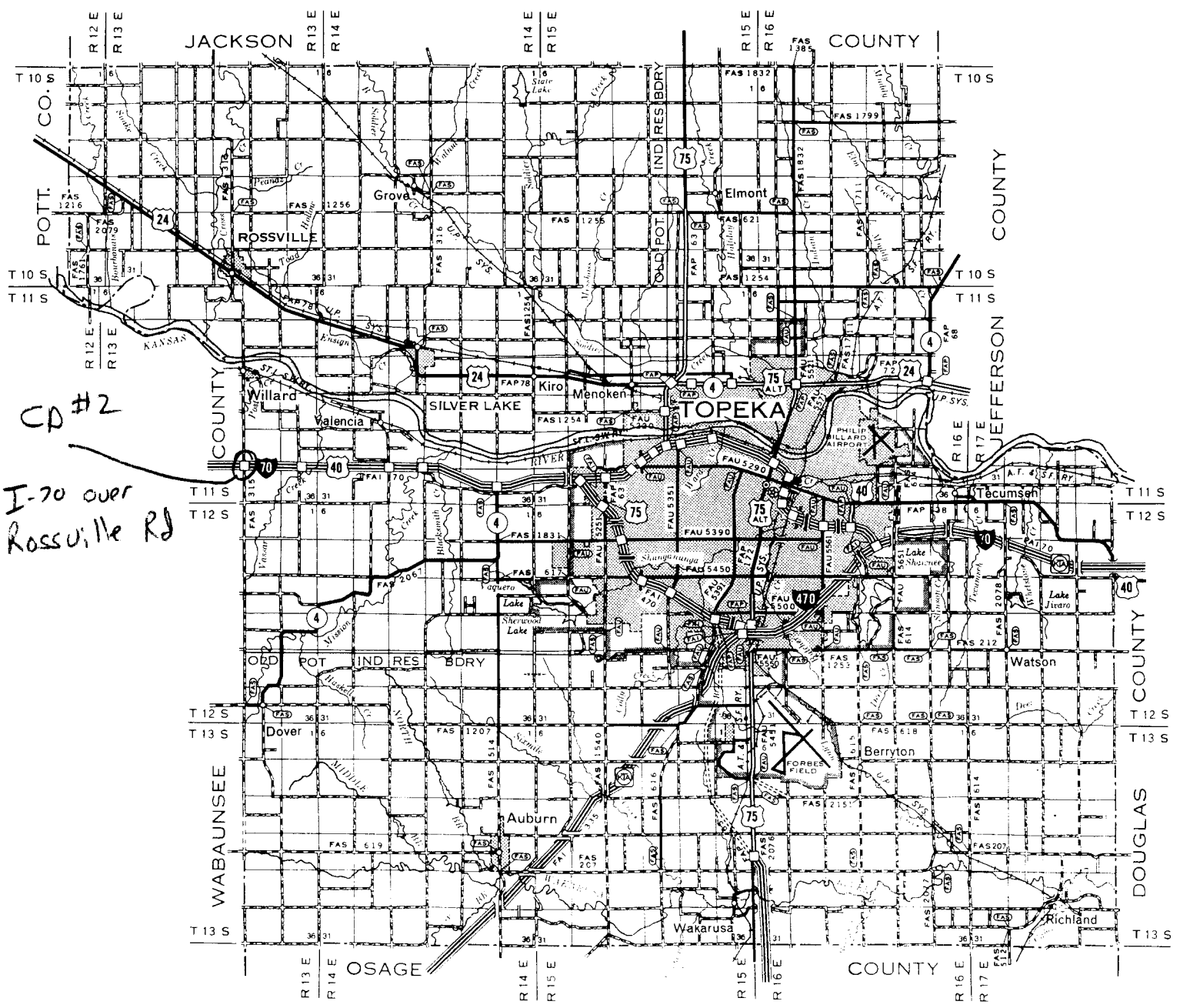


NW NW NW 35-11-13E

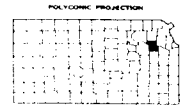
2A D11 ✓



LEGEND

- ROADS AND ROADWAY FEATURES**
- PRIMITIVE ROAD
 - UNIMPROVED ROAD
 - GRADED AND DRAINED ROAD
 - SOIL SURFACED ROAD
 - GRAVEL OR STONE ROAD - NOT GRADED OR DRAINED
 - GRAVEL OR STONE ROAD - GRADED AND DRAINED
 - GRAVEL OR STONE ROAD WITH STABILIZED SURFACE
 - BITUMINOUS ROAD - LOW TYPE
 - PAVED ROAD
 - DIVIDED HIGHWAY
 - HIGHWAY WITH FULL CONTROL OF ACCESS AND INTERCHANGE

- ROAD SYSTEM DESIGNATION**
- FEDERAL AID INTERSTATE HIGHWAY SYSTEM
 - FEDERAL AID PRIMARY HIGHWAY SYSTEM
 - FEDERAL AID SECONDARY HIGHWAY SYSTEM
 - INTERSTATE - NUMBERED HIGHWAY
 - U.S. NUMBERED HIGHWAY
 - STATE HIGHWAY SYSTEM OR STATE NUMBERED HIGHWAY
 - END OF DESIGNATED SYSTEM OR MARKED ROUTE

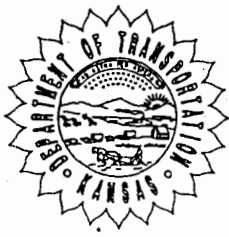


FA SYSTEM REVISED TO MAR 15, 1988

**GENERAL HIGHWAY MAP
SHAWNEE COUNTY
KANSAS**

KANSAS DEPARTMENT OF TRANSPORTATION
BUREAU OF TRANSPORTATION PLANNING

SCALE



KANSAS DEPARTMENT OF TRANSPORTATION

RTE./CO. 70-89	SOUNDING NO. CD #2	SHEET 1 OF 3
BRIDGE STA. 40+578.795 ^{EB} 6B	PROJ. NO. K-6358-01	BRIDGE NO. 70-89-0.000(002) EB 70-89-0.010(001) WB
SITE NAME I-70 over Rossville Road		HOLE STA. 40+630.31 m Rt. Proj. E
GEOLOGIST Randy Billinger	SCALE: 1:100 (10mm = 1 Meter)	DATE 2-12-01
DRILLER Rob Verwynck	RIG TYPE Mobile B-b1	TOP HOLE ELEV. 309.70
GROUNDWATER ELEV 307 ⁰⁸	TOTAL DEPTH 21 ¹⁵ m	M/B ELEV. 304.31

35-11-13E

BIT TYPE	GEOLOGIC NAME	STRATIGRAPHIC COLUMN	DEPTH	ELEVATION	CLASSIFICATION OF MATERIALS DESCRIPTION AND REMARKS	UNCONFINED COMPRESSION kPa	STANDARD PENETRATION OR CASING DRIVE	
							BLOWS	ELEV
			0 ⁰⁰	309.70				
			70	308.0	Silty clay			
	Mantle				Gravel, sand & silty clay. Some limestone pieces. Strated through this zone.			
			457	305 ¹³	Brown clay & sand. Grades to gray shale or tight gray clay.			
			539	304 ³¹				
	Willard Shale Formation				Shale, sandy, gray to gray-green. Thin sandstone lenses common.	676.4	Sample 1	303 ⁴⁶
				303				
				302				

Case 2 Core 1

SOUNDING NO. <u>CD #2</u>		PROJECT NO. <u>K-6358-01</u>		SHEET 2 OF 3			
DATE <u>2-12-01</u>		RTE./CO. <u>70-89</u>		TOTAL DEPTH <u>21¹⁵ m</u>			
THE <u>309.70</u>		UNCONFINED COMPRESSION		STANDARD PENETRATION OR CASING DRIVE			
BIT TYPE	GEOLOGIC NAME	STRATIGRAPHIC COLUMN	DEPTH	ELEVATION	CLASSIFICATION OF MATERIALS DESCRIPTION AND REMARKS	BLOWS	ELEV
	Willard Shale Formation		Core 2	302	Shale, sandy, gray.	510.9	Sample 2 301 ⁵⁴
			Core 3	301 ²⁰		301 ⁰⁰	1092.2
			Core 4	299	Shale, gray, clayey.	1429.0	Sample 4 298 ⁷⁹
			Core 5	297		2209.8	Sample 5 297 ⁰⁶
			Core 6	296		1840.7	Sample 6 293 ⁵²
			Core 7	295			
			Core 8	294			
			Core 9	293			
			Core 10	292			

SOUNDING NO. CD # 2

PROJECT NO. K-6358-01

SHEET 3 OF 3

DATE 2-12-01

RTE./CO. 70-89

TOTAL DEPTH 21¹⁵ m

THE 309.70

BIT TYPE	GEOLOGIC NAME	STRATIGRAPHIC COLUMN	DEPTH	ELEVATION	CLASSIFICATION OF MATERIALS DESCRIPTION AND REMARKS	UNCONFINED COMPRESSION	STANDARD PENETRATION OR CASING DRIVE	
							BLOWS	ELEV
				292				
	Elmont Ls 1/4br. Willard Shale Fm.	Core 10 11 12 13	19 ⁸⁷	291	Shale, gray, clayey.	2155.6	Sample 7	291 ⁶⁹
					290			
				289	Limestone, platy, shaly.	1776.9	Sample 8	290.56
			21 ¹⁵	288 ⁵⁵	Limy shale break.			
				288				
				287				
				286				

I-70 over Rossville Rd Core Hole #2

Project No. 70-89 K-6358-01

	<u>Elevation</u>	<u>Depth</u>		
Core Hole #2	309.70	0.00	Mantle, silty clay.	
Sta. 40+630	308.00	1.70	Gravel, limestone rubble, sand, silty clay.	
31 m Rt. Project C.L.	306.35	3.35	Heavy sand and gravel.	
Water Level 2.62 m	305.13	4.57	Clay with some sand.	Mantle
Water Elevation 307.08	304.58	5.12	Tight clay, gray.	
Date Drilled 2/12/01	304.31	5.39	Shale, gray.	Willard
	304.22	5.48	Shale, firm, gray-green.	Shale
	303.91	5.79	Start coring.	Formation

Note: We had to go in and strat through much of the sand and gravel. We could not drive our casing through it. When we cleaned out the casing after getting it to seat in the shale, we rinsed out lots of gravel, limestone chips sand, and some clumps of brown clay. We think this is an old creek bed that was covered when the existing bridge was built. The creek now flows through a RCB that is in place.

Core # 1	303.91	5.79	Shale, very sandy, gray-green.	Willard
5.79 to 7.13 m	303.18	6.52	Sandstone, shaly, gray-green.	Shale
Cut 1.34 m	302.85	6.85	Shale, sandy, gray-green.	Formation
Recovered 1.21 m	302.57	7.13	End core 1.	
RQD = 48%				
Lost 0.12 m off the top.			Sample 1 6.09 to 6.24 Shale, sandy, gray-green.	
Core # 2	302.57	7.13	Shale, gray to gray-green, sandy, thin ss lenses.	
7.13 to 8.65 m	301.05	8.65	End core 2.	
Cut 1.52 m				
Recovered 1.52 m				
RQD = 50%			Sample 2 7.98 to 8.16 Shale, sandy, gray.	
Core # 3	301.05	8.65	Shale, less sandy, but sandy lenses, gray	Willard
8.65 to 10.18 m	299.65	10.05	Limestone, hard, gray.	Shale
Cut 1.52 m	299.52	10.18	End core 3.	Formation
Recovered 1.52 m				
RQD = 100%			Sample 3 9.38 to 9.57 Shale, gray.	
Core # 4	299.52	10.18	Shale, firm, gray, clayey.	Willard
10.18 to 11.70 m	298.00	11.70	End core 4	Shale
Cut 1.52 m				Formation
Recovered 1.49 m				
RQD = 100%			Sample 4 10.72 to 10.91 Shale, gray.	
Core # 5	298.00	11.70	Shale, gray, clayey, firm.	Willard
11.70 to 13.22 m	296.48	13.22	End core 5.	Shale
Cut 1.52 m				Formation
Recovered 1.52 m				
RQD = 100%			Sample 5 12.49 to 12.64 Shale, gray.	
core came out all 1 piece.				

I-70 over Rossville Rd Core Hole #2

Project No. 70-89 K-6358-01

Core # 6	296.48	13.22	Shale, gray, firm, mostly clayey.	Willard Shale Formation
13.22 to 14.59 m	295.11	14.59	End core 6.	
Cut 1.37 m				
Recovered 1.37 m			No sample taken.	
RQD = 100%				
Core # 7	295.11	14.59	Shale, gray, clayey, firm.	Willard Shale Formation
14.59 to 15.24 m	294.46	15.24	End core 7.	
Cut 0.64 m				
Recovered 0.64 m			No sample taken.	
RQD = 100%				
Core # 8	294.46	15.24	Shale, gray, firm, clayey.	Willard Shale Formation
15.24 to 15.54 m	294.16	15.54	End core 8.	
Cut 0.3 m				
Recovered 0.3 m			No sample taken.	
RQD = 100 %				
Core # 9	294.16	15.54	Shale, gray, firm, clayey.	Willard Shale Formation
15.54 to 17.22 m	292.48	17.22	End core 9.	
Cut 1.67 m				
Recovered 1.61 m			Sample 6 16.00 to 16.18 Shale, gray.	
RQD = 100%				
Core # 10	292.48	17.22	Shale, gray, firm, clayey.	Willard Shale Formation
17.22 to 18.74 m	290.96	18.74	End core 10.	
Cut 1.52 m				
Recovered 1.52 m			Sample 7 17.83 to 18.01 Shale, gray.	
RQD = 100 %				
Core # 11	290.96	18.74	Shale, gray, firm, clayey.	Willard Shale Formation
18.74 to 19.32 m	290.38	19.32	End core 11.	
Cut 0.57 m				
Recovered 0.57 m			Sample 8 18.98 to 19.14 Shale, gray.	
RQD = 100%				
Core # 12	290.38	19.32	Shale, gray, firm, clayey.	Willard Shale Formation
19.32 to 19.62 m	290.08	19.62	End core 12.	
Cut 0.3 m				
Recovered 0.3 m				
RQD = 100%				

I-70 over Rossville Rd Core Hole #2

Project No. 70-89 K-6358-01

Core # 13	290.08	19.62	Shale, gray, firm, clayey.	<u>Willard Shale</u>
19.62 to 21.15 m	289.83	19.87	Limestone, platy, shaly, gray.	
Cut 1.52 m	289.53	20.17	Limestone, hard.	Elmont
Recovered 1.52 m	289.37	20.33	Limestone, platy, shaly, gray.	Limestone
RQD = 70%	288.98	20.72	Limestone, hard.	Member
	288.80	20.90	Shaly.	
	288.73	20.97	Limestone, hard.	
	288.58	21.12	Shale, gray-green, firm.	<u>Harveyville Shale</u>
	288.55	21.15	Total depth. End core hole 2. Stopped in shale.	

Kansas Department of Transportation

Report of sample of Shelby/ Geology Cores

Laboratory No. 01-419

Date Reported. February 26, 2001

Date Received. February 20, 2001

Specification No. -- Quantity ---

Source of material Project

Sample from Project

Submitted by Delmar Thompson, Lawrence Regional Geology Office

Identification marks Tags with samples

Project or POV 70-89 K-6358-01, Shawnee County

Type of construction Bridge Replacement I-70 over Cassville Rd CD #2

TEST RESULTS

Sample No.	Station	Dist. m	Depth m	Description	Qu. kPa	Dry Unit Weight kg/m ³	Moisture (% of Dry Wt.)
S# 1	40+630	31m RT	6.09-6.24	Shale, Sandy, Green	676.4	1,987	13.3%
S# 2	"	"	7.98-8.16	Shale, Sandy, Gray	510.9	1,964	13.1%
S# 3	"	"	9.38-9.57	Shale, Gray	1,092.2	2,014	12.2%
S# 4	"	"	10.72-10.91	Shale, Gray	1,429.0	2,030	12.0%
S# 5	"	"	12.49-12.64	Shale, Gray	2,209.8	2,042	11.9%
S# 6	"	"	16.00-16.18	Shale, Gray	1,840.7	2,057	11.5%
S# 7	"	"	17.83-18.01	Shale, Gray	2,155.6	2,080	11.1%
S# 8	"	"	18.98-19.14	Shale, Gray	1,776.9	1,991	12.9%
					18.5	124.3	

cc: L.S. Ingram
G.R. Koontz
D. Thompson
J.J. Brennan
Soil Section
File

Reported by: James J. Brennan

Title James J. Brennan, Soils Engineer

2-12-01

meters

feet

I-70 over Rossville Road

17

Core Hole 2

Sta 40+630 3in R & E

Randy, Rob, B: V

open closed

w- 2,62m

307.08

309.70 0°

308.0 1.70

307.7 2.01

3.35

305.83 3.87

305.13 4.57

304.58 5.12

304.31 5.39

304.31 5.39

304.22 5.48

303.91 5.79

0°-5⁶5⁶-6⁶6⁶-11⁰11⁰-12⁷12⁷-15⁰15⁰-16⁸16⁸-17⁷17⁷17²-18⁰18⁰-19⁰19⁰

Casing set

Strat. LS pieces, not in place
 tried to core, LS pieces + silty clay & sand
 strat, heavy sand & gravel

Casing 5°+2⁶=7⁶7⁶+3¹=10⁷+4⁰=14⁷+2⁹=17⁷17⁶+1⁸=19⁴ 17⁷ in ground 1⁷ out

Strat, LS pieces, sand, gravel, clay
 clay brown with sand?
 shale? gray or light gray clay

Stop @ 17⁷ and reset casing to 17⁷
 think we are in gray shale, clean out
 casing

lots of LS chips, may be settlement
 shale, firm gray green
 Start coring

Core 1

19⁰-23⁴ ft

5.79-7.13 m

Cut 4^{ft} / 1.34 mRecov. 4^{ft} / 1.21 mRQD = $2\frac{1}{4} / 4 = 48\%$ lost 0^{ft} off top
(0.12 m)

meters

303.91 5.79

303.18 6.52

302.85 6.85

302.57 7.13

feet

19⁰-21⁴21⁴-22⁵22⁵-23⁴23⁴Shale, very sandy, greenish-gray
Sandstone, shaly, gray-green
Shale, sandy, gray-green
End core 1Sample 1 20⁰-20⁵ shale, sandy, green
(6.09-6.24 m)
303.46

Core 2

23⁴-28⁴ ft

7.13-8.65 m

Cut 5^{ft} / 1.52 mRecov. 5^{ft} / 1.52 mRQD = $2\frac{5}{5} = 50\%$

302.57 7.13

301.05 8.65

23⁴-28⁴28⁴Shale, gray to gray-green, very sandy
numerous thin shaly sandstone lenses
End core 2Sample 2 26²-26⁸ sandy shale, gray
(7.98-8.16 m)
301.54

Core 3

28⁴-33⁴ ft

8.65-10.18 m

Cut 5^{ft} / 1.52 mRecov. 5^{ft} / 1.52 m

RQD = 100%

301.05 8.65

299.65 10.05

299.52 10.18

28⁴-33⁰33⁰-33⁴33⁴Shale, gray, firm, more clayey but
still some thin sandy lenses
LS, hard, gray
End core 3Sample 3 30⁸-31⁴ shale, gray
(9.38-9.57 m)
300.13

Willard Shale

	meters		feet
Core 4	299.52	10.18	33 ⁴ -38 ⁴
33 ⁴ -38 ⁴ ft	298.0	11.70	38 ⁴
10.18-11.70 m			
cut 5 ⁰ ft / 1.52 m			
Recov. 4 ⁹ ft / 1.49 m			
RQD = 100%			
Core 5	298.0	11.70	38 ⁴ -43 ⁴
38 ⁴ -43 ⁴ ft	296.48	13.22	43 ⁴
11.70-13.22 m			
cut 5 ⁰ ft / 1.52 m			
Recov. 5 ⁰ ft / 1.52 m			
RQD = 100%			
core came out all 1 piece			
Core 6	296.48	13.22	43 ⁴ -47 ⁹
43 ⁴ -47 ⁹ ft	295.11	14.59	47 ⁹
13.22-14.59 m			
cut 4 ⁵ ft / 1.37 m			
Recov. 4 ⁵ ft / 1.37 m			
RQD = 100%			

Shale, gray, firm, clayey
End Core 4

Sample 4 35²-35⁸ shale, gray, clayey
(10.72-10.91 m)
298.79

Shale, gray, clayey, firm
End Core 5

Sample 5 41⁰-41⁵ shale, gray, firm
(12.49-12.64 m)
297.06

Shale, gray, firm, clayey, sticky
End Core 6

Willoughby Shale

	meters		Feet	
Core 7	295.11	14.59	47 ⁹ -50 ⁰	Shale, gray, firm, clayey, sticky End Core
47 ⁹ -50 ⁰ ft	294.46	15.24	50 ⁰	
14.59-15.24 m				
cut 2 ¹ / ₂ ft / 0.64 m				
Recov 2 ¹ / ₂ ft / 0.64 m				
RQD = 100%				
Core 8	294.46	15.24	50 ⁰ -51 ⁰	Shale, gray, firm End core 8
50 ⁰ -51 ⁰ ft	294.16	15.54	51 ⁰	
15.24-15.54 m				
cut 1 ⁰ / ₂ ft / 0.3 m				
Recov. 1 ⁰ / ₂ ft / 0.3 m				
RQD = 100%				
Core 9	294.16	15.54	51 ⁰ -56 ⁵	Shale, gray, firm End Core 9
51 ⁰ -56 ⁵ ft	292.48	17.22	56 ⁵	
15.54-17.22 m				
cut 5 ⁵ / ₂ ft / 1.67 m				
Recov. 5 ⁵ / ₂ ft / 1.61 m				
RQD = 100%				
				Sample 6 52 ⁵ -53' (16.00-16.18 m) Shale, gray 293.52

well bed shale

Core 10
56⁵-61⁵ ft
292.48 17.22
290.96 18.74

17.22-18.74 m

Cut 5 ft / 1.52 m
Recov 5 ft / 1.52 m
RQD = 100%

Feet

56⁵-61⁵
61⁵

Shale, gray, firm.
End Core 10

sample 7 58⁵-59¹ Shale gray
(17.83-18.01 m)
291.69

Core 11
61⁵-63⁴ ft
290.96 18.74
290.38 19.32
18.74-19.32 m

Cut 1 ft / 0.57 m
Recov. 1 ft / 0.57 m
RQD = 100%

61⁵-63⁴
63⁴

Shale gray
End Core 11

sample 8 62³-62⁸ Shale, gray
(18.98-19.14 m)
290.56

Willard shale

Core 12
63⁴-64⁴ ft
290.38 19.32
290.08 19.62
19.32-19.62 m

Cut 1 ft / 0.3 m
Recov. 1 ft / 0.3 m
RQD = 100%

63⁴-64⁴
64⁴

Shale gray
End Core 12

	meters		feet
Core 13	290.08	19.62	644-652
644-694 ft	289.83	19.87	652-656
19.62-21.15 m	289.71	19.99	656-662
Cut 5° ft / 1.52 m	289.53	20.17	662-667
Recov. 5° ft / 1.52 m	289.37	20.33	667-680
RQD = 35/50	288.98	20.92	680-685
= 70%	288.80	20.90	685-688
	288.73	20.97	688-693
	288.58	21.12	693-694
	288.55	21.15	694

I-70 over Rossville Rd.

Shale, gray
 LS, shaly, platy, gray
 LS, very platy, gray
 LS, hard solid piece ✓
 LS, shaly dark gray ✓
 LS, hard gray solid ✓
 Shaly ✓
 LS, gray ✓
 Shale, gray-green ✓
 End core 13
 Total depth

Willard sh
 Elmont
 LS.

Bm #143			312.414
π	1.501	313.915	
PA 8		1.995	311.920
PA 9		3.01	310.905