APPENDIX J

HAZARDOUS, TOXIC AND RADIOLOGICAL WASTE (HTRW)

PROJECT DESCRIPTION

General

The Dallas Floodway Extension, as recommended by the U.S. Army Corps of Engineers, Fort Worth District, calls for flood protection to the city of Dallas, south of the downtown area. The proposed alignment of the Dallas Floodway Extension consists of constructing lower/upper overbank swales with wetland cells, left/right bank levees, and sump areas. All are shown on the enclosed project map (Figure 1), and on individual site maps in Sections J-1 through J-6.

Lower/Upper Overbank Swale

The lower overbank swale will extend 3.3 miles downstream from the west side of Highway 75 (Central Expressway) to 2,000 ft. below Loop 12, entirely along the east bank of the Trinity River. The swale was designed with a slope of .0005 ft./ft. and varying widths. The upper overbank swale extends 1.5 miles downstream from the confluence of Cedar Creek to the river crossing west of Highway 75.

Wetland Cells

Numerous wetland cells are situated inside both lower and upper swales to provide additional flood capacity, recreational value, and wildlife habitat. The interconnected cells vary in size and shape and are generally 1 - 3 ft. in depth.

Lamar Street Levee

The left bank levee, situated between the Union Pacific Railroad (UPRR) and the Trinity River, was designed for Standard Project Flood (SPF) protection plus 2 ft. freeboard. The SPF design has a total length of 2.5 miles with a slope of 3.5 ft. horizontal to 1 ft. vertical and typical height of about 27 ft. including freeboard.

Lamar Street Sumps

Numerous sumps will be located along the length of Lamar Street Levee to control exterior drainage through the levees. The sumps vary in size and are generally 6 - 10 ft. in depth.

Central Wastewater Treatment Plant/Cadillac Heights Levee

The right bank levee, extending from the Cedar Crest and 11th Street intersection downstream to the Central Wastewater Treatment Plant, was designed by Albert H. Halff Associates for SPF protection. The SPF design has a total length of 1.5 miles and a typical height of about 25 ft. including freeboard.

PROJECT SITE HTRW OVERVIEW

General

The Dallas Floodway Extension can be characterized as an urban area, with industrial, commercial, retail, and residential land usage. The floodplain also contains hardwood bottom land, marshes, old gravel quarries, former municipal landfills, and residential and industrial dump sites.

Methodology

Several HTRW studies and site investigations have been conducted by the Corps using A-E firms. All site investigations performed for the Corps were in accordance with ER 1165-2-132, dated 26 June 1992. The objective of these investigations is to facilitate early identification and appropriate consideration of HTRW problems in reconnaissance, feasibility, and ultimately, preconstruction engineering and design (PED), land acquisition, construction, and, operations, maintenance, repair, replacement, and rehabilitation (OMRRR) phases of the project. The firms were: Albert H. Halff Associates, Inc., February 1993; Environmental Science & Engineering, Inc., August 1993; Freese and Nichols, Inc., May 1995; Geo-Marine, Inc., April 1997; and Tetra Tech NUS, Inc., September 1998. Each firm was contracted by the Corps to conduct the site investigations. Specific tasking was stated in the scope-of-work and was determined by extensive review of any information pertaining to HTRW within a given area. Such information was often in the form of site visits and inspections, aerial photographs, prior sampling events, site investigation reports, regulatory compliance and inspection records, notice-of-violations (NOVs), registered or unregistered complaints, etc. The information was obtained through numerous site visits as well as correspondence and research of Environmental Protection Agency (EPA) and Texas Natural Resource Conservation Commission (TNRCC) records. Several regulatory files were examined with notable investigations conducted by Ecology & Environment, Inc., McCulley, Frick & Gilman, Inc., Entec, Inc., and Brockette, Davis, Drake, Inc.

The original scopes of work for each site investigation specified sample parameters, procedures, methods, locations and sample media. However, changes in project feature alignment, inability to obtain rights-of-entry, and the continuing emergence of independent site investigation data, directly affected decisions on the scoping of investigations. Typically, Corps sampling events involved use of invasive investigative techniques such as a rotary drilling rig, Geo-Probe, piezometers, hand augering, sediment and surfacewater sampling. Soil, sediment, surfacewater, and groundwater were then retained for laboratory analysis. Analysis generally consisted of any or all of the following: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/PCBs, cyanide, and metals. Several sites were investigated in this manner. Oftentimes, right-of-entry could not be obtained so sample locations had to be moved off-site or abandoned altogether.

The suspected HTRW areas are shown on Figure 1 and are described in the sections attached to Appendix J. They are also summarized in Section J-5 of this appendix, Dallas Floodway Extension HTRW Waste Classifications. As noted above, numerous investigations have been conducted by the Corps of Engineers and others. The pertinent portions of these reports have been extracted and are included in Sections J-1 through J-4 and in Section J-6. Section J-6 includes the most recent site investigation conducted by Tetra Tech NUS, Inc., in September 1998. Section J-1 contains the Geo-Marine site investigation conducted in April 1997. Section J-2 contains the Freese and Nichols site investigation from May 1995 and a figure from National Soil Services. Section J-3 contains the Environmental Science and Engineering site investigation from August 1993. Section J-4 contains a site investigation conducted by Albert H. Halff in June 1993. Section J-5, contains summaries of each site, a review of HTRW areas along the Dallas Floodway Extension, and various items of correspondence with the EPA and the TNRCC. Due to the numerous investigations used in compiling this HTRW summary a variety of name and numbering conventions have been used to identify the various sites. The area numbers (1 through 15) used in this narrative will be used consistently throughout Appendix J and the figures presented in Sections J-1 through J-6. The figures referenced in this summary are from the original report. Within a section some figures may be omitted. The following is a brief overview of each area.

Area 1 - Praxair

Praxair, formerly occupied by Union Carbide Linde Gas Division, is an active industrial facility that repackages gasses and reconditions gas cylinders. It is located along Lamar Street at the upstream end of the project, on the left bank of the Trinity River. The Area 1 site plan and corresponding sample locations are shown in Figure 1 of Section J-1. An abandoned lime pit, located behind the property, was used in the manufacturing of acetylene gas during the period of Linde Gas operation. The facility was noted as having had one leaking petroleum storage tank (LPST). The LPST has been removed and the site has obtained closure compliance with state regulations. The Corps site investigation involved composite sampling of shallow soils within the acetylene lime pit, with chemical analysis for priority pollutant organics and inorganics. No prior sampling of the acetylene pit is known to have occurred.

Area 2 - Tri-Gas / Occidental Chemicals

This area, located southwest of Lamar Street, consists of an industrial gas facility (Tri-Gas) and an active silicates plant which produces liquid and solid sodium silicate (Occidental Chemicals). It is shown in Figure 2 of Section J-1. During a recent site visit, an environmental sampling crew was noted at the Tri-Gas facility. It was determined that at least two abandoned lime pits, located behind the Tri-Gas plant, which had been used in the manufacturing of acetylene gas, were apparently undergoing closure in compliance with state regulations. It was also determined that the facility had contained one LPST which had been removed with closure status pending. At Occidental Chemicals, a limited prior investigation has been conducted at a two-acre inactive landfill located on the east-southeastern side of the property. The landfill reportedly contains the following industrial non-hazardous Class I wastes: 4200 cu.yds. (est.) alkaline product wastes, floor sweepings, and empty caustic containers; 3000 lbs (est.) asbestos piping; and 50-100 (est.) empty 5-gallon paint thinner cans. An Ecology and Environment, Inc., report stated that ponded water on the landfill had been sampled with results indicating elevated levels of lead contaminants as well as high pH/alkalinity. Inspection reports obtained from the EPA noted discoloration in surface water and soils near the Trinity River, indicating a possible breakout of leachate into the river. However, no action by the EPA was taken. The landfill had been in operation from 1941 to 1971, and was capped in 1984 with an eventual no further action (NFA) recommended at the site. The June 1997 Corps site investigation conducted by Geo-Marine, Inc. was to involve sampling at two locations along the proposed levee and sumps. However, right-of-entry was not obtained at the time of the investigation.

Area 3 - Dallas Public Schools (Formerly Proctor & Gamble)

The former Proctor & Gamble plant, now partially demolished, is located along Lamar Street. The Area 3 site plan and corresponding sample locations are shown in Figure 3 of Section J-1. The proposed levee and sump area encompass a large portion of the eastern half of the property, within the vicinity of the warehouse. Environmental records from TNRCC indicated landfilling had occurred behind the plant warehouse and dated back to the late 1940's. A geophysical survey and extensive sampling was conducted by Brockette, Davis, Drake, Inc. Elevated concentrations of mercury, selenium, and zinc were noted in the report. A deed record map was also reviewed at the TNRCC regional office. Indications were that prior operations at the facility have resulted in contamination of the entire complex east of the Union Pacific Railroad tracks (which parallel Lamar Street). Contaminants shown on the map consisted of heavy metals, total petroleum hydrocarbons (TPH), and acids. In addition, at least one leaking underground storage tank (LUST) has been documented, resulting in a release of toluene into the groundwater and soil. Reports at TNRCC indicated the release had occurred along the northern portion of the facility. Additional research has indicated the possibility of more such occurrences on-site. However, their locations have not been specifically identified. The June 1997 Corps site investigation involved soil and groundwater sampling of the proposed sump areas on each side of the railroad tracks as well as background sampling upgradient along Lamar Boulevard.

Area 4 - Trinity Recycling (Formerly Okon Metals)

This active metals recycling facility, located along Lamar Street, has been in operation since the 1950s. The Area 4 site plan and corresponding sample locations (SD0401, SB0401, and SB0402) are shown in Figure 4 of Section J-1. The Corps site investigation involved soil and groundwater sampling at two locations within the proposed sump area at the back of the property, with one location being in the vicinity of an alleged cyanide spill. TNRCC records indicated an anonymous unsubstantiated claim that dumping of the spent cyanide solution, which had been used for extraction of gold, had occurred near a smelter shed. However, the exact location of the release was not known. In addition, a sediment sample was taken from a ponded area within the sump, and background levels of priority pollutant organics and inorganics were sampled from adjoining city of Dallas property.

Area 5 - Gravel Pits

Numerous water filled gravel pits are located throughout the project area and are listed below.

Ponds Near Trinity Recycling

These three former gravel pits are located across the railroad tracks from Trinity Recycling on city of Dallas property. A site plan and corresponding sample locations (SD0402 through SD0407) are shown in Figure 4 of Section J-1. Limited information is available concerning the ponds. The Corps site investigation involved using a boat to obtain sediment samples from six locations within the ponds and a background soil/groundwater sample (SB0403). No prior sampling of the ponds is known to have occurred.

Pond Near Interstate 45

This former gravel pit is located west of and adjacent to I-45 and south-southeast of Proctor and Gamble. It is shown in Figure 5 of Section J-1. Limited information is available concerning the pond. The Corps site investigation involved using a boat to obtain bottom sediment samples from three locations within the pond. No prior sampling of the pond is known to have occurred.

Dixie Metals Pond

This small ponded area is located at the base of the south end of Dixie Metals Landfill. It is shown in Figure 6 of Section J-1. The Dixie Metals pond has received a large amount of fill material in the past few years. In 1995, Entact, Inc. conducted verification sampling around the perimeter of a slurry wall which surrounds the Dixie Metals Landfill and approximately one-half of the pond. Three soil samples were taken from an excavated area, now filled with water, marking the present pond location. The report entitled Remedial Action Plan Final Report and Engineer's Certification, Dixie Metals Facility, Dallas, Texas dated May 19, 1995, by Entact, Inc. was reviewed for this appendix. The recent Corps site investigation was to involve wading into the pond to obtain a sediment sample. However, changes in proposed sump locations resulted in this sites elimination as an area of concern.

Linfield Landfill Pond

This pond is located west of and adjacent to Linfield Landfill. The Linfield Landfill Pond site plan and corresponding sample locations are shown in Figure 7 of Section J-1 and in Figure 2 of Section J-2. For several years, extensive dumping of trash has occurred primarily at the northwestern end of the former gravel pit. A 1995 Corps site investigation was conducted by Freese and Nichols, Inc. in which sediment and surface water were sampled for priority pollutant organics and inorganics. The recent Corps site investigation involved using of a boat to obtain additional samples of bottom sediment since dumping of trash has continued to occur in the area.

Area 6 - Valley Steel & W.E. Grace Manufacturing Company

These industrial facilities are located on opposite sides of U.S. Highway 75 near Lamar Street. A site plan and corresponding sample locations are shown in Figure 8 of Section J-1 and in Figure 3-3 of Section J-3. The addition of fill in low areas to the south and excavation of shallow ditches draining run-off to a northerly located sump is proposed by the Corps for both properties. A small sump area is proposed at the northern tip of Valley Steel.

According to Valley Steel files, while engaging in steel pipe thread cleaning operations, acid and caustic wastes had been improperly disposed in unlined pits on the facility. A study conducted in 1973 identified high concentrations of sulfates, manganese, iron, oil and grease in groundwater and soils at Valley Steel. Limited information is available on W.E. Grace, a steel component manufacturing facility. Soil and groundwater sampling was conducted in 1993 by Environmental Science and Engineering, Inc., for the Corps at W.E. Grace and in the vicinity of Valley Steel. The 1997 Corps site investigation was to involve soil and groundwater sampling at one location within the sump area at Valley Steel. However, requests for right-of-entry to Valley Steel were denied at both prior and recent site investigations.

Area 7 - Dallas Demolition Company

This site is a landfilled area located near Martin Luther King Boulevard along the west bank of the Trinity River. A site plan and corresponding sample locations are shown in Figure 3-4 of Section J-3. The Dallas Demolition Company has been extensively landfilled with construction debris dating back to at least the 1970's. In 1992, a Maxim Engineering site investigation was conducted at Dallas Demolition. The investigation involved drilling of numerous test borings with some soil and groundwater sampling. No additional investigations from this site are known to exist.

Area 8 - Vacant Land Near Dal-Chrome

This thickly vegetated and undeveloped sump area is bordered by Sargent Road, Dal-Chrome Company Inc., and several residential buildings. It is shown in Section J-1 on Figure 9. Prior investigations at the adjacent Dal-Chrome site included sampling for background metals concentrations at locations fairly close to the property line with Area 8. Elevated levels of lead were found to exist in these shallow surface soils. The Corps site investigation was to involve composite sampling of surface soils at two locations within the sump area. However, right-of-entry was not obtained at the time of the site investigation.

Area 9 - Energy Conversion Systems & Darling International

This site is located off the 1100 block of Sargent Road, to the north of the Central Wastewater Treatment Plant. It is shown in Section J-1, Figure 10. Previous occupants of the southern half of Area 9 (presently owned and operated by Darling International Inc.) were N.L. Industries, a secondary lead smeltering facility, and Valcar Enterprises, Beatrice Company, and Lone Star Rendering, all animal fat rendering plants. Other adjacent properties include Dixie Metals (now Exide Corporation), a former secondary lead smelter, and the Union Pacific Railroad. Occupants of property to the north (presently owned by Energy Conversion Systems) included Superior Industries and Mainland Land and Equipment Company.

During preparation of the draft GRR, a number of documents were researched at TNRCC. These included a Baseline Risk Assessment Report and a Corrective Measures Study Report conducted on behalf of a group of businesses collectively known as the Sargent Road Client Group. These businesses make up the southern portion of Area 9. These documents noted the presence of hazardous levels of lead in soils resulting from smeltered slag and broken battery casings that had been buried in pits extensively throughout the southern portion of Area 9. The areas with hazardous levels of lead were located away from the project features. Aerial photographs indicate the northern portion of Area 9 had also been continuously landfilled with industrial waste during the same time period. Presumably the waste consisted of lead slag and battery casings. In addition, three LPSTs were noted on the Darling International property.

After release of the draft GRR and prior to preparation of the final GRR, follow-on site visits in the

vicinity of Area 9 identified construction of an apparent landfill cap over the lead-contaminated soils was underway in the southern portion of Area 9 (Darling International). Examination of TNRCC files was conducted to determine the purpose and nature of these activities. The examinations revealed new documents that confirm the presence of lead at hazardous levels in this area in close proximity to the Cadillac Heights levee alignment. Given a similar site history, it is likely that hazardous levels of lead exist on the northern adjacent portion of Area 9 (Energy Conversion Systems), where current owners are preparing to conduct investigations.

A May 1998 site visit also identified construction by the City of Dallas of an adjacent 120-inch interceptor line. The interceptor runs parallel to theTrinity River and between the river and Area 9.

Area 10 - Vacant Land

Area 10 is located along the swale alignment north of the Dallas Central Wastewater Treatment Plant (CWWTP) between Sargent Road and the Trinity River. It is shown in Section J-1, Figure 10. Historical data indicates Area 10 was formerly utilized by the city as dumping grounds. Visual reconnaissance of the site noted numerous piles of surface debris which generally consisted of household garbage and other municipal wastes, as well as broken battery casings. Additionally, Area 10 lies downgradient from the leaking petroleum storage tanks (LPSTs) and unregulated lead smelter waste of Area 9. The Corps site investigation was to involve soil and groundwater sampling at three locations along the swale alignment. However, right-of-entry was not obtained during the time of the site investigation. No prior investigations were available for this site.

Area 11 - Municipal Sludge Disposal Lagoon E

Area 11 is located directly along the swale alignment, between the northeast side of the CWWTP levee and the Trinity River. It is shown in Section J-4, Figure 3. The site is an inactive serpentine shaped sludge lagoon which was used for disposal of municipal sewage sludge. Since the early 1970s Lagoon E has not been in use. A prior site investigation was conducted by Albert H. Halff Associates, Inc. in 1992. Development of a closure plan followed with the report entitled, Closure Plan Municipal Sludge Disposal Lagoon E, Central Wastewater Treatment Plant, Dallas, Texas, dated, June 1993, by Albert H. Halff Associates, Inc. This report was reviewed for this appendix. Sampling at Lagoon E included sludge samples taken from hand augering in the lagoon, soil borings with subsequent monitoring well construction, and background sampling.

Area 12 - Union Pacific Railroad Landfill

Area 12 is located northeast of Linfield Landfill, entirely on UPRR property (formerly Southern Pacific Railroad). It is shown in Figure 13 of Section J-1. Visual reconnaissance of the site noted surface expressions of landfilled trenches and scattered material, which generally consisted of construction debris. Corps site investigation work was to involve soil and groundwater sampling at two locations along the swale alignment and a geophysical survey to determine the lateral and vertical extent of the landfill. Several attempts at obtaining right-of-entry into this area had been denied by the Southern Pacific Railroad. No prior investigations of this site were available.

Area 13 - Linfield Landfill

This landfill is bordered by UPRR property to the north, a gravel quarry/pond to the southwest, Sleepy Hollow Golf Club to the south and the Trinity River to the east. Figure 1 of Section J-2 shows the location of landfilled waste types and permanent monitoring wells at Linfield. Formerly operated by the City of Dallas, Linfield Landfill was closed in 1975. Following its closure, it was placed on the EPA Comprehensive Environmental Responsibility Compensation and Liability Information System (CERCLIS) list. During the period of EPA oversight, several groundwater monitoring events occurred. Although various contaminants were detected, the concentrations were considered low and showed a general declining trend. Subsequently, the site was removed from CERCLA regulatory status and "no further action" was declared due its low

potential for a impacting human health or the environment. The "no further action" status at Linfield Landfill is indicative of it being removed from CERCLA regulatory status. As is the case with all suspected CERCLA sites, Linfield Landfill remains on the CERCLIS listing, signifying that it was, in the past, a potential CERCLA site. The current regulatory status of Linfield landfill has been discussed extensively with EPA and TNRCC. These contacts are covered in the paragraphs titled COORDINATION later in this report. Unless future investigations indicate there is a currently undetected release from Linfield Landfill, this status is expected to stand. Measures to prevent a release during and after construction of the swale are discussed in the SUMMARY OF ANALYTICAL RESULTS.

Presently, the landfill is occupied by a tree salvaging business. Landfilled materials from west to east (down gradient) include: brush, demolition debris, municipal and incinerated commercial wastes, and industrial liquid waste trenches. Since 1995, extensive dumping of off-site excavated rock from Dallas Area Rapid Transit (DART) construction has occurred on the western end, along the proposed swale alignment. Historical research conducted during the Initial Assessment indicated that the site had been under investigation since 1972. At that time, a USGS investigation determined that contamination was present in the groundwater due to the liquid waste pits. Groundwater contaminants included: grease, oils, solvents, acids, dyes, inks, and thinners. In 1982 the city of Dallas installed five monitoring wells around the landfill perimeter, and for several years has sampled them annually. A 1995 Corps site investigation was conducted by Freese and Nichols, Inc., in which two temporary monitoring wells were installed in the proposed swale alignment and then sampled. Sample locations from the 1995 site investigation are shown in Figure 2 of Section J-2. An additional Corps investigation was performed in 1998 by Tetra Tech NUS, Inc., to fully characterize the nature and extent of landfilled materials and groundwater contamination within the limits of the proposed swale alignment. A total of 28 borings were installed and 15 groundwater samples were collected. Sample locations from the 1998 site investigation are shown in Figure 1 of Section J-6.

Area 14 - Open Dump Near Linfield

This area is located due west of Linfield Landfill and south of the pond. It is shown in Section J-2, Figure 2. Visual reconnaissance of the site noted numerous piles of surface debris which generally consisted of household garbage and other municipal wastes. Like Linfield Landfill, Area 14 has recently received an extensive amount of dumped rock spoil from DART tunnel construction. This area was included in the 1995 site investigation with one temporary monitoring well installed and sampled - in what was then the proposed Joppa alignment of the swale.

SUMMARY OF ANALYTICAL RESULTS

General

Analytical results are displayed in Sections J-1 through J-4 and in Section J-6, and the more significant ones are briefly summarized below. A detailed fact sheet for each site is contained in Section J-5. The fact sheet lists the results of all available testing and presents the maximum concentration of each contaminant detected at the site. Based on this summary, a waste classification was assigned to each result using appropriate federal and state waste classification regulations. A more detailed explanation of this process is contained in the Introduction to Section J-5.

Area 1 - Praxair

Corps site investigation results (Geo-Marine, Inc.) are shown in Section J-1, Table 9, Page J-46, and Section J-5, Pages 2-4. Several low parts per billion (ppb) semi-volatile organic analytes (SVOCs) were tentatively identified in sediment from the old acetylene pit. None of the concentrations were elevated enough to be considered significant. Of the eight RCRA metals tested in soil, barium and lead were present at levels that slightly exceeded two times the background with concentrations of 110 and 38 parts per million (ppm). Statistically, more sampling would be needed to make accurate comparisons of field sample concentrations with background levels. Other detected inorganics (arsenic, total chromium, and mercury) had concentrations

close to background and were not high enough to be considered significant.

To eliminate the potential of encountering any unforseen HTRW upon excavation of the sump area, future sampling is recommended in the next project phase. Contaminants encountered from prior site investigations can then be more accurately characterized in nature and extent by field screening (i.e. immunoassay field testing) in conjunction with cone penetrometer sampling rigs. Investigation costs are shown in Table 1.

Final disposition is anticipated to be relocation of approximately 10% of soil to the McCommas Bluff, Avalon, or Itasca Landfills. This soil would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Area 2 - Tri-Gas / Occidental Chemicals

Due to lack of right-of-entry, no sampling was performed at Tri-Gas or at Occidental Chemicals.

The nature and extent of wastes deposited in the landfill at Area 2 have resulted in avoidance of the southeastern sump in the project design. Thus, no associated HTRW costs are anticipated in this portion of Area 2.

To eliminate the potential of encountering any unforseen HTRW upon excavation of the north and west sump areas, future sampling is recommended in the next project phase. Contaminants encountered from prior site investigations can then be more accurately characterized in nature and extent by field screening (i.e. immunoassay field testing) in conjunction with cone penetrometer sampling rigs. Investigation costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Final disposition is anticipated to be relocation of approximately 30% of soil to the McCommas Bluff, Avalon, or Itasca Landfills. This soil would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Area 3 - Dallas Public Schools (Formerly Proctor & Gamble)

Corps site investigation results are shown in Section J-1, Table 10, Pages J-49 to J-54, and Section J-5, Pages 7-9. The only significant contaminant in soil was the volatile organic analyte (VOC) acetone present in numerous samples at concentrations ranging from 380 ppb to below detection limit (<11 ppb). Generally, results of RCRA metals analysis indicated concentrations in soil to be within or slightly above background levels for all metals. The greatest deviation from background occurred at two locations with elevated levels of barium at 150 ppm and lead at 96 ppm. These total concentrations are not high enough to be considered significant. Elevated inorganic concentrations in groundwater were noted for all RCRA metals with the exception of silver and mercury. One field sample located in the sump (sample no. SB0302) contained three metals that exceeded the Safe Water Drinking Act (SWDA) Maximum Contaminant Levels (MCLs): arsenic (56 ppb), chromium (110 ppb), and lead (300 ppb). The sample SB0305, located across the railroad tracks from SB0302, also contained one metal (lead at 40 ppb) that exceeded SWDA MCLs. However, these standards are set for drinking water supplies, and there is no known or anticipated future usage of drinking water from the shallow aquifer at this site.

The vast extent and wide variety of contaminants within the deed recorded area across the tracks have resulted in avoidance of the northeastern sump in the project design. Thus, no associated HTRW costs have been established for this portion of the site.

A proposed sump beneath a large warehouse and two sets of railroad tracks is located in Area 3 and

will be excavated during construction. Since the presence of elevated contaminants in soil and groundwater appear to pose a possible environmental threat, concerns could be warranted if contaminated soil and seepage are allowed to remain in the sump. Presently, insufficient data is available to fully determine the extent of contaminants within this sump area. Additional site investigation sampling is therefore recommended in the next project phase. Contaminants encountered from prior site investigations can then be more accurately characterized in nature and extent by field screening (i.e. immunoassay field testing) in conjunction with cone penetrometer sampling rigs. Investigation costs are shown in Table 1.

Final disposition is anticipated to be relocation of approximately 10% of soil to the McCommas Bluff, Avalon, or Itasca Landfills. This soil would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Area 4 - Trinity Recycling (Formerly Okon Metals)

Corps site investigation results are shown in Section J-1, Table 11, Pages J-57 to J-59 and Section J-5, Pages 10-12. As in the case with Area 3, the main organic contaminant in soils throughout the site was acetone. Measurable concentrations were present in all samples, including background, at levels ranging from 80 ppb to 13 ppb. A sediment sample was also taken at one location with ponded water. Results indicated several SVOCs at low ppm levels. None of the soil samples elsewhere exhibited this extensive range of SVOC contaminants. However, these contaminants were not present at concentrations high enough to be considered hazardous. Results of inorganics analysis indicated concentrations in soil to be within or slightly above background levels for all metals with the exception of lead. In soil and sediment sampled from four locations, high concentrations of lead were noted with a maximum level of 2000 ppm. These total concentrations are potentially high enough for the material to exceed TCLP criteria for classification of hazardous waste.

The only organic contaminant in groundwater was the VOC chlorobenzene, present in one sample at a concentration of 150 ppb. Elevated inorganic concentrations in groundwater were noted for arsenic (10 ppb), barium (270 ppb), chromium (43 ppb), and lead (2300 ppb). The background groundwater sample only showed the occurrence of barium at 200 ppb. The high ppb detection of lead in groundwater is significant in that it was collected from the same boring location as that of the maximum soil lead concentration. The depth to groundwater at this location was only 3.5 feet below ground surface. Thus, it appears that high concentrations of lead have become mobile in the shallow aquifer at this site.

The probability of lead contamination at Area 4 have resulted in its avoidance in the project design.

Area 5 - Gravel Pits

Ponds Near Trinity Recycling

Results from the recent Corps site investigation are shown in Section J-1, Table 11, Pages J-60 to J-62, and Section J-5, Pages 13-16. Organics analysis of sediment indicated acetone in all samples with concentrations ranging from 590 ppb to 53 ppb. Although acetone is a common laboratory contaminant, analysis of trip and equipment blanks indicated much lower concentrations of this constituent, when present at all. Based on knowledge of industrial activities along Lamar Street, the presence of acetone in pond sediment in low to mid ppb concentrations is probably indicative of its upstream usage as a solvent at these facilities. The chemical has been used for several years and has migrated off-site, probably by way of surface run-off through drainage ditches and/or dumping in the ponds. Other organic contaminants were toluene at 97 ppb and 2-butanone at 47 ppb. Toluene and 2-butanone are also common laboratory contaminants but were not detected in trip and equipment blanks. For those reasons these values should all be considered valid. Slightly elevated inorganics included: arsenic, barium, chromium, and mercury. More significant are lead levels of 33, 36, 50, and 52 ppm measured from sediment samples.

Presently, insufficient data is available to fully determine the extent of contaminants in the pond. Additional site investigation sampling is therefore recommended. Investigation costs are shown in Table 1.

Construction of project features in this area will most likely involve removal of bottom sediment along the levee alignment and placement of fill in portions of these gravel pits. Based on this plan of action and prior disposal practices in the area, final disposition is anticipated to be relocation of approximately 50% of this waste to the McCommas Bluff, Avalon, or Itasca Landfills. The sediment would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Pond Near Interstate 45

Results from the recent Corps site investigation are shown in Section J-1, Table 12, Pages 66-67, and Section J-5, Pages 13-16. Organics analysis of sediment indicated acetone in all samples with concentrations ranging from 130 ppb to 65 ppb. Although acetone is a common laboratory contaminant, analysis of trip and equipment blanks indicated much lower concentrations of this constituent, when present at all. Since acetone is a widely used solvent and not known to occur naturally, its occurrence in low to mid ppb concentrations is probably due to runoff from upstream industrial facilities along Lamar Street. Slightly elevated inorganics included: arsenic, barium, chromium, and mercury. Total lead concentrations were 40 ppm, 58 ppm, and 72 ppm.

Presently, insufficient data is available to fully determine the extent of contaminants in the pond. Additional site investigation sampling is therefore recommended. Investigation costs are shown in Table 1.

Construction of project features in this area will most likely involve removal of bottom sediment along the levee alignment and placement of fill in portions of these gravel pits. Based on this plan of action and prior disposal practices in the area, final disposition is anticipated to be relocation of approximately 50% of this waste to the McCommas Bluff, Avalon, or Itasca Landfills. The sediment would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Dixie Metals Pond

Due to lack of right-of-entry, the Corps did not sample this site. Presently, insufficient data is available to fully determine the extent of contaminants in the pond.

Although this site does not contain any project features, its proximity to Cadillac Heights Levee warrants future investigation. Presently, insufficient data is available to fully determine the extent of any contamination in the pond. Additional site investigation sampling is therefore recommended. Investigation costs are shown in Table 1.

Linfield Landfill Pond

Results of the 1995 Corps site investigation are shown in Section J-1, Table 13, in Section J-2, Tables 1 and 2 (labeled Sample IA-3), and in Section J-5, Pages 13-16. In sediment sampled from one location, the total concentration of lead was 370 ppm. Other RCRA metals arsenic, barium and chromium were detected at low to mid ppm concentrations but are not considered significant. Organic detects consisted of acetone at 290 ppb and carbon disulfide at 32 ppb. The presence of acetone in low to mid ppb concentrations is probably indicative of its upstream usage as a solvent at industrial facilities and/or dumping in the area.

Construction of the concrete lined swale at the adjacent Linfield Landfill will most likely involve the placement of fill along the gravel pits eastern shoreline, partially filling it in. Although sediment and surface water from the pit did not appear to pose an environmental threat in 1995, the recent high ppm levels of metals in sediment are of potential concern. Presently, insufficient data is available to fully determine the

extent of contaminants in the pond. Additional site investigation sampling is therefore recommended. If elevated barium and lead are confirmed in sediment and surface water, contaminants could ultimately seep into the swale and impart the need for adequate protection from seepage (i.e. slurry wall, concrete lining, etc.). Investigation costs are shown in Table 1.

Area 6 - Valley Steel & W.E. Grace Manufacturing Company

Valley Steel

Analytical results of the 1993 Corps site investigation (Environmental Science and Engineering, Inc.) are shown in Section J-3, Tables 4-2 to 4-4, and Section J-5, Pages 17-18. Of the eight RCRA metals tested in soil, barium, chromium, lead and selenium were present at levels that exceeded two times the background sample. Statistically, more sampling would be needed to make accurate comparisons of field sample concentrations with background levels. Cyanide was also detected in soil sample 6-1 ALT (32.8 ppm) but was not present in the laboratory duplicate taken from the same depth, and is not considered significant for that reason. In addition, cyanide was not detected in groundwater at that same location.

RCRA metals test results for groundwater from Valley Steel also resulted in insignificant concentrations with slight detections of some RCRA metals, but at concentrations below background levels. One SVOC, di-n-butyl phthalate, was detected at about the same concentration as background. However, this compound is often associated with laboratory induced contamination. No other significant organic/inorganic concentrations were detected in this area.

It should be noted that during the time of this investigation, right-of-entry to Valley Steel could not be obtained. Thus, samples were collected off-site but adjacent to Valley Steel and probably should not be considered representative of on-site conditions. Additional attempts at obtaining right-of-entry during the recent site investigation were denied by the property owners.

Past records and visual observation of Valley Steel indicate that the area with potential for contamination most likely is situated towards the west end of the property line. In this area, the Corps has proposed to add fill material and construct a shallow ditch to improve drainage into northerly located sump areas. The shallow drainage ditch connecting the filled area to the sump has the possibility of creating an exposure pathway if elevated contaminants are present in soil. Thus it is recommended for future sampling. Investigation costs are shown in Table 1.

Final disposition is anticipated to be relocation of approximately 5% of soil to the McCommas Bluff, Avalon, or Itasca Landfills. This soil would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

W.E. Grace Manufacturing Company

Analytical results of the 1993 Corps site investigation are shown in Section J-3, Tables 4-2 to 4-4, and Section J-5, Pages 17-18. Of the eight RCRA metals tested in soil, lead was present at 89.3 ppm, a level higher than two times background. Statistically, more sampling would be needed to make accurate comparisons of field sample concentrations with background levels. RCRA metals tested in groundwater from W.E. Grace resulted in a significant exceedance of twice background for arsenic, barium, cadmium, chromium, and lead. No other significant organic/inorganic concentrations in soil and groundwater were detected in this area. The significantly elevated metals in groundwater at this site exceed drinking water standards for some metals, as shown in Section J-3. However, these standards are set for drinking water supplies, and there is no known or anticipated future usage of drinking water from the shallow aquifer at this site. Additionally, they do not exceed hazardous waste levels set forth by RCRA. Unless groundwater is anticipated to come into contact with surface drainage pathways as a result of the shallow excavated ditch, the level of concern for this site is anticipated to be low.

As in the case with Valley Steel, the Corps has proposed to construct a shallow ditch in conjunction with adding fill material to prevent ponding of water and improve drainage to the northerly situated sump areas. The shallow drainage ditch connecting the filled area to the sump has the possibility of creating an exposure pathway if elevated contaminants are present, and is therefore recommended for future sampling. Investigation costs are shown in Table 1.

Final disposition is anticipated to be relocation of approximately 5% of soil to the McCommas Bluff, Avalon, or Itasca Landfills. This soil would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Area 7 - Dallas Demolition Company

Analytical results from the Maxim Engineering site investigation are shown in Section J-3, Tables 4-10 and 4-11, and Section J-5, Pages 21-24. Elevated VOC concentrations in soil included: chloroform at 6.2 ppm, and methylene chloride at 1.2 to 1.4 ppm. At one location, the pesticides chlordane and dieldrin were detected at concentrations of 1.1 and 3.0 ppm. No other organics were present in soil. The only significant inorganic concentration was that of mercury (8 ppm). Other inorganic concentrations in soil were comparable to those found at background locations.

Elevated concentrations of organics in groundwater consisted of: the VOC 1,1,1-trichloroethane at 56 ppb, SVOCs 1,2-dichlorobenzene at 9 ppb, and bis 2-ethylhexyl phthalate (a common lab contaminant) at 5 ppb, and the pesticide a-BHC at 15 ppb. These concentrations were all considered insignificant since they were only slightly above detection limits. No significant inorganic concentrations were detected at this site.

VOCs constitute the major concern identified by of this study. According to Federal Regulation 40 CFR 268.43, soils with chloroform concentrations > 5.6 ppm need to be treated before disposal. Another significant detect was methylene chloride. While this VOC is commonly attributed to laboratories, its presence in elevated concentrations exceeds that which is normally expected to be laboratory induced. The low ppm levels of pesticides reported in the investigation could warrant greater concern if they are prevalent at the site. However, it should be noted that of the 155 total soil samples obtained in this investigation, only 4 were analyzed for priority pollutants. Likewise, only 1 of 7 groundwater samples were analyzed for priority pollutants. Also, no QA/QC was available for review.

Thus, the limited testing and numerous contaminants identified by the Maxim Engineering site investigation, coupled with the location being directly along the swale alignment, warrant further site investigation at Dallas Demolition. Contaminants encountered from the prior site investigation can then be more accurately characterized in nature and extent by field screening (i.e. immunoassay field testing) in conjunction with cone penetrometer sampling rigs. Investigation costs are shown in Table 1.

Final disposition is anticipated to be relocation of approximately 10% of soil to the McCommas Bluff, Avalon, or Itasca Landfills. This soil would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Area 8 - Vacant Land Near Dal-Chrome

Due to lack of right-of-entry, no sampling was conducted in the vacant land along Sargent Road. However, recent removal of the proposed sump areas along the Cadillac Heights Levee have resulted in elimination of this site from the project design.

Area 9 - Energy Conversion Systems & Darling International

No Corps of Engineers investigations have been performed in this area. The available data has been obtained from several reports contained in TNRCC files and address only the southern portion of Area 9 (Darling International). Extracts from these reports are contained in Section J-5, pages 22 and 24. These reports indicate very high levels of lead (61,500 ppm), some of which are hazardous. Investigations are planned by the property owners for the northern portion of Area 9 (Energy Conversion Systems). This data will be obtained as it becomes available. However, extensive landfilling of this area is evident from aerial photography and appears to have occurred during the same time period as the landfilling to the south. The results are likely to be similar. Based on the data for the 120-inch interceptor line, soils outside of Area 9 have elevated lead levels, but they are not at hazardous concentrations. It appears that the very high lead contamination is present within Area 9 and has not migrated beyond its limits. Any off-site migration would be due to surface runoff and re-deposition of the sediment in adjacent Area 10. It is unlikely that the sediment would be hazardous with respect to lead.

Presently, insufficient data is available to fully document the extent of contamination along the levee alignment. Construction in these areas risk encountering buried lead slag and battery casings along the levee alignment. In any event, the available data substantiate that care must be taken during advanced engineering and design. Final design of the Cadillac Heights levee must be based upon the data currently available and data being developed by others, as well as additional sampling and testing to determine the optimum alignment. While the preference would be to avoid areas of high concentrations altogether, alternatives might include keeping the current alignment, relocating along Sargent Road, or relocating toward the river. Final design will seek to avoid any sites with hazardous wastes. If this cannot be accomplished, then the local sponsor has been advised and is aware of the fact that costs for removal and/or remediation of hazardous wastes are a 100% local cost. If areas with hazardous wastes can be avoided, the levee alignment will consider minimizing disturbance of known contaminants, costs for special wastes handling and disposal, and impacts on natural resources. Additional site investigation and sampling is therefore recommended. Investigation costs are shown on Table 1.

Based on the above discussion, final disposition of excavated soils at Area 9 is anticipated to be relocation of approximately 50% of the soils to the McCommas Bluff, Avalon, or Itasca landfills. Disposal costs are shown in Table 1. All remaining soils are assumed to be clean and can be used as fill, placed in spoil areas or hauled off-site.

Area 10 - Vacant Land

Due to lack of right-of-entry, no sampling was conducted at this site.

Since Area 10 is situated directly along the swale alignment, a Phase I site investigation is recommended. Contaminants encountered during this initial phase can then be more accurately characterized in nature and extent by field screening (i.e. immunoassay field testing) in conjunction with cone penetrometer sampling rigs. Investigation costs are shown in Table 1.

Final disposition is anticipated to be relocation of approximately 10% of soil to the McCommas Bluff, Avalon, or Itasca Landfills. This soil would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Area 11 - Central Wastewater Treatment Plant Municipal Sludge Disposal Lagoon E

Analytical results of the 1993 Lagoon E closure plan (Albert Halff Associates, Inc.) are shown in Section J-4, Tables I, II, IV, and V, and Section J-5, Pages 27-29. The closure plan indicated that Lagoon E contains sludge with detectable concentrations of each of the metals analyzed except arsenic, molybdenum, and selenium. Maximum total metals concentrations in sludge were as follows: 363 ppm barium, 49.8 ppm

cadmium, 280 ppm chromium, 154 ppm copper, 635 ppm lead, 7.5 ppm mercury, 469 ppm nickel, 25.8 ppm silver, and 668 ppm zinc. When subjected to TCLP analyses, none of these metals exceeded hazardous concentrations. Sludge samples analyzed for organics resulted in slight detects of the SVOCs: bis(2-ethylhexyl) phthalate and di-n-butyl phthalate. Both are suspected laboratory contaminants. Slightly elevated VOCs included: 1.3 ppm acetone, 3.3 ppm methylene chloride, 0.021 ppm toluene, 0.128 chlorobenzene, 0.032 ppm ethyl benzene, and 0.067 ppm xylene. None of these were classified as hazardous by RCRA standards.

Analysis of native soil surrounding Lagoon E indicated no detectable VOCs or SVOCs. Inorganics were found in all soil samples and included the metals: barium, chromium, copper, nickel and zinc. Only two samples did not contain any detectable concentrations of lead. Comparison of these total metals concentrations with regional background levels, as published by the USGS Professional Paper 1270, resulted in all metals falling within their documented ranges. Groundwater analysis indicated no detectable concentrations of VOCs or SVOCs. The only detectable inorganic encountered was barium in two locations at 1.1 and 1.9 ppm.

Lagoon E is situated directly along the swale alignment and will be excavated during construction. Thus, final disposition is anticipated to be dewatering and treatment of groundwater, if needed, and relocation of approximately one-third of soil to the McCommas Bluff, Avalon, or Itasca Landfills. The closure plan indicated that Lagoon E sludge would most likely be classified as Class I non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Area 12 - Union Pacific Railroad Landfill

Due to lack of right-of-entry, no sampling or geophysical survey was conducted at this site.

Since Area 12 is situated directly along the swale alignment, and the portion situated directly within the swale alignment will be excavated during construction, a Phase I site investigation is recommended. Contaminants encountered during this initial phase can then be more accurately characterized in nature and extent by field screening (i.e. immunoassay field testing) in conjunction with cone penetrometer sampling rigs. If contaminants are determined to be present in such amounts as to pose a potential environmental threat, additional leachate protection features such as a slurry wall should be considered. Investigation costs are shown in Table 1.

Final disposition is anticipated to be relocation of approximately 5% of soil to the McCommas Bluff, Avalon, or Itasca Landfills. This soil would be mildly contaminated and disposed as Class I Non-hazardous waste. Disposal costs are shown in Table 1. All remaining soils are clean and can be used as fill, placed in spoil piles on-site or hauled off-site.

Area 13 - Linfield Landfill

Historically high analytical results from the five City of Dallas perimeter wells are shown in Table 3 of Section J-2, and Section J-5, Pages 31-34. Generally, the data has shown a declining trend in concentrations in the past 15 years with inorganics now at or below detection levels. All constituents have been at non-hazardous concentrations.

Analytical results of the 1995 Corps site investigation (Freese and Nichols, Inc.) are shown in Section J-2, Tables 1 and 2, and Section J-5, Pages 31-34. Elevated inorganic concentrations were detected in the groundwater samples with lead levels of 5.8 and 6.5 ppm, respectively. This data is potentially significant in that these levels appear to exceed the TCLP concentration criteria for classification of hazardous waste (lead $\geq$ 5.0 mg/L). With the exception of two SVOCs which are primarily associated with laboratory contamination, the only other organics were slight elevated levels of phenanthrene and chlorobenzene, both at non-hazardous concentrations. However, these groundwater samples were not analyzed using the TCLP test method 1311

required to by 40 CRF 261.24 to meet the definition of hazardous waste due to toxicity; therefore, the groundwater results from this investigation cannot be used for making a hazardous waste determination. Analytical results of soil indicated no detectable concentrations of organics and only slightly elevated inorganic concentrations of arsenic, barium, cadmium and chromium, none at potentially hazardous concentrations.

The 1998 site investigation (Tetra Tech NUS, Inc.) was designed to fully characterize the nature and extent of landfilled materials and groundwater contamination within the limits of the proposed swale alignment. A total of 28 borings were installed on a 200-foot grid (i.e., approximately one boring per acre) following TNRCC recommendations contained in Section J-5 for visually classifying the landfilled materials. Boring locations are shown on Figure 1 of Section J-6. Subsurface profiles for the site are shown on Figures 2 through 4 of Section J-6. All landfilled materials visually classified as municipal solid waste. Two soil samples were collected from within the landfilled materials based on elevated volatile organic screening levels. These samples were analyzed for the TCLP parameters listed in 40 CFR 261.24. Results are summarized on Table 1 of Section J-6. Chlorobenzene and methyl ethyl ketone were the only organic constituents detected, and they were at non-hazardous concentrations. Lead was the only metal detected at a potentially hazardous concentration of 119 mg/Kg in one soil sample; TCLP analysis of this sample, however, showed the concentration to be non-hazardous at 0.040 mg/L. Groundwater samples were collected from within the landfilled materials in 14 of the borings and were analyzed for the full suite of TCLP parameters listed in 40 CFR 261.24 using the TCLP test method 1311. They were also analyzed for corrosivity in accordance with 40 CRF 261.22. Results are summarized on Table 2 of Section J-6. One groundwater sample contained trichloroethylene at 0.0021 mg/L. Seven groundwater samples contained benzene at a maximum concentration of 0.052 mg/L. Thirteen groundwater samples contained chlorobenzene at a maximum concentration of 0.079 mg/L. No other organic constituents were detected. All detected organic constituents were at non-hazardous concentrations. Metals detected were arsenic, barium, lead, selenium, and silver. All metals were at non-hazardous concentrations. One groundwater sample was collected from beneath the landfill and was analyzed for the full suite of TCLP parameters using the TCLP test method 1311. Barium was the only constituent detected, and it was at a non-hazardous concentration. The pH of all 15 groundwater samples was within the non-hazardous range.

Combined 1995 and 1998 site investigation results coupled with existing information on waste types within the landfill allow for the following assumptions regarding waste classification and disposal: 1) landfilled wastes and associated soil classify as non-hazardous municipal solid waste and can be disposed of as non-hazardous municipal solid waste; and 2) the groundwater within and beyond the landfill limits is only moderately contaminated and can be disposed of as non-hazardous municipal solid waste. Disposal costs are shown in Table 1.

During construction a number of measures are proposed to prevent a release and to limit the amount of contaminated soil, groundwater, and solid waste that must be handled. Excavation will be limited to that required to construct the swale plus the protection measures required to protect the wastes left in place after construction is complete. A slurry wall is proposed to isolate the portion of the landfill that will not be disturbed, which also contains the liquid waste pits, from the construction area. This should limit the amount of groundwater occurring as leachate that will have to be handled and minimize the risk of a release and exposure during construction. The contractor will be required to implement runoff controls, construct sumps to collect rain falling inside the excavation, provide protection to prevent floodwater from entering the excavation, provide daily cover over exposed solid wastes at the end of the day, etc. These requirements, and many more, are outlined in the May 30, 1995, letter from TNRCC contained in Section J-5. The goal of all of these measures is to prevent a release during construction. When construction of the swale is completed a cap will be placed over any remaining solid wastes and slope protection, such as concrete lining the channel or placing gabbions, will be put in place to protect environmental receptors throughout the life of the project.

Area 14 - Open Dump Near Linfield

Analytical results of the 1995 Corps site investigation are shown in Section J-2, Tables 1 and 2, and

Section J-5, Pages 35-36. Elevated inorganic concentrations in groundwater were noted for all RCRA metals. The field sample, IA-4, contained five metals that exceeded the SWDA MCLs: arsenic (380 ppb), cadmium (118 ppb), chromium (210 ppb), lead (700 ppb), mercury (60 ppb), selenium (290 ppb), and silver (370 ppb). No organic concentrations were detected in groundwater at this site.

Analytical data of soil indicated slightly elevated concentrations for all RCRA metals except selenium. Elevated SVOC concentrations of pyrene (6.4 ppm), phenanthrene (4.8 ppm), fluoranthene (7.2 ppm), and chrysene (4.6 ppm) were noted but were only slightly above detection limits (4 ppm) and not high enough to be considered significant.

Although Area 14 is located near the proposed concrete lined portion of the swale, it will not be affected by project construction. Thus, no investigation or disposal costs have been assigned to Area 14.

OTHER INVESTIGATION AREAS - SWALE, SUMPS, AND LEVEES

To eliminate the potential of encountering any unforseen HTRW upon excavation of the lower/upper overbank swale, additional sump areas, and levee inspection trenches in areas other than those addressed above, field screening is recommended. Test kits are available for a wide variety of parameters, are inexpensive, and can be used virtually anywhere. Special emphasis should be placed on screening gravel pits, drainage ditches, and other topographic features where contaminants could accumulate over time. Another alternative that can be utilized in areas with suitable access is cone penetrometer sampling with the Site Characterization and Analysis Penetrometer System (SCAPS). This fairly recent innovation in in-situ investigative technology allows the sampling crew to perform quick analysis of organics, soil stratigraphy, and resistivity. Since this truck mounted unit is fully capable of soil and groundwater sampling, it can be used in conjunction with immunoassay testing to perform analysis on other parameters. Investigation costs are shown in Table 1.

COST ESTIMATE SUMMARY

General

The cost estimate presented in Table 1 is the synthesis of several cost estimates prepared either in-house by the Fort Worth District or by one of several A-E firms that have conducted investigations at the proposed Dallas Floodway Extension. The A-E cost estimates are contained in the original reports and are typically "order of magnitude" estimates rather than final, detailed estimates. As the project has matured and potential HTRW sites have been identified, the features and alignment have been changed to avoid problem areas. Thus, some of the costs identified in the A-E cost estimates have been eliminated. Consequently the cost estimates have been modified, based primarily on judgement and experience, to reflect the current project.

Area specific assumptions for the cost estimate summary are noted in the SUMMARY OF ANALYTICAL RESULTS section. Some more specific cost issues relating to the summary are discussed below.

The total amount of excavation in each of the areas suspected of having contamination was determined and is presented in the table. Using this, an estimate was made of how much of the total excavation would be contaminated and require disposal as Class 1 non-hazardous industrial waste, Class 2 non-hazardous industrial waste, or non-hazardous municipal solid waste. The percentage and resulting cubic yards of contaminated wastes are presented in Table 1. A unit price of $40/CY for Class 1 and Class 2 wastes and $25/CY for municipal solid waste was used to determine transportation and disposal costs for each site. A unit price of $0.20/gal was used for disposal of the groundwater associated with Linfield Landfill. All of these unit prices are based on discussions with transportation companies, landfill operators and treatment companies.

The investigation costs are based on the recommendations contained in the June 1997 Geo-Marine report, but have been modified by district personnel. Investigation costs shown as COMPLETED TO DATE reflect costs incurred for ongoing investigations from April through September 1998.

The possibility of encountering groundwater exists in many of the project areas. It is anticipated that groundwater will not be impacted to the point that treatment will be needed. The water will be removed and disposed of, as needed.

COORDINATION

Coordination with the SWD HTRW Design Center at Tulsa District, the Environmental Protection Agency Region VI (EPA) and the TNRCC has been on-going throughout the development of the DFE. Most of the contacts with regulators have been informal and were made as part of the regulatory records research. Following the decision to route the swale through Linfield landfill several phone calls were made between the Fort Worth District and the TNRCC to determine what TNRCC's requirements would be to accomplish this. A letter was received on 30 May 1995 outlining their requirements for construction through Linfield landfill. A copy is included in Section J-5.

A peer review of the entire DFE GRR was conducted by the Tulsa District in August 1997. Appendix J HTRW was reviewed by the Planning Division and the HTRW Design Center. Their comments were incorporated into the draft GRR submitted to HQUSACE in the fall of 1997.

Since September 1997, EPA and TNRCC have been consulted concerning the funding, cleanup options and liability releases available through the EPA Brownfields Program and the TNRCC Voluntary Cleanup Program. In January 1998 additional phone conversations have been held with EPA and TNRCC to confirm the regulatory status of the Linfield Landfill in light of HQUSACE comments on the draft GRR. Both agencies were clear that regulation of any activities in Linfield Landfill are the responsibility of the TNRCC. A memorandum to files documenting both of these conversations was prepared and is included in Section J-5.

On 5 & 6 February 1998, an engineer from Tulsa District, with extensive experience in landfill closure and design, reviewed the DFE GRR Appendix J to assess the HTRW investigations conducted to date and the proposed construction techniques and waste handling procedures for construction of the swale through the Linfield landfill. The results of this review are included in Section J-5.

On 11 February 1998, a meeting was held with the TNRCC Municipal Solid Waste Division to discuss removal of Linfield landfill and TNRCC recommendations on how to accomplish this in light of currently available data. This meeting was attended by representatives from the Fort Worth District, the Southwestern Division and the City of Dallas. Several TNRCC representatives were present including the person who signed the 30 May 1995 letter and a waste classifications specialist who had recently come from the RCRA enforcement portion of TNRCC. The following resulted from this meeting:

1. TNRCC is the responsible regulatory agency to work with.
2. The 30 May 1995 guidance was still accurate.
3. Handling the wastes as municipal solid waste is reasonable pending further characterization of the landfill materials.
4. Removal and separate treatment of the leachate is reasonable.
5. TNRCC provided additional suggestions on how to investigate the landfill, dispose of the wastes and properly close the landfill wastes that will remain after completion of construction.

The results of this meeting are documented in a trip report which is enclosed in Section J-5. This trip report was forwarded to TNRCC for their information. A response from TNRCC was requested to ensure that the minutes were accurate and that the Fort Worth District understood the guidance they had provided. A copy of this letter, dated 6 March 1998, is enclosed in Section J-5. A letter, dated 9 March 1998, was received

from the City of Dallas, in which they reiterated their understanding that "Any material encountered with the Dallas Floodway Extension that are classified as hazardous substance as defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) would be solely the City's responsibility." See Section J-5 for a copy of this letter.

Further coordination between the Fort Worth District and the Municipal Solid Waste Division of the TNRCC took place during development of the 1998 site investigation plan for Linfield Landfill. This coordination is documented in a memorandum dated 22 June 1998, which is enclosed in Section J-5 and was also forwarded to the TNRCC on 6 July 1998 for their information. A revision to this original investigative approach was similarly coordinated with the TNRCC and is documented in a letter sent on 12 August 1998. A copy of this letter is also enclosed in Section J-5. The TNRCC verbally agreed with the results and conclusions of the September 1998 Linfield Landfill site investigation on 15 December 1998 upon review of a faxed summary of the investigation results.

Based on currently available data, all of the wastes that will be removed during construction of the Dallas Floodway Extension are non-hazardous wastes, with all costs being cost sharable.

CONCLUSIONS

As expected, the Dallas Floodway Extension has a number of potential HTRW concerns associated with it. Most of the high risk sites have been identified based on review of historic records, interviews with local officials, site visits and searching federal and state environmental agency files. Some, but not all, of these sites have been investigated to determine if a release has occurred to the environment. Where investigations were not conducted, this was due to the current landowner not granting right of entry. Where problems have been identified, such as the landfills at Oxy Chemical (Area 2) and Dallas Public Schools (Area 3), project features have been eliminated or relocated to avoid or minimize these problems.

RECOMMENDATIONS

The District will continue developing plans for more site-specific investigations using TNRCC recommendations for site characterization and waste classification. As we schedule investigations, our Real Estate Division is pursuing the necessary rights-of-entry. Results of these investigations will be presented in a Design Documentation Report prior to preparation of plans and specifications for the project.

The goal of these investigations will be to determine if contamination is present and, if present, to identify the degree, vertical extent, and areal extent of the contamination. If results reveal HTRW contamination, th first course of action will be to seek avoidance of the identified site. If avoidance is not achievable, then the City of Dallas is aware of their sole financial resposibility for cleanup of identified HTRW materials.

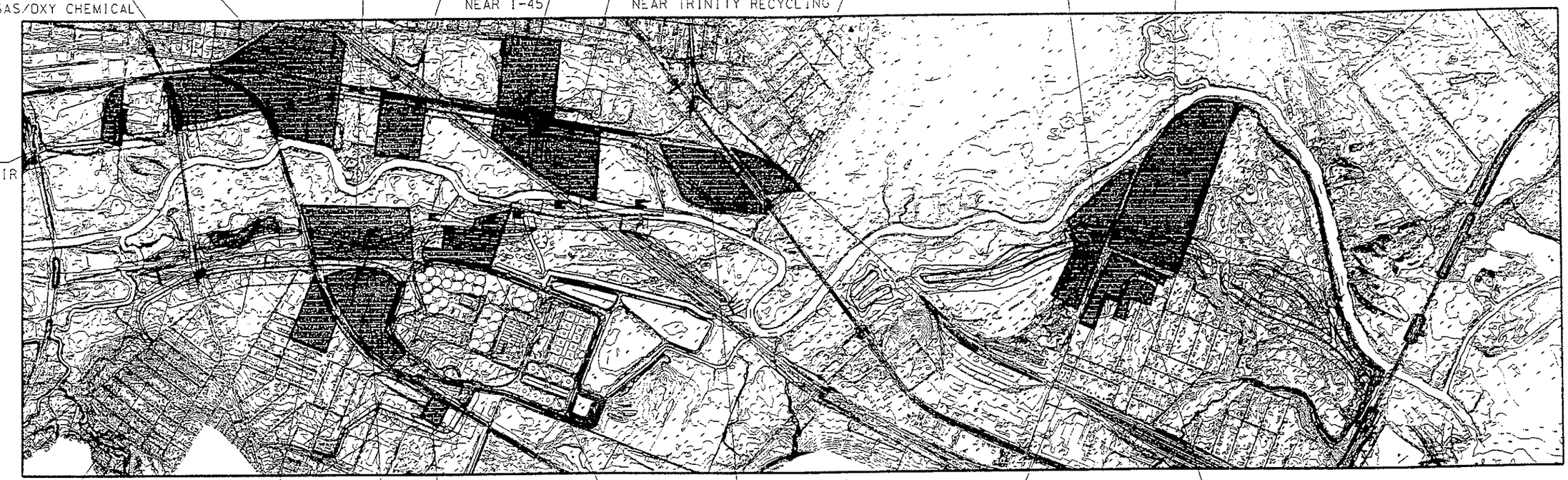
Table 1

Non-Hazardous Wastes Requiring Special Handling and Disposal

		SOLIDS					LIQUIDS				
Area	Name	Total Excavated Material CY	Contaminated Material %	Contaminated Material CY	Transportation & Disposal Unit Cost $/CY	Transportation & Disposal Cost $	Liquids Gal	Liquids Unit Cost $/Gal	Liquids Total Cost $	Investigations $	
1	Praxair	65,658	10	6,566	40	262,632				102,600	
2	Tri-Gas/Oxy Chem	59,740	30	17,922	40	716,880				115,800	
3	Dallas Public Schools	75,023	10	7,502	40	300,092				132,300	
4	Trinity Recycling	-	0	-	40	-				-	
5	Various Ponds/Gravel Pits										
	Linfield Landfill Pond	-	0	-	40	-				10,000	
	Pond near Dixie	-	0	-	40	-				10,000	
	Pond near Trinity	20,000	50	10,000	40	400,000				141,100	
	Pond near I-45	10,000	50	5,000	40	200,000				94,000	
6	Valley Steel/W. E. Grace	12,407	5	620	40	24,814				32,000	
7	Dallas Demolition	106,667	10	10,667	40	426,668				168,000	
8	Vacant land @ Dal Chrome	-	0	-	40	-				-	
9	En. Conv. Sys. & Darling Int.	5,926	50	2,963	40	118,520				50,000	
10	Vacant land Near ECS & DI	184,847	10	18,485	40	739,388				167,500	
11	Lagoon E	55,000	33	18,150	40	726,000				-	
12	UPRR Landfill	127,138	5	6,357	40	254,276				168,000	
13	Linfield Landfill	282,168	100	282,168	25	7,054,200	5,400,000	0.20	1,080,000	189,000	
14	Open Dump Near Linfield	-	0	-	40	-				-	
15	Priority 2 & 3 Sites	1,846,296	5	92,315	40	3,692,592				259,600	
	Subtotal					14,916,062			1,080,000	1,639,900	Investigation Subtotal
	Contingency @ 20%					2,983,212			216,000	327,980	Contingency @ 20%
	Total					17,899,274			1,296,000	1,967,880	Investigation Total
										406,000	Completed to Date
										1,561,880	To be Completed

Summary

Cost Shared Waste Disposal	$	19,195,274
Investigation Costs	$	1,967,880
Total Shared Amount	$	21,163,154



SCALE: 1" = 800'

SYM	P.C. NO.	ACTION	DATE	DESCRIPTION OF REVISION

ENVIRONMENTAL DIVISION
ENVIRONMENTAL DESIGN BRANCH

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: C. KIRBY
DRAWN BY: C. KIRBY
REVIEWED BY: J. DRYSDALE

DALLAS FLOODWAY EXTENSION
TRINITY RIVER PROJECT, TEXAS

GENERAL REEVALUATION REPORT

HTRW AREAS OF COI CERN
FIGURE 1

SUBMITTED BY:
MARK E. SIMMONS, P.E.
CHIEF, ENVIRONMENTAL
DESIGN BRANCH

SOL. NO.
CONTR. NO.
DRAWING NUMBER
SHEET NO.
OF
DATED:
SEQUENCE NO.

REFERENCE FILE NAME
REFERENCE FILE DESCRIPTION

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CONTR. NO.

SECTION J-1

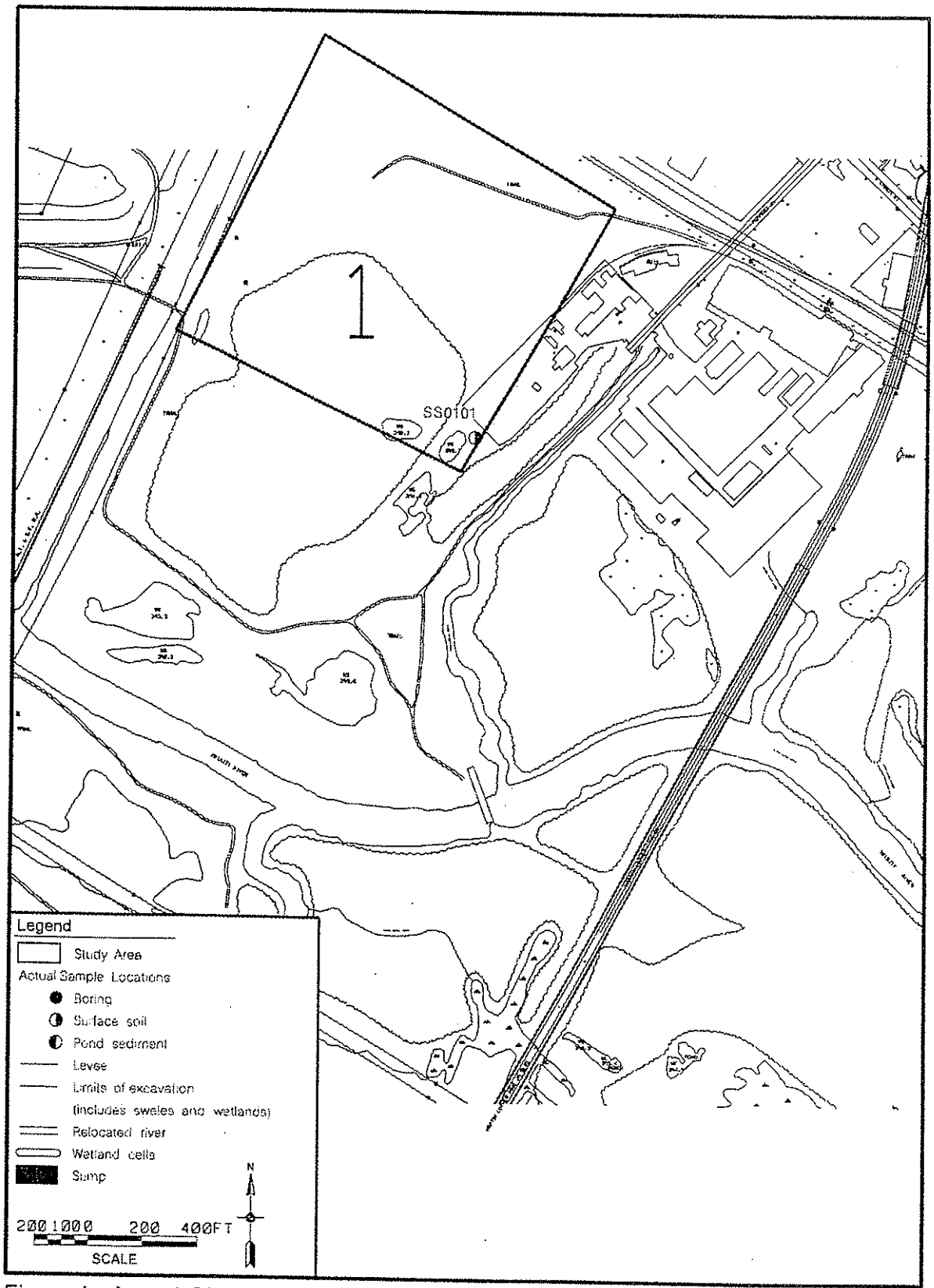


Figure 1. Area 1 Site Plan with Actual Sampling Location and Construction Elements.

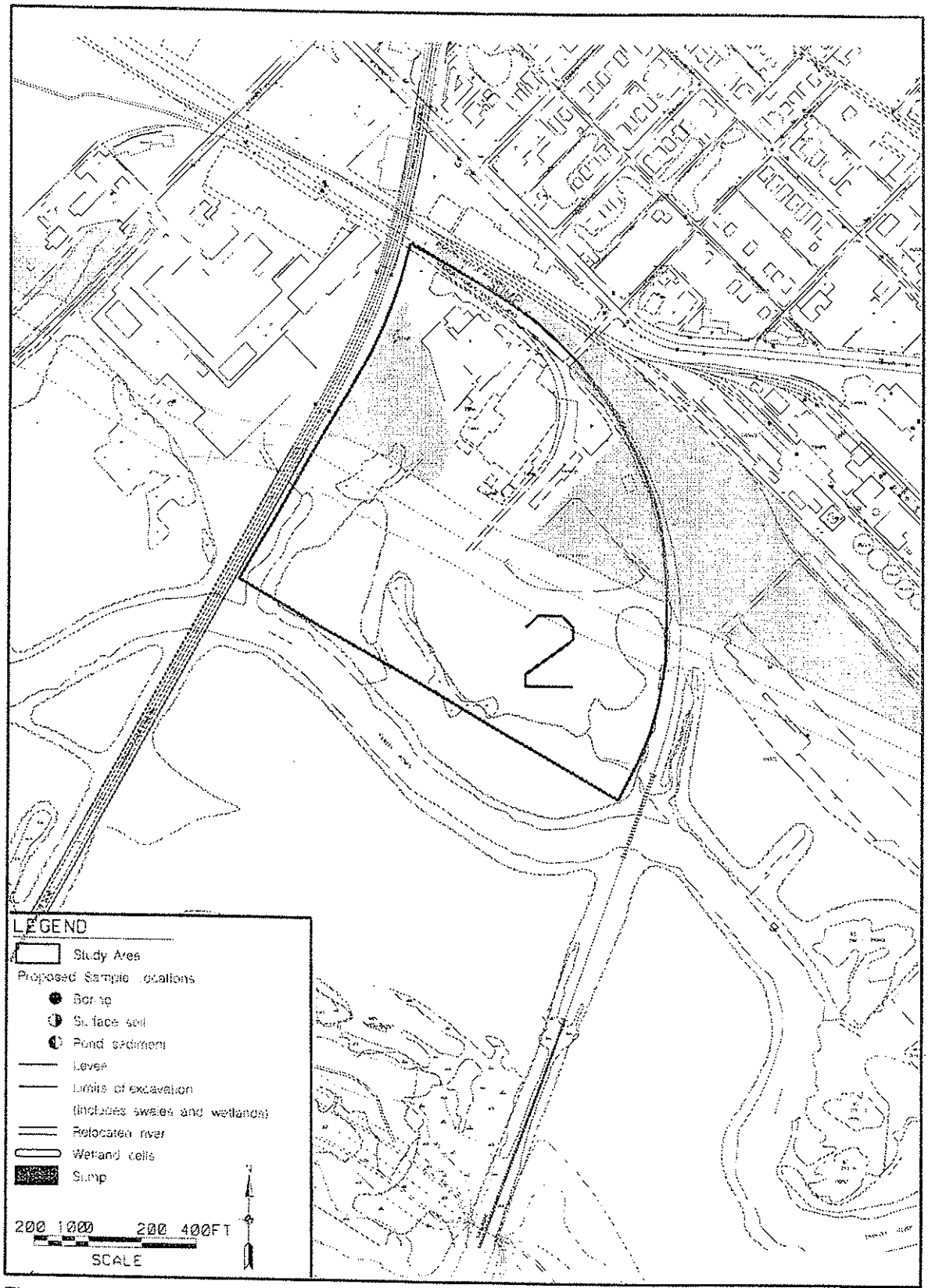


Figure 2. Area 2 Site Plan with Proposed Sampling Locations and Construction Elements.

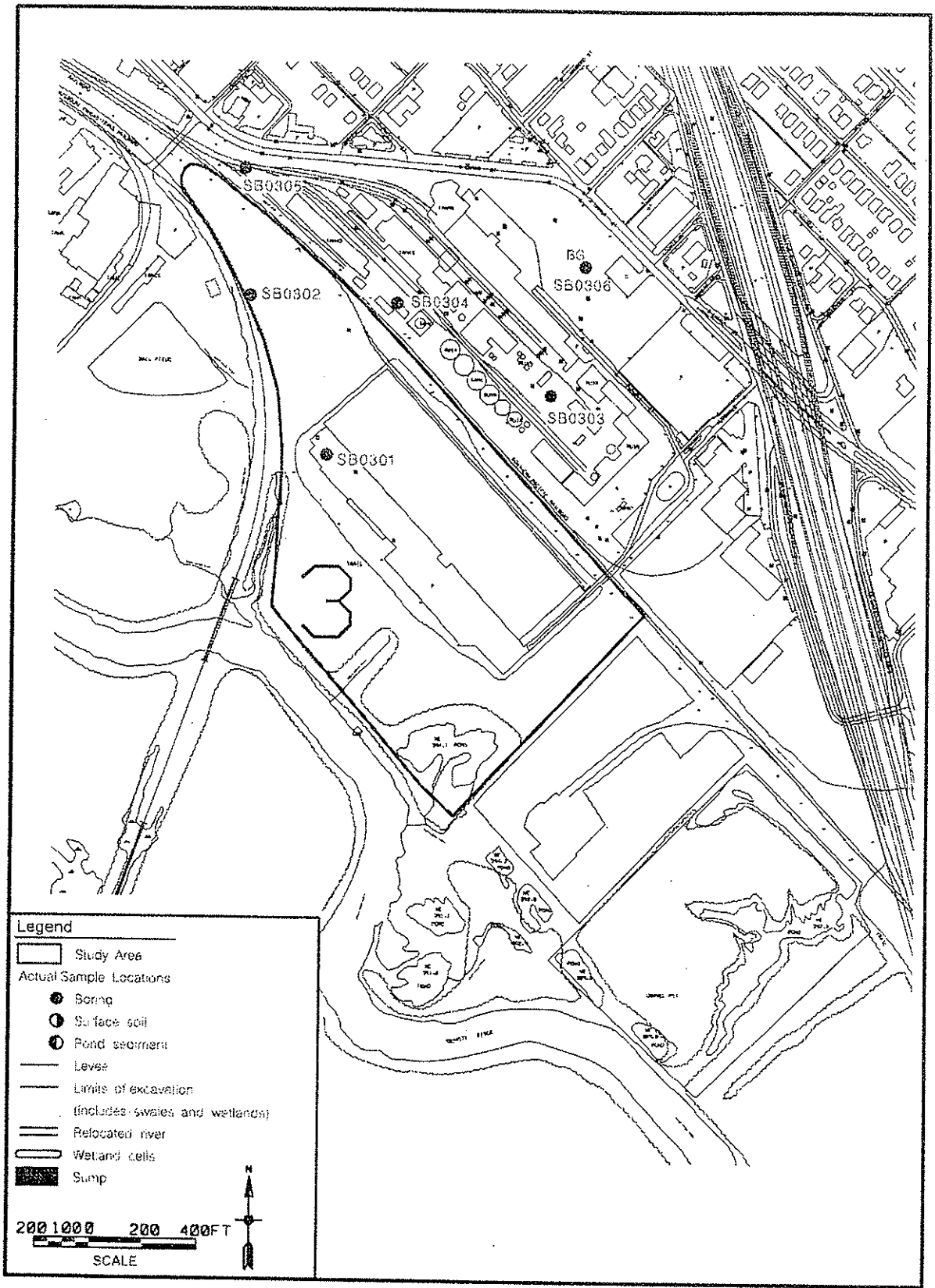


Figure 3. Area 3 Site Plan with Actual Sampling Location and Construction Elements.

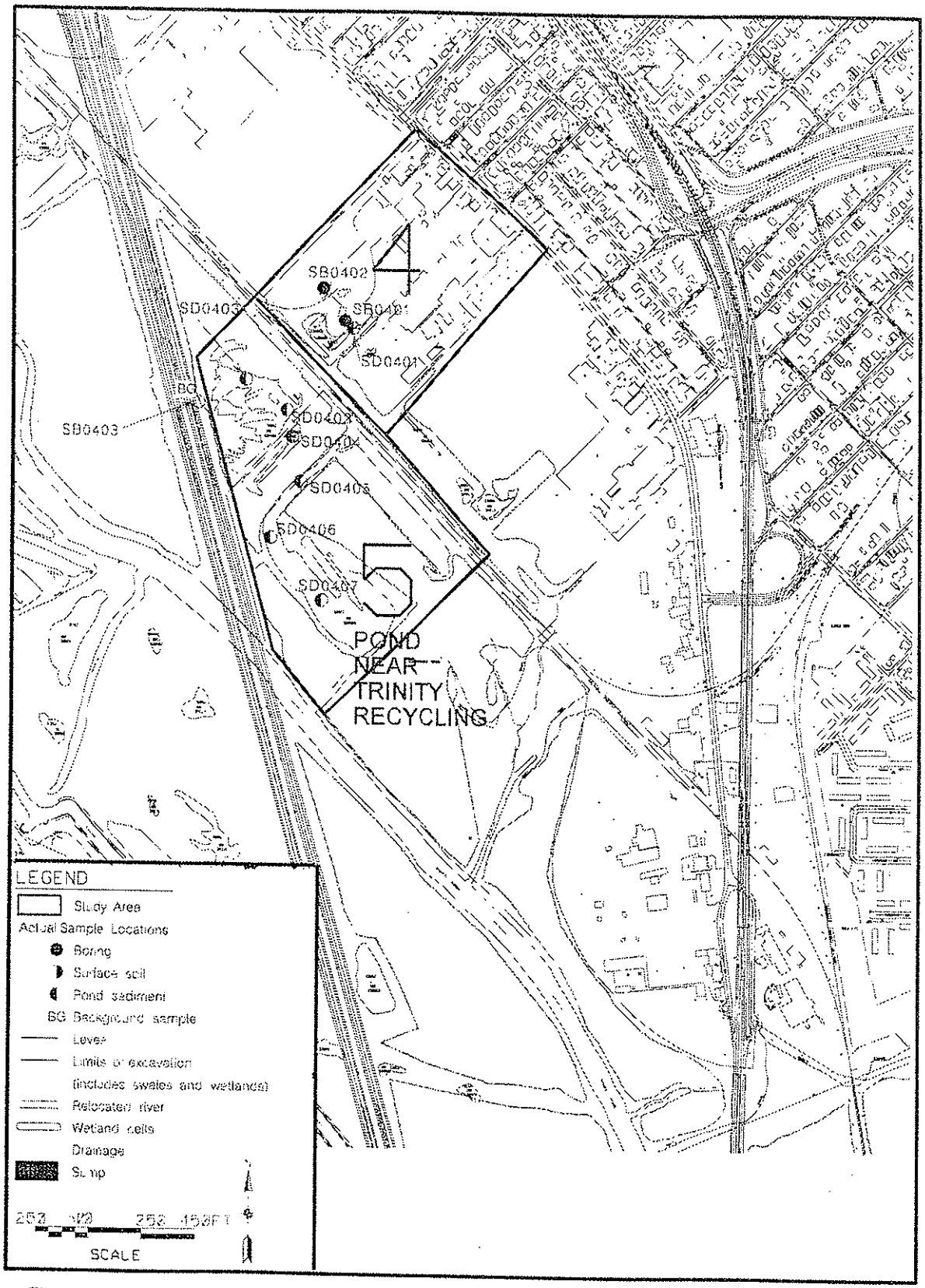


Figure 4. Aeras 4 and 5 Site Plan with Actual Sampling Locations and Construction Elements.

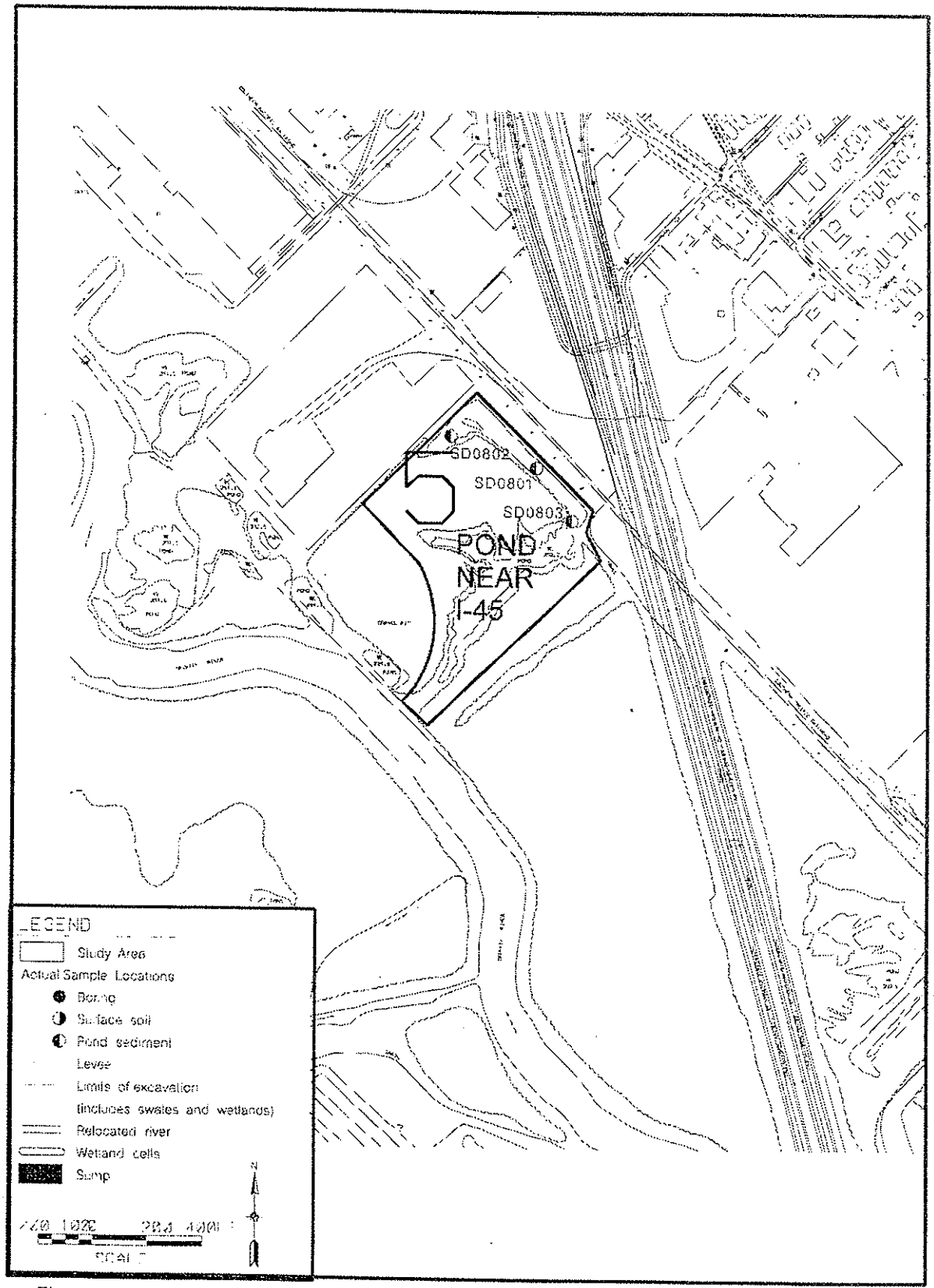


Figure 5. Area 5 Site Plan with Actual Sampling Locations and Construction Elements.

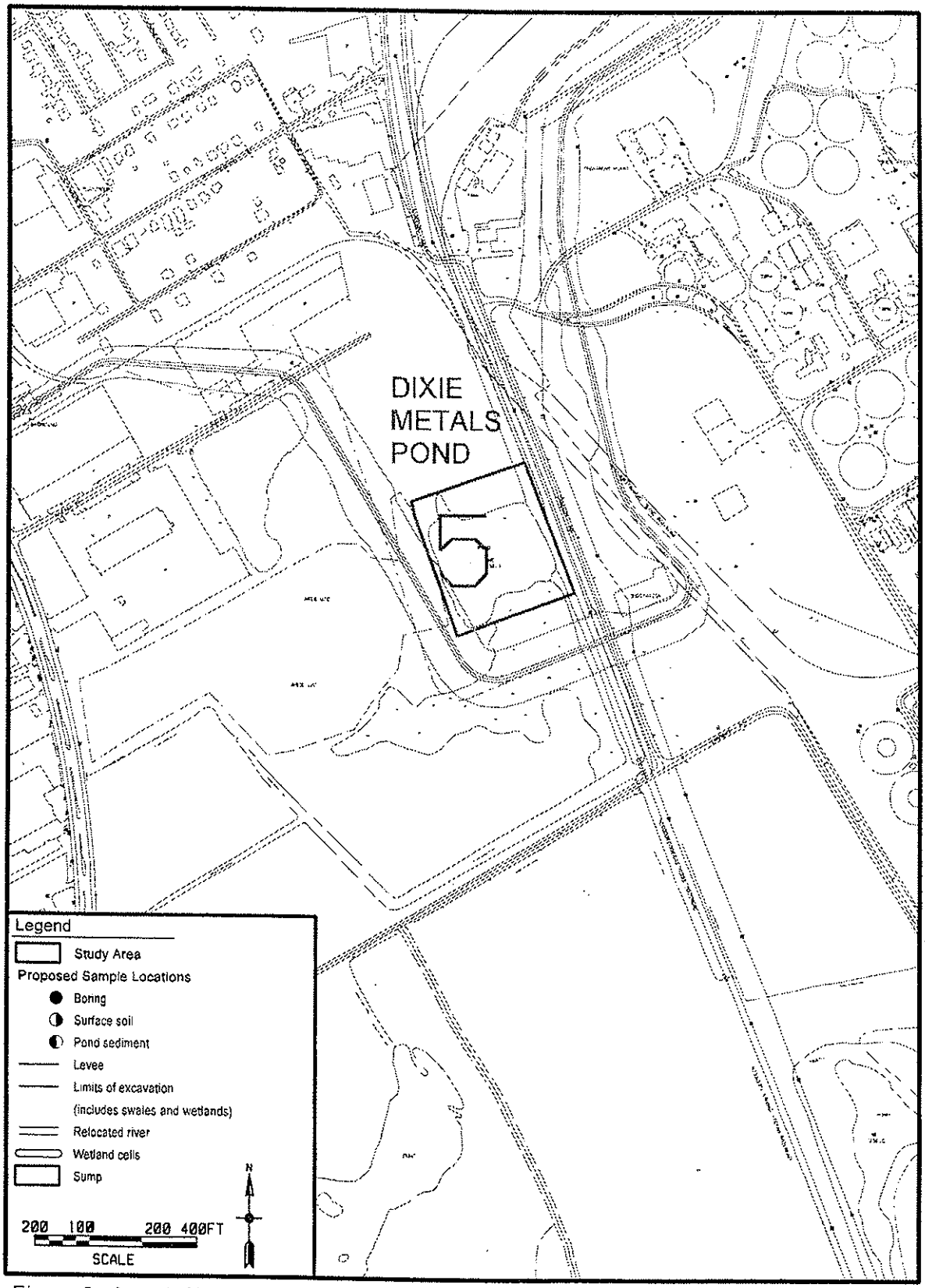


Figure 6. Area 5 Site Plan with Proposed Sampling Location and Construction Elements.

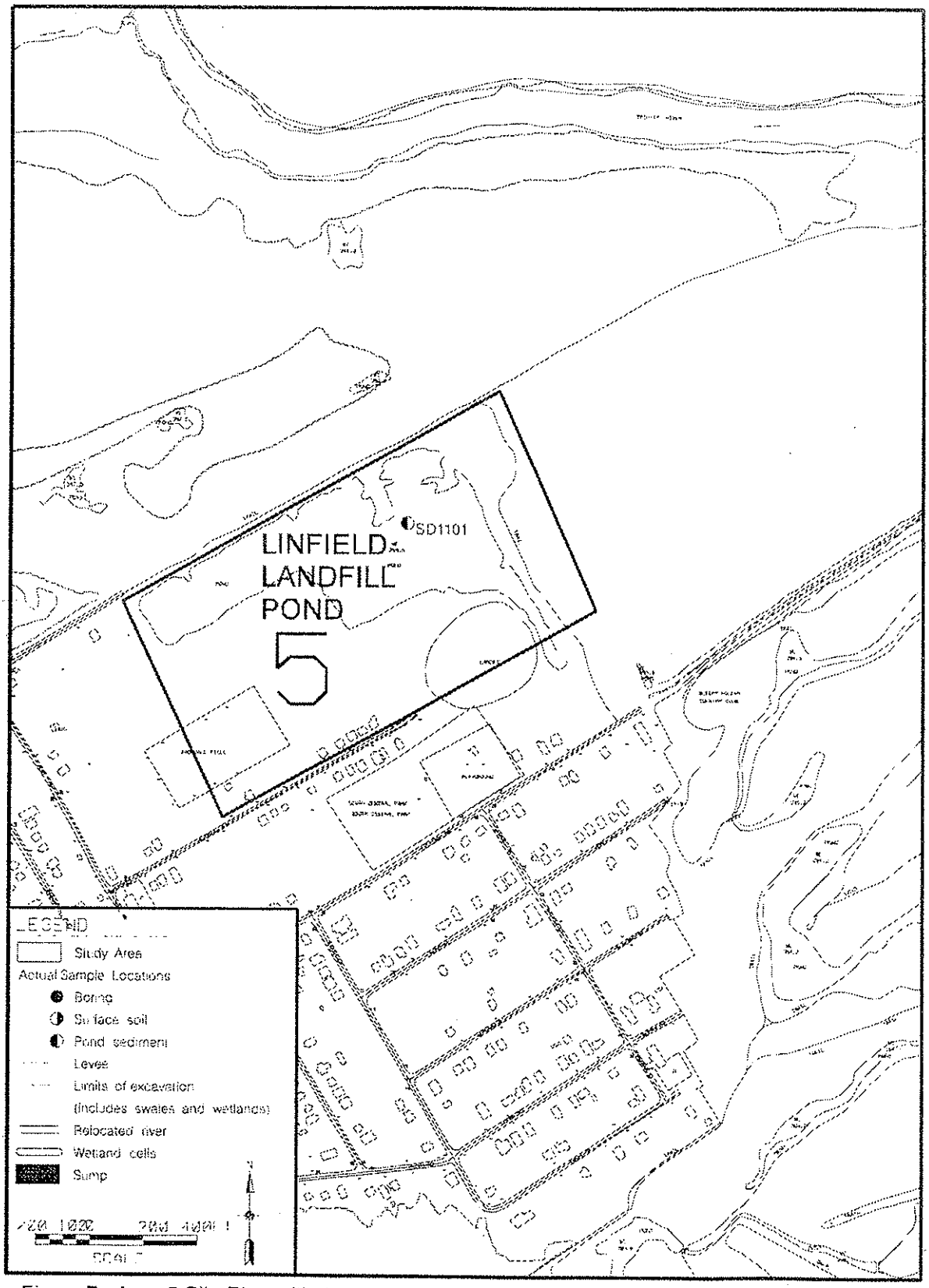


Figure 7. Area 5 Site Plan with Actual Sampling Location and Construction Elements.

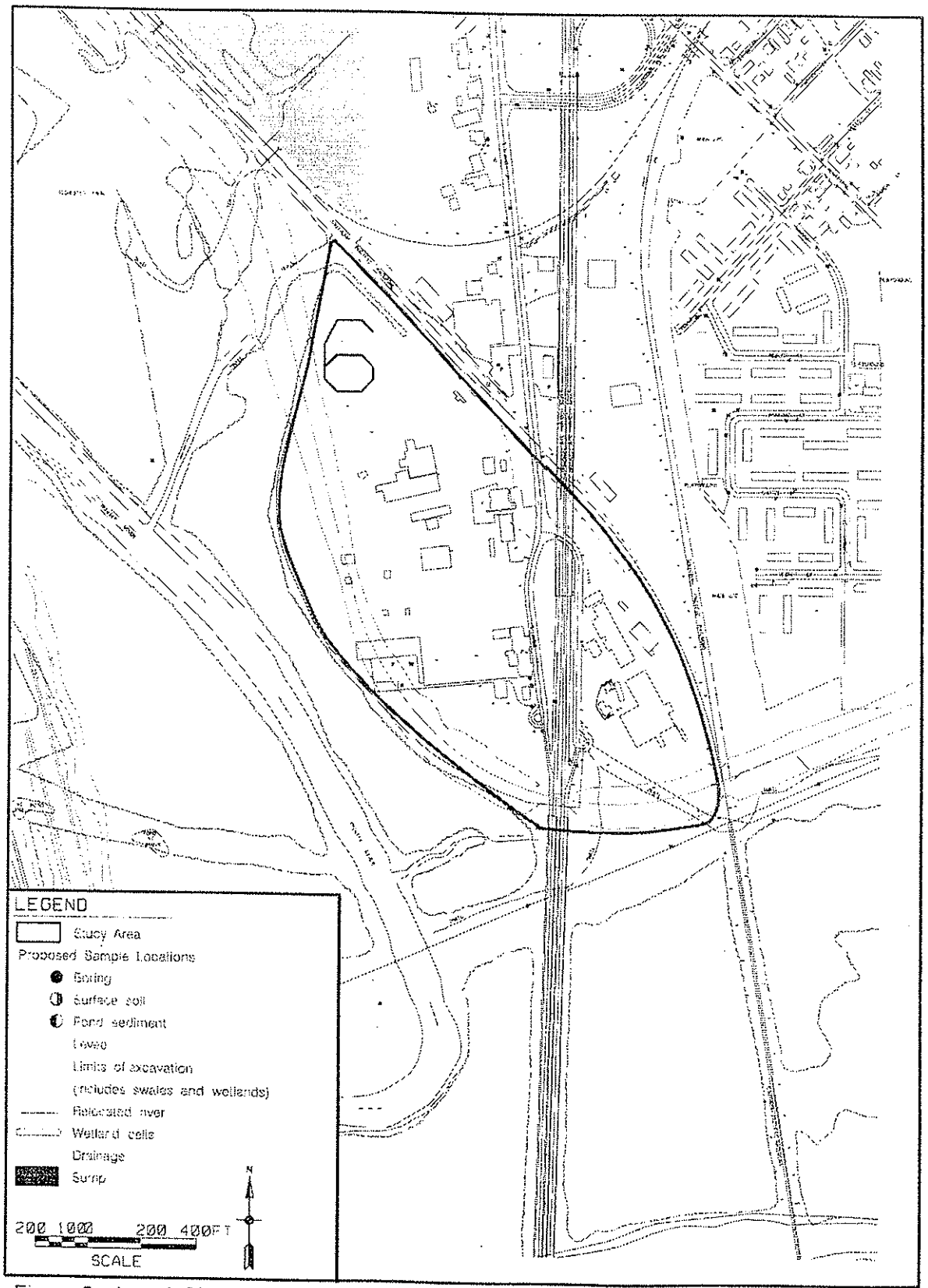


Figure 8. Area 6 Site Plan with Proposed Sampling Location and Construction Elements.

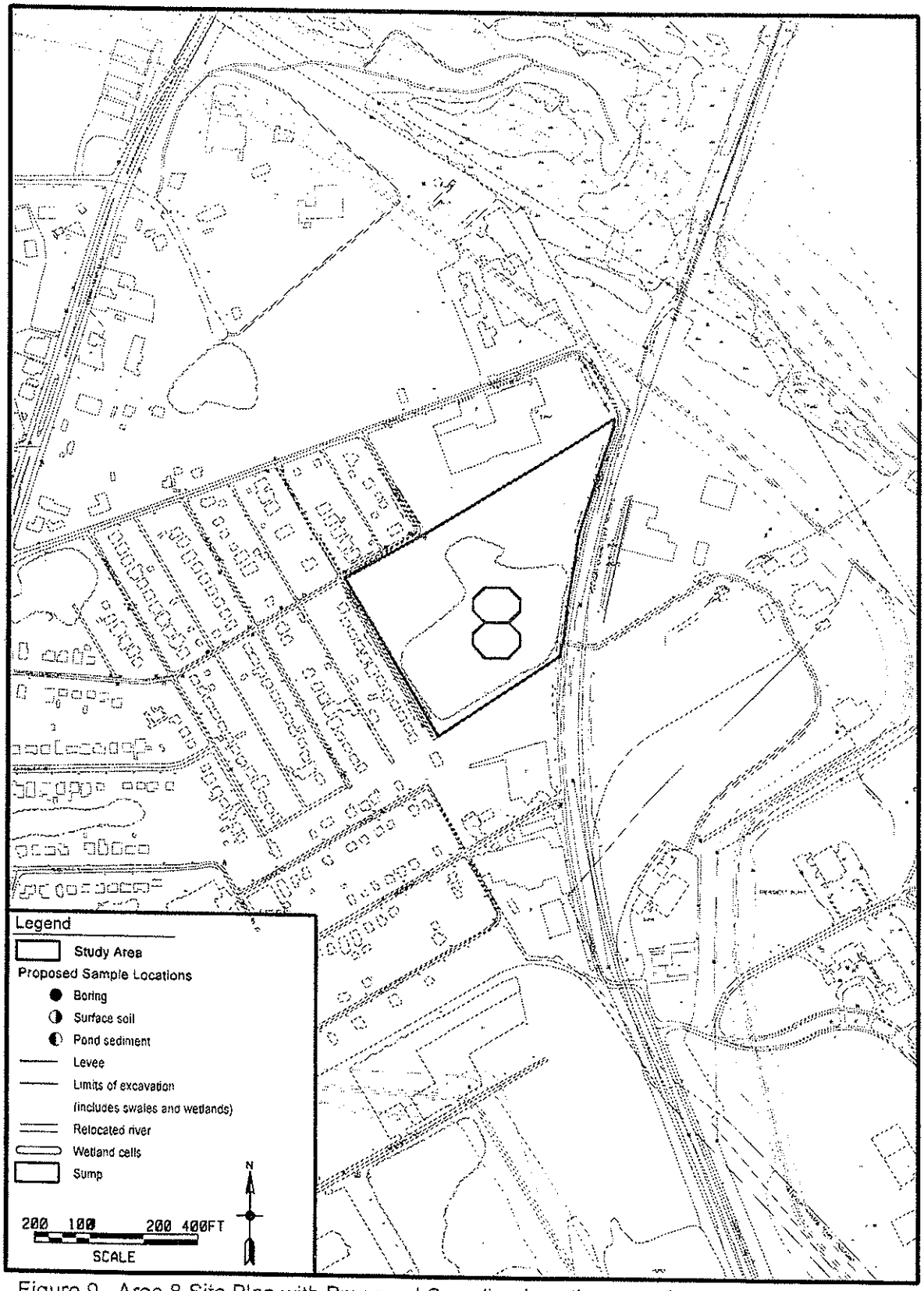


Figure 9. Area 8 Site Plan with Proposed Sampling Locations and Construction Elements.

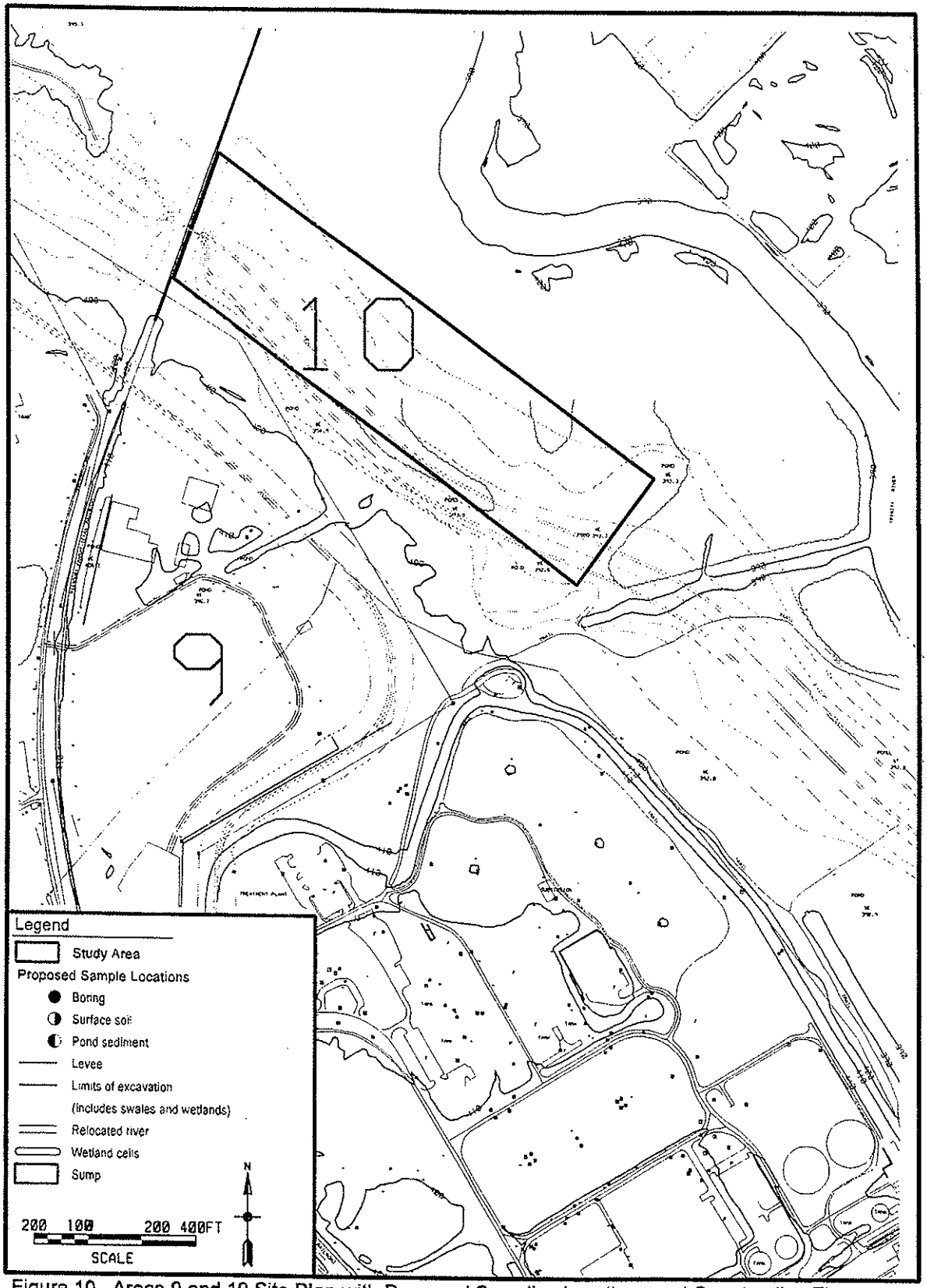


Figure 10. Areas 9 and 10 Site Plan with Proposed Sampling Locations and Construction Elements.

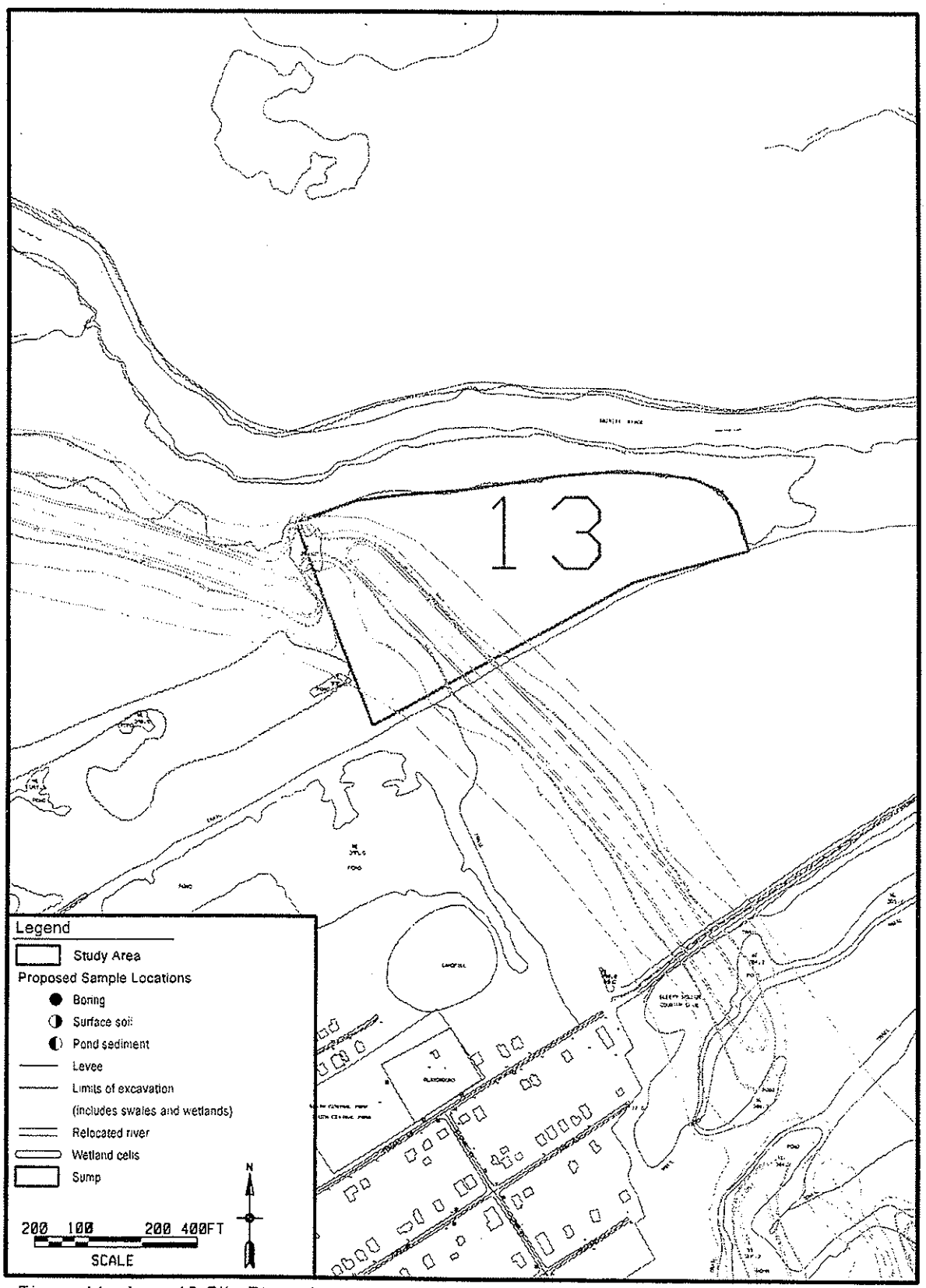


Figure 11. Area 13 Site Plan with Proposed Sampling Locations and Construction Elements.

Table 9

Summary of Analytical Results
Area 1

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SS0101				
Arsenic	7.8		0.76	mg/kg
Barium	110		3.0	mg/kg
Benzo(a)anthracene	89	J	500	ug/kg
Benzo(a)pyrene	100	J	500	ug/kg
Benzo(b)fluoranthene	270	J	500	ug/kg
Benzo(ghi)perylene	83	J	500	ug/kg
bis(2-Ethylhexyl)phthalate	200	J	500	ug/kg
Chromium (Total)	21		1.5	mg/kg
Chrysene	120	J	500	ug/kg
Fluoranthene	150	J	500	ug/kg
Indeno(1,2,3-cd)pyrene	72	J	500	ug/kg
Lead	38		0.76	mg/kg
Mercury	0.03		0.03	mg/kg
Phenanthrene	73	J	500	ug/kg
Pyrene	200	J	500	ug/kg

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 10

Summary of Analytical Results
Area 3

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB030100				
Arsenic	3.9		0.59	mg/kg
Barium	33		2.4	mg/kg
Chromium (Total)	4.2		1.2	mg/kg
Lead	6		0.59	mg/kg
Sample Number: SB030104				
Acetone	380		40	ug/kg
Arsenic	3.6		0.6	mg/kg
Barium	55		2.4	mg/kg
Chromium (Total)	5.2		1.2	mg/kg
Lead	7		0.6	mg/kg
Mercury	0.048		0.024	mg/kg
Sample Number: GW0301				
Acetone	53		10	ug/l
Barium	74		20	ug/l
Selenium	11		5	ug/l
1,2-Dichlorothene	1.2	J	5	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 10 (cont'd)

Summary of Analytical Results
Area 3

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB030202				
Arsenic	5.7		0.57	mg/kg
Barium	86		2.3	mg/kg
Chromium (Total)	20		1.1	mg/kg
Lead	96		0.57	mg/kg
Mercury	0.18		0.023	mg/kg
Selenium	1.6		0.57	mg/kg
Sample Number: SB030211				
Acetone	66		12	ug/kg
Arsenic	5.3		0.58	mg/kg
Barium	49		2.3	mg/kg
Benzo(b)fluoranthene	180	J	380	ug/kg
Chromium (Total)	13		1.2	mg/kg
Fluoranthene	49	J	380	ug/kg
Lead	7.1		0.58	mg/kg
Sample Number: GW0302				
Arsenic	56		5	ug/l
Barium	740		20	ug/l
Chromium (Total)	110		10	ug/l
Lead	300		50	ug/l
Methylene chloride	1.4	J	5	ug/l
Selenium	14		5	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 10 (cont'd)

Summary of Analytical Results
Area 3

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB030304				
Arsenic	2.4		0.62	mg/kg
Barium	95		2.5	mg/kg
Chromium (Total)	4.2		1.2	mg/kg
Lead	6.8		0.62	mg/kg
Sample Number: SB030310				
Acetone	13		12	ug/kg
Arsenic	5		0.6	mg/kg
Barium	150		2.4	mg/kg
Chromium (Total)	6		1.2	mg/kg
Lead	9.1		0.6	mg/kg
Sample Number: GW0303				
Acetone	19	B	10	ug/l
Barium	47		20	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 10 (cont'd)

Summary of Analytical Results
Area 3

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB030402				
Arsenic	7.4		0.55	mg/kg
Barium	54		2.2	mg/kg
Chromium (Total)	16		1.1	mg/kg
Lead	78		0.55	mg/kg
Mercury	0.099		0.022	mg/kg
Sample Number: SB030416				
Arsenic	2.7		0.59	mg/kg
Barium	30		2.4	mg/kg
Benzo(b)fluoranthene	150	J	390	mg/kg
Chromium (Total)	4		1.2	mg/kg
Lead	7.2		0.59	mg/kg
Sample Number: GW0304				
1,2-Dichlorobenzene	24		10	ug/l
2-Chlorophenol	2.4	J	10	ug/l
Arsenic	26		5	ug/l
Barium	21		20	ug/l
Acetone	8.9	J,B	10	ug/l
1,2-Dichloroethene	1.6	J	5	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 10 (cont'd)

Summary of Analytical Results
Area 3

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB030502				
Arsenic	4.2		0.57	mg/kg
Barium	59		2.3	mg/kg
Chromium (Total)	12		1.1	mg/kg
Lead	7.1		0.57	mg/kg
Sample Number: SB030512				
Acetone	5.2	J	11	ug/kg
Arsenic	9.2		0.57	mg/kg
Barium	13		2.3	mg/kg
Chromium (Total)	5.7		1.1	mg/kg
Lead	3.1		0.57	mg/kg
Methylene chloride	1.2	J	5.7	ug/kg
Sample Number: GW0305				
Barium	52		20	ug/l
Lead	40		5	ug/l
Selenium	6.5		5	ug/l
Trichloroethene	1.7	J	5	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 10 (cont'd)

Summary of Analytical Results
Area 3

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB030602				
Arsenic	4.8		0.57	mg/kg
Barium	30		2.3	mg/kg
Chromium (Total)	14		1.1	mg/kg
Lead	7.3		0.57	mg/kg
Selenium	1.3		0.57	mg/kg
Sample Number: SB030612				
Acetone	12		12	ug/kg
Arsenic	34		0.58	mg/kg
Barium	8		2.3	mg/kg
Chromium (Total)	10		1.2	mg/kg
Lead	2.8		0.58	mg/kg
Sample Number: GW0306				
2-Chlorophenol	3.5	J	10	ug/l
Barium	36		20	ug/l
Selenium	6		5	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 11

Summary of Analytical Results
Area 4

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB040101				
Arsenic	3.2		0.58	mg/kg
Barium	34		2.3	mg/kg
Chromium (Total)	7.6		1.2	mg/kg
Lead	21		0.58	mg/kg
Sample Number: SB040116				
Acetone	13		12	ug/kg
Arsenic	4.6		0.58	mg/kg
Barium	62		2.3	mg/kg
Cadmium	17		0.58	mg/kg
Chlorobenzene	1.4	J	5.8	ug/kg
Chromium (Total)	27		1.2	mg/kg
Lead	560		0.58	mg/kg
Mercury	1.5		0.023	mg/kg
Silver	3.6		1.2	mg/kg
Sample Number: GW0401				
1,2-Dichlorobenzene	24		10	ug/l
Arsenic	7.9		5	ug/l
Barium	270		20	ug/l
Benzene	4.7	J	5	ug/l
Chlorobenzene	150		5	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 11 (cont'd)

Summary of Analytical Results
Area 4

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB040202				
Arsenic	16		0.58	mg/kg
Barium	160		2.3	mg/kg
Cadmium	15		0.58	mg/kg
Chromium (Total)	75		1.2	mg/kg
Lead	2000		0.58	mg/kg
Silver	4		1.2	mg/kg
Sample Number: SB040212				
Acetone	72		12	ug/kg
Arsenic	3.3		0.58	mg/kg
Barium	23		2.3	mg/kg
Chromium (Total)	12		1.2	mg/kg
Lead	210		0.58	mg/kg
Methylene chloride	5.9		5.8	ug/kg
Sample Number: GW0402				
Arsenic	10		5	ug/l
Barium	200		20	ug/l
Chromium (Total)	43		10	ug/l
Lead	2300		5	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 11 (cont'd)

Summary of Analytical Results
Area 4

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SB040302				
Arsenic	5.1		0.58	mg/kg
Barium	76		2.3	mg/kg
Chromium (Total)	10		1.2	mg/kg
Lead	20		0.58	mg/kg
Sample Number: SB040309				
Acetone	80		12	ug/kg
Arsenic	4.8		0.62	mg/kg
Barium	66		2.5	mg/kg
Chromium (Total)	7.6		1.2	mg/kg
Cyanide	0.91		0.62	mg/kg
Lead	11		0.62	mg/kg
Sample Number: GW0403				
Barium	210		20	ug/l

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 11 (cont'd)

Summary of Analytical Results
Area 4-5

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SD0401				
Acetone	36		17	ug/kg
Toluene	8.7		8.3	ug/kg
Phenanthrene	150	J	550	ug/kg
Fluoranthene	560		550	ug/kg
Pyrene	870		550	ug/kg
Benzo(a)anthracene	930		550	ug/kg
Bis(2-Ethylhexyl)phthalate	760		550	ug/kg
Chrysene	1000		550	ug/kg
Benzo(b)fluoranthene	2900		550	ug/kg
Benzo(a)pyrene	1400		550	ug/kg
Indo(1,2,3-cd)pyrene	1000		550	ug/kg
Dibenzo(a,h)anthracene	400	J	550	ug/kg
Benzo(ghi)perylene	1100		550	ug/kg
Silver	2.3		1.7	mg/kg
Arsenic	3.9		0.83	mg/kg
Barium	71		3.3	mg/kg
Cadmium	6.6		0.83	mg/kg
Chromium (Total)	24		1.7	mg/kg
Lead	310		0.83	mg/kg
Mercury	0.27		0.033	mg/kg
Sample Number: SD0402				
2-Butanone	47		28	ug/kg
Arsenic	9.5		1.4	mg/kg
Barium	120		5.7	mg/kg
bis(2-Ethylhexyl)phthalate	110	J	940	ug/kg
Carbon disulfide	7.7	J	14	ug/kg
Chromium (Total)	17		2.8	mg/kg
Lead	50		1.4	mg/kg
Mercury	0.086		0.057	mg/kg

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 11 (cont'd)

Summary of Analytical Results
Area 5

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SD0403				
2-Butanone	100		30	ug/kg
Acetone	590		30	ug/kg
Arsenic	7.5		1.5	mg/kg
Barium	110		6.1	mg/kg
Benzo(b)fluoranthene	390	J	1000	ug/kg
bis(2-Ethylhexyl)phthalate	160	J	1000	ug/kg
Carbon disulfide	8.4	J	15	ug/kg
Chromium (Total)	12		3	mg/kg
Lead	36		1.5	mg/kg
Sample Number: SD0404				
Acetone	140		26	ug/kg
Arsenic	9.4		1.3	mg/kg
Barium	72		5.3	mg/kg
bis(2-Ethylhexyl)phthalate	100	J	870	ug/kg
Chromium (Total)	9		2.6	mg/kg
Lead	23		1.3	mg/kg
Toluene	97		13	ug/kg
Sample Number: SD0405				
2-Butanone	8.6	J	18	ug/kg
Acetone	86		18	ug/kg
Arsenic	9.6		0.91	mg/kg
Barium	98		3.6	mg/kg
Benzo(a)anthracene	64	J	600	ug/kg
Benzo(a)pyrene	75	J	600	ug/kg
Benzo(b)fluoranthene	340	J	600	ug/kg
Benzo(ghi)perylene	61	J	600	ug/kg
bis(2-Ethylhexyl)phthalate	210	J	600	ug/kg
Chromium (Total)	13		1.8	mg/kg
Chrysene	84	J	600	ug/kg
Fluoranthene	150	J	600	ug/kg
Lead	33		0.91	mg/kg
Mercury	0.054		0.036	mg/kg
Pyrene	100	J	600	ug/kg

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 11 (cont'd)

Summary of Analytical Results
Area 5

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SD0406				
Acetone	190		22	ug/kg
Arsenic	12		1.1	mg/kg
Barium	120		4.4	mg/kg
Benzo(b)fluoranthene	350	J	730	ug/kg
Bis(2-Ethylhexyl)phthalate	190	J	730	ug/kg
Chromium (Total)	15		2.2	mg/kg
Fluoranthene	100	J	730	ug/kg
Lead	52		1.1	mg/kg
Mercury	0.067		0.044	mg/kg
Pyrene	83	J	730	ug/kg
Sample Number: SD0407				
Acetone	53		18	ug/kg
Arsenic	6.5		0.91	mg/kg
Barium	98		3.6	mg/kg
Benzo(a)pyrene	63	J	600	ug/kg
Benzo(b)fluoranthene	320	J	600	ug/kg
Bis(2-Ethylhexyl)phthalate	240	J	600	ug/kg
Chromium (Total)	10		1.8	mg/kg
Chrysene	70	J	600	ug/kg
Fluoranthene	120	J	600	ug/kg
Lead	28		0.91	mg/kg
Mercury	0.054		0.036	mg/kg
Pyrene	85	J	600	ug/kg
Toluene	4.5	J	9.1	ug/kg

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 12

Summary of Analytical Results
Area 5

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SD0801				
2-Butanone	14	J	23	ug/kg
Acetone	130		23	ug/kg
Arsenic	15		1.2	mg/kg
Barium	110		4.6	mg/kg
Benzo(a)anthracene	85	J	770	ug/kg
Benzo(a)pyrene	110	J	770	ug/kg
Benzo(b)fluoranthene	110	J	770	ug/kg
Benzo(k)fluoranthene	180	J	770	ug/kg
Bis(2-Ethylhexyl)phthalate	420	J	770	ug/kg
Chromium (Total)	20		2.3	mg/kg
Chrysene	100	J	770	ug/kg
Fluoranthene	190	J	770	ug/kg
Lead	58		1.2	mg/kg
Mercury	0.12		0.046	mg/kg
Pyrene	200	J	770	ug/kg
Sample Number: SD0802				
Acetone	98		23	ug/kg
Arsenic	11		1.2	mg/kg
Barium	100		4.6	mg/kg
Benzo(a)anthracene	250	J	770	ug/kg
Benzo(a)pyrene	180	J	770	ug/kg
Benzo(b)fluoranthene	430	J	770	ug/kg
Benzo(ghi)perylene	180	J	770	ug/kg
Benzo(k)fluoranthene	240	J	770	ug/kg
Bis(2-Ethylhexyl)phthalate	450	J	770	ug/kg
Chromium (Total)	15		2.3	mg/kg
Chrysene	230	J	770	ug/kg
Fluoranthene	400	J	770	ug/kg
Indeno(1,2,3-cd)pyrene	140	J	770	ug/kg
Lead	72		1.2	mg/kg
Mercury	0.14		0.046	mg/kg
Phenanthrene	130	J	770	ug/kg
Pyrene	430	J	770	ug/kg

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

Table 12 (cont'd)

Summary of Analytical Results
Area 5

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SD0803				
Acetone	65		23	ug/kg
Arsenic	9.3		1.1	mg/kg
Barium	94		4.5	mg/kg
Benzo(a)anthracene	140	J	750	ug/kg
Benzo(a)pyrene	170	J	750	ug/kg
Benzo(b)fluoranthene	400	J	750	ug/kg
Benzo(ghi)perylene	100	J	750	ug/kg
Bis(2-Ethylhexyl)phthalate	620	J	750	ug/kg
Chromium (Total)	14		2.3	mg/kg
Chrysene	190	J	750	ug/kg
Fluoranthene	250	J	750	ug/kg
Lead	40		1.1	mg/kg
Phenanthrene	130	J	750	ug/kg
Pyrene	310	J	750	ug/kg
Toluene	4.7	J	11	ug/kg

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

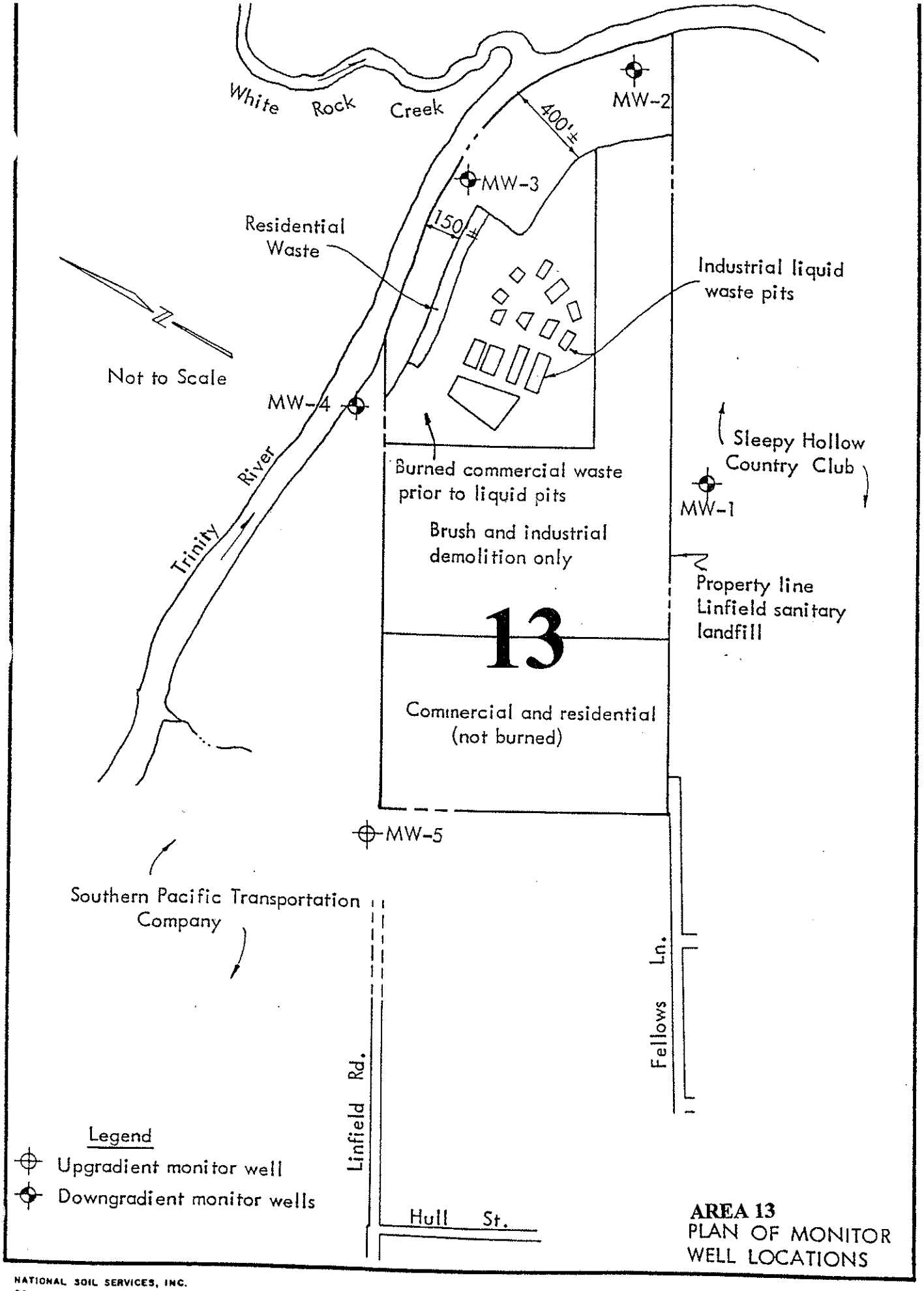
Table 13

Summary of Analytical Results
Area 5

Parameter	Reported Result	Qualifier	Quantitative Limit	Unit
Sample Number: SD1101				
2-Butanone	10	J	48	ug/kg
Acetone	290		48	ug/kg
Anthracene	93	J	1600	ug/kg
Arsenic	12		2.4	mg/kg
Barium	210		9.5	mg/kg
Benzo(a)anthracene	310	J	1600	ug/kg
Benzo(a)pyrene	370	J	1600	ug/kg
Benzo(b)fluoranthene	720	J	1600	ug/kg
Bis(2-Ethylhexyl)phthalate	580	J	1600	ug/kg
Carbon disulfide	32		24	ug/kg
Chromium (Total)	16		4.8	mg/kg
Chrysene	330	J	1600	ug/kg
Fluoranthene	730	J	1600	ug/kg
Indeno(1,2,3-cd)pyrene	190	J	1600	ug/kg
Lead	370		2.4	mg/kg
Mercury	0.14		0.095	mg/kg
Phenanthrene	270	J	1600	ug/kg
Pyrene	930	J	1600	ug/kg

Qualifiers: J = Estimated Value B = Also Present in Laboratory Blank

SECTION J-2



NATIONAL SOIL SERVICES, INC.
CONSULTING ENGINEERS.

FIGURE 1

TABLE 1

US ARMY CORPS OF ENGINEERS – FORT WORTH DISTRICT
DALLAS FLOODWAY EXTENSION – HAZARDOUS AND TOXIC WASTE INVESTIGATION

SUMMARY OF REPORTED SOIL PARAMETER LEVELS

TEST PARAMETERS	SAMPLE LOCATIONS IA–1	PQL	IA–3	PQL	IA–4	PQL	IA–5	PQL	IA–0	PQL	TCLP*20	CLASS 1 LEVEL*20
Metals (mg/Kg)												
Arsenic	2.9	1.0	1.9	1.0	2.2	1.0	1.8	1.0	6.9		100.0	36.0
Barium	29	1.0	16	1.0	71	1.0	15	1.0	88.0		2000.0	2000.0
Cadmium	4.0	1.0	1.3	1.0	5.4	1.0	2.7	1.0	ND	1.2	20.0	10.0
Chromium	9.8	2.0	4.9	2.0	10	2.0	5.9	2.0	14.0		100.0	100.0
Lead	ND	10.0	26	10.0	19	10.0	ND	10.0	22.1		100.0	30.0
Mercury	ND	0.3	ND	0.3	0.5	0.3	ND	0.3	0.25		20.0	4.0
Selenium	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.6	20.0	20.0
Silver	ND	2.0	ND	2.0	2.6	2.0	ND	2.0	ND	1.2	100.0	100.0
VOCs (EPA 8260 – ug/Kg)	NONE REPORTED ABOVE PQLs											
SVOCs (EPA 8270–ug/Kg)												
Pyrene	ND	770	ND	810	6400	4000	ND	790	6220	406		
Phenanthrene	ND	1500	ND	1600	4800	4000	ND	790	3830	406		
Fluoranthene	ND	770	ND	810	7200	4000	ND	790	3650	406		
Chyrsene	ND	770	ND	810	4600	4000	ND	790	2620	406		
Acenapthene	ND	770	ND	810	ND	4000	ND	790	554	406		
Flourene	ND	770	ND	810	ND	4000	ND	790	781	406		
Anthracene	ND	770	ND	810	ND	4000	ND	790	1370	406		
Benzo(a)anthracene	ND	770	ND	810	ND	4000	ND	790	2840	406		
Benzo(k)fluoranthene	ND	770	ND	810	ND	4000	ND	790	3140	406		
Benzo(a)pyrene	ND	770	ND	810	ND	4000	ND	790	1880	406		
Indeno(1,2,3–cd)pyrene	ND	770	ND	810	ND	4000	ND	790	1270	406		
Benzo(g,h,i)perylene	ND	770	ND	810	ND	4000	ND	790	799	406		
CYANIDE (EPA 9010)	None Reported above PQLs											
HERBICIDES (EPA 8150	None Reported Above PQLs											
PESTICIDES & PCBs(EPA 8080 – ug/Kg)												
Dieldrin	ND	1.44	ND	16.1	ND	14.5	ND	14.5	17			
WASTE CLASSIFICATION	Municipal		Municipal		Municipal		Municipal		Municipal			

PQL – Practical Quantitation Limit
ND – Compound Level Not Reported Above PQL

Note: Reported levels were compared with a TCLP X 20 and Class I Threshold X 20 value to account for mechanical dilution with the TCLP Method

TABLE 2

US ARMY CORPS OF ENGINEERS – FORT WORTH DISTRICT
DALLAS FLOODWAY EXTENSION – HAZARDOUS AND TOXIC WASTE INVESTIGATION

SUMMARY OF REPORTED GROUNDWATER PARAMETERS VERSUS
TCLP TOXICITY AND TNRCC CLASS I WASTE LEVEL THRESHOLDS

TEST PARAMETERS	SAMPLE LOCATIONS IA–1	PQL	IA–3	PQL	IA–4	PQL	IA–5	PQL	IA–0	PQL	* TCLP	CLASS 1 LEVEL
METALS (mg/L)												
Arsenic	0.13	0.01	0.01	0.01	0.02	0.01	0.96	0.02	0.38		5.0	36.0
Barium	7.86	0.02	0.07	0.02	2.16	0.02	3.80	0.02	25.3		100.0	2000.0
Cadmium	0.10	0.02	ND	0.02	0.08	0.02	0.36	0.02	0.118		1.0	10.0
Chromium	0.42	0.02	ND	0.02	0.21	0.02	0.70	0.02	2.72		5.0	100.0
Lead	5.8*	0.1	0.20	0.1	0.7	0.1	6.50*	0.1	6.96*		5.0	30.0
Mercury	0.009	0.001	ND	0.001	0.06	0.01	0.12	0.01	0.0014		0.2	4.0
Selenium	ND	0.005	ND	0.005	0.29	0.02	ND	0.02	0.006		1.0	20.0
Silver	0.02	0.02	ND	0.02	0.37	0.02	0.19	0.02	0.044		5.0	100.0
VOC's (EPA 8260 – ug/L)												
Chlorobenzene	ND	5.0	ND	5.0	ND	5.0	9.0	5.0	ND			70,000
SVOC's (EPA 8270 – ug/L)												
Bis(2–Ethylhexyl)phthalate	89	57	ND	11	ND	20	ND	57	ND	1000		30,000
Di–n–octylphthalate	63	57	ND	11	ND	20	71	57	ND	1000		
Phenanthrene	60	57	ND	11	ND	20	ND	57	ND	1000		
CYANIDES (EPA 9010 – mg/L)	0.01	0.01	ND	0.01	ND	0.01	ND	0.01	0.01			
HERBICIDES (8150)	None Reported above PQLs											
PCBs (EPA 8080)	None Reported above PQLs											
PESTICIDES (EPA 8080)	None Reported above PQLs											
WASTE CLASSIFICATION	Hazardous		Municipal		(see IA–0)		Hazardous		Hazardous			

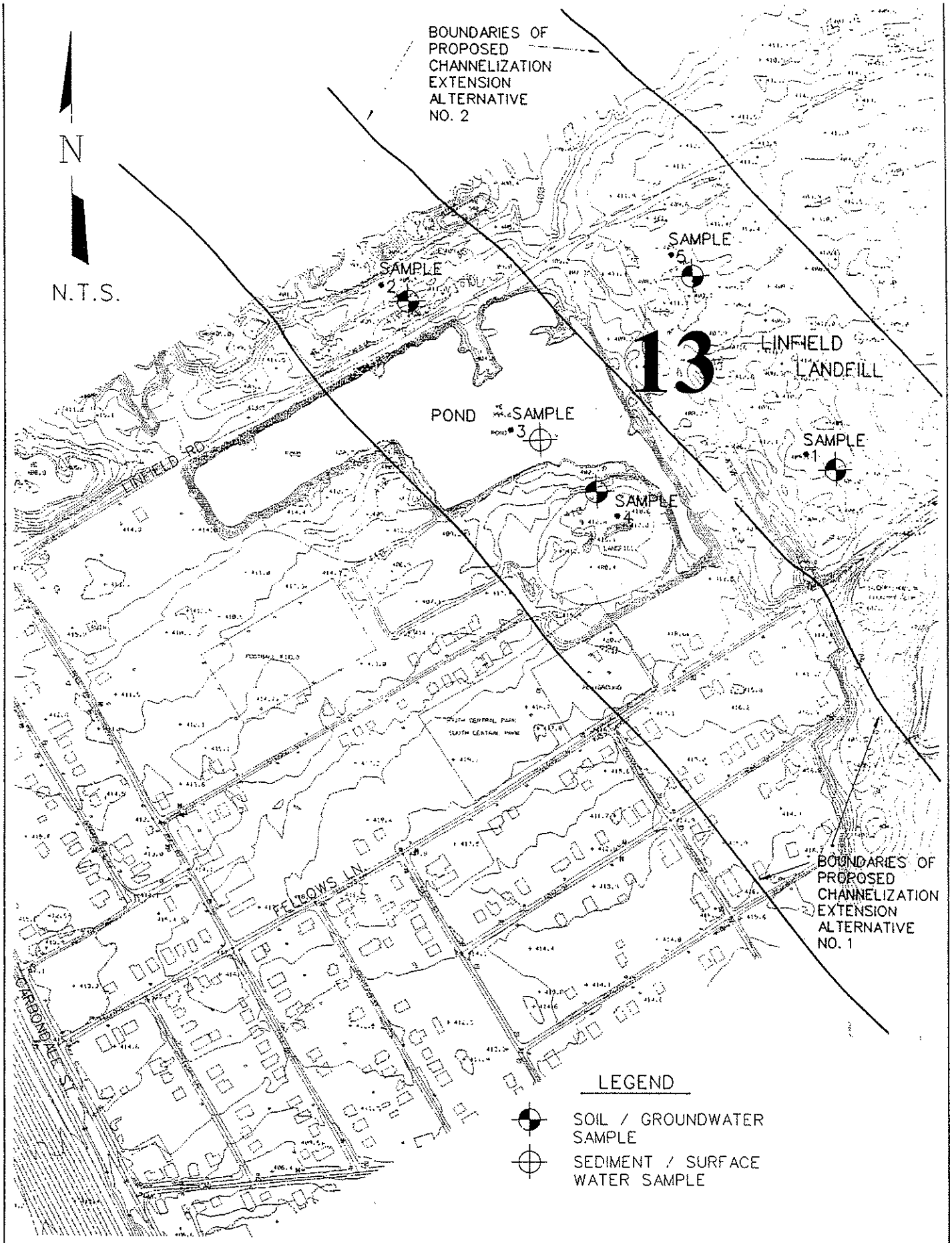
PQL – Practical Quantitation Limit
ND – Compound Level Not Reported Above PQL
* – Parameter level exceeds TCLP level

TABLE 3

HISTORICAL HIGH DETECTS - LINFIELD LANDFILL
DALLAS FLOODWAY EXTENSION

Parameter	Units	Well No.	Year
Arsenic	0.08 mg/L	MW-2	1984
Cadmium	0.17 mg/L	MW-5	1993
Chromium	0.121 mg/L	MW-5	1994
Iron	40.3 mg/L	MW-2	1998
Lead	0.15 mg/L	MW-4	1983
Manganese	18.4 mg/L	MW-2	1994
Selenium	0.5 mg/L	MW-4	1983
Cyanide	0.28 mg/L	MW-1	1989
Conductivity	5650 umhos	MW-4	1983
Chloride	1070 mg/L	MW-1	1998
Sulphate	5650 mg/L	MW-4	1983
Nitrate	22 mg/L	MW-3	1989
Phenolpthalene	0.54 mg/L	MW-4	1989
pH	7.7	MW-5	1986

SECTION J-3



FREESE • NICHOLS

FIGURE 2
SAMPLE LOCATION AND TOPOGRAPHIC MAP

U.S. ARMY CORPS OF ENGINEERS - FORT WORTH DISTRICT
DALLAS FLOODWAY EXTENSION INVESTIGATION

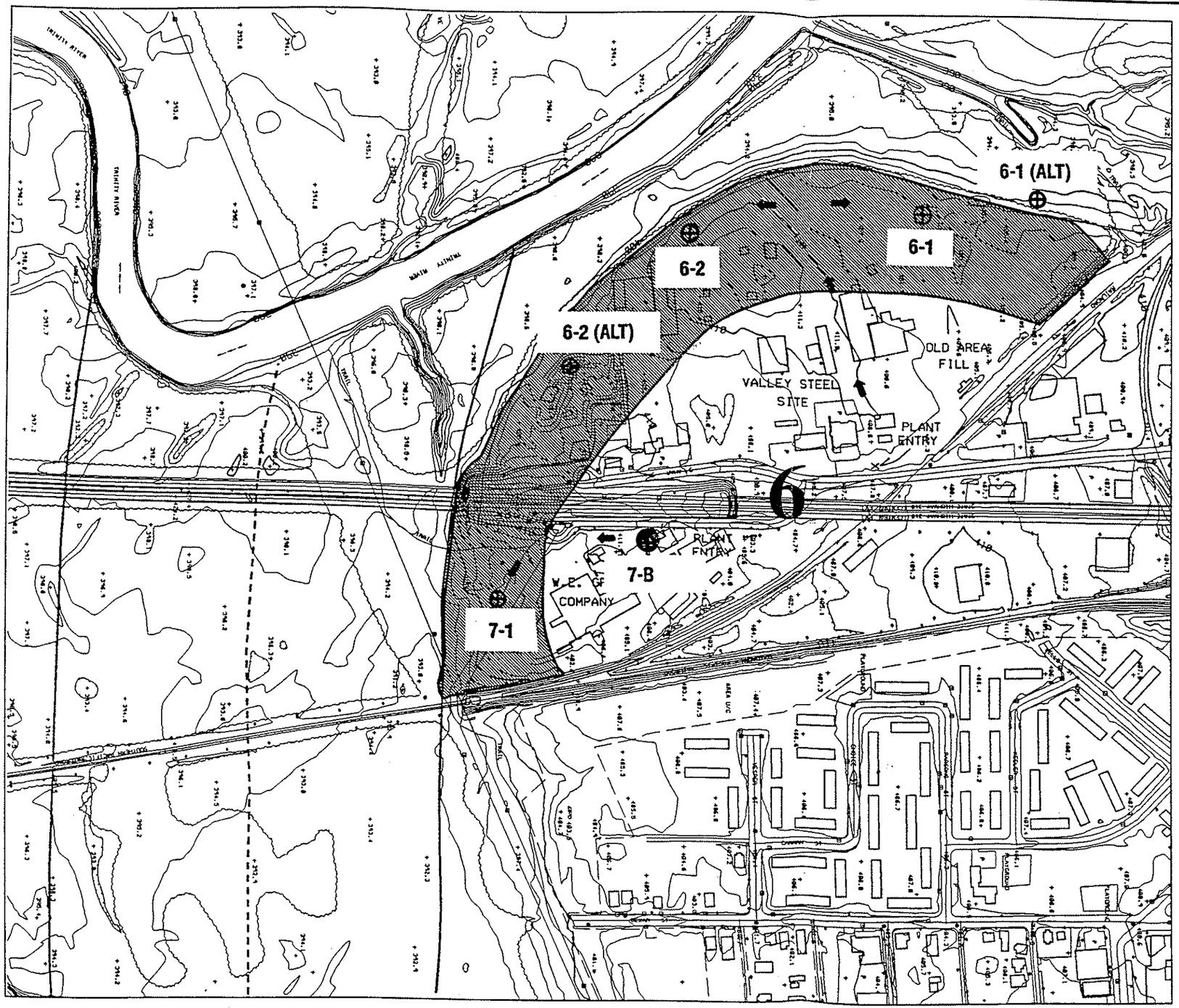


FIGURE 3-3. SITE INVESTIGATION PLAN
AREA 6 VALLEY STEEL SITE
& W. E. GRACE SITE

PHASE I SITE INVESTIGATION (SI)
DALLAS FLOODWAY EXTENSION, DALLAS, TEXAS
USACE FORT WORTH DISTRICT

LEGEND

- ⊕ SOIL BORING/MONITOR WELL LOCATION
- ● BACKGROUND BORING/WELL LOCATION
- LANDFILL AREA
- ➡ SITE ACCESS ROUTE
- FLOODWAY PROJECT BOUNDARY (PRELIMINARY)
- FLOODWAY PROJECT CENTERLINE (PRELIMINARY)

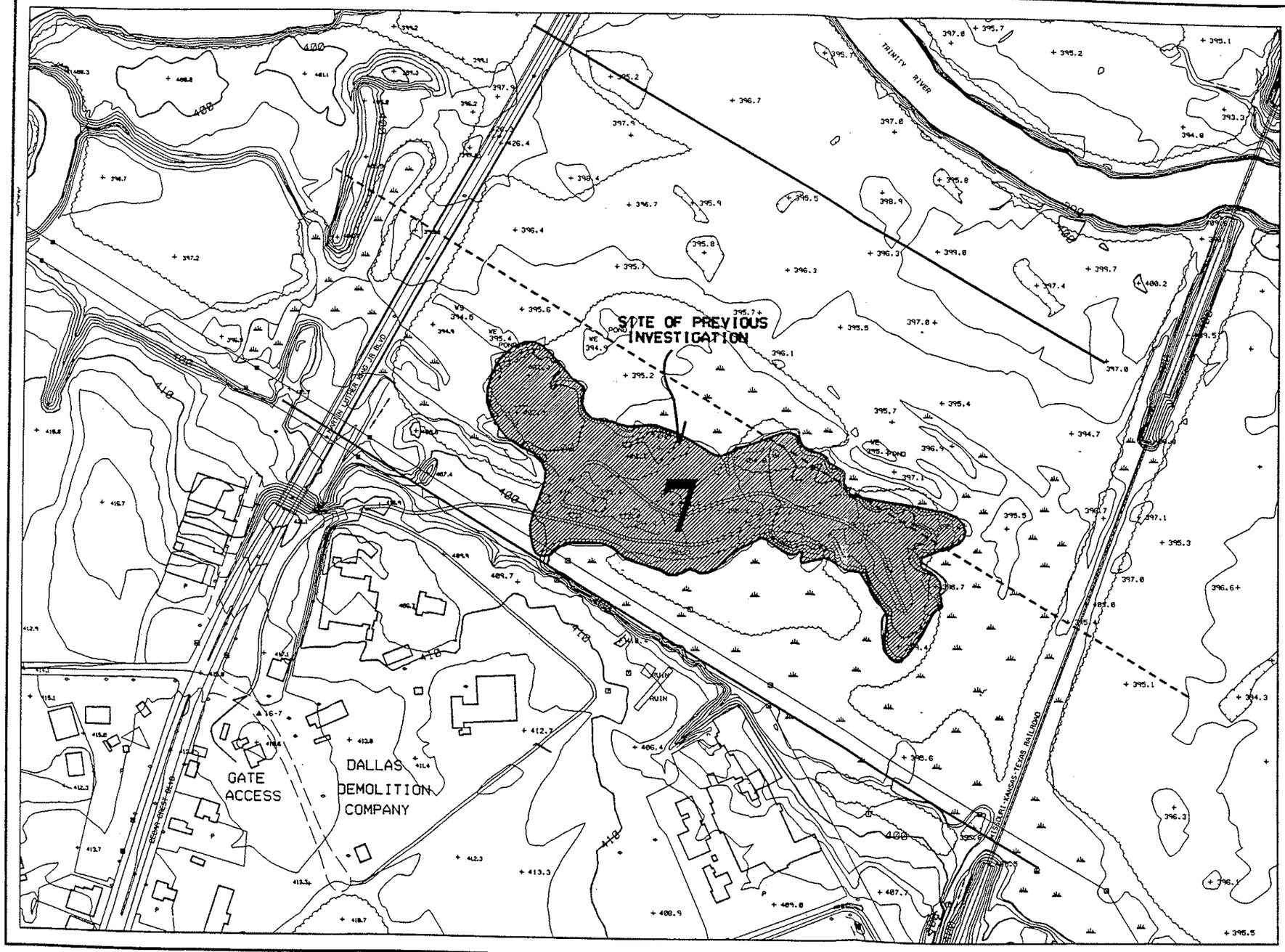
0 100 200
SCALE FEET

Environmental Science & Engineering, Inc.
A ENCORP Company

JUNE 1993

FIGURE 3-4. SITE INVESTIGATION PLAN
AREA 7
DALLAS DEMOLITION COMPANY FILL AREA

PHASE I SITE INVESTIGATION (SI)
DALLAS FLOODWAY EXTENSION, DALLAS, TEXAS
USACE FORT WORTH DISTRICT



LEGEND

- SOIL BORING/MONITOR WELL LOCATION
- BACKGROUND BORING/WELL LOCATION
- LANDFILL AREA
- SITE ACCESS ROUTE
- FLOODWAY PROJECT BOUNDARY (PRELIMINARY)
- FLOODWAY PROJECT CENTERLINE (PRELIMINARY)

0 100 200
SCALE FEET

ESE
A CILCORP Company
Environmental Science & Engineering, Inc.

MAY 1993

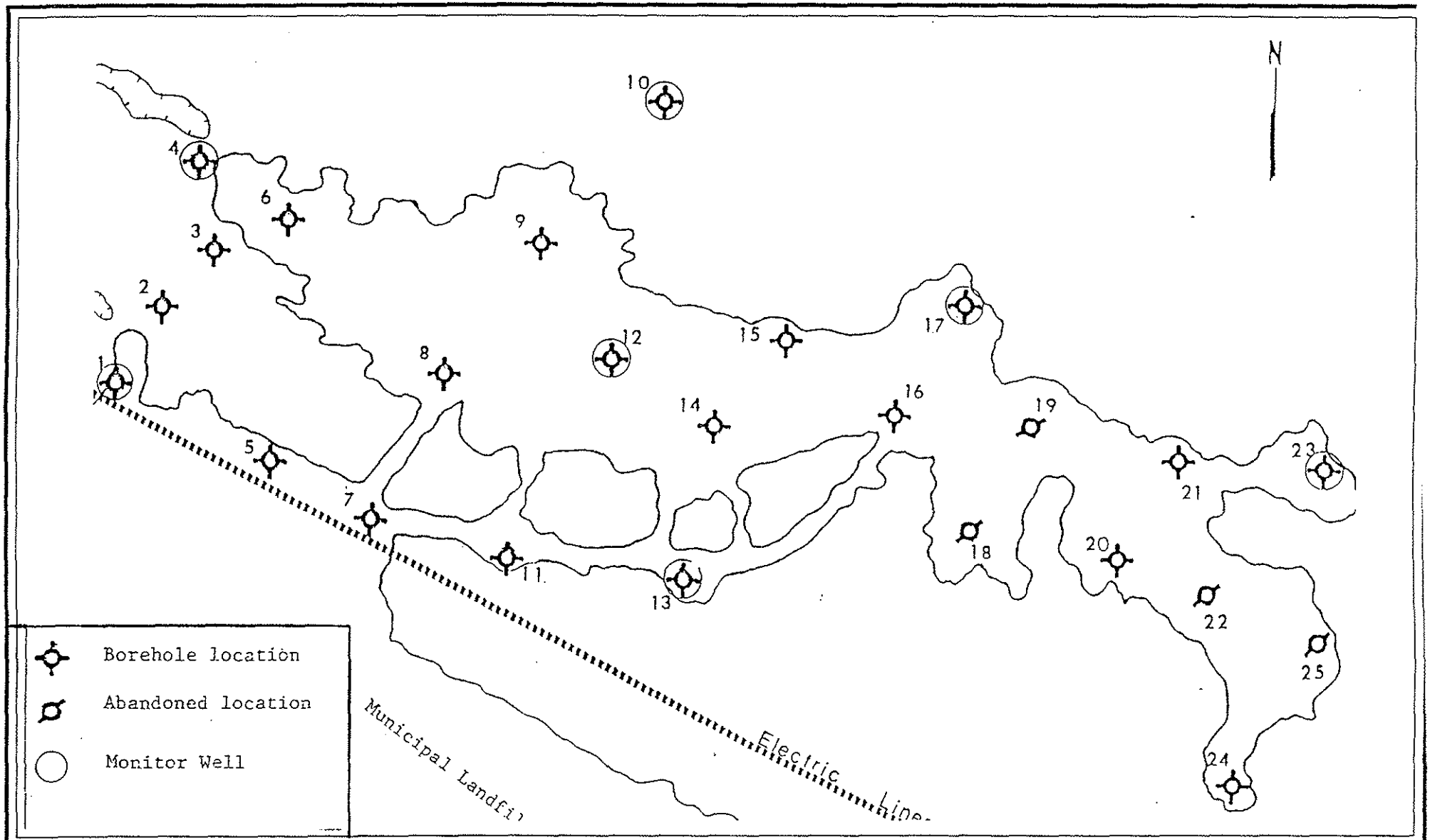


FIGURE 3-5: Location of Groundwater Monitoring Wells
Dallas Floodway Extension Property
Dallas, Texas

SOURCE: Maxin, 1989

ESE Environmental Science & Engineering, Inc.
A CH2MHILL Company

TABLE 4-2 Laboratory Analysis Data Results for Background Soil and Groundwater Samples Area of Investigation #6/7 - Valley Steel/WE Grace Equipment Co. Site Dallas Floodway Extension Site Investigation				
PARAMETER **(Soil in mg/kg)** **(Water in ug/l)**	**Background Soil and Groundwater Sample ID and Location Numbers**			
	FTWS-15 7-B 0'-2'	**FTWS-22 7-B 6'-8'**	**FTWS-22 7-B Dup 6'-8'**	**FTWW-12 Well 7-B 8'-18'**
VOAs:				
Methylene Chloride	NRQ	17.7	14.6	ND
SVOAs:				
Di-N-Butylphthalate	NRQ	ND	ND	35.0
PESTICIDE/PCBs (All analytes)	NRQ	ND	ND	ND
CYANIDE	NRQ	ND	ND	ND
TAL METALS [1]:				
Aluminum	NRQ	NRQ	NRQ	NRQ
Arsenic	0.548	0.80	1.20	ND
Barium	8.96	5.57	8.88	70.9
Beryllium	NRQ	NRQ	NRQ	NRQ
Cadmium	ND	ND	ND	ND
Calcium	NRQ	NRQ	NRQ	NRQ
Chromium	3.19	2.38	3.33	ND
Cobalt	NRQ	NRQ	NRQ	NRQ
Copper	NRQ	NRQ	NRQ	NRQ
Iron	NRQ	NRQ	NRQ	NRQ
Lead	1.19	1.49	1.77	ND
Magnesium	NRQ	NRQ	NRQ	NRQ
Manganese	NRQ	NRQ	NRQ	NRQ
Mercury	ND	ND	ND	ND
Nickel	NRQ	NRQ	NRQ	NRQ
Potassium	NRQ	NRQ	NRQ	NRQ
Selenium	0.267	ND	ND	2.9

TABLE 4-2 Laboratory Analysis Data Results for Background Soil and Groundwater Samples Area of Investigation #6/7 - Valley Steel/WE Grace Equipment Co. Site Dallas Floodway Extension Site Investigation				
PARAMETER (Soil in mg/kg) (Water in ug/l)	Background Soil and Groundwater Sample ID and Location Numbers			
	FTWS-15 7-B 0'-2'	FTWS-22 7-B 6'-8'	FTWS-22 7-B Dup 6'-8'	FTWW-12 Well 7-B 8'-18'
Silver	ND	ND	ND	ND
Sodium	NRQ	NRQ	NRQ	NRQ
Vanadium	NRQ	NRQ	NRQ	NRQ
Zinc	NRQ	NRQ	NRQ	NRQ

LEGEND:

ND = Not Detected
NRQ = Not Requested

(1) Only eight RCRA Toxicity Characteristic (TC) metals analyzed for Area 6/7 investigation, in accordance with USACE authorization.

Source: ESE, 1993

Table 4-3
Laboratory Analysis Data Results for Soil Samples
Area of Investigation #6/7 - Valley Steel/WE Grace Equipment Co. Site
Dallas Floodway Extension Site Investigation

PARAMETER (Units in mg/kg, dry wt basis)	Soil Sample ID and Location Numbers								
	FTWS-15 7-B 0'-2'	FTWS-22 7-B 6'-8'	FTWS-23 7-B 6'-8' Dup	FTWS-14 7-1 2'-4'	FTWS-19 6-1 ALT 0'-2'	FTWS-20 6-1 ALT 5'-7'	FTWS-21 6-1 ALT 5'-7' Dup	FTWS-17 6-2 ALT 0'-2'	FTWS-18 6-2 ALT 11'-13'
VOAs (All analytes)	NRQ				NRQ			NRQ	
Methylene Chloride	NRQ	17.7	14.6	ND	NRQ	ND	ND	NRQ	ND
SVOAs (All analytes)	NRQ	ND	ND	ND	NRQ	ND	ND	NRQ	ND
PESTICIDE/PCB (All analytes)	NRQ	ND	ND	ND	NRQ	ND	ND	NRQ	ND
CYANIDE	NRQ	ND	ND	ND	NRQ	ND	32.8	NRQ	ND
TAL METALS [1]:									
Aluminum	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ
Arsenic	0.548	0.800	1.20	ND	2.34	2.66	2.31	0.83	1.28
Barium	8.96	5.57	8.88	ND	45.3	13.2	15.0	21.8	11.6
Beryllium	NRQ	NRQ	NRQ	ND	NRQ	NRQ	NRQ	NRQ	NRQ
Cadmium	ND	ND	ND	?	ND	ND	ND	ND	ND

Table 4-3
Laboratory Analysis Data Results for Soil Samples
Area of Investigation #6/7 - Valley Steel/WE Grace Equipment Co. Site
Dallas Floodway Extension Site Investigation

PARAMETER (Units in mg/kg,dry wt basis)	Soil Sample ID and Location Numbers								
	FTWS-15 7-B 0'-2'	FTWS-22 7-B 6'-8'	FTWS-23 7-B 6'-8' Dup	FTWS-14 7-1 2'-4'	FTWS-19 6-1 ALT 0'-2'	FTWS-20 6-1 ALT 5'-7'	FTWS-21 6-1 ALT 5'-7' Dup	FTWS-17 6-2 ALT 0'-2'	FTWS-18 6-2 ALT 11'-13'
Calcium	NRQ	NRQ	NRQ	6,800	NRQ	NRQ	NRQ	NRQ	NRQ
Chromium	3.19	2.38	3.33	ND	10.8	5.68	6.80	4.56	4.19
Copper	NRQ	NRQ	NRQ	42.7	NRQ	NRQ	NRQ	NRQ	NRQ
Iron	NRQ	NRQ	NRQ	20,900	NRQ	NRQ	NRQ	NRQ	NRQ
Lead	1.19	1.49	1.77	89.3	11.6	5.19	6.11	4.33	2.10
Magnesium	NRQ	NRQ	NRQ	ND	NRQ	NRQ	NRQ	NRQ	NRQ
Manganese	NRQ	NRQ	NRQ	314.0	NRQ	NRQ	NRQ	NRQ	NRQ
Mercury	ND	ND	ND	0.02	ND	ND	ND	ND	ND
Nickel	NRQ	NRQ	NRQ	ND	NRQ	NRQ	NRQ	NRQ	NRQ
Potassium	NRQ	NRQ	NRQ	ND	NRQ	NRQ	NRQ	NRQ	NRQ
Selenium	0.267	ND	ND	ND	NRQ	NRQ	NRQ	NRQ	NRQ
Silver	ND	ND	ND	ND	0.61	ND	ND	ND	ND
Sodium	NRQ	NRQ	NRQ	ND	NRQ	NRQ	NRQ	NRQ	NRQ
Vanadium	NRQ	NRQ	NRQ	ND	NRQ	NRQ	NRQ	NRQ	NRQ

Table 4-3 Laboratory Analysis Data Results for Soil Samples Area of Investigation #6/7 - Valley Steel/WE Grace Equipment Co. Site Dallas Floodway Extension Site Investigation									
PARAMETER (Units in mg/kg,dry wt basis)	Soil Sample ID and Location Numbers								
	FTWS-15 7-B 0'-2'	FTWS-22 7-B 6'-8'	FTWS-23 7-B 6'-8' Dup	FTWS-14 7-1 2'-4'	FTWS-19 6-1 ALT 0'-2'	FTWS-20 6-1 ALT 5'-7'	FTWS-21 6-1 ALT 5'-7' Dup	FTWS-17 6-2 ALT 0'-2'	FTWS-18 6-2 ALT 11'-13'
Zinc	NRQ	NRQ	NRQ	56.8	NRQ	NRQ	NRQ	NRQ	NRQ

LEGEND:

ND = Not Detected
NRQ = Not Requested

(1) Only eight RCRA TC metals analyzed for Area 6/7 investigations, in accordance with USACE direction.

Source: ESE, 1993.

Table 4-4 Laboratory Analysis Data Results for Groundwater Samples Area of Investigation #6/7 - Valley Steel/WE Grace Equipment Co. Site Dallas Floodway Extension Site Investigation					
PARAMETER (Units in microgram/liter)	**Groundwater Sample ID and Location Numbers**				
	FTWW-12 **Well 7-B** **15'-25'**	**FTWW-11** **Well 7-1** **13.5'-23.5'**	**FTWW-15** **Well 6-1 ALT** **2.5'-12.5'**	**FTWW-16** **Well 6-1 ALT** **2.5'-12.5' Dup**	**FTWW-14** **Well 6-2 ALT** **10'-20'**
VOAs (All analytes)	ND	ND	ND	ND	ND
SVOAs:					
Di-N-Butylphthalate	35.0	ND	13.0	14	65.4
PESTICIDE/PCBs (All analytes)	ND	ND	ND	ND	ND
CYANIDE	ND	ND	ND	ND	ND
TAL DISSOLVED METALS:(1)					
Aluminum	NRQ	167,000	NRQ	NRQ	NRQ
Arsenic	ND	26.4	ND	ND	ND
Barium	70.9	1,440	57.6	46.5	32.6
Beryllium	NRQ	15.6	NRQ	NRQ	NRQ
Cadmium	ND	15.2	ND	ND	ND
Calcium	NRQ	211,000	NRQ	NRQ	NRQ
Chromium	ND	255.0	ND	ND	ND
Cobalt	NRQ	249.0	NRQ	NRQ	NRQ
Copper	NRQ	74.5	NRQ	NRQ	NRQ
Iron	NRQ	515,000	NRQ	NRQ	NRQ

Table 4-4
Laboratory Analysis Data Results for Groundwater Samples
Area of Investigation #6/7 - Valley Steel/WE Grace Equipment Co. Site
Dallas Floodway Extension Site Investigation

PARAMETER (Units in microgram/liter)	Groundwater Sample ID and Location Numbers				
	FTWW-12 Well 7-B 15'-25'	FTWW-11 Well 7-1 13.5'-23.5'	FTWW-15 Well 6-1 ALT 2.5'-15.5'	FTWW-16 Well 6-1 ALT 2.5'-12.5' Dup	FTWW-14 Well 6-2 ALT 10'-20'
Lead	ND	177.0	ND	ND	ND
Magnesium	NRQ	32,300	NRQ	NRQ	NRQ
Manganese	NRQ	14,500	NRQ	NRQ	NRQ
Mercury	ND	0.3	ND	ND	ND
Nickel	NRQ	441.0	NRQ	NRQ	NRQ
Potassium	NRQ	39,800	NRQ	NRQ	NRQ
Selenium	2.90	NRQ	2.30	1.7	ND
Silver	ND	NRQ	ND	ND	ND
Sodium	NRQ	97,400	NRQ	NRQ	NRQ
Vanadium	NRQ	673.0	NRQ	NRQ	NRQ
Zinc	NRQ	897.0	NRQ	NRQ	NRQ

LEGEND: ND = Not Detected
NRQ = Not Requested

(1) All groundwater samples except TMW 7-1 were analyzed for 8 RCRA TC metals; TMW 7-1 included the TAL metals analyte list.

Source: ESE, 1993

Table 4-10 Historical Data Results for Soil Samples Area of Investigation #10 - Dallas Demolition Company Site Dallas Floodway Extension Site Investigation				
PARAMETER (Units in mg/kg, dry wt basis)	**Soil Sample ID and Location Numbers**			
	#1 15'-16'	**#7 6'-7'**	**#12 3'-4'**	**#13 6'-7'**
VOAs:				
Methylene chloride	1.22	1.411	ND	ND
Chloroform	6.2	ND	ND	ND
SVOAs (All analytes)				
PESTICIDES/PCBs:				
Chlordane	ND	ND	3.0	ND
Dieldrin	ND	ND	1.1	ND
TAL METALS:				
Barium	28.3	10.0	18.2	105.0
Cadmium	ND	ND	7.5	1.1
Chromium	4.3	14.6	11.3	18.0
Copper	3.0	8.8	15.0	15.2
Lead	4.3	16.1	84.0	234.0
Mercury	ND	ND	8.0	ND
Nickel	5.5	18.3	15.4	13.4
Zinc	9.8	19.9	117.0	60.6

LEGEND:

ND = Not Detected

Source: Maxim Engineers, Inc., 1989

Table 4-11 Historical Data Results for Groundwater Samples Area of Investigation #10 - Dallas Demolition Company Site Dallas Floodway Extension Site Investigation	
PARAMETER **(Units in microgram/liter)**	**Groundwater Sample ID and Location Numbers** **TMW #10**
VOAs:	
1,1,1-Trichloroethane	36
SVOAs:	
Bis (2-Ethylhexyl)Phthalate	5.0
1,2-Dichlorobenzene	9.0
PESTICIDE/PCBs:	
a-BHC	15.3
TAL METALS:	
Zinc	10.0

LEGEND:

ND = Not Detected

Source: Maxim Engineers, Inc., 1989

SECTION J-4

N

0 75 150 225 300 450

SCALE IN FEET

BH-2

B-44T

A'

BH-4

TRINITY RIVER

E-1

BH-1

LAGOON E

11

E-4

E-3

A

BH-5

E-5

BH-3

E-2

CENTRAL
WASTEWATER
TREATMENT PLANT

EXPLANATION:

- PROPERTY BOUNDARY
- SOIL BORING/MONITORING WELL LOCATION
- HAND AUGER SAMPLE LOCATION
- GEOTECHNICAL BORING LOCATION
- APPROX. LIMITS OF LAGOON E

FIGURE 3

SOIL BORING LOCATION MAP

TABLE I

Lagoon E Closure Plan
Central Wastewater Treatment Plant
Dallas, Texas

Sludge Analyses Totals [1]

	E-1	E-2	E-3	E-5
Reactivity - Cyanide[b]	BDL	BDL	BDL	BDL
Reactivity - Sulfide[b]	BDL	BDL	BDL	470
pH	8.6	8.2	8.1	8.1
Ignitability (Flash Point)	>200° F	>200° F	>212° F	>212° F
Metals[b]				
Arsenic	BDL	BDL	BDL	BDL
Barium	250	184	359	363
Cadmium	1.6	23.9	49.8	49.1
Chromium	24.4	215	258	280
Copper	92.3	128	154	145
Lead	310	635	507	383
Mercury	7.5	0.58	1.4	2.4
Molybdenum	BDL	BDL	BDL	BDL
Nickel	19.1	45.2	338	469
Selenium	BDL	BDL	BDL	BDL
Silver	11.8	25.8	11.8	6.4
Zinc	668	522	106	96.2
Fecal Coliform	BDL	BDL	NA	NA
Salmonella	Neg	Neg	NA	NA
Pesticides[b]	BDL	BDL	BDL	BDL
Herbicides[b]	BDL	BDL	BDL	BDL
Acid Extractables	BDL	BDL	BDL	BDL

TABLE I (continued)

Parameter[a]	E-1	E-2	E-3	E-5
Base Neutral Extractables[b]				
Bis(2-ethyl-hexl) phthalate	BDL	21	BDL	BDL
Di-n-butyl phthalate	14*	15*	BDL	BDL
Volatiles[b]				
Acetone	0.19**	1.3**	BDL	BDL
Methylene chloride	0.14**	3.3**	BDL	BDL
Toluene	BDL	BDL	0.021	BDL
Chlorobenzene	BDL	BDL	0.128	0.073
Ethyl benzene	BDL	BDL	0.032	BDL
Xylenes	BDL	BDL	0.067	BDL

Notes: (1) No sludge was encountered in boring E-4; therefore, a sample from E-4 was not submitted for analysis.

a All detectable concentrations reported by laboratory for each parameter included in table.

b Concentrations expressed in parts per million.

BDL Indicates concentrations of compound specified were below analytical method detection limits.

NA Indicates the sample was not analyzed for the analyte specified.

Neg Indicates the analytical results were negative for the analyte specified.

* Probable laboratory contamination (See Appendix A)

** Result is not blank corrected. Process blank exhibited 0.013 ppm Acetone and 0.022 ppm Methylene Chloride.

TABLE II

Lagoon E Closure Plan
Central Wastewater Treatment Plant
Dallas, Texas

Sludge Analyses - TCLP Metals[1]

Parameter	E-1	E-2	E-3	E-5
Arsenic[a]	BDL	BDL	BDL	BDL
Barium[a]	0.53	0.41	BDL	BDL
Cadmium[a]	BDL	BDL	BDL	BDL
Chromium[a]	BDL	0.01	BDL	BDL
Lead[a]	0.03	0.05	BDL	BDL
Mercury[a]	BDL	BDL	BDL	BDL
Selenium[a]	BDL	BDL	BDL	BDL
Silver[a]	BDL	BDL	BDL	BDL

Notes: (1) No sludge was encountered in boring E-4; therefore, a sample from E-4 was not submitted for analysis.

a Concentrations reported in parts per million.

BDL = Indicates compound concentrations were below analytical method detection limit.

TABLE IV

Lagoon E Closure Plan
Central Wastewater Treatment Plant
Dallas, Texas

Soil Analyses Totals

Parameter	BH-1 10.0-12.5	BH-1 40.0-42.5	BH-2 10.0-12.5	BH-2 35.0-37.5	BH-3 10.0-12.5	BH-3 27.5-30.0	BH-4 10.0-12.5	BH-4 30.0-32.5	BH-5 15.0-17.5	BH-5 20.0-21.5
Total Metals[a]										
Barium	122	74.8	76.5	52.7	136.2	170	120	143	206	89.7
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	31.6	22.1	28.4	22.1	33.0	25.4	36.5	24.8	18.6	15.7
Copper	11.5	10.0	9.8	10.0	9.8	10.9	11.6	8.1	4.2	3.1
Lead	10.7	6.6	9.8	8.3	11.2	9.6	6.6	12.9	BDL	BDL
Mercury	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nickel	16.4	13.3	16.3	13.3	16.8	19.1	16.6	21.0	12.7	9.2
Silver	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Zinc	34.5	28.2	29.4	28.2	30.7	28.7	34.9	25.9	19.8	13.8
Volatile Organics[a]	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Base/Neutral Extractables[a]	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Notes: a All depths expressed in feet.
Concentrations expressed in milligrams per kilogram.
BDL = Indicates compound concentrations were below analytical method detection limits.

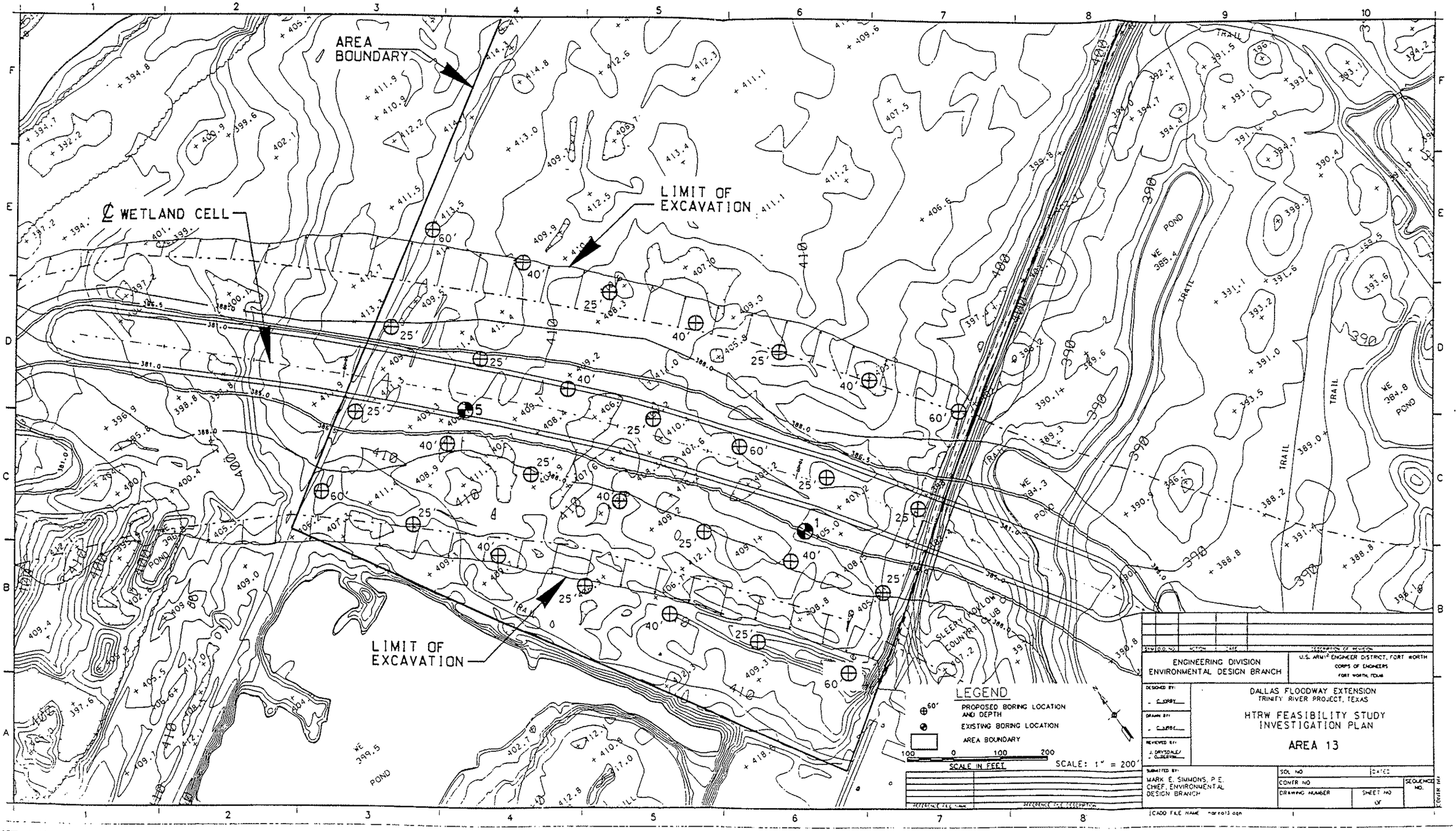
TABLE V
Lagoon E Closure Plan
Central Wastewater Treatment Plant
Dallas, Texas

Groundwater Analyses

Parameter	BH-1	BH-2	BH-3	BH-4	BH-5
Total Metals[a]					
Barium	1.1	BDL	1.9	BDL	BDL
Cadmium	BDL	BDL	BDL	BDL	BDL
Chromium	BDL	BDL	BDL	BDL	BDL
Copper	BDL	BDL	BDL	BDL	BDL
Lead	BDL	BDL	BDL	BDL	BDL
Mercury	BDL	BDL	BDL	BDL	BDL
Nickel	BDL	BDL	BDL	BDL	BDL
Silver	BDL	BDL	BDL	BDL	BDL
Zinc	BDL	BDL	BDL	BDL	BDL
Volatile Organics[a]	BDL	BDL	BDL	BDL	BDL
Base/Neutral Extractables[a]	BDL	BDL	BDL	BDL	BDL

Notes: Concentrations reported in milligrams per kilogram.
BDL = Indicates compound concentrations were below analytical method detection/ quantification limits.

SECTION J-5



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DALLAS FLOODWAY EXTENSION

HTRW WASTE CLASSIFICATIONS

Table of Contents

Introduction

Attached are fact sheets for fourteen potential HTRW sites located in or near the proposed Dallas Floodway Extension project, which our Initial Assessment indicates may contain hazardous wastes, industrial wastes or municipal solid wastes.

Available data for each site, derived from a variety of sources, is summarized. Where chemical testing data is available, it has been used to classify the wastes from each site as municipal solid waste, Class 1 industrial non-hazardous waste, Class 2 industrial non-hazardous waste or hazardous waste. Where data is not available, review of historic activities at the site, data from adjacent sites, data from similar sites and judgement have been used to project a waste classification.

Waste classification is based on the wastes either being a listed waste or a characteristic waste (i.e. ignitable, corrosive, reactive or toxic). The waste classifications presented in this document are based primarily on results from Toxicity Characteristic Leaching Procedure (TCLP) analysis. Most of the sites have analyses for total concentration only, which do not reliably indicate what TCLP test results would be. To guide waste classification efforts, the total concentrations for solids (i.e. soils, sludge, sediment, etc.) have been used with the TCLP "20 Times" rule to assign a classification. In the process of conducting the TCLP test, the total concentration is reduced by a factor of 20, hence the "20 Times" rule. For example, if the TCLP test result for lead is 5.0 mg/l or greater, the waste is a hazardous waste based on RCRA criteria. Unless the sample has a total lead concentration of 100 mg/kg or greater, it is not possible for the sample to test as a hazardous waste. To classify liquids, the total concentrations were compared directly to the TCLP concentrations with no reduction using the "20 Times" rule. This same methodology has been used for determining Class 1 and Class 2 assignments, based on the Texas Administrative Code (TAC) Chapter 335 Subchapter R.

On several occasions DFE project features were sited in areas that were found to have materials classified as hazardous waste located on the property. With only one exception, Linfield landfill, all project features impacting these areas have been relocated. The site data for the areas that have been avoided is presented in this report for information purposes.

1. Site Name: Praxair (Formerly Union Carbide Linde Gas Division)

2. Project Features at Site: A levee and a sump are proposed in the southwestern portion of this property in the vicinity of a former UST and an abandoned lime pit.

3. Site History: This facility is used for repackaging industrial gases from bulk cylinders and containers. According to records, the facility disposed of trichloroethane and caustic paint sludge in a UST on the site which had been previously used for gasoline. The UST was removed in 1984, with surface water and soil samples taken in the area of excavation (data not available for review). No leak testing was conducted on the tank during removal. The UST site was designated as closed by the Texas Water Commission (TWC) on March 11, 1986. The abandoned lime pit is located behind the facility and was used as a lime disposal area during the manufacturing of acetylene gas. Specific information on the content of waste (other than lime) was not available for the pit. Historic records research also suggests much of this area is underlain by "suspect fill".

4. Investigations: Surface water and soil sampling around the UST was conducted during tank removal in 1984 (unknown firm). The June 1997, Corps site investigation (Geo-Marine) involved soil sampling of the abandoned lime pit in the proposed sump area. A sample was analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and RCRA metals.

A. By Others: UST investigated in 1984 during tank removal.
- Six soil and one surface water sample taken in and around the tankhold.
- Sludge sample taken from tank with results indicating hazardous concentration of lead (13.96 mg/l) and pH 11.6.

(1) Sample Locations: 6
(2) Soil Test Results: Range of concentrations, mg/kg

Parameter	Values	Waste Class
Arsenic	7-31	Class 2
Barium	20-90	Class 2
Chromium	2-74	Class 2
Lead	8-404	Class 1 -See Remark (a.) Below
No PCBs or dioxins detected		

(3) Surface Water Samples: 1
(4) Water Test Results: Range of concentrations, mg/l

Parameter	Values	Waste Class
Arsenic	2-7 -See Remark (b.) Below	Class 1
Barium	2-7	Class 2

Chromium	2-7 -See Remark (b.) Below	Class 1
Lead	2-7 -See Remark (b.) Below	Class 1
No PCBs or dioxins detected		

B. By SWF: Investigated in June 1997 by Geo-Marine.
- One surface soil sample taken from lime pit.

(1) Sample Locations: 1
(2) Soil Test Results: Concentration, ug/kg, unless noted otherwise

Parameter	Value	Waste Class
Fluoranthene	150	Class 2
Chrysene	120	Class 2
Phenanthrene	73	Class 2
Pyrene	0.200	Class 2
Indeno(1,2,3-cd)pyrene	72	Class 2
Benzo(a)anthracene	89	Class 2
Benzo(a)pyrene	100	Class 2
Benzo(b)fluoranthene	270	Class 2
Benzo(ghi)perylene	83	Class 2
Bis(2-Ethylhexyl)phthalate	200	Class 2
Arsenic	7.8 mg/kg	Class 2
Barium	110 mg/kg	Class 2
Chromium	21 mg/kg	Class 2
Lead	38 mg/kg	Class 1
Mercury	30	Class 2

(3) Monitoring Wells: NA
(4) Water Test Results: NA

5. Waste Classification:

A. Soil: 5% Class 1 industrial non-hazardous waste; 95% Class 2 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

B. Sediment: NA
Basis:

C. Surface Water: Class 1 industrial non-hazardous waste
Basis:TAC Chapter 335 Subchapter R

D. Groundwater:
Basis:

E. Solid Waste: NA
Basis:

F. Leachate: NA
Basis:

6. Remarks:
(a.) Based on SWF experience, total lead concentration of 404 mg/kg would not likely result in TCLP Pb > 5.0 mg/l. Thus, material is anticipated to be categorized as Class 1 or Class 2 industrial non-hazardous waste. In all events, as we have demonstrated to date avoidance will be practiced if any hazardous waste is encountered.
(b.) Specific concentrations for this parameter were not available, but reportedly ranged as shown - with the average concentration being 4.5 mg/l. If this average value is used, then TCLP results for As, Cr, and Pb are < 5.0 mg/l. Thus, the material is anticipated to be categorized as Class 1 or Class 2 industrial non-hazardous waste.

1. **Site Name:** Tri-Gas / Occidental Chemical

2. **Project Features at Site:** A levee passes through the southern portion of both properties in the vicinity of two lime pits, an LPST, and an industrial landfill. The sump area, situated at Tri-Gas, is at or very near the lime pits and LPST. The landfill is located east of Occidental Chemical Company and is situated at or very near to the levee alignment.

3. **Site History:** The area consists of an industrial gas facility (Tri-Gas) and an active silicates plant which produces liquid and solid sodium silicate (Occidental Chemicals). The LPST and lime pits have been removed and capped, respectively, with closure status pending from the TNRCC. The 2-acre landfill was in operation from 1941-1971 and capped in 1984. It reportedly contains the following Class 1 wastes: 4200 cu.yds. (est.) alkaline product wastes, floor sweepings, and empty caustic containers; 3000 lbs (est.) asbestos piping; and 50-100 (est.) empty 5-gallon paint thinner cans.

4. **Investigations:** At Tri-Gas, drilling was conducted in February 1998 (Rone Engineers) to obtain compliance with state closure regulations. Samples were taken and analyzed for priority pollutant organics and inorganics, but were not made available for our review. Other environmental investigations were conducted at the Occidental Chemical landfill by Ecology and Environment, Inc., in January 1986. Their report stated that ponded water on the landfill had been sampled and results indicated elevated levels of lead contamination, as well as high pH/alkalinity. Inspection reports obtained from the EPA noted discoloration in surface water and soils near the Trinity River, indicating a possible breakout of leachate into the river. However, no action was taken at the time. The landfill was capped in 1984, with an eventual no further action (NFA) recommended for the site.

A. By Others: Limited investigations of the landfill by EPA, and Ecology and Environment, Inc., in 1985-1986.

- Ponded water sampled from landfill with results indicating elevated lead contamination and high pH/alkalinity.
- Visually classified wastes as: alkaline products wastes, alkaline floor sweepings, empty caustic containers, asbestos piping, and empty paint thinner cans.
- Landfill content appears to be consistent with Class I industrial nonhazardous waste.
- No leachate samples taken from landfill.

(1) Borings: NA
(2) Soil Test Results: NA
(3) Monitoring Wells: NA
(4) Water Test Results: NA

B. By SWF: None

- Right-of-entry not obtained

(1) Borings: NA

(2) Soil Test Results: NA
(3) Monitoring Wells: NA
(4) Water Test Results: NA

5. Waste Classification:

A. Soil: 5% Class 1 industrial non-hazardous; 95% Class 2 industrial non-hazardous Waste
Basis: Knowledge of past landfill use

B. Sediment: NA
Basis:

C. Surface Water:
Basis:

D. Groundwater: Class 2 industrial non-hazardous waste
Basis: Knowledge of past landfill use

E. Solid Waste: All Class 1 industrial non-hazardous Waste
Basis: Knowledge of past landfill use

F. Leachate: All Class 1 industrial non-hazardous waste
Basis: Knowledge of past landfill use

6. Remarks:

1. **Site Name:** Dallas Public Schools (Formerly Proctor & Gamble)

2. **Project Features at Site:** Levee and a sump are located in the southwestern half of the property, at or very close to a landfill where commercial wastes were placed. Any landfilled materials encountered in the sump area or levee inspection trench will be removed. Average landfill depth is about 15 feet. The vast majority of the landfilled materials were placed southwest (outside) of the sump and levee alignment.

3. **Site History:** The landfill was closed prior to October 1973. It received a mixture of commercial wastes (i.e., Crisco cans, broken glass, bricks, steel rods, and concrete), burned commercial wastes (mainly plastic containers) and possible unknown wastes from industrial plant operations. Northeastern portion of the property (between the railroad and Lamar Street) contained the main Proctor & Gamble plant with numerous USTs, ASTs, buried pipelines, trenches, etc. In general, the plant has a long history of having generated and disposed of commercial and industrial wastes throughout the entire northeastern portion of the property.

4. **Investigations:** Drilling was conducted in April 1990 (unknown firm) to confirm the landfill boundaries as determined by a geophysical survey (unknown firm and date). Samples were taken and analyzed for priority pollutant inorganics (i.e., heavy metals). Numerous other environmental investigations have occurred in the northeastern portion of the property outside the area of the project features. The June 1997, Corps site investigation (Geo-Marine) involved soil and groundwater sampling of the proposed sump area on each side of the railroad tracks as well as background sampling upgradient along Lamar Boulevard. The samples were analyzed for VOCs, SVOCs, pesticides/PCBs, cyanide, and RCRA metals.

A. **By Others:** Landfill investigated in April 1990.

- Thirty-five borings drilled and sampled within the landfill (outside the area of excavation).
- Visually classified wastes as clean fill dirt containing: concrete, bricks, metal rods, plastic and metal cans, and incinerated plastic debris.
- Landfill content appears to be consistent with Class 1 and Class 2 industrial non-hazardous wastes
- No leachate samples were taken from the landfill.

(1) Borings: 35

(2) Soil Test Results: Maximum Concentration, mg/kg

Parameter	Value	Waste Class
Arsenic	68	Class 1
Silver	0.92	Class 2
Beryllium	4.6	Class 2
Cadmium	1.8	Class 2
Chromium	88	Class 2

Copper	220	Class 2
Mercury	11	Hazardous -See remark (a.) below
Nickel	110	Class 2
Lead	260	Class 1 -See remark (b.) below
Selenium	38	Hazardous -See remark (a.) below
Thallium	440	Class 2
Zn	2000	Class 2

(3) Monitoring Wells: None
(4) Water Test Results: None

B. By SWF: Investigated in June 1997 by Geo-Marine.
- Six borings drilled to depth of groundwater or refusal.
- Visually classified wastes (upper 10 feet) as sand, sandy clay, and clayey sand soil fill.

(1) Borings: 6
(2) Soil Test Results: Maximum Concentration, mg/kg

Parameter	Value	Waste Class
Acetone	0.38	Class 2
Methylene Chloride	0.0012	Class 2
Fluoranthene	0.049	Class 2
Benzo(b)fluoranthene	0.180	Class 2
Arsenic	34	Class 2
Barium	150	Class 2
Chromium	20	Class 2
Lead	96	Class 1
Selenium	1.6	Class 2
Mercury	0.18	Class 2

(3) Monitoring Wells: 6 Temporary monitoring wells sampled
(4) Water Test Results: Maximum Concentration, ug/l

Parameter	Value	Waste Class
Acetone	53	Class 2
Methylene Chloride	1.4	Class 2
1,2 Dichloroethene	1.6	Class 2
Trichloroethene	1.7	Class 2
2-Chlorophenol	3.5	Class 2
1,2-Dichlorobenzene	2.4	Class 2
Arsenic	56	Class 2
Barium	740	Class 2
Chromium	110	Class 2

Mercury	ND	
Lead	300	Class 2
Selenium	14	Class 2

5. Waste Classification:

A. Soil: 5% Class 1 industrial non-hazardous; 95% Class 2 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

B. Sediment: NA
Basis:

C. Surface Water: NA
Basis:

D. Groundwater: Class 2 Industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

E. Solid Waste: NA
Basis:

F. Leachate: NA
Basis:

6. Remarks:

(a.) Based on these two indicators the entire known location of the landfill will be avoided if possible. If the landfill cannot be avoided and project features are sited there, additional sampling and testing, including TCLP, will be performed to accurately assign waste classifications. If further sampling and testing reveals hazardous wastes, the site will be avoided.
(b) Based on SWF experience, total lead concentration of 260 mg/kg would not likely result in TCLP Pb > 5.0 mg/l. Thus, material is anticipated to be categorized as Class 1 or Class 2 industrial non-hazardous waste. If further sampling and testing reveals hazardous wastes, the site will be avoided.

1. Site Name: Trinity Recycling (Formerly Okon Metals)

2. Project Features at Site: Currently there are no project features on this site. A levee passes adjacent to the site and a sump will also likely be located adjacent to the site, but an exact location for these features has not been determined.

3. Site History: This active metals recycling facility, located along Lamar Street, has been in operation since the 1950's. TNRCC records indicated an anonymous, unsubstantiated claim that dumping of the spent cyanide solution, which had been used for extraction of gold, had occurred near a smelter shed. The exact location of the release was not known.

4. Investigations:

A. By Others: None

B. By SWF: The Corps site investigation involved soil and groundwater sampling at two locations within a proposed sump area, now deleted from the project, at the back of the property, with one location being in the vicinity of an alleged cyanide spill. In addition, a sediment sample was taken from a ponded area within the sump. The samples were analyzed for VOCs, SVOCs, pesticides/PCBs, cyanide, and RCRA metals.

(1) Borings: Two, converted to temporary monitoring wells, were drilled
(2) Soil Test Results: Results in mg/kg unless noted otherwise.

Parameter	Value	Waste Class
As	16	Class 2
Ba	160	Class 2
Cd	17	Class 1
Cr	75	Class 2
Pb	2,000	Class 1 - See remark (a.) below
Hg	1.5	Class 1
Ag	4	Class 2
Acetone	72 ug/l	Class 2
Chlorobenzene	1.4 ug/l	Class 2
Methylene Chloride	5.9 ug/l	Class 2

(3) Monitoring Wells: Four
(4) Water Test Results: Results in ug/l

Parameter	Value	Waste Class
As	10	Class 2
Ba	270	Class 2

Cr	43	Class 2
Pb	2,300	Class 1
Benzene	4.7	Class 2
Chlorobenzene	150	Class 2

(5) Sediment Sample: One taken
(6) Sediment Test Results: Results in ug/kg

Parameter	Value	Waste Class
As	3.9	Class 2
Ba	71	Class 2
Cd	6.6	Class 2
Cr	24	Class 2
Pb	310	Class 2
Hg	0.27	Class 2
Ag	2.3	Class 2
Acetone	36	Class 2
Toluene	8.7	Class 2
Phenanthrene	150	Class 2
Fluoranthene	560	Class 2
Pyrene	870	Class 2
Benzo(a)anthracene	930	Class 2
Bis(2-ethylhexyl)phthalate	760	Class 2
Chrysene	1,000	Class 2
Benzo(b)fluoranthene	2,900	Class 2
Benzo(a)pyrene	1,400	Class 2
Indo(1,2,3-cd)pyrene	1,000	Class 2
Dibenzo(a,h)anthracene	400	Class 2
Benzo(ghi)perylene	1,100	Class 2

5. Waste Classification

A. Soil: Class 1 non-hazardous industrial waste
Basis: TAC Chapter 335 Subchapter R

B. Sediment: Class 2 non-hazardous industrial waste
Basis: Class 1 non-hazardous industrial waste

C. Surface Water: NA
Basis:

D. Groundwater: Class 1 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

6. Remarks:

(a.) Based on SWF experience, a total lead concentration of 2000 mg/kg would not likely result in TCLP Pb > 5.0 mg/l. Thus, the material is anticipated to be categorized as Class 1 or Class 2

industrial non-hazardous waste. Presently, there are no project features located on this site. If this changes, further sampling and testing will be conducted. If the testing reveals hazardous wastes, the site will be avoided.

1. **Site Name:** Various Ponds / Gravel Pits

2. **Project Features at Site:** These sites are possible uncontrolled fill areas located throughout the Dallas Floodway Extension project area. Two of the ponded areas, I-45 and Trinity Recycling, are situated along the alignment of the Lamar Street Levee. The remaining two ponds, Dixie Metals and Linfield Landfill, have no project features passing through them, though project features are in their vicinity (i.e., Cadillac Heights Levee and lower swale, respectively).

3. **Site History:** The I-45, Trinity Recycling, and Linfield Landfill ponds are in vegetated, undeveloped, and/or semi-rural areas and have resulted from remnant gravel quarrying operations. The Dixie Metals pond had not been a gravel pit, but rather an excavated area that probably contained contaminated soil. In all cases, the pits have been partially filled in with random fill, such as rock or dirt spoil material, residential wastes, and other unknown wastes. Water also continues to accumulate in the pits. With the exception of Dixie Metals, the sites have all been steadily used as dumping areas for an indefinite amount of time. In the last 3 years, Linfield Landfill Pond and Dixie Metals Pond have received a substantial amount of rock and dirt spoil material. No other information is available pertaining to their site history.

4. **Investigations:** The Spring 1995 SWF site investigation (Freese and Nichols) involved sampling at Linfield Landfill Pond. The 1997 Geo-Marine investigation involved sampling at Linfield Landfill Pond, I-45 Pond and Trinity Recycling Ponds. The samples were analyzed for VOCs, SVOCs, cyanide, and RCRA metals. One other sampling event at Dixie Metals Pond was conducted before the excavation filled with water.

A. By Others:

(1) Surface Soil Samples: 3

(2) Soil Test Results: Dixie Metals Pond; Entact, Inc., May 1995; Maximum Concentration, mg/kg

Parameter	Value	Waste Class
Lead	500.3	Class 1 -See remark (a.) below

B. By SWF:

- Investigated in 1995 by Freese & Nichols
- Sediment content appears to be consistent with municipal solid waste.

(1) Sediment Samples: 1

(2) Soil Test Results: Linfield Landfill Pond; Freese and Nichols, Inc., 1995; Concentration, mg/kg

Parameter	Value	Waste Class
Arsenic	1.9	Class 2
Barium	16	Class 2

Cadmium	1.3	Class 2
Chromium	4.9	Class 2
Lead	26	Class 2

No organics were detected in sediment at this site

(3) Surface Water Samples: 1
(4) Water Test Results: Linfield Landfill Pond; Freese and Nichols, Inc., 1995; Concentration, mg/l

Parameter	Value	Waste Class
Arsenic	0.01	Class 2
Barium	0.07	Class 2
Lead	0.20	Class 2

No organic concentrations were detected in groundwater at this site

(5) Sediment Samples: 3
(6) Soil Test Results: Pond Near I-45; Geo-Marine, Inc., 1997; Maximum Concentration, ug/kg

Parameter	Value	Waste Class
Acetone	130	Class 2
2-Butanone	14	Class 2
Fluoranthene	400	Class 2
Chrysene	230	Class 2
Phenanthrene	130	Class 2
Pyrene	430	Class 2
Toluene	4.7	Class 2
Indeno(1,2,3-cd)pyrene	140	Class 2
Benzo(a)anthracene	250	Class 2
Benzo(a)pyrene	180	Class 2
Benzo(b)fluoranthene	430	Class 2
Benzo(k)fluoranthene	240	Class 2
Benzo(ghi)perylene	180	Class 2
Bis(2-Ethylhexyl)phthalate	620	Class 2
Arsenic	15 mg/kg	Class 2
Barium	110 mg/kg	Class 2
Chromium	20 mg/kg	Class 2
Mercury	0.14 mg/kg	Class 2
Lead	72 mg/kg	Class 1

(7) Sediment Samples: 1
(8) Soil Test Results: Linfield Landfill Pond; Geo-Marine, Inc., 1997; Concentration, ug/kg

Parameter	Value	Waste Class
Acetone	290	Class 2
2-Butanone	10	Class 2
Fluoranthene	730	Class 2
Anthacene	93	Class 2
Chrysene	330	Class 2
Phenanthrene	270	Class 2
Pyrene	930	Class 2
Indeno(1,2,3-cd)pyrene	190	Class 2
Benzo(a)anthracene	310	Class 2
Benzo(a)pyrene	370	Class 2
Benzo(b)fluoranthene	720	Class 2
Bis(2-Ethylhexyl)phthalate	580	Class 2
Carbon Disulfide	32	Class 2
Arsenic	12 mg/kg	Class 2
Barium	210 mg/kg	Class 2
Chromium	16 mg/kg	Class 2
Mercury	0.14 mg/kg	Class 2
Lead	370 mg/kg	Class 1 -See Remarks Below

(9) Sediment Samples: 1
(10) Soil Test Results: Trinity Recycling Pond; Geo-Marine, Inc., 1997; Maximum Concentration, ug/kg

Parameter	Value	Waste Class
Acetone	590	Class 2
Toluene	8.7	Class 2
2-Butanone	100	Class 2
Fluoranthene	560	Class 2
Chrysene	1000	Class 2
Phenanthrene	150	Class 2
Pyrene	870	Class 2
Indeno(1,2,3-cd)pyrene	1000	Class 2
Benzo(a)anthracene	930	Class 2
Benzo(a)pyrene	1400	Class 2
Benzo(ghi)perylene	1100	Class 2
Benzo(b)fluoranthene	2900	Class 2
Dibenzo(a,h)anthracene	400	Class 2
Bis(2-Ethylhexyl)phthalate	760	Class 2
Carbon Disulfide	8.4	Class 2
Arsenic	12 mg/kg	Class 2
Barium	120 mg/kg	Class 2
Chromium	24 mg/kg	Class 2

Mercury	0.27 mg/kg	Class 2
Lead	310 mg/kg	Class 1 - See Remarks Below
Silver	2.3 mg/kg	Class 2

5. Waste Classification:

A. Soil: Class 2 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

B. Sediment: NA
Basis:

C. Surface Water: NA
Basis:

D. Groundwater: Class 2 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

E. Solid Waste: NA
Basis:

F. Leachate: NA
Basis:

6. Remarks:

(a.) Based on SWF experience, total lead concentration of 310-500 mg/kg would not likely result in TCLP Pb > 5.0 mg/l. Thus, material is anticipated to be categorized as Class 1 or Class 2 non-hazardous waste. If later tests confirm the wastes to be hazardous the site will be avoided.

1. Site Name: Valley Steel & W.E. Grace Manufacturing Company

2. Project Features at Site: The addition of fill in low areas to the south and excavation of shallow ditches draining run-off to a northerly located sump are proposed by the Corps for both properties. A small sump area is proposed at the northern tip of Valley Steel.

3. Site History: These industrial facilities are located on opposite sides of U.S. Highway 75 near Lamar Street. According to Valley Steel files, while engaging in steel pipe thread cleaning operations, acid and caustic wastes had been improperly disposed in unlined pits on the facility (unknown locations). Limited information is available on W.E. Grace, a steel component manufacturing facility.

4. Investigations:

A. By Others: A study conducted in 1973 identified high concentrations of sulfates, manganese, iron, oil and grease in groundwater and soils at Valley Steel. This study is not currently available.

B. By SWF: Soil and groundwater sampling was conducted in 1993 by Environmental Science and Engineering, Inc. at W.E. Grace and in the vicinity of Valley Steel. The samples were analyzed for VOCs, SVOCs, pesticides/PCBs, cyanide, and RCRA metals. The 1997 Corps site investigation program was to have involved soil and groundwater sampling at one location within the sump area at Valley Steel. However, requests for right-of-entry to Valley Steel were denied.

(1) Borings: Four, converted to temporary monitoring wells, were drilled
(2) Soil Test Results: Results in mg/kg

Parameter	Value	Waste Class
As	2.66	Class 2
Ba	45.3	Class 2
Be	ND	
Ca	6,800	Class 2
Cd	ND	
Cr	10.8	Class 2
Cu	42.7	Class 2
Fe	20,900	Class 2
Pb	89.3	Class 1 - See remark (a.) below
Mg	ND	
Mn	314.0	Class 2
Hg	0.02	Class 2
Ni	ND	
K	ND	

Se	0.267	Class 2
Ag	0.61	Class 2
Na	ND	
V	ND	
Zn	56.8	Class 2
Methylene Chloride	17.7	Class 2

No SVOAs, pesticides or PCBs detected.

(3) Monitoring Wells: Four

(4) Water Test Results: Results in ug/l

Parameter	Value	Waste Class
As	1.20	Class 2
Ba	70.9	Class 2
Cd	ND	
Cr	3.33	Class 2
Pb	1.77	Class 2
Hg	ND	
Se	2.9	Class 2
Ag	ND	Class 2
Cyanide	ND	
Di-n-butyl phthalate	35.0	Class 2
Methylene Chloride	17.7	Class 2

No pesticides or PCBs detected

5. Waste Classification

A. Soil: Class 1 non-hazardous industrial waste
Basis: TAC Chapter 335 Subchapter R

B. Sediment: NA
Basis:

C. Surface Water: NA
Basis:

D. Groundwater: Class 2 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

6. Remarks -

(a.) Based on SWF experience, total lead concentration of 310-500 mg/kg would not likely result in TCLP Pb > 5.0 mg/l. Thus, material is anticipated to be categorized as Class 1 or Class 2 non-hazardous waste. If later tests confirm the wastes to be hazardous the site will be avoided.

1. **Site Name:** Dallas Demolition

2. **Project Features at Site:** This site is a landfilled area located near Martin Luther King Boulevard along the west bank of the Trinity River. The swale passes through an extensively landfilled portion (approx. 1200 ft by 300 ft) of Dallas Demolition in the Trinity River Floodplain.

3. **Site History:** The Dallas Demolition Company has been extensively landfilled with construction debris dating back to at least the 1970's. The dumping area, and the business location in general, received miscellaneous debris from construction sources, as well as unknown sources. The nature and extent of deposited wastes have not been characterized to date. No other information is available pertaining to site history.

4. **Investigations:** In 1992, a Maxim Engineering site investigation was conducted at Dallas Demolition. The investigation involved drilling numerous temporary monitoring wells with groundwater measurement, however, few samples were retained for analysis. No additional investigations from this site are known to exist.

A. **By Others:** Limited investigations of the landfill by Maxim Engineering, 1992.
- Only 4 of 155 total soil samples were analyzed for priority pollutants; only 1 of 7 groundwater samples were analyzed for priority pollutants.
- Visual classification indicates construction debris-type fill from the ground surface to approximately 6 - 9 ft below ground surface (bgs).
- Visually classified soil lithology as a mixture of fill material and brown/gray clay or sandy clay to 9 - 10 bgs.
- Landfill content appears to be consistent with Type IV Municipal Waste.
- A groundwater mound is present in the middle of the site with a general gradient to the east and west.

(1) Borings: 25

(2) Soil Test Results: Maximum Concentration, mg/kg

Parameter	Value	Waste Class
Methylene Chloride	1.411	Class 2
Cloroform	6.2	Class 2
Chlordane	3.0	Class 1
Dieldrin	1.1	Class 1
Barium	105.0	Class 2
Cadmium	7.5	Class 2
Chromium	18.0	Class 2
Copper	15.2	Class 2
Lead	234.0	Class 1 -See remark (a.) below
Mercury	8.0	Class 1 -See remark (b.) below

Nickel	18.3	Class 2
Zinc	117.0	Class 2

(3) Temporary Monitoring Wells: 1
(4) Water Test Results: Concentration, ug/l

Parameter	Value	Waste Class
1,1,1-Trichloroethane	36	Class 2
Bis (2-Ethylhexyl)Phthalate	5.0	Class 2
1,2-Dichlorobenzene	9.0	Class 2
a-BHC	15.3	Class 2
Zinc	10.0	Class 2

B. By SWF: NA
(1) Borings: NA
(2) Soil Test Results: NA
(3) Monitoring Wells: NA
(4) Water Test Results: NA

5. Waste Classification:

A. Soil: Class 1 industrial non-hazardous
Basis:TAC Chapter 335 Subchapter R

B. Sediment: NA
Basis:

C. Surface Water: NA
Basis:

D. Groundwater: Class 2 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

E. Solid Waste: All Type IV Municipal
Basis: Visual Classification and knowledge of history of landfill use

F. Leachate: Class 2 industrial non-hazardous waste
Basis: Knowledge of landfill use

6. Remarks:

(a) Based on SWF experience, a total lead concentration of 234 mg/kg would not likely result in TCLP Pb > 5.0 mg/l. Thus, material is anticipated to be categorized as Class 1 or Class 2 industrial non-hazardous waste. If further sampling and testing reveals hazardous wastes, the site will be avoided.

(b) Based on SWF experience, a total mercury concentration of 8.0 mg/kg would not likely result in TCLP Hg > 5.0 mg/l. Thus, material is anticipated to be categorized as Class 1 or Class 2 industrial non-hazardous waste. If further sampling and testing reveals hazardous wastes, the site will be avoided.

1. **Site Name:** Vacant Land Near Dal-Chrome

2. **Project Features at Site:** This vacant site is located southeast and adjacent to Dal-Chrome. It was originally recommended as a sump area along the Cadillac Heights levee portion of the project. However, it was later determined that sump areas were not needed on that side of the river, so it was removed from the project.

3. **Site History:** This thickly vegetated and undeveloped sump area is bordered by Sargent Road, Dal-Chrome Company, Inc. (a chrome plating facility), and several residential buildings. Dal-Chrome was noted in the environmental records as a CERCLA site, with no further remedial action planned (NFRAP). No other information is available pertaining to site history.

4. **Investigations:** Prior investigations at the adjacent Dal-Chrome site included sampling for background metals concentrations at locations fairly close to this sites' property line. Elevated levels of lead were found to exist in the shallow surface soils. No investigations directly within the vacant land are known to exist.

   A. **By Others:** NA
      (1) Borings: NA
      (2) Soil Test Results: NA

   B. **By SWF:** NA
      (1) Borings: NA
      (2) Soil Test Results: NA
      (3) Monitoring Wells: NA
      (4) Water Test Results: NA

5. **Waste Classification:**
   A. **Soil:** NA
      Basis:
   B. **Sediment:** NA
      Basis:
   C. **Surface Water:** NA
      Basis:
   D. **Groundwater:** NA
      Basis:
   E. **Solid Waste:** NA
      Basis:
   F. **Leachate:** NA
      Basis:

6. **Remarks:** There are no project features on this site.

1. **Site Name:** Energy Conversion Systems / Darling International, Inc.

2. **Project Features at Site:** This site is located off the 1100 block of Sargent Road, to the north of the Central Wastewater Treatment Plant. Cadillac Heights Levee passes through the northeastern portions of the adjoining properties at, or very close to, the vicinity where lead slag and battery casings were landfilled in pits.

3. **Site History:** Previous occupants of the southern half of this site, N.L. Industries (a secondary lead smeltering facility), had buried smeltered slag and broken battery casings in pits extensively throughout this site and onto adjoining properties (i.e., Valcar and UPRR). Other smelters in the area, such as Dixie Metals, may have also contributed to the extremely high lead contamination present in the area. N.L. Industries had been in operation from approximately 1940 to 1978 and had disposed of the lead in an open landfill prior to the 1960s. The site is presently occupied by an animal fat rendering plant, Darling International Inc. (formerly Valcar Enterprises, Beatrice Company and Lone Star Rendering). Occupants of property to the north (presently owned by Energy Conversion Systems) included Superior Industries and Mainland Land and Equipment Company. In general, the smeltering plants in the area have a long history of having generated and disposed of commercial and industrial wastes (mostly lead slag and associated lead containing plant wastes) throughout the entire site.

4. **Investigations:** The site has been extensively investigated by government agencies and firms throughout the past resulting in numerous inspections, sampling events, risk assessments, corrective measures reports, etc. Since this area has been recommended for avoidance, the Corps has not taken part in any investigations in this area.

A. By Others: Evaluated under EPA's CERCLA (Superfund) in 1980's and TWC/TNRCCs RCRA from 1991 to present.

- EPA "Potential Hazardous Waste Site Inspection Report", dated July 1980, describes area as former open dump/landfill with inadequate leachate collection. Samples analyzed for heavy metals.

- EPA Superfund enforcement action in early 1980s resulted in concrete cap placed over a portion of the contaminated region. Cap was inspected and found to be cracked and opened up with exposed lead slag, and battery casings that had been deposited beneath.

- Following site inspection and soil/surfacewater sampling event (maximum total Pb 129,000 mg/kg), City of Dallas informed the TWC Central Office (Austin) in 1991 of lead slag deposits so appropriate enforcement action could be taken.

- Numerous investigations follow including: historical research, inspections, risk assessment, corrective measures study, corrective measures implementation plan, etc.

- Numerous soil borings drilled with detailed chemical analysis of soil lead contamination (at depths to Austin Chalk) throughout southern portion of site.

- Numerous monitoring wells installed and groundwater sampled throughout southern portion (Darling International) to characterize nature and extent of metals as well as contamination resulting from 3 LPSTs. Groundwater direction was to the southeast. Chemical data confirmed that lead and other metals are not mobile in groundwater at the site (analytical data unavailable). Contaminants associated with LPSTs were found to be below applicable TNRCC regulatory levels. Closure status of the three LPSTs is presently unknown.

- Analysis of aerial photographs shows widespread dumping throughout the northern as well as southern portions of the site. Presumably the waste consisted of lead slag and battery casings.

- Southern portion of site undergoing corrective action to date with capping and monitoring of lead contaminated waste in vicinity of Darling International.

(1) Borings: 37
(2) Soil Test Results: Maximum Concentration, mg/kg; Report by McCulley, Frick & Gilman, Inc.

Parameter	Value	Waste Class
Lead	61,500	Hazardous -See remark (a.) below
Lead	3965	Class 1 -See remark (b.) below

(3) Monitoring Wells: 10
(4) Water Test Results: Maximum Concentration, ug/l; Report by McCulley, Frick & Gilman, Inc.

Parameter	Value	Waste Class
TPH	14.5 mg/l	Class 2
Benzene	<1.0	Class 2
Toluene	2.8	Class 2
Ethylbenzene	7.9	Class 2
Xylene	50.1	Class 2

B. By SWF: NA

(1) Borings: NA
(2) Soil Test Results: NA
(3) Monitoring Wells: NA
(4) Water Test Results: NA

5. **Waste Classification:**
   A. **Soil:** Class 1 industrial non-hazardous waste
      Basis: TAC Chapter 335 Subchapter R
   B. **Sediment:** NA
      Basis:
   C. **Surface Water:** NA
      Basis:
   D. **Groundwater:** Class 2 Industrial non-hazardous waste
      Basis: TAC Chapter 335 Subchapter R
   E. **Solid Waste:** NA
      Basis: Avoidance of the landfill
   F. **Leachate:** NA
      Basis: Avoidance of the landfill

6. **Remarks:**

(a.) Sample taken away from project levee alignment.
(b.) Based on SWF analytical results of lead investigations, total lead concentration of 3965 mg/kg would not likely result in TCLP Pb > 5.0 mg/l. Thus, material is anticipated to be categorized as Class 1 or Class 2 Non-hazardous Waste. If further sampling and testing reveals hazardous wastes, the site will be avoided.

1. **Site Name:** Vacant Land Near Energy Conversion Systems / Darling International, Inc.

2. **Project Features at Site:** This site is located off the 1100 block of Sargent Road, to the north of the Central Wastewater Treatment Plant, and northeast of Energy Conversion Systems / Darling International, Inc. The upper swale passes through this vacant land at, or very close to, the vicinity where hazardous industrial lead slag was placed in landfilled pits.

3. **Site History:** This site is under ownership of UPRR and the City of Dallas. Previous occupants to the southwest of this site include N.L. Industries (a secondary lead smeltering facility), and Valcar Enterprises, an animal fat rendering plant. Prior to the 1960s, N.L. Industries had buried smeltered slag and broken battery casings in pits extensively throughout Valcar and onto adjoining sites, at or very close to the swale location in this site.

4. **Investigations:** The site was investigated during the risk assessment conducted for Energy Conversion Systems / Darling International. No SWF investigation has been conducted at the site due to lack of right-of-entry.

A. By Others: McCulley, Frick & Gilman, Inc.

- Numerous soil borings drilled with detailed chemical analysis of soil lead contamination (at depths to Austin Chalk) throughout southeastern portion of site adjacent to Darling International.

- Adjoining property to this site undergoing corrective action to date with capping and monitoring of lead contaminated waste.

(1) Borings: 20
(2) Soil Test Results: Maximum Concentration, mg/kg; Report by McCulley, Frick & Gilman, Inc.

Parameter	Value	Waste Class
Lead	2660	Class 1 -See Remark (a.) Below

(3) Monitoring Wells: NA
(4) Water Test Results: NA

B. By SWF: NA

(1) Borings: NA
(2) Soil Test Results: NA
(3) Monitoring Wells: NA
(4) Water Test Results: NA

5. Waste Classification:

A. Soil: Class 1 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

B. Sediment: NA
Basis:

C. Surface Water: NA
Basis:

D. Groundwater: Class 2 industrial non-hazardous waste
Basis: TAC Chapter 335 Subchapter R

E. Solid Waste: Type I Municipal Waste
Basis: See Remark (b.)

F. Leachate: NA
Basis:

6. Remarks:

(a.) This sample was taken approximately 100 feet west of the project swale alignment. Based on SWF analytical results of lead investigations, total lead concentration of 2660 mg/kg would not likely result in TCLP Pb > 5.0 mg/l. Thus, material is anticipated to be categorized as Class 1 or Class 2 Non-hazardous Waste. If further sampling and testing reveals hazardous wastes, the site will be avoided.

(b.) Based on interviews, the site apparently contains a surface battery dump of unknown size and location. Efforts to locate it have not been successful to date.

1. Site Name: Lagoon E at the Dallas Central Wastewater Treatment Plant

2. Project Features at Site: The swale passes through and will remove the majority of Lagoon E.

3. Site History: Lagoon E is a serpentine shaped lagoon which was used for disposal of municipal sludge from the 1930's until the early 1970's. It is located in the northeast portion of the plant, within the floodplain of the Trinity River.

4. Investigations:

A. By Others: Investigated in 1993 by Albert H. Halff Associates under contract to the City of Dallas. Collected samples of the sludge, soils and groundwater.

(1) Borings: Five, converted to monitoring wells
(2) Soil Test Results: Results are in mg/kg

Parameter	Value	Waste Class
Ba	206	Class 2
Cd	ND	
Cr	36.5	Class 2
Cu	11.6	Class 2
Pb	12.9	Class 2
Hg	ND	
Ni	21.0	Class 2
Ag	ND	
Zn	34.9	Class 2

No VOC or SVOC detected

(3) Monitoring Wells: Five
(4) Water Test Results: Maximum values in mg/l

Parameter	Value	Waste Class
Ba	1.9	Class 2
Cd	ND	
Cr	ND	
Cu	ND	
Pb	ND	
Hg	ND	
Ni	ND	
Ag	ND	
Zn	ND	

No VOC or SVOC detected

(5) Sludge Test Results: Results in mg/kg unless noted otherwise

Parameter	Value	Waste Class
pH	8.1 - 8.6	Class 2
Reactivity	ND	
Ignitability	>212° F	Class 2
As	ND	Class 2 - See TCLP data below
Ba	363	Class 2 - See TCLP data below
Cd	49.8	Class 2 - See TCLP data below
Cr	280	Class 2 - See TCLP data below
Cu	154	Class 2
Pb	635	Class 2 - See TCLP data below
Hg	7.5	Class 2 - See TCLP data below
Mo	ND	
Ni	469	Class 2
Se	ND	Class 2 - See TCLP data below
Ag	25.8	Class 2 - See TCLP data below
Zn	668	Class 2
Bis(2-ethylhexl)phthalate	21	Class 2
Di-n-butyl phthalate	15	Lab contaminant
Acetone	0.19	Class 2
Methylene Chloride	3.3	Class 2
Toluene	0.021	Class 2
Chlorobenzene	0.128	Class 2
Ethyl benzene	0.032	Class 2
Xylenes	0.067	Class 2

No Fecal Coliform, Salmonella, pesticides, herbicides, acid extractables detected

(6) TCLP Analyses

Parameter	Value	Waste Class
As	ND	
Ba	0.53	Class 2
Cd	ND	
Cr	0.01	Class 2
Pb	0.05	Class 2
Hg	ND	
Se	ND	
Ag	ND	

B. By SWF: None

5. **Waste Classification**
   A. **Soil:** Class 2 non-hazardous industrial waste
      Basis: TAC Chapter 335 Subchapter R
   B. **Sediment:** NA
      Basis:
   C. **Surface Water:** NA
      Basis:
   D. **Groundwater:** Class 2 industrial non-hazardous waste
      Basis: TAC Chapter 335 Subchapter R
   E. **Sludge:** Class 2 industrial non-hazardous waste
      Basis: TAC Chapter 335 Subchapter R

6. **Remarks** -

1. **Site Name:** Union Pacific Railroad (UPRR)

2. **Project Features at Site:** The swale will pass through this site.

3. **Site History:** The Union Pacific Railroad landfill is located northeast of Linfield Landfill, entirely on UPRR property (formerly Southern Pacific Railroad). Visual reconnaissance of the site noted surface expressions of landfilled trenches and scattered material, which generally consisted of construction debris, i.e. broken concrete, rebar, tile, scrap metal, etc.

4. **Investigations:** Investigation work has been proposed at two locations along the swale alignment along with a proposed geophysical survey to determine the lateral and vertical extent of the landfill. Attempts at obtaining right-of-entry into this area had been denied by the Southern Pacific Railroad. No prior investigations of this site were available.

   A. **By Others:** None

   B. **By SWF:** None

5. **Waste Classification**
   A. **Soil:** Class 2 non-hazardous industrial waste.
      Basis: Visual inspection of site and knowledge of surrounding sites.
   B. **Sediment:** NA
      Basis:
   C. **Surface Water:** NA
      Basis:
   D. **Groundwater:** Class 2 industrial non-hazardous waste.
      Basis: Visual inspection of site and knowledge of surrounding sites.
   E. **Solid Waste:** Primarily construction debris, which can be segregated and placed in a Type IV municipal landfill, with possibly some Class 2 industrial non-hazardous wastes, which can be placed in a Type I Municipal landfill with a special waste trench.
      Basis: Visual inspection of site and knowledge of surrounding sites.

6. **Remarks** -

1. Site Name: Linfield Landfill

2. Project Features at Site: Swale passes through western end of landfill where commercial and residential wastes were placed. At the center of the swale all of the landfill materials will be removed . The thickness of the landfill materials left in place will increase from the center toward the edges of the swale.

3. Site History: Closed in 1975. Received a mixture of commercial and residential wastes, burned commercial wastes, brush and industrial demolition debris and industrial liquids which were placed in pits. Landfill is currently being used for disposal of tailings from DART tunnel construction and placement of tree trimming debris

4. Investigations:

A. By Others: Evaluated under CERCLA in February 1980 and given a "no further action" status by EPA. In 1982 five monitoring wells were installed by National Soil Services around the perimeter of the landfill. Monitored semi-annually from 1982 to 1984. Monitored annually from 1985 to present (1998). In general, while contamination is present, it shows a decreasing trend.

(1) Borings: None
(2) Soil Test Results: NA
(3) Monitoring Wells: 5
(4) Water Test Results: Maximum values in mg/l

Parameter	Value	Waste Class
pH	5.91 - 7.7	NA
Sp. Cond.	5650	NA
Chlorides	1070	NA
Sulfates	5650	NA
Nitrates	9.8	NA
Phenols	0.540	NA
As	0.021	Class 2
Cd	0.17	Class 2
Cr	0.121	Class 2
Fe	40.3	NA
Pb	0.15	Class 2
Mn	18.4	NA
Se	0.500	Class 2
CN-	0.28	Class 2
TOC	44	NA

B. By SWF: Investigated in Spring 1995 by Freese and Nichols. Two borings were drilled

two feet into insitu soils. Visually classified wastes as soil fill, concrete, scrap metal, clay pipe fragments, plastic debris, rope and ceramic tile fragments. Landfill content appears to be consistent with municipal solid waste. Leachate tested as potentially hazardous for lead (5.8 & 6.5 mg/l).

(1) Borings: 2
(2) Soil Test Results: Maximum values in mg/Kg

Parameter	Value	Waste Class
As	2.9	Class 2
Ba	29	Class 2
Cd	4.0	Class 2
Cr	9.8	Class 2
Pb	ND	NA
Hg	ND	NA
Se	ND	NA
Ag	ND	NA

No VOA, SVOA, Cyanide, pesticides, herbicides or PCBs detected.

(3) Monitoring Wells: 2 temporary
(4) Water Test Results: Maximum values in mg/L

Parameter	Value	Waste Class
As	0.96	Class 2
Ba	7.86	Class 2
Cd	0.36	Class 2
Cr	0.70	Class 2
Pb	6.5	RCRA Hazardous
Hg	0.12	Class 2
Se	ND	NA
Ag	0.19	Class 2
Chlorobenzene	0.009	Class 2
Bis(2-Ethylhexyl)phthalate	0.089	Class 2
Phenanthrene	0.060	NA
Cyanide	0.01	Class 2

No pesticides, herbicides or PCBs detected.

C. By SWF: Investigated in September 1998 by Tetra Tech NUS. Twenty-eight (28) borings were drilled into insitu soils. Visually classified landfilled wastes as municipal solid waste. Two soil samples collected from within landfilled materials tested as non-hazardous due to toxicity. Fourteen (14) groundwater samples collected from within landfilled materials and

one (1) groundwater sample collected from beneath the landfill tested as non-hazardous using TCLP test method 1311 for toxicity characteristic parameters.

(1) Borings: 28
(2) Soil Test Results: Maximum values in mg/Kg

Parameter	Value	Waste Class
As	ND	NA
Ba	947	Municipal
Cd	3.6	Municipal
Cr	21	Municipal
Pb	119	Municipal
Pb TCLP	0.040 mg/L	Municipal
Hg	3.6	Municipal
Se	0.40	Municipal
Ag	ND	NA
Chlorobenzene	0.091	Municipal
Methyl ethyl ketone	0.014	Municipal

No SVOA, pesticides or herbicides detected.

(3) Monitoring Wells: 15 temporary
(4) Water Test Results: Maximum values mg/L

Parameter	Value	Waste Class
pH	6.49-8.18	NA
As	0.247	Municipal
Ba	1.5	Municipal
Cd	ND	NA
Cr	ND	NA
Pb	0.119	Municipal
Hg	ND	NA
Se	0.058	Municipal
Ag	0.13	Municipal
Trichloroethylene	0.0021	Municipal
Benzene	0.052	Municipal
Chlorobenzene	0.079	Municipal

No SVOA, pesticides, or herbicides detected.

5. Waste Classification:

A. Soil: Municipal solid waste
Basis: 30 TAC Chapter 330 Subchapter A, 30 TAC 335 Subchapter R

B. Sediment: NA
Basis:

C. Surface Water: NA
Basis:

D. Groundwater: Municipal solid waste
Basis: 30 TAC Chapter 330 Subchapter A, 30 TAC 335 Subchapter R

E. Solid Waste: Municipal
Basis: 30 TAC 330 Subchapter A, visual classification, knowledge of landfill history

F. Leachate: Municipal solid waste
Basis: 30 TAC Chapter 330 Subchapter A, 30 TAC 335 Subchapter R

6. Remarks - Waste classifications are based on combined results of 1995 and 1998 investigations and landfill history. Water sample results for 1998 investigation supercede results for 1995 investigation because 1995 samples were not analyzed using TCLP test method 1311, required for designating waste as being hazardous due to toxicity. Municipal solid waste classification is derived from 1998 conclusion that landfill contains municipal solid waste, as defined in 30 TAC 330 Subchapter A, and test results for corrosivity and TCLP resulted in non-hazardous concentrations, as defined in 40 CFR 261.22 and 261.24, respectively.

1. **Site Name:** Open Dump Near Linfield Landfill

2. **Project Features at Site:** This site is an uncontrolled fill area located south and adjacent to Linfield Landfill Pond. The swale passes through an extensive portion (approx.1200 ft by 600 ft) of Linfield Landfill, located northeast of the open dump area, along the lower western portion of the Trinity River Floodplain. If this site is purchased as part of the project, and currently that is not proposed, the wastes and/or contaminated material encountered at this site will likely be covered, contained, and left in place, since project features do not effect this area. Previously, the site had been situated within the Joppa swale alignment. However, the swale alignment was rerouted through Linfield Landfill and this site was removed from the project.

3. **Site History:** This sparsely vegetated and undeveloped dumping area has been landfilled with residential waste, construction debris, and rock spoil. The site had been steadily used as a dumping grounds for an unknown amount of time. In the last 5 years, it has received a substantial amount of rock spoil from DART construction as cover material. No other information is available pertaining to the sites history.

4. **Investigations:** The Spring 1995 Corps site investigation (Freese and Nichols) involved one temporary monitoring well - in what was then the proposed Joppa alignment of the swale.

A. **By Others:** NA
   (1) Borings: NA
   (2) Soil Test Results: NA

B. **By SWF:** Investigated in 1995 by Freese and Nichols.
   - One temporary monitoring well drilled two feet into insitu soils.
   - Visually classified wastes as rock spoil, concrete, residential waste, and construction debris.
   - Landfill content appears to be consistent with municipal solid waste.
   - Elevated inorganic concentrations in groundwater were noted for all RCRA metals.

   (1) Borings: 1
   (2) Soil Test Results: Concentration, mg/kg

Parameter	Value	Waste Class
Fluoranthene	7.2	Class 2
Chrysene	4.6	Class 2
Phenanthrene	4.8	Class 2
Pyrene	6.4	Class 2
Arsenic	2.2	Class 2
Barium	71	Class 2
Silver	2.6	Class 2
Cadmium	5.4	Class 2

Chromium	10	Class 2
Mercury	0.5	Class 2
Lead	19	Class 2

(3) Temporary monitoring Wells: 1
(4) Water Test Results: Concentration, mg/l

Parameter	Value	Waste Class
Arsenic	0.02	Class 2
Barium	2.16	Class 2
Cadmium	0.08	Class 2
Chromium	0.21	Class 2
Lead	0.70	Class 2
Mercury	0.06	Class 2
Selenium	0.29	Class 2
Silver	0.37	Class 2

No organic concentrations were detected in groundwater at this site

5. **Waste Classification:**
   - **A. Soil:** Class 2 industrial non-hazardous waste
     Basis: TAC Chapter 335 Subchapter R
   - **B. Sediment:** NA
     Basis:
   - **C. Surface Water:** NA
     Basis:
   - **D. Groundwater:** Class 2 industrial non-hazardous waste
     Basis: TAC Chapter 335 Subchapter R
   - **E. Solid Waste:** NA
     Basis: Visual observation of landfilled wastes (i.e., residential, construction debris, and rock spoil).
   - **F. Leachate:** NA
     Basis:

6. **Remarks:** No project features are currently anticipated at this site.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 30, 1995

U.S. Army Corps of Engineers (COE)
P.O. Box 17300
Ft. Worth, Texas 76102-0300
Attn: CESWF-ED-E/Jim Drysdale

RE: Channelization of Trinity River through Linfield Sanitary Landfill (Closed Landfill)

Dear Mr. Drysdale:

During recent phone conversations with various personnel of the Texas Natural Resource Conservation Commission (TNRCC), you indicated that the City of Dallas is considering exhuming waste from the above referenced site and channelizing a portion of the Trinity River through the landfill site.

In addition, you noted that hazardous waste may have been deposited at the site and that elevated levels of lead were detected in recently obtained leachate samples.

This letter provides some guidance in regards to regulatory issues associated with the proposed activities on this closed site. Prior to any construction activities, a plan detailing the proposed activities must be submitted to the TNRCC Municipal Solid Waste Division for review and approval, as required by 30 Texas Administrative Code (TAC) Section (§) 330.255(a) which states:

> "The owner or operator shall submit any plans for proposed construction activities or structural improvements located on closed MSWLF units or MSW sites and not associated with approved solid waste disposal activities, with supporting documentation in accordance with subsection (b) of this section, to the executive director for review and approval."

Prior to the submittal of the plan, it is recommended that you schedule a meeting with TNRCC personnel in Austin. This meeting would include representatives from both Industrial & Hazardous Waste and Municipal Solid Waste Divisions to address planned activities.

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

The following is a summary of minimum requirements which need to be addressed in the submitted plan:

1. A site plan of the landfill that shows the area that will be affected by excavation/construction related activities and the fill areas;

2. Details of the location of the proposed channel and any structures on the landfill site;

3. A waste sampling and analysis plan (A soil boring survey shall be conducted characterizing type of waste, depth of waste, underlaying soil strata, prevailing geologic/hydrogeologic conditions, and existing groundwater levels. Groundwater and leachate samples shall be collected and analyzed for constituents. Boring logs shall be prepared and submitted with supporting details.);

4. A calculation sheet prepared and showing total volume of waste to be excavated/relocated during construction activities (Excavated materials shall not be used for embankment or any other purposes except disposal to an approved disposal facility. A copy of an agreement/contract, showing that disposal of excavated materials shall be at an approved landfill, shall be submitted.);

5. Notification given to the public, adjacent land owners, and local emergency officials regarding waste excavation/ relocation activities (Also, TNRCC Region 4 office, located in Duncanville, shall be notified prior to the beginning of waste excavation/relocation activities. Methods for notification prior to the start of each waste relocation event shall be specified.);

6. A Contingency Plan developed to cease waste removal operations specified in the event weather conditions, nuisance odors or air monitoring indicate an impact on off-site areas is imminent;

7. A plan for daily cover of all exposed waste at the end of each day;

8. Appropriate measures to contain rainfall surface run-off from the active working face in the event of inclement weather (All rainfall surface run-off from the active face shall be disposed of at a permitted facility.);

9. Liners provided at all the exposed side walls of excavated surfaces (Soil and Liner Quality Control Plan (SLQCP) shall be developed in accordance with 30 Texas Administrative Code (TAC) Section (§) 330.205. Soils and Liner Evaluation Report (SLER) shall be prepared and submitted in accordance with 30 TAC § 330.206.);

10. Nuisance odor control measures to be implemented at site to minimize the effect of waste relocation on the operation of local businesses, adjacent property owners, and the general public using routes of transportation in the vicinity of the site (The measures may include, but not be limited to, spraying of exposed waste and/or application of soil cover to the exposed waste surfaces to minimize odors and the attraction of vectors. A plan shall be developed to control air pollution related problems describing measures to be taken in the event of occurrence of objectionable odors.);

11. On-site combustible gas detection equipment (Concentration of methane gas (CH_4) shall not exceed Lower Explosive Limit (LEL), 5% methane by volume in air.);

12. Control of ponded water in operational areas to avoid its becoming a nuisance;

13. Control of windblown waste and litter in accordance with 30 TAC § 330.120;

14. A construction schedule showing dates and time of day that work in the landfill area will take place;

15. A weather monitoring station established at the site (Measurements of meteorological parameters such as wind speed, wind direction, temperature, and wind chill, if necessary, shall be taken hourly and recorded during each waste relocation event.);

16. Air monitoring at the site on a daily basis during each waste relocation event (The ambient air shall be monitored for the following: Hydrogen Sulfide (H_2S), Methane (CH_4), Carbon dioxide (CO_2), and Oxygen (O_2). Air monitoring shall be performed using direct reading instruments and readings shall be documented on a daily basis. Direct reading of the instruments shall be used by the site engineer to determine whether to continue waste relocation activities. Air monitoring shall be performed downwind from the designated relocation area. Procedures for air sampling at the site shall also be specified.);

17. A status report of work activities of each waste relocation event to include quantity of waste relocated, air monitoring results, and any anticipated problems that might arise as a result of changing weather conditions (These status reports shall be submitted on a weekly basis to the TNRCC during each waste relocation event for review and documentation purposes.);

18. Provide all remaining exposed waste surfaces, at the end of construction activities, with a final cover in accordance with 30 TAC § 330.251;

19. Perform Post-Closure Care Maintenance in accordance with 30 TAC § 330.254.

If you have any questions regarding this letter, please contact Mr. Sam Coyner at (512) 239-2519.

Sincerely,

Thomas Collins, P.E.

H. Thomas Collins, P.E., Team Leader
Landfill Remediation Team
Compliance and Enforcement Section
Municipal Solid Waste Division

HTC\sjc

cc: TNRCC Region 4 Office
Vic Ramirez, TNRCC ECL
TNRCC I&HW Waste Evaluation Section
Ada Lichaa, TNRCC MSW Corrective Action
City of Dallas

CESWF-EV-D (200-1a)

13 January 1998
Simmons/rg/8-9923/1630

MEMORANDUM FOR FILES

SUBJECT: Dallas Floodway Extension (DFE), Record of Conversation with Environmental Protection Agency (EPA), and Texas Natural Resource Conservation Commission (TNRCC), Concerning Regulatory Status of Linfield Landfill

1. On 9 January 1998, the undersigned contacted Carlos Sanchez, an RPM with the Superfund Division, and Stan Hitt, Director of the Brownfields Program. Both work at EPA Region VI. On 12 January 1998, I also contacted Chuck Epperson, Chief of the Voluntary Cleanup Section with TNRCC. I discussed the current regulatory status of Linfield Landfill with all three and the impact construction of the swale would have on this status. I told each of them:

a. Linfield Landfill is a CERCLIS site with a current "No Further Action Status".

b. The swale will pass through the western end of the landfill removing about 25% of its volume.

c. The wastes that will be removed are municipal solid wastes, but that industrial wastes, including liquid industrial wastes, were disposed of in the eastern end of the landfill.

d. Testing by CESWF in the landfill has identified lead in the leachate at levels slightly above hazardous levels.

e. The CSEWF proposes to:

(1) Isolate the portion of the landfill not required for construction from that portion that will be disturbed.

(2) Remove and dispose of all wastes, including the leachate as required, in accordance with applicable laws.

(3) Reclose the landfill, ensuring no future releases from the landfill occur.

2. I contacted Mr. Sanchez (a former CESWF employee currently involved in the West Dallas Lead Smelter Superfund Projects) who felt that EPA would have little interest in revisiting the Linfield Landfill. It had been assessed while on the CERCLIS and was determined not to be a problem. He confirmed that future regulation of the landfill was the responsibility of the TNRCC.

3. I contacted Mr. Hitt because he oversees the Brownfields Program for EPA Region VI.

a. I asked him about a "comfort letter" for Linfield Landfill. He stated

that this site would fall under the Brownfields Initiative, but that a "comfort letter" would likely be issued once the construction was complete. He stated landfills are very complex and full of surprises, so EPA is reluctant to issue one before construction is complete.. He also confimed that the TNRCC Voluntary Cleanup (VCP) program was the appropriate framework to go through, and that any liability release from TNRCC would be honored by EPA as well, since they have a Memorandum of Agreement (MOA) in-place to recognize each others liability releases.

b. I asked him if EPA would be willing to provide us a letter saying that, if the Corps followed the construction process outlined above in para 2.e., EPA would anticipate requiring no additonal actions by the Corps to address the remainder of the landfill. He was receptive to this idea. He made it clear that this would not be binding, and that once further investigations were conducted, revisions may be required. I offered to ghost-write a letter for him and send it via e-mail. He agreed to staff it through EPA to see what could be done.

4. I contacted Mr. Epperson, head of the TNRCC VCP. He was also receptive to considering Linfield Landfill under the VCP, as well as any other sites in the DFE project. I explained that we had contacted the TNRCC Industrial & Hazardous Waste, Waste Evaluation Section, in May 1995, to determine what actions were necessary concerning construction in or on a landfill. He felt that our approach, as described in para 2.e., was sound and that, if we complied with the May 1995 letter, we should not have any problems. He cautioned that work in landfills is always complex and that the TNRCC may require ground-water monitoring after construction to ensure no new releases occur as the result of our activities.

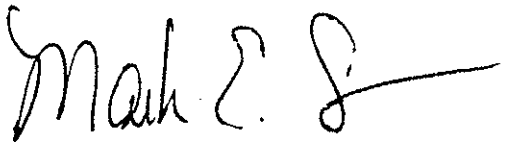
5. In summary:

a. The EPA has little interest in regulating this site under their CERCLA authority.

b. The TNRCC is the regulatory agency that will regulate this site.

c. The proposal to deal only with those wastes generated by construction of the swale, with no requirement to remediate the remainder of Linfield Landfill is reasonable and, in principle, acceptable to EPA and TNRCC.

6. Questions on the above should be directed to the undersigned at (817) 978-9923, EXT 1630.



MARK E. SIMMONS P.E.
Chief, Environmental Design Branch

CESWF-EV-D
SUBJECT: Dallas Floodway Extension (DFE), Record of Conversation With Environmental Protection Agency (EPA), and Texa. Natural Resource Conservation Commission (TNRCC), Concerning Regulatory Status of Linfield Landfill

CF:
CESWF-EV (M. Ensch)
CESWF-PM (M. Mocek)
CESWF-PM-C (B. Fickel)
CESWF-PM-C (G. Rice)
CESWF-EC-TP (K. Craig)
CESWF-EV-DI (D. Perrin)
CESWF-EV-DI (J. Drysdale)

TRIP REPORT
REVIEW OF LINFIELD LANDFILL AND OTHER HTRW SITES
DALLAS FLOODWAY EXTENSION PROJECT

I. REVIEW OF APPENDIX J

A. Previous Investigations. The previous investigations have consisted of preliminary assessments with 1 to 6 soil borings, sediment samples, and groundwater samples per site. The purpose of the preliminary assessment is to determine the presence and nature of contaminants at a site. The previous site investigations have been limited by Right of Entry and weather problems. The previous investigations are adequate and should be continued on all of the sites when weather and right of entries permit.

B. Future Investigations. The preliminary assessment investigations should continue on the previously univestigated sites. The preliminary assessments should be performed using methods similar to the previous investigations. Consideration should be given to skipping the preliminary assessment and performing a more detailed investigation if there is a high likelihood of finding contamination. Investigations to determine the nature and extent of contamination should be conducted on sites where contaminants above regulatory standards were discovered. The recommended investigation would consist of soil borings 10 ft. deep on 200 ft. centers along the levees. Borings should be drilled in a grid pattern on 200 ft. centers for the sump and swale excavation areas. These borings should be drilled to a depth of 5 ft. below the bottom of the sump or swale. Groundwater samples should be taken and elevations recorded when groundwater is encountered. Also, additional soil boring and groundwater sampling should be performed 200 to 400 ft. past the edge of the excavation. When planning borings outside the excavated areas, consideration should be given to the potential localized change in groundwater flow direction near a sump or swale excavation. The purpose of the additional borings would be to determine if contamination exists outside the excavation which could seep into the sump or swale during or after construction. A direct push rig used in conjunction with an on site lab would be the quickest and most efficient method of performing the investigation. The direct push rig and onsite lab provide immediate test results allowing the onsite geologist/engineer to make informed decisions on additional boring locations required to fully characterize a site. The onsite lab should be capable of analyzing both soil and groundwater for all contaminants of concern. The direct push rig could be a cone penetrometer (CPT) rig or Geoprobe/Earthprobe rig mounted on an all-terrain vehicle. CPT rigs can provide valuable soil classification and hydraulic conductivity information, however most CPT rigs are large and would not be able to access the majority of these sites. A CPT rig should only be considered in locations accessible to large conventional rotary rigs. Due to accessibility, the Geoprobe/Earthprobe type units would probably be the best choice for most of these projects. Most Geoprobe/Earthprobe type rigs also have limited augering capabilities for areas where direct push tools cannot be used. However, conventional rotary rigs should be used when investigating the interior of a landfill because direct push tools can be damaged when hard irregular shaped objects are encountered in a landfill. This investigation technique has been used by the Tulsa District many times with excellent results. The investigations have been performed using both types of direct push rigs mentioned above

and have been performed by both contractors and District personnel. These investigations were performed faster and were less expensive than similar investigations using convention methods (rotary rig and offsite lab). Information gathered during any geotechnical or environmental investigations could be used by either discipline. Investigations by either discipline should be coordinated to avoid duplication of work.

C. Waste Classification. The current waste classifications in Appendix J are reasonable. They could be refined if additional background soil borings could be performed in the area. The background information could be particularly useful in determining acceptable concentrations of metals. The quantities need to be refined using information from the additional investigations. Soil contamination is usually limited to the area immediately around the source of contamination. however groundwater contamination can extend well beyond the source in sandy or gravelly areas. Therefore, the future investigations should be designed to locate all groundwater contamination in or near the sumps and swales and determine the most efficient method of dealing with the groundwater (containment or collection and treatment/disposal).

D. Disposal Alternatives. The waste classifications and disposal methods identified in Appendix J are reasonable. Contaminated soil and landfill waste will be disposed of in a hazardous waste (RCRA) landfill or a municipal solid waste landfill (MSWLF), depending on the classification of the waste. Incineration is another method of disposing or treating solid waste. Tulsa District is using a thermal desorption process at Longhorn Army Ammunition Plant (LHAAP) to remove contaminants from soil. However, incineration or thermal desorption is probably not an acceptable treatment method because acquiring an air permit in Dallas for this treatment process would be difficult and maybe impossible. Testing of any waste disposed of offsite will likely be required to determine the appropriate disposal facility. The operators of the MSWLF should require testing to protect themselves if testing is not required by TNRCC. Onsite disposal of the Class 1 Nonhazardous solid waste may be an option and will be discussed below. Any hazardous solid waste should be taken offsite for disposal. Construction of a RCRA landfill for onsite disposal would be cost prohibitive and permits in a floodplain would probably be impossible to acquire. TNRCC and the wildlife agencies will not allow contaminated groundwater to seep into the sump and swale areas during or after construction. Therefore, contaminated groundwater must be contained using some type of impermeable barrier where excavation in areas with contaminated groundwater is required. Construction controls should be used to minimize collection of surface runoff in excavations through contaminated areas. However, all surface runoff and groundwater that collect in contaminated areas should be pumped into portable storage tanks and be analyzed to determine the required disposal or treatment method. TCLP analysis should be adequate but TNRCC will have to concur.

II. LINFIELD LANDFILL

A. Slurry Trench. Any slurry trench should be keyed into the low permeability rock even in areas that are predominantly clay to avoid the potential underseepage through sand or gravel lenses. The geotechnical borings do not identify the top of rock elevation along the entire length of the wall. Borings should be conducted to locate the top of rock. Also, the slurry trench should

be extended approximately perpendicular to the sump or swale an adequate distance to prevent contaminated groundwater from seeping around the wall. This is particularly important for any wall constructed upgradient of a sump or swale. Construction of a conventional slurry trench through landfill debris will be difficult. Keeping the trench open and preventing the loss of slurry (even if panel construction is used) could be difficult due to the large number and size of voids that can exist in landfills. Test wells could be placed in the landfill to determine the hydraulic conductivity and design the slurry for the trench. The wells could also be used for leachate sampling or monitoring. Other barriers to considered in addition to or in place of conventional slurry trenches are sheet pile walls with sealed joints or walls consisting of synthetic liners.

B. Cover System. No synthetic covers are required for MSWLF's if the landfill does not have a synthetic bottom liner, according to 30 TAC Chapter 330, Subchapter J. The landfill cover must have a permeability equal to or less than the bottom liner of the landfill and cannot be greater than $1*10^{-5}$. At a minimum, the landfill cover should consist of 2 ft. of compacted clay with 6 in. of topsoil. Since the swale will be constructed to carry Trinity River flood flows, TNRCC may require the use of a synthetic liner as added protection. However, a concrete lined channel through the landfill may satisfy them. This is a point that could be negotiated.

C. Slope Protection. Adequate protection should be designed to prevent erosion of the cover due to river velocities and/or rainfall runoff down the sideslopes. A properly designed and constructed concrete lined channel will provide adequate protection. The top of the slope should be bermed or graded to prevent uncontrolled runoff down the slope if the concrete lining does not extend to the top of the slope. Topsoil and adequate grass cover could provide enough protection from runoff if the grading is done properly.

D. Waste Disposal and Classification. Collection, removal, treatment, and offsite disposal of leachate and solid waste were addressed in Paragraph I. Testing of the waste will probably not be required if permission is given to relocate the waste on the existing landfill. Any new landfill created on the golf course or other area on the project will have to meet the requirements of any new MSWLF permitted by TNRCC.

E. Worker Protection. Worker protection and protection of the public will be required and should consist of stationary air monitoring stations, weather stations, and portable air monitoring equipment. In addition, nuisance odors must be controlled and not permitted to impact surrounding neighborhoods.

III. DISPOSAL IN NEW OR EXISTING LANDFILL.

A. Disposal in New Landfill. According to TNRCC regulations, any new landfill located in the golf course receiving Class I Nonhazardous Waste must be permitted, designed, and operated like any new MSWLF. The construction of a new landfill to meet current criteria would likely exceed the cost of offsite disposal. In addition, TNRCC will not permit a MSWLF in a 100-year floodplain unless specific written approval is requested and received.

B. The best disposal option would be to seek permission to relocate the excavated waste in another portion of the landfill. TNRCC does not generally approve of this practice and 30 TAC 330.955 does not allow this practice. However, if Dallas owned the portion of the landfill where the waste would be moved and the COE designed an adequate cap, TNRCC may be receptive to relocation of the waste. The potential cost savings are worth negotiating with TNRCC for relocation of the waste on the existing landfill. TNRCC should be told the waste will be moved to an area of the existing landfill that is above the 100-year floodplain. Also, a minimum of 2 ft. of compacted clay and 6 in. of topsoil will be placed over the relocated waste and graded with slopes of 3 to 5%. The use of a geomembrane and possibly a drainage layer in addition to the compacted clay could be used as a negotiating point. A minimum of 18 inches of coversoil is required when a geomembrane is used.

IV. DEALINGS WITH TNRCC

A. Personnel and Organizations. The appropriate people and organizations have been identified and are listed on the last page of the May 30, 1995 letter addressed to Jim Drysdale. The people I have dealt with on the LHAAP projects are Michael Moore, Diane Poteet, and Alvie Nichols of the Superfund Section. Also, Richard Anderson was the person who reviewed the technical design aspects of the landfill caps. All of these people followed the regulations closely but were fair and easy to work with. However, they probably will not work on any part of the Dallas Floodway Extension unless they have changed sections or a CERCLA site is encountered.

B. Past Landfill Experiences. I have designed or reviewed the design of landfills caps or covers in Arkansas, Oklahoma, and Texas. The excavation of three landfills under a new runway is the only Tulsa District project I am aware of in the last five years which required a substantial amount of waste excavation and relocation. The project was located at Altus AFB, Oklahoma. The waste was excavated and sorted according to PID readings. All groundwater or rainwater collected in the excavation was pumped into portable storage tanks, tested, and disposed of properly. Based on interviews with people involved with the project, all of the water collected was determined to be clean and did not require special disposal procedures. The 10th Street Superfund Site, in Oklahoma City, required excavation and relocation of PCB contaminated soil within the existing landfill. The excavation was continued until tests on the soil in the bottom and on the sidewalls of the excavation had levels of PCB less than 25 ppm. Water that collected in the excavation was drummed and tested. This water was clean and did not require special disposal. The only project I worked on in Texas which was remotely similar was the LHAAP landfill caps. One of the landfills is in the 100-year floodplain of Harrison Bayou, however no extensive relocation of waste was required. Some minor amounts of waste were moved or relocated to make grading of the cap easier. Small piles were leveled and the edges of the landfill were reshaped to place the geosynthetic layers.

RANDEL MEAD, P.E.
Geotechnical Engineer
Tulsa District, Corps of Engineers
February 10, 1998

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF

February 19, 1998

Environmental Design Branch
Environmental Division

Mr. H. Thomas Collins, P.E.
Permits Section, Municipal Solid Waste Division
Texas Natural Resources Conservation Commission
MC-124
P.O. Box 13087
Austin, Texas 78711-3087

Dear Mr. Collins:

Enclosed are minutes of our February 11, 1998 meeting in which we discussed the Dallas Floodway Extension project and how it will impact Linfield landfill. Please review the minutes to ensure they are accurate and that we understand your guidance. If the minutes are correct, it is requested that you provide a written response to that effect.

If you have questions concerning the minutes, or if you need additional information, please contact the undersigned at telephone 817/978-9923, extension 1630. We look forward to hearing from you and working with you in the future.

Sincerely,

Mark E. Simmons, P.E.
Chief, Environmental Design Branch

CESWF-EV-D (200-1a)

19 February 1998
Simmons/rg/8-9923/1630

MEMORANDUM THRU CESWF-EV (MIKE ENSCH)

FOR FILES

SUBJECT: Environmental Compliance Regulatory Issues Associated with Excavating Materials from Linfield Landfill -- Dallas Floodway Extension (DFE) Project

1. On 11 February 1998, Fort Wort District and Southwestern Division Office personnel and a city of Dallas representative met with Texas Natural Resources Conservation Commission (TNRCC) staff. A list of meeting participants is presented in enclosure 1. This meeting was arranged at the request of the Corps of Engineers for two primary purposes: (1) brief TNRCC on the above referenced project; and (2) seek their input on anticipated regulatory requirements resulting from the Corps proposal to construct a chain of wetlands through the closed Linfield landfill, located in the southern portion of Dallas, Texas.

2. William Fickel, Director, Civil Works Programs, first provided a project overview to familiarize TNRCC staff with pertinent project features and general information regarding ongoing planning activities. The writer, who is Chief, Environmental Design Branch, followed, offering background details on history of the Linfield landfill, HTRW investigations and testing the Corps has conducted to date, and coordination undertaken with EPA and others. I reiterated the purpose of this meeting was to obtain TNRCC recommendations to assure compliance with applicable Federal, State, and local waste disposal laws and regulations. The Corps was particularly interested in determining that TNRCC was the responsible agency for monitoring compliance efforts, how they would classify the waste materials, what the applicable procedural requirements for removal and replacement of the waste materials at another site would be, and to gain information concerning any special requirements for handling the lead-containing leachate contained within the landfill. Thomas Collins, TNRCC, stated that guidance contained within their letter of 30 May 1995, which was fully coordinated within TNRCC, was still valid. An open question and answer exchange then ensued between the meeting participants.

3. Highlights on the informal guidance offered by TNRCC staff regarding various questions and issues raised are summarized below:

a. Linfield landfill is classified as a pre-RCRA site, based on the time frame it was closed. As such, in TNRCC's view, they have responsibility for monitoring any actions involving disturbance of the waste materials. They did state it was highly unlikely that the landfill would ever be regulated under CERCLA again. The TNRCC was unable to find any record of this landfill in their database, nor any record of landfill permits (the Corps and the city of Dallas will attempt to research this issue).

b. Existing materials in-place at the Lindfield landfill are not considered RCRA materials; however,

they should be characterized to determine their waste characteristics for proper disposal after excavation. Not enough information is presently known to classify the materials.

c. Concurred that the lead-containing leachate could be removed by using well points and/or constructing sumps and then pumping the leachate to holding tanks where it could be tested and, if necessary, treated to meet acceptable levels for disposal. Final disposal of the leachate at the city of Dallas Central Wastewater Treatment Plant is anticipated.

d. Agreed there are three possible options for disposal of the solid wastes: (1) haul the solid waste materials to an authorized Type I landfill such as McComas Bluff or Avalon; (2) place the solid waste materials in a new landfill to be permitted and constructed downstream on an adjacent golf course (which is to be abandoned when the DFE Project is built); or (3) place the solid waste materials on top of the undisturbed portion of Linfield landfill. The McCommas Bluff landfill is a Type I municipal landfill and is located a few miles from the project site. The Avalon landfill is a Type I municipal landfill with a dedicated special waste trench, and is able to also accept some industrial wastes. It is located about 30 miles from the project site. Cost estimates presented in the draft GRR report are based on hauling the solid waste material to the Avalon site. Wastes may be split for disposal at both landfills. The TNRCC cautioned strongly that placing the solid waste materials in a new landfill in the golf course area or on top of the undisturbed portion of Linfield landfill would require going though a permitting process similar to opening a new landfill, which could take in excess of 2 years to complete and might not be successful. They suggested significant public and political issues often make this option impossible.

e. Recommended we consider providing filter fabric, as a separator between the landfill cap and the slope protection (i.e. gabbions or rip rap), on the side slopes of the swale.

f. Agreed that one test boring/ acre should be sufficient for initial characterization of Linfield landfill. Visual classification and test results would determine if more investigations on a tighter grid spacing are warranted.

g. A work plan will be submitted by the Corps to TNRCC for their review/comment/ concurrence to initially screen the site. The plan will include a site-specific safety and health plan, field investigation plan and waste management plan. Reminded the Corps that we would need proper equipment to test for methane and hydrogen sulfide gas when the site was opened.

h. Noted it was important to coordinate with the city of Dallas as regards using the McComas Bluff landfill and/or the Central Wastewater Treatment Plant for disposal of wastes. We must ensure their permit requirements are met before disposal.

i. The TNRCC does not see any air regulations relevant to the project except for site safety precautions during site investigation work and project excavation, due to the possibility of methane and other explosive gases.

j. The Corps will provide the Region 4 office copies of all documents and correspondence provided to the TNRCC Austin office.

4. At the conclusion of the meeting, it was mutually agreed that the Corps would prepare meeting notes outlining our understanding of the guidance offered by the TNRCC staff and forward these notes to them for review and to confirm their accuracy and completeness. Fort Worth District requested, and the TNRCC staff agreed to provide, a formal written response on their findings after review of the memo. The following primary points of contact were established for future exchanges of information:

a. General Coordination: Thomas Collins, Permits Section, Municipal Solid Waste Division, TNRCC.

b. Wastes Classification: Gerry Bolmer, Special Waste Coordinator, Municipal Solid Waste Division, TNRCC.

c. Mark Simmons, Chief, Environmental Design Branch, Environmental Division, Fort Worth District, Corps of Engineers.

Mark E. Simmons

MARK E. SIMMONS, P.E.
Chief, Environmental Design Branch

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

March 6, 1998

Mark E. Simmons, P.E.
Chief, Environmental Design Branch
Department of the Army
Fort Worth District, Corps of Engineers
P.O. Box 17300
Fort Worth, TX 76102-0300

Re: Minutes of February 11, 1998 Meeting
Dallas Floodway Extension (DFE) Project

Dear Mr. Simmons:

The Texas Natural Resource Conservation Commission (TNRCC) is in receipt of your letter dated February 19, 1998. After review of the minutes of the above referenced meeting, the TNRCC finds that the content is as discussed. The air regulations issue as outlined on page 3, paragraph "i" should be revisited with the Air Permits Division due to the possibility gases from the closed Linfield Landfill could be present.

If you have any questions or comments concerning this correspondence, please contact Mr. Gerry Bolmer, Ground-Water Protection Team, at (512) 239-6781.

Sincerely,

Bryan W. Dixon, P.E., Director
Municipal Solid Waste Division
Texas Natural Resource Conservation Commission

BWD/JDA/geb

cc: William A. Robinson, TNRCC Regulatory Section
TNRCC Region 4 Office/ Arlington - Sam Barrett, Waste Section Manager
MSW Reader File

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000 • Internet address: www.tnrcc.state.tx.us

CITY OF DALLAS

March 9, 1998

Mr. William Fickel, Jr.
Director of Civil Works, CESWF-PM-C
U.S. Army Corps of Engineers, Fort Worth District
P.O. Box 17300
Fort Worth, Texas 76102-0300

RE: The Trinity River Corridor, Dallas Floodway Extension Project

Dear Bill Fickel:

I appreciate the continued efforts of the Fort Worth District to complete the Draft General Reevaluation Report and EIS for public disclosure. As you are aware, the City of Dallas has scheduled an important bond election for the Trinity River Corridor on May 2, 1998 that includes the Dallas Floodway Extension Project. We feel it is very important for the U.S. Army Corps of Engineers to release this draft report in a timely fashion before the bond election date. Also, the report would be basis for the City, the Fort Worth District, and several other involved agencies to speak from the same reference on project details.

The City understands that the preliminary Draft General Reevaluation Report is receiving Headquarters review and subsequent approval is required before the report can be released to the public. Regarding one of Headquarters' issues on Hazardous, Toxic, and Radioactive Waste (HTRW), the City is aware of Engineering Regulation 1165-2-132. Any materials encountered with the Dallas Floodway Extension Project that are classified as hazardous substance as defined under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) would be the City's responsibility. In the event that hazardous sites are encountered with project construction, avoidance measures can be pursued with project modifications. The City also understands that the recent revisions to the draft report have not increased the City's cash requirement of $24.7 million as presently estimated for the project.

TRINITY RIVER CORRIDOR PROJECT / PUBLIC WORKS AND TRANSPORTATION 320 E. JEFFERSON BOULEVARD DALLAS, TEXAS 75203 TELEPHONE 214/948-4202 FAX 214/948-4239

CESWF-EV-D (200-1a)

22 June 1998
Perrin/rg/8-3221/1641

MEMORANDUM THRU CESWF-EV-D (MARK SIMMONS)

FOR FILES

SUBJECT: Waste Classification for Linfield Landfill, Dallas Floodway Extension (DFE) Project

1. Reference:

a. Memorandum for Files (CESWF-EV-D), 19 February 1998, subject: Environmental Compliance Regulatory Issues Associated with Excavating Materials from Linfield Landfill, Dallas Floodway Extension (DFE) Project.

b. Memorandum for Record (MFR) (CESWF-EV-DI), 27 April 1998, subject: Feasibility Phase, Hazardous, Toxic, and Radioactive Waste (HTRW) Investigations, Dallas Floodway Extension (DFE) Project Study.

2. The purpose of this memorandum is to document telephone conversation between the writer and Mr. Gerry Bolmer, Special Waste Coordinator, Municipal Solid Waste Division, Texas Natural Resource Conservation Commission (TNRCC), 19 June 1998.

3. I called Mr. Bolmer to discuss the investigative approach for classifying buried wastes and leachate materials at Linfield Landfill. I explained the purpose of this next investigative phase as being an effort to obtain data necessary to address HQUSACE comments for the GRR. These data should address the following:

a. Determine if the landfill leachate is hazardous;

b. Fully characterize buried wastes and leachate for disposal purposes; and

c. Quantify the amount of leachate and buried wastes to be removed for construction of the swale.

4. Mr. Bolmer and I agreed leachate samples are the only samples to be collected. These samples should be analyzed for the full suite of TCLP constituents listed in 40 CFR 261.24. Waste material can be classified visually. Mr. Bolmer emphasized that a complete written descriptive record of visual observations of all waste encountered in each boring is very important for TNRCC to classify this material. Field judgment should be used in collecting any samples of waste. These samples should be collected only if suspicious materials are encountered which would lead the sampler to think they might be hazardous (i.e., drums, sludge, car batteries, etc.). Visual classification can be performed using soil borings; trenches are not necessary and are not recommended. No samples need to be collected of the underlying in situ materials at this time.

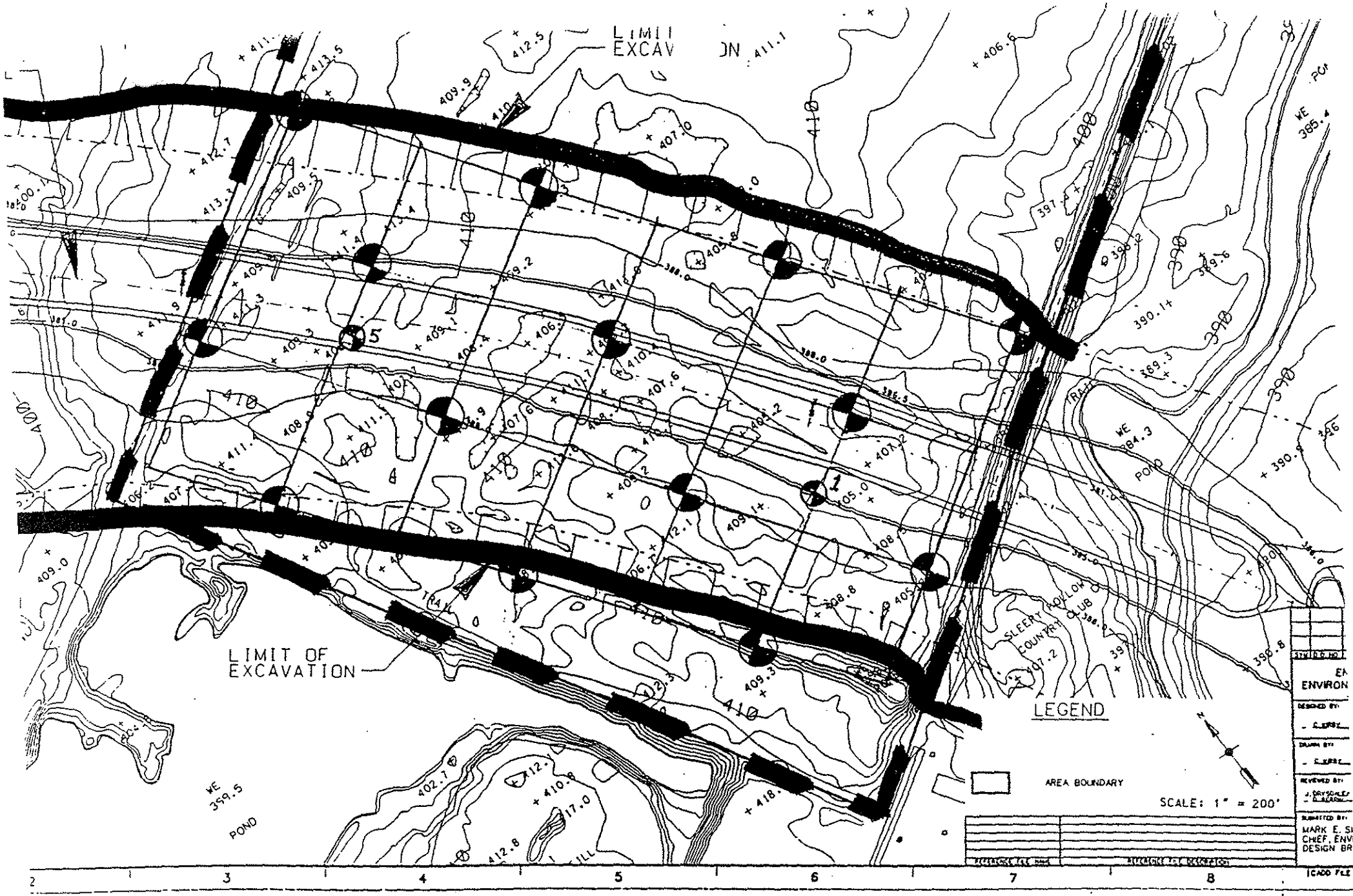
5. Ref 1.a., documents TNRCC's investigative approach for initial characterization of the landfill as being one boring per acre. This approach equates to an approximate spacing of 200 feet between borings across the site. Mr. Bolmer and I agreed that only about half of these borings would be necessary to obtain data needed to address HQUSACE's comments. I faxed Mr. Bolmer a proposed boring layout (attached) for his comments. He agreed with the layout and the proposed number of borings for this next effort. Should results of this next investigative effort support keeping the proposed swale alignment at this location, then additional borings to complete the 200-foot grid spacing across the swale area will be required to provide enough visual descriptive data for TNRCC to classify the buried waste.

6. Mr. Bolmer and I briefly discussed the potential source(s) of the hazardous constituents in the leachate. He explained that the most likely source for hazardous leachate is industrial waste buried in the eastern half of the landfill. Right now, the TNRCC is using information contained in the few records for the site which indicate the western end of the landfill was used for municipal waste disposal. As long as no landfilled hazardous wastes are encountered during investigations of this portion of the site, the TNRCC will continue to classify this portion of the landfill as municipal solid waste.

7. In accordance with requirements of 30 TAC 330.255, Post-Closure Land Use for municipal solid waste landfills, borings through a final cover are prohibited unless authorized by the TNRCC. Prior to performing any investigations on Linfield Landfill, Mr. Bolmer requested a letter be sent to him fully describing the proposed investigation and requesting authorization to proceed. I agreed to provide him this information.

Deborah C. Perrin

DEBORAH C. PERRIN, P.G.
Team Leader, Investigations Section
Environmental Design Branch



ea13.m KIRBY_C Tuesday June 16 1998 01:08:48 PM CDT

August 12, 1998

Environmental Design Branch
Environmental Division

Mr. Gerry Bolmer
Special Waste Coordinator
Municipal Solid Waste Division
Texas Natural Resource Conservation Commission
MC-124
P.O. Box 13087
Austin, Texas 78711-3087

Dear Mr. Bolmer:

This letter is in reference to the subsurface investigations to be performed by the U.S. Army Corps of Engineers, Fort Worth District, at Linfield Landfill in Dallas, Texas, in August 1998, as part of the planning efforts for designing the Dallas Floodway Extension project. Proposed investigations were submitted to you in a letter dated July 1, 1998, and consisted of 14 borings designed to penetrate the entire thickness of buried waste for the purpose of visually classifying waste material and obtaining leachate samples for analysis. The purpose of this letter is to propose additional investigative efforts as discussed between Deborah Perrin and yourself telephonically on July 27, 1998.

Due to year end funding considerations, and the potential impact this site may have on the design of the Dallas Floodway Extension project, personnel at the Corps of Engineers have opted to perform a more extensive investigation at Linfield Landfill to fully characterize the buried waste and to begin developing stratigraphic and hydrogeologic data for the site. Therefore, the investigative effort has been expanded to include an additional 14 borings to be drilled to 40- and 60-foot depths. Proposed boring locations and corresponding depths are shown on the enclosed boring layout.

The revised plan for investigation will begin with drilling the 14 shallow borings first. Estimated final depth of these borings is 25 feet. These borings will be completed into the first clay layer encountered beyond the bottom of the waste materials, at which point a slotted PVC pipe and disposable bailer will be used for collecting a leachate sample from each boring. Following completion of the 14 shallow borings, 9 40-foot borings and 5 60-foot borings will be drilled using 8 three-fourths of an inch outside diameter hollow-stem augers. An 8-inch diameter threaded PVC casing will be placed into the clay layer underlying the site and will be grouted in-place from the bottom of the casing. The grout will be allowed to set up for a minimum of 8 hours before the boring will be advanced to its final depth of either 40 or 60 feet. Soil samples of natural material will

be collected every 5 feet or change in lithology and will be tested for geotechnical parameters only. A ground-water sample will be collected from each boring using a slotted PVC pipe and disposable bailer. Although ground-water samples collected from beneath the landfill are not expected to be characteristic of ground water at the site, chemical analysis of these samples will provide an indication of any gross ground-water contamination beneath the landfill. Upon completion of sampling, each boring will be grouted from the bottom up using a bentonite grout mixture, and the PVC surface casing will be grouted in-place. All investigation-derived waste generated from the drilling and sampling event will be containerized and characterized in accordance with 30 TAC Subchapter R requirements, then will be disposed of off-site.

Personnel at the Corps of Engineers understand that additional investigative efforts beyond those described in this letter will be required to fully characterize hydrogeologic conditions for the site. These efforts will be designed using data obtained from this investigative effort and will be coordinated with you for approval in the future.

Please address any questions or comments regarding this request to Ms. Deborah Perrin, U.S. Army Corps of Engineers, Fort Worth District, ATTN: CESWF-EV-DI, P.O. Box 17300, Fort Worth, Texas, 76102-0300. Ms. Perrin's telephone number is (817) 978-3221, extension 1641. It will be assumed no response from your office within 14 days of receipt of this letter will be concurrence to proceed with this effort.

Sincerely,

/s/

William Fickel, Jr.
Chief, Environmental Division

Enclosure

Copy Furnished With Enclosure:

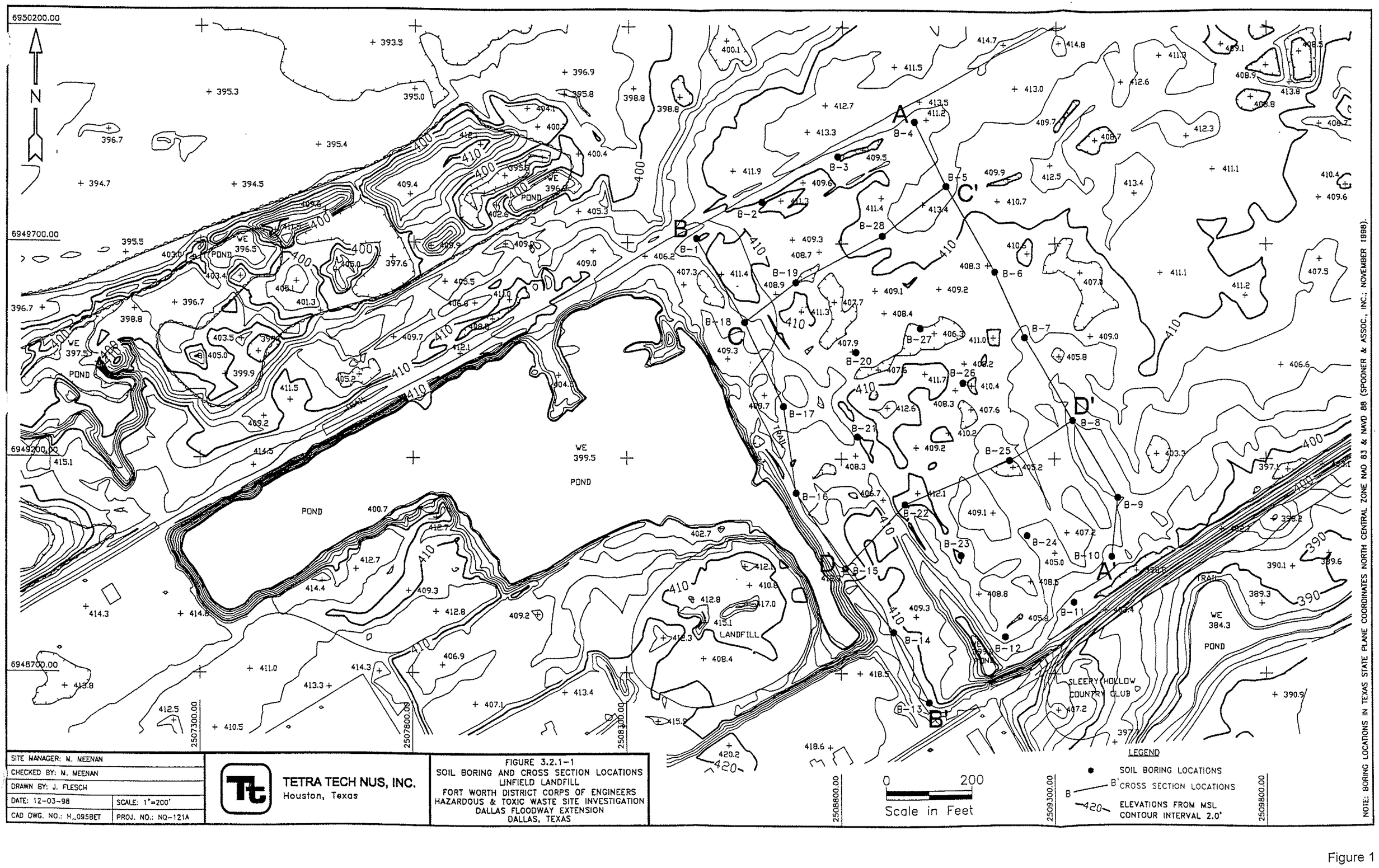
Mr. Sid Slocum
Water Program Manager
Texas Natural Resource Conservation Commission
Region 4
1101 East Arkansas Lane
Arlington, Texas 76010-6499

CESWF-EV-DI PERRIN

CESWF-EV-D SIMMONS

CESWF-EV FICKEL

SECTION J-6



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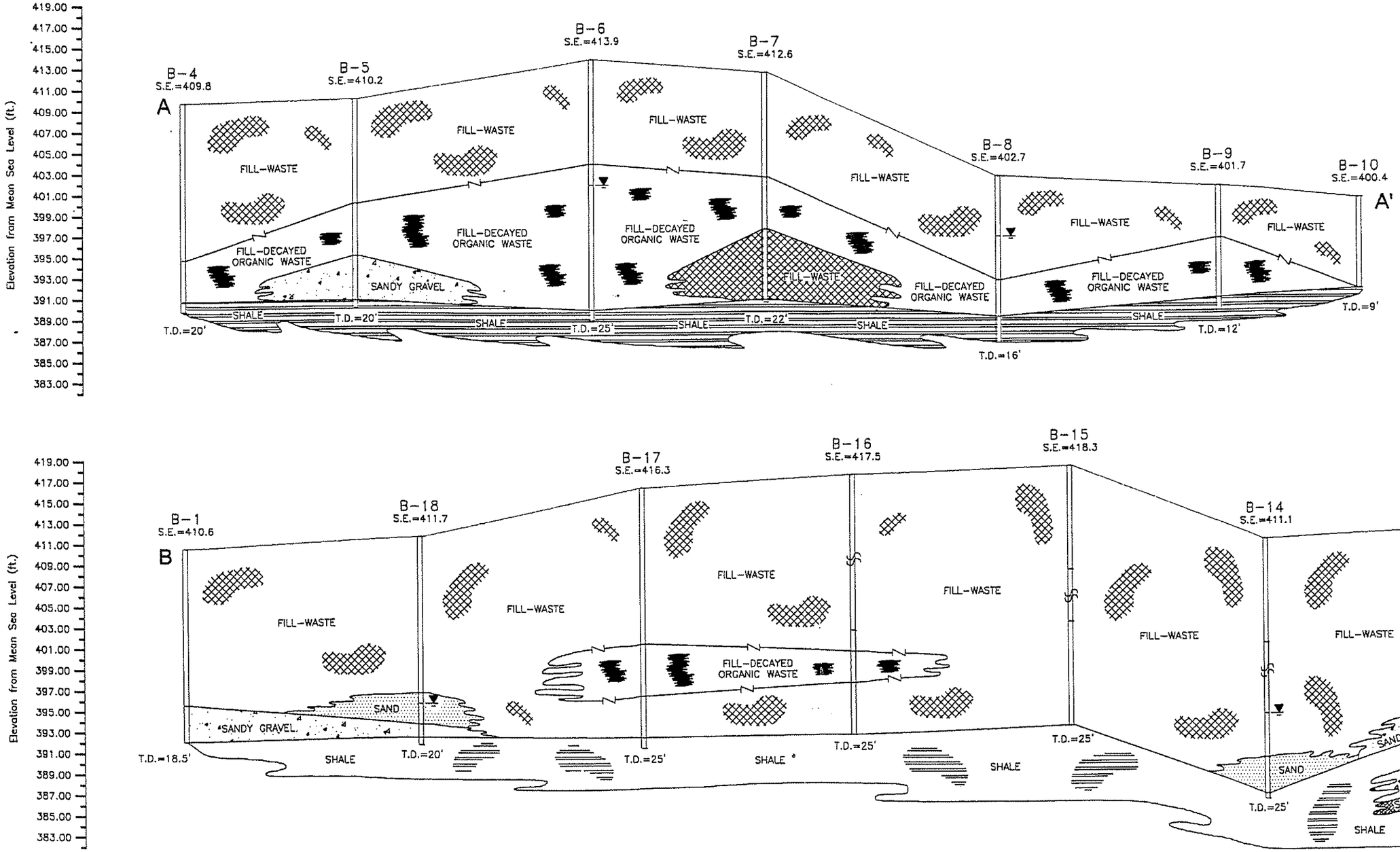
CHECKED BY: M. MEENAN	
DRAWN BY: J. FLESCH	
DATE: 12-03-98	SCALE: 1"=200'
CAD DWG. NO.: H_095BET	PROJ. NO.: NO-121A

TETRA TECH NUS, INC.
Houston, Texas

FIGURE 3.2.1-1
SOIL BORING AND CROSS SECTION LOCATIONS
LINFIELD LANDFILL
FORT WORTH DISTRICT CORPS OF ENGINEERS
HAZARDOUS & TOXIC WASTE SITE INVESTIGATION
DALLAS FLOODWAY EXTENSION
DALLAS, TEXAS

Figure 1



SITE MANAGER: M. NEENAN	
CHECKED BY: K. MENGDEN	
DRAWN BY: J. FLESCH	
DATE: 12-04-98	SCALE: AS NOTED
CAD DWG. NO.: 121ACS1	PROJ. NO.: NO-121A

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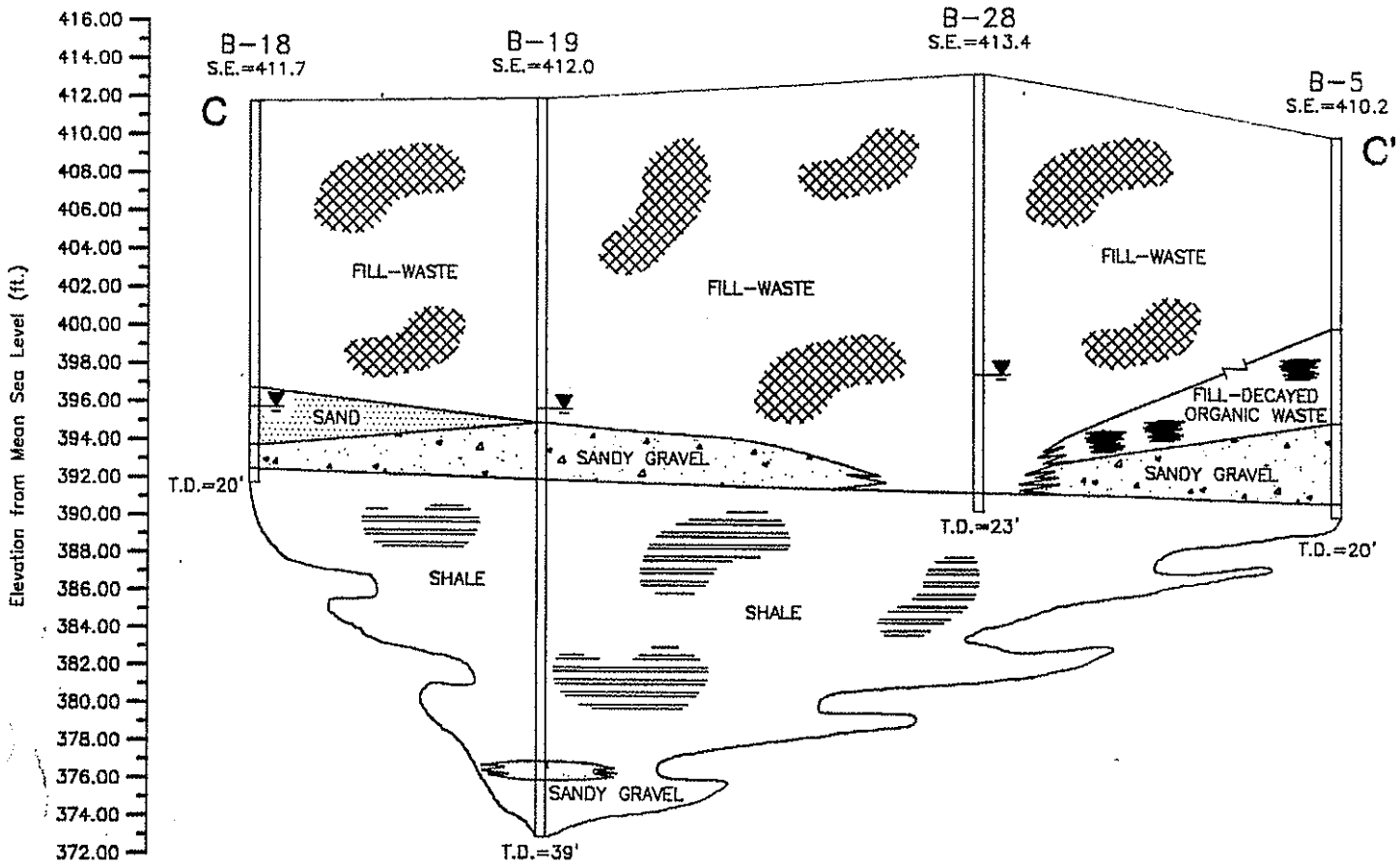
FIGURE 3.5.4-1
SUBSURFACE PROFILES (A-A'/B-B')
LINFIELD LANDFILL
FORT WORTH DISTRICT CORPS OF ENGINEERS
HAZARDOUS & TOXIC WASTE SITE INVESTIGATION
DALLAS FLOODWAY EXTENSION
DALLAS, TEXAS

Figure 2



LEGEND

- WATER LEVEL
- NO RECOVERY
- T.D. TOTAL DEPTH
- S.E. SURFACE ELEVATION

0 100
Horizontal Scale in Feet

0 10
Vertical Scale in Feet

SITE MANAGER: M. MEENAN	
CHECKED BY: K. MENGDEN	
DRAWN BY: J. FLESCH	
DATE: 12-04-98	SCALE: AS NOTED
CAD DWG. NO.: 121ACS2	PROJ. NO.: NQ-121A

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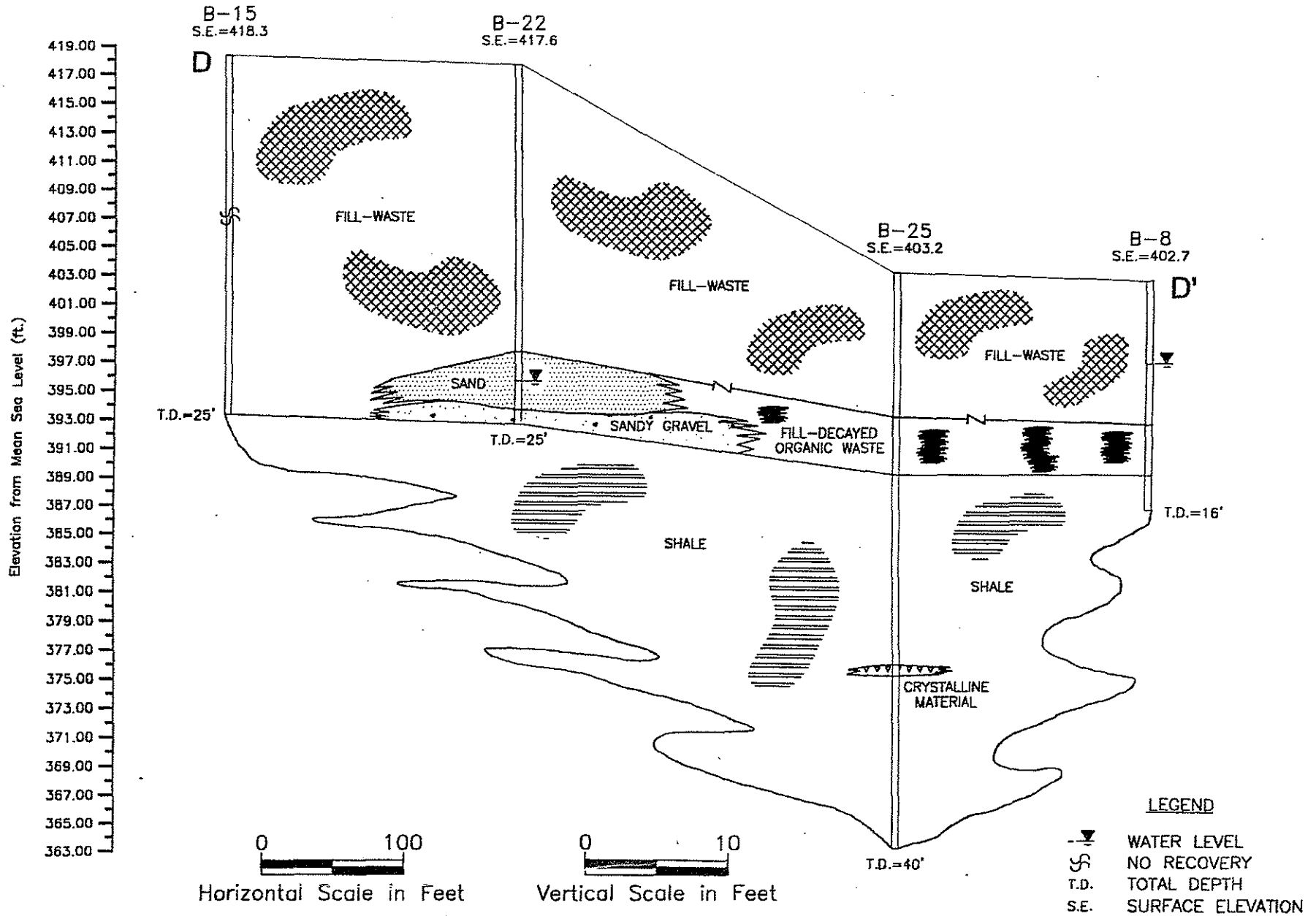
Houston, Texas

FIGURE 3.5.4-2
SUBSURFACE PROFILE (C-C')
LINFIELD LANDFILL
FORT WORTH DISTRICT CORPS OF ENGINEERS
HAZARDOUS & TOXIC WASTE SITE INVESTIGATION
DALLAS FLOODWAY EXTENSION
DALLAS, TEXAS



SITE MANAGER: M. MEENAN	
CHECKED BY: K. MENGDEN	
DRAWN BY: J. FLESCH	
DATE: 12-07-98	SCALE: AS NOTED
CAD DWG. NO.: 121ACS3	PROJ. NO.: NQ-121A

TETRA TECH NUS, INC.
Houston, Texas

FIGURE 3.5.4-3
SUBSURFACE PROFILE (D-D')
LINFIELD LANDFILL
FORT WORTH DISTRICT CORPS OF ENGINEERS
HAZARDOUS & TOXIC WASTE SITE INVESTIGATION
DALLAS FLOODWAY EXTENSION
DALLAS, TEXAS

Figure 4

TABLE 1

ANALYTICAL RESULTS-SOIL

Linfield Landfill, Dallas Texas

Parameter	Regulatory TCLP Concentration (40 CFR 261.24) (mg/L)	Action Level (20 x TCLP) (mg/kg)	Analytical Results (mg/kg)	
			LLF-BH19-10-15	LLF-BH20-20-25
VOLATILE COMPOUNDS				
Benzene	0.5	10	<0.005	<0.005
Carbon tetrachloride	0.5	10	< 0.005	< 0.005
Chlorobenzene	100	2000	0.016	0.091
Chloroform	6.0	120	< 0.005	< 0.005
1,2-Dichloroethane	0.5	10	< 0.005	< 0.005
1,1-Dichloroethylene	0.7	14	< 0.005	< 0.005
Methyl ethyl ketone	200	4000	< 0.010	0.014
Tetrachloroethylene	0.7	14	< 0.005	< 0.005
Trichloroethylene	0.5	10	< 0.005	< 0.005
Vinyl chloride	0.2	4	< 0.005	< 0.005
SEMIVOLATILE COMPOUNDS				
o-Cresol	200	4000	< 5.0	< 12
m- and p-Cresol	200	4000	< 5.0	< 12
1,4-Dichlorobenzene	7.5	150	< 5.0	< 12
2,4-Dinitrotoluene	0.13	2.6	< 5.0	< 12
Hexachlorobenzene	0.13	2.6	< 5.0	< 12
Hexachlorobutadiene	0.5	10	< 5.0	< 12
Hexachloroethane	3.0	60	< 5.0	< 12
Nitrobenzene	2.0	40	< 5.0	< 12
Pentachlorophenol	100	2000	< 12	< 29
Pyridine	5.0	100	< 5.0	< 12
2,4,5-Trichlorophenol	400	8000	< 12	< 29
2,4,6-Trichlorophenol	2.0	40	< 5.0	< 12
PESTICIDES				
Chlordane	0.03	0.6	< 0.033	< 0.033
Endrin	0.02	0.4	< 0.0033	< 0.0033
Heptachlor	0.008	0.16	< 0.0017	< 0.0017
Lindane	0.4	8	< 0.0017	< 0.0017
Methoxychlor	10	200	< 0.017	< 0.017
Toxaphene	0.5	10	< 0.017	< 0.017
HERBICIDES				
2,4-D	10	200	< 0.120	< 0.120
2,4,5-TP(Silvex)	1.0	20	< 0.012	< 0.012
METALS				
Arsenic	5.0	100	< 6.2	< 4.8
Barium	100	2000	92	947
Cadmium	1.0	20	3.6	2.4
Chromium	5.0	100	21	19
Lead	5.0	100	93	119[(1)]
Mercury	0.2	4.0	0.39	3.6
Selenium	1.0	20	< 0.51	0.40
Silver	5.0	100	< 1.2	< 0.97

Note:

(1) Since lead was detected at a concentration greater than the action level of 100 mg/kg, the sample was analyzed for TCLP lead, and the resulting concentration was 0.040 mg/l lead.

TABLE 2

ANALYTICAL RESULTS-WATER

Linfield Landfill, Dallas Texas

Parameter	Regulatory TCLP Concentration (40 CFR 261.24) (mg/L)	Analytical Results (mg/L)			
		LLF-GW02	LLF-GW03	LLF-GW06	LLF-GW08
VOLATILE COMPOUNDS					
Benzene	0.5	0.0057	0.0063	0.033	< 0.002
Carbon tetrachloride	0.5	< 0.002	< 0.002	< 0.002	< 0.002
Chlorobenzene	100	0.044	0.035	0.025	0.018
Chloroform	6.0	< 0.002	< 0.002	< 0.002	< 0.002
1,2-Dichloroethane	0.5	< 0.002	< 0.002	< 0.002	< 0.002
1,1-Dichloroethylene	0.7	< 0.002	< 0.002	< 0.002	< 0.002
Methyl ethyl ketone	200	< 0.002	< 0.002	<0.010	<0.010
Tetrachloroethylene	0.7	< 0.002	< 0.002	< 0.002	< 0.002
Trichloroethylene	0.5	< 0.002	< 0.002	< 0.002	0.0021
Vinyl chloride	0.2	< 0.002	< 0.002	< 0.002	< 0.002
SEMIVOLATILE COMPOUNDS					
o-Cresol	200	< 0.050	< 0.050	< 0.050	< 0.050
m- and p-Cresol	200	< 0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	7.5	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	0.13	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	0.13	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	0.5	< 0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	3.0	< 0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	2.0	< 0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	100	< 0.120	< 0.120	< 0.120	< 0.120
Pyridine	5.0	< 0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	400	< 0.120	< 0.120	< 0.120	< 0.120
2,4,6-Trichlorophenol	2.0	< 0.050	< 0.050	< 0.050	< 0.050
PESTICIDES					
Chlordane	0.03	< 0.005	< 0.005	< 0.005	< 0.005
Endrin	0.02	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Heptachlor	0.008	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Lindane	0.4	<0.00025	<0.00025	<0.00025	<0.00025
Methoxychlor	10	< 0.0025	< 0.0025	< 0.0025	< 0.0025
Toxaphene	0.5	< 0.025	< 0.025	< 0.025	< 0.025
HERBICIDES					
2,4-D	10	< 0.0012	< 0.0012	< 0.0012	< 0.0012
2,4,5-TP(Silvex)	1.0	< 0.00012	< 0.00012	< 0.00012	< 0.00012
METALS					
Arsenic	5.0	< 0.05	0.202	0.142	0.247
Barium	100	0.50	0.54	0.34	0.56
Cadmium	1.0	< 0.05	< 0.05	< 0.05	< 0.05
Chromium	5.0	< 0.1	< 0.1	< 0.1	< 0.1
Lead	5.0	0.078	0.092	0.042	< 0.03
Mercury	0.2	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	1.0	< 0.05	< 0.05	< 0.05	< 0.05
Silver	5.0	< 0.1	0.13	0.12	0.12
pH (CORROSIVITY FIELD/LAB)		(1)/6.93	(1)/6.95	(1)/6.95	(1)/6.54

(1) pH result not recorded due to field equipment malfunction.

TABLE 2
(Continued)
ANALYTICAL RESULTS-WATER

Linfield Landfill, Dallas Texas

Parameter	Regulatory TCLP Concentration (40 CFR 261.24) (mg/L)	Analytical Results (mg/L)			
		LLF-GW11	LLF-GW12	LLF-GW14	LLF-GW16
VOLATILE COMPOUNDS					
Benzene	0.5	< 0.002	< 0.002	< 0.002	0.0016
Carbon tetrachloride	0.5	< 0.002	< 0.002	< 0.002	< 0.002
Chlorobenzene	100	0.0087	0.0031	0.0056	0.0073
Chloroform	6.0	< 0.002	< 0.002	< 0.002	< 0.002
1,2-Dichloroethane	0.5	< 0.002	< 0.002	< 0.002	< 0.002
1,1-Dichloroethylene	0.7	< 0.002	< 0.002	< 0.002	< 0.002
Methyl ethyl ketone	200	< 0.010	< 0.010	< 0.010	< 0.010
Tetrachloroethylene	0.7	< 0.002	< 0.002	< 0.002	< 0.002
Trichloroethylene	0.5	< 0.002	< 0.002	< 0.002	< 0.002
Vinyl chloride	0.2	< 0.002	< 0.002	< 0.002	< 0.002
SEMIVOLATILE COMPOUNDS					
o-Cresol	200	< 0.050	< 0.050	< 0.050	< 0.050
m- and p-Cresol	200	< 0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	7.5	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	0.13	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	0.13	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	0.5	< 0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	3.0	< 0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	2.0	< 0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	100	< 0.120	< 0.120	< 0.120	< 0.120
Pyridine	5.0	< 0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	400	< 0.120	< 0.120	< 0.120	< 0.120
2,4,6-Trichlorophenol	2.0	< 0.050	< 0.050	< 0.050	< 0.050
PESTICIDES					
Chlordane	0.03	< 0.005	< 0.005	< 0.005	< 0.005
Endrin	0.02	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Heptachlor	0.008	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Lindane	0.4	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Methoxychlor	10	< 0.0025	< 0.0025	< 0.0025	< 0.0025
Toxaphene	0.5	< 0.025	< 0.025	< 0.025	< 0.025
HERBICIDES					
2,4-D	10	< 0.0012	< 0.0012	< 0.0012	< 0.0012
2,4,5-TP(Silvex)	1.0	< 0.00012	< 0.00012	< 0.00012	< 0.00012
METALS					
Arsenic	5.0	0.086	0.218	0.056	< 0.05
Barium	100	0.80	1.0	0.20	1.5
Cadmium	1.0	< 0.05	< 0.05	< 0.05	< 0.05
Chromium	5.0	< 0.1	< 0.1	< 0.1	< 0.1
Lead	5.0	0.107	0.100	0.071	0.073
Mercury	0.2	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	1.0	0.058	0.052	< 0.05	< 0.05
Silver	5.0	< 0.1	< 0.1	< 0.1	< 0.1
pH (CORROSIVITY FIELD/LAB)		6.49/7.68	6.51/7.51	6.67/7.70	6.92/7.65

TABLE 2
(Continued)
ANALYTICAL RESULTS-WATER

Linfield Landfill, Dallas Texas

Parameter	Regulatory TCLP Concentration (40 CFR 261.24) (mg/L)	Analytical Results (mg/L)			
		LLF-GW18	LLF-GW19	LLF-GW20	LLF-GW21
VOLATILE COMPOUNDS					
Benzene	0.5	< 0.002	< 0.002	0.052	0.0052
Carbon tetrachloride	0.5	< 0.002	< 0.002	< 0.002	< 0.002
Chlorobenzene	100	0.029	< 0.002	0.079	0.0097
Chloroform	6.0	< 0.002	< 0.002	< 0.002	< 0.002
1,2-Dichloroethane	0.5	< 0.002	< 0.002	< 0.002	< 0.002
1,1-Dichloroethylene	0.7	< 0.002	< 0.002	< 0.002	< 0.002
Methyl ethyl ketone	200	< 0.010	< 0.010	< 0.010	< 0.010
Tetrachloroethylene	0.7	< 0.002	< 0.002	< 0.002	< 0.002
Trichloroethylene	0.5	< 0.002	< 0.002	< 0.002	< 0.002
Vinyl chloride	0.2	< 0.002	< 0.002	< 0.002	< 0.002
SEMIVOLATILE COMPOUNDS					
o-Cresol	200	< 0.050	< 0.050	< 0.050	< 0.050
m- and p-Cresol	200	< 0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	7.5	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	0.13	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	0.13	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	0.5	< 0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	3.0	< 0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	2.0	< 0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	100	< 0.120	< 0.120	< 0.120	< 0.120
Pyridine	5.0	< 0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	400	< 0.120	< 0.120	< 0.120	< 0.120
2,4,6-Trichlorophenol	2.0	< 0.050	< 0.050	< 0.050	< 0.050
PESTICIDES					
Chlordane	0.03	< 0.005	< 0.005	< 0.005	< 0.005
Endrin	0.02	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Heptachlor	0.008	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Lindane	0.4	< 0.00025	< 0.00025	< 0.00025	< 0.00025
Methoxychlor	10	< 0.0025	< 0.0025	< 0.0025	< 0.0025
Toxaphene	0.5	< 0.025	< 0.025	< 0.025	< 0.025
HERBICIDES					
2,4-D	10	< 0.0012	< 0.0012	< 0.0012	< 0.0012
2,4,5-TP(Silvex)	1.0	< 0.00012	< 0.00012	< 0.00012	< 0.00012
METALS					
Arsenic	5.0	< 0.05	< 0.05	< 0.05	< 0.05
Barium	100	0.32	0.2	0.42	1.1
Cadmium	1.0	< 0.05	< 0.05	< 0.05	< 0.05
Chromium	5.0	< 0.1	< 0.1	< 0.1	< 0.1
Lead	5.0	0.088	< 0.03	0.119	0.105
Mercury	0.2	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	1.0	0.079	< 0.05	< 0.05	0.052
Silver	5.0	< 0.1	< 0.1	< 0.1	< 0.1
pH (CORROSIVITY FIELD/LAB)		6.79/7.57	8.18/6.8	7.27/7.79	7.17/7.50

TABLE 2
(Continued)
ANALYTICAL RESULTS-WATER

Linfield Landfill, Dallas Texas

Parameter	Regulatory TCLP Concentration (40 CFR 261.24) (mg/L)	Analytical Results (mg/L)		
		LLF-GW24	LLF-GW26	LLF-GW28
VOLATILE COMPOUNDS				
Benzene	0.5	< 0.002	< 0.002	0.0036
Carbon tetrachloride	0.5	< 0.002	< 0.002	< 0.002
Chlorobenzene	100	0.0085	0.0023	< 0.002
Chloroform	6.0	< 0.002	< 0.002	< 0.002
1,2-Dichloroethane	0.5	< 0.002	< 0.002	< 0.002
1,1-Dichloroethylene	0.7	< 0.002	< 0.002	< 0.002
Methyl ethyl ketone	200	< 0.010	< 0.010	< 0.010
Tetrachloroethylene	0.7	< 0.002	< 0.002	< 0.002
Trichloroethylene	0.5	< 0.002	< 0.002	< 0.002
Vinyl chloride	0.2	< 0.002	< 0.002	< 0.002
SEMIVOLATILE COMPOUNDS				
o-Cresol	200	< 0.050	< 0.050	< 0.050
m- and p-Cresol	200	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	7.5	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	0.13	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	0.13	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	0.5	< 0.050	< 0.050	< 0.050
Hexachloroethane	3.0	< 0.050	< 0.050	< 0.050
Nitrobenzene	2.0	< 0.050	< 0.050	< 0.050
Pentachlorophenol	100	< 0.120	< 0.120	< 0.120
Pyridine	5.0	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	400	< 0.120	< 0.120	< 0.120
2,4,6-Trichlorophenol	2.0	< 0.050	< 0.050	< 0.050
PESTICIDES				
Chlordane	0.03	< 0.005	< 0.005	< 0.005
Endrin	0.02	< 0.0005	< 0.0005	< 0.0005
Heptachlor	0.008	< 0.00025	< 0.00025	< 0.00025
Lindane	0.4	< 0.00025	< 0.00025	< 0.00025
Methoxychlor	10	< 0.0025	< 0.0025	< 0.0025
Toxaphene	0.5	< 0.025	< 0.025	< 0.025
HERBICIDES				
2,4-D	10	< 0.0012	< 0.0012	< 0.0012
2,4,5-TP(Silvex)	1.0	< 0.00012	< 0.00012	< 0.00012
METALS				
Arsenic	5.0	< 0.05	< 0.05	0.16
Barium	100	0.9	0.35	0.5
Cadmium	1.0	< 0.05	< 0.05	< 0.05
Chromium	5.0	< 0.1	< 0.1	< 0.1
Lead	5.0	0.03	0.111	0.05
Mercury	0.2	< 0.001	< 0.001	< 0.001
Selenium	1.0	< 0.05	< 0.05	< 0.05
Silver	5.0	< 0.1	< 0.1	< 0.1
pH (CORROSIVITY FIELD/LAB)		6.9/8.09	7.38/7.80	7.43/8.12