WORK PLAN
FOR
ADDITIONAL
SITE CHRACTERIZATION

Former Exxon Station
5175 Broadway Street
Oakland, California

ACHCSA Fuel Leak Case No. RO0000139

Prepared For:

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September 12, 2005

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TABLE OF CONTENTS

INTRODUCTION

Purpose

This work plan was prepared in response to the most recent October 6, 2004 directive letter issued by the Alameda County Health Care Services Agency (ACHCSA) - Environmental Protection Division, requesting additional site characterization activities at the Former Exxon Station located at 5175 Broadway Street in Oakland, California. A copy of the October 6, 2004 ACHCSA directive letter is attached.

In general accordance with the technical comments presented in the aforementioned directive letter, the purpose of this work plan is to describe the procedures and methods used to conduct the following additional site characterization activities: 1) define the lateral and vertical extent of the hydrocarbon-effected groundwater plume in the direct vicinity of the site, 2) define the lateral and vertical extent of residual source soil contamination east and south of the former underground fuel storage tank (UST) cavity, and if warranted 3) install additional monitor wells to further assess the hydrocarbon concentrations in groundwater and evaluate contaminant plume stability. The work will be conducted in general accordance with the State Water Resources Control Board's Leaking Underground Fuel Tank (LUFT) manual and the TRI-Regional Board Staff Recommendation for Preliminary Evaluation and Investigation of Underground Tank Sites.

Scope

The general scope of work contained in this work plan includes the following:

- Perform a subsurface utility corridor survey (Preferential Migratory Pathway Study) along the Broadway and Coronado Avenue frontages of the property: findings are presented herein
- Prepare geologic cross-sections (B-B' & C-C') showing results of subsurface utility survey and proposed additional soil borings; findings are presented herein
- Pre-field work activities and permitting
- Direct push hydropunch boring and sampling activities
- Direct push soil boring and sampling activities
- Backfilling activities
- Additional monitor well installation (if warranted)
- Sample analysis
- Waste management
- GeoTracker AB2886 Analytical Uploading
- Data interpretation and report preparation and submittal.

Site Location and Description

The subject property is located at 5175 Broadway Street, at southwest corner of the intersection of Broadway Street and Coronado Avenue in Oakland, California (Alameda County). The site lies approximately 0.55 mile (2,900 feet) south-southeast of Highway 24 and approximately 2.3 miles east of Interstate 80 and the San Francisco Bay. The general location of the site is shown on the attached Figure 1, *Site Location Map*.

The commercial property has been vacant since 1979 and was formerly occupied by an Exxon Service Station for fuel distribution and the service and repair of automobiles. The site is approximately 13,200 square feet in lot area with about 10% utilized by a vacant station/garage structure and the remaining 90%, uncovered and vacant. The majority of the ground surface is paved with concrete and/or asphalt and the elevation of the site is approximately 160 feet above Mean Sea Level (Figure 1). The site, adjacent properties, and pertinent site structures are shown on the attached Figure 2, *Site Plan*.

The property is relatively flat lying, slightly sloping to the south-southwest. The topographic relief in the immediate vicinity of the site is also generally directed toward the south-southwest (Figure 1). Regional topographic relief appears to be directed toward the southwest, in the general direction of the San Francisco Bay. Three 8,000-gallon gasoline USTs and one 500-gallon waste oil UST were located beneath the subject property at the approximate locations shown in Figure 2. The tanks were removed by Tank Protect Engineering, Inc. (TPE) in January 1990. A brief discussion of the tank removal activities is presented herein.

Site Geology and Hydrogeology

According to a Geologic Map of the San Francisco-San Jose Quadrangle published by the California Department of Conservation, the site is underlain by marine sandstone, greenstones, shale, conglomerates, and cherts of the Mesozoic Franciscan Complex (thicknesses not established). The map also indicates that the site lays approximately 1.5 miles southeast and 18 miles northwest, respectively, of the Hayward and San Andreas Fault Zones.

Native subsurface soil reported at the site during the preliminary UST removal and well installation activities in January/April 1990 and July 1991 was predominantly a moist to wet, light to dark yellowish brown, silty clay with gravel between approximately 5 (STMW-4) and 15 (STMW-5) fbg, overlying a light brown clayey silt (STMW-4) and dark brown to olive green claystone (MW-3) and silty, gravelly clay (STMW-5) to a total explored sample depth of 20 fbg. Soil observed at the southeast side of the property, as observed in MW-2, was predominantly a yellow brown clayey silt to 2.5 fbg overlying a brown/green claystone to a total explored sample depth of 23 fbg.

Depth to groundwater as measured on a general quarterly basis in the five onsite monitoring wells between May 1990 and October 2002, ranged between approximately 8 (MW-1) and 14.5 (STMW-5) fbg. The associated site groundwater gradient flow

measured during this monitoring period was directed generally southwest. The regional groundwater flow in the vicinity of the site is assumed to be towards the southwest, in the direction of the San Francisco Bay, and generally following the natural topographic relief of the area.

The site is in the East Bay Plain groundwater basin according to the San Francisco Bay Basin Water Quality Control Plan prepared by the California Regional Water Quality Control Board – Region 2 (CRWQCB, 1995). Groundwater in this basin is designated beneficial for municipal and domestic water supply and industrial process, service water, and agricultural water supply.

The nearest surface water body is Glen Echo Creek, approximately 0.75 mile (3,950 feet) south of the site, with intermittent southwesterly surface water flow generally paralleling Broadway Street to its intersection with 27th Street. Flow then appears to continue southward along 27th Street via a potential underground culvert into Lake Merritt, located approximately 1.8 miles south-southwest of the site (Figure 1).

Environmental Site History

UST Removal Activities – January 1990

On January 10, 1990, TPE removed three 8,000-gallon gasoline USTs, one 500-gallon waste oil UST, and associated subsurface product piping from the site at the approximate locations shown in Figure 2. The following table presents a summary of the tank designations, size, type of construction and contents:

Designation	Construction	Diameter (Feet)	Length (Feet)	Volume (Gallons)	Tank Contents	DTB* (FBG)
Tank 1	Steel	4	6	500	Waste Oil	7
Tank 2-4	Steel	8	22	8,000	Gasoline	12

Notes: DTB* = Approximate Depth to Bottom of Tank
FBG = Feet Below Grade Surface

Groundwater was reportedly observed to stabilize in the UST excavation between 10.5 and 11 fbg, the approximate vertical limit of the UST excavation. Immediately following UST removal activities, TPE collected discrete soil samples (*Sample Ids: S-1-W to S-4-S*) from the center of the waste oil tank excavation and the sidewalls of gasoline tank excavation, at the approximate ends of each former UST. TPE also collected discrete soil samples (*Sample Ids: S-P-1 to S-P-3*) directly beneath the fuel product lines between the dispenser islands and USTs, and collected a composite grab groundwater sample (*Sample ID L1-L4*) from the northwest side of the gasoline UST excavation. The approximate locations of each UST and product piping removal sample are shown in Figure 2. Analytical results of soil and grab groundwater samples collected during the UST removal activities at the site are summarized in the attached Table 1A.

Over-Excavation and Well Installation Activities – February/April 1990

On February 19, 1990, TPE over-excavated approximately 700 tons of gasoline-affected soil surrounding the former UST locations, to the approximate lateral excavation limits shown in Figure 2. As approved by the ACHCSA in a letter dated November 9, 1990, following onsite soil treatment and discrete soil sampling and analysis of the over-excavated stockpiled soil, TPE subsequently backfilled the excavation with the stockpiled soil. To date, the over-excavated area has been left unpaved.

TPE, on April 17 and 24, 1990, rotary auger drilled three 10-inch-diameter borings at the site and converted each to a 4-inch-diameter groundwater monitor well (**MW-1 to MW-3**). Discrete soil samples were collected from each borehole between 4 and 14.5 fbg and analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-G) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Monitor well locations are shown in Figure 2. Table 1B, attached, presents the analytical results of the borehole sampling activities.

On April 30, 1990, following initial well development, TPE collected groundwater samples from each well and analyzed the samples for TPH-G and BTEX constituents. Top of casing elevations for each wellhead were professionally surveyed relative to Mean Sea Level (Reported Benchmark Elevation = 158.39 feet). Table 2 presents the analytical results of the initial well sampling activities. A copy of the *Exploratory Boring Log* and *Well Construction Detail Log* for MW-1 to MW-3 are attached. Appendix B provides a copy of TPE's June 1990 Cross Section A-A', the location of which is referenced in Figure 2. The tank removal, over-excavation, and well installation activities are documented in TPE's *Preliminary Site Assessment Report*, dated June 13, 1990.

Quarterly Well Monitoring Activities – September 1990 & January 1991

On September 26, 1990, and January 14, 1991, Soil Tech Engineering, Inc. (STE) conducted monitoring and sampling activities at the site for each of the newly-installed groundwater wells MW-1 to MW-3. Table 2 includes the respective groundwater sample analytical results and fluid-level monitoring data for these events.

Additional Well Installation and Sampling – June 1991 to August 1994

Based on the elevated concentrations of gasoline-range hydrocarbons measured in the groundwater samples collected in each well, the ACHCSA, in a letter dated March 29, 1991, requested additional site investigation to delineate the extent of the dissolved hydrocarbon plume. STE, on June 21, 1991, installed two additional groundwater monitor wells at the site (**STMW-4 & STMW-5**), at the locations shown in Figure 2. Discrete soil samples were collected from each borehole at 5 and 10 fbg and analyzed for TPH-G and BTEX. Table 1B includes the analytical results of the borehole sampling activities. A copy of the *Exploratory Boring Log* and *Well Construction Detail Log* for STMW-4 & STMW-5 is attached.

Following well development on June 24, 1991, STE sampled each well on July 3, 1991 and submitted the groundwater samples for TPH-G and BTEX analysis. Table 2 includes the respective groundwater sample analytical results and fluid-level monitoring data for this event. Details of the June/July 1991 well installation and sampling activities are presented in STE's July 23, 1991, *Report of Additional Investigation and Groundwater Sampling.*

As recommended in the July 1991 report, STE conducted six additional quarterly monitoring and sampling events at the site in November 1991, March, June, and September 1992 (consecutive events), and in January 1993 and August 1994 (non-consecutive events). Table 2 includes the respective groundwater sample analytical results and fluid-level monitoring data for these events. Details of each respective monitoring/sampling event are presented in STE's November 1991, March, June, and October 1992, January 1993, and September 1994, *Reports of Quarterly Groundwater Sampling and Monitoring.*

On October 5, 1994, STE prepared their *Work Plan for Additional Soil and Groundwater Investigation*; however, work plan submittal/implementation and quarterly monitoring was reportedly not authorized by the responsible party, and thus monitoring was discontinued at the site between August 1994 and November 1996. The general scope of work presented in STE's work plan included drilling four additional soil borings at the west and east corners of the property and convert each to an additional monitor well.

Quarterly Well Monitoring Activities – November 1996 to February 2001

STE resumed well monitoring and sampling activities at the site on a consecutive quarterly basis between November 7, 1996 and February 16, 2001. STE monitored, purged, and sampled each of the five onsite wells, and analyzed each sample for TPH-G, TPH as diesel (TPH-D), BTEX, and methyl tertiary-butyl ether (MTBE). Groundwater samples were not analyzed for TPH-D analysis in May 1999 and between November 1999 and February 2001. Monitoring and sampling was discontinued at the site until January 2002. Table 2 includes the respective groundwater sample analytical results and fluid-level monitoring data for these quarterly events.

Well Monitoring Activities – January, July, and October 2002

Based upon client authorization, Enviro Soil Tech Consultants (ESTC) conducted additional well monitoring and sampling activities at the site on January 11, July 1, and October 4, 2002. ESTC monitored, purged, and sampled each well, and analyzed each sample for TPH-G, TPH-D, BTEX, and MTBE. Table 2 includes the respective groundwater sample analytical results and fluid-level monitoring data for these quarterly events. Details of each respective monitoring/sampling event are presented in ESTC's March 4, July 19, and October 25, 2002, Quarterly Groundwater Monitoring and Sampling Report.

Human Health Risk Assessment – February 2004

Based on the reportedly decreasing trend of residual elevated concentrations of gasoline-range hydrocarbons measured in the groundwater samples collected at the site since April 1990, the ACHCSA, in a letter dated December 2001, requested that a Human Health Risk Assessment be conducted to determine whether the site qualified as a low risk groundwater case. ESTC subcontracted SOMA Environmental Engineering, Inc. (SOMA) to prepare their report entitled "*Conducting Human Health Risk Assessment*", which was submitted to the ACHCSA on February 17, 2004.

Based on review of SOMA's February 2004 report, the ACHCSA, in their letter dated October 6, 2004, informed the responsible party to postpone proposal and review of additional human health screening evaluation until site and source characterization activities, as proposed herein, are completed. The ACHCSA requested a work plan addressing the additional site/source characterization activities to be conducted at the subject site. On August 4, 2005, Ms. Mojdeh Mehdizadeh contracted GGTR to prepare the requested work plan, which is presented in the following sections.

PLANNED WORK

Sequence

The following is the planned sequence of activities at the site:

- Perform a subsurface utility corridor survey (Preferential Migratory Pathway Study) along the Broadway and Coronado Avenue frontages of the property: findings are presented herein
- Prepare geologic cross-sections (B-B' & C-C') showing results of preferential migratory pathway study and proposed additional soil borings; findings are presented herein
- Notify all representative parties of scheduled field activities
- Obtain site Excavation Permit from City of Oakland Department of Public Works Engineering for all work conducted in public right of way
- Obtain Drilling Permit from Alameda County Public Works Agency
- Conduct site markout and notify Underground Service Alert for utility clearance
- Conduct Hydropunch groundwater sampling to delineate lateral extent of contaminant groundwater plume in the vicinity of the site
- Conduct GeoProbe Soil and Groundwater Sampling to delineate lateral and vertical extent of source soil and contaminant groundwater plume in direct vicinity of former UST cavity
- Backfill borings with neat Portland cement
- Submit all samples to State-licensed environmental laboratory for analysis
- Submit tabulated preliminary analytical results to the ACHCSA for review

- If warranted, install and develop additional groundwater wells to further delineate and monitor plume stability
- Conduct well monitoring and sampling in MW-1 to MW-3, STMW-4, STMW-5, and if warranted, in each newly-installed monitor well
- Profile, transport, and dispose of all impacted solid/liquid waste
- Interpret all field and analytical data and prepare summary report
- If warranted, incorporate newly-installed groundwater wells into quarterly monitoring and sampling schedule

Subsurface Utility Corridor Survey

The ACHCSA, in their October 6, 2004 letter, requested that the aforementioned cross sections include utility conduit locations to evaluate whether any underground utility corridors may potentially act as preferential pathways for on- and/or off-site migration of dissolved-phase contaminant hydrocarbons. On September 1, 2005, GGTR conducted an offsite subsurface utility corridor survey along the Broadway Street and Coronado Avenue frontages of the property. The approximate locations of the pertinent subsurface site vicinity utilities are shown in Figure 2. Associated cross sections B-B' & C-C' (locations referenced in Figure 2) showing the approximate locations and depths of the utilities and trenches in the direct vicinity of the site are presented in Figures 3 and 4, respectively. Cross Section A-A' was presented previously in TPE's June 1990 *Preliminary Site Assessment Report*, a copy of which is attached.

During the site reconnaissance, GGTR was unable to locate MW-3, apparently covered with gravel and dirt. GGTR subsequently returned to the site; however was unsuccessful at locating MW-3 with a magnetometer, due to the non-metallic well box covers used for all site monitor wells.

On September 6, 2005, GGTR visited the City of Oakland Department of Engineering to obtain a copy of their subsurface utility and monument maps associated with the sanitary and storm sewer lines located in the direct vicinity of the site. GGTR also contacted the East Bay Municipal Utilities District (EBMUD), Engineering/Mapping Division to obtain utility map(s) associated with the municipal supply water mains/laterals in the vicinity of the site. Information obtained from each agency included utility line dimensions (diameter), grade and invert elevations/depths, and flow directions. GGTR also obtained information from the SBC Engineering Division and Pacific Gas & Electric (PG&E) for the associated utility corridors, which were located beneath the sidewalk and parking lane locations only. Utility corridor designation, approximate location, and associated line diameters, depths, and flow line directions are included in Figure 2. Data for PG&E and Pacific Bell utilities was verbally provided and are only approximate due to the absence of "as-built" plans.

Based on the reported maximum invert flow line depths of the sewer and water lines $\leq$7.5 fbg and on the historical fluctuation of the groundwater depth reported at the site (8 (MW-1) and 14.5 (STMW-5) fbg), it appears that each sanitary, storm water, and water

utility main along the Coronado Avenue and Broadway Street frontages, are not located between the upper and lower vertical limits of the historical water table fluctuation and do not appear to act as a pathway for on- or off-site migration of contaminant hydrocarbons. Invert gradient and flow for each utility are generally northwestward, along Coronado Avenue, and south southwestward along Broadway Street.

Pre-Field Activities

GGTR will obtain a drilling permit from of the County of Alameda Public Works Agency and an excavation permit from the City of Oakland Department of Engineering. GGTR will notify all property owners and tenants as well as the ACHCSA of all scheduled work activities. At least 72 hours before commencing field activities, GGTR will visit the site and outline the proposed work areas in white surface paint and subsequently notify Underground Service Alert (USA) to locate and mark any subsurface utilities extending through the designated work areas. GGTR will locate and uncover MW-3. Also, GGTR will prepare a traffic control plan should partial or complete closure of the parking lane and/or sidewalk along the College Avenue frontages be warranted.

Additional Site Characterization Activities

Proposed Boring Locations

Based on review of the findings of the historical site investigation and quarterly monitoring activities and the subsurface utility corridor survey discussed above, and on the review of the geologic cross sections presented in Figures 3 and 4, GGTR proposes drilling fifteen (15) direct push borings in the direct vicinity of the site to further define the lateral and vertical extent of soil and groundwater contamination. GGTR provides the following rational for the proposed additional soil boring locations, which are shown in Figure 5.

GeoProbe Borings B1-B5, located at the eastern corner of the property, will assess the lateral and vertical extent of soil and groundwater contamination in the direct vicinity of MW-1 and STMW-4, as well as help determine whether any offsite source(s) may exist in the general up-gradient direction of the property. **GeoProbe Borings B6-B10** will assess the lateral and vertical extent of soil and groundwater impact in the direct vicinity of MW-2 and MW-3, and whether residual soil underlying the former and existing fuel pump islands may be potential contaminant sources. Grab groundwater from Boring B3 will be also be utilized to assess the extent of contamination up-gradient of both monitor wells. GeoProbe borings will be drilled to approximately 17.5 fbg (@ 3 feet past the maximum reported groundwater depth) and sampled continuously (discussed below).

Onsite **Hydropunch Borings B11-B15**, located along the southwest and northwest property lines, will further assess the extent of groundwater contamination in the general down gradient direction of MW-3 and STMW-4, monitor wells reportedly showing maximum gasoline hydrocarbon concentrations. Hydropunch borings will be drilled to

approximately 15 fbg and screened between approximately 8 and 14.5 fbg, prior to collecting a discrete grab groundwater sample (discussed below).

Figure 5, attached presents an isoconcentration map estimating the extent of TPH-G and benzene in groundwater at the site (October 2004), and shows the approximate location of each proposed percussion boring. Actual boring locations will be determined in the field and based upon utility clearance and accessibility.

Based on field screening of soil samples collected during field activities, additional soil borings may be warranted to further delineate the extent of source contamination. The additionally proposed boring locations will be reviewed and authorized by both the ACHCSA and responsible party prior to drilling.

Drilling and Soil Sampling Activities

GGTR will direct the subcontracted driller to initially hand auger each proposed soil boring location up to approximately 4 fbg to confirm clearance of any unmarked subsurface utilities. GGTR will drill each boring using a trailer-mounted, Geoprobe® direct push technology rig equipped with 1- and 2-inch-diameter, flush-threaded, dual-cased drill rods and split spoon sampler. A dual-cased rod assembly will be utilized to minimize potential sidewall soil from cross contaminating deeper zone soil and/or groundwater in each borehole.

Each boring will be drilled to approximately 17.5 feet below grade, or 2 to 3 feet past the first encountered groundwater. Prior to drilling, the depth to groundwater (relative to grade surface) will initially be measured in MW-1 through STMW-5 to determine the approximate location of the capillary fringe zone and to calculate a current gradient and flow direction. Soil samples will be collected in each boring using a butyrate plastic tube-lined remote split spoon sampler (2 feet in length) beginning at approximately 5 fbg and continuing to approximately 3 feet below the anticipated water table level. Soil samples will be collected continuously, specifically at changes of lithology, at the soil/groundwater interface, and at areas showing obvious contamination.

At the anticipated drill depth, the inner drill rods will be extracted and the inner rod/split spoon sampler assembly will be re-advanced through the cased borehole to depth and subsequently pushed approximately 24 additional inches into relatively undisturbed soil. All soil samples retained for laboratory analysis will be sealed with Teflon and plastic end caps, appropriately labeled, and transferred to cooler chilled to approximately 4° Centigrade. Soil boring samples will also be screened using a Thermo® 580B Organic Vapor Analyzer (OVA) and described using the Unified Soil Classification System and Munsell Rock Color Chart.

Geoprobe® drilling will be conducted by a California-licensed Water Well Drilling Contractor (C57). Boreholes will be logged under the supervision of a Registered Civil Engineer/Geologist. Hand auger soil cuttings generated during drilling activities will be

transferred to a 55-gallon, D.O.T.-approved steel drum. GGTR will collect a four point composite soil sample from the drummed soil cuttings for analysis and waste disposal characterization. All down hole drilling and sampling equipment will be decontaminated between each boring location using an Alconox® solution and double rinsed with potable water. Equipment wash and rinse water will be transferred directly to a separate 55-gallon drum. All drilling and sampling activities will be conducted under the direct supervision of a representative of the ACHCSA.

Grab Groundwater Sampling Activities

Immediately following soil sampling activities in **B1 through B10,** and in Hydropunch Borings **B11 through B15**, GGTR will then periodically monitor and record the depth to water in the cased borehole and allow sufficient time for stabilization. Based upon observed subsurface lithology and if the borehole appears to have adequate groundwater recharge capability, GGTR will either advance 0.75-inch-diameter, factory-sealed, screened PVC casing directly through the cased borehole to the approximate total depth of each borehole (slow recharge), or re-advance the inner drill rod assembly retrofitted with a discrete interval groundwater sampler to a designated sample depth (fast recharge).

If PVC casing is utilized, the casing will be screened between the soil/groundwater interface depth and the maximum borehole depth. The outer drill rod assembly will then be extracted an equivalent length to the top of the well screen, exposing the screened portion of the temporary well to the surrounding soil strata, and a grab groundwater sample will be collected using a clean, stainless steel bailer. If use of the discrete interval sampler is warranted, clean polyethylene sample tubing will be advanced through the center of the inner drill rod assembly to depth and threaded to the superior portion of screened sample point. GGTR will then extract the tubes approximately 8 to 12 inches, exposing the screened section of the sample point to the surrounding strata and groundwater. Using a low-flow purge pump, GGTR will then collect a grab groundwater sample directly from the effluent end of the polyethylene tubing. In either case, if a sufficient volume of groundwater is present, GGTR will initially purge approximately 0.25 gallon prior to sampling.

GGTR will carefully drain the volatile groundwater sample directly into laboratory-cleaned, 40-milliliter volatile organic analysis (VOA) vials. A specialized drainage tip will be used to prevent loss of any volatile constituents during sample transfer. GGTR will seal each sample container with a threaded cap and invert the VOA vials to insure no headspace or entrapped air bubbles are present. Groundwater samples analyzed for non volatile analysis, if warranted, will be transferred to laboratory-supplied amber glass or polyethylene bottles.

Backfilling Activities

Immediately following grab groundwater sampling activities in all additional soil and hydropunch borings, GGTR will direct the subcontracted driller to extract all temporary

well casing and drill tubes from each borehole and tremie grout with neat Portland cement up to approximately 0.5 fbg. The balance of each borehole will be backfilled with appropriate surface material to restore original site conditions.

Soil & Groundwater Sample Analysis

A Chain-of-Custody form will be initiated by GGTR personnel at the time of sampling and will accompany the soil and groundwater samples to a State-certified environmental laboratory using California Department of Health Services approved analytical methods.

All soil and grab groundwater samples will be analyzed for:

- Total Petroleum Hydrocarbons as Gasoline (TPH-G; SW8020F)
- Benzene, Toluene, Ethylbenzene and Total Xylenes (BTEX; SW8020F)
- Methyl Tertiary-Butyl Ether (MTBE; SW8020F)
- Ethylene Dibromide and Ethylene Dichloride (EDB & EDC; EPA 8260)

Soil samples collected from B5 and B10 @ 10 fbg (maximum depth of former UST removal soil samples) should be analyzed for cadmium, chromium, lead, nickel, and zinc (LUFT 5 Metals; EPA 6010B ICAP).

Additional soil samples collected from both the unsaturated and saturated zones of B5 and B9 should be tested for physical parameters of Particle Size Analysis (ASTM D422), Organic Content (ASTM D2974), and Total Porosity (API RP40), to provide site-specific data for future re-evaluation of human health screening as discussed in the ACHCSA's October 6, 2004 directive letter.

All grab groundwater samples will additionally be analyzed for Fuel Oxygenates (EPA Method 8260), including Tertiary Amyl Methyl Ether (TAME), Ethyl Tertiary Butyl Ether (ETBE), Di-Isopropyl Ether (DIPE), and Tertiary Butyl Alcohol (TBA).

The stockpile composite soil sample will be analyzed for:

- TPH-G
- BTEX & MTBE
- Total Lead (EPA Method 6010B/ICAP)

Monitoring Well Construction (If Warranted)

Following receipt of all chemical and physical testing conducted on the soil and grab groundwater samples collected in the proposed soil (B1 through B10) and hydropunch borings (B11 through B15), GGTR will discuss all preliminary data with the ACHCSA and determine whether the additional wells are required, and if so, their most appropriate location(s). If warranted, GGTR will then return to the site and rotary auger drill additional, hollow stem auger soil boring(s), and place each additional boring according to field data/observations from the percussion borings. Each additional boring will be converted to a 2-inch-diameter, groundwater monitoring well. The proposed total well

depth will be approximately 25 fbg. Figure 6 is a Well Construction Diagram showing the anticipated construction details of the additionally proposed groundwater monitoring wells in the vicinity of the subject property.

The monitoring wells will be constructed of standard 2-inch-diameter, flush-threaded, Schedule 40 Polyvinyl Chloride (PVC) factory slotted well screen and blank riser casing. Due to the appreciable amount of fines observed in the soil samples during the April 1990 and June 1991 well installation activities, GGTR proposes using 0.010-inch slotted well screen sections in lieu of the 0.020-inch well screen used for MW-1 through STMW-5. The screened casing interval will extend from approximately 5 to 20 fbg. Blank riser casing will extend from approximately 0.5 to 5 fbg. A locking compression plug and threaded PVC bottom cap will be installed at the top and bottom of each well, respectively. Filter pack, consisting of No. 2/12 silica sand, will be placed within the annular space between the PVC casing and borehole as the auger sections are withdrawn from the borehole. Filter sand will extend approximately 1 foot above the upper limit of the screened well section to the total depth of each well.

Prior to setting the annular well seal, if a sufficient volume of water is present within each borehole, GGTR will surge each well using a 2-inch-diameter surge block to remove any native annular fines and settle the sand filter pack. If required, GGTR will place additional sand within the borehole/well annulus to maintain the proper amount above the well screen. GGTR will than place hydrated bentonite chips above the annular filter pack up to approximately 2 fbg. The remainder of the annular space will be filled with neat Portland cement grout and a traffic-rated monitoring well box will be placed directly over each monitor well casing and secured in place with concrete, flush to surface grade. If actual site conditions vary significantly from that anticipated, GGTR personnel may vary the well construction specifications accordingly.

Monitoring Well Development & Elevation/Coordinate Survey

At least 48 hours following completion of the additional well installation activities, GGTR will develop each well to improve the groundwater hydraulic conductivity between the newly introduced sand filter pack and the native soil surrounding each well casing. GGTR will initially monitor and record the depth to water in each well and subsequently surge each well along the entire water column interval for approximately 10 minutes, using a 2-inch-diameter surge block. Well development will continue by purging $\geq$10 casing volumes of groundwater from each well using a diaphragm pump and polyethylene tubing, and continuing until the well water is relatively free of turbidity and suspended fines (generally only until slightly cloudy). GGTR will transfer the well purge water to 55-gallon, DOT-approved, steel drums and temporarily store them onsite pending transport and disposal to a licensed facility.

A Civil Engineer or Land Surveyor licensed in the State of California will survey the grade elevation and the elevation of the top of casing (TOC; north side) of each newly-installed monitor well relative to Mean Sea Level (NGVD 29). In addition, the latitude,

longitude, and coordinates of each well location will be surveyed relative to the California Coordinate System, Zone III (NAD83).

Quarterly Monitor Well Sampling Activities

Approximately 48 hours following development activities in each newly-installed well, GGTR will measure and record the depth to water and presence of sheen or free product in each existing and newly-installed well using a Keck® oil/water interface probe. GGTR will obtain all measurements relative to the approximate north side of the TOC, with an accuracy of 0.01 foot. GGTR will also measure and record the dissolved oxygen concentration in each well (insitu) using a YSI®55 Dissolved Oxygen Meter and measure the oxidation-reduction potential.

GGTR will purge approximately three to four casing volumes of groundwater from each well and simultaneously monitor the pH, temperature and conductivity of the purge water to evaluate groundwater stabilization. GGTR will purge each well using a diaphragm pump and transfer the purge water to a 55-gallon storage drum. If floating product is present in any well, the well will not be sampled at this time.

GGTR will then collect a groundwater sample in each well using a factory-sealed, disposable, clear acrylic bailer. The volatile water samples will be poured directly into laboratory cleaned 40-milliliter volatile organic analysis (VOA) vials to prevent loss of any volatile constituents. The vials will be filled slowly and in such a manner that the meniscus extends above the top of the VOA vial. After the vials are filled and capped, they will be inverted to insure there is no headspace or entrapped air bubbles. Groundwater samples analyzed for diesel/stoddard-range organics will be carefully poured into laboratory cleaned 1-liter amber bottles. All groundwater samples will be labeled and placed in a cooler chilled to approximately 4°C. GGTR will submit the samples under chain of custody command to a State-certified analytical laboratory for chemical analysis. Equipment wash and rinse water will be transferred to a 55-gallon storage drum. Each drum will be sealed with a steel lid and appropriately labeled as non-hazardous waste.

Monitor Well Groundwater Sample Analysis

All groundwater samples obtained from each newly installed (and existing) well will be analyzed for the following California Department of Health Services approved methods.

- TPH-G (SW8020F)
- BTEX (SW8020F)
- MTBE (SW8020F; Confirmation by EPA 8260)
- Fuel Oxygenates (EPA 8260), including EDB & EDC

During only the first sampling event, two groundwater samples collected from relatively clean monitor wells will additionally be analyzed for total dissolved solids (EPA Method 160.1) to further assess groundwater quality at the site. A sample trip blank will

accompany all groundwater samples to the laboratory and be analyzed for TPH-G and BTEX . GGTR will request that all associated laboratory analytical reports be reported in Electronic Deliverable Format (State Assembly Bill 2886, Fall 2000) in general accordance with the State Water Resources Control Board's GeoTracker Database System.

Waste Management

Hydrocarbon-effected soil generated during the additional soil boring and well installation activities will be either drummed and then temporarily stored onsite in a secure area. Pending receipt of the composite stockpile soil sample analysis, GGTR will subsequently profile and transport the waste to an appropriate licensed disposal facility under uniform waste manifest.

Equipment wash and rinse water generated from the decontamination of soil boring and well installation equipment will be transferred to a 55-gallon, D.O.T.-approved steel drum, labeled, and stored onsite. The liquid waste will be profiled for disposal/recycling under uniform waste manifest following receipt of the laboratory results of soil boring grab groundwater sample analysis.

Data Interpretation and Report Preparation

Following the completion of all field work, GGTR will review all field and analytical data and prepare a technical report, discussing the activities and findings of the investigation and present conclusions and recommendations. The report will be submitted to the ACHCSA for regulatory review.

AB2886 GeoTracker Uploading

Pursuant to State Assembly Bill 2886, Fall 2000, all soil/groundwater sample analytical data, wellhead elevation and coordinate data, well fluid-level data, and well construction data collected at the site since September 2001 are required to be uploaded in Electronic Deliverable Format to the State Water Resources Control Board's GeoTracker Database System. Also, geologic boring logs and well construction logs of each existing and newly-installed boring/monitor well, as well as a copy of all letters, work plans, and reports prepared during current and future phases of this site investigation, are required to be uploaded in PDF format to the State GeoTracker Database.

Schedule

GGTR anticipates beginning the additional field activities within two to three weeks of receiving client authorization to proceed. The aforementioned report should be available within 60 days following receipt of all soil and groundwater analytical results.

Report Distribution

All reports that are prepared during the continuing work on this project will be sent to:

Alameda County Health Care Services
Environmental Health Services
Environmental Protection (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
Attention: Mr. Don Hwang *(1 Hard Copy, Unbound)*
(1 PDF Copy Via GeoTracker)

Ms. Mojdeh Mehdizadeh
1408 Stonehedge Drive
Pleasant Hill, California 94523 *(2 Hard Copies, Bound + CD)*

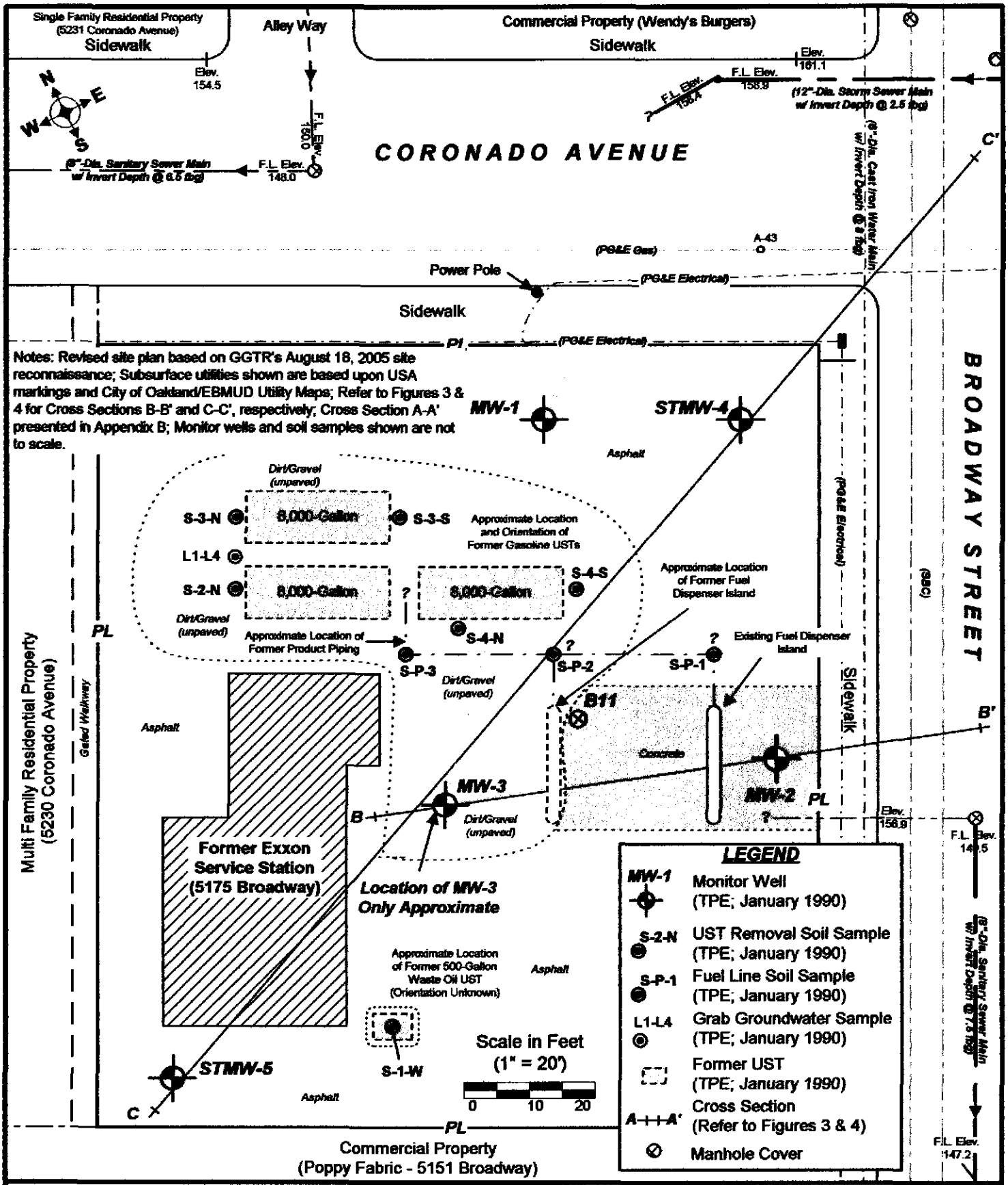
Mr. Kent Tarman
J H Tarman Co. Realtors
1814 Franklin Street, Suite 104
Oakland, California 94612 *(1 Hard Copy, Bound + CD)*

ATTACHMENTS

FIGURES
TABLES
REGULATORY CORRESPONDENCE
EXPLORATORY BORING LOGS
WELL CONSTRUCTION DETAIL LOGS
CROSS SECTION A-A'

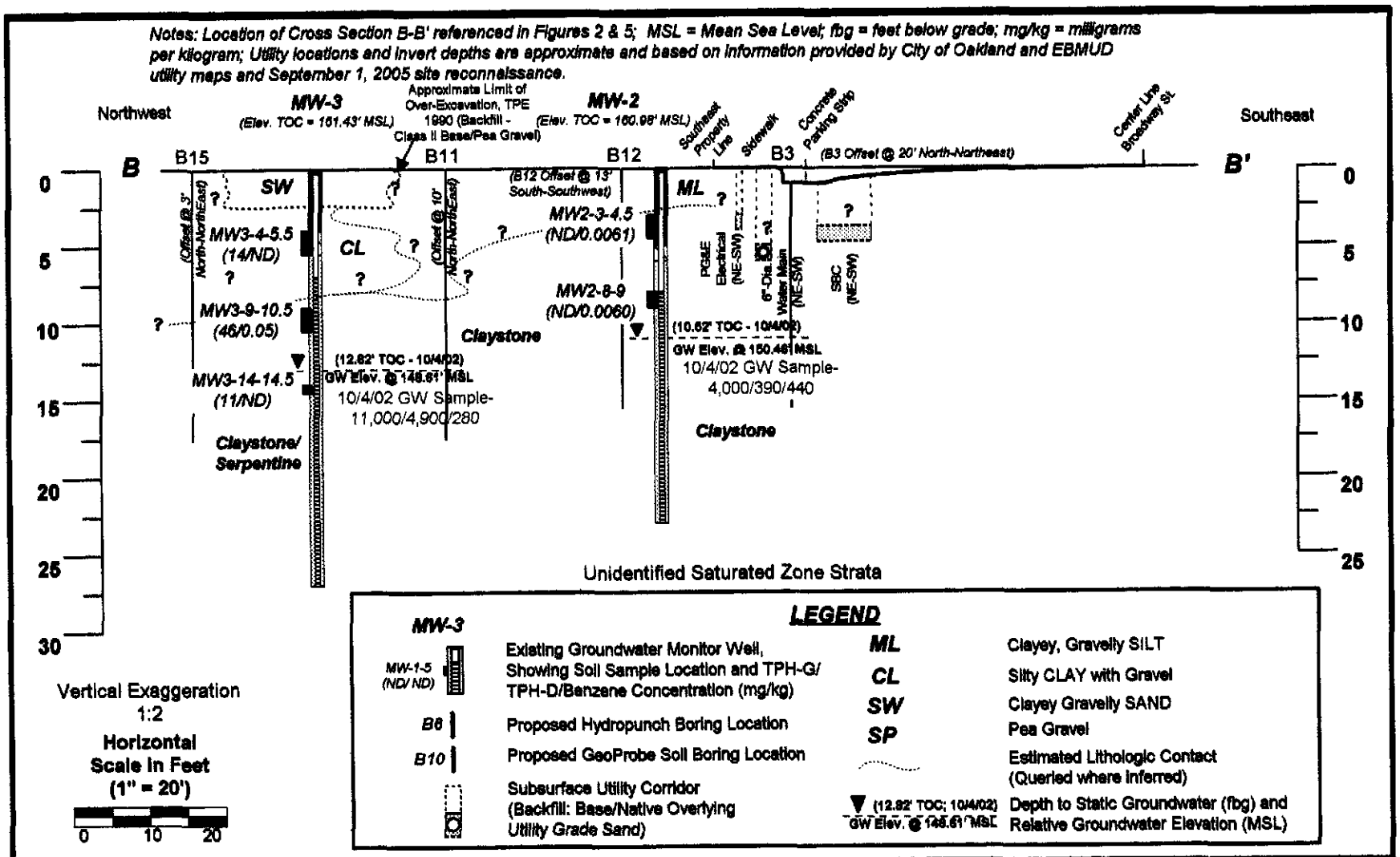
GOLDEN GATE TANK REMOVAL, INC. 255 Shipley Street San Francisco, CA 94107 Ph (415) 512-1555 Fx (415) 512-0964	**SITE LOCATION MAP** 5175 Broadway Street Oakland, California

GGTR Project No. 8679	*Fn:8679.sc1.wp.F1*	*Figure By: baw/08.05*	***Figure 1***



GOLDEN GATE TANK REMOVAL, INC. 255 Shipley Street San Francisco, CA 94107 Ph (415) 512-1555 Fx (415) 512-1555	**SITE PLAN** 5175 Broadway Street Oakland, California

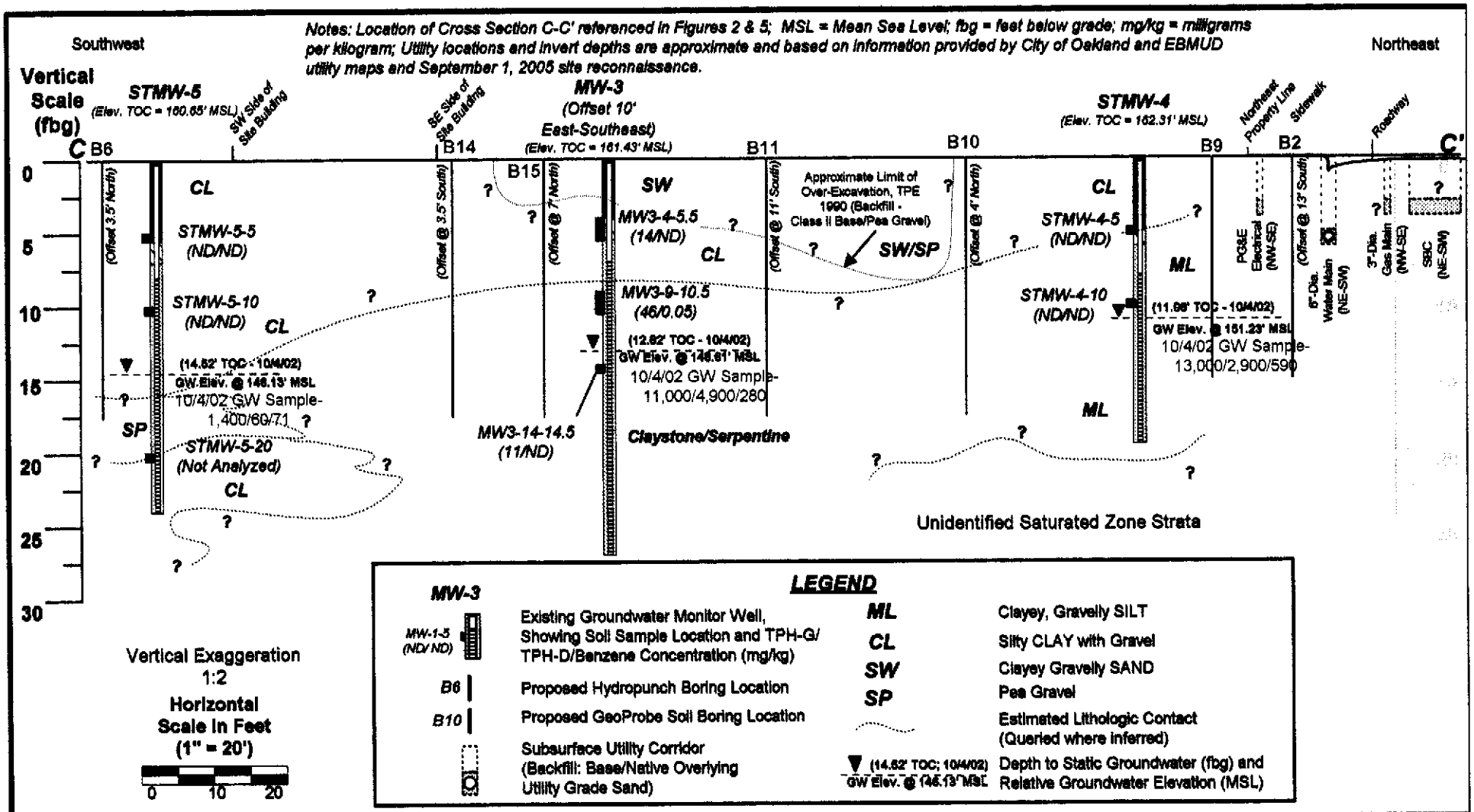
GGTR Project No. 8679	*Fn:8679.sc1.wp.F2*	*Drawing By: baw/08.05*	***Figure 2***



GOLDEN GATE TANK REMOVAL, INC.
255 Shipley Street
San Francisco, California 94107
Phone (415) 512-1555 Fax (415) 512-1555

CROSS SECTION B-B'
5175 Broadway Street
Oakland, California

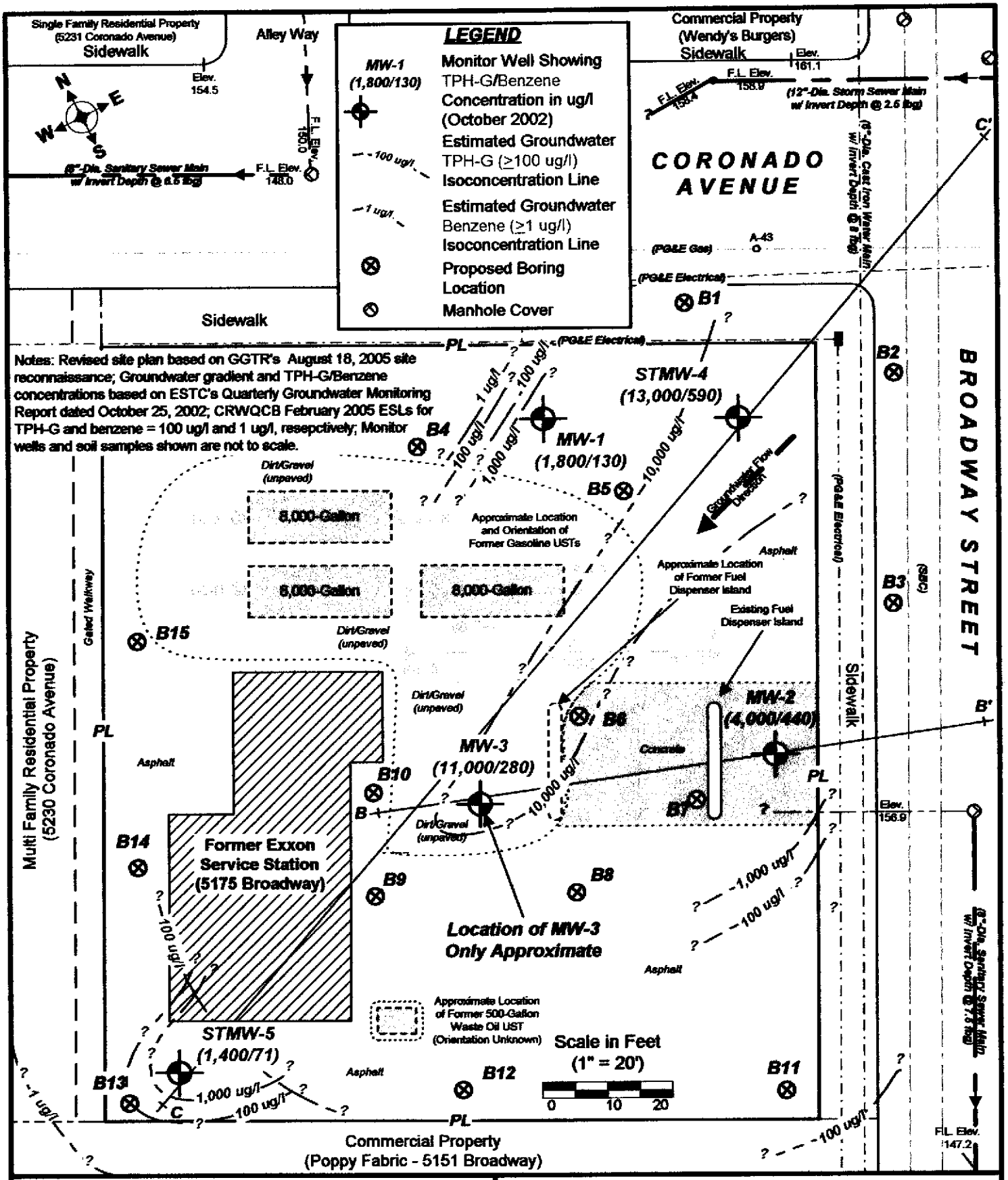
GGTR Project No. 8679	Fn: 8679.sc1.wp.F3	Figure By: baw/08.05	FIGURE 3



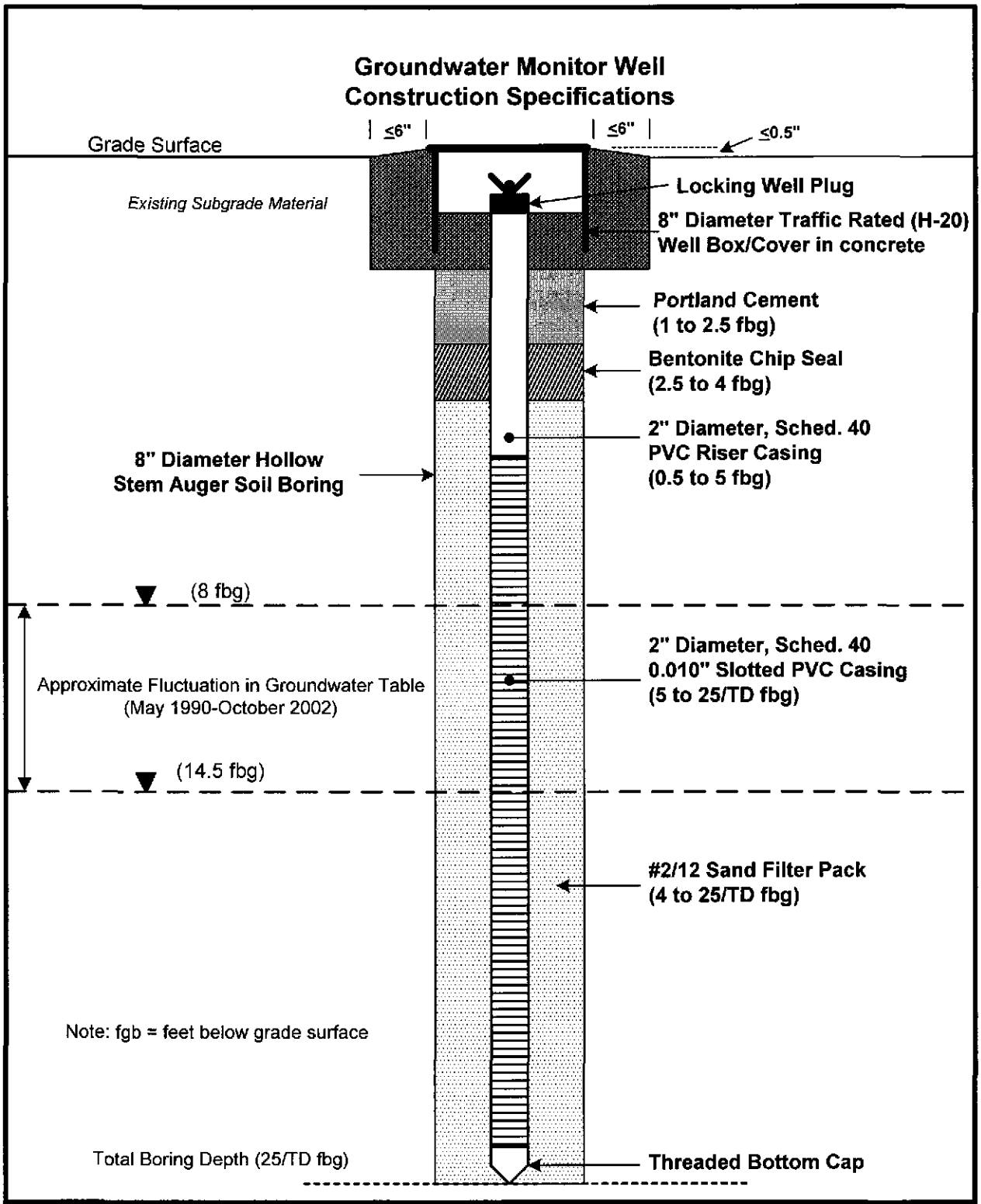
GOLDEN GATE TANK REMOVAL, INC.
255 Shipley Street
San Francisco, California 94107
Phone (415) 512-1555 Fax (415) 512-1555

CROSS SECTION C-C'
5175 Broadway Street
Oakland, California

GGTR Project No. 8679	Fn: 8679.sc1.wp.F4	Figure By: baw/08.05	**FIGURE 4**



GOLDEN GATE TANK REMOVAL, INC. 255 Shipley Street San Francisco, CA 94107 Ph (415) 512-1555 Fx (415) 512-1555	ESTIMATED GROUNDWATER TPH-G/BENZENE ISOCONCENTRATION MAP & PROPOSED BORING LOCATIONS 5175 Broadway Street, Oakland, California
GGTR Project No. 8679 | *Fn:8679.sc1.wp.F5*	*Drawing By: baw/08.05* | ***Figure 5***



GOLDEN GATE TANK REMOVAL, INC. 255 Shipley Street San Francisco, CA 94107 Ph (415) 512-1555 Fx (415) 512-0964	**PROPOSED WELL CONSTRUCTION DIAGRAM** 5175 Broadway Street Oakland, California

GGTR Project No. 8679	*Dwg: baw/09.05*	*Not To Scale*	***Figure 6***

TABLE 1A

Results of Tank Removal and Over-Excavation Sample Analysis

5175 Broadway Street, Oakland, CA

Sample ID	Sample Depth (fbg)	Sample Date	TPH-G (ppm)	TPH-D (ppm)	TOG (ppm)	HVOCs (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Total Xylenes (ppm)
S-1-W	7	1/10/90	ND	ND	ND	ND	ND	ND	ND	ND
S-2-N	10		970	--	--	--	ND	ND	13	15
S-3-N	10		120	--	--	--	ND	ND	ND	ND
S-3-S	10		930	--	--	--	ND	ND	ND	14
S-4-N	10		12	--	--	--	ND	ND	ND	0.130
S-4-S	10		55	--	--	--	ND	ND	ND	0.800
L1-L4 (Water)	10.5		6,900	--	--	--	0.053	ND	ND	0.810
S-P-1	2-3	1/31/90	ND	--	--	--	ND	ND	ND	ND
S-P-2	2-3		ND	--	--	--	ND	ND	ND	ND
S-P-3	2-3		34	--	--	--	ND	ND	ND	ND
Laboratory Detection Limit			≤5	10	30	≤0.001	≤5.0	≤5.0	≤5.0	≤5.0

NOTES:

S-1-W = waste oil UST removal soil sample collected from floor of excavation
S-2-N to S-4-S = gasoline UST removal soil sample collected from floor and sidewalls of excavation
S-P-1 to S-P-3 = tank removal product line soil samples

TPH-G = total petroleum hydrocarbons (TPH) as gasoline (EPA Method 5030);
TPH-D = TPH as diesel (EPA Method 3510)
TOG = total oil & grease (SM 503A)
BTEX = benzene, toluene, ethylbenzene, total xylenes (EPA Method 8020)
HVOCs = halogenated volatile organic compounds (EPA Method 8010)
fbg = feet below grade; ppm = parts per million; -- = not analyzed for this constituent
ND = concentration below associated laboratory reporting limit

TABLE 1B

Historical Results of Subsurface Boring Soil Sample Analysis

5175 Broadway Street, Oakland, CA

Boring/Well Location	Sample Date	Sample Depth (fbg)	TPH-G (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)
MW-1	4/17/90	8-8.5	190	0.24	0.21	0.92	0.60
		13.5-14	180	1.7	1.4	2.4	6.4
MW-2	4/24/90	3-4.5	ND	0.0061	0.0050	0.0057	0.026
		8-9	ND	0.0060	0.0050	0.0089	0.013
MW-3	4/17/90	4-5.5	14	ND	ND	ND	0.10
		9-10.5	46	0.050	ND	0.40	0.20
		14-14.5	11	ND	ND	ND	0.10
STMW-4	6/21/91	5	ND	ND	ND	ND	ND
		10	ND	ND	ND	ND	ND
STMW-5		5	ND	ND	ND	ND	ND
		10	ND	ND	ND	ND	ND
Laboratory Reporting Limit			0.5	50	≤0.010	0.005	1.0
CRWQCB February 2005 ESL – Shallow Soil			100 (100)	0.044 (0.18)	2.9 (9.3)	3.3 (32)	2.3 (11)
CRWQCB February 2005 ESL – Deep Soil			100 (100)	0.044 (0.18)	2.9 (9.3)	3.3 (32)	2.3 (11)

NOTES:

TPH-G = total petroleum hydrocarbons (TPH) as gasoline (EPA Method 8015M)
BTEX = benzene, toluene, ethylbenzene, total xylenes (EPA Method 8020)
fbg = feet below grade; mg/kg = milligrams per kilogram (parts per million)

CRWQCB/ESL = California Regional Water Quality Control Board's Interim Final – February 2005, Tier 1 Environmental Screening Level for shallow (<10 fbg) or deep (>10 fbg) soil at a residential land use permitted site with groundwater that **is (is not)** a potential source of drinking water

TABLE 2

Historical Results of Groundwater Sample Analysis & Fluid-Level Data

5175 Broadway Street, Oakland, CA

Well ID	Sample Date	TOC Elevation (Feet/MSL)	DTW* (Feet/ TOC)	GW Elevation (Feet/MSL)	Product/ Odor/ Sheen	TPH-G (ug/L)	TPH-D (ug/L)	Fuel Oxy (ug/L)	MTBE (ug/L)	B/T/E/X (ug/L)
MW-1	4/30/89	97.71	--	--	No sheen or odor	200	--	--	--	18 / 5 / 2 / 12
	5/17/90	97.71	9.26	88.45	--	--	--	--	--	-- / -- / -- / --
	9/26/90	97.71	9.92	87.79	No sheen Mild petroleum odor	1300	--	--	--	55 / 31 / 120 / 100
	1/14/91	97.71	9.54	88.17	No sheen Mild petroleum odor	3100	--	--	--	350 / 83 / 86 / 130
	7/03/91	102.04	9.42	92.62	No sheen Light petroleum odor	580	--	--	--	32 / 41 / 40 / 55
	11/11/91	102.04	9.45	92.59	No sheen Mild petroleum odor	330	--	--	--	20 / 2 / 2 / 11
	3/04/92	101.83	7.93	93.90	No sheen Light petroleum odor	810	--	--	--	11 / 5 / 10 / 23
	6/02/92	101.83	8.98	92.85	No sheen Mild sewerage odor	2200	--	--	--	93 / 32 / 40 / 120
	9/28/92	101.83	9.29	92.54	No sheen Mild sewerage odor	2900	--	--	--	24 / 78 / 19 / 37
	1/11/93	101.83	7.56	94.27	No sheen Light sewerage odor	1700	--	--	--	5.7 / 6 / 11 / 28
	8/15/94	101.83	9.19	92.64	No sheen Mild sewerage odor	2000	--	--	--	120 / 3 / 6 / 16
Laboratory Reporting Limit						≤500	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

Table 2 Continued on Following Page

TABLE 2 (Cont'd)

Historical Results of Groundwater Sample Analysis & Fluid-Level Data

5175 Broadway Street, Oakland, CA

Well ID	Sample Date	TOC Elevation (Feet/MSL)	DTW* (Feet/ TOC)	GW Elevation (Feet/MSL)	Product/ Odor/ Sheen	TPH-G (ug/L)	TPH-D (ug/L)	Fuel Oxy (ug/L)	MTBE (ug/L)	B/T/E/X (ug/L)
MW-1	11/07/96	97.50	8.73	88.77	No sheen Light sewerage odor	1200	270	--	ND<0.5	3 / 1.1 / 1.5 / 3.8
	2/12/97	97.50	7.92	89.58	No sheen Light sewerage odor	1800	ND<50	--	ND<0.5	13 / 5.7 / 4.8 / 17
	6/16/97	97.50	9.04	88.46	No sheen/Very Light sewerage odor	330	ND<50	--	ND<0.5	2.7 / ND<0.5 / ND<0.5 / 1.2
	9/30/97	97.50	7.56	89.94	No sheen or odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	1/27/98	97.50	7.96	89.54	No sheen or odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	4/24/98	97.50	7.98	89.52	Light rainbow sheen Light sewerage odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	8/17/98	97.50	8.98	88.52	No sheen Light sewerage odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	11/16/98	97.50	8.90	88.90	No sheen Light sewerage odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	2/16/99	97.50	8.64	88.86	Light rainbow sheen Slight sewerage odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	5/17/99	97.50	8.50	89.00	No sheen Strong sewerage odor	280	--	120 (DIPE)	ND<0.5	1.1 / 0.6 / ND<0.5 / ND<0.5
	8/17/99	97.50	9.24	88.26	Light sheen Sewerage odor	790	86	ND	ND<5	5.6 / 4.3 / 4.5 / 11
Laboratory Reporting Limit						≤500	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

Table 2 Continued on Following Page

TABLE 2 (Cont'd)

Historical Results of Groundwater Sample Analysis & Fluid-Level Data

5175 Broadway Street, Oakland, CA

Well ID	Sample Date	TOC Elevation (Feet/MSL)	DTW* (Feet/ TOC)	GW Elevation (Feet/MSL)	Product/ Odor/ Sheen	TPH-G (ug/L)	TPH-D (ug/L)	Fuel Oxy (ug/L)	MTBE (ug/L)	B/T/E/X (ug/L)
MW-1	11/17/99	97.50	10.44	87.06	Light rainbow sheen Light sewerage odor	1300	--	ND	ND<1	3.6 / 1.9 / 2.7 / 6.6
	2/17/00	97.50	8.48	89.02	Light rainbow sheen Light sewerage odor	580	--	ND	ND<5	1.1 / 2.3 / 3.6 / 4.9
	5/17/00	97.50	8.24	89.26	Light rainbow sheen Light sewerage odor	1500	--	130 (DIPE)	ND<5	130 / 6.8 / 6.1 / ND<5
	8/17/00	97.50	8.77	88.73	Rainbow sheen Light sewerage odor	550	--	ND	ND<25	160 / ND<25 / ND<25 / ND<25
	11/15/00	97.50	9.04	88.46	Light rainbow sheen Light sewerage odor	130	--	22 (DIPE)	ND<5	ND<5 / ND<5 / ND<5 / ND<5
	2/16/01	97.50	7.6	89.90	No sheen Light sewerage odor	400	--	110 (DIPE)	ND<5	26 / ND<5 / ND<5 / ND<5
	1/11/02	97.50	8.08	89.42	No sheen Sewerage odor	600	160A	110 (DIPE)	52 (7.9)	74 / 53 / 14 / 52
	7/01/02	161.03 (resurveyed)	9.02	152.01	No sheen Sewerage odor	670	280LY	ND	ND<5	25 / ND<5 / ND<5 / ND<5
	10/04/02	161.03	9.74	151.29	Rainbow sheen Sewerage odor	1800	520	60 (DIPE)	14	130 / 7.8 / 8.1 / 14
Laboratory Reporting Limit						≤500	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

Table 2 Continued on Following Page

TABLE 2 (Cont'd)

Historical Results of Groundwater Sample Analysis & Fluid-Level Data

5175 Broadway Street, Oakland, CA

Well ID	Sample Date	TOC Elevation (Feet/MSL)	DTW* (Feet/ TOC)	GW Elevation (Feet/MSL)	Product/ Odor/ Sheen	TPH-G (ug/L)	TPH-D (ug/L)	Fuel Oxy (ug/L)	MTBE (ug/L)	B/T/E/X (ug/L)
MW-2	4/30/89	97.78	--	--	No sheen or odor	230	--	--	--	39 / 18 / 5 / 23
	5/17/90	97.78	--	--	--	--	--	--	--	-- / -- / -- / --
	9/29/90	97.78	10.83	86.95	No sheen Mild petroleum odor	850	--	--	--	940 / 5 / 25 / 47
	1/14/91	97.78	10.63	87.15	No sheen or odor	3100	--	--	--	30 / 52 / 24 / 34
	7/03/91	102.02 (resurveyed)	10.08	91.94	No sheen Light petroleum odor	1590	--	--	--	30 / 52 / 24 / 34
	11/11/91	102.02	10.21	91.81	No sheen Mild petroleum odor	960	--	--	--	320 / 15 / 4 / 29
	3/04/92	102.02	8.70	92.97	No sheen Light petroleum odor	1500	--	--	--	9.5 / 8.4 / 9.8 / 22
	6/02/92	102.02	9.52	92.15	No sheen Mild sewerage odor	2800	--	--	--	84 / 41 / 59 / 95
	9/28/92	102.02	10.09	91.58	No sheen Mild sewerage odor	1600	--	--	--	47 / 20 / 47 / 97
	1/11/93	102.02	8.52	93.15	No sheen Light sewerage odor	2500	--	--	--	8.6 / 10 / 17 / 32
	8/15/94	97.49 (resurveyed)	9.91	91.76	No sheen Light petroleum odor	6000	--	--	--	450 / 60 / 100 / 95
Laboratory Reporting Limit						≤500	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

Table 2 Continued on Following Page

TABLE 2 (Cont'd)

Historical Results of Groundwater Sample Analysis & Fluid-Level Data

5175 Broadway Street, Oakland, CA

Well ID	Sample Date	TOC Elevation (Feet/MSL)	DTW* (Feet/ TOC)	GW Elevation (Feet/MSL)	Product/ Odor/ Sheen	TPH-G (ug/L)	TPH-D (ug/L)	Fuel Oxy (ug/L)	MTBE (ug/L)	B/T/E/X (ug/L)
MW-2	11/07/96	97.49	10.02	87.47	No sheen/Very Light sewerage odor	4200	780	--	ND<0.5	25 / 4.9 / 8.1 / 14
	2/12/97	97.49	8.91	88.58	No sheen/Very Light sewerage odor	1800	5700	--	ND<0.5	16 / 3.1 / 3.4 / 8.8
	6/16/97	97.49	9.75	87.74	No sheen/Very Light sewerage odor	2500	ND<50	--	ND<0.5	22 / 5.1 / 7.8 / 11
	9/30/97	97.49	7.89	89.51	No sheen or odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	1/27/98	97.49	8.38	89.11	No sheen or odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	4/24/98	97.49	8.68	88.81	No sheen Slight sewerage odor	2100	1400	--	ND<0.5	18 / 6.5 / 4.8 / 21
	8/17/98	97.49	9.74	87.75	No sheen or odor	2900	ND<50	--	ND<0.5	5.1 / 4.5 / 5.8 / 17
	11/16/98	97.49	10.14	87.35	No sheen Light sewerage odor	1400	ND<50	--	ND<0.5	2.1 / 1.9 / 2.3 / 4.8
	2/16/99	97.49	8.92	88.57	No sheen Slight sewerage odor	1600	ND<50	--	ND<2.5	82 / 16 / ND<2.5 / 40
	5/17/99	97.49	9.26	88.23	No sheen Mild sewerage odor	8200	--	ND	ND<250	43 / 73 / 140 / 100
	8/17/99	97.49	10.04	87.45	No sheen Sewerage odor	2900	260	ND	ND<5	20 / 81 / 17 / 38
Laboratory Reporting Limit						≤500	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

Table 2 Continued on Following Page

TABLE 2 (Cont'd)

Historical Results of Groundwater Sample Analysis & Fluid-Level Data

5175 Broadway Street, Oakland, CA

Well ID	Sample Date	TOC Elevation (Feet/MSL)	DTW* (Feet/ TOC)	GW Elevation (Feet/MSL)	Product/ Odor/ Sheen	TPH-G (ug/L)	TPH-D (ug/L)	Fuel Oxy (ug/L)	MTBE (ug/L)	B/T/E/X (ug/L)
MW-2	11/17/99	97.49	11.52	85.97	Light rainbow sheen Light sewerage odor	2600	ND<50	ND	ND<1	7 / 3.7 / 5.3 / 12.9
	2/17/00	97.49	9.5	87.99	Light rainbow sheen Light sewerage odor	1700	--	ND	ND<5	3.2 / 6.8 / 11 / 12.3
	5/17/00	97.49	8.84	88.65	No sheen Light sewerage odor	3800	--	ND	ND<25	450 / 65 / 110 / 80
	8/17/00	97.49	8.50	88.99	No sheen or odor	4300	--	ND	ND<50	440 / ND<50 / 78 / ND<50
	11/15/00	97.49	9.94	87.55	No sheen Light sewerage odor	5800	--	ND	ND<25	320 / 41 / 78 / 64
	2/16/01	97.49	8.52	88.97	No sheen or odor	2200	--	ND	ND<5	110 / 20 / 38 / 33
	1/11/02	97.49	8.82	88.67	No sheen or odor	3100	620A	ND	ND<50	280 / 86 / 84 / 110
	7/01/02	160.98 (resurveyed)	9.64	151.34	No sheen or odor	2600	940LY	ND	ND<10	300 / 29 / 45 / 27
	10/04/02	160.98	10.52	150.46	No sheen Sewerage odor	4000	390	ND	ND<25	440 / 66 / 140 / 120
Laboratory Reporting Limit						≤500	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

Table 2 Continued on Following Page

TABLE 2 (Cont'd)
Historical Results of Groundwater Sample Analysis & Fluid-Level Data
5175 Broadway Street, Oakland, CA

Well ID	Sample Date	TOC Elevation (Feet/MSL)	DTW* (Feet/ TOC)	GW Elevation (Feet/MSL)	Product/ Odor/ Sheen	TPH-G (ug/L)	TPH-D (ug/L)	Fuel Oxy (ug/L)	MTBE (ug/L)	B/T/E/X (ug/L)
MW-3	4/30/90	98.14	--	--	No sheen Mild petroleum odor	56000	--	--	--	3600 / 8600 / 1300 / 7200
	5/17/90	98.14	12.42	85.72	--	--	--	--	--	-- / -- / -- / --
	9/26/90	98.14	13.50	84.64	No sheen Mild petroleum odor	54000	--	--	--	5100 / 420 / 1600 / 8000
	1/14/91	98.14	12.58	85.56	Light sheen Strong petroleum odor	35000	--	--	--	2600 / 6600 / 1500 / 5700
	7/03/91	102.46 (resurveyed)	12.08	90.38	Rainbow sheen Strong petroleum odor	33000	--	--	--	4120 / 4300 / 1400 / 4800
	11/11/91	102.46	12.29	90.17	Very light rainbow sheen/Mild petroleum odor	57000	--	--	--	3900 / 8400 / 2100 / 14000
	3/04/92	102.18 (resurveyed)	10.26	91.92	Brown sheen Strong petroleum odor	57000	--	--	--	720 / 870 / 81 / 3100
	6/02/92	97.94 (resurveyed)	11.40	90.78	Rainbow sheen Mild petroleum odor	50000	--	--	--	240 / 240 / 220 / 740
	9/28/92	97.94	12.64	89.54	Rainbow sheen spots Strong petroleum odor	64000	--	--	--	110 / 93 / 97 / 250
	1/11/93	97.94	10.10	92.08	Rainbow sheen Mild petroleum odor	68000	--	--	--	210 / 280 / 360 / 990
	8/15/94	97.94	12.20	89.98	Brown sheen spots Mild petroleum odor	50000	--	--	--	870 / 1200 / 1300 / 3000
Laboratory Reporting Limit						≤500	≤250	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

Table 2 Continued on Following Page

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MW-3	11/07/96	97.49	12.40	85.54	Very thin layer of brown sheen/ Light petroleum odor	68000	470	--	ND<0.5	33 / 27 / 63 / 120
	2/12/97	97.49	10.23	87.71	Brown sheen spots Light petroleum odor	25000	3500	--	ND<0.5	39 / 43 / 15 / 91
	6/16/97	97.49	11.79	86.15	Light brown sheen spots/Very light petroleum odor	9700	ND<50	--	ND<0.5	26 / 29 / 45 / 81
	9/30/97	97.49	9.40	88.54	No sheen or odor	6000	1600	--	ND<0.5	43 / 36 / 12 / 11
	1/27/98	97.49	9.80	88.14	No sheen or odor	380	560	--	ND<0.5	5.7 / 4.1 / 1.7 / 9.1
	4/24/98	97.49	9.90	88.04	Rainbow sheen Light sewerage odor	ND<50	680	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	8/17/98	97.49	11.46	86.48	No sheen or odor	16000	ND<50	--	ND<0.5	200 / 18 / 31 / 82
	11/16/98	97.49	12.40	85.54	Rainbow sheen Strong sewerage odor	68000	ND<50	--	ND<0.5	86 / 54 / 69 / 130
	2/16/99	97.49	10.72	87.2	Rainbow sheen Strong sewerage odor	33000	ND<50	--	170	270 / 110 / ND<5 / 770
	5/17/99	97.49	10.54	87.40	Rainbow sheen Strong petroleum odor	72000	--	ND	ND<250	280 / 230 / 320 / 890
	8/17/99	97.49	11.92	86.02	Rainbow sheen Strong petroleum odor	20000	1800	ND	ND<5	51 / 41 / 61 / 130
Laboratory Reporting Limit						≤500	≤250	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

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MW-3	11/17/99	97.49	13.60	84.34	Rainbow sheen Strong petroleum odor	1700	--	ND	ND<1	39 / 22 / 31 / 84
	2/17/00	97.49	10.68	87.26	Rainbow sheen Strong petroleum odor	8800	--	ND	ND<5	16 / 39 / 74 / 90
	5/17/00	97.49	10.25	87.69	Rainbow sheen Strong petroleum odor	22000	--	ND	ND<5	300 / 260 / 410 / 940
	8/17/00	97.49	11.84	86.10	Rainbow sheen Strong petroleum odor	15000	--	ND	ND<50	230 / 140 / 470 / 750
	11/15/00	97.49	11.82	86.12	Rainbow sheen Strong petroleum odor	12000	--	ND	ND<25	250 / 210 / 390 / 700
	2/16/01	97.49	9.68	88.26	Rainbow sheen Strong petroleum odor	7400	--	ND	ND<5	40 / 72 / 100 / 250
	1/11/02	97.49	9.58	88.36	Rainbow sheen Petroleum odor	9300	1900B	ND	ND<25	230 / 200 / 290 / 580
	7/01/02	161.43 (resurveyed)	11.14	150.29	Rainbow sheen Sewerage odor	13000	5200LY	ND	ND<13	230 / 220 / 450 / 890
	10/04/02	161.43	12.82	148.61	Rainbow sheen Petroleum odor	11000	4900	ND	ND<25	280 / 170 / 450 / 730
Laboratory Reporting Limit						≤500	≤250	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

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STMW-4	7/03/91	103.58[1]	11.00	92.58	Light rainbow sheen Mild petroleum odor	3100	--	--	--	610 / 62 / 39 / 150
	11/11/91	103.58	11.08	92.50	Light rainbow sheen Strong petroleum odor	3600	--	--	--	990 / 15 / 2.6 / 180
	3/04/92	101.08 (resurveyed)	9.44	91.64	Rainbow sheen spots Mild petroleum odor	5000	--	--	--	35 / 20 / 22 / 71
	6/02/92	98.80 (resurveyed)	10.32	92.76	No sheen Light petroleum odor	13000	--	--	--	140 / 45 / 63 / 210
	9/28/92	98.80	10.76	92.32	Brown sheen spots Mild petroleum odor	40000	--	--	--	35 / 20 / 48 / 110
	1/11/93	98.80	9.28	93.80	Brown sheen spots Mild petroleum odor	24000	--	--	--	26 / 88 / 92 / 280
	8/15/94	98.80	10.54	92.54	Light rainbow sheen spots/Light petroleum odor	9000	--	--	--	500 / 34 / 46 / 130
	11/07/96	98.80	10.37	88.43	Rainbow sheen spots Very light petroleum odor	13000	180	--	ND<0.5	40 / 2.9 / 7.8 / 19
	2/12/97	98.80	9.36	89.44	Rainbow sheen spots Very light petroleum odor	5300	5700	--	ND<0.5	95 / 5.3 / 5.9 / 18
	6/16/97	98.80	10.40	88.40	No sheen/Very light sewerage odor	5300	ND<50	--	ND<0.5	37 / 6.2 / 1.7 / 11
	9/30/97	98.80	8.50	90.30	No sheen or odor	2700	ND<50	--	ND<0.5	42 / 7.7 / 5.7 / 26
Laboratory Reporting Limit						≤1,250	≤250	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

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STMW-4	1/27/98	98.80	8.90	89.90	No sheen or odor	3000	300	--	ND<0.5	60 / 17 / 12 / 49
	4/24/98	98.80	9.50	89.30	Rainbow sheen Strong sewerage odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	8/17/98	98.80	10.36	88.44	Rainbow sheen Light petroleum odor	29000	ND<50	--	ND<0.5	36 / 24 / 59 / 160
	11/16/98	98.80	10.56	88.24	Rainbow sheen Strong petroleum odor	13000	ND<50	--	--	26 / 21 / 20 / 41
	2/16/99	98.80	9.64	89.16	Rainbow sheen Strong petroleum odor	32000	ND<50	--	ND<100	660 / 16 / 16 / 150
	5/17/99	98.80	9.96	88.84	Rainbow sheen Strong petroleum odor	13000	--	ND	ND<250	1600 / 30 / 45 / 78
	8/17/99	98.80	10.64	88.16	Rainbow sheen Light petroleum odor	12000	990	ND	ND<5	260 / 22 / 33 / 72
	11/17/99	98.80	12.02	86.78	Rainbow sheen Light petroleum odor	7900	--	ND	ND<1	21 / 12 / 17 / 40
	2/17/00	98.80	9.32	98.48	Rainbow sheen Light petroleum odor	4900	--	ND	ND<5	8.9 / 21 / 38 / 50
	5/17/00	98.80	9.65	89.15	Rainbow sheen Strong petroleum odor	9600	--	ND	ND<50	840 / ND<50 / 60 / ND<50
	8/17/00	98.80	10.34	88.46	Rainbow sheen Strong petroleum odor	5100	--	ND	ND<50	680 / ND<50 / 62 / ND<50
Laboratory Reporting Limit						≤1,250	≤250	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

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STMW-4	11/15/00	98.80	10.52	88.28	Rainbow sheen Strong petroleum odor	3900	--	34 (DIPE)	ND<25	640 / ND<25 / 26 / 27
	2/16/01	98.80	9.20	89.60	Rainbow sheen Light petroleum odor	5700	--	26 (DIPE)	ND<25	560 / ND<25 / ND<25 / ND<25
	1/11/02	98.80	9.58	89.22	No sheen or odor	4900	930	ND	ND<250	560 / 59 / 25 / ND<25
	7/01/02	162.31 (resurveyed)	10.28	152.03	Rainbow sheen Sewerage odor	6700	6700	ND	ND<13	470 / 18 / 32 / 45
	10/04/02	162.31	11.08	151.23	Rainbow sheen Petroleum odor	13000	2900	35 (DIPE)	ND<25	590 / 26 / 65 / 110
Laboratory Reporting Limit						≤1,250	≤250	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

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STMW-5	7/03/91	101.99	13.29	88.07	No sheen or odor	690	--	--	--	99 / 81 / 19 / 98
	11/11/91	101.99	14.00	87.99	No sheen/Very light petroleum odor	410	--	--	--	61 / 2.4 / 1.4 / 20
	3/04/92	101.36 (resurveyed)	11.80	89.56	No sheen/Very light petroleum odor	460	--	--	--	13 / 6.5 / 11 / 18
	6/02/92	101.36	13.06	88.30	No sheen Mild petroleum odor	1800	--	--	--	27 / 20 / 21 / 43
	9/28/92	101.36	14.04	87.32	No sheen Mild sewerage odor	1500	--	--	--	14 / 6.1 / 18 / 22
	1/11/93	101.36	11.61	89.75	No sheen Light sewerage odor	800	--	--	--	1.8 / 3 / 3.1 / 9.4
	8/15/94	101.36	13.85	87.51	No sheen Mild sewerage	3000	--	--	--	320 / 62 / 34 / 220
	11/07/96	97.14 (resurveyed)	13.67	83.47	Rainbow sheen spots Very light petroleum odor	1200	330	--	ND<0.5	11 / 1.7 / 4.4 / 13
	2/17/97	97.14	12.07	82.07	Rainbow sheen spots Very light petroleum odor	1000	3700	--	ND<0.5	11 / 17 / 1.7 / 9.7
	6/19/97	97.14	13.33	83.81	No sheen /Very light sewerage odor	950	2300	--	ND<0.5	7.4 / 1 / 1 / 7.2
	9/30/97	97.14	11.24	85.90	No sheen Light sewerage odor	710	1100	--	ND<0.5	5.8 / 4 / 1 / 1
Laboratory Reporting Limit						≤250	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

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STMW-5	1/27/98	97.14	11.64	85.50	No sheen Light sewerage odor	340	1100	--	ND<0.5	2 / 1.8 / 1.6 / 8.2
	4/24/98	97.14	11.84	85.30	Rainbow sheen Strong petroleum odor	3300	ND<50	--	ND<0.5	12 / 9.4 / 8.5 / 37
	8/17/98	97.14	13.20	83.94	Rainbow sheen Light sewerage odor	5300	ND<50	--	ND<0.5	26 / 17 / 14 / 39
	11/16/98	97.14	13.74	83.40	Rainbow sheen Strong sewerage odor	ND<50	ND<50	--	ND<0.5	ND<0.5 / ND<0.5 / ND<0.5 / ND<0.5
	2/16/99	97.14	12.22	84.92	Rainbow sheen Strong sewerage odor	950	ND<50	--	11	150 / 3.8 / 1.4 / 14
	5/17/99	97.14	12.58	84.56	Rainbow sheen Mild petroleum odor	2800	--	ND	30	67 / 9.4 / ND<2.5 / 16
	8/17/99	97.14	13.48	83.66	Rainbow sheen Light petroleum odor	2800	230	ND	ND<5	18 / 17 / 18 / 36
	11/17/99	97.14	14.88	82.26	Rainbow sheen Light petroleum odor	1600	--	ND	ND<1	3.9 / 2.3 / 3.2 / 7.5
	2/17/00	97.14	12.56	84.58	Rainbow sheen Light petroleum odor	770	--	ND	ND<5	1.5 / 3.2 / 5.8 / 7
	5/17/00	97.14	12.08	85.06	Rainbow sheen Strong petroleum odor	4500	--	ND	ND<25	ND<25 / ND<25 / ND<25 / ND<25
	8/17/00	97.14	13.56	83.58	Rainbow sheen Strong petroleum odor	2900	--	ND	ND<10	170 / 64 / 100 / 250
Laboratory Reporting Limit						≤250	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

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STMW-5	11/15/00	97.14	13.28	83.86	Rainbow sheen Strong petroleum odor	2100	--	ND	ND<5	120 / 24 / 40 / 54
	2/16/01	97.14	11.60	85.54	Rainbow sheen Light petroleum odor	850	--	ND	ND<5	58 / 9.8 / 9.4 / 18
	1/11/02	97.14	11.72	85.42	Rainbow sheen Sewerage odor	920	ND<50	ND	13	76 / 16 / 16 / 28
	7/01/02	160.65 (resurveyed)	13.14	147.51	Rainbow sheen Sewerage odor	4300	1500LY	ND	ND<5	71 / 14 / 14 / 36
	10/0402	160.65	14.52	146.13	Rainbow sheen Petroleum odor	1400	60	ND	ND<5	71 / 17 / 26 / 35
Laboratory Reporting Limit						≤250	50	≤50	0.5 (1)	0.5 / 0.5 / 0.5 / 1.0
CRWQCB MSWQO (MCL)						NC	NC	Varies	5	1 / 150 / 700 / 1,750
CRWQCB February 2005 Tier 1 ESL						100/500	100/640	Varies	5/1,800	1.0(46)/40(130)/30(290)/13(13)

NOTES:

TOC - top of well casing (north side)
DTW - depth to water relative to TOC
ug/L - micrograms per liter (equivalent to parts per billion)
TPH-G - Total Petroleum Hydrocarbons as Gasoline (SW8020F)
TPH-D – TPH as Diesel (EPA Method 8015M)
Fuel Oxy – Fuel Oxygenates by EPA Method 8260B
MTBE - Methyl Tertiary Butyl Ether (EPA Method 8260)
BTEX - Benzene / Toluene / Ethylbenzene / Total Xylenes (SW8020F)
MSL - Mean Sea Level
ND - not detected above laboratory reporting limit
NC - no criteria established
-- - not analyzed for this constituent
fbg - feet below grade surface

CRWQCB MSWQO (Primary MCL) = California Regional Water Quality Control Board, Municipal Supply Water Quality Objective; Primary Maximum Contaminant Level

CRWQCB/RBSL = CRWQCB's February 2005 Tier 1Environmental (Risk-Based) Screening Level; Levels shown are for Groundwater, which IS / IS NOT a threatened drinking water resource.

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

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

October 6, 2004

Mojdeh Mehdizadeh
C/o Mohammed H. Mehdizadeh
678 La Corso Dr.
Walnut Creek, CA 94598

Dear Ms. Mehdizadeh:

Subject: Fuel Leak Case No. RO0000139; Former Exxon Station, 5175 Broadway St., Oakland, CA 94611

Alameda County Environmental Health staff has reviewed "Conducting Human Health Risk Assessment" dated February 17, 2004 by SOMA Environmental Engineering, Inc. The purpose of the report was to evaluate the adverse impact of the residual chemicals in the groundwater on human health. We request that you address the following technical comments and send us the technical reports requested below.

TECHNICAL COMMENTS

1) Soil Exposure Pathways - Direct contact with soil was not evaluated. However, contaminant concentrations of up to 190 milligrams/kilogram (mg/kg) Total Petroleum Hydrocarbons-Gasoline (TPH-G) and 1.7 mg/kg benzene, were detected in the boring for MW-1. Therefore, please postpone proposal for human health screening evaluation for soil contaminants until site and soil characterizations have been completed.
2) Air Exposure Pathways – (Water Exposure Pathways - Potential emissions of groundwater VOCs into indoor air was evaluated as Air Exposure Pathways.) The DTSC-Modified Johnson and Ettinger (J&E) Model was utilized, specifically the Screening Groundwater Model or GW-SCREEN.
   a) The data from the most recent sampling event, July 18, 2002, were used as input concentrations for the J&E Indoor Air Model. Instead, the more conservative highest concentration detected ought to have been used.
   b) Site-specific physical parameters (e.g., total porosity, air-filled porosity, water-filled porosity and organic carbon content) were not measured at this site. Therefore, the default values ought to have been used.

   Nevertheless, the total excess cancer risk for exposure to indoor air emissions associated with benzene detected in STMW-4 was calculated to be 2.5E-06. This exceeds the target total excess individual cancer risk of 1 E-06. Please postpone review of your human health screening evaluation and proposal to address these issues.

3) Site Characterization - Up to 13,800 micrograms/liter (ug/l) Total Petroleum Hydrocarbons-Gasoline (TPH-G) October 4, 2002 most recent quarter , maximum 72,000 ug/l and 590 ug/l 51,000 ug/l benzene, have been detected in onsite monitoring wells. The lateral and vertical extent of your dissolved contaminant plume is undefined. Please propose additional sampling locations to define the plumes associated with your site in the Work Plan requested below. Include geologic cross-sections and show soil and groundwater analytical results, utility conduits, well screens, etc., and explain your rationale for the additional sampling locations. You may want to consider performing an investigation to quickly define the location of the contaminant plume downgradient from the release site prior to installing the permanent monitoring network. That will allow you to optimize the location and depth of the permanent wells, thereby reducing the cost of the monitoring work. Collection of groundwater samples using a one-time direct push water sampling tool would be appropriate for this investigation.
4) Source Characterization - Up to 970 mg/kg Total Petroleum Hydrocarbons-Gasoline (TPH-G) were detected in contaminated soil collected from downgradient borings MW-2 and MW-3. VSB-1 not on site plan. Thus, the source area has not been delineated. We request that you propose additional borings to delineate the lateral and vertical extent of soil contamination in the source area. Please propose boring locations in the Work Plan requested below.
5) Soil samples from borings - Include those at changes of lithology, at the soil/groundwater interface, and at areas of obvious contamination. Please propose where soil samples will be collected from borings in the Work Plan requested below.

TECHNICAL REPORT REQUEST

Please submit a Work Plan to the Alameda County Environmental Health (Attention: Don Hwang) by December 6, 2004.

If you have any questions, please call me at (510) 567-6746.

Sincerely,

Don Hwang
Hazardous Materials Specialist
Local Oversight Program

C: Mansour Sepehr, SOMA Environmental Engineering, Inc., 2680 Bishop Drive, Suite 203, San Ramon, California
Donna Drogos
Files

LOG OF EXPLORATORY BORING

PROJECT NUMBER 104 BORING NO. MW-1

PROJECT NAME 5175 Broadway, Oakland, California PAGE 1 Of 2

BY J. Mrakovich DATE 4/17/90 SURFACE ELEV. 156 ±

Recovery (ft/ft)	PID (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
							Asphalt surface
							Fill: Aggregate base of sand and gravel (SP), orange to dark brown, dry.
							Fill: Clayey, gravelly, sand (SW), dark red brown with brick fragments, 5% medium sand, rootlets, damp, no odor.
1.5/1.5		13					Silty clay (CL), brown, stiff, damp, no odor.
				5			@ 6.5' color change to brown-orange.
							Gravelly sand (SW), olive-brown, dry, no odor.
.75/.75		47 for 9 inches					Clayey silt (ML), 30% shale/ claystone fragments, probably weathered bedrock, mottled blue-green/brown, strong gasoline odor, damp, dense.
				10			Serpentine, mottled blue-green/brown, highly fractured, damp, very dense, strong gasoline odor.
							Claystone/shale, brown to black, fractured, moist, very dense, slight odor.
1.0/1.0		52					
				15			
.5/.5		34 for 6 inches					
				20			

REMARKS

Boring drilled with continuous-flight hollow-stem 10-inch O.D. augers (6.625-inch I.D.). Samples collected in a 3-inch O.D. modified California sampler.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 104

PROJECT NAME 5175 Broadway, Oakland, California

BY J. Mrakovich DATE 4/17/90

BORING NO. MW-1

PAGE 2 Of 2

SURFACE ELEV. 156 ±

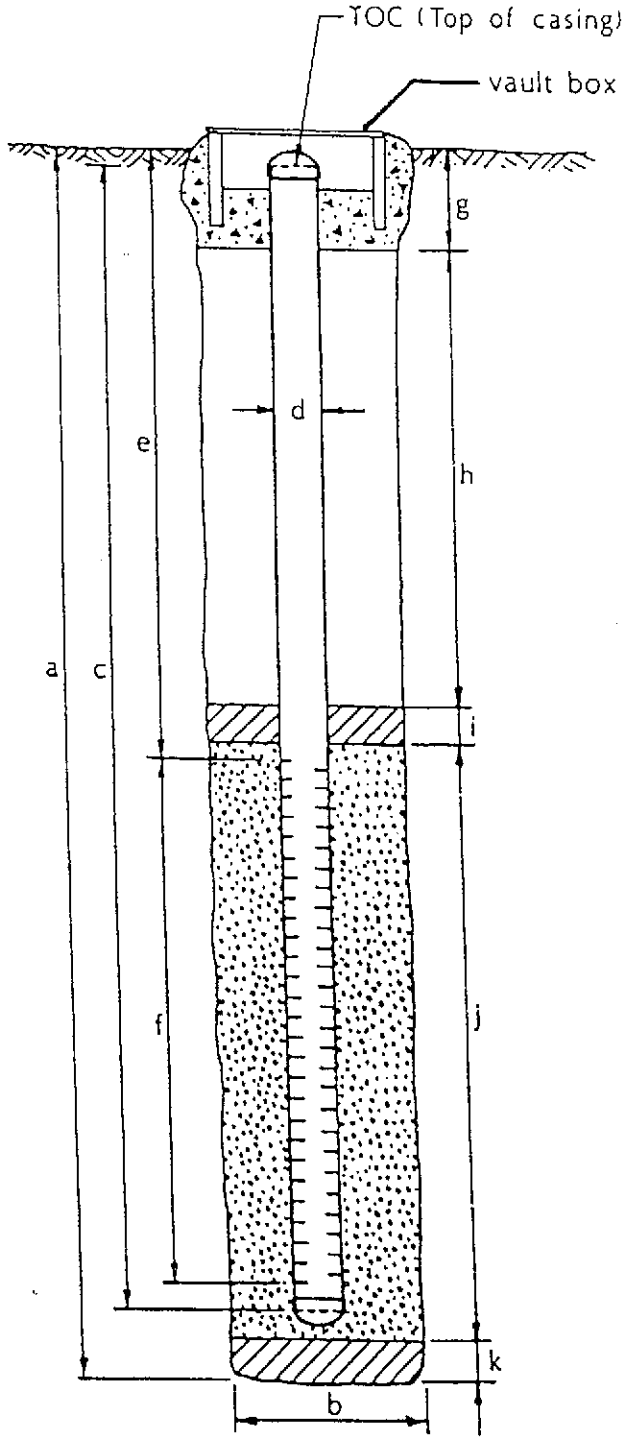
Recovery (ft/ft)	PID (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
							@ 23.0' wet
.17/.17		50 for 2 inches		25			Boring terminated at 23 feet. Sampled to 23.17 feet.

REMARKS

WELL DETAILS

PROJECT NUMBER 104
PROJECT NAME 5175 Broadway
LOCATION Oakland, CA
WELL PERMIT NO. 90222

BORING / WELL NO. MW-1
TOP OF CASING ELEV. 155.03
GROUND SURFACE ELEV. 156 ±
DATUM Mean sea level
INSTALLATION DATE 4/17/90



EXPLORATORY BORING

a. Total depth 23 ft.
b. Diameter 10 in.
Drilling method Hollow-stem auger

WELL CONSTRUCTION

c. Total casing length 23 ft.
Material Schedule 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 13.0 ft.
f. Perforated length 10.0 ft.
Perforated interval from 23.0 to 13.0 ft.
Perforation type Machine slot
Perforation size .020-inch
g. Surface seal 1.0 ft.
Seal material Concrete
h. Backfill 8.5 ft.
Backfill material Cement
i. Seal 1.0 ft.
Seal material Bentonite
j. Gravel pack 12.5 ft.
Pack material 8x20 filter sand
k. Bottom seal 0.0 ft.
Seal material N/A

LOG OF EXPLORATORY BORING

PROJECT NUMBER 104

PROJECT NAME 5175 Broadway, Oakland, California

BY J. Mrakovich DATE 4/24/90

BORING NO. MW-2

PAGE 1 Of 2

SURFACE ELEV. 156 ±

Recovery (ft/ft)	PID (ppm)	Penetration (blws/ft)	DEPTH IN FT.	DESCRIPTION
				Concrete
				Clayey silt (ML), mottled yellow-brown and olive brown, damp, slight odor.
				Claystone, mottled yellow-brown with minor blue-green, highly fractured (blocky), upper 9-inches weathered to a clayey consistency, very dense, damp, no odor.
1.25/1.5		97	5	
1.0/1.0		84		@ 8.0' color change to include more blue-green, slight gasoline odor.
			10	@ 10.0' hard drilling 10-12 feet, strong gasoline odor while drilling.
.42/.42		80 for 5 inches		@ 13.0-13.4' insufficient sample for analysis, no odor.
.25/.25		50 for 3 inches		@ 18.0-18.25' insufficient sample for analysis, no odor.
			20	

REMARKS

Boring drilled with continuous-flight hollow-stem 10-inch O.D. (6.625-inch I.D.). Samples collected in a 3-inch O.D. modified California sampler.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 104

PROJECT NAME 5175 Broadway, Oakland, California

BY J. Mrakovich DATE 4/24/90

BORING NO. MW-2

PAGE 2 Of 2

SURFACE ELEV. 156 ±

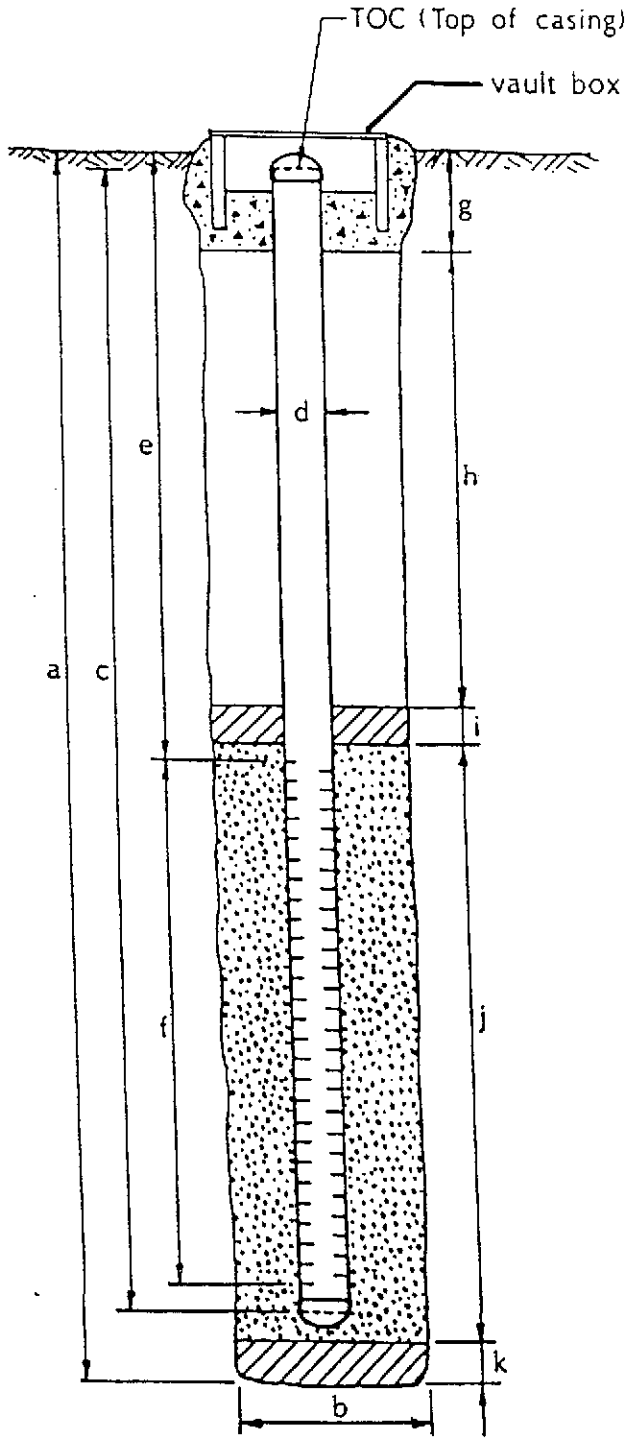
Recovery (ft/ft)	PID (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
.17/.17		50 for 2 inches	▽	25			@ 23.0-23.17' insufficient sample for analysis, no odor. Boring terminated at 23 feet. Sampled to 23.17 feet.

REMARKS

WELL DETAILS

PROJECT NUMBER 104
PROJECT NAME 5175 Broadway
LOCATION Oakland, CA
WELL PERMIT NO. 90222

BORING / WELL NO. MW-2
TOP OF CASING ELEV. 154.97
GROUND SURFACE ELEV. 156 ±
DATUM Mean sea level
INSTALLATION DATE 4/24/90



EXPLORATORY BORING

a. Total depth 23.0 ft.
b. Diameter 10 in.
Drilling method Hollow-stem auger

WELL CONSTRUCTION

c. Total casing length 23.0 ft.
Material Schedule 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 8.0 ft.
f. Perforated length 15.0 ft.
Perforated interval from 23.0 to 8.0 ft.
Perforation type Machine slot
Perforation size .020-inch
g. Surface seal 1.0 ft.
Seal material Concrete
h. Backfill 4.0 ft.
Backfill material Cement
i. Seal 1.0 ft.
Seal material Bentonite
j. Gravel pack 17.0 ft.
Pack material 8x20 filter sand
k. Bottom seal 0.0 ft.
Seal material N/A

LOG OF EXPLORATORY BORING

PROJECT NUMBER 104

PROJECT NAME 5175 Broadway, Oakland, California

BY J. Mrakovich DATE 4/17/90

BORING NO. MW-3

PAGE 1 Of 2

SURFACE ELEV. 156 ±

Recovery (ft/ft)	PID (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
							Fill: Clayey, gravelly, sand (SW), dark brown and black. Hard object encountered at 3 feet, dry, no odor.
							Silty clay (CL), black, slightly damp, firm, slight gasoline odor.
1.5/1.5		7		5			@ 7.0' color change to grey, gasoline odor, damp.
1.5/1.5		75		10			Claystone, yellow-brown, weathered to a clayey consistency, damp, strong gasoline odor.
							Claystone/serpentine, mottled green and dark brown, weathered, highly fractured, very dense, damp, strong gasoline odor.
.5/.5		50 for 6 inches		15			@ 14.0'-14.5', slight gasoline odor, damp.
.33/.33		50 for 4 inches		20			@ 19.0'-19.33', slight gasoline odor, insufficient sample for analysis, moist.

REMARKS

Boring drilled with continuous hollow-stem 10-inch O.D. augers (6.625-inch I.D.). Samples collected in a 3-inch O.D. modified California sampler.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 104

BORING NO. MW-3

PROJECT NAME 5175 Broadway, Oakland, California

BY J. Mrakovich DATE 4/17/90

SURFACE ELEV. 156 ±

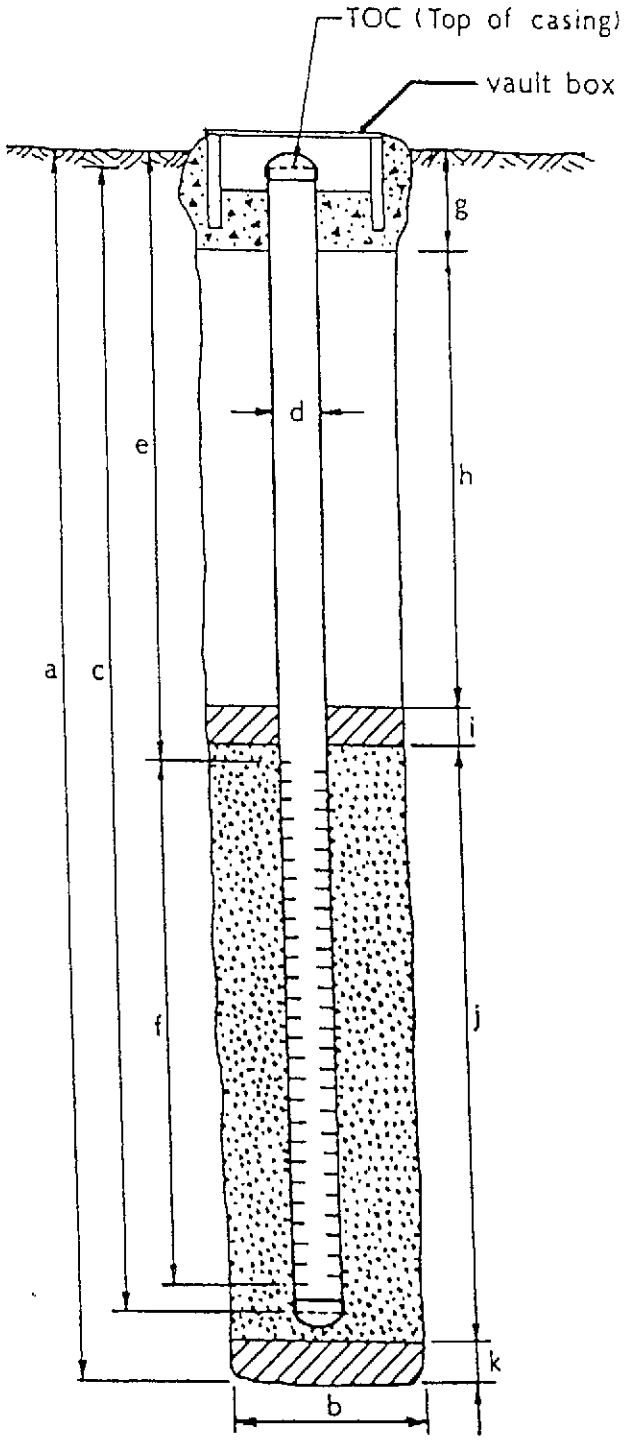
Recovery (ft/ft)	PID (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
				25			Boring terminated at 27 feet.

REMARKS

WELL DETAILS

PROJECT NUMBER 104
PROJECT NAME 5175 Broadway
LOCATION Oakland, CA
WELL PERMIT NO. 90222

BORING / WELL NO. MW-3
TOP OF CASING ELEV. 155.93
GROUND SURFACE ELEV. 156 ±
DATUM Mean sea level
INSTALLATION DATE 4/17/90



EXPLORATORY BORING

a. Total depth 27.0 ft.
b. Diameter 10 in.
Drilling method Hollow-stem auger

WELL CONSTRUCTION

c. Total casing length 27.0 ft.
Material Schedule 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 7.0 ft.
f. Perforated length 20.0 ft.
Perforated interval from 27.0 to 7.0 ft.
Perforation type Machine slot
Perforation size .020-inch
g. Surface seal 1.0 ft.
Seal material Concrete
h. Backfill 4.0 ft.
Backfill material Cement
i. Seal 1.5 ft.
Seal material Bentonite
j. Gravel pack 21.5 ft.
Pack material 8x20 filter sand
k. Bottom seal 0.0 ft.
Seal material N/A

File No. 8-90-420-GI

Logged By: Noori Ameli	Exploratory Boring Log	Boring No. STMW-1
Date Drilled. 6/21/91	Approx. Elevation	Boring Diameter 8-inch
Drilling Method: Mobile drill rig B-40L		Sampling Method

Depth, Ft.	Sample No.	Field Test for Total Ionization	Penetration Resistance Blows/6"	Unified Soil Classification	DESCRIPTION
1					2-inch asphalt, 2-inch baserock.
2					Reddish-brown silty clay, stiff.
3					Light brown silty clay, stiff.
4					Light brown silty gravelly clay.
5	4-5				Light brown clayey gravelly silt, stiff.
6					
7					
8					
9					
10	4-10				Light brown clayey gravelly silt, mild petroleum odor.
11					
12					Medium size rocks ($\frac{1}{2}$ inch - 1 inch).
13					▽ Groundwater level encountered at 13 feet. Stronger odor, moist.
14					
15					Color changes to darker.
16					

Remarks

File No. 8-90-420-GI

Logged By: Noori Ameli	Exploratory Boring Log	Boring No. STMW-1
Date Drilled: 6/21/91	Approx. Elevation	Boring Diameter 8-inch
Drilling Method: Mobile drill rig B-40L		Sampling Method

Depth	Sample No.	Field Test for Total Ionization	Penetration Resistance Blows/6"	Unified Soil Classification	DESCRIPTION
17					Color changes to darker.
18					
19					Boring terminated at 19-feet 6-inches.
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					

Remarks

File No. 8-90-420-GI

Logged By: Noori Ameli	Exploratory Boring Log	Boring No. STMW-2
Date Drilled: 6/21/91	Approx. Elevation	Boring Diameter 8-inch

Drilling Method: Mobile drill rig B-40L

Sampling Method:

Depth, Ft.	Sample No.	Field Test for Total Ionization	Penetration Resistance Blows/Ft.	Unified Soil Classification	DESCRIPTION
1					4-inch asphalt, 3-inch baserock.
2					Medium brown silty clay with some gravel.
3					
4					
5	5-5				Medium brown/dark grey silty clay, firm.
6					
7					
8					
9					
10	5-10				Dark greenish-grey silty clay with some pea gravel.
11					
12					
13					
14					Olive-green silty clay with some medium size gravel.
15					More gravel in the soil.
16					Light petroleum odor.
					Olive-green silty clayey gravel.

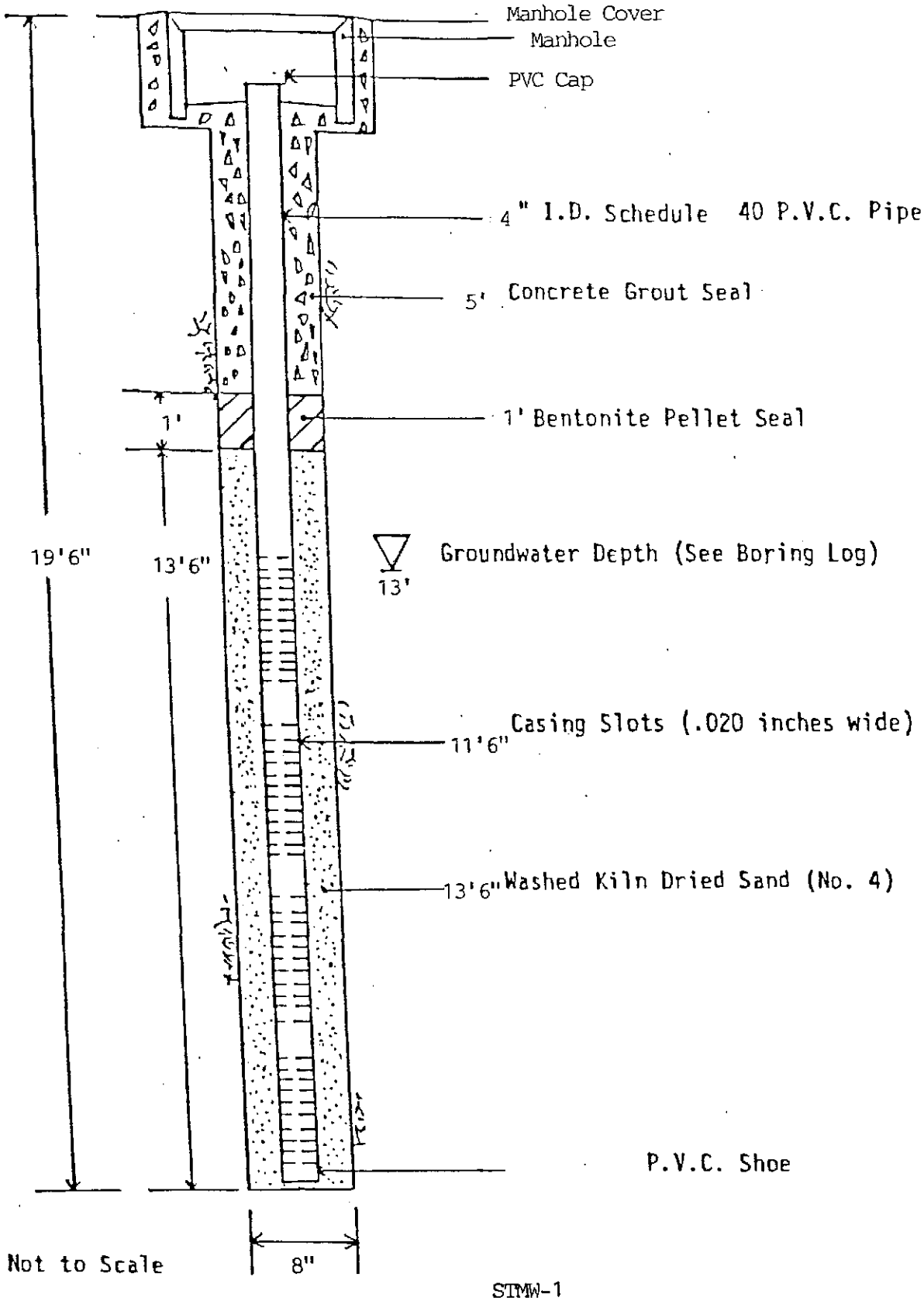
Remarks

File No. 8-90-420-GI

Logged By: Noori Ameli	Exploratory Boring Log	Boring No. STMW-2
Date Drilled: 6/21/91	Approx. Elevation	Boring Diameter 8-inch
Drilling Method: Mobile drill rig B-40L		Sampling Method

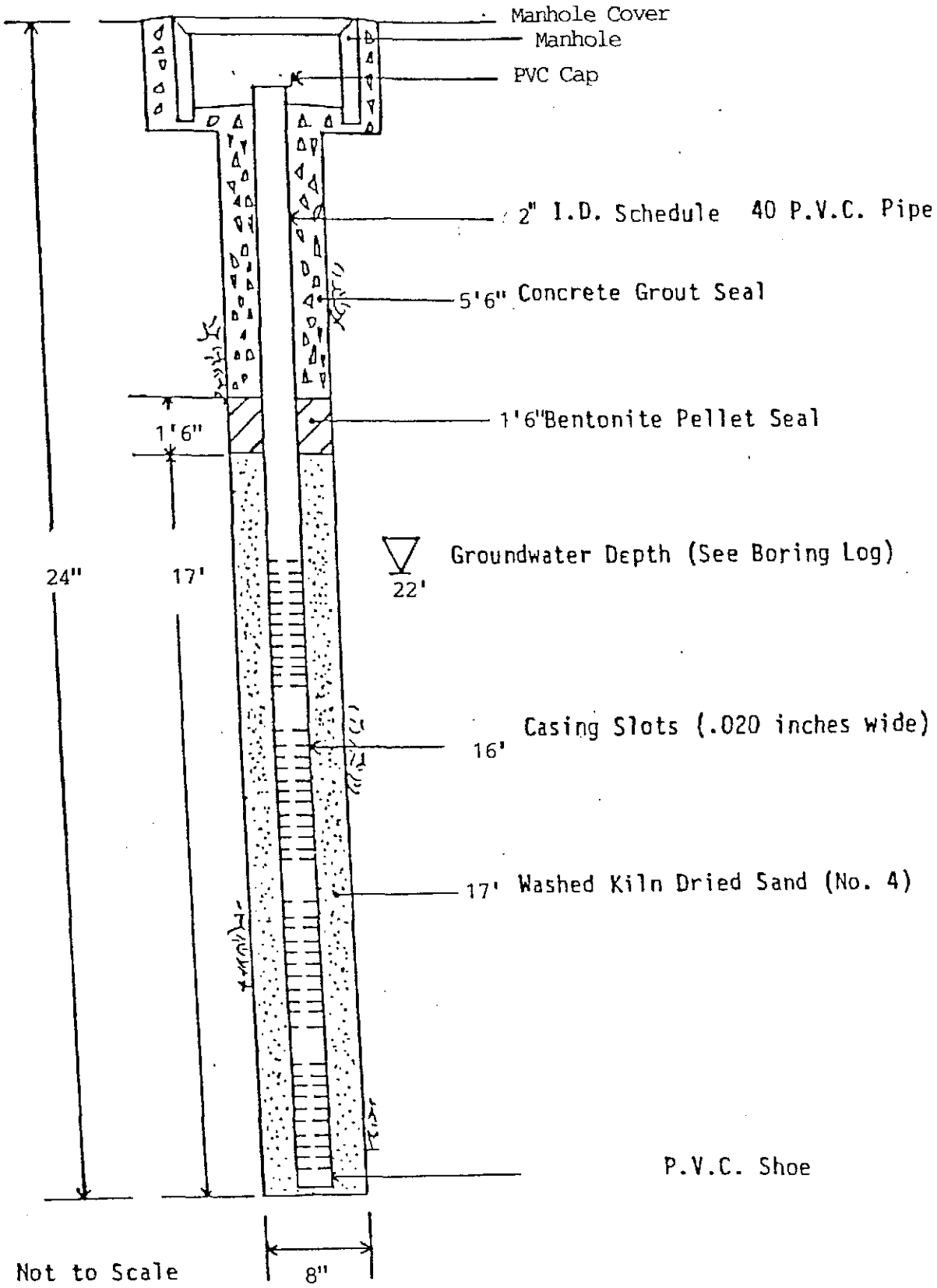
Depth, Ft.	Sample No.	Field Test for Total Ionization	Penetration Resistance Blows/6"	Unified Soil Classification	DESCRIPTION
17					Olive-green silty clayey gravel.
18					
19					
20	S-20				Olive-green silty clay with some pea gravel.
21					
22					Olive-brown silty clay with small and medium size gravel.
					▽ Groundwater level encountered at 22 feet.
23					
24					Boring terminated at 24 feet.
25					
26					
27					
28					
29					
30					
31					
32					

Remarks



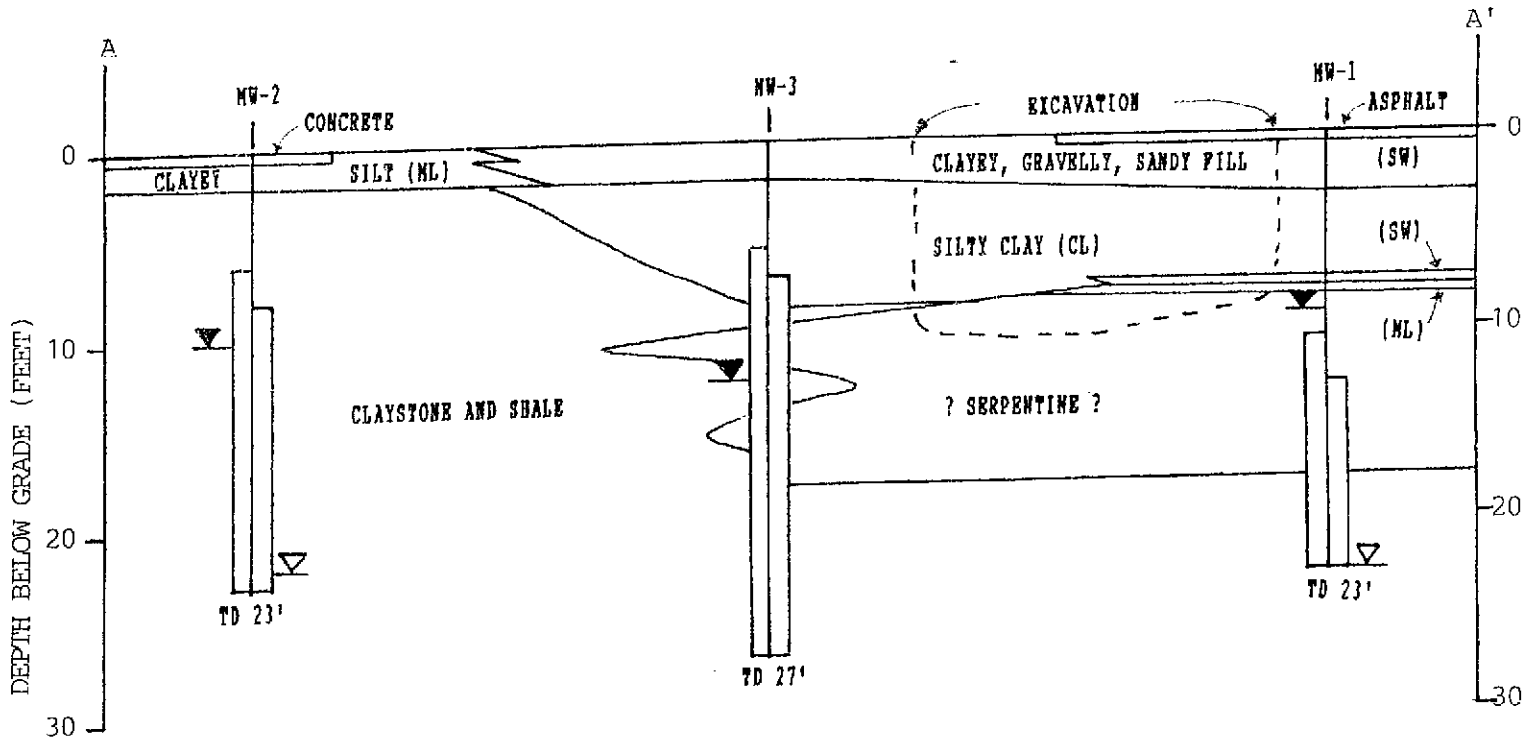
STMW-1

Piezometer Schematic



STMW-2

Piezometer Schematic



LEGEND

SEE FIGURE 4 FOR LOCATION OF CROSS SECTION

0 20
SCALE IN FEET

VERTICAL EXAGGERATION X 2

STABILIZED WATER LEVEL 4/30/90

BOREHOLE
SCREENED INTERVAL
SAND PACK INTERVAL
FIRST ENCOUNTERED GROUNDWATER

TD 23' - TOTAL DEPTH OF BOREHOLE

TANK PROTECT ENGINEERING
Of Northern California

GEOLOGIC CROSS SECTION
5175 BROADWAY
OAKLAND, CALIFORNIA

FIGURE
3