

BORING LOG NO. BR60-1

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PROJECT: IA 60 NB Bridge Over Floyd River Tributary

CLIENT: HDR Engineering, Inc.
Omaha, NESITE: Highway 60
Alton, IA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.923776° Longitude: -96.063563° Northing: 9500375 Easting: 11282074 Surface Elev.: 1268 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY HP (psf)	STRENGTH TEST				WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
								TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)	CONFINING PRESSURE (psi)				
	DEPTH ELEVATION (Ft.)														
	0.8 8" ASPHALT 1267.5														
	1.5 AGGREGATE BASE COURSE, 10 inches of aggregate 1266.5														
	4.5 FILL - DARK BROWN TO BROWN FIRM SILTY CLAY, Trace Sand and Gravel (Fill) (USCS: Fill - Lean Clay With Sand, Trace Gravel) 1263.5	5			8									43-18-25	
					5	1-1-3 N=4									
					8		2000 (HP)	UC	1769	9.3		28.1	93		
		10			12	1-2-3 N=5									
					12									42-20-22	89
	14.5 VERY DARK BROWN FIRM SILTY CLAY, Trace Sand (Alluvium) (USCS: Lean Clay, Trace Sand) 1253.5	15			18	2-2-3 N=5									
					12			UU	2186	15	10	40.4	76		
		20			20	2-2-2 N=4									
					15		1000 (HP)	UC	1597	9.5		36.1	84	46-18-28	
	24.5 VERY DARK BROWN FIRM SILTY CLAY (Alluvium) (USCS: Lean Clay) 1243.5	25			12	2-3-4 N=7									
	29.5 GRAY COARSE SAND, With Clay Lenses (Alluvium) (USCS: Silty Sand, Trace Fines) 1238.5	30			12	7-8-12 N=20									33
	34.5 DARK GRAY GLACIAL MATERIAL (Glacial) (USCS: Sandy Lean Clay, Trace Gravel) 1233.5	35			18	5-28-34 N=62									
	39.5 GRAY GLACIAL MATERIAL (Glacial) (USCS: Sandy Silt) 1228.5	40			18	15-24-28 N=52									
	44.5 1223.5	45			19	25-23-23 N=46								NP	

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

Hammer Type: Automatic

Advancement Method:
0-34.5 ft. Hollow Stem Auger; 34.5-85 ft. - Rotary WashAbandonment Method:
Boring backfilled with auger cuttings and/or bentonite chips and topped with sack-crete.See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured by Terracon and rounded to the nearest half-foot.

Notes:

Energy transfer ratio of 86.9%; hammer efficiency correction is 1.45 (March 2024).

Borings were laid out in the field with a GPS device capable of locating the exploration points to about 0.5-foot horizontal and vertical accuracy.

Northings and Eastings are based on the Iowa Regional Coordinate System, Zone 1

WATER LEVEL OBSERVATIONS

19.5 ft. while drilling

17 ft. while drilling at 34.5 ft.

15080 A Cir
Omaha, NE

Boring Started: 09-18-2024

Boring Completed: 09-18-2024

Project No.: D9245014

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT SMART LOG D9245014 HIGHWAY 60 BRIDGE - IA DOT.GPJ TERRACON_DATATEMPLATE.GDT 11/7/24

BORING LOG NO. BR60-1

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PROJECT: IA 60 NB Bridge Over Floyd River Tributary

CLIENT: HDR Engineering, Inc.
Omaha, NESITE: Highway 60
Alton, IA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.923776° Longitude: -96.063563° Northing: 9500375 Easting: 11282074 Surface Elev.: 1268 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY HP (psf)	STRENGTH TEST				WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
								TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)	CONFINING PRESSURE (psi)				
	DEPTH ELEVATION (Ft.)														
	GRAYISH BROWN GLACIAL MATERIAL (Glacial) (USCS: Silty Sand, Trace Fines) (continued)														
		50		×	19	19-24-24 N=48									
		55		×	18	18-19-16 N=35									
	59.5 1208.5	60		×	20	8-11-17 N=28									
		65		×	18	7-14-16 N=30									
	69.5 1198.5	70		×	16	10-17-16 N=33									
		75		×	12	13-21-31 N=52									
		80		×	9	17-25-30 N=55									
	85.0 1183	85		×	2	50/5"									
	Boring Terminated at 85 Feet														

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

Hammer Type: Automatic

Advancement Method:
0-34.5 ft. Hollow Stem Auger; 34.5-85 ft. - Rotary WashSee [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with auger cuttings and/or bentonite chips and topped with sack-crete.See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured by Terracon and rounded to the nearest half-foot.

WATER LEVEL OBSERVATIONS

- ▽ 19.5 ft. while drilling
- ▽ 17 ft. while drilling at 34.5 ft.

15080 A Cir
Omaha, NE

Boring Started: 09-18-2024

Boring Completed: 09-18-2024

Project No.: D9245014

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT_SMART_LOG_D9245014 HIGHWAY 60 BRIDGE - IA DOT.GPJ TERRACON_DATATEMPLATE.GDT 11/7/24

BORING LOG NO. BR60-2

Page 1 of 2

PROJECT: IA 60 NB Bridge Over Floyd River Tributary

CLIENT: HDR Engineering, Inc.
Omaha, NESITE: Highway 60
Alton, IA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.923814° Longitude: -96.063295° Northing: 9500388 Easting: 11282146 Surface Elev.: 1269 (Ft.) ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
								TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI		
	0.8	9.5" CONCRETE	1268												
	Casing was advanced through the bridge deck and seated into the embankment soils below. (AIR)														
	5														
	10														
	15														
	18.0														
	FILL - BROWN GRANULAR MATERIAL (Alluvium) (USCS: Fill - Silty Sand, Trace Fines)														
	20		0	50/0"											
	22.0														
	BROWN GRANULAR MATERIAL (Alluvium) (USCS: Silty Sand, With Gravel)														
	24.5			10	5-15-20 N=35								NP	13	
	DARK GRAY FIRM TO SOFT SILTY CLAY (Alluvium) (USCS: Fat Clay)														
	25			6	5-5-6 N=11										
	29.5			9	3-2-1 N=3										
	DARK GRAY FIRM TO VERY FIRM GLACIAL CLAY (Glacial) (USCS: Sandy Lean Clay, With Gravel)														
30			16	3-5-6 N=11											
34.5			2						26.6	96	40-14-26	55			
DARK GRAY GLACIAL MATERIAL (Glacial) (USCS: Sandy Lean Clay, With Gravel)															
35			8	50/1"											
40			2	25-50/3"											
44.5															
DARK GRAY GLACIAL MATERIAL (Glacial) (USCS: Sandy Lean Clay, With Gravel)															
45			14	14-21-23 N=44									6		

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

Hammer Type: Automatic

Advancement Method:

6" diameter core through bridge deck, 0-22.5 ft. Casing;
22.5-85.33 ft. Rotary Wash

Abandonment Method:

Boring backfilled with auger cuttings and/or bentonite chips.
Surface patched with quick set concrete with rebar reinforcement.

WATER LEVEL OBSERVATIONS

No groundwater observed

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured by Terracon and rounded to the nearest half-foot.

15080 A Cir
Omaha, NE

Notes:

Energy transfer ratio of 86.9%; hammer efficiency correction is 1.45 (March 2024).

Borings were laid out in the field with a GPS device capable of locating the exploration points to about 0.5-foot horizontal and vertical accuracy.

Northings and Eastings are based on the Iowa Regional Coordinate System, Zone 1
No recovery at 18' and 19.5'

Boring Started: 09-18-2024

Boring Completed: 09-18-2024

Project No.: D9245014

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT_SMART_LOG_D9245014 HIGHWAY 60 BRIDGE - IA DOT.GPJ TERRACON_DATATEMPLATE.GDT 11/7/24

BORING LOG NO. BR60-2

Page 2 of 2

PROJECT: IA 60 NB Bridge Over Floyd River Tributary

CLIENT: HDR Engineering, Inc.
Omaha, NE

SITE: Highway 60
Alton, IA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.923814° Longitude: -96.063295° Northing: 9500388 Easting: 11282146 Surface Elev.: 1269 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
								TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH ELEVATION (Ft.)													
	BROWN GLACIAL MATERIAL (Glacial) (USCS: Silty Sand) <i>(continued)</i>													
		50		X	12	14-16-18 N=34								
		55		X	16	9-13-18 N=31								
	clay lense at 59.5 ft.	60		X	14	9-12-19 N=31								
		64.5												
	BROWN TO GRAYISH BROWN COHESIVE MATERIAL (Dakota Formation) (USCS: Weathered Shale*)	65		X	20	7-13-25 N=38								
		70		X	23	7-8-13 N=21							59-21-38	
		74.5												
	BROWN TO GRAY COHESIVE MATERIAL , Poorly Cemented (Dakota Formation) (USCS: Sandy Silt)	75		X	15	14-25-39 N=64								
		80		X	14	15-25-39 N=64								
		85.3		X		26-50/4"								
	Cemented at bottom of boring Boring Terminated at 85.33 Feet	1183.5												

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

Hammer Type: Automatic

Advancement Method:
6" diameter core through bridge deck, 0-22.5 ft. Casing;
22.5-85.33 ft. Rotary Wash

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with auger cuttings and/or bentonite chips.
Surface patched with quick set concrete with rebar reinforcement.

See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured by Terracon and rounded to the nearest half-foot.

WATER LEVEL OBSERVATIONS

No groundwater observed



15080 A Cir
Omaha, NE

Boring Started: 09-18-2024

Boring Completed: 09-18-2024

Project No.: D9245014

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BORING LOG NO. BR60-3

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PROJECT: IA 60 NB Bridge Over Floyd River Tributary

CLIENT: HDR Engineering, Inc.
Omaha, NESITE: Highway 60
Alton, IA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.923901° Longitude: -96.063313° Northing: 9500420 Easting: 11282141 Surface Elev.: 1269 (Ft.) ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
								TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
0.8	11" CONCRETE	1268.5												
	Casing was advanced through the bridge deck and seated into the embankment soils below. (AIR)													
		5												
		10												
		15												
		20												
		25												
29.5		1239.5												
	DARK BROWN SILTY SAND (Alluvium) (USCS: Silty Sand)	1237			4	2-4-4 N=8								
32.0	DARK GRAY VERY FIRM GLACIAL CLAY (Glacial) (USCS: Sandy Lean to Fat Clay, Trace Gravel)	1232			14	6-10-16 N=26							40-14-26	68
37.0					14	4-8-8 N=16								
39.5	DARK GRAY GLACIAL MATERIAL (Glacial) (USCS: Silty Sand, Trace Fines)	1229.5			20	18-26-20 N=46								
	BROWN TO GRAYISH BROWN GLACIAL MATERIAL (Glacial) (USCS: Silty Sand, Trace Fines)				8	15-20-37 N=57								43
		45			18	16-20-25 N=45								

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

Hammer Type: Automatic

Advancement Method:
6" diameter core through bridge deck, 0-29.5 ft. Casing;
29.5-68 ft. Rotary WashAbandonment Method:
Boring backfilled with auger cuttings and/or bentonite chips.
Surface patched with quick set concrete with rebar reinforcement.

WATER LEVEL OBSERVATIONS

No groundwater observed

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured by Terracon and rounded to the nearest half-foot.

15080 A Cir
Omaha, NENotes:
Energy transfer ratio of 86.9%; hammer efficiency correction is 1.45 (March 2024).
Borings were laid out in the field with a GPS device capable of locating the exploration points to about 0.5-foot horizontal and vertical accuracy.
Northings and Eastings are based on the Iowa Regional Coordinate System, Zone 1
Slow advance rate from 38 to 42 ft.

Boring Started: 09-19-2024

Boring Completed: 09-19-2024

Project No.: D9245014

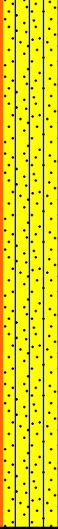
THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT SMART LOG D9245014 HIGHWAY 60 BRIDGE - IA DOT.GPJ TERRACON_DATATEMPLATE.GDT 11/7/24

BORING LOG NO. BR60-3

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PROJECT: IA 60 NB Bridge Over Floyd River Tributary

CLIENT: HDR Engineering, Inc.
Omaha, NESITE: Highway 60
Alton, IA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.923901° Longitude: -96.063313° Northing: 9500420 Easting: 11282141 Surface Elev.: 1269 (Ft.) DEPTH ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (psf)	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
								TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	BROWN TO GRAYISH BROWN GLACIAL MATERIAL (Glacial) (USCS: Silty Sand, Trace Fines) (continued) Possible cemented layer at 64.5 ft.	50		16		10-14-44 N=58								8
		55		16		13-24-21 N=45								
		60		20		7-23-27 N=50								
		65		3		50/3"								
		68.0												
	Bit chatter at 68 ft. Bit Refusal at 68 Feet	1201												

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

Hammer Type: Automatic

Advancement Method:
6" diameter core through bridge deck, 0-29.5 ft. Casing;
29.5-68 ft. Rotary WashSee [Exploration and Testing Procedures](#) for a
description of field and laboratory procedures used
and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with auger cuttings and/or bentonite chips.
Surface patched with quick set concrete with rebar
reinforcement.See [Supporting Information](#) for explanation of
symbols and abbreviations.
Elevations measured by Terracon and rounded to
the nearest half-foot.

WATER LEVEL OBSERVATIONS

No groundwater observed

15080 A Cir
Omaha, NE

Boring Started: 09-19-2024

Boring Completed: 09-19-2024

Project No.: D9245014

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. IADOT_SMART_LOG_D9245014 HIGHWAY 60 BRIDGE - IA DOT.GPJ TERRACON_DATATEMPLATE.GDT 11/7/24

BORING LOG NO. BR60-4

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PROJECT: IA 60 NB Bridge Over Floyd River Tributary

CLIENT: HDR Engineering, Inc.
Omaha, NESITE: Highway 60
Alton, IA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.923921° Longitude: -96.063072° Northing: 9500426 Easting: 11282206 Surface Elev.: 1269 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY HP (psf)	STRENGTH TEST				WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
								TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)	CONFINING PRESSURE (psi)				
	DEPTH ELEVATION (Ft.)														
	0.8 10" CONCRETE 1268														
	1.2 AGGREGATE BASE COURSE, 4 inches of aggregate 1269														
	FILL - BROWN TO DARK BROWN FIRM SILTY CLAY (Fill) (USCS: Fill - Lean Clay)	5		X	4	10-5-3 N=8									
					10		2500 (HP)					29.3	87	45-20-25	
				X	8	2-3-3 N=6									
		10			2		1500 (HP)					21.3	94		
	12.0 DARK BROWN STIFF SILTY CLAY (Alluvium) (USCS: Lean Clay) 1257			X	10	1-2-3 N=5									
		15			12		2500 (HP)	UC	1343	8.3		37.3	79	44-21-23	
	17.0 DARK BROWN TO DARK GRAY STIFF SILTY CLAY (Alluvium) (USCS: Sandy Lean Clay, Trace Gravel) 1252			X	22	1-1-2 N=3									
		20			20			UU	1992	14.3	15	31.3	86	38-16-22	67
	22.0 DARK BROWN FIRM SILTY CLAY (Alluvium) (USCS: Lean Clay, Trace Gravel) 1247			X	4	1-3-5 N=8									
		25		X	14	1-3-9 N=12									
	trace cobbles at 26 ft.														
	29.5 DARK GRAY FIRM TO VERY FIRM GLACIAL CLAY (Glacial) (USCS: Sandy Lean Clay, Trace Gravel) 1239.5	30		X	7	4-6-9 N=15									
		35		X	15	4-7-10 N=17									73
	39.5 GRAY TO BROWN GLACIAL MATERIAL (Glacial) (USCS: Silty Sand, Trace Fines) 1229.5	40		X	16	21-25-41 N=66									
		45		X	14	21-23-26 N=49									

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

Hammer Type: Automatic

Advancement Method:
0-29.5 ft. Hollow Stem Auger; 29.5-85 ft. - Rotary WashSee [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).Notes:
Energy transfer ratio of 86.9%; hammer efficiency correction is 1.45 (March 2024).
Borings were laid out in the field with a GPS device capable of locating the exploration points to about 0.5-foot horizontal and vertical accuracy.
Northings and Eastings are based on the Iowa Regional Coordinate System, Zone 1Abandonment Method:
Boring backfilled with auger cuttings and/or bentonite chips and topped with sack-crete.See [Supporting Information](#) for explanation of symbols and abbreviations.
Elevations measured by Terracon and rounded to the nearest half-foot.

WATER LEVEL OBSERVATIONS

20 ft. while drilling

14 ft. after 10 min delay before sampling at 24.5 ft.

15080 A Cir
Omaha, NE

Boring Started: 09-17-2024

Boring Completed: 09-17-2024

Project No.: D9245014

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BORING LOG NO. BR60-4

Page 2 of 2

PROJECT: IA 60 NB Bridge Over Floyd River Tributary

CLIENT: HDR Engineering, Inc.
Omaha, NE

SITE: Highway 60
Alton, IA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 42.923921° Longitude: -96.063072° Northing: 9500426 Easting: 11282206 Surface Elev.: 1269 (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	FIELD TEST RESULTS	LABORATORY HP (psf)	STRENGTH TEST				WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
								TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)	CONFINING PRESSURE (psi)			LL-PL-PI	
DEPTH															

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

Hammer Type: Automatic

Advancement Method:
0-29.5 ft. Hollow Stem Auger; 29.5-85 ft. - Rotary Wash

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with auger cuttings and/or bentonite chips and topped with sack-crete.

See [Supporting Information](#) for explanation of symbols and abbreviations.

Elevations measured by Terracon and rounded to the nearest half-foot.

WATER LEVEL OBSERVATIONS

- 20 ft. while drilling
- 14 ft. after 10 min delay before sampling at 24.5 ft.



15080 A Cir
Omaha, NE

Boring Started: 09-17-2024

Boring Completed: 09-17-2024

Project No.: D9245014

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