REMEDIAL INVESTIGATION REPORT

VOLUME I

TEXT, TABLES AND FIGURES

FMC CORPORATION
8787 ENTERPRISE DRIVE
NEWARK, CALIFORNIA

JUNE 1999

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FMC Corporation
8787 Enterprise Drive
Newark, California

FMC Corporation

1735 Market Street
Philadelphia Pennsylvania 19103
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June 15, 1999

State of California
Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

To: Loretta Barsamian
Executive Officer

Att: Mr. Ade Fagorala
Associate Engineering Geologist

Re: Submittal of the Remedial Investigation Report
Task B.2. Order Number 98-066
FMC Corporation
8787 Enterprise Drive
Newark, Alameda County, California 94560

Dear Ms. Barsamian:

By the present letter and enclosed report, FMC Corporation (FMC) is submitting the "Remedial Investigation Report, FMC Corporation, 8787 Enterprise Drive, Newark, Alameda County, California" dated June 1999, to the State of California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) as required under Task B.2. of Order Number 98-066, "Revision of Site Cleanup Requirements and Rescission of Order No. 89-055" For: FMC Corporation for the property located at 8787 Enterprise Drive, Newark, Alameda County, California (Order). The RWQCB adopted the Order on July 15, 1998.

Task B.2. of Order Number 98-066 requires submittal of a technical report "documenting completion of necessary tasks identified in Task B.1. workplan" on or before April 1, 1999. FMC was granted an extension of the report submittal date to June 15, 1999, in a March 26, 1999 letter issued by the RWQCB.

If you have any questions or require further information, please call me at (408) 289-3141.

Sincerely,

Zahra M. Zahiraleslamzadeh
Project Manager

cc: City of Newark Fire Department (Jacqueline Bretschneider)
Department of Toxic Substances Control (Barbara Cook)
Alameda County Water District (Steven Inn)
Alameda County Health Agency (Thomas Peacock)
Regional Water Quality Control Board (Steven Hill)*

* Cover Letter Only

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Mohsen Mehran, Geosystem Consultants, Inc.

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McLaren Hart, Inc.

June 14, 1999

Ms. Zahra M. Zahiraleslamzadeh
FMC Corporation
1125 Coleman Avenue, Gate 1 Annex
San Jose, California 95103

SUBJECT: REMEDIAL INVESTIGATION REPORT, FMC CORPORATION, 8787 ENTERPRISE DRIVE, NEWARK, ALAMEDA COUNTY, CALIFORNIA

Dear Ms. Zahiraleslamzadeh:

Please find enclosed the "Remedial Investigation Report" for the above-referenced site. This report has been prepared in accordance with Task B.2. of the State of California Regional Water Quality Control Board, San Francisco Bay Region Site Cleanup Requirements Order Number 98-066.

If you have any questions regarding the report, please call either of us at (510) 521-5200.

Sincerely,

Douglas O. Beadle, REA
Supervising Environmental Scientist
Project Manager

Stephen M. Carlton, CHG
Principal Hydrologist

REGISTERED GEOLOGIST
STEPHEN M. CARLTON
No. 4730
Expires: 01/31/00
STATE OF CALIFORNIA

Enclosure

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EXECUTIVE SUMMARY

In accordance with Task B.2. of the State of California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Site Cleanup Requirements Order (Order) Number 98-066, adopted on July 15, 1998, this remedial investigation (RI) report presents the results of investigations at the FMC Corporation (FMC) 8787 Enterprise Drive facility in Newark, Alameda County, California (Site). Task B.2. of Order Number 98-066 states, in pertinent part:

> "[FMC shall submit a technical report] documenting completion of necessary tasks identified in the Task B.1. [RI] workplan [to further define the lateral and vertical extent of pollution in soil and groundwater at the site]."

As directed by RWQCB Order Number 98-066 (RWQCB, 1998a), the principal objective of the current RI was to define the vertical and lateral extent of contamination in soil and groundwater. FMC's September 1998 RI Workplan (McLaren/Hart, 1998), approved by the RWQCB in November 1998 (RWQCB, 1998b), was designed to accomplish this objective. The specific objectives were as follows: 1) obtain representative data confirming previous investigation results; 2) further characterize soil and groundwater conditions beneath the Site; and 3) provide the information necessary to establish Site specific risk based cleanup standards for soil and groundwater in order to develop a final remedial action plan with respect to the entire Site. Comments received from the RWQCB, Alameda County Water District (ACWD), and Newark Fire Department (NFD) were considered during implementation of the Workplan.

Using standard protocols, the implementation of the RI Workplan included installation of 84 soil borings, collecting 217 soil samples, obtaining 21 grab groundwater samples, and sampling 72 groundwater wells for chemical analyses.

The data collected during the current RI have been summarized and integrated with the information obtained from previous investigations to further characterize subsurface environmental conditions.

Site Stratigraphy and Hydrogeology

The Site is located west of Interstate 880 (I-880) and east of salt evaporation ponds in an area with various industrial and commercial uses. Lithologically, the Site is characterized by a thin layer of fill materials underlain by three alluvial deposits units, collectively termed as the shallow zone. The shallow zone occurs at depths of approximately five to 20 feet below ground surface (bgs) and is underlain by the Newark aquitard, extending to depths ranging from 45 to 50 feet bgs. This clay separates the shallow zone from the deeper Newark aquifer which ranges in thickness from 10 to 35 feet beneath the Site and extends from about 50 to 75 feet bgs. An isolated bedrock outcrop of serpentine occurs near the southwestern corner of the Site and acts as a barrier to groundwater movement in the shallow zone and the underlying Newark aquifer. An extensive, thick clay aquitard separates the Newark aquifer from the underlying Centerville aquifer (Irvington aquitard). The Centerville aquifer is absent beneath the southwestern half of the Site.

Groundwater flow direction within the shallow zone remains heavily influenced by the shallow zone groundwater extraction system, with an overall regional flow to the northwest. A large area of capture exists on Parcels B and I. Flow direction within the Newark aquifer is generally toward the west, with significant capture noted around extraction wells DW-2 and DW-8.

Soil Quality

Site soils have been tested for metals, elemental phosphorus (P_4), phosphates, volatile organic compounds (VOCs), petroleum hydrocarbons, and pH.

Based on soil data from previous investigations and the current RI, metals concentrations in all parcels did not exceed their respective United States Environmental Protection Agency (USEPA) Preliminary Remedial Goals (PRGs) for industrial soils. Arsenic was detected in one soil boring located in the area of the former Filter Aid Pit on Parcel D at a concentration of 210 milligrams/kilogram (mg/kg) at 5 feet bgs. However, this value is below the USEPA PRG (for industrial soil) (non-cancer endpoint).

The results of the current investigation did not reveal P_4 in any of the Parcel A soil samples analyzed by the laboratory. Data from this and previous investigations reveal that the extent of P_4 has been defined in the area of the former Phosphorus Storage Pits located at Parcel A and is not present in soils near the former Phosphoric Acid Plant. Additionally, P_4 was detected in only one location at the former Phossy Pond and along the former pipeline, at a concentration of 0.0015 mg/kg.

The RI Workplan did not propose further sampling for phosphates in soil, as there was no indication of historic concerns nor are there any regulatory cleanup levels or remedial goals for phosphates. The results of previous phosphate investigations revealed concentrations ranging from < 0.2 mg/kg to 1,400 mg/kg.

The results of VOC analyses performed at the Site indicate that the extent of EDB in soil at Parcels B and I has been well defined. A review of the data indicates that concentrations of 1,2-DCA are very limited in extent within vadose zone soils. The maximum concentrations of 1,2-DCA reported are generally within the saturated zone. Trihalomethanes are not present in soils within the vadose zone.

Motor oil was present in soils at concentrations up to 2,700 mg/kg on Parcel I, however, the levels were generally less than 100 mg/kg. There is no USEPA PRG for motor oil in soils. Numerous risk-based studies have been performed for motor oil in soils and greatly elevated cleanup levels are routinely accepted for this non-volatile, biodegradable compound.

pH was measured in soils in Parcels A and D and Parcel B. The pH in the majority of soils at all Site parcels were found to be within a range greater than 2 and less than 12.5. The pH in samples collected at the request of the NFD from soils previously excavated from the former Phosphoric Acid Plant and placed as "windrows" on the southeastern portion of Parcel A were all within a range greater than 2 and less than 12.5. The one location where pH was previously detected at a pH below 2.0 (Parcel A) has been defined to be an isolated occurrence.

Four soil borings were proposed to be installed in Parcel C, in accordance with the RI Workplan. Due to concrete demolition and removal activities at that Parcel and the presence of concrete pads beneath two former fuel oil storage tanks, drilling could not be performed in Parcel C. Based on active remediation to address elevated petroleum hydrocarbons present in soil beneath the former fuel oil storage tanks, additional soil sampling at Parcel C is not warranted.

Shallow Zone Groundwater Quality

Arsenic was detected above its State of California Environmental Protection Agency (CAL EPA) Maximum Contaminant Level (MCL) in 26 groundwater samples collected from the shallow zone during the current investigation. The highest concentrations were detected in Parcel A. Barium, chromium, lead, nickel, and selenium were also detected above MCLs in the shallow zone. Elevated levels of arsenic, barium, chromium, lead, and nickel were not detected in Site soils. Selenium concentrations detected in groundwater are likely due to the natural occurrence of this metal. Selenium concentrations above MCLs were also detected in off-site upgradient monitoring wells.

The most prevalent VOCs in the shallow groundwater zone are EDB, 1,2-DCA, and trihalomethanes. In addition to these compounds, other chlorinated VOCs are present at lower levels. Downgradient Site monitoring wells (W-1, W-2, W-3, and W-28) do not contain EDB. The EDB plume has been contained and, in general, EDB concentrations have decreased significantly within the shallow zone over time due to extraction and natural attenuation mechanisms.

1,2-DCA concentrations within the shallow zone have been variable over time. This compound is not present in downgradient wells. The majority of 1,2-DCA present within the shallow zone was detected in Parcels B and I with lower concentrations present in Parcels A and D, including one upgradient off-site monitoring well (MW-OS6). The groundwater extraction system is capturing the highest impacted area, while lower levels are present upgradient of the extraction system. Low levels of 1,2-DCA near the Site's southeastern perimeter is the result of migration from off-site sources, since 1,2-DCA is present in shallow groundwater at neighboring/upgradient facilities.

Trihalomethanes were detected at concentrations exceeding its MCL in 13 shallow zone wells, all within Parcels B and I. There does not appear to be a source of trihalomethanes within Site soils. Trihalomethane concentrations in shallow zone groundwater have been variable over time, yet generally have decreased over the past two years. Trihalomethanes have not been detected in downgradient Site monitoring wells.

Other chlorinated VOCs detected in one or more monitoring wells at levels above MCLs in the shallow zone include 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), 1,2-dichloropropane (1,2-DCP), carbon tetrachloride, cis-1,2-dichloroethene (cis-1,2-DCE), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride. Downgradient wells do not contain these compounds. The occurrence of these compounds at the northeastern portion of the Site is attributable to (an) off-site source(s). Other chlorinated VOCs present in monitoring well W-22 (located to the south of the Site) may be the result of migration of chemicals from (an) upgradient off-site source(s) to the east-southeast.

P_4 was not present in groundwater monitoring wells sampled in Parcel A. Minimal concentrations of P_4 were present in grab groundwater samples in the vicinity of the former Phosphorus Storage Pits.

Six shallow zone monitoring wells within Parcel A were sampled to assess the concentrations of phosphates in groundwater in accordance with ACWD concerns. The maximum concentrations of orthophosphate detected was 130 parts per million (ppm), while a maximum of 420 ppm total phosphate was present in Parcel A, consistent with previous data. There are no state or federal cleanup levels for phosphates in groundwater.

pH results were generally measured within neutral ranges in shallow zone monitoring wells.

Motor oil was detected in two shallow zone monitoring wells located in proximity to the former fuel oil storage tanks on Parcel C at a maximum concentration of 220 parts per billion (ppb). There is no state or federal cleanup level for motor oil in groundwater. Active soil remediation is occurring in this area; once this source is removed, motor oil in groundwater is expected to biodegrade. There were no other petroleum hydrocarbons detected. Volatile petroleum components (benzene, toluene, ethylbenzene, and xylenes [BTEX] and methyl tertiary-ethyl-ether [MTBE], etc.) were not detected in any groundwater samples collected at Parcel C.

Newark Aquifer Groundwater Quality

Arsenic was detected in three Newark aquifer monitoring wells at levels greater than its MCL. Selenium was also detected above its MCL in three Newark aquifer wells, yet these levels are likely due to the natural occurrence of this metal.

EDB was detected in one Newark aquifer well (extraction well DW-2) at a concentration of 160 ppb. The EDB contamination has been contained and concentrations have decreased within the Newark aquifer since investigations began in 1980.

1,2-DCA was detected in five Newark aquifer wells, all at levels in excess of its MCL. The 1,2-DCA contamination has been contained and concentrations have (generally) decreased over time.

pH groundwater results were generally measured within the neutral range in Newark aquifer monitoring wells.

Installation of a soil boring at the southwest corner of Parcels B and I determined the presence of bedrock at 35 feet bgs, well above the Newark aquifer. This confirms that the Newark aquifer is not present at the southwestern portion of the Site. Therefore, the new Newark aquifer monitoring well proposed for this location was not installed. Wells DW-3 and DW-4 adequately provide the westernmost definition of Newark aquifer groundwater quality conditions at the Site.

Monitoring well DW-1 is completed within a saturated sand layer within the Irvington aquitard, which is located beneath the Newark aquifer. DW-1 is located in close proximity to shallow zone and Newark aquifer wells with elevated levels of EDB. Monitoring performed since 1989 has not revealed EDB in DW-1, confirming that the Irvington aquitard is an effective barrier to downward migration of EDB. Additionally, recent monitoring results indicate that no VOCs are present in this well.

The RI Workplan proposed locating and sampling Newark aquifer groundwater monitoring well DW-5 north of the Site, for metals and VOCs. This well was buried by debris in 1994 or 1995. During the period of 1985 through 1994, this monitoring well was sampled for VOCs 52 times. EDB was never detected at or above laboratory reporting limits. 1,2-DCA had been detected on four occasions (maximum of 11 ppb), yet was not detected from 1991 through 1994 at or above a reporting limit of 0.5 ppb. During the current RI, a utility locator's attempt to find this well was unsuccessful. FMC has obtained the original permit for this well showing measurements from nearby landmarks and has contacted the property owner to request permission to perform shallow digging in this vicinity to attempt location. If found, the well will be sampled and the results will be included in the next semi-annual monitoring report.

Conclusions

In accordance with the RI objectives and approach, the vertical and lateral extent of all chemicals of concern at the Site has been delineated with the exception of metals in shallow zone groundwater north of Parcel A. Although metal-impacted shallow zone groundwater is generally upgradient of the Site's extraction and treatment system, FMC will further delineate the extent of this impact north of Parcel A.

FMC will continue operating the groundwater extraction and treatment system and continue performing routine monitoring and reporting in accordance with Order Number 98-066 (Self-Monitoring Program). FMC will propose Site specific risk based cleanup standards for both soil and groundwater, and will submit a final remedial action plan with respect to the entire Site in

1.0 INTRODUCTION

On July 15, 1998, the State of California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) adopted Site Cleanup Requirements Order (Order) Number 98-066 "Revision of Site Cleanup Requirements and Rescission of Order No. 89-055 For: FMC Corporation for the property located at 8787 Enterprise Drive, Newark, Alameda County" (Site) (RWQCB, 1998a). Task B.2. of the Order requires submittal of a technical report "documenting completion of necessary tasks identified in the Task B.1. workplan (Remedial Investigation [RI] Workplan) [to further define the lateral and vertical extent of pollution in soil and groundwater at the site]" on or before April 1, 1999. FMC Corporation (FMC) was granted an extension of the report submittal date to June 15, 1999 (FMC, 1999), in a March 26, 1999 letter issued by the RWQCB (RWQCB, 1999).

The RI Workplan (McLaren/Hart, 1998) described the Site use history, summarized previous investigations, closures, and remedial measures completed at the Site, proposed additional soil and groundwater investigations to confirm the results of previous investigations, and proposed to further define the horizontal and vertical extent of certain chemicals in soil and groundwater with respect to the entire Site. This report utilizes the data collected during previous investigations and this RI, and provides the basis for establishing Site specific risk based cleanup standards for both soil and groundwater and proposes a final remedial action plan with respect to the entire Site.

The remainder of this section presents a brief description of the Site background and regulatory requirements.

1.1 SITE BACKGROUND

FMC and predecessor companies manufactured chemicals at the Site from 1929 through 1995. Chemicals manufactured at various times included quick lime, bromine, ethylene dibromide (EDB) (a soil fumigant), magnesia compounds, phosphates, and phosphoric acid. The bromine towers, EDB plant, and magnesia plant were shutdown and the manufacturing facilities were removed in 1968. The phosphate plant and phosphoric acid plant were shutdown in 1994 and 1995, respectively. All former manufacturing facilities were removed by the end of 1996. At present, FMC only operates a facility for storage and distribution of hydrogen peroxide at the Site.

1.2 REGULATORY REQUIREMENTS

Historic and current Site regulatory requirements are discussed in the following subsections.

1.2.1 Regional Water Quality Control Board

Currently, the Site is subject to RWQCB Order Number 98-066, adopted on July 15, 1998. The purpose of Order Number 98-066 is to evaluate the effectiveness of the ongoing groundwater remediation system, undertake a remedial investigation and evaluation of remedial alternatives with respect to the entire Site, and to develop cleanup standards and propose a final remedial action plan with respect to the entire Site. The Site was previously subject to the following RWQCB Orders:

- Order Number 85-113, Waste Discharge Requirements, adopted September 18, 1985 (rescinded by Order Number 89-055);
- Order Number 87-049, Amendment to Waste Discharge Requirements, adopted May 20, 1987 (rescinded by Order Number 89-055);
- Order Number 89-055, Site Cleanup Requirements, adopted April 19, 1989 (rescinded by Order Number 98-066);
- Order Number 92-048, Waste Discharge Requirements (NPDES Permit Number CA0005177), adopted May 20, 1992 (expired without renewal May 20, 1997) and predecessor orders going back to 1976 adopting NPDES permits; and

- WDID #2 01S011253, General NPDES Permit for Discharge of Storm Water Associated with Industrial Activity, Notice of Intent (NOI) submitted September 29, 1994 (Notice of Termination submitted on November 21, 1996).

The RI Workplan was submitted on September 25, 1998 in accordance with Task B.1. of RWQCB Order Number 98-066, and approved by the RWQCB in a letter dated November 6, 1998 (RWQCB, 1998b). Task B.2. of the Order requires submittal of this RI Report on or before April 1, 1999. Due to delays in submittal of the RI Workplan, the elapsed time prior to the subsequent approval of the Workplan from the RWQCB, delays in obtaining drilling permits, and inclement weather, FMC requested an extension for submittal of the RI Report by June 15, 1999 (FMC, 1999a). Approval of the extension was granted in a March 26, 1999 letter issued by the RWQCB (RWQCB, 1999).

This RI Report is being submitted in accordance with Task B.2. of the Order and presents the methodology and results of soil and groundwater investigation activities performed pursuant to Task B.1. of the Order. Additionally, this report presents data collected during previous Site investigations, and provides the basis for establishing soil and groundwater cleanup standards and final remedial actions with respect to the entire Site. Supporting data and documentation are presented in various appendices.

1.2.2 Alameda County Water District

Historic correspondence with the Alameda County Water District (ACWD) includes groundwater injection letters, Statements of Operator Production Facilities, soil boring and well drilling permits, and copies of investigation workplans and reports. In addition, FMC pays quarterly fees for groundwater extracted by the Site's extraction system.

1.2.3 Newark Fire Department

FMC currently maintains a Hazardous Materials Business Plan with the Newark Fire Department (NFD). Historic correspondence with the NFD includes operating permits, closure plans and closure certification reports, hazardous material incident reports, and inspection reports.

1.2.4 Bay Area Air Quality Management District

FMC has had a number of permits issued by the Bay Area Air Quality Management District (BAAQMD) for various units and sources including the former gasoline storage tank located on Parcel B.

1.2.5 Union Sanitary District

Discharge of the treated groundwater has been occurring to the Union Sanitary District (USD) sanitary sewer since 1988 in accordance with USD Groundwater Permit Number GW-94-042. In addition, FMC's hydrogen peroxide distribution facility is permitted to discharge facility rinsewater to the sanitary sewer. All of the plant's sanitary wastes have been discharged and continue to discharge to the USD. In March 1999, FMC applied for a temporary permit (Permit Number GW99-078) for discharge of groundwater generated during concrete demolition activities at the former Magnesia Plant area. The permit was issued on March 26, 1999 and expired on April 26, 1999.

1.3 Report Organization

This RI Report is consistent with applicable portions of the United States Environmental Protection Agency (USEPA) and Resource Conservation and Recovery Act (RCRA) guidelines presented in the documents entitled:

- "Environmental Investigations, Standard Operating Procedures and Quality Assurance Manual", USEPA, May 1996;

- "Test Methods for Evaluating Solid Wastes - Physical/Chemical Methods", SW-846, 3rd Edition, Version 2.0, USEPA, December 1997; and
- 40 Code of Federal Regulations (CFR) Part 264 – "Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Revised April 22, 1998.

This report consists of three volumes. Volume I presents the text, tables and figures. Volume II presents Appendices A and B. Appendices C through H are located within Volume III.

Section 2.0 presents a physical description and history of the Site, along with a summary of the land use, climate, topography, and regional geology and hydrogeology. Section 3.0 presents a chronology of previous environmental activities at the Site. The current RI approach, investigation methodologies and quality assurance/quality control (QA/QC) measures are presented in Section 4.0. A summary of previous Site investigations and a detailed presentation of the current investigation, data evaluation, and delineation of the nature and extent of contamination are provided in Section 5.0. Section 6.0 and 7.0 present a discussion of the interim remedial measures and the previous closures at the Site, respectively. A summary and conclusions are presented in Section 8.0, followed by reference material used in the preparation of this report in Section 9.0. Tables and figures introduced in the report are included following Section 9.0. The supporting data are included in the following appendices:

- Appendix A - Soil Boring Logs
- Appendix B - Soil Certified Analytical Data Reports and Chain-of-Custody Records
- Appendix C - Groundwater Certified Analytical Data Reports and Chain-of-Custody Records
- Appendix D - Survey Data
- Appendix E - Field Notes
- Appendix F - Aquifer Test Results
- Appendix G - Summary of Analytical Results for Soil and Groundwater
- Appendix H - Average Metal Concentrations in Soils in the Western United States

2.0 CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

This section describes the Site location and summarizes the Site history, land use, climate, topography, and regional geology and hydrogeology.

2.1 DESCRIPTION AND HISTORY

The Site location and history are described in the following subsections.

2.1.1 Location

The Site is located west of Interstate 880 (I-880) and east of salt evaporation ponds in an area with various industrial and commercial uses. Figure 1 shows the location of the Site, and Figure 2 presents a detailed Site map showing surrounding properties. The parcels formerly used for manufacturing at the Site (Parcels A, B, C, D, and I) comprise 39.3 acres and are located at the western end of Enterprise Drive in Newark, Alameda County, California. This portion of the Site is bounded by the Southern Pacific Railroad and the Hetch-Hetchy Pipeline Right-of-Way to the north, Willow Street to the east, Enterprise Drive and undeveloped land owned by Cargill, Incorporated – Salt Division to the south, and undeveloped land including present or former salt evaporation ponds and one engineered barge canal connected to the Newark Slough to the west.

2.1.2 History of Operations

FMC and predecessor companies manufactured chemicals at the Site from 1929 through 1995. At present, FMC only operates a facility for storage and distribution of hydrogen peroxide on the Site.

Sierra Magnesite Company first began chemical production at the Site in 1929. Quick lime was manufactured from oyster shells (Parcel C), and bromine and EDB were made from seawater bittern (Parcels B and I). Sierra Magnesite became California Chemical Company in 1934. California Chemical Company merged into Westvaco Chlorine Products Corporation in 1937. A magnesia plant was constructed at that time on Parcel C. In 1942, a pilot plant for a copper-based catalyst was built on Parcel I, which was leased from Leslie Salt Company, and a plant for the full production of the catalyst was constructed on Parcel A. These catalyst plants were closed in 1944. Westvaco Chlorine Products Corporation merged with Food Machinery Corporation in 1948 to form Food Machinery and Chemical Corporation (later shortened to FMC Corporation). A phosphate plant and phosphoric acid plant were constructed on Parcel A in 1950. Between 1955 and 1959, full scale manufacturing of the 1707 Catalyst was performed at the location of the former pilot plant on Parcel I. The magnesia plant, bromine towers, and EDB plant were shutdown and the manufacturing facilities were removed in 1968. In the mid 1960s, a small catalyst plant was constructed on Parcel B for manufacture of a proprietary catalyst; this facility was shutdown in 1976. During that same year, a hydrogen peroxide (and other chemical) distribution area was constructed on Parcel B. FMC acquired the adjacent site (Parcel I where part of the former EDB plant was located) from Designed Building Systems, Inc. (DBS) on August 16, 1988. The phosphate plant and phosphoric acid plant were shutdown in 1994 and 1995, respectively. All former manufacturing facilities were removed by the end of 1996 (Redeker, 1998; Delucchi, 1998; Woodward-Clyde, 1994; ESI, 1988). The City of San Francisco maintains a right-of-way for the Hetch-Hetchy water pipeline that bisects the eastern portion of the Site from the southeast to the northwest and borders the western portion to the north (San Francisco Water Department, 1987).

A discussion of specific areas is presented within the following subsections.

2.1.2.1 Parcel A (Former Phosphoric Acid Plant and Phosphate Plant Area)

Parcel A formerly contained the phosphoric acid plant and the phosphate plant, the phossy pond and the first 1707 catalyst plant. These areas are described below.

2.1.2.1.1 Former Phosphoric Acid Plant and Phosphate Plant

A phosphoric acid plant and phosphate plant were constructed on Parcel A in 1950. Phosphoric acid was manufactured by burning P_4, and phosphate products by processing phosphoric acid and sodium carbonate. The plant was subsequently retrofitted for purposes of manufacturing additional phosphate products using sodium and potassium hydroxide (Redeker, 1998). P_4 was originally stored in steel aboveground storage tanks. In the 1960's, FMC constructed two below grade pits of steel reinforced concrete in Parcel A for storage of P_4 and removed the tanks from service. The pits were taken out of service, decontaminated, and closed in place (i.e., the concrete floors and walls remain) under NFD oversight by backfilling in 1993-1994. Sampling in the mid-1970's and 1996 revealed the presence of P_4 in soil immediately outside the walls of the pits, suggesting that leaks or spills occurred (Woodward-Clyde, 1994, 1996). Sampling of the shallow zone groundwater beneath Parcel A has shown levels of arsenic above the State of California, Environmental Protection Agency (CAL EPA) Maximum Contaminant Levels (MCLs) (Woodward-Clyde, 1994). All phosphate manufacturing concluded in 1994 and that plant was shutdown. Manufacturing of phosphoric acid concluded in June 1995, and that plant was shutdown at that time. FMC completed dismantling and removal of the equipment and structures for the plants by the end of 1996.

In the late 1960's, approximately 20,000 gallons of phosphoric acid, stored in lead lined redwood aboveground storage tanks, either spilled or leaked in the area south of the former air compressors that were located outside the southern portion of the former warehouse (PES, 1998). The acid was thought to have flowed toward the west (Woodward-Clyde, 1994). The tanks were subsequently sealed with plastic liners (Delucchi, 1998).

2.1.2.1.2 Former Phossy Pond

FMC operated a surface impoundment, known as the "phossy pond", from early 1950 until the late 1970's for water that had come into contact with P_4 (e.g., water used to cover the P_4 during shipment in railcars or used to displace the P_4 during unloading) on the east side of Parcel A, north of the Hetch-Hetchy Right-of-way (FMC, 1985). The pond was approximately 120 feet wide, 160 feet long, and 4 feet deep. Water was kept in the pond at all times. Discarded pipes, valves, etc. that had contained P_4 were occasionally discarded into the pond to prevent ignition. The pond was unlined and not connected into any surface drainage. The phossy pond was closed in 1985 under the authority of the California Department of Health Services (DHS) (now the

Department of Toxic Substances Control, or DTSC) (Woodward-Clyde, 1994). The DHS acknowledged the completion of the phossy pond closure in a letter dated January 27, 1986 (DHS, 1986).

2.1.2.1.3 Former 1707 Catalyst Plant

The "1707" catalyst plant was located on the western half of Parcel A and operated from 1942 to 1944 to produce a catalyst used in the production of synthetic rubber for the United States Government during World War II. The catalyst contained magnesia, potassium carbonate, copper sulfate, and iron sulfate (Woodward-Clyde, 1994; ESI, 1988; Chang, 1998; Redeker, 1998).

2.1.2.2 Parcels B & I (Former EDB Plant and DBS Property Area)

Parcels B and I formerly contained the EDB plant and bromine towers, the "Petro-Tex" catalyst pilot plant, the 1707 catalyst pilot plant, the research pilot plant, the soda ash transloading area, an effluent pond (E-1 pond), the quality control laboratory, stores buildings, and an aboveground storage tank area. Additionally, Parcel B still contains the hydrogen peroxide distribution facility, the paint shed and garage, several warehouses, and the groundwater extraction and treatment system. These areas are described below.

2.1.2.2.1 Former EDB and Bromine Plants

The bromine towers and adjoining EDB plant were constructed in 1929 (Redeker, 1998; Westvaco Digest, 1953) on Parcels B and I (ESI, 1988; Chang, 1998). Bromine was extracted from seawater bittern in the bromine towers and then was reacted with ethylene gas to produce EDB (Chang, 1998). EDB was manufactured primarily for agricultural use as a soil fumigant. Over the years of operations, there could have been minor leaks and spills in the course of routine manufacturing and handling. The only known significant spill occurred in 1967 when a steel tank used to store EDB ruptured, spilling approximately 6,000 gallons of product onto the ground. Other than flushing with water, there is no record of specific cleanup actions taken at the time (Woodward-Clyde, 1994).

There was an underground diesel tank that overflowed and/or leaked in the 1960's. The tank was removed. Additionally, a small underground gasoline storage tank was removed from the area in 1986 in accordance with the NFD requirements and oversight. The adjacent soil was impacted with petroleum hydrocarbons and was excavated, treated, and placed back into the pit (Woodward-Clyde, 1994).

2.1.2.2.2 Former Petro-Tex Catalyst Plant

A "Petro-Tex" catalyst plant operated at the location of the current warehouse on Parcel B beginning in the mid 1960s. The plant was owned 50% by FMC and used iron and zinc oxide, barium carbonate, and polyvinyl alcohol for manufacturing a proprietary catalyst. The plant operated through 1976 (ESI, 1988; Chang, 1998; Redeker, 1998; Delucchi, 1998).

2.1.2.2.3 Former 1707 Catalyst Pilot Plant and Manufacturing Plant

Parcel I contained a 1707 catalyst pilot plant that operated for a few months prior to the operation of the 1707 catalyst plant on Parcel A during World War II. The pilot plant's purpose was to conduct research necessary for the development of the 1707 catalyst plant (Redeker, 1998). Between 1955 and 1959, full scale manufacturing of 1707 catalyst was conducted on Parcel I at the location of the former pilot plant (Delucchi, 1998).

2.1.2.2.4 Former Research Pilot Plant

A small magnesia research pilot plant existed at the location of the later training center during the 1950s and early 1960s. The pilot plant's purpose was to conduct research necessary for the development of magnesia products (Redeker, 1998).

2.1.2.2.5 Former Soda Ash Transloading Area

A soda ash transloading area was present on Parcel B, northwest of the EDB area. Soda ash was transferred from railcars to trucks, and some soda ash spilled onto the ground and railroad tracks. The area was paved in 1992. This area is equipped with a below-grade screw conveyor, a product elevator, and a dust collector. This area was also used for transferring sodium phosphates as well, through 1980 (Woodward-Clyde, 1994).

2.1.2.2.6 Former Effluent (E-1) Pond

Parcel B contained a clay lined pond (E-1 Pond) which was operated from the mid-1970's to 1995 as part of the plant's effluent management and treatment system under a National Pollutant Discharge Elimination System (NPDES) permit. Effluent from the plant, consisting of cooling tower blowdown, boiler blowdown, softener regeneration brines, and stormwater runoff, was collected in this pond and adjusted for pH prior to discharge (Woodward-Clyde, 1994). The effluent pond was taken out of service and backfilled with clean fill in mid-1996 (Woodward-Clyde, 1996b).

2.1.2.2.7 Former Laboratory

A laboratory operated on Parcel B from approximately 1941 through 1994 as a product quality control lab for the magnesia and phosphate products produced on Parcels C and A, respectively. All sample material was recycled with the exception of gypsum and magnesia, which were transferred off-site (Delucchi, 1998).

2.1.2.2.8 Former Stores and Former Engineering Stores Buildings

The former stores building located on Parcel B was used as a parts warehouse for storage of pumps, motors, valves, etc. The former engineering stores building located on the same Parcel was used for office space for maintenance personnel and later for storage of files (Chang, 1998).

2.1.2.2.9 Former Aboveground Storage Tank Area

Diesel and solvents were stored in aboveground storage tanks (ASTs) in this area beginning in the 1950s (Redeker, 1998). Additionally, a 500-gallon aboveground gasoline storage tank was located near this area, used by the Hydrogen Peroxide Transloading facility. In accordance with a December 16, 1998 Aboveground Storage Tanks Closure Plan (FMC, 1998a), the four aboveground steel storage tanks (three diesel and one Stoddard solvent) and convault aboveground gasoline storage tank were closed in December 1998. Results of the closures were presented in an Aboveground Storage Tank Closure Report dated March 11, 1999 (FMC, 1999b), and are discussed in Section 7.0. The March 11, 1999 Closure Report was accepted by the NFD in a letter dated May 5, 1999 (NFD, 1999).

2.1.2.2.10 Hazardous Waste Storage Area

The hazardous waste storage area was operated as a less than 90-day storage facility beginning in January 1987 under DHS oversight until July 1997 when the NFD Certified Unified Program Administrator (CUPA) Program assumed authority. Hazardous waste stored at the facility is limited to spent filters and carbon generated by the Site's groundwater treatment system.

2.1.2.2.11 Existing Hydrogen Peroxide Transloading Facility

A hydrogen peroxide transloading and chemical warehousing and distribution facility was constructed on Parcel B in 1976. FMC has ceased warehousing and distribution of chemical products, but continues to operate the hydrogen peroxide transloading facility.

2.1.2.2.12 Existing Paint Shed and Garage

A paint shed and a garage are located on the northern portion of Parcel B. These facilities have been utilized as storage areas for paints and maintenance of vehicles, respectively, since the 1950s (Chang, 1998; Redeker, 1998). Currently, these areas are not in use.

2.1.2.2.13 Existing Groundwater Extraction and Treatment System

Following the adoption of RWQCB Order Number 85-113 on September 18, 1985, FMC implemented a remedial measures program based on the EDB concentrations detected in the Newark aquifer. The Newark aquifer remediation program was initiated in January and February 1986. Currently, the program consists of extracting groundwater from Well DW-2 and DW-8, filtering to remove suspended solids, and treating by granular activated carbon (GAC) to remove volatile organic compounds (VOCs) prior to discharge. Following the adoption of RWQCB Order Number 87-049 and based on the results of Site investigations, FMC installed and commenced operation of a shallow zone extraction system in August 1989. The shallow zone system was comprised of 26 extraction wells (W-7, W-20, W-29, W-33, and W-37 through W-58) from which groundwater was pumped under negative pressure. In September 1989, Wells W-7 and W-52 through W-58 were isolated from the extraction system to minimize the possibility of accelerating the migration of 1,2-dichloroethane (1,2-DCA) and other compounds to the Site from upgradient sources. With the concurrence of the RWQCB, methods for discharging treated groundwater have been reinjection into the Newark aquifer, discharge to surface waters, and since October 1988, discharge to the USD sanitary sewer system (Geosystem, August 1998a). The system is discussed in detail in Section 6.0.

2.1.2.2.14 Former DBS Property

Parcel I was leased by FMC from Leslie Salt Company (or its predecessor companies) from 1929 through 1969. Subsequent to 1969 the property was purchased by DBS. DBS used the area for customizing mobile buildings, and portions of the property were leased to a number of small businesses which included, a pallet repair business (north side), truck repair station (south side), trailer remodeling business (south side), junk car dealer (south side) and equipment storage yard (south side). FMC purchased land owned by DBS on Parcel I in 1988.

2.1.2.3 Parcel C (Former Magnesia Plant Area)

Parcel C formerly contained the magnesia plant, as described below.

2.1.2.3.1 Former Magnesia Plant

Between 1929 and 1937 a kiln was operated on Parcel C which roasted oyster shells for the production of quick lime. The magnesia plant was constructed in 1937 on approximately 15 acres adjacent to an engineered barge canal connected to the Newark Slough. Prior to its construction, a pilot plant performed research on the magnesia process (Redeker, 1998). Upon the magnesia plant's completion, barges with clams and oyster shells (used as a source of calcium) were brought from the San Francisco Bay into the Newark Slough and barge canal and unloaded at the magnesia plant. Magnesia compounds were produced and gypsum was a coproduct. Additionally, debrominated seawater bittern was used as a raw material. In the early 1940's, dolomite replaced the oyster shells as the source of calcium and magnesite (Redeker, 1998). The magnesia compounds were used in refactory brick, pulp, and paper. The gypsum was primarily used in wallboard manufacture, Portland cement, and as a soil amendment. The manufacturing equipment, which consisted of five kilns, crushers, burners, and fuel oil storage, was removed with the closure of the plant in 1968. Two Bunker C fuel oil storage tanks were located on the western portion of the plant (Redeker, 1998).

2.1.2.4 Parcel D (Former Maintenance and Parking Area)

Parcel D formerly contained the stormwater pond, tetrapotassium pyrophosphate (TKPP) pond, and filter aid pit. These areas are described below.

2.1.2.4.1 Former Stormwater Pond

Stormwater runoff from areas outside the containment portions of the phosphoric acid and the phosphate plants was collected and contained in an earthen impoundment near the southeastern corner of the Site in order to meet NPDES permit requirements specifying capture and retention of the first 90,000 gallons of any rainfall event. The pond, constructed in 1978-1979, was approximately 3-4 feet deep, had a capacity of approximately 300,000 gallons, and was lined with native clay soil. Samples of sludge and underlying soil were collected from the pond in 1985-1986 and the pond was subsequently closed in 1987 by excavation and off-site disposal, with the excavated soils manifested as a hazardous waste due to arsenic (toxicity characteristic). The area was subsequently backfilled (Woodward-Clyde, 1994). After closure of the pond, stormwater runoff was collected in a 200,000 gallon aboveground storage tank located near the former pond. The 200,000-gallon tank was closed in 1995 under the authority of the NFD.

2.1.2.4.2 Former TKPP Pond

Activated carbon and backwash slurry generated from the filtration step used in the production of TKPP were disposed of in an earthen impoundment, known as the "TKPP Pond", located immediately south of the Hetch-Hetchy right-of-way. The unlined and undrained pond was constructed in 1972 and measured approximately 22 feet wide, 52 feet long, and three feet deep. The pond was utilized through 1980 (PES, 1998). It was closed pursuant with notifications to the RWQCB and the DHS in 1983 by excavation and off-site disposal, and the area backfilled. The DHS approved the closure of the TKPP Pond in a letter dated April 12, 1984 (DHS, 1984b).

2.1.2.4.3 Former Filter Aid Pit

Prior to about 1972, the effluent (E-1) ditch began in the middle of Parcel D, with a pit located at the head of the ditch used for disposal of filter cake. The filter cake contained dicalite (diatomaceous earth) and arsenic sulfide, generated during the production of food grade phosphoric acid. Along with 700-800 feet of ditch, the pit was closed by excavation and off-site disposal in 1972, and the area backfilled with clean fill and graded (Woodward-Clyde, 1994).

2.1.2.5 Parcels E, F, and G (Undeveloped Parcels)

There are three undeveloped parcels (E, F, and G), owned by FMC, that are located to the southeast, northeast, and east of Willow Street, respectively. These properties comprise 7.9

acres, have not been used for manufacturing activities, and have remained undeveloped. However, groundwater beneath these parcels has been polluted with VOCs from upgradient off-site sources. The RWQCB issued a letter in September 1998 concluding "groundwater pollution identified beneath [these parcels] is likely the result of the migration of pollutants in groundwater from upgradient site[s]" (RWQCB, 1998c).

2.1.2.6 Hetch-Hetchy Right-of-Way

The City of San Francisco Water Department owns a right-of-way at the Site for the Hetch-Hetchy water pipeline. The right-of-way bisects the eastern portion of the Site from the southeast to the northwest and borders the western portion to the north. FMC has a Land Use Permit with the San Francisco Water Department for access to this property (San Francisco Water Department, 1987).

2.1.2.7 Neighboring Properties

Four neighboring sites are currently conducting groundwater cleanup under RWQCB Orders, including: Ashland Chemical Company, Romic Environmental Technologies (Romic), Jones-Hamilton Chemical Company, and the Baron-Blakeslee (now part of Allied Signal Corporation) solvent processing facility. Three of these sites are located upgradient of the Site, with Ashland being up- to cross-gradient of the Site. Pollutants from the sites have commingled to some extent in the shallow groundwater zone. A discussion of each facility is presented below.

The Ashland Chemical Company is located directly southeast of the Site (8610 Enterprise Drive) and has operated under Site Cleanup Requirements Order Numbers 89-109 and 98-080 to cleanup released VOCs in the shallow zone groundwater. A groundwater extraction and treatment system has been installed. Groundwater flow within the shallow zone at the site is variable, with flows observed toward the southwest, west, north, and northwest. 1,2-DCA and several other VOCs have migrated off-site. Vinyl chloride, trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), and cis-1,2-dichloroethene (cis-1,2-DCE) have historically been detected above MCLs in downgradient monitoring well W-22, located on FMC's Site. 1,1-DCA, cis-1,2-DCE, and 1,2-DCA have all been detected in FMC monitoring well W-26 (also located downgradient of the Ashland property), at concentrations above their respective MCLs (Fluor Daniel GTI, July 1998).

Romic is located to the west of Willow Street (37445 Willow Street), southeast of the Ashland Chemical Company site. The RWQCB issued Site Cleanup Requirements Order Number 89-111 to Romic (the site was then owned by Foster Chemicals) to investigate and remediate soil and groundwater contamination at the site. The site is currently extracting, monitoring, and reporting under Order Number 98-094. 1,2-DCA is the primary contaminant of concern, although other VOCs have been detected. 1,2-DCA has impacted shallow groundwater at this site at concentrations up to 59,200 parts per billion (ppb). Romic has performed a soil investigation, installed groundwater monitoring wells, and installed a groundwater extraction and treatment system for the shallow zone (Romic, 1999).

Jones-Hamilton Company is located at 8400 Enterprise Drive, southeast of the intersection of Willow Street and Enterprise Drive. The site has operated under Site Cleanup Requirements Order Number 89-110, and currently 98-067, to address chemicals in shallow zone groundwater beneath the site. Contaminants of concern include pentachlorophenol (PCP), tetrachlorophenol (TCP), 1,2-DCA, benzene, and gasoline. A slurry wall, and groundwater extraction and treatment system have been installed at the site. Some chemicals appear to have migrated from the site (Jones-Hamilton, 1999).

Baron-Blakeslee (now Allied Signal) operated a solvent processing facility for a number of years at 8333 Enterprise Drive, located approximately 0.4 miles east of the FMC Site. The facility was shutdown in 1994, but is currently being leased to another solvent distributor. The RWQCB issued Site Cleanup Requirements Order Number 95-132 (rescinded by Order Number 98-108) to cleanup VOCs released to soil and groundwater. The area of impact is widespread. VOCs (including TCE, tetrachloroethene [PCE], 1,1-DCE, 1,1,1,-trichloroethane [1,1,1-TCA], and trichloroflouromethane [TCFM]) have migrated offsite to a significant distance in the westerly direction. First quarter 1998 monitoring data showed VOC concentrations greater than 10,000 ppb present in monitoring wells on or near FMC Parcels F and G (Radian, 1998).

2.2 LAND USE

The Site is located in an industrial area within the western boundary of the City of Newark, at the perimeter of urban development. The Site is located approximately 1.8 miles east of the San Francisco Bay. There are no other structures between the Site and San Francisco Bay. The Coyote Hills Regional Park is located approximately one mile north of the Site, while the San Francisco Bay National Wildlife Refuge is located approximately 1½ miles to the northwest. The USD operates a sanitary waste lift\transfer station approximately 250 feet north of the Site. Additionally, several light industrial facilities are located to the north in the Thornton Business Center.

Several industries exist, or have existed, in the immediate vicinity of the Site, mostly to the east-southeast. These industries include, the Ashland Chemical Company, Romic, Jones-Hamilton Chemical Company, and the Baron-Blakeslee solvent processing facility.

2.3 CLIMATE

The Site is located in an area which has a mild, semi-arid climate with marked seasonal cycles of precipitation. Precipitation data for the area were obtained from the Newark Weather Station (a substation of the National Weather Service). Data indicate that the mean annual precipitation in the vicinity of the Site is approximately 13.7 inches (National Climate Data Center, 1999). About 95% of the annual precipitation falls in the seven months from October to April, with more than 50% during the three winter months of December through February. The mild temperatures and sunny days common to the area result in moderate evaporation. Pan evaporation data from the Newark Weather Station indicate an average evaporation rate of 1,518 millimeters per year (59.8 inches per year) between 1924 and 1978 (State of California, 1979). (Pan evaporation is the calculated evapotranspiration that would occur if the soil were saturated to ground surface). The majority of the evaporation occurs during summer months.

Predominant winds in the vicinity of the Site (San Francisco Airport, 18.4 miles to the northwest) are from the west to northwest with an average velocity of 10.6 miles per hour (Western Regional Climate Center, 1999).

2.4 TOPOGRAPHY AND SURFACE FEATURES

The Site is located near the eastern shore of the San Francisco Bay, in a low-lying, marshy area adjacent to salt evaporators that border the bay. The Site is located immediately to the northeast of a bedrock outcrop that rises about 40 feet above the otherwise flat ground surface. This outcrop is one of the most southerly outliers of a northwest-trending chain of outcrops known as the Coyote Hills (Figure 3). The Site is relatively flat with an elevation of approximately 11 feet above mean sea level (MSL).

Surface water drainage features in the vicinity of the Site include Plummer Creek to the south (approximately 0.5 miles), Newark Slough to the north (approximately 500 feet), and several smaller, unnamed ditches. Surface water also occurs in low-lying areas within the marshes to the south and west of the Site.

2.5 REGIONAL GEOLOGY AND HYDROGEOLOGY

The regional geology and hydrogeology are described in the following subsections.

2.5.1 Regional Geology

The Santa Clara Valley and the southern San Francisco Bay area represent a tectonically downdropped graben between the active Hayward fault to the northeast and the San Andreas fault zone to the southwest. Within this depression, blocks of basement rocks have been differentially downdropped and uplifted along subsidiary faults. The elevation of these basement rocks is variable and can range from several hundred feet above sea level, as occurs along the Coyote Hills, to over 2,000 feet below sea level. A generalized regional geologic cross-section

(A-A'), passing through the Site, is shown on Figure 4 (trace of cross-section provided on Figure 3).

The basement rocks are represented by the Franciscan Assemblage, an assemblage of varied lithologies (sandstone, serpentine, ophiolites, etc.) of Jurassic age. Other Mesozoic and Tertiary formations overlie the Franciscan Assemblage but do not occur within the study area. These formations have not, therefore, been discussed in this report.

The basement rocks are generally overlain by several hundred feet of quaternary alluvium, composed of gravel, sand, silt, and clay. The sediments are derived mostly from detritus brought in from the Alameda Creek drainage area, northeast of the Site, and deposited in the Niles Cone alluvial fan (Figure 3).

2.5.2 Regional Hydrogeology

Hydrogeologically, the site is located within the Niles Cone. The origin and formation of the various alluvial deposits beneath the Site are a reflection of episodic sea level fluctuations, related to Pleistocene glaciations, which have resulted in a cyclic sequence of coarse alluvial sediments interbedded with fine alluvial and estuarine deposits. The coarse alluvial sediments are of continental origin and represent high yielding aquifers. The fine grained deposits are typically of marine or estuarine origin and are considered aquitards because of their low hydraulic conductivity. In the general vicinity of the Site, the defined series of individual aquitards and aquifers, from the surface down, includes the Newark aquitard, Newark aquifer, Irvington aquitard, Centerville aquifer, Mission aquitard, and Fremont aquifer. Below 400 feet, where the stratigraphy is less well defined, is a series of aquifers known as the deep aquifers. The Centerville aquifer and the other underlying aquifers, however, may not be present beneath the Site because of the shallow bedrock associated with the Coyote Hills (Geosystem, 1986a).

Recharge of the aquifers in the vicinity of the Site is primarily by surface water from Alameda Creek, which has a drainage area exceeding 600 square miles. This recharge occurs naturally and via artificial recharge basins constructed and operated by the ACWD along the Alameda

Creek drainage channel. Hydraulic gradients in the upper aquifers (Newark, Centerville, and Fremont) are to the south and west, and water transfer to adjacent basins is very limited. The deeper aquifers (below 400 feet) have a hydraulic gradient toward the north and appear to be continuous with aquifers of other sub-basins.

3.0 CHRONOLOGY OF PREVIOUS ENVIRONMENTAL ACTIVITIES

FMC initiated soil and groundwater investigations at the Site in 1980. Extensive remedial measures have been conducted since 1985. A chronology of previous environmental activities and data collected at the Site is presented in reports listed in the table below. These reports present the results of the previous soil and groundwater investigations, closures, and remedial measures completed at the Site. The complete reference for each of these documents is included in Section 9.0 and the findings are incorporated in the RI discussion and overall assessment of the data presented in Section 5.0.

Report Date	Report Title	Report Generator
Apr 1999	Aquifer Test Summary Shallow Zone and Newark aquifer	Geosystem
Mar 1999	Aboveground Storage Tank Closure Report	Decon
Jan 1999	Groundwater & Extraction/Treatment System Monitoring Annual Compliance Report Calendar Year 1998	Geosystem
Sep 1998	Remedial Investigation Workplan	McLaren/Hart
Aug 1998	Additional Soil Characterization in EDB Area	PES
Aug 1998	Summary Report, Subsurface Characterization and Remediation	Geosystem
July 1998	Semi Annual Report, Groundwater and Extraction/Treatment System Monitoring, First Half of 1998	Geosystem
Apr 1998	Closure Certification Report	PES
Feb 1998	Annual Report - 1997. Evaluation of Remedial Actions	Geosystem
Oct 1997	Work Plan For Additional Characterization For The EDB Area	PES
Feb 1997	Annual Report 1996/Evaluation of Remedial Actions	Geosystem
Jun 1996	Report of Sampling Results, FMC Former Phosphoric Acid Plant And Other Areas	Woodward Clyde
May 1996	Addendum To Sampling Plan (Covering Phosphoric Acid Plant)	Woodward Clyde
May 1996	Evaluation Of Soil Heave	Woodward Clyde
Apr 1996	E-1 Pond Closure Sampling	Woodward Clyde
Mar 1996	Report Of Soil Sampling Results, Former Phosphate Plant	Woodward Clyde
Feb 1996	Annual Report 1995/Evaluation of Remedial Actions	Geosystem
Jan 1996	Report Of Soils Study For Phosphoric Acid Plant Site	Woodward Clyde
Dec 1995	Letter Report, Chemical Explanation For Swelling Of Soil In Phosphoric Acid Plant	Woodward Clyde
Dec 1995	Phosphorus Storage Pit Closure Report	Woodward Clyde

Report Date	Report Title	Report Generator
Oct 1995	Sampling Plan, FMC Newark- Phosphate Plant	Woodward Clyde
Aug 1995	Sampling Plan, Closure Of Hazardous Materials Storage Facilities	Woodward Clyde
May 1995	Closure Plan For Hazardous Materials Storage Facilities	Woodward Clyde
Feb 1995	Annual Report 1994/Evaluation of Remedial Actions	Geosystem
Apr 1994	Report Of Site Investigation, FMC, Newark	Woodward Clyde
Feb 1994	Annual Report 1993/Evaluation of Remedial Actions	Geosystem
Oct 1993	Phosphate Plant And Phosphorus Storage Pit Closure Plan	Woodward Clyde
Apr 1993	Modifications To Shallow Zone Containment System	Geosystem
Feb 1993	Annual Report 1992/Evaluation of Remedial Actions	Geosystem
Feb 1992	Annual Report 1991/Evaluation of Remedial Actions	Geosystem
Sep 1991	Evaluation Of Treated Groundwater Injection	Geosystem
Feb 1991	Annual Report 1990/Evaluation of Remedial Actions	Geosystem
Aug 1990	Evaluation Of Discharge Alternatives For Treated Groundwater	Geosystem
Feb 1990	Newark Aquifer Characterization Study	Geosystem
Feb 1990	Annual Report 1989/Evaluation of Remedial Actions	Geosystem
Nov 1989	Shallow Zone Characterization Study	Geosystem
Oct 1989	Completion of Shallow Zone Containment System	Geosystem
Jan 1989	1988 Annual Report	Geosystem
Jul 1988	Development Of Shallow Zone Containment System Design	Geosystem
Jan 1988	1987 Annual Report	Geosystem
Dec 1987	Shallow Zone Containment System Design	Geosystem
Aug 1987	Evaluation Of Groundwater Injection	Geosystem
Mar 1987	Rehabilitation Of Injection Well DW-10	Geosystem
Aug 1986	Evaluation Of Extraction/Injection System	IT
Jul 1986	Evaluation Of Newark Aquifer Remediation	Geosystem
May 1986	Shallow Zone Compliance Boundary Monitoring Wells	Geosystem
Apr 1986	Report Evaluation Of Shallow Zone Containment Measures	IT
Mar 1986	Addendum to the Health and Environmental Risk Assessment	Arthur D. Little, Inc.
Feb 1986	Final Report, EDB Remedial Measures Program	IT
Feb 1986	Carbon Treatment System Operation And Maintenance Manual	IT
Mar 1985	Investigation Of EDB Distribution In Soil	IT
Apr 1985	Health and Environmental Risk Assessment	IT
Jan 1985	Evaluation Of Selected Mitigation Alternatives	IT

Report Date	Report Title	Report Generator
Nov 1984	Investigation Of EDB Distribution In Soil	IT
Oct 1984	Progress Report, Sorption/Desorption Studies	IT
Sep 1984	Evaluation Of Contaminated Soil Treatment Technologies	IT
Aug 1984	Evaluation Of Groundwater Treatment Technologies	FMC
Jul 1984	Progress Report, Evaluation Of Selected Mitigation Alternatives	IT
Jun 1984	Additional Soil Sampling For The Soil And Groundwater Investigation (Phase II B Report)	David Keith Todd
Feb 1984	Remedial Action Feasibility Study EDB Project	D'Appolonia
Aug 1983	Additional Soil Sampling For The Soil And Groundwater Investigation (Phase II A Report)	David Keith Todd
Jun 1982	Soil And Groundwater Investigation FMC Chemical Group Plant, Phase II	David Keith Todd
Mar 1981	Groundwater Investigation, FMC Industrial Chem Group Plant, Phase I	David Keith Todd

4.0 REMEDIAL INVESTIGATION METHODOLGY

The current RI approach, investigation methodologies, and QA/QC measures (including data management) are presented in the following subsections.

4.1 REMEDIAL INVESTIGATION APPROACH

As directed by RWQCB Order Number 98-066, the principal objective of the current RI was to define the vertical and lateral extent of contamination in soil and groundwater. FMC's September 1998 RI Workplan, approved by the RWQCB in November 1998, was designed to accomplish this objective. The specific objectives were to: 1) obtain representative data confirming previous investigation results; 2) further characterize soil and groundwater conditions beneath the site; and 3) provide the information necessary to establish Site specific risk based cleanup standards for soil and groundwater in order to develop a final remedial action plan with respect to the entire Site. The approach adopted included the review of historic data, identification of data deficiencies, and development of a sampling and analysis plan.

Under the field investigation phase of this RI, soil samples were collected at strategic locations across the Site to assess if elevated levels of metals exist in soil and, if so, how they relate to groundwater conditions. Samples were collected from borings in Parcel A to confirm previous P_4 delineation and to assess potential impact of P_4 in soils beneath the former Phosphoric Acid Plant area. Also, soil samples from Parcel A were collected from the former Phossy Pond and along the former pipeline that ran from the former Phosphoric Acid Plant to the Phossy Pond and analyzed for metals, P_4, and pH at the request of the NFD. Additionally, soil previously excavated from the former Phosphoric Acid Plant and placed as "windrows" on the southeastern portion of Parcel A was sampled for pH at the request of the NFD. Soil samples were collected at multiple locations throughout Parcels B and I to assess potential petroleum hydrocarbon impact, based on the Site use history, and to further delineate the western and southeastern extent of VOCs in these parcels. Additionally, pH levels were measured in soils across the Site to confirm previous data.

Groundwater level measurements were recorded to continue to provide an understanding of groundwater movement beneath the Site. Groundwater samples were collected throughout the Site to further characterize the extent of VOCs, and were collected across the Site and from upgradient off-site monitoring wells to assess metals in groundwater. Additionally, groundwater samples were collected from Parcel A to assess the presence of P_4, and to determine phosphate concentrations in accordance with ACWD concerns. pH levels were measured in groundwater beneath the Site to confirm previous data.

Using standard protocols, the implementation of the workplan included installation of 84 soil borings, collecting 217 soil samples, obtaining 21 grab groundwater samples, and sampling 72 groundwater wells for chemical analyses. The principal documents utilized during the implementation of the RI Workplan are as follows:

- "Environmental Investigations, Standard Operating Procedures and Quality Assurance Manual", USEPA, May 1996;
- "Test Methods for Evaluating Solid Wastes – Physical/Chemical Methods", SW-846, 3rd Edition, Version 2.0, USEPA, December 1997; and
- 40 Code of Federal Regulations (CFR) Part 264 – "Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Revised April 22, 1998.

In addition to the above documents, the comments received from various agencies, including RWQCB, ACWD, and NFD were considered during the implementation of the RI Workplan.

The data collected during the current RI have been summarized and integrated within the information obtained from previous investigations to further characterize subsurface environmental conditions. The methodologies followed during the implementation of the workplan are presented in this section. The results and data evaluation are presented in Section 5.0.

4.1.1 Soil Investigation Methods

Selection of soil sample locations and chemical analytes were based on extensive review of the Site use history and previous investigation data. The rationale for specific soil boring locations was presented in the RI Workplan. Soil samples were obtained by hand augering and drilling. A total of 84 soil borings were installed and 217 soil samples were collected and analyzed. Soil samples were collected at depths ranging from the near-surface to 20 feet bgs. Dependent on location, the samples were analyzed by the following USEPA SW-846 Methods (USEPA, 1997) by a State of California certified laboratory:

Method	Analytes
6010/7000	CAM 17 Metals
7580	P_4
8260	VOCs
8015M	Petroleum Hydrocarbons
9040	pH

All current and previous soil boring locations are shown on Figures 5 through 8. The soil investigation was performed from December 1998 through June 1999. The results of these analyses are presented in Section 5.3.

4.1.1.1 Pre-Mobilization

Prior to mobilization of drilling and sampling equipment, soil boring locations were clearly marked on the ground with marking paint or stakes. Each location was assigned a pre-determined soil boring identification number. As required by law, Underground Service Alert (USA) was contacted at least 48 hours in advance in order that they could alert operators of utilities at the Site, and a USA ticket number was obtained for verification. Additionally, an independent underground utility surveyor was used to ensure that each soil boring location was clear of underground utilities. The required drilling application and fee were submitted to the ACWD and drilling permits were obtained upon their review and acceptance of the RI Workplan (ACWD, 1998).

4.1.1.2 Drilling Methods

Soil borings were installed and soil samples were collected using hydraulically-driven (direct-push) or hollow stem auger drilling rigs, or hand-augering equipment. Seventy-four soil borings were installed (in Parcels A & D and B & I) using direct-push drilling rigs, and one boring was installed in Parcel I using the hollow stem auger drilling rig. The hollow stem auger drilling rig was used at this location because the direct-push drilling rig was anticipated to encounter refusal at a depth of 25 feet bgs. Additionally, nine soil samples were collected using a hand-auger at the TPH impacted area in Parcel C, and an additional 10 samples were collected at Parcel A in the area of the former Phossy Pond to assess pH levels in surface soils.

Hydraulically - Driven (Direct-Push) Borings

Direct-push soil sampling technology was utilized for the majority of Site subsurface soil sampling. The method was selected because it provided the greatest level of safety for site workers and produced minimal drill cuttings, thereby reducing the volume of investigation-derived waste and associated costs for sampling and potential disposal.

Truck mounted (LD-1) or all-terrain (MD-1) direct-push drilling rigs were used to advance soil borings to a maximum depth of 25 feet in fine-grained sediments. This system consisted of a 90-pound hammer mounted on truck or on an all-terrain vehicle. Sediment cores were collected by driving 2- or 3.5-inch outer diameter dual casing into the soil with a hydraulically-driven hammer. The dual casing consisted of an outer drive casing and an inner sample barrel, which were simultaneously driven into the ground. Sediment cores were collected in butyrate or stainless steel liners inside the sample barrel. After being advanced three feet, the full inner sample barrel was retrieved, while the outer drive casing was left in place to prevent the borehole from collapsing. Use of the dual cased sampling system insured borehole integrity and minimized cross-contamination across soil horizons. Seventy-four borings were installed using the direct-push method from December 1998 through May 1999. The locations of the borings are shown on Figures 5 through Figure 7. Soil boring logs are presented in Appendix A.

Hollow Stem Auger Boring

The hollow stem auger drilling method was used to drill one boring in Parcel I (MH-57). The drilling involved advancing 8-inch diameter augers equipped with a California modified split-spoon sampler (CMSS) to the desired depth. The CMSS consisted of a 2-inch diameter by 18-inch long stainless steel core barrel lined with three 2 x 6 inch brass sleeves. After reaching the desired depth with the augers, the CMSS was driven 18-inches ahead of the borehole using a 140-pound hammer dropped from approximately 30 inches. The CMSS was then withdrawn from the augers and split longitudinally for sample retrieval. During drilling, soil samples were collected for lithologic characterization. The boring location is shown on Figure 5 and Figure 7, and the soil boring log is presented in Appendix A.

Hand-Auger Borings

A hand-auger in combination with a manually-driven sampler was used to collect shallow (less than three feet) soil samples for waste profiling purposes and in 10 shallow soil borings. The hand auger was advanced to the desired sampling depth, and the sampler was then pounded into the uppermost soil. The manually-driven sampler consisted of a driving head attached to a 25-pound drop hammer.

4.1.1.3 Sample Handling

Soil samples submitted for laboratory analyses were collected in 6-inch stainless steel tubes or butyrate/acetate liners. After extracting the stainless steel tubes or butyrate/acetate liners from the sampling device, Teflon tape was placed over the open ends, and airtight caps were slipped over the tape. An adhesive label with a unique 5-digit identification number was attached to each soil container. This identification number was recorded on the soil boring log and chain-of-custody form. The soil samples were then placed in an ice chest and kept cold. Soil samples were shipped the following morning via courier to a California state-certified laboratory. All samples were transported to the laboratory under proper chain-of-custody documentation (Appendix B).

4.1.1.4 Equipment Decontamination

All drilling and sampling equipment was decontaminated prior to conducting Site work. Any equipment that contacted Site soils/groundwater was steam-cleaned or triple washed using laboratory-grade non-phosphatic detergent between boreholes. Steam cleaning liquids were collected in self-contained washing bins. Disposable sampling equipment was discarded after one use.

4.1.1.5 Drill Cuttings and Fluid Containment

All sediment cores that did not potentially contain P_4 were placed in sediment core storage boxes (core boxes). The core boxes are constructed from wax coated corrugated cardboard measuring approximately 2-feet long, 1-foot wide, and 3-inches tall, and can contain up to 10 feet of sediment cores. Each core box contains dividers to separate each sediment core interval to potentially allow for future re-confirmation of lithology. Additionally, each core box was labeled with boring location, site name, date, and sampling intervals. All core boxes are stored in a dry and safe location in a warehouse located on-site.

Sediment cores produced from areas potentially impacted by P_4 were placed as quickly as possible into 55-gallon drums containing water to prevent possible ignition. These drums were temporarily stored in a hazardous waste accumulation area on-site, pending analytical results. Additionally, drill cuttings not produced from areas potentially impacted by P_4 were also stored in this same hazardous waste accumulation area. A composite sample was collected from the drums and analyzed for chemicals-of-concern for disposal purposes, and the soil was disposed of in accordance with applicable local, state, and federal regulations.

All fluids generated during steam cleaning and equipment decontamination were temporarily contained in 55-gallon drums for storage and subsequent treatment by the on-site groundwater remediation system, if appropriate.

4.1.1.6 Soil Boring Abandonment

Upon completion, each soil boring was backfilled with Portland cement (with 5% bentonite powder) from total completion depth to ground surface using a tremie pipe. Borehole abandonment was conducted under the supervision of an ACWD inspector.

4.1.1.7 Surveying

The location (northing and easting) and elevation (feet above mean sea level) of each soil boring were surveyed to the Eastern Bay Discharge Authority brass disc, stamped EBDA 50, at the southwestern corner of the transmission tower number 4/27 at the Site (reference mark RM-15 at 7.183 feet above mean sea level, National Geodetic Vertical Datum, 1929). The surveying was conducted by Kier & Wright, a state of California licensed surveyor, according to the North American Datum - 87 (NAD-87) coordinate system. All survey data have been stored in an AutoCAD database and is presented in Appendix D.

4.1.1.8 Soil Classification

During drilling, the sediment cores were lithologically described by the field geologist. Soil samples were classified using the Unified Soil Classification System (USCS) in accordance with Description and Identification of Soils (Visual-Manual Procedure), American Society for Testing and Materials (ASTM) D2488. A Munsell Color Chart was used to determine sample color. These descriptions were recorded in a field drilling logbook. The soil boring logs are presented in Appendix A.

Soil borings MH-1 through MH-4 were installed in areas potentially impacted by P_4. To ensure the health and safety of the drillers and field geologist, the sediment cores at these locations were not lithologically described in detail. The field geologist was able to make minimal lithologic descriptions before submersing the sediment cores in water to prevent possible ignition.

During drilling, soil sample headspace readings were measured in the field for VOCs using a photoionization detector (PID), a flame ionization detector (FID), and/or Draegar tubes. Approximately 200 grams of soil were placed in a Ziplock bag and allowed to rest in direct sunlight for approximately five minutes. The instrument probes or Draegar tube was then inserted into the Ziplock bag and a measurement recorded in the field drilling logbook.

4.1.2 Groundwater Investigation Methods

The groundwater investigation was designed after extensive review of the Site use history and previous investigation data. The rationale for specific sampling locations was presented in the RI Workplan. The objective of the groundwater investigation was to obtain sufficient hydrologic and water quality data to assess the presence of metals, P_4, phosphates, petroleum hydrocarbons and pH levels in the groundwater beneath the Site, and to further delineate the lateral and vertical extent of VOCs in the shallow zone and Newark aquifer beneath the Site. A total of 63 Site groundwater wells were sampled and 21 grab groundwater samples were collected and, dependent on location, were analyzed by the following USEPA SW-846 Methods by a State of California certified laboratory:

Method	Analytes
6010/7000	CAM 17 Metals
8260	VOCs
(GC)	P_4
365.2	Phosphates
8015M	Petroleum Hydrocarbons
9045/Field	pH

Additionally, nine off-site monitoring wells were sampled to assess the background metal concentrations in groundwater at upgradient and cross-gradient locations. All monitoring well and grab groundwater locations are shown on Figure 5. The groundwater investigation was performed from December 1998 through May 1999. The results of these analyses are presented in Section 5.4.

4.1.2.1 Sampling Methods

Prior to the collection of groundwater samples, and as proposed in the RI Workplan, all Site monitoring wells were inspected to determine their integrity. This included verifying that the wells were secured in locked vault boxes or above grade "stove pipe" type protective coverings and were not damaged. The total depth of each well was compared to that presented on the original well completion logs to ensure that they did not have obstructions or significant silting within the casing. Some well caps and locks were damaged or missing; these were replaced. No other damage that could potentially compromise sampling data was observed. Table 1 presents the monitoring and extraction well completion details at the Site.

The volume of groundwater in each monitoring well was calculated prior to sampling. Stagnant water was removed by purging a minimum of three casing volumes using a positive displacement pump, centrifugal pump, or submersible pump, and ensuring that pH, electrical conductivity, and temperature had stabilized and turbidity levels were not excessive. The monitoring wells were sampled using disposable polyethylene bailers. After sample collection and appropriate preservation, all groundwater samples were transported under chain-of-custody to state-certified analytical laboratories for analyses. Samples submitted for metals analyses were transported to the laboratory as soon as possible and immediately filtered and preserved prior to analyses.

4.1.2.2 Baseline Monitoring Well Sampling

Routine groundwater monitoring has been performed at the Site since 1981. The routine groundwater monitoring involved the measurement of potentiometric groundwater surfaces in all Site monitoring wells and sampling and analysis for VOCs in selected monitoring wells. To meet the current RI goals, a baseline groundwater monitoring event was conducted from December 1998 through May 1999. The baseline event included analyses of all Site wells for

VOCs, and selected wells for metals, P_4, phosphates, petroleum hydrocarbons, and pH to determine subsurface conditions. Specifically, the baseline event included the following:

- Collection of samples from 63 wells for VOC analyses from shallow zone and Newark aquifer monitoring wells to further characterize the extent of VOCs;
- Collection of samples from 31 shallow zone and Newark aquifer monitoring wells for metals analyses to assess the soluble concentration of California Assessment Manual (CAM) metals;
- Collection of samples from nine shallow zone off-site monitoring wells to assess background metal concentrations in groundwater;
- Collection of samples from six shallow zone monitoring wells for P_4 and phosphates, to assess subsurface conditions in potential areas of concern;
- Collection of samples from three shallow zone monitoring wells for petroleum hydrocarbons to assess conditions beneath Parcel C; and
- Measurement of pH in all shallow zone and Newark aquifer monitoring wells to assess Site-wide conditions.

4.1.2.3 Grab Groundwater Sampling

Grab groundwater samples were collected from 21 locations to augment the baseline monitoring well sampling by advancing the soil borings to first encountered groundwater. Polyvinyl Chloride (PVC) well screens and blank casing measuring 1.5 inches in diameter and 5 foot in length were then inserted into the boreholes. When possible, three volumes of groundwater were purged prior to sample collection. Grab groundwater samples were collected for metals, VOCs, P_4, and pH analyses using disposable bailer or by a low-speed peristaltic pump, and placed into the appropriate sample containers. All grab groundwater samples were transported under chain-of-custody to state-certified laboratories for analyses.

4.2 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

QA/QC Procedures presented in the Quality Assurance Project Plan (QAPP) within the RI Workplan were followed during the Site investigation. Every attempt was made at all stages of the investigation to verify the accuracy of the data. A summary of the QA/QC procedures is presented below.

4.2.1 Sample Collection and Analyses

All soil and groundwater samples were collected and analyzed in accordance with procedures described in the RI Workplan. Field and laboratory instruments were calibrated appropriately and documentation has been kept on file. Measurements made in the field and laboratory were recorded on appropriate data sheets. All samples were properly preserved (where applicable) and delivered to the laboratory under chain-of-custody documentation and procedures in each case.

Groundwater QA/QC samples were collected and analyzed during the baseline sampling event. Field QA/QC samples included trip and rinse blanks, replicates, and duplicates. Laboratory QA/QC analyses included method blanks, laboratory control spikes, matrix spikes, and matrix spike duplicates.

4.2.2 Data Tracking

Laboratory data were tracked to ensure accuracy and timeliness goals were met. Procedures for tracking included: 1) confirmation of sample receipt by the laboratory (including condition of samples upon arrival); 2) routine communication with the laboratory manager prior to, and during analyses; 3) affirmation of analyses within designated hold times; and 4) complete review of hard and electronic copies of data.

4.2.3 Data Evaluation and Validation

All data were reviewed for questionable results and, when necessary, one or more of the following procedures were performed: 1) results were confirmed or denied with the analytical laboratory; 2) samples were re-analyzed (providing hold times could be met); or 3) the sample location was re-sampled and analyzed. Questionable data were not used during consideration of Site conditions, chemical trends, and/or averages.

Laboratory data reports were reviewed for prevision and accuracy relative to matrix spike recoveries, laboratory control sample recoveries, duplicate, and method blank performance. No data were deemed unacceptable, in the opinion of the QA Officer.

4.2.4 Data Management

Appropriate laboratory and field data were entered into a Microsoft Access computer database and tabulated for reporting purposes. Original copies of all data are kept on file. All data have been reported using procedures consistent with the QAPP.

5.0 REMEDIAL INVESTIGATION RESULTS

This section describes the physical and chemical characteristics of the Site in terms of geology, hydrogeology, soil quality, and groundwater quality.

5.1 SITE STRATIGRAPHY

The detailed geologic information presented in this section identifies the major aquifers and aquitards underlying the Site. This characterization provides the basis for evaluating the potential migration of any chemicals that may have originated from FMC's operations. In addition, on November 25, 1998, the ACWD provided comments to the RWQCB relative to FMC's September 25, 1998 RI Workplan. The ACWD expressed concern over downward migration of VOCs from the Newark aquifer toward the underlying aquifers. This section is also intended to address the geologic aspects of ACWD's comments.

The site is underlain by unconsolidated alluvial and estuarine sediments, of Quaternary origin, deposited over basement rocks. Four geologic cross-sections (B-B' through E-E') were prepared from previous lithologic data collected from the Site and surrounding region and are shown on Figures 9 through 11. The trace of cross-sections are shown on the bottom of each figure.

Additionally, two geologic cross-sections (F-F' and G-G') were prepared from the current lithologic data collected at specific soil borings to further summarize the stratigraphy underlying the Site at Parcels A and D, and B and I, respectively (Figures 12 and 13). The trace of cross-sections are shown at the bottom of each figure. Additionally, a Site-wide cross-section (H-H') has been constructed using previous and current lithologic data and is presented as Figure 14. Cross-section locations were chosen to provide an overall representation of subsurface conditions.

The cross-sections have been prepared using primarily boring logs and available well drillers logs. Where available, the approximate subsurface configuration of bedrock has been inferred from geophysical data. A description of the various stratigraphic units is presented below.

5.1.1 Bedrock

An isolated bedrock outcrop of serpentine, corresponding to basement rocks of the Mesozoic Franciscan Assemblage, occurs near the southwestern corner of the Site. Soil borings W-19 and DW-7, located about 100 feet away from the outcrop, encountered bedrock at 20 to 28 feet. Soil boring DW-1, which at 115 feet depth is the deepest on-site boring, did not encounter bedrock. Projecting a gently dipping bedrock/alluvial contact under the site, the bedrock would be encountered at approximately 200 feet below the center of the Site, and 300 feet below its northeastern corner (Figure 11). The absence of the Fremont aquifer west of the Coyote Hills indicates a bedrock saddle approximately 300 feet deep.

5.1.2 Newark Aquitard and Shallow Zone

At the Site, the Newark aquitard extends to depths of 35 to 45 feet below ground surface and consists of moderately stiff to stiff gray brown silty clay, clay, and sandy clay. Lenses of sand, silty sand, and gravelly sand up to 6 feet thick occur within the upper 10 to 15 feet, although these are typically discontinuous.

Numerous borings installed during the current RI and previous investigations have shown that the Site is generally underlain by a fill layer which varies in thickness from 0 to 5 feet. The fill layer consists primarily of gravel, sand, clay, crushed rock, concrete, brick, and asphalt. Below the fill layer, a predominantly silty clay layer is encountered which extends on the average to approximately 10 feet bgs. The silty clay layer is moist in most of the borings. Previous studies (DWR, 1973) suggest that the silty clay layer has a confining effect on the underlying saturated zones.

The silty clay layer is underlain by a layer consisting of varying amounts of fine sand, silt, and clay. This layer extends to about 18 to 20 feet bgs and is generally wet to saturated. This layer has been termed the "shallow water-bearing zone" or shallow zone. Locally, as in soil boring W-26, the shallow zone may include coarse sand and gravel. A stiff, wet, blue-gray, clayey silt layer has been encountered at a depth of 18 to 20 feet bgs. Borings that have penetrated the blue-gray, clayey silt layer indicate that this layer is 5 to 7 feet thick. This layer is believed to be a major barrier to downward migration of EDB and 1,2-DCA from the shallow zone to the underlying Newark aquifer. The blue-gray clayey silt is underlain by silty clay and clay layers to a depth of about 40 to 45 feet, where the Newark aquifer is encountered.

Consistent with previous lithologic data, a review of the current RI geologic cross-sections indicate that shallow subsurface materials consist primarily of a thin layer of fill materials underlain by blue-gray, silty clay and clay deposits with discontinuous interbedded silty sand and silty gravels. During the current RI, first saturation was encountered at depths of approximately 6.5 to 13 feet bgs.

5.1.3 Newark Aquifer

At the Site, the Newark aquifer is encountered at depths ranging from 45 to 57 feet and varies in thickness from 10 to 35 feet. Characteristically, the sediments are loose to medium dense, gray to brown, well graded, clean sand and gravel. The sand is generally fine to medium-grained, and occasionally coarse. Layers of silty clay up to 3 feet thick occur within the coarser-grained material. The Newark aquifer is fairly continuous laterally in Parcels A and D and Parcels B and I, with a decrease in thickness and pinching out of the unit to the southwest (in Parcels B and I) because of the presence of bedrock.

5.1.4 Irvington Aquitard

Regionally, an extensive, thick clay aquitard separates the Newark aquifer from the underlying Centerville aquifer and largely protects the latter from receiving saline water from the Newark aquifer. The Irvington aquitard occurs 100 to 120 feet below sea level. The thickness of the aquitard at the Site varies from 50 to 85 feet. The sediments consist of stiff gray brown sandy and silty clay. As shown on Figure 11, a saturated sand lens was encountered in well DW-1 located within the EDB area. As well DW-1 is slotted within the sand lens, the water quality of this well combined with geologic characterizations has been utilized to address potential downward migration of VOCs (Section 5.4.2). Toward the southwest, where the Newark aquifer thins, the Irvington aquitard merges with the Newark aquitard and both abut against the Franciscan basement rocks (bedrock).

5.1.5 Centerville Aquifer

Regionally, the top of this aquifer occurs 150 to 200 feet below sea level. Because of the bedrock height, rising to the outcrop southwest of the Site, this aquifer is absent in the southwestern half of the Site, but could be present below the northeastern half. Vertical continuity between the Centerville and the Newark aquifers seems unlikely under the Site because of the increased thickness of the Irvington aquitard and the lensing and pinching out of both the Newark and the Centerville aquifers. Logs of wells located about 4,000 feet to the east of the Site indicate that this aquifer is not laterally continuous, ranges in thickness between 30 and 40 feet where present, and can contain aquitard lenses up to 25 feet thick (Figure 9).

5.1.6 Fremont Aquifer and Deeper Aquifers

The Fremont aquifer is separated from the overlying Centerville aquifer by a thick clay layer referred to as the Mission aquitard. The Fremont aquifer is not as well defined as the Newark and Centerville aquifers but is generally thicker and more productive. The depth to the Fremont aquifer varies from 300 to 390 feet below ground surface. The Deeper aquifers are most certainly absent within the Site area due to the presence of shallow bedrock.

5.2 SITE HYDROGEOLOGY

The previous investigations at the Site have shown that, in terms of groundwater quality, the shallow zone and Newark aquifer are most significant. Thus, this section focuses on the hydrogeologic evaluation of these two water-bearing zones. The hydrogeologic information is based on numerous site-specific investigations conducted since 1981. Between 1984 and 1987, several assessments were performed to characterize the hydraulic properties of the shallow zone and Newark aquifer, to predict the migration rates of VOCs, and to assist in the design and evaluation of remedial measures. This section presents a summary of the hydrogeologic data with emphasis on groundwater flow direction, hydraulic gradient, and aquifer properties. A more detailed description of the hydraulic properties of the shallow zone and Newark aquifer presented in Appendix F.

5.2.1 Shallow Zone

Numerous monitoring wells have been installed in the shallow zone (Table 1). Groundwater in the shallow zone is encountered at depths ranging from 2 to 5 feet bgs. The depth to groundwater depends on the proximity to recharge areas, varies seasonally, and responds rapidly to direct precipitation. The bedrock outcrop immediately adjacent to the site acts as a barrier to groundwater movement in the shallow zone and the underlying Newark aquifer. In both cases, the net result is a deflection of the westerly groundwater flow direction to the north. Although flow in the shallow zone is influenced by recharge, the bedrock barrier to the southwest, and other artificial stresses, the overall direction of regional flow is from southeast to northwest, with a deflection to the north in the western portion of the Site.

As part of the current RI, depth to groundwater was measured in all Site monitoring and extraction wells on January 12, 1999. Table 2 presents the groundwater level measurements at each well and calculated water surface elevations. Using the January 12, 1999 water level data, groundwater elevation contour maps were prepared for the shallow zone (Figure 15). Consistent with historic data, groundwater flow direction within the shallow zone in January 1999 remained heavily influenced by the shallow zone groundwater extraction system. As shown on Figure 15, at and in the vicinity of the EDB area, the shallow zone water table is depressed as a result of extraction from the shallow zone producing a large area of capture in Parcels B and I. Because of the bedrock outcrop on the western portion of the Site previously discussed, shallow zone groundwater flow direction is toward the north and northwest in this area.

To estimate the hydraulic properties of the shallow zone, several rising-head and falling-head slug tests have been performed. Details of these tests are provided in Appendix F. The average hydraulic properties obtained from the tests performed at the FMC sites are as follows:

Property	Value
Hydraulic conductivity	4.36 ft/day
Transmissivity	33.8 ft^2/day
Storativity	3.7×10^{-3}

Depending on the magnitude of hydraulic gradient and porosity, under regional conditions, the average pore water velocity may vary from 0.02 to 0.20 feet per day. However, as reflected in the water quality data, FMC's shallow zone containment system has controlled downgradient migration of the plume.

5.2.2 Newark Aquifer

The piezometric surface in the Newark aquifer is similar to that in the shallow zone. As shown on Figure 16, the direction of flow in the Newark aquifer is generally to the west, except where influenced by FMC's extraction system. Historically, wells DW-2 and DW-8 have been pumping to remediate and contain the EDB containing zone of the Newark aquifer. However, during January 1999, well DW-8 was temporarily shutdown.

To evaluate the hydraulic properties of the Newark aquifer, several pumping tests have been conducted by FMC and the ACWD. On November 9, 1984, a constant discharge pumping test was conducted in well DW-2 to estimate the transmissivity and storativity of the Newark aquifer. As part of the Salinity Barrier Project (SBP), the ACWD performed constant-discharge pumping tests to characterize the hydrogeology of the inland areas influenced by salt water intrusion. The results of the tests performed at or in the vicinity of the FMC site are as follows:

Property	Value
Hydraulic conductivity	67.5 ft/day
Transmissivity	1,136 ft^2/day
Storativity	4.2×10^{-5} - 8.9×10^{-3}

The ACWD tests showed a transmissivity of 13,660 ft^2/day and storativity of 5.1 x 10^{-4}. The hydraulic conductivities, based on numerical groundwater flow model developed by Geosystem (Geosystem, 1986a), varied from 46 to 173 ft/day.

Based on historic data, the hydraulic gradient in the Newark aquifer has varied from 0.0031 to 0.0052. The corresponding seepage velocities were estimated at 0.70 to 1.2 feet per day. The estimates of seepage velocity are based on an average hydraulic conductivity of 67.5 feet per day and an effective porosity of 0.30. Locally, the seepage velocities may vary depending on specific hydraulic parameters.

5.3 SOIL QUALITY

Since 1980, FMC has performed numerous phases of investigation at the Site. Initial soil investigations were performed between 1981 and 1985 in the EDB Area (Parcel B) and over three hundred soil samples were analyzed for chemicals of concern. Numerous additional soil investigations occurred over the entire Site through 1998, in conjunction with closure activities under the authority of the DHS and NFD, to further characterize EDB in Parcels B and I, and in anticipation of future property reuse. Although the results of the previous investigations have been submitted to the regulatory agencies, this section also describes the historical data that are necessary to support the delineation of the parameters of concern. Where applicable, United States Environmental Protection Agency (USEPA) Region IX Preliminary Remedial Goals (PRGs) for industrial property uses ("industrial soils") (USEPA, 1998) were compared to Site soils data. PRGs are standardized risk-based tools for evaluating and cleaning up contaminated sites.

Soil quality data from the current RI are presented in Tables 3 through 9, while the certified analytical data reports and chain-of-custody records are included as Appendix B. A compilation of historic soil data is presented in Appendix G. Analytical results for soils at Parcels A, B, C, D, and I are discussed in the following subsections. Within each subsection, previous investigations are discussed first, followed by data from the current RI.

5.3.1 Parcels A and D

All Site soil borings installed on Parcels A and D are shown on Figure 6. Soil data from previous investigations are presented on Figure 17 and are included on tables within Appendix G. Current soil investigation results are also shown on Figure 17 and are included on Tables 3, 4, and 8. The data are discussed below.

5.3.1.1 Previous Investigations

Previous soil investigations conducted on Parcel A were performed in conjunction with the closure of the former Phosphoric Acid Plant and former Phosphate Plant under the authority of the NFD. In addition, samples were collected and analyzed throughout Parcel A and in the vicinity of the former Phossy Pond and 1707 Catalyst Plant in anticipation of future property reuse. Various analyses were performed on the samples, including metals, P_4, phosphate, pH, and petroleum hydrocarbons.

Previous soil investigations conducted on Parcel D were performed in conjunction with the closure of the former 200,000 gallon aboveground storage tank under the authority of the NFD (a closure certification report was submitted to the NFD on April 10, 1998 and this tank was designated as T-134 on Plate 3 of that report [PES, 1998a]). Additionally, soil investigations were conducted in conjunction with the closure of the former stormwater pond. In addition, samples were collected throughout Parcel D and in the vicinity of the former Filter Aid Pit, former TKPP Pond, and former E-1 Ditch in anticipation of future property reuse. Various analyses were performed on the samples, including phosphates, P_4, petroleum hydrocarbons, and metals.

5.3.1.2 Current Investigation

During the current RI, 49 soil borings were installed at Parcels A and D to assess the nature and extent of metals and P_4, and to evaluate pH levels in the soil beneath these parcels.

Samples from 38 of the soil borings were analyzed for CAM 17 metals using USEPA SW-846 Series 6010/7000. Eight of these soil borings (MH-1, MH-2, MH-3a, MH-4, and MH-58 through MH-66) were installed to a depth of 15 feet bgs and soil samples were collected at approximate depths of 1.5 feet (when possible), 5 feet, 10 feet, and 15 feet bgs. Boring MH-3 was completed to a depth of only 7 feet, due to the presence of P_4. Borings HA-2, HA-5, and HA-9 were installed to a depth of 1.5 feet bgs. All the other soil borings (MH-5 through MH-24) were generally installed to a depth of 10 feet bgs and soil samples were collected at 1.5 feet and 5 feet bgs, and above first encountered groundwater.

Samples from 17 soil borings at Parcel A were analyzed for P_4 using USEPA SW-846 Method 7580. Of the 57 soil samples collected from these borings, 17 soil samples (soil borings MH-1 through MH-4) were collected at or around the former Phosphorus Storage Pit area. These samples were generally collected at the near-surface, 5 feet, 10 feet, and 15 feet bgs. Seven samples (soil borings MH-13, MH-14 and MH-56) were collected at similar depths in the vadose zone from the former Phosphoric Acid Plant area. The other 33 samples (MH-58 through MH-66) were also collected at similar depths from an area at and near the former Phossy Pond. The boring locations in the vicinity of the former Phosphorus Storage Pit area were selected to confirm that the P_4 impacted area beneath the former pits has been delineated. The borings in the former Phosphoric Acid Plant area were installed to assess the potential impact of P_4 to the subsurface, while the boring locations at and in the vicinity of the former Phossy Pond and former pipeline were selected to address NFD concerns.

Ninety-seven soil samples were collected from the 49 soil boring locations at Parcels A and D and analyzed for soil pH using USEPA Method 9040. Of the 97 soil samples, 19 were collected to address NFD concerns and the rest were collected to assess soil pH throughout Parcels A and D.

Results

The results of the current RI metals and P_4 analyses for Parcels A and D are shown on Tables 3 and 4, respectively. Results from all pH analyses are presented on Table 8. All current and previous investigation data are presented on Figure 17.

Metals

The results of the current and previous chemical analyses does not indicate widespread distribution of elevated metals concentrations in the soils at Parcels A and D. Of the 109 soil samples collected during the current RI and 70 samples collected during previous investigations for metals, no metals exceeded their respective USEPA PRGs (industrial soils). The highest concentrations of metals detected in soils at Parcels A and D during all investigations, the background range and average concentrations found in the Western United States (Appendix H), and USEPA PRG values are listed below:

Compound	Soil Boring and Depth (ft. bgs)	Highest Concentration (mg/kg)	Background Range and (Average Concentration)[1] (mg/kg)	USEPA PRG (mg/kg)
Arsenic	MH-22 4.5 - 5'	210	0.1 – 194 (11)	480
Cobalt	MH-19 4 - 4.5'	530	1 – 40 (8)	29,000
Copper	8(WCpp) 1'	2,400	2 – 100 (20)	70,000
Nickel	MH-63 1 -1.5'	2,700	0.1 – 1,530 (34)	37,000
Lead	8(WCpp) 3'	330	<1 – 888 (29)	1,000
Silver	MH-19 4 - 4.5'	40	0.01 – 8 (0.4)	9,400
Vanadium	MH-23 1 - 1.2'	170	<7 – 500 (100)	13,000
Zinc	MH-7 7 – 7.5'	190	10 – 2,000 (54)	100,000

[1] Background range and average concentrations found in Western United States soils (Appendix H).

Soil boring MH-22, located in the former E-1 ditch ("downstream" of the former Filter Aid Pit), contained arsenic at 210 mg/kg at 5 feet bgs. This concentration exceeds the background range of 0.1 to 194 mg/kg. However, this value is below the PRG (for industrial soil) (non-cancer endpoint). The average concentration of arsenic detected in all of the 179 samples collected at these parcels is 9.9 mg/kg, which is lower than the average background value of 11 mg/kg.

Other metal concentrations detected above background levels included cobalt in soil boring MH-19 (530 mg/kg), copper in soil boring 8(WCpp) (2,400 mg/kg), nickel in soil boring MH-63 (2,700 mg/kg), and silver in soil boring MH-19 (40 mg/kg). However, all of these concentrations are well below their respective PRGs for industrial soils.

For confirmation, one soil boring (MH-20) installed adjacent to soil boring 8(WCpp) where relatively high concentrations of copper [2,400 mg/kg] and lead [330 mg/kg] were detected. Soil samples from boring MH-20 contained copper at 31 mg/kg (4.5 – 5 feet bgs) and 25 mg/kg (11 – 11.5 feet bgs), and lead at 11 mg/kg (4.5 – 5 feet bgs) and 9.3 mg/kg (11 – 11.5 feet bgs). The comparison between the results of the two borings indicates that the previously elevated concentrations are localized.

There were no metals detected in soils in the former Phossy Pond area or along the former underground pipeline that ran from the former Phosphoric Acid Plant to the Phossy Pond, at or above their respective USEPA PRGs (industrial soil).

P_4

Previous investigations revealed the presence of P_4 in soils in the area of the former Phosphorus Storage Pits, and in soils within the immediate vicinity. An approximate 15,000 square foot area was identified as potentially being impacted with P_4 based on these data.

The results of the current investigation did not reveal P_4 at or above the laboratory reporting limit in all of the 22 soil samples analyzed from locations near the former Phosphorus Storage Pits and the former Phosphoric Acid Plant. P_4 was present (ignited) in soil boring MH-3 at a depth of approximately 4.5 feet bgs. Upon identification of P_4 at this location, an additional boring (MH-3a) was installed approximately 4 feet west of MH-3 (further away from the former Phosphorus Storage Pits). Samples collected from this boring did not contain P_4. These results confirm that the extent of P_4 has been defined in the area of the former Phosphorus Storage Pits and that P_4 is not present in soils near the former Phosphoric Acid Plant. The area impacted with P_4 at the former Phosphorus Storage Pits is shown on Figure 17.

Additionally, P_4 was detected in only one location (out of 32 samples) at the former Phossy Pond and along the former pipeline, at a minimal concentration of 0.0015 mg/kg.

Phosphates

The RI Workplan did not propose sampling for phosphates in soil, as there was no indication of historic concerns nor are there any regulatory cleanup levels or remedial goals for phosphates. Therefore, soil was not analyzed for phosphates during the current RI. However, phosphate analyses were performed on groundwater samples collected from six shallow zone groundwater monitoring wells during the current RI at the request of the ACWD, and these results are presented in Section 5.4.3. The results of previous phosphate investigations revealed concentrations ranging from < 0.2 mg/kg to 1,400 mg/kg.

pH

Previous soil investigations generally found pH within a range greater than 2 and less than 12.5 at these parcels, with the exception of one boring, from 18(WCpp). Shallow samples collected 18(WCpp) contained pH at levels less than 2.

Shallow soil samples collected from soil borings installed in the vicinity of this boring during the current RI did not contain pH ≤2.0 and ≥12.5, indicating the impacted area is very limited in extent. Additionally, pH detected in soils previously excavated from the former Phosphoric Acid Plant that were previously placed as "windrows" on the southeastern portion of Parcel A were within a range greater than 2.0 and less than 12.5. All soil samples collected from these parcels during the current RI contained pH levels within a range greater than 2.0 and less than 12.5.

5.3.2 Parcels B and I

All Site soil borings installed on Parcels B and I are shown on Figure 7. Soil data from previous investigations are presented on Figure 18 and are included on tables within Appendix G. Current soil investigation results are also shown on Figures 18 and 19, and are included on Tables 5 through 8. The data are discussed below.

5.3.2.1 Previous Investigations

Soil investigations conducted on Parcels B and I were initiated in 1981 primarily to define the extent of VOCs associated with former EDB manufacturing. Between 1981 and 1983, over 300 soil samples were analyzed to determine the extent of VOCs on these parcels. Results from the early soil quality studies were used to develop the understanding of EDB migration to groundwater to assist in the design of the groundwater extraction and treatment system. Between 1993 and 1994, an additional 17 soil borings were installed in anticipation of future property reuse and three soil borings were installed in conjunction with the closure of the former E-1 pond. In 1997, twenty soil borings were installed in accordance with the "Workplan for Additional Soil Characterization in the EDB Area" (PES, 1997). The workplan was submitted to the RWQCB on October 13, 1997, and was approved by letter dated December 11, 1997. The results of this investigation were summarized in a report titled "Additional Soil Characterization in EDB Area, FMC Corporation, Enterprise Drive, Newark, California", dated August 1998 (PES, 1998b). Analyses performed on samples from the above-mentioned investigations included EDB, 1,2-DCA, bromoform, phosphates, petroleum hydrocarbons, metals, and pH. Additionally, soil samples were collected during closure of the former aboveground storage tanks located on Parcel B in December 1998. The samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline, TPH as diesel, benzene, toluene, ethylbenzene, and xylenes (BTEX), and halogenated organic compounds.

The previous investigations identified significant EDB impact in the area south of the current warehouse and former Petro-tex Catalyst Plant. Most of the EDB detections identified during previous investigations exceeded the PRG limit of 0.029 mg/kg for industrial soils. The highest concentration of EDB (2,600 mg/kg) was detected in soil boring F at a depth of 5 feet bgs. Soil borings located adjacent to soil boring F with EDB concentrations exceeding the PRG include 2, 7, 13, 14, D, E, F, and SB-10.

5.3.2.2 Current Investigation

During the current RI, 20 soil borings were installed at Parcels B and I to assess the nature and extent of metals, petroleum hydrocarbons and VOCs, and to evaluate pH levels in the soil beneath these parcels.

Samples from 17 of the soil borings were analyzed for CAM 17 metals using USEPA SW-846 Series 6010/7000 to assess if elevated levels of metals exist in soil and, if so, how they relate to groundwater conditions. The soil borings were installed to depths of 10 - 14 feet bgs and soil samples were collected at approximate 5-foot intervals.

Samples from 12 of the soil borings at Parcels B and I were analyzed for VOCs (including halogenated compounds), using USEPA SW-846 Method 8260 to further delineate the western and southeastern extent of VOCs. Previous investigations had defined the extent of VOCs in other directions within the EDB-impacted area. Three of these borings (MH-28a, MH-29a, and MH-30a) were installed and sampled subsequent to the initial effort, as laboratory hold times for VOCs had been exceeded for some samples. Forty-eight soil samples were collected at 5-foot depth intervals from the 12 soil borings.

Samples from 13 of the soil borings at Parcels B and I were analyzed for petroleum hydrocarbons using USEPA SW-846 Method 8015M to assess potential petroleum hydrocarbon impact, based on a review of the Site use history. These borings were installed to a depth ranging from 5 feet bgs to 13 feet bgs and soil samples were collected at various depths.

Petroleum hydrocarbons analyzed included heavy hydrocarbons, diesel, gasoline, kerosene, and motor oil.

Fifteen soil samples were collected from five soil borings locations at Parcel B and analyzed for soil pH using USEPA Method 9040.

Results

The results of the current RI metals, VOC, petroleum hydrocarbon, and analyses for Parcels B and I are shown on Tables 5, 6, and 7, respectively. Results from all pH analyses are presented on Table 8. All current and previous investigation data are presented on Figures 18 and 19.

Metals

The results of the current and previous chemical analyses indicate that metals contamination is not present in the soils at Parcels B and I. Of the 49 soil samples analyzed for metals during the current investigation and 31 samples analyzed during previous investigations, no metals exceeded their respective USEPA PRGs for industrial soils. The highest concentrations of metals detected in soils at Parcels B and I during all investigations, along with the background range and average concentrations found in the Western United States, and USEPA PRG values are listed below:

Metal	Soil Boring and Depth (ft. bgs)	Highest Concentration (mg/kg)	Background Range and (Average Concentration)[1] (mg/kg)	USEPA PRG (mg/kg)
Arsenic	MH-25 13.5 – 14'	20	0.1 – 194 (11)	480
Barium	MH-41 1.5 – 2'	680	--	100,000
Cobalt	MH-41 1.5 - 2'	100	1 – 40 (8)	29,000
Chromium	MH-45 1 – 1.5'	310	5 – 3,000 (100)	450
Copper	MH-39 8.5 - 9'	410	2 – 100 (20)	70,000

Metal	Soil Boring and Depth (ft. bgs)	Highest Concentration (mg/kg)	Background Range and (Average Concentration)[1] (mg/kg)	USEPA PRG (mg/kg)
Lead	MH-46 1 – 1.5'	240	1 – 888 (29)	1,000
Mercury	MH-27 0.5 - 1'	0.85	0.01 – 4.6 (0.098)	560
Nickel	MH-45 1 – 1.5'	330	0.1 – 1,530 (34)	37,000
Silver	MH-38 4.5 – 5'	5.7	0.01 – 8 (0.04)	9,400
Zinc	MH-39 8.5 - 9'	480	10 – 2,000 (54)	100,000

[1] Background range and average concentrations found in Western United States soils (Appendix H).

VOCs

The results of the current and previous investigations conclude that the EDB soil contamination has been well defined. EDB soil isoconcentration contours have been drawn using the data collected during all investigations and are presented on Figure 20. Eighteen soil borings installed during this period around the perimeter of the EDB-impacted area either did not contain EDB at or above the laboratory reporting limit, or reported concentrations lower than the USEPA PRG (industrial soils). Soil samples collected during the current investigation at depths of 10 feet and greater were generally from the saturated soil zone (see soil boring logs in Appendix A). These sample results are denoted with an asterisk on Table 6. Since groundwater beneath Parcels B and I is contaminated with VOCs, results for laboratory analyses for saturated soils are not discussed here.

In addition to EDB, previous investigations reported concentrations of 1,2-DCA in Site soils within Parcels B and I. A review of the collective (current and previous) data indicates that concentrations of 1,2-DCA are very limited in extent within vadose zone soils. That data reveal that higher concentrations of 1,2-DCA are generally found at depths of 10 to 20 feet bgs (saturated zone). The highest 1,2-DCA concentration detected in the vadose zone was observed in soil boring SB-10 (6.57 ppm at 5 feet bgs). The VOC concentrations detected in saturated soil samples reflect groundwater concentrations. Further discussion of this groundwater contamination is included in Section 5.4.2.2. 1,2-DCA soil isoconcentration contours have been drawn for 5 foot and 10 foot depths, using data collected since December 1997. These contours are shown on Figure 21.

A collective review of the current and previous data indicate that trihalomethanes (sum of bromoform, chloroform, and dibromomethane) were not detected in soil samples collected from the vadose zone.

There were no other VOCs present in soil samples collected from the unsaturated zone during the current investigation, at or above their respective USEPA PRGs for industrial soils..

Petroleum Hydrocarbon Results

The results of the current investigation did not reveal petroleum hydrocarbons in soil at Parcels B and I at or above their respective laboratory reporting limits, with the exception of motor oil. Motor oil was reported in 29 of the 38 soil samples analyzed, with concentrations ranging from 1.0 to 2,700 mg/kg. The maximum value detected was in soil boring MH-55 (1 – 1.5 feet) at a concentration of 2,700 mg/kg, although most samples were less than 100 mg/kg. There is no USEPA PRG for motor oil in soils. Numerous risk-based studies have been performed for motor oil in soils and greatly elevated cleanup levels are routinely accepted for this non-volatile, biodegradable compound.

pH

There were no previous or current RI soil samples that contained pH ≤2.0 or ≥12.5.

5.3.3 Parcel C

In anticipation of future property reuse, six soil borings were installed within Parcel C from 1993 through 1994. Soil samples were collected from multiple depths in most of the borings.

Analyses performed on the samples included petroleum hydrocarbons, arsenic, and pH. Arsenic was not detected above background levels or its PRG, and pH values ranged from 7.7 to 10. Motor oil was present at concentrations up to 1,200 ppm.

Figure 8 shows all previously installed soil borings and wells on Parcel C, while previously existing soil data at Parcel C is shown on Figure 22.

In accordance with the RI Workplan, four soil borings were proposed to be installed at Parcel C (as part of the current RI) to confirm previous motor oil concentrations observed in soil. However, several factors precluded the collection of these soil samples at this parcel. Two of the proposed borings (designated 51 and 52 in the RI Workplan) were not installed, in part due to concrete demolition and removal activities at this parcel. The other two proposed borings (designated 53 and 54) were proposed for drilling at the location of the two former bunker C fuel aboveground storage tanks, believed to have been present near the southern boundary of this parcel. However, the remains of the former tanks were actually found near the northwest corner of the Site during concrete demolition and removal activities, and from a historic aerial photograph discovered subsequent to the RI Workplan submittal. Upon discovery of the remnants of these former tanks, several soil borings were attempted at this location. However, refusal was encountered at shallow depths (approximately 1 foot bgs) at most locations and when drilling efforts were successful, water was encountered at the time at approximately 1.5 feet bgs. Therefore, no soil samples were collected. Upon removal of the remnants of the tanks, concrete pads were discovered beneath the former tank location. Elevated levels of the petroleum hydrocarbons (primarily as motor oil) have been encountered beneath these former tanks. Soil excavation and sampling beneath these former pads has been performed in accordance with NFD requirements. These data are presented in Table 9. Upon removal of the impacted soil, the source of motor oil in groundwater (Section 5.4.4) will no longer exist. Based on this active remediation, additional soil sampling at Parcel C does not appear to be warranted.

5.4 GROUNDWATER QUALITY

Groundwater investigations were initiated at the Site in 1980. The current groundwater monitoring well network comprises 29 shallow zone monitoring wells and six monitoring wells completed in the Newark aquifer, installed at the Site from 1980 through 1989. Analyses performed have included VOCs (including EDB), metals, major cations/anions, and total dissolved solids (TDS). In accordance with Order Numbers 85-113, 89-055 and 98-066, routine monitoring including quarterly, semi-annual and annual groundwater monitoring has been conducted on-site since 1985, however, many of the Site wells have been monitored since 1981, prior to these orders. Self-monitoring and reporting under NPDES permits have been conducted since 1976, and monitoring and reporting under the USD permit since 1988. A summary report of the groundwater characterization and remediation conducted at the Site from 1980 through mid-1998 was prepared by Geosystem (Geosystem, 1998a). Key elements of that report have been included within the discussions that follow.

Groundwater samples were collected from 72 groundwater wells and from 21 grab groundwater borings during the current RI. The groundwater sampling was conducted from December 1998 through June 1999. The results from the current RI are presented in Tables 10 through 14, while the certified analytical data reports and chain-of-custody records are included as Appendix C. A compilation of all current and historic groundwater data is presented in Appendix G.

Current analytical results for groundwater beneath the Site are discussed within this section. Also discussed are historic results, with respect to trends observed and chemicals removed by the Site groundwater extraction and treatment system. Additionally, groundwater quality impact from off-site sources is also noted.

Proposed drilling and sampling methods within the RI Workplan included installation of a new Newark aquifer groundwater monitoring well near the southwest corner of Parcels B and I. Prior to mobilizing field equipment for the well installation, a detailed review of previous soil boring logs in this area was performed. Borings in the vicinity of the proposed well encountered bedrock between approximately 20 and 30 feet bgs, shallower than the Newark aquifer.

However, for completeness, a hollow stem auger soil boring (MH-57) was installed northeast of shallow zone well W-19 (Figure 5) to confirm the lithology in this area. Bedrock was encountered at a depth of 35 feet bgs in the boring, confirming the absence of the Newark aquifer. Therefore, a monitoring well was not installed at this location. Newark aquifer wells DW-3 and DW-4 adequately provide the westernmost definition of groundwater quality conditions within this aquifer at the Site.

The RI Workplan proposed locating and sampling Newark aquifer groundwater monitoring well DW-5 north of the Site, for metals and VOCs. This well was buried by debris during construction activities in 1994 or 1995. During the period of 1985 through 1994, this monitoring well was sampled for VOCs 52 times. EDB was never detected at or above laboratory reporting limits. 1,2-DCA had been detected on four occasions (maximum of 11 ppb), yet was not detected from 1991 through 1994 at or above a reporting limit of 0.5 ppb. During the current RI, a utility locator's attempt to find this well was unsuccessful. FMC has obtained the original permit for this well showing measurements from nearby landmarks and has contacted the property owner to request permission to perform shallow digging in this vicinity to attempt location. If found, the well will be sampled and the results will be included in the next semi-annual monitoring report.

An assessment of the distribution of chemicals in groundwater with respect to the entire Site is presented in the following subsections.

5.4.1 Metals Results

Twenty-five shallow zone Site wells, six Newark aquifer Site wells, and nine off-site groundwater monitoring wells were sampled and analyzed for metals during the current investigation. Additionally, 14 grab groundwater samples were collected and analyzed for metals during the current investigation. Table 10 presents the analytical results for metals in all Site and off-site groundwater wells. Metal concentrations in monitoring wells and grab groundwater locations are shown on Figure 23. Results are discussed by aquifer below. Previous metals data are included in the discussions, where available. All groundwater samples collected during previous investigations were not filtered prior to analyses, and therefore represent total metals concentrations present.

5.4.1.1 Shallow Zone

Metals detected in the shallow zone above MCLs included arsenic, barium, chromium, nickel, lead, and selenium. Previous and current shallow zone metals data are discussed below, by metal.

Arsenic

Arsenic had previously been detected above MCLs in historic (early 1980s) and limited 1993 sampling in shallow zone groundwater monitoring wells in Parcel A. In addition, grab groundwater samples collected in 1995 from Parcel A during closure of the former phosphate and phosphoric acid plants showed arsenic levels above MCLs.

During the current RI, arsenic was detected above its MCL of 50 ppb in 14 shallow zone groundwater monitoring wells and 12 shallow zone grab groundwater samples with a maximum concentration of 1,400 ppb in the grab groundwater sample from MH-12. The highest concentrations were generally observed in Parcel A. Arsenic was initially detected at a concentration of 9,900 ppb in shallow zone monitoring well W-5. To confirm this elevated level, two resampling events were conducted. The first resampling event did not reveal arsenic at or above the laboratory reporting limit of 5 ppb, while the subsequent resampling revealed arsenic at a concentration of 80 ppb. This indicates that the original concentration of 9,900 ppb is likely a false positive, and therefore has not been considered in the evaluation of the data. Eight upgradient and one cross-gradient shallow zone off-site monitoring wells sampled during the current RI also contained arsenic. One of the upgradient wells (B-31) contained 160 ppb arsenic, above its MCL, while a cross-gradient well (MW-OS5) contained 390 ppb arsenic. Figure 23 shows current arsenic isoconcentration contours for the shallow zone.

Barium

Barium was detected slightly above its MCL of 1,000 ppb in the shallow zone grab groundwater sample collected from MH-12 (1,200 ppb). There were no other groundwater samples collected from the shallow zone which contained barium near or above its MCL. Therefore, barium impact to groundwater is extremely isolated. Previous barium groundwater data does not exist for the Site.

Chromium

Chromium was detected above its MCL of 50 ppb in four shallow zone grab groundwater samples collected during the current investigation (MH-3a, MH-11, MH-12 and W-5). Most exceedances were in Parcel A. There were no other groundwater samples collected from the shallow zone which contained chromium above its MCL. Chromium was not detected in the only groundwater sample analyzed for this metal during previous investigations (W-28).

Lead

Lead was detected above its MCL of 15 ppb in three shallow zone groundwater samples collected during the current investigation (MH-12, W-5, and W-8). There were no other groundwater samples collected from the shallow zone which contained lead above its MCL. Lead was not detected in the limited previous groundwater samples collected and analyzed for lead at the Site.

Nickel

Nickel was detected above its MCL of 100 ppb in eight shallow zone groundwater samples during the current investigation (Parcel A and Parcel B). There were no other groundwater samples collected from the shallow zone which contained nickel above its MCL. Previous nickel groundwater data does not exist for the Site.

Selenium

Selenium was detected above its MCL of 50 ppb in two shallow zone monitoring wells (W-5 and W-25) during the current investigation. These concentrations are likely naturally occurring background levels, within ranges reported at other sites in the San Francisco Bay Area. Three of the upgradient shallow zone off-site wells (B-26, B-31, and MW-OS57) also contained elevated levels of selenium, similar to Site well concentrations.

5.4.1.2 Newark Aquifer

Metals detected in the Newark aquifer above MCLs included arsenic and selenium. Arsenic was detected in three Newark aquifer monitoring wells at levels greater than its MCL (Parcel B and Parcel D), with a maximum of 310 ppb in monitoring well DW-8. Figure 23 shows current arsenic isoconcentration contours for the Newark aquifer. Additionally, Newark aquifer wells DW-7, DW-8, and DW-11 contained selenium at concentrations above its MCL, likely due to naturally occurring background levels. There are no previous metals data for the Newark aquifer.

5.4.2 VOC Results

VOC results are discussed below. Current RI VOC data are presented on Table 11. Previous data are discussed first, followed by data from the current RI.

5.4.2.1 Previous Investigations

Historically, EDB was discovered in groundwater at Parcels B and I where EDB was previously manufactured. EDB was detected at concentrations of up to 490,000 ppb in monitoring well W-23 in 1984 in the shallow groundwater zone (0-20 feet) beneath the EDB area. 1,2-DCA was also detected at elevated concentrations in the shallow zone. A portion of 1,2-DCA impact in shallow zone groundwater at the Site has been thought to be attributable to off-site sources. Chemical compounds found at lower concentrations in the shallow groundwater zone beneath the EDB area included bromoform, dibromochloromethane, diethyl ether, bromochloromethane, methylene bromide, 1-chloro-2-bromoethane, benzene, bromodichloromethane, chloroform, carbon tetrachloride, and TCE.

Lower levels of EDB, 1,2-DCA and other chemicals were historically found in the deeper Newark aquifer. In the vicinity of the Site, the Newark aquifer is located approximately 50-70 feet below the ground surface and is separated from the shallow zone by the Newark aquitard (20-50 feet thick). The uppermost segment of this aquitard consists of a layer of heavy gray clay approximately 5 feet thick. This clay layer has provided a barrier to the migration of EDB in the vertical direction across most of the Site. However, because EDB has been detected in the Newark aquifer, there appears to be some interconnection between the two zones. The possible mechanisms for the migration of EDB to the Newark aquifer are described in the various reports summarized in the Geosystem summary report presented within the RI Workplan. Based on hydrologic and water quality evidence, it was concluded that the one-time introduction of EDB through a failed well completion and subsequent abandonment in 1981 was not the major cause of EDB contamination in the Newark aquifer. However, this abandoned well may have acted as a pathway between the two zones. Other most probable pathways include transport through "windrows" in the confining layer, and migration through the confining layer. Some of the nearby ACWD wells are perforated in both the shallow zone and Newark aquifer, although these are not located on the Site where EDB contamination is found. Two of the ACWD wells are located upgradient.

5.4.2.2 Current Investigation

Fifty-five shallow zone wells, seven shallow zone grab groundwater borings, and eight Newark aquifer wells were sampled and analyzed for VOCs during the current investigation. VOC sampling was performed concurrent with neighboring site sampling and analysis activities. The most prevalent VOCs in the shallow zone remain EDB, 1,2-DCA, and trihalomethanes. In addition to these compounds, other chlorinated VOCs were detected on a lesser scale. A discussion of conditions is presented below, by aquifer.

Shallow Zone

Table 11 presents the analytical results for VOCs in shallow zone (as well as Newark aquifer) groundwater. EDB, 1,2-DCA, trihalomethanes, and other chlorinated VOC shallow zone isoconcentration contours are presented on Figures 24, 25, 26, and 27, respectively.

EDB was detected at concentrations exceeding its MCL of 0.05 ppb in 19 shallow zone wells and four grab groundwater samples, all within Parcels B and I (Figure 24). The maximum concentration of EDB detected was 1,800,000 ppb at grab groundwater boring 7 (GRAB-7). EDB is not present in downgradient wells. A review of all data shows, in general, EDB concentrations have decreased significantly within the shallow zone due to extraction and other natural attenuation mechanisms (Appendix G). Through December 1998, a total of 82,206,693 gallons of groundwater have been extracted and treated, and 799 pounds of EDB have been removed.

1,2-DCA was detected at concentrations exceeding its MCL of 0.5 ppb in 48 shallow zone wells and in all seven grab groundwater borings. 1,2-DCA is not present in downgradient wells. Concentrations of 1,2-DCA within shallow zone groundwater have been variable over time. The majority of 1,2-DCA present within the shallow zone is in Parcels B and I with lower concentrations present in Parcels A and D, including one upgradient off-site monitoring well (MW-OS6) (Figure 25). 1,2-DCA is present in groundwater at neighboring/upgradient facilities, and may have impacted portions of the Site. Through December 1998, 4,109 pounds of 1,2-DCA have been removed by the groundwater extraction and treatment system.

Trihalomethanes were detected at concentrations exceeding its MCL of 100 ppb in 13 shallow zone wells, all within Parcels B and I (Figure 26). These compounds do not exist in downgradient wells. Trihalomethane concentrations in shallow zone groundwater have been variable over time, yet generally have decreased over the past two years.

Other chlorinated VOCs detected above MCLs in the shallow zone include 1,1-DCA, 1,1-DCE, 1,2-dichloropropane (1,2-DCP), carbon tetrachloride, cis-1,2-DCE, PCE, TCE, and vinyl chloride. The maximum concentrations detected for these compounds were 7 ppb 1,1-DCA (W-8), 26 ppb 1,1-DCE (W-13), 62 ppb 1,2-DCP (W-27), 7.5 ppb carbon tetrachloride (W-58), 13 ppb cis-1,2-DCE (W-22), 26 ppb PCE (W-13), 1,200 TCE (W-20), and four ppb vinyl chloride (W-22). These compounds are not present in downgradient wells. Distinct groundwater isoconcentration contours for: a) PCE, TCE, cis-1,2-DCE, and vinyl chloride; and b) 1,1,1-TCA, 1,1-DCE, and 1,1-DCA were generated from the December 1998 through January 1999 groundwater quality data, and are shown on Figure 27. These contours were drawn separately to group "like" chemicals together (i.e., TCE degrading to cis-1,2-DCE as a daughter product). The occurrence of these compounds at the northeastern portion of the Site is attributable to (an) off-site source(s) to the east and southeast. Other chlorinated VOCs present in monitoring well W-22 (located at the southeast corner of Parcels B and I) may be the result of migration of chemicals from (an) upgradient off-site source(s) to the east-southeast.

There was no BTEX or methyl tertiary-butyl-ether (MTBE) detected in shallow zone groundwater, at or above laboratory reporting limits.

Newark Aquifer

Table 11 presents the analytical results for VOCs in the Newark aquifer (as well as the shallow zone). EDB concentrations within the Newark aquifer are shown on Figure 28 while 1,2-DCA concentrations within the Newark aquifer are shown on Figure 29.

EDB was detected in one Newark aquifer well (DW-2) at a concentration of 160 ppb. DW-2 is an operating extraction well within this aquifer. 1,2-DCA was detected in five wells (DW-2, DW-4, DW-6, DW-8, and DW-11), all at levels in excess of its MCL.

Review of the historic data (Appendix G) shows that EDB concentrations in the Newark aquifer have reduced since investigations began in 1980. 1,2-DCA concentrations within this aquifer have (generally) significantly decreased over time. EDB and 1,2-DCA are contained within Parcel B in the Newark aquifer.

Irvington Aquitard

One Site monitoring well, DW-1, is completed within a saturated sand layer stratified within the Irvington aquitard (Figure 14). As previously described, the Irvington aquitard is stratigraphically located beneath the Newark aquifer. As shown on Figures 24 and 28, DW-1 is located within Parcel I, in close proximity to shallow zone and Newark aquifer wells that have historically shown elevated concentrations of EDB. The results of monitoring conducted since 1989 have not revealed EDB within DW-1 at or above laboratory reporting limits. Recent monitoring results indicate that no VOCs are present in this well. Therefore, DW-1 provides definition of the vertical extent of EDB in Site groundwater beneath the Newark aquifer.

5.4.3 Phosphorus (P_4) and Phosphate Results

Table 12 presents the current groundwater analytical data for P_4 and phosphates.

During the current RI, four grab groundwater samples were collected (MH-1, MH-2, MH-3a, and MH-4) and two monitoring wells (W-12 and W-13) were sampled to assess the presence of P_4 in groundwater. P_4 was detected in two grab groundwater samples (MH-1 and MH-3a), at concentrations of 52 ppb and 260 ppb, respectively. There were no other detections of P_4. The P_4 sampling was performed to provide an indication of the occurrence of phosphorus in groundwater in the area of known P_4 soil impact. There are no state or federal cleanup levels for P_4 in groundwater. The data indicate minimal concentrations of P_4 in grab groundwater samples collected within the vicinity of the former Phosphorus Storage Pits.

Six shallow zone groundwater monitoring wells (W-8 through W-13) within Parcel A were sampled during the current RI to assess the concentrations of phosphates in groundwater in accordance with ACWD concerns. Analyses consisted of orthophosphate and total phosphates. The maximum concentrations of orthophosphate detected was 130 ppm at shallow zone well W-11. Shallow zone well W-9 contained the maximum concentration of total phosphate, observed at 420 ppm. There are no state or federal cleanup levels for phosphates in groundwater. The current data is generally consistent with previous phosphate data for the Site.

5.4.4 pH Results

pH was measured in 12 grab groundwater locations at Parcel A using USEPA Method 9045 and in 72 groundwater monitoring wells using calibrated field meters. All results were measured within the neutral range. Table 13 presents current investigation laboratory pH data from the grab groundwater samples while pH measurements from the monitoring wells can be found on sampling event data sheets within Appendix E. Previous pH groundwater data ranged from 6.5 (Parcel A) to 10.89 (Parcel A).

5.4.5 Petroleum Hydrocarbon Results

In accordance with the RI Workplan, shallow zone monitoring wells W-1, W-2, and W-3 (Parcel C) were sampled during the current RI to assess potential impact of petroleum hydrocarbon compounds on groundwater in the shallow zone. Table 14 presents petroleum hydrocarbon results for groundwater while the data are shown on Figure 22. Motor oil was detected in monitoring wells W-1 and W-2 at 200 ppb and 220 ppb, respectively. There is no MCL for motor oil in groundwater. Active soil remediation is occurring in this area; once this source is removed, motor oil in groundwater is expected to biodegrade. Motor oil was not detected at or above a laboratory reporting limit of 200 ppb in monitoring well W-3. There were no other petroleum hydrocarbons detected in these monitoring wells, at or above laboratory reporting limits. As discussed previously, volatile petroleum components (BTEX, MTBE, etc.) were not detected in any of these wells, at or above laboratory reporting limits.

5.4.6 Salt Water Intrusion

The groundwater within the Newark aquifer has also been impacted by salt water intrusion, attributable to historical overpumping. Up to 112,300 ppm of TDS have been measured in Newark aquifer monitoring wells, making the water unsuitable for most beneficial uses (Geosystem, 1998a). Chloride concentrations in the Newark aquifer beneath the Site range from 15,000 to 20,000 ppm, mainly as a result of saltwater intrusion.

The ACWD manages groundwater resources in the Newark, Union City, and Fremont areas. On average 35% of the residents' water supply comes from groundwater, most of this from well fields located about five miles east of the Site. The ACWD's management activities address saltwater intrusion caused by past overdrafting of the Newark aquifer and deeper aquifers for domestic and agricultural uses. The ACWD has reversed the overdrafting by recharging imported water and operates several extraction wells to remove high salinity groundwater from the Newark aquifer and deeper aquifers within the Niles Cone (aquifer Reclamation Program or ARP). The ACWD is planning on treating a portion of its ARP pumpage for potable use with a proposed desalination plant about 1.5 miles southeast of the site.

In the late 1970s, the ACWD initiated construction of an alignment of extraction wells in the Newark aquifer to serve as a salinity barrier curtain. The curtain has been planned to expand in a north-south direction, just inland of the salt evaporation ponds, for the entire width of the Niles Cone. The SBP wells would serve two functions: 1) prevent salt water intrusion during drought periods; and 2) accelerate the removal of saline groundwater in the Newark aquifer east of the SBP wells. At this time, the ACWD has completed construction of five wells, including one within 1,500 feet of the Site. Installation of additional wells has been postponed pending a re-evaluation of the project.

As the Site is located west (or bayward) of the proposed SBP wells alignment, implementing the SBP will accelerate the migration of salts in both the shallow zone and Newark aquifer. Previous investigations, however, have shown that FMC's extraction from the Newark aquifer would contain the EDB plume even if SBP wells were pumping (Geosystem, 1986a).

6.0 INTERIM REMEDIAL MEASURES

This section summarizes the implemented remedial measures and their effectiveness. As several remedial efforts have been associated with the closure of various waste management units, these remedial measures are addressed in Section 7.0. Therefore, this section addresses only the interim remedial measures related to the EDB area. The principal remedial measures associated with the EDB area have included the construction of a cap over the EDB area, remediation of the Newark aquifer, and containment/remediation of the shallow zone.

6.1 CONSTRUCTION OF THE CAP

In 1986, pursuant to RWQCB Order Number 85-113, FMC constructed an asphalt cap with perimeter concrete ditches to prevent the direct infiltration of precipitation into the EDB area and subsequent runoff of EDB-impacted waters into the ditches draining that area. In addition, the cap prevented direct exposure to EDB-impacted soils. Construction of the cap and lining of the ditches surrounding the EDB area have been effective in preventing EDB entering into the surface waters.

6.2 NEWARK AQUIFER EXTRACTION SYSTEM

The Newark aquifer extraction system operation began in 1986 and has primarily consisted of two extraction wells, DW-2 and DW-8 (for a period of time during 1986 - 1987, well DW-6 was used as an extraction well). Well DW-2 is located in the capped area, to the south of the treatment system. Well DW-8 is located outside the capped area, on the northern site boundary. The locations of wells DW-2 and DW-8 and the treatment system are shown on Figure 5. Well construction details are presented in Table 1. Groundwater has been extracted from wells DW-2 and DW-8 and transferred directly to the treatment system via individual pipelines. The cumulative volume of water extracted from each of wells DW-2 and DW-8 is recorded via flow totalizing meters in the respective discharge lines (Geosystem, 1990b).

6.3 SHALLOW ZONE CONTAINMENT SYSTEM

The shallow zone extraction and containment system began operation in 1989 and includes 26 extraction wells, well head controls and instrumentation, header lines that transfer extracted groundwater, a double-diaphragm vacuum pump, and a temporary holding tank and feed pump circuit (Geosystem, 1990b).

As shown on Figure 5, the extraction wells are aligned along the northern and eastern boundaries of the capped area and along the northern and eastern edge of the former DBS facility. The locations of these wells have been established to create a barrier to the lateral migration of EDB in the shallow zone. Four of the extraction wells, wells W-7, W-20, W-29, and W-33, were installed during previous investigations or during the design of the shallow zone containment system. The remaining wells, wells W-37 through W-58, were installed specifically as extraction wells in May 1989. All of the wells are completed above the blue-gray, clayey silt layer that defines the lower boundary of the shallow zone. Wells W-7 and W-52 through W-58 have been shutoff to minimize the possibility of accelerating the migration of 1,2-DCA and other compounds to the Site from upgradient areas.

6.4 GROUNDWATER TREATMENT SYSTEM

The groundwater treatment system is located inside the capped area, adjacent to the southeast corner of the warehouse building (Figure 5). The principal components of the treatment system are cartridge filters to remove particulate matter, two granular activated carbon (GAC) vessels operated in series (i.e., one vessel as primary and the other vessel as secondary for "polishing"), one standby GAC vessel, the sanitary sewer connection, and the associated controls and instrumentation. Auxiliary treatment system components include the holding tank, which provides temporary storage for VOC-containing groundwater generated during well development, well purging, and carbon replacement. The holding tank also receives water from both the shallow and Newark aquifer extraction systems. Water from the holding tank is injected into the GAC vessels, via a cartridge filter, by an electric centrifugal pump. The treatment system is located on a reinforced concrete foundation slab surrounded by a 12-inch-high concrete berm.

From January 1986 until April 1, 1987, the treatment system effluent (i.e., treated groundwater from wells DW-2 and DW-8) was injected into the Newark aquifer via Injection wells DW-9 and DW-10. Because of the loss of integrity of the injection wells, this practice was discontinued in April 1987. Subsequently, with approval from the RWQCB, FMC began discharging the treated water to the effluent pond (Figure 5), from which it was discharged to the E-1 ditch, together with waste water from the plant, under the conditions of a NPDES permit issued by the RWQCB. Because of the chemical reaction between the hardness of the treated water and residual phosphate in the plant waste water, discharge into the effluent pond produced settleable matter that occasionally exceeded the NPDES permit limit. As an alternative, FMC applied for a permit to discharge treated groundwater into the USD sewer system. A discharge permit was issued by USD in September 1988 and FMC began discharging into the sanitary sewer on October 18, 1988.

6.5 EVALUATION OF EFFECTIVENESS

Since 1989, FMC has performed evaluations of treatment system effectiveness and has provided results to the RWQCB on an annual basis. These evaluations have addressed groundwater hydraulics and groundwater quality of both the shallow zone and Newark aquifer, and assessments of treatment system efficiency. A comprehensive discussion of the treatment system effectiveness evaluation will be submitted to the RWQCB as part of Task B.3. of Order Number 98-066.

7.0 CLOSURES

FMC has performed numerous closures at the Site since 1986 in accordance with applicable regulatory oversight. A summary of these closures are discussed in the following subsections.

7.1 FORMER PHOSPHATE PLANT AND PHOSPHORIC ACID PLANT, PARCELS A AND D

The following closures were conducted under the direction of the NFD:

- Phosphorus Storage Pit Closure - 1993-1994;
- Hazardous Materials Storage Tanks, Phosphoric Acid Plant and Phosphate Plant Area–1995-1996;
- Former Phosphoric Acid Plant Elevator-1995-1996;
- Final Phosphoric Acid Plant Closure Activities-1995-1996; and
- Removal of an approximate 1,000-gallon underground gasoline storage tank - 1986.

A Closure Certification Report was submitted to the NFD on April 10, 1998, summarizing closure activities and reports for the former Phosphoric Acid Plant and Phosphate Plant (FMC, 1998b). This report included discussions of the closure of the former phosphorus storage pits and remediation of areas of soil that apparently had been affected by phosphoric acid, resulting in "heaving" conditions.

FMC closed the former phossy water pond in 1985-86 under the direction of the DHS. This pond had been taken out of service and filled with sand in the late 1970s. It was closed and remediated in 1986 under a plan approved by the DHS. The closure of the phossy water pond was acknowledged by the DHS in a letter dated January 27, 1986 (DHS, 1986).

The former effluent (E-1) pond was taken out of service and backfilled with clean fill in mid-1996.

The former stormwater pond was closed in 1987 by excavation and off-site disposal, with excavated soils manifested as a hazardous waste due to high arsenic concentrations. Prior to closure, confirmational soil samples of sludge and underlying soil from the pond were obtained (1985 – 1986) and analyzed. The area was subsequently backfilled. After closure of the pond, stormwater runoff was collected in a 200,000-gallon AST located near the former pond. The 200,000-gallon tank was closed in 1995 under the authority of the NFD.

The former TKPP pond was closed in 1983 pursuant to notifications to the RWQCB and DHS by excavation and off-site disposal, and the area was backfilled. The DHS approved the closure of the TKPP pond in a letter dated April 12, 1984 (DHS, 1984b).

The former filter aid pit, along with 700-800 feet of the E-1 ditch, was closed by excavation and off-site disposal in 1972, and the area was backfilled with clean fill and graded.

7.2 FORMER ABOVEGROUND STORAGE TANKS, PARCEL B

Five aboveground storage tanks were removed in December 1998 from Parcel B. Four 500-gallon steel tanks were located on a concrete secondary containment pad (Figure 7). Of these four, three tanks contained diesel fuel, and the fourth contained Stoddard solvent, a petroleum naphtha mixture. Following removal of the tanks, a soil sample was collected from soil immediately below an integral sump cast into the containment pad. The sample was analyzed for TPH as gasoline, TPH as diesel, BTEX, and halogenated organic compounds. Only gasoline and diesel were detected, at concentrations of 1.1 mg/kg and 26 mg/kg, respectively. The fifth tank, a 500-gallon steel and concrete tank containing gasoline, was located on a separate concrete containment pad (Figure 7). A soil sample was collected from soil immediately below the concrete pad and in line with the placement of the main opening of the tank. The sample was analyzed for TPH as gasoline and BTEX. Only xylenes were detected, at a concentration of 0.032 mg/kg.

Removal of the five tanks is detailed further in the "Aboveground Storage Tank Closure Report" (FMC, 1999b). All closure activities were performed in accordance with, and under the inspection of, the NFD. For completeness, certified analytical results are included in Appendix G. The closure certification report was accepted by the NFD in a letter dated May 5, 1999 (NFD, 1999).

7.3 FORMER MAGNESIA PLANT, PARCEL C

In November 1998, concrete demolition and removal activities were initiated in the area of the former Magnesia Plant to remove concrete foundations and rubble that were left in-place after the plant was decommissioned and aboveground structures dismantled or demolished in 1968. During the demolition activities, seven concrete pits previously used to house machinery were discovered (Figure 8). Approximately 70,000 gallons of water which had collected in the pits was pumped into onsite storage tanks and sampled for petroleum hydrocarbons, metals, and pH, before discharge to the sanitary sewer under the authority of the USD (Permit Number 99-078). The pits were subsequently removed in accordance with, and under the inspection of, the NFD.

Additionally, the remains of two former fuel oil storage tanks were discovered during grading activities (Figure 8), as discussed in Section 5.1.2.3. Only the bottoms of the tanks and approximately three vertical feet of tank walls remained intact, buried below fill material. Soil saturated with product was observed in, and around, the tank remnants. A closure plan for removal of the tanks was submitted to the NFD and the tank bottoms were removed in April 1999 in accordance with, and under the inspection of, the NFD. Total petroleum hydrocarbon impacted soil (Figure 22) has been excavated and disposed of in accordance with all applicable Federal, State, and local regulations, and verification soil samples have been collected from the bottom of the excavation. For completeness, certified analytical results for soil and water samples collected during these activities are included in Appendix G, and are summarized on Table 8. Upon completion of impacted soil removal activities, a closure certification report will be submitted to the NFD.

8.0 SUMMARY AND CONCLUSIONS

In accordance with Task B.2. of RWQCB Order Number 98-066, FMC has collected additional soil and groundwater data at the site located at 8787 Enterprise Drive, Newark, Alameda County, California (Site). Consistent with the September 25, 1998 RI Workplan, and as directed by Order Number 98-066, the data collected from previous Site investigations and the current RI have been utilized to define the vertical and lateral extent of contamination in soil and groundwater. The specific objectives were to: 1) obtain representative data confirming previous investigation results; 2) further characterize soil and groundwater conditions beneath the Site; and 3) provide the information necessary to establish Site specific risk based cleanup standards for soil and groundwater in order to develop a final remedial action plan with respect to the entire Site. The approach adopted included the review of historic data, identification of data deficiencies, and development of a sampling and analysis plan.

Under the field investigation phase of this RI, soil samples were collected at strategic locations across the Site to assess if elevated levels of metals exist in soil and, if so, how they relate to groundwater conditions. Samples were collected from borings in Parcel A to confirm previous P_4 delineation and to assess potential impact of P_4 in soils beneath the former Phosphoric Acid Plant area. Also, at the request of the NFD, soil samples were collected from the former Phossy Pond and along the former pipeline that ran from the former Phosphoric Acid Plant to the Phossy Pond and analyzed for metals, P_4, and pH. Additionally, soil previously excavated from the former Phosphoric Acid Plant and placed as "windrows" on the southeastern portion of Parcel A was sampled for pH at the request of the NFD. Soil samples were collected at multiple locations throughout Parcels B and I to assess potential petroleum hydrocarbon impact, based on the Site use history, and to further delineate the western and southeastern extent of VOCs in these parcels. Additionally, pH levels were measured in soils across the Site to confirm previous data.

Groundwater level measurements were recorded to continue to provide an understanding of groundwater movement beneath the Site. Groundwater samples were collected throughout the Site to further characterize the extent of VOCs, and were collected across the Site and from upgradient off-site monitoring wells to assess metals in groundwater. Additionally, groundwater samples were collected from Parcel A to assess the presence of P_4, and also to determine phosphate concentrations in accordance with ACWD concerns. pH levels were measured in groundwater beneath the Site to confirm previous data.

Current investigative work performed for this RI Report was conducted from December 1998 through June 1999 and included installing a total of 84 soil borings, collecting 217 soil samples, obtaining 21 grab groundwater samples, and sampling 72 groundwater wells on and near the Site. The data collected during the current RI have been summarized and integrated within the information obtained from previous investigations to further characterize subsurface environmental conditions. Results are summarized below.

8.1 SITE STRATIGRAPHY AND HYDROGEOLOGY

An isolated bedrock outcrop of serpentine occurs near the southwestern corner of the Site and is believed to be present at approximately 200 feet bgs beneath the center of the Site and 300 feet below its northwestern corner.

At the Site the Newark aquitard extends to depths of 35 to 45 feet below ground surface, consisting primarily of clay. The Site is generally underlain by a fill layer to a depth of 5 feet bgs. Below the fill, a silty clay layer is encountered which extends to approximately 10 feet bgs. This silty clay layer is underlain by a saturated layer consisting of fine sand, silt, and clay, extending to about 20 feet bgs. This layer is referred to as the shallow zone. Below the shallow zone is a 5- to 7-foot thick clayey silt believed to be the major barrier to downward migration of EDB and 1,2-DCA to the underlying Newark aquifer. This layer is underlain by silty clay and clay layers to a depth of 40 to 45 feet, where the Newark aquifer is encountered.

The Newark aquifer varies in thickness from 10 to 35 feet. This aquifer is fairly continuous laterally in Parcels A and D and Parcels B and I, and "pinches out" to the southwest due to the presence of bedrock.

Regionally, an extensive, thick clay aquitard separates the Newark aquifer from the underlying Centerville aquifer. The Irvington aquitard is 50 to 85 feet thick beneath the Site. Well DW-1 is completed within a saturated sand layer within this aquitard. Toward the southwest, where the Newark aquifer thins, the Irvington aquitard merges with the Newark aquitard and both abut against the bedrock.

The Centerville aquifer occurs approximately 150 to 200 feet bgs. This aquifer is absent beneath the southwest half of the Site. Vertical continuity between the Centerville and Newark aquifers appears unlikely. Deeper aquifers are not present beneath the Site.

Groundwater in the shallow zone is encountered at depths ranging from 2 to 5 feet bgs. The depth to groundwater depends on the proximity to recharge areas, varies seasonally, and responds rapidly to direct precipitation. The piezometric surface in the Newark aquifer is similar to that in the shallow zone. Groundwater flow direction within the shallow zone remains heavily influenced by the shallow zone groundwater extraction system, with an overall regional flow to the northwest. A large area of capture exists on Parcels B and I. Additionally, the bedrock outcrop on the western portion of the Site continues to deflect shallow zone groundwater toward the north and northwest in this area. Flow direction within the Newark aquifer remains generally toward the west, with significant capture noted around extraction wells DW-2 and DW-8. Based on regional flow directions, there are no public supply wells located downgradient of the Site.

Installation of a soil boring at the southwest corner of Parcels B and I determined the presence of bedrock at 35 feet bgs. This confirms that the Newark aquifer is not present at the southwestern portion of the Site. Therefore, a monitoring well completed within the Newark aquifer was not installed at this location. Wells DW-3 and DW-4 adequately provide the westernmost definition of Newark aquifer groundwater quality conditions at the Site.

8.2 SOIL QUALITY

Parcels A and D

Based on data from previous investigations and the current RI, there is no indication of widespread distribution of elevated metals concentrations in the soils at Parcels A and D. No metals exceeded their respective PRGs for industrial soils. Arsenic was detected in one soil boring located in the area of the former Filter Aid Pit at a concentration of 210 mg/kg at 5 feet bgs. However, this concentration is below the USEPA PRG (for industrial soil). Sampling performed at the request of the NFD did not reveal metals in soils in the former Phossy Pond area or along the former underground pipeline that ran from the former Phosphoric Acid Plant to the Phossy Pond, at or above their respective USEPA PRGs (industrial soil).

The extent of P_4 in the area of the former Phosphorus Storage Pits has been delineated and is not present in soils near the former Phosphoric Acid Plant. Sampling performed at the request of the NFD did not reveal P_4 at the former Phossy Pond and along the former pipeline, with the exception of one sample at a concentration of 0.0015 mg/kg.

The RI Workplan did not propose further sampling for phosphates in soil, as there was no indication of historic concerns nor are there any regulatory cleanup levels or remedial goals for phosphates. Therefore, soil was not analyzed for phosphates during the current RI. The results of previous phosphate investigations revealed concentrations ranging from < 0.2 mg/kg to 1,400 mg/kg.

The pH in the majority of soils at Parcels A and D were found to be within a range greater than 2.0 and less than 12.5. The one location where pH was previously detected below 2.0 (Parcel A) has been defined to be an isolated occurrence. The pH in samples collected at the request of the NFD from soils previously excavated from the former Phosphoric Acid Plant and placed as "windrows" on the southeastern portion of Parcel A were all within a range greater than 2.0 and less than 12.5.

Parcels B and I

Based on data from previous investigations and the current RI, metals contamination is not present in soils at Parcels B and I. No metals exceeded their respective USEPA PRGs for industrial soils.

The extent of EDB in soil has been well defined. A review of the data indicates that concentrations of 1,2-DCA are very limited in extent within vadose zone soils. The maximum concentrations of 1,2-DCA reported are generally within the saturated zone. Trihalomethanes are not present in soils within the vadose zone.

Motor oil was present in soils at concentrations up to 2,700 mg/kg, although most samples contained less than 100 mg/kg. There is no USEPA PRG for motor oil in soils. Numerous risk-based studies have been performed for motor oil in soils and greatly elevated cleanup levels are routinely accepted for this non-volatile, biodegradable compound.

All pH levels from Parcels B and I were within a range greater than 2.0 and less than 12.5.

Parcel C

In accordance with the RI Workplan, four soil borings were proposed to be installed in Parcel C to address the elevated motor oil concentrations observed in both soil and groundwater. Due to concrete demolition and removal activities, and the presence of concrete pads beneath two former fuel oil storage tanks, drilling could not be performed in Parcel C. Based on active remediation to address elevated petroleum hydrocarbons present in soil at the former fuel oil storage tanks, the proposed soil sampling at Parcel C is not warranted.

8.3 GROUNDWATER

Shallow Zone Quality

Metals detected above MCLs in the shallow zone include arsenic, barium, chromium, lead, nickel, and selenium. Arsenic was detected above its MCL in 26 groundwater samples collected from the shallow zone during the current investigation, with a maximum concentration of 1,400 ppb. The highest concentrations are in Parcel A. As described in Section 8.2, a significant source of arsenic within Site soils does not appear to be present. Arsenic was also detected in one off-site upgradient (B-31) and one cross-gradient (MW-OS5) shallow zone well above its MCL. Barium, chromium, lead, nickel, and selenium were also detected above their respective MCLs, yet to a lesser extent. Elevated levels of barium, chromium, lead, and nickel were not detected in Site soils. Selenium concentrations detected are likely due to natural occurrences of this metal.

The most prevalent VOCs in the shallow zone are EDB, 1,2-DCA, and trihalomethanes. In addition to these compounds, other chlorinated VOCs are present at lower levels.

Downgradient Site monitoring wells (W-1, W-2, W-3, and W-28) do not contain EDB. The EDB plume has been contained and, in general, EDB concentrations have decreased significantly within the shallow zone over time due to extraction and other natural attenuation mechanisms.

1,2-DCA concentrations within the shallow zone have been variable over time, yet it is not present in downgradient wells. The majority of 1,2-DCA present within the shallow zone is in Parcels B and I with lower concentrations present in Parcels A and D, including one upgradient off-site monitoring well (MW-OS6). The groundwater extraction system is capturing the highest impacted area, while lower levels are present upgradient of the extraction system. Low levels of 1,2-DCA near the Site's southeastern perimeter is the result of migration from off-site sources, since 1,2-DCA is present in shallow groundwater at neighboring/upgradient facilities.

Trihalomethanes were detected at concentrations exceeding its MCL in 13 shallow zone wells, all within Parcels B and I. There does not appear to be a source of trihalomethanes within Site soils. Trihalomethane concentrations in shallow zone groundwater have been variable over time, yet generally have decreased over the past two years. Downgradient Site monitoring wells do not contain trihalomethanes.

Other chlorinated VOCs detected above MCLs in the shallow zone include 1,1-DCA, 1,1-DCE, 1,2-DCP, carbon tetrachloride, cis-1,2-DCE, PCE, TCE, and vinyl chloride. The groundwater extraction system is capturing these compounds present within Parcels B and I. The occurrence of these compounds at the northeastern portion of the Site is attributable to (an) off-site source(s). Other chlorinated VOCs present in monitoring well W-22 (located at the southeast corner of Parcels B and I) may be the result of migration of chemicals from (an) upgradient off-site source(s) to the east-southeast.

P_4 was not present in groundwater monitoring wells sampled in Parcel A. Minimal concentrations of P_4 were present in two grab groundwater samples in the vicinity of the former Phosphorus Storage Pits.

Six shallow zone monitoring wells within Parcel A were sampled to assess the concentrations of phosphates in groundwater in accordance with ACWD concerns. The maximum concentrations of orthophosphate detected was 130 ppm, while a maximum of 420 ppm total phosphate was present in Parcel A, consistent with previous data. There are no state or federal cleanup levels for phosphates in groundwater.

pH shallow zone groundwater results were generally measured within the neutral range.

Motor oil was detected in two monitoring wells located in proximity to the former fuel oil storage tanks on Parcel C at a maximum concentration of 220 ppb. There is no state or federal cleanup level for motor oil in groundwater. Active soil remediation is occurring in this area; once this source is removed, motor oil in groundwater is expected to biodegrade. There were no

Newark Aquifer Quality

Arsenic was detected in three Newark aquifer monitoring wells at levels greater than its MCL, with a maximum of 310 ppb. Selenium was also detected in three Newark aquifer wells at concentrations in excess of its MCL. However, the selenium concentrations are likely due to naturally occurring background levels.

EDB was detected in one Newark aquifer well (DW-2) at a concentration of 160 ppb. DW-2 is an operating extraction well within this aquifer. The EDB contamination has been contained and concentrations have decreased within the Newark aquifer since investigations began in 1980.

1,2-DCA was detected in five wells, all at levels in excess of its MCL. The 1,2-DCA contamination has been contained and concentrations have (generally) decreased over time.

pH groundwater results were generally measured within the neutral range in Newark aquifer monitoring wells.

The Newark aquifer is not present at the southwestern portion of the Site. Wells DW-3 and DW-4 adequately provide the westernmost definition of Newark aquifer groundwater quality conditions at the Site.

Monitoring well DW-1 is completed within a saturated sand layer within the Irvington aquitard, which is located beneath the Newark aquifer. DW-1 is located in close proximity to shallow zone wells and Newark aquifer wells with elevated levels of EDB. Monitoring performed since 1989 has not revealed EDB in DW-1, confirming that the Irvington aquitard is an effective barrier to downward migration of EDB.

The RI Workplan proposed locating and sampling Newark aquifer groundwater monitoring well DW-5 north of the Site, for metals and VOCs. This well was buried by debris in 1994 or 1995. During the period of 1985 through 1994, this monitoring well was sampled for VOCs 52 times. EDB was never detected at or above laboratory reporting limits. 1,2-DCA had been detected on four occasions (maximum of 11 ppb), yet was not detected from 1991 through 1994 at or above a reporting limit of 0.5 ppb. During the current RI, a utility locator's attempt to find this well was unsuccessful. FMC has obtained the original permit for this well showing measurements from nearby landmarks and has contacted the property owner to request permission to perform shallow digging in this vicinity to attempt to locate the well. If found, the well will be sampled and the results will be included in the next semi-annual monitoring report.

In accordance with the RI objectives and approach, the vertical and lateral extent of all chemicals of concern at the Site has been delineated with the exception of metals in shallow zone groundwater north of Parcel A. Although metal-impacted shallow zone groundwater is generally upgradient of the Site's extraction and treatment system, FMC will further delineate the extent of this impact north of Parcel A.

FMC will continue operating the groundwater extraction and treatment system, and continue performing routine monitoring and reporting in accordance with Order Number 98-066 (Self-Monitoring Program). FMC will propose Site specific risk based cleanup standards for both soil and groundwater, and will submit a final remedial action plan with respect to the entire Site in accordance with Task B.3. of Order Number 98-066 within 210 days of the approval of this report.

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Table 1
Monitoring and Extraction Well Construction Details

Well No.	Reference Elevation (ft. MSL)	Total Depth (feet)	Perforated Interval (feet)	Casing Diameter (inches)	Water Bearing Zone	Remarks
W-1	11.50	22.50	15.5 - 20.5	4	Shallow	
W-2	10.05	20.50	13.5 - 18.5	4	Shallow	
W-3	10.78	25.50	18.5 - 23.5	4	Shallow	
W-4	10.64	21.50	14.5 - 19.5	4	Shallow	
W-5	11.62	20.50	13.5 - 18.5	4	Shallow	
W-6	10.75	18.00	11.0 - 16.0	4	Shallow	
W-7	8.83	18.00	11.0 - 16.0	4	Shallow	Extraction Well
W-8	11.08	19.50	12.5 - 17.5	4	Shallow	
W-9	14.45	21.00	14.0 - 19.0	4	Shallow	
W-10	14.68	21.00	14.0 - 19.0	4	Shallow	
W-11	11.76	19.50	12.5 - 17.5	4	Shallow	
W-12	13.23	19.50	12.5 - 17.5	4	Shallow	
W-13	12.02	19.00	12.0 - 17.0	4	Shallow	
W-15	11.20	17.50	10.5 - 15.5	4	Shallow	
W-16	10.50	16.50	9.5 - 14.5	4	Shallow	
W-19	13.93	17.50	5.0 - 15.0	4	Shallow	
W-20	9.38	22.00	10.0 - 20.0	4	Shallow	Extraction Well
W-21	9.65	22.00	10.0 - 20.0	4	Shallow	
W-22	8.62	21.00	10.0 - 20.0	4	Shallow	
W-23	12.74	18.00	8.0 - 18.0	2	Shallow	
W-24	8.34	20.50	5.0 - 20.0	4	Shallow	
W-25	8.25	20.00	5.0 - 20.0	4	Shallow	
W-26	7.18	21.00	5.5 - 20.5	4	Shallow	
W-27	7.08	20.00	5.0 - 20.0	4	Shallow	
W-28	7.65	20.50	5.0 - 20.0	4	Shallow	
W-29	9.66	20.70	10.0 - 19.9	6	Shallow	Extraction Well
W-30	9.87	20.00	9.8 - 19.4	4	Shallow	
W-31	9.93	18.10	7.4 - 17.3	6	Shallow	
W-32	8.23	19.80	9.6 - 19.2	4	Shallow	

Table 1
Monitoring and Extraction Well Construction Details

Well No.	Reference Elevation (ft. MSL)	Total Depth (feet)	Perforated Interval (feet)	Casing Diameter (inches)	Water Bearing Zone	Remarks
W-33	6.45	19.10	8.4 - 18.3	6	Shallow	Extraction Well
W-34	7.12	19.80	9.6 - 19.2	4	Shallow	
W-35	6.72	20.10	9.4 - 19.3	6	Shallow	
W-36	10.34	20.10	10.2 - 19.7	4	Shallow	
W-37	7.80	19.20	9.0 - 18.5	4	Shallow	Extraction Well
W-38	7.68	18.30	8.2 - 17.7	4	Shallow	Extraction Well
W-39	9.62	18.50	8.4 - 17.9	4	Shallow	Extraction Well
W-40	9.17	18.50	8.4 - 17.9	4	Shallow	Extraction Well
W-41	8.69	18.50	8.4 - 17.9	4	Shallow	Extraction Well
W-42	8.32	16.70	6.8 - 16.0	4	Shallow	Extraction Well
W-43	7.97	17.60	7.4 - 17.0	4	Shallow	Extraction Well
W-44	7.95	16.80	6.7 - 16.2	4	Shallow	Extraction Well
W-45	7.95	17.70	7.6 - 17.0	4	Shallow	Extraction Well
W-46	7.96	16.80	6.7 - 16.1	4	Shallow	Extraction Well
W-47	8.58	18.70	8.5 - 17.9	4	Shallow	Extraction Well
W-48	8.92	18.30	8.1 - 17.5	4	Shallow	Extraction Well
W-49	8.96	18.70	8.5 - 18.0	4	Shallow	Extraction Well
W-50	9.05	19.00	8.9 - 18.3	4	Shallow	Extraction Well
W-51	9.03	19.30	9.1 - 18.6	4	Shallow	Extraction Well
W-52	6.96	18.80	837 - 18.1	4	Shallow	Extraction Well
W-53	6.95	19.40	9.4 - 18.9	4	Shallow	Extraction Well
W-54	6.92	18.60	8.5 - 18.0	4	Shallow	Extraction Well
W-55	8.60	17.70	7.5 - 17.0	4	Shallow	Extraction Well
W-56	8.70	17.40	7.3 - 16.8	4	Shallow	Extraction Well
W-57	8.78	17.90	7.8 - 17.2	4	Shallow	Extraction Well
W-58	8.69	18.30	8.1 - 17.6	4	Shallow	Extraction Well
DW-1	11.35	116.00	101.0 - 110.0	4	Newark	
DW-2	9.50	75.00	52.0 - 70.0	4	Newark	Extraction Well
DW-3	8.96	76.00	58.0 - 73.0	2	Newark	
DW-4	12.45	60.00	45.0 - 60.0	2	Newark	

Table 1
Monitoring and Extraction Well Construction Details

Well No.	Reference Elevation (ft. MSL)	Total Depth (feet)	Perforated Interval (feet)	Casing Diameter (inches)	Water Bearing Zone	Remarks
DW-5	5.60	76.00	43.0 - 73.0	4	Newark	
DW-6	6.84	76.00	49.6 - 64.4	4	Newark	
DW-7	14.30	46.00	11.0 - 31.0	2	Shallow	
DW-8	6.44	74.00	51.0 - 71.0	6	Newark	Extraction Well
DW-9	8.27	71.50	31.0 - 71.0	6	Newark	
DW-10	7.42	76.00	40.0 - 60.0	6	Newark	
DW-11	12.66	70.50	55.5 - 69.5	4	Newark	

ft MSL - feet mean sea level.

Table 2
Groundwater Levels
January 1999

Well No.	Reference Elevation (ft. MSL)	Depth to Water (feet)	Water Elevation (ft. MSL)	Water Bearing Zone	Remarks
W-1	11.50	7.73	3.77	Shallow	
W-2	10.05	6.26	3.79	Shallow	
W-3	10.78	6.66	4.12	Shallow	
W-4	10.64	6.39	4.25	Shallow	
W-5	11.62	9.03	2.59	Shallow	
W-6	10.75	7.38	3.37	Shallow	
W-7	8.83	4.96	3.87	Shallow	Extraction Well
W-8	11.08	7.93	3.15	Shallow	
W-9	14.45	10.93	3.52	Shallow	
W-10	14.68	11.19	3.49	Shallow	
W-11	11.76	8.27	3.49	Shallow	
W-12	13.23	9.85	3.38	Shallow	
W-13	12.02	8.92	3.10	Shallow	
W-15	11.20	8.54	2.66	Shallow	
W-16	10.50	9.80	0.70	Shallow	
W-19	13.93	6.73	7.20	Shallow	
W-21	9.65	5.94	3.71	Shallow	
W-22	8.62	4.88	3.74	Shallow	
W-23	12.74	8.99	3.75	Shallow	
W-24	8.34	3.32	5.02	Shallow	
W-25	8.25	5.16	3.09	Shallow	
W-26	7.18	3.46	3.72	Shallow	
W-27	7.08	3.51	3.57	Shallow	
W-28	7.65	4.12	3.53	Shallow	
W-29	9.66	NA	- -	Shallow	
W-30	9.87	6.79	3.08	Shallow	Extraction Well
W-31	9.93	6.89	3.04	Shallow	
W-32	8.23	4.99	3.24	Shallow	
W-34	7.12	3.13	3.99	Shallow	
W-36	10.34	6.94	3.40	Shallow	

Table 2
Groundwater Levels
January 1999

Well No.	Reference Elevation (ft. MSL)	Depth to Water (feet)	Water Elevation (ft. MSL)	Water Bearing Zone	Remarks
W-55	8.60	NA	- -	Shallow	Extraction Well
DW-1	11.35	5.40	5.95	Newark	
DW-2	9.50	9.12	0.38	Newark	Extraction Well
DW-3	8.96	5.20	3.76	Newark	
DW-4	12.45	8.54	3.91	Newark	
DW-6	6.84	1.99	4.85	Newark	
DW-8	6.44	3.62	2.82	Newark	Extraction Well
DW-11	12.66	6.93	5.73	Newark	

ft MSL - feet mean sea level.

NA - Not Applicable

Table 3
Analytical Results (mg/kg) - Soil Samples, Parcels A & D
Metals (USEPA Methods 6010/7000)*

Parcel	Borehole	Depth (ft.bgs.)	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
			Analyte																
		PRG[1]:	9,400	480**	100,000	3,400	930	29,000	450	70,000	560	9,400	37,000	1,000	750	9,400	150	13,000	100,000
		TTLC[2]:	500	500	10,000	75	100	8,000	2,500	2,500	20	3,500	2,000	1,000	500	100	700	2,400	5,000
A	**MH-1**	4.5-5	**4.3**	**3.8**	**200**	**0.41**	<0.5	**11**	**58**	**27**	<0.1	<1	**71**	**8.8**	<2.5	<0.25	<0.5	**31**	**43**
		10-10.5	**3.8**	**5.4**	**130**	**0.36**	<0.5	**9.7**	**54**	**23**	<0.1	<1	**63**	**8.1**	<2.5	<0.25	<0.5	**34**	**42**
		14.5-15	**3**	**1.8**	**55**	<0.25	<0.5	**7.8**	**49**	**14**	<0.1	<1	**59**	**5.5**	<2.5	<0.25	<0.5	**20**	**31**
	MH-2	1.5-2	**4.8**	**4.3**	**220**	**0.48**	<0.5	**12**	**74**	**31**	<0.1	<1	**78**	**12**	<2.5	<0.25	<0.5	**46**	**52**
		4.5-5	**5.1**	**4.5**	**220**	**0.48**	<0.5	**13**	**79**	**31**	<0.1	<1	**84**	**11**	<2.5	<0.25	<0.5	**44**	**52**
		10-10.5	**2.7**	**2.8**	**38**	<0.25	<0.5	**6.7**	**42**	**12**	<0.1	<1	**52**	**5**	<2.5	<0.25	<0.5	**20**	**28**
		14.5-15	**2.6**	**3.5**	**76**	<0.25	<0.5	**6.3**	**42**	**12**	<0.1	<1	**48**	**5.3**	<2.5	<0.25	<0.5	**21**	**28**
	MH-3	1-1.5	**4**	**0.87**	**130**	**0.4**	<0.5	**13**	**53**	**35**	<0.1	<1	**54**	**13**	<2.5	<0.25	<0.5	**51**	**47**
	MH-3a	0.5-1	**3.8**	**3.9**	**160**	**0.51**	<0.5	**16**	**67**	**32**	<0.1	<1	**67**	**18**	<2.5	<0.75	<1.5	**44**	**46**
		4.5-5	**4.2**	**6.4**	**180**	**0.55**	<0.5	**15**	**73**	**33**	<0.1	<1	**80**	**16**	<2.5	<0.75	<1.5	**43**	**52**
		9.5-10	**4**	**6.8**	**150**	**0.52**	<0.5	**12**	**74**	**30**	<0.1	<1	**77**	**9.8**	<2.5	<0.75	<1.5	**47**	**54**
		14.5-15	**2.7**	**3.8**	**69**	**0.26**	<0.5	**10**	**89**	**16**	<0.1	<1	**87**	**120**	<2.5	<0.75	<1.5	**25**	**34**
	MH-4	1.5-2	**4.3**	**4.5**	**150**	**0.48**	<0.5	**9.9**	**70**	**39**	**0.13**	<1	**54**	**19**	<2.5	<0.25	<0.5	**42**	**87**
		4.5-5	**4.6**	**3.2**	**180**	**0.47**	<0.5	**13**	**70**	**28**	<0.1	<1	**77**	**12**	<2.5	<0.25	<0.5	**43**	**46**
		9.5-10	**4.3**	**5.3**	**280**	**0.37**	<0.5	**14**	**55**	**29**	<0.1	<1	**75**	**12**	<2.5	<0.25	<0.5	**33**	**51**
		14.5-15	**2.9**	**3.4**	**58**	<0.25	<0.5	**8.9**	**50**	**15**	**0.18**	<1	**67**	**7.6**	<2.5	<0.25	<0.5	**23**	**33**
	MH-5	1.5-2	**4.6**	**8.5**	**140**	**0.55**	**0.97**	**15**	**68**	**32**	<0.1	<1	**73**	**17**	<2.5	<0.25	<0.5	**45**	**51**
		4.5-5	**5.1**	**10**	**170**	**0.49**	**1.1**	**17**	**73**	**35**	**0.14**	<1	**92**	**14**	<2.5	<0.25	<0.5	**41**	**61**
		9-9.5	**4.2**	**5.4**	**220**	**0.41**	**1.2**	**14**	**67**	**29**	<0.1	<1	**85**	**11**	<2.5	<0.25	<0.5	**35**	**51**
	MH-6	4.5-5	**4.1**	**5.3**	**180**	**0.45**	**1**	**11**	**67**	**31**	<0.1	<1	**75**	**12**	<2.5	<0.25	<0.5	**40**	**50**
		9-9.5	**2.7**	**3.6**	**68**	<0.25	**0.77**	**7.8**	**48**	**14**	<0.1	<1	**60**	**6.2**	<2.5	<0.25	<0.5	**22**	**32**
	MH-7	4.5-5	**6.4**	**5.6**	**230**	<1.3	<2.5	**19**	**100**	**45**	<0.1	<5	**120**	**12**	<13	**0.46**	<1	**56**	**76**
		7-7.5	**4.6**	**4.4**	**130**	**0.32**	<0.5	**12**	**56**	**28**	<0.1	<1	**69**	**35**	<2.5	<1	<1	**32**	**190**
	MH-8	1-1.5	**5.7**	**5.2**	**210**	**0.47**	<0.5	**19**	**67**	**31**	<0.1	<1	**72**	**13**	<2.5	<1	<1	**49**	**50**
		4.5-5	**6.1**	**5.3**	**150**	**0.49**	<0.5	**14**	**76**	**35**	<0.1	<1	**89**	**13**	<2.5	<1	<1	**50**	**60**
		8-8.5	**4.7**	**4.9**	**180**	**0.38**	<0.5	**12**	**64**	**25**	**0.11**	<1	**78**	**10**	<2.5	<1	<1	**38**	**47**
	MH-9	1-1.5	**5.2**	**3.2**	**110**	**0.44**	**1.1**	**49**	**58**	**200**	**0.15**	<1	**57**	**25**	<2.5	<0.25	<0.5	**61**	**69**
		8.5-9	**4**	**7.6**	**110**	**0.43**	**1**	**11**	**69**	**28**	<0.1	<1	**77**	**11**	<2.5	<0.25	<0.5	**39**	**47**
	MH-10	1-1.5	<5	**3.6**	**170**	<1.3	<2.5	**11**	**57**	**45**	**0.13**	<5	**78**	**52**	<13	<0.25	<0.5	**31**	**99**

Table 3
Analytical Results (mg/kg) - Soil Samples, Parcels A & D
Metals (USEPA Methods 6010/7000)*

			Analyte																
		Depth (ft.bgs.)	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
		PRG[1]:	9,400	480**	100,000	3,400	930	29,000	450	70,000	560	9,400	37,000	1,000	750	9,400	150	13,000	100,000
Parcel	Borehole	TTLC[2]:	500	500	10,000	75	100	8,000	2,500	2,500	20	3,500	2,000	1,000	500	100	700	2,400	5,000
A	MH-10	3.5-4	<5	41	180	<1.3	<2.5	6	41	32	0.18	<5	47	38	<13	<0.25	<0.5	40	65
		8-8.5	4.7	2.5	140	0.45	<0.5	16	56	31	<0.1	<1	72	11	<2.5	<0.25	<0.5	39	59
	MH-11	1-1.5	4.8	24	180	0.51	0.95	18	70	230	<0.1	<1	72	35	<2.5	<0.25	<0.5	59	78
		4.5-5	4.4	5.4	170	0.52	1	13	71	35	<0.1	<1	81	13	<2.5	<0.25	<0.5	44	52
		9.5-10	3.7	9.7	180	0.44	0.91	11	68	26	<0.1	<1	75	9.9	<2.5	<0.25	<0.5	40	48
	MH-12	1-1.5	24	26	60	<0.25	<0.5	<1	20	27	1.2	<1	1	7.9	9.1	<0.25	<0.5	31	11
		4.5-5	6.3	13	230	<1.3	<2.5	17	89	38	<0.1	<5	100	22	<13	<0.25	<0.5	57	67
		9.5-10	3.8	7.6	180	0.41	1	12	55	28	<0.1	<1	64	11	<2.5	<0.25	<0.5	39	49
	MH-13	0.5-1	<5	2.8	170	<1.3	<2.5	9.3	51	28	0.23	<5	71	31	<13	<0.25	<0.5	27	76
		4.5-5	5	4.6	150	0.44	<0.5	18	62	31	<0.1	100	12	<2.5	<2.5	<0.25	<0.5	36	59
		8.5-9	2.8	4.2	56	<0.25	<0.5	7.3	45	13	0.2	<1	56	6.8	<2.5	<0.25	<0.5	20	32
	MH-14	1-1.5	4.1	5.3	170	0.53	<0.5	12	74	38	<0.1	<1	79	14	<2.5	<0.75	<1.5	45	58
		4.5-5	<5	4.3	160	<1.3	<2.5	10	71	30	<0.1	<5	75	13	<13	<0.75	<1.5	40	52
		8-8.5	3.7	7.2	200	0.49	<0.5	11	65	28	<0.1	<1	66	11	<2.5	<0.75	<1.5	43	52
D	MH-15	1-1.5	4.4	5.2	150	0.27	<0.5	9.5	59	21	0.11	<1	69	8.5	<2.5	<0.25	<0.5	32	40
		4.5-5	4.5	9.4	150	0.38	0.92	12	63	27	<0.1	<1	70	11	<2.5	<0.25	<0.5	35	46
		9.5-10	5.3	1.2	280	0.45	0.93	14	80	27	<0.1	<1	90	12	<2.5	<0.25	<0.5	42	48
	MH-16	1-1.5	3.5	4.6	150	0.29	<0.5	8.8	43	20	0.13	<1	60	12	<2.5	<0.25	<0.5	27	42
		4.5-5	3.7	21	160	0.32	<0.5	9.8	54	23	<0.1	<1	69	10	<2.5	<0.25	<0.5	31	44
		11.5-12	3.5	3.3	90	0.31	<0.5	9.8	58	18	<0.1	<1	74	8.2	<2.5	<0.25	<0.5	27	41
	MH-17	1-1.5	3.4	4.2	150	0.29	<0.5	9.6	45	19	<0.1	<1	62	9.9	<2.5	<0.25	<0.5	33	42
		4.5-5	3.5	59	160	0.31	<0.5	9.2	51	21	0.13	<1	64	8.8	<2.5	<0.25	<0.5	31	43
		10-10.5	3.6	4.4	89	0.39	<0.5	11	60	23	<0.1	<1	75	10	<2.5	<0.25	<0.5	35	45
	MH-18	1-1.5	3.6	2.9	140	<0.25	<0.5	8.6	44	19	0.16	<1	63	8.2	<2.5	<0.25	<0.5	27	41
		4.5-5	3.7	<0.5	120	0.34	<0.5	9.5	54	26	<0.1	<1	61	8.5	<2.5	<0.25	<0.5	31	44
		11.5-12	3.7	3.6	120	0.3	<0.5	11	62	20	<0.1	<1	87	9.3	<2.5	<0.25	<0.5	31	41
A	MH-19	4-4.5	40	3.5	670	<1.3	<2.5	530	47	130	<0.1	<5	54	18	<13	<0.75	<1.5	68	90
		8.5-9	3.8	4.6	350	0.46	<0.5	12	70	27	<0.1	<1	72	25	<2.5	<0.75	<1.5	43	49
		11-11.5	2.7	4.9	88	0.29	<0.5	7.8	62	16	<0.1	<1	64	15	<2.5	<0.75	<1.5	27	33

Table 3
Analytical Results (mg/kg) - Soil Samples, Parcels A & D
Metals (USEPA Methods 6010/7000)*

Parcel	Borehole	Depth (ft.bgs.)	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
		PRG[1]:	9,400	480**	100,000	3,400	930	29,000	450	70,000	560	9,400	37,000	1,000	750	9,400	150	13,000	100,000
		TTLC[2]:	500	500	10,000	75	100	8,000	2,500	2,500	20	3,500	2,000	1,000	500	100	700	2,400	5,000
A	MH-20	4.5-5	5.6	5.9	200	0.51	<0.5	12	80	31	<0.1	<1	84	11	<2.5	<1	<1	51	52
		11-11.5	4.9	5.1	210	0.33	<0.5	10	61	25	<0.1	<1	73	9.3	<2.5	<1	<1	35	46
D	MH-21	1-1.5	5.9	12	190	0.57	<0.5	15	82	42	<0.1	<1	87	16	<2.5	<0.25	<0.5	52	51
		4.5-5	5.8	6.7	330	0.56	0.6	16	84	30	<0.1	<1	94	13	<2.5	<0.25	<0.5	52	48
		9-9.5	3.7	2.1	41	0.25	<0.5	9	57	15	<0.1	<1	64	6.7	<2.5	<0.25	<0.5	28	32
	MH-22	1-1.5	6.5	<2.5	64	<1.3	<2.5	21	71	43	<0.1	<5	48	<13	<13	<0.25	<0.5	76	47
		4.5-5	13	210	130	<0.25	0.55	6.1	39	32	0.56	<1	32	12	4	<0.25	<0.5	23	18
		10-10.5	4.5	1.3	110	<0.25	0.56	11	56	18	<0.1	<1	87	8.2	<2.5	<0.25	<0.5	24	40
	MH-23	1-1.2	9.8	<0.5	44	<1.3	<2.5	32	54	52	<0.1	<5	35	16	<13	<0.25	<0.5	170	68
		4.5-5	4.5	5.2	190	0.53	1.3	14	76	36	<0.1	<1	86	14	<2.5	<0.25	<0.5	47	60
		9.5-10	2.9	4	160	0.33	0.96	12	60	19	<0.1	<1	72	8.2	<2.5	<0.25	<0.5	31	37
	MH-24	0.5-1	9.5	1.7	100	<1.3	<2.5	29	45	53	<0.1	<5	35	<13	<13	<0.25	<0.5	140	62
		4.5-5	5.1	4.8	160	0.35	0.52	13	56	26	<0.1	<1	76	12	<2.5	<0.25	<0.5	30	46
		9-9.5	3.8	2.1	110	0.26	<0.5	9.4	52	17	<0.1	<1	66	7.7	<2.5	<0.25	<0.5	26	34
A	MH-56	1-1.5	<1	<0.5	18	<0.25	<0.5	<1	4.4	1.5	<0.1	<1	3.8	<2.5	<2.5	<0.25	<0.5	3.4	6
	MH-58	1-1.5	8.6	3.6	150	0.35	0.66	20	55	44	0.14	<1.0	88	22	<2.5	<0.25	<1.5	36	52
		4.5-5	4.8	6.5	150	0.4	<0.5	14	69	32	<0.10	<1.0	84	16	<2.5	<0.75	<1.5	36	54
		9.5-10	3.4	4.1	50	<0.25	<0.5	8.6	57	16	<0.10	<1.0	68	9.0	<2.5	<0.75	<1.5	23	35
		12.5-13	3.1	4.2	74	<0.25	<0.5	8.7	46	14	<0.10	<1.0	65	9.3	<2.5	<0.75	<1.5	20	34
	MH-59	4.5-5	5.1	5.3	250	0.46	<0.5	14	77	32	<0.10	<1.0	90	17	<2.5	<0.75	<1.5	38	54
		9.5-10	4.5	7.1	160	0.39	<0.5	14	53	29	<0.10	<1.0	66	15	<2.5	<0.75	<1.5	36	54
		14.5-15	2.6	3.5	58	<0.25	<0.5	6.7	44	12	<0.10	<1.0	52	7.8	<2.5	<0.75	<1.5	18	26
	MH-60	1-1.5	5.3	<4.5	100	<0.25	0.81	19	68	51	<0.10	21	100	15	<2.5	<0.75	<1.5	56	68
		4.5-5	5.5	6.0	180	0.52	<0.5	15	84	34	<0.10	<1.0	91	19	<2.5	<0.75	<1.5	45	61
		9.5-10	4.6	5.6	150	0.41	<0.5	13	73	31	<0.10	<1.0	82	16	<2.5	<0.75	<1.5	41	54
		14.5-15	2.8	3.2	56	<0.25	<0.5	7.2	52	17	<0.10	<1.0	58	8.0	<2.5	<0.75	<1.5	22	29
	MH-61	1-1.5	3.4	5.8	120	<0.25	<0.5	8.4	42	19	0.12	<1.0	56	11	<2.5	<0.75	<1.5	25	37
		4.5-5	5.0	5.8	250	0.5	<0.5	14	73	32	<0.10	<1.0	87	17	<2.5	<0.75	<1.5	41	50
		10-10.5	4.8	6.2	84	0.39	<0.5	14	79	31	<0.10	93	16	<2.5	<2.5	<0.75	<1.5	37	54

Table 3
Analytical Results (mg/kg) - Soil Samples, Parcels A & D
Metals (USEPA Methods 6010/7000)*

Parcel	Borehole	Depth (ft.bgs.)	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
			Analyte																
		PRG[1]:	9,400	480**	100,000	3,400	930	29,000	450	70,000	560	9,400	37,000	1,000	750	9,400	150	13,000	100,000
		TTLC[2]:	500	500	10,000	75	100	8,000	2,500	2,500	20	3,500	2,000	1,000	500	100	700	2,400	5,000
A	MH-61	15-15.5	2.6	3.4	68	<0.25	<0.5	6.6	43	11	<0.10	<1.0	51	7.0	<2.5	<0.75	<1.5	18	27
	MH-62	1-1.5	4.2	4.8	160	0.32	<0.5	11	65	27	0.38	<1.0	74	37	<2.5	<0.75	<1.5	35	52
		4.5-5	7.3	42	150	0.56	14	23	78	30	<0.1	<1.0	130	17	<2.5	<0.75	<1.5	43	900
	MH-63	1-1.5	5.8	4.4	150	<0.25	1.6	31	94	73	1.0	380	2700	41	3.1	<0.75	<1.5	46	84
		4.5-5	6.2	35	210	0.83	150	12	120	63	<0.1	<1.0	37	19	4.2	<0.75	<1.5	66	1700
		10-10.5	5.3	6.7	180	0.44	<0.5	16	79	35	<0.1	<1.0	92	18	<2.5	<0.75	<1.5	43	63
		14-14.5	3.6	5.2	130	0.27	<0.5	12	63	21	<0.1	<1.0	87	12	<2.5	<0.75	<1.5	27	40
	MH-64	1-1.5	4.5	5.3	180	0.32	<0.5	12	66	33	0.31	22	170	20	<2.5	<0.75	<1.5	38	58
		4.5-5	4.8	6.2	180	0.46	<0.5	14	68	26	<0.1	<1.0	100	13	<2.5	<0.75	<1.5	42	52
		10-10.5	4.6	7.2	120	0.4	<0.5	11	61	29	0.12	<1.0	72	14	<2.5	<0.75	<1.5	40	53
		16-16.5	3.4	6.5	110	<0.25	<0.5	12	64	18	<0.1	<1.0	97	8.7	<2.5	<0.75	<1.5	25	36
	MH-65	1-1.5	4.7	6.7	170	0.34	<0.5	12	100	29	0.16	43	280	14	<2.5	<0.75	<1.5	38	48
		4.5-5	5.6	34	170	0.48	<0.5	18	73	28	<0.1	<1.0	120	15	<2.5	<0.75	<1.5	44	50
		9.5-10	5.7	8.5	150	0.54	<0.5	16	87	34	<0.1	<1.0	100	18	<2.5	<0.75	<1.5	50	72
		16-16.5	3.2	4.1	100	<0.25	<0.5	8.8	50	15	<0.1	<1.0	68	8.0	<2.5	<0.75	<1.5	22	33
	MH-66	1-1.5	4.7	4.8	180	0.32	<0.5	11	59	36	0.29	<1.0	63	17	<2.5	<0.75	<1.5	43	49
		4.5-5	9.5	5.3	240	0.34	8.1	7.6	120	34	0.18	<1.0	46	28	<2.5	<0.75	<1.5	39	390
		10-10.5	5.2	8.2	120	0.45	<0.5	15	80	32	<0.1	<1.0	95	17	<2.5	<0.75	<1.5	43	57
		16-16.5	3	4.5	78	<0.25	<0.5	7.2	44	14	<0.1	<1.0	57	8.2	<2.5	<0.75	<1.5	21	30
	HA-2	1-1.5	3.5	4.4	130	<0.25	<0.5	8.2	36	22	0.1	<1.0	40	11	<2.5	<0.25	<0.5	34	47
	HA-5	1-1.5	4.5	4.2	180	0.44	<0.5	14	74	32	<0.1	<1.0	88	15	<2.5	<0.25	<0.5	46	57
	HA-9	1-1.5	3.6	4.0	140	0.29	<0.5	10	48	27	<0.1	<1.0	57	13	<2.5	<0.25	<0.5	35	54

[1] - USEPA Preliminary remedial goal for industrial soil.
[2] - Total threshold limit concentration.
* - Samples collected 1/7/99 through 5/21/99.
* *- Noncancer endpoint, PRG for cancer endpoint is 3.
mg/kg - milligrams per kilogram.
ft. bgs. - Feet below ground surface.
Ag - Silver
As - Arsenic
Ba - Barium
Be - Beryllium
Cd - Cadmium
Co - Cobalt
Cr - Chromium
Cu - Copper
Hg - Mercury
Mo - Molybdenum
Ni - Nickel
Pb - Lead
Sb - Antimony
Se - Selenium
Tl - Thallium
V - Vanadium
Zn - Zinc

Table 4
Analytical Results (mg/kg) - Soil Samples, Parcel A
Phosphorus (USEPA Method 7580)*

Parcel	Location	Depth (ft.bgs.)	Phosphorus (P4)
A	**MH-1**	4.5-5	<0.001
		10-10.5	<0.001
		14.5-15	<0.001
	MH-2	1.5-2	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		14.5-15	<0.001
	MH-3	1-1.5	<0.001
		4.5-5	**(ignited)**
	MH-3a	0.5-1	<0.001
		4.5-5	<0.001
		9.5-10	<0.001
		14.5-15	<0.001
	MH-4	1.5-2	<0.001
		4.5-5	<0.001
		9.5-10	<0.001
		14.5-15	<0.001
	MH-13	0.5-1	<0.001
		4.5-5	<0.001
		8.5-9	<0.001
	MH-14	1-1.5	<0.001
		4.5-5	<0.001
		8-8.5	<0.001
	MH-56	1-1.5	<0.001
	MH-58	1-1.5	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		16-16.5	<0.001

Table 4
Analytical Results (mg/kg) - Soil Samples, Parcel A
Phosphorus (USEPA Method 7580)*

Parcel	Location	Depth (ft.bgs.)	Phosphorus (P4)
A	**MH-59**	1-1.5	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		16-16.5	<0.001
	MH-60	1-1.5	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		16-16.5	<0.001
	MH-61	1-1.5	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		16-16.5	<0.001
	MH-62	1-1.5	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		16-16.5	<0.001
	MH-63	1-1.5	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		16-16.5	<0.001
	MH-64	1-1.5	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		16-16.5	<0.001
	MH-65	1-1.5	<0.001
		4.5-5	<0.001
		10-10.5	<0.001
		16-16.5	<0.001

Table 4
Analytical Results (mg/kg) - Soil Samples, Parcel A
Phosphorus (USEPA Method 7580)*

Parcel	Location	Depth (ft.bgs.)	Phosphorus (P4)
A	**MH-66**	1-1.5	<0.001
		4.5-5	**0.0015**
		10-10.5	<0.001
		16-16.5	<0.001

* - Samples collected 1/13/99 through 5/21/99.
ft. bgs. - Feet below ground surface.
mg/kg - Milligrams per kilogram.

Table 5
Analytical Results (mg/kg) - Soil Samples, Parcels B & I
Metals (USEPA Methods 6010/7000)*

Parcel	Borehole	Depth (ft.bgs.)	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
			Analyte																
		PRG[1]:	9,400	480**	100,000	3,400	930	29,000	450	70,000	560	9,400	37,000	1,000	750	9,400	150	13,000	100,000
		TTLC[2]:	500	500	10,000	75	100	8,000	2,500	2,500	20	3,500	2,000	1,000	500	100	700	2,400	5,000
B	MH-25	0.5-1	3.3	1.4	110	<0.25	<0.5	8.9	48	19	0.11	<1	65	8.9	<2.5	<0.25	<0.5	25	34
		4.5-5	4.7	6.8	280	0.44	<0.5	13	73	31	<0.1	<1	80	12	<2.5	<1.3	<2.5	39	49
		13.5-14	5.6	20	170	0.38	0.52	14	77	31	<0.1	<1	90	12	<2.5	<1.3	<2.5	37	44
	MH-26	1-1.5	3	1.3	120	<0.25	<0.5	7.7	23	23	<0.1	<1	32	5.8	<2.5	<0.25	<0.5	26	29
		4.5-5	4.4	7	160	0.39	<0.5	12	61	28	<0.1	<1	75	14	<2.5	<1.3	<2.5	32	44
		12.5-13	3.3	3	190	0.26	<0.5	8.7	49	20	<0.1	<1	60	8.8	<2.5	<0.25	<0.5	26	34
	MH-27	0.5-1	4.6	9	240	0.35	0.5	11	49	57	0.85	<1	50	30	<2.5	<1.3	<2.5	37	56
		4.5-5	<5	5.9	350	<1.3	<2.5	10	56	32	<0.1	<5	74	<13	<13	<1.3	<2.5	30	46
		10.5-11	3.5	5.5	160	0.25	<0.5	10	49	20	<0.1	<1	66	8.4	<2.5	<1.3	<2.5	25	35
I	MH-37	1.5-2	6	8	200	0.55	<0.5	16	80	31	<0.1	<1	88	12	<2.5	<1	<1	51	55
		4.5-5	6	7	160	0.49	<0.5	15	82	34	<0.1	<1	100	11	<2.5	<1	<1	45	59
		9.5-10	<5	5.7	260	<1.3	<2.5	11	54	27	<0.1	<5	78	<13	<13	<1	<1	25	45
	MH-38	1-1.5	5.1	3.9	180	0.47	<0.5	14	68	28	0.12	<1	77	14	<2.5	<1	<1	43	51
		4.5-5	5.7	5.8	160	0.45	<0.5	15	73	36	<0.10	<1	99	11	<2.5	<1	<1	39	61
		7-7.5	4.6	6	120	0.31	<0.5	11	63	24	<0.10	<1	86	7.8	<2.5	<1	<1	31	47
	MH-39	1-1.5	3.7	2.4	110	0.33	0.52	11	31	45	1.1	<1	37	26	<2.5	<0.25	<0.5	55	43
		4.5-5.0	3.6	3.6	160	0.3	<0.5	9.3	52	23	<0.1	<1	65	9.9	<2.5	<0.25	<0.5	29	39
		8.5-9.0	4.6	3.8	200	0.41	<0.5	13	73	410	<0.1	<1	89	12	<2.5	<0.25	<0.5	39	480
	MH-40	1-1.5	4.5	4.2	180	0.4	0.76	13	82	40	<0.1	<1	80	13	<2.5	<0.25	<0.5	46	51
		4.5-5.0	2	7.8	150	<0.25	<0.5	5.3	42	17	<0.1	1.2	37	7.9	<2.5	<0.25	<0.5	35	24
		8.0-8.5	2.8	4.4	220	0.26	<0.5	7.8	39	27	0.13	<1	49	13	<2.5	<0.25	<0.5	25	43
	MH-41	1.5-2.0	3.7	7.4	680	0.52	<0.5	100	21	25	<0.1	<1	55	10	<2.5	<0.25	<0.5	25	39
		4.5-5.0	3.4	17	95	0.59	0.56	7.4	12	20	0.17	<1	29	14	<2.5	<0.25	<0.5	17	35
	MH-42	1.5-2	4.5	6.5	190	0.48	<0.5	14	68	24	<0.1	<1	78	15	<2.5	<1.3	<2.5	38	47
		4.5-5	<5	7.7	260	<1.3	<2.5	13	71	29	<0.1	<5	81	<13	<13	<1.3	<2.5	41	48
		12.2-13	3.7	6	59	0.27	<0.5	10	52	23	<0.1	<1	68	13	<2.5	<1.3	<2.5	27	39
	MH-43	1.5-2	4.7	5.9	200	0.53	<0.5	13	72	26	<0.1	<1	77	13	<2.5	<1.3	<2.5	45	47
		4.5-5	4.7	5.5	180	0.53	<0.5	14	72	29	<0.1	<1	78	14	<2.5	<1.3	<2.5	44	48
		12.5-13	4.1	7.1	81	0.34	<0.5	10	62	30	<0.1	<1	81	9.9	<2.5	<1.3	<2.5	29	52
	MH-44	1-1.5	3.8	1.4	100	<0.25	<0.5	12	46	31	<0.1	<1	33	13	<2.5	<0.25	<0.5	54	36
		4.5-5	2.6	2.4	180	0.37	<0.5	11	36	21	<0.1	<1	41	7.7	<2.5	<0.25	<0.5	31	25

Table 5
Analytical Results (mg/kg) - Soil Samples, Parcels B & I
Metals (USEPA Methods 6010/7000)*

Parcel	Borehole	Depth (ft.bgs.)	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
			Analyte																
		PRG[1]:	9,400	480**	100,000	3,400	930	29,000	450	70,000	560	9,400	37,000	1,000	750	9,400	150	13,000	100,000
		TTLC[2]:	500	500	10,000	75	100	8,000	2,500	2,500	20	3,500	2,000	1,000	500	100	700	2,400	5,000
B	MH-44	8-8.5	4	2.6	150	0.47	<0.5	12	49	20	<0.1	<1	48	9.6	<2.5	<0.25	<0.5	44	40
I	MH-45	1-1.5	8	3.8	330	<1.3	<2.5	33	310	49	<0.1	<5	330	15	<13	<0.25	<0.5	85	76
		7.5-8	3.9	2.5	210	0.48	0.66	12	66	31	<0.1	<1	65	25	<2.5	<0.25	<0.5	47	56
	MH-46	1-1.5	<5	3.5	87	<1.3	<2.5	7.3	42	35	0.26	<5	38	240	<13	<0.25	<0.5	41	62
		4.5-5	4.7	4	220	0.55	0.53	13	77	31	<0.1	<1	80	14	<2.5	<0.25	<0.5	47	50
		8-8.5	4.2	3.8	120	0.45	<0.5	11	74	30	<0.1	<1	84	12	<2.5	<0.25	<0.5	41	51
B	MH-47	1-1.5	5.3	7.8	240	0.48	0.86	14	68	95	0.29	<1	79	51	<2.5	<0.25	<0.5	41	260
		5-5.5	5.3	4.5	170	0.55	<0.5	15	77	33	<0.1	<1	82	15	<2.5	<0.25	<0.5	50	53
		6-6.5	5	4	200	0.51	<0.5	14	76	31	<0.1	<1	79	13	<2.5	<0.25	<0.5	44	48
	MH-48	1-1.5	2.6	2.8	81	<0.25	0.5	4.1	30	33	<0.1	<1	23	220	<2.5	<0.25	<0.5	24	53
		4.5-5	5	5	170	0.55	<0.5	15	75	30	<0.1	<1	75	14	<2.5	<0.25	<0.5	51	47
		9.5-10	4.2	4.6	140	0.37	<0.5	10	66	26	<0.1	<1	81	10	<2.5	<0.25	<0.5	36	44
	MH-49	1-1.5	<5	3	150	<1.3	<2.5	8	40	22	<0.1	<5	47	40	<13	<0.25	<0.5	35	52
		4.5-5	5	4.9	320	0.59	0.59	14	74	33	0.1	<1	85	13	<2.5	<0.25	<0.5	50	49
		10.5-11	4.5	4.5	150	0.44	<0.5	12	69	31	0.1	<1	88	12	<2.5	<0.25	<0.5	36	57
	MH-50	1-1.5	4.3	3.2	130	0.43	<0.5	13	60	130	0.14	<1	61	34	<2.5	<0.25	<0.5	53	93
		4.5-5	5.2	4.2	310	0.59	<0.5	15	82	34	<0.1	<1	85	15	<2.5	<0.25	<0.5	52	56
		6.5-7	5	4.2	200	0.57	<0.5	15	78	31	<0.1	<1	81	14	<2.5	<0.25	<0.5	48	53

* - Samples were collected 12/14/98 through 1/6/99.
[1] - Preliminary remedial goal for industrial soil.
[2] - Total threshold limit concentration
** - Noncancer endpoint, PRG for cancer endpoint is 3.
mg/kg - milligrams per kilogram.
ft. bgs. - Feet below ground surface.
Ag - Silver
As - Arsenic
Ba - Barium
Be - Beryllium
Cd - Cadmium
Co - Cobalt
Cr - Chromium
Cu - Copper
Hg - Mercury
Mo - Molybdenum
Ni - Nickel
Pb - Lead
Sb - Antimony
Se - Selenium
Tl - Thallium
V - Vanadium
Zn - Zinc

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Table 6
Analytical Results (mg/kg) - Soil Samples, Parcels B & I
Volatile Organic Compounds (USEPA Method 8260)**

Parcel	Borehole	Depth (ft.bgs.)	1,1-DCA	1,2,4-Trimethylbenzene	1,2-DCA	1,3,5-Trimethylbenzene	Benzene	Bromo chloro methane	Chloro benzene	Chloroform	Dibromo methane	EDB	Methylene chloride	Toluene	TCE	Vinyl chloride	Xylenes, total
		PRG[1]:	2,000	170	0.76	70	1.4	-	180	0.52	-	0.029	20	520	6.1	0.048	210
B	MH-28	1-1.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		4.5-5	<0.005	<0.005	**0.0065**	<0.005	<0.005	<0.005	**0.007**	<0.005	<0.005	<0.005	<0.005	**0.01**	<0.005	<0.01	<0.01
		14.5-15*	<0.025	<0.025	**0.085**	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.05	<0.05
		19.5-20*	<0.025	<0.025	**0.75**	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	**0.029**	<0.025	<0.025	<0.025	<0.05	<0.05
	MH-28a	9.5-10*	<0.005	<0.005	**0.39**	<0.005	**0.016**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		17-17.5*	<0.005	<0.005	**0.87**	<0.005	**0.035**	**0.01**	<0.005	<0.005	**0.01**	**0.81**	**0.027**	<0.005	<0.005	**0.015**	<0.01
	MH-29	4.5-5	<0.005	<0.005	**0.066**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		14.5-15*	<0.25	<0.25	**0.53**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.5	<0.5
		19.5-20*	<0.025	<0.025	**0.95**	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.05	<0.05
	MH-29a	3-3.5	<0.005	**0.01**	**0.046**	<0.005	<0.005	**0.0072**	<0.005	<0.005	**0.0057**	<0.005	**0.0055**	<0.005	<0.005	<0.01	**0.011**
		9.5-10	<0.005	<0.005	**0.15**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.0056**	<0.005	<0.005	<0.01	<0.01
	MH-30	0.5-1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		4.5-5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		9.5-10*	<0.005	<0.005	**0.019**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
	MH-30a	15-15.5*	<0.005	<0.005	**4**	<0.005	**0.013**	<0.005	<0.005	<0.005	<0.005	**0.027**	**0.011**	<0.005	<0.005	**0.015**	<0.01
		18-18.5*	<0.025	<0.025	**20**	<0.025	**0.03**	<0.025	<0.025	<0.025	<0.025	<0.025	**0.035**	<0.025	<0.025	**0.075**	<0.05
		19.5-20*	<0.025	<0.025	**13**	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	**0.031**	<0.025	<0.025	<0.05	<0.05
	MH-31	1-1.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		4.5-5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.006**	<0.005	<0.01	<0.01
		10-10.5	<0.005	<0.005	**0.18**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		14.5-15*	<0.5	<0.5	**9.9**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1
		19.5-20*	<0.5	<0.5	**13**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1
	MH-32	1-1.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.0058**	<0.005	<0.01	<0.01
		4.5-5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		10-10.5*	<0.005	<0.005	**0.019**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		15.5-16*	<0.25	<0.25	**0.63**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.5	<0.5
		19.5-20*	<0.25	<0.25	**2.8**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.5	<0.5
	MH-33	1-1.5	<0.005	<0.005	**0.0085**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		4.5-5	<0.005	<0.005	**0.0068**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.0097**	<0.005	<0.01	<0.01
		7.5-8	<0.005	<0.005	**0.0091**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		13.5-14*	<0.25	<0.25	**4.4**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.5	<0.5
		15.5-16*	<0.5	<0.5	**11**	**0.54**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1
		19.5-20*	<1	<1	**14**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2

Table 6
Analytical Results (mg/kg) - Soil Samples, Parcels B & I
Volatile Organic Compounds (USEPA Method 8260)**

			Analyte														
		Depth (ft.bgs.)	1,1-DCA	1,2,4-Trimethylbenzene	1,2-DCA	1,3,5-Trimethylbenzene	Benzene	Bromochloromethane	Chlorobenzene	Chloroform	Dibromomethane	EDB	Methylene chloride	Toluene	TCE	Vinyl chloride	Xylenes, total
Parcel	Borehole	PRG[1]:	2,000	170	0.76	70	1.4	-	180	0.52	-	0.029	20	520	6.1	0.048	210
B	MH-34	1-1.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		4.5-5	<0.005	<0.005	**0.0059**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		9.5-10*	<0.25	<0.25	**1.9**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.5	<0.5
		14.5-15*	<1	<1	**11**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2
		19.5-20*	<0.25	<0.25	**12**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.5	<0.5
I	MH-35	1-1.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		4.5-5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		9.5-10*	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
		14.5-15*	<0.025	<0.025	**0.28**	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	**0.3**	**0.073**	<0.025	**0.045**	<0.05	<0.05
		19.5-20*	<0.25	<0.25	**4.4**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**3.6**	<0.5	<0.5
	MH-36	1-1.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.015**	<0.005	<0.005	<0.01	<0.01
		4.5-5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.015**	<0.005	<0.005	<0.01	<0.01
		9.5-10*	**0.011**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.017**	<0.005	**0.013**	<0.01	<0.01
		14.5-15*	<0.025	<0.025	**0.2**	<0.025	<0.025	<0.025	<0.025	**0.3**	<0.025	**0.035**	**0.065**	<0.025	**0.5**	<0.05	<0.05
		19.5-20*	<0.25	<0.25	**0.74**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**3.9**	<0.5	<0.5

mg/kg - milligrams per kilogram.
* - Sample collected from saturated zone.
** - Samples were collected 1/4/99 through 2/13/99
[1] - Preliminary remedial goal for industrial soil.
1,1-DCA - 1,1-dichloroethane.
1,2-DCA - 1,2-dichlorethane.
EDB - Ethylene dibromide.
TCE - Trichloroethene.
ft. bgs. - feet below ground surface.

Table 7
Analytical Results (mg/kg) - Soil Samples, Parcels B & I
Petroleum Hydrocarbons (USEPA Method 8015)*

Parcel	Location	Depth (ft.bgs.)	Heavy Hydrocarbons (C32-C40)	TPH as Diesel	TPH as Gasoline	TPH as Kerosene	TPH as Motor Oil
I	MH-37	1.5-2		<1	<1		**4.9**
		4.5-5		<1	<1		**13**
		9.5-10		<1	<1		**1.5**
	MH-38	1-1.5		<1	<1		**3.7**
		4.5-5		<1	<1		**2.7**
		8-8.5		<1	<1		<1
	MH-39	1-1.5	<10	<10		<10	**35**
		4.5-5.0	<1	<1	<1	<1	**3.5**
		8.5-9.0	<1	<1	<1	<1	**2**
	MH-40	1-1.5	<1	<1	<1	<1	**18**
		4.5-5.0	<200	<200	<1	<200	**1,800**
		8.0-8.5	<10	<10	<1	<10	**120**
	MH-41	1.5-2.0	<1	<1	<1	<1	**1.8**
		4.5-5.0	<1	<1	<1	<1	**1.6**
	MH-42	1.5-2	<1	<1	<1	<1	**7.2**
		4.5-5	<1	<1	<1	<1	<1
		12.2-13	<1	<1	<1	<1	**2.2**
	MH-43	1.5-2	<1	<1	<1	<1	**2.8**
		4.5-5	<1	<1	<1	<1	<1
		12.5-13	<1	<1	<1	<1	<1
	MH-44	1-1.5		<10	<1		**120**
		4.5-5		<1	<1		**9**
		8-8.5		<1	<1		**2.5**
	MH-45	1-1.5		<1	<1		**2.2**
		4.5-5		<1	<1		**5.8**
		7.5-8		<1	<1		**6.5**
	MH-46	1-1.5		<50	<1		**310**
		4.5-5		<1	<1		**1**
		8-8.5		<1	<1		<1
B	MH-47	1-1.5		<50	<1		**150**
		5-5.5		<1	<1		<1
		6-6.5		<1	<1		<1
	MH-48	1-1.5		<10	<1		**54**
		4.5-5		<1	<1		<1
		9.5-10		<1	<1		<1
I	MH-55	1-1.5	<50	<50	<1	<50	**2,700**
		4.5-5.0	<1	<1	<1	<1	**5.5**
		9.0-9.5	<1	<1	<1	<1	**3.6**

ft. bgs. - Feet below ground surface.
TPH - Total petroleum hydrocarbons.
mg/kg - milligrams per kilogram.
* - Samples were collected 12/14/98 through 1/4/99.

Table 8
Analytical Results - Soil Samples
pH (USEPA Method 9040)*

Parcel	Borehole	Depth (ft.bgs.)	pH
A	MH-1	4.5-5	8.9
	MH-1	10-10.5	8.2
	MH-1	14.5-15	8.6
	MH-2	1.5-2	8.7
	MH-2	4.5-5	8.7
	MH-2	10-10.5	8.3
	MH-2	14.5-15	7.9
	MH-3	1-1.5	8.2
	MH-3a	0.5-1	7.79
	MH-3a	4.5-5	9.63
	MH-3a	9.5-10	8.74
	MH-3a	14.5-15	8.37
	MH-4	1.5-2	7.3
	MH-4	4.5-5	8.5
	MH-4	9.5-10	8.7
	MH-4	14.5-15	8.1
	MH-5	1.5-2	8.39
	MH-5	4.5-5	8.64
	MH-5	9-9.5	7.61
	MH-6	4.5-5	9.14
	MH-6	9-9.5	8.74
	MH-7	4.5-5	8.92
	MH-7	7-7.5	8.23
	MH-8	1-1.5	8.86
	MH-8	4.5-5	8.68
	MH-8	8-8.5	8.01
	MH-9	1-1.5	6.75
	MH-9	8.5-9	8.28
	MH-10	1-1.5	11
	MH-10	3.5-4	11.9
	MH-10	8-8.5	9.22
	MH-11	1-1.5	8.2
	MH-11	4.5-5	7.7
	MH-11	9.5-10	7.3
	MH-12	1-1.5	5.1
	MH-12	4.5-5	7.2
	MH-12	9.5-10	8.6
	MH-13	0.5-1	11.53
	MH-13	4.5-5	6.66
	MH-13	8.5-9	6.93
	MH-14	1-1.5	7.75
	MH-14	4.5-5	8.06
	MH-14	8-8.5	7.7
D	MH-15	1-1.5	8.63
	MH-15	4.5-5	7.75
	MH-15	9.5-10	7.43

Parcel	Borehole	Depth (ft.bgs.)	pH
D	MH-16	1-1.5	7.44
	MH-16	4.5-5	7.79
	MH-16	11.5-12	7.21
	MH-17	1-1.5	7.76
	MH-17	4.5-5	8.7
	MH-17	10-10.5	7.86
	MH-18	1-1.5	7.38
	MH-18	4.5-5	7.61
	MH-18	11.5-12	7.5
A	MH-19	4-4.5	11.29
	MH-19	8.5-9	8.83
	MH-19	11-11.5	7.95
	MH-20	4.5-5	8.26
	MH-20	11-11.5	7.95
D	MH-21	1-1.5	7.61
	MH-21	4.5-5	8.49
	MH-21	9-9.5	7.92
	MH-22	1-1.5	8.8
	MH-22	4.5-5	7.76
	MH-22	10-10.5	8.01
	MH-23	1-1.2	8.9
	MH-23	4.5-5	9
	MH-23	9.5-10	8.5
	MH-24	0.5-1	8.19
	MH-24	4.5-5	8.06
	MH-24	9-9.5	8.09
B	MH-25	0.5-1	7.74
	MH-25	4.5-5	8.47
	MH-25	13.5-14	7.97
	MH-26	1-1.5	8.53
	MH-26	4.5-5	8.33
	MH-26	12.5-13	8.59
	MH-27	0.5-1	8.22
	MH-27	4.5-5	8.29
	MH-27	10.5-11	8.54
	MH-49	1-1.5	9.68
	MH-49	4.5-5	9.21
	MH-49	10.5-11	8.26
	MH-50	1-1.5	9.6
	MH-50	4.5-5	7.99
	MH-50	6.5-7	8.04
A	MH-56	1-1.5	8.3
	MH-58	1-1.5	7.15
	MH-59	4.5-5	8.13
	MH-60	1-1.5	8.09
	MH-61	1-1.5	7.83

Table 8
Analytical Results - Soil Samples
pH (USEPA Method 9040)*

Parcel	Borehole	Depth (ft.bgs.)	pH
A	**MH-62**	1-1.5	7.86
	MH-63	1-1.5	7.93
	MH-64	1-1.5	8.31
	MH-65	1-1.5	7.37
	MH-66	1-1.5	7.48
	HA-1	1-1.5	8.26
	HA-2	1-1.5	6.82
	HA-3	1-1.5	7.01
	HA-4	1-1.5	6.55
	HA-5	1-1.5	7.33
	HA-6	1-1.5	6.60
	HA-7	1-1.5	6.49
	HA-8	1-1.5	6.75
	HA-9	1-1.5	6.27
	HA-10	1-1.5	6.58
	HA-11	1-1.5	7.69
	HA-12	1-1.5	8.57
	HA-13	1-1.5	9.36
	HA-14	1-1.5	8.20
	HA-14	2.5-3	8.55

ft.bgs. - feet below ground surface.
* - Samples collected 12/16 through 5/21/99.

Table 9
Analytical Results (mg/kg) - Verification Soil Samples, Parcel C
Volatile Organic Compounds, Diesel, Motor Oil, and Total Recoverable Petroleum Hyrdrocarbons (USEPA Methods 8260, 8015M, and 418.1)*

Location	Analyte															
	1,1-DCA	1,2,4-Trimethyl benzene	1,2-DCA	1,3,5-Trimethyl benzene	Benzene	Bromo chloro methane	Chloro benzene	Chloroform	Dibromo methane	EDB	Methylene chloride	Naphthalene	Toluene	TCE	Vinyl chloride	Xylenes, total
PRG[1]:	2,000	170	0.76	70	1.4	-	180	0.52	-	0.029	20	-	520	6.1	0.048	210
V-1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	**0.0198**	<0.005	<0.005	<0.01	<0.01
V-2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	**0.145**	<0.005	<0.005	<0.01	<0.01
V-3	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	**0.0372**	<0.005	<0.005	<0.01	<0.01
V-4	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	<0.005	<0.005	<0.005	<0.01	<0.01
V-5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	<0.005	<0.005	<0.005	<0.01	<0.01
V-6	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	**0.0135**	<0.005	<0.005	<0.01	<0.01
V-7	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	**0.0371**	<0.005	<0.005	<0.01	<0.01

Location	Analyte		
	TPH - Diesel	TPH - Motor Oil	TRPH
PRG[1]:	-	-	-
V-1	5.66	8.86	78
V-2	2,142	2,171	6,510
V-3	6,971	7,618	5,535
V-4	<2.5	7.13	<5.0
V-5	31.7	39.7	70.5
V-6	644	758	4,090
V-7	897	2,103	2,045

mg/kg - milligrams per kilogram.
* - Samples were collected 5/3/99.
[1] - Preliminary remedial goal for industrial soil.
1,1-DCA - 1,1-dichloroethane.
1,2-DCA - 1,2-dichlorethane.
EDB - Ethylene dibromide.
TCE - Trichloroethene.
TPH - Total petroleum hydrocarbons.
TRPH - Total recoverable petroleum hydrocarbons.

Table 10
Analytical Results (ppb) - Groundwater Samples
Metals (USEPA Method 6010/7000)*

Parcel	Location	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
		Analyte																
		MCL: -	50	1,000	4	5	-	50	1,300	2	-	100	15	6	50	2	-	-
A	MH-1	<10	17	<20	<5	<10	<20	10	<20	<0.2	<20	100	<5	<50	20	<10	<20	<20
	MH-2	<10	51	<20	<5	<10	<20	<10	<20	<0.2	110	130	<5	<50	12	<10	<20	140
	MH-3a	<10	82	350	<5	<10	<20	64	43	<0.2	38	400	11	<50	<10	<10	32	49
	MH-4	<10	46	<20	<5	<10	35	<10	<20	<0.2	270	290	<5	<50	14	<10	<20	<20
	MH-5	<10	98	31	<5	<10	<20	<10	<20	<0.2	140	76	<5	<50	7.1	<10	<20	<20
	MH-6	<10	230	58	<5	<10	26	<10	<20	<0.2	130	380	<5	<50	<5	<10	58	<20
	MH-7	<10	310	<20	<5	<10	<20	<10	<20	0.24	130	74	<5	<50	<5	<10	<20	<20
	MH-8	<10	260	<20	<5	<10	<20	25	<20	<0.2	170	82	<5	<50	<5	<10	28	21
	MH-9	<10	240	<20	<5	<10	<20	15	<20	<0.2	98	30	6.6	<50	<5	<10	51	<20
	MH-10	<10	150	<20	<5	<10	<20	12	<20	<0.2	53	42	9.2	<50	<5	<10	26	<20
	MH-11	<10	650	260	<5	<10	26	85	42	0.26	42	160	<50	<50	<50	<50	57	87
	MH-12	27	1,400	1,200	<5	<10	100	420	170	1.5	84	680	76	<50	<50	<50	220	380
	MH-20	<10	1,000	<20	<5	<10	<20	46	45	0.22	92	73	<5	<50	<5	<10	<20	<20
	MHW-1	<10	210	31	<5	<10	<20	<10	<20	<0.2	130	<20	8.1	<50	<5	<10	36	<20
C	W-1	<10	<5	50	<5	<10	<20	<10	<20	0.2	<20	<20	<5	<50	<5	<10	<20	<20
	W-2	<10	<5	32	<5	<10	<20	<10	<20	<0.2	<20	<20	<5	<50	<5	<10	<20	<20
	W-3	<50	<5	<100	<25	<50	<100	<50	<100	<0.2	<100	<100	<5	<250	<5	<10	<100	<100
B	W-4	<250	75	<500	<130	<250	<500	<250	<500	<0.2	<500	<500	<5	<1200	38	<10	<500	700
	W-4 (R)	<250	46	<500	<130	<250	<500	<250	<500	<0.2	<500	<500	<5	<1200	42	<10	<500	<500
	W-5 (A)	<250	9,900	<500	<130	<250	<500	<250	<500	0.86	<500	<500	<25	<1200	190	<50	<500	<500
	W-5	<50	<5	<100	<25	<50	<100	210	<100	0.64	<100	970	<5	<250	<5	<30	<100	<100
	W-5	<10	80	90	<10	<10	110	60	20	<0.2	<40	390	60	<50	320	<100	110	30
	W-6	<10	130	110	<5	<10	<20	<10	<20	<0.2	56	<20	<5	<50	14	<10	<20	47

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Table 10
Analytical Results (ppb) - Groundwater Samples
Metals (USEPA Method 6010/7000)*

Parcel	Location	Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
		Analyte																
		MCL: -	50	1,000	4	5	-	50	1,300	2	-	100	15	6	50	2	-	-
A	W-8	<10	14	<20	<5	<10	<20	<10	<20	<0.2	29	<20	29	<50	<5	<10	<20	<20
	W-9	<10	1,000	25	<5	<10	<20	<10	<20	<0.2	98	<20	<15	<50	<15	<30	21	<20
	W-10	<10	200	95	<5	<10	<20	<10	<20	<0.2	50	38	<15	<50	<15	<30	24	<20
	W-11	<10	310	22	<5	<10	<20	<10	<20	<0.2	39	76	11	<50	<5	<10	21	38
A	W-12	<10	61	63	<5	<10	77	<10	22	0.37	59	400	<15	<50	<15	<30	<20	28
	W-13	<10	67	24	<5	<10	<20	<10	<20	<0.2	100	<20	<15	<50	<15	<30	22	<20
D	W-15	<10	120	20	<5	<10	<20	<10	<20	<0.2	44	<20	<5	<50	5.1	<10	21	25
	W-16	12	<2.5	270	<5	<10	<10	<2	<5	<0.2	50	70	<20	<50	<50	<50	66	120
	W-19	<10	<2.5	170	<5	<10	<10	10	<5	<0.2	20	50	<20	<50	<50	<50	67	40
	W-19 (R)	<10	<2.5	170	<5	<10	<10	<2	<5	<0.2	<10	60	<20	<50	<50	<50	75	33
	W-21	<10	26	150	<5	<10	<20	<10	<20	<0.2	73	30	11	<50	<5	<10	<20	<20
I	W-22	<10	65	58	<5	<10	<20	<10	<20	<0.2	<20	<20	<5	<50	<5	<10	<20	25
	W-24	<250	78	<500	<130	<250	<500	<250	<500	<0.2	<500	<500	<5	<1200	24	<10	<500	<500
	W-25	<10	550	29	<5	<10	<20	<10	<20	<0.2	33	39	<5	<50	58	<25	<20	<20
B	W-26	<10	<2.5	170	<5	<10	<10	<2	<5	<0.2	30	37	<20	<50	<50	<50	69	30
	W-27	<10	26	30	<5	<10	<20	<10	<20	<0.2	74	<20	<5	<50	<5	<10	<20	45
	W-28	<10	67	150	<5	<10	<20	<10	<20	<0.2	<20	<20	<5	<50	22	<10	<20	25
	W-30	<20	41	77	<10	<20	<40	<20	<40	0.22	41	<40	<5	<100	5.5	<20	<40	<40
I	W-34	<250	120	<500	<130	<250	<500	<250	<500	<0.2	<500	<500	<5	<1200	12	<10	<500	<500
B	W-35	<250	38	<500	<130	<250	<500	<250	<500	<0.2	<500	<500	<5	<1200	<5	<10	<500	<500
	DW-2	<50	<25	<100	<25	<50	<100	<50	<100	<0.2	<100	<100	<15	<250	<15	<30	<100	<100
	DW-3	30	<2.5	290	<5	18	<10	34	13	<0.2	<10	40	<20	<50	<50	<50	150	40
	DW-6	<10	<2.5	120	<5	<10	<10	24	15	<0.2	<10	20	<20	<50	<50	<50	120	40
	DW-7	<50	280	150	<25	<50	<100	<50	<100	<0.2	<100	<100	<5	<250	350	<50	<100	<100
	DW-8	<250	310	<500	<130	<250	<500	<250	<500	<0.2	<500	<500	<25	<1200	230	<50	<500	<500

Table 10
Analytical Results (ppb) - Groundwater Samples
Metals (USEPA Method 6010/7000)*

		Analyte																
		Ag	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Tl	V	Zn
Parcel	Location	MCL: -	50	1,000	4	5	-	50	1,300	2	-	100	15	6	50	2	-	-
D	DW-11	<50	160	130	<25	<50	<100	<50	<100	<0.2	<100	<100	<5	<250	160	<10	<100	<100
	RINSE	<10	<5	<20	<5	<10	<20	<10	<20	<0.2	<20	<20	<5	<50	<5	<5	<20	<20
Off-Site Wells																		
	B-7	<10	20	70	<5	<10	<10	13	<10	<0.2	46	<20	<40	<50	<50	<150	27	<10
	B-8	<10	12	72	<5	<10	10	11	<10	<0.2	140	<20	<40	<50	<50	<150	<10	<10
	B-9	<10	22.3	30	<5	<10	<10	<10	<10	<0.2	34	<20	<40	<50	<50	<150	<10	<10
	B-26	<10	24.4	240	<5	<10	30	130	58	<0.2	<10	140	<40	57	300	<150	280	<10
	B-31	<10	160	57	<5	<10	<10	22	<10	<0.2	<10	<20	<40	<50	80	<150	34	16
	MW-OS5	<10	390	110	<5	<10	<10	<2	<10	<0.2	73	<20	<40	<50	90	<50	31	21
	MW-OS57	<10	9.7	307	<5	<10	16	97	33	<0.2	12	86	45	<50	68	<150	40	88
	MW-OS58	<10	6.5	94	<5	<10	<10	<10	<10	<0.2	<10	<20	<40	<50	<50	<150	<10	<10
	MW-OS59	<10	11.2	110	<5	<10	<10	18	<10	<0.2	<10	<20	<40	<50	<50	<150	<10	30

ppb - parts per billion.
* - Samples collected 12/15/98 through 6/7/99
MCL - California EPA maximum contaminant level.
Ag - Silver
As - Arsenic
Ba - Barium
Be - Beryllium
Cd - Cadmium
Co - Cobalt
Cr - Chromium
Cu - Copper
Hg - Mercury
Mo - Molybdenum
Ni - Nickel
Pb - Lead
Sb - Antimony
Se - Selenium
Tl - Thallium
V - Vanadium
Zn - Zinc
(R) - Replicate sample
(A) - Anomalous results.

Table 11
Analytical Results (ppb) - Groundwater Samples
Volatile Organic Compounds (USEPA Method 8260)*

Parcel	Location	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCB	1,2-DCA	1,2-Dichloropropane	1,3-DCB	1,4-DCB	Bromoform	Carbon tetra chloride	Chloro benzene	Chloroform	cis-1,2-DCE	Dibromo chloro methane	EDB	PCE	TCE	Trichloro fluoro methane	Vinyl chloride
		MCL: 200	5	6	600	0.5	5	-	5	**	0.5	70	**	6	**	0.05	5	5	150	0.5
C	W-1 (G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	W-2 (G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-2	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	W-2 (R)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	W-3 (G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-3	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
B	W-4 (G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-5 (G)	<5000	<5000	<5000	<5000	**82,000**	<5000	<5000	<5000	**110,000**	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000	<10000
	W-6 (G)	<1	<1	<1	<1	**33**	**4**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2
	W-7 (G)	<2.5	<2.5	<2.5	<2.5	**120**	<2.5	<2.5	<2.5	**3**	<2.5	<2.5	**42**	<2.5	<2.5	**71**	<2.5	**14**	**3**	<5
A	W-8 (G)	<1	**7**	**8**	<1	**11**	**52**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2
	W-9 (G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-10 (G)	<2.5	**5**	<2.5	<2.5	**120**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5
	W-11 (G)	<1	<1	<1	<1	**49**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2
	W-12 (G)	<2.5	<2.5	<2.5	<2.5	**74**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5
	W-13 (G)	<10	<10	**26**	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**26**	**260**	<10	<20
D	W-15 (G)	**3**	**3**	<0.5	<0.5	**4**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-16 (G)	<2.5	<2.5	<2.5	<2.5	**100**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5
I	W-19 (G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
B	W-20 (G)	<100	<100	<100	<100	**4,500**	<100	<100	<100	<100	<100	<100	**360**	<100	<100	**720**	<100	**1,200**	<100	<200
I	W-21 (G)	<0.5	<0.5	<0.5	<0.5	**21**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-21	<5	<5	<5	<5	**27**	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	W-22 (G)	<0.5	**4**	**2**	<0.5	**1**	**1**	<0.5	<0.5	<0.5	<0.5	**1**	<0.5	**13**	<0.5	<0.5	<0.5	**6**	<0.5	**4**
B	W-23 (G)	<20000	<20000	<20000	<20000	**78,000**	<20000	<20000	<20000	**300,000**	<20000	<20000	<20000	<20000	<20000	**490,000**	<20000	<20000	<20000	<40000
I	W-24 (G)	<0.5	<0.5	<0.5	<0.5	**28**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1**	**1**	<0.5	<0.5	<0.5	**4**	<0.5	<1
	W-25 (G)	<1	<1	<1	<1	**40**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2
	W-25	<5	<5	<5	<5	**31**	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	W-25 (R)	<5	<5	<5	<5	**30**	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
B	W-26 (G)	**1**	**5**	**1**	<0.5	**3**	**13**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**6**	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-27 (G)	<2.5	<2.5	**6**	<2.5	**17**	**62**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5
	W-28 (G)	<0.5	<0.5	<0.5	**8**	**2**	<0.5	**2**	**3**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-29 (G)	<25	<25	<25	<25	**580**	<25	<25	<25	**27**	<25	<25	<25	<25	<25	**62**	<25	<25	<25	<50
	W-30 (G)	<2.5	<2.5	<2.5	<2.5	**80**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5
	W-31 (G)	<0.5	<0.5	<0.5	<0.5	**11**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-32 (G)	<0.5	<0.5	<0.5	<0.5	**29**	**2**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1

Table 11
Analytical Results (ppb) - Groundwater Samples
Volatile Organic Compounds (USEPA Method 8260)*

Parcel	Location		1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCB	1,2-DCA	1,2-Dichloropropane	1,3-DCB	1,4-DCB	Bromoform	Carbon tetra chloride	Chloro benzene	Chloroform	cis-1,2-DCE	Dibromo chloro methane	EDB	PCE	TCE	Trichloro fluoro methane	Vinyl chloride
		MCL:	200	5	6	600	0.5	5	-	5	**	0.5	70	**	6	**	0.05	5	5	150	0.5
I	W-33	(G)	<0.5	<0.5	<0.5	<0.5	**14**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-34	(G)	<12	<12	<12	<12	**440**	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<25
B	W-35	(G)	<0.5	<0.5	<0.5	<0.5	**17**	<0.5	<0.5	<0.5	<1.2	**3**	<1.2	**30**	<0.5	<0.5	**11**	<0.5	**4**	<0.5	<1
	W-36	(G)	<40000	<40000	<40000	<40000	**140,000**	<40000	<40000	<40000	**1,300,000**	<40000	<40000	<40000	<40000	**56,000**	**310,000**	<40000	<40000	<40000	<80000
	W-37	(G)	<50	<50	<50	<50	**1,300**	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<100
	W-38	(G)	<25	<25	<25	<25	**1,500**	<25	<25	<25	**790**	<25	<25	<25	<25	<25	**71**	<25	<25	<25	<50
	W-39	(G)	<50	<50	<50	<50	**2,400**	<50	<50	<50	**56**	<50	<50	<50	<50	<50	**160**	<50	<50	<50	<100
	W-40	(G)	<25	<25	<25	<25	**520**	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50
	W-41	(G)	<25	<25	<25	<25	**1,400**	<25	<25	<25	**990**	<25	<25	<25	<25	**44**	**800**	<25	<25	<25	<50
	W-42	(G)	<10	<10	<10	<10	**25**	<10	<10	<10	**120**	<10	<10	<10	<10	<10	**270**	<10	<10	<10	<20
	W-43	(G)	<25	<25	<25	<25	**440**	<25	<25	<25	**830**	<25	<25	<25	<25	**36**	**780**	<25	<25	<25	<50
	W-44	(G)	<10	<10	<10	<10	**300**	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20
	W-45	(G)	<25	<25	<25	<25	**81**	<25	<25	<25	**330**	<25	<25	<25	<25	<25	**650**	<25	<25	<25	<50
	W-46	(G)	<500	<500	<500	<500	**4,500**	<500	<500	<500	**14,000**	<500	<500	<500	<500	**620**	**15,000**	<500	<500	<500	<1000
	W-47	(G)	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	**24,000**	<1000	<1000	<1000	<1000	**1,000**	**2,200**	<1000	<1000	<1000	<2000
	W-48	(G)	<2000	<2000	<2000	<2000	**5,900**	<2000	<2000	<2000	**41,000**	<2000	<2000	<2000	<2000	<2000	**4,500**	<2000	<2000	<2000	<4000
	W-49	(G)	<100	<100	<100	<100	**5,800**	<100	<100	<100	**4,000**	<100	<100	<100	<100	**260**	**4,700**	<100	<100	<100	<200
	W-50	(G)	<100	<100	<100	<100	**360**	<100	<100	<100	<100	<100	<100	<100	<100	<100	**5,100**	<100	<100	<100	<200
	W-51	(G)	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	<10000	**160,000**	<10000	<10000	<10000	<20000
	W-52	(G)	<0.5	<0.5	<0.5	<0.5	**10**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.4**	**0.9**	<0.5	<1
	W-53	(G)	<0.5	<0.5	<0.5	<0.5	**7.3**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.78**	<0.5	<0.5	<1
	W-54	(G)	<0.5	<0.5	<0.5	<0.5	**2.7**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-55	(G)	<0.5	<0.5	<0.5	<0.5	**0.55**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-56	(G)	<0.5	<0.5	<0.5	<0.5	**0.52**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-57	(G)	<0.5	<0.5	<0.5	<0.5	**3.8**	<0.5	<0.5	<0.5	<0.5	**0.71**	<0.5	**0.85**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	W-58	(G)	<0.5	<0.5	<0.5	<0.5	**19**	<0.5	<0.5	<0.5	<0.5	**7.5**	<0.5	**22**	<0.5	<0.5	**1**	**0.53**	**1.6**	<0.5	<1
	DW-1	(G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	DW-2		<100	<100	<100	<100	**3,600**	<100	<100	<100	<100	<100	<100	<100	<100	<100	**160**	<100	<100	<100	<200
	DW-3	(G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	DW-4	(G)	<0.5	<0.5	<0.5	<0.5	**26**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**3.6**	<0.5	<1
	DW-6	(G)	<1.2	**2**	**2**	<1.2	**30**	**62**	<1.2	<1.2	<1.2	<1.2	<1.2	**1**	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<2.5
	DW-7	(G)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	DW-7		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	DW-8		<12	<12	<12	<12	**610**	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<25
D	DW-11	(G)	<0.5	<0.5	<0.5	<0.5	**17**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
B	GRAB-1		<5	<5	<5	<5	**26**	<5	<5	<5	<5	<5	<5	<5	<5	<5	**13**	<5	<5	<5	<10

Table 11
Analytical Results (ppb) - Groundwater Samples
Volatile Organic Compounds (USEPA Method 8260)*

		Analyte																		
		1,1,1-TCA	1,1-DCA	1,1-DCE	1,2-DCB	1,2-DCA	1,2-Dichloropropane	1,3-DCB	1,4-DCB	Bromoform	Carbon tetrachloride	Chlorobenzene	Chloroform	cis-1,2-DCE	Dibromochloromethane	EDB	PCE	TCE	Trichlorofluoromethane	Vinyl chloride
Parcel	Location	MCL: 200	5	6	600	0.5	5	-	5	**	0.5	70	**	6	**	0.05	5	5	150	0.5
B	GRAB-2	<5	<5	<5	<5	**150**	<5	<5	<5	<5	<5	<5	<5	<5	<5	**5**	<5	<5	<5	<10
	GRAB-3	<5	<5	<5	<5	**11**	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	GRAB-4	<5	<5	<5	<5	**12**	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	GRAB-5	<5	<5	<5	<5	**45**	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	GRAB-6	<50000	<50000	<50000	<50000	**300,000**	<50000	<50000	<50000	<50000	<50000	<50000	<50000	<50000	<50000	**890,000**	<50000	<50000	<50000	<100000
	GRAB-7	<50000	<50000	<50000	<50000	**230,000**	<50000	<50000	<50000	<50000	<50000	<50000	<50000	<50000	<50000	**1,800,000**	<50000	<50000	<50000	<100000
	RINSE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	TRIP	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
	TRIP	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10

ppb - parts per billion.
* - Samples collected 12/28/98 through 3/4/99.
(G) - Geosystems data.
1,1,1-TCA - 1,1,1-trichloroethane.
1,1-DCA - 1,1-dichloroethane.
1,1-DCE - 1,1-dichloroethene.
1,2-DCA - 1,2-dichlorethane.
cis-1,2-DCE - csi-1,2-dichloroethene.
EDB - Ethylene dibromide.
TCE - Trichloroethene.
PCE - Tetrachloroethene
1,2-DCB - 1,2-dichlorobenzene.
1,3-DCB - 1,3-dichlorobenzene.
1,4-DCB - 1,4-dichlorobenzene.
MCL - California EPA maximum contaminant level.
** - MCL is 100 ppb as total trihalomethane.

Table 12
Analytical Results - Groundwater Samples
Phosphorus and Phosphates (Standard Method 365.2)*

Parcel	Location	Analyte: Orthophosphate as P (ppm)	Analyte: Phosphorus (P_4) (ppb)	Analyte: Total Phosphate (PO_4) (ppm)
A	MH-1		52	
	MH-2		<0.5	
	MH-3a		260	
	MH-4		<0.5	
	W-8	4.3		18
	W-8 (R)	3.1		19
	W-9	40		420
	W-10	31		270
	W-11	130		360
	W-12	33	<0.1	240
	W-13	19	<0.1	100

* - Samples collected 12/21/98 through 4/27/99.
ppm - parts per million.
ppb - parts per billion.
(R) - Replicate sample.

Table 13
Analytical Results - Groundwater Samples
pH (USEPA Method 9045)*

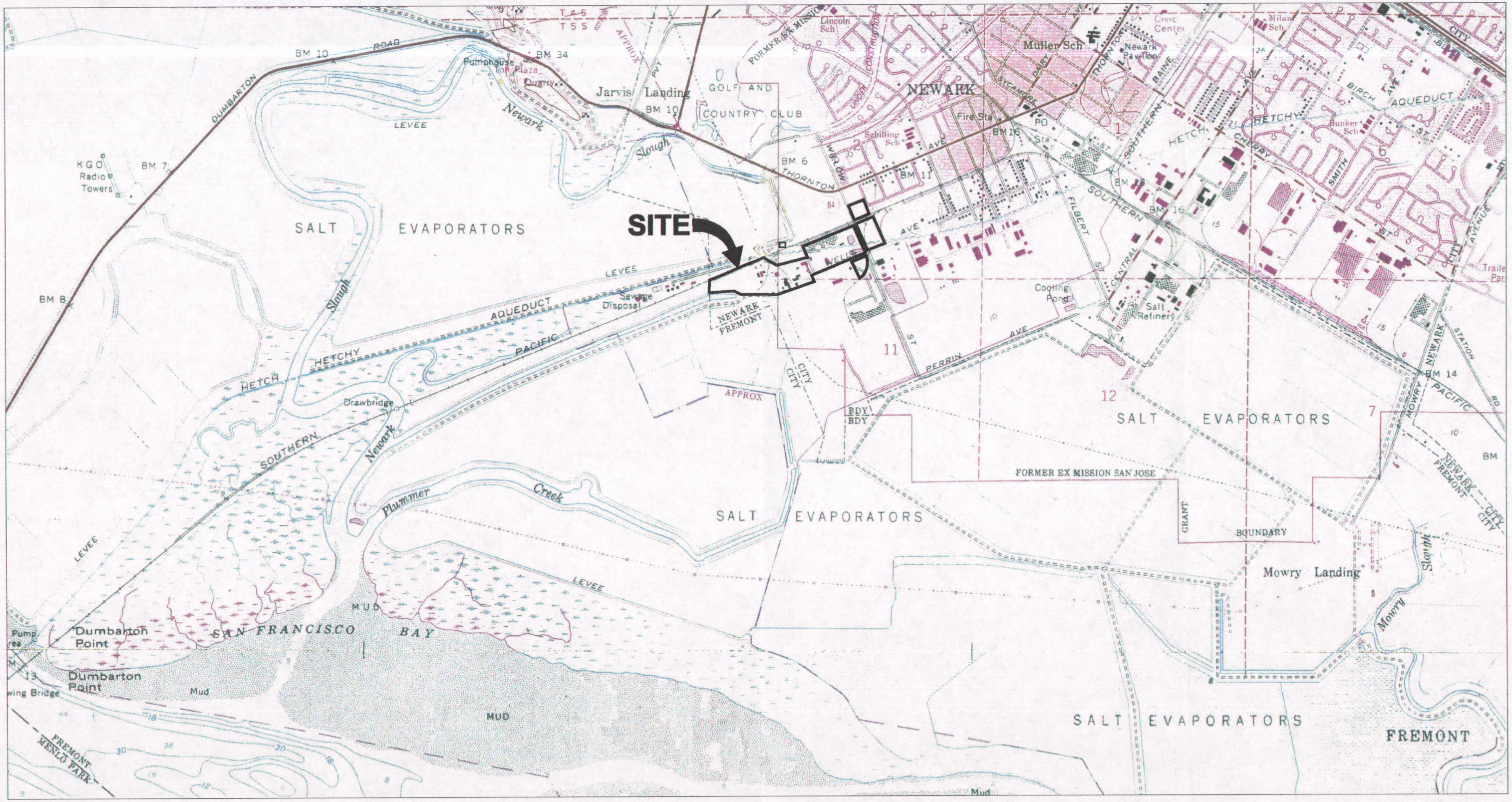
Parcel	Location	pH
A	MH-1	7.5
	MH-2	7.3
	MH-3a	7.19
	MH-4	7.3
	MH-6	7.23
	MH-7	7.03
	MH-8	7.5
	MH-9	7.01
	MH-10	7.04
	MH-11	6.7
	MH-12	7.2
	MH-20	6.73

* - Samples were collected 1/12/99 through 2/4/99.

Table 14
Analytical Results (ppb) - Groundwater Samples
Petroleum Hydrocarbons (USEPA Method 8015M)*

Parcel	Location	TPH as Diesel	TPH as Gasoline	TPH as Kerosene	TPH as Motor Oil
	MCL:	-	-	-	-
C	**W-1**	<200	<50	<200	**200**
	W-2	<200	<50	<200	**220**
	W-3	<200	<50	<200	<200

* - Samples collected on 3/29/99.
MCL - California EPA / USEPA maximum contaminant level.
TPH - Total petroleum hydrocarbons.
ppb - parts per billion.



MAP SOURCE: USGS 7.5' TOPO NEWARK, CALIFORNIA QUADRANGLE; 1959; PHOTOREVISED 1980

SCALE

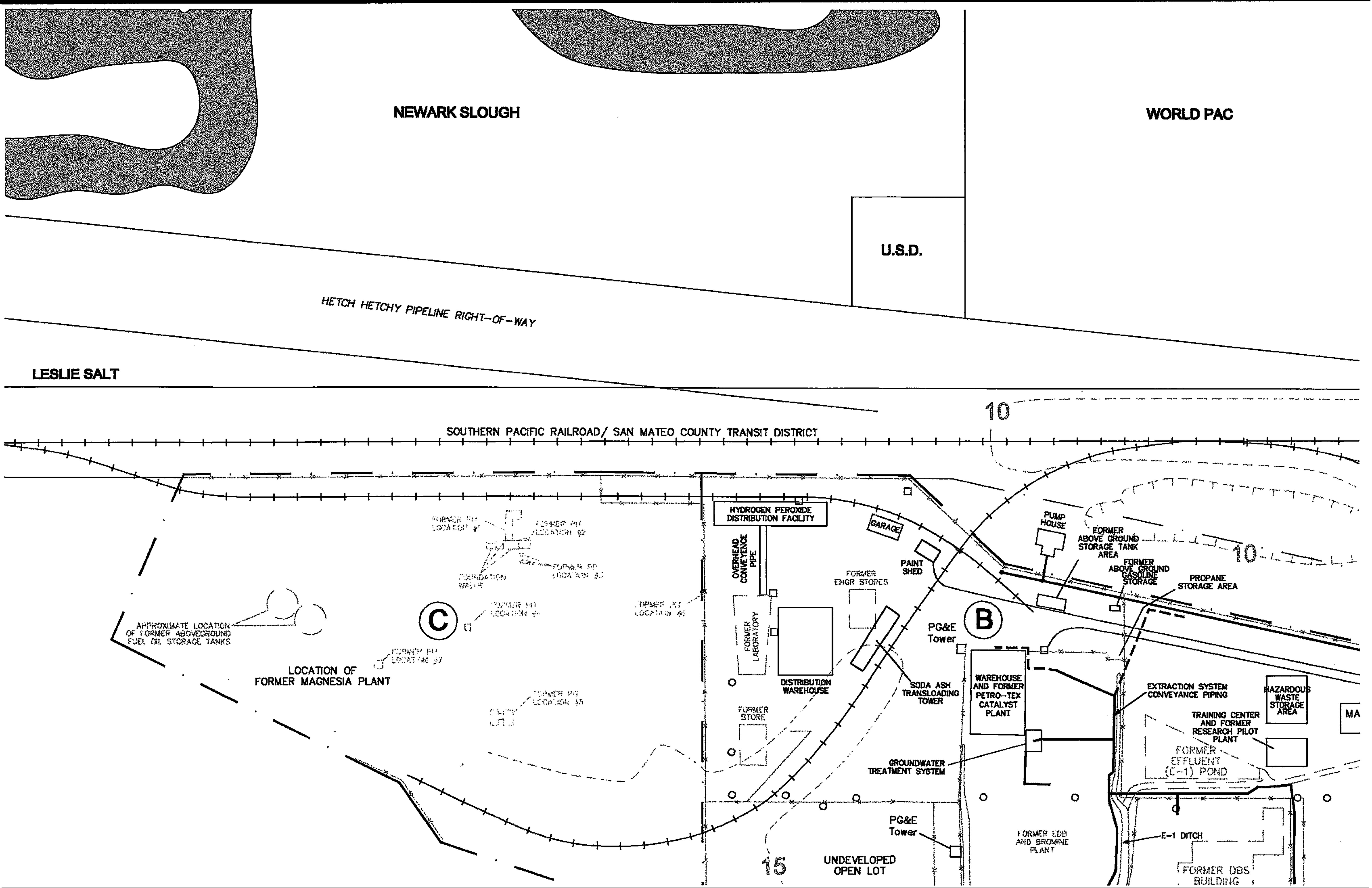
0 2000' 4000'

FIGURE 1
SITE LOCATION MAP
FMC CORPORATION

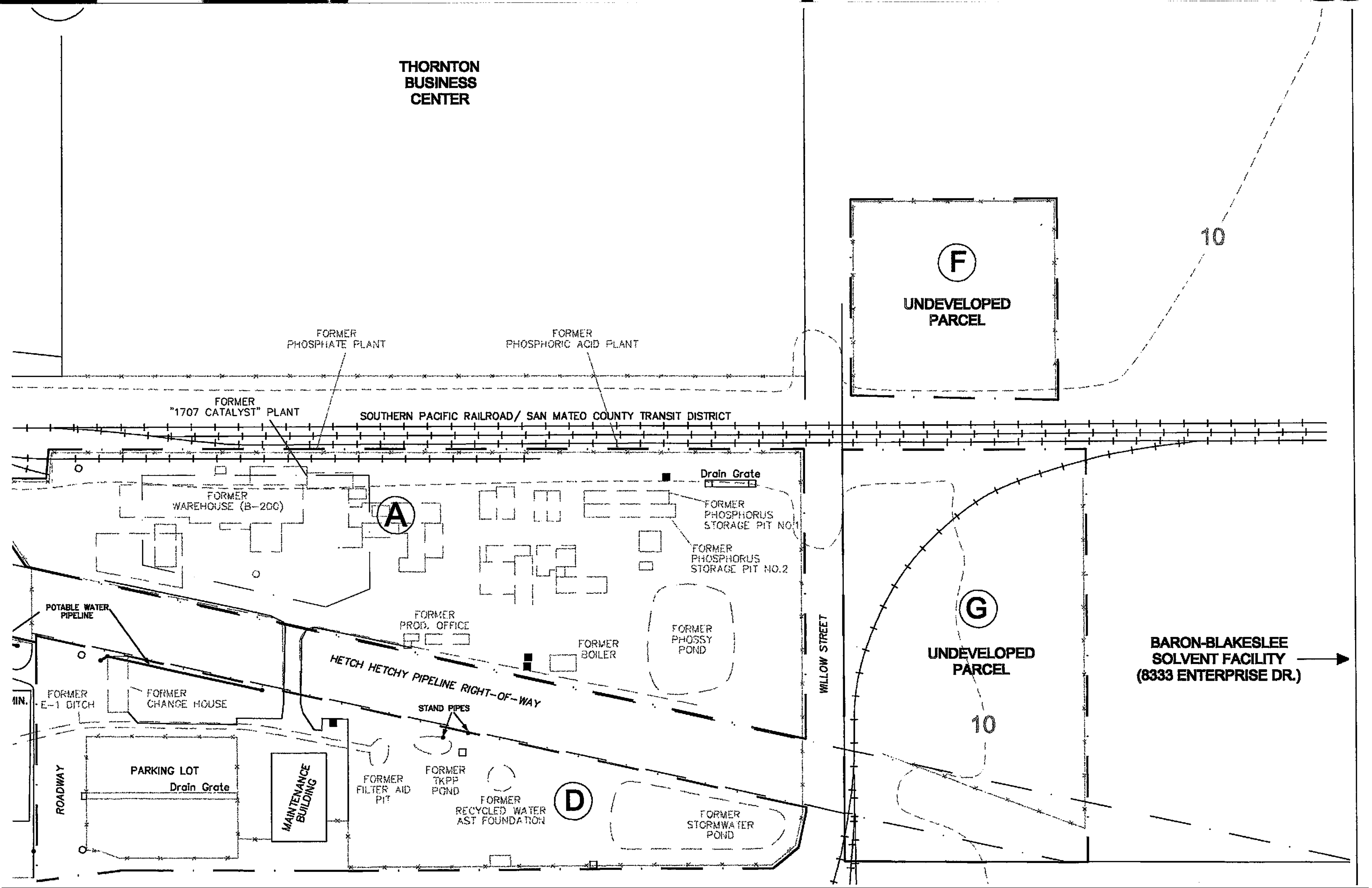
FMC Corporation
8787 Enterprise Drive
Newark, California

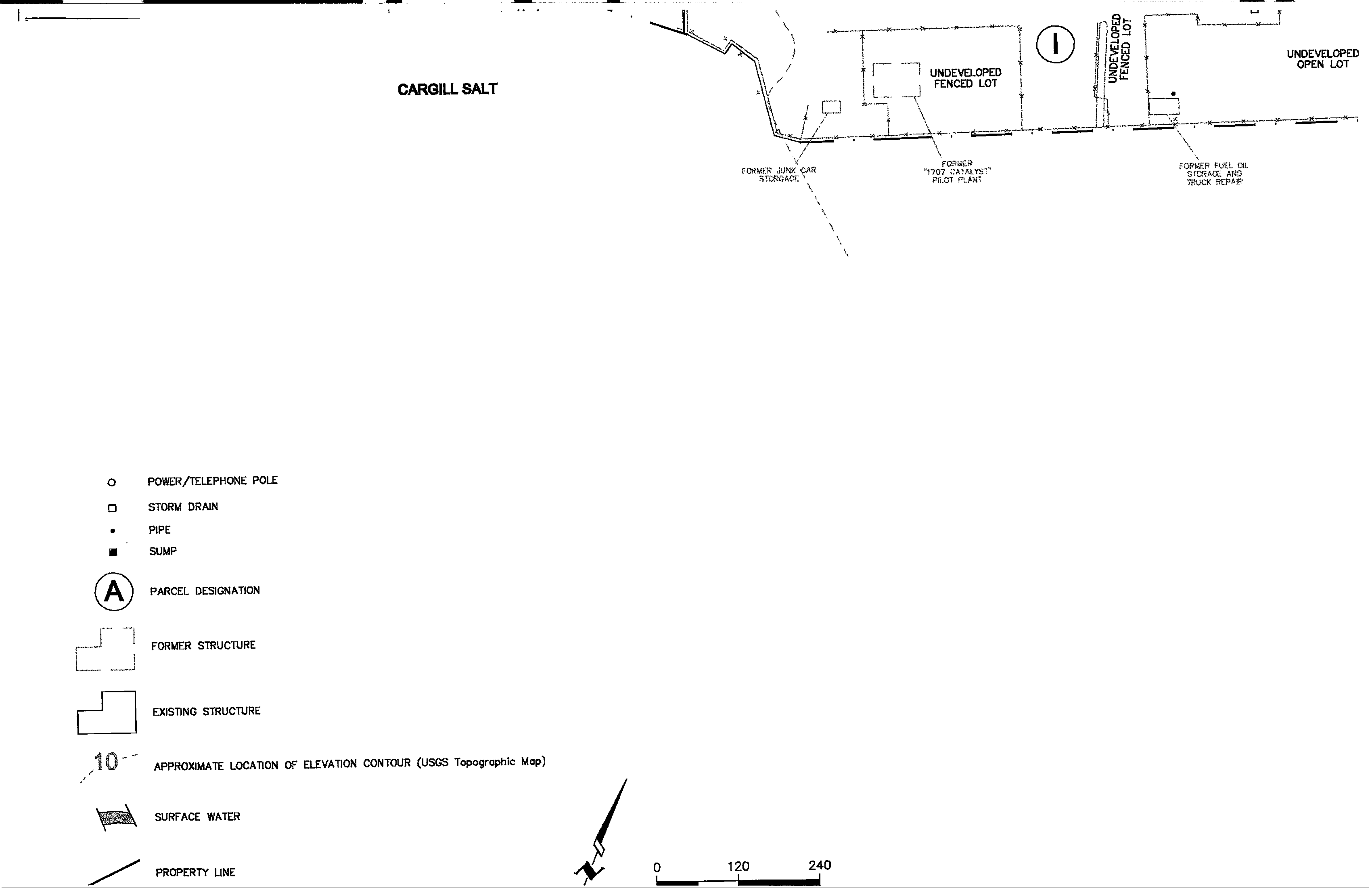
JUNE 1999

j:\cad_data\fmc\newark\0599\fig1-0599.dwg 02-26-99



NEWARK SLOUGH
WORLD PAC
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
10
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
HYDROGEN PEROXIDE DISTRIBUTION FACILITY
GARAGE
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
10
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
PAINT SHED
OVERHEAD CONVEYENCE PIPE
FORMER ENGR STORES
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
C
B
PG&E Tower
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
SODA ASH TRANSLOADING TOWER
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
MA
LOCATION OF FORMER MAGNESIA PLANT
FORMER STORE
TRAINING CENTER AND FORMER RESEARCH PILOT PLANT
FORMER EFFLUENT (E-1) POND
GROUNDWATER TREATMENT SYSTEM
PG&E Tower
FORMER EDB AND BROMINE PLANT
E-1 DITCH
15
UNDEVELOPED OPEN LOT
FORMER DBS BUILDING


THORNTON BUSINESS CENTER
F
UNDEVELOPED PARCEL
10
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
Drain Grate
FORMER WAREHOUSE (B-200)
A
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
FORMER BOILER
FORMER PHOSSY POND
HETCH HETCHY PIPELINE RIGHT-OF-WAY
WILLOW STREET
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
FORMER E-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
10
PARKING LOT
Drain Grate
ROADWAY
MAINTENANCE BUILDING
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER AST FOUNDATION
D
FORMER STORMWATER POND


CARGILL SALT
UNDEVELOPED FENCED LOT
I
UNDEVELOPED FENCED LOT
UNDEVELOPED OPEN LOT
FORMER JUNK CAR STORAGE
FORMER "1707 CATALYST" PILOT PLANT
FORMER FUEL OIL STORAGE AND TRUCK REPAIR
POWER/TELEPHONE POLE
STORM DRAIN
PIPE
SUMP
A
PARCEL DESIGNATION
FORMER STRUCTURE
EXISTING STRUCTURE
10
APPROXIMATE LOCATION OF ELEVATION CONTOUR (USGS Topographic Map)
SURFACE WATER
PROPERTY LINE
N
0
120
240

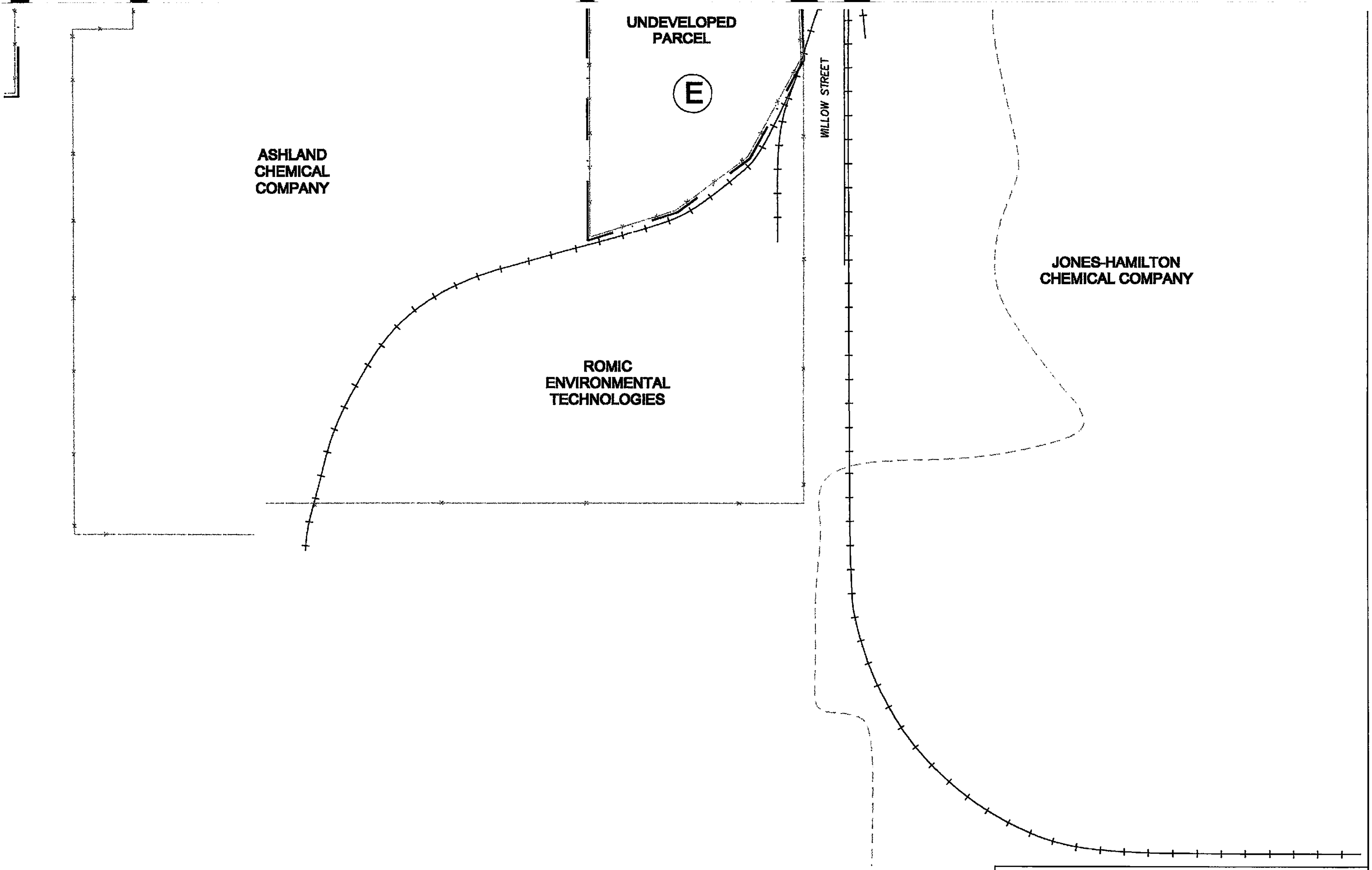
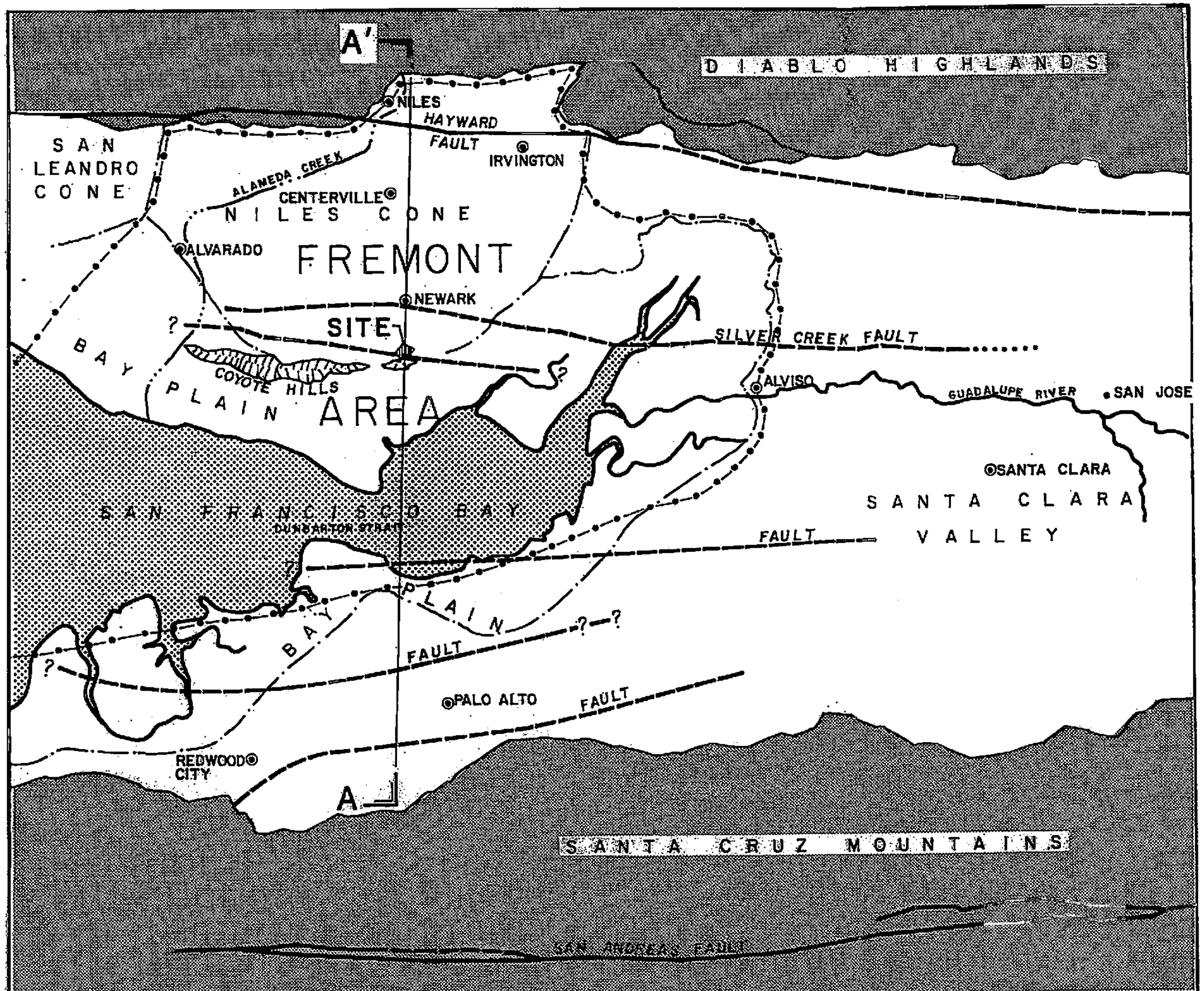

UNDEVELOPED PARCEL
E
ASHLAND CHEMICAL COMPANY
WILLOW STREET
JONES-HAMILTON CHEMICAL COMPANY
ROMIC ENVIRONMENTAL TECHNOLOGIES

FIGURE 2



LEGEND

FAULT (DASHED WHERE APPROXIMATE)

APPROXIMATE PHYSIOGRAPHIC BOUNDARY

LOCATION OF GEOLOGIC SECTION

SOURCE: FIGURE A-4 FROM AUGUST 1998 "SUMMARY REPORT SUBSURFACE CHARACTERIZATION AND REMEDIATION", PREPARED BY GEOSYSTEM CONSULTANTS, INC.

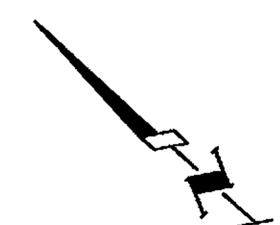
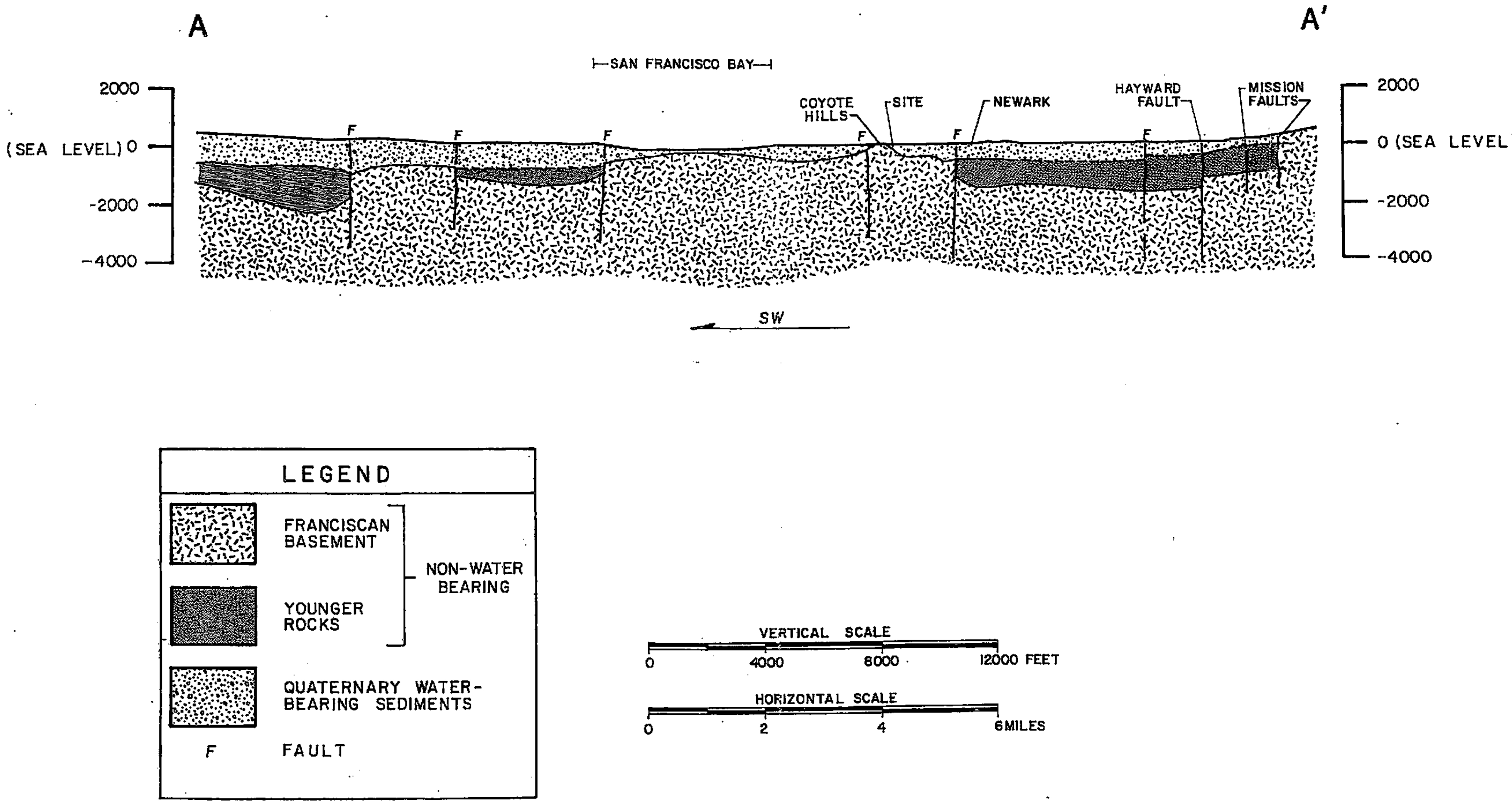


FIGURE 3
GENERALIZED REGIONAL PHYSIOGRAPHY

FMC Corporation
8787 Enterprise Drive
Newark, California

JUNE 1999

j:\cad_data\fmc\newark\fig3-border.dwg 02-26-99



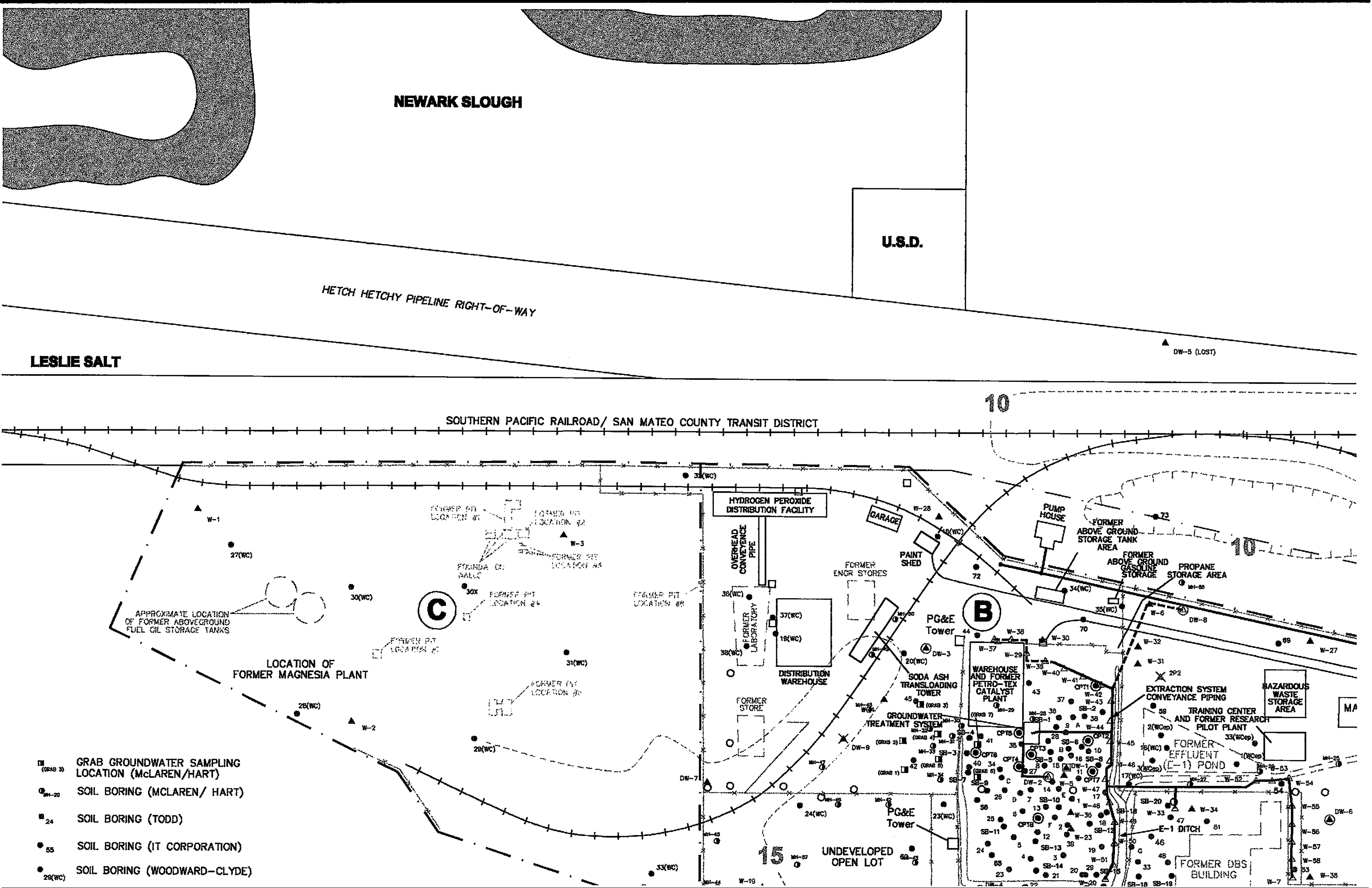
SOURCE: FIGURE A-5 FROM AUGUST 1998 "SUMMARY REPORT SUBSURFACE CHARACTERIZATION AND REMEDIATION", PREPARED BY GEOSYSTEM CONSULTANTS, INC.

FIGURE 4
REGIONAL GEOLOGIC CROSS SECTION A-A'

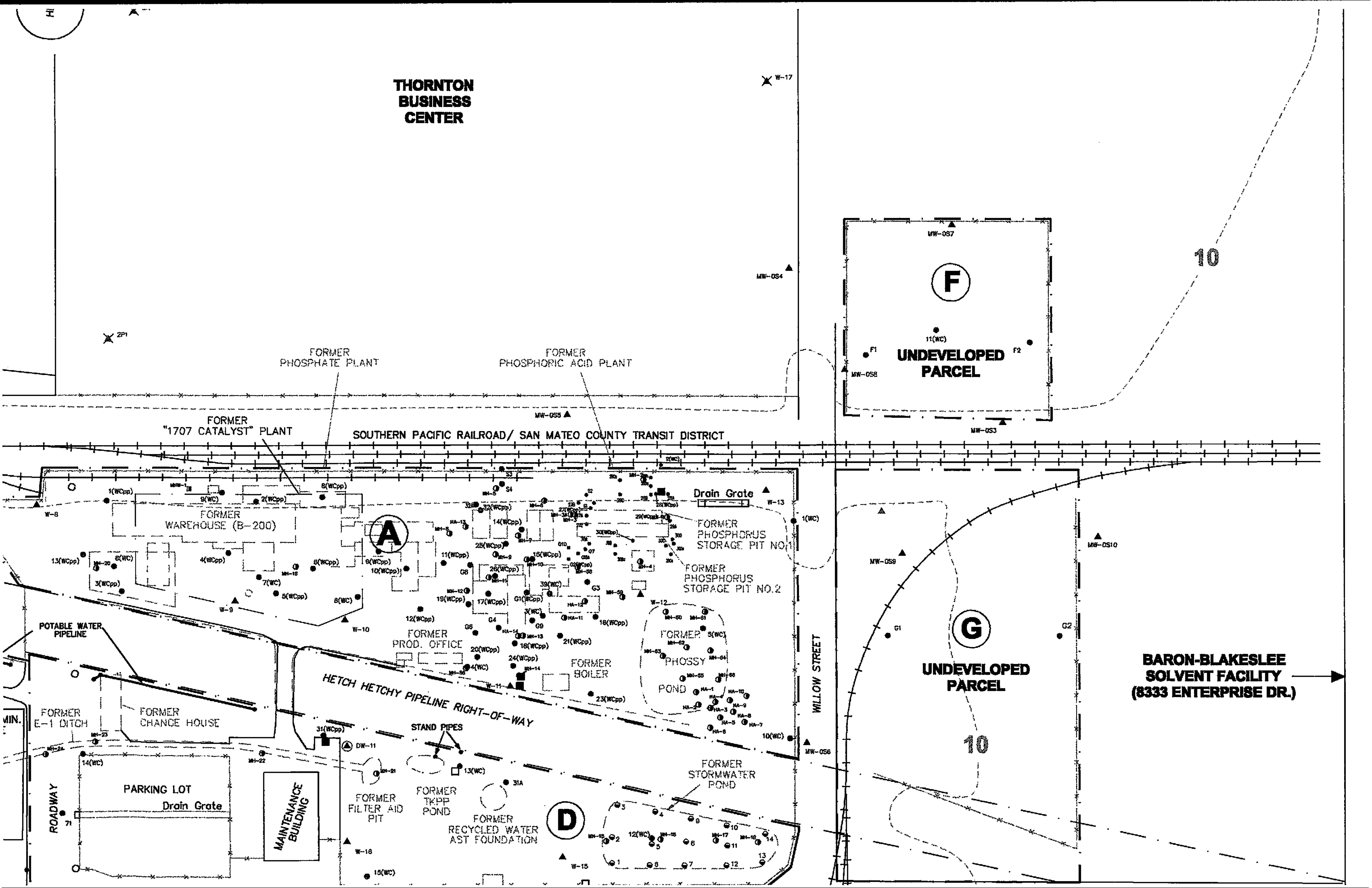
FMC Corporation
8787 Enterprise Drive
Newark, California

JUNE 1999

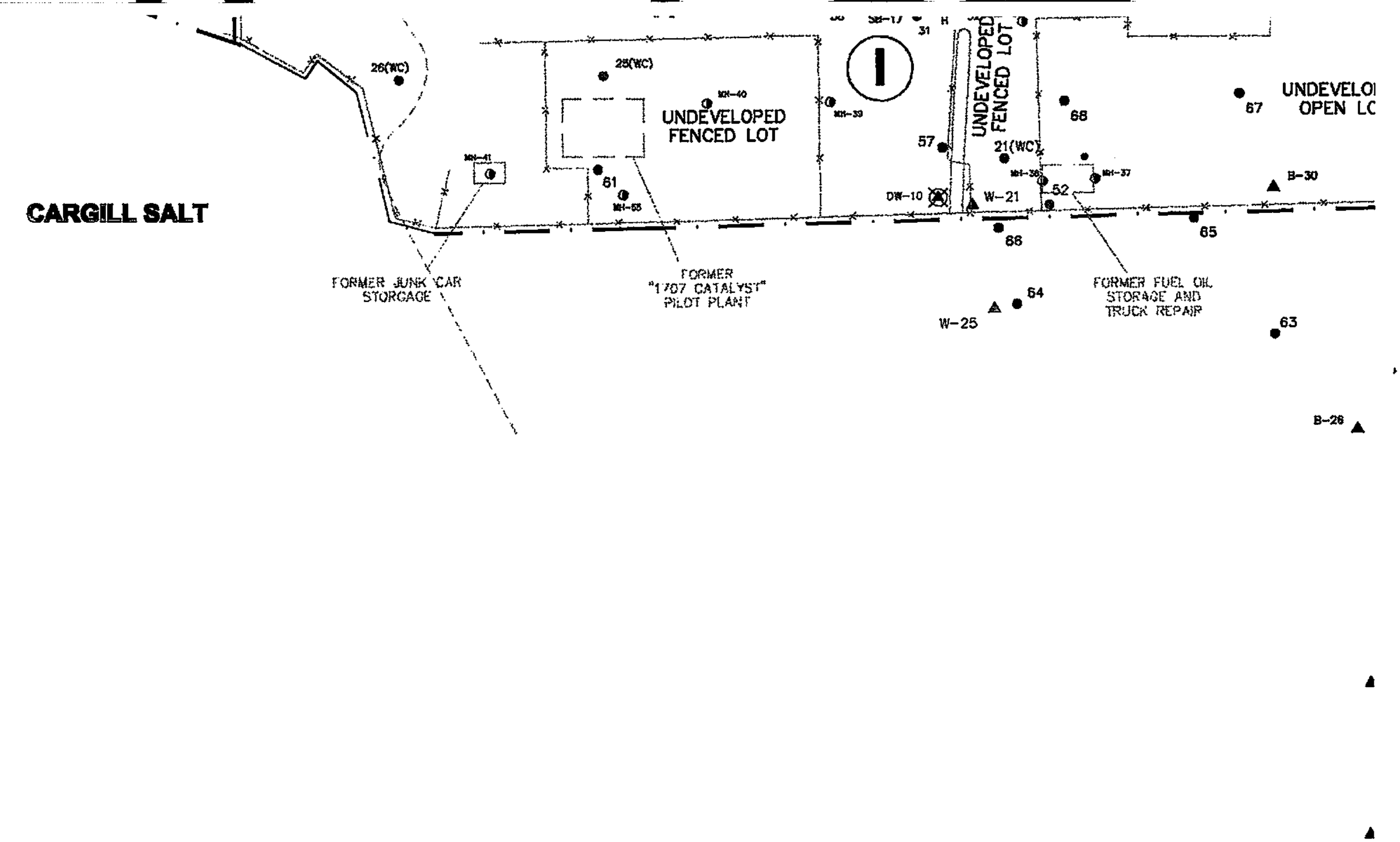
j:\cad_data\fmc\newark\fig3-border.dwg 02-26-99



NEWARK SLOUGH
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
DW-5 (LOST)
10
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
HYDROGEN PEROXIDE DISTRIBUTION FACILITY
GARAGE
PAINT SHED
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
OVERHEAD CONVEYENCE PIPE
FORMER ENGR STORES
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
FORMER STORE
SODA ASH TRANSLOADING TOWER
PG&E Tower
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
GROUNDWATER TREATMENT SYSTEM
EXTRACTION SYSTEM CONVEYANCE PIPING
TRAINING CENTER AND FORMER RESEARCH PILOT PLANT
HAZARDOUS WASTE STORAGE AREA
FORMER EFFLUENT (E-1) POND
E-1 DITCH
FORMER DBS BUILDING
UNDEVELOPED OPEN LOT
15
C
B
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
LOCATION OF FORMER MAGNESIA PLANT
GRAB GROUNDWATER SAMPLING LOCATION (McLAREN/HART)
SOIL BORING (MCLAREN/ HART)
SOIL BORING (TODD)
SOIL BORING (IT CORPORATION)
SOIL BORING (WOODWARD-CLYDE)


THORNTON BUSINESS CENTER
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
F
UNDEVELOPED PARCEL
10
A
FORMER WAREHOUSE (B-200)
Drain Grate
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
FORMER BOILER
FORMER PHOSSY POND
HETCH HETCHY PIPELINE RIGHT-OF-WAY
WILLOW STREET
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
FORMER E-1 DITCH
FORMER CHANCE HOUSE
STAND PIPES
PARKING LOT
Drain Grate
ROADWAY
MAINTENANCE BUILDING
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER AST FOUNDATION
D
FORMER STORMWATER POND
10

- 28(WCswp) SOIL BORING (WOODWARD–CLYDE STORM WATER POND)
- 2(WCep) SOIL BORING (WOODWARD–CLYDE EFFLUENT POND)
- 33(WCpp) SOIL BORING (WOODWARD–CLYDE PHOSPHATE PLANT)
- SB 15 SOIL BORING (PES ENVIRONMENTAL)
- CPT1 CPT LOCATION (PES ENVIRONMENTAL)
- 2P3 ABANDONED MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)
- E58 MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)
- 3 STORM WATER POND SAMPLES (GEOSYSTEM)
- W-4 SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
- DW-9 ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
- DW-3 NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
- DW-10 ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
- W-7 SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
- DW-2 NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
- DW-1 IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
- B-28 MONITORING WELL (ASHLAND CHEMICAL)
- MW-OS9 MONITORING WELL (BARON–BLAKESLEE)
- J10 MONITORING WELL (JONES–HAMILTON Co.)
- P-3 MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)
- POWER/TELEPHONE POLE
- STORM DRAIN
- PIPE
- SUMP
- A PARCEL DESIGNATION
- FORMER STRUCTURE
- EXISTING STRUCTURE
- SURFACE WATER



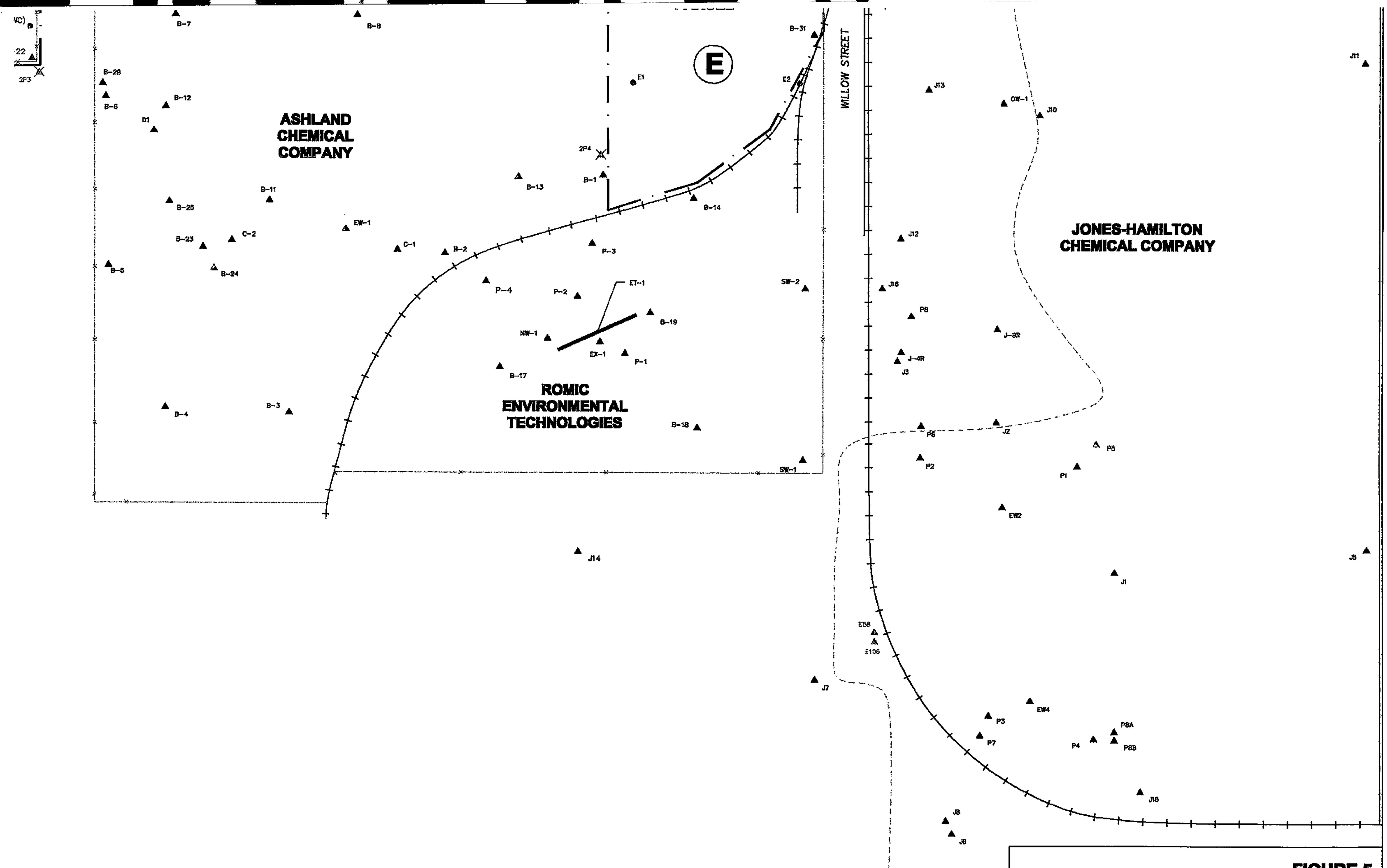
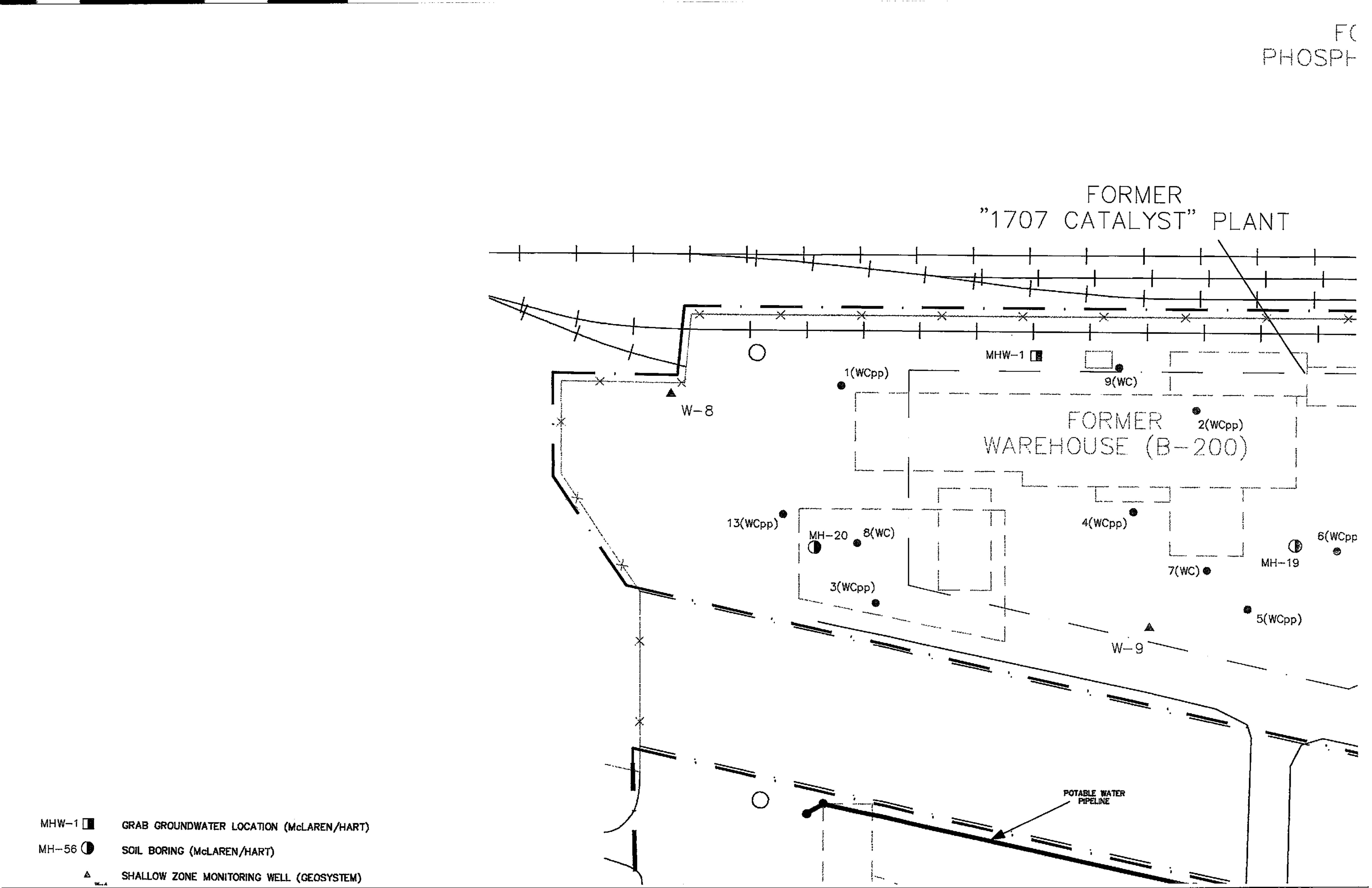
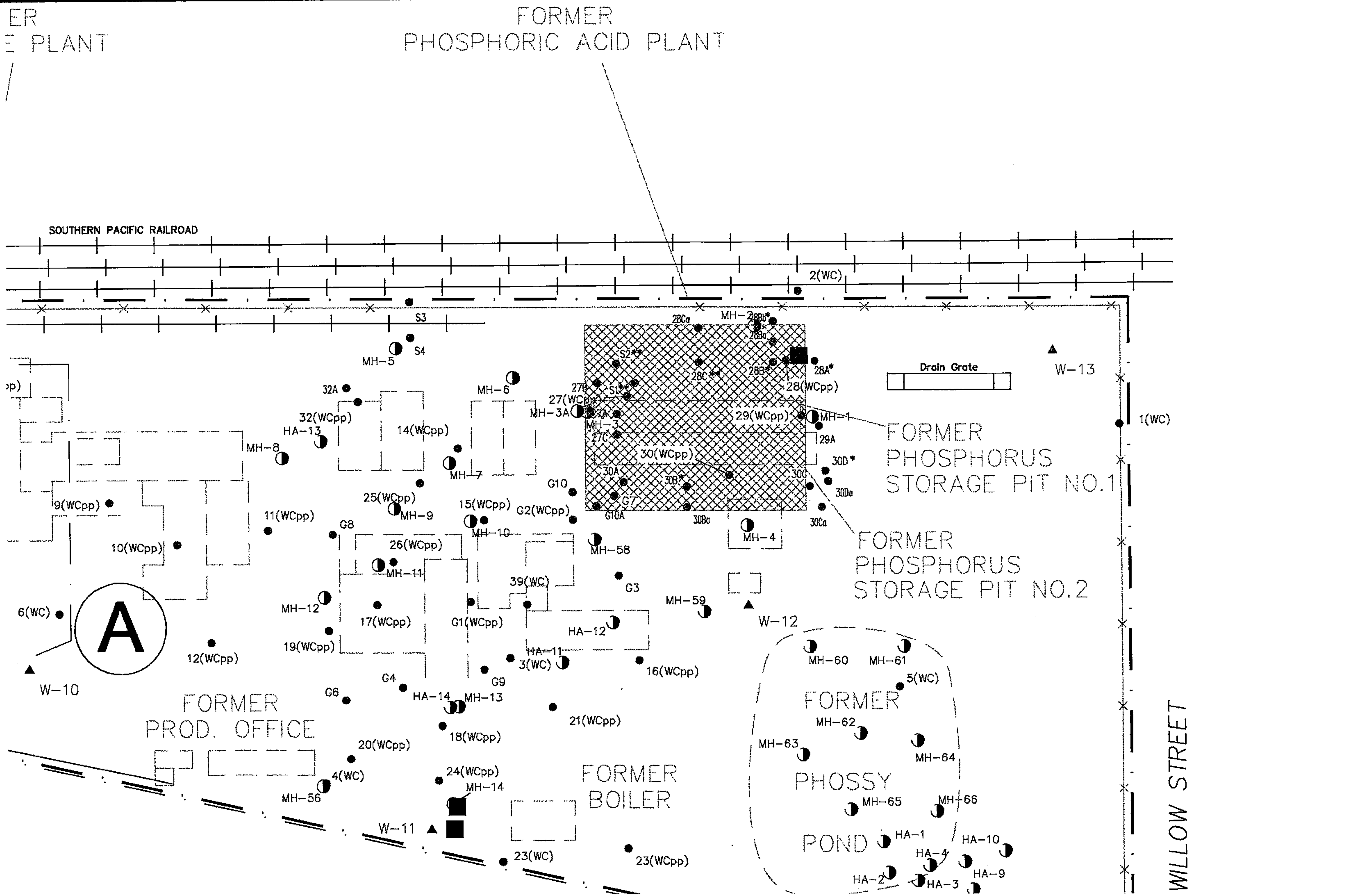


FIGURE 5
SOIL BORING AND


FC
PHOSPH
FORMER
"1707 CATALYST" PLANT
MHW-1
1(WCpp)
9(WC)
W-8
FORMER
WAREHOUSE (B-200)
2(WCpp)
13(WCpp)
MH-20
8(WC)
4(WCpp)
6(WCpp
MH-19
7(WC)
3(WCpp)
5(WCpp)
W-9
POTABLE WATER
PIPELINE
MHW-1 GRAB GROUNDWATER LOCATION (McLAREN/HART)
MH-56 SOIL BORING (McLAREN/HART)
SHALLOW ZONE MONITORING WELL (GEOSYSTEM)



ER
PLANT
FORMER
PHOSPHORIC ACID PLANT
SOUTHERN PACIFIC RAILROAD
2(WC)
S3
S4
MH-5
MH-6
32A
32(WCpp)
HA-13
MH-8
14(WCpp)
MH-7
MH-3A
MH-3
27(WCpp)
27B
27C
S1
S2
28Ca
MH-2
28Bb
28Ba
28C
28B
28A
28(WCpp)
29(WCpp)
MH-1
29A
30(WCpp)
30A
30B
30C
30D
30Da
30Ba
30Ca
G7
G10A
G10
Drain Grate
W-13
1(WC)
FORMER
PHOSPHORUS
STORAGE PIT NO.1
FORMER
PHOSPHORUS
STORAGE PIT NO.2
MH-4
9(WCpp)
11(WCpp)
10(WCpp)
25(WCpp)
MH-9
15(WCpp)
G2(WCpp)
MH-10
G8
26(WCpp)
MH-11
MH-58
39(WC)
G3
MH-59
W-12
6(WC)
A
MH-12
17(WCpp)
G1(WCpp)
HA-12
19(WCpp)
12(WCpp)
W-10
HA-11
3(WC)
16(WCpp)
MH-60
MH-61
5(WC)
G4
G9
G6
HA-14
MH-13
21(WCpp)
FORMER
PROD. OFFICE
18(WCpp)
20(WCpp)
4(WC)
MH-56
24(WCpp)
MH-14
W-11
FORMER
BOILER
23(WC)
23(WCpp)
FORMER
MH-62
MH-63
MH-64
PHOSSY
MH-65
MH-66
POND
HA-1
HA-10
HA-4
HA-2
HA-3
HA-9
WILLOW STREET

DW-3

SOIL BORING (IT CORPORATION)

SOIL BORING (WOODWARD-CLYDE)

FORMER PHOSPHATE PLANT SAMPLING LOCATION (WOODWARD-CLYDE)

POWER/TELEPHONE POLE

STORM DRAIN

PIPE

SUMP

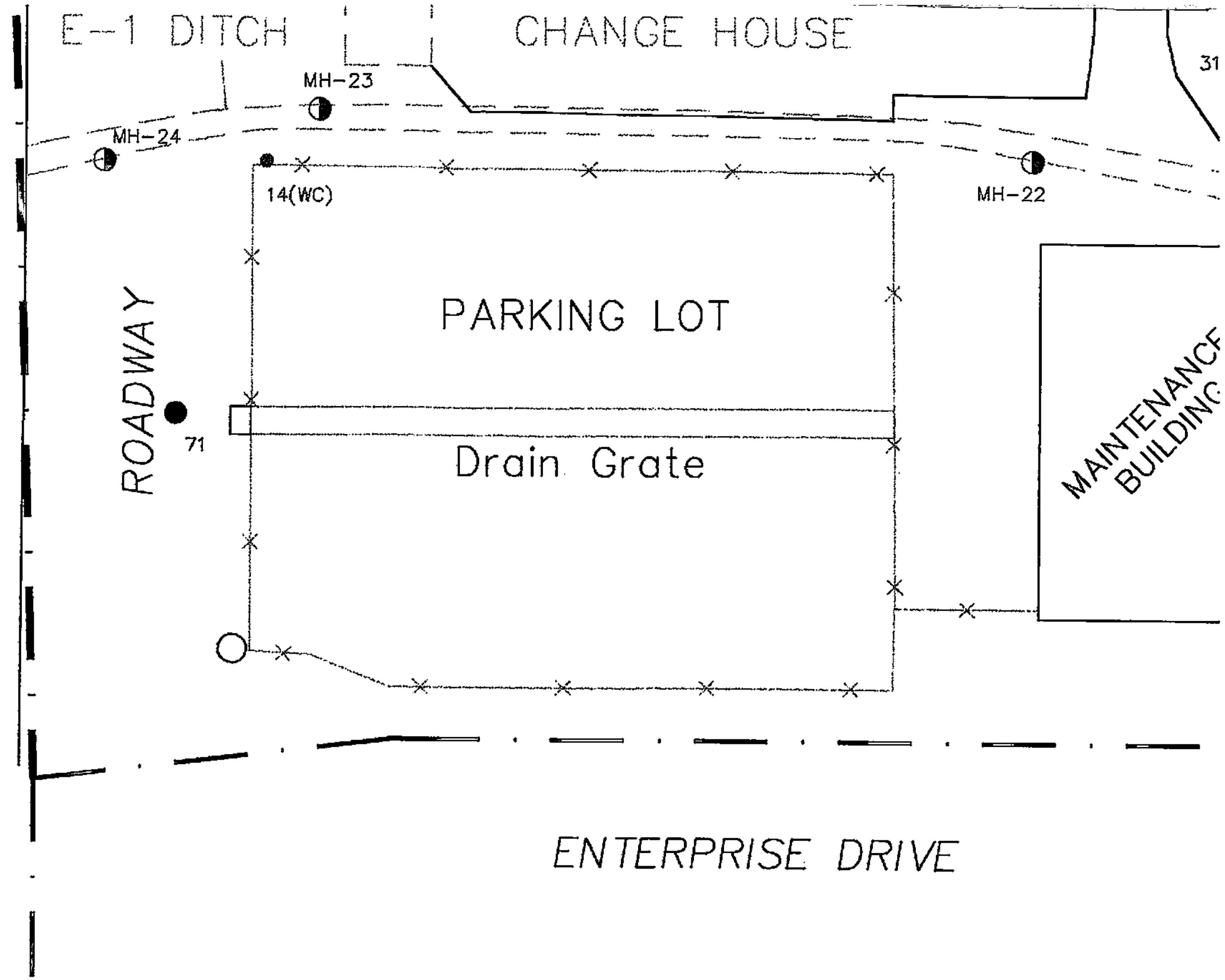
PARCEL DESIGNATION

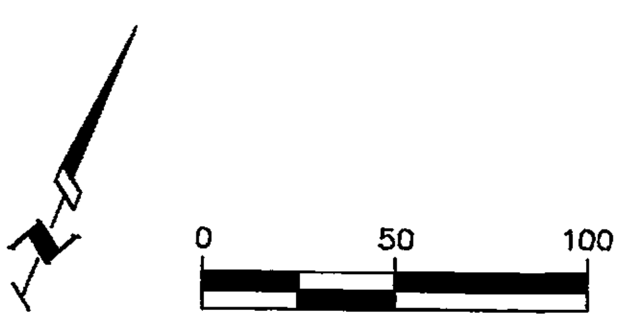
AREA POTENTIALLY IMPACTED WITH ELEMENTAL PHOSPHORUS

FORMER STRUCTURE

EXISTING STRUCTURE

PROPERTY LINE





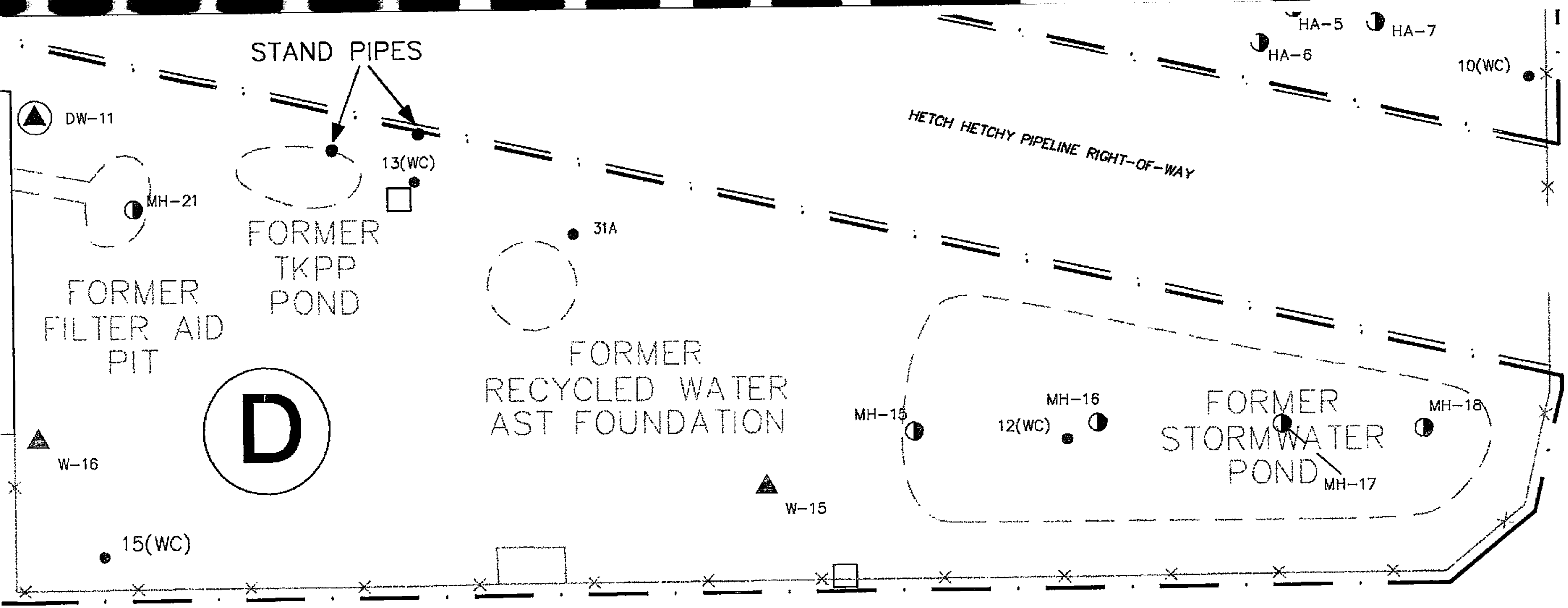
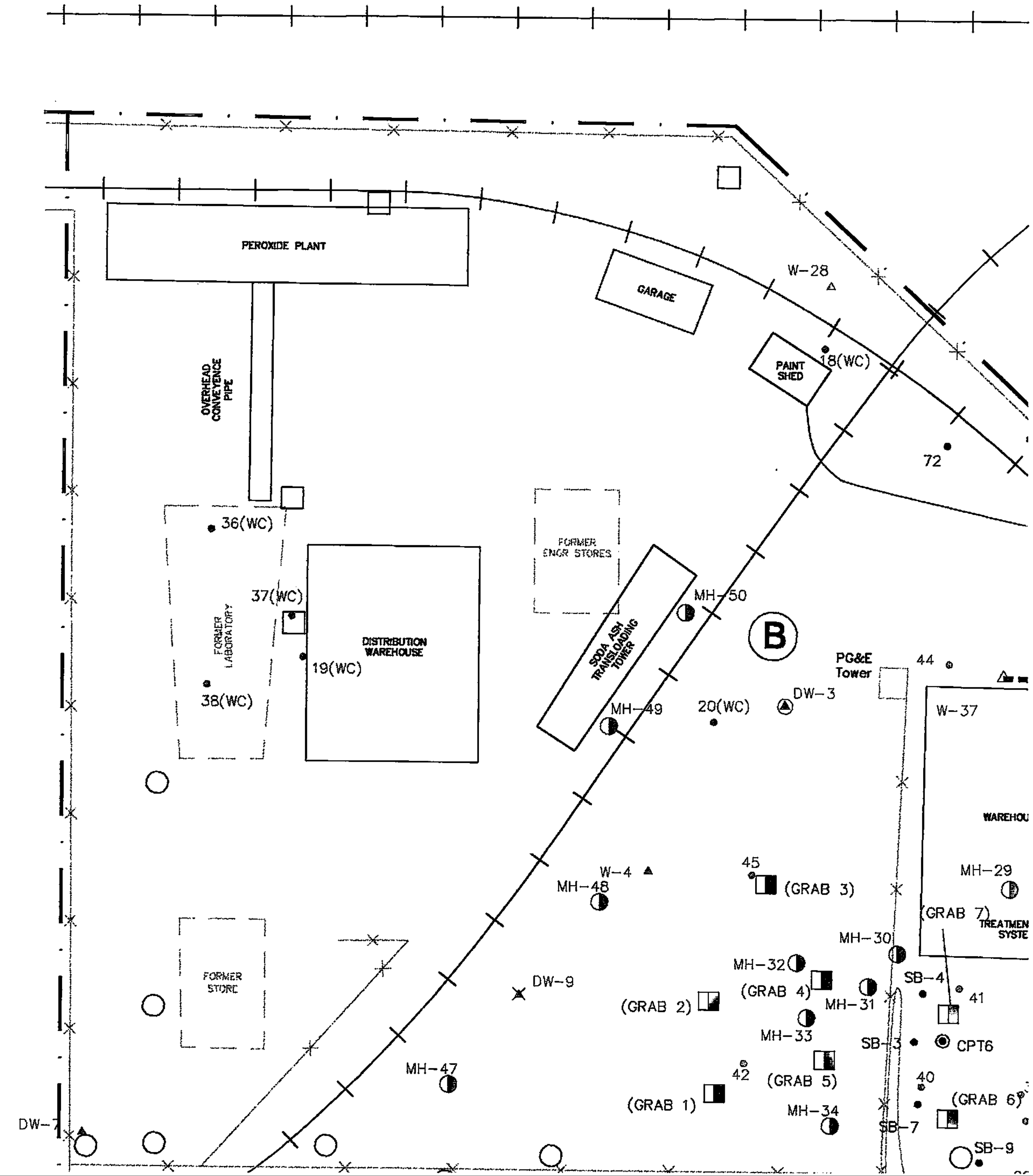
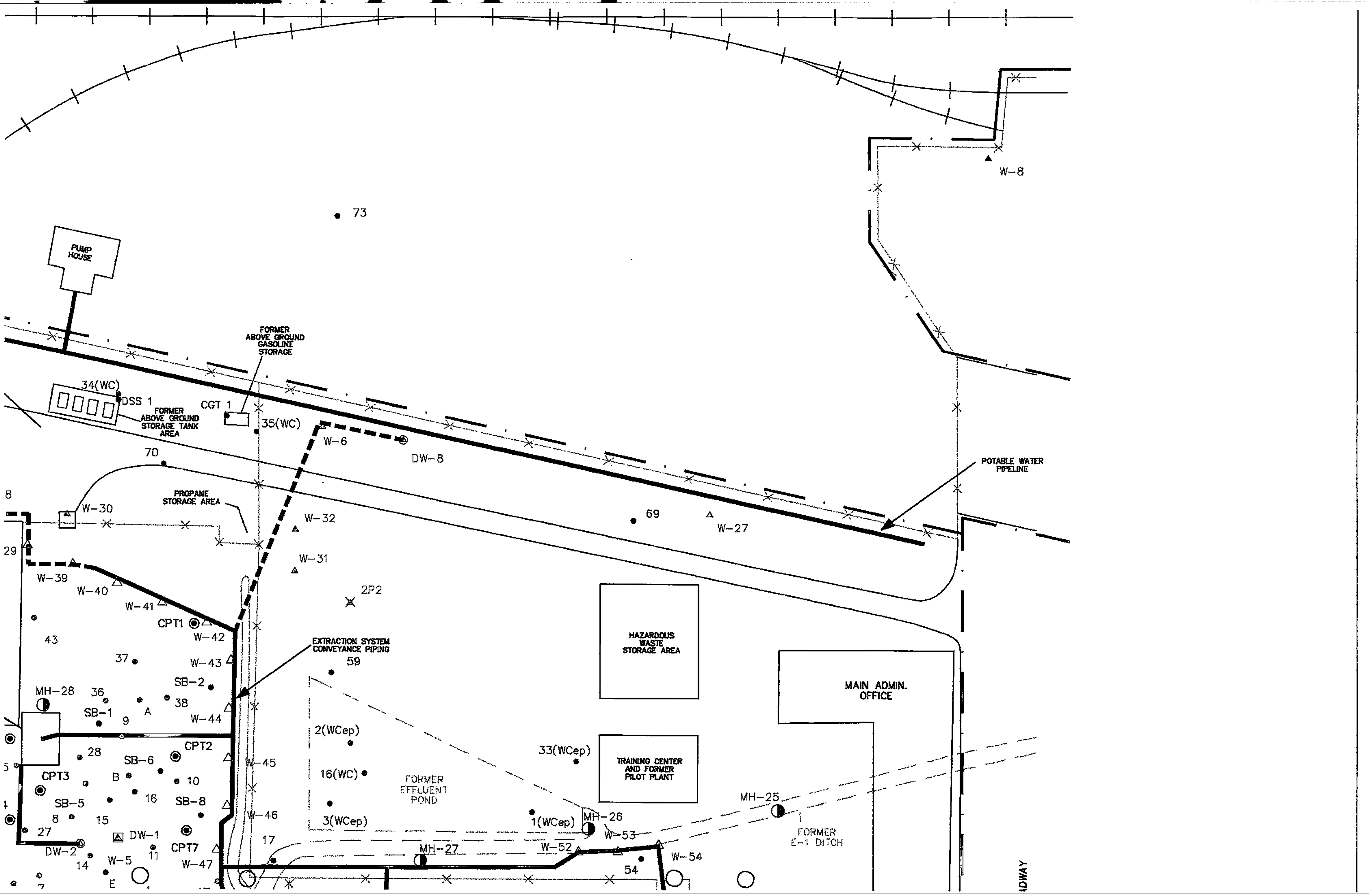
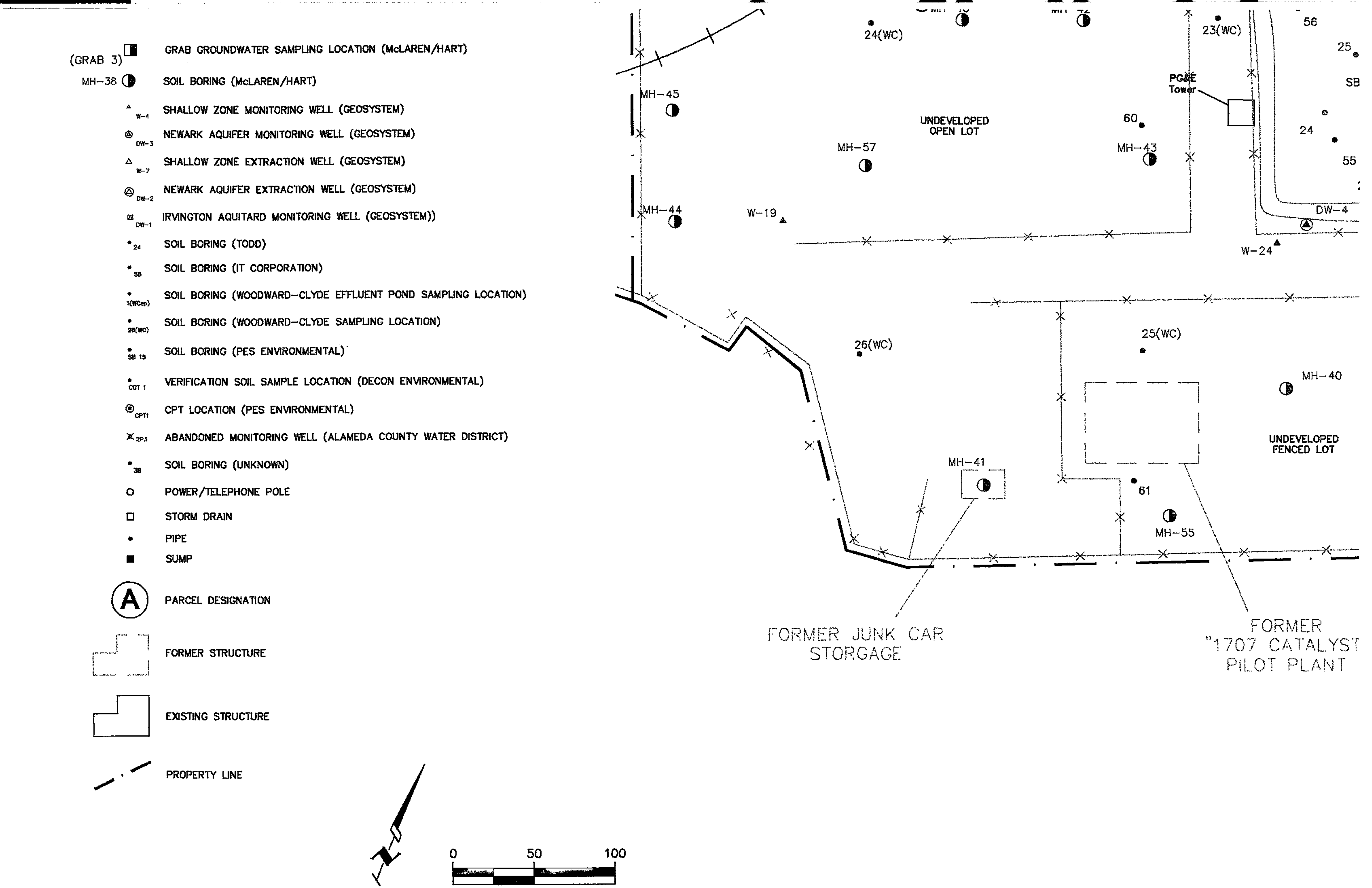

STAND PIPES
DW-11
MH-21
FORMER FILTER AID PIT
FORMER TKPP POND
13(WC)
31A
FORMER RECYCLED WATER AST FOUNDATION
HETCH HETCHY PIPELINE RIGHT-OF-WAY
HA-5
HA-7
HA-6
10(WC)
D
W-16
15(WC)
W-15
MH-15
MH-16
12(WC)
FORMER STORMWATER POND
MH-17
MH-18

FIGURE 6

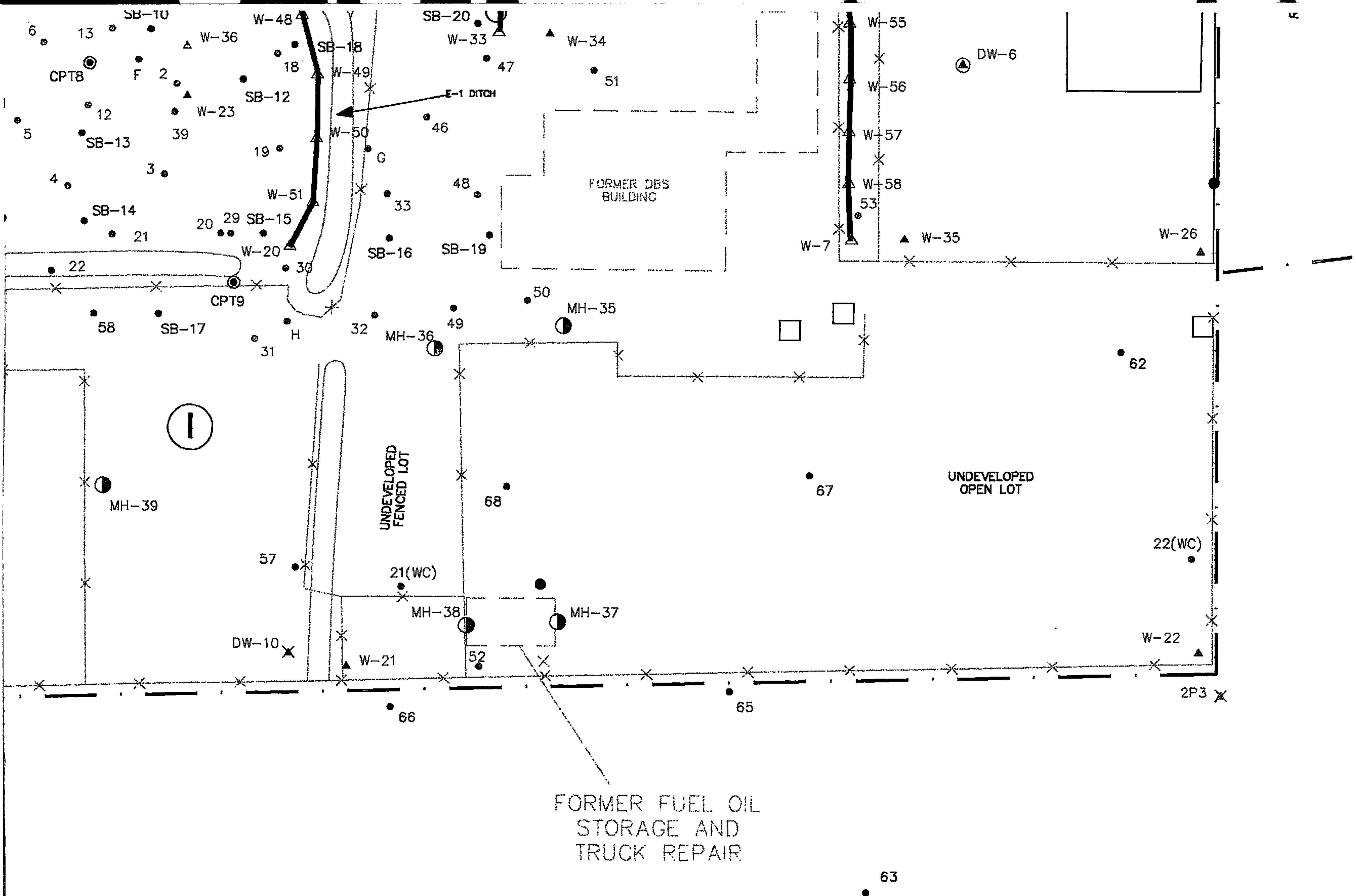

PEROXIDE PLANT
GARAGE
W-28
PAINT SHED
18(WC)
72
OVERHEAD CONVEYENCE PIPE
36(WC)
37(WC)
FORMER LABORATORY
19(WC)
DISTRIBUTION WAREHOUSE
38(WC)
FORMER ENGR STORES
SODA ASH TRANSLOADING TOWER
MH-50
B
PG&E Tower
44
MH-49
20(WC)
DW-3
W-37
WAREHOU
W-4
MH-48
45
(GRAB 3)
MH-29
(GRAB 7)
TREATMEN SYSTE
MH-30
MH-32
(GRAB 4)
MH-31
SB-4
41
DW-9
(GRAB 2)
MH-33
SB-3
CPT6
FORMER STORE
MH-47
42
(GRAB 5)
40
(GRAB 1)
MH-34
(GRAB 6)
SB-7
SB-9
DW-7



PUMP HOUSE
73
W-8
FORMER ABOVE GROUND GASOLINE STORAGE
34(WC)
DSS 1
CGT 1
FORMER ABOVE GROUND STORAGE TANK AREA
35(WC)
W-6
DW-8
70
PROPANE STORAGE AREA
W-30
W-32
W-31
2P2
69
W-27
POTABLE WATER PIPELINE
W-39
W-40
W-41
CPT1
W-42
43
37
W-43
EXTRACTION SYSTEM CONVEYANCE PIPING
59
HAZARDOUS WASTE STORAGE AREA
MAIN ADMIN. OFFICE
MH-28
36
SB-2
38
SB-1
9
A
W-44
2(WCep)
28
SB-6
CPT2
W-45
33(WCep)
TRAINING CENTER AND FORMER PILOT PLANT
CPT3
B
10
16(WC)
FORMER EFFLUENT POND
SB-5
16
SB-8
MH-25
8
15
W-46
3(WCep)
1(WCep)
MH-26
27
DW-1
W-53
FORMER E-1 DITCH
DW-2
11
CPT7
17
MH-27
W-52
W-54
14
W-5
W-47
E
54
29

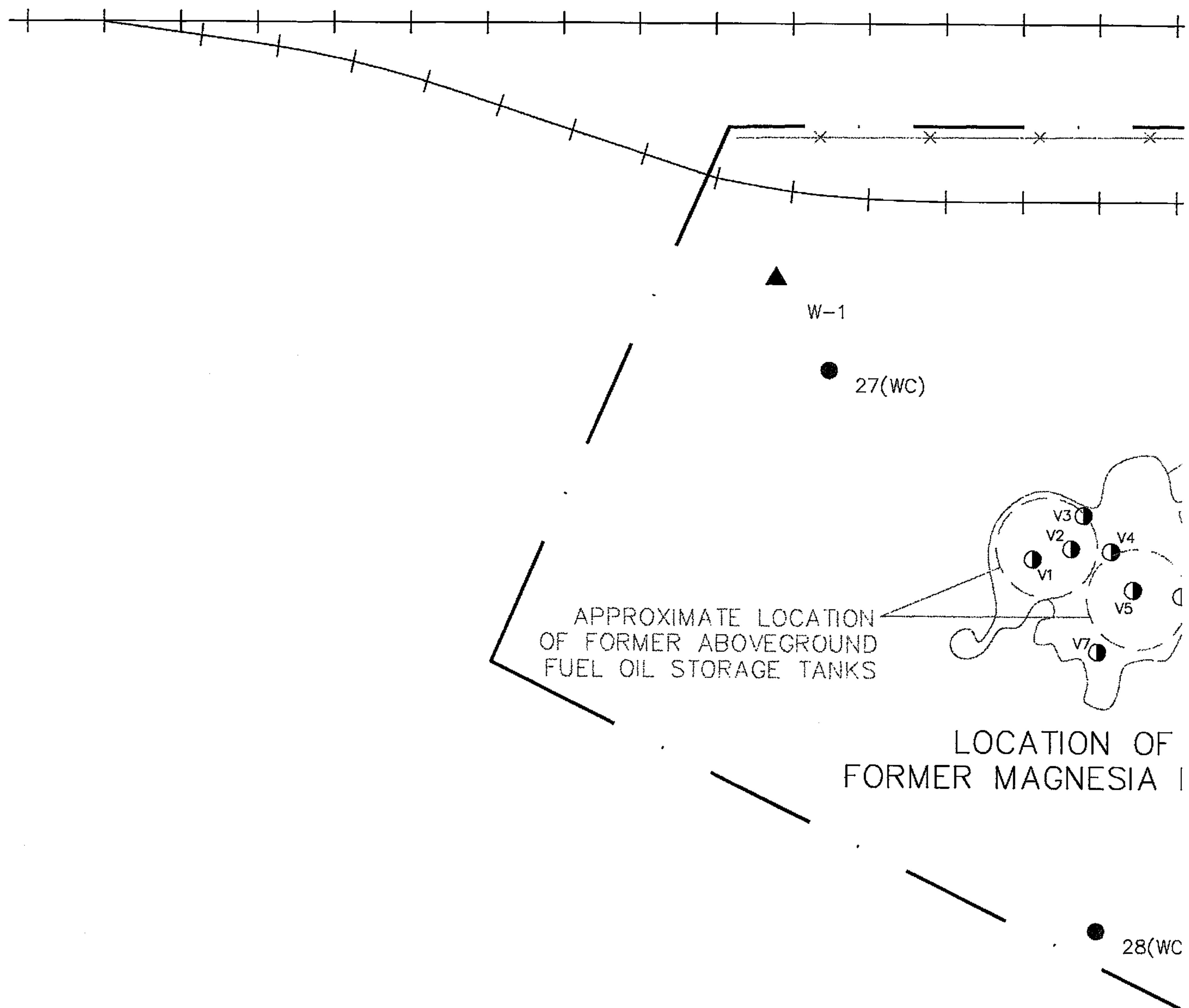


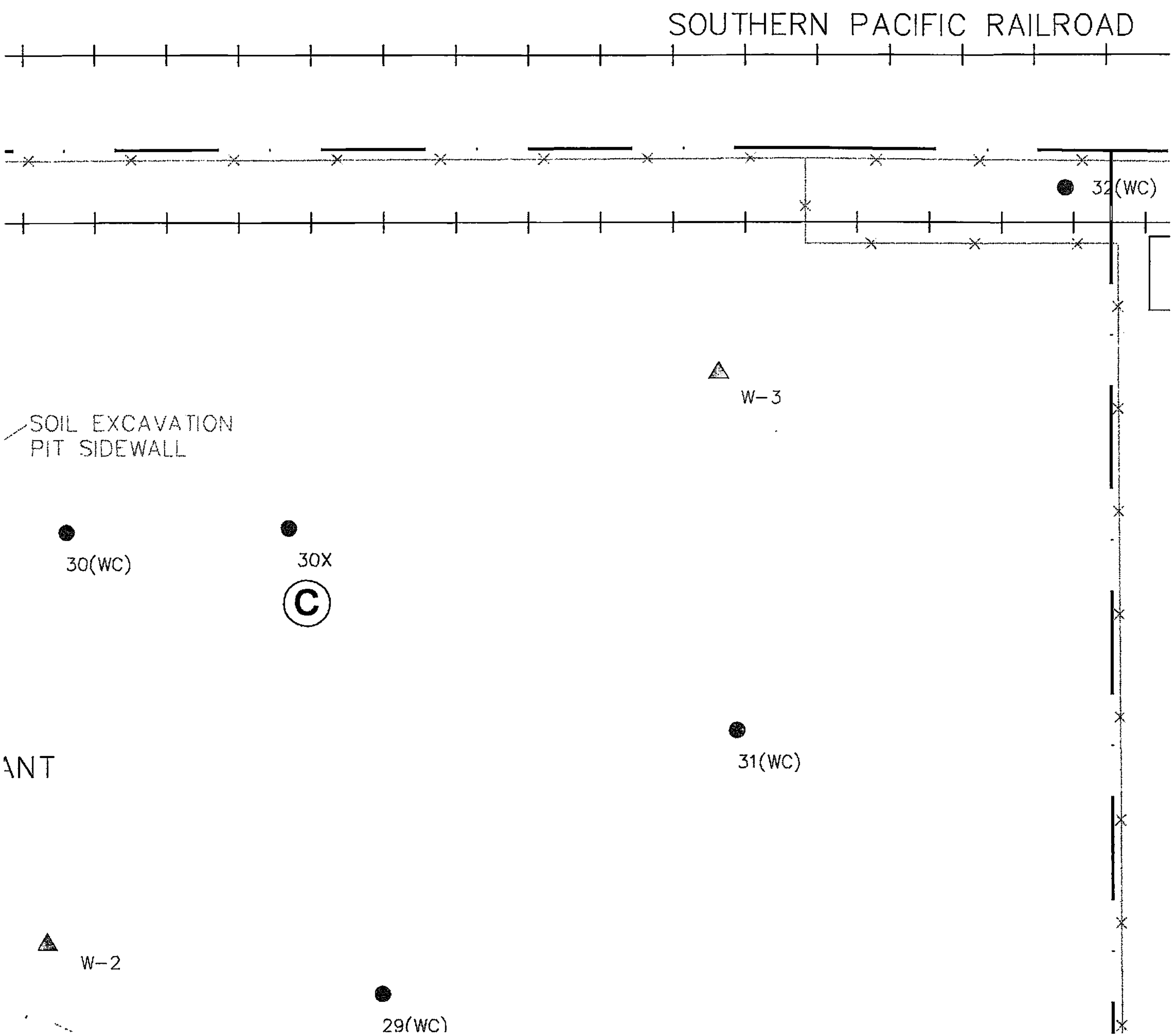
GRAB GROUNDWATER SAMPLING LOCATION (McLAREN/HART)
(GRAB 3)
MH-38
SOIL BORING (McLAREN/HART)
SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM))
SOIL BORING (TODD)
SOIL BORING (IT CORPORATION)
SOIL BORING (WOODWARD-CLYDE EFFLUENT POND SAMPLING LOCATION)
SOIL BORING (WOODWARD-CLYDE SAMPLING LOCATION)
SOIL BORING (PES ENVIRONMENTAL)
VERIFICATION SOIL SAMPLE LOCATION (DECON ENVIRONMENTAL)
CPT LOCATION (PES ENVIRONMENTAL)
ABANDONED MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)
SOIL BORING (UNKNOWN)
POWER/TELEPHONE POLE
STORM DRAIN
PIPE
SUMP
A
PARCEL DESIGNATION
FORMER STRUCTURE
EXISTING STRUCTURE
PROPERTY LINE
0
50
100
24(WC)
23(WC)
56
25
SB
PG&E Tower
MH-45
UNDEVELOPED OPEN LOT
60
24
MH-57
MH-43
55
MH-44
W-19
DW-4
W-24
25(WC)
26(WC)
MH-40
UNDEVELOPED FENCED LOT
MH-41
61
MH-55
FORMER JUNK CAR STORGAGE
FORMER "1707 CATALYST PILOT PLANT



E-1 DITCH
FORMER DBS BUILDING
UNDEVELOPED FENCED LOT
UNDEVELOPED OPEN LOT
FORMER FUEL OIL STORAGE AND TRUCK REPAIR
SB-10
SB-12
SB-13
SB-14
SB-15
SB-16
SB-17
SB-18
SB-19
SB-20
CPT8
CPT9
W-7
W-20
W-21
W-22
W-23
W-26
W-33
W-34
W-35
W-36
W-48
W-49
W-50
W-51
W-55
W-56
W-57
W-58
DW-6
DW-10
MH-35
MH-36
MH-37
MH-38
MH-39
21(WC)
22(WC)
2P3

FIGURE 7


W-1
27(WC)
V3
V2
V4
V1
V5
V7
APPROXIMATE LOCATION
OF FORMER ABOVEGROUND
FUEL OIL STORAGE TANKS
LOCATION OF
FORMER MAGNESIA
28(WC



SOUTHERN PACIFIC RAILROAD
32(WC)
W-3
SOIL EXCAVATION
PIT SIDEWALL
30(WC)
30X
C
31(WC)
ANT
W-2
29(WC)

V1 VERIFICATION SAMPLE LOCATION (MCLAREN/ HART)

28(WC) SOIL BORING (WOODWARD-CLYDE)

W-4 SHALLOW ZONE MONITORING WELL (FMC), INSTALLED BY GEOSYSTEM

POWER/TELEPHONE POLE

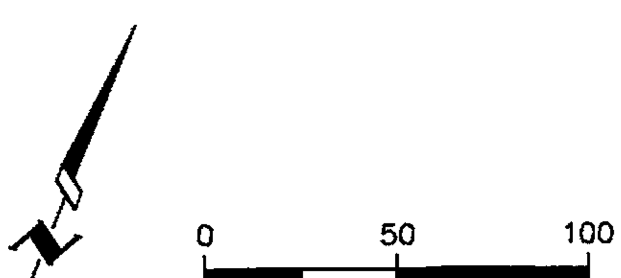
(A) PARCEL DESIGNATION

FORMER STRUCTURE

EXISTING STRUCTURE

PROPERTY LINE

NOTE: V1 THROUGH V7 WERE OBTAINED FOLLOWING SOIL REMOVAL ACTIVITIES IN ACCORDANCE WITH NEWARK FIRE DEPARTMENT REQUIREMENTS.



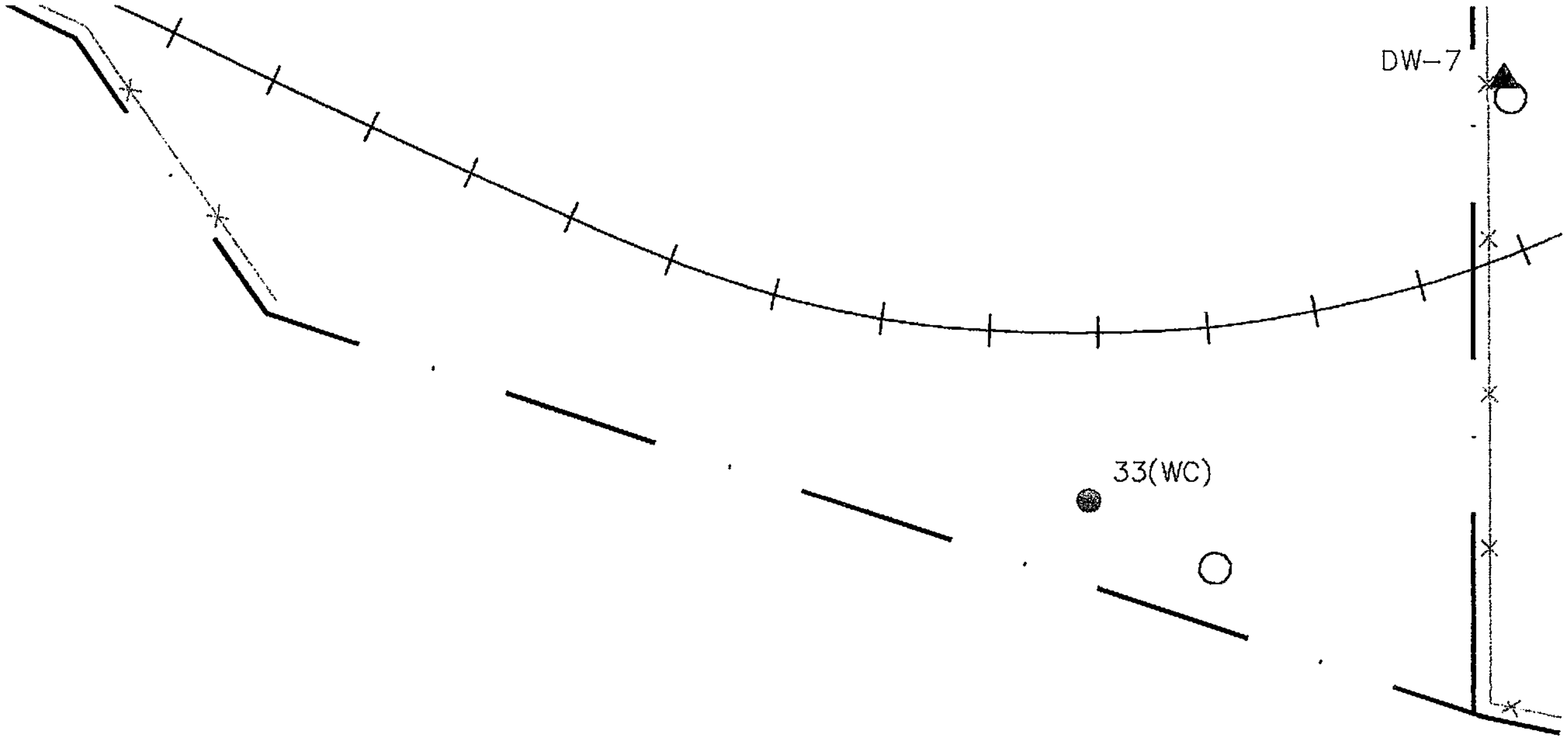
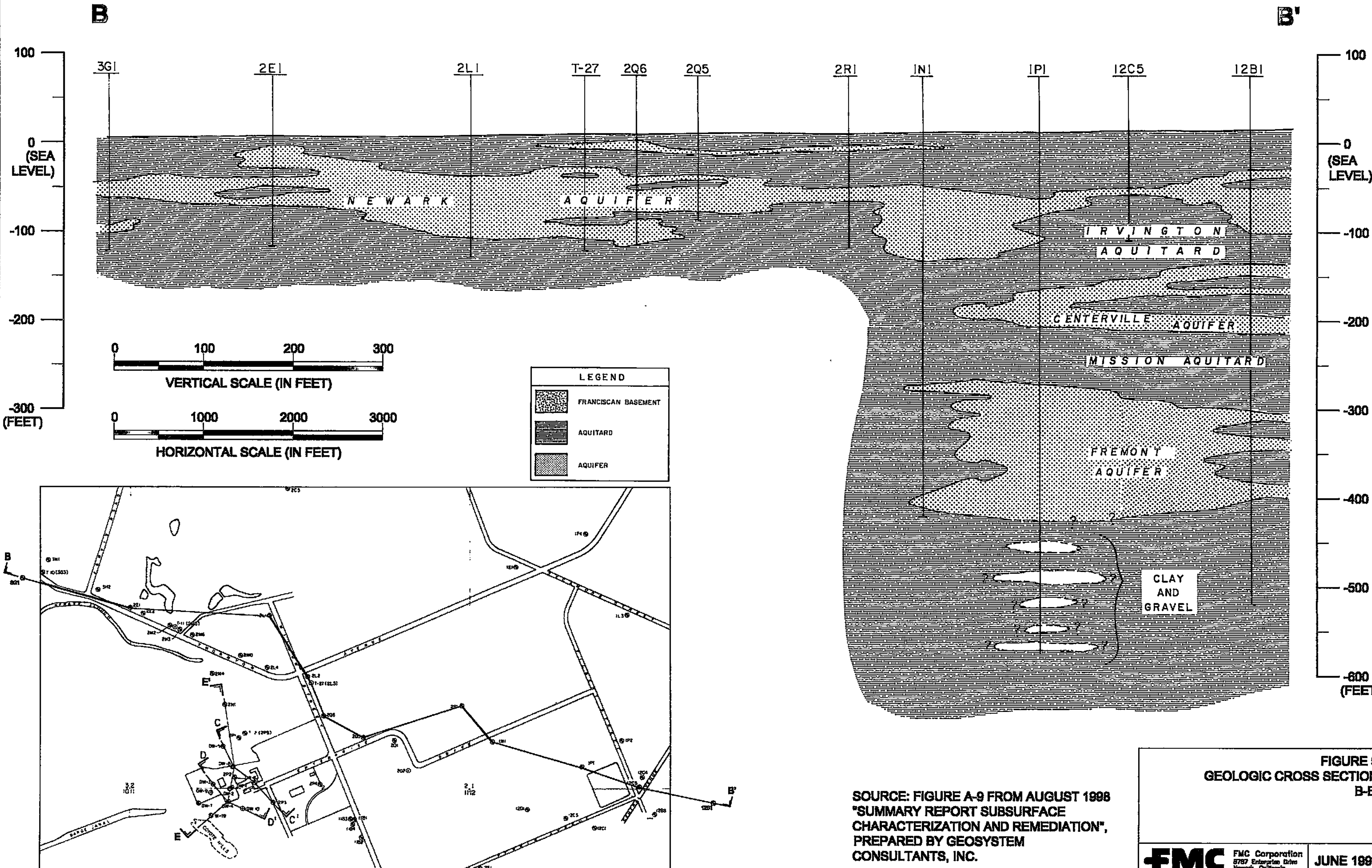


FIGURE 8
PREVIOUSLY EXISTING
SOIL BORING AND



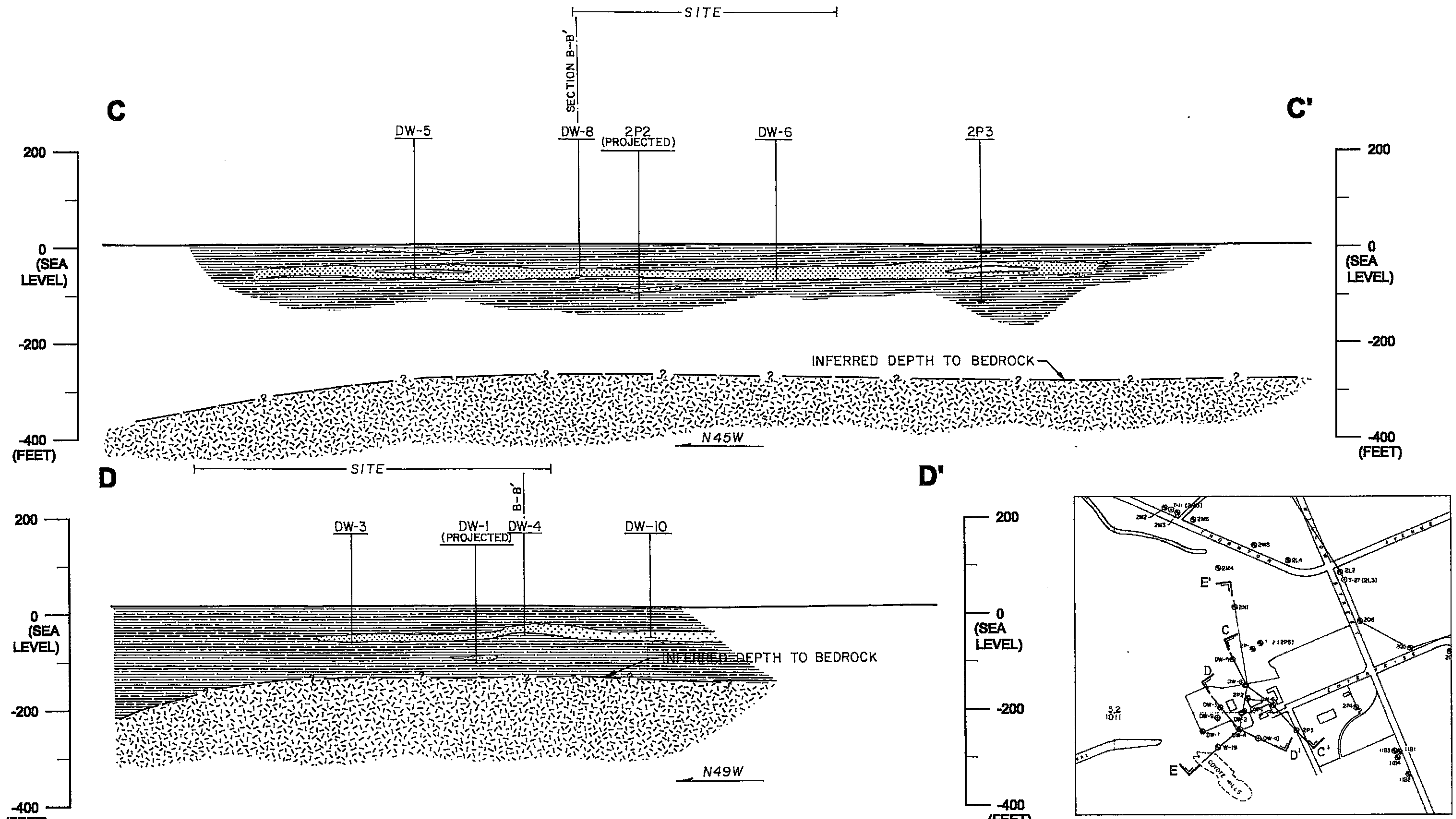
SOURCE: FIGURE A-9 FROM AUGUST 1998 "SUMMARY REPORT SUBSURFACE CHARACTERIZATION AND REMEDIATION", PREPARED BY GEOSYSTEM CONSULTANTS, INC.

FIGURE 9
GEOLOGIC CROSS SECTION B-B'

FMC Corporation
8787 Enterprise Drive
Newark, California

JUNE 1999

0599\fig9-border.dwg 02-26-99



LEGEND	
	FRANCISCAN BASEMENT
	AQUITARD
	AQUIFER

0 200 400 600

VERTICAL AND HORIZONTAL SCALE (IN FEET)

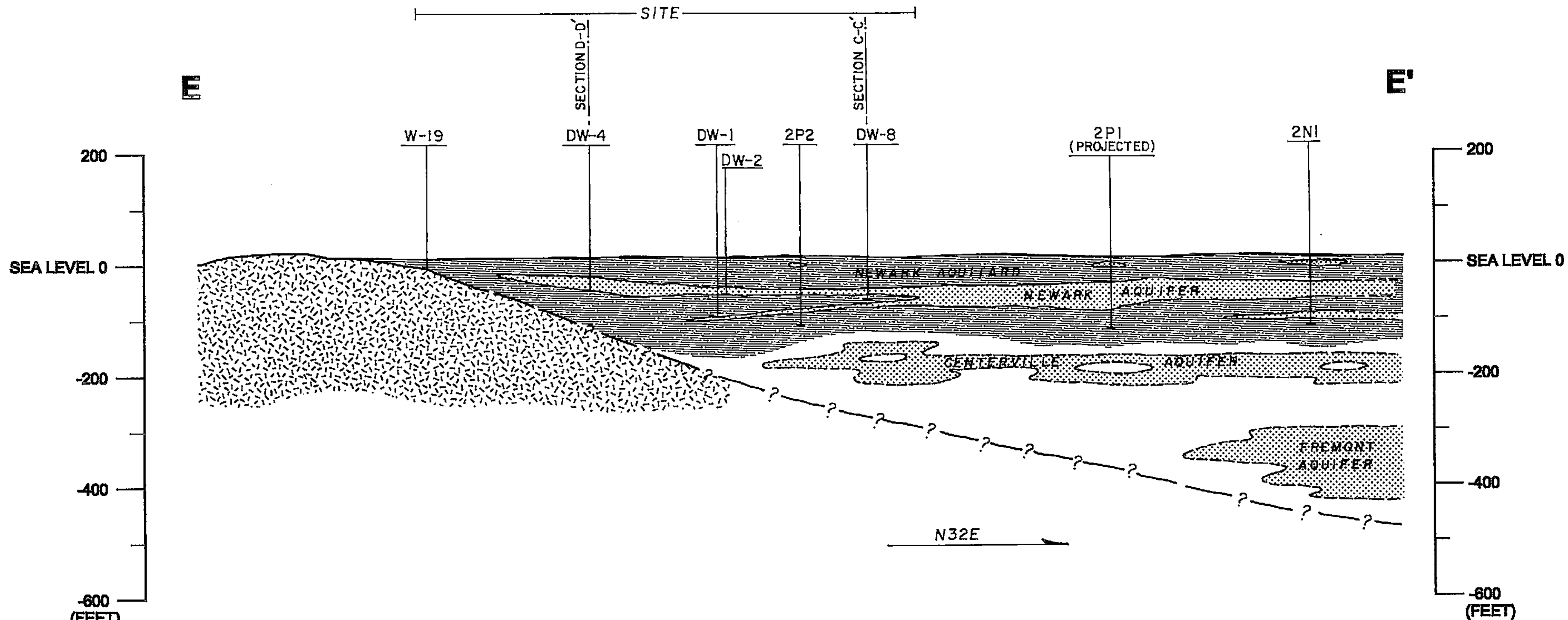
SOURCE: FIGURE A-8 FROM AUGUST 1998 "SUMMARY REPORT SUBSURFACE CHARACTERIZATION AND REMEDIATION", PREPARED BY GEOSYSTEM CONSULTANTS, INC.

FIGURE 10
GEOLOGIC CROSS SECTIONS C-C' AND D-D'

FMC Corporation
8787 Enterprise Drive
Newark, California

JUNE 1999

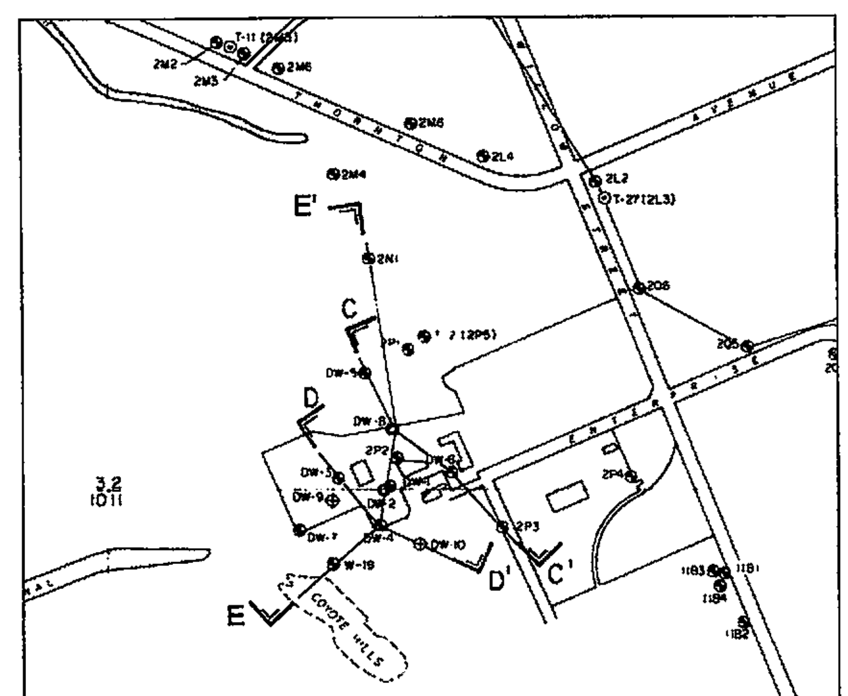
0599\fig10--border.dwg 02-26-99



VERTICAL AND HORIZONTAL SCALE (IN FEET)

LEGEND	
	FRANCISCAN BASEMENT
	AQUITARD
	AQUIFER

NOTE:
1. DISTRIBUTION OF THE CENTERVILLE AND FREMONT AQUIFERS IS PROJECTED FROM LOGS OF WELLS WITHIN A 2-MILE RADIUS.



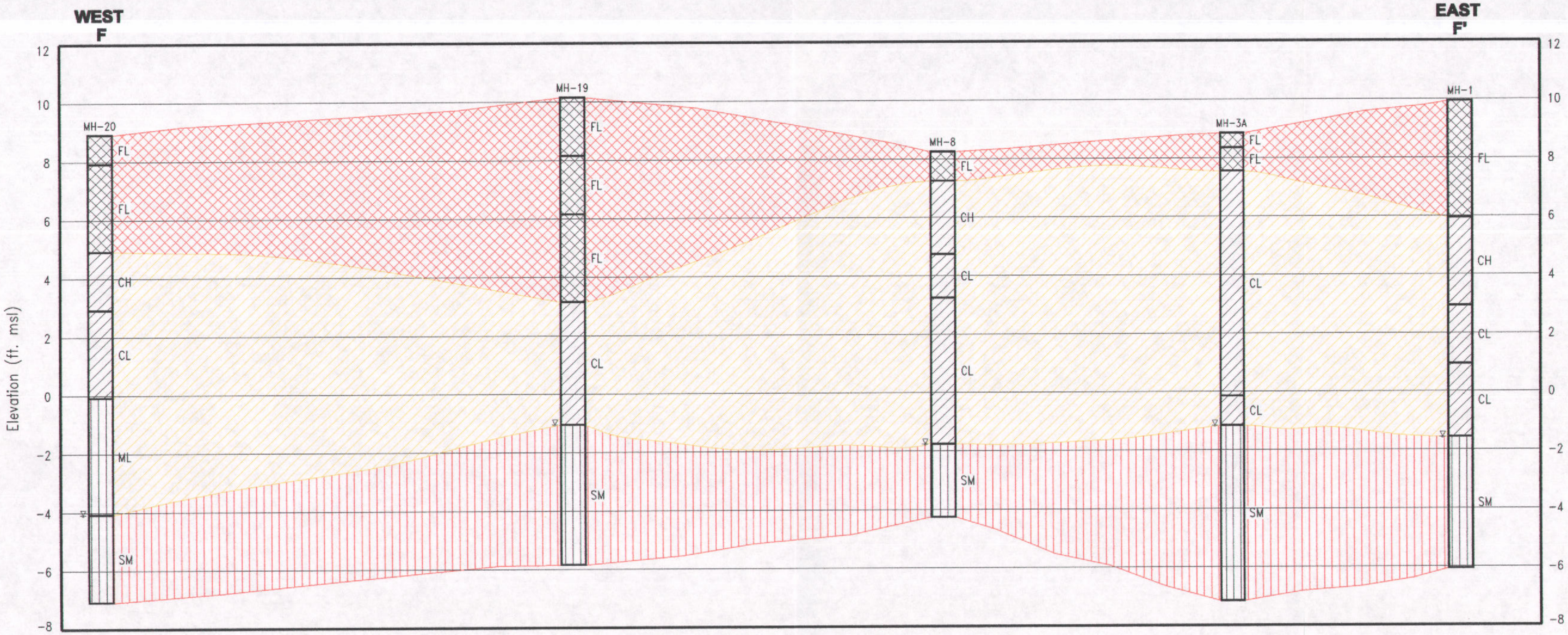
SOURCE: FIGURE A-7 FROM AUGUST 1998 "SUMMARY REPORT SUBSURFACE CHARACTERIZATION AND REMEDIATION", PREPARED BY GEOSYSTEM CONSULTANTS, INC.

FIGURE 11
GEOLOGIC CROSS SECTION
E-E'

FMC Corporation
5757 Enterprise Drive
Newark, California

JUNE 1999

0599\fig11-border.dwg 02-28-99



FL (FILL)

CH \ CL \ OH \ ML (CLAY \ SILTY CLAY \ ORGANIC CLAY \ SILT)

SM \ GM (SILTY SAND \ SILTY GRAVELS)

FIRST ENCOUNTERED WATER

VERTICAL EXAGGERATION = 24.5

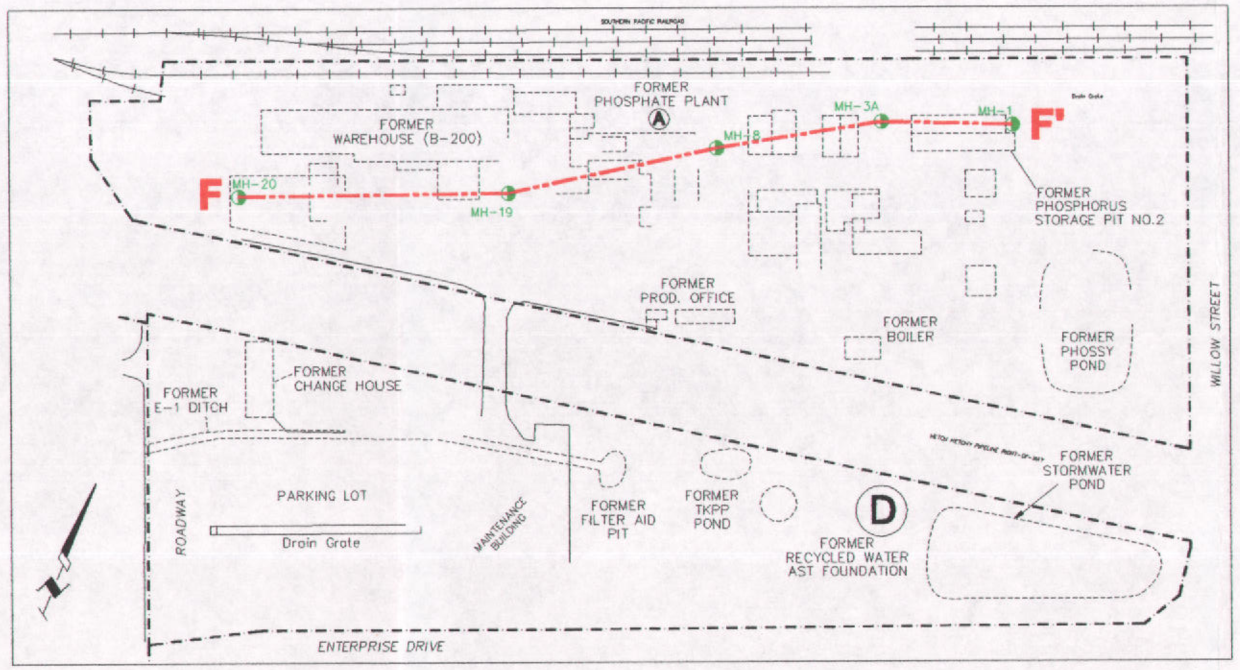
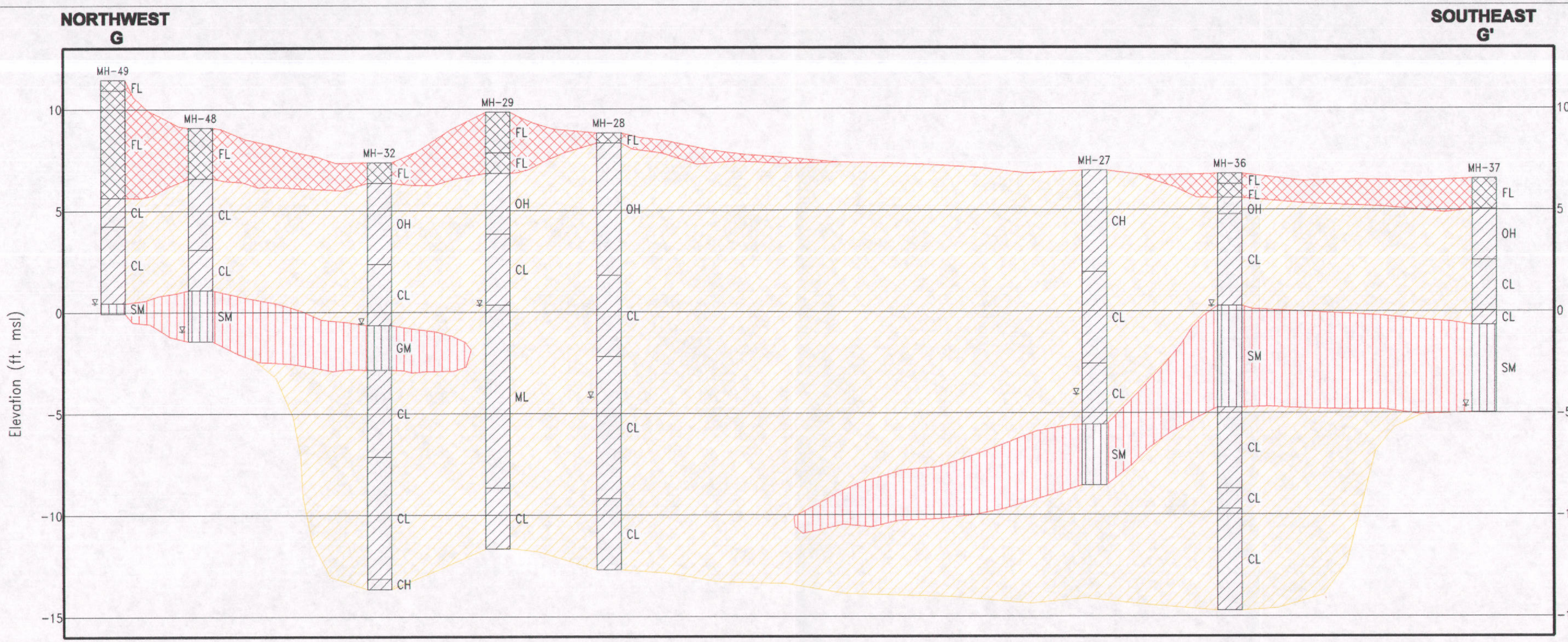


FIGURE 12
GEOLOGIC CROSS-SECTION F-F'

FMC Corporation
8787 Enterprise Drive
Newark, California

JUNE 1999

0599\f12-0599.dwg 04-15-99

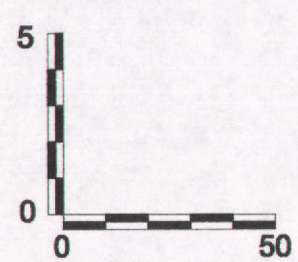


FL (FILL)

CH \ CL \ OH \ ML (CLAY \ SILTY CLAY \ ORGANIC CLAY \ SILT)

SM \ GM (SILTY SAND \ SILTY GRAVELS)

FIRST ENCOUNTERED WATER



VERTICAL EXAGGERATION = 8.6

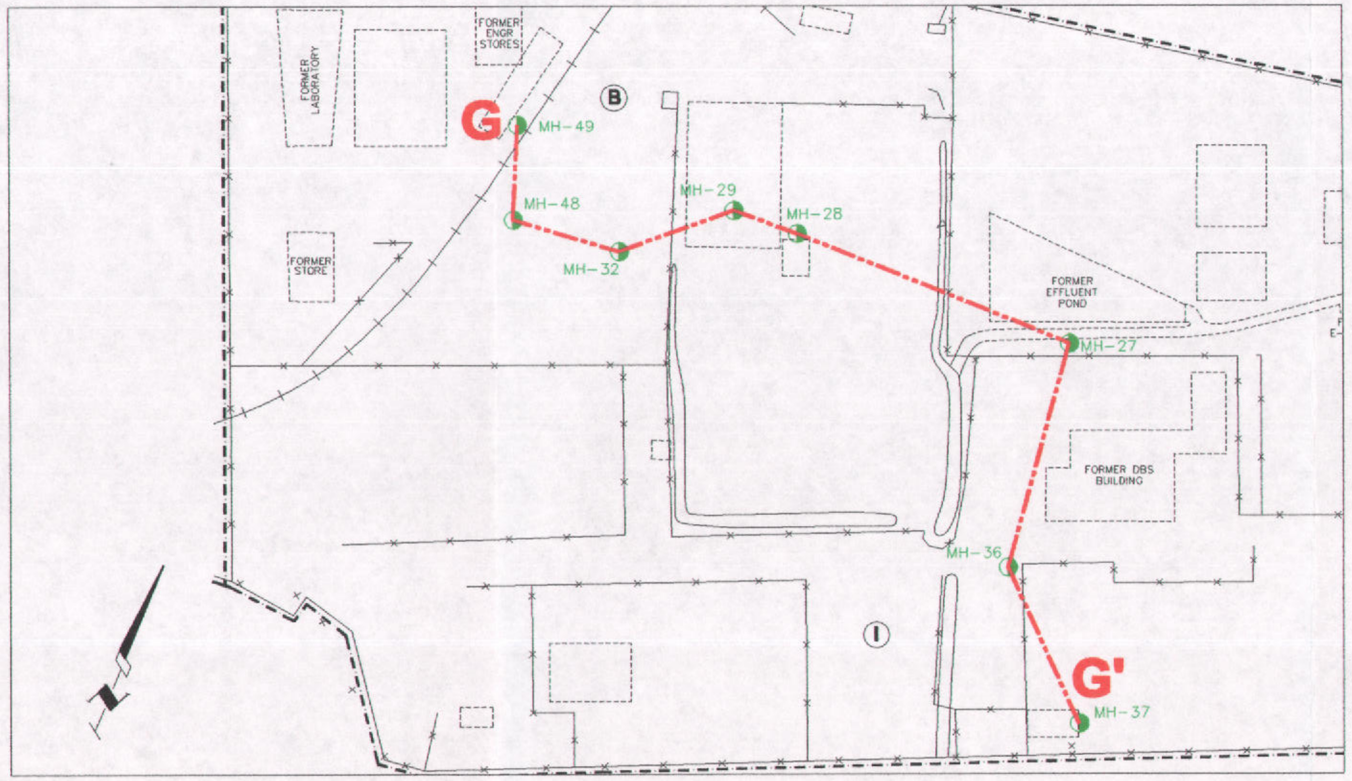
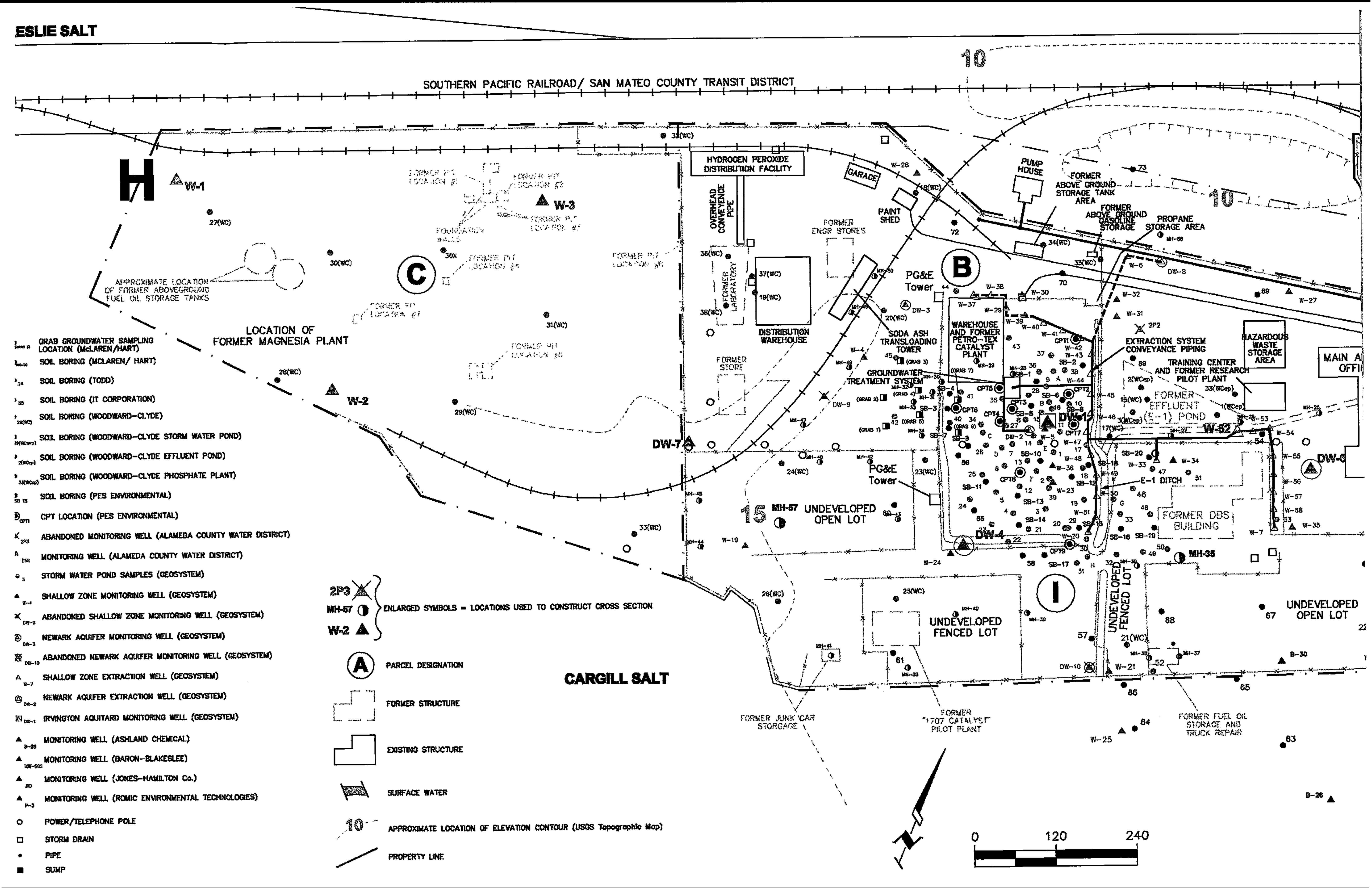


FIGURE 13
GEOLOGIC CROSS-SECTION G-G'

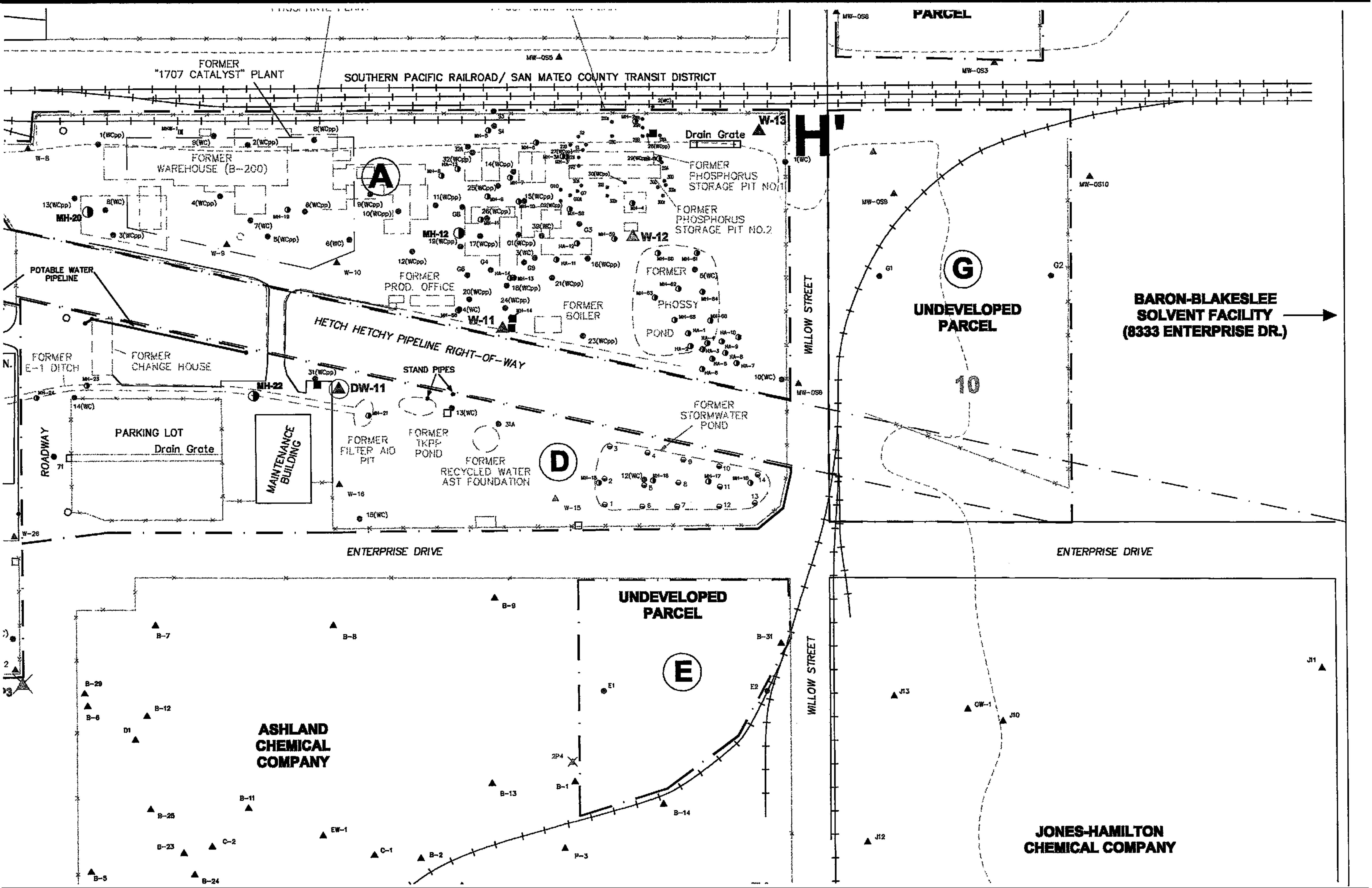
FMC Corporation
8787 Enterprise Drive
Newark, California

JUNE 1999

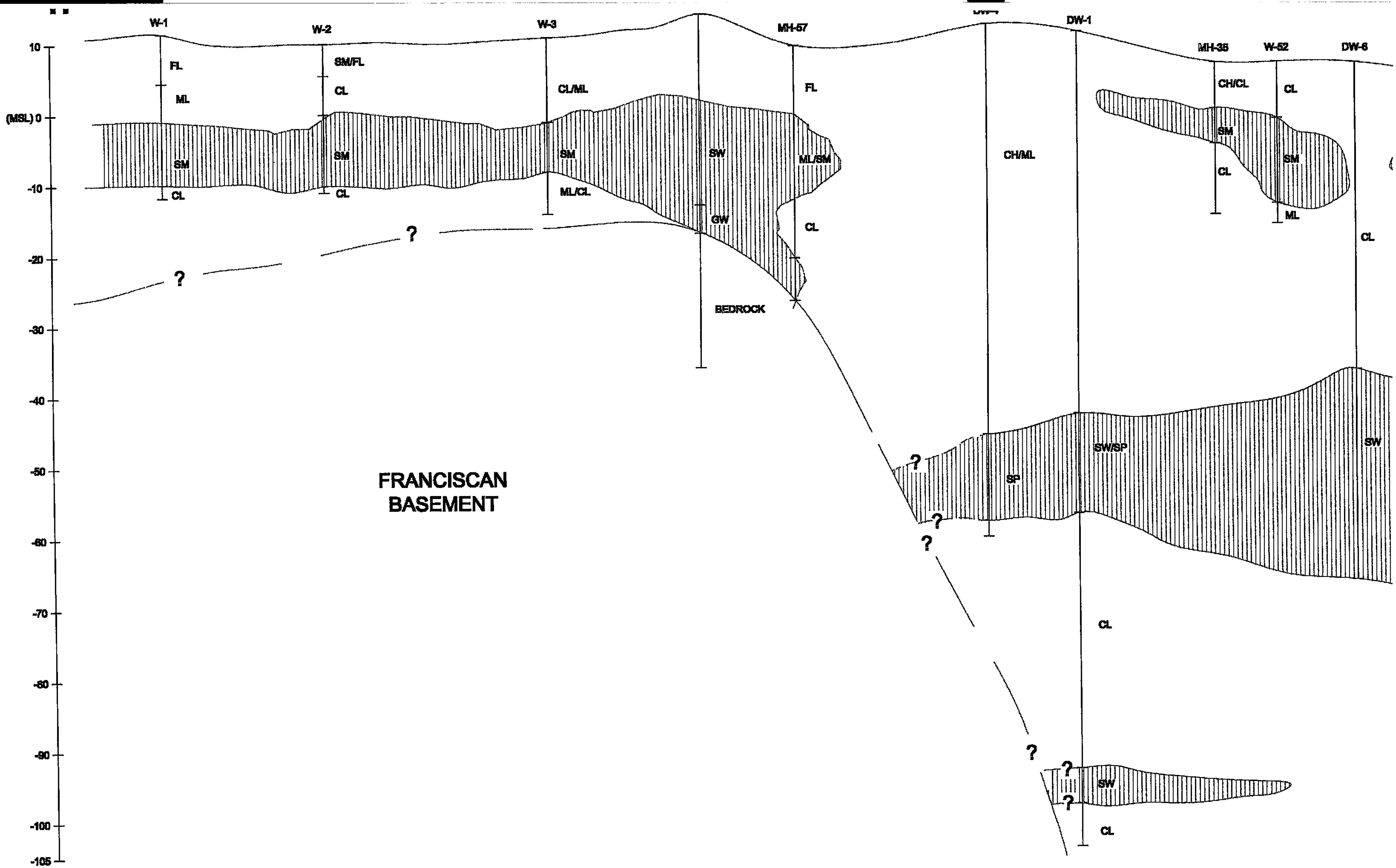
0599\f13-0599.dwg 04-15-99



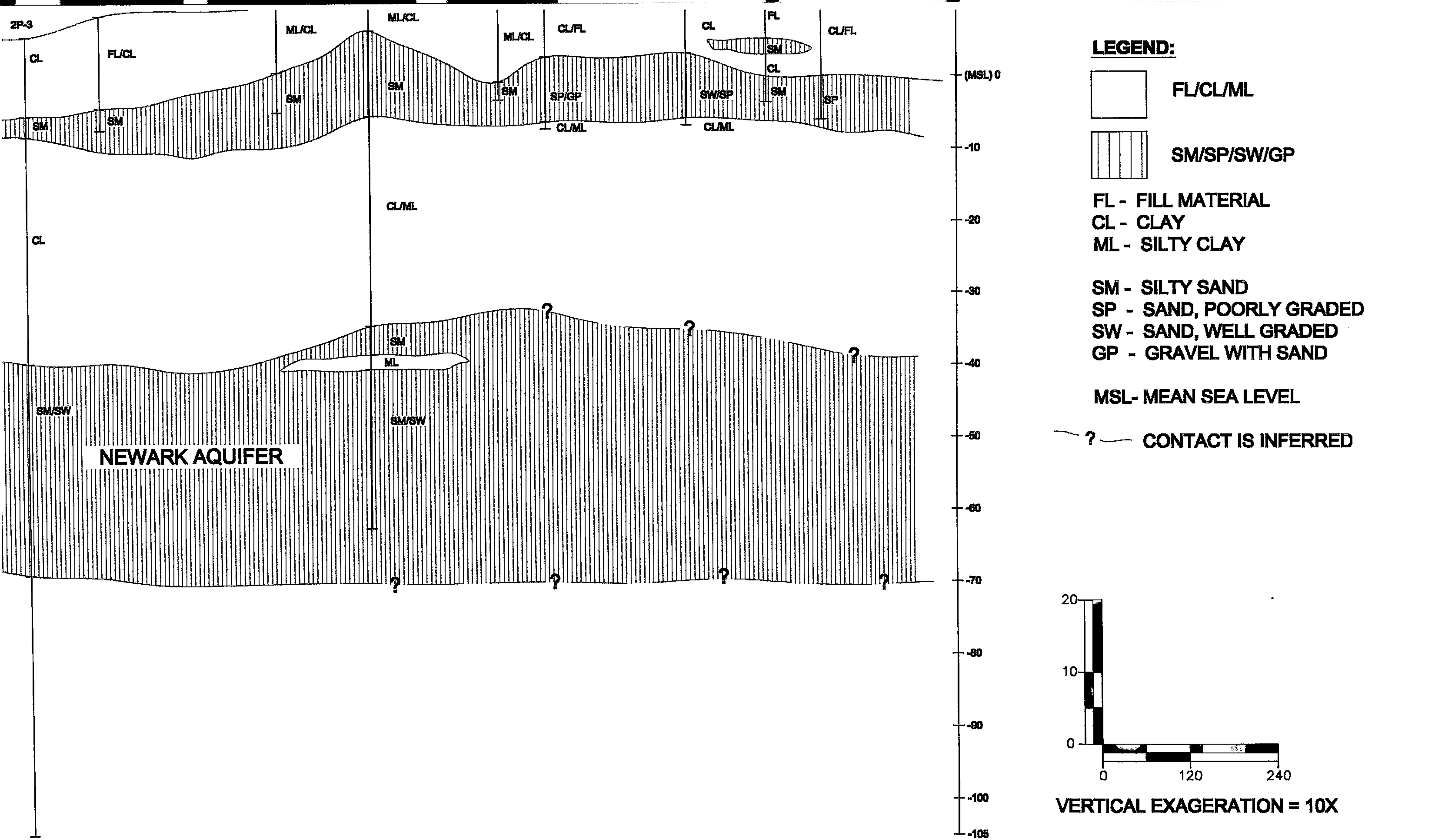
LESLIE SALT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
10
H
W-1
W-2
W-3
C
LOCATION OF FORMER MAGNESIA PLANT
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
HYDROGEN PEROXIDE DISTRIBUTION FACILITY
OVERHEAD CONVEYENCE PIPE
GARAGE
PAINT SHED
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
FORMER ENGR STORES
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
PG&E Tower
B
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
SODA ASH TRANSLOADING TOWER
GROUNDWATER TREATMENT SYSTEM
EXTRACTION SYSTEM CONVEYANCE PIPING
TRAINING CENTER AND FORMER RESEARCH PILOT PLANT
HAZARDOUS WASTE STORAGE AREA
MAIN A OFFI
FORMER EFFLUENT (E-1) POND
E-1 DITCH
FORMER DBS BUILDING
FORMER STORE
DW-7
15
UNDEVELOPED OPEN LOT
DW-4
DW-1
DW-6
MH-57
MH-35
I
UNDEVELOPED FENCED LOT
UNDEVELOPED OPEN LOT
CARGILL SALT
FORMER JUNK CAR STORAGE
FORMER "1707 CATALYST" PILOT PLANT
FORMER FUEL OIL STORAGE AND TRUCK REPAIR
GRAB GROUNDWATER SAMPLING LOCATION (McLAREN/HART)
SOIL BORING (McLAREN/ HART)
SOIL BORING (TODD)
SOIL BORING (IT CORPORATION)
SOIL BORING (WOODWARD-CLYDE)
SOIL BORING (WOODWARD-CLYDE STORM WATER POND)
SOIL BORING (WOODWARD-CLYDE EFFLUENT POND)
SOIL BORING (WOODWARD-CLYDE PHOSPHATE PLANT)
SOIL BORING (PES ENVIRONMENTAL)
CPT LOCATION (PES ENVIRONMENTAL)
ABANDONED MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)
MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)
STORM WATER POND SAMPLES (GEOSYSTEM)
SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
MONITORING WELL (ASHLAND CHEMICAL)
MONITORING WELL (BARON-BLAKESLEE)
MONITORING WELL (JONES-HAMILTON Co.)
MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)
POWER/TELEPHONE POLE
STORM DRAIN
PIPE
SUMP
2P3
MH-57
W-2
ENLARGED SYMBOLS = LOCATIONS USED TO CONSTRUCT CROSS SECTION
PARCEL DESIGNATION
FORMER STRUCTURE
EXISTING STRUCTURE
SURFACE WATER
APPROXIMATE LOCATION OF ELEVATION CONTOUR (USGS Topographic Map)
PROPERTY LINE
N
0
120
240



FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
PARCEL
W-13
H'
Drain Grate
FORMER WAREHOUSE (B-200)
A
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
MH-20
MH-12
W-12
FORMER PROD. OFFICE
FORMER PHOSSY POND
FORMER BOILER
W-11
POTABLE WATER PIPELINE
HETCH HETCHY PIPELINE RIGHT-OF-WAY
FORMER E-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
MH-22
DW-11
PARKING LOT
Drain Grate
ROADWAY
MAINTENANCE BUILDING
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER AST FOUNDATION
D
FORMER STORMWATER POND
WILLOW STREET
G
UNDEVELOPED PARCEL
10
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
ENTERPRISE DRIVE
ENTERPRISE DRIVE
UNDEVELOPED PARCEL
E
WILLOW STREET
ASHLAND CHEMICAL COMPANY
JONES-HAMILTON CHEMICAL COMPANY

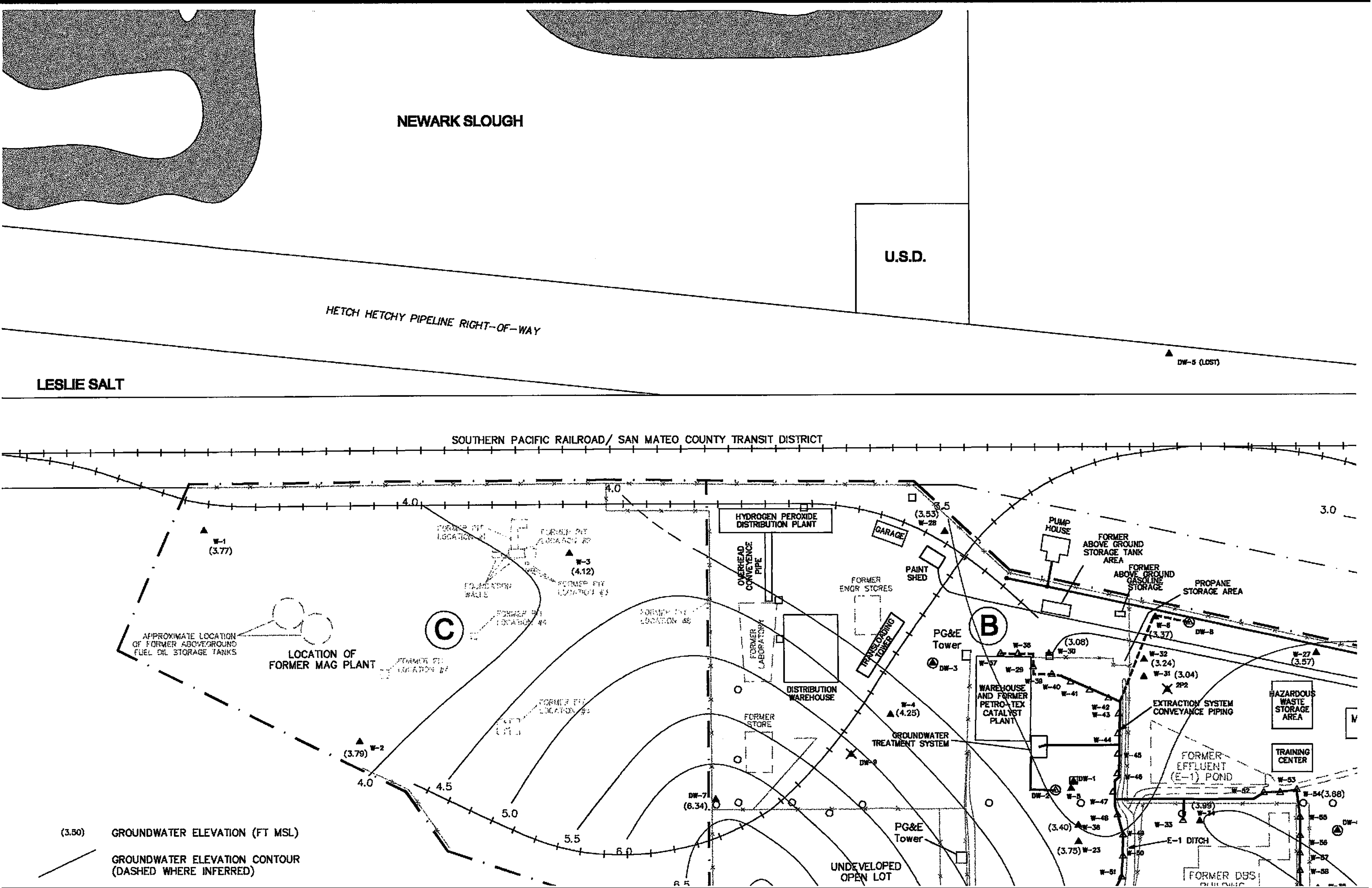


W-1
W-2
W-3
MH-57
DW-1
MH-35
W-52
DW-6
10
(MSL) 0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-105
FL
ML
SM
CL
SM/FL
CL
SM
CL
CL/ML
SM
ML/CL
SW
GW
BEDROCK
FL
ML/SM
CL
CH/ML
SP
SW/SP
CL
SW
CL
CH/CL
SM
CL
CL
SM
ML
CL
SW
FRANCISCAN BASEMENT
?

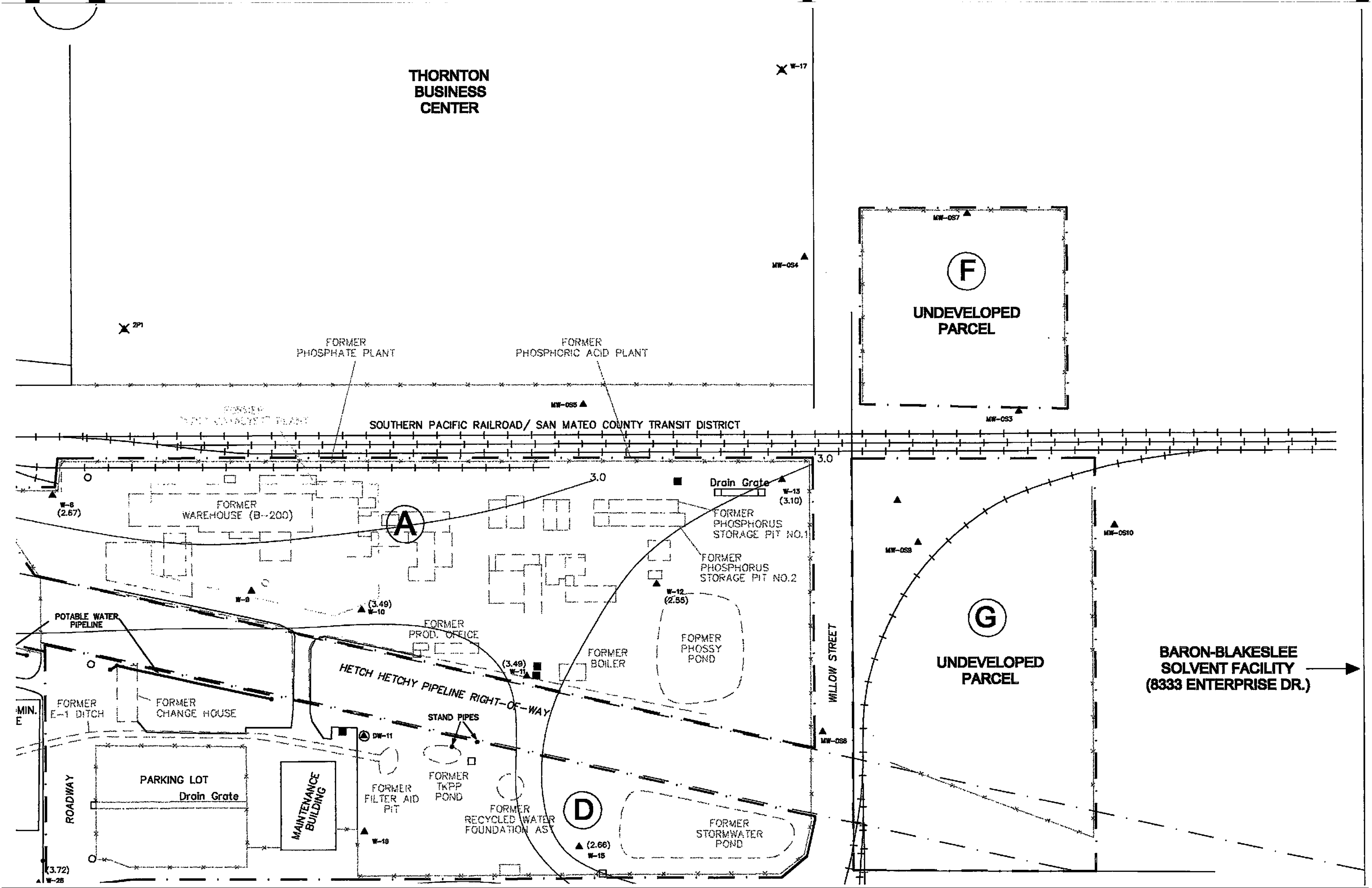


2P-3
CL
FL/CL
ML/CL
ML/CL
ML/CL
CL/FL
CL
FL
CL/FL
SM
SM
CL
SM
SM
SM
SP/GP
SW/SP
SM
SP
SM
SM
CL/ML
CL/ML
CL/ML
CL
SM
ML
SM/SW
SM/SW
NEWARK AQUIFER
(MSL) 0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-105
LEGEND:
FL/CL/ML
SM/SP/SW/GP
FL - FILL MATERIAL
CL - CLAY
ML - SILTY CLAY
SM - SILTY SAND
SP - SAND, POORLY GRADED
SW - SAND, WELL GRADED
GP - GRAVEL WITH SAND
MSL- MEAN SEA LEVEL
? CONTACT IS INFERRED
20
10
0
0
120
240
VERTICAL EXAGERATION = 10X

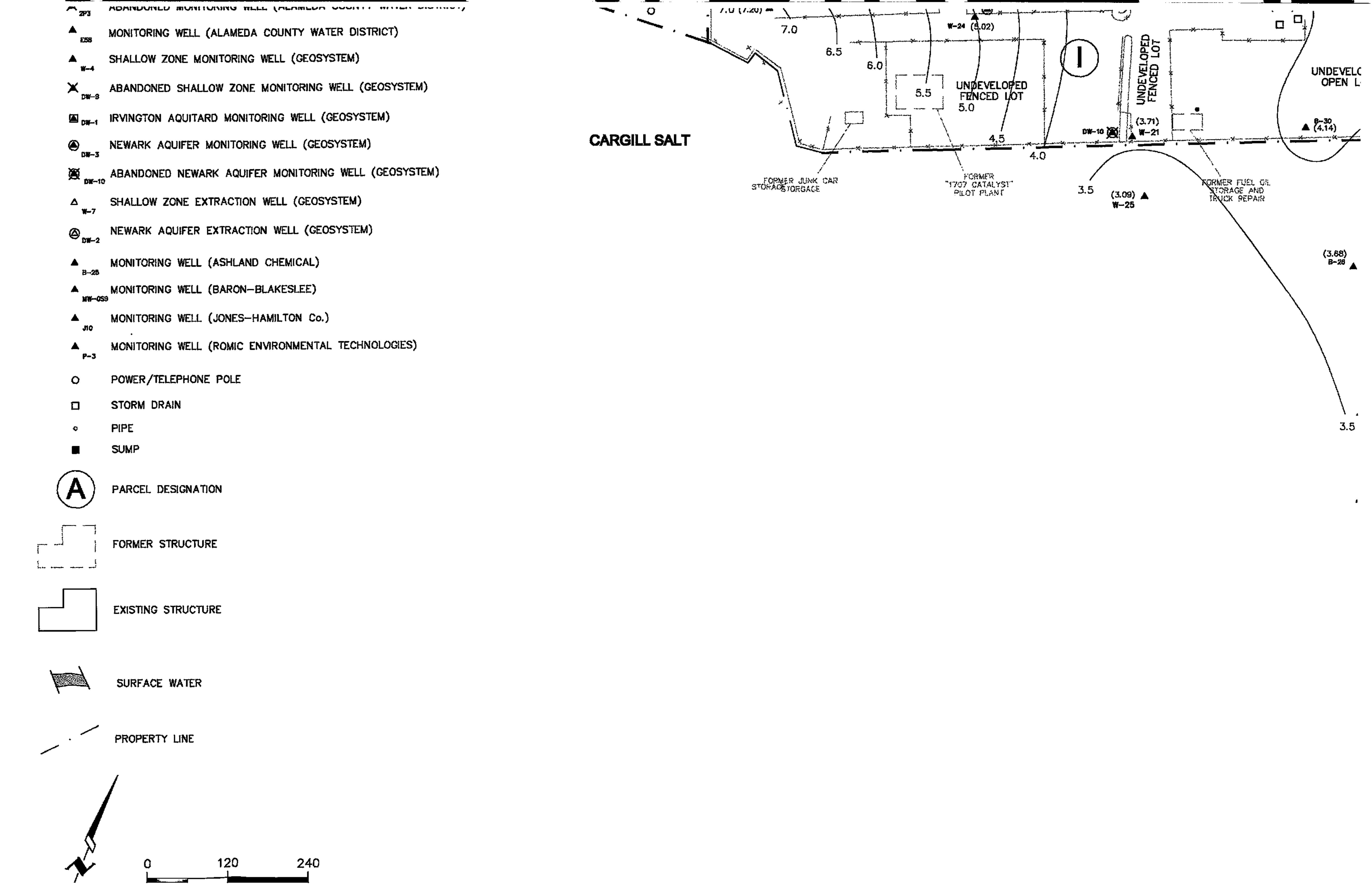
FIGURE 14



NEWARK SLOUGH
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
DW-5 (LOST)
LESLIE SALT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
HYDROGEN PEROXIDE DISTRIBUTION PLANT
OVERHEAD CONVEYENCE PIPE
GARAGE
PAINT SHED
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
FORMER ENGR STORES
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
TRANSLOADING TOWER
PG&E Tower
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
GROUNDWATER TREATMENT SYSTEM
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
TRAINING CENTER
FORMER EFFLUENT (E-1) POND
E-1 DITCH
FORMER DBS BUILDING
FORMER STORE
UNDEVELOPED OPEN LOT
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
LOCATION OF FORMER MAG PLANT
C
B
W-1 (3.77)
W-2 (3.79)
W-3 (4.12)
W-4 (4.25)
W-28 (3.53)
W-6 (3.37)
W-27 (3.57)
W-32 (3.24)
W-31 (3.04)
W-30 (3.08)
DW-7 (6.34)
DW-3
DW-8
DW-9
2P2
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
(3.50) GROUNDWATER ELEVATION (FT MSL)
GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)



THORNTON BUSINESS CENTER
W-17
2P1
MW-OS4
MW-OS7
F
UNDEVELOPED PARCEL
MW-OS3
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
MW-OS5
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
3.0
3.0
Drain Grate
W-13 (3.10)
W-8 (2.67)
FORMER WAREHOUSE (B-200)
A
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
MW-OS10
MW-OS9
W-9
(3.49) W-10
W-12 (2.55)
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
FORMER PHOSSY POND
(3.49) W-11
FORMER BOILER
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
HETCH HETCHY PIPELINE RIGHT-OF-WAY
WILLOW STREET
FORMER E-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
DW-11
MW-OS6
PARKING LOT
Drain Grate
ROADWAY
MAINTENANCE BUILDING
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER FOUNDATION AST
D
FORMER STORMWATER POND
W-16
(2.66) W-15
(3.72) W-28


MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)
SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
MONITORING WELL (ASHLAND CHEMICAL)
MONITORING WELL (BARON-BLAKESLEE)
MONITORING WELL (JONES-HAMILTON Co.)
MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)
POWER/TELEPHONE POLE
STORM DRAIN
PIPE
SUMP
A
PARCEL DESIGNATION
FORMER STRUCTURE
EXISTING STRUCTURE
SURFACE WATER
PROPERTY LINE
0
120
240
CARGILL SALT
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
W-24 (5.02)
I
UNDEVELOPED FENCED LOT
UNDEVELOPED FENCED LOT
DW-10
(3.71) W-21
(3.09) W-25
B-30 (4.14)
(3.68) B-26
FORMER JUNK CAR STORAGE
FORMER "1707 CATALYST" PILOT PLANT
FORMER FUEL OIL STORAGE AND TRUCK REPAIR
3.5

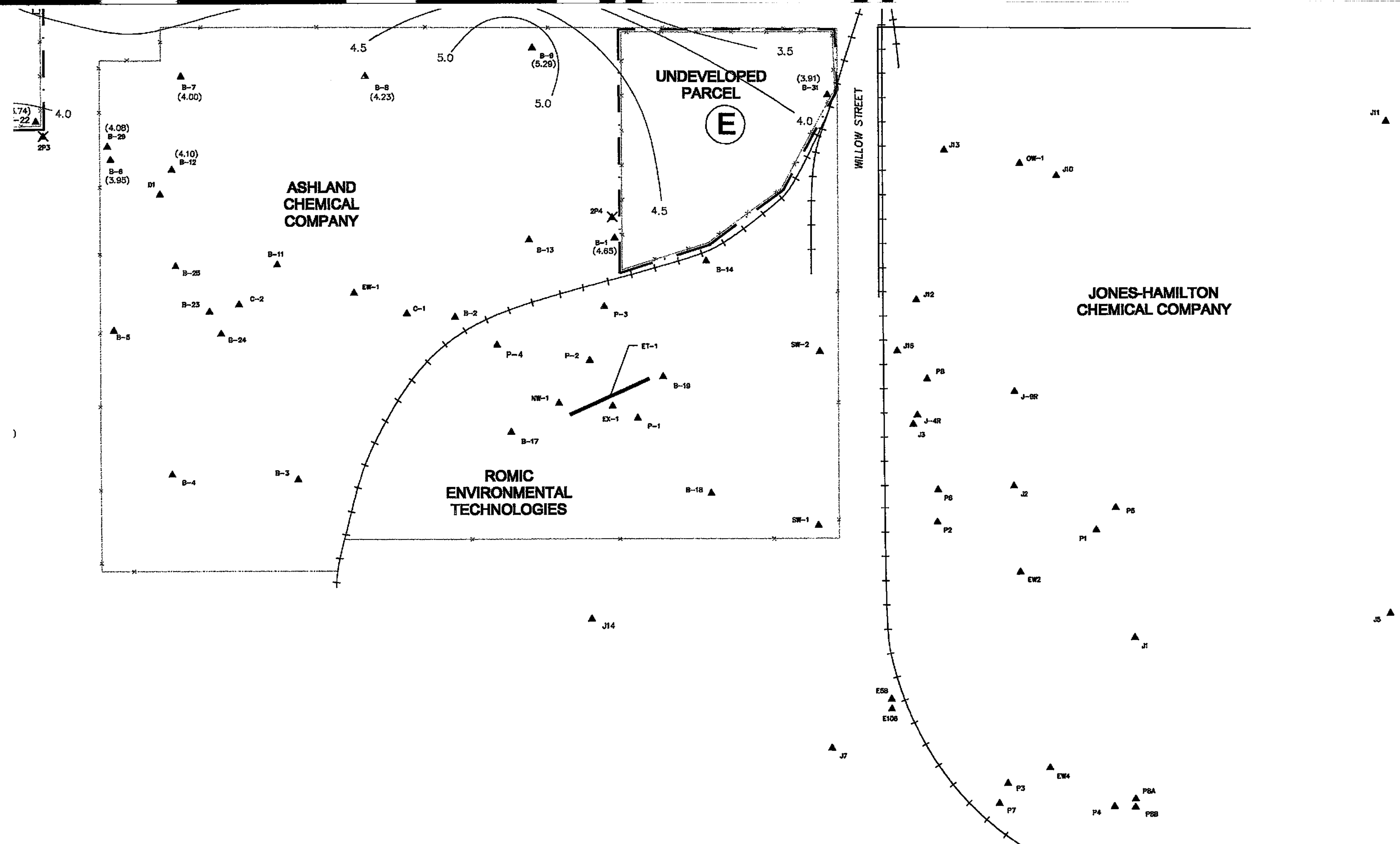
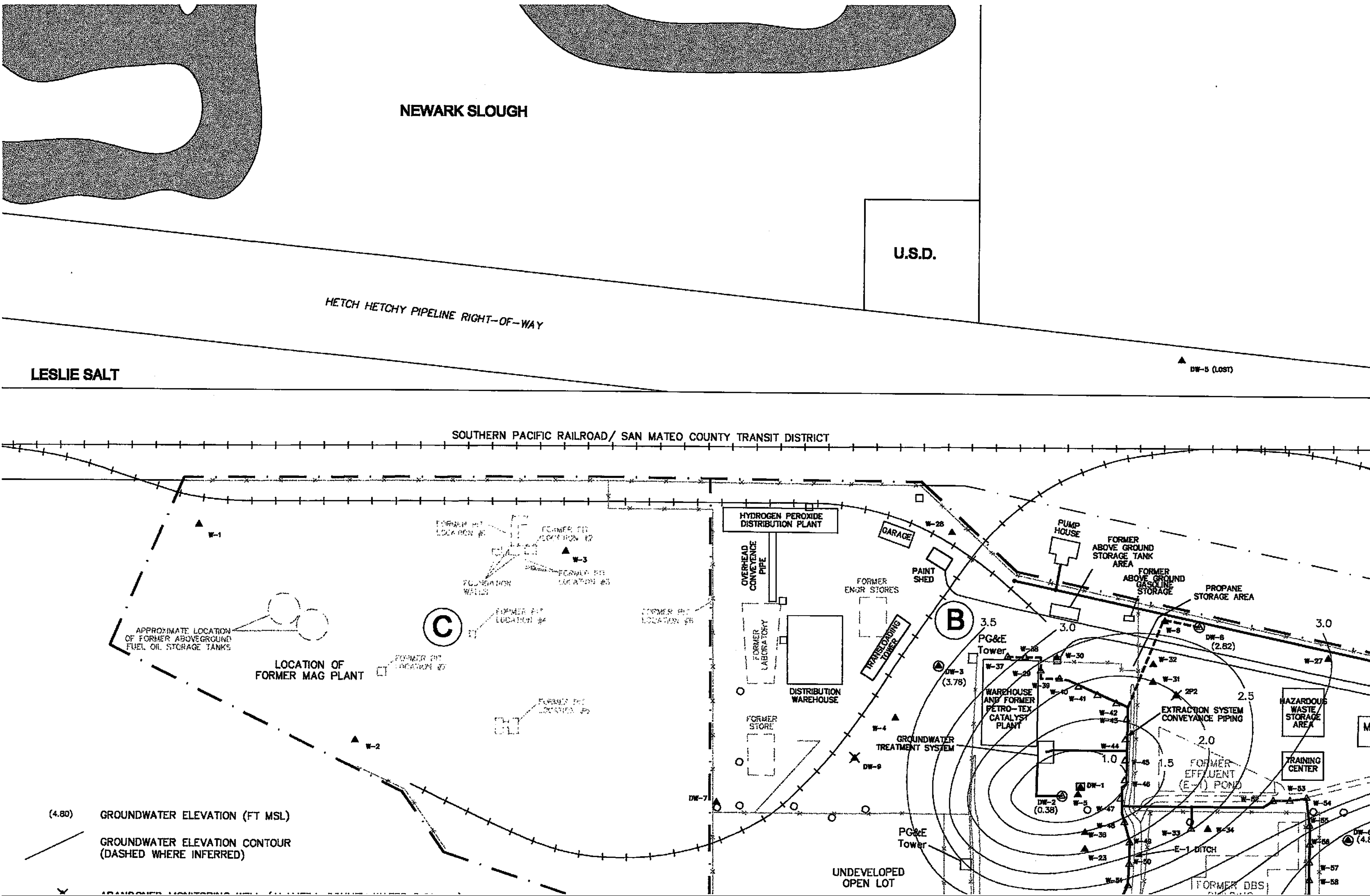
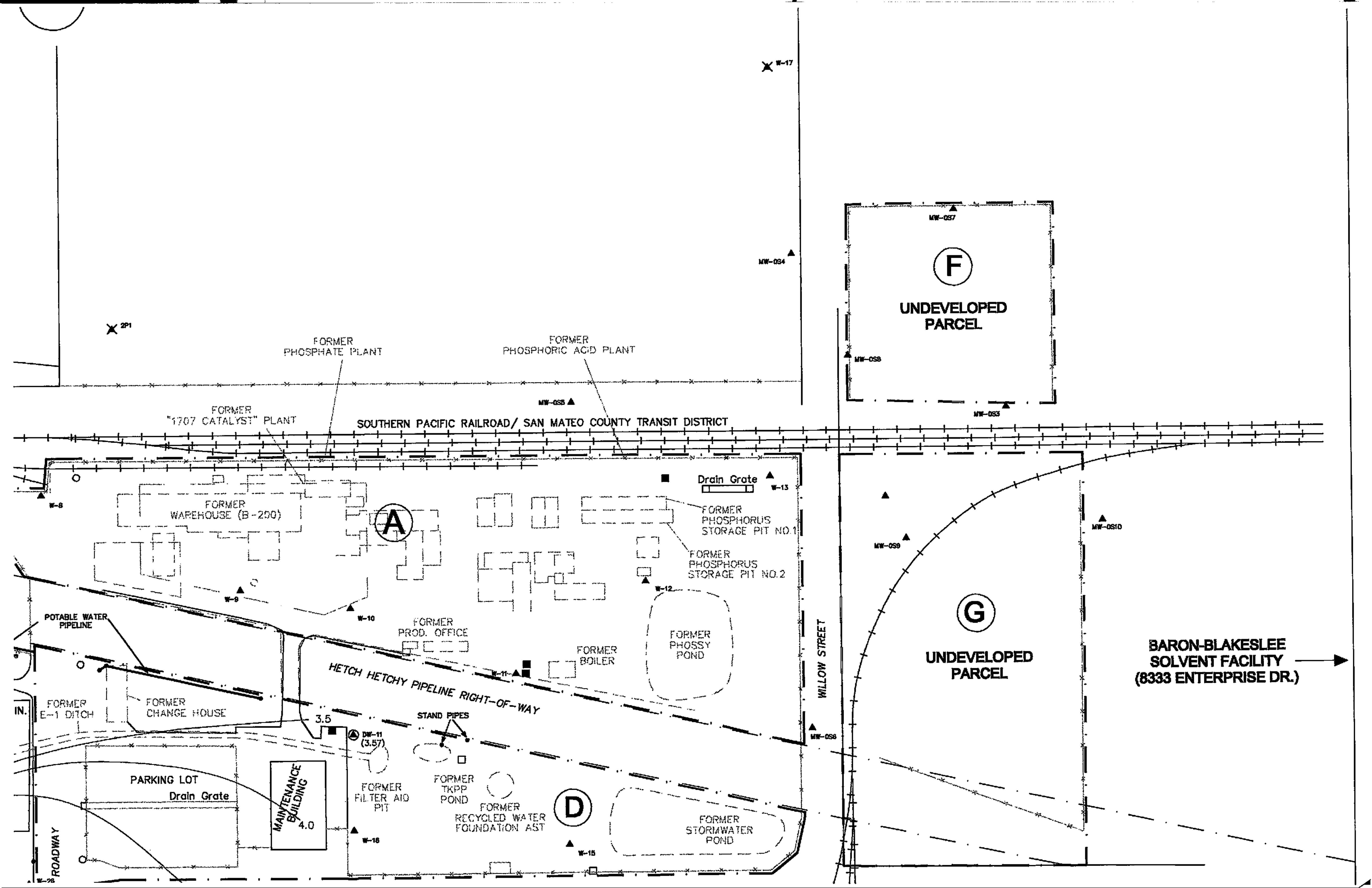


FIGURE 15
SHALLOW ZONE GROUNDWATER
ELEVATION CONTOURS



NEWARK SLOUGH
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
DW-5 (LOST)
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
W-1
W-3
W-2
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
LOCATION OF FORMER MAG PLANT
C
B
HYDROGEN PEROXIDE DISTRIBUTION PLANT
OVERHEAD CONVEYENCE PIPE
GARAGE
PAINT SHED
FORMER ENGR STORES
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
TRANSLOADING TOWER
FORMER STORE
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
PG&E Tower
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
GROUNDWATER TREATMENT SYSTEM
EXTRACTION SYSTEM CONVEYANCE PIPING
FORMER EFFLUENT (E-1) POND
HAZARDOUS WASTE STORAGE AREA
TRAINING CENTER
E-1 DITCH
FORMER DBS
UNDEVELOPED OPEN LOT
DW-3 (3.76)
DW-8 (2.82)
DW-2 (0.38)
DW-6 (4.85)
DW-7
DW-9
DW-1
3.5
3.0
2.5
2.0
1.5
1.0
(4.80) GROUNDWATER ELEVATION (FT MSL)
GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)

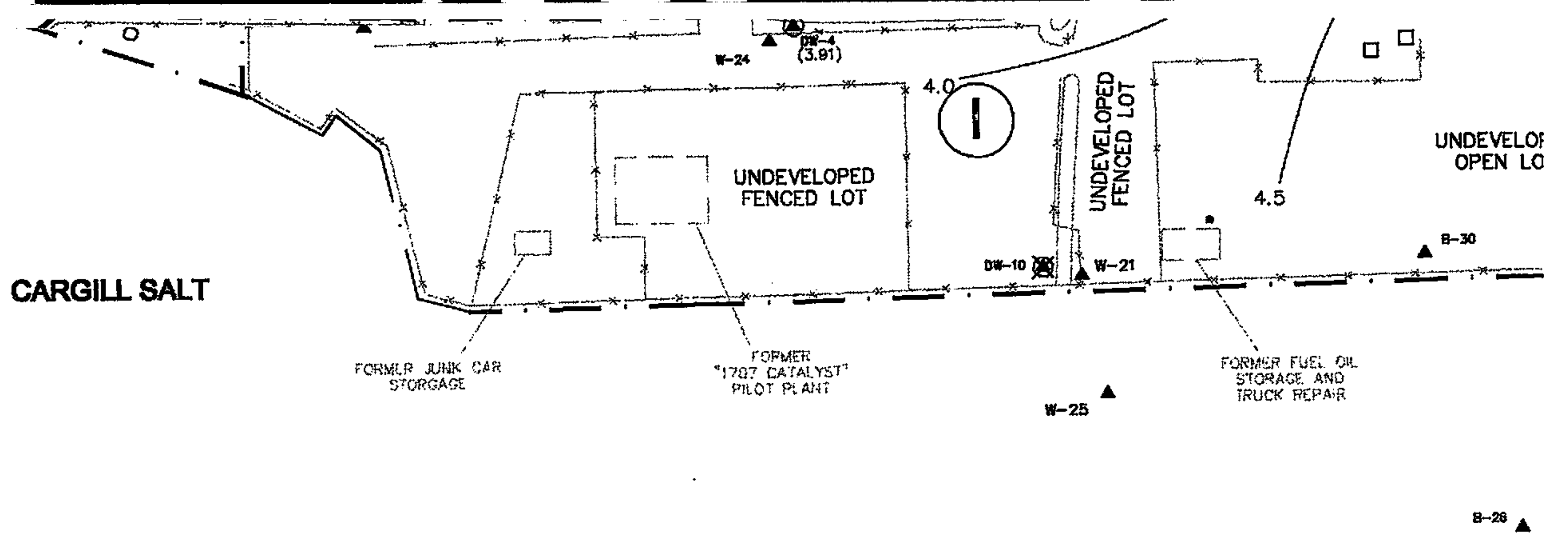


W-17
2P1
MW-0S7
MW-0S4
F
UNDEVELOPED PARCEL
MW-0S8
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
MW-0S5
MW-0S3
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
Drain Grate
W-13
W-8
FORMER WAREHOUSE (B-200)
A
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
MW-0S10
MW-0S9
W-12
W-9
W-10
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
FORMER BOILER
FORMER PHOSSY POND
WILLOW STREET
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
W-11
HETCH HETCHY PIPELINE RIGHT-OF-WAY
IN.
FORMER E-1 DITCH
FORMER CHANGE HOUSE
3.5
STAND PIPES
DW-11 (3.57)
MW-0S6
PARKING LOT
Drain Grate
MAINTENANCE BUILDING
4.0
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER FOUNDATION AST
D
FORMER STORMWATER POND
W-16
W-15
ROADWAY
W-28

- ESB — MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)
- W-4 — SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
- DW-9 — ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
- DW-1 — IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
- DW-3 — NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
- DW-10 — ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
- W-7 — SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
- DW-2 — NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
- B-26 — MONITORING WELL (ASHLAND CHEMICAL)
- MW-DSS — MONITORING WELL (BARON-BLAKESLEE)
- J10 — MONITORING WELL (JONES-HAMILTON Co.)
- P-3 — MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)
- POWER/TELEPHONE POLE
- STORM DRAIN
- PIPE
- SUMP
- (A) PARCEL DESIGNATION
- FORMER STRUCTURE
- EXISTING STRUCTURE
- SURFACE WATER
- PROPERTY LINE

0 120 240

CARGILL SALT



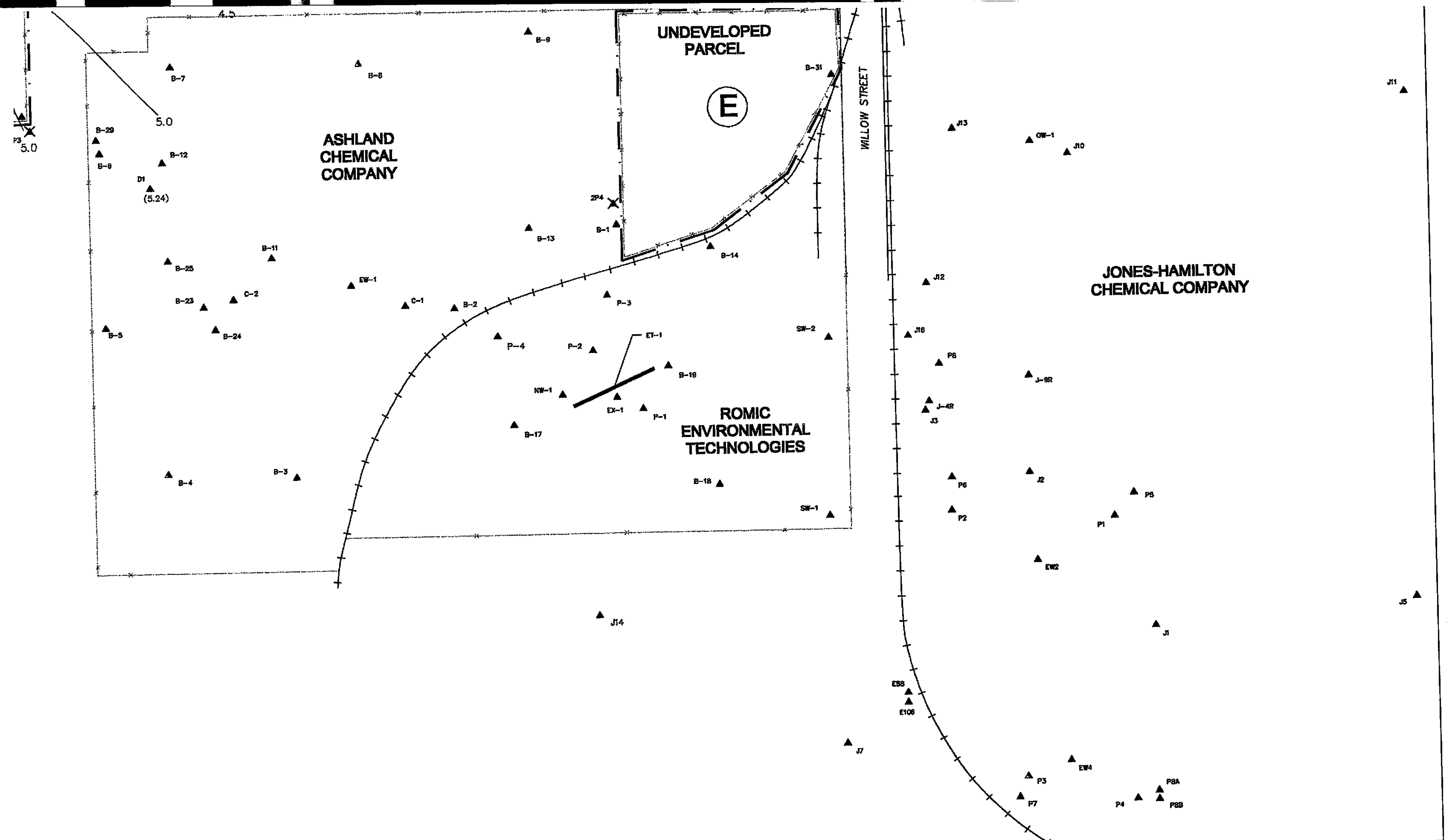
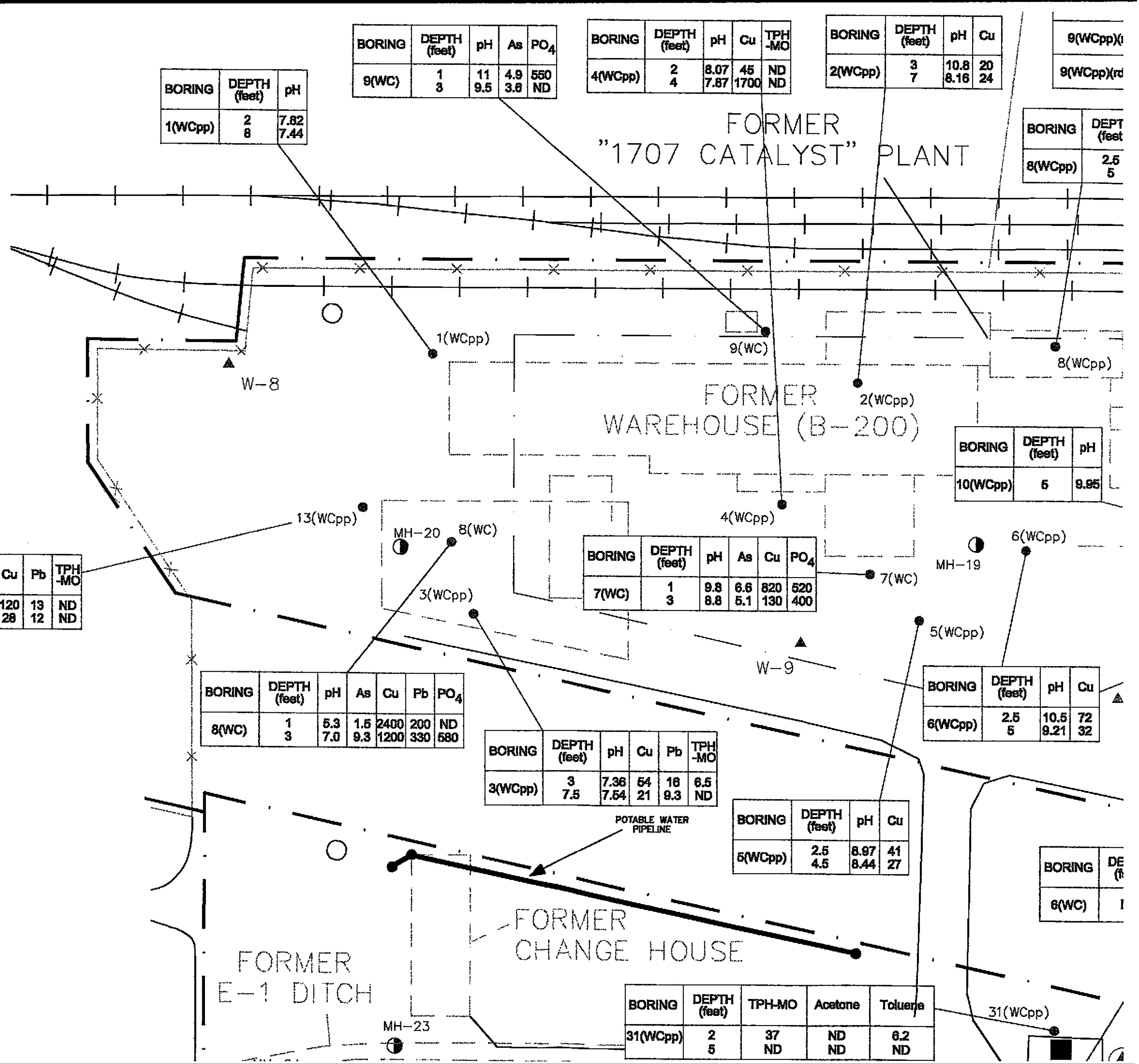


FIGURE 16
NEWARK AQUIFER GROUNDWATER ELEVATION CONTOURS.



BORING	DEPTH (feet)	pH
1(WCpp)	2 8	7.82 7.44

BORING	DEPTH (feet)	pH	As	PO_4
9(WC)	1 3	11 9.5	4.9 3.6	550 ND

BORING	DEPTH (feet)	pH	Cu	TPH-MO
4(WCpp)	2 4	8.07 7.87	45 1700	ND ND

BORING	DEPTH (feet)	pH	Cu
2(WCpp)	3 7	10.8 8.16	20 24

9(WCpp)(
9(WCpp)(rd

BORING	DEPT (feet
8(WCpp)	2.5 5

BORING	DEPTH (feet)	pH
10(WCpp)	5	9.95

BORING	DEPTH (feet)	pH	Cu	Pb	TPH-MO
13(WCpp)	4 6	6.22 7.03	120 28	13 12	ND ND

BORING	DEPTH (feet)	pH	As	Cu	PO_4
7(WC)	1 3	9.8 8.8	6.6 5.1	820 130	520 400

BORING	DEPTH (feet)	pH	As	Cu	Pb	PO_4
8(WC)	1 3	5.3 7.0	1.5 9.3	2400 1200	200 330	ND 580

BORING	DEPTH (feet)	pH	Cu	Pb	TPH-MO
3(WCpp)	3 7.5	7.36 7.54	54 21	16 9.3	6.5 ND

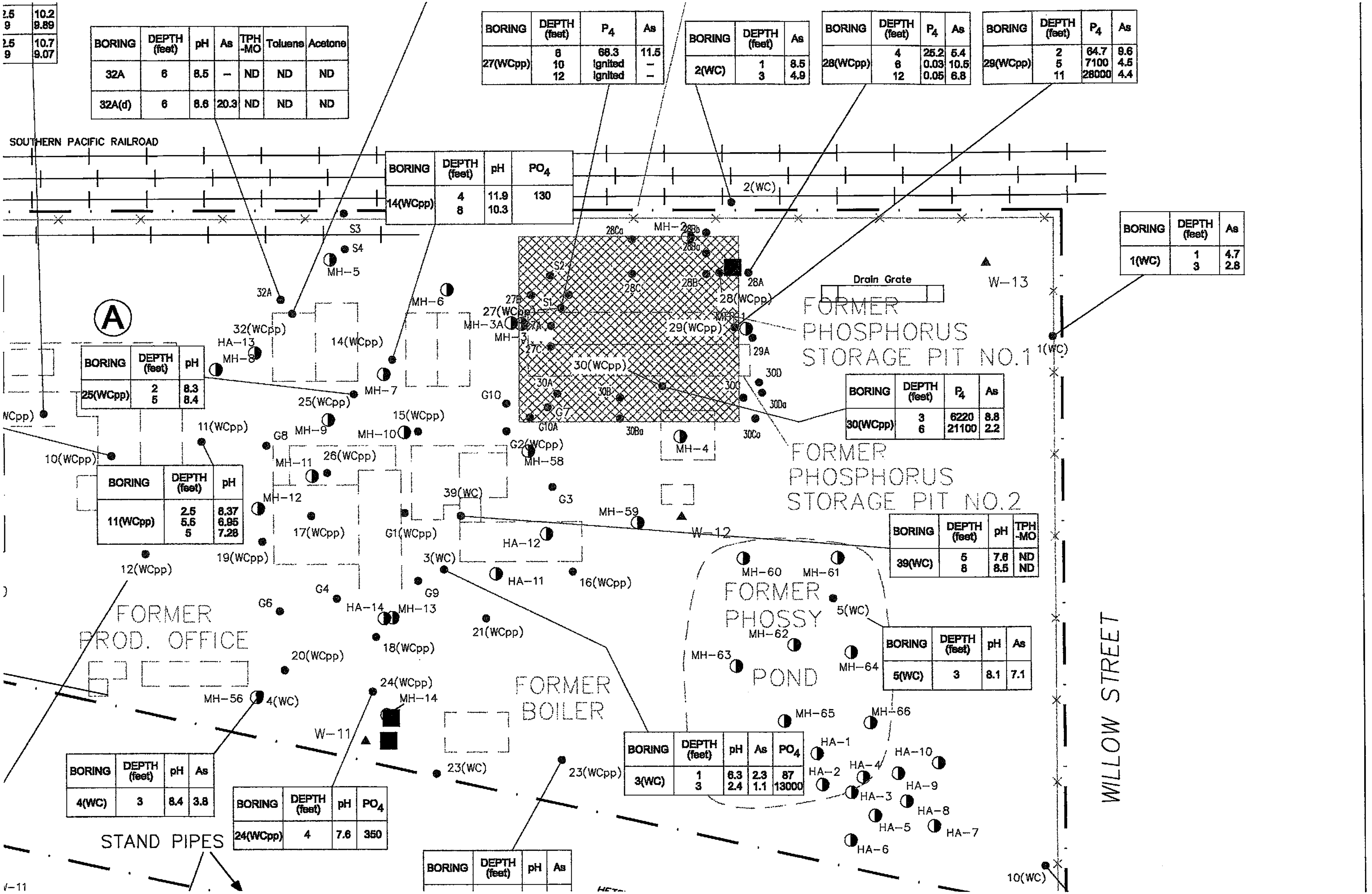
BORING	DEPTH (feet)	pH	Cu
6(WCpp)	2.5 5	10.5 9.21	72 32

BORING	DEPTH (feet)	pH	Cu
5(WCpp)	2.5 4.5	8.97 8.44	41 27

BORING	DE (f
6(WC)	I

BORING	DEPTH (feet)	TPH-MO	Acetone	Toluene
31(WCpp)	2 5	37 ND	ND ND	6.2 ND

CONCENTRATIONS IN PARTS PER MILLION (ppm) AND pH UNITS



2.5 9	10.2 9.89
2.5 9	10.7 9.07

BORING	DEPTH (feet)	pH	As	TPH -MO	Toluene	Acetone
32A	6	8.5	–	ND	ND	ND
32A(d)	6	8.6	20.3	ND	ND	ND

BORING	DEPTH (feet)	P_4	As
27(WCpp)	8 10 12	68.3 Ignited Ignited	11.5 – –

BORING	DEPTH (feet)	As
2(WC)	1 3	8.5 4.9

BORING	DEPTH (feet)	P_4	As
28(WCpp)	4 6 12	25.2 0.03 0.05	5.4 10.5 6.8

BORING	DEPTH (feet)	P_4	As
29(WCpp)	2 5 11	64.7 7100 28000	9.6 4.5 4.4

BORING	DEPTH (feet)	pH	PO_4
14(WCpp)	4 8	11.9 10.3	130

BORING	DEPTH (feet)	As
1(WC)	1 3	4.7 2.8

BORING	DEPTH (feet)	pH
25(WCpp)	2 5	8.3 8.4

BORING	DEPTH (feet)	P_4	As
30(WCpp)	3 6	6220 21100	8.8 2.2

BORING	DEPTH (feet)	pH
11(WCpp)	2.5 5.5 5	8.37 6.95 7.28

BORING	DEPTH (feet)	pH	TPH -MO
39(WC)	5 8	7.6 8.5	ND ND

BORING	DEPTH (feet)	pH	As
5(WC)	3	8.1	7.1

BORING	DEPTH (feet)	pH	As	PO_4
3(WC)	1 3	6.3 2.4	2.3 1.1	87 13000

BORING	DEPTH (feet)	pH	As
4(WC)	3	8.4	3.8

BORING	DEPTH (feet)	pH	PO_4
24(WCpp)	4	7.6	350

BORING	DEPTH (feet)	pH	As

STORM WATER POND SAMPLES (GEOSYSTEM)

SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

SOIL BORING (IT CORPORATION)

SOIL BORING (WOODWARD-CLYDE SAMPLING LOCATION)

FORMER PHOSPHATE PLANT SAMPLING LOCATION (WOODWARD-CLYDE)

POWER/TELEPHONE POLE

STORM DRAIN

PIPE

SUMP

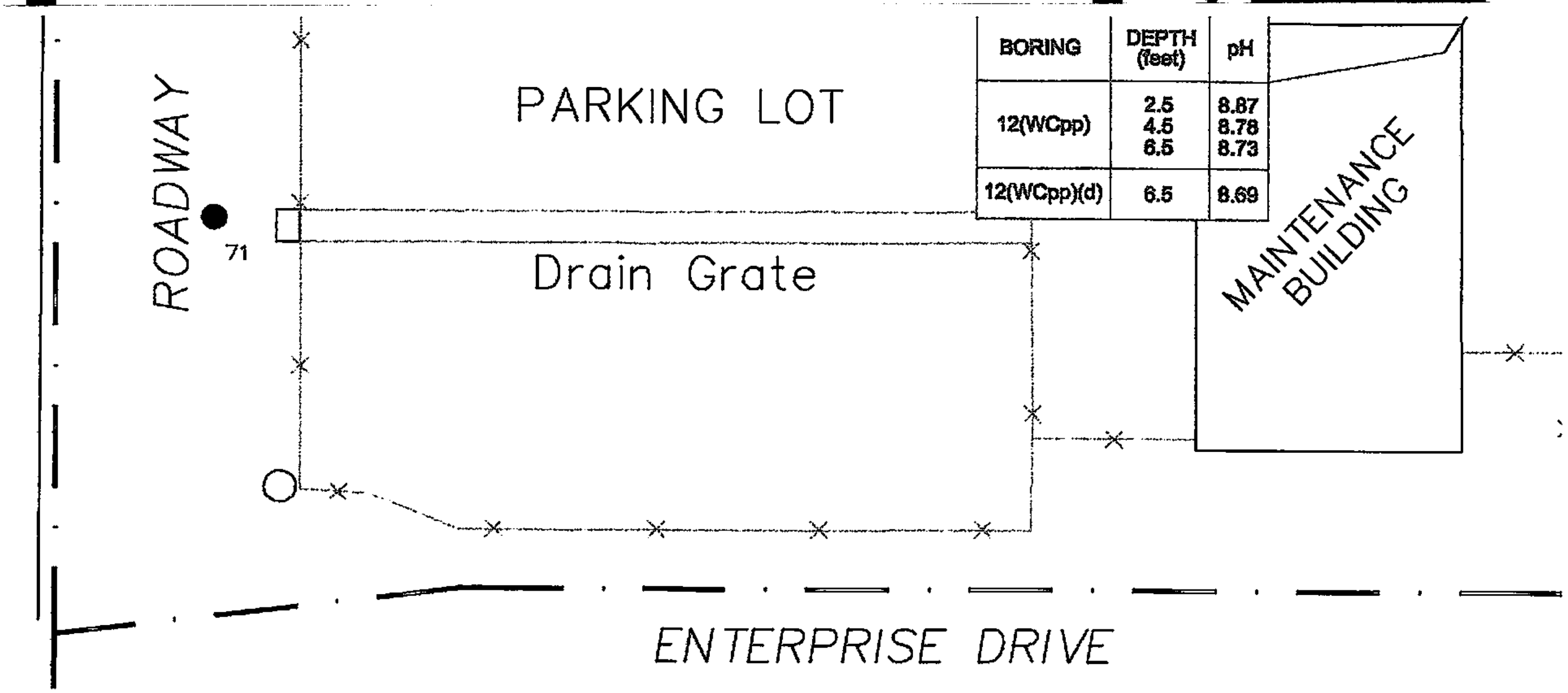
PARCEL DESIGNATION

AREA IMPACTED WITH ELEMENTAL PHOSPHORUS

FORMER STRUCTURE

EXISTING STRUCTURE

PROPERTY LINE



BORING	DEPTH (feet)	pH
12(WCpp)	2.5	8.87
	4.5	8.78
	6.5	8.73
12(WCpp)(d)	6.5	8.69

BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb	P_4
MH-1	4.5	8.9	3.8	58	71	8.8	<0.001
	10.0	8.2	5.4	54	63	8.1	<0.001
	15	8.6	1.8	49	59	5.5	<0.001
MH-2	1.5	8.7	4.3	74	78	12	<0.001
	4.5	8.7	4.5	79	84	11	<0.001
	10.0	8.3	2.8	42	52	5	<0.001
	15.0	7.9	3.6	42	48	5.3	<0.001
MH-3	1.0	8.2	0.87	53	54	13	<0.001
	4.5	–	–	–	–	–	IGNITED
MH-3a	0.5	7.79	3.9	67	67	18	<0.001
	4.5	9.63	6.4	73	80	16	<0.001
	9.5	8.74	6.8	74	77	9.8	<0.001
	15.0	8.37	3.8	89	87	120	<0.001
MH-4	1.5	7.3	4.5	70	54	19	<0.001
	4.5	8.5	3.2	70	77	12	<0.001
	9.5	8.7	5.3	55	75	12	<0.001
	15.0	8.1	3.4	50	67	7.6	<0.001

BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb
MH-5	1.5	8.39	8.5	68	73	17
	4.5	8.64	10	73	92	14
	9.0	7.61	5.4	67	85	11
MH-6	4.5	9.14	5.3	67	75	12
	9.0	8.74	3.6	48	60	6.2
MH-7	4.5	8.92	5.6	100	120	12
	7.0	8.23	4.4	56	69	35
MH-8	1.0	8.86	5.2	67	72	13
	4.5	8.68	5.3	76	89	13
	8.0	8.01	4.9	64	78	10
MH-9	1.0	6.76	3.2	58	57	25
	8.5	8.28	7.6	69	77	11
MH-10	1.0	11	3.6	57	78	52
	3.5	11.9	41	41	47	38
	8.0	9.22	2.5	56	72	11
MH-11	1.0	8.2	24	70	72	35
	4.5	7.7	5.4	71	81	13
	9.5	7.3	9.7	68	75	9.9
MH-12	1.0	5.1	26	20	1	7.9
	4.5	7.2	13	89	100	22
	9.5	8.6	7.6	55	64	11

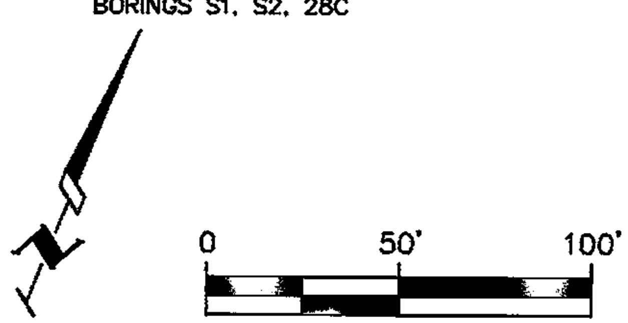
BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb	P_4
MH-13	0.5	11.53	2.8	51	71	31	<0.001
	4.5	6.66	4.6	62	12	<2.5	<0.001
	8.5	6.93	4.2	45	56	6.8	<0.001
MH-14	1.0	7.75	5.3	74	79	14	<0.001
	4.5	8.06	4.3	71	75	13	<0.001
	8.0	7.7	7.2	65	66	11	<0.001

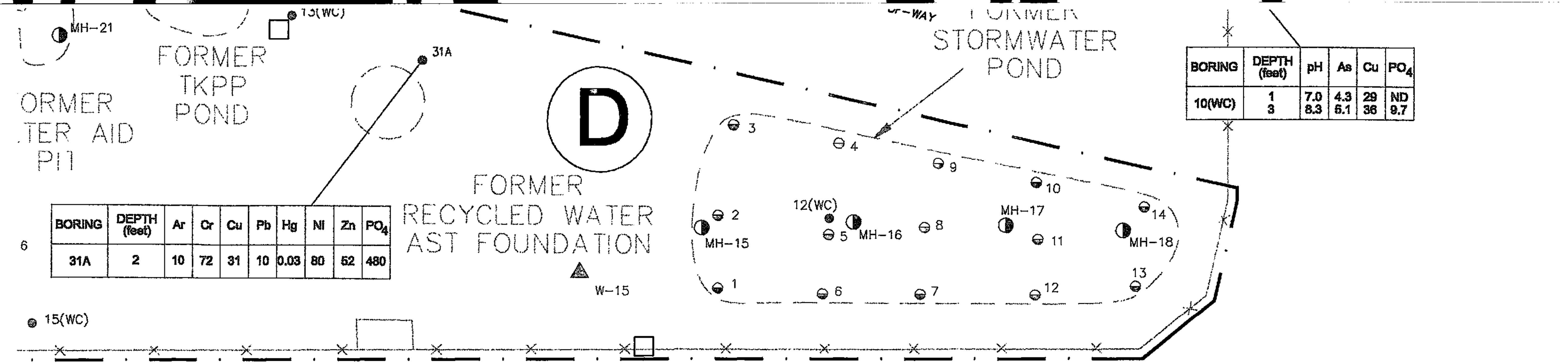
BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb
MH-15	1.0	8.63	5.2	59	69	8.5
	4.5	7.75	9.4	63	70	11
	9.5	7.43	1.2	80	90	12
MH-16	1.0	7.44	4.6	43	60	12
	4.5	7.79	21	54	69	10
	11.5	7.21	3.3	58	74	8.2
MH-17	1.0	7.76	4.2	45	62	9.9
	4.5	8.7	59	51	64	8.8
	10.0	7.86	4.4	60	75	10
MH-18	1.0	7.38	2.9	44	63	8.2
	4.5	7.61	<0.5	54	61	8.5
	11.5	7.5	3.6	62	87	9.3
MH-19	4.0	11.29	3.5	47	54	18
	8.5	8.83	4.6	70	72	25
	11.0	7.95	4.9	62	64	15

BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb
MH-20	4.5	8.26	5.6	80	84	11
	11.0	7.95	5.1	61	73	9.3
MH-21	1.0	7.61	12	82	87	16
	4.5	8.49	6.7	84	94	13
	9.0	7.92	2.1	57	64	6.7
MH-22	1.0	8.8	<2.5	71	48	<13
	4.5	7.76	210	39	32	12
	10.0	8.01	1.3	56	87	8.2
MH-23	1.0	8.9	<0.5	54	35	16
	4.5	9	5.2	76	86	14
	9.5	8.5	4	60	72	8.2
MH-24	0.5	8.19	1.7	45	35	<13
	4.5	8.06	4.8	56	76	12
	9.0	8.09	2.1	52	66	7.7

BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb	
MH-56	1.0	8.3	<0.5	4.4	3.8	<2.5	<
MH-58	1.0	7.15	3.6	55	88	22	<
	4.5	–	6.5	69	84	16	<
	9.5	–	4.1	57	68	9	<
	12.5	–	4.2	46	65	9.3	<
MH-59	4.5	8.13	5.3	77	90	17	<
	9.5	–	7.1	53	66	15	<
	14.5	–	3.5	44	52	7.8	<

(d) DUPLICATE
(rd) REDRILL
NS NOT SAMPLED
ND NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMITS
TPH-MO TOTAL PETROLEUM HYDROCARBONS, MOTOR OIL
* BORINGS 28A, 28B, 28Bb, 30B, AND 30D WERE SAMPLED FOR GROUNDWATER ONLY
** NO SAMPLE RESULTS WERE REPORTED FOR BORINGS S1, S2, 28C





BORING	DEPTH (feet)	Ar	Cr	Cu	Pb	Hg	Ni	Zn	PO_4
31A	2	10	72	31	10	0.03	80	52	480

BORING	DEPTH (feet)	pH	As	Cu	PO_4
10(WC)	1 3	7.0 8.3	4.3 5.1	29 36	ND 9.7

ORING	DEPTH (feet)	pH	As	Cr	Ni	Pb	P₄
MH-60	1.0	8.09	<1.5	68	100	15	<0.001
	4.5	–	6.0	84	91	19	<0.001
	9.5	–	5.6	73	82	16	<0.001
	14.5	–	3.2	52	58	8	<0.001
MH-61	1.0	7.83	5.8	42	56	11	<0.001
	4.5	–	5.8	73	87	17	<0.001
	10.0	–	6.2	79	16	<2.5	<0.001
	15.0	–	3.4	43	51	7	<0.001
MH-62	1.0	7.86	4.8	65	74	37	<0.001
	4.5	–	42	78	130	17	<0.001
MH-63	1.0	7.93	4.4	94	2,700	41	<0.001
	4.5	–	35	120	37	19	<0.001
	14	–	6.7	79	92	18	<0.001
MH-64	1.0	8.31	5.3	66	170	20	<0.001
	4.5	–	6.2	68	100	13	<0.001
	10.0	–	7.2	61	72	14	<0.001
	16.0	–	6.5	64	97	8.7	<0.001
MH-65	1.0	7.37	6.7	100	280	14	<0.001
	4.5	–	34	73	120	15	<0.001
	9.5	–	8.5	87	100	18	<0.001
	16.0	–	4.1	50	68	8	<0.001
MH-66	1.0	7.48	4.8	59	63	17	<0.001
	4.5	–	5.3	120	46	28	0.0015
	10.0	–	8.2	80	95	17	<0.001
	16.0	–	4.5	44	57	8.2	<0.001

BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb
HA-1	1.0	8.26	–	–	–	–
HA-2	1.0	6.82	4.4	36	40	11
HA-3	1.0	7.01	–	–	–	–
HA-4	1.0	6.55	–	–	–	–
HA-5	1.0	7.33	4.2	74	88	15
HA-6	1.0	6.60	–	–	–	–
HA-7	1.0	6.49	–	–	–	–
HA-8	1.0	6.75	–	–	–	–
HA-9	1.0	6.27	4.0	48	57	13
HA-10	1.0	6.58	–	–	–	–
HA-11	1.0	7.69	–	–	–	–
HA-12	1.0	8.57	–	–	–	–
HA-13	1.0	9.36	–	–	–	–
HA-14	1.0	8.20	–	–	–	–
	2.5	8.55	–	–	–	–

BORING	DEPTH (feet)	pH	PO_4	As
15(WCpp)	7 8	7.1 6.8	560 560	10 24
16(WCpp)	2 4 10	12.4 12.3 8.2	7.8 2.8 68	1.4 2 5.6
17(WCpp)	8 9	6.9 7.5	320 190	15 6.5
18(WCpp)	2 5	1.6 1.3	1300 1400	– –
19(WCpp)	5 6	8 7.9	660 700	– –
20(WCpp)	2 6	8.6 7.4	68 390	– –
21(WCpp)	3 7	8.1 8.3	– –	– –
26(WCpp)	6 8	7.8 7.8	300 170	12 8.4

BORING	DEPTH (feet)	As	Cu	PO_4
12(WC)	2.5	ND	–	ND
13(WC)	3	ND	42	–
14(WC)	3	6.9	45	–
15(WC)	1 3	5.3 5.1	41 40	23 41
23(WC)	1 3	3.0 4.8	– 74	–

BORING	DEPTH (feet)	pH
G1(WCpp)	2 4	9.4 8.8
G1(WCpp)*	5 7 8	6.8 9.3 8.5
G2(WCpp)	2	8.3
G2(WCpp)*	4 8 11	2.4 3.7 6
G3*	4 7	6.8 9
G4	4 8	7.6 6.6
G4*	2 6	6.5 7.1
G6	8	8.6
G6*	6	7.9
G7	2 4	11.2 10.6
G7*	8	9.5
G8	2 8	9.3 9.1
G8*	4 6	11.9 12.1
G9*	1 3.5	8.1 8.1
G10*	2 4	7.9 7.9
G10A*	2.5 3.5	6.6 3.5

* SAMPLE ANALYSES PERFORMED BY FMC LABORATORY, NEWARK, CA

BORING	DEPTH (feet)	P₄
27A	5 10	(ND) (ND)
27B	5	(ND)
27C	10 15 20	(ND) (ND) (ND)
28Ba	5 15	(ND) (ND)
28Ca	10 20	(ND) (ND)
29A	5 10 15 20	(ND) (ND) (ND) (ND)
30A	5	(ND)
30Ba	10 20	(ND) (ND)
30C	10 15 20	(ND) 15200 7.8
30Ca	5	(ND)
30Da	10	(ND)
S3	2-4	(ND)
S4	2-4	0.09

STORMWATER POND SAMPLES		
BORING	DEPTH (feet)	TOTAL ARSENIC
1	.5 2.5	18 28
2	.5 2.5	18 29
3	.5 2.5	14 23
4	.5 2.5	19 17
5	.5 2.5	21 22
6	.5 2.5	23 23
7	.5 2.5	19 25
8	.5 2.5	18 12
9	.5 2.5	3.6 22
10	.5 2.5	19 20
11	.5 2.5	18 21
12	.5 2.5	10 10
13	.5 2.5	21 13
14	.5 2.5	20 23

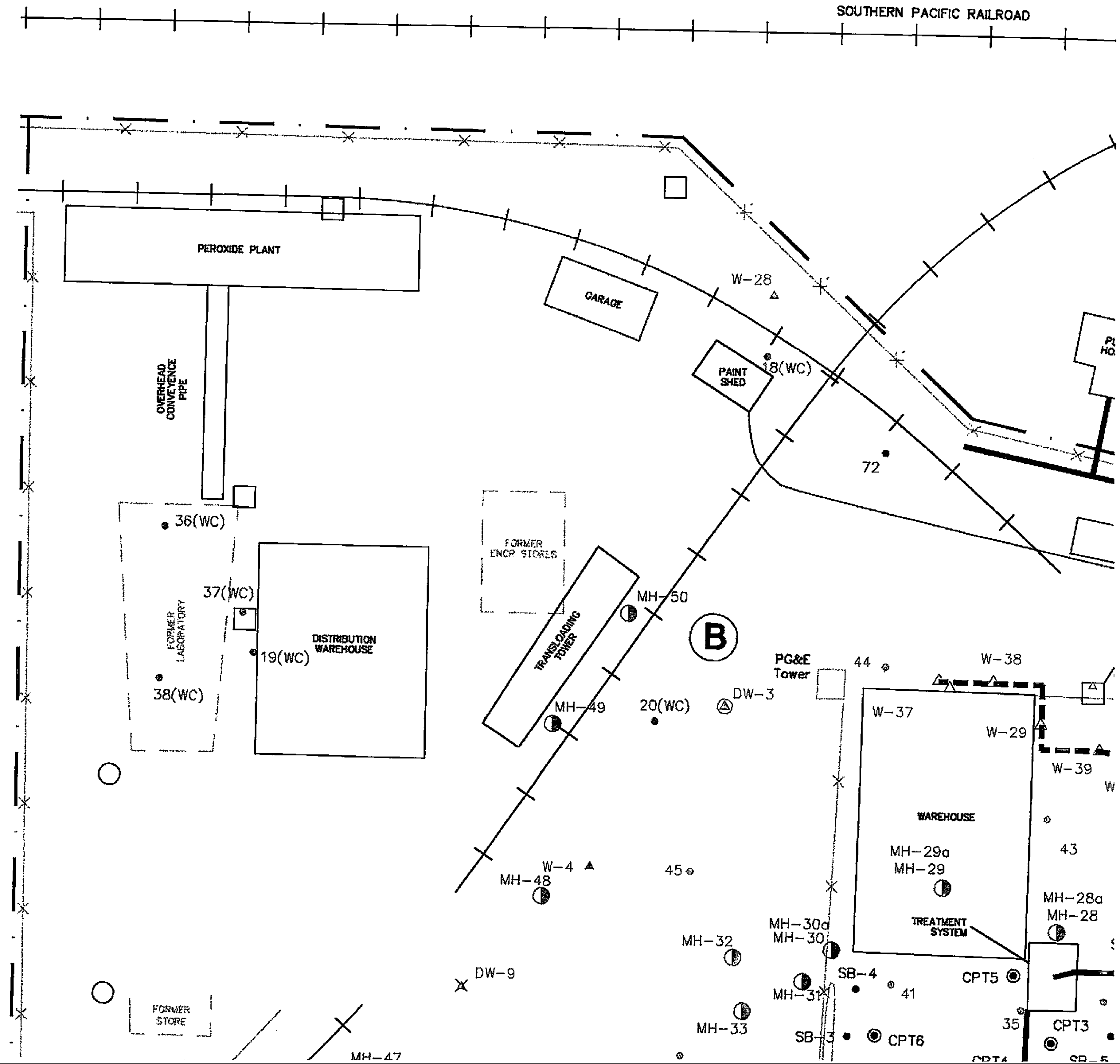
FIGURE 17

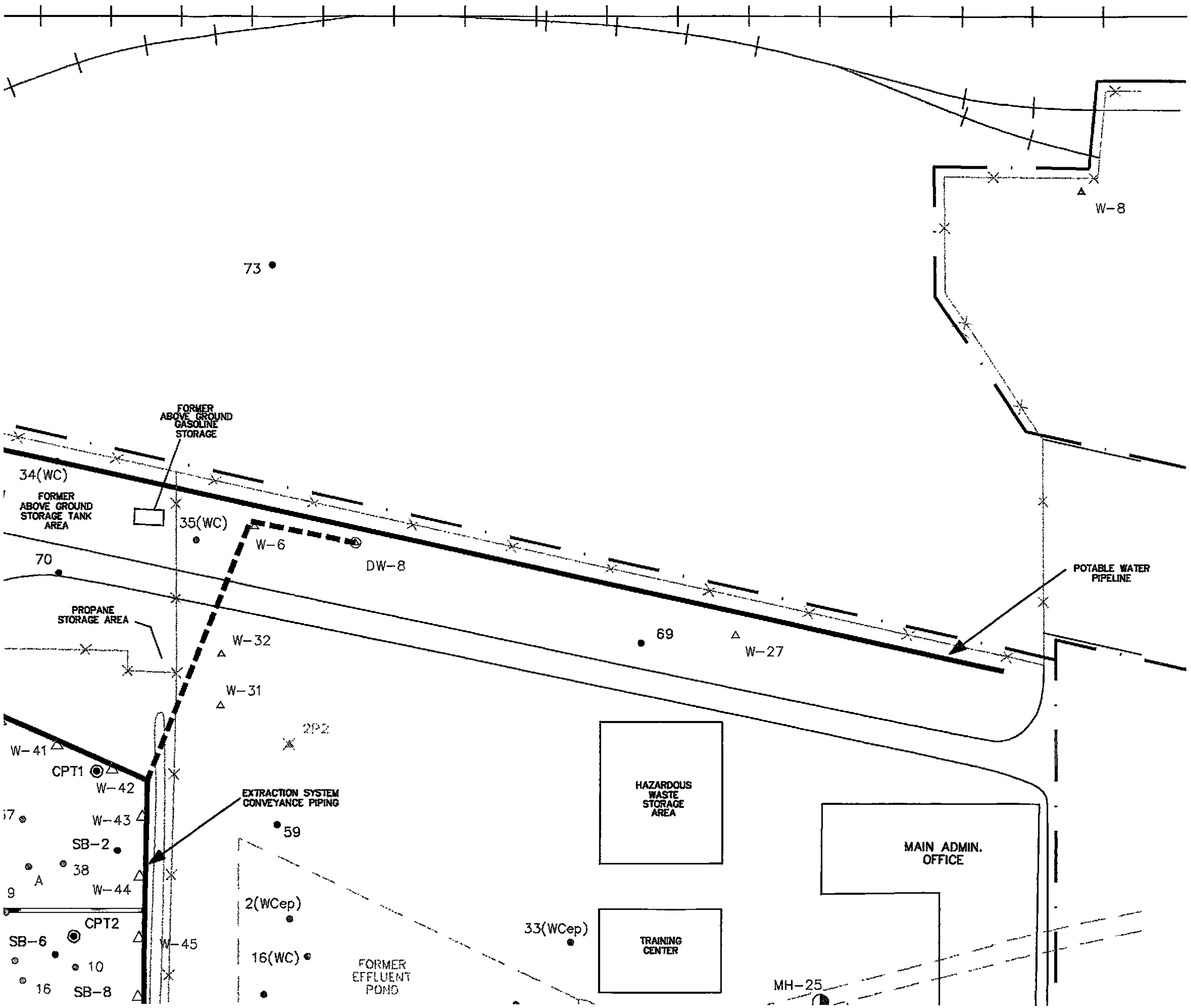
PREVIOUSLY EXISTING AND

BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb	Se
MH-25	0.5	7.74	1.4	48	65	8.9	<0.25
	4.5	8.47	6.8	73	80	12	<1.3
	13.5	7.97	20	77	90	12	<1.3
MH-26	1.0	8.53	1.3	23	32	5.8	<0.25
	4.5	8.33	7	61	75	14	<1.3
	12.5	8.59	3	49	60	8.8	<0.25
MH-27	0.5	8.22	9	49	50	30	<1.3
	4.5	8.29	5.9	56	74	<13	<1.3
	10.5	8.54	5.5	49	66	8.4	<1.3

BORING	DEPTH (feet)	TPH-mo	As	Cr	Ni	Pb	Se
MH-37	1.5	4.9	8	80	86	12	<1
	4.5	13	7	82	100	11	<1
	9.5	1.5	5.7	54	78	<13	<1
MH-38	1.0	3.7	3.9	68	77	14	<1
	4.5	2.7	5.8	73	99	11	<1
	7.0	<1	6	63	86	7.8	<1
MH-39	1.0	35	2.4	31	37	26	<0.25
	4.5	3.5	3.6	52	65	9.9	<0.25
MH-40	1.0	18	4.2	82	80	13	<0.25
	4.5	1800	7.8	42	37	7.9	<0.25
	8.0	120	4.4	39	49	13	<0.25
MH-41	1.5	1.8	7.4	21	55	10	<0.25
	4.5	1.6	17	12	29	14	<0.25
MH-42	1.5	7.2	6.5	68	78	15	<1.3
	4.5	<1	7.7	71	81	<13	<1.3
	12.2	2.2	6	52	68	13	<1.3
MH-43	1.5	2.8	5.9	72	77	13	<1.3
	4.5	<1	5.5	72	78	14	<1.3
	12.5	<1	7.1	62	81	9.9	<1.3
MH-44	1.0	120	1.4	46	33	13	<0.25
	4.5	9	2.4	36	41	7.7	<0.25
	8.0	2.5	2.6	49	48	9.6	<0.25
MH-45	1.0	2.2	3.8	310	330	15	<0.25
	4.5	5.8	--	--	--	--	--
	7.5	6.5	2.5	66	65	25	<0.25
MH-46	1.0	310	3.5	42	38	240	<0.25
	4.5	1	4	77	80	14	<0.25
	8.0	<1	3.8	74	84	12	<0.25
MH-47	1.0	150	7.8	68	79	51	<0.25
	5.0	<1	4.5	77	82	15	<0.25
	6.0	<1	4	76	79	13	<0.25
MH-48	1.0	54	2.8	30	23	220	<0.25
	4.5	<1	5	75	75	14	<0.25
	9.5	<1	4.6	66	81	10	<0.25

BORING	DEPTH (feet)	pH	As	Cr	Ni	Pb	Se
MH-49	1.0	9.68	3	40	47	40	<0.25
	4.5	9.21	4.9	74	85	13	<0.25
	10.5	8.26	4.5	69	88	12	<0.25
	1.0	9.6	3.2	60	61	34	<0.25





W-8
73
FORMER ABOVE GROUND GASOLINE STORAGE
34(WC)
FORMER ABOVE GROUND STORAGE TANK AREA
35(WC)
W-6
DW-8
70
POTABLE WATER PIPELINE
PROPANE STORAGE AREA
W-32
69
W-27
W-31
2P2
W-41
CPT1
W-42
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
W-43
59
SB-2
38
A
W-44
MAIN ADMIN. OFFICE
2(WCep)
CPT2
33(WCep)
TRAINING CENTER
SB-6
W-45
10
16(WC)
FORMER EFFLUENT POND
16
SB-8
MH-25

TPH-MO TOTAL PETROLEUM HYDROCARBONS, MOTOR OIL

MH-38 SOIL BORING (McLAREN/HART)

W-4 SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

DW-3 NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

W-7 SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)

DW-2 NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)

DW-1 IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)

24 SOIL BORING (TODD)

55 SOIL BORING (IT CORPORATION)

1(WCep) SOIL BORING (WOODWARD–CLYDE EFFLUENT POND SAMPLING LOCATION)

26(WC) SOIL BORING (WOODWARD–CLYDE SAMPLING LOCATION)

SB 15 SOIL BORING (PES ENVIRONMENTAL)

CPT1 CPT LOCATION (PES ENVIRONMENTAL)

POWER/TELEPHONE POLE

STORM DRAIN

PIPE

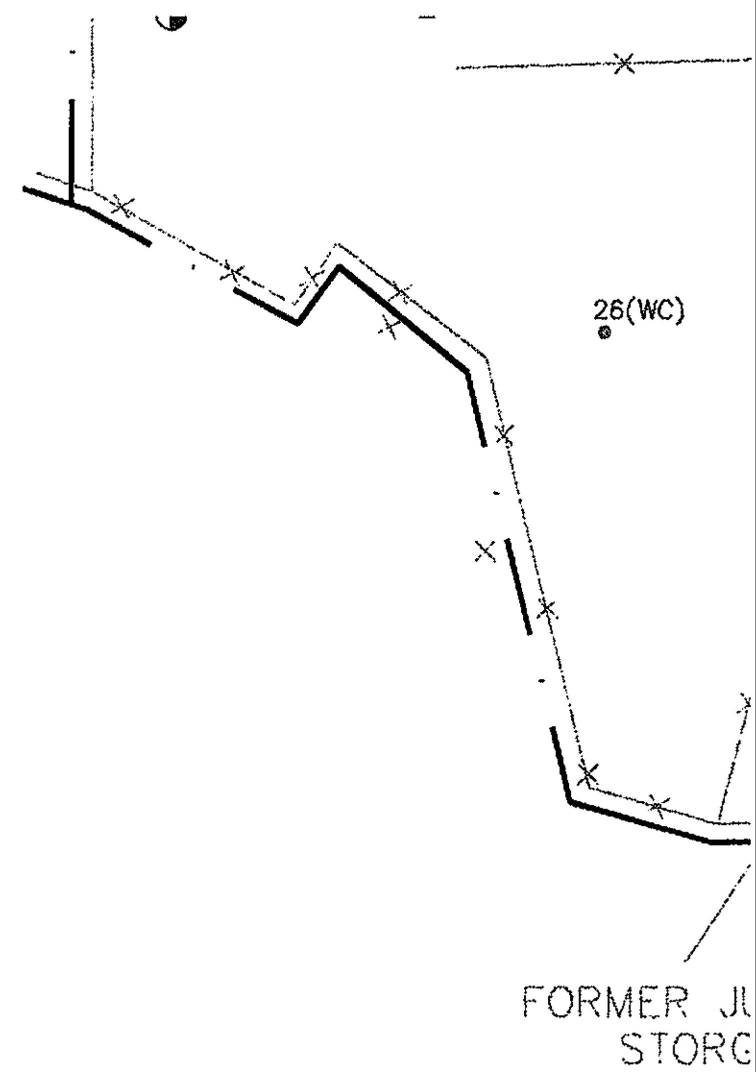
SUMP

(A) PARCEL DESIGNATION

FORMER STRUCTURE

EXISTING STRUCTURE

PROPERTY LINE



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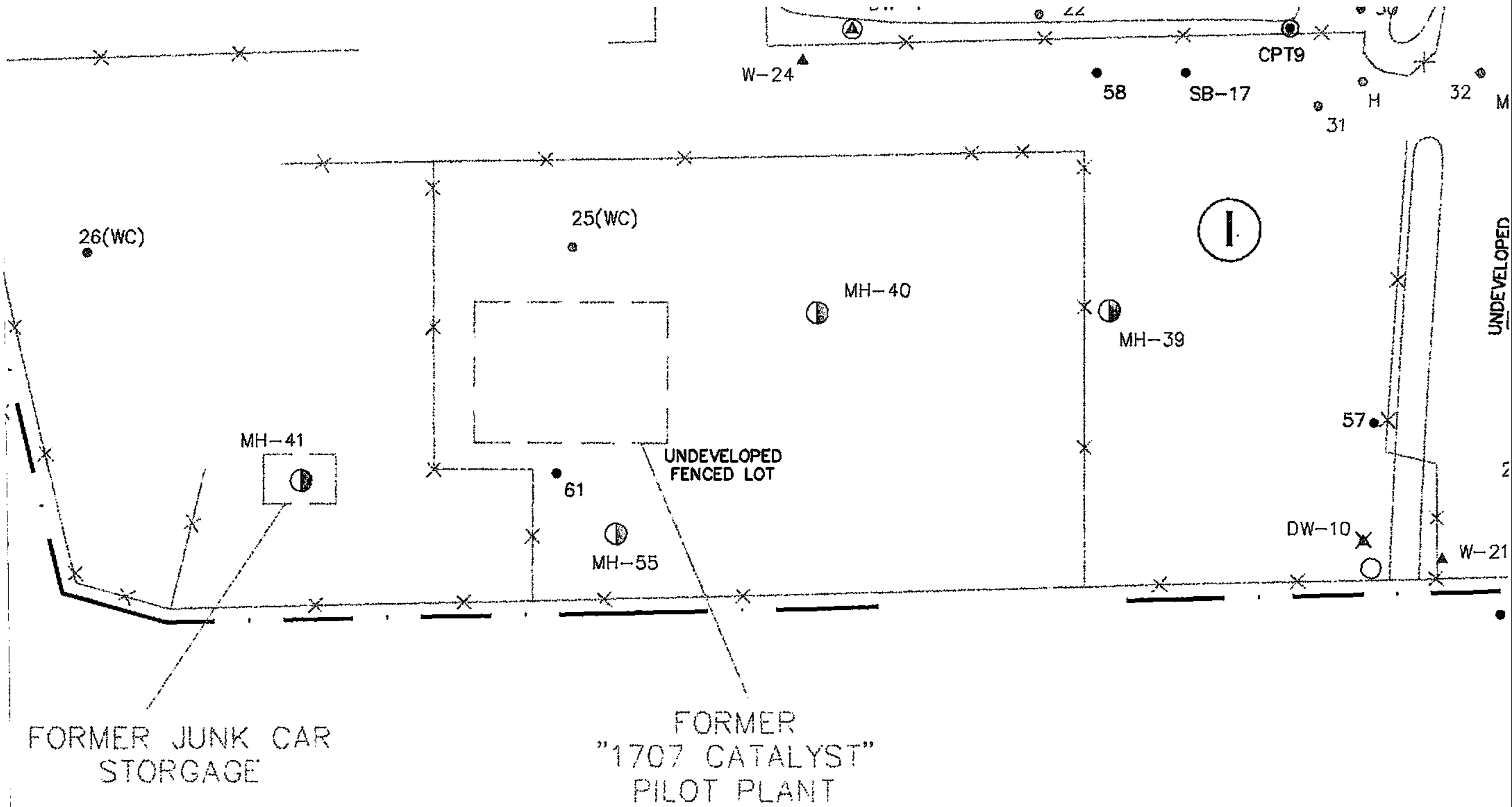
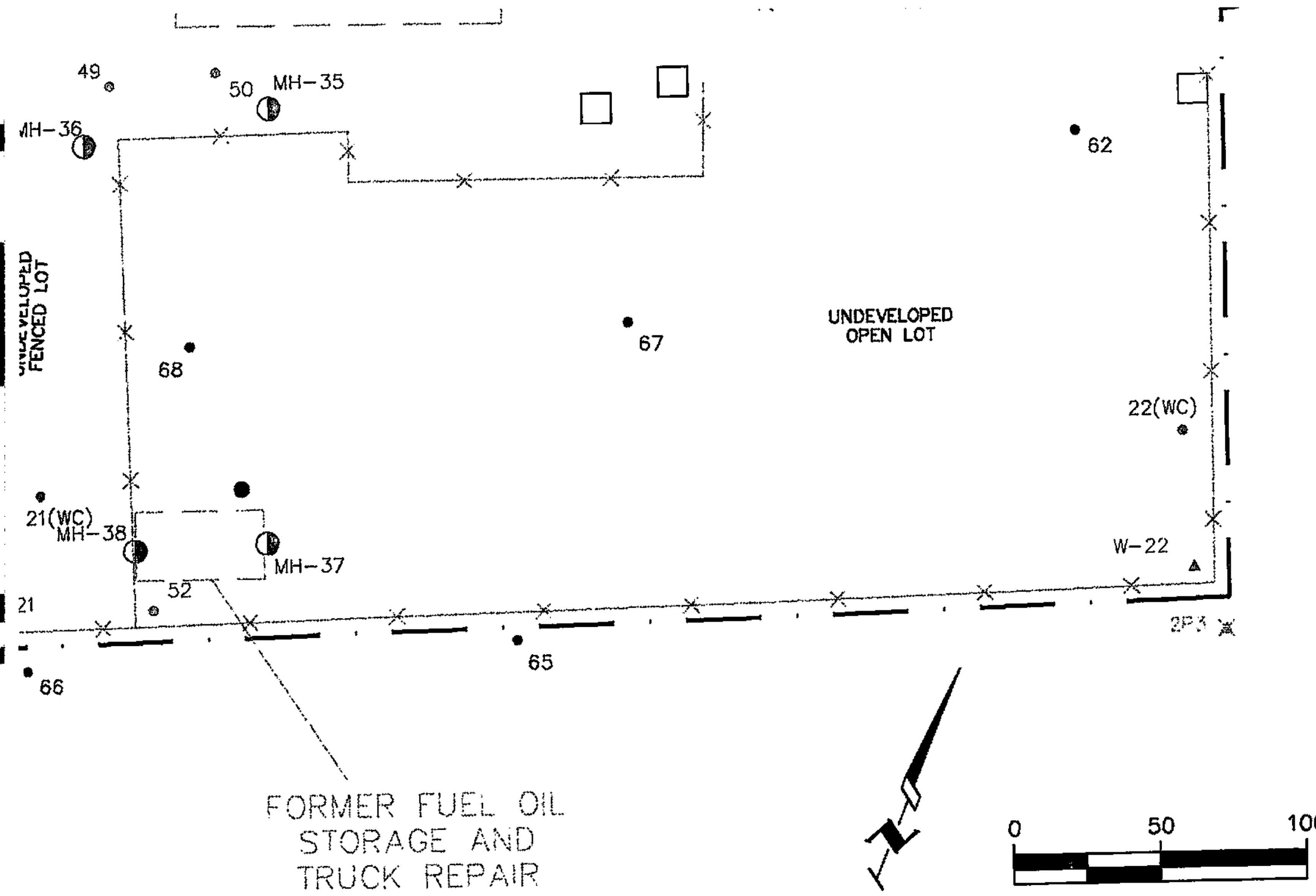


BORING	DEPTH (feet)	As	Cd	Cr	Cu	Pb	PO_4	TPH-G	TPH-D	TPH-K	TPH-MO
16(WC)	0.5	5.0	–	–	130	–	–	–	–	–	–
17(WC)	1	3.9	–	–	34	–	–	–	–	–	–
18(WC)	1	–	1.4	72	–	16	–	ND	1.8	–	–
	3	–	0.75	43	–	17	–	ND	49	–	–
19(WC)	1	–	–	–	–	–	–	–	ND	ND	20
	3	–	–	–	–	–	–	–	ND	ND	ND
20(WC)	1	4.4	–	–	–	–	78	–	–	–	–
21(WC)	1	1.2	–	–	200	–	–	ND	–	–	–
	3	4.5	–	–	66	–	–	ND	–	–	–
	3(D)	4.8	–	–	46	–	–	ND	–	–	–

BORING	DEPTH (feet)	As	Cd	Cr	Cu	Pb	PO_4	TPH-G	TPH-D	TPH-K	TPH-MO
22(WC)	1	4.6	–	–	46	–	–	–	–	–	–
	1(D)	5.7	–	–	36	–	–	–	–	–	–
	3	6.5	–	–	36	–	–	–	–	–	–
23(WC)	1	3.0	–	–	86	–	–	–	ND	ND	ND
	3	4.8	–	–	74	–	–	–	ND	ND	ND
24(WC)	1	2.8	–	–	180	–	–	–	ND	ND	75
	3	2.1	–	–	61	–	–	–	ND	ND	43
25(WC)	1	–	–	–	40	–	ND	–	–	–	–
	1(D)	–	–	–	46	–	ND	–	–	–	–
	3	–	–	–	40	–	ND	–	–	–	–
26(WC)	1	–	–	–	42	–	ND	–	–	–	–
	3	–	–	–	160	–	ND	–	ND	ND	400



BORING	DEPTH (feet)	As	Cr	Cu	Pb	Ni	Zn	PO_4
1(WCep)	2.5	3.8	55	30	12	73	56	370
2(WCep)	2.5	2.8	62	48	28	72	98	380
3(WCep)	2.5	2.4	66	54	46	62	140	210

BORING	DEPTH (feet)	PH	Acetone (ppm)
32(WCpp)	2	8.2	19

BORING	DEPTH (feet)	TPH-MO	Ag	As	Ba	Co	Cr	Cu	Pb	Hg	Ni	Vd	Zn	Toluene	Acetone
34(WC)	2	16	–	–	–	–	–	–	–	–	–	–	–	ND	ND
36(WC)	4	–	ND	7.5	300	12	62	31	9.2	0.11	74	36	54	ND	ND
37(WC)	2	–	ND	5.1	–	ND	60	29	9.5	0.03	71	ND	47	ND	ND
	4	–	ND	5.4	–	ND	60	30	10	0.05	79	ND	55	ND	ND
38(WC)	3	–	ND	4.6	–	ND	59	33	9.3	0.04	66	ND	48	ND	ND
35(WC)	2	ND	–	–	–	–	–	–	–	–	–	–	–	–	–

PARCELS

FMC

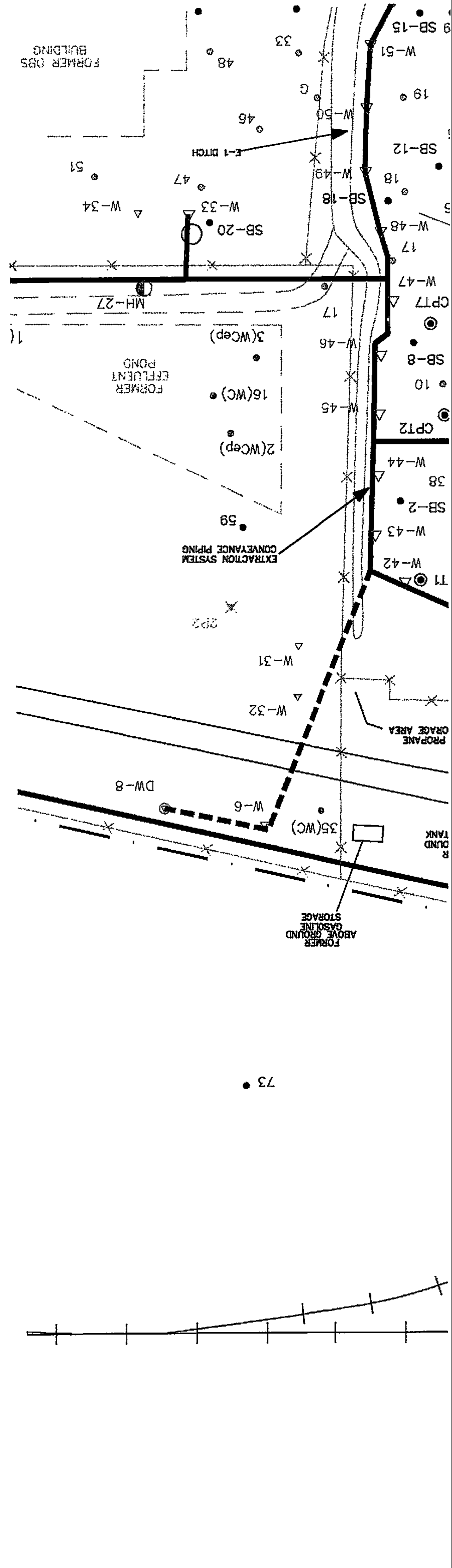
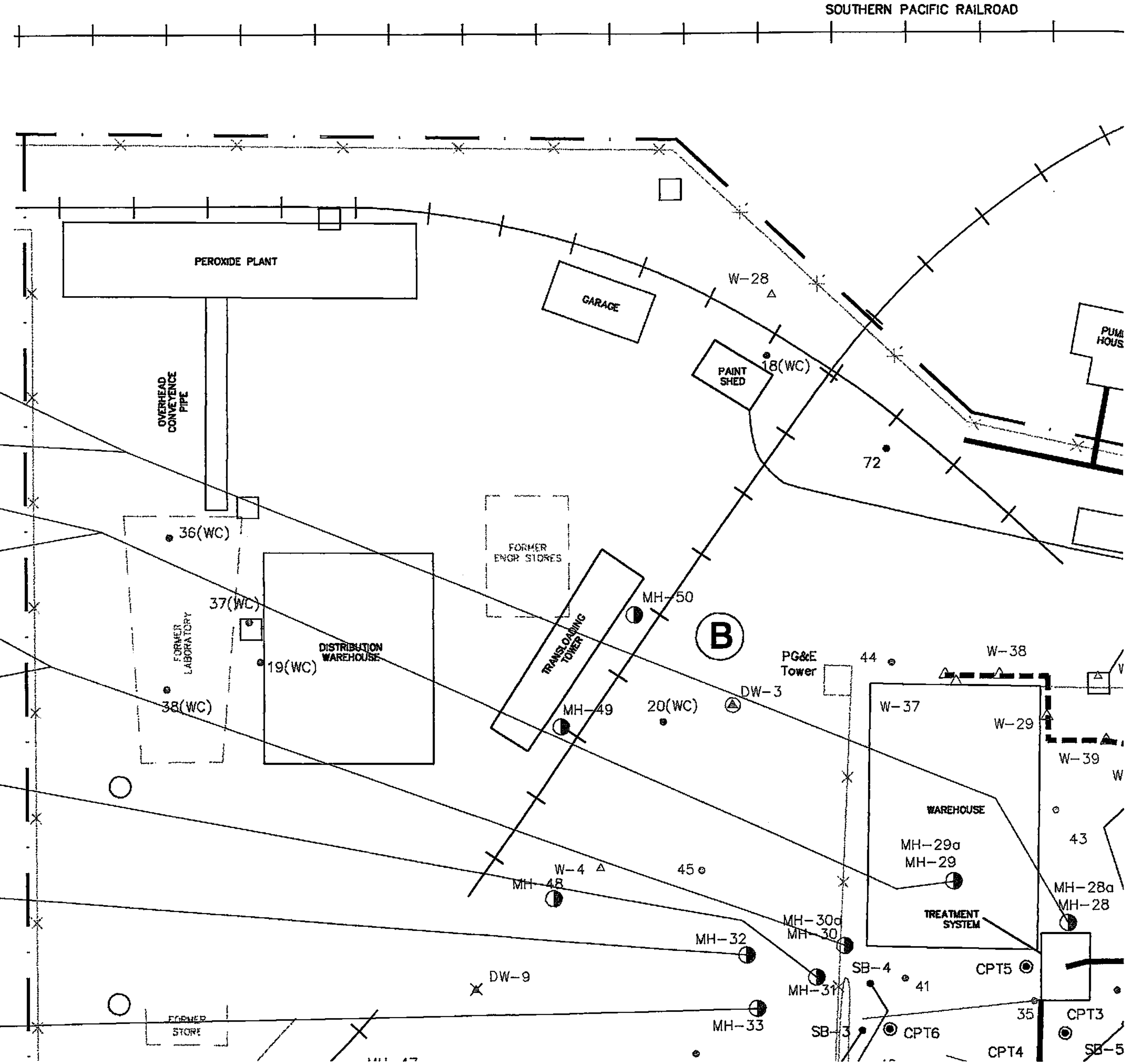


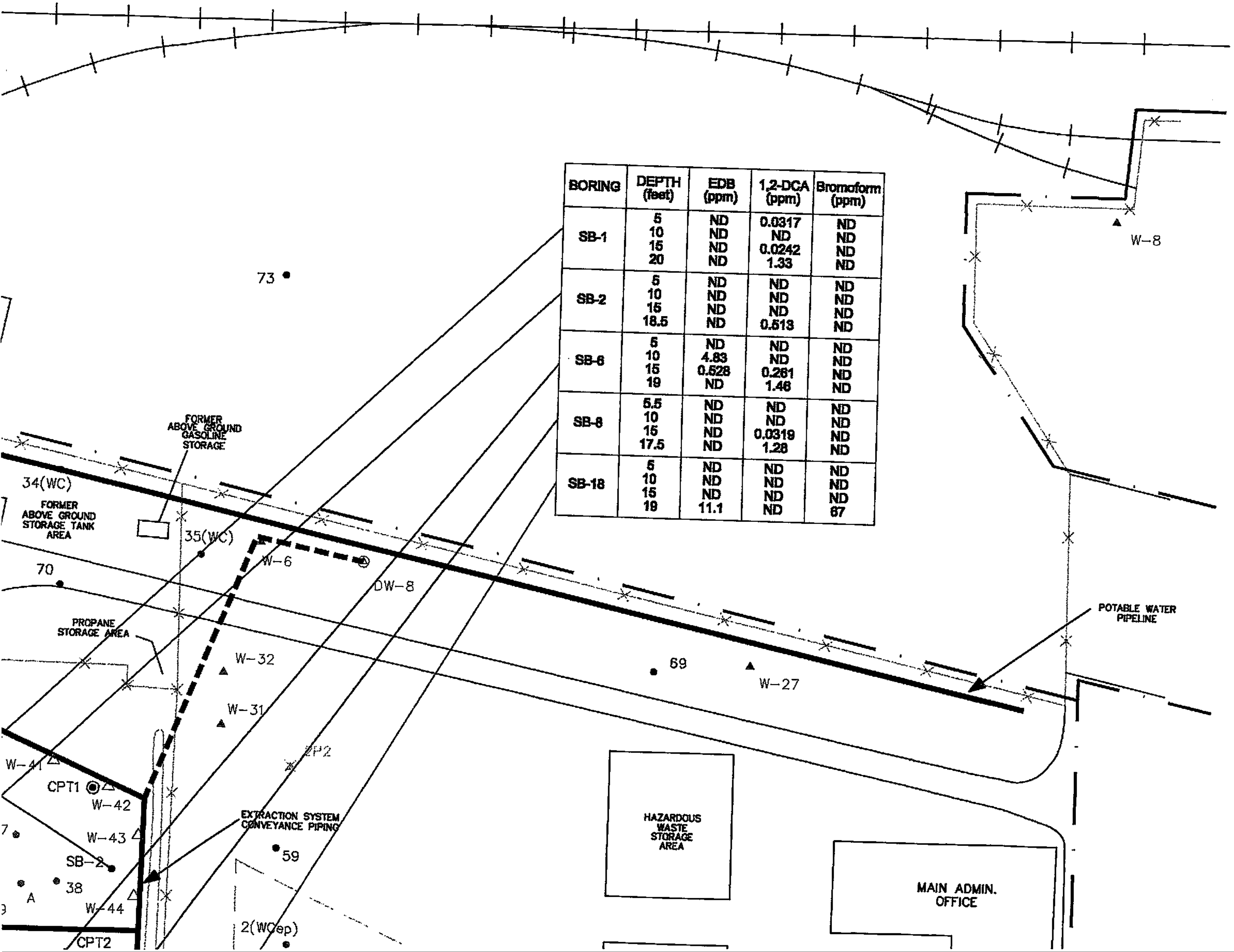
FIGURE 18
PREVIOUSLY EXISTING AND CURRENT RI ANALYTICAL DATA, PARCELS 'B' AND 'I' (METALS, PETROLEUM HYDROCARBONS AND pH)

FMC — FMC Corporation, 8787 Enterprise Drive, Newark, California	JUNE 1999

BORING	DEPTH (feet)	EDB (ppm)
54	5 10 15 20	ND ND ND ND
55	5 10 15 20	ND ND ND ND
56	5 10 15 20	ND ND 0.081 ND
57	5 10 15 20	ND ND 0.041 ND
58	5 10 15 20	ND ND 0.046 ND
59	5 10 15 20	ND ND ND ND
60	5 10 15 20	ND ND ND ND
61	5 10 15 20	ND ND ND ND
62	5 10 15 20	ND ND ND ND
63	5 10 15 20	ND ND ND ND
64	5 10 15 20	ND ND ND ND
65	5 10 15 20	ND ND ND ND
66	5 10 15 20	ND ND ND ND
67	5 10 15 20	ND ND ND ND
68	5 10	ND ND

BORING	DEPTH (feet)	EDB	1,2-DCA	TCE	Vinyl Chloride
MH-28	1.0	<0.005	<0.005	<0.005	<0.01
	4.5	<0.005	0.0065	<0.005	<0.01
	15*	<0.025	0.085	<0.025	<0.05
	20*	0.029	0.75	<0.025	<0.05
MH-28a	9.5	<0.005	0.39	<0.005	<0.015
	17*	0.81	0.87	<0.005	<0.01
MH-29	4.5	<0.005	0.066	<0.005	<0.01
	15*	<0.25	0.53	<0.25	<0.5
	20*	<0.025	0.95	<0.025	<0.05
MH-29a	3.0	<0.005	0.046	<0.005	<0.01
	9.5	<0.005	0.15	<0.005	<0.01
MH-30	0.5	<0.005	<0.005	<0.005	<0.01
	4.5	<0.005	<0.005	<0.005	<0.01
	9.5	<0.005	0.019	<0.005	<0.01
MH-30a	15*	0.027	4	<0.005	0.015
	18*	<0.025	20	<0.025	0.075
	20*	<0.025	13	<0.025	<0.05
MH-31	1.0	<0.005	<0.005	<0.005	<0.01
	4.5	<0.005	<0.005	<0.005	<0.01
	10.0	<0.005	0.18	<0.005	<0.01
	15*	<0.5	8.8	<0.5	<1
	20*	<0.5	13	<0.5	<1
MH-32	1.0	<0.005	<0.005	<0.005	<0.01
	4.5	<0.005	<0.005	<0.005	<0.01
	10*	<0.005	0.019	<0.005	<0.01
	15*	<0.25	0.63	<0.25	<0.5
	20*	<0.25	2.8	<0.25	<0.5
MH-33	1.0	<0.005	0.0085	<0.005	<0.01
	4.5	<0.005	0.0068	<0.005	<0.01
	7.5	<0.005	0.0091	<0.005	<0.01
	13.5*	<0.25	4.4	<0.25	<0.5
	15.5*	<0.5	11	<0.5	<1





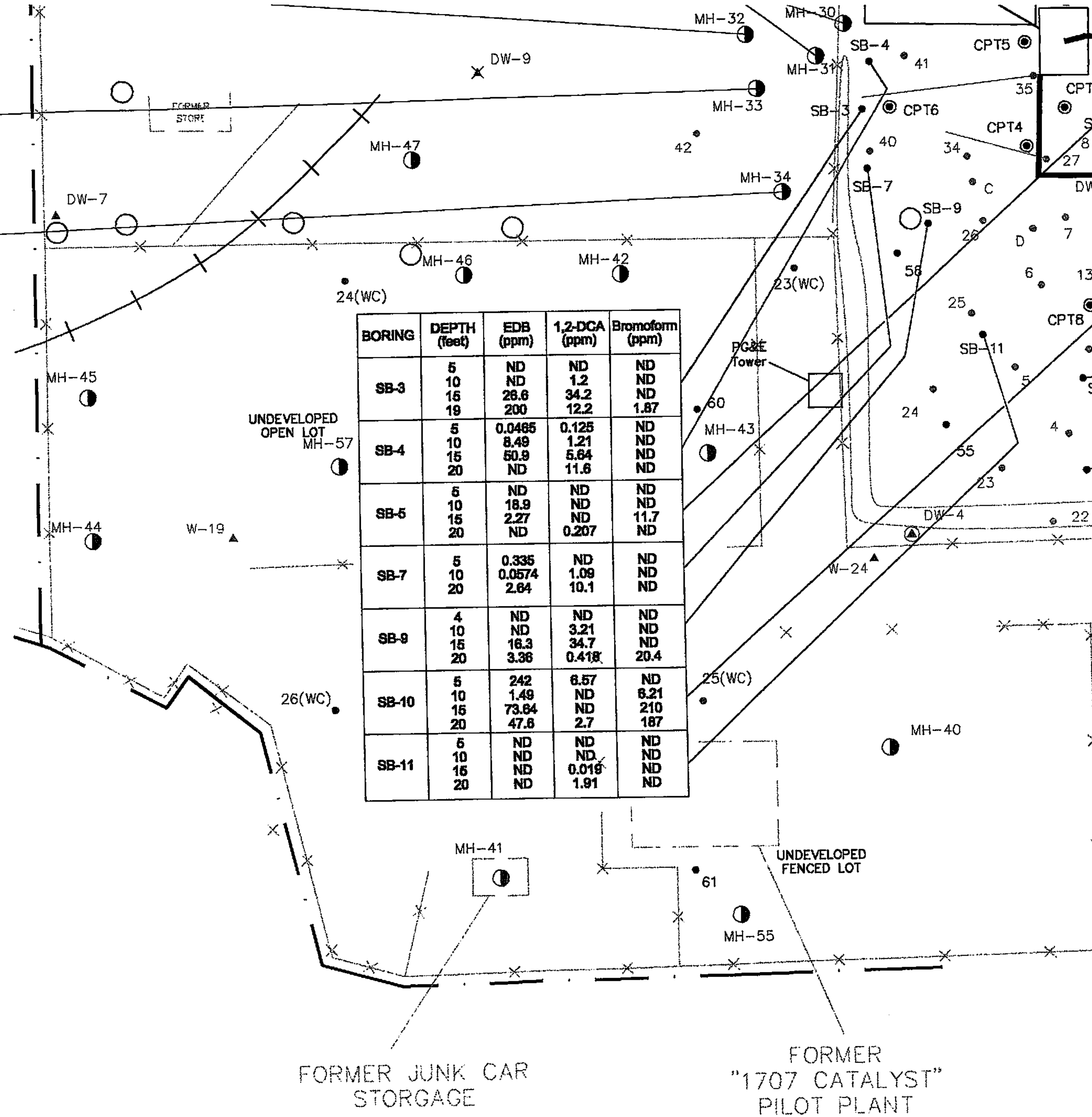
BORING	DEPTH (feet)	EDB (ppm)	1,2-DCA (ppm)	Bromoform (ppm)
SB-1	5 10 15 20	ND ND ND ND	0.0317 ND 0.0242 1.33	ND ND ND ND
SB-2	5 10 15 18.5	ND ND ND ND	ND ND ND 0.513	ND ND ND ND
SB-6	5 10 15 19	ND 4.83 0.528 ND	ND ND 0.261 1.46	ND ND ND ND
SB-8	5.5 10 15 17.5	ND ND ND ND	ND ND 0.0319 1.28	ND ND ND ND
SB-18	5 10 15 19	ND ND ND 11.1	ND ND ND ND	ND ND ND 67

BORING	DEPTH (feet)	EDB (ppm)
A	0 2 5	0.34 0.02 0.03
B	0 2 5	0.07 0.4 110
C	0 2 5	0.02 0.02 0.05
D	0 2 5	9.7 0.1 0.7
E	0 2 5	0.07 16 100
F	0 2 5 9	0.16 0.35 2,600 520
G	0 2 5	0.03 0.17 0.95
H	0 2 5	0.05 0.16 0.05
1	2 5 10 15 20	0.05 2.4 250 1,900 2.3
2	5 10 15 20A 20B	1.8 11 2,700 12,000 130
3	2 5 10 15 20A 20B	ND 19 0.97 350 280 500
4	2 5 10 15 20	0.02 0.02 0.1 19 0.16
5	2 5 10 15 20	0.02 0.02 0.08 0.19 0.05
6	2 5 10 15 20	0.03 ND 0.08 0.03 ND
7	2 5 10 15 20	0.07 ND 26 34 0.06
8	2 5 10 15 20	ND ND 0.02 17 0.03
9	2 5 10 15 20	0.06 ND 6.5 50 0.38
10	2 5 10 15	ND ND ND ND

BORING	DEPTH (feet)	EDB (ppm)
18	2 5 10 15 20	0.05 ND ND 4 7.8
19	2 5 10 15 20	0.15 ND ND ND 4.2
20	5 10 15 20	ND ND 2.2 86
21	2 5 10 15 20	ND ND 0.69 22 0.28
22	5 10 15 20	– – – –
23	5 10 15 20	– – – –
24	5 10 15 20	– – – –
25	5 10 15 20	– – – –
26	2 5 10 15 20	0.05 ND ND 3.6 0.67
27	2 5 10 15 20A 20B	0.48 21 900 520 490 0.25
28	2 5 10 15 20	ND ND 2.5 47 0.82
29	15 20 25 30	12 160 0.6 24.3
30	2 5 10 15 20	ND ND 14 51 0.27
31	5 10 15 20	0.1 1.2 2.6 0.8
32	5 10 15 20	2.6 0.3 0.5 3.7
33	5 10 15 20	180 74 68 44
34	5 10 15 20	1.6 130 180 0.2

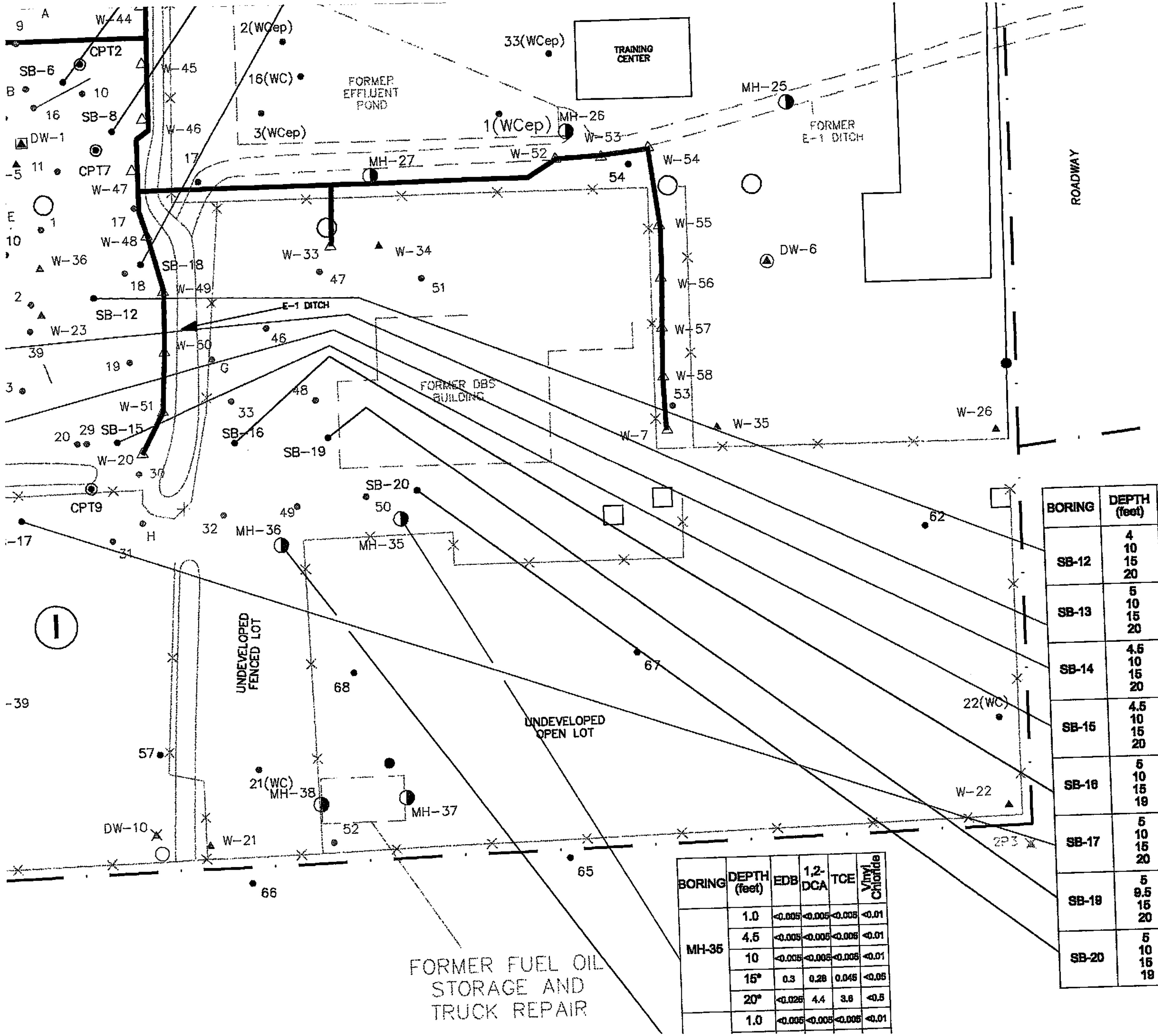
66	10 15 20	ND ND ND
67	5 10 15 20	ND ND ND ND
68	5 10 15 20	ND ND ND ND
69	5 10 15 20	ND ND 0.001 ND
70	5 10 15 20	ND ND ND ND
71	5 10 20	ND ND ND
72	5 10 15 20	ND ND 0.0058 ND
73	5 10 15 20	ND ND ND ND

	15	<0.25	0.63	<0.25	<0.5
	20*	<0.25	2.8	<0.25	<0.5
MH-33	1.0	<0.005	0.0085	<0.005	<0.01
	4.5	<0.005	0.0068	<0.005	<0.01
	7.5	<0.005	0.0091	<0.005	<0.01
	13.5*	<0.25	4.4	<0.25	<0.5
	15.5*	<0.5	11	<0.5	<1
	20*	0.029	14	<0.005	<0.01
MH-34	1.0	<0.005	<0.005	<0.005	<0.01
	4.5	<0.005	0.0069	<0.005	<0.01
	9.5	<0.25	1.9	<0.25	<0.5
	15*	<1	11	<1	<2
	20*	<0.25	12	<0.25	<0.5



BORING	DEPTH (feet)	EDB (ppm)	1,2-DCA (ppm)	Bromoform (ppm)
SB-3	5 10 15 19	ND ND 26.6 200	ND 1.2 34.2 12.2	ND ND ND 1.87
SB-4	5 10 15 20	0.0465 8.49 50.9 ND	0.125 1.21 5.64 11.6	ND ND ND ND
SB-5	5 10 15 20	ND 18.9 2.27 ND	ND ND ND 0.207	ND ND 11.7 ND
SB-7	5 10 20	0.335 0.0574 2.64	ND 1.09 10.1	ND ND ND
SB-9	4 10 15 20	ND ND 16.3 3.36	ND 3.21 34.7 0.418	ND ND ND 20.4
SB-10	5 10 15 20	242 1.49 73.64 47.6	6.57 ND ND 2.7	ND 6.21 210 187
SB-11	5 10 15 20	ND ND ND ND	ND ND 0.019 1.91	ND ND ND ND

MH-38 SOIL BORING (McLAREN/HART)
W-4 SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
DW-3 NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
W-7 SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
DW-2 NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
DW-1 IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
24 SOIL BORING (TODD)
55 SOIL BORING (IT CORPORATION)
1(WCep) SOIL BORING (WOODWARD-CLYDE EFFLUENT POND SAMPLING LOCATION)
26(WC) SOIL BORING (WOODWARD-CLYDE SAMPLING LOCATION)
SB 15 SOIL BORING (PES ENVIRONMENTAL)
CPT1 CPT LOCATION (PES ENVIRONMENTAL)
POWER/TELEPHONE POLE
STORM DRAIN
PIPE
SUMP

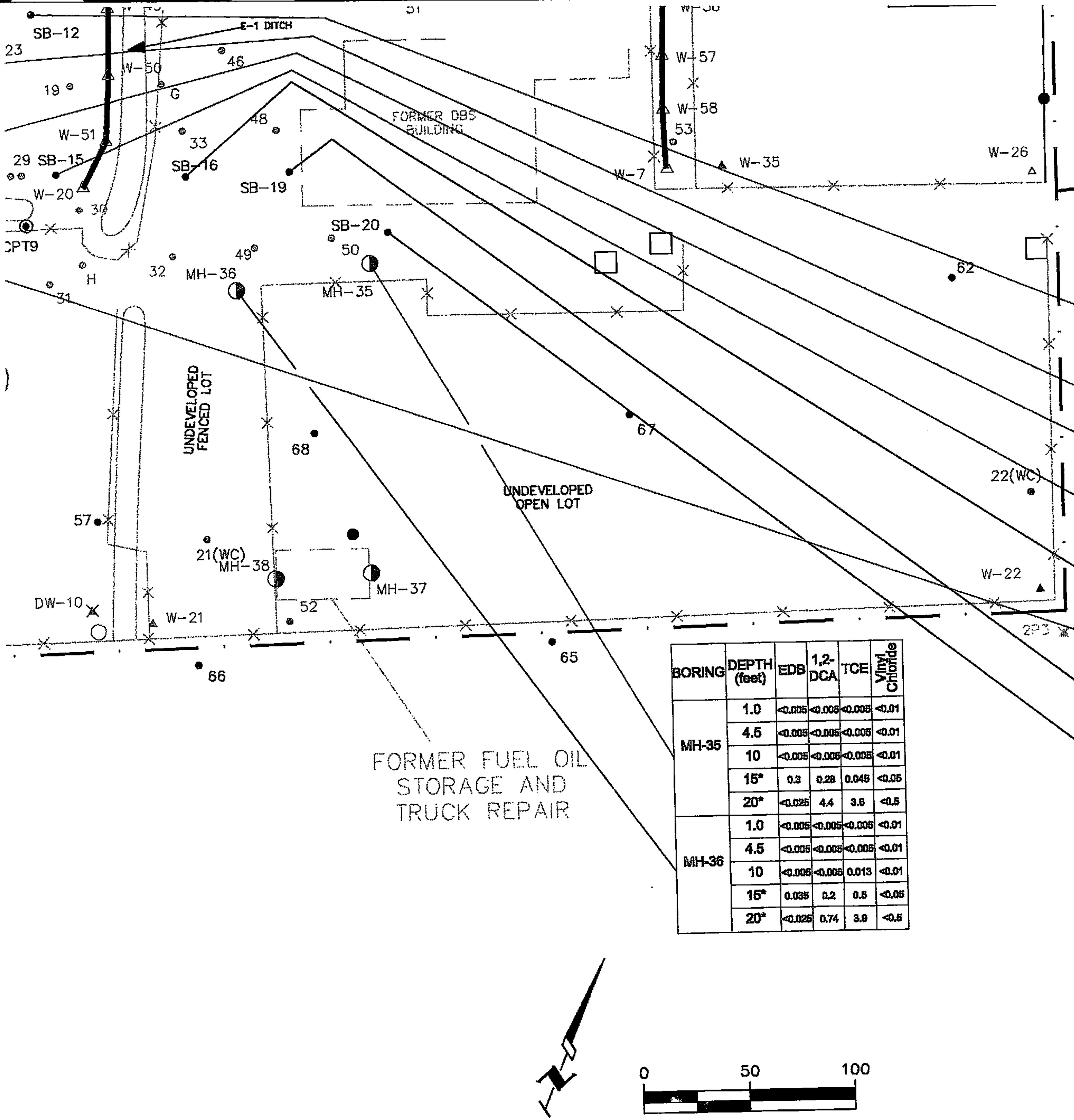


11	2	
	5	ND
	10	ND
	15	0.26
	20	ND
12	2.5	0.06
	5	ND
	10	13
	15	18
	20A	17
	20B	0.19
13	2	ND
	5	ND
	7.5	ND
	10	0.19
	12.5	2.4
	15	2.3
	20.5-21.5	ND
	25	0.29
	30	ND
14	2	ND
	5	ND
	10	0.18
	15	0.66
	20	ND
15	2	ND
	5	ND
	10	1.3
	15	2.8
	20	0.04
16	2	0.35
	5	0.99
	10	170
	15	64
	20	0.41
17	2	0.53
	5	0.94
	10	4.4
	15	2.8
	20	ND

35	10	[illegible]
	20	0.7
36	5	0.3
	10	0.8
	15	14
	20	0.2
	22	ND
37	5	ND
	10	ND
	15	7.2
	20	0.1
38	5	ND
	10	ND
	15	8.5
	20	0.1
39	20	280
	25	ND
	30	ND
	35	ND
	40	ND
40	5	370
	10	1,400
	15	150
	20	0.4
41	5	170
	10	600
	15	260
	20	210
42	5	0.09
	10	ND
	15	0.05
	20	ND
43	5	0.1
	10	0.1
	15	ND
	20	ND
44	5	ND
	10	ND
	15	0.01
	20	ND
	25	ND
45	5	ND
	10	ND
	15	ND
	20	ND
46	5	ND
	10	ND
	15	ND
	20	ND
47	5	ND
	10	0.02
	15	ND
	20	ND
48	5	ND
	10	0.8
	15	3.6
	20	0.2
49	5	0.01
	10	60
	15	46
	20	0.2
50	5	0.04
	10	1.0
	15	24
	20	0.1
51	5	0.18
	10	0.39
	15	0.96
	20	0.36
52	5	0.07
	10	0.44
	15	0.17
	20	ND
	5	ND
	10	0.13

BORING	DEPTH (feet)	EDB (ppm)	1,2-DCA (ppm)	Bromoform (ppm)
SB-12	4	ND	0.103	0.0466
	10	ND	0.0457	ND
	15	0.631	0.623	0.133
	20	226	ND	419
SB-13	5	ND	ND	ND
	10	ND	ND	ND
	15	ND	ND	2.8
	20	ND	6.77	ND
SB-14	4.5	ND	ND	ND
	10	ND	ND	ND
	15	ND	0.107	ND
	20	ND	2.25	ND
SB-15	4.5	ND	ND	ND
	10	ND	ND	ND
	15	0.11	0.048	ND
	20	ND	6.27	ND
SB-16	5	1.13	0.00693	ND
	10	16.5	ND	ND
	15	9.04	ND	ND
	19	ND	23.2	ND
SB-17	5	ND	ND	ND
	10	ND	ND	ND
	15	ND	0.0635	ND
	20	ND	0.43	ND
SB-19	5	ND	ND	ND
	9.5	ND	ND	ND
	15	ND	0.234	ND
	20	ND	2.93	ND
SB-20	5	ND	ND	ND
	10	ND	ND	ND
	15	ND	ND	ND
	19	ND	0.085	ND

BORING	DEPTH (feet)	EDB	1,2-DCA	TCE	Vinyl Chloride
MH-35	1.0	<0.005	<0.005	<0.005	<0.01
	4.5	<0.005	<0.005	<0.005	<0.01
	10	<0.005	<0.005	<0.005	<0.01
	15*	0.3	0.28	0.045	<0.05
	20*	<0.025	4.4	3.8	<0.5
	1.0	<0.005	<0.005	<0.005	<0.01



15	2 5 10 15 20	ND ND 1.3 2.8 0.04
16	2 5 10 15 20	0.35 0.99 170 64 0.41
17	2 5 10 15 20	0.53 0.94 4.4 2.8 ND

40	5 10 15 20	370 1,400 160 0.4
41	5 10 15 20	170 600 260 210
42	5 10 15 20	0.09 ND 0.05 ND
43	5 10 15 20	0.1 0.1 ND ND
44	5 10 15 20 25	ND ND 0.01 ND ND
45	5 10 15 20	ND ND ND ND
46	5 10 15 20	ND ND ND ND
47	5 10 15 20	ND 0.02 ND ND
48	5 10 15 20	ND 0.8 3.6 0.2
49	5 10 15 20	0.01 60 46 0.2
50	5 10 15 20	0.04 1.0 24 0.1
51	5 10 15 20	0.18 0.39 0.96 0.36
52	5 10 15 20	0.07 0.44 0.17 ND
53	5 10 15 20	ND 0.13 0.45 0.21

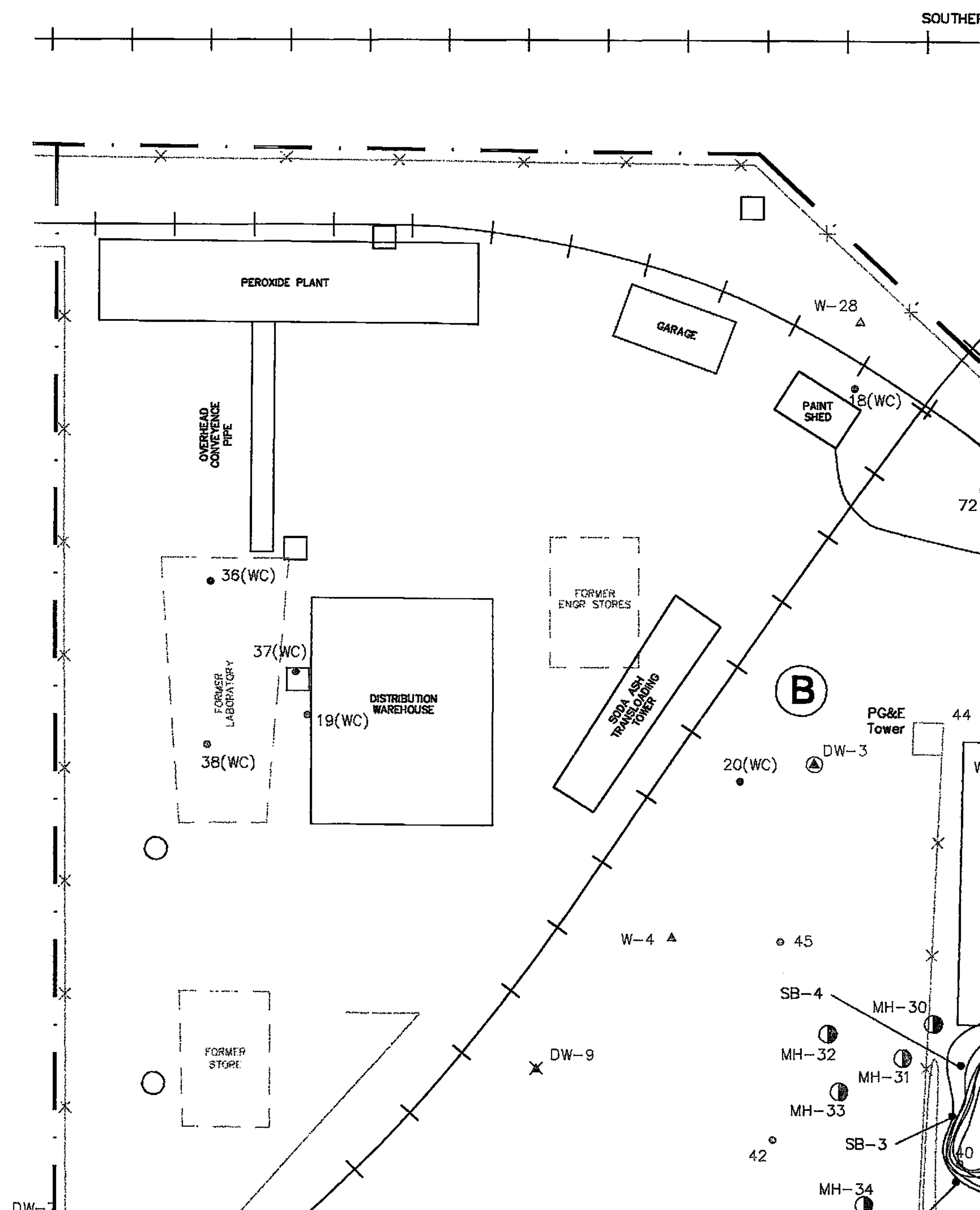
BORING	DEPTH (feet)	EDB (ppm)	1,2-DCA (ppm)	Bromoform (ppm)
SB-12	4 10 15 20	ND ND 0.631 226	0.103 0.0457 0.623 ND	0.0466 ND 0.133 419
SB-13	5 10 15 20	ND ND ND ND	ND ND ND 6.77	ND ND 2.8 ND
SB-14	4.5 10 15 20	ND ND ND ND	ND ND 0.107 2.25	ND ND ND ND
SB-15	4.5 10 15 20	ND ND 0.11 ND	ND ND 0.048 6.27	ND ND ND ND
SB-16	5 10 15 19	1.13 16.5 9.04 ND	0.00693 ND ND 23.2	ND ND ND ND
SB-17	5 10 15 20	ND ND ND ND	ND ND 0.0635 0.43	ND ND ND ND
SB-19	5 9.5 15 20	ND ND ND ND	ND ND 0.234 2.93	ND ND ND ND
SB-20	5 10 15 19	ND ND ND ND	ND ND ND 0.085	ND ND ND ND

BORING	DEPTH (feet)	EDB	1,2-DCA	TCE	Vinyl Chloride
MH-35	1.0	<0.005	<0.005	<0.005	<0.01
	4.5	<0.005	<0.005	<0.005	<0.01
	10	<0.005	<0.005	<0.005	<0.01
	15*	0.3	0.28	0.045	<0.05
	20*	<0.025	4.4	3.6	<0.5
MH-36	1.0	<0.005	<0.005	<0.005	<0.01
	4.5	<0.005	<0.005	<0.005	<0.01
	10	<0.005	<0.005	0.013	<0.01
	15*	0.035	0.2	0.5	<0.05
	20*	<0.025	0.74	3.9	<0.5

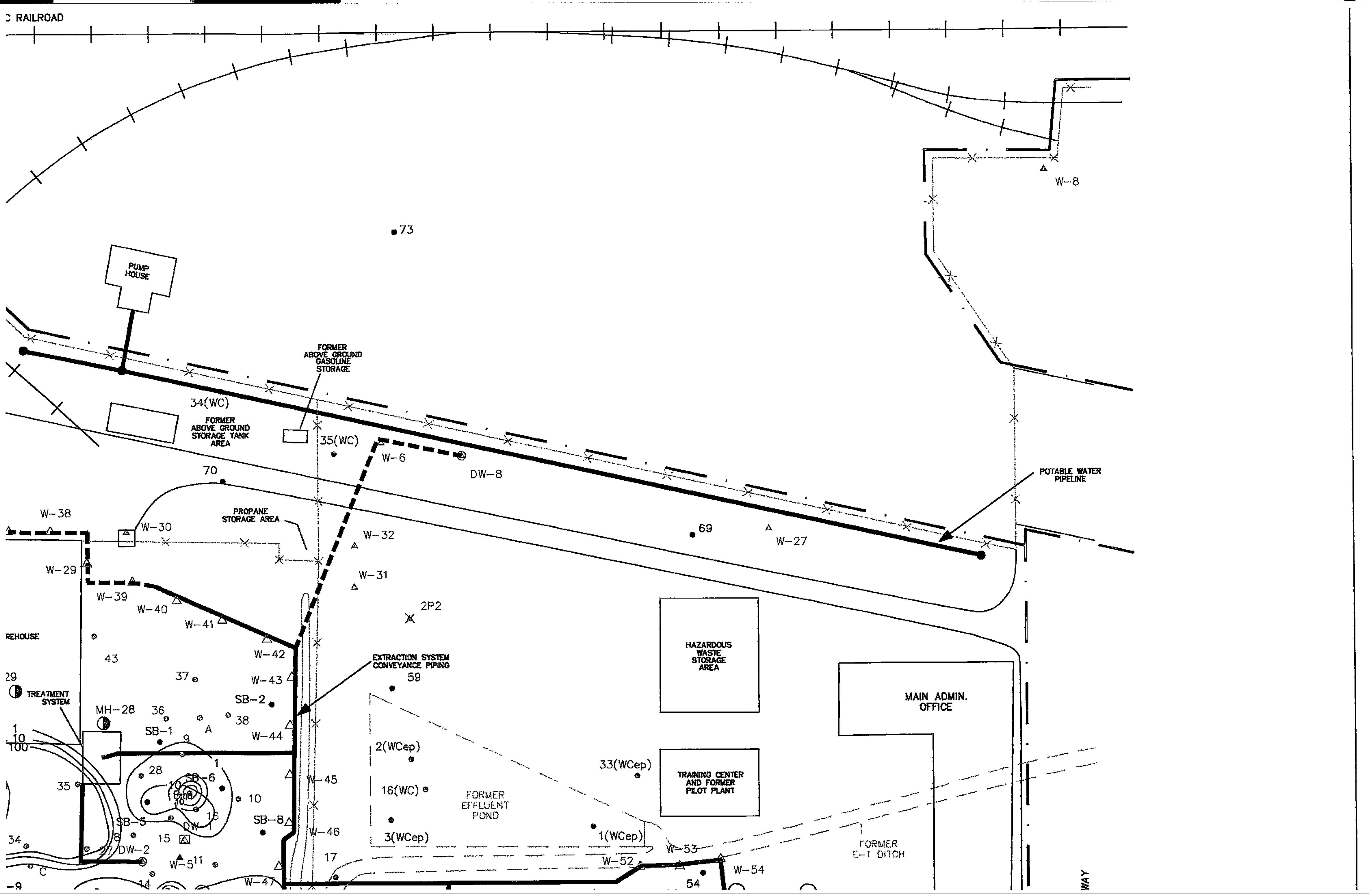
FIGURE 19
PREVIOUSLY EXISTING AND CURRENT RI ANALYTICAL DATA, PARCELS 'B' AND 'I' (VOCs)

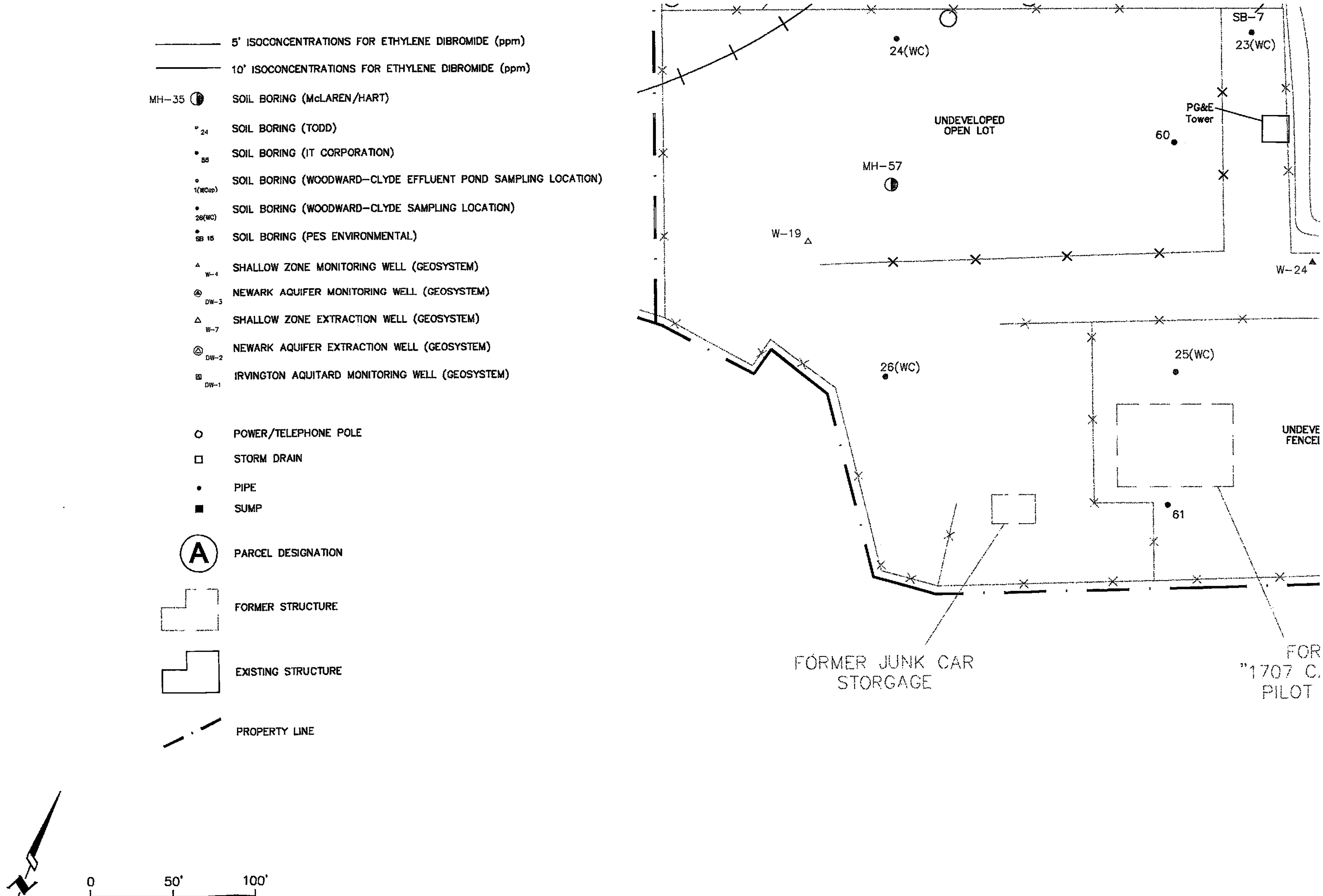
FMC
FMC Corporation
8787 Enterprise Drive
Newark, California

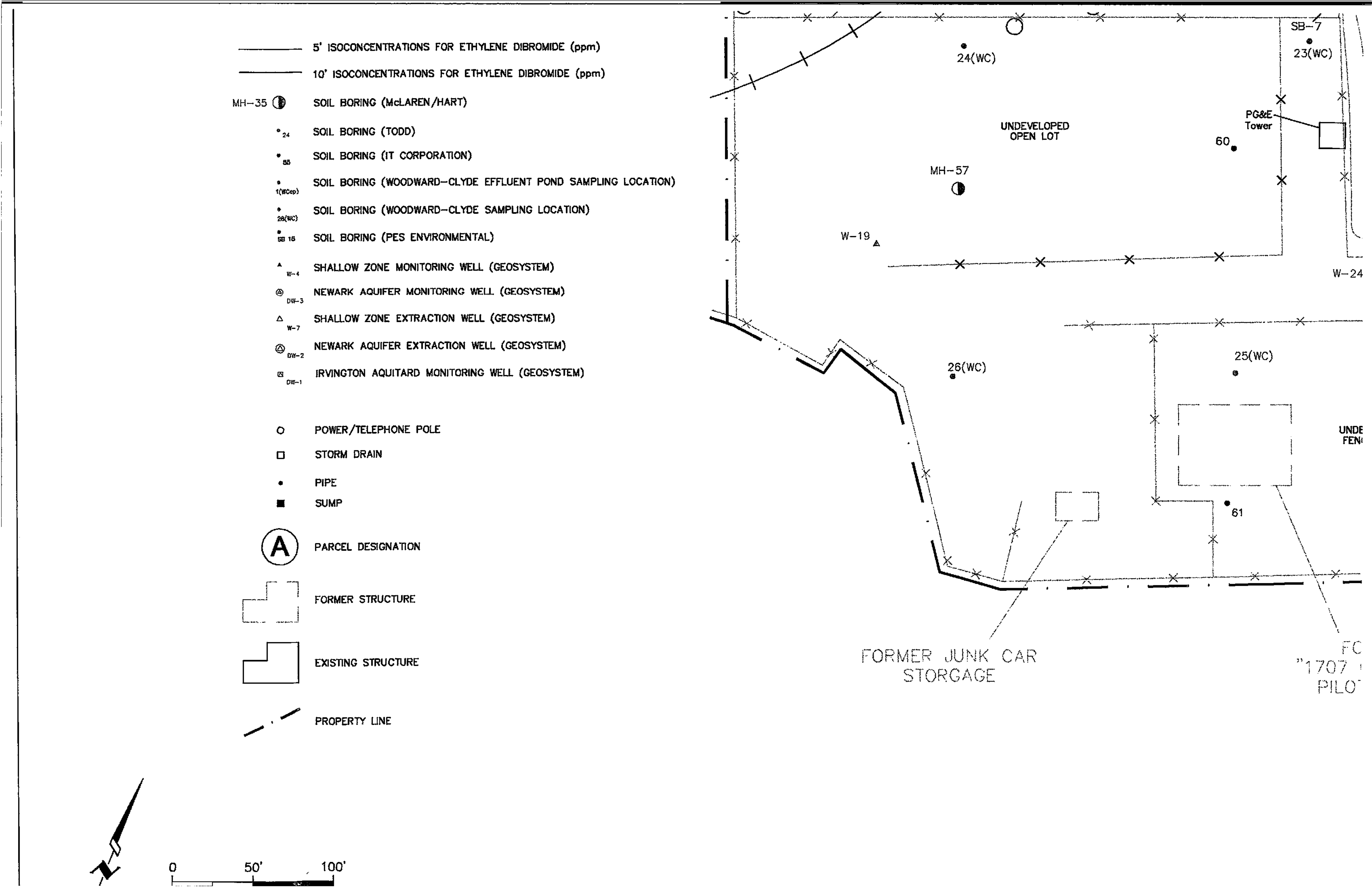
JUNE 1999



SOUTHERN
PEROXIDE PLANT
OVERHEAD CONVEYENCE PIPE
GARAGE
W-28
PAINT SHED
18(WC)
72
36(WC)
37(WC)
FORMER LABORATORY
19(WC)
DISTRIBUTION WAREHOUSE
38(WC)
FORMER ENGR STORES
SODA ASH TRANSLOADING TOWER
B
PG&E Tower
44
DW-3
20(WC)
W-4
45
SB-4
MH-30
MH-32
MH-31
MH-33
FORMER STORE
DW-9
SB-3
42
MH-34
DW-7


RAILROAD
PUMP HOUSE
FORMER ABOVE GROUND GASOLINE STORAGE
FORMER ABOVE GROUND STORAGE TANK AREA
34(WC)
35(WC)
73
W-8
W-6
DW-8
70
69
W-27
POTABLE WATER PIPELINE
W-38
W-30
PROPANE STORAGE AREA
W-32
W-31
W-29
W-39
W-40
W-41
2P2
REHOUSE
43
W-42
HAZARDOUS WASTE STORAGE AREA
EXTRACTION SYSTEM CONVEYANCE PIPING
59
MAIN ADMIN. OFFICE
TREATMENT SYSTEM
37
W-43
MH-28
36
SB-2
SB-1
38
A
W-44
2(WCep)
33(WCep)
TRAINING CENTER AND FORMER PILOT PLANT
28
SB-6
W-45
16(WC)
FORMER EFFLUENT POND
SB-5
SB-8
DW-1
W-46
3(WCep)
1(WCep)
W-53
FORMER E-1 DITCH
DW-2
W-5
W-52
W-54
W-47
17
54


5' ISOCONCENTRATIONS FOR ETHYLENE DIBROMIDE (ppm)
10' ISOCONCENTRATIONS FOR ETHYLENE DIBROMIDE (ppm)
MH-35
SOIL BORING (McLAREN/HART)
SOIL BORING (TODD)
SOIL BORING (IT CORPORATION)
SOIL BORING (WOODWARD-CLYDE EFFLUENT POND SAMPLING LOCATION)
SOIL BORING (WOODWARD-CLYDE SAMPLING LOCATION)
SOIL BORING (PES ENVIRONMENTAL)
SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
POWER/TELEPHONE POLE
STORM DRAIN
PIPE
SUMP
A
PARCEL DESIGNATION
FORMER STRUCTURE
EXISTING STRUCTURE
PROPERTY LINE
0
50'
100'
SB-7
23(WC)
24(WC)
PG&E Tower
UNDEVELOPED OPEN LOT
60
MH-57
W-19
W-24
26(WC)
25(WC)
61
FORMER JUNK CAR STORGAGE


5' ISOCONCENTRATIONS FOR ETHYLENE DIBROMIDE (ppm)
10' ISOCONCENTRATIONS FOR ETHYLENE DIBROMIDE (ppm)
MH-35
SOIL BORING (McLAREN/HART)
SOIL BORING (TODD)
SOIL BORING (IT CORPORATION)
SOIL BORING (WOODWARD-CLYDE EFFLUENT POND SAMPLING LOCATION)
SOIL BORING (WOODWARD-CLYDE SAMPLING LOCATION)
SOIL BORING (PES ENVIRONMENTAL)
SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
POWER/TELEPHONE POLE
STORM DRAIN
PIPE
SUMP
PARCEL DESIGNATION
FORMER STRUCTURE
EXISTING STRUCTURE
PROPERTY LINE
0
50'
100'
SB-7
24(WC)
23(WC)
PG&E Tower
UNDEVELOPED OPEN LOT
60
MH-57
W-19
W-24
26(WC)
25(WC)
61
FORMER JUNK CAR STORGAGE

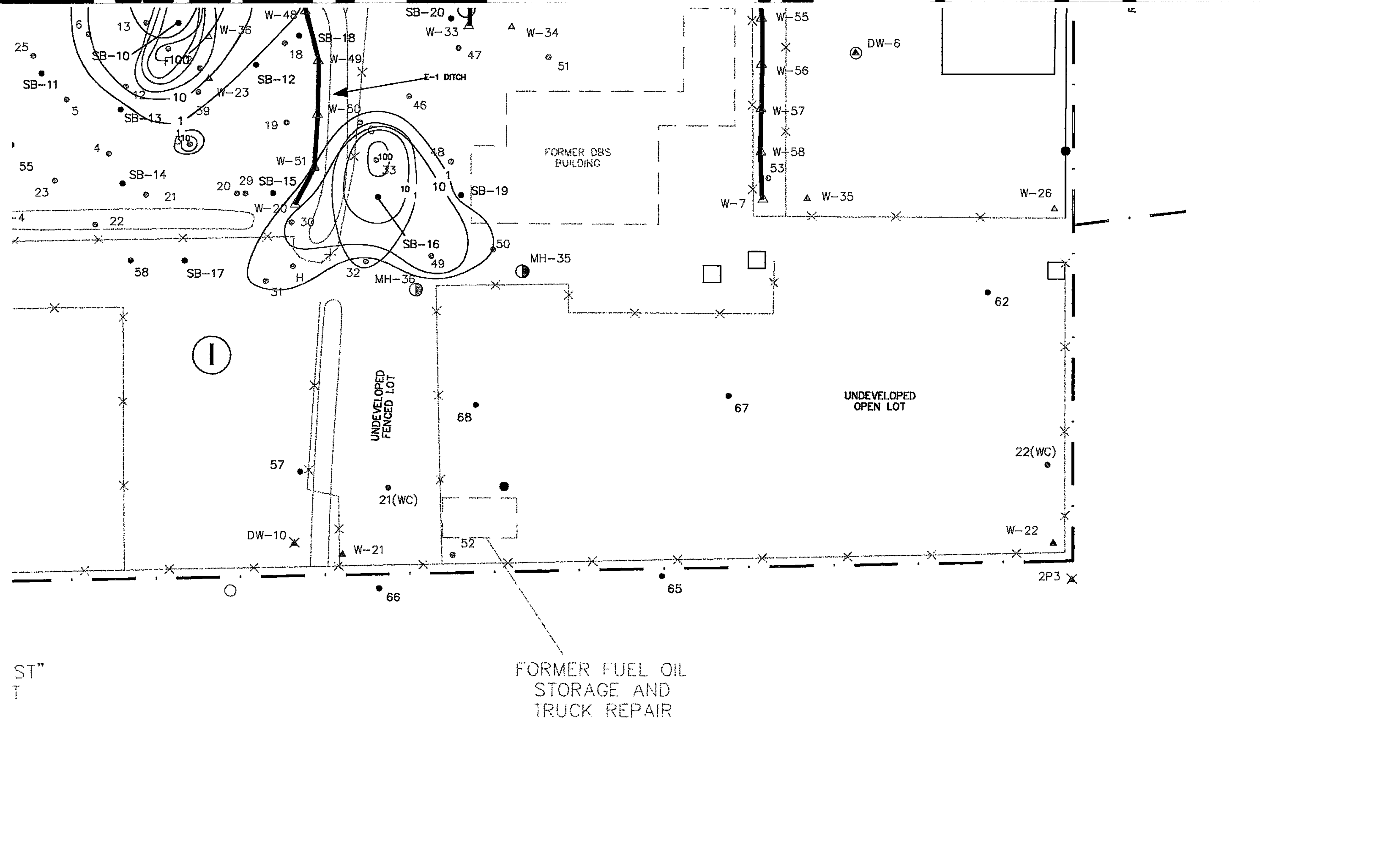
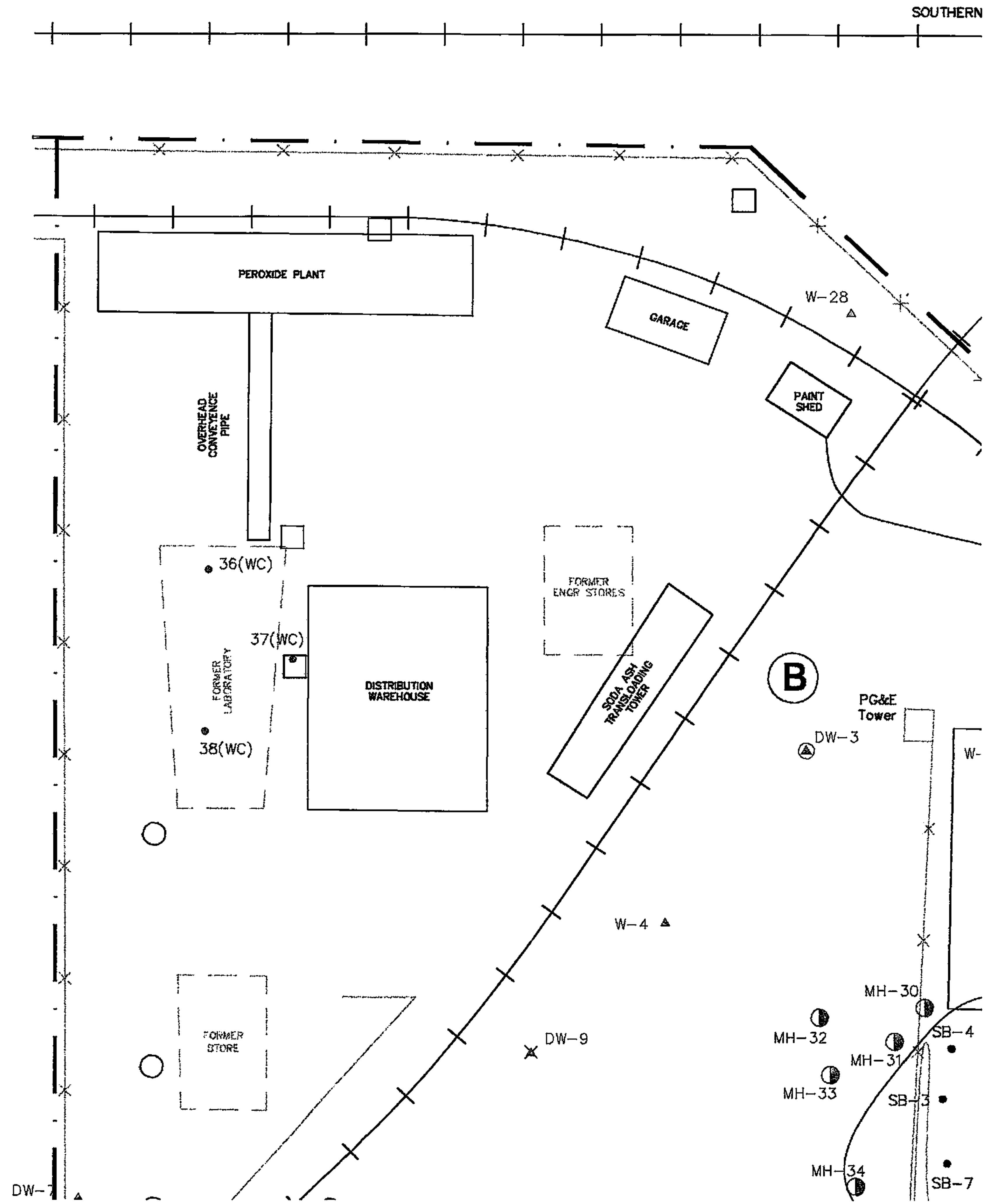
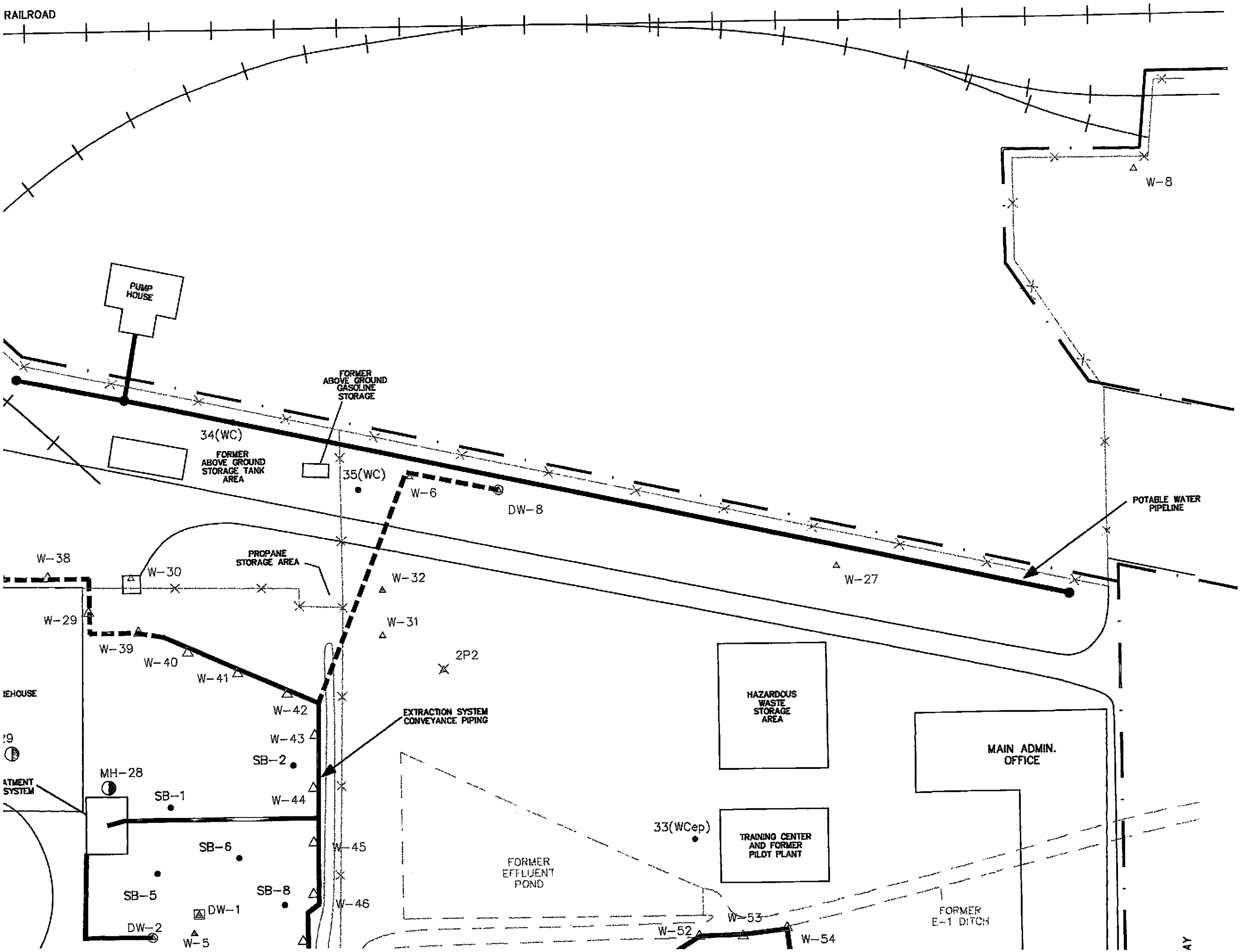
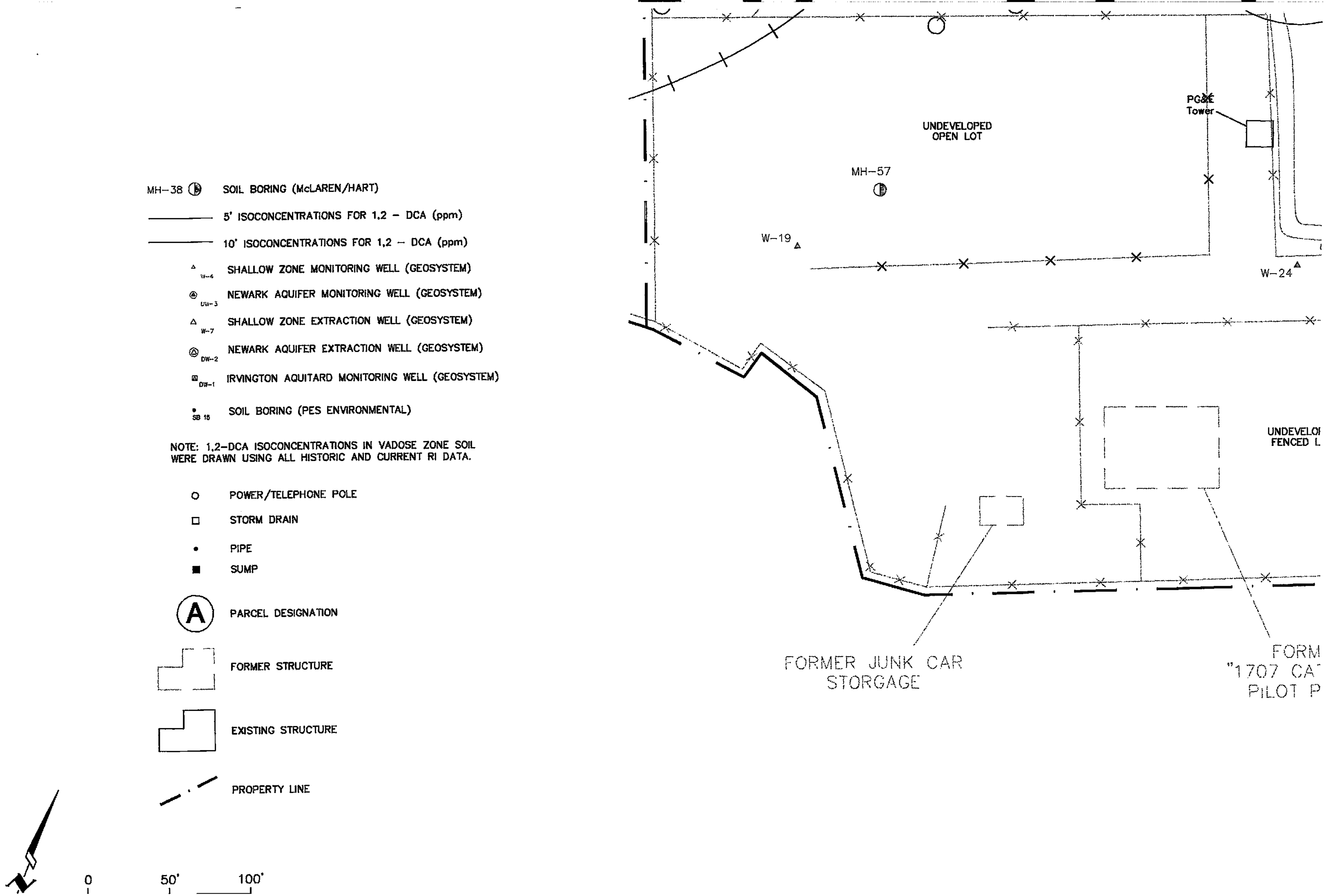


FIGURE 20
EDB ISOCONCENTRATIONS
IN SOIL (ppm)



SOUTHERN
PEROXIDE PLANT
OVERHEAD CONVEYENCE PIPE
GARAGE
W-28
PAINT SHED
36(WC)
37(WC)
38(WC)
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
FORMER ENGR STORES
SODA ASH TRANSLOADING TOWER
B
PG&E Tower
DW-3
W-4
DW-9
MH-30
MH-32
MH-31
MH-33
MH-34
SB-4
SB-3
SB-7
FORMER STORE
DW-7


RAILROAD
W-8
PUMP HOUSE
FORMER ABOVE GROUND GASOLINE STORAGE
34(WC)
FORMER ABOVE GROUND STORAGE TANK AREA
35(WC)
W-6
DW-8
POTABLE WATER PIPELINE
W-38
W-30
PROPANE STORAGE AREA
W-32
W-27
W-29
W-31
W-39
W-40
2P2
W-41
EHOUSE
W-42
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
W-43
MAIN ADMIN. OFFICE
SB-2
MH-28
ATMENT SYSTEM
SB-1
W-44
33(WCep)
TRAINING CENTER AND FORMER PILOT PLANT
SB-6
W-45
FORMER EFFLUENT POND
SB-5
SB-8
DW-1
W-46
FORMER E-1 DITCH
W-53
DW-2
W-52
W-54
W-5



MH-38 SOIL BORING (McLAREN/HART)
5' ISOCONCENTRATIONS FOR 1,2 – DCA (ppm)
10' ISOCONCENTRATIONS FOR 1,2 – DCA (ppm)
W-4 SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
DW-3 NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
W-7 SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
DW-2 NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
DW-1 IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
SB 15 SOIL BORING (PES ENVIRONMENTAL)
NOTE: 1,2-DCA ISOCONCENTRATIONS IN VADOSE ZONE SOIL WERE DRAWN USING ALL HISTORIC AND CURRENT RI DATA.
POWER/TELEPHONE POLE
STORM DRAIN
PIPE
SUMP
A PARCEL DESIGNATION
FORMER STRUCTURE
EXISTING STRUCTURE
PROPERTY LINE
0
50'
100'
UNDEVELOPED OPEN LOT
PG&E Tower
MH-57
W-19
W-24
UNDEVELO
FENCED L
FORMER JUNK CAR STORGAGE
FORM
"1707 CA
PILOT P

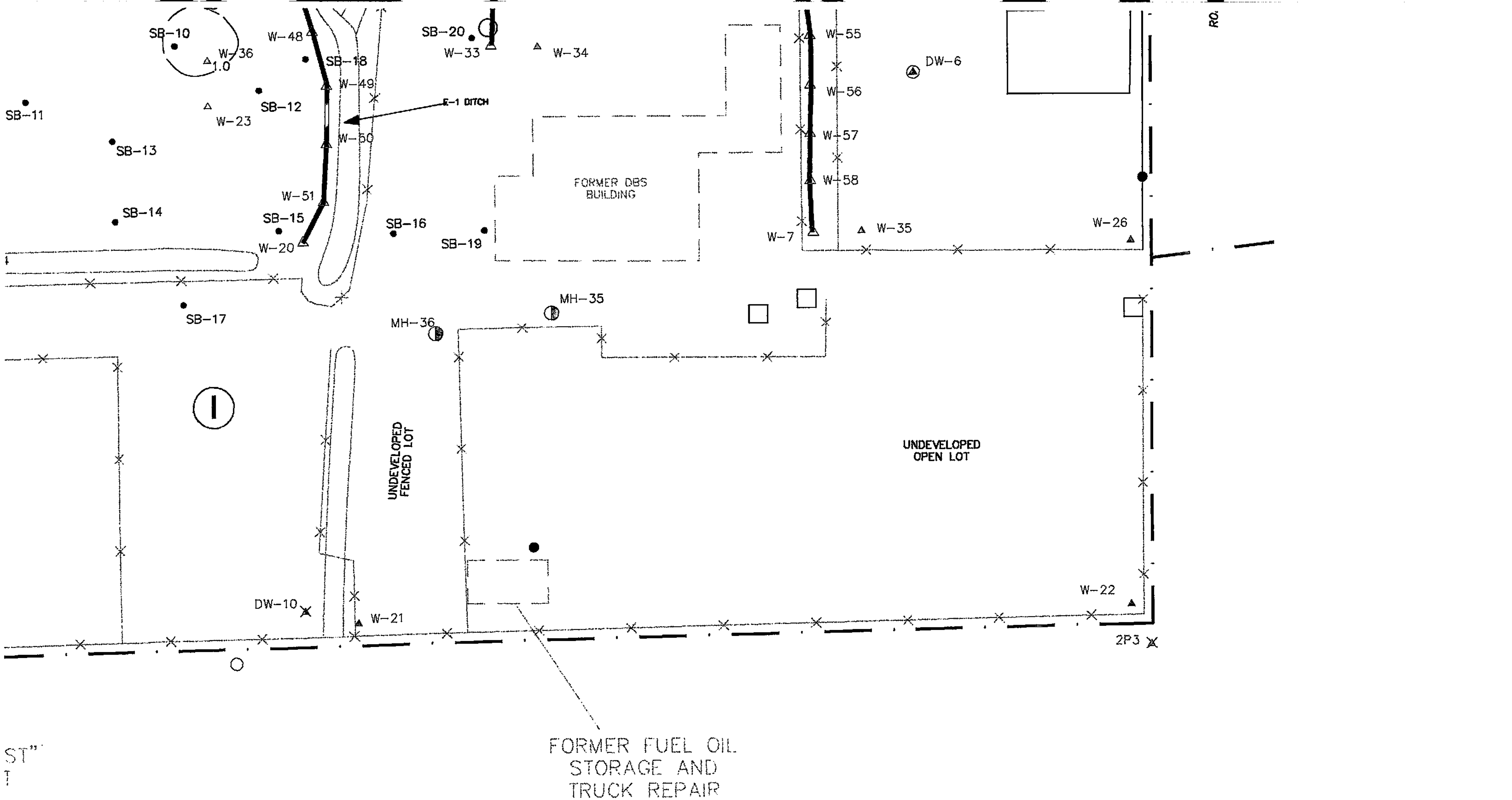
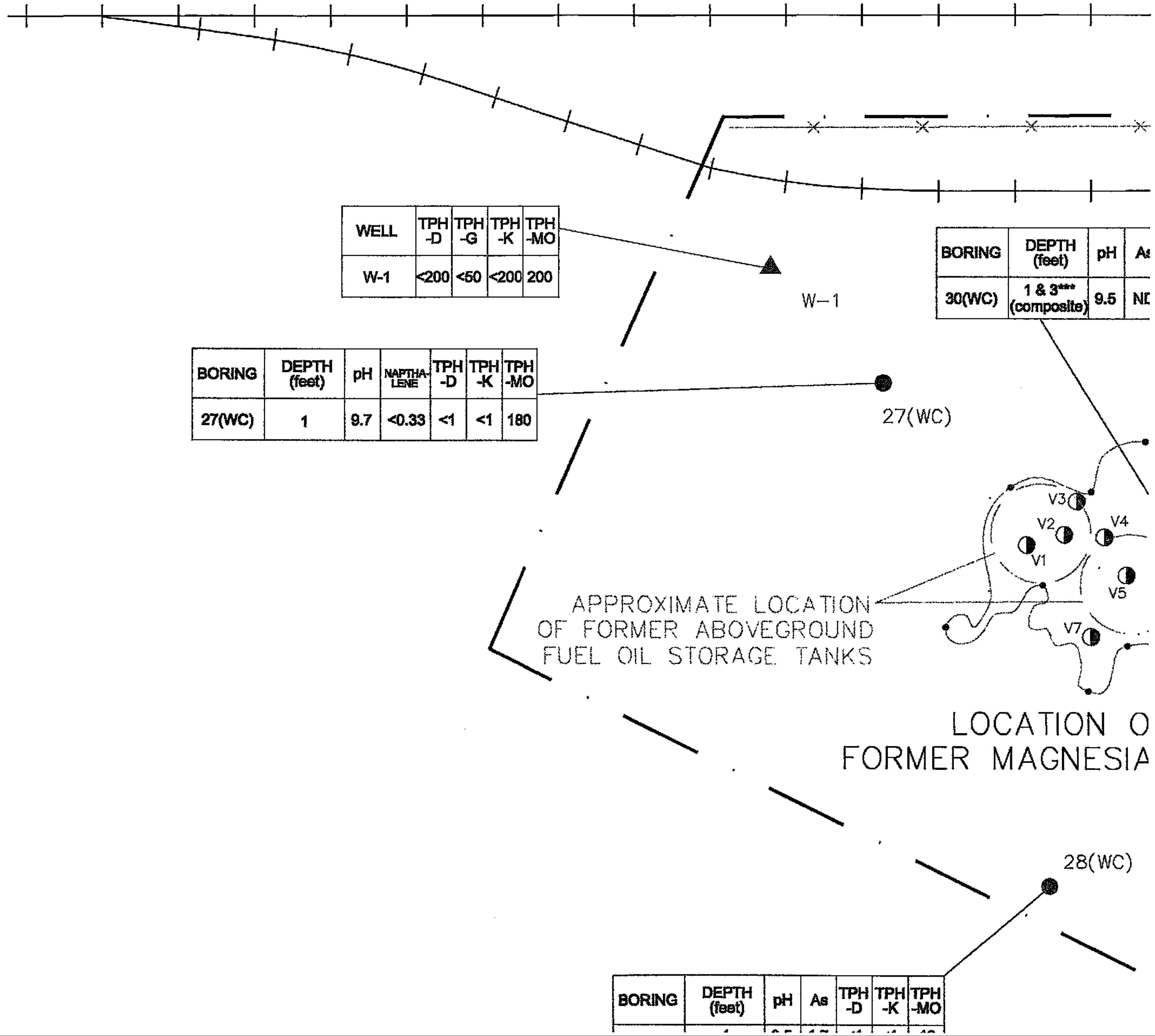


FIGURE 21

1,2 - DCA ISOCONCENTRATIONS IN

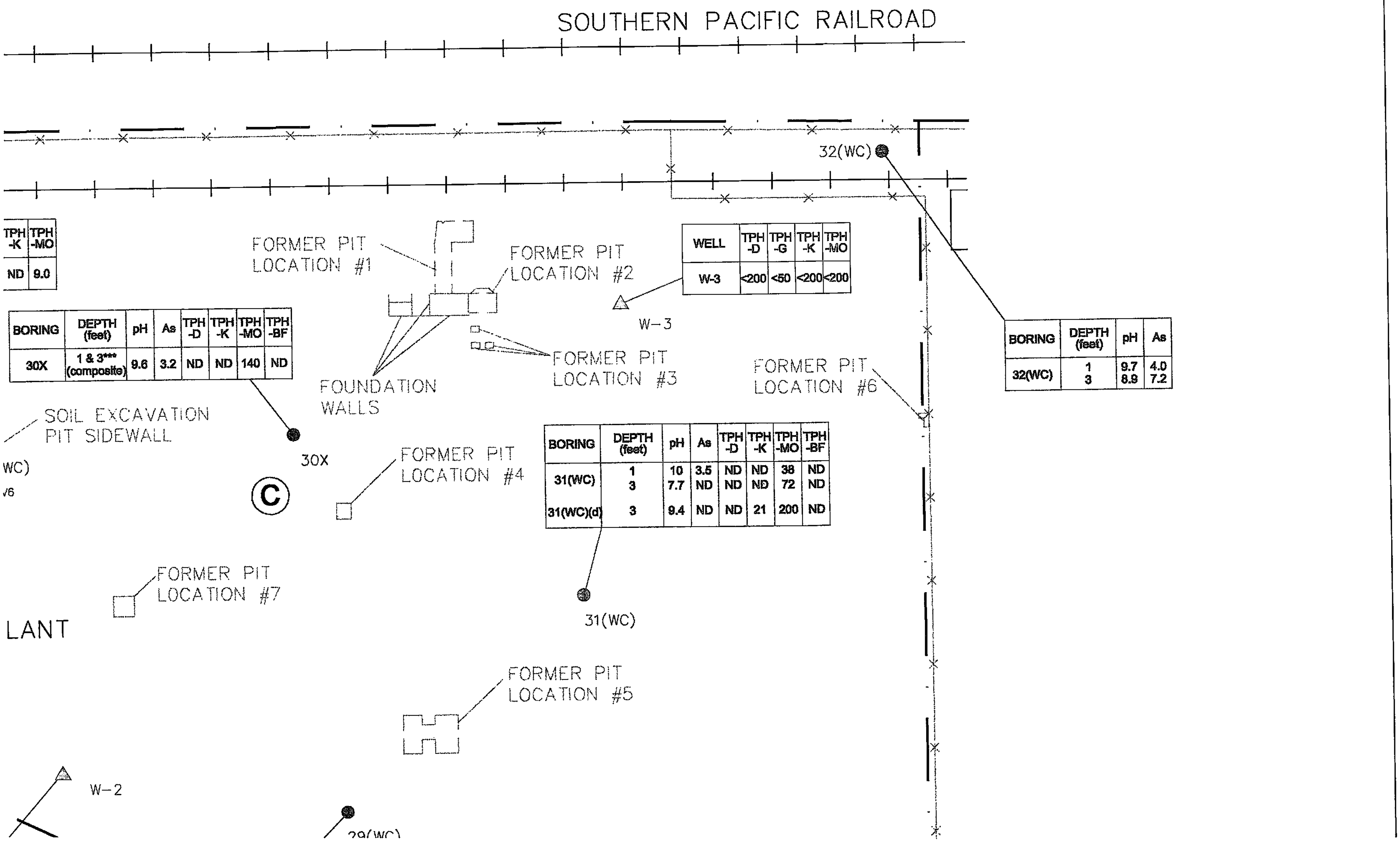


WELL	TPH -D	TPH -G	TPH -K	TPH -MO
W-1	<200	<50	<200	200

BORING	DEPTH (feet)	pH	NAPTHA-LENE	TPH -D	TPH -K	TPH -MO
27(WC)	1	9.7	<0.33	<1	<1	180

BORING	DEPTH (feet)	pH	As
30(WC)	1 & 3*** (composite)	9.5	NI

BORING	DEPTH (feet)	pH	As	TPH -D	TPH -K	TPH -MO
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



TPH -K	TPH -MO
ND	9.0

BORING	DEPTH (feet)	pH	As	TPH -D	TPH -K	TPH -MO	TPH -BF
30X	1 & 3*** (composite)	9.6	3.2	ND	ND	140	ND

WELL	TPH -D	TPH -G	TPH -K	TPH -MO
W-3	<200	<50	<200	<200

BORING	DEPTH (feet)	pH	As	TPH -D	TPH -K	TPH -MO	TPH -BF
31(WC)	1	10	3.5	ND	ND	38	ND
	3	7.7	ND	ND	ND	72	ND
31(WC)(d)	3	9.4	ND	ND	21	200	ND

BORING	DEPTH (feet)	pH	As
32(WC)	1	9.7	4.0
	3	8.9	7.2

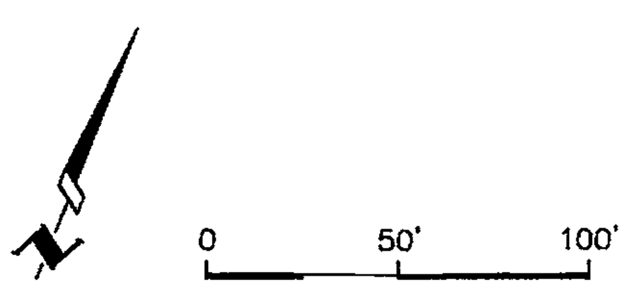
(d)	3	8.9	2.9	<3	<3	1200
	3	9.0	2.9	<3	<3	850

WELL	TPH -D	T
W-2	<200	[illegible]

- VERIFICATION SOIL SAMPLE (MCLAREN/HART)
- SOIL BORING (WOODWARD-CLYDE)
- SHALLOW ZONE MONITORING WELL (FMC)
- POWER/TELEPHONE POLE
- STORM DRAIN
- PIPE
- SUMP
- PARCEL DESIGNATION
- FORMER STRUCTURE
- EXISTING STRUCTURE
- PROPERTY LINE

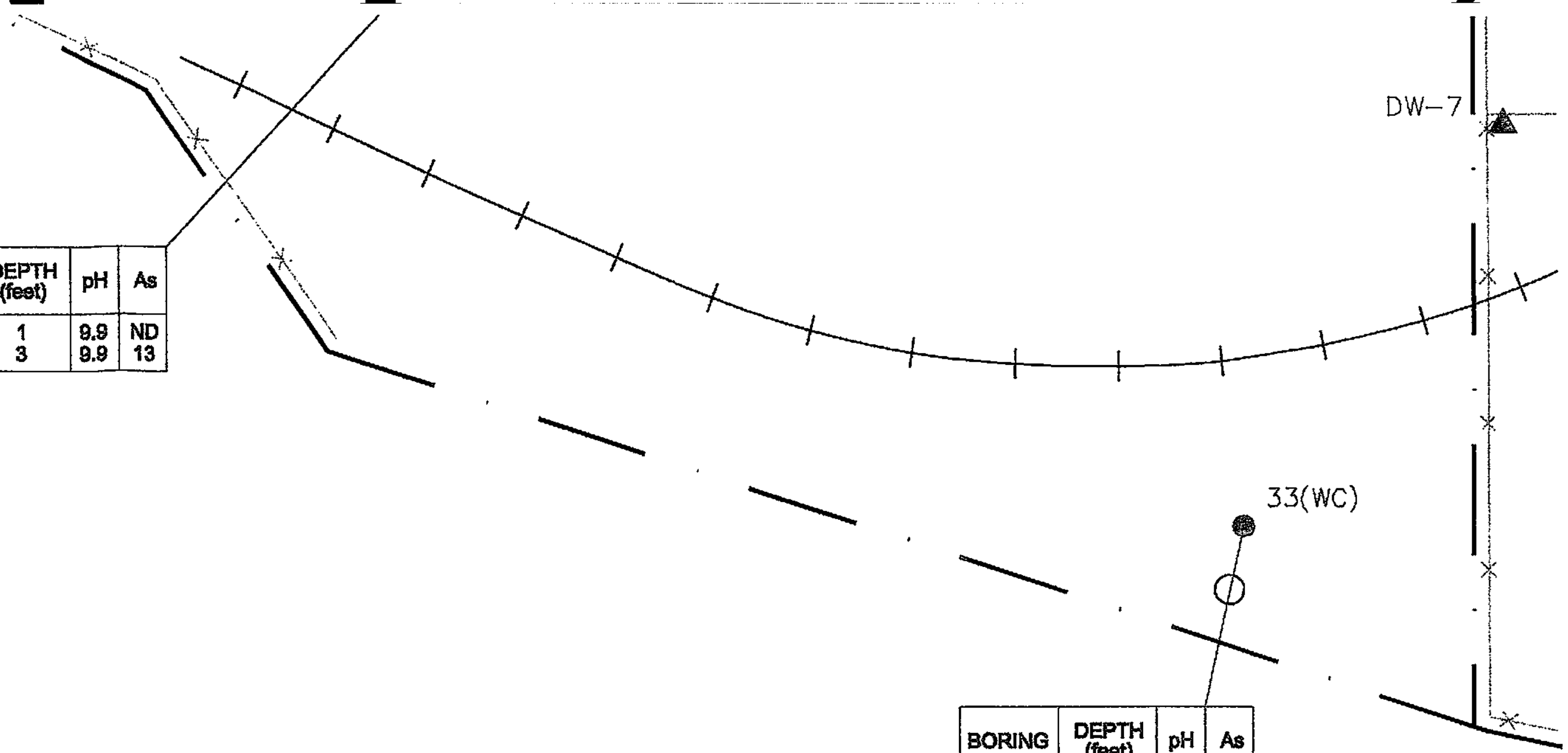
TPH-G	TOTAL PETROLEUM HYDROCARBONS, GASOLINE
TPH-MO	TOTAL PETROLEUM HYDROCARBONS, MOTOR OIL
TPH-K	TOTAL PETROLEUM HYDROCARBONS, KEROSENE
TPH-D	TOTAL PETROLEUM HYDROCARBONS, DIESEL
TPH-BF	TOTAL PETROLEUM HYDROCARBONS, BUNKER FUEL
ND	NOT DETECTED, AT OR ABOVE LABORATORY REPORTING LIMITS
(d)	DUPLICATE

NOTE:
1. SOIL RESULTS (ORANGE) IN PARTS PER MILLION (ppm), JANUARY 1993
2. GROUNDWATER RESULTS (BLUE) IN PARTS PER BILLION (ppb), MARCH 1999
3. V1-V7 WERE OBTAINED FOLLOWING SOIL REMOVAL ACTIVITIES IN ACCORDANCE WITH NEWARK FIRE DEPARTMENT REQUIREMENTS.



PH -K	TPH -MO
200	220

BORING	DEPTH (feet)	pH	As
29(WC)	1 3	9.9 9.9	ND 13



BORING	DEPTH (feet)	pH	As
33(WC)	1 3	9.8 7.8	1.2 7.6

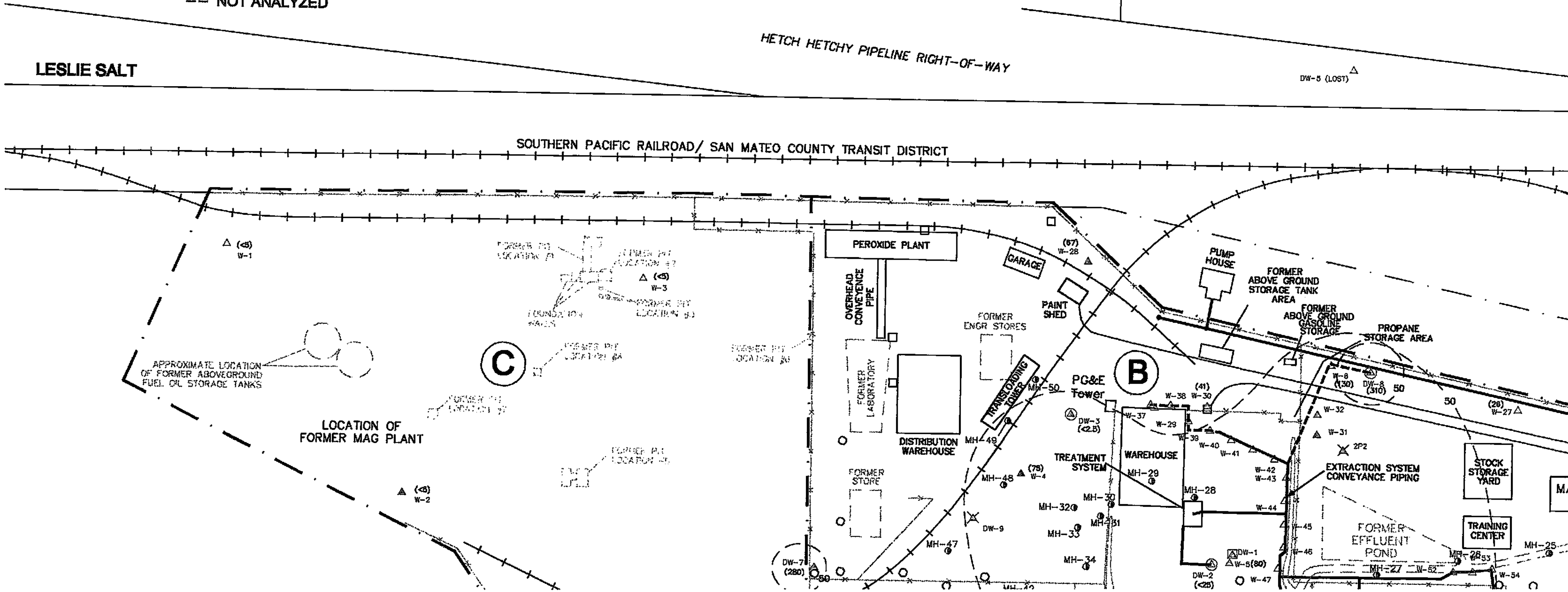
FIGURE 2

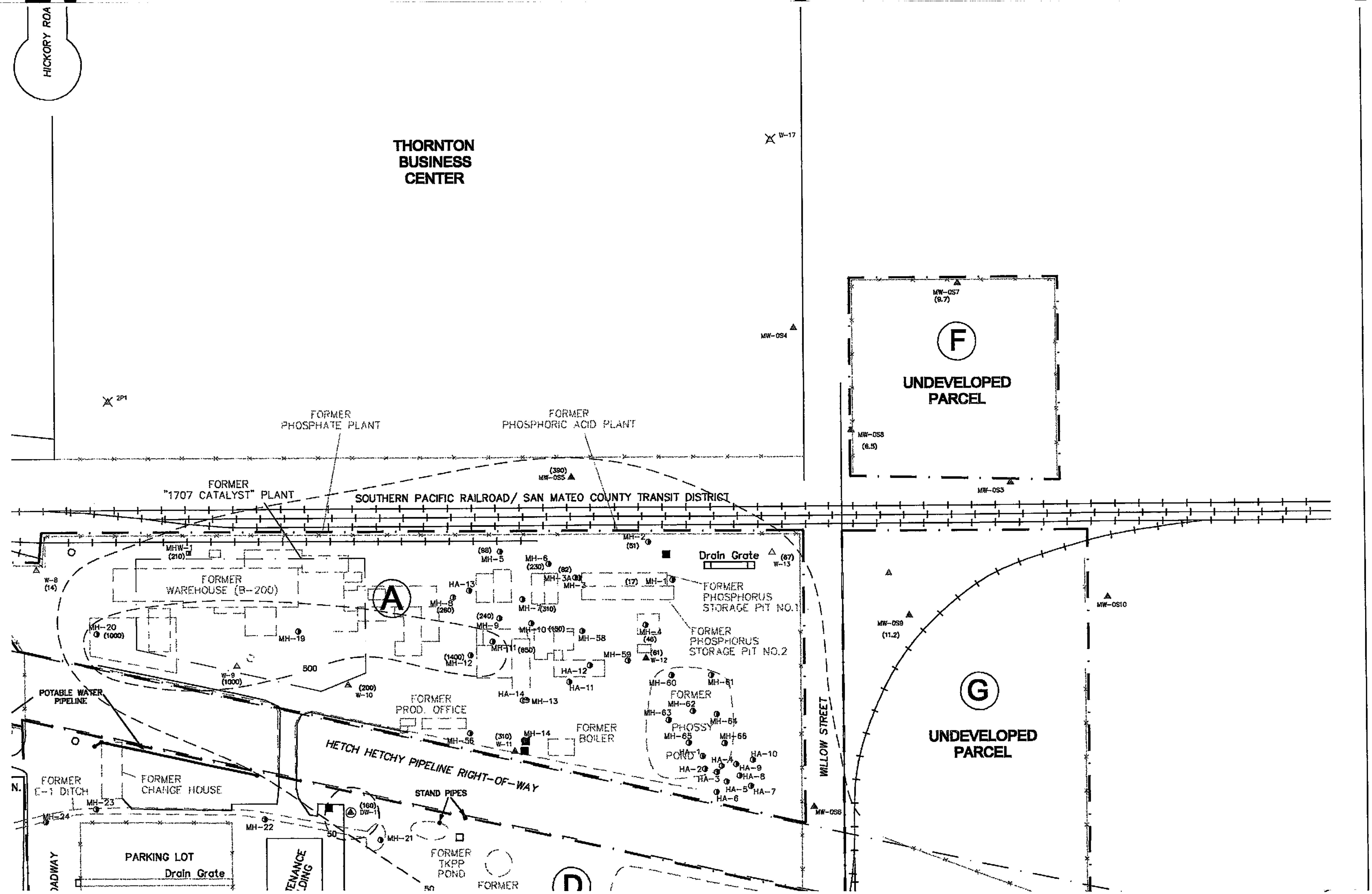
PREVIOUSLY EXISTING AND

BORING	pH	As	Ba	Cr	Ni	Pb	Se
MH-1	7.5	17	<20	10	100	<5	20
MH-2	7.3	51	<20	<10	130	<5	12
MH-3a	7.19	82	350	64	400	11	<10
MH-4	7.3	46	<20	<10	290	<5	14
MH-5	–	98	31	<10	76	<5	7.1
MH-6	7.23	230	58	<10	380	<5	<5
MH-7	7.03	310	<20	<10	74	<5	<5

BORING	pH	As	Ba	Cr	Ni	Pb	Se
MH-8	7.5	260	<20	25	82	<5	<5
MH-9	7.01	240	<20	15	30	6.6	<5
MH-10	7.04	150	<20	12	42	9.2	<5
MH-11	6.7	650	260	85	160	<50	<50
MH-12	7.2	1400	1200	420	680	76	<50
MH-20	6.73	1000	<20	46	73	<5	<5
MHW-1	--	210	31	<10	<20	8.1	<5

-- NOT ANALYZED





HICKORY ROA
THORNTON BUSINESS CENTER
UNDEVELOPED PARCEL
F
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
Drain Grate
FORMER WAREHOUSE (B-200)
A
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
FORMER BOILER
FORMER PHOSSY POND
HETCH HETCHY PIPELINE RIGHT-OF-WAY
WILLOW STREET
G
UNDEVELOPED PARCEL
FORMER C-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
PARKING LOT
Drain Grate
FORMER TKPP POND
FORMER
D

SHALLOW ZONE ARSENIC ISOCONCENTRATION (ppb)

NEWARK AQUIFER ARSENIC ISOCONCENTRATION (ppb)

MHW-1 GRAB GROUNDWATER SAMPLING LOCATION (McLAREN/HART)

MH-38 SOIL BORING (McLAREN/HART)

2P3 ABANDONED MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)

E38 MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)

W-4 SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

DW-9 ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

DW-1 IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)

DW-3 NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

DW-10 ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

V-7 SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)

W-2 NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)

-26 MONITORING WELL (ASHLAND CHEMICAL)

W-OS9 MONITORING WELL (BARON-BLAKESLEE)

10 MONITORING WELL (JONES-HAMILTON Co.)

-3 MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)

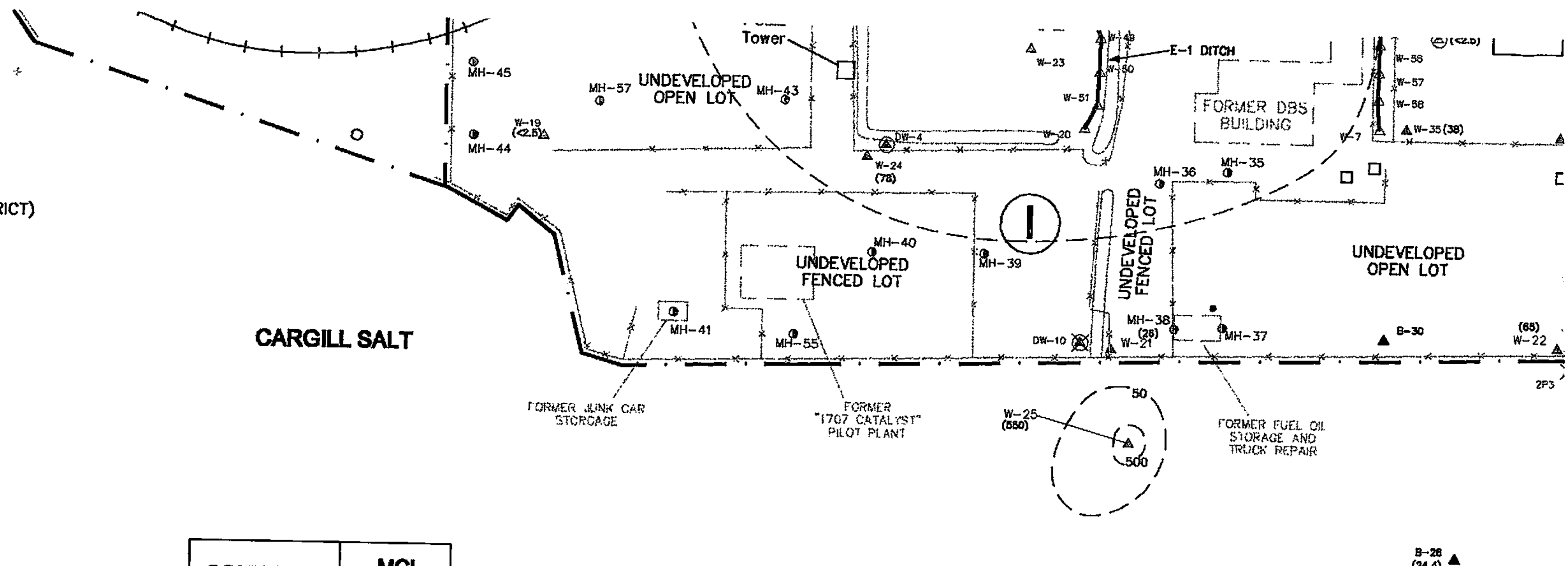
POWER/TELEPHONE POLE

STORM DRAIN

PIPE

SUMP

PARCEL DESIGNATION



COMPOUND	MCL (ppb)
As	50
Ba	1000
Cr	50
Ni	100
Pb	15
Se	50

MCL - Maximum contaminant level in parts per billion (ppb)

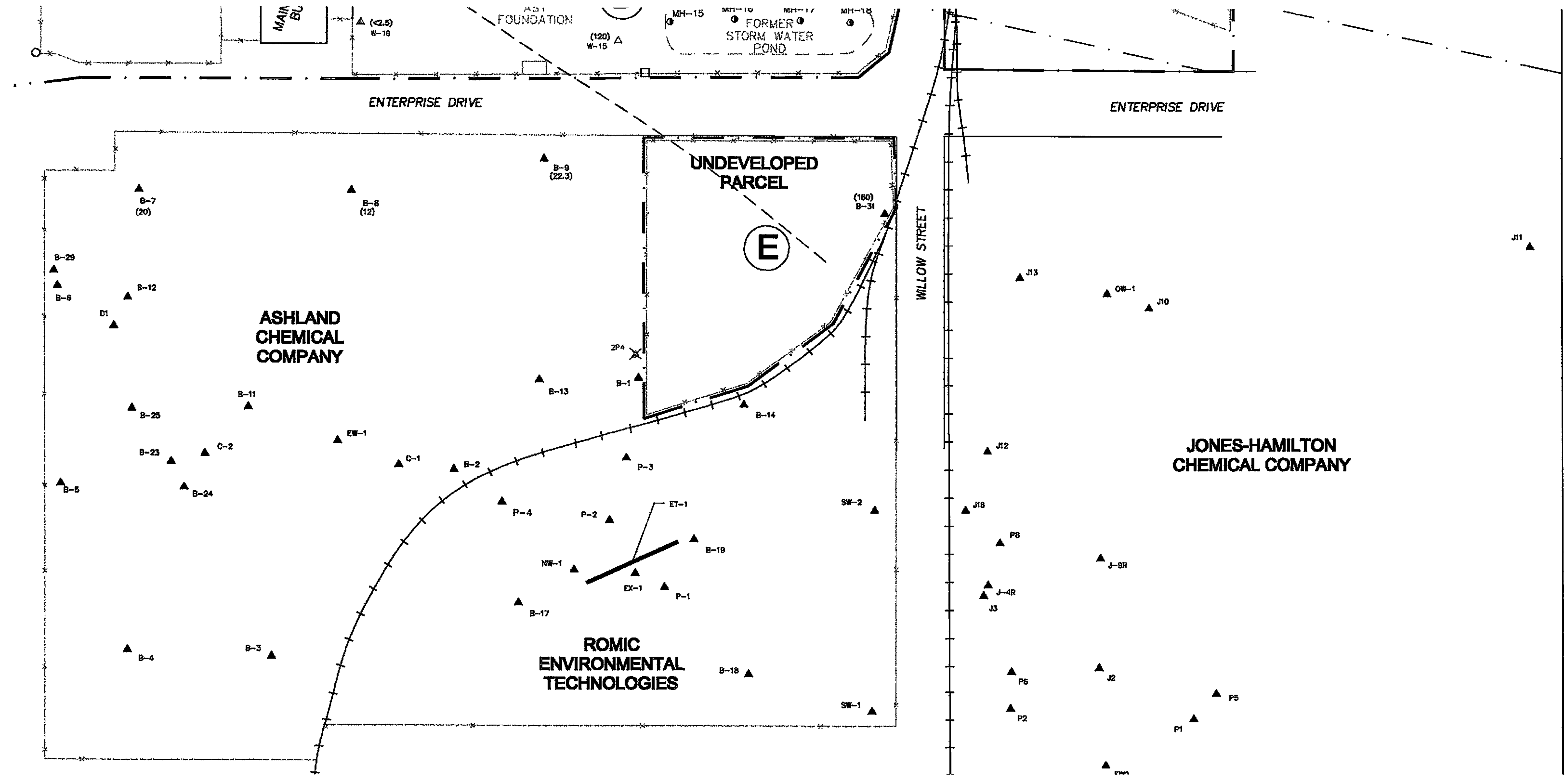
B-27

B-28

MONITORING WELL	As	Ba	Cr	Ni	Pb	Se
W-1	<5	50	<10	<20	<5	<5

MONITORING WELL	As	Ba	Cr	Ni	Pb	Se
W-8	13	<20	<10	<20	29	<5

MONITORING WELL	As	Ba	Cr	Ni	Pb	Se
W-15	120	20	<10	<20	<5	5.1



ENTERPRISE DRIVE
ENTERPRISE DRIVE
FOUNDATION
MH-15
FORMER STORM WATER POND
(<2.5) W-16
(120) W-15
UNDEVELOPED PARCEL
E
(160) B-31
WILLOW STREET
ASHLAND CHEMICAL COMPANY
ROMIC ENVIRONMENTAL TECHNOLOGIES
JONES-HAMILTON CHEMICAL COMPANY
B-9 (22.3)
B-7 (20)
B-8 (12)
B-29
B-6
B-12
D1
2P4
B-1
B-13
B-14
B-11
B-25
EW-1
C-2
B-23
C-1
B-2
P-3
B-5
B-24
P-4
ET-1
P-2
SW-2
B-19
NW-1
EX-1
P-1
B-17
B-4
B-3
B-18
SW-1
J11
J13
OW-1
J10
J12
J16
P8
J-9R
J-4R
J3
P6
J2
P5
P2
P1

ONITORING WELL (ASHLAND CHEMICAL)

IONITORING WELL (BARON–BLAKESLEE)

IONITORING WELL (JONES–HAMILTON Co.)

IONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)

OWER/TELEPHONE POLE

TORM DRAIN

IPE

JMP

ARCEL DESIGNATION

)RMER STRUCTURE

ISTING STRUCTURE

OPERTY LINE

)NCENTRATIONS IN PARTS PER BILLION (ppb)

As	50
Ba	1000
Cr	50
Ni	100
Pb	15
Se	50

MCL - Maximum contaminant level in parts per billion (ppb)

B-27

B-28

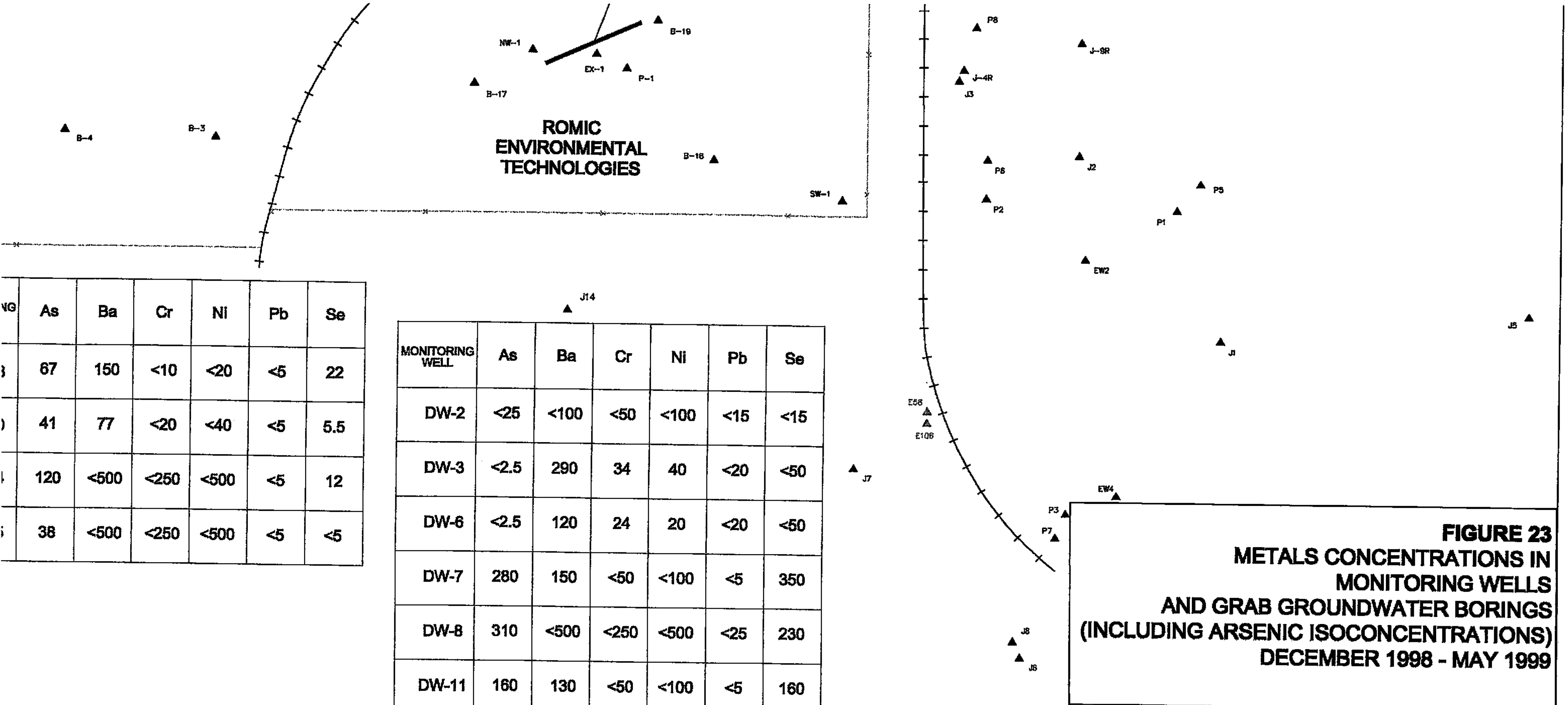
MONITORING WELL	As	Ba	Cr	Ni	Pb	Se
W-1	<5	50	<10	<20	<5	<5
W-2	<5	32	<10	<20	<5	<5
W-3	<5	<100	<50	<100	<5	<5
W-4	75	<500	<250	<500	<5	38
W-5	80	90	210	970	60	320
W-6	130	110	<10	<20	<5	14

MONITORING WELL	As	Ba	Cr	Ni	Pb	Se
W-8	13	<20	<10	<20	29	<5
W-9	1000	25	<10	<20	<15	<15
W-10	200	95	<10	38	<15	<15
W-11	310	22	<10	76	11	<5
W-12	61	63	<10	400	<15	<15
W-13	67	24	<10	<20	<15	<15

MONITORING WELL	As	Ba	Cr	Ni	Pb	Se
W-15	120	20	<10	<20	<5	5.1
W-16	<2.5	270	<2	70	<20	<50
W-19	<2.5	170	10	60	<20	<50
W-21	26	150	<10	30	11	<5
W-22	65	58	<10	<20	<5	<5
W-24	78	<500	<250	<500	<5	24
W-25	550	29	<10	39	<5	58
W-26	<2.5	170	<2	30	<20	<50
W-27	26	30	<10	<20	<5	<5

0 120 240

EWARK\0599\F23_0599.DWG



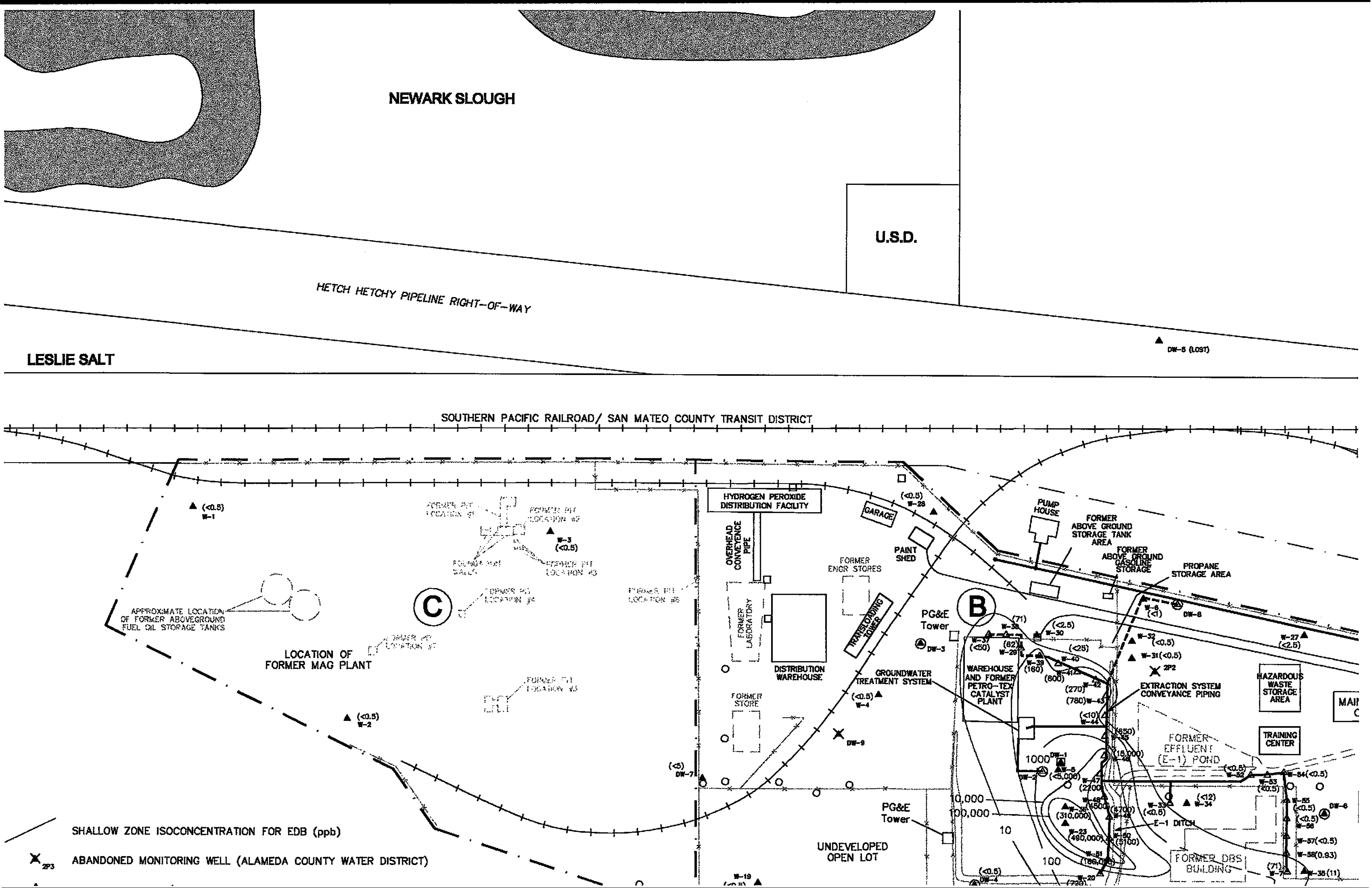
NG	As	Ba	Cr	Ni	Pb	Se
	67	150	<10	<20	<5	22
	41	77	<20	<40	<5	5.5
	120	<500	<250	<500	<5	12
	38	<500	<250	<500	<5	<5

MONITORING WELL	As	Ba	Cr	Ni	Pb	Se
DW-2	<25	<100	<50	<100	<15	<15
DW-3	<2.5	290	34	40	<20	<50
DW-6	<2.5	120	24	20	<20	<50
DW-7	280	150	<50	<100	<5	350
DW-8	310	<500	<250	<500	<25	230
DW-11	160	130	<50	<100	<5	160

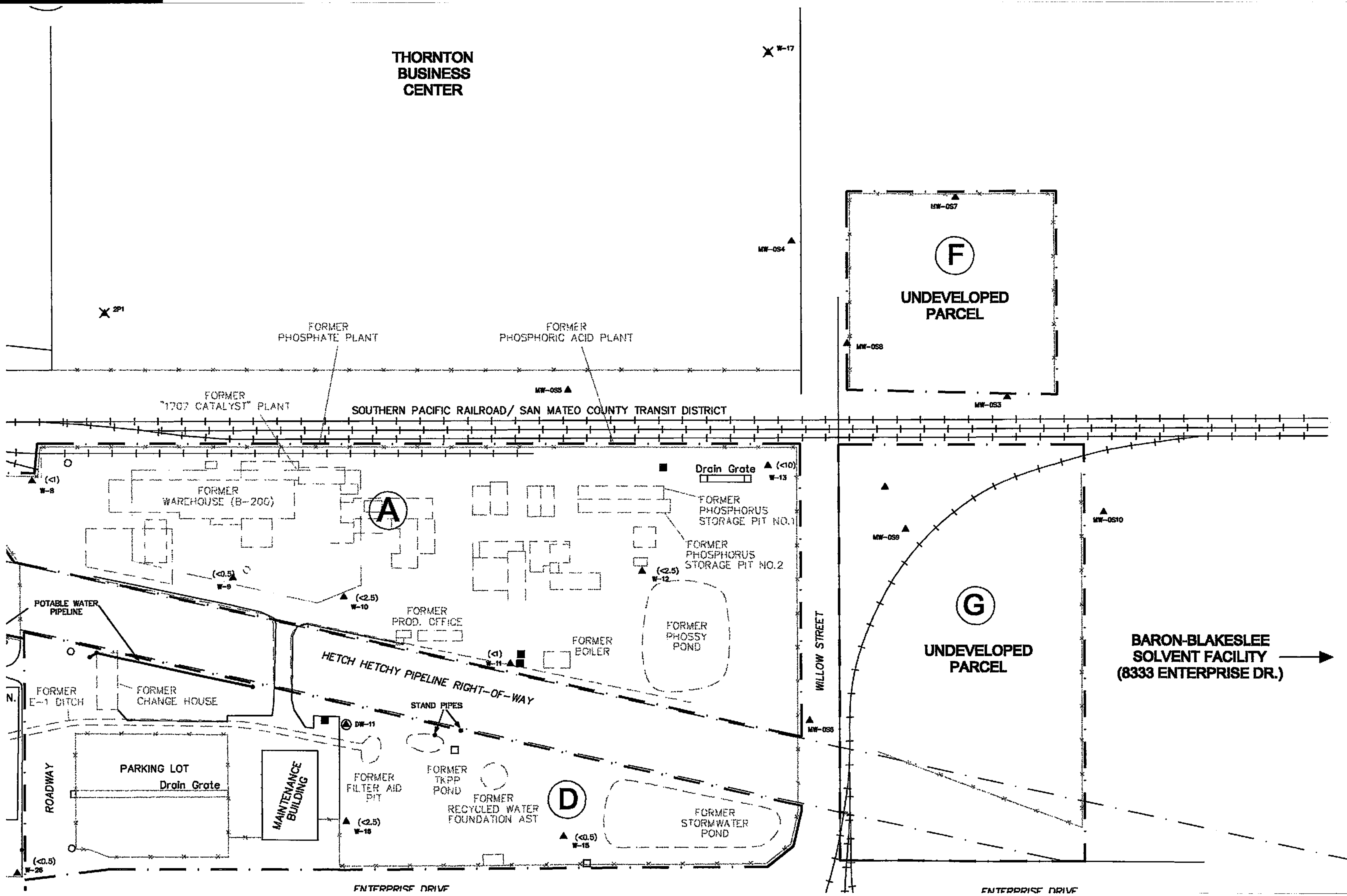
FIGURE 23
METALS CONCENTRATIONS IN MONITORING WELLS AND GRAB GROUNDWATER BORINGS (INCLUDING ARSENIC ISOCONCENTRATIONS)
DECEMBER 1998 - MAY 1999

FMC Corporation
8787 Enterprise Drive
Newark, California

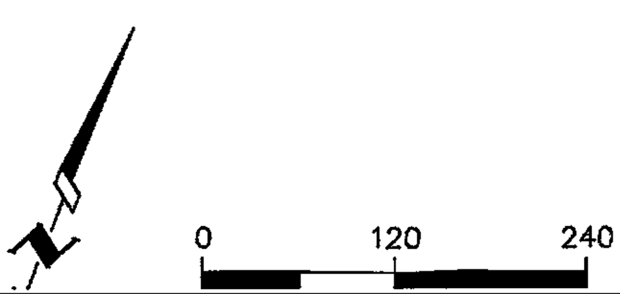
JUNE 1999

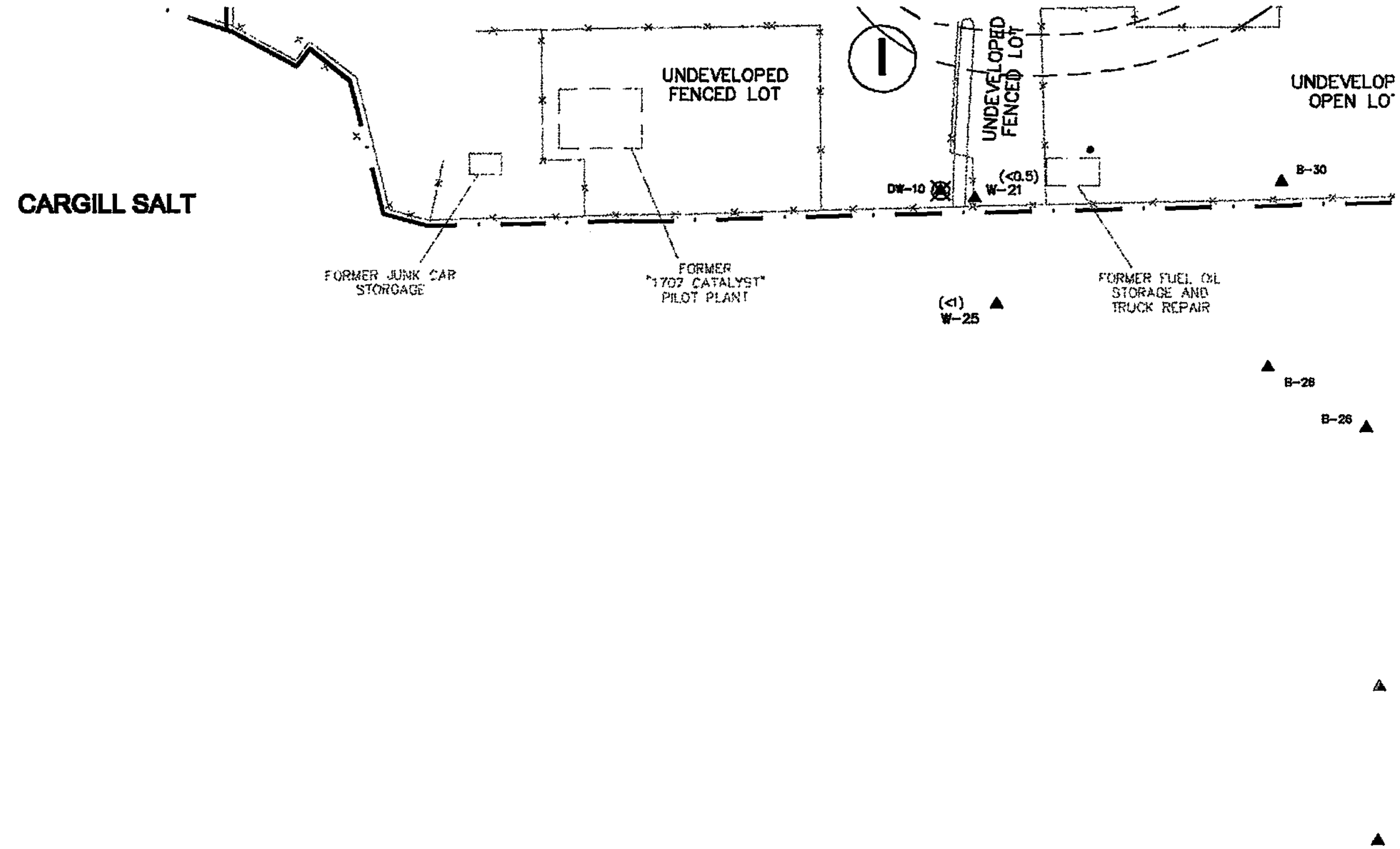


NEWARK SLOUGH
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
DW-5 (LOST)
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
HYDROGEN PEROXIDE DISTRIBUTION FACILITY
GARAGE
PAINT SHED
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
OVERHEAD CONVEYENCE PIPE
FORMER ENGR STORES
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
TRANSLOADING TOWER
PG&E Tower
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
LOCATION OF FORMER MAG PLANT
C
B
GROUNDWATER TREATMENT SYSTEM
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
TRAINING CENTER
FORMER EFFLUENT (E-1) POND
E-1 DITCH
FORMER DBS BUILDING
FORMER STORE
UNDEVELOPED OPEN LOT
PG&E Tower
SHALLOW ZONE ISOCONCENTRATION FOR EDB (ppb)
ABANDONED MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)


THORNTON BUSINESS CENTER
W-17
2P1
MW-0S4
MW-0S7
F
UNDEVELOPED PARCEL
MW-0S8
MW-0S3
MW-0S5
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
(<1) W-8
FORMER WAREHOUSE (B-200)
A
Drain Grate
(<10) W-13
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
(<2.5) W-12
(<0.5) W-9
(<2.5) W-10
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
(<1) W-11
FORMER BOILER
FORMER PHOSSY POND
HETCH HETCHY PIPELINE RIGHT-OF-WAY
WILLOW STREET
MW-0S9
MW-0S10
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
FORMER E-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
DW-11
MW-0S6
PARKING LOT
Drain Grate
ROADWAY
MAINTENANCE BUILDING
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER FOUNDATION AST
D
FORMER STORMWATER POND
(<2.5) W-16
(<0.5) W-15
(<0.5) W-26
ENTERPRISE DRIVE
ENTERPRISE DRIVE

- W-4 SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
- DW-1 IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
- DW-9 ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
- DW-3 NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
- DW-10 ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
- W-7 SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
- DW-2 NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
- B-25 MONITORING WELL (ASHLAND CHEMICAL)
- MW-059 MONITORING WELL (BARON-BLAKESLEE)
- J10 MONITORING WELL (JONES-HAMILTON Co.)
- P-3 MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)
- POWER/TELEPHONE POLE
- STORM DRAIN
- PIPE
- SUMP
- A PARCEL DESIGNATION
- FORMER STRUCTURE
- EXISTING STRUCTURE
- SURFACE WATER
- PROPERTY LINE





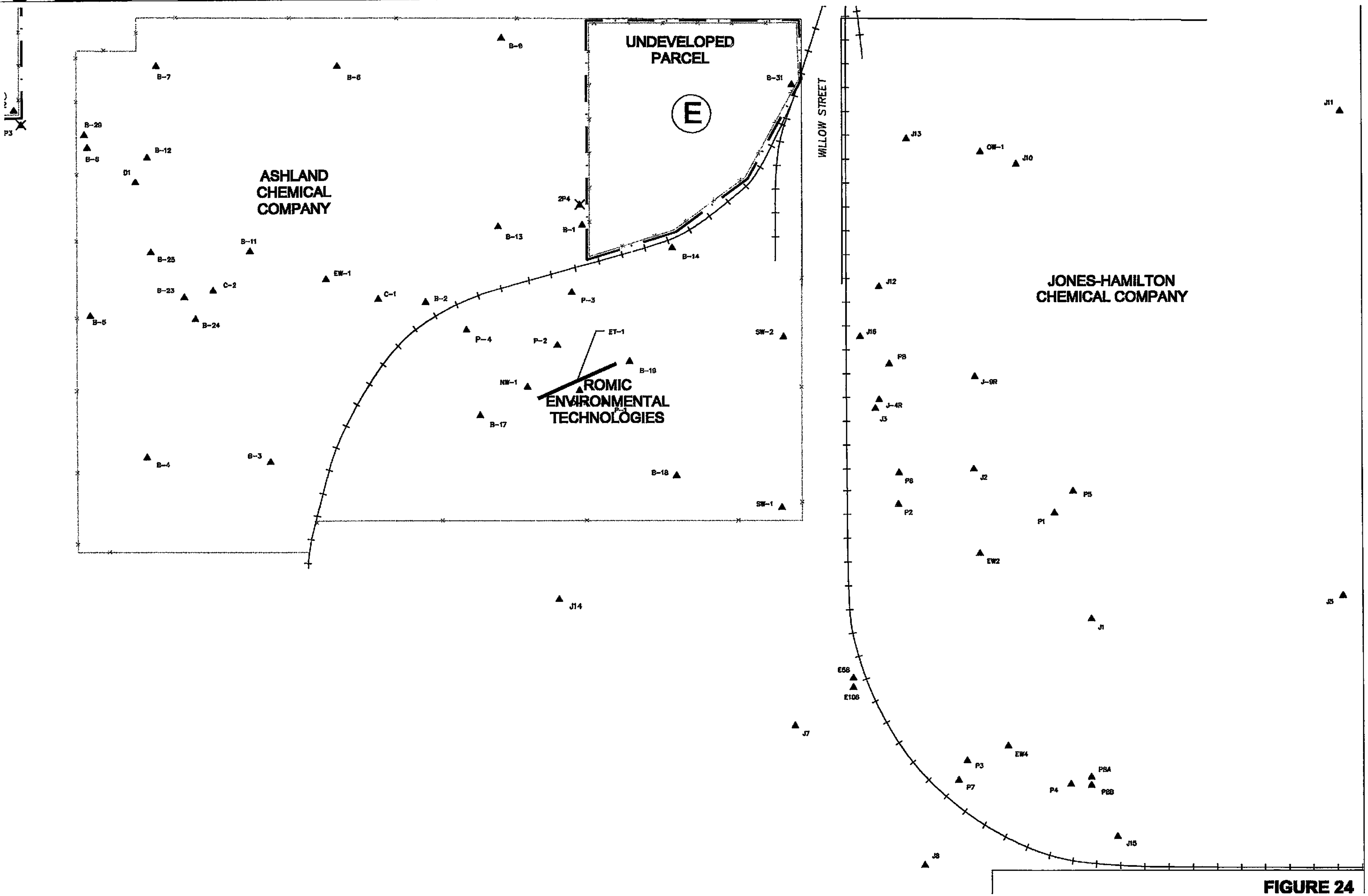
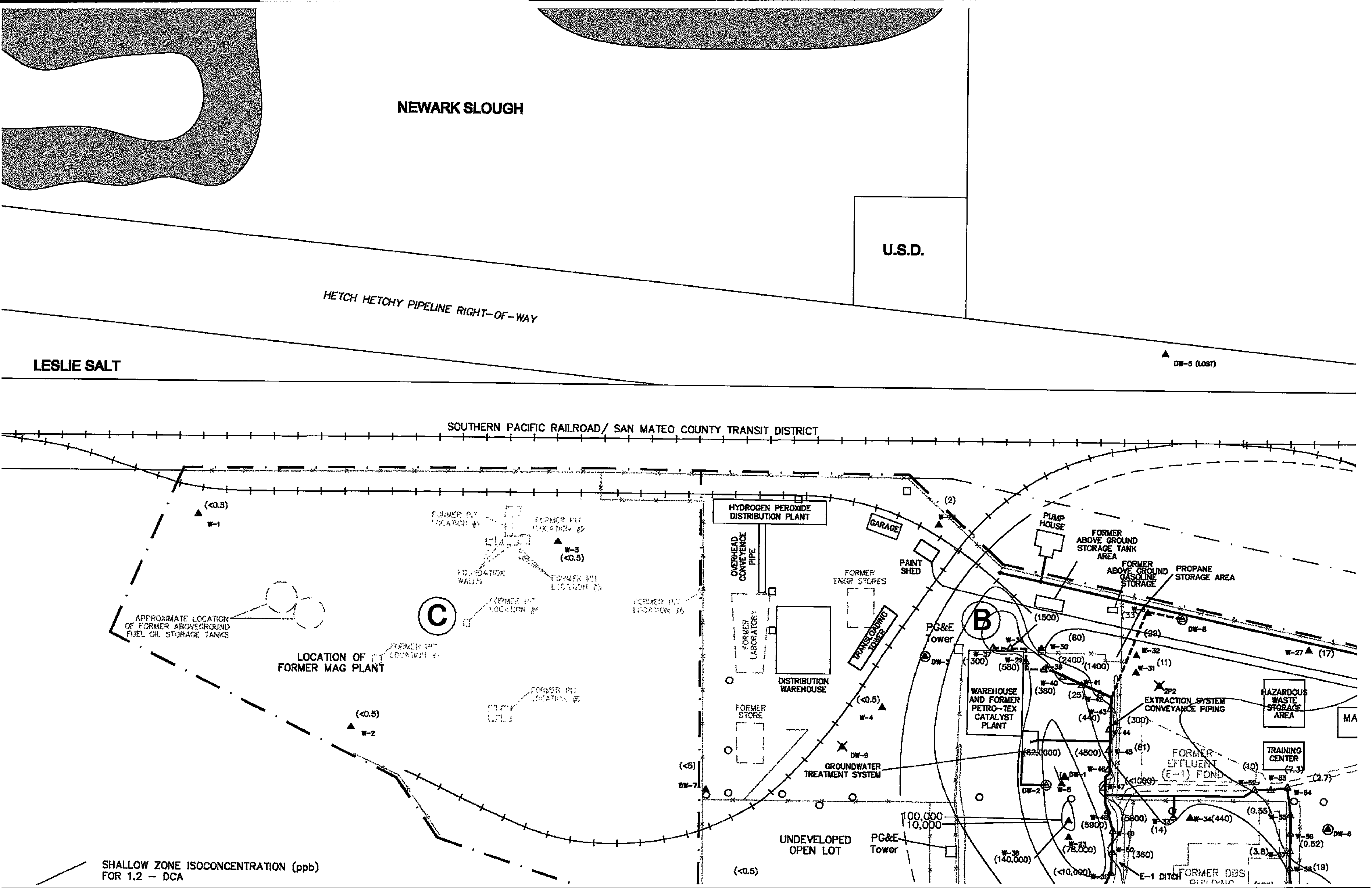
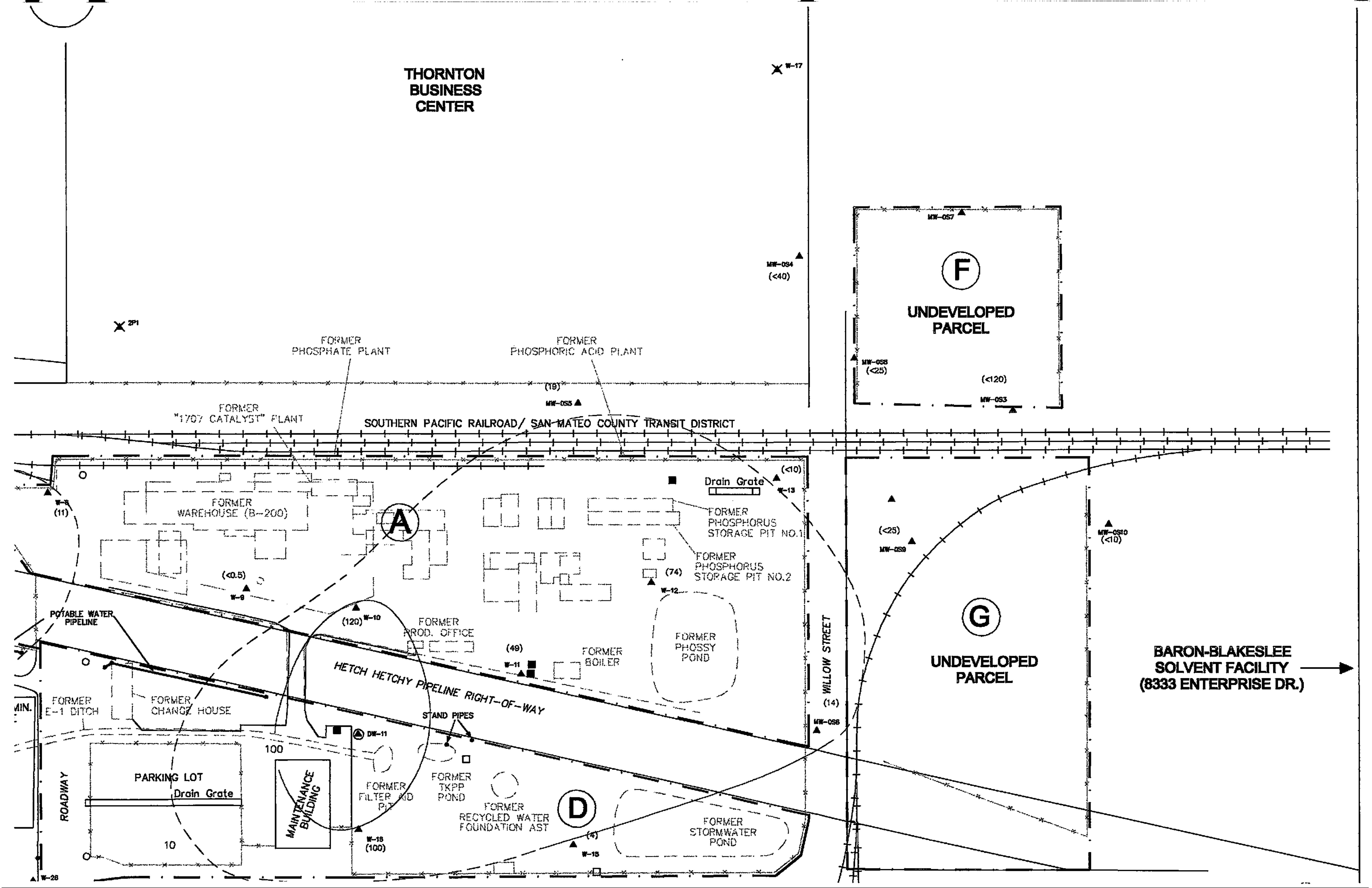

UNDEVELOPED PARCEL
E
ASHLAND CHEMICAL COMPANY
ROMIC ENVIRONMENTAL TECHNOLOGIES
WILLOW STREET
JONES-HAMILTON CHEMICAL COMPANY
B-9
B-7
B-8
B-31
P3
B-29
B-12
D1
2P4
B-1
B-13
B-11
B-25
B-14
EW-1
C-2
B-23
C-1
B-2
P-3
B-5
B-24
ET-1
SW-2
P-4
P-2
B-19
NW-1
B-17
B-4
B-3
B-18
SW-1
J14
J11
J13
OW-1
J10
J12
J16
P8
J-9R
J-4R
J3
P6
J2
P5
P2
P1
EW2
J5
J1
E58
E108
J7
EW4
P3
P9A
P7
P4
P9B
J15
J8

FIGURE 24



NEWARK SLOUGH
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
DW-5 (LOST)
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
HYDROGEN PEROXIDE DISTRIBUTION PLANT
GARAGE
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
OVERHEAD CONVEYENCE PIPE
PAINT SHED
FORMER ENGR STORES
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
TRANSLOADING TOWER
PG&E Tower
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
LOCATION OF FORMER MAG PLANT
C
B
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
TRAINING CENTER
FORMER EFFLUENT (E-1) POND
FORMER STORE
GROUNDWATER TREATMENT SYSTEM
UNDEVELOPED OPEN LOT
PG&E Tower
E-1 DITCH
FORMER DBS
SHALLOW ZONE ISOCONCENTRATION (ppb) FOR 1,2 – DCA



THORNTON BUSINESS CENTER
W-17
2P1
MW-OS4
(<40)
F
UNDEVELOPED PARCEL
MW-OS7
MW-OS8
(<25)
(<120)
MW-OS3
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
(19)
MW-OS5
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
A
FORMER WAREHOUSE (B-200)
(<10)
Drain Grate
W-13
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
(74)
W-12
(<0.5)
W-9
(11)
(<25)
MW-OS9
MW-OS10
(<10)
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
POTABLE WATER PIPELINE
(120)
W-10
FORMER PROD. OFFICE
(49)
W-11
FORMER BOILER
FORMER PHOSSY POND
WILLOW STREET
HETCH HETCHY PIPELINE RIGHT-OF-WAY
(14)
MW-OS6
FORMER E-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
DW-11
100
ROADWAY
PARKING LOT
Drain Grate
10
MAINTENANCE BUILDING
FORMER FILTER AND PIT
FORMER TKPP POND
FORMER RECYCLED WATER FOUNDATION AST
D
(4)
W-15
FORMER STORMWATER POND
W-18
(100)
W-28

2P3 ABANDONED MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)

E56 MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)

W-4 SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

DW-9 ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

DW-1 IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)

DW-3 NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

DW-10 ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

W-7 SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)

DW-2 NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)

B-25 MONITORING WELL (ASHLAND CHEMICAL)

MW-0S9 MONITORING WELL (BARON-BLAKESLEE)

J10 MONITORING WELL (JONES-HAMILTON Co.)

P-3 MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)

POWER/TELEPHONE POLE

STORM DRAIN

PIPE

SUMP

A PARCEL DESIGNATION

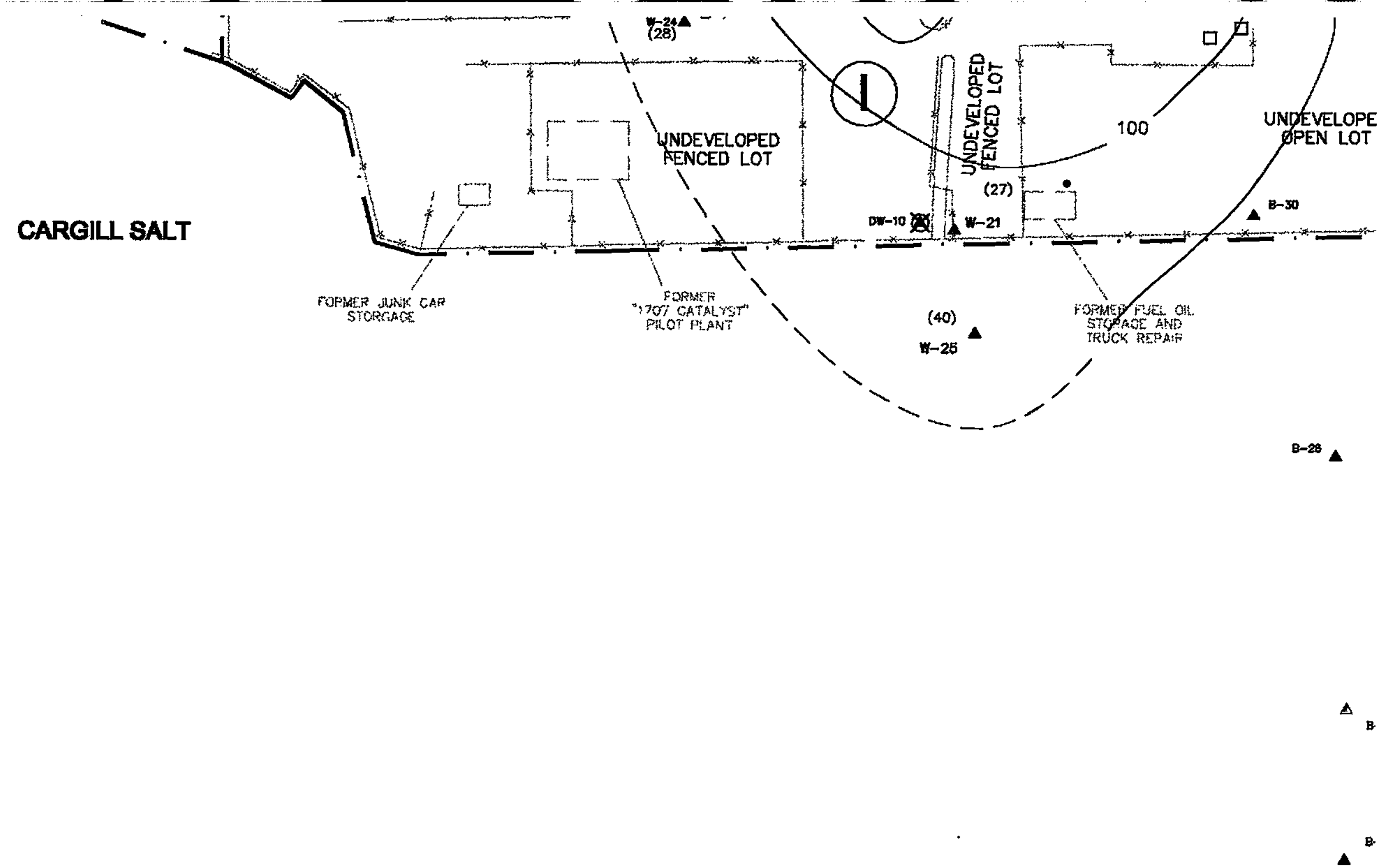
FORMER STRUCTURE

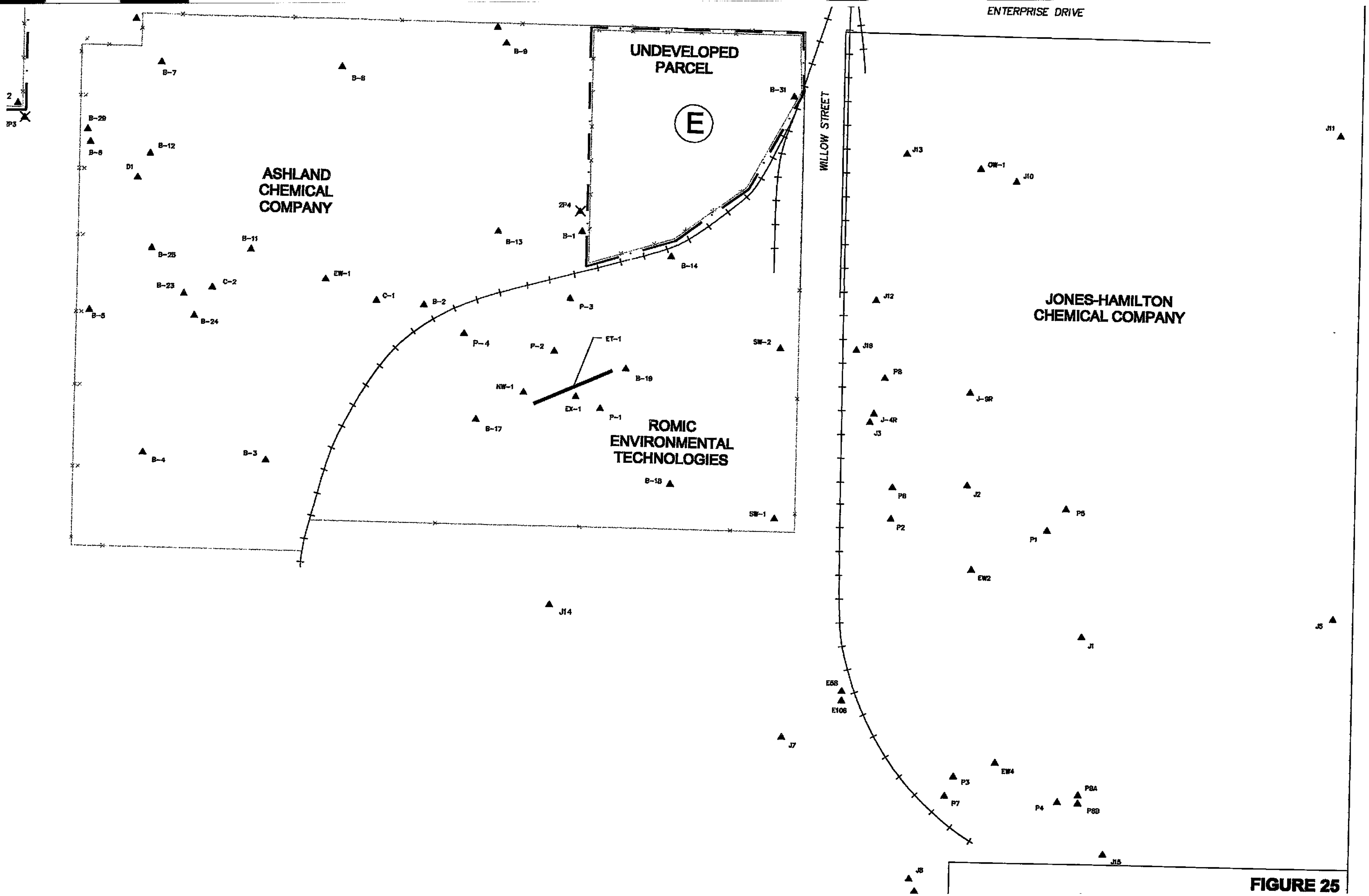
EXISTING STRUCTURE

SURFACE WATER

PROPERTY LINE

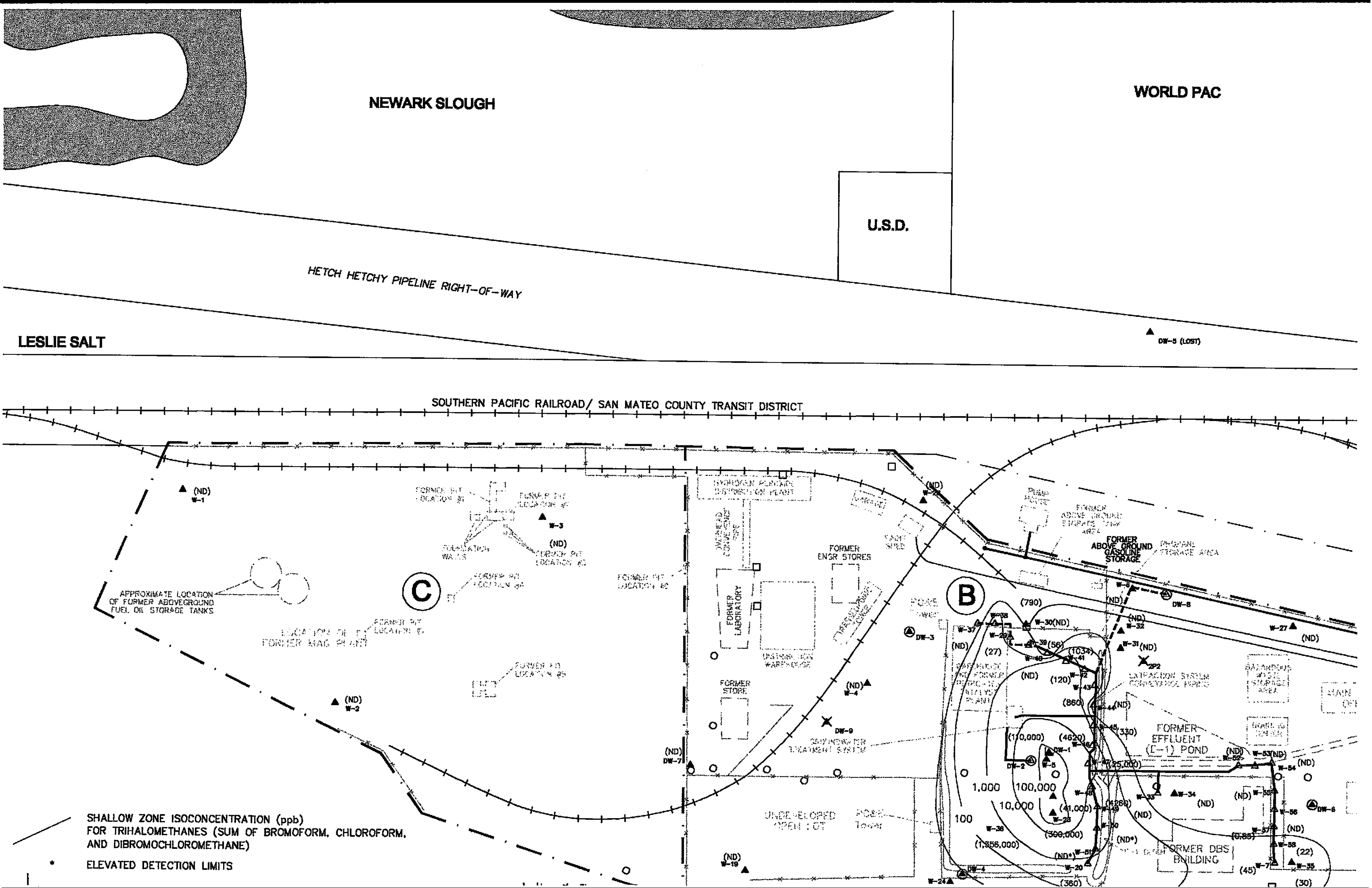
0 120 240



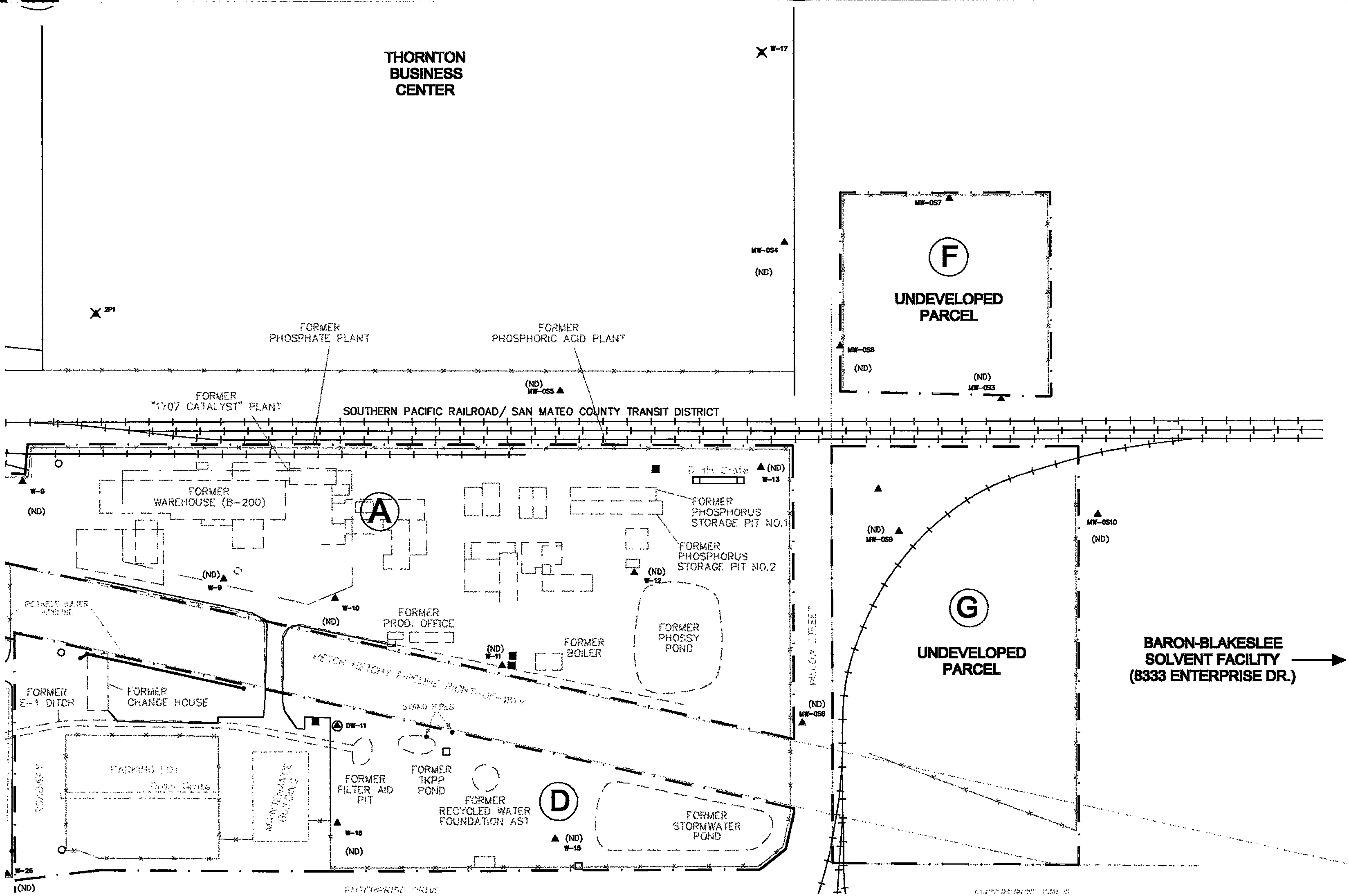


ENTERPRISE DRIVE
UNDEVELOPED PARCEL
E
ASHLAND CHEMICAL COMPANY
WILLOW STREET
JONES-HAMILTON CHEMICAL COMPANY
ROMIC ENVIRONMENTAL TECHNOLOGIES
B-7
B-8
B-9
B-31
B-29
B-6
B-12
D1
2P4
B-1
B-13
B-11
B-25
B-14
B-23
C-2
EW-1
C-1
B-2
P-3
B-5
B-24
P-4
P-2
ET-1
SW-2
B-19
NW-1
EX-1
P-1
B-17
B-4
B-3
B-18
SW-1
J14
J7
J13
OW-1
J10
J11
J12
J18
P8
J-9R
J-4R
J3
P6
J2
P5
P2
P1
EW2
J1
J5
E5S
E10S
EW4
P3
P7
P4
P8A
P8B
J15
J8

FIGURE 25

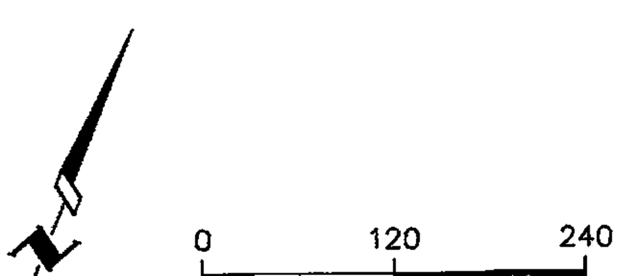


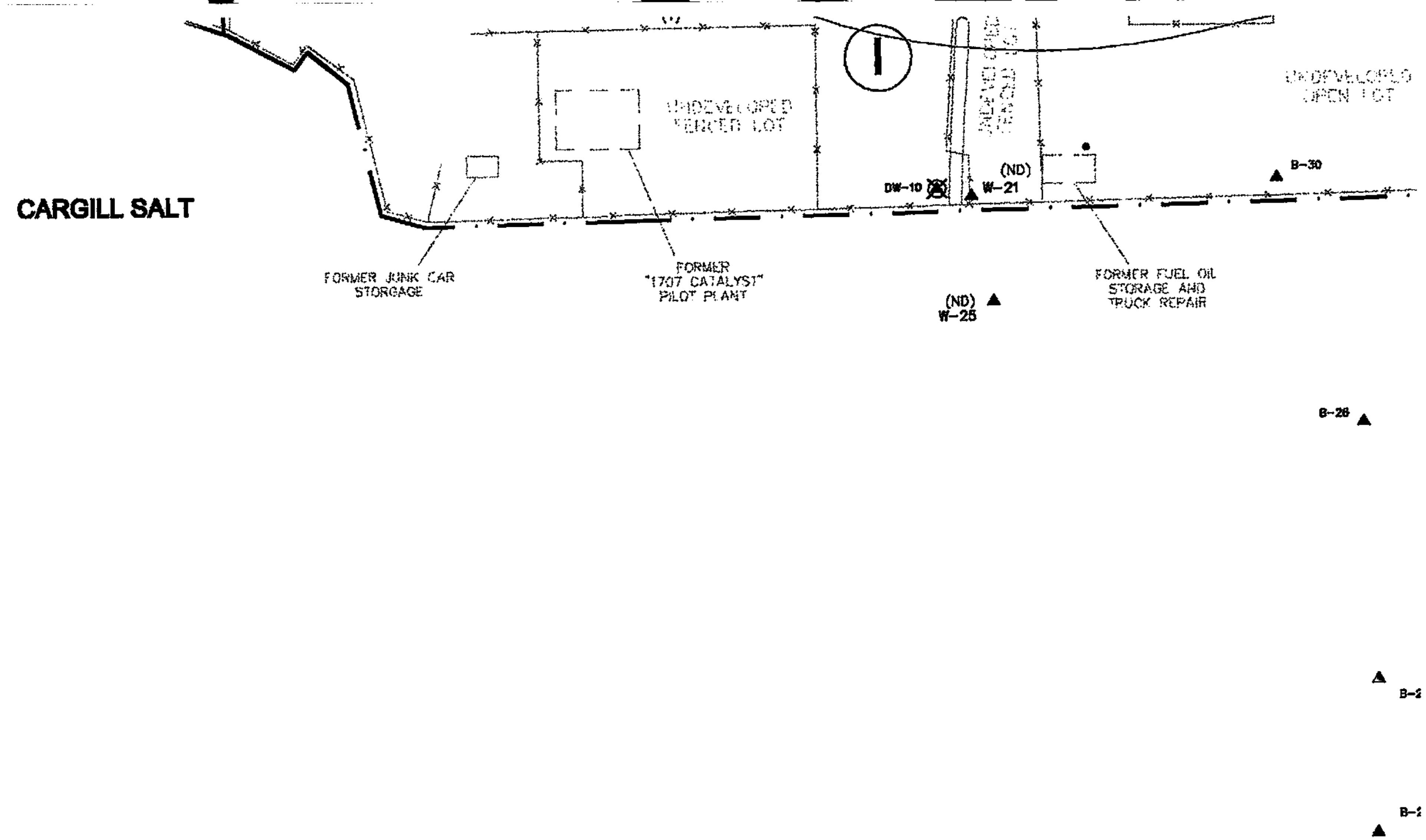
NEWARK SLOUGH
WORLD PAC
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
DW-5 (LOST)
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
C
B
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
FORMER ENGR STORES
FORMER LABORATORY
FORMER STORE
FORMER ABOVE GROUND GASOLINE STORAGE
FORMER EFFLUENT (E-1) POND
FORMER DBS BUILDING
UNDEVELOPED OPEN LOT
SHALLOW ZONE ISOCONCENTRATION (ppb) FOR TRIHALOMETHANES (SUM OF BROMOFORM, CHLOROFORM, AND DIBROMOCHLOROMETHANE)
* ELEVATED DETECTION LIMITS



THORNTON BUSINESS CENTER
W-17
MW-OS7
MW-OS4
(ND)
F
UNDEVELOPED PARCEL
2P1
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
MW-OS8
(ND)
(ND)
MW-OS3
(ND)
MW-OS5
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
W-8
(ND)
FORMER WAREHOUSE (B-200)
A
(ND)
W-13
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
(ND)
W-12
(ND)
MW-OS9
MW-OS10
(ND)
(ND)
W-9
W-10
(ND)
FORMER PROD. OFFICE
(ND)
W-11
FORMER BOILER
FORMER PHOSSY POND
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
FORMER E-1 DITCH
FORMER CHANGE HOUSE
(ND)
MW-OS6
DW-11
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER FOUNDATION AST
D
FORMER STORMWATER POND
W-16
(ND)
(ND)
W-15
W-26
(ND)

- ABANDONED MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT) — 2P3
- MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT) — E58
- SHALLOW ZONE MONITORING WELL (GEOSYSTEM) — W-4
- ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM) — DW-9
- IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM) — DW-1
- NEWARK AQUIFER MONITORING WELL (GEOSYSTEM) — DW-3
- ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM) — DW-10
- SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM) — W-7
- NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM) — DW-2
- MONITORING WELL (ASHLAND CHEMICAL) — B-25
- MONITORING WELL (BARON-BLAKESLEE) — MW-059
- MONITORING WELL (JONES-HAMILTON Co.) — J10
- MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES) — P-3
- POWER/TELEPHONE POLE
- STORM DRAIN
- PIPE
- SUMP
- (A) PARCEL DESIGNATION
- FORMER STRUCTURE
- EXISTING STRUCTURE
- SURFACE WATER
- PROPERTY LINE





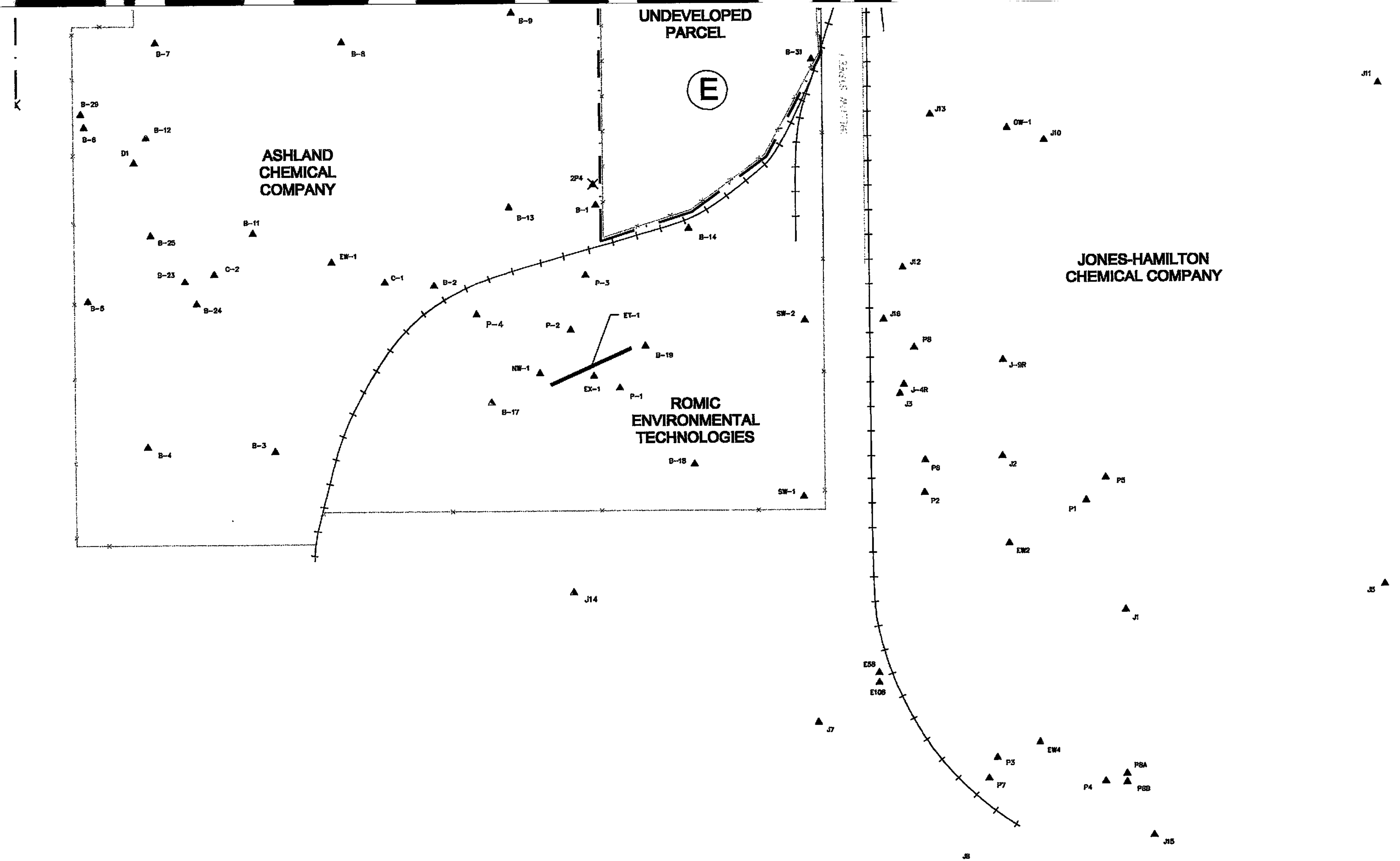
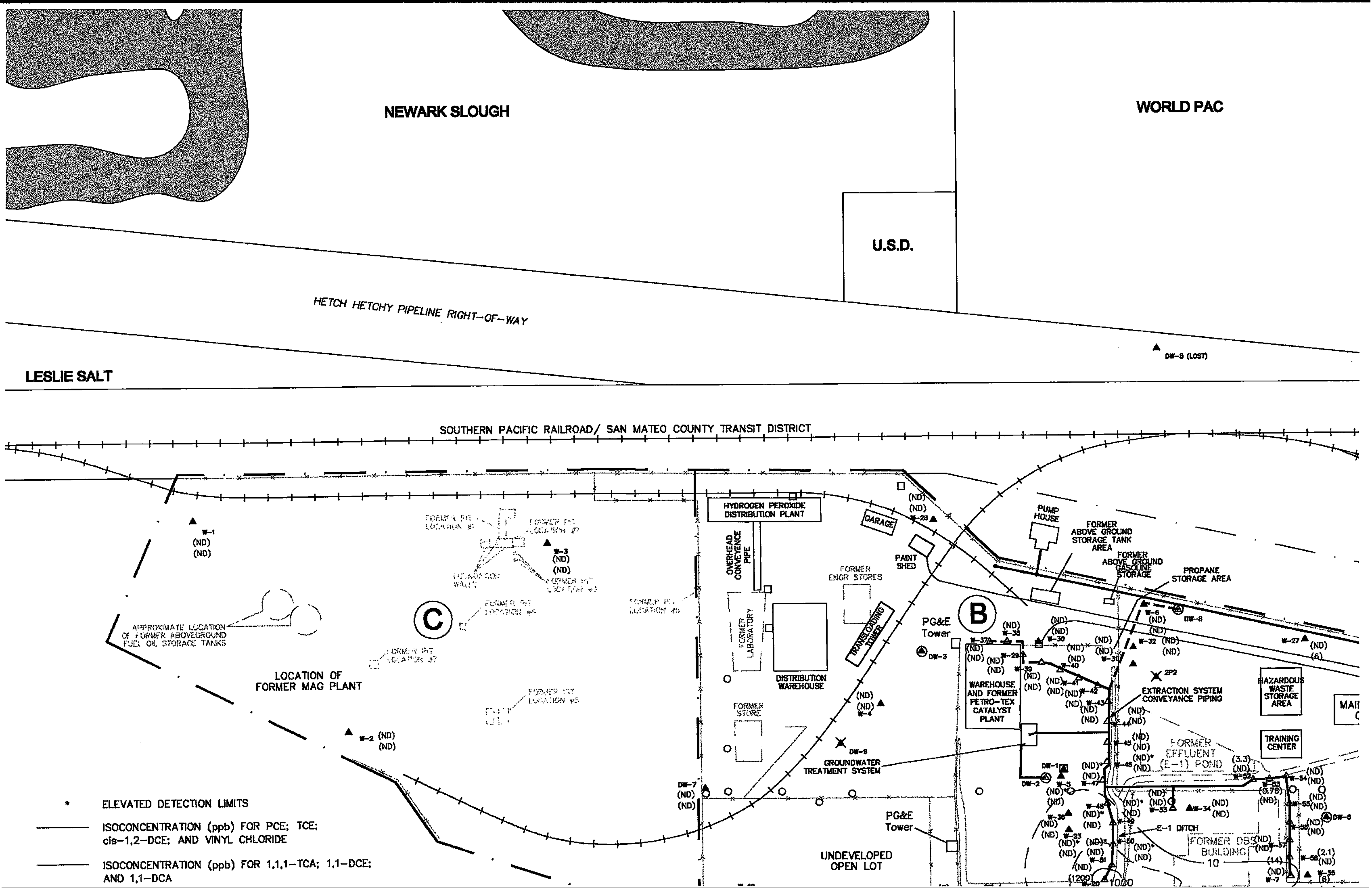
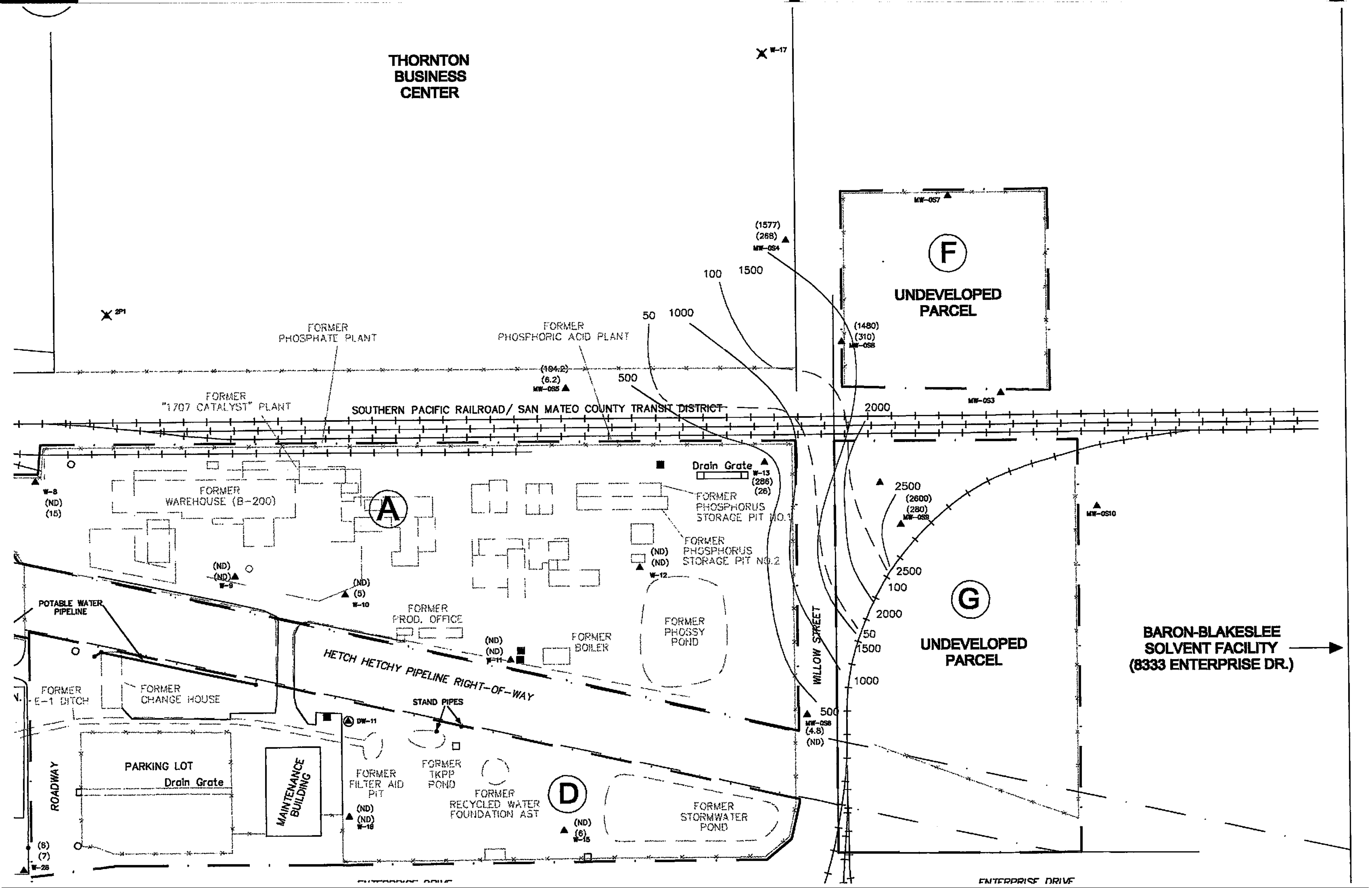


FIGURE 26
TRIHALOMETHANE CONCENTRATIONS



NEWARK SLOUGH
WORLD PAC
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
DW-5 (LOST)
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
HYDROGEN PEROXIDE DISTRIBUTION PLANT
GARAGE
PAINT SHED
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
OVERHEAD CONVEYENCE PIPE
FORMER ENGR STORES
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
TRANSLOADING TOWER
PG&E Tower
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
TRAINING CENTER
FORMER EFFLUENT (E-1) POND
GROUNDWATER TREATMENT SYSTEM
FORMER STORE
E-1 DITCH
FORMER DBS BUILDING
UNDEVELOPED OPEN LOT
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
LOCATION OF FORMER MAG PLANT
C
B
* ELEVATED DETECTION LIMITS
ISOCONCENTRATION (ppb) FOR PCE; TCE; cis-1,2-DCE; AND VINYL CHLORIDE
ISOCONCENTRATION (ppb) FOR 1,1,1-TCA; 1,1-DCE; AND 1,1-DCA


THORNTON BUSINESS CENTER
W-17
2P1
UNDEVELOPED PARCEL
F
MW-OS7
(1577)
(268)
MW-OS4
(1480)
(310)
MW-OS8
MW-OS3
100
1500
50
1000
500
2000
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
(184.2)
(6.2)
MW-OS5
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
Drain Grate
W-13
(286)
(26)
FORMER WAREHOUSE (B-200)
A
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
W-8
(ND)
(15)
(ND)
(ND)
W-9
(ND)
(5)
W-10
(ND)
(ND)
W-12
2500
(2600)
(280)
MW-OS9
MW-OS10
2500
100
2000
50
1500
1000
500
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
(ND)
(ND)
W-11
FORMER BOILER
FORMER PHOSSY POND
HETCH HETCHY PIPELINE RIGHT-OF-WAY
WILLOW STREET
MW-OS6
(4.8)
(ND)
FORMER E-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
DW-11
PARKING LOT
Drain Grate
ROADWAY
MAINTENANCE BUILDING
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER FOUNDATION AST
D
FORMER STORMWATER POND
(ND)
(ND)
W-16
(ND)
(6)
W-15
(6)
(7)
W-28
ENTERPRISE DRIVE

MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)

SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)

NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)

NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)

MONITORING WELL (ASHLAND CHEMICAL)

MONITORING WELL (BARON-BLAKESLEE)

MONITORING WELL (JONES-HAMILTON Co.)

MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)

POWER/TELEPHONE POLE

STORM DRAIN

PIPE

SUMP

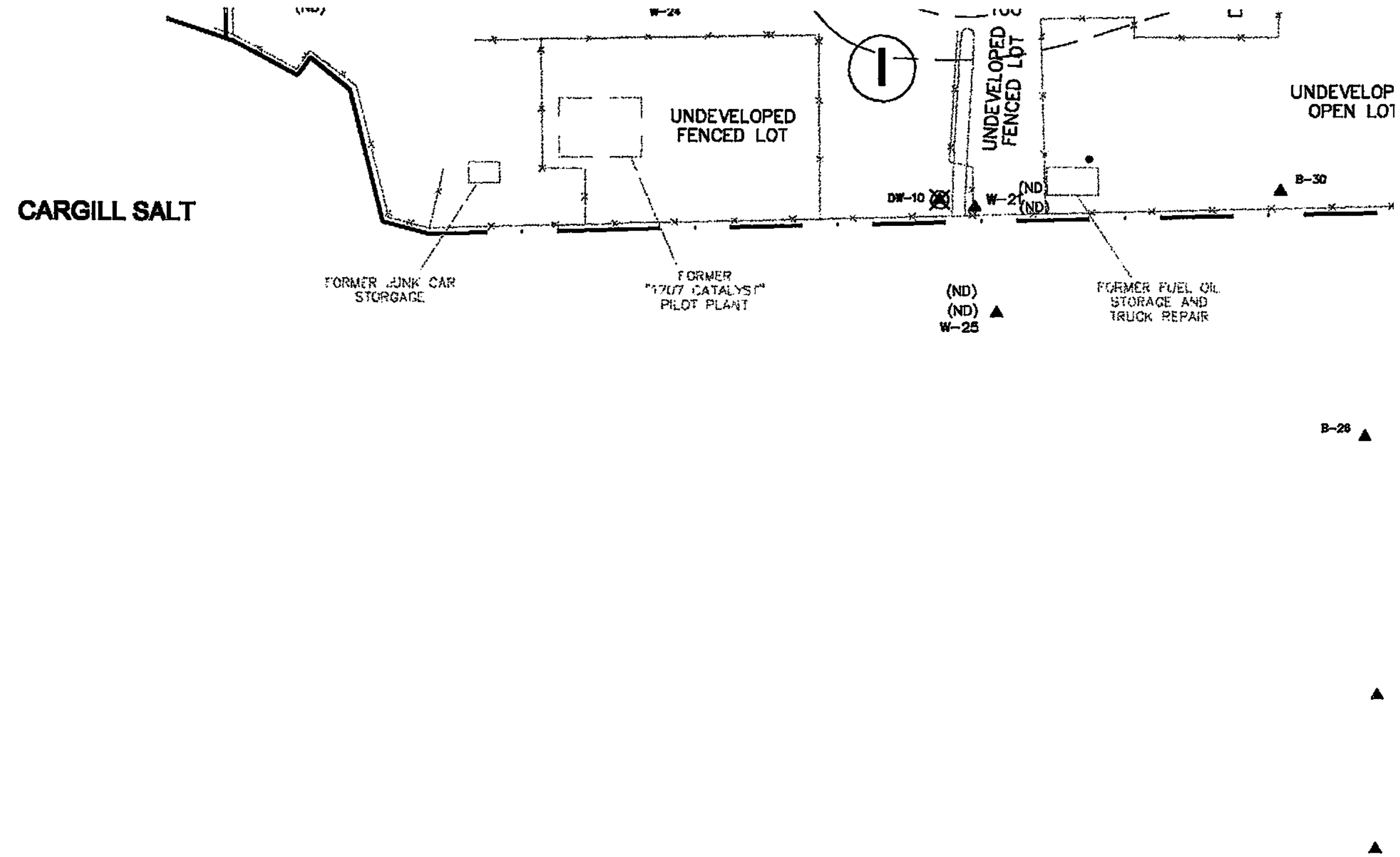
PARCEL DESIGNATION

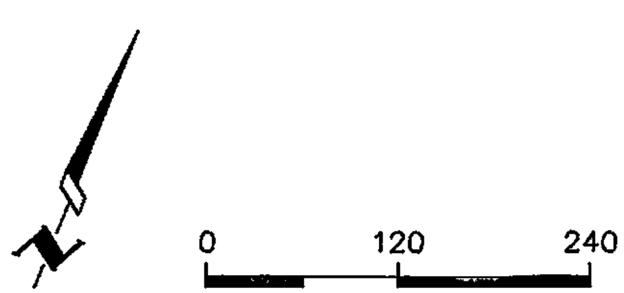
FORMER STRUCTURE

EXISTING STRUCTURE

SURFACE WATER

PROPERTY LINE





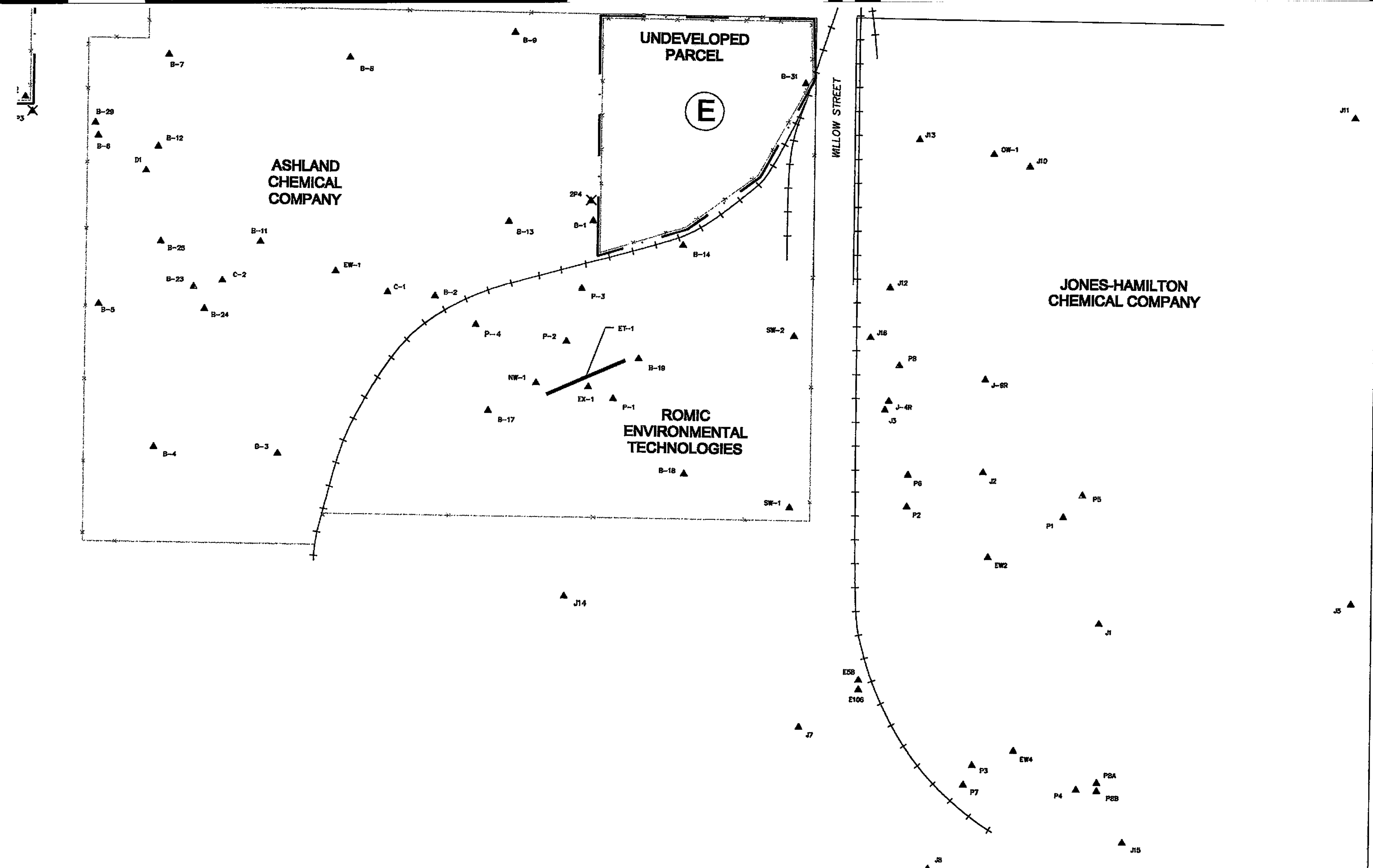
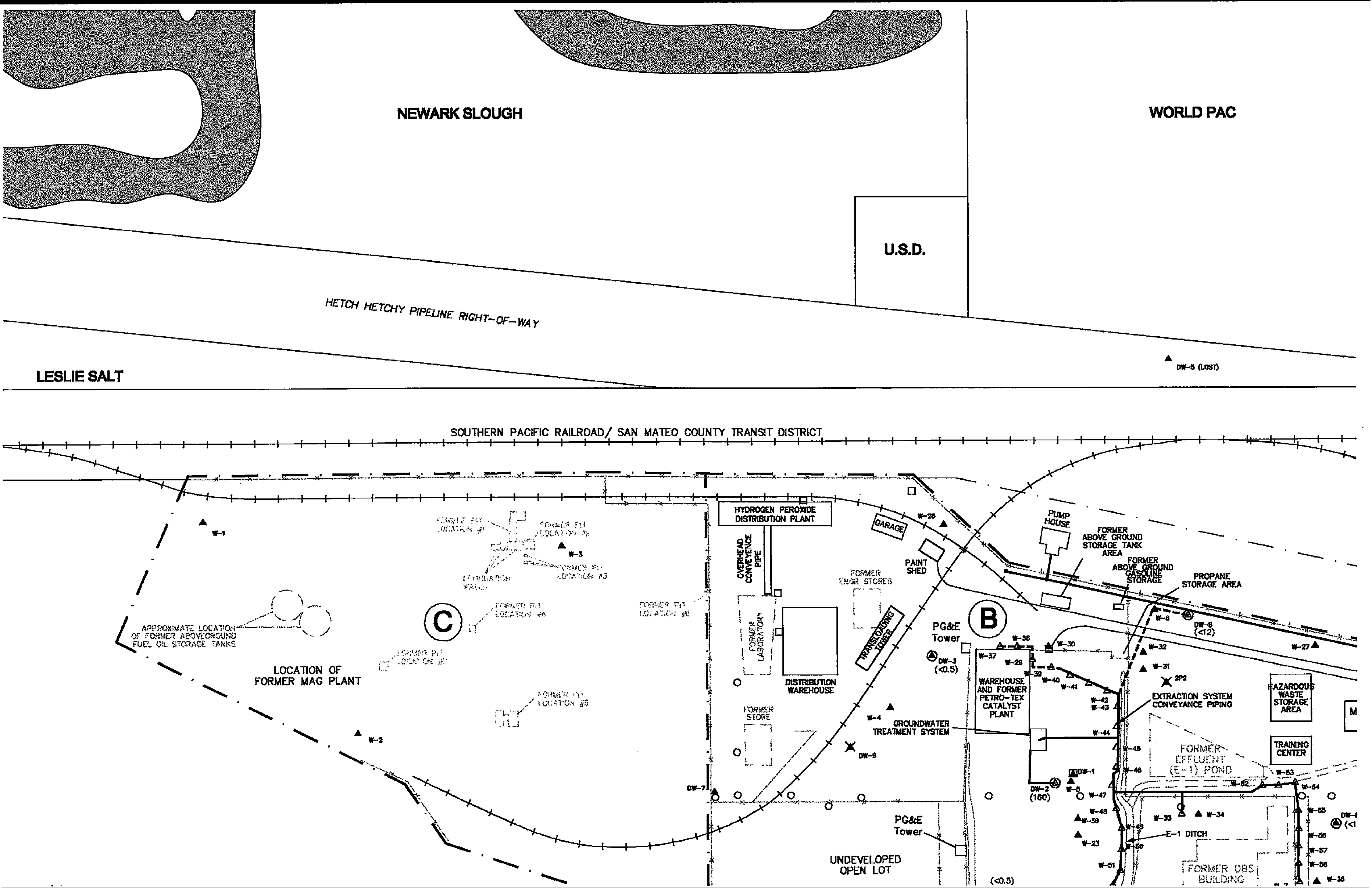
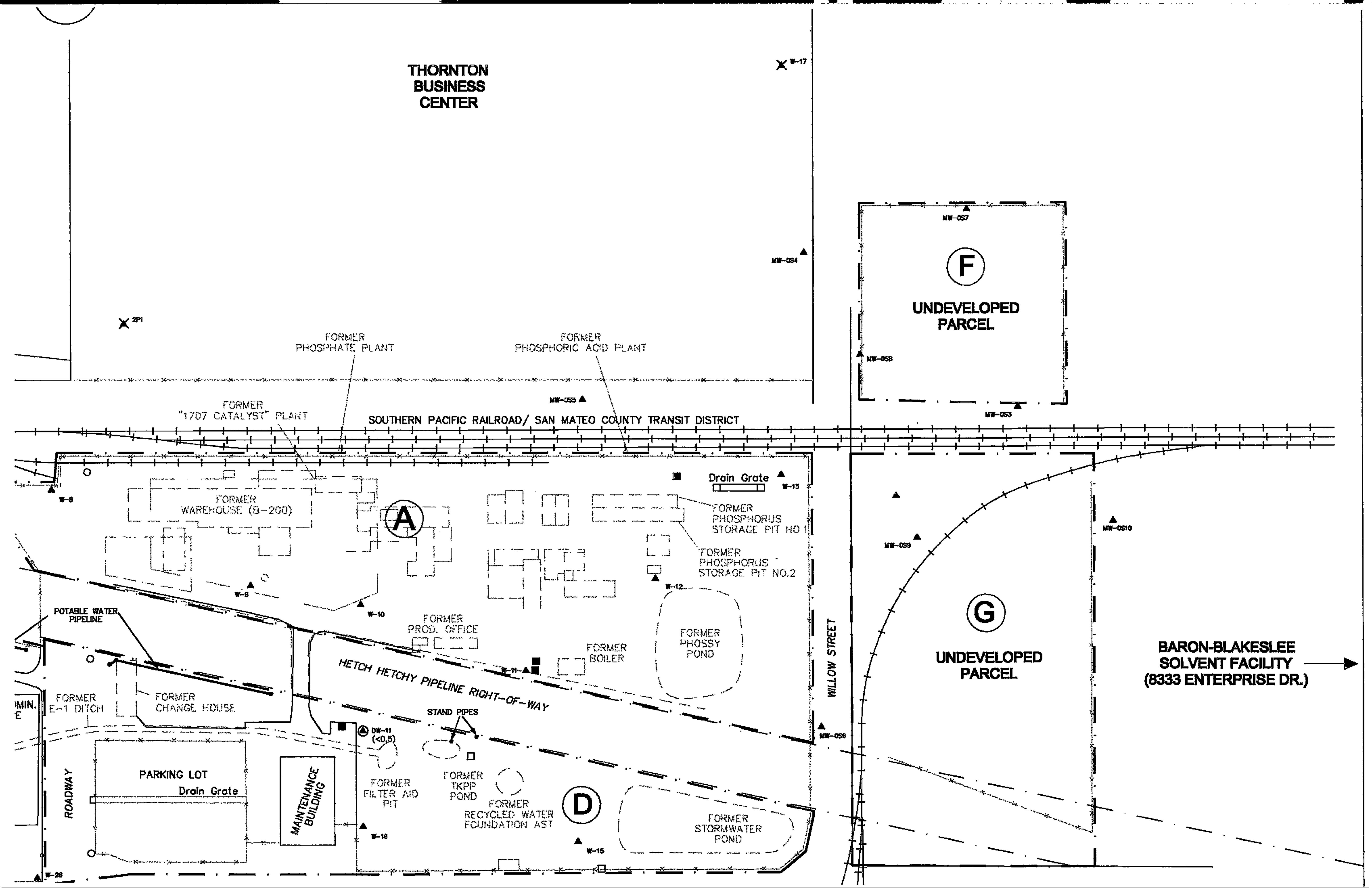

UNDEVELOPED PARCEL
E
ASHLAND CHEMICAL COMPANY
ROMIC ENVIRONMENTAL TECHNOLOGIES
JONES-HAMILTON CHEMICAL COMPANY
WILLOW STREET
B-7
B-8
B-9
B-31
B-29
B-6
B-12
D1
2P4
B-1
B-13
B-11
B-25
B-14
EW-1
B-23
C-2
C-1
B-2
P-3
B-5
B-24
P-4
P-2
ET-1
SW-2
B-19
NW-1
EX-1
P-1
B-17
B-4
B-3
B-18
SW-1
J14
J13
OW-1
J10
J11
J12
J16
P8
J-8R
J-4R
J3
P6
J2
P5
P2
P1
EW2
J5
J1
E5B
E10G
J7
EW4
P3
P7
P8A
P4
P8B
J15
J8
J6

FIGURE 27


NEWARK SLOUGH
WORLD PAC
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
DW-5 (LOST)
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
W-1
W-3
W-2
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
LOCATION OF FORMER MAG PLANT
C
HYDROGEN PEROXIDE DISTRIBUTION PLANT
OVERHEAD CONVEYENCE PIPE
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
FORMER ENGR STORES
FORMER STORE
TRANSLOADING TOWER
GARAGE
PAINT SHED
W-26
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
B
PG&E Tower
DW-3 (<0.5)
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
GROUNDWATER TREATMENT SYSTEM
W-4
DW-9
DW-7
DW-6 (<12)
W-27
W-32
W-31
2P2
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
TRAINING CENTER
FORMER EFFLUENT (E-1) POND
DW-2 (160)
E-1 DITCH
PG&E Tower
UNDEVELOPED OPEN LOT
(<0.5)
FORMER DBS BUILDING



THORNTON BUSINESS CENTER
W-17
MW-OS4
2P1
F
UNDEVELOPED PARCEL
MW-OS7
MW-OS8
MW-OS3
MW-OS5
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
Drain Grate
W-13
W-8
FORMER WAREHOUSE (B-200)
A
FORMER PHOSPHORUS STORAGE PIT NO 1
FORMER PHOSPHORUS STORAGE PIT NO.2
MW-OS9
MW-OS10
W-9
W-10
W-12
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
FORMER BOILER
FORMER PHOSSY POND
WILLOW STREET
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
W-11
HETCH HETCHY PIPELINE RIGHT-OF-WAY
FORMER E-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
DW-11 (<0.5)
MW-OS6
ROADWAY
PARKING LOT
Drain Grate
MAINTENANCE BUILDING
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER FOUNDATION AST
D
FORMER STORMWATER POND
W-16
W-15
W-26

E58 MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)

W-4 SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

DW-9 ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)

DW-1 IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)

DW-3 NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

DW-10 ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)

W-7 SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)

DW-2 NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)

B-25 MONITORING WELL (ASHLAND CHEMICAL)

MW-0S9 MONITORING WELL (BARON–BLAKESLEE)

J10 MONITORING WELL (JONES–HAMILTON Co.)

P-3 MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)

POWER/TELEPHONE POLE

STORM DRAIN

PIPE

SUMP

A PARCEL DESIGNATION

FORMER STRUCTURE

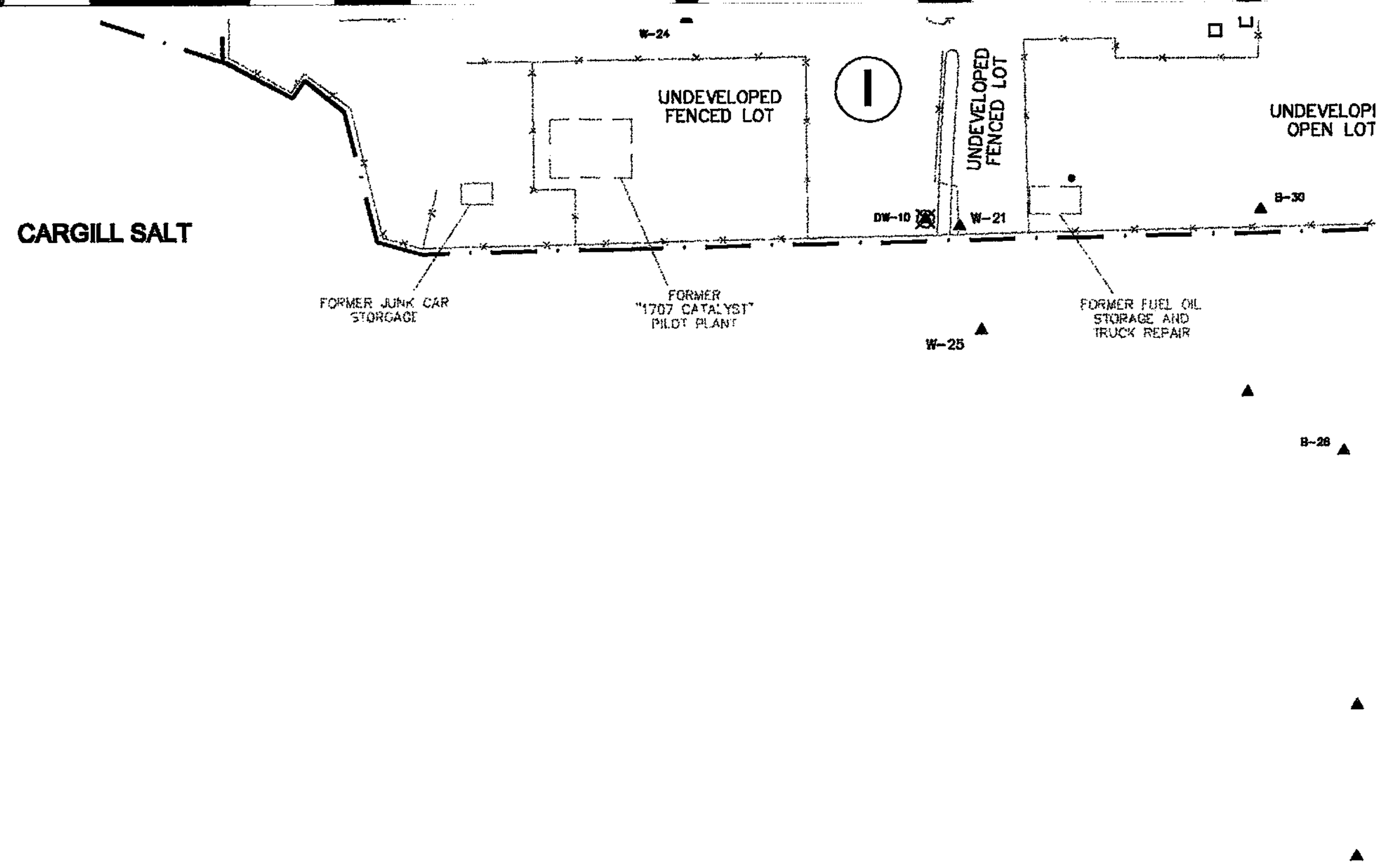
EXISTING STRUCTURE

SURFACE WATER

PROPERTY LINE

EDB ETHYLENE DIBROMIDE

0 120 240



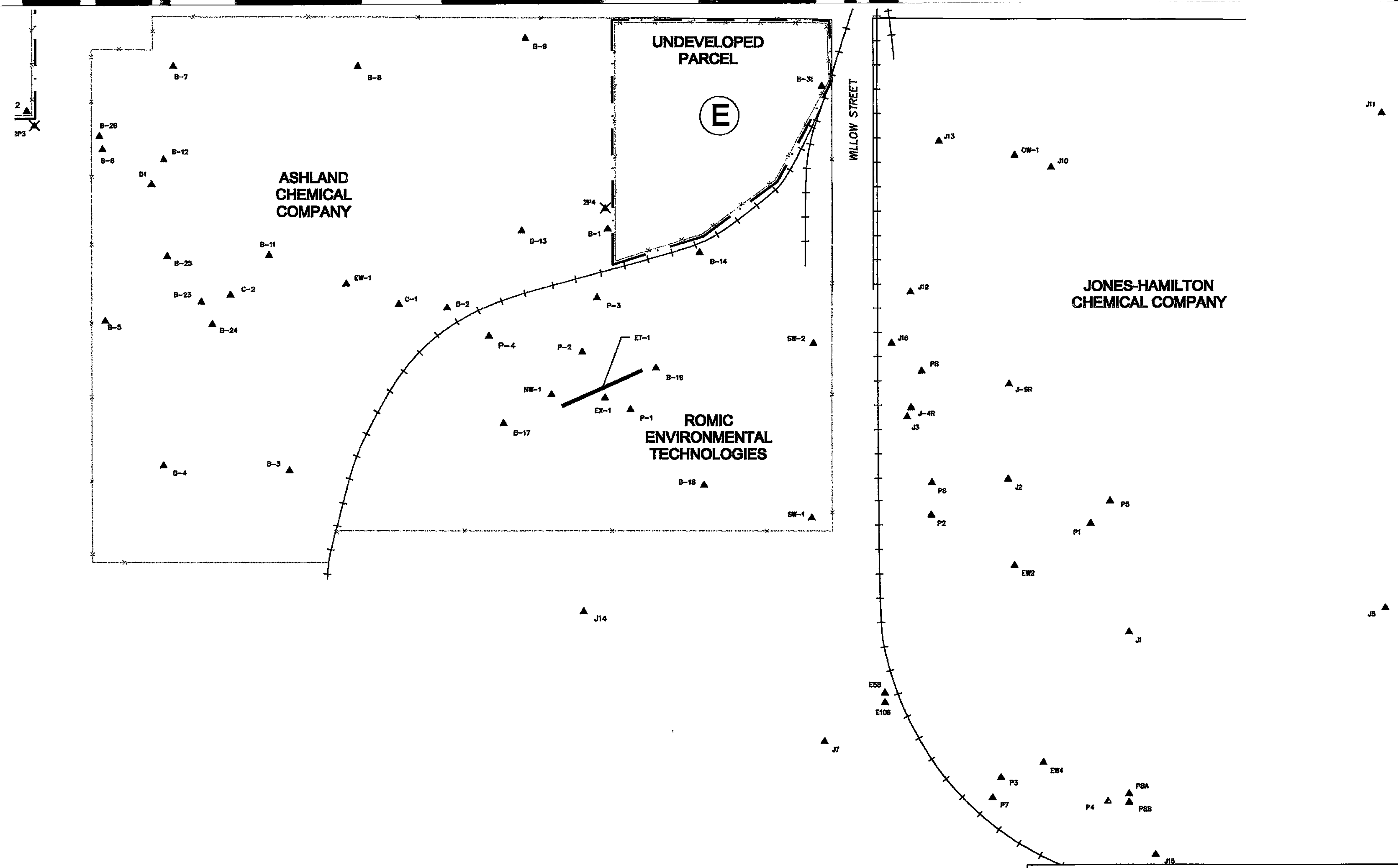
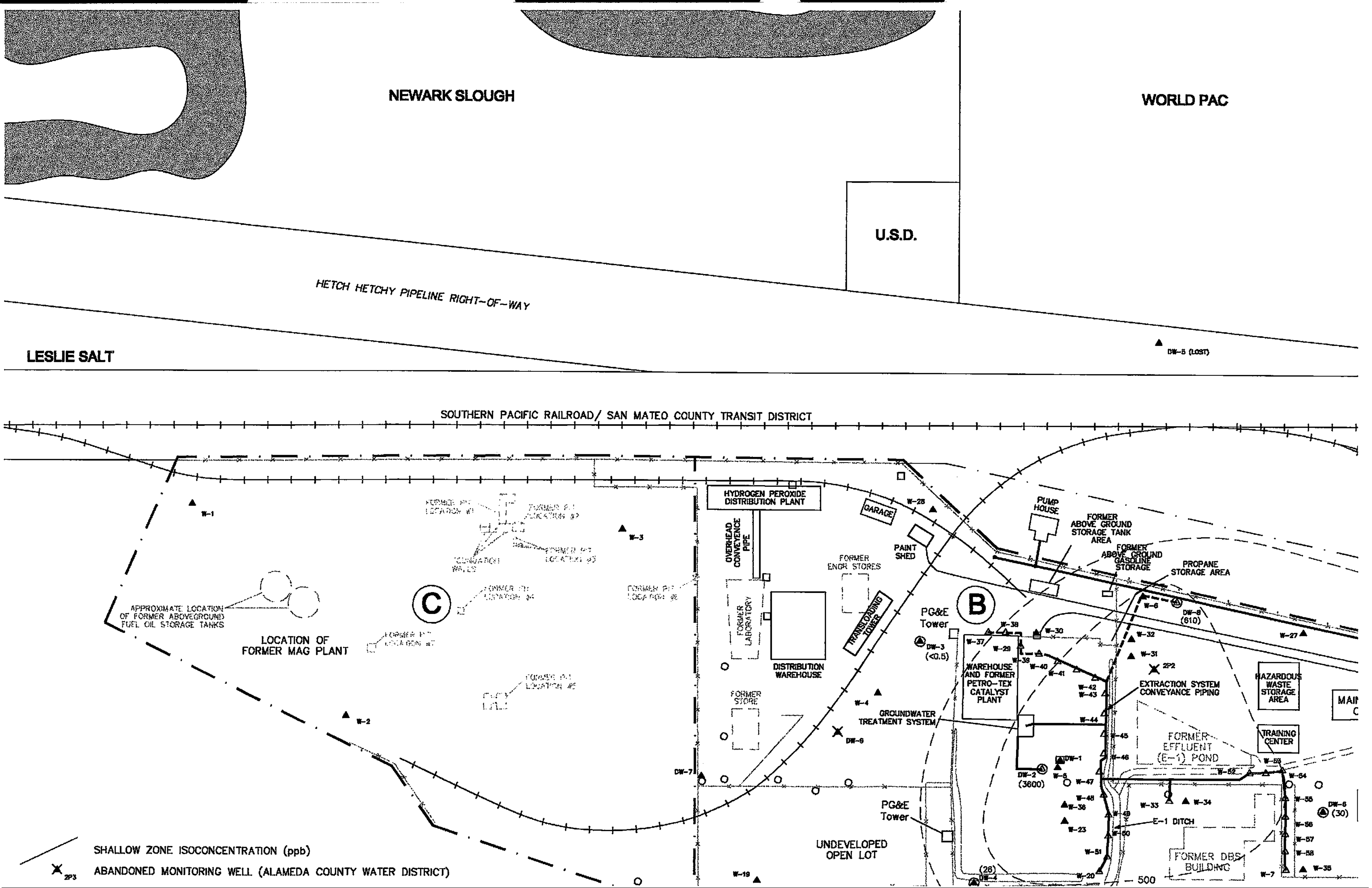
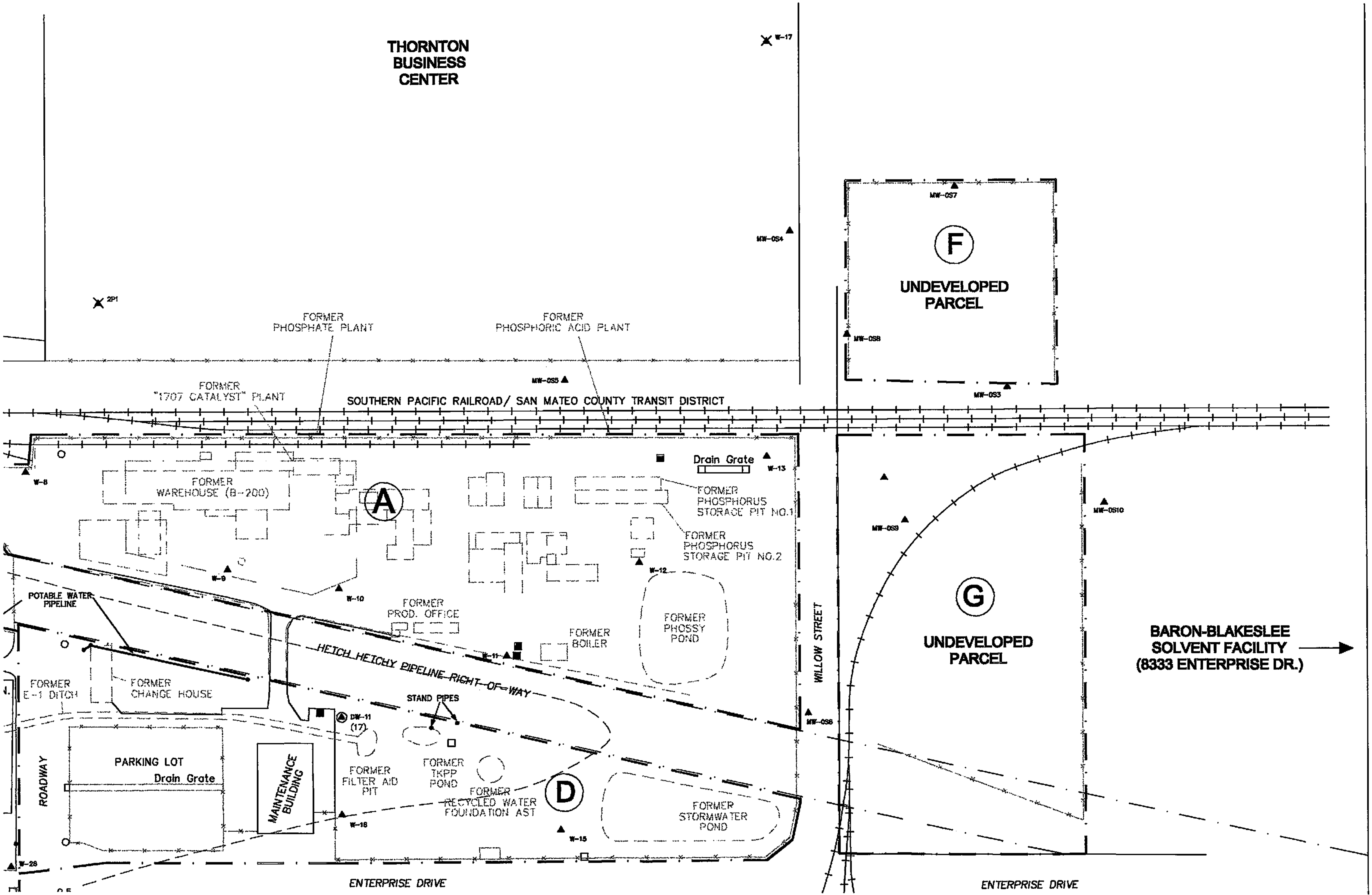
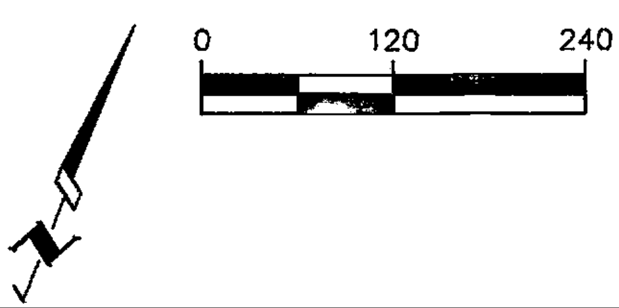


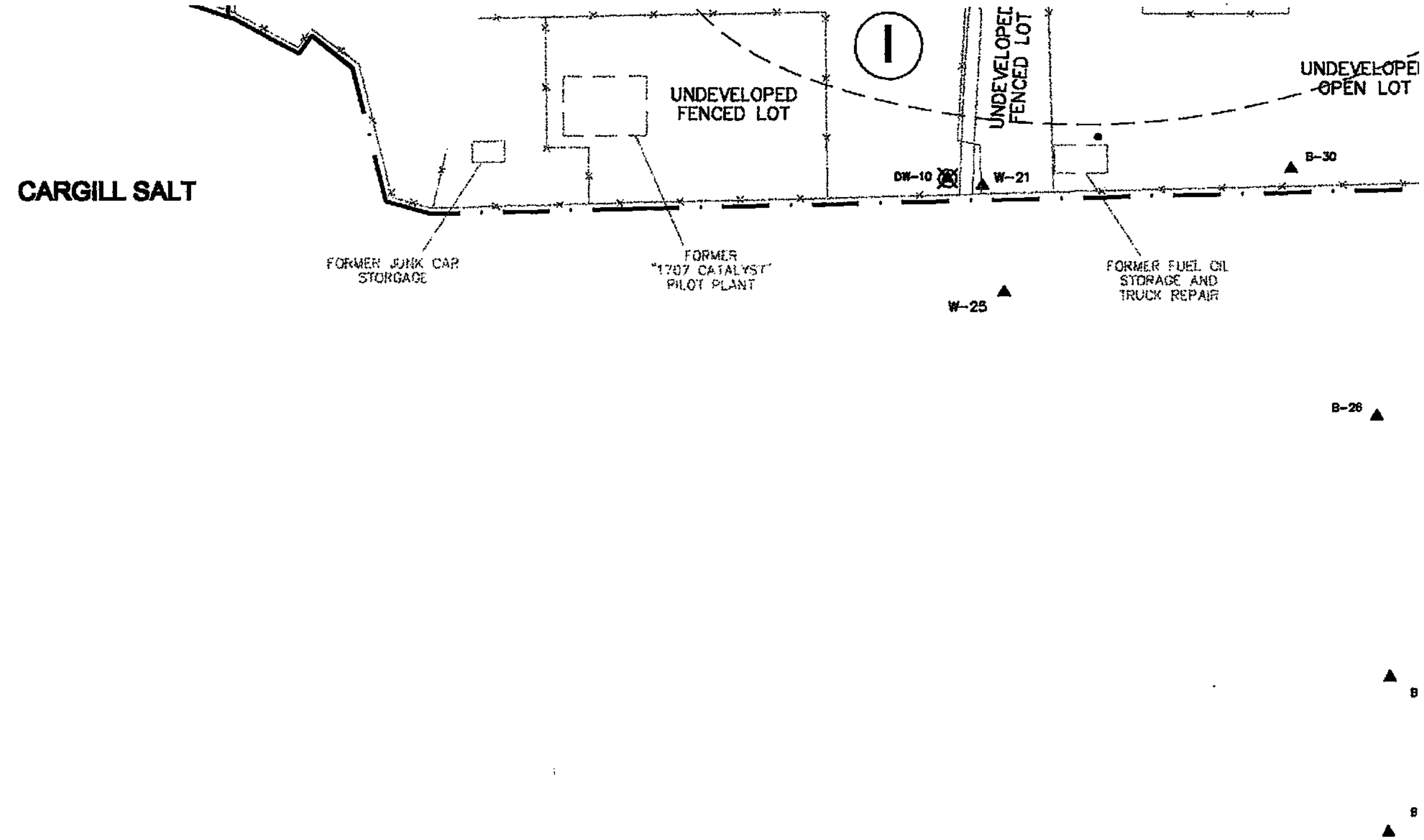
FIGURE 28
EDB CONCENTRATIONS IN


NEWARK SLOUGH
WORLD PAC
U.S.D.
HETCH HETCHY PIPELINE RIGHT-OF-WAY
LESLIE SALT
DW-5 (LOST)
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
W-1
W-3
W-2
APPROXIMATE LOCATION OF FORMER ABOVEGROUND FUEL OIL STORAGE TANKS
C
LOCATION OF FORMER MAG PLANT
HYDROGEN PEROXIDE DISTRIBUTION PLANT
OVERHEAD CONVEYENCE PIPE
FORMER LABORATORY
DISTRIBUTION WAREHOUSE
FORMER ENGR STORES
TRANSLOADING TOWER
FORMER STORE
GARAGE
PAINT SHED
W-28
PUMP HOUSE
FORMER ABOVE GROUND STORAGE TANK AREA
FORMER ABOVE GROUND GASOLINE STORAGE
PROPANE STORAGE AREA
B
PG&E Tower
DW-3 (<0.5)
WAREHOUSE AND FORMER PETRO-TEX CATALYST PLANT
GROUNDWATER TREATMENT SYSTEM
EXTRACTION SYSTEM CONVEYANCE PIPING
HAZARDOUS WASTE STORAGE AREA
TRAINING CENTER
FORMER EFFLUENT (E-1) POND
E-1 DITCH
FORMER DBS BUILDING
DW-8 (610)
DW-2 (3600)
DW-6 (30)
DW-4
DW-7
DW-1
2P2
W-4
W-19
UNDEVELOPED OPEN LOT
500
SHALLOW ZONE ISOCONCENTRATION (ppb)
2P3
ABANDONED MONITORING WELL (ALAMEDA COUNTY WATER DISTRICT)


THORNTON BUSINESS CENTER
W-17
2P1
MW-0S4
MW-0S7
F
UNDEVELOPED PARCEL
MW-0S8
MW-0S3
FORMER PHOSPHATE PLANT
FORMER PHOSPHORIC ACID PLANT
MW-0S5
FORMER "1707 CATALYST" PLANT
SOUTHERN PACIFIC RAILROAD/ SAN MATEO COUNTY TRANSIT DISTRICT
Drain Grate
W-13
W-8
FORMER WAREHOUSE (B-200)
A
FORMER PHOSPHORUS STORAGE PIT NO.1
FORMER PHOSPHORUS STORAGE PIT NO.2
W-12
MW-0S9
MW-0S10
W-9
W-10
POTABLE WATER PIPELINE
FORMER PROD. OFFICE
FORMER BOILER
FORMER PHOSSY POND
W-11
HETCH HETCHY PIPELINE RIGHT-OF-WAY
WILLOW STREET
G
UNDEVELOPED PARCEL
BARON-BLAKESLEE SOLVENT FACILITY (8333 ENTERPRISE DR.)
FORMER E-1 DITCH
FORMER CHANGE HOUSE
STAND PIPES
DW-11 (17)
MW-0S6
PARKING LOT
Drain Grate
ROADWAY
MAINTENANCE BUILDING
FORMER FILTER AID PIT
FORMER TKPP POND
FORMER RECYCLED WATER FOUNDATION AST
D
FORMER STORMWATER POND
W-16
W-15
W-28
ENTERPRISE DRIVE
ENTERPRISE DRIVE

- W-4 — SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
- DW-9 — ABANDONED SHALLOW ZONE MONITORING WELL (GEOSYSTEM)
- DW-1 — IRVINGTON AQUITARD MONITORING WELL (GEOSYSTEM)
- DW-3 — NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
- DW-10 — ABANDONED NEWARK AQUIFER MONITORING WELL (GEOSYSTEM)
- W-7 — SHALLOW ZONE EXTRACTION WELL (GEOSYSTEM)
- DW-2 — NEWARK AQUIFER EXTRACTION WELL (GEOSYSTEM)
- B-25 — MONITORING WELL (ASHLAND CHEMICAL)
- MW-059 — MONITORING WELL (BARON-BLAKESLEE)
- J10 — MONITORING WELL (JONES-HAMILTON Co.)
- P-3 — MONITORING WELL (ROMIC ENVIRONMENTAL TECHNOLOGIES)
- POWER/TELEPHONE POLE
- STORM DRAIN
- PIPE
- SUMP
- (A) PARCEL DESIGNATION
- FORMER STRUCTURE
- EXISTING STRUCTURE
- SURFACE WATER
- PROPERTY LINE





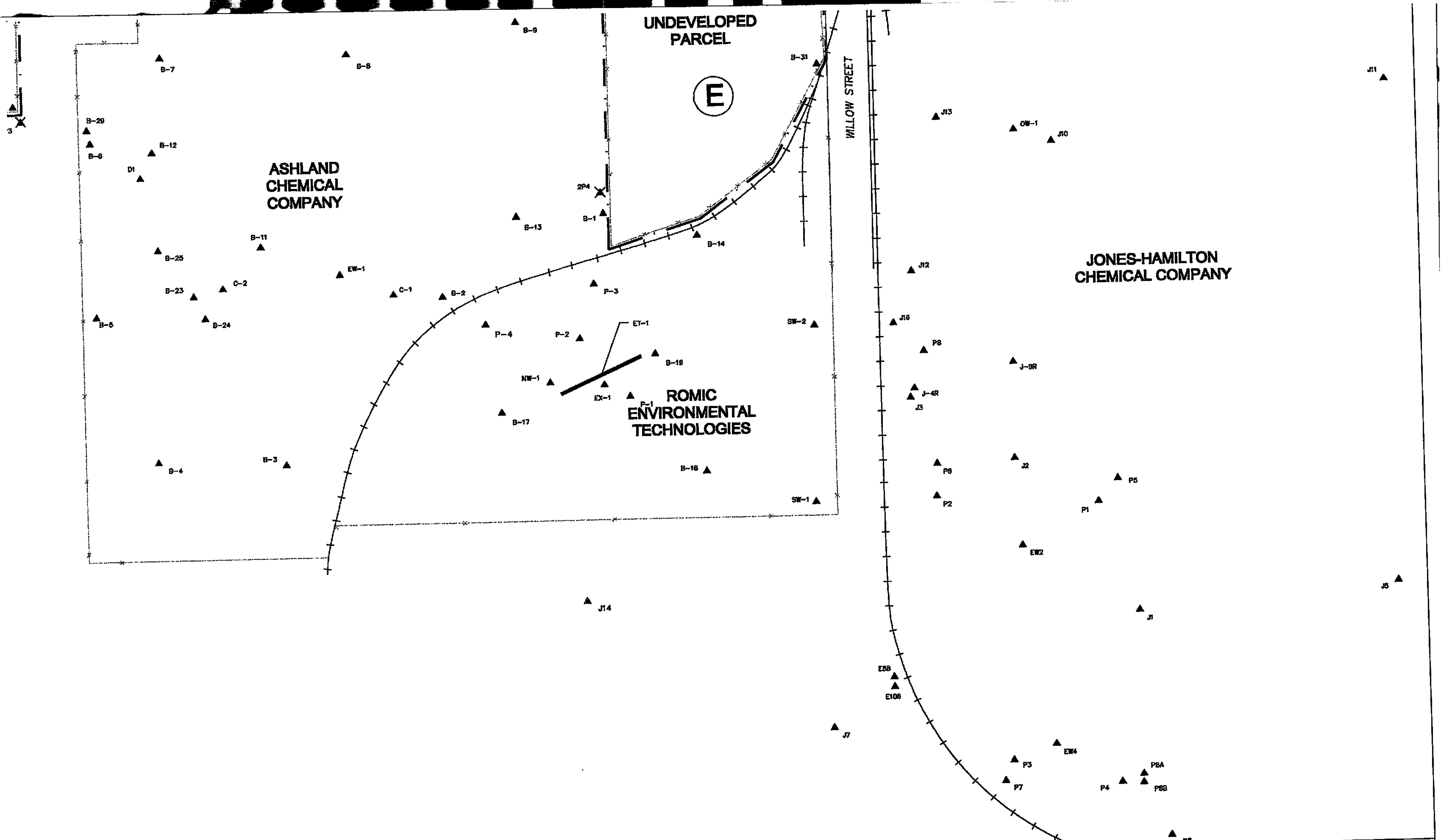


FIGURE 29
1,2 - DCA CONCENTRATIONS IN GROUNDWATER (ppb), JANUARY 1999