GROUND WATER INVESTIGATION WORK PLAN

Rifkin Realty Properties Case
4525-4563 Horton Street
Emeryville, California

STID 3827

August 25, 1994

c/o Frank Satterwhite, Receiver
Receiver for Rifkin Property
3220 Monika Lane
Hayward, California 94541

Prepared For

Alameda County Health Care Services Agency
Department of Environmental Health
Division of Hazardous Materials
80 Swan Way, Room 20
Oakland, California 94621

Prepared By

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Project Number 113093

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A GENERAL SITE INFORMATION

Mr. Frank Satterwhite, Receiver for the subject property, has authorized TMC Environmental, Inc. (TMC) to submit a work plan to the local implementing agency for further subsurface investigation. The workplan is based upon the results of tank and source removal at the property.

1. SITE LOCATION

The subject property, called the "Site" in this workplan, is located at the following address:

4525-4563 Horton Street, City of Emeryville
County of Alameda, State of California
Assessor's Parcel No. 49-1041-005

2. SITE DESCRIPTION

The site is on Horton Street between 53rd and 45th Streets (see Plate 1, Site Vicinity Map), and is rectangular in configuration. The site is currently developed, with an existing two story, brick walled, commercial building (see Plate 2, Site Map). The building occupies the majority of the one acre property. The Site is bordered to the north by Chiron International Research Corporation, to the south by the Sherwin Williams Paint Company, to the east by Horton Street and Chiron, and to the west by railroad tracks and the foundation of a dismantled building on a vacant lot. Temescal Creek runs through a culvert beneath the building. The remainder of the site is paved for parking or is landscaped. Public utilities service the general area. Land use of the surrounding area is commercial and industrial.

3. PROPERTY OWNER

The property owners for this site are:

Harvey M. Rifkin, Trustee of the Harvey M. Rifkin Living Trust Dated March 11, 1987, Robert Rifkin, Harvey Rifkin, as Trustee of the Estate of Beatrice L. Rifkin, deceased, Robert Kantor and Sandra Kantor

c/o Mr. Frank Satterwhite, Receiver
3220 Monika Lane
Hayward, California 94541

4. CONSULTANT OF RECORD

The consultant of record for this workplan is:

TMC Environmental Inc.
13908 San Pablo Avenue, Suite 101, San Pablo, California 94806

Mr. Tom Edwards, president or Mr. Mark Youngkin, vice president can be reached at (510) 232-8366.

5. LEAD IMPLEMENTING AGENCY

The lead implementing agency with jurisdiction over this site is:

County of Alameda Health Care Services Agency
Department of Environmental Health, Division of Hazardous Materials
80 Swan Way, Room 200, Oakland, California

The officer overseeing this case is Ms. Susan Hugo, who can be reached at (510) 271-4320.

6. SITE BACKGROUND

The following investigative and remedial work has been completed at the site. The summaries provided are only a quick reference to the more complete information in the original reports. Please refer to the original reports for a complete discussion of the work and original documentation.

6.1 UNDERGROUND TANK REMOVALS

Bay Area Tank Removal, Inc. (BATR) of San Francisco, California removed [redacted] underground petroleum storage tanks from the sidewalk at 4525, 4529, and 4549 Horton Street, Emeryville, California. The tank at 4525 Horton Street was a 1500 gallon diesel tank. The tank at 4529 Horton Street was a 500 gallon paint thinner tank. The tank at 4549 Horton was a 1500 gallon heating oil tank. The age of the tanks appears to be 30-40 years. On November 24, 1993, the tanks were removed with a backhoe and loaded onto trucks for transport and cleaning at the H & H Ship Service facility in San Francisco, California.

The 1500 gallon diesel tank was corroded with obvious holes. The bottom of the tank pit contained green colored soil with no odor. The product and vent lines occurred at the southwest end of the tank against the adjacent building wall. The pinched off product line protruded from the ground with no dispenser. BATR removed the product line, vent, and vent lines. Two soil samples

were recovered from beneath the tank, one beneath each end of the tank. Inspector Susan Hugo directed the recovery of three additional soil samples from the apparently stained side walls of the tank pit. The sample analysis results indicate non detectable concentrations of diesel range or gasoline range hydrocarbons on the tank pit bottom and side walls.

The 1500 gallon heating oil tank was corroded with obvious holes. Obvious soil contamination occurred in the bottom of the tank pit. No soil samples were collected below the tank because of the obvious heating oil soil contamination.

The 500 gallon paint thinner tank was corroded with obvious holes. Obvious odor was observed in the tank pit. BATR recovered two soil samples from the paint thinner tank pit, one from beneath the center of the tank and one from the northwest side wall. The laboratory reported the bottom sample to have a concentration of 10,000 ppm gasoline range hydrocarbon.

BATR stockpiled the overburden soil from the three tank pits on site for laboratory analysis and disposal. The diesel tank pit was filled with imported back fill material and resurfaced with concrete. The heating oil and paint thinner tank pits were left open for later source removal work.

6.2 SOURCE REMOVAL - HEATING OIL & PAINT THINNER TANK

BATR over excavated contaminated soil surrounding the paint thinner tank on January 6, 1994. A backhoe removed about 72 cubic yards of sandy clay-silt from the tank pit. Paint thinner concentrations up to 3909 ppm were encountered during the excavation of soil. The majority of contaminated soil was removed during the excavation. The bottom of the excavation was at 11.5 feet below grade in gray-brown sandy clay-silt. Paint thinner concentrations of up to 2630 ppm remain on the south and west side walls of the excavation beneath utility lines. Mr. Barny Chan, inspector with Alameda County, gave permission to back fill the excavation when the majority of contaminated soil had been removed. On January 10, 1994, TMC drilled hand augered borings into the west wall of the paint thinner tank excavation. The hand augered borings indicate the extent of remaining soil contamination is limited to beneath the utility lines. Ground water occurred in the excavation at a depth of 10-11 feet below grade. The fresh ground water had no sheen or floating product. H & H Ship Service pumped out 250 gallons of water in the excavation prior to groundwater grab sampling. The grab water sampling indicates no detectable paint thinner in the groundwater.

BATR over excavated contaminated soil surrounding the heating oil tank on January 10, 1994. A backhoe removed about 36 cubic yards of sandy clay-silt from the tank pit. Heating oil concentrations up to 15,700 ppm TPH as diesel were encountered during the excavation of soil. The majority of heating oil contaminated soil was removed during the over excavation. Heating oil contaminated soil remains beneath adjacent utility lines. The bottom of the excavation was at 12 feet below grade in gray-brown sandy clay-silt. Mr. Barny Chan, inspector with Alameda

County, gave permission to back fill the excavation when the majority of contaminated soil had been removed.

On January 13, 1994, TMC drilled hand augered borings into the side walls of the heating oil tank excavation limits. The hand augered borings indicate the extent of soil contamination is limited to beneath the utility lines. Ground water occurred in the excavation at a depth of 8-10 feet below grade. The fresh ground water had no sheen or floating product. During the back filling of the excavation with imported fill material, a four inch diameter observation sump was installed in the excavation. On January 11, January 19, and February 9, 1994, H & H Ship Service pumped out 4970 gallons of pit water from the observation sump prior to groundwater grab sampling. The laboratory reported non detectable results for the grab water sampling.

Bay Area Tank Removal, Inc. filled both excavations with imported material, then resurfaced the sidewalk with concrete. Den Beste Trucking transported 72 cubic yards of paint thinner contaminated soil to Browning Ferris Industries in Livermore, California for disposal. Manley & Sons Trucking transported 36 yards of heating oil contaminated soil to Forward Inc. Landfill in Manteca, California.

6.3 GASOLINE TANK SOURCE REMOVAL

Two underground gasoline storage tanks were excavated and removed from the site in 1988. On July 8, 1988, one 1000 gallon underground gasoline tank was removed by Tank Excavators. The agency inspection form by Mr. Dennis Byrne indicates the 1000 gallon tank was intact and in good condition. No groundwater was observed in the tank pit. Samples from beneath the tank had a gasoline odor. A 550 gallon underground gasoline tank was discovered during this tank removal. The 550 gallon tank was removed by Tank Excavators on September 30, 1988. Safety Specialist, Inc. indicates the 550 gallon tank was intact with no holes.

Soil samples were recovered from beneath the removed storage tanks by Safety Specialist, Inc. Samples from beneath the 1000 gallon tank had 86 ppm at the south end and 616 ppm at the north end of the tank. Samples from beneath the 550 gallon tank had 5 ppm at the south end and 41 ppm at the north end. The inspection form indicates no over excavation occurred and the overburden soil was returned to the tank pits.

A ground water monitoring well, MW-1, was installed through the north end of the tank pit by Safety Specialist, Inc. on November 14, 1988. This well was screened through diesel contaminated soil, [redacted] feet below grade. The well soil samples were not sampled for gasoline. Initial sampling of the well indicated diesel contamination of the groundwater at 7.4 ppm. The well was not sampled for gasoline. Aqua Terra Technologies (ATT) sampled the groundwater in well MW-1 for gasoline during four quarterly periods in 1989. ATT summarized the sampling results in their final quarterly sampling report. Ground water concentrations had decreased to 2.1 ppm gasoline, 0.098 ppm benzene, 0.007 ppm toluene, 0.009 ppm ethylbenzene, and 0.016 ppm total xylenes in November 22, 1989. On November 8, 1993, Alameda County

Health Care Services Agency issued a letter requesting further site characterization.

PC Exploration drilling company of San Jose, California drilled out monitoring well MW-1 on January 19, 1994. The well was destroyed to allow over excavation of the former tank pit. Prior to the abandonment, the monitoring well was purged and a groundwater sample recovered. TMC Environmental, Inc. personnel recovered a sample of clear ground water from the well with a disposable bailer. Ground water concentrations were reported at 77 ppm diesel with no detectable gasoline or BTEX

Bay Area Tank Removal, Inc. (BATR) excavated two exploratory trenches at the former location of the 500 gallon gasoline tank on January 26, 1994. The backhoe excavated rubble and fill material to a depth of 8 feet below grade where apparently undisturbed clay-silt soil was encountered. BATR recovered two soil samples from depths of five and eight feet below grade in each trench. No detectable gasoline, diesel, or BTEX was encountered during the exploratory trenching of the former 500 gallon tank location.

BATR over excavated contaminated soil in the 1000 gallon gasoline tank pit on January 26 and 27, 1994. A backhoe removed about 36 cubic yards of sandy clay-silt from the side walls and bottom of the former tank pit area. The bottom of the excavation was at 11.5 feet below grade. Ground water was encountered at 8-10 feet below grade. No sheen or floating product was observed on the water in the pit. The majority of fuel contaminated soil was removed during the over excavation of soil.

Ground water interface contamination of 2140 ppm gasoline occurred at the north end of the tank pit about 9 feet below grade. Interface contamination of 242 ppm diesel occurred at the center of the tank pit at about 9 feet below grade. The south end of the tank pit had no detectable interface contamination. An additional two feet of water saturated sand and clay was excavated below samples 3-16 and 3-17. No additional soil samples could be recovered in the water saturated soil. Gasoline contamination of 128 ppm remains on the east wall of the excavation directly beneath the natural gas utility line. No other significant fuel soil contamination remains on the excavation limits.

On January 27, 1994, TMC recovered hand auger samples from the east wall of the gasoline tank excavation limits. Gasoline contamination of 128 ppm remains on the east wall of the excavation directly beneath the natural gas utility line. One hand augured boring penetrated beneath the adjacent natural gas utility line. Three soil samples came from the boring at two, four, and six feet from the excavation limit at a depth of 5 feet. The sample recovered from the hand augered boring indicates the gasoline extent is limited to beneath the natural gas utility line.

BATR filled the excavation with imported material. Prior to the placement of the fill, about 200 gallons of pit water was evacuated by H & H Ship Service. A four inch observation sump was installed in the excavation during the back filling. The sidewalk was then resurfaced with concrete.

On February 8 and 9, 1994, H & H Ship Service pumped out the pit water in the observation sump prior to groundwater grab sampling. Samples OB-2A & B appear to represent the condition of the ground water. No sheen or floating product was observed on the fresh ground water. The

grab water sampling indicates no detectable groundwater concentrations of gasoline or BTEX. Diesel is reported in the ground water at 14-15 ppm. Diesel soil contamination was only found in the ground water interface samples from 9 feet below grade. The origin of the diesel contamination is unknown, possibly from an off site up gradient source to the southeast across Horton Street.

6.4 SHERWIN WILLIAMS EXPLORATORY BORINGS

During June 1994, TMC drilled and sampled four exploratory borings on the Sherwin Williams property adjacent to the Rifkin property on the south. The laboratory analysis results show significant gasoline, diesel, and BTEX contamination of the ground water in borings SW-1 and SW-2. The results of the drilling and sampling are to be presented in a technical report.

6.5 LEVINE FRICKE MONITORING WELLS

During July 1994 Sherwin Williams Company and Levine Fricke installed five ground water monitoring wells on the Rifkin Property to further investigate the extent of arsenic contamination of the ground water. The location of the wells, RP-1 through Rp-5 are shown on plate 2, Site Map. The results of ground water sampling have not been reported yet by Levine Fricke.

B PROPOSED SCOPE OF ADDITIONAL WORK

The lateral extent of ground water contamination at the site is not presently known. The Alameda County Health Care Services Agency in a letter dated November 1993, requests an investigation to determine the extent of hydrocarbons in the ground water. Additional ground water monitoring wells are needed on the site to investigate for the extent of petroleum fuel contamination.

Upon the authorization of Receiver, TMC is proposing additional work to investigate for the extent of contamination in the ground water at the site. As required by LUFT guidelines, the target chemicals for this investigation will be total extractable hydrocarbons as diesel, gasoline, benzene, toluene, ethylbenzene, and total xylenes. The objectives of this investigation are as follows:

- To investigate for the extent of petroleum fuel compounds in the ground water surrounding the former location of the former underground storage tanks,
- To recommend investigation or remedial actions based on the results of work performed.

The scope of the work includes:

- The installation of three new ground water monitoring wells. The development

and sampling of the wells. Groundwater gradient data will be obtained using the newly installed Sherwin-Williams monitoring wells in conjunction with the proposed wells. Purge water will be disposed of by H & H Ship Service of San Francisco, CA. Soil samples will be recovered from each well at five foot intervals for the laboratory analyses of the target contaminants.

- Write a technical report explaining the methods and findings of the investigation.

The tasks completed during this investigation agree with the guidelines of the State enforcing agency, the San Francisco Bay Regional Water Quality Control Board. The responsible party and/or owner of this property has sole responsibility for complying with all Federal, State and local environmental regulations. The investigation and reporting guidelines applicable to leaking underground fuel tanks, available through this agency, apply to the site.

C SAMPLING AND ANALYSIS PLAN

This Sampling and Analysis Plan (SAP) defines the procedures that will be observed by TMC personnel participating in the sampling of soil and water at the site. Modifications to this SAP will be made, as needed, by submitting revised versions to the implementing agency. This SAP has been prepared to define standard operating procedures that will allow, to the extent practical, the following objectives to be achieved:

- Decontamination and disposal practices that minimize the risk of cross-contamination of contamination at the site during field measurements and sampling;
- Performance of field measurements and collection of samples that are representative of site conditions at the location and time of measurement or collection, and;
- To produce field measurements and environmental sampling results that are representative of site conditions at the specified time and location.

1. SAMPLE COLLECTION AND HANDLING

1.1 DRILLING OF EXPLORATORY BORINGS AND WELLS

- Permits required for drilling the soil borings or installation of monitoring wells will be obtained before the start of work from the local permitting agency. A copy of the permit will be present on site during drilling operations.

- The drilling method used for exploratory borings and wells is dictated by the purpose of the drilling, the anticipated lithology, and the anticipated drilling depth. All drilling will be conducted to minimize potential cross-contamination between various lithologic units, and to minimize disturbance of target groundwater zones. Well installation in the shallow water-bearing

zone will be drilled with a continuous-flight hollow-stem auger of at least 8 inches OD. In areas of restricted access where a minuteman drill rig is used, then solid flight augur will be used for soil sampling only.

- The drilling contractor will have a valid C-57 Water Well Contractor's License. The contractor will have a current Statement of Responsibility or Workmen's Compensation Certificate on file with the local permitting agency.

- Following the advancement of a boring and prior to well construction or sealing, TMC may elect to collect a semi-representative or grab groundwater sample from the boring hole. Grab samples will be collected by slowly purging the boring hole with a bailer until the hole is evacuated or four boring hole volumes are removed. Samples will be collected with a clean Teflon or a dedicated, disposable PVC bailer. Samples will be handled and transported as if a representative groundwater sample. No quality control samples or assessment will be collected with grab samples.

1.2 LITHOLOGIC LOGGING

- Under the supervision of a certified engineering geologist will be a field geologist, or soil scientist, or environmental specialist and a qualified field technician on site to direct drilling operations, supervise sampling procedures, and record information needed for bore hole and monitoring well logs, cross sectional charts, and site maps.

- Cuttings and other samples from all borings will be visually logged and samples will be classified according to methods recommended by the U.S. Environmental Protection Agency. In addition all boring logs will include a geologic description of the lithology encountered at the sampling intervals.

- The field or rough log will be edited and drafted to produce the final log reproduced in the technical report. The field or rough logs will not be kept on file, but discarded upon completion of the final log. A copy of the final logs will be stored on file at TMC for a period of three years following release of the report.

- The lithologic logs are valid only for the specific locations and time period in which the data was observed. No warranty is expressed that the conditions shown on the logs is representative of other portions of the Site or other time periods. TMC retains the right to edit and revise the lithologic logs in light of new or revised data.

1.3 WELL CONSTRUCTION

- Groundwater monitoring wells will be installed for the following purposes: to investigate the lateral extent of groundwater pollution; to evaluate groundwater quality; to determine the direction of groundwater flow; to evaluate the hydrogeologic characteristics of the aquifers and aquitards; and to serve as potential groundwater extraction points for remedial activities.

- An inspector will be present to witness the installation of the annular seal. The licensed well driller will submit the required State Well Drillers Report to the California Department of Water Resources.

- The boring will be advanced until a saturated zone is encountered, the boring will end a maximum of 15 feet below the depth at which the saturated zone is encountered or 5 feet into a perching clay aquitard layer. Only one aquifer will be penetrated by the well and all wells will be single cased. If applicable, separate wells will be used to sample different aquifers. Well design will be location-specific and based upon lithologic logs and sieve analysis of representative aquifer material.

- The boring will be completed as a groundwater monitoring well within the saturated zone. A 2 or 4-inch ID, National Sanitation Foundation (NSF) specified, Schedule 40 PVC blank, well screen, and casing will be used. Sections will be flush-threaded and screwed together without the use of cement. A threaded end cap will be used at the bottom of the well. An optional one to five foot blank silt trap may be placed at the bottom of the well screen. Prior to installation, all casing and screens will be decontaminated and observed for damage.

- No screen section will be of such length as to provide unnecessary interconnection between two or more permeable zones, and in no case will the screened interval for a well exceed twenty feet in length.

- If site conditions permit, the slotted pipe will extend two to five feet above the water surface to form a sensing zone for detection of floating product. The annulus of the perforated section will be packed with clean filter pack material for the length of the saturated zone and 1-3 feet above the top of the screen. Filter pack material will be commercially prepared pre-mixed, pre-washed, sand\gravel. About one foot of bentonite slurry or pellets will be placed on top of the sand envelope pack, upon which will be placed a class-A cement or cement-bentonite annular seal to the surface.

- Once the bentonite seal has hydrated for at least 30 minutes, the annular space above the seal will be filled with a cement grout. A cement grout mixture will use no more than 8 gallons of potable water per one 94-pound bag of Portland cement.

- Appropriate filter sand and screen slot sizes for proposed wells will be determined on the basis of sieve analysis if available or professional judgement. Filter sand size will be selected to be compatible with screened formations, and slot sizes will be selected to be compatible with chosen filter sand sizes. Standard sizing methodologies (Driscoll, F.G., 1988, Groundwater and Wells, 2nd edition, Johnson Division, St. Paul, Minnesota) will be used whenever possible; however, for formations containing appreciable silt and clay-sized particles, standard methodologies may not be applicable. In these cases, best geologic judgement will be used to minimize water sample turbidity and provide for collection of representative samples.

- The top of the wellhead will be finished with a concrete surface pad to slope water away.

- The top of the well casing will be locked to prevent contamination and tampering. Above-

grade or at-grade well completion will depend upon the final well location and traffic conditions. Above grade completion will require an eight (8)-inch diameter locking, steel protective casing set into a concrete pad. At-grade completion will require a Christy, or equivalent, traffic box and a concrete pad. The wellhead will be protected with a watertight cap. New wells will be numbered and well locations and well head elevations will be surveyed.

1.4 WELL DEVELOPMENT

- Wells will not be developed until 72 hours following placement of the cement seal or the well will be developed prior to the placement of the seal. The wells will be developed to remove fines from the boring hole and to establish hydraulic continuity between the filter pack and the formation.

- Equipment inserted into the well during development will be decontaminated by washing or steam cleaning before and after its use.

- Wells will be developed until the water is visually free of fine-grained sediments or until field measurements of Ph, electrical conductivity, and temperature stabilize. At least ten well volumes of water will be removed during development of the well.

- Development of wells screened in sand-size or coarser formations will be accomplished by surging and evacuating the water and sediment by pumping or bailing intermittently. Wells screened in predominantly fine grained, unconsolidated material will be developed by bailing without purging. Studies available in the literature indicate that surging wells in fine grained materials increases the turbidity greatly above simple bailing.

1.5 SAMPLE COLLECTION AND HANDLING - SOIL SAMPLES

- Soil samples will be collected for lithologic description, chemical analyses, and may be collected for analysis of physical characteristics.

- The soil sampling in borings and new wells will normally commence at a depth of 3½-5 feet below surface grade with a 1½-foot interval of drive sampling, unless prior investigation or site conditions warrant modification. Samples will be taken at five-foot increments to the depth of the boring. Soil sampling will follow the guidelines presented in ASTM Method D 1452-80, Standard Practice for Soil Investigations and Sampling by Auger Borings. Continuous sampling may be utilized where additional detail is regarded as necessary by TMC staff to define the lithologic or contamination characteristics. A modified California split spoon sampler fitted with three, 2 inch X 6 inch, brass thin-walled liners will be driven ahead of the auger to collect the soil samples in all borings or wells. The brass liners will be purchased cleaned and kept in an enclosed container to assure cleanliness. Liners will be field cleaned with a soap wash and rinse prior to use.

- Soil sampler casings will be disassembled, steam-cleaned or cleaned in soapy (TSP) water.

The casing is then rinsed with clean tap water and with de-ionized water, then air-dried just before taking each sample. The cleaned casings will then be reassembled with similarly cleaned and dried brass, sample liners and carefully lowered into the hollow stem of the augers for the collection of the sample.

- The soil samples in the bottom of the three brass liners in the sampling casings (if in good condition) will be taken as the samples to be tested. The samples will be labeled and sealed in the field in their original liners. The ends of the sample liners will be capped with aluminum foil, and sealed in place by clean plastic caps and tape. The sample liners will be placed in waterproof, plastic bags and stored in an ice chest.

- The middle liners from the sampler casing will be extruded in the field and examined to help provide information for the boring logs. The cuttings from the borings will be examined during the drilling to provide a continuous log of the materials encountered using ASTM Method D-2488-84 for visual description and identification of soils.

- The middle liners from the sample casing will extruded in the field into a clear plastic ziplock bag and immediately sealed. The soil material will then be broken into small pieces. After approximately five minutes of solar exposure, the probe of the hydrocarbon vapor monitor will be inserted into the bag to the record the vapor level. Vapor levels will be recorded on the field boring log.

- A geologic drilling log will be maintained of the materials encountered and sample locations in all borings and wells. The log will include field descriptions of the soil properties, lithologic variations, moisture conditions, well construction, and any unusual characteristics noted that may suggest the presence of chemical contamination.

- A sample of the representative aquifer material will be recovered from each well boring for laboratory sieve particle size analysis. The sieve analysis will be used to design the well screen properties of subsequent groundwater monitoring wells.

- Samples at five foot intervals from surface grade to the ground water interface will be submitted for laboratory analysis. If field screening is appropriate, selected representative soil samples will be submitted to the environmental laboratory for chemical analyses based upon field screening results. All samples retained for chemical analysis will be stored on dry ice in a clean, covered cooler-box for transport to the laboratory. Duplicate samples, if any, will be refrigerated.

1.6 SAMPLE COLLECTION AND HANDLING - WATER SAMPLES

- No groundwater sampling will begin until 72 hours following well development. Before purging, the water level elevation will be measured with an electric sounder, pressure transducer, or a marked steel tape to the nearest 0.01 foot. The reference elevation for each well will be the north side of the top of the well casing. Successive water level measurements will be taken until measurements agree within 0.02 feet.

- A clear, dedicated, disposable PVC bailer will used to observe the presence and thickness of immiscible layers or free product present on the water surface. If free petroleum product is observed, the thickness of the free product will be measured in the bailer, and also using a oil-water interface probe in subsequent sampling intervals.

- A minimum of 3 well volumes of stale water will be purged from the well before the collection of the sample. The water parameters of temperature, conductivity, and optionally pH will be monitored with instrument probes from grab samples recovered at regular intervals to verify stabilization. Well stabilization is defined when three consecutive water parameter measurements vary by no more than 10 percent.

- The ground water samples to be analyzed for volatile compounds will be recovered from the monitoring wells using a clear Teflon sampling bailer equipped with a stopcock sampling attachment. Non volatile samples will be collected in a dedicated and disposable PVC bailer. A field log will be maintained of purging and sampling procedures.

- All water retained for chemical analysis will be placed in clean Teflon screw-cap 40 ml. VOC vials for the TVH as gasoline and BTEX samples, one-liter amber glass bottles for the TEH as diesel samples, and one liter amber glass bottles for the petroleum oil and grease samples. The vials and bottles will be topped-off to avoid air space, and screw-cap sealed. All full 40 ml VOA vials will be inverted to look for air bubbles, and sampled again if air bubbles are observed in the vial. Samples collected for mobile laboratories will use the sample bottles specified by the on site laboratory personnel.

- One trip blank or equipment blank will be taken for each set of 10 water samples collected and transported off site. The water sample trip blank would be provided by the environmental laboratory. Deionized water provided by the laboratory will be poured into the bailer, then the sample containers to provide an equipment blank.

2. LABORATORY PROCEDURES

2.1 LABORATORIES

- The designated laboratory for chemical analysis of environmental samples from the site is Advanced Materials Engineering Research in Sunnyvale, California, DOHS laboratory certification number 1909 and/or Geochem Mobile Laboratories, San Jose, California, DOHS laboratory certification number 1888.

- All chemical sampling, handling, and storage will be conducted according to Environmental Protection Agency and Regional Water Quality Control Board guidelines for the investigation of suspected underground storage tank leaks.

- The samples will be delivered to the laboratory within two days of its acquisition. Samples will be kept on ice or refrigerated to 4 degrees Celsius, or cooler, continuously during storage and transport to the laboratory.

- Unless otherwise requested by the laboratory, no preservatives will be added to the sample unless provided with the sample bottles. The sealed sample will only be opened by laboratory personnel who will do the chemical analysis. The samples will analyzed within 7-14 days from their collection date depending on EPA quality control criteria appropriate for each analysis method.

2.2 LABORATORY PROCEDURES

- Soil and groundwater samples will be chemically analyzed for TPH as gasoline and diesel with BTEX distinction, EPA methods 8015M/LUFT and EPA 8020, selected samples will be analyzed for TPH as motor oil, EPA method 8015M/LUFT. Selected soil samples may also be analyzed for organic lead.

2.3 SAMPLE RECORDS

- All samples will be labeled with the following information using waterproof ink: site name, specific sample location identifier, date and time collected, name of the sample collector and affiliation
- A field-data-sheet will be filled out for each group of samples. The data sheet will contain the following information: label information, sampling method, type of container, physical characteristics (texture, color, odor, etc.), disposition, used for field analysis, stored, sent for laboratory analyses.

2.4 CHAIN OF CUSTODY

- A chain of positive, signature custody and transference will be strictly maintained. The chain-of custody form will be included with any samples leaving the job site and will follow the samples until they are analyzed or disposed of. The chain-of custody form will contain the following information: sample number, signature of collector, date and time of collection, sample type, identification of well or boring, number of containers, parameters requested for analysis, signature of person(s) involved in sample chain of possession, inclusive dates of possession, laboratory sample number
- When the samples arrive at the laboratory, the receiver will sign the chain of custody forms and enter a laboratory identification number onto the sample label and chain of custody form. The identification number will be used by the laboratory in its internal tracking system, thus the status of a particular sample can be determined at any time by referring to the laboratory log books. Both the laboratory identification and field sample numbers will be cited when the analytical results are reported.
- The wet-signature originals of both the laboratory Certified Analytical Report and the

completed chain of custody will be provided with the technical report to the client. A copy of the these documents will be retained by TMC on file for a period of three years from release of the report.

3. DECONTAMINATION

- All equipment that will come in contact with potentially contaminated soil or water will be decontaminated prior to and after each use. Decontamination will consist of high pressure hot water rinsing, or phosphate free detergent washing followed by deionized, reverse osmosis or distilled water rinse.
- Equipment probes, filtration apparatus, measuring tapes, transducers, foot valves, and well sounders will be cleaned with a phosphate-free detergent solution and rinsed with distilled water. These devices will be cleaned prior to initial use at the site, and following use in each well.
- Water sample containers will be cleaned appropriately by the analytical laboratory.
- Field personnel will wear clean nitrile or latex gloves whenever they are handling sampling equipment or samples.
- All protective equipment worn by field personnel will be appropriately decontaminated or disposed of, as necessary, after use at each drilling or sampling location to avoid transporting contaminants to new work locations, and to meet health and safety objectives. Clean water will be available to rinse any exposed area of skin, clothing, or equipment that may come in contact with potentially contaminated material.

4. STORAGE AND DISPOSAL PRACTICES

- Equipment wash and rinse water, well development, and purged water will be collected in clean 55-gallon liquid drums for disposition or treatment within 90 days once laboratory analysis results are available dependent upon client authorization and funding. Barrels will be labelled immediately upon use and stored in a secure area.
- Soil and groundwater samples will be used as the first phase of testing. If any hazardous chemicals are detected in these samples, the cuttings and/or drilling- development fluids will be tested, so that proper means of disposal can be determined. Handling and disposal methods for contaminated substances will depend on the types and concentrations of chemicals detected during testing.
- TMC cannot accept ownership or responsibility for disposal of any contaminated material encountered at the site, nor can TMC accept ownership of responsibility for disposal of any contaminated drill cuttings or rinse water from cleaning of equipment produced as a result of investigation or remediation activities. The property owner will handle and dispose of

contaminated substances in accordance with applicable regulations of local, state, and federal agencies. Disposal will occur at an appropriate regulated waste disposal facility. Uncontaminated soils generated during the above operations will be disposed of on-site. Uncontaminated drilling and sampling fluids used during the above operations will be discharged to the site or used for dust control, as appropriate.

D QUALITY ASSURANCE AND QUALITY CONTROL

1. OBJECTIVE

The objective of quality assurance and quality control is to provide environmental sampling and analysis data of known and acceptable quality. To meet this objective, field and laboratory quality control procedures will be done.

These quality assurance and quality control guidelines have been prepared to define standard operating procedures that will allow, to the extent practical, the following objectives to be achieved:

- to assess whether chemical analysis of samples occurs in accordance with professional opinion of acceptable quality;
- to assess the accuracy and precision of the chemical analysis results, and;
- to assure that the samples collected are representative of the site conditions under study.

2. FIELD QUALITY ASSURANCE PROGRAM

The following sections contains procedures for collecting field samples and decontaminating equipment.

2.1 CALIBRATION AND MAINTENANCE

The procedures described in this section pertain to the calibration and maintenance of field equipment and instrumentation used during the investigation. The instruments are used for general qualitative survey tasks. The instruments will be calibrated according to the manufacturer's instructions and schedule. Any meters that cannot be calibrated will be returned for service and replaced with a properly functioning meter.

- OVA-FID instruments and Sensidyne or Gastech hydrocarbon detector calibration: calibrated monthly according to manufacturers instructions using factory supplied gas standards.

All equipment will receive routine preventive maintenance checks to minimize equipment

breakdowns in the field.

2.2 FIELD QUALITY CONTROL CHECKS

Various types of field blanks verify that the sample collection and handling process have not effected the quality of the samples. Field blanks are used to determine the accuracy of the chemical analysis. An equipment blank is collected for each group of ten (lot) water samples collected in the field. The equipment blank is used for non dedicated equipment. The equipment blank is to be analyzed for all the required monitoring parameters. No equipment blank is collected for soil samples.

3. LABORATORY QUALITY ASSURANCE PROGRAM

All samples collected during this project will be analyzed by a California Department of Health Services-certified laboratory for the selected parameters in accordance with standard U.S. Environmental Protection Agency-approved methods. All laboratory QA/QC information will be made available in a QA/QC Summary Report prepared by the laboratory. Laboratory quality control measures will include those required by the DOHS under their Hazardous Waste Laboratory Certification Program.

The laboratory quality control and quality assurance program will provide for standards, laboratory blanks, duplicates, and spiked samples for calibration and identification of potential matrix interferences according to current EPA protocols. The extraction of volatile chemicals for analysis will strictly follow EPA guidelines for minimum time limits.

4. DATA VALIDATION AND REPORTING

Data collected and used in project reports will be appropriately identified and will be included in a separate appendix in the final report. The certified analytical reports from the reporting laboratory along with chain of custody forms will be in the appendix. All data will be reviewed and apparent abnormalities (e.g., unexpected order-of-magnitude difference among samples or instrument readings) will be investigated by reviewing procedures, field instrument procedures and calibrations, and laboratory QC results.

5. EVALUATION OF THE QUALITY OF DATA

All data reported is to be complete and fully documented. Laboratory detection limits are to meet California Department of Health Services standards for minimum verification detection limits. Data that is much different from most other values in a data set will be considered an outlier. An

outlier will be investigated and corrected if determined to be due to:

- inconsistent sampling or analytical chemistry methodology
- errors in the transcription of data values
- a catastrophic unnatural occurrence such as a spill

Documentation and validation of the cause of an outlier will accompany any attempt to correct or delete data values. Simple statistical methods will be used to evaluate data sets when sufficient sampling intervals are available.

To document that the data collected during the investigation are representative of conditions at the site, the chemical data will be assessed in terms of accuracy and precision using both the analytical laboratory and field collection programs. A combination of qualitative and quantitative assessments will be used to check the quality of the chemical data. Complex statistical data verification and significance evaluations will not be performed. Analysis of internal laboratory QC samples will be used to evaluate the analytical procedures used by the laboratory. Analysis of field QC samples will be used to evaluate both the field handling and sampling procedures, and laboratory analytical procedures.

E LABORATORY CERTIFICATION

All soil and water samples will be analyzed by a California Department of Health Services certified laboratory. The laboratory will have the appropriate certification for each analysis performed from the appropriate administrations listed below:

1. Hazardous Materials Laboratory Certification Program:

   California Department of Health Services, Hazardous Materials Laboratory

   2151 Berkeley Way, Room 234,Berkeley, CA 94704 (510) 540-3003

2. Drinking Water Laboratory Certification:

   California Department of Health Services, Sanitation and Radiation Laboratory

   2151 Berkeley Way, Room 465, Berkeley, CA 94704 (510) 540-2201

F. SITE SPECIFIC SAFETY PLAN

This Site Specific Safety Plan (SSP) has been prepared and accompanies this workplan. The SSP describes the health and safety procedures for the activities planned in performing all site investigation and potential remediation at the site on 4525-4563 Horton Street in Emeryville, California. The SSP is intended to apply to all future amendments to the scope of work.

1. INTRODUCTION

The following describes the health and safety procedures for the activities planned in performing all site investigation and remediation field activities at the site. This safety plan is intended to apply to all future amendments to the scope of work. All personnel and subcontractors will follow this plan. Each company has the prime responsibility for it's own employee safety. It is expressly intended that all project work will comply with applicable sections of the California Occupational Health and Safety Code. All parties working on this project will maintain a general responsibility to identify and correct any health and safety hazards. All parties are responsible for working in a legally safe manner. In the vicinity of the former underground storage tanks, an area of petroleum fuel contamination may be expected.

1.1 PROJECT DESCRIPTION

The project potentially involves the excavation and sampling of fuel contaminated soil and the handling and remediation of contaminated ground water. The work to be done will include all or part of the following tasks: excavation and handling of contaminated soil and the sampling of contaminated soil.

1.2 KEY PERSONNEL

The project personnel who will have complete responsibility for the safe operation of this project are:

Project Manager:	Mark Youngkin	(510) 232-8366
Safety Officers:	Tom Ghigliotto	(510) 232-8366

1.3 SAFETY OFFICER RESPONSIBILITIES

The responsibilities of the Project Managers and Safety Officers are as follows:

- To conduct initial site safety training for all project field team members as described in this document

- To assure all field team personnel have read and understand the Health and Safety Plan
- To assure all work done by field personnel is conducted according to safe practices outlined in this plan
- To coordinate with safety personnel fire-watch, traffic control and site security
- To monitor activities to assure the proper use of personal protective equipment such as hard hats, protective eye wear, gloves, coveralls, respirators, etc.
- To monitor ambient hydrocarbon vapors
- To make certain personnel safety equipment is in a usable condition
- To shut down or modify field work activity based on criteria presented in this document.
- Safety training is to be provided to the field team specific to this project. It may be used as a future reference for the field team concerning health and safety matters

1.4 SUBCONTRACTOR RESPONSIBILITIES

The responsibilities of the subcontractor with respect to safety are:

- To read, understand and accept this Health and Safety Plan
- To assure all members of the subcontractor crew attend the safety training program required by OSHA and EPA regulations, that the workers understand and read the English language and therefore understand the safety requirements in this safety plan
- To make certain equipment and other machines are properly inspected and maintained and are complying with applicable sections of the California Health and Safety Code
- To supply and maintain safety related protective equipment such as hard hats, safety boots, protective coveralls, gloves, safety eye wear, respirators, etc., as specified in this plan
- To assure each employee working at this site read and comply with this Health and Safety Plan
- To enforce corrective action under the direction of the Site Safety Officer
- To enforce all shoring, trenching, confined space, and excavation regulations according to OSHA guidelines. All subcontractors agree to accept sole responsibility for complying with these regulations.
- To post all applicable EPA, OSHA, and proposition 65 signs and labels

Each subcontractor is responsible for the health and safety of its associated employees. Each subcontractor is obligated to comply with all applicable statutory safety and health requirements. Each subcontractor shall provide written incident / accident reports within 24 hours of occurrence. Each subcontractor shall identify one of its qualified employees as the Site Health and Safety Officer for its employer and operations.

1.5 FIELD TEAM MEMBER RESPONSIBILITIES

The responsibilities of the field team members are:

- Read, understand and follow this plan
- Do all work safety
- Cooperate with safety personnel
- Report any unsafe conditions to the immediate supervisor
- Be aware and alert for signs and symptoms of potential exposure to site contaminants and heat stress

1.6 POTENTIAL HAZARD

As air, water, soil and chemical substance monitoring data become available for all site work, the information will be evaluated by the Site Safety Officer. Appropriate action as Health and Safety modifications will be initiated by the Safety Officer if necessary. The anticipated activities of this project include:

- Excavation, removal and disposal of a subsurface soil
- Collection of soil and water samples
- Monitoring of ambient hydrocarbon concentrations during project activities

The general types of hazards associated with this project include, but are not limited to the following:

- Mechanical hazards: swinging objects, machinery,

  normal construction hazards, drill rigs, etc.
- Electrical hazards: buried cables, overhead power lines, lightning bolts, electrical equipment, etc.
- Chemical hazards: petroleum fuel and its constituents
- Fire hazards: natural gas and product lines, flammable petroleum hydrocarbons, and motor driven equipment

- Thermal hazards: heat stress, heat stroke, minor burns
- Acoustical hazards: excessive noise created by machinery, hammers, compressors, drill rigs, coring machines, etc.
- Confined space hazards: underground tanks, vaults, trenches

Job hazard analyses associated with each major work activity are presented in the following sections.

2. HAZARD EVALUATION

2.1 SOIL EXCAVATION AND HANDLING

Excavating and handling petroleum fuel contaminated soil will potentially expose field personnel to the following hazards:

- Chemical hazards: Exposure to various chemical substances, including but not limited to, petroleum hydrocarbon liquids and vapors, and liquid and solid chemically contaminated soil and construction equipment and material.
- Physical hazards: operating machinery; falling objects; and exposure to outside temperature extremes; working around excavators, backhoe, loaders, and dump trucks; tripping hazards; open trenches and excavations, confined space entry, shoring construction
- Fire, Electrical and Noise Hazards: underground gas and product lines, and excessive machinery noise from excavators, backhoe, loaders and dump trucks.

Excavation activities will be conducted by subcontractors who specialize in the removal and excavation of underground tanks and contaminated soils. The subcontractors are responsible for the adequate training, equipment and enforcement of OSHA and EPA regulations concerning confined space entry, trenching and excavation, and shoring installation. Of special concern is the entry of non shored excavations that conform to OSHA confined space entry regulations. Subcontractors will pay special attention to these regulations and take appropriate action to implement them.

2.2 SOLID AND LIQUID MATERIALS SAMPLING

The sampling of soil and liquid exposes personnel to the same potential health hazards as listed above soil excavation and soil borings and monitoring well installation. Soil samples are collected in all of both of these activities. Soil will be collected for analyses in a backhoe bucket above ground. Groundwater samples will be collected from excavations. Some samples may contain high levels of hazardous chemicals creating the potential for chemical exposure through inhalation and skin contact. Sample collecting may pose the greatest risks of chemical exposure for site workers. Sampling operations on a drill rig use a large hammer that may generate excessive noise.

2.3 PACKAGING AND SHIPMENT OF SAMPLES

The potential for overexposure to hazardous gasoline constituents still exists during the shipment of samples to the lab. After the samples have been collected in brass tubes or appropriate sample bottles, the containers will be properly packaged to protect shipping and laboratory personnel from exposure. The hazards associated with shipping samples are small provided the containers do not leak or break.

3. HAZARD CRITERIA

3.1 HYDROCARBON VAPORS

Hydrocarbon vapors expected to be encountered consist of mostly petroleum fuel vapors. Very small amounts of petroleum fuel vapor are expected to be encountered. Exposure to elevated levels of hydrocarbon vapors presents potential health risks that need to be properly controlled. Work practices and methods will be started to limit exposures. When elevated exposures persist, respiratory protection will be the primary control method to protect personnel from inhalation of hydrocarbon vapors.

Petroleum fuel has hundreds of chemical compounds. There are certain compounds (for example benzene) that present significant hazards and must be properly controlled. To do so, a working limit of 30 ppm total hydrocarbon vapor is the maximum acceptable level of exposure without respiratory protection. In a typical situation with <1% of the hydrocarbon vapors being benzene, a 30 ppm concentration of total hydrocarbon vapor will result in a breathing zone of less than 1 ppm benzene vapor. This level is one tenth of the current occupational Permissible Exposure Limit (PEL) for an 8 hour exposure to benzene.

A hydrocarbon vapor analyzer will be used to measure real time breathing zone concentration for comparison with the 30 ppm hydrocarbon vapor working limit. When a persistent vapor level of 30 ppm occurs, appropriate respirators will be donned and other vapor measurements will be made. If hydrocarbon vapors exceed 30 ppm as measured on the field instrument, work will be stopped. The field crew will be instructed to stay up wind. Methods will be applied to subdue fugitive vapor emissions such as sprinkling soil with water, or the use of a blower. The site Safety Officer will make such determinations.

Dust control during soil disturbance activities such as earthmoving, soil drilling and sampling is required. Soil during disturbance must be wetted as practical to prevent generation of any dust. Failure to prevent generation of dust may require the usage of respirators.

3.2 HEAT STRESS AND NOISE

A hazard exists when individuals work in warm temperatures, particularly while wearing impervious protective clothing. When the ambient air temperature exceeds 65 degrees, heat stress may become a problem. If these conditions are encountered, the following precautions will be taken:

- During day-to-day field work, the on-site supervisor will be alert for the signs and symptoms of heat stress.

Field workers will be observed for the following signs and symptoms of heat stress.

- profuse sweating, or complete lack of sweating,
- skin color change,
- increased heart rate,
- body temperatures more than 100 degrees as measured by thermometers, and
- vision problems.

Any team member who exhibits any of these signs or symptoms will be removed immediately from field work. The team member will consume electrolyte fluid or cool water while resting in a shaded area. The individual will be instructed to rest until the symptoms are no longer recognizable. If the symptoms appear critical, persist or get worse, immediate medical attention will be sought.

When working around mechanical equipment the potential exists for exposure to excessive noise. To deal with the health hazards of excessive noise, ear plugs or ear protection will be provided.

4. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

This section specifies personal protective equipment required for the various tasks of this project. The level of protection required is described as Level D (modified). Level D personal protective equipment will be used when hazard evaluation indicates that activities will be conducted in areas with low potential for contact with contaminants. Level C (modified) protection includes Level D protection and also respiratory protection. Level C is not anticipated on this site.

4.1 SOIL EXCAVATION AND HANDLING

Respiratory Protection: all field personnel will be required to have available an air purifying respirator with organic vapor cartridges. The respirators will be required based on criteria listed

herein.

Protective Clothing: all field personnel who handle contaminated soil or liquid will wear impervious coveralls and butyl rubber gloves. Impervious coveralls will not be required if soil or water is not visibly contaminated, or if vapor measurements are below 500 ppm.

Head Protection: Field personnel will wear non-metallic safety helmets always within the work zone.

Foot Protection: Field personnel will wear neoprene rubber boots with steel toes. Under non-liquid exposure conditions, leather boots with steel toes and shanks are permissible.

Ear Protection: Field personnel, based on noise levels, may be required to wear earplugs during soil excavation and drilling.

Eye Protection: Field personnel will wear chemical-resistant safety glasses with attached side shield where splashes of potentially hazardous liquid or particles are likely.

4.2 SOIL AND LIQUID SAMPLE COLLECTION

Personnel who are likely to be exposed to contaminated soil or water samples will be required to wear the same personal protective equipment as outlined herein.

4.3 PACKAGING AND SHIPMENT OF SAMPLES

Eye Protection: Personnel will wear chemical resistant safety glasses with attached side shield while packaging samples.

Hand Protection: butyl rubber or nitrile gloves will be worn while packaging the samples.

Packaging and Shipping Requirements: all samples that are to be shipped for analysis must comply with Department of Transportation (DOT) regulations, as follows:

- Package the primary container to protect it from breaking,
- tape all lids with hydrocarbon resistant tape,
- wrap the primary container with absorbent brown paper (wadding), and
- place the primary container in a plastic (ziploc) bag.

5. SITE CONTROL AND WORK ZONES

Controlled access areas or "work zones" will be established on the site at locations where contaminants are present or the potential exists for contaminants to be present at levels requiring personal protective equipment of Level D (modified) or greater. General site security will be

maintained within the controlled access areas.

During all phases of the project work a work zone around the immediate vicinity of the project will be established and taped off if necessary to prevent entry. Only authorized personnel will be permitted to enter the work zone. Authorized personnel will include those who have duties requiring their presence in the work zone and have read this site safety plan. Work zones will be created to aid in the decontamination of equipment and personnel. The following describes the zones to be established at the discretion of the site safety officer:

Exclusion Zone: A 5 foot zone surrounding the work area will be defined before work starts. The area inside the zone is the "Exclusion Zone". The exclusion zone constitutes the area where potentially hazardous airborne contaminants and physical hazards to the workers exist. Full personal protection must be available to all personnel in this area. The size of the Exclusion Zone may be changed to fit site conditions and to ensure contaminant containment.

Support Zone: A Support Zone, the outermost zone, must be defined for each field activity. Support equipment is in this uncontaminated or clean area. Normal work clothes are appropriate within this zone. The location of this zone depends on factors such as accessibility, wind direction (it should be up wind of excavation), and resources (e.g., roads, utilities, shelter).

6. DECONTAMINATION PROCEDURES

Petroleum hydrocarbon liquids and vapors may occur within the work zones. Due to the nonvolatile nature of the petroleum fuel that may be encountered, decontamination of equipment and vehicles will be importance. Formal decontamination procedure will be followed including general cleaning of oil from all equipment, tools, and street and sidewalk surfaces. No eating, drinking or smoking will be permitted in the exclusion zone. All personnel involved in work activities will be instructed to wash their hands, face, neck and forearms after the work day. Soap, water and towels will be provided at the site for this purpose. The field personnel will be instructed to shower at home after each work day.

In the event extreme contamination is encountered, decontamination of personnel, equipment and vehicles will be important to insure that contamination does not spread to unsuspecting people and property. Personal decontamination mainly involves personal hygiene. Contamination should not be present on the skin if the proper protective methods specified in this plan are used. However all field personnel will be instructed to follow these guidelines to ensure that contamination does not remain on equipment, sample containers or in contact with their bodies.

The field team should remove their personal protective clothing in the following sequence:

Step 1: Move out of the exclusion zone and into the decontamination zone. Do not remove personal protective equipment.

Step 2: Obtain decontamination solutions and decontaminate the spades, shovels and other equipment by brushing them under a water rinse. A high-pressure steam cleaner may be used for decontamination. All wastes and spent decontamination liquids will be properly contained.

Step 3: Remove outer gloves and coveralls and place them inside a garbage bag. Keep the air purifying respirator on.

Step 4: Move to the support zone and remove the respirator.

7. MONITORING PROGRAM

Personal exposure to ambient airborne hazards will be monitored to assure that personnel exposures do not exceed acceptable limits and the appropriate selection of protective equipment items. Airborne hydrocarbon vapor concentrations will be measured primarily by a hydrocarbon vapor meter. If concentrations approach criteria levels, all personnel will be notified of possible site safety changes. Audits will be conducted by the Safety Officer to insure compliance with the Safety Plan and to provide additional support as required.

7.1 AMBIENT VAPOR READING

A hydrocarbon vapor monitor will be used during sampling and excavation activities. This instrument will be used to measure both excavation and breathing zone concentrations of hydrocarbon vapors. The instrument will be calibrated before and after field measurements each day using known calibration gases. Readings will be taken in the area where the field team members are working and surrounding down-wind areas. Measurements will be taken every 10 minutes when hydrocarbon vapors show levels above 30 ppm.

7.2 EXPLOSIVE VAPORS

In the event that explosive or flammable gases or vapors are detected the following criteria will apply:

<1% LEL	Work proceeds with occasional monitoring.
1% to 5% LEL	Contact safety officer and work may proceed with continuous monitoring if the source and type of vapor is known.
5% to 9% LEL	Safety officer must be on location, work may proceed with caution and continuous monitoring.

10% or >10% Stop work, then contact project manager and safety officer. Special controls will be implemented as necessary.

7.3 OXYGEN READINGS

Because the explosive and flammable gas indicator is often combined with an atmospheric oxygen meter the following criteria will be observed:

>22% Oxygen	Stop work. Area may be oxygen enriched leading to possible flash fire. Notify safety officer.
20.7% to 21%	Normal atmospheric content. Continue work.
19.5% to 20.0%	Proceed with caution. Atmosphere may be oxygen deficient or oxygen displacing gas may be present. Be prepared to stop work and evacuate.
<19.5% Oxygen	Stop work and evacuate area.

In the event that an atmosphere is discovered that is equal to or less than 19.5% oxygen, the area shall be evacuated immediately. For operations where entry into a confined space such as a tank is necessary, special permits and safety procedures must be followed. No entry of confined space is allowed in this site safety plan.

8. SAFETY AND HEALTH TRAINING

This section summarizes the content of the health and safety training to be provided to the field team. It may be used as a future reference for the field team concerning health and safety matters.

Each section of this safety plan provides information to ensure safety for all workers. It will be the responsibility of the Project Safety Officer to assure the field team has access to this plan, reads the safety procedures, and understands how to conduct work safely. It will be the individuals responsibility to bring to the attention of the Safety Officer any portion of this plan and related training they do not fully understand. Before beginning site work, the field team will discuss the contents of this plan. All members will be adequately informed in safe work practices.

All field team members will be instructed regarding potential health and safety hazards. Specifically, the following topics will be covered in the initial training session:

- Physical safety hazards, (e.g., muscular stress and strain, unguarded equipment, electrical shock, overhead hazards, etc.),
- Emergency procedures, (vapor controls, medical and fire emergencies, etc.),
- Explosive/flammability hazards,

- Hazardous materials that may be encountered and potential routes of exposures, (inhalation and skin contact with petroleum hydrocarbons),
- Physical hazards such as noise and heat stress,
- Hygienic practices, (washing up before lunch/coffee breaks, no eating drinking - smoking allowed in taped off areas, etc.), and
- Types, proper use, limitations, maintenance, inspection, and storage of protective clothing and equipment.

Personal protective equipment includes:

- eye protection
- gloves
- coveralls
- respirators
- hard hats, and
- hearing protection

Special emphasis will be placed on the use and limitations of respiratory protection. Half-mask respirators equipped with air purifying organic vapor cartridges will be used. Half-mask respirators and eye goggles will be used if eye irritation or skin contact exposure potential exists. Each individual will be responsible for the limitations and maintenance of half-mask and full-face respirators including qualitative fit testing, routine inspection, replacement of parts, cleaning, disinfection, and storage requirements. Written instructions and procedures concerning respirators and criteria for use will be provided for each field worker by the Site Safety Officer if needed.

9. MEDICAL MONITORING PROGRAM

Requirements for medical surveillance applicable to all companies and subcontractors are provided in OSHA 29 CFR Part 1910 and Cal OSHA Title 8. The work tasks in this workplan involve active physical work and potential exposure to petroleum hydrocarbons, heat stress, noise and physical safety hazards common to subsurface and construction operations. The work will require people of reasonable health with normal vision and hearing acuity. The companies involved with this project are responsible for assuring the health and fitness of their employees on this project. As a rule, each worker should have clearance from a physician dated by one year before start-up of the project. This documentation should show the employees' ability to do the required work while wearing an air purifying respirator.

Medical surveillance will be provided for employees who are or may be exposed to hazardous substances above permissible exposure limits and published exposure limits for 30 or more days a

year or those who are injured in an emergency situation. Under these circumstances, employers must provide pre employment physical and annual medical examinations.

10. EMERGENCY RESPONSE PLAN

Emergency procedures listed in this plan give the field team instruction on how to handle medical emergencies and fires and explosions. The emergency procedures will be carefully reviewed with the field team during the health and safety training session.

10.1 INJURIES

Medical problems occurring on site will be handled quickly. Emergency telephone numbers are recorded in this document. The local emergency numbers are:

Police, Fire and Rescue Dial 911

The field team will be instructed to seek immediate professional medical attention for all serious injuries. A first aid kit will be present at the work site for use in minor injuries. If anyone receives a splash or particle in the eye, the field team will be instructed to irrigate the eye for 15 minutes. Instruction will be provided to wash any skin areas with soap and water if direct contact with contaminants has occurred.

10.2 FIRE AND EXPLOSION HAZARDS

Fires on site are of particular concern during soil excavation and removal activities due to the possibility of encountering flammable petroleum hydrocarbon liquid or vapors. During these activities the Site Safety Officer will be present and equipped with an explosive vapor monitor for area monitoring and a multi-purpose (A, B, C,) fire extinguisher.

The local fire department will be notified of the location and anticipated activities to minimize the fire risk to the surrounding neighborhood. In addition, any flammable material will be cleared away from the site before the start of work. If a fire does occur, the local fire department will be contacted immediately.

10.3 OPERATION SHUTDOWN

Under extreme hazardous situations the on-site supervisor, Safety Officer, or Project Manager may temporarily suspend operations while controlling the hazard. If vapor measurements on the explosive vapor monitor show levels approaching explosive limits, operations will be stopped. During this activity, all personnel will be required to stand up wind to prevent exposure to fugitive

vapor emissions. The Safety Officer will have ultimate authority for operations shutdown.

10.4 COMMUNITY PROTECTION

To assure the community protection from health and fire hazards, up wind and downwind monitoring with the hydrocarbon vapor monitor will be done if the general work area has hydrocarbon levels exceeding 30 ppmv. If down wind monitoring shows persistent levels above 30 ppmv at the perimeter of the work area, work will be shut down and vapor emission control efforts will begin until measurements show levels have dropped below 30 ppmv. An alternate approach of expanding the taped off area zone may be used to provide additional community protection.

10.5 RECORD KEEPING REQUIREMENT

The following record keeping requirements will be maintained in the program file indefinitely.

- Copy of this Health and Safety Plan
- Health and Safety Training Certification Form for Site Safety Officer
- Any accident/illness report forms
- Personal sampling results
- Documentation of employees medical ability to do work and wear respirators

Pertinent documentation will be provided to workers and agencies as required by Federal and State safety laws.

10.6 ENVIRONMENTAL INCIDENT NOTIFICATION LIST

The following agency should be contacted as required during an environmental emergency:

AGENCY	PHONE NUMBER
Fire Department	911
Police	911
Ambulance	911
Sate Office of Emergency Services	800-852-7550
National Response Center	800-424-8802
Regional Water Quality Control Board	510-464-8802

Fish and Game	(day)	415-326-0324
	(night)	415-557-0220
Bay Area Air Quality Management		415-771-6000
Department of Health		415-554-2500
Coast Guard		415-437-3073
Environmental Protection Agency		415-974-8131

11. CONFINED SPACE ENTRY

No confined space entry is proposed during the course of work described in the workplan for this project. No underground tanks are present on the site. All trenching and excavation will be performed under shored or sloped conditions complying with OSHA and EPA regulations in order to avoid confined space conditions. Subcontractors knowledgeable in the field of underground tank removal and soil excavation will enforce all applicable regulations concerning confined space entry during all trenching and excavation work.

G STATEMENT OF QUALIFICATION OF LEAD PROFESSIONAL

1. GENERAL DESCRIPTION OF QUALIFICATION

The receiver has authorized TMC Environmental, Inc. to prepare this workplan and begin investigation of the site. The following is a brief description of TMC's qualifications and experience in the environmental field. **TMC Environmental, Inc.** (**TMC**) is an environmental consulting firm established to specialize in environmental consulting, engineering and project management. **TMC** serves a diverse group of clients with offices in California and Oregon. **TMC** offers the following environmental services:

* Phase 1 & 2 Environmental Site Assessments
* Soil and Groundwater Sampling
* Tank Removal Management
* Soil and Groundwater Investigations
* Hazardous Materials Management
* Regulatory compliance and negotiation
* Soil and Groundwater Remediation
* Closure Reports

TMC staff members are knowledgeable in environmental remediation technologies such as

groundwater recovery and treatment, vapor extraction, soil excavation, waste transportation and disposal. Registered environmental and geologic professionals manage all projects. **TMC** offers clients the seal of approval with registered geologists, engineering geologist, and environmental assessors. Our clients and the regulatory agencies can be assured that our work meets the State's environmental standards. Certified OSHA safety managers supervise all relevant projects.

2. KEY PERSONNEL

The following professionals will manage and conduct the environmental tasks and investigations outlined in the workplan:

Tom Edwards, President

Education:

A.A., Business Administration, Contra Costa College

Professional registration:

Registered Environmental Assessor, REA-02645

Oregon Registered UST Soil Cleanup Supervisor License No.1919

Oregon Registered Decommission Supervisor License No. 1918

Certified OSHA Safety/Training Manager

Mr. Edwards has worked as a manager in the environmental field for more than 12 years in almost every aspect of environmental consulting and construction. He manages underground tank removal and installation, site investigation, hazardous materials management, soil remediation and ground water, and surface spill response and recovery. Mr. Edwards has also participated in the research and development of underground tank monitoring systems, surface skimmers, and groundwater recovery systems, which are now being used in most industries across the nation.

Mark Youngkin, Vice President

Education:

M.S., Geology, Colorado School of Mines

B.S., Geology, Southwest Missouri University

Professional registration:

California Registered Geologist, RG-3888

California Registered Engineering Geologist, EG-1380

Oregon Registered Engineering Geologist, No. E1182

General Engineering Contractor, A-556439

Hazardous Substance Removal and Remediation Certification

Registered Environmental Assessor, REA-00995

Mr. Youngkin has worked as a manager in the environmental field for over 13 years. His experience covers a wide range of skills including: hazardous materials management, soil and groundwater investigation, site remediation, real estate assessments, regulatory compliance and negotiation, fault and landslide investigations, engineering feasibility investigations for tunnel projects, rock mechanics analysis, and environmental hazard mitigation. Mr. Youngkin oversees all projects requiring registration approval.

Michael Princevalle, Project Soil Scientist

Education:

B.S., Soil Science, California Polytechnic State University

Professional registration:

California Registered Environmental Assessor, REA-01022

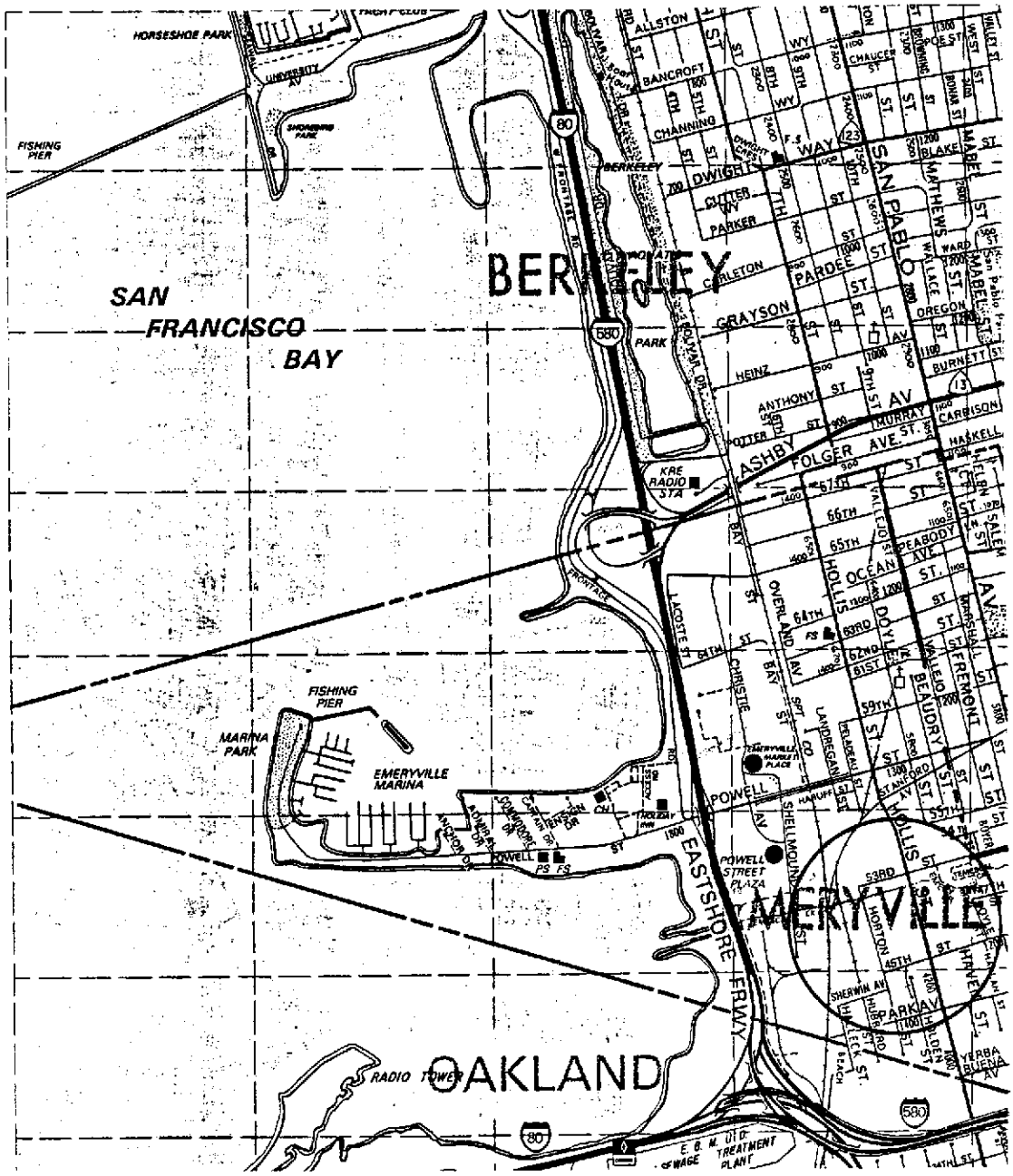
Certified OSHA Safety/Training Manager

Mr. Princevalle has worked in many areas of environmental management. He specializes in environmental law, particularly SARA, RCRA, and CERCLA. He is especially knowledgeable of hazardous materials management and has trained personnel from several companies on the safe handling, storage, and disposal of hazardous materials. Mr. Princevalle also brings many years of experience in environmental site assessments and contaminated soil and groundwater investigation.

H LIMITATIONS

The procedures and opinions in this workplan agree with professional practice as provided in the guidelines of the California Regional Water Quality Control Board for addressing fuel leaks from underground tanks. This workplan is only part of the ongoing work required by the lead implementing agency at this site. The lab test results rely on limited data collected at the sampling location only. Budget constraints restrict the amount of testing allowed. The lab test results do not apply to the general site as a whole. Therefore, TMC Environmental Inc. cannot have complete knowledge of the underlying conditions at the conclusion of the work specified in the

workplan. Workplans and reports contain information provided to **TMC** by the client and government agencies. **TMC** does not warranty the accuracy of reported information. We provide the information in the resulting report to our client so a more informed decision about site conditions can be made. The professional opinion and judgement in the report is subject to revisions in light of new information. We do not state or imply any guarantees or warranties that the subject property is or is not free of environmental impairment.



Base map from Thomas Guides Alameda County

TMC
Environmental, Inc.

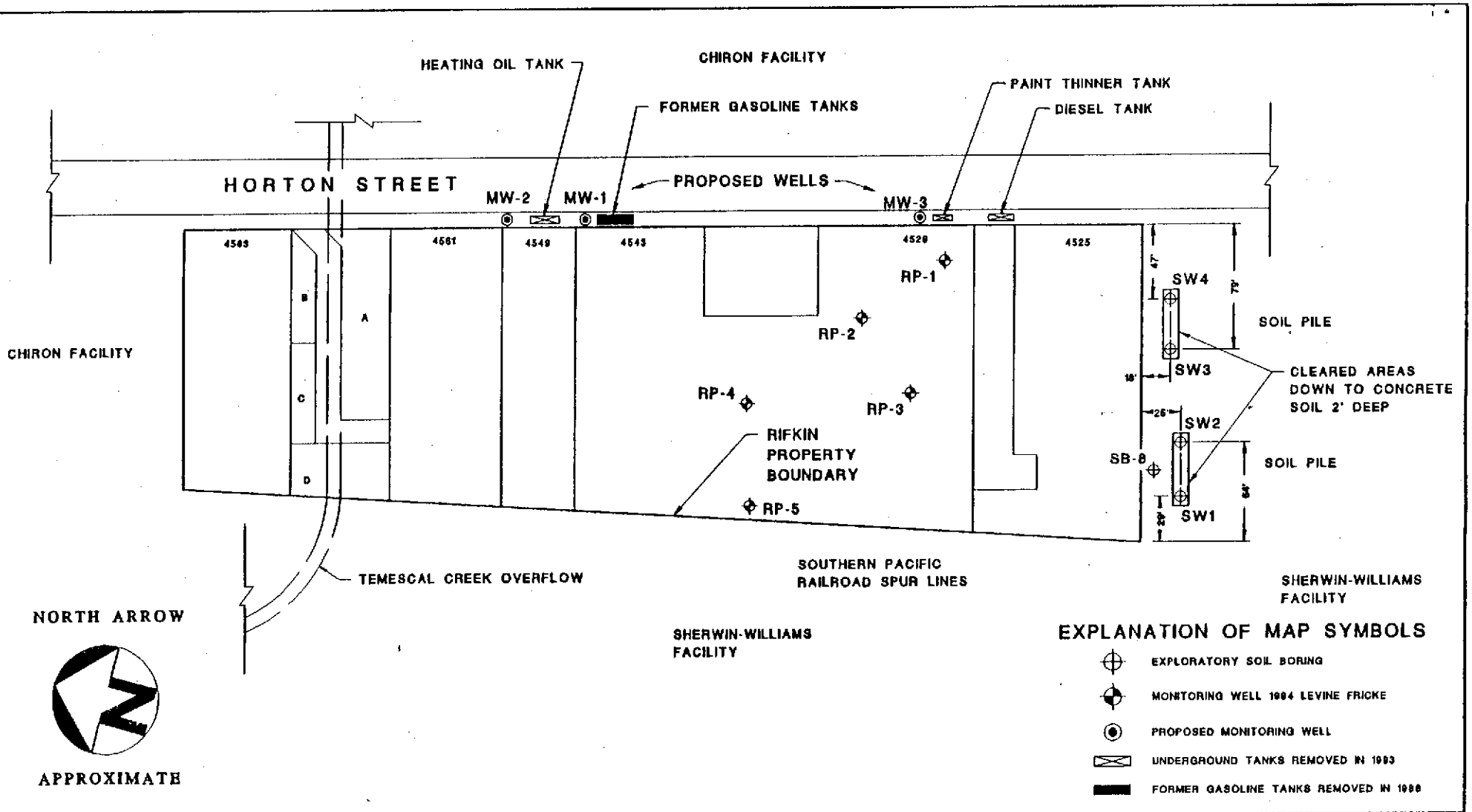
SITE VICINITY MAP

Rifkin Property
Emeryville, California

Project No. 1-13093 August 1994

PLATE

1



SCALE IN FEET

0 60 120

APPROXIMATE

TMC Environmental, Inc.

TMC ENVIRONMENTAL, INC.

13908 SAN PABLO AVENUE, SUITE 101
SAN PABLO, CALIFORNIA 94806
510-232-8366 FAX 510-232-5133

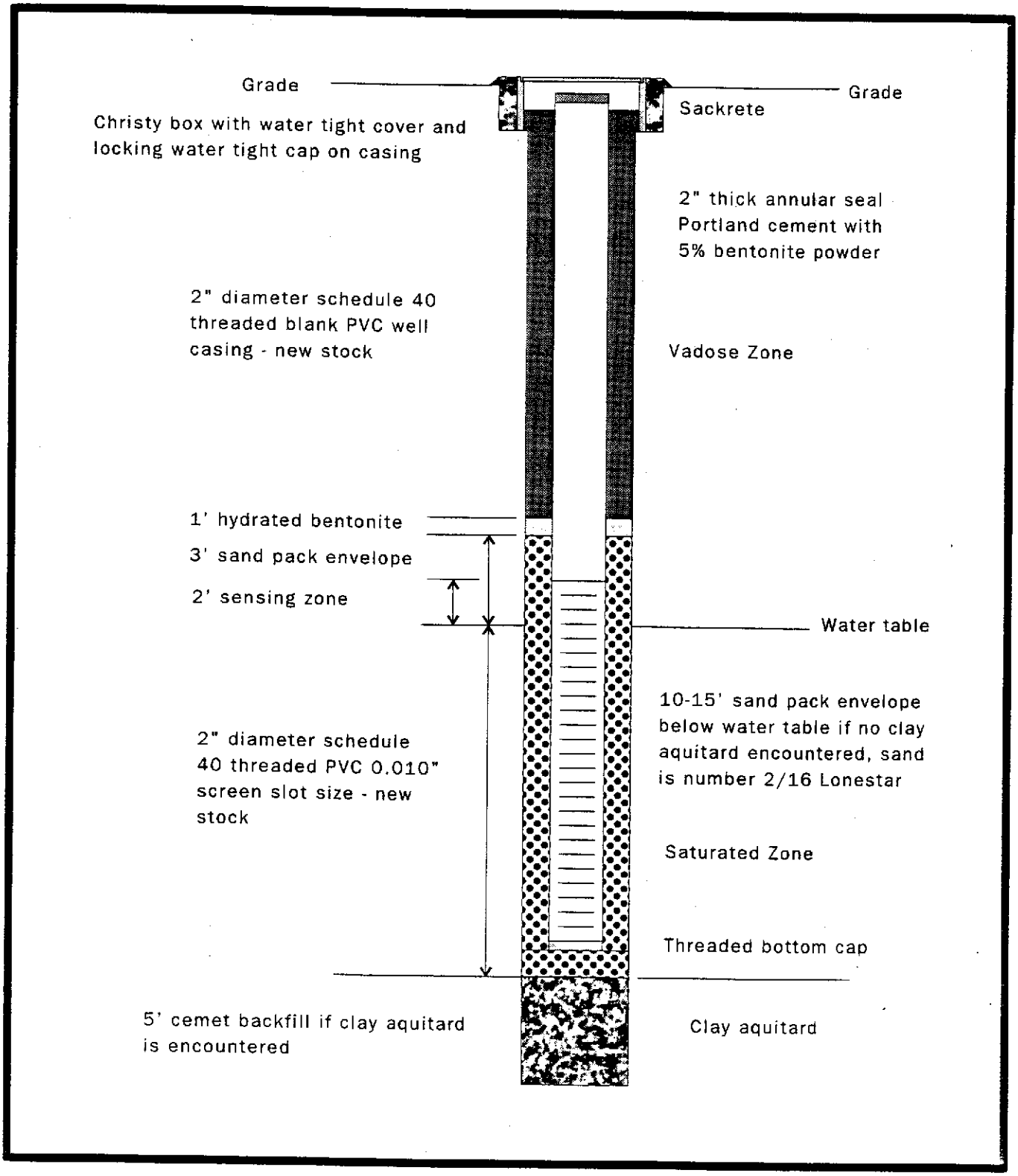
SITE MAP

RIFKIN PROPERTY
EMERYVILLE, CALIFORNIA

DATE OF DRAWING: AUGUST, 1994 JOB NO. 113093

PLATE

2



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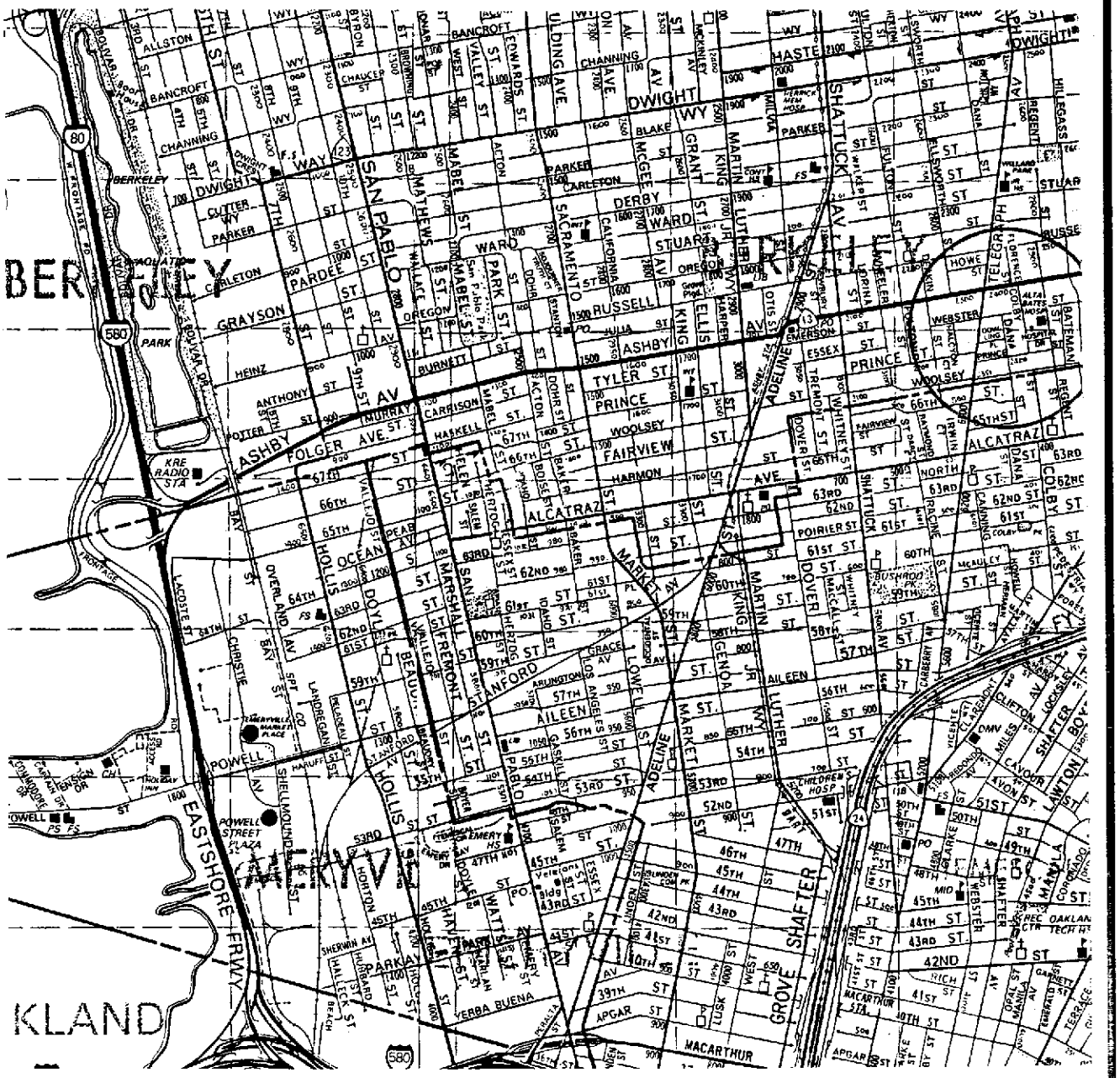
Well Construction Diagram

Sketch map - not to scale

Rifkin Property
Emeryville, California

PLATE
3



Alta Bates Hospital, 3001 Colby Street, Berkeley, California
Directions from site: Horton Street to 53rd Street, 53rd Street to Hollis Street, Hollis Street to Ashby Avenue, Ashby Avenue to Colby Street

TMC
Environmental, Inc.

HOSPITAL LOCATION MAP

Rifkin Property
Emeryvill, California

Project No. 1-13093 August 1994

PLATE

4