EAST BAY
MUNICIPAL UTILITY DISTRICT

GARY L. HUNT
ASSISTANT GENERAL MANAGER
OPERATIONS, PLANNING, AND MAINTENANCE

January 19, 1996

Juliet Shin
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502

Dear Ms. Shin:

Subject: Transmittal of the Material Management Plan for the District's Adeline Maintenance Center

Enclosed for your review is a copy of the Materials Management Plan (MMP) developed for the Adeline Maintenance Center (AMC). As we have discussed in our meetings on this subject, the plan outlines the criteria for determining if soil containing petroleum hydrocarbons and /or other chemical constituents can be managed in place or must otherwise be remediated. The criteria were established using ASTM-RBCA and Tri-County Regional guidance. It also outlines the process for integrating additional characterization and remediation of contaminated materials with the ongoing AMC construction project. The MMP is designed to be a working document in that assumptions used in the development of threshold criteria will be reevaluated as additional soil and groundwater data is collected during AMC construction.

I would like to meet with you to discuss the MMP within the next week or two. We are currently beginning phase 1 AMC construction in block 4, following the procedures and criteria outlined in the MMP. I will call you to set a meeting date. Please give me a call if you have any questions.

Sincerely,

Eileen Fanelli

EILEEN FANELLI
Senior Environmental Compliance Specialist

EMF:prb

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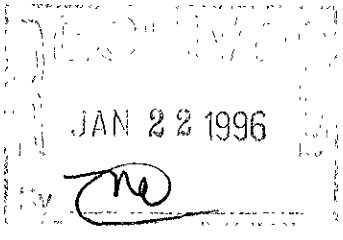


375 ELEVENTH STREET . OAKLAND . CA 94607-4240 . (510) 287-0444
P.O. BOX 24055 . OAKLAND . CA 94623-1055

GeoPlexus, Inc.

Health & Safety Training • Geo/Environmental Personnel • Engineering Geology Consultants • Environmental Management Consultants

MATERIALS MANAGEMENT PLAN
for
EAST BAY MUNICIPAL UTILITY DISTRICT
ADELINE MAINTENANCE CENTER
1200 21st STREET
OAKLAND, CALIFORNIA

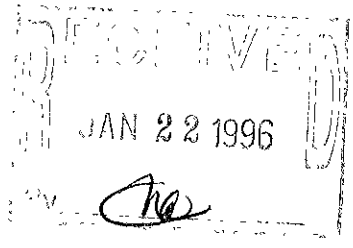
prepared for:

Walsh Pacific Construction
EBMUD Adeline Maintenance Facility
2130-A Adeline Street
Oakland, California

and

Special Projects Division
Engineering Department
East Bay Municipal Utility District
375 Eleventh Street
Oakland, California

January 18, 1996



1900 Wyatt Drive, Suite 1 • Santa Clara, California 95054 • Phone 408/987-0210 • FAX 408/988-0815

MATERIALS MANAGEMENT PLAN
for
EAST BAY MUNICIPAL UTILITY DISTRICT
ADELINE MAINTENANCE CENTER
1200 21st STREET
OAKLAND, CALIFORNIA

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Geo Plexus, Incorporated
1900 Wyatt Drive, Suite 1, Santa Clara, California 95054 Phone 408/987-0210 Fax 408/988-0815

ACRONYMS

AMC	Adeline Maintenance Center
ASTM	American Society for Testing and Materials
BTEX	Volatile Aromatic Compounds (Benzene, Toluene, Ethyl benzene and Xylene)
DHS	State of California Department of Health Services
DTSC	State of California Department of Toxic Substance Control
EBMUD	East Bay Municipal Utility District
EPA	U.S. Environmental Protection Agency
FID	Flame Ionizing Detector
HVOC	Halogenated Volatile Organic Compounds
LUST	Leaking Underground Storage Tank
MMP	Materials Management Plan
OVA	Organic Vapor Analyzer
OVM	Organic Vapor Meter
PID	Photoionization Detector
RBCA	Risk-Based Corrective Action
RBSL	Risk-Based Screening Levels
RCRA	Resource Conservation and Reclamation Act
RWQCB	State of California Regional Water Quality Control Board
STLC	Soluble Threshold Limit Concentration
TPH gas	Total Petroleum Hydrocarbons as gasoline
TPH diesel	Total Petroleum Hydrocarbons as diesel
TTLC	Total Threshold Limit Concentrations
UST	Underground Storage Tank
WPC	Walsh Pacific Construction
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compounds

MATERIALS MANAGEMENT PLAN
for
EAST BAY MUNICIPAL UTILITY DISTRICT
ADELINE MAINTENANCE CENTER
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1.0 INTRODUCTION

East Bay Municipal Utility District (EBMUD) is constructing a new Adeline Maintenance Center (AMC) at the site of the existing AMC. The AMC site comprises four city blocks, as shown in Figure 1. Walsh Pacific Construction (WPC) has been retained by EBMUD as the design/build contractor for the AMC project which includes demolition of several existing structures, the construction of 5 new buildings, and remodeling of 2 buildings. The construction project will be completed in 3-phases over a 2-year period ending approximately November, 1997.

Alameda County Health Department is the lead regulatory agency providing oversight of environmental investigations and remedial activities conducted at the site. References specific to this document are included in Appendix A.

1.1 PURPOSE AND SCOPE

Previous environmental investigations of the AMC site have identified localized areas of soil contamination, primarily from the past operation of underground storage tanks. The purpose of this Materials Management Plan (MMP) is to coordinate on-going remediation of environmentally impaired soil with the planned AMC construction activities in order to obtain regulatory closure of the site.

The MMP summarizes:

- the existing environmental site conditions relative to the planned AMC construction activities (Section 1);
- presents threshold criteria, based on applicable guidance, for remediation of impaired soil (Section 2);
- identifies areas within the AMC site where contaminants exceed threshold concentrations and require remediation either during or after ACM construction (Section 3);
- evaluates potential management options (Section 4);
- describes additional characterization activities and action plans for specific areas within the AMC together with characterization and confirmation sampling protocols and procedures (Sections 5 and 6);
- outlines the technical approach to evaluate and manage unforseen soil and/or ground water contamination encountered during AMC construction (Section 7); and
- outlines the processes for documenting completed remedial activities (Section 8).

1.2 SITE DESCRIPTION AND BACKGROUND

The project site is located at 1200 21st Street in the City of Oakland, Alameda County, California, as indicated on Figure 1, and is owned and occupied by EBMUD. The project site, which comprises four city blocks, as indicated on Figure 2, has been used for vehicle and equipment maintenance and fuel storage/ distribution for EBMUD vehicles and equipment since at least the 1930's.

The site is currently occupied by several office structures (administration, engineering, shops, etc.), maintenance service areas, and parking/storage areas. The site has maintained several underground storage tanks for fuel dispensing and waste oil retention in the past (removed in November, 1994) which were located at the former service station building (Figure 2). EBMUD currently maintains two existing underground gasoline and storage tanks for vehicle servicing which are located at the Central Services Building (Figure 2), one underground waste oil tank at the existing Machine Shop (Figure 2), and several hydraulic lifts located in the vehicle work bay of the Auto Shop (Figure 2).

Observations recorded during removal of the underground storage tanks from the former service station in 1994 (Figure 3) identified that surface and near-surface soils to a depth of 12-feet were locally impacted with gasoline, diesel, and motor oil products. Based on the presence of strong gasoline vapors and the presence of petroleum products seeping from the sidewalls of the excavation, EBMUD personnel decided to proceed with limited excavation to abate the observed conditions. The excavation for the 4,000 gallon and adjacent concrete encased tanks was extended to abate the impacted soil (GEMS, 1994). Figure 4 illustrates the extent and configuration of the final excavation limits.

Subsequent to the tank removal and soil excavation activities, a preliminary site assessment was performed (Geo Plexus, 1995) which included advancing eighteen exploration borings across the property at the locations indicated on Figure 5. The borings were located to investigate potential areas of subsurface contamination from EBMUD facilities and operations, as well as from previous site uses (as documented by aerial photographs and site records) which included residential housing and commercial office/warehouse structures.

The project site is underlain by near uniform soil conditions composed of 1- to 3-feet of aggregate base and/or fill material underlain by brown to greenish-gray, fine-grained to silty sand to a gray-brown silty clay, to depths of 8-feet. An organic rich zone, locally classified as peat, was encountered between 8- to 10-feet below the ground surface. The borings terminated in a blue-green silty sand. Perched water was encountered in several of the exploration borings at depths ranging from 5- to 8-feet below the ground surface at the time of drilling.

Analytical testing of selected soil samples from these borings identified that subsurface soils locally contain petroleum hydrocarbons, organic solvents, and selected metals. The analytical test data for these samples is summarized in Appendix B.

Table 1 summarizes the identified areas and soil contaminates of concern within the AMC.

TABLE 1

KNOWN IMPACTED SOIL AREAS WITHIN THE AMC

Existing Buildings	TPH gas BTEX	TPH diesel	Oil & Grease	Volatile Organics (1)	Metals (2)	Free Product	Known Existing UST
Santa Fe Buildings and Parking Lot Area	♦	♦	♦		♦		
Central Service Center	♦	♦					♦
Machine Shop/Foundry	♦	♦	♦	♦			♦
Auto Shop Building	♦	♦	♦	♦			
Anderson Building	♦						
Former Service Station	♦	♦	♦			♦	

Notes: (1) Low concentrations of Volatile Organics detected include:
1,2-Dichlorobenzene, 1,4-Dichlorobenzene, 1,1-Dichloroethane, Tetrachloroethene, 1,1,1-Trichloroethane, and Trichloroethene
(2) Elevated levels of Cadmium, Copper, Lead and Zinc reported only in one soil sample at the welding shop.

Area summaries describing the general nature of contaminants encountered are presented below:

Santa Fe Buildings

Low concentrations (23-24 parts per million (ppm)) of Total Petroleum Hydrocarbons (TPH) as gas and low concentrations of Volatile Aromatic Compounds (BTEX) were encountered at the existing welding shop. Oil & Grease Compounds and TPH as diesel were detected at concentrations of 26 and 450 ppm, respectively.

Santa Fe Building Parking Lot Area

WPC advanced three shallow test pits (7-foot depth) within the planned "footprint" of Building 6 at locations indicated on Figure 6. Soils excavated from depths of 1- to 5-feet in Test Pit 1 (fill soil) emitted strong gasoline odors; however, the underlying native silty clay did not emit noticeable odors. Analytical testing of samples from 3- to 5-foot depths contained 2,100-~~6,700~~ ppm TPH gas and ~~77~~ 55 ppm Benzene. A sample obtained from 7-foot depths did not contain detectable concentrations of TPH gas; however, Benzene was detected at 0.010 ppm. The soil samples obtained from Test Pit 3 did not contain detectable concentrations of TPH gas or BTEX. The analytical test data is presented in Appendix C.

Perched water was observed to be seeping through the loose fill at the contact with the underlying sand and silty clay in all three test pits. The water in Test Pit 1 exhibited strong gasoline odors and analytical testing of "grab" water samples detected 17,000- 45,000 parts per billion (ppb) TPH as gas and 450-2,500 ppb Benzene. The water samples from Test Pits 2 and 3 did not contain detectable concentrations of TPH gas or BTEX.

Machine Shop/Foundry Area

Low concentrations of TPH diesel (1.9 ppm) were encountered in the soil sample from the boring advanced within the foundry.

Machine Shop Underground Storage Tank

Oil and Grease Compounds and TPH diesel were detected at concentrations of 24,000 ppm and 6,400 ppm, respectively in the soil samples obtained adjacent to the existing underground waste oil storage tank. Low concentrations of Volatile Organic Compounds and BTEX were also detected. (Refer to Fig 10)

Auto Shop Building

Oil and Grease Compounds were detected at concentrations of 13,000-18,000 ppm and TPH diesel was detected at concentrations of 2,200 ppm in the soil samples obtained adjacent to a hydraulic lift inside the building. Low concentrations of TPH gas and Volatile Organic Compounds were also detected.

Anderson Building

The analytical testing detected TPH as gas at concentrations of 120 ppm to 460 ppm and low concentrations of BTEX in the soil samples from within the Anderson Building.

Former Service Station

Six underground storage tanks (see Figure 3) were excavated and removed from the property in November, 1994. The native soil material exposed in the sidewalls of the excavation exhibited strong petroleum odors, soil discoloration/staining (gray-green color) and free-product was observed to be leaching from these soils. The excavation for the 4,000 gallon and adjacent concrete encased tanks was extended laterally to the north, east and south to abate the impacted soil (see Figure 4). The excavation was extended vertically to a depth of 13- to 16-feet below ground surface. Perched water was observed seeping from various locations along the side walls of the excavation and along the sand bedding for the various utility lines (storm sewer, sanitary sewer, water, phone lines, etc.) encountered within the limits of the excavation. Residual, near surface soil contamination remains in-place around the perimeter of the excavation, particularly beneath West Grand Avenue and beneath the former service station building.

1.3 PLANNED AMC IMPROVEMENTS

WPC has been retained by EBMUD for the design and construction of the new AMC. The work includes the demolition of several of the existing structures/facilities, remodeling of two existing buildings (Buildings 1 and 4) and construction of five new buildings (Buildings 2, 3, 5, 6, and 7). Figure 7 indicates the referenced building identifiers (name and number). The project will be completed in three (3) phases over a two-year period ending approximately November, 1977.

1.3.1 Project Elements

The construction project consists of numerous activities where potentially contaminated subsurface soils and perched water will be encountered. These activities include:

- excavations to 6-feet below the ground surface for new foundations and utilities;
- reworking, replacement, and compaction of site soils for foundation support (where soils meet specified construction criteria, as determined by the project geotechnical engineer);
- construction dewatering; and
- site grading.

As such, EBMUD has included in the construction contract provisions for managed remediation efforts of the contaminated soils, free-product, and contaminated perched water encountered during the construction. Management alternatives for soil and water generated during construction are detailed in Section 4 of this MMP.

1.3.2 Schedule and Phasing

The general schedule for each construction phase is outlined below:

	ANTICIPATED START DATE
PHASE 1	
Building 6 - Fleet Maintenance Building	
Demolition of Santa Fe Buildings	Jan, 1996
Construction of New Structure	
Building 5 - Materials Testing Laboratory	
Construction of New Structure	Feb-Mar, 1996
PHASE 2	
Building 3 - Shops Building	
Demolition of Old Service Station	July-Aug, 1996
Demolition of Auto Shop	
Demolition of Administration Building. West	
Construction of New Structure	

	ANTICIPATED START DATE
PHASE 3	
Building 2 - Stores Building	
Demolition of Machine Shop	May-July, 1997
Removal of Waste Oil Tank	
Demolition of Paint Shop and Carpenter Shop	
Demolition of Central Warehouse	
Construction of New Structure	
Building 7 - New Service Station	May-July, 1997
Demolition of Maintenance Building & Laundry	
Installation of New Underground Fuel Tanks	
Removal of Existing Underground Fuel Tanks	
Anderson Building.	
Demolition of Existing Building	Sept-Oct, 1997

2.0 THRESHOLD CRITERIA

The following outlines the threshold criteria for specific contaminants of concern at the AMC site. It also identifies applicable regulatory guidance and evaluates and presents criteria specific to the AMC site.

Various agencies have published criteria and guidelines related to investigation and remediation of soil and ground water contaminated with petroleum and chlorinated organic compounds. This section addresses the documents and guidelines which are applicable to the construction areas and addresses the technical approach used to develop cleanup levels for the AMC site. These levels are based on our current understanding of site conditions and will be re-evaluated as additional data is collected throughout the construction phases of the project.

2.1 APPLICABLE GUIDELINES AND EVALUATION OF CRITERIA

The following standards and/or guidelines have been used to evaluate the known site conditions and to assist in determining the limits of anticipated remedial action, and would be used to evaluate the need for remedial action based on conditions encountered during construction, and provide the basis for characterization and criteria for disposal of the soil generated:

- State of California Leaking Underground Fuel Tank Field Manual

  This document provides regulatory agencies with guidelines in dealing with leaking fuel tank problems. The manual is intended to assist in assessing fuel leaks, by providing a framework for determining required investigation of sites and of cleanup levels, of screening sites, and for determining remedial actions. It provides general guidance, and is not a standard or specific guideline.

- State of California Regional Water Quality Control Board Tri-Regional Guidelines

  These documents present recommendations for the initial investigation of Underground Storage Tank (UST) releases and tank removal processes. The reports describe fuel leak indicators, and present the requirements for site investigations (soil and ground water).

- California Code of Regulations - Title 22

  Presents environmental health standards for the classification and management of hazardous waste. The document also establishes drinking water standards, waste treatment standards, and threshold limit concentrations for hazardous materials.

- Resource Conservation and Recovery Act

  Provides framework for federal regulation of hazardous waste and controls the generations, transportation, treatment, storage, and disposal of hazardous waste. RCRA established the "cradle to grave" aspect of hazardous waste management and disposal.

- ASTM Risk-Based Corrective Action Applied at Petroleum Release Sites
  Provides a decision making process for the assessment and response to subsurface (soil and ground water) contamination based on risk to human health and environmental resources. The Risk-Based Corrective Action (RBCA) process recognizes the variability in complexity, physical and chemical characteristics and risk to human health and environmental resources of sites and utilizes a tiered approach to match appropriate assessments and remedial activities in consideration of more cost-effective remedial action.

- EPA SW846
  Provides sampling and analytical testing methodology for solid waste.

- Federal OSHA and CAL OSHA guidelines
  Documents provide guidelines, standards, and regulations to protect workers from occupational hazards, including mandating training in various aspects of hazardous materials handling and exposure.

- NIOSH and ACGIH Threshold Limit Values
  Documents present published information on health effects and standards or guidelines for protection of workers from exposure to various chemicals and compounds.

2.2 EVALUATION OF APPLICABLE CRITERIA

The principal guidance documents applicable to estimating the human health and environmental risk of site contaminants are the Tri-Regional Guidelines and the ASTM Risk-Based Corrective Action (RBCA) document. The Tri-Regional Guidelines present generalized maximum soil contaminant levels for TPH as gas, diesel, and oil & grease compounds and BTEX compounds. The ASTM-RBCA document outlines general assessment criteria based on the risk of exposure to the contaminated soil (by off-gassing and/or direct contact) and by the potential for contaminants leaching to the ground water.

The Tri-Regional Guidelines have been used a standard for petroleum hydrocarbon clean-up activities throughout the San Francisco Bay Area and will be used to develop clean-up levels for petroleum contaminated areas located within the footprint of the planned structures. Certain aspects of these criteria are more stringent than the ASTM-RBCA criteria. However, since the areas beneath the new structures will be inaccessible for future assessment these criteria provide a conservative level of assurance that potential risks have been mitigated.

For areas outside of the building footprints, the ASTM-RBCA criteria will be used to evaluate the need to remove contaminated soil with respect to organic contaminates. The application of the ASTM-RBCA criteria is deemed relevant and applicable for the isolated areas of heavy petroleum hydrocarbon compounds (i.e., diesel, oil and grease, etc.) known to be present outside the planned buildings.

Using the ASTM-RBCA approach, the following site conditions and assumptions have been used to assess the project site:

(1) the project site is a commercial/industrial land use;
(2) the planned structures do not have basements and include soil vapor barriers;
(3) the site is covered by structures and/or pavement preventing exposure by air-born particulates or direct soil contact; and
(4) shallow ground water is locally known to be brackish and is not known to be used as a potable water source for domestic or industrial supply.

Elimination of the soil vapor, soil volatilization, and soil contact/ingestion as exposure pathways for the project site, results in one relevant exposure pathway; the potential for contaminants to leach from the soil into the underlying ground water. The local, shallow ground water is known to be brackish and to our knowledge is not used as a potable water source.

Based on the above factors, using a cancer risk of 1×10^{-4} as outlined in the ASTM-RBCA document is conservative for the development of petroleum related soil clean up levels at the AMC site.

Inorganic contaminants of concern are limited to selected heavy metals (Cadmium, Copper, Lead, and Zinc). Hazardous waste classification criteria, as outlined in California Code of Regulations Title 22, was used to establish conservative cleanup levels.

2.3 SUMMARY OF THRESHOLD CRITERIA

The risk-based analysis requires establishing Tier-1 Evaluation Risk-Based Screening Levels (RBSL) for contaminants of concern to evaluate the necessity for soil and/or ground water remediation. The ASTM-RBCA document provides case examples and Tier-1 RBSL's for petroleum products, exposure pathways, and site use (commercial/industrial) similar to the AMC site conditions and utilizes human risk target levels comparable to those considered applicable to the AMC site. As such, the Tier-1 RBSL's presented in the ASTM-RBCA document for a cancer risk of 1×10^{-4} are considered conservative and applicable to the project site.

Table 2 summarizes the maximum concentrations of TPH compounds (gas, diesel, and oil & grease) and the BTEX compounds in soil which could be left in-place for protection of ground water resources based on the Tri-Regional Guidelines (for beneath planned structures) and presents the ASTM-RBCA RBSL's for contaminants of concern (for areas outside of the planned building footprints).

TABLE 2

THRESHOLD VALUES FOR SOIL

Constituent	Tri-Regional Guidelines	RBSL to Protect Ground Water (Soil core.)
TPH gas	100 ppm	unlimited
TPH diesel	1,000 ppm	unlimited
Oil & Grease	1,000 ppm	unlimited
Benzene	0.3 ppm	~~5.78~~ 1.68 ppm ← not correct. Needs to be multiplied by 0.29 ppm.
Toluene	0.3 ppm	361 ppm
Ethylbenzene	1 ppm	133 ppm
Xylenes	1 ppm	not applicable

PNAs?

Low concentrations of Volatile Organic Compounds (VOC's) were detected in one soil sample obtained adjacent to the existing waste oil tank (scheduled to be removed during construction) and from a soil sample obtained adjacent to a hydraulic lift within the existing auto shop (also scheduled to be removed during construction). The remaining soil samples analyzed did not contain detectable concentrations of VOC's and as such, these compounds are considered to be of very limited extent.

The current criteria established in the California Code of Regulations Title 22 for determination of maximum concentrations of VOC's in soil is related to toxicity characterization for landfill disposal and are not relevant to evaluation of the concentrations of VOC's acceptable to remain in the soil at the AMC site. At this time, risk-based assessments similar to the petroleum constituent analysis previously addressed, have not been completed to establish the applicable VOC threshold criteria for the AMC site. Specific evaluations will be performed for the areas of concern for Phase II and Phase III project areas and will be submitted as addenda to this MMP as discussed in Section 6.2. VOC's are not contaminants of concern for the Phase I construction area.

The classification of soils containing heavy metals is stipulated in the California Code of Regulations Title 22 as Total Threshold Limit Concentrations (TTLC) for disposal classifications. TTLC's for the metals of concern at the AMC site are outlined below:

Metals of Concern	TTLC
Chromium	2,500 ppm
Copper	2,500 ppm
Lead	1,000 ppm
Zinc	5,000 ppm

Only one sample of soil from the existing welding shop area contained Lead above the TTLC. No other metal constituents in this sample were above the TTLC's and no other samples contained elevated metal concentrations. Since lead was the only elevated metal constituent, and noting that the effected area will be paved preventing human contact with the soil, use of the TTLC as cleanup criteria is conservative for the project site.

The above threshold values are conservative, based on the following:

- the property will be entirely capped by buildings or pavements preventing dermal contact with, or ingestion of, soil by site workers or the public;
- ground water is not known to be locally used for domestic supply in the project vicinity;
- contaminant leachate potential to ground water is minimal; and
- because paving will prevent significant infiltration of precipitation.

but not all

Treatment/disposal criteria for water extracted during construction dewatering will be based on NPDES and/or EBMUD sanitary sewage discharge permit requirements. Threshold values for ground water have not been established for this project due to a lack of existing water quality data and absence of identified impact. Ground water quality data will be evaluated as it is collected during the AMC construction project.

3.0 AREAS OF CONCERN

The areas of concern are described by construction phase and are further described as the following two categories:

(1) within the construction limits - defined as within the footprint and/or structural excavation of the planned structures
(2) outside of construction limits - defined as outside of the footprint and/or structural excavation of the planned structures.

Table 3 summarizes the project areas where contaminants of concern are present above the threshold criteria outlined in Section 2.3.

TABLE 3

AREAS OF ANTICIPATED REMEDIATION

Planned Construction Phase and Building	UST Removal	Remedial Excavation within Building Footprint	Remedial Excavation Extending Beyond Building Footprint
Phase 1 - Fleet Maintenance Building.		♦	♦
Phase 2 - Shops Building.		♦	♦
Phase 3 - Stores Building (Central Warehouse Building)	♦		♦
Phase 3 - Existing Fuel Station	♦		♦

~~Former Service St~~ (Refer to titles given in Section 1.3.2, pg 5)

3.1 WITHIN CONSTRUCTION LIMITS

Based on Tri-Regional Guidelines soil in several areas within the proposed footprints of the planned structures have concentrations of petroleum hydrocarbons, BTEX constituents, or volatile organic compounds concentrations above threshold criteria. The estimated extent of areas of concern are described below:

PHASE 1

Building 6- Fleet Maintenance Bldg.

Based on analytical testing of soil samples obtained from the test pits, soils with elevated levels of TPH gas and BTEX exist within the northeast corner of the planned building area as indicated on Figure 8.

no. levels of benzene exceeding the 1.68 ppm threshold were observed in MK121, MK122 at 12' bgs MK120

PHASE 2

Building 3 - Shops Bldg.

Based on previous remedial action at the former service station it is anticipated that soil containing petroleum products above the threshold limit will be encountered at depths of 1- to 7-feet below the ground surface (see Figure 9). Furthermore, based on the information derived from the borings advanced within the existing auto shop, it is anticipated that soil containing petroleum and volatile organic compounds above the threshold limit will be encountered immediately adjacent to the existing hydraulic lifts.

3.2 OUTSIDE OF CONSTRUCTION LIMITS

Based on the existing data, several areas outside of the building footprints have been identified which have petroleum compounds which exceed the ASTM-RBCA Tier-1 RBSL's. These include:

PHASE 1

Building 6- Fleet Maintenance Building.

Based on evidence obtained from the previous exploratory borings, and from the data derived from the recent test pit data, soils with elevated levels of TPH gas and BTEX will be excavated beyond the northeast corner of the planned building and could extend to beneath the existing Welding Shop building (see Figure 8). These soils will also be screened to determine if elevated concentrations of Lead exist. Soils located outside of the building footprint with concentrations of contaminates below the Tier-1 RBSL's will be left in-place.

PHASE 2

Building 3 - Shops Building.

Based on previous remedial action at the former service station and investigation borings within the existing auto shop, it is anticipated that soil with concentrations of petroleum products in excess of the Tier-1 RBSL's will be encountered at depths of 1- to 10-feet below the ground surface beyond the footprint of the proposed structure (see Figure 9). at least to 12' bgs

PHASE 3

Building 2 - Stores Building (Central Warehouse)

One existing 1,000-gallon underground waste oil storage tank will be removed from outside of the existing Machine Shop building (see Figure 10) along with the soil immediately adjacent to the tank which exceed the Tier-1 RBSL's. Need to be sampled for PNAs. Samples from boring 2-7 never was analyzed for PNAs

Existing Fuel Station

Two existing 10,000-gallon underground storage tanks (gasoline and diesel fuel) will be removed from the existing fuel station (located at the existing Central Services Building). Based on previous investigations, it is not anticipated that any soil would be removed from beneath or adjacent to the tanks.

4.0 PREFERRED SOIL MANAGEMENT OPTIONS

This section of the MMP addresses the evaluation of management options for soil containing contaminants of concern above threshold criteria identified in Section 3.

4.1 EVALUATION CRITERIA

The various treatment and/or disposal options considered include on-site and off-site resources to accomplish the reduction in concentrations of petroleum hydrocarbons, to minimize the generation of hazardous materials, and to minimize the charges associated with the anticipated remedial activities. An evaluation of on-site remediation for pre-treatment of the anticipated excavated soils prior to disposal or for re-use as backfill material has been performed with respect to time, available space for treatment activities, and cost limitations imposed by the AMC construction. These limitations include:

TIME: The AMC is an operating EBMUD facility and all construction related activity necessitates temporary relocation of EBMUD employees and maintenance/repair facilities. The AMC construction schedule has been established and is organized with the employee/ maintenance activity relocation effort to expedite the construction and to reduce the impact on the continued operation of the AMC.

AVAILABLE SPACE FOR TREATMENT: As previously stated, the AMC activities will continue during the construction period and the specific functions disrupted by the construction activities will be temporarily relocated within the AMC site. As such, there are two specific impacts to the available space for on-site treatment activities: (1) the area of planned construction, and (2) the area necessary to relocated vehicles, maintenance activities and equipment, temporary offices, etc. This leaves little space for staging soil for treatment. The available space within the AMC is estimated to be less than a few hundred square feet.

COST: The project goal is to complete the construction of the AMC and any necessary remediation of contaminated soil conditions encountered as cost effectively as possible within the existing construction plans, specifications, allotted schedule, and budget. For example, the AMC construction plans minimize the need for purchase of fill, by re-compaction of existing soil to the extent possible. Preferred management alternatives should minimize the amount of material excavated for off-site disposal if on-site treatment and re-use are viable options.

4.2 ON-SITE TREATMENT/REUSE OPTIONS

The following table summarizes the on-site treatment technology considerations:

TABLE 4

ON-SITE TREATMENT CONSIDERATIONS

TREATMENT OPTION	TREATMENT COST	TIME REQUIRED	SPACE REQUIREMENTS	EVALUATION
Aeration of petroleum impacted soils	$45-65/ton	1- month to 6-months per construction phase	Approx. 65,000 square feet for duration of project	Exceeds available space and imposes construction delays
Bioremediation of petroleum impacted soils	$28-35/ton	1- month to 6-months per construction phase	Approx. 45,000 square feet for duration of project	Exceeds available space and imposes construction delays
Incineration of petroleum impacted soils	Setup $9,500-11,000 Treatment - $75/ton	1- month to 2-months per construction phase	Approx. 65,000 square feet for duration of project	Exceeds available space
Soil Washing of petroleum impacted soils	Setup - $8,500-12,000 Treatment - $95/ton	1- month to 3-months per construction phase	Approx. 65,000 square feet for duration of project	Exceeds available space and imposes construction delays. Generates waste.
Chemical Fixation of metal contaminated soils	$45-85/ton	20-days to 30-days per construction phase	Approx. 25,000 square feet per treatment site	Only metal identified is lead and quantity is small. Not feasible.

Note: Cost indicated is direct treatment cost and does not reflect the cost for excavation, transport, and contractor overhead/profit or cost impact to EBMUD operations.

4.3 OFF-SITE TREATMENT/DISPOSAL OPTIONS

The following table summarizes the off-site disposal considerations:

TABLE 5

OFF-SITE DISPOSAL CONSIDERATIONS

DISPOSAL OPTION	COST	MATERIALS LIMITATIONS	ANALYTICAL REQUIREMENTS	EVALUATION
Class III Landfill	$27-58 per ton	TPHgas <100 ppm TPH diesel < 1000 ppm Oil & Grease < 1000 ppm Benzene < 0.4 ppm	Requires specific profiling prior to materials acceptance and determination of cost	Direct load & haul upon profiling and acceptance. Requires import fill.
Class II Landfill	$31-40 per ton	TPHgas <10,000 ppm TPH diesel < 10,000 ppm Oil & Grease <10,000 ppm Benzene < 10 ppm	Requires specific profiling prior to materials acceptance and determination of cost	Direct load & haul upon profiling and acceptance. Requires import fill.
Class I Landfill	$173-335 per ton	none for petroleum contaminated soils	Requires general profiling prior to materials acceptance and determination of cost	Direct load & haul. Requires import fill. Significant cost impact.
Off-Site Incineration	$33-55 per ton	STLC Lead Limits	Requires general profiling prior to materials acceptance	Direct load & haul upon profiling and acceptance. Requires import fill.

Note: Cost indicated is transportation and disposal cost and does not reflect the cost for excavation or backfill materials, contractor overhead/profit or cost impact to EBMUD operations.

4.4 PREFERRED OPTIONS

Use of on-site treatment methods (bioremediation, aeration, etc.) for the remediation of petroleum contaminated soils would necessitate treatment periods of 1- to 6-months (for each construction phase) which imposes significant and unacceptable delays in completion of the construction and continued disruption of the AMC activities. Furthermore, the area necessary to mix and treat the soils far exceeds the available space at the AMC.

Use of alternative treatment technologies (e.g, incineration, soil washing, etc.) were considered and although they decrease the time necessary for treatment, the area required for equipment, stockpiling, and treatment far exceeds the available space at the AMC. The equipment and labor related to the handling and transport of the soils for on-site treatment increases the construction budget and the construction delays imposed pending treatment of the soil for re-use results in significant impacts to the construction schedule and continued disruption of the AMC activities. It is noted that the noise and emissions generated from the on-site treatment activities (24-hour operation of equipment) may present unacceptable impacts to the neighboring residential community. Therefore, large-scale, on-site treatment of the soils has been omitted from further consideration.

Aeration of limited quantities of soil contaminated with TPH gas or VOC's is appropriate if the aeration results in the materials being acceptable for re-use as backfill and space is available.

Based on these preliminary evaluations and unit costs, the following treatment/disposal methods will be utilized:

TPH gas contaminated soil:

- Direct load and haul for landfill disposal (pre-characterized/approved)
- Stockpile and sample followed by landfill disposal (undocumented soil)
- On-site aeration for materials with re-use as backfill (if space available)

TPH diesel and Oil & Grease contaminated soil:

- Direct load and haul for landfill disposal (pre-characterized/approved)
- Stockpile and sample followed by landfill disposal (undocumented soil)

Metals contaminated soil (only if characterization results warrant remediation):

- Direct load and haul for landfill disposal (pre-characterized/approved)
- Stockpile and sample followed by landfill disposal

Organic Solvents:

- Direct load and haul for landfill disposal (pre-characterized/approved)
- Stockpile and sample followed by landfill disposal (undocumented soil)
- On-site aeration for materials re-use as backfill

Since actual quantities of soil and concentrations of contaminants have not yet been determined, the selection of the appropriate landfill has not been completed. As described in Section 6, additional soil borings or test pits will be advanced in areas to characterize the soil and to identify appropriate disposal options.

5.0 METHODOLOGY

The following describes the protocols for managing soil and perched water conditions encountered during the AMC construction where contaminants exceed the established threshold criteria. The vertical and lateral extent of the hydrocarbon and solvent impacted soils at the project site have not been completely delineated at this time. Therefore, provisions have been included for additional characterization through soil borings and/or test pits as presented in Sections 6 and 7. Protocols for field screening areas where contamination is not known or suspected to exiist are presented in Section 7.

5.1 EXCAVATION PROTOCOLS

Excavation of soil containing contaminants above threshold criteria will be performed by a State of California Class A Contractor with the Hazardous Materials Certification under direct oversight of a Certified Engineering Geologist from Geo Plexus, Inc. and documentation will be recorded in a fashion which will result in site characterization (including excavation profiling and logging and documenting of sample locations) being performed as the excavation proceeds.

clean soils or those below threshold levels?

It is anticipated that the excavation will proceed in a fashion which will allow for the separation of any clean soils from the impacted soils. Field screening of the excavated soils will be performed on-site through the use of an Organic Vapor Analyzer (OVA) or Organic Vapor Meter (OVM) and with a Hanby Field Test Kit (for petroleum compounds) as the excavation proceeds. Soils exhibiting visible evidence of petroleum or solvent contamination (e.g., visible staining, visible sheen and/or product, noticeable odors, etc.) will be segregated as contaminated soils. Interim analytical testing of soil samples will be performed to correlate the OVA/OVM readings and Hanby Test Kit results with petroleum concentrations in the excavated soil material. It is anticipated that soils which do not exhibit detectable vapors and have OVM readings less than 10 ppm will be segregated and stockpiled as clean soil materials. Interim analytical testing of soil samples will be performed to verify the field results.

changed (units (could be ASTM values)?

The excavation will proceed laterally and vertically beneath the planned structures until the soil conditions are below the ~~Tri-Regional Guideline~~ criteria and will extend laterally outside of the planned building footprints until the soil concentrations are within the Tier-1 RBSL's or until functional excavation limits are encountered (i.e., encroachment of structures to remain, public property, etc.). The excavation will progress vertically outside of the building footprints until soil conditions within the RBSL's are achieved.

5.2 EXCAVATION CHARACTERIZATION

Geo Plexus personnel will be providing continuous observation of the excavation activities to assure compliance with this MMP. On site documentation of the field conditions and remedial activities will be recorded on a daily basis to include air/vapor monitoring data, field test kit analysis data, sampling data, and chain-of-custody documentation for any samples (soil or grab water) collected and other pertinent observations recorded. A base map will be updated daily identifying the locations of the excavation limits and noting the sample locations.

5.3 DEWATERING

It is anticipated that perched ground water (observed in the previous excavations, test pits, and borings) will be encountered in localized areas during excavation. Prior to beginning excavation for each project phase, the area will be investigated using test pits to assess the presence of perched water and to evaluate the need for dewatering. Samples of any water encountered will be collected for analytical testing and the results will be reviewed to determine if treatment of the water is required prior to discharge under appropriate permit conditions. .

5.4 CONFIRMATION SAMPLING

Soil samples will be obtained prior to or during excavation activities to complete the characterization of soil and/or ground water in the areas identified in Section 3.0. Final verification samples of the native soil materials at the base of the excavation and from the excavation sidewalls will be obtained to document the site conditions prior to backfilling and construction. At this time, we anticipate obtaining 1 sample per 200 square feet in areas where contamination above threshold criteria is removed. However, this rate may be revised based on an evaluation using EPA SW-846 guidelines.

The soil samples would be obtained from the excavation sidewalls and excavation bottom by advancing a pre-cleaned 2 inch I.D. brass or stainless steel liner into the undisturbed soil. Should the excavated area to be sampled not be directly accessible for personnel for safety reasons, the samples would be obtained remotely through the use of a backhoe or excavator.

The soil samples would be immediately sealed in the liners using aluminum foil or teflon tape and plastic caps and properly labeled including: the date, time, sample location, and project number and would be immediately placed on ice for transport to the laboratory under chain-of-custody documentation.

The soil samples would be submitted to and tested by a State of California, Department of Health Services certified testing laboratory. Analytical testing would be scheduled and performed in accordance with the State of California, Regional Water Quality Control Board Recommendations for Initial Evaluation and Investigation of Underground Tanks and Alameda County Department of Environmental Health guidelines.

Depending on the contaminants known to be present at the various work areas, the testing could include: Total Petroleum Hydrocarbons as gasoline by Method GCFID 5030/8015, Total Petroleum Hydrocarbons as diesel by Method GCFID 3550/8015, Oil & Grease by EPA Method 5520, Volatile Aromatics (BTEX) by EPA Method 8020, Volatile Halogenated Compounds by EPA Method 8010, and RCRA 9-Metals by EPA Methods 7000 series.

5.5 TANK EXCAVATION AND REMOVAL

The tank removals would be performed by a State of California Class A Contractor with the Hazardous Materials Certification. An Alameda County Department of Environmental Health Tank Removal/Closure Permit application would be prepared and submitted prior to removal of the tank. The tank removal activities would be coordinated with the Alameda County Department of Environmental Health personnel. also Fire Dept.

The existing pavement and soil material overlying the tank will be removed and excavated with a backhoe to expose the tank and to verify the size and construction of the tank. The excavation will then proceed around the tank to expose the sides and associated piping. Fluids contained in the tank will be extracted by pumping and retained on-site in 55-gallon containers for disposal or be directly evacuated by vacuum truck and transported directly for disposal/recycling by a licensed facility. The piping connected to the tank will be removed and temporarily plugged to prohibit discharge.

The tank would be inerted by placing a minimum of 50-pounds of dry-ice into the tank and allowed to vent to the atmosphere until the oxygen content is determined to be below 16% and the Lower Explosive Limit (LEL) is determined to be below 10% of the LEL as measured by a Gastech Tank Tester device. The Gastech device would be calibrated the day of the tank removal by the contractor personnel.

The tank + piping would be removed and transported from the property under hazardous waste manifest documentation by a licensed hazardous material transporter for destruction at their treatment, storage, and disposal facility.

Soil samples would be obtained from the native soil material beneath the tank as required by the Alameda County Department of Environmental Health personnel and would be performed by Geo Plexus, Incorporated personnel by and/or under the direct oversight of a Certified Engineering Geologist. The soil samples to be collected for analytical testing would be obtained from the backhoe bucket by advancing a pre-cleaned 2 inch I.D. brass or stainless steel liner into the undisturbed soil contained in the backhoe bucket. The soil samples would be immediately sealed in the liners using aluminum foil or teflon tape and plastic caps and properly labeled including: the date, time, sample location, and project number. The samples would be placed in a cooler maintained at 4°C immediately for transport to the laboratory under chain-of-custody documentation.

The soil samples would be submitted to and tested by a State of California, Department of Health Services certified testing laboratory. Analytical testing would be scheduled and performed in accordance with the State of California, Regional Water Quality Control Board Guidelines and Alameda County protocols and would be extracted/analyzed within the maximum sample holding times.

The analytical testing schedule will be determined in coordination with Alameda County personnel at the time the tank is removed.

5.6 WORKER HEALTH AND SAFETY ISSUES

Previous investigation activities identified the presence of Total Petroleum Hydrocarbons as gasoline, diesel, and motor oils, Volatile Aromatic/Organic Compounds, and heavy metals in the soil at the individual areas identified. It is anticipated that potential chemical exposure to site personnel could exist for short periods of time (intermittent each day); however, since the site is not fully characterized, the potential exists for greater exposure to elevated concentrations of fuel products, aromatic/organic compounds, and heavy metals.

Table 6 summarizes the OSHA training requirements for personnel involved in the remedial action portion of this project. All environmental related work would be performed in accordance with this MMP and within the protocols specified in the Health and Safety Plan (to be prepared as a separate document and incorporated herein by reference).

TABLE 6

OSHA TRAINING REQUIREMENTS

Personnel	40-HR Hazwoper	32-HR Site Worker	24-HR Site Worker	8-HR Supervisor	Confined Space (1)	CPR/ First Aid
Equipment Operator	♦					
Truck Operators			♦			
Site Workers (2)	♦	♦	♦	♦	♦	♦
Project Manager	♦			♦		
EBMUD Personnel			♦			
Geo Plexus Personnel	♦			♦	♦	♦

NOTES:(1) Confined space training required only if confined spaces are determined to be present and entry into confined space is anticipated.
(2) Level of training dependant on worker exposure to hazardous materials and assigned duties. Site Workers includes subcontractor personnel.

6.0 AREA-SPECIFIC IMPLEMENTATION PLANS

The following sections present general protocols for supplemental site investigations as required and present generalized remedial action plans for each construction phase.

6.1 SUPPLEMENTAL INVESTIGATIONS PROTOCOLS

Supplemental investigations of identified and/or suspected areas would be conducted to reduce the uncertainty of remediation requirements for the individual areas and to assess the potential for perched water to be present. The investigations would be accomplished with test pits and/or advancing soil borings.

Test pits will be advanced by WPC personnel with a backhoe and borings will be advanced by a State of California Licensed Drilling Contractor. Both test pits and borings will be logged under the supervision of a State of California Certified Engineering Geologist.

The soils encountered within the test pits will be monitored in the field for evidence of hydrocarbon content through the use of a portable photo-ionization detector (PID), organic vapor meter (OVM), or similar device. The test pits will be backfilled with the excavated materials.

Soil samples collected from the test pits for analytical testing will be obtained from the backhoe bucket by advancing a pre-cleaned 2 inch I.D. brass or stainless steel liner into the undisturbed soil contained in the backhoe bucket. The soil samples will be immediately sealed in the liners using aluminum foil and plastic caps and properly labeled including: the date, time, sample location, and project number. The samples will be immediately placed in a cooler maintained at 4°C for transport to the laboratory under chain-of-custody documentation.

Drilling and sampling equipment used for advancing the exploratory borings will be thoroughly steam cleaned before drilling begins and between each boring to prevent the introduction of off-site contamination and cross contamination between borings. Sampling equipment will be cleaned between sample events by steam cleaning or using a phosphate-free detergent bath and double rinsed in hot water baths to prevent cross contamination. The drilling and sampling equipment will be steam cleaned subsequent to completion of the field activities. Soil cuttings and rinsate waters derived from the borings/cleaning will be retained in 5- gallon and/or 55-gallon containers and stored on-site during the drilling pending results of the analytical testing. The drill cuttings and soil samples will be monitored in the field for evidence of hydrocarbon content through the use of a PID or OVM. The borings will be backfilled with a neat cement slurry to the ground surface upon completion of drilling/sampling.

Soil samples from the borings will be obtained through the use of a 2 inch I.D. split-barrel sampler advanced into the undisturbed soil by a 140 pound hammer repeatedly falling 30 inches. Sand catchers will be used as necessary to retain the samples. A split-barrel, standard penetration sampler will be used should the 2 inch sampler prove ineffective at obtaining the samples. The soil samples will be retained and transmitted to the laboratory as previoulsy described and will be tested as deemed appropriate.

6.2 IMPLEMENTATION PLANS

The following describes conceptual work plans by AMC construction phase to further characterize and remediate as necessary, the soil conditions encountered. The additional characterization test pits/borings will be coordinated with the established construction schedule and Alameda County Department of Environmental Health personnel will be notified at least one-week prior to commencing with field investigation and remedial activities. Detailed phase-specific work plans will be submitted as addenda to this MMP.

6.2.1 Phase 1

Building 6 - Fleet Maintenance Building

Figure 8 illustrates the anticipated areas of soil excavation for Phase 1 AMC construction and areas where soilis likely to contain contaminants of concern above threshold criteria.

Within Building Footprint

The underlying soils containing TPH gas constituents above criteria will be excavated and removed from the site for disposal at an appropriate landfill (approximately 450-1,200 yds.). It is anticipated that up to 6 test pits will be advanced to collect additional soil samples for "pre-characterization" for landfill disposal. The samples would be submitted for analytical testing for TPH gas, BTEX, Resistivity-Corrosivity-Ignitability (RCI), and Metals (TTLC and STLC) as required by the landfills. PNAs too

The contaminated perched water anticipated to be encountered will be evacuated and treated prior to discharge under appropriate permit conditions.

Outside of Building Footprint

It is anticipated that the existing asphalt paving surface will be removed and the existing welding shop will be demolished and removed from the site for disposal. The underlying soils known to contain TPH gas constituents (approximately 600-1,300 yds.) will be excavated and spread out on-site for aeration to promote volatilization of the gasoline constituents (if space is determined to be available). An air discharge permit would be obtained from the Bay Area Air Quality Management District prior to placement of the soils for aeration. The soils will be tilled/turned daily to promote the aeration process. Following aeration, confirmation soil samples will be collected to characterize the soil for re-use as backfill. The excavation will also be sampled as outlined in Section 5.4.

Any perched water encountered will be evacuated and treated prior to discharge under appropriate permit conditions.

6.2.2 Phase 2

Figure 9 illustrates the areas the anticipated areas of soil excavation for Phase 2 AMC construction and areas where soil is likely to contain contaminants of concern above threshold criteria.

Building 3 - Shops Building

Within Building Footprint

The soils within the former service station area are anticipated to contain elevated concentrations of hydrocarbon compounds (gas, diesel, motor oil, etc.) and will be loaded directly upon excavation (approximately 600-1,000 yds.) and transported for off-site disposal.

will analyze for chlorinateds?

The existing hydraulic lifts and reservoir tanks (if any) will be removed concurrent with the demolition of the existing auto shop. All hydraulic oils will be removed from the lifts and tanks by vacuum methods and transported by a licensed waste hauler for recycling/disposal. The hydraulic lifts will be transported by a licensed hazardous materials hauler for disposal at an appropriate licensed treatment, storage, or disposal facility under manifest conditions. Soils located immediately adjacent/beneath the lifts which exhibit petroleum hydrocarbon or organic compounds in excess of threshold limits (approximately 50-500 yds.) will be excavated and disposed of at an appropriate landfill.

It is proposed that additional soil borings be advanced throughout this area to collect soil samples to quantify the volume of soil to be removed and for landfill pre-characterization to facilitate the "load and haul" activities (intent is to avoid the stockpiling of the soil and construction delays imposed pending analysis and landfill acceptance). A detailed characterization plan will be prepared and submitted under separate cover.

Outside Building Footprint

or TPH

Localized areas outside of the building footprint at the former service station area likely contain free-product. Any free product will be removed. Soils containing BTEX above threshold criteria will be excavated (approximately 200-500 yds.) and transported off-site for disposal.

6.2.3 Phase 3

Figure 10 illustrates ~~the areas~~ the anticipated areas of soil excavation for Phase 3 AMC construction and areas where soil is likely to contain contaminants of concern above threshold criteria.

Building 2 - Stores Building (Central Warehouse)

Outside Building Footprint

The existing waste oil tank will be excavated and removed in accordance with protocols presented in this MMP. The soils within this area (approximately 50-150 yds.) are anticipated to contain elevated concentrations of heavier hydrocarbon compounds (diesel, motor oil, etc.) and will be stockpiled on-site pending analytical testing prior to off-site disposal.

Existing Fuel Station

The existing gasoline and diesel fuel tanks will be excavated and removed in accordance with protocols presented in this MMP. The soils within this area are anticipated to contain low concentrations of gasoline and diesel compounds. Excavated soils, if any, will be stockpiled on-site pending analytical testing to determine if the soil meets criteria for re-use as backfill or must be disposed of at an off-site facility.

7.0 CONTINGENCIES

The following items have been included as contingencies to address the potential for encountering unknown site conditions during the construction activities:

7.1 ADDITIONAL TANKS/SUMPS

Should additional tanks and /or sumps be encountered during the site demolition and excavation activities, Alameda County Department of Environmental Health personnel will be notified immediately and a tank removal permit will be completed and submitted as time allows. The tank will be inerted and removed in accordance with the procedures previously described. Soil samples would also be obtained from beneath the tank/sump as previously described.

7.2 FREE PRODUCT

Should free product be observed to be leaching from the sidewalls or from the base of the planned excavations and ponding in the excavation, the product would be removed by vacuum techniques by a licensed hazardous waste removal contractor. Alternatively, the product could be removed from the excavation to a temporary holding tank pending disposal/recycling. The product would then be transported under manifest conditions to an appropriate treatment facility for recycling and/or disposal. If the product can be removed/controlled with continued soil excavation, then vacuum removal would not be implemented. An interim control measure would be implemented to allow AMC construction to continue.

7.3 WATER SEEPAGE

Excavation dewatering is not anticipated except where perched water confined to fill soils, utility trenches, etc. is encountered. However, should water be observed to be entering and ponding in the excavation, samples of the water would be collected in accordance with Alameda County Department of Environmental Health and State of California Regional Water Quality Control Board guidelines.

Water "grab" samples would be obtained through the use of a pre-cleaned disposable teflon bailer lowered into the water column. The water retained in the bailer would be decanted into sterilized glass vials with Teflon lined screw caps. The samples would be immediately sealed in the vials and properly labeled including: the date, time, sample location, project number, and indication of any preservatives added to the sample. The samples would immediately be placed into a chilled cooler and maintained at 4° C for transport to the laboratory under chain-of-custody documentation. The water samples would be submitted for testing which could include: Total Petroleum Hydrocarbons as gasoline by Method GCFID 5030/8015, Total Petroleum Hydrocarbons as diesel by Method GCFID 3550/8015, Oil & Grease by EPA Method 5520, Volatile Aromatics (BTEX) by EPA Method 8020, Volatile Halogenated Compounds by EPA Method 8010, CAM 17 Metals by EPA Method 7000 series.

In lieu of performing analytical testing for discharge of the water, and if the quantity of water is low, the water could be removed by vacuum techniques and manifested as an oily-waste water for disposal and/or recycling by a licensed contractor.

7.4 FIELD SCREENING PROTOCOLS FOR SOIL

The following criteria represent the generalized "field" approach for evaluation of site conditions and for consideration of remediation at the time of excavation:

Level I - No Remedial Action Planned
- No known source or identified contaminants
- No visible hydrocarbon staining
- PID/FID readings <10 ppm
- Negative field indicator test
- Constituents within established limit concentrations based on previous investigations or supplemental studies

Level II - Site Remediation Considered
- Known/unknown source
- Visible hydrocarbon/solvent staining of soil
- PID/FID readings >10 ppm
- Positive field indicator test

Level III - Site Remediation Implemented
- Based on previous testing
- Known/unknown source
- Visible petroleum product leaching from soil
- Concentrations exceed selected criteria
- Positive field indicator test (verified by analytical testing)

8.0 REPORTING

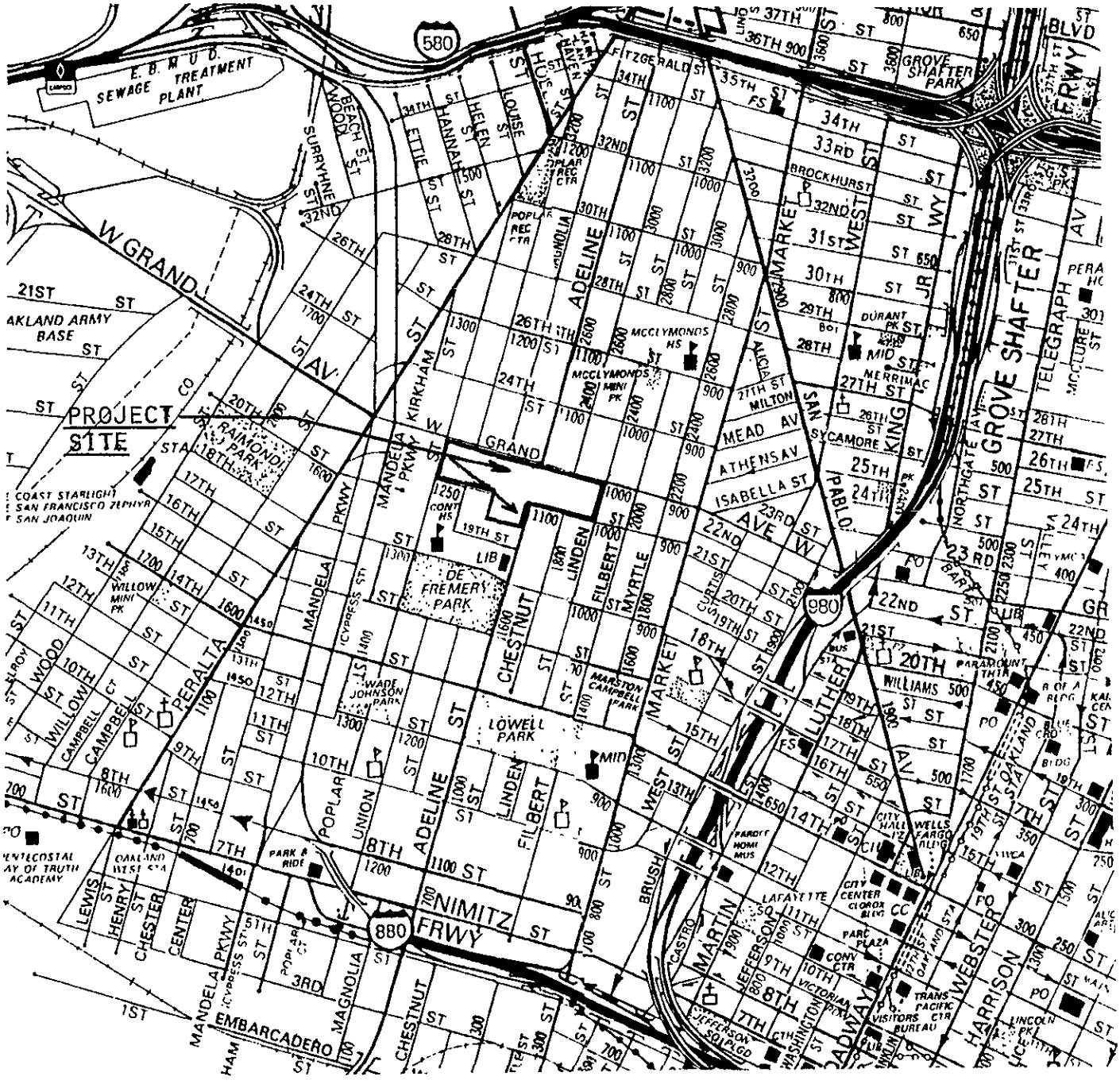
The excavation activities will be performed under the direct observation of a Certified Engineering Geologist from Geo Plexus, Inc. to assure that the remedial activities are accomplished in accordance with this MMP.

8.1 PROGRESS REPORT

A Progress Report would be prepared and submitted to WPC and EBMUD following completion of each construction phase. The report would include a summary of observations and construction activities, summary of remedial activities performed, chain-of-custody documentation for soil and water samples, results of the analytical test data, and conclusions and recommendations based on these findings. Site plans and drawings would be included to illustrate the lateral and vertical locations of samples collected.

8.2 FINAL REPORT

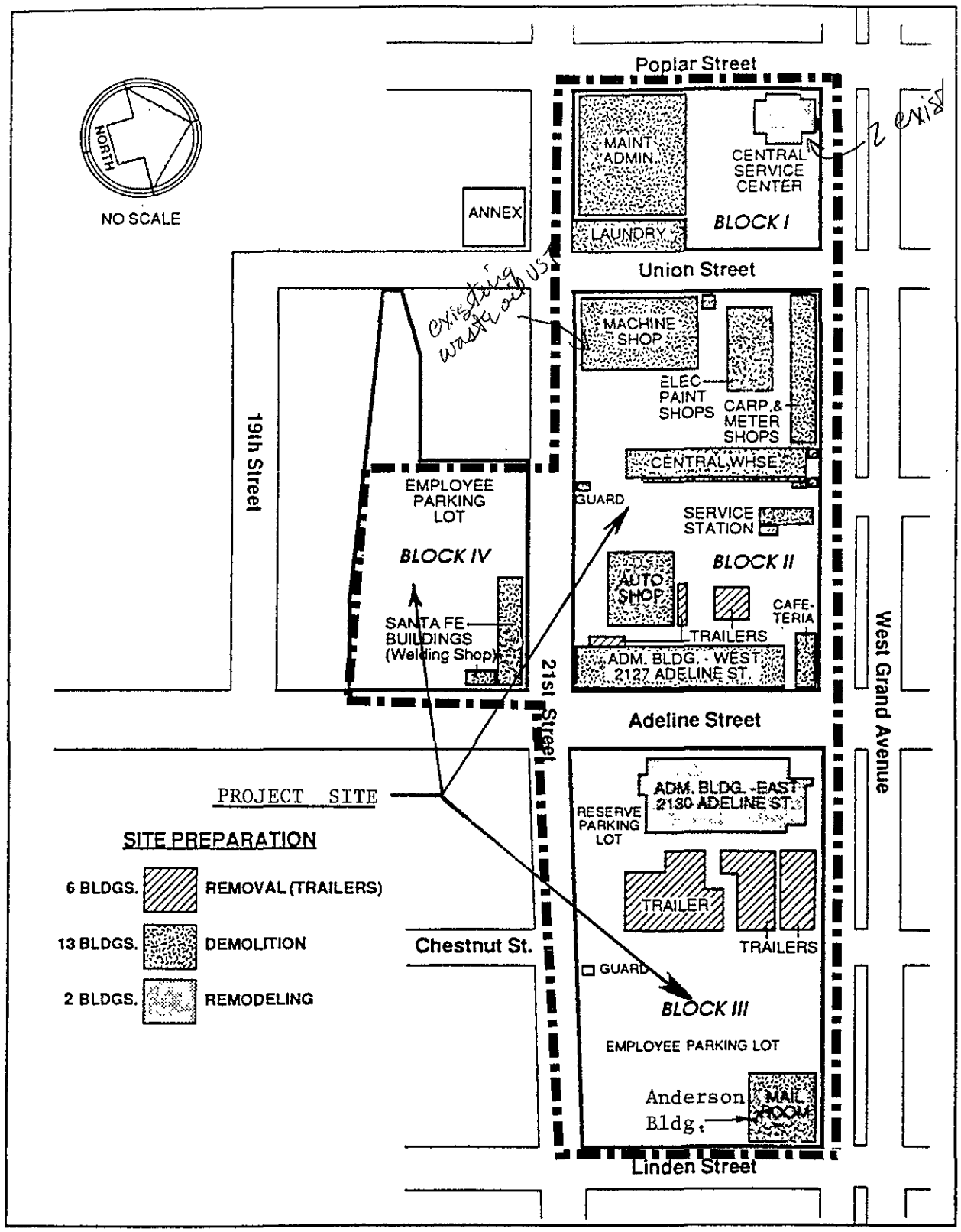
A Final Report would be prepared and submitted within 60 days of completion of the construction/remedial activities. The report would include a summary of observations and construction activities, summary of remedial activities performed, chain-of-custody documentation for soil and water samples, results of the analytical test data, and conclusions and recommendations based on these findings. Site plans and drawings would be included to illustrate the lateral and vertical locations of samples collected. This report would also provide a summary of any environmental issues remaining for the property which were not addressed during the construction phase of work.



Source: Thomas Brothers Maps

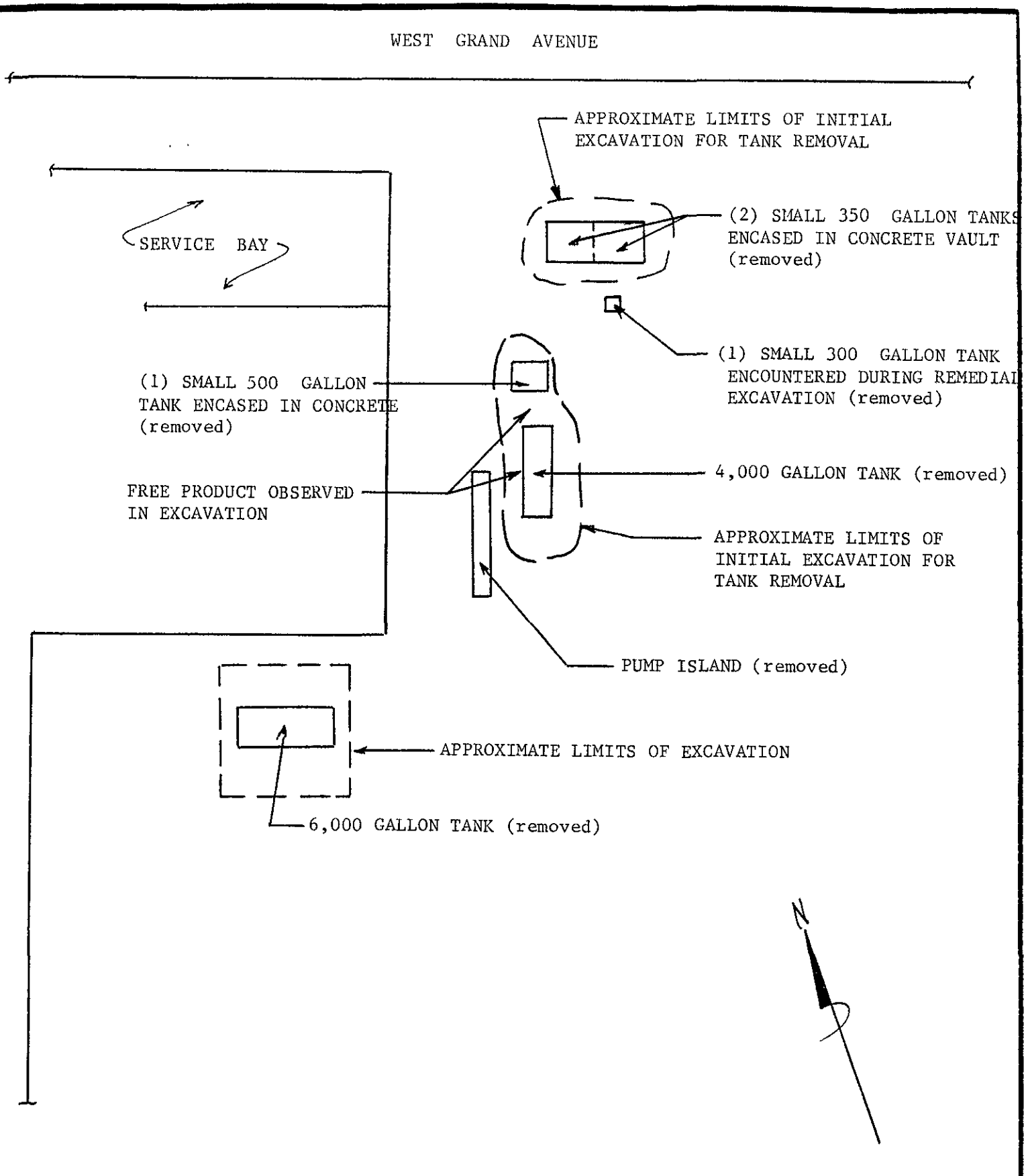
EAST BAY MUD FACILITY		
DATE 11/19/94	SCALE n/a	DRAWN BY dcg
LOCATION PLAN		
	Figure 1	

GeoPlexus, Inc.



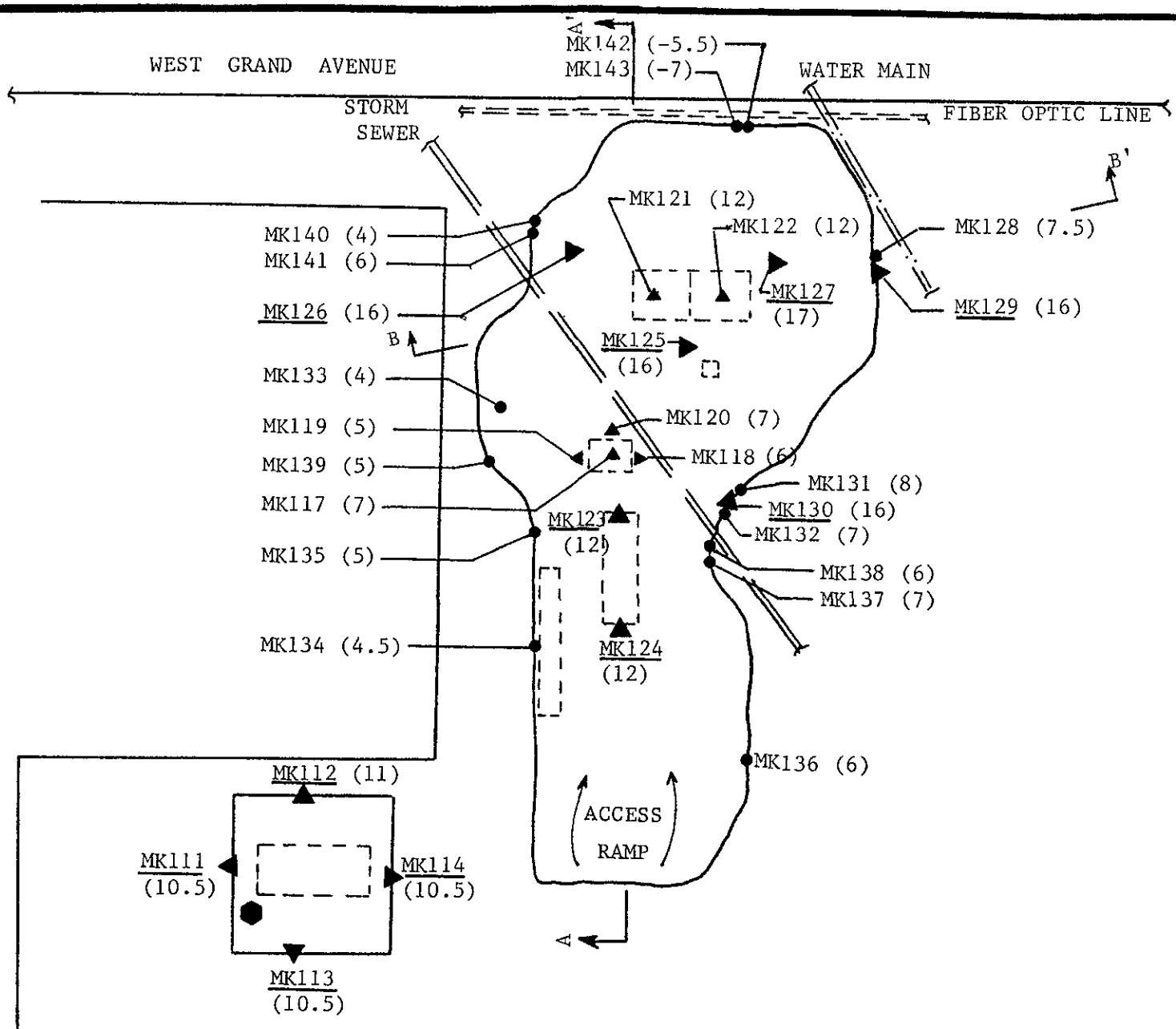
EBMUD FACILITY		
DATE 2/12/95	SCALE n/a	DRAWN BY dcg
SITE PLAN		
	Figure 2	

GeoPlexus, Inc.



TANK & EXCAVATION LOCATIONS		
DATE 12/2/94	SCALE 1"=20'	DRAWN BY dcg
EBMUD FACILITY		
	Figure 3	

GeoPlexus, Inc.



MK115A,B Water Samples
MK116 Water Sample

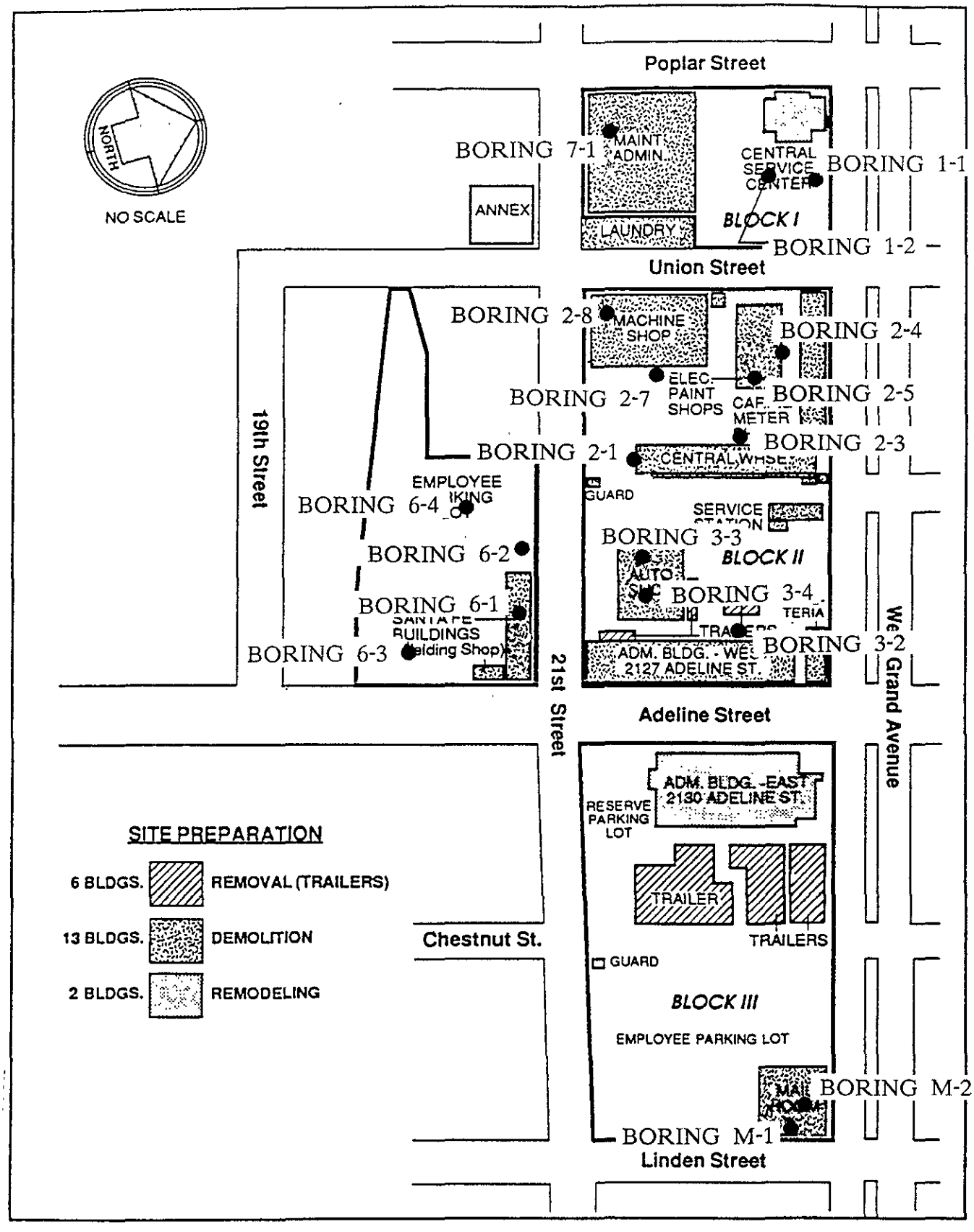
LEGEND

- ▲ Shallow Samples (Area Excavated)
- ▲ Final Bottom/Sidewall Samples
- ● Shallow Sidewall Samples (located in remaing shallow zone)

(16) Depth Below Ground Surface of Samples

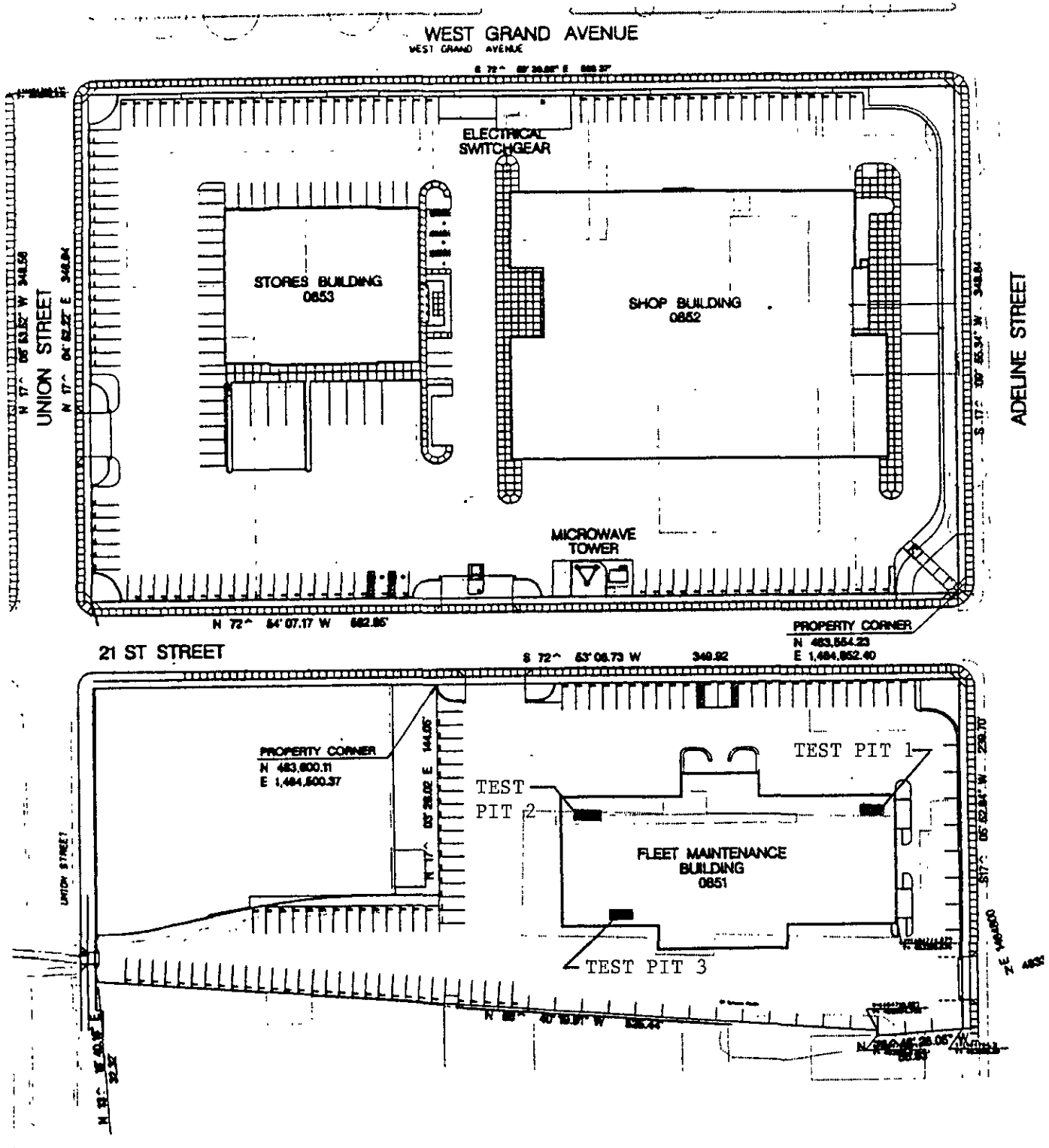
SAMPLE LOCATION PLAN		
DATE 12/2/94	SCALE 1"=20'	DRAWN BY dcg
EBMUD SITE		
	Figure 4	

GeoPlexus, Inc.



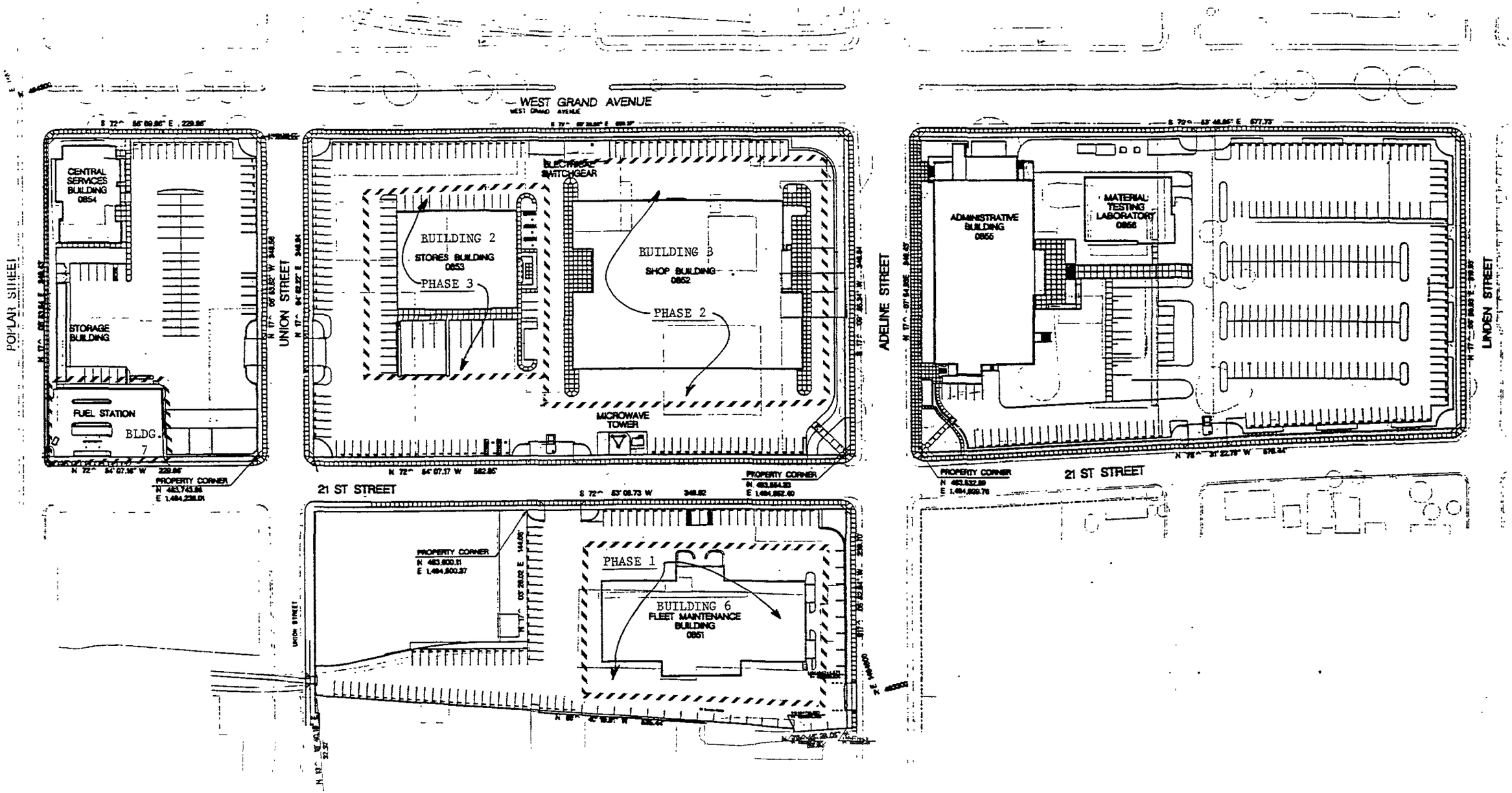
EBMUD FACILITY		
DATE 2/12/95	SCALE n/a	DRAWN BY dcg
BORING LOCATION PLAN		
	Figure 5	

GeoPlexus, Inc.



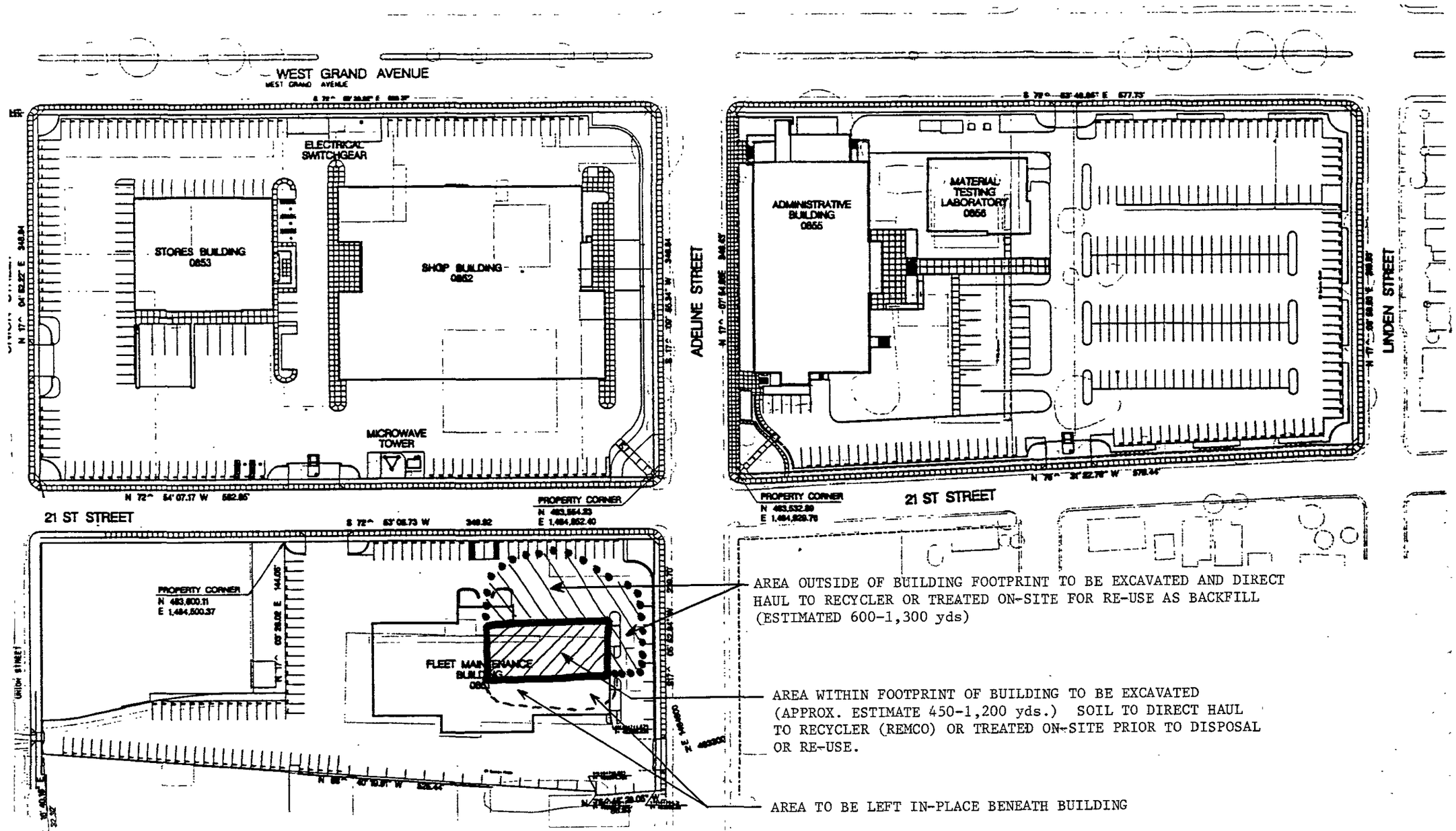
PHASE 1 TEST PIT LOCATION PLAN		
DATE 1/5/96	SCALE 1"=100'	DRAWN BY dcg
EBMUD ADELINE FACILITY		
	Figure 6	

GeoPlexus, Inc.



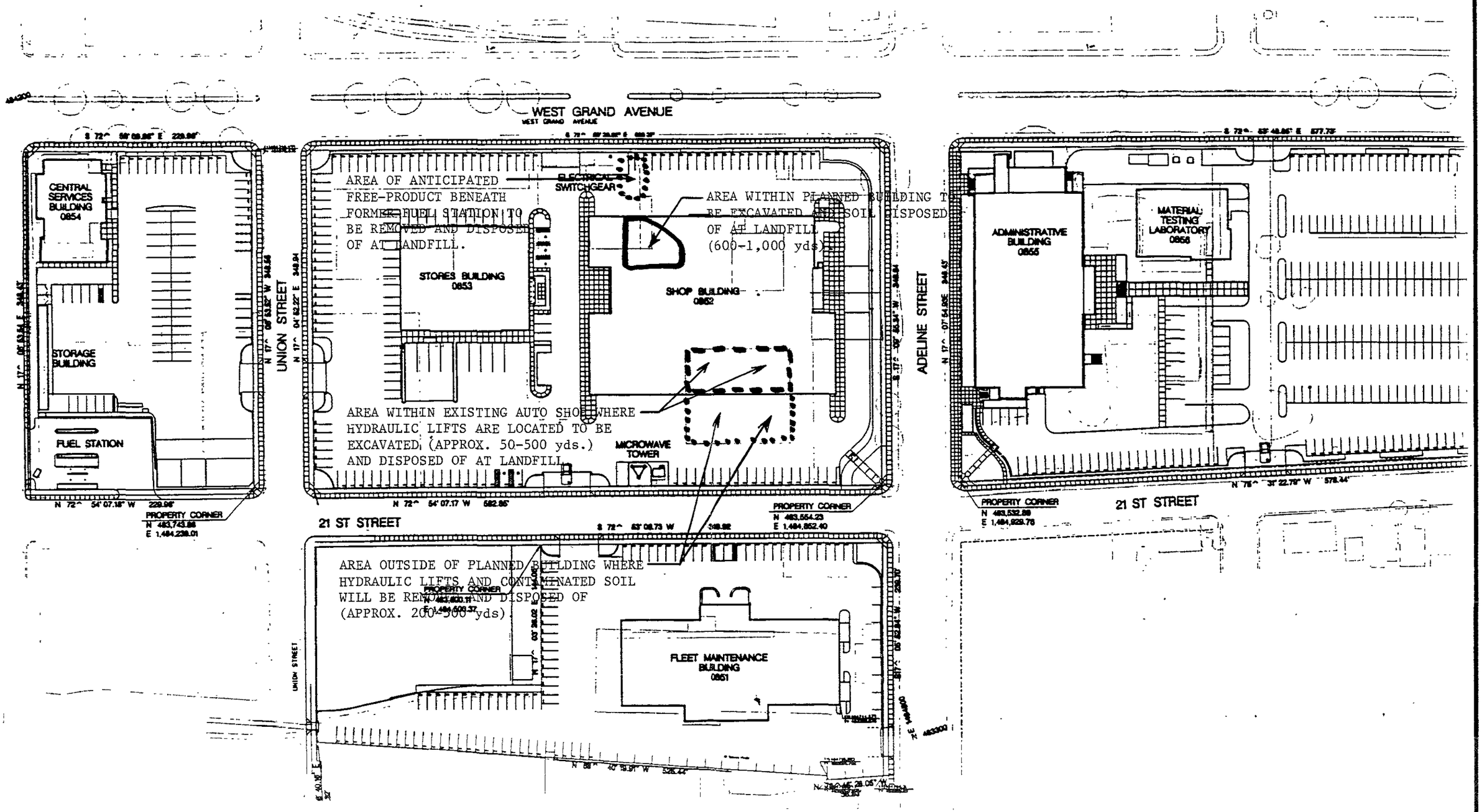
CONSTRUCTION PLAN
FIGURE 7

GeoPlexus, Inc.



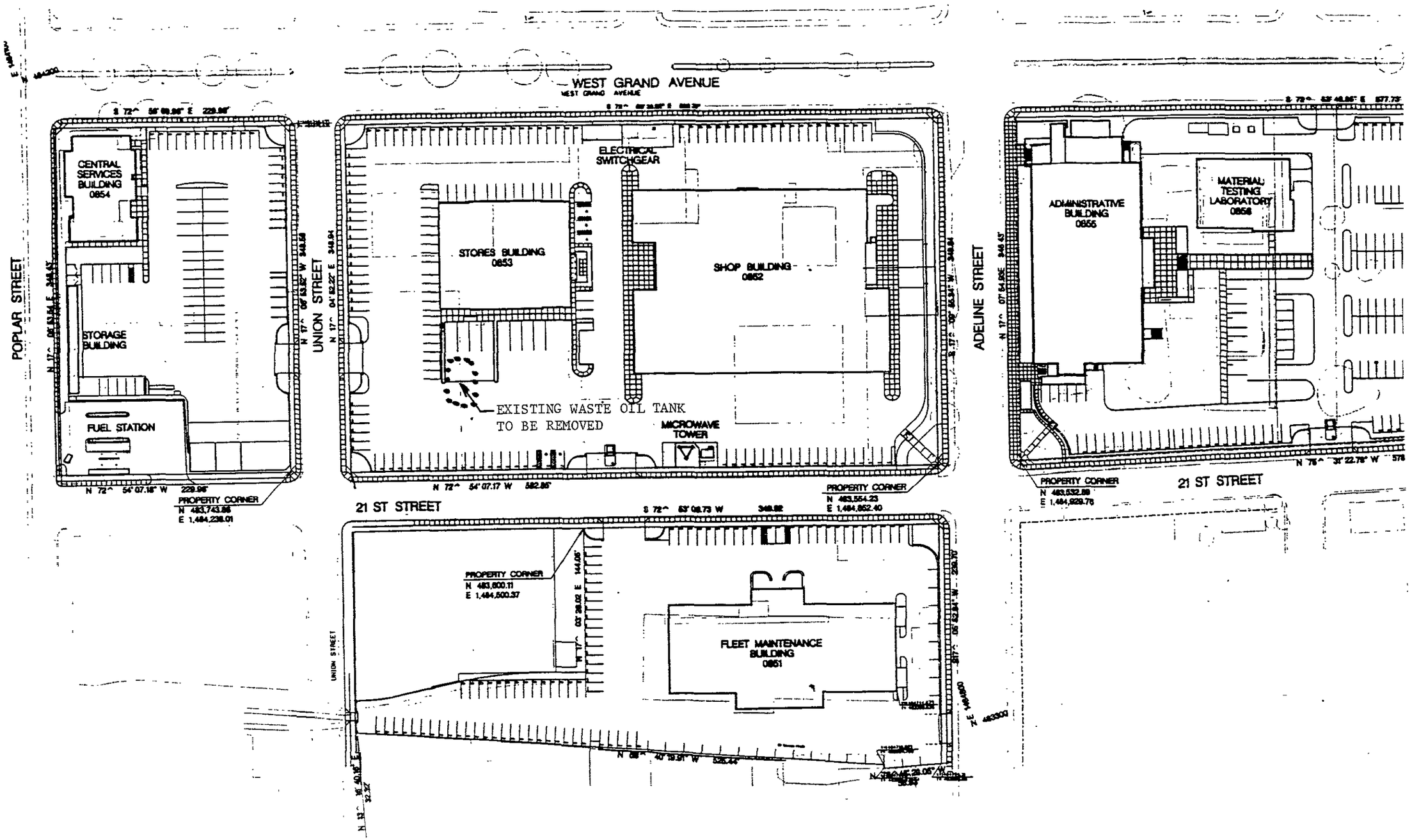
PHASE 1 IMPLEMENTATION PLAN
FIGURE 8

GeoPlexus, Inc.



PHASE 2 IMPLEMENTATION PLAN
FIGURE 9

GeoPlexus, Inc.



PHASE 3 IMPLEMENTATION PLAN
FIGURE 10

GeoPlexus, Inc.

APPENDIX A

REFERENCES

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_____, 1990, Guidance Document for the Development of Health-Based Remedial Clean-Up Levels for the South Bay Multi-Site Cooperative Superfund Program, prepared by Clement Associates Inc.

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APPENDIX B

SUMMARY OF PREVIOUS INVESTIGATION ANALYTICAL TEST DATA

TABLE B-1

SUMMARY OF ANALYTICAL TEST DATA
GASOLINE AND VOLATILE AROMATIC COMPOUNDS

Sample	TPHgas	Benzene	Toluene	Ethyl-Benzene	Total Xylenes
EB1-1-S1, 9-10'	N.D.	0.011	0.026	0.014	0.041
EB1-1-S2, 12-12.5'	N.D.	N.D.	N.D.	N.D.	N.D.
EB1-2-S1, 11-12'	N.D.	N.D.	N.D.	N.D.	N.D.
EB1-2-S2, 13-13.5'	N.D.	N.D.	N.D.	N.D.	N.D.
EB2-1-S1, 11-12'	N.D.	N.D.	N.D.	N.D.	N.D.
EB2-1-S2, 14.5-15'	N.D.	N.D.	N.D.	N.D.	N.D.
EB2-3-S2, 5-5.5'	N.D.	N.D.	N.D.	N.D.	N.D.
EB2-7-S1, 6-7'	130	0.43	2.4	2.7	6.5
EB2-7-S2, 9.5-10'	N.D.	0.008	0.014	0.005	0.029
EB3-2-S1, 7-8'	N.D.	N.D.	N.D.	N.D.	N.D.
EB3-3-S1, 4-5'	29	0.012	0.019	0.021	0.17
EB3-3-S2, 8-8.5'	63	0.011	0.010	N.D.	0.42
EB3-4-S1, 5-5.5'	N.D.	N.D.	N.D.	N.D.	N.D.
EB6-1-S1, 3-4'	N.D.	N.D.	N.D.	N.D.	0.009
EB6-1-S2, 5.5-6'	N.D.	N.D.	N.D.	N.D.	N.D.
EB6-2-S2, 6.5-7'	140	0.84	0.38	3.4	7.6
EB6-2-S3, 9-9.5'	23	0.98	0.12	0.97	4.5
EB6-3-S1, 6.5-7'	N.D.	N.D.	N.D.	N.D.	N.D.
EB6-4-S1, 5-6'	N.D.	N.D.	N.D.	N.D.	N.D.
EB7-1-S1, 3-4'	N.D.	N.D.	N.D.	N.D.	N.D.
EB-M1-S1, 5-6'	78	N.D.	N.D.	0.063	0.32
EB-M1-S2, 9-10'	120	N.D.	0.014	N.D.	0.53
EB-M2-S1, 10-11'	460	N.D.	0.35	0.66	2.0

Notes: Concentrations reported as Parts Per Million (mg/kg).
N.D. indicates that concentrations below detection limit.

TABLE B- 2

SUMMARY OF ANALYTICAL TEST DATA
DIESEL FUEL AND OIL & GREASE COMPOUNDS

Sample	TPHd	O&G
EB1-1-S1, 9-10'	13	---
EB1-1-S2, 12-12.5'	ND	---
EB1-2-S1, 9-10'	1.5	---
EB1-2-S2, 13-13.5'	1.5	---
EB2-1-S2, 11-12'	ND	ND
EB2-3-S2, 2.5-3.5'	ND	---
EB2-4-S1, 9-10'	ND	---
EB2-7-S1, 6-7'	6,400	24,000
EB2-7-S2, 9.5-10'	ND	ND
EB2-8-S2, 11.5-12'	1.9	ND
EB3-2-S1, 7-8'	ND	ND
EB3-3-S1, 4-5'	2,200	18,000
EB3-3-S2, 8-8.5'	2,300	13,000
EB3-4-S1, 5-5.5'	2.8	ND
EB6-1-S1, 3-4'	26	450
EB6-1-S2, 5.5-6'	ND	---
EB6-2-S1, 1.5-2.5'	---	ND
EB6-2-S2, 6.5-7'	ND	---
EB6-2-S3, 9-9.5'	2.5	---
EB6-3-S1, 6.5-7'	ND	ND
EB6-4-S1, 5-6'	ND	ND
EB7-1-S1, 3-4'	ND	ND

Notes: Concentrations reported as Parts Per Million (mg/kg).
N.D. indicates that concentrations below detection limit.

TABLE B-3

SUMMARY OF ANALYTICAL TEST DATA
VOLATILE HALOCARBON COMPOUNDS

Sample	Volatile Halocarbon Compounds Detected	Concentration
EB2-1-S1, 11-12'	ND	
EB2-1-S2, 14.5-15'	ND	
EB2-3-S1, 2.5-3.5'	ND	
EB2-4-S1, 9-10'	ND	
EB2-4-S2, 14-15'	ND	
EB2-5-S1, 3.5-4'	ND	
EB2-5-S2, 7-8'	ND	
EB2-7-S1, 6-7'	1,2-Dichlorobenzene	98 ppb
	1,4-Dichlorobenzene	30 ppb
	1,1-Dichloroethane	210 ppb
	Tetrachloroethene	1,900 ppb
	1,1,1-Trichloroethane	540 ppb
	Trichloroethene	870 ppb
EB2-8-S2, 11.5-12'	ND	
EB3-3-S1, 4-5'	Tetrachloroethene	68 ppb
EB3-3-S2, 8-8.5'	ND	
EB3-4-S1, 5-5.5'	ND	
EB6-1-S1, 3-4'	ND	
EB6-2-S2, 6.5-7'	ND	
EB6-3-S1, 6.5-7'	ND	
EB6-4-S1, 5-6'	ND	
EB7-1-S2, 10-11'	ND	
EB-M1-S1, 5-6'	ND	
EB-M1-S2, 9-10'	ND	
EB-M2-S1, 10-11'	ND	

Notes: Concentrations reported as Parts Per Billion (ug/kg).
N.D. indicates that concentrations below detection limit.

TABLE B-4

SUMMARY OF ANALYTICAL TEST DATA
SEMIVOLATILE COMPOUNDS

Sample	Semivolatile Compounds Detected	Concentration
EB2-4-S2, 14-15'	ND	
EB6-1-S1, 3-4'	Phenanthrene	3.9 ppm
	Fluoranthene	2.9 ppm
	Pyrene	3.3 ppm
EB6-2-S1, 1.5-2.5'	ND	

Notes: Concentrations reported as Parts Per Million (mg/kg).
N.D. indicates that concentrations below detection limit.

TABLE B-5

SUMMARY OF ANALYTICAL TEST DATA
CAM 17 METALS

Sample	Sb	As	Ba	Be	Cd	Co	Cr	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
2-1-S1	ND	5.6	450	ND	ND	3.8	30	22	7.2	ND	ND	41	ND	ND	ND	28	35
2-3-S1	ND	5.5	140	ND	ND	8.3	28	20	73	ND	ND	37	ND	ND	ND	26	66
2-4-S2	ND	3.0	32	ND	ND	6.3	29	12	6.7	ND	ND	37	ND	ND	ND	21	42
2-5-S1	ND	9.5	51	ND	ND	4.4	39	17	10	ND	ND	25	ND	ND	ND	35	44
2-8-S1	ND	7.9	42	ND	ND	5.2	35	32	44	ND	ND	24	ND	ND	ND	27	72
2-7-S1	ND	3.9	27	ND	ND	3.7	24	9.4	27	ND	ND	19	ND	ND	ND	16	31
6-1-S1	2.6	3.6	240	ND	2.1	6.0	33	190	2600	ND	ND	27	ND	ND	ND	21	730
6-2-S1	ND	4.3	160	ND	ND	6.6	24	17	75	ND	ND	19	ND	ND	ND	20	44

Note: Concentrations reported as Parts Per Million (mg/kg).

APPENDIX C

SUMMARY OF TEST PIT ANALYTICAL TEST DATA

[redacted] TEXAS, INC. [redacted] CHAIN-OF-CUSTODY 55374GPX0224

[redacted] 900 [redacted] Drive [redacted] 1, S[redacted] lara, [redacted] rnia [redacted] Phone 408/987-0210 Fax 408/988-0815

PROJECT NUMBER	PROJECT NAME
C95041	WALSH PACIFIC EBMUD - W. ADELINE SITE

Send Report Attention of:	Report Due	Verbal Due
DAVID GHELL	/ /	/ /

Sample Number	Date	Time	Comp	Grab	Station Location	Number of Cntnrs	Type of Containers	Type of Analysis: TPH as Diesel (8015)	TPH as Gas (8015)	Metals	Pb, Cd, Ni, Zn	Condition of Samples	Initial
TP-1-S1	12/28/95	1220		—	DEPTH 5-6' SPOILS	1EA	6" BRASS TUBE	/	/			59967	
TP-1-S2	"	1225		—	DEPTH 7' SPOILS	"	"	/				59968	
TP 3-S1	"	1235		—	DEPTH 3-5' SPOILS	"	"	/				59969	
TP3-S2	"	1238		—	DEPTH 7' SPOILS	"	"	/				59970	
TP1-WS1A	12/28/95	1200		/	TEST PIT 1	2EA	ADDITIONAL 40 ml VOA	/				59971	
TP2-WS1A	"	1248		/	TEST PIT 2	1EA	"	/				59972	
TP3-WS1A	"	1243		—	TEST PIT 3	1EA	"	/				59973	
TP1-WS2	12/28/95	1200		/	TEST PIT 1	1EA	UNACIDIZED UNFILTERED 500 ml bottle			✓		59974	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	12/29/95 0810	Wayne Dunlap	12/29/95 0810
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Wayne Dunlap	12-29-95 0942	[signature]	12/29/95 9:42
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

Remarks: STD TAT

	VOAs	O&G	METALS	OTHER
ICE/T° GOOD CONDITION HEAD SPACE ABSENT ✓	PRESERVATIVE APPROPRIATE CONTAINERS ✓		✓	

METALS Filtered + Preserved IN LAB upon ARRIVAL

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Geo Plexus, Inc. 1900 Wyatt Drive, # 1 Santa Clara, Ca. 95054	Client Project ID: # C95041; Walsh Pacific EBMUD-W. Adeline Site	Date Sampled: 12/26-12/28/95
		Date Received: 12/29/95
	Client Contact: David Glick	Date Extracted: 12/29/95
	Client P.O:	Date Analyzed: 12/29/95

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylben-zene	Xylenes	% Rec. Surrogate
59967	TP1-S1	S	2100,b,d	7.7	98	50	290	102
59968	TP1-S2	S	ND	0.010	0.006	0.026	0.017	91
59969	TP3-S1	S	ND	ND	0.020	0.009	0.056	92
59970	TP3-S2	S	ND	ND	ND	ND	ND	103
59971	TP1-WS1A	W	45,000,a	2500	7600	1400	7500	99
59972	TP2-WS1A	W	ND	ND	1.9	ND	2.7	94
59973	TP3-WS1A	W	ND	ND	2.8	0.81	5.4	91
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Geo Plexus, Inc. 1900 Wyatt Drive, # 1 Santa Clara, Ca. 95054	Client Project ID: # C95041; Walsh Pacific EBMUD-W. Adeline Site	Date Sampled: 12/26-12/28/95
		Date Received: 12/29/95
	Client Contact: David Glick	Date Extracted: 12/29/95
	Client P.O:	Date Analyzed: 12/29/95

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
59967	TP1-S1	S	570,d	99
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	
		S	1.0 mg/kg	

* water samples are reported in ug/L, soil samples in mg/kg, and all TCLP and STLC extracts in mg/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Geo Plexus, Inc. 1900 Wyatt Drive, # 1 Santa Clara, Ca. 95054	Client Project ID: # C95041; Walsh Pacific EBMUD-W. Adeline Site	Date Sampled: 12/26-12/28/95
		Date Received: 12/29/95
	Client Contact: David Glick	Date Extracted: 12/29/95
	Client P.O:	Date Analyzed: 12/29/95

Dissolved LUFT Metals*

EPA analytical methods 6010/200.7, 239.2+

Lab ID	Client ID	Matrix	Extraction°	Cadmium	Chromium	Lead	Nickel	Zinc	% Rec. Surrogate
59974	TP1-WS2	W	TTLC	---	ND	ND	ND	ND	NA
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		S	TTLC	0.5 mg/L	0.5	3.0	2.0	1.0	
		W	TTLC	0.01 mg/kg	0.005	0.005	0.05	0.05	
		---	STLC,TCLP	0.01 mg/L	0.05	0.2	0.05	0.05	

* soil samples are reported in mg/kg, and water samples and all STLC & TCLP extracts in mg/L

+ Lead is analysed using EPA method 6010 (ICP)for soils, STLC & TCLP extracts and method 239.2 (AA Furnace) for water samples

o EPA extraction methods 1311(TCLP), 3010/3020(water,TTLC), 3040(organic matrices,TTLC), 3050(solids,TTLC); STLC from CA Title 22

surrogate diluted out of range; N/A means surrogate not applicable to this analysis

i) liquid sample that contains greater than ~ 2 vol. % sediment; this sediment is extracted with the liquid, in accordance with EPA methodologies and can significantly effect reported metal concentrations.

DHS Certification No. 1644

Edward Hamilton, Lab Director

GeoPlexus, Inc.

.fGAK226

CHAIN-OF-CUSTODY

1900 Wyatt Drive, Suite 1, Santa Clara, California 95054
Phone 408/987-0210 Fax 408/988-0815

PROJECT NUMBER: C95041

PROJECT NAME: WALSH PACIFIC EMUD - W. ADELINE SITE

Send Report Attention of: DAVID GLICK

Report Due: / /

Verbal Due: / /

Sample Number	Date	Time	Comp	Grab	Station Location	Number of Cntnrs	Type of Containers	Type of Analysis: TPH-G/BTEX	Condition of Samples	Initial
TP-1-5-3	1/5/96	12:00		X	NW end 4'4"	1	brass 2"	✓	[redacted]	DTH
TP1-453abc		10:20		X	TP-1-5. end 2'8"	3	40ml VOA	✓		DTH
TP-1-5-4		12:12		X	SW end 4'3"	1	brass 2"	✓		DTH
TP1-55		12:30		X	SE end 4'4"	1	55-2"	✓		DTH
										DTH

	VOAS	O&G	METALS	OTHER
PRESERVATIVE	✓			
APPROPRIATE CONTAINERS	✓			

ICE/T° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ✓

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
[signature]	1/4/96 0915	[signature]	1/4/96 945
[signature]	1/4/96 1445	[signature]	1/4/96 17:15
[signature]			

Remarks: with sample HCL prs.

URGENT SAME DAY RUSH

FAX TO DAVID HOSTER @ (415) 494-2505

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

Geo Plexus, Inc. 1900 Wyatt Drive, # 1 Santa Clara, Ca. 95054	Client Project ID: # c95041; Walsh Pacific, EBMUD-W. Adeline site	Date Sampled: 01/05/96
		Date Received: 01/05/96
	Client Contact: David Glick	Date Extracted: 01/05/96
	Client P.O:	Date Analyzed: 01/05/96

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylbenzene	Xylenes	% Rec. Surrogate
60193	TP1-S-3	S	6100,a	56	390	130	750	95
60194	TP1-WS3abc	W	13,000,a	440	22	610	1100	91
60195	TP-1S-4	S	7200,a	59	500	170	1000	95
60196	TP1-S5	S	1200,a	12	79	28	160	100
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 01/05/96 Matrix: Soil

Analyte	Concentration (mg/kg) Sample (#56725)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	2.287	2.120	2.03	113	104	7.6
Benzene	0.000	0.192	0.188	0.2	96	94	2.1
Toluene	0.000	0.186	0.182	0.2	93	91	2.2
Ethylbenzene	0.000	0.194	0.192	0.2	97	96	1.0
Xylenes	0.000	0.614	0.610	0.6	102	102	0.7
TPH (diesel)	0	311	313	300	104	104	0.5
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 01/05/96-01/06/96 Matrix: Water

Analyte	Concentration (ug/L) Sample (#60170)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.0	110.5	113.2	100	110	113	2.5
Benzene	0	10.70	10.80	10	107.0	108.0	0.9
Toluene	0	10.90	11.00	10	109.0	110.0	0.9
Ethyl Benzene	0	11.10	11.20	10	111.0	112.0	0.9
Xylenes	0	33.40	33.70	30	111.3	112.3	0.9
TPH (diesel)	0	148	151	150	98	101	2.4
TRPH (oil & grease)	0	23000	22400	23700	97	95	2.6

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100