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					concrete
					Gravelly Clay (CL) light brown to dark grey, soft, dry
	☐	283			
	☐	585			
5					Silty Clay, ldark grey, soft, moist
	☐	530			Silty Clay, greenish brown to green, stiff, moist
					Gravelly Sand (SW) with fines, grey, loose, saturated subrounded gravels, sub angular sands
10					
					Gravelly Clay (CL) greenish grey, soft, wet
	☒				
	☒	541			
15					
	☒				
20					

Total Depth of Boring = 16 feet

Notes:
Hole collapsed at 12 feet bgs, no static water at this depth.
Borehole abandoned with neat cement grout.

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Clayton GROUP SERVICES

LOG OF BORING B-22

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Warren Chamberlain
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					concrete
					Silty Clay (CL) black, soft, dry, rootlets
	☐	15			
5					
	☐	40			
					becomes stiff
10	☐	63			
	☒	454			changes to green color
	☒				
15					changes to brown color
	☒	22			
					Total Depth of Boring = 16 feet
20					

Notes:
Dry hole.
Borehole abandoned with neat cement grout.

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Clayton GROUP SERVICES

LOG OF BORING B-23

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03
Date Completed	: 04/17/03
Hole Diameter	: 2-inch
Drilling Method	: Geoprobe
Sampling Method	: Macrocore
Driller	: ECA
Logged by	: Matt Reimer

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					concrete
					Gravelly Sand (SW) light brown, loose, dry
	☐	56			
5					
	☐	38			
10					
	☒	88			becomes green
	☒				becomes gravelly clay, green, medium stiff, dry
15	☒	531			Clay, green, stiff, dry
20					

Total Depth of Boring = 16 feet

Notes:
Dry hole, no water had entered borehole prior to abandonment.
Borehole abandoned with neat cement grout.

Clayton GROUP SERVICES

LOG OF BORING B-24

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Matt Reimer
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					concrete
					Gravelly Clay (CL) light brown, soft, dry
	☐	58			
5					Silty Clay, dark grey, soft , dry
	☐	57			
					Clay, dark grey, medium stiff, dry
10	☐	32			
	☒				
					Clay, green, stiff, dry
	☒				
15	☒	259			Clay, greenish brown, stiff, dry

Total Depth of Boring = 16 feet

20

Notes:
Dry hole, no water had entered borehole prior to abandonment.
Borehole abandoned with neat cement grout.

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Clayton GROUP SERVICES

LOG OF BORING B-25

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Warren Chamberlain
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					asphalt surface cover
					Silty Clay (CL) fdark brown, soft, dry
	☐	1			becomes moist, slightly more silty
5					
					becomes black, stiff clay
	☐	88			
					thin 3" sand stringer
	☐	461			becomes green clay, stiff
10					
	☒	197			becomes gravelly from 11 to 13 feet bgs
	☒	14			
15	☒	2			transistion to orange brown clay, very stiff
					Total Depth of Boring = 16 feet
20					

Notes:
Dry hole, no water had entered borehole prior to abandonment.
Borehole abandoned with neat cement grout.

LOG OF BORING B-26

Clayton GROUP SERVICES

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Warren Chamberlain
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					asphalt surface cover
					Gravelly Clay (CL) reddish brown, soft, dry, rootlets
					becomes silty clay at 2 feet bgs, brown, soft, dry
	☐	0			
5			▽		
					becomes moist, and black-brown
	☐	0			becomes greenish grey clay, stiff, moist
10	☐	0			
	☒	14.7			
					becomes gravelly from 12.5 to 14 feet bgs
	☒	208			
15	☒	127			
					Total Depth of Boring = 16 feet
20					

Notes:
Static water level at 5.67 feet bgs.
Borehole abandoned with neat cement grout.

Clayton GROUP SERVICES

LOG OF BORING B-27

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started	: 04/17/03	Driller	: ECA
Date Completed	: 04/17/03	Logged by	: Matt Reimer
Hole Diameter	: 2-inch		
Drilling Method	: Geoprobe		
Sampling Method	: Macrocore		

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					asphalt surface cover
					Gravelly Clay (CL) dark brown, soft, dry, rootlets
	☐	0			
5					
	☐ ☒	0			
10	☒		▽		
					becomes light grey clay, stiff, moist
	☒	437			
15					
20					

Total Depth of Boring = 12 feet

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Notes:
Static water level at 10.60 feet bgs.
Borehole abandoned with neat cement grout.

Clayton GROUP SERVICES

LOG OF BORING B-28

Green City Lofts LLC
Subsurface Investigation
1007 41st Street
Emeryville, California

Clayton Project No.: 70-03365.01

Date Started : 04/17/03
Date Completed : 04/17/03
Hole Diameter : 2-inch
Drilling Method : Geoprobe
Sampling Method : Macrocore

Driller : ECA
Logged by : Warren Chamberlain

Depth in FEET	Samples	OVA (ppm)	Water Levels	GRAPHIC	DESCRIPTION
0					asphalt surface cover
					Silty Clay (CL) dark brown, soft, dry, rootlets
	☐	41			
	☐	27			
5					Silty Sand (SM) brown, loose , saturated
			▽		
	☒	557			
	☒	782			
10					Gravelly Silty Clay (CL) green, stiff, moist
	☒	340			

Total Depth of Boring = 12 feet

15

20

Notes:
Static water level at 6.70 feet bgs.
Borehole abandoned with neat cement grout.

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ATTACHMENT 2

ANALYTICAL DATA SHEETS AND

CHAIN OF CUSTODY DOCUMENTATION

(NOT INCLUDED)

6920 Koll Center Parkway
Suite 216
Pleasanton, CA 94566
925.426.2600
Fax 925.426.0106

Clayton
GROUP SERVICES

December 23, 2002

Barney Chan
ALAMEDA COUNTY ENVIRONMENTAL HEALTH DEPARTMENT
1131 Harbor Bay Parkway
Alameda, CA 94502-6577

Clayton Project No. 70-03365.01

Subject: Predevelopment Investigation Report of the Former Dunne Paint Facility at 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, California

Dear Mr. Chan:

Clayton Group Services, Inc. (Clayton) is pleased to present our Predevelopment Investigation report for the above-referenced subject property. Enclosed are two copies of the report.

We appreciate the opportunity to be of service. If you have any questions, please contact us at (925) 426-2600.

Sincerely,

for
Jesse D. Edmands
Supervisor
Environmental Assessments
Environmental Services

John A. Rosso, P.E.
Director
Environmental Services

JDE/jde

Cc: Martin Samuels-Green City Lofts, LLC (2 copies)

Enclosure

S:\ES\PROJECTS\2003\03365 Green City\Predevelopment Invst\70-03365-01 rpt.doc

6920 Koll Center Parkway
Suite 216
Pleasanton, CA 94566
925.426.2600
Fax 925.426.0106

Clayton
GROUP SERVICES

Predevelopment Investigation

Former Dunne Paints 1007 41st Street Oakland/Emeryville and 4050 Adeline Street Emeryville, California

Clayton Project No. 70-03365.01
December 23, 2002

Prepared for:
GREEN CITY LOFTS, LLC
Emeryville, California

Prepared by:
CLAYTON GROUP SERVICES, INC.
6920 Koll Center Parkway
Suite 216
Pleasanton, California 94566
925-426-2600

Clayton GROUP SERVICES

Tables

Figures

Appendices

1.0 INTRODUCTION

Green City Lofts, LLC retained Clayton Group Services, Inc. (Clayton) to conduct a Predevelopment Investigation of the property located at 1007 41st Street in Oakland/Emeryville and 4050 Adeline Street in Emeryville, Alameda County, California (subject property). The subject property location and plan are depicted on Figures 1 and 2, respectively. Resumes for environmental professionals involved in this assessment are included in Appendix A.

1.1 PURPOSE

The purpose of the investigation was to provide an independent, professional opinion regarding the recognized environmental conditions (RECs) associated with the subject property identified during the performance of Clayton's Phase I ESA of the subject property (Clayton Project No. 70-03365.00; dated September 25, 2002). The Phase I ESA identified several RECs (as described in Section 1.4) at the subject property that were further assessed during this investigation. In addition, soil data was collected in order to facilitate the offsite disposal of excavated material in light of the proposed redevelopment. Furthermore, collected soil and groundwater data was used to evaluate potential human health risks following redevelopment.

1.2 METHODOLOGY

This investigation was performed under the conditions of, and in accordance with Clayton's Workplan dated October 30, 2002. The scope of work was approved by Barney Chan of the Alameda County Environmental Health Department (ACEHD). As a guideline, Clayton used ASTM Designation E 1903-97, *Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process*. This investigation included the following components:

- Work plan development
- Pre-field activities
- Field activities
- Laboratory analysis
- Data evaluation and report development

1.3 LIMITATIONS

The information and opinions expressed in this report are given in response to a limited assignment by Green City Lofts, LLC and should be considered and implemented only in light of that assignment. The services provided by Clayton in completing this project were consistent with normal standards of the profession. No other warranty, expressed or implied, is made.

1.4 BACKGROUND

The approximately 1-acre subject property currently consists of several interconnecting warehouse-type buildings that were constructed over time. Currently, the buildings are primarily used for commercial/live-work use or are otherwise vacant. The westernmost portions (about 9,500 square feet) consist of office and open warehouse space. The central and eastern portions contain multiple rooms/spaces that have been renovated for commercial/live-work use. Several small buildings are also located southeast of the main buildings. Total square footage of the buildings is reportedly 35,600-square feet. Asphalt-paved parking is present in the western portion, with concrete loading docks located along the southern portion (access from Adeline Street) and in the northern portion (access from 41st Street).

Historically, from at least 1903 to around 1952, the subject property was residentially developed in the central and western portions. From at least 1923 to around 1991, the eastern portions were developed with paint manufacturing buildings. Additional paint manufacturing facilities were added to the west after the residential structures were removed. Paint manufacturing activities were reportedly conducted onsite by Frank W. Dunne Company/Dunne Quality Paints during this time period. The locations of former paint manufacturing operations are shown on Figure 2. From 1991 to the present, the subject property has been used for the retail sale of paints, which reportedly ceased sometime in the mid-1990s, and residential and general warehouse purposes.

1.4.1 PLANNED REDEVELOPMENT SUMMARY

The subject property will be purchased and redeveloped in the near future with 5 buildings containing 62 loft-style residential condominiums. The height of these buildings will be between 3 and 5 stories (maximum height of around 75 feet). The proposed building elevation is shown on Figure 3. The existing buildings will be demolished and a virtually zero lot-line excavation of the underlying soil will be conducted in order to allow for an approximately 11-foot tall half-basement garage structure underneath the future buildings, resulting in approximately 12,000-cubic yards of excavated soil that will be disposed of offsite. The proposed excavation boundary is shown on Figure 4. This action will remove most of the contaminated material underlying the subject property. In addition, dewatering activities will most likely be conducted, as the planned excavation will encounter groundwater, which has historically been found to occur at depths of about 7 feet below ground surface (bgs). This dewatering action will also most likely remove a significant quantity of contaminated groundwater underneath the subject property. The basement structure and buildings will be constructed over a bentonite mat foundation, which will prevent groundwater intrusion into the structure. Furthermore, the basement garage will separate the overlying residential buildings from the underlying soil and will be naturally ventilated. This redevelopment has been approved by both the City of Oakland and the City of Emeryville.

1.4.2 ENVIRONMENTAL SUMMARY

Three main environmental investigations have been conducted in association with the subject property. These were conducted in 1988, 1992, and 1999 and included limited soil and groundwater sampling. In summation, these investigations were initially conducted in 1988 to investigate six underground storage tanks (USTs) containing paint thinner located under the northern sidewalk, and included 16 borings in and around the USTs. Two groundwater monitoring wells (MW-D1 and MW-D2) were installed in the UST backfill areas and groundwater samples were subsequently collected from 1988 to 1999. In 1992, six soil borings (B-1 through B-6) were advanced across the subject property. In 1999, two shallow soil borings (DV and DS) and a grab groundwater sampling point (HP-4) were advanced in the southern portion of the subject property. The results of these investigations are summarized in Clayton's Phase I ESA report dated September 25, 2002 as well as below.

Previous Soil Evaluation Activities

Frank W. Dunne Company/Dunne Paints Company operated the subject property from at least 1923 to 1991 for manufacturing of architectural coatings. Operations involved latex paint blending, varnish production, and solvent mixing primarily within the eastern and southern portions of the subject property. The operations included the use of 6 paint thinner USTs (the date of the installation of these USTs is not well understood), multiple aboveground storage tanks (ASTs), solvent mixing, and brick ovens for varnish production.

Soil evaluation activities commenced in 1988, with the collection of multiple soil samples from 16 soil borings advanced near the former paint thinner USTs in the northern sidewalk. Elevated concentrations of total petroleum hydrocarbons were detected quantified as mineral spirits (TPH-ms) were detected with a maximum concentration of 27,391 parts per million (ppm). The USTs along with about 60 cubic yards of contaminated soil were reportedly removed in 1988.

In 1992, six additional soil borings (B-1 through B-6) were advanced with samples collected and analyzed at 4 and 7 feet bgs, respectively, within several interior and exterior portions of the subject property. Analytical results indicated concentrations of TPH-ms in 5 of the 12 soil samples tested, with the highest concentration detected in B-6 (620 ppm) at a depth of 7 feet bgs within the former paint manufacturing building (eastern portion of the subject property). TPH odors and/or detectable concentrations were found in all six borings. No concentrations of other TPH compounds or benzene, toluene, ethylbenzene or xylenes (BTEX, collectively) were detected in the soil samples.

In 1999, two additional soil borings (DV and DS) were advanced near an in ground vent and within an exposed patch of soil in the southern portion of the subject property, within the former varnish production area. Elevated concentrations of metals including zinc (4,100 ppm), mercury (2,700 ppm), and lead (1,900 ppm) were discovered in near surface soil in the DS boring. In addition, up to 15,000 ppm of TPH-ms was detected in near surface soil in the DS boring. Geotechnical borings advanced on the subject property in 2000 have also revealed petroleum odors to between 5 and 15 feet bgs. In addition, odors were noted in soil during groundwater hydropunch sampling (HP-4).

In 1999, a soil vapor (flux chamber) sample was collected from the subject property in a room that was reportedly formerly used for solvent mixing. The soil vapor sample was analyzed for volatile organic compounds (VOCs). Concentrations of VOCs detected from the vapor sample collected on the subject property included methylene chloride, benzene, toluene, xylene, acetone, propanol, butanone, hexane, cyclohexane, ethanol, and TPH.

Through these soil investigations and geotechnical work, the presence of approximately 3 to 4 feet of fill of unknown origin and containing some debris, such as glass fragments, was found to exist at some locations at the subject property. The only soil samples collected within the reported fill material present at the subject property were the DV and DS samples at the surface, 2 and 3 feet bgs. The lateral and vertical extent of the fill was not investigated across the subject property.

The offsite disposal of excavated soil (reportedly around 12,000-cubic yards) will occur during the redevelopment activities planned for the subject property. Since this material was largely uncharacterized and the collected data indicates the presence of hazardous substances and petroleum products, special handling and soil disposal requirements will most likely apply. The lack of comprehensive soil data throughout the subject property was deemed to be of environmental concern.

Previous Groundwater Evaluation Activities

Groundwater quality was evaluated at 3 locations on and near the subject property as follows: two groundwater monitoring wells (MW-D1 and MW-D2) installed in two of the UST backfills (northern sidewalk area) and from a temporary well (HP-4) installed in the southern portion of the subject property, near former resin aboveground storage tanks (ASTs). The HP-4 location was sampled for TPH-ms only, and was found to contain TPH-ms at 570 parts per billion (ppb). The monitoring wells were sampled between 9 and 10 times, respectively, from 1988 to 1999, with the maximum concentration of analytes being total purgeable petroleum hydrocarbons (TPPH)-non gasoline at 6,200 ppb and TPH-ms found at 1,600 ppb discovered in MW-D2. These wells were also analyzed for chlorinated VOCs 2 or 3 times and no concentrations were detected. No other groundwater samples were collected at the subject property.

Groundwater levels were measured about 10 times in wells MW-D1 and MW-D2 in the UST backfill, as well as 7 other monitoring wells located in 41st Street and the northern adjoining O.N.E. Color Communications property and the eastern adjoining California Linens property, and groundwater was found to generally occur around 6 to 8 feet bgs.

The groundwater flow direction in this monitoring well network has been measured, and westerly and southwesterly groundwater flows have been reported.

Only one groundwater sample was collected at the subject property (HP-4 near the southern subject property), which was contaminated with 570 ppb of TPH-ms; the source of this contamination was unknown. Therefore, the downgradient and lateral extent of the groundwater contamination on the subject property did not appear to be well understood. Furthermore, other compounds were historically detected onsite and were not tested for comprehensively in soil or groundwater across the subject property. These include metals (primarily lead, mercury, and zinc), VOCs including methylene chloride, which were historically used onsite, and semi-VOCs (SVOCs).

Groundwater is expected to be encountered during the planned redevelopment activities and will be discharged offsite. In addition, dewatering activities beneath the future buildings are expected to occur based on the groundwater elevation. The lack of comprehensive groundwater characterization across the subject property was deemed to be of environmental concern.

Potential Onsite Source Areas

Based on review of previous environmental investigations and historical use of the subject property, it did not appear that all of the former onsite industrial use areas were thoroughly investigated. To date, the environmental investigations have focused on the six former paint thinner USTs in the northern sidewalk, which are not located on the subject property, as well as a paint thinner UST on the O.N.E. Color Communications and fuel USTs at California Linens as the only source of contamination.

Our review of the limited data does indicated that other potential source areas could be present, such as the solvent mixing room, where elevated concentrations of VOCs and TPH were detected in soil vapor (flux chamber) samples, the former paint manufacturing building where 620 ppm of TPH-ms was detected in a soil sample, and the former ASTs in the southern portion of the property where a groundwater sample revealed 570 ppb of TPH-ms. Also, only limited soil sampling has been conducted throughout the building and in the former varnish production area, which contains multiple sumps and drains, some of them still containing liquids. The shallow soil sample collected in the varnish production area showed significantly elevated concentrations of metals and TPH-ms. In addition, the area of the westernmost office/warehouse portion of the subject property was historically used for outdoor storage of miscellaneous materials and the soil or groundwater quality in this area has not been investigated (petroleum odors were noted in geotechnical borings advanced in this area).

In summary, there appear to be several historic use areas, which were not thoroughly investigated, including:

- Underground dispenser piping from the USTs and pump in the southern portion of the subject property.

* Former varnish production area in the southern portion of the subject property consisting of brick ovens, drains, sumps, and aboveground piping.

* Underground sewer systems, which may have received wastes, including the northern sump in the northern loading dock area and the drain in the southwestern corner of the parking lot.

* Former paint manufacturing building.

* Former solvent mixing room.

* Former outdoor AST area.

* Former office/warehouse building formerly used for outdoor storage of miscellaneous materials.

* The northern adjoining ONE property and the eastern adjoining California Linens property both have significant groundwater contamination issues and are located upgradient from the subject property. Contaminant plumes may have migrated underneath the subject property. In addition, the eastern adjoining warehouse was an appliance manufacturer in the late 1960s and it is unknown if chemical releases from this property have occurred.

REC Summary

The following RECs were identified during the Phase I ESA:

* With regards to the largely uncharacterized soil and groundwater quality at the subject property, Clayton recommended conducting a subsurface investigation to understand the nature and extent of soil and groundwater contamination on the subject property in coordination with the ACEHD.

* Redevelopment plans include the mass excavation of the subject property to depths of about 10.5 feet bgs, including excavation of 3 to 4 feet of fill of unknown origin and soil from below the groundwater surface. Insufficient soil data was collected to fully characterize the subsurface conditions. Clayton recommended comprehensively characterizing the soil to be excavated (including the fill material) across the entire subject property prior to excavation in order to allow for waste profiling, appropriate offsite disposal, and worker health and safety protection.

* To facilitate the construction of the proposed below grade structure, groundwater will be extracted and discharged. Long-term operation of the below grade basement structure may also generate contaminated groundwater. Groundwater water quality information should be collected to allow the discharge to be treated and permitted. In addition, offsite properties to the north and east are known to contain significant groundwater contamination that could be drawn on to the property during dewatering

activities. Clayton recommended collecting grab groundwater samples from the subject property's upgradient boundaries (northern and eastern) in order to evaluate the potential migration of contaminant plumes underneath the subject property and associated waste discharge requirements.

2.0 SCOPE OF WORK

The scope of work of this investigation involved assessing soil and groundwater underneath the subject property. The scope of work is described in detail below:

2.1 PRE-FIELD ACTIVITIES

A specific work plan was developed and submitted to the Alameda County Environmental Health Department (ACEHD). The work plan described Clayton's work objectives, including the proposed assessment activities, the field sampling plan, and laboratory analytical tests. Clayton interacted with Mr. Barney Chan of the ACEHD during the investigation, who approved the scope of work.

Prior to conducting the field activities, a health and safety plan specific to the work at the subject property was prepared. Clayton also marked the area to be assessed with white paint and contacted Underground Service Alert (USA) at least 48 hours prior to conducting the field activities. Clayton utilized a private utility locating service prior to conducting field activities. In addition, Clayton obtained a drilling permit from the Alameda County Department of Public Works (ACDPW).

2.2 FIELD ACTIVITIES

There are three primary purposes for performing this investigation:

1) Clayton evaluated soil conditions within the area to be excavated during redevelopment activities in order to appropriately characterize the soil for offsite disposal and for worker health & safety.

2) Clayton evaluated soil in potential source areas through discrete sampling.

3) Clayton gathered soil and groundwater data below the depth of the planned excavation for use in a health risk assessment (HRA) and to characterize environmental quality of the remaining subsurface following redevelopment.

On November 4 and 5, 2002, Jesse D. Edmands, Supervisor of Environmental Assessments and Erick Leif, Staff Environmental Consultant of Clayton, supervised the advancement of 16 borings (B-1 through B-16) at locations depicted on Figure 2. The borings were advanced using Geoprobe® direct push drilling equipment. Concrete coring was necessary at several locations, since the majority of the investigated areas were capped by concrete building foundations or concrete pavement.

A total of 16 borings were advanced within the following areas across the subject property as follows: former laboratory (B-1), former paint mill (B-2 and B-4), former solvent mixing room (B-3), near two outdoor sumps (B-5 and B-7), former varnish kitchen (B-6 and B-8), former UST dispenser and piping (B-10 and B-12, respectively), former resin ASTs (B-11), former latex paint blending room (B-9), historic outdoor storage area (B-13 and B-14) and at downgradient locations B-15 and B-16.

These areas were designed to investigate potential source areas on the subject property and to provide appropriate spacing for soil compositing. The borings were advanced both inside and outside of the current buildings to depths between 11 and 30 feet bgs.

2.2.1 Composite Soil Sampling

Clayton performed soil analyses on 4-point composite soil samples, which is required for characterizing appropriate disposal methods for waste material. The soil sample compositing was done according to sample depth and material horizon. Three soil samples were collected from each of the 16 borings as follows:

- One (1) soil sample was collected from the shallow vadose zone (sometimes containing fill) encountered from the ground surface to about 3 feet bgs;
- One (1) soil sample was collected from the vadose zone between the shallow/fill zone and the groundwater table from around 4 to 7 feet bgs;
- One (1) soil sample was collected from soil underneath the groundwater table from around 8 to 13 feet bgs.

These 48 soil samples were composited by the laboratory into 12, 4-point composite samples for analysis from four areas across the subject property as shown on Figure 4. The results of the composite soil sampling are provided in Appendix C.

2.2.2 Discrete Soil Sampling

Twenty six (26) soil samples from the borings were obtained in the areas of concern (*e.g.*, solvent mixing room, paint mill, latex blending room, varnish kitchen, sumps, UST dispenser and piping, resin ASTs, and historic area of outdoor storage) based on field observations (*e.g.*, odors, discoloration, chemical sheen). The discrete soil samples were collected from 3 to 25 feet bgs within 15 of the 16 borings as follows:

Boring ID	Sample Depth (feet bgs)
B-1	11
B-2	6 and 16
B-3	3 and 13

Boring ID	Sample Depth (feet bgs)
B-4	10
B-5	3 and 13
B-6	9
B-7	4, 12, and 23
B-8	5 and 17
B-9	6 and 14
B-10	6, 9, and 25
B-11	3, 10, and 16
B-12	3
B-13	14
B-14	3
B-16	3

*Discrete soil sampling locations are also depicted on Figures 6 and 7.

Clayton screened soil cores for lithology and physical evidence of contamination (*e.g.*, odors, discoloration, chemical sheen). Clayton also screened soil at approximately 2.0-foot intervals for ionizable substances using an organic vapor analyzer (OVA). A 6.0-inch long soil sample was cut from the acetate sample tube, sealed with Teflon tape, capped, labeled, and placed in a pre-chilled ice chest. Collected soil samples were then transported to a State of California-certified laboratory under formal chain-of-custody documentation.

2.2.3 Groundwater Sampling

The 16 borings were developed into temporary well points for collecting grab groundwater samples at each boring location. A temporary one-inch outer diameter PVC casing was installed into the open boreholes. The lower five feet of casing was slotted screen.

Sufficient groundwater was not encountered in 12 of the 16 borings due to the extensive presence of clay. Borings on the western end of the subject property (B-12, B-14, B-15, and B-16) contained some gravel and produced groundwater for sample collection. The other 12 locations lacking sufficient groundwater for sample collection were left open for 3 days following completion of the field activities, and groundwater failed to enter the 12 open boreholes during this period, some of which had been drilled to depths of 30 feet.

The grab groundwater samples from the 4 locations were collected using a disposable bailer, and transferred into appropriate laboratory supplied containers. The sample containers were sealed, labeled with identifying information and placed in a pre-chilled ice chest for transportation to the analytical laboratory under formal chain-of-custody documentation.

Once the fieldwork was complete, the PVC casing was removed and the borings were filled to the ground surface with cement grout. Waste generation during the fieldwork consisted of soil cuttings containerized in one 55-gallon drum and left onsite for future disposal pending receipt of the analytical results.

2.3 LABORATORY ANALYSIS

A total of 26 discrete soil samples and 4 grab groundwater samples were submitted for analysis under formal chain-of-custody documentation to McCampbell Analytical's State of California-certified laboratory in Pacheco, California. In addition, the 12 composite soil samples for waste characterization were submitted (see Appendix C). The analytical results are summarized in Tables 1 through 6. Copies of the certified analytical data sheets and chain-of-custody documentation are included in Appendix D.

2.3.1 Discrete Soil Analysis

The 26 discrete soil samples were analyzed using following United States Environmental Protection Agency (USEPA)-approved methods:

- USEPA Method 8015M for Total Petroleum Hydrocarbons in the gasoline range (TPH-g), diesel range (TPH-d), and motor oil range (TPH-mo)
- USEPA Method 8260 for Volatile Organic Compounds (VOCs), including benzene, toluene, ethylbenzene, and xylenes (BTEX, collectively) and methyl tertiary butyl ether (MTBE)

In addition, eleven discrete soil samples collected above 7 feet bgs were analyzed for the following:

- USEPA Method 6010 for California Assessment Manual (CAM) 17 total metals (CAM 17)

2.3.2 Groundwater Analysis

The 4 grab groundwater samples collected were analyzed using the following USEPA-approved methods:

- USEPA Method 8015M for TPH-g, -d, -mo
- USEPA Method 8260 for VOCs, including BTEX and MTBE

- USEPA Method 6010 for CAM 17 total metals. Samples were collected in unpreserved bottles and filtered by the laboratory prior to analysis.

- USEPA Method 9045/9040 for pH

3.0 PHYSICAL CHARACTERISTICS OF THE SUBJECT PROPERTY

This section discusses the surface and subsurface features of the subject property observed during this investigation.

3.1 SURFACE FEATURES

The subject property consists of warehouse-type buildings constructed on concrete foundations approximately 5-inches thick. An approximately 4-foot tall concrete loading dock is present in the northern portion, fronting 41st Street. A concrete driveway is located along the southern portion of the subject property, and upslopes to a higher elevation (approximately 2-feet) from the asphalt-paved parking lot in the western end of the subject property. Virtually the entire subject property is capped by asphalt, concrete pavement, or building foundations.

The areas around the subject property consist of industrial properties. The National Upholstery building is located immediately south of the subject property. Concrete sidewalks followed by Adeline and 41st Streets, both capped by asphalt, are located west and north of the subject property, respectively. Beyond Adeline Street is an elementary school and residences. Beyond 41st Street are residences and the O.N.E. Color Communications (former Boysen Paint) site. East of the subject property is an asphalt-paved parking lot followed by Linden Street, with the California Linens site beyond. A warehouse building is located immediately southeast of the subject property.

3.2 GEOLOGY/LITHOLOGY

Soil types encountered below the subject property generally consist of clayey fill material containing red bricks and sand from around 2 to 5 feet bgs in some places. Underlying the fill is dark gray clay. Increasing sand and gravel content components were observed in the western borings on the subject property, with some of these borings producing groundwater within the higher gravel content zones.

3.3 BORING OBSERVATIONS

Sixteen borings (B-1 through B-16) were advanced on the subject property at locations depicted on Figure 2. During logging of each soil boring, soil samples were thoroughly inspected for visual evidence of contamination. The evidence of petroleum staining, odors, and OVA readings are presented on the boring logs in Appendix B and on the geological cross section (Figure 8).

Boring B-1 was advanced in the northeastern corner of the subject property, within a former laboratory. Shallow refusal of the drilling equipment was encountered at 11 feet bgs. Green soil staining and a petroleum hydrocarbon odor were noted in soil from 8 to 11 feet bgs; OVA readings ranged from 0.0 to 3.1 ppm in this depth interval.

Boring B-2 was advanced in the former paint mill, south of Boring B-1. Petroleum hydrocarbon odors and black/green soil staining were noted throughout the 16-foot deep boring. OVA readings ranged from 24.2 to 151.6 ppm, with the highest readings over 100 ppm detected below 6.5 feet bgs.

Boring B-3 was advanced in the former solvent mixing room in the eastern portion of the subject property. Petroleum hydrocarbon odors and green/black soil staining was noted from 7 to 16 feet bgs, which was the total depth of the boring. OVA readings ranged from 0.0 to 13.9 ppm, with the 13.9 ppm reading occurring at around 12 feet bgs.

Boring B-4 was advanced in the former paint mill, west of Boring B-2. The upper soil (above 10 feet) in this boring contained no readily apparent petroleum hydrocarbon odors, stained soil, or OVA readings; soil below 10 feet contained some green soil staining and petroleum hydrocarbon odors to 16 feet bgs, which was the total depth of this boring. OVA readings were detected at around 10 and 12 feet bgs up to 55.3 ppm; no readings were detected at 14 and 16 feet bgs.

Boring B-5 was advanced in a former outdoor storage area and near a sump of unknown purpose, west of Boring B-3. No soil staining or readily apparent petroleum hydrocarbon odors were noted in soil from the surface to about 9 feet bgs; however, OVA readings revealed detections ranging from 3.9 to 19.1 ppm in this interval. Black and green soil staining was generally observed from 9 to 17 feet bgs, which was the total depth of B-5. OVA readings up to 162.2 ppm were detected below 9 feet.

Boring B-6 was advanced near the former varnish kitchen, southwest of Boring B-5. Reddish-brown fill material was noted in this boring to about 4 feet bgs. No petroleum hydrocarbon odors or staining was observed from the surface to around 9 feet; however, OVA readings revealed 2.4 to 6.2 ppm within this interval. Black and green soil staining and petroleum hydrocarbon odors were noted from 9 to 18 feet bgs with OVA readings up to 212.2 ppm in this interval.

Boring B-7 was advanced in the concrete driveway, near a sump just north of a suspected varnish kitchen. Soil with black and green soil staining as well as petroleum hydrocarbon odors were noted throughout this boring. OVA readings ranged from 14.4 to 55.7 ppm, with the highest detection recorded at 9 feet bgs. From about 22 to 30 feet bgs, which was the total depth of B-7, no soil staining or elevated OVA readings were observed.

Boring B-8 was advanced near an in-ground air vent within the former varnish kitchen area in the southern portion of the subject property. No petroleum hydrocarbon odors, soil staining, or elevated OVA readings were observed from the surface to about 8 feet bgs. From 8 to 17 feet bgs, which was the total depth of B-8, petroleum hydrocarbon odors along with green/black soil staining were noted from 14 to 17 feet. OVA readings from 8 to 17 feet bgs ranged from 18.3 to 156.9 ppm, with the highest readings recorded at 8 and 16 feet bgs, respectively.

Boring B-9 was advanced in the former latex paint blending room toward the central portion of the subject property. No soil staining or petroleum hydrocarbon odors were noted from the surface to about 8 feet bgs; OVA readings ranged from 3.1 to 9.1 ppm within this interval. Black soil staining and petroleum hydrocarbon odors were noted from about 8 to 10 feet bgs, with green soil staining and petroleum hydrocarbon odors noted from 10 to 15 feet bgs, where refusal of the drilling equipment prevented further advancement of this boring. Elevated OVA readings were observed at 11 (161.5 ppm) and 13 (115.3 ppm) feet bgs.

Boring B-10 was advanced near the former solvent UST pump located outside the south end of a central warehouse building on the subject property. No petroleum hydrocarbon odors were noted from 3 to about 6 feet bgs. Petroleum hydrocarbon odors and green/black soil staining were noted from about 6 to 22 feet bgs; OVA readings within this interval ranged from 0.0 to 139.6 ppm, with the highest concentration detected at 6 feet bgs. No odors, soil staining, or elevated OVA readings were noted from soil between 22 and 30 feet bgs, which was the total depth of B-10.

Boring B-11 was advanced in the concrete driveway within the former resin AST area along the southern subject property boundary, just southwest of B-10. Soil was not recovered from 0.5 to 1.5 feet bgs. Black and green soil staining and petroleum hydrocarbon odors were noted from 1.5 feet to 22 feet bgs. OVA readings ranged from 7.7 to 222.2 ppm within this interval, with the highest concentration observed around 7.5 feet bgs. No soil staining or petroleum hydrocarbon odors were noted in soil from 22 to 27 feet bgs, which was the total depth of B-11.

Boring B-12 was advanced within the northern portion of a warehouse, along the suspected former UST piping connecting the pump near B-10 to the former USTs in the northern sidewalk. Soil with no soil staining or petroleum hydrocarbon odors was noted from the surface to about 9 feet bgs. Soil from 9 to 17 feet bgs was stained black and green and contained petroleum hydrocarbon odors. OVA readings ranged from 14.8 to 206.8 ppm, with the highest concentration observed at 15 feet bgs, which was within groundwater, which was encountered around 14 feet in this boring. Groundwater collected from this boring also contained petroleum hydrocarbon odors and sheen. The total depth of B-12 was 17 feet bgs.

Boring B-13 was advanced just west of the concrete driveway in the western portion of the subject property. No petroleum hydrocarbon odors, soil staining, or elevated OVA readings were observed in soil to about 6 feet bgs. Soil from 6 to about 17.5 feet bgs contained black and green staining, petroleum odors, and OVA readings ranging from 10.9 to 50.4 ppm, with the highest reading observed at 15 feet bgs. Soil from below 17.5 feet to 30 feet bgs was free from staining, petroleum hydrocarbon odors, and elevated OVA readings.

Boring B-14 was advanced within the westernmost warehouse on the subject property. Fill was noted to about 5 feet bgs. No petroleum hydrocarbon odors, soil staining, or elevated OVA readings were noted from the surface to about 10 feet bgs. Beginning around 10 feet bgs, petroleum hydrocarbon odors were noted and an OVA reading of 107.4 ppm was observed, with green soil noted from around 13 to 17 feet bgs with an OVA reading of 47.1 ppm within this interval. The odors/soil staining corresponded to the approximate depth of groundwater encountered in this boring, which also contained a petroleum odor and sheen.

Boring B-15 was advanced in the northwest corner of the subject property in the asphalt-paved parking lot, near the intersection of 41st Street and Adeline Street. The sample underneath the asphalt to 3 feet was not recovered. No petroleum hydrocarbon odors, soil staining, or elevated OVA readings were observed from 3 to about 8 feet. Soil beyond 8 feet to 17 feet bgs contained petroleum hydrocarbon odors, with green soil noted from 10 to 17 feet bgs. An elevated OVA reading was observed at 11 feet (131.5 ppm). Groundwater was encountered around 11 feet bgs and corresponded with increasing gravel content, and groundwater contained a petroleum hydrocarbon odor and sheen.

Boring B-16 was advanced in the southwestern corner of the subject property in the asphalt-paved parking lot. No petroleum hydrocarbon odors, soil staining, or elevated OVA readings were observed from the surface to about 6 feet bgs. Soil beyond 6 feet contained petroleum hydrocarbon odors with green soil noted from 9 to 12 feet bgs. An elevated OVA reading was observed at 10 feet bgs at 74.4 ppm. Groundwater was encountered around 9 feet bgs, which corresponded with increasing gravel content, and groundwater contained a petroleum hydrocarbon odor and sheen.

3.3.1 Observation Summary

In general, petroleum hydrocarbon odor and staining was observed beginning around 6 feet bgs and extended to about 22 feet bgs, excluding B-10 and B-11, where petroleum hydrocarbon odors and staining were observed throughout the depth. Very little water bearing sediments, except for increased sand and gravel at some locations in the western portions of the subject property which produced sufficient groundwater for sample collection, were observed in the borings. The depth of the first evidence of contamination generally corresponds with the depth of groundwater at about 7 feet bgs, which had been historically observed in the general vicinity of the subject property.

4.0 ANALYTICAL RESULTS

4.1 SHALLOW VERSUS DEEP SOIL

The discrete soil sampling data is summarized in Tables 1 through 3 and presented below. The TPH-g and TPH-d data is also depicted on Figures 6 and 7. Figure 5 presents discrete TPH soil analytical data plotted as a function of sample depth. As seen on Figure 5, the analytical data defines three main zones, one with generally low concentrations above 7 feet, one with higher concentrations between 7 and 17 feet bgs, and another one with lower concentrations from 17 to 30 feet bgs. However, two areas with high concentrations in the shallow soil were discovered, and include B-10@6' (3,500 mg/kg of TPH-d) and B-11@3' (4,300 mg/kg of TPH-d), which are the highest concentrations of TPH in the diesel range detected during this investigation in the shallow soil.

In general, the shallow zone is characterized by low concentrations of petroleum hydrocarbons (excluding the concentrations detected at B-10 and B-11) below 250 mg/kg. The middle zone is generally characterized by higher concentrations above 250 mg/kg and corresponds to the area where groundwater was encountered in 4 of the borings and thought to occur across the site. The deeper zone is characterized by little or no concentrations of petroleum hydrocarbons.

Presented below are the general findings associated with this investigation. To aid in data interpretation, Figures 6 and 7 provide approximate contours of TPH constituents; the highest TPH concentration measured within the boring being represented (shallow or deep) is contoured. Please note that Figure 7 presents both soil and groundwater data in ppm.

4.1.1 TPH in Soil

The laboratory indicated that the TPH detected in soil closely resembled a mineral spirits signature falling in the TPH-g and TPH-d range. Excluding the two shallow soil samples from B-10@6' and B-11@3', the shallow soil above 7 feet bgs generally contained lower concentrations of TPH as compared to deeper soil below 7 feet bgs.

TPH as mineral spirits in the gasoline range was detected at concentrations ranging from <1.0 to 3,600 mg/kg in discrete soil sampled above 7 feet bgs. Only 4 of 11 soil samples above 7 feet bgs contained concentrations above 100 mg/kg, including B-10@6' (3,600 mg/kg), B-11@3' (2,500 mg/kg), B-7@4' (250 mg/kg), and B-8@5' (230 mg/kg).

Discrete soil sampled below 7 feet bgs contained TPH as mineral spirits in the gasoline range at concentrations ranging from <1.0 to 2,100 mg/kg. Eleven of 15 soil samples below 7 feet bgs contained concentrations above 100 mg/kg, including B-11@16' (2,100 mg/kg), B-11@10' (1,800 mg/kg), B-9@14' (530 mg/kg), B-6@9' (440 mg/kg), B-13@14' (400 mg/kg), B-10@9' (380 mg/kg), B-3@13' (250 mg/kg), B-2@16' (210 mg/kg), B-5@13' (180 mg/kg), B-7 @12' (130 mg/kg), and B-8@17' (130 mg/kg).

TPH as mineral spirits in the diesel range was detected at concentrations ranging from <1.0 to 4,300 mg/kg in discrete soil sampled above 7 feet bgs. Only 5 of 11 soil samples above 7 feet bgs contained concentrations above 100 mg/kg, including B-11@3' (4,300 mg/kg), B-10@6' (3,500 mg/kg), B-2@6' (160 mg/kg), B-8@5' (130 mg/kg), and B-7@4' (120 mg/kg).

Discrete soil sampled below 7 feet bgs contained TPH as mineral spirits in the diesel range at concentrations ranging from <1.0 to 720 mg/kg. Only 4 of 15 soil samples contained concentrations above 100 mg/kg, including B-11@10' (720 mg/kg), B-11@16' (510 mg/kg), B-10@9' (220 mg/kg), and B-13@14' (160 mg/kg).

TPH-mo was not detected in 22 of the 26 discrete soil samples. Concentrations were detected in B-7@4' (5.5 mg/kg), B-11@16' (51 mg/kg), B-14@3' (24 mg/kg), and B-16@3' (28 mg/kg).

Soil data from borings B-10 and B-11 reveal that these locations contain the highest concentrations of TPH contamination, with concentrations exceeding 1,000 mg/kg.

4.1.2 VOCs in Soil

VOCs were detected in less than half of the discrete soil samples analyzed (12 of the 26 discrete soil samples). The highest VOC concentration detected in soil was naphthalene at 14,000 micrograms per kilogram (µg/kg) in B-10@6', which also contained sec-Butyl benzene (550 µg/kg), ethylbenzene (1,000 µg/kg), isopropylbenzene (710 µg/kg), n-Propyl benzene (1,200 µg/kg), and 1,2,4-TMB (1,400 µg/kg).

The sample with the second highest VOC concentrations was B-11@3', which contained naphthalene (4,600 µg/kg), ethylbenzene (3,500 µg/kg), n-Propyl benzene (2,000 µg/kg), 1,2,4-TMB (8,600 µg/kg), 1,3,5-TMB (4,200 µg/kg), and xylenes (8,200 µg/kg). Deeper soil samples from B-11 at 10 and 16 feet contained only one VOC, naphthalene at 1,600 µg/kg and 3,200 µg/kg. The remaining concentrations of VOCs were below 750 µg/kg in the remaining 8 discrete soil samples containing VOC concentrations.

As with the TPH contamination, the highest concentrations of VOCs in soil were detected in Borings B-10 and B-11.

4.1.3 Metals in Soil

Eleven total metal analytes were detected above laboratory method detection limits in the 11 discrete soil samples analyzed from above 7 feet bgs. Soil below 7 feet bgs was not analyzed for metals. The concentration ranges, in addition to the sample identification for the highest detected metal ion, are listed below:

Arsenic	<2.5 to 16 mg/kg	(B-14@3')
Barium	75 to 260 mg/kg	(B-11@3')
Cadmium	<0.5 to 15 mg/kg	(B-11@3')
Chromium	9.1 to 51 mg/kg	(B-2@6')
Cobalt	4.8 to 29 mg/kg	(B-3@3')
Copper	13 to 56 mg/kg	(B-14@3')
Lead	4.2 to 280 mg/kg	(B-12@3')
Mercury	0.071 to 1.4 mg/kg	(B-14@3')

Nickel	6.3 to 74 mg/kg	(B-2@6')
Vanadium	25 to 34 mg/kg	(B-11@3')
Zinc	24 to 3,900 mg/kg	(B-11@3')

4.2 GROUNDWATER

Grab groundwater analytical results for B-12, B-14, B-15, and B-16 are summarized in Tables 9 through 11. Each of the 4 grab groundwater samples contained a petroleum hydrocarbon odor and sheen. The remaining 12 borings were left open for 3 days following the advancement of each boring and groundwater failed to enter the boring during this period. The analytical results are presented below.

4.2.1 TPH in Groundwater

The laboratory indicated that the TPH detected in groundwater closely resembled a mineral spirits signature falling in the TPH-g and TPH-d range. TPH as mineral spirits in the gasoline range was detected at 4,000 micrograms per liter (µg/L) or ppb in B-15, 9,200 µg/L in B-12, 170,000 µg/L in B-14, and 150,000 µg/L in B-16. TPH as mineral spirits in the diesel range were detected at 16,000 µg/L in B-15, 17,000 µg/L in B-12, 220,000 µg/L in B-14, and 1,200,000 µg/L in B-16 (which was the highest concentration of an analyte detected during this investigation). TPH-mo was detected at 260 µg/L in B-12 only.

This data shows that the western (downgradient) portion of the subject property is impacted by TPH.

4.2.2 VOCs in Groundwater

Low concentrations of VOCs were detected in each of the 4 grab groundwater samples collected. The highest VOC concentration was n-Propyl benzene at 210 µg/L in B-12, which contained the most VOC detections including benzene (63 µg/L), n-Butyl benzene (47 µg/L), sec-Butyl benzene (52 µg/L), ethylbenzene (21 µg/L), naphthalene (38 µg/L), toluene (13 µg/L), 1,2,4-TMB (6.5 µg/L), xylenes (26 µg/L), and isopropylbenzene (120 µg/L). B-14 contained naphthalene (30 µg/L), toluene (2.0 µg/L), carbon disulfide (1.5 µg/L), and DIPE (2.4 µg/L). B-15 and B-16 contained only one detection of tert-butyl benzene each at 5.3 µg/L and 6.4 µg/L, respectively.

4.2.3 Metals in Groundwater

Low concentrations of two of the 17 total metal analytes were detected in groundwater as follows: barium at 0.16 to 0.34 mg/L in all 4 samples and molybdenum at 0.07 mg/L in B-12.

4.2.4 Groundwater pH

Groundwater pH ranged from 6.86 to 6.92. Analytical results for pH are presented in Table 11.

4.3 HEALTH RISK ASSESSMENT

Ratech Resources prepared a health risk assessment (HRA) for the subject property (Appendix D). The HRA was performed under a residential scenario, which is appropriate since the proposed future use of the subject property is residential condominiums. Soil at this site will be excavated to a depth of about 10.5 feet bgs. Therefore, soil data below the proposed basement excavation and groundwater data were considered for this HRA. Naphthalene was the only VOC detected in soil below 10.5 feet bgs and the only carcinogenic VOC detected in groundwater was benzene. As indicated in the HRA report, there will be no direct exposure pathways to soil or groundwater at the subject property following redevelopment, since material above 10.5 feet will be removed and a foundation and surface cap will eliminate all direct contact exposure pathways. Therefore, the only potentially complete exposure pathway remaining is likely to be exposure to VOCs in indoor air. TPH is not considered by the USEPA or by Cal/EPA to pose a threat to public health, and was therefore not evaluated in this HRA. Inhalation of VOCs in indoor air as the sole exposure route was evaluated using maximum concentrations in soil and groundwater as a health protective measure. The results indicated that the calculated risk levels of VOCs in indoor air did not exceed *de minimus* levels and therefore did not pose a risk to human health.

5.0 CONCLUSIONS

The subject property is underlain by very low permeability clay. Across most of the subject property, petroleum hydrocarbon odors and staining was generally not present above the water table (above about 7 feet bgs), though petroleum hydrocarbon odor and staining were observed in some locations, such as B-10 and B-11. The vertical and lateral extent of the TPH soil contamination at the subject property has been adequately defined. The vertical distribution of TPH has been defined to low to non-detectable levels in most locations. Excluding soil from B-10 and B-11, the soil above 7-feet bgs contains lower concentrations of TPH. The majority of the contamination was encountered between 7 and 17 feet bgs, which correspond to the elevation of groundwater. TPH concentrations decrease sharply between 14 and 22 feet at the locations sampled and significant impacts do not appear to extend beyond 25 feet.

Excluding B-10 and B-11, there is a lack of significant VOC contamination in soil at the subject property. For example, no benzene was detected in any soil sample. In addition, only one VOC, which was naphthalene, was detected in deeper soil to remain following the planned excavation project. Although elevated concentrations of metals were detected in soil above 7 feet bgs, this material will be excavated during future redevelopment.

Since the proposed redevelopment will result in the mass excavation of about 12,000-cubic yards of soil, which will include all soil above 7 feet bgs, a large portion of contaminated soil, including areas with high soil concentrations of TPH (*i.e.*, B-10 and B-11), will be removed from the subject property. Therefore, any residual potential source areas that may be present will most likely be excavated and removed following redevelopment.

Due to the extensive presence of low permeability clay in the subsurface, very little groundwater was present across the subject property. The subsurface sediments produced groundwater at only 4 of the 16 locations, which were primarily located in the western portion (downgradient) of the subject property. Groundwater at the 4 locations sampled is impacted by TPH, and based on the soil data collected from across the subject property, it is assumed that groundwater underlying the remainder of the subject property is also impacted. Again, groundwater in the areas tested confirms that the subsurface is not significantly impacted by VOCs or metals. The extent of the petroleum hydrocarbon groundwater contamination at the subject property appears to extend offsite to the west and possibly to the south. The full extent of groundwater impacts is unknown. Furthermore, the impacts from offsite releases is unclear; however, the environmental quality of the subsurface materials at the subject property are well understood.

Given the lack of groundwater encountered in 12 of the 16 borings due to the extensive presence of low permeability clay at the subject property, it does not appear that the contamination present in groundwater will migrate significantly. In addition, future dewatering activities will most likely result in the removal of a significant quantity of TPH impacted groundwater in the western portion of the subject property.

Based on the results of the HRA, there does not appear to be a threat to human health at the subject property, since naphthalene was the only VOC detected in soil below 10.5 feet and the concentration detected coupled with the proposed development scenario was not determined to pose a health risk, especially since naphthalene is not a carcinogen. Furthermore, the only carcinogen detected in groundwater was benzene, and was determined not to be at a concentration that would pose a risk to human health.

Following excavation and dewatering of the subject property for the construction of the proposed project, it appears that no further remedial action is necessary by the subject property owner. Furthermore, the residual contamination that may remain has been shown not to present a risk to human health and this site should be acceptable for risk-based closure.

This report prepared by:

Jesse D. Edmands
Supervisor
Environmental Assessments
Environmental Services

This report reviewed by:

John A. Rosso, P.E.
Director
Environmental Services

December 23, 2002
Clayton Project No. 70-03365.01

TABLES

TABLE 1

Summary of Discrete Soil Sample Analytical Results - TPH
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	TPH-g (mg/kg)	TPH-d (mg/kg)	TPH-mo (mg/kg)
B-1@11'	<1.0	<1.0	<1.0
B-2@6'	94[e]	160[n]	<1.0
B-2@16'	210[e,m]	13[n]	<1.0
B-3@3'	<1.0	<1.0	<1.0
B-3@13'	250[e,m]	37[n]	<1.0
B-4@10'	74[e]	52[n]	<1.0
B-5@3'	<1.0	<1.0	<1.0
B-5@13'	180[e,m]	21[n]	<1.0
B-6@9'	440[e]	38[n]	<1.0
B-7@4'	250[e]	120[n]	5.5
B-7@12'	130[e]	76[n]	<1.0
B-7@23'	18[e]	7.0[n]	<1.0
B-8@5'	230[e,m]	130[n]	<1.0
B-8@17'	130[e,m]	40[n]	<1.0
B-9@6'	6.2[e]	4.8[n]	<1.0
B-9@14'	530[e,m]	100[n]	<1.0
B-10@6'	3,600[e]	3,500[n]	<25
B-10@9'	380[e]	220[n]	<1.0
B-10@25'	<1.0	1.1[b]	<1.0
B-11@3'	2,500[e]	4,300[n]	<500
B-11@10'	1,800[e]	720[n]	<100
B-11@16'	2,100[e]	510[n]	51
B-12@3'	<1.0	1.6[b]	<1.0
B-13@14'	400[e]	160[n]	<1.0
B-14@3'	<1.0	9.4[g]	24
B-16@3'	7.4[e]	6.0[d,g]	28

Notes:
<# = analyte not detected at or above the indicated laboratory method reporting limit
mg/kg = milligrams per kilogram
Sampling date: November 4 and 5, 2002
TPH-g, -d, -mo = Total petroleum hydrocarbons quantified as gasoline, diesel, motor oil, respectively
b = diesel range compounds are significant; no recognizable pattern
e = TPH pattern that does not appear to be derived from gasoline (stoddard solvent/mineral spirit?)
g = oil range compounds are significant
m = no recognizable pattern
n = stoddard solvent/mineral spirit

TABLE 2

Summary of Discrete Soil Sample Analytical Results - VOCs
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	Naphthalene (µg/kg)	n-Butly benzene (µg/kg)	sec-Butyl benzene (µg/kg)	tert-Butyl benzene (µg/kg)	Ethylbenzene (µg/kg)	Isopropylbenzene (µg/kg)	n-Propyl benzene (µg/kg)	Hexachlorobutadiene (µg/kg)	1,2,4-Trimethylbenzene (µg/kg)	1,3,5-Trimethylbenzene (µg/kg)	Xylenes (µg/kg)
B-1@11'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-2@6'	25	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
B-2@16'	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
B-3@3'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-3@13'	480	<100	110	<100	<100	<100	<100	<100	740	<100	<100
B-4@10'	<50	50	<50	<50	<50	<50	<50	92	<50	<50	<50
B-5@3'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-5@13'	410	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
B-6@9'	81	<5.0	<5.0	6.3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-7@4'	<5.0	<5.0	17.0	<5.0	<5.0	<5.0	9.1	<5.0	7.4	<5.0	<5.0
B-7@12'	60	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-7@23'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-8@5'	<5.0	<5.0	<5.0	27.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-8@17'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-9@6'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-9@14'	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
B-10@6'	14,000	<400	550	<400	1,000	710	1,200	<400	1,400	<400	<400
B-10@9'	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
B-10@25'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-11@3'	4,600	<2000	<2000	<2000	3,500	<2000	2,000	<2000	8,600	4,200	8,200
B-11@10'	1600	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500
B-11@16'	3200	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
B-12@3'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-13@14'	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
B-14@3'	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
B-16@3'	12	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:
No other VOCs detected in addition to the above-listed analytes
<# = analyte not detected at or above the laboratory method reporting limit
µg/kg = micrograms per kilogram
Sampling date November 4 and 5, 2002
VOCs = Volitile Organic Compounds

TABLE 3

Summary of Discrete Soil Sample Analytical Results - Total Metals
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)	Mercury (mg/kg)
B-2@6'	<2.5	5.9	110	<0.5	<0.5	51	10	16	7.3	<2.0	74	<2.5	<1.0	<2.5	30	47	<0.06
B-3@3'	<2.5	2.9	130	<0.5	<0.5	35	29	21	15	<2.0	48	<2 5	<1.0	<2.5	32	67	0.071
B-5@3'	<2.5	6.1	160	<0.5	0.58	34	13	22	24	<2.0	50	<2.5	<1.0	<2.5	32	64	0.079
B-7@4'	<2.5	2.6	98	<0.5	0.51	29	9.6	21	24	<2.0	39	<2.5	<1.0	<2.5	26	59	0.14
B-8@5'	<2.5	<2.5	140	<0 5	<0.5	20	4.8	13	3	<2.0	21	<2.5	<1.0	<2.5	20	24	<0.06
B-9@6'	<2.5	5.5	120	<0.5	<0.5	31	6.7	16	6.7	<2.0	41	<2.5	<1.0	<2.5	30	49	<0.06
B-10@6'	<2.5	3.8	110	<0.5	<0.5	31	8.5	18	6.1	<2.0	42	<2.5	<1.0	<2.5	28	55	<0.06
B-11@3'	<2.5	5.5	260	<0.5	15.0	31	15	27	100	<2.0	43	<2.5	<1.0	<2.5	34	3900	0.17
B-12@3'	<2.5	4.2	130	<0.5	<0.5	29	9.2	17	280	<2.0	41	<2.5	<1.0	<2.5	27	160	0.28
B-14@3'	<2.5	16	75	<0.5	3.3	9.2	7.9	56	130	<2.0	6.3	<2.5	<1.0	<2.5	25	300	1.4
B-16@3'	<2.5	4.5	120	<0.5	<0.5	30	10	18	5	<2.0	44	<2.5	<1 0	<2.5	25	50	<0.06

Notes:
<# = analyte not detected at or above the indicated laboratory method reporting limit
mg/kg = milligrams per kilogram
Sampling date: November 4 and 5, 2002

TABLE 4

Summary of Groundwater Sample Analytical Results - TPH and Total Metals
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	TPH-g (µg/L)	TPH-d (µg/L)	TPH-mo (µg/L)	METALS Barium (mg/L)	METALS Molybdenum (mg/L)
B-12	**9,200**[a,e,h,I]	**17,000**[n,h,I]	**260**	**0.16**	**0.07**
B-14	**170,000**[e.h]	**220,000**[n,h]	<25,000	**0.17**	<0.05
B-15	**4,000**[e,h,I]	**16,000**[n,h,I]	<250	**0.17**	<0.05
B-16	**150,000**[g,m,h,I]	**1,200,000**[n,I]	<25,000	**0.34**	<0.05

<u>**Notes:**</u>
<# = analyte not detected at or above the laboratory method reporting limit
mg/L = milligrams per Liter
µg/L = micrograms per Liter
Sampling date: November 4 and 5, 2002
TPH = total petroleum hydrocarbons quantified as gasoline (TPH-g), diesel (TPH-d), and motor oil (TPH-mo)
Metals = CAM 17 total metals
a = unmodified or weakly modified gasoline is significant
e = TPH pattern that does not appear to be derived from gasoline
g = strongly aged gasoline or diesel range compounds are significant
m = no recognizable pattern
n = stoddard solvent/mineral spirit
h = lighter than water immiscible sheen/product is present
I = liquid sample that contains greater than 2 vol.% sediment

TABLE 5

Summary of Groundwater Sample Analytical Results - VOCs
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	Benzene (µg/L)	n-Butyl benzene (µg/L)	sec-Butyl benzene (µg/L)	tert-Butyl benzene (µg/L)	Ethylbenzene (µg/L)	Naphthalene (µg/L)	Toluene (µg/L)	1,2,4-Trimethylbenzene (µg/L)
B-12	**63**	**47**	**52**	<5.0	**21**	**38**	**13**	**6.5**
B-14	<1.0	<1.0	<1.0	<1.0	<1.0	**30**	**2.0**	<1.0
B-15	<5.0	<5.0	<5.0	**5.3**	<5.0	<5.0	<5.0	<5.0
B-16	<2.5	<2.5	<2.5	**6.4**	<2.5	<2.5	<2.5	<2.5

SAMPLE ID	Xylenes (µg/L)	Isopropylbenzene (µg/L)	n-Propyl benzene (µg/L)	Carbon Disulfide (µg/L)	DIPE (µg/L)
B-12	**26**	**120**	**210**	<5.0	<5.0
B-14	<1.0	<1.0	<1.0	**1.5**	**2.4**
B-15	<5.0	<5.0	<5.0	<5.0	<5.0
B-16	<2.5	<2.5	<2.5	<2.5	<2.5

Notes:
<# = analyte not detected at or above the laboratory method reporting limit
µg/L = micrograms per Liter
Sampling date: November 4 and 5, 2002
VOCs = Volatile organic compounds

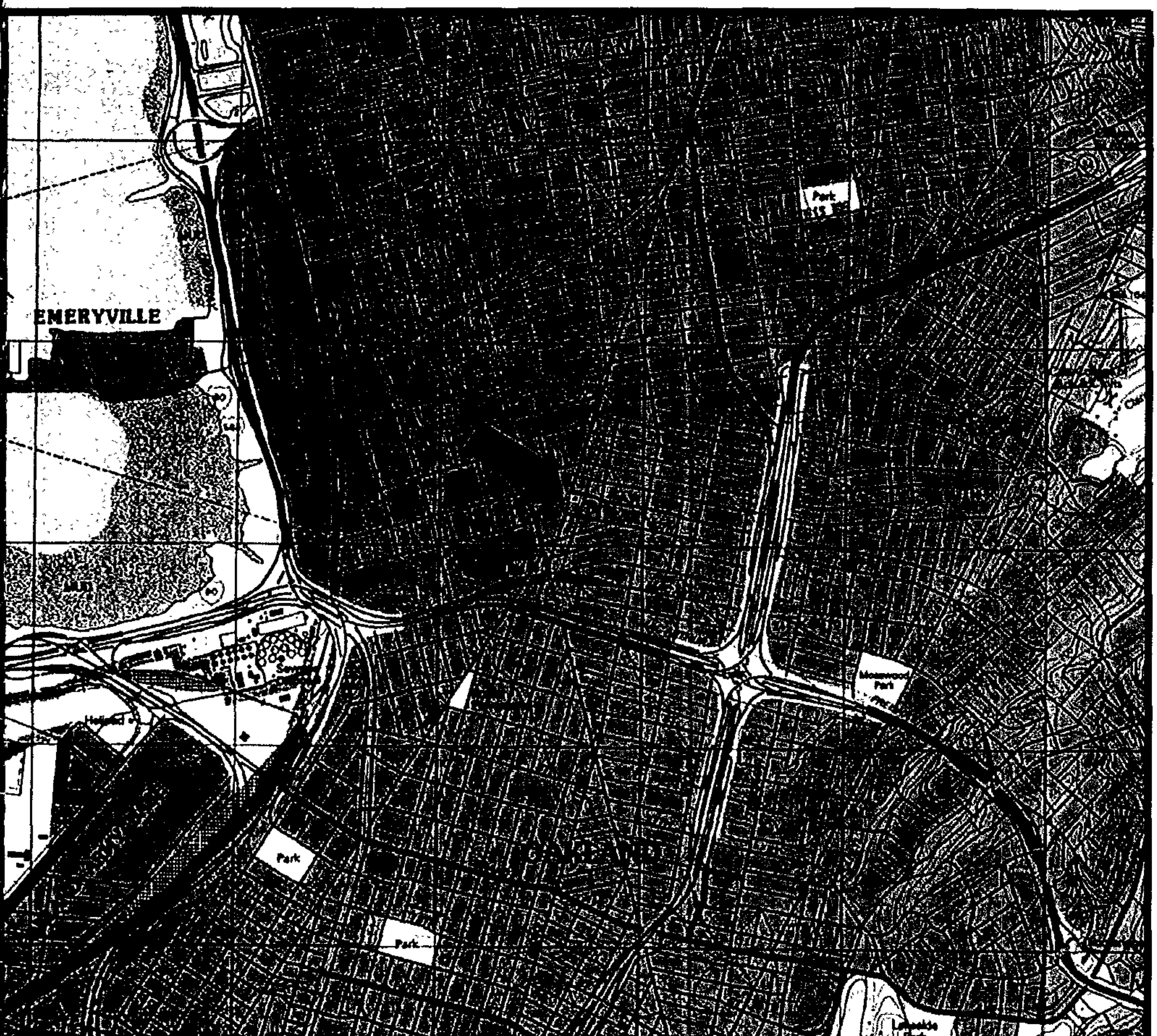
TABLE 6

Summary of Groundwater Sample Analytical Results - pH
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	pH
B-12	6.86 @ 19.1°C
B-14	6.91 @ 19.2°C
B-15	6.92 @ 18.6°C
B-16	6.72 @ 18.0°C

Notes:
Sampling date: November 4 and 5, 2002

FIGURES



Map Source: TOPO! © 2000 National Geographic Holdings

Note: Boundaries and Location Information is Approximate

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

Portion of the 7.5-Minute Series Oakland West, California
Quadrangle Topographic Map (Datum: NAD 27)
United States Department of the Interior
Geological Survey
1997

N

PROPERTY LOCATION MAP
1007 41st Street
Emeryville/Oakland, California and
4050 Adeline Street
Emeryville, California
Clayton Project No. 70-03365.00

Figure

1

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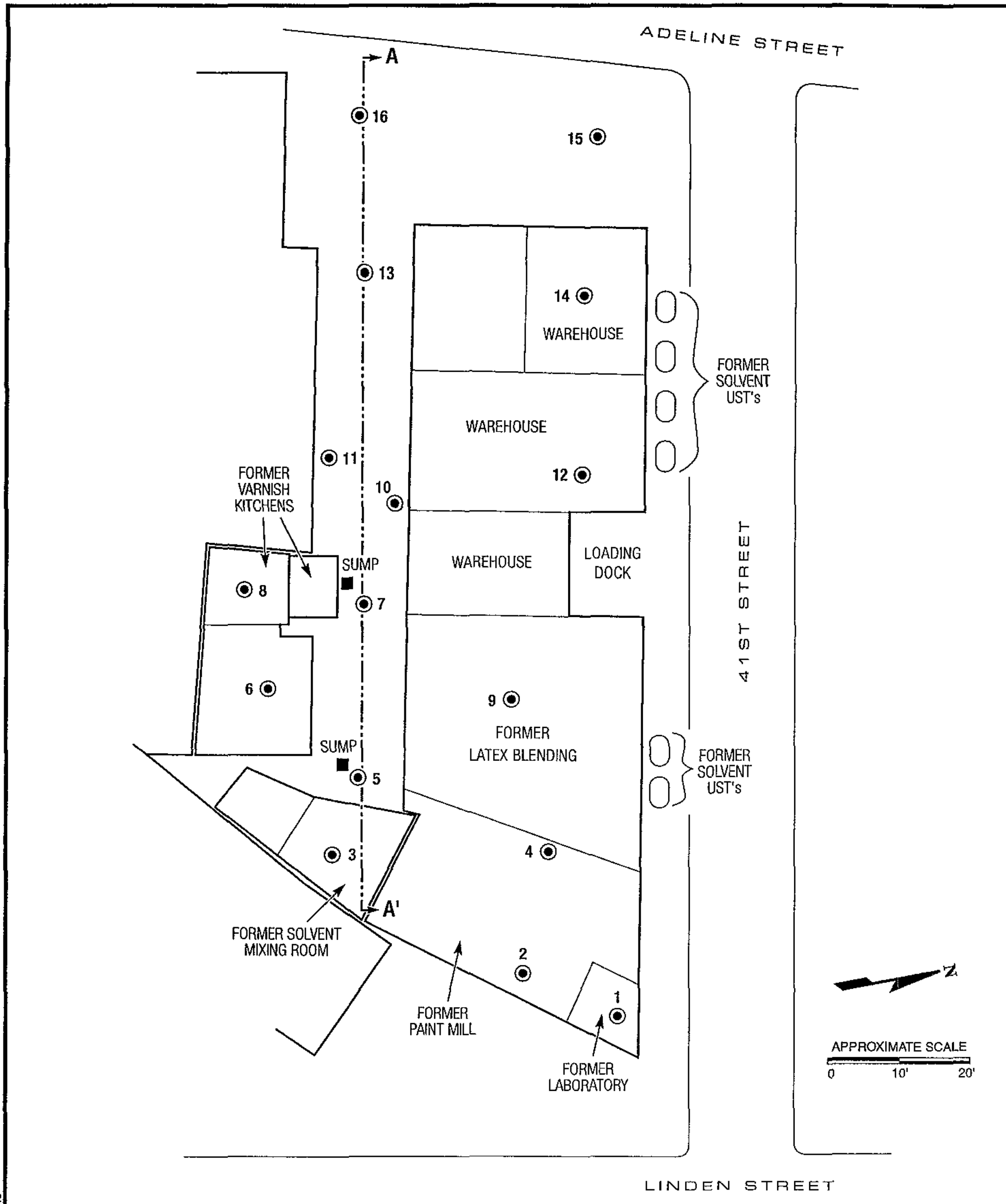


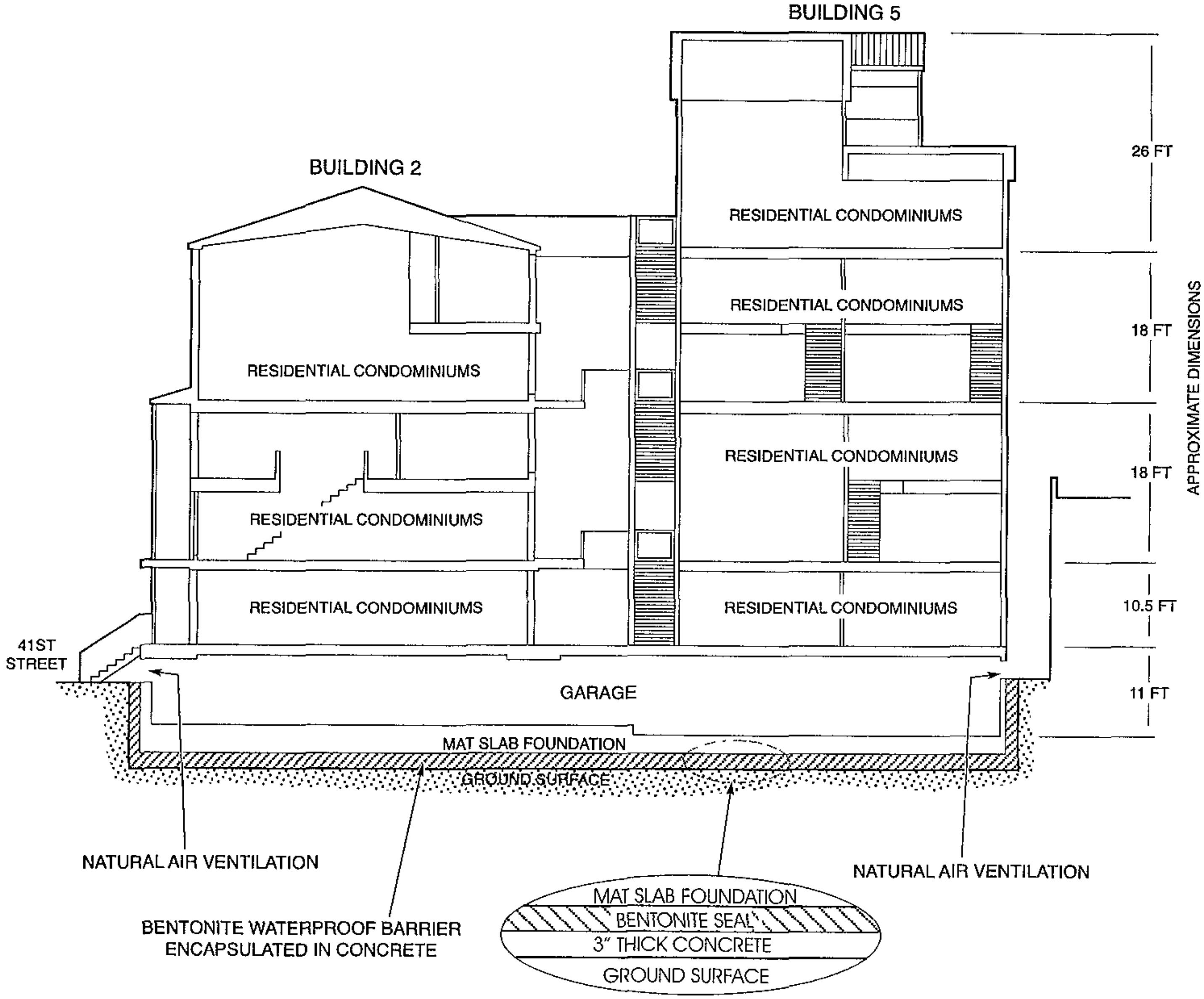
70-03365.01/TechGraphic

LEGEND	SITE PLAN WITH BORING LOCATIONS AND SHOWING SECTION A-A'
◉ Boring Location	Former Dunne Paints 1007 41st Street, Oakland and 4050 Adeline Street, Emeryville, California Clayton Project No.: 70-03365.01

Figure 2

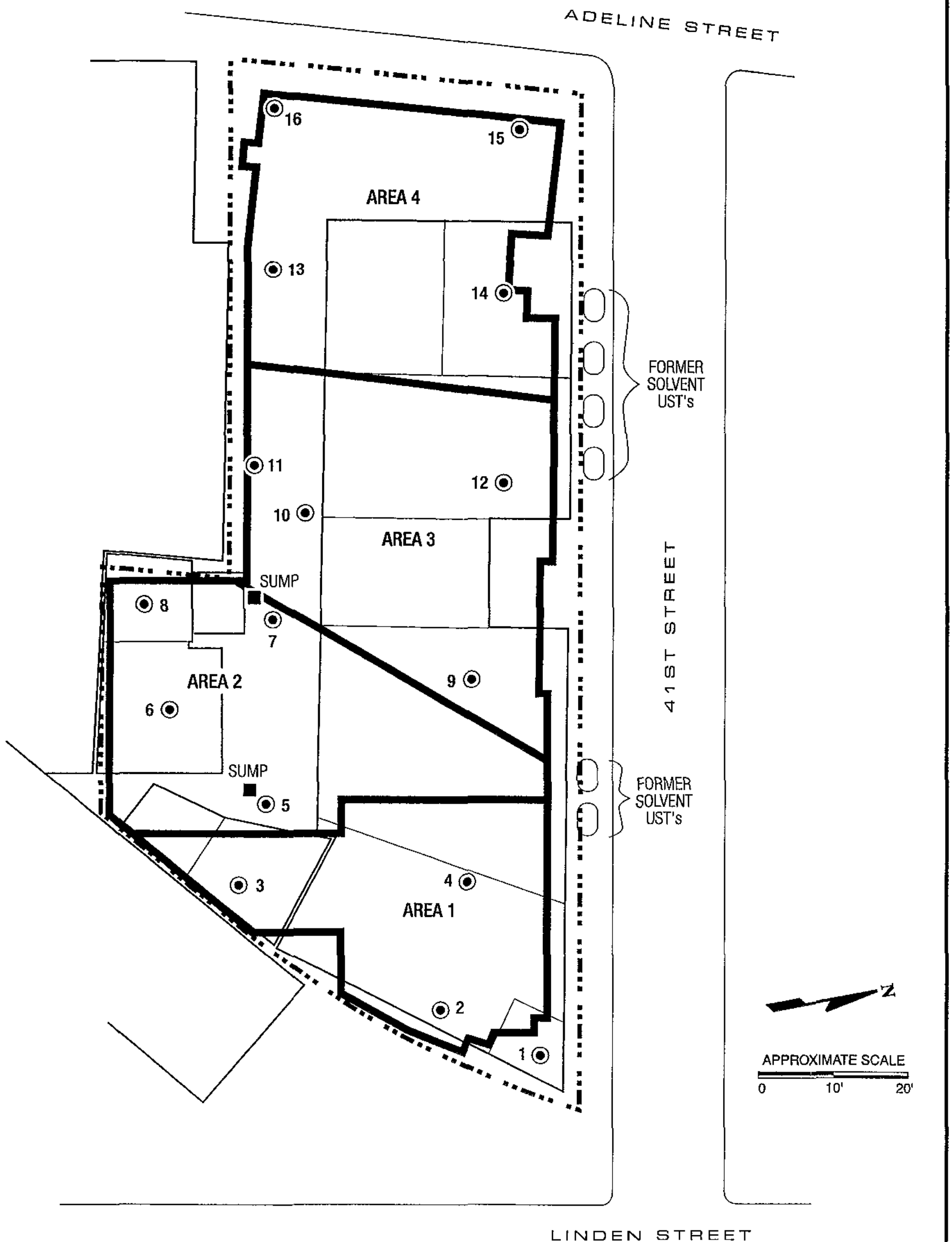
12/11/02

Clayton GROUP SERVICES



PROPOSED BUILDING ELEVATION 1007 41ST Street and 4050 Adeline Street Oakland/Emeryville, California Clayton Project No.: 70-03365.01	Figure 3 12/11/02	Clayton GROUP SERVICES

70-03365.01/TechGraphic



LEGEND	
·· ··· ▬▬	Property Boundary
▬▬▬	Excavation Boundary

SITE PLAN SHOWING THE EXCAVATION AREA
Former Dunne Paints
1007 41st Street, Oakland and
4050 Adeline Street, Emeryville, California
Clayton Project No.: 70-03365.01

Figure 4

12/11/02

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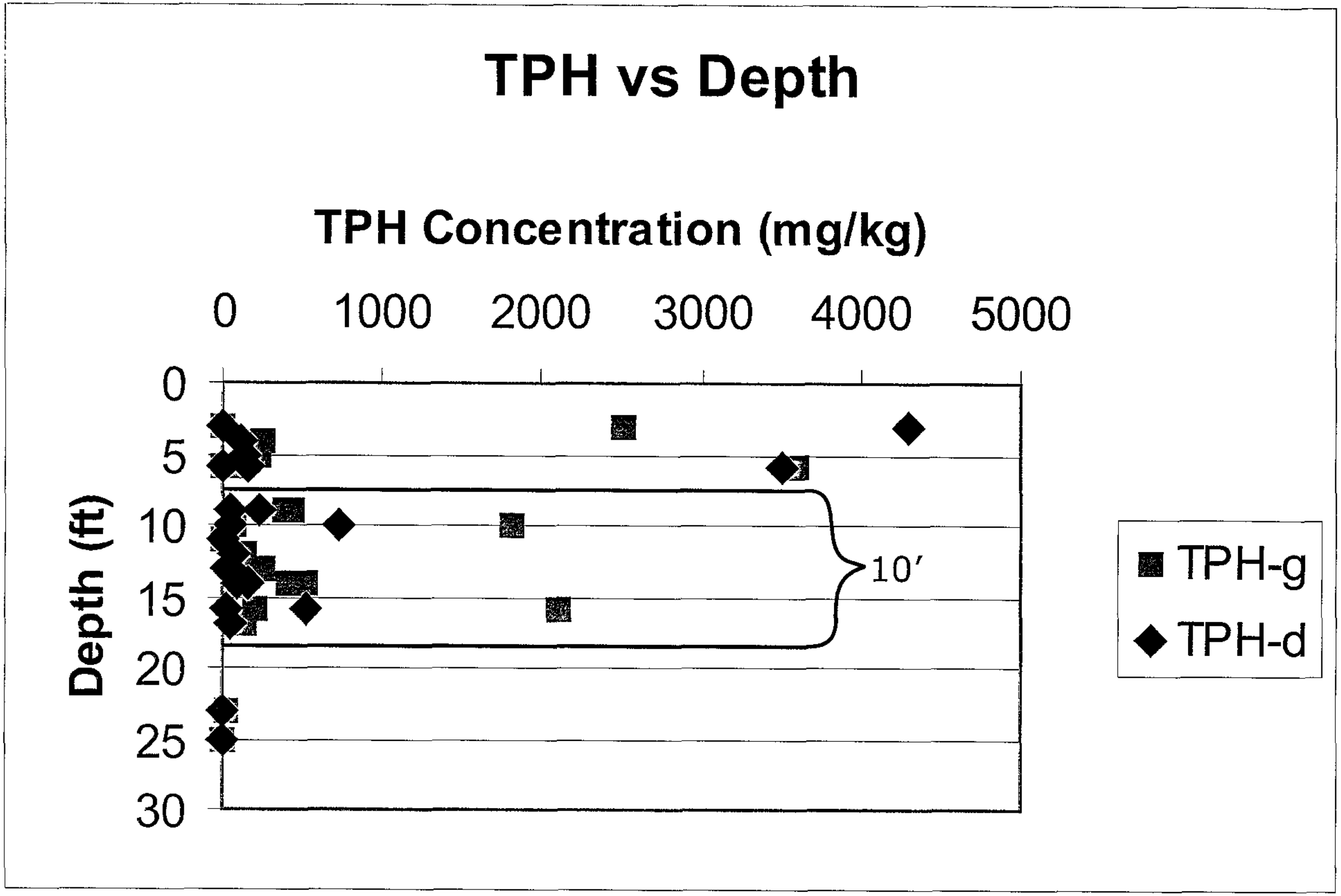
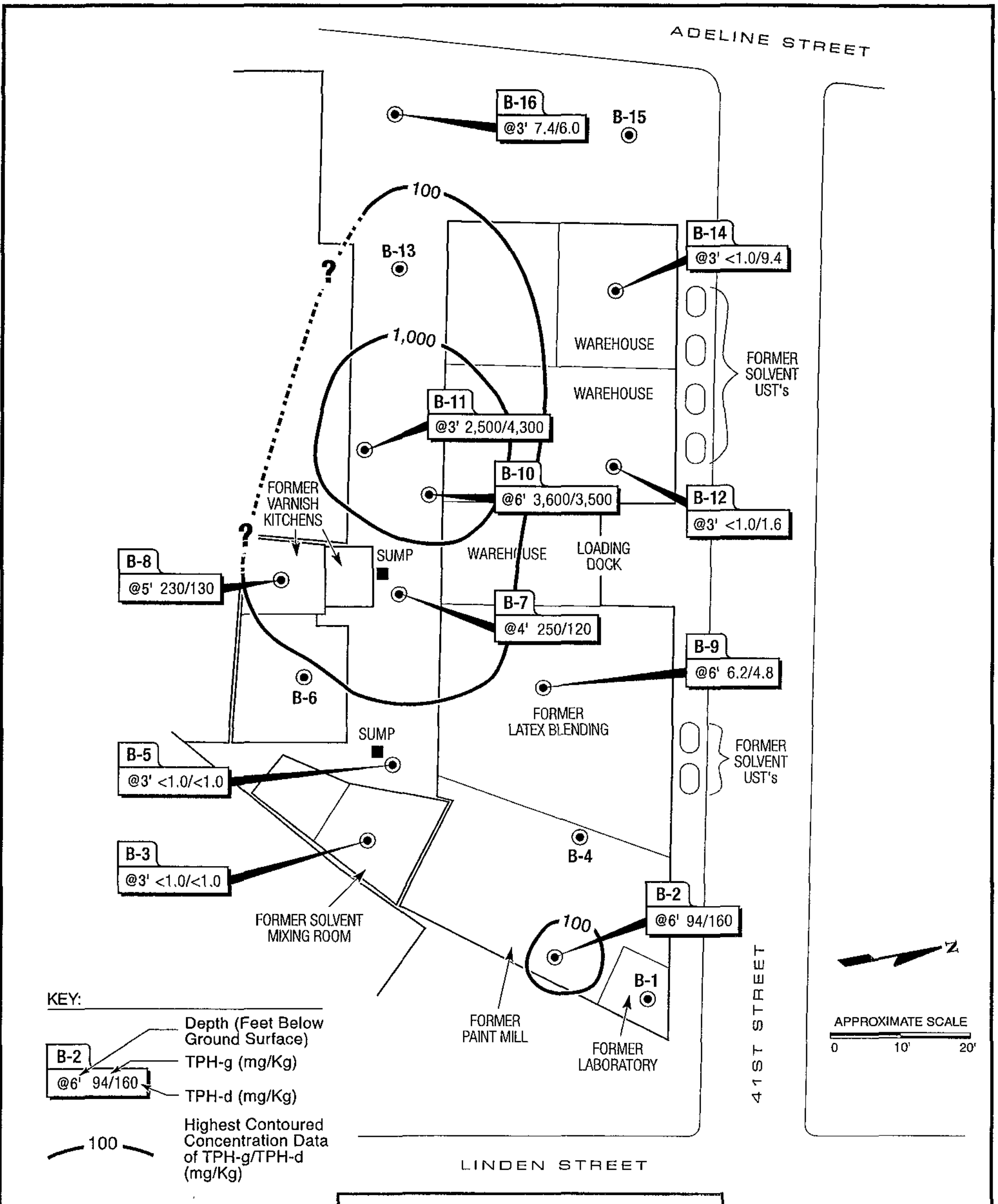
70-03365.01/TechGraphic



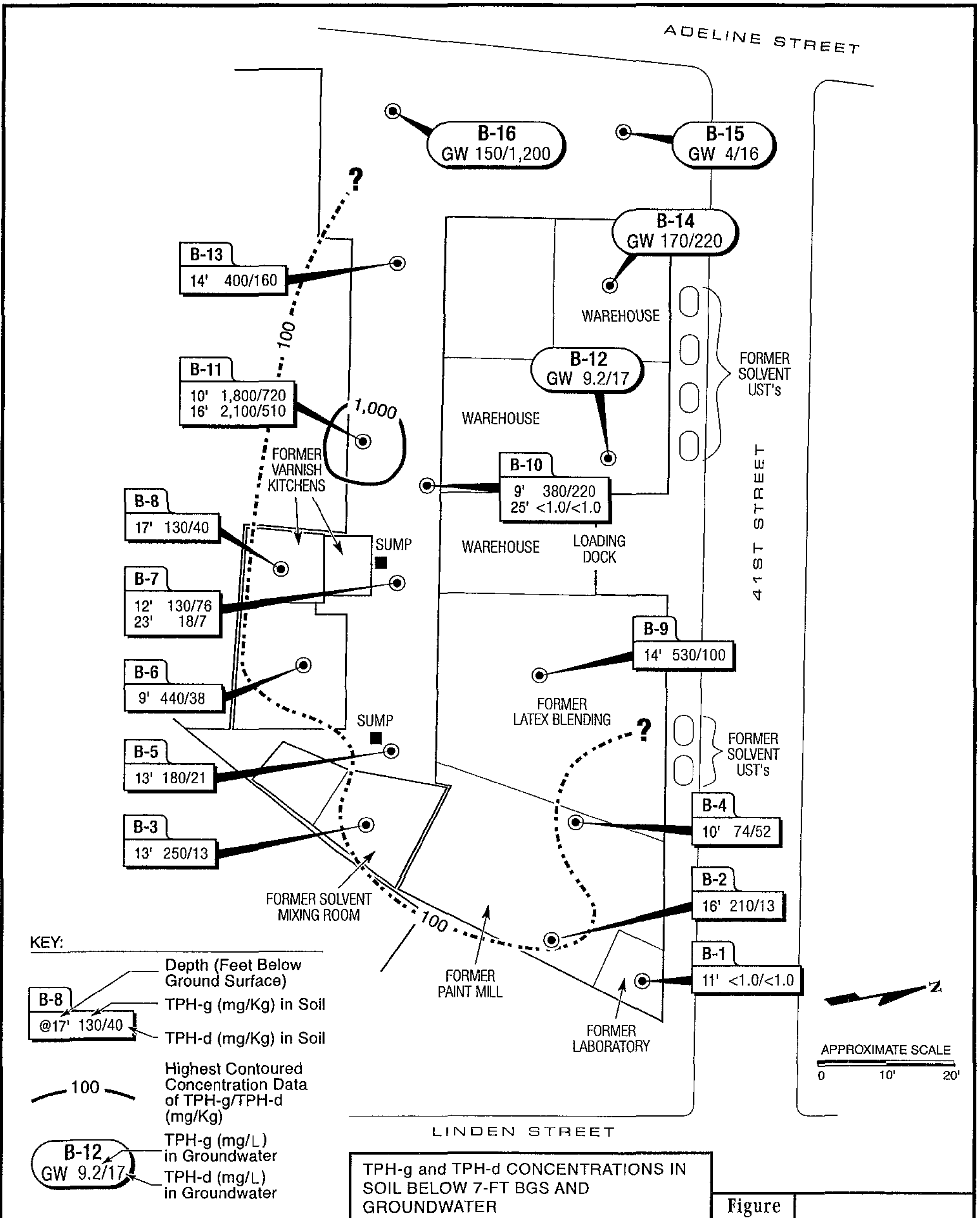
TPH vs DEPTH PLOT	FIGURE	
Former Dunne Paints 1007 41st Street, Oakland and 4050 Adeline Street Emeryville, California Clayton Project No. 70-03365.01	5	Clayton GROUP SERVICES



LEGEND		
◉ Boring Location	TPH-g and TPH-d CONCENTRATIONS ABOVE 7-FT BGS IN SOIL Former Dunne Paints 1007 41st Street, Oakland and 4050 Adeline Street, Emeryville, California Clayton Project No.: 70-03365.01	Figure 6 12/11/02

Clayton GROUP SERVICES

70-03365.01/TechGraphic



TPH-g and TPH-d CONCENTRATIONS IN SOIL BELOW 7-FT BGS AND GROUNDWATER
Former Dunne Paints
1007 41st Street, Oakland and
4050 Adeline Street, Emeryville, California
Clayton Project No.: 70-03365.01

Figure 7

12/11/02

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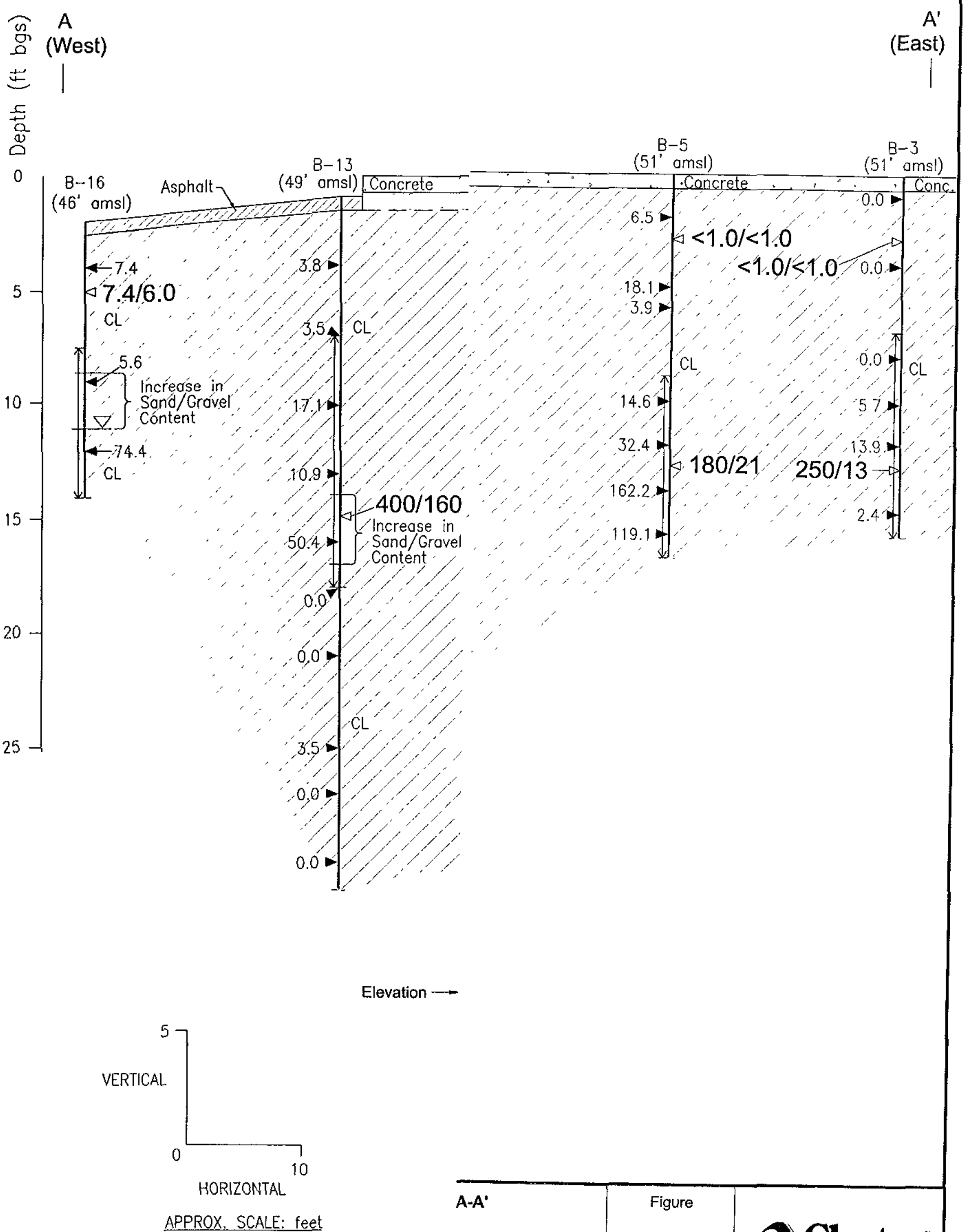
70-03365.01/TechGraphic



A-A'

ITS
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03365 01

Figure

8

12/12/02
SECTION1202 DWG

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APPENDIX A

RESUMES OF ENVIRONMENTAL PROFESSIONALS

JESSE D. EDMANDS

Supervisor, Environmental Assessments, Environmental Services

Summary of Professional Experience

Jesse D. Edmands has conducted numerous Phase I and Phase II Environmental Site Assessments (ESAs) throughout the Bay Area for various financial, industrial and commercial clients. The sites have included industrial and agricultural facilities, residential properties, commercial and retail buildings, and undeveloped land. Mr. Edmands has conducted Phase I ESAs in accordance with ASTM Designation E 1597–00 and client-designated protocols. He has also conducted asbestos and lead-based paint surveys, soil and groundwater sampling, well installation and sampling, historical research and interviews with owners, occupants and local government, and has generated written reports. Through subsurface investigations including geophysical surveys, active and passive soil gas techniques, and Geoprobe soil and groundwater sampling, Mr. Edmands has identified the presence of many recognized environmental conditions, such as underground storage tanks (USTs), volatile organic compounds (VOCs), petroleum hydrocarbons, methyl tertiary butyl ether (MTBE), metals, and pesticides/arsenic in soil and groundwater. Mr. Edmands has managed a variety of projects for a large telecommunications client, including Phase I and Phase II ESAs, National Environmental Policy Act (NEPA) screens, geophysical surveys, biological assessment, and archeological and architectural site evaluations.

Project Experience

Phase I and Phase II ESAs

Nuclear Fuel Industry

Mr. Edmands completed a Phase I ESA of a large nuclear fuel and product testing facility in operation since the 1950s. Following document reviews, site inspections, and onsite personnel interviews, Mr. Edmands developed a passive soil gas survey plan across the site that included the installation of approximately 200 soil gas modules within buildings and in exterior portions of the property. He also developed a sampling workplan that included the testing of soil and groundwater in potential hot spots for industrial solvents, metals, and radionucleotides. Mr. Edmands discovered elevated concentrations of these contaminants throughout the site and developed a comprehensive report that was submitted to the local regulatory oversight agency for review and guidance.

Phase I and Phase II ESAs

Electrical Power Generation Industry

Through initial subsurface soil and groundwater sampling, Mr. Edmands identified the presence of several industrially related VOCs, including tetrachloroethylene (PCE), trichloroethylene (TCE), and 1,1 dichloroethene (DCE) at an electrical generation site. To assess the vertical and horizontal extent of contamination, he supervised cone penetrometer testing (CPT) involving the collection of lithological data and water samples at discrete depths in specific aquifer zones. Mr. Edmands also conducted a

54-point active soil gas survey, and, with the installation and sampling of four permanent monitoring wells, completed a comprehensive site characterization for the client.

Phase I and Phase II ESAs and NEPA Screening
Telecommunications Industry
Mr. Edmands has conducted and managed numerous environmental assessments on proposed telecommunication sites throughout California and Nevada. These have included Phase I and Phase II ESAs, and NEPA screens necessary for compliance with Federal Communications Commission (FCC) permitting requirements. His NEPA-related work has included researching potential wilderness areas, wildlife areas, wetlands, endangered and threatened species, historic places and cultural resources, Indian religious sites, and flood plains. Mr. Edmands has also helped facilitate additional work stemming from the NEPA screen process, including cultural resource surveys (e.g., archeological and architectural evaluations) and biological assessments. Mr. Edmands has experience reviewing reports and preparing them for production, preparing proposals, and interacting with clients.

Phase I and Phase II ESAs
Sheetmetal Fabrication Facility
A Phase I ESA at a sheet-metal fabrication facility identified former plating and painting operations that utilized solvent tanks, sumps, and clarifiers. The local oversight authority granted closure, but further site assessment was conducted through a Phase II ESA during which Mr. Edmands detected the presence of several VOCs in groundwater at elevated concentrations. To delineate the extent of contamination of detected PCE and TCE, Mr. Edmands supervised additional borings throughout the building and then installed a series of passive soil gas modules based on identified hot spots.

Phase I and Phase II ESAs
Food Processing Industry
Mr. Edmands conducted a Phase I ESA at a former potato chip and nut processing facility that had been in operation since the late 1940s. After reviewing available documentation and completing a site inspection, he identified several suspect areas of potential chemical use and collected groundwater samples. Mr. Edmands discovered elevated concentrations of several industrial VOCs in the groundwater beneath the site, which assisted his client in making the appropriate decisions during a property transaction.

Employment History

Clayton Group Services, Inc. – Pleasanton, California
Supervisor, Environmental Assessments
2002 to Present

Clayton Group Services, Inc. – Pleasanton, California
Environmental Consultant
2001 to 2002

Clayton Group Services, Inc. – Pleasanton, California
Staff Environmental Consultant
1999 to 2001

Education

B.A., Environmental Science with Distinction, Minor in Geology, 1999
Boston University, Boston, Massachusetts

Professional Registrations and Certifications

EPA/AHERA California Accredited Asbestos Building Inspector, No. 9682 I, 1999
OSHA 40-Hour Hazardous Waste Operations and Emergency Response Training, 1999
California DHS Certified Lead Inspector/Assessor (Certificate ID# 10064), 2001

Publications and Presentations

Edmands, Jesse D., Daniel J. Brabander and Drew S. Coleman. 2001. Uptake and Mobility of Uranium in Black Oaks: Implications for Biomonitoring Depleted Uranium-Contaminated Groundwater. *Chemosphere. 44: 789-795.*

Edmands, Jesse. 1999. Uptake and Mobility of Uranium in Black Oaks: Implications for Biomonitoring Depleted Uranium Contaminated Groundwater. Paper presented to the Geological Society of America, October, Denver, Colorado. Publication with Abstracts.

Professional Affiliation

American Geophysical Union (AGU)
National Association of Environmental Professionals (NAEP)

Clayton Group Services

JON A. ROSSO, P.E.
Director, Environmental Services

Summary of Professional Experience

Jon A. Rosso has more than 17 years of experience in the environmental consulting field. He has served in senior technical, project management, litigation support, and construction management capacities on a variety of multidisciplinary projects in the areas of waste management, groundwater hydrology, risk assessment, bedrock investigations, and civil engineering. He has managed various large-scale projects valued at up to $40 million.

Mr. Rosso has planned and executed hundreds of investigations related to soil and groundwater contamination issues and has worked extensively with regulatory agencies throughout the United States. Mr. Rosso's strong understanding of state and federal environmental regulations and practical solutions provides particular expertise in client/agency negotiations leading to favorable client results. Contaminants of concern on these projects have included volatile organic compounds (VOCs) as dissolved and as dense nonaqueous-phase liquids (DNAPLs); heavy metals; dioxins, pesticides; petroleum hydrocarbons; polychlorinated biphenyls (PCBs); asbestos; and polynuclear aromatic hydrocarbons (PAHs).

Mr. Rosso has significant experience with numerous cleanup technologies and understands the feasibility, practicality, and effectiveness of the common options. Remedial systems with which he has extensive experience include large-scale removal, groundwater extraction, encapsulation, groundwater treatment, vapor treatment, dual phase extraction, soil vapor extraction, air sparge systems, biodegradation, oxidation, chemical fixation, barrier systems, hydraulic control, and waste stabilization. Mr. Rosso is currently responsible for overseeing the environmental risk management and remediation practice for Clayton in the Northern California Region, where he is responsible for the quality and budgets of complex environmental scenarios from inception to completion.

Project Experience

Trichloroethane (TCA) Investigation and Remediation

Manufacturing Industry

Mr. Rosso was the project manager, construction manager, and engineer of record for the investigation and remediation of a historical release of more than 1 million pounds of TCA into overburden and bedrock groundwater at a major manufacturing facility in Rhode Island. The groundwater contamination threatened one of the primary drinking water aquifers for Rhode Island. The vertical and lateral extent of the plume was defined using a network of surface water monitoring points and various well types including microwells, overburden monitoring wells, bedrock wells, multiple stage completion wells, and private domestic wells. Sampling data indicated that the dissolved plume encompassed an area of about 200 acres and extended more than a mile from the site. The TCA product, a DNAPL, was found over a quarter mile away from the original source at a depth of 400 feet below the ground surface.

The remediation plan included installing a half-mile-long interceptor subdrain system to hydraulically control and extract the overburden and bedrock groundwater for treatment. The majority of the interceptor subdrain was to be constructed on property that had originally been a land grant from the King of England and is a registered historic property. Archeological investigations on this property, as part of the remediation permitting and planning, uncovered a prehistoric feature approximately 4,000 to 7,000 years old, requiring complete removal and preservation. The archeological investigation, permitting, and removal was performed efficiently and did not impact the project schedule. The remedial design and permit process involved approvals from six divisions of the Rhode Island Department of Environmental Management (RIDEM); United States Army Corps of Engineers (USACE), United States Environmental Protection Agency (USEPA), the U.S. Department of Interior, and various historic preservation commissions.

Mr. Rosso assisted legal counsel with property access, easements, and well closure agreements. To allow construction and operation of the interceptor subdrain to proceed, a revised and amended consent agreement with RIDEM was successfully negotiated. This agreement consolidated key permitting authority among the various divisions and created a freshwater wetland delineation and mitigation plan. As the project manager, construction manager, and engineer of record, Mr. Rosso was responsible for hiring and managing the consultants and contractors, developing the plans and specifications, evaluating bids, awarding the contracts, and approving all payments. Project activities ultimately led to site containment using a system that was essentially passive, with very reasonable annual operating costs.

Superfund Site Remediation

Superfund Site – Former Petroleum Recycling Facility

Mr. Rosso served as program manager for implementation of removal activities at a former petroleum recycling facility in Patterson, California. The abandoned waste oil recycling facility contained about 5.5 million gallons of hazardous waste and hazardous waste water, tank-bottoms sludge, and waste oil. In addition, the site contained 1,200 drums of used oil filters and miscellaneous chemicals. Wastewater and sludge were found to be RCRA hazardous waste and to contain dioxin compounds. The project was initiated under an order issued by the USEPA, and work is funded through a Steering Committee representing 21 potentially responsible parties (PRPs) who are cooperating to fund the remediation. The project is two-thirds completed, and the final stage of sludge removal began in November 1999. Working for the PRPs, Mr. Rosso managed the investigation of waste materials, regulatory interaction, community relations, cost recovery, treatability analysis, value engineering, waste disposal, and site decontamination. USEPA Region IX officials have publicly praised the cleanup project, calling it a "model effort for Superfund removal projects."

Litigation Support
Steel Industry
Mr. Rosso provided litigation support to defend this steel company from a claim that the historic operations of the steel plant contaminated an adjacent property that recycled steel barrels. At issue was a claim that heavy residual petroleum fuel known as Bunker fuel spilled on the client's property and migrated cross-gradient to the adjacent property. Working with an expert witness in chemistry, Mr. Rosso evaluated previous investigations by others, historical aerial photographs and records, regulatory files, depositions, cost estimates, and various remedial investigations and feasibility studies.

Based on the analysis of the available data and computer modeling techniques, Mr. Rosso and Dr. James Bruya (a chemical expert) developed a theory that numerous chemical products were spilled as part of the barrel recycling process and were subsequently affected by caustic cleaning solutions. The theory speculated that modified chemical compounds observed in soil and groundwater samples were then incorrectly interpreted to be residual petroleum fuel hydrocarbons by analytical laboratories that used qualitative analytical techniques. To defend the client, a comprehensive subsurface investigation and laboratory testing program was implemented on both properties to explore the plaintiff's theory of migration and Clayton's theory as source of the contamination. The investigation and specialized laboratory-testing program demonstrated that the source of contamination was the barrel cleaning facility.

Tetrachloroethene (PCE) Investigation and Remediation
Manufacturing Industry
A release of more than 60,000 pounds of PCE into groundwater occurred at a major manufacturing facility in Security, Colorado. The groundwater contamination affected the main aquifer for the area, which supplied 35,000 people with drinking water. Mr. Rosso served as a senior technical advisor for the investigation and remediation of the site. The project team used a network of more than 100 monitoring wells, municipal wells, and domestic wells to define the vertical and lateral extent of the plume, which was more than six miles long. Mr. Rosso developed various alternative remedial plans configured to fit on various offsite properties, evaluated the effectiveness of the scenarios, and developed detailed cost estimates for each conceptual plan including long-term operation costs. The remedial alternatives included groundwater extraction and treatment for hydraulic control, chemical reaction walls, soil bentonite walls, air sparging, chemical injection and reaction, and natural attenuation. Based on extensive aquifer testing, subsurface investigation, and computer modeling, a hydraulic control system was designed and presented to the Colorado Department of Public Health, which approved the plan. The system was implemented and appears to be effective.

Site Assessment and Subsurface Investigation
Municipal Redevelopment Agency

As a senior environmental consultant to the San Francisco Redevelopment Agency, Mr. Rosso conducted a site assessment and subsurface investigation for the proposed parking facility at the San Francisco Giants' new baseball park. The environmental site assessment (ESA) identified several issues. First, the property had been part of a major fuel oil handling facility operating between 1920 and 1930. Aerial photographs from 1930 showed three 40-foot-diameter aboveground oil tanks (ASTs) and a pump station onsite. The adjacent properties contained 19 ASTs with one tank measuring 150 feet in diameter. Second, the ESA identified that the site was underlain with 20 to 30 feet of rubble debris from the 1906 earthquake and fire. The subsurface investigation was designed to characterize the subsurface and quantify the remedial issues for the construction of the parking structure. The subsurface investigation confirmed that earthquake debris were present and contaminated with lead, hydrocarbons, and PAHs. Third, the ESA identified significant quantities of heavy hydrocarbons underlying the property. Fuel characterization analyses indicated that the hydrocarbons were residual fuel oil and crude oil. Mr. Rosso reviewed various remedial options with the San Francisco Department of Public Health and reached agreement that the most cost effective and practical remedial plan was to encapsulate the material onsite. These activities were completed in a timely manner, allowing the project to proceed as scheduled on a sound environmental and fiscal basis.

Site Investigations, Evaluations, and Remediation

State Superfund Sites – Landfills

Mr. Rosso investigated, evaluated, and remediated two California State Superfund landfills that contained chromium-contaminated furnace bricks. In the past, a local winery's glass bottle furnaces had been remodeled and the brick linings were placed in uncontrolled landfills. The bricks subsequently released hexavalent and trivalent chromium to groundwater. The assessment involved the installation of monitoring well networks at each landfill to define the vertical and lateral extent of groundwater contamination. Based on review of historical aerial photographs, extensive exploratory trenching programs were developed to locate the bricks within each landfill. The most cost-effective remedial alternative included the complete removal of the contaminated bricks (approximately 5,000 cubic yards) and the extraction and treatment of shallow groundwater. The remedial actions resulted in site closure and removal from the state Superfund list.

Mediation and Litigation Support

Transportation Industry

Mr. Rosso provided mediation and litigation support for a major overnight courier corporation against the San Francisco International Airport regarding cost recovery for hazardous waste remediation encountered during the construction of Taxiway C. The project involved developing defense arguments through extensive historical research, evaluation of investigations by multiple parties, identification of various types of fuel hydrocarbons, analysis of airport cost claims and construction schedule impacts. The work by Mr. Rosso provided a strong basis for the client to negotiate with the airport.

Landfill Investigations

Real Estate Development Industry

A 1,000-acre development was planned for Orinda, California. As part of the environmental assessment of the property, Mr. Rosso investigated four major onsite landfills, which contained construction debris. The landfills were delineated using historic aerial photographs and topographic mapping. The four landfills contained more than 100,000 cubic yards of construction debris. A subsurface investigation was designed to investigate and characterize the landfills, some of which extend to depths of 60 feet below ground surface. The laboratory-testing program demonstrated that three of the landfills did not contain hazardous compounds and could be used as general fill in the development. One of the landfills, which was located in a former quarry, contained high concentrations of lead, hydrocarbons, and PCBs. The contaminated fill material was primarily soil mixed with metal debris, tires, and asphalt. Interviews with former ranch personnel identified the material as Caltrans shoulder scrapping. As part of remedial feasibility study, Mr. Rosso developed surface-water and bedrock groundwater investigations. Based on the results of the investigations, a remedial action plan was developed. Due to toxicity and solubility issues with the fill, the most practical remedial solution was excavation and offsite disposal, which was implemented, allowing the development project to move forward.

Emergency Response and Remediation

Transportation Industry

Mr. Rosso was the onsite technical advisor and project manager for the emergency response and remediation of a massive toxic chemical spill due to a 23-car train derailment north of Houston, Texas. The remedial action included the rapid restoration of the railroad line and the protection of a nearby river. Working with the contractor, Mr. Rosso identified the lateral and vertical extent of soil contamination and developed a remedial program, which involved removing 700,000 gallons of hazardous liquids, excavating 14,000 cubic yards of soil, and restoring the remediated area with a low permeability cap. Working with the Texas regulatory agencies, Mr. Rosso implemented a followup groundwater investigation, which concluded that only minor residual contamination existed following the remediation.

Site Remediation Plans

Real Estate Redevelopment

As project manager, Mr. Rosso prepared site remediation plans for a mixed-use, master-planned, water-oriented development to be built on 50 acres along the shore of San Francisco Bay. Historically, the site was part of a highly industrialized area, which included major steel production and fabrication facilities. Mr. Rosso studied past manufacturing operations and existing site conditions and evaluated various previous investigations conducted by others. As part of this study and studies by others, more than 275 soil samples were collected and chemically analyzed. Statistical evaluation of the data indicated that hydrocarbons and heavy metals were present in near-surface soil in localized areas of the site and did not substantially affect the groundwater. The remediation plan, developed in association with regulatory agencies, consisted of excavating and removing 40,000 cubic yards of contaminated soil from various areas of the site followed by chemical fixation, compaction, and encapsulation of the excavated soil beneath a 5-acre concrete parking structure on the property. The plan was approved and implemented, allowing the development to proceed as planned and in compliance with environmental regulations.

Site Assessments and Remediation
Chemical Industry
Mr. Rosso was project manager for the site assessment and remediation of two inactive evaporation ponds containing 9,000 cubic yards of residual sludge materials from aluminum anodizing processes at a California chemical manufacturing facility. Interacting with the California Regional Water Quality Control Board (RWQCB) on behalf of the client and one of its subsidiaries, Mr. Rosso developed a site characterization program, which focused on defining the subsurface conditions, soil quality, and extent of groundwater contamination. These assessment activities involved drilling and continuously sampling soil borings, installing monitoring and extraction wells, logging geophysical subsurface conditions, and chemically testing soil and groundwater samples. Evaluation studies included investigating the effects of high pH on groundwater geochemistry, treatability studies for nonhazardous disposal of sludge, aquifer testing, and computer modeling for groundwater extraction systems. The remediation consisted of excavating the sludge material, disposing of the material as nonhazardous waste, controlled backfilling and surface grading of the former pond areas, and monitoring geochemical transformations in the groundwater. These activities brought the site into compliance with state environmental regulations.

Site Characterization and Remedial Plans
Food Processing and Distribution Plant
As a senior technical consultant, Mr. Rosso directed site characterization activities and developed remedial plans for a 70-acre food processing and distribution facility in California. Mr. Rosso conducted an ESA of the property and identified several areas of concern including multiple fuel and solvent handling facilities and the former presence of 18 underground storage tanks (USTs), primarily in a fuel tank farm area. Investigations of the UST areas indicated significant releases to the subsurface. Free-floating fuel product was found on the groundwater surface. Fuel characterization techniques identified the floating fuel product as a mixture of gasoline and diesel. Various remedial options reviewed in detail included horizontal extraction wells, bioremediation, injection of hydrogen peroxide, product extraction, soil vapor extraction, groundwater sparging, and excavation. Evaluations indicated that the most cost-effective and practical remedial plan was to remove the free product and monitor the natural attenuation of the plume. In addition to onsite issues, chlorinated organic solvents were found in groundwater entering the property from an upgradient source. Mr. Rosso identified potential offsite sources of chlorinated solvents through the use regulatory record and historic aerial photography.

This information was used by the client to determine the remedial course of action and allowed the major rehabilitation of the facility to proceed on schedule.

Subsurface Evaluation
Transportation Industry
As project manager, Mr. Rosso evaluated the subsurface conditions for the expansion of a private waste water treatment plant and major access road at the San Francisco International Airport. These renovation projects were located adjacent to major jet fuel distribution facilities not owned by the Airport. The investigation focused on identifying, delineating, and quantifying fuel products in the subsurface. The laboratory testing program included fuel fingerprinting and fuel characterization techniques. The investigation identified jet fuel products floating on the groundwater in several areas. The objective of remedial activities was to protect foundation and pipeline construction workers within the jet fuel contaminated areas. These activities delineated the areas of concern and minimized the uncertainty for the expansion project bidding contractor. This resulted in a more accurate bid and minimized change orders.

Trichloroethene (TCE) Investigations
Manufacturing Facility
As a senior technical advisor, Mr. Rosso investigated the presence of TCE in groundwater beneath two adjacent manufacturing facilities in central California. He assisted the downgradient property owner and its environmental counsel to evaluate the work of opposing consultants, assess and delineate the extent of contamination, and develop a variety of possible remedial actions. The work also included assessing groundwater flow and using numerical simulation models to estimate the fate and transport of chemicals and the extraction systems' zone of capture. These investigations demonstrated the upgradient facility as the major source of contamination. Mr. Rosso provided litigation support to the environmental counsel for the downgradient property owner, evaluated remedial alternatives, and prepared community relations plans. The most cost-effective measures proved to be groundwater extraction and treatment and soil vapor extraction from the vadose zone. As a result of these activities, the client received a favorable settlement.

Contamination Source Investigation
Real Estate Redevelopment
As part of the redevelopment of downtown Hartford, Connecticut, a major bank was foreclosing on several contiguous properties. The ESAs and subsurface investigations by others identified chlorinated solvents in the groundwater on the properties. The main issue for the bank involved the source of the contamination, which the previous consultant believed was onsite. Based on the evaluation of the data, subsurface conditions, and hydrogeologic regime, it appeared that an offsite source was responsible for the chlorinated solvents in the groundwater. The review of regulatory records identified a nearby property that was previously used by a barrel cooperage, which had recycled steel barrels. The former cooperage had been replaced with an office building for the Connecticut Department of Public Works. Regulatory records indicated that the barrel

cooperage had recycled chlorinated solvents and apparently had buried a large number of drums, which were uncovered during the construction of the office building. Computer analysis and models demonstrated that the source of contamination was most likely the former barrel cooperage. These findings allowed the bank fund the redevelopment project.

Employment History

Clayton Group Services, Inc. – Pleasanton, California
Director, Environmental Services
1998 to Present

A. F. Evans Company, Inc. – San Ramon, California
Manager of Acquisitions and Project Manager
1997 to 1998

Treadwell & Rollo, Inc. – San Francisco, California
Founding Shareholder, Officer, and Senior Associate Engineer
1988 to 1997

Geomatrix Consultants, Inc. – San Francisco, California
Senior Staff Engineer
1984 to 1988

Woodward-Clyde Consultants – Oakland, California
Staff Engineer
1982 to 1984

Education

M.S., Civil Engineering (Construction Management), 1988
University of California, Berkeley, California

B.S., Civil Engineering, 1984
University of California, Berkeley, California

Professional Registrations and Certifications

Environmental Assessor: California (inactive)
Licensed Civil Engineer, State of California, No. 45310, 1990
Licensed Civil Engineer, State of Connecticut, No. 7818, 1993
Licensed Civil Engineer, State of Massachusetts, No. 37347, 1993
Licensed Civil Engineer, State of New Jersey, No. 38988, 1995
Licensed Civil Engineer, State of Rhode Island, No. 6057, 1993

Professional Affiliations

American Chemical Society (ACS)
American Society of Civil Engineers, (ASCE)
Chi Epsilon, National Civil Engineering Honor Society
National Ground Water Association (NGWA)

APPENDIX B

BORING LOGS

Clayton Group Services

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02

CLIENT: GREEN CITY LOFTS, LLC

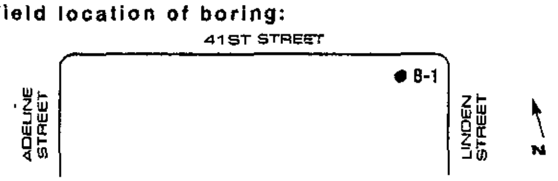
LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. **B-1**

Sheet 1 of 1

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Lithographic Symbol	DESCRIPTION
		0		CT	xxxxx	CONCRETE
				CL	hatched	CLAY, OLIVE GRAY, DRY, SOME ROOTLETS, NO ODOR
		1	X			
	0.0	2				
		3				
	0.0	4				SAMPLE NOT RECOVERED
		5	X	CL	hatched	CLAY, BLACK, DRY, NO ODOR
	1.4	6				
		7				
	0.0	8				GREEN, DRY, PETROLEUM ODOR
		9				
	3.1	10	X			
		11				REFUSAL AT 11 FT.
						TOTAL DEPTH OF BORING = 11 FT.
		12				
		13				No Groundwater Encountered
		14				
		15				
		16				
		17				
		18				

Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/4/02

CLIENT: GREEN CITY LOFTS, LLC

LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. B-2

Sheet 1 of 1

Field location of boring:

Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
				CT	xxxxx	CONCRETE
	48.6	1		CL	hatched	CLAY, BLACK. DRY, PETROLEUM ODOR
		2				
	58.2	3	X			
		4				
	24.2	5	X			
	101.4	6				
		7				
	25.1	8				
		9				
	29.2	10				GREEN, DRY, STRONG PETROLEUM ODOR
	45.1	11				
		12				
		13				
	151.6	14				GRAVELLY
		15				
		16	X			TOTAL DEPTH OF BORING = 16 FT.
		17				No Groundwater Encountered
		18				

Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/4/02

CLIENT: GREEN CITY LOFTS, LLC

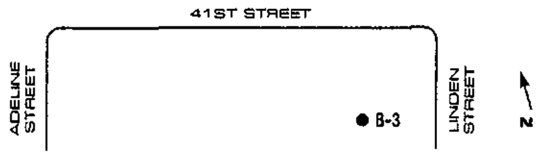
LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. B-3

Sheet 1 of 1

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
		0		CT	xxxxx	CONCRETE
	0.0	1		CL		CLAY, SOME GRAVEL, BROWN, DRY, NO ODOR
		2				
		3	X	CL		
	0.0	4				
		5				SAMPLE NOT RECOVERED
		6				
		7	X	CL		CLAY, GREEN, DRY, PETROLEUM ODOR
	0.0	8				
		9	X			
	5.7	10				BLACK
		11				
	13.9	12		CL		GREEN, PETROLEUM ODOR
		13	X			
	2.4	14				
		15				
		16				TOTAL DEPTH OF BORING = 16 FT.
		17				No Groundwater Encountered
		18				

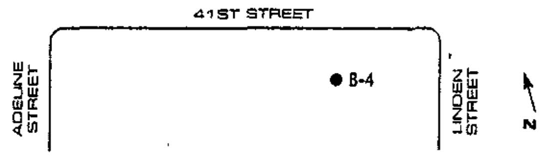
Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/4/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. **B-4**
Sheet 1 of 1

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID/OVA	Depth	Sample	Soil Group Symbol (USCS)	Lithographic Symbol	DESCRIPTION
				CT		CONCRETE
						CLAY, BLACK, DRY, NO ODOR
		1				
	0.0	2				
		3	X			
		4				
	0.0	5				
		6	X			
	0.0	7				BLACK, MOIST, NO ODOR
		8		CL		
	0.0	9				
		10	X			GREEN, STRONG PETROLEUM ODOR
	55.3	11				BROWN, MOIST, PETROLEUM ODOR
	3.1	12				
		13				
	0.0	14				
		15				
	0.0	16				
						TOTAL DEPTH OF BORING = 16 FT.
		17				
						No Groundwater Encountered
		18				

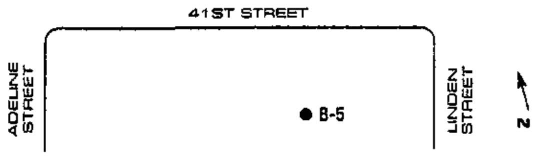
Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/4/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. **B-5**
Sheet 1 of 1

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
				CT	×××××	CONCRETE
						CLAY, BLACK/BROWN, MOIST, NO ODOR
		1				
	6.5	2				
			X			
		3				
		4				
	19.1	5				
						GRAY, MOIST, NO ODOR
	3.9	6	X			
		7				
		8		CL		
		9	X			
						BLACK, MOIST, STRONG PETROLEUM ODOR
	14.6	10				
		11				
						GREEN, STRONG PETROLEUM ODOR
	32.4	12				
		13	X			
	162.2	14				
						LESS GREEN, MORE BROWN, STRONG PETROLEUM ODOR
		15				
	119.1	16				
		17				TOTAL DEPTH OF BORING = 17 FT.
		18				
						No Groundwater Encountered

Clayton Group Services — LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01	DATE: 11/4/02
CLIENT: GREEN CITY LOFTS, LLC	
LOCATION:	
LOGGED BY: JE	DRILLER: ECA
BORING NO. B-6	Sheet 1 of 1

Field location of boring:

Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
		0–0.5		CT	××××	CONCRETE
	6.2	0.5–1		Fill		CLAY WITH SAND, SOME GRAVEL (FILL), REDDISH BROWN, DRY, NO ODOR
		2.5–3	X	Fill		
	2.4	3.5–4		Fill		
		4		CL		CLAY, BLACK, DRY, NO ODOR
		5.5–6	X	CL		
		7		CL		BROWN, MOIST, NO ODOR
	85.5	8.5–9	X	CL		
		9		CL		BLACK, MOIST, PETROLEUM ODOR
	33.4	9.5–10		CL		
	31.8	11.5–12		CL		
		12.5–13	X	CL		
		13		CL		GREEN, STRONG PETROLEUM ODOR
	212.2	13.5–14		CL		
	19.3	16.5–17		CL		
		18				TOTAL DEPTH OF BORING = 18 FT.
						No Groundwater Encountered

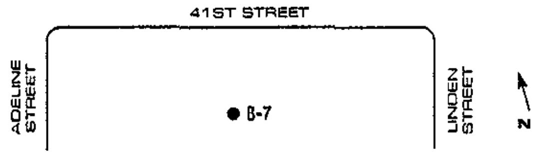
Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. **B-7**
Sheet 1 of 2

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH
Casing Installation Data.

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
		0		CT	xxxxx	CONCRETE
						SAMPLE NOT RECOVERED
		1				
		2	X	CL		CLAY, BLACK, MOIST, PETROLEUM ODOR
	23.2	3				
		4	X			
		5				
		6				
	31.3	7				
		8	X			
	55.7	9				DARK GRAY, MOIST, STRONG PETROLEUM ODOR
		10		CL		
	14.4	11				
		12	X			GREEN, STRONG PETROLEUM ODOR
	55.0	13				
		14				
	27.5	15				
	54.3	16				
		17				
		18				

Clayton Group Services

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02

CLIENT: GREEN CITY LOFTS, LLC

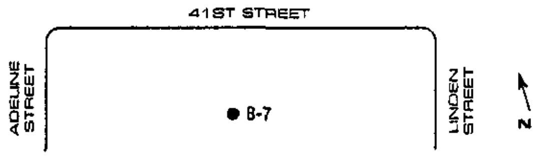
LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. **B-7**

Sheet 2 of 2

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID/OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
				CL	(hatched)	CLAY, GREEN, STRONG PETROLEUM ODOR
		19				
		20	X			
	45.8	21				
		22				BROWN, MOIST, NO ODOR
		23	X			
	0.0	24				
		25				
		26				
		27				
	2.1	28				
		29				
		30				TOTAL DEPTH OF BORING = 30 FT.
		31				No Groundwater Encountered
		32				
		33				
		34				
		35				
		36				

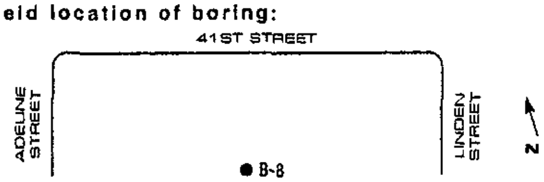
Clayton Group Services

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. **B-8**
Sheet 1 of 1

Field location of boring:



Ground Elev.: **Datum:**

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH

Casing Installation Data:

Water Level					
Time					
Date					

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
				CT	xxxxx	CONCRETE
				CL	////	CLAY WITH SAND, SOME GRAVEL, DRY, NO ODOR
		1		CL	////	CLAY, DARK GRAY, DRY, NO ODOR
	0.0	2				
		3	X			
	1.7	4				
		5	X			BROWN, DRY, NO ODOR
		6		CL		
	18.3	7				
	122.7	8				BROWN, MOIST, PETROLEUM ODOR
		9	X			
		10				
	79.5	11				
	33.1	12				SAMPLE NOT RECOVERED
		13				
		14		CL	////	CLAY, GREENISH BLACK, STRONG PETROLEUM ODOR
		15				
	156.9	16				
		17	X			REFUSAL AT 17 FT.
						TOTAL DEPTH OF BORING = 17 FT.
		18				
						No Groundwater Encountered

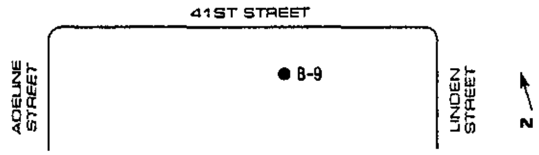
Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. B-9
Sheet 1 of 1

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH
Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
				CT		CONCRETE
		1	X	CL		CLAY, BLACK, DRY, NO ODOR
	5.2	2				
		3				
	9.1	4				SAMPLE NOT RECOVERED
		5		CL		CLAY, BLACK, DRY, NO ODOR
		6	X			
	3.1	7				
	2.4	8	X			BLACK, MOIST, STRONG PETROLEUM ODOR
		9				
		10				GREEN, STRONG PETROLEUM ODOR
	161.5	11				SAMPLE NOT RECOVERED
		12				
	115.3	13		CL		GREEN, STRONG PETROLEUM ODOR
		14	X			
		15				REFUSAL AT 15 FT.
						TOTAL DEPTH OF BORING = 15 FT.
		16				
		17				No Groundwater Encountered
		18				

Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02

CLIENT: GREEN CITY LOFTS, LLC

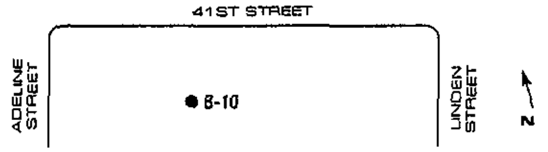
LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. B-10

Sheet 1 of 2

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
		0		CT	xxxxx	CONCRETE
		0–3				SAMPLE NOT RECOVERED
		3	X	Fill		CLAY WITH RED BRICKS, BLACK, DRY, NO ODOR
		4–8		CL		
	139.6	6	X			*STRONG PETROLEUM ODOR*
		8–12		CL		CLAY, BLACK/GREEN, MOIST, STRONG PETROLEUM ODOR
		8.5	X			
	14.8	10.5				
	22.5	11.5				
		12–18		CL		CLAY WITH SOME GRAVEL, GREEN, DRY, STRONG PETROLEUM ODOR
	26.1	15.5				
	2.1	16.5				

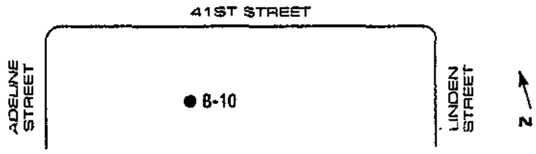
Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. **B-10**
Sheet 2 of 2

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
					//////	CLAY WITH SOME GRAVEL, GREEN, DRY, STRONG PETROLEUM ODOR
	0.0				//////	CLAY WITH GRAVEL, GREEN, MOIST, STRONG PETROLEUM ODOR
		19			//////	
					//////	GREEN TO BROWN, MOIST, PETROLEUM ODOR
		20			//////	
		21			//////	
		22			//////	
					//////	NO ODOR
		23			//////	
	0.0			CL	//////	
		24			//////	
			X		//////	
		25			//////	
		26			//////	
		27			//////	
	0.0				//////	
		28			//////	
		29			//////	
	0.0				//////	
		30				TOTAL DEPTH OF BORING = 30 FT.
		31				No Groundwater Encountered
		32				
		33				
		34				
		35				
		36				

Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02

CLIENT: GREEN CITY LOFTS, LLC

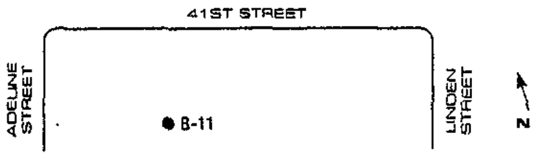
LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. **B-11**

Sheet 1 of 2

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level					
Time					
Date					

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
		0		CT	xxxxx	CONCRETE
		0.5–1.5				SAMPLE NOT RECOVERED
		1.5	X	CL	//////	CLAY, BLACK, MOIST, STRONG PETROLEUM ODOR
		2				
		2.5	X			
		3				
		4		CL		
		5				
		6				
		6.5	X			
		7				
	222.2	7				DARK GRAY/GREEN, STRONG PETROLEUM ODOR
	187.2	7.5				
		8		CL	//////	CLAY WITH SAND (INCREASING GRAVEL CONTENT), BLACK, MOIST, STRONG PETROLEUM ODOR
		9		CL	//////	CLAY, DARK GRAY/GREEN, MOIST, STRONG PETROLEUM ODOR
		9.5	X			
		10				
		11				
		12				
	70.8	13		CL		
		14				
		15				
	31.7	15.5	X			
		16				
		17		CL	//////	CLAY WITH SAND (INCREASING GRAVEL CONTENT), GREEN, DRY, STRONG PETROLEUM ODOR
	142.1	18				

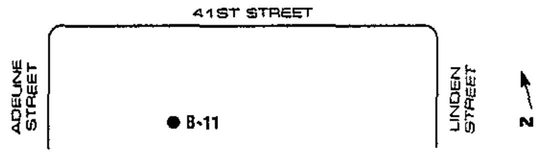
Clayton
GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. B-11
Sheet 2 of 2

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH
Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
				CL		CLAY WITH SAND (INCREASING GRAVEL CONTENT), GREEN, DRY, STRONG PETROLEUM ODOR
		19				
	7.7	20				
	62.7	21				
		22		CL		CLAY, YELLOWISH ORANGE, MOIST, NO ODOR
	23.2	23				
		24	X			
		25				
	0.0	26				
		27				TOTAL DEPTH OF BORING = 27 FT.
		28				No Groundwater Encountered
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				

Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/4/02

CLIENT: GREEN CITY LOFTS, LLC

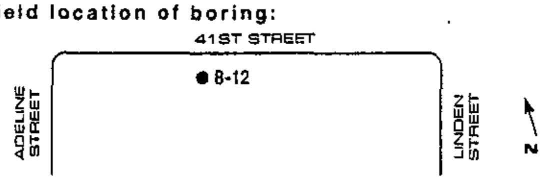
LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. **B-12**

Sheet 1 of 1

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
				CT		CONCRETE
		1		Fill		CLAY WITH SAND, SOME GRAVEL (FILL), REDDISH BROWN, DRY, NO ODOR
	4.2	2				CLAY, BLACK, DRY, NO ODOR
		3	X			
		4				
	3.1	5				
		6				
		7	X			BLACK, MOIST, NO ODOR
		8				
	14.8	9		CL		MOIST, PETROLEUM ODOR
		10				GREEN, STRONG PETROLEUM ODOR
	71.6	11				
		12				
		13	X			
		14		▽		GREEN, MOIST, STRONG PETROLEUM ODOR
	206.8	15				
		16				
		17				TOTAL DEPTH OF BORING = 17 FT.
		18				Groundwater Encountered at 14' at Time of Drilling

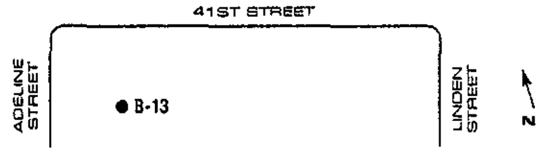
Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. **B-13**
Sheet 1 of 2

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Lithographic Symbol	DESCRIPTION
				AS		ASPHALT
						CLAY, BLACK, DRY, NO ODOR
		1				
			X			
		2				
	3.8	3				
		4				
			X			
		5				
	3.5	6		CL		
						PETROLEUM ODOR
		7				
			X			
		8				
	27.1	9				BLACK/GREEN, MOIST, STRONG PETROLEUM ODOR
		10				
		11				
	10.9	12				
		13				CLAY WITH SAND (INCREASING GRAVEL CONTENT), GREEN, MOIST, STRONG PETROLEUM ODOR
			X			
		14		CL		
	50.4	15				
		16				CLAY, GREEN, MOIST, STRONG PETROLEUM ODOR
	0.0	17				
				CL		BROWN, NO ODOR
		18				

Clayton Group Services

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02

CLIENT: GREEN CITY LOFTS, LLC

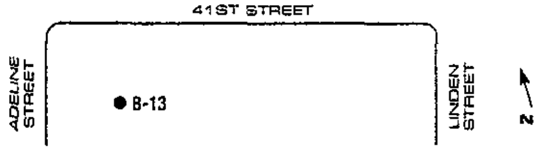
LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. **B-13**

Sheet 2 of 2

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
						YELLOWISH ORANGE, MOIST, NO ODOR
		19				
	0.0	20				
		21				
		22				
		23				
	3.5	24		CL		
		25				
	0.0	26				
		27				
		28				
	0.0	29				
		30				TOTAL DEPTH OF BORING = 30 FT.
		31				No Groundwater Encountered
		32				
		33				
		34				
		35				
		36				

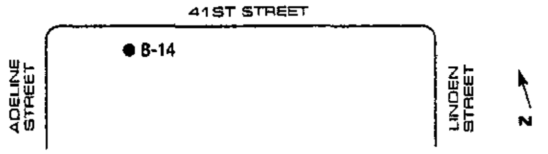
Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/4/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. **B-14**
Sheet 1 of 1

Field location of boring:



Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH
Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID / OVA	Depth	Sample	Soil Group Symbol (USCS)	Litho-graphic Symbol	DESCRIPTION
		0–1		CT	xxxx	CONCRETE
	0.0	1		CL	////	CLAY WITH SAND, SOME GRAVEL (FILL), REDDISH BROWN, DRY, NO ODOR
		2				
		3	X			
	2.4	4				
		5		CL	////	CLAY, BLACK, DRY, NO ODOR
	18.8	6				
		7	X			
	0.0	8				MOIST
		9				
	107.4	10				STRONG PETROLEUM ODOR
		11				
		12				
		13	X	▽		GREEN, STRONG PETROLEUM ODOR
		14				
		15				
	47.1	16				
		17				TOTAL DEPTH OF BORING = 17 FT.
		18				Groundwater Encountered at 13' at Time of Drilling

Clayton Group Services

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/4/02

CLIENT: GREEN CITY LOFTS, LLC

LOCATION:

LOGGED BY: JE DRILLER: ECA

BORING NO. B-15

Sheet 1 of 1

Field location of boring:

Ground Elev.: Datum:

Drilling Method: GEOPROBE

Hole Dia.: 2 INCH

Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID/OVA	Depth	Sample	Soil Group Symbol (USCS)	Lithographic Symbol	DESCRIPTION
		0–3				SAMPLE NOT RECOVERED
		3	X	CL	hatched	CLAY, BROWN, SOME ROOTLETS, DRY, NO ODOR
	0.0	4				
		5–6	X			
	2.4	7				DARK GRAY, DRY, NO ODOR
		8				MOIST, STRONG PETROLEUM ODOR
		10	X			GREEN
	131.5	11		▽ CL	hatched	CLAY WITH SAND (INCREASING GRAVEL CONTENT), GREEN, MOIST TO SATURATED, STRONG PETROLEUM ODOR
	4.2	14				
		17				TOTAL DEPTH OF BORING = 17 FT.

Groundwater Encountered at 11' at Time of Drilling

Clayton GROUP SERVICES

LOG OF EXPLORATORY BORING

PROJECT NO.: 70-03365.01 DATE: 11/5/02
CLIENT: GREEN CITY LOFTS, LLC
LOCATION:
LOGGED BY: JE DRILLER: ECA

BORING NO. **B-16**
Sheet 1 of 1

Field location of boring:

41ST STREET
ADELINE STREET
LINDEN STREET
● B-16
N

Ground Elev.: Datum:

Drilling Method: GEOPROBE
Hole Dia.: 2 INCH
Casing Installation Data:

Water Level						
Time						
Date						

Drilling Rate FT/MIN	PID/OVA	Depth	Sample	Soil Group Symbol (USCS)	Lithographic Symbol	DESCRIPTION
		0		AS		ASPHALT
				CL		CLAY, OLIVE GRAY, DRY, NO ODOR
		1				
	7.4	2				
		3	X			
		4				
		5				
		6	X			STRONG PETROLEUM ODOR
	5.6	7		CL		CLAY WITH SAND (INCREASING GRAVEL CONTENT), MOIST, STRONG PETROLEUM ODOR
		8				
		9	X	▽		
						CLAY, GREEN, MOIST, STRONG PETROLEUM ODOR
	74.4	10				
		11				
		12				TOTAL DEPTH OF BORING = 12 FT.
		13				Groundwater Encountered at 8.5' at Time of Drilling
		14				
		15				
		16				
		17				
		18				

Clayton
GROUP SERVICES

APPENDIX C

COMPOSITE SOIL SAMPLING REPORT

Clayton GROUP SERVICES

1.0 COMPOSITE SOIL SAMPLING

As part of the investigation on November 4, and 5, 2002, Clayton performed soil analyses on 4-point composite soil samples, which is required for characterizing appropriate disposal methods for waste material. The soil sample compositing was done according to sample depth and material horizon. Three soil samples were collected from each of the 16 borings (see attached Figure 3) as follows:

- One (1) soil sample was collected from the shallow vadose zone (sometimes containing fill) encountered from the ground surface to about 3 feet bgs;
- One (1) soil sample was collected from the vadose zone between the shallow/fill zone and the groundwater table from around 4 to 7 feet bgs;
- One (1) soil sample was collected from soil underneath the groundwater table from around 8 to 13 feet bgs.

These 48 soil samples were composited by the laboratory into 12, 4-point composite samples for analysis from each Area as follows:

Composite Soil Sample ID	Sample ID and Depth (feet bgs)
Area 1-A	B-1@1' B-2@3' B-3@3' B-4@3'
Area 1-B	B-1@5' B-2@6' B-3@7' B-4@6'
Area 1-C	B-1@11' B-2@9' B-3@9' B-4@10'
Area 2-A	B-5@3' B-6@3' B-7@2' B-8@3'
Area 2-B	B-5@6' B-6@6' B-7@4' B-8@5'
Area 2-C	B-5@9' B-6@9' B-7@8' B-8@9'

Composite Soil Sample ID	Sample ID and Depth (feet bgs)
Area 3-A	B-9@1' B-10@3' B-11@2' B-12@3'
Area 3-B	B-9@6' B-10@6' B-11@7' B-12@7'
Area 3-C	B-9@10' B-10@9' B-11@10' B-12@13'
Area 4-A	B-13@2' B-14@3' B-15@3' B-16@3'
Area 4-B	B-13@5' B-14@7' B-15@6' B-16@6'
Area 4-C	B-13@8' B-14@13' B-15@10' B-16@9'

*Composite soil sampling locations are depicted on Figure 3.

Clayton screened soil cores for lithology and physical evidence of contamination (*e.g.*, odors, discoloration, chemical sheen). Clayton also screened soil at approximately 2.0-foot intervals for ionizable substances using an organic vapor analyzer (OVA). A 6.0-inch long soil sample was cut from the acetate sample tube, sealed with Teflon tape, capped, labeled, and placed in a pre-chilled ice chest. Collected soil samples were then transported to a State of California-certified laboratory under formal chain-of-custody documentation.

1.1.1 Composite Soil Analysis

Clayton performed soil analyses on 4-point composite soil samples, which is required for characterizing appropriate disposal methods for waste material. The soil sample compositing was done according to sample depth and material horizon. Clayton submitted three soil samples from each of the 16 borings for analysis (48 soil samples). The laboratory composited and analyzed a 4-point composite per material horizon as follows: 1) in the shallow/fill layer, 2) in the mid-vadose zone, and 3) from underneath the groundwater table. This compositing scheme resulted in the analysis of 12, 4-point composites collected from 16 boring locations across the subject property using the following United States Environmental Protection Agency (USEPA)-approved methods:

- USEPA Method 8015M for Total Petroleum Hydrocarbons (TPH), quantified for gasoline (TPH-g), diesel (TPH-d), and motor oil (TPH-mo)
- USEPA Method 8270 for semi-volatile organic compounds (SVOCs)-*4 composite soil samples (one from each Area within the fill zone) and 2 from the mid-vadose zone within Areas 2 and 3 (6 total)*
- USEPA Method 8260 for Volatile Organic Compounds (VOCs), including benzene, toluene, ethylbenzene, and xylenes (BTEX, collectively), and methyl tertiary butyl ether (MTBE)
- USEPA Method 6010 for California Assessment Manual (CAM) 17 total metals (CAM 17)
- USEPA Method 8080 for polychlorinated biphenyls (PCBs)- *4 composite soil samples (one from each Area within the fill zone) and 2 from the mid-vadose zone within Areas 2 and 3 (6 total)*

Based on some of the metal analytical results, California Waste Extraction Test (WET) Procedures for soluble lead and copper and Toxicity Characteristic Leachate Procedure (TCLP) for lead were conducted.

2.0 FINDINGS

The composite soil data is summarized in Tables 1 through 5 and presented below. The location of the composite soil sampling is shown on Figure 3. The purpose of the composite soil sampling was to characterize the material to be excavated for offsite disposal at an appropriate facility.

2.1.1 TPH-g

The laboratory indicated that the TPH detected in soil closely resembled a mineral spirits signature falling in the TPH-g and TPH-d range. TPH-g concentrations ranged from 4.8 to 1,800 milligrams per kilogram (mg/kg) or parts per million (ppm) within the 12, 4-point composite soil samples analyzed as follows:

- Area 1 soil contained TPH-g concentrations of 5.3 mg/kg (Area 1-A), 5.8 mg/kg (Area 1-B), and 120 mg/kg (Area 1-C).
- Area 2 soil contained TPH-g concentrations of 75 mg/kg (Area 2-A), 83 mg/kg (Area 2-B), and 160 mg/kg (Area 2-C).
- Area 3 soil contained TPH-g concentration of 440 mg/kg (Area 3-A), 1,800 mg/kg (Area 3-B), and 590 mg/kg (Area 3-C).
- Area 4 soil contained TPH-g concentrations of 23 mg/kg (Area 4-A), 4.8 mg/kg (Area 4-B), and 430 mg/kg (Area 4-C).

2.1.2 TPH-d

The laboratory indicated that the TPH detected in soil closely resembled a mineral spirits signature falling in the TPH-g and TPH-d range. TPH-d concentrations ranged from 2.5 to 730 mg/kg within the 12, 4-point composite soil samples analyzed as follows:

- Area 1 soil contained TPH-d concentrations of 2.5 mg/kg (Area 1-A), 3.5 mg/kg (Area 1-B), and 18 mg/kg (Area 1-C).
- Area 2 soil contained TPH-d concentrations of 32 mg/kg (Area 2-A), 99 mg/kg (Area 2-B), and 54 mg/kg (Area 2-C).
- Area 3 soil contained TPH-d concentrations of 730 mg/kg (Area 3-A), 570 mg/kg (Area 3-B), and 730 mg/kg (Area 3-C).
- Area 4 soil contained TPH-d concentrations of 68 mg/kg (Area 4-A), 4.8 mg/kg (Area 4-B), and 71 mg/kg (Area 4-C).

2.1.3 TPH-mo

Low concentrations of TPH-mo concentrations were detected in two composite soil samples at 8.0 and 110 mg/kg in Area 4-B and Area 4-A, respectively.

2.1.4 VOCs

VOCs were detected in 8 of the 12, 4-point composite samples as follows:

- Naphthalene (42 to 3,300 micrograms per kilogram (µg/kg) or parts per billion (ppb) in Areas 1-C, 2-A, and 3-A through C);
- N-butyl benzene (63 µg/kg in Area 2-A);
- Sec-butyl benzene (7.5 and 70 µg/kg in Areas 2-B and 3-A, respectively);
- Tert-butyl benzene (5.0 µg/kg in Area 2-B);
- Ethylbenzene (300 and 330 µg/kg in Areas 3-A and 3-B, respectively);
- Isopropylbenzene (97 µg/kg in Area 3-A),
- N-propyl benzene (7.2 to 260 µg/kg in Areas 3-A, 3-B, and 4-A);
- 4-Isopropyl toluene (91 and 110 µg/kg in Areas 2-A and 3-A, respectively),
- 1,2,4-Trimethylbenzene or TMB (62 to 1,000 µg/kg in Areas 2-A, 3-A, 3-C, and 4-A);
- 1,3,5-TMB (25 to 360 µg/kg in Areas 3-A, 3-C, and 4-A);
- 1,1,2-Trichloroethane or TCA (7.5 µg/kg in Area 4-A); and
- Xylenes (630 µg/kg in Area 3-A).

2.1.5 SVOCs

Low concentrations of three SVOCs were detected in 3 of the 6, 4-point composite soil samples analyzed as follows:

- Phenol (4.8 mg/kg in Area 2-A);
- 2-Methylnaphthalene (1.4 and 1.9 mg/kg in Areas 3-B and 3-A, respectively); and
- Naphthalene (1.7 and 2.4 mg/kg in Areas 3-A and 3-B, respectively).

2.1.6 PCBs

The analytical results did not show the presence of PCBs at or above the laboratory method detection limits in the 6, 4-point composite samples analyzed.

2.1.7 Metals

Eleven total metal analytes were detected above laboratory method detection limits. The concentration ranges, in addition to the sample identification for the highest detected metal ion, are listed below:

Arsenic	<2.5 to 21 mg/kg	(Area 4-A)
Barium	39 to 800 mg/kg	(Area 3-C)
Cadmium	0.55 to 3.5 mg/kg	(Area 4-A)
Chromium	8.4 to 35 mg/kg	(Area 1-A)
Cobalt	2.4 to 29 mg/kg	(Area 1-A)
Copper	5.5 to 390 mg/kg	(Area 4-A)
Lead	4.2 to 190 mg/kg	(Area 3-C)
Mercury	0.061 to 0.48 mg/kg	(Area 4-A)
Nickel	12 to 48 mg/kg	(Area 1-A)
Vanadium	7.9 to 35 mg/kg	(Area 2-B)
Zinc	14 to 830 mg/kg	(Area 3-A)

Based on the elevated concentrations of lead above 10 times the Soluble Threshold Limit Concentration (STLC) of 50 mg/kg in Areas 3-A (56 mg/kg), 3-C (190 mg/kg), 4-A (110 mg/kg) as well as copper above 10 times the STLC of 250 mg/kg in Area 4-A (390 mg/kg), WET Procedures were conducted and TCLP was conducted for lead in Areas 3-A and 4-A. Soluble lead was detected at 0.65, 1.3, and 11 mg/kg in Areas 4-A, 3-C, and 3-A, respectively. Soluble copper was detected at 0.17 mg/kg in Area 4-A. No TCLP concentrations of lead were detected above the laboratory method detection limit.

3.0 <u>CONCLUSIONS</u>

Given the presence of TPH impacts throughout the majority of the areas tested, this will most likely require that the material be placed in a controlled landfill. Soil from Area 3-A will most likely require disposal as California hazardous waste at a Class I facility, based on the metal results. The excavated material does not appear to be a Federal hazardous waste.

The results of the composite soil sampling should be provided to disposal facilities in order to appropriately profile the material for waste acceptance and disposal.

TABLES

TABLE 1

Summary of Composite Soil Analytical Results - TPH
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	TPH-g (mg/kg)	TPH-d (mg/kg)	TPH-mo (mg/kg)
Area 1-A	5.3[e]	2.5[d]	<1.0
Area 1-B	5.8[e]	3.5[d]	<1.0
Area 1-C	120[e]	18[n]	<1.0
Area 2-A	75[e]	32[n]	<1.0
Area 2-B	83[e]	99[n]	<1.0
Area 2-C	160[e]	54[n]	<1.0
Area 3-A	440[e]	730[n]	<500
Area 3-B	1800[e]	570[d]	<500
Area 3-C	590[e]	730[n]	<50
Area 4-A	23[e]	68[n,g]	110
Area 4-B	4.8[e]	2.8[n,g]	8.0
Area 4-C	430[e]	71[n]	<10

Notes:
<# = analyte not detected at or above the indicated laboratory method reporting limit
mg/kg = milligrams per kilogram
Sampling date: November 4 and 5, 2002
TPH-d, mo, k = Total petroleum hydrocarbons as diesel, motor oil, and kerosene, respectively, with silica gel cleanup
d = gasoline range range compounds are significant
e = TPH pattern that does not appear to be derived from gasoline (stoddard solvent/mineral spirit?)
g = oil range compounds are significant
n = stoddard solvent/mineral spirit
Area 1-A=Composite of samples B-1@1', B-2@3', B-3@3', and B-4@3'
Area 1-B = Composite of samples B-1@5', B-2@6', B-3@7', B-4@6'
Area 1-C = Composite of samples B-1@11', B-2@9', B-3@9', B-4@10'
Area 2-A = Composite of samples B-5@3', B-6@3', B-7@2', and B-8@3'
Area 2-B = Composite of samples B-5@6', B-6@6', B-7@4', and B-8@5'
Area 2-C = Composite of samples B-5@9', B-6@9', B-7@8', and B-8@9'
Area 3-A = Composite of samples B-9@1', B-10@3', B-11@2', and B-12@3'
Area 3-B = Composite of samples B-9@6', B-10@6', B-11@7', and B-12@7'
Area 3-C = Composite of samples B-9@10', B-10@9', B-11@10', and B-12@13'
Area 4-A = Composite of samples B-13@2', B-14@3', B-15@3', and B-16@3'
Area 4-B = Composite of samples B-13@5', B-14@7', B-15@6', and B-16@6'
Area 4-C = Composite of samples B-13@8', B-14@13', B-15@10', and B-16@9'

TABLE 2

Summary of Composite Soil Analytical Results - VOCs Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	Naphthalene (µg/kg)	n-Butly benzene (µg/kg)	sec-Butyl benzene (µg/kg)	tert-Butyl benzene (µg/kg)	Ethylbenzene (µg/kg)	Isopropylbenzene (µg/kg)	n-Propyl benzene (µg/kg)	4-Isopropyl toluene (µg/kg)	1,2,4-TMB (µg/kg)	1,3,5-TMB (µg/kg)	1,1,2-Trichloroethane (µg/kg)	Xylenes (µg/kg)
Area 1-A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Area 1-B	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Area 1-C	42	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Area 2-A	100	63	<250	<250	<250	<250	<250	91	480	<250	<250	<250
Area 2-B	<5.0	<5.0	7.5	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Area 2-C	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Area 3-A	1200	220	70	<50	300	97.0	230	110	1000	360	<50	630
Area 3-B	3300	<200	<200	<200	330	<200	260	<200	<200	<200	<200	<200
Area 3-C	820	<200	<200	<200	<200	<200	<200	<200	630	210	<200	<200
Area 4-A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.2	<5.0	62	25	7.5	<5.0
Area 4-B	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Area 4-C	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200

Notes:

No other VOCs detected in addition to the above-listed analytes
<# = analyte not detected at or above the laboratory method reporting limit
µg/kg = micrograms per kilogram
Sampling date: November 4 and 5, 2002
VOCs = Voltile Organic Compounds
Area 1-A=Composite of samples B-1@1', B-2@3', B-3@3', and B-4@3'
Area 1-B = Composite of samples B-1@5', B-2@6', B-3@7', B-4@6'
Area 1-C = Composite of samples B-1@11', B-2@9', B-3@9', B-4@10'
Area 2-A = Composite of samples B-5@3', B-6@3', B-7@2', and B-8@3'
Area 2-B = Composite of samples B-5@6', B-6@6', B-7@4', and B-8@5'
Area 2-C = Composite of samples B-5@9', B-6@9', B-7@8', and B-8@9'
Area 3-A = Composite of samples B-9@1', B-10@3', B-11@2', and B-12@3'
Area 3-B = Composite of samples B-9@6', B-10@6', B-11@7', and B-12@7'
Area 3-C = Composite of samples B-9@10', B-10@9', B-11@10', and B-12@13'
Area 4-A = Composite of samples B-13@2', B-14@3', B-15@3', and B-16@3'
Area 4-B = Composite of samples B-13@5', B-14@7', B-15@6', and B-16@6'
Area 4-C = Composite of samples B-13@8', B-14@13', B-15@10', and B-16@9'

TABLE 3

Summary of Composite Soil Analytical Results - SVOCs
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	Phenol (mg/kg)	2-Methylnaphthalene (mg/kg)	Naphthalene (mg/kg)
Area 1-A	<0.33	<0.33	<0.33
Area 2-A	**4.8**	<0.33	<0.33
Area 2-B	<0.33	<0.33	<0.33
Area 3-A	<0.33	**1.9**	**1.7**
Area 3-B	<0.33	**1.4**	**2.4**
Area 4-A	<13	<13	<13

Notes:
No other SVOCs detected in addition to the above-listed analytes
<# = analyte not detected at or above the laboratory method reporting limit
µg/kg = micrograms per kilogram
Sampling date: November 4 and 5, 2002
SVOCs = Semi-volatile organic compounds
Area 1-A=Composite of samples B-1@1', B-2@3', B-3@3', and B-4@3'
Area 1-B = Composite of samples B-1@5', B-2@6', B-3@7', B-4@6'
Area 1-C = Composite of samples B-1@11', B-2@9', B-3@9', B-4@10'
Area 2-A = Composite of samples B-5@3', B-6@3', B-7@2', and B-8@3'
Area 2-B = Composite of samples B-5@6', B-6@6', B-7@4', and B-8@5'
Area 2-C = Composite of samples B-5@9', B-6@9', B-7@8', and B-8@9'
Area 3-A = Composite of samples B-9@1', B-10@3', B-11@2', and B-12@3'
Area 3-B = Composite of samples B-9@6', B-10@6', B-11@7', and B-12@7'
Area 3-C = Composite of samples B-9@10', B-10@9', B-11@10', and B-12@13'
Area 4-A = Composite of samples B-13@2', B-14@3', B-15@3', and B-16@3'
Area 4-B = Composite of samples B-13@5', B-14@7', B-15@6', and B-16@6'
Area 4-C = Composite of samples B-13@8', B-14@13', B-15@10', and B-16@9'

TABLE 4

Summary of Composite Soil Analytical Results - PCBs
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	PCBs (mg/kg)
Area 1-A	<25
Area 2-A	<25
Area 2-B	<250
Area 3-A	<250
Area 3-B	<250
Area 4-A	<250

Notes:
<# = analyte not detected at or above the indicated laboratory method reporting limit
mg/kg = milligrams per kilogram
Sampling date: November 4 and 5, 2002
PCBs = Polychlorinated biphenyls
Area 1-A=Composite of samples B-1@1', B-2@3', B-3@3', and B-4@3'
Area 1-B = Composite of samples B-1@5', B-2@6', B-3@7', B-4@6'
Area 1-C = Composite of samples B-1@11', B-2@9', B-3@9', B-4@10'
Area 2-A = Composite of samples B-5@3', B-6@3', B-7@2', and B-8@3'
Area 2-B = Composite of samples B-5@6', B-6@6', B-7@4', and B-8@5'
Area 2-C = Composite of samples B-5@9', B-6@9', B-7@8', and B-8@9'
Area 3-A = Composite of samples B-9@1', B-10@3', B-11@2', and B-12@3'
Area 3-B = Composite of samples B-9@6', B-10@6', B-11@7', and B-12@7'
Area 3-C = Composite of samples B-9@10', B-10@9', B-11@10', and B-12@13'
Area 4-A = Composite of samples B-13@2', B-14@3', B-15@3', and B-16@3'
Area 4-B = Composite of samples B-13@5', B-14@7', B-15@6', and B-16@6'
Area 4-C = Composite of samples B-13@8', B-14@13', B-15@10', and B-16@9'

TABLE 5

Summary of Soil Analytical Results - Total Metals
Former Dunne Paints
Oakland/Emeryville, California

SAMPLE ID	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)	Mercury (mg/kg)
Area 1-A	<2.5	2.9	130	<0.5	<0.5	35	29	21	15	<2.0	48	<2.5	<1.0	<2.5	32	67	0.071
Area 1-B	<2.5	6.5	140	<0.5	<0.5	33	8	21	6.5	<2.0	41	<2.5	<1.0	<2.5	35	51	<0.06
Area 1-C	<2.5	<2.5	230	<0.5	<0.5	16	5.4	15	6.3	<2.0	24	<2.5	<1.0	<2.5	23	24	<0.06
Area 2-A	<2.5	4.7	120	<0.5	0.55	31	11	20	26	<2.0	46	<2.5	<1.0	<2.5	33	72	0.079
Area 2-B	<2.5	3.3	150	<0.5	<0.5	31	10	19	13	<2.0	39	<2.5	<1.0	<2.5	30	46	0.067
Area 2-C	<2.5	2.8	160	<0.5	<0.5	28	9.3	19	6.3	<2.0	40	<2.5	<1.0	<2.5	28	46	<0.06
Area 3-A	<2.5	3.3	200	<0.5	2	31	8.5	20	56	<2.0	44	<2.5	<1.0	<2.5	26	830	0.062
Area 3-B	<2.5	5	140	<0.5	<0.5	31	10	18	10	<2.0	45	<2.5	<1.0	<2.5	30	79	0.061
Area 3-C	<2.5	2.6	800	<0.5	1.1	24	8.5	18	190	<2.0	37	<2.5	<1.0	<2.5	26	730	0.29
Area 4-A	<2.5	21	140	<0.5	3.5	24	6.7	390	110	<2.0	31	<2.5	<1.0	<2.5	25	260	0.48
Area 4-B	<2.5	<2.5	39	<0.5	<0.5	8.4	2.4	5.5	<3.0	<2.0	12	<2.5	<1.0	<2.5	7.9	14	0.2
Area 4-C	<2.5	<2.5	220	<0.5	<0.5	25	7.1	13	4.2	<2.0	36	<2.5	<1.0	<2.5	23	33	0.076

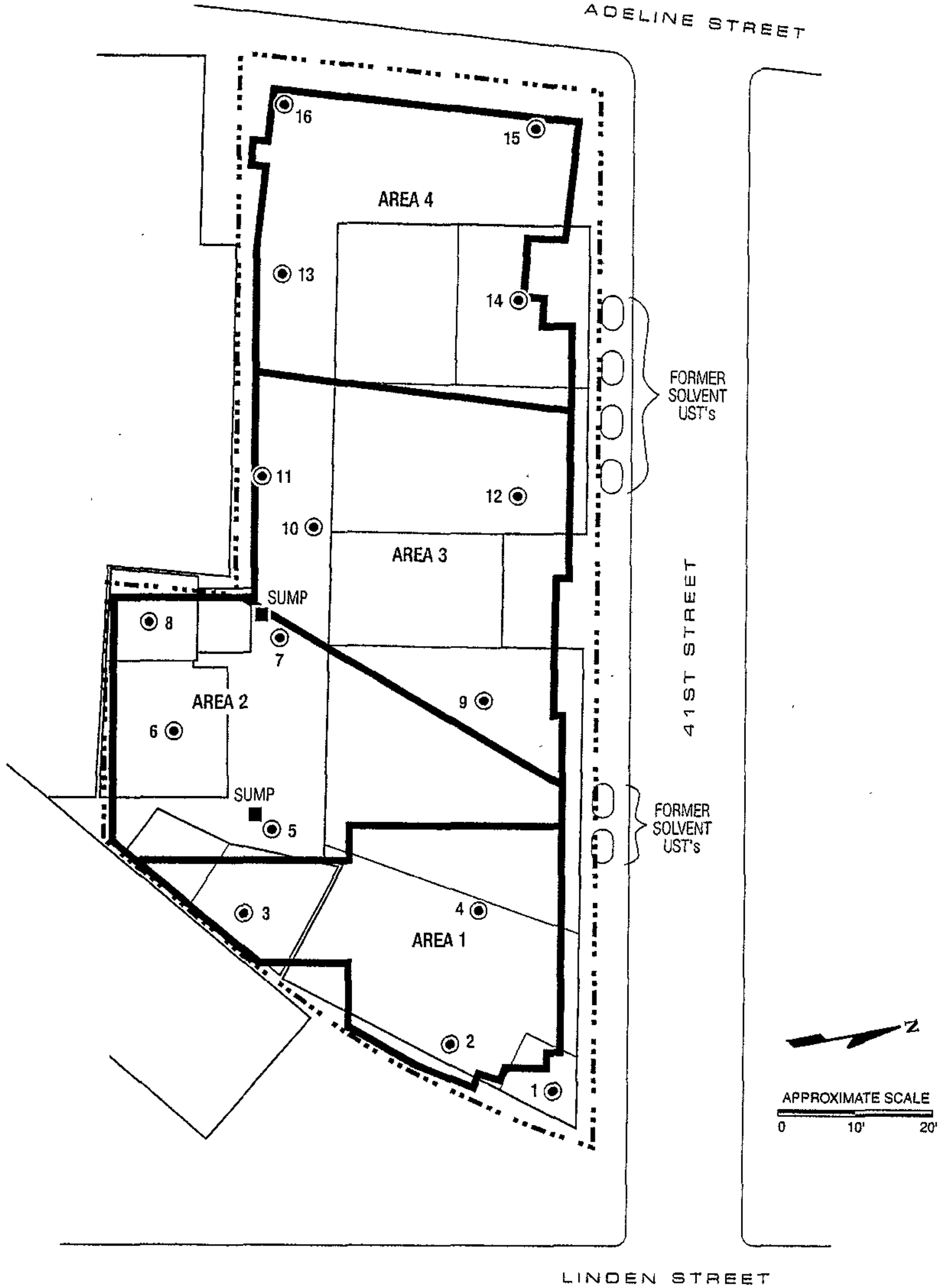
SOLUBLE ANALYSIS

SAMPLE ID	STLC Copper (mg/L)	STLC Lead (mg/L)	TCLP Lead (mg/L)
Area 3-A	NA	11	<0.2
Area 3-C	NA	1.3	NA
Area 4-A	0.17	0.65	<0.2

Notes:
NA = Not analyzed
<# = analyte not detected at or above the indicated laboratory method reporting limit
mg/kg = milligrams per kilogram
mg/L = milligrams per Liter
Sampling date: November 4 and 5, 2002
Area 1-A=Composite of samples B-1@1', B-2@3', B-3@3', and B-4@3'
Area 1-B = Composite of samples B-1@5', B-2@6', B-3@7', B-4@6'
Area 1-C = Composite of samples B-1@11', B-2@9', B-3@9', B-4@10'
Area 2-A = Composite of samples B-5@3', B-6@3', B-7@2', and B-8@3'
Area 2-B = Composite of samples B-5@6', B-6@6', B-7@4', and B-8@5'
Area 2-C = Composite of samples B-5@9', B-6@9', B-7@8', and B-8@9'
Area 3-A = Composite of samples B-9@1', B-10@3', B-11@2', and B-12@3'
Area 3-B = Composite of samples B-9@6', B-10@6', B-11@7', and B-12@7'
Area 3-C = Composite of samples B-9@10', B-10@9', B-11@10', and B-12@13'
Area 4-A = Composite of samples B-13@2', B-14@3', B-15@3', and B-16@3'
Area 4-B = Composite of samples B-13@5', B-14@7', B-15@6', and B-16@6'
Area 4-C = Composite of samples B-13@8', B-14@13', B-15@10', and B-16@9'

APPENDIX C

FIGURE



70-03365.01/TechGraphic

LEGEND	SITE PLAN SHOWING THE EXCAVATION AREA Former Dunne Paints 1007 41st Street, Oakland and 4050 Adeline Street, Emeryville, California Clayton Project No.: 70-03365.01	Figure 4 12/11/02	Clayton GROUP SERVICES
Property Boundary Excavation Boundary			

APPENDIX D

HEALTH RISK ASSESSMENT

Health Risk Assessment
Green City Lofts
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LIST OF ABBREVIATIONS AND ACRONYMS

atm	atmosphere
ARARs	Applicable Or Relevant And Appropriate Requirements
ARB	Air Resources Board
bgs	below ground surface
Cal/EPA	California Environmental Protection Agency
cm^2	centimeter square
COPC	compound of potential concern
d	day
ED	exposure duration
EPC	exposure point concentration
g	grams
HI	Hazard Index
HQ	Hazard Quotient
HRA	Health Risk Assessment
IRAs	interim removal actions
J&E	Johnson and Ettinger
kg	kilogram
m^3	cubic meter
μg	microgram
μg/L	micrograms per liter
mg	milligram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
OEHHA	Office of Environmental Health Hazard Assessment
PRG	preliminary remediation goal
RAGS	Risk Assessment Guidance for Superfund
RfC	reference concentration
RI	remedial investigation
SF	slope factor
SVOC	semi-volatile organic chemical
μg	microgram
μg/l	micrograms per liter
UCL	upper confidence limit
URF	Unit Risk Factor
VOC	volatile organic compound

1.0 INTRODUCTION

A health risk assessment (HRA) was requested by the Alameda County Environmental Health Department in order to evaluate the potential risk to human health posed by chemicals that may have been released into the environment at the former Dunne Paints Facility, 1007 41st Street, Oakland/Emeryville and 4050 Adeline Street, Emeryville, California (hereunder referred to as the "Site"). It is proposed that the subject property be developed into residential condominiums following a site investigation, a health risk assessment, and an evaluation of the need for interim remediation. This HRA Report contains the methods and findings of the HRA conducted for the Site.

This HRA was conducted primarily using the procedures detailed in the California Environmental Protection Agency (Cal/EPA) document entitled *Supplemental Guidance for Human Health Multimedia Risk Assessment of Hazardous Waste Sites and Permitted Facilities* (Cal/EPA, 1992). In addition, use of the Johnson & Ettinger model to characterize potential indoor air risks and hazards is included which is consistent with current risk practice as described in the 1995 risk-based corrective action guidance provided by the American Society for Testing and Materials (ASTM) entitled *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (ASTM, 1995).

2.0 EXPOSURE & HAZARD ASSESSMENT

In order to establish the setting for potential exposures in the HRA, the Site data, and the associated exposure scenarios and pathways are described. A Site location map is provided as Clayton Figure 2-1, which indicates the location and features of the Site.

2.1 Exposure Pathways Analysis

In order to evaluate potentially complete pathways of exposure for any particular site it is essential to understand the planned use of a site. The ultimate use of the property provides a clear indication of the types of materials that will remain in place once development is complete, and the structures that will be in place both below and above ground. Clearly, any materials that are removed from the property can no longer be a source of potential exposure. The planned development of the subject Site in this HRA is residential condominium property with a parking garage constructed below the first floor of the residences extending a significant distance above grade, i.e., 11-feet. Because all contaminated material above 10.5 feet will be removed and the construction project will create a foundation and surface cap for the residences, this will eliminate all direct contact exposure pathways. Further, groundwater is not used as a source of drinking water or showering water at the Site, and is not intended for such use following residential development. Thus, it will not be possible to come into direct contact with any compounds present in soil or groundwater because it will not be possible to contact the soil or groundwater.

As such, the only potentially complete exposure pathway might be inhalation of volatile organic compounds (VOCs) present in residual soil or groundwater, following construction that could volatilize and enter indoor air. This type of potential exposure is known as an indirect exposure pathway. In summary, the Site will be re-graded and all material at or above 10.5 feet will be removed before the foundation is poured. Residual materials that are 10.5 feet or more below ground surface, and the groundwater beneath the new foundation that may contain VOCs are the only sources of exposure and are therefore evaluated in this HRA. A summary of the potentially complete exposure pathways for Site is provided in Figure 2-2 in light of the current development planned for the property.

2.2 Data Summary and Site Status

In November 2002, Clayton collected discrete soil and groundwater samples as part of the Environmental Site Assessment for the Site. The data are provided in the Phase II Environmental Site Assessment Report to which this HRA is attached. Summaries of the maximum reported concentration data for analytes in soil and groundwater onsite are presented in Tables 2-1 and 2-2, respectively. The tables indicate that several VOCs were detected in groundwater, but only naphthalene was detected in soil. Boring data indicate that the soil type is predominantly clay, and that the depth to groundwater varies across the Site. As a health protective measure, only the maximum detected concentrations for each compound were used in the HRA, and are those reported in the Tables 2-1 and 2-2. The data used in this HRA are included in the Phase II Environmental Site Assessment Report, to which this HRA is attached.

3.0 QUANTIFICATION OF RISKS AND HAZARDS

This evaluation provides a health-protective quantification of risk and hazard. The quantification process involves estimation of indoor air concentrations and subsequent calculation of risk and hazard for volatile organic compounds using the Johnson and Ettinger (J&E) heuristic model as described in the following sections.

3.1 Johnson and Ettinger Screening Model Methodology

As a conservative estimation, the Johnson and Ettinger (J&E) screening models were used, i.e., SLSCREEN to assess the indoor air impacts of VOCs detected in soil, and GWSCREEN to assess the indoor air impacts of VOCs in groundwater. These J&E models provide screening-level calculations that incorporate both diffusive and convective transport mechanisms to estimate the concentration of VOCs in indoor air (U.S. EPA, 1997a). The model predicts the intrusion of VOCs from the soil beneath the building foundation into indoor air using steady state, one-dimensional, diffusion and convective velocity assumptions. For the purpose of this evaluation, the maximum detected soil and groundwater VOC concentrations were used.

The values for the modeling parameters used for this assessment are presented in Table 3-1. The values are essentially unchanged from the conservative default values specified for the model, except for the use of site-specific soil type and depths below ground surface (following construction re-grading) to soil and groundwater contamination.

3.1.1 Exposure Point Concentrations

Analysis of potential health impacts requires the identification of representative concentrations in exposure media to which a receptor may be exposed in accordance with *Supplemental Guidance for Human Health Multimedia Risk Assessment of Hazardous Waste Sites and Permitted Facilities* (Cal/EPA, 1992). These concentrations are referred to as exposure point concentrations (EPCs). For this HRA, the EPCs selected were the maximum concentrations of VOCs detected in soil and groundwater. The depth to the maximum concentration was not the detection depth, but rather the distance to the maximum detected VOCs following installation of a foundation. This is a health protective assumption for one essential reason. That is, the presence of a parking garage makes the depth below grade to the water table greater than the distance assumed for modeling purposes. The height of the parking garage and the dispersion of VOCs in outside air is not considered to occur and therefore the concentrations of VOCs in indoor air are likely to be much less than the model predicts.

3.1.2 Exposure Parameters

As stated previously, the parameters for both SLCSREEN and GWSCREEN were default selections, except for the soil type used in SLSCREEN. The list of parameters is provided in Table 3-1. Because the most health protective use of the Site is residential, the exposure duration was left at 30 years, and the exposure frequency at 350 days per year. In addition, the physical and chemical properties of the vadose zone were left as the default values rather than site-specific data, which are less conservative.

4.0 TOXICITY ASSESSMENT

The hierarchy of state and federal documentation containing toxicity used for this HRA is as follows:

- *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (Cal/EPA, 2002)
- *Integrated Risk Information Systems* (IRIS) (U.S. EPA, 2000)
- *U.S. EPA Region 9, Preliminary Remediation Goals* (PRGs) (U.S. EPA, 2002)

The identification of a compound as possessing carcinogenic (cancer causing) and/or noncarcinogenic (noncancer causing) properties is the sole discretion of the federal and state regulatory authorities. The designation of cancer and/or noncancer properties is quantitatively expressed as a Unit Risk Factor (URF) and a Reference Concentration (RfC), respectively. The URF and RfC values are generated by federal and state regulatory agencies and are collectively known as toxicity criteria.

Table 4-1 contains a list of the toxicity criteria used for the risk and hazard analysis in the Johnson and Ettinger groundwater model in this HRA. It is noted here that the cancer toxicity criterion used in the Johnson and Ettinger model is the Unit Risk Factors (in this case, only benzene is a carcinogen), and Reference Concentrations for noncarcinogens.

It is noted here that Total Petroleum Hydrocarbons (TPH) as a group are not considered by the U.S. EPA or by Cal/EPA to pose a threat to public health, and are therefore not evaluated using risk assessment methodology. The chemical structure of TPH is a combination of long and short chain hydrocarbons in addition to individual constituents such as benzene, toluene, ethylbenzene, and xylenes (BTEX). There are no federal or California State toxicity criteria for long and short chain hydrocarbons, however BTEX compounds are considered to have potential impacts to public health, and as such have associated toxicity criteria and are therefore included in this HRA. As indicated previously, the toxicity criteria selected for this HRA were taken from State of California and U.S. EPA sources, and the references for those criteria are cited above.

TABLE 4-1. Toxicity Criteria

Chemical	Unit Risk Factor (URF) ($\mu g/m^3)^{-1}$	Reference Concentration ($\mu g/m^3$)
1,2,4-Trimethylbenzene	NA	2.4E+00
Benzene	2.9E-05	6.0E-02
Carbon disulfide	NA	7.0E-01
Ethylbenzene	NA	1.0E+00
Cumene (isopropylbenzene)	NA	3.9E-01
Naphthalene	NA	9.0E-03
n-Butylbenzene	NA	1.0E-02
n-Propylbenzene	NA	1.0E-02
sec-Butylbenzene	NA	1.0E-02
t-Butylbenzene	NA	1.0E-02
Toluene	NA	3.0E-01
Xylenes	NA	7.0E-01

Note:
NA = not applicable

5.0 RISK CHARACTERIZATION

5.1 Summary of Results

Estimated potential cancer risks and noncancer hazards for the residential exposure scenario based on VOCs detected in soils are provided in Table 5-1. Sample data and calculations for naphthalene, which was the only compound detected in soil at a depth of greater than 10-feet, using the J&E model are provided in Attachment A; Tables A-1 and A-2, respectively. Estimated potential noncancer hazards and cancer risks based on VOCs in groundwater are presented in Table 5-2. Sample data and calculations for sec-butylbenzene detected in groundwater using the J&E model are provided in Attachment B; Tables B-1 and B-2, respectively. A summary of the combined results for soil and groundwater is presented in Table 5-3.

5.2 Discussion of Results

The noncancer results are expressed as a Hazard Index (HI). The HI is a sum of the individual Hazard Quotients (HQs) estimated for each of the individual compounds. Cancer risk results are expressed as the sum of the individual cancer risks. In this HRA there is only one compound with cancer causing properties i.e., benzene, therefore only one cancer risk was estimated.

The results of the assessment for soil indicate that naphthalene was the only compound of concern. Using the maximum concentration, the total Hazard Index was 2.23E-04 (0.000223). As indicated in Section 4.0, naphthalene does not have carcinogenic properties, thus a carcinogenic risk was not estimated.

Groundwater results indicate a total carcinogenic risk of 4.34E-07 attributable to benzene, which is the only carcinogen in the list of compounds detected in groundwater. The total Hazard Index for the compounds in groundwater was estimated to be 5.43E-02 (0.0543).

The combined soil and groundwater risk and Hazard Index for was therefore estimated to be 4.34E-07 and 5.45E-02 (0.0545), respectively. These results indicate that neither the carcinogenic risk, nor noncarcinogenic Hazard Index, exceed the *de minimus* levels of 1.0E-06 or unity (1), respectively. These values are typically taken to be levels that are acceptable for risk management decision-making regarding residential property use. This is in accord with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) under which a cancer risk of 1×10^{-6} is considered "the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure" (U.S. EPA, 1980). For noncarcinogenic effects, CERCLA does not specify a point of departure, but it generally is appropriate to assume a Hazard Index of unity (1) (U.S. EPA, 1991). A risk level of 1×10^{-5} may be utilized as a point of departure for determining the need to establish remediation goals, as is seen in California's Proposition 65 legislation (22 CCR, Chapter 3. Safe Drinking Water and Toxic Enforcement of 1986), in which it is stated:

> *"22-12711. (a) (1). Where a state or federal agency has developed a regulatory level for a chemical known to the state to causė cancer which is calculated to result in not more than one excess case of cancer in an exposed population of 100,000, such level shall constitute the no significant risk level."*

Under this premise, the results of this HRA process have been used to describe a potential risk significantly less than one excess cancer risk in 100,000 exposed persons. Additionally, with respect to non-carcinogenic hazard estimates, the regulatory decision-making point of departure is generally unity (1), at both the federal and state level.

5.3 Uncertainties

As indicated in Section 2.1, there will be no direct exposure pathways to soil or groundwater at the Site following completion of the residential condominium project, because all contaminated material above 10.5 feet will be removed, and a foundation and surface cap will eliminate all direct contact exposure pathways. Therefore, the only potentially complete exposure pathway remaining is likely to be exposure to VOCs in indoor air.

The risk evaluation results in this HRA indicate that the indoor air pathway, based on a groundwater source, was the only pathway for which a significant risk or hazard may exist. Direct exposures to VOCs in groundwater onsite are not likely to be complete due to the depth to groundwater, and the fact that groundwater is not used for potable purposes at this Site.

Inhalation of VOCs in indoor air as the sole exposure route was evaluated using maximum concentrations in soil and groundwater as a health protective measure. To quantify potential indoor air impacts, the SLSCREEN and GWSCREEN versions of the J&E model were used. The assumptions used in these models tend to be health-protective and may have a tendency to overestimate true conditions. While modifications to parameters such as exposure duration are permitted, there are others to which the model is sensitive that affect the result in a conservative manner. For example, the J&E model requires information regarding soil type. In this case, one continuous layer of clay was assumed to exist throughout the modeled soil column. This oversimplification, coupled with the presence of a parking garage between the foundation and the floor of the condominium residences, may result in modeled concentrations of VOCs that exceed true and actual indoor air concentration of VOCs. This in turn tends to overestimate predicted potential health impacts.

Because the results of this HRA do not exceed *de minimus* levels, the overestimation subsumed in the risk estimation process can effectively be disregarded, and decision regarding the property use can reflect the health protective risk and hazard estimates.

6.0 REFERENCES

American Society for Testing and Materials (ASTM). 1995. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*. (Standard Guide) E 1739-95. November.

California Environmental Protection Agency (Cal/EPA). 1992. *Supplemental Guidance for Human Health Multimedia Risk Assessment of Hazardous Waste Sites and Permitted Facilities.* Department of Toxic Substances Control. July.

——. 2002. *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values.* March, http//:www.arb.ca.gov/toxics/healthval/healthval.htm

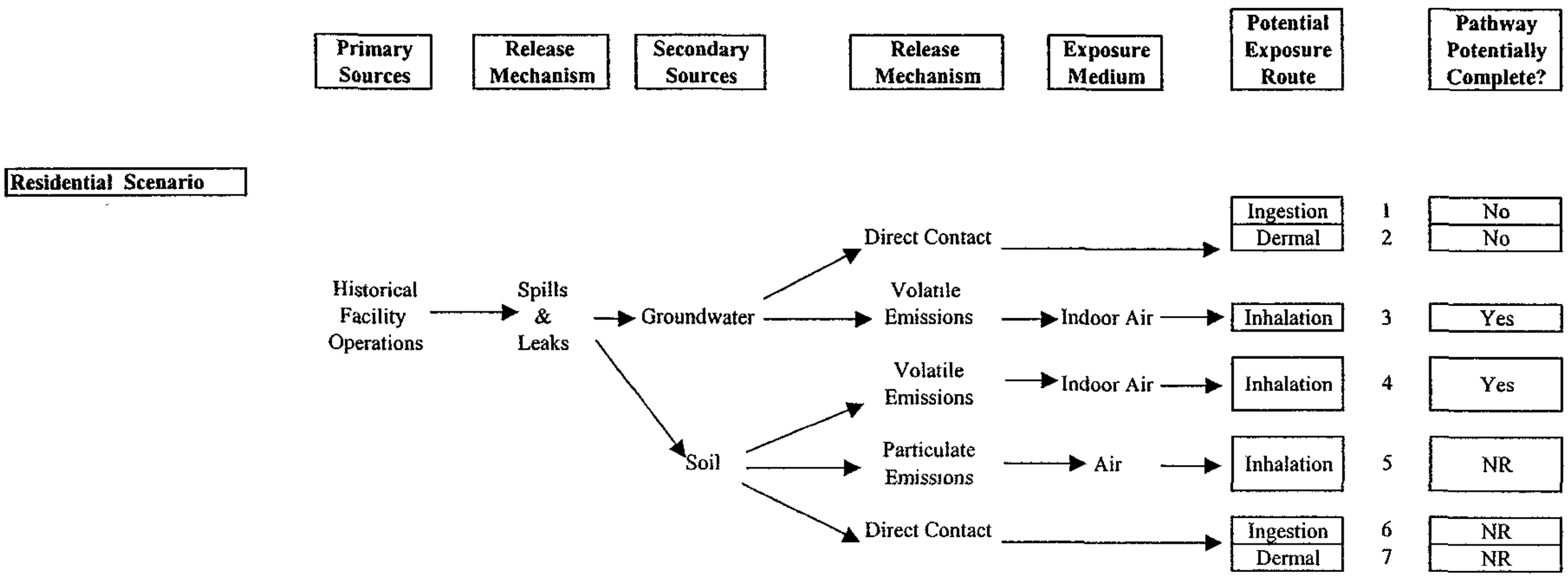
U. S. Environmental Protection Agency (U.S. EPA) 1980. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (40 CFR 300 §300.430[e][2i]).

____. 1997a. *User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion Into Buildings*. Prepared by Environmental Quality Management, Inc. for E.H. Pechan & Associates, Inc. and submitted to the U.S. EPA.

. 2000. *Integrated Risk Information Systems* (IRIS). Washington, D.C.

____. 2002. *U.S. EPA Region 9 Preliminary Remediation Goals.* Washington, D.C. November 1.

Figure 2-2
Exposure Pathways Analysis



Pathway Notes:

1 Groundwater is not a source of drinking water
2 Groundwater is not a source of showering water
3 Volatile Organic Compounds (VOCs) in groundwater may enter indoor air
4 Volatile Organic Compounds (VOCs) in residual soil may enter indoor air
5 NR = not relevant because VOCs are the only compounds of concern
6 NR = not relevant because VOCs are the only compounds of concern, and the site will be covered with a permanent cap, post-remediation
7 NR = not relevant because VOCs are the only compounds of concern, and the site will be covered with a permanent cap, post-remediation

Table 2-1
Compounds Detected in Soil
Volatile Organic Compounds

CAS No.	Chemical	Maximum Soil Concentration (µg/kg)	Depth BGS (cm)	Total Samples	Detects	Percent Detection
91203	Naphthalene	3200	183	9	3	33%

Notes:
CASN = Chemical Abstract Series Number
BGS=below ground surface
cm=centimeter
µg/kg=microgram per kilogram

16 feet = 6 feet left

Table 2-2
Compounds Detected in Groundwater
Volatile Organic Compounds

CAS No.	Chemical	Maximum Groundwater Concentration (µg/L)	Depth BGS (cm)	Total Samples	Detects	Percent Detection
95636	1,2,4-Trimethylbenzene	6.5	122	4	1	25%
71432	Benzene	63	122	4	1	25%
75150	Carbon disulfide	1.5	122	4	1	25%
100414	Ethylbenzene	21	122	4	1	25%
98828	Cumene (isopropylbenzene)	120	122	4	1	25%
91203	Naphthalene	38	122	4	2	50%
104518	n-Butylbenzene	47	122	4	1	25%
103651	n-Propylbenzene	210	122	4	1	25%
135988	sec-Butylbenzene	52	122	4	1	25%
98066	t-Butylbenzene	5.3	61	4	2	50%
108883	Toluene	13	122	4	2	50%
1330207	Xylenes	26	122	4	1	25%

Notes:
CASN = Chemical Abstract Series Number
BGS=below ground surface
cm=centimeter
µg/L=microgram per liter

14 feet = 4 feet left
12 feet = 2 feet left

Table 3-1
Johnson & Ettinger Parameters
Residential Scenario

Parameter	Value Selected
Contaminant concentration	Maximum detected concentration
Depth to bottom of floor	15 cm (default)
Depth to contamination	Minimum depth to soil VOC 488 cm
	Minimum depth to groundwater VOCs[1] 427 cm
Average soil and groundwater temperature	10 degrees Celcius
Soil Type	*Site specific*, clay
Vadose zone soil dry bulk density	1.5 g/cm3 (default)
Vadose zone soil total porosity	0.43 unitless (default)
Vadose zone soil water-filled porosity	0.3 cm3/cm3 (default)
Vadose zone soil organic carbon fraction	0.002 unitless (default)
Averaging time for carcinogens	70 years (default)
Averaging time for noncarcinogens	30 years (default)
Exposure Duration; residential	30 years (default)
Exposure frequency; residential	350 days (default)

Notes:
cm = centimeter
cm3/cm3 = cubic centimeter per cubic centimeter
g/cm3 = grams per cubic centimeter
[1] groundwater depth for t-butylbenzene was 274 cm

Table 5-1
Johnson and Ettinger Results For Indoor Air
Volatile Organic Compounds
Residential Scenario
Soil Source

CAS No.	Chemical	Incremental Risk	Hazard Quotient	Maximum Soil Concentration (µg/kg)	Depth BGS (cm)	SCS Soil Type
91203	Naphthalene	NA	2.23E-04	3200	183	C
	TOTALS	**NA**	**2.23E-04**			

Notes:
CASN = Chemical Abstract Series Number
BGS=below ground surface
SCS=Soil Conservation Service
cm=centimeter
µg/kg=microgram per kilogram
C = clay

Table 5-2
Johnson and Ettinger Results For Indoor Air
Volatile Organic Compounds
Residential Scenario
Groundwater Source

CAS No.	Chemical	Incremental Risk	Hazard Quotient	Maximum Groundwater Concentration (µg/l)	Depth BGS (cm)	SCS Soil Type
95636	1,2,4-Trimethylbenzene	NA	8.73E-07	6.5	122	C
71432	Benzene	4.34E-07	5.82E-04	63	122	C
75150	Carbon disulfide	NA	7.29E-06	1.5	122	C
100414	Ethylbenzene	NA	1.28E-05	21	122	C
98828	Cumene (isopropylbenzene)	NA	2.04E-02	120	122	C
91203	Naphthalene	NA	1.72E-04	38	122	C
104518	n-Butylbenzene	NA	2.88E-03	47	122	C
103651	n-Propylbenzene	NA	1.53E-02	210	122	C
135988	sec-Butylbenzene	NA	5.14E-03	52	122	C
98066	t-Butylbenzene	NA	1.29E-03	6.4	61	C
108883	Toluene	NA	2.57E-05	13	122	C
1330207	Xylenes	NA	8.45E-03	26	122	C
	TOTALS	**4.34E-07**	**5.43E-02**			

Notes:
CASN = Chemical Abstract Series Number
BGS=below ground surface
SCS=Soil Conservation Service
cm=centimeter
µg/L=microgram per liter
C = clay

Table 5-3
Johnson and Ettinger Results For Indoor Air
Volatile Organic Compounds
Residential Scenario
Total Risk and Hazard Summary

Groundwater

CAS No.	Chemical	Incremental Risk	Hazard Quotient	Maximum Groundwater Concentration (µg/l)	Depth BGS (cm)	SCS Soil Type
95636	1,2,4-Trimethylbenzene	NA	8.73E-07	6.5	122	C
71432	Benzene	4.34E-07	5.82E-04	63	122	C
75150	Carbon disulfide	NA	7.29E-06	1.5	122	C
100414	Ethylbenzene	NA	1.28E-05	21	122	C
98828	Cumene (isopropylbenzene)	NA	2.04E-02	120	122	C
91203	Naphthalene	NA	1.72E-04	38	122	C
104518	n-Butylbenzene	NA	2.88E-03	47	122	C
103651	n-Propylbenzene	NA	1.53E-02	210	122	C
135988	sec-Butylbenzene	NA	5.14E-03	52	122	C
98066	t-Butylbenzene	NA	1.29E-03	6.4	61	C
108883	Toluene	NA	2.57E-05	13	122	C
1330207	Xylenes	NA	8.45E-03	26	122	C
	Subtotal	**4.34E-07**	**5.43E-02**			

Soil

CAS No.	Chemical	Incremental Risk	Hazard Quotient	Maximum Soil Concentration (µg/kg)	Depth BGS (cm)	SCS Soil Type
91203	Naphthalene	NA	2.23E-04	3200	183	C
	Subtotal	**NA**	**2.23E-04**			

Groundwater and Soil Sum

	Incremental Risk	Hazard Quotient
TOTAL	**4.34E-07**	**5.45E-02**

Notes:
CASN = Chemical Abstract Series Number
BGS=below ground surface
SCS=Soil Conservation Service
cm=centimeter
µg/L=microgram per liter
µg/kg=microgram per kilogram
C = clay

ATTACHMENT A

JOHNSON & ETTINGER
SAMPLE DATA AND CALCULATIONS
SOIL

DATA ENTRY SHEET

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION
(enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
91203	3200	Naphthalene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	183	10	C		

ENTER Vadose zone soil dry bulk density, r_b^A (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm³/cm³)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)
1.5	0.43	0.3	0.002

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (mg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
473	0.130	0.641	7.41E-10	0.599	4 44E-10	3,844	3200	5.63E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	12,913	1.52E-04	6.55E-03	1.75E-04	4.70E-04	473

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (mg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m^3)
15	4 00E+00	4.99E+03	0.10	4.28E-01	4.70E-04	3.84E+02	2.94E+15	5.18E-06	2.59E-02

Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.4E-01

ATTACHMENT B

JOHNSON & ETTINGER
SAMPLE DATA AND CALCULATIONS
GROUNDWATER

DATA ENTRY SHEET

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
1330207	26	xylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)
15	122	C	10

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone soil dry bulk density, r_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, q_w^V (cm^3/cm^3)
C			1.5	0.43	0.3

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, q_a^V (cm³/cm³)	Vadose zone effective total fluid saturation, S_{te} (cm³/cm³)	Vadose zone soil intrinsic permeability, k_i (cm²)	Vadose zone soil relative air permeability, k_{rg} (cm²)	Vadose zone soil effective vapor permeability, k_v (cm²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm³/cm³)	Air-filled porosity in capillary zone, $q_{a,cz}$ (cm³/cm³)	Water-filled porosity in capillary zone, $q_{w,cz}$ (cm³/cm³)	Floor-wall seam perimeter, X_{crack} (cm)
107	0.130	0.641	7.41E-10	0.599	4.44E-10	81.52	0.43	0.067	0.363	3,844

Bldg. ventilation rate, $Q_{building}$ (cm³/s)	Area of enclosed space below grade, A_B (cm²)	Crack-to-total area ratio, h (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $DH_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m³/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, m_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm²/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm²/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm²/s)
5.63E+04	9.24E+05	4.16E-04	15	10,255	2.92E-03	1.26E-01	1.75E-04	4.24E+00	4.77E-01	6 05E-01

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm³/s)	Crack effective diffusion coefficient, D^{crack} (cm²/s)	Area of crack, A_{crack} (cm²)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, a (unitless)	Infinite source bldg. conc., $C_{building}$ (mg/m³)	Unit risk factor, URF $(mg/m^3)^{-1}$	Reference conc., RfC (mg/m³)
107	15	3.27E+03	0 10	4.28E-01	4.24E+00	3.84E+02	1.00E+00	1.89E-03	6.17E+00	NA	7.0E-01

Clayton
GROUP SERVICES

APPENDIX E

LABORATORY ANALYTICAL DATA SHEETS

(NOT INCLUDED)

APPENDIX B

LETTERS FROM ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

March 21, 2003

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

Mr. Martin Samuels
Green City Development Group, Inc.
4048 Adeline St.
Emeryville, CA 94608

Dear Mr. Samuels:

Subject: Fuel Leak Case, RO0000073, 1007 41st St., Oakland CA 94608, former Dunne Paints

Alameda County Environmental Health Local Oversight staff has reviewed the case file for the subject site including the following reports:

- September 25, 2002 Phase I Environmental Site Assessment, Clayton Group Services
- December 23, 2002 Predevelopment Investigation, Clayton Group Services

We generally concur with the proposed development provided the following technical comments are addressed and requested reports are submitted to our office. On the condition that these technical issues are adequately addressed, no further active remediation will be required by our office.

Technical Comments

1. We concur with the proposed excavation of this site to an average depth of 10.5' and the removal of groundwater if encountered. Based upon previous results, post-excavation soil sampling is required in the west portion of the site, near the areas of borings B-11, B-12 and B14-B16. If post-excavation soil concentrations exceed 5000 ppm TPH in these areas, we request that additional soil excavation up to a maximum depth of 15.5' bgs be performed to remove the highly impacted soil.
2. A groundwater delineation and monitoring program is required after the project is completed. Please submit your proposal by the date specified below. You may want to consider performing an initial investigation to quickly define the location of the contaminant plume down-gradient from the release prior to installing the permanent monitoring network. We require that your monitoring be coordinated with the neighboring sites, ONE Color Communications (1001 42nd St., Oakland) and California Linen (989 41st St., Oakland).
3. An appropriate Health and Safety Plan must be observed by construction workers during the project and a Risk Management Plan is required for notification of future utilities workers.
4. A Risk Assessment Addendum reflecting the contaminants found after your remediation project is complete will be required prior to site closure.

Technical Report Request

- Post-excavation sampling plan- 30 days prior to scheduled excavation
- Groundwater Delineation and Monitoring Work Plan- within 60 days of receipt of this letter.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

C: B. Chan, D. Drogos, files
Mr. Jon Rosso, Clayton Group Services, Inc., 6920 Koll Center Parkway, Suite 216, Pleasanton, CA 94566

1007 41st St cond ltr

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

April 9, 2003

Mr. Martin Samuels
Green City Development Group, Inc.
4048 Adeline St.
Emeryville, CA 94608

Dear Mr. Samuels:

Subject: Fuel Leak Case, RO0000073, 1007 41st St., Oakland CA 94608, former Dunne Paints

Alameda County Environmental Health Local Oversight staff has received and reviewed the April 7, 2003 Supplemental Soil Sampling Workplan for the subject site prepared by Clayton Group Services. This work has been proposed in lieu of the post-excavation sampling required by our office, in order to avoid delays in the construction program.

The work plan is approved with the following technical comments:

- Twelve borings (B-17 through B-28) are proposed for additional soil characterization in the areas of proposed excavation and anticipated petroleum impact. Three soil samples from each of the borings will be collected. Because the elevation of the surface across the site varies, the proposed sample depths also vary. Excavation is proposed to a depth of 10.5' relative to the western portion of the site. All samples collected at the elevation of 39 amsl (approximately 10.5' below ground surface in the western portion) will be analyzed for Total Petroleum Hydrocarbons as mineral spirits. In addition, all samples should be screened using an organic vapor analyzer with a FID detector. Samples with elevated screening results should also be considered for chemical analysis.
- In addition, all soil samples from borings B-17, B-23 and B-28 will be analyzed since there is prior evidence that these areas may be significantly impacted.
- Project oversight by your consultant during the excavation process is still essential. Groundwater removal and excavation of obviously contaminated soils is required regardless of your pre-excavation results.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M. Chan

Barney M. Chan
Hazardous Materials Specialist

C: B. Chan, D. Drogos, files
Mr. Jon Rosso, Clayton Group Services, Inc., 6920 Koll Center Parkway, Suite 216, Pleasanton, CA 94566

1001 41st St Sampling

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

May 27, 2003

Mr. Martin Samuels
Green City Development Group, Inc.
3675 Del Monte Ave.
Oakland, CA 94605

Dear Mr. Samuels:

Subject: Fuel Leak Case, RO0000073, 1007 41st St., Oakland, CA 94608, former Dunne Paints

Alameda County Environmental Health, Local Oversight Program (LOP) staff has reviewed the May 23, 2003 Supplemental Investigation of the Former Dunne Paints Facility, prepared by Clayton Group Services. This report provides the results of supplemental soil sampling in the western portion of this site in an attempt to characterize residual soils that would be left after the proposed excavation of this area to a depth of 10.5'. Twelve boring locations were sampled at a frequency of 1 per every 1000 square feet. The results indicate that only one area, near boring B18, would likely encounter total petroleum hydrocarbons as mineral spirits exceeding 5000 ppm at the excavated depth. Since the sample 2' deeper in the same area reported only 99 ppm TPHms, Clayton proposes to excavate this area an additional 2' at the time of soil excavation.

Based upon the results of the supplemental investigation, our office concurs with the proposal to excavate an additional 2' beneath the area of B18 at the time of site excavation. With the exception of noticeable areas of contamination uncovered during excavation ie free product or obvious staining and odor as observed by your consultant, no additional excavation will be required by our office.

You may contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

C: B. Chan, D. Drogos
Mr. Jon Rosso, Clayton Group Services, Inc., 6920 Koll Center Parkway, Suite 216, Pleasanton, CA 94566

Supsoilinv1007 41st St