



**Conceptual Remedial Plan
Yerba Buena Project Site
Emeryville and Oakland, California**

November 8, 1990
1649

Prepared for:

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**CONCEPTUAL REMEDIAL PLAN
YERBA BUENA PROJECT SITE
EMERYVILLE AND OAKLAND, CALIFORNIA**

1.0 BACKGROUND

The Yerba Buena Project Site covers an area of approximately 51 acres and is located in Oakland and Emeryville, California. An environmental investigation was conducted by Levine·Fricke between September 1989 and May 1990 on behalf of Catellus Development Corporation (formerly Santa Fe Pacific Realty Corporation). The layout of the Yerba Buena Project Site (hereafter referred to as "the Site") is presented in Figure 1. As illustrated in Figure 2, the Site has been divided into three quadrants (A, B, and C) to aid in the organization of the sampling and analysis program. The Site excludes the areas presently or formerly occupied by the Markstein Beverage Company, and the Oakland Terminal Railway.

Two phases of environmental investigation were conducted at the Site. Phase I of the Investigation consisted of a historical review of the Site and site usage; development of a sampling and chemical analysis work plan; sampling and chemical analysis of soil samples collected from areas identified as potential environmental concerns during the historical review; sampling and chemical analysis of soil in nontargeted areas to characterize the general quality of shallow soil; and sampling and analysis of "grab" and monitoring well ground-water samples. Phase II of the Investigation consisted of conducting a soil-gas and shallow ground-water reconnaissance survey in Area A; collecting additional soil samples for lead, zinc, polychlorinated biphenyls (PCBs), and/or volatile organic compound (VOC) analysis; and conducting a shallow ground-water survey in the vicinity of Phase I monitoring well LF-9. Soil and ground-water sampling results have been compared to available regulatory guidelines to aid in evaluating areas of potential environmental concern.

The Phase I investigation included the Ransome Company site in the north-central portion of the Site. Further investigations of this Ransome area are currently being conducted by Ransome and environmental consultants working on behalf of Ransome, and was not included in the Phase II investigation conducted by Levine·Fricke. It is our understanding that any remedial work to be conducted at the Ransome site will be coordinated

by the Ransome Company, therefore, possible remedial alternatives for the Ransome area are not discussed in this report.

A brief summary of the results of the Phase I and II Investigations is presented below. These results are presented in detail in a separate report (Levine·Fricke, "Phase I & II Environmental Investigation, Yerba Buena Project Site, Emeryville, California," August 15, 1990).

1.1 Geology and Hydrogeology

Subsurface materials encountered at the Site consisted predominantly of gravelly, silty clays with occasional sandy and/or gravelly interbeds (alluvial deposits). Fill sediments greater than 2 feet thick were generally not encountered at the Site, with the exception of a 4- to 5-foot elevated soil platform in Area A.

The depth to shallow ground water beneath the Site ranged between 2.5 feet (well LF-11) and 12.2 feet (well LF-4) below grade during the latest round of ground-water measurements at the Site (April 23, 1990). Ground-water elevation data collected at the Site in both February and April 1990 indicated a westerly to southwesterly direction of ground-water flow, at an approximate gradient of 0.001 ft/ft to 0.003 ft/ft. Ground-water levels measured in one of two shallow/deeper well pairs installed in Area A indicated a low to moderate upward vertical gradient (0.012 ft/ft). Ground-water levels measured in the second well pair indicated an essentially flat gradient.

1.2 Soil Quality

With the exception of a few localized areas, concentrations of compounds detected in soil at the Site would not be expected to adversely impact human health or the environment, given the current and intended use of the Site and potential beneficial uses of ground water beneath the Site.

Lead was detected in two locations (at depths of 3.5 feet or less) (A5 in Area A and C17 in Area C) at concentrations greater than 1,000 parts per million (ppm). Additional sampling in these two areas during Phase II of the Investigation indicated that elevated lead concentrations are limited laterally and vertically to localized areas (areas of less than 40 feet by 40 feet laterally and apparently less than 3 to 5 feet below grade). Lead was not detected in ground-water samples collected in the vicinity of these two

locations. An elevated concentration of zinc was also detected in soil at location C17 (at a depth of 1.0 foot) in Area C; again, the affected area is of apparently limited lateral and vertical extent (approximately 20 feet by 20 feet laterally and 3.0 feet or less below grade) based on Phase II sampling in the immediate vicinity.

Heavy fraction total petroleum hydrocarbons (TPH) in the range of lubricating oil were detected in 39 of 101 samples collected at the Site. Concentrations were generally below 500 ppm; however, concentrations greater than 5,000 ppm were detected in shallow soil samples (at depths of 4.5 feet or less) collected from two locations (A8 and LF5) in Area A at the Site. Samples collected from four additional locations (at depths of 4.0 feet or less) (A13, A22, B7, and C19) in Areas A, B, and C contained TPH as oil at concentrations between 1,000 and 5,000 ppm. Soil containing less than 1,000 ppm TPH as oil do not appear to be of environmental concern, due to the following characteristics.

- the very low mobility of lubricating-type oil in soils
- the presence of underlying silty clays to aid in inhibiting downward migration
- the shallow and apparently limited areal extent of TPH-affected soils with concentrations less than 1,000 ppm
- the absence of other chemical compounds (specifically, VOCs) in soils where TPH was detected
- the fact that TPH was generally either not detected or was detected at low concentrations (less than 1 ppm) in ground-water samples (except for the Ransome site and one location in Area C).

PCBs were detected in near-surface soils at one Phase I sampling location in Area A (A22, at 0.1 ppm) and two locations in Area B (B25 and B26, at concentrations up to 5.4 ppm). Additional sampling was conducted in the vicinity of locations B25 and B26, and results indicated a generally localized area with low concentrations (less than 7.5 ppm) of PCBs in soil around location B26. The vertical extent of the PCBs appears to be less than 3 feet in depth. EPA's PCB Spill Cleanup Policy, Code of Federal Regulations (40CFR 761.125) states that spills of PCBs in residential/commercial areas need to be cleaned up to 10 mg/kg, with a minimum 10-inch cap of clean material placed on top of the remediated area. As the concentrations of PCBs detected at the Site are well below the EPA's proposed clean-up level, excavation of the PCB-affected soil may not be required, however, it is recommended

that this area be covered with a minimum 10-inch cap of clean, low permeability materials to prevent erosional transport of the PCB-affected soils.

Low concentrations (up to 1 ppm) of pyrene and VOCs were detected in soils in Area A and C, and herbicides were detected in Areas A, B, and C. Herbicides were detected at concentrations up to 0.74 ppm at depths ranging from 1.5 to 4.0 feet below grade.

Asbestos, chlorinated pesticides and semi-volatile organic compounds (SVOCs) (excluding PCBs and pyrene) were not detected in soil samples collected at the Site.

1.3 Ground-Water Quality

Twenty-five monitoring well and grab ground-water samples were collected at the Site during Phase I of the Investigation. These samples were analyzed for SVOCs, 13 heavy metals, VOCs, and TPH (as gasoline and diesel/oil). Six additional monitoring well samples were collected and analyzed for VOCs during Phase II of the Investigation.

SVOCs were not detected in ground-water samples collected from the Site, and metal concentrations detected in ground-water samples were below laboratory detection limits or State Maximum Contaminant Levels (MCLs) for drinking water.

One or more VOCs were detected in the samples collected from eight of the Phase I monitoring wells (LF-4, LF-5, LF-6, LF-8, LF-9, LF-10, LF-11, and LF-12). VOCs were not detected in samples collected from the remaining wells (LF-1, LF-2, LF-3, LF-7, and LF-16).

Relatively low concentrations (0.021 ppm or less) of 1,1-dichloroethane (1,1-DCA) were detected in several locations in Area B and in monitoring wells LF-6 and LF-8. These concentrations are slightly above the DHS Recommended Action Levels for drinking water. Well LF-8 also contained low concentrations (0.015 ppm or less) of 1,1,1-trichloroethane (1,1,1-TCA) and 1,1-dichloroethene (1,1-DCE). The concentrations of 1,1,1-TCA and 1,1-DCE are at or below the State MCLs for drinking water for these compounds.

Concentrations of 1,1-DCE, 1,1,1-TCA, and 1,1-DCA (up to 0.73 ppm) in excess of drinking water standards (MCLs or DHS Recommended Action Levels for drinking water) were detected in wells LF-4 (screened from 9.5 to 19.5 feet below grade) and LF-5 (screened from 10 to 25 feet below grade) located in Area

A. The lateral extent of these compounds in the vicinity of these wells was characterized during Phase II of the Investigation to extend approximately 800 to 1,200 feet southwest of well LF-5, and 250 to 300 feet northeast of well LF-5, in a band approximately 200 to 250 feet wide. These compounds were not detected in samples from Phase II deeper well LF-5D (screened from 34 to 44 feet below grade), but were detected in deeper well LF-4D (screened from 29 to 39 feet below grade) at concentrations similar to concentrations detected in well LF-4. The concentrations detected in well LF-4D were confirmed by additional sampling conducted on October 4, 1990. The confirmatory sample had similar concentrations as the previous LF-4D sample.

Several VOCs were detected in ground water collected from well LF-10, located on the upgradient (northern) boundary of Area C (notably, up to 7.6 ppm of trichloroethylene [TCE]). Some of the same compounds were also detected in wells LF-12, LF-11, and LF-9, in a grab sample collected at C29 (also located along the northern boundary of Area C), and in a grab sample collected from C15, located near the center of Area C. Based on the distribution of the concentrations of these compounds in Area C and the southwesterly ground-water gradient, these compounds most likely originated from an off-site source to the north.

1.4 Perched Ground Water Near Well LF-9

Perched ground water with an oily sheen and strong fuel odor was detected during Phase I of the Investigation in shallow sediments (less than 3 feet deep) near well LF-9. A grab ground-water sample collected from this zone during Phase I was characterized as containing TPH resembling oil and Stoddard solvent. The extent and type of hydrocarbons detected in the perched water were then more fully characterized during Phase II of the Investigation. According to the Phase II fuel characterization results, the petroleum hydrocarbons consisted of a mixture of hydrocarbons resembling mineral spirits, polynuclear aromatic compounds, phenols, and fatty acids. Analysis results of a sample collected from well LF-9, which was screened below the perched zone, indicated that ground water underlying the perched water has only been marginally impacted by the presence of the petroleum hydrocarbons in the perched zone. The hydrocarbons appear to be limited to the railroad track area, and extend approximately 30 feet west of well LF-9. The northern and eastern boundaries of the petroleum hydrocarbon-affected zone were not defined during the Phase II investigation.

2.0 RECOMMENDATIONS FOR FURTHER INVESTIGATION**2.1 TPH in Soil**

Additional investigation and possible soil remediation in the two areas with concentrations greater than 5,000 ppm of TPH as oil in soil and the four areas with concentrations between 1,000 and 5,000 ppm of TPH as oil in soil will likely be required. Additional investigation of the vertical and lateral extent of TPH-affected soil in the vicinity of these locations will be needed to assess the volume of soil that may have to be removed, treated, and/or disposed of prior to development of the affected portions of the Site. Suggested alternatives for remediation of TPH-affected soil are discussed in a later section of this plan. Once the distribution and approximate volume of affected soil are adequately assessed, the most appropriate remedial alternative can be evaluated.

To further assess the extent of TPH-affected soil in the areas with TPH concentrations above 1,000 ppm, Levine·Fricke will drill additional soil borings in the vicinity of previous sampling locations where elevated TPH concentrations were detected, to collect soil samples for analysis for extractable TPH. Results from this additional investigation will provide a more accurate estimate of the volume of affected soil, and a more accurate basis for recommending the most appropriate remedial option.

2.2 Lead-Affected Soil

To further assess the extent of lead-affected soil in the areas with elevated concentrations (above 500 ppm), Levine·Fricke drilled eight additional soil borings on October 24, 1990, in the vicinity of the previous sampling location A5, to collect soil samples for lead analysis during a third phase of investigation. These results have been summarized on Figure 1 and will be presented in a Phase III investigation report upon the completion of additional recommended investigation. Additionally, six to seven borings are recommended in the vicinity of locations A21 and LF-5 to better assess the extent and concentration of lead in the shallow sediments. Results from this additional investigation will provide data to develop a more accurate estimate of the volume of affected soil in area A, and a more accurate basis for recommending the most appropriate remedial option. Soil sampling conducted during the Phase II Environmental Investigation in the vicinity of C17 is adequate to estimate the volume of lead- and zinc-affected soil in this area.

2.3 TPH-Affected Perched Ground Water Near LF-9

Based on the results of the Phase I and II Investigations, and current regulatory guidelines, further investigation of the northern and eastern extent of petroleum-affected soil and ground-water in the vicinity of well LF-9 is recommended. Depending on the extent and concentrations of TPH detected in ground-water or soil near well LF-9, remediation of petroleum-impacted shallow soils and perched ground water in that vicinity. Potential alternatives for the remediation of the TPH-affected soil are discussed in a later section of this plan.

The petroleum hydrocarbons affecting soil and perched ground-water in the vicinity of LF-9 may originate at an off-site source north of the Site. Previous attempts to collect samples north of the railroad tracks near LF-9 were not successful, due to insufficient water in the borehole or collapse of the borehole. Qualitative samples previously collected in this area indicate slightly increasing concentrations of TPH (up to 3 ppm) in the perched ground water east of well LF-9 in the direction of Hollis Street.

Additional characterization of the lateral extent of the affected soil and ground-water will be targeted east of Phase II sampling location BB1 (the sampling location furthest east of LF-9) adjacent to Hollis Street, and to the north and northeast of well LF-9, on the far side of the railroad tracks. Levine·Fricke recommends collection of at least one additional soil and one grab ground-water sample from each of the sampling locations.

The soil and perched ground-water samples collected adjacent to Hollis Street and from the area north of the railroad tracks should be analyzed for TPH and characterized for fuel type using thin layer chromatography (TLC), as was performed on samples previously collected from this area. We also recommend that at least one of the samples be analyzed for the presence of polychlorinated biphenyls (PCBs).

2.4 Potential Herbicides in Ground Water

Collection and analysis of ground-water samples from existing wells in the vicinity of the railroad tracks where herbicides were detected in soil is recommended to assess potential impacts on ground-water quality by the herbicides. Herbicides were detected in soil samples collected from three locations in Area A (A12, A23, and LF5), four locations in Area B (B9, B11, B12, and LF8), and two locations in Area C (C1 and C3).

Samples of ground-water will be collected from wells LF-5 and LF-6 in Area A, and wells LF-8 and LF-20 in Area B, to assess potential impacts from the herbicide-affected soils. In Area C, there are no existing downgradient wells in the vicinity of sampling locations C1 and C3. Therefore, if warranted, a soil boring will be drilled and a grab ground-water sample will be collected in the vicinity of these two soil sampling locations. All ground-water samples collected will be analyzed for chlorinated herbicides.

2.5 VOCs in Ground-Water in Area A

Based on the discovery of VOCs in ground-water samples collected from deeper well LF-4D in Area A, additional investigation of the vertical extent of VOC-affected ground-water in Area A is recommended. The recommended additional investigation includes the following items.

- reconnaissance ground-water sampling northeast of well LF-5 and in the area between wells LF-17, LF-18, and LF-19 to further assess the lateral extent of VOC-affected ground water
- soil sampling on a 50-foot sampling grid to further attempt to identify a potential source area of VOCs northeast of well LF-5
- installation of one additional shallow well (less than 25 feet deep) northeast of well LF-5 to monitor the upgradient limit of the VOC-affected ground water
- installation of one to two shallow (less than 25 feet deep) wells downgradient of well LF-4 to monitor the downgradient extent of the VOC-affected groundwater
- installation of a deeper (greater than approximately 50 feet below grade) ground-water monitoring well in the vicinity of wells LF-4/4D to further assess the vertical extent of VOC-affected ground-water in that area
- analysis of samples from wells LF-4, LF-4D and the well to be installed in the deeper water-bearing zone for total dissolved solids (TDS) to further assess possible salt water intrusion in the area.

The additional investigation of VOC-affected soil and ground-water recommended for Area A is described below in more detail.

2.5.1 · ADDITIONAL GROUND-WATER AND SOIL RECONNAISSANCE SAMPLING

Additional soil and ground-water reconnaissance sampling is recommended northeast of well pair LF-5/LF-5D to further attempt to identify a potential source of VOCs in Area A and to assess the limit of affected ground-water northeast of well LF-5. Additionally, reconnaissance ground-water sampling is recommended downgradient of well LF-4 in the area between wells LF-17, LF-18 and LF-19 to better assess the downgradient extent of the VOC-affected ground-water. Approximately 15 to 20 ground-water samples will be collected using a soil-gas probe. Sampling locations will be determined in the field based upon the results of the initial samples collected. Initial sampling locations will be located approximately 300 feet northeast of well LF-5 and approximately 300 feet southwest of well LF-4, to give a preliminary estimate of the lateral extent. Ground-water samples will be collected from approximately 6 to 12 feet below grade (depending on the depth to ground water), and will be analyzed by an on-site mobile laboratory for VOCs.

Following the reconnaissance-level ground-water investigation in Area A, additional soil investigation will be conducted northeast of well LF-5 to further evaluate the presence of a source for the VOCs in Area A. The additional soil investigation will be conducted by selecting 10 to 20 soil sampling locations on an approximate 50-foot sampling grid in the area northeast of well LF-5. The locations will depend on the results of the preceding reconnaissance ground-water investigation. Soil samples will be collected using a soil probe and will be analyzed for VOCs in an on-site mobile laboratory.

2.5.2 INSTALLATION OF ADDITIONAL SHALLOW MONITORING WELLS

Levine·Fricke also recommends that additional shallow monitoring wells be installed to assess the extent of affected ground water in Area A. One additional well is proposed to be located northeast of well pair LF-5/LF-5D to assess the upgradient extent of affected ground-water. One to two wells are proposed southwest of well pair LF-4/LF-4D to assess the downgradient extent of affected ground-water. The location of these wells will be based on the results from the additional soil and ground-water reconnaissance sampling. The upgradient well will be in the area of the apparent northeastern limit of VOC-affected ground-water. Likewise, the downgradient wells will be in the area of the apparent downgradient limit of VOC-affected ground-water. The monitoring wells will be installed

to depths between approximately 20 to 25 feet below grade and screened across the shallow ground-water surface. Soil samples will be collected during installation of the wells. Soil samples will be selected for laboratory analysis based on field screening of the samples using a photoionization detector (PID). After installation, the wells will be developed and ground-water samples collected. The soil and ground-water samples will be analyzed by a state-certified laboratory for VOCs using EPA method 8010/601.

2.5.3 DEEPER GROUND-WATER MONITORING NEAR LF-4/4D

The discovery of concentrations of VOCs in the deeper well similar to concentrations detected in the shallower well LF-4 may indicate hydraulic communication between the shallower and deeper (intermediate) ground-water zones in the vicinity of LF-4 (screened from 9.5 to 19.5 feet below grade) and LF-4D (screened from 29 to 39 feet below grade). The ground-water elevation measurements for LF-4 and LF-4D were essentially the same (13.89 and 13.82 feet above mean sea level [msl], respectively, as measured on April 23, 1990), also indicating communication between the zones. Hydraulic communication between shallower and deeper zones was not apparent in measurements and analyses for wells LF-5 (screened from 10 to 25 feet below grade) and LF-5D (screened from 34 to 44 feet below grade), located approximately 280 feet northeast of LF-4/4D. VOCs were not detected in ground water collected from well LF-5D, and the ground-water elevation measurements for the well pair indicated a 1.79-foot difference in elevation between the two wells (approximately a 0.12 ft/ft upward vertical gradient).

To further evaluate the vertical extent of the VOCs detected in wells LF-4 and LF-4D, we recommend that at least one additional well be installed immediately southwest of LF-4/LF-4D to monitor the concentrations in a deeper ground-water bearing zone (greater than approximately 50 feet deep). The well will be installed using a hollow-stem auger rig or mud rotary rig and will be double-cased to prevent possible contamination of the deeper water-bearing zone during well installation.

We also recommend resampling of wells LF-5 and LF-5D to confirm the non-detected VOC analysis result obtained for a sample collected from well LF-5D in the Phase II Investigation.

2.5.4 FURTHER ASSESSMENT OF SHALLOW GROUND-WATER AS A POTENTIAL DRINKING-WATER SOURCE

To better clarify whether shallow and intermediate depth ground water at the Site is a potential drinking water source, Levine·Fricke recommends analysis of ground-water samples collected from the different ground-water bearing zones for total dissolved solids (TDS) as an indicator of background ground-water quality and to check for possible saltwater intrusion in the area. If warranted, hydraulic testing of the intermediate (30 to 40 feet depth) and possibly deeper (greater than 50 feet depth) zones may be conducted to assess whether there is adequate sustained yield of water from these units to serve as potential drinking water sources.

2.6 VOCs in the Vicinity of Well LF-10

As discussed in Section 1.3, several VOC compounds were detected (notably, up to 7.6 ppm of TCE) in well LF-10, located on the upgradient boundary of Area C. Some of the same compounds were also detected in ground-water samples from wells LF-12, LF-11, and LF-9, in a grab ground-water sample collected at C-29 (also located along the upgradient boundary of Area C), and in a grab ground-water sample collected from C15, located near the center of Area C. As noted above, based on the distribution of concentrations found and the southwesterly ground-water gradient in this area, these compounds most likely originated from an off-site source to the north.

According to Sanborn Fire Insurance maps, the area to the north of Area C was historically heavily industrialized, and hosted numerous potential users of chlorinated solvents such as plating shops, machine shops, manufacturing facilities, foundries, and battery manufacturers. Of particular note, compounds similar to those found in Area C ground-water samples have reportedly been detected at the Electro Coatings facility, a State Superfund site located approximately 450 feet to the northeast of the Area C border. According to documents contained in regulatory agency files, chromium and VOCs including TCE, tetrachloroethylene (PCE), and TCA have been detected in ground water at the Electro Coatings site (RWQCB, 1986). PCE and TCE have reportedly been detected in ground water at concentrations up to 42 and 580 ppm, respectively (Ecology & Environment, 1985). The extent of the VOC contamination in ground water has reportedly not been defined. The RWQCB has stated that the Electro Coatings Facility is the probable source of some, if not all, of the VOC contamination detected in ground water at the facility

(RWQCB, 1986). Electro Coatings reportedly filed for bankruptcy under Chapter 11 of the Federal Bankruptcy Code on May 23, 1986 (Electro Coatings, Inc., 1986). The Electro Coatings site is presently on the DHS Expenditure Plan list of backlog sites. Evidently no further action has been taken to define the extent of VOC contamination in ground water in the vicinity of Electro Coatings, or to remediate affected ground water.

Based on this information, the Electro Coatings facility appears to be a likely source for the VOCs found in ground water in Area C of the Yerba Buena site. According to Ms. Janet Naito of the DHS, the RWQCB is now the lead agency for the Electro Coatings site. Further investigation of ground-water quality upgradient of the Yerba Buena Site would be required to confirm that Electro Coatings is the source of the VOCs detected in ground water in Area C.

3.0 WASTE CHARACTERIZATION

To assess remedial options for the elevated concentrations of lead, zinc, and petroleum hydrocarbons detected in soils at the Site, it is necessary to consider the soils in relation to Federal and State regulatory standards. The current Federal and State policies for classifying lead- and petroleum-affected soils are discussed below. Since elevated zinc concentrations were found with elevated lead concentrations, classification of the lead-affected soils will be the driving factor for remediation of areas affected by zinc. It should be noted that these waste characterizations are developed to determine how soil should be disposed, and not related to clean-up levels. Clean-up levels for the affected soils would be determined based on regulatory requirements and/or risk to human health and the environment.

3.1 Lead

At the Federal level, lead-containing wastes are classified as hazardous waste under the Resource Conservation and Recovery Act (RCRA) if the wastes are from specified sources or if the concentration of lead measured using the Toxicity Characteristic Leaching Procedure (TCLP) equals or exceeds 5.0 mg/l. The TCLP replaced the Extraction Procedure Toxicity (EP Tox) Test effective September 25, 1990; the threshold concentration remained the same, at 5.0 mg/l. If the specific sources of the lead in the soil at the Site are unknown, the classification would be based on the results of the TCLP tests.

Lead-containing wastes are classified as hazardous under California regulations (Title 22, California Code of Regulations [CCR], Section 66699) if the total concentration of lead exceeds the TTLC value of 1,000 mg/kg, or if the "leachable" portion of the lead, as measured by the Waste Extraction Test (WET), exceeds the Soluble Threshold Limit Concentration (STLC) value of 5.0 mg/l. Soils which do not contain lead in hazardous concentrations, but which have the potential to degrade waters of the state, are considered designated wastes by Title 23, CCR, Section 2522.

TCLP and WET analyses of soil samples obtained from the Site may become necessary if contaminated soil is to be excavated and disposed off-site. Such data will provide an indication of the soil classification, and how soils excavated from the Site may be disposed of. Again, it should be noted that the TCLP and WET analyses are not related to site cleanup levels, and that specific cleanup levels would be determined based on an assessment of risk to human health and the environment and/or regulatory agency requirements.

Various requirements are triggered by the presence of materials classified as Federal or State hazardous wastes. The land disposal restrictions (LDRs) are of primary concern in identifying remedial options for the lead-affected soils at the Site. The U.S. Environmental Protection Agency (EPA) LDRs took effect on August 8, 1990 for RCRA hazardous waste containing lead. Disposal of these RCRA hazardous wastes is no longer allowed unless treatment, which results in a lead concentration of less than 5.0 mg/l as measured by the TCLP or EP Tox test, is conducted.

The EPA LDRs only apply to RCRA hazardous wastes if placement of those wastes occurs. Placement occurs when the wastes are removed from their current location and redeposited in another unit (i.e., a treatment container or a disposal facility). Placement does not occur when the wastes are treated in situ, capped in place, or consolidated within the existing contaminated area.

The Department of Health Services (DHS) LDRs also apply to State (non-RCRA) hazardous waste if placement occurs. The DHS LDRs have been developed for generic categories of waste; the lead-containing soils which are DHS (non-RCRA) hazardous wastes would be included in the category of solids with metals. The LDRs for this category will be effective on May 8, 1992. After that date, disposal of these hazardous

wastes with lead concentrations in excess of treatment standards will not be allowed unless treatment occurs or a variance or exemption is achieved.

The possible presence of designated wastes triggers requirements set by the RWQCB. Requirements for addressing these wastes on site are typically set on a case-by-case basis.

Based on the concentrations of lead observed in the Phase I and II investigations, it is possible that some portions of the lead-affected soils will be within each of the three categories discussed above: RCRA hazardous waste (based on source or TCLP), State (non-RCRA) hazardous waste (based on the WET), and designated wastes.

3.2 Petroleum Hydrocarbons

Petroleum hydrocarbons in soil are considered hazardous under Federal and State regulations if the waste exhibits certain characteristics related to toxicity, ignitability, and reactivity. Based on the concentrations and the nature of the hydrocarbons identified in the Phase I Investigation, the soils containing petroleum hydrocarbons would not be expected to exhibit these characteristics, and, therefore, would not be hazardous wastes under Federal or State laws.

The soils containing petroleum hydrocarbons may be considered designated wastes by the RWQCB.

4.0 OPTIONS FOR SITE REMEDIATION

4.1 Lead- and Zinc-Affected Soils

The estimated volume of soil affected by lead at concentrations greater than 1,000 ppm at the Site is approximately 200 to 11,000 cubic yards. Elevated concentrations of zinc (>5,000 ppm) were detected in an apparently limited area (approximately 20 feet by 20 feet). Soils in this area were also affected by elevated concentrations of lead. The remedial efforts for these soils will likely be driven by the presence of lead, and the volume estimate given above for lead-affected soils includes the estimated volume of soil affected by both lead and zinc. (This estimate assumes a clean-up level for lead of 1,000 ppm and for zinc of 5,000 ppm; actual clean-up levels will require agency review and approval). Additional soil sampling in the vicinity of Phase I and II sampling locations in Area A with

significant lead concentrations (greater than 500 ppm) will be performed to better assess the final volume of affected soil to be remediated. The lead- and zinc-affected area in Area C appears to be adequately defined and is of apparently limited extent (approximately 20 feet by 20 feet laterally and less than 3 feet in depth). Figures 1 and 2 illustrate the approximate estimated boundaries of the affected areas based on analyses performed to date in Areas A and C, respectively.

The following remedial options apply to the various classifications of lead-affected soils.

- Excavation and removal of soils containing lead above agency-approved cleanup concentrations but below RCRA LDR concentrations, and disposal of the soils in an off-site, permitted landfill (Option 1)
- Excavation and removal of lead-affected soils, off-site treatment (stabilization) of the soils, and disposal of the treated product in an off-site permitted landfill (Option 2)
- On-site geotechnical containment of the affected soils through capping, using building foundations, paved surfaces and/or landscaping (Option 3)
- Excavation of lead-affected soils, on-site treatment (stabilization) of the soils, and disposal of the treated soils in an off-site, permitted landfill (Option 4)
- Excavation of lead-affected soils, on-site treatment (stabilization) of the soils, and disposal of treated soils on site (Option 5)

Because of either the high cost or extended time frame requirements, Options 4 and 5 are considered to be less feasible alternatives for the Site, based upon our current understanding of development plans. Options 1 through 3 are discussed in greater detail below. A combination of these options may be used, depending on the extractable lead concentrations in soil, and thus soil classifications, found at the Site.

4.1.1 OPTION 1: EXCAVATION AND DISPOSAL OF UNTREATED SOIL

This remedial option would involve excavating lead-affected soils and disposing of the soils in an off-site, permitted landfill without prior treatment. This option would apply to

soils with concentrations above the approved cleanup levels but below RCRA LDR criteria (i.e., soils with extract lead concentrations of less than 5.0 mg/l as measured by the TCLP test), assuming that the lead did not result from a RCRA listed source. Acceptable cleanup levels may be based on the EPA's interim guidelines of 500 to 1,000 ppm; however, these levels may vary significantly depending on the approving agency and the future use of the Site. This option would involve the following steps.

Steps

- The volume of affected soil would have to be further evaluated through additional soil sampling and analysis.
- Samples of the affected soil would be submitted to the landfill for analysis, and the landfill would accept or reject the waste based on the analytical results. If the TCLP results for lead are below 5.0 mg/l, treatment of lead prior to disposal would not be required. If the lead concentrations are greater than 5.0 mg/l, treatment prior to disposal would be required (see Option 2). Soils which do not contain lead in excess of either the Federal and State hazardous threshold levels may possibly be disposed of in a Class 2 or Class 3 landfill if they meet the applicable criteria.
- A work plan and an accompanying health and safety plan describing the proposed remediation would have to be prepared for the lead agency. The work plan would contain proposed cleanup levels for the Site. The overseeing regulatory agencies would approve both plans prior to soil excavation.
- Soils which require Class 1 (hazardous waste site) disposal (for lead) would be excavated and transported to an off-site, permitted landfill.
- Confirmatory sampling would be required following excavation to document that the approved cleanup levels were attained at the Site, and that no additional soil excavation would be required.

Evaluation

This option would reduce potential risks to human health or the environment at the Site by removing unacceptable concentrations of lead from the Site. Short-term hazards and nuisances would be generated during excavation and transport

of the soils (e.g., dust, noise, increased traffic), which would require mitigation. Removing affected soils from the Site would also reduce potential on-site generator liability associated with lead in soils, and reduce or eliminate restrictions on site development, depending upon the selected cleanup levels.

The estimated costs for this option would be substantially less than those for excavation and treatment of affected soils (Option 2), but may be more than for on-site containment (Option 3).

4.1.2 OPTION 2: EXCAVATION, TREATMENT AT AN OFF-SITE, PERMITTED HAZARDOUS WASTE TREATMENT FACILITY, AND DISPOSAL

If excavation and disposal is chosen as the preferred remedial option for soils which exceed the TCLP concentration of 5 mg/l of lead, treatment prior to disposal would be required.

Steps

Option 2 effectively involves the same steps as Option 1, with the exception that the lead-affected soils would be treated at an off-site RCRA-permitted hazardous waste treatment facility, such as USPCI in Utah, and disposed of in an appropriate landfill. USPCI uses a stabilization procedure to reduce leaching of lead from solid wastes. A treatability study would be performed prior to stabilization to evaluate whether the wastes can be treated to effectively meet the RCRA LDR treatment standard of 5 mg/l. Once wastes are treated, we understand that it is USPCI's policy to dispose of the stabilized wastes in its RCRA-approved waste disposal cells, which are engineered to isolate the wastes and prevent future leaching of waste constituents.

Evaluation

As with Option 1, this option would reduce potential risks to human health or the environment at the Site by removing unacceptable concentrations of lead from the Site. In addition, this option would minimize potential environmental threats at the disposal location by greatly reducing the mobility, and thus the potential for migration, of the lead in affected soils. Removing affected soils from the Site and stabilizing lead-affected soils prior to disposal would also reduce potential on-site and off-site generator liability, and reduce or eliminate restrictions on site development (again, depending upon the selected cleanup levels). As with Option

1, short-term hazards and nuisances would be generated during excavation and transport of the soils (e.g., dust, noise, increased traffic), which would require mitigation.

This option would be considerably more expensive than disposal without treatment. Given the costs involved, minimizing the amount of soils that would require treatment would be essential. More refined sampling and analysis could be conducted to more accurately estimate the volume of soils requiring treatment, and to segregate soils requiring treatment from less-affected soils.

4.1.3 OPTION 3: ON-SITE GEOTECHNICAL CONTAINMENT

A third remedial option would be to contain lead-affected soils by capping them under building foundations, pavement or landscaping. This option would be most appropriate for soils that are not classified as either State or Federal hazardous wastes. For soils classified as hazardous wastes, on-site disposal would require a deed restriction and long-term ground-water monitoring, at a minimum, and possibly other regulatory conditions.

Steps

As with Option 1 further evaluation of the volume of affected soil would be required. Depending upon development plans, some excavation of affected soils and their relocation to areas that will be appropriately capped may be required under this option. In this case, confirmatory sampling would be required.

Containment would involve covering the affected soils with barriers such as low-permeability soils, pavement, or buildings. Since data from the Phase I investigation indicate that ground-water quality has not been affected by lead in on-site soils, capping should be sufficient to mitigate the possibility that such impacts could occur in the future. However, the regulatory agencies will likely require extended ground-water monitoring under this option to document that no impact to ground-water quality is occurring. Additional ground-water monitoring wells would likely be required for this purpose.

Evaluation

This option would effectively reduce or eliminate exposure pathways with respect to lead-affected soils, thereby minimizing threats to human health or the environment. It would be relatively simple to implement, and would generate fewer potential short-term hazards or nuisance conditions than Options 1 or 2. The main disadvantage of this approach is that if affected soils remain on site, some potential for on-site exposure to these soils or migration of lead to ground water would exist. Controls on the area used for containment, such as a deed restriction, would be required to prevent future disturbance of the contained soils, and to notify future site occupants of their presence.

If hazardous concentrations of soils were to be contained on-site, extensive review and negotiations with regulatory agencies would be involved. It is unlikely that this option could be approved for soils with high soluble lead concentrations.

If residential development is constructed over affected areas, the developer/owner of the Site would risk some potential future liability for actual or perceived human health risks associated with the presence of the affected soils. Actual risks are derived primarily from future excavation of capped areas and can be mitigated through deed restrictions; perceived risks are due to the presence of the material. This would not be a significant issue if affected areas were not used for residential development or similarly sensitive uses.

Another disadvantage of this option is that it would be necessary to develop strict health and safety procedures to be followed during site development to mitigate exposure to site workers and nearby residents.

Finally, if residential or other sensitive uses are planned for the portion of the Site affected with lead, Catellus may be obligated under California law to apply to the DHS for a determination as to whether the Site is a Hazardous Waste Property. The process for DHS review of such an application is lengthy (three to six months) and may require submittal of additional data.

This option would likely be the least expensive of the three remedial options.

4.1.4 RECOMMENDATIONS

Based on our current understanding of development plans for the Site and our preliminary estimates of the volume of affected soils, we recommend the use of Option 1 (excavation and disposal of untreated soil) for lead-affected soils which are not classified as RCRA wastes (i.e., which do not exceed the extraction test criteria of 5 mg/l), and the use of Option 2 (excavation, off-site treatment, and off-site disposal) for soils which meet the RCRA waste criteria. Option 3 may be considered if the volume of affected soils is greater than anticipated.

4.2 Petroleum-Affected Soils

Elevated concentrations (above 1,000 ppm) of petroleum-affected soils were found in the vicinity of borings C19, A13, A22, B7 and well LF-5. Additional investigation needs to be conducted to estimate the approximate volume of oil-affected soils. Based upon existing data, the volume of oil-affected soil could range between 2,000 and as much as 71,000 cubic yards.

These soils will most likely be considered designated wastes and the remediation would be expected to include RWQCB involvement and approval. Options for remediating petroleum-affected soils include the following.

- Off-site disposal (Option 1)
- On-site biotreatment (Option 2)
- Geotechnical containment (Option 3).

These options are discussed in detail below. For any of these options, a work plan would be prepared and presented to the Alameda County Environmental Health Department and/or the RWQCB for review before remedial activities begin.

Site-specific cleanup levels for TPH as oil will need to be established and approved by the regulatory agencies. Soils containing concentrations of TPH as oil below 1,000 ppm may be allowed to remain on-site, depending upon intended site use and their potential to impact ground water. The RWQCB requires a permit for leaving petroleum-contaminated soil on-site, and containment and ground-water monitoring, at least, would likely be required.

4.2.1 OPTION 1: EXCAVATION AND OFF-SITE DISPOSAL

One option for remediation of petroleum-affected soil is excavation and off-site disposal. It is likely that this option will be more costly than excavation, biotreatment and on-site disposal, yet, it could be accomplished in a shorter time frame.

Confirmatory sampling and analysis would be required following soil excavation to document the effectiveness of removal. Ground-water monitoring may be required in areas where TPH was found in deeper soils to assess the impacts on ground-water quality.

4.2.2 OPTION 2: EXCAVATION AND ON-SITE BIOTREATMENT

A second option for remediation of petroleum-affected soils is excavation of soil with TPH concentrations exceeding approved cleanup levels (assumed at this time to be 1,000 ppm) and on-site biotreatment to reduce the concentrations to below levels of concern. Initial biotreatability studies would be necessary to evaluate the feasibility of this option at the Site. Once treated, the soils potentially may be used as fill materials at the Site, or alternatively can be disposed of in a Class 3 landfill. This option would particularly apply in areas where elevated concentrations of TPH were found in soils at depths of 2 feet or greater (sampling locations C13, A4 and A21). Because of the proximity to ground water in these locations, excavation of the affected soils may be required. As with Option 1, confirmatory sampling and analysis would be required following excavation.

Biotreatment of the TPH-affected soils would take approximately six months to complete. To reduce potential interference with development, treatment could be located in an area of the Site that is slated for later development.

4.2.3 OPTION 3: GEOTECHNICAL CONTAINMENT

As with lead-affected soils, petroleum-affected near-surface soils can potentially be contained under building foundations, asphalt paving or landscaping. Although generally applied cleanup levels are not available from the California State regulatory agencies, at a minimum, areas with concentrations of petroleum compounds at or exceeding 1,000 ppm would likely require containment. Further definition of the lateral extent of soils having concentrations at or above the cleanup level would be required to allow for effective containment. In addition, periodic ground-water monitoring may be required

(i.e., on a quarterly, semi-annual, or annual basis) to document that the soils are not impacting ground-water quality.

4.3 Erosion Control

To address potential concerns regarding the impacts of chemical-affected soils on surface water quality through soil erosion, we recommend incorporating measures into the site development plan to minimize surface soil erosion for all areas containing elevated concentrations of lead, zinc, TPH, and PCBs in surface soils that are not otherwise remediated. Such measures could include covering affected areas with soil, paving, or buildings.

Soils underlying landscaped areas within the completed commercial development with residual concentrations of lead, zinc, TPH, and PCBs below their respective cleanup levels should pose minimal health and environmental risks if capped with a minimum of one foot of soil covering. Similar soils underlying building footprints and paved areas should not present a public or environmental health risk.

5.0 RECOMMENDATIONS FOR GROUND-WATER MONITORING

We recommend quarterly monitoring for a period of at least one year of shallow ground-water in up-gradient well LF-10 to monitor changes in the concentrations of VOCs detected in ground water in this area. Modifications to the quarterly monitoring program for this well may occur after a source and responsible party for the VOCs detected in this area have been identified.

A program to monitor the VOCs in Area A will be proposed after re-sampling and further investigation of the LF-4/LF-5 area.

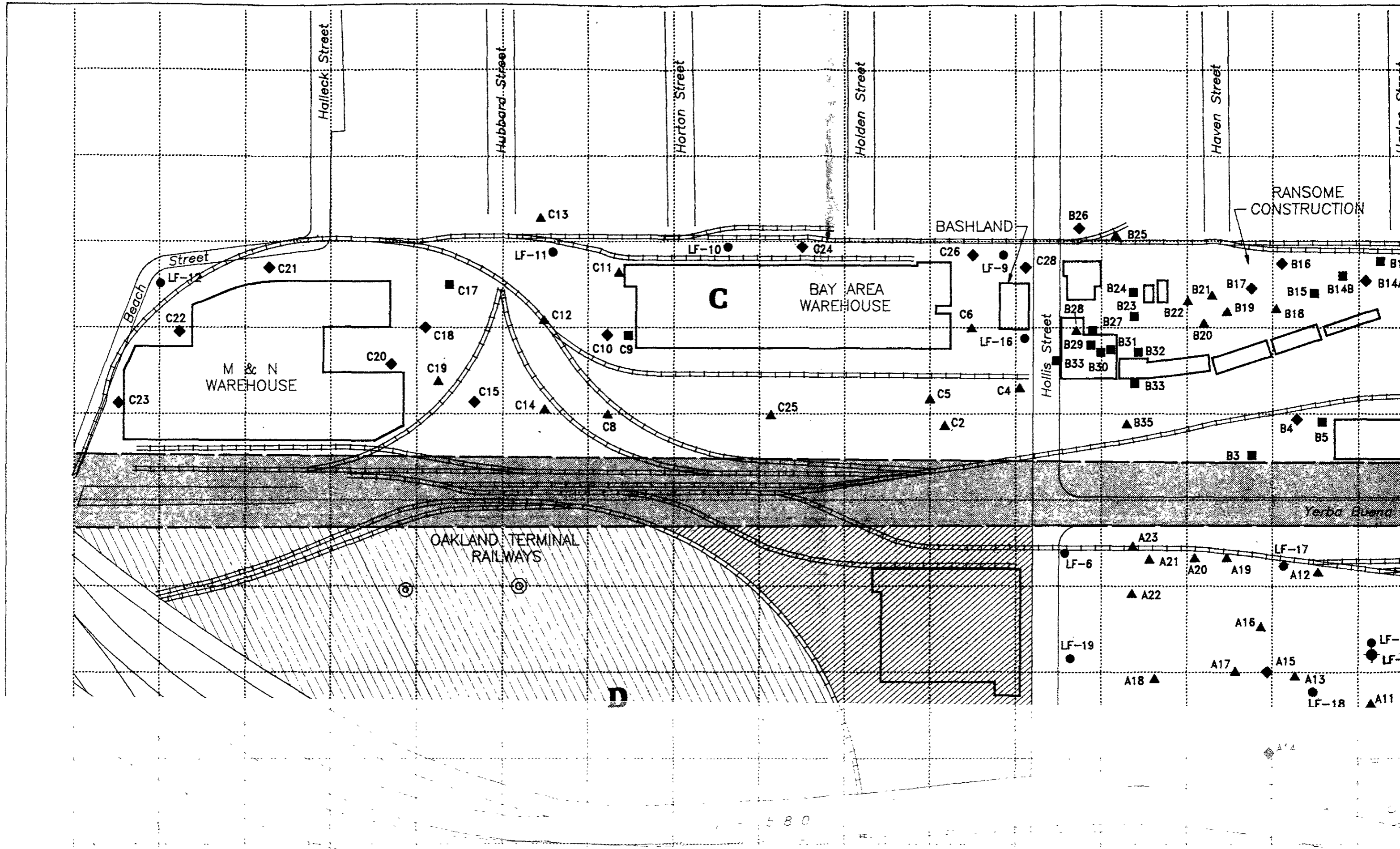
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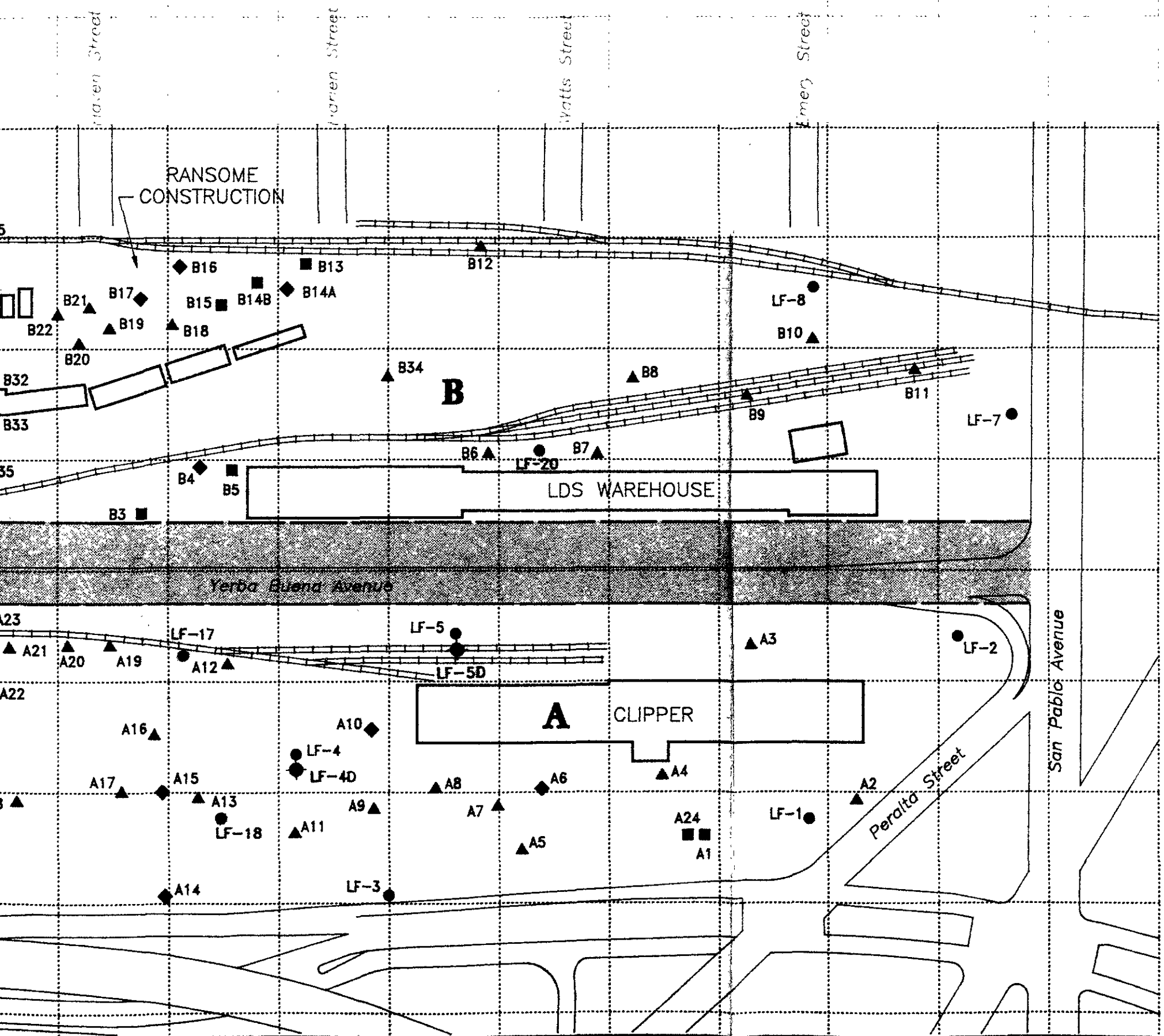
Ecology & Environment, 1985. FIT Site Inspection Report, Electro Coatings, Inc., by Steve Wisbaum, Ecology & Environment, June 1985. Prepared for the U.S. EPA.

Electro Coatings, Inc., 1986. Letter from Kathleen U. Poling, Electro Coatings, Inc. to Michael Amman, RWQCB, June 18, 1986.

Levine·Fricke, 1990. Phase I and II Environmental Investigation, Yerba Buena Project Site, Emeryville, California, August 15, 1990.

RWQCB, 1986. Letter from Donald D. Dalke, RWQCB, to Kathleen Poling, Electro Coatings, Inc., April 8, 1986.





EXPLANATION

- SHALLOW MONITORING WELL (<25 FT)
- ◆ DEEP MONITORING WELL (35-45 FEET)
- ▲ PHASE I INVESTIGATION SHALLOW SOIL SAMPLING LOCATION (LESS THAN 5 FEET)
- PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (8 TO 18 FEET)
- ◆ PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (13 TO 18 FEET) AND GRAB GROUND-WATER SAMPLE LOCATION
- ▨ NON-ACCESSIBLE AREA
- ▩ YERBA BUENA RIGHT-OF-WAY
- ▧ OAKLAND TERMINAL RAILWAYS (NOT INCLUDED IN THIS INVESTIGATION)

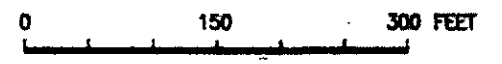
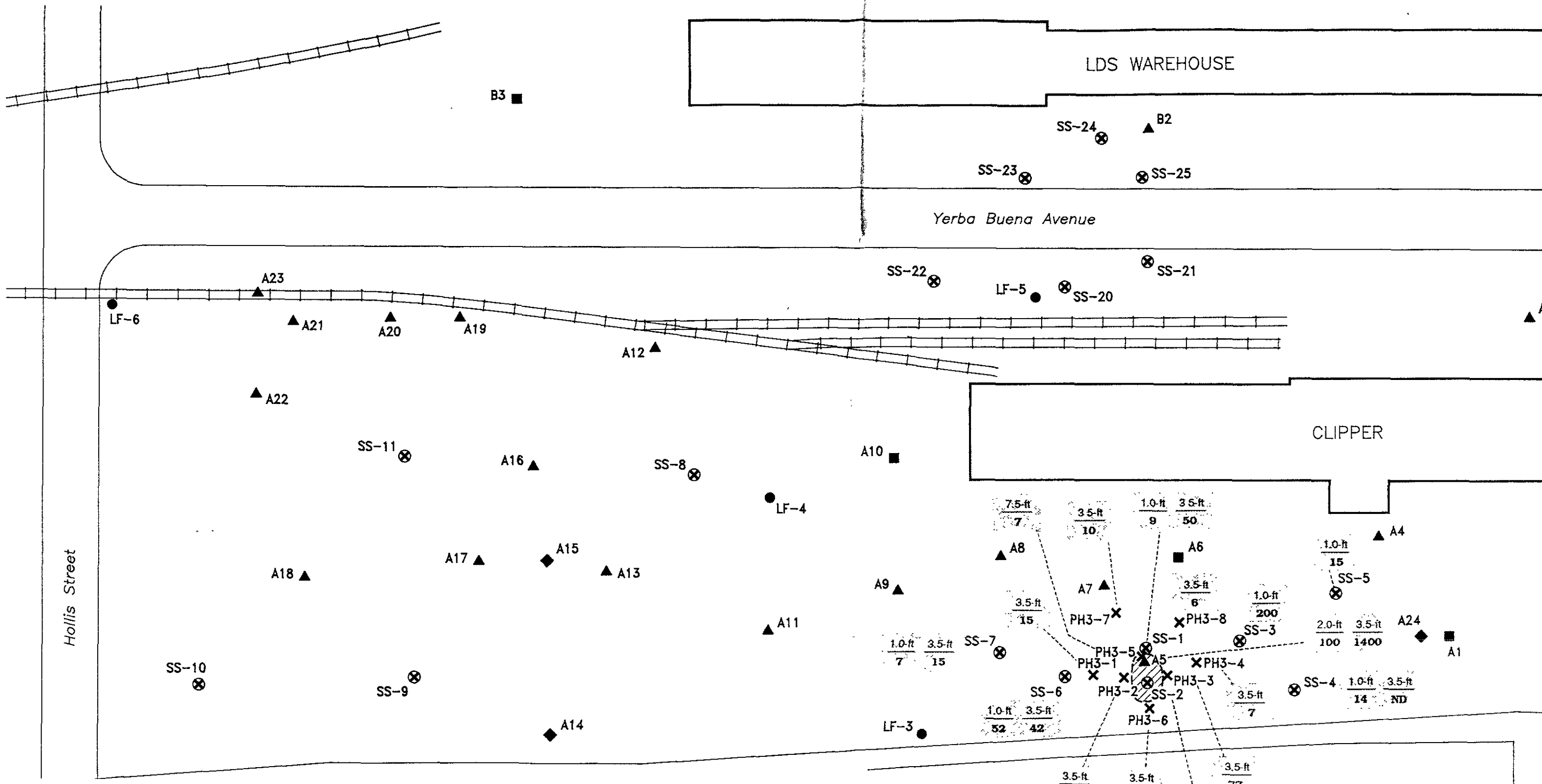


Figure 1 :
SITE PLAN SHOWING PHASE I
INVESTIGATION SAMPLING LOCATIONS
YERBA BUENA SITE

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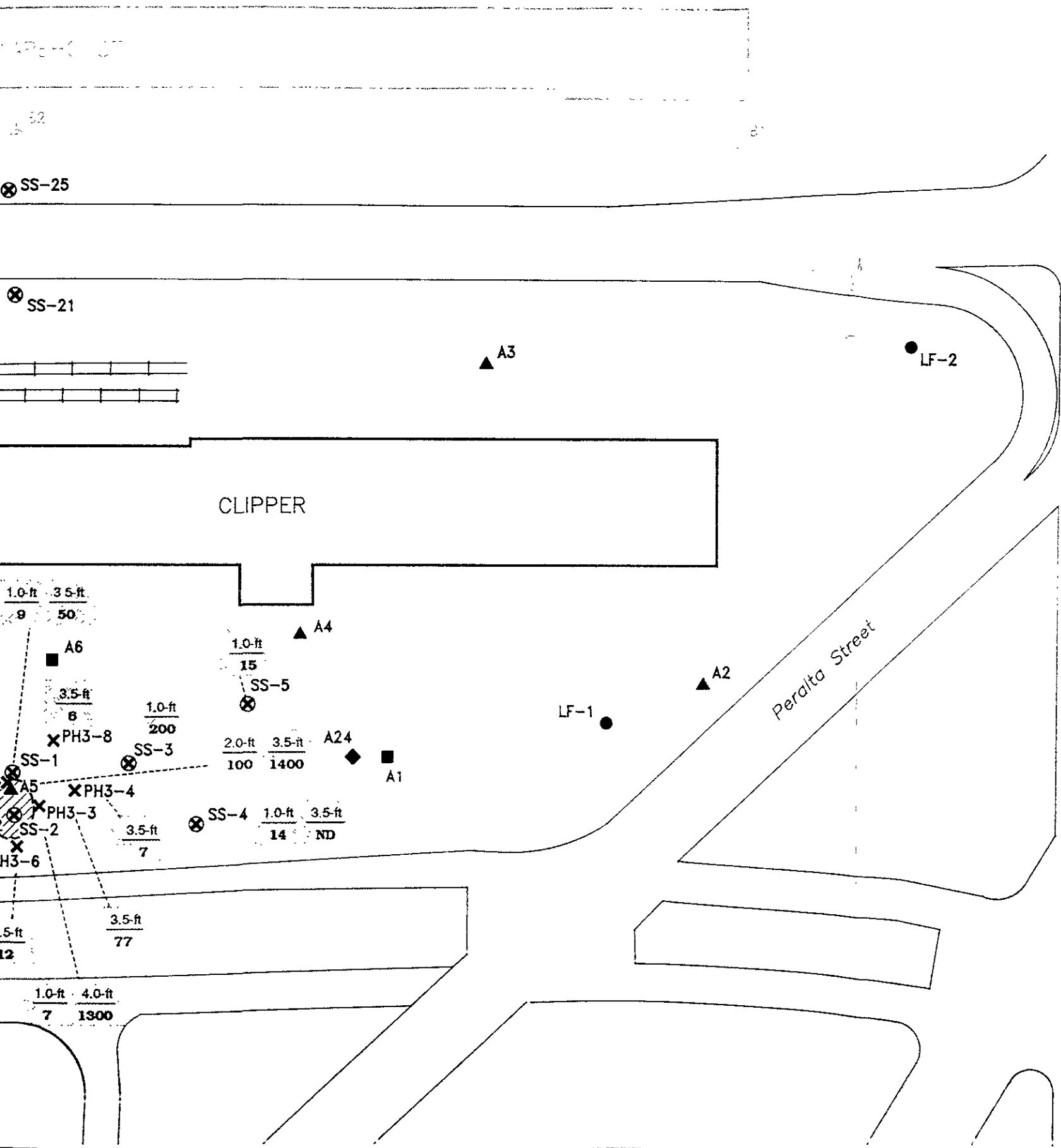


LDS WAREHOUSE

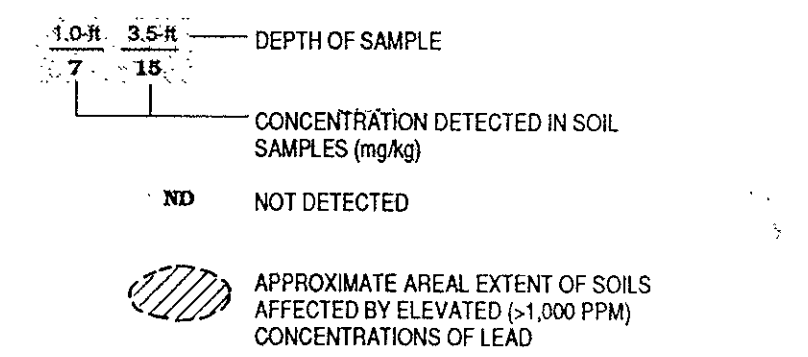
Yerba Buena Avenue

Hollis Street

CLIPPER



- SAMPLING LOCATION (LESS THAN 5 FEET)
- PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (6 TO 18 FEET)
- ◆ PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (13 TO 18 FEET) AND GRAB GROUND-WATER SAMPLE LOCATION
- ⊗ PHASE II INVESTIGATION SOIL SAMPLING LOCATION FOR LEAD ANALYSIS
- ⊗ PHASE III INVESTIGATION LOCATION FOR LEAD ANALYSIS



- NOTES:
- 1) SAMPLE RESULTS PRESENTED FOR LOCATION A5 WERE COLLECTED DURING PHASE I OF THE INVESTIGATION.
 - 2) PHASE III LOCATION PH3-5 IS LOCATED ADJACENT (WITHIN 5 FEET) OF PHASE I LOCATION A5.

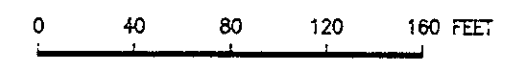


Figure 2 :
LEAD DETECTED IN SHALLOW SOIL SAMPLES (mg/kg) NEAR LOCATION A5 AND APPROXIMATE EXTENT OF LEAD-AFFECTED SOILS

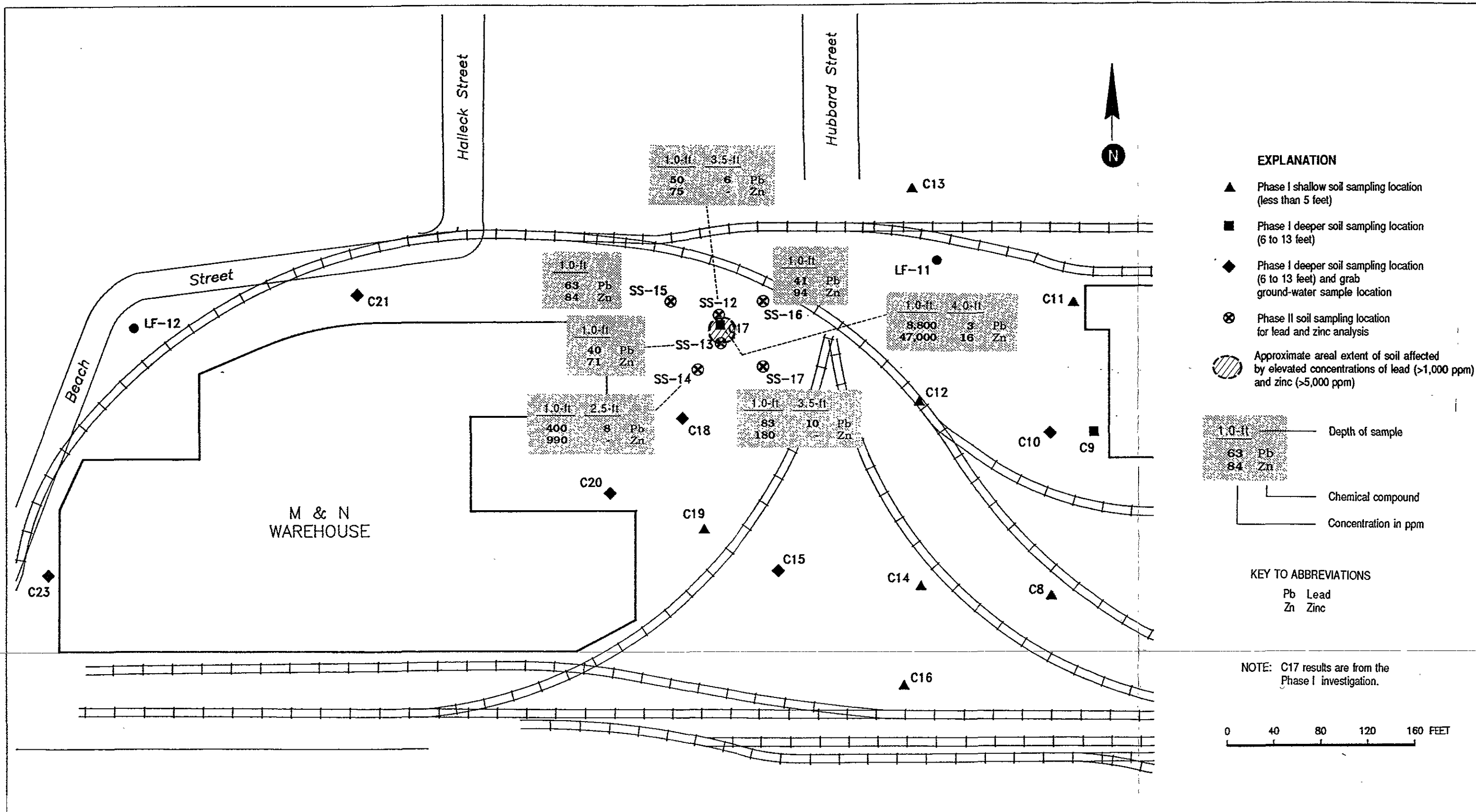
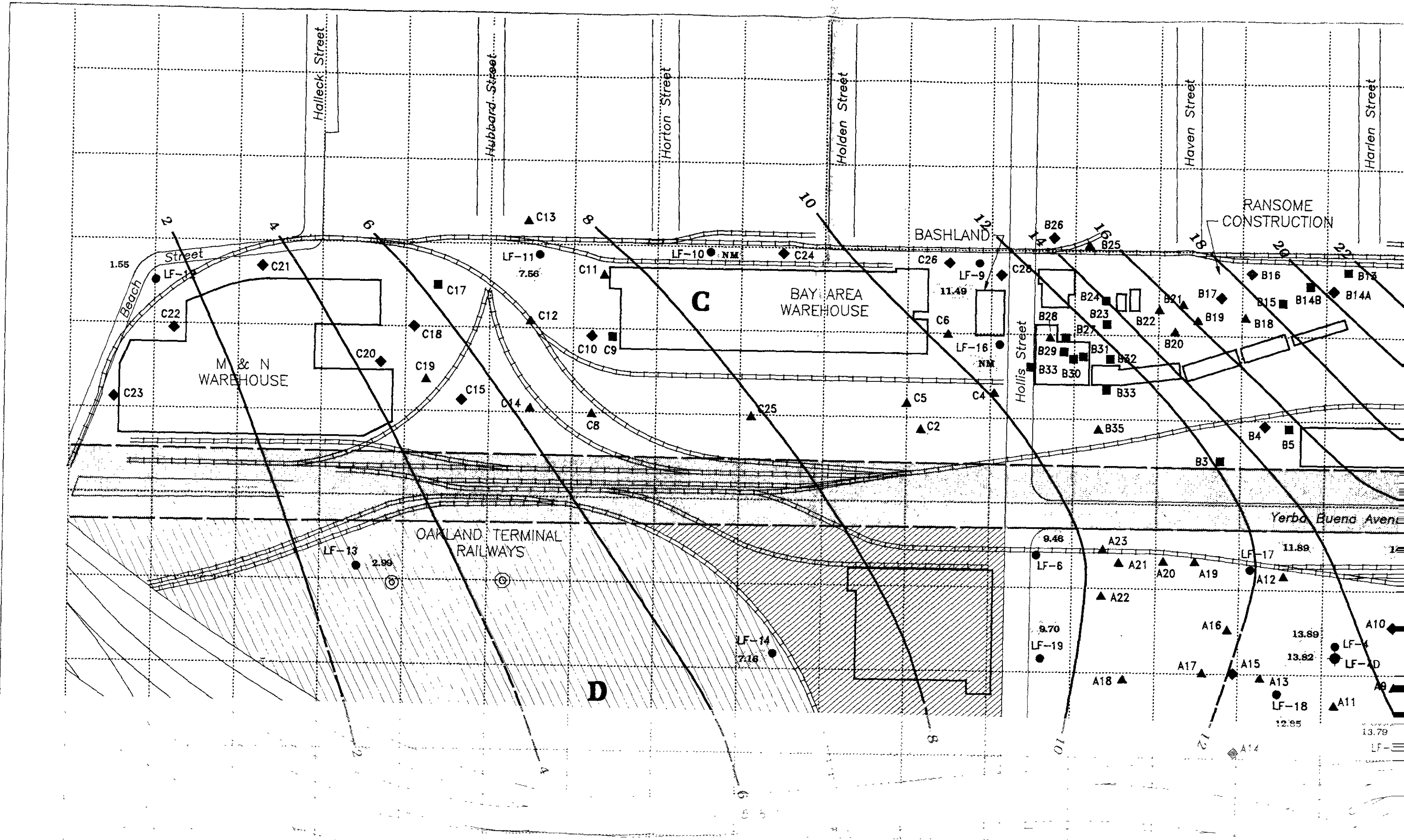
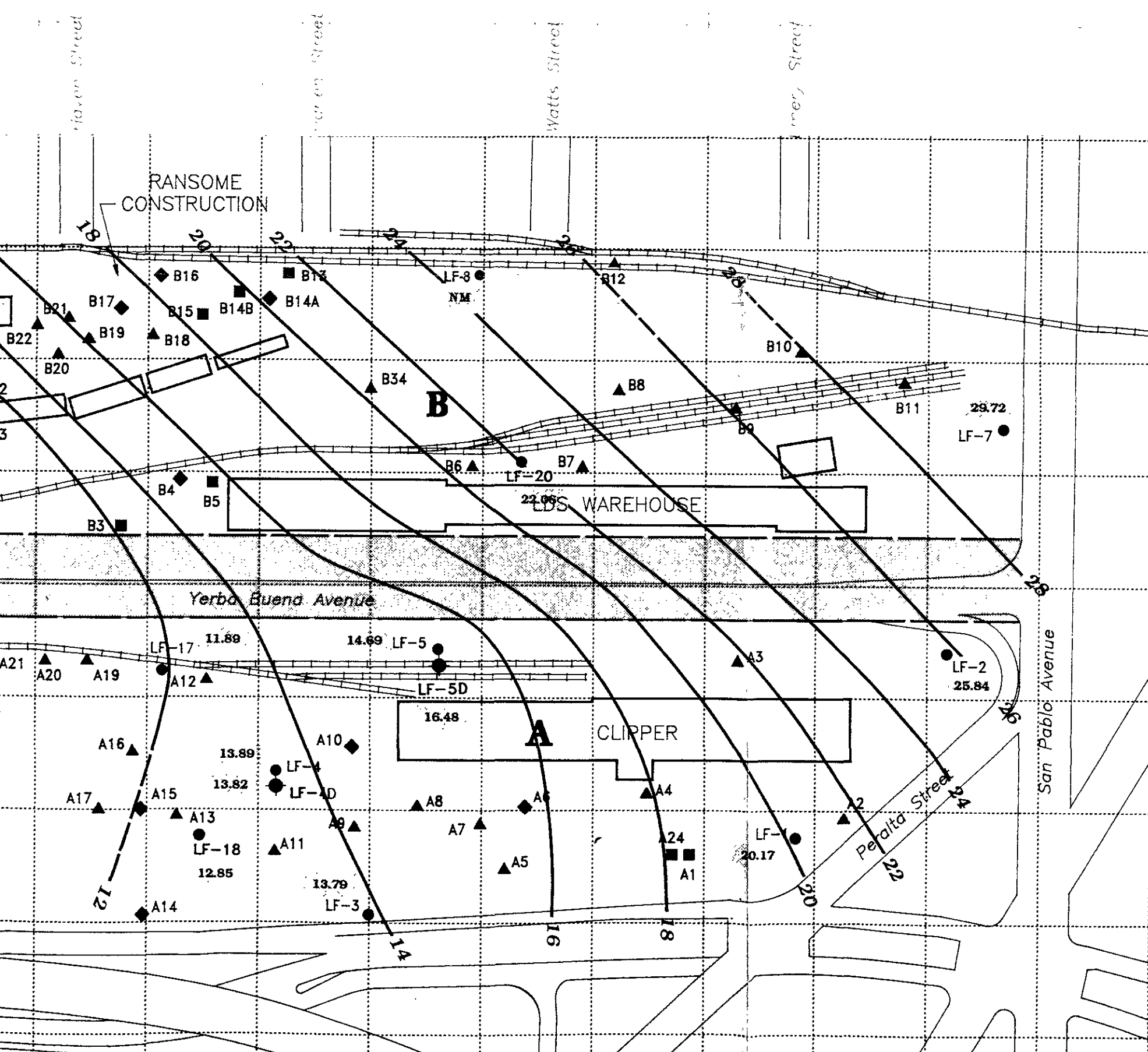


Figure 3 :
APPROXIMATE EXTENT OF SOIL
AFFECTED BY LEAD AND ZINC
IN AREA C





EXPLANATION

- SHALLOW MONITORING WELL (<25 FT)
- ◆ DEEP MONITORING WELL (35-45 FEET)
- ▲ PHASE I INVESTIGATION SHALLOW SOIL SAMPLING LOCATION (LESS THAN 5 FEET)
- PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (6 TO 18 FEET)
- ◆ PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (13 TO 18 FEET) AND GRAB GROUND-WATER SAMPLE LOCATION
- NON-ACCESSIBLE AREA
- YERBA BUENA RIGHT-OF-WAY
- OAKLAND TERMINAL RAILWAYS (NOT INCLUDED IN THIS INVESTIGATION)
- 20.85 GROUND-WATER ELEVATION
- 6 WATER TABLE CONTOURS (DASHED WHERE INFERRED)
- NM NOT MEASURED

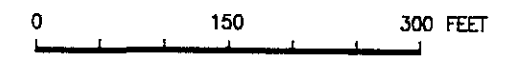


Figure 9:
GROUND-WATER ELEVATION CONTOURS
 APRIL 23, 1990

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AS/BD

LF-20 ● ND

LDS WAREHOUSE

B3 ■

GW-10 ND

B2 ▲

GW-4

Yerba Buena Avenue

0.001 1,1-DCA
0.161 1,1-DCE
0.049 1,1,1-TCA

0.014 1,1-DCA
0.73 1,1-DCE
0.270 1,1,1-TCA

LF-5
LF-5D

ND

GW-3

0.001 1,1-DCA
0.009 1,1-DCE
0.003 1,1,1-TCA

GW-21

0.001 1,1-DCE

0.008 1,1-DCA
0.490 1,1-DCE
0.082 1,1,1-TCA

0.003 1,1-DCE
0.00005 1,1,1-TCA

CLIPPER

0.006 1,1-DCA
0.150 1,1-DCE
0.094 1,1,1-TCA

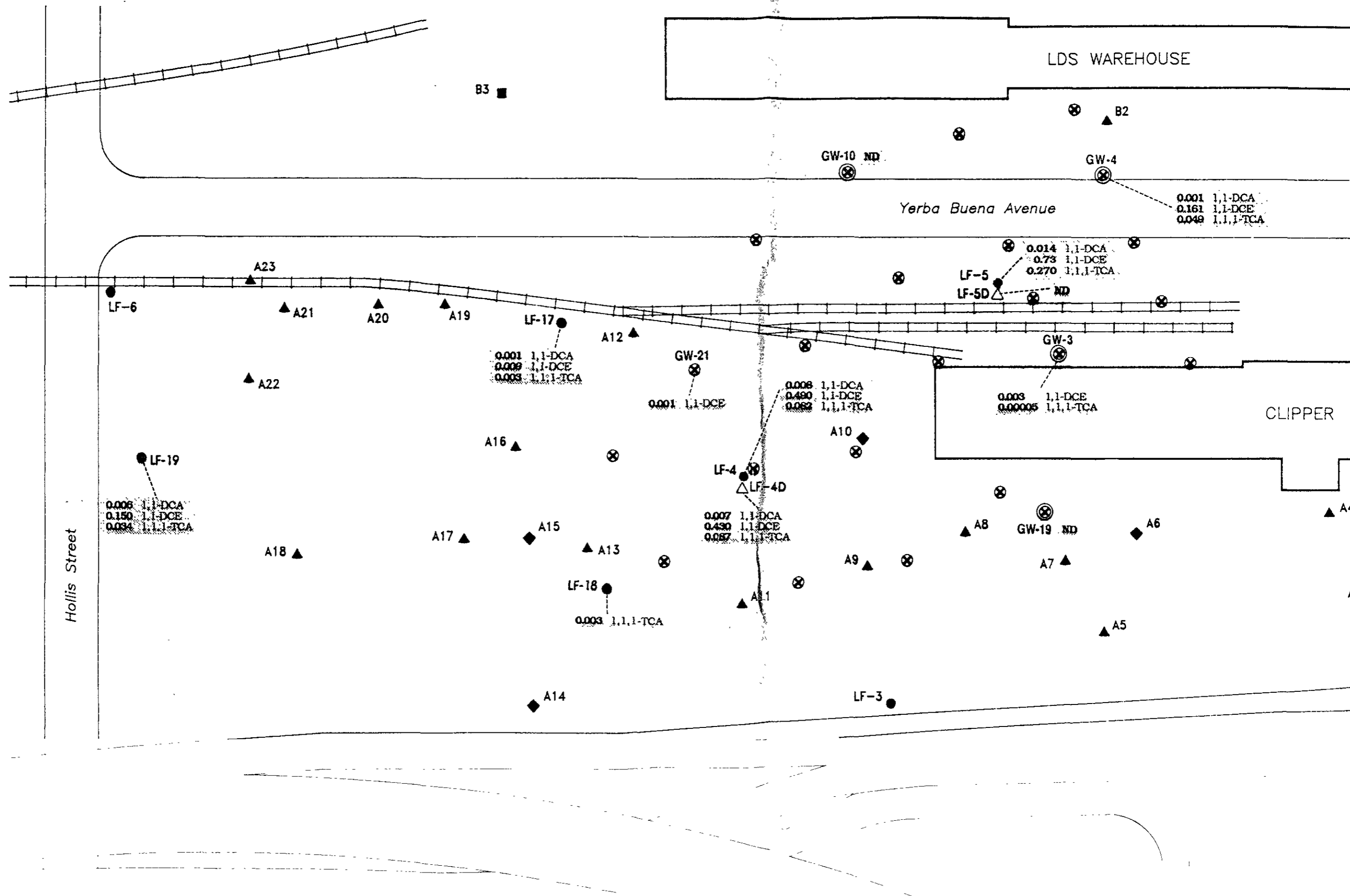
Hollis Street

0.007 1,1-DCA
0.430 1,1-DCE
0.087 1,1,1-TCA

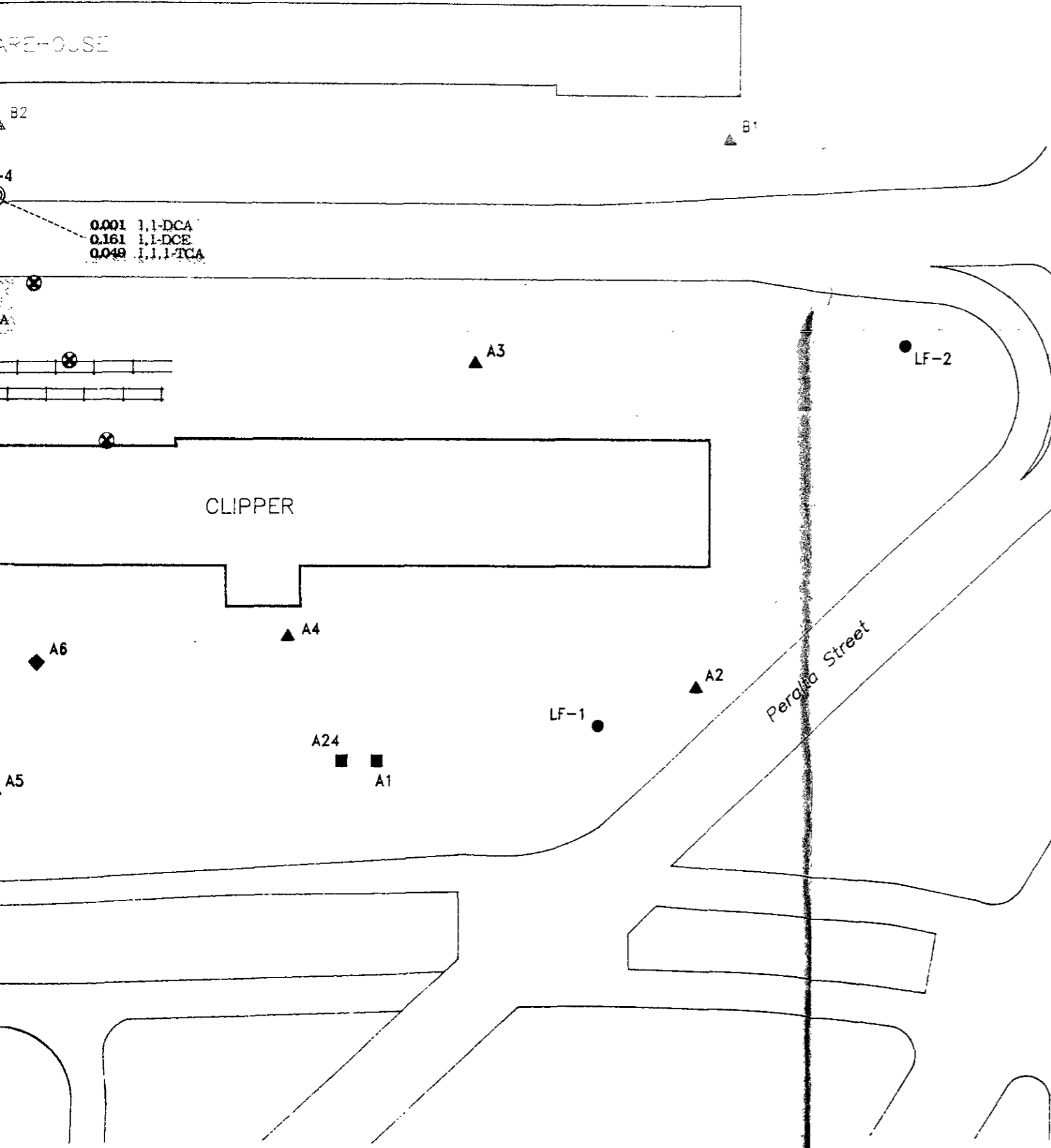
GW-19 ND

0.003 1,1,1-TCA

LF-3 ●



LF-20 ND



EXPLANATION

- SHALLOW (LESS THAN 25 FEET) MONITORING WELL LOCATION
- △ DEEPER (35 TO 45 FEET) MONITORING WELL LOCATION
- ▲ PHASE I INVESTIGATION SHALLOW SOIL SAMPLING LOCATION (LESS THAN 5 FEET)
- PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (6 TO 18 FEET)
- ◆ PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (13 TO 18 FEET) AND GRAB GROUND-WATER SAMPLE LOCATION
- ⊗ SOIL-GAS SAMPLING LOCATION
- ⊕ SHALLOW GROUNDWATER RECONNAISSANCE SAMPLING LOCATION

0.006 1,1-DCA
0.720 1,1-DCE
0.025 1,1,1-TCA

1,1-DICHLOROETHANE
1,1-DICHLOROETHENE
1,1,1-TRICHLOROETHENE

CHEMICAL COMPOUND
CONCENTRATION DETECTED IN GROUND-WATER SAMPLES (PPM)

ND NOT DETECTED

- NOTE:
1. MONITORING WELL SAMPLES WERE SUBMITTED TO MED-TOX ASSOCIATES FOR VOLATILE ORGANIC COMPOUNDS ANALYSIS USING EPA METHOD 8010.
 2. RESULTS INDICATED FOR WELLS LF-4 AND LF-5 ARE FROM THE PHASE I INVESTIGATION.

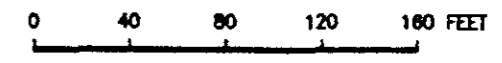
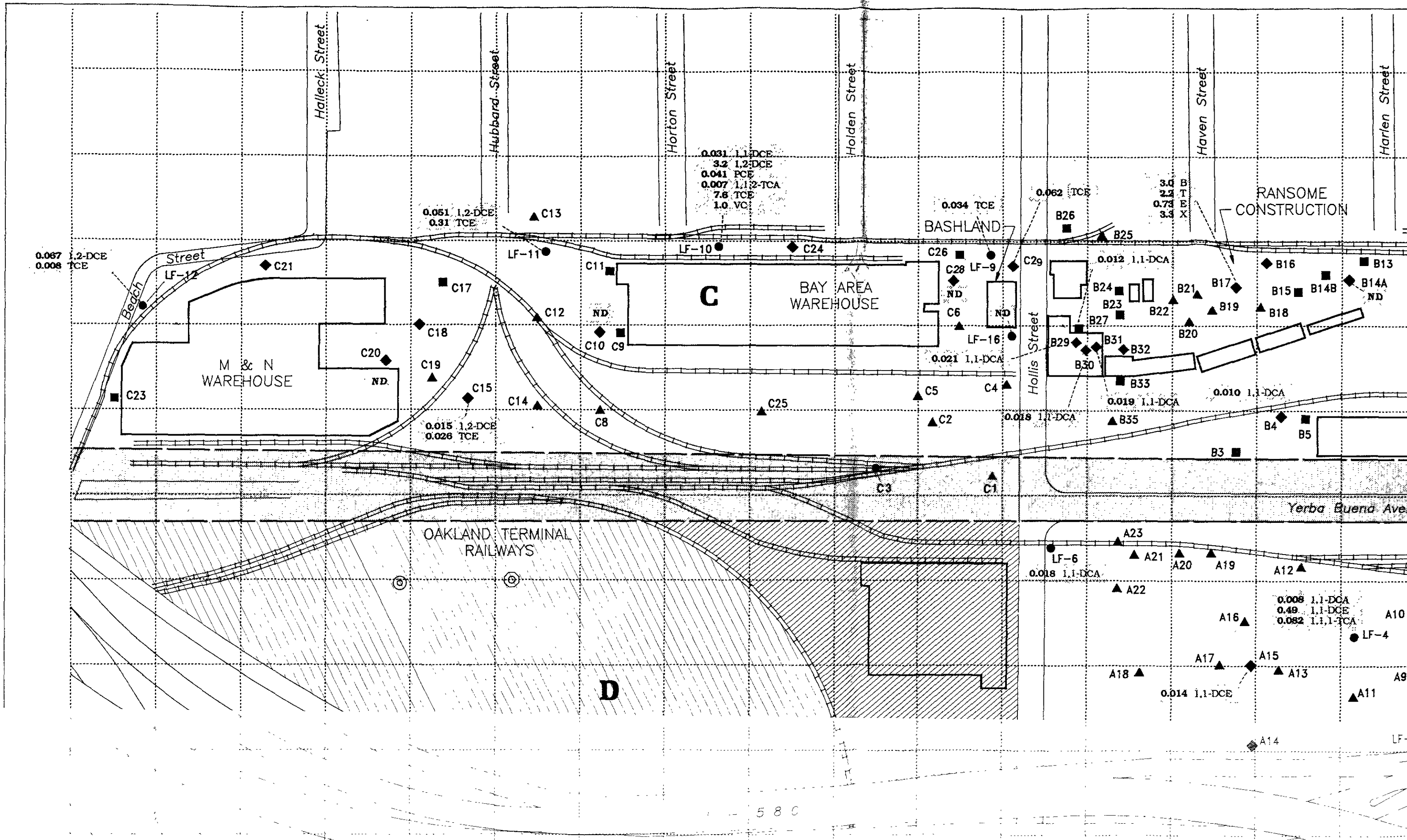


Figure 18 :
VOLATILE ORGANIC COMPOUNDS DETECTED IN SHALLOW GROUND-WATER SAMPLES (ppm) IN AREA A, PHASE II INVESTIGATION

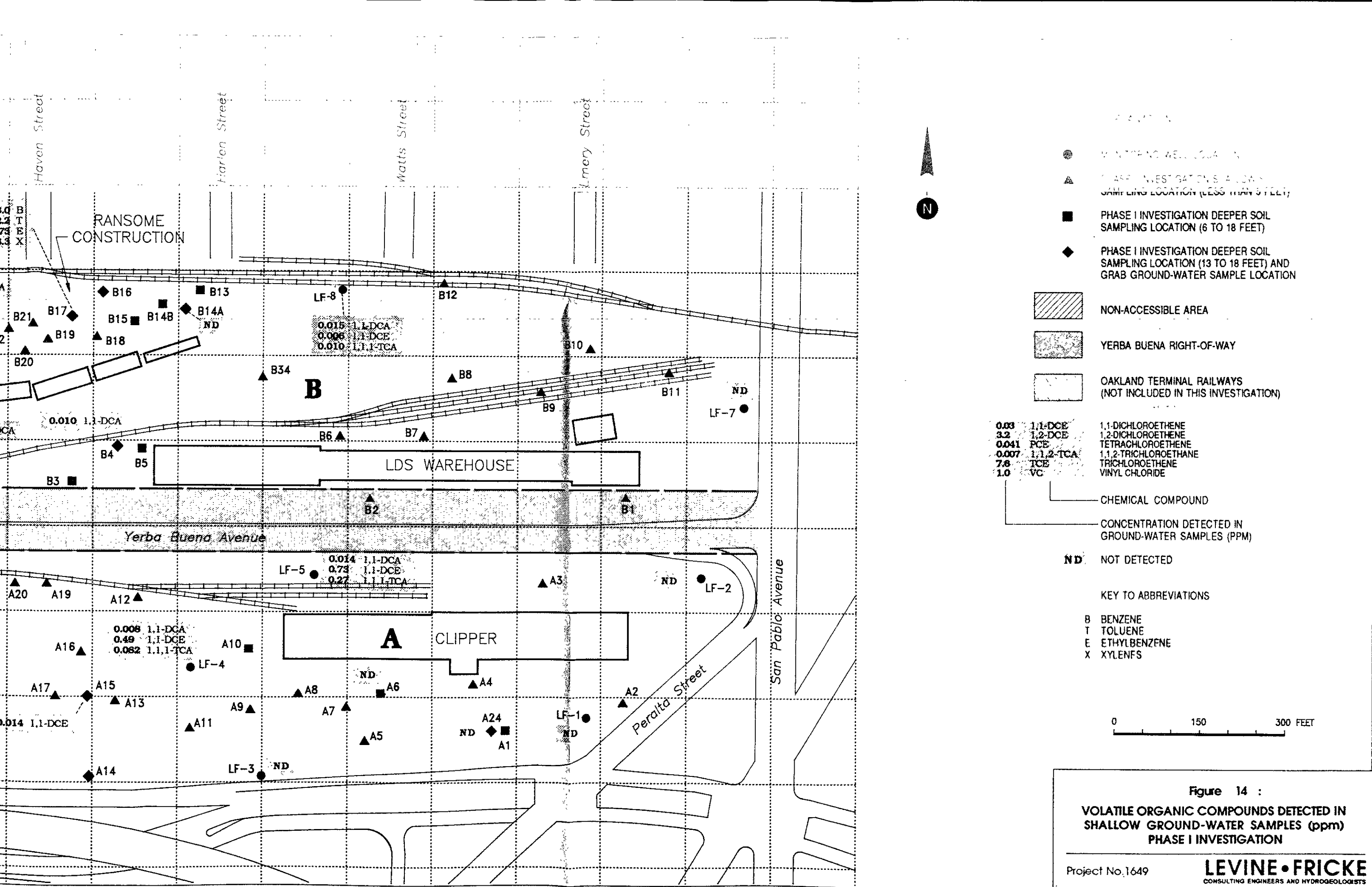
Project No. 1649

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ALS12RUL600d/f



580



- WATER TABLE WELL LOCATION
- ▲ PHASE I INVESTIGATION SHALLOW SAMPLING LOCATION (LESS THAN 6 FEET)
- PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (6 TO 18 FEET)
- ◆ PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (13 TO 18 FEET) AND GRAB GROUND-WATER SAMPLE LOCATION

- NON-ACCESSIBLE AREA
- YERBA BUENA RIGHT-OF-WAY
- OAKLAND TERMINAL RAILWAYS (NOT INCLUDED IN THIS INVESTIGATION)

0.03	1,1-DCE	1,1-DICHLOROETHENE
3.2	1,2-DCE	1,2-DICHLOROETHENE
0.041	PCE	TETRACHLOROETHENE
0.007	1,1,2-TCA	1,1,2-TRICHLOROETHANE
7.6	TCE	TRICHLOROETHENE
1.0	VC	VINYL CHLORIDE

— CHEMICAL COMPOUND

— CONCENTRATION DETECTED IN GROUND-WATER SAMPLES (PPM)

ND NOT DETECTED

KEY TO ABBREVIATIONS

B BENZENE
 T TOLUENE
 E ETHYLBENZENE
 X XYLENES

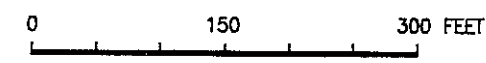
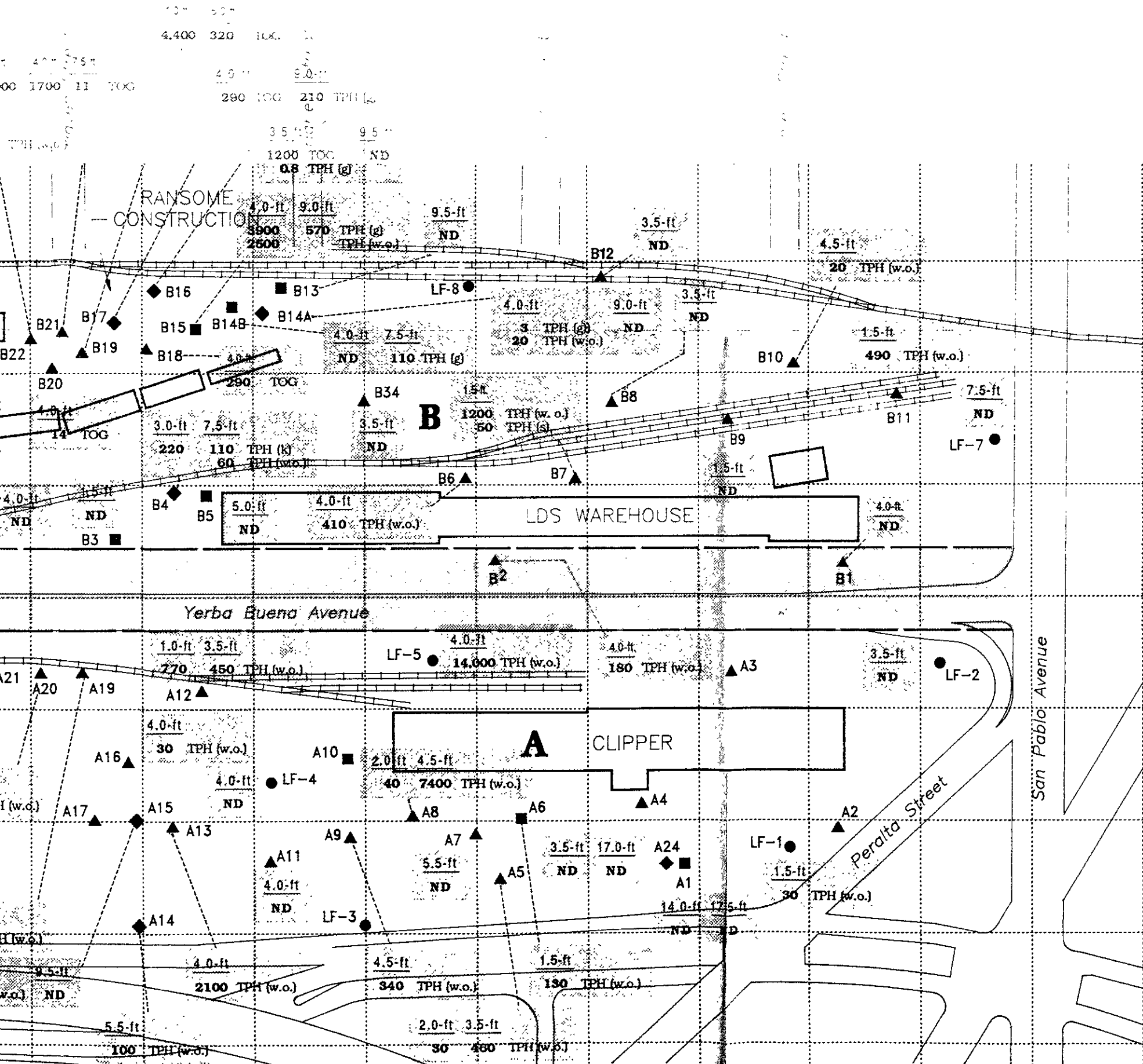


Figure 14 :
VOLATILE ORGANIC COMPOUNDS DETECTED IN SHALLOW GROUND-WATER SAMPLES (ppm) PHASE I INVESTIGATION

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ALS12JUL90bdfc



- SAMPLING LOCATION (LESS THAN 5 FEET)
 - PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (6 TO 18 FEET)
 - ◆ PHASE I INVESTIGATION DEEPER SOIL SAMPLING LOCATION (13 TO 18 FEET) AND GRAB GROUND-WATER SAMPLE LOCATION
 - ▭ NON-ACCESSIBLE AREA
 - ▭ YERBA BUENA RIGHT-OF-WAY
 - ▭ OAKLAND TERMINAL RAILWAYS (NOT INCLUDED IN THIS INVESTIGATION)
- 4.0-ft ——— DEPTH OF SAMPLE
- 3900 TPH (g) TPH AS GASOLINE (g)
 2500 TPH (w.o.) TPH AS WASTE OIL (w.o.)
 1700 TOG TOTAL OIL AND GREASE
 500 TPH (s) TPH AS STODDARD SOLVENT (s)
- CHEMICAL COMPOUND
- CONCENTRATION DETECTED IN SOIL SAMPLES (PPM)
- ND NOT DETECTED

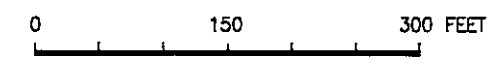
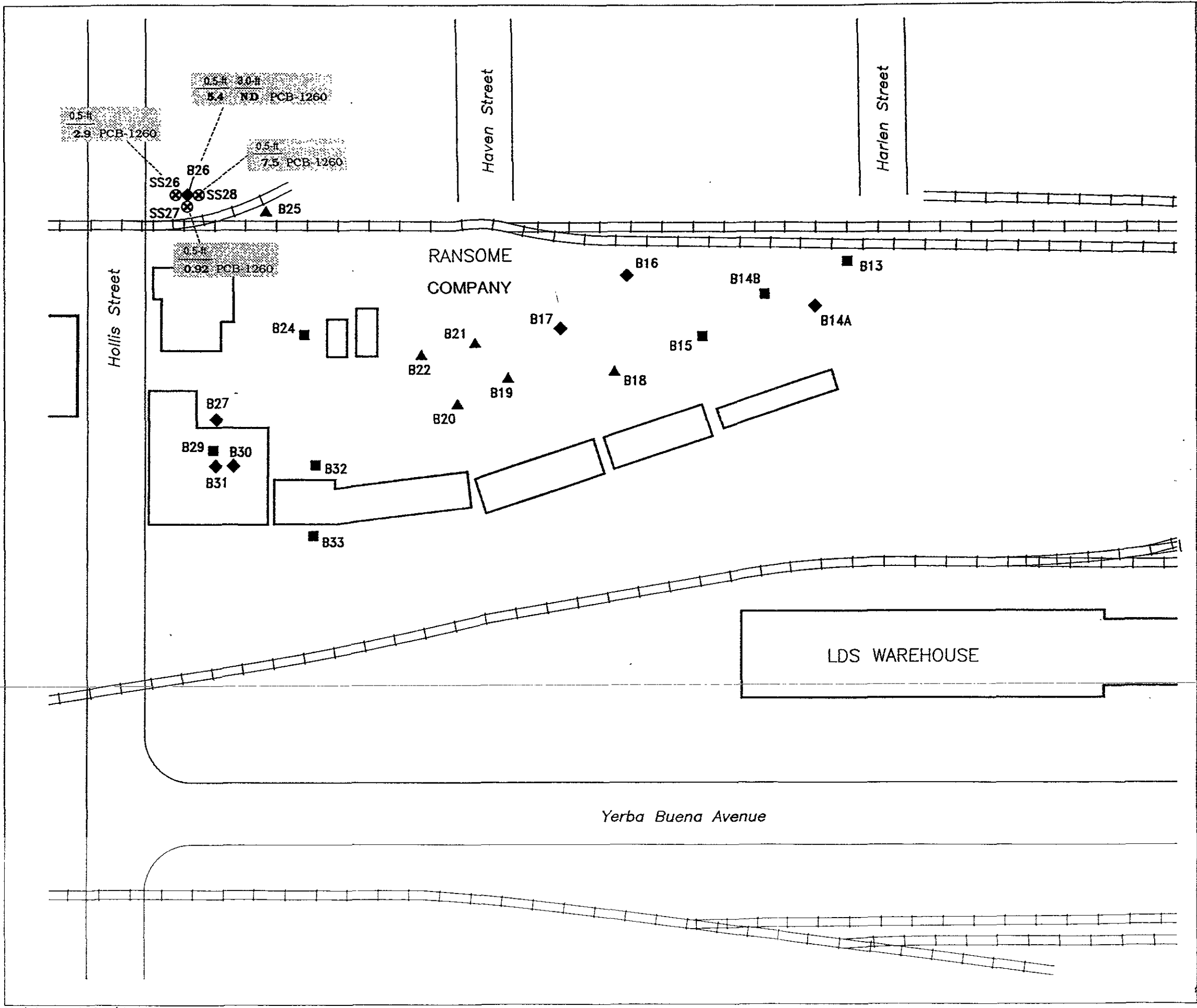


Figure 13 :
 TOTAL PETROLEUM HYDROCARBONS
 DETECTED IN SOIL SAMPLES (ppm)
 PHASE I INVESTIGATION



EXPLANATION

- ▲ Phase I shallow soil sampling location (less than 5 feet)
- Phase I deeper soil sampling location (6 to 13 feet)
- ◆ Phase I deeper soil sampling location (6 to 13 feet) and grab ground-water sample location
- ⊗ Phase II soil sampling location for PCB analysis

0.5 ft ————— Depth of sample
 5.4 PCB-1260 ————— Chemical Compound
 ————— Concentration in mg/kg

NOTE: B26 results were collected during the Phase I investigation.

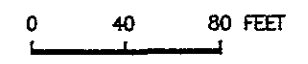


Figure 20 :
 PCB DETECTED IN
 SOIL SAMPLES (mg/kg) IN AREA B,
 PHASE II INVESTIGATION

Project No.1649

LEVINE • FRICKE
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