CERTIFIED
ENVIRONMENTAL
CONSULTING INC.

June 17, 1992

REF: 92-157-808

Ms. Susan Hugo
Alameda County Health Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621
(510) 271-4320
(510) 569-4757 FAX

SUBJECT: Work Plan for Monitoring Well Installation and Remediation at Hill Lumber Company, 1259 Brighton Avenue, Albany, CA 94706

Dear Ms. Hugo:

Certified Environmental Consulting, Inc. (CEC) is pleased to submit a Work Plan for the investigation and remediation at Hill Lumber in Albany.

The project has been divided into several tasks to allow for a step-wise evaluation and changes in the scope of work as additional information is gathered. A detailed description of each task is provided in the attached work plan. It is our intention to obtain final site closure in a minimum amount of time. We expect that excavation will begin no sooner than July 6 and will be concluded by about July 20, 1992. We also expect that wells will be installed between July 21 and July 31, 1992.

We declare, under penalty of perjury, that the information and/or recommendations contained in the attached report are true and correct.

We are looking forward to working with you on this project.

Sincerely,

Tom Suggs
Hydrogeologist

Stanley L. Klemetson, Ph.D., P.E.
Vice President

Enclosures

cc: Ralph Hill, Hill Lumber Company
Tom Callaghan, RWQCB

140 West Industrial Way
Benicia, California 94510

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WORK PLAN FOR WELL INSTALLATION AND REMEDIATION

PROJECT SITE

Hill Lumber Company
1259 Brighton Avenue
Albany, CA 94706

PREPARED FOR

Mr. Ralph Hill
Hill Lumber Company
1259 Brighton Avenue
Albany, CA 94706
(510) 525-1000

SUBMITTED TO

Ms. Susan Hugo
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PREPARED BY

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CEC PROJECT NO. 91-06-504

June 17, 1992

TABLE OF CONTENTS

INTRODUCTION 1
Project Description 1
Site Location and Description 1
Site History and Use 1
Previous Subsurface Investigations 1
Geology and Hydrogeology 4

SITE REMEDIATION 5
Notifications 5
Task 1 - Soil Excavation 5
Soil disposal 5
Laboratory analysis 6
Verification soil sampling 6
Task 2 - Groundwater Extraction 6
Wastewater treatment and disposal 6

GROUNDWATER MONITORING 7
Task 3 - Well Installation and Development 7
Rational for well location 7
Well design specifications 7
Task 4 - Quarterly Monitoring 9
Task 5 - Reporting 9

APPENDICES 10
A. Soil Sampling in Excavations 10
B. Water Sampling in Wells and Boreholes. 12
C. Well Construction. 16
D. Site Specific Health and Safety Plan 24

LIST OF FIGURES

Figure 1. Site Location Map 2

Figure 2. Site Layout Map 3

Figure 3. Design Specifications for MW-1 and MW-2 8

INTRODUCTION

Project Description

The project includes the excavation of approximately 111 cubic yards of petroleum-contaminated surface surrounding two gasoline storage tanks and the installation of two 25-foot monitoring wells within 10 ft. of the respective tank excavations. After completion, the wells will be monitored for four quarters over the period of one year to determine any impacts on local groundwater quality. In addition, one piezometer will be installed on the east side of the property.

Site Location and Description

Hill Lumber Company is located at 1259 Brighton Avenue near Masonic Avenue in Albany, California (Figure 1). El Cerrito Creek is about 300-400 ft. north of the lumber yard and the San Francisco Bay is about 1.0 mile to the west.

Site History and Use

Hill Lumber Company has utilized the site as a lumber yard and retail lumber store since 1922. From 1950's to 1991, Hill Lumber maintained one 1,000-gallon underground gasoline tank, located below the sidewalk (Figure 2), for refueling fleet vehicles. From the 1930's to the 1950's, Hill Lumber utilized a 500-gallon underground leaded gasoline tank located in the loading dock area of the shop building. There had been no historic loss of inventory from either tank.

Previous Subsurface Investigations

On April 17, 1991, Semco, Inc. of Modesto, California removed both the 1,000-gallon tank and the 500-gallon tank. The concentration of total petroleum hydrocarbons in the gasoline range (TPH-G) below the 1000-gallon tank ranged from 2 to 3,700 mg/Kg. TPH-G concentrations below the 500-gallon tank ranged from 210 to 890 mg/Kg. There was no record of groundwater in the excavations. The excavations were backfilled to grade with pea gravel and repaved.

FIGURE 1
SITE LOCATION MAP
HILL LUMBER COMPANY
1259 BRIGHTON AVE., ALBANY, CA
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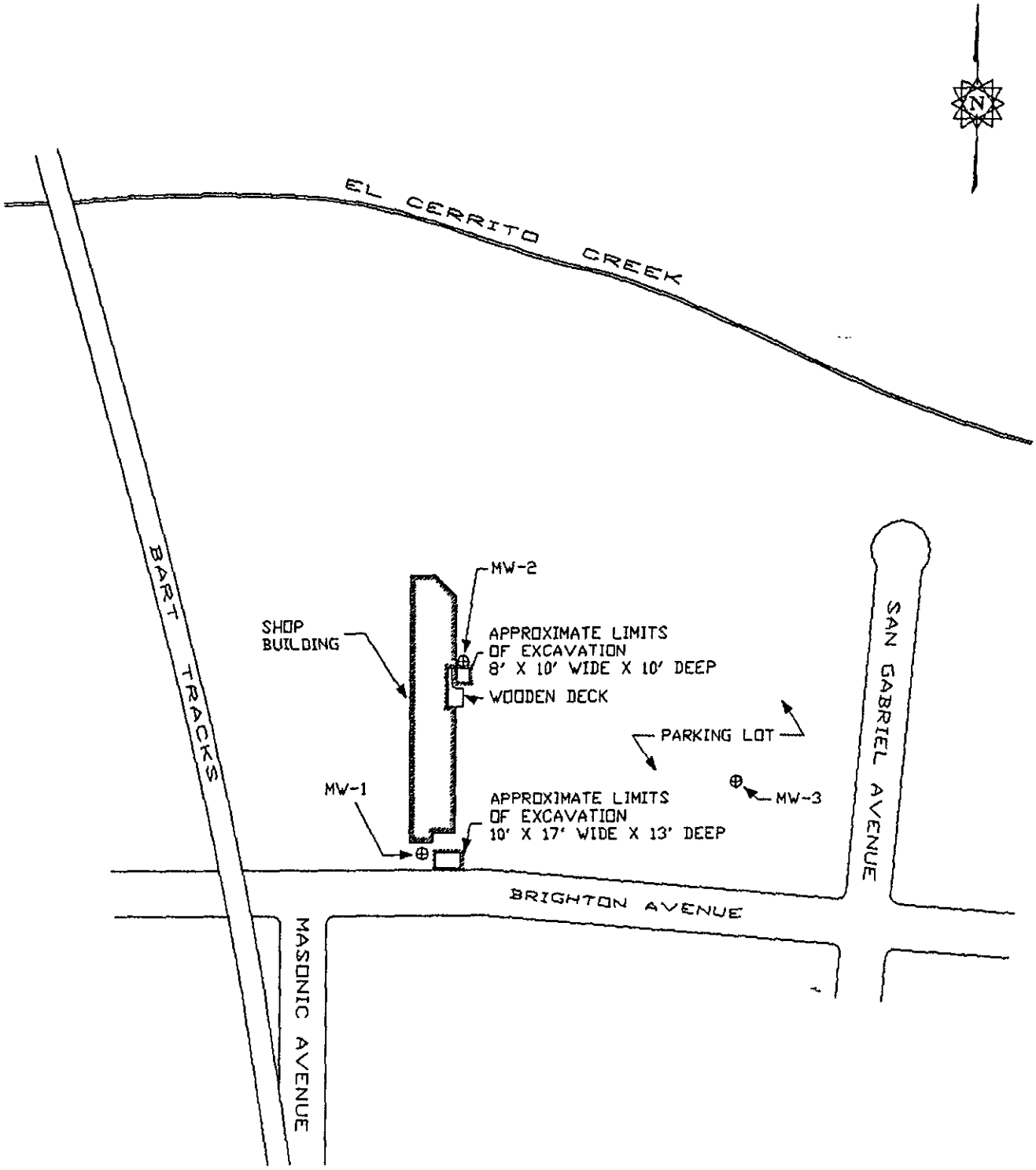

FIGURE 2
SITE LAYOUT MAP
HILL LUMBER COMPANY
1259 BRIGHTON AVE., ALBANY, CA
JOB NO. 92-157-808

1" = APPROX. 100'

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On July 11, 1991, Certified Environmental Consulting, (CEC) oversaw the drilling and sampling of four soil borings within about 10 ft. of the tank excavations. Based on samples collected respectively just below and just above the capillary fringe, CEC concluded that soil contamination is limited to two small regions extending about 2 to 4 ft. around each tank. CEC also collected a water sample through an uncased boring in the gasoline tank excavation in the sidewalk. This water sample contained 2,925 μg/L TPH-G and 59 μg/L benzene.

Geology and Hydrogeology

The site is located on the East Bay Plain about 0.5 miles west of the Oakland Hills, about 1.0 mile east of the San Francisco Bay, and 0.4 miles northeast of Albany Hill. The property is bounded on the north by El Cerrito Creek, an ephemeral stream flowing into the Bay. The local topography is gently sloping to the west, toward the Bay.

The site is underlain by the Quaternary Older Alluvium of Hickenbottom and Muir (1988), an assemblage poorly consolidated to unconsolidated clay, silt and gravel, locally, about 100 ft. thick. The upper soil profile consists of at least 10 ft. of reddish brown and gray sandy clay. The Older Alluvium is deposited on the flanks of a thick sequence of undivided Tertiary, Cretaceous and Jurassic bedrock (Hickenbottom and Muir, 1988), probably belonging to the Franciscan Complex. Bedrock outcrops in the Oakland Hills and in Albany Hill.

Brackish groundwater occurred at approximately 9.7 ft. below ground surface (bgs) on July 11, 1991. Groundwater flow direction is estimated to be to the westward or northwestward toward El Cerrito Creek and the San Francisco Bay. Local groundwater is not a source of domestic water. There are no known beneficial uses for shallow groundwater below the site. -?

References:

Hickenbottom, K and Muir, K, 1988, Geohydrology and groundwater-quality overview of the East Bay Plain area, Alameda County, California, 205 (j) report: California Regional Water Quality Control Board, 83 p. with 5 plates.

Suggs, T. R., 1991, unpublished field notes: Certified Environmental Consulting, 1-800-447-0171.

SITE REMEDIATION

Site remediation will consist essentially of removing shallow, hydrocarbon-contaminated soil which may be a continuing source of groundwater contamination and extracting a small amount (approximately 4,000 gallons) of groundwater from the new excavation. Remediation will be conducted in a step-wise fashion to allow for changes in the scope of work as additional information is gathered. The overall project is outlined below.

Notifications

The following notifications will take place before beginning work.

1. Work Plan will be submitted to Alameda County Health Agency (ACHA). Drilling permits also will be obtained from ACHA.

2. Area to be excavated will be marked with white paint and Underground Service Alert, (800) 227-2600, will be notified at least one week prior to commencement of work.

3. Susan Hugo, Alameda County Health Agency, (510) 271-4530, will be notified at least 72 hours prior to commencement of site work.

4. Hill Lumber, (510) 589-3030, will be notified at least 48 hours prior to commencement of site work.

Task 1 - Soil Excavation

Approximately 111 cubic yards of soil will be removed from the excavations located in the sidewalk in front of the shop and in the loading dock area. CEC will oversee excavation and will field-test contamination levels at the limits of the excavation using a photoionizing organic vapor meter (OVM).

We expect that pea gravel from Sunol will be used for backfill material up to 2.0 ft. below grade. Construction mix, compacted to at least 90 % optimum density, will be used placed from 2.0 ft. below grade to the surface.

Soil disposal. Excavation spoils will be hauled off site for treatment or disposal. Soils with less than 100 mg/Kg TPH-G may be hauled to Guadalupe Sanitary Landfill in Los Gatos. Soils with greater than 100 mg/Kg and less than 1000 mg/Kg TPH-G may be treated at Port Costa Materials. Excavated soil will be covered with 10-mil plastic and temporarily stockpiled on site. If rainy weather is expected, spoils will be bermed to prevent leaching and rainwater runoff.

Laboratory analysis. Because the contamination is fuel leakage from a gasoline tank, samples will be analyzed for TPH-G/BTEX (CGFID 5030 and EPA SW-846 Method 8015/8020 Modified) and total lead by ICAP.

Verification soil sampling. Because groundwater is expected in the excavations, soil samples will be collected in the capillary fringe in each of the excavation sidewalls, or as directed by the county regulator, to confirm that all contaminated soil has been removed. In the event water is not encountered, samples will be collected about 2.0 ft. below the respective tank inverts in each of the excavation sidewalls. Samples will be analyzed for TPH-G/BTEX and total lead.

Task 2 - Groundwater Extraction

The excavation will be dewatered during construction to facilitate work. We expect that the total volume of water pumped will not exceed 4000 gallons. When excavation is completed, the pit will be allowed to recharge once and a pit water sample will be collected using a Teflon bailer. The sample will be analyzed for TPH-G/BTEX and total lead.

Wastewater treatment and disposal. Water pumped from the pit will be stored in a Baker tank. An initial sample of tank water will be collected and analyzed for TPH-G/BTEX, total lead, and flash point ingnitability. Approval will be requested from the East Bay Municipal Utilities District (EBMUD) wastewater treatment works for a one-time discharge of wastewater. If treatment is required, a microbial/nutrient mixture will be added to the tank to consume hydrocarbons biologically. Wastewater will be resampled and analyzed after one week to verify that hydrocarbon levels are acceptable to EBMUD. If further treatment is required to meet EBMUD standards, water may be passed through a carbon adsorption canister.

GROUNDWATER MONITORING

Task 3 - Well Installation and Development

After excavation, two groundwater monitoring wells (MW-1 and MW-2) will be installed and developed according to SWRCB standards following the procedures in Appendix B. Wells MW-1 and MW-2 will be located downgradient from the respective excavations within 10 ft. of the underground storage tanks (Figure 2). In addition, one piezometer (MW-3) will be installed on the east side of the property. It is understood that additional wells may be required if contamination is detected.

During drilling, soil samples will be collected at 5-ft. intervals or at distinct lithologic changes in MW-1 and MW-2. In addition, one soil sample will be collected immediately above the water table (from the capillary fringe) in each well. Soil samples will be screened using an OVM. Unless hydrocarbon vapor concentrations greater than approximately 10 ppm are detected, only the soil sample from the capillary fringe will be submitted for laboratory analysis.

Rational for well location. Because water tables in the East Bay Plain tend to mimic topography, the local groundwater gradient direction is expected to be to the west or northwest, toward the Bay and El Cerrito Creek. Using this assumption, monitoring well MW-1 will be located in the sidewalk about 5.0 ft. northwest of the 1000-gallon tank excavation. Monitoring well MW-2 cannot be located west of the excavation in the loading dock without drilling inside the building. Therefore, MW-2 will be located in the loading dock about 5.0 ft. north of the 500-gallon tank excavation.

Well design specifications. Criteria used to determine well design specifications are contained in Appendix C, Well Construction. The filter pack material (No. 2./14 sand) and screen size (0.010 in.) were selected on the assumption of a sandy clay soil. The screened interval and well depth were determined on the basis of depth to groundwater (9.7 ft.) measured in an uncased boring on July 11, 1991. A sketch of the well design is shown in Figure 3.

Specifications for MW-1 and MW-2 will be as follows:

Total Depth	25.0 ft.
Bore Diameter	10 in.
Casing Diameter	4 in.
Well Seal Type	bentonite pellets
Well Seal Interval	4.0 - 5.0 ft. bgs
Filter Pack Material	No. 2/14 Lonestar sand
Filter Pack Interval	5.0 - 25.0 bgs
Screen Slot Size	0.010 in
Screened Interval	7.0 - 25.0 bgs

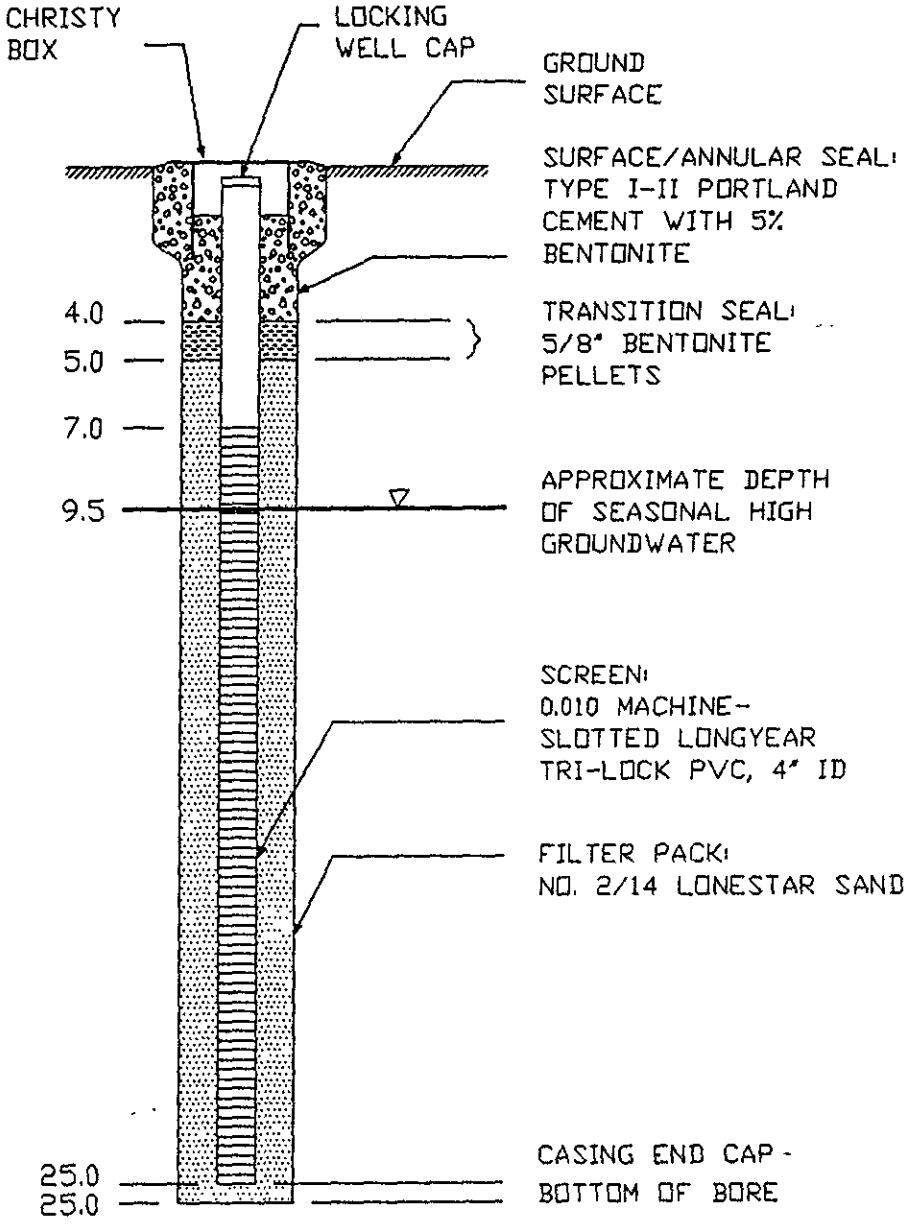

FIGURE 3
SPECIFICATIONS FOR MW-1 AND MW-2
HILL LUMBER COMPANY
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Specifications for MW-3 will be as follows:

Total Depth	20.0 ft.
Bore Diameter	6 in.
Casing Diameter	2 in.
Well Seal Type	bentonite pellets
Well Seal Interval	4.0 - 5.0 ft. bgs
Filter Pack Material	No. 2/14 Lonestar sand
Filter Pack Interval	5.0 - 20.0 bgs
Screen Slot Size	0.010 in
Screened Interval	5.0 - 20.0 bgs

The wells will be developed no less than 24 hours after emplacing the grout seal. The piezometer will be neither developed nor sampled.

Task 4 - Quarterly Monitoring

After the wells have been completed and purged, initial water samples will be collected and analyzed for TPH-G/BTEX and total lead. Samples will be collected, preserved, and analyzed according to protocols in Appendix B.

The wells will be sampled quarterly for a period of one year. Water level elevations in MW-1, MW-2, and MW-3 will be recorded prior to each sampling event. The depth of any floating product will be recorded.

Task 5 - Reporting

A groundwater quality monitoring report will be prepared and submitted each quarter to the Alameda Health Agency, Division of Hazardous Materials, and the RWQCB. The report will include a site history, a summary of all findings, laboratory results, and recommendations for further action.

Stanley L. Klemetson, Ph.D, P.E.
Vice President
P.E No. 40087

REGISTERED PROFESSIONAL ENGINEER
STANLEY LOUIS KLEMETSON
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STATE OF CALIFORNIA

APPENDIX A

Soil Sampling in Excavations

COLLECTION

Representative samples of excavated soils will be obtained for laboratory analysis using a slide hammer. Samples will be contained in 2-in. i. d., 6-in. long brass tubes.

HANDLING

Sample tubes will be sealed at each end with Teflon sheeting and PVC end caps. Samples will be labeled with self-adhesive, preprinted labeled indicating project name (or number), sample number, boring/well number, sample depth, date and time, and sampler's name. Samples will be stored in an ice chest with dry ice or blue ice, maintained at 4° C, and transported under chain-of-custody to a State-certified laboratory.

DOCUMENTATION

A sample location sketch will be recorded in the geologist's field notebook. Collection methods, signs of contamination, soil type, preferential flow paths in the excavation, names of regulators and contractors, and any other appropriate information will also be recorded. Copies of field notes will be submitted to the Project Manager.

FIELD EQUIPMENT DECONTAMINATION PROCEDURES

The sampler will be decontaminated after each use by washing in a trisodium phosphate solution, followed by tap water and deionized water rinses. Equipment will be sealed in plastic bags or other sealed containers to prevent contact with solvents, dusts or other contamination.

All rinseate used in the decontamination process will be collected in 5-gallon buckets and either returned to the excavation or stored on site in steel, DOT-approved drums. Drums used to store rinseate will be labeled as to contents, suspected contaminants, date container filled, expected removal date, company name, contact and phone number. Drums will then be sealed and left on-site for subsequent disposal pending analytical results.

QUALITY CONTROL

One field duplicate sample will be collected and analyzed for every sample set up to 10 samples. The field duplicate will be collected identically to and immediately after a randomly chosen sample. This will provide second sample confirmation and a means of determining sample precision.

APPENDIX B

Water Sampling in Wells and Boreholes

GENERAL CONSIDERATIONS

In general, the composition of water within the well casing and in close proximity to the well is not representative of groundwater quality. This may be due to contamination by drilling equipment or to disparities in oxidation-reduction potential between the well and aquifer. To obtain a representative groundwater sample, therefore, the well should be pumped or bailed until the well is thoroughly flushed of standing water and contains fresh water from the aquifer. One common procedure is to pump or bail the well until a minimum of three bore volumes (or alternatively, 10 casing volumes) have been removed.

PURGING

During each round of sampling, static water level will be measured prior to purging using an electronic sounder. All water-level measurements will be recorded to the nearest 0.01 foot with respect to mean sea level elevation.

A minimum of three bore volumes shall be purged from the well prior to sampling. Bore and well volumes will be calculated using the following formula:

$$CV = h\ [(A_{bore} - A_{casing})(0.3) + A_{casing}\ ]$$

where CV is the bore volume, h is the height of the water collumn in the well, A_{bore} and A_{casing} are the cross sectional areas of the bore and casing respectively, and 0.3 is the porosity of the filter pack.

To ensure that water in the well has been exchanged, pumping or bailing shall commence at the top and work downward. The well will be allowed to return to 80 percent of the original water level before sampling.

Temperature, pH, specific conductance, and turbidity will be measured for each bore volume pumped. Purging will continue until these field-measured water quality parameters have stabilized and the water is, in the judgement of the geologist, representative of water in the aquifer. Data obtained from field water quality measurements will be recorded in the field log book or data sheets. A separate aliquot of groundwater collected from the purge water outlet stream will be used for field measurements; samples intended for laboratory analysis will not be used.

Temperature, pH, specific conductance, and turbidity meters will be calibrated per manufacturers guidelines. Calibration shall be documented in the field log book or data sheets and will include a description of the calibration method, identification number of equipment and/or regents used in calibration.

Temperature will be measured with a good grade mercury-filled Centigrade thermometer, bimetallic-element thermometer, or electronic thermistor.

Acidity/alkalinity (pH) will be measured by dipping conductivity probe in the water source or sample; pH will be measured withing a few minutes after collection of the sample.

Conductivity will be measured using a vial of development/purge water and a turbidity meter. The instrument will be calibrated to read between 1 and 400 Nephelometric turbidity units (NTUs). This is a measure of the amount of light scattered at right angles to the path of light passing through the water. The greater the NTU reading, the greater the amount of light scattered by particles in the water, therefore, the greater the turbidity.

SAMPLE COLLECTION

Wells and borings will be sampled using a new, clean, disposable Teflon bailer attached to new, clean string. Sample vials and bottles will be filled to overflowing and sealed so that no air is trapped in the vial or bottle. Once filled, samples will be inverted and tapped to test for air bubbles. Samples will be contained in vials and bottles approved by the US EPA and the RWQCB, San Francisco Bay Region. Some analyses may require separate sample containers in accordance with EPA methods described in 40 CFR, Part 136 and SW-846.

Water samples intended for volatile hydrocarbon analysis will be contained in 40 ml VOA vials prepared according to EPA SW-849 and capped with Teflon-lined septa caps. Samples to be analyzed using EPA Method 602/8020 will contain a small amount of preservative (HCl). Samples to be analyzed using EPA Method 601/8010 and EPA Method 624/8240 will not be preserved. Water samples to be analyzed for low level THH-D will be stored in dark glass, 1-liter bottles to reduce degradation by sunlight. Antimicrobial preservative (HCl) may be added to the sample bottle if a prolonged holding time is expected prior to analysis.

Sample containers will be labelled with self-adhesive, preprinted tags. Labels will contain the following information in waterproof ink:

1. Project number (or name)
2. Sample number (or name)
3. Sample location (well number, etc.)
4. Date and time samples were obtained
5. Treatment (preservative added, filtered, etc.)
6. Name of sample collector

All purged water will be stored on site in steel, DOT-approved drums. Drums will be labeled as to contents, suspected contaminants, date container filled, expected removal date,

company name, contact and phone number. Drums will then be sealed and left on-site for subsequent disposal pending analytical results.

DOCUMENTATION

Sampling information will be recorded in ink in a bound notebook with consecutively number pages. Pages may not be removed for any reason. Alternatively, specially formatted field data sheets may be used to record the information collected during water quality sampling. Errata may be marked out with a single line, and initials of person making the change. The log book and data sheets will be placed in the project file when sampling is completed.

FIELD EQUIPMENT DECONTAMINATION PROCEDURES

All sampling equipment, such as buckets and stands, will be decontaminated after each use by washing in a trisodium phosphate solution followed by tap water rinses. Equipment will be stored in plastic bags or other sealed containers to prevent contact with solvents, dusts or other contamination.

All rinseate used in the decontamination process will be stored on site in steel, DOT-approved drums. Drums will be labeled as to contents, suspected contaminants, date container filled, expected removal date, company name, contact and phone number. Drums will then be sealed and left on-site for subsequent disposal pending analytical results.

APPENDIX C

Well Construction

GENERAL PRACTICES

Each monitoring well will be designed to register the potentiometric surface, facilitate soil sampling, and permit water sampling. CEC's standard procedures for well installation and soil/water sampling meet or exceeds guidelines set forth by the EPA, California State Regional Water Quality Control Board, San Francisco Bay Region and the Alameda County Health Agency. Drilling, construction, and completion of all exploratory borings and monitoring wells will be in conformance with procedures in this manual.

DRILLING PROCEDURES

Monitoring wells will be drilled with a hollow-stem, continuous-flight auger. All boring and logging will be overseen by a geologist with special attention given to avoiding the contamination of clean aquifers underlying contaminated zones. The following procedures used by CEC geologists prevent pollution of underlying aquifers:

1. Drilling will cease if 5.0 ft. of saturated impermeable material is encountered. It will be assumed that any significant saturated, impermeable layer, such as a clay layer, is an aquitard separating the shallow and deep aquifers and should not be penetrated.

2. Drilling will be terminated 20 ft. below any perched or unconfined water table.

3. Drilling will be terminated at 50 ft. below ground surface if groundwater is not encountered. This is above nearly all deep aquifers currently supplying groundwater in the Bay Area.

The drill rig operator and the CEC geologist will discuss significant changes in material penetrated by the drill, changes in drilling conditions, hydraulic pressure, and drilling action. The CEC geologist will be present during the drilling of exploratory borings and will observe and record changes in relative moisture, content, lithology, and degree of induration, and will note water producing zones. This record will be used later to prepare a detailed lithologic log. Lithologic descriptions will include soil or rock type, color, grain, size, texture, hardness, degree of induration, carbonate content, presence of fossils and other materials (gypsum, hydrocarbons) and other pertinent information. A copy of the logs will be retained in the field file at the project site.

Soil Cuttings

Soil cuttings generated during drilling will be placed in steel, DOT-approved drums. Drums will be labeled as to contents, suspected contaminants, date container filled, expected removal date, company name, name and phone number of technical contact, and name of generator. Drums will be sealed and left on-site for subsequent disposal pending analytical

results. Disposal of soil cuttings will be the responsibility of the owner/generator, although CEC may arrange for disposal.

Screen and Casing

The monitoring well assembly will consist of new, schedule 40 PVC casing from the bottom of the boring to the ground surface. Casing will be shipped in protective wrappers and carefully rinsed before installation.

From the base of the well to approximately 2.0 ft. feet above the ground water surface, casing will consist of perforated casing (well screen); the remainder of the well will be solid PVC casing. Perforated casing (well screen) will be factory slotted. Screen sizes are not intended to provide optimum flow but to provide hydraulic connection between the borehole and the monitoring well. The perforation size is selected to retain 70 to 90% of the filter pack material.

Upon completion of drilling, well casing will be assembled and lowered to the bottom of the boring. Casing will be connected with dry threads or slip joints, since using glue to connect casing sections could cause false analytical interpretations of water quality. The bottom of the casing will be approximately flush with the bottom of the boring and will be capped with a threaded PVC cap or plug. Using the lithologic log for control, the CEC geologist will specify the exact depths of screened intervals so that the well screen is within the water-bearing zone to be monitored.

Where possible, the casing will extend six inches above the ground surface. When monitoring wells are placed in traffic areas where they cannot extend above the surface, pre-cast concrete or cast iron boxes and covers will be installed.

Filter Pack

After the monitoring well assembly has been lowered to the specified depth, filter pack will be placed in the annular space between the well casing and borehole from the bottom of the well to approximately 2 ft. above the top of the well screen. The depth to the top of the filter pack will be verified using the tremie pipe or a weighted steel tape. Filter pack will be at least 95% silica sand. Sand will be hard, durable, well rounded, spherical grains that have been washed until free of dust and contamination.

ASTM recommends the following guidelines for screen slot and filter pack selection based on the anticipated strata:

Anticipated Soil Type	Recommended Well Screen Slot Size (inches)	Recommended Filter Pack Material (U.S. sieve sizes)
Sand & Gravel	0.030	20 to 4
Silt & Sand	0.020	30 to 8
Clay & Silt	0.010	50 to 16

Reference: 1988, Development methods for water wells: an anthology: NWWA Water Well Journal.

Grout Seal

A layer of bentonite pellets approximately one foot thick will be placed above the filter pack and charged with water. The depth to the top of the bentonite pellets layer will be verified using the tremie pipe or a weighted steel tape.

A cement-bentonite grout mixture will be tremied into the annular space from the bentonite seal to the top of the well. The grout material will be a mixture of Portland Type I/II cement (94 lb.) to five gallons of clean water or a sand-cement slurry with a minimum of 11 sacks of Portland Type I/II cement per cubic yard. Only clean water from a municipal supply shall be used to prepare the grout.

Capping Wells

After emplacing the grout, steel or pre-cast concrete well vault (or valve box) will be completed below ground surface. A metal tag containing well number and construction data will be permanently attached to the well vault. A steel well cover clearly marked "monitoring well" will be bolted to the vault. A suitable watertight, locking well cap will be fitted to the riser casing to prevent the entry of surface runoff or foreign matter.

WELL DEVELOPMENT

When well installation is complete, the well will be developed by surging, and/or bailing, and/or pumping to remove fines from the formation and filter pack. Well development generally restores natural hydraulic properties to the adjacent soils and improves hydraulic properties near the borehole so the water flows more freely in the well. Wells will be developed no less than 24 hours after emplacing the grout seal.

At the least, pumping should continue until water in casing storage has been removed. There are at least two common methods for determining that water in casing storage has been removed and water is flowing freely from the aquifer: (1) Monitor water level while pumping. When the pumping water level has "stabilized," it is likely that little or no water from casing storage is being pumped. (2) Monitor the temperature, pH, conductivity, and turbidity of the water while pumping. When these parameters "stabilize," it is probable that little or no water from casing storage is being pumped and most of the water is coming from the aquifer.

CEC will use the latter method. During development, pH, specific conductance, and temperature of the return water from the water pump will be measured. Well development will proceed until these field-measured water quality parameters have stabilized and the water is, in the judgment of the geologist, at its greatest possible clarity.

Temperature, pH, specific conductance, and turbidity meters shall be calibrated per manufacturers guidelines. Calibration shall be documented in the field log book or data sheets and will include a description of the calibration method, identification number of equipment and/or regents used in calibration.

Temperature will be measured with a good grade mercury-filled Centigrade thermometer, bimetallic-element thermometer, or electronic thermistor.

pH measurements will be made as soon as possible after collection of the sample preferably within a few minutes.

Conductivity will be measured by dipping the conductivity probe in the water source or sample. The probe must be immersed above the vent. The temperature of the sample will be used to calculate specific conductance from the conductivity measurement. Conductivity will be reported in units of micromhos per centimeter (mmho/cm) at 25° C.

Turbidity will be measured by placing a vial of development/purge water into a turbidity meter for measurement. The instrument will be calibrated to read in a range between 1 and 400 Nephelometric turbidity units (NTUs). This is a measure of the amount of light scattered at right angles to the path of light passing through the water. The greater the NTU reading, the greater the amount of light scattered by particles in the water, therefore, the greater the turbidity.

WELL PURGING AND WATER SAMPLING

Purging and sampling will be in accordance with procedures in Appendix B, Water Sampling in Wells and Boreholes.

SOIL SAMPLING IN BOREHOLES

U.S. Environmental Protection Agency standards serve as the foundation for all field sampling operations performed by CEC. EPA SW-846 is the primary publication from which procedures are derived. While some aspects of field and laboratory work may be delegated to the California Department of Health Services, the California Water Resources Control Board, the San Francisco Regional Water Quality Control Board, and the Alameda County Health Agency establish the general and specific criteria for sampling.

Sample Intervals

Undisturbed soil samples will be obtained for laboratory analysis and geotechnical classification at 5-ft. intervals or at distinct lithologic changes, beginning at 5 ft. below grade. In addition, one soil sample will be collected immediately above the water table (from the capillary fringe) in each hole. If only one hole is bored, it will be logged continuously from five 5 ft. below grade to the bottom of the bore.

Soil samples will be screened using an OVM. In general, samples with hydrocarbon vapor readings over 10 ppm or the appearance or odor of contamination will be submitted for laboratory analysis. Unless hydrocarbon vapors are detected with the OVM, only the soil sample from the capillary fringe will be submitted for laboratory analysis.

Collection Devices

Samples will be collected using a 2- or 2.5-inch-i.d. Modified California split spoon sampler containing three, six-inch-long brass tubes. The sampler and tubes will be decontaminated before and after each use by steam cleaning, or an Alconox solution wash, and tap water followed by deionized water rinses. The sampler will be driven ahead of the augers using a 140 pound drop hammer. The average blow counts required to drive the sampler the last 12 inches will be recorded on the boring logs.

Preservation and Handling

Sample tubes will be labeled, sealed at each end with Teflon sheeting and PVC end caps, placed in ziplock bags, and stored in an ice chest with dry ice. Samples will be delivered under chain of custody to a State-certified laboratory.

Soils Classification

Soils exposed at the ends of each brass tube will be examined by a geologist for obvious signs of contamination and classified according to the Unified Soil Classification System. These observations will be recorded in the boring logs.

Sample Labeling and Chain of Custody

Samples selected for analysis will be labeled with self-adhesive, preprinted labeled indicating project name (or number), sample number, boring/well number, sample depth, date and collection time. The same information will be recorded on the chain of custody.

DOCUMENTATION

A well construction diagram for each monitoring well will be completed by the geologist and submitted to the project manager when the work has been completed. In addition, the details of well installation, construction, development, and field measurements of water quality parameters will be summarized as daily entries in a field notebook or data sheets which will be submitted to the project manager when the work has been completed.

DRILLING EQUIPMENT DECONTAMINATION PROCEDURES

The sampler will be decontaminated before and after each use by steam cleaning or washing in an Alconox solution, followed by tap water and deionized water rinses. Only clean water from a municipal supply will be used for decontamination of drilling equipment. Equipment will be sealed in plastic bags or other sealed containers to prevent contact with solvents, dusts or other contamination.

All rinseate used in the decontamination process will be stored on site in steel DOT approved drums. Drums will be labeled as to contents, suspected contaminants, date container filled, expected removal date, company name, contact and phone number, sealed and left on-site for subsequent disposal pending analytical results.

APPENDIX D

Site Specific Health and Safety Plan for Hill Lumber Company

I. PROJECT PLAN

Objectives and Project Description

Certified Environmental Consulting, Inc., (CEC) has prepared this Health and Safety Plan for Hill Lumber Company in prior to removing petroleum-contaminated soil and installing monitoring wells at Hill Lumber. The following emergency response plan will be implemented prior to beginning site work to handle on-site emergencies. The first priority in all emergency incidents will be to minimize adverse health risks to workers.

Field Activities

Site work will include excavating approximately 111 cubic yards of soil from two underground storage tank areas and installing two 25-ft. monitoring wells and one 25-ft. piezometer.

Personnel Requirements

Tank removal contractor with crew, field geologists, well drillers

Key Personnel and Owner Representative

Project Assignment	Name/Agency	Telephone
Tank Removal Contractor	Chuck Kiper, SEMCO	(415) 572-8033
Field Geologist	Tom Suggs, CEC	(707) 745-0171
Project Manager	Tom Suggs, CEC	(707) 745-0171
Quality Assurance Officer	Stanley L. Klemetson	(707) 745-0171
Site Safety Officer	Michael T. Noble, CEC	(707) 745-0171
Owner Representative	Ralph Hill, Hill Lumber	(510) 525-1000
Well Drilling Contractor	Bruce Wennas, West Hazmat	(510) 782-8770

Threshold Limit Values for Anticipated Chemical Substances

Substance	OSHA PEL	ACGIH TVL	NIOSH REL
Benzene	10 ppm	10 ppm	0.1 ppm

Toxicological Hazards of Wastes

Human exposure to benzene concentrations in excess of 150 ppm may cause headache, weariness, and loss of appetite. Vapors at high concentrations may cause smarting of the eyes and dermatitis. Benzene appears to be poorly absorbed through skin.

Physical Hazards Associated with Site Activities

- Slip, trip and fall hazards
- Hazards due to falling or swinging objects and heavy equipment
- Excessive noise

III. SITE CHARACTERIZATION

A. Site Information

Location	Hill Lumber Company 1259 Brighton Avenue Albany, CA 94706
Topography	Flat and gently sloping to the east
Accessibility	There are no access problems. Gate remain open during business hours.
Pathways for Hazardous Substance Dispersion	Gasoline may volatalize slightly from soil
Anticipated Weather Conditions	Mild weather
Past and Present Use of Site	Lumber yard

B. Description of Wastes On Site

Location	Soils underlying sidewalk and loading dock.
Physical State of Wastes	Adsorbed in soil matrix
Range of Concentrations Found to Date	Soil samples below the 1000-gallon tank contained from 2 to 3,700 mg/Kg TPH-G. Soils below the 500-gallon tank contained from 210 to 890 mg/Kg TPH-G. A water sample collected below the 1000-gallon tank contained 2,925 μg/L TPH-G and 59 μg/L benzene.

IV. PERSONAL PROTECTIVE EQUIPMENT

Level of Protection — Level D

Respiratory Protection — Half mask dual cartridge respirator with organic vapor cartridges; will only be required if airborne concentrations are above action levels.

Protective Clothing

- Hard hat (required)
- Work boots (required)
- Safety Glasses (optional)
- Hearing Protection (optional)
- Protective gloves (optional)

Action Levels and Work Requirements — Don respirators if organics in the breathing zone exceed a constant 20 ppm

V. EXPOSURE MONITORING PLAN

Frequency and Type of Monitoring — Air should be monitored every 30 minutes using an organic vapor meter while excavating and sampling in contaminated areas.

Methodology — Monitor downwind in the breathing zone.

VI. DECONTAMINATION PROCEDURES

For PPE — Leave the work area and remove clothing, respirator last. All non-reusable clothing will be disposed of in garbage containers.

VII. PROTECTION OF GENERAL PUBLIC

Procedures — The tank removal contractor will redirect pedestrian traffic around the work area using temporary fencing, or barricades and warning ribbon. The temporary pedestrian walkway will also be protected from automobile traffic using barricades and warning ribbon. Any excavation left open over night will be enclosed with fencing.

Only authorized personnel will be permitted within 10 ft. of heavy equipment.

VII. EMERGENCY RESPONSE

Command and Control

The on-site Semco representative will be responsible for enforcing health and safety procedures related to construction. The on-site CEC representative will be responsible for health and safety issues related to sampling and well drilling.

Directions to Hospital

See area map for route to Alta Bates, Albany

Emergency Procedures for Personnel Injured or Exposed in the Work Zone

1. Assist the injured or exposed worker out of the sampling area.
2. Call for medical help.
3. Administer CPR/first aid as needed.
4. If possible, carefully remove the victim's PPE and begin decontamination procedures.

Emergency Agencies with Telephone Numbers

Emergency Service	Name/Agency	Telephone
Ambulance	Albany Fire Dept.	911
Hospital	Alta Bates - Albany 1247 Marin Avenue Albany, CA	(510) 527-7411
Police	Albany	911
Fire Department	Albany	911
Public Health	Susan Hugo Department of Environmental Health	(510) 271-4530
Emergency Spills	CalEPA	(415) 974-8131
Worker Health and Safety	OSHA	(800) 648-1003
CHEMTREC	CHEMTREC	(800) 424-9300
Utilities	Underground Service Alert	(800) 227-2600

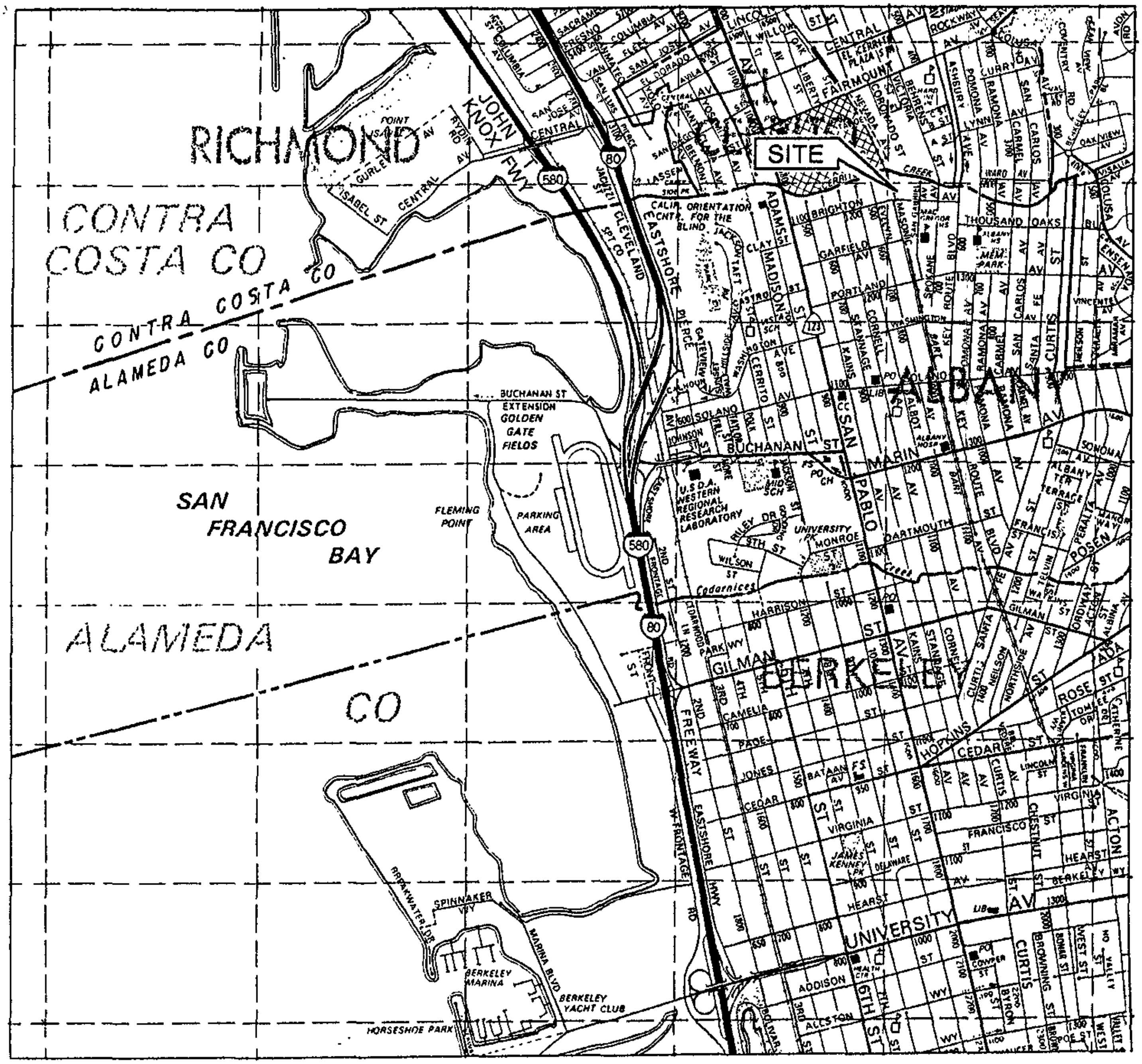

PLATE 1
ROUTE TO ALTA BATES – ALBANY HOSPITAL
1247 MARIN AVE., ALBANY

FROM
HILL LUMBER COMPANY
1259 BRIGHTON AVE., ALBANY, CA
JOB NO. 92-157-808

CERTIFIED
ENVIRONMENTAL
CORPORATION
140 WEST INDUSTRIAL WAY, BENICIA, CA 94510-0171
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