HWDS SAMPLE PREPARATION RECORD

PROJECT 633 NEIC SAMPLE NO. 096 REGION SAMPLE NO. 1 TAG NO. 3-1308

SAMPLE DESCRIPTION ~~Composite dredge spoil sample from locations #9 and #9A~~

Project Name: Pigeon Point Landfill

COLLECTION DATE 2 / 5 / 81 TIME 15:29/ ~~16:05~~ SUSPECT HAZARDS --

RECEIVED DATE 2 / 13 / 81 PREPARATION DATE 3 / 5 / 81

<<<<<<<<<<<<<<<<<<<<<<<<<<< PREPARATIONS REQUESTED >>>>>>>>>>>>>>>>>>>>>>>>>>>>

- (A) TOTAL METALS
- (B) ACID EXTRACTABLE METALS
- (C) TOTAL MERCURY
- (D) STRONG ACID ANIONS
- (E) BASE/NEUTRAL ORGANICS
- (F) ACID (PHENOLIC) ORGANICS
- (G) GENERAL ORGANIC EXTRACT
- (H) VOLATILE ORGANICS
- I OTHER (SPECIFY) ____

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< SAMPLE DATA >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

SAMPLE CONDITION teflon square

NO./TYPE CONTAINER RECEIVED: (8 OZ. JAR,) OTHER ____

ESTIMATED TOTAL AMOUNT RECEIVED: ____ ML ____ GRAMS

TOTAL SAMPLE/BOTTLE WEIGHT ____ GRAMS

AQUEOUS PHASE, NO. 1, RELATIVE AMOUNT ____ % OF TOTAL ____

DESCRIPTION ____

SOLID PHASE, NO. 2, RELATIVE AMOUNT ____ % OF TOTAL 100%

DESCRIPTION Reddish brown soil

NON-AQ. PHASE, NO. 3, RELATIVE AMOUNT ____ % OF TOTAL ____

ORIGINAL (Red)

DESCRIPTION ____

SAMPLE TAG INFORMATION TAG VERIFIED

PREPARED BY KD/GL REAGENT BLANK # 633-114

SEMS DocID 2332264

HWDS SAMPLE PREPARATION RECORD

PROJECT 633 NEIC SAMPLE NO. 096 REGION SAMPLE NO. 1 TAG NO. 31308

SAMPLE DESCRIPTION Composite dredge spoil sample from locations #9 and #9A

Project Name: Pigeon Point Landfill

COLLECTION DATE 2/5/81 TIME 15:29/16:05 SUSPECT HAZARDS ---

RECEIVED DATE 2/13/81 PREPARATION DATE 5/5/81

AQUEOUS PHASE, NO. 1

CODE(S)	PREPARATION	ALIQUOT TAKEN	FINAL AMOUNT
Z	PH,OXIDIZERS,SULFIDE,CYANIDE SPOT TEST		
[illegible]	ALKALINITY(ACIDITY),CONDUCTIVITY		
X	SULFIDE,CYANIDE (QUANTITATIVE)		
A,C	TOTAL METALS,MERCURY		
D	STRONG ACID ANIONS		
E,F	BASE/NEUTRAL,ACIDIC ORGANICS		
H	VOLATILE ORGANICS		
I	OTHER ----------		

SOLID PHASE, NO. 2

CODE(S)	PREPARATION	ALIQUOT TAKEN	FINAL AMOUNT
W	PH,OXIDIZERS,ALKALINITY(ACIDITY),COND.	1.1g	100ml
V	SULFIDE,CYANIDE SPOT TESTS	1.1g	
U	SULFIDE,CYANIDE (QUANTITATIVE)	1.9g	
T	% MOISTURE	(SEE PAGE 3)	
A	TOTAL METALS	1.1g	
B	ACID EXTRACTABLE METALS		
C	TOTAL MERCURY	C-1 0.1g C-2 0.1g	
D	STRONG ACID ANIONS	1.0g	
E,F,G	BASE/NEUTRAL,ACIDIC ORGANICS, GENERAL ORGANIC EXTRACT	~~20.1g~~ CMS	20.7g*
H	OTHER VOA	1.0ml (1.2g in 10ml MEOH)	4ml x 2

ORIGINAL (Red)

* aliquot reprepped due to lab accident 3/10/81 CMS

HWDS SAMPLE PREPARATION RECORD

PROJECT 633 NEIC SAMPLE NO. 096 REGION SAMPLE NO. 1 TAG NO. 31308

SAMPLE DESCRIPTION Composite dredge spoil sample from locations #9 and #9A

Project Name: Pigeon Point Landfill

COLLECTION DATE 2 / 5 / 81 TIME 15:29/16:05 SUSPECT HAZARDS --

RECEIVED DATE 2 / 13 / 81 PREPARATION DATE 3 / 5 / 81

NON-AQUEOUS LIQUID PHASE, NO. 3

CODE(S)	PREPARATION	ALIQUOT TAKEN	FINAL AMOUNT
A	TOTAL METALS		
G	GENERAL ORGANIC EXTRACT		
H	VOLATILE ORGANICS		
I	OTHER _____		

<<<<<<<<<<<<<<<<<<<<<<<<<<<<< PRELIMINARY RESULTS >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

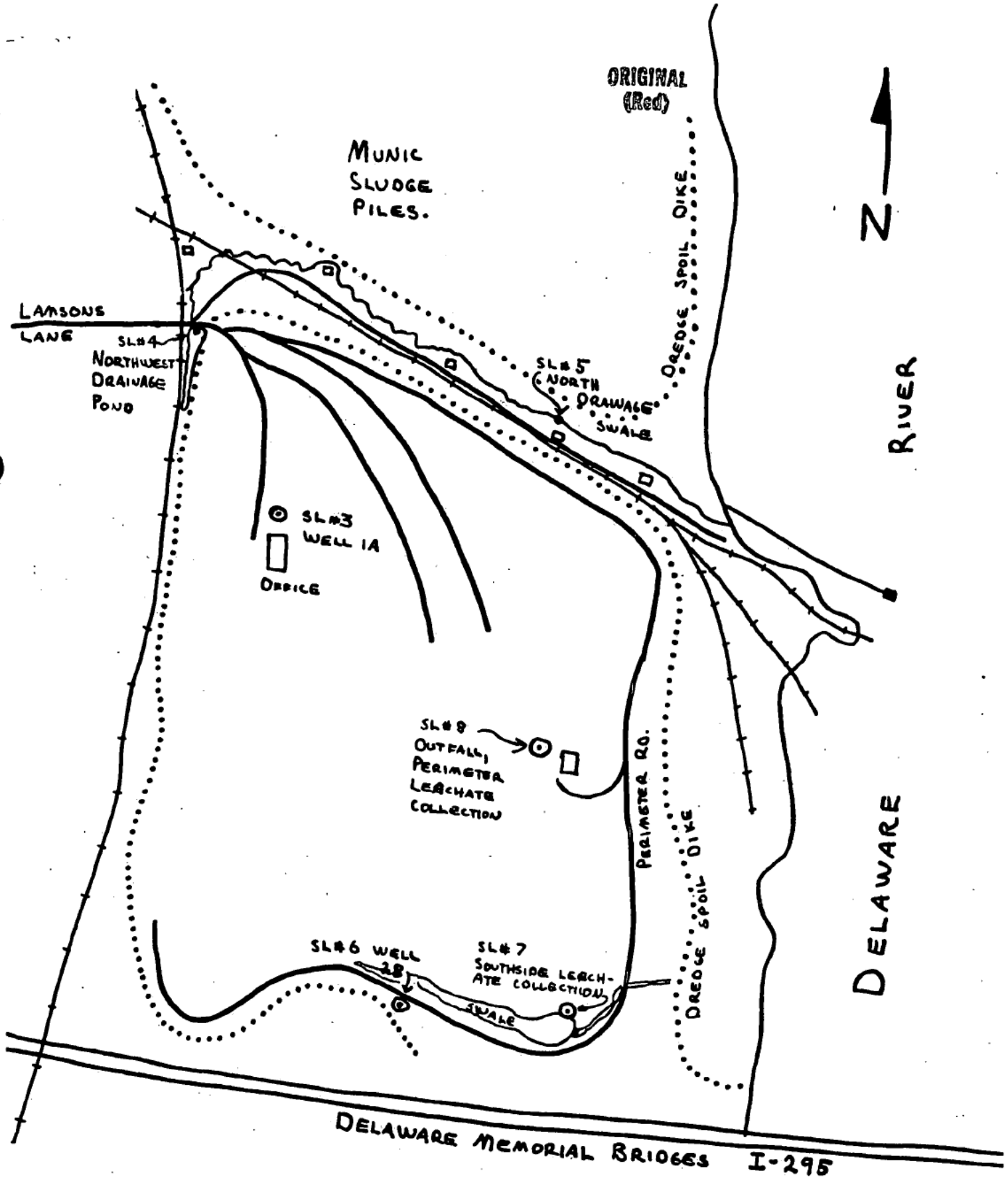
PH OF AQUEOUS PHASE _____

T % MOISTURE _____ GROSS WET WT. 7.11g GROSS DRY WT. _____

CONTAINER TARE WT. 6.19g

PREPARATION COMMENTS _____

ORIGINAL (Red)



PIGEON POINT LANDFILL
TDD# F3-8101-17 DE.-27

"non responsive based on revised scope"

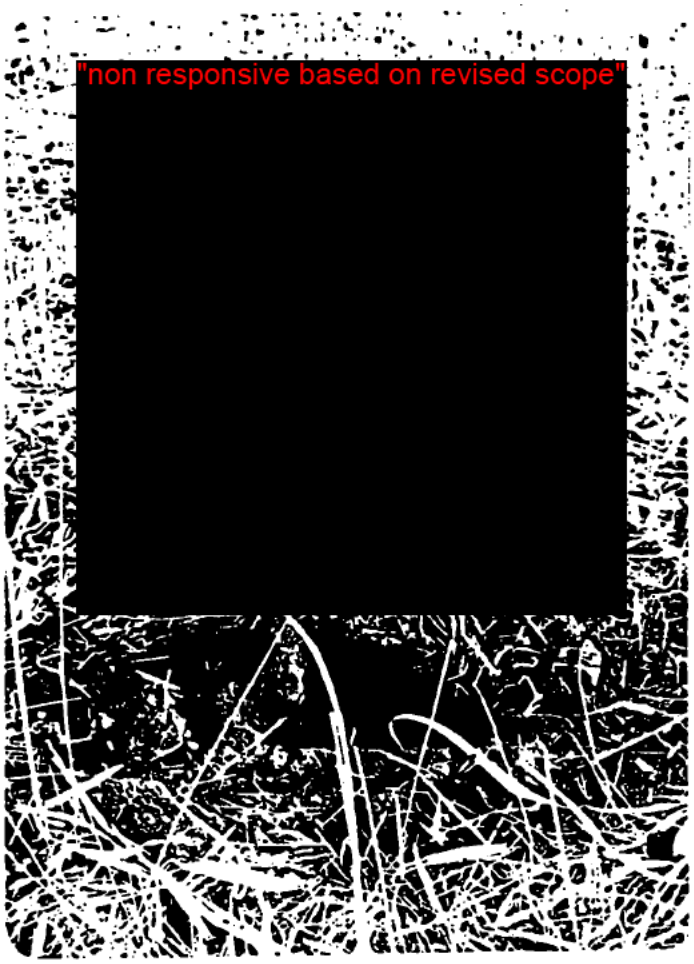
[redacted]

ORIGINAL (Red)

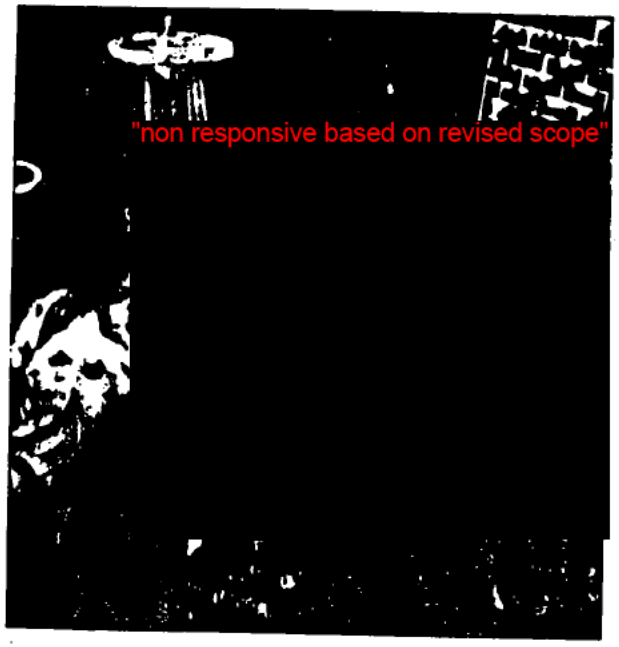
S-1

ORIGINAL (Red)

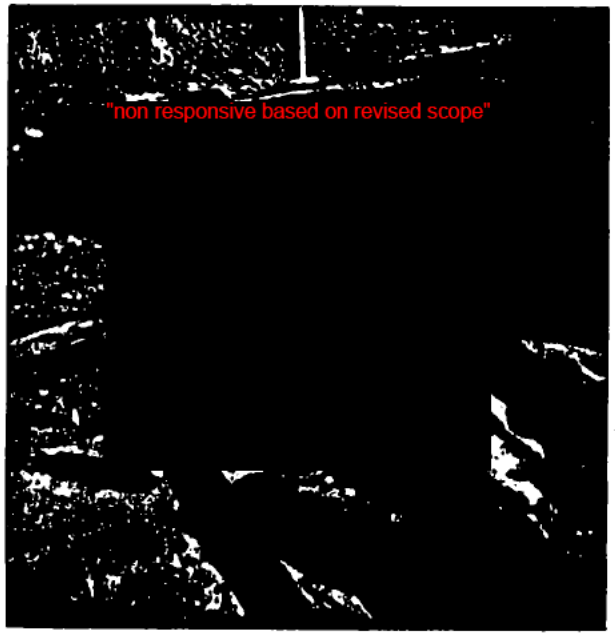
S-3



S-2



#1 1022 2/5/81 Pigeon Point Landfill
F3-8101-17
Artesian Water Co. SL#1
Castle Hills #3



#2 1120 2/5/81 Pigeon Point Lf.
F3-8101-17
Atlas Point Plant well # 9
ICI Americas SL#2

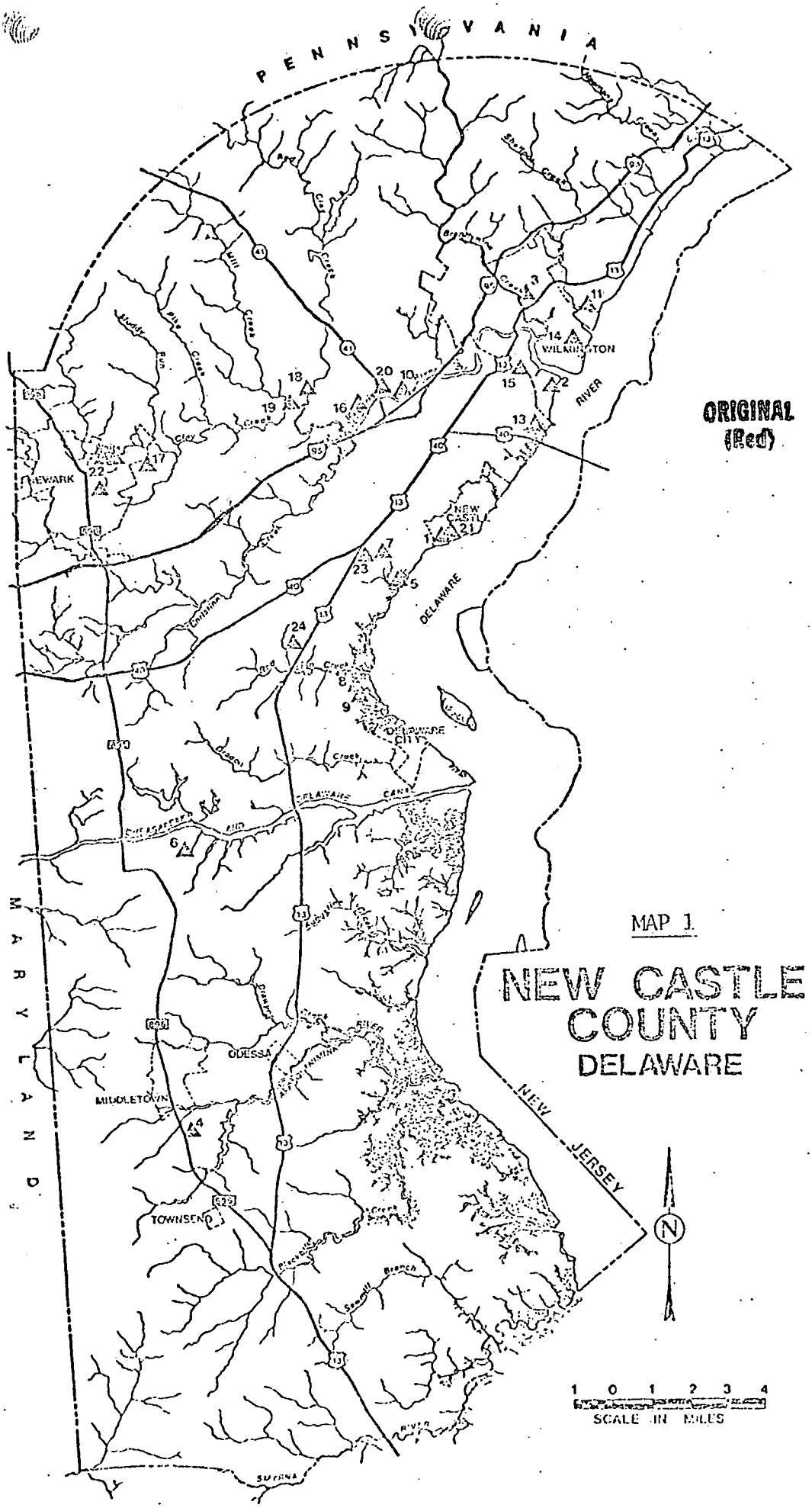
ORIGINAL (Red)

TABLE 1

ORIGINAL (Red)

KEY TO EXISTING LANDFILLS

Number	Designation
1	Abex Corporation
2	Marine Terminal
3	Container Corporation of America
4	Delaware State Highway Department
5	Weaver's Pole Line Construction
6	Carmen Miccucio
7	Delaware Sand and Gravel
8	Diamond Shamrock Chemical Company
9	Getty Oil Company
10	Harvey and Knotts
11	Delmarva Power & Light Co., Edgemoor
12	Delmarva Power & Light Co., Delaware City
13	Pigeon Point
14	DuPont, Edgemoor
15	Delaware Contracting Company (Pyrites Co.)
16	E.I. duPont de Nemours & Co., Newport
17	FMC Corporation
18	O. & T. Realty
19	Timko Brothers
20	City of Newport
21	Wilmington Fibre Specialty Company
22	City of Newark
23	Llangollen
24	Tybouts Corner


PENNSYLVANIA
MARYLAND
NEW JERSEY
DELAWARE
RIVER
WILMINGTON
NEWARK
NEW CASTLE
DELAWARE CITY
ODESSA
MIDDLETOWN
TOWNSEND
ORIGINAL
(Red)
MAP 1
NEW CASTLE
COUNTY
DELAWARE
N
1 0 1 2 3 4
SCALE IN MILES

ORIGINAL (Red)

A site inspection revealed poor coverage and compaction of the refuse, particularly around the perimeter of the larger fill area, and an absence of ground cover. These factors, combined with the relatively flat landfill surface, insure maximum infiltration into the fill. Once the fill has reached field capacity, downward percolation occurs with the addition of excess water. Leachate contamination has been observed (Roy F. Weston, Inc., September 1972) in the small, unnamed intermittent stream gulley which is adjacent to the eastern edge of the landfill. The high content of dissolved organics and iron staining of the banks and vegetation indicate leachate seepage from the landfill into the stream. It is probable that field capacity has already been reached, and any leachate produced would be percolating downward into the subsurface strata. It has been observed that municipal landfills in humid environments similar to New Castle County's will produce leachate which may percolate downward to the water table without sufficient renovation by the various soil mechanisms to prevent groundwater pollution (Apgar and Langmuir, 1971).

This landfill is in the same geologic environment as the Llangollen landfill. Since the sands and gravels of the overlying Columbia Formation were removed, the refuse directly overlies the Potomac aquifer. In this area, the upper confining clay layer of the Potomac is thought to be absent; hence, it is probable that direct contact exists between the sands of the Potomac Formation and the refuse. The nearby (less than 1,500 feet separation) wellfields of the Amoco Chemical Corporation and the Artesian Water Co. (about 4,000 feet separation) are located in the downdip section of the Potomac sands which subcrop or are exposed underneath both landfills. The hydraulic gradient is such that groundwater recharge in the landfill area would move toward these water wells. The Llangollen landfill has already proven to be a prolific source of groundwater pollution, with the well fields in question threatened by the migrating contaminated water. The Delaware Sand & Gravel landfill has similar potential. Its identification as a source of pollution, if any, is obscured by the effects of and concern over Llangollen, however. Detailed subsurface investigations will be required to determine the scope of the problem. Such studies probably will be carried out in accordance with the recently adopted state solid waste regulations.

PIGEON POINT LANDFILL, New Castle County

The Pigeon Point Landfill has been operated by the New Castle County Department of Public Works since about 1971. Prior to the County operation, the City of Wilmington utilized the site for waste disposal. The landfill is located on the west shore of the Delaware River and is bounded on the south by the westbound span of the Delaware Memorial Bridge (Figure 8). Approximately 120 acres of the 177-acre site have been used for the disposal of domestic, commercial, and industrial wastes. At present, daily waste loads average over 1,000 tons. The majority of the wastes received are landfilled conventionally on the southern portion of the site. The remainder are processed through shredding and iron recovery facilities. This milled refuse, which

ORIGINAL
(Red)

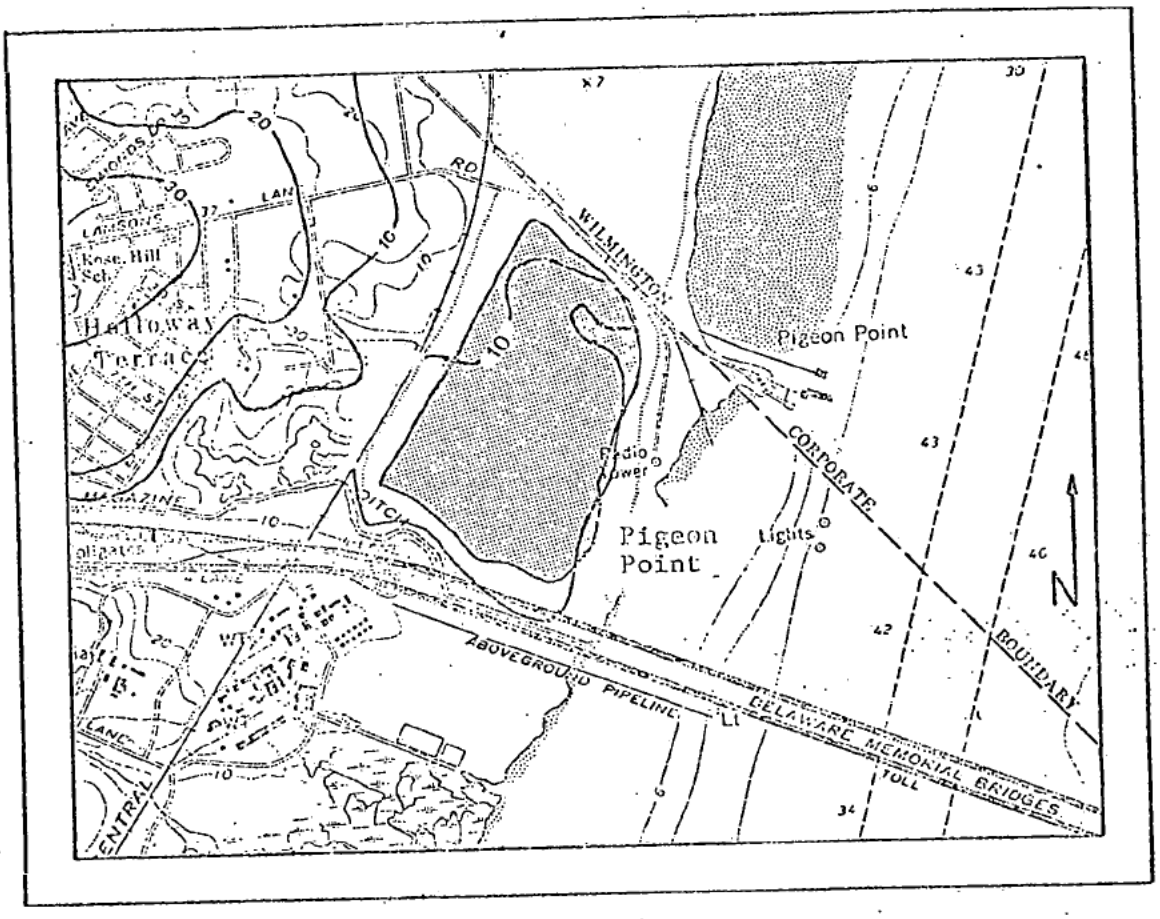


Figure 8 : Locational map for landfills.

LEGEND

Approximate extent of the landfill site

Water table elevation contour lines

Base map: U.S. Geological Survey quadrangles

SCALE

1:24,000

0 .5 1 MILE

ORIGINAL
(Red)

ideally reduces the refuse to particle sizes of two to six inches, is deposited in the central portion of the site separate from the unmilled refuse. For the past few years, this facility has been operated as a landfill with compaction and covering provided. The application of a soil cover on a regular basis is hindered, however, by the lack of suitable material on-site.

For approximately 40 to 50 years prior to landfilling, the site was used for the disposal of dredge spoils. The spoil material, which is generally a high plasticity, clayey silt containing some organic material, comprises the upper 8 to 12 feet of the site. A 20-foot high dike was constructed around the site to contain the hydraulically-placed material. The sediments upon which the spoil was placed are Recent organic marsh and estuarine sediments with similar textual characteristics. The combined thickness of these fine-grained deposits ranges from less than five feet at the western edge of the site to over fifty feet adjacent to the River.

The other geologic units encountered in the area are the Pleistocene Columbia Formation and the Potomac Formation. The Columbia, which is mostly medium to coarse sand, occurs primarily in the western and northern portion of the site, attaining a maximum thickness of fifteen feet along the northern boundary. The Potomac Formation is continuous throughout the site. The upper clayey zone of the Potomac separates the sandy zone of the Potomac from the overlying Recent and Pleistocene sediments. The clay zone is absent, however, near the center of the site, and the fine sands of the Potomac Formation are in direct contact with a sandy unit, which may be the Columbia Formation.

Leachate generation has been occurring at the Pigeon Point Landfill for several years. Leachate movement is greatly retarded, however, due to the low permeabilities of the underlying soils and the relatively level topography. These factors also contribute to a very high rate of evapotranspiration which reduces the amount of water available to the groundwater flow system. Hence, leachate quantities are relatively small. The movement of leachate has been generally away from the site in all directions due to the formation of a groundwater mound beneath the landfill.

The extent and degree of water quality degradation due to leachate migration has proven difficult to determine because of inadequate data for the surrounding area and the effects of pollutant contributions from the spoil deposits. E. H. Richardson Associates, Inc., stated in their December, 1973, report to the County that much of the water quality deterioration in the area may be due to leaching from the dredge spoils. Further, it is necessary to determine whether this is a major contributing factor. The improvement in water quality in the sediments underlying the spoil and marsh deposits may be due to previously mentioned renovation mechanisms.

Following monitoring and design studies, a leachate control program for the Pigeon Point facility was begun in 1974. The primary aim of this work is to inhibit leachate generation and collect (and possibly treat) the leachate that is produced. At the present time, a ditch and collector system is being contructed which will prevent leachate from leaving the site. In addition,

the application of impervious soils, the establishment of a good vegetative cover, and final grades of five to ten percent are planned to reduce leachate generation.

ORIGINAL
(Red)

APPENDIX A

ORIGINAL (Red)

Landfill Site	Contact Person
DuPont Co.	Mr. Phillip A. Palmer (Louviers, 366-3858)
Container Corporation of America	Mr. Al Gray (Plant Manager, 655-3364, 652-3601)
Pyrites Company	Mr. Gordon (655-6578)
Marine Terminal	Mr. Steinle (656-8566)
O. & T. Realty	Mr. Michael Timko (998-8901)
City of Newport	Mrs. Virginia Price (CLerk, City Hall, 994-6403)
Harvey & Knotts	Mr. Edgar Harvey (994-0991)
Delaware Contracting Co.	Mr. Jim Thomas (998-1148)
FMC Corporation	Mr. Bob Worty (Plant Engineer, 737-6160)
Wilmington Fibre Specialty	Mr. John W. Morris III (328-7525)
Abex Corporation	Mr. Ivery (Plant Engineer, 328-7513)
Delaware Sand & Gravel	Mr. Dell Aversano
Weaver's Pole Line Construction Co.	Mr. Weaver (328-6672, 322-1509)
Delmarva Power & Light	Mr. Hudson Hoen (429-3494)
Diamond Shamrock Chemical Co.	Mr. Jess Vargo (Plant Engineer, 834-4561)
Getty Oil Co.	Mr. Dick Ladd (Plant Environmental Engineer, 834-4581)
Carmen Miccucio	Mr. Miccucio (366-8426)
State Highway Dept. (Middletown)	Mr. Gary Homewood (678-4327)
Timko Bros.	Mr. Paul Timko (998-9813)

Pigeon Pt. Landfill Monitor Wells

PAGE 1

WELL NUMBER MP-14

	3-22-78	6-27-78	9-25-78	12-19-78	3-22-79	5-22-79	8-27-79	12-4-79				
pH	6.8	6.9	6.9	6.6	6.4	6.6	6.6	6.5				
Chloride, mg/l	443	445	416	442	455	478	439	499				
Alkalinity, mg/l	425	408	408	470	481	444	410	470				
NO_2/NO_3-N, mg/l	0.85	<0.5	0.73	1.30	0.27	0.28	0.27	0.25				
TKN, mg/l	17.9	20.8	28.8	21.1	18	25	30	25				
COD, mg/l	94	189	200	53	80	70	80	83				
BOD, mg/l	5	4	24	7	<5	<5	11	17				
Fe, mg/l	11	170	38.7	50.1	47	49.0	39.5	47.0				
Mn, mg/l								83				

Potomac ?47' deep by

ORIGINAL (Red)

Pigeon Pt. Landfill Monitor Wells

WELL NUMBER MP-24

PAGE 1

	12-29-79	3-23-78	6-27-78	9-26-78	12-19-78	3-22-79	8-28-79	11-5-79	2-26-80			
pH	7.1	7.2	7.1	6.7	6.8	6.7	6.9	6.7	6.8			
Chloride, mg/l	205	191	203	199	199	198	206	200	200			
Alkalinity, mg/l	780	817	752	852	805	846	789	804	779			
NO_2/NO_3-N, mg/l	0.33	0.50	<0.5	<0.52	<0.05	0.28	0.39	0.31				
TKN, mg/l	55	56	41.0	53.2	37.3	31	55	43	<0.05			
COD, mg/l	157	66	39	39	100	67	56	70	62			
BOD, mg/l	1	2	3	17	8	13	20	34	14			
Fe, mg/l	3.80	9.8	15.0	29.2	29.8	67	16.7	36.2	30.5			
Mn, mg/l								0.53	0.51			

Potomac 75' deep

ORIGINAL (Red)

Pigeon Pt. Landfill Monitor Wells

WELL NUMBER MP-26

PAGE 1

	12-29-77	3-23-78	6-26-78	9-25-78	12-18-78	3-21-79						
pH	6.8	6.7	6.7	6.2	6.2	6.3						
Chloride, mg/l	415	400	385	342	311	333						
Alkalinity, mg/l	300	261	298	303	314	293						
NO_2/NO_3-N, mg/l	0.70	0.37	0.35	<0.5	<0.05	0.47						
TKN, mg/l	12.3	14.3	13.7	16.8	11.1	7.6						
COD, mg/l	86	92	137	172	64	71						
BOD, mg/l	1	<1	6	<5	<5	<5						
Fe, mg/l	27.0	0.64	12.6	16.8	19.1	9.5						
Mn, mg/l												

Potomac, 63.5' deep

ORIGINAL (Red)

Pigeon Pt. Landfill Monitor Wells

WELL NUMBER MP-29

PAGE 1

	12-30-77	3-22-78	6-26-78	9-25-78	12-18-78	3-21-79	5-22-79	8-27-79	12-4-79	2-20-80		
pH	6.8	6.3	6.4	6.2	6.2	6.2	6.4	6.3	6.2	6.3		
Chloride, mg/l	315	305	311	306	298	311	311	299	314	313		
Alkalinity, mg/l	250	276	345	240	251	235	225	209	219	209		
NO_2/NO_3-N, mg/l	0.0	<0.1	<0.1	<0.5	<0.05	0.38	0.16	0.24	0.26			
TKN, mg/l	12.0	<0.2	15.5	17.3	8.5	6.5	18	19	16	15.9		
COD, mg/l	68	74	79	219	49	21	26	28	73	59		
BOD, mg/l	3	5	4	17	25	8	9	19	27	28		
Fe, mg/l	62.0	67	60.0	68.2	60.1	54	74.0	63.2	53.7	65.5		
Mn, mg/l									2.90	1.94		

Potomac 51' deep

* cannot read O#'s copy cut off numbers

ORIGINAL (Red)

Pigeon Pt. Landfill Monitor Wells

WELL NUMBER MP-31

PAGE 1

	12-30-77	3-23-78	6-28-78	9-26-78	12-19-78	3-22-79	5-22-79	8-28-79	11-5-79	2-26-80		
pH	6.8	6.7	6.7	6.4	6.4	6.2	6.5	6.6	6.7	6.4		
Chloride, mg/l	125	114	153	115	118	119	116	117	164	120		
Alkalinity, mg/l	105	78	157	105	84	157	125	99	78	188		
NO_2/NO_3-N, mg/l	0.31	0.69	0.63	<0.5	1.00	0.53	0.40	0.21	0.51			
TKN, mg/l	<0.1	3.6	2.5	2.0	1.29	<0.1	0.6	1	6	<0.05		
COD, mg/l	11	18	55	71	241	4	17	11	<10	40		
BOD, mg/l	<1	<1	3	2	<5	<5	<5	3	4	<10		
Fe, mg/l	24.0	19	20.5	18.3	6.9	23	17.9	24.6	6.41	17.4		
Mn, mg/l									0.41	0.65		

Potable, 64' deep

ORIGINAL (Red)

Pigeon Pt. Landfill Monitor Wells

WELL NUMBER MP-28

PAGE 1

	12-30-77	3-22-78	6-26-78	5-22-79	8-27-79	12-4-79	2-20-80					
pH	6.4	6.3	6.3	6.0	6.0	6.0	6.0					
Chloride, mg/l	305	291	289	289	297	310	317					
Alkalinity, mg/l	155	171	157	178	178	183	172					
NO_2/NO_3-N, mg/l	0.31	0.32	0.12	0.15	0.22	<0.2						
TKN, mg/l	12.0	13.9	9.31	14	14	8	12.0					
COD, mg/l	81	69	97	55	83	62	87					
BOD, mg/l	<1	1	1	<5	3	4	<10					
Fe, mg/l	9.50	5.8	10.8	15.1	12.9	27.1	15.2					
Mn, mg/l						28.0	22.4					

Potomac 53' deep

ORIGINAL (Red)

Pigeon Pt. Landfill Monitor Wells

WELL NUMBER MP-1

PAGE 1

	12-29-77	3-22-78	6-28-78	9-26-78	12-18-78	3-22-79	8-28-79	11-5-79	2-26-80			
pH	7.4	7.3	7.6	7.1	6.8	6.8	7.0	6.9	6.7			
Chloride, mg/l	637	636	527	613	527	561	482	496	453			
Alkalinity, mg/l	950	1000	891	1050	1024	935	1035	961	878			
NO_2/NO_3-N, mg/l	5.2	0.52	1.82	<0.5	0.65	0.97	0.32	0.39				
TKN, mg/l	129	72	104	126	110	86	164	118	0.41			
COD, mg/l	471	484	565	1540	550	741	596	683	657			
BOD, mg/l	4	7	7	41	23	14	21	87	14			
Fe, mg/l	1.34	19	1.55	448	71.0	73	84.6	96.3	121			
Mn, mg/l								1.85	1.64			

15' deep
[illegible] navy-columbia

ORIGINAL (Red)

WELL NUMBER MP-25

PAGE 1

	12-29-77	3-23-78	6-26-78	9-25-78	12-18-78	3-21-79	5-22-79	2-20-80				
pH	6.1	6.2	6.4	6.0	6.1	5.9	6.2	6.2				
Chloride, mg/l	398	439	458	367	354	392	502	407				
Alkalinity, mg/l	80	63	84	78	99	89	89	84				Q
NO_2/NO_3-N, mg/l	0.33	0.29	1.70	<0.5	1.02	1.44	0.24	—				
TKN, mg/l	3.7	11.0	7.4	5.7	2.7	1.2	6	4.7				
COD, mg/l	98	65	71	126	72	51	71	57				
BOD, mg/l	<1	<1	3	<5	<5	<5	<5.	<10				
Fe, mg/l	3.10	1.67	1.57	3.2	0.8	2.3	2.0	1.35				
Mn, mg/l								33.0				

Q: 27.5' deep

ORIGINAL (Red)

Pigeon Pt. Landfill Monitor Wells

WELL NUMBER MP-27

PAGE 1

	12-29-77	3-22-78	6-26-78	9-25-78	12-18-78	3-21-79	8-27-79	2-20-80				
pH	6.4	6.1	6.4	6.3	6.4	7.2	6.5	6.3				
Chloride, mg/l	234	370	253	326	330	167	278	407				
Alkalinity, mg/l	145	221	199	246	266	157	225	272				
NO_2/NO_3-N, mg/l	0.35	0.27	0.14	<0.05	<0.05	1.69	0.24					
TKN, mg/l	1.0	9.9	33.4	6.2	2.4	4.7	82	8.8				
COD, mg/l	87	102	128	182	80	58	93	93				
BOD, mg/l	1	1	1	<5	<5	<5	<5	<10				
Fe, mg/l	9.40	12	3.57	4.1	5.7	2.2	3.8	3.15				
Mn, mg/l								38.0				

@ 26.5' bgs

ORIGINAL PAGE

Pigeon Pt. Landfill Monitor Wells

WELL NUMBER MP-30

PAGE 1

	12-30-77	3-21-78	6-28-78	9-26-78	12-19-78	3-22-79						
pH	7.2	7.0	7.2	6.6	6.4	6.4						
Chloride, mg/l	712	437	872	434	891	706						
Alkalinity, mg/l	555	462	747	398	810	810						
NO_2/NO_3-N, mg/l	0.57	3.6	2.58	<0.5	<0.05	0.99						
TKN, mg/l	2.8	8.9	36.2	9.9	31.3	19						
COD, mg/l	237	90	294	215	74	226						
BOD, mg/l	2	7	3	9	25	14						
Fe, mg/l	13.8	43	112	134	31.3	226						
Mn, mg/l												

* this data may actually be for MP-32 at this date

○ 25' deep

ORIGINAL (Red)

WELL NUMBER MP-32

	12-30-77	3-21-78	6-27-78	9-26-78	12-19-78	3-22-79	5-22-79	8-28-79	12-4-79	2-26-80		
H	7.2	6.8	7.0	6.4	6.6	6.6	6.7	6.9	6.6	6.5		
hloride, mg/l	441	867	431	848	453	447	455	438	451	459		
lkalinity, mg/l	390	836	428	773	413	460	476	392	376	444		
O_2/NO_3-N, mg/l	0.33	0.94	1.83	<0.5	<0.05	0.91	0.24	0.14	0.21			
KN, mg/l	7.2	20.6	9.5	31.0	7.20	5.6	10	10	12	0.41		
OD, mg/l	52	276	163	243	35	49	74	86	76	80		
OD, mg/l	1	8	3	17	15	5	10	17	27	<10		
e, mg/l	7.0	17	30.5	173	7.2	45	72.7	63.2	10.2	71.5		
n, mg/l									8.00	5.14		

↑* based on previous data it appears this data may have been interchanged with that for MP-30 on this line

25' deep

ORIGINAL (Red)

Tidal Marsh

Tidal marsh (Tm) consists of areas that are regularly flooded by tidal waters. The soil material has not been examined in detail, but it ranges from sand to clay and in some places is mucky or peaty. Besides being more or less salty, some areas apparently contain a fairly large amount of sulfur compounds. If these areas were drained and reclaimed, the sulfur compounds would be oxidized to other compounds that normally are highly toxic to crops and most other plants. Areas of Tidal marsh that extend inland along some of the streams are less affected by salt than areas that are close to the Delaware River.

Tidal marsh is of little or no use for farming at the present time because it is not suitable for crops, pasture, or timber. About the only practical uses are for wildlife and recreation. Some areas have been hydraulically covered with fill material to form Made land, which is part of the land type, Made land and Urban land. (Capability unit VIIIw-1; woodland suitability group 24)

ORIGINAL (Red)

(b) (9)
(b) (9)

FIGURE 4. GEOLOGIC CROSS SECTION OF NEW CASTLE COUNTY.

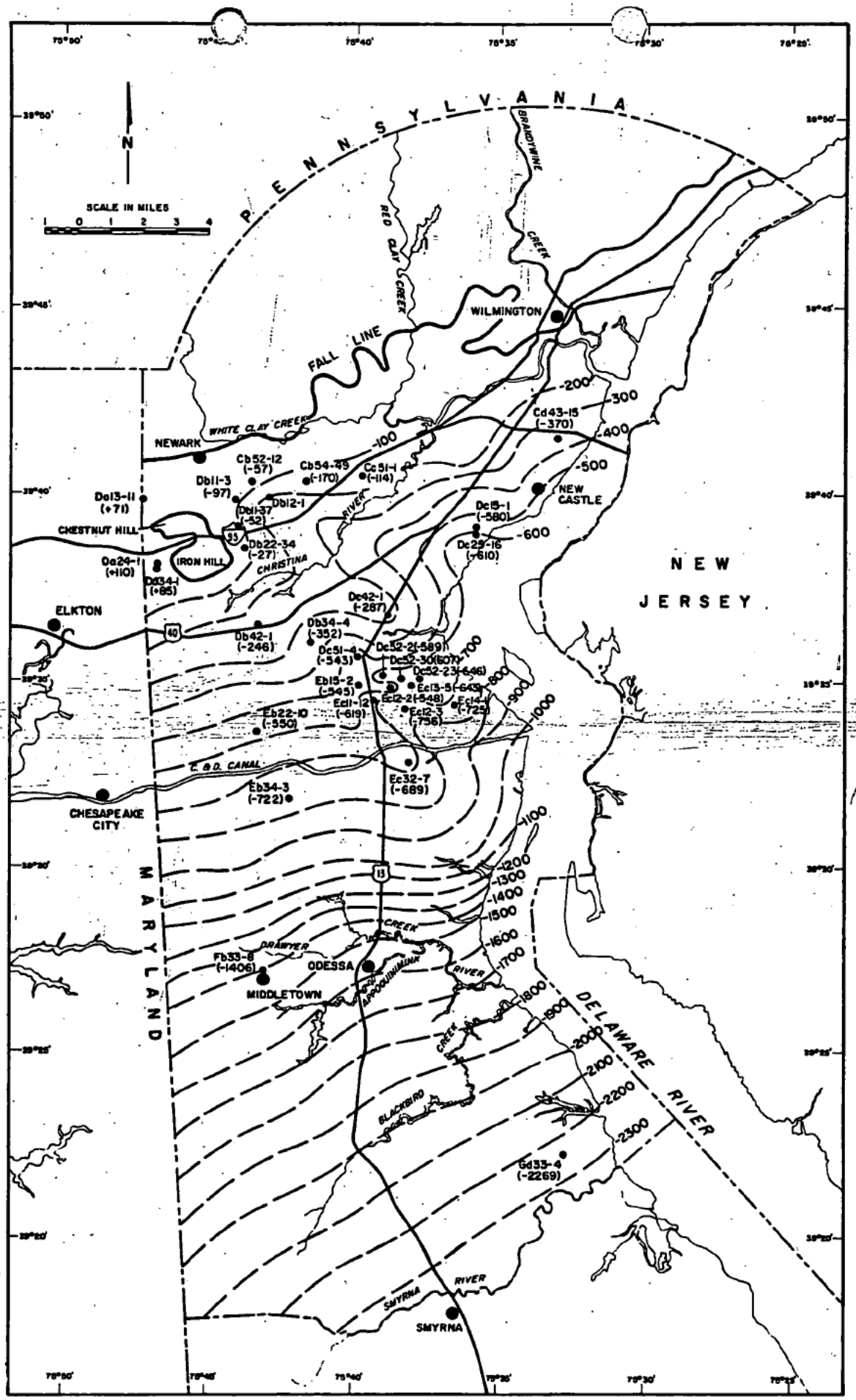
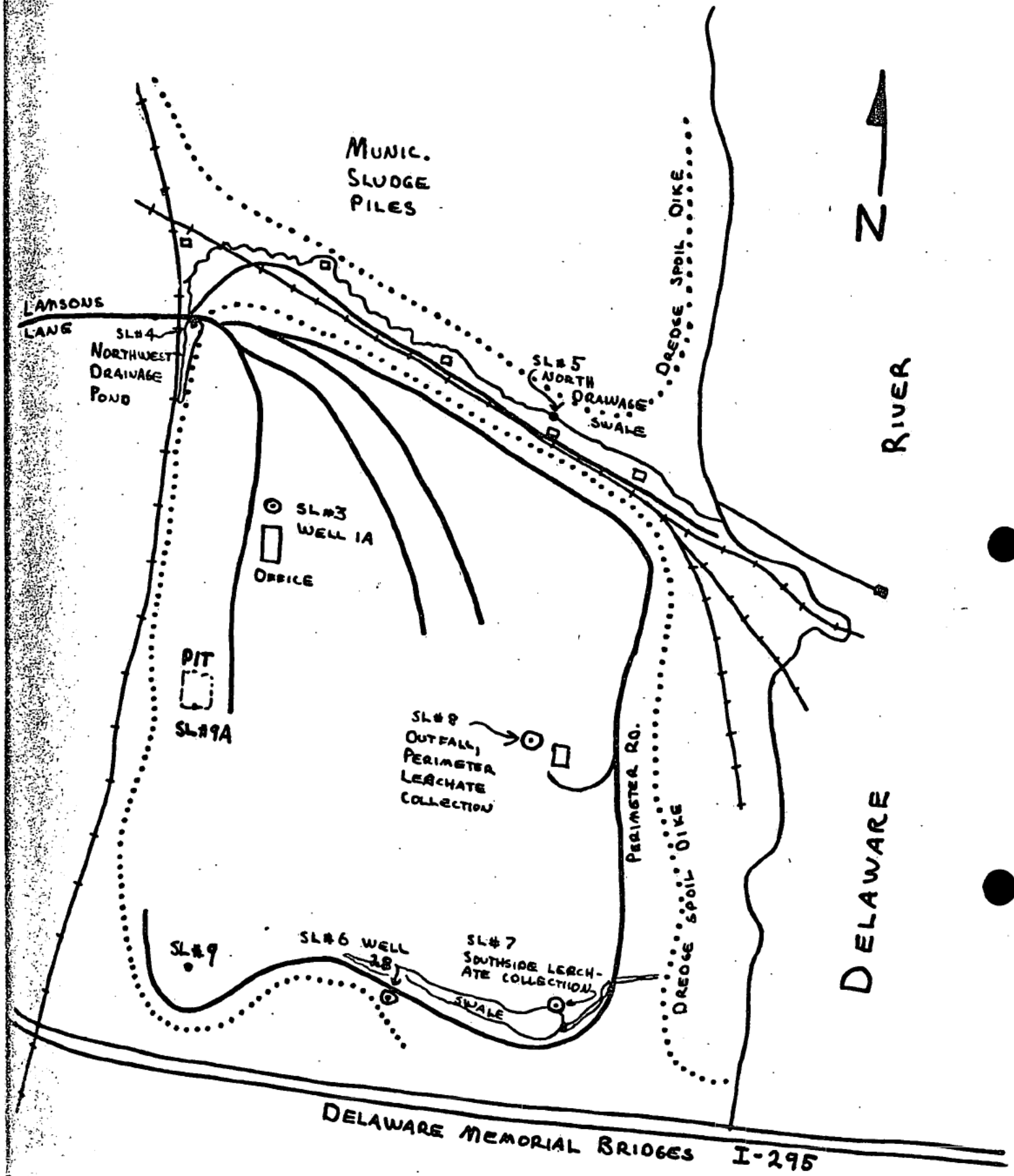
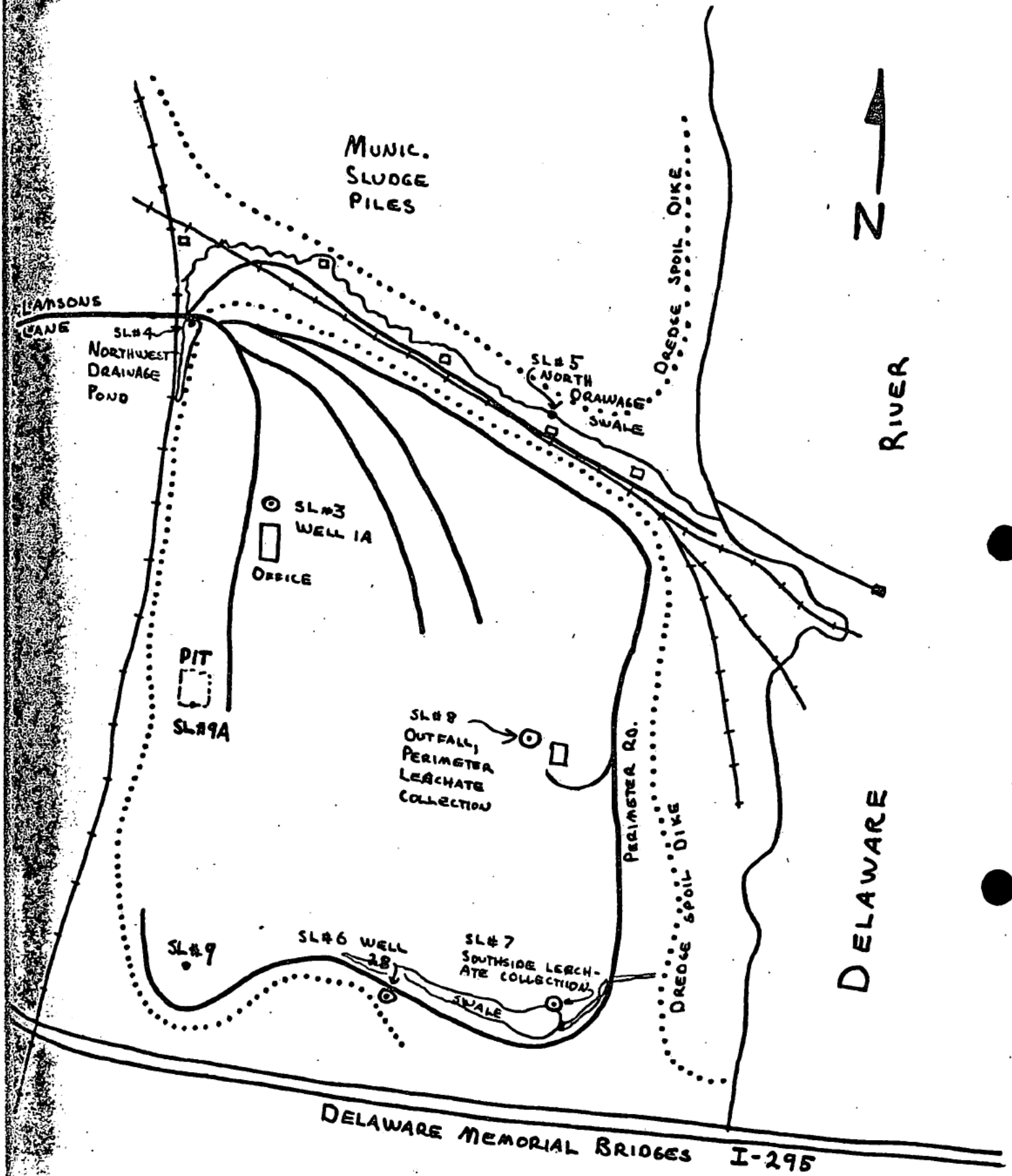


FIGURE 5. STRUCTURAL MAP OF THE TOP OF THE BASEMENT CRYSTALLINE ROCKS.



ORIGINAL (Red)

PIGEON POINT LANDFILL
TDD# F3-8101-17 DE.-27
SAMPLE LOCATIONS



ORIGINAL (Red)

PIGEON POINT LANDFILL
TDD # F3-8101-17 DE.-27
SAMPLE LOCATIONS

Construction Summary
OPERATIONAL MONITOR WELLS
Pigeon Point Landfill

ORIGINAL (Red)

Monitor Well Identification	Installation Date	Elevation (N.G.S. datum) Surface (Approx.)	Top of Casing	Screen Bottom	Probable Formation
1	Mar. 1976	21 ft.	23.4 ft.	6.0 ft.	Marsh/Hydraulic Fill
1A	May 1980	21 ft.	22.7 ft.	- 9.8 ft.	Columbia (Pleistocene)
24	May 1975	30 ft.	31.1 ft.	-68 ± ft.	Marsh & "Basal Gravel"
25	Apr. 1975	--- (Not Surveyed) ---			Columbia
26	May 1975	--- (Not Surveyed) ---			Potomac (Cretaceous)
27	May 1975	--- (Not Surveyed) ---			Columbia
28	Mar. 1976	16 ft.	17.8 ft.	-35.4 ft.	Potomac
28A	May 1980	16 ft.	17.8 ft.	1.2 ft.	Marsh/Hydraulic Fill
29	Mar. 1976	14 ft.	17.6 ft.	-35.8 ft.	Potomac
29A	May 1980	14 ft.	15.8 ft.	- 0.8 ft.	Marsh/Hydraulic Fill
31	Mar. 1976	23 ft.	26.6 ft.	-40.1 ft.	Potomac
31A	May 1980	22.5 ft.	24.6 ft.	7.5 ft.	Hydraulic Fill/Marsh
32	Mar. 1976	15 ft.	18.8 ft.	-11.5 ft.	Marsh
32A	May 1980	19.5 ft.	21.3 ft.	3.2 ft.	Hydraulic Fill/Marsh
37	May 1980	18.5 ft.	20.6 ft.	4.0 ft.	Hydraulic Fill/Marsh
37A	May 1980	19 ft.	20.6 ft.	-21.6 ft.	Potomac
39	May 1980	14 ft.	15.9 ft.	- 0.7 ft.	Marsh/Hydraulic Fill
41	May 1980	23 ft.	24.9 ft.	- 1.6 ft.	Marsh/Hydraulic Fill
41A	May 1980	23 ft.	25.0 ft.	-32.3 ft.	Potomac
42	May 1980	18 ft.	19.9 ft.	1.8 ft.	Marsh/Hydraulic Fill
42A	May 1980	18 ft.	19.8 ft.	-22.2 ft.	Marsh

SOURCE: DEL DNREC SOLID WASTE MANAGEMENT BRANCH

PLATE 6.

(b) (9)
(b) (9)
(b) (9)

TABLE 2.

(b) (9)(b) (9)

Well #	Date Drilled	Depth (feet)	Diameter (inch)	Screen Interval (feet)	Aquifer	Pumping Capacity (gpm)
35417	1976	(b) (9)			Potomac	250

(b) (9)(b) (9)

ORIGINAL (Red)

Well #	Date Drilled	Depth (feet)	Diameter (inch)	Screen Interval (feet)	Aquifer	Pumping Capacity (gpm)
1	1953 ~~1954~~ cd 52-15	(b) (9)			~~Upper~~ Mid Potomac	(b) (9)
2	1958				~~Upper~~ Mid Potomac	(b) (9)
3	1959				~~Upper~~ Mid Potomac	(b) (9)

(b) (9)(b) (9)

Well #	Date Drilled	Depth (feet)	Diameter (inch)	Screen Interval (feet)	Aquifer	Pumping Capacity (gpm)
1	Aug. 1960 cd 42-15	(b) (9)			Mid. Potomac	(b) (9)

SOURCE: WATER RESOURCES AGENCY FOR NEW CASTLE COUNTY
INVENTORY OF PUBLIC WATER SYSTEMS IN NEW CASTLE COUNTY

EXPLANATION

HOLOCENE

30

COLUMBIA FORMATION AND HOLOCENE SEDIMENTS

Thickness of these surficial deposits is indicated by contour lines (isopachs) that are dashed where uncertain. The Columbia Formation (Pleistocene age) includes gravelly coarse and medium sands with some interbedded silts. Columbia deposits are fluvial and derived from glaciated areas to the northeast and north. Sediments in present-day stream valleys and marshes are Holocene age fine sands, silts, and clay. Holocene deposits also include fresh, poorly sorted, micaceous sands and gravels in and near the Piedmont, derived mainly from underlying or nearby crystalline rocks.

PLEISTOCENE

UPPPER CRETACEOUS?

ORIGINAL (Red)

Kpt

POTOMAC FORMATION

Variegated red, gray, purple, yellow, and white, frequently lignitic silts and clays containing interbedded white, gray, and rust-brown quartz sands and some gravel. Individual beds usually restricted laterally in northern Delaware.

LOWER CRETACEOUS