

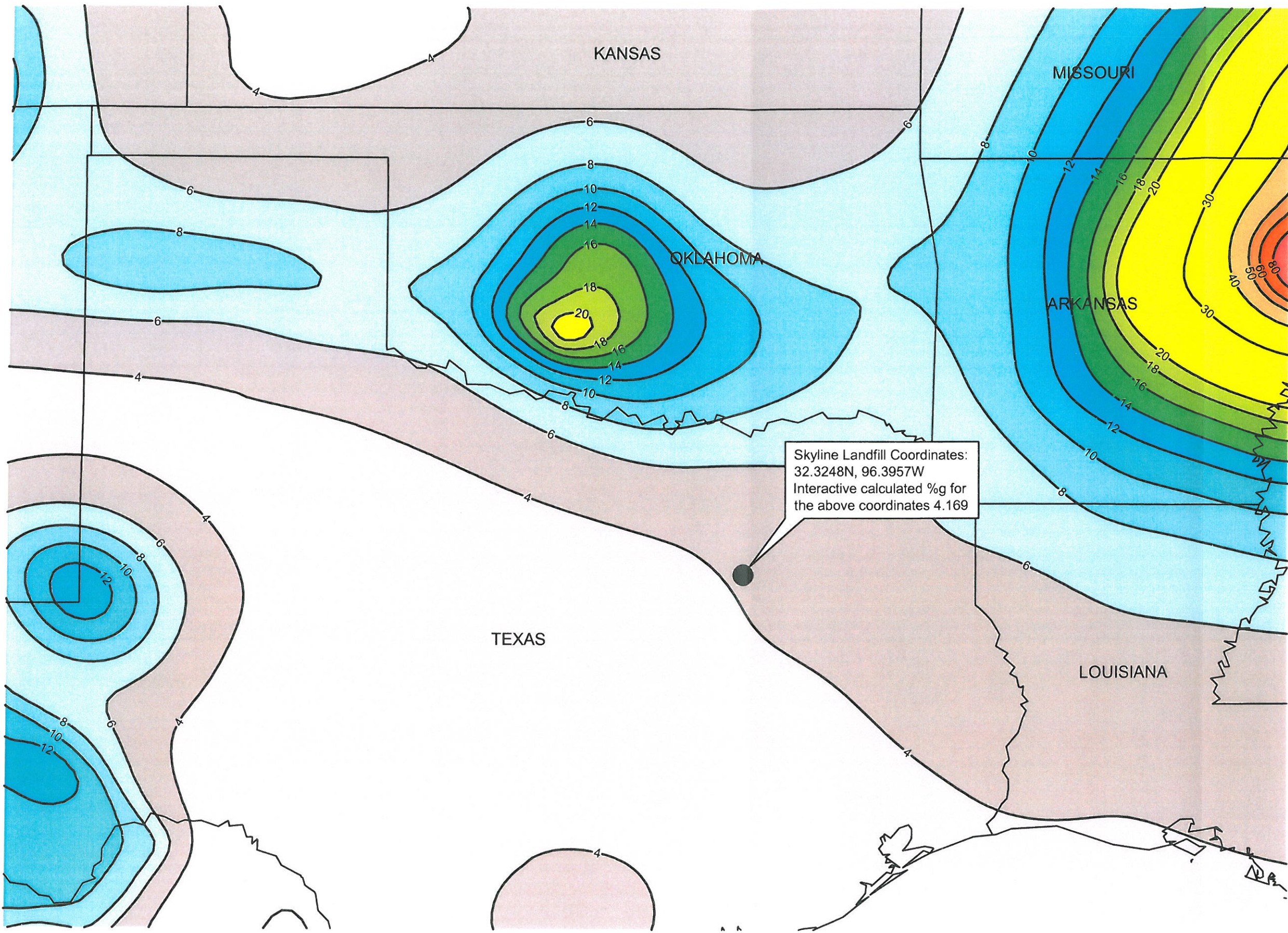


**SKYLINE LANDFILL**  
**APPENDIX E4**  
**FAULT AND SEISMIC DATA**

Seismic Impact Zone Map  
Locations Of Oil/Gas Producing Wells

E4-1  
E4-2

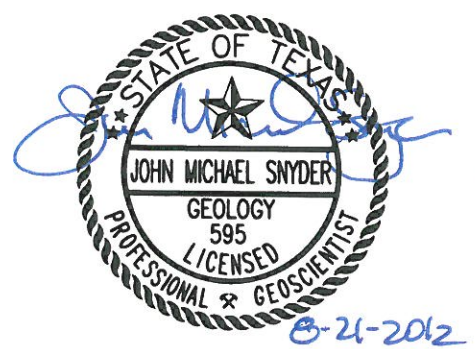
J:\101\01\120\ATT E4-1\_Seismic.dwg Layout: Layout1 User: gwhite



NOT TO SCALE

LEGEND  
 — 4 — CONTOUR OF PEAK HORIZONTAL ACCELERATION

Skyline Landfill Coordinates:  
 32.3248N, 96.3957W  
 Interactive calculated %g  
 for the above coordinates 4.169



SOURCE: USGS INTERACTIVE NATIONAL SEISMIC HAZARD MAPS — 2008  
 PEAK HORIZONTAL ACCELERATION (%g) WITH 2% PROBABILITY OF EXCEEDANCE IN 50 YEARS  
 URL: <http://gldims.cr.usgs.gov.website/nshp2008/viewer.htm>

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS							TBPE FIRM NO. F-256		TBPG FIRM NO. 50222	
1	8/12	NOD NO. 1 RESPONSE	SRC	ESF	ESF	ESF	DSN.	ESF	DATE :	04/12
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	DWN.	SRC	SCALE :	GRAPHIC
							CHK.	JMS	DWG :	E4-1_Seismic.dwg

**SEISMIC IMPACT MAP**  
**WASTE MANAGEMENT OF TEXAS, INC.**  
**SKYLINE LANDFILL**  
**MAJOR PERMIT AMENDMENT**



**BIGGS & MATHEWS**  
 ENVIRONMENTAL  
 CONSULTING ENGINEERS  
 MANSFIELD • WICHITA FALLS  
 817-563-1144

DRAWING  
**E4-1**

**SKYLINE LANDFILL**  
**APPENDIX E5**  
**LABORATORY TESTS**

Geotechnical Laboratory Test Summary	E5-1 through E5-6
Geotechnical Laboratory Testing Data	
Vertical Permeability Test Results	E5-7
Horizontal Permeability Test Results	E5-10
Triaxial Shear Test Results	E5-11

**Skyline Landfill  
Geotechnical Laboratory Test Summary**

Subsurface Exploration	Stratum	Boring #	Sample Elevation, ft	Atterberg Limits				Moisture, %	Unit Dry Weight, pcf	Permeability, cm/sec
				Liquid Limit, %	Plastic Limit, %	Plasticity Index, %	Passing 200 Sieve, %			
	I	CB-1	476.5	78	24	54				
	I	CB-1	456.5	81	24	57	26			
	I	CB-1	446.5	81	27	54	25			
	I	CB-1	436.5	76	25	51	20			
	I	CB-2	488.7	90	24	66	19			
	I	CB-2	473.7	86	26	60	27			
	I	CB-2	453.7	73	24	49	25			
	I	CB-2	433.7	73	24	49	21			
	I	CB-3	476.2	79	26	53	17			
	I	CB-3	451.2	97	31	66	28			
	I	CB-3	441.2	92	30	62	30			
	I	CB-3	436.2	92	29	63	25			
	I	CB-4	481.7	74	27	47	24			
	I	CB-4	471.7	69	26	43	29			
	I	CB-4	456.7	80	27	53	29			
	I	CB-4	451.7	90	26	64	28			
	I	CB-5	473	86	30	56	25			
	I	CB-5	448	92	28	64	27			
	I	CB-5	443	90	31	59	25			
	I	CB-5	433	78	27	51	23			
	I	CB-6	483.4	94	66	28	18			
	I	CB-6	473.4	89	61	28	28			
	I	CB-6	458.4	85	56	29	28			
	II	CB-6	438.4	77	58	19	29			
	I	CB-7	456.6	80	53	27	19			
	II	CB-7	446.6	87	61	26	27			
	II	CB-7	436.6	88	62	26	26			
	II	CB-7	421.6	93	70	23	26			
	I	CB-8	482.5	82	46	36	23			
	I	CB-8	462.5	83	56	27	36			
	II	CB-8	442.5	89	60	29	27			
	II	CB-8	422.5	90	68	22	29			
	I	CB-9	489.7	82	55	27	22			
	I	CB-9	469.7	91	65	26	27			
	II	CB-9	454.7	92	68	24	26			
	II	CB-9	434.7	65	45	20	24			

**McBride-Ratcliff -  
1987-1990**

**Skyline Landfill  
Geotechnical Laboratory Test Summary**

Subsurface Exploration	Stratum	Boring #	Sample Elevation, ft	Atterberg Limits			Passing 200 Sieve, %	Moisture, %	Unit Dry Weight, pcf	Permeability, cm/sec
				Liquid Limit, %	Plastic Limit, %	Plasticity Index, %				
<b>McBride-Ratcliff - 1987-1990</b>	I	CB-10	427.8	68	40	28				
	I	CB-10	417.8	72	53	19				
	I	CB-10	407.8	75	57	18				
	I	CB-11	507.1	56	38	18				
	I	CB-11	492.1	50	33	17				
	I	CB-11	477.1	80	55	25				
	I	CB-11	462.1	74	55	19				
	I	CB-12	445.8	72	48	24				
	I	CB-12	430.8	73	52	21				
	I	CB-12	420.8	64	44	20				
	I	CB-13	430.4	86	25	61				
	II	CB-13	415.4	73	24	49				
	II	CB-13	410.4	74	27	47				
	II	CB-13	390.4	78	24	54				
	I	CB-15	435	69	29	40				
	II	CB-15	425	70	28	42				
	II	CB-15	410	65	27	38				
	I	CB-16	437.4	69	21	48				
	I	CB-16	427.4	71	28	43				
	II	CB-16	417.4	65	26	39				
II	CB-16	412.4	63	28	35					
I	CB-17	475.6	73	28	45					
I	CB-17	460.6	79	29	50					
II	CB-17	445.6	85	27	58					
II	CB-17	430.6	87	27	60					
I	CB-18	411.6	81	26	55					
I	CB-18	401.6	73	26	47					
I	CB-18	391.6	71	28	43					
II	CB-18	381.6	67	27	40					
I	CB-19	406	76	24	52					
I	CB-19	396	71	23	48					
II	CB-19	381	65	28	37					
II	CB-19	371								
I	CB-20	493.1	83	28	55					
I	CB-20	478.1	74	27	47					
I	CB-20	463.1	78	25	53					

**Skyline Landfill  
Geotechnical Laboratory Test Summary**

Subsurface Exploration	Stratum	Boring #	Sample Elevation, ft	Atterberg Limits				Passing 200 Sieve, %	Moisture, %	Unit Dry Weight, pcf	Permeability, cm/sec
				Liquid Limit, %	Plastic Limit, %	Plasticity Index, %					
	II	CB-20	438.1	79	27	52		18			
	I	CB-21	501.2	65	25	40		28			
	I	CB-21	481.2	75	27	48		25			
	II	CB-21	451.2	69	28	41		20			
	II	CB-21	411.2	67	27	40		19			
	I	CB-22	406.3	77	29	48		26			
	I	CB-22	401.3	70	27	43		17			
	II	CB-22	386.3	91	28	63		15			
	I	CB-23	444.6	72	22	50		20			
	II	CB-23	439.6	74	27	47		24			
	II	CB-23	434.6	66	27	39		20			
	II	CB-23	429.6	62	28	34		23			
	I	CB-24	485.7	73	25	48		22			
	I	CB-24	460.7	67	26	41		20			
	II	CB-24	435.7	75	26	49		19			
	I	CB-25	433	74	28	46		23			
	I	CB-25	423	70	26	44		21			
	I	CB-25	413	67	24	43		16			
	I	CB-25	403	62	26	36		20			
	I	CB-26	441.5	70	26	44		26			
	I	CB-26	431.5	73	26	47		28			
	I	CB-26	421.5	77	22	55		25			
	I	CB-26	411.5	71	27	44		21			
	II	CB-27	400.1	75	21	54		27			
	II	CB-27	390.1	78	23	55		26			
	II	CB-27	380.1	59	23	36		20			
	II	CB-27	370.1	60	24	36		16			
	I	P-12	436	72	33	39		27	91		
	I	P-12	431	72	35	37		28			
	I	P-13	437	75	38	37		26			
	I	P-13	432	74	34	40		27	93		
	I	P-13	427	73	35	38		26	93		
	I	P-13	422	47	27	20		21	103		
	I	P-13	417	72	26	46		18			
	I	P-13	412	67	29	38		18	110		
	I	P-13	407	62	25	37		18			

**McBride-Ratcliff -  
1987-1990**

**Skyline Landfill  
Geotechnical Laboratory Test Summary**

Subsurface Exploration	Stratum	Boring #	Sample Elevation, ft	Atterberg Limits				Moisture, %	Unit Dry Weight, pcf	Permeability, cm/sec
				Liquid Limit, %	Plastic Limit, %	Plasticity Index, %	Passing 200 Sieve, %			
	I	P-14	501	76	30	46		83		
	I	P-14	496	63	27	36				
	I	P-14	486							
	I	P-14	476	72	33	39				
	I	P-15	486	73	30	43				
	I	P-16	501	69	21	48		96		
	I	P-16	496	89	30	59		102		
	I	P-16	491	80	29	51		97		
	I	P-16	486	77	30	47				
	I	P-16	481	67	29	38		96		
	I	P-16	476					96		
	I	P-16	471	79	32	47		100		
	I	P-16	466					97		
	I	P-16	461	59	27	32				
	II	P-16	453	86	31	55		96		
	II	P-16	450	80	31	49				
	II	P-16	445	90	32	58		103		
	I	P-17	477	77	42	35		103		
	I	P-17	467	77	42	35		93.2		
	I	P-18	482	79	26	53				
	I	P-18	477							
	I	P-18	472	80	28	52		92		
	I	P-18	467					92		
	I	P-18	462	78	32	46				
	I	P-18	457	81	33	48		93		
	I	P-18	452	84	30	54		91		
	I	P-19	414	85	28	57		92		
	I	P-19	404					31		
	I	P-19	394	72	30	42		96		
	II	P-19	384				99	78		
	II	P-19	374					104		
	II	P-19	364	80	33	47		98		
	II	P-19	354					18		
	II	P-19	348					18		
	I	P-20	416					17		
	I	P-20	406	74	31	43		29		
								95		

**McBride-Ratcliff -  
1987-1990**

**Skyline Landfill  
Geotechnical Laboratory Test Summary**

Subsurface Exploration	Stratum	Boring #	Sample Elevation, ft	Atterberg Limits				Passing 200 Sieve, %	Moisture, %	Unit Dry Weight, pcf	Permeability, cm/sec
				Liquid Limit, %	Plastic Limit, %	Plasticity Index, %					
McBride-Ratcliff - 1987-1990	I	P-21	416						93		
	I	P-22	416								
	I	P-22	406	77	24	53		30			
	I	P-22	396	77	30	47		29			
	II	P-22	386	75	28	47		20			
	I	P-23	421	78	28	50		19			
	I	P-23	416					19			
	I	P-23	411	71	23	48		29			
	I	P-23	406					30			
	I	P-23	401	62	29	33		29			
	I	P-23	396	65	26	39		31			
	I	P-23	391	85	30	55		8			
	II	P-23	381	63	28	35		20			
	II	P-23	371	70	21	49		19			
	II	P-23	366					19			
	II	P-23	361	77	30	47		19			
	II	P-23	356					99			
	II	P-23	351	66	33	33		17			
	II	P-23	346	83	25	58		19			
	II	P-23	341					19			
	II	P-23	331	84	30	54		19			
	II	P-23	326					16			
	II	P-23	321	75	27	48		17			
	II	P-23	316	78	30	48					
	II	P-23	311	71	28	43					
	II	P-23	306					16			
	II	P-23	298	77	26	51		16			
	I	CB-28	418.8	85	26	59		99.5			
	I	CB-28	408.8	81	37	44					
	I	CB-29	395.5	70	23	47					
	I	CB-32	433.3	76	24	52					
	I	CB-33	417	65	24	41		30			
	I	CB-34	463.3	74	27	47					
	I	CB-34	413.3	72	26	46		99.6			
	I	CB-35	429.9	72	28	44					
I	CB-35	424.9	74	28	46						
HDR Engineering - 1991											



**Skyline Landfill  
Geotechnical Laboratory Test Summary**

Subsurface Exploration	Stratum	Boring #	Sample Elevation, ft	Atterberg Limits				Moisture, %	Unit Dry Weight, pcf	Permeability, cm/sec
				Liquid Limit, %	Plastic Limit, %	Plasticity Index, %	Passing 200 Sieve, %			
HDR Engineering - 1991	I	CB-36	432.7	71	24	47				
	I	CB-36	422.7	63	22	41	30			
	I	CB-37	432.8	64	26	38	19			
	I	CB-38	433.5	61	24	37				
	I	CB-39	478.8	66	27	39	99.6	27	4.00E-09	
	I	CB-39	463.8	72	25	47		26		
	I	CB-39	418.8	63	24	39		18		
	I	CB-40	427.1	74	26	48				
	I	CB-40	422.1	71	22	49				
	I	CB-41	470.4	79	25	54				
	I	CB-42	452.2	72	27	45		23	102	
	I	CB-42	437.2	70	24	46		24		
	I	CB-42	392.2	56	26	30		21		
	I	CB-42	437.2	74	24	50		34		
	I	CB-44	382.2	61	23	38		26	98	
	I	CB-45	426.5	74	25	49		22		
	I	CB-46	457.4	73	25	48		20		
	I	CB-46	437.4	70	22	48		27		
	I	CB-48	482.3	67	24	43	98.4	28		
	I	CB-48	447.3	65	19	46	99.7	20	6.80E-09	
	I	CB-49	488.7	44	20	24		22	105	
	I	CB-49	473.7	82	24	58		29		
	I	CB-50	462.3	69	22	47	98.4	27		
	I	CB-50	437.3	62	24	38		22		
	I	CB-51	452.1	75	25	50		28		
	I	CB-51	418.1	62	24	38	99.2	21		
	I	CB-52	460.3	81	22	59		27		
	I	CB-52	425.3	73	22	51		22	97	
	I	CB-53	476.4	73	19	54		33	102	
	I	CB-53	446.4	73	19	54		28		
	I	CB-53	436.4	67	23	44		25		
	I	CB-54	453.9	79	25	54		27	97	
I	CB-55	459.5	87	32	55		33			
I	CB-56	446.1	79	26	53		27			
I	CB-56	436.1	69	30	39		22			
Biggs & Mathews Environmental, Inc.	II	CB-21	396.6						8.20E-09	
	II	CB-33	378.9						9.0E-09	
	II	CB-36	384.7						6.0E-09	



1700 Robert Road, Suite 101  
 Mansfield, Texas 76063  
 Metro 817.572.2818  
 Fax 817.561.5485

CLIENT: Biggs & Matthews Engineering

REPORT DATE: 10/16/2011

PROJECT NO.: 1655

PROJECT: Skyline Landfill

**HYDRAULIC CONDUCTIVITY WORKSHEET**  
**FALLING HEAD - FIXED WALL PERMEAMETER**

LOCATION: TP-1 EL 426.0

MATERIAL: Shaley clay, gray & tan

BORING/SAMPLE: North of Cell #8

PROCTOR #:

SAMPLE ORIENTATION: H    X    V     
 Remold   

LAB START DATE: 10/14/2011

LAB RPT. DATE: 10/16/2011

TECHNICIAN: MLT

DEPTH/LIFT:

PERM FLUID USED: De-aired Tap Water

a. Length of Specimen, L: 1.0 in  
 c. Sample Volume  
 ( $\pi b^2 / 4 * a$ ): 4.909 cu in

b. Avg. Diameter of Specimen: 2.5 in  
 d. Wet Unit Weight:  
 $(((f-h)*3.8095)/c)$ : 108.8 pcf

**INITIAL CONDITIONS**

e. Ring + Wet Weight Soil: 667.1 gms  
 f. Wet Weight Soil + Tare: 237.5 gms  
 g. Dry Weight Soil + Tare: 206.2 gms  
 h. Tare Weight: 97.3 gms  
 i. Moisture Content  
 $[(f-g)/(g-h)]*100$ : 28.7 %  
 j. Unit Dry Weight  
 $[d/(1+(i/100))]$ : 84.5 pcf

**FINAL CONDITIONS**

k. Wet Weight Soil + Tare: 245.5 gms  
 l. Dry Weight Soil + Tare: 206.2 gms  
 m. Tare Weight: 97.3 gms  
 n. Moisture Content  
 $[(k-l)/(l-m)]*100$ : 36.1 %  
 o. Unit Dry Weight  
 $[d/(1+(n/100))]$ : 80.0 pcf  
 p. Ring Weight: 526.9 gms

Date	Time	t sec	Initial Height, h <sub>o</sub>	Corrected h <sub>o</sub> - C	Final Height, h <sub>f</sub>	Corrected h <sub>f</sub> - C	Temp C	R <sub>t</sub>	k @ 20C cm/sec
14-Oct	09:19		44.1	36.6					
14-Oct	18:20	32460			31.7	24.2	22	0.953	8.4E-07
14-Oct	18:20		31.7	24.2					
15-Oct	06:51	45060			30.2	22.7	22	0.953	9.4E-08
15-Oct	06:51		30.2	22.7					
15-Oct	12:06	18900			29.6	22.1	22	0.953	9.4E-08
15-Oct	12:06		29.6	22.1					
15-Oct	16:00	14040			29.2	21.7	22	0.953	8.6E-08
15-Oct	16:00		29.2	21.7					
15-Oct	21:32	19920			28.7	21.2	22	0.953	7.7E-08
15-Oct	21:32								
14-Oct	18:20		31.7	24.2					
15-Oct	21:32	97920			28.7	21.2	22	0.953	8.9E-08
Height of Top of Specimen From Top of Table:			7.50 cm		Standpipe Diameter 1.05 cm		Standpipe Area 0.866 sq cm		

skyline Perm Test Method: Corps of Engineers EM 1110-2-1906, Appendix M/16/2011

H<sub>f</sub>-C = H<sub>f</sub>-H<sub>t</sub>

LANDTEC