ID 403
Report Number 1997-010

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WESTON

SITE INSPECTION PRIORITIZATION REPORT
KEEGAN LANDFILL
KEARNY, HUDSON COUNTY, NEW JERSEY

CERCLIS ID No.: NJD981490428

Prepared by:
Region II Superfund Technical Assessment and Response Team
Roy F. Weston, Inc.
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Edison, New Jersey

prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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SUBMITTED BY:

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START Project Manager

Date 12/08/97

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Site Assessment Team Leader

Date 12/10/97

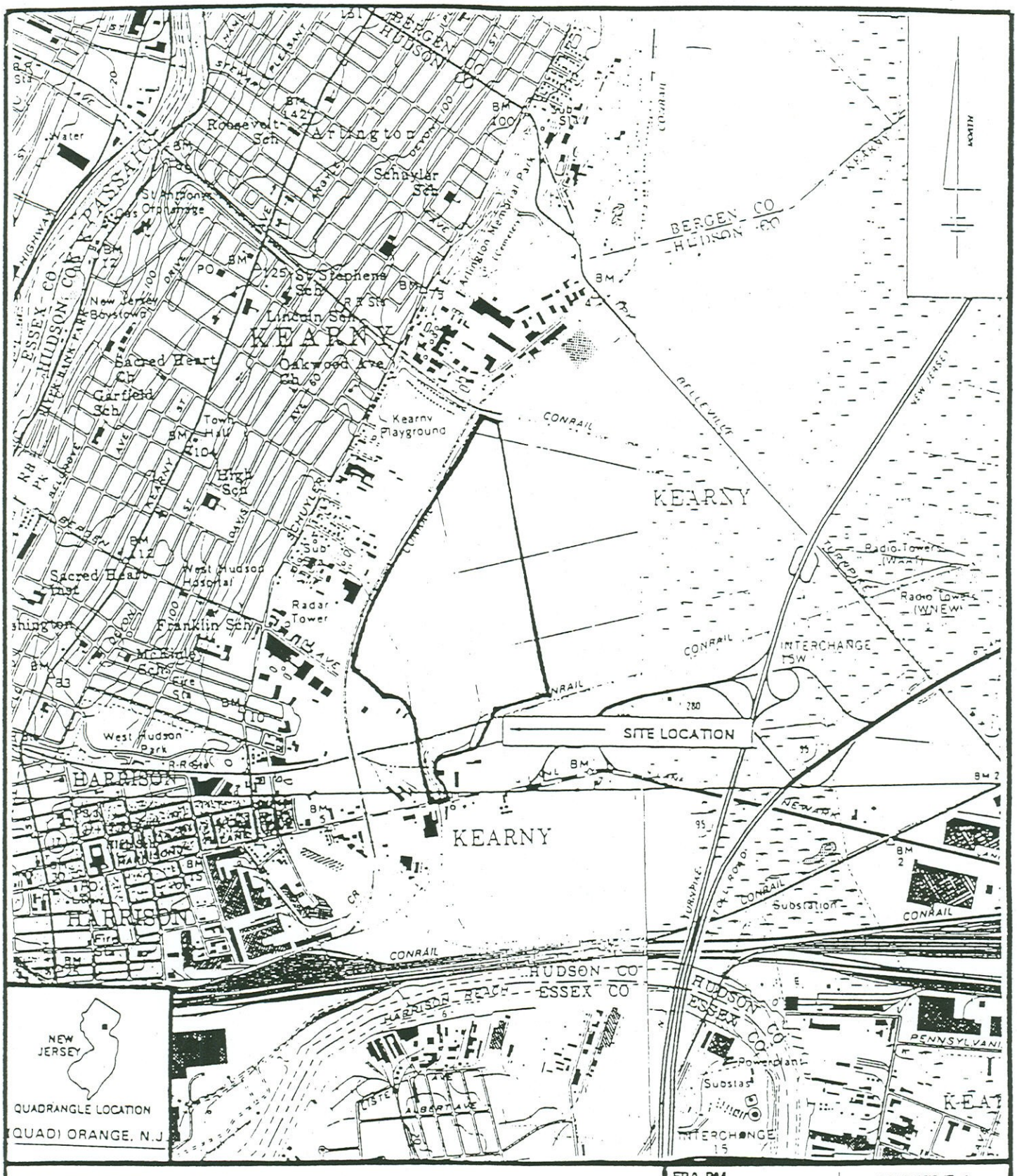
SITE SUMMARY

The Keegan Landfill (Keegan) site (a.k.a. MSLA Site B) is located at the foot of Bergen Avenue in a predominantly industrial section of Kearny, Hudson County, New Jersey (Ref. Nos. 1; 3, p. 3). Figures 1 and 2 provide a Site Location Map and Site Map, respectively. The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list notes that the site is located in Congressional District No. 11; however, the actual district is No. 09 (Ref. Nos. 1, p. 1; 2, p. 3). The unfenced property encompasses approximately 230 acres. The site is bordered on the north and west by Conrail railroad tracks; on the southwest by businesses along Bergen Avenue, including a scrap metal facility; on the south by Harrison Avenue; and on the southeast and east by wetland areas and a tidal open-water wetland (Ref. Nos. 3, pp. 3, 64; 4; 7). Primary site access was formerly gained through two entrances from Bergen Avenue. An additional access road originates at Harrison Avenue, located south of the site (Ref. Nos. 3, pp. 3, 12; 7). The three entrances are currently barricaded with concrete roadway dividers (Ref. No. 7). One makeshift shelter exists on site; it is unknown if the shelter is occupied (Ref. No. 24, p. 3). Another east-west Conrail rail line crosses the southern portion of the site (Ref. No. 4). One creek, Frank Creek, originates on site. The creek flows south and eventually discharges to the Passaic River, which is located ½-mile south of the former Harrison Avenue site entrance. The unnamed creek identified in the September 1989 Site Inspection (SI) Report is actually an open-water wetland area that is contiguous with other site wetlands (Ref. Nos. 3, pp. 3, 8, 12, 64; 4; 24, p. 3).

The Town of Kearny (the "Town") owns the property, which was leased to John P. Keegan/Municipal Sanitary Landfill Authority (Keegan/MSLA). From the mid-1960s to 1974, Keegan/MSLA operated an unlined municipal landfill at the site; operations ceased at the request of the Hackensack Meadowlands Development Commission (HMDC) (Ref. No. 3, p. 41). Keegan/MSLA no longer leases the property (Ref. No. 7). A 1986 Malcolm Pirnie, Inc. Preliminary Assessment (PA) Report noted the on-site presence of approximately 10 drums; the drums' location and contents, if any, are unknown (Ref. No. 3, pp. 3, 36). During the 1989 U.S. Environmental Protection Agency (EPA) Region II Field Investigation Team (FIT) SI, personnel noted the occurrence of ongoing disposal of cardboard waste, construction waste, household refuse, and landscaping debris (e.g., leaves, tree branches). During the inspection, FIT personnel also noted the presence of abandoned tires, appliances, and automobiles (Ref. No. 3, pp. 65, 67, 68). The drums observed during the April 1986 PA off-site reconnaissance were not observed during the SI on-site activities (Ref. No. 3, pp. 65 through 70).

In addition to landfill activities, illegal dumping of various materials and wire burning have occurred on site (Ref. No. 3, pp. 38, 45, 199). A Kearny Police Department officer, who worked as a truck driver for DuPont Chemical of Newark during the 1960s, stated that for approximately 7 years, a daily delivery of approximately forty 30-gallon drums of waste was disposed of on the Keegan property. Drums of waste were reportedly both deposited intact or emptied onto the ground surface. Drum contents included plating wastes, such as chromate and bichromate slurry; pigment wastes; and organic wastes (Ref. No. 3, p. 383).

In December 1981, December 1984, June/July 1987, and most recently in 1992, underground fires occurred at the site (Ref. Nos. 3, pp. 44, 46, 204 through 213; 7). On July 2, 1987, the New Jersey Department of Environmental Protection (NJDEP) cited fires as a recurring problem and recommended that the Town submit a closure plan for the landfill (Ref. No. 3, p. 182). In July 1987, the Town of Kearny contracted Neglia Engineering Associates (Neglia) to provide closure guidance for the extinguished portions of the landfill. In August 1987, Neglia provided the following recommendations: 1) improvement of the access road by eliminating depressions and providing a turnaround area, 2) deposition of two feet of compacted cover and seed layer on the extinguished areas, and 3) securing of the access road from Bergen Avenue, securing of a roadway easement for the access road situated on lots



Roy F. Weston, Inc. FEDERAL PROGRAMS DIVISION	EPA PM MOYIK	FIGURE 1 SITE LOCATION MAP
IN ASSOCIATION WITH RESOURCE APPLICATION, Inc. C.C. JOHNSON & MALHOTRA, P.C., R.E. SARRIERA ASSOCIATES, PRC ENVIRONMENTAL MANAGEMENT, AND GRB ENVIRONMENTAL SERVICES, INC.	START PM CAMPBELL	KEEGAN LANDFILL KEARNY, NJ

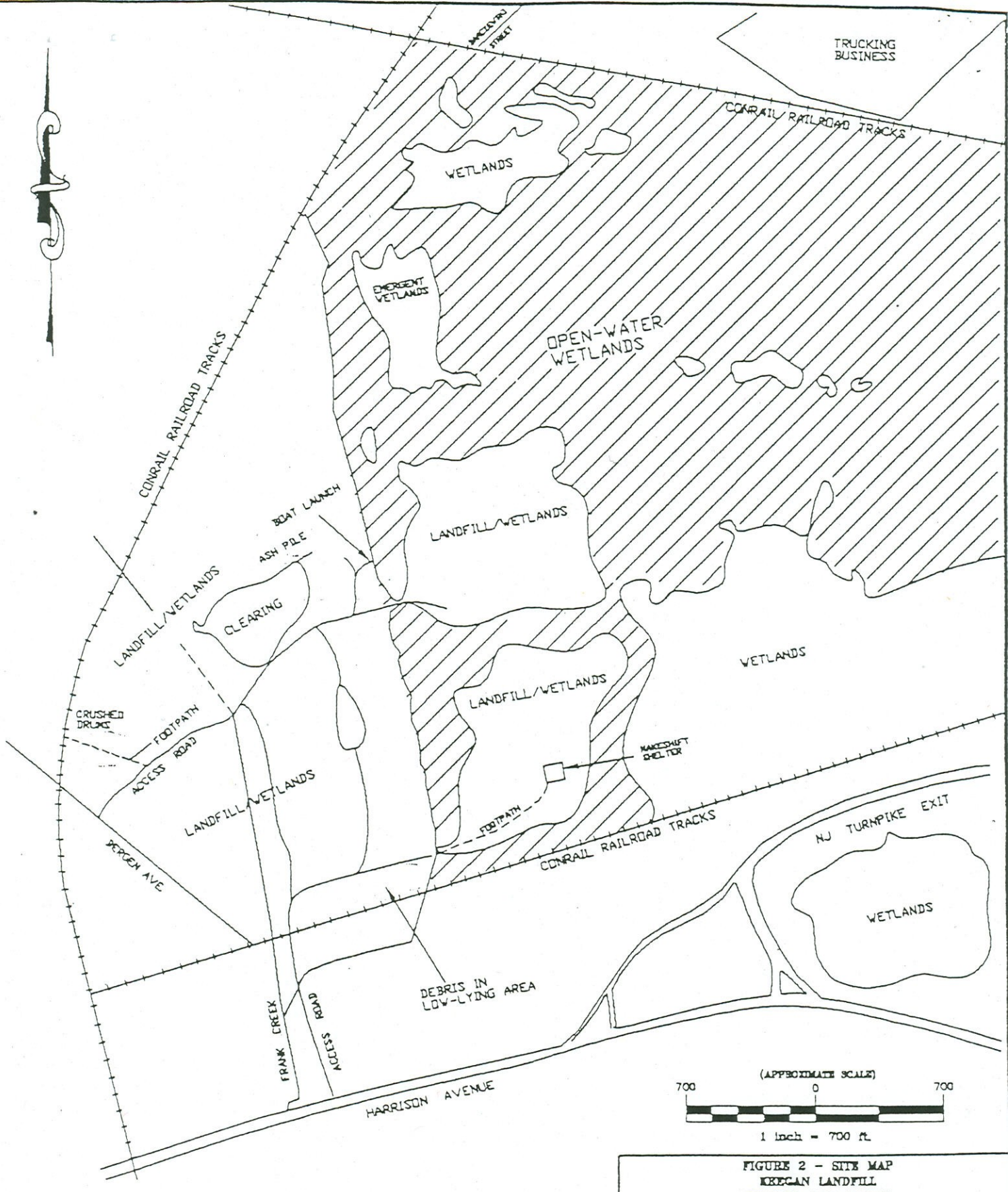


FIGURE 2 - SITE MAP
KREGAN LANDFILL
KEARNY, NEW JERSEY
JULY 1997

US ENVIRONMENTAL PROTECTION AGENCY
SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
CONTRACT # 68-W8-0016

DRAWN BY: J. HAMPTON JR.
EPA TASK MONITOR: C. MOYIK
START PROJECT MANAGER: K. CAMPBELL

WESTON Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH PRC ENVIRONMENTAL MANAGEMENT, INC.,
C.C. JOHNSON & MALHOTRA, P.C., RESOURCE APPLICATIONS, INC.,
R.E. CARPENTER ASSOCIATES, AND GRB ENVIRONMENTAL SERVICES, INC.

owned by Hudson Meadows Urban Renewal Corporation, and cessation of illegal dumping on these lots (Ref. No. 3, pp. 188, 189). As of June 1997, the Town has improved the access road and secured the three site entrances from vehicular traffic. The site property is currently involved in litigation between the Town and the HMDC; the HMDC is attempting to procure the property. Dependent upon the outcome of court proceedings, HMDC plans to utilize the property initially as a construction/demolition debris landfill; after proper closure, HMDC plans to develop the property into a recreational park (Ref. No. 7).

On April 25, 1989, as part of SI activities, Region II FIT collected a total of seven surface water samples and six sediment samples from on-site surface water bodies. Samples were obtained from the open-water wetland, the "unnamed creek," and Frank Creek (Ref. No. 3, pp. 4, 13). Analytical results of the sediment samples indicate the presence of elevated concentrations of semivolatile organic compounds, polychlorinated biphenyls (PCBs), and metals (mercury, lead, and chromium). Elevated concentrations of mercury, lead, and chromium were also detected in the Frank Creek surface water samples (Ref. No. 3, pp. 4, 216 through 220). Additional analytical data collected on site by IT Corporation in 1994 indicate the presence of elevated concentrations of volatile organic compounds (VOCs) and metals in groundwater (Ref. Nos. 9, p. 37; 10, p. 3). In addition, analytical data of surface soil samples indicate the presence of VOCs; semivolatile organic compounds, such as phthalates and polynuclear aromatic hydrocarbons (PAHs); pesticides; PCBs; dioxin; petroleum hydrocarbons; and inorganic analytes, such as aluminum, barium, chromium, iron, lead, mercury, and cyanide (Ref. Nos. 9, p. 34; 10, p. 2).

On July 30-31, 1997, the U.S. Environmental Protection Agency (U.S. EPA) Region II Superfund Technical Assessment and Response Team (START) conducted sampling at the site as part of Site Inspection Prioritization (SIP) activities. START collected a total of 13 sediment samples, 3 surface water samples, and 4 soil samples (Ref. No. 24, p. 16). Analytical data of soil and sediment samples indicate the on-site presence of phthalates, pesticides, and metals at concentrations significantly above background (Ref. No. 25, pp. 14 through 16, 18 through 23, 26 through 28, and 337 through 339). During the sampling event, START personnel observed the following conditions/events on and adjacent to the site: leachate at the headwaters of Frank Creek, an ash pile located at the end of the westernmost access road, a variety of debris along all access roads, and recreational use of property/adjacent surface waters (e.g., a motorcyclist, person in a kayak, apparent boat launch area) (Ref. No. 24, pp. 1, 3 through 5, 10).

Although there is a potential for a release of contaminants to groundwater, drinking water supplies within the site vicinity are obtained from sources greater than 4 miles from the site (Ref. Nos. 4; 8, p. 23; 11, 12). The July 1997 START analytical data documents a release of site contaminants to adjacent surface water sediments (Ref. No. 25, pp. 14 through 16, 18 through 23, 26 through 28, and 337 through 339). The eastern adjacent wetland areas are interconnected with the Kearny Marsh, a NJDEP Natural Heritage Program (NHP) Priority Site and state-listed endangered species habitat (Ref. Nos. 14, 22). The remainder of the surface water migration route is composed of highly industrialized coastal tidal water bodies (Ref. No. 3, pp. 146, 147). Although these surface waters sustain fish populations, state-issued prohibitions and health advisories exist regarding the sale and consumption of specific fishes taken from these waters (Ref. Nos. 20; 24, p. 18). There are no residences, schools, or day care facilities within 200 feet of the site boundary (Ref. Nos. 3, pp. 3, 12, 49, 51; 4). As no remedial actions involving removal or containment of on-site wastes have occurred, contaminants associated with the site may continue to migrate to groundwater and adjacent surface water bodies (Ref. Nos. 1, p. 2; 3, p. 29).

SITE ASSESSMENT REPORT: SITE INSPECTION PRIORITIZATION
PART I: SITE INFORMATION

1. Site Name/Alias Keegan Landfill (a.k.a. MSLA Site B)

   Street Foot of Bergen Avenue

   City Kearny State NJ Zip Code 07032

2. County Hudson County Code 017 Cong.Dist. 09

3. CERCLIS ID No. NJD981490428

4. Block Nos. 205; 286 Lot Nos. 18, 19, 24 through 33*; 4

5. Latitude 40° 45' 19" N Longitude 74° 08' 15" W

   USGS Quad(s). Orange, NJ

6. Approximate size of site 230 acres

7. Owner Town of Kearny Telephone No. (201) 955-7979

   Street 402 Kearny Avenue

   City Kearny State New Jersey Zip 07032

8. Operator John P. Keegan/Municipal Sanitary Landfill Authority (MSLA)* Telephone No. (201) 741-1377

   Street 18 Somerset Drive

   City Rumson State New Jersey Zip 07760

9. Type of Ownership

   __Private __Federal __State
   __County X Municipal __Unknown __Other_____

* An access road crosses Lot Nos. 18, 31, 32 of Block 205; the owner of these properties is Hudson Meadow Urban Renewal Corporation (Mimi Development) (Ref. No. 3, p. 188).

* The second party identified as former lessee of Keegan Landfill is William A. Keegan, Jr., of 411 Bergen Avenue, Kearny, NJ. (Ref. No. 3, p. 43).

PART I: SITE INFORMATION (Continued)

10. Owner/Operator Notification on File

__ RCRA 3001 __Date __CERCLA 103c Date _____

X None __ Unknown

11. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments

None known.

12. Site Status

__Active X Inactive __Unknown

13. Years of Operation: mid-1960s to 1974 (as Municipal Landfill)

14. Identify the types of waste sources (e.g., landfill, surface impoundment, piles, stained soil, above- or underground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Sources

Waste Unit No.	Waste Source Type	Facility Name for Unit
1	Landfill	Landfill

Ref. Nos. 1 through 7.

PART I: SITE INFORMATION (Continued)

(b) Other Areas of Concern
Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

On August 5, 1980, the Kearny Police Department received information regarding illegal dumping of hazardous materials; the event allegedly occurred 1 year prior to the police report. Materials were reportedly dumped in an area southeast of the western Conrail line and northeast of Bergen Avenue. The Kearny Department of Public Works excavated four locations to depths from 18 inches to 4 feet. No evidence of deposited materials was observed. No samples were collected during the investigation of the incident.

In December 1984, while monitoring an underground landfill fire, a member of the Kearny Department of Public Health and Environmental Protection (DPHEP) noted that "a large pile of debris had been set on fire over the weekend by someone burning wire." The location and size of the burn pile are unknown.

Ref. No. 3, pp. 45, 47.

15. Describe the regulatory history of the site, including the scope and objectives of any previous response actions, investigations and litigation by State, Local and Federal agencies (indicate type, affiliation, and date of investigations).

Local - Underground landfill fires are known to have occurred on site in December 1981, December 1984, June/July 1987, and most recently in 1992. Local agencies, including the Kearny DPHEP, and Keegan/MSLA personnel have been on site at these times to conduct and monitor fire-extinguishing efforts (Ref. Nos. 3, pp. 44, 46, 204 through 213; 7). During the 1987 fire, NJDEP personnel also visited the site to monitor fire-extinguishing progress (Ref. No. 3, pp. 206, 207, 209, 213).

State - In May 1986 Malcolm Pirnie, Inc., a contractor to the NJDEP, conducted a Preliminary Assessment (PA) of the site. PA activities included the collection of background information and performance of an off-site reconnaissance. The PA evaluation indicated that the site, although "non-hazardous" overall, was a medium priority candidate for further action due to the observance of drums and exposed waste on the unsecured site (Ref. Nos. 1, p. 2; 3, pp. 34, 35, 40).

As mentioned in the above subsection ("Local"), NJDEP personnel participated in the monitoring of the June/July 1987 fire. On July 2, 1987, the NJDEP recommended that the Town submit a landfill closure plan (Ref. No. 3, p. 182). In August 1987, Neglia, under contract to the Town, provided closure recommendations for the extinguished burn areas (Ref. No. 3, pp. 188, 189).

PART I: SITE INFORMATION (Continued)

Federal - In April 1989, Region II FIT conducted surface water/sediment sampling on site as part of a Site Inspection (SI) project. A total of seven surface water samples and six sediment samples were collected from on-site surface water bodies. Analytical data indicate the presence of elevated concentrations of semivolatile organic compounds, PCBs, and metals in sediment samples. Analytical data indicate the presence of elevated concentrations of the same metals in the Frank Creek surface water samples (Ref. No. 3, pp. 4, 13, 28). In July 1997, Region II START conducted environmental sampling at the site. Analytical results of this event are discussed in the Site Inspection Prioritization subsection of Part III of this report.

a) Is the site or any waste source subject to Petroleum Exclusion? Identify petroleum products and by-products that justify this decision.

Petroleum products and by-products are not known to have been disposed of at the site. Therefore, neither the site nor any waste source is subject to petroleum exclusion provisions under CERCLA.

Ref. No. 3, p. 3.

b) Has normal farming application of pesticides registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) occurred at the site? Have pesticides been produced or stored on site? Have there been any leaks or spills of pesticides on site?

The site has not been used for agricultural purposes, nor are pesticides known to have been produced, stored, or spilled on site. However, analytical data of on-site soil and sediment samples collected in July 1997 by Region II START indicate the presence of pesticides, including 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endrin, endrin aldehyde, and chlordane. Similarly, analytical data of sample collected by IT Corporation indicate the presence of pesticides, including aldrin, beta-BHC, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, endrin, endosulfan I, endosulfan sulfate, heptachlor, heptachlor epoxide, and methoxychlor.

Ref. Nos. 3, p. 3; 9, pp. 34, 35; 10, Attachment C, p. 13, Attachment D, pp. 41 through 48, Attachment E, pp. 22 through 25; 25, pp. 26 through 28.

c) Is the site or any waste source subject to RCRA Subtitle C (briefly explain)?

Neither the site nor any waste source is subject to RCRA Subtitle C. The site has been inactive as a municipal sanitary landfill since 1974.

Ref. No. 3, p. 3.

PART I: SITE INFORMATION (Continued)

d) Is the site or any waste source maintained under the authority of the Nuclear Regulatory Commission (NRC)?

Neither the site nor any waste source is maintained under the authority of the NRC.

Ref. No. 3, p. 3.

16. Do any conditions exist on site that would warrant immediate or emergency action?

There are no conditions on site that would warrant immediate or emergency action. The landfill has been inactive since 1974 and, although there have been underground fires at the site, the most recent event occurred in 1992.

Ref. Nos. 3, p. 41; 7.

17. Information available from:

Contact Cathy Moyik Agency U.S. EPA Telephone No.: (212) 637-4339
Preparer Kathy Campbell Agency Region II START Date: December 1997

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 1 - Landfill

Source Type

X	Landfill		Contaminated Soil
	Surface Impoundment		Pile
	Drums		Land Treatment
	Tanks/Containers		Other

Description:

1. Describe the types of containers, impoundments or other storage systems (i.e., concrete-lined surface impoundment) and any labels that may be present.

   The Keegan site is an unlined landfill located in a primarily industrial portion of Kearny, New Jersey; the Town of Kearny owns the property. From the mid-1960s to 1974 Keegan/MSLA, the property lessee, operated a municipal sanitary landfill at the site. Historical information indicates that unauthorized dumping has occurred. Wastes deposited on site include construction and landscaping debris; cardboard waste; household refuse; used tires, appliances, and automobiles; and drummed wastes. From 1981 to the present, four underground landfill fires have occurred on site. While monitoring the December 1984 fire, a Kearny DPHEP member observed the remains of a wire burn pile; its location and size are unknown.

   A Kearny Police Department member reported that, while working as a truck driver for DuPont of Newark in the 1960s, drummed wastes were transported to the site for disposal. For approximately 7 years, at least one daily delivery of an estimated forty 30-gallon drums were reportedly deposited both intact and emptied on the site. Drum contents included plating wastes, such as chromate and bichromate slurry; pigment wastes, and organic wastes. A 1986 PA Report noted the presence of 10 drums; however, their location and contents, if any, are unknown. Drums and crushed drums were observed at various locations during 1997 Region II START SIP on-site sampling activities.

PART II: WASTE SOURCE INFORMATION (Continued)

2. Describe the physical condition of the containers or storage systems (i.e., rusted and/or bulging metal drums).

   N/A

3. Describe any secondary containment that may be present (e.g., drums on concrete pad in building or above ground tank surrounded by berm).

   The Keegan Landfill site is unlined; no secondary containment is present.

Ref. Nos. 3, pp. 3, 35, 38, 41, 44 through 47, 65 through 70, 199, 204 through 213, 383; 7; 8, pp. 28, 61; 24, p. 1, 5, 12.

Hazardous Waste Quantity

The actual quantity of hazardous waste disposed of at the site is unknown. For the purposes of this report, the total site acreage (i.e., 230 acres) will be utilized as an estimated hazardous waste quantity value.

Hazardous Substances/Physical State

In July 1997 Region II START collected 13 sediment samples, 4 soil samples, and 3 surface water samples from the site and its vicinity. Analytical data indicate the presence of phthalates, pesticides, and metals at concentrations significantly above background. As part of 1989 SI activities, seven surface water samples and six sediment samples were collected from on-site surface water bodies. Analytical data of the sediment samples collected in 1989 indicate the presence of elevated concentrations of semivolatile organic compounds, such as phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(a)pyrene; PCBs; and metals, such as mercury, lead, and chromium. Analytical data indicate the presence of elevated concentrations of the same metals in the Frank Creek surface water samples.

Plating wastes and organic wastes from DuPont were reportedly disposed on site during the 1960s in slurry and liquid forms. Wastes generated from wire burning are in the solid/ash state. The physical state of other possible deposited wastes is unknown.

Additional analytical data collected on site by IT Corporation in 1994 indicate the presence of VOCs and elevated concentrations of metals in groundwater. In addition, analytical data of surface soil samples indicate the presence of VOCs; semivolatile organic compounds, such as phthalates and PAHs; pesticides; PCBs; dioxin; and inorganic analytes, such as aluminum, barium, chromium, iron, lead, mercury, and cyanide.

Ref. Nos. 3, pp. 4, 27, 28, 45, 216 through 220, 383; 9, pp. 34, 37; 10, pp. 2, 3; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

PART III. SAMPLING RESULTS

EXISTING ANALYTICAL DATA

Site Inspection - On April 25, 1989, Region II FIT conducted an SI at the Keegan site. Seven surface water samples and six sediment samples were collected from on-site surface water bodies; the total numbers include one environmental duplicate sample per sampling medium (Ref. No. 3, pp. 13, 27). A Sample Location Map is presented in Reference No. 3, page 13. An analytical data summary is presented in Reference No. 3, page 28. All media samples were analyzed for Target Compound List (TCL) and Target Analyte List (TAL) parameters. For Quality Assurance/Quality Control (QA/QC) purposes, two equipment rinsate blank samples and one trip blank sample (VOC analysis only) were also collected. The Contract Laboratory Program (CLP) data package is included in Reference No. 3, pp. 215 through 350.

Analytical data of sediment samples indicate the presence of elevated concentrations of semivolatile organic compounds, such as phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(a)pyrene; PCBs, such as Aroclor 1254 and Aroclor 1260; and metals, such as mercury, lead, and chromium. Analytical data indicate the presence of elevated concentrations of the same metals in the Frank Creek surface water samples.

Passaic River Flood Protection Project - In May 1994, the Baltimore District of the U.S. Army Corps of Engineers (USACE) contracted IT Corporation to perform a Hazardous, Toxic, or Radioactive Waste (HTRW) investigation and hydrogeologic investigation along the proposed alignment of the Passaic River Basin floodwater diversion tunnel (Ref. Nos. 8, p. 2; 9, p. 1). As part of the HTRW investigation, IT Corporation collected soil and groundwater samples for chemical analyses. The sampling methodology is outlined in Reference No. 9, pages 17 through 28. Workshaft 2B-K of the project is located near the foot of Bergen Avenue on the Keegan Landfill site. During the project, a pilot borehole into bedrock and overburden boring were drilled at this location. Wells were constructed in both boreholes (Ref. No. 8, pp. 11, 24, 88, 89). At the close of sampling activities, IT Corporation abandoned the wells by drilling out obstructions in the pilot borehole and grouting both boreholes (Ref. No. 8, p. 60).

From May through August 1994, IT Corporation collected numerous surface soil, subsurface soil, and groundwater samples. All media samples were analyzed for the following parameters: VOCs, semivolatile organic compounds, pesticides, PCBs, total petroleum hydrocarbons (TPH), and metals (including cyanide). Most of the media samples were also analyzed for the presence of herbicides and the dioxin compound 2,3,7,8-TCDD (Ref. No. 9, pp. 33, 34). Table 1 of this report provides a summary of selected soil sampling analytical results. Table 2 of this report presents a summary of selected groundwater sampling analytical results.

Table 1: PASSAIC RIVER FLOOD PROTECTION PROJECT DATA

SOIL SAMPLING DATES: 05/19/94 THROUGH 08/12/94

Sample No.	S-PB01-08	S-PB01-12	S-PB01-50	S-PB01-100	S-0B1-04	S-HA1*	S-HA2*	S-HA3*	S-HA4*	S-HA6*	S-HA7*	S-HA8*	S-HA9*	S-HA10*	S-HA11*	S-HA12*	S-HA13*
Contaminant																	
-TAL Metal	(mg/kg)																
Aluminum	6,100	5,300	11,000	12,000	6,560	4,940	3,570	4,640	5,180	5,280	16,000	9,220	13,900	9,600	2,620	12,800	16,800
Barium	12 B	8.3 B	66	130	252	388	2,300	783	1,890	1,740	2,700	2,740	23,200	3,300	1,370	242	4,070
Chromium	9.4	8.3	19	211	40.9	38.9	249	171	386	179	406	437	295	262	101	450	1,270
Iron	7,300	5,500	23,000	23,000	11,100	14,700	35,900	25,800	43,300	77,100	60,200	35,100	48,600	57,800	8,000	53,800	202,000
Lead	9.4	-	13	15	199	452	1,460	959	1,090	1,850	13,000	7,700	7,240	9,400	4,260	564	6,520
Mercury	-	-	-	-	0.34	0.67	5.7	1.3	3.8	3.2	3.6	1	3.7	1.4	-	0.31	1.3
-TCL Compound	(ug/kg)																
Bis(2-ethylhexyl)phthalate	79 BJ	44 BJ	-	63 J	300 J	-	-	-	7,600	15,000	-	810	1,500	-	-	-	-
Di-n-butyl phthalate	320 J	150 J	110 J	90 J	-	-	-	-	-	-	4,700	-	-	-	-	-	-
Di-n-octyl phthalate	87 BJ	160 BJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	-	-	-	-	1,200 J	-	-	-	-	-	-	-	2,000	-	-	-	-
Anthracene	-	-	-	-	1,800	-	-	2,200	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	-	-	-	-	4,000	910	-	4,400	2,100	-	-	-	4,200	-	-	-	-
Benzo(b)fluoranthene	-	-	-	-	4,800	1,400	4,100	7,200	5,000	-	1,500	500	13,000	-	430	-	-
Benzo(k)fluoranthene	-	-	-	-	4,200	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	-	-	-	-	5,200	670	1,900	4,000	-	-	-	-	8,100	-	-	-	-
Chrysene	-	-	-	-	4,100	720	-	4,100	-	-	-	-	4,200	-	-	-	-
Fluoranthene	-	-	-	-	9,900	1,800	-	8,200	3,700	-	-	-	3,600	-	-	-	-
Hexachlorobenzene	-	-	-	-	-	-	-	-	-	-	-	860	5,400	140,000	640	-	-
Naphthalene	-	-	-	-	300 J	-	-	-	-	-	-	-	-	-	-	-	-
Phenathrene	-	-	-	-	6,700	1,100	-	7,500	2,500	-	-	-	2,000	-	-	-	-
Pyrene	-	-	-	-	7,800	1,700	-	8,600	4,100	-	-	-	4,800	-			
1,2,4-Trichlorobenzene	-	-	-	-	-	-				-	-	-	3,700	-			
Trichloroethene	-	-	-	-	-	-				-	-	-	-	-			
PCBs - Total Aroclors	-	-	-	-	2,230	430				-	-	-	-	-			
Aldrin	-	-	-	-	45	-				-	-	-	-	-			
4',4'-DDD	-	-	-	-	20	-				790	-	-	-	-			
4',4'-DDE	-	-	-	-	12	-				7,400	73,000	480	6,300	27,000	210	-	-
4',4'-DDT	-	-	-	-	7.1	31	120	-	-	3,700	9,400	2,000	6,800	50,000	140	230	100
Dieldrin	-	-	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-
Endrin	-	-	-	-	3.8	-	-	-	-	-	-	-	-	-	-	-	-

All sample numbers are preceded by "2BK-."

J - Estimated value.

B - Detected in blank sample.

- - Not detected.

Ref. Nos. 8, p. 28; 10, Atts. A through E.

Sample Designations:

* - Sample Nos. S-HA1 through S-HA13 are surficial soil samples (e.g., collected from a depth less than 2 feet.

"PB" - Sample collected from the overburden portion of a pilot borehole in bedrock; the final number indicates sample depth.

"OB" - Sample collected from overburden borehole; the final number indicates sample depth.

EXISTING ANALYTICAL DATA (Continued)

Table 2: PASSAIC RIVER FLOOD PROTECTION PROJECT DATA
GROUNDWATER SAMPLING DATE: JULY 26, 1994

	~TAL Metal	Aluminum	Barium	Chromium	Iron	Lead	Mercury	~TCL Compound	1,2-Dichloroethene	Trichloroethene	Tetrachloroethene
Sample No.	(mg/L)							(ug/L)			
GW-0B1		8.6	0.42	0.027	33.9	0.11	0.00023		–	–	–
GW-PB1		0.12	0.028	–	46.2	0.024	–		31	34	5.1
TB-0726 (VOAs ONLY)		NA	NA	NA	NA	NA	NA		–	–	–

All sample numbers are preceded by "2BK-."
– - Not detected.
NA - Not analyzed for particular contaminant.

Ref. No. 10, Attachment F.

A complete list of groundwater sampling analytical results is located in Reference No. 9, pp. 44 through 59. Groundwater and Soil Sample Location Maps are presented in Reference Number 8, pp. 56 and 57.

Surface Soil Sampling - Analytical data of surface soil samples indicate the presence of elevated concentrations of inorganic analytes, such as aluminum [16,800 milligrams per kilogram (mg/kg)], barium (23,200 mg/kg), chromium (1,270 mg/kg), iron (202,000 mg/kg), lead (13,000 mg/kg), and mercury (3.8 mg/kg) (Ref. No. 10, pp. 1, 2, Att. D, pp. 57 through 64, Att. E, pp. 30 through 33). PCBs were also detected in on-site soils at total Aroclor concentrations ranging from non-detected to 120,000 micrograms per kilogram (ug/kg) (Ref. No. 10, Att. D, pp. 41 through 48, Att. E, pp. 22 through 25).

EXISTING ANALYTICAL DATA (Continued)

Other organic compound groups detected in on-site surface soils include VOCs; semivolatile organic compounds, including phthalates and PAHs; and pesticides, such as 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT (see Table 2). Analytical data of four surface soil samples indicated the presence of the dioxin compound 2,3,7,8-TCDD; contaminant concentration ranged from 0.34 to 5.5 ug/kg (Ref. No. 9, p. 34). TPH surface soil sample concentrations ranged from 42 mg/kg to 24,000 mg/kg (Ref. No. 10, Att. D, pp. 49 through 56, Att. E, pp. 26 through 29). Total cyanide concentrations in surface soil samples ranged from non-detected to 7.8 mg/kg (Ref. No. 10, Att. D, pp. 65 through 74, Att. E, pp. 34 through 37).

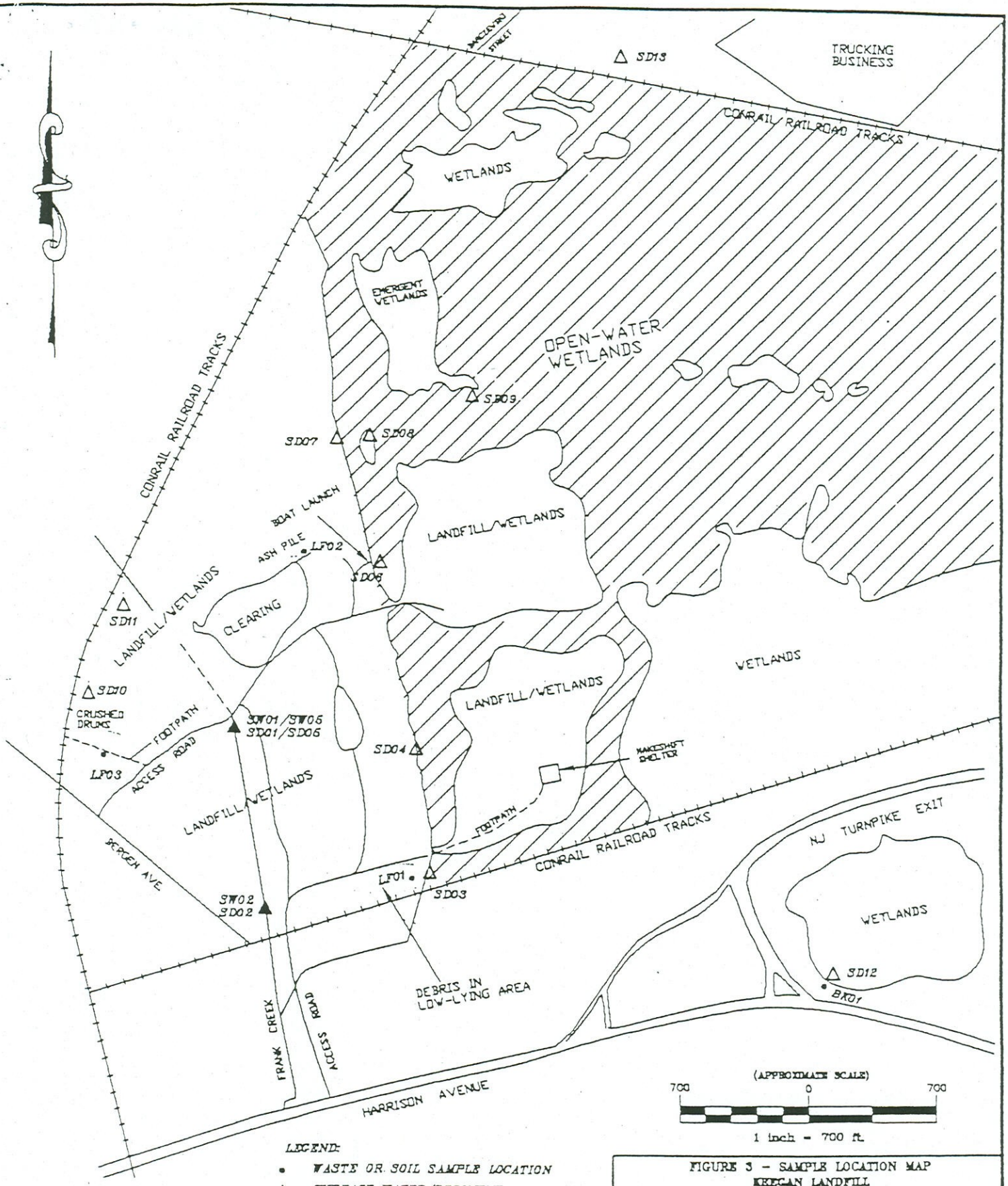
Subsurface Soil Sampling - Analytical data of subsurface soil samples indicated the presence of elevated concentrations of inorganic analytes such as aluminum (12,000 mg/kg), barium (711 mg/kg), chromium (211 mg/kg), iron (23,000 mg/kg), and mercury (0.65 mg/kg) (Ref. No. 10, Att. B, p. 2, Att. C, p. 8). Analytical data of Sample No. 2BK-OB1-04, collected at a depth of 4 feet, indicated the presence of organic compounds similar to those detected in surface soil samples (i.e., PAHs, PCBs, and pesticides) (Ref. No. 10, Att. C, pp. 9 through 13).

Groundwater Sampling - Analytical data of a groundwater sample collected from the 510-foot pilot boring indicated the presence of elevated concentrations of VOCs (1,2-dichloroethene, trichloroethene, and tetrachloroethene) and metals (iron and zinc). Analytical data of the overburden groundwater sample indicated the presence of elevated concentrations of lead (Ref. No. 9, p. 37).

SITE INSPECTION PRIORITIZATION SAMPLING RESULTS

On July 30-31, 1997, Region II START conducted a sampling event at the site as part of SIP activities. During the SIP, 13 sediment samples, three surface water samples, and four soil samples were collected. In addition, 2 rinsate blanks and 1 trip blank were collected for Quality Assurance/Quality Control (QA/QC) purposes (Ref. No. 25, pp. 1 through 5). Figure 3 provides a Sample Location Map. All samples, except for the trip blank sample, were analyzed under the U.S. EPA Contract Laboratory Program (CLP) for full Target Compound List (TCL) and Target Analyte List (TAL) parameters, excluding cyanide; the trip blank sample was analyzed through the CLP for volatile organic compounds (VOCs) only. Environmental duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples were collected for QA/QC purposes. One environmental duplicate was collected per sampling medium (Sample Nos. SW01/SW05 and SD01/SD05). Additional sample volumes were collected at the Sample No. SW02/SD02 location and submitted to the laboratories for MS/MSD analyses (Ref. No. 25, p. 4).

Tables 3 and 4 present analytical data summaries for the sampling event. Reference No. 25 includes the Sampling Trip Report, as well as the CLP TCL/TAL analytical data packages. Analytical data of soil and sediment samples indicate the presence of elevated concentrations of phthalates, pesticides, and metals.



LEGEND:

- ● *WASTE OR SOIL SAMPLE LOCATION*
- ▲ *SURFACE WATER/SEDIMENT SAMPLE LOCATION*
- △ *SEDIMENT SAMPLE LOCATION*

FIGURE 3 – SAMPLE LOCATION MAP
KREGAN LANDFILL
KEARNY, NEW JERSEY
JULY 1997

US ENVIRONMENTAL PROTECTION AGENCY
SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
CONTRACT # 68-W8-0016

DRAWN BY: J. HAMPTON JR.
EPA TASK MONITOR: C. MOYIK
START PROJECT MANAGER: K. CAMPBELL

WESTON Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH PRC ENVIRONMENTAL MANAGEMENT, INC., C.C. JOHNSON & MALHOTRA, P.C., RESOURCE APPLICATIONS, INC., R.E. SARRIERA ASSOCIATES, AND CRS ENVIRONMENTAL SERVICES, INC.

I:\FIGURES\...\KREGAN.DWG

Table 3: Data Summary for TCL Compounds
Keegan Landfill SIP
July 30-31,1997

Sample No.	Diethyl phthalate	n-Nitrosodi phenylamine	Butylbenzyl phthalate	4,4'-DDE	Endrin	4,4'-DDD	4,4'-DDT	Endrin aldehyde	alpha-Chlordane	gamma-Chlordane	Aroclor-1260
SD01	ND (330)	ND (330)	ND (330)	16	*48*	*73*	93	ND (3.3)	ND (1.7)	ND (1.7)	530
SD02	ND (330)	ND (330)	700	ND (3.3)	ND (3.3)	*240*	130	ND (3.3)	*73*	*72*	450
SD03	ND (330)	ND (330)	580	29	ND (3.3)	*26*	73	31	*28*	*24*	520
SD04	ND (330)	ND (330)	*2,600*	54	ND (3.3)	*78*	100	R	*29*	*16*	600
SD05	ND (330)	ND (330)	ND (330)	ND (3.3)	ND (3.3)	*130*	R	ND (3.3)	ND (1.7)	ND (1.7)	ND (33)
SD06	ND (330)	ND (330)	ND (330)	ND (3.3)	ND (3.3)	ND (3.3)	9.5	ND (3.3)	*22*	*20*	110
SD07	*1,400*	ND (330)	*7,800*	*730*	R	*1,300*	*780*	*810*	*900*	*870*	8,100
SD08	ND (330)	ND (330)	ND (330)	ND (3.3)	ND (3.3)	ND (3.3)	ND (3.3)	ND (3.3)	ND (1.7)	ND (1.7)	ND (33)
SD09	ND (330)	ND (330)	180	ND (3.3)	ND (3.3)	*81*	ND (3.3)	ND (3.3)	ND (1.7)	ND (1.7)	ND (33)
SD10	ND (330)	ND (330)	*2,800*	23	ND (3.3)	*39*	78	R	*25*	*26*	350
SD11	ND (330)	ND (330)	*1,900*	*140*	R	*1,900*	*530*	*260*	*180*	*170*	690
SD12*	ND (330)	ND (330)	230	ND (3.3)	ND (3.3)	ND (3.3)	48	72	ND (1.7)	ND (1.7)	320
SD13*	ND (330)	ND (330)	120	20	ND (3.3)	ND (3.3)	R	ND (3.3)	R	ND (1.7)	350
LF01	ND (330)	ND (330)	190	*56*	*120*	*42*	ND (3.3)	ND (3.3)	*83*	*63*	650
LF02	ND (330)	ND (330)	ND (330)	ND (3.3)	ND (3.3)	ND (3.3)	R	ND (3.3)	ND (1.7)	ND (1.7)	ND (33)
LF03	*1,600*	*1,200*	*5,300*	*180*	*300*	R	*600*	*93*	*190*	R	1,800
BK01*	ND (330)	ND (330)	ND (330)	ND (3.3)	ND (3.3)	ND (3.3)	61	ND (3.3)	ND (1.7)	ND (1.7)	810

Ref. No. 25
All concentrations are reported in micrograms per kilogram (ug/kg).
Bold italics indicates that concentration exceeds three times background.
* Samples SD12, SD13, and BK01 are background samples.
ND = Not detected.
R = Rejected data.
( ) = Method detection limit.

Table 4: Data Summary for TAL Analytes
Keegan Landfill SIP
July 30-31, 1997

Sample No.	Antimony	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Vanadium
SD01	3.8	***27.9***	5.3	103	447	1,130	10.8	50.2	74.2
SD02	2.5	11.8	5.8	125	279	879	4.2	44	53.8
SD03	ND (12)	2.6	1.3	19.8	R	164	1.1	16	20.6
SD04	***71.5***	***17.9***	13.9	***229***	588	27,700	1.7	157	94.8
SD05	2.8	***18.9***	4.3	61.7	302	844	7.5	35.3	51.3
SD06	ND (12)	4.6	1.1	19.8	R	92.2	0.3	12.9	13
SD07	23.2	93	***22.2***	***441***	***1,560***	2,250	7.1	468	145
SD08	ND (12)	4.9	1.5	49.2	R	215	0.82	21.7	51.7
SD09	15.9	***31.4***	3.4	***143***	R	518	0.89	43.9	112
SD10	6.6	9.2	8.4	54.9	247	319	1.2	56.2	49.3
SD11	4.7	2.7	8.2	***281***	545	1,330	5	71.1	72.4
SD12*	ND (12)	1.8	1.7	35.1	R	282	0.75	24.6	35.7
SD13*	ND (12)	5.4	5.9	44.2	390	754	4	299	59.6
LF01	1.7	4.5	3.3	57	177	463	2.1	27.3	23.1
LF02	4	***60.5***	0.87	28.9	***4,870***	91.4	0.15	13.8	24.3
LF03	***215***	***39.6***	***22.4***	***118***	443	1,200	***3.7***	***82.3***	***106***
BK01*	3.9	12.1	5.4	34.2	154	522	1.1	24	30.4

Ref. No. 25.

All concentrations are reported in milligrams per kilogram (mg/kg).

Bold italics indicates that concentration exceeds three times background.

* Samples SD12, SD13, and BK01 are background samples.

ND = Not detected.

R = Rejected data.

( ) = Contract Required Detection Limit.

Soil Sampling - Three samples (Sample Nos. LF01, LF02, and LF03) were collected from areas of the landfill in order to assist in characterizing the site waste source. One background sample (Sample No. BK01) was collected from an area located southeast of the site in order to assist in determining regional background hazardous substance concentrations. Analytical results of landfill samples indicated the presence of the following substances at concentrations significantly above background: diethyl phthalate, butylbenzyl phthalate, n-nitrosodiphenylamine, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, endrin, endrin aldehyde, chlordane, antimony, arsenic, cadmium, chromium, copper, mercury, nickel, and vanadium. Aroclor-1260 was detected in soil samples LF01 and LF03 at concentrations of 650 ug/kg and 1,800 ug/kg, respectively. However, Aroclor-1260 was also detected in the background soil sample, Sample BK01, at a concentration of 810 ug/kg (Ref. No. 25, pp. 14 through 16, 18 through 23, 26 through 28, and 337 through 339).

Sediment Sampling - START collected a total of 13 sediment samples, including two background samples (Sample Nos. SD12 and SD13), from the site and its vicinity. Two samples were collected from areas located north and southeast of the site in order to assist in determining regional background hazardous substance concentrations. Analytical data of Samples SD01 through SD11 represent TCL/TAL parameter concentrations within site wetlands and adjacent wetlands. Samples SD01/SD05 and SD02 were collected from Frank Creek, a south-flowing water body that originates on site. Samples SD10 and SD11 were collected from associated wetland areas. Analytical data of the Frank Creek sediment samples indicate the presence of the following substances at concentrations significantly above background: butylbenzyl phthalate, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, endrin, endrin aldehyde, chlordane, arsenic, and chromium. Samples SD03, SD04, and SD06 through SD09 were collected from wetland areas along the eastern portion of the site. Analytical data of these samples indicate the presence of the following substances at concentrations significantly above background: diethyl phthalate, butylbenzyl phthalate, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, endrin aldehyde, chlordane, antimony, arsenic, cadmium, chromium, and copper. Aroclor-1260 was detected in Samples SD03, SD04, SD06, and SD07; the concentrations ranged from 110 to 8,100 ug/kg. However, Aroclor-1260 was also detected in background sediment samples SD12 and SD13 at concentrations of 320ug/kg and 350 ug/kg, respectively (Ref. No. 25, pp. 14 through 16, 18 through 23, 26 through 28, and 337 through 339).

Surface Water Sampling - START collected three surface water samples, including one environmental duplicate sample (Sample No. SW05), from Frank Creek. Organic analytical data of these samples did not indicate the presence of elevated levels of TCL compounds. Inorganic analytical data indicate lead concentrations ranging from 1,020 to 1,590 ug/L (Ref. No. 25, pp. 17, 24, 25, 29, and 336).

PART IV. HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence and relationship to background.**

A release of contaminants is suspected due to the presence of on-site soil contamination and the existence of a shallow water table. From the mid-1960s to 1974, the property was utilized as a municipal sanitary landfill. Keegan/MSLA leased the property from the Town of Kearny. Unauthorized dumping is also reported to have occurred at the site. Wastes deposited on site included cardboard, construction, and household waste; landscaping debris; abandoned tires, appliances, automobiles; and drummed/uncontained plating wastes (chromate and bichromate slurry), pigment wastes, and organic wastes. As part of the Passaic River Flood Protection Project, IT Corporation drilled two on-site wells, including one 510-foot pilot boring well (Well No. 2BK-PB01) and one 22-foot overburden monitoring well (Well No. 2BK-OB01). The wells are located at Workshaft 2BK, at the foot of Bergen Avenue. Groundwater was encountered at 14 feet below ground surface. In July 1994, one groundwater sample was collected from each well.

Results of on-site groundwater sampling suggest that a release to groundwater has occurred; however, the data do not meet the observed release criteria because background samples were not collected. Analytical data of overburden groundwater samples indicate the presence of inorganic analytes, including aluminum, barium, chromium, iron, lead, and mercury. The pilot borehole groundwater sample contained the following chlorinated solvents: 1,2-dichloroethene (31 ug/L), trichloroethene (34 ug/L), and tetrachloroethene (5.1 ug/L). The sample also contained aluminum, barium, iron, lead, and zinc. In addition, analytical data of surface soil and subsurface soil samples indicate the presence of similar analytes. Numerous contaminants, such as PCBs, phthalates, PAHs, pesticides, petroleum hydrocarbons, and dioxin, have been detected in surface soil samples. Surface soil sample 2BK-S-HA13 contained trichloroethene (7.7 ug/kg); VOCs were not detected in all other soil samples. Similarly, analytical data of soil and sediment samples collected in July 1997 by Region II START indicate the presence of phthalates, pesticides, and inorganic analytes at concentrations significantly above background.

Ref. Nos. 8, pp. 3, 12, 53, 56, 57; 9, pp. 34, 37, 44 through 58; 10, pp. 2, 3; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, areas of karst terrain, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

The Keegan site is located within the Hackensack Meadowlands in the Piedmont physiographic province of New Jersey. The meadowlands area was once glacial Lake Hackensack. Groundwater is not known to be used for drinking water purposes in the vicinity of the site. Therefore, there is no true aquifer of concern. For the purposes of this report, the aquifer of concern is considered to be the underlying Passaic Formation of the Brunswick Group (Newark Supergroup). The formation consists of soft, reddish shale; red sandstone and siltstone; mudstone; and conglomerate. The strata are generally tilted northwestward, with the ridges tending northeastward. In the site area, the total thickness of these late Triassic Age rocks is estimated to be 6,000 to 7,000 feet. The primary water-bearing zone occurs from less than 200 feet to 600 feet below ground surface. Groundwater movement and storage occurs primarily due to extensive fracturing of its component rocks. Though cracks intersect so as to allow omni-directional movement, water may be inhibited in traveling along certain paths by fracture size and capacity. Approximately 150 feet of unconsolidated sediment overlie bedrock at the site. The sediments mainly consist of glacial lake sediments and glacial till, which do not yield a significant amount of water; these sediments usually act as a semi-confining aquiclude.

In 1994, IT Corporation conducted a hydrogeologic investigation at the Keegan site as part of USACE Passaic River Flood Protection Project activities. One 510-foot pilot borehole (No. 2BK-PB01) and one 22-foot overburden borehole were drilled. The stratigraphy of the 2BK-PB01 borehole was reported as follows: 0' to 6' – refuse and soil fill material; 6' to 9' – organic soil with fill; 9' to 20.5' – gray, sandy silt and silty sand; 20.5' to 25' – medium to coarse sand and fine gravel; 25' to 50' – brownish-gray silty sand, sandy silt, and clay; 50' to 100' – gray to reddish-brown varved clay, and silt with sand seams; 100' to 140' – silty sand; and 140' to 155' – glacial till. Bedrock was encountered at 155 feet below ground surface. Groundwater flow in the overburden is believed to be south-southwestward toward the Passaic River. Groundwater occurs at water table conditions at 14 feet below grade.

Ref. Nos. 3, pp. 39, 106, 132 through 135, 356 through 358, 361; 8, pp. 19, 28, 53, 58, 61 through 87.

3. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

The actual lowest point of waste disposal is unknown. Analytical data of surface soil and sediment samples collected by Region II START indicate the presence of phthalates, pesticides, and inorganic analytes at concentrations significantly above background. The highest possible seasonal level of the saturated zone of the aquifer of concern is the bedrock surface, which is encountered 155 feet below ground surface at the site. Therefore, the depth from the lowest point of waste disposal to the highest seasonal level of the saturated zone of the aquifer of concern is estimated to be 155 feet.

Ref. Nos. 8, pp. 28, 53; 10, Att. C, pp. 8 through 13; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

4. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the top of the aquifer of concern?**

The varved clay and silt with sand seams encountered between 50 and 100 feet below grade at the site is the least permeable continuous intervening stratum. The permeability associated with this material (silty clay) is 10^{-6} centimeters per second (cm/s).

Ref. Nos. 8, pp. 27, 28, 57, 61 through 67; 13, p. 4.

5. **What is the net precipitation at the site (inches)?**

The net precipitation in the vicinity of the site is between 15 and 30 inches.

Ref. No. 13, pp. 2, 3.

6. **What is the distance to and depth of the nearest well that is currently used for drinking purposes?**

Groundwater is not used for drinking purposes within 4 miles of the site.

Ref. Nos. 4; 8, p. 23; 11; 12.

7. If a release to groundwater is observed or suspected, determine the number of people that obtain drinking water from wells that are documented or suspected to be actually contaminated by hazardous substance(s) attributed to an observed release from the site.

Groundwater is not utilized for drinking water purposes within 4 miles of the site. Due to the absence of drinking water wells in the site vicinity, no wells are suspected to be within a contamination boundary of a potential release.

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

8. Identify the population served by wells located within 4 miles of the site that draw from the aquifer of concern.

Distance	Population
0 - ¼ mile	0
> ¼ - ½ mile	0
> ½ - 1 mile	0
> 1 - 2 miles	0
> 2 - 3 miles	0
> 3 - 4 miles	0

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

State whether groundwater is blended with surface water, groundwater, or both before distribution.

Not applicable.

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

Is a designated wellhead protection area within 4 miles of the site?

The site is not located within a designated wellhead protection area, as groundwater is not utilized for drinking water purposes within 4 miles of the site.

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

Does a waste source overlie a designated or proposed wellhead protection area? If a release to groundwater is observed or suspected, does a designated or proposed wellhead protection area lie within the contaminant boundary of the release?

Not applicable.

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

9. Identify one of the following resource uses of groundwater within 4 miles of the site (i.e., commercial livestock watering, ingredient in commercial food preparation, supply for commercial aquaculture, supply for major, or designated water recreation area, excluding drinking water use, irrigation (5-acre minimum) of commercial food or commercial forage crops, unusable).

Groundwater is not known to be utilized for the above-mentioned resources. No drinking water wells are located within 4 miles of the site; however, the potential exists for underlying groundwater to be used for drinking water purposes. Regionally, the chemical quality of bedrock groundwater is considered to be undesirable for potable supply without proper treatment. Groundwater within 4 miles of the site is utilized for industrial, commercial, and small-scale irrigation (lawn-watering) purposes.

Ref. Nos. 4; 8, pp. 22, 23, 46 through 52; 11; 12.

SURFACE WATER ROUTE

10. Describe the likelihood of a release of contaminant(s) to surface water as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence and relationship to background.

There are observed releases of contaminants associated with the site to both watersheds of the surface water pathway. From the mid-1960s to 1974, the property was utilized as a municipal sanitary landfill. Keegan/MSLA leased the property from the Town of Kearny. Unauthorized dumping is also reported to have occurred at the site. Wastes deposited on site include cardboard, construction, and household waste; landscaping debris; abandoned tires, appliances, automobiles; and drummed/uncontained plating wastes (chromate and bichromate slurry), pigment wastes, and organic wastes. Two probable points of entry to surface water exist on site: a creek that originates on site (Frank Creek), and a tidal open-water wetland. Frank Creek flows south and eventually discharges to the Passaic River, located ½ mile south of the site's Harrison Avenue entrance. The tidal wetland area, located along the eastern border of the site, is part of the Hackensack River drainage basin. Although there are observed releases to both watersheds, the Hackensack River watershed is evaluated fully in this report due to analytical data supporting actual contamination of a sensitive environment.

On July 30-31, 1997, Region II START collected 13 sediment samples, four soil samples, and three surface water samples. The samples were analyzed through the U.S. EPA CLP for TCL/TAL parameters. All of the surface water samples were collected from Frank Creek. The sediment samples were collected from locations along Frank Creek and contiguous wetlands, the eastern open-water wetland area, and two background locations. Analytical data of sediment samples collected from Frank Creek and its associated wetlands

indicate the presence of phthalates, pesticides, arsenic, and chromium at concentrations significantly above background. Analytical data of sediment samples collected from the eastern open-water wetland area indicate the presence of phthalates, pesticides, antimony, arsenic, cadmium, chromium, and copper at concentrations significantly above background. Concentrations of PCBs were detected at various locations throughout the site; however, PCBs were also detected at similar levels in background samples.

On April 25, 1989, Region II FIT conducted a SI at the Keegan site and collected seven surface water samples and six sediment samples from on-site surface water bodies. All media samples were analyzed for TCL/TAL parameters through the U.S. EPA CLP. Analytical data of sediment samples indicate the presence of elevated concentrations of semivolatile PAH compounds, such as phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(a)pyrene; PCBs, such as Aroclor 1254 and Aroclor 1260; and metals, such as mercury, lead, and chromium. Analytical data indicate the presence of elevated concentrations of the same metals in the Frank Creek surface water samples. Analytical data of Sample No. Sed-1, a sediment sample collected from the open-water wetland perimeter, indicated the presence of PCBs, mercury, and lead. An "oily sheen" was observed at surface water/sediment Sample Location No. SW-5. In 1994, similar contaminants were detected during on-site surface soil sampling conducted by IT Corporation.

Ref. Nos. 3, pp. 12, 13, 27, 28, 38, 41, 45, 78, 199, 383; 7; 10, p. 2; 14; 24; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

11. **Identify the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.**

Two downslope surface water bodies are located on site. Frank Creek originates on site and flows south off site before discharging to the Passaic River; the river is located ½-mile south of the former Harrison Avenue entrance. The estuarine open-water wetland is situated along the eastern border of the site. The open-water wetland area drains southeastward to the Hackensack River. The Passaic and Hackensack Rivers both discharge to Newark Bay.

Ref. Nos. 3, pp. 3, 12; 14; 24, p. 3.

12. **What is the distance in feet to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

Frank Creek originates on site. The open-water wetland is immediately adjacent to the eastern border of the site.

Ref. Nos. 3, pp. 3, 12; 14.

13. Identify all surface water body types within 15 downstream miles.

Name	Water Body Type	Flow (cfs)	Saline/Fresh/Brackish
Open-water Wetland Hackensack River Watershed *	Tidal River	N/A	Brackish
Frank Creek	Tidal River	N/A	Brackish
Passaic River	Tidal River	N/A	Brackish
Hackensack River*	Tidal River	N/A	Brackish
Newark Bay*	Coastal Tidal	N/A	Saline
Arthur Kill *	Coastal Tidal	N/A	Saline
Kill Van Kull*	Coastal Tidal	N/A	Saline
Upper NY Bay*	Coastal Tidal	N/A	Saline
Hudson River*	Tidal River	N/A	Brackish
The Narrows*	Coastal Tidal	N/A	Saline
Lower NY Bay*	Coastal Tidal	N/A	Saline

* Surface water body evaluated in Hazard Ranking System (HRS) PREscore for the site.

Ref. Nos. 3, p. 90; 13, p. 6; 14 through 17.

14. Determine the 2-yr., 24-hr. rainfall (inches) for the site.

The 2-year, 24-hour rainfall in the area of the site is approximately 3.3 inches.

Ref. No. 18.

15. Determine size of the drainage area (acres) for sources at the site.

Two drainage areas exist on the 230-acre property. It is estimated that the Frank Creek area, belonging to the Passaic River basin, drains approximately 60 percent, or 138 acres, of the site. Consequently it is estimated that the open-water wetland area, belonging to the Hackensack River basin, drains approximately 40 percent, or 92 acres, of the site.

Ref. Nos. 3, pp. 3, 12, 112; 14.

16. **Describe the predominant soil group in the drainage area.**

Overburden soils in the drainage area are composed primarily of glacial lake sediment deposits, refuse, and fill. Glacial lake sediments typically include sand, gravel, silt, clay, peat, and root mat. Due to the presence of clays, sandy clays, silty clays, and organic soils, it is estimated that fine-textured soils with very low infiltration rates are the predominant soil group in the area of the site.

Ref. Nos. 3, pp. 356, 357; 8, p. 28; 13, p. 5.

17. **Determine the type of floodplain within which the site is located.**

The Keegan site is located within a 100-year flood area.

Ref. No. 19.

18. **Identify drinking water intakes in surface waters within 15 miles downstream of the point of surface water entry. For each intake identify: the name of the surface water body in which the intake is located, the distance in miles from the point of surface water entry, population served, and stream flow at the intake location.**

Intake	Distance	Population Served	Flow (cfs)
None	N/A	N/A	N/A

Ref. Nos. 4; 8, p. 52; 11; 12.

19. **Identify fisheries that exist within 15 miles downstream of the point of surface water entry. For each fishery specify the following information:**

Fishery Name	Water Body Type	Flow (cfs)	Saline/Fresh/Brackish
Open-water Wetland	Tidal River	N/A	Brackish
Hackensack River	Tidal River	N/A	Brackish
Newark Bay	Coastal Tidal	N/A	Saline
Arthur Kill	Coastal Tidal	N/A	Saline
Kill Van Kull	Coastal Tidal	N/A	Saline
Upper NY Bay	Coastal Tidal	N/A	Saline
Hudson River	Tidal River	N/A	Brackish
The Narrows	Coastal Tidal	N/A	Saline
Lower NY Bay	Coastal Tidal	N/A	Saline

During July 1997 Region II START sampling activities, no one was observed fishing. However, START personnel noted the presence of a boat launch area, as well as discarded fishing supplies, along the eastern wetland shore.

There is a statewide ban on the sale of all striped bass taken from New Jersey waters. A ban also exists on the sale and consumption of *all* fish and shellfish taken from the lower portion of the Passaic River.

Certain restrictions due to known contamination exist on the above-mentioned fisheries. In the Newark Bay Complex, which includes Newark Bay, the lower Hackensack River, Arthur Kill, Kill Van Kull, and tidal portions of its tributaries, there is a ban on the consumption of striped bass and blue crab, as well as a health advisory regarding the consumption of American eel, bluefish, white perch, and white catfish. In the Hudson River and Upper New York Bay, there is a health advisory regarding the consumption of American eel, striped bass, bluefish, white perch, white catfish, and blue crabs. In the Raritan Bay Complex, which includes The Narrows and Lower New York Bay, there is a health advisory regarding the consumption of striped bass, bluefish, white perch, white catfish, and blue crabs.

Ref. Nos. 13, p. 6; 14 through 17; 20; 24, p. 10.

20. **Identify surface water sensitive environments that exist within 15 miles of the point of surface water entry.**

Environment	Water Body Type	Flow (cfs)	Wetland Frontage (miles)
Wetlands - Open-water Wetland (Hackensack River watershed)	Tidal River	N/A	4
Wetlands - Hackensack River	Coastal Tidal	N/A	10
Wetlands -Newark Bay	Coastal Tidal	N/A	0.1
Wetlands -Arthur Kill	Coastal Tidal	N/A	2
Wetlands - Upper NY Bay	Coastal Tidal	N/A	1
Wetlands - Lower NY Bay	Coastal Tidal	N/A	0.1

Environment	Water Body Type	Flow (cfs)	Wetland Frontage (miles)
State-listed endangered species (*Podilymbus podiceps*)	Coastal Tidal	N/A	N/A
Unique Biotic Community – Coastal Heron Rookery at Kearny Marsh	Coastal Tidal	N/A	N/A
Federally-listed endangered species (*Falco peregrinus*)	Coastal Tidal	N/A	N/A
State-listed endangered species (*Sterna antillarum*)	Coastal Tidal	N/A	N/A
State-listed endangered species (*Lemna perpusilla*)	Coastal Tidal	N/A	N/A
Unique Biotic Community – Coastal Heron Rookery at Global Terminal	Coastal Tidal	N/A	N/A

Ref. Nos. 13, p. 6; 14 through 17; 21; 22.

21. **If a release to surface water is observed or suspected, identify any intakes, fisheries, and sensitive environments from question Nos. 18-20 that are or may be actually contaminated by hazardous substance(s) attributed to an observed release from the site.**

Intake: N/A

Fishery: Open-water wetland

Sensitive Environment: Wetland; state-listed endangered species habitat; unique biotic community.

The 1997 Region II START analytical data support actual contamination of 0.2 mile of wetland frontage based on an observed release of contaminants to the adjacent open-water

wetland, which is interconnected with the Kearny Marsh. The NJDEP Natural Heritage Program (NHP) has indicated that a state-listed endangered species habitat (Pied-billed grebe) and a unique biotic community (coastal heron rookery at Kearny Marsh) may be located within the site boundaries.

Ref. Nos. 4; 9, p. 23; 11; 12; 14 through 17; 21; 22; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 though 339.

22. **Identify whether the surface water is used for any of the following purposes, such as: irrigation (5 acre minimum) of commercial food or commercial forage crops, watering of commercial livestock, commercial food preparation, recreation, potential drinking water supply.**

The surface waters along the migration route are highly industrialized waterways. However, surface waters provide navigational channels for both commercial and recreational boating vessels. In July 1997, Region II START personnel observed a person in a kayak on the adjacent open-water wetland area.

Ref. No. 3, pp. 146, 147; 24, p. 4.

SOIL EXPOSURE PATHWAY

23. **Determine the number of people that occupy residences or attend school or day care on or within 200 feet of observed contamination.**

The site is located in a primarily industrial area of the Town of Kearny. No residences are located on or within 200 feet of observed contamination. There are no schools or day care centers within 200 feet of the site.

Ref. Nos. 3, pp. 3, 12, 49, 51; 4.

24. **Determine the number of people that regularly work on or within 200 feet of observed contamination.**

The site is currently inactive; no workers are employed at the site.

Ref. No. 7.

25. **Identify terrestrial sensitive environments on or within 200 feet of observed contamination.**

Numerous contaminants, such as PCBs, phthalates, PAHs, pesticides, petroleum hydrocarbons, and dioxin, have been detected in surface soil samples. The NJDEP Natural Heritage Program (NHP) has indicated that a state-listed endangered species habitat (Pied-billed grebe) and a unique biotic community (coastal heron rookery at Kearny Marsh) may be located within the site boundaries. However, these locations are not considered terrestrial sensitive environments.

Ref. Nos. 10, p. 2; 22; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

26. **Identify whether there are any of the following resource uses, such as commercial agriculture, silviculture, livestock production or grazing within an observed or suspected soil contamination.**

The site is located in a primarily industrial portion of the Town of Kearny. None of the above-mentioned resource uses occur within an area of observed or suspected soil contamination.

Ref. Nos. 3, pp. 3, 49, 51; 4.

AIR PATHWAY

27. **Describe the likelihood of release of hazardous substances to air as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them the site. For an observed release, define the supporting analytical evidence and relationship to background.**

A potential for a release of contaminants associated with the site to air is not currently suspected. From the mid-1960s to 1974, the property was utilized as a municipal sanitary landfill. Unauthorized dumping is also reported to have occurred at the site. Wastes deposited on site include cardboard, construction, and household waste; landscaping debris; abandoned tires, appliances, and automobiles; and drummed/uncontained plating wastes (chromate and bichromate slurry), pigment wastes, and organic wastes. The site is currently inactive.

Underground landfill fires are known to have occurred on site in December 1981, December 1984, June/July 1987, and most recently in 1992. On June 29, 1987, air monitoring results during the underground landfill fire indicated "3 ppm organics at ground level." In December 1994, while monitoring an underground landfill fire, a Kearny DPHEP employee noted the presence of a debris pile from wire-burning activities.

In 1994, IT Corporation conducted on-site field activities as part of the Passaic River Flood Protection Project. Air monitoring was conducted using a photoionization detector (PID) during advancement of a split-spoon sampler at Pilot Borehole 2BK-PB01. Well boring logs indicate that a PID reading of "5 ppm above background" was detected from the 32-foot-depth sample. No readings above background were detected in ambient air during non-intrusive activities. During July 1997 Region II sampling activities, no air monitoring instrument readings were detected in ambient air. During collection of Sample No. SW-02, a PID reading of 0.5 units above background was detected from the sample.

Ref. Nos. 3, p. 3, 38, 44, 45, 46, 47, 65, 67, 68, 199, 204 through 213, 383; 7; 8, p. 62; 24.

28. **Determine populations that reside within 4 miles of the site.**

Distance	Population
On site	0
> 0 - ¼ mi.	230
> ¼ - ½ mi.	1,820
> ½ - 1 mi.	17,490
> 1 - 2 mi.	63,220
> 2 - 3 mi.	128,230
> 3 - 4 mi.	187,460

Ref. Nos. 7; 23.