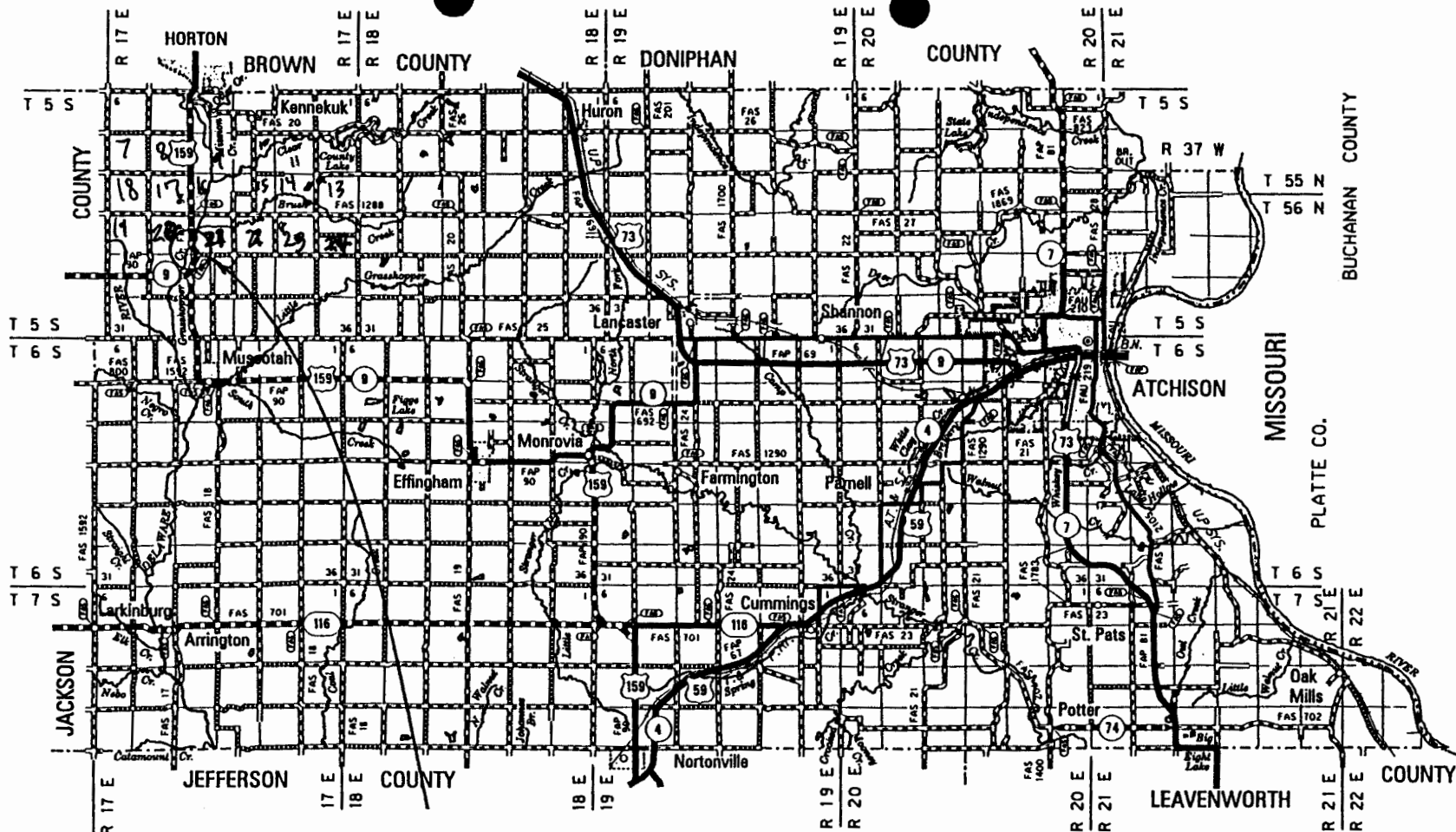


△
8AS

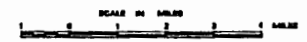


Proj.No. 159-003 K-5030-01
 Br.Nos. 159-003-27.28 & RCB
 US-159 over Grasshopper Creek
 Atchison County

21-5-17E
 SW SW SW

GENERAL HIGHWAY MAP
ATCHISON COUNTY
 KANSAS

PREPARED BY THE
 KANSAS DEPARTMENT OF TRANSPORTATION
 BUREAU OF TRANSPORTATION PLANNING
 IN COOPERATION WITH THE
 U. S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION



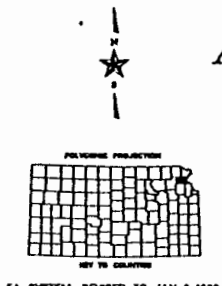
1981
 COMPUTER GENERATED

ROADS AND ROADWAY FEATURES

Primitive Road (Type A)	-----
Unimproved Road (Type B)	-----
Graded and Drained Road (Type C)	-----
Soil Surfaced Road (Type D)	-----
Gravel or Stone Road - Not Graded or Drained (Type E-1)	-----
Gravel or Stone Road - Graded and Drained (Type E-2)	-----
Gravel or Stone Road With Stabilized Surface (Type E-3)	-----
Maintenance Road - Low Type (Type F, G-1, H-1)	-----
Paved Road (Type G-2, H-2, L, K, U)	-----
Divided Highway	-----
Highway With Full Control of Access and Interchange	-----

Road System Designation

Federal-Aid Interstate Highway System	FAI
Federal-Aid Primary Highway System	FAP
Federal-Aid Secondary Highway System	FAS
Federal-Aid Urban Highway System	FMI
Interstate Numbered Highway	70
U.S. Numbered Highway	40
State Highway System or State Numbered Highway	20
End of Designated System or Marked Route	36
Kansas Turnpike Authority	KTA



FA SYSTEM REVISED TO JAN. 6, 1983

QAS



KANSAS DEPARTMENT OF TRANSPORTATION



1. ROUTE-COUNTY NO. 159-03	7. SOUNDING NO. 1	12. SHEET 1 OF 3
2. BRIDGE STA. 193+82.75	8. PROJECT NO. K-5030-01	13. BRIDGE NO. 27.28
3. DESCRIPTION US 159 over Grasshopper Creek		14. HOLE STA. 194+63, R+32
4. GEOLOGIST Thompson/Billinger	9. VERTICLE SCALE 1"=10'	15. DATE 10-25-94
5. DRILLER Sunderland	10. RIG B-61	16. ELEVATION TOP OF HOLE 1001.7
6. GROUND WATER ELEV. 984.6	11. TOTAL DEPTH OF HOLE 644	17. ELEVATION TOP OF ROCK 971.5

BIT TYPE & NO.	GEOLOGIC NAME	STRATIGRAPHIC COLUMN	DEPTH	ELEVATION	CLASSIFICATION OF MATERIALS DESCRIPTION AND REMARKS	UNCONFINED COMPRESSION T S F	STANDARD PENETRATION OR CASING DRIVE 8" Auger	
							BLOWS	ELEV.
			0°	1001.7				
	Soil Mantle			1000	Clay, silty, brown to light gray	30.5		995.2
				990				
				984.6		1.7		989.7
				980		4.2		979.7
			265	775.2				
			302	771.5	Sand, med. to light gravel	0.15		974.7
	Harveyville Member	1		970	Shale, gray to dark gray, very Firm, little weathering, limy	38.17		
		2				110.28		
		3	392	962.5	Limestone, light gray to olive, mudlime	91.22		
	Reading Mbr.	4	419	959.8	lower 1' gradational mix Shale, light gray to olive, very Firm, limy	15.6		
		5	47.9	953.8	Limestone, shaly, light gray to olive	132.27		
		6	49.7	952.0		131.26		
	Auburn Fm.	7		950	Shale, dark gray upper 2.6 and lower 2.6 limy	32.91		
			58.6	943.1	Limestone, light gray			942.6
			59.1	941.5	Shale dark gray, limy			
			60.2	940.0	Limestone light gray	1131.14		
			61.7	940				
			644	937.3	Shale, olive to dark gray			

DRILLING LOG (con't sheet)		SOUNDING NO. 1		PROJECT NO. K-5030-01		SHEET 2 OF 3		
ELEVATION TOP OF HOLE 1001.7		GROUND WATER ELEV. 984.6		TOTAL DEPTH OF HOLE 64.4		ELEVATION TOP OF ROCK 971.5		
BIT TYPE & NO.	GEOLOGIC NAME	STRATIGRAPHIC COLUMN	DEPTH	ELEVATION	CLASSIFICATION OF MATERIALS DESCRIPTION AND REMARKS	UNCONFINED COMPRESSION	STANDARD PENETRATION OR CASING DRIVE	
							BLOWS	ELEV.
					Core # 1 31°-34 ³ Cut 3 ³ Recov. 3 ³ 31°-34 ³ Shale, gray Firm - little weathering RQD = 64% Sample # 1 32°-32 ⁴⁵ - Shale			
					Core # 2 34 ³ -38 ¹ Cut 3 ⁸ Recov. 3 ⁸ 34 ³ -34 ² Shale, gray Firm 34 ² -36 ⁸ Shale, dark gray, slightly fissile 36 ⁸ -38 ¹ - Shale, gray, very Firm limy RQD = 71% Sample # 2 36 ⁸ -37 ⁵ - Shale			
					Core # 3 38 ¹ -43 ¹ Cut 5° Recov. 5° 38 ¹ -39 ² - Shale dark gray to black 39 ² -41 ⁹ - Limestone, mud lime, light gray to olive, lower 1° gradational mix into olive, limy shale. 41 ⁹ -43 ¹ - Shale, olive, limy, very Firm. RQD = 80% Sample # 3, 39 ² 39 ⁷⁵ - Limestone Sample # 4, 41 ² 42 ⁵⁵ - Shale			
					Core # 4 43 ¹ -47 ⁹ Cut 4 ⁸ Recov. 4 ⁸ 43 ¹ -45 ⁹ - Shale, light gray to olive, very Firm 45 ⁹ -47 ⁹ - Shale, olive RQD = 96% Sample # 5 45 ² -45 ⁸ - Shale			

DRILLING LOG (con't sheet)		SOUNDING NO.		PROJECT NO. K-5030-01		SHEET 3 OF 3		
ELEVATION TOP OF HOLE 1001.7		GROUND WATER ELEV. 984.6		TOTAL DEPTH OF HOLE 64 ⁹		ELEVATION TOP OF ROCK 971.5		
BIT TYPE & NO.	GEOLOGIC NAME	STRATIGRAPHIC COLUMN	DEPTH	ELEVATION	CLASSIFICATION OF MATERIALS DESCRIPTION AND REMARKS	UNCONFINED COMPRESSION	STANDARD PENETRATION OR CASING DRIVE	
							BLOWS	ELEV.
					Core # 5 47 ⁹ -52 ³ Cut 4 ⁴ Recov. 4 ⁴ 47 ⁹ -49 ⁷ - Limestone, shaly, olive to gray 49 ⁷ -52 ³ Shale, dark gray, lime RQD = 100% Sample # 6 48 ² -48 ⁹ - Limestone Sample # 7 50 ⁰ -50 ⁷ - Shale			
					Core # 6 52 ³ -56 ⁰ Cut 3 ⁷ Recov. 3 ⁷ 52 ³ -56 ⁰ - shale dark gray RQD = 89% Sample # 8 54 ¹ -54 ⁶ - Shale			
					Core # 7 56 ⁰ -60 ⁰ Cut 4 ⁰ Recov. 4 ⁰ 56 ⁰ -58 ⁶ Shale dark gray to limy 58 ⁶ -59 ¹ - Limestone, light gray 59 ¹ -60 ⁰ Shale, dark gray RQD = 70% Sample # 9 56 ³ -56 ⁸ - Shale			
					Core # 8 60 ⁰ -64 ⁴ Cut 4 ⁴ Recov. 4 ³ 60 ⁰ -60 ² Shale, gray, limy 60 ² -61 ⁷ - Limestone, light gray 61 ⁷ -62 ¹ - Shale, dark gray, limy 62 ¹ -63 ⁰ Shale, dark gray to black 63 ⁰ -63 ⁸ shale, olive, very limy 63 ⁸ -64 ³ Shale dark gray RQD = 98% Sample # 10 60 ² -61 ⁰ Limestone			

KANSAS DEPARTMENT OF TRANSPORTATION

Report of sample of Geology Cores

Laboratory No. 94-4825

Date Rep'td. November 7, 1994

Date Rec'd. October 27, 1994

Specification No. - - Quantity - - -

Source of material Project

Sample from Project

Submitted by Delmer Thompson, Lawrence Geology Office

Identification marks Tags with samples

Project or POV 159-03 K-5030-01, Atchison County, District 1

Type of construction Foundation for Br. #27.28

TEST RESULTS

Sample No.	Station	Dist.ft. CL	Depth ft.	Description	Qu. t.s.f.	Sample p.c.f. by Dry Wt.	Moisture (% of Dry Wt.)
Core #1	194+63	32 Rt	320-324 ⁵	Shale, gray	38.167	140.3	7.8
Core #2	"	"	368-375	Shale, gray, limy	110.276	145.7	6.4
Core #3	"	"	393-397 ⁵	Ls, lt gry to olive	91.222	140.5	8.0
Core #4	"	"	419-425 ⁵	Sh, olive, limy	108.431	137.1	9.1
Core #5	"	"	452-458	Shale, lt gray	15.628	134.1	7.4
Core #6	"	"	482-489	LS, lt gry to olive	132.267	146.5	5.1
Core #7	"	"	500-507	Shale, dk gray	131.266	146.5	3.8
Core #8	"	"	541-546 ⁹	Shale, gray	32.905	134.3	6.9
Core #9	"	"	563-568 ⁹	Shale, dk gray	Lost Sample while trimming		
Core #10	"	"	602-610	Limestone	1131.135	162.9	1.0

cc: L.S. Ingram
L.A. Rockers
D. Thompson
J.J. Brennan
Soil Section
File

Reported by _____

Title James J. Brennan, Soils Engineer

Pross. 159-7-K-5030-01 Br.# 27.28, US 159 over Grasshopper Crk. Atchison Co.

PA# 1	1003.4	0°-4°	Mantle, clay, silty, brown
Sta. 194+63, 20Lt	999.4	4°-26 ⁵	Mantle, clay, silty, dark brown - Peak 20°-21 ⁵
↪ 985.3			Grades to slightly sandy, brown-gray
	976.9	26 ⁵ -28°	Clay, silty to sandy - Fine gray-brown
	975.4	28°-29 ⁸	Finner Clay, silty, to sandy
	973.6	29 ⁸ -32 ⁸	Sand to gravel - light
	970.6	32 ⁸ -39°	Shale, Firm, occasional limy zone
	964.4	39°-48°	Shale Finner, limy
	962.6	40 ⁸ -43 ⁸	Limestone, shaly
	959.6	43 ⁸ -47 ²	Shale, limy, gray
	956.2	47 ²	TD
PA# 2	999.3	0°-14°	Mantle, clay, silty, brown to red-brown
Sta. 193+00, 29R+	985.3	14°-21 ⁵	Clay, silty, gray brown, wet
	977.8	21 ⁵ -22 ⁵	Clay, silty, gravel, light
	976.8	22 ⁵ -24°	Sand to gravel - heavy
	975.3	24°-26°	Shale, slightly weathered
	973.3	26°-34°	Shale, gray, limy
	965.3	34°-37 ⁵	Shale, gray, Firm
	961.8	37 ⁵ -40 ¹	Limestone, shaly
	958.4	40 ¹ -45 ²	Shale, gray, limy
	954.1	45 ² -47 ⁸	Limestone, shaly
	951.9	47 ⁸ -52 ⁵	Shale, gray, limy
	946.8	52 ⁵	TD
PA# 3	998.6	0°-14°	Clay, silty, brown, soft
Sta. 194+16, 21R+	984.6	14°-24°	Clay, silty, brown, wet
↪ 984.6	974.6	24°-24°	Gravel zone
	973.8	24 ⁸ -25 ⁴	Clay, silty, gray-brown
	973.2	25 ⁴ -25 ⁷	Gravel zone
	972.9	25 ⁷ -26 ⁵	Clay, silty, gray-brown
	972.1	26 ⁵ -28 ⁵	Shale, Firm, olive to brown
	970.1	28 ⁵ -35 ⁸	Shale, Firm, gray, limy
	962.8	35 ⁸ -38 ⁷	Limestone, shaly, gray
	959.9	38 ⁷ -44 ⁷	Shale, limy, gray
	953.9	44 ⁷ -46°	Limestone, shaly
	952.6	46°-53°	Shale, limy
	945.6	53°	TD

Pros. 159-3-K-5030-01, Br#27,28, US159 over Grasshopper Creek Atchison Co.

PA#4	999.1	0°-21 ⁶	Mud, clay, silty, brown
Sta. 193+03, 40L+	977.5	21 ⁶ -21 ⁸	Gravel zone
985.3	977.3	21 ⁸ -22 ⁸	Clay, silty, gray brown
	976.3	22 ³ -24 ⁵	Sand to gravel
	974.6	24 ⁵ -27°	Shale, limy, olive, slightly weathered
	972.1	27°-36°	Shale, limy, gray
	962.3	36 ⁸ -42 ⁸	Limestone, shaly
	956.3	42 ⁸ -45 ³	Shale, gray, limy
	953.8	45 ³ -47 ⁵	Limestone, shaly
	951.6	47 ⁵ -57°	Shale, gray, limy
	942.1	57°-57 ⁸	Limestone, shaly
	941.3	57 ⁸ -59 ⁸	Limestone, hard
	939.3	59 ⁸ -67 ⁵	Shale, gray, firm
	931.6	67 ⁵	
PA#5	983.2	0°-2°	Silt, dark gray, wet
Sta. 193+46, 25R+	981.2	2°-6°	Clay, silty to sandy, gray-brown
	977.2	6°-9 ⁵	Rubble, heavy
	973.7	9 ⁵ -13 ⁴	Shale, brown, weathered
	969.8	13 ⁴ -20 ⁶	Shale, gray, limy
	962.6	20 ⁶ -22 ⁹	Limestone
	960.3	22 ⁹ -23 ²	Limestone, shaly
	960.0	23 ² -27 ⁵	Shale, gray, limy
	955.7	27 ⁵	TD
PA#6	994.2	0°-2°	Heavy rock rubble - erosion check
Sta. 194+18, 21L+	992.2	2°-10°	Clay, silty, brown
	984.2	10°-21'	Clay, silty, gray-brown
	973.1	21'-22 ⁸	Sand to gravel
	971.4	22 ⁸ -23 ⁷	Gravel, heavy
	170.5	23 ⁷ -25°	Shale, limy, firm
	969.2	25°-31 ⁷	Shale, gray, limy
	962.5	31 ⁷ -34 ²	Limestone, shaly
	959.9	34 ² -40'	Shale, limy, gray
	954.1	40'-42 ⁸	Limestone, shaly
	951.4	42 ⁸ -47°	Shale, gray, limy
	947.2	47°	TD

Proj. 159-3-K-5030-01, Br. #27.28, US 159 over Grasshopper Creek, Atchison Co.

	+	H.I.	-	Elev.
Bm#23				1005.15
π	1.4	1006.55		
PA#1			3.2	1003.35
Bm#23			1.4	1005.15
Bm#23				1005.15
π	4.21	1009.36		
PA#2			10.11	999.25
Bm#23			4.21	1005.15
Bm#23				1005.15
π	4.73	1009.88		
PA#3			11.33	998.55
PA#4			10.81	999.07
Bm#23			4.73	1005.15
Bm#23				1005.15
π	3.77	1008.92		
PA#5			21 ⁰² +3 ⁹ Post	983.2
Bm#23			3.77	1005.15
Bm#23				1005.15
π	0 ³	1005.45		
PA#6			11.3	994.15
Bm#23			0 ³	1005.15
Bm#23				1005.15
π	3.60	1008.75		
CD#1			7.05	1001.70
Bm#23			3.60	1005.15

RCB

Project No. 159-3 K-5030-01

K-159 over Little Creek

Atchison Co.

PA #1	994.1	0°-13°	Silty clay, tan-brown
115+66	981.1	13°-43°	Silt + silty clay, very soft
Rt 58°	951.1	43°	SIS
W/L 14° =	980.1		

PA 2	994.5	0°-13°	Silty Clay, tan-brown
116+62	981.5	13°-32°	Silt + silty clay
Lt. 27°	961.9	32°	SIS
W/L 14° =	979.7		

BM# 12			998.78
TI	4.98	1003.76	
PA 1		9.70	994.06
PA 2		9.28	994.48
BM 12		4.98	998.78

KANSAS DEPARTMENT OF TRANSPORTATION

Report of sample of Geology Cores

Laboratory No. 94-4825

Date Rep'td. November 15, 1994

Date Rec'd. October 27, 1994

Specification No. - - Quantity - - -

Source of material Project

Sample from Project

Submitted by Delmer Thompson, Lawrence Geology Office

Identification marks Tags with samples

Project or POV 159-03 K-5030-01, Atchison County, District 1

Type of construction Foundation for Br. #27.28

TEST RESULTS

Sample No.	Station	Dist.ft. CL	Depth ft.	Description	Qu. t.s.f.	Sample p.c.f. by Dry Wt.	Moisture (% of Dry Wt.)
SH #1	194+63	32 Rt	45-65	Clay, silty, brown	3.485	100.8	23.4
SH #2	"	"	150-170	Clay, silty, brn, damp	1.700	89.5	30.1
SH #3	"	"	200-220	Clay, very silty, brn	4.191	104.4	22.7
SH #4	"	"	250-270	Vry slty, lt gry, sand	0.148	104.2	22.6
Core #1	"	"	320-324 ⁵	Shale, gray	38.167	140.3	7.8
Core #2	"	"	368-375	Shale, gray, limy	110.276	145.7	6.4
Core #3	"	"	393-397 ⁵	Ls, lt gry to olive	91.222	140.5	8.0
Core #4	"	"	419-425 ⁵	Sh, olive, limy	108.431	137.1	9.1
Core #5	"	"	452-458	Shale, lt gray	15.628	134.1	7.4
Core #6	"	"	482-489	Ls, lt gry to olive	132.267	146.5	5.1
Core #7	"	"	500-507	Shale, dk gray	131.266	146.5	3.8
Core #8	"	"	541-546	Shale, gray	32.905	134.3	6.9
Core #9	"	"	563-569	Shale, dk gray	Lost Sample	while trimming	
Core #10	"	"	602-610	Limestone	1131.135	162.9	1.0

See attached routine analysis test results.

- cc: L.S. Ingram
- L.A. Rockers
- D. Thompson ✓
- J.J. Brennan
- Soil Section
- File 18-3

Reported by Chuck Olden for

Title James J. Brennan, Soils Engineer