FIELD MEMO

TO: Warren Gordon, P.E.
Resident Engineer, Pelham Bay Landfill

FROM: Daniel Creighton
Geomembrane Supervisor

DATE: March 19, 1996

SUBJECT: Addendum: Geomembrane Damage to the Top of Landfill (3/14/96)

Due to the thunderstorm and winds last night, much more geomembrane liner was blown away and damaged beyond repair. The following is a summary of the additional panels that were damaged and must be replaced.

Panels Totally Blown Away:

733, 734, 735, 736, 737, S-3, S-4, S-5, S-6, S-7, S-8,
S-9, S-11, S-12, S-13, S-14, S-15, S-16, S-17, S-39, S-40, S-41,
S-42, S-43, S-44, S-45, S-46, S-47, S-48, S-49, S-50, S-51, S-52,
S-53, S-54, S-55, S-92, S-93, S-93A, S-94, S-95, S-96, S-97, S-98,
S-99, S-100, S-112, S-113, and S-114.

Sub-Total SF = 122,657

New Total of Panels Blown Away = 324,563 SF
New Total of Panels Damaged Beyond Repair = 65,516 SF
New Approximate Total of Questionable Panels = 42,428 SF

Amended Grand Total of Damaged and Questionable Panels = 432,507 SF

A few other panels on top of landfill are now questionable and tests along the borders of damaged panels will have to be done more frequently to insure the integrity of the material. Again, tests should include all appropriate methods as per the Contract Documents to insure that the material still meets the specifications listed on page 02778-5, Part 2, Section 2.2.A.

xc: Ramaglia/Durig
Ciancia (WCCI)
NYS DEC
Rant (BRECO)

BRECO MECHANICAL GROUP, INC.
201 SAW MILL RIVER ROAD
YONKERS, NEW YORK 10701

*TEL. (914) 963-3600 * FAX (914) 963-3989*

June 17, 1996

Mr. Roy Durig, P.E.
Chief - Landfill Remediation
New York City Department of
Environmental Protection
96-05 Horace Harding Expressway
5th Floor - Lefrak Plaza
Corona, New York 11368

Re: Pelham Bay Landfill Closure
Contract No. 876-HP
Letter No. 78

Dear Mr. Durig,

The attached letter from GSE Lining Technology Inc. dated June 14, 1996 was forwarded directly to you by GSE. GSE's letter essentially states that GSE has again completed the installation of the geomembrane liner. Per the provisions of Paragraph 3.3K of Specification 02778, GEOMEMBRANE ACCEPTANCE, the geomembrane installation has been accepted by the DEP. Per paragraph 3.3K, ownership and responsibility for the geomembrane now belongs to NYCDEP, (and not to Breco, as erroneously stated in GSE's 6/14/96 letter).

Consistent with this, GSE states that any damage that occurs to the geomembrane from and after June 14, 1996 will be repaired by GSE at and for the account of the NYCDEP.

We will be completing the final tabulation of costs for the repair and will submit them to you shortly.

Very Truly Yours,
BRECO MECHANICAL GROUP, INC.

Mark SanAngelo
Project Manager

Enc.

cc: P. Zoltanesky, Jr
P. Smith/ J. Jarahari
W. Gordon
A. Ciancia
S. Mokbel
Durig.617

GSE™
GSE Lining Technology, Inc.

19103 Gundle Road
Houston, Texas 77073
800-435-2008
713-443-8564
Fax: 713-875-6010

June 14, 1996

Mark San Angelo
Breco Mechanical Group, Inc.
201 Saw Mill River Road
Yonkers, New York 10701

RE: Pelham Bay Landfill, Cover and Protection of Work
GSE Lining Technology, Inc. Project Number XA4790

Dear Mr. San Angelo:

On June 14, 1996, GSE Lining Technology, Inc. completed its installation subcontract requirements on the above referenced project, including the repairs to the damaged liner. As of this date, the Scope of Work required of GSE has final acceptance by DEP's third party inspector (four (4) final acceptance sheets attached) and you as the onsite representative of Breco Mechanical Group, Inc. With these acceptances, except for the submittal of as-built panel drawings; final submittals of conformance testing; and final billing, GSE has completed the installation of the geomembrane and the responsibility for protection of the geomembrane now belongs to Breco.

Please be advised that the exposed liner is now at risk to the elements, Acts of God and the onsite construction activities of Breco Mechanical Group, Inc. and its other subcontractors, invitees, and other third parties. Any damage that occurs to the geomembrane from and after June 14, 1996 will be repaired by GSE at and for the account of Breco Mechanical Group, Inc. GSE, in the very near future, will be submitting the remaining contract items for approval by the onsite Resident Engineer and the onsite representative of Breco Mechanical Group, Inc.

Sincerely,

Ronald Zunker, Jr.
Project Manager -
Installation Services

RZ/cr

cc: Warren Gordon, NYCDEP
Master File

Gundle

PROJECT: Pelham Bay Landfill
LOCATION: Bronx New York
DATE 5-24-96 P.F.# XA4790

Final
~~PRE-START~~ SITE INSPECTION

1. INSPECTED BY:

NAME	REPRESENTING	POSITION
Vic Siracusa	GSE Liner Technology	Field Supvr.
Paul Doscher	Breco Mechanical Group, Inc.	
Daniel Crotanon	NYC DEP	Geo Supvr.

2. DESCRIPTION OF INSPECTED AREA Area Wall Final Inspection.
60mil HDPE Smooth Liner From Panel PR.1 PR.2 PR.3 PR.4 PR.5 PR.6 PR.7 PR.8 PR.9 PR.10 PR.11 PR.12 PR.13 PR14 PR.15 PR.16 PR.17 PR.18

PHOTOS ENCLOSED ☐ TO FOLLOW ☐

3. REMEDIAL WORK REQUIRED:

4. DATE & CONDITIONS OF GUNDLE START-UP:

5. FURTHER INSPECTION REQUIRED: YES ☐ NO ☐ DATE: _____

6. BILLING FOR ADDITIONAL INSPECTION/WORK (Must be accompanied by Change Order)

GUNDLE REPRESENTATIVE (WHITE)	OWNER/CONTRACTOR (YELLOW)	INSPECTOR (PINK)

Gundle

PROJECT: Pelham Bay L.F
LOCATION: Bronx New York
DATE 5/28/96 P.F.# XA4790

Final ~~PRE-START SITE~~ INSPECTION

1. INSPECTED BY:

NAME	REPRESENTING	POSITION
Vik Sivakasame	G.S.E Lining Technology	Field Sup
Paul Dooley	Bosco Mechanical Group Inc	
Daniel	NYCDEP	

2. DESCRIPTION OF INSPECTED AREA
Final Inspection Panel Pr.19 TO Pr.31

PHOTOS ENCLOSED ☐ TO FOLLOW ☐

3. REMEDIAL WORK REQUIRED:

4. DATE & CONDITIONS OF GUNDLE START-UP:

5. FURTHER INSPECTION REQUIRED: YES ☐ NO ☐ DATE:

6. BILLING FOR ADDITIONAL INSPECTION/WORK (Must be accompanied by Change Order)

V. K. Sivakasame — GUNDLE REPRESENTATIVE (WHITE)
Paul Dooley — OWNER/CONTRACTOR (YELLOW)
INSPECTOR (PINK)

Form No. GS126

printed on recycled paper

Gundle

PROJECT: Pelham Pkwy LIE
LOCATION: BRONX NEW YORK
DATE 5.31 P.F.# KA4780

~~PRE-START-SITE INSPECTION~~ Final

1. INSPECTED BY:

NAME	REPRESENTING	POSITION
VIC SIACCASONE	G.S.E	SUP
PAUL DOSCHER	BRECO	SUP
DANIEL	DEP	SUP

2. DESCRIPTION OF INSPECTED AREA

Final INSPECTION PANELS Room PR.51 TO PR-66 PR-67 TO PR80

PHOTOS ENCLOSED ☐ TO FOLLOW ☐

3. REMEDIAL WORK REQUIRED:

4. DATE & CONDITIONS OF GUNDLE START-UP:

5. FURTHER INSPECTION REQUIRED: YES ☐ NO ☐ DATE:

6. BILLING FOR ADDITIONAL INSPECTION/WORK (Must be accompanied by Change Order)

6-2-96

GUNDLE REPRESENTATIVE (WHITE) | OWNER/CONTRACTOR (YELLOW) | INSPECTOR (PINK)

Gundle

PROJECT: Pelham Bay
LOCATION: Bronx NY
DATE 6/11/96 P.F.# XA4790

Final
~~PRE-START SITE INSPECTION~~

1. INSPECTED BY:

NAME	REPRESENTING	POSITION
Vik Siackasone	G.S.E.	Sup
Paul Dascher	Breco	Sup
Daniel -	Dep	Sup

2. DESCRIPTION OF INSPECTED AREA
Final inspection panels From TR1 thru TR11 and PR81 thru PR124

PHOTOS ENCLOSED ☐ TO FOLLOW ☐

3. REMEDIAL WORK REQUIRED:
Supply GSE TEE Shots (H)

4. DATE & CONDITIONS OF GUNDLE START-UP:

5. FURTHER INSPECTION REQUIRED: YES ☐ NO ☐ DATE: _____

6. BILLING FOR ADDITIONAL INSPECTION/WORK (Must be accompanied by Change Order)

GUNDLE REPRESENTATIVE (WHITE) | OWNER/CONTRACTOR (YELLOW) | INSPECTOR (PINK)

Gundle Lining Construction Corp
Gundle
19103 Gundle Road
Houston, Texas 77073-3598
U.S.A.
Phone: (713) 443-8564
Toll Free: (800) 435-2008
Telex: 764057 GUNDLE HOU
FAX: (713) 875-6010

CERTIFICATE OF ACCEPTANCE

JOB NO: XA 4790
JOB NAME: Pelham Bay Landfill
CLIENT: BEECO MECHANICAL CRP
BILL TO: SAME

JOB DESCR:
% COMPLETE OF TOTAL JOB: 100%

MATERIAL	ESTIMATED SQ. FEET	FINAL QUANTITY / DESCRIPTION
60mil HDPE	315524	DEPLOYED WELD + QC.
60mil HDT	23.078	DEPLOYED WELD AND QC.

I, the undersigned, duly authorized representative of _____ do hereby take over and accept the work described above from the date hereof and confirm that to the best of my knowledge the work has been completed in accordance with specifications and the terms and conditions of the contract.

Name	Signature	Title	Date
V.K. Blackmore	V.K. Blackmore	Field supervisor	6-13-96

Certificate accepted by Gundle Lining Representative

Name	Signature	Title	Date
PAUL F. DOSCHER	Paul F. Doscher	SUPER.	6-13-96

New York City Department of Environmental Protection

Division of Landfill Remediation

Pelham Bay Landfill

Contract 876-HP

Geomembrane Capping and Gas Collection System

SAMPLES ALONG PERIMETER OF DAMAGED LINER

DATE	SAMPLE #	PANEL #	SHEAR (PPI) SAME DIRECTION AS WELD	SHEAR (PPI) PERPENDICULAR TO WELD	COMMENTS
5/1/96	1	S-211	178	153	
			176	160	
	2	S-210	169	170	
			170	173	
	3	S-208	169	164	LINER HAS SLIGHT MELT MARKS ON UNDERSIDE
			166	163	
	4	S-204	172	185	
			166	189	
	5	S-198	160	174	
			165	171	
	6	S-194	172	169	
			172	162	
	7	S-190	169	175	
			163	182	
	8	S-187	178	177	MISSING COMPOSITE FOR ½ OF AREA.
			172	175	
	9	S-160	172	170	
			174	162	
	10	S-159	163	170	
			162	170	
	11	S-185	159	169	
			160	166	
	12	S-189	166	182	NO COMPOSITE
			160	176	
	13	S-193	172	185	NO COMPOSITE
			173	175	

Inspector's Name

New York City Department of Environmental Protection
Division of Landfill Remediation
Pelham Bay Landfill
Contract 876-HP
Geomembrane Capping and Gas Collection System

SAMPLES ALONG PERIMETER OF DAMAGED LINER

DATE	SAMPLE #	PANEL #	SHEAR (PPI) SAME DIRECTION AS WELD	SHEAR (PPI) PERPENDICULAR TO WELD	COMMENTS
5/1/96	14	S-195	171	168	No Composite
			177	164	
5/2/96	15	S-152 EAST	156	161	½ No Composite. Slight evidence of melting on Southern edge
			162	161	
	16	S-152 CENTER	164	174	
			171	169	
	17	S-129 EAST	170	175	
			168	178	
	18	S-129 CENTER	159	167	
			165	170	
	19	S-129 WEST	167	174	No Composite
			168	173	
	20	S-131	171	163	
			173	168	
	21	S-72	166	168	
			167	175	
	22	S-71	158	171	
			158	168	
	23	S-71	160	172	~~No Composite~~
			176	160	
	24	S-71	160	167	No Composite
			160	172	
	25	S-32	163	177	No Composite
			162	175	
	26	S-33	158	174	
			158	171	

Inspector's Name Daniel O'Connor

New York City Department of Environmental Protection
Division of Landfill Remediation
Pelham Bay Landfill
Contract 876-HP
Geomembrane Capping and Gas Collection System

SAMPLES ALONG PERIMETER OF DAMAGED LINER

DATE	SAMPLE #	PANEL #	SHEAR (PPI) SAME DIRECTION AS WELD	SHEAR (PPI) PERPENDICULAR TO WELD	COMMENTS
5/2/96	27	S-35	178	183	
			179	182	
	28	S-37	167	174	
			168	178	
	29	S-78	158	179	
			161	177	
	30	S-84	149	164	
			153	170	
	31	S-82	158	167	FOLDED OVER COMPOSITE NE CORNER
			164	167	
	32	S-87	155	164	
			157	166	
	33 T	779	179	192	
			178	190	
	34 T	777	172	171	½ COMPOSITE SUBMITTED W. SLIGHT MELT MARKS ON UNDERSIDE
			173	170	
	35 T	686	168	171	
			165	169	
	36 T	688	161	170	
			162	167	
	37 T	691	169	174	
			167	168	
	38 T	683	167	175	
			169	173	
	39 T	695	172	169	
			171	169	

T = TEXTURED

Inspector's Name Daniel O'Connor

C:\123R4W\SAMPLE\DAM_SAMP

New York City Department of Environmental Protection
Division of Landfill Remediation
Pelham Bay Landfill
Contract 876-HP
Geomembrane Capping and Gas Collection System

SAMPLES ALONG PERIMETER OF DAMAGED LINER

DATE	SAMPLE #	PANEL #	SHEAR (PPI) SAME DIRECTION AS WELD	SHEAR (PPI) PERPENDICULAR TO WELD	COMMENTS
5/2/96	40 T	P-699 TOP	206	200	
			200	197	
	41 T	P-699 BOTTOM	198	199	
			199	204	
	42 T	P-702	197	197	
			190	186	
	43 T	P-733 BOTTOM	209	209	
			203	201	
	44 T	P-733 TOP	200	200	
			199	195	
	45 T	P-735	193 D.C	199	BUNDLED COMPOSITE - GAS WELL
			~~193~~ 194 D.C	198	
	46 T	P-737	195	203	
			190	205	
	47 S	S-11 BOTTOM	186	193	
			187	177	
	48 S	S-11 MIDDLE	181	171	
			183	175	
	49 S	S-11 TOP	188	201	
			191	204	
	50 S	S-2	199	212	
			200	210	
	51 S	S-4	183	200	
			192	194	
	52 S	S-6	194	204	
			191	193	
	53 S	S-9	175	196	
			175	191	

Inspector's Name: Daniel O'Connor

T = Textured
S = smooth

FIELD REPORT – WELD TESTS

DATE FAXED OR CALLED IN:	DATE WELDED:	PAGE OF
JOB# XA4790 JOB NAME: Pelham Bay L-F		
SUPERVISOR NAME: Bill Shaughnessy	S.S.#	AMBIENT TEMP.

JOB SPECIFICATION REQUIREMENTS: MATERIAL	MIL	PEEL IN:	PEEL OUT:	SHEAR:
MATERIAL	MIL Same direction	PEEL IN: Against	PEEL OUT:	SHEAR:

FUS/ EXT	MAT/MIL	SEAM #	SAMPLE # OR SEAM TEST	TECH I.D. #	MACHINE #	PEEL IN PPI	PEEL OUT PPI	SHEAR PPI	PASS/ FAIL	MACHINE SETTINGS TEMP.	SPEED	PRESSURE	VOLTS
	60# HDPE	S-11	SAM-47			186	P	183	P				
						187	P	177	P				
		S-11	SAM-48			181	P	171	P				
						183	P	175	P				
		S-11	SAM-49			188	P	201	P				
						191	P	204	P				
		S-02	SAM-50			199	P	212	P				
						200	P	210	P				
		S-4	SAM-51			183	P	200	P				
						182	P	193	P				
		S-6	SAM-52			194	P	191	P				
						204	P	193	P				
		S-9	SAM-53			175	P	196	P				
						175	P	191	P				

All weld test field reports must be phoned in or faxed in daily to the attention of Patti Spencer. Phone 1 (800) 435–2008 Fax (713) 875–6010

CALL YOUR PROJECT MANAGER IMMEDIATELY UPON NOTIFICATION OF A FAILURE

ATTN: Nan ep, x747

FIELD REPORT – WELD TESTS

DATE FAXED OR CALLED IN:		DATE WELDED:		PAGE OF
JOB#	JOB NAME:			
SUPERVISOR NAME:		S.S.#		AMBIENT TEMP.
JOB SPEC. REQUIREMENTS:	MATERIAL	MIL	PEEL SPEC:	SHEAR SPEC:
	MATERIAL	MIL S.	PEEL SPEC: A.	SHEAR SPEC:

FUS/ EXT	MAT./MIL	PANEL ~~SEAM~~ #	SAMPLE # OR SEAM TEST	TECH I.D. #	MACHINE #	PEEL IN PPI	PEEL OUT PPI	SHEAR PPI	PASS/ FAIL	MACHINE SETTINGS TEMP.	SPEED	PRESSURE	VOLTS
		S-152	SAMPLE #15			156.	P.	161	P.				
						162.	P	161	P				
		S-152	SAMPLE #16			164	P	174	P				
						171	P	169	P				
		S-129	SAMPLE-17			170	P	175	P				
						168	P	178	P.				
		S-129	SAMPLE-18			159	P	167	P				
						164	P	170	P				
		S-129	SAMPLE-19			167	P	174	P				
						168.	P	175	P				
		S-131	SAMPLE-20			171	P	163	P				
						173	P	168	P				
		S-72	SAMPLE-21			166	P	168	P				
						167	P	175	P				

All weld test field reports must be faxed in or phoned in daily. PHONE (800) 435-2008; FAX (713) 875-6010

CALL ED ZIMMEL (x821) OR YOUR PROJECT MANAGER UPON NOTIFICATION OF A FAILURE!!!

Rev. 11-2-94

FIELD REPORT – WELD TESTS

DATE FAXED OR CALLED IN:	DATE WELDED:	PAGE OF
JOB# XA4790 JOB NAME: Pelham Bay Bronx NY		
SUPERVISOR NAME: Erik Stackesone	S.S.# 464 49 6623	AMBIENT TEMP:

JOB SPECIFICATION REQUIREMENTS: MATERIAL	MIL	PEEL IN:	PEEL OUT:	SHEAR:
MATERIAL	MIL	PEEL IN:	PEEL OUT:	SHEAR:

FUS/ EXT	MAT./MIL	SEAM #	SAMPLE # OR SEAM TEST	TECH I.D. #	MACHINE #	PEEL IN PPI	PEEL OUT PPI	SHEAR PPI	PASS/ FAIL	MACHINE SETTINGS TEMP.	SPEED	PRESSURE	VOLTS
			8			178	–	177	P				
						172	–	175	P				
			9			172	–	170	P		1		
						174	–	162	P				
			10			163	–	170	P				
						162	–	170	P				
			11			159	–	169	P				
						166	–	166	P				
			12			166	–	182	P				
						160	–	176	P				
			13			172	–	185	P				
						173	–	175	P				
			14			171	–	168	P				
						177	–	164	P				

All weld test field reports must be phoned in or faxed in daily to the attention of Patti Spencer. Phone 1 (800) 435–2008 Fax (713) 875–6010

CALL YOUR PROJECT MANAGER IMMEDIATELY UPON NOTIFICATION OF A FAILURE!!

REV.3/24/93

FIELD REPORT – WELD TESTS

DATE FAXED OR CALLED IN:	DATE WELDED: 5-1-96	PAGE OF
JOB# 19479 JOB NAME: Pelham Bay Bronx NY		
SUPERVISOR NAME: F.K. Stackasone	S.S.# 464-49-6673	AMBIENT TEMP:
JOB SPECIFICATION REQUIREMENTS: MATERIAL	MIL Same direction	PEEL IN: opcite PEEL OUT: SHEAR:
MATERIAL	MIL Yield	PEEL IN: Break PEEL OUT: SHEAR:

FUS/ EXT	MAT./MIL	SEAM #	SAMPLE # OR SEAM TEST	TECH I.D. #	MACHINE #	~~PEEL IN~~ ~~PPI~~	~~PEEL OUT~~ ~~PPI~~	SHEAR PPI	PASS/ FAIL	MACHINE SETTINGS TEMP.	SPEED	PRESSURE	VOLTS
			1			178	–	153	P				
						176	–	160	P				
			2			169	–	170	P		1		
						170	–	173	P				
			3			169	–	164	P				
						168	–	163	P				
			4			172	–	185	P				
						166	–	189	P				
			5			160	–	174	P				
						165	–	171	P				
			6			172	–	169	P				
						172	–	162	P				
			7			169	–	175	P				
						163	–	182	P				

All weld test field reports must be phoned in or faxed in daily to the attention of Patti Spencer. Phone 1 (800) 435–2008 Fax (713) 875–6010

CALL YOUR PROJECT MANAGER IMMEDIATELY UPON NOTIFICATION OF A FAILURE!!

REV. 3/24/93

BRECO MECHANICAL GROUP, INC.
201 Saw Mill River Road
YONKERS, NEW YORK 10701

(914) 963-3850
(914) 963-3600

LETTER OF TRANSMITTAL

DATE	JOB NO.
5/20/96	876HP
ATTENTION	
RE:	

TO WARREN GORDON, P.E.
NYC-DEP

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☑ QC TEST RESULTS

COPIES	DATE	NO.	DESCRIPTION
1		6	RESULTS OF TESTS PERFORMED ON SAMPLES TAKEN ON TOP DUE TO DAMAGE.

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☑ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO FILE

SIGNED: Michael Rand

If enclosures are not as noted, kindly notify us at once.

GSE Lining Technology, Inc.

Report Date: 5/17/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi CD [ppi]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % CD [%]	Tensile Strength @ Break ASTM D 638, Type IV, 2 ipm Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	Tensile Strength @ Break ASTM D 638, Type IV, 2 ipm Smooth Spec = 243 ppi Textured Spec = 243 ppi CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. CD [lb.]
1	Pass	5/8/96	S	143	165	19	19	256	295	729	809	54	52
2	Pass	5/8/96	S	168	166	18	15	305	287	777	793		
3	Pass	5/8/96	S	153	148	20	16	277	255	794	793	49	54
4	Pass	5/8/96	S	171	164	17	16	291	280	743	769		
5	Pass	5/8/96	S	146	160	18	17	249	303	704	853		
6	Pass	5/8/96	S	168	166	21	18	258	262	675	759	52	61
7	Pass	5/8/96	S	163	160	19	17	264	244	685	720	49	55
8	Pass	5/8/96	S	162	161	21	16	314	309	806	853		
9	Pass	5/8/96	S	153	148	18	16	317	287	835	816		
10	Pass	5/8/96	T	155	169	20	16	276	300	772	830		
11	Pass	5/8/96	S	151	151	18	17	311	284	837	828		
12	Pass	5/8/96	S	157	168	18	18	298	298	791	817		
13	Pass	5/8/96	S	169	162	20	16	289	264	756	760		
14	Pass	5/8/96	S	166	166	18	18	298	254	764	709		
15	Pass	5/8/96	S	162	163	19	15	294	270	782	792	52	58
16	Pass	5/8/96	S	154	176	18	18	270	302	738	804		
17	Pass	5/8/96	S	160	171	20	16	315	282	887	812		
18	Pass	5/8/96	S	155	171	17	18	285	314	798	863		
19	Pass	5/8/96	S	158	178	18	17	303	324	827	897	52	56

Report By:
Melody Adams
Nathan Ivy

GSE I ing Technology, Inc.

Report Date: 5/17/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	Tensile Strength @ Yield Smooth Spec = 130 ppi Textured Spec = 130 ppi CD [ppi]	Tensile Elongation @ Yield ASTM D 638, Type IV, 2 ipm 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	Tensile Elongation @ Yield ASTM D 638, Type IV, 2 ipm 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % CD [%]	Tensile Strength @ Break Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	Tensile Strength @ Break Smooth Spec = 243 ppi Textured Spec = 243 ppi CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. CD [lb.]
20	Pass	5/8/96	S	152	157	19	16	276	293	768	857		
21	Pass	5/8/96	S	149	178	20	17	278	288	809	794		
22	Pass	5/8/96	S	158	176	17	17	304	337	821	903		
23	Pass	5/8/96	S	175	169	19	17	312	289	767	809	53	56
24	Pass	5/8/96	S	155	168	17	17	255	320	689	856		
25	Pass	5/8/96	S	156	158	20	16	275	284	728	804		
26	Pass	5/8/96	S	155	165	20	17	285	342	766	914	53	58
27	Pass	5/8/96	S	169	178	17	17	255	296	744	818		
28	Pass	5/8/96	S	163	177	17	17	253	268	705	760		
29	Pass	5/8/96	S	195	172	15	16	293	313	753	824		
30	Pass	5/8/96	S	178	155	16	17	290	292	794	798	53	53
31	Pass	5/8/96	S	181	161	17	17	267	271	746	765		
32	Pass	5/8/96	S	180	167	14	16	281	310	768	805		
33	Pass	5/8/96	T	180	182	16	17	193	209	541	604	49	50
34	Pass	5/8/96	T	178	182	17	16	155	154	416	461	55	52
35	Pass	5/8/96	T	168	172	16	16	180	181	504	519		
36	Pass	5/8/96	T	166	172	17	17	185	177	516	511	52	47
37	Pass	5/8/96	T	164	164	16	16	120	112	393	318		
38	Pass	5/8/96	T	182	175	16	17	182	207	489	553		

Report By:
Melody Adams

GSE Lining Technology, Inc.

Report Date: 5/17/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi MD [ppi]	Tensile Strength @ Yield ASTM D 638, Type IV, 2 ipm Smooth Spec = 130 ppi Textured Spec = 130 ppi CD [ppi]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % MD [%]	Tensile Elongation @ Yield 1.3" gage length Smooth Spec = 13 % Textured Spec = 13 % CD [%]	Tensile Strength @ Break ASTM D 638, Type IV, 2 ipm Smooth Spec = 243 ppi Textured Spec = 243 ppi MD [ppi]	Tensile Strength @ Break ASTM D 638, Type IV, 2 ipm Smooth Spec = 243 ppi Textured Spec = 243 ppi CD [ppi]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% MD [%]	Tensile Elongation @ Break 2.0" gage length Smooth Spec = 500% Textured Spec = 150% CD [%]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. MD [lb.]	Tear Resistance ASTM D 1004 Smooth Spec = 40 lb. Textured Spec = 40 lb. CD [lb.]
39	Pass	5/8/96	T	160	164	17	17	102	157	416	501	55	51
40	Pass	5/8/96	T	170	179	17	16	194	113	576	440		
41	Pass	5/8/96	T	174	178	16	15	132	142	220	449		
42	Pass	5/8/96	T	164	175	17	16	202	128	560	418		
43	Pass	5/8/96	T	172	165	17	16	193	124	564	529		
44	Pass	5/8/96	T	169	179	17	14	164	178	475	544		
45	Pass	5/8/96	T	171	175	17	16	175	130	483	269	54	49
46	Pass	5/8/96	T	173	170	18	16	166	171	516	480		
47	Pass	5/8/96	S	191	161	15	16	296	282	779	786		
48	Pass	5/8/96	S	155	161	16	15	240	265	703	790		
49	Pass	5/8/96	S	170	185	16	14	280	292	734	770	54	52
50	Pass	5/8/96	S	175	187	16	14	290	303	765	810		
51	Pass	5/8/96	S	167	173	16	14	285	289	774	803		
52	Pass	5/8/96	S	173	168	17	15	272	277	730	798		
53	Pass	5/8/96	S	156	160	17	17	242	257	705	761		

Report By:
Melody Adams
Nathan Ivy

GSE Lining Technology, Inc.

Report Date: 5/17/96

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
1	Pass	5/8/96	S	92	-0.17	-0.15	0.95	150	<-40	59
2	Pass	5/8/96	S							62
3	Pass	5/8/96	S	92	0.1	0.08	0.95	150	<-40	58
4	Pass	5/8/96	S							61
5	Pass	5/8/96	S							59
6	Pass	5/8/96	S	104	0.15	0.25	0.95	150	<-40	61
7	Pass	5/8/96	S	102	-0.07	-0.15	0.95	150	<-40	61
8	Pass	5/8/96	S							60
9	Pass	5/8/96	S							60
10	Pass	5/8/96	T							60
11	Pass	5/8/96	S							59
12	Pass	5/8/96	S							59
13	Pass	5/8/96	S							61
14	Pass	5/8/96	S							62
15	Pass	5/8/96	S	101	-0.08	0.07	0.95	150	<-40	60
16	Pass	5/8/96	S							62
17	Pass	5/8/96	S							60
18	Pass	5/8/96	S							61
19	Pass	5/8/96	S	89	-0.15	-0.37	0.95	150	<-40	61

Report By:
Melody Adams
Nathan Ivy

GSE Lining Technology, Inc.

Pelham Bay Landfill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
20	Pass	5/8/96	S							60
21	Pass	5/8/96	S							60
22	Pass	5/8/96	S							61
23	Pass	5/8/96	S	97	-0.23	-0.1	0.95	150	<-40	62
24	Pass	5/8/96	S							60
25	Pass	5/8/96	S							60
26	Pass	5/8/96	S	106	0.17	-0.35	0.95	150	<-40	62
27	Pass	5/8/96	S							62
28	Pass	5/8/96	S							60
29	Pass	5/8/96	S							63
30	Pass	5/8/96	S	102	0.42	0.12	0.95	Pending	Pending	61
31	Pass	5/8/96	S							61
32	Pass	5/8/96	S							62
33	Pass	5/8/96	T	111	0.25	0.02	0.95	112	Pending	63
34	Pass	5/8/96	T	101	0.12	0.1	0.95			63
35	Pass	5/8/96	T							62
36	Pass	5/8/96	T	96	0.12	0.05	0.95	174	Pending	61
37	Pass	5/8/96	T							64
38	Pass	5/8/96	T							65

Report By:
Melody Adams
Nathan Ivy

GSE Lin g Technology, Inc.

Report Date: 5/17/96

Pelham Bay Lanafill
GSE MR No. 1413-01
GSE Job No. XA4790

Sample #	Pass/Fail	Date Received	(S)mooth/ (T)extured	Puncture FTMS 101/Method 2065 Smooth Spec = 60 lb. Textured Spec = 60 lb. Resistance [lb.]	Dimensional Stability ASTM D 1204 1 hr. @ 100 degC Spec = +/- 3% MD [% change]	TD [% change]	Specific Gravity ASTM D 792/D 1505 Spec = >0.93	OIT ASTM D 3895 1 atm @ 200 degC GSE Spec = 100 min. [minutes]	Low Temp. Brittleness ASTM D 746 Spec = -40°F [°]	Average Thickness ASTM D 1593 Spec = 60 +/-10% [mil]
39	Pass	5/8/96	T	97	0.02	0.2	0.95	Pending	Pending	63
40	Pass	5/8/96	T							62
41	Pass	5/8/96	T							61
42	Pass	5/8/96	T							63
43	Pass	5/8/96	T							64
44	Pass	5/8/96	T							62
45	Pass	5/8/96	T	101	-0.13	0.2	0.95	Pending	Pending	63
46	Pass	5/8/96	T							63
47	Pass	5/8/96	S							59
48	Pass	5/8/96	S							56
49	Pass	5/8/96	S	95	-0.18	0.33	0.95	Pending	Pending	66
50	Pass	5/8/96	S							60
51	Pass	5/8/96	S							58
52	Pass	5/8/96	S							60
53	Pass	5/8/96	S							60

Report By:

GSE™

Quality Control Certificate

RAILCAR : ACFX53288
MATERIAL : HDT 060 MIL
BATCH # : 050595
ROLL # : 03032371

MANF. DATE : 05/05/1995
PROJECT NAME : PELHAM BAY CLOSURE
MR NUMBER : 1413-01 PROJECT # : XA4790
LOCATION : HOUSTON TX 054

TEST PARAMETER	TESTING FREQUENCY	TYPICAL SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Minimum Thickness (mil)	EVERY ROLL	54.0 min	57.0	D 751 NSF Mod.
Carbon Black (%)	5TH ROLL	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	5TH ROLL	A-1/A-2/B-1	A-1	D 3015
Density (g/cc)	5TH ROLL	0.940 min	0.947	D 1505 (Meth.A)
Tensile Properties:				
Yield Strength (ppi)	EVERY ROLL	130	154	
Break Strength (ppi)	EVERY ROLL	75	192	D 638 Type IV
Yield Elongation (%)	EVERY ROLL	10	17	2 ipm
Break Elongation (%)	EVERY ROLL	120	589	
Puncture Resistance (lb)	EVERY ROLL	80	122	FTMS 101, Meth. 2065
Tear Resistance (lb)	EVERY ROLL	45	61	D 1004
Dimensional Stability (%)	EVERY ROLL	-2.00 to 2.00	-0.28	D 1204 (1 hr, 100C)
ESCR (hrs)	1/RAILCAR	1500 min	Pending	D 1693 NSF MOD.

APPROVED
#20
6/3/96
QA

GSE™

Quality Control Certificate

RAILCAR : TR9316-2
MATERIAL : HDT 060 MIL
BATCH # : 012295
ROLL # : 04019914

MANF. DATE : 01/22/1995
PROJECT NAME : PELHAM BAY CLOSURE
MR NUMBER : 1413-01 PROJECT # : XA4790
LOCATION : HOUSTON TX 054

TEST PARAMETER	TESTING FREQUENCY	TYPICAL SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Minimum Thickness (mil)	EVERY ROLL	54.0 min	56.0	D 751 NSF Mod.
Carbon Black (%)	5TH ROLL	2.0 to 3.0	2.1	D 1603
Carbon Black Dispersion	5TH ROLL	A-1/A-2/B-1	A-1	D 3015
Density (g/cc)	5TH ROLL	0.940 min	0.946	D 1505 (Meth.A)
Tensile Properties:				
Yield Strength (ppi)	EVERY ROLL	130	174	
Break Strength (ppi)	EVERY ROLL	75	155	D 638 Type IV
Yield Elongation (%)	EVERY ROLL	10	17	2 ipm
Break Elongation (%)	EVERY ROLL	120	490	
Puncture Resistance (lb)	EVERY ROLL	80	120	FTMS 101, Meth. 2065
Tear Resistance (lb)	EVERY ROLL	45	55	D 1004
Dimensional Stability (%)	EVERY ROLL	-2.00 to 2.00	0.05	D 1204 (1 hr, 100C)
ESCR (hrs)	1/RAILCAR	1500 min	Pending	D 1693 NSF MOD.

APPROVED
DP
#20
6/3/95
QA

GSE™

Quality Control Certificate

RAILCAR : PSPX1109
MATERIAL : HDT 060 MIL
BATCH # : 082195
ROLL # : 03034514

MANF. DATE : 08/21/1995
PROJECT NAME : PELHAM BAY CLOSURE
MR NUMBER : 1413-01 PROJECT # : XA4790
LOCATION : HOUSTON TX 054

TEST PARAMETER	TESTING FREQUENCY	TYPICAL SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Minimum Thickness (mil)	EVERY ROLL	54.0 min	56.0	D 751 NSF Mod.
Carbon Black (%)	5TH ROLL	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	5TH ROLL	A-1/A-2/B-1	A-1	D 3015
Density (g/cc)	5TH ROLL	0.940 min	0.947	D 1505 (Meth.A)
Tensile Properties:				
Yield Strength (ppi)	EVERY ROLL	130	157	
Break Strength (ppi)	EVERY ROLL	75	157	D 638 Type IV
Yield Elongation (%)	EVERY ROLL	10	17	2 ipm
Break Elongation (%)	EVERY ROLL	120	408	
Puncture Resistance (lb)	EVERY ROLL	80	112	FTMS 101, Meth. 2065
Tear Resistance (lb)	EVERY ROLL	45	57	D 1004
Dimensional Stability (%)	EVERY ROLL	-2.00 to 2.00	0.02	D 1204 (1 hr, 100C)
ESCR (hrs)	1/RAILCAR	1500 min	Pending	D 1693 NSF MOD.

APPROVED
#20
6/3/96
QA

C-1 Geocomposite Production Minimum Property Values Quality Control Certificates

Appendix C-1
GEOCOMPOSITE PRODUCTION MINIMUM PROPERTY VALUES QUALITY CONTROL CERTIFICATES

The Tensar Corporation supplied the geocomposite (Tensar product code DC4205)for the Pelham Bay Landfill Closure. Geocomposite for this project was delivered to the project site from April 1995 through May 1996. Each shipment of geocomposite material was accompanied by quality control certification from the manufacturer. Each certificate provide information on the thickness, tensile strength, melt index, density, %CB and Peel and/or Bond Strength. The range of values for each parameter were as follows:

Thickness (mm)	5.20 – 5.98
Tensile Strength (lb/ft)	588.6 – 904.8
Melt Index (gm/10min)	0.318 – 0.669
Density (gm/cc)	0.948 – 0.978
% CB	2.16 – 2.92

Peel Strength Addendum (gm/in)

Top	1104 - 5148
Bottom	1052 - 4791

Bond Strength (g/in) 1129 - 4640

In addition to the QC certification for the particular lot of material shipped, Material Property Data Sheets were provided. Copies of representative QC documentation that accompanied each shipment are included in this appendix.

Tensar®

The Tensar Corporation

1210 Citizens Parkway
Morrow, Georgia 30260
(404) 968-3255

MAY 04, 1995

AGAM CONSTRUCTORS, INC.
CONSTRUCTION MANAGERS
RECEIVED
MAY 05 1995
PRESIDENT
ARMANDO M. BYRNE S.

AGAM CONSTRUCTORS INC
4E DOWNING PLACE
POUGHKEEPSIE, NY 12603

REFERENCE: TENSAR ORDER NUMBER: 400895
PURCHASE ORDER NUMBER: 135-03/94-144
BILL OF LADING NUMBER: 53705

SOLD TO: AGAM CONSTRUCTORS INC
4E DOWNING PLACE

POUGHKEEPSIE, NY 12603

SHIP TO: AGAM FIELD OFFICE
PELHAM BAY LANDFILL
3599 BRUCKNER BLVD.

BRONX, NY 10464

This is to certify that TENSAR DC420501 geocomposite as manufactured by the TENSAR Corporation, meets the characteristics and properties per the attached specification sheet.

Sincerely,

Ron Humpolick
Manager of Continuous Improvement
and Quality Control

Bill Wright
Notary Public, Clayton County, Georgia
My Commission Expires May 10, 1998

The Tensar Corporation

1210 Citizens Parkway
Morrow, Georgia 30260
(404) 968-3255

AGAM CONSTRUCTORS INC

PELHAM BAY LANDFILL

DC 4205 018 PEEL STRENGTH ADDENDUM

(gm/in)

LOT NO.	TOP	BOTTOM
5-0240-07A	2782	2486
5-0241-05A	3091	2514
5-0241-17B	2439	2348
5-0241-37B	2963	1911
5-0241-42A	2421	3599
5-0241-47A	3463	2259
5-0241-51A	3424	1895
5-0241-57A	2111	3372
5-0241-61A	2241	3436
5-0241-26A	4168	4696
5-0241-14A	2499	2196
5-0241-09B	2143	2163

DRAINAGE COMPOSITE DC4205

The drainage composite shall consist of a geotextile bonded to each side of a drainage net. The drainage composite shall have a low compressibility in order to maintain high flow capacity over a wide range of confining pressures. The bonding process shall not introduce adhesives or other foreign products. The strength of the bond between the drainage net and the geotextile shall be greater than the friction developed between the geotextile and a soil. The drainage composite shall maintain a high flow under long term loading conditions and shall be resistant to all forms of biological or chemical degradation normally encountered in a soil environment. The drainage composite shall be made from the drainage net and geotextile products whose property requirements are listed below.

PROPERTY	TEST METHOD	NOTES	UNITS	VALUE
Flow Capacity	ASTM 4716	1		
• Gradient of 1				
• Transmissivity @ 500 psf			$x10^{-3}ft^2/sec$	21
			(gpm/ft width)	(9.55)
• Transmissivity @ 10,000 psf			$x10^{-3}ft^2/sec$	16
			(gpm/ft width)	(7.24)
• Transmissivity @ 20,000 psf			$x10^{-3}ft^2/sec$	8.6
			(gpm/ft width)	(3.86)
Mechanical Properties		3,4,5		
• Compression		1,2		
@ 20,000 psf			%	50
• Peak Tensile Strength-MD	ASTM D5035	6	lbs/ft	575
Drainage Net				
• Aperture Size	I.D. Calipered	7	inches	0.3
• Thickness	O.D. Calipered	8,9	inches	0.20
• Polyethylene Polymer				
-Specific Gravity	ASTM D792		g/cm^3	0.940
-Carbon Black Stabilization	ASTM D4218		%	2.5
Geotextile		10		
• Grab Tensile Strength	ASTM D4632		lbs	130/110
• AOS	ASTM D4751		US Std.Sv.Sz.	70
• Weight	ASTM D1910		oz/sy	4.0,4.5,6.0,8.0,10
Composite				
• Laminate Bond Strength	ASTM F904	11	g/in	400
• Dimensions - Finished Product				
-Thickness	O.D. Calipered		in	0.24
-Roll Length			ft	225
-Roll Width (Drainage Net)			ft	14
• Roll Weight			lbs	890

Notes

1. Test values are for the core net only.
2. Compression Tests are performed on a 2-inch square sample loaded at a 1mm/minute constant rate of strain.
3. Test values are for drainage net prior to bonding process.
4. All test values are nominal, unless otherwise indicated.
5. MD - Machine (roll) Direction.
6. Minimum value.
7. Inside dimensions in each principal direction are measured by calipers.
8. Outside dimensions in each principal direction are measured by calipers.
9. Thickness is measured by placing the specimen flat on a comparator base and lowering a round 1/2 inch diameter flat end contact surface squarely over a junction.
10. Geotextile splices within each roll of finished goods shall be considered acceptable product. The splicing methods shall include, but are not limited to, stitching or heat bonding. The finished splice shall maintain the continuity of the filtration function of the geotextile. These methods will be considered viable and acceptable unless otherwise specified.
11. Minimum value of a random 5 sample (MD) average between the polyethylene geonet and the needle punched geotextile.

The Tensar Corporation
1210 Citizens Parkway
Morrow, GA 30260
1-800-845-4453

APPENDIX D
LOAMY SOIL TESTING

D-1 During Construction Loamy Soil Testing

D-1 During Construction Loamy Soil Testing

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	Structural Backfill (August 10, 1995)						
4	storm water on 200' slope, trench 3	80'	12.1	95.7	A	124.8	10.3
5	storm water on 200' slope, trench 3	40'	11.1	96.5	A	124.8	10.3
6	storm water on 200' slope, trench 3	20'	9.0	95.4	A	124.8	10.3
	Loamy Soil: Roadways (August 31, 1995)						
7	lower road B at A-5.5	30	6.5	100.2	A	122.8	10.0
8	lower road B at A-8	32	5.3	100.0	A	122.8	10.0
10	lower road B at A-11	35	7.3	95.1	A	122.8	10.0
12	lower road B at A-13	38	6.0	98.0	A	122.8	10.0
14	lower road B at A-15	40	4.3	100.2	A	122.8	10.0
16	lower road B at A-17	42	6.4	99.7	A	122.8	10.0
18	lower road B at A-19	44	7.8	99.3	A	122.8	10.0
	Loamy on Road B, 1st Lift, (August 31, 1995)						
7	lower road B at A-5.5 = sta 35+00	30	6.5	100.2	A	122.8	10.0
8	lower road B at A-8 = sta 33+00	32	5.3	100.0	A	122.8	10.0
9	lower road B at A-8, anchor trench	32	7.5	95.9	A	122.8	10.0
10	lower road B at A-11 31+00	35	7.3	95.1	A	122.8	10.0
11	lower road B at A-11, anchor trench	35	7.0	98.8	A	122.8	10.0
12	lower road B at A-13 39+00	38	6.0	98.0	A	122.8	10.0
13	lower road B at A-13, anchor trench	38	6.7	96.9	A	122.8	10.0
14	lower road B at A-15 27+00	40	4.3	100.2	A	122.8	10.0
15	lower road B at A-15, anchor trench	40	7.5	98.7	A	122.8	10.0
16	lower road B at A-17 25+00	42	6.4	99.7	A	122.8	10.0
17	lower road B at A-17, anchor trench	42	4.8	98.7	A	122.8	10.0
18	lower road B at A-19 23+00	44	7.8	99.3	A	122.8	10.0
	Loamy on Roads (September 8, 1995)						
1	Road A, survey line A-10 / STA 35+00	12	4.4	99.5	A	122.8	10.0
2	anchor trench adj. to test #1	12	7.5	95.4	A	122.8	10.0
3	Road A, survey line A-12 / STA 33+00	12	4.8	100.0	A	122.8	10.0
4	anchor trench adj. to test #3	12	9.2	89.7	B	122.8	10.0
5	Road A, survey line A-14 / STA 31+00	12	4.8	100.0	A	122.8	10.0
6	anchor trench adj. to test #5	12	8.2	94.2	B	122.8	10.0
7	Road A, survey line A-16 / STA 29+00	12	4.5	100.0	A	122.8	10.0
8	nchor trench adj. to test #7	12	7.0	83.4	B	122.8	10.0
9	Road A, survey line A-18 / STA 27+00	12	4.5	100.0	A	122.8	10.0
10	Road A, survey line A-20 / STA 25+00	14	6.0	100.0	A	122.8	10.0
11	Road A, survey line A-24 / STA 23+00	12	5.1	100.0	A	122.8	10.0
12	Road A, survey line A-26 / STA 21+00	12	6.9	100.0	A	122.8	10.0
13	Road A, survey line A-29 / STA 19+00	12	7.4	100.0	A	122.8	10.0

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	Loamy on Roads (September 8, 1995) (continued)						
14	Road A, survey line A-31 / STA 17+00	12	5.3	100.0	A	122.8	10.0
15	lower Road B, survey line A-25 / STA 21+00	46	4.8	100.0	A	122.8	10.0
16	anchor trench adj. to test #5	46	9.2	99.2	A	122.8	10.0
17	lower Road B, survey line A-27 / STA 19+00	44	9.1	96.4	A	122.8	10.0
18	anchor trench adj. to test #17	44	5.5	99.6	A	122.8	10.0
19	lower Road B, survey line A-30 / STA 17+00	42	6.3	100.0	A	122.8	10.0
20	upper Road B, survey line B-0.5 / STA 93+00	78	6.1	100.0	A	122.8	10.0
21	upper Road B, survey line B-3 / STA 91+00	78	5.6	100.0	A	122.8	10.0
22	anchor trench adj. to test #21	78	9.4	93.3	A	122.8	10.0
23	upper Road B, survey line B-5 / STA 89+00	72	6.9	100.0	A	122.8	10.0
24	anchor trench adj. to test #23	72	9.2	87.1	A	122.8	10.0
25	upper Road B, survey line B-7 / STA 87+00	73	6.0	98.5	A	122.8	10.0
26	anchor trench adj. to test #25	73	5.7	100.0	A	122.8	10.0
27	upper Road B, survey line B-9 / STA 85+00	76	6.5	100.0	A	122.8	10.0
28	anchor trench adj. to test #27	76	7.1	96.1	A	122.8	10.0
29	upper Road B, survey line B-11 / STA 83+00	79	7.1	100.0	A	122.8	10.0
30	anchor trench adj. to test #29	79	7.2	95.1	A	122.8	10.0
31	upper Road B, survey line B-13 / STA 81+00	82	6.4	100.0	A	122.8	10.0
32	anchor trench adj. to test #31	82	7.2	95.7	A	122.8	10.0
33	upper Road B, survey line A-26 / STA 78+00	86	4.3	100.0	A	122.8	10.0
34	anchor trench adj. to test #33	86	6.1	100.0	A	122.8	10.0
35	upper Road B, survey line A-27 / STA 77+00	88	4.9	100.0	A	122.8	10.0
36	anchor trench adj. to test #35	88	6.1	100.0	A	122.8	10.0
37	upper Road B, survey line A-30 / STA 75+00	88	5.9	99.3	A	122.8	10.0
38	anchor trench adj. to test #37	88	6.5	97.1	A	122.8	10.0
39	Road C, survey line B-2 / STA 15+00	122	6.6	98.8	A	122.8	10.0
40	Road C, survey line B-6 / STA 17+00	118	6.4	100.0	A	122.8	10.0
41	Road C, survey line B-9 / STA 19+00	119	4.7	100.0	A	122.8	10.0
42	Road C, survey line B-11 / STA 21+00	122	5.9	100.0	A	122.8	10.0
43	Road C, survey line A-29 / STA 23+00	124	4.3	100.0	A	122.8	10.0
44	Road C, survey line A-31 / STA 25+00	121	4.3	100.0	A	122.8	10.0
45	Road C, survey line A-33 / STA 27+00	117	3.7	100.0	A	122.8	10.0
46	Road C, survey line A-35 / STA 29+00	112	3.6	99.8	A	122.8	10.0
47	Road C, survey line A-37 / STA 31+00	110	3.1	100.0	A	122.8	10.0
	3" Minus: Anchor Trench (September 15, 1995)						
14	anchor trench lower road 1st lift A-1	21.5	6.4	100.0	A	122.8	10.0
	3" Minus: Roadway (September 15, 1995)						
13	lower road B 1st lift above line A-1	21.5	5.9	96.2	A	122.8	10.0
15	line 4 lower road B 1st lift above liner	20.5	6.5	100.0	A	122.8	10.0
16	line 4 lower road B 1st lift above anchor trench	20.5	4.6	93.8	B	122.8	10.0
17	line 1 lower road B 1st lift above liner	19.5	6.2	99.7	A	122.8	10.0
18	line E-5 lower road 1st lift above liner	15.5	7.0	97.7	A	122.8	10.0

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	3" Minus: Roadway (September 15, 1995) (continued)						
19	line E-3 lower road 1st lift	16.5	8.7	98.0	A	122.8	10.0
20	line E-0.5 lower road 1st lift	24.5	7.4	100.1	A	122.8	10.0
	Slope Drain - Loamy (September 21, 1995)						
7	80' north MHSP 10	70	8.2	95.1	A	121.9	12.1
8	MHSP 11	63	6.8	97.8	A	121.9	12.1
	Loamy: Slope Drain Pond C (September 29, 1995)						
13	1st lift above down slope drain between SP10-SP11	82.0'	11.3	95.0	A	121.9	10.0
14	2nd lift above down slope drain between SP10-SP11	84.0'	4.7	99.2	A	112.3	9.6
	Loamy: Roadways (September 29, 1995)						
5	upper road B, station A62 / STA 107+00	70.0'	2.8	96.4	A	112.3	9.6
6	upper road B, station A61 / STA 105+00	72.0'	4.5	95.6	A	112.3	9.6
7	upper road B, station A59.5	73.0'	3.5	100.2	A	112.3	9.6
8	upper road B, station F8.5 / STA 104+00	74.0'	5.7	98.4	A	112.3	9.6
9	upper road B, station F7/ STA 103+00	74.0'	3.2	97.7	A	112.3	9.6
10	Road C, station F7 / STA 6+00	97.0'	7.6	98.6	A	116.2	8.7
11	Road C, station F8 / STA 4+00	95.0'	9.9	99.1	A	116.2	8.7
	Loamy: Slope Drain Pond C (October 12, 1995)						
6	30' ne of MH SP#11	66	7.0	95.6	A	112.3	9.6
7	160' ne of MH SP#11	48	6.8	96.2	A	112.3	9.6
8	10' sw of B.O. #4	10	7.1	91.2	B	112.3	9.6
8A	Retest of #8	10	6.2	97.1	C	112.3	9.6
	Loamy Road A (November 28, 1995)						
12	Loamy Road A line A-69	12	10.6	93.9	A	122.8	10.0
13	Loamy Road A line A-68	12	12.3	100.0	A	122.8	10.0
14	Loamy Road A line A-67	12	13.4	94.8	A	122.8	10.0
15	Loamy Road A line A-65	12	17.2	91.8	A	122.8	10.0
16	Loamy Road A line A-64	12	15.4	91.9	A	122.8	10.0
	Loamy on Roads (March 28, 1996)						
1	Road A station 15+00	subgrade	11.2	96.3	A	125.0	9.0
2	Road A station 13+00	subgrade	9.8	99.3	A	125.0	9.0
3	Road A station 11+00	subgrade	9.9	98.2	A	125.0	9.0
4	Road A station 9+00	subgrade	10.1	96.4	A	125.0	9.0

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	Loamy on Roads (March 28, 1996) (continued)						
5	Road A station 7+00	subgrade	6.8	99.8	A	125.0	9.0
6	Road A station 5+00	subgrade	5.0	97.2	A	125.0	9.0
7	Road A station 3+00	subgrade	8.9	97.5	A	125.0	9.0
8	Road A station 1+00	subgrade	8.6	95.9	A	125.0	9.0
9	Road B station 1+00; 1st lift	subgrade	7.8	99.5	A	125.0	9.0
10	Road B station 3+00; 1st lift	subgrade	8.7	98.2	A	125.0	9.0
11	Road B station 5+00; 1st lift	subgrade	8.1	97.3	A	125.0	9.0
12	Road B station 7+00; 1st lift	subgrade	6.3	96.9	A	125.0	9.0
13	Road B station 9+00; 1st lift	subgrade	8.1	97.5	A	125.0	9.0
14	Road B station 11+00; 1st lift	subgrade	4.8	96.8	A	125.0	9.0
15	Road B station 13+00; 1st lift	subgrade	9.6	95.3	A	125.0	9.0
16	Road B station 15+00; 1st lift	subgrade	8.1	96.9	A	125.0	9.0
	Loamy Roads (May 10, 1996)						
1	Road B station 107+00	1	7.3	105.1	A	see Proctor Reports	
2	Road B station 105+00	1	9.7	100.2	A	dated 5/14/96	
3	Road B station 101+00	4	10.5	101.1	A	" "	" "
4	Road B station 99+00	3	10.1	103.6	A	" "	" "
5	Road B station 97+00	4	13.1	97.9	B	" "	" "
6	Road B station 95+00	3	12.3	102.6	A	" "	" "
7	Road B station 73+00	4	12.5	94.3	B	" "	" "
8	Road B station 71+00	3	12.0	98.2	A	" "	" "
9	Road B station 69+00	4	11.9	94.1	B	" "	" "
10	Road B station 67+00	3	12.6	97.7	B	" "	" "
11	Road B station 65+00	1	8.8	102.8	A	" "	" "
12	Road B station 63+00	1	7.8	104.6	A	" "	" "
13	Road B station 61+00	1	7.6	104.8	A	" "	" "
14	Road B station 59+00	1	7.1	103.2	A	" "	" "
15	Road B station 57+00	1	7.6	100.7	A	" "	" "
16	Road B station 55+00	1	6.7	101.4	A	" "	" "
17	Road B station 61+00*	1	6.3	100.4	A	" "	" "
18	Road B station 59+00*	1	7.7	103.2	A	" "	" "
19	Road B station 57+00*	1	8.1	101.4	A	" "	" "
20	Road B station 55+00*	1	7.2	104.1	A	" "	" "
	*should be Lift 3 from 95+00 to 101+00					" "	" "
21	Road B station 53+00	1	6.7	99.6	A	" "	" "
22	Road B station 51+00	1	9.5	94.7	B	" "	" "
23	Road B station 37+00	1	6.6	96.8	A	" "	" "
24	Road B station 1+00	4	6.8	102.9	A	" "	" "
25	Road B station 11+00 (?1+00)	3	7.0	105.2	A	" "	" "
26	Road B station 3+00	4	10.6	99.7	A	" "	" "
27	Road B station 3+00	3	9.9	103.3	A	" "	" "
28	Road B station 5+00	4	10.3	98.2	A	" "	" "
29	Road B station 5+00	3	8.1	105.8	A	" "	" "
30	Road B station 7+00	4	10.0	93.2	B	" "	" "

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
	Loamy on Roads (May 10, 1996) (continued)						
31	Road B station 7+00	3	8.5	106.2	A	" "	" "
32	Road B station 9+00	4	9.4	104.7	A	" "	" "
33	Road B station 11+00	4	8.9	100.8	A	" "	" "
34	Road B station 11+00	3	8.0	107.1	A	" "	" "
35	Road B station 13+00	4	14.0	94.8	B	" "	" "
36	Road B station 13+00	3	15.3	99.4	A	" "	" "
37	Road B station 15+00	4	11.8	96.8	B	" "	" "
38	Road B station 15+00	3	12.2	99.8	A	" "	" "
39	Road B station 17+00	4	12.8	93.2	B	" "	" "
40	Road B station 17+00	3	13.2	101.3	A	" "	" "
41	Road B station 19+00	4	14.7	96.1	A	" "	" "
42	Road B station 19+00	3	12.7	105.7	A	" "	" "
43	Road B station 21+00	4	13.9	99.1	A	" "	" "
44	Road B station 21+00	3	14.2	102.9	A	" "	" "
	May 29, 1996						
1	station 1+00	lift 3	6.3	107.6	A	117.0	10.3
2	station 1+00	lift 4	6.3	92.3	B	117.0	10.3
3	station 7+00	lift 3	5.3	110.3	A	117.0	10.3
4	station 9+00	lift 3	4.8	107.7	A	117.0	10.3
5	station 13+00	lift 3	7.7	101.6	A	117.8	11.4
6	station 15+00	lift 3	6.3	104.2	A	117.8	11.4
7	station 17+00	lift 3	6.1	106.6	A	117.8	11.4
8	station 19+00	lift 3	5.4	104.8	A	117.8	11.4
9	station 23+00	lift 3	6.4	115.0	A	110.8	10.4
10	station 23+00	lift 4	8.2	106.5	A	110.8	10.4
11	station 25+00	lift 3	6.5	115.3	A	110.8	10.4
12	station 25+00	lift 4	6.3	108.1	A	110.8	10.4
13	station 27+00	lift 3	9.2	104.7	A	110.8	10.4
14	station 27+00	lift 4	9.9	98.4	A	110.8	10.4
15	station 29+00	lift 3	7.8	111.5	A	110.8	10.4
16	station 29+00	lift 4	8.2	108.3	A	110.8	10.4
17	station 31+00	lift 3	5.8	94.6	*	124.1	11.3
18	station 31+00	lift 4	5.8	96.8	*	124.1	11.3
19	station 33+00	lift 3	8.1	95.*	*	124.1	11.3
20	station 33+00	lift 4	8.6	9*.*	*	124.1	11.3
21	station 35+00	lift 3	7.4	*	*	124.1	11.3
22	station 35+00	lift 4	7.7	*	*	124.1	11.3
23	station 37+00	lift 3	5.8	*	*	124.1	11.3
24	station 37+00	lift 4	7.?	*	*	124.1	11.3
25	station 39+00	lift 3	7.5	96.1	B	124.1	11.3
26	station 39+00	lift 4	7.1	98.6	A	124.1	11.3
27	station 41+00	lift 3	7.6	100.2	A	124.0	8.5
28	station 41+00	lift 4	7.5	94.4	B	124.0	8.5
29	station 43+00	lift 2	5.1	95.4	B	124.0	8.5

Prepared by: B. Magliaro/S. Albrecht
Checked by: S. Albrecht 6/22/99

During Construction Loamy Soil Testing - Field Compaction Tests

Pelham Bay Landfill Closure and Final Remediation

Test No.	Location	Elev.	Water Content %	Percent Compactiion	Comment	Maximum Density (#/cu.ft.)	Optimum Moisture (%)
			May 29, 1996 (continued)				
30	station 43+00	lift 3	5.3	98.0	A	124.0	8.5
31	station 45+00	lift 2	4.7	103.5	A	124.0	8.5
32	station 46+00	lift 3	5.0	99.4	A	124.0	8.5
33	station 47+00	lift 2	5.2	104.7	A	124.0	8.5
34	station 47+00	lift 3	4.5	109.5	A	124.0	8.5
35	station 49+00	lift 2	6.6	95.6	B	124.0	8.5
36	station 49+00	lift 3	8.3	99.4	A	119.2	9.6
37	station 51+00	lift 3	7.7	100.2	A	119.2	9.6
38	station 53+00	lift 2	6.9	107.7	A	119.2	9.6
39	station 53+00	lift 3	7.7	103.5	A	119.2	9.6
40	station 55+00	lift 2	7.7	103.6	A	119.2	9.6
41	station 55+00	lift 3	8.8	97.1	B	119.2	9.6
42	station 57+00	lift 2	5.5	102.2	A	119.2	9.6
43	station 57+00	lift 3	5.5	98.7	A	119.2	9.6
44	station 59+00	lift 2	5.3	108.7	A	119.2	9.6
45	station 59+00	lift 3	5.5	103.6	A	119.2	9.6
46	station 61+00	lift 2	4.3	108.2	A	120.2	12.8
47	station 61+00	lift 3	5.6	106.8	A	120.2	12.8
48	station 63+00	lift 3	5.4	108.6	A	120.2	12.8
49	station 63+00	lift 3	5.7	105.5	A	120.2	12.8
50	station 65+00	lift 2	5.8	111.6	A	120.2	12.8
51	station 65+00	lift 3	6.3	107.3	A	120.2	12.8
52	station 67+00	lift 2	5.7	105.2	A	120.2	12.8
53	station 67+00	lift 3	6.3	102.0	A	120.2	12.8
54	station 69+00	lift 2	6.1	99.6	A	120.2	12.8
55	station 69+00	lift 3	6.2	100.0	A	120.2	12.8
56	station 71+00	lift 3	6.4	103.2	A	119.7	12.5
57	station 71+00	lift 4	7.6	100.5	A	119.7	12.5
58	station 73+00	lift 3	6.9	108.8	A	119.7	12.5
59	station 73+00	lift 4	8.1	106.0	A	119.7	12.5
60	station 75+00	lift 3	6.9	102.8	A	119.7	12.5
61	station 75+00	lift 4	6.8	93.5	B	119.7	12.5
62	station 77+00	lift 3	5.5	102.4	A	119.7	12.5
63	station 77+00	lift 4	6.7	98.9	A	119.7	12.5
64	station 79+00	lift 3	7.1	100.9	A	119.7	12.5
65	station 79+00	lift 4	7.3	93.3	B	119.7	12.5
66	station 91+00	lift 3	8.6	103.0	A	119.7	12.5
67	station 91+00	lift 4	11.0	96.3	B	119.7	12.5
68	station 81+00	lift 3	7.7	94.7	B	123.8	10.7
69	station 81+00	lift 4	8.3	93.9	B	123.8	10.7

COMMENTS:

A. Test results comply with specifications

B. Recompaction required

C. Test is after recompaction

* Values to be provided by NYCDEP

APPENDIX E
TOPSOIL TESTING

E-1 Topsoil Testing – pH, TOC, Grain Size Analysis

E-2 Topsoil Testing – Nutrient Analysis

E-3 Topsoil Analysis – pH Adjustment

E-1 Topsoil Testing – pH, TOC, Grain Size Analysis

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001
Report#	MC-44	MC-43	MC-42	MC-41	MC-40	MC-39	MC-38	MC-37
Sample ID	061801	061701	061501	061201	061101	061001	060901	060801
Sample Date	06/18/98	06/17/98	06/15/98	06/12/98	06/11/98	06/10/98	06/09/98	06/08/98
pH	6.8	7.2	6.7	6.8	6.3	6.5	7.2	6.9
TOC*	6.0%	7.7%	7.7%	7.9%	7.0%	8.4%	5.7%	6.4%
Grain Size Analysis								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"				100.0		100.0	100.0	
3/4"		100.0	100.0	98.4	100.0	98.5	99.0	100.0
1/2"	100.0	98.8	99.5	97.9	98.7	93.5	96.9	98.7
3/8"	99.2	96.4	99.5	97.2	96.6	90.8	94.3	96.9
1/4"	96.7	92.6	97.7	95.1	93.5	87.3	90.8	93.9
#4	94.1	89.6	95.8	93.1	91.0	84.6	88.5	91.7
#8	85.8	81.4	90.6	88.2	84.3	79.8	83.3	84.7
#10	83.6	80.2	88.7	86.4	82.2	78.1	81.9	83.2
#16	77.7	72.4	81.9	81.7	75.5	72.6	78.4	75.5
#20	73.8	68.0	76.6	78.1	70.7	69.5	72.9	71.3
#30	68.5	62.6	69.6	73.0	64.0	64.3	67.0	62.9
#35	66.1	61.4	67.7	71.7	63.0	63.0	66.1	62.6
#40	61.9	57.8	62.8	67.8	58.9	58.5	61.1	59.2
#50	56.6	51.4	55.1	61.4	52.0	51.6	55.6	52.1
#60	51.6	47.3	49.4	58.6	47.0	46.8	50.8	47.1
#80	43.3	40.0	44.0	49.0	39.6	39.9	43.3	39.3
#100	38.3	35.5	35.7	44.0	34.9	35.5	38.8	34.7
#200	21.0	21.5	19.8	27.4	20.6	22.2	22.9	21.6
#270	14.4	15.1	12.8	19.7	14.3	16.6	12.1	16.3

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001
Report#	MC-36	MC-35	MC-34	MC-33	MC-32	MC-30	MC-31	MC-29
Sample ID	060501	060401	060301	060201	060101	052901	0529PB	052801
Sample Date	06/05/98	06/04/98	06/03/98	06/02/98	06/01/98	05/29/98	05/29/98	05/28/98
pH	6.9	7.0	7.4	6.8	6.8	7.1	7.0	6.6
TOC*	6.7%	6.9%	7.2%	4.8%	7.1%	7.3%	10.6%	6.6%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"						100.0	100.0	
3/4"	100.0	100.0	100.0	100.0	100.0	99.8	98.4	100.0
1/2"	99.4	95.7	96.8	98.9	98.6	98.2	93.6	98.7
3/8"	97.0	92.5	96.0	98.2	98.0	96.7	90.8	96.6
1/4"	92.7	89.4	92.9	96.3	95.1	92.0	87.7	93.4
#4	89.7	86.9	90.8	94.6	92.1	90.8	86.1	91.8
#8	82.6	71.3	85.1	88.8	85.7	84.7	82.2	86.2
#10	80.9	80.1	83.9	87.3	84.4	83.6	81.1	85.4
#16	75.2	74.9	78.7	81.0	79.7	79.7	76.8	80.2
#20	71.1	71.0	74.7	77.8	76.3	77.0	73.8	76.5
#30	64.8	64.5	68.9	70.7	70.7	72.5	67.6	70.3
#35	63.8	63.2	63.4	70.5	69.9	71.1	65.9	67.7
#40	51.9	58.6	56.0	67.1	66.0	65.6	61.0	63.2
#50	47.7	51.1	53.2	59.8	58.9	61.5	53.1	54.8
#60	44.1	48.1	51.6	54.6	53.8	57.4	47.9	49.5
#80	40.2	39.0	43.2	45.9	45.4	50.3	39.8	41.1
#100	33.8	34.7	37.6	40.4	40.1	45.9	35.3	35.4
#200	20.0	22.2	22.3	23.9	24.4	30.7	22.6	25.7
#270	14.8	17.0	17.2	17.2	17.3	23.8	17.2	19.9

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001
Report#	MC-28	MC-27	MC-24	MC-25	MC-26	MC-23	MC-22	MC-20
Sample ID	052701	052201	052001	052002	052003	0501801	0501401	0501201
Sample Date	05/27/98	05/22/98	05/20/98	05/20/98	05/20/98	05/18/98	05/14/98	05/12/98
pH	6.8	7.2	6.8	6.5	6.9	6.9	6.9	6.4
TOC*	7.2%	6.2%	5.7%	3.6%	6.7%	5.6%	4.9%	5.2%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"	100.0	100.0			100.0			
3/4"	99.6	97.0	100.0		97.6	100.0	100.0	100.0
1/2"	97.4	95.7	99.0	100.0	95.7	99.4	99.2	97.7
3/8"	96.3	93.4	99.0	99.8	94.9	97.6	98.6	97.1
1/4"	93.5	91.0	97.4	99.0	93.2	94.6	96.8	95.4
#4	91.5	88.7	96.2	98.2	92.1	93.1	95.5	94.1
#8	85.6	84.1	92.1	94.9	87.9	88.6	92.4	90.4
#10	83.6	82.8	90.4	93.5	86.4	87.2	91.3	89.2
#16	76.6	78.2	84.9	88.8	81.8	82.0	87.9	85.5
#20	72.2	74.8	80.5	85.4	78.4	77.8	85.2	82.7
#30	68.5	69.6	74.5	80.4	73.6	71.9	80.1	78.5
#35	66.9	68.3	72.5	78.6	72.1	70.0	79.2	76.9
#40	62.5	64.3	67.7	74.5	68.1	66.7	75.6	73.4
#50	57.4	57.9	59.9	67.6	61.7	58.9	69.9	67.7
#60	53.5	53.5	54.2	62.3	57.0	54.0	65.6	63.6
#80	43.5	46.1	45.1	53.3	48.8	46.1	58.4	56.4
#100	38.9	41.7	39.6	47.6	43.7	41.3	53.3	51.7
#200	32.0	26.8	31.3	28.3	26.7	26.4	35.4	34.2
#270	24.0	20.0	19.8	20.6	19.2	17.6	26.5	26.7

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001
Report#	MC-21	MC-19	MC-18	MC-17	MC-16	MC-15	MC-14	MC-13
Sample ID	0501202	050701	050501	050101	042801	042401	042101	041701
Sample Date	05/12/98	05/07/98	05/05/98	05/01/98	04/28/98	04/24/98	04/21/98	04/17/98
pH	6.5	6.6	6.9	7.0	6.4	6.2	6.7	6.2
TOC*	4.6%	5.3%	4.5%	6.4%	6.6%	5.0%	6.2%	4.9%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"					100.0			
3/4"	100.0	100.0	100.0	100.0	98.3	100.0	100.0	
1/2"	99.5	98.0	99.2	97.4	95.3	98.9	97.5	100.0
3/8"	98.9	96.9	98.2	96.2	94.4	96.3	96.6	99.5
1/4"	96.3	94.9	95.1	94.2	92.9	94.0	94.8	96.0
#4	94.6	93.2	93.8	92.7	91.4	92.3	92.9	93.7
#8	90.1	89.2	89.1	88.4	86.7	87.9	88.6	88.7
#10	89.0	88.0	88.0	87.0	85.0	86.5	87.3	87.0
#16	85.3	84.1	83.5	82.9	79.4	82.8	83.3	80.5
#20	82.3	80.1	79.9	79.8	74.7	79.4	80.2	76.1
#30	77.7	75.9	74.8	75.8	68.0	75.6	75.7	70.4
#35	76.8	74.5	73.9	73.7	66.2	72.6	73.9	68.4
#40	71.8	70.1	70.1	70.0	60.0	69.2	70.1	64.0
#50	65.2	64.0	83.8	63.9	53.2	63.0	63.8	57.3
#60	60.4	59.3	59.3	59.5	47.9	58.5	59.3	52.6
#80	52.7	51.7	51.8	52.0	39.8	51.1	51.5	45.1
#100	47.9	46.8	46.9	47.2	34.9	46.5	46.7	40.5
#200	31.3	29.7	29.5	30.2	20.5	30.6	30.2	25.5
#270	23.5	22.7	21.9	22.2	13.1	23.2	23.0	19.5

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	ITL	TCLI	TCLI	TCLI
LAB#	FVG-001	FVG-001	FVG-001	FVG-001			FVG-001	FVG-001
Report#	MC-12	MC-10	MC-11	MC-09			MC-08	MC-07
Sample ID	041401	041001	041002	040801	040601	040301	033101	033102
Sample Date	04/14/98	04/10/98	04/10/98	04/08/98	04/06/98	04/03/98	03/31/98	03/31/98
pH	6.2	6.5	6.4	6.0	7.4	7.0 / 7.7	6.7	6.4
TOC*	6.1%	5.6%	3.7%	5.7%	3.8%	2.3% / 2.6%	3.8%	3.9%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"	100.0	100.0	100.0	100.0			100.0	100.0
3/4"	100.0	100.0	97.7	100.0			100.0	99.8
1/2"	100.0	98.7	96.4	97.9	100.0	100.0	98.7	99.2
3/8"	99.9	96.7	95.6	94.4	97.9	99.1	96.6	96.9
1/4"	97.8	93.4	93.9	91.1			93.5	93.8
#4	96.6	90.0	91.8	88.6	95.7	95.7	91.3	92.0
#8	89.5	82.2	86.7	83.1			85.6	86.2
#10	88.4	80.2	85.0	80.3	90.0	89.9	84.0	84.2
#16	82.8	75.1	79.4	71.9	85.5	86.2	78.7	78.8
#20	77.2	71.6	75.2	65.2			74.7	74.3
#30	70.0	65.8	69.4	56.9			68.4	67.8
#35	69.3	64.6	87.5	54.3			67.6	66.2
#40	65.7	60.3	63.2	49.8	70.0	73.0	64.3	62.9
#50	58.7	53.3	58.2	43.0	63.5	66.9	57.8	56.2
#60	53.9	48.2	51.1	38.5			52.3	50.8
#80	46.1	40.0	42.7	31.4			44.7	42.5
#100	41.3	35.1	37.7	27.3	46.0	49.8	39.3	37.3
#200	26.6	20.6	23.0	15.5	33.8	35.5	22.8	21.4
#270	20.3	14.3	17.0	10.3			17.1	14.4

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	TCLI	TCLI	TCLI	TCLI	TCLI	TCLI	ITL	ITL
LAB#	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001	FVG-001		
Report#	MC-08	MC-01	MC-02	MC-03	MC-04	MC-05		
Sample ID	033103	032501	032502	032503	032504	032505	030401	030201
Sample Date	03/31/98	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98	03/04/98	03/02/98
pH	6.5	6.8	6.1	7.2	7.3	6.5	6.7	7.3
TOC*	3.8%	7.5% / 1.9%[1]	6.3%	8.5%	9.8%	6.6%	7.2%	4.3%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"	100.0	100.0	100.0	100.0	100.0	100.0		
3/4"	100.0	100.0	100.0	100.0	100.0	100.0		
1/2"	99.5	98.7	99.5	98.9	98.1	100.0	100.0	100.0
3/8"	98.6	98.2	98.9	98.0	97.5	100.0	97.6	99.3
1/4"	95.9	96.1	97.7	96.0	95.0	99.5		
#4	95.1	95.0	96.3	94.0	93.5	98.4	93.4	93.1
#8	90.2	94.4	91.2	88.8	88.8	94.1		
#10	88.8	90.7	89.8	87.4	87.2	92.6	88.1	86.8
#16	83.6	87.8	84.1	83.0	83.1	87.8	83.9	83.2
#20	80.4	85.7	80.2	76.0	80.0	84.6		
#30	75.8	82.5	75.3	70.5	76.2	79.7		
#35	74.4	80.1	71.8	68.6	73.7	78.1		
#40	71.3	78.2	68.4	66.7	70.6	75.1	68.1	70.8
#50	65.8	73.0	61.5	62.7	64.4	66.9	60.8	65.1
#60	61.0	68.8	56.9	59.5	60.0	64.4		
#80	53.7	61.2	49.1	51.5	52.3	51.5		
#100	48.6	55.8	44.7	46.6	47.3	46.7	43.6	49.6
#200	30.3	36.0	29.7	29.4	30.8	34.5	23.8	26.9
#270	23.0	28.5	23.4	23.3	23.8	28.7		

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	ITL	ITL	ITL	ITL	ITL	ITL	ITL	ITL
LAB#								
Report#								
Sample ID	022301	022302	021901	021902	021701	021702	021301	021101
Sample Date	02/23/98	02/23/98	02/19/98	02/19/98	02/17/98	02/17/98	02/13/98	02/11/98
pH	7.1	7.3	7.5	7.5	7.5	7.6	7.2	7.4
TOC*	4.9%	6.4%	6.3%	3.3%(2)	9.3%	8.9%	13.1%	10.2%
Grain Size Analysi								
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"					100.0			
3/4"	100.0	100.0	100.0		97.4	100.0	100.0	100.0
1/2"			99.2	100.0	97.4	98.8	100.0	98.4
3/8"	95.2	99.7	97.0	99.3	96.2	97.4	96.9	97.2
1/4"								
#4	90.5	95.5	89.0	96.3	92.3	93.0	91.6	92.5
#8								
#10	69.0	79.3	76.0	88.5	85.0	85.7	83.9	85.1
#16	63.4	64.1	72.7	84.2	79.9	81.1	79.5	74.2
#20								
#30								
#35								
#40	38.8	39.2	61.5	69.5	63.0	65.7	65.6	45.8
#50	30.2	30.7	56.2	62.5	55.8	57.9	59.3	37.9
#60								
#80								
#100	18.4	18.9	42.8	48.1	38.7	41.6	43.5	23.8
#200	12.9	14.8	25.8	33.6	28.7	29.3	29.3	13.7
#270								

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

TOPSOIL TESTING
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

Lab ID	ITL	ITL	ITL	ITL	ITL	ITL	ITL
LAB#							
Report#							
Sample ID	021001	020901	020601	020602	020603	#1	#2
Sample Date	02/10/98	02/09/98	02/06/98	02/06/98	02/06/98	02/16/98	02/16/98
pH	7.4	7.3	6.7	7.4	7.5		
TOC*	10.5%	6.2%	5.5%	13.5%	7.9%		
Grain Size Analysi							
Seive Size	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)	Percent Passing (%)
1"						100.0	100.0
3/4"		98.9		100.0	100.0	98.1	99.1
1/2"	100.0	97.9	100.0	98.0	96.1	96.4	95.1
3/8"	98.1	95.4	98.3	95.5	95.1	95.3	92.5
1/4"							
#4	93.4	89.9	94.2	91.2	90.7	92.0	87.9
#8							
#10	83.2	81.6	87.9	85.0	84.4	86.3	81.9
#16	70.8	69.9	83.2	81.0	79.9	82.0	77.9
#20							
#30							
#35							
#40	35.9	30.8	65.7	65.5	63.5	64.6	62.9
#50	31.2	24.6	58.1	58.6	56.3	56.6	56.5
#60							
#80							
#100	18.1	13.8	40.9	42.9	40.5	38.5	41.0
#200	10.7	9.5	29.6	31.9	30.0	26.3	29.1
#270							

Notes:

* TOC = Total Organic Carbon

(1) Original result 7.5%, 1.9% on re-test

(2) This is an increase in weight of soil, therefore Total Organic Content by this method (ASTM D-2974), is not possible.

Prepared By: K. Petruzzelli
Checked By: S. Albrecht
6/18/98

E-2 Topsoil Testing – Nutrient Analysis

TOPSOIL ANALYSIS - pH ADJUSTMENT
PELHAM BAY LANDFILL CLOSURE AND FINAL REMEDIATION

			SAMPLE DATE				SAMPLE DATE	
			8/25/97	9/2/97	9/15/97		10/2?/97	
AREA#	ACREAGE	DATE OF FIRST SULFUR APPLICATION	pH			DATE OF SECOND SULFUR APPLICATION	pH	CO3
1	1.6	7/29	7.5	--	7.8		7.5	6.22
2	1.8	7/28	7.8	8.2	8.1		7.8	2.93
3	2.5	7/28	7.8	8.4	7.9		7.5	5.44
4	3.0	7/28	7.9	7.9	9.4		7.8	3.38
5	3.0	7/28-7/29	8.6	8.1	9.8		7.9	4.17
6	2.3	7/28-7/30	7.8	8.3	9.3		8.0	3.44
7	2.8	7/28-7/29	8.0	8.0	7.4		8.4	5.49
8	2.8	7/29-8/01	8.0	7.9	8.4		7.9	5.64
9	2.8	7/30-8/01	8.5	8.7	7.9		7.8	3.97
10	2.8	7/30	8.1	8.6	7.5		7.9	2.73
11	3.2	7/30	8.5	7.5	7.5		7.4	3.17
12	3.0	7/31	9.1	7.1	7.2		7.3	3.34
13	5.3	7/31	7.8	7.7	7.6		7.6	4.64
14	3.7	8/4,8/7	8.0	7.6	7.6		7.3	6.87
15	4.0	8/4,8/7	8.5	8.7	7.8		7.4	6.29
16	3.0	8/4,8/7	7.8	7.8	7.7		7.3	7.22
17	3.1	8/5,8/7	8.0	8.2	8.6		7.6	8.92
18	3.9	8/5,8/7	7.9	8.0	7.8		7.5	5.74
19	3.7	8/5,8/7	7.8	7.8	8.5		7.6	3.54
20	3.0	8/5,8/6	8.1	8.7/7.9	8.7		7.5	5.94
21	4.1	8/5,8/6	7.7	7.7	7.8		7.4	5.99
22	3.2	8/6	8.0	8.5	8.1		7.2	5.56
23	3.2	8/6	8.0	9.8	8.3		8.0	7.58
24	3.0	8/1, 8/6	7.9	8.0	9.7		7.7	7.56
25	3.0	8/1, 8/6	7.9	8.5	8.3		7.7	8.87
26	4.8	8/1, 8/7	8.1	8.6	8.1		7.7	5.39
27	2.0	8/1, 8/4	7.8	7.8	8.2		7.6	7.75

E-3 Topsoil Analysis – pH Adjustment

Top Soil Nutrient Analysis
Pelham Bay Landfill Closure and Final Remediation

Lab ID	NJAES	NJAES	NJAES	NJAES	NJAES	NJAES	NJAES	NJAES
Lab#	5576	5577	5579	5580	5578	5581	5716	5717
Sample ID	PBTS19/8/97	PBTS1	PBTS2	PBTS39/8/97	PBTS29/8/97	PBTS3	1A1	1A2
Sample Date	9/5/97	9/5/97	9/5/97	9/5/97	9/5/97	9/5/97	9/5/97	9/15/97
Soil Test								
Soil Texture	sandy loam	sandy loam	sandy loam	sandy loam	sandy loam	sandy loam	sandy loam	sandy loam
Soil pH [1]	7.5	7.6	8.2	7.3	7.9	6.8	7.8	7.8
Essential Nutrients (lbs/acre) [2]								
Phosphorus	125	133	91 [3]	125	83 [3]	46 [3]	86 [3]	94 [3]
Potassium	407	460	326	516	201 [3]	147 [3]	194 [3]	199 [3]
Magnesium	547	511	621	446	520	220 [3]	516	540
Calcium	4093	4180	10620	5083	4019	1433 [3]	3513	3758
Kjeldahl Nitrogen	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Trace Nutrients (ppm) [4]								
Copper	4.9	5.2	4	3.3	3.1	1.4	2.7	2.8
Manganese	49.7	48	39	73.2	61.9	108.2 [5]	48.2	56.8
Zinc	18.7	20.1	24.4	17.1	13.5	4.1	12.7	14.8
Aluminum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Comments:

[1] pH 6.8 - 6.9 very slightly acidic, 7.0 neutral, 7.1 - 7.3 - very slightly alkaline; 7.4 - 8.2 moderately alkaline.

[2] Unless noted, values are considered very high; well above desirable range for plant growth.

[3] Values are considered within the desirable range for plant growth.

[4] Unless noted, values are considered adequate for plant growth.

[5] Values are considered high; above range for plant growth.

[6] Acceptability for plant growth not indicated.

Note:

NJAES = New Jersey Agricultural Experiment Station

CNL = Cornell Nutrient Analysis Laboratories

ITL = Independent Testing Labs

N/A = Not analyzed

? = Data not legible

Prepared by: K. Petruzzelli

Checked by: S. Albrecht, 6/18/99

Top Soil Nutrient Analysis
Pelham Bay Landfill Closure and Final Remediation

Lab ID	NJAES	NJAES	NJAES	CNAL	ITL	ITL	NJAES	NJAES
Lab#	5718	5719	6485	4264-47 (H)	A3341-1	A3341-2	539	540
Sample ID	2A1	2A2	100907	280410	B7/S-5.20-22	B7/S-4.15-17	20604	20605
Sample Date	9/15/97	9/15/97	10/9/97	10/9/97	12/16/97	12/16/97	2/6/98	2/6/98
Soil Test								
Soil Texture	sandy loam	sandy loam	sandy loam	N/A	N/A	N/A	sandy loam	sandy loam
Soil pH [1]	7.8	7.8	8.1	7.0	N/A	N/A	7.8	7.7
Essential Nutrients (lbs/acre) [2]								
Phosphorus	88 [3]	82 [3]	102	43 [3]	90.7 (ppm) [6]	83.2 (ppm) [6]	137	218
Potassium	187 [3]	174 [3]	163 [3]	140 [3]	241 (ppm) [6]	223 (ppm) [6]	845	1014
Magnesium	503	481	623	840	N/A	N/A	722	909
Calcium	3553	3374	4928	6600	N/A	N/A	9483	11735
Kjeldahl Nitrogen	N/A	N/A	N/A	N/A	369 (ppm) [6]	395 (ppm) [6]	n	N/A
Trace Nutrients (ppm) [4]								
Copper	2.7	2.5	3.5	N/A	N/A	N/A	11.4	23.5 [5]
Manganese	53.9	47.5	50.8	32.0	N/A	N/A	38.4	47.5
Zinc	11.8	11.3	18.8	?	N/A	N/A	44.4	56.2 [5]
Aluminum	N/A	N/A	N/A	36.0	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	8.0	N/A	N/A	N/A	N/A

Comments:

[1] pH 6.8 - 6.9 very slightly acidic, 7.1 - 7.3 very slightly alkaline; 7.4 - 8.2 moderately alkaline.

[2] Unless noted, values are considered very high; well above desirable range for plant growth.

[3] Values are considered within the desirable range for plant growth.

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Note:

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CNL = Cornell Nutrient Analysis Laboratories

ITL = Independent Testing Labs

N/A = Not analyzed

Prepared by: K. Petruzzelli

Checked by: S. Albrecht, 6/18/99

Top Soil Nutrient Analysis
Pelham Bay Landfill Closure and Final Remediation

Lab ID	NJAES	NJAES	NJAES	NJAES
Lab#	541	774	775	776
Sample ID	20606	21711	21712	21713
Sample Date	2/6/98	2/17/98	2/17/98	2/17/98
Soil Test				
Soil Texture	sandy loam	sandy loam	sandy loam	sandy loam
Soil pH [1]	7.6	7.7	7.8	7.9
Essential Nutrients (lbs/acre) [2]				
Phosphorus	221	209	252	175
Potassium	1099	966	1186	987
Magnesium	981	781	934	732
Calcium	10230	7422	7286	6038
Kjeldahl Nitrogen	N/A	N/A	N/A	N/A
Trace Nutrients (ppm) [4]				
Copper	21.7 [5]	4.1	5.5	3.7
Manganese	45.0	45.4	40.3	32.4
Zinc	49.3	32.3	45.1	29.6
Aluminum	N/A	N/A	N/A	N/A
Iron	N/A	N/A	N/A	N/A

Comments:

[1] pH 6.8 - 6.9 very slightly acidic, 7.1 - 7.3 very slightly alkaline; 7.4 - 8.2 moderately alkaline.

[2] Unless noted, values are considered very high; well above desirable range for plant growth.

[3] Values are considered within the desirable range for plant growth.

[4] Unless noted, values are considered adequate for plant growth.

[5] Values are considered high; above range for plant growth.

[6] Acceptability for plant growth not indicated.

Note:

NJAES = New Jersey Agricultural Experiment Station

CNL = Cornell Nutrient Analysis Laboratories

ITL = Independent Testing Labs

N/A = Not analyzed

Prepared by: K. Petruzzelli

Checked by: S. Albrecht, 6/18/99

APPENDIX F
PHOTOS

Photo No. 1 – Construction of Concrete Slurry Wall Cap
Photo No. 2 – View of Pond B and Landfill Geomembrane Layer
Photo No. 3 – Installation of Smooth HDPE Geomembrane at Top of Landfill
Photo No. 4 – Seaming of Textured and smooth HDPE Membrane at Top of Landfill
Photo No. 5 – Detail of LFG Vent Boot
Photo No. 6 – Installation of 24" Diameter Pipe Downchute
Photo No. 7 – Geocomposite Layer
Photo No. 8 – LFG Collection Pipe Installation over Geocomposite Layer (with Geogrid Reinforcement)
Photo No. 9 – Installation of 30" Diameter HDPE Pipe Connection between Ponds B and C
Photo No. 10- Roadway Construction
Photo No. 11- Installation of Barrier Protection Material over Geocomposite Layer
Photo No. 12- Covering LFG Collection Line with Barrier Protection Material
Photo No. 13- Installation of LFG Flare Station
Photo No. 14- Construction of Swale E
Photo No. 15- Access Roadway and Drainage Swale
Photo No. 16- Construction of Topsoil Layer

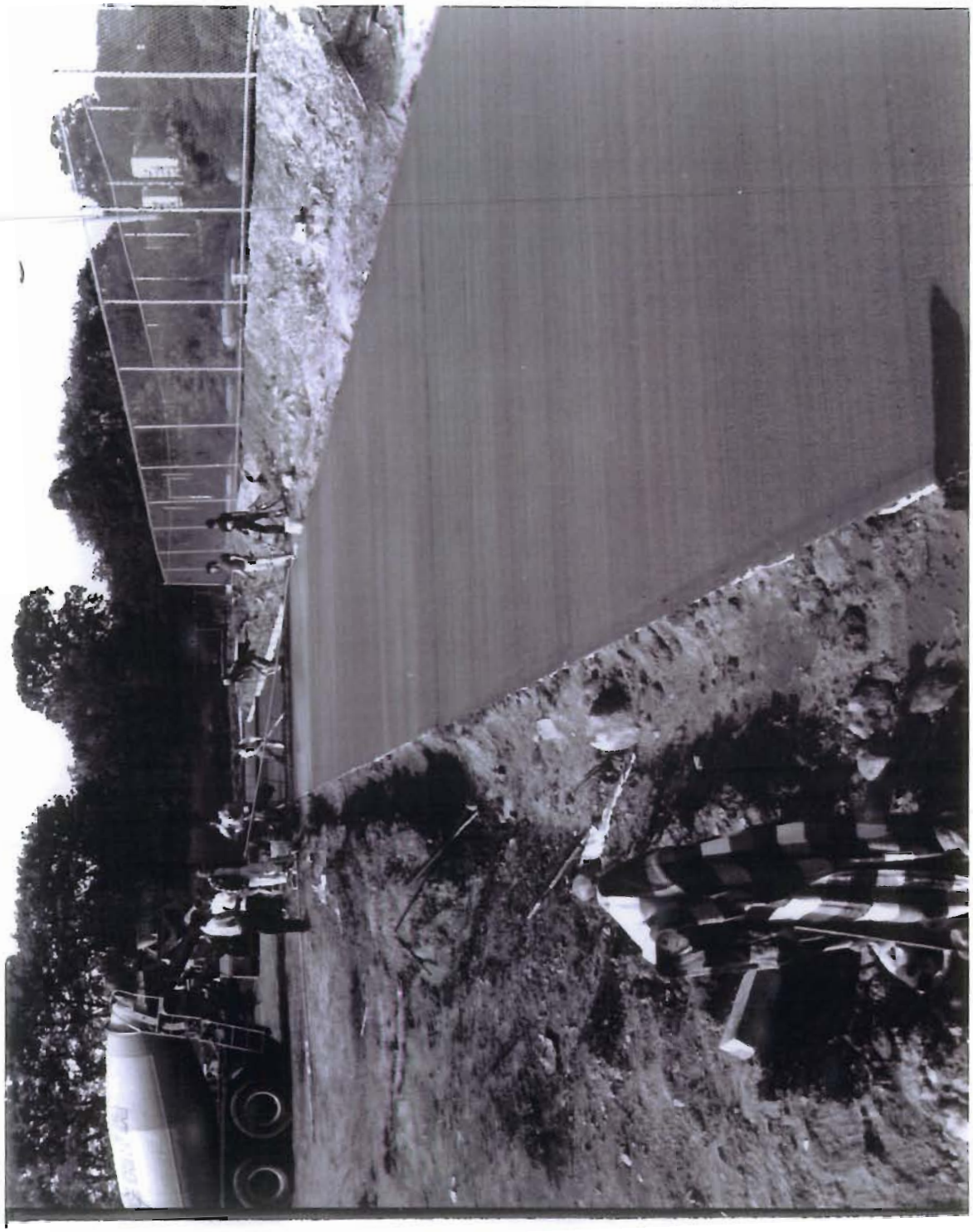


Photo No.1. Construction of Concrete Slurry Wall Cap. (October 14, 1994)

Photo No. 2. View of Pond B and Landfill Geomembrane Layer. (August 18, 1995)

Photo No. 3. Installation of Smooth HDPE Geomembrane at Top of Landfill
(November 1, 1995)

Photo No. 4. Seaming of Textured and Smooth HDPE Geomembrane at Top of Landfill (September 27, 1995)

Photo No. 5. Detail of LFG Vent Boot. (May 11, 1995)

Photo No. 6. Installation of 24" Diameter Pipe Downchute. (June 7, 1995)

Photo No. 7. Geocomposite Layer. (June 26, 1995)

Photo No. 8. LFG Collection Pipe Installation over Geocomposite Layer (with Geogrid Reinforcement). (August 1, 1995)

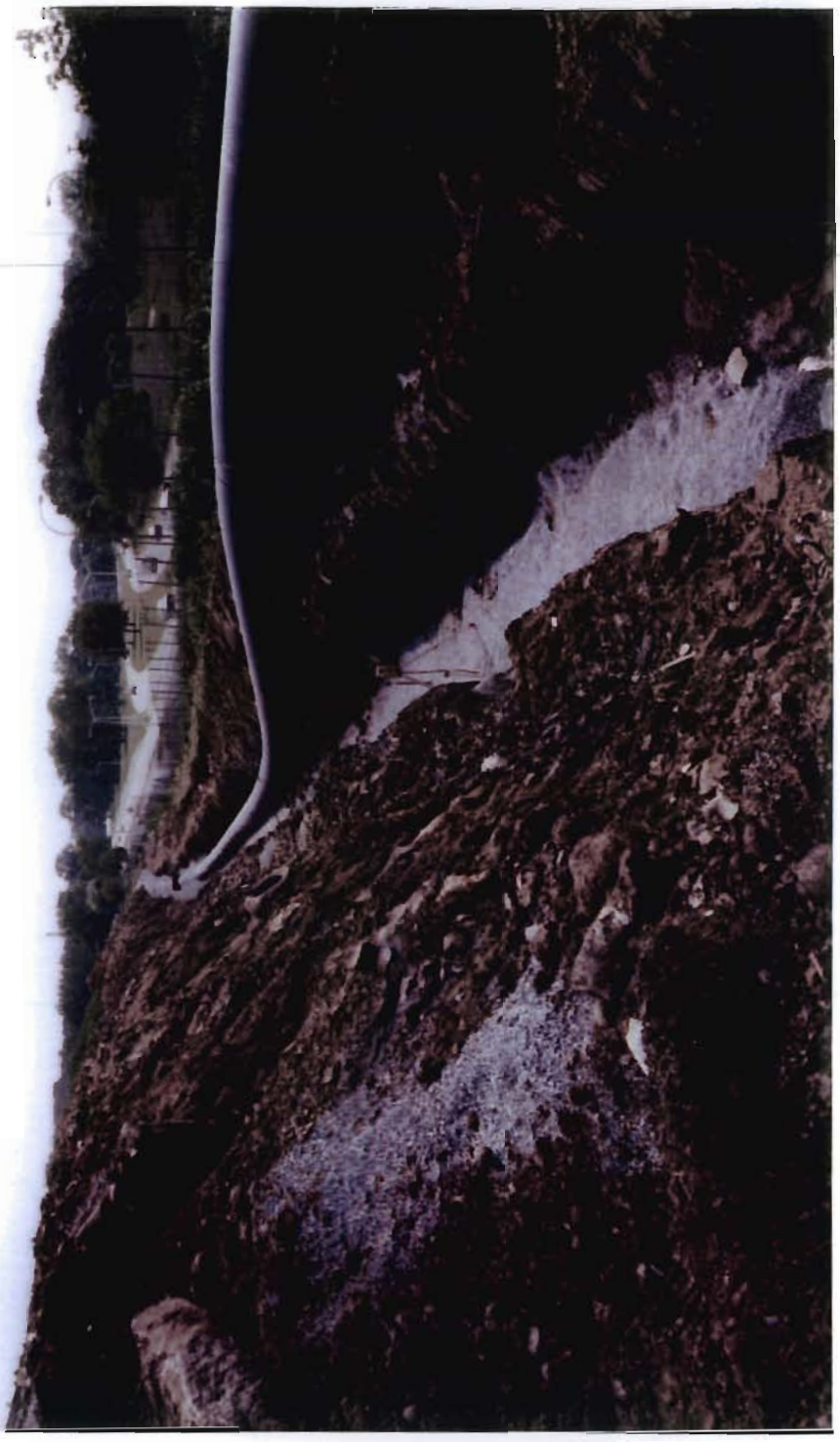


Photo No. 9. Installation of 30" Diameter HDPE Pipe Connection between Ponds B and C. (June 7, 1995)

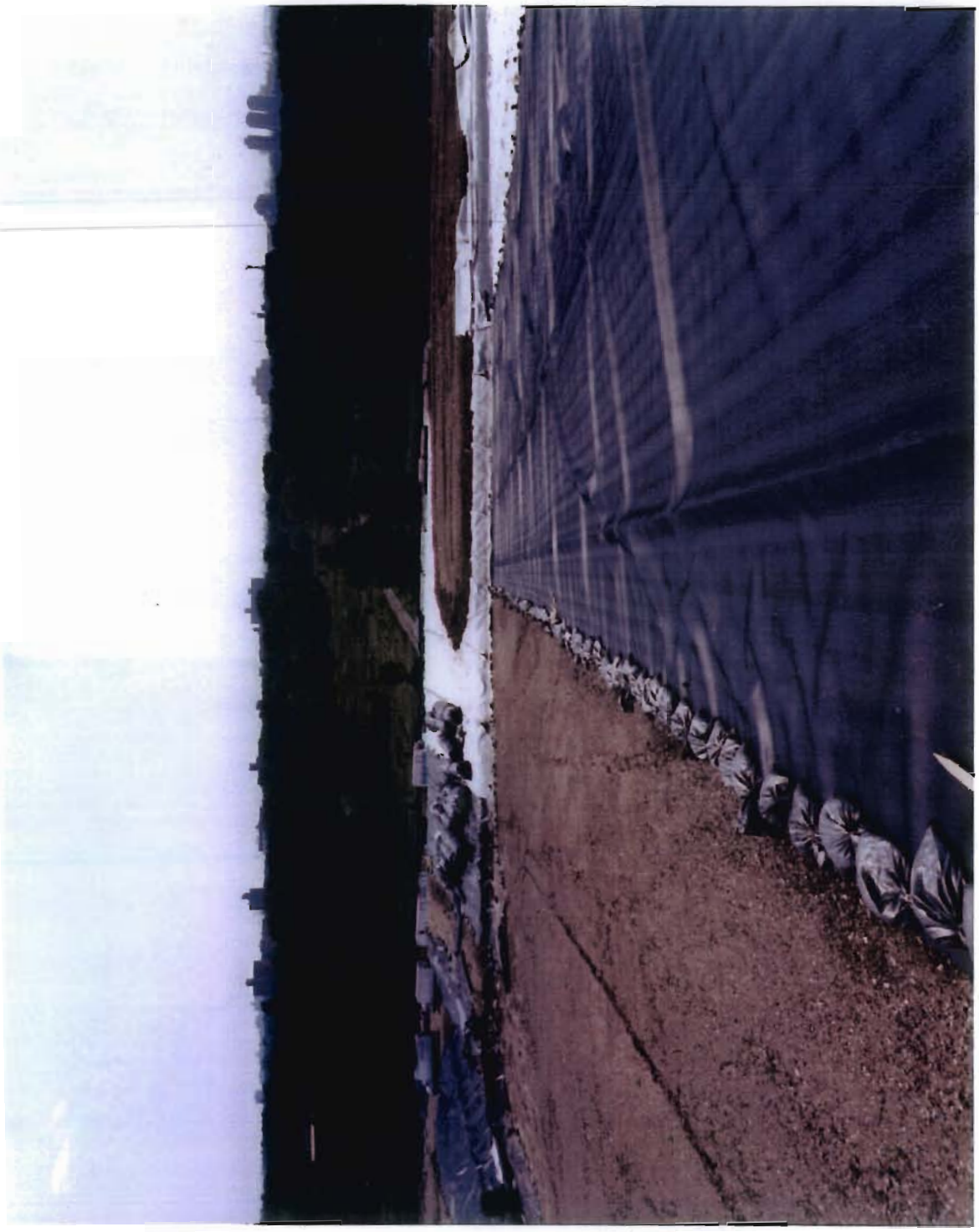


Photo No. 10. Roadway Construction. (June 7, 1995)

Photo No. 11. Installation of Barrier Protection Material over Geocomposite Layer.
(September 27, 1995)

Photo No. 12. Covering LFG Collection Line with Barrier Protection Material.
(July 12, 1995)

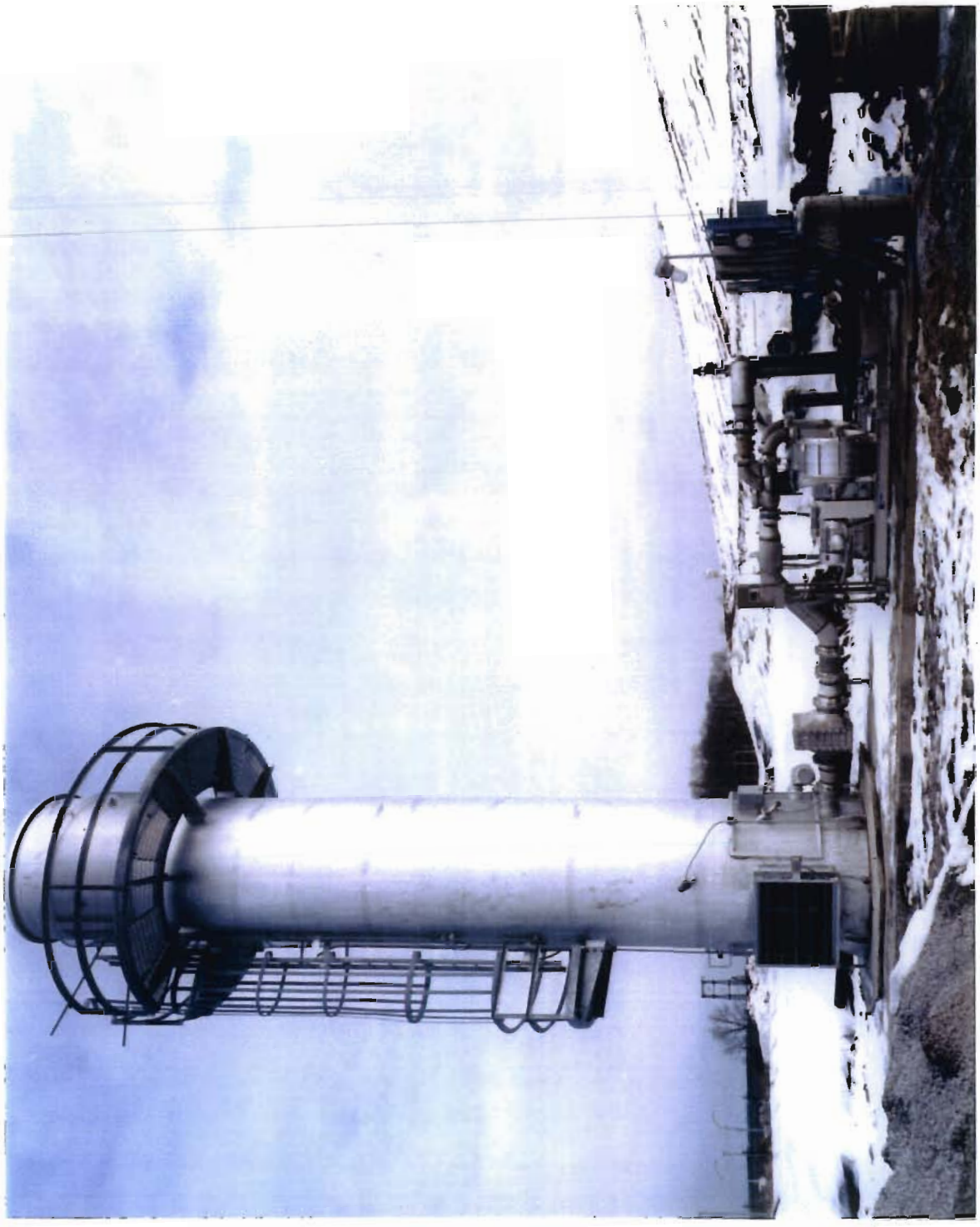


Photo No. 13. Installation of LFG Flare Station. (February 15, 1996)

Photo No. 14. Construction of Swale E. (August 21, 1996)

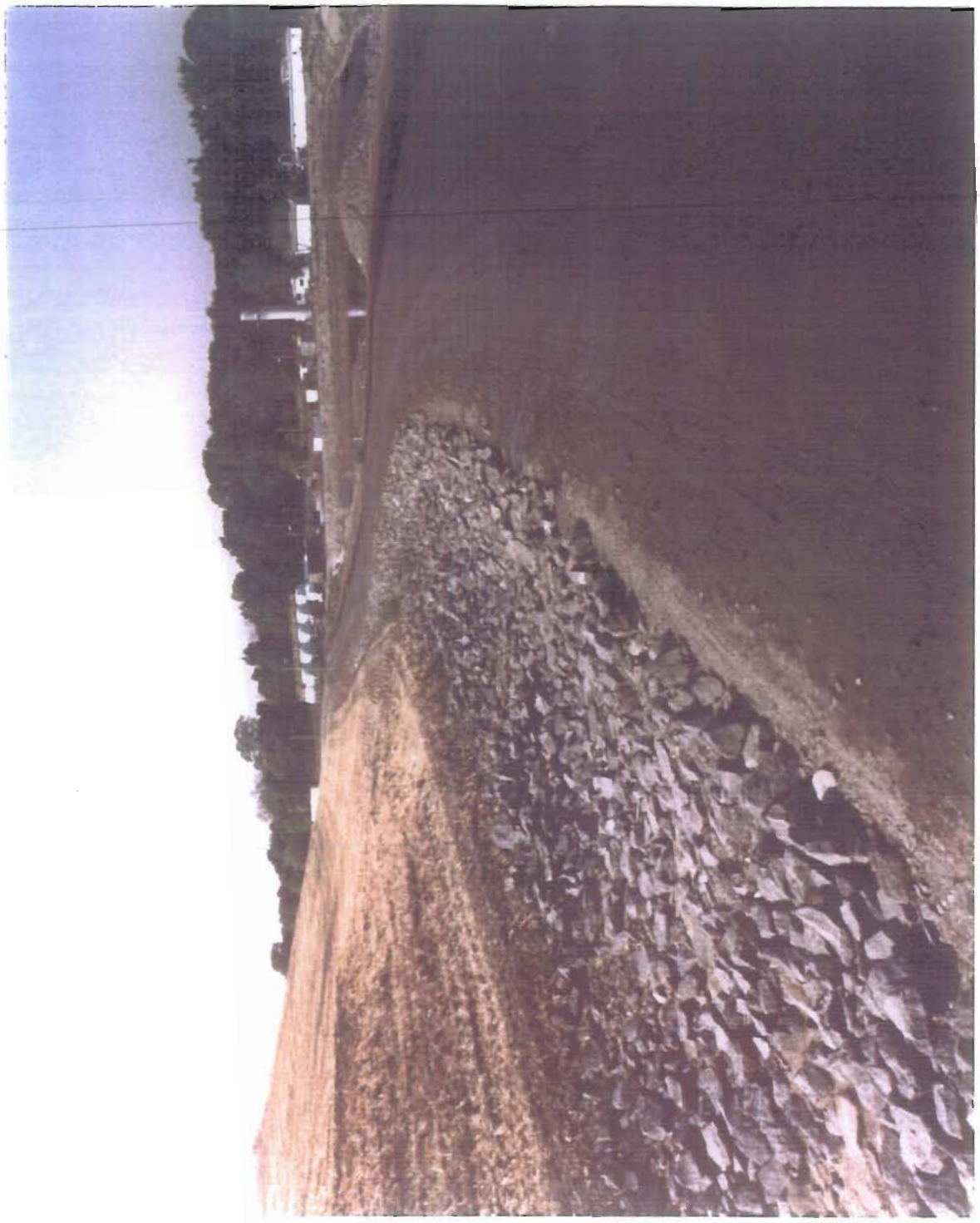


Photo No. 15. Access Roadway and Drainage Swale. (May 20, 1998)

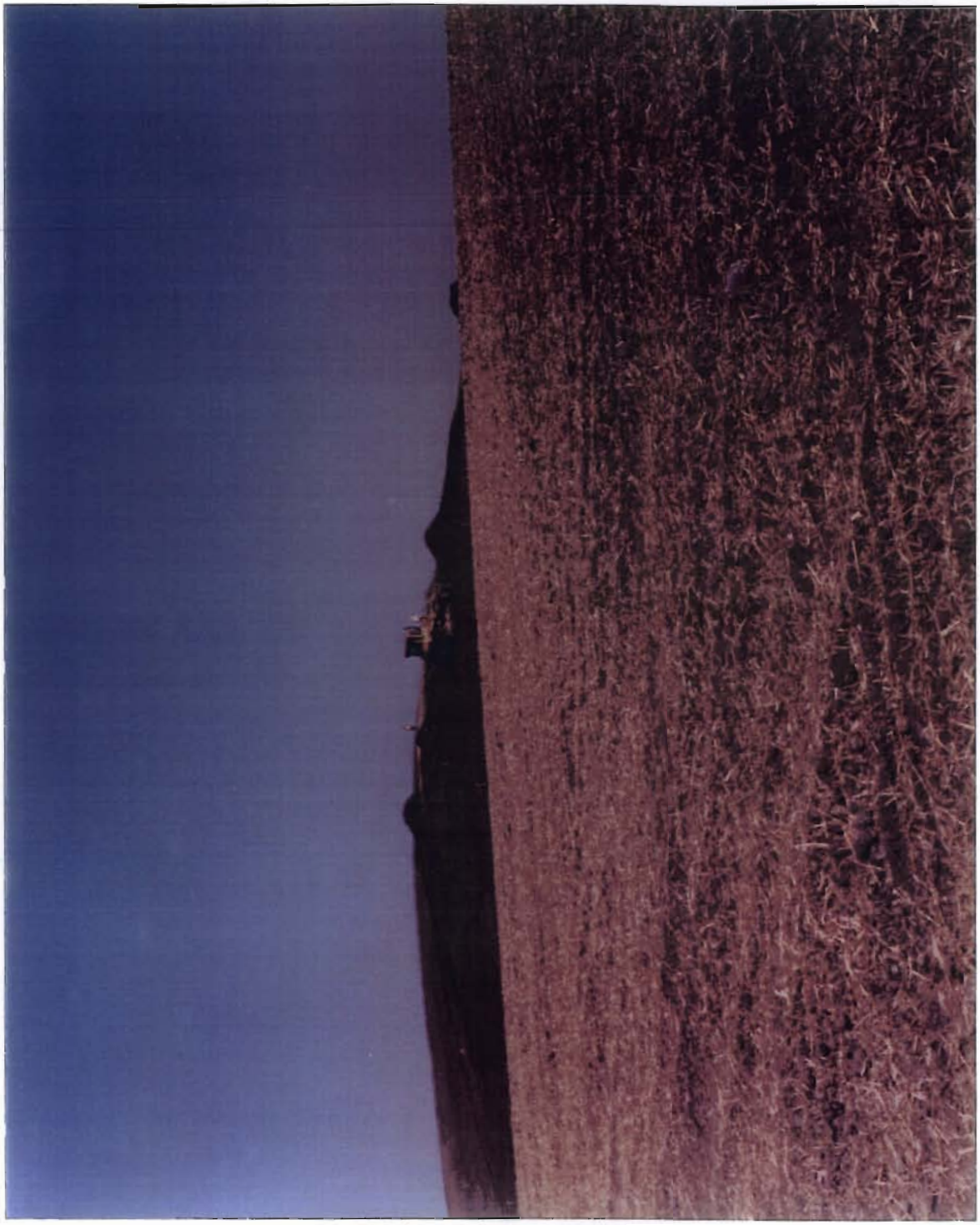
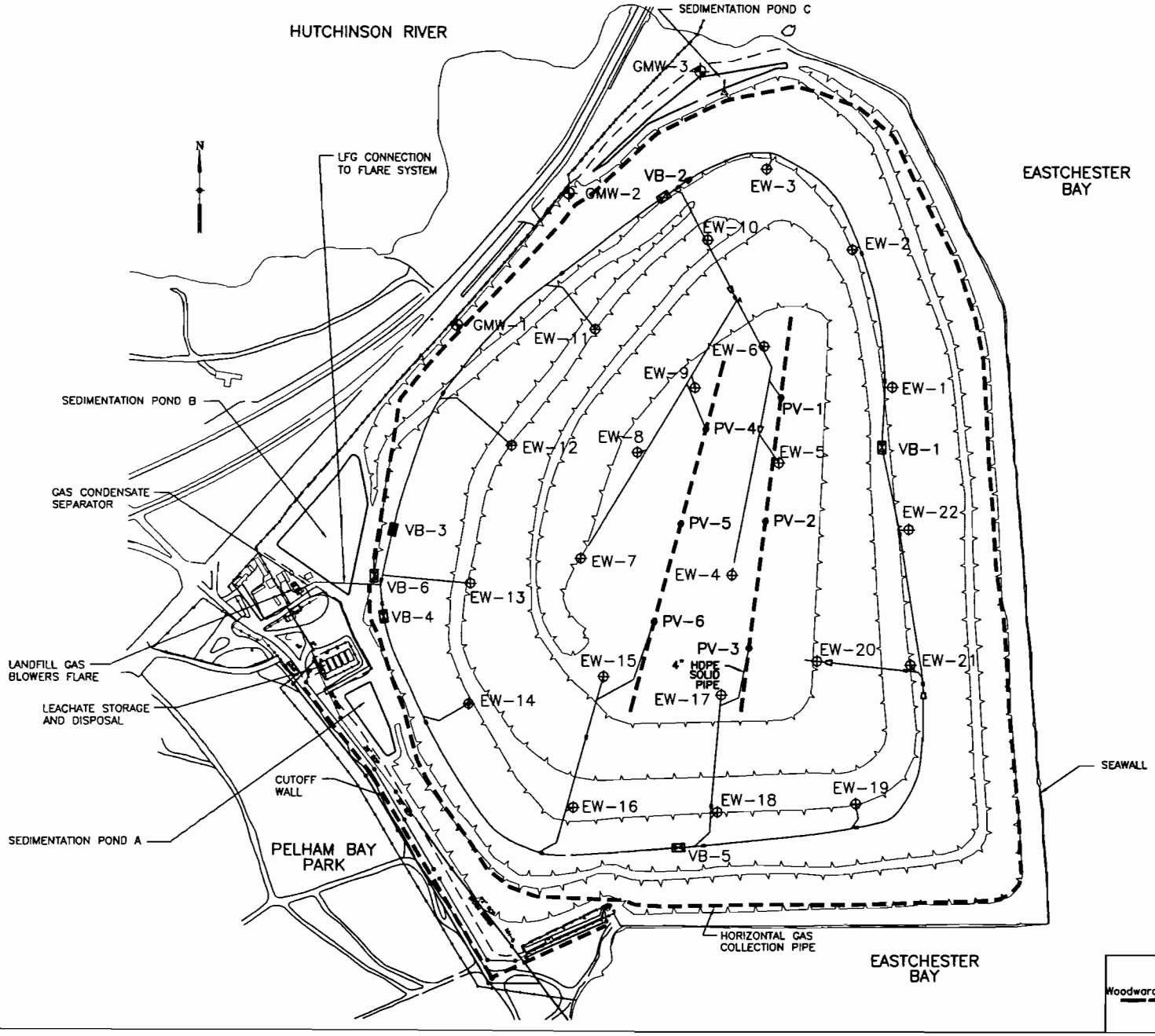


Photo No. 16. Construction of Topsoil Layer. (May 20, 1998)

APPENDIX G
FIGURES



LEGEND:

- EW-1 GAS EXTRACTION WELL
- GMW-1 GAS MONITORING WELL
- EMBANKMENT
- VB-1 VALVE BOX
- HORIZONTAL GAS COLLECTION PIPE
- PV-1 PASSIVE VENT
- LIMIT OF LANDFILL CAPPING SYSTEM
- SEAWALL
- CUTOFF WALL

DEP
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BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

PELHAM BAY LANDFILL REMEDIATION

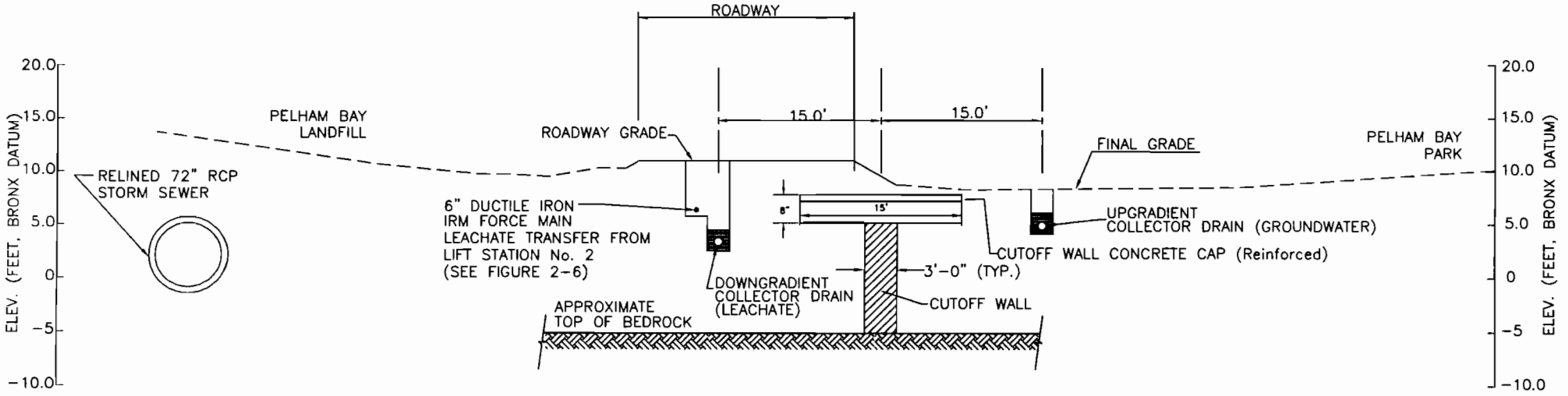
GAS COLLECTION SYSTEM, AND GAS COLLECTION SYSTEM
CONTRACT NO. 576-HP

FIGURE G-1
GAS COLLECTION AND FLARING SYSTEM

Woodward-Clyde Consultants, Inc.

DRAWN BY: RMF
DESIGN BY: PRD
CHECKED BY: ARM
GROUP LEADER: SMH

SCALE: 1" = 300'
DATE: AUG 1, 1996



NOTE: SEE CONTRACT HP-875 AS-BUILTS FOR LOCATION OF ELECTRICAL CONDUITS

SECTION A-A'

(NOT TO SCALE)

0 5 10 20

SCALE (FEET)

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BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

PELHAM BAY LANDFILL RECREATION

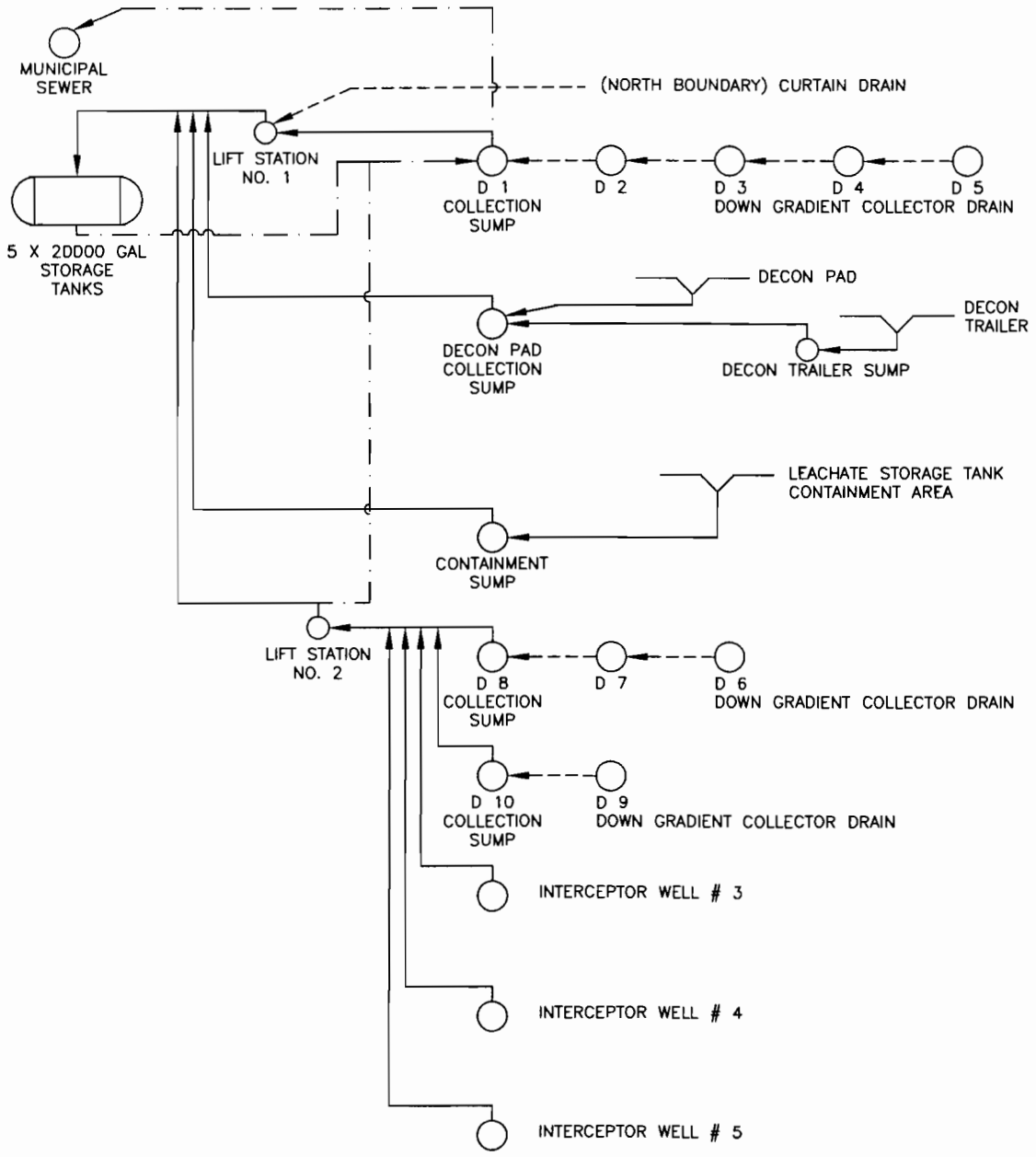
CONTRACT NO. HP-

FIGURE G-2
TYPICAL SECTION THROUGH CUTOFF WALL

Woodward-Clyde Consultants, Inc.

AS SHOWN

AUG 1, 1996



LEGEND

- PIPED DISCHARGE TO WET WELL
- DRAIN DISCHARGE TO WET WELL
- PUMPED DISCHARGE FROM WET WELL
- FUTURE PIPEWORK (CONTRACT 877HP)

DEP
THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL ENGINEERING

NO	DATE	DESCRIPTION	APPR'D

REVISIONS

CAPITAL PROJECT NAME & NO.: PELHAM BAY LANDFILL REMEDIATION

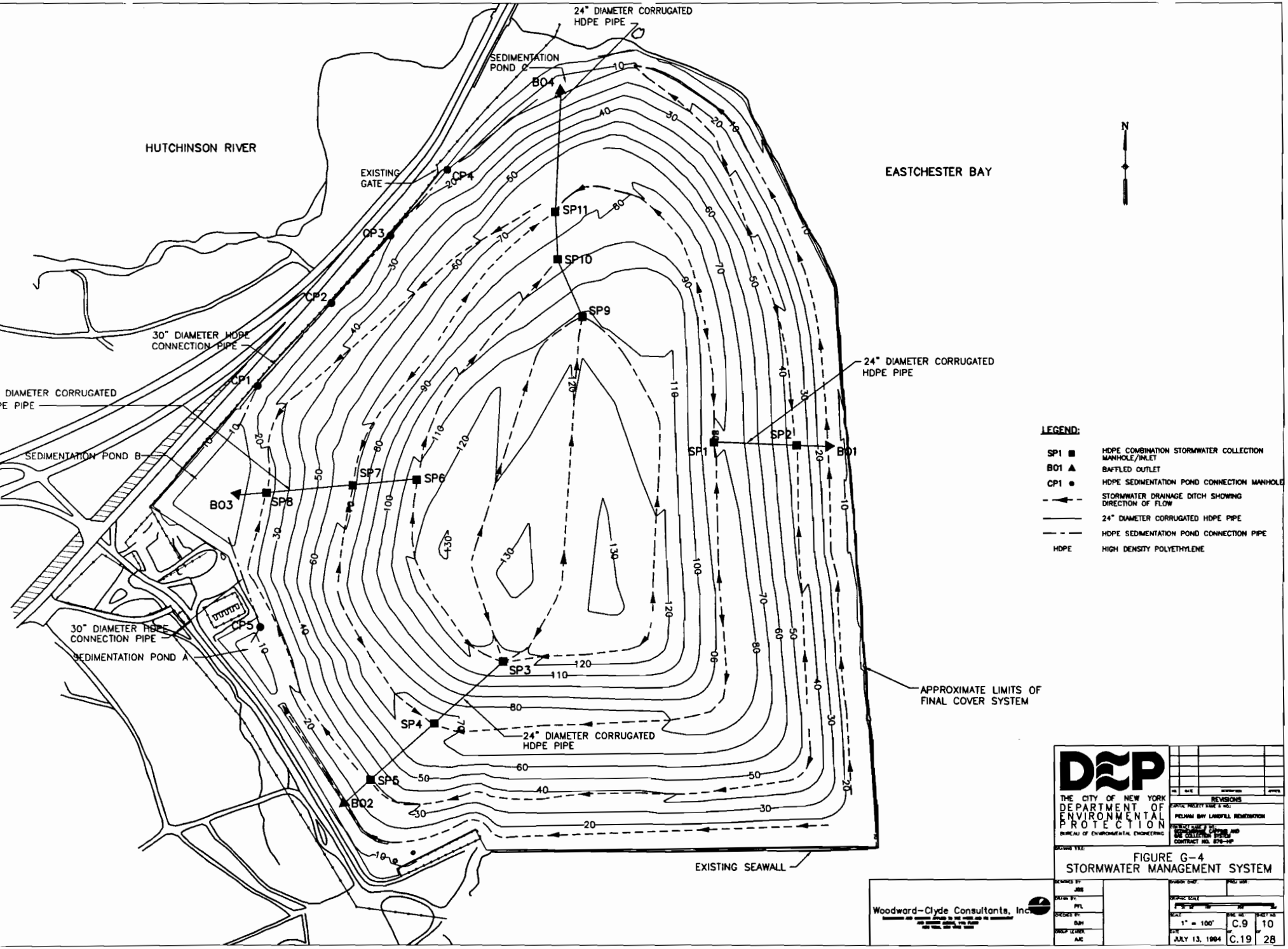
CONTRACT NAME & NO.: GEOMEMBRANE CAPPING AND GAS COLLECTION SYSTEM CONTRACT NO. 876-HP

DRAWING TITLE:

FIGURE G-3
LEACHATE COLLECTION SYSTEM SCHEMATIC DIAGRAM

Woodward-Clyde Consultants, Inc.
ENGINEERING AND SCIENCES APPLIED TO THE EARTH AND ITS ENVIRONMENT
343 SEVENTH AVENUE, 11th FLOOR
NEW YORK, NEW YORK 10001

DESIGNED BY: RMT	DIVISION CHIEF:
DRAWN BY: KAK	PROJ MGR:
CHECKED BY: RMT	GRAPHIC SCALE:
GROUP LEADER:	SCALE: NOT TO SCALE
DATE:	DWG. NO.:
	SHEET NO. OF:



THE CITY OF NEW YORK
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BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

CAPITAL PROJECT TITLE & NO.: PELHAM BAY LANDFILL REMEDIATION

PROJECT NAME & NO.: MUNICIPAL CAPPING AND GAS COLLECTION SYSTEM CONTRACT NO. 876-MP

FIGURE G-4
STORMWATER MANAGEMENT SYSTEM

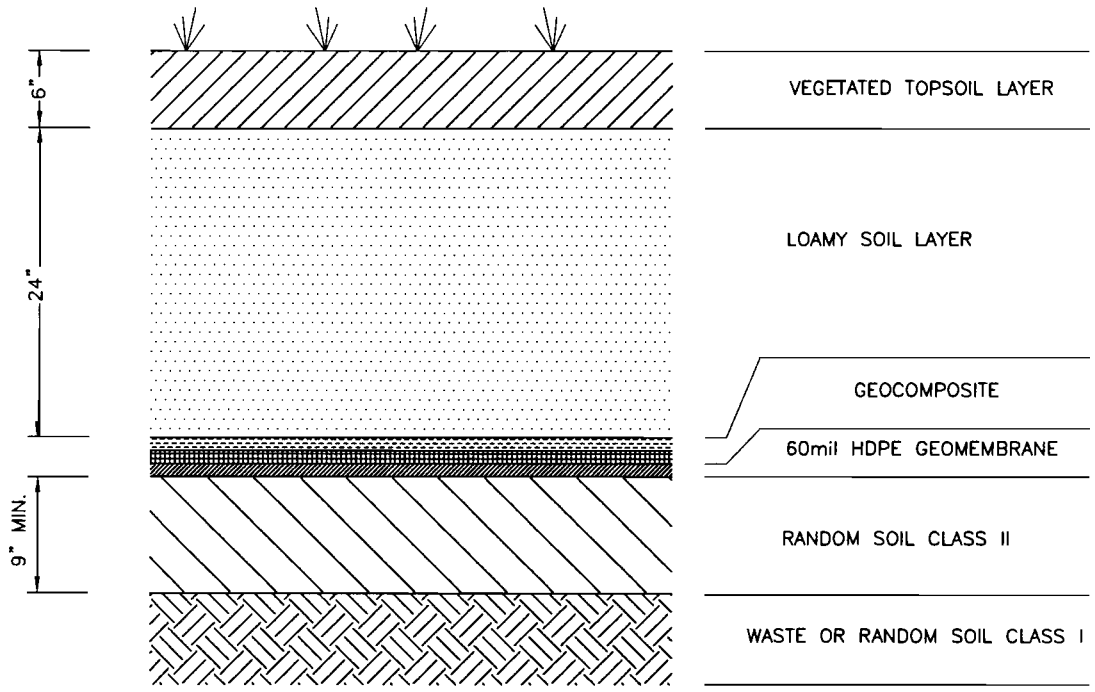
Woodward-Clyde Consultants, Inc.

DESIGNED BY: JBS
DRAWN BY: PFL
CHECKED BY: BJH
GROUP LEADER: AJC

GRAPHIC SCALE: 0 50 100

SCALE: 1" = 100'
DATE: JULY 13, 1994

DRG. NO. C.9 of C.19
SHEET NO. 10 of 28



TYPICAL COVER SECTION

NOT TO SCALE

THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

PELHAM BAY LANDFILL REMEDIATION

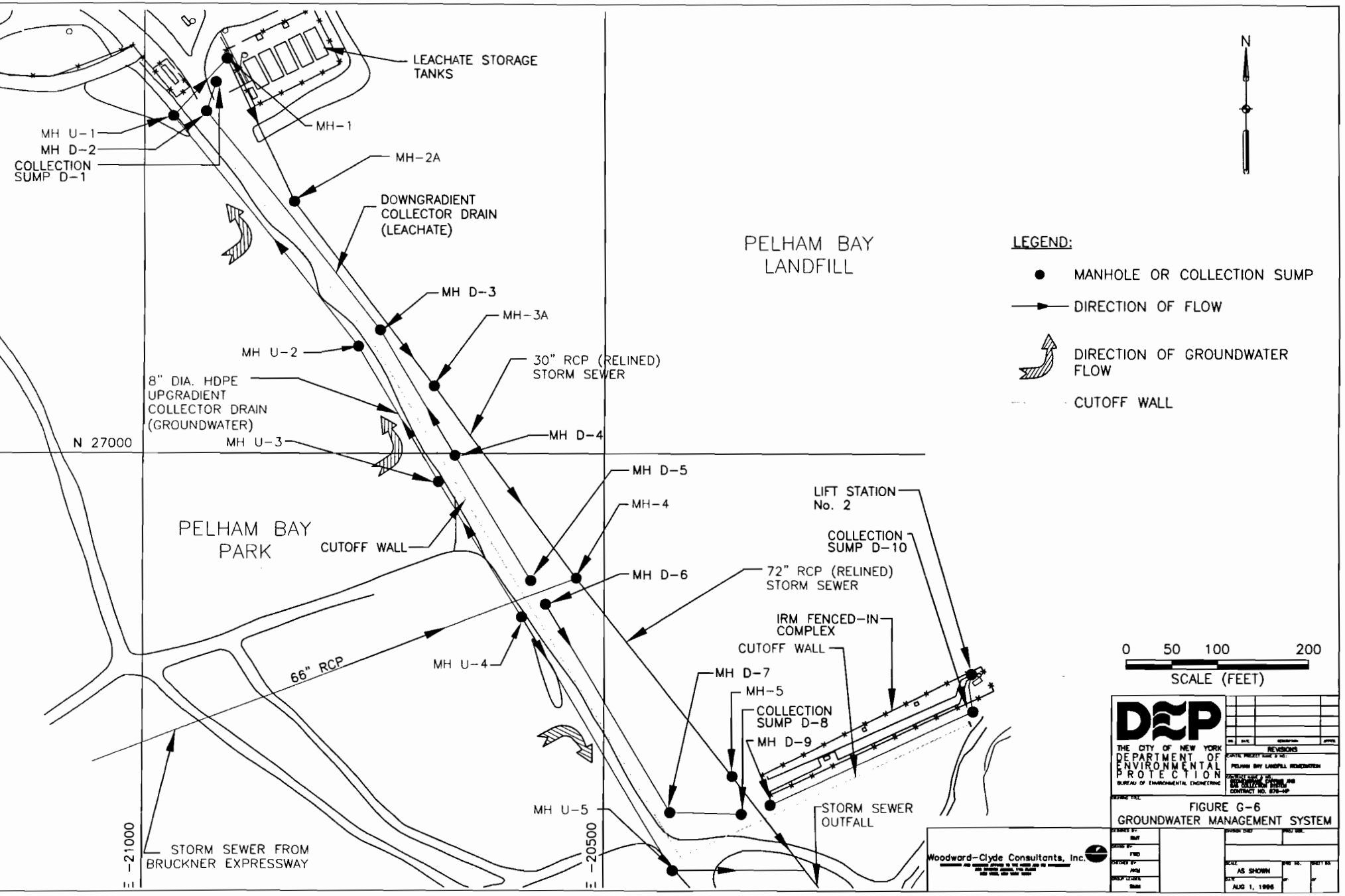
RECHARGE CYCLING AND GAS COLLECTION SYSTEM
CONTRACT NO. 876-HP

FIGURE G-5
TYPICAL LANDFILL COVER SECTION

Woodward-Clyde Consultants, Inc.

DESIGNED BY: WLP
DRAWN BY: WLP
CHECKED BY: BJH
GROUP LEADER: AJC

SCALE: AS NOTED
DATE: JULY 13, 1994
DWG. NO.: C.9
SHEET NO.: 9 OF 36



THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

PELHAM BAY LANDFILL REMEDIATION

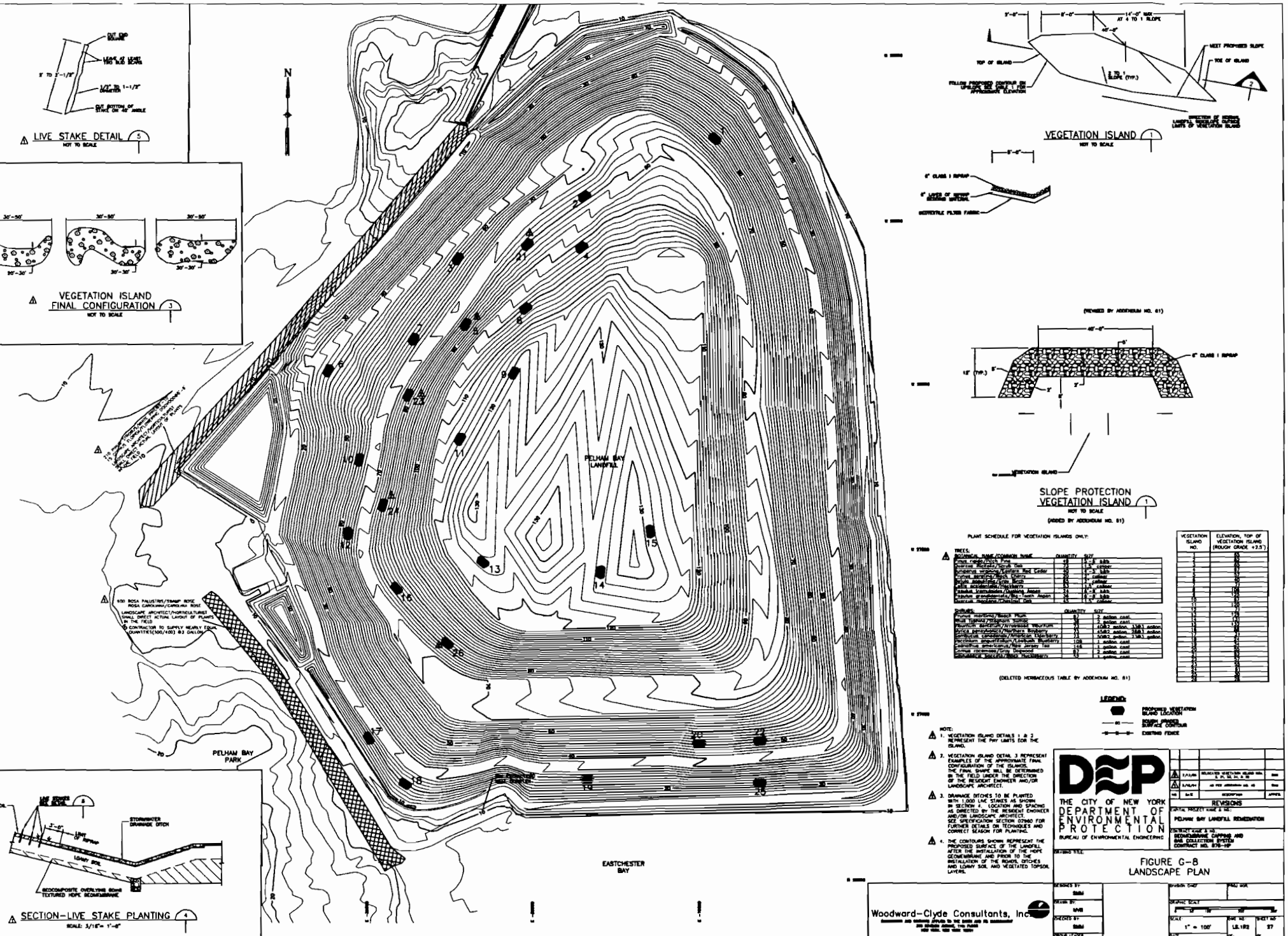
CONTRACT NO. 676-HP

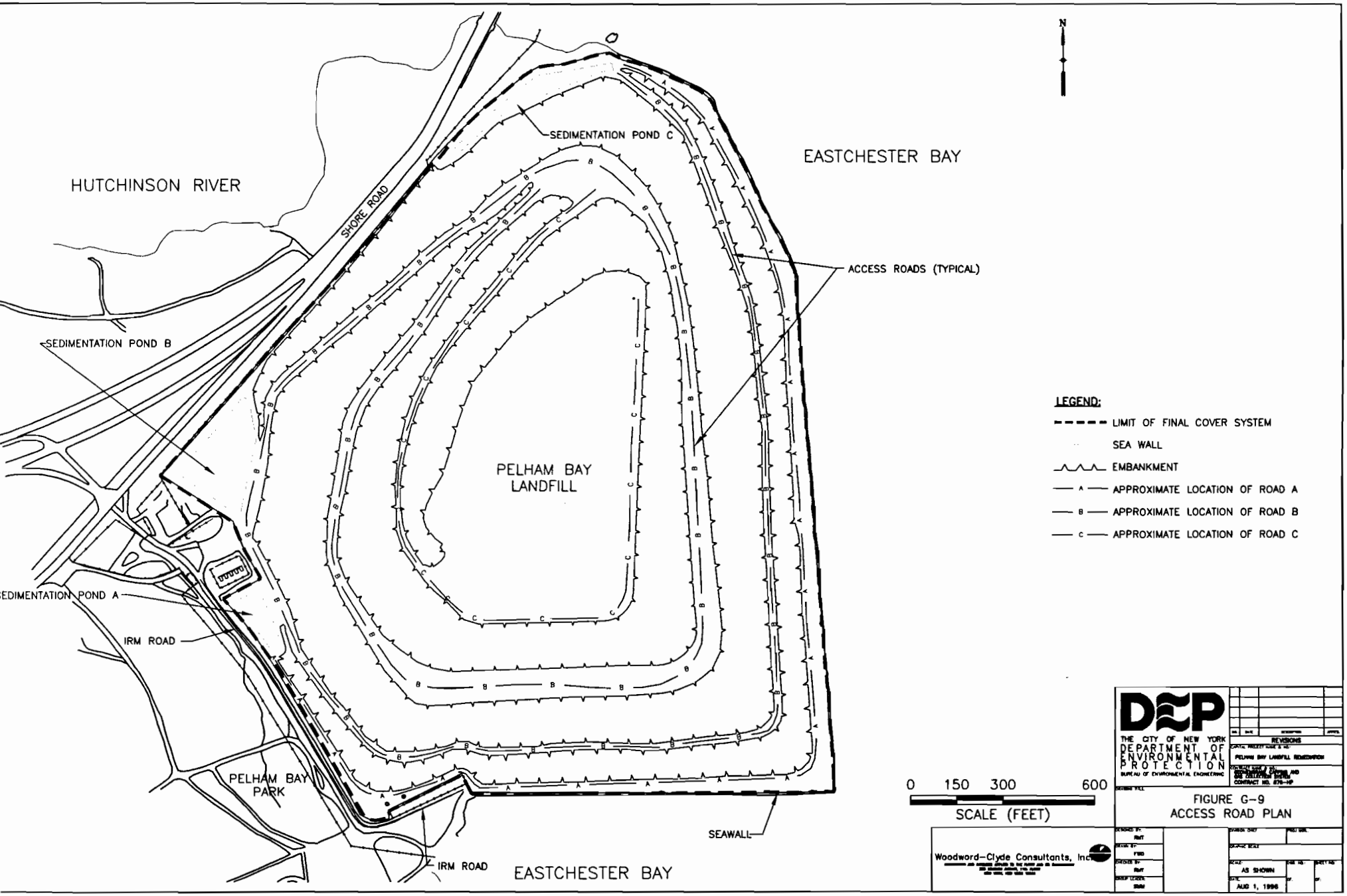
FIGURE G-6
GROUNDWATER MANAGEMENT SYSTEM

Woodward-Clyde Consultants, Inc.

AS SHOWN

AUG 1, 1996


N
PELHAM BAY LANDFILL
PELHAM BAY PARK
EASTCHESTER BAY
STORMWATER DRAINAGE DITCH
LOAMY SOIL
GEOCOMPOSITE OVERLYING 60mil TEXTURED HDPE GEOMEMBRANE
LIVE STAKE DETAIL 5
NOT TO SCALE
VEGETATION ISLAND FINAL CONFIGURATION 3
NOT TO SCALE
SECTION-LIVE STAKE PLANTING 4
SCALE: 3/16"= 1'-0"
VEGETATION ISLAND 1
NOT TO SCALE
SLOPE PROTECTION VEGETATION ISLAND 1
NOT TO SCALE
(ADDED BY ADDENDUM NO. 01)
(REVISED BY ADDENDUM NO. 01)
6" CLASS I RIPRAP
VEGETATION ISLAND
PLANT SCHEDULE FOR VEGETATION ISLANDS ONLY:
TREES.
SHRUBS:
(DELETED HERBACEOUS TABLE BY ADDENDUM NO. 01)
VEGETATION ISLAND NO.
ELEVATION, TOP OF VEGETATION ISLAND (ROUGH GRADE +2.5')
LEGEND:
PROPOSED VEGETATION ISLAND LOCATION
PROPOSED CONTOUR
EXISTING CONTOUR
EXISTING FENCE
NOTE:
1. VEGETATION ISLAND DETAILS 1 & 2 REPRESENT THE PAY LIMITS FOR THE ISLAND.
2. VEGETATION ISLAND DETAIL 3 REPRESENT EXAMPLES OF THE APPROXIMATE FINAL CONFIGURATION OF THE ISLANDS. THE FINAL SHAPE WILL BE DETERMINED IN THE FIELD UNDER THE DIRECTION OF THE RESIDENT ENGINEER AND/OR LANDSCAPE ARCHITECT.
3. DRAINAGE DITCHES TO BE PLANTED WITH 1,000 LIVE STAKES AS SHOWN IN SECTION 4. LOCATION AND SPACING AS DIRECTED BY THE RESIDENT ENGINEER AND/OR LANDSCAPE ARCHITECT. SEE SPECIFICATION SECTION 02960 FOR FURTHER DETAILS ON TECHNIQUES AND CORRECT SEASON FOR PLANTING.
4. THE CONTOURS SHOWN REPRESENT THE PROPOSED SURFACE OF THE LANDFILL AFTER THE INSTALLATION OF THE HDPE GEOMEMBRANE AND PRIOR TO THE INSTALLATION OF THE BIOMIX, DITCHES AND LOAMY SOIL AND VEGETATED TOPSOIL LAYERS.
DEP
THE CITY OF NEW YORK DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL ENGINEERING
REVISIONS
CAPITAL PROJECT NAME & NO.
PELHAM BAY LANDFILL REMEDIATION
CONTRACT NAME & NO.
REMEDIATION CAPPING AND GAS COLLECTION SYSTEM
CONTRACT NO. 678-1EP
DRAWING TITLE:
FIGURE G-8
LANDSCAPE PLAN
Woodward-Clyde Consultants, Inc
DESIGNED BY: SMM
DRAWN BY: MVR
CHECKED BY: SMM
GROUP LEADER: AJC
DIVISION CHIEF:
PROJ. MGR.
GRAPHIC SCALE
SCALE: 1" = 100'
DATE: FEBRUARY 13, 1998
DWG. NO.: LS.1R3
SHEET NO.: 37
OF: 38



THE CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL ENGINEERING

REVISIONS

PELHAM BAY LANDFILL REMEDIATION

FIGURE G-9
ACCESS ROAD PLAN

Woodward-Clyde Consultants, Inc.

AS SHOWN

AUG 1, 1996

Damage to the Liner

The Problem

High winds started on Friday, February 26, 1996, forcing a halt to all construction activities on the landfill. At the time we were in the process of installing geo-composite material and Barrier Protection Layer (BPL) on the geomembrane previously installed on the top of the landfill.

Since the wind exceeded 40mph at the base of the landfill no one was allowed to travel to the top where the wind was usually 10-15MPH higher and the potential for injury greater.

The high wind condition continued for the weekend and subsided by Monday March 1st On Monday afternoon the crew ventured back on the landfill to investigate the extent of the damage the weekend storm has caused to the liner. At the top of the landfill it was revealed that approximately 13:5 acres of lining on the top was damaged.

Of the damaged areas approximately 10 acres were completely missing as it had blown off the top and was at the base or in the surrounding water or park. The nature of the damage to the liner that was left on the top was stretching in areas and shrinking in others.

Damage

Based on the condition of the damaged areas two theories emerged as the main cause of the damage: wind or fire.

The idea of a fire would seem to be remote at best, as conditions on the top of the landfill at that time would not be conducive to a fire. On the one hand, the conditions of high winds with little or no gas accumulation would make a fire unlikely. On the other hand, there could have been accumulation of landfill gas below the liner in the gas collection layer. This landfill gas could have been directed upward and accumulated below the liner on the landfill "plateau". However the shrinking and fusing of large portions of the line gave credence to the theory.

The second and more plausible theory is that of extensive wind damage. It is possible that the high winds at the top of the landfill reached over 70mph and caused excessive stretching of the liner. As the liner broke and flapped in the wind it stretched and then fused as it lost its elasticity.

Neither theory was extensively researched and the focus soon returned to repairing the damaged areas and the closure of the landfill.

The contractor made a claim to his insurance company and the insurance company of the liner installation subcontractors. A settlement was reached by all parties and the liner replacement started.

Replacing the Damaged Liner

Extensive testing on the liner that remained was conducted to set the limits of the damaged areas. Portions of the liner were removed and tested on site and samples were sent to the lab for conformation. All the liner that exhibited any result that did not meet the requirement of the contract was removed and new liner was installed.

Appendix B-6 and B-7 shows the QC testing results

New liner was installed in the spring and the liner was completed by the summer of 1996.

Section 6.5 Landscaping

In the fall of 1995 the contractor started to stock pile topsoil at the base of the landfill in anticipation of spreading the soil during the winter and start the final planting in the spring of 1996.

The contracts called for spreading 6"of topsoil over 2 feet of barrier protection layer and landscaping the soil with a design seed mix of prairie grass and other wild grasses. The seed mix was specially designed for the landfill and was purchased and stored at a seed depot.

Topsoil

The contractor investigated and submitted various sources that were going to be used proposed to provide the quantity and quality of topsoil to be used on the landfill. However due to the large volume and the quality required, the required material could not be obtained naturally and would have to be manufactured from soil and compost.

Soil delivery:
The contract required the topsoil testing @ 1 sample per source. As the possible sources increased and quality of the material decreased additional soil testing was required. A change order was issued to the contractor for additional testing at the source and at the site.

After soil testing at the various processing sites two subcontractors were eventually approved to deliver material to the site for use as topsoil. The two approved subcontractors delivered approximately 20,000 cubic yards of topsoil that was stockpiled at the base of the landfill. The material was tested at the source and at the landfill and the data in the resulting test report was in compliance with the contract and was submitted to the New York City DEP.

Soil Spreading and planting
Spreading of the topsoil started on the east side of the landfill in February of 1996. Starting on the lower level of the landfill 6" of topsoil was spread by bulldozers. After approximately 30 acres were covered with topsoil the area was hydro-seeded with the design seed mix and a rye grass seed mix.

Landscaping
The hydro-seeding operation consists of mixing the specified prairie seed with a rye grass and sheep fescue seeds, water and green coagulant indicator. The rye grass and fescue was used as a quick germinating grass that would provide shade for the prairie seed during the initial germination period. During April and May of 1996 the lower area of the landfill was hydro-seeded with the mix and the area covered with straw mulch for shade and moisture retention.

Initial Growth

In June and July of 1996 the specified prairie grass or the rye grass did not germinate as expected. It was initially believed that this was due to the hot summer days in June and July and the seeds would germinate as the heat subsides. The soil and the seeded areas were inspected by personnel from the New York City Parks Department, the landscaper and Cornell Cooperation extension to ascertain the reason why the grass was not germinating as anticipated. The results from the testing and inspection showed no adverse conditions that would prevent the specified seed mix from growing.

By September 1996 the grass did not show any improvement and additional testing and consultations with Cornell and Parks Department, revealed that the pH was above the acceptable limit for the specified prairie grass mix.

Investigation

The DEP and DEC commissioned Rutgers University as an outside source to investigate the problem with the lack of growth in the area previous landscaped. The focus of the investigation was on soil source, seed stock and planting technique.

Additional investigation was conducted by the NYC IG, NYS DEC and the court appointed Special Referee Office to see if any malfeasance was involved.

Soil: After additional testing on landfill, at the source and in the stockpile, it was determined that the soil was of low quality and had a high pH which would prevent the grass from growing.
The investigators reviewed the test results from the contractors approved lab and found inaccuracies with the data and poor QA/AC for the lab. The lab was dismissed and a new lab was contracted to do all further soil testing.

Soil Source: One of the approved sources for the topsoil to the site manufactured the topsoil from a blend of compost and dirt and stockpiled the material next to a recycling area. The investigation revealed that the recycled material along with other unspecified material was added to the topsoil blend as a bulking agent. These material consisting of wood, crushed concrete, glass and other crushed material.

Seed Stock: Testing of the seed that was purchased and stored for use on the landfill revealed germination rates below normal. The germination rates for the stock material were less than the specified rate. New seeds would therefore be required.

Planting Technique: The planting schedule and technique of the subcontractor were reviewed and found to be substandard and a new sub-contractor was hired to complete the project.

The investigation by the NYC DEP IG and the Federal Special Referee revealed that there was no malfeasance by City or State employees and the problem was contractual

between Brecco the contractor and their sub-contractors for the soil, seed and landscaping.

New Landscaping

The result of the investigation resulted in new techniques for planting and a new protocol for soil testing and delivery to the site.

The recommendation of the investigation was:

(1) The existing soil at the site both topsoil and the soil for the barrier protection layer was to be treated with sulfur to reduce the pH

(2) The entire landfill (including the areas previous topsoiled) was to be covered with 6 inches of new topsoil.

(3) New seeds were to be used

(4) A new and more experienced landscaper was to be hired.

With a new testing protocol featuring additional soil testing and more frequent site visits, new topsoil was manufactured and delivered to the site.

Sulfur was added to the existing soil and mixed to lower the pH of the existing soil. After mixing and testing the pH of the soil was lowered and the new topsoil was spread over the existing soil.

During the spring and fall of 1999 the landfill was landscaped using new soil, new seed and a new landscaper.

The new soil was hydroseeded and straw mulch was used to cover the seeds for protection from the sun and also as a moisture retention barrier.

Growth on the landfill was established by the summer of 2000 and deemed to be successful by the spring of 2001.