



5/15/93

April 30, 1993

Barney Chan  
Alameda County Department  
of Environmental Health  
Hazardous Materials Division  
80 Swan Way, Room 200  
Oakland, California 94621-1426

OK  
Reviewed 5/15/93  
Be

Re: ACDEH STID #3737  
Shell Service Station  
630 High Street  
Oakland, California  
WA Job #81-602-02

Dear Mr. Chan:

As you discussed with project geologist N. Scott MacLeod on March 5, 1993, Weiss Associates (WA) is submitting this workplan to install one well in the street adjacent to the site referenced above (Figure 1). This well will be installed to assess whether hydrocarbons are in soil and/or ground water at the northern corner of the site, which is cross gradient of the suspected hydrocarbon source area. Presented below are details of our proposed well installation.

**Well location:** The well will be located in a traffic-island at the corner of High Street and the ramp to Highway 880 (Figure 2).

**Drilling and sampling:** The well will be drilled with hollow-stem augers by a licensed drilling contractor. WA will collect soil samples at five foot intervals, at lithologic changes and at the water table. Selected soil samples will be analyzed for total petroleum hydrocarbons as gasoline (TPH-G) by modified EPA Method 8015 and benzene, ethylbenzene, toluene and xylenes (BETX) by EPA Method 8020. WA's standard field procedures for monitoring well installation, development and sampling are included as Attachment A.

**Well development and sampling:** WA will develop the wells using surge block agitation and bailer evacuation as described in Attachment A. Ground water samples will be collected immediately following the well development and will be analyzed for TPH-G by modified EPA Method 8015 and BETX by EPA Method 8020.

Barney Chan  
April 30, 1993

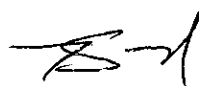
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WA has already started the encroachment permit and well installation permit application processes and will install the new well shortly after receiving the necessary permits. If we are unable to obtain an encroachment permit from the City of Oakland to install the well within the city's right-of-way, we will install the well in the northern corner of the Shell property. Please call if you have any questions or comments.



Sincerely,  
Weiss Associates

  
Robert E. Kitay  
Senior Staff Geologist

  
N. Scott MacLeod, R.G.  
Project Geologist

REK/NSM:rek

Attachments: A - Standard Field Procedures

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cc: Dan Kirk, Shell Oil Company, P.O. Box 5278, Concord, California 94520-9998  
Richard Hiatt, Water Quality Control Board - San Francisco Bay Region, 2101 Webster Street, Suite 500, Oakland, CA 94612

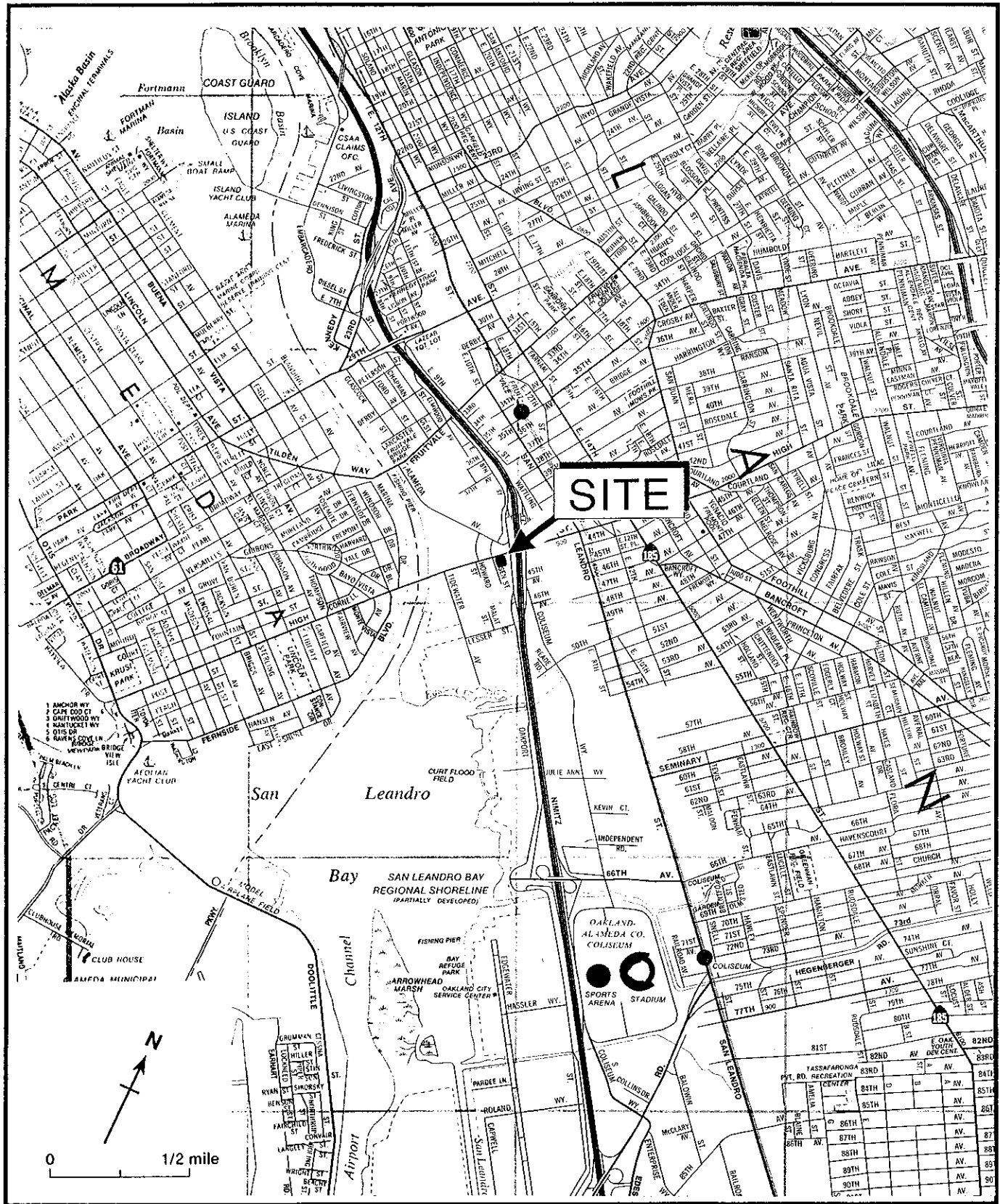
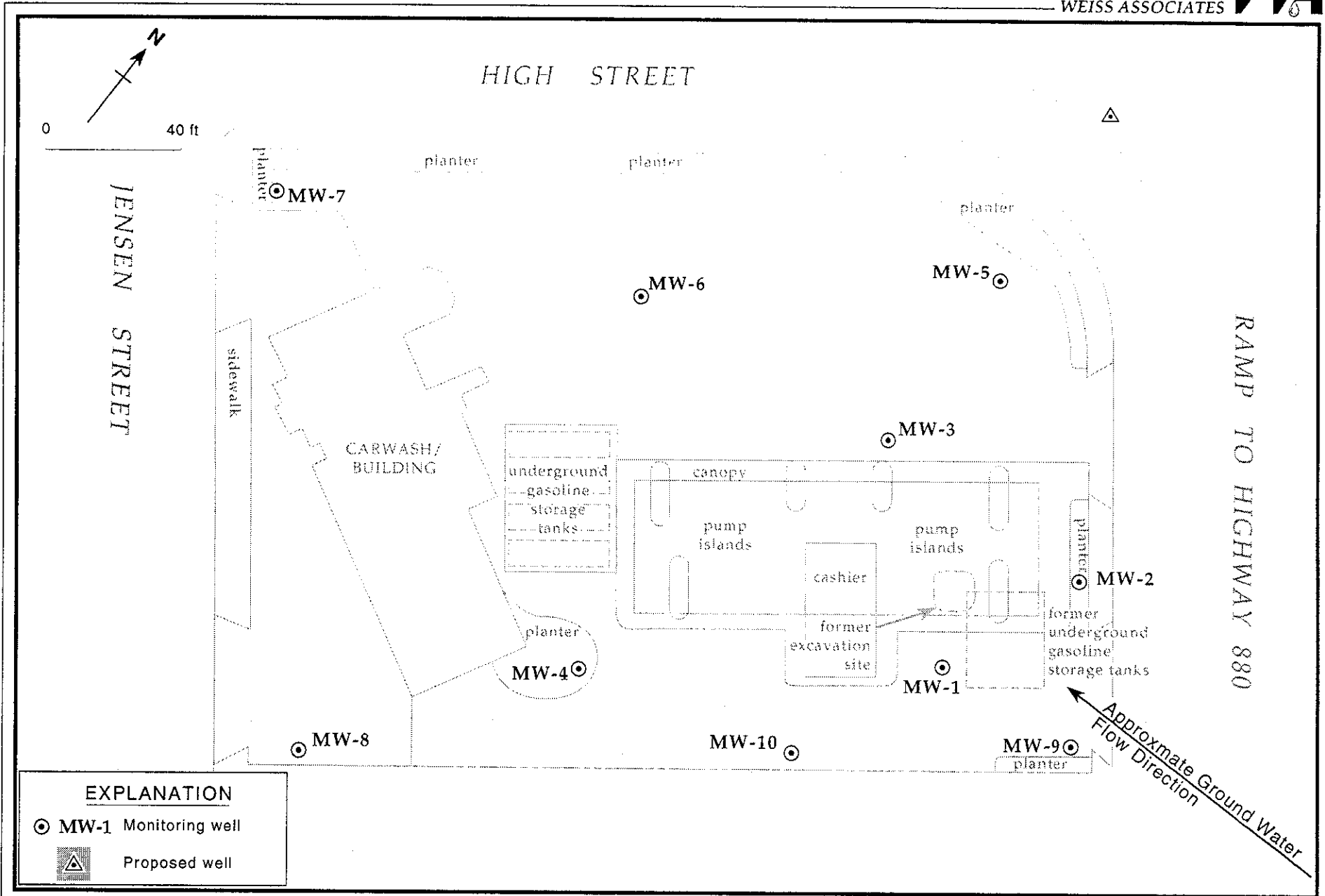


Figure 1. Site Location Map - Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California





EXPLANATION	
	MW-1 Monitoring well
	Proposed well

Figure 2. Proposed Well Location - Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California

**ATTACHMENT A**  
**STANDARD FIELD PROCEDURES**

## STANDARD FIELD PROCEDURES

Weiss Associates (WA) has developed standard procedures for drilling and sampling soil borings and installing, developing and sampling ground water monitoring wells. These procedures comply with Federal, State and local regulatory guidelines. Specific procedures are summarized below.

### SOIL BORING AND SAMPLING

#### Objectives/Supervision

Soil sampling objectives include characterizing subsurface lithology, assessing whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and collecting samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG).

#### Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers. Split-barrel samplers lined with steam-cleaned brass or stainless steel tubes are driven through the hollow auger stem into undisturbed sediments at the bottom of the borehole using a 140 pound hammer dropped 30 inches. Soil samples can also be collected without using hollow-stem augers by progressively driving split-barrel soil samplers to depths of up to 20 ft.

Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Near the water table and at lithologic changes, the sampling interval may be less than five ft.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

#### Sample Analysis

After noting the lithology at each end of the sampling tubes, the tube chosen for analysis is immediately trimmed of excess soil and capped with teflon tape and plastic end caps. The sample is labelled, stored at or below 4°C, and transported under chain-of-custody to a State-certified analytic laboratory.

### Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the stratigraphy and ground water depth to select soil samples for analysis.

### Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe. If wells are completed in the borings, the well installation, development and sampling procedures summarized below are followed.

## MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

### Well Construction and Surveying

Wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and state and local regulatory guidelines. Well screens typically extend 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three to five ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of cement with 3-5% bentonite.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security. The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

### Well Development

After 24 hours, the wells are developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing,

pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

#### Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labelled, placed in protective foam sleeves, stored at 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.