IMPLEMENTATION OF CORRECTIVE ACTION PLAN

2504 MacARTHUR BOULEVARD

OAKLAND, CALIFORNIA

Prepared for

MARR & ASSOCIATES

27737 Fallen Leaf Court
Hayward, California 94542

Project No. MAR-101J

February 1997

IMFC INGRAM MASON & FAIRBAIRN
A DIVISION OF IMFC CORPORATION

IMPLEMENTATION OF CORRECTIVE ACTION PLAN

2504 MacARTHUR BOULEVARD

OAKLAND, CALIFORNIA

Prepared for

MARR & ASSOCIATES

27737 Fallen Leaf Court
Hayward, California 94542

Project No. MAR-101J

February 1997

TABLE OF CONTENTS

TABLE OF CONTENTS

(Continued)

IMPLEMENTATION OF
CORRECTIVE ACTION PLAN FOR
HYDROCARBON CONTAMINATED SOIL AND GROUNDWATER

2504 MacArthur Boulevard
Oakland, California

General

A corrective action plan (CAP) was implemented at the site located at 2504 MacArthur Boulevard, Oakland, California (Site). This report documents the performance of the CAP and is intended to lead to the closure of the Site. Site Location Map is presented in Figure 1.

This report is prepared in accordance with the requirements of Alameda County Department of Environmental Health (County); and guidelines of: 1) State Water Resources Control Board, the leaking Underground Fuel Tank (LUFT) field manual; 2) Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites, Regional Water Quality Control Board, San Francisco Bay Region (RWQCB); and 3) the State Water Resources Control Board's a) Petroleum Underground Storage Tank Cleanup Fund Regulations, b) Petroleum Underground Storage Tank Cleanup Fund Corrective Action Guide, and c) Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304.

Section one of the report documents the implementation of mitigation measures and the remediation of contaminated soil by excavation and off-site disposal. The second section is the first quarterly groundwater monitoring report. Section Three presents the conclusions and recommendations.

CORRECTIVE ACTION PLAN FOR
HYDROCARBON CONTAMINATED SOIL AND GROUNDWATER

2504 MacArthur Boulevard
Oakland, California

SECTION ONE

IMPLEMENTATION OF MITIGATION MEASURES

I-A. BACKGROUND

Four underground storage tanks were removed from the Site on June 27, 1994. During the excavation, extensive visible staining in the sidewalls was observed and strong hydrocarbon fuel odor was detected. Soil samples obtained from the tank excavation area confirmed that the subsurface had been moderately to highly impacted by fuel hydrocarbons. Upon removal of the tanks, under the direction of the representative of the County, the tank pits were overexcavated and the contaminated soil was stockpiled at the Site. Subsequently, the contaminated soil was removed from the Site. Figures 2 and 3 show sample locations and limits of overexcavation. Summary of soil analyses for samples taken during the tank excavation operation is presented in Table 1.

Upon approval of the County, a program of subsurface investigation was implemented in July 1995. The services were based on the requirements of the County and RWQCB. It was intended that the investigation would reasonably define the horizontal and vertical extent of the pollutants in and around the location of former underground tanks, and would also initially define the geologic and hydrogeologic parameters needed for determining an effective and feasible remedial action for the Site.

The investigation consisted of advancing five soil borings at pre-determined locations; collecting soil samples; converting three soil borings into monitoring wells; obtaining groundwater samples; chemical analyses of selected samples; establishing horizontal and vertical control of the wells, and calculating the groundwater potentiometric levels and flow direction; and identifying and recommending appropriate remedial technology. Figure 4 depicts the locations of soil borings and monitoring wells. Tables 2 and 3 show the summary of soil and groundwater analyses data, respectively.

I-A-1. Extent of Soil Contamination

Evaluation of data generated during the field exploration, coupled with the review and analysis of findings during the tank excavation operation indicated that three separate areas of the Site contained contaminated soil. A brief description of each area follows:

1. The first area was located in the northern part of the Site in the vicinity of monitoring well MW-B3 and the Boston Avenue sidewalk. Laboratory analyses of the samples and evaluation of field observations revealed that the depth of the impacted zone is about seven feet below ground surface (bgs). Contamination in this area was attributed to the leakage from the fill-pipe of former tank(s) that passed through this area. The fill-pipe had not been previously removed during the tank excavation operation. Several confirmatory soil samples taken during the overexcavation of former tanks' pit, just a few feet west of this zone at a depth of approximately 8.5 feet bgs detected low concentration of contaminants.

2. The second area was located in the southwest area of the Site, in the vicinity of monitoring well MW-B1 and the MacArthur Boulevard sidewalk. Laboratory analyses of samples collected in this area, coupled with field testing and screening of soil cuttings indicated the existence of a contaminated zone, extending to an approximate depth of 15 feet bgs. Given the Site's features in this area (location of tanks and dispensers) and topography (sloping toward

the southwest corner of the property,) as well as the nature of business and past practices of former tenants, this contamination was attributed to repeated leak from the tanks, and migration of contaminants from the tanks' backfill into adjoining strata. This contaminated zone was very close to the locations of various utilities, sanitary sewer and storm drain; and therefore, constituted a health and safety hazard.

3. The third contaminated area was located immediately north of the former pump island location. Review of the tank removal report revealed the existence of contaminated soil directly underneath the leaking tank. Most of this contaminated zone had already been removed during overexcavation and replaced with clean imported fill; but confirmatory samples collected during the tank excavation operation indicated that some contaminated soil remained in place.

I-A-2. Groundwater Contamination

During the performance of the investigation, groundwater had been encountered at a depth of 34 feet bgs in both borings B-1 and B-3, but immediately rose. Boring B-5, drilled to a depth of 20 feet bgs, was dry when the drill rig broke down. Five days later, upon resumption of drilling activities, groundwater was encountered at the depth of 10 feet. This indicated the existence of a confined water zone. The regional groundwater flow is estimated to be generally in a west/southwesterly direction toward the San Francisco Bay. Based on the groundwater level measurements, taken on July 11, 1995, the site-specific groundwater flow direction was assessed to be in a southerly direction with a gradient of about 0.067 ft/ft.

The original source of contamination (the tanks) had already been removed from the Site, but the impacted soil remaining around the former location of tanks was acting as the primary source. Groundwater coming in contact with the contaminated soil (either through normal seasonal groundwater fluctuations or through surface seepage) was mobilizing the pollutants.

In order to establish controls for the prevention of possible migration, and in order to eliminate or reduce the source of contamination, it was necessary to implement some remedial measures and controls.

I-B. SCOPE OF SERVICES

Based on the requirements of regulatory agencies, IMFC provided professional and technical services to develop and implement remediation concepts for hydrocarbon-contaminated soil and groundwater at the Site. After review of available information, it was determined that some immediate interim remediation measure should be implemented. The intended purpose of the measure was to establish control, reduce the rate of migration and expansion of the existing plume of hydrocarbon to the adjacent property(ies), and to remove the potential source of groundwater contamination. IMFC evaluated the following methods for remediation of impacted soil contamination underneath the Site:

1- Passive Remediation
2- Excavation and landfilling
3- Vapor Extraction
4- Bioremediation
5- Enhanced In-Situ Bioremediation

The alternatives were evaluated for technical implementability, environmental effectiveness, permitting requirements, monitoring requirements, cost and duration. The examination of the alternatives within the these parameters concluded the following:

1- Passive Remediation: determined to be inappropriate for the extent of existing contamination, and rejected in favor of more environmentally responsible options. However, this

alternative will be considered for remediation of residual contamination after implementation of selected mitigation measure.

2- Excavation and Landfilling: determined to be an acceptable means for cleaning up the Site because it provides for source removal, thus eliminating many long term site management concerns.

3- Vapor Extraction: determined not to be appropriate based on the soil texture, relatively low volatility of the hydrocarbon contaminants present, and the Site geology.

4- Bioremediation: determined to present a number of permitting, operating, and monitoring obstacles which limited the applicability of the method.

5- Enhanced In-Situ Bioremediation: determined to be unacceptable based on the anticipated regulatory opposition to the use of injection wells, the Site's physical restrictions, and because of economic considerations.

Based upon a comparison of parameters for each alternative, alternative 2 was selected and recommended to the County for implementation. Upon approval from the County, the soil remedial action plan was prepared by IMFC.

To mitigate the potential impact to groundwater, it was planned to excavate contaminated soil in two separate areas, and set up a quarterly groundwater monitoring program. The plan consisted of five general elements which included: 1) Soil excavation, 2) Confirmatory Testing of the Excavation Limits, 3) Lining of Excavation with visqueen and Backfilling with Fresh Fill, 4) Soil Conveyance, Stockpiling and Treatment of Excavated Soil, and 5) Confirmatory Testing of the Stockpiled Soil, and Disposal.

Activities for implementation of the Corrective Action Plan (CAP) included the following:

- Review of previous site activities, preparation of a workplan and Site Health and Safety Plan;
- Excavation of hydrocarbon fuel contaminated soil; and collection and analysis of soil samples for total petroleum hydrocarbon as gasoline (TPH-G) and BTEX;
- Determination of final excavation limits; and
- Review of laboratory/field data and preparation of a report containing outlines of the findings and recommendations leading to the closure of the Site.

The scope of services for this project included the following:

Task 100 Meetings
Task 200 Preparation of Remediation Workplan
Task 300 Health and Safety Plan
Task 400 Permits
Task 500 Implementation of Workplan

I-C. ANALYTICAL METHODOLOGY

I-C-1. Pollutants of Concern

The historical land use and available information for the Site indicated release(s) of contaminants generally associated with the operations of a service station dispensing gasoline only. Accordingly, the remediation workplan identified the primary pollutant as Total Petroleum Hydrocarbon as Gasoline (TPH-G); and therefore, all soil samples were tested for Total Purgeable Petroleum Hydrocarbon (TPPH) with Benzene, Toluene, Ethylbenzene, and total Xylene (BTEX) distinction [EPA Test Method 5030/8015 Modified/8020], and total lead.

I-C-2. Analytical Laboratory

For this project IMFC utilized the services of Sequoia Analytical Laboratory, Walnut Creek,

California. Sequoia Analytical is certified in California by the Department of Health Services under the Environmental Laboratory Accreditation Program (ELAP), and its certification number is 1271. All soil samples were analyzed on an accelerated turnaround time.

I-C-3. Sampling Methodology

Once the probable pollutants were identified, developing an acceptable sampling program was completed. The sampling protocol and methodology were based on guidance from the following:

* *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites, California Regional Water Quality Control Board, San Francisco Bay Region, August 10, 1991.*
* *Test Methods for evaluating Solid Waste, SW-846, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency.*
* *IMFC's Sampling Protocol.*

I-C-4. Selection of Sample Locations

The selection of sample locations was based on the anticipated location of any pollutant hot spots, and on the goal of obtaining average representative pollutant concentrations from non-hot spot areas. Space and overhead restrictions at the Site as well as health & safety considerations required continuous visual inspection and extensive screening of soil strata during excavation. The locations of samples were determined in the field on the basis of visual inspection and results of field testing. Numerous samples were collected during the excavation operation, however, a limited number of representative samples was selected for chemical analysis. Figure 5 shows limits of excavation and locations of samples selected for chemical analysis.

I-D. PERFORMANCE OF SERVICES

IMFC prepared a detailed site-specific technical remediation workplan and forwarded to the County for approval. It was assumed that contaminated soil would be excavated from two separate areas of the Site. These areas were located within the proximity and around monitoring wells MW-B1 and MW-B3 as shown on Figure 4. County's comments and recommendations were incorporated into the workplan. A copy of the County's approval letter is included in Appendix A.

After approval of the workplan by the County, the services were implemented in the field.

As required by 29 CFR 1910.120, a site specific Health and Safety Plan was prepared to cover all phases of the work including but not limited to data acquisition, and phases such as maintenance, monitoring, abandonment and/or removal, and waste disposal. Prior to initiation of excavation operation, the contents of the plan were discussed with all field personnel.

The excavation, backfilling, sampling protocol and disposal activities were as follows:

- An experienced engineer directed all field operations, supervised screening process, and logged samples in the field.
- VCI of California, a licensed contractor specialized in hazardous material handling was retained to excavate and stockpile contaminated soil in designated areas.
- Sequoia Analytical Laboratory, a state-certified laboratory provided confirmation analyses.
- California Utility Surveys, an underground utility locator was retained to provide subsurface survey of utility lines and/or other buried objects in and around the areas designated for excavation.
- Based on the results of previous investigations, moderate to significant concentration of gasoline contaminated soils had been located in two separate areas. The larger area was

located near and around monitoring well MW-B1. The aerial extent of this area was originally estimated to be approximately 12 feet by 10 feet. However, due to presence of highly contaminated soil strata, encountered during the excavation operation, the aerial extent of this area was increased while attempting to "chase" the pollutants and trying to reach non-detectable concentrations of gasoline. The concentrations of pollutants in the smaller area near and around monitoring well MW-B3 were low, and consequently the aerial extent of the excavation was reduced.

- As an average, the initial depth of excavation was estimated to be approximately 10 feet. However, during excavation operation, visual inspection and results of the field screening instrument, necessitated the area around MW-B1 be excavated deeper. By the same token, excavation at the area near MW-B3 was terminated at a much shallower depth due to low levels of pollutants encountered.
- In order to save and protect the integrity of monitoring wells MW-B1 and MW-B3 during the excavation of contaminated soil, IMFC proceeded to tightly secure the wells and carefully hand excavate and remove the soil around the annular cement grout seal of the wells. Ample precaution was exercised to safeguard against inadvertent formation of conduit(s) around the wells and migration of water into the substrata.
- Samples were obtained from the appropriate depths by use of a hand held slide hammer sampler. Sampling equipment was pre-washed in Trisodium Phosphate (TSP) solution prior to sampling. A photoionization detector (PID) continuously screened the contamination at the sidewalls and pit floor in order to determine the locations of representative samples. Further, numerous soil samples were screened with a PID using headspace analysis. For the headspace analysis, the sample was placed in a zip-lock bag and exposed to a warm surface to enhance volatilization of any hydrocarbon pollutants in the soil samples. The headspace in the zip-lock bag was then tested for hydrocarbon content using the PID. Upon determination of sampling points within the excavation, samples were collected by driving a 2-inch

diameter by 6-inch long brass tube into the soil. After collection of the samples, the brass tube ends were covered with aluminum foil and capped with plastic end-caps and were taped to the brass tubes with duct tape. The tubes were then labeled and placed in an iced cooler for transport under chain-of-custody to Sequoia Analytical Laboratory.

- Large volume of surface and perched groundwater entering the pit during the excavation operation was obstructing the progress of work and preventing visual inspection. To maintain close monitoring of excavation activities and collecting representative soil samples, as well as facilitating backfilling activities, a temporary pump was installed to continuously pumped out the water collected in the pit. The pumped water was stored in a 1000-gallon container on-site and eventually hauled off-site for disposal. — disposal manifest ?
- Due to the space limitation at the Site, the excavated soil was stockpiled in two separate piles and covered with visqueen. Each stockpile contained roughly the same volume of soil. Before disposal of the stockpiled soil it was necessary to characterize the soil contamination in the stockpiles.
- Two 4-part composite soil samples were collected from each soil stockpile. All samples were collected in accordance with the California Regional Water Quality Control Board "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites, dated August 1991."
- Samples collected from the stockpiles along with selected samples from the floor and sidewalls of the excavation were chemically analyzed for total petroleum hydrocarbons as gasoline (TPH-G), and for benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total lead. In addition, to satisfy the requirements for disposal, one of the stockpile samples was tested for reactivity, corrosivity, and ignitability (RCI). A summary of the soil analytical results is presented on Table 4. Result of RCI is shown on Table 5.
- An old 6-inch domestic sewer line was encountered at the southern end of the excavation around monitoring well MW-B1, within the gasoline-laced soil. After removal of the

contaminated soil, the sewer line collapsed under its own weight. The sewer line was eventually replaced and repaired prior to backfilling operation.

- Backfilling operation of the pits was commenced immediately after completion of excavation activities and review of laboratory results. The pits were lined with visqueen, and clean imported fill material was placed and compacted. Backfill material was carefully placed around the exposed annular cement grout seal of each monitoring well in 6-inch layers and compacted to secure proper bonding.
- Due to heavy precipitation during the performance of field services, it was not possible to immediately resurface the excavated areas to match the surrounding area. To protect the newly placed backfill from the heavy surface runoff, as well as for health and safety considerations, a temporary asphalt cover was placed. Subsequently, this temporary cover was removed and the areas were resurfaced with concrete.
- The stockpiled soil was subsequently transported to Vasco Road Sanitary Landfill for disposal.
- Eight 55-gallon drums at the Site, containing soil cuttings from previous investigations were also hauled off-site for disposal.

I-E. DISCUSSION

All utilities were located using the services of a private locator as well as "Underground Services Alert." Also, prior to excavation activities, a Site Safety Plan was prepared and discussed with all field personnel. Approximately 60 tons of soil from two areas of the Site was excavated on December 12 and 13, 1996. The excavation of the southern area reached a maximum depth of 13 feet bgs in some locations. A highly gasoline-contaminated soil layer was encountered between approximate depths of 5 and 9 feet bgs. Also a perched groundwater zone was initially encountered at approximately 8 feet bgs. The excavation was extended to what appeared to be

the visible vertical limit of the hydrocarbon contamination, however, the lateral extent of contamination appeared to go beyond the southern limit of the excavation. The lateral extent of the excavation was extended in northerly and southerly directions as far as possible in order to "chase" the contamination. Subsequently, confirmatory sampling and field testing of the excavation limits were performed. However, because inclement weather threatened the stability of the excavation, and because of safety considerations, it was decided that the excavation be backfilled immediately. The excavation was lined with 0.06 mil visqeen, backfilled with fresh clean imported fill, and compacted. The area was temporarily resurfaced with asphalt to prevent the backfill from surface runoff. Subsequently, the area was resurfaced with concrete.

The excavation of the northern area reached a maximum depth of 6 feet bgs in some locations. Low levels of contamination were encountered to an approximate depth of 5 feet bgs, and no contamination was detected below this depth. Two underground electrical lines in the middle of the excavation and two underground pipes in this area were encountered. One of the pipes was identified as the fill pipe for the former tanks. The use of the second 4-inch pipe was not identified. Due to the low to non-detected levels of contamination at this area, and the existence of electrical lines and pipes, the excavation operation was terminated at an approximate depth of 6 feet bgs. The fill pipe was triple-rinsed and filled with concrete.

The excavated soil from the two areas was stockpiled in two separate piles and covered with visqueen. Each stockpile contained roughly the same volume of soil. Eventually, the stockpiled soil was sampled, chemically tested, and removed from the Site for disposal in a landfill.

Laboratory analysis detected wide range of hydrocarbon contamination and low level of total lead. Total petroleum hydrocarbons as gasoline (TPH-G) were detected in levels ranging from zero to 1,100 parts per million (ppm). The highest level of hydrocarbons detected in the soil stockpiled on Site was 13 ppm.

Normally, excavation and stockpiling of the hydrocarbon-laced soil could be characterized as landfarming. During the process, lighter compounds including the constituents of gasoline, are preferentially degraded and volatilized. Heavier compounds are degraded at a slower rate or are incorporated into the soil mass by virtue of soil adhesion characteristics. These heavier compounds are chemically similar in nature to asphalt and therefore, solidification within an aggregate matrix will serve to contain the hydrocarbon fractions that have not been previously removed. It was believed that the contaminated soil mixed and combined with other clean soils would further lower the contaminant concentrations. Additionally, it was anticipated that the levels of hydrocarbon contaminants would further decrease as a consequence of on-site aeration. Accordingly, the stockpiles were tilled several times prior to their removal and disposal. The stockpiled soil was removed from the Site for disposal at Vasco Road Sanitary Landfill on January 23, and 24, 1997.

CORRECTIVE ACTION PLAN FOR
HYDROCARBON CONTAMINATED SOIL AND GROUNDWATER

2504 MacArthur Boulevard
Oakland, California

SECTION TWO

FIRST QUARTERLY GROUNDWATER MONITORING PROGRAM

II-A. INTRODUCTION/BACKGROUND

As part of a program of subsurface investigation in July 1995, three soil borings were converted into monitoring wells. Groundwater was encountered at a depth of 34 feet bgs in two borings but immediately started to rise. In another boring, groundwater level had stabilized at 10 feet bgs. These movements indicated the existence of a confined water zone underneath the Site. The regional groundwater flow is estimated to be generally in a west/southwesterly direction toward the San Francisco Bay. Based on the groundwater level measurements, taken on July 11, 1995, the site-specific groundwater flow direction was assessed to be in a southerly direction with a gradient of about 0.067 ft/ft (Figure 6A).

Minor concentrations of hydrocarbon pollutants were detected in the groundwater. Although the geology and hydrogeology of the site make the characterization of potential pathways and conduits difficult to estimate, it was assumed that pollutants in the groundwater have not substantially migrated off-site at this time.

Due to the low levels of contaminants detected in the groundwater, a program of quarterly monitoring has been implemented to gather additional data for contamination characterization, and for the future selection of an appropriate treatment technology, if needed.

II-B. METHODOLOGIES

II-B-1. Pollutants of Concern

To date, the pollutants that have been identified at this Site are Total Petroleum Hydrocarbons as Gasoline (TPH-G), plus Benzene, Toluene, Ethylbenzene, and total Xylenes (BTEX). Concentrations of total lead have been detected previously at the Site; however, lead does not appear to be a primary soil contaminant at the Site. This program of sampling and analysis is primarily concerned with petroleum hydrocarbons. Specifically, water samples were tested for the following:

1. Total Purgeable Petroleum Hydrocarbons as Gasoline (TPH-G) by GCFID (LUFT Method) following sample purge and trap by EPA Method 5030/8015 Mod. /8020;
2. Volatile hydrocarbon constituents: Benzene, Toluene, Ethylbenzene, and total Xylenes (BTEX) by EPA Method 8020;
3. Methyl Tertiary Butyl Ether (MTBE) by EPA Method 8020.

II-B-2. Analytical Laboratory

For this project, IMFC utilized the services of Sequoia Analytical, Inc. (Sequoia Analytical) in Walnut Creek, California. Sequoia is a State-certified environmental laboratory; (Environmental

Laboratory Accreditation Program [ELAP] # 1271). All samples were analyzed on the standard laboratory turnaround time.

II-C. FIELD ACTIVITIES

All field work was performed in accordance with the requirements of the California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region. IMFC's Sampling Protocol (Appendix B) was followed for all sampling activities.

II-C-1. Groundwater Elevation Measurements

Static depth-to-water (DTW) levels were measured in the three groundwater monitoring wells at the Site on November 6, 1996, December 12, 1996, and January 23, 1997. The static DTW level in each monitoring well was measured to the nearest 0.01-foot using an electronic water-level sounder cleaned with TSP and water before each use. Subsequent to measuring the DTW data, IMFC collected water samples from each of the three monitoring wells for visual examination. Figures 6-2, 6-3, and 6-4 show the relevant groundwater level contours for the Site on November 6, 1996, December 12, 1996, and January 23, 1997, respectively. Table 6 summarizes the measured DTW levels, well-head elevations and cumulative groundwater elevations at the Site since July 1995.

II-C-2. Groundwater Sampling

On December 13, 1996, IMFC collected groundwater samples from the three groundwater monitoring wells (MW-B1, MW-B3, and MW-B5) at the Site. These groundwater monitoring wells have been constructed in the first-encountered water-bearing zone beneath the Site. Before obtaining the groundwater samples, each well was purged until the electrical conductivity, pH,

temperature and turbidity values of the groundwater had stabilized. During the purging process for each well, on December 12, 1996, IMFC periodically measured and recorded these parameters. Each well was purged of at least three well volumes.

Before sample collection, the water level in each well was allowed to recover to at least 80% of the initial water level. Because of slow recovery rates, water samples for laboratory analysis were collected from the three wells on December 13, 1996. A sample of the formation water was then collected from the water in each of the wells using a new disposable Teflon® bailer. The water samples were then gently decanted into laboratory-cleaned, 40-milliliter (ml) glass vials and sealed with Teflon®-lined caps. All containers were inspected for air bubbles to check for head-space, which would allow volatilization to occur.

The samples were labeled in the field with the date, project location, and sample identification, and immediately chilled in an ice chest for transport under Chain-of-Custody to the Sequoia Analytical laboratory in Walnut Creek, California. No evidence of measurable floating product, hydrocarbon vapor or perceptible odors were noted in the water samples collected from the wells. Appendix E contains the Monitoring Well Sampling Data Sheets, which indicates well development data, and stabilization measurements.

Purged water from the wells was temporarily stored on-site in labeled 55-gallon metal drums approved by the Department of Transportation. A licensed disposal contractor later removed this drummed purge water from the Site.

II-C-3 Chemical Analysis

On December 16, 1996, IMFC submitted the groundwater samples collected from each of the three groundwater monitoring wells at the Site to Sequoia Analytical. Each of the water samples

was analyzed for TPH-G, BTEX and MTBE. The laboratory chemical analyses indicated that none of the groundwater samples contained any analyte above the laboratory detection limits. Appendix B contains a copy of the original laboratory analytical reports and the Chain-of-Custody Records.

II-C-4. Discussion of Sampling Results

The results of laboratory chemical analyses on water samples collected from monitoring wells MW-B1, MW-B3, and MW-B5 indicated non-detectable levels of contaminants tested for above the laboratory detection limits.

CORRECTIVE ACTION PLAN FOR
HYDROCARBON CONTAMINATED SOIL AND GROUNDWATER

2504 MacArthur Boulevard
Oakland, California

SECTION THREE

CONCLUSOINS AND RECOMMENDATIONS

III-A. GENERAL

A corrective action plan (CAP) was implemented at the site located at 2504 MacArthur Boulevard, Oakland, California. After review of available information, it was determined that some immediate interim remediation measure should be implemented. The intended purpose of the measure was to establish control, reduce the rate of migration and expansion of the existing plume of hydrocarbon to the adjacent property(ies), and to remove the potential source of groundwater contamination. IMFC evaluated several methods for remediation of contaminated soil underneath the Site. Each alternative was evaluated for technical implementability, environmental effectiveness, permitting requirements, monitoring requirements, cost and duration. The examination of the alternatives within the these parameters concluded that excavation and off-site disposal to be an acceptable means for cleaning up the Site because it provides for source removal, thus eliminating many long term site management concerns. The plan was implemented after approval of the County. Also, as part of the plan, a program of groundwater monitoring was implemented. The following presents IMFC's conclusions and recommendations.

III-B CONCLUSIONS

Based on work performed at the Site by IMFC, and previous site data available to IMFC, the following conclusions were reached:

- Considering the implementation of this CAP, as well as all previous investigations and excavation activities, it may be concluded that major portion of highly to moderately impacted soil at the Site has been excavated and removed. The concentration levels of remaining soil contaminants at the Site are fairly low and should not require any actively-engineered remediation. It is believed that passive bioremediation would eventually eliminate the remaining soil pollutants. Passive bioremediation processes may act to naturally reduce and eventually eliminate the low levels of petroleum hydrocarbon components present in the remaining contaminated mass underneath the Site. Natural ubiquitous microbial populations in the soil could degrade the petroleum hydrocarbons to carbon dioxide and water, resulting in completion of cleanup.

- The concentration of contaminants in the northern area around the vicinity of monitoring well MW-B3 were low, and consequently, the excavation activities were terminated at shallower depth. The fill pipe of the former tanks, extending under the sidewalk, were triple-rinsed, backfilled with concrete, and abandoned in-place. No further remedial activities appear needed for this area.

- A highly gasoline-contaminated soil layer was encountered in southern area near and in the vicinity of monitoring well MW-B1, between approximate depths of 5 and 9 feet bgs. The excavation was extended to what appeared to be the visible vertical limit of the hydrocarbon contamination; however, the lateral extent of contamination appeared to go beyond the southern limit of the excavation. The lateral extent of the excavation was extended in

northerly and southerly directions as far as possible in order to "chase" the contamination.

- ▷ Groundwater flow direction was found to be undulating between southeast and southwest with gradient ranging from 0.036 ft/ft to 0.007 ft/ft. during the November 1996/January 1997. This appears to be reasonably consistent with general regional groundwater flow direction and with the previous groundwater measurements collected at the Site.

- ▷ Groundwater samples collected from three monitoring wells indicated non-detectable concentrations of TPH-G, BTEX, and MTBE. It shows a noticeable decrease from the concentrations encountered during the 1995 investigations. It also indicates that contaminants at higher elevations have not migrated sufficiently down to reach the groundwater table.

III-C RECOMMENDATIONS

Based upon the above conclusions, and guidelines established by the California Regional Water Quality Control Board, IMFC recommends the following:

- ➢ Continue the existing program of monitoring at the Site, in order to evaluate the potential petroleum fuel hydrocarbon concentrations and distribution in the groundwater; and to evaluate the groundwater flow direction and gradient. However, because of the relatively stable groundwater flow direction toward the south, and the absence of contaminants in groundwater, it is recommended to continue the monthly schedule for groundwater level monitoring, but the next episode of sampling and testing be performed in July 1997.

III-D LIMITATIONS

The data, information, interpretations, and recommendations contained in this technical report are presented solely as bases and guides to the existing environmental conditions of the site

located at 2504 MacArthur Boulevard, Oakland, Alameda County, California. The conclusions and professional opinions presented herein were developed by IMFC in accordance with generally accepted engineering principles and practices. As with all geotechnical and environmental reports, the opinions expressed here are subject to revisions in light of new information, new governmental regulations or new interpretations of existing regulations, which may be developed in the future, and no warranties are expressed or implied.

Soil deposits may vary in type, strength, permeability, and many other important properties between points of observation and exploration. Additionally, changes can occur in groundwater and soil moisture conditions due to seasonal variations, or for other reasons. Furthermore, the distribution of chemical concentrations in the soil and groundwater can vary spatially and over time. The chemical analysis results presented herein are illustrative of only the sampling locations at the time of sampling. Therefore, it must be recognized that IMFC does not and cannot have complete knowledge of the subsurface conditions underlying the subject site. The opinions presented are based upon the findings at the points of exploration and upon interpretative data, including interpolation and extrapolation of information obtained at points of observation.

The services provided represent professional opinions, formulated within specific budget limits, upon which client can base actions to reduce the potential for exposure to liability for the consequence of the occurrence of hazardous waste.

This report has not been prepared for use by parties other than Mr. Michael Marr. It may not contain sufficient information for the purposes of other parties or other uses. If any changes are

made in the project as described in this report, the conclusions and recommendations contained herein should not be considered valid, unless the changes are reviewed by IMFC, and the conclusions and recommendations are modified or approved in writing.

TABLE 1
SUMMARY OF SOIL ANALYSES DATA
FOR SAMPLES FROM TANK EXCAVATION

Sample Number	Date	Sample Matrix	TPH-G mg/Kg	Benzene ug/Kg	Toluene ug/Kg	Ethyl Benzene ug/Kg	Total Xylenes ug/Kg	Lead mg/Kg
AB-1	6/27/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	8.0
BB-1	6/27/94	SOIL	3.4	12	68	75	320	5.9
CB-1	6/27/94	SOIL	12	N.D.	N.D.	29	40	6.9
AB-2	6/27/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	8.5
BB-2	6/27/94	SOIL	15	8.8	160	170	980	10.0
SP-1A,B,C	6/27/94	SOIL	1,600	870	12,000	14,000	77,000	14
CB-2	6/27/94	SOIL	24	N.D.	N.D.	39	56	9.3
SP-2A,B,C	6/27/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	14
SW-1	7/6/94	SOIL	9.5	8.3	N.D.	58	81	---
SW-2	7/6/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	---
SW-3	7/6/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	---
SW-4	7/6/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	---
SW-5	7/6/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	---
SW-6	7/6/94	SOIL	210	400	990	2,800	11,000	---
SW-7	7/6/94	SOIL	250	120	120	330	480	---
SW-8	7/6/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	---
SW-9	7/6/94	SOIL	N.D.	N.D.	N.D.	N.D.	N.D.	---
SW-10	7/6/94	SOIL	5.4	N.D.	N.D.	20	37	---
SW-11	7/6/94	SOIL	8.2	15	N.D.	16	23	---
SW-12	7/6/94	SOIL	22	N.D.	N.D.	42	34	---
SW-13	7/6/94	SOIL	1.8	N.D.	N.D.	N.D.	N.D.	---
Detection Limits			**1.0**	**5.0**	**5.0**	**5.0**	**5.0**	**0.5**

NOTES: mg/Kg Milligrams per Kilogram (parts per million)
ug/Kg Micrograms per Kilogram (parts per billion)
TPH-G Total Pertroleum Hydrocarbons as Gasoline

IMFC

TABLE 2

SUMMARY OF SOIL ANALYSES DATA

Sample No.	TPH-G (mg/kg)	TPH-D (mg/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Ethyl Benzene (ug/kg)	Total Xylenes (ug/kg)	O&G (mg/kg)
B-1-5	310	3.8	ND	ND	1300	ND	NT
B-1-10	470	NT	ND	ND	1700	1700	NT
B-1-40	ND	NT	ND	ND	ND	ND	NT
B-3-5	490	ND	ND	380	5300	18000	NT
B-3-10	ND	ND	ND	ND	ND	8.7	NT
B-3-30	ND	NT	ND	ND	ND	ND	NT
B-4-15	ND	NT	ND	ND	ND	ND	NT
B-5-15	ND	NT	ND	ND	ND	ND	ND
B-6-5	ND	ND	ND	ND	ND	ND	NT

NOTES

Sample No.	The first two characters refer to the boring number, and the last character is the depth at which the sample was obtained.
TPH-G	Total Petroleum Hydrocarbons as Gasoline
TPH-D	Total Petroleum Hydrocarbons as Diesel
O&G	Oil & Grease
mg/kg	Milligrams per kilograms (parts per million, ppm)
ug/kg	Micrograms per kilograms (part per billion, ppb)
ND	Not detected above laboratory detection limits
NT	Not tested

TABLE 3

SUMMARY OF GROUNDWATER ANALYSES DATA

Well No.	TPH-G (mg/l)	TPH-D (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Total Xylenes (ug/l)
MW B-1	0.06	ND	0.5	2.8	1.2	6.0
MW B-3	0.20	ND	2.7	12.0	4.4	23.0
MW B-5	0.38	ND	ND	1.7	1.5	5.1

NOTES

TPH-G Total Petroleum Hydrocarbons as Gasoline
TPH-D Total Petroleum Hydrocarbons as Diesel
mg/l Milligrams per liter (parts per million, ppm)
ug/l Micrograms per liter (parts per billion, ppb)
ND Not detected above laboratory detection limits

SAMPLE NUMBER	DATE SAMPLED	DEPTH (in feet)	LOCATION	TPH-G	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	LEAD	
S-1	12/13/96	10	EAST WALL	100	N.D.	0.55	0.33	0.46	5.4	
S-2	"	13	EXC. FLOOR	6.2	N.D.	N.D.	N.D.	0.016	5.0	
S-3	"	11	SOUTH WALL	N.D.	N.D.	N.D.	N.D.	N.D.	17.0	
S-4	"	12	S.W. WALL	87	N.D.	N.D.	0.14	0.36	7.9	
S-5	"	12	WEST WALL	410	N.D.	0.25	1.3	0.99	4.7	
S-6	"	COMPOSITE	STOCKPILE	N.D.	0.0075	0.033	0.011	0.046	8.3	
S-7	"	8	NORTH WALL	1,100	N.D.	N.D.	5.4	3.1	10.0	
S-8	"	COMPOSITE	STOCKPILE	13	0.018	0.021	0.032	0.043	3.9	
Detection Limit:									1.0 mg/kg	
Reporting Limit:				1.0 mg/kg	0.005 mg/kg	0.005 mg/kg	0.005 mg/kg	0.005 mg/kg		

NOTES:

TPH-G: Purgeable Hydrocarbons quantitated against a fresh gasoline standard.
COMPOSITE: (Samples S-6 & S-8) Composite of 4 representative samples from the stockpile.

mg/kg: Milligrams per Kilogram. (parts per million)
N.D.: Not detected at or above detection limit.

IMFC

MARR & ASSOCIATES

2504 MacArthur Boulevard
Oakland, California

SUMMARY OF SOIL ANALYSIS DATA, Dec. 96

PROJECT NO.	DATE	TABLE NO.
MAR-101J	February 97	4

SUMMARY OF SOIL ANALYSES DATA

REACTIVITY, CORROSIVITY, AND IGNITABILITY (RCI)

STOCKPILED SOIL

ANALYTE	DETECTION LIMIT (mg/kg)	SAMPLE RESULTS (mg/kg)
Reactivity:		
Sulfide	*13*	*13*
Cyanide	*0.50*	*N.D.*
Reaction with Water	*N.A.*	*N.D.*
Corrosivity:		
pH (pH Units)	-	*7.4*
Ignitability:		
Flash Point (Pensky-Martens), C		*>100*

NOTES:

Sample tested was composite of 4 representative samples from the stockpiled soil.

mg/kg: Milligram per Kilogram. (part per million)
N.D.: Not detected at or above laboratory detection limits.

IMFC

MARR AND ASSOCIATES

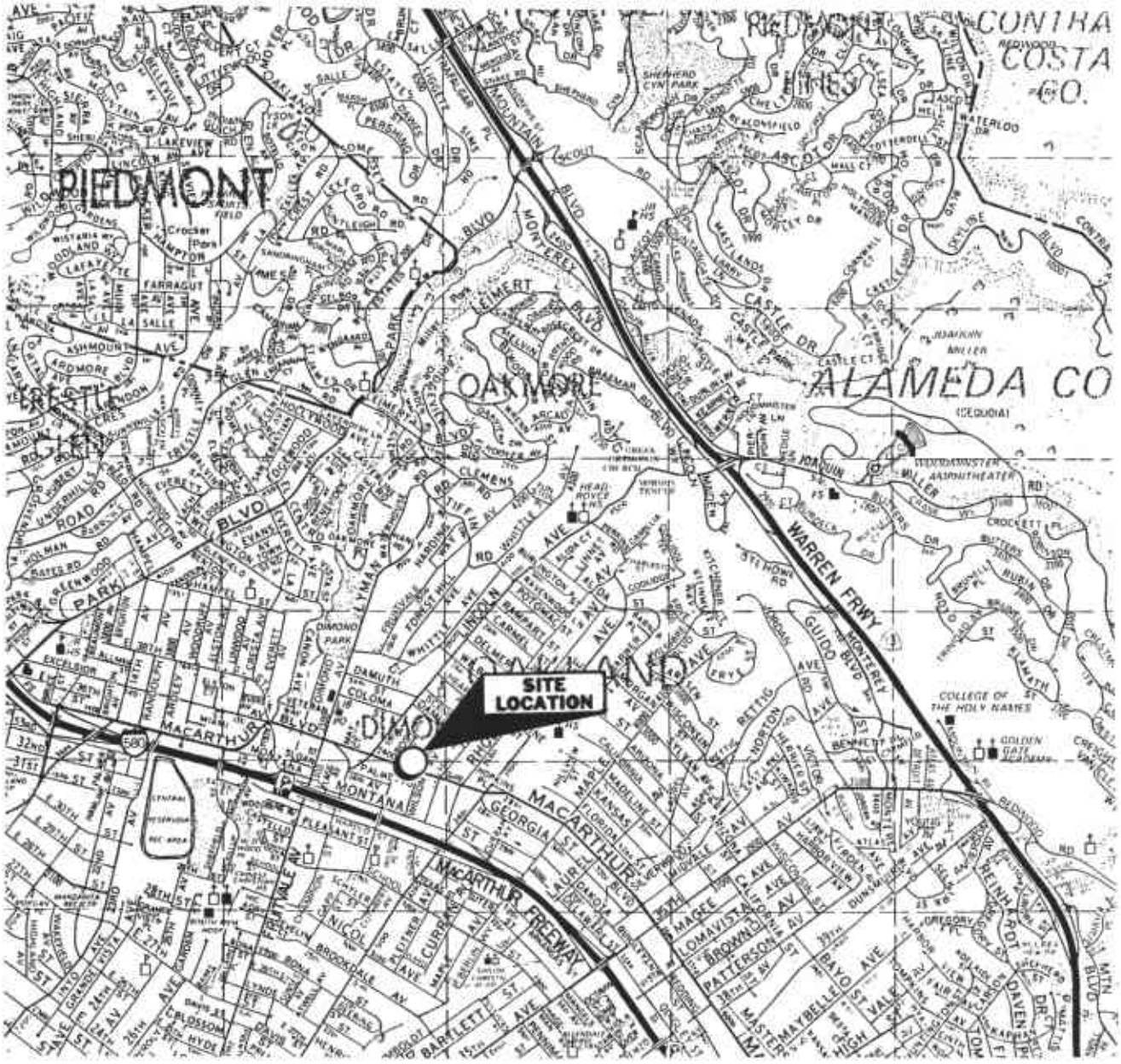
2504 MacArthur Blvd.
Oakland, California

RCI TEST RESULTS
STOCKPILED SOIL

PROJECT NO.	DATE	TABLE NO.
MAR-101J	*FEBRUARY 97*	*5*

Well Date	Wellhead * Elevation	Depth to Water	Elevation of Groundwater	Field Observations
MW-B1				
07/11/95	198.19	9.70	188.49	None
11/06/96		8.60	189.59	None
12/12/96		7.40	190.79	None
01/23/97		5.20	192.99	None
MW-B3				
07/11/95	201.41	9.22	192.19	None
11/06/96		11.38	190.03	None
12/12/96		9.28	192.13	None
01/23/97		8.05	193.36	None
MW-B5				
07/11/95	201.39	9.26	192.13	None
11/06/96		10.28	191.11	None
12/12/96		9.58	191.81	None
01/23/97		8.28	193.11	None

* Wellhead Elevations based on a site survey by Brian Kangas Foulk Consulting Engineers of Walnut Creek, California, dated July 14, 1995.



SCALE: 1" = 2200'

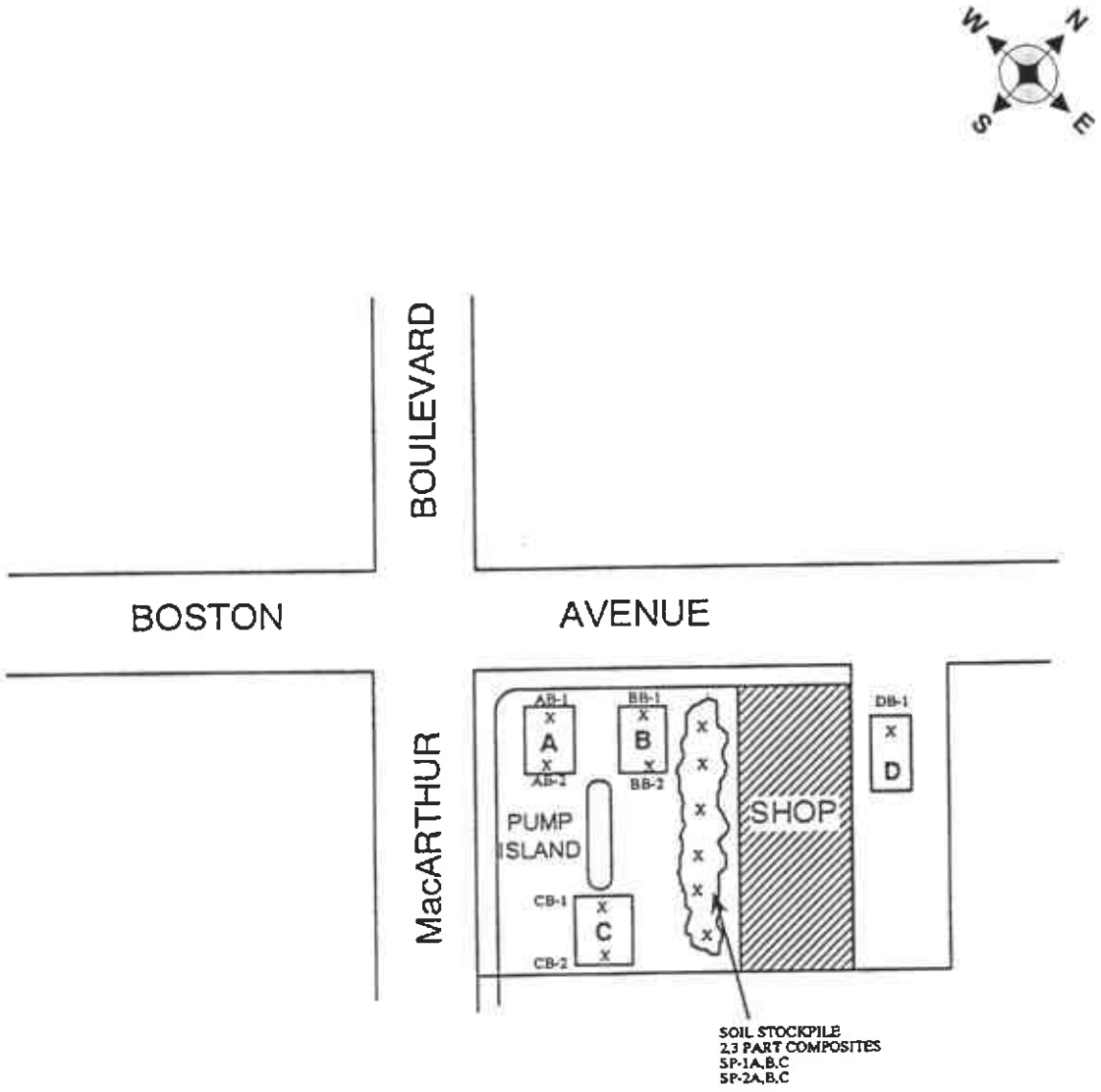
IMFC

MARR AND ASSOCIATES

2504 MacArthur Blvd.
Oakland, California

SITE LOCATION MAP

PROJECT NO.	DATE	FIGURE NO.
MAR-101J	FEBRUARY 97	1



LEGEND

Approximate Tank Location

X Approximate Sample Location

AB-1 Sample Number

Not to Scale

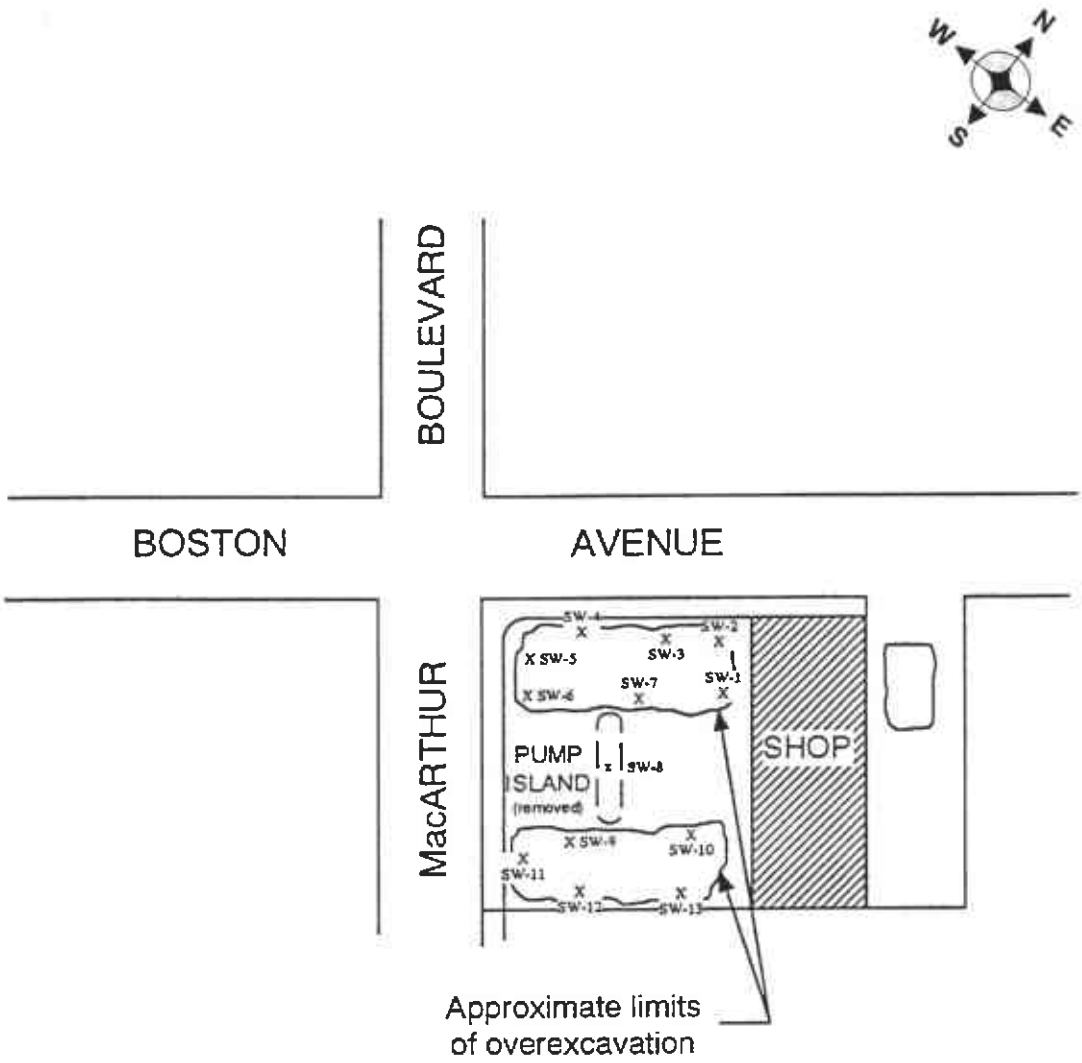
IMFC

MARR AND ASSOCIATES

2504 MacArthur Blvd.
Oakland, California

SAMPLE LOCATION MAP-
TANK EXCAVATION

PROJECT NO.	DATE	FIGURE NO.
MAR-101J	FEBRUARY 97	2



LEGEND

X Approximate Sample Location

SW-1 Sample Number

Not to Scale

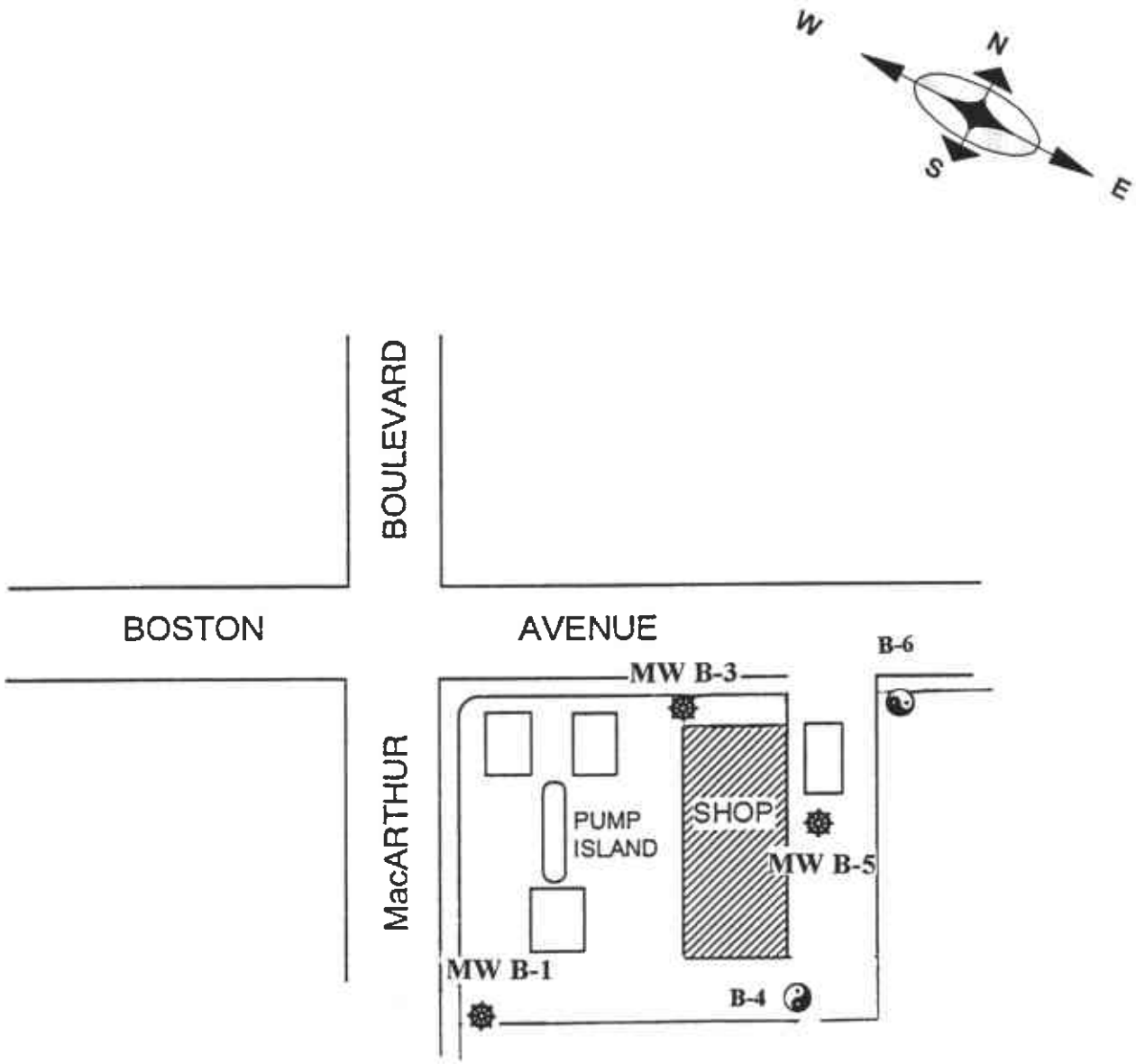
IMFC

MARR AND ASSOCIATES

2504 MacArthur Blvd.
Oakland, California

SAMPLE LOCATION MAP-
OVEREXCAVATION

PROJECT NO.	DATE	FIGURE NO.
MAR-101J	FEBRUARY 97	3



LEGEND

- Approximate Location of Soil Borings
- Approximate Location of Monitoring Wells
- Approximate Location of Former Tanks

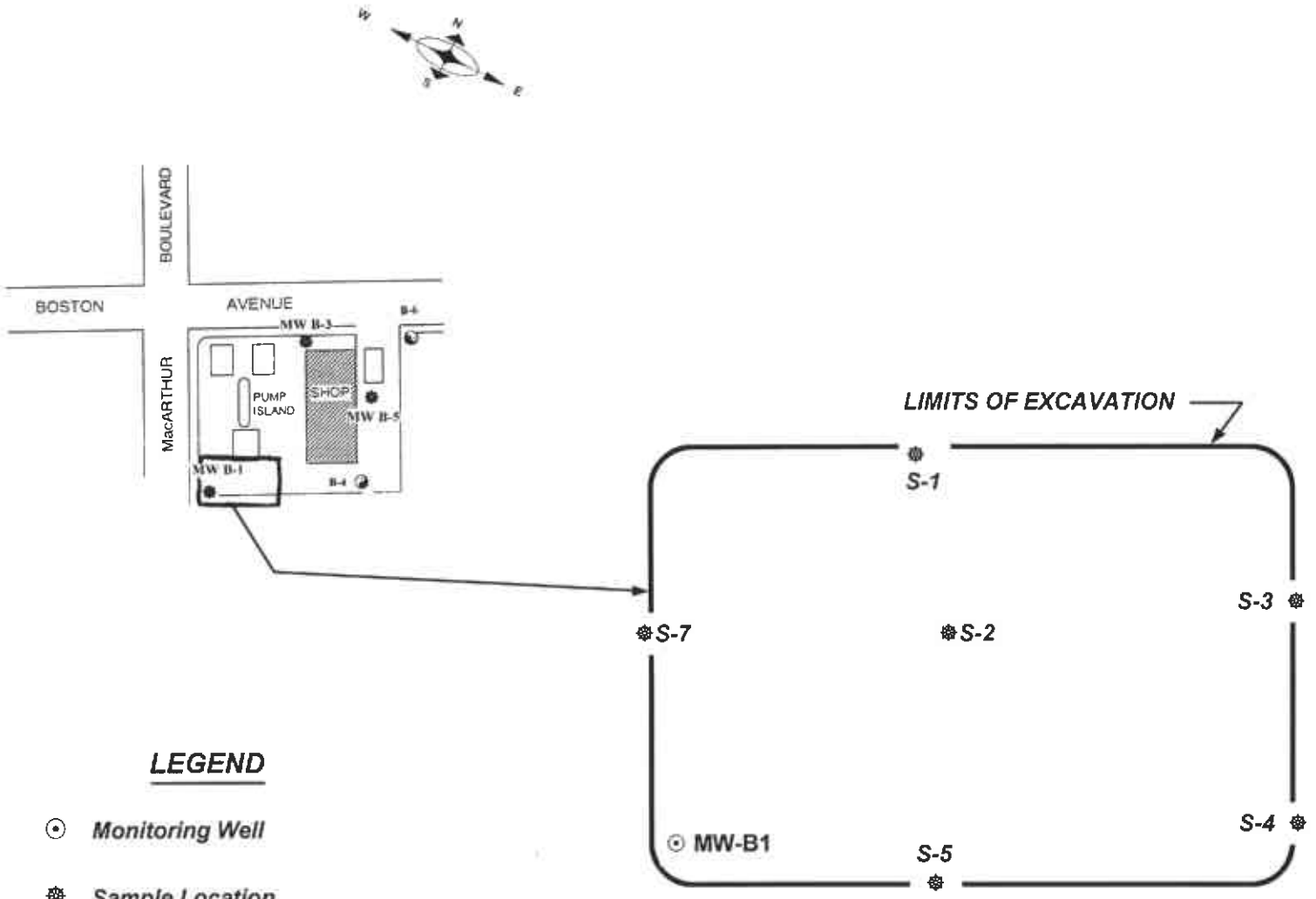
Not to Scale

IMFC

MARR AND ASSOCIATES
2504 MacArthur Blvd.
Oakland, California

LOCATIONS OF MONITORING WELLS
DRILLING OPERATION, 1995

PROJECT NO.	DATE	FIGURE NO.
MAR-101J	FEBRUARY 97	4



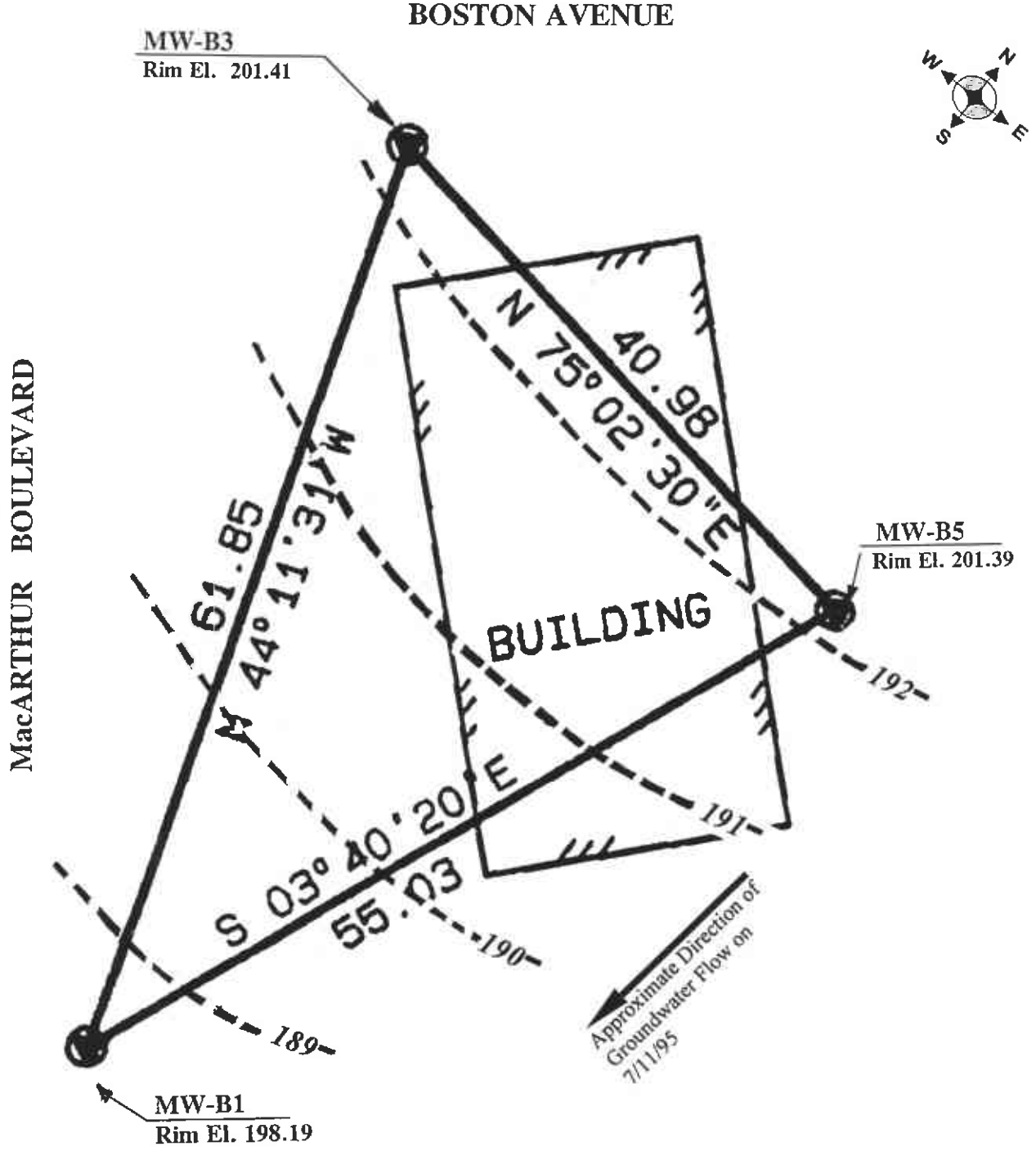
IMFC

MARR & ASSOCIATES

2504 MacArthur Boulevard
Oakland, California

EXCAVATION LIMIT & SAMPLE LOCATION, Dec. 96

PROJECT NO.	DATE	FIGURE NO.
MAR-101J	February 97	5



Source: Eichleay Engineers Inc. of California, 1995

10 0 10 20

GRAPHIC SCALE (FEET)

LEGEND

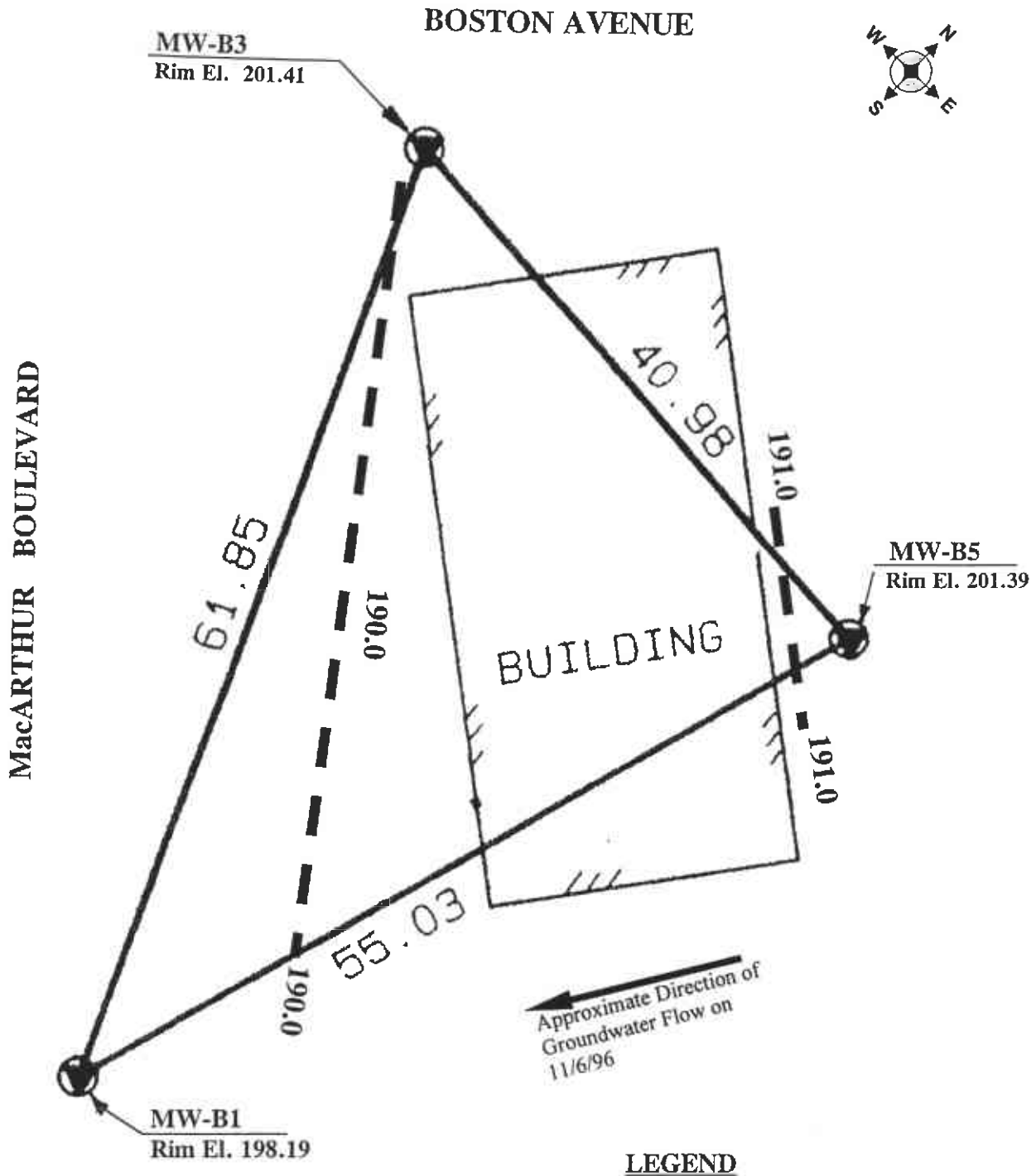
---191--- Groundwater Contours & Elevations

IMFC

MARR & ASSOCIATES

2504 MacArthur Boulevard
Oakland, California

GROUNDWATER POTENTIOMETRIC LEVELS AUGUST 1995		
PROJECT NO.	DATE	FIGURE NO.
MAR-101J	February 1997	6-1



10 0 10 20

GRAPHIC SCALE (FEET)

LEGEND

---191--- Groundwater Contours & Elevations

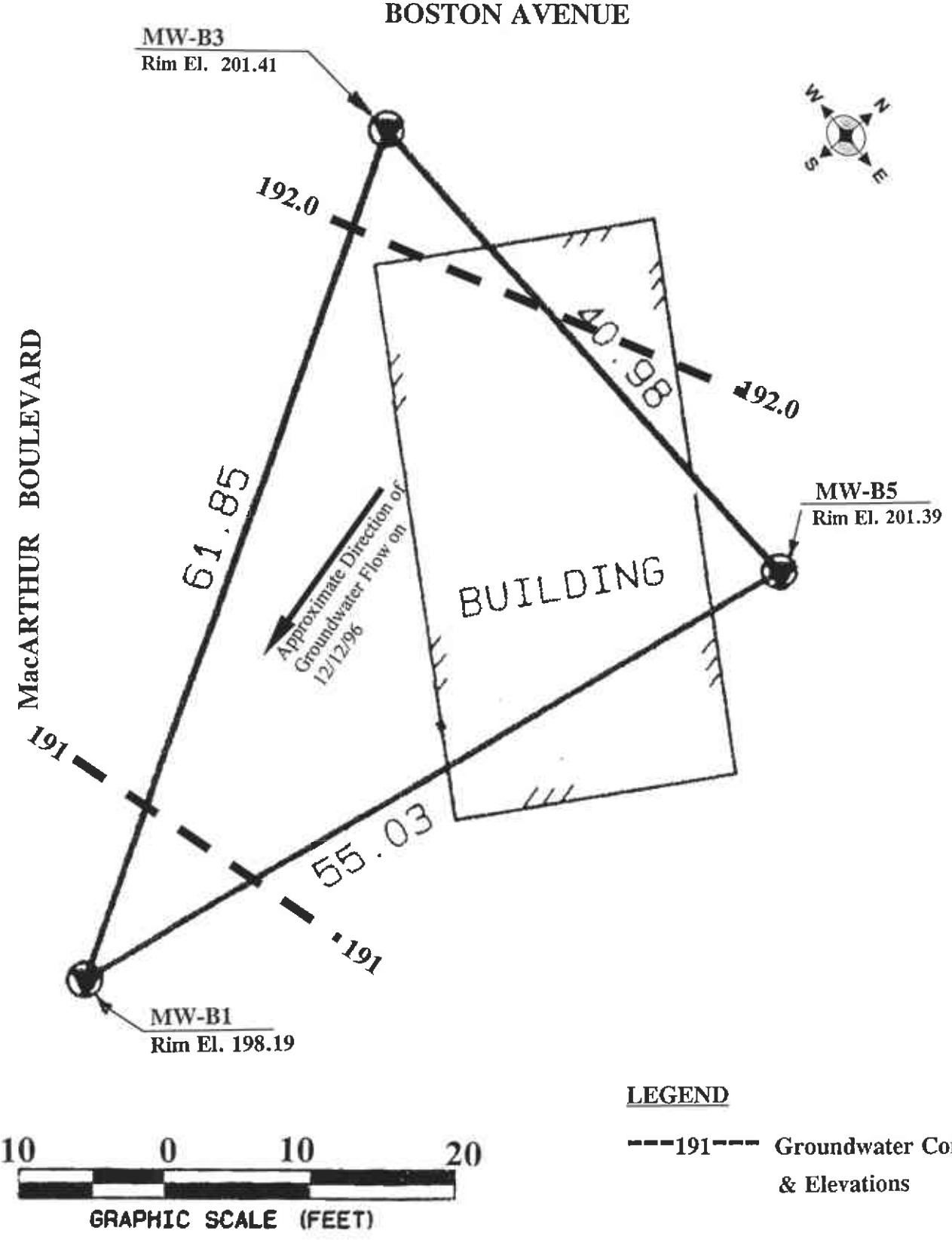
IMFC

MARR & ASSOCIATES

2504 MacArthur Boulevard
Oakland, California

GROUNDWATER POTENTIOMETRIC LEVELS
NOVEMBER 1996

PROJECT NO.	DATE	FIGURE NO.
MAR-101J	February 1997	6-2



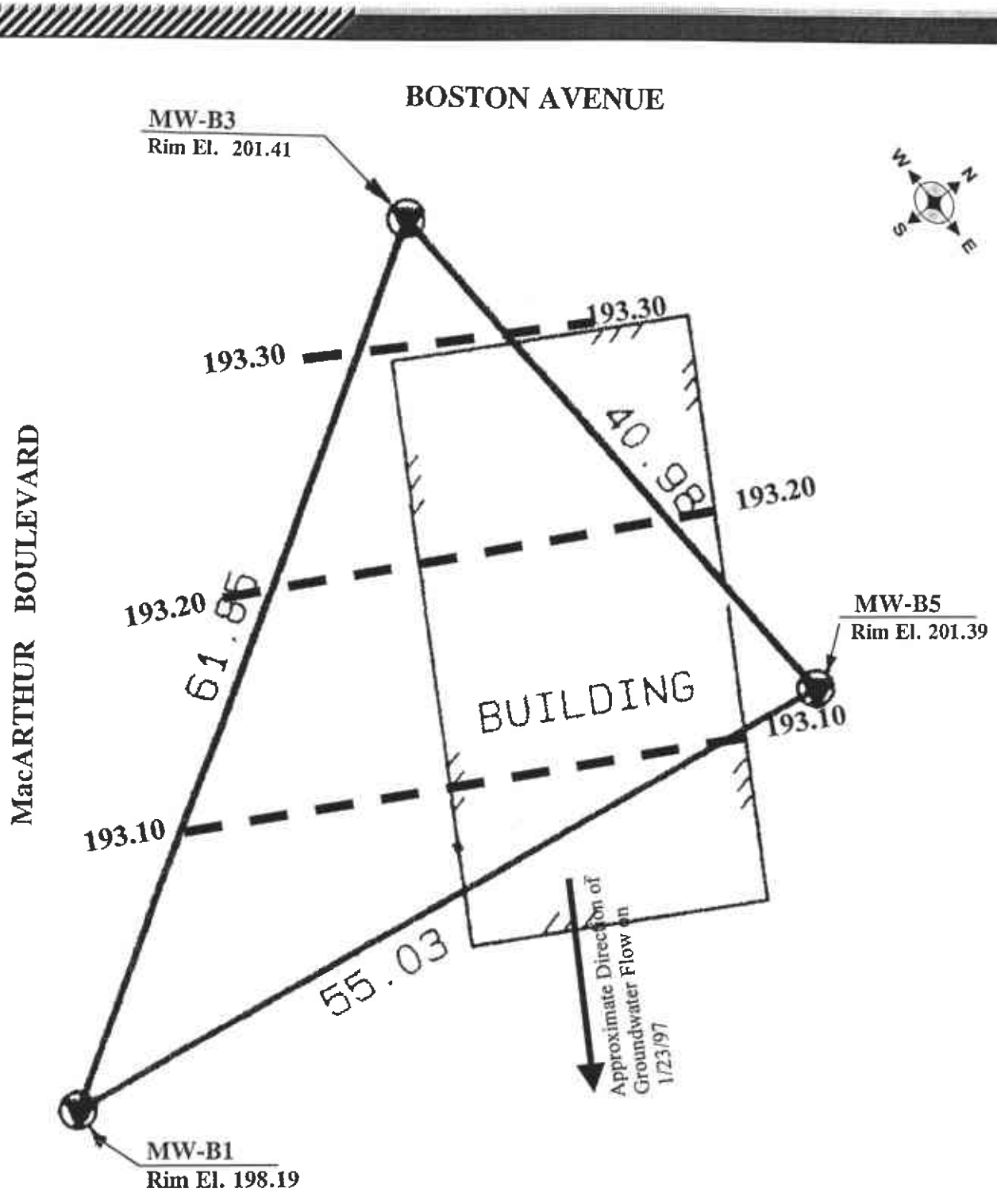
IMFC

MARR & ASSOCIATES

2504 MacArthur Boulevard
Oakland, California

GROUNDWATER POTENTIOMETRIC LEVELS
DECEMBER 1996

PROJECT NO.	DATE	FIGURE NO.
MAR-101J	February 1997	6-3



LEGEND

---191--- Groundwater Contours & Elevations

10 0 10 20

GRAPHIC SCALE (FEET)

IMFC

MARR & ASSOCIATES

2504 MacArthur Boulevard
Oakland, California

GROUNDWATER POTENTIOMETRIC LEVELS
JANUARY 1997

PROJECT NO.	DATE	FIGURE NO.
MAR-101J	February 1997	6-4

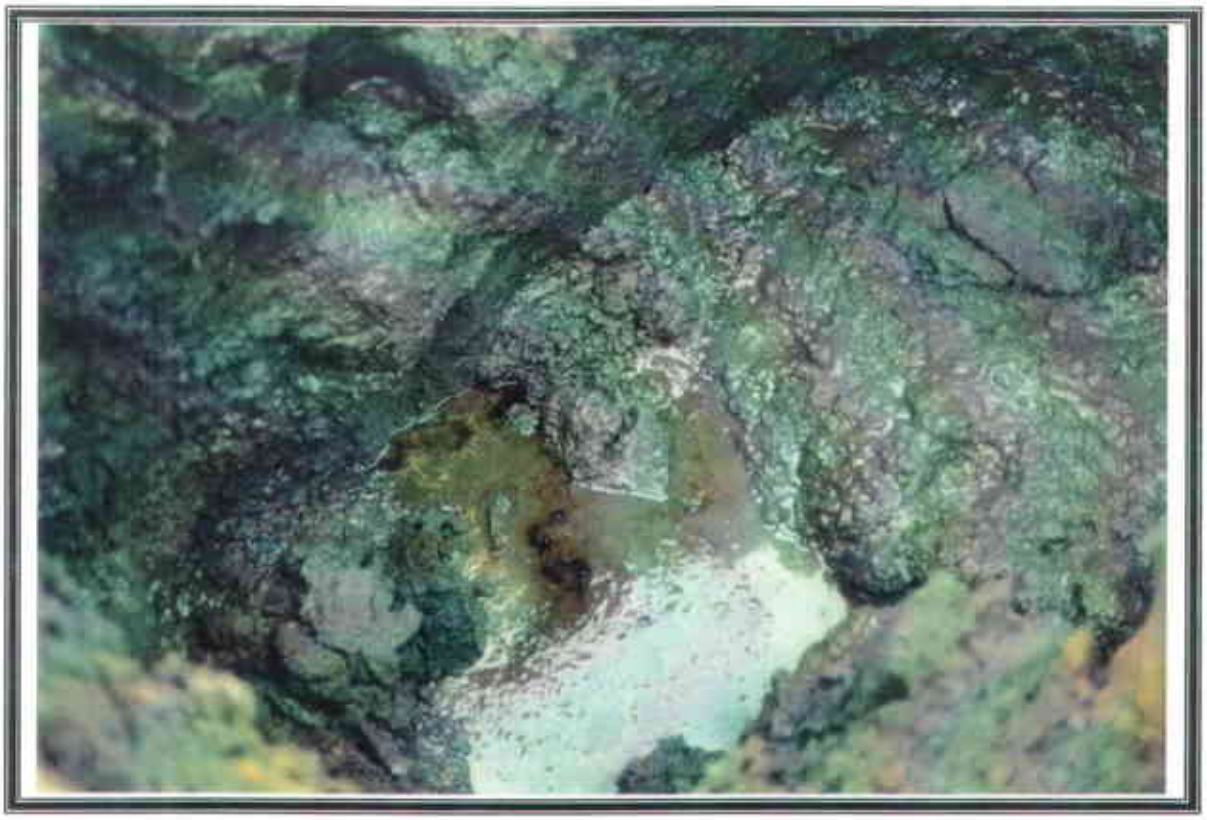


Photo No. 1- Pollutants inside the excavation

Photo No. 2- Contaminated soil, Stockpile No. 1

Photo No. 3- Contaminated soil, Stockpile No. 2

Photo No. 4- Loading contaminated soil into trucks for disposal

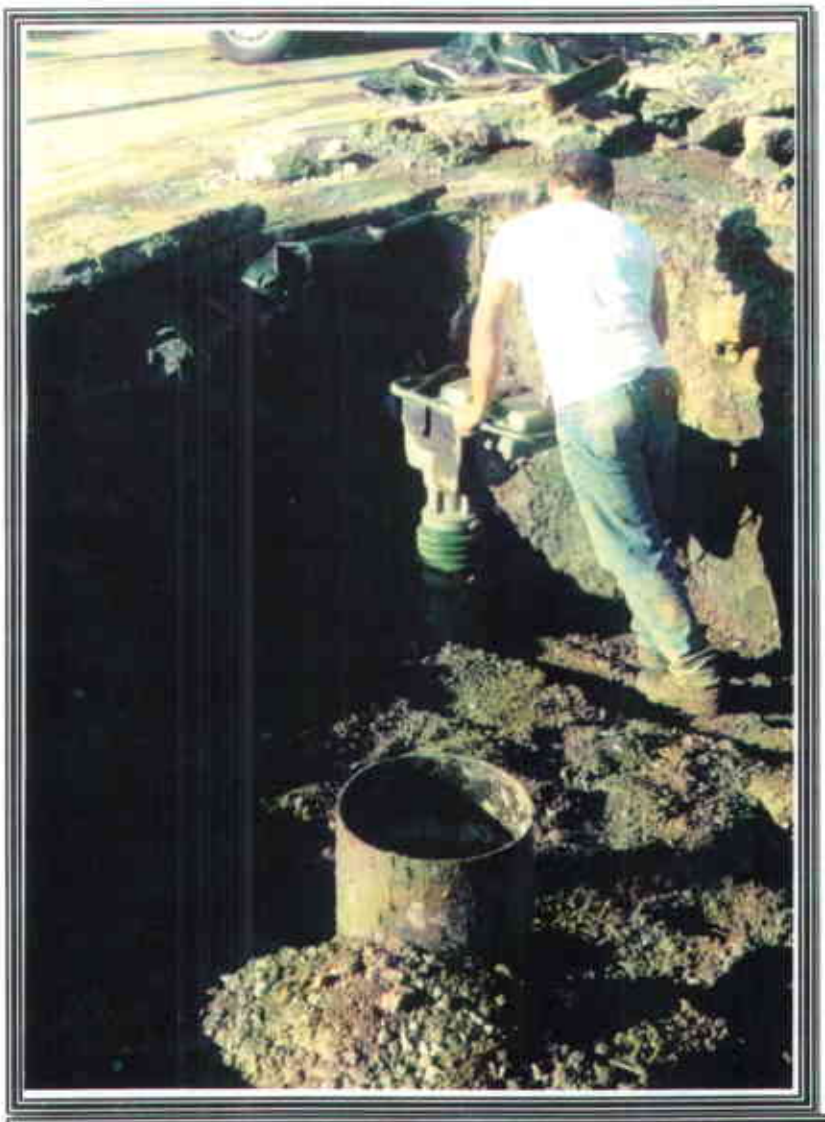


Photo No. 5- Compacting clean fill inside the excavation

Photo No. 6- Reinforcing bars for concrete resurfacing over the fill

Photo No. 7- Temporary asphalt cover over the former excavation to protect the fill

Photo No. 8- Resurfacing with concrete

Photo No. 9- Completed work area near monitoring well MW-B3

Photo No. 10- Completed work area near monitoring well MW-B1

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

RAFAT A. SHAHID, Assistant Agency Director
Alameda County CC4580
Environmental Health Services
1131 Harbor Bay Pkwy., #250
Alameda CA 94502-6577
(510)567-6700 FAX(510)337-9335

August 26. 1996

Michael Marr
27737 Fallen Leaf Court
Hayward, CA - 94542

Ref: Grace Auto- 2504 MacArthur Boulevard, Oakland, CA- 94602
STID # 24

Dear Mr. Marr:

I am in receipt of the workplan, dated July 16, 1996 (mistyped as 1965) for the above referenced property. The workplan includes a proposal to excavate soil in two areas where significant petroleum hydrocarbon contamination was identified through previous investigations conducted on the referenced property.

This Department approves the workplan with the following recommendations:

- Based on the assumed areal extent of excavation mentioned in the workplan, at a minimum 4 sidewall and 1 bottom confirmation samples should be collected from each excavation pit.
- All confirmation samples should be analyzed for TPH as gasoline by EPA method 8015 and for BTEX by EPA method 8020.
- All the groundwater samples, in addition to the chemicals mentioned in the workplan, should be analyzed for MTBE (Methyl Teritiary Butyl Ether). The MTBE analysis is being requested based on San Francisco Regional Water Quality Board's requirement that MTBE be tested on all sites with gasoline releases occurring after 1983. Information on this request is attached to this letter.

If you have any questions, you may reach me at (510) 567-6764

Sincerely,

Madhulla Logan

Madhulla Logan
Hazardous Material Specialist

C: **Cheryl Gordan,** State Water Resources Control Board, Sacramento, CA
Fred Serafin, Ingram-Mason and Fairbairn, 41 Sutter St, Suite 1537, SF, CA- 94104

IMFC

SAMPLING PROTOCOL

SAMPLING (GENERAL)

1. Any materials supplied by the client will reduce the cost of our work. These may include tap water, 55-gallon drums, and DI-water. Arrangements will be made before the start of the project.

2. Chemical sampling procedures and sample storage will be conducted under the direction of our consulting laboratory or a consulting analytical chemist.

3. All equipment used during the sampling process will be thoroughly steam-cleaned prior to its use.

4. All samples will be stored in an ice chest and packed in blue ice or ice in such a manner as to prevent sample immersion in melted ice.

5. All samples will be delivered to the consulting laboratory as soon as possible after collection.

6. All sample containers will be opened only by the consulting laboratory which performs the chemical testing.

SOIL SAMPLES

1. Soil samples will be attempted at 5-foot intervals or more frequently as determined in the field.

2. Sample container cleaning blanks may be taken of the steam-cleaned brass liners for quality control purposes at the rate of one per boring.

3. All soil sampling equipment will be disassembled and thoroughly steam-cleaned prior to each usage.

4. The ends of all soil sample liners will be covered with aluminum foil and an air-tight cap which will be wrapped with aluminized tape and properly labeled. All soil samples will be immediately stored in an ice chest and packed with blue ice or ice in such a manner as to prevent immersion in melted ice.

5. All excess soils will be place in 55-gallon drums for proper disposal.

6. The center of each soil liner will be extracted at the consulting laboratory for appropriate analysis.

WATER SAMPLES

1. At least 3 to 5 well bore volumes will be purged from each well prior to sampling for volatile organic compounds. Purging will be accomplished using a bladder or centrifugal pump, a Honda jet pump with foot valve, or by hand-bailing with a clean teflon bailer. During evacuation, Ph, conductivity, and temperature will be monitored and recorded. All samples will be retrieved with a steam-cleaned teflon bailer. Cleaning blanks of the teflon bailer will be taken between each well to be sampled if the client so desires.

2. Samples will not be taken until the pH, conductivity, and temperature measurements have stabilized during well purging.

3. All sampling equipment, including gloves and tape measures will be properly decontaminated between each well.

4. All samples will be place in the appropriate cleaned containers provided by the project laboratory. The type of container necessary is contingent upon the analysis needed.

SAMPLE RECORDS AND CUSTODY

1. Records will be maintained for all samples collected by Ingram-Mason & Fairbairn.

2. A positive chain-of-custody record will be maintained by Ingram-Mason & Fairbairn for future reference.

3. All records will be maintained under strict confidence by Ingram-Mason & Fairbairn and will be released only by written authorization of the client.

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn	Client Project ID:	2405 MacArthur Blvd.	Sampled: Dec 13, 1996
41 Sutter St., Suite 1537	Sample Matrix:	Soil	Received: Dec 16, 1996
San Francisco, CA 94104	Analysis Method:	EPA 5030/8015 Mod./8020	Reported: Dec 20, 1996
Attention: Fred Serafin	First Sample #:	612-0975	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 612-0975 S-1	Sample I.D. 612-0976 S-2	Sample I.D. 612-0977 S-3	Sample I.D. 612-0978 S-4	Sample I.D. 612-0979 S-5	Sample I.D. 612-0980 S-6
QC Batch Number:		SP121896 8020EXA	SP121896 8020EXA	SP121896 8020EXA	SP121896 8020EXA	SP121896 8020EXA	SP121896 8020EXA
Purgeable Hydrocarbons	1.0	100	6.2	N.D.	87	410	N.D.
Benzene	0.0050	N.D.	N.D.	N.D.	N.D.	N.D.	0.0075
Toluene	0.0050	0.55	N.D.	N.D.	N.D.	0.25	0.033
Ethyl Benzene	0.0050	0.33	N.D.	N.D.	0.14	1.3	0.011
Total Xylenes	0.0050	0.46	0.016	N.D.	0.36	0.99	0.046
Chromatogram Pattern:		Gasoline & Unidentified Hydrocarbons >C8	Unidentified Hydrocarbons >C8	--	Gasoline & Unidentified Hydrocarbons >C8	Gasoline & Unidentified Hydrocarbons >C8	--

Quality Control Data

Report Limit Multiplication Factor:	50	2.0	1.0	20	50	1.0
Date Analyzed:	12/18/96	12/18/96	12/18/96	12/18/96	12/18/96	12/18/96
Instrument Identification:	HP-5	HP-5	HP-5	HP-5	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	118	110	107	107	99	108

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn	Client Project ID:	2405 MacArthur Blvd.	Sampled:	Dec 13, 1996
41 Sutter St., Suite 1537	Sample Matrix:	Soil	Received:	Dec 16, 1996
San Francisco, CA 94104	Analysis Method:	EPA 5030/8015 Mod./8020	Reported:	Dec 20, 1996
Attention: Fred Serafin	First Sample #:	612-0981		

QC Batch Number: SP121896 SP121896

8020EXA 8020EXA

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 612-0981 S-7	Sample I.D. 612-0982 S-8
Purgeable Hydrocarbons	1.0	1,100	13
Benzene	0.0050	N.D.	0.018
Toluene	0.0050	N.D.	0.021
Ethyl Benzene	0.0050	5.4	0.032
Total Xylenes	0.0050	3.1	0.043
Chromatogram Pattern:		Gasoline & Unidentified Hydrocarbons >C8	Gasoline & Unidentified Hydrocarbons >C8

Quality Control Data

Report Limit Multiplication Factor:	100	2.5
Date Analyzed:	12/18/96	12/18/96
Instrument Identification:	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	96	99

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn	Client Project ID:	2405 MacArthur Blvd.	Sampled: Dec 13, 1996
41 Sutter St., Suite 1537	Sample Descript:	Soil	Received: Dec 16, 1996
San Francisco, CA 94104	Analysis for:	Lead	Digested: Dec 17, 1996
Attention: Fred Serafin	First Sample #:	612-0975	Analyzed: Dec 18, 1996
			Reported: Dec 20, 1996

LABORATORY ANALYSIS FOR: Lead

Sample Number	Sample Description	Detection Limit mg/kg	Sample Result mg/kg	QC Batch Number	Instrument ID
612-0975	S-1	1.0	5.4	ME1217966010MDA	MV-4
612-0976	S-2	1.0	5.0	ME1217966010MDA	MV-4
612-0977	S-3	1.0	17	ME1217966010MDA	MV-4
612-0978	S-4	1.0	7.9	ME1217966010MDA	MV-4
612-0979	S-5	1.0	4.7	ME1217966010MDA	MV-4
612-0980	S-6	1.0	8.3	ME1217966010MDA	MV-4
612-0981	S-7	1.0	10	ME1217966010MDA	MV-4
612-0982	S-8	1.0	3.9	ME1217966010MDA	MV-4

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn
41 Sutter St., Suite 1537
San Francisco, CA 94104
Attention: Fred Serafin

Client Project ID: 2405 MacArthur Blvd.
Matrix: Solid

QC Sample Group: 6120975-982

Reported: Dec 26, 1996

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Lead
QC Batch#:	GC121896	GC121896	GC121896	GC121896	ME121796
Analy. Method:	8020EXA EPA 8020	8020EXA EPA 8020	8020EXA EPA 8020	8020EXA EPA 8020	6010MDA EPA 6010
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 3050
Analyst:	D. Newcomb	D. Newcomb	D. Newcomb	D. Newcomb	J. Kelly
MS/MSD #:	6120364	6120364	6120364	6120364	6120975
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	5.4 mg/kg
Prepared Date:	12/18/96	12/18/96	12/18/96	12/18/96	12/17/96
Analyzed Date:	12/18/96	12/18/96	12/18/96	12/18/96	12/18/96
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5	MV-4
Conc. Spiked:	0.40 mg/kg	0.40 mg/kg	0.40 mg/kg	1.2 mg/kg	50 mg/kg
Result:	0.37	0.34	0.37	1.0	51
MS % Recovery:	93	85	93	83	91
Dup. Result:	0.38	0.35	0.38	1.1	49
MSD % Recov.:	95	88	95	92	87
RPD:	2.70	2.90	2.70	9.50	4.0
RPD Limit:	0-20	0-20	0-20	0-20	20
LCS #:	5LCS121896	5LCS121896	5LCS121896	5LCS121896	LCS121796
Prepared Date:	12/18/96	12/18/96	12/18/96	12/18/96	12/17/96
Analyzed Date:	12/18/96	12/18/96	12/18/96	12/18/96	12/18/96
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5	MV-4
Conc. Spiked:	0.40 mg/kg	0.40 mg/kg	0.40 mg/kg	1.2 mg/kg	50 mg/kg
LCS Result:	17	16	17	50	45
LCS % Recov.:	85	80	85	83	90
MS/MSD LCS Control Limits	50-150	50-150	50-150	50-150	80-120

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

IMFC

INGRAM-MASON & FAIRBAIRN
A DIVISION OF IMFC CORPORATION

41 SUTTER STREET, SUITE 1537
SAN FRANCISCO, CA 94104

TEL (415) 281-9696
FAX (800) 804-IMFC

CHAIN OF CUSTODY FORM

Project: 2905 MacArthur Blvd.
Job Number: MAR-101I
Project Manager: Fred Serafin
Date: 12/16/1996

Laboratory: Sequoia Analytical
Turnaround Time: 5-DAY
Results To: Fred Serafin
Samplers: FS./Pat/Chad

ITEM NO.	SAMPLE NUMBER	DATE AND TIME SAMPLED: Date	Time	MATRIX	# CONTAINERS & PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	HCl			ANALYSIS REQUESTED / TYPE OF CONTAINER: TPH-G, BTEX,	Pb (Total)					COMMENTS
1	S-1	12/13/96		Soil	1						✓	✓	6120975				
2	S-2	↓		↓	1						✓	✓	6120976				
3	S-3				1						✓	✓	6120977				
4	S-4				1						✓	✓	6120978				
5	S-5				1						✓	✓	6120979				
6	S-6				1						✓	✓	6120980				
7	S-7				1						✓	✓	6120981				
8	S-8	↓		↓	1						✓	✓	6120982				
9																	
10																	
11																	
12																	

MISCELLANEOUS

Number of Coolers	Type of Coolant
1	ICE

COMMENTS: Pls call Fred (415) 951-4793 with results ASAP.

Page 1 of 1

CHAIN OF CUSTODY RECORD

Relinquished by: (signature & affiliation)	Date/Time	Received by: (signature & affiliation)	Date/Time
F. L. S[signature]	12/16/96		
Dispatched by: (signature & affiliation)		Received for lab by: [signature]	12/16/96 1145

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn	Client Project ID:	2405 MacArthur Blvd.	Sampled:	Dec 13, 1996
41 Sutter Street, Suite 1537	Sample Descript:	Solid, S-8	Relogged:	Dec 23, 1996
San Francisco, CA 94104			Analyzed:	Dec 26, 1996
Attention: Fred Serafin	Lab Number:	612-0982	Reported:	Dec 31, 1996

CORROSIVITY AND IGNITABILITY

Analyte	Sample Results	QC Batch Number	Instrument ID
Corrosivity:			
pH (pH Units)	7.4	IN122696904514A	INPH-1
Ignitability:			
Flashpoint (Pensky-Martens), °C	>100	IN122696101000A	Manual

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn	Client Project ID:	2405 MacArthur Blvd.	Sampled:	Dec 13, 1996
41 Sutter Street. Suite 1537	Sample Descript:	Solid, S-8	Relogged:	Dec 23, 1996
San Francisco, CA 94104			Analyzed:	Dec 26, 1996
Attention: Fred Serafin	Lab Number:	612-0982	Reported:	Dec 31, 1996

REACTIVITY

Analyte	Detection Limit mg/kg	Sample Results mg/kg	QC Batch Number	Instrument ID
Reactivity:				
Sulfide, mg/kg.....	13	13	IN122796084600A	Manual
Cyanide, mg/kg.....	0.50	N.D.	IN122796084600A	Manual
Reaction with water.....	N.A.	N.D.	IN122796084600A	Manual

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1210

Jim Bava
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn
41 Sutter Street. Suite 1537
San Francisco, CA 94104
Attention: Fred Serafin

Client Project ID: 2405 MacArthur Blvd.
Matrix: Solid
QC Sample Group: 612-0982

Reported: Dec 31, 1996

QUALITY CONTROL DATA REPORT

Analyte:	Corrosivity	Ignitability
QC Batch#:	IN122696	IN122696
	9045I4A	101000A
Analy. Method:	EPA 9045	EPA 1010
Prep. Method:	EPA 9045	EPA 1010
Analyst:	Y. Borinshteyn	M. Kosovskiy
Duplicate Sample #:	6121479	6121479
Prepared Date:	12/26/96	12/26/96
Analyzed Date:	12/26/96	12/26/96
Instrument I.D.#:	INPH-1	Manual
Sample Concentration:	7.4 pH Units	>100°C
Dup. Sample Concentration:	7.4 pH Units	>100°C
RPD:	0.0	0.0
RPD Limit:	0-30	0-30

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

** RPD = Relative % Difference

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn
41 Sutter Street. Suite 1537
San Francisco, CA 94104
Attention: Fred Serafin

Client Project ID: 2405 MacArthur Blvd.
Matrix: Solid
QC Sample Group: 612-0982

Reported: Dec 31, 1996

QUALITY CONTROL DATA REPORT

Analyte:	Reactive Cyanide	Reactive Sulfide
QC Batch#:	IN122796 084600A	IN122796 084600A
Analy. Method:	SW 846	SW 846
Prep. Method:	-	-
Analyst:	K. Sims	K. Sims
MS/MSD #:	9612E74-1A	9612E74-1A
Sample Conc.:	N.D.	13 mg/L
Prepared Date:	12/27/96	12/27/96
Analyzed Date:	12/27/96	12/27/96
Instrument I.D.#:	Manual	Manual
Conc. Spiked:	0.50 mg/kg	50 mg/kg
Result:	0.068	46
MS % Recovery:	14	66
Dup. Result:	0.060	54
MSD % Recov.:	12	82
RPD:	13	16
RPD Limit:	0-30	0-30
LCS #:	IN091896	IN112596
Prepared Date:	12/27/96	12/27/96
Analyzed Date:	12/27/96	12/27/96
Instrument I.D.#:	Manual	Manual
Conc. Spiked:	0.20 mg/L	10 mg/L
LCS Result:	0.025	8.3
LCS % Recov.:	13	83
MS/MSD LCS Control Limits	70-130	70-130

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

IMFC

INGRAM-MASON & FAIRBAIRN
A DIVISION OF IMFC CORPORATION

41 SUTTER STREET, SUITE 1537
SAN FRANCISCO, CA 94104
TEL (415) 281-9696
FAX (800) 804-IMFC

CHAIN OF CUSTODY FORM

Project: 2745 MacArthur Blvd.
Job Number: MAR-101I
Project Manager: Fred Serafin
Date: 12/16/1996

Laboratory: Sequoia Analytical
Turnaround Time: 5 - DAY
Results To: Fred Serafin
Samplers: FS./Pat/Chad

ITEM NO.	SAMPLE NUMBER	DATE AND TIME SAMPLED: Date	Time	MATRIX	# CONTAINERS & PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	HCl			ANALYSIS REQUESTED / TYPE OF CONTAINER: TPH-G, BTEX	Pb (Total)					COMMENTS
1	S-1	12/13/96		Soil	1						✓	✓	6120975				
2	S-2	↓		↓	1						✓	✓	6120976				
3	S-3	↓		↓	1						✓	✓	6120977				
4	S-4	↓		↓	1						✓	✓	6120978				
5	S-5	↓		↓	1						✓	✓	6120979				
6	S-6	↓		↓	1						✓	✓	6120980				
7	S-7	↓		↓	1						✓	✓	6120981				
8	S-8	↓		↓	1						✓	✓	6120982				
9																	
10																	
11																	
12																	

MISCELLANEOUS

Number of Coolers	Type of Coolant
1	ICE

COMMENTS: Pls call Fred (415) 951-4793 with results ASAP.

Page 1 of 1

CHAIN OF CUSTODY RECORD

Relinquished by: (signature & affiliation)	Date/Time	Received by: (signature & affiliation)	Date/Time
F.R.S. [signature]	12/16/96		
Dispatched by: (signature & affiliation)	Date/Time	Received for lab by: [signature]	12/16/96 11AT

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn	Client Project ID:	2504 MacArthur Blvd.	Sampled: Dec 12-13, 1996
41 Sutter Street, Suite 1537	Sample Matrix:	Water	Received: Dec 16, 1996
San Francisco, CA 94104	Analysis Method:	EPA 5030/8015 Mod./8020	Reported: Dec 31, 1996
Attention: Fred Serafin	First Sample #:	6121-4754	

QC Batch Number: GC122696 GC122696 GC122696
802004A 802004A 802004A

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 6121-4754 MW-B1	Sample I.D. 6121-4755 MW-B3	Sample I.D. 6121-4756 MW-B5
Purgeable Hydrocarbons	50	N.D.	N.D.	N.D.
Benzene	0.50	N.D.	N.D.	N.D.
Toluene	0.50	N.D.	N.D.	N.D.
Ethyl Benzene	0.50	N.D.	N.D.	N.D.
Total Xylenes	0.50	N.D.	N.D.	N.D.
MTBE:	0.60	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0
Date Analyzed:	12/26/96	12/26/96	12/26/96
Instrument Identification:	HP-4	HP-4	HP-4
Surrogate Recovery, %: (QC Limits = 70-130%)	96	94	94

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Ingram-Mason & Fairbairn
41 Sutter Street, Suite 1537
San Francisco, CA 94104
Attention: Fred Serafin

Client Project ID: 2504 MacArthur Blvd.
Matrix: Liquid

QC Sample Group: 6121454-456

Reported: Dec 31, 1996

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC122696 802004A	GC122696 802004A	GC122696 802004A	GC122696 802004A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	K. Nill	K. Nill	K. Nill	K. Nill
MS/MSD #:	6121454	6121454	6121454	6121454
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	12/26/96	12/26/96	12/26/96	12/26/96
Analyzed Date:	12/26/96	12/26/96	12/26/96	12/26/96
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Result:	15	16	15	47
MS % Recovery:	75	80	75	78
Dup. Result:	17	18	17	53
MSD % Recov.:	85	90	85	88
RPD:	13	12	13	12
RPD Limit:	0-25	0-25	0-25	0-25

LCS #:	4LCS122696	4LCS122696	4LCS122696	4LCS122696
Prepared Date:	12/26/96	12/26/96	12/26/96	12/26/96
Analyzed Date:	12/26/96	12/26/96	12/26/96	12/26/96
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
LCS Result:	16	17	17	53
LCS % Recov.:	80	85	85	88

MS/MSD	60-140	60-140	60-140	60-140
LCS	70-130	70-130	70-130	70-130
Control Limits				

SEQUOIA ANALYTICAL, #1271

Jim Bava
Project Manager

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

[redacted] Project: [redacted]

INGRAM-MASON & FAIRBAIRN
A DIVISION OF IMFC CORPORATION

41 SUTTER STREET, SUITE 1537
SAN FRANCISCO, CA 94104

TEL (415) 281-9696
FAX (800) 804-IMFC

Job Number: MAR 1015
Project Manager: Fred Serafin
Date: 12/16/1996

Laboratory: Sequoia Analytical
Turnaround Time: 10-DAY
Results To: Fred Serafin
Samplers: FS

ITEM NO.	SAMPLE NUMBER	DATE AND TIME SAMPLED: Date	Time	MATRIX	# CONTAINERS & PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	HCl			ANALYSIS REQUESTED / TYPE OF CONTAINER: TPH-G BTEX & MTBE					COMMENTS		
1	MW-B1	12/12/96	12:30p	H_2O				2			✓		6121	154		A-B		
2	MW-B3	12/13/96	4:30p	↓				2			✓		6121	155		↓		
3	MW-B5	12/13/96	5:00p	↓				2			✓		6121	156		↓		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		

MISCELLANEOUS

Number of Coolers	Type of Coolant
1	ICE

COMMENTS: Please call Fred, (415) 951-4793 with the results.

Page 1 of 1

CHAIN OF CUSTODY RECORD

Relinquished by: (signature & affiliation)	Date/Time	Received by: (signature & affiliation)	Date/Time
F.R.S.	12/16/96		
Relinquished by: (signature & affiliation)		Received by: (signature & affiliation)	Date/Time
Relinquished by: (signature & affiliation)		Received by: (signature & affiliation)	Date/Time
Relinquished by: (signature & affiliation)		Received by: (signature & affiliation)	Date/Time
Dispatched by: (signature & affiliation)	Date/Time	Received for lab by:	Date/Time 12/16/96 1145

IMFC

INGRAM-MASON & FAIRBAIRN
A Division of IMFC Corporation
ONE SANSOME STREET, SUITE 1900
SAN FRANCISCO, CALIFORNIA 94104
TEL (415) 951-4793 (415) 281 - 9696
FAX (415) 951-4701 (800) 804-IMFC

WATER LEVEL RECORDS

DATE: 11/6/96 PROJECT NO.: MAR-101J

LOCATION: 2504 MacArthur Blvd. Oakland, CA TECHNICIAN: Keith

WELL NO.	WATER LEVEL	TIME	BOTTOM OF WELL
B-1	8.6'	10:15	40.3
B-3	11.38	10:23	35.0
B-5	10.28	10:30	23.0

COMMENTS: .....

.....

IMFC

INGRAM-MASON & FAIRBAIRN
A Division of IMFC Corporation
ONE SANSOME STREET, SUITE 1900
SAN FRANCISCO, CALIFORNIA 94104
TEL (415) 951-4793 (415) 281 - 9696
FAX (415) 951-4701 (800) 804-IMFC

WATER LEVEL RECORDS

DATE: 12/12/96 PROJECT NO.: MAR-101J

LOCATION: 2504 MacArthur Blvd., Oakland TECHNICIAN: TR

WELL NO.	WATER LEVEL	TIME	BOTTOM OF WELL
B-1	7.40	2:35 p.	40.3
B-3	9.28	2:45 p.	35.0
B-5	9.58	2:50 p.	23.0
12/13/96 SAMPLING			
B-3	9.27		
B-5	9.56		

COMMENTS: Rain, wet conditions

IMFC

INGRAM-MASON & FAIRBAIRN
A Division of IMFC Corporation
ONE SANSOME STREET, SUITE 1900
SAN FRANCISCO, CALIFORNIA 94104
TEL (415) 951-4793 (415) 281 - 9696
FAX (415) 951-4701 (800) 804-IMFC

WATER LEVEL RECORDS

DATE: 1/23/97 PROJECT NO.: MAR-101 3

LOCATION: Oakland, CA TECHNICIAN: Steve

WELL NO.	WATER LEVEL	TIME	BOTTOM OF WELL
B-1	5.20	10:53	40.3
B-3	8.05	11:00	35.0
B-5	8.28	11:20	23.0

COMMENTS: .....

.....

IMFC

INGRAM-MASON & FAIRBAIRN
A Division of IMFC Corporation
ONE SANSOME STREET, SUITE 1900
SAN FRANCISCO, CALIFORNIA 94104
TEL (415) 951-4793 (415) 281 - 9696
FAX (415) 951-4701 (800) 804-IMFC

WATER LEVEL RECORDS

DATE: 2-27-97 PROJECT NO.: MAR-101J

LOCATION: 2504 MacArthur Blvd., Oakland TECHNICIAN: F.S.

WELL NO.	WATER LEVEL BELOW TOP OF CASING	TIME	DEPTH OF WELL BELOW TOP OF CASING
B-1	5.95	1:30	40.3
B-3	8.40	1:36	35.0
B-5	8.40	1:39	23.0

COMMENTS: Well-heads were removed ½ hour before measurement.

IMFC

INGRAM MASON & FAIRBAIRN
ONE SANSOME STREET, SUITE 1900
SAN FRANCISCO, CALIFORNIA 94104
TEL (415) 951-4793 (415) 281-9696
FAX (415) 951-4701 (800) 804-IMFC

GROUND-WATER SAMPLING FORM

Job Number: MAR-101J
Location: 2504 MacArthur
Date: 12/12/96

Well Number: B-1
Well Type: ☑ Monitor ☐ Extraction ☐ Other:
Well Material: ☑ PVC ☐ Steel ☐ Other
Sampled By: F.S.

WELL PURGING

PURGE VOLUME

Casing Diameter(D in inches):
☑ 2" ☐ 4" ☐ 6" ☐ Other

Total Depth of Well (BOW) 40.3'
Water Level 7.40
Well Volumes To Be Purged: 3

Well Volume Factors:

Well Casing ID (inches)	(Vol. Factor)
2.0	0.1632
3.0	0.3672
4.0	0.6528
4.5	0.826
6.0	1.469

Purge Volume:

40.3 (total depth) - 7.40 (water level) x 0.1632 (Well Vol. Fac.) x 3 (# of vol. to purge) = 16.1 gallons (calculated purge volume)

PURGE TIME

9:50 Start 11:30 Stop 1.67H Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL VOL. PURGED

20 gallons

PURGE METHOD

☐ Jet Pump ☐ Bailer ☑ Dedicated Pump ☐ Other

WELL SAMPLING PARAMETERS:

Gallons Removed	Time	Temp. C	pH	Cond. (umhos/cm)	Turbidity (NTU)	Other
—	9:50	14.2	7.6	1120	Not Measured	
15	11:00	14.0	7.6	1090	" "	
20	11:30	14.0	7.45	1100	" "	

SAMPLING METHOD:

Time Sampled:
☑ Bailer ☐ Bladder Pump ☐ Other

COMMENTS:

Samples collected	No. of	Container	Preservatives
EPA 8240			
EPA 8270			
EPA 8010			
TPH (Gas) + BTEX	2	VOAS	HCL
METALS			

IMFC

INGRAM MASON & FAIRBAIRN
ONE SANSOME STREET, SUITE 1900
SAN FRANCISCO, CALIFORNIA 94104
TEL (415) 951-4793 (415) 281-9696
FAX (415) 951-4701 (800) 804-IMFC

GROUND-WATER SAMPLING FORM

Job Number: MAR - 101 J
Location: 2504 MacArthur Blvd
Date: 12-13-96

Well Number: B-3
Well Type: ☑ Monitor ☐ Extraction ☐ Other:
Well Material: ☑ PVC ☐ Steel ☐ Other
Sampled By: FS / Keith

WELL PURGING

PURGE VOLUME

Casing Diameter(D in inches):
☑ 2" ☐ 4" ☐ 6" ☐ Other

Total Depth of Well (BOW) 35.0
Water Level 9.27
Well Volumes To Be Purged: 3

Well Volume Factors:

Well Casing ID (inches)	(Vol. Factor)
2.0	0.1632
3.0	0.3672
4.0	0.6528
4.5	0.826
6.0	1.469

Purge Volume:

35.0 (total depth) - 9.27 (water level) x 0.1632 (Well Vol. Fac.) x 3 (# of vol. to purge) = 12.54 gallons (calculated purge volume)

PURGE TIME

12:45 Start 2:00 Stop 1.25 Hr Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL VOL. PURGED

20 gallons

PURGE METHOD

☐ Jet Pump ☐ Bailer ☑ Dedicated Pump ☐ Other

WELL SAMPLING PARAMETERS:

Gallons Removed	Time	Temp. C	pH	Cond. (umhos/cm)	Turbidity (NTU)	Other
0	12:45	14.5	7.6	840	Not Meas.	
10	1:25	14.3	7.5	890	"	
20	2:00	14.2	7.3	720	"	

SAMPLING METHOD:

Time Sampled:
☑ Bailer ☐ Bladder Pump ☐ Other

COMMENTS:

Samples collected	No. of	Container	Preservatives
EPA 8240			
EPA 8270			
EPA 8010			
TPH (Gas) + BTEX	2	VOAS	HCL
METALS			

IMFC

INGRAM MASON & FAIRBAIRN
ONE SANSOME STREET, SUITE 1900
SAN FRANCISCO, CALIFORNIA 94104
TEL (415) 951-4793 (415) 281-9696
FAX (415) 951-4701 (800) 804-IMFC

GROUND-WATER SAMPLING FORM

Job Number: MAR-101J
Location: 2504 MacArthur, Oakland
Date: 12-13-96

Well Number: B-5
Well Type: ☑ Monitor ☐ Extraction ☐ Other:
Well Material: ☐ PVC ☐ Steel ☐ Other
Sampled By: FS/Keith

WELL PURGING

PURGE VOLUME

Casing Diameter(D in inches):
☑ 2" ☐ 4" ☐ 6" ☐ Other
Total Depth of Well (BOW) 23.0
Water Level 9.56
Well Volumes To Be Purged: 3

Well Volume Factors:

Well Casing ID (inches)	(Vol. Factor)
2.0	0.1632
3.0	0.3672
4.0	0.6528
4.5	0.826
6.0	1.469

Purge Volume:

23.0 (total depth) - 9.56 (water level) x 0.1632 (Well Vol. Fac.) x 3 (# of vol. to purge) = 6.58 (calculated purge volume) gallons

PURGE TIME ____ Start ____ Stop ____ Elapsed

PURGE RATE Initial ____ gpm Final ____ gpm

ACTUAL VOL. PURGED ____ gallons

PURGE METHOD
☐ Jet Pump ☐ Bailer ☑ Dedicated Pump ☐ Other

WELL SAMPLING PARAMETERS:

Gallons Removed	Time	Temp. C	pH	Cond. (umhos/cm)	Turbidity (NTU)	Other
0	2:30	13.5	7.3	1290		
7	3:35	14.0	7.5	1350		

SAMPLING METHOD:

Time Sampled:
☑ Bailer ☐ Bladder Pump ☐ Other

Samples collected	No. of	Container	Preservatives
EPA 8240			
EPA 8270			
EPA 8010			
TPH (Gas) + BTEX	2	VOAS	HCL
METALS			

COMMENTS:

Well purged dry – in 4 mins. Tried again – purged dry in 2 mins. Max. H_2O removed 7 G.