



# MEMO

December 10, 2018

**To:** Pat. N. Nwachukwu, P.E.

**From:** Stanley F. Yin, P.E.



**Subject:** Geotechnical Investigation  
Montgomery County  
CSJ: 1259-01-043, ETC.  
Highway: FM 1097  
From Blueberry Hills Dr. to Anderson Road

---

Per your request, we have completed the geotechnical investigation for the subject project. Attached for your use and further handling are the thirty-eight WinCore logs and Hydrometer Analysis (D50) results. If you have any questions, please contact me at Ext. 5211 or Tae Sun You at Ext. 5218.

#### Attachments

**CC:** Lucio F. Ortiz, P.E.  
Larry W. Blackburn, P.E.





# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **R1**  
Structure **Bridge**  
Station **276+73.90**  
Offset **19.91' RT**

District **Houston**  
Date **09/13/2018**  
Grnd. Elev. **213.10 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
65		31 (6) 36 (6)	SAND, loose to dense, tan			22				
70		50 (3) 50 (2)				20				
75		17 (6) 17 (6)				16				% Passing No. 200 = 21
80		24 (6) 31 (6)				21				
85		34 (6) 41 (6)				17				w/ sandstones 85'-88'
125.1										
90		50 (6) 50 (4.5)	CLAY, sandy, hard, gray & tan (CH)	0	81	20	55	29	130	
119.1										
95		50 (5) 50 (3.5)	SAND, dense to very dense, tan			23				% Passing No. 200 = 7
100		50 (1) 50 (0.5)				18				% Passing No. 200 = 22
105		50 (5) 50 (3.5)				25				
110		50 (4) 50 (3)								
115		50 (5) 50 (4)				24				% Passing No. 200 = 24
93.1	120	50 (4) 50 (3)				23				

Remarks: E 3799841.3, N 10153162.8;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gaeren)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County Montgomery  
Highway FM 1097  
CSJ 1259-01-043,ETC

Hole R2  
Structure Bridge  
Station 278+77.09  
Offset 50.24' RT

District Houston  
Date 09/18/2018  
Grnd. Elev. 213.20 ft  
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
206.2	5	4 (6) 4 (6)	CLAY, sandy, very soft, dark gray (CL)			23				D50 = 0.0013 mm
						18	49	21		
						21	44	19		
196.2	10	4 (6) 3 (6)	CLAY, very soft, gray (CH)			23				
						22	50			
						23	56			
196.2	15	3 (6) 4 (6)	CLAY, very soft, gray (CH)			23	57	126		
						25	54			
						23	59			
196.2	20	6 (6) 5 (6)	CLAY, sandy, soft, gray (CL)			21				
						25	38			
						25				
181.2	25	4 (6) 4 (6)	CLAY, sandy, soft, gray (CL)			24	41	19		
						0	12.8	23		123
						20	44			
181.2	30	5 (6) 6 (6)	CLAY, sandy, soft, gray (CL)			20	44			
						23	52	31		
						19				
176.2	35	5 (6) 5 (6)	CLAY, soft, tan (CH)			23	52	31		
						19				
						0	37.3	21	44	126
176.2	40	3 (6) 3 (6)	CLAY, sandy, very soft to soft, gray (CL)			18				
						14				
						17				
164.2	45	2 (6) 3 (6)	CLAY, sandy, very soft to soft, gray (CL)			14				
						17				
						17				
164.2	50	20 (6) 28 (6)	SAND, compact to very dense, gray			17				
						17				
						17				
164.2	55	50 (1) 50 (0.5)	SAND, compact to very dense, gray			17				
						17				
						23				
164.2	60	20 (6) 25 (6)	SAND, compact to very dense, gray			23				
						17				
						17				

Remarks: E 3800034.0, N 10153091.5;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **R2**  
Structure **Bridge**  
Station **278+77.09**  
Offset **50.24' RT**

District **Houston**  
Date **09/18/2018**  
Grnd. Elev. **213.20 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
65		50 (2) 50 (1)	SAND, compact to very dense, gray			23				wet 75'-79'
70		50 (6) 50 (3.5)				19				
75		50 (3) 50 (1.5)				18				
80		50 (5) 50 (4)				18				
85		30 (6) 49 (6)				23				
90		50 (5) 50 (4)				19				
95		22 (6) 34 (6)				17				
100		47 (6) 50 (5.5)				21				
105		50 (5.5) 50 (4)				20				
110		48 (6) 50 (5.5)				22				wet 110'-114'
115		50 (2.5) 50 (1)				18				
93.2 120		50 (6) 50 (5)				23				

Remarks: E 3800034.0, N 10153091.5;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County Montgomery  
Highway FM 1097  
CSJ 1259-01-043,ETC

Hole E1  
Structure Embankment  
Station 283+13.00  
Offset 9.93' RT

District Houston  
Date 09/12/2018  
Grnd. Elev. 207.90 ft  
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
5		3 (6) 3 (6)	CLAY, very soft to soft, dark gray (CH)			20	50	32		
						22				
10		4 (6) 5 (6)				23				
						24				
193.9		7 (6) 8 (6)	CLAY, sandy, soft, dark gray (CL)	0	25.9	21	55	126		
						15	34	22		
20		5 (6) 5 (6)				30				
						15				
184.9		6 (6) 7 (6)	CLAY, soft, dark gray (CH)			20	49			
						22	50			
25		4 (6) 5 (6)				18	50			
					0	34.3	23		120	
175.9		4 (6) 3 (6)	CLAY, sandy, very soft to soft, gray & yellow (CL)			24	48	31		
						25				
35		9 (6) 21 (6)			0	13	18		127	w/ sands 35'-39'
168.9		9 (6) 19 (6)	SAND, slightly compact, tan			25				
						21				
45		11 (6) 20 (6)				19				% Passing No. 200 = 28
50										
155.9										
55										
60										

Remarks: E 3800469.0, N 10153042.2;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gaeren)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **E2**  
Structure **Embankment**  
Station **287+70.81**  
Offset **61.82' RT**

District **Houston**  
Date **09/07/2018**  
Grnd. Elev. **208.70 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
5		3 (6) 4 (6)	CLAY, sandy, very soft to soft, dark gray (CL)			17	48			
						22				
10		8 (6) 12 (6)				21	49	34		
						17	43	26		
196.7			SAND, clayey, loose, brown & reddish brown			18				% Passing No. 200 = 47
15		5 (6) 8 (6)				16	25	10		% Passing No. 200 = 46
						18				
189.7			CLAY, sandy, stiff, reddish & tan (CL)	0	41.5	21	49	131		
20		11 (6) 13 (6)								
184.7			SAND, loose to dense, tan & gray			21				% Passing No. 200 = 25
25		5 (6) 6 (6)								
30		4 (6) 10 (6)				28				
35		16 (6) 40 (6)								
40		50 (4) 50 (2)			18					
45		50 (3.5) 50 (2)			20					
159.7			CLAY, very stiff, gray & tan (CH)			22	53	27		
50		22 (6) 23 (6)								
156.7										
55										
60										

Remarks: E 3800906.6, N 10152898.0;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B1**  
Structure **Storm Sewer**  
Station **212+77.57**  
Offset **16.82' RT**

District **Houston**  
Date **08/31/2018**  
Grnd. Elev. **215.50 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
213.5			FILL, reddish dark sandy materials			17				
			CLAY, stiff, dark brown, w/ ferrous nodules (CH)			17				
5		10 (6) 11 (6)		0	99	20	63	130		
208.5			CLAY, sandy, very stiff, tan, w/ calcareous nodules (CL)			17				
10		27 (6) 20 (6)				9				
203.5			CLAY, very stiff, gray tan (CH)	0	44.3	20	57	128		
15		21 (6) 25 (6)				19				
198.5			SAND, slightly compact, gray							
20		9 (6) 14 (6)				12				
193.5										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3793594.9, N 10154535.8;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT





# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B2**  
Structure **Storm Sewer**  
Station **216+83.63**  
Offset **49.54' RT**

District **Houston**  
Date **08/31/2018**  
Grnd. Elev. **221.90 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
219.9			FILL, dark brown sandy materials			14				w/ organic materials 0-7'
			CLAY, soft, dark brown (CH)			16				
5		6 (6) 8 (6)		0	107.3	19	66	127		
214.9			CLAY, silty, very stiff, tan (CL)	0	84.8	24		126		
10		20 (6) 26 (6)				25				w/ calcareous nodules 10'-12'
209.9			CLAY, sandy, very stiff, tan gray (CL)			13				
15		27 (6) 25 (6)				12	39			
						14				w/ calcareous nodules 18'-22'
20		21 (6) 26 (6)				14				
199.9										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3794005.6, N 10154511.0;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B3**  
Structure **Storm Sewer**  
Station **220+78.76**  
Offset **51.81' RT**

District **Houston**  
Date **08/31/2018**  
Grnd. Elev. **228.50 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
226.5			FILL, dark brown sandy materials			0				w/ organic materials 0-2'
224.5			CLAY, sandy, brown (CL)			14				
224.5		8 (6) 9 (6)	CLAY, soft, tan (CH)			18	69			w/ calcareous nodules 8'-12'
				0	35.1	28		125		
10		5 (6) 8 (6)				24	55			
216.5			CLAY, sandy, stiff, tan (CL)			21				
15		14 (6) 15 (6)				18				
211.5			CLAY, stiff, tan (CH)			26	71			
20		16 (6) 21 (6)		0	19.9	21		121		
206.5										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3794391.5, N 10154426.1;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B4**  
Structure **Storm Sewer**  
Station **227+72.15**  
Offset **22.15' RT**

District **Houston**  
Date **09/04/2018**  
Grnd. Elev. **234.60 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
232.6			FILL, reddish tan sandy materials			5				w/ organic materials 0-2'
			CLAY, soft to stiff , tan & gray (CH)			18				w/ wood 3'-4'
5		4 (6) 5 (6)		0	55	20	60	127		w/ ferrous nodules 5'-7'
			CLAY, sandy, very stiff, tan (CL)			28				w/ calcareous nodules 8'-22'
10		6 (6) 7 (6)		0	17.6	27	60	124		
				28						
15		20 (6) 14 (6)		19						
217.6			CLAY, sandy, very stiff, tan (CL)			19	40			
20		30 (6) 39 (6)		19						
212.6										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3795052.7, N 10154204.0;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B5**  
Structure **Storm Sewer**  
Station **233+13.17**  
Offset **24.99' LT**

District **Houston**  
Date **09/04/2018**  
Grnd. Elev. **237.80 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks	
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)		
235.8			FILL, reddish tan sandy materials								
233.8			CLAY, sandy, dark brown (CL)			17				w/ ferrous nodules 3'-5'	
5		5 (6) 5 (6)	CLAY, soft to stiff, tan (CH)			22	64	136		w/ calcareous nodules 5'-17'	
						21					
10		6 (6) 7 (6)				23					
						0	29.2	29	78	124	w/ ferrous nodules 13'-17'
15		10 (6) 11 (6)				28					
						27					
20		8 (6) 14 (6)				27					
215.8											
25											
30											
35											
40											
45											
50											
55											
60											

Remarks: E 3795593.6, N 10154156.6;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B6**  
Structure **Storm Sewer**  
Station **236+80.89**  
Offset **6.62' LT**

District **Houston**  
Date **08/31/2018**  
Grnd. Elev. **242.00 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
240.			FILL, brown sandy materials			14				w/ organic materials 0-2'
			CLAY, soft, tan (CH)			5				w/ rocks 3'-7'
5		4 (6) 5 (6)				20	103			
				0	60.3	19	60	132		
10		7 (6) 7 (6)				17				
230.			CLAY, sandy, soft, reddish tan (CL)			17				% Passing No. 200 = 62
15		7 (6) 6 (6)				16				
225.			SAND, loose, tan							
20		5 (6) 6 (6)				12				
220.										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3795953.1, N 10154073.5;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B7**  
Structure **Storm Sewer**  
Station **242+29.54**  
Offset **75.99' RT**

District **Houston**  
Date **09/04/2018**  
Grnd. Elev. **246.00 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
244.			FILL, dark brown sandy materials							w/ organic materials 0-2'
			CLAY, sandy, soft, dark brown (CL)			13				
5		9 (6) 11 (6)		0	120.3	14	42	131		
239.			CLAY, soft, tan (CH)			26				w/ calcareous nodules 8'-12'
10		9 (6) 10 (6)		0	39.4	24	74	122		
						27				
232.			CLAY, sandy, stiff to very stiff, tan (CL)			19				w/ ferrous nodules 15'-17'
15		49 (6) 28 (6)				19				
						19				
20		10 (6) 21 (6)				24				
224.										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3796469.4, N 10153870.4;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B8**  
Structure **Storm Sewer**  
Station **246+74.14**  
Offset **10.71' LT**

District **Houston**  
Date **08/31/2018**  
Grnd. Elev. **241.10 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
239.1			FILL, dark brown sandy materials			3				w/ organic materials 0-2'
			CLAY, very soft, reddish tan (CH)			21				
5		3 (6) 4 (6)				21	58			
234.1			CLAY, silty, stiff to very stiff, tan (CL)	0	40.9	21			127	w/ calcareous nodules 8'-12'
10		12 (6) 10 (6)				22				
						28	34			
15		25 (6) 31 (6)				14				
						29				
222.1			CLAY, sandy, hard, tan (CL)			21				% Passing No. 200 = 66
20		50 (6) 50 (4.5)								
219.1										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3796922.1, N 10153854.8;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B9**  
Structure **Storm Sewer**  
Station **251+47.62**  
Offset **71.64' RT**

District **Houston**  
Date **09/04/2018**  
Grnd. Elev. **230.00 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
228.	[Pattern]	50 (5.5) 50 (4)	FILL, tan reddish sandy materials							w/ organic materials 0-2'
			CLAY, silty, hard, dark brown, w/ calcareous & ferrous nodules (CL)	0	118.9	9	29	123	16	
223.	[Pattern]	11 (6) 16 (6)	CLAY, stiff, tan, w/ calcareous nodules (CH)	0	42.6	22	62	123	17	w/ ferrous nodules 10'-12'
			CLAY, sandy, tan (CL)						13	
218.	[Pattern]	20 (6) 31 (6)	SAND, compact, tan							% Passing No. 200 = 95
216.									9	
208.	[Pattern]	20 (6) 24 (6)								
									7	
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3797364.9, N 10153668.0;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT





# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B10**  
Structure **Storm Sewer**  
Station **255+49.26**  
Offset **16.62' LT**

District **Houston**  
Date **09/04/2018**  
Grnd. Elev. **218.10 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks	
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)		
216.1	[Pattern]	12 (6) 14 (6)	FILL, tan sandy materials							w/ organic materials 0-2'	
			CLAY, sandy, stiff, reddish tan (CL)			16					
5						14	41				
211.1	[Pattern]	10 (6) 12 (6)	CLAY, reddish tan (CH)	0	31.9	25			125	% Passing No. 200 = 32	
							24	50			
208.1	[Pattern]	8 (6) 9 (6)	SAND, loose to slightly compact, reddish tan			16					
15							16				
20									15		
196.1	[Pattern]	8 (6) 11 (6)									
25											
30											
35											
40											
45											
50											
55											
60											

Remarks: E 3797776.1, N 10153663.6;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B11**  
Structure **Storm Sewer**  
Station **260+62.06**  
Offset **74.12' RT**

District **Houston**  
Date **09/04/2018**  
Grnd. Elev. **206.40 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
204.4	[Pattern]	9 (6) 11 (6)	FILL, dark brown sandy materials							w/ organic materials 0-7'
			SAND, loose, tan, w/ clays			4				
199.4	[Pattern]	23 (6) 25 (6)	CLAY, sandy, very stiff, tan, w/ ferrous nodules (CL)							% Passing No. 200 = 29
							4			
194.4	[Pattern]	7 (6) 13 (6)	SAND, loose, tan, w/ clays							% Passing No. 200 = 1
							0	7.9	19	
										% Passing No. 200 = 35
184.4		6 (6) 7 (6)								
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3798255.2, N 10153459.8;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B12**  
Structure **Storm Sewer**  
Station **267+07.17**  
Offset **17.73' LT**

District **Houston**  
Date **08/30/2018**  
Grnd. Elev. **216.70 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
214.7			FILL, reddish tan sandy materials							
			CLAY, soft, reddish tan, w/ calcareous nodules (CH)			13				
	5	5 (6) 5 (6)				14	68			
209.7			CLAY, sandy, soft, tan (CL)			24				
	10	5 (6) 4 (6)		0	15.7	26	42	124		
204.7			SAND, loose, tan, w/ clays			21				% Passing No. 200 = 20
	15	7 (6) 5 (6)				20				
	20	6 (6) 6 (6)				13				
194.7										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3798904.7, N 10153404.7;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B13**  
Structure **Storm Sewer**  
Station **273+20.78**  
Offset **9.47' LT**

District **Houston**  
Date **08/30/2018**  
Grnd. Elev. **205.30 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
203.3			FILL, dark brown sandy materials							w/ organic materials 0-2'
			SAND, dark brown, w/ clays			7				
200.3	5	5 (6) 6 (6)				7				% Passing No. 200 = 38
			CLAY, sandy, soft, reddish tan (CL)			21				w/ ferrous nodules 6'-7'
	10	8 (6) 9 (6)				18	35			
193.3				0	15.4	21			123	
			SAND, loose, tan			17				% Passing No. 200 = 20
	15	8 (6) 10 (6)				20				
	20	6 (6) 9 (6)				20				
183.3										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3799501.6, N 10153263.6;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B14**  
Structure **Storm Sewer**  
Station **292+62.40**  
Offset **20.29' LT**

District **Houston**  
Date **08/30/2018**  
Grnd. Elev. **217.50 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
215.5			FILL, dark brown sandy materials							w/ organic materials 0-2'
			CLAY, stiff, tan, w/ calcareous nodules (CH)			22				
5		11 (6) 16 (6)				21	76			
210.5			CLAY, sandy, hard, tan (CL)	0	114.5	14		139		w/ calcareous nodules 10'-12'
10		50 (5.5) 50 (4)				13	32			
205.5			SAND, very dense, tan			14				% Passing No. 200 = 49
15		50 (1) 50 (0.5)				9				
20		50 (3) 50 (1.5)				9				
195.5										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3801404.6, N 10152878.1;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B15**  
Structure **Storm Sewer**  
Station **298+16.98**  
Offset **68.96' RT**

District **Houston**  
Date **08/30/2018**  
Grnd. Elev. **236.60 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
234.6			CLAY, sandy, tan (CL)			12				w/ organic materials 0-2'
			CLAY, tan (CH)			22	57			
232.6		9 (6) 50 (6)	CLAY, silty, stiff to very stiff, tan (CL)			27				
						23	46			
		8 (6) 26 (6)				24				
				0	18.3	24		122		
222.6		10 (6) 12 (6)	CLAY, stiff, tan (CH)	0	35	26		121		
						24	67			
		16 (6) 17 (6)				18				
214.6										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3801929.4, N 10152677.5;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B16**  
Structure **Storm Sewer**  
Station **302+40.77**  
Offset **6.69' RT**

District **Houston**  
Date **08/30/2018**  
Grnd. Elev. **238.70 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
236.7			FILL, reddish tan sandy materials							w/ calcareous nodules 3'-4'
			CLAY, soft, tan (CH)			19				
5		5 (6) 13 (6)				22	73			
						24				
10		7 (6) 10 (6)		0	41.8	24			123	
				0	60.1	25	71		130	
224.7		13 (6) 44 (6)	CLAY, sandy, stiff to very stiff, tan (CL)			24				
						21	43			
20		14 (6) 16 (6)				21				
216.7										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3802357.3, N 10152653.9;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B17**  
Structure **Storm Sewer**  
Station **308+89.30**  
Offset **9.20' RT**

District **Houston**  
Date **08/29/2018**  
Grnd. Elev. **230.20 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
228.2			FILL, tan sandy materials			23				w/ organic materials 0-2'
226.2			CLAY, sandy, tan (CL)			12				w/ calcareous nodules 2'-7'
5		3 (6) 4 (6)	CLAY, very soft to stiff, tan (CH)			12	54			
						26	67			
						13	50			
10		7 (6) 10 (6)		0	30.9	24	74	127		
						24	68			
				0	37.8	24		127		
15		10 (6) 12 (6)				25				
						27				
20		12 (6) 12 (6)		0	16.1	25		123		
208.2										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3802992.3, N 10152522.1;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT





# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B18**  
Structure **Storm Sewer**  
Station **313+30.53**  
Offset **63.19' RT**

District **Houston**  
Date **08/29/2018**  
Grnd. Elev. **250.60 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
248.6			FILL, brown sandy materials							w/ organic materials 0-2'
			CLAY, soft, tan (CH)			23				
	5	4 (6) 6 (6)				21	53			
242.6			CLAY, silty, stiff, tan (CL)	0	37.6	27	71	126		
	10	14 (6) 14 (6)				22				
						19				
238.6			CLAY, stiff, tan (CH)			25	85			
	15	12 (6) 13 (6)				26				
						22	69			
232.6			CLAY, sandy, tan (CL)			20				
230.6	20	50 (3) 50 (2.5)				19				
			CLAY, hard, tan (CH)			25	69			
228.6										
	25									
	30									
	35									
	40									
	45									
	50									
	55									
	60									

Remarks: E 3803413.9, N 10152381.2;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B19**  
Structure **Storm Sewer**  
Station **317+29.85**  
Offset **10.85' RT**

District **Houston**  
Date **08/24/2018**  
Grnd. Elev. **257.10 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks	
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)		
255.1	5	15 (6) 16 (6)	CLAY, tan (CH)			16				w/ organic materials 0-2'	
			CLAY, sandy, stiff, tan, w/ calcareous nodules (CL)			13	46				
						9	35				
								14			
250.1 249.1	10	9 (6) 10 (6)	CLAY, tan (CH)			18	54			w/ calcareous nodules 9'-10'	
			CLAY, sandy, soft, tan (CL)			14	30				
								14			
245.1	15	14 (6) 16 (6)	CLAY, stiff to very stiff, tan (CH)	0	64.1	27			138	w/ organic materials 15'-17'	
					0	57.3	24	65	126		
								26			
								22	57		
20	20	28 (6) 30 (6)				19					
235.1											
25											
30											
35											
40											
45											
50											
55											
60											

Remarks: E 3803815.2, N 10152351.6;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B20**  
Structure **Storm Sewer**  
Station **321+67.03**  
Offset **10.77' RT**

District **Houston**  
Date **08/24/2018**  
Grnd. Elev. **255.40 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
251.4			CLAY, dark brown, w/ organic materials (CH)			28				
						19	63			
5		18 (6) 20 (6)	CLAY, sandy, stiff, tan (CL)	0	99.1	17			134	w/ calcareous nodules 5'-7'
						14	36			
10		21 (6) 15 (6)				16	40			
243.4			CLAY, hard, tan (CH)	0	44.4	25	76		128	
15		50 (5) 50 (4)		0	42	26	68		126	
238.4			CLAY, sandy, hard, tan (CL)							
20		45 (6) 47 (6)				15				% Passing No. 200 = 88
233.4										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3804241.4, N 10152254.7;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B21**  
Structure **Storm Sewer**  
Station **325+33.91**  
Offset **65.36' RT**

District **Houston**  
Date **08/29/2018**  
Grnd. Elev. **241.60 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
239.6			FILL, dark brown sandy materials			23				% Passing No. 200 = 68
			CLAY, sandy, stiff, tan (CL)			16				
5		20 (6) 12 (6)				15	39			
						26				
10		10 (6) 12 (6)				20				
229.6			CLAY, stiff, tan (CH)			30	71			
						27				
15		14 (6) 21 (6)		0	56.4	27	75	125		
224.6			CLAY, sandy, hard, tan (CL)			27	48			
						19				
20		50 (6) 50 (4)		0	102.6	16	38	131		
219.6										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3804586.8, N 10152119.5;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B22**  
Structure **Storm Sewer**  
Station **328+62.13**  
Offset **9.08' RT**

District **Houston**  
Date **08/24/2018**  
Grnd. Elev. **227.70 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
224.7			FILL, dark brown sandy materials, w/ organic materials			23				
						24				
5		6 (6) 7 (6)	CLAY, soft to very stiff, tan (CH)	0	30.7	23	59	125		
						23				
10		7 (6) 8 (6)				26				
						0	26.6	27	83	123
						29				
15		23 (6) 20 (6)				0	38.5	25	87	121
						26				
209.7			CLAY, silty, tan (CL)			23	40			
207.7	20	15 (6) 16 (6)				24				
205.7			CLAY, stiff, tan (CH)			28	83			
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3804919.3, N 10152101.0;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B23**  
Structure **Storm Sewer**  
Station **333+74.89**  
Offset **65.89' RT**

District **Houston**  
Date **08/29/2018**  
Grnd. Elev. **228.30 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
226.3			FILL, dark brown sandy materials							w/ concrete 0-2'
224.3			CLAY, sandy, dark brown (CL)			17	48			
5		3 (6) 3 (6)	CLAY, very soft to very stiff, tan (CH)			22	56			
						28				
10		27 (6) 40 (6)		0	16	26	64	124		
216.3			CLAY, sandy, tan (CL)			22	41			
215.3			CLAY, stiff, tan (CH)			26				
15		11 (6) 13 (6)				26		123		
						26	77			
20		11 (6) 14 (6)				24				
206.3										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3805407.0, N 10151932.0;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B24**  
Structure **Storm Sewer**  
Station **339+37.48**  
Offset **10.73' RT**

District **Houston**  
Date **08/24/2018**  
Grnd. Elev. **253.00 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
251.			FILL, dark brown sandy materials			15				w/ organic materials 0-7'
			CLAY, very soft to very stiff, tan (CH)			17				
5		3 (6) 4 (6)				35	95			
						24	67	124		
10		8 (6) 7 (6)				35				
						28				
				0	21.4	26	68	127		
15		12 (6) 14 (6)				17	54			
				0	38.1	27		125		
						26				
20		18 (6) 29 (6)				25	81			
231.										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3805968.1, N 10151863.3;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B25**  
Structure **Storm Sewer**  
Station **347+91.48**  
Offset **70.04' RT**

District **Houston**  
Date **08/24/2018**  
Grnd. Elev. **271.80 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
269.8			FILL, dark brown sandy materials			1				w/ asphalts 0-2'     % Passing No. 200 = 20  % Passing No. 200 = 67 % Passing No. 200 = 33
267.8		CLAY, reddish tan (CH)	0	49.4	20	57	130			
264.8	5	4 (6) 5 (6)	CLAY, sandy, soft, reddish tan (CL)	0	111.8	15	47	135		
			SAND, loose, reddish tan			18				
	10	6 (6) 8 (6)				19				
259.8			CLAY, sandy, tan (CL)			28				
258.8			SAND, very loose to loose, tan			26				
	15	3 (6) 5 (6)				23				
	20	2 (6) 3 (6)				31				
249.8										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3806790.1, N 10151622.5;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT





# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B26**  
Structure **Storm Sewer**  
Station **352+96.72**  
Offset **0.62' LT**

District **Houston**  
Date **08/22/2018**  
Grnd. Elev. **268.60 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
265.6			FILL, dark brown sandy materials			5				w/ organic materials 0-2'
						9				
5		3 (6) 4 (6)	CLAY, very soft, reddish tan (CH)			27	66			
						28	68			
261.6			SAND, slightly compact, reddish tan, w/ clays			17				% Passing No. 200 = 26
						18	37	17		
10		13 (6) 14 (6)								
255.6			CLAY, soft, light brown (CH)			17				
						24				
15		7 (6) 8 (6)		0	20.2	31			123	
				0	20.3	31	89	53	122	
20		9 (6) 10 (6)				31				
246.6										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3807299.0, N 10151586.7;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B27**  
Structure **Storm Sewer**  
Station **357+48.42**  
Offset **3.09' RT**

District **Houston**  
Date **08/22/2018**  
Grnd. Elev. **271.40 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
269.4			FILL, reddish tan sandy materials			12				
267.4			CLAY, sandy, tan (CL)			19	41	23		
267.4	5	3 (6) 3 (6)	CLAY, very soft, light brown (CH)			28				
				0	22.2	27	65	124		w/ ferrous nodules 8'-10'
261.4	10	5 (6) 5 (6)	CLAY, sandy, soft, light brown (CL)	0	19.5	34		123		
259.4			CLAY, stiff, tan (CH)	0	20	28		123		
	15	12 (6) 12 (6)				20	81			
						33				
	20	11 (6) 11 (6)		0	44.8	25	73	126		
249.4										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3807739.9, N 10151488.5;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B28**  
Structure **Storm Sewer**  
Station **360+15.32**  
Offset **2.41' LT**

District **Houston**  
Date **08/23/2018**  
Grnd. Elev. **282.00 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
281.			FILL, dark brown sandy materials			18				w/ organic materials 0-4'
			CLAY, dark brown (CH)			25				
				0	42.8	20	58	126		
				0	56.2	19		129		
277.5	5	6 (6) 14 (6)	CLAY, sandy, stiff, light brown (CL)			16	48	30		
275.			SAND, dense to very dense, tan, w/ clays							
	10	30 (6) 50 (5)				7				% Passing No. 200 = 28
	15	50 (2) 50 (1)				12				% Passing No. 200 = 36
	20	36 (6) 50 (5)				14				% Passing No. 200 = 36
260.										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3808001.8, N 10151436.8;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B29**  
Structure **Storm Sewer**  
Station **366+66.34**  
Offset **5.21' LT**

District **Houston**  
Date **08/22/2018**  
Grnd. Elev. **283.00 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
281.			FILL, red & brown sandy materials			10				w/ organic materials 0-4'
			CLAY, soft, tan (CH)	0	96.1	16			132	
5		6 (6) 8 (6)		0	38.7	23	61		122	w/ calcareous nodules 5'-10'
						26	60			
273.		22 (6) 34 (6)	CLAY, sandy, very stiff, tan (CL)	0	37.2	21			131	
						16	35	16		
269.		29 (6) 50 (6)	SILT, sandy, very stiff, tan			14	26	6		% Passing No. 200 = 52
266.			SAND, dense, tan, w/ clays							
20		50 (4.5) 50 (3)				12	31	12		% Passing No. 200 = 45
261.										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3808637.6, N 10151296.7;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B30**  
Structure **Storm Sewer**  
Station **373+39.93**  
Offset **6.19' LT**

District **Houston**  
Date **08/22/2018**  
Grnd. Elev. **282.20 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
280.2			FILL, black sandy materials			21				w/ organic materials 0-4'
			CLAY, very soft to stiff, tan (CH)	0	67.9	17			133	
5		3 (6) 4 (6)		0	34.2	21	61		129	
				0	21.9	27	74		120	w/ calcareous nodules 8'-12'
10		11 (6) 26 (6)				28				
270.2			SILT, sandy, tan			16	24		7	
268.2			SAND, dense, tan, w/ clays			11	26		6	% Passing No. 200 = 43
15		50 (4.5) 50 (4)								
263.2			CLAY, sandy, hard, tan (CL)			14	26		8	% Passing No. 200 = 53
20		50 (4) 50 (3)								
260.2										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3809291.9, N 10151136.3;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT





# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B32**  
Structure **Storm Sewer**  
Station **383+12.91**  
Offset **7.42' LT**

District **Houston**  
Date **08/21/2018**  
Grnd. Elev. **278.40 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
276.4			FILL, dark brown sandy materials			8				w/ organic materials 0-4'
			CLAY, stiff, light brown (CH)			22	64			
5		15 (6) 13 (6)		0	56	24	56	125		w/ calcareous nodules 5'-14'
271.4			CLAY, sandy, very stiff to very hard, light brown (CL)			16	48			
10		20 (6) 24 (6)				12				
						16				% Passing No. 200 = 63
15		50 (4) 50 (5)				16				
						22				
20		50 (6) 50 (5)				16				
256.4										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3810238.9, N 10150912.9;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT



# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B33**  
Structure **Storm Sewer**  
Station **388+19.76**  
Offset **65.65' RT**

District **Houston**  
Date **08/23/2018**  
Grnd. Elev. **267.10 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks	
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)		
265.1			FILL, dark brown sandy materials			14				w/ organic materials 0-2'	
			CLAY, sandy, very soft, reddish tan, w/ ferrous nodules (CL)			18					
5		2 (6) 3 (6)				20	43				
260.1			CLAY, soft, reddish tan, w/ ferrous nodules (CH)	0	12.4	26			118		
10		4 (6) 5 (6)		0	35.5	24	61		124		
255.1			CLAY, sandy, very soft, tan (CL)			27	30	8			% Passing No. 200 = 50
15		3 (6) 4 (6)				33					
250.1			SAND, dense, tan, w/ clays			27					% Passing No. 200 = 17
20		34 (6) 50 (3)				24					% Passing No. 200 = 13
245.1											
25											
30											
35											
40											
45											
50											
55											
60											

Remarks: E 3810710.0, N 10150712.8;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)    Logger: Linda Hall (TXDOT)

Organization: TXDOT





# DRILLING LOG

WinCore  
Version 3.3

County **Montgomery**  
Highway **FM 1097**  
CSJ **1259-01-043,ETC**

Hole **B34**  
Structure **Storm Sewer**  
Station **394+73.17**  
Offset **33.56' LT**

District **Houston**  
Date **08/21/2018**  
Grnd. Elev. **264.20 ft**  
GW Elev. **N/A**

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Deviator Press. (psi)	Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
262.2			FILL, dark brown sandy materials			12				w/ organic materials 0-2'
			SAND, very loose, brown, w/ clays			22	36	21		% Passing No. 200 = 37
5		2 (6) 2 (6)				25	37	23		% Passing No. 200 = 42
257.2			CLAY, gray (CH)			25	54	37		
255.2			CLAY, sandy, soft, gray (CL)	0	18.9	21	48	130		
252.2			CLAY, gray (CH)	0	23.8	25	51	122		
250.2		20 (6) 31 (6)	SAND, compact to very dense, tan			27	28			% Passing No. 200 = 33
20		50 (1) 50 (1.5)				21				% Passing No. 200 = 43
242.2										
25										
30										
35										
40										
45										
50										
55										
60										

Remarks: E 3811367.5, N 10150642.6;

The ground water elevation was not determined during the course of this boring.

Driller: Dempsey Gearen (Dempsey Gearen)

Logger: Linda Hall (TXDOT)

Organization: TXDOT

**Houston District Laboratory**

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

**Summary of Hydrometer and  
Mechanical Sieve Analysis  
of Soil Binder (Tex-110-E)**

<b>Boring No.</b>	<b>Sample No.</b>	<b>Sample Depth</b>	<b>Soil Type</b>	<b>% Passing No. 200</b>	<b>D50 (mm)</b>
R1	6	13 ft.	CLAY	59	<b>0.0354</b>
	8A	18 ft.	SAND	46	<b>0.0912</b>
	10	23 ft.	SAND	47	<b>0.0944</b>
R2	6	13 ft.	CLAY	79	<b>0.0013</b>
	9	20 ft.	CLAY	68	<b>0.0082</b>
	11	28 ft.	CLAY	74	<b>0.0077</b>

## Houston District Laboratory

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

**Hydrometer and Mechanical Sieve**  
**Analysis of Soil Binder**  
**(Tex-110-E)**

<b>Boring No.:</b>	R-1	<b>Sample Depth:</b>	13 ft	<b>Station No.:</b>	276+73.90
<b>Sample No.:</b>	6	<b>Soil Descrip.:</b>	CLAY, sandy, dark gray		
<b>Starting Time:</b>		<b>Date of Input:</b>	10/30/18	<b>Date of Testing:</b>	10/19/18
<b>Hydrometer No.:</b>	4	<b>Filename:</b>	U:\Projects-TSY\FM 1097_1259-01-043_044-TSY\Hydrometer\[Hydrometer R-1_6.xlsx]Hydrometer		
		<b>Defl. Ag.:</b>		<b>Weight of Air Dry Sample (g):</b>	50.00
<b>% Soil Binder:</b>	79.4	<b>% Ret. No. 40:</b>	20.61	<b>Corrected. Wt. Of Soil (g):</b>	48.78

Hydrometer Reading	T Corr. DR.	Corr. Hydro. Reading	% Soil in Suspension	Time Min.	Temp F	Grain Diam. mm (Theo.)	Composite Correction
34	0.966	30.6	50.39	0.5	71.9	0.111	3.4
34	0.966	30.6	50.39	1	71.9	0.078	3.4
33	0.966	29.6	48.74	2	71.9	0.055	3.4
31	0.966	27.6	45.45	5	71.9	0.035	3.4
30	0.966	26.6	43.80	15	71.9	0.020	3.4
29	0.966	25.6	42.15	30	71.9	0.014	3.4
28	0.966	24.6	40.51	60	71.9	0.010	3.4
26	0.966	22.6	37.21	250	71.9	0.005	3.4
24	0.966	20.6	33.92	1440	71.9	0.002	3.4

**Hygroscopic Moisture of Soil Binder (Tex-103-E)**

<b>Dish No.</b>		<b>% Hyg M:</b>	2.50	Assumed
<b>Wet Weight</b>				
<b>Dry Weight</b>		<b>Tare Weight</b>		

<b>Estimated D50:</b>	0.0354 millimeters
-----------------------	--------------------

*Assumptions*

Property	Value
Hygroscopic Moisture (%)	2.50
Soil Specific Gravity	2.60

**Soil Spec. Gravity (Tex108E)**

<b>Flask No.:</b>	H1
<b>T (g):</b>	660.56
<b>Wt. Soil (g):</b>	50.00
<b>Cor. Wt. Soil (g)</b>	48.78
<b>L (g):</b>	690.58
<b>Spec. Gravity</b>	2.60
<b>a(Gr, Gw)</b>	1.012

**Sieve Analysis After the Final Hydrometer Reading**

Ret. On	Cumul. Grams	% S.R.	% T.	% Passing
No. 50	0.89	1.82	22.06	77.94
No. 100	6.9	14.15	31.84	68.16
No. 140	10.45	21.42	37.62	62.38
No. 200	12.38	25.38	40.76	59.24

T: Weight of flask and water. S: Weight of dry soil. L: Weight of flask, soil, and water.

**Tested By:** Ruhama Bekele

**Checked By:** Tae Sun You

CSJ: 1259-01-043, ETC  
 County: Montgomery  
 Highway: FM 1097

Boring No.: R-1  
 Sample No.: 6

Hydrometer Reading	Time Min.	Correction Factors			Corr. Grain Diam.mm
		Elev. of Hyd. (KL)	Sp. Gr. (KG)	Vis (KN)	
34	0.5	0.494	1.015	0.966	0.0538
34	1	0.494	1.015	0.966	0.0380
33	2	0.496	1.015	0.966	0.0270
31	5	0.501	1.015	0.966	0.0172
30	15	0.503	1.015	0.966	0.0100
29	30	0.505	1.015	0.966	0.0071
28	60	0.507	1.015	0.966	0.0050
26	250	0.512	1.015	0.966	0.0025
24	1440	0.516	1.015	0.966	0.0010

**Mechanical Sieve Analysis (If Necessary)**

Sieve No.	Cumul. Grams	% Retained	% Passing
3/8"	6.83	3.64	96
No. 4	21.29	11.34	89
No. 10	28.73	15.31	85
No. 20	33.705	17.96	82
No. 40	38.68	20.61	79

Passing No. 40 148.98 Grams

**Total (Grams) 187.66** = Cumulative Weight Retained on No. 40 + Weight of Passing No. 40

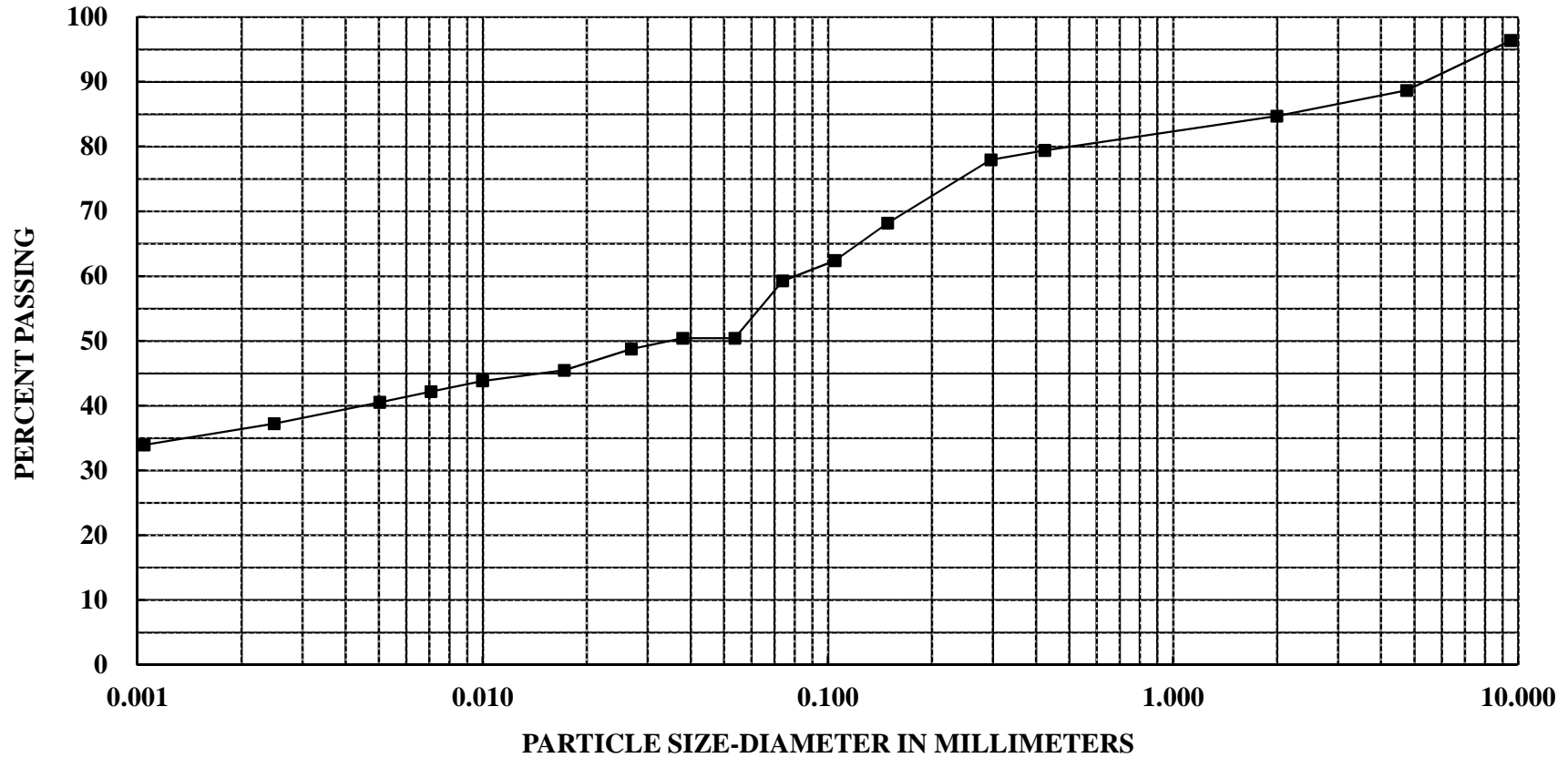
Size	% Passing	% of Sample	Material
		20.6	Coarse Sand
# 40	79.4	29.0	Fine Sand
0.05 mm	50.4	9.9	Silt
0.005 mm	40.5	40.5	Clay
		100	

LL =   
 PI =

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

### CUMULATIVE MECHANICAL ANALYSIS (Tex-110-E)

**Boring No.:** R-1      **Sample Depth:** 13 ft      **Station No.:** 276+73.90      **Date of Testing:** 10/19/18  
**Sample No.:** 6      **Soil Descrip.:** CLAY, sandy, dark gray



**Estimated D50:**      **0.0354**      **millimeters**

**Classification:** Clay Diameter: Less than 0.005 mm, Silt: 0.005 to 0.05 mm (No. 270), Fine Sand: 0.05 to 0.425 mm (No. 40), Coarse Sand: 0.425 to 2 mm (No. 10), Coarse Aggr.: More than 2 mm.

## Houston District Laboratory

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

**Hydrometer and Mechanical Sieve  
 Analysis of Soil Binder  
 (Tex-110-E)**

<b>Boring No.:</b>	R-1	<b>Sample Depth:</b>	18 ft	<b>Station No.:</b>	276+73.90
<b>Sample No.:</b>	8A	<b>Soil Descrip.:</b>	SAND, clayey, gray & tan		
<b>Starting Time:</b>		<b>Date of Input:</b>	10/30/18	<b>Date of Testing:</b>	10/19/18
<b>Hydrometer No.:</b>	4	<b>Filename:</b>	U:\Projects-TSY\FM 1097_1259-01-043_044-TSY\Hydrometer\[Hydrometer R-1_8A.xlsx]Hydrometer		
		<b>Defl. Ag.:</b>		<b>Weight of Air Dry Sample (g):</b>	50.00
<b>% Soil Binder:</b>	89.6	<b>% Ret. No. 40:</b>	10.38	<b>Corrected. Wt. Of Soil (g):</b>	48.78

Hydrometer Reading	T Corr. DR.	Corr. Hydro. Reading	% Soil in Suspension	Time Min.	Temp F	Grain Diam. mm (Theo.)	Composite Correction
25	0.966	21.6	39.20	0.5	71.9	0.111	3.4
24	0.966	20.6	37.38	1	71.9	0.078	3.4
23	0.966	19.6	35.57	2	71.9	0.055	3.4
21	0.966	17.6	31.94	5	71.9	0.035	3.4
20	0.966	16.6	30.12	15	71.9	0.020	3.4
19	0.966	15.6	28.31	30	71.9	0.014	3.4
18	0.966	14.6	26.49	60	71.9	0.010	3.4
18	0.966	14.6	26.49	250	71.9	0.005	3.4
17	0.966	13.6	24.68	1440	71.8	0.002	3.4

**Hygroscopic Moisture of Soil Binder (Tex-103-E)**

<b>Dish No.</b>		<b>% Hyg M:</b>	<b>2.50</b>	Assumed
<b>Wet Weight</b>				
<b>Dry Weight</b>		<b>Tare Weight</b>		

<b>Estimated D50:</b>	<b>0.0912 millimeters</b>
-----------------------	---------------------------

*Assumptions*

Property	Value
Hygroscopic Moisture (%)	<b>2.50</b>
Soil Specific Gravity	<b>2.71</b>

**Soil Spec. Gravity (Tex108E)**

<b>Flask No.:</b>	H
<b>T (g):</b>	660.06
<b>Wt. Soil (g):</b>	50.00
<b>Cor. Wt. Soil (g)</b>	48.78
<b>L (g):</b>	690.81
<b>Spec. Gravity</b>	<b>2.71</b>
<b>a(Gr, Gw)</b>	0.988

**Sieve Analysis After the Final Hydrometer Reading**

Ret. On	Cumul. Grams	% S.R.	% T.	% Passing
No. 50	2.56	5.25	15.09	84.91
No. 100	13.76	28.21	35.66	64.34
No. 140	19.98	40.96	47.09	52.91
No. 200	23.54	48.26	53.63	46.37

T: Weight of flask and water. S: Weight of dry soil. L: Weight of flask, soil, and water.

**Tested By:** Ruhama Bekele

**Checked By:** Tae Sun You

CSJ: 1259-01-043, ETC  
 County: Montgomery  
 Highway: FM 1097

Boring No.: R-1  
 Sample No.: 8A

Hydrometer Reading	Time Min.	Correction Factors			Corr. Grain Diam.mm
		Elev. of Hyd. (KL)	Sp. Gr. (KG)	Vis (KN)	
25	0.5	0.514	0.984	0.966	0.0542
24	1	0.516	0.984	0.966	0.0385
23	2	0.518	0.984	0.966	0.0273
21	5	0.522	0.984	0.966	0.0174
20	15	0.524	0.984	0.966	0.0101
19	30	0.527	0.984	0.966	0.0072
18	60	0.529	0.984	0.966	0.0051
18	250	0.529	0.984	0.966	0.0025
17	1440	0.531	0.984	0.966	0.0010

**Mechanical Sieve Analysis (If Necessary)**

Sieve No.	Cumul. Grams	% Retained	% Passing
3/8"	0	0.00	100
No. 4	2.85	1.48	99
No. 10	6.68	3.47	97
No. 20	13.325	6.93	93
No. 40	19.97	10.38	90

Passing No. 40 172.36 Grams

**Total (Grams) 192.33** = Cumulative Weight Retained on No. 40 + Weight of Passing No. 40

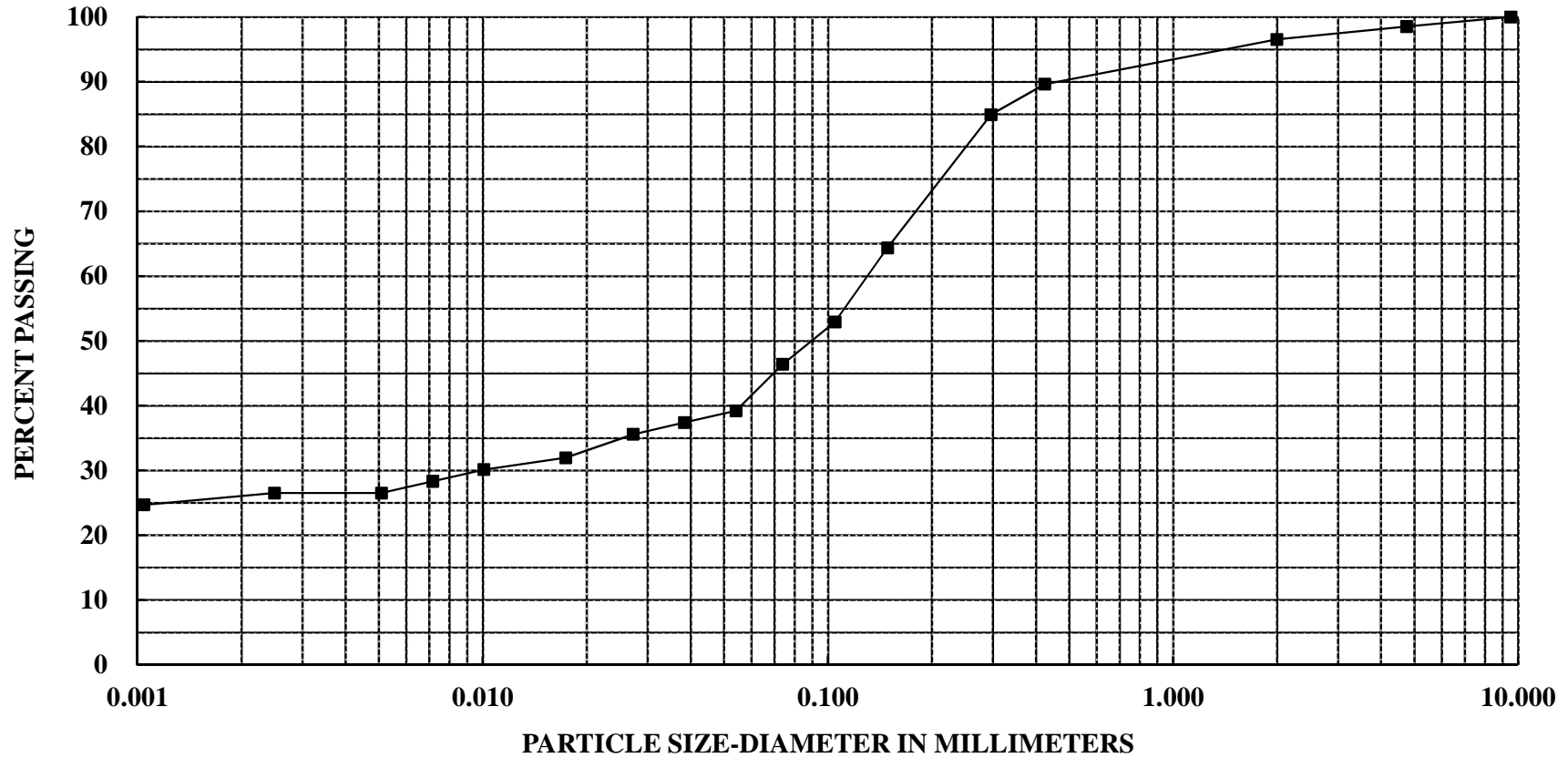
Size	% Passing	% of Sample	Material
		10.4	Coarse Sand
# 40	89.6	50.4	Fine Sand
0.05 mm	39.2	12.7	Silt
0.005 mm	26.5	26.5	Clay
		<u>100</u>	

LL =   
 PI =

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

### CUMULATIVE MECHANICAL ANALYSIS (Tex-110-E)

**Boring No.:** R-1      **Sample Depth:** 18 ft      **Station No.:** 276+73.90      **Date of Testing:** 10/19/18  
**Sample No.:** 8A      **Soil Descrip.:** SAND, clayey, gray & tan



**Estimated D50:**            **0.0912**            **millimeters**

**Classification:** Clay Diameter: Less than 0.005 mm, Silt: 0.005 to 0.05 mm (No. 270), Fine Sand: 0.05 to 0.425 mm (No. 40), Coarse Sand: 0.425 to 2 mm (No. 10), Coarse Aggr.: More than 2 mm.



## Houston District Laboratory

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

**Hydrometer and Mechanical Sieve  
 Analysis of Soil Binder  
 (Tex-110-E)**

<b>Boring No.:</b>	R-1	<b>Sample Depth:</b>	23 ft	<b>Station No.:</b>	276+73.90	
<b>Sample No.:</b>	10	<b>Soil Descrip.:</b>	SAND, clayey, gray & tan			
<b>Starting Time:</b>		<b>Date of Input:</b>	10/30/18	<b>Date of Testing:</b>	10/19/18	
<b>Hydrometer No.:</b>	4	<b>Filename:</b>	U:\Projects-TSY\FM 1097_1259-01-043_044-TSY\Hydrometer\[Hydrometer R-1_10.xlsx]Hydrometer			
		<b>Defl. Ag.:</b>		<b>Weight of Air Dry Sample (g):</b>	50.00	
<b>% Soil Binder:</b>	87.3	<b>% Ret. No. 40:</b>	12.72	<b>Corrected. Wt. Of Soil (g):</b>	48.78	

Hydrometer Reading	T Corr. DR.	Corr. Hydro. Reading	% Soil in Suspension	Time Min.	Temp F	Grain Diam. mm (Theo.)	Composite Correction
29	0.964	25.6	45.18	0.5	72.2	0.111	3.4
29	0.964	25.6	45.18	1	72.2	0.078	3.4
28	0.964	24.6	43.42	2	72.2	0.055	3.4
27	0.964	23.6	41.65	5	72.2	0.035	3.4
26	0.964	22.6	39.89	15	72.2	0.020	3.4
25	0.964	21.6	38.12	30	72.2	0.014	3.4
24	0.964	20.6	36.36	60	72.2	0.010	3.4
22	0.964	18.6	32.83	250	72.2	0.005	3.4
20	0.964	16.6	29.30	1440	72.2	0.002	3.4

**Hygroscopic Moisture of Soil Binder (Tex-103-E)**

<b>Dish No.</b>		<b>% Hyg M:</b>	2.50	Assumed
<b>Wet Weight</b>				
<b>Dry Weight</b>		<b>Tare Weight</b>		

<b>Estimated D50:</b>	0.0944 millimeters
-----------------------	--------------------

**Assumptions**

Property	Value
Hygroscopic Moisture (%)	2.50
Soil Specific Gravity	2.71

**Soil Spec. Gravity (Tex108E)**

<b>Flask No.:</b>	A
<b>T (g):</b>	674.47
<b>Wt. Soil (g):</b>	50.00
<b>Cor. Wt. Soil (g)</b>	48.78
<b>L (g):</b>	705.26
<b>Spec. Gravity</b>	2.71
<b>a(Gr, Gw)</b>	0.986

**Sieve Analysis After the Final Hydrometer Reading**

Ret. On	Cumul. Grams	% S.R.	% T.	% Passing
No. 50	3.5	7.18	18.98	81.02
No. 100	15.08	30.91	39.70	60.30
No. 140	19.97	40.94	48.45	51.55
No. 200	22.5	46.13	52.98	47.02

T: Weight of flask and water. S: Weight of dry soil. L: Weight of flask, soil, and water.

**Tested By:** Ruhama Bekele

**Checked By:** Tae Sun You

CSJ: 1259-01-043, ETC  
 County: Montgomery  
 Highway: FM 1097

Boring No.: R-1  
 Sample No.: 10

Hydrometer Reading	Time Min.	Correction Factors			Corr. Grain Diam.mm
		Elev. of Hyd. (KL)	Sp. Gr. (KG)	Vis (KN)	
29	0.5	0.505	0.982	0.964	0.0530
29	1	0.505	0.982	0.964	0.0375
28	2	0.507	0.982	0.964	0.0266
27	5	0.509	0.982	0.964	0.0169
26	15	0.512	0.982	0.964	0.0098
25	30	0.514	0.982	0.964	0.0070
24	60	0.516	0.982	0.964	0.0049
22	250	0.520	0.982	0.964	0.0024
20	1440	0.524	0.982	0.964	0.0010

**Mechanical Sieve Analysis (If Necessary)**

Sieve No.	Cumul. Grams	% Retained	% Passing
3/8"	0	0.00	100
No. 4	0.55	0.42	100
No. 10	2.32	1.79	98
No. 20	9.405	7.26	93
No. 40	16.49	12.72	87

Passing No. 40 113.13 Grams

**Total (Grams) 129.62** = Cumulative Weight Retained on No. 40 + Weight of Passing No. 40

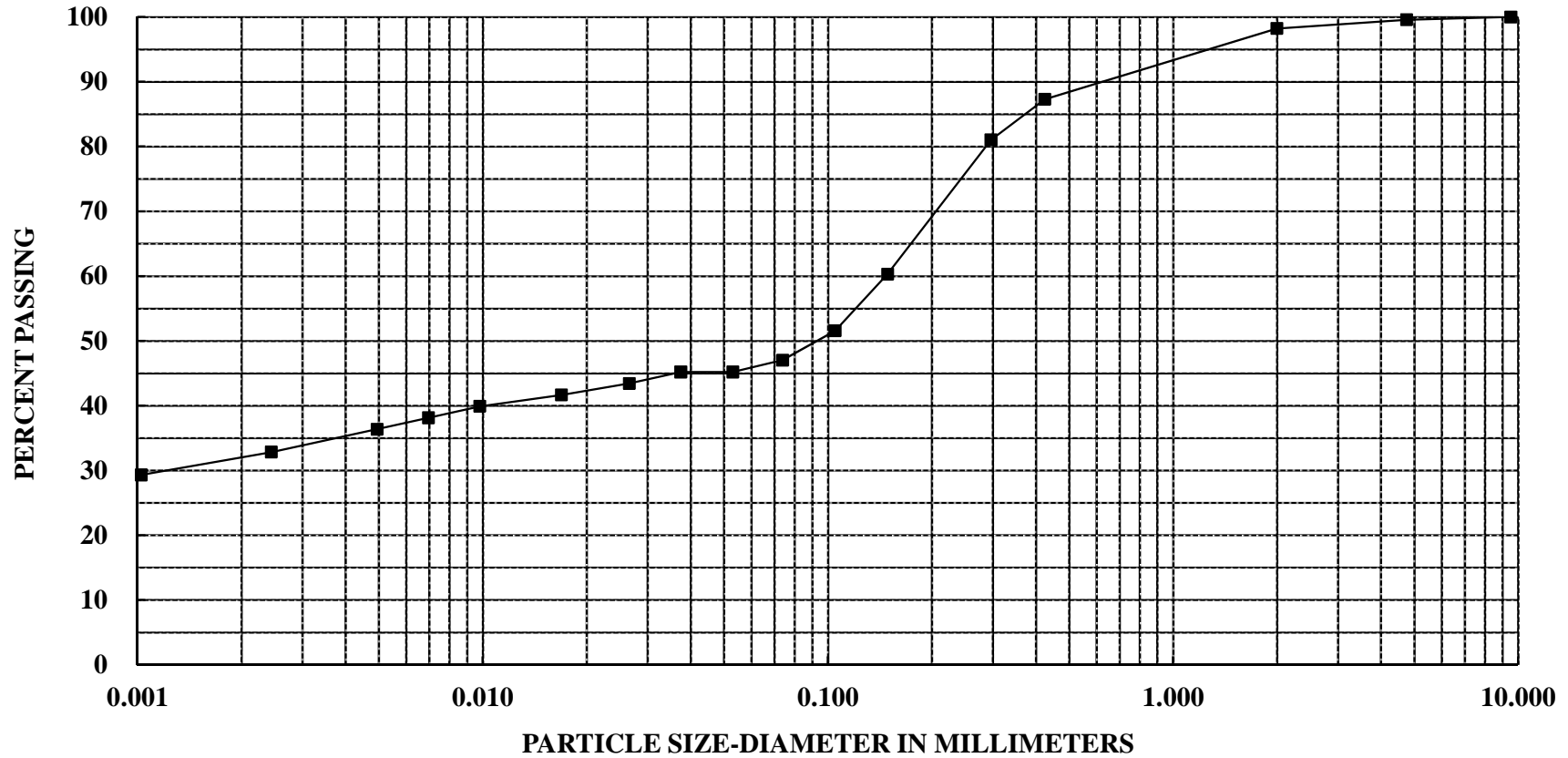
Size	% Passing	% of Sample	Material
		12.7	Coarse Sand
# 40	87.3	42.1	Fine Sand
0.05 mm	45.2	8.8	Silt
0.005 mm	36.4	36.4	Clay
		<u>100</u>	

LL =   
 PI =

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

### CUMULATIVE MECHANICAL ANALYSIS (Tex-110-E)

**Boring No.:** R-1      **Sample Depth:** 23 ft      **Station No.:** 276+73.90      **Date of Testing:** 10/19/18  
**Sample No.:** 10      **Soil Descrip.:** SAND, clayey, gray & tan



**Estimated D50:**                      **0.0944**                      **millimeters**

**Classification:** Clay Diameter: Less than 0.005 mm, Silt: 0.005 to 0.05 mm (No. 270), Fine Sand: 0.05 to 0.425 mm (No. 40), Coarse Sand: 0.425 to 2 mm (No. 10), Coarse Aggr.: More than 2 mm.

## Houston District Laboratory

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

**Hydrometer and Mechanical Sieve  
 Analysis of Soil Binder  
 (Tex-110-E)**

<b>Boring No.:</b>	R-2	<b>Sample Depth:</b>	13 ft	<b>Station No.:</b>	278+77.09	
<b>Sample No.:</b>	6	<b>Soil Descrip.:</b>	CLAY, gray			
<b>Starting Time:</b>		<b>Date of Input:</b>	10/31/18	<b>Date of Testing:</b>	10/30/18	
<b>Hydrometer No.:</b>	4	<b>Filename:</b>	U:\Projects-TSY\FM 1097_1259-01-043_044-TSY\Hydrometer\[Hydrometer R-2_6.xlsx]Hydrometer			
		<b>Defl. Ag.:</b>		<b>Weight of Air Dry Sample (g):</b>	50.00	
<b>% Soil Binder:</b>	99.0	<b>% Ret. No. 40:</b>	1.04	<b>Corrected. Wt. Of Soil (g):</b>	48.64	

Hydrometer Reading	T Corr. DR.	Corr. Hydro. Reading	% Soil in Suspension	Time Min.	Temp F	Grain Diam. mm (Theo.)	Composite Correction
42	0.953	39	79.92	0.5	73.9	0.111	3
39	0.953	36	73.77	1	73.9	0.078	3
36	0.953	33	67.62	2	73.9	0.055	3
35	0.953	32	65.57	5	73.9	0.035	3
34	0.953	31	63.53	15	73.9	0.020	3
31	0.953	28	57.38	30	73.9	0.014	3
30	0.953	27	55.33	60	73.9	0.010	3
29	0.953	26	53.28	250	73.9	0.005	3
27	0.961	24	49.18	1440	72.6	0.002	3

**Hygroscopic Moisture of Soil Binder (Tex-103-E)**

<b>Dish No.</b>	BS-31	<b>% Hyg M:</b>	<b>2.80</b>
<b>Wet Weight</b>	81.66		
<b>Dry Weight</b>	80.3	<b>Tare Weight</b>	31.66

<b>Estimated D50:</b>	<b>0.0013 millimeters</b>
-----------------------	---------------------------

**Assumptions**

Property	Value
Hygroscopic Moisture (%)	<b>2.80</b>
Soil Specific Gravity	<b>2.62</b>

**Soil Spec. Gravity (Tex108E)**

<b>Flask No.:</b>	A
<b>T (g):</b>	674.7
<b>Wt. Soil (g):</b>	50.00
<b>Cor. Wt. Soil (g)</b>	48.64
<b>L (g):</b>	704.77
<b>Spec. Gravity</b>	<b>2.62</b>
<b>a(Gr, Gw)</b>	1.007

**Sieve Analysis After the Final Hydrometer Reading**

Ret. On	Cumul. Grams	% S.R.	% T.	% Passing
No. 50	0.38	0.78	1.81	98.19
No. 100	2.78	5.72	6.69	93.31
No. 140	6.4	13.16	14.06	85.94
No. 200	9.79	20.13	20.95	79.05

T: Weight of flask and water. S: Weight of dry soil. L: Weight of flask, soil, and water.

**Tested By:** Anis Merchant

**Checked By:** Tae Sun You

CSJ: 1259-01-043, ETC  
 County: Montgomery  
 Highway: FM 1097

Boring No.: R-2  
 Sample No.: 6

Hydrometer Reading	Time Min.	Correction Factors			Corr. Grain Diam.mm
		Elev. of Hyd. (KL)	Sp. Gr. (KG)	Vis (KN)	
42	0.5	0.477	1.009	0.953	0.0509
39	1	0.484	1.009	0.953	0.0365
36	2	0.490	1.009	0.953	0.0261
35	5	0.492	1.009	0.953	0.0166
34	15	0.494	1.009	0.953	0.0096
31	30	0.501	1.009	0.953	0.0069
30	60	0.503	1.009	0.953	0.0049
29	250	0.505	1.009	0.953	0.0024
27	1440	0.509	1.009	0.961	0.0010

**Mechanical Sieve Analysis (If Necessary)**

Sieve No.	Cumul. Grams	% Retained	% Passing
3/8"	0	0.00	100
No. 4	0	0.00	100
No. 10	0.17	0.05	100
No. 20	1.75	0.54	99
No. 40	3.33	1.04	99

Passing No. 40 318.27 Grams

**Total (Grams) 321.6** = Cumulative Weight Retained on No. 40 + Weight of Passing No. 40

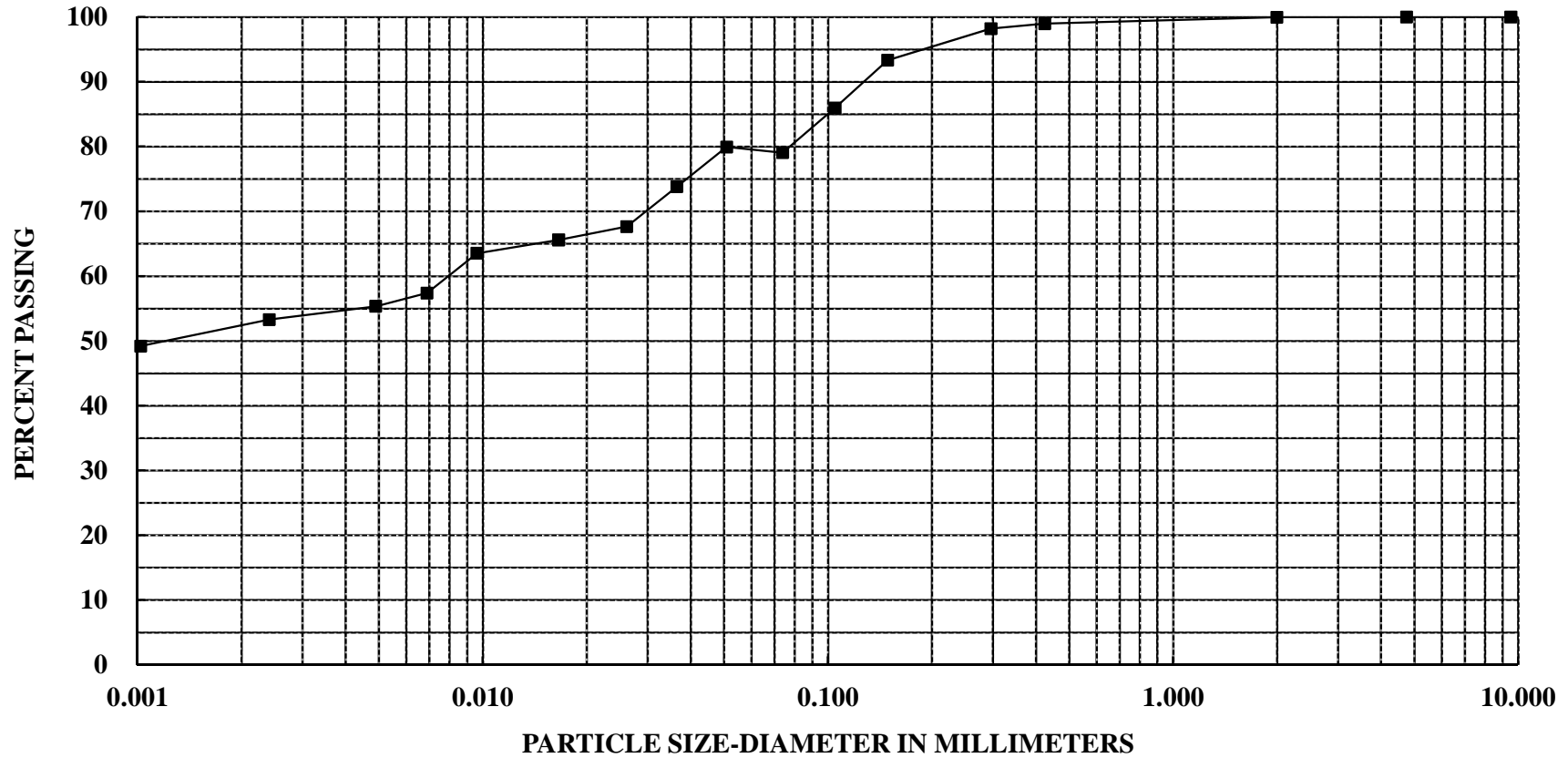
Size	% Passing	% of Sample	Material
		1.0	Coarse Sand
# 40	99.0	19.0	Fine Sand
0.05 mm	79.9	24.6	Silt
0.005 mm	55.3	55.3	Clay
		<u>100</u>	

LL =   
 PI =

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

### CUMULATIVE MECHANICAL ANALYSIS (Tex-110-E)

**Boring No.:** R-2      **Sample Depth:** 13 ft      **Station No.:** 278+77.09      **Date of Testing:** 10/30/18  
**Sample No.:** 6      **Soil Descrip.:** CLAY, gray



**Estimated D50:**      **0.0013**      **millimeters**

**Classification:** Clay Diameter: Less than 0.005 mm, Silt: 0.005 to 0.05 mm (No. 270), Fine Sand: 0.05 to 0.425 mm (No. 40), Coarse Sand: 0.425 to 2 mm (No. 10), Coarse Aggr.: More than 2 mm.

## Houston District Laboratory

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

**Hydrometer and Mechanical Sieve**  
**Analysis of Soil Binder**  
**(Tex-110-E)**

<b>Boring No.:</b>	R-2	<b>Sample Depth:</b>	20 ft	<b>Station No.:</b>	278+77.09
<b>Sample No.:</b>	9	<b>Soil Descrip.:</b>	CLAY, sandy, gray		
<b>Starting Time:</b>		<b>Date of Input:</b>	10/31/18	<b>Date of Testing:</b>	10/30/18
<b>Hydrometer No.:</b>	10	<b>Filename:</b>	U:\Projects-TSY\FM 1097_1259-01-043_044-TSY\Hydrometer\[Hydrometer R-2_9.xlsx]Hydrometer		
		<b>Defl. Ag.:</b>		<b>Weight of Air Dry Sample (g):</b>	50.00
<b>% Soil Binder:</b>	98.4	<b>% Ret. No. 40:</b>	1.59	<b>Corrected. Wt. Of Soil (g):</b>	48.87

Hydrometer Reading	T Corr. DR.	Corr. Hydro. Reading	% Soil in Suspension	Time Min.	Temp F	Grain Diam. mm (Theo.)	Composite Correction
39	0.956	36	72.28	0.5	73.5	0.111	3
37	0.956	34	68.26	1	73.5	0.078	3
35	0.956	32	64.25	2	73.5	0.055	3
32	0.956	29	58.22	5	73.5	0.035	3
29	0.956	26	52.20	15	73.5	0.020	3
27	0.956	24	48.19	30	73.5	0.014	3
26	0.956	23	46.18	60	73.5	0.010	3
25	0.956	22	44.17	250	73.5	0.005	3
24	0.958	21	42.16	1440	73.2	0.002	3

**Hygroscopic Moisture of Soil Binder (Tex-103-E)**

<b>Dish No.</b>	LOL-1	<b>% Hyg M:</b>	<b>2.31</b>
<b>Wet Weight</b>	81.56		
<b>Dry Weight</b>	80.43	<b>Tare Weight</b>	31.56

<b>Estimated D50:</b>	<b>0.0082 millimeters</b>
-----------------------	---------------------------

**Assumptions**

Property	Value
Hygroscopic Moisture (%)	<b>2.31</b>
Soil Specific Gravity	<b>2.66</b>

**Soil Spec. Gravity (Tex108E)**

<b>Flask No.:</b>	H
<b>T (g):</b>	660.14
<b>Wt. Soil (g):</b>	50.00
<b>Cor. Wt. Soil (g)</b>	48.87
<b>L (g):</b>	690.66
<b>Spec. Gravity</b>	<b>2.66</b>
<b>a(Gr, Gw)</b>	0.997

**Sieve Analysis After the Final Hydrometer Reading**

Ret. On	Cumul. Grams	% S.R.	% T.	% Passing
No. 50	0.56	1.15	2.71	97.29
No. 100	4.66	9.54	10.97	89.03
No. 140	10.62	21.73	22.97	77.03
No. 200	15.04	30.78	31.87	68.13

T: Weight of flask and water. S: Weight of dry soil. L: Weight of flask, soil, and water.

**Tested By:** Anis Merchant

**Checked By:** Tae Sun You

CSJ: 1259-01-043, ETC  
 County: Montgomery  
 Highway: FM 1097

Boring No.: R-2  
 Sample No.: 9

Hydrometer Reading	Time Min.	Correction Factors			Corr. Grain Diam.mm
		Elev. of Hyd. (KL)	Sp. Gr. (KG)	Vis (KN)	
39	0.5	0.484	0.996	0.956	0.0511
37	1	0.488	0.996	0.956	0.0364
35	2	0.492	0.996	0.956	0.0260
32	5	0.498	0.996	0.956	0.0166
29	15	0.505	0.996	0.956	0.0097
27	30	0.509	0.996	0.956	0.0069
26	60	0.512	0.996	0.956	0.0049
25	250	0.514	0.996	0.956	0.0024
24	1440	0.516	0.996	0.958	0.0010

**Mechanical Sieve Analysis (If Necessary)**

Sieve No.	Cumul. Grams	% Retained	% Passing
3/8"	0	0.00	100
No. 4	0.24	0.05	100
No. 10	2.35	0.49	100
No. 20	4.995	1.04	99
No. 40	7.64	1.59	98

Passing No. 40 474.09 Grams

**Total (Grams) 481.73** = Cumulative Weight Retained on No. 40 + Weight of Passing No. 40

Size	% Passing	% of Sample	Material
		1.6	Coarse Sand
# 40	98.4	26.1	Fine Sand
0.05 mm	72.3	26.1	Silt
0.005 mm	46.2	46.2	Clay
		100	

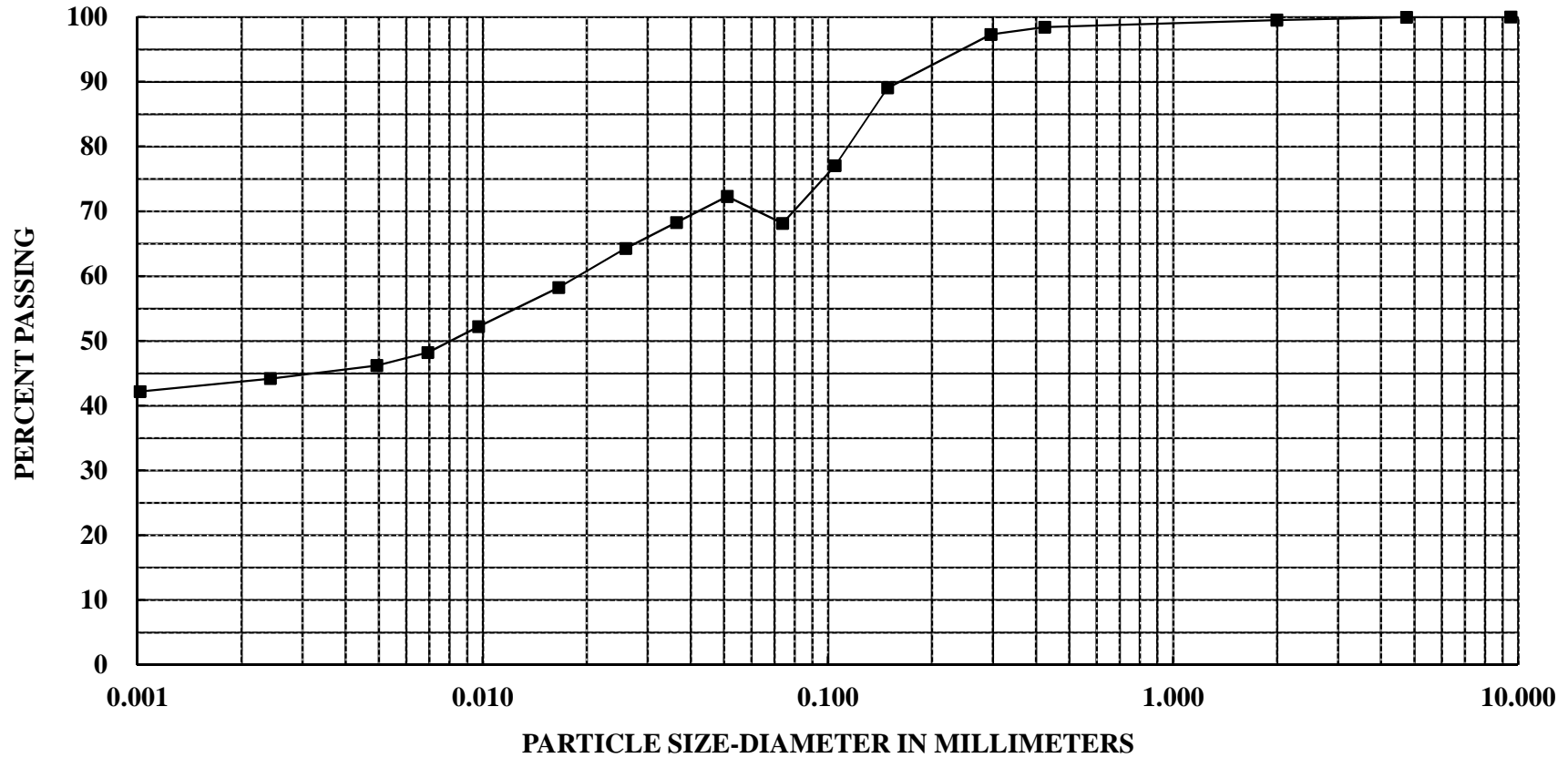
LL =   
 PI =



**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

### CUMULATIVE MECHANICAL ANALYSIS (Tex-110-E)

**Boring No.:** R-2      **Sample Depth:** 20 ft      **Station No.:** 278+77.09      **Date of Testing:** 10/30/18  
**Sample No.:** 9      **Soil Descrip.:** CLAY, sandy, gray



**Estimated D50:**                      **0.0082**                      **millimeters**

**Classification:** Clay Diameter: Less than 0.005 mm, Silt: 0.005 to 0.05 mm (No. 270), Fine Sand: 0.05 to 0.425 mm (No. 40), Coarse Sand: 0.425 to 2 mm (No. 10), Coarse Aggr.: More than 2 mm.

## Houston District Laboratory

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

**Hydrometer and Mechanical Sieve  
 Analysis of Soil Binder  
 (Tex-110-E)**

<b>Boring No.:</b>	R-2	<b>Sample Depth:</b>	28 ft	<b>Station No.:</b>	278+77.09	
<b>Sample No.:</b>	12	<b>Soil Descrip.:</b>	CLAY, sandy, gray			
<b>Starting Time:</b>		<b>Date of Input:</b>	10/31/18	<b>Date of Testing:</b>	10/30/18	
<b>Hydrometer No.:</b>	11	<b>Filename:</b>	U:\Projects-TSY\FM 1097_1259-01-043_044-TSY\Hydrometer\[Hydrometer R-2_12.xlsx]Hydrometer			
		<b>Defl. Ag.:</b>		<b>Weight of Air Dry Sample (g):</b>	50.00	
<b>% Soil Binder:</b>	99.4	<b>% Ret. No. 40:</b>	0.57	<b>Corrected. Wt. Of Soil (g):</b>	48.90	

Hydrometer Reading	T Corr. DR.	Corr. Hydro. Reading	% Soil in Suspension	Time Min.	Temp F	Grain Diam. mm (Theo.)	Composite Correction
40	0.958	37	75.60	0.5	73.2	0.111	3
38	0.958	35	71.51	1	73.2	0.078	3
35	0.958	32	65.38	2	73.2	0.055	3
31	0.958	28	57.21	5	73.2	0.035	3
29	0.958	26	53.12	15	73.2	0.020	3
27	0.958	24	49.04	30	73.2	0.014	3
26	0.958	23	47.00	60	73.2	0.010	3
24	0.958	21	42.91	250	73.2	0.005	3
23	0.958	20	40.87	1440	73.2	0.002	3

**Hygroscopic Moisture of Soil Binder (Tex-103-E)**

<b>Dish No.</b>	AM-2	<b>% Hyg M:</b>	<b>2.25</b>
<b>Wet Weight</b>	81.52		
<b>Dry Weight</b>	80.42	<b>Tare Weight</b>	31.52

<b>Estimated D50:</b>	<b>0.0077 millimeters</b>
-----------------------	---------------------------

**Assumptions**

Property	Value
Hygroscopic Moisture (%)	<b>2.25</b>
Soil Specific Gravity	<b>2.63</b>

**Soil Spec. Gravity (Tex108E)**

<b>Flask No.:</b>	A
<b>T (g):</b>	674.67
<b>Wt. Soil (g):</b>	50.00
<b>Cor. Wt. Soil (g)</b>	48.90
<b>L (g):</b>	704.97
<b>Spec. Gravity</b>	<b>2.63</b>
<b>a(Gr, Gw)</b>	1.005

**Sieve Analysis After the Final Hydrometer Reading**

Ret. On	Cumul. Grams	% S.R.	% T.	% Passing
No. 50	0.11	0.22	0.79	99.21
No. 100	1.52	3.11	3.66	96.34
No. 140	6.4	13.09	13.58	86.42
No. 200	12.44	25.44	25.86	74.14

T: Weight of flask and water. S: Weight of dry soil. L: Weight of flask, soil, and water.

**Tested By:** Anis Merchant

**Checked By:** Tae Sun You

CSJ: 1259-01-043, ETC  
 County: Montgomery  
 Highway: FM 1097

Boring No.: R-2  
 Sample No.: 12

Hydrometer Reading	Time Min.	Correction Factors			Corr. Grain Diam.mm
		Elev. of Hyd. (KL)	Sp. Gr. (KG)	Vis (KN)	
40	0.5	0.482	1.006	0.958	0.0516
38	1	0.486	1.006	0.958	0.0368
35	2	0.492	1.006	0.958	0.0263
31	5	0.501	1.006	0.958	0.0169
29	15	0.505	1.006	0.958	0.0099
27	30	0.509	1.006	0.958	0.0070
26	60	0.512	1.006	0.958	0.0050
24	250	0.516	1.006	0.958	0.0025
23	1440	0.518	1.006	0.958	0.0010

**Mechanical Sieve Analysis (If Necessary)**

Sieve No.	Cumul. Grams	% Retained	% Passing
3/8"	0	0.00	100
No. 4	0.96	0.17	100
No. 10	1.12	0.20	100
No. 20	2.15	0.38	100
No. 40	3.18	0.57	99

Passing No. 40 557.25 Grams

**Total (Grams) 560.43** = Cumulative Weight Retained on No. 40 + Weight of Passing No. 40

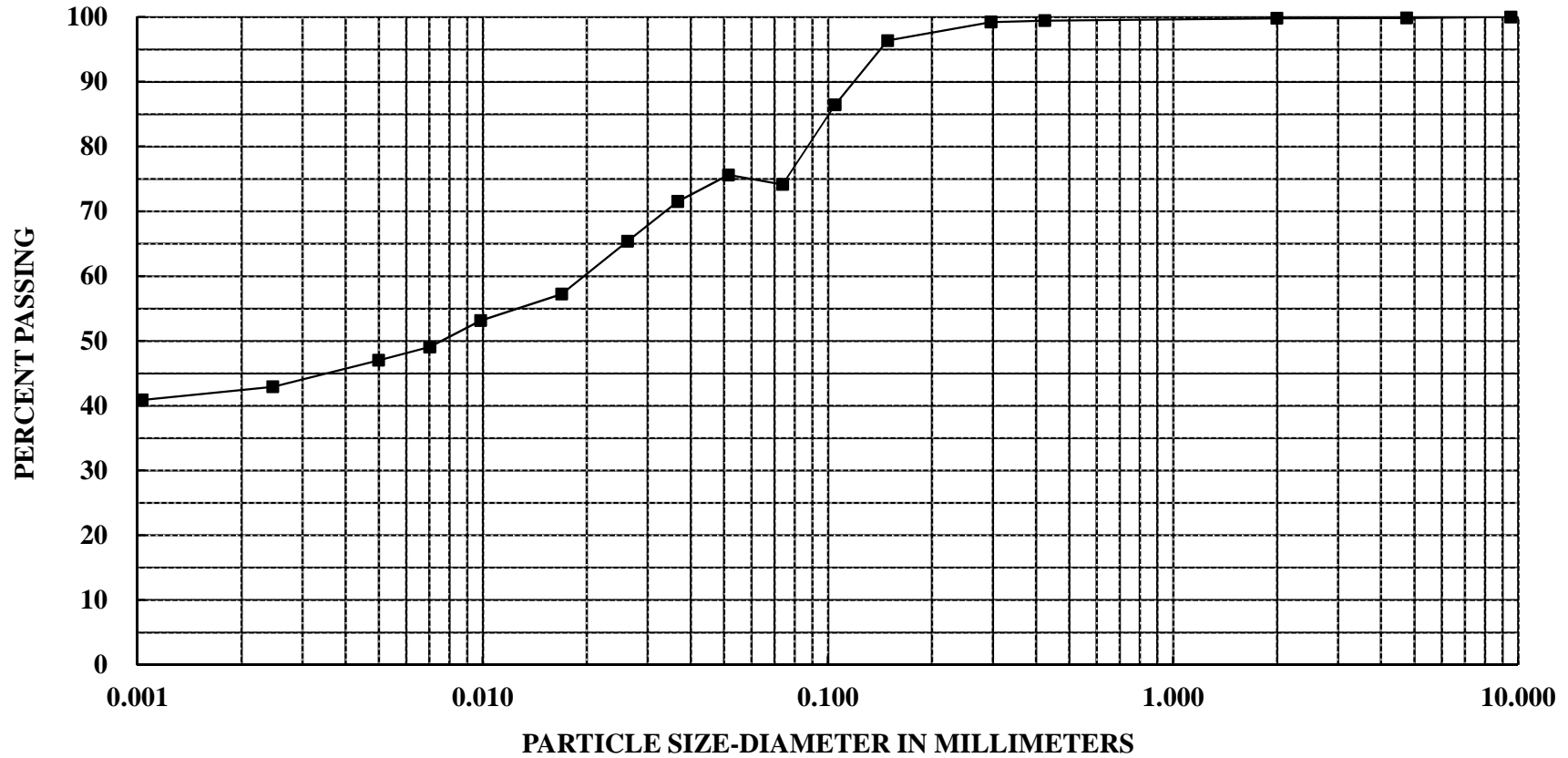
Size	% Passing	% of Sample	Material
		0.6	Coarse Sand
# 40	99.4	23.8	Fine Sand
0.05 mm	75.6	28.6	Silt
0.005 mm	47.0	47.0	Clay
		<u>100</u>	

LL =   
 PI =

**CSJ:** 1259-01-043, ETC  
**County:** Montgomery  
**Highway:** FM 1097

### CUMULATIVE MECHANICAL ANALYSIS (Tex-110-E)

**Boring No.:** R-2      **Sample Depth:** 28 ft      **Station No.:** 278+77.09      **Date of Testing:** 10/30/18  
**Sample No.:** 12      **Soil Descrip.:** CLAY, sandy, gray



**Estimated D50:**                      **0.0077**                      **millimeters**

**Classification:** Clay Diameter: Less than 0.005 mm, Silt: 0.005 to 0.05 mm (No. 270), Fine Sand: 0.05 to 0.425 mm (No. 40), Coarse Sand: 0.425 to 2 mm (No. 10), Coarse Aggr.: More than 2 mm.