

**WORK PLAN FOR ADDITIONAL SITE CHARACTERIZATION
FOR SITE LOCATED AT
2301 EAST 12th STREET, OAKLAND**

✓ OK 02/11/99

This work plan discusses additional site characterization which includes soil and groundwater sampling at the property located at 2301 East 12th Street in Oakland, California. The site is at the southwest corner of the intersection of East 12th Street and 23rd Avenue. A site location map is presented in Figure 1.

The existing 6 monitoring wells at the site have been sampled several times since 1992. The results of the sampling indicate that additional monitoring is required to determine the extent of petroleum contamination at the site. A site plan showing the existing wells and proposed additional subsurface investigations is presented in Figure 2.

The proposed work will consist of the following tasks:

- 1) Groundwater samples will be collected from the existing 6 monitoring wells and analyzed for parameters requested by the Alameda County Health Care Services Agency (ACHCSA). This will include total petroleum hydrocarbons as gasoline (TPH-g), TPH as diesel (TPH-d), benzene, toluene, ethy-benzene, and xylene (BTEX), methyl tertiary-butyl ether (MTBE), and groundwater parameters such as: sulfate, nitrate, oxidation reduction potential, pH, dissolved oxygen, and alkalinity. All chemical compounds will be shipped off-site for analysis at a State-certified laboratory. *except for D.O., pH & Redox.*
- 2) The results of the bioremediation analyses will be discussed with the ACHCSA to determine if the level of dissolved oxygen in the groundwater is low (depleted). If the oxygen in the groundwater is depleted then use of socks containing Oxygen Release Compounds (ORC) may be installed in the water column of the existing wells. The results of subsequent monitoring will be used to assess whether or not this technique can be used on a larger scale for bioremediation of the groundwater contaminant plume.
- 3) Three hydropunch borings will be located in the park area northwest of the site to define the down gradient edge of the plume. Permits will be obtained by the city for clearance to install the well on city property. Soil samples for lithology will be collected every 5 vertical feet, starting at 10 feet below the ground surface. One soil sample will be collected in the vadose zone from each boring and submitted to the laboratory for TPH-g, TPH-d, BTEX, MTBE, and volatile organic analysis method 8010 (VOCs). A water sample will also be collected from each boring and submitted to the laboratory for TPH-g, TPH-d, BTEX, MTBE, and VOCs. The samples will be collected, maintained, and transported following appropriate QA/QC procedures.
- 4) One hydropunch boring will be installed on the east side of East 12th Street. The purpose of this hydropunch is to assess whether there is contamination coming from offsite that may be contributing to the contaminant plume. One soil and one groundwater sample will be collected from the hydropunch and submitted for TPH-g, TPH-d, BTEX, MTBE, and VOCs.
- 5) Two hydropunches will be placed inside the existing building at the site. The purpose of these hydropunches is to assess whether there is contamination migrating from the property

directly upgradient of the site. One soil and one groundwater sample will be collected from each of the borings and analyzed for TPH-g, TPH-d, BTEX, MTBE, and VOCs.

- 6) A summary report will be prepared to document the results of the soil and groundwater investigation. The results of the investigation will also be discussed with the ACHCSA. Based on that meeting, recommendations will be prepared to address any future requirements for the site.

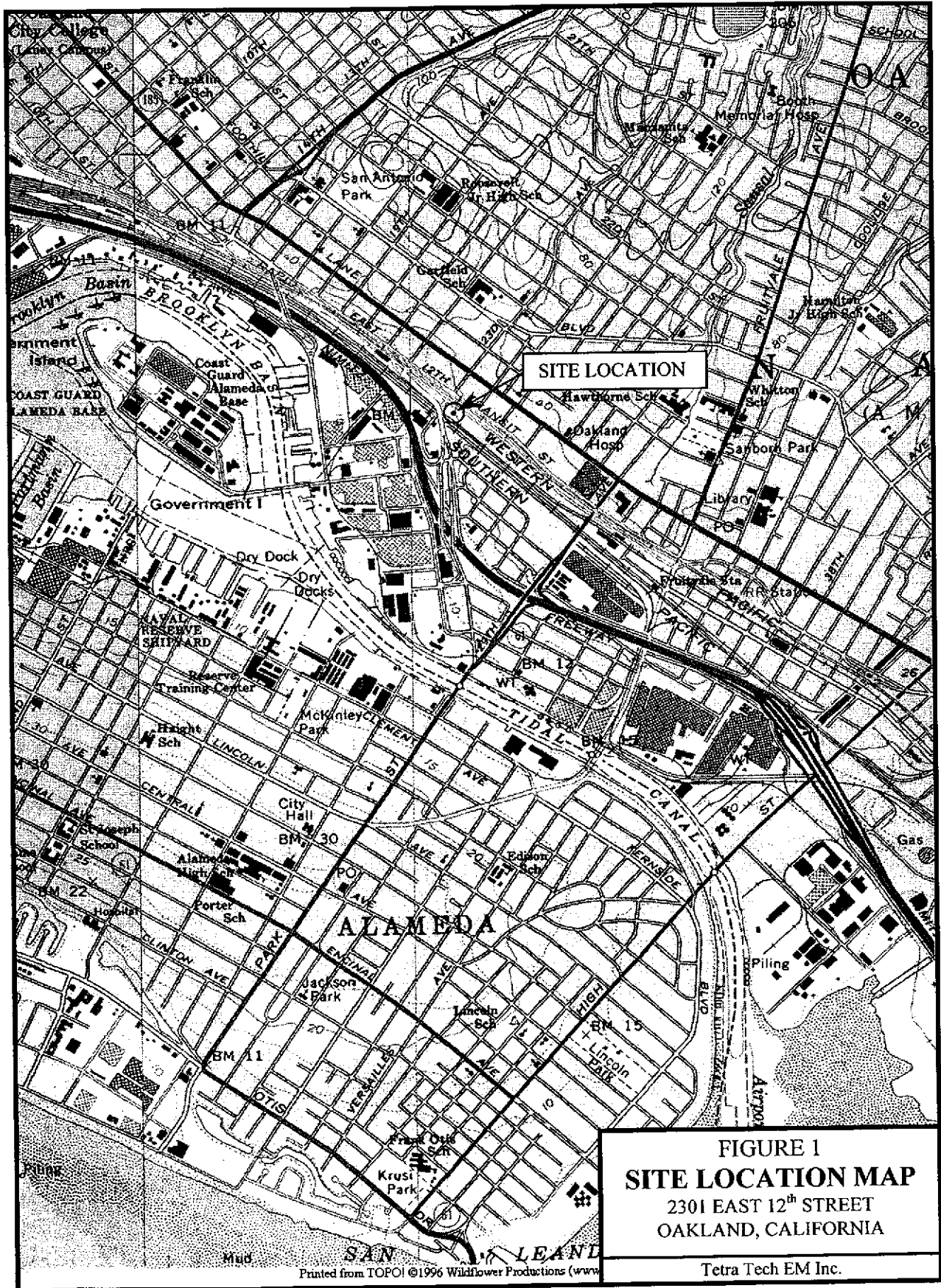


FIGURE 1
SITE LOCATION MAP
 2301 EAST 12th STREET
 OAKLAND, CALIFORNIA

