

BORING LOG NO. 1

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PROJECT: BRF-009-3(29)--38-30

CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

SITE: IA 9 over West Fork Little Sioux River
Dickinson County, Iowa

GRAPHIC LOG	LOCATION		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Latitude: 43.4305°	Longitude: -95.276°										LL-PL-PI
	Station: 296+28	Offset: -15	Surface Elev.: 1413.5 (Ft.)									
	ELEVATION (Ft.)											
0.2	ASPHALT		1413.5									
1.5	CONCRETE		1412									
4.0	FILL - BROWN FINE TO COARSE SAND , Trace Gravel		1409.5		12	9-12-14 N=26	C1		18.9			
	(Fill), moist (USDA: Fill - Sand) (USCS: Fill - Fine to Medium Sand, Trace Gravel) (Iowa LRFD Description: Gravelly Sand Fill)				14	CONSOL	D1		15.5	111	35-14-21	
	DARK BROWN STIFF SANDY CLAY , With Occasional Sand Seams				14	2-2-2 N=4 1000 (HP)	D2		33.3			
11.5	(Alluvium), moist (USDA: Sandy Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Stiff Sandy Clay)		1402		14		D3		17.8 19.1			34-18-16
	GRAY FINE TO COARSE SAND , Trace Gravel				8	4-6-7 N=13	E1		11			
	(Alluvium), wet (USDA: Sand) (USCS: Fine to Coarse Sand, Trace Gravel) (Iowa LRFD Description: Silty Sand)				0	0-0-0 N=0	E2					
19.0	GRAY STIFF SANDY CLAY , Trace Gravel		1394.5		14	2-2-2 N=4 2500 (HP)	F1		15.6			
	(Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Stiff Sandy Clay)				18	3-4-3 N=7	F2		15.9			
					16	2-3-3 N=6	F3		17.9			
					16	3-3-3 N=6	F4		15.8			
39.0	GRAY FIRM SANDY CLAY , Trace Gravel		1374.5		16	5-6-10 N=16	G1					
	(Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Firm Sandy Glacial Clay)				10	5-7-8						
	Cobbles encountered at about 42 feet.											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic
Drill - Abutment

Advancement Method:
Power Auger: 0-1.5'
Hollow Stem Auger: 1.5-29'
Washbore: 29'-Boring Termination

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

Notes:

WATER LEVEL OBSERVATIONS

9.5' Observed During Drilling

Terracon
600 SW 7th St, Ste M
Des Moines, IA

Boring Started: 02-05-2024

Boring Completed: 02-06-2024

Drill Rig: 709

Driller: SA

Project No.: 08235254

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT SMART LOG 08235254.GPJ TERRACON DATATEMPLATE.GDT 8/2/24

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CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

GRAPHIC LOG	LOCATION Latitude: 43.4305° Longitude: -95.276° Station: 296+28 Offset: -15 Surface Elev.: 1413.5 (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS				
	DEPTH	ELEVATION (Ft.)										LL-PL-PI				
	GRAY FIRM SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Firm Sandy Glacial Clay) (continued)				■		N=15	G2								
					■	16	4-6-6 N=12	G3								
					■	10	4-5-6 N=11	G4								
					■	16	5-7-7 N=14	G5								
					■	18	4-6-7 N=13	G6								
					■	16	15-22-16 N=38	H1								
					■	18	6-10-12 N=22	H2								
					■	18	9-15-16 N=31	H3								
					■	18	10-16-30 N=46	H4								
					■	18	10-20-26									
					GRAY VERY FIRM TO HARD SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Very Firm Sandy Glacial Clay)											

Hammer Type: Automatic
Drill - Abutment

Notes:

Project No.: 08235254

BORING LOG NO. 1

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PROJECT: BRF-009-3(29)--38-30

CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

SITE: IA 9 over West Fork Little Sioux River
Dickinson County, Iowa

GRAPHIC LOG	LOCATION Latitude: 43.4305° Longitude: -95.276° Station: 296+28 Offset: -15 Surface Elev.: 1413.5 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
											LL-PL-PI	
	GRAY VERY FIRM TO HARD SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Very Firm Sandy Glacial Clay) (continued)					N=46	H5					
		95		18	7-15-17 N=32	H6						
		100		18	7-15-15 N=30	H7						
		105		18	8-14-13 N=27	H8						
		110		18	7-12-14 N=26	H9						
		115		18	10-15-22 N=37	H10						
		120		18	7-15-18 N=33	H11						
		120.5										
		Boring Terminated at 120.5 Feet										
		Stratification lines are approximate. In-situ, the transition may be gradual.										
Advancement Method: Power Auger: 0-1.5' Hollow Stem Auger: 1.5-29' Washbore: 29'-Boring Termination		Abandonment Method: Boring backfilled with Auger Cuttings Surface capped with concrete		Notes: Boring Started: 02-05-2024 Drill Rig: 709 Project No.: 08235254		Boring Completed: 02-06-2024 Driller: SA						
WATER LEVEL OBSERVATIONS  9.5' Observed During Drilling		 600 SW 7th St, Ste M Des Moines, IA										

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CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

GRAPHIC LOG	LOCATION		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
												LL-PL-PI
	Latitude: 43.4304° Longitude: -95.2759°											
	Station: 296+61 Offset: 15											
	Surface Elev.: 1413.5 (Ft.)											
DEPTH	ELEVATION (Ft.)											
0.8	CONCRETE		1412.5									
Air void below bridge deck												
11.0			1402.5									
12.0	CONCRETE		1401.5									
GRAY SOFT SANDY CLAY , Trace Gravel (Alluvium), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Soft Silty Clay)				■	12	1-2-2 N=4	D1					
19.0			1394.5									
GRAY STIFF SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Stiff Sandy Clay)				■	14	1-2-2 N=4	E1					
				■	14	5-6-6 N=12	E2					
				■	12	3-3-4 N=7	E3					
				■	14	3-4-4 N=8	E4					
				■	14	3-2-4 N=6	E5					
44.0			1369.5		■	16	4-6-6					

Hammer Type: Automatic
Drill - Pier

Project No.: 08235254

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT_SMART_LOG 08235254.GPJ TERRACON_DATATEMPLATE.GDT 8/2/24

BORING LOG NO. 2

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PROJECT: BRF-009-3(29)--38-30

CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

SITE: IA 9 over West Fork Little Sioux River
Dickinson County, Iowa

GRAPHIC LOG	LOCATION Latitude: 43.4304° Longitude: -95.2759° Station: 296+61 Offset: 15 Surface Elev.: 1413.5 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
											LL-PL-PI	
	GRAY FIRM SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Firm Sandy Glacial Clay) (continued)					N=12	F1					
		50		0		3-4-5 N=9	F2					
		55		16		4-6-7 N=13	F3					
		60		18		5-7-8 N=15	F4					
		65		18		4-7-9 N=16	F5					
		70		16		4-5-7 N=12	F6					
		75		16		5-5-7 N=12	F7					
		80		18		10-16-28 N=44	G1					
		85		18		10-20-28 N=48	G2					
		90		18		9-15-23						
	79.0	1334.5	GRAY VERY FIRM TO HARD SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Glacial Material)									
Stratification lines are approximate. In-situ, the transition may be gradual.												
Advancement Method: Casing: 0-24' Washbore: 14'-Boring Termination						Notes:						
Abandonment Method: Boring backfilled with Auger Cuttings Bridge deck patched with concrete												
WATER LEVEL OBSERVATIONS None observed prior to washbore drilling						Boring Started: 02-07-2024			Boring Completed: 02-08-2024			
						Drill Rig: 709			Driller: SA			
						Project No.: 08235254						

Terracon
600 SW 7th St, Ste M
Des Moines, IA

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CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

GRAPHIC LOG	LOCATION		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Latitude: 43.4304° Longitude: -95.2759°											LL-PL-PI
	Station: 296+61	Offset: 15										
DEPTH		ELEVATION (Ft.)										

Depth (ft)	Soil Description	SPT Blows (N)	Soil Type	Notes
90-95	GRAY VERY FIRM TO HARD SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Glacial Material) (<i>continued</i>) Cobbles encountered at about 90 feet.	N=38	G3	
95-100		18	9-15-17 N=32	G4
100-105		18	10-16-17 N=33	G5
105-110		18	9-15-18 N=33	G6
110-115		18	10-16-18 N=34	G7
115-120		0	15-26-60 N=86	G8
120-125	Cobbles encountered at about 121 feet.	18	10-22-24 N=46	G9
125-128.8		18	11-18-22 N=40	G10

Cobbles encountered at about 121 feet.

Boring Terminated at 125.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic
Drill - Pier

Notes:

Terracon
600 SW 7th St, Ste M
Des Moines, IA

Driller: SA

BORING LOG NO. 3

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PROJECT: BRF-009-3(29)--38-30

CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

SITE: IA 9 over West Fork Little Sioux River
Dickinson County, Iowa

GRAPHIC LOG	LOCATION		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Latitude: 43.4305° Longitude: -95.2758°											LL-PL-PI
	Station: 296+86 Offset: -15											
	Surface Elev.: 1413.5 (Ft.)											
	DEPTH	ELEVATION (Ft.)										
	0.8	1412.5										
	CONCRETE											
	AIR VOID BELOW BRIDGE DECK											
			5									
	10.5	1403	10	▽								
	WATER											
	15.5	1398	15									
	15.7	1398										
	CONCRETE RUBBLE											
	Boring Terminated at 15.7 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic
Drill - Pier

Advancement Method:
Casing: 0-15.5'
Power Auger: 15.5-Boring Termination

Abandonment Method:
Bridge deck patched with concrete

Notes:

WATER LEVEL OBSERVATIONS

10.5' While Drilling

Terracon
600 SW 7th St, Ste M
Des Moines, IA

Boring Started: 02-12-2024

Drill Rig: 709

Project No.: 08235254

Boring Completed: 02-12-2024

Driller: SA

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT_SMART_LOG_08235254.GPJ TERRACON_DATATEMPLATE.GDT 3/26/25

BORING LOG NO. 4

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PROJECT: BRF-009-3(29)--38-30

CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

SITE: IA 9 over West Fork Little Sioux River
Dickinson County, Iowa

GRAPHIC LOG	LOCATION		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Latitude: 43.4304° Longitude: -95.2757°											LL-PL-PI
	Station: 297+18 Offset: 15											
	Surface Elev.: 1413.5 (Ft.)											
	ELEVATION (Ft.)											
	0.2	ASPHALT	1413.5									
	1.5	CONCRETE	1412									
		FILL - BROWN FIRM SANDY CLAY , Trace Gravel		■	14	5-10-9 N=19	C1		17.3			
	4.0	(Fill), moist	1409.5									
		(USDA: Fill - Loam)		□	14		D1	1570	22.1	98	38-22-16	
		(USCS: Fill - Sandy Lean Clay, Trace Gravel)										
		(Iowa LRFD Description: Firm Silty Clay Fill)										
		DARK BROWN STIFF SANDY CLAY , Trace Gravel		■	12	4-5-5 N=10	D2		19.3			
	9.0	(Alluvium), moist	1404.5									
		(USDA: Loam)										
		(USCS: Sandy Lean Clay, Trace Gravel)		□	14	CONSOL	E1		18.5	107	29-15-14	
		(Iowa LRFD Description: Stiff Sandy Clay)										
		Cobbles encountered at about 5 feet.										
		BROWN CLAYEY SAND , Trace Gravel										
	14.0	(Alluvium), wet	1399.5									
	(USDA: Sandy Loam)		■	6	2-3-3 N=6	F1		23.9				
	(USCS: Clayey Sand, Trace Gravel)											
	(Iowa LRFD Description: Silty Sand)											
	GRAY SOFT TO STIFF SANDY CLAY , Trace Gravel											
	(Glacial), moist											
	(USDA: Loam)											
	(USCS: Sandy Lean Clay, Trace Gravel)		■	10	2-1-2 N=3	F2		17.5				
	(Iowa LRFD Description: Stiff Sandy Clay)											
			25	■	14	2-3-3 N=6	F3		16.5			
			30	■	18	2-1-2 N=3	F4		18.2			
			35	■	16	3-3-3 N=6	F5		16.5			
			40	■	18	2-4-4 N=8	F6		16.4			
			45	■	18	3-4-5						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic
Drill - Abutment

Advancement Method:
Power Auger: 0-19'
Washbore: 19'-Boring Termination

Abandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

Notes:

WATER LEVEL OBSERVATIONS

12' While Drilling

Terracon
600 SW 7th St, Ste M
Des Moines, IA

Boring Started: 02-06-2024

Boring Completed: 02-07-2024

Drill Rig: 709

Driller: SA

Project No.: 08235254

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT SMART LOG 08235254.GPJ TERRACON DATATEMPLATE.GDT 8/2/24

BORING LOG NO. 4

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PROJECT: BRF-009-3(29)--38-30

CLIENT: Shive-Hattery, Inc.
Cedar Rapids, IowaSITE: IA 9 over West Fork Little Sioux River
Dickinson County, Iowa

GRAPHIC LOG	LOCATION Latitude: 43.4304° Longitude: -95.2757° Station: 297+18 Offset: 15 Surface Elev.: 1413.5 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
											LL-PL-PI
	DEPTH ELEVATION (Ft.)					N=9	F7		14.9		
	48.0 1365.5										
	GRAY VERY FIRM CLAY , Trace Sand (Glacial), moist (USDA: Silty Loam) (USCS: Lean Clay, Trace Sand) (Iowa LRFD Description: Very Firm Glacial Clay)	50		18		5-10-17 N=27	G1				
	52.0 1361.5										
	GRAY FIRM SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Firm Sandy Glacial Clay) Cobbles encountered at about 52 feet.	55		18		2-3-4 N=7	H1				
		60		18		4-7-7 N=14	H2				
		65		18		5-6-6 N=12	H3				
		70		18		5-7-7 N=14	H4				
	74.0 1339.5										
	GRAY VERY FIRM TO HARD SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Very Firm Sandy Glacial Clay)	75		18		7-14-12 N=26	I1				
		80		14		22-60-45 N=105	I2				
		85		17		12-60-100/5"	I3				
		90		14		6-10-12					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic
Drill - AbutmentAdvancement Method:
Power Auger: 0-19'
Washbore: 19'-Boring TerminationAbandonment Method:
Boring backfilled with Auger Cuttings
Surface capped with concrete

Notes:

WATER LEVEL OBSERVATIONS

12' While Drilling

Terracon
600 SW 7th St, Ste M
Des Moines, IA

Boring Started: 02-06-2024

Boring Completed: 02-07-2024

Drill Rig: 709

Driller: SA

Project No.: 08235254

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT SMART LOG 08235254.GPJ TERRACON DATATEMPLATE.GDT 8/2/24

BORING LOG NO. 4

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PROJECT: BRF-009-3(29)--38-30

CLIENT: Shive-Hattery, Inc.
Cedar Rapids, Iowa

SITE: IA 9 over West Fork Little Sioux River
Dickinson County, Iowa

GRAPHIC LOG	LOCATION Latitude: 43.4304° Longitude: -95.2757° Station: 297+18 Offset: 15 Surface Elev.: 1413.5 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	Sample ID	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
											LL-PL-PI	
	GRAY VERY FIRM TO HARD SANDY CLAY , Trace Gravel (Glacial), moist (USDA: Loam) (USCS: Sandy Lean Clay, Trace Gravel) (Iowa LRFD Description: Very Firm Sandy Glacial Clay) (continued)					N=22	I4					
		95		18	10-18-24 N=42	I5						
		100		18	8-12-13 N=25	I6						
		105		18	7-15-16 N=31	I7						
		110		18	10-15-16 N=31	I8						
		115		18	12-15-15 N=30	I9						
		120		18	11-15-17 N=32	I10						
		Boring Terminated at 120.5 Feet										
		Stratification lines are approximate. In-situ, the transition may be gradual.										
		Hammer Type: Automatic Drill - Abutment										
Advancement Method: Power Auger: 0-19' Washbore: 19'-Boring Termination		 600 SW 7th St, Ste M Des Moines, IA		Notes:								
Abandonment Method: Boring backfilled with Auger Cuttings Surface capped with concrete												
WATER LEVEL OBSERVATIONS  12' While Drilling				Boring Started: 02-06-2024 Drill Rig: 709 Project No.: 08235254								
				Boring Completed: 02-07-2024 Driller: SA								

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT_SMART_LOG_08235254.GPJ TERRACON DATATEMPLATE.GDT 8/2/24