Xtra OIL COMPANY
2307 PACIFIC AVENUE
ALAMEDA, CA 94501
(510) 865-9503 FAX (510) 865-1889

June 9, 2014

RECEIVED
By Alameda County Environmental Health at 4:21 pm, Jun 10, 2014

Ms. Karel Detterman
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

SUBJECT: IN SITU CHEMICAL OXIDATION FEASIBILITY TEST
WORK PLAN ADDENDUM CERTIFICATION
County Case # RO 191
Xtra Oil Company
1701 Park Street
Alameda, CA

Dear Ms. Detterman**:**

P&D Environmental, Inc. has prepared the following document for the subject site:

- In Situ Chemical Oxidation Feasibility Test Work Plan Addendum dated June 9, 2014 (document 0058.W6A).

I declare under penalty of perjury that the contents and conclusions in the document are true and correct to the best of my knowledge.

Should you have any questions, please do not hesitate to contact me at (510) 865-9506.

Sincerely,
Xtra Oil Company

Keith Simas

0058.L54

P&D ENVIRONMENTAL, INC.

55 Santa Clara Avenue, Suite 240
Oakland, CA 94610
(510) 658-6916

June 9, 2014
Work Plan 0058.W6A

Ms. Karel Detterman
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

SUBJECT: IN SITU CHEMICAL OXIDATION FEASIBILITY TEST
WORK PLAN ADDENDUM
County Case # RO 191
Xtra Oil Company
1701 Park Street
Alameda, CA

Dear Ms. Detterman:

P&D Environmental, Inc. (P&D) has prepared this work plan addendum to augment P&D's February 7, 2014 In Situ Chemical Oxidation (ISCO) Feasibility Test Work Plan (document 0058.W6) in response to a request for additional information from the Alameda County Department of Environmental Health (ACDEH). This work plan addendum is prepared in accordance with guidance set forth in the following documents.

- USEPA How to Evaluate Alternative Cleanup Technologies for UST Sites: A Guide for Corrective Action Plan Reviewers, http://www.epa.gov/oust/pubs/tums.htm

- ITRC's Technical and Regulatory Guidance for In Situ Chemical Oxidation of Contaminated Soil and Groundwater, 2nd Edition, January 2005.

The requested change of remedial solution from Soil Vapor Extraction (SVE) in conjunction with groundwater extraction/pump and treat is based on concerns related to the limitations of the effectiveness of this remedial solution and cost. The SVE and groundwater extraction remedial solution was used at the former Exxon/Valero facility located at 1725 Park Street (located approximately 100 feet to the northeast of the subject site) with limited success. Review of boring logs for boreholes located at the 1725 Park Street site shows that the subsurface conditions are essentially identical to the subsurface conditions at the subject site. After many years of remediation system operation at 1725 Park Street, only limited success was achieved.

In accordance with the approved remedial solution of SVE and groundwater extraction for the subject site, three groundwater extraction wells and one groundwater observation well were installed at the site at a cost of approximately $17,800.00. These wells have been useful in providing water quality data to better define the extent of impacted groundwater. In addition, these wells will be useful for monitoring associated with implementation of the remedial solution for the subject site.

Upon further consideration of capital costs for SVE system and groundwater extraction system equipment purchase (pumps, controllers, granular activated carbon), installation, and startup (approximately $85,00.00), combined with long term operation costs (a total of approximately $1,200,000.00 after 5 years (approximately $185,000 per year) with limited confidence in achieving desired cleanup goals within 5 years based on 1725 Park Street remediation results), the responsible party for the subject site requested that alternate remedial methods be considered. Ozone injection was determined to have a lower cost of capitalization (less than $15,000) and lower on-going annual operating costs (estimated to be less than $180,000 per year), with an expected shorter remediation duration of less than two years if the technology is demonstrated to be feasible. Based on lower project capitalization costs, lower project on-going operating costs, and anticipated greater effectiveness, ozone injection was identified as a potentially cost-effective alternative to the previously recommended remedial solution. Assuming that ozone injection can effectively remediate the site within two years, the estimated cost of ozone injection will be less than $400,000.00, which is substantially less than the anticipated cost of the SVE and groundwater extraction remedial solution.

The by-products of the site contaminants resulting from the use of ozone are carbon dioxide and water (see Exhibit XIII-7 – Organic Compound Oxidation Stoichiometry provided in the USEPA guidance document referenced above).

Figures showing sanitary sewer locations in the vicinity of the subject site (Figure 1), storm drains in the site vicinity (Figure 2), and the existing SVE trench at the site (Figure 3) are attached with this work plan addendum. The depth of the sanitary sewer pipe in the vicinity of the subject site is below the water table (see Figure 1). For this reason the envelope surrounding the sanitary sewer pipe is not considered to be a concern as a potential preferential conduit for ozone migration. Storm water in the vicinity of the site drains in the street gutter and is only channeled in subsurface storm drain pipes beneath streets at street gutter elevations at street intersections (see Figure 2). For this reason, storm drain pipes or associated trenches are not considered to be a concern as a potential preferential conduit for ozone migration. It is P&D's understanding that the existing horizontal vapor extraction trenching extends to a depth of approximately four feet below the ground surface. It is also our understanding that the proposed trenching shown in Figure 3 has not been excavated or installed. Review of Figure 3 shows that the horizontal vapor extraction trenching is isolated from nearby buildings and is limited in extent to the central portion of the subject site. For this reason the vapor extraction trenching is not considered to be a concern as a potential preferential conduit for ozone migration.

Vapor control for ozone injection feasibility testing will be performed by using a diffuser below the water table at the one proposed ozone injection location and maintaining injection rates low enough so that ozone diffuses into groundwater. A packer will be placed in the injection well above the water table to prevent any fugitive emissions from escaping from the well. In addition, the proposed feasibility test well is located as far from buildings as possible, and subsurface vapor pressures will be monitored during the feasibility test to determine if there is evidence of increases in subsurface vapor pressure in the vicinity of the location where ozone is injected into groundwater.

The following contingencies will be implemented during the ozone injection feasibility test.

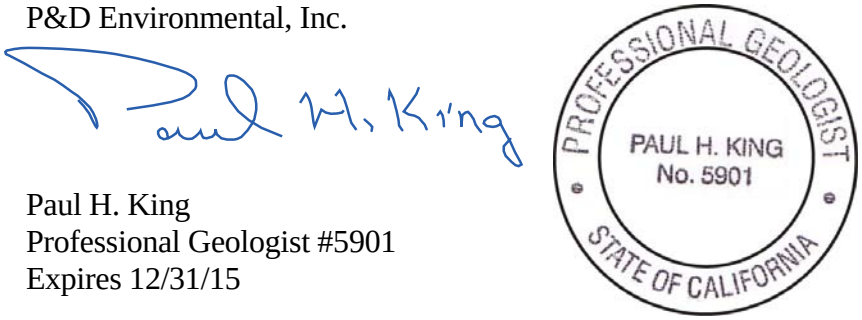
- Atmospheric ozone monitoring will be performed prior to system startup, on the day of system startup, and weekly thereafter at the injection wellhead, at surrounding groundwater monitoring well wellheads (MW1, MW4, EW2, EW-4, EW-5, see Figure 4), and at the ozone generator using a hand-held portable ozone gas detector capable with a range of 0 to 1 ppm. In the event that ozone concentrations exceeding 0.1 ppm (the OSHA PEL) are detected, the source of the ozone leak will be identified and sealed.
- Monitoring of Volatile Organic Compound (VOC) concentrations with a Photoionization Detector and ozone vapor concentrations with a hand-held portable ozone gas detector in surrounding groundwater monitoring well wellheads (MW1, MW4, EW2, EW-4, EW-5, see Figure 4) will be performed prior to system startup, on the day of system startup, and weekly thereafter. In the event that increases of greater than 10 percent of baseline VOC concentrations or ozone concentrations exceeding 0.1 ppm are detected at property perimeter locations MW1, MW4, EW-4, or EW-5 the ozone generator will be shut off and the remedial approach re-assessed.
- Soil vapor pressures will be monitored at surrounding groundwater monitoring well wellheads (MW1, MW4, EW2, EW-4, EW-5, see Figure 4) using a monometer. In the event that pressures exceeding 2 inches of water are detected at the property boundary the ozone injection rate will be reduced and the property perimeter soil vapor pressures re-evaluated until perimeter monitoring soil vapor pressures are reduced to below 2 inches of water.

Written notification will be provided to the ACDEH upon implementation of the remedial solution. Monthly progress reports will be provided thereafter until arranged otherwise with the ACDEH.

June 9, 2014
Work Plan 0058.W6A

Should you have any questions or comments, please do not hesitate to contact us at (510) 658-6916.

Sincerely,
P&D Environmental, Inc.



Paul H. King
Professional Geologist #5901
Expires 12/31/15

Attachments:
Figure 1 – Sanitary Sewer Map
Figure 2 – City of Alameda Storm Drain Map
Figure 3 – Layout of Existing Remediation System
Figure 4 – Site Plan Showing Well Locations

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0058.W6A

FIGURES

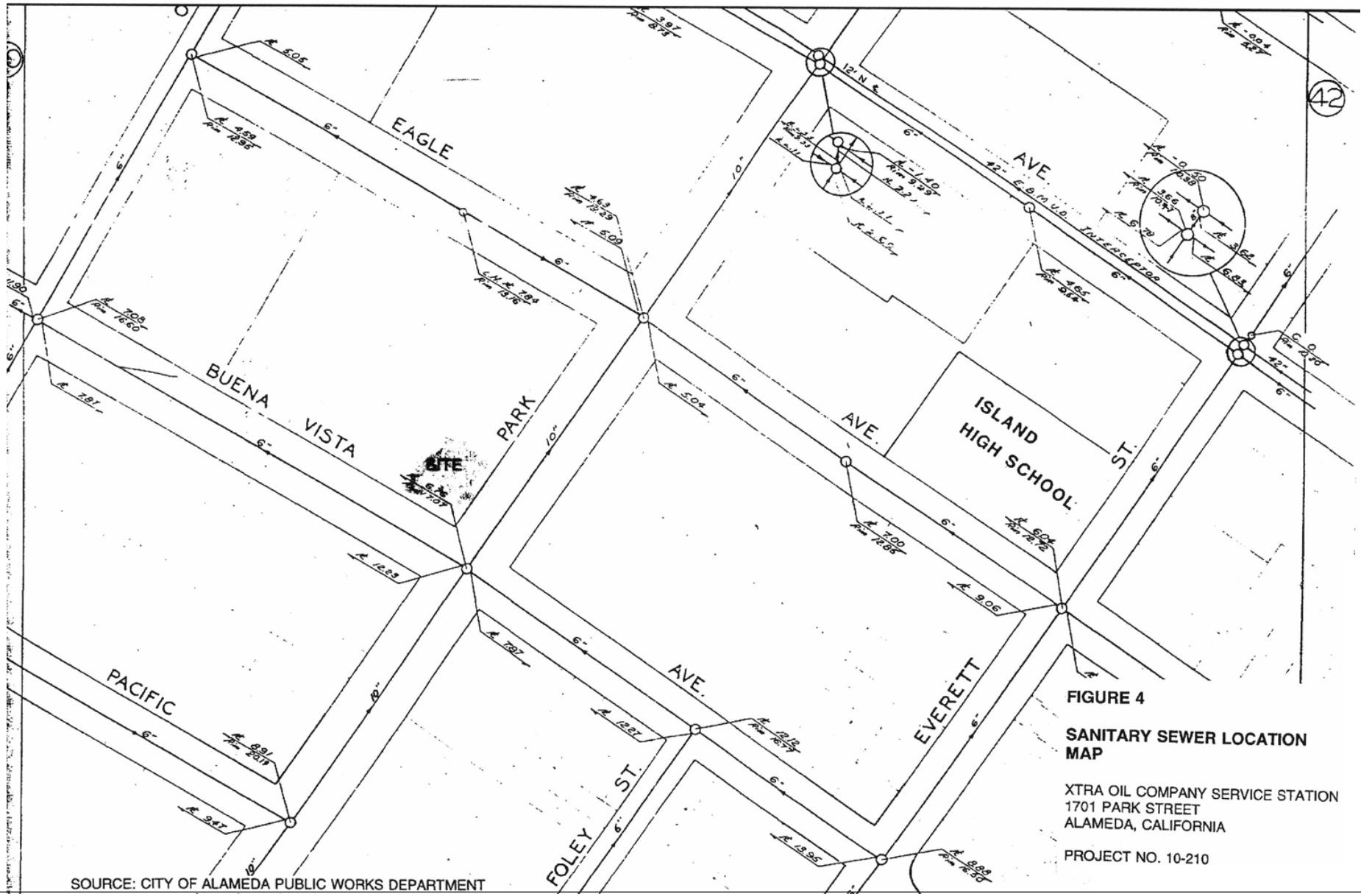

Figure 1
Sanitary Sewer Location Map
1701 Park Street
Alameda, California

Map From: Work Plan for Additional Site Characterization Xtra Oil Service Station Alisto Engineering July 26 1996	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	N No Scale

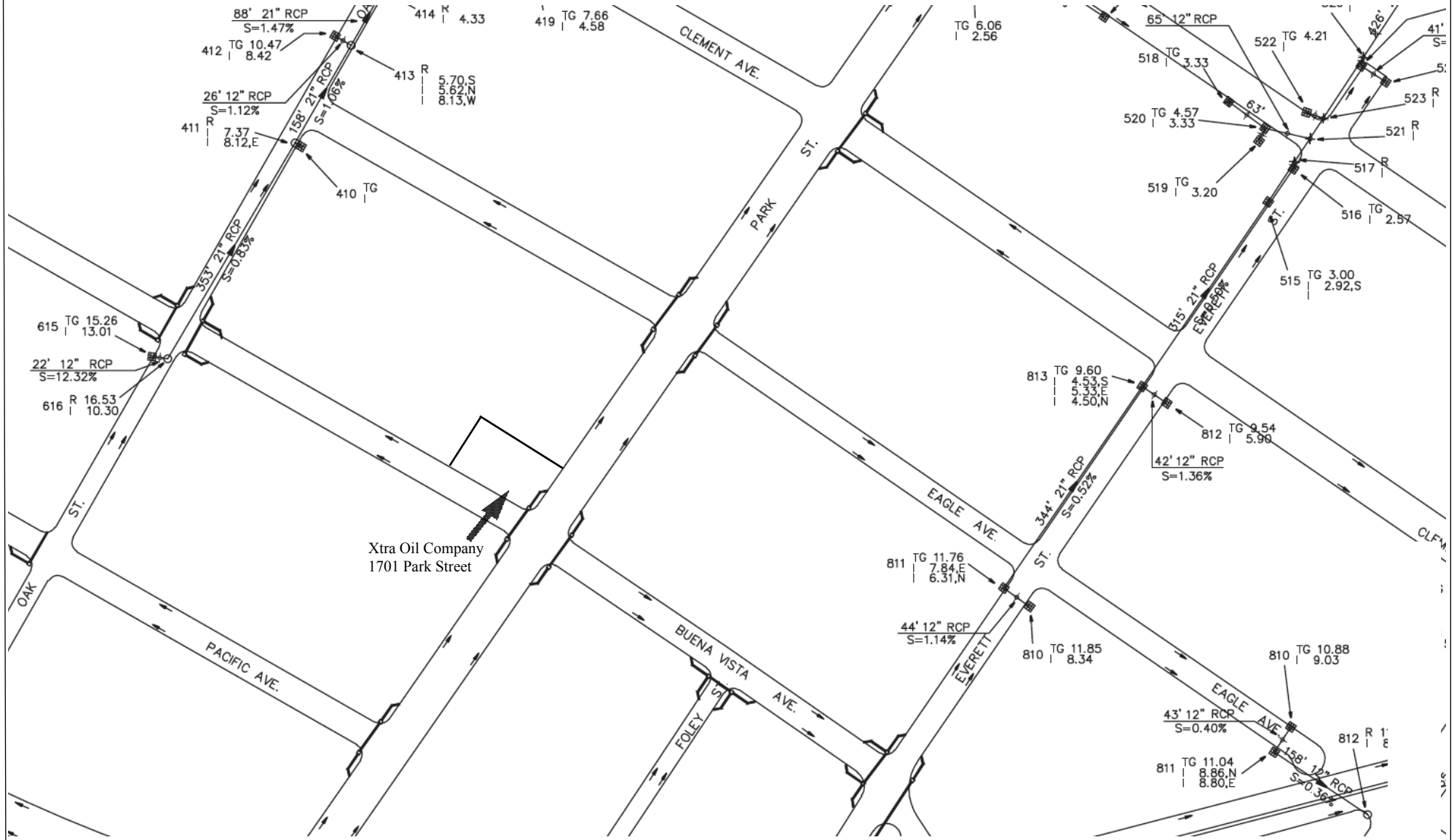

Figure 2
City of Alameda Storm Drain Map
1701 Park Street
Alameda, California

Map From: City of Alameda Public Works Department October 2010	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	N No Scale

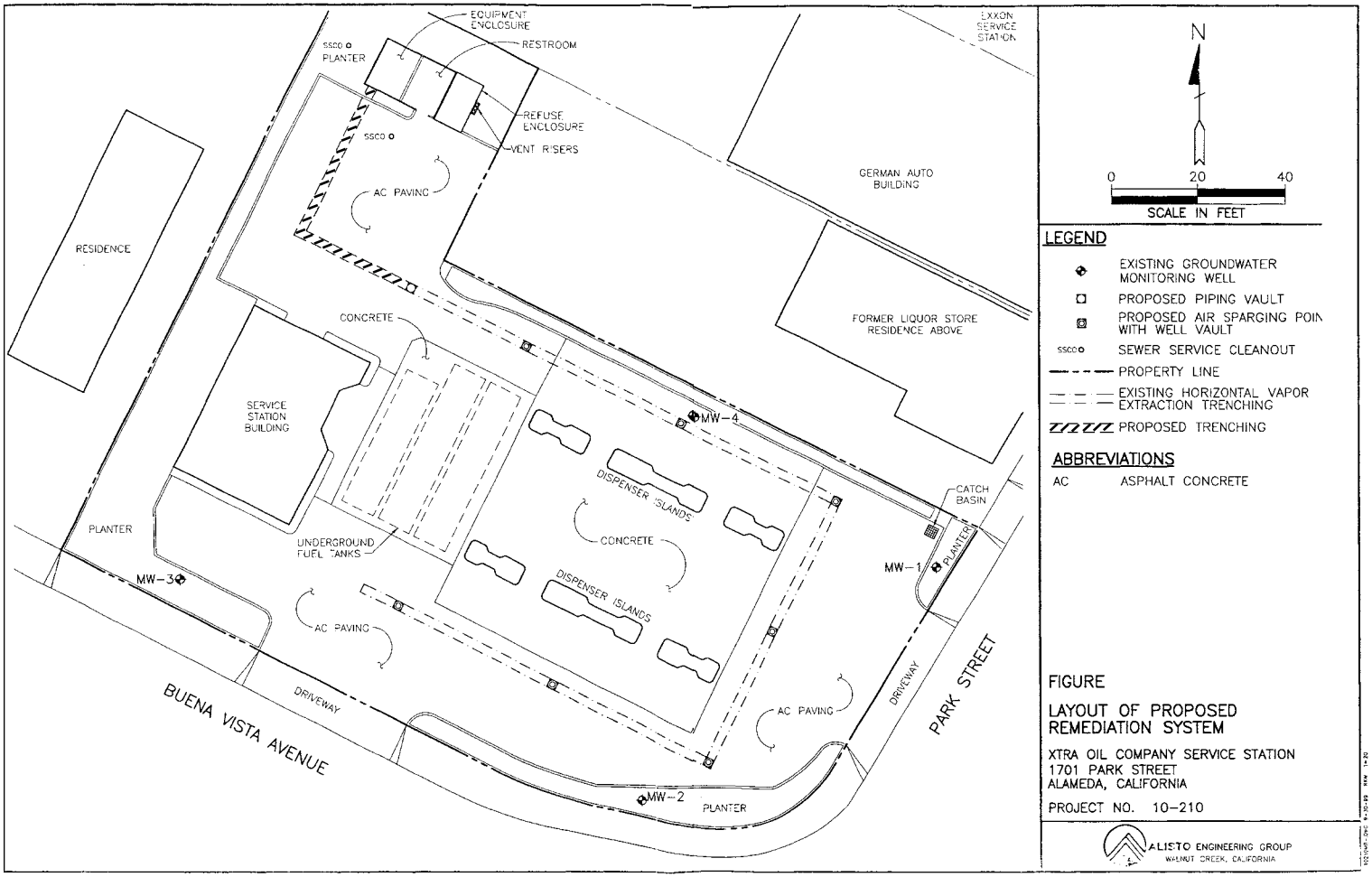

Figure 3
Layout of Existing Remediation System
1701 Park Street
Alameda, California

Map From: Corrective Action Plan Xtra Oil Service Station Alisto Engineering October 1999	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	

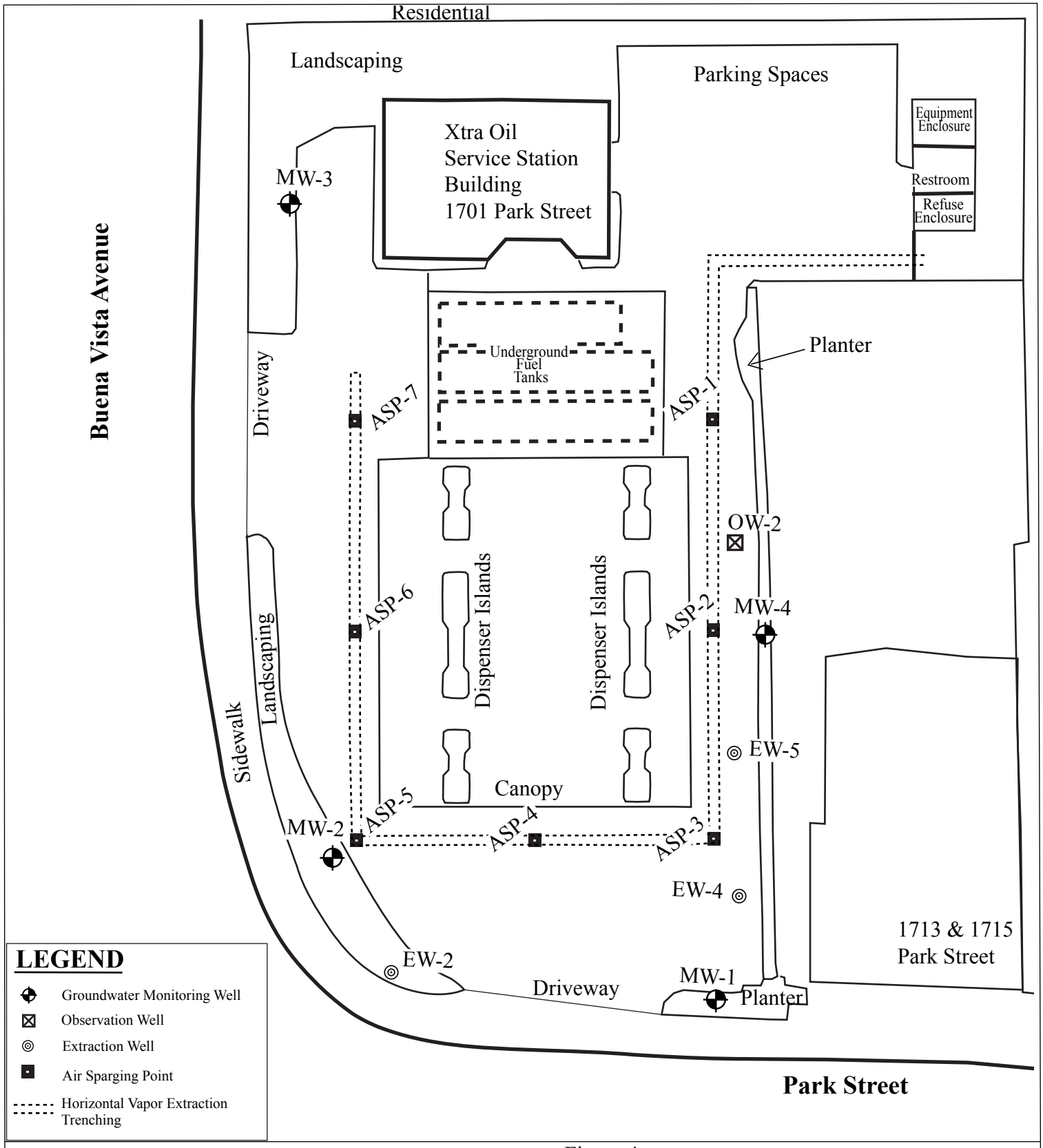

Figure 4
Site Plan Showing Well Locations
Xtra Oil Company
1701 Park Street
Alameda, California

Basemap from: Alisto Engineering Group September 2005, and Google Earth October 2009

P&D Environmental, Inc.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610

0 12.5 25
Approximate Scale in Feet

N