



Texas Commission on Environmental Quality

Waste Permits Division Correspondence

Cover Sheet

Date: 10/28/2025

Facility Name: New Boston Landfill

Permit or Registration No.: 576C

Nature of Correspondence:

☒ Initial/New

☐ Response/Revision to TCEQ Tracking No.:
_____ (from subject line of TCEQ letter
regarding initial submission)

Affix this cover sheet to the front of your submission to the Waste Permits Division. Check appropriate box for type of correspondence. Contact WPD at (512) 239-2335 if you have questions regarding this form.

Table 1 - Municipal Solid Waste Correspondence

Applications	Reports and Notifications
☐ New Notice of Intent	☐ Alternative Daily Cover Report
☐ Notice of Intent Revision	☐ Closure Report
☐ New Permit (including Subchapter T)	☐ Compost Report
☐ New Registration (including Subchapter T)	☐ Groundwater Alternate Source Demonstration
☐ Major Amendment	☐ Groundwater Corrective Action
☐ Minor Amendment	☐ Groundwater Monitoring Report
☐ Limited Scope Major Amendment	☐ Groundwater Background Evaluation
☒ Notice Modification	☐ Landfill Gas Corrective Action
☐ Non-Notice Modification	☐ Landfill Gas Monitoring
☐ Transfer/Name Change Modification	☐ Liner Evaluation Report
☐ Temporary Authorization	☐ Soil Boring Plan
☐ Voluntary Revocation	☐ Special Waste Request
☐ Subchapter T Disturbance Non-Enclosed Structure	☐ Other:
☐ Other:	

Table 2 - Industrial & Hazardous Waste Correspondence

Applications	Reports and Responses
☐ New	☐ Annual/Biennial Site Activity Report
☐ Renewal	☐ CPT Plan/Result
☐ Post-Closure Order	☐ Closure Certification/Report
☐ Major Amendment	☐ Construction Certification/Report
☐ Minor Amendment	☐ CPT Plan/Result
☐ CCR Registration	☐ Extension Request
☐ CCR Registration Major Amendment	☐ Groundwater Monitoring Report
☐ CCR Registration Minor Amendment	☐ Interim Status Change
☐ Class 3 Modification	☐ Interim Status Closure Plan
☐ Class 2 Modification	☐ Soil Core Monitoring Report
☐ Class 1 ED Modification	☐ Treatability Study
☐ Class 1 Modification	☐ Trial Burn Plan/Result
☐ Endorsement	☐ Unsaturated Zone Monitoring Report
☐ Temporary Authorization	☐ Waste Minimization Report
☐ Voluntary Revocation	☐ Other:
☐ 335.6 Notification	
☐ Other:	



BIGGS & MATHEWS ENVIRONMENTAL, INC

TBPE No. F-256 TBPG No. 50222

October 28, 2025

Megan Henson
Manager, Municipal Solid Waste Section
MC-124
Texas Commission on Environmental Quality
12100 Park 35 Circle, Bldg F
Austin, Texas 78753

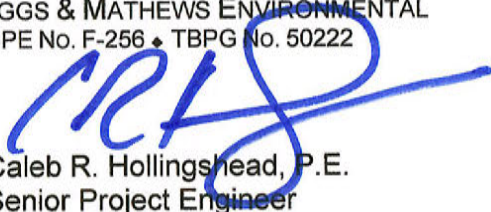
Re: New Boston Landfill
Bowie County, Texas
TCEQ Permit No. MSW 576C
Permit Modification – Alternate Final Cover Design Demonstration
RN102594892; CN600127856

Ms. Henson:

On behalf of Waste Management of Texas, Inc., enclosed is a permit modification for the New Boston Landfill. This permit modification has been prepared consistent with Title 30 of the Texas Administrative Code (TAC) §305.70(k)(10) for a notice permit modification to include an alternative final cover system design. Please call or e-mail me if you have any questions at 817-563-1144 or chollingshead@biggsandmathews.com.

Sincerely,

BIGGS & MATHEWS ENVIRONMENTAL
TBPE No. F-256 • TBPG No. 50222



Caleb R. Hollingshead, P.E.
Senior Project Engineer

Attachments: Permit Modification (original and two copies)

cc: Guy R. Campbell, Waste Management of Texas, Inc.
Leroy Biggers, TCEQ Region 5

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

PART III – FACILITY INVESTIGATION AND DESIGN

ALTERNATE FINAL COVER DESIGN

PERMIT MODIFICATION

Prepared for

WASTE MANAGEMENT OF TEXAS, INC.

October 2025



Prepared by

BIGGS & MATHEWS ENVIRONMENTAL
1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

PART III – FACILITY INVESTIGATION AND DESIGN

ALTERNATE FINAL COVER DESIGN

PERMIT MODIFICATION

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ATTACHMENT 2 – MARKED (REDLINE/STRIKEOUT) PAGES

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Texas Commission on Environmental Quality

Application Form for Municipal Solid Waste Permit or Registration Modification or Temporary Authorization

Application Tracking Information

Facility Name: New Boston Landfill

Permittee or Registrant Name: Waste Management of Texas, Inc.

MSW Authorization Number: 576C

Initial Submission Date: 10/28/2025

Revision Date: _____

Instructions for completing this form are provided in [form TCEQ-20650-instr](#)¹. If you have questions, contact the Municipal Solid Waste Permits Section by email to mswper@tceq.texas.gov, or by phone at 512-239-2335.

Application Data

1. Submission Type
☒ Initial Submission ☐ Notice of Deficiency (NOD) Response
2. Authorization Type
☒ Permit ☐ Registration
3. Application Type
☒ Modification with Public Notice ☐ Modification without Public Notice
☐ Temporary Authorization (TA) ☐ Modification for Name Change or Transfer
4. Application Fee
Amount The application fee for a modification or temporary authorization is \$150.
Payment Method ☐ Check ☒ Online through ePay portal www3.tceq.texas.gov/epay/ If paid online, enter ePay Trace Number: XXXXXXXXXX

¹ www.tceq.texas.gov/downloads/permitting/waste-permits/msw/forms/20650-instr.pdf

5. Electronic Versions of Application

For modifications that require public notice, TCEQ will publish electronic versions of the applications online. Applicants must provide complete electronic copies of their initial applications, responses to notices of deficiencies, and the final technically complete versions. (Refer to instructions for this form for how to submit electronically.)

6. Party Responsible for Mailing Notice

For modifications that require notice, indicate who will be responsible for mailing notice:

☐ Applicant ☐ Agent in Service ☒ Consultant

Contact Name: Caleb R. Hollingshead, P.E.

Title: Senior Engineer

Email Address: [REDACTED]

7. Confidential Documents

Does the application contain confidential documents?

☐ Yes ☒ No

If "Yes", reference the confidential documents in the application, but submit the confidential documents as an attachment in a separate binder marked "CONFIDENTIAL."

8. Facility General Information

Facility Name: New Boston Landfill

Contact Name: Guy R. Campbell Title: Engineering Manager

MSW Authorization Number (if existing): 576C

Regulated Entity Reference Number: **RN** 102594892

Physical or Street Address: 1030 W U.S. Highway 82

City: New Boston County: Bowie State: TX Zip Code: 75570

Phone Number: (903) 628-6595

Latitude (Decimal Degrees): 33° 28' 17.5"

Longitude (Decimal Degrees): 94° 26' 45"

9. Facility Types

☒ Type I ☐ Type IV ☐ Type V
☐ Type IAE ☐ Type IVAE ☐ Type VI

10. Description of the Revisions to the Facility

Provide a brief description of revisions to permit or registration conditions and supporting documents referred to by the permit or registration, and a reference to the specific provisions under which the modification or temporary authorization application is being made. Also, provide an explanation of why the modification or temporary authorization is needed:

Permit modification prepared consistent with 30 TAC 305.70(k)(10) for changes to include an alternative final cover design.

11. Facility Contact Information

Site Operator (Permittee or Registrant)

Name: Waste Management of Texas, Inc.

Customer Reference Number: **CN** 600127856

Contact Name: Guy R. Campbell Title: Engineering Manager

Mailing Address: 5012 MLK Freeway

City: Fort Worth County: Tarrant State: TX Zip Code: 76119

Phone Number: (405) 417-8124

Email Address: [REDACTED]

Texas Secretary of State (SOS) Filing Number: 22300000

Operator (if different from Site Operator)

Name: N/A

Customer Reference Number: **CN**

Contact Name: Title:

Mailing Address:

City: County: State: Zip Code:

Phone Number:

Email Address:

Texas Secretary of State (SOS) Filing Number:

Consultant (if applicable)Firm Name: Biggs and Mathews Environmental, Inc.Consultant Name: Caleb R. Hollingshead, P.E.Texas Board of Professional Engineers Firm Registration Number: F-256Contact Name: Caleb R. Hollingshead, P.E. Title: Senior EngineerMailing Address: 1700 Robert Road, Suite 100City: Mansfield County: Tarrant State: TX Zip Code: 76063Phone Number: (817) 563-1144Email Address: [REDACTED]**Agent in Service (required for out-of-state applicants)**Name: N/A

Mailing Address: _____

City: _____ County: _____ State: TX Zip Code: _____

Phone Number: _____

Email Address: _____

12. Ownership Status of the Facility

Is this a modification that changes the legal description, the property owner, or the Site Operator (Permittee or Registrant)?

☐ Yes ☒ No

If the answer is "No", skip the next question and proceed to signature page.

Does the Site Operator (Permittee or Registrant) own all the facility units and all the facility property?

☐ Yes ☐ No

If "No", provide the following information for other owners.

Owner Name: _____

Mailing Address: _____

City: _____ County: _____ State: TX Zip Code: _____

Phone Number: _____

Email Address: _____

Signature Page

Site Operator or Authorized Signatory

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: Guy R. Campbell Title: Engineering Manager

Email Address: [REDACTED]

Signature: [Signature] Date: 10/28/25

Operator or Principal Executive Officer Designation of Authorized Signatory

To be completed by the operator if the application is signed by an authorized representative for the operator.

I hereby designate _____ as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

Operator or Principal Executive Officer Name: _____

Email Address: _____

Signature: _____ Date: _____

Notary

SUBSCRIBED AND SWORN to before me by the said Guy R. Campbell

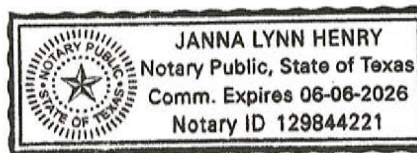
On this 28th day of October, 2025

My commission expires on the 6th day of June, 2026

[Signature]

Notary Public in and for

Tarrant County, Texas



Note: Application Must Bear Signature and Seal of Notary Public

Attachments for Permit or Registration Modification with Public Notice

Refer to instruction document **200650-instr** for professional engineer seal requirements.

Attachments Table 1. Required attachments.

Required Attachments	Attachment Number
Land Ownership Map	1
Landowners List	1
Marked (Redline/Strikeout) Pages	2
Unmarked Revised Pages	3

Attachments Table 2. Additional attachments as applicable.

Additional Attachments as Applicable (select all that apply and add others as needed)	Attachment Number
☐ TCEQ Core Data Form(s)	
☐ Signatory Authority Delegation	
☐ Fee Payment Receipt	
☐ Confidential Documents	

PERMIT MODIFICATION NARRATIVE

This permit modification provides changes to the Site Development Plan to include alternate final cover designs in accordance with 30 TAC §305.70(k)(10). The New Boston Landfill has an approved final cover design consisting of a clay infiltration layer, a low-density polyethylene membrane, a geocomposite/geotextile drainage layer, and an erosion layer. This permit modification maintains the approved final cover design and provides additional alternate final cover design for the top deck and for the side slope.

The optional top deck alternate final cover design consists of a 12-inch-thick compacted clay infiltration layer, a 40-mil linear low-density polyethylene membrane, a double sided geocomposite, and a 24-inch-thick erosion layer. The optional side slope alternate final cover design consists of a 12-inch-thick compacted clay infiltration layer, a double sided geocomposite, and a 36-inch-thick erosion layer.

The purpose of this modification is to provide flexibility in final cover construction based on the availability of materials at the time of construction while providing equivalent reduction in infiltration and protection from erosion as the final cover system specified in 30 TAC §330.457. This permit modification includes revisions to Part III Attachment B (General Facility Design), Attachment D (Waste Management Unit Design), and Attachment H (Closure Plan).

ATTACHMENT 1
ADJACENT LAND OWNERSHIP INFORMATION

**NEW BOSTON LANDFILL
ADJACENT PROPERTY OWNERS
(From Bowie County Records, October 23, 2025)**

- | | |
|---|---|
| 1 DORIS BURNS
1715 COUNTY ROAD 3004
NEW BOSTON, TX 75570 | 16 NATHAN & JACKLYN WHITTINGTON
140 COUNTY ROAD 3003
NEW BOSTON, TX 75570 |
| 2 GARY CADDENHEAD
909 SW FRON ST
NEW BOSTON, TX 75570 | 17 VICKI WIGGINS LIVING TRUST
158 COUNTY ROAD 3005
NEW BOSTON, TX 75570 |
| 3 ALLEN SMITH
460 COUNTY ROAD 4001
NEW BOSTON, TX 75570 | 18 PROSPERITY CHURCH
PO BOX 477
NEW BOSTON, TX 75570 |
| 4 MASON CROSBY
1165 FM 3378
NEW BOSTON, TX 75570 | 19 JAMES & JACQUELINE BARBER
PO BOX 833
NEW BOSTON, TX 75570 |
| 5 LOUIS LEWIS
213 COUNTY ROAD 4005
NEW BOSTON, TX 75570 | 20 RONALD & TERRY HUMPHREY
136 MYRTLE DR
NEW BOSTON, TX 75570 |
| 6 CARA LEWIS
1443 COUNTY ROAD 3004
NEW BOSTON, TX 75570 | 21 NEW COVENANT LIFE FELLOWSHIP
136 MYRTLE DR
NEW BOSTON, TX 75570 |
| 7 BUFORD RANEY
PO BOX 622
NEW BOSTON, TX 77570 | 22 FREDRICK & YVETTE CRAWFORD
112 S MAPLE ST
NEW BOSTON, TX 75570 |
| 8 CONNIE BARON
1546 COUNTY ROAD 3004
NEW BOSTON, TX 77570 | 23 LANDMARK PENTECOSTAL CHURCH
1601 MALL DR
TEXARKANA, TX 75503 |
| 9 MATHEW MCGREGOR
1490 COUNTY ROAD 3004
NEW BOSTON, TX 77570 | 24 DRT VENTURES LLC
4 WOODMONT CROSSING ST
TEXARKANA, TX 75503 |
| 10 BOBBY WALKER
160 COUNTY ROAD 3005
NEW BOSTON, TX 77570 | 25 ROGER LYNCH
33 FM 2149
NEW BOSTON, TX 75570 |
| 11 JAMES SHIRLEY
60 COUNTY ROAD 3005
NEW BOSTON, TX 77570 | 26 REGINA CARSON
PO BOX 431
NEW BOSTON, TX 75570-0431 |
| 12 MICHAEL & KYNZI LONG
201 COUNTY ROAD 4257
NEW BOSTON, TX 77570 | 27 ARTHUR LEE & SANDRA NERO
PO BOX 413
NEW BOSTON, TX 75570-0413 |
| 13 CHARLES WILLIAMS
684 COUNTY ROAD 3004
NEW BOSTON, TX 77570 | 28 VIRGINIA PAIGE BROCK
392 COUNTY ROAD 3012
NEW BOSTON, TX 75570-5920 |
| 14 LARRY & CHARLEAN CARROLL
131 COUNTY ROAD 3003
NEW BOSTON, TX 77570 | 29 JOHN PERRY
PO BOX 15
MART, TX 76664 |
| 15 JOHNNY HOOKS
613 N CENTER ST
NEW BOSTON, TX 77570 | 30 BRIGETTE CALVERT
719 TEXAS LANE
NEW BOSTON, TX 75570 |

**NEW BOSTON LANDFILL
ADJACENT PROPERTY OWNERS
(From Bowie County Records, October 23, 2025)**

31	GRETCHON F & JOYCE POWELL 127 PEARLY ST NEW BOSTON, TX 75570-0042	45	V HAYWOOD 705 N BOWIE ST NEW BOSTON, TX 75570-9631
32	124 PEARLIE SERIES-A SERIES OF MEDANKA LLC 4506 ALDRIDGE DR SACHSE, TX 75048	46	JD & VIRGIE HOOKS 613 N CENTER ST NEW BOSTON, TX 75570
33	ALVIN & DEBORAH FIELDS PO BOX 193 NEW BOSTON, TX 75570-0193	47	BOOKER T & VERA HOOKS 518 N BOWIE ST NEW BOSTON, TX 76670
34	LDJC PROPERTIES, LLC 6023 CALHOON TRAIL TEXARKANA, AR 71854	48	REGINALD AUSTIN 705 N BOWIE ST NEW BOSTON, TX 75570
35	ODIE B FIELDS, JR 110 PEARLEY ST NEW BOSTON, TX 75570-1801	49	FRANK COX 1801 LAKE SHORE CIR COLLEGE STATION, TX 77845
36	BILLIE N BARBER PO BOX 654 NEW BOSTON, TX 75570	50	LAFAY CROWELL 351 COUNTY ROAD 3001 NEW BOSTON, TX 75570
37	JEWEL & KISHINA SHAW 50 WOODLAND WAY NEW BOSTON, TX 75570	51	BILLIE WALKER 721 TEXAS LN NEW BOSTON, TX 75570
38	LINDA FAY HAWTHRON & ERIC J THOMAS 2421 N AKIN AVE TEXARKANA, TX 75501	52	RODNEY & DENA ANN TALBERT 719 TEXAS LN NEW BOSTON, TX 75570
39	AUSTIN MARVEL PO BOX 654 NEW BOSTON, TX 75570	53	JULIE DEE MAY 185 COUNTY ROAD 3001 NEW BOSTON, TX 75570
40	TROY PRICE 117 PEARLY ST NEW BOSTON, TX 75570-1802	54	RICHARD R THOMPSON 700 HWY 82 W NEW BOSTON, TX 75570
41	JUNE JENNINGS 141 PEARLY ST NEW BOSTON, TX 75570-1602	55	NEW BOSTON HOUSING AUTHORITY PO BOX 806 NEW BOSTON, TX 75570
42	ARDIS COTTON JR & KAY COTTON 764 TEXAS LN NEW BOSTON, TX 75570	56	DWAYNE & DWIGHT JONES 106 PEGGY ST NEW BOSTON, TX 75570
43	BRIGETTE ELAINE TALBERT 719 TEXAS LN NEW BOSTON, TX 75570	57	MAURICE & ALICE HURD 102 PEGGY DR NEW BOSTON, TX 75570
44	DEAR FAMILY LIMITED PARTNERSHIP 207 S PARK DR NEW BOSTON, TX 75570	58	BOYCE & JANA K RANEY 570 TEXAS LN NEW BOSTON, TX 75570

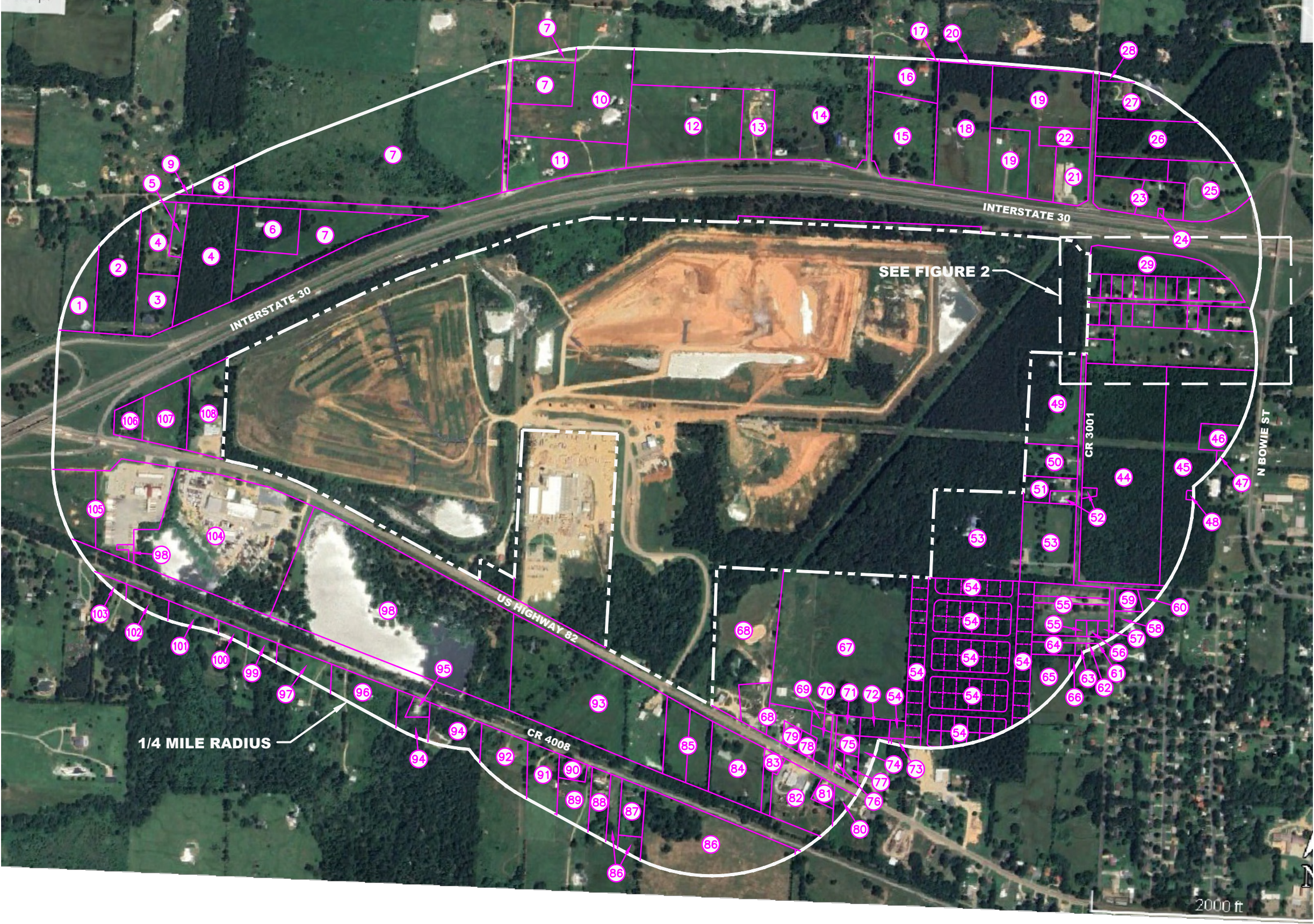
**NEW BOSTON LANDFILL
ADJACENT PROPERTY OWNERS
(From Bowie County Records, October 23, 2025)**

59	MICHAEL S McDONALD 620 TEXAS LN NEW BOSTON, TX 75570	73	JASON W PIRKEY 913 FM 911 N AVERY, TX 75554
60	RICKY OLSON 205 OAK LN NEW BOSTON, TX 75570	74	WESTSIDE MISSIONARY BAPTIST CHURCH PO BOX 21 NEW BOSTON, TX 75570
61	DEBRA ROBINSON PO BOX 84 DE KALB, TX 75559	75	AMERICAN HERITAGE APARTMENTS INC 1430 COLLEGE DR TEXARKANA, TX 75503
62	RICHARD ELLIS 201 CECIL NEW BOSTON, TX 75570	76	LAURA D ROBBINS 808 HWY 82 W NEW BOSTON, TX 75570
63	NEW BOSTON WEST LLC 2525 N CANYON RD PROVO, UT 84604	77	JENNY LOU SPURLOCK 806 HWY 82 W NEW BOSTON, TX 75570
64	JOY N WILLIAMS 10708 BRISTOL TERR KANSAS CITY, MO 64134	78	JERRY O & CHARLENE YATES 908 HWY 82 W NEW BOSTON, TX 75570
65	TERRENCE D ELLIS 123 TEXAS LN NEW BOSTON, TX 75570	79	NETEX RENTALS LLC SERIES N2 413 E FRONT ST DE KALB, TX 75559
66	WILLIAM L BROWN JR 555 TEXAS LN NEW BOSTON, TX 75570	80	316 LANDSCAPING SOLUTIONS 3796 HWY 82 W NEW BOSTON, TX 75570
67	ZACHARY & KRISTEN RIOS 401 HOLLY ST NEW BOSTON, TX 75570	81	BOWIE COUNTY SOIL & WATER COMPANY 905 HWY 82 W NEW BOSTON, TX 75570
68	DAMON SHANE & STACIE JOHNSON 912 HWY 82 W NEW BOSTON, TX 75570	82	EARNEST SHELTON SR% DAN & EARNEST (JR) SHELTON 909 HWY 82 W NEW BOSTON, TX 75570
69	PAMELA BELL 303 HOLLY ST NEW BOSTON, TX 75570	83	BOWIE COUNTY FARM BUREAU PO BOX 757 NEW BOSTON, TX 75570
70	CARMEN WHALEN 906 HWY 82 W NEW BOSTON, TX 75570	84	ENON PRIMITIVE BAPTIST CHURCH 206 E WALTERS BLVD NEW BOSTON, TX 75570-3807
71	SAMANTHA M MILLS 302 HOLLY ST NEW BOSTON, TX 75570	85	SOUTHWESTERN ELECTRIC POWER COMPANY PO BOX 16428 COLUMBUS, OH 43216
72	TITUS GROUP INVESTMENTS LLC PO BOX 271004 DALLAS, TX 75227	86	STEVEN K WICKER 5080 COUNTY ROAD 309 DE KALB, TX 75559

**NEW BOSTON LANDFILL
ADJACENT PROPERTY OWNERS
(From Bowie County Records, October 23, 2025)**

87	ROY SPRADLIN 743 COUNTY ROAD 4008 NEW BOSTON, TX 75570	101	CALVIN N & DIANE THOMPSON 1411 COUNTY ROAD 4008 NEW BOSTON, TX 75570
88	MATHEW JOHNSON PO BOX 922 NEW BOSTON, TX 75570-0922	102	JAMES EDWARD ROBERTS 2571 COUNTY ROAD 3204 DE KALB, TX 75559
89	ANGELA LEWIS 827 COUNTY ROAD 4008 NEW BOSTON, TX 75570	103	MARK & JENNIFER HELMICK 1549 COUNTY ROAD 4008 NEW BOSTON, TX 75570
90	JESSE JOHN DUSON 831 COUNTY ROAD 4008 NEW BOSTON, TX 75570	104	PARADIGM INVESTMENTS LLC PO BOX 957 MAYFIELD, KY 42066
91	JENNIFER S DANIEL 883 COUNTY ROAD 4008 NEW BOSTON, TX 75570	105	VICTRON STORES LP 791 N HWY 77 ST 501C #181 WAXAHACHIE, TX 75165
92	LLOYD EDWARDS 949 COUNTY ROAD 4008 NEW BOSTON, TX 75570	106	BARBARA S TUCKER 2086 HWY 82 W NEW BOSTON, TX 75570
93	EDWARD & SHEILA HIGGINS PO BOX 725 NEW BOSTON, TX 75570-0725	107	TRAVELERS PLAZA 10609 GREENBRIAR LN ROCKWALL, TX 75089
94	TANGATA LAPUAHO & JANIS KASITATI PO BOX 1164 NEW BOSTON, TX 75570	108	AMERICAN LEGION POST #488 % DOYLE WILLIAMS PO BOX 66 NEW BOSTON, TX 75570
95	G & W PINEY WOODS PROPERTIES LLC 723 MAIN ST TEXARKANA, TX 75501		
96	WILLIAM N REED 243 COUNTY ROAD 3107 NEW BOSTON, TX 75570-6353		
97	STEPHEN F & ANITA MAYES 1237 COUNTY ROAD 4008 NEW BOSTON, TX 75570-9803		
98	CITY OF NEW BOSTON PO BOX 5 NEW BOSTON, TX 75570-0005		
99	ROBIN LYNN HALL 313 COUNTY ROAD 4008 NEW BOSTON, TX 75570-5047		
100	LINDSEY LIVING TRUST ANNAMARY LINDSEY TRUSTEE 1365 COUNTY ROAD 4008 NEW BOSTON, TX 75570		

O:\Waste Management\New Boston\Solid Waste\2025 Alt Final Cover Permit Mod\Drawings\PropertyOwners 10-25.dwg Layout: Layout1 User: Chollingshead



0 400 800
SCALE IN FEET

LEGEND

PERMIT BOUNDARY

① LAND OWNERSHIP IDENTIFICATION

- NOTES:**
1. REFER TO LAND OWNERS LIST FOR ADJACENT LAND OWNER NAMES.
 2. ADJACENT LAND OWNERS BASED ON BOWIE COUNTY APPRAISAL DISTRICT RECORDS DOWNLOADED ON OCTOBER 23, 2025.
 3. LAND OWNERS HAVE BEEN IDENTIFIED ADJACENT TO AND WITHIN 1/4 MILE OF THE PERMIT BOUNDARY.
 4. IMAGERY TAKEN FROM GOOGLE EARTH ON OCTOBER 23, 2025, IMAGERY DATE JUNE 20, 2023.



LAND OWNERSHIP MAP

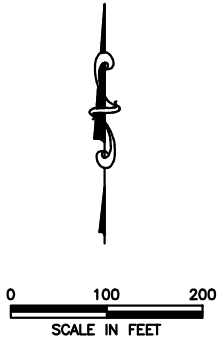
WASTE MANAGEMENT OF TEXAS, INC.
NEW BOSTON LANDFILL

BME **BIGGS & MATHEWS ENVIRONMENTAL**
1700 ROBERT ROAD, STE. 100
MANSFIELD, TEXAS 76063
817-563-1144

FIGURE
1

REVISIONS		
REV	DATE	DESCRIPTION

O:\Waste Management\New Boston\Solid Waste\2025 Alt Final Cover Permit Mod\Drawings\PropertyOwners 10-25.dwg User: CHollingshead Layout: Layout2



- LEGEND**
- PERMIT BOUNDARY
 - LAND OWNERSHIP IDENTIFICATION



LAND OWNERSHIP MAP

WASTE MANAGEMENT OF TEXAS, INC.
NEW BOSTON LANDFILL



BIGGS & MATHEWS ENVIRONMENTAL
1700 ROBERT ROAD, STE. 100
MANSFIELD, TEXAS 76063
817-563-1144

REVISIONS		
REV	DATE	DESCRIPTION

TBPE FIRM NO. F-256
TBPG FIRM NO. 50222

FIGURE
2

ATTACHMENT 2
MARKED (REDLINE/STRIKEOUT) PAGES

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT B
GENERAL FACILITY DESIGN**

Prepared for

Waste Management of Texas, Inc.

Technically Complete September 12, 2014

Permit Issued November 12, 2015

Revised April 2018

Revised October 2025



Prepared by

BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS
FIRM REGISTRATION NO. F-256 AND NO. 10194895

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION NO. 50222

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5	ENDANGERED SPECIES PROTECTION.....	B-9

APPENDIX B1 – DRAWINGS

- B.1 Waste Movement Flow Diagram
- B.2 Waste Disposal, Processing, and/or Storage Schematic Plan
- B.3 Waste Processing and/or Storage Facilities Schematic Plan
- B.4 Waste Processing and/or Storage Facilities Schematic Plan
- B.5 Citizen's Convenience Area Facilities Schematic Plan



**Table B-2
New Boston Landfill
Components of the Final Cover Systems**

Cover System Component	Description	Minimum Thickness
West and North Disposal Areas Final Cover		
TOPSLOPE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Cushion Layer	Geotextile	8 oz
Flexible Membrane Cover	Smooth LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
<u>TOPSLOPE - ALTERNATE</u>		
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>24 inches</u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite</u>	<u>0.25 inches nominal</u>
<u>Flexible Membrane Cover</u>	<u>Smooth or Textured LLDPE geomembrane</u>	<u>40 mil nominal</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec</u>	<u>12 inches</u>
SIDESLOPE OPTION A		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.2 inches nominal
Flexible Membrane Cover	Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE OPTION B		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Geotextile over studded geomembrane	8 oz
Flexible Membrane Cover	Textured LLDPE geomembrane with studs on top	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
<u>SIDESLOPE - ALTERNATE</u>		
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>36 inches</u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite</u>	<u>0.25 inches nominal</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec</u>	<u>12 inches</u>
South Disposal Area Final Cover System		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec	18 inches

Final cover placement will generally follow the sequence of development as shown in Part II, Appendix IIA, Drawings IIA.16 through IIA.24, and will be ongoing as the site is developed. Sectors will be closed according to the closure plan provided in Attachment H – Closure Plan.

RACM

Regulated asbestos-containing material (RACM) may be accepted at the New Boston Landfill as defined in 40 Code of Federal Regulations Part 61 in accordance with 30 TAC §330.171(c)(3). The existing landfill has previously notified TCEQ of its intent to accept RACM. The New Boston Landfill, by inclusion of the requirements of §330.171(c)(3) in the Site Operating Plan, is providing written notification to the executive director of the

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D
WASTE MANAGEMENT UNIT DESIGN**

Prepared for

Waste Management of Texas, Inc.

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Prepared by

BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS
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**Table D-4
New Boston Landfill
Components of the Final Cover Systems**

Cover System Component	Description	Minimum Thickness
West and North Disposal Areas Final Cover		
TOPSLOPE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Cushion Layer	Geotextile	8 oz
Flexible Membrane Cover	Smooth LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-5} cm/sec	18 inches
<u>TOPSLOPE - ALTERNATE</u>		
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>24 inches</u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite</u>	<u>0.25 inches nominal</u>
<u>Flexible Membrane Cover</u>	<u>Smooth or Textured LLDPE geomembrane</u>	<u>40 mil nominal</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability less than or equal to 1×10^{-7} cm/sec</u>	<u>12 inches</u>
SIDESLOPE OPTION A		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.2 inches nominal
Flexible Membrane Cover	Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-5} cm/sec	18 inches
SIDESLOPE OPTION B		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Geotextile over studded geomembrane	8 oz
Flexible Membrane Cover	Textured LLDPE geomembrane with studs on top	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-5} cm/sec	18 inches
<u>SIDESLOPE - ALTERNATE</u>		
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>36 inches</u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite</u>	<u>0.25 inches nominal</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability less than or equal to 1×10^{-7} cm/sec</u>	<u>12 inches</u>
South Disposal Area Final Cover		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-7} cm/sec	18 inches

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D3
CONSTRUCTION DESIGN DETAILS**

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BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

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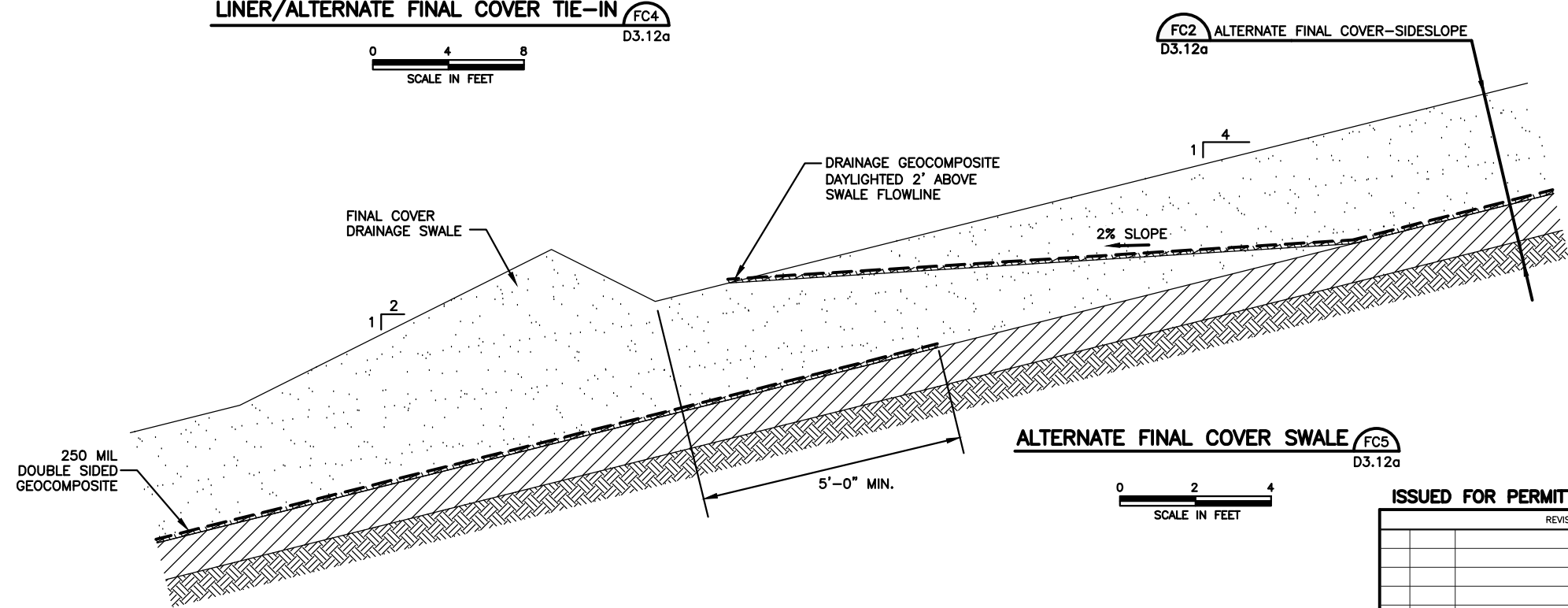
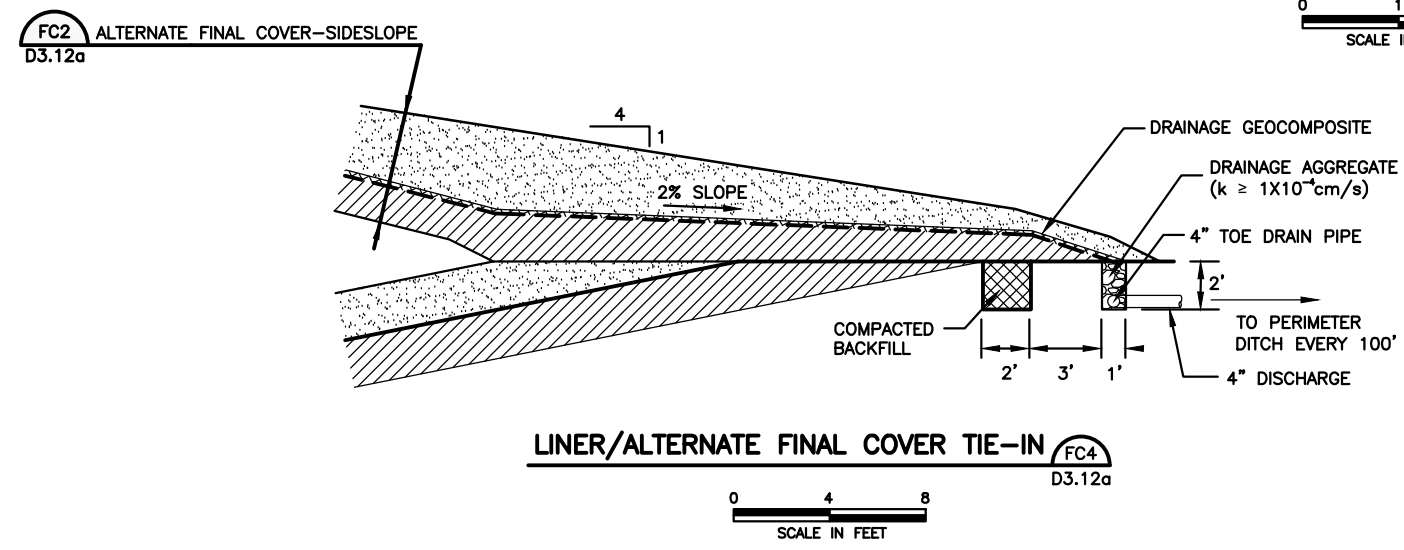
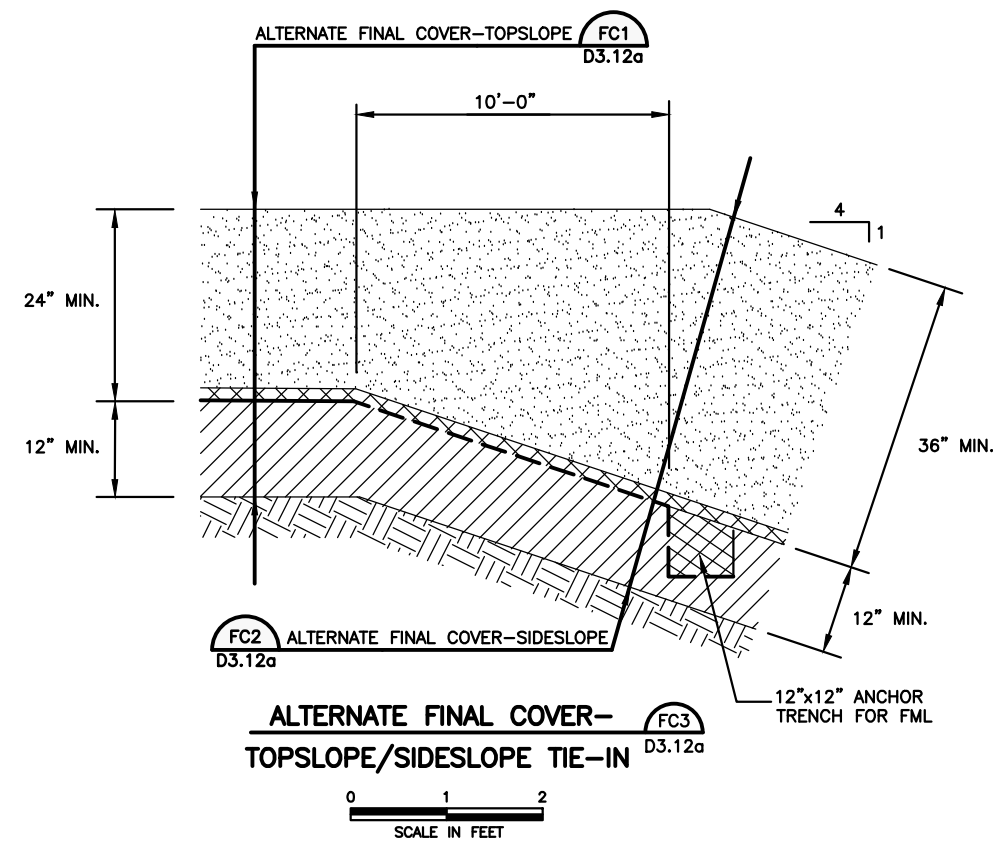
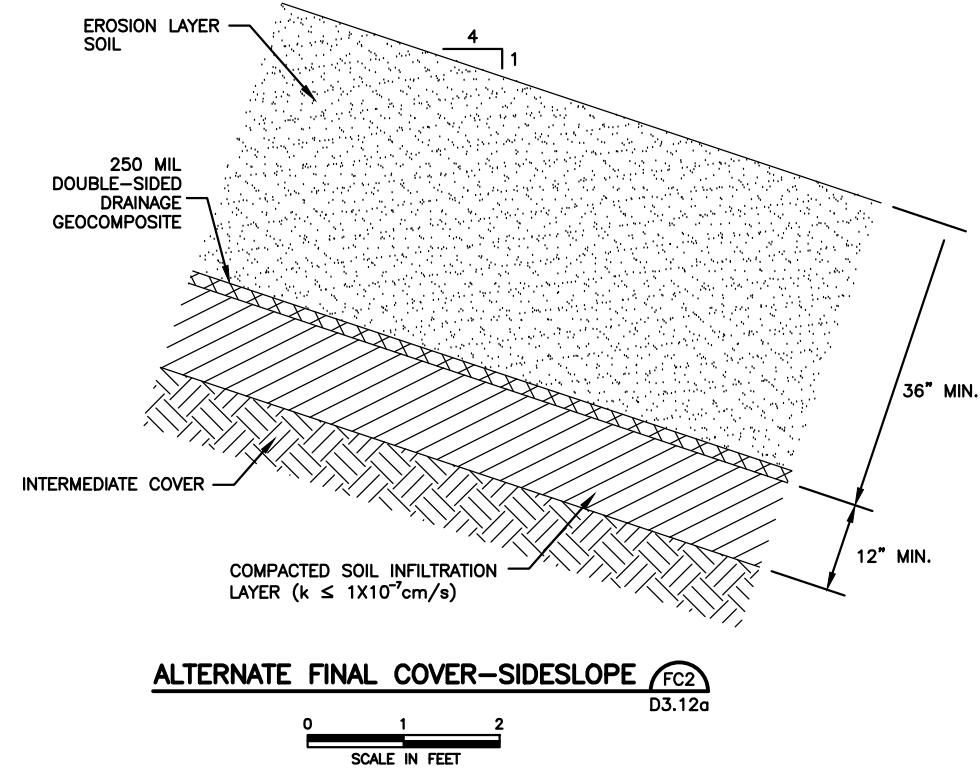
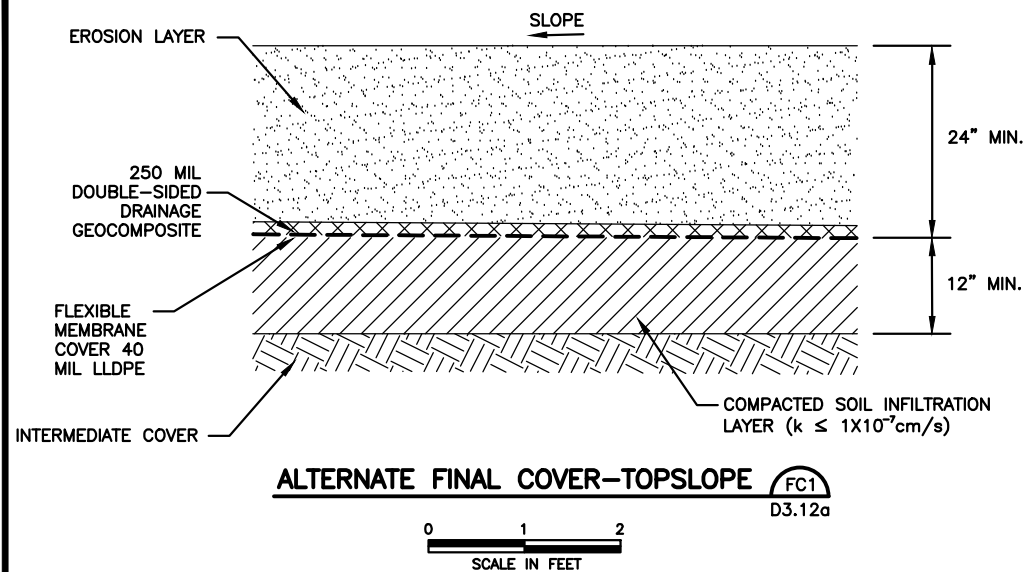
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FINAL COVER DETAILS
ALTERNATE OPTION

WASTE MANAGEMENT OF TEXAS, INC
NEW BOSTON LANDFILL

BME

**BIGGS & MATHEWS
ENVIRONMENTAL**
1700 ROBERT ROAD, STE. 100
MANSFIELD, TEXAS 76063
817-563-1144

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D3.12a

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**NEW BOSTON LANDFILL
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**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D5
GEOTECHNICAL DESIGN.**

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BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

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8 COVER CONSTRUCTION

30 TAC §§330.165, 330.457

8.1 Daily, Weekly, and Intermediate Cover

The daily, weekly, and intermediate cover should be constructed of soils that are free of waste and debris. Suitable cover materials should be available from the proposed excavations or on-site borrow sources. Requirements for the placement of daily, weekly, and intermediate cover are provided in Part IV – Site Operating Plan.

8.2 Final Cover

Final cover construction has been completed over ~~18.4~~the entire 52.5 acres of the West Disposal Area and details of the cover is documented in the Final Cover Evaluation Reports (FCERs). FCER approval dates are shown on Attachment ~~D4J~~, Drawing ~~D4.3J.1~~.

~~The final cover system in the remainder of the West Disposal Area and the North Disposal Area will consist of an 18-inch-thick compacted soil infiltration layer overlain by a geomembrane, a drainage/cushion layer, and a 24-inch-thick erosion layer. There are two final cover system designs proposed for the West and North Disposal Areas as shown on Table D-4 in Attachment D.~~ The final cover system in the South Disposal Area will consist of an 18-inch-thick compacted soil infiltration layer overlain by an erosion layer. The final cover system requirements are provided in Attachment D8 and the final cover system details are provided in Attachment D3.

The infiltration layer material must consist of relatively homogeneous cohesive materials that are free of debris, rocks greater than one inch in diameter, plant materials, frozen materials, foreign objects, and organic material. The infiltration layer should be constructed directly over the intermediate cover once the waste has reached final grades. The infiltration layer construction procedure should be the same as those outlined in Section 7 for liner construction.

The erosion layer should consist of: (1) topsoil stockpiled during the excavation process, (2) on-site soils which has been modified to be capable of sustaining vegetation, or (3) an imported material suitable to sustain vegetation growth. This layer may be spread and placed in one lift over the drainage layer. After spreading, the layer should be rolled lightly to reduce future erosion, although not to the extent that compaction would inhibit plant growth.

8.3 Final Cover Testing and Documentation

CQA testing of the final cover system must be performed during construction. Final cover system requirements are outlined in Attachment D8.

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 576C**

PERMIT AMENDMENT APPLICATION

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D8A
WEST AND NORTH DISPOSAL AREAS
FINAL COVER QUALITY CONTROL PLAN**

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BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

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APPENDIX D8A-A

GRI GM17

APPENDIX D8A-B

Geocomposite Transmissivity Calculation

2 FINAL COVER SYSTEM

30 TAC §330.457

2.1 Final Cover System

The final cover system in the West and North Disposal Areas will be a composite cover system consisting of an intermediate cover layer, an infiltration layer, a flexible membrane cover, a drainage layer, and an erosion layer. Final cover has been constructed over 18.1 acres of the West Disposal Area and details of the cover are documented in the Final Cover Evaluation Reports (FCERs). Approval dates are shown on Attachment D1 – Site Layout Plans, Drawing D1.3.

The final cover plans are included in Attachment D3 – Construction Design Details, Drawings D3.9 and D3.10. Details of the final cover system are provided in Drawings D3.12, [D3.12a](#), and D3.13. The components of the final cover system are listed from top to bottom in Table D8A-1.

**Table D8A-1
New Boston Landfill
Components of the Final Cover System**

Cover System Component	Description	Minimum Thickness
West and North Disposal Areas Final Cover		
TOPSLOPE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Cushion Layer	Geotextile	8 oz
Flexible Membrane Cover	Smooth LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-6}$ cm/sec	18 inches
<u>TOPSLOPE - ALTERNATE</u>		
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>24 inches</u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite</u>	<u>0.25 inches nominal</u>
<u>Flexible Membrane Cover</u>	<u>Smooth or Textured LLDPE geomembrane</u>	<u>40 mil nominal</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec</u>	<u>12 inches</u>
SIDESLOPE OPTION A		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.2 inches nominal
Flexible Membrane Cover	Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE OPTION B		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Geotextile over studded geomembrane	8 oz
Flexible Membrane Cover	Textured LLDPE geomembrane with studs on top	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
<u>SIDESLOPE - ALTERNATE</u>		
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>36 inches</u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite</u>	<u>0.25 inches nominal</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec</u>	<u>12 inches</u>

Construction Monitoring

Continuous on-site monitoring is necessary to assure that the components of the final cover system are constructed in accordance with this FCQCP. The CQA monitor shall provide continuous on-site observation during the following construction activities:

- Infiltration layer placement, processing, compaction, and testing
- Flexible membrane cover deployment, trial welds, seaming, testing, and repairing
- Drainage layer deployment and seaming
- Erosion layer placement
- Any work that could damage the installed components of the final cover system

4 INFILTRATION LAYER

30 TAC §330.457

4.1 General

The infiltration layer consists of ~~an 18-inch-thick layer of~~ compacted, relatively homogeneous, cohesive material. The CQA monitor shall provide continuous on-site observation during infiltration layer placement, processing, compaction, and testing. The GP shall make sufficient site visits during infiltration layer construction to document the construction activities, testing, and thickness verification in the Final Cover System Report, in accordance with Section 8.

4.2 Materials

Infiltration layer material shall consist of soil that is free from debris, rubbish, frozen materials, foreign objects, and organic material. The required infiltration layer material properties are summarized in Table D8A-2.

Table D8A-2
New Boston Landfill
Infiltration Material Properties

Test	Standard	Required Property
Plasticity Index	ASTM D 4318	15 or greater
Liquid Limit	ASTM D 4318	30 or greater
Percent Passing No. 200 Mesh Sieve	ASTM D 1140	30 or greater
Percent Passing 1-inch Sieve	ASTM D 422	100
Coefficient of Permeability	ASTM D 5084 or COE EM 1110-2-1906 Appendix VII	less than or equal to 1×10^{-5} cm/sec

Preconstruction testing procedures and frequencies for infiltration layer materials are listed in Section 4.8.1.

4.3 Subgrade Preparation

Prior to placing infiltration layer material, the subgrade should be proof rolled with heavy, rubber-tired construction equipment to detect soft areas. The GP or CQA monitor must observe the proof-rolling operation. Soft areas should be compacted and then be proof rolled again.

5 FLEXIBLE MEMBRANE COVER

30 TAC §330.457

5.1 General

The flexible membrane cover (FMC) component of the final cover system consists of:

TOPSLOPE

- Smooth 40-mil thick linear low-density polyethylene (LLDPE) geomembrane

TOPSLOPE - ALTERNATE

- Smooth or textured 40-mil thick linear low-density polyethylene (LLDPE) geomembrane

SIDESLOPE - OPTION A

- Textured 40-mil thick LLDPE geomembrane

SIDESLOPE - OPTION B

- Textured 40-mil thick or greater LLDPE geomembrane with studs on top

The CQA monitor shall provide continuous on-site observation of during FMC deployment, trial welds, seaming, testing, and repairing. The GP shall make sufficient site visits during the FMC installation to document the installation and testing in the Final Cover Evaluation Report, in accordance with Section 8.

5.2 Materials

5.2.1 Properties

FMC shall consist of smooth, textured, and studded LLDPE geomembrane produced from virgin raw materials. Recycled materials are not acceptable. The FMC shall not be manufactured from resin from differing suppliers. The FMC shall meet the requirements in the most current revisions of Geosynthetics Research Institute (GRI) Standard GM17 (LLDPE). Copies of GRI GM17 are included in Appendix D8A-A. Refer to Section 6.2.2 for required drainage properties of the studded geomembrane.

Manufacturer quality control testing procedures and frequencies for FMC are listed in Section 5.5.1. Third party conformance testing procedures and frequencies for FMC are listed in Section 5.5.2.

5.2.2 Delivery and Storage

FMC shall be shipped in rolls labeled with the manufacturer's name, roll number, and lot or batch number. The CQA monitor shall inspect the rolls for shipping damage and complete a geosynthetics receipt log for all materials delivered to the site. Damaged rolls shall be rejected.

The FMC shall be unloaded and handled with equipment that does not damage the rolls. Rolls should not be pushed, slid, or dragged to the storage location. The FMC must not

6 DRAINAGE LAYER

30 TAC §330.457

6.1 General

The drainage layer consists of a geocomposite over textured geomembrane or a geotextile over studded geomembrane on the sideslopes. A geotextile will be installed as a cushion fabric on topslopes. The CQA monitor shall provide on-site observation during geocomposite and geotextile installation. The GP shall make sufficient site visits during the geocomposite drainage layer and geotextile installation to document the installation in the Final Cover Evaluation Report.

6.2 Materials

6.2.1 Geocomposite

Double-sided geocomposite (nonwoven geotextile bonded to the top and bottom of HDPE drainage net) ~~will~~may be installed on the sideslopes over textured membrane or compacted clay infiltration layer. The geocomposite shall have the minimum properties listed in Table D8A-7.

**Table D8A-7
New Boston Landfill
Geocomposite Properties**

Material	Test	Standard	Required Property
Geotextile	Material		Nonwoven polypropylene or polyester
	Apparent Opening Size	ASTM D 4751	70 sieve
	Unit Weight	ASTM D 5261	6 oz/yd ²
	Grab Strength	ASTM D 4632	150 lb
	Puncture Strength	ASTM D 6241	300 lb
	Trapezoidal Tear Strength	ASTM D 4533	65 lb
	Permittivity	ASTM D 4491	0.1 sec ⁻¹
	Deterioration	ASTM D 4355	70%/500 hrs
HDPE Drainage Net	Density	ASTM D 1505	0.93 g/cm ³
	Thickness	ASTM D 5199	0.2 inch
	Carbon Black	ASTM D 4218	Minimum 2%, maximum 3%
	Resin Melt Flow Index	ASTM D 1238	1 g/10 min
	Tensile Strength	ASTM D 5035 or 7179	40 lb/in
Geocomposite	Transmissivity	ASTM D 4716	5 x 10 ⁻⁴ m ² /sec
	Ply Adhesion	ASTM D 7005	0.5 lb/in

Manufacturer quality control testing procedures for geocomposite are listed in Section 6.5.

6.2.2 Geotextile / Studded Geomembrane

Nonwoven geotextile ~~will~~may be installed on the topslopes and on sideslopes over the studded geomembrane. The geotextile shall have the minimum properties listed in Table D8A-8. The geotextile over studded geomembrane shall provide a minimum transmissivity of 5×10^{-4} m²/sec when tested in accordance with ASTM D 4716.

Table D8A-8
New Boston Landfill
Geotextile Properties

Test	Standard	Required Property
Material Unit Weight	ASTM D 5261	Nonwoven polypropylene or polyester 8 oz/yd ²

Manufacturer quality control testing procedures for geotextile are listed in Section 6.5.

6.2.3 Delivery and Storage

Geocomposite and geotextile shall be shipped in rolls with opaque wrappers labeled with the manufacturer's name, roll number, and lot or batch number. The CQA monitor shall inspect the rolls for shipping damage and complete a geosynthetics receipt log for all materials delivered to the site. Damaged rolls shall be rejected.

The geocomposite and geotextile shall be unloaded and handled with equipment that does not cause damage. Rolls should not be pushed, slid, or dragged to the storage location. The geocomposite and geotextile must not be stored on wet, soft, or rocky subgrade, but must be stored on a stable subgrade. Geocomposite and geotextile must not be stacked more than five rolls high to avoid crushing the roll cores. The stored geocomposite and geotextile must be protected from puncture, grease, dirt, excessive heat, or other damage.

6.3 Preparation

Prior to installation of the drainage layer, the FMC shall be tested and verified in accordance with Section 5.5. The CQA monitor shall observe that the surface to receive the geocomposite or geotextile is free of debris, stones, and dirt and verify that the conformance documentation has been submitted and approved.

6.4 Installation

Geocomposite and geotextile shall be deployed by equipment that will not damage, crimp, or stretch it nor damage the underlying FMC. All panels must be anchored with adequate ballast to prevent uplift from wind. Smoking and damaging shoes shall not be permitted on the geocomposite or geotextile and only low-ground pressure supporting equipment shall be allowed on the FMC. Adjacent rolls of geocomposite shall be securely tied through the drainage net with plastic fasteners every five feet along the

7 EROSION LAYER

30 TAC §330.457

7.1 General

The erosion layer consists of an ~~an 24-inch-thick~~ layer of soil with the top six inches capable of sustaining native plant growth. The CQA monitor shall provide continuous on-site observation during erosion layer placement to assure that erosion layer placement does not damage underlying geosynthetics. The GP shall make sufficient site visits during erosion layer placement to document the construction activities and thickness verification in the Final Cover Evaluation Report.

7.2 Materials

Erosion layer material shall consist of soil that is free from debris, rubbish, frozen materials, foreign objects, and organic material, or any material that could damage the underlying geosynthetics.

7.3 Preparation

Prior to placing the erosion layer material, the top of infiltration layer elevations shall be verified in accordance with the requirements of Section 4.8.3 and all testing on the underlying geosynthetics shall be completed.

7.4 Placement

The erosion layer shall be placed in a manner that minimizes the potential to damage the underlying geosynthetics. Hauling equipment shall be restricted to haul roads of sufficient thickness to protect the underlying geosynthetics. The erosion layer shall be dumped from the haul road and spread by low ground pressure equipment in a manner that minimizes wrinkles and stress in the geosynthetics. On sideslopes, erosion layer shall be placed from the bottom to the top, not across or down. Erosion layer shall not be placed over geosynthetics that are stretched across the toes of slopes. The minimum separation distance between construction equipment and the geosynthetics are listed in Table D8A-10.

The erosion layer will be seeded or sodded immediately following the application of final cover in order to minimize erosion.

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D9
ALTERNATE FINAL COVER DESIGN DEMONSTRATION**

Prepared for

Waste Management of Texas, Inc.

October 2025



Prepared by

BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS
FIRM REGISTRATION No. F-256 AND No. 10194895

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION No. 50222



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1 **ALTERNATE FINAL COVER 1**

2 **PERFORMANCE EVALUATION 2**

3 **RESULTS..... 3**

APPENDIX D9.A
Help Model Results

1 ALTERNATE FINAL COVER

In accordance with 30 TAC §330.457(d), the proposed alternate final covers achieve an equivalent reduction in infiltration and provide equivalent erosion protection as the prescribed system. The prescribed final cover system for MSW landfill units with a synthetic bottom liner, as described in 30 TAC §330.457(a)(1,3), consists of the following components from top to bottom:

- A minimum erosion layer consisting of 6-inches of earthen material capable of sustaining native plant growth;
- A clay-rich soil cover layer consisting of a minimum of 18-inches of earthen material with a minimum coefficient of permeability of 1×10^{-5} cm/sec, and;
- A synthetic membrane.

The following additional alternate final cover system is proposed for the New Boston Landfill, listed from top to bottom:

Top Deck – Alternate Final Cover:

- 24-inch soil erosion layer;
- 250-mil double-sided geocomposite;
- 40-mil LLDPE geomembrane cover, and;
- 12-inch infiltration layer consisting of compacted soils ($k \leq 1 \times 10^{-7}$ cm/s).

Side Slope – Alternate Final Cover:

- 36-inch erosion layer;
- 250-mil double-sided geocomposite, and;
- 12-inch infiltration layer consisting of compacted soils ($k \leq 1 \times 10^{-7}$ cm/s).

Perforated HDPE pipe will be installed at the toe of the slope and the geocomposite drainage layer will daylight at intervals approximately 100 feet on the side slopes to collect drainage from the geocomposite drainage layer. The perforated piping will collect the drainage and direct the flow into the perimeter drainage system. The daylighted drainage geocomposite will collect drainage and direct the flow into the invert of the final cover swales and into the final cover letdown structures. Details of the geocomposite alternate final cover system are shown on Drawing D3.12a in Attachment D3.

2 PERFORMANCE EVALUATION

The performances of the top deck and sideslope composite alternate final cover designs were evaluated using the HELP computer modelling program (HELP Model Version 4.0.1). The HELP model simulates hydrologic processes for a landfill by performing daily, sequential water budget analyses using a quasi-two-dimensional deterministic approach. The model accepts weather, soil, and design data and uses solution techniques to account for key factors affecting water movement within the landfill. The model accounts for both surface and sub-surface processes including transpiration, surface runoff, evaporation, vertical percolation, saturated lateral drainage, and geosynthetics leakage to estimate the various movements of water within the selected profile.

The performance evaluations were performed for a unit area of landfill final cover modeled for thirty years. Each model assumed near steady-state values for the simulation period. The model requires input design data including daily and general climatological records, site-specific soil parameters, material properties, and landfill design data. Models for the prescriptive and alternate final cover systems are provided in Appendix D9.A.

3 RESULTS

Four HELP model simulations were conducted to estimate the percolation through the cover systems. Two HELP model simulations were conducted for final cover systems (top deck and sideslope) prescribed by current regulations and two HELP model simulations were conducted for alternate final cover systems (top deck and sideslope). Results from the models are summarized below.

HELP Model Results – Estimated Percolation

Final Cover System Configuration	Description	Avg. Annual Total Summary
		(in.)
Prescriptive	Top Deck	0.5804
	Side Slope	0.5719
Alternate	Top Deck	0.0000
	Side Slope	0.0248

Final Cover System Configuration	Description	Peak Values Summary
		(in.)
Prescriptive	Top Deck	0.0032
	Side Slope	0.0032
Alternate	Top Deck	0.0000
	Side Slope	0.0025

The simulations demonstrate that the proposed alternate final cover systems will provide a greater reduction in infiltration than the prescribed cover system. The erosion layer evaluation, provided in the final cover drainage structure design included in Appendix C1-E, demonstrates the thickness of the alternate final cover erosion layer is greater than the anticipated losses due to erosion.

APPENDIX D9.A
HELP MODEL RESULTS

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: NB FC: Prescribed (TS) **Simulated On:** 10/17/2025 12:38

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)

SCL - Sandy Clay Loam

Material Texture Number 10

Thickness	=	6 inches
Porosity	=	0.398 vol/vol
Field Capacity	=	0.244 vol/vol
Wilting Point	=	0.136 vol/vol
Initial Soil Water Content	=	0.409 vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-04 cm/sec

Layer 2

Type 1 - Vertical Percolation Layer

SC/CL New Boston Clays (Uncompacted)

Material Texture Number 43

Thickness	=	18 inches
Porosity	=	0.464 vol/vol
Field Capacity	=	0.31 vol/vol
Wilting Point	=	0.187 vol/vol
Initial Soil Water Content	=	0.4603 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05 cm/sec

Layer 3

Type 4 - Flexible Membrane Liner

LDPE Membrane

Material Texture Number 36

Thickness	=	0.04 inches
Effective Sat. Hyd. Conductivity	=	4.00E-13 cm/sec
FML Pinhole Density	=	3 Holes/Acre
FML Installation Defects	=	4 Holes/Acre
FML Placement Quality	=	3 Good

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	86.2
Fraction of Area Allowing Runoff	=	100 %
Area projected on a horizontal plane	=	1 acres
Evaporative Zone Depth	=	24 inches
Initial Water in Evaporative Zone	=	10.74 inches
Upper Limit of Evaporative Storage	=	10.74 inches
Lower Limit of Evaporative Storage	=	4.182 inches
Initial Snow Water	=	0 inches
Initial Water in Layer Materials	=	10.74 inches
Total Initial Water	=	10.74 inches
Total Subsurface Inflow	=	0 inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	33.47 Degrees
Maximum Leaf Area Index	=	5
Start of Growing Season (Julian Date)	=	91 days
End of Growing Season (Julian Date)	=	304 days
Average Wind Speed	=	1.885 mph
Average 1st Quarter Relative Humidity	=	83 %
Average 2nd Quarter Relative Humidity	=	78 %
Average 3rd Quarter Relative Humidity	=	65 %
Average 4th Quarter Relative Humidity	=	77 %

Note: Evapotranspiration data was obtained for New Boston, Texas

Normal Mean Monthly Precipitation (inches)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
3.877037	4.325889	5.150083	3.745899	5.13176	4.523972
3.4829	2.643919	3.968276	5.007685	4.584613	5.01805

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45

Normal Mean Monthly Temperature (Degrees Fahrenheit)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
54.9	53	59.8	70.1	78.2	89
92.1	89.8	80.7	69.9	61.3	53.9

Note: Temperature was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.47/-94.45
 Solar radiation was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.47/-94.45

Average Annual Totals Summary

Title: NB FC: Prescribed (TS)

Simulated on: 10/17/2025 12:39

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	51.46	[8.49]	186,800.1	100.00
Runoff	15.267	[6.018]	55,418.1	29.67
Evapotranspiration	35.590	[3.56]	129,189.9	69.16
Subprofile1				
Percolation/leakage through Layer 3	0.580392	[0.09213]	2,106.8	1.13
Average Head on Top of Layer 3	11.6263	[1.8587]	---	---
Water storage				
Change in water storage	0.0235	[1.5438]	85.2	0.05

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: NB FC: Prescribed (TS)

Simulated on: 10/17/2025 12:39

	Peak Values for Years 1 - 30*	
	(inches)	(cubic feet)
Precipitation	5.10	18,522.5
Runoff	4.420	16,043.7
Subprofile1		
Percolation/leakage through Layer 3	0.003240	11.8
Average head on Layer 3	24.0000	
Other Parameters		
Snow water	6.7883	24,641.3
Maximum vegetation soil water	0.4475 (vol/vol)	
Minimum vegetation soil water	0.1743 (vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: NB FC: Prescribed (TS)

Simulated on: 10/17/2025 12:40

Simulation period: 30 years

Layer	Final Water Storage	
	(inches)	(vol/vol)
1	2.4460	0.4077
2	8.2860	0.4603
3	0.0000	0.0000
Snow water	0.7125	---

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: NB FC: Prescribed (SS) **Simulated On:** 10/17/2025 12:21

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)

SCL - Sandy Clay Loam

Material Texture Number 10

Thickness	=	6 inches
Porosity	=	0.398 vol/vol
Field Capacity	=	0.244 vol/vol
Wilting Point	=	0.136 vol/vol
Initial Soil Water Content	=	0.409 vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-04 cm/sec

Layer 2

Type 1 - Vertical Percolation Layer

SC/CL New Boston Clays (Uncompacted)

Material Texture Number 43

Thickness	=	18 inches
Porosity	=	0.464 vol/vol
Field Capacity	=	0.31 vol/vol
Wilting Point	=	0.187 vol/vol
Initial Soil Water Content	=	0.4603 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05 cm/sec

Layer 3

Type 4 - Flexible Membrane Liner

LDPE Membrane

Material Texture Number 36

Thickness	=	0.04 inches
Effective Sat. Hyd. Conductivity	=	4.00E-13 cm/sec
FML Pinhole Density	=	3 Holes/Acre
FML Installation Defects	=	4 Holes/Acre
FML Placement Quality	=	3 Good

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	87.3
Fraction of Area Allowing Runoff	=	100 %
Area projected on a horizontal plane	=	1 acres
Evaporative Zone Depth	=	24 inches
Initial Water in Evaporative Zone	=	10.74 inches
Upper Limit of Evaporative Storage	=	10.74 inches
Lower Limit of Evaporative Storage	=	4.182 inches
Initial Snow Water	=	0 inches
Initial Water in Layer Materials	=	10.74 inches
Total Initial Water	=	10.74 inches
Total Subsurface Inflow	=	0 inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	33.47 Degrees
Maximum Leaf Area Index	=	5
Start of Growing Season (Julian Date)	=	91 days
End of Growing Season (Julian Date)	=	304 days
Average Wind Speed	=	1.885 mph
Average 1st Quarter Relative Humidity	=	83 %
Average 2nd Quarter Relative Humidity	=	78 %
Average 3rd Quarter Relative Humidity	=	65 %
Average 4th Quarter Relative Humidity	=	77 %

Note: Evapotranspiration data was obtained for New Boston, Texas

Normal Mean Monthly Precipitation (inches)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
3.877037	4.325889	5.150083	3.745899	5.13176	4.523972
3.4829	2.643919	3.968276	5.007685	4.584613	5.01805

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.471528/-94.445833

Normal Mean Monthly Temperature (Degrees Fahrenheit)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
54.9	53	59.8	70.1	78.2	89
92.1	89.8	80.7	69.9	61.3	53.9

Note: Temperature was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.471528/-94.445833
 Solar radiation was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.471528/-94.445833

Average Annual Totals Summary

Title: NB FC: Prescribed (SS)

Simulated on: 10/17/2025 12:25

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	51.46	[8.49]	186,800.1	100.00
Runoff	15.453	[5.988]	56,094.4	30.03
Evapotranspiration	35.412	[3.534]	128,544.3	68.81
Subprofile1				
Percolation/leakage through Layer 3	0.571949	[0.09251]	2,076.2	1.11
Average Head on Top of Layer 3	11.4489	[1.867]	---	---
Water storage				
Change in water storage	0.0235	[1.6002]	85.2	0.05

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: NB FC: Prescribed (SS)

Simulated on: 10/17/2025 12:25

	Peak Values for Years 1 - 30*	
	(inches)	(cubic feet)
Precipitation	5.10	18,522.5
Runoff	4.420	16,042.8
Subprofile1		
Percolation/leakage through Layer 3	0.003240	11.8
Average head on Layer 3	24.0000	
Other Parameters		
Snow water	6.7883	24,641.4
Maximum vegetation soil water	0.4475 (vol/vol)	
Minimum vegetation soil water	0.1743 (vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: NB FC: Prescribed (SS)

Simulated on: 10/17/2025 12:25

Simulation period: 30 years

Layer	Final Water Storage	
	(inches)	(vol/vol)
1	2.4460	0.4077
2	8.2860	0.4603
3	0.0000	0.0000
Snow water	0.7125	---

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: NB FC: Alternate (TS) **Simulated On:** 10/17/2025 13:05

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)

SC/CL New Boston Clays (Uncompacted)

Material Texture Number 43

Thickness	=	24 inches
Porosity	=	0.464 vol/vol
Field Capacity	=	0.31 vol/vol
Wilting Point	=	0.187 vol/vol
Initial Soil Water Content	=	0.3944 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05 cm/sec

Layer 2

Type 2 - Lateral Drainage Layer

250-mil DS 6oz Composite

Material Texture Number 123

Thickness	=	0.25 inches
Porosity	=	0.85 vol/vol
Field Capacity	=	0.01 vol/vol
Wilting Point	=	0.005 vol/vol
Initial Soil Water Content	=	0.01 vol/vol
Effective Sat. Hyd. Conductivity	=	5.00E+01 cm/sec
Slope	=	25 %
Drainage Length	=	100 ft

Layer 3

Type 4 - Flexible Membrane Liner

LDPE Membrane

Material Texture Number 36

Thickness	=	0.04 inches
Effective Sat. Hyd. Conductivity	=	4.00E-13 cm/sec
FML Pinhole Density	=	2 Holes/Acre
FML Installation Defects	=	3 Holes/Acre
FML Placement Quality	=	3 Good

Layer 4

Type 3 - Barrier Soil Liner

Liner Soil (High)

Material Texture Number 16

Thickness	=	12 inches
Porosity	=	0.427 vol/vol
Field Capacity	=	0.418 vol/vol
Wilting Point	=	0.367 vol/vol
Initial Soil Water Content	=	0.427 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-07 cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	90.5
Fraction of Area Allowing Runoff	=	100 %
Area projected on a horizontal plane	=	1 acres
Evaporative Zone Depth	=	24 inches
Initial Water in Evaporative Zone	=	9.466 inches
Upper Limit of Evaporative Storage	=	11.136 inches
Lower Limit of Evaporative Storage	=	4.488 inches
Initial Snow Water	=	0 inches
Initial Water in Layer Materials	=	14.592 inches
Total Initial Water	=	14.592 inches
Total Subsurface Inflow	=	0 inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	33.47 Degrees
Maximum Leaf Area Index	=	5
Start of Growing Season (Julian Date)	=	91 days
End of Growing Season (Julian Date)	=	304 days
Average Wind Speed	=	1.885 mph
Average 1st Quarter Relative Humidity	=	83 %
Average 2nd Quarter Relative Humidity	=	78 %
Average 3rd Quarter Relative Humidity	=	65 %
Average 4th Quarter Relative Humidity	=	77 %

Note: Evapotranspiration data was obtained for New Boston, Texas

Normal Mean Monthly Precipitation (inches)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
3.877037	4.325889	5.150083	3.745899	5.13176	4.523972
3.4829	2.643919	3.968276	5.007685	4.584613	5.01805

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45

Normal Mean Monthly Temperature (Degrees Fahrenheit)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
54.9	53	59.8	70.1	78.2	89
92.1	89.8	80.7	69.9	61.3	53.9

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45

Average Annual Totals Summary

Title: NB FC: Alternate (TS)

Simulated on: 10/17/2025 13:06

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	51.46	[8.49]	186,800.1	100.00
Runoff	22.529	[5.439]	81,780.4	43.78
Evapotranspiration	26.695	[3.049]	96,901.7	51.87
Subprofile1				
Lateral drainage collected from Layer 2	2.2088	[1.2613]	8,018.1	4.29
Percolation/leakage through Layer 4	0.000000	[0]	0.0006	0.00
Average Head on Top of Layer 3	0.0005	[0.0003]	---	---
Water storage				
Change in water storage	0.0275	[1.8316]	99.9	0.05

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: NB FC: Alternate (TS)

Simulated on: 10/17/2025 13:07

	Peak Values for Years 1 - 30*	
	(inches)	(cubic feet)
Precipitation	5.10	18,522.5
Runoff	4.237	15,381.2
Subprofile1		
Drainage collected from Layer 2	0.1881	682.7
Percolation/leakage through Layer 4	0.000000	0.0000
Average head on Layer 3	0.0143	---
Maximum head on Layer 3	0.0006	---
Location of maximum head in Layer 2	0.00	(feet from drain)
Other Parameters		
Snow water	6.7883	24,641.3
Maximum vegetation soil water	0.4380	(vol/vol)
Minimum vegetation soil water	0.1870	(vol/vol)

Final Water Storage in Landfill Profile at End of Simulation Period

Title: NB FC: Alternate (TS)
Simulated on: 10/17/2025 13:07
Simulation period: 30 years

Layer	Final Water Storage	
	(inches)	(vol/vol)
1	9.5783	0.3991
2	0.0025	0.0100
3	0.0000	0.0000
4	5.1240	0.4270
Snow water	0.7125	---

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: NB FC: Alternate (SS) **Simulated On:** 10/17/2025 12:54

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)

SC/CL New Boston Clays (Uncompacted)

Material Texture Number 43

Thickness	=	36 inches
Porosity	=	0.464 vol/vol
Field Capacity	=	0.31 vol/vol
Wilting Point	=	0.187 vol/vol
Initial Soil Water Content	=	0.336 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05 cm/sec

Layer 2

Type 2 - Lateral Drainage Layer

250-mil DS 6oz Composite

Material Texture Number 123

Thickness	=	0.25 inches
Porosity	=	0.85 vol/vol
Field Capacity	=	0.01 vol/vol
Wilting Point	=	0.005 vol/vol
Initial Soil Water Content	=	0.01 vol/vol
Effective Sat. Hyd. Conductivity	=	5.00E+01 cm/sec
Slope	=	25 %
Drainage Length	=	100 ft

Layer 3

Type 3 - Barrier Soil Liner

Liner Soil (High)

Material Texture Number 16

Thickness	=	12 inches
Porosity	=	0.427 vol/vol
Field Capacity	=	0.418 vol/vol
Wilting Point	=	0.367 vol/vol
Initial Soil Water Content	=	0.427 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-07 cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	91.2
Fraction of Area Allowing Runoff	=	100 %
Area projected on a horizontal plane	=	1 acres
Evaporative Zone Depth	=	36 inches
Initial Water in Evaporative Zone	=	12.094 inches
Upper Limit of Evaporative Storage	=	16.704 inches
Lower Limit of Evaporative Storage	=	6.732 inches
Initial Snow Water	=	0 inches
Initial Water in Layer Materials	=	17.221 inches
Total Initial Water	=	17.221 inches
Total Subsurface Inflow	=	0 inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	33.47 Degrees
Maximum Leaf Area Index	=	5
Start of Growing Season (Julian Date)	=	91 days
End of Growing Season (Julian Date)	=	304 days
Average Wind Speed	=	1.885 mph
Average 1st Quarter Relative Humidity	=	83 %
Average 2nd Quarter Relative Humidity	=	78 %
Average 3rd Quarter Relative Humidity	=	65 %
Average 4th Quarter Relative Humidity	=	77 %

Note: Evapotranspiration data was obtained for New Boston, Texas

Normal Mean Monthly Precipitation (inches)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
3.877037	4.325889	5.150083	3.745899	5.13176	4.523972
3.4829	2.643919	3.968276	5.007685	4.584613	5.01805

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45

Normal Mean Monthly Temperature (Degrees Fahrenheit)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
54.9	53	59.8	70.1	78.2	89
92.1	89.8	80.7	69.9	61.3	53.9

Note: Temperature was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.47/-94.45
 Solar radiation was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.47/-94.45

Average Annual Totals Summary

Title: NB FC: Alternate (SS)

Simulated on: 10/17/2025 12:56

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	51.46	[8.49]	186,800.1	100.00
Runoff	22.275	[5.477]	80,858.3	43.29
Evapotranspiration	27.827	[3.13]	101,011.7	54.07
Subprofile1				
Lateral drainage collected from Layer 2	1.2494	[1.1293]	4,535.2	2.43
Percolation/leakage through Layer 3	0.024783	[0.019879]	90.0	0.05
Average Head on Top of Layer 3	0.0003	[0.0002]	---	---
Water storage				
Change in water storage	0.0840	[2.3257]	305.0	0.16

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: NB FC: Alternate (SS)

Simulated on: 10/17/2025 12:56

	Peak Values for Years 1 - 30*	
	(inches)	(cubic feet)
Precipitation	5.10	18,522.5
Runoff	4.210	15,283.1
Subprofile1		
Drainage collected from Layer 2	0.1451	526.9
Percolation/leakage through Layer 3	0.001888	6.8550
Average head on Layer 3	0.0109	---
Maximum head on Layer 3	0.0004	---
Location of maximum head in Layer 2	0.00	(feet from drain)
Other Parameters		
Snow water	6.7883	24,641.3
Maximum vegetation soil water	0.4320	(vol/vol)
Minimum vegetation soil water	0.1870	(vol/vol)

Final Water Storage in Landfill Profile at End of Simulation Period

Title: NB FC: Alternate (SS)

Simulated on: 10/17/2025 12:56

Simulation period: 30 years

Layer	Final Water Storage	
	(inches)	(vol/vol)
1	13.9021	0.3862
2	0.0025	0.0100
3	5.1240	0.4270
Snow water	0.7125	---

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT H
CLOSURE PLAN**

Prepared for

Waste Management of Texas, Inc.

Technically Complete September 12, 2014
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Prepared by

BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION No. F-256 AND No. 10194895

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION No. 50222



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APPENDIX H1 – FIGURES

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APPENDIX H3 – MAXIMUM INVENTORY OF WASTE ONSITE

2 FINAL COVER SYSTEM

30 TAC §330.457

2.1 Final Cover System Design

2.1.1 West and North Disposal Areas

~~The final cover system in the West and North Disposal Areas will be a composite cover system consisting of an intermediate cover layer, an infiltration layer, a flexible membrane cover, a drainage layer, and an erosion layer. There are two final cover system designs for the West and North Disposal Areas at the New Boston Landfill, the components of which are listed on Table H-1 of this section.~~ Final cover has been constructed over ~~18.4~~the entire 52.5 acres of the West Disposal Area and details of the cover are documented in the Final Cover Evaluation Reports (FCERs). Approval dates are shown on Appendix ~~H2J~~, Drawing ~~H2-2J.1~~.

The final cover plans are included in Appendix H2, Drawings H2.2 and H2.3 and the final cover details are provided in Drawings H2.5, H2.5a, and H2.6. The components of the final cover system are listed from top to bottom in Table H-1.

The final cover will be seeded or sodded immediately following the application of the final cover in order to minimize erosion. The vegetation will be native and introduced grasses. Temporary cold weather vegetation will be established if required. Irrigation will be employed as needed until vegetation is established. Erosion control measures such as silt fences and straw bales will be used to minimize erosion until the vegetation is established. Areas that experience erosion or do not readily vegetate will be repaired, reseeded or sodded until vegetation is established, or the soil will be replaced with soil that will support the grasses.

Table H-1
New Boston Landfill
Components of the West and North Disposal Areas Final Cover System

Cover System Component	Description	Minimum Thickness
West and North Disposal Areas Final Cover		
TOPSLOPE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Cushion Layer	Geotextile	8 oz
Flexible Membrane Cover	Smooth LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
<u>TOPSLOPE - ALTERNATE</u>		
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>24 inches</u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite</u>	<u>0.25 inches nominal</u>
<u>Flexible Membrane Cover</u>	<u>Smooth or Textured LLDPE geomembrane</u>	<u>40 mil nominal</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec</u>	<u>12 inches</u>
SIDESLOPE OPTION A		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.2 inches nominal
Flexible Membrane Cover	Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE OPTION B		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Geotextile over studded geomembrane	8 oz
Flexible Membrane Cover	Textured LLDPE geomembrane with studs on top	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
<u>SIDESLOPE - ALTERNATE</u>		
<u>Erosion Layer</u>	<u>Soil that is capable of sustaining native plant growth</u>	<u>36 inches</u>
<u>Drainage Layer</u>	<u>Double-sided geocomposite</u>	<u>0.25 inches nominal</u>
<u>Infiltration Layer</u>	<u>Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec</u>	<u>12 inches</u>

2.1.2 South Disposal Area

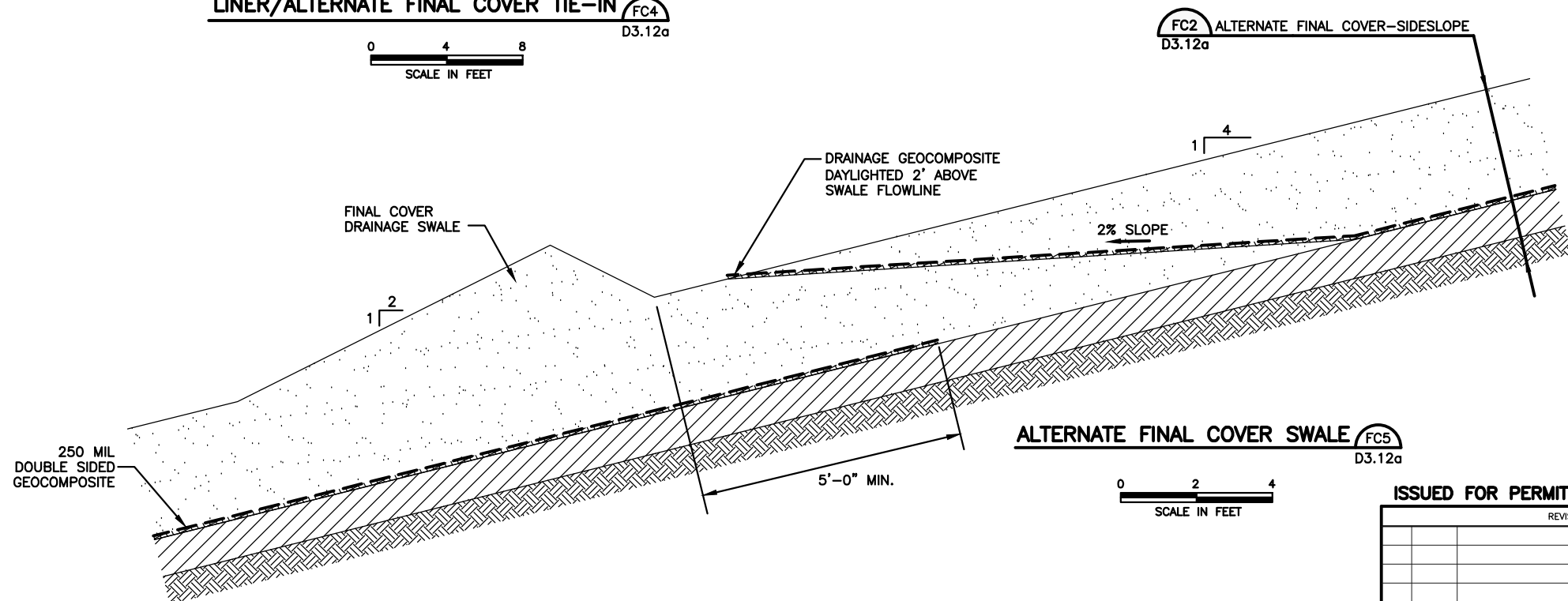
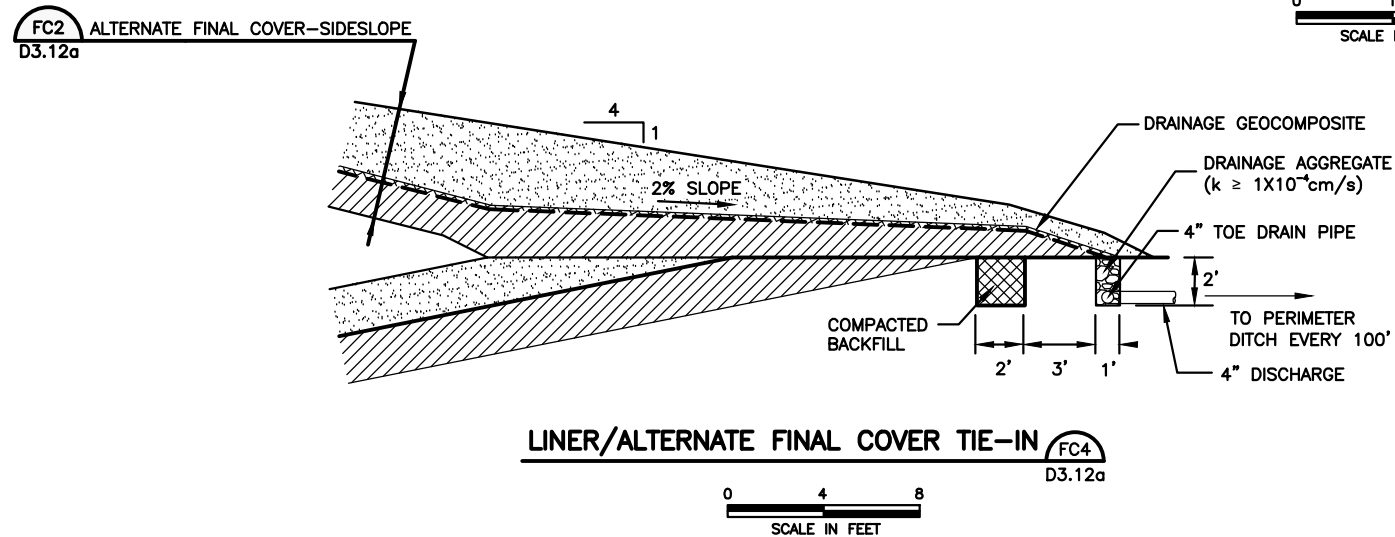
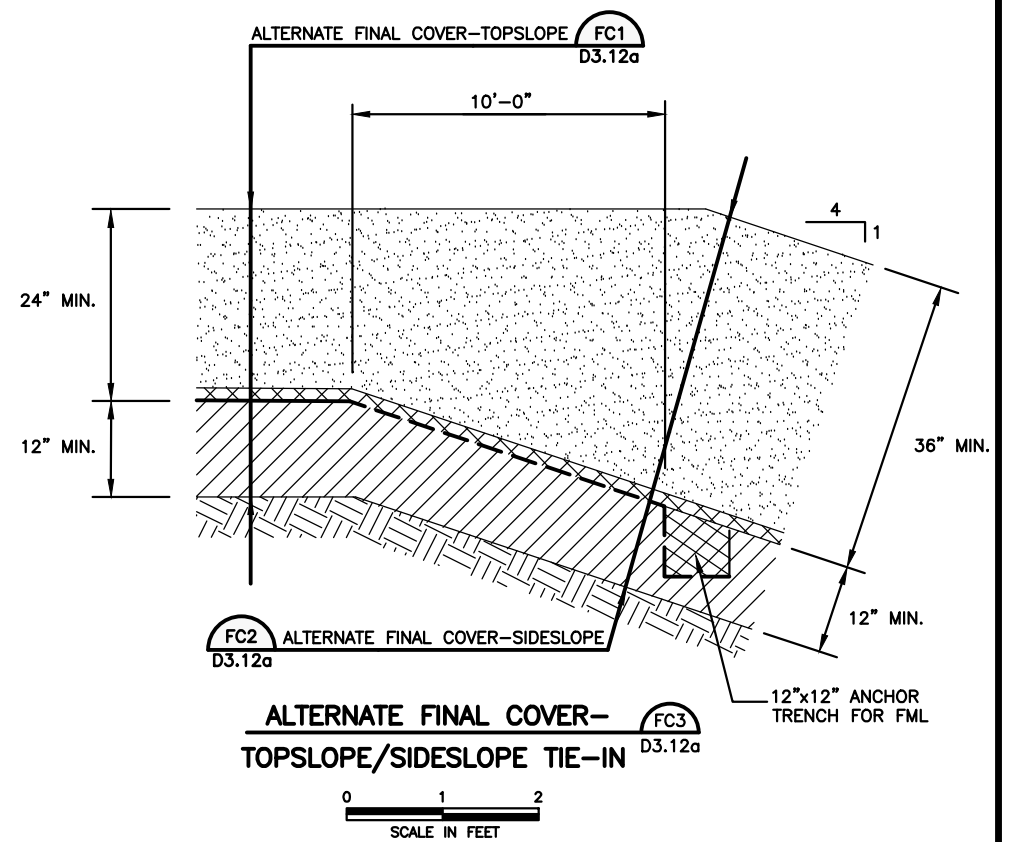
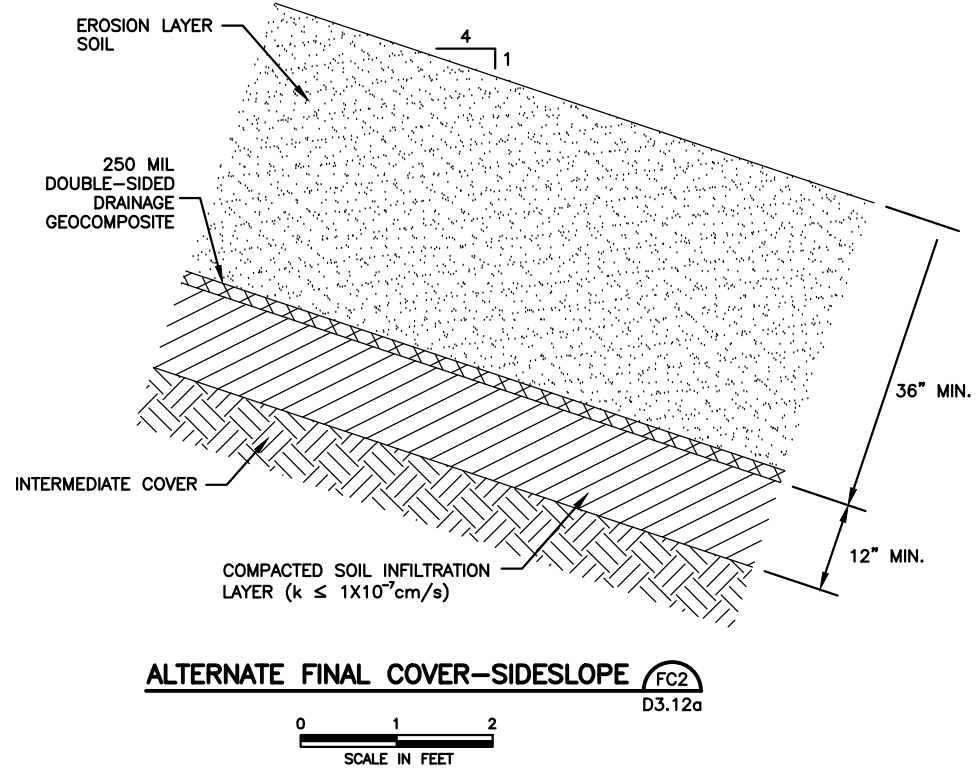
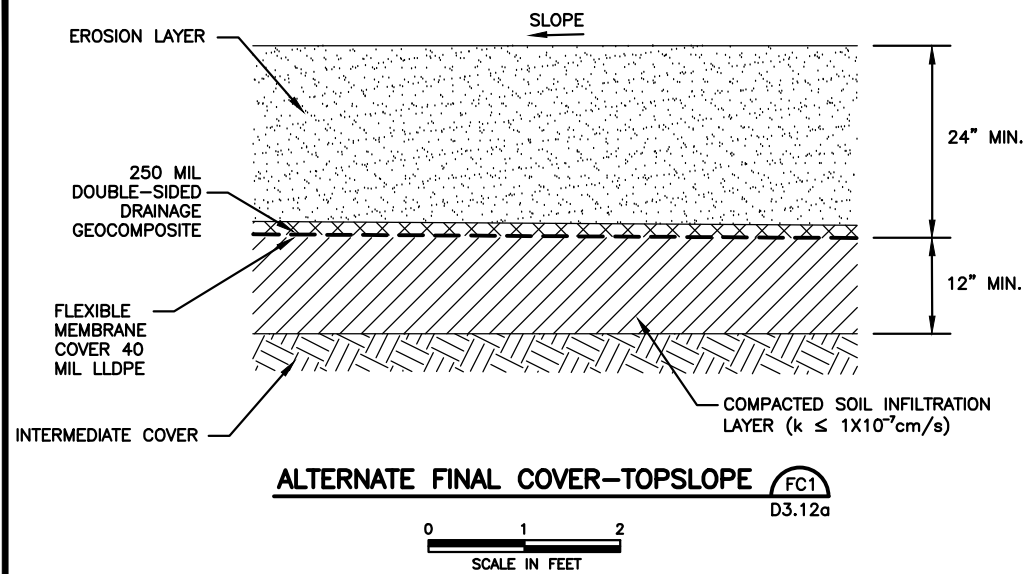
The final cover system in the South Disposal Area will consist of an infiltration layer and an erosion control layer. The final cover plan is included in Appendix H2, Drawing H2.3 and the final cover details are provided in Drawing H2.6. The components of the final cover system are listed from top to bottom in Table H-2.

The final cover will be seeded or sodded immediately following the application of the final cover in order to minimize erosion. The vegetation will be native and introduced grasses. Temporary cold weather vegetation will be established if required. Irrigation will be employed as needed until vegetation is established. Erosion control measures such as silt fences and straw bales will be used to minimize erosion until the vegetation is established. Areas that experience erosion or do not readily vegetate will be repaired, reseeded or sodded until vegetation is established, or the soil will be replaced with soil that will support the grasses.

NEW BOSTON LANDFILL

**APPENDIX H2
FINAL COVER SYSTEM PLANS AND DETAILS**

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FINAL COVER DETAILS
ALTERNATE OPTION

WASTE MANAGEMENT OF TEXAS, INC
NEW BOSTON LANDFILL

BME

**BIGGS & MATHEWS
ENVIRONMENTAL**
1700 ROBERT ROAD, STE. 100
MANSFIELD, TEXAS 76063
817-563-1144

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H2.5a

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ATTACHMENT 3
UNMARKED REVISED PAGES

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT B
GENERAL FACILITY DESIGN**

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1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS
FIRM REGISTRATION NO. F-256 AND NO. 10194895

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
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**Table B-2
New Boston Landfill
Components of the Final Cover Systems**

Cover System Component	Description	Minimum Thickness
West and North Disposal Areas Final Cover		
TOPSLOPE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Cushion Layer	Geotextile	8 oz
Flexible Membrane Cover	Smooth LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
TOPSLOPE - ALTERNATE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.25 inches nominal
Flexible Membrane Cover	Smooth or Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec	12 inches
SIDESLOPE OPTION A		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.2 inches nominal
Flexible Membrane Cover	Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE OPTION B		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Geotextile over studded geomembrane	8 oz
Flexible Membrane Cover	Textured LLDPE geomembrane with studs on top	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE - ALTERNATE		
Erosion Layer	Soil that is capable of sustaining native plant growth	36 inches
Drainage Layer	Double-sided geocomposite	0.25 inches nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec	12 inches
South Disposal Area Final Cover System		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec	18 inches

Final cover placement will generally follow the sequence of development as shown in Part II, Appendix IIA, Drawings IIA.16 through IIA.24, and will be ongoing as the site is developed. Sectors will be closed according to the closure plan provided in Attachment H – Closure Plan.

RACM

Regulated asbestos-containing material (RACM) may be accepted at the New Boston Landfill as defined in 40 Code of Federal Regulations Part 61 in accordance with 30 TAC §330.171(c)(3). The existing landfill has previously notified TCEQ of its intent to accept RACM. The New Boston Landfill, by inclusion of the requirements of §330.171(c)(3) in the Site Operating Plan, is providing written notification to the executive director of the

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D
WASTE MANAGEMENT UNIT DESIGN**

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BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

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30 TAC §330.63(d)

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Attachment D2 – Cross Sections

Attachment D3 – Construction Design Details

Attachment D4 – Site Life

Attachment D5 – Geotechnical Design

Attachment D6 – Leachate and Contaminated Water Management Plan

Attachment D7 – Liner Quality Control Plans

Attachment D7A – North Disposal Area Liner Quality Control Plan

Attachment D7B – South Disposal Area Liner Quality Control Plan

Attachment D8 – Final Cover Quality Control Plans

Attachment D8A – West and North Disposal Areas Final Cover Quality Control Plan

Attachment D8B – South Disposal Area Final Cover Quality Control Plan

Attachment D9 – Alternate Final Cover Design Demonstration

**Table D-4
New Boston Landfill
Components of the Final Cover Systems**

Cover System Component	Description	Minimum Thickness
West and North Disposal Areas Final Cover		
TOPSLOPE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Cushion Layer	Geotextile	8 oz
Flexible Membrane Cover	Smooth LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-5} cm/sec	18 inches
TOPSLOPE - ALTERNATE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.25 inches nominal
Flexible Membrane Cover	Smooth or Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-7} cm/sec	12 inches
SIDESLOPE OPTION A		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.2 inches nominal
Flexible Membrane Cover	Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-5} cm/sec	18 inches
SIDESLOPE OPTION B		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Geotextile over studded geomembrane	8 oz
Flexible Membrane Cover	Textured LLDPE geomembrane with studs on top	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-5} cm/sec	18 inches
SIDESLOPE - ALTERNATE		
Erosion Layer	Soil that is capable of sustaining native plant growth	36 inches
Drainage Layer	Double-sided geocomposite	0.25 inches nominal
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-7} cm/sec	12 inches
South Disposal Area Final Cover		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Infiltration Layer	Compacted soil with a coefficient of permeability less than or equal to 1×10^{-7} cm/sec	18 inches

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D3
CONSTRUCTION DESIGN DETAILS**

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BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

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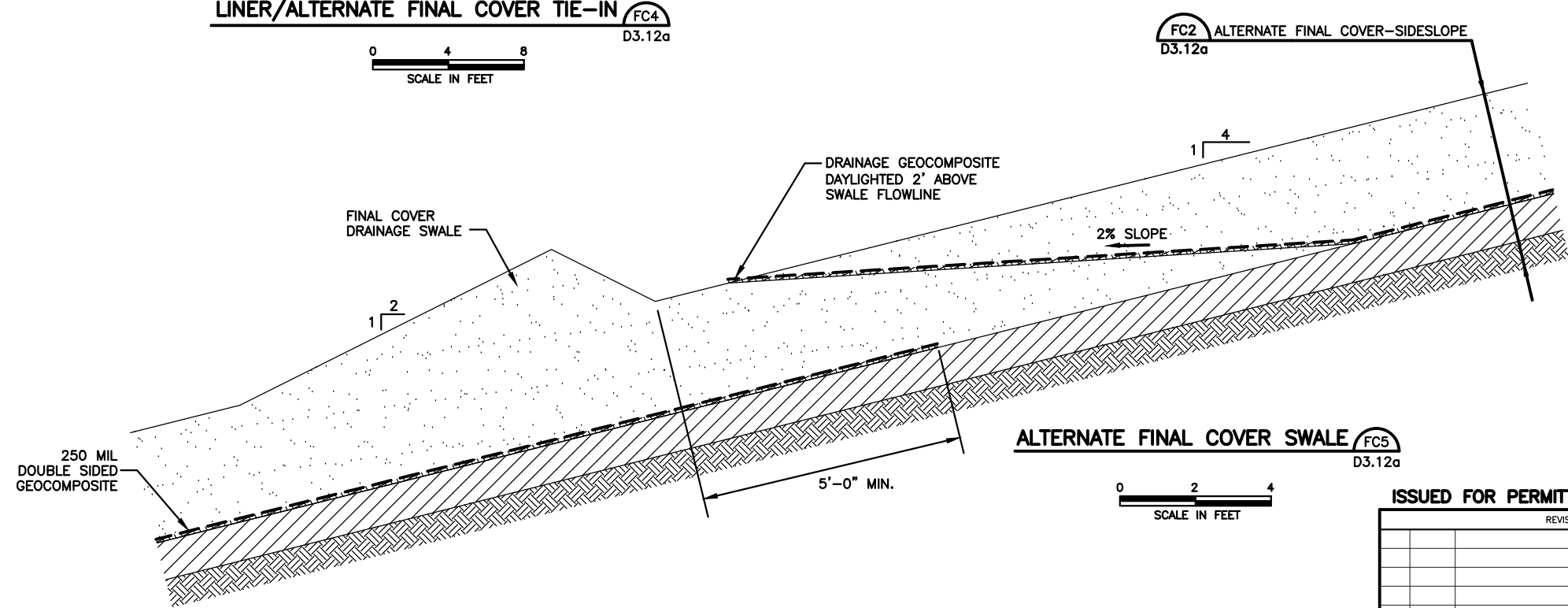
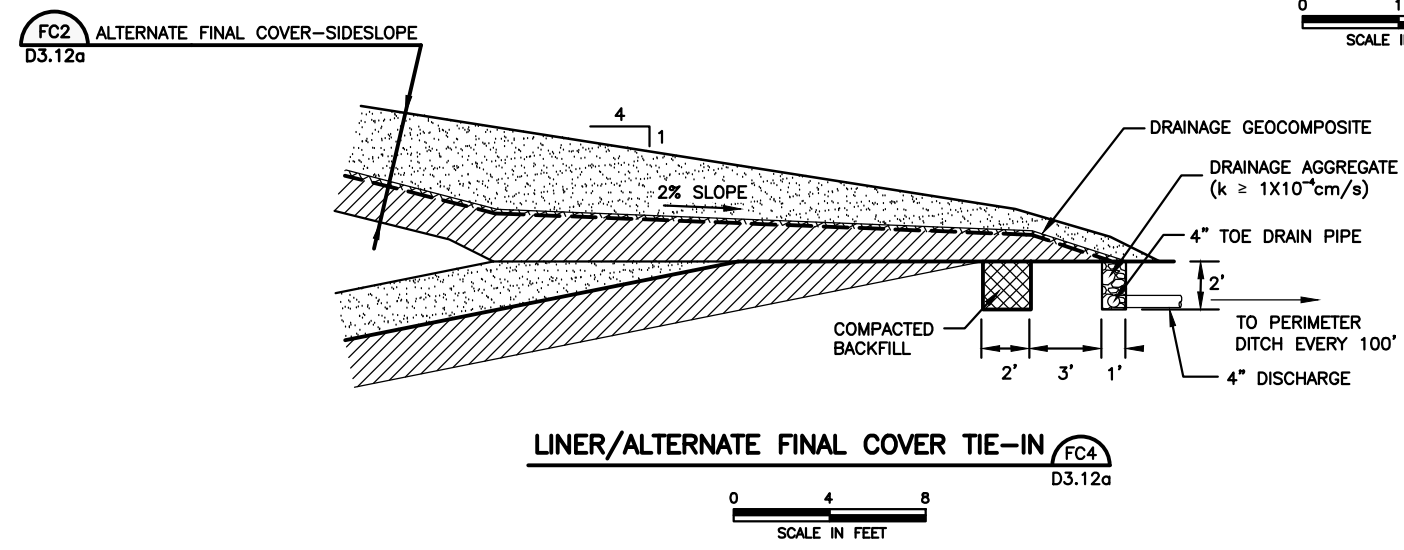
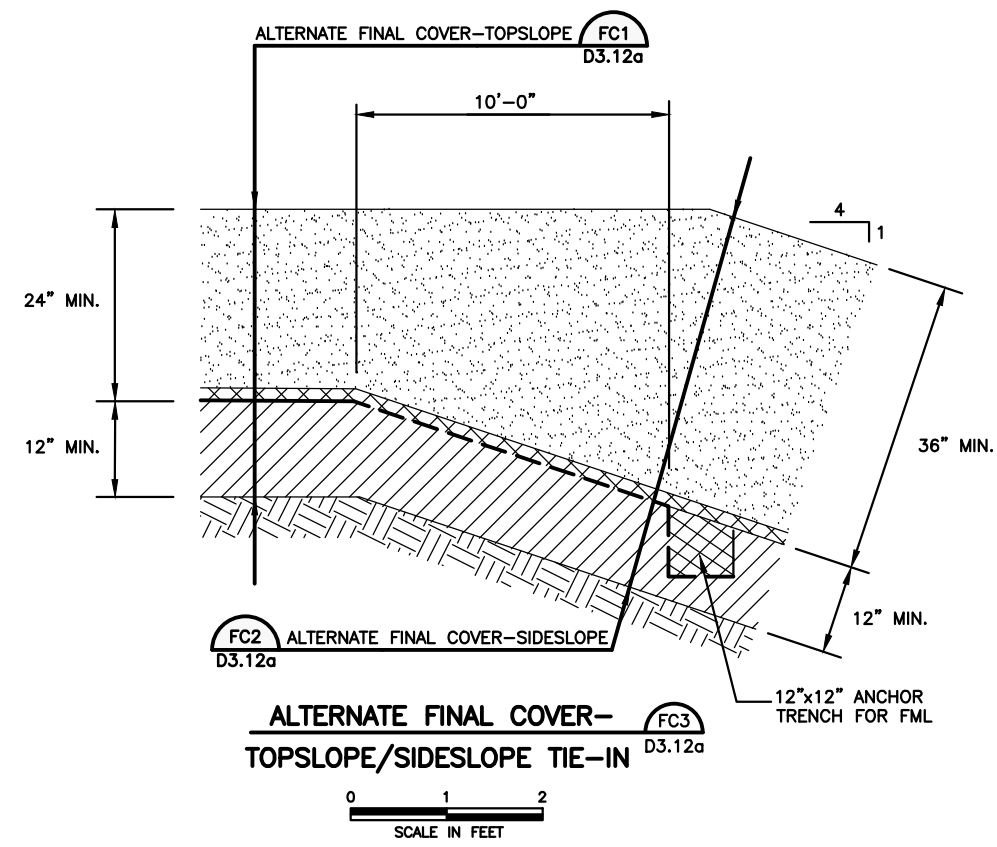
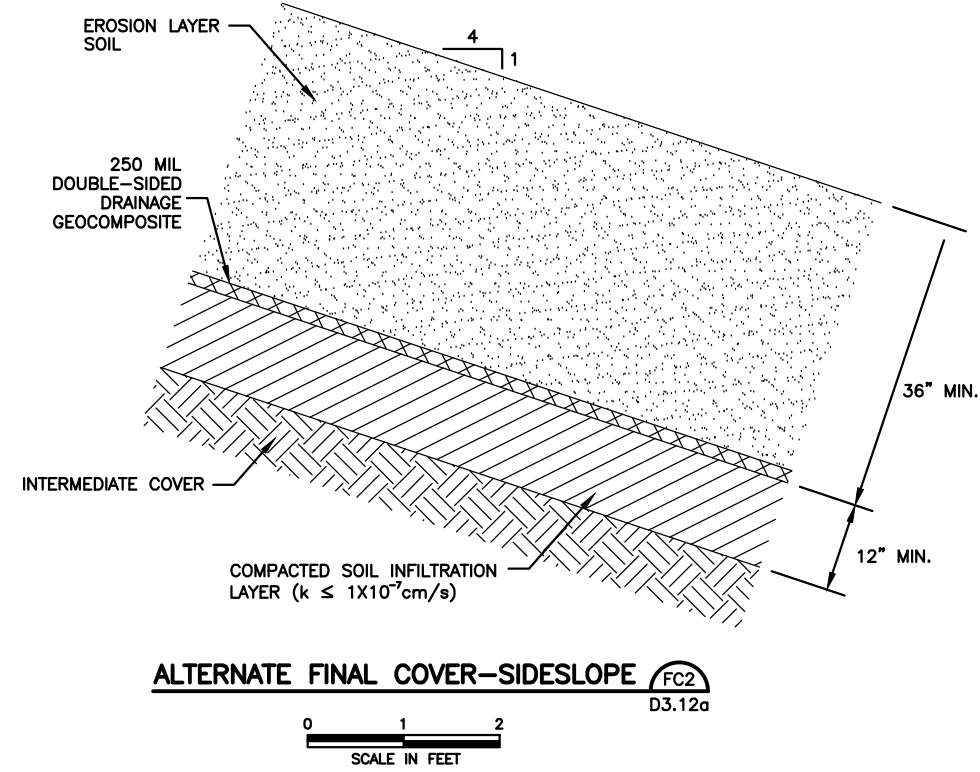
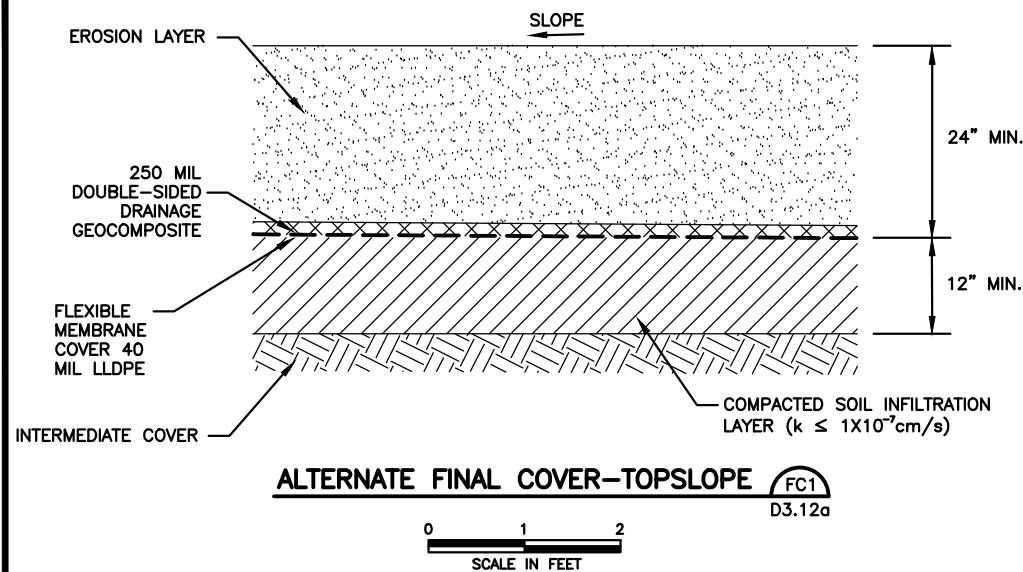


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30 TAC §330.63(d)(4)(F)

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FINAL COVER DETAILS
ALTERNATE OPTION

WASTE MANAGEMENT OF TEXAS, INC
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**BIGGS & MATHEWS
ENVIRONMENTAL**
1700 ROBERT ROAD, STE. 100
MANSFIELD, TEXAS 76063
817-563-1144

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**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D5
GEOTECHNICAL DESIGN.**

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1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

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FIRM REGISTRATION No. 50222



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8 COVER CONSTRUCTION

30 TAC §§330.165, 330.457

8.1 Daily, Weekly, and Intermediate Cover

The daily, weekly, and intermediate cover should be constructed of soils that are free of waste and debris. Suitable cover materials should be available from the proposed excavations or on-site borrow sources. Requirements for the placement of daily, weekly, and intermediate cover are provided in Part IV – Site Operating Plan.

8.2 Final Cover

Final cover construction has been completed over the entire 52.5 acres of the West Disposal Area and details of the cover is documented in the Final Cover Evaluation Reports (FCERs). FCER approval dates are shown on Attachment J, Drawing J.1.

There are two final cover system designs proposed for the West and North Disposal Areas as shown on Table D-4 in Attachment D. The final cover system in the South Disposal Area will consist of an 18-inch-thick compacted soil infiltration layer overlain by an erosion layer. The final cover system requirements are provided in Attachment D8 and the final cover system details are provided in Attachment D3.

The infiltration layer material must consist of relatively homogeneous cohesive materials that are free of debris, rocks greater than one inch in diameter, plant materials, frozen materials, foreign objects, and organic material. The infiltration layer should be constructed directly over the intermediate cover once the waste has reached final grades. The infiltration layer construction procedure should be the same as those outlined in Section 7 for liner construction.

The erosion layer should consist of: (1) topsoil stockpiled during the excavation process, (2) on-site soils which has been modified to be capable of sustaining vegetation, or (3) an imported material suitable to sustain vegetation growth. This layer may be spread and placed in one lift over the drainage layer. After spreading, the layer should be rolled lightly to reduce future erosion, although not to the extent that compaction would inhibit plant growth.

8.3 Final Cover Testing and Documentation

CQA testing of the final cover system must be performed during construction. Final cover system requirements are outlined in Attachment D8.

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 576C**

PERMIT AMENDMENT APPLICATION

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D8A
WEST AND NORTH DISPOSAL AREAS
FINAL COVER QUALITY CONTROL PLAN**

Prepared for

Waste Management of Texas, Inc.

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Prepared by



BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION No. F-256 AND No. 10194895

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION No. 50222



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30 TAC §330.457

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APPENDIX D8A-A

GRI GM17

APPENDIX D8A-B

Geocomposite Transmissivity Calculation

2 FINAL COVER SYSTEM

30 TAC §330.457

2.1 Final Cover System

The final cover system in the West and North Disposal Areas will be a composite cover system consisting of an intermediate cover layer, an infiltration layer, a flexible membrane cover, a drainage layer, and an erosion layer. Final cover has been constructed over 18.1 acres of the West Disposal Area and details of the cover are documented in the Final Cover Evaluation Reports (FCERs). Approval dates are shown on Attachment D1 – Site Layout Plans, Drawing D1.3.

The final cover plans are included in Attachment D3 – Construction Design Details, Drawings D3.9 and D3.10. Details of the final cover system are provided in Drawings D3.12, D3.12a, and D3.13. The components of the final cover system are listed from top to bottom in Table D8A-1.

**Table D8A-1
New Boston Landfill
Components of the Final Cover System**

Cover System Component	Description	Minimum Thickness
West and North Disposal Areas Final Cover		
TOPSLOPE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Cushion Layer	Geotextile	8 oz
Flexible Membrane Cover	Smooth LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-6}$ cm/sec	18 inches
TOPSLOPE - ALTERNATE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.25 inches nominal
Flexible Membrane Cover	Smooth or Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec	12 inches
SIDESLOPE OPTION A		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.2 inches nominal
Flexible Membrane Cover	Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE OPTION B		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Geotextile over studded geomembrane	8 oz
Flexible Membrane Cover	Textured LLDPE geomembrane with studs on top	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE - ALTERNATE		
Erosion Layer	Soil that is capable of sustaining native plant growth	36 inches
Drainage Layer	Double-sided geocomposite	0.25 inches nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec	12 inches

Construction Monitoring

Continuous on-site monitoring is necessary to assure that the components of the final cover system are constructed in accordance with this FCQCP. The CQA monitor shall provide continuous on-site observation during the following construction activities:

- Infiltration layer placement, processing, compaction, and testing
- Flexible membrane cover deployment, trial welds, seaming, testing, and repairing
- Drainage layer deployment and seaming
- Erosion layer placement
- Any work that could damage the installed components of the final cover system

4 INFILTRATION LAYER

30 TAC §330.457

4.1 General

The infiltration layer consists of compacted, relatively homogeneous, cohesive material. The CQA monitor shall provide continuous on-site observation during infiltration layer placement, processing, compaction, and testing. The GP shall make sufficient site visits during infiltration layer construction to document the construction activities, testing, and thickness verification in the Final Cover System Report, in accordance with Section 8.

4.2 Materials

Infiltration layer material shall consist of soil that is free from debris, rubbish, frozen materials, foreign objects, and organic material. The required infiltration layer material properties are summarized in Table D8A-2.

**Table D8A-2
New Boston Landfill
Infiltration Material Properties**

Test	Standard	Required Property
Plasticity Index	ASTM D 4318	15 or greater
Liquid Limit	ASTM D 4318	30 or greater
Percent Passing No. 200 Mesh Sieve	ASTM D 1140	30 or greater
Percent Passing 1-inch Sieve	ASTM D 422	100
Coefficient of Permeability	ASTM D 5084 or COE EM 1110-2-1906 Appendix VII	less than or equal to 1×10^{-5} cm/sec

Preconstruction testing procedures and frequencies for infiltration layer materials are listed in Section 4.8.1.

4.3 Subgrade Preparation

Prior to placing infiltration layer material, the subgrade should be proof rolled with heavy, rubber-tired construction equipment to detect soft areas. The GP or CQA monitor must observe the proof-rolling operation. Soft areas should be compacted and then be proof rolled again.

The subgrade elevations shall be verified in accordance with the requirements of Section 4.8.3 prior to the placement of infiltration layer.

5 FLEXIBLE MEMBRANE COVER

30 TAC §330.457

5.1 General

The flexible membrane cover (FMC) component of the final cover system consists of:

TOPSLOPE

- Smooth 40-mil thick linear low-density polyethylene (LLDPE) geomembrane

TOPSLOPE - ALTERNATE

- Smooth or textured 40-mil thick linear low-density polyethylene (LLDPE) geomembrane

SIDESLOPE - OPTION A

- Textured 40-mil thick LLDPE geomembrane

SIDESLOPE - OPTION B

- Textured 40-mil thick or greater LLDPE geomembrane with studs on top

The CQA monitor shall provide continuous on-site observation of during FMC deployment, trial welds, seaming, testing, and repairing. The GP shall make sufficient site visits during the FMC installation to document the installation and testing in the Final Cover Evaluation Report, in accordance with Section 8.

5.2 Materials

5.2.1 Properties

FMC shall consist of smooth, textured, and studded LLDPE geomembrane produced from virgin raw materials. Recycled materials are not acceptable. The FMC shall not be manufactured from resin from differing suppliers. The FMC shall meet the requirements in the most current revisions of Geosynthetics Research Institute (GRI) Standard GM17 (LLDPE). Copies of GRI GM17 are included in Appendix D8A-A. Refer to Section 6.2.2 for required drainage properties of the studded geomembrane.

Manufacturer quality control testing procedures and frequencies for FMC are listed in Section 5.5.1. Third party conformance testing procedures and frequencies for FMC are listed in Section 5.5.2.

5.2.2 Delivery and Storage

FMC shall be shipped in rolls labeled with the manufacturer's name, roll number, and lot or batch number. The CQA monitor shall inspect the rolls for shipping damage and complete a geosynthetics receipt log for all materials delivered to the site. Damaged rolls shall be rejected.

The FMC shall be unloaded and handled with equipment that does not damage the rolls. Rolls should not be pushed, slid, or dragged to the storage location. The FMC must not

6 DRAINAGE LAYER

30 TAC §330.457

6.1 General

The drainage layer consists of a geocomposite over textured geomembrane or a geotextile over studded geomembrane on the sideslopes. A geotextile will be installed as a cushion fabric on topslopes. The CQA monitor shall provide on-site observation during geocomposite and geotextile installation. The GP shall make sufficient site visits during the geocomposite drainage layer and geotextile installation to document the installation in the Final Cover Evaluation Report.

6.2 Materials

6.2.1 Geocomposite

Double-sided geocomposite (nonwoven geotextile bonded to the top and bottom of HDPE drainage net) may be installed on the sideslopes over textured membrane or compacted clay infiltration layer. The geocomposite shall have the minimum properties listed in Table D8A-7.

**Table D8A-7
New Boston Landfill
Geocomposite Properties**

Material	Test	Standard	Required Property
Geotextile	Material		Nonwoven polypropylene or polyester
	Apparent Opening Size	ASTM D 4751	70 sieve
	Unit Weight	ASTM D 5261	6 oz/yd ²
	Grab Strength	ASTM D 4632	150 lb
	Puncture Strength	ASTM D 6241	300 lb
	Trapezoidal Tear Strength	ASTM D 4533	65 lb
	Permittivity	ASTM D 4491	0.1 sec ⁻¹
	Deterioration	ASTM D 4355	70%/500 hrs
HDPE Drainage Net	Density	ASTM D 1505	0.93 g/cm ³
	Thickness	ASTM D 5199	0.2 inch
	Carbon Black	ASTM D 4218	Minimum 2%, maximum 3%
	Resin Melt Flow Index	ASTM D 1238	1 g/10 min
	Tensile Strength	ASTM D 5035 or 7179	40 lb/in
Geocomposite	Transmissivity	ASTM D 4716	5 x 10 ⁻⁴ m ² /sec
	Ply Adhesion	ASTM D 7005	0.5 lb/in

Manufacturer quality control testing procedures for geocomposite are listed in Section 6.5.

6.2.2 Geotextile / Studded Geomembrane

Nonwoven geotextile may be installed on the topslopes and on sideslopes over the studded geomembrane. The geotextile shall have the minimum properties listed in Table D8A-8. The geotextile over studded geomembrane shall provide a minimum transmissivity of 5×10^{-4} m²/sec when tested in accordance with ASTM D 4716.

**Table D8A-8
New Boston Landfill
Geotextile Properties**

Test	Standard	Required Property
Material Unit Weight	ASTM D 5261	Nonwoven polypropylene or polyester 8 oz/yd ²

Manufacturer quality control testing procedures for geotextile are listed in Section 6.5.

6.2.3 Delivery and Storage

Geocomposite and geotextile shall be shipped in rolls with opaque wrappers labeled with the manufacturer's name, roll number, and lot or batch number. The CQA monitor shall inspect the rolls for shipping damage and complete a geosynthetics receipt log for all materials delivered to the site. Damaged rolls shall be rejected.

The geocomposite and geotextile shall be unloaded and handled with equipment that does not cause damage. Rolls should not be pushed, slid, or dragged to the storage location. The geocomposite and geotextile must not be stored on wet, soft, or rocky subgrade, but must be stored on a stable subgrade. Geocomposite and geotextile must not be stacked more than five rolls high to avoid crushing the roll cores. The stored geocomposite and geotextile must be protected from puncture, grease, dirt, excessive heat, or other damage.

6.3 Preparation

Prior to installation of the drainage layer, the FMC shall be tested and verified in accordance with Section 5.5. The CQA monitor shall observe that the surface to receive the geocomposite or geotextile is free of debris, stones, and dirt and verify that the conformance documentation has been submitted and approved.

6.4 Installation

Geocomposite and geotextile shall be deployed by equipment that will not damage, crimp, or stretch it nor damage the underlying FMC. All panels must be anchored with adequate ballast to prevent uplift from wind. Smoking and damaging shoes shall not be permitted on the geocomposite or geotextile and only low-ground pressure supporting equipment shall be allowed on the FMC. Adjacent rolls of geocomposite shall be securely tied through the drainage net with plastic fasteners every five feet along the

7 EROSION LAYER

30 TAC §330.457

7.1 General

The erosion layer consists of a layer of soil with the top six inches capable of sustaining native plant growth. The CQA monitor shall provide continuous on-site observation during erosion layer placement to assure that erosion layer placement does not damage underlying geosynthetics. The GP shall make sufficient site visits during erosion layer placement to document the construction activities and thickness verification in the Final Cover Evaluation Report.

7.2 Materials

Erosion layer material shall consist of soil that is free from debris, rubbish, frozen materials, foreign objects, and organic material, or any material that could damage the underlying geosynthetics.

7.3 Preparation

Prior to placing the erosion layer material, the top of infiltration layer elevations shall be verified in accordance with the requirements of Section 4.8.3 and all testing on the underlying geosynthetics shall be completed.

7.4 Placement

The erosion layer shall be placed in a manner that minimizes the potential to damage the underlying geosynthetics. Hauling equipment shall be restricted to haul roads of sufficient thickness to protect the underlying geosynthetics. The erosion layer shall be dumped from the haul road and spread by low ground pressure equipment in a manner that minimizes wrinkles and stress in the geosynthetics. On sideslopes, erosion layer shall be placed from the bottom to the top, not across or down. Erosion layer shall not be placed over geosynthetics that are stretched across the toes of slopes. The minimum separation distance between construction equipment and the geosynthetics are listed in Table D8A-10.

The erosion layer will be seeded or sodded immediately following the application of final cover in order to minimize erosion.

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW-576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT D9
ALTERNATE FINAL COVER DESIGN DEMONSTRATION**

Prepared for

Waste Management of Texas, Inc.

October 2025



Prepared by

BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 ♦ Mansfield, Texas 76063 ♦ 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS
FIRM REGISTRATION NO. F-256 AND NO. 10194895

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION NO. 50222



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APPENDIX D9.A Help Model Results

1 ALTERNATE FINAL COVER

In accordance with 30 TAC §330.457(d), the proposed alternate final covers achieve an equivalent reduction in infiltration and provide equivalent erosion protection as the prescribed system. The prescribed final cover system for MSW landfill units with a synthetic bottom liner, as described in 30 TAC §330.457(a)(1,3), consists of the following components from top to bottom:

- A minimum erosion layer consisting of 6-inches of earthen material capable of sustaining native plant growth;
- A clay-rich soil cover layer consisting of a minimum of 18-inches of earthen material with a minimum coefficient of permeability of 1×10^{-5} cm/sec, and;
- A synthetic membrane.

The following additional alternate final cover system is proposed for the New Boston Landfill, listed from top to bottom:

Top Deck – Alternate Final Cover:

- 24-inch soil erosion layer;
- 250-mil double-sided geocomposite;
- 40-mil LLDPE geomembrane cover, and;
- 12-inch infiltration layer consisting of compacted soils ($k \leq 1 \times 10^{-7}$ cm/s).

Side Slope – Alternate Final Cover:

- 36-inch erosion layer;
- 250-mil double-sided geocomposite, and;
- 12-inch infiltration layer consisting of compacted soils ($k \leq 1 \times 10^{-7}$ cm/s).

Perforated HDPE pipe will be installed at the toe of the slope and the geocomposite drainage layer will daylight at intervals approximately 100 feet on the side slopes to collect drainage from the geocomposite drainage layer. The perforated piping will collect the drainage and direct the flow into the perimeter drainage system. The daylighted drainage geocomposite will collect drainage and direct the flow into the invert of the final cover swales and into the final cover letdown structures. Details of the geocomposite alternate final cover system are shown on Drawing D3.12a in Attachment D3.

2 PERFORMANCE EVALUATION

The performances of the top deck and sideslope composite alternate final cover designs were evaluated using the HELP computer modelling program (HELP Model Version 4.0.1). The HELP model simulates hydrologic processes for a landfill by performing daily, sequential water budget analyses using a quasi-two-dimensional deterministic approach. The model accepts weather, soil, and design data and uses solution techniques to account for key factors affecting water movement within the landfill. The model accounts for both surface and sub-surface processes including transpiration, surface runoff, evaporation, vertical percolation, saturated lateral drainage, and geosynthetics leakage to estimate the various movements of water within the selected profile.

The performance evaluations were performed for a unit area of landfill final cover modeled for thirty years. Each model assumed near steady-state values for the simulation period. The model requires input design data including daily and general climatological records, site-specific soil parameters, material properties, and landfill design data. Models for the prescriptive and alternate final cover systems are provided in Appendix D9.A.

3 RESULTS

Four HELP model simulations were conducted to estimate the percolation through the cover systems. Two HELP model simulations were conducted for final cover systems (top deck and sideslope) prescribed by current regulations and two HELP model simulations were conducted for alternate final cover systems (top deck and sideslope). Results from the models are summarized below.

HELP Model Results – Estimated Percolation

Final Cover System Configuration	Description	Avg. Annual Total Summary
		(in.)
Prescriptive	Top Deck	0.5804
	Side Slope	0.5719
Alternate	Top Deck	0.0000
	Side Slope	0.0248

Final Cover System Configuration	Description	Peak Values Summary
		(in.)
Prescriptive	Top Deck	0.0032
	Side Slope	0.0032
Alternate	Top Deck	0.0000
	Side Slope	0.0025

The simulations demonstrate that the proposed alternate final cover systems will provide a greater reduction in infiltration than the prescribed cover system. The erosion layer evaluation, provided in the final cover drainage structure design included in Appendix C1-E, demonstrates the thickness of the alternate final cover erosion layer is greater than the anticipated losses due to erosion.

APPENDIX D9.A
HELP MODEL RESULTS

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: NB FC: Prescribed (TS) **Simulated On:** 10/17/2025 12:38

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)

SCL - Sandy Clay Loam

Material Texture Number 10

Thickness	=	6 inches
Porosity	=	0.398 vol/vol
Field Capacity	=	0.244 vol/vol
Wilting Point	=	0.136 vol/vol
Initial Soil Water Content	=	0.409 vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-04 cm/sec

Layer 2

Type 1 - Vertical Percolation Layer

SC/CL New Boston Clays (Uncompacted)

Material Texture Number 43

Thickness	=	18 inches
Porosity	=	0.464 vol/vol
Field Capacity	=	0.31 vol/vol
Wilting Point	=	0.187 vol/vol
Initial Soil Water Content	=	0.4603 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05 cm/sec

Layer 3

Type 4 - Flexible Membrane Liner

LDPE Membrane

Material Texture Number 36

Thickness	=	0.04 inches
Effective Sat. Hyd. Conductivity	=	4.00E-13 cm/sec
FML Pinhole Density	=	3 Holes/Acre
FML Installation Defects	=	4 Holes/Acre
FML Placement Quality	=	3 Good

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	86.2
Fraction of Area Allowing Runoff	=	100 %
Area projected on a horizontal plane	=	1 acres
Evaporative Zone Depth	=	24 inches
Initial Water in Evaporative Zone	=	10.74 inches
Upper Limit of Evaporative Storage	=	10.74 inches
Lower Limit of Evaporative Storage	=	4.182 inches
Initial Snow Water	=	0 inches
Initial Water in Layer Materials	=	10.74 inches
Total Initial Water	=	10.74 inches
Total Subsurface Inflow	=	0 inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	33.47 Degrees
Maximum Leaf Area Index	=	5
Start of Growing Season (Julian Date)	=	91 days
End of Growing Season (Julian Date)	=	304 days
Average Wind Speed	=	1.885 mph
Average 1st Quarter Relative Humidity	=	83 %
Average 2nd Quarter Relative Humidity	=	78 %
Average 3rd Quarter Relative Humidity	=	65 %
Average 4th Quarter Relative Humidity	=	77 %

Note: Evapotranspiration data was obtained for New Boston, Texas

Normal Mean Monthly Precipitation (inches)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
3.877037	4.325889	5.150083	3.745899	5.13176	4.523972
3.4829	2.643919	3.968276	5.007685	4.584613	5.01805

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45

Normal Mean Monthly Temperature (Degrees Fahrenheit)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
54.9	53	59.8	70.1	78.2	89
92.1	89.8	80.7	69.9	61.3	53.9

Note: Temperature was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.47/-94.45
 Solar radiation was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.47/-94.45

Average Annual Totals Summary

Title: NB FC: Prescribed (TS)

Simulated on: 10/17/2025 12:39

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	51.46	[8.49]	186,800.1	100.00
Runoff	15.267	[6.018]	55,418.1	29.67
Evapotranspiration	35.590	[3.56]	129,189.9	69.16
Subprofile1				
Percolation/leakage through Layer 3	0.580392	[0.09213]	2,106.8	1.13
Average Head on Top of Layer 3	11.6263	[1.8587]	---	---
Water storage				
Change in water storage	0.0235	[1.5438]	85.2	0.05

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: NB FC: Prescribed (TS)

Simulated on: 10/17/2025 12:39

	Peak Values for Years 1 - 30*	
	(inches)	(cubic feet)
Precipitation	5.10	18,522.5
Runoff	4.420	16,043.7
Subprofile1		
Percolation/leakage through Layer 3	0.003240	11.8
Average head on Layer 3	24.0000	
Other Parameters		
Snow water	6.7883	24,641.3
Maximum vegetation soil water	0.4475 (vol/vol)	
Minimum vegetation soil water	0.1743 (vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: NB FC: Prescribed (TS)

Simulated on: 10/17/2025 12:40

Simulation period: 30 years

Layer	Final Water Storage	
	(inches)	(vol/vol)
1	2.4460	0.4077
2	8.2860	0.4603
3	0.0000	0.0000
Snow water	0.7125	---

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: NB FC: Prescribed (SS) **Simulated On:** 10/17/2025 12:21

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)

SCL - Sandy Clay Loam

Material Texture Number 10

Thickness	=	6 inches
Porosity	=	0.398 vol/vol
Field Capacity	=	0.244 vol/vol
Wilting Point	=	0.136 vol/vol
Initial Soil Water Content	=	0.409 vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-04 cm/sec

Layer 2

Type 1 - Vertical Percolation Layer

SC/CL New Boston Clays (Uncompacted)

Material Texture Number 43

Thickness	=	18 inches
Porosity	=	0.464 vol/vol
Field Capacity	=	0.31 vol/vol
Wilting Point	=	0.187 vol/vol
Initial Soil Water Content	=	0.4603 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05 cm/sec

Layer 3

Type 4 - Flexible Membrane Liner

LDPE Membrane

Material Texture Number 36

Thickness	=	0.04 inches
Effective Sat. Hyd. Conductivity	=	4.00E-13 cm/sec
FML Pinhole Density	=	3 Holes/Acre
FML Installation Defects	=	4 Holes/Acre
FML Placement Quality	=	3 Good

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	87.3
Fraction of Area Allowing Runoff	=	100 %
Area projected on a horizontal plane	=	1 acres
Evaporative Zone Depth	=	24 inches
Initial Water in Evaporative Zone	=	10.74 inches
Upper Limit of Evaporative Storage	=	10.74 inches
Lower Limit of Evaporative Storage	=	4.182 inches
Initial Snow Water	=	0 inches
Initial Water in Layer Materials	=	10.74 inches
Total Initial Water	=	10.74 inches
Total Subsurface Inflow	=	0 inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	33.47 Degrees
Maximum Leaf Area Index	=	5
Start of Growing Season (Julian Date)	=	91 days
End of Growing Season (Julian Date)	=	304 days
Average Wind Speed	=	1.885 mph
Average 1st Quarter Relative Humidity	=	83 %
Average 2nd Quarter Relative Humidity	=	78 %
Average 3rd Quarter Relative Humidity	=	65 %
Average 4th Quarter Relative Humidity	=	77 %

Note: Evapotranspiration data was obtained for New Boston, Texas

Normal Mean Monthly Precipitation (inches)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
3.877037	4.325889	5.150083	3.745899	5.13176	4.523972
3.4829	2.643919	3.968276	5.007685	4.584613	5.01805

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.471528/-94.445833

Normal Mean Monthly Temperature (Degrees Fahrenheit)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
54.9	53	59.8	70.1	78.2	89
92.1	89.8	80.7	69.9	61.3	53.9

Note: Temperature was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.471528/-94.445833
 Solar radiation was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.471528/-94.445833

Average Annual Totals Summary

Title: NB FC: Prescribed (SS)

Simulated on: 10/17/2025 12:25

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	51.46	[8.49]	186,800.1	100.00
Runoff	15.453	[5.988]	56,094.4	30.03
Evapotranspiration	35.412	[3.534]	128,544.3	68.81
Subprofile1				
Percolation/leakage through Layer 3	0.571949	[0.09251]	2,076.2	1.11
Average Head on Top of Layer 3	11.4489	[1.867]	---	---
Water storage				
Change in water storage	0.0235	[1.6002]	85.2	0.05

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: NB FC: Prescribed (SS)

Simulated on: 10/17/2025 12:25

	Peak Values for Years 1 - 30*	
	(inches)	(cubic feet)
Precipitation	5.10	18,522.5
Runoff	4.420	16,042.8
Subprofile1		
Percolation/leakage through Layer 3	0.003240	11.8
Average head on Layer 3	24.0000	
Other Parameters		
Snow water	6.7883	24,641.4
Maximum vegetation soil water	0.4475 (vol/vol)	
Minimum vegetation soil water	0.1743 (vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: NB FC: Prescribed (SS)

Simulated on: 10/17/2025 12:25

Simulation period: 30 years

Layer	Final Water Storage	
	(inches)	(vol/vol)
1	2.4460	0.4077
2	8.2860	0.4603
3	0.0000	0.0000
Snow water	0.7125	---

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: NB FC: Alternate (TS) **Simulated On:** 10/17/2025 13:05

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)

SC/CL New Boston Clays (Uncompacted)

Material Texture Number 43

Thickness	=	24 inches
Porosity	=	0.464 vol/vol
Field Capacity	=	0.31 vol/vol
Wilting Point	=	0.187 vol/vol
Initial Soil Water Content	=	0.3944 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05 cm/sec

Layer 2

Type 2 - Lateral Drainage Layer

250-mil DS 6oz Composite

Material Texture Number 123

Thickness	=	0.25 inches
Porosity	=	0.85 vol/vol
Field Capacity	=	0.01 vol/vol
Wilting Point	=	0.005 vol/vol
Initial Soil Water Content	=	0.01 vol/vol
Effective Sat. Hyd. Conductivity	=	5.00E+01 cm/sec
Slope	=	25 %
Drainage Length	=	100 ft

Layer 3

Type 4 - Flexible Membrane Liner

LDPE Membrane

Material Texture Number 36

Thickness	=	0.04 inches
Effective Sat. Hyd. Conductivity	=	4.00E-13 cm/sec
FML Pinhole Density	=	2 Holes/Acre
FML Installation Defects	=	3 Holes/Acre
FML Placement Quality	=	3 Good

Layer 4

Type 3 - Barrier Soil Liner

Liner Soil (High)

Material Texture Number 16

Thickness	=	12 inches
Porosity	=	0.427 vol/vol
Field Capacity	=	0.418 vol/vol
Wilting Point	=	0.367 vol/vol
Initial Soil Water Content	=	0.427 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-07 cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	90.5
Fraction of Area Allowing Runoff	=	100 %
Area projected on a horizontal plane	=	1 acres
Evaporative Zone Depth	=	24 inches
Initial Water in Evaporative Zone	=	9.466 inches
Upper Limit of Evaporative Storage	=	11.136 inches
Lower Limit of Evaporative Storage	=	4.488 inches
Initial Snow Water	=	0 inches
Initial Water in Layer Materials	=	14.592 inches
Total Initial Water	=	14.592 inches
Total Subsurface Inflow	=	0 inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	33.47 Degrees
Maximum Leaf Area Index	=	5
Start of Growing Season (Julian Date)	=	91 days
End of Growing Season (Julian Date)	=	304 days
Average Wind Speed	=	1.885 mph
Average 1st Quarter Relative Humidity	=	83 %
Average 2nd Quarter Relative Humidity	=	78 %
Average 3rd Quarter Relative Humidity	=	65 %
Average 4th Quarter Relative Humidity	=	77 %

Note: Evapotranspiration data was obtained for New Boston, Texas

Normal Mean Monthly Precipitation (inches)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
3.877037	4.325889	5.150083	3.745899	5.13176	4.523972
3.4829	2.643919	3.968276	5.007685	4.584613	5.01805

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45

Normal Mean Monthly Temperature (Degrees Fahrenheit)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
54.9	53	59.8	70.1	78.2	89
92.1	89.8	80.7	69.9	61.3	53.9

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45

Average Annual Totals Summary

Title: NB FC: Alternate (TS)

Simulated on: 10/17/2025 13:06

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	51.46	[8.49]	186,800.1	100.00
Runoff	22.529	[5.439]	81,780.4	43.78
Evapotranspiration	26.695	[3.049]	96,901.7	51.87
Subprofile1				
Lateral drainage collected from Layer 2	2.2088	[1.2613]	8,018.1	4.29
Percolation/leakage through Layer 4	0.000000	[0]	0.0006	0.00
Average Head on Top of Layer 3	0.0005	[0.0003]	---	---
Water storage				
Change in water storage	0.0275	[1.8316]	99.9	0.05

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: NB FC: Alternate (TS)

Simulated on: 10/17/2025 13:07

	Peak Values for Years 1 - 30*	
	(inches)	(cubic feet)
Precipitation	5.10	18,522.5
Runoff	4.237	15,381.2
Subprofile1		
Drainage collected from Layer 2	0.1881	682.7
Percolation/leakage through Layer 4	0.000000	0.0000
Average head on Layer 3	0.0143	---
Maximum head on Layer 3	0.0006	---
Location of maximum head in Layer 2	0.00 (feet from drain)	
Other Parameters		
Snow water	6.7883	24,641.3
Maximum vegetation soil water	0.4380 (vol/vol)	
Minimum vegetation soil water	0.1870 (vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: NB FC: Alternate (TS)
Simulated on: 10/17/2025 13:07
Simulation period: 30 years

Layer	Final Water Storage	
	(inches)	(vol/vol)
1	9.5783	0.3991
2	0.0025	0.0100
3	0.0000	0.0000
4	5.1240	0.4270
Snow water	0.7125	---

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: NB FC: Alternate (SS) **Simulated On:** 10/17/2025 12:54

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)

SC/CL New Boston Clays (Uncompacted)

Material Texture Number 43

Thickness	=	36 inches
Porosity	=	0.464 vol/vol
Field Capacity	=	0.31 vol/vol
Wilting Point	=	0.187 vol/vol
Initial Soil Water Content	=	0.336 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05 cm/sec

Layer 2

Type 2 - Lateral Drainage Layer

250-mil DS 6oz Composite

Material Texture Number 123

Thickness	=	0.25 inches
Porosity	=	0.85 vol/vol
Field Capacity	=	0.01 vol/vol
Wilting Point	=	0.005 vol/vol
Initial Soil Water Content	=	0.01 vol/vol
Effective Sat. Hyd. Conductivity	=	5.00E+01 cm/sec
Slope	=	25 %
Drainage Length	=	100 ft

Layer 3

Type 3 - Barrier Soil Liner

Liner Soil (High)

Material Texture Number 16

Thickness	=	12 inches
Porosity	=	0.427 vol/vol
Field Capacity	=	0.418 vol/vol
Wilting Point	=	0.367 vol/vol
Initial Soil Water Content	=	0.427 vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-07 cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	91.2
Fraction of Area Allowing Runoff	=	100 %
Area projected on a horizontal plane	=	1 acres
Evaporative Zone Depth	=	36 inches
Initial Water in Evaporative Zone	=	12.094 inches
Upper Limit of Evaporative Storage	=	16.704 inches
Lower Limit of Evaporative Storage	=	6.732 inches
Initial Snow Water	=	0 inches
Initial Water in Layer Materials	=	17.221 inches
Total Initial Water	=	17.221 inches
Total Subsurface Inflow	=	0 inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	33.47 Degrees
Maximum Leaf Area Index	=	5
Start of Growing Season (Julian Date)	=	91 days
End of Growing Season (Julian Date)	=	304 days
Average Wind Speed	=	1.885 mph
Average 1st Quarter Relative Humidity	=	83 %
Average 2nd Quarter Relative Humidity	=	78 %
Average 3rd Quarter Relative Humidity	=	65 %
Average 4th Quarter Relative Humidity	=	77 %

Note: Evapotranspiration data was obtained for New Boston, Texas

Normal Mean Monthly Precipitation (inches)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
3.877037	4.325889	5.150083	3.745899	5.13176	4.523972
3.4829	2.643919	3.968276	5.007685	4.584613	5.01805

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 33.47/-94.45

Normal Mean Monthly Temperature (Degrees Fahrenheit)

<u>Jan/Jul</u>	<u>Feb/Aug</u>	<u>Mar/Sep</u>	<u>Apr/Oct</u>	<u>May/Nov</u>	<u>Jun/Dec</u>
54.9	53	59.8	70.1	78.2	89
92.1	89.8	80.7	69.9	61.3	53.9

Note: Temperature was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.47/-94.45
 Solar radiation was simulated based on HELP V4 weather simulation for:
 Lat/Long: 33.47/-94.45

Average Annual Totals Summary

Title: NB FC: Alternate (SS)

Simulated on: 10/17/2025 12:56

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	51.46	[8.49]	186,800.1	100.00
Runoff	22.275	[5.477]	80,858.3	43.29
Evapotranspiration	27.827	[3.13]	101,011.7	54.07
Subprofile1				
Lateral drainage collected from Layer 2	1.2494	[1.1293]	4,535.2	2.43
Percolation/leakage through Layer 3	0.024783	[0.019879]	90.0	0.05
Average Head on Top of Layer 3	0.0003	[0.0002]	---	---
Water storage				
Change in water storage	0.0840	[2.3257]	305.0	0.16

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: NB FC: Alternate (SS)

Simulated on: 10/17/2025 12:56

	Peak Values for Years 1 - 30*	
	(inches)	(cubic feet)
Precipitation	5.10	18,522.5
Runoff	4.210	15,283.1
Subprofile1		
Drainage collected from Layer 2	0.1451	526.9
Percolation/leakage through Layer 3	0.001888	6.8550
Average head on Layer 3	0.0109	---
Maximum head on Layer 3	0.0004	---
Location of maximum head in Layer 2	0.00 (feet from drain)	
Other Parameters		
Snow water	6.7883	24,641.3
Maximum vegetation soil water	0.4320 (vol/vol)	
Minimum vegetation soil water	0.1870 (vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: NB FC: Alternate (SS)

Simulated on: 10/17/2025 12:56

Simulation period: 30 years

Layer	Final Water Storage	
	(inches)	(vol/vol)
1	13.9021	0.3862
2	0.0025	0.0100
3	5.1240	0.4270
Snow water	0.7125	---

**NEW BOSTON LANDFILL
BOWIE COUNTY, TEXAS
TCEQ PERMIT NO. MSW 576C**

**PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT H
CLOSURE PLAN**

Prepared for

Waste Management of Texas, Inc.

Technically Complete September 12, 2014
Permit Issued November 12, 2015
Revised February 2018

Revised October 2025



Prepared by

BIGGS & MATHEWS ENVIRONMENTAL

1700 Robert Road, Suite 100 • Mansfield, Texas 76063 • 817-563-1144

TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION No. F-256 AND No. 10194895

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION No. 50222



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APPENDIX H1 – FIGURES

Figure H1 Affidavit to the Public

APPENDIX H2 – FINAL COVER SYSTEM PLANS AND DETAILS

APPENDIX H3 – MAXIMUM INVENTORY OF WASTE ONSITE

2 FINAL COVER SYSTEM

30 TAC §330.457

2.1 Final Cover System Design

2.1.1 West and North Disposal Areas

There are two final cover system designs for the West and North Disposal Areas at the New Boston Landfill, the components of which are listed on Table H-1 of this section. Final cover has been constructed over the entire 52.5 acres of the West Disposal Area and details of the cover are documented in the Final Cover Evaluation Reports (FCERs). Approval dates are shown on Appendix J, Drawing J.1.

The final cover plans are included in Appendix H2, Drawings H2.2 and H2.3 and the final cover details are provided in Drawings H2.5, H2.5a, and H2.6. The components of the final cover system are listed from top to bottom in Table H-1.

The final cover will be seeded or sodded immediately following the application of the final cover in order to minimize erosion. The vegetation will be native and introduced grasses. Temporary cold weather vegetation will be established if required. Irrigation will be employed as needed until vegetation is established. Erosion control measures such as silt fences and straw bales will be used to minimize erosion until the vegetation is established. Areas that experience erosion or do not readily vegetate will be repaired, reseeded or sodded until vegetation is established, or the soil will be replaced with soil that will support the grasses.

Table H-1
New Boston Landfill
Components of the West and North Disposal Areas Final Cover System

Cover System Component	Description	Minimum Thickness
West and North Disposal Areas Final Cover		
TOPSLOPE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Cushion Layer	Geotextile	8 oz
Flexible Membrane Cover	Smooth LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
TOPSLOPE - ALTERNATE		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.25 inches nominal
Flexible Membrane Cover	Smooth or Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec	12 inches
SIDESLOPE OPTION A		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Double-sided geocomposite	0.2 inches nominal
Flexible Membrane Cover	Textured LLDPE geomembrane	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE OPTION B		
Erosion Layer	Soil that is capable of sustaining native plant growth	24 inches
Drainage Layer	Geotextile over studded geomembrane	8 oz
Flexible Membrane Cover	Textured LLDPE geomembrane with studs on top	40 mil nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-5}$ cm/sec	18 inches
SIDESLOPE - ALTERNATE		
Erosion Layer	Soil that is capable of sustaining native plant growth	36 inches
Drainage Layer	Double-sided geocomposite	0.25 inches nominal
Infiltration Layer	Compacted soil with a coefficient of permeability $\leq 1 \times 10^{-7}$ cm/sec	12 inches

2.1.2 South Disposal Area

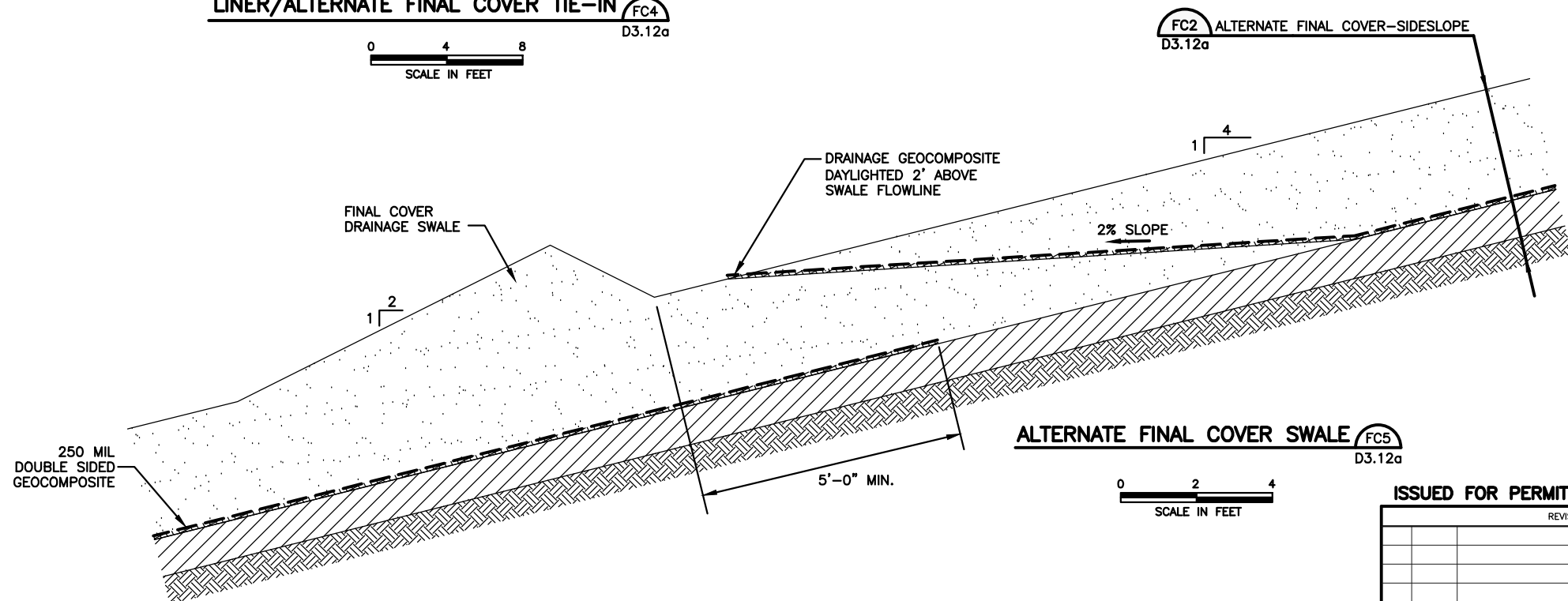
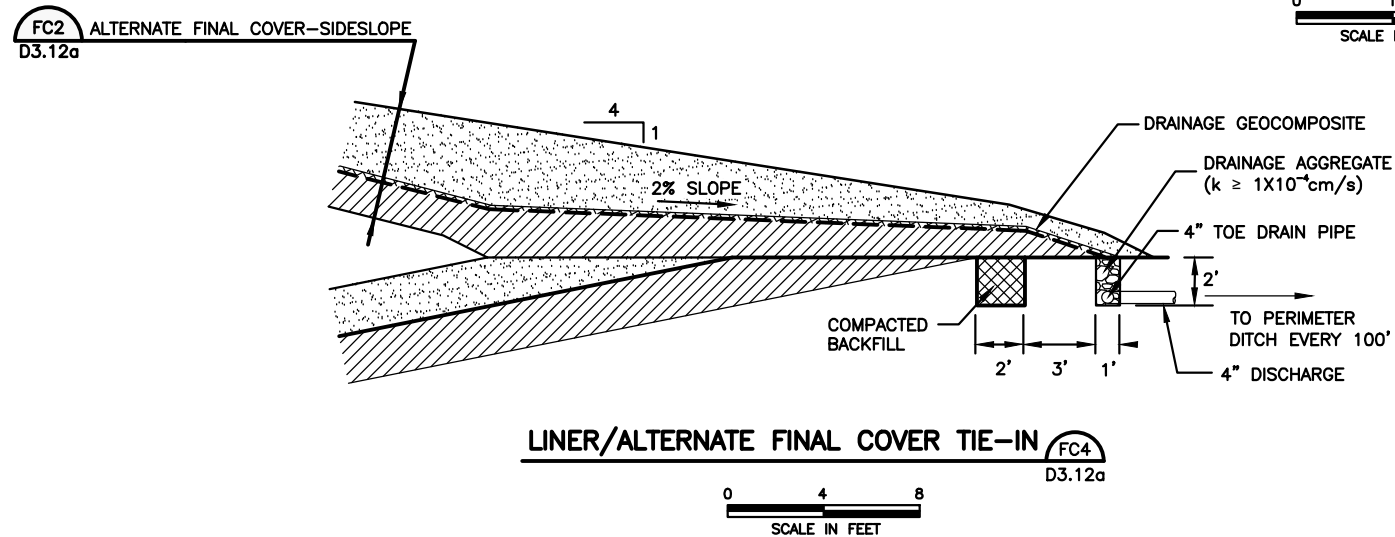
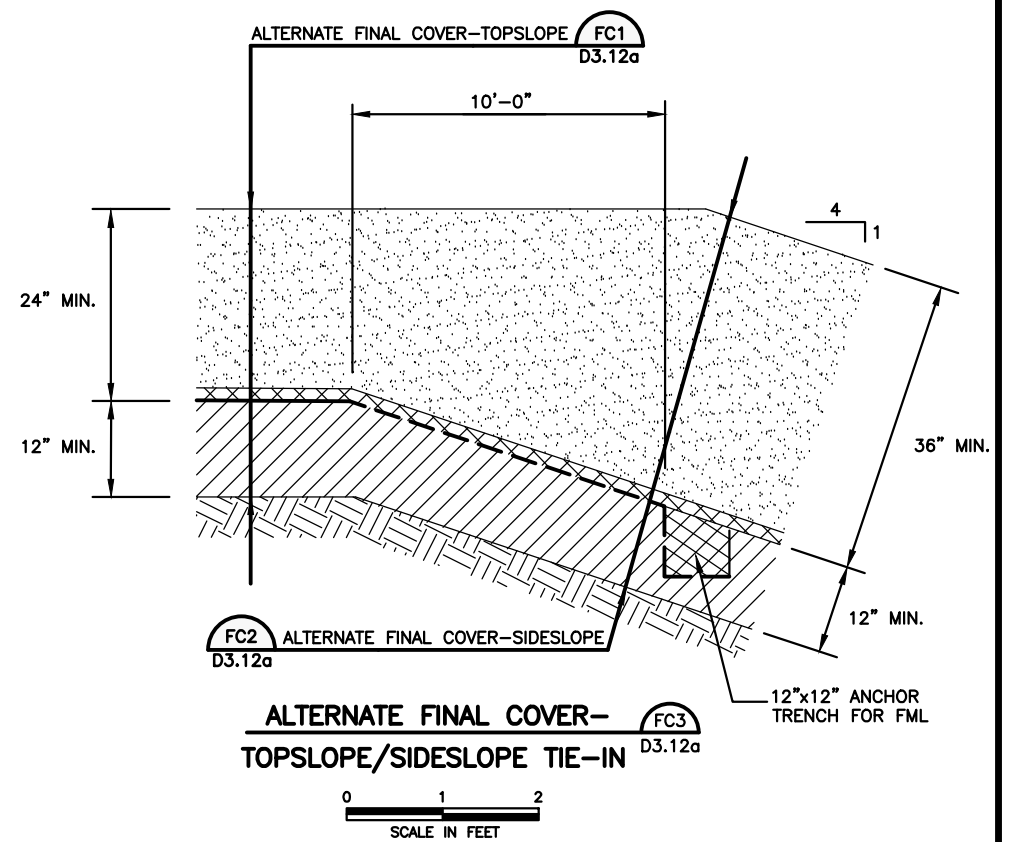
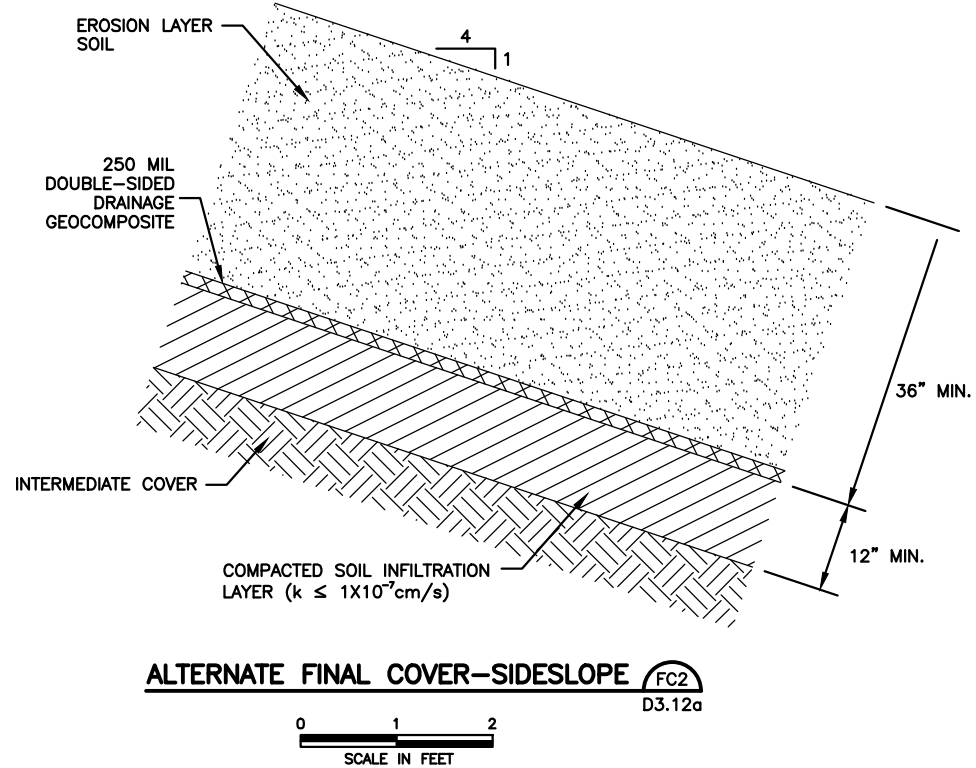
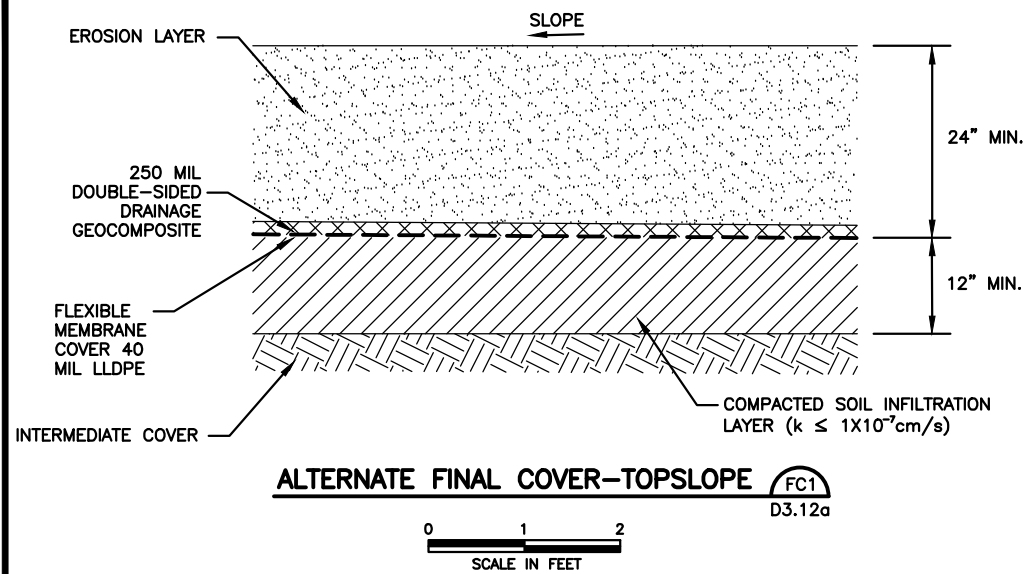
The final cover system in the South Disposal Area will consist of an infiltration layer and an erosion control layer. The final cover plan is included in Appendix H2, Drawing H2.3 and the final cover details are provided in Drawing H2.6. The components of the final cover system are listed from top to bottom in Table H-2.

The final cover will be seeded or sodded immediately following the application of the final cover in order to minimize erosion. The vegetation will be native and introduced grasses. Temporary cold weather vegetation will be established if required. Irrigation will be employed as needed until vegetation is established. Erosion control measures such as silt fences and straw bales will be used to minimize erosion until the vegetation is established. Areas that experience erosion or do not readily vegetate will be repaired, reseeded or sodded until vegetation is established, or the soil will be replaced with soil that will support the grasses.

NEW BOSTON LANDFILL

**APPENDIX H2
FINAL COVER SYSTEM PLANS AND DETAILS**

O:\Waste Management\New Boston\Solid Waste\2025 Alt Final Cover Permit Mod\Drawings\H2.5a.dwg Layout: ATT H2.5a User: Chollingshead



FINAL COVER DETAILS
ALTERNATE OPTION

WASTE MANAGEMENT OF TEXAS, INC
NEW BOSTON LANDFILL

BME

**BIGGS & MATHEWS
ENVIRONMENTAL**
1700 ROBERT ROAD, STE. 100
MANSFIELD, TEXAS 76063
817-563-1144

TBPCLS FIRM NO. F-256 AND NO. 10194895

DRAWING
H2.5a

ISSUED FOR PERMITTING PURPOSES ONLY			
REVISIONS			
REV	DATE	DESCRIPTION	DWN BY