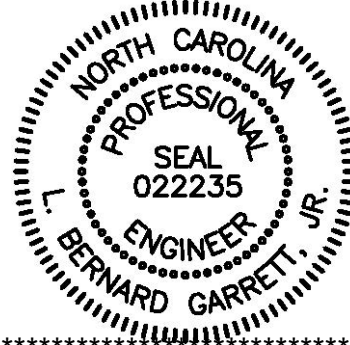


ADDENDUM NO. 1

BID #24-1015  
PROJECT MANUAL  
FOR THE  
BLACKBURN RESOURCE RECOVERY FACILITY  
C&D LANDFILL CLOSURE PROJECT

\*\*\*\*\*  
Signed, sealed, and dated this 4<sup>th</sup> day of April 2024

By: *Bernie Garrett*  
Bernie Garrett, P.E.



Title: Project Manager

\*\*\*\*\*  
Bidders on this Project are hereby notified that this Addendum shall be attached to and made a part of the above-named Bidding and Contract Documents dated March 2024.

The following items are issued to add to, modify, and clarify the Bidding and Contract Documents. These items shall have full force and effect as the Bidding and Contract Documents, and cost involved shall be included in the bid prices. Bids, to be submitted on the specified bid date, shall conform to the additions and revisions listed herein.

Acknowledge receipt of the Addendum by inserting its number and date on Page 2 of 4 of Section C-410-2018 Bid Form. Failure to do so may subject the bidder to disqualification.

Addendum No. 1

Blackburn Resource Recovery Facility C&D Landfill Closure Project

April 4, 2023

**SPECIFICATIONS**

Section C-200-2018 – Instructions to Bidders, paragraph 5.03 A. Other Site-related Documents, add:

2. Laboratory Test Results dated March 22, 2024, prepared by Geotechnics

**ATTACHMENTS**

1. Laboratory Test Results dated March 22, 2024, prepared by Geotechnics.

END OF ADDENDUM NO. 1



March 22, 2024

Project No. R-2024-068-001

Stefan Bray  
Garrett & Moore  
1029 West South St.  
Raleigh, NC 27603

sbray@garrett-moore.com

**Transmittal**  
**Laboratory Test Results**  
**Catawba County Landfill**

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e., pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,  
**Geotechnics, Inc.**

Michael P. Smith  
VP Regional Manager

***We understand that you have a choice in your laboratory services  
and we thank you for choosing Geotechnics.***

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#1
Lab ID:	R-2024-068-001-001	Soil Color:	Red



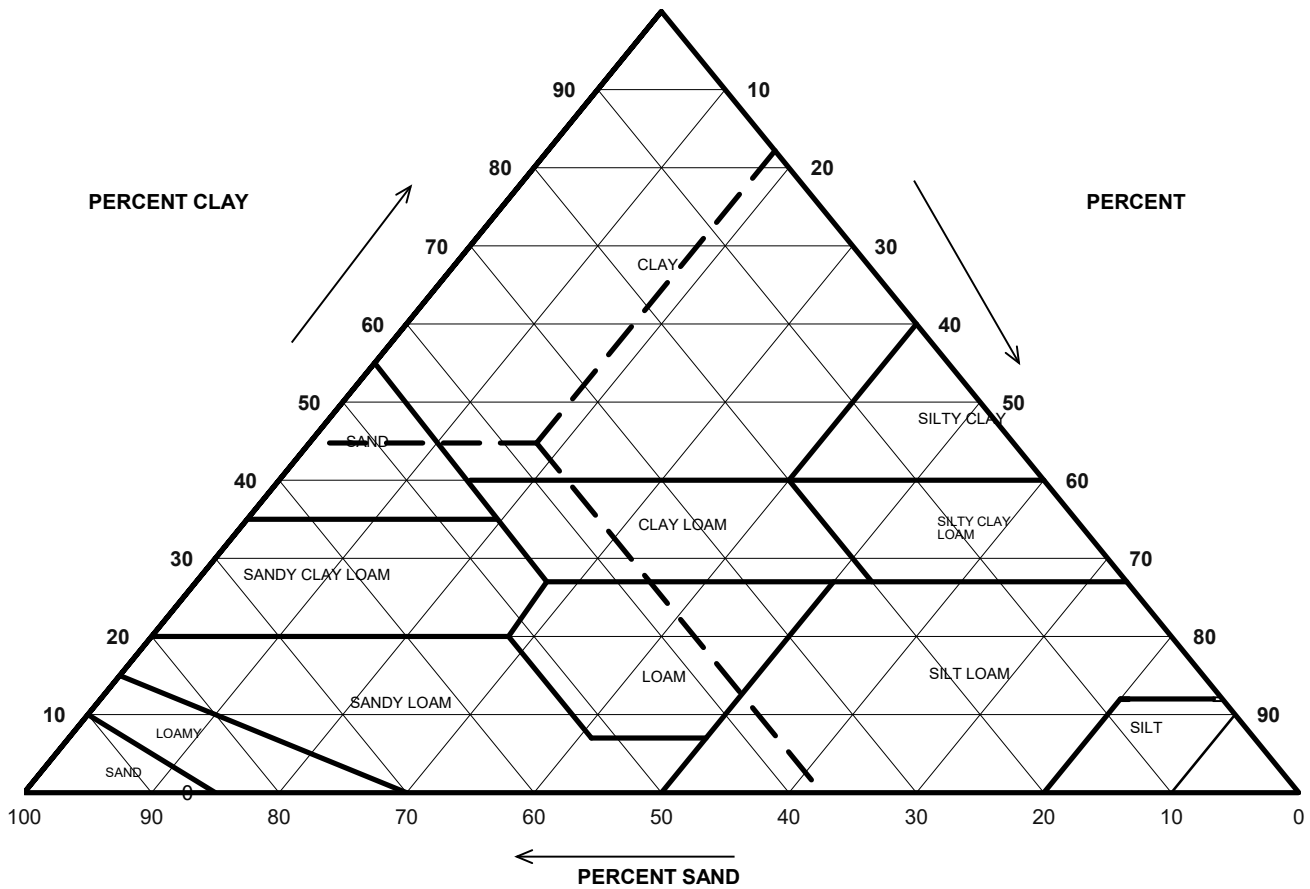
**USCS Symbol:**  
**ML, TESTED**

**USCS Classification:**  
**SANDY SILT**

Tested By	EH	Date	3/12/24	Checked By	AES	Date	3/12/24
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### USDA CLASSIFICATION CHART

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#1
Lab ID:	R-2024-068-001-001	Soil Color:	Red



USDA SUMMARY			
Particle Size (mm)	Percent Finer	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification

		<b>Gravel</b>	<b>0.32</b>	
<b>2</b>	<b>99.68</b>	<b>Sand</b>	<b>37.30</b>	<b>37.42</b>
<b>0.05</b>	<b>62.38</b>	<b>Silt</b>	<b>17.76</b>	<b>17.82</b>
<b>0.002</b>	<b>44.62</b>	<b>Clay</b>	<b>44.62</b>	<b>44.77</b>

USDA Classification: **CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#1
Lab ID:	R-2024-068-001-001	Soil Color:	Red

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	704	Tare No.:	NA				
Wt. of Tare & Wet Sample (g):	599.67	Weight of Tare & Wet Sample (g):	NA				
Wt. of Tare & Dry Sample (g):	496.70	Weight of Tare & Dry Sample (g):	NA				
Weight of Tare (g):	89.60	Weight of Tare (g):	NA				
Weight of Water (g):	102.97	Weight of Water (g):	NA				
Weight of Dry Soil (g):	407.10	Weight of Dry Soil (g):	NA				
<b>Moisture Content (%):</b>	<b>25.3</b>	<b>Moisture Content (%):</b>	<b>0.0</b>				
Dry Weight of Sample (g):	NA	Total Dry Weight of Sample (g):	407.10				
Tare No. (Sub-Specimen)	704	Wet Weight of +3/4" Sample (g):	0.00				
Wt. of Tare & Wet Sub-Specimen (g):	599.67	Dry Weight of + 3/4" Sample (g):	0.00				
Weight of Tare (g):	89.60	Dry Weight of - 3/4" Sample (g):	407.10				
Sub-Specimen Wet Weight (g):	510.07	Dry Weight -3/4" +3/8" Sample (g):	0.00				
Tare No. (-3/8" Sub-Specimen):	NA	Dry Weight of -3/8" Sample (g):	407.10				
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	NA	J - Factor (% Finer than 3/4"):	NA				
Weight of Tare (g):	NA	J - Factor (% Finer than 3/8"):	NA				
Sub-Specimen -3/8" Wet Weight (g):	NA						

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.0
6"	150	0.00	0.00	0.00	100.00	100.0
3"	75	0.00	0.00	0.00	100.00	100.0
2"	50	0.00	( *)	0.00	100.00	100.0
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.0
1"	25	0.00	0.00	0.00	100.00	100.0
3/4"	19	0.00	0.00	0.00	100.00	100.0
1/2"	12.5	0.00	( ** )	0.00	100.00	100.0
3/8"	9.5	0.00	0.00	0.00	100.00	100.0
#4	4.75	0.68	0.17	0.17	99.83	99.8
#10	2	0.64	0.16	0.32	99.68	99.7
#20	0.85	15.16	( ** )	4.05	95.95	96.0
#40	0.425	43.18	10.61	14.65	85.35	85.3
#60	0.25	32.72	8.04	22.69	77.31	77.3
#100	0.15	30.42	7.47	30.16	69.84	69.8
#140	0.106	15.40	3.78	33.95	66.05	66.1
#200	0.075	13.38	3.29	37.23	62.77	62.8
Pan	-	255.52	62.77	100.00	-	-

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By EH Date 3/12/24 Checked By AES Date 3/12/24

## HYDROMETER ANALYSIS

ASTM D7928-21

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#1
Lab ID:	R-2024-068-001-001	Soil Color:	Red

Elapsed Time (min)	Reading mm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	37.0	21.2	3.22	9.9	0.0422	99.1	62.2
2	36.0	21.2	3.22	10.1	0.0301	96.2	60.4
4	36.0	21.2	3.22	10.1	0.0213	96.2	60.4
8	35.0	21.2	3.22	10.3	0.0152	93.3	58.5
15	34.0	21.2	3.22	10.5	0.0112	90.3	56.7
30	33.0	21.2	3.22	10.7	0.0080	87.4	54.9
60	31.0	21.2	3.22	11.0	0.0057	81.5	51.2
240	28.0	22.7	2.67	11.6	0.0029	74.3	46.6
1440	26.0	21.1	3.25	11.9	0.0012	66.8	41.9

### Soil Specimen Data

Tare No.:	200	Percent Finer than # 200:	62.77
Wt. of Tare & Dry Material (g):	221.95		
Weight of Tare (g):	183.25	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	33.70		

**Notes:** Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	R- 480
Cylinder	R- 54
Thermometer	R- 1505
Balance	R- 657
#200 Sieve	R- 1944
Foam Inhibitor Used	No

Tested By	RFF	Date	3/11/24	Checked By	AES	Date	3/14/24
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## ATTERBERG LIMITS

ASTM D 4318-17

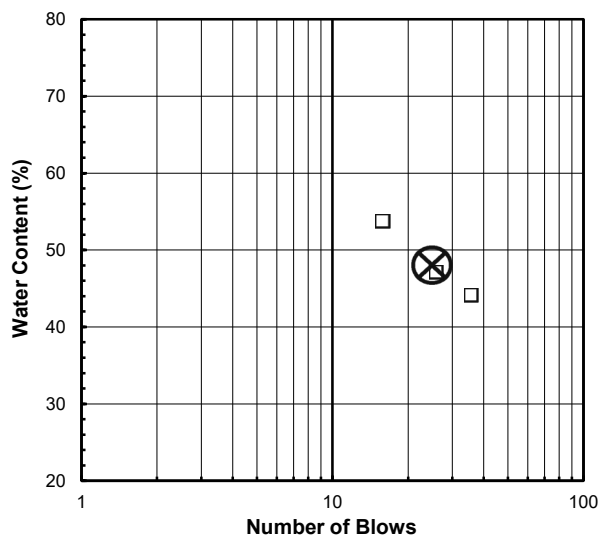
Client: Garrett & Moore	Boring No.: NA
Client Reference: Catawba County Landfill	Depth (ft): STOCKPILE
Project No.: R-2024-068-001	Sample No.: #1
Lab ID: R-2024-068-001-001	Soil Description: RED SILT

**Note: The USCS symbol used with this test refers only to the minus No. 40** (Minus #40 sieve material, Air dried) **sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.**

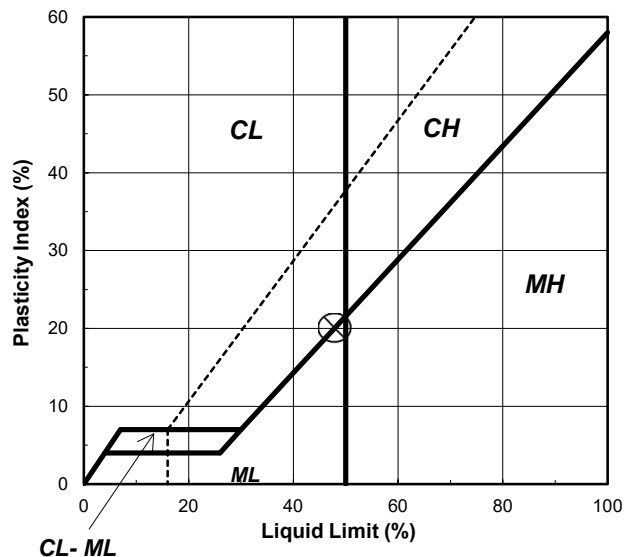
As Received Moisture Content ASTM D2216-19	Liquid Limit Test			
	1	2	3	M
Tare Number: 479	O	A-N	5M	U
Wt. of Tare & Wet Sample (g): 391.46	26.19	26.33	26.22	L
Wt. of Tare & Dry Sample (g): 332.01	22.81	22.82	22.50	T
Weight of Tare (g): 98.79	15.13	15.35	15.56	I
Weight of Water (g): 59.5	3.4	3.5	3.7	P
Weight of Dry Sample (g): 233.2	7.7	7.5	6.9	O
Was As Received MC Preserved: <b>Yes</b>				I
<b>Moisture Content (%): 25.5</b>	<b>44.0</b>	<b>47.0</b>	<b>53.6</b>	<b>N</b>
<b>Number of Blows:</b>	<b>36</b>	<b>26</b>	<b>16</b>	<b>T</b>

Plastic Limit Test	1	2	Range	Test Results
Tare Number: KP	D-1			<b>Liquid Limit (%): 48</b>
Wt. of Tare & Wet Sample (g): 26.11	26.07			<b>Plastic Limit (%): 28</b>
Wt. of Tare & Dry Sample (g): 23.74	23.67			<b>Plasticity Index (%): 20</b>
Weight of Tare (g): 15.45	15.17			<b>USCS Symbol: ML</b>
Weight of Water (g): 2.4	2.4			
Weight of Dry Sample (g): 8.3	8.5			
<b>Moisture Content (%): 28.6</b>	<b>28.2</b>	<b>0.4</b>		
<i>Note: The acceptable range of the two Moisture Contents is ± 0.84</i>				

**Flow Curve**



**Plasticity Chart**



Tested By **JCB IV** Date **3/6/24** Checked By **AES** Date **3/11/24**



## MOISTURE - DENSITY RELATIONSHIP

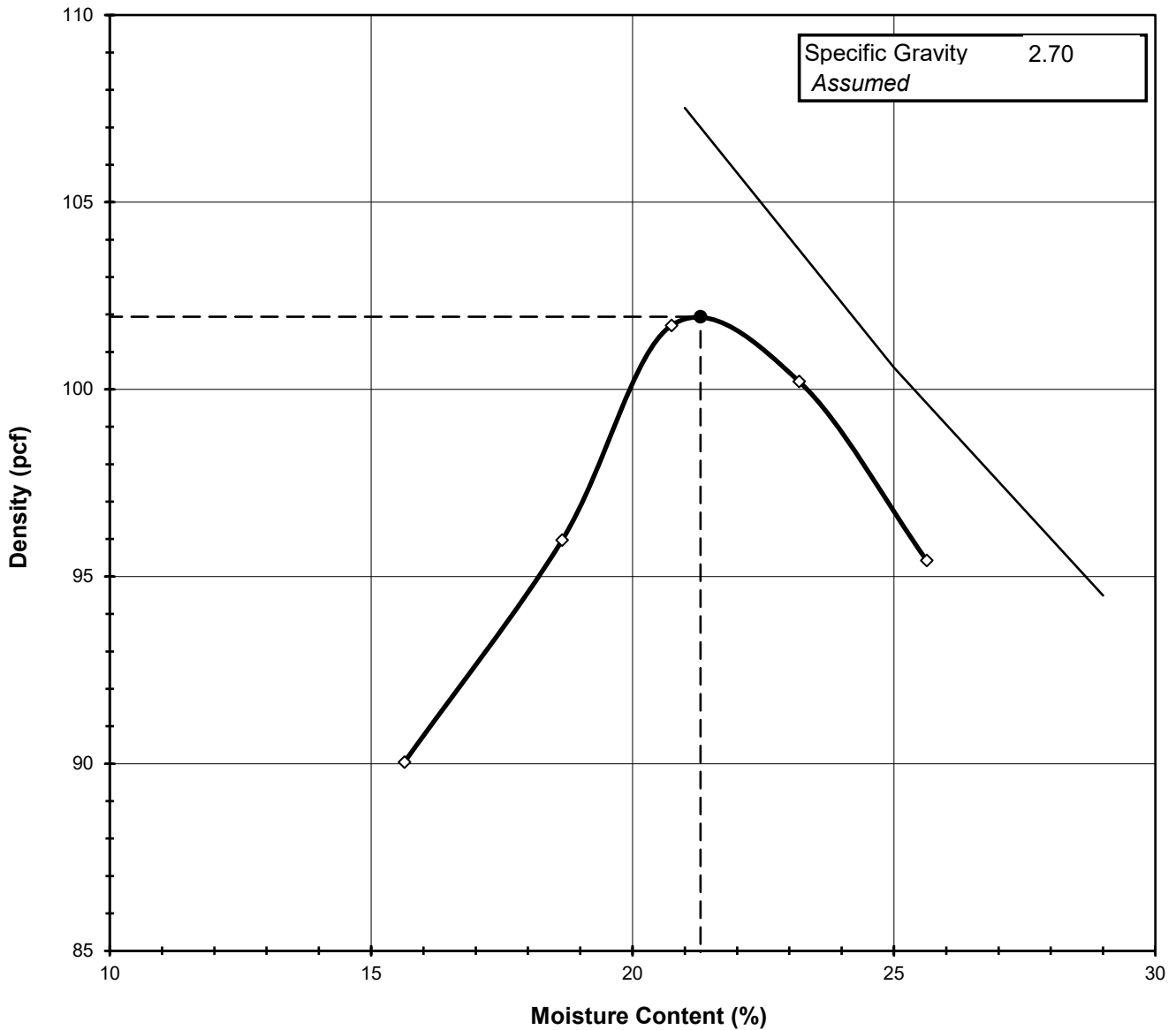
*ASTM D698-12*

Client: Garrett & Moore  
 Client Reference: Catawba County Landfill  
 Project No.: R-2024-068-001  
 Lab ID: R-2024-068-001-001

Boring No.: NA  
 Depth (ft): STOCKPILE  
 Sample No.: #1  
 Test Method: **STANDARD**

Visual Description: Red Sandy Silt

**Optimum Moisture Content (%): 21.3**  
**Maximum Dry Density (pcf): 101.9**



Tested By **NS** Date **3/13/24** Checked By **AES** Date **3/14/24**

## MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client: Garrett & Moore  
 Client Reference: Catawba County Landfill  
 Project No.: R-2024-068-001  
 Lab ID: R-2024-068-001-001

Boring No.: NA  
 Depth (ft): STOCKPILE  
 Sample No.: #1

Visual Description: Red Sandy Silt

Total Weight of the Sample (g):	22450
As Received Water Content (%):	NA
Assumed Specific Gravity:	2.70
Percent Retained on 3/4":	NA
Percent Retained on 3/8":	NA
Percent Retained on #4:	NA
Oversize Material:	Not included
Procedure Used:	B

Test Type:	<b>STANDARD</b>
Rammer Weight (lb):	5.5
Rammer Drop (in):	12
Rammer Type:	MECHANICAL
Machine ID:	R606
Mold ID:	R607
Mold diameter:	4"
Weight of the Mold (g):	4247
Volume of the Mold (cm <sup>3</sup> ):	943

### Mold / Specimen

Point No.	1	2	3	4	5
Weight of Mold & Wet Sample (g):	5821	5968	6103	6113	6059
Weight of Mold (g):	4247	4247	4247	4247	4247
Weight of Wet Sample (g):	1574	1721	1856	1866	1812
Mold Volume (cm <sup>3</sup> ):	943	943	943	943	943

### Moisture Content / Density

	7-A	716	488	704	20-A
Tare Number:	7-A	716	488	704	20-A
Weight of Tare & Wet Sample (g):	358.10	305.20	347.90	333.40	352.50
Weight of Tare & Dry Sample (g):	321.36	271.51	305.13	287.51	299.30
Weight of Tare (g):	86.40	90.90	99.00	89.60	91.70
Weight of Water (g):	36.74	33.69	42.77	45.89	53.20
Weight of Dry Sample (g):	234.96	180.61	206.13	197.91	207.60

Wet Density (g/cm <sup>3</sup> ):	1.67	1.82	1.97	1.98	1.92
Wet Density (pcf):	104.1	113.9	122.8	123.4	119.9
<b>Moisture Content (%)</b> :	<b>15.6</b>	<b>18.7</b>	<b>20.7</b>	<b>23.2</b>	<b>25.6</b>
<b>Dry Density (pcf)</b> :	<b>90.0</b>	<b>96.0</b>	<b>101.7</b>	<b>100.2</b>	<b>95.4</b>

### Zero Air Voids

<b>Moisture Content (%)</b> :	21.0	25.0	29.0
<b>Dry Unit Weight (pcf)</b> :	107.5	100.6	94.5

Tested By NS Date 3/13/24 Checked By AES Date 3/14/24

# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

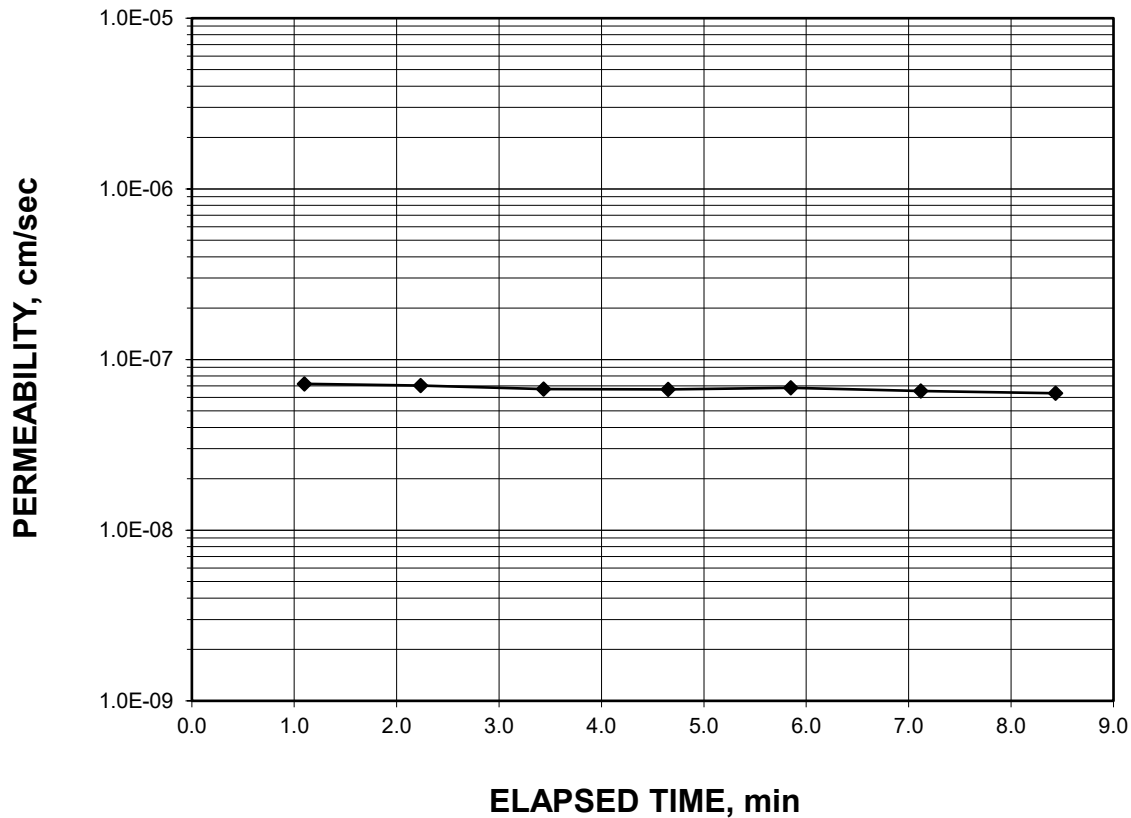
ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#1
Lab ID No.	R-2024-068-001-001		

Visual Description: Red Sandy Silt

**AVERAGE PERMEABILITY = 6.6E-08 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 6.6E-10 m/sec @ 20°C**

### PERMEABILITY vs. TIME



Tested By: DL      Date: 3/20/24      Checked By: AES      Date: 3/22/24

# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#1
Lab ID No.	R-2024-068-001-001		
	Specific Gravity	2.70	Assumed
	Sample Condition		Remolded

Visual Description: Red Sandy Silt

Permeant Type: Deaired Tap Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	705	495
Wt. of Tare & WS (gm.)	211.27	568.98
Wt. of Tare & DS (gm.)	188.11	473.85
Wt. of Tare (gm.)	91.08	99.23
Wt. of Water (gm.)	23.16	95.13
Wt. of DS (gm.)	97.03	374.62
Moisture Content (%)	<b>23.9</b>	<b>25.4</b>

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	2439.58	NA
Wt. of Tube (gm.)	1624.81	NA
Wt. of WS (calc.) (gm.)	814.77	824.80
Length 1 (in.)	3.992	3.972
Length 2 (in.)	3.992	3.908
Length 3 (in.)	3.992	3.946
Top Diameter (in.)	2.872	2.851
Middle Diameter (in.)	2.872	2.864
Bottom Diameter (in.)	2.872	2.866
Average Length (in.)	3.99	3.94
Average Area (in. <sup>2</sup> )	6.48	6.43
Sample Volume (cm <sup>3</sup> )	423.79	415.09
Unit Wet Wt. (gm./ cm <sup>3</sup> )	1.923	1.987
Unit Wet Wt. (pcf)	120.0	124.0
Unit Dry Wt. (pcf)	96.9	98.9
Unit Dry Wt. (gm./ cm <sup>3</sup> )	1.552	1.585
Void Ratio, e	0.740	0.704
Porosity, n	0.425	0.413
Pore Volume (cm <sup>3</sup> )	180.2	171.5
Total Wt. Of Sample After Test		823.18

Tested By: DL      Date: 3/20/24      Checked By: AES      Date: 3/22/24

# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#1
Lab ID No.	R-2024-068-001-001		

### Test Pressures

Cell Pressure(psi)	70.0
Back Pressure(psi)	60.0
Eff. Cons. Pressure(psi)	10.0
Response (%)	97

### Final Sample Dimensions

Sample Length (cm), L	10.01
Sample Area (cm <sup>2</sup> ), A	41.46
Pipette Area (cm <sup>2</sup> ), a <sub>p</sub>	0.03142
Annulus Area (cm <sup>2</sup> ), a <sub>a</sub>	0.76712
Equilibrium Level (cm), R <sub>eq</sub>	0.9

**AVERAGE PERMEABILITY = 6.6E-08 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 6.6E-10 m/sec @ 20°C**

DATE		TIME			ELAPSED TIME	PIPETTE READING	INCREMENT GRADIENT	TEMP.	INCREMENTAL PERMEABILITY @ 20°C
(mm/dd/yy)	(hr)	(min)	(sec)	(min)	t	R <sub>p</sub>	i	(°C)	(cm/sec)
3/21/24	13	41	23	41.38	0.000	12.6	15.3	22.0	NA
3/21/24	13	42	29	42.48	1.100	12.5	15.1	22.0	7.2E-08
3/21/24	13	43	37	43.62	2.233	12.4	15.0	22.0	7.1E-08
3/21/24	13	44	49	44.82	3.433	12.3	14.9	22.0	6.7E-08
3/21/24	13	46	2	46.03	4.650	12.2	14.7	22.0	6.7E-08
3/21/24	13	47	14	47.23	5.850	12.1	14.6	22.0	6.8E-08
3/21/24	13	48	30	48.50	7.117	12.0	14.5	22.0	6.5E-08
3/21/24	13	49	49	49.82	8.433	11.9	14.3	22.0	6.3E-08

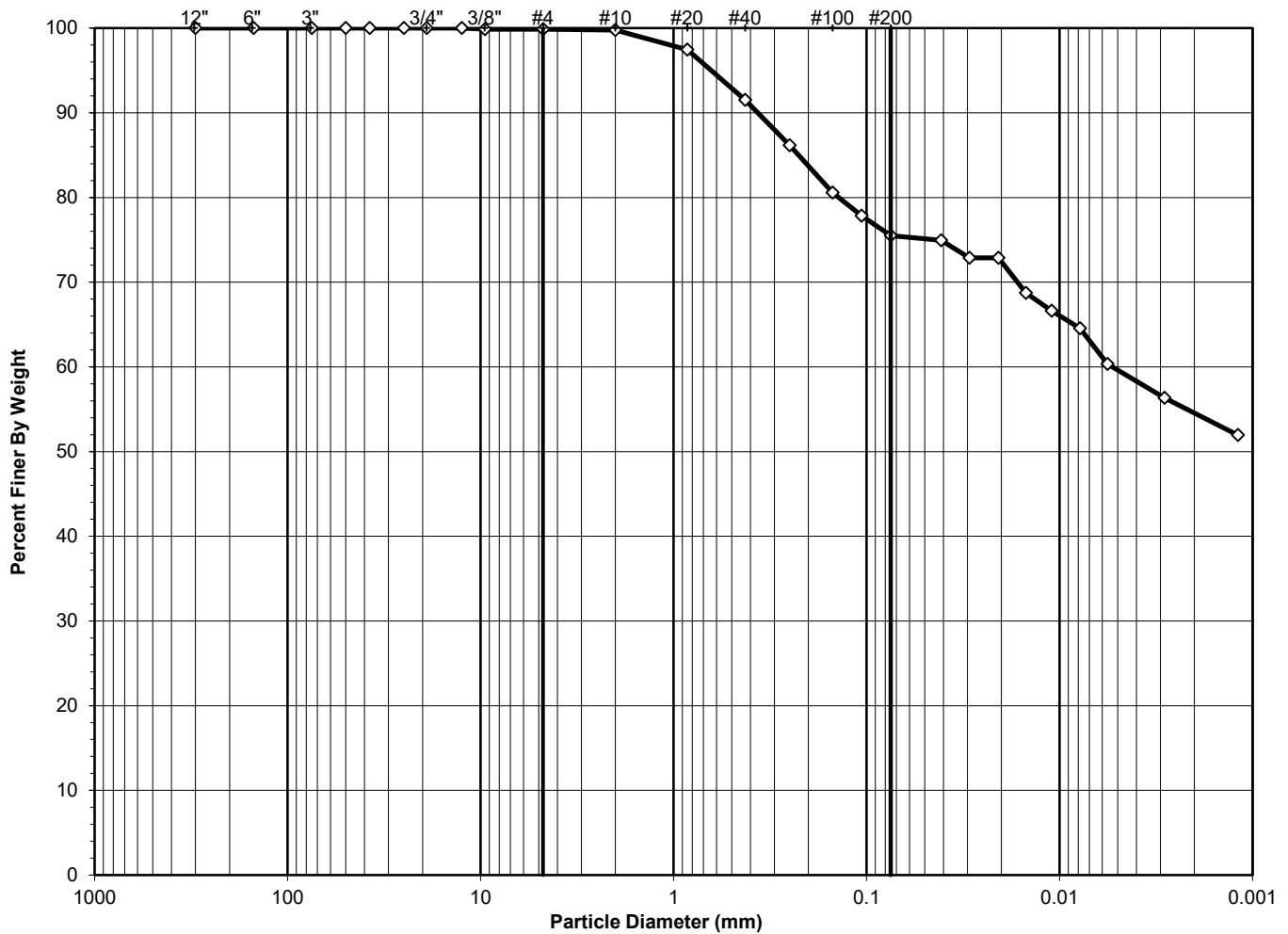
Tested By: DL      Date: 3/21/24      Checked By: AES      Date: 3/22/24

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#2
Lab ID:	R-2024-068-001-002	Soil Color:	Red

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



**USCS Symbol:**  
**MH, TESTED**

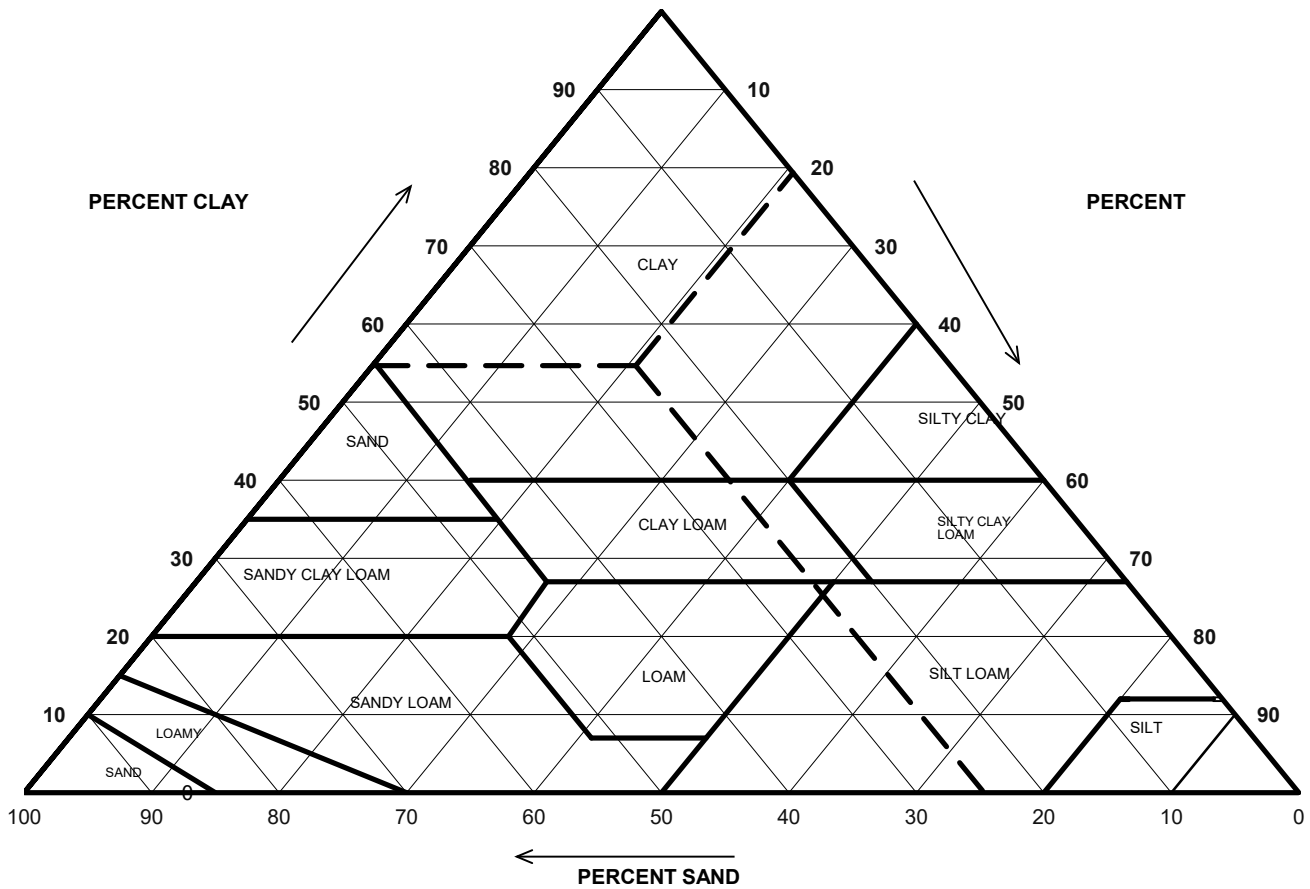
**USCS Classification:**  
**ELASTIC SILT WITH SAND**

Tested By EH                      Date 3/12/24                      Checked By AES                      Date 3/12/24

### USDA CLASSIFICATION CHART

Client: Garrett & Moore  
 Client Reference: Catawba County Landfill  
 Project No.: R-2024-068-001  
 Lab ID: R-2024-068-001-002

Boring No.: N/A  
 Depth (ft): STOCKPILE  
 Sample No.: #2  
 Soil Color: Red



USDA SUMMARY			
Particle Size (mm)	Percent Finer	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification
		Gravel	0.25
2	99.75	Sand	24.63
0.05	75.13	Silt	20.59
0.002	54.53	Clay	54.67

USDA Classification: **CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#2
Lab ID:	R-2024-068-001-002	Soil Color:	Red

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	718	Tare No.:	NA				
Wt. of Tare & Wet Sample (g):	456.15	Weight of Tare & Wet Sample (g):	NA				
Wt. of Tare & Dry Sample (g):	385.43	Weight of Tare & Dry Sample (g):	NA				
Weight of Tare (g):	91.88	Weight of Tare (g):	NA				
Weight of Water (g):	70.72	Weight of Water (g):	NA				
Weight of Dry Soil (g):	293.55	Weight of Dry Soil (g):	NA				
<b>Moisture Content (%):</b>	<b>24.1</b>	<b>Moisture Content (%):</b>	<b>0.0</b>				
Wet Weight of -3/4" Sample (g):	22500.00	Total Dry Weight of Sample (g):	18131.81				
Tare No. -3/4" Sub-Specimen (g):	834	Wet Weight of +3/4" Sample (g):	0.00				
Wt. of Tare & Wet -3/4" Sub-Specimen (g):	1659.13	Dry Weight of + 3/4" Sample (g):	0.00				
Weight of Tare (g):	260.10	Dry Weight of - 3/4" Sample (g):	18131.81				
Sub-Specimen 3/4" Wet Weight (g):	1399.03	Dry Weight -3/4" +3/8" Sample (g):	22.68				
Tare No. (-3/8" Sub-Specimen):	488	Dry Weight of -3/8" Sample (g):	18109.14				
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	447.12	J - Factor (% Finer than 3/4"):	NA				
Weight of Tare (g):	99.05	J - Factor (% Finer than 3/8"):	99.9%				
Sub-Specimen -3/8" Wet Weight (g):	348.07						

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.0
6"	150	0.00	0.00	0.00	100.00	100.0
3"	75	0.00	0.00	0.00	100.00	100.0
2"	50	0.00	( *)	0.00	100.00	100.0
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.0
1"	25	0.00	0.00	0.00	100.00	100.0
3/4"	19	0.00	0.00	0.00	100.00	100.0
1/2"	12.5	0.00	( ** )	0.00	100.00	100.0
3/8"	9.5	1.41	0.13	0.13	99.87	99.9
#4	4.75	0.00	0.00	0.00	100.00	99.9
#10	2	0.34	0.12	0.12	99.88	99.8
#20	0.85	6.46	( ** )	2.42	97.58	97.5
#40	0.425	16.65	5.94	8.36	91.64	91.5
#60	0.25	15.10	5.38	13.74	86.26	86.1
#100	0.15	15.66	5.58	19.33	80.67	80.6
#140	0.106	7.67	2.73	22.06	77.94	77.8
#200	0.075	6.62	2.36	24.42	75.58	75.5
Pan	-	212.00	75.58	100.00	-	-

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By **EH** Date **3/12/24** Checked By **AES** Date **3/12/24**



## HYDROMETER ANALYSIS

ASTM D7928-21

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#2
Lab ID:	R-2024-068-001-002	Soil Color:	Red

Elapsed Time (min)	Reading mm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	39.0	22.0	2.93	9.6	0.0411	99.3	75.0
2	38.0	22.0	2.93	9.8	0.0293	96.5	72.9
4	38.0	22.0	2.93	9.8	0.0207	96.5	72.9
8	36.0	22.0	2.93	10.1	0.0149	91.0	68.7
15	35.0	22.0	2.93	10.3	0.0110	88.3	66.6
30	34.0	22.0	2.93	10.5	0.0078	85.5	64.6
60	32.0	21.9	2.97	10.8	0.0056	79.9	60.3
240	30.0	22.1	2.89	11.2	0.0029	74.6	56.3
1440	28.0	21.8	3.00	11.6	0.0012	68.8	51.9

### Soil Specimen Data

Tare No.:	217	Percent Finer than # 200:	75.48
Wt. of Tare & Dry Material (g):	212.62		
Weight of Tare (g):	171.70	Specific Gravity:	2.70 Assumed
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	35.92		

**Notes:** Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	R- 480
Cylinder	R- 54
Thermometer	R- 1505
Balance	R- 657
#200 Sieve	R- 1944
Foam Inhibitor Used	No

Tested By	RFF	Date	3/9/24	Checked By	AES	Date	3/11/24
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## ATTERBERG LIMITS

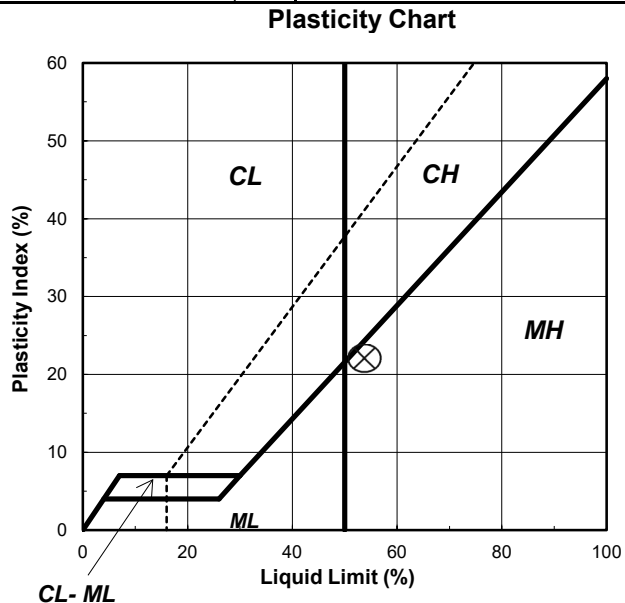
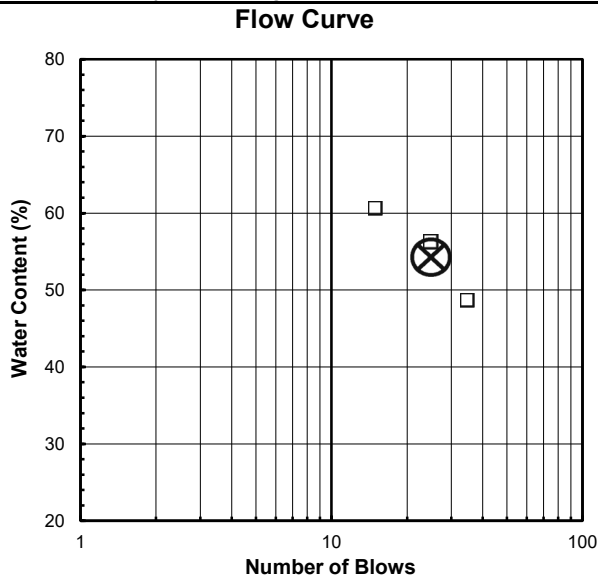
ASTM D 4318-17

Client: Garrett & Moore	Boring No.: NA
Client Reference: Catawba County Landfill	Depth (ft): STOCKPILE
Project No.: R-2024-068-001	Sample No.: #2
Lab ID: R-2024-068-001-002	Soil Description: RED ELASTIC SILT

**Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.** (Minus #40 sieve material, Air dried)

As Received Moisture Content ASTM D2216-19	Liquid Limit Test			
	1	2	3	M
Tare Number: 854	3	W	3M	U
Wt. of Tare & Wet Sample (g): 354.59	33.16	26.15	25.30	L
Wt. of Tare & Dry Sample (g): 314.30	27.33	22.16	21.61	T
Weight of Tare (g): 134.72	15.33	15.06	15.51	I
Weight of Water (g): 40.3	5.8	4.0	3.7	P
Weight of Dry Sample (g): 179.6	12.0	7.1	6.1	O
Was As Received MC Preserved: <b>Yes</b>				I
<b>Moisture Content (%): 22.4</b>	<b>48.6</b>	<b>56.2</b>	<b>60.5</b>	<b>N</b>
<b>Number of Blows: 35</b>	<b>35</b>	<b>25</b>	<b>15</b>	<b>T</b>

Plastic Limit Test	1	2	Range	Test Results
Tare Number: X-9 S				<b>Liquid Limit (%): 54</b>
Wt. of Tare & Wet Sample (g): 27.48 23.95				<b>Plastic Limit (%): 32</b>
Wt. of Tare & Dry Sample (g): 24.61 21.79				<b>Plasticity Index (%): 22</b>
Weight of Tare (g): 15.58 15.09				<b>USCS Symbol: MH</b>
Weight of Water (g): 2.9 2.2				
Weight of Dry Sample (g): 9.0 6.7				
<b>Moisture Content (%): 31.8 32.2 -0.5</b>				
<i>Note: The acceptable range of the two Moisture Contents is ± 0.84</i>				



Tested By JCB IV Date 3/7/24 Checked By AES Date 3/11/24

## MOISTURE - DENSITY RELATIONSHIP

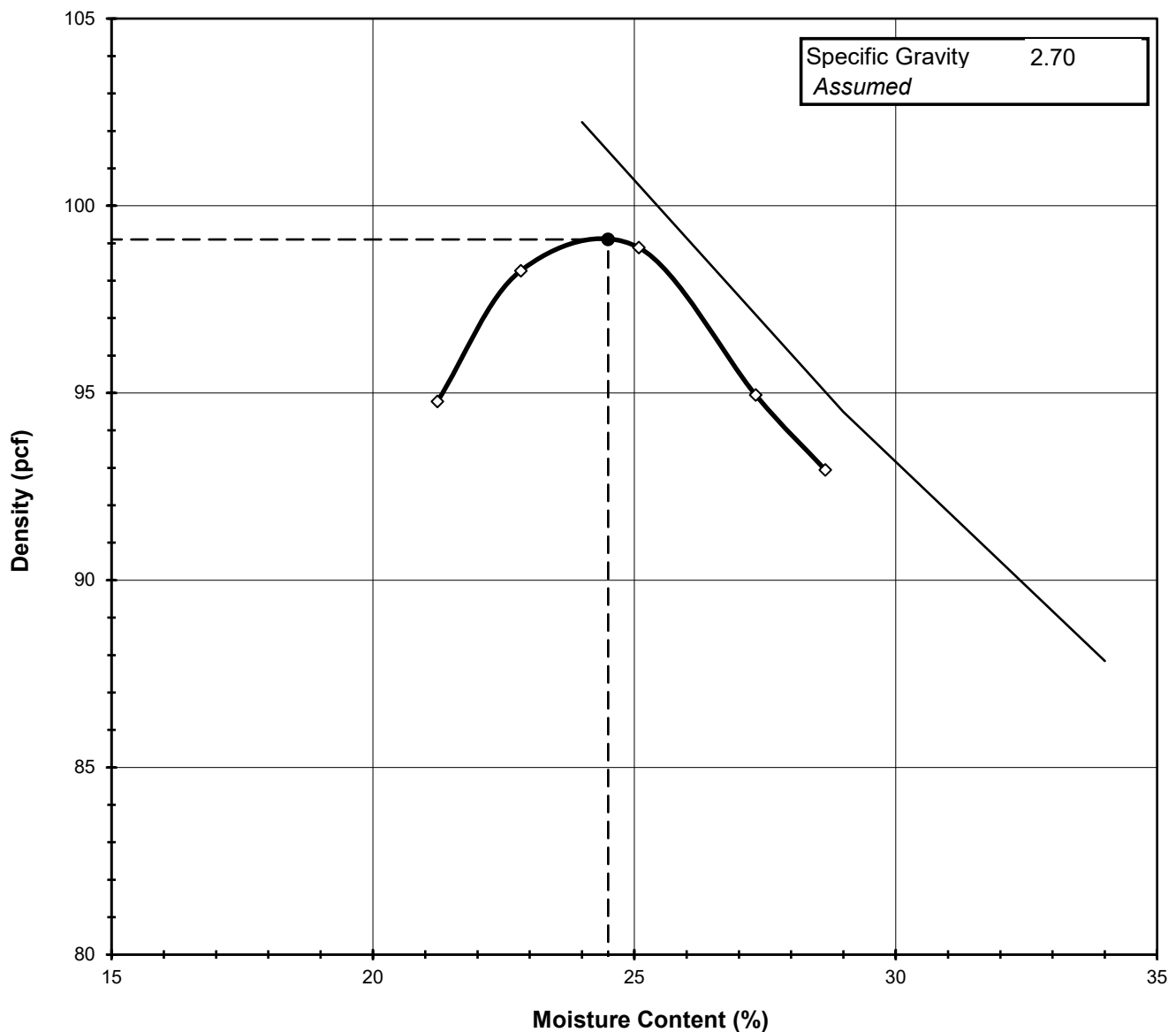
*ASTM D698-12*

Client: Garrett & Moore  
 Client Reference: Catawba County Landfill  
 Project No.: R-2024-068-001  
 Lab ID: R-2024-068-001-002

Boring No.: NA  
 Depth (ft): STOCKPILE  
 Sample No.: #2  
 Test Method: **STANDARD**

Visual Description: Red Elastic Silt with Sand

**Optimum Moisture Content (%): 24.5**  
**Maximum Dry Density (pcf): 99.1**



Tested By NS Date 3/12/24 Checked By AES Date 3/13/24

## MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	Garrett & Moore	Boring No.:	NA
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#2
Lab ID:	R-2024-068-001-002		

Visual Description: Red Elastic Silt with Sand

Total Weight of the Sample (g):	23450	Test Type:	STANDARD
As Received Water Content (%):	NA	Rammer Weight (lb):	5.5
Assumed Specific Gravity:	2.70	Rammer Drop (in):	12
Percent Retained on 3/4":	NA	Rammer Type:	MECHANICAL
Percent Retained on 3/8":	NA	Machine ID:	R606
Percent Retained on #4:	NA	Mold ID:	R607
Oversize Material:	Not included	Mold diameter:	4"
Procedure Used:	B	Weight of the Mold (g):	4247
		Volume of the Mold (cm <sup>3</sup> ):	943

### Mold / Specimen

Point No.	1	2	3	4	5
Weight of Mold & Wet Sample (g):	5984	6071	6116	6074	6054
Weight of Mold (g):	4247	4247	4247	4247	4247
Weight of Wet Sample (g):	1736	1824	1869	1827	1807
Mold Volume (cm <sup>3</sup> ):	943	943	943	943	943

### Moisture Content / Density

Tare Number:	705	15-A	447	442	495
Weight of Tare & Wet Sample (g):	346.90	390.90	395.60	338.80	332.60
Weight of Tare & Dry Sample (g):	302.10	334.27	336.10	287.28	280.62
Weight of Tare (g):	91.10	86.20	98.90	98.70	99.20
Weight of Water (g):	44.80	56.63	59.50	51.52	51.98
Weight of Dry Sample (g):	211.00	248.07	237.20	188.58	181.42

Wet Density (g/cm <sup>3</sup> ):	1.84	1.93	1.98	1.94	1.92
Wet Density (pcf):	114.9	120.7	123.7	120.9	119.6
<b>Moisture Content (%)</b> :	<b>21.2</b>	<b>22.8</b>	<b>25.1</b>	<b>27.3</b>	<b>28.7</b>
<b>Dry Density (pcf)</b> :	<b>94.8</b>	<b>98.3</b>	<b>98.9</b>	<b>94.9</b>	<b>92.9</b>

### Zero Air Voids

<b>Moisture Content (%)</b> :	24.0	29.0	34.0
<b>Dry Unit Weight (pcf)</b> :	102.2	94.5	87.8

Tested By NS Date 3/12/24 Checked By AES Date 3/13/24

# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

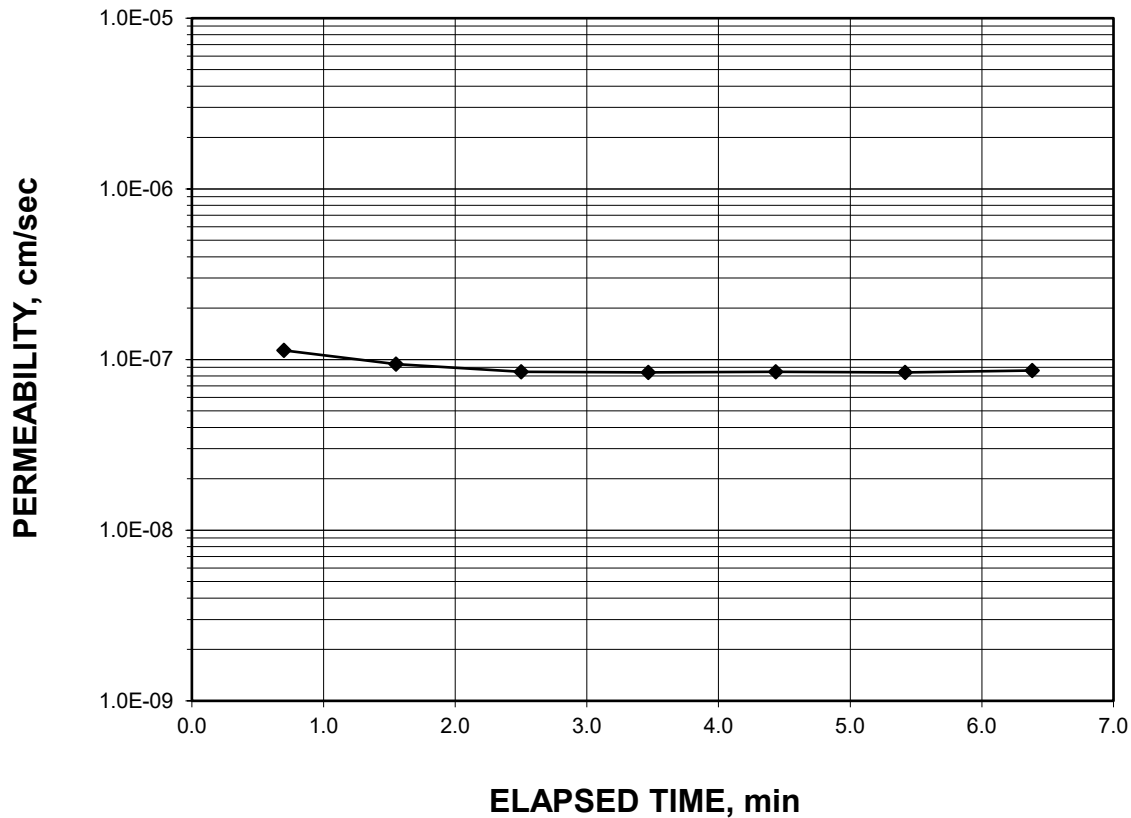
ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#2
Lab ID No.	R-2024-068-001-002		

Visual Description: Red Silty Clay

**AVERAGE PERMEABILITY = 8.5E-08 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 8.5E-10 m/sec @ 20°C**

### PERMEABILITY vs. TIME



Tested By: DL      Date: 3/20/24      Checked By: AES      Date: 3/22/24

# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#2
Lab ID No.	R-2024-068-001-002		
	Specific Gravity	2.70	Assumed
	Sample Condition		Remolded

Visual Description: Red Silty Clay

Permeant Type: Deaired Tap Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	708	482
Wt. of Tare & WS (gm.)	251.59	594.50
Wt. of Tare & DS (gm.)	217.18	484.24
Wt. of Tare (gm.)	90.80	97.45
Wt. of Water (gm.)	34.41	110.26
Wt. of DS (gm.)	126.38	386.79
Moisture Content (%)	<b>27.2</b>	<b>28.5</b>

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	2438.00	NA
Wt. of Tube (gm.)	1624.81	NA
Wt. of WS (calc.) (gm.)	813.19	821.36
Length 1 (in.)	3.992	3.997
Length 2 (in.)	3.992	3.950
Length 3 (in.)	3.992	3.966
Top Diameter (in.)	2.872	2.874
Middle Diameter (in.)	2.872	2.871
Bottom Diameter (in.)	2.872	2.871
Average Length (in.)	3.99	3.97
Average Area (in. <sup>2</sup> )	6.48	6.48
Sample Volume (cm <sup>3</sup> )	423.79	421.56
Unit Wet Wt. (gm./ cm <sup>3</sup> )	1.919	1.948
Unit Wet Wt. (pcf)	119.8	121.6
Unit Dry Wt. (pcf)	94.1	94.6
Unit Dry Wt. (gm./ cm <sup>3</sup> )	1.508	1.516
Void Ratio, e	0.790	0.781
Porosity, n	0.441	0.438
Pore Volume (cm <sup>3</sup> )	187.1	184.8
Total Wt. Of Sample After Test		821.66

Tested By: DL      Date: 3/20/24      Checked By: AES      Date: 3/22/24

# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#2
Lab ID No.	R-2024-068-001-002		

### Test Pressures

Cell Pressure(psi)	70.0
Back Pressure(psi)	60.0
Eff. Cons. Pressure(psi)	10.0
Response (%)	99

### Final Sample Dimensions

Sample Length (cm), L	10.09
Sample Area (cm <sup>2</sup> ), A	41.80
Pipette Area (cm <sup>2</sup> ), a <sub>p</sub>	0.03142
Annulus Area (cm <sup>2</sup> ), a <sub>a</sub>	0.76712
Equilibrium Level (cm), R <sub>eq</sub>	0.9

**AVERAGE PERMEABILITY = 8.5E-08 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 8.5E-10 m/sec @ 20°C**

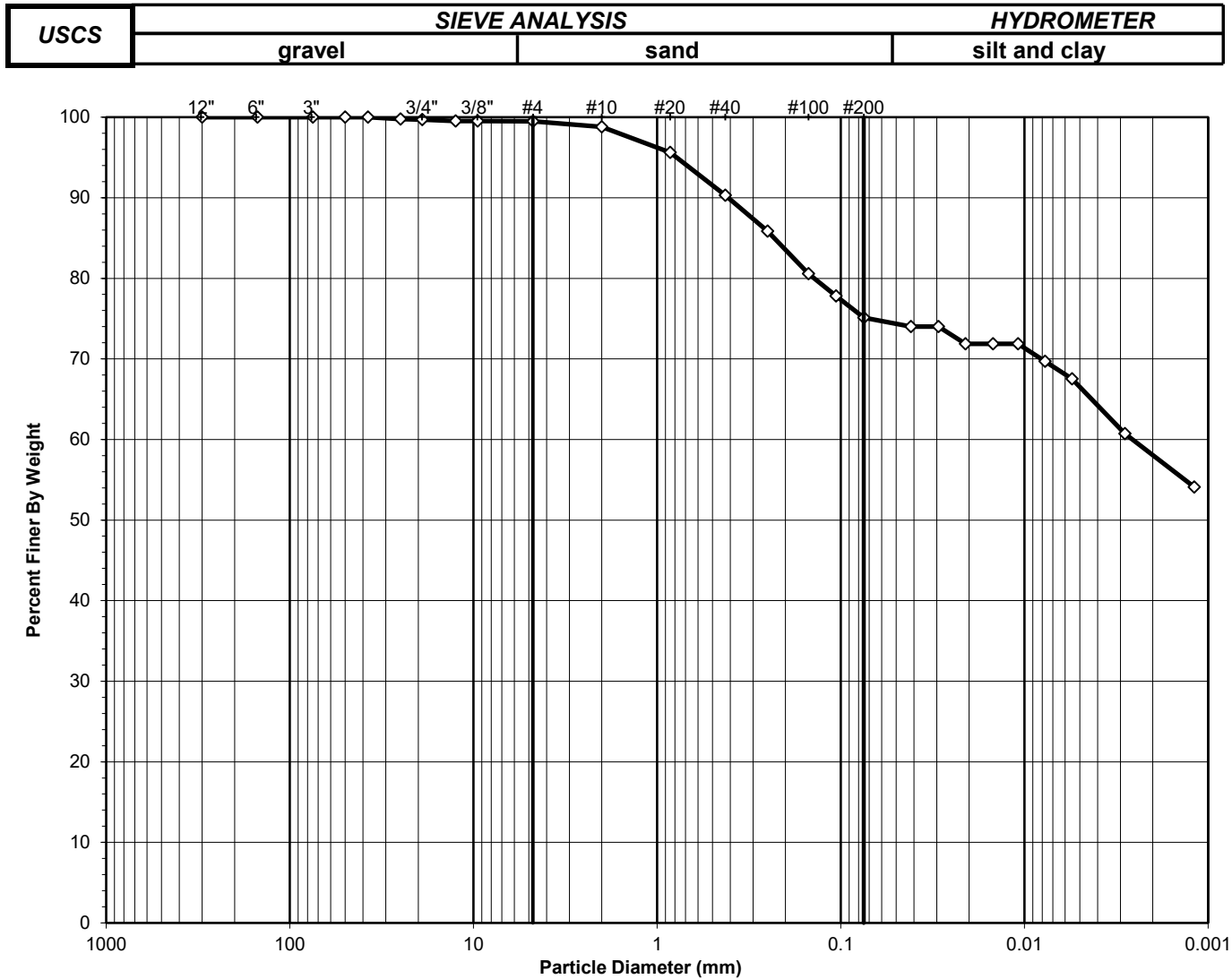
DATE		TIME			ELAPSED TIME	PIPETTE READING	INCREMENT GRADIENT	TEMP.	INCREMENTAL PERMEABILITY @ 20°C
(mm/dd/yy)	(hr)	(min)	(sec)	(min)	t	R <sub>p</sub>	i	(°C)	(cm/sec)
3/21/24	14	28	3	28.05	0.000	12.6	15.1	22.0	NA
3/21/24	14	28	45	28.75	0.700	12.5	15.0	22.0	1.1E-07
3/21/24	14	29	36	29.60	1.550	12.4	14.9	22.0	9.4E-08
3/21/24	14	30	33	30.55	2.500	12.3	14.8	22.0	8.5E-08
3/21/24	14	31	31	31.52	3.467	12.2	14.6	22.0	8.4E-08
3/21/24	14	32	29	32.48	4.433	12.1	14.5	22.0	8.5E-08
3/21/24	14	33	28	33.47	5.417	12.0	14.4	22.0	8.4E-08
3/21/24	14	34	26	34.43	6.383	11.9	14.2	22.0	8.6E-08

Tested By: DL      Date: 3/21/24      Checked By: AES      Date: 3/22/24

## SIEVE AND HYDROMETER ANALYSIS

ASTM D6913 / D7928

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#3
Lab ID:	R-2024-068-001-003	Soil Color:	Red



**USCS Symbol:**  
**MH, TESTED**

**USCS Classification:**  
**ELASTIC SILT WITH SAND**

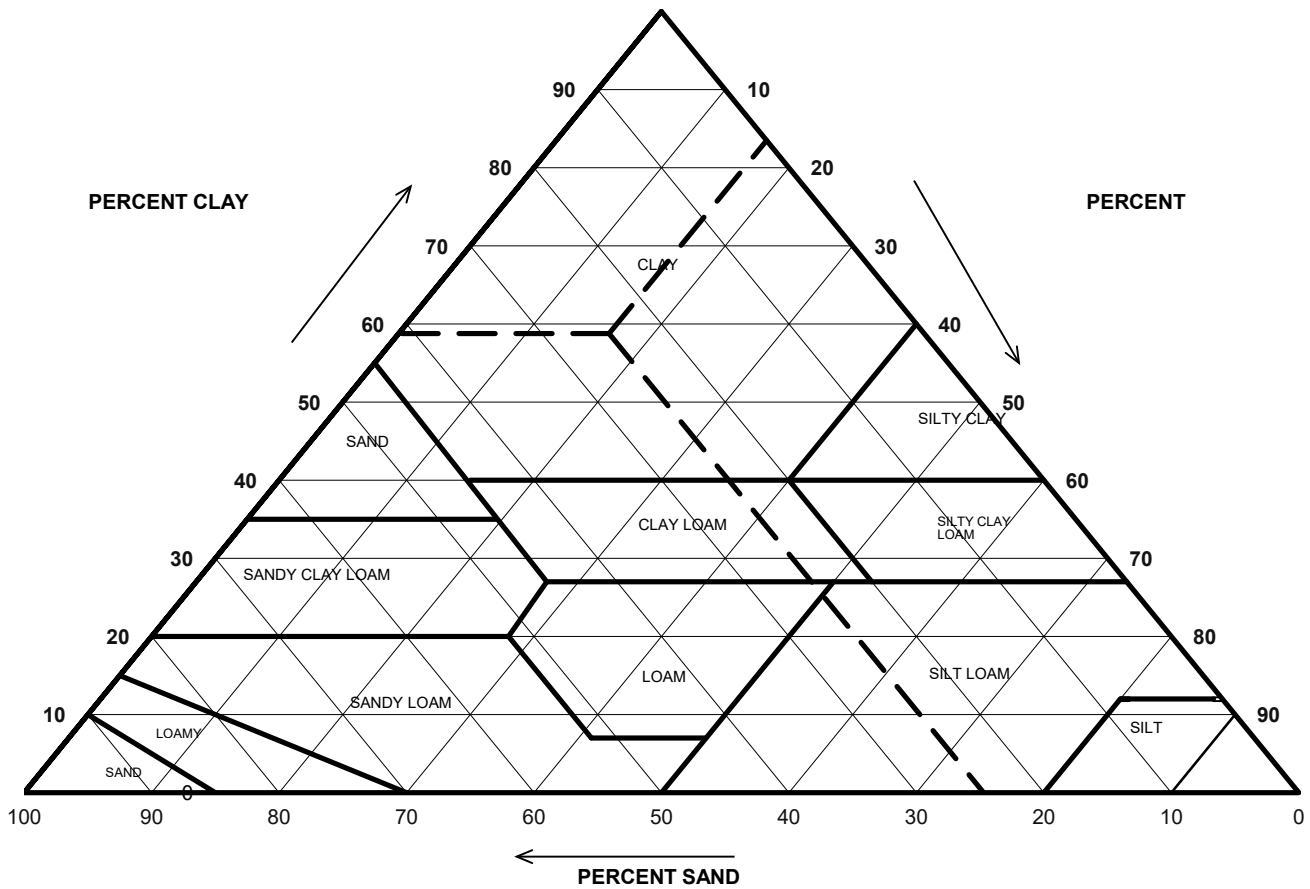
Tested By SS                      Date 3/9/24                      Checked By AES                      Date 3/11/24



### USDA CLASSIFICATION CHART

Client: Garrett & Moore  
 Client Reference: Catawba County Landfill  
 Project No.: R-2024-068-001  
 Lab ID: R-2024-068-001-003

Boring No.: N/A  
 Depth (ft): STOCKPILE  
 Sample No.: #3  
 Soil Color: Red



USDA SUMMARY			
Particle Size (mm)	Percent Finer	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classification

		Gravel	1.21	
2	98.79	Sand	24.43	24.73
0.05	74.36	Silt	16.30	16.50
0.002	58.06	Clay	58.06	58.77

USDA Classification: **CLAY**

## WASH SIEVE ANALYSIS

ASTM D6913-17

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#3
Lab ID:	R-2024-068-001-003	Soil Color:	Red

Moisture Content of Passing 3/4" Material				Moisture Content of Retained 3/4" Material			
Tare No.:	X-23	Tare No.:	X-2				
Wt. of Tare & Wet Sample (g):	415.80	Weight of Tare & Wet Sample (g):	193.34				
Wt. of Tare & Dry Sample (g):	357.01	Weight of Tare & Dry Sample (g):	193.19				
Weight of Tare (g):	143.09	Weight of Tare (g):	141.73				
Weight of Water (g):	58.79	Weight of Water (g):	0.15				
Weight of Dry Soil (g):	213.92	Weight of Dry Soil (g):	51.46				
<b>Moisture Content (%):</b>	<b>27.5</b>	<b>Moisture Content (%):</b>	<b>0.3</b>				
Wet Weight of -3/4" Sample (g):	21000.00	Total Dry Weight of Sample (g):	16524.41				
Tare No. -3/4" Sub-Specimen (g):	841	Wet Weight of +3/4" Sample (g):	51.68				
Wt. of Tare & Wet -3/4" Sub-Specimen (g):	1689.89	Dry Weight of + 3/4" Sample (g):	51.53				
Weight of Tare (g):	260.19	Dry Weight of - 3/4" Sample (g):	16472.88				
Sub-Specimen 3/4" Wet Weight (g):	1429.70	Dry Weight -3/4" +3/8" Sample (g):	25.41				
Tare No. (-3/8" Sub-Specimen):	X-19	Dry Weight of -3/8" Sample (g):	16447.47				
Wt. of Tare & Wet -3/8" Sub-Specimen (g):	538.33	J - Factor (% Finer than 3/4"):	99.7%				
Weight of Tare (g):	142.58	J - Factor (% Finer than 3/8"):	99.5%				
Sub-Specimen -3/8" Wet Weight (g):	395.75						

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.0
6"	150	0.00	0.00	0.00	100.00	100.0
3"	75	0.00	0.00	0.00	100.00	100.0
2"	50	0.00	( *)	0.00	100.00	100.0
1 1/2"	37.5	0.00	0.00	0.00	100.00	100.0
1"	25	38.86	0.23	0.23	99.77	99.8
3/4"	19	12.82	0.08	0.31	99.69	99.7
1/2"	12.5	1.73	( ** )	0.15	99.85	99.5
3/8"	9.5	0.00	0.00	0.15	99.85	99.5
#4	4.75	0.10	0.03	0.03	99.97	99.5
#10	2	2.22	0.72	0.75	99.25	98.8
#20	0.85	9.84	( ** )	3.92	96.08	95.6
#40	0.425	16.64	5.36	9.28	90.72	90.3
#60	0.25	13.92	4.48	13.76	86.24	85.8
#100	0.15	16.43	5.29	19.05	80.95	80.6
#140	0.106	8.66	2.79	21.84	78.16	77.8
#200	0.075	8.35	2.69	24.53	75.47	75.1
Pan	-	234.28	75.47	100.00	-	-

**Notes :** ( \*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample  
 ( \*\* ) The - 3/4" and - 3/8" sieve analysis is based on the Weight of the Dry Specimen

Tested By SS Date 3/9/24 Checked By AES Date 3/11/24

## HYDROMETER ANALYSIS

ASTM D7928-21

Client:	Garrett & Moore	Boring No.:	N/A
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#3
Lab ID:	R-2024-068-001-003	Soil Color:	Red

Elapsed Time (min)	Reading mm	Temp. (C°)	Offset rd,m	Effective Depth, Hm (cm)	D (mm)	Mass Percent (%) Finer, Nm	Mass Percent (%) Finer, Nm'
0	NA	NA	NA	NA	NA	NA	NA
1	37.0	22.5	2.75	9.9	0.0416	98.5	74.0
2	37.0	22.5	2.75	9.9	0.0294	98.5	74.0
4	36.0	22.5	2.75	10.1	0.0210	95.7	71.9
8	36.0	22.5	2.75	10.1	0.0148	95.7	71.9
15	36.0	22.5	2.75	10.1	0.0108	95.7	71.9
30	35.0	22.5	2.75	10.3	0.0077	92.8	69.7
60	34.0	22.5	2.75	10.5	0.0055	89.9	67.5
240	31.0	22.1	2.89	11.0	0.0028	80.9	60.7
1440	28.0	21.9	2.97	11.6	0.0012	72.0	54.1

### Soil Specimen Data

Tare No.:	2	Percent Finer than # 200:	75.12
Wt. of Tare & Dry Material (g):	367.75	Specific Gravity:	2.70 Assumed
Weight of Tare (g):	328.38		
Weight of Deflocculant (g):	5.0		
Weight of Dry Material (g):	34.37		

**Notes:** Hydrometer test is performed on - # 200 sieve material.

Hydrometer - 152H	R- 480
Cylinder	R- 54
Thermometer	R- 1505
Balance	R- 657
#200 Sieve	R- 1944
Foam Inhibitor Used	No

Tested By	RFF	Date	3/6/24	Checked By	AES	Date	3/11/24
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page 4 of 4

## ATTERBERG LIMITS

ASTM D 4318-17

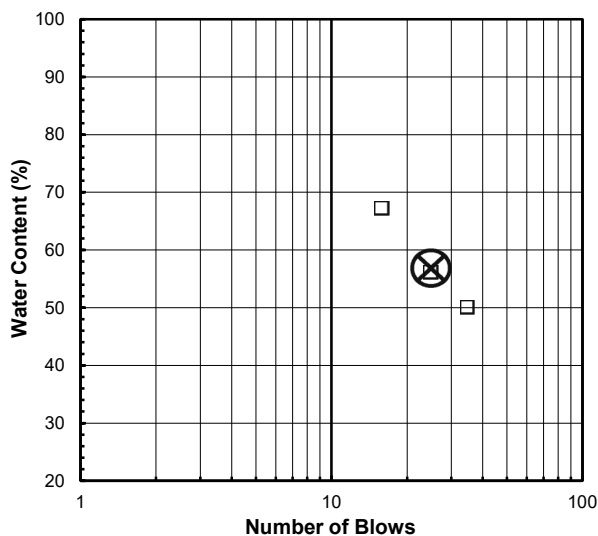
Client:	Garrett & Moore	Boring No.:	NA
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#3
Lab ID:	R-2024-068-001-003	Soil Description:	RED ELASTIC SILT

**Note:** The USCS symbol used with this test refers only to the minus No. 40 (Minus #40 sieve material, Air dried) sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

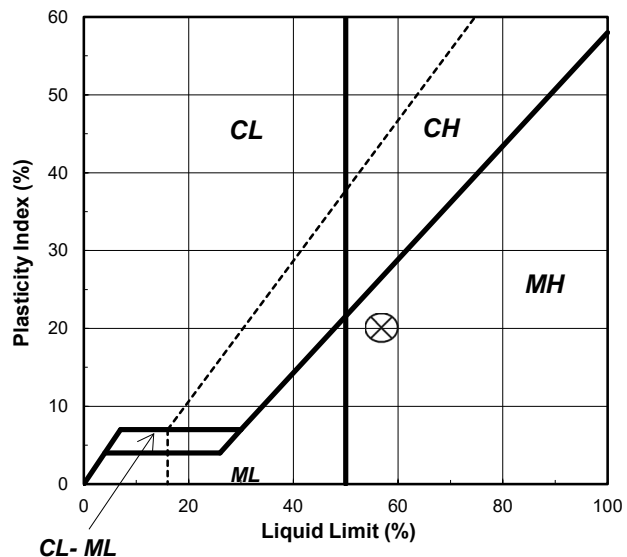
As Received Moisture Content ASTM D2216-19	Liquid Limit Test			
	1	2	3	M
Tare Number:	X-15	3M	S	W
Wt. of Tare & Wet Sample (g):	369.94	28.32	28.18	25.12
Wt. of Tare & Dry Sample (g):	319.12	24.06	23.49	21.08
Weight of Tare (g):	142.30	15.54	15.11	15.06
Weight of Water (g):	50.8	4.3	4.7	4.0
Weight of Dry Sample (g):	176.8	8.5	8.4	6.0
Was As Received MC Preserved:	<b>Yes</b>			
<b>Moisture Content (%):</b>	<b>28.7</b>	<b>50.0</b>	<b>56.0</b>	<b>67.1</b>
<b>Number of Blows:</b>		<b>35</b>	<b>25</b>	<b>16</b>

Plastic Limit Test	1	2	Range	Test Results
Tare Number:	3	H		<b>Liquid Limit (%):</b> <b>57</b>
Wt. of Tare & Wet Sample (g):	25.53	23.88		<b>Plastic Limit (%):</b> <b>37</b>
Wt. of Tare & Dry Sample (g):	22.80	21.51		<b>Plasticity Index (%):</b> <b>20</b>
Weight of Tare (g):	15.35	15.03		<b>USCS Symbol:</b> <b>MH</b>
Weight of Water (g):	2.7	2.4		
Weight of Dry Sample (g):	7.5	6.5		
<b>Moisture Content (%):</b>	<b>36.6</b>	<b>36.6</b>	<b>0.1</b>	
<i>Note: The acceptable range of the two Moisture Contents is ±</i>				<i>0.84</i>

**Flow Curve**



**Plasticity Chart**



Tested By **JCB IV** Date **3/6/24** Checked By **AES** Date **3/7/24**

## MOISTURE - DENSITY RELATIONSHIP

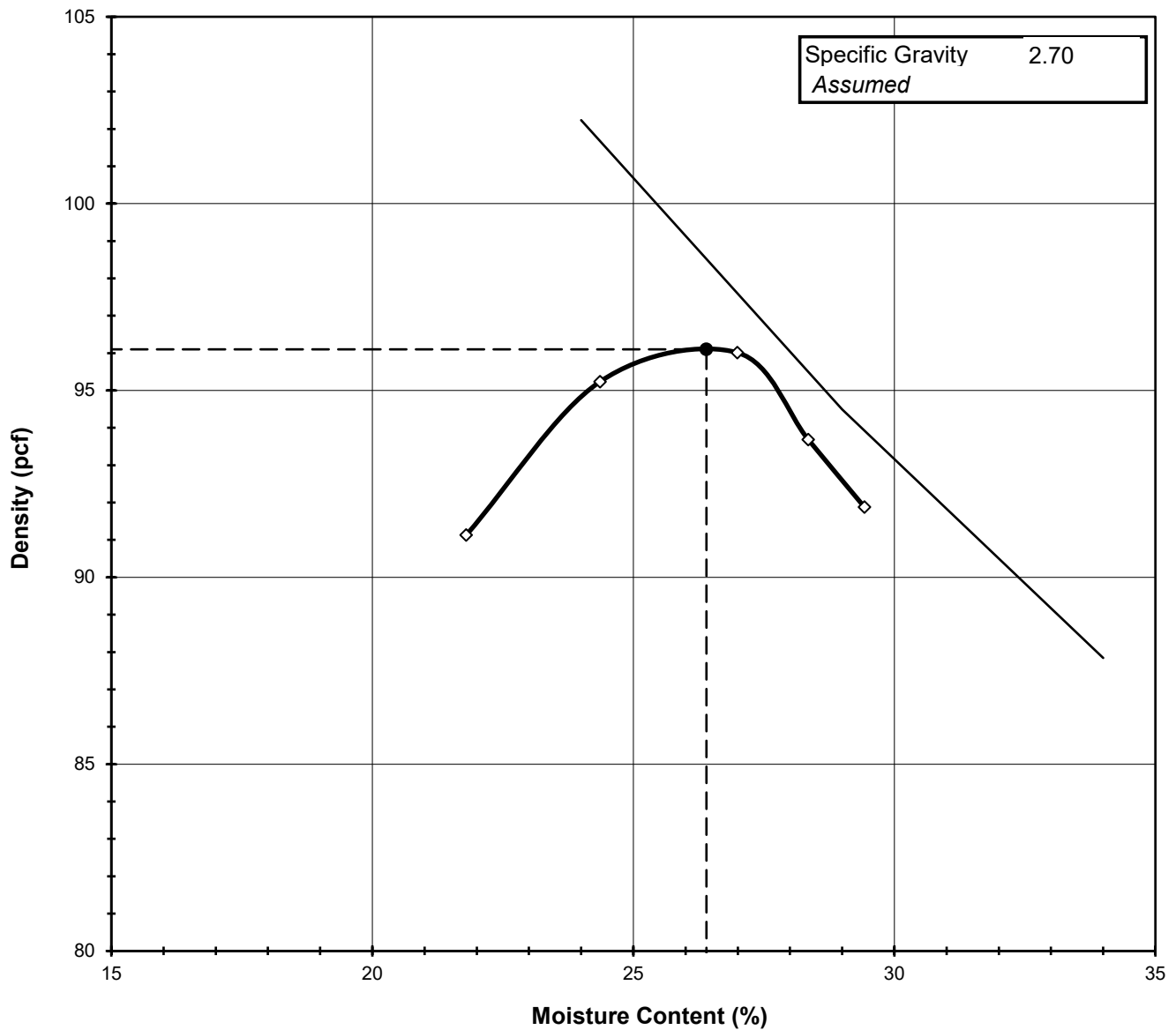
*ASTM D698-12*

Client: Garrett & Moore  
 Client Reference: Catawba County Landfill  
 Project No.: R-2024-068-001  
 Lab ID: R-2024-068-001-003

Boring No.: NA  
 Depth (ft): STOCKPILE  
 Sample No.: #3  
 Test Method: **STANDARD**

Visual Description: Red Elastic Silt with Sand

**Optimum Moisture Content (%): 26.4**  
**Maximum Dry Density (pcf): 96.1**



Tested By *NS* Date *3/12/24* Checked By *AES* Date *3/13/24*

## MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	Garrett & Moore	Boring No.:	NA
Client Reference:	Catawba County Landfill	Depth (ft):	STOCKPILE
Project No.:	R-2024-068-001	Sample No.:	#3
Lab ID:	R-2024-068-001-003		

Visual Description: Red Elastic Silt with Sand

Total Weight of the Sample (g):	21850	Test Type:	STANDARD
As Received Water Content (%):	NA	Rammer Weight (lb):	5.5
Assumed Specific Gravity:	2.70	Rammer Drop (in):	12
Percent Retained on 3/4":	NA	Rammer Type:	MECHANICAL
Percent Retained on 3/8":	NA	Machine ID:	R606
Percent Retained on #4:	NA	Mold ID:	R607
Oversize Material:	Not included	Mold diameter:	4"
Procedure Used:	B	Weight of the Mold (g):	4247
		Volume of the Mold (cm <sup>3</sup> ):	943

### Mold / Specimen

Point No.	1	2	3	4	5
Weight of Mold & Wet Sample (g):	5925	6037	6090	6064	6044
Weight of Mold (g):	4247	4247	4247	4247	4247
Weight of Wet Sample (g):	1677	1790	1843	1817	1797
Mold Volume (cm <sup>3</sup> ):	943	943	943	943	943

### Moisture Content / Density

Tare Number:	432	10-A	3-A	5-A	482
Weight of Tare & Wet Sample (g):	339.40	376.80	336.30	393.00	338.00
Weight of Tare & Dry Sample (g):	296.41	320.13	282.97	326.23	283.30
Weight of Tare (g):	99.20	87.50	85.40	90.70	97.40
Weight of Water (g):	42.99	56.67	53.33	66.77	54.70
Weight of Dry Sample (g):	197.21	232.63	197.57	235.53	185.90

Wet Density (g/cm <sup>3</sup> ):	1.78	1.90	1.95	1.93	1.91
Wet Density (pcf):	111.0	118.4	121.9	120.2	118.9
<b>Moisture Content (%):</b>	<b>21.8</b>	<b>24.4</b>	<b>27.0</b>	<b>28.3</b>	<b>29.4</b>
<b>Dry Density (pcf):</b>	<b>91.1</b>	<b>95.2</b>	<b>96.0</b>	<b>93.7</b>	<b>91.9</b>

### Zero Air Voids

<b>Moisture Content (%):</b>	24.0	29.0	34.0
<b>Dry Unit Weight (pcf):</b>	102.2	94.5	87.8

Tested By NS Date 3/12/24 Checked By AES Date 3/13/24

# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

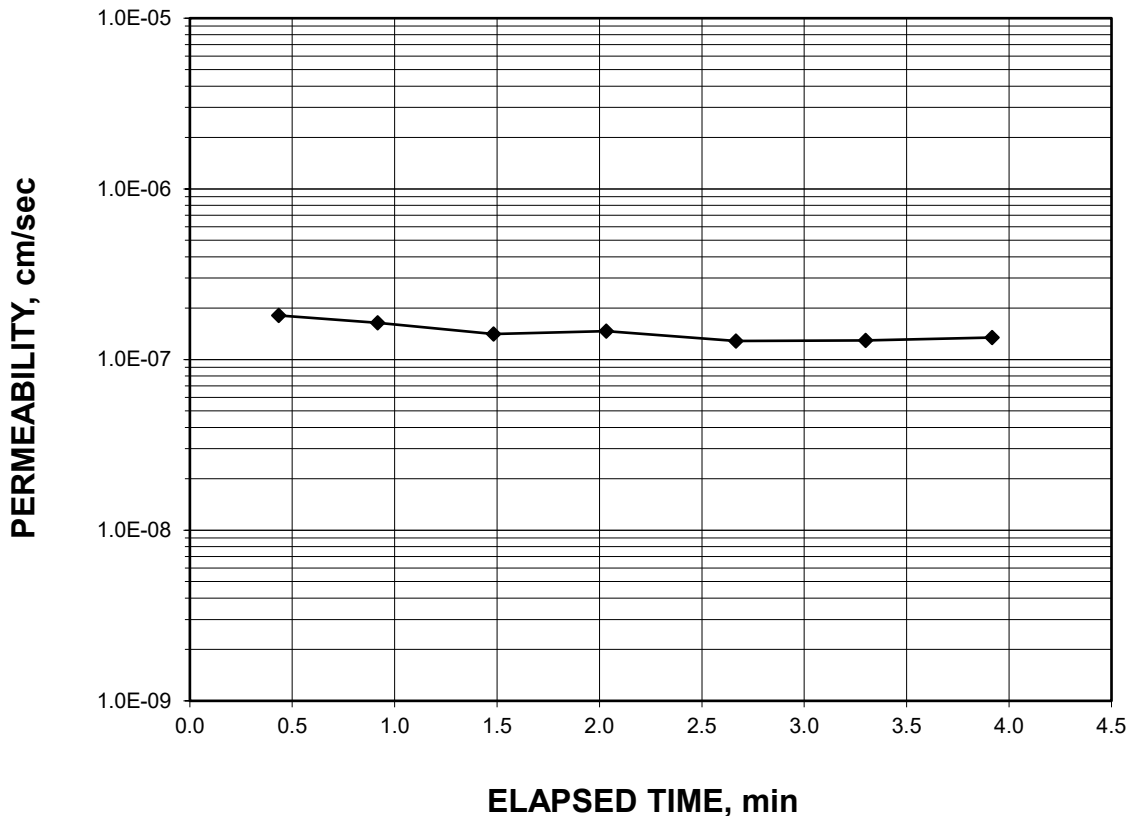
ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#3
Lab ID No.	R-2024-068-001-003		

Visual Description: Red Silty Clay

**AVERAGE PERMEABILITY = 1.3E-07 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 1.3E-09 m/sec @ 20°C**

### PERMEABILITY vs. TIME



Tested By: DL      Date: 3/20/24      Checked By: AES      Date: 3/22/24

# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#3
Lab ID No.	R-2024-068-001-003		
	Specific Gravity	2.70	Assumed
	Sample Condition		Remolded

Visual Description: Red Silty Clay

Permeant Type: Deaired Tap Water

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	700	10-A
Wt. of Tare & WS (gm.)	269.25	538.40
Wt. of Tare & DS (gm.)	228.63	433.04
Wt. of Tare (gm.)	91.05	87.46
Wt. of Water (gm.)	40.62	105.36
Wt. of DS (gm.)	137.58	345.58
Moisture Content (%)	<b>29.5</b>	<b>30.5</b>

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	2427.32	NA
Wt. of Tube (gm.)	1624.81	NA
Wt. of WS (calc.) (gm.)	802.51	808.48
Length 1 (in.)	3.992	3.931
Length 2 (in.)	3.992	3.922
Length 3 (in.)	3.992	3.917
Top Diameter (in.)	2.872	2.869
Middle Diameter (in.)	2.872	2.859
Bottom Diameter (in.)	2.872	2.870
Average Length (in.)	3.99	3.92
Average Area (in. <sup>2</sup> )	6.48	6.45
Sample Volume (cm <sup>3</sup> )	423.79	414.76
Unit Wet Wt. (gm./ cm <sup>3</sup> )	1.894	1.949
Unit Wet Wt. (pcf)	118.2	121.7
Unit Dry Wt. (pcf)	91.3	93.2
Unit Dry Wt. (gm./ cm <sup>3</sup> )	1.462	1.494
Void Ratio, e	0.847	0.807
Porosity, n	0.459	0.447
Pore Volume (cm <sup>3</sup> )	194.3	185.3
Total Wt. Of Sample After Test		810.09

Tested By: DL      Date: 3/20/24      Checked By: AES      Date: 3/22/24



# FLEXIBLE WALL PERMEABILITY TEST

## PERMOMETER METHOD

ASTM D 5084-16a  
(SOP-S22C)

Client	Garrett & Moore	Boring No.	N/A
Client Project	Catawba County Landfill	Depth (ft.)	STOCKPILE
Project No.	R-2024-068-001	Sample No.	#3
Lab ID No.	R-2024-068-001-003		

### Test Pressures

Cell Pressure(psi)	70.0
Back Pressure(psi)	60.0
Eff. Cons. Pressure(psi)	10.0
Response (%)	99

### Final Sample Dimensions

Sample Length (cm), L	9.97
Sample Area (cm <sup>2</sup> ), A	41.62
Pipette Area (cm <sup>2</sup> ), a <sub>p</sub>	0.03142
Annulus Area (cm <sup>2</sup> ), a <sub>a</sub>	0.76712
Equilibrium Level (cm), R <sub>eq</sub>	0.9

**AVERAGE PERMEABILITY = 1.3E-07 cm/sec @ 20°C**  
**AVERAGE PERMEABILITY = 1.3E-09 m/sec @ 20°C**

DATE		TIME			ELAPSED TIME	PIPETTE READING	INCREMENT GRADIENT	TEMP.	INCREMENTAL PERMEABILITY @ 20°C
(mm/dd/yy)	(hr)	(min)	(sec)	(min)	t	R <sub>p</sub>	i	(°C)	(cm/sec)
3/21/24	14	43	30	43.50	0.000	12.6	15.3	22.0	NA
3/21/24	14	43	56	43.93	0.433	12.5	15.2	22.0	1.8E-07
3/21/24	14	44	25	44.42	0.917	12.4	15.1	22.0	1.6E-07
3/21/24	14	44	59	44.98	1.483	12.3	14.9	22.0	1.4E-07
3/21/24	14	45	32	45.53	2.033	12.2	14.8	22.0	1.5E-07
3/21/24	14	46	10	46.17	2.667	12.1	14.7	22.0	1.3E-07
3/21/24	14	46	48	46.80	3.300	12.0	14.5	22.0	1.3E-07
3/21/24	14	47	25	47.42	3.917	11.9	14.4	22.0	1.3E-07

Tested By: DL      Date: 3/21/24      Checked By: AES      Date: 3/22/24