



Soil Excavation and Aeration

Abandoned Chevron Service Station #90019
Oakland, California
WGR Project #1-101.06

Western Geologic Resources, Inc. (WGR) is pleased to submit the workplan on behalf of Chevron, USA for remediation of soils at the abandoned service station (#90019) located at 210 Grand Avenue in Oakland, California. A site location map is presented as Figure 1. A site map is included as Figure 2. Subsurface investigations have identified concentrations of total volatile hydrocarbons (TVH), benzene, toluene, ethylbenzene and total xylenes (BTEX) and oil and grease in the soils. The remediation plan for this site will involve the following tasks:

1. Excavation of soils,
2. Aeration of excavated soils,
3. Use of aerated soils that meet regulatory requirements as backfill, and
4. Disposal of soils that do not meet regulatory requirements for backfill.

A general description of remediation tasks is included below.

BACKGROUND

In February and March 1989, WGR conducted a soil vapor survey (SVS) at the site. The highest concentrations of total volatile hydrocarbons (TVH) were detected in points installed at 5 ft and between 13 to 15 ft below grade, located in the vicinity of the underground fuel-storage tanks and pump islands on the south half of the site. Lower concentrations of TVH were detected on the north part of the site behind the service station building. Based on the results of the SVS, WGR drilled soil borings B-1 through B-5 and completed them as 4-inch diameter monitor wells MW-1 through MW-5. Wells were screened in the shallow groundwater zone from 6 ft to 16.5 ft below grade.

Soil samples collected during the drilling of borings B-1 through B-5 contained TPPH at concentrations ranging from 6 parts-per-million (ppm) to 390 ppm, with the highest concentration detected in the sample from boring B-5. BTEX compounds were detected in soil samples collected from four of the five borings. The depths of the samples that contained BTEX compounds ranged



from 5 ft to 16.5 ft below grade, and the highest concentrations were found in the soil sample collected from 5 ft below grade in boring B-2. The soil samples collected from boring B-1 were below the limits of detection for BTEX compounds.

TPPH concentrations, reported as gasoline, in groundwater samples collected from wells MW-1 through MW-5 ranged from non-detectable in the groundwater samples collected from wells MW-2 and MW-3, to a high of 20,000 parts-per-billion (ppb) in the groundwater sample collected from well MW-5. Groundwater collected from well MW-1 at the north end of the site contained 600 ppm TPPH. The highest concentrations for the BTEX compounds in groundwater were also detected in the sample collected from well MW-5. Petroleum-based oil and grease compounds were below the detection limit of 3 ppb in groundwater for the five wells.

Measurements of static groundwater levels made on 14 March 1989 indicated that the estimated direction of groundwater flow was to the south, with wells MW-1 and MW-2 located the most upgradient and well MW-5 in the most downgradient position.

EXCAVATION

Soils will be excavated from the areas of the former fuel tanks, former hydraulic lift, former product line areas and the former waste oil tank. Excavation of soil will continue downward to the first occurrence of groundwater, or when chemical analysis indicate that no further hydrocarbon contamination is present. The areal extent of the excavation will also extend until chemical analysis indicate that no further hydrocarbon contamination is present.

Soil samples will be collected in accordance with the WGR Standard Operating Procedure (Attachment 1). Prior to backfill, soil samples will be collected at the base of each wall, at an interval of one sample for every 20 yards. The samples will be analyzed for hydrocarbon content by a state certified laboratory.

Soils removed during excavation will be read with a photoionization detector (PID) and segregated into three distinct piles depending on the readings (low, 0-10 ppm; medium 10-50 ppm; high 50-maximum ppm). If it is suspected that the soil contains detectable levels of oil and grease, these soils will be segregated away from the other piles regardless of PID readings and a soil sample collected for laboratory analysis. The piles will be arranged so as to take maximum advantage of site space. Piles will be made 3-6 feet high and 6-9 feet wide and will be laid on top of polyethylene sheeting. Upon conclusion of excavation each day, soil samples will be collected from each pile at approximately 50 cubic yard intervals. The area the samples are collected from will be marked to identify the sample area.



The excavation piles will be turned twice a week. The piles will not be mixed during this process.

Upon receipt of laboratory analysis, initial segregation of the piles will be re-evaluated. Any soil that contains levels of oil and grease will be segregated and prepared for disposal. Soils that read below detection limits will also be segregated. The remaining soils will be aerated until soil throughout the pile is dry. Soil samples will then be collected at 20 cubic yard intervals as called for by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). Upon receipt of laboratory analysis, soils that contain less than the analytical detection limits for TPH and any other compounds outlined by the involved regulatory agencies will be used as backfill. Soils with levels higher than these limits will continue to be aerated until aeration no longer produces a decrease in hydrocarbon concentration.

After 90 days, aerating soils will be used for backfill if they meet appropriate hydrocarbon concentration levels. If the soils do not meet these levels, they will be properly disposed of. The 90 day limit for aerating soils is set by the Bay Area Air Quality Management District (BAAQMD) requirements for passive aeration of soils.

DISPOSAL

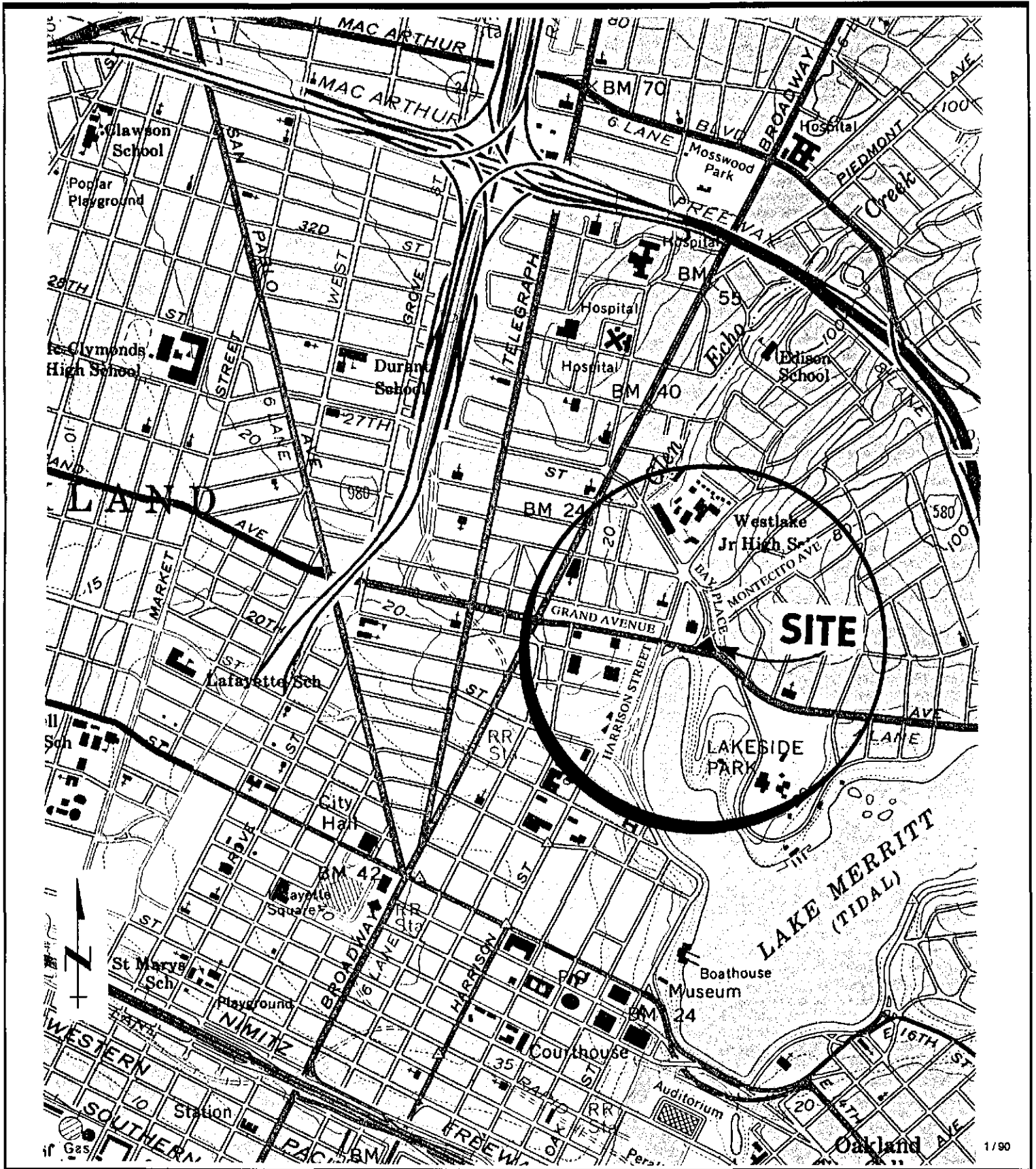
Soils that have been identified as containing oil and grease or soils that no longer respond to aeration will be hauled to an appropriate landfill or treatment facility. Soil samples will be collected as required for the landfill or treatment facility. If the oil and grease containing soils contain volatile compounds, and if there is suitable area for aeration, the soils will be aerated prior to disposal.



**STANDARD OPERATING PROCEDURES
RE: EXCAVATION SOIL SAMPLING
SOP-11**

Soil samples from soil stockpiles are collected in thin-walled, 4-inch long by 2-inch outside diameter brass tubes. The sampling protocol for stockpile sampling is determined by the dimensions of the soil pile. An average of one soil sample per 20 cubic yards is collected.

The sampling tools used are hand sampling devices that maintain the physical integrity of the samples while minimizing volatilization. The tubes are immediately trimmed and sealed with aluminum foil and plastic end caps. They are then hermetically sealed with duct tape, labeled, and refrigerated until delivery, under chain-of-custody, to the laboratory.



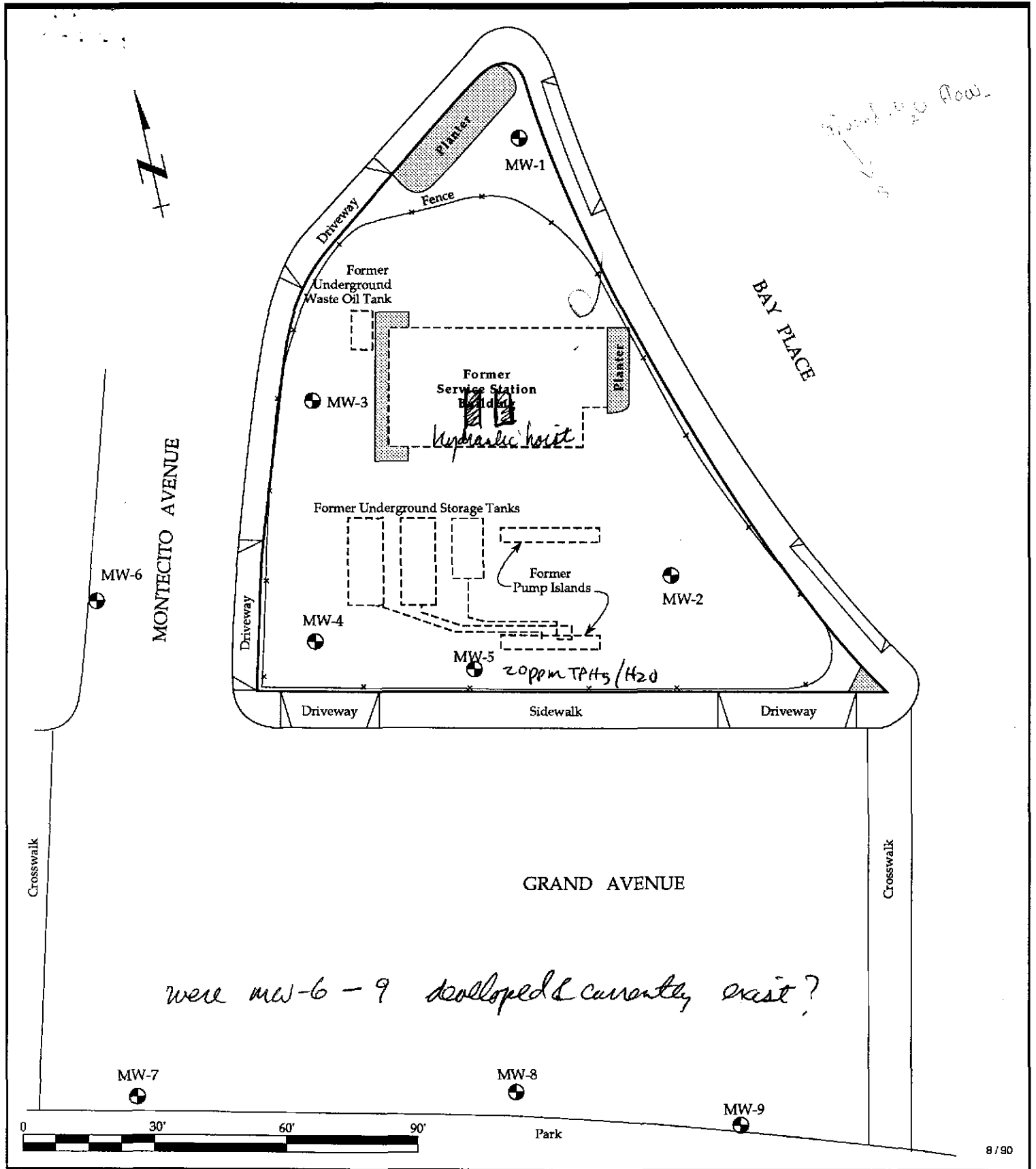
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NOT TO SCALE


Site Location Map
Chevron Service Station #90019
Oakland, California

FIGURE

1



EXPLANATION

 MW-8 Monitor Well location

Base Map
 Former Chevron Service Station #90019
 210 Grand Avenue
 Oakland, California

FIGURE

2