

APPENDIX E
AGENCY, AND OTHER RECORDS – SURROUNDING SITES



REMEDIAL ACTION PLAN

CIRCLE K STORE #2211310
(FORMER MOBIL #7-3047)
6401 EAST PACIFIC COAST HIGHWAY
LONG BEACH, CALIFORNIA 90803

CRWQCB CASE #908030016

PREPARED FOR:



CIRCLE K STORES INC.
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SUBMITTED TO:

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION
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BLAES PROJECT #200-1310-01

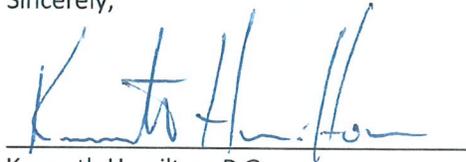
APRIL 14, 2014

This document was prepared by Blaes Environmental Management, Inc. for the exclusive use of Circle K Stores Inc. as it pertains to Circle K Store #2211310 located at 6401 East Pacific Coast Highway in Long Beach, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists, engineers, and environmental consultants practicing in this field. No other warranty, express or implied, is made as to the professional advice in this report. *Any use of or reliance on this report by a third party shall be at such a party's sole risk.*

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All work associated with this project was performed under the supervision of a California Registered Professional Geologist.

Sincerely,



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Blaes Project #200-1310-01

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1.0 INTRODUCTION

This remedial action plan (RAP) was prepared by Blaes Environmental Management, Inc. (Blaes Environmental), on behalf of Circle K Stores Inc. (Circle K), for submittal to the California Regional Water Quality Control Board (CRWQCB). This RAP presents the findings of recent air sparge (AS) remedial feasibility testing and proposes AS in conjunction with soil vapor extraction (SVE) remediation to address persistent fuel hydrocarbons and oxygenates in soil and groundwater underlying portions of Circle K Store #2211310 resulting from historical use as Mobil Station #7-3047.

A release of petroleum hydrocarbons was discovered in 1983 during an underground storage tank (UST) removal program at the site. Petroleum hydrocarbon constituents discovered below the USTs resulted in a liquid-phase and dissolved phase petroleum hydrocarbon plume in groundwater. Petroleum hydrocarbons continue to be detected in groundwater monitoring wells at concentrations exceeding the applicable State of California maximum contaminant levels (MCLs).

Circle K conducted the groundwater AS feasibility test to aid in evaluating remediation technology alternatives to address dissolved phase fuel hydrocarbons and oxygenates in groundwater underlying portions of the site. The feasibility test included the permitting and installation of a nested AS well, on-site groundwater AS pilot testing, collection and recording of field parameters from the AS well and nearby observation wells, analysis of pre-and post-test groundwater samples, and data tabulation and evaluation. It is the opinion of Blaes Environmental that the test results show groundwater AS, when combined with SVE remediation, will be an effective method to further reduce the mass of fuel hydrocarbons in soil and groundwater to levels favorable for closure by the CRWQCB. Plans and specifications of the proposed SVE/AS system for site remediation are provided within.

2.0 SITE BACKGROUND

2.1 SITE LOCATION AND LAND USE

The site is a Circle K owned, dealer operated, retail fuel service station located on the eastern corner of the intersection of East 2nd Street and East Pacific Coast Highway in Long Beach, California (**Figure 1**). The site is located in a mixed commercial and residential area of Los Angeles County and lies at an elevation of approximately 9 feet above mean sea level. Regionally, the site area grades to lower elevations towards the southwest (towards Alamitos Bay). On-site surface drainage has been altered to flow towards the north and southwest, away from the building structure and towards the surrounding streets. Eight fuel dispensers are located beneath two canopies (four dispensers beneath each canopy) and are connected to four 10,000-gallon fuel USTs. A car wash (with an oil/water separator) is located along the northern property boundary. A site plan indicating the property layout is included as **Figure 2**.

The immediate site vicinity consists of retail and commercial properties. Southwest of the site, across East Pacific Coast Highway, is the SeaPort Marina Hotel which is located on the southern corner of the intersection. Immediately southeast of the site is the parking lot and entrance to a strip mall complex composed of various retail businesses and restaurants. The property is bordered to the north by 2nd Street and an In-N-Out Burger restaurant (located on the northern corner of the intersection). Immediately northeast of the site is a parking lot and Ruby's restaurant. City National Bank is located on the western corner of the intersection.

2.2 GEOLOGIC AND HYDROGEOLOGIC SETTING

The geologic and hydrogeologic setting has previously been described by CardnoERI and others and is summarized as follows: the site lies near the southern boundary of the Los Angeles Basin in the Alamitos Gap Erosional Unconformity at an elevation of approximately 9 feet above mean sea level. The site is located within the Long Beach Plain, which is primarily composed of recent fine-grained alluvial deposits and Pleistocene marine deposits of clay, silt, sandy silt, sand and gravel. The Seal Beach Fault is located approximately 1,300 feet north of the site and is part of the active northwest-trending Newport-Inglewood Fault Zone. This fault zone is underlain at depth by a series of northwest/southeast striking subsidiary faults (Randall, 1993).

Alamitos Bay is located approximately 0.2 miles southwest of the Site and the Cerritos Channel is located approximately 0.4 miles north of the site. The San Gabriel River is located approximately 0.5 miles southeast of the Site. The Site lies in the southern tip of the West Coast Groundwater Basin within the former San Gabriel River Delta Area. The Seal Beach Fault allows for the lateral migration of groundwater throughout the recent alluvium; however, the fault forms a substantial barrier to groundwater movement through the aquifers of the Lower Pleistocene San Pedro Formation. Groundwater on the seaward side of the Seal Beach Fault is known to be impacted by saltwater intrusion (CDWR, 1961).

Depth to first groundwater in the Long Beach area is generally less than 50 feet below the ground surface (bgs). Depth to groundwater beneath the site has historically been less than 10 feet bgs. Industries and municipalities in the area generally no longer utilize the shallow groundwater for beneficial purposes, due in part to poor water quality. In the Long Beach area, regional groundwater flow direction is southwesterly towards San Pedro Bay. At the subject site, groundwater flow is generally directed northwest but is highly variable with local highs and lows possibly related to tidal influence.

2.3 SENSITIVE RECEPTORS

There are no hospitals, day care centers, or schools within one mile of the site. The survey found the nearest elementary school (Kettering Elementary School) was located approximately 1.2 miles northeast of the site. The nearest residential properties are located approximately 1,170 feet west of the site and approximately 2,300 feet southwest of the site. Based on the Los Angeles County Department of Public Works (LACDPW, 2012) online database, there is one active water well within a one-mile radius of the site. Well #503A (State Well #5S12W02J02) is located approximately 0.90 miles northeast of the site and was reportedly last gauged on April 4, 2007 with a recorded depth to water of 50.20 feet. According to the Orange County Water District, no drinking water wells exist within a one-mile radius of the Site (TRC, 1999).

2.4 PREVIOUS INVESTIGATIONS

Previous investigations conducted at the site have included two UST removal events, site investigations to characterize the extent of petroleum hydrocarbons in soil and groundwater, periodic groundwater monitoring, SVE remedial feasibility testing, SVE remediation, and periodic Liquid-Phase Hydrocarbon (LPH) removal events. The following section briefly describes previous environmental activities.

- In 1983, four steel USTs were excavated and removed from the site. Soil samples collected from beneath the southeastern end of the northern dispenser island indicated elevated levels of petroleum hydrocarbons.
- From 1983 to 1996, multiple groundwater monitoring wells were installed both onsite and offsite to evaluate the lateral extent of petroleum hydrocarbons in groundwater from the release. Liquid-Phase Hydrocarbons were found in several of the wells at the site and in 1988 a LPH removal system was installed at the site. LPH is still detected intermittently in two of the wells on the northwestern part of the property (wells B1 and B2).
- In April 1995, soil samples were collected during the excavation and removal of product lines, fuel dispensers, and USTs at the site. The previous tanks were removed and four new 10,000-gallon fiberglass tanks were installed at the site.
- In June 1995, an SVE pilot test was conducted at the site. The results of the feasibility testing indicated that SVE using a horizontal vapor capture trench would be more viable than vertical SVE wells. In October 1995 a horizontal SVE trench was installed in an approximate north-south orientation near the western property boundary. In November 1995, a SVE test was conducted using the horizontal SVE trench.
- In February 1996, groundwater monitoring well B4 was abandoned to accommodate the construction of a car wash at the property.
- From September 1998 to November 2006, a SVE system with thermal oxidizer operated at the site to remediate petroleum hydrocarbons within the vadose zone soil. During that time period, an estimated 144,593 pounds of petroleum hydrocarbons were extracted and treated from the site. Based on the SVE system operational results, SVE has been shown to be an effective component of the remediation process at the site.

- In April and May 2006, ERI conducted overpurgage events within wells B2 and B7 using a vacuum truck. The objective was to remove or reduce the LPH within these wells using an aggressive pumping method. Approximately 200 and 550 gallons of groundwater was pumped from wells B2 and B7, respectively, in April 2006. Approximately 400 and 600 gallons of groundwater was pumped from wells B2 and B7, respectively, in May 2006.

The site is currently on a semi-annual groundwater monitoring and sampling schedule (first and third quarters) that includes the sampling of 8 onsite and 5 offsite monitoring wells. Well construction details are provided on **Table 1**. The most recent groundwater monitoring and sampling event (February 2014) indicated a groundwater gradient generally towards the northwest (**Figure 3**) and an average depth to groundwater of approximately 7.56 feet below the top of well casing. The dissolved phase petroleum hydrocarbon concentrations for gasoline range total petroleum hydrocarbons (TPH-g), benzene, methyl tertiary butyl ether (MTBE), and tertiary butyl alcohol (TBA) detected in groundwater monitoring wells from the February 2014 event are presented in **Figures 4, 5, 6, and 7**, respectively. Recent groundwater monitoring data and laboratory analytical results are provided in **Table 2**. A summary of historical groundwater monitoring data and laboratory analytical results is provided in **Appendix A**. Historical soil sample analytical results are provided in **Appendix B**.

3.0 AIR SPARGE REMEDIAL FEASIBILITY TESTING

Blaes Environmental, on behalf of Circle K, conducted groundwater AS remedial feasibility testing as part of a program to evaluate technology alternatives to address residual concentrations of dissolved-phase fuel hydrocarbons underlying portions of the site. The AS pilot test included the following work elements:

- Installation of nested on-site AS wells AS-1A & AS-1B.
- Remedial AS feasibility pilot testing to assess pressures and flows into the subsurface.
- Collection and laboratory analysis of soil and pre- and post-test groundwater samples.
- Data evaluation and preparation of this RAP.

All work associated with this program was conducted under the supervision of a State of California professional geologist. Details of the groundwater AS pilot test are provided in the following sections.

3.1 REMEDIAL WELL AS-1 DRILLING AND INSTALLATION

3.1.1 WELL PERMITTING

Blaes Environmental acquired well construction permit #1852 from the City of Long Beach Department of Health and Human Services prior to initiation of field work. A copy of the well construction permit is provided in **Appendix C**.

3.1.2 SITE-SPECIFIC HEALTH AND SAFETY PLAN

Blaes Environmental generated a site-specific health and safety plan (HASP) for the scope of work performed at the site. A copy of the HASP was available on-site during all field activities. Health and safety meetings were held prior to beginning work each day, and the HASP was discussed and signed by all on-site workers involved. The signed HASP will be retained in the Blaes Environmental project file.

3.1.3 UNDERGROUND UTILITY LOCATION AND CLEARING

Blaes staff visited the site, marked the proposed drilling location with white chalk, and notified Underground Service Alert as required by law. Representatives of the utility companies visited the site and marked the approximate locations of their underground utilities. The drilling crew later cleared the

boring location using hand auger methods to approximately five feet bgs prior to drilling as a precautionary measure to minimize the possibility of accidental damage to underground utilities.

3.1.4 DRILLING, SOIL SAMPLING AND WELL INSTALLATION

On February 15, 2013, a licensed drilling company (Cascade Drilling) advanced soil boring AS-1A/B using a truck-mounted CME-75 hollow-stem auger drilling rig at the location indicated in **Figure 2**. Soil samples were collected at five-foot depth intervals using a modified California split-spoon soil sampler lined with three 2-inch diameter by 6-inch long brass sleeves. The soil sample contained in the middle brass sleeve was field-screened using a photo-ionization detector (PID) to detect for the presence of volatile organic compounds (VOCs). The soil was additionally visually inspected and logged using the Unified Soil Classification System (USCS).

One soil sample (AS-1A/B-7'), collected at 7 feet bgs and selected based on field screening results and proximity to the capillary fringe, was analyzed for TPH-g and VOCs by an analytical laboratory using Environmental Protection Agency (EPA) Method 8260B (full list for BTEX and fuel oxygenates). Soil laboratory analytical results indicated concentrations of TPH-g (790 milligrams per kilogram {mg/Kg}) and various VOC analytes including benzene (3.1 mg/Kg) and MTBE (3.2 mg/Kg). A summary of the soil laboratory analytical results is provided in **Table 3**. A soil boring log describing geologic materials encountered during drilling is provided in **Appendix D**. A copy of the soil laboratory analytical report is included in **Appendix E**.

After drilling to the target depth (25 feet bgs) and completion of soil sampling, the soil boring was converted to nested AS test well AS-1A/B. The nested remedial AS test wells were constructed with 2-inch diameter schedule 40 PVC with three feet of 0.010-inch slotted casing. The screen of AS-1A and AS-1B were installed from 22 to 25 feet bgs and from 10 to 13 feet bgs, respectively. At the ground surface, the remedial test wells were sealed with removable caps and enclosed within a traffic-rated, 12-inch-diameter locking well box that was cemented in place. The construction diagram of remedial test well AS-1A/B is included in **Appendix D**.

3.1.5 WASTE MANAGEMENT

Soil cuttings (solid waste) and purged groundwater (liquid waste) generated during drilling were temporarily stored on-site in properly labeled and sealed DOT-approved 55-gallon steel drums pending characterization and disposal. Two drums of liquid waste and three drums of solid waste were removed

from the site on February 20, 2013 and transported to a Crosby & Overton facility in Long Beach, California for disposal. A Copy of the manifest for the proper transport and disposal of the non-hazardous solid and liquid waste is provided in **Appendix F**.

3.2 GROUNDWATER AIR SPARGE FEASIBILITY TESTING

Blaes Environmental performed the approximate six hour groundwater AS pilot test on October 24, 2013. The AS test equipment included an air compressor with particulate filter, direct-reading flow and pressure instrumentation, an isolation/control valve manifold, and compressed air lines and fittings (**Figure 8**). Nearby monitoring wells used as observation points were fitted with capped risers with sampling ports to facilitate pressure monitoring and other field measurements, including well head total organic vapor (TOV) monitoring. The objectives of AS testing were to evaluate:

- The pressure required to overcome hydrostatic head in saturated soils to provide effective sparge flow;
- The change in dissolved oxygen (DO) concentrations at lateral distances from the AS test well produced by air sparging;
- The effect of AS remediation on dissolved-phase petroleum hydrocarbon concentrations in the groundwater at the site; and
- The estimated effective radius of influence (ROI) of AS for future equipment specifications and possible well spacing intervals.

3.2.1 BASELINE PARAMETERS

The AS test was preceded by the collection and recording of baseline field parameters from well AS-1A and AS-1B and from the selected observation wells (B1, B2, B3, B6, B9 and SV1). Baseline field parameters included depth to groundwater, TOVs, DO, conductivity, salinity, temperature, pH, oxidation-reduction potential (ORP) and pressure/vacuum measurements. Additionally, pre-sparge, no-purge groundwater samples were collected from nearby monitoring wells B2 and B3.

3.2.2 GROUNDWATER AIR SPARGING

After collection of baseline field parameters and pre-sparge groundwater sampling, the AS feasibility test was initiated by slightly opening the air control valve and applying pressurized air to remediation test well AS-1B (the shallow AS well) incrementally until a measurable air flow was observed. The AS-1B test was conducted for approximately three hours, after which feasibility testing was conducted on AS-1A according

to the same procedures. During each test, the sparge air pressure was increased in increments until a stabilized air flow was measured at a designated maximum pressure.

3.2.3 OBSERVATION WELL MONITORING

The lateral influence of induced pressure during injection of air into well AS-1A & AS-1B was monitored using monitoring wells B1, B2, B3, B6, B9 and SV1. Sensitive calibrated Magnehelic™ pressure gauges were connected to each of the monitoring points to measure the lateral pressure response. At periodic intervals during the AS test, the pressure and flow rate into the test well, and the induced pressure response on lateral monitoring point wells were monitored and recorded on a field data sheet. To further aid in evaluating AS effectiveness, the observation wells were periodically field screened for DO concentrations, temperature, conductivity, and depth to water before, during, and after the AS test. A portable photo-ionization detector was used to monitor changes in TOV concentrations at the observation wells during the AS test.

3.2.4 AS TEST GROUNDWATER SAMPLING

To aid in evaluating the effect of AS on dissolved-phase fuel hydrocarbon concentrations, no-purge groundwater samples were collected from monitoring wells B2 and B3 at the end of the AS-1B test (prior to starting the AS-1A test) and upon conclusion of the AS-1A test. The pre-test, mid-test and post-test groundwater samples were analyzed by a state-certified environmental laboratory for TPH-g and VOCs (full list for BTEX and fuel oxygenates including DIPE, EtBE, TAME, and TBA) following EPA Method 8260B.

3.3 GROUNDWATER AIR SPARGE FEASIBILITY TEST RESULTS

Compressed air was injected first into well AS-1B at pressures that ranged from approximately 10 pounds per square inch (psi) to 11.6 psi. Corresponding air flow rates into AS-1B ranged from 3.0 standard cubic feet of air per minute (scfm) to approximately 8 scfm. Pressures injected into well AS-1A ranged from approximately 15.5 psi to 19.5 psi with a corresponding flow rate of 2 scfm to 10.5 scfm. The graphs showing air flow rate versus pressure for both AS-1A and AS-1B are provided as **Figure 9**. Pressure and air flow measurements recorded during the AS-1A/B tests, including pressure and TOV measurements at the observation wells, are provided in **Table 4**.

An effective pressure response was recorded in most of the observation wells during each AS test. The highest pressure response was recorded at well B3, located approximately 8.8 feet from the AS test wells,

with pressures as high as 7.8 inches of water recorded during the AS-1B test and 9 inches of water recorded during the AS-1A test. Additionally, AS testing of the shallow zone (AS-1B) resulted in a pressure response of 0.12 inches of water in well B6 located 69 feet laterally from the test wells. Testing of the deeper zone (AS-1A) resulted in a pressure response of up to 1.5 inches of water in well B9 located approximately 105 feet laterally from the test wells. Graphs of the monitoring well pressure response during each AS test are shown in **Figure 10**. Pressure response data is provided on **Table 4**.

TOV concentrations monitored at the observation well heads increased over time in a majority of the monitoring wells. Significant increases in TOV concentrations were observed in wells B1, B2 and B3 during the AS-1B test and primarily in well B3 during the AS-1A test. Graphs of the changes in TOV concentrations throughout each AS test are provided in **Figure 11**. TOV response data is provided on **Table 4**.

Groundwater elevation gaging data collected during baseline conditions, and at the approximate midpoint and conclusion of the AS feasibility test indicated water table mounding during each of the tests. The maximum rise in groundwater was 6.66 feet recorded at the end of the AS-1B test in well B3, located approximately 8.8 feet from well AS-1A/B. The maximum rise in groundwater at distance (well B9 located approximately 105.7 feet from well AS-1A/B) was 2.31 feet recorded at the end of the AS-1A test. As might be expected, mounding was most significant in the observation wells closest to the AS test wells and less prevalent further away. Groundwater parameters measured in the field are provided in **Table 5**.

Dissolved oxygen concentrations increased significantly in nearby observation well B3 during both AS tests. DO in well B3 increased from a baseline of 2.9% to 29.4% by the end of the AS-1B test and to 32.5% by the end of the AS-1A test. Significant changes in DO concentrations were not observed in the remaining observation wells. Groundwater parameters measured in the field are provided in **Table 5**.

Pre-test, mid-test, and post-test groundwater samples collected from monitoring wells B2 and B3 generally indicated a significant decrease in petroleum hydrocarbon concentrations. Benzene concentrations decreased in well B2 from a baseline of 5,200 micrograms per liter ($\mu\text{g/L}$) to 1,100 $\mu\text{g/L}$ by the end of the AS-1B test and to 730 $\mu\text{g/L}$ by the end of the AS-1A test. A similar reduction was reported in the samples collected from well B3 which had a baseline concentration of 9,300 $\mu\text{g/L}$. The B3 benzene concentration was subsequently reduced to 4,700 $\mu\text{g/L}$ at the end of the AS-1B test and to

1,600 µg/L at the end of the AS-1A test. A summary of the laboratory analytical results for groundwater samples is provided in **Table 6**. A copy of the laboratory analytical report is provided in **Appendix G**.

3.4 AIR SPARGE FEASIBILITY TEST EVALUATION

Evaluation of the feasibility test data indicates the following:

- Favorable positive pressure influence was measured in most observation wells during the AS tests. A reduction in pressure responses in select wells during the AS tests could be attributed to groundwater mounding resulting in potentially submerged screens or a significant reduction in screen length above the water table.
- Air injected into remediation wells AS-1/A and AS-1/B at recommended pressures dispersed into the saturated zone with flow rates effective for remediation of dissolved phase hydrocarbons.
- The increase in TOV concentrations at the observation wells indicates that AS successfully mobilized vapor phase fuel hydrocarbons from groundwater to the vadose zone.
- Favorable rises in DO concentrations were measured in observation well B3, located approximately 8.8 feet from the test wells.
- Significant groundwater mounding was observed at the site within several hours as a result of continuous, extended AS testing. Groundwater elevations increased 2.31 feet in observation well B9, to a maximum rise of 6.66 feet in observation well B3. To reduce the effects of mounding, implementation of air sparging at the site should be conducted using pulsed sparge flow at a recommended flow rate of approximately 5 scfm.
- Pre-, mid- and post-test groundwater samples collected from monitoring wells B2 and B3 indicated a significant decrease in petroleum hydrocarbon concentrations over the duration of the test.
- Based on the results of the recent AS feasibility test and previous SVE operating data, implementation of AS/SVE remediation at the site would effectively reduce hydrocarbon concentrations in soil and groundwater.
- The AS ROI was estimated to be between approximately 15 to 20 feet from test well AS-1A/B.

4.0 PROPOSED REMEDIAL ACTION

Based on the results of the October 2013 AS test, the previous operation of an SVE remediation system at the site, current and historical site conditions, and experience with similar projects, Blaes Environmental recommends implementation of combined AS/SVE remedial technologies to address hydrocarbon impacted groundwater beneath the site. The proposed corrective action includes the following work elements:

- Acquisition of necessary permits from regulatory agencies.
- Boring mark-outs and subsurface utility clearance.
- Drilling, field screening of soil cuttings and borehole logging.
- Installation of twelve (12) additional AS remediation wells (**Figure 12**).
- Laboratory analysis of selected soil samples collected from the borings drilled for well installation.
- Trenching and tie-in of newly installed AS remediation wells to the existing remediation compound.
- Startup and operation of a newly installed AS and SVE remediation system within the existing remediation compound.
- Preparation and submittal of a report to the CRWQCB documenting the remedial action activities.

Field activities associated with the proposed corrective action will be conducted under the supervision of a State of California professional geologist. Details of the proposed scope of work are provided in the following sections.

4.1 WELL PERMITTING

Blaes Environmental will obtain permits from the City of Long Beach for the construction of the proposed AS remediation wells. The approved well construction permit will be kept on-site during drilling, and a copy will be included in the subsequent remedial installation-progress report.

4.2 SITE HEALTH AND SAFETY PLAN

Blaes Environmental will prepare a health and safety plan (HASP) for the site prior to initiating field activities. The HASP will summarize potential chemical and physical hazards, health and safety policies and practices, and provide emergency contingencies, including contact information for police, medical, and fire. A copy of the HASP will be available on-site during all field activities. A health and safety meeting will be conducted before initiating field activities and the HASP will be reviewed and signed by all Blaes Environmental personnel and subcontractors. The HASP will conform to OSHA HAZWOPER requirements (29 CFR 1910.120).

4.3 UNDERGROUND UTILITY LOCATION AND CLEARING

Blaes Environmental will visit the site and mark the locations of the proposed borings with white chalk. Blaes Environmental will provide notification of drilling activities to Underground Service Alert (USA) at least 48 hours prior to drilling as required. USA is a service that notifies public utility companies of work being performed near their underground utilities. Representatives of the utility companies will visit the site and mark the locations of their respective underground utilities in the vicinity of the work area. To verify underground utility clearance, air excavation equipment may be used to advance each boring to approximately five feet below grade prior to drilling for remediation well installation.

Additionally, a geophysical survey of the site was performed on February 11, 2013 to delineate underground utilities. The geophysical survey results will be used to help prevent damage to subsurface utility conduits during well installation and construction activities. A copy of the geophysical survey is provided in Appendix H.

4.4 DRILLING, SOIL SCREENING/SAMPLING AND REMEDIATION WELL INSTALLATION

The remedial action program will involve the drilling of 12 on-site soil borings with conversion to AS remediation wells (**Figure 12**). The scope of activities for the proposed remedial well installation is presented in the following sections.

4.4.1 DRILLING, FIELD SCREENING AND SOIL SAMPLING

A licensed drilling company will be contracted to advance the soil borings for well installation using a truck-mounted or limited-access hollow-stem auger drill rig, as appropriate. Soil borings will be drilled to approximately 25 feet bgs for proposed AS wells, depending on the depth to groundwater and lithology at the specific drilling location. Soil cuttings will be screened in the field for TOVs during drilling

using a portable PID. Soil samples will be collected at approximate 10 foot sample intervals and logged using the Unified Soil Classification System.

4.4.2 REMEDIATION WELL INSTALLATION

Each of the soil borings will be converted into an AS remediation well after drilling to the target depth. Each AS well will be constructed of two-inch diameter schedule 80 PVC and will be installed to a depth of approximately 25 feet bgs. The newly installed AS wells will be constructed with a three foot long well screen. Construction details of the proposed AS wells are presented in **Appendix I**. Final construction of the remediation wells will be based on the encountered lithology and current depth to groundwater at the boring locations.

4.5 REMEDIATION CONSTRUCTION

4.5.1 REMEDIATION DESIGN PLAN

Prior to remediation construction activities, a detailed design plan will be prepared. The design plan will include the proposed remedial trenching layout and AS/SVE remedial system specifications. The plan set will be submitted to the City of Long Beach for conditional use permitting, as appropriate.

4.5.2 LATERAL PIPING AND MANIFOLD CONSTRUCTION

Blaes Environmental will oversee saw-cutting of paving materials and trenching needed for installation of air supply piping for the new AS remediation wells. Each of the newly-installed remediation wells will be individually connected to 1.5-inch diameter schedule 40 PVC pipes which will be routed to the existing remediation compound. The conveyance line for each new AS well will be stubbed up individually inside the remediation compound in 1.5-inch diameter schedule 80 PVC or galvanized steel.

Additionally, a 30 foot section of the trench located near the northern dispenser canopy will include the installation of a horizontal SVE well. The horizontal SVE line will be constructed of 3-inch diameter schedule 40 PVC with 0.020-inch slotted screen. The SVE line will be installed at a depth of approximately four feet bgs and backfilled with sand to a depth of approximately two feet bgs (the depth of the AS conveyance line trench). Pressure testing of the newly-installed underground remediation piping will be performed prior to trench back-filling to identify potential leakage. The approximate two foot deep trenches will be back-filled with a single-sack slurry after favorable line testing. Surface completion of the trenches will be flush with grade and similar to surrounding paving materials. The proposed new AS remediation conveyance piping is depicted on **Figure 13**.

4.6 WASTE MANAGEMENT

Soil and water waste generated during the proposed additional remediation well installation, trenching and remediation system installation activities will be stored on-site in a roll-off bin and/or properly labeled DOT-approved, labeled 55-gallon steel drums pending characterization, transport and disposal. Paving debris will be contained in a roll-off bin pending transport and recycling as road base material.

4.7 REMEDATION SYSTEM OPERATION, MAINTENANCE, AND EVALUATION

Following the completion of construction activities, a stand-alone AS remedial system will be installed in the equipment compound and connected to the AS well manifold. The new AS system will include a built-in AS manifold containing individual flow meters, pressure gauges, timers, and solenoid valves to individually connect to the AS conveyance piping stub-ups. Additionally, an all-electric, catalytic oxidizer will be installed concurrently with the AS system. The SVE system will be connected to the existing VE manifold within the remediation compound. A new electric service will be established to feed the SVE/AS remedial systems.

During operation of the AS/SVE remediation systems, Blaes Environmental will perform airflow and emissions monitoring, sampling and reporting as specified by AQMD permit requirements. Influent vapor monitoring, well head vacuums, influent vapor sampling and vapor extraction system maintenance will be performed as required during visits for the agency-required emissions monitoring. All AS/SVE system controls, especially safety shutdown devices, will be inspected for proper operation. Additionally, all operational parameters (i.e., temperature, pressure, flow rate, vacuum, total runtime, and system alarms, etc.) will be recorded, and any necessary adjustments will be made to assure proper operation. After connection of the new remediation wells, Blaes Environmental will evaluate influent vapor concentrations from individual wells to aid in directing vacuum and sparging air to remediation wells yielding the highest concentrations.

Composite influent and effluent vapors will be monitored during each visit at the vapor extraction unit and individual SVE wells at the vapor manifold inside the compound using a PID. Influent vapor monitoring results will be used to optimize the system efficiency. Effluent vapor monitoring results will be used to evaluate the efficiency of the vapor treatment system. AS flow and injection pressure into individual wells will be balanced as needed. The AS/SVE remediation system will be designed to operate continuously, requiring only weekly or bi-monthly visits for inspection, monitoring and maintenance.

The AS portion of the AS/DPE remediation system will be operated in pulse mode to reduce the effects of groundwater mounding observed during recent testing. Groundwater elevation gauging will be performed frequently during initial AS/SVE operation to aid in assessing potential groundwater mounding conditions arising from AS.

Blaes Environmental will continuously evaluate remediation system operational parameters to assess the efficiency of the operating AS/SVE system, including analytical results for incoming vapor and groundwater. Vacuum and sparge air will be directed to remediation wells having the highest influent vapor concentrations to maximize removal of hydrocarbon mass from soil and groundwater. The effectiveness of the AS remedial system will be monitored using the groundwater monitoring and sampling program already established for the site (**Table 1**). The AS/SVE remediation systems will be shut down a minimum of 72-hours prior to a scheduled groundwater monitoring and sampling event.

When groundwater concentrations and influent vapor concentrations reach low or asymptotic conditions, rebound testing of the AS/SVE system will be performed per applicable regulatory agency guidelines. After successful completion of rebound testing, Blaes Environmental will submit a work plan for a remediation confirmation soil assessment to the CRWQCB.

4.8 REPORTING

Blaes Environmental will perform data evaluation following completion of field activities and prepare a remedial action implementation report documenting the latest scope of corrective action conducted at the site, including as-built well construction diagrams and waste disposal documentation, and the results of any further testing, remediation system installation and initial operation. The report will be submitted to the CRWQCB via the California Geotracker database.

Periodic site status reports will be submitted according to the semi-annual schedule already established for the site. The remedial status reports will describe the procedures and results of the remediation program during the previous reporting period and will include a compilation of the SVE/AS field data, a summary of groundwater monitoring activities, mass removal estimations, vapor and groundwater sampling analytical results, laboratory reporting documentation, and supporting figures and tables.

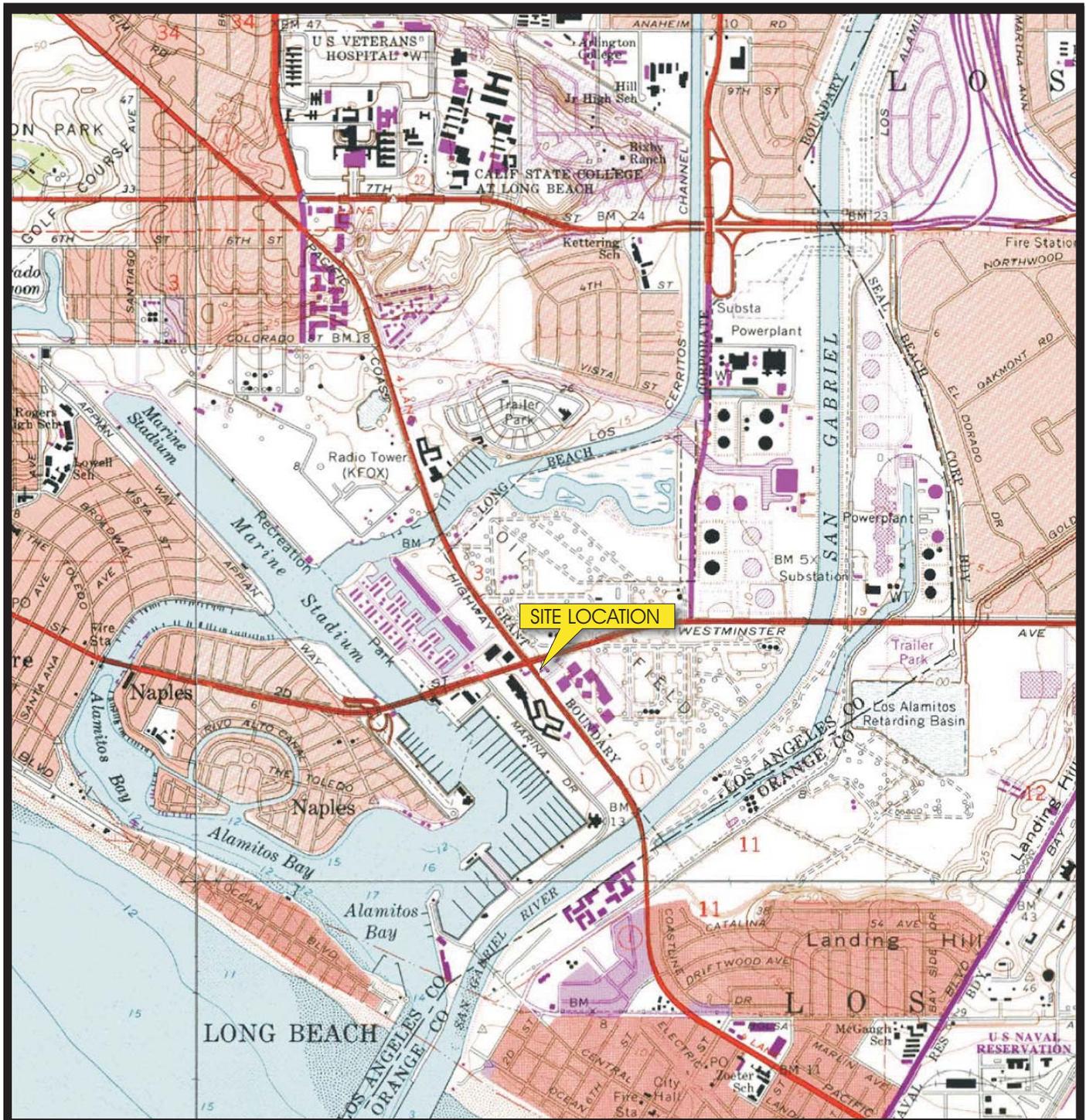
4.9 CORRECTIVE ACTION IMPLEMENTATION SCHEDULE

Blaes Environmental will begin permitting and implementation of the remedial actions proposed within this RAP upon approval by the CRWQCB and/or following the requisite 60-day expedited agency oversight program (EAOP) requirements and after obtaining necessary permits. Prior to initiating the scope of work, Blaes Environmental will provide notification to the CRWQCB of the schedule.

5.0 REFERENCES

- Blaes Environmental Management, Inc., 2013. Groundwater Monitoring Report, Second and Third Quarters 2013. Circle K Store #22113310, Former ExxonMobil Station #7-3037. October 17.
- California Department of Water Resources (CDWR), 1961. Bulletin No. 104, Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County, Bulletin 104. 1961.
- California Regional Water Quality Control Board, Los Angeles Region 4 (CRWQCB-LAR), 1994. Water Quality Control Basin Plan. 1994.
- CardnoERI, Third Quarter 2011 Groundwater Monitoring and Status Report, 2011. Former Exxon Station 73047 6401 East Pacific Coast Highway, Long Beach, California, September 26.
- CardnoERI, Work Plan for the Installation of Three Nested Air Sparging/Soil Vapor Extraction (AS/SVE) Wells and the Performance of an AS/SVE Feasibility Test, 2007. Former Exxon Station 73047 6401 East Pacific Coast Highway, Long Beach, California, June 7.
- CardnoERI, 2005, Quarterly Report for the First Quarter 2005, Former Exxon Station 73047, 6401 East Pacific Coast Highway, Long Beach, California, April 15.
- Los Angeles County Department of Public Works (LACDPW), 2012. Water Resources website:
<http://dpw.lacounty.gov/general/wells>
- Randall, D.H., et al., 1993, Geology of the City of Long Beach, United States of America: Bulletin of the Association of Engineering Geologist, vol. 20.
- State Water Resources Control Board *Geo Tracker (SWRCB GeoTracker) –Internet web site.*
https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0603701717
- VET, 1998, Site Characterization Report, Tosco/76 Products Service Station 5379, 6280 East Second Street, Long Beach, California, Vapor Extraction Technology, Inc., November 6, 1998.

FIGURES



Source: MapTech Terrain Navigator -Los Alamitos Quadrangle, 7.5 Minute Topographic Series, 1964 (1981 photo-revised)



Approximate Scale
1:24,000
1 inch = 2000 feet



Contour Interval = 5 feet



SITE LOCATION: T5S, R12W, Section 11

33° 45' 28.35" North Latitude; 118° 06' 37.58" West Longitude



CRWQCB Case #908030016
Circle K Store # 2211310
6401 East Pacific Coast Hwy
Long Beach, CA 90803

**SITE
LOCATION
MAP**

March 2014 | Project #200-1310-01 | Figure 1

P:\Technical\200 Circle K - Corona\200-01310-01
Long Beach - Pacific Coast Hwy\2211310 Fixed Graphics

Soil Sampling Key:

- 1 = T1N
- 2 = T2N
- 3 = T2S
- 4 = T3N
- 5 = T3S
- 6 = T4N
- 7 = T4S
- 8 = T5E(a)
- 9 = T5W(a)
- 10 = L-1
- 11 = L-2
- 12 = L-3
- 13 = P1-2
- 14 = P3-4
- 15 = P5-6
- 16 = P7-8
- 17 = P9-10
- 18 = P11-12
- 19 = P13-14
- 20 = P15-16
- 21 = D-1
- 22 = D-2
- 23 = D-3
- 24 = D-4
- 25 = D-5
- 26 = D-6
- 27 = D-7
- 28 = D-8
- 29 = L-1
- 30 = L-2
- 31 = L-3
- 32 = L-4
- 33 = L-5
- 34 = L-6
- 35 = D1
- 36 = D2
- 37 = D3
- 38 = D4
- 39 = D5
- 40 = D6

#1-20 Collected by H.E.M.C. 7/5/1988

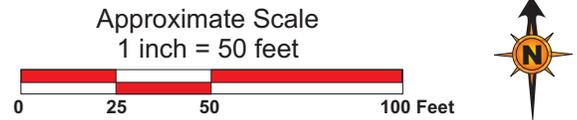
#21-34 Collected by DELTA 4/13/1995

#35-40 Collected by FREY 1/30/2006

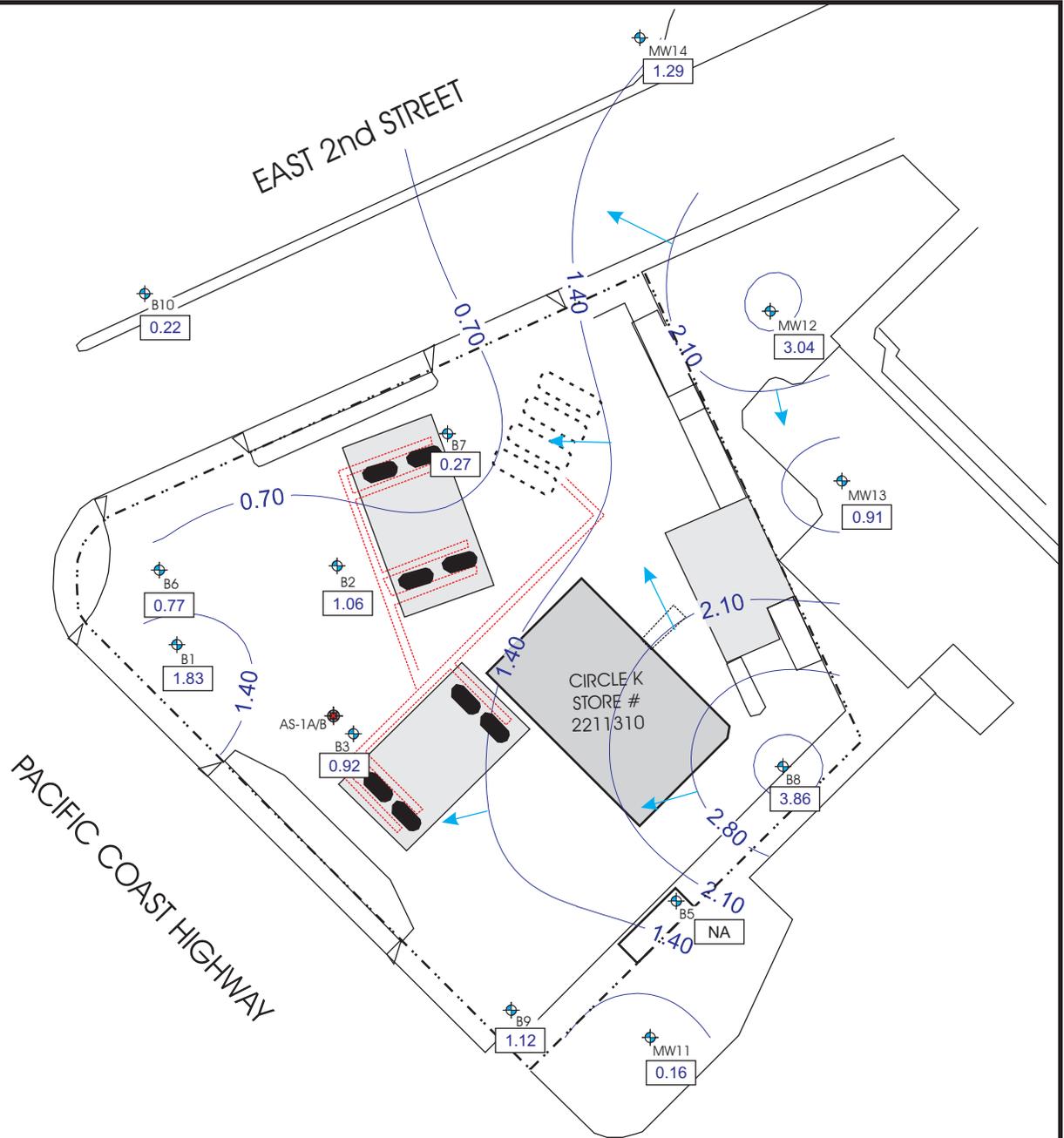


Legend	
	Groundwater Monitoring Well(s) & ID
	Vapor Extraction Well(s) & ID
	Soil Sampling Point(s) & ID
	76 Station Groundwater Monitoring Well(s) & ID
	Destroyed Groundwater Monitoring Well(s) & ID
	Air Sparge Test Well & ID

Map Source : Modified from a map provided by ERI



CRWQCB Case ID #908030016 Circle K Store #2211310 6401 East Pacific Coast Hwy Long Beach, CA 90803	
SITE PLAN	
March 2014	Project # 200-1310-01
<small>P:\Technical\200 Circle K - Corona\200-01310-01 Long Beach - Pacific Coast Hwy\2211310 Fixed Graphics</small>	
Figure 2	

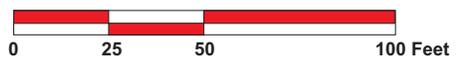


LEGEND

-  Approximate Location of Groundwater Monitor Well(s) and ID
-  Approximate Location of Air Sparge Well(s) and ID
- 1.83 Groundwater Elevation (feet above mean sea level)
- NA Not Applicable - Not Accessible
-  Groundwater Directional Gradient Arrow
Groundwater Contour Interval = 0.7 feet
Approximate Gradient = 0.015 (B8 TO B10)

Map Source : Modified from a map provided by ERI

Approximate Scale
1 inch = 50 feet



CRWQCB Case #908030016
Circle K Store #2211310
6401 East Pacific Coast Hwy
Long Beach, CA 90803

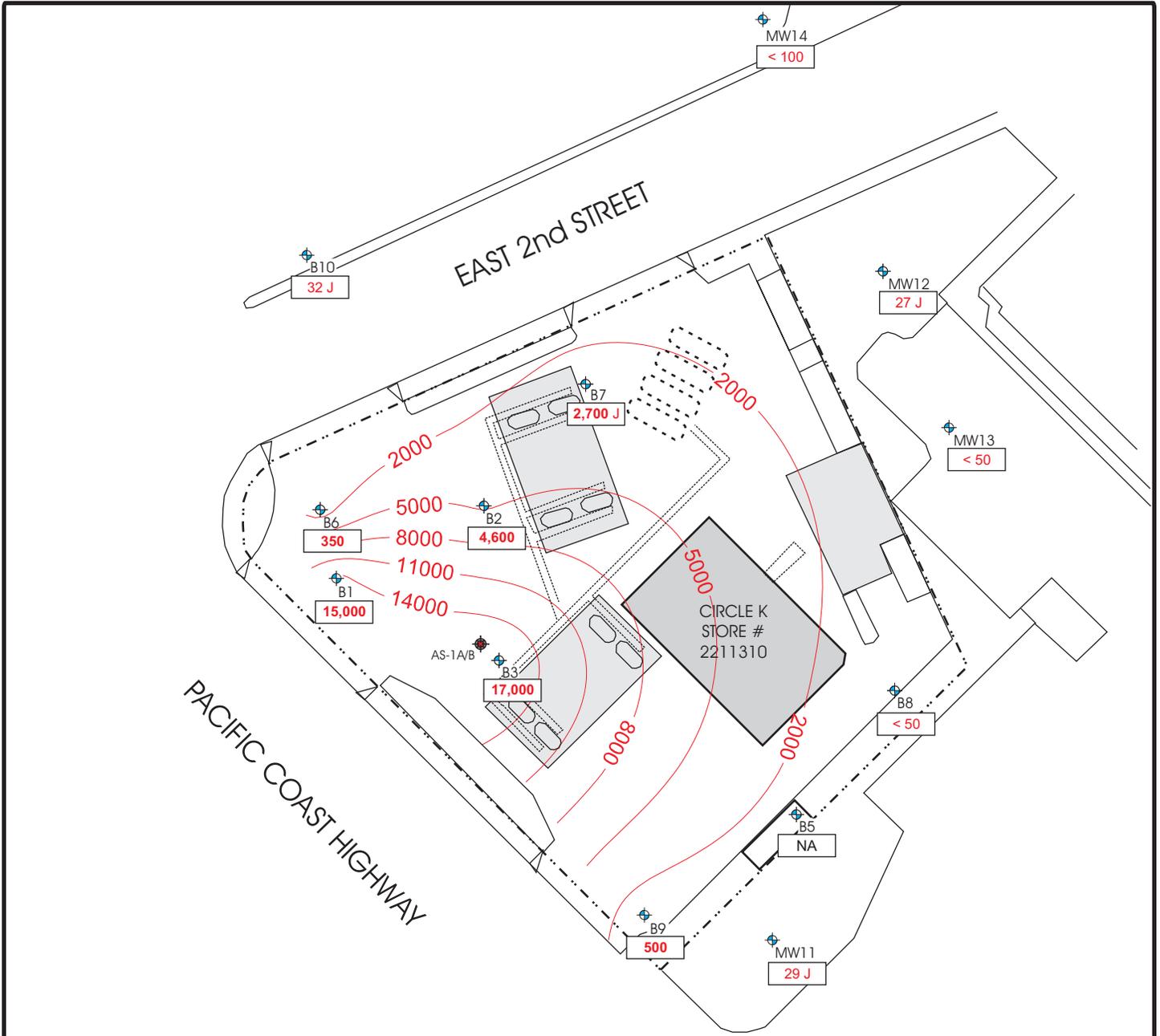
Groundwater Elevation Contour Map
February 18, 2014

March 2014

Project # 200-1310-01

Figure
3

P:\Technical\200 Circle K - Corona\200-01310-01 Long Beach - Pacific Coast Hwy\2211310 Groundwater Monitoring\2014 GWM\1310 1Q14 GWM\1310 1Q14 Graphics



LEGEND

B6 Approximate Location of Groundwater Monitor Well(s) & ID

AS-1A/B Approximate Location of Air Sparge Well(s) & ID

350 Total Petroleum Hydrocarbon (TPH-g) Concentration micrograms per liter (parts per billion)
J - Concentration detected above laboratory method detection limit but below laboratory reporting limit - approximate value.

< 50 concentration box"/> < 50 Not detected above given reporting limit

NA Not Accessible - unable to locate well

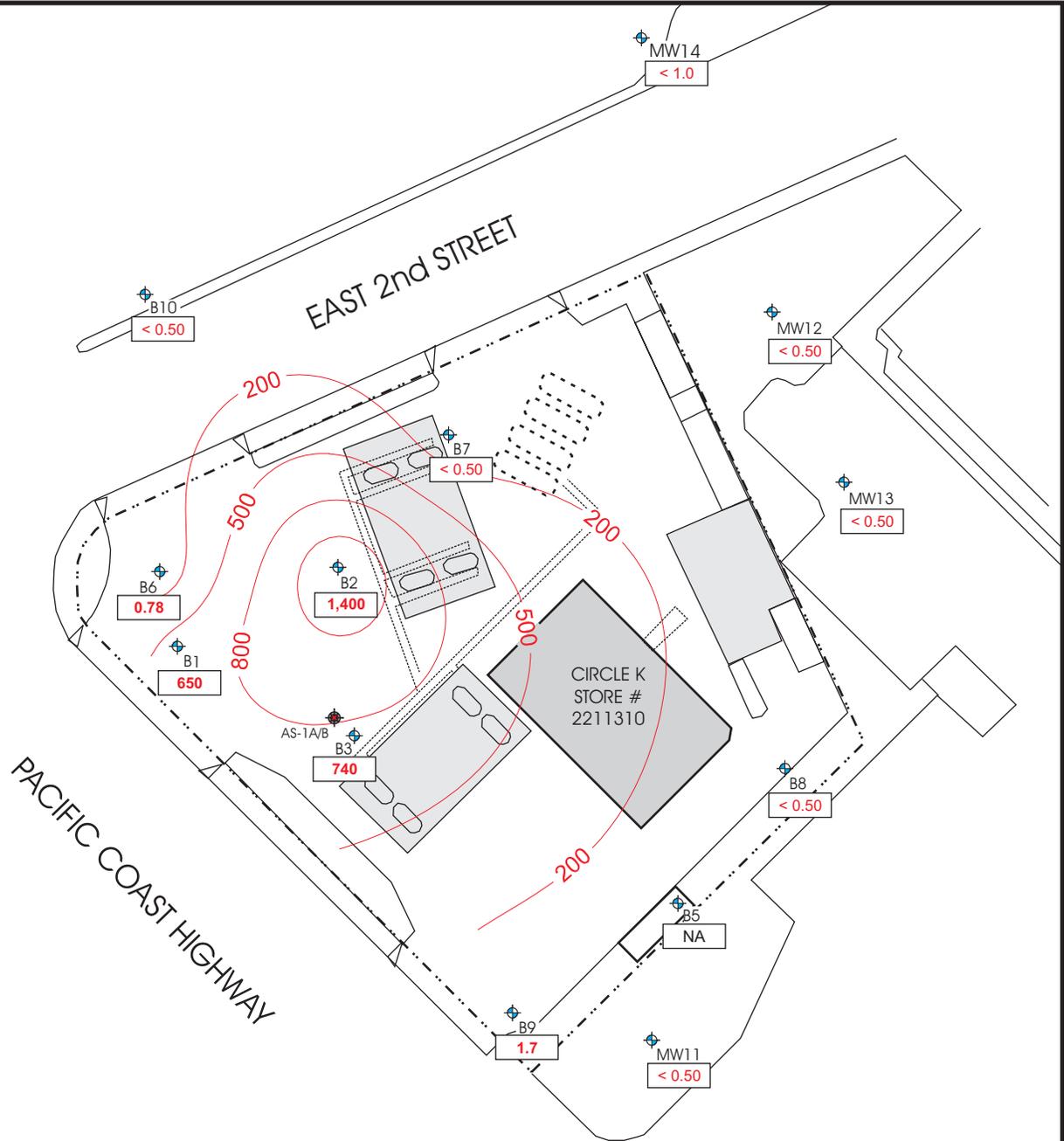
5000 Contour Interval = 3,000 parts per billion

Map Source : Modified from a map provided by ERI

Approximate Scale
1 inch = 50 feet



		Circle K Stores, Inc.	
CRWQCB Case #908030016 Circle K Store #2211310 6401 East Pacific Coast Hwy Long Beach, CA 90803		TPH-g Isoconcentration Map February 18, 2014	
March 2014	Project # 200-1310-01	Figure 4	
<small>P:\Technical\200 Circle K - Corona\200-01310-01 Long Beach - Pacific Coast Hwy, 2211310 Groundwater Monitoring\2014 GWM\1310 1Q14 GWM\1310 1Q14 Graphics</small>			



LEGEND

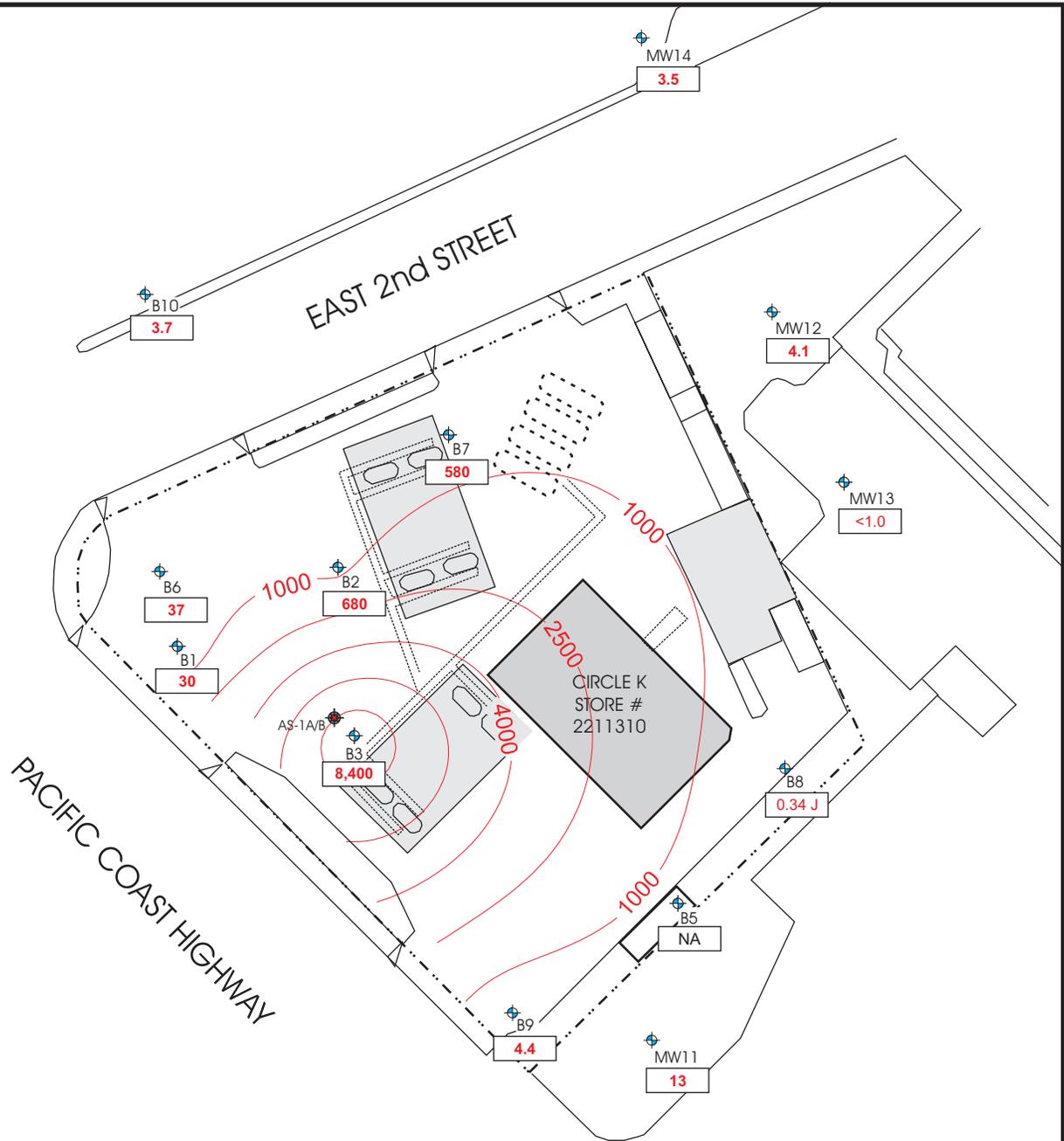
-  Approximate Location of Groundwater Monitor Well(s) & ID
-  Approximate Location of Air Sparge Well(s) and ID
-  Benzene Concentration - micrograms per liter (parts per billion)
J - Concentration detected above laboratory method detection limit but below laboratory reporting limit - approximate value.
-  Not detected above given reporting limit
-  Not Applicable - Unable to locate well
-  Contour Interval = 300 parts per billion

Approximate Scale
1 inch = 50 feet



 	
CRWQCB Case ID #908030016	
Circle K Store #2211310	
6401 East Pacific Coast Hwy	
Long Beach, CA 90803	
Benzene Isoconcentration Map	
February 18, 2014	
March 2014	Project # 200-1310-01
<small>P:\Technical\200 Circle K - Corona\200-01310-01 Long Beach - Pacific Coast Hwy\2211310 Groundwater Monitoring\2014 GWM\1310 1Q14 GWM\1310 1Q14 Graphics</small>	
Figure 5	

Map Source : Modified from a map provided by ERI



LEGEND

- Approximate Location of Groundwater Monitor Well(s) & ID
- Approximate Location of Air Sparge Well(s) and ID
- 37 Methyl-t-Butyl Ether Concentration - micrograms per liter (parts per billion)
J - Concentration detected above laboratory method detection limit but below laboratory reporting limit - approximate value.
- < 1.0 Not detected above given reporting limit
- NA Not Accessible - Unable to locate well
- Contour Interval = 1,500 parts per billion

Map Source : Modified from a map provided by ERI

Approximate Scale
1 inch = 50 feet



CRWQCB Case #908030016
Circle K Store #2211310
6401 East Pacific Coast Hwy
Long Beach, CA 90803

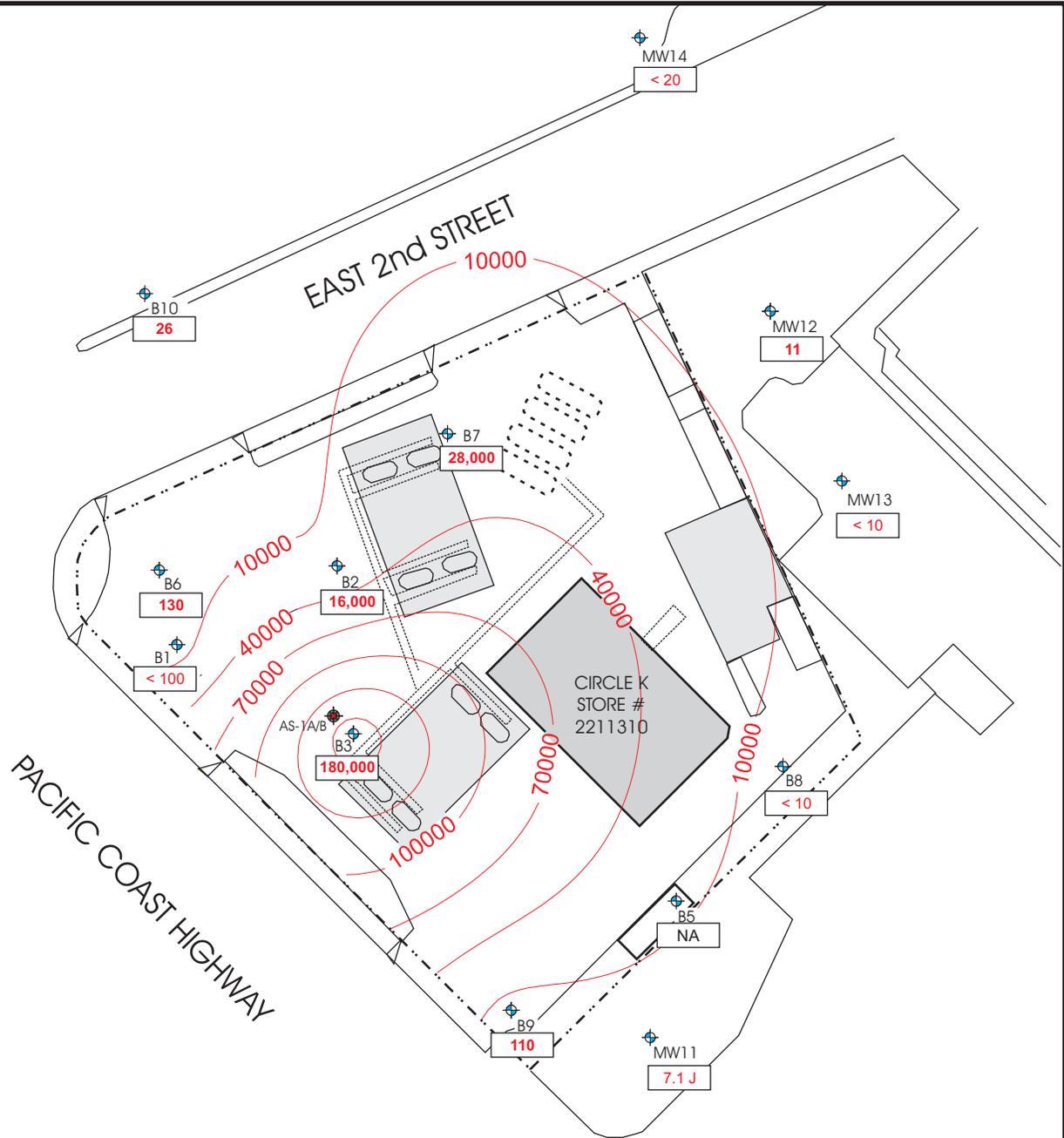
MTBE
Isoconcentration
Map
February 18, 2014

March 2014

Project # 200-1310-01

Figure
6

P:\Technical\200 Circle K - Coronal\200-01310-01 Long Beach - Pacific Coast Hwy.
2211310 Groundwater Monitoring\2014 GWM\1310 1Q14 GWM\1310 1Q14 Graphics



LEGEND

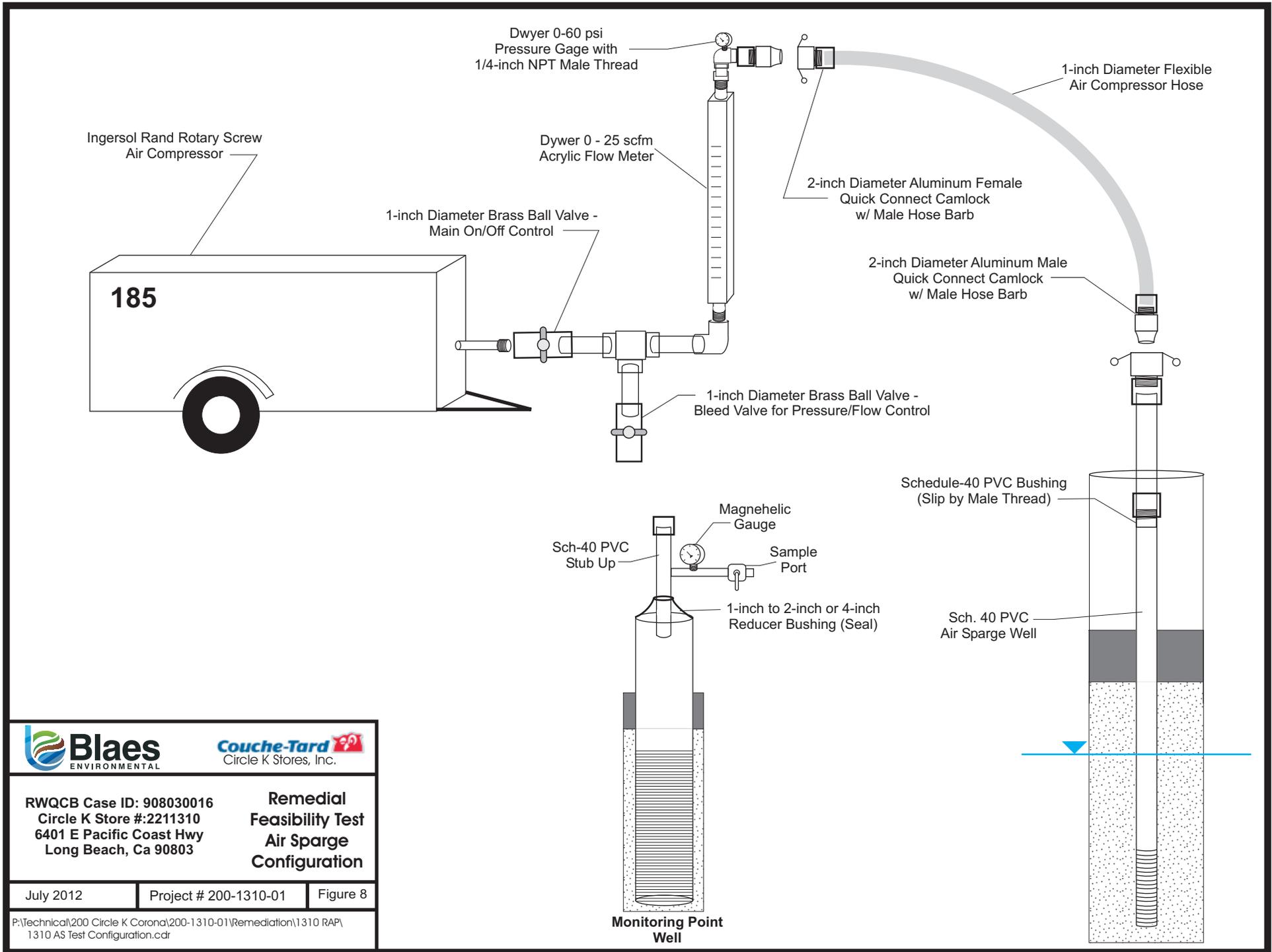
- B6 Approximate Location of Groundwater Monitor Well(s) & ID
- AS-1A/B Approximate Location of Air Sparge Well(s) and ID
- 130 Tert-Butyl alcohol Concentration - micrograms per liter (parts per billion)
J - Concentration detected above laboratory method detection limit but below laboratory reporting limit - approximate value.
ID - Analyte was identified by the RT and presence of a single mass ion
- < 10 Not detected above given reporting limit
- NA Not Accessible - Unable to locate well
- Contour Interval = 30,000 parts per billion

Map Source : Modified from a map provided by ERI

Approximate Scale
1 inch = 50 feet



CRWQCB Case #908030016 Circle K Store #2211310 6401 East Pacific Coast Hwy Long Beach, CA 90803	
TBA Isoconcentration Map February 18, 2014	
March 2014	Project # 200-1310-01
Figure 7	
P:\Technical\200 Circle K - Coronal\200-01310-01 Long Beach - Pacific Coast Hwy. 2211310 Groundwater Monitoring\2014 GWM\1310 1Q14 GWM\1310 1Q14 Graphics	



RWQCB Case ID: 908030016
 Circle K Store #:2211310
 6401 E Pacific Coast Hwy
 Long Beach, Ca 90803

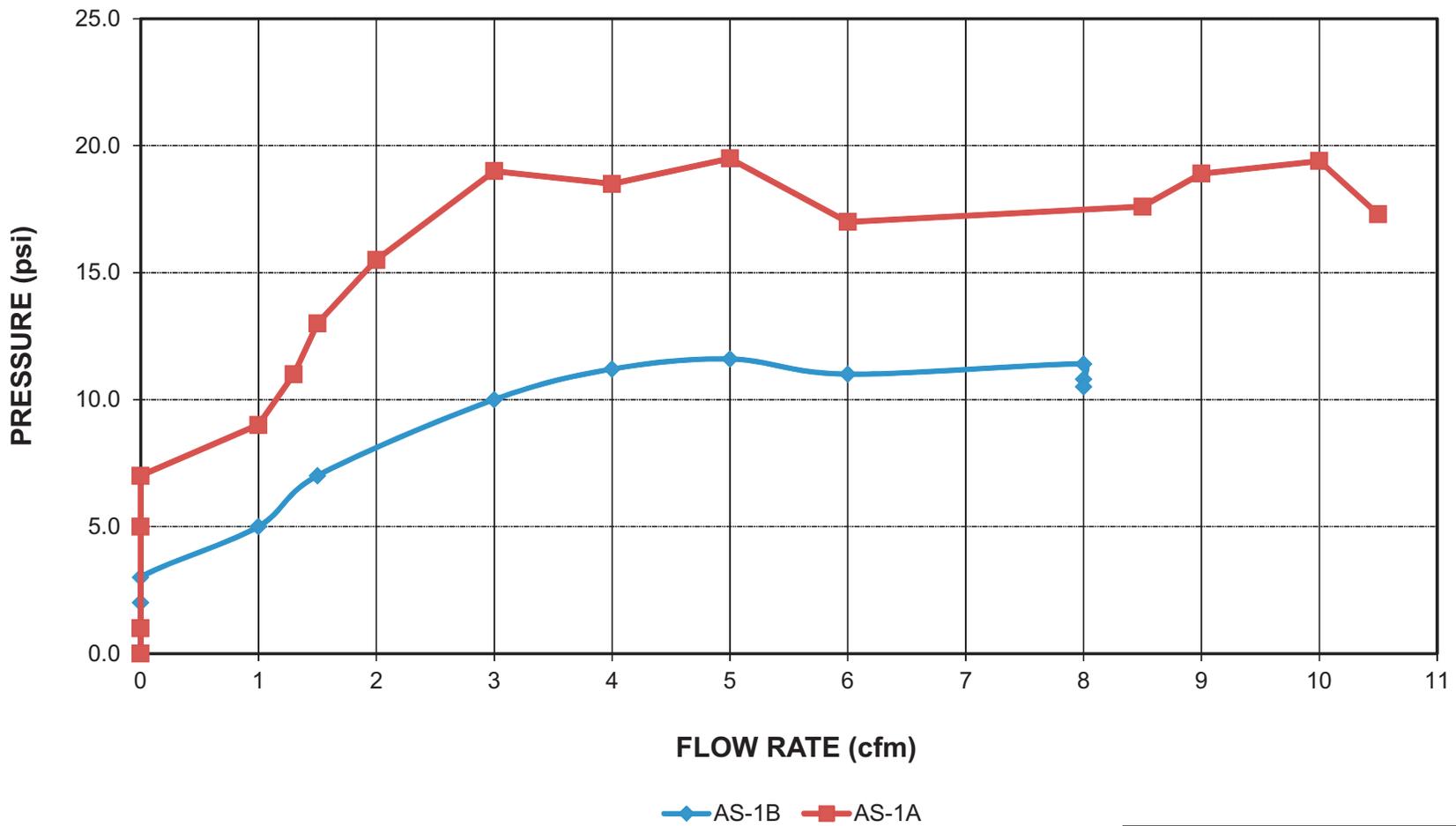
**Remedial
 Feasibility Test
 Air Sparge
 Configuration**

July 2012

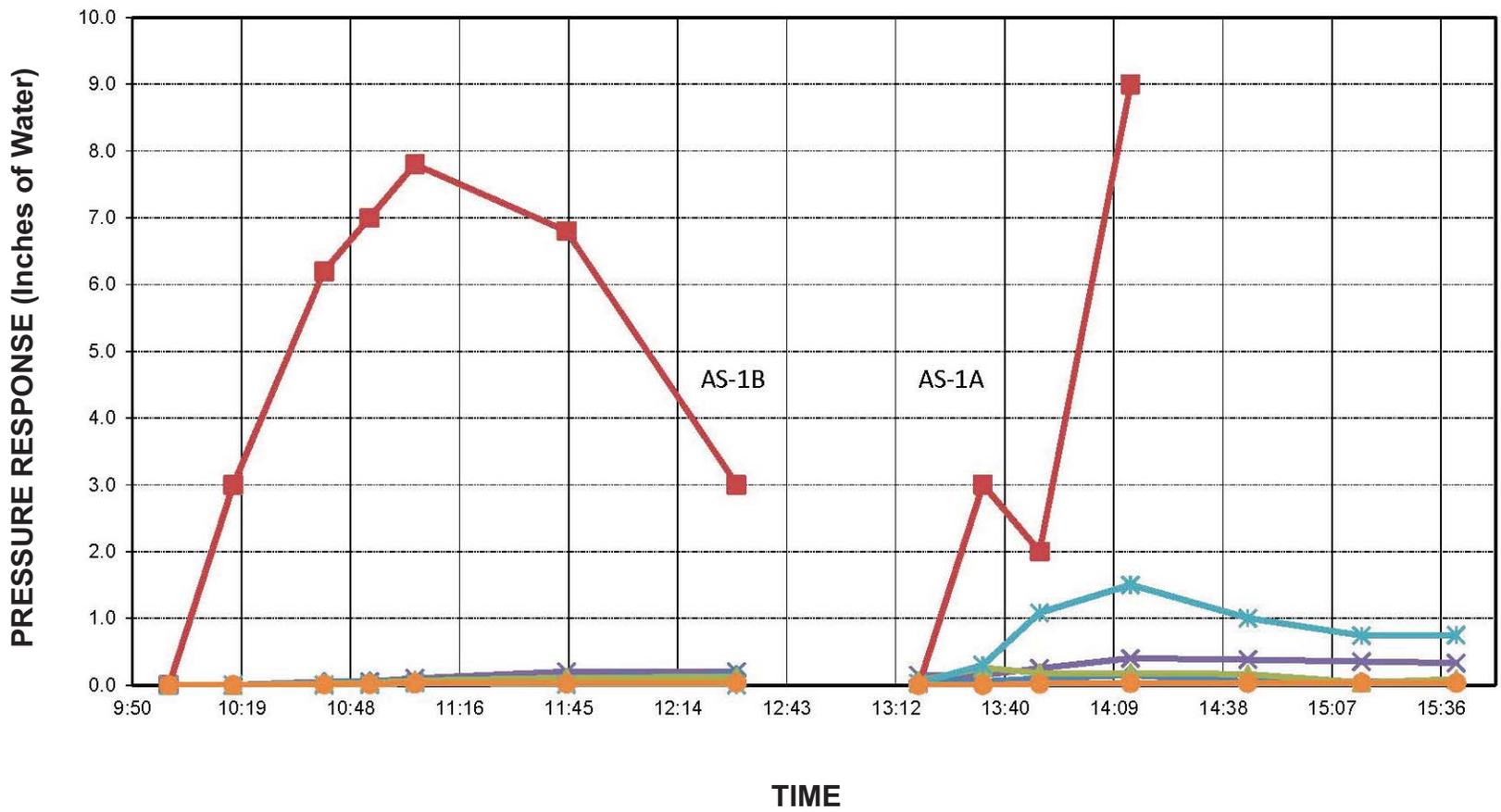
Project # 200-1310-01

Figure 8

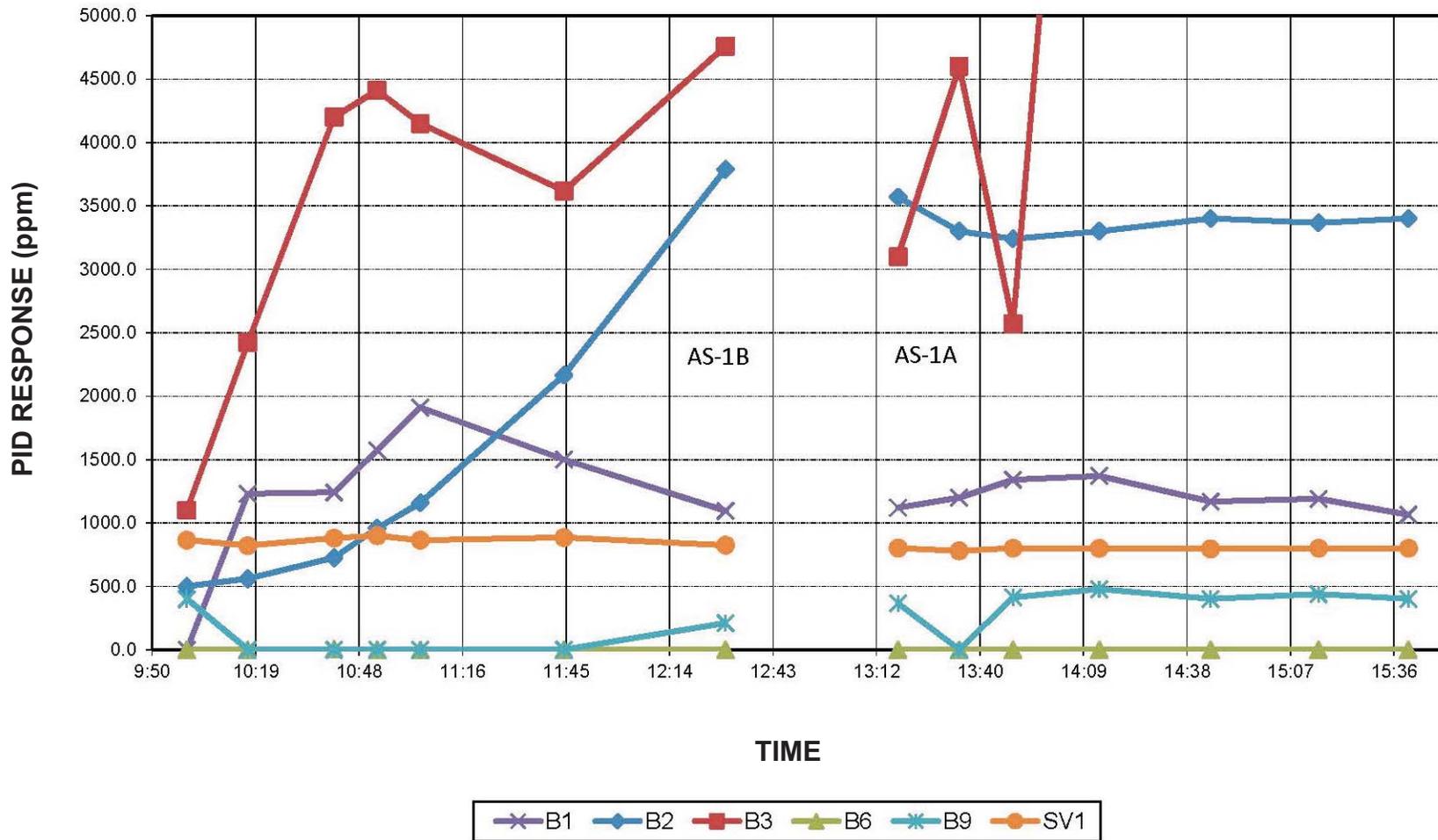
P:\Technical\200 Circle K Corona\200-1310-01\Remediation\1310 RAP\1310 AS Test Configuration.cdr



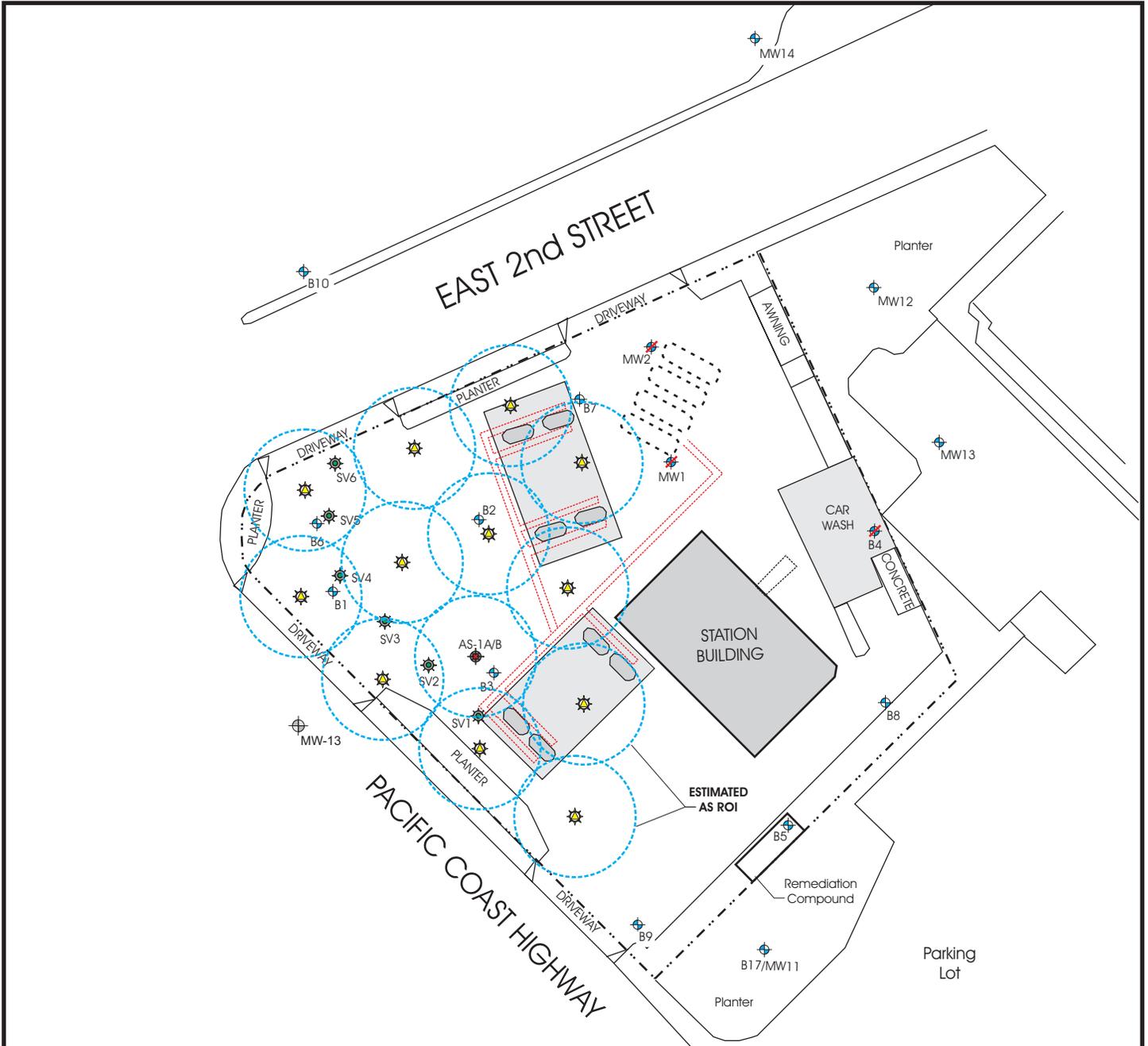
 		
RWQCB Case ID: 908030016 Circle K Store #:2211310 6401 E Pacific Coast Hwy Long Beach, Ca 90803		
AS-1A/B WELL PERFORMANCE CURVES		
March 2014	Project # 200-1310-01	Figure 9
<small>P:\Technical\200 Circle K Corona\200-1310-01\Remediation\1310 RAP\1310 Well Curve.cdr</small>		



 		
RWQCB Case ID: 908030016 Circle K Store #:2211310 6401 E Pacific Coast Hwy Long Beach, Ca 90803		AS TEST PRESSURE RESPONSE GRAPHS
March 2014	Project # 200-1310-01	Figure 10
P:\Technical\200 Circle K Corona\200-1310-01\Remediation\1310 RAP\1310 Pressure Response Graph.cdr		

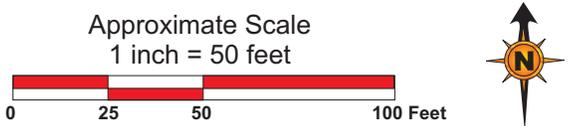


 		
RWQCB Case ID: 908030016 Circle K Store #:2211310 6401 E Pacific Coast Hwy Long Beach, Ca 90803		AS TEST TOV RESPONSE GRAPHS
March 2014	Project # 200-1310-01	Figure 11
<small>P:\Technical\200 Circle K Corona\200-1310-01\Remediation\1310 RAP\1310 TOV Response Graph.cdr</small>		

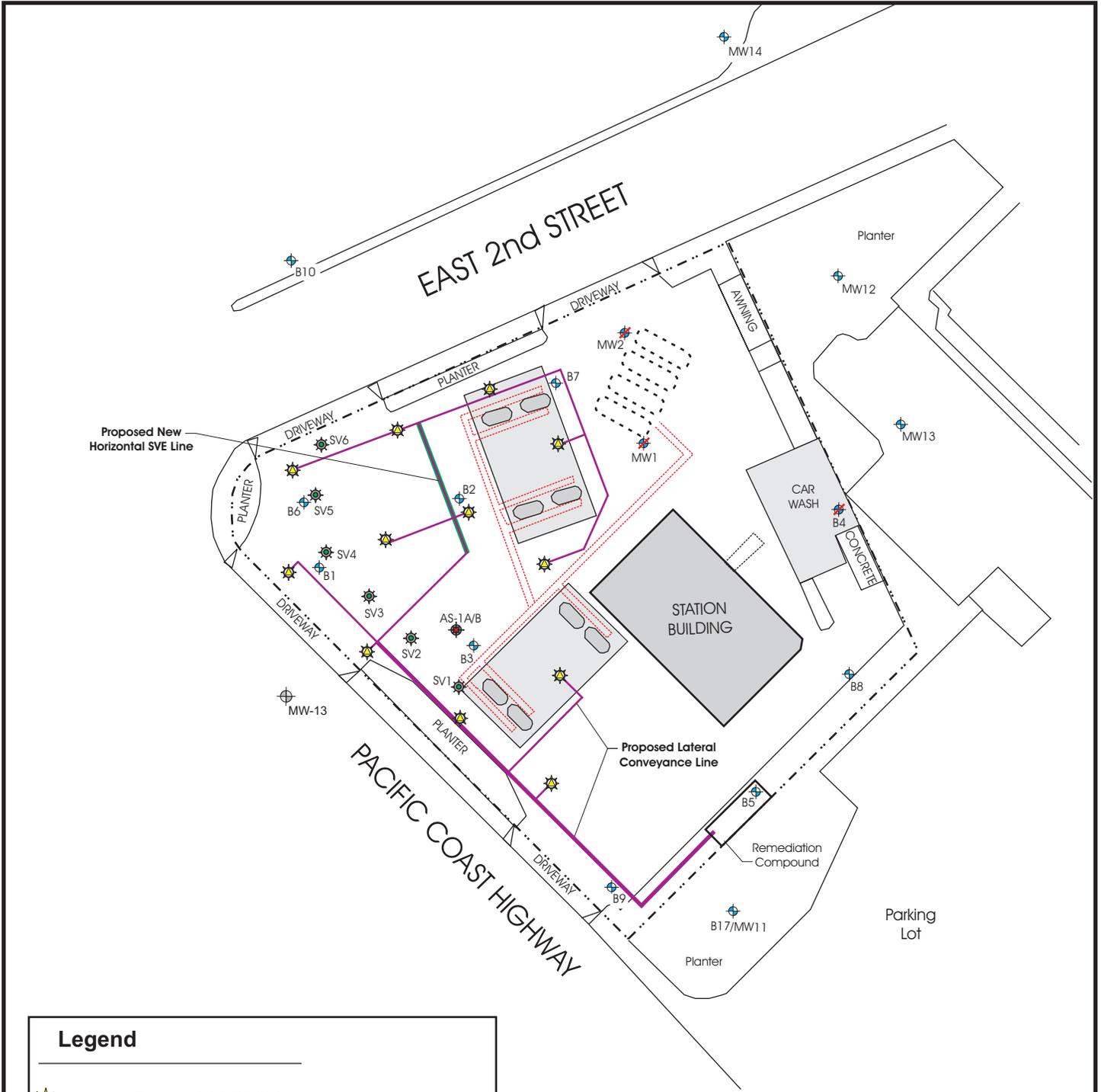


Legend	
	Proposed AS Well(s)
	Groundwater Monitoring Well(s) & ID
	Vapor Extraction Well(s) & ID
	76 Station Groundwater Monitoring Well(s) & ID
	Destroyed Groundwater Monitoring Well(s) & ID
	Air Sparge Test Well & ID

Map Source : Modified from a map provided by ERI



		Circle K Stores, Inc.	
CRWQCB Case ID #908030016 Circle K Store #2211310 6401 East Pacific Coast Hwy Long Beach, CA 90803			
		PROPOSED AS WELL LOCATIONS WITH ESTIMATED ROI	
March 2014	Project # 200-1310-01	Figure 12	
<small>P:\Technical\200 Circle K - Corona\200-01310-01\1310 Remediation\1310 RAP\1310 Well Array & ROI</small>			



Legend

- Proposed AS Well(s)
- Groundwater Monitoring Well(s) & ID
B9
- Vapor Extraction Well(s) & ID
SV2
- 76 Station Groundwater Monitoring Well(s) & ID
MW-13
- Destroyed Groundwater Monitoring Well(s) & ID
MW-1
- Air Sparge Test Well & ID
AS-1A/B

Map Source : Modified from a map provided by ERI

Approximate Scale
1 inch = 50 feet

		 Circle K Stores, Inc.
CRWQCB Case ID #908030016 Circle K Store #2211310 6401 East Pacific Coast Hwy Long Beach, CA 90803		PROPOSED REMEDIATION LAYOUT
March 2014	Project # 200-1310-01	Figure 13
<small>P:\Technical\200 Circle K - Corona\200-01310-01\1310 Remediation\1310 RAP\1310 Remedial Layout</small>		

TABLES

TABLE 1
GROUNDWATER MONITORING SCHEDULE AND WELL CONSTRUCTION DETAILS
 CIRCLE K STORE #2211310
 6401 EAST PACIFIC COAST HIGHWAY, LONG BEACH, CALIFORNIA

Well Number	Well Activities				Date Installed	Well Location	Elevation TOC (feet)	Total Well Depth (feet bgs)	Casing Diameter (inches)	Screened Interval (feet bgs)
	Gauge	Sample	Purge	LPH Removal						
MW11	1Q/3Q	1Q/3Q	P	NA	2004*	OFFSITE	11.21	27.48**	2	5-25
MW12	1Q/3Q	1Q/3Q	P	NA	2004*	OFFSITE	10.36	27.28**	2	8-28
MW13	1Q/3Q	1Q/3Q	P	NA	2004*	OFFSITE	8.23	21.46**	2	5-25
MW14	1Q/3Q	1Q/3Q	P	NA	2004*	OFFSITE	7.49	23.07**	2	5-25
B1	1Q/3Q	1Q/3Q	P	NA	07/06/86	ONSITE	8.48	30.5	4	4-29
B2	1Q/3Q	1Q/3Q	P	NA	07/05/86	ONSITE	9.03	30	4	4-29
B3	1Q/3Q	1Q/3Q	P	NA	07/05/86	ONSITE	9.36	30	4	3-28
B5	1Q/3Q	1Q/3Q	P	NA	1993*	ONSITE	8.17	--	--	--
B6	1Q/3Q	1Q/3Q	P	NA	1996*	ONSITE	8.63	28.45**	2	--
B7	1Q/3Q	1Q/3Q	P	NA	1996*	ONSITE	8.44	26.99**	2	--
B8	1Q/3Q	1Q/3Q	P	NA	1996*	ONSITE	8.44	7.05**	2	--
B9	1Q/3Q	1Q/3Q	P	NA	1996*	ONSITE	8.45	27.02**	2	--
B10	1Q/3Q	1Q/3Q	P	NA	1996*	OFFSITE	7.99	25.43**	2	--
SV1	NA	NA	NA	NA	--	--	--	--	--	--
SV2	NA	NA	NA	NA	--	--	--	--	--	--
SV3	NA	NA	NA	NA	--	--	--	--	--	--
SV4	NA	NA	NA	NA	--	--	--	--	--	--
SV5	NA	NA	NA	NA	--	--	--	--	--	--
SV6	NA	NA	NA	NA	--	--	--	--	--	--
AS-1A	NA	NA	NA	NA	2/15/2013	ONSITE	--	25.5	2	10-13
AS-1B							--		2	22-25

Explanation:

- LPH = liquid-phase hydrocarbons
- TOC = top of casing
- bgs = below ground surface
- 1Q/3Q = first quarter/third quarter
- P = purge
- NA = not applicable
- * = Information obtained from Cardno ERI's *Third Quarter 2011 Groundwater Monitoring and Status Report* dated September 26, 2011.
- ** = Information obtained during the first quarter 2014 groundwater monitoring and sampling event conducted on February 18, 2014.
- = unknown

TABLE 2
CURRENT vs. PRIOR GROUNDWATER MONITORING DATA AND LABORATORY ANALYTICAL RESULTS
 CIRCLE K STORE #2211310
 6401 EAST PACIFIC COAST HIGHWAY, LONG BEACH, CALIFORNIA

Well ID & Screen Interval (feet bgs)	Date	TOC Elevation (feet amsl)	Note	Depth to Water (feet bTOC)	LPH Thickness (feet)	Groundwater Elevation (feet amsl) Corrected for LPH	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Ethanol (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)
B1 4-30	08/21/13	8.48	a	6.84	0.00	1.64	11,000	570	12	720	65	<1,500	43	<100	<10	<10	<10
	02/18/14		a	6.65	0.00	1.83	15,000	650	8.7	310	52	<1,500	30	<100	<10	<10	<10
B2 4-29	08/21/13	9.03	a	7.58	0.00	1.45	2,500	780	14	100	32	<3,800	480	17,000	<25	8.5 J	<25
	02/18/14		a	7.97	0.00	1.06	4,600	1,400	33	250	68	<1,500	680	16,000	<10	13	<10
B3 3-28	08/21/13	9.36	a	8.35	0.00	1.01	25,000	860	<100	400	360	<30,000	14,000	170,000	<200	<200	<200
	02/18/14		a	8.44	0.00	0.92	17,000	740	<100	290	270	<30,000	8,400	180,000	<200	<200	<200
B6 Unknown	08/21/13	8.63	a	8.53	0.00	0.10	220	<0.50	<0.50	<0.50	<1.0	<150	32	240	<1.0	<1.0	<1.0
	02/18/14		a	7.86	0.00	0.77	350	0.78	<0.50	1.0	<1.0	<150	37	130	<1.0	<1.0	<1.0
B7 Unknown	08/21/13	8.44	a	8.24	0.00	0.20	4,300 J	<50	<50	<50	<100	<15,000	850	28,000	<100	<100	<100
	02/18/14		a	8.17	0.00	0.27	2,700 J	<50	<50	<50	<100	<15,000	580	28,000	<100	<100	<100
B8 Unknown	08/21/13	8.44	a	4.54	0.00	3.90	<50	<0.50	<0.50	<0.50	<1.0	<150	0.95 J	<10	<1.0	<1.0	<1.0
	02/18/14		a	4.58	0.00	3.86	<50	<0.50	<0.50	<0.50	<1.0	<150	0.34 J	<10	<1.0	<1.0	<1.0
B9 Unknown	08/21/13	8.45	a	6.92	0.00	1.53	370	1.8	1.6	<0.50	1.8	<150	3.2	53	<1.0	<1.0	<1.0
	02/18/14		a	7.33	0.00	1.12	500	1.7	0.99	<0.50	1.3	<150	4.4	110	<1.0	<1.0	<1.0
B10 Unknown	08/21/13	7.99	a	7.72	0.00	0.27	110	<0.50	0.52	<0.50	<1.0	<150	4.2	38	<1.0	<1.0	<1.0
	02/18/14		a	7.77	0.00	0.22	32 J	<0.50	<0.50	<0.50	<1.0	<150	3.7	26	<1.0	<1.0	<1.0
MW11 5-25	08/21/13	11.21	a	11.54	0.00	-0.33	<50	<0.50	<0.50	<0.50	<1.0	<150	2.1	<10	<1.0	<1.0	<1.0
	02/18/14		a	11.05	0.00	0.16	29 J	<0.50	<0.50	<0.50	<1.0	<150	13	7.1 J, ID	<1.0	<1.0	<1.0
MW12 8-28	08/21/13	10.36	a	9.91	0.00	0.45	<50	<0.50	<0.50	<0.50	<1.0	<150	1.9	6.9 J, ID	0.63 J	<1.0	<1.0
	02/18/14		a	7.32	0.00	3.04	27 J	<0.50	<0.50	<0.50	<1.0	<150	4.1	11	0.61 J	<1.0	<1.0
MW13 5-25	08/21/13	8.23	a	7.24	0.00	0.99	<50	<0.50	<0.50	<0.50	<1.0	<150	<1.0	<10	0.98 J	<1.0	<1.0
	02/18/14		a	7.32	0.00	0.91	<50	<0.50	<0.50	<0.50	<1.0	<150	<1.0	<10	1.2	<1.0	<1.0
MW14 5-25	08/21/13	7.49	a	7.09	0.00	0.40	31 J	<0.50	<0.50	<0.50	<1.0	<150	3.9	8.0 J, ID	<1.0	<1.0	<1.0
	02/18/14		a	6.20	0.00	1.29	<100	<1.0	<1.0	<1.0	<2.0	<300	3.5	<20	<2.0	<2.0	<2.0

Explanation:

bgs = below ground surface
 TOC = top of casing
 amsl = above mean sea level
 bTOC = below top of casing
 LPH = liquid-phase hydrocarbons (free product)
 TPH-g = total petroleum hydrocarbons - gasoline range
 µg/L = micrograms per liter (parts per billion)
 MTBE = methyl tertiary butyl ether
 TBA = tertiary butyl alcohol
 DIPE = di-isopropyl ether
 ETBE = ethyl tertiary butyl ether
 TAME = tertiary amyl methyl ether

a = well purged prior to sampling
 0.00 = not detected (LPH)
BOLD = analyte detected at or above given laboratory method reporting limit
 < = analyte not detected above given laboratory method reporting limit
 J = Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
 ID = Analyte was identified by the retention time and presence of a single mass ion.
 Note: Groundwater elevations in wells with free product (LPH) are corrected relative to the specific gravity of gasoline (correction factor: 0.76).

**TABLE 3
SUMMARY OF AS WELL INSTALLATION SOIL LABORATORY ANALYTICAL RESULTS**

CIRCLE K STORE #2211310
6401 EAST PACIFIC COAST HIGHWAY, LONG BEACH, CALIFORNIA

Soil Sample ID	Sampling Date	Sample Depth (feet bgs)	EPA 8260B Volatile Organic Compounds (mg/kg)														
			VFH	B	T	E	X	MTBE	1,2,4-TMB	1,3,5-TMB	N	n-BB	N-PB	sec-BB	p-IPT	IPB	Add. VOCs
AS-1A/B-7'	2/15/2013	7	790	3.1	3.4	28	120	3.2	67	23	11	7.2	13	1.5 J	0.76 J	3.6	ND

Notes:

feet bgs = feet below the ground surface
mg/kg = milligrams per kilogram (parts per million)

VFH = Volatile Fuel Hydrocarbons (C4-C12, gasoline range)

B = Benzene

T = Toluene

E = Ethylbenzene

X = Xylenes (Total)

MTBE = Methyl tert-Butyl Ether

1,2,4-TMB = 1,2,4-Trimethylbenzene

1,3,5-TMB = 1,3,5-Trimethylbenzene

N = Naphthalene

n-BB = n-Butylbenzene

N-PB = N-Propylbenzene

sec-BB = sec-Butylbenzene

p-IPT = p-Isopropyltoluene

IPB = Isopropylbenzene

Add. VOCs = Additional Volatile Organic Compounds

ND = Not Detected

bold = denotes analyte concentration detected above the laboratory reporting limit

J = Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit; given concentration is an approximate value

< = Analyte Not Detected at or above given reporting limit

TABLE 4
AIR SPARGE FEASIBILITY TEST FIELD DATA
OCTOBER 24, 2013

Circle K Store #2211310
6401 East Pacific Coast Highway, Long Beach, California

TIME	AIR SPARGE WELL AS-1A / AS-1B 22 - 25 / 10 - 13		MONITORING POINT WELLS											
	Injection Pressure (psi)	Flow Rate (cfm)	B3 3 - 28		SV1 unknown		B2 4 - 29		B1 4 - 29		B6 unknown		B9 unknown	
			"H2O	PID	"H2O	PID	"H2O	PID	"H2O	PID	"H2O	PID	"H2O	PID
AS-1B Baseline	0.0	0.0	0.0	1,100	0.0	865	0.00	500	0.0	0.0	0.0	0.0	0.0	400
10:10	10.0	3.0	---	---	---	---	---	---	---	---	---	---	---	---
10:13	11.2	4.0	1.8	---	0.0	---	0.00	---	0.0	0.0	0.0	---	0.00	---
10:17	11.6	5.0	3.0	2,422	0.0	820	0.00	560	0.0	1,230	0.0	0.0	0.01	13
10:33	11.0	5.0	---	---	---	---	---	---	---	---	---	---	---	---
10:34	11.5	6.0	---	---	---	---	---	---	---	---	---	---	---	---
10:41	11.0	6.0	6.2	4,200	0.010	880	0.050	725	0.00	1,240	0.020	4.0	0.01	0
10:53	11.1	7.0	7.0	4,412	0.015	899	0.055	959	0.05	1,572	0.035	0.0	0.01	414
11:05	11.4	8.0	7.8	4,150	0.025	863	0.055	1,157	0.10	1,910	0.065	0.0	0.03	417
11:45	10.8	8.0	6.8	3,617	0.025	885	0.100	2,166	0.20	1,500	0.110	0.0	0.01	417
12:30	10.5	8.0	3.0	4,760	0.030	824	0.150	3,790	0.20	1,095	0.120	0.0	0.0	210
12:56	10.5	8.0	---	---	---	---	---	---	---	---	---	---	---	---
AS-1A Baseline	0.0	0.0	0.0	3,100	0.00	802	0.05	3,570	0.15	1,120	0.06	0.0	0.03	366
13:28	15.5	2.0	---	---	---	---	---	---	---	---	---	---	---	---
13:29	16.5	2.0	---	---	---	---	---	---	---	---	---	---	---	---
13:30	19.0	3.0	---	---	---	---	---	---	---	---	---	---	---	---
13:31	18.0	3.0	---	---	---	---	---	---	---	---	---	---	---	---
13:32	18.5	4.0	---	---	---	---	---	---	---	---	---	---	---	---
13:33	19.5	5.0	---	---	---	---	---	---	---	---	---	---	---	---
13:35	16.5	5.5	3.0	4,600	0.00	780	0.05	3,300	0.15	1,200	0.26	0.0	0.30	0.0
13:44	17.0	6.0	---	---	---	---	---	---	---	---	---	---	---	---
13:45	17.6	7.0	---	---	---	---	---	---	---	---	---	---	---	---
13:46	18.5	8.5	---	---	---	---	---	---	---	---	---	---	---	---
13:49	18.9	9.0	---	---	---	---	---	---	---	---	---	---	---	---
13:50	19.4	10.0	2.0	2,570	0.02	800	0.10	3,240	0.25	1,340	0.18	0.0	1.08	412
13:57	18.9	10.3	---	---	---	---	---	---	---	---	---	---	---	---
14:14	17.3	10.5	9.0	>10,000	0.03	800	0.15	3,300	0.40	1,370	0.18	0.0	1.50	478
14:45	16.0	8.0	---	---	0.03	795	0.05	3,400	0.38	1,167	0.16	0.0	1.00	400
15:15	15.6	7.8	---	---	0.03	800	0.05	3,366	0.35	1,190	0.04	0.0	0.74	438
15:40	15.6	7.8	---	---	0.03	800	0.05	3,400	0.33	1,065	0.09	0.0	0.75	400
Lateral Distance from AS test well (feet)			8.8		20.7		44		52		69		105.7	

Notes:

- cfm - cubic feet per minute
- psi - Pounds per square inch
- PID - Photoionization Detector (Mini RAE 2000)
- "H2O - Inches of water column (pressure)

TABLE 5
AIR SPARGE FEASIBILITY TEST GROUNDWATER PARAMETER DATA
OCTOBER 24, 2013

Circle K Store #2211310
6401 East Pacific Coast Highway, Long Beach, California

Well ID TOC Elev.	Test Period	Distance from AS Well (ft)	Depth to Groundwater (ft btoc)	Groundwater Elevation (ft amsl)	Δ Groundwater Elevation from Baseline (feet)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Cond. (μS)	Specific Cond. (μS)	Salinity (ppt)	Temp (°C)	ORP	pH
B1 8.48	Baseline	52	7.67	0.81	---	4.1	0.34	1,652	1,666	0.83	25.47	-270.0	7.80
	AS1B End		6.89	1.59	0.78	2.2	0.18	1,646	1,664	0.83	25.63	-263.0	8.18
	AS1A End		4.29	4.19	3.38	1.9	0.15	1,632	1,675	0.82	26.47	-259.6	8.03
B2 9.03	Baseline	44	7.95	1.08	---	4.9	0.36	21,180	22,009	12.66	27.04	-287.0	7.50
	AS1B End		5.82	3.21	2.13	3.3	0.24	22,050	23,028	13.21	27.31	-247.0	7.59
	AS1A End		2.88	6.15	5.07	2.7	0.20	22,530	23,947	13.54	28.38	-222.8	7.49
B3 9.36	Baseline	8.8	8.25	1.11	---	2.9	0.23	11,180	11,136	6.35	24.82	-344.0	7.61
	AS1B End		1.59	7.77	6.66	29.4	2.34	9,871	9,926	5.55	25.19	-146.0	7.89
	AS1A End		3.35	6.01	4.90	32.5	2.61	9,955	9,920	5.60	24.81	-152.3	7.86
B6 8.63	Baseline		8.02	0.61	---	4.7	0.39	2,227	2,208	1.12	24.52	-433.8	7.92
	AS1B End		7.57	1.06	0.45	2.5	0.20	2,135	2,129	1.09	24.82	-284.0	8.37
	AS1A End		3.83	4.80	4.19	3.2	0.26	2,193	2,180	1.12	24.69	-25,605.0	8.00
B9 8.45	Baseline	105.7	7.56	0.89	---	4.4	0.36	1,682	1,695	0.85	25.36	-404.9	7.67
	AS1B End		7.41	1.04	0.15	3.1	0.25	1,658	1,689	0.84	25.97	-218.0	8.89
	AS1A End		5.25	3.20	2.31	4.0	0.32	1,661	1,697	0.83	26.14	-235.1	8.34

Notes: All groundwater parameters measured in-situ.

TOC Elev. = Top of Casing Elevation (feet above mean sea level)

ft btoc = Feet below the top of well casing

ft amsl = Feet above mean sea level

Δ = Change (in water level). Negative number represents a decrease in groundwater elevation.

mg/L = milligrams per Litre

Cond = Conductivity

μS = microseimens

ppt = parts per thousand

°C = Degrees Celsius

ORP = Oxygen Reduction Potential

TABLE 6
AIR SPARGE FEASIBILITY TEST GROUNDWATER LABORATORY ANALYTICAL RESULTS
OCTOBER 24, 2013

Circle K Store #2211310
6401 East Pacific Coast Highway, Long Beach, California

Well ID	Collection	EPA Method 8260B (µg/L)													Additional VOCs
		VFH	B	T	E	X	MTBE	TBA	1,2,4-TMB	1,3,5-TMB	N-PB	N	IsoPB	Ethanol	
B2	Pre-AS Test (09:26)	25,000	5,200	110	840	89 J	8,500	10,000	<100	<100	81 J	260	32 J	<15,000	ND
	Mid-AS Test (13:00)	6,100	1,100	24	160	<40	2,100	14,000	<40	<40	21 J	47	<40	<6,000	ND
	Post-AS Test (16:45)	6,200	730	98	140	230	1,400	14,000	120	48	8.1 J	46	6.1 J	<3,000	ND
B3	Pre-AS Test (09:30)	68,000	9,300	200	1,800	2,100	27,000	110,000	2,000	150 J	240	450	85 J	<30,000	ND
	Mid-AS Test (12:59)	55,000	4,700	160	1,400	1,800	23,000	130,000	1,800	240	210	300	82 J	<30,000	ND
	Post-AS Test (16:45)	40,000	1,600	<100	410	360	23,000	140,000	830	65 J	180 J	170 J	55 J	<30,000	ND

Notes:

- VFH = Volatile Fuel Hydrocarbons (C4 - C12: Gasoline Range)
- B = Benzene
- T = Toluene
- E = Ethylbenzene
- X = Xylenes (Total)
- MTBE = methyl tert butyl ether
- TBA = parts per thousand
- 1,2,4-TMB = 1,2,4-Trimethylbenzene
- 1,3,5-TMB = 1,3,5-Trimethylbenzene
- N-PB = N-Propylbenzene
- N = Naphthalene
- IsoPB = Isopropylbenzene
- VOCs = Volatile Organic Compounds (EPA 8260B, Full List)
- ND = Not Detected at or above the laboratory method reporting limits
- < = Not Detected at or above the given laboratory method reporting limit
- J = Analyte detected above the laboratory method detection limit but below the laboratory method reporting limit.
- J-Flag concentration is considered an estimate.

File 60-89

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CALIFORNIA REGIONAL WATER
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**FINAL 1994-1995 SEMIANNUAL
GROUNDWATER SAMPLING AND ANALYSIS REPORT
MARKET PLACE SANITARY LANDFILL
Long Beach, California**

Project No. 760211

PREPARED FOR

**Bixby Ranch Company
3010 Old Ranch Parkway, Suite 100
Seal Beach, California 90740**

PREPARED BY

**IT Corporation
2355 Main Street, Suite 100
Irvine, California 92714**

January 1996

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Appendix

Description

A . Laboratory Reports and Chain-of-Custody Documentation

1.0 Introduction

This report presents groundwater data collected from the Market Place Landfill (Site). The data were collected during Solid Waste Assessment Test (SWAT) sampling conducted in 1988 and 1989, as well as the two rounds of semiannual sampling conducted in December 1994 and September 1995. The SWAT groundwater data and the recent semiannual groundwater data are combined to simplify comparison of water quality and chemistry from the recent past to the present.

1.1 Project Background

The Los Angeles Regional Water Quality Control Board (RWQCB) reviewed the site SWAT addendum report (IT, 1991) and prepared a review letter dated September 19, 1994 (RWQCB, 1994). The review letter indicated that the SWAT monitoring network, although capable of detecting waste constituents in the groundwater, has not adequately demonstrated that the subject disposal site is not the source of certain compounds detected in groundwater monitoring wells downgradient of the disposal site.

On behalf of Bixby Ranch Company, IT responded to the review letter and recommended that the site groundwater monitoring wells be sampled twice over the next 12 month period and that the samples be tested for dissolved lead and nickel in accordance with EPA Method 6010, for pesticides in accordance with EPA Method 608, and for leachate indicators. The RWQCB agreed that semiannual sampling would be adequate but that the samples must be tested during the first round for the following analytes:

- General groundwater chemistry
- Selected metals
- Purgeable organic halocarbons and aromatics
- Pesticides and polychlorinated biphenyls (PCBs).

Following review of analytical data from the first semiannual sampling, an agreement was reached with the RWQCB on August 29, 1995 to limit the analytical testing for the second semiannual sampling and only include purgeable organic halocarbons and aromatics, pesticides and polychlorinated biphenyls (PCBs), and general groundwater chemistry in the analytical

program.

The following sections discuss the site health and safety program, field activities, groundwater monitoring results, the results of analytical testing, and conclusions.

2.0 Site Health and Safety Plan

IT is committed to provide a safe and healthful work environment for all its employees. In accordance with the Code of Federal Regulations, Title 29, Section 1910.120 and the California Code of Regulations, Section 5192, a site-specific health and safety plan was prepared for all field activities. The plan addresses known and potential site hazards, protective measures to minimize worker exposure, emergency routes, and other considerations related to the safety of personnel on site. The health and safety plan was reviewed and signed by all appropriate site personnel, and was enforced by the IT-qualified site safety officer.

3.0 Field Activities

3.1 Groundwater Sampling

On September 7, 1995, IT personnel purged and sampled the five groundwater monitoring wells at the site. Details of the sampling event are discussed in the following sections.

3.1.1 Groundwater Level Monitoring

Prior to purging and sampling the wells, the depth from the top of casing to water in the monitoring wells was measured using an electronic water level meter. Water level data and well casing elevation survey data were used to calculate groundwater elevations relative to mean sea level. Water level measurements and well elevation survey data are summarized in Table 1.

3.1.2 Groundwater Purging and Sampling

The monitoring wells were purged of approximately three casing volumes of water using a Grundfos Ready-Flow II, 2-inch submersible pump connected to 0.5-inch diameter high density polyethylene (HDPE) tubing. Groundwater purged from the wells was temporarily

stored on-site in 55-gallon steel drums pending analytical results. The drums were subsequently sent to a waste disposal recycling facility. Field measurements of pH, electrical conductivity, and temperature were recorded for each casing volume of water removed. Well purging continued until three casing volumes had been purged and the aforementioned parameters stabilized.

Following purging, the water levels in each well were allowed to recover to approximately 80 percent of the pre-purge level. At this time, the submersible pump was reactivated and the pump controller adjusted to allow a low but continuous flow of water. Groundwater samples were collected directly from the pump discharge tubing into appropriate containers. New tubing was used for each well to prevent the risk of cross-contamination between wells.

4.0 Analytical Program

Groundwater samples were analyzed in accordance with the following Environmental Protection Agency (EPA) Methods, per agreement with the RWQCB:

- Volatile purgeable halocarbons and aromatics - Method 8240
- Pesticides/PCBs - Method 8080
- Biochemical oxygen demand (BOD) - Method 405.1
- Chemical oxygen demand (COD) - Method 410
- Total organic carbon (TOC) - Method 415
- Total organic halogens (TOX) - Method 9020
- Oil and grease - Method 413.2
- General groundwater chemistry: pH, electric conductivity, Total alkalinity as (CaCO₃), hydroxide, chloride, fluoride, nitrate, orthophosphate (as total P), sulfate, bromide by various EPA methods.

5.0 Results

5.1 Groundwater Levels and Flow Direction

Groundwater levels were observed to be approximately 0.95-feet higher in most wells compared to those measured during the December 1994 semiannual monitoring (Table 1). The groundwater flow direction for the September 1995 monitoring is toward the north-northeast and consistent with the flow directions observed during previous monitoring events (Figures 3 through 8).

5.2 Laboratory Analyses

The analytical results for this monitoring are summarized in Tables 2 through 5. The laboratory report, analyses request and chain-of-custody record are provided in Appendix A.

6.0 Discussion

Groundwater elevation data from six quarters of measurements at the Market Place Landfill have consistently indicated that the groundwater flow is to the east and northeast. With detected concentrations of benzene at 84 micrograms per liter (ug/l) in MP-3 and 8.9 ug/l at MP-1, we feel that the data indicate that the source of the benzene contamination is from the direction of higher concentration upgradient of well MP-3.

Upgradient of well MP-3, approximately 150 feet across Pacific Coast Highway is the location of a former Chevron Seal Beach Gas Plant property which operated from 1929 to the mid-1970's. A gas compression booster plant continued in operation there until 1985. Soil with BTEX and TPH contamination was excavated at the property, bioremediated, and replaced in the excavation pits, thereby eliminating the source of the contaminant. The total volume of soil excavated included 56,730 cubic yards, of which 23,420 cu yds was selected for bioremediation. The groundwater, however was left untreated since it was considered nonpotable due to its saline and brine content.

A closure report (by Levine-Fricke, dated June 21, 1994) for the former Chevron Seal Beach Gas Plant property, indicates benzene was detected at 414 and 770 micrograms per liter in groundwater taken from a groundwater monitoring well along Pacific Coast Highway (upgradient

of the Market Place property). In a study by Harding Lawson Associates (1987) of the former gas plant property, data indicated a benzene concentration of 621 ug/l was detected in groundwater from an on-site monitoring well, and soil sample data indicated a BTEX concentration of 2,500 micrograms per kilogram (ug/kg) benzene, 9,500 ug/l toluene, 108,000 ug/l ethylbenzene, and 162,000 ug/kg of total xylenes. Hydraulic gradient data from the central portion of the former gas plant property, where the benzene-contaminated well was located, was calculated to be north to northeast at 0.0027 ft/ft supporting the findings of this study.

Analytical results from the 1994 Levine-Fricke closure report for the former gas plant property indicate that, of the four wells sampled and analyzed, the sample with elevated benzene concentrations (414 and 770 micrograms per liter) also had significantly higher (nearly 100 percent higher) chloride concentrations (71,000 milligrams per liter) and Total Dissolved Solids (120,000 milligrams per liter) than other samples from the study. This suggests the groundwater from that well did not mix with fresh water, was fairly stagnant, and had a seawater source supporting a directional flow toward the Market Place Landfill.

7.0 Conclusions

Analytical results contained in this report indicate that pesticides were not detected in groundwater from any of the monitoring wells during the two rounds of semiannual sampling. Groundwater from upgradient well MP-3 did however show a concentration of dissolved benzene at 84 micrograms per liter (ug/l), an increase from the 14 ug/l detected during the first semiannual sampling round. However, the benzene concentration from this well has generally decreased from a high of 800 ug/l detected in October of 1988 to its current level of 84 ug/l detected in September 1995, which we believe is consistent with the elimination of the source of contamination at its off-site origin which is upgradient.

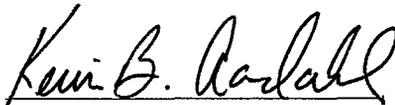
Groundwater samples from downgradient well MP-1 showed detections of several purgeable halocarbons and aromatics. The concentrations were higher than what was detected during the first round of semiannual sampling. However, it should be noted that all of the concentrations were below Maximum Contaminant Levels (MCL's) for drinking water, with exception of benzene and vinyl chloride. The compounds detected included: benzene, 1,2-, 1,3-, and 1,4-Dichlorobenzene, trans-1,2-Dichloroethene, and vinyl chloride. Chlorobenzene was detected

at 1.2 ug/l during the first semiannual sampling, as well as ethylbenzene and total xylenes at 2.0 and 1.7 ug/l, respectively. The concentrations of these compounds in the samples from MP-1 were below the MCL's for drinking water. None of these compounds were detected in the well during the initial four quarters of SWAT monitorings. Since the groundwater beneath the site is saline and nonpotable, the maximum allowable contaminant levels for the above contaminants is likely to be higher than that established for drinking water.

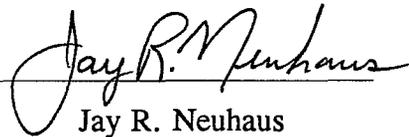
Following a review of sites with previous or current environmental problems in proximity with the Market Place Landfill, and the nature of the dissolved contaminants found in the upgradient and downgradient wells, IT believes that the contamination is from an off-site source upgradient from the Market Place Landfill. The potential upgradient source, located approximately 150 feet across Pacific Coast Highway, is the location of a former Chevron Seal Beach Gas Plant property which operated from 1929 to the mid-1970's. A gas compression booster plant continued in operation there until 1985. Soil with BTEX and TPH contamination was excavated at the property, bioremediated, and replaced in the excavation pits thus eliminating the source of the contaminant. As groundwater with dissolved contaminants migrates from the suspected upgradient site across the Market Place Landfill and mixes with waters beneath the landfill, the landfill materials breakdown and release organic compounds (i.e. petroleum hydrocarbons) which could explain the dissolved contaminants which were detected in downgradient well MP-1. In addition, the fact that concentrations of benzene are diminishing the further away from the source one goes would also point toward the former gas plant property as the origin of the contaminant. The former gas plant received closure by the RWQCB on September 22, 1994 without any request for groundwater remediation based upon the nonpotability of the groundwater. Based on all the data collected at the Market Place Landfill and the nonpotability of the underlying groundwater we believe no further activities are required at this site and invoke your concurrence on this matter.

8.0 Statement of Certification

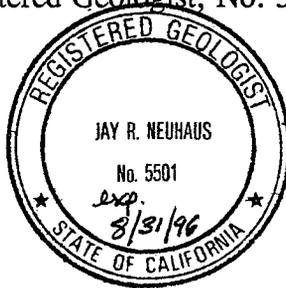
We, Kevin B. Aardahl, and Jay R. Neuhaus, certify that, to the best of our knowledge and belief, the data and information presented in this report, are accurate and complete. We further certify that the work was conducted in accordance with accepted practices and procedures.



Kevin B. Aardahl
Project Manager



Jay R. Neuhaus
California Registered Geologist, No. 5501, Exp. 8/31/96



9.0 References

IT Corporation, 1991, "Solid Waste Water Quality Assessment Test (SWAT), Market Place Landfill", Addendum Report, Project No. 240827, January.

Levine-Fricke, 1994, "Excavation Closure Report, Chevron Seal Beach Gas Plant, 6655 Marina Drive, Long Beach, CA", June 21.

Harding Lawson Associates, 1987, "Site Assessment Report, Chevron Seal Beach Gas Plant, Prepared for Alamitos Bay Partnership", April 27.

Regional Water Quality Control Board, 1994, letter from Robert Ghirelli, Executive Officer, to Ron Bradshaw, Bixby Ranch Company, September 19.

Regional Water Quality Control Board, 1995, Personal communications between Blythe Poneck, personnel, and Kevin Aardahl, IT Corporation, regarding the work plans for Studebaker-Loynes and Market Place landfills, September 6.

Regional Water Quality Control Board, 1995, Personal communication between Blythe Poneck, personnel, and Kevin Aardahl, IT Corporation, regarding monitoring requirements for the second semiannual sampling at the Studebaker-Loynes and Market Place landfills, August 29.

FIGURES

DRAWING NUMBER 760211-A8

CHECKED BY **W.C. 8-30-95**
APPROVED BY **K.A. 8-30-95**

HDS 6-21-95
DRAWN BY

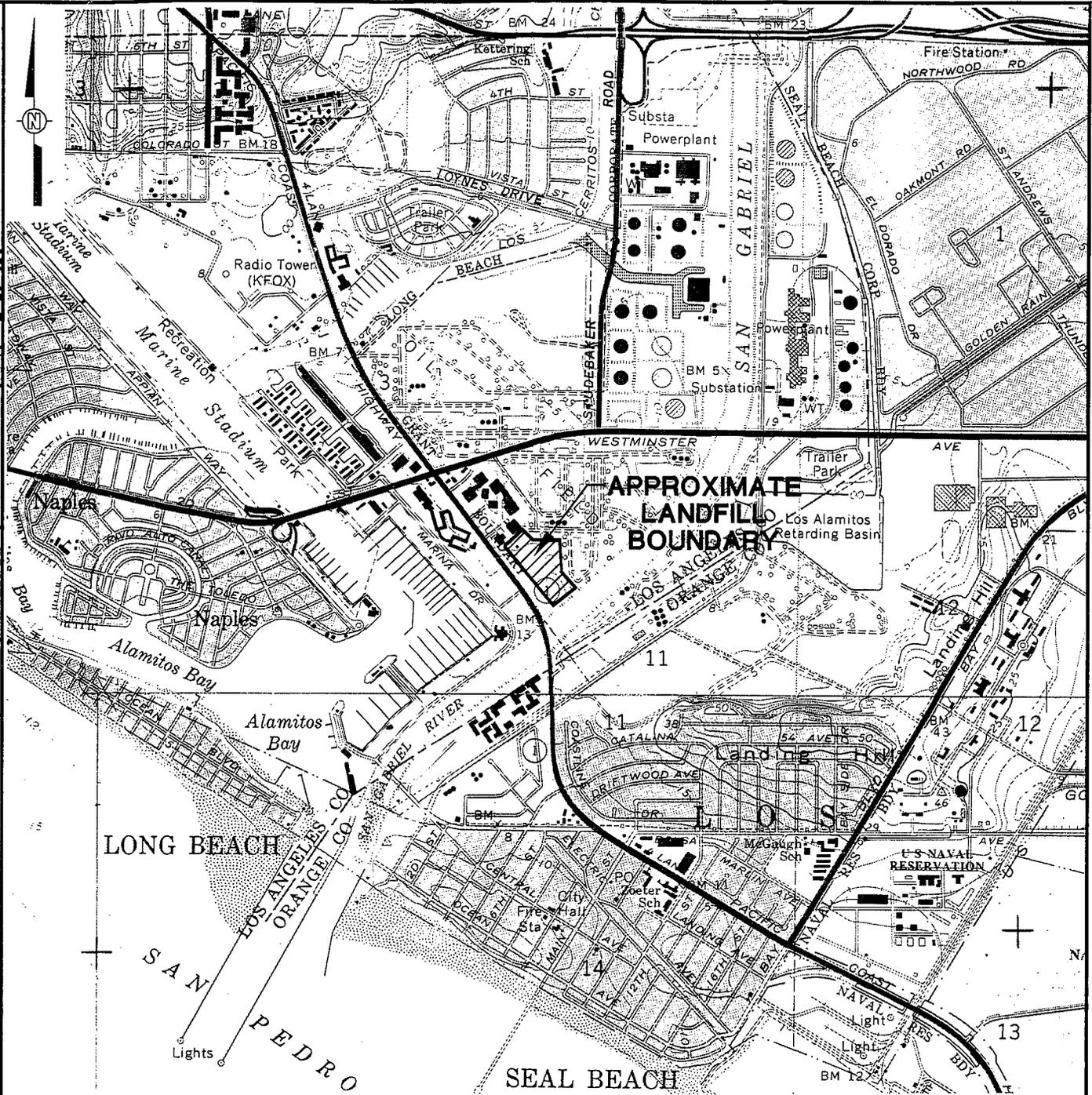


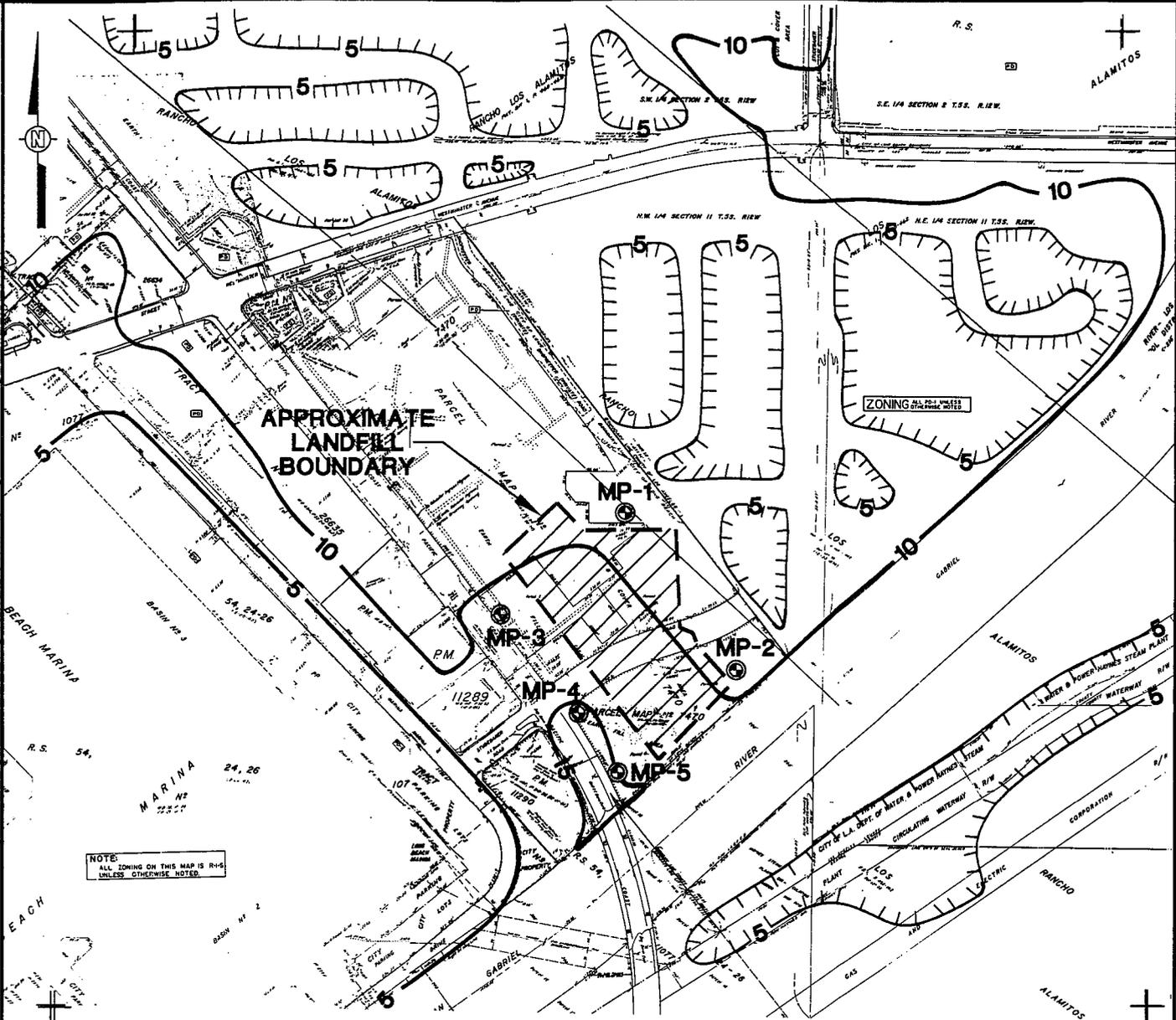
FIGURE 1
TOPOGRAPHIC MAP
MARKET PLACE LANDFILL

PREPARED FOR
BIXBY RANCH COMPANY
SEAL BEACH, CALIFORNIA

REFERENCE:
7.5 MINUTE USGS TOPOGRAPHIC MAPS OF LONG BEACH,
LOS ALAMITOS AND SEAL BEACH, CALIFORNIA QUADRANGLES;
DATED: 1964, 1964 AND 1965 RESPECTIVELY;
PHOTOREVISED: 1981; SCALE = 1:24,000



DRAWN BY: HDS 6-26-95
 CHECKED BY: J.C. 8-30-95
 APPROVED BY: RA 8-30-95
 DRAWING NUMBER: 760211-A7

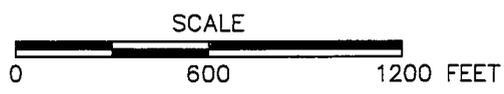


NOTE:
 ALL ZONING ON THIS MAP IS R/S
 UNLESS OTHERWISE NOTED.

LEGEND

MP-1
 ● SWAT MONITORING WELL

5
 — TOPOGRAPHIC CONTOUR



REFERENCE:
 BASE MAP — CITY OF LONG BEACH, DEPARTMENT
 OF ENGINEERING, 1978 THROUGH 1982.
 FOR TOPOGRAPHIC REFERENCE, SEE FIGURE 1.

FIGURE 2

DETAILED TOPOGRAPHIC MAP OF
 MARKET PLACE LANDFILL

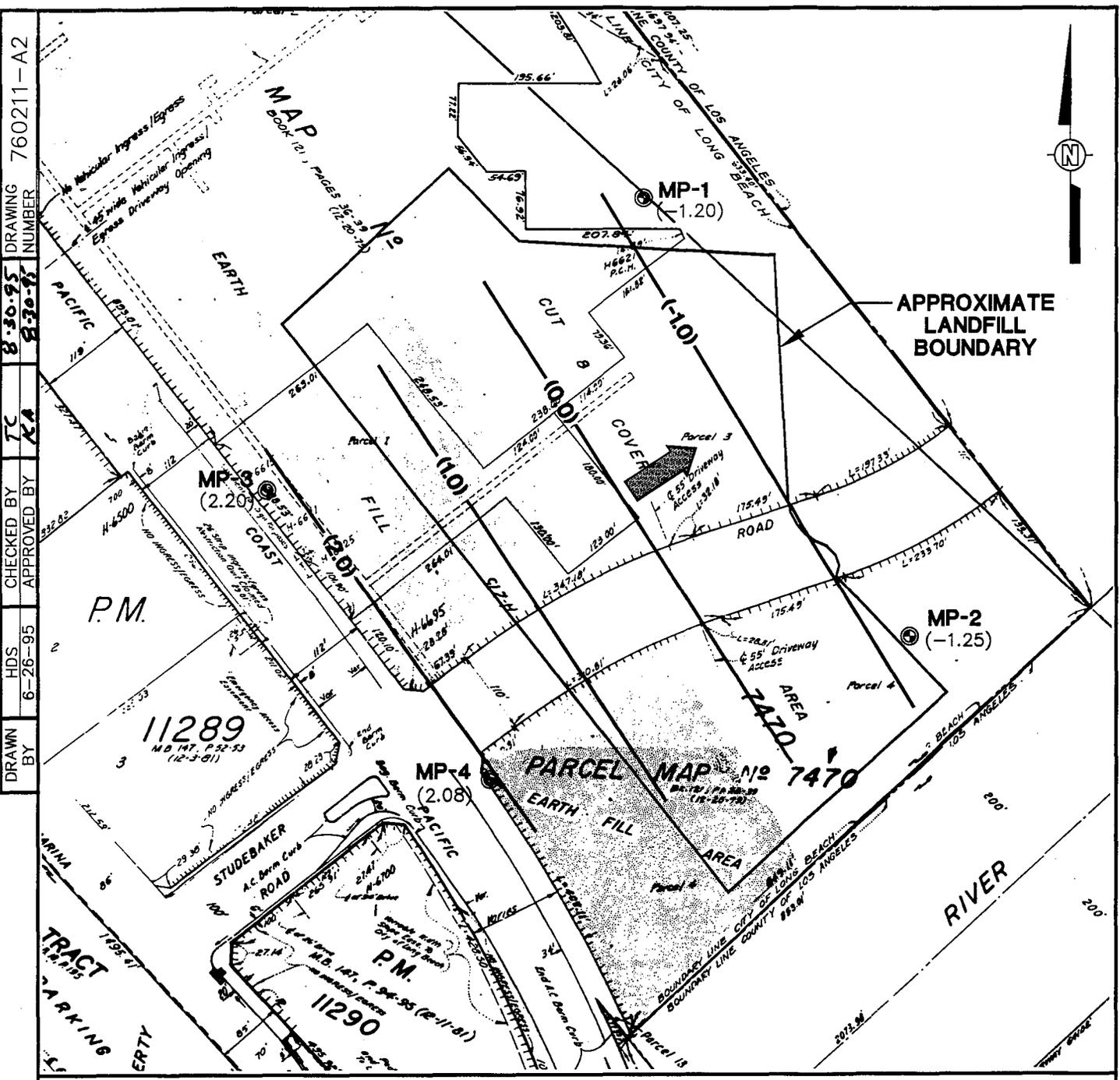
PREPARED FOR

**BIXBY RANCH COMPANY
 SEAL BEACH, CALIFORNIA**



INTERNATIONAL
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 CORPORATION

DRAWN BY: HDS 6-26-95
 CHECKED BY: JC
 APPROVED BY: KA
 DRAWING NUMBER: 8-30-95 760211-A2



LEGEND

MP-1
 (2.20) SWAT MONITORING WELL AND GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

(1.0) GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)

➔ DIRECTION OF GROUNDWATER FLOW



REFERENCE:
 BASE MAP - CITY OF LONG BEACH, DEPARTMENT OF ENGINEERING, 1978 THROUGH 1982

FIGURE 3

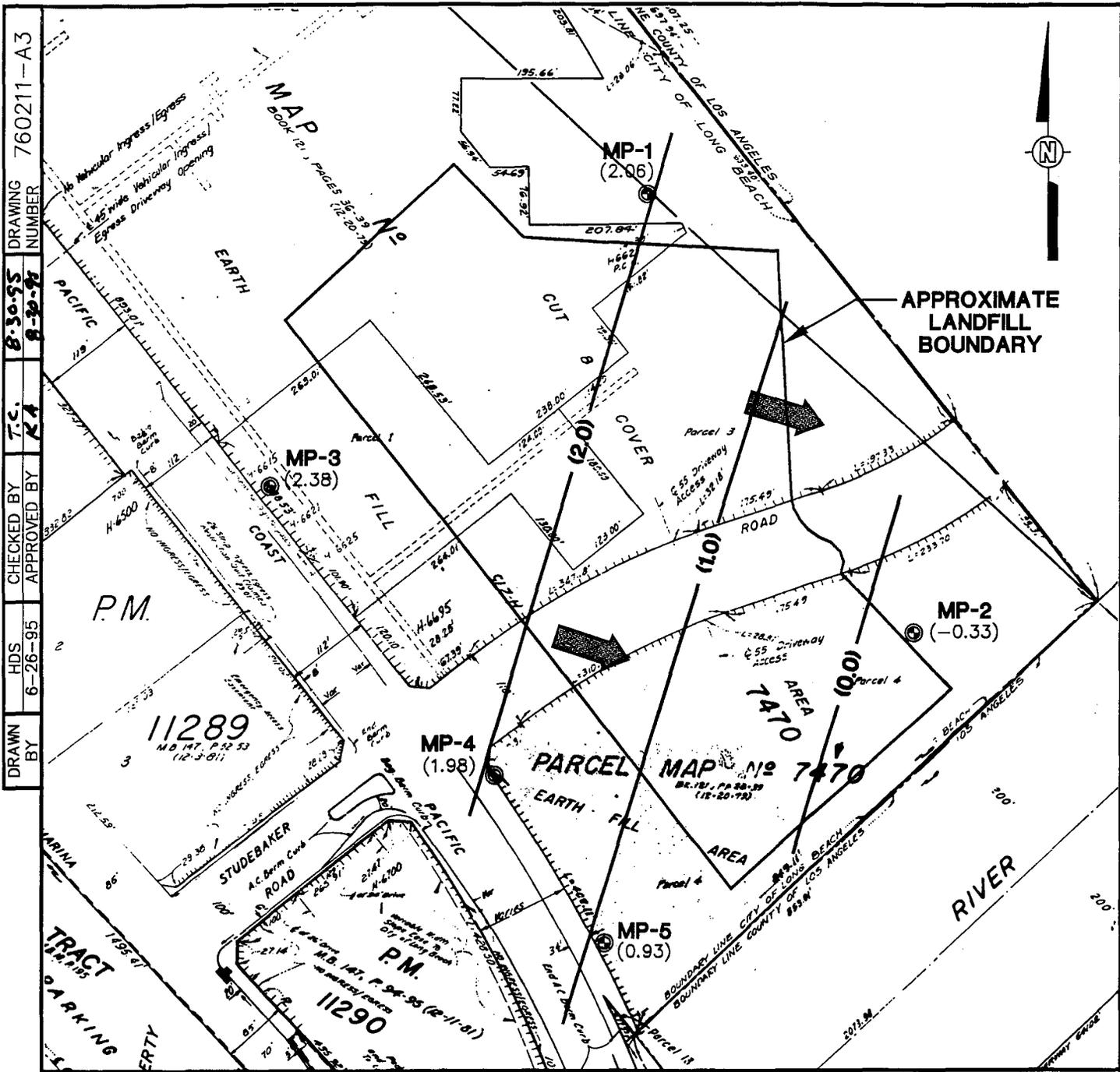
GROUNDWATER ELEVATION CONTOUR MAP FOR OCTOBER 19, 1988 MARKET PLACE LANDFILL

PREPARED FOR

BIXBY RANCH COMPANY SEAL BEACH, CALIFORNIA



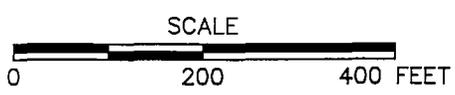
INTERNATIONAL TECHNOLOGY CORPORATION



DRAWN BY: HDS 6-26-95
 CHECKED BY: T.C.
 APPROVED BY: RA
 DRAWING NUMBER: 760211-A3
 DATE: 8-30-95

LEGEND

- 
MP-1
 (2.38) SWAT MONITORING WELL AND GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 
 (1.0) GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)
- 
 DIRECTION OF GROUNDWATER FLOW



REFERENCE:
 BASE MAP - CITY OF LONG BEACH, DEPARTMENT OF ENGINEERING, 1978 THROUGH 1982

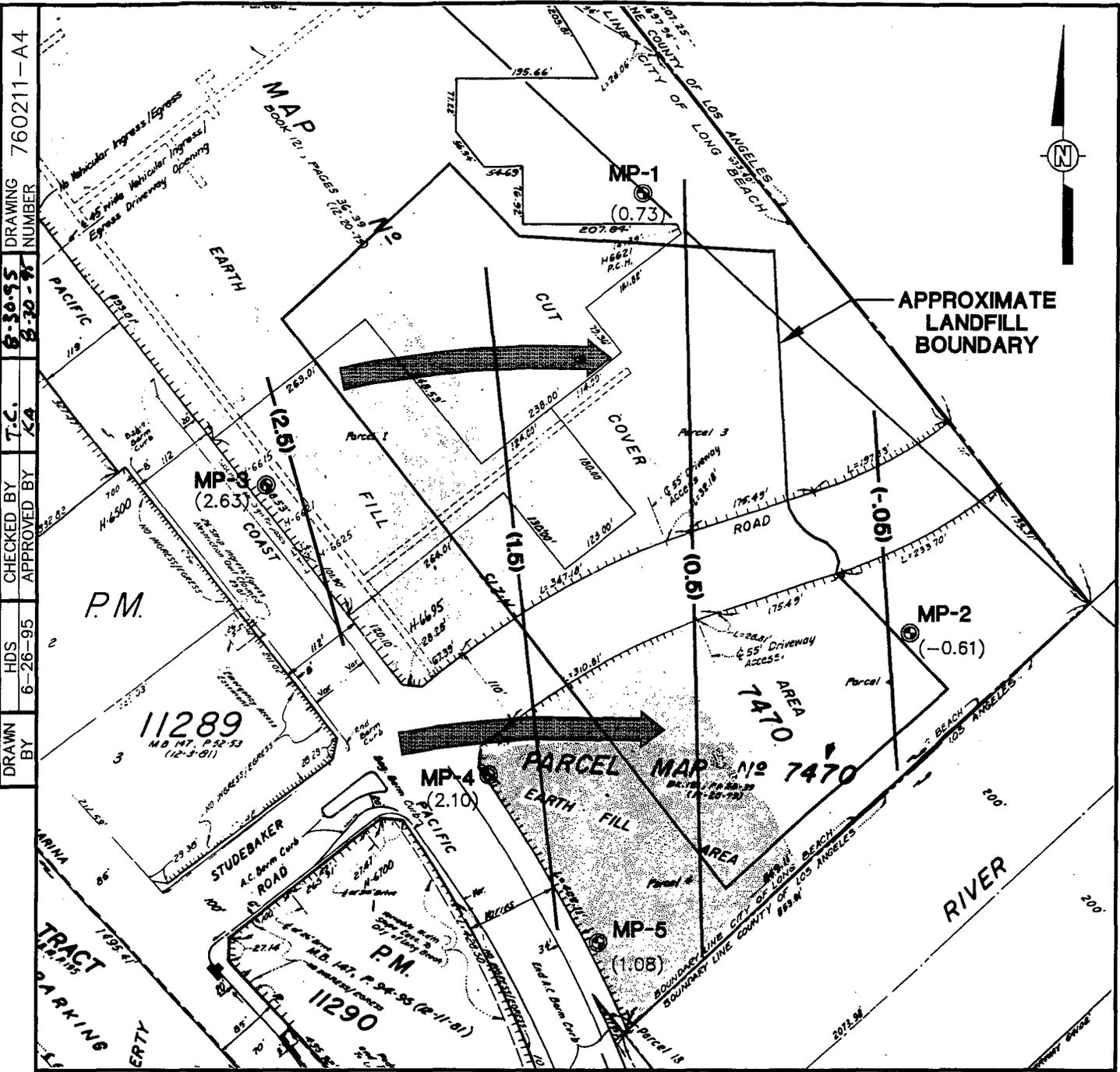
FIGURE 4

GROUNDWATER ELEVATION CONTOUR MAP FOR JANUARY 31, 1989 MARKET PLACE LANDFILL

PREPARED FOR

BIXBY RANCH COMPANY SEAL BEACH, CALIFORNIA





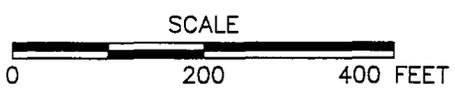
DRAWN BY: HDS 6-26-95
 CHECKED BY: T.C.
 APPROVED BY: KA
 DRAWING NUMBER: 8-30-95
 760211-A4

LEGEND

 **MP-1**
 (0.73) SWAT MONITORING WELL AND GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

 (1.0) GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)

 DIRECTION OF GROUNDWATER FLOW



REFERENCE:
 BASE MAP - CITY OF LONG BEACH, DEPARTMENT OF ENGINEERING, 1978 THROUGH 1982

FIGURE 5

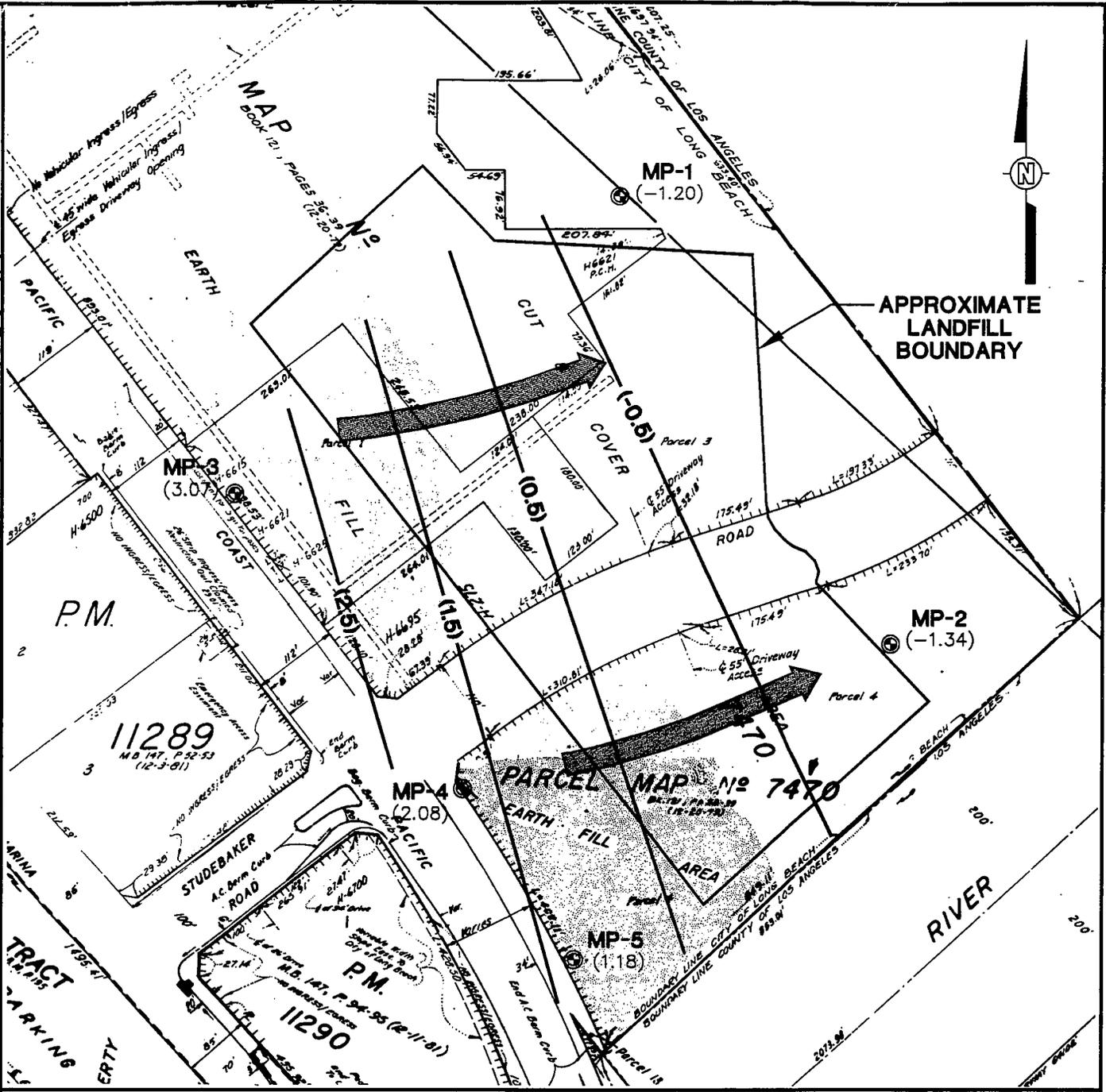
GROUNDWATER ELEVATION CONTOUR MAP FOR MAY 4, 1989 MARKET PLACE LANDFILL

PREPARED FOR

BIXBY RANCH COMPANY SEAL BEACH, CALIFORNIA



DRAWING NUMBER 760211-A5
 CHECKED BY T.C. 8-30-95
 APPROVED BY CA 8-30-95
 HDS 6-26-95
 DRAWN BY

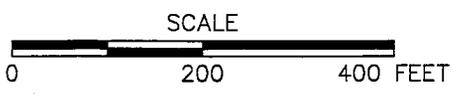


LEGEND

MP-1
 (⊙) SWAT MONITORING WELL AND
 GROUNDWATER ELEVATION
 (FEET ABOVE MEAN SEA LEVEL)

(-1.0) GROUNDWATER ELEVATION CONTOUR
 (FEET ABOVE MEAN SEA LEVEL)

➔ DIRECTION OF GROUNDWATER FLOW



REFERENCE:
 BASE MAP - CITY OF LONG BEACH, DEPARTMENT
 OF ENGINEERING, 1978 THROUGH 1982

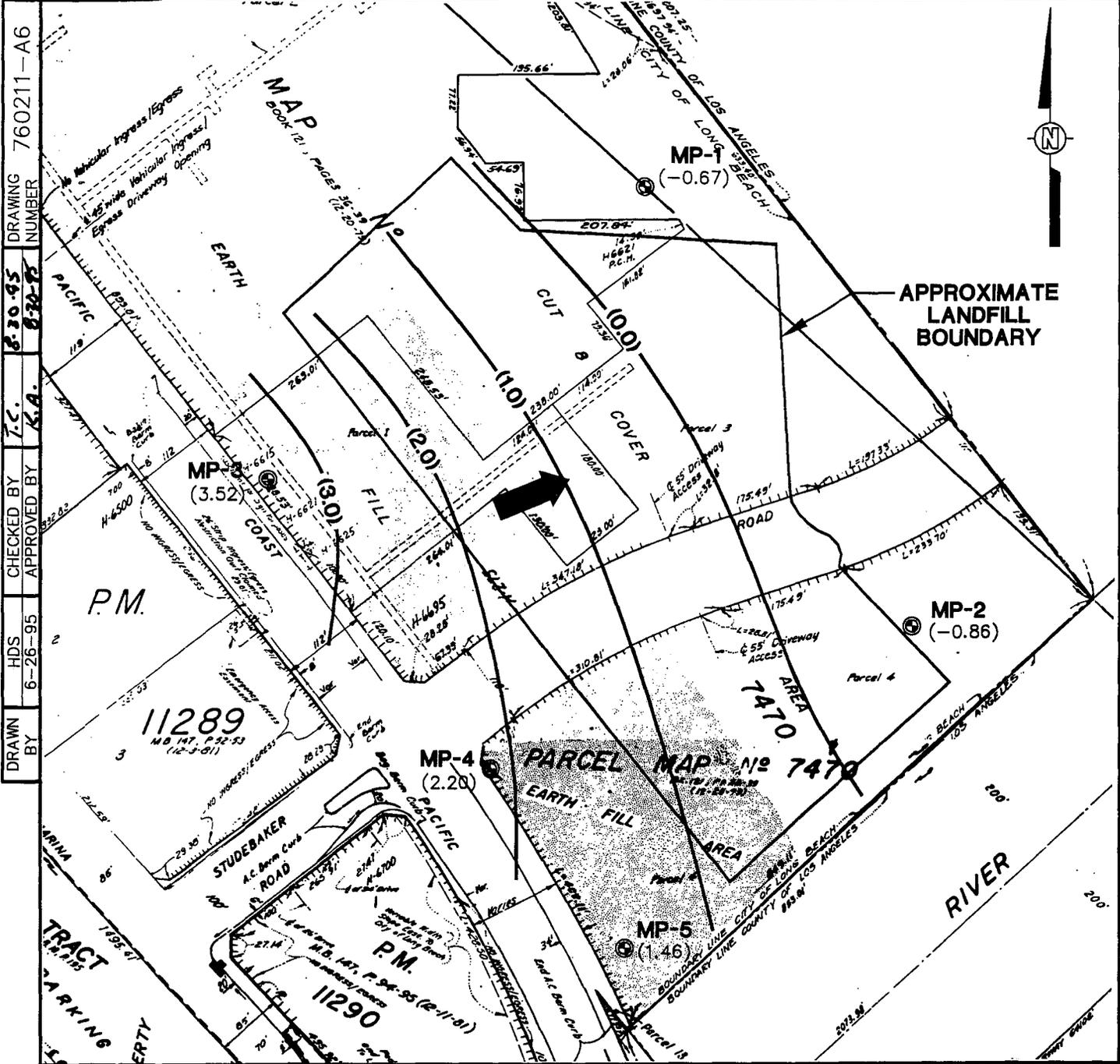
FIGURE 6

**GROUNDWATER ELEVATION
 CONTOUR MAP FOR
 SEPTEMBER 6, 1989
 MARKET PLACE LANDFILL**

PREPARED FOR

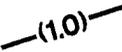
**BIXBY RANCH COMPANY
 SEAL BEACH, CALIFORNIA**

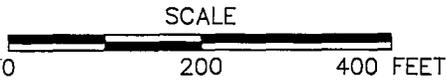




DRAWING NUMBER 760211-A6
 8-20-95
 8-22-95
 CHECKED BY T.C.
 APPROVED BY S.A.
 HDS 6-26-95
 DRAWN BY

LEGEND

- 
 MP-1
 (-0.67) SWAT MONITORING WELL AND GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 
 (-1.0) GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)
- 
 DIRECTION OF GROUNDWATER FLOW



REFERENCE:
 BASE MAP - CITY OF LONG BEACH, DEPARTMENT OF ENGINEERING, 1978 THROUGH 1982

FIGURE 7

GROUNDWATER ELEVATION CONTOUR MAP FOR DECEMBER 8, 1994 MARKET PLACE LANDFILL

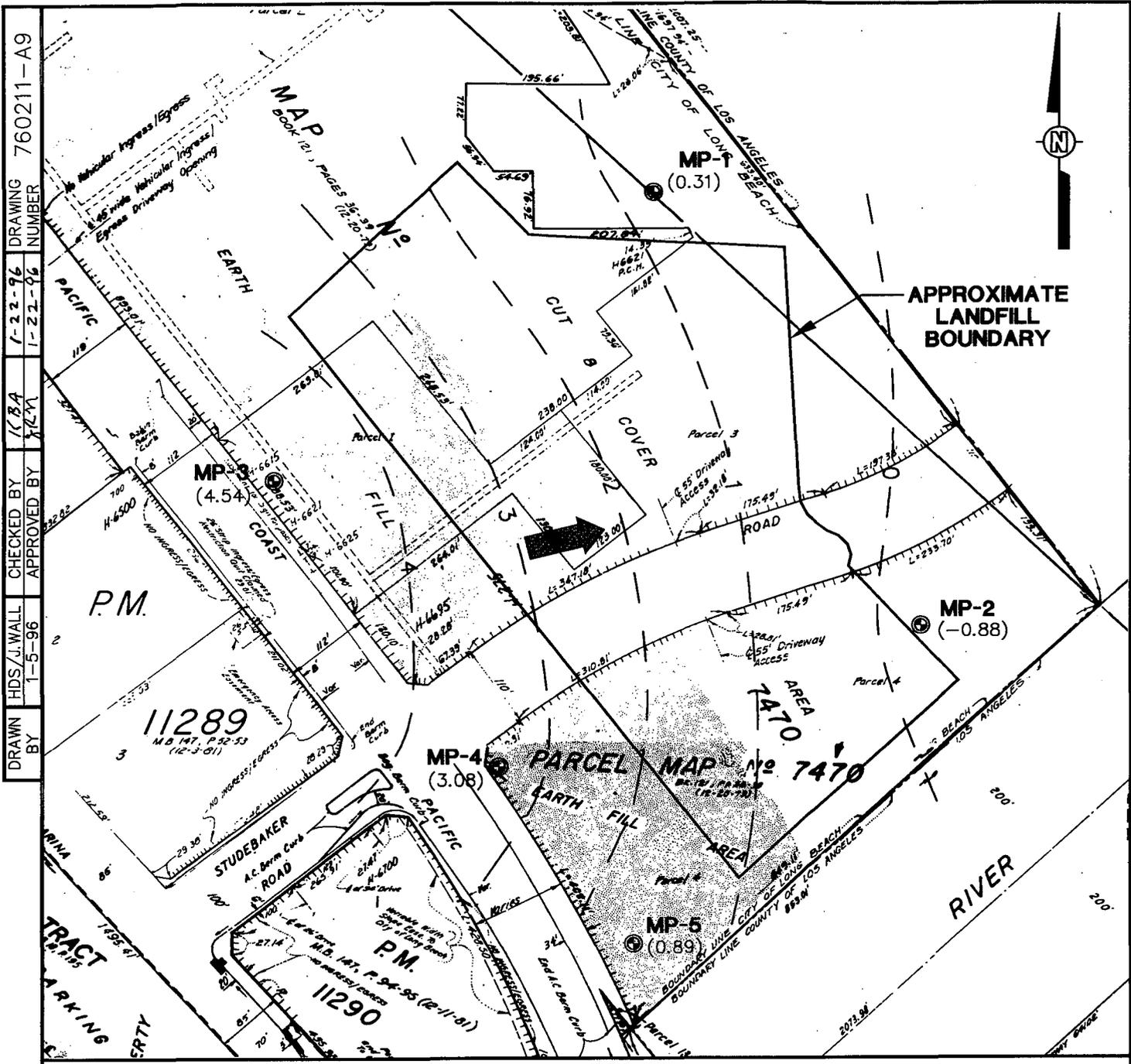
PREPARED FOR

BIXBY RANCH COMPANY SEAL BEACH, CALIFORNIA



INTERNATIONAL TECHNOLOGY CORPORATION

DRAWN BY: HDS/J.WALL
 CHECKED BY: KBA
 APPROVED BY: [Signature]
 1-5-96
 DRAWING NUMBER: 760211-A9
 7-22-96
 1-22-96



LEGEND

- MP-1
 (-0.67)
 SWAT MONITORING WELL AND
 GROUNDWATER ELEVATION
 (FEET ABOVE MEAN SEA LEVEL)
- 2
 GROUNDWATER ELEVATION CONTOUR
 (FEET ABOVE MEAN SEA LEVEL)
- DIRECTION OF GROUNDWATER FLOW



REFERENCE:
 BASE MAP - CITY OF LONG BEACH, DEPARTMENT
 OF ENGINEERING, 1978 THROUGH 1982

FIGURE 8

**GROUNDWATER ELEVATION
 CONTOUR MAP FOR
 SEPTEMBER 7, 1995
 MARKET PLACE LANDFILL**

PREPARED FOR

**BIXBY RANCH COMPANY
 SEAL BEACH, CALIFORNIA**



**INTERNATIONAL
 TECHNOLOGY
 CORPORATION**

Market Place
Salvage # 2

FINAL REPORT
ASSESSMENT OF THE BIXBY RANCH COMPANY
SANITARY LANDFILL
FOR THE PRESENCE OF HAZARDOUS SUBSTANCES

PROJECT NO. 240402

PREPARED FOR

BIXBY RANCH COMPANY
523 West 6th Street
Los Angeles, California 90014

PREPARED BY

IT CORPORATION
17461 Derian Avenue
Irvine, California 92714

June 30, 1987

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TABLE NUMBER

DESCRIPTION

1	ORGANIC COMPOUNDS DETECTED
2	TOTAL CONCENTRATIONS OF LEAD
3	SOLUBLE CONCENTRATIONS OF LEAD

FIGURE NUMBER

DESCRIPTION

1	Site Location Map
1A	Location of Test Points (Pits, Borings and Wells)
2	Total Depths of Test Pits and Borings
3	Depth to Base of Trash
4	Thickness of Trash
5	Location of IT Sample Collection Sites and Wells
6	Distribution of Extractable Lead in Refuse Above Water Table

1.0 BACKGROUND AND SCOPE OF STUDY

In late 1986, geotechnical studies (Moore and Taber, 1986) of the inactive Bixby Ranch Company sanitary landfill located at the intersection of the Pacific Coast Highway and the San Gabriel River suggested that the landfill may contain hazardous substances. In early 1987, Bixby Ranch Company contracted with IT Corporation to perform a preliminary assessment of the landfill to determine if such substances are, in fact, present.

The site on which the landfill is located (figure 1 and 1A) is approximately 7 acres in size, while the landfill itself is approximately 3 acres. The site consists of a vacant lot covered with numerous piles of soil and asphalt and concrete demolition debris. Beneath the site are extensive deposits of fill, which, in turn, are underlain by native fine-to coarse-grained clay, silt and sand.

The sanitary landfill is located on the eastern half of the site. Based on test borings and backhoe excavations by Moore and Taber, the landfill was known to contain newspaper, plastic, metal, wood, glass, plant debris, rubber tubes and tires, grass clippings, leaves and branches and other substances. The depth of refuse was determined to vary throughout the landfill, ranging from 5 feet to 33 feet.

Ground water was encountered by Moore and Taber in test borings about 13 to 18 feet below the ground surface. The refuse was relatively dry and undecomposed above the water table, but wet and highly decomposed below the water table.

Beginning in February, 1987, and extending to June, 1987, IT Corporation conducted its assessment, which consisted of the following:

- drilling of 10 borings to allow soil and refuse sampling and analysis (figure 1A);
- drilling and construction of two monitoring wells to allow sampling and analysis of groundwater (figure 1A);

- analysis of soil samples from all borings for EPA priority pollutants, including organics and metals;
- evaluation of all data to determine if potentially hazardous substances are present in hazardous concentrations.

This report presents a discussion of the work performed and the results of that work.

2.0 OBJECTIVES

The study was conducted in two phases. The objectives of the first phase were to:

- perform an historical analysis of the landfill;
- sample the refuse above and below ground water and sample ground water within the boundaries of the landfill;
- determine the chemical composition of the samples collected by performing quantitative chemical analyses for EPA priority organic and metallic pollutants;
- evaluate the results to determine if any potentially hazardous substances are present in the landfill in hazardous concentrations;
- provide a report and recommendations.

Difficulties in obtaining samples of ground water plus an expanded scope of work to include assessing the proposed Studebaker Road right-of-way for hazardous substances required conducting the second phase. The objectives of the second phase were to:

- construct two monitoring wells - one within the landfill and one without (figure 1A and 5);
- collect and analyze ground-water samples from the wells;
- determine if ground water fluctuates with the oceanic tides and by how much;

- determine the presence of trash and the concentrations of copper, lead and zinc along the projected Studebaker Road right-of-way (figure 1A and 5).

3.0 HISTORICAL ANALYSIS OF LANDFILL

The site was leased from the Bixby Ranch Company in 1960 by City Dump and Salvage, Inc. of Long Beach, California, (City Dump and Salvage) for the purpose of dumping waste on a portion of the site. In September, 1960, City Dump and Salvage received a permit from the County of Los Angeles, Industrial Waste Division, to dump the following types of waste in the eastern half of the site at least 300 feet from Pacific Coast Highway (see Appendix A):

- non-water soluble, non-decomposable inert solids;
- ordinary household and commercial refuse, including decomposable organic refuse and scrap metal;
- garbage and market refuse.

The disposal of liquids and semi-liquids and hazardous wastes was not permitted.

City Dump and Salvage began disposal operations at the site in mid-1960 (prior to receiving its permit) and ceased operations in early 1961 after filling the landfill to its permitted capacity. Clients of City Dump and Salvage, included the City of Long Beach, J and S Disposal Company (servicing the City of Lakewood), and the Veteran's Administration Hospital. Possible other clients are not known.

The disposal permit allowed for the excavation and subsequent filling with refuse of a trench below the ground water table in the eastern one-third to one-half of the site. Based on information from Moore and Taber and IT borings and trenches, the shape and depth of this trench has been determined to be that shown in figures 3 and 4. Some violation of the permit appears to have occurred at the proposed Studebaker Road right-of-way, where trash has been found to a depth of about 10 feet below the existing surface (figure 3).

Final cover of the landfill was in place by May 16, 1961. There is no indication that landfilling occurred at the site since that time, except for the dumping of inert demolition materials.

4.0 DRILLING AND SAMPLING

PHASE I

On March 5, 1987, five borings (IT-1, IT-1A, IT-2, IT-3 and IT-4) were drilled within the landfill boundary to depths of approximately 21, 36, 26.5, 38, and 43 feet respectively (figure 1 and 2). All borings were drilled using 8-inch diameter, continuous-flight, hollow-stem augers.

Soil samples were collected at approximately 5-foot intervals to the total depth of each boring. Specific sample locations are shown on the enclosed boring logs (Appendix B). All borings were backfilled with a slurry mixture of grout.

Soil and refuse samples were collected using a split-spoon sampler, which contains two 2-inch by 6-inch brass sample cylinders. Soil, when encountered, was examined and classified in accordance with the Unified Soil Classification System. The ends of the sample cylinders were wrapped with aluminum foil, sealed, and packed on ice (to minimize volatilization) until they were delivered to Chemical Research Laboratory in Stanton, California. IT chain-of-custody procedures were maintained to ensure integrity of the samples.

Refuse was not encountered while drilling boring IT-1. In boring IT-1A, refuse was encountered from approximately 3 to 30 feet below grade. In boring IT-2, refuse was encountered from approximately 6 to 18 feet below grade. In boring IT-3, refuse was encountered from approximately 10 to 30 feet below grade. In boring IT-4, refuse was encountered from approximately 16 to 35 feet below grade.

Refuse encountered above the water table (water table at approximately 15 feet below grade) was gray in color, slightly decomposed, and consisted mainly of newspaper, wood, glass, rubber, metal and cloth fragments. Refuse encountered below the water table was black in color, wet and moderately to highly decomposed.

PHASE II

On April 8 and 9, 1987, eight borings (IT-5 to IT-9 and MW-1, MW-2 and MW-2A) were drilled within the site (figure 1A). Borings MW-1 and MW-2 were completed as ground-water monitoring wells to depths of 32 and 38 feet below grade, respectively. Borings IT-5, IT-6, IT-7, IT-8, and IT-9 were drilled within the proposed Studebaker Road right-of-way to depths of approximately 16, 21, 11, 11 and 11 feet below grade, respectively. All borings were drilled using 8-inch diameter, continuous-flight, hollow-stem augers. Soil samples were collected at approximately 5-foot intervals to the total depth of each boring. Specific sample depths are shown on the enclosed boring logs. Borings IT-5 to IT-9 were backfilled with the surface cuttings from each boring.

Soil and refuse sampling procedures and protocols were the same as those used for Phase I drilling and sampling.

Refuse was not encountered while drilling borings MW-1 and IT-5, IT-6, IT-8, and IT-9. In boring IT-7, refuse was encountered from approximately 5 to 10.5 feet below grade. In boring MW-2 and MW-2A, refuse was encountered from approximately 11.5 to 36 feet below grade. Boring MW-2 was originally intended to be constructed as a monitoring well. However, a 10-foot section of a drilling hammer could not be retrieved from the hole, and MW-2 was abandoned and backfilled with a slurry mixture of grout. MW-2A was then drilled and completed approximately 3 feet from MW-2.

Refuse encountered above and below the water table in borings IT-7, MW-2, and MW-2A was similar in composition and characteristics as to that described previously for the other boreholes.

5.0 MONITORING WELL CONSTRUCTION AND DEVELOPMENT

Monitoring wells MW-1 and MW-2A were constructed using 2-inch diameter, PVC well casings. Well casings were installed from 6 inches below grade to a depth of 31.5 and 38 feet below grade, respectively. Well MW-1 was screened from 6.5 to 31.5 feet below grade using 0.02-inch slotted PVC screen. The blank portion of the PVC casing above the well screen extended from 6 inches to 6.5 feet below grade. Well MW-2A was screened from 11 to 38 feet below grade using 0.02-inch slotted screen. The blank portion of the PVC casing above the well screen extended from 6 inches to 11 feet below grade.

In well MW-1, number 3 Monterey sand was placed in the annular space between the boring and the well casing from 5 to 32 feet below grade. A one-foot layer of bentonite was placed on top of the sand. The remaining annular space was filled with a slurry mixture of grout to within 1 foot of grade. In well MW-2, number 3 Monterey sand was placed in the annular space between the boring and the well casing from a depth of 6.5 to 38 feet below grade. A 1.5-foot layer of bentonite was placed on top of the sand. The remaining annular space was filled with a slurry mixture of grout to within 1 foot of grade. Both wells were completed at the surface with a locking steel traffic cover.

A Teflon®-PVC bailer was used to develop wells MW-1 and MW-2A by removing approximately three well-volumes of liquid and sediments from each well.

A clean Teflon® - PVC bailer was used to collect water samples from each well. Prior to sampling, the bailer was cleaned with an aqueous solution of Alconox® and rinsed with clean water. Water samples were placed in glass and

plastic sample containers with Teflon®-lined lids. The samples were packed on ice for delivery to the IT Analytical Services Laboratory in Cerritos, California. IT chain-of-custody procedures were maintained to ensure sample integrity.

6.0 ANALYSIS OF SAMPLES

In borings IT-1 to IT-4 and wells MW-1 and MW-2A, samples were collected at approximately 5-foot intervals. Those samples taken above the water table were composited to one sample per borehole or well, and those samples taken below the water table were composited to one sample per borehole or well, for a total of two samples per hole.

In borings IT-5 to IT-9, samples were also taken at 5-foot intervals and composited. Since ground water was not encountered in these holes because of their shallow depth, only one composite sample was analyzed from each hole.

The soil samples from Phase I borings (IT-1 to IT-4) were analyzed by Chemical Research Laboratories, Inc., Stanton, California, a laboratory certified by the California Department of Health Services.

Analyses were performed for U.S. Environmental Protection Agency priority pollutants, as follows:

<u>EPA Method</u>	<u>Parameters</u>
624/8240	Volatile organic pollutants
625/8270	Semi-volatile organic pollutants
608/8080	Pesticides and aroclors
335	Cyanide
8040	Phenols
7060, 7471, 7740	Metals and semi-metals

The soil samples from Phase II borings (IT-5 to IT-9) and the two well borings (MW-1 and MW-2A) were analyzed by IT Analytical Services laboratory, Cerritos, California, which is also certified by the California Department of Health Services. These samples were analyzed for metals and semi-metals only.

The water samples from the two water wells were analyzed by both laboratories for EPA priority pollutants by methods 624 (volatile organic compounds) and 625 (semi-volatile organic compounds). In addition, IT Analytical Services analyzed the water samples for metals and semi-metals and for chemical oxygen demand (COD), acidity (pH), and total dissolved solids (TDS).

As a double-check on analytical accuracy for copper, lead and zinc, a suite of soil samples was re-submitted to both laboratories, each of which analyzed for these metals using the same methods for the earlier analyses.

All chemical analyses and other laboratory results are included in this report in Appendix C.

7.0 GROUND-WATER LEVEL

In Phase I, ground water was encountered in borings at an average depth of approximately 15 feet below grade. In well MW-2A, ground water is at a depth of approximately 11 feet. The difference is due to the fact that the top of MW-2A is 4 feet lower in elevation than the average of the tops of the borings.

Ground water beneath the site is essentially sea water, and the gradient of the ground-water table is approximately zero, or horizontal.

It was suspected that the ground-water level fluctuates with the oceanic tides but with a lower amplitude. Water-level measurements made in well MW-2A over a period of three days corroborated this suspicion, indicating a tide-related variation of about 2.5 inches from high tide to low tide. This small amplitude is due to the fact that the soils surrounding the landfill and between the landfill and the nearest ocean water (San Gabriel River) have a high clay content and, therefore, low permeability. This low permeability effectively dampens, or suppresses, tidal influence.

8.0 DISCUSSION OF RESULTS

Geometry of Landfill

Based on the historical records and borehole data, it is clear that the landfill is confined to the eastern portion of the site. Figures 3 and 4 show that the landfill is nearly rectangular in plan view and that the deepest portion occurs more than 300 feet from Pacific Coast Highway on a part of the property where deep disposal was allowed in the lessee's waste disposal permit. The deepest part of the landfill is estimated to be approximately 20 to 25 feet below sea level, a depth allowed by the permit. The lessee apparently excavated to this depth using a drag line, then bulldozed trash into the excavation.

When the thickness of trash (figure 4) is subtracted from the depth to the base of trash (figure 3), it becomes evident that the final soil cover is thinnest between boreholes IT-1A and IT-3.

Composition of Refuse

Historical records indicate that the landfill was permitted to accept only non-hazardous refuse.

Results of chemical analyses indicate the presence of organic substances normally found in municipal landfills - detergents, plasticisers, solvents, disinfectants. These organic substances, shown in Table 1, are potentially hazardous if present in high enough concentrations. However, their concentrations are low and do not exceed allowable concentrations, either for single substances or on a cumulative-effect basis.

Allowable concentration relates to the maximum amount of a substance, or mixture of substances, that can be ingested by certain test animals (usually rats and mice) without their dying. Since this depends on the weight of test animal, the allowable concentrations are expressed in terms of milligrams of potentially hazardous substance per kilogram of weight of the test animal (milligrams per kilogram). Table 1 lists lethal doses of the detected substances in milligrams per kilogram of body weight to illustrate the relatively high allowable concentrations. These doses are the doses which cause the death of 50 percent of the test animals in a specific period of time (oral lethal dose - 50 percent, or LD₅₀). EPA procedures call for summing the effect of potentially hazardous substances by considering the concentration of the substance and its oral LD₅₀ according to a complex formula.

With respect to inorganic substances (metals and semi-metals), results of chemical analyses indicate that the substances tested for in the refuse are present in non-hazardous concentrations, except for lead. Table 2 shows the total concentration of lead in the refuse, natural soil and fill-soil samples analyzed. The allowable total concentration of lead in solid materials is 1,000 parts per million, and this amount is not exceeded. However, Table 3 shows the extractable concentration of lead for the same samples, and the allowable concentration is 5 parts per million. This amount is exceeded in 5 samples. The total concentration of lead (total threshold limit concentration, or TTLC) is the amount of lead detected when the entire sample is chemically digested with strong acids. The extractable concentration of lead (soluble threshold limit concentration, or STLC) is the amount of lead detected when the same sample is leached by only a relatively weak acid, which is intended to simulate the leaching effect of slightly acidic groundwater.

Figure 6 shows the estimated distribution of extractable (STLC) lead in refuse above the water table. Figure 7 shows the estimated distribution of extractable lead below the water table. It is clear that hazardous concentrations of lead are confined to the landfill itself and especially to the refuse above the water table. It is probable that the groundwater has leached and diluted some of the lead contained in the refuse.

The small amount of refuse found at IT-7 within the proposed Studebaker Road right-of-way contains only small concentrations of lead. This may be due either to sample inhomogeneity or to the possibility that high-lead refuse simply was not dumped at this location.

The source of the lead (and anomalous but non-hazardous copper and zinc) is not known. However, the presence of minute (non-hazardous) amounts of cyanide in several of the refuse samples analyzed suggests that metal-plating solutions may have been dumped illegally at the landfill. This would also explain the ubiquitous distribution of the lead (and copper and zinc).

Composition of Natural Soil and Fill

Natural soil samples below the landfill and fill samples (soil cover) are uniformly low in potentially hazardous substances, including lead. This suggests that vertical and lateral migration of materials from the landfill has not occurred to any significant extent. This probably is due to the fact that the soils are very fine-grained (silts and clays) and act as barriers to the flow of ground water.

Well MW-1, which was drilled in natural soil, shows no evidence of contamination by landfill material, even though it is close to the landfill and the landfill is approximately 26 years old. This may be construed as indicating that, if the soils surrounding the landfill are similar to the soils between the landfill and MW-1, very little migration of substances from the landfill is likely to occur, even over an extended period of time.

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Well MW-1, which was drilled in natural soil, shows no evidence of contamination by landfill material, even though it is close to the landfill and the landfill is approximately 26 years old. This may be construed as indicating that, if the soils surrounding the landfill are similar to the soils between the landfill and MW-1, very little migration of substances from the landfill is likely to occur, even over an extended period of time.

Ground Water

As previously indicated, ground water beneath the site appears to be primarily sea water. It is probable that some meteoric water (rainfall) has infiltrated the landfill and diluted the sea water. However, this dilution is probably small, considering the twice-daily tidal effect that very likely causes regular recharge of the ground water by sea water.

Ground water samples at both well MW-1 and MW-2A (also called MW-10A) contained small amounts of sediment that clogged the 0.5 micron filters used in the field. Consequently, analyses of the groundwater for metals probably are slightly higher than they would be for completely filtered samples. In spite of this, results indicate that ground water within the landfill contains substantially less lead and other metals than the sludge from within the landfill (sludge analyses by either total dissolution or extraction). Ground water from without the landfill (MW-1) contains even less lead and other heavy metals (1/50th to 1/100th the amount in the landfill groundwater), suggesting that migration of fluids from the landfill toward MW-1 has not been significant or is very slow.

Groundwater from beneath the site is not potable and will not be used directly as a source of drinking water. Nevertheless, it must be evaluated against drinking water standards in case it is ever removed from the site and disposed of. From this point of view, the groundwater does not meet drinking water standards for metals and organic chemicals, as one would expect of ground water that has contacted a sanitary landfill. Therefore, if water per se is removed from beneath the landfill, it would have to be assessed and appropriately disposed of.

Groundwater from without the landfill (MW-1) appears to be primarily sea water. It contains a slightly anomalous concentration of zinc relative to sea water, but this may have come from the small amount of sediment in the sample collected.

The sediment may have yielded enough naturally occurring zinc during laboratory analysis to increase the zinc concentration of the water above typical sea water levels.

Groundwater from MW-1 was not analyzed for organic chemicals, because it was clear from the analyses for metals of the MW-1 water and soil samples (taken during drilling) that migration of landfill fluids toward MW-1 has not occurred to a significant extent. Also, it had been determined that lead was the only potentially hazardous substance of concern.

Based on the analyses for metals of water from MW-1, it does not appear that this water is hazardous. However, to be certain, if it is planned to remove this water, an analysis for potentially hazardous organics should be performed. Such an analysis would normally be done as part of a SWAT study.

Studebaker Road Right-of-Way

Analytical results from boreholes IT-5 to IT-9 drilled along the Studebaker Road right-of-way show that the natural soils and fill do not contain hazardous concentrations of copper, lead or zinc.

A small amount of trash in IT-7 appears not to contain hazardous concentrations of lead. However, because of its inhomogeneity, this trash may turn out in subsequent samplings to contain higher concentrations of lead. Therefore, it should be checked further if it is to be removed during road-building.

9.0 CONCLUSIONS

The following conclusions may be drawn regarding the presence of hazardous substances in the Bixby landfill:

- the refuse in the landfill southeast of the Studebaker Road right-of-way contains lead in slightly to moderately hazardous concentrations;
- no other potentially hazardous substances were found in hazardous concentrations in the refuse;
- the natural soils and soil fills at the site appear not to contain potentially hazardous substances in hazardous concentrations;
- the soils beneath the Studebaker Road right-of-way appear not to contain potentially hazardous substances in hazardous concentrations;
- ground water beneath the site is primarily sea water and does not constitute a source of drinking water;
- substances from the landfill do not appear to be migrating from the site to an appreciable extent, at least in the direction of MW-1. Except for slightly anomalous concentrations of zinc, ground water at MW-1 appears to be primarily sea water;
- at present, a solid waste assessment test (SWAT) is scheduled. This test should determine if the landfill is leaking hazardous substances to the ground water.

10.0 RECOMMENDATIONS

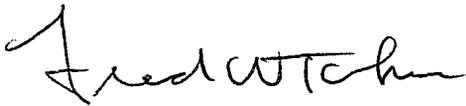
The following recommendations are made:

- although a portion of the site contains hazardous concentrations of lead, if materials are not removed from this portion, remedial measures may not have to be taken;
- if materials are removed from the hazardous portion, they will have to be removed to a Class I landfill;

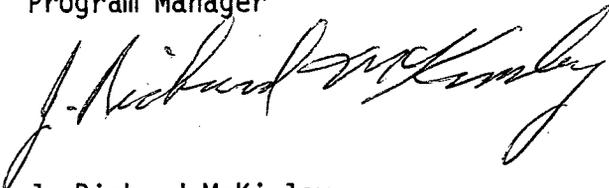
- the small amount of trash at the Studebaker Road right-of-way should be further checked for the possibility of hazardous concentrations of lead if it is to be removed.
- if ground water per se is removed from beneath the landfill, it will have to be assessed and disposed of appropriately;
- if ground water per se is removed from the site but outside the landfill, it should be tested for potentially hazardous organic substances.

Respectfully submitted,

IT CORPORATION



Fred W. Tahse
Program Manager



J. Richard McKinley
Project Director

REFERENCES

1. Interim Foundation Investigation Report, Moore and Taber Geotechnical Engineers and Geologists, August 25, 1986.
2. File No. 4903-10, Los Angeles County, Department of County Engineering, Industrial Waste Division.
3. File No. 1430-1, Los Angeles County Planning Commission.
4. Aerial photographs, Whittier College, Whittier California.

Tables

TABLE 1
 ORGANIC COMPOUNDS DETECTED
 BIXBY RANCH LANDFILL
 PROJECT NO. 240402

<u>COMPOUND</u>	<u>MAXIMUM CONCENTRATION DETECTED (PPM)</u>	<u>ORAL LD₅₀ (mg/kg)</u>
<u>EPA 8080</u>		
Arochlor 1248 (PCB)	4.2	11
<u>EPA 624/8240</u>		
Methylene chloride	0.26	2,136
Acetone	1.9	3,000
1,1-Dichloroethene	0.29	200
Trichloroethene	0.10	2,402
Toluene	1.8	5,000
Ethylbenzene	0.36	3,500
Styrene	0.11	316
Total xylenes	1.7	4,300
<u>EPA 625/8270</u>		
Phenol	0.2	282
2-Chlorophenol	0.2	440
1,4-Dichlorobenzene	0.3	500
2-Methylphenol	0.6	121
4-Methylphenol	0.02	207
Naphthalene	1.5	580
2-Methylnaphthalene	3.9	1,630
Phenanthrene	0.6	700
Di-n-butylphthalate	6.8	5,282
Fluoranthene	0.3	2,000
Pyrene	0.7	800
bio(2-ethylhexyl)phthalate	4.5	30
Chrysene	0.2	>5 (est)
Di-n-Octyl phthalate	2.7	6,513
Fluorene	0.7	>5 (est)
Cyanide	0.62	5

TABLE 2
TOTAL CONCENTRATIONS OF LEAD
BIXBY RANCH LANDFILL
PROJECT NO. 240402

<u>SAMPLE IDENTIFICATION</u>	<u>LEAD (ppm)</u>	<u>SAMPLE MATERIAL</u>
<u>IT-1</u>	NA	Soil or Fill
<u>IT-1A</u> (S-1,S-2,S-3 Composite)	310	Refuse
S-4	386	Refuse
<u>IT-2</u> (S-2,S-3 Composite)	285	Refuse
S-5	4.23	Natural Soil
<u>IT-3</u> S-2	177	Refuse
(S-3,S-4,S-5,S-6 Composite)	100	Refuse
<u>MW-2</u> (S-1,S-2 Composite)	7.6	Soil or Fill
(S-3,S-5,S-6,S-7 Composite)	60	Refuse
<u>IT-4</u> S-4	231	Refuse
(S-5,S-6,S-7,S-8 Composite)	75.6	Refuse
W-2	12.5	
<u>IT-5</u> (S-1,S-2,S-3 Composite)	8.1	Soil or Fill
<u>IT-6</u> (S-1,S-2,S-3,S-4 Composite)	9.2	Soil or Fill
<u>IT-7</u> (S-1,S-2 Composite)	11	Refuse + Soil (1:1)
<u>IT-8</u> (S-1, S-2 Composite)	5.9	Soil or Fill
<u>IT-9</u> (S-1,S-2 Composite)	11	Soil or Fill
<u>MW-1</u> (S-1,S-2 Composite)	3.7	Soil
S-3	3.3	Soil
<u>TTLC</u>	1,000	

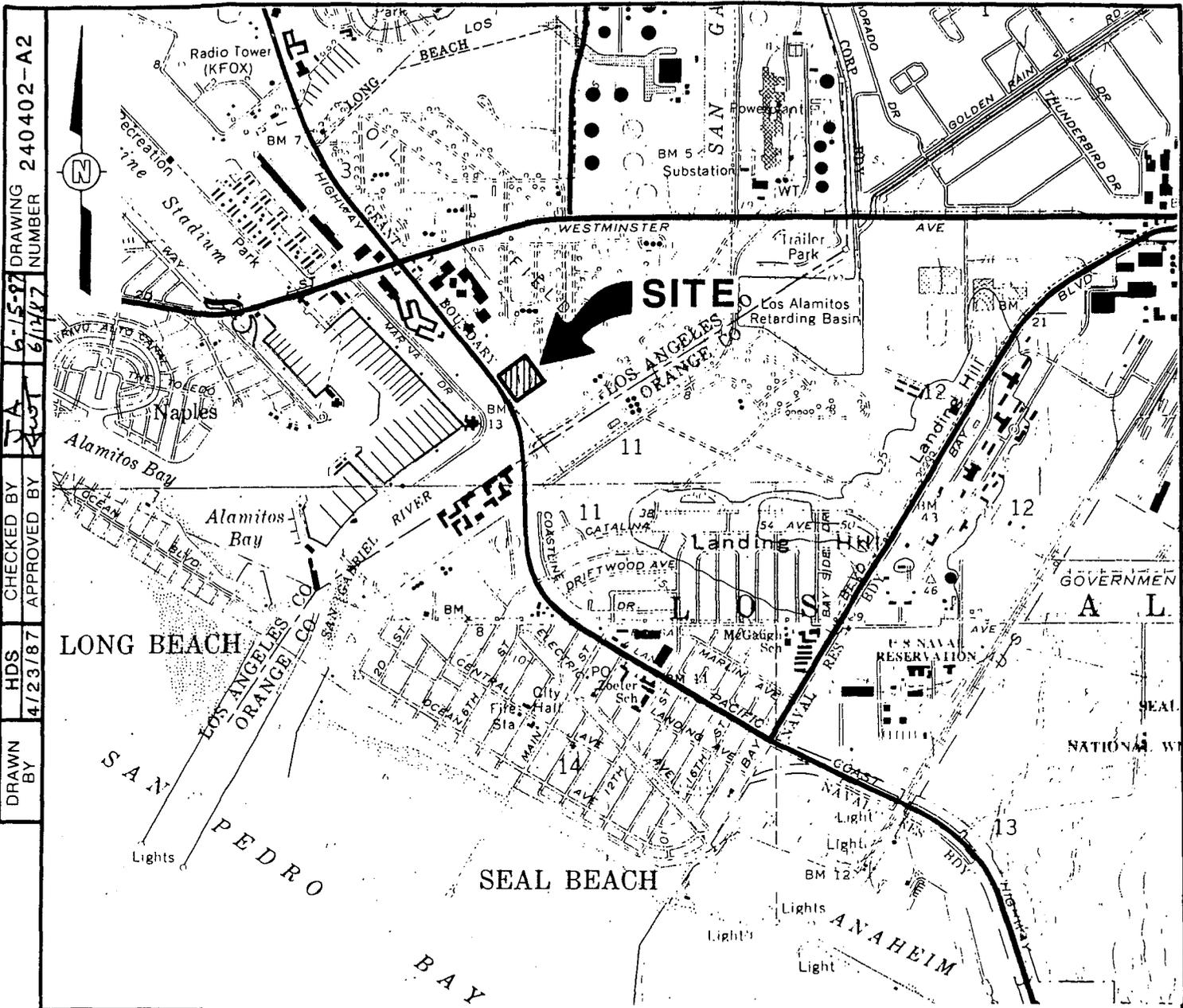
NA = Not Analyzed.

TABLE 3
 SOLUBLE CONCENTRATION OF LEAD
 BIXBY RANCH LANDFILL
 PROJECT NO. 240402

<u>SAMPLE IDENTIFICATION</u>	<u>LEAD (ppm)</u>	<u>SAMPLE MATERIAL</u>
<u>IT-1</u>	NA	Soil or Fill
<u>IT-1A</u> (S-1,S-2,S-3 Composite)	23	Refuse
S-4	26	Refuse
<u>IT-2</u> (S-2,S-3 Composite)	18	Refuse
S-5	-	Natural Soil
<u>IT-3</u> S-2	26	Refuse
(S-3,S-4,S-5,S-6 Composite)	9.8	Refuse
<u>MW-2</u> (S-1,S-2 Composite)	0.55	Soil or Fill
(S-3,S-5,S-6,S-7 Composite)	3.30	Refuse
<u>IT-4</u> S-4	4.6	Refuse
(S-5,S-6,S-7,S-8 Composite)	0.4	Refuse
W-2	1.2	
<u>IT-5</u> (S-1,S-2,S-3 Composite)	0.3	Soil or Fill
<u>IT-6</u> (S-1,S-2,S-3,S-4 Composite)	0.23	Soil or Fill
<u>IT-7</u> (S-1,S-2 Composite)	0.59	Refuse + Soil (1:1)
<u>IT-8</u> (S-1, S-2 Composite)	<0.2	Soil or Fill
<u>IT-9</u> (S-1,S-2 Composite)	0.35	Soil or Fill
<u>MW-1</u> (S-1,S-2 Composite)	<0.2	Soil
S-3	<0.2	Soil
<u>STLC</u>	5.0	

NA = Not Analyzed.

Figures



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 CHECKED BY: JTA 6/15/97
 APPROVED BY: JST 6/14/97
 DRAWING NUMBER: 240402-A2

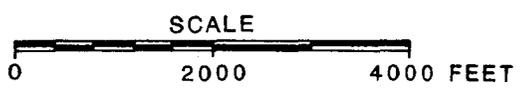


FIGURE 1

SITE LOCATION MAP

PREPARED FOR

**BIXBY RANCH COMPANY
LONG BEACH, CALIFORNIA**

REFERENCE:
 7.5 MIN. USGS TOPOGRAPHIC MAP OF LOS ALAMITOS
 AND SEAL BEACH, CALIFORNIA QUADRANGLES,
 DATED 1964 AND 1965 RESPECTIVELY,
 PHOTOREVISED 1981 FOR BOTH
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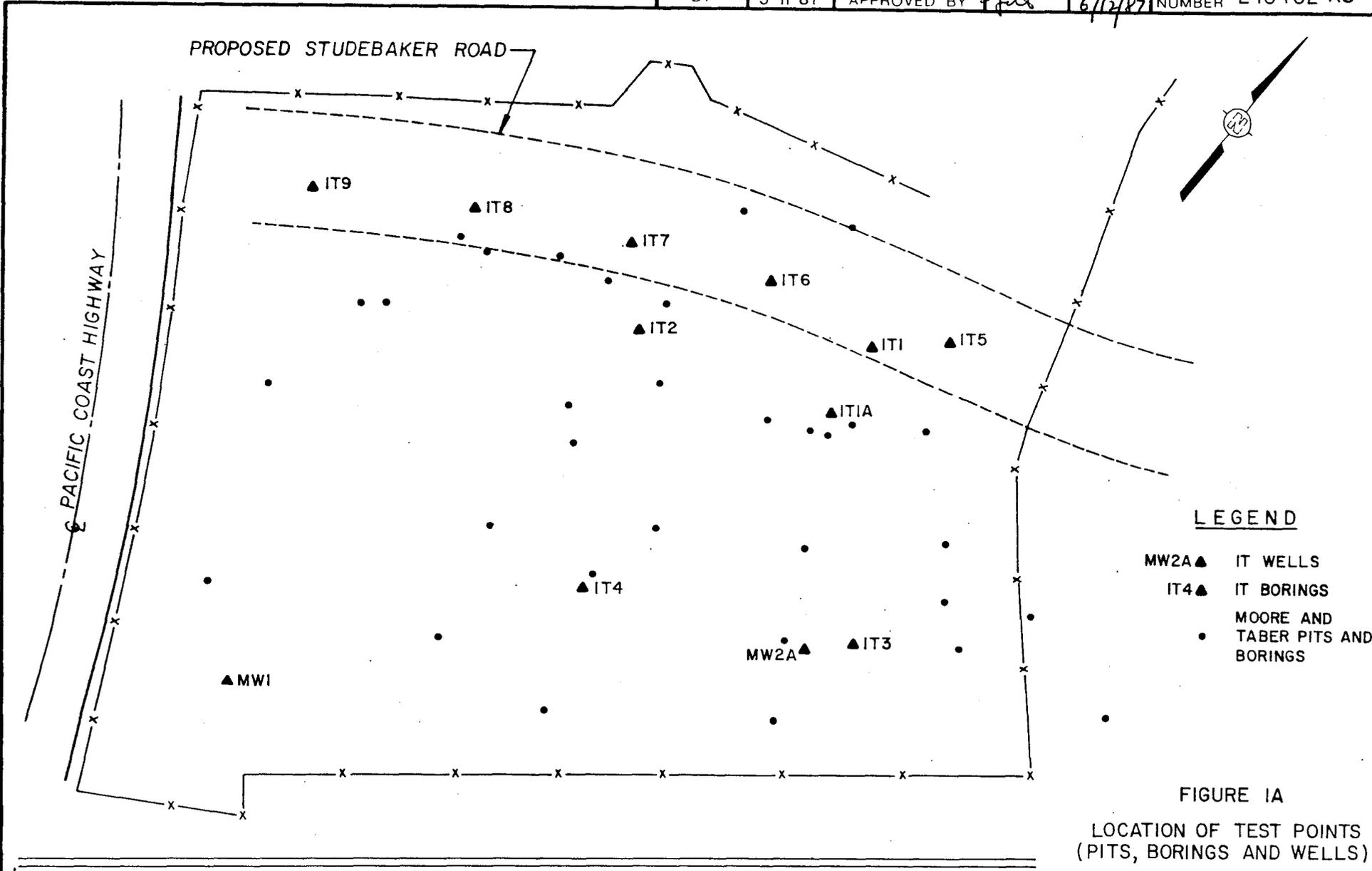


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	5-11-87	APPROVED BY	<i>[Signature]</i>	6/12/87		

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LEGEND

- MW2A▲ IT WELLS
- IT4▲ IT BORINGS
- MOORE AND TABER PITS AND BORINGS

FIGURE 1A
 LOCATION OF TEST POINTS
 (PITS, BORINGS AND WELLS)

PREPARED FOR
 BIXBY RANCH COMPANY
 LONG BEACH, CALIFORNIA

SAN GABRIEL RIVER CHANNEL



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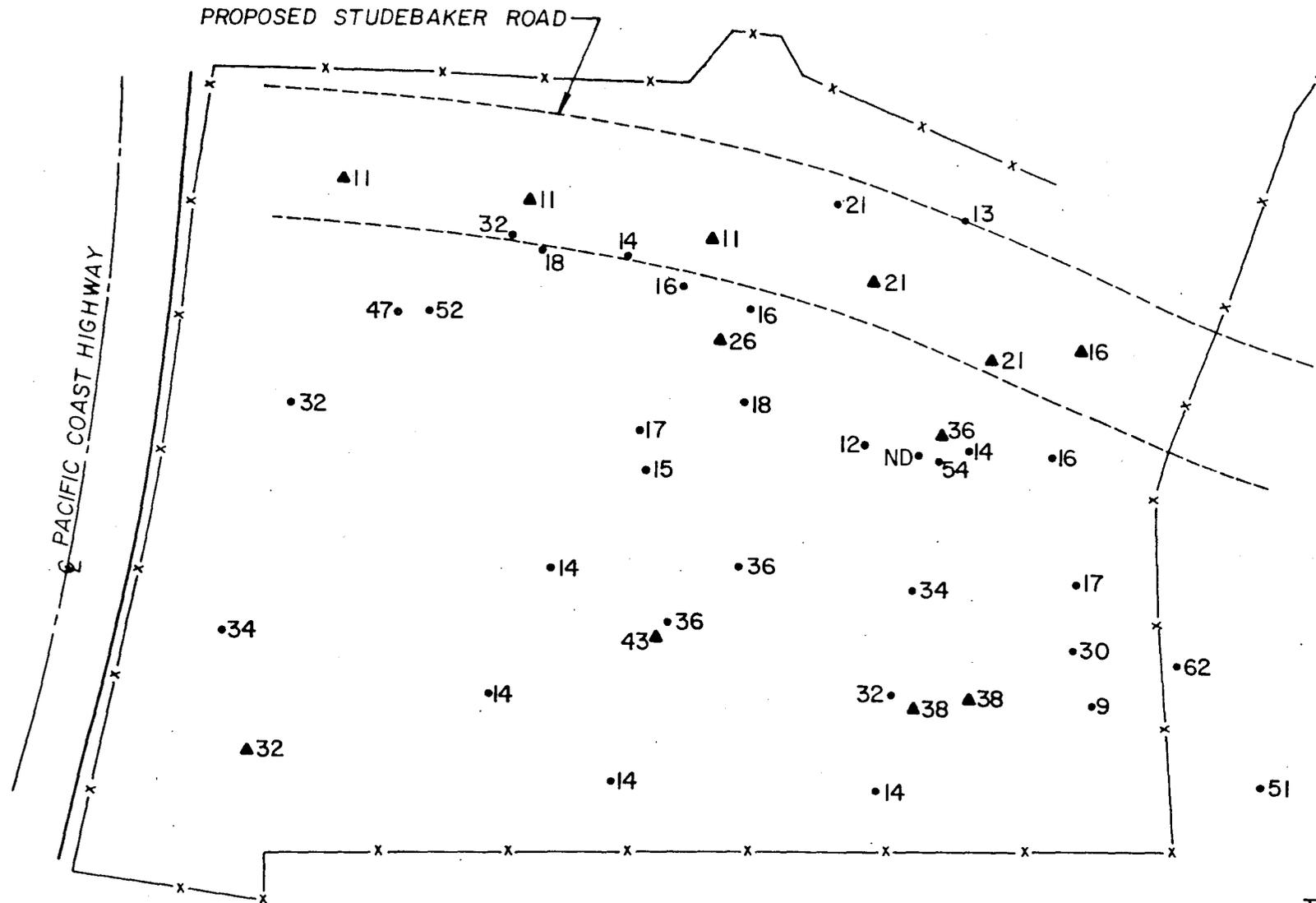


FIGURE 2

TOTAL DEPTHS OF TEST PITS AND BORINGS

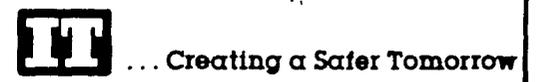
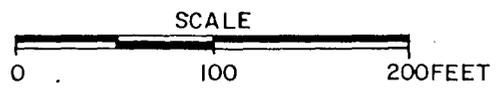
PREPARED FOR

BIXBY RANCH COMPANY
LONG BEACH, CALIFORNIA

SAN GABRIEL RIVER CHANNEL

LEGEND

- 36 TOTAL DEPTH IN FEET
- ▲38



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5-12-87		APPROVED BY	[Signature]	6/14/87		

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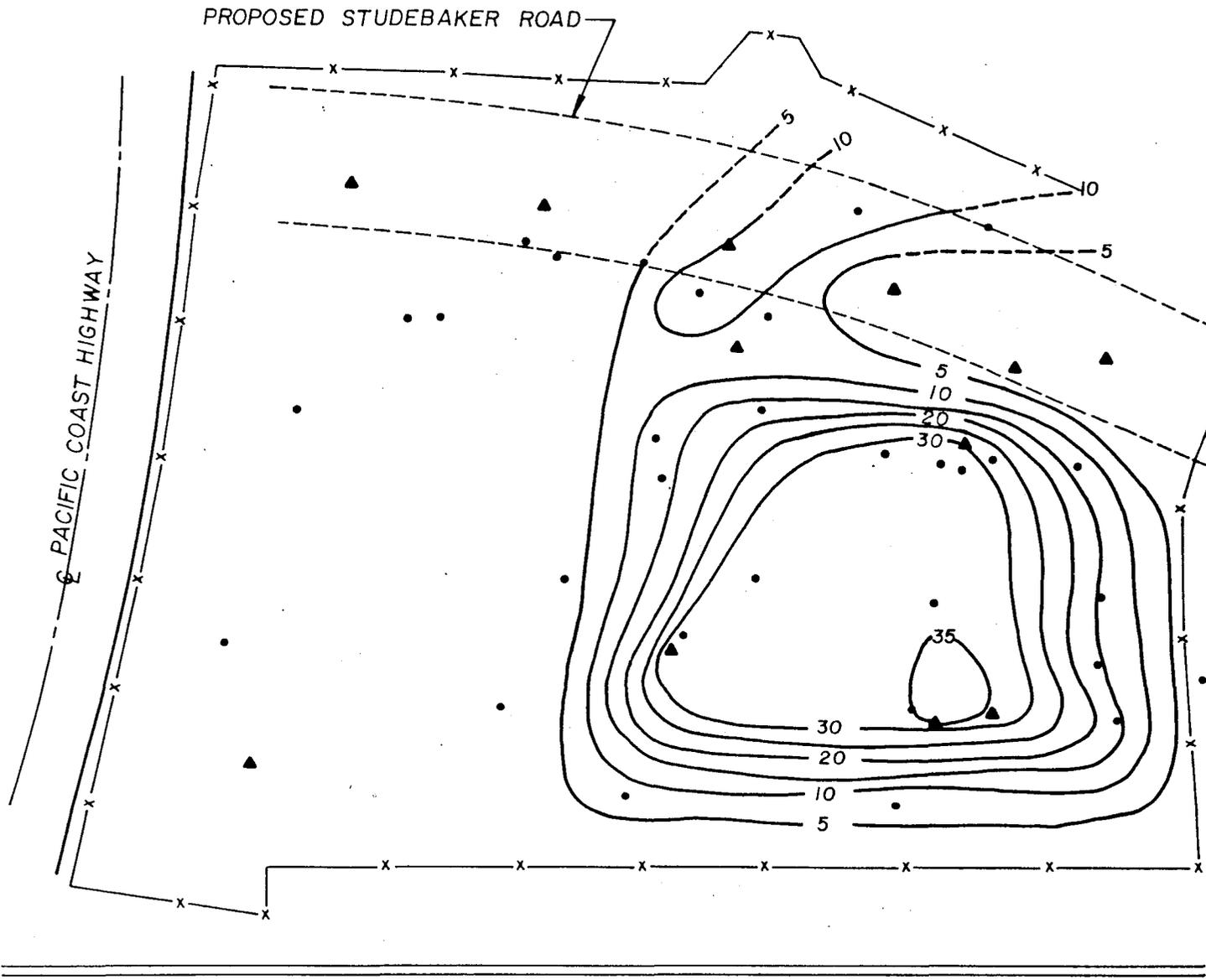
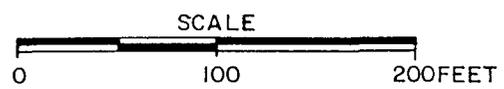


FIGURE 3
DEPTH TO BASE OF TRASH

PREPARED FOR
BIXBY RANCH COMPANY
LONG BEACH, CALIFORNIA



LEGEND
— CONTOUR INTERVAL 5 FEET

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	5-11-87		APPROVED BY		[Signature]

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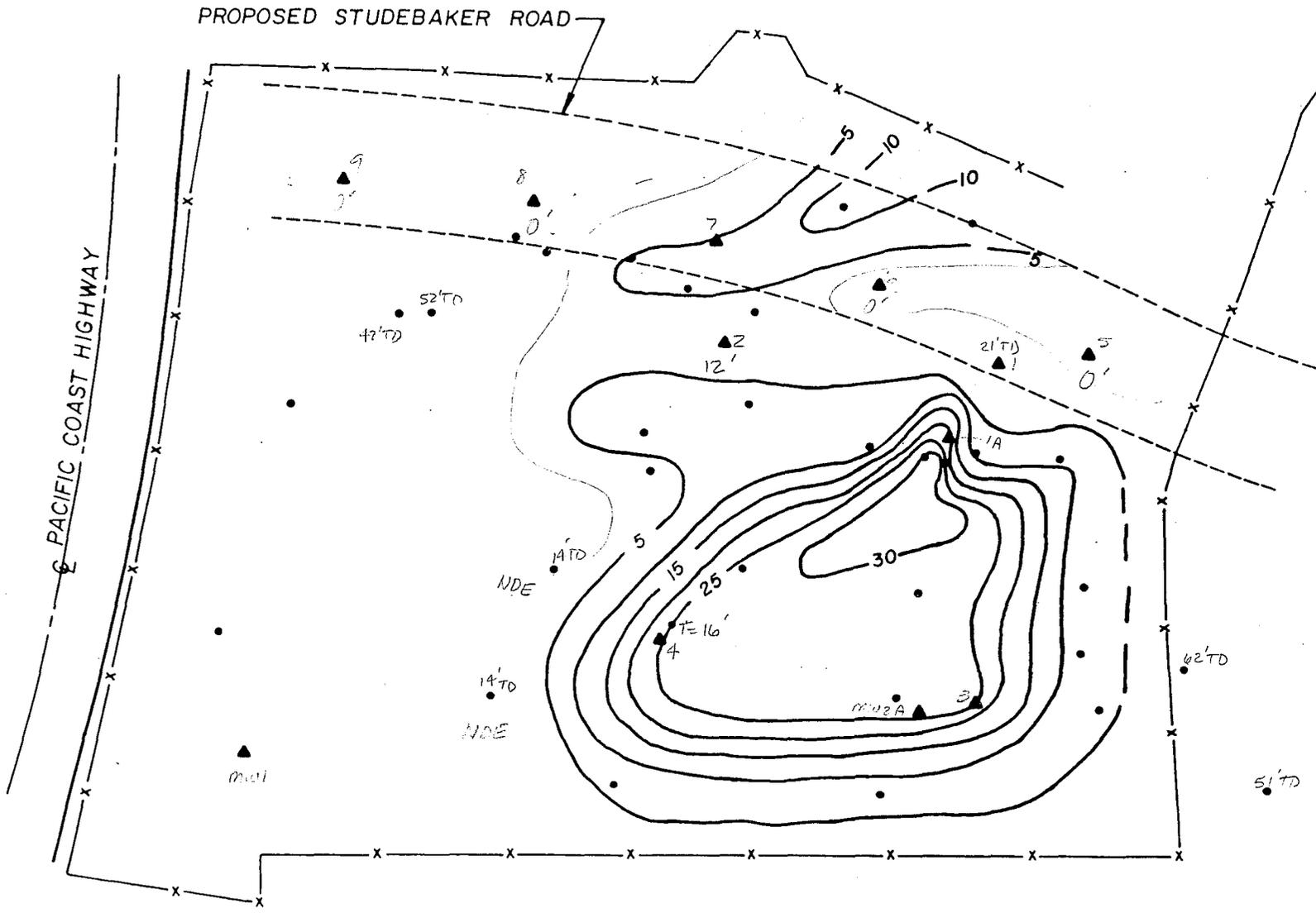
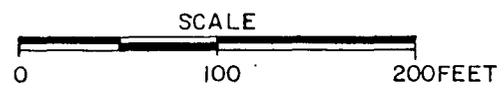


FIGURE 4

THICKNESS OF TRASH

PREPARED FOR

BIXBY RANCH COMPANY
LONG BEACH, CALIFORNIA



LEGEND

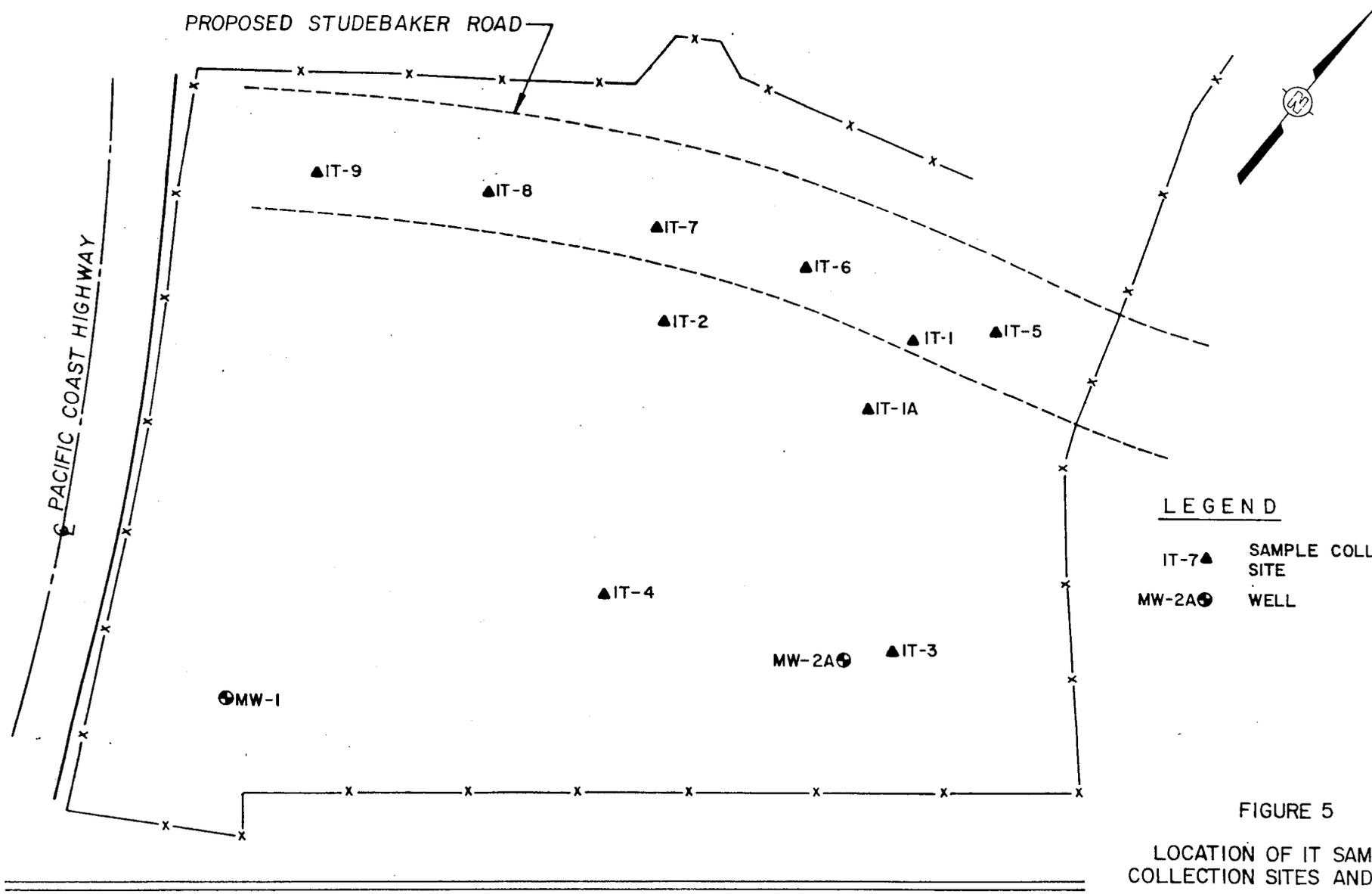
— CONTOUR INTERVAL 5 FEET



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	5-12-87	APPROVED BY	[Signature]	6/12/87		

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LEGEND

IT-7▲ SAMPLE COLLECTION SITE

MW-2A● WELL

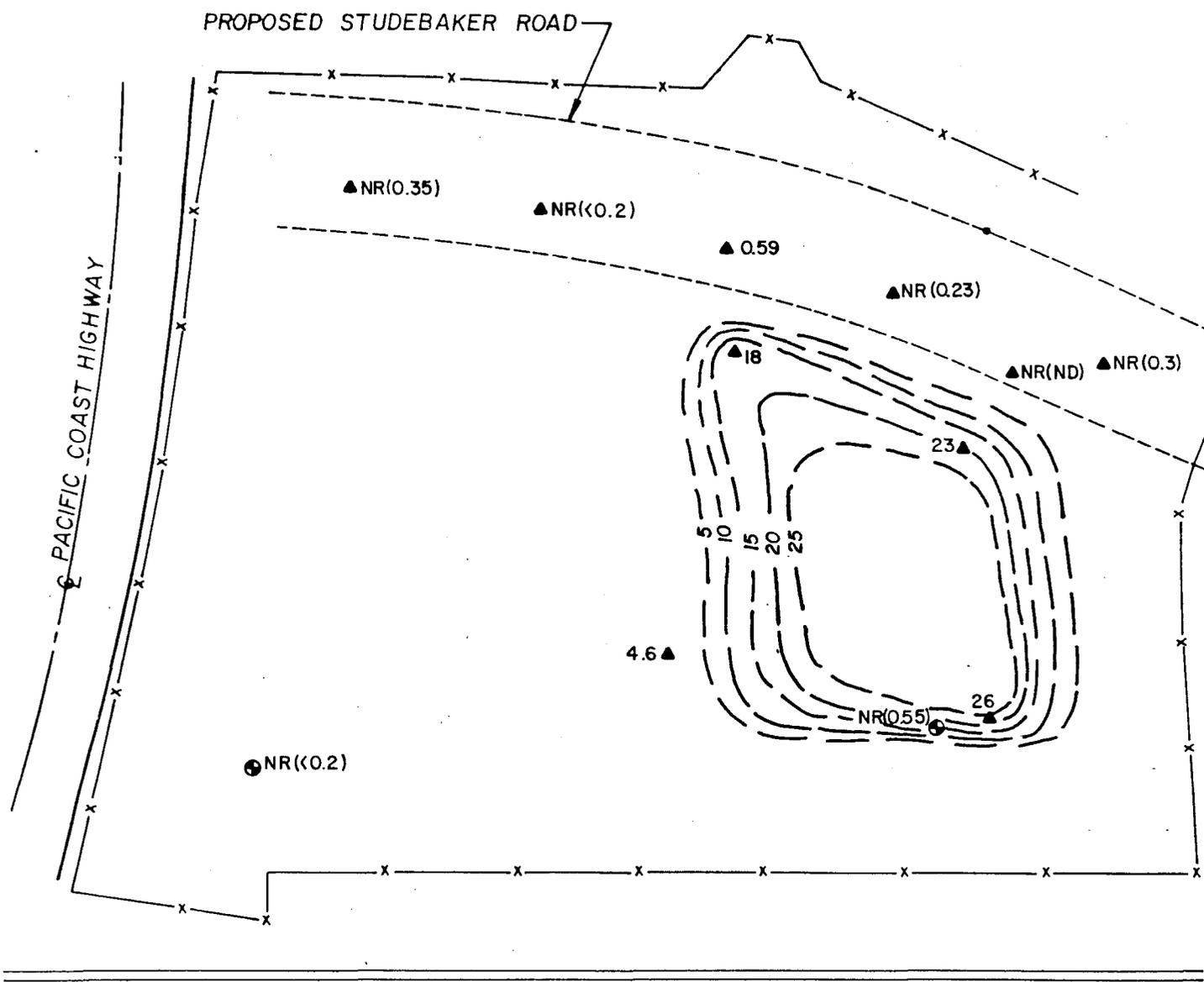
FIGURE 5
LOCATION OF IT SAMPLE COLLECTION SITES AND WELLS

PREPARED FOR
 BIXBY RANCH COMPANY
 LONG BEACH, CALIFORNIA

SCALE
 0 100 200 FEET

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	5-12-87	APPROVED BY	[Signature]	6/14/87		

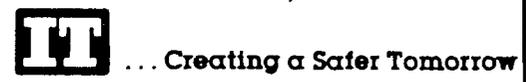
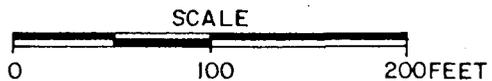
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- LEGEND**
- CONTOUR INTERVAL 5 PPM
 - 23 CONCENTRATION OF LEAD IN REFUSE (PPM)
 - NR(23) NO REFUSE (CONCENTRATION OF LEAD IN SOIL OR FILL)(PPM)

FIGURE 6
 DISTRIBUTION OF
 EXTRACTABLE LEAD
 IN REFUSE ABOVE
 WATER TABLE

PREPARED FOR
 BIXBY RANCH COMPANY
 LONG BEACH, CALIFORNIA



**STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION**

ORDER NO. R4-2002-022

GENERAL WASTE DISCHARGE REQUIREMENTS

**FOR POST-CLOSURE MAINTENANCE OF
INACTIVE NONHAZARDOUS WASTE LANDFILLS
WITHIN THE LOS ANGELES REGION**

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board), finds that:

BACKGROUND

1. Nonhazardous solid waste landfills (which include former Class II-2 landfills, former Class III landfills and burn dumps) have been regulated by the State Water Resources Control Board (State Board) and the Regional Boards since the 1960's through the issuance of Waste Discharge Requirements (WDRs). The applicable regulations governing landfills in California, Division 3, Chapter 15 (Discharges of Waste to Land) of Title 23, California Code of Regulations (Title 23) are now contained in Division 2 (commencing with section 20005) of Title 27 of the California Code of Regulations (hereafter this combination of division and title is simply referred to as "Title 27").
2. Pursuant to Title 27 section 20080(g), landfills that are closed, abandoned, or inactive on (or before November 27, 1984) are not specifically required to be closed in accordance with Chapter 3, Subchapter 5 (Closure and Post-Closure Maintenance) (commencing with section 20950) requirements of Title 27. However, these landfills are subject to prior post-closure maintenance requirements that are carried over in Title 27, section 21090 (b) and (c).
3. Regional Board staff estimates that there are in excess of 700 landfills in the Los Angeles Region, the majority of which were closed, abandoned, or inactive prior to November 27, 1984. With increased redevelopment in the Los Angeles Region, Regional Board staff is increasingly being requested to evaluate groundwater monitoring and post-closure maintenance requirements for these closed, abandoned, or inactive landfills. For each such request, staff has to evaluate the need for a groundwater monitoring program and the potential impact from the redeveloped end use to waters of the state. Such requests are anticipated to continue, and far exceed the capacity of staff to review and bring to the Board for consideration of individual waste discharge requirements in a timely manner. These circumstances create the need for an expedited system for processing the numerous

**GENERAL WASTE DISCHARGE REQUIREMENTS
POST-CLOSURE MAINTENANCE OF INACTIVE
NONHAZARDOUS WASTE LANDFILLS
ORDER NO. R4-2002-022**

FILE NO. 01-019

requests for implementing groundwater monitoring and post-closure maintenance requirements for these closed, abandoned, or inactive landfills.

4. Many of the closed, abandoned and inactive landfills in the Los Angeles Region contain a variety of nonhazardous materials, including municipal, agricultural, and/or petroleum wastes. However, these facilities also received waste during a time period when record-keeping and other environmental requirements were not as stringent. The facilities sometimes received a variety of waste materials commingled with more common, inert and or nonhazardous wastes. As a result, the groundwater monitoring requirements specified by this Order and its attachments are intended to screen and sample for a wide variety of wastes (including pesticides and solvents) that may have been disposed in the facilities subject to this Order.
5. Pursuant to Title 27 section 20080(g), persons responsible for discharges at landfills that are closed, abandoned, or inactive may be required to develop and implement a monitoring program. If water quality impairment is found, such persons may be required to develop and implement a corrective action program based on the provisions of Chapter 3, Subchapter 3, Article 1 (Water Quality Monitoring and Response Programs for Solid Waste Management Units), of Title 27 section 20380 et seq.
6. The Regional Board may require formal closure of a landfill in accordance with Title 27 Chapter 3, Subchapter 5, Articles 1 (commencing with section 20950) and 4 (commencing with section 21430) under the following conditions listed below, consistent with Title 27 section 22190:
 - a. when there is a proposed site development or land use change that jeopardizes the integrity of the existing cover;
 - b. when water quality impairment is found, as part of a groundwater monitoring program; or
 - c. when nuisance conditions exist that warrant such activity.
7. Pursuant to California Water Code (CWC), section 13263, this Regional Board issues WDRs for post-closure maintenance of inactive landfills. In accordance with CWC section 13263(d) the Regional Board may prescribe requirements although no Report of Waste Discharge (ROWD) has been filed.
8. The State Board has developed a fee rating system (Title 23, section 2200) for WDRs that considers a discharge's threat to water quality and complexity. The two-dimensional

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rating system requires the Regional Board to assign each discharge a category of threat to water quality between "1" (most threatening) and "3" (least threatening) based on certain factors. Similarly, the Regional Board must assign each discharge a complexity rating between "A" (most complex) and "C" (least complex). As discussed below, this Order covers two classes of discharge: those with a fee rating of 1-B or 3-C.

9. CWC section 13273 requires the State Board to develop a ranked list of all known landfills throughout the state on the basis of the threat to water quality. Section 13273 requires the operator of each solid waste disposal site on the ranked list to conduct and submit to the appropriate Regional Board the results of a Solid Waste Assessment Test (SWAT) report to determine if the site is leaking hazardous waste.
10. SWAT reports indicated that landfills which contain decomposable waste have leaked hazardous waste to groundwater. Volatile organic constituents in groundwater near the inactive landfills may have occurred through landfill gas migration. These impacts to groundwater adversely affect beneficial uses and could cause a long-term loss of a designated beneficial use.
11. Because of the potential impact to groundwater quality, from leaking inactive landfills, the Regional Board considers such landfills as a category "1" threat to water quality, in accordance with Title 23, section 2200. As former Class II or Class III waste management facilities, the inactive landfills subject to this Order are assigned a complexity ranking of category "B".
12. Landfills that do not contain decomposable waste such as those that were operated by open burning of refuse may also impact water quality. The residual waste material may contain soluble constituents which are leachable to waters of the state under acidic conditions. Potential water quality impacts from these landfills could result from erosion during the rainy season, if waste is exposed and is not contained onsite. Surface water quality objectives may be exceeded in cases of extreme erosion of these landfill surfaces. For purposes of this Order, the Regional Board considers landfills a category "3" threat to water quality when potential discharges could degrade water quality without violating water quality objectives or cause a minor impairment of designated beneficial uses. The "complexity" rating is a category "C" for discharges that must comply with best management practices such as erosion control measures.
13. The issuance of this Order establishing general WDRs is consistent with this Regional Board's goal to provide water resources protection, enhancement, and restoration, while balancing economic and environmental impacts as stated in the Strategic Plan of the State

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Water Resources Control Board and the Regional Boards, and in conformance with the Porter-Cologne Water Quality Control Act (CWC, section 13000, et seq.).

14. The issuance of this Order may supersede existing site-specific orders that were issued by this Regional Board to landfills that are in post-closure maintenance.
15. The adoption of general WDRs for inactive landfills for post-closure maintenance would assist in:
 - a. Protecting the groundwaters and surface waters of the state from pollution or contamination;
 - b. Simplifying and expediting the application process for WDRs by dischargers; and
 - c. Reducing time expended by Regional Board staff on preparing and considering individual WDRs for each project.
16. The Regional Board has determined that the issuance of general WDRs for post-closure maintenance of inactive, nonhazardous waste landfills is appropriate. The classes of facilities are similar in nature, present similar threats to water resources, can be similarly managed, and lend themselves to general requirements for the entire class of facilities covered by this Order.
17. The Regional Board adopted a revised Water Quality Control Plan for the Los Angeles Region (Basin Plan) on June 13, 1994. The Basin Plan contains beneficial uses (municipal and domestic supply, agricultural supply, industrial process supply, industrial service supply, groundwater recharge, and freshwater replenishment) and water quality objectives for groundwater in the Los Angeles Region. The requirements in this Order, as they are met, will be in conformance with the goals of the Basin Plan.
18. Inactive landfills are existing facilities and as such are exempt from the provisions of the California Environmental Quality Act in accordance with Title 14, California Code of Regulations, section 15301.
19. The Regional Board, in establishing the requirements contained herein, considers factors identified in CWC section 13263(a) including, but not limited to the following:
 - a. Past, present, and probable future beneficial uses of water;

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- b. Environmental characteristics of the hydrologic unit under consideration, including the quality of water available thereto;
 - c. Water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality in the area;
 - d. Economic considerations;
 - e. Beneficial uses to be protected and water quality objectives reasonably required for that purpose;
 - f. Other waste discharges;
 - g. The need to prevent nuisance.
20. The Regional Board has considered all water resource related environmental factors associated with the discharge of waste associated with these inactive landfills.
21. In accordance with the Governor's Executive Order requiring any proposed activity be reviewed to determine whether such activity will cause additional energy usage, Regional Board staff have determined that implementation of these general WDRs will not result in a change in energy usage.
22. The Regional Board has notified interested agencies and all known interested parties of its intent to issue post-closure maintenance requirements for these inactive landfills.
23. The Regional Board in a public meeting heard and considered all comments pertaining to post-closure maintenance of these inactive landfills.

IT IS HEREBY ORDERED, that:

A. ELIGIBILITY

- 1. Enrollment into Order R4-2002-022 is not mandatory and is only applicable to landfills closed, abandoned, or inactive on or before November 27, 1984 per Title 27 section 20080(g). Landfills will only be enrolled Order R4-2002-022 under three scenarios:

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- a. the discharger is required to enroll into the program to satisfy a Conditional Use Permit, or equivalent requirement and submits the required filing materials, or
 - b. the discharger elects to be enrolled under the program and submits the required filing materials.
 - c. the Executive Officer directs the discharger to be enrolled under the program because site conditions may pose a threat to water quality.
2. In order for the Executive Officer to enroll an inactive landfill under this Order, the discharger shall submit a complete ROWD and an appropriate filing fee (pursuant to Title 23, section 2200 [Annual Fee Schedule]) for each inactive landfill. The ROWD shall include the following:
- a. Form 200, *Application for Facility Permit/Waste Discharge*.
 - b. A discussion of the landfill and waste characteristics including:
 - i. Identification of the period during which waste was disposed of at the site;
 - ii. Description of landfill disposal methods, operation and maintenance activities;
 - iii. Description of types and quantities of waste disposed of;
 - iv. Identification of the total volume of waste disposed of at the site;
 - v. Any closure or post-closure activities conducted at the landfill subsequent to ceasing operation; and
 - vi. Present and future land use of the inactive landfill.
 - c. Documentation of how the discharger will comply with all applicable requirements of this Order for the inactive landfills.
 - d. A topographic scale map showing the location, users, and uses of all wells located within one mile of the inactive landfill.

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- e. Any other information pertinent to the protection of water quality and the prevention of nuisance.
2. The discharger shall receive authorization from the Executive Officer, stating that it is appropriate to regulate the inactive landfill under this Order and that individual WDRs are not required. The authorization letter shall specify the following:
 - a. Any modification to monitoring and reporting program(s) accompanying these WDRs.
 - b. Any other conditions necessary to ensure that the facility can conform to this Order in order to protect the beneficial uses of receiving waters.
3. It may be necessary for a discharger, authorized under this Order, to apply for and obtain individual WDRs with more specific requirements. When individual WDRs with specific requirements are issued to a discharger, the applicability of these general WDRs to the individual permittee shall be terminated on the effective date of the individual permit.
4. Notwithstanding the conditions specified above, individual cases may be brought to the Regional Board for consideration of WDRs when deemed appropriate by the Executive Officer.

B. PROHIBITIONS

1. Discharges of waste to land as a result of inadequate post-closure maintenance practices, and that have not been specifically described to the Regional Board and for which valid WDRs are not in force, are prohibited.
2. The discharge of waste shall not:
 - a. Cause the Regional Board's objectives for the ground or surface waters as established in the Basin Plan, to be exceeded;
 - b. Cause pollution, contamination, or nuisance, or adversely affect beneficial uses of ground or surface waters as established in the Basin Plan;

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- c. Cause the occurrence of coliform or pathogenic organisms in waters pumped from a groundwater basin;
 - d. Cause the occurrence of objectionable tastes and odors in waters pumped from a groundwater basin;
 - e. Cause waters pumped from a groundwater basin to foam;
 - f. Cause the presence of toxic materials in waters pumped from a groundwater basin; or
 - g. Cause the pH of waters pumped from a groundwater basin to fall below 6.0, or rise above 9.0.
3. Odors, vectors, and other nuisances of waste origin beyond the limits of the landfill site are prohibited.
 4. The discharge of waste to surface drainage courses is prohibited.
 5. Basin Plan prohibitions shall not be violated.
 6. The use of pressurized water lines overlying waste is prohibited unless the water lines are designed in accordance with Maintenance Specification D.5 (Irrigation Systems Control) discussed below.

C. GROUNDWATER MONITORING

1. Groundwater monitoring is a critical component of the post-closure maintenance program prescribed in this Order. Therefore, the discharger shall demonstrate through either completion of a SWAT questionnaire or a SWAT report that there has been no discharge of contamination to groundwater. Otherwise, the discharger shall complete a SWAT monitoring program as part of post-closure maintenance per this Order. For all landfills that have not completed a SWAT, the discharger shall submit a SWAT proposal as defined in section 13273 of the CWC within 90 days of when the landfill is enrolled under this Order. Based on the results of the SWAT program, the Regional Board will either issue a letter to the discharger indicating that further groundwater monitoring at the site is not required or require implementation of a groundwater quality monitoring program per requirements listed below and in section C of monitoring and reporting program CI-8372.

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SWAT Monitoring Program

2. The discharger shall provide the following basic information in conformance with the State Board's SWAT Technical Guidance Manual for use by owners/operators in preparing SWAT reports (Attachment 1):
 - a. Description of the disposal site and its history.
 - b. Thorough description of the site hydrogeology.
 - c. Rationale for the location and design of all monitoring points.
 - d. Well logs and sample analysis data.
 - e. Interpretation of the data relative to hazardous waste leakage.
 - f. Certification of the preparer's credentials.

3. The SWAT program consists of the following:
 - a. Initial submittal of a SWAT Proposal or "Workplan" to the Regional Board containing the discharger's plans for compliance with the SWAT law.
 - b. Establishment of a monitoring network that meets all requirements of Title 27.
 - c. Either inclusion of upgradient monitoring points or acceptance of responsibility by the discharger for all pollutants detected through downgradient monitoring.
 - d. Sampling at least four different times over a year in order to ensure detecting any seasonal discharges.
 - e. Analysis of water quality samples for:
 - i. Volatile Organics (EPA 624)
 - ii. Semi-volatile Organics (EPA 625)

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- iii. ICAP Metals
- f. Quality Control/Quality Assurance of all laboratory chemical analyses.
- 4. The SWAT Program shall focus on groundwater monitoring. However, in cases where there was an apparent threat to surface water quality, surface water monitoring points shall also be established, and when approved by the Executive Officer, shall be monitored by the discharger in conformance with an approved monitoring plan.
- 5. Vadose zone monitoring shall be implemented during the SWAT program. However, the Regional Board's Executive Officer may waive this requirement for sites where the waste is very close to or present in groundwater; that is, where little or no vadose zone exists, and where it was assumed that the groundwater analysis will show any leakage.
- 6. In cases where a site is already being addressed through another program or action by the Regional Board, the Regional Board's Executive Officer may consider reports submitted for the other program or action to be equivalent to a SWAT report. Examples include submittals of Hydrogeological Assessment Reports (HARs) for compliance with the Toxic Pit Cleanup Act, reports prepared in response to a Cleanup and Abatement Order, or monitoring under the core regulatory waste discharge requirement program for waste discharges to land (Land Disposal).

Groundwater Monitoring Program

- 7. The discharger shall use the constituents listed in Monitoring and Reporting Program No. CI-8372 and revisions thereto, as "monitoring parameters". These monitoring parameters are a short list of constituents and parameters used shall be used for the majority of monitoring activity and are subject to the most appropriate statistical or non-statistical tests under the attached Monitoring and Reporting Program No. CI-8372 and any revised monitoring and reporting program approved by the Regional Board's Executive Officer.
- 8. The discharger shall implement the attached Monitoring and Reporting Program No. CI-8372 and revisions thereto in order to detect, at the earliest opportunity, any unauthorized discharge of waste constituents from the landfill or any unreasonable impairment of beneficial uses associated with (caused by) discharges of waste to the landfill.

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9. The discharger shall follow the Water Quality Protection Standards (WQPS) for detection monitoring established by the Regional Board in this Order pursuant to Title 27 section 20390. WQPS may be modified by the Regional Board based on more recent or complete groundwater monitoring data such as from the monitoring network required by this Order, changes in background water quality, or for any other valid reason. The following are five parts of WQPS as established by this Regional Board:

- a. For facilities enrolled under this Order, groundwater quality limits for the following constituents are established based on region-wide limits in the Basin Plan or based on site-specific data as allowed in the Basin Plan.
- b. The discharger shall test for the monitoring parameters listed below and in Monitoring and Reporting Program No. CI-8372 and revisions thereto for:

<u>Monitoring Parameters</u>	<u>Test Method</u>
1. Chemical Oxygen Demand (COD)	EPA 410.4
2. Total Organic Halides (TOX)	EPA 9020
3. Total Organic Carbon (TOC)	EPA 415.1
4. Total Dissolved Solids (TDS)	EPA 160.1
5. Chloride	EPA 300.0
6. Sulfate	EPA 300.0
7. Boron	EPA 6010
8. Hydroxide Alkalinity (CaCO ₃)	Std. M2320B
9. Total Hardness (as CaCO ₃)	Std. M2340
10. Volatile Organics	EPA 8260*

*All peaks greater than 10% of the internal standard shall be identified and quantified for gas chromatography analyses.

- c. The concentration limit for each monitoring parameter for each monitoring point shall be its background value as obtained during that reporting period.
- d. Monitoring points and background monitoring points for detection monitoring shall be those used during the SWAT monitoring program and any revised monitoring and reporting program approved by the Regional Board's Executive Officer.

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e. The minimum duration of the compliance period for the landfill is five (5) years. Each time the standard is not met (i.e., releases discovered), the landfill begins a compliance period on the date the Regional Board directs the discharger to begin an Evaluation Monitoring Program (EMP). If the discharger's Corrective Action Program (CAP) has not achieved compliance with the standard by the scheduled end of the compliance period, the compliance period is extended until the landfill has been in continuous compliance for at least three consecutive years.

10. For each monitoring point described in this Order, the discharger shall monitor semiannually for the monitoring parameters listed in Specification No. C.9.b and for the monitoring parameters listed below, for the detection monitoring program. In determining whether measurably significant evidence of a release from the waste management unit exists, concentration limits, listed in Specification No. C.9.c of this Order, shall be used for the monitoring parameters.

<u>Monitoring Parameters</u>	<u>Test Method</u>
Electrical Conductivity	Field
pH	Field
Groundwater Elevation	Field

11. Once each year, during the Spring/Summer monitoring period, all wells shall be sampled and also analyzed for the following expanded list of constituents of concern (COCs). COCs are those constituents which are likely to be in the waste in the landfill or which are likely to be derived from waste constituents, in the event of a release. Based on the results of the SWAT monitoring program or any additional source(s) of monitoring information, the discharger may propose a modified list of COC parameters for approval by the Executive Officer. If approved by the Executive Officer the monitoring and reporting program for the site will be amended with the revised COC monitoring parameters.

<u>Monitoring Parameters</u>	<u>Test Method</u>
Semi-volatiles*	EPA 3510/8270
Pesticides*	EPA 3510/8080
PCBs*	EPA 3510/8080
Metals**	EPA 6010 (else, see below)
Biological Oxygen Demand	EPA 405.1
Foaming Agents	EPA 425.1
Herbicides	EPA 8150
Nitrate (as N)	EPA 300.0

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Nitrite	EPA 300.0
Oil and Grease	EPA 413.2
Sulfides	EPA 376.2
Total cyanide	EPA 335.2
Total phenols	EPA 420.1
Turbidity	NTU; EPA 180.1

*All peaks greater than 10% of the internal standard shall be identified and quantified for gas chromatography analyses.

** Aluminum, Antimony, Arsenic (EPA 7060), Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Hexavalent chromium (Std. Method 3500 CrO), Lead, Magnesium, Mercury (EPA 7470), Molybdenum, Nickel, Potassium, Selenium (EPA 7740), Silver, Sodium, Strontium, Thallium, Tin, Vanadium, and Zinc

D. POST-CLOSURE MAINTENANCE SPECIFICATIONS

General Maintenance Requirements

1. The discharger shall prepare a post-closure maintenance plan within 90 days of being enrolled in these general WDRs which contains, but is not limited to, the following:
 - a. The persons, companies, or agencies responsible for each aspect of landfill maintenance, along with their addresses and phone numbers;
 - b. Location map(s) indicating property boundaries and the existing limits of waste, internal roads, and structures within the property boundary.
 - c. Location map(s) of current monitoring and control systems including drainage and erosion control systems and landfill gas monitoring and control systems.
 - d. A description of the methods, procedures, schedules, and processes that will be used to maintain, monitor and inspect the landfill.
2. The landfill maintenance period shall continue until the Regional Board's Executive Officer determines that remaining wastes in all waste management units (WMUs) at the site will not threaten water quality.

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3. Landfilled areas shall be adequately protected from any washout, erosion of wastes or cover materials. The surface drainage system shall be designed to adequately handle the rainfall from a 100-year, 24-hour storm event.
4. The structural integrity and effectiveness of all containment structures and the existing cover shall be maintained as necessary to correct the effects of settlement or other adverse factors.
5. For inactive landfills with water lines overlying waste, the design shall consider, but not be limited to, the following:
 - a. Flexible connectors;
 - b. Secondary containment;
 - c. Moisture sensors within secondary containment;
 - d. Rain sensors;
 - e. Annual leak testing;
 - f. Automatic shutoff valves; and
 - g. A maintenance plan describing the inspection and maintenance schedule for all mitigation devices.

Erosion Control

9. Any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion, ponding, flooding, or to prevent surface drainage from contacting or percolating through wastes at the facility on an annual basis. The annual erosion control measures shall be completed prior to the anticipated rainy season but not later than October 31. In addition, maintenance, and repairs necessitated by changing site conditions shall be made at any time of year.
10. Silt fences, hay bales, and other erosion control measures shall be used to manage surface water runoff from landfill areas where landfill cover has recently been

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constructed, and from areas where landfill containment system construction is occurring.

11. All areas, including surface drainage courses, shall be maintained to minimize erosion. Landfill cover shall be maintained to minimize percolation of liquids through wastes.

Surface Drainage

12. Surface water runoff within the boundaries of the landfill (i.e., precipitation that falls on the landfill cover) shall be collected by a system of berms, ditches, downchutes, swales and drainage channels, and shall be diverted off the landfill to either desilting basins or to natural watercourses offsite.
13. Surface drainage from tributary areas and internal site drainage from surface and subsurface sources shall not contact or percolate through waste and shall either be contained onsite or be discharged in accordance with applicable storm water regulations.
14. Surface drainage from the landfill is subject to State Board Order No. 97-03-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001, "Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities".
15. Where flow concentrations result in erosive flow velocities, surface protection such as asphalt, concrete, riprap, silt fences or other erosion control materials shall be used for protection of drainage conveyance structures. Interim bench ditches shall be provided with erosion control material and riprap to control erosion where necessary.
16. Where high velocities occur at terminal ends of downchutes, or where downchutes cross landfill cover access roads, erosion control material shall be applied to exposed soil surfaces. Energy dissipaters shall be installed to control erosion at locations where relatively high erosive flow velocities are anticipated.

Expanded Post-Closure Maintenance Requirements

17. If results of a SWAT program indicate statistically significant evidence of a release from the landfill, the discharger shall implement the following expanded post-closure maintenance requirements and revised post-closure maintenance

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requirements approved by the Regional Board's Executive Officer.

18. The discharger shall comply with all applicable requirements of Title 27 Chapter 3, Subchapter 5, Article 2 (Closure and Post-Closure Maintenance Standards for Disposal Sites and Landfills) (commencing with section 21090, hereafter "Post Closure Maintenance Regulations").
19. Any vegetation used at the site shall be selected to require minimum irrigation and maintenance, and shall not impair the integrity of containment structures including the existing cover.
20. For all inactive landfills with decomposable waste that have a final cover system that differs from the prescriptive design described in Title 27 section 21090 (a)(1-3), the discharger shall submit a technical report to the Regional Board, for approval by the Executive Officer, that evaluates the effectiveness of the existing alternative cover in limiting infiltration into the waste per Title 27 section 20080 (b)(2)(A) and (B). The technical report shall be submitted no later than 180 days after the landfill has been enrolled under these general WDRs.
21. The migration of landfill gas from the site shall be controlled, as necessary, to ensure that landfill gases and gas condensate are not discharged to surface waters or groundwaters. Condensate shall be collected and removed from the site except as defined in Title 27, section 20090(e).

E. PROVISIONS

1. Neither the treatment nor the discharge of waste shall create a pollution, contamination, or nuisance, as defined by CWC section 13050.
2. This Order includes the "*Standard Provisions Applicable to Waste Discharge Requirements*", adopted November 7, 1990 (Attachment 2). If there is any conflict between provisions stated herein and the Standard Provisions, these provisions stated herein will prevail.
3. The discharger shall comply with all conditions of this Order and any additional conditions prescribed by the Regional Board in addenda thereto. Noncompliance with this Order constitutes a violation of the CWC and is grounds for:
 - a. enforcement action;

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- b. termination, revocation and reissuance, or modification of this Order; or
 - c. other actions allowed by law.
4. The discharger shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.
5. The discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate laboratory and process controls including appropriate quality assurance procedures.
6. This Order may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:
 - a. Violation of any terms or conditions of this Order;
 - b. Obtaining this Order by misrepresentation or failure to disclose fully all relevant and material facts required by the ROWD; or
 - c. A change in any condition that requires either a temporary, permanent reduction, or elimination of the authorized discharge.
7. The filing of a request by the discharger for the modification, revocation and reissuance, or termination of this Order, or notification of planned changes or anticipated noncompliance does not stay any condition of this Order.
8. This Order is not transferable to any person except after notice to the Executive Officer. The Regional Board may require modification or revocation and reissuance of this Order to change the name of the discharger and incorporate such other requirements as may be necessary under the CWC. The discharger shall submit notice of any proposed transfer of this Order's responsibility and coverage as described under Reporting Requirement F.3 of this Order.

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9. In accordance with CWC section 13263(g), these requirements shall not create a vested right to continue to discharge. All discharges of waste into the waters of the State are privileges, not rights, and are subject to rescission or modification.
10. The discharger shall allow the Regional Board, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:
 - a. Enter upon the discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;
 - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;
 - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
 - d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the CWC, any substances or parameters at any location.
11. A copy of this Order shall be maintained at the local offices of the discharger and shall be available to operating personnel at all times.
12. The provisions of this Order are severable, and if any provision of this Order, or the application of any provision of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order, shall not be affected thereby.
13. This Order becomes effective on the date of adoption by this Regional Board.

F. REPORTING REQUIREMENTS

1. The discharger shall file the following reports in accordance with the following schedule:
 - a. Report of Waste Discharge

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The discharger shall file a new ROWD at least 120 days prior to the following:

- i. Significant change in post-closure maintenance activities which would significantly alter existing drainage patterns and slope configurations, or pose a potential threat to the integrity of the site;
- ii. Change in land use other than as described in the findings of this Order;
- iii. Significant change in disposal area, e.g. excavation and relocation of waste on site; or
- iv. Any planned change in the regulated facility or activity which may result in noncompliance with this Order.

b. Workplan

The discharger shall submit a workplan at least 30 days prior to any maintenance activities, for approval by the Executive Officer, which could alter existing surface drainage patterns or change existing slope configurations. These activities may include, but not be limited to, significant grading activities, the importation of fill material, the design and installation of soil borings, groundwater monitoring wells and other devices for site investigation purposes.

c. Written Notification

The discharger shall provide verbal notification at least two working days prior to any maintenance activities that are routine in nature, do not add a significant amount of water, do not inhibit drainage, have limited potential for impacts to beneficial use of water, and will not interfere with future routine maintenance. These activities may include, but not be limited to:

- i. routine maintenance grading and dust control;
- ii. landscaping with minimal/no water application;
- iii. gas surveys with temporary probes; or

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- iv. replacement/removal of gas collection wells.
2. The discharger shall furnish to the Executive Officer, within a reasonable time, any information which the Executive Officer may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The discharger shall also furnish to the Executive Officer, upon request, copies of records required by this Order.
3. The discharger shall notify the Executive Officer, in writing, at least 30 days in advance of any proposed transfer of this Order's responsibility and coverage between the current owner and new owner for construction, operation, closure, or post-closure maintenance of a landfill. This agreement shall include an acknowledgement that the existing owner is liable for violations up to the transfer date and that the new owner is liable from the transfer date on. The agreement shall include an acknowledgement that the new owners shall accept responsibility for compliance with this Order that includes the post-closure maintenance of the landfill.
4. Where the discharger becomes aware that it failed to submit any relevant facts in a ROWD or submitted incorrect information in a ROWD or in any report to the Regional Board, it shall promptly submit such facts or information.
5. The discharger shall report any noncompliance that may endanger health or the environment. Any such information shall be provided verbally to the Executive Officer within 24 hours from the time the owner becomes aware of the circumstances. A written submission shall also be provided within seven days of the time the owner becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate, or prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.
6. The discharger shall notify the Executive Officer immediately of any slope failure occurring in a waste management unit. Any failure which threatens the integrity of the containment features or the waste management unit shall be promptly corrected after approval of the method and schedule by the Executive Officer.

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7. The discharger shall comply with the attached monitoring and reporting program CI-8372. Monitoring results shall be reported at the intervals specified in monitoring and reporting program CI-8372.
8. All applications, reports, or information submitted to the Executive Officer shall be signed and certified as follows:
 - a. The ROWD shall be signed as follows:
 - i. For a corporation - by a principal executive officer of at least the level of vice-president.
 - ii. For a partnership or sole proprietorship - by a general partner or the proprietor, respectively.
 - iii. For a municipality, state, federal or other public agency - by either a principal executive officer or ranking elected official.
 - iv. For a military installation - by the base commander or the person with overall responsibility for environmental matters in that branch of the military.
 - b. All other reports required by this Order and other information required by the Executive Officer shall be signed by a person designated in paragraph 8.a of this provision, or by a duly authorized representative of that person. An individual is a duly authorized representative only if:
 - i. The authorization is made in writing by a person described in paragraph 8.a of this provision;
 - ii. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity; and
 - iii. The written authorization is submitted to the Executive Officer.
 - c. Any person signing a document under this section shall make the following certification:

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“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.”

9. The discharger shall submit reports required under this Order and other information requested by the Executive Officer, to:

California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, California 90013
ATTN: Technical Services Unit

10. The discharger shall perform quarterly inspections of the landfill site and report the results semi-annually. The report shall contain information on the site condition and a discussion of any significant findings with regard to:
- a. General site conditions;
 - b. Surface cover and slope;
 - c. Drainage facilities;
 - d. Groundwater and vadose zone monitoring networks;
 - e. Methane gas control systems;
 - f. Observation of seepage from the site; and
 - g. Maintenance activities at the site.

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11. A copy of the Storm Water Pollution Prevention Plan for the site shall be submitted to this Regional Board by April 30 on an annual basis, or as it is updated.

G. NOTIFICATIONS

1. These requirements have not been officially reviewed by the United States Environmental Protection Agency and are not issued pursuant to section 402 of the Clean Water Act.
2. The CWC provides that any person who intentionally or negligently violates any WDRs issued, reissued, or amended by this Regional Board is subject to administrative civil liability of up to 10 dollars per gallon of waste discharged, or if no discharge occurs, up to \$1,000 per day of violation. The Superior Court may impose civil liability of up to \$10,000 per day of violation or, if a cleanup and abatement order has been issued, up to \$15,000 per day of violation.
3. The CWC provides that any person failing or refusing to furnish technical or monitoring program reports, as required under this Order, or falsifying any information provided in the monitoring reports is guilty of a misdemeanor and may be subject to administrative civil liability of up to \$1,000 per day of violation.
4. Post-closure maintenance of this waste management unit may be subject to regulations of the California Integrated Management Board, the South Coast Air Management District or the Ventura County Air Pollution Control District.
5. Definitions of terms used in this Order shall be as set forth in Title 27, section 20164.

I, Dennis A. Dickerson, Executive Officer, do certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on January 24, 2002.



Dennis A. Dickerson
Executive Officer