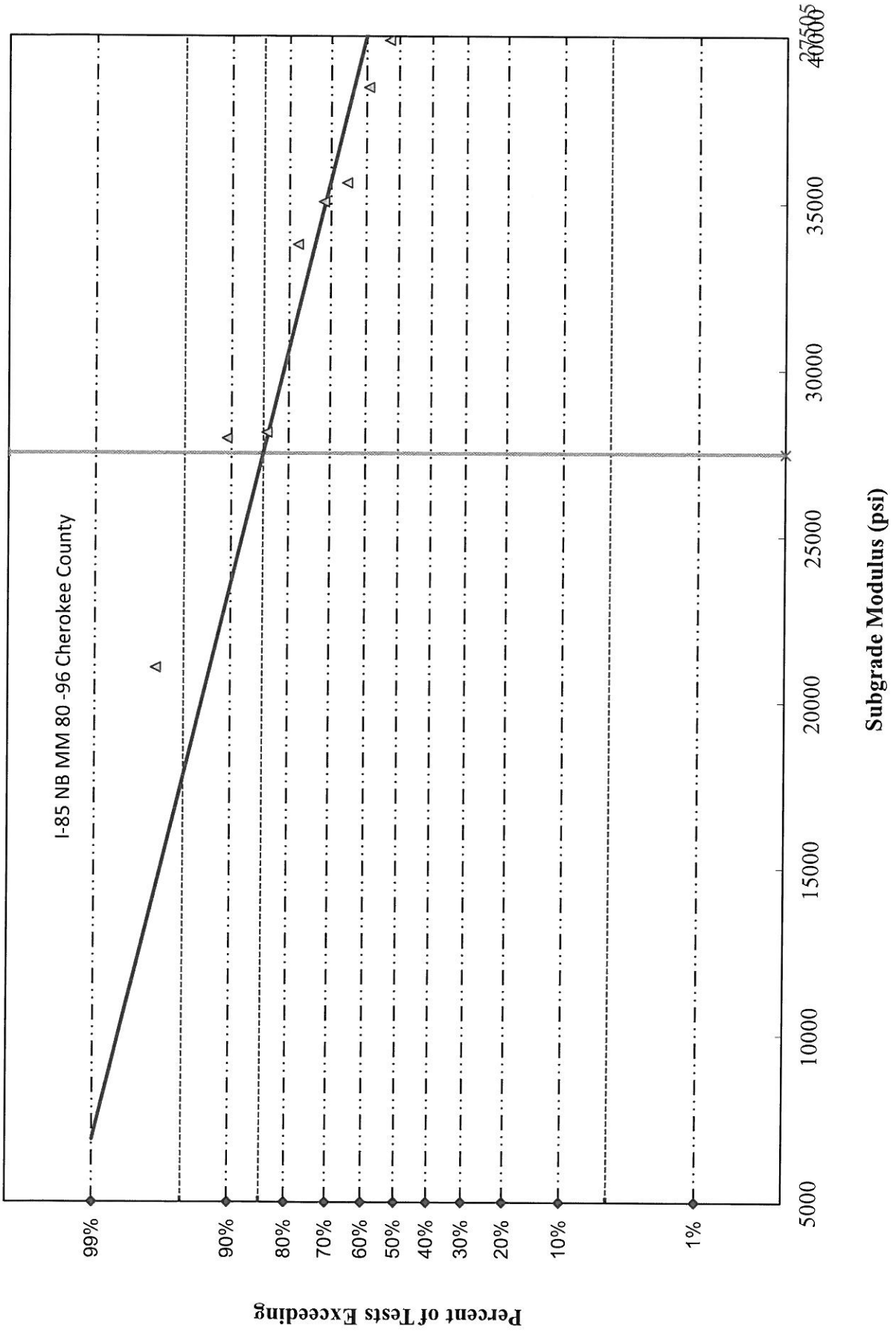
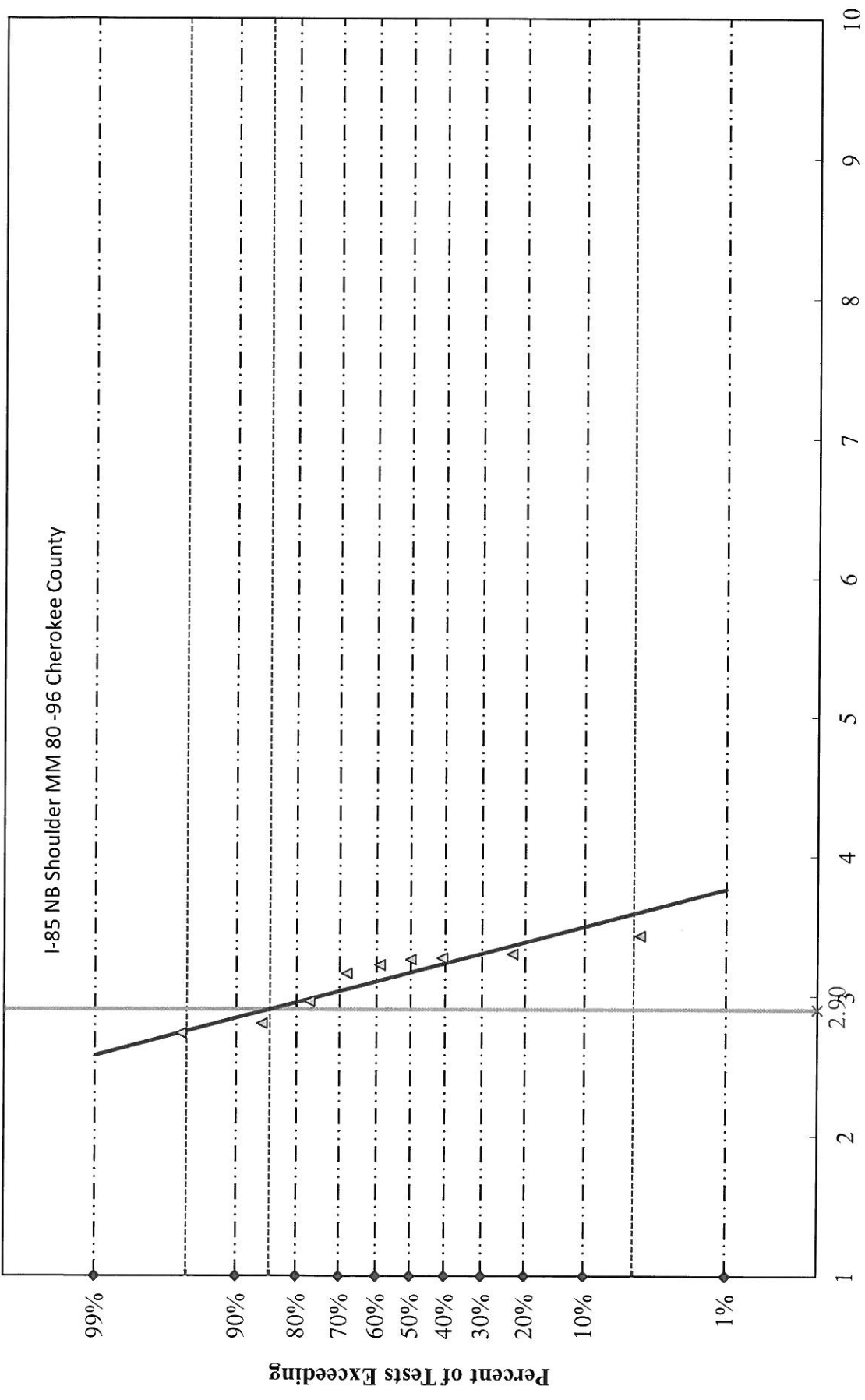
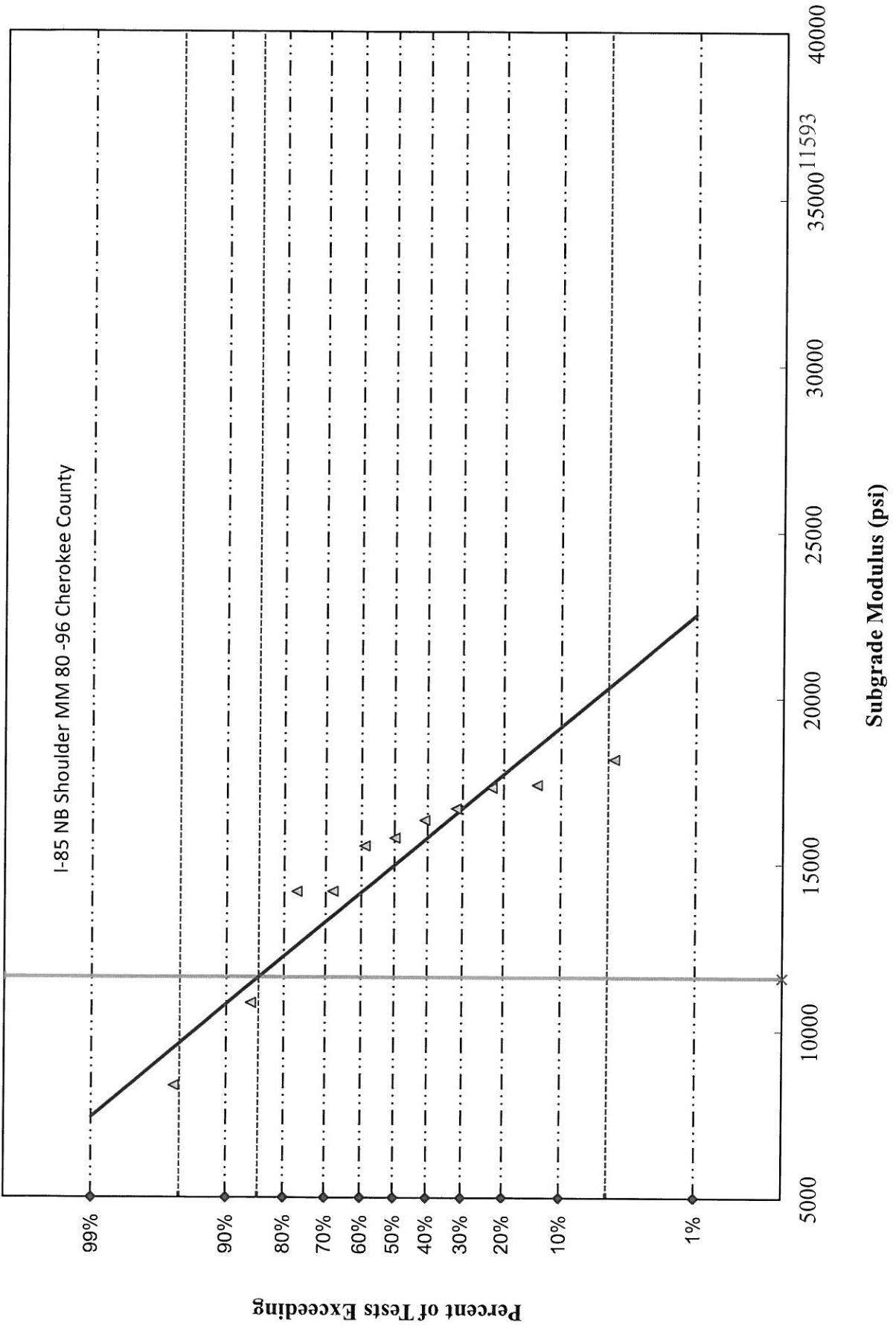


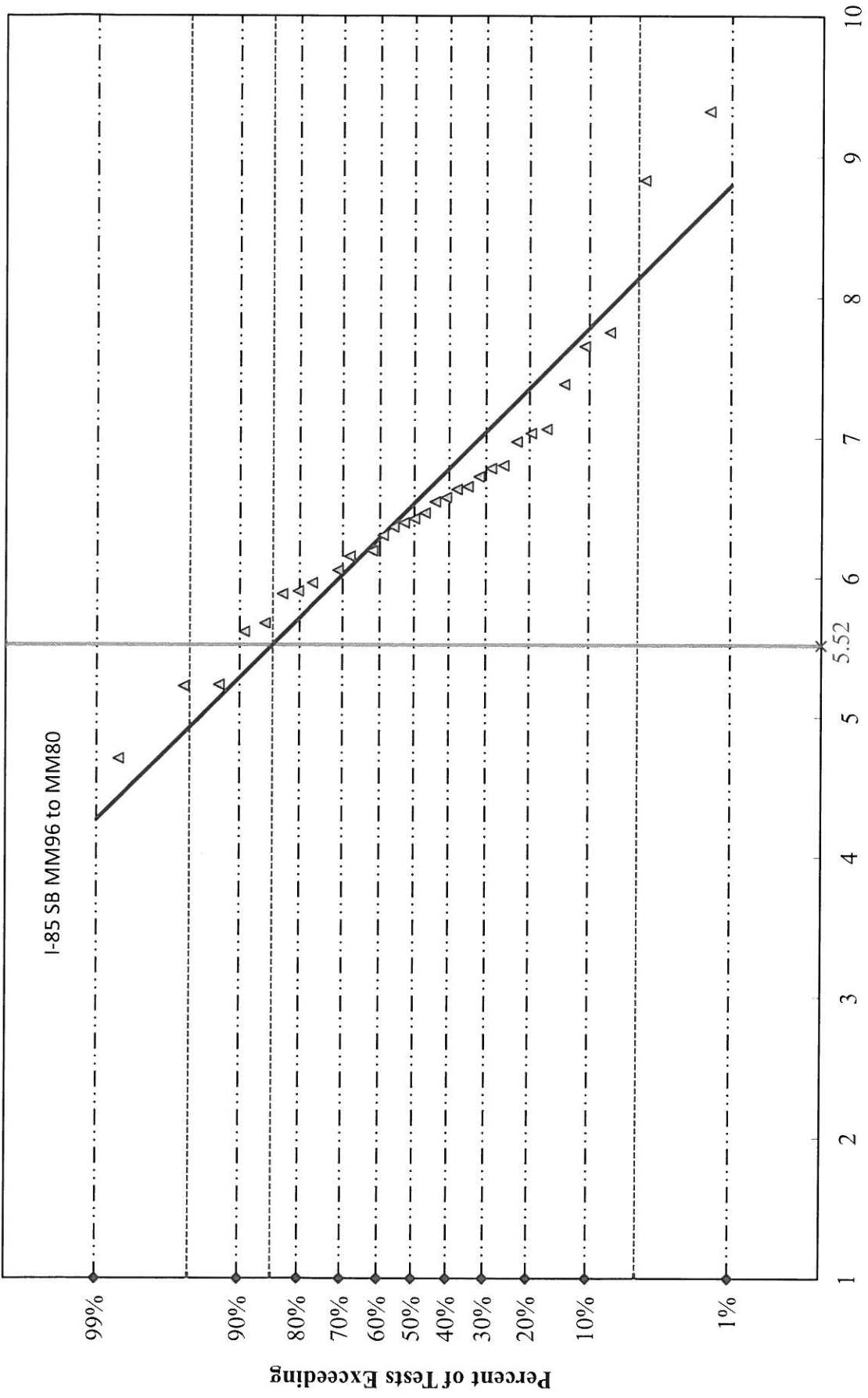
Structure Number (SN)



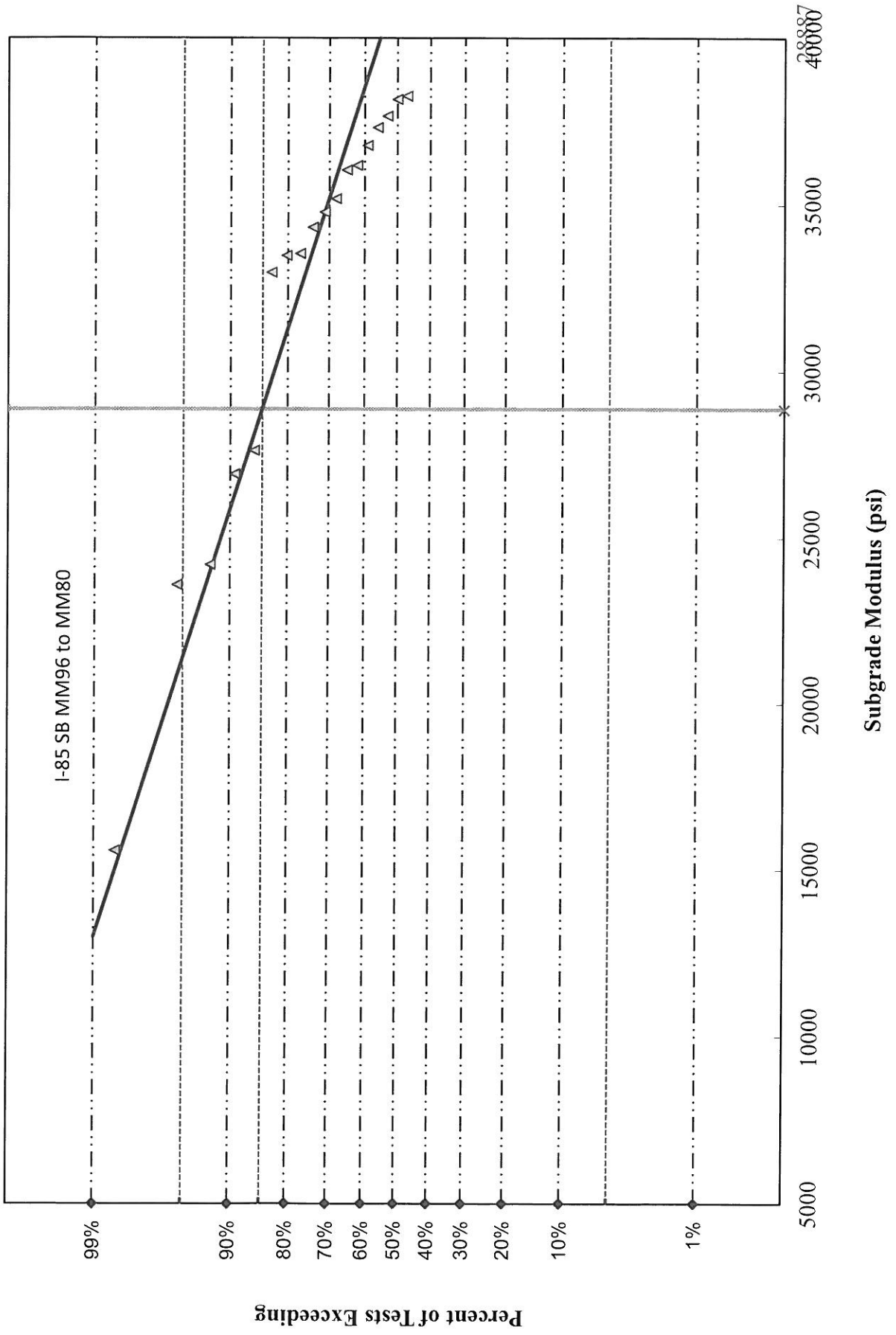


Structure Number (SN)





Structure Number (SN)



CORE DATA

REQUESTOR \_\_\_\_\_

ROAD I-85

FWD FILE # \_\_\_\_\_

LANE/DIRECTION OSB LANE

COUNTY Cherokee

OPERATORS ES/LS

DATE 08/09/2015

DISTANCE	CORE #	DEPTH	BASE	COMMENTS
MM 96.0	1	20" 3/4		1 <sup>st</sup> Core at SB MM 96.0
95.5	2	13 1/4"	MACROKIN	
95.2	3	15 3/4"	" "	5 day Temp
94.5	4	10 1/2"	" "	8-8 - 78
94.0	5	11.0	" "	8-7 - 78
93.5	6	11 1/4"	" "	8-6 - 80
93.0	7	13.0 "	" "	8-5 - 84
92.7	8	21 1/2"	" "	8-4 - 84
92.0	9	13 "	" "	Avg - 80.8
91.5	10	12 3/4"	" "	
91.0	11	12 "	" "	Base 10" Mac
90.5	12	13 "	" "	
90.1	13	15 3/4"	" "	
89.5	14	18 1/2"	" "	
89.0	15	23 "	" "	
88.5	16	16 1/4"	" "	
88.0	17	12 "	" "	
87.5	18	12 1/4"	" "	Layer of AC under macrokin
87.0	19	16 1/2"	" "	
86.5	20	13 "	" "	
86.0	21	13 "	" "	
85.5	22	13 "	" "	SB 1" @ 5.5"-60"
85.0	23	12 "	" "	Layer of AC under macrokin
84.5	24	12 "	" "	Layer of AC "
84.0	25	12 "	" "	Layer of AC under macrokin 5.5"
83.5	26	12 "	" "	" "
83.0	27	13 "	" "	
82.5	28			
	Avg -	14.1481		
	1/2 Avg -	7.0741		
	5/8 -	1.4148		

REQUESTOR L. Gibson

ROAD I-85

FWD FILE # \_\_\_\_\_

LANE/DIRECTION NB

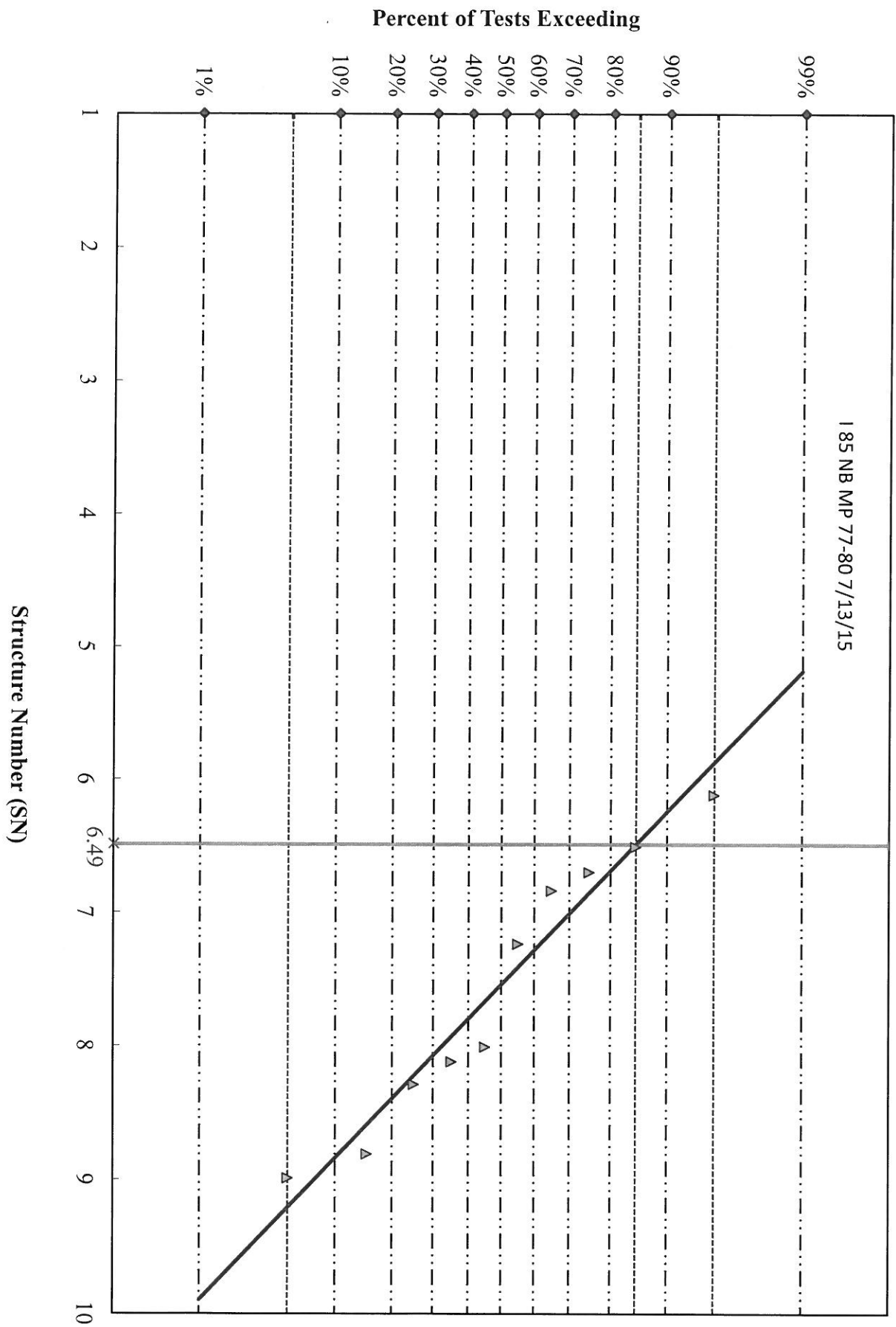
COUNTY Cherokee

OPERATORS R / / / ke

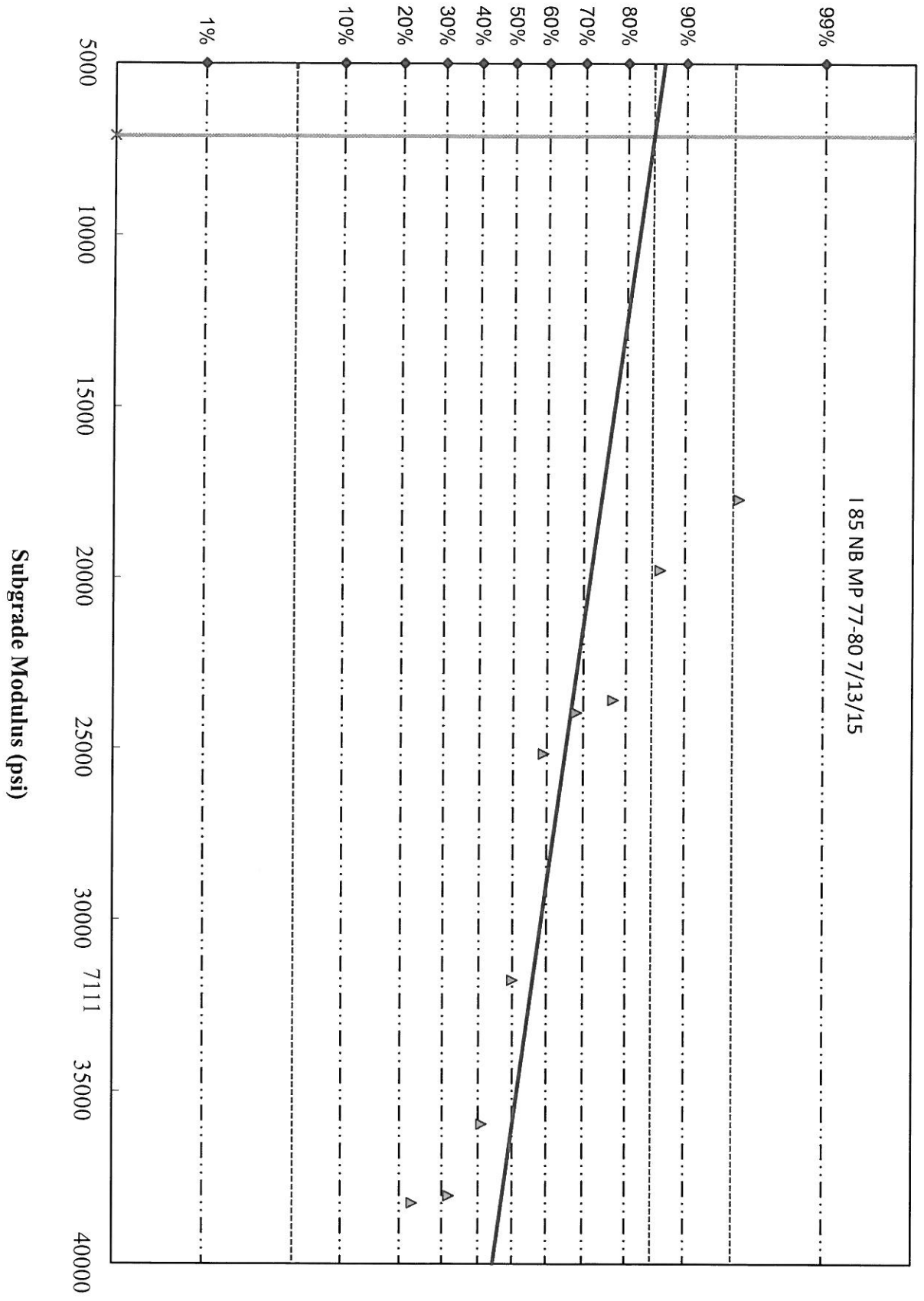
DATE 12/15/15

DISTANCE	CORE #	DEPTH	BASE	COMMENTS
80.5		12.0		
		5.25		Shoulder
81		11.50		
		5.50		Shoulder
82		14.0		
83		15.0		
83.8		14.5		
85		15.0		
		5.0		Shoulder
86		14.5		
88		14.75		
89		21.75		
		22.5		Shoulder
90		19.0		
91		14.5		
		4.75		Shoulder
92		12.0		
		5.0		Shoulder
93		22.0		
94		14.5		
95		14.0		
96		17.75		
		15.0	x	Shoulder
	Avg-Road =	14.714	$\frac{8}{0.8} = 1.4714$	5-day Temp
	± Avg-Road =	7.357		12-14 - 62
				12-13 - 56
				12-12 - 60
	Avg Shoulder =	5.1		12-11 - 56
	± Avg Shoulder =	2.55		12-10 - 52
				Avg - 57.2

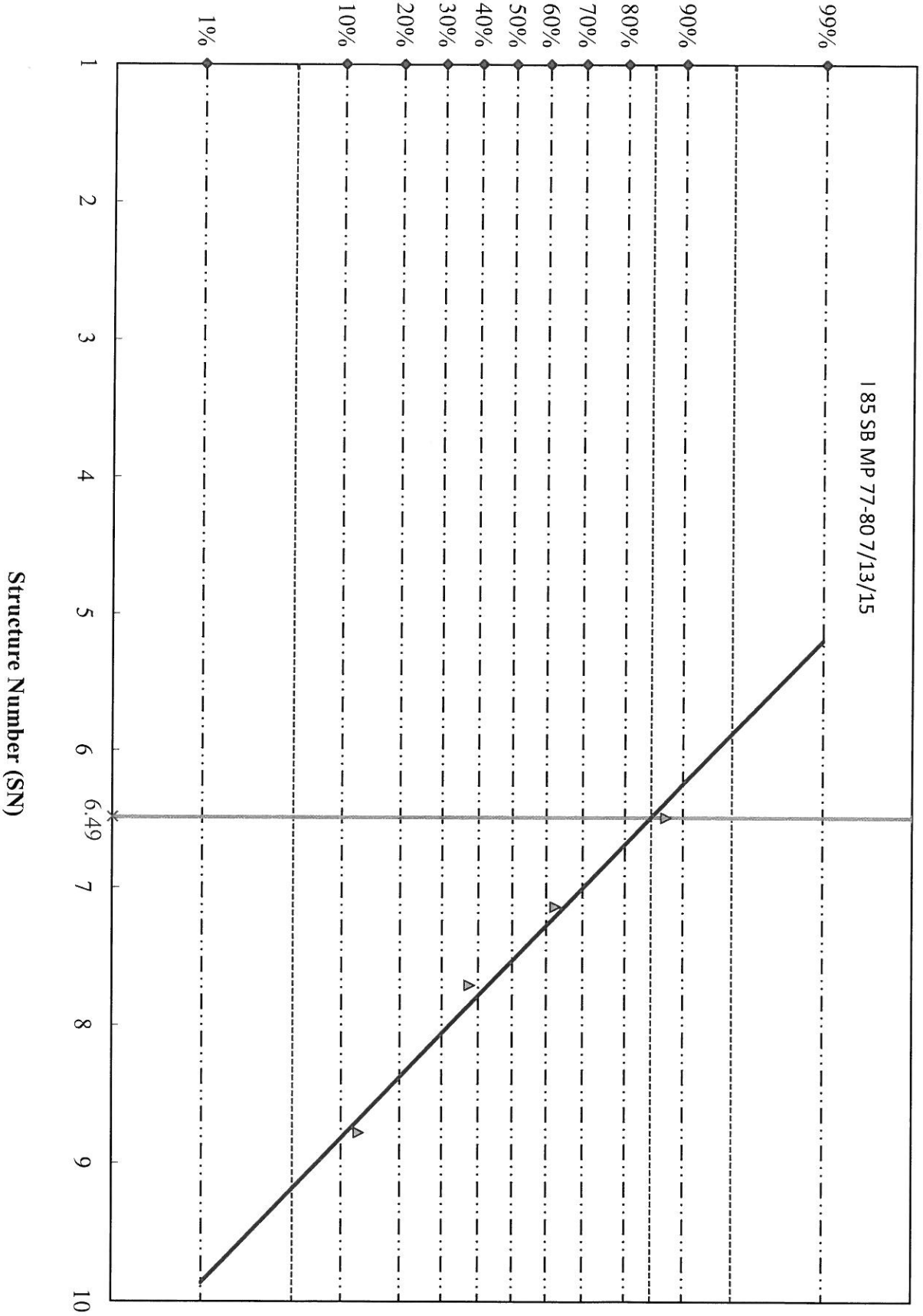




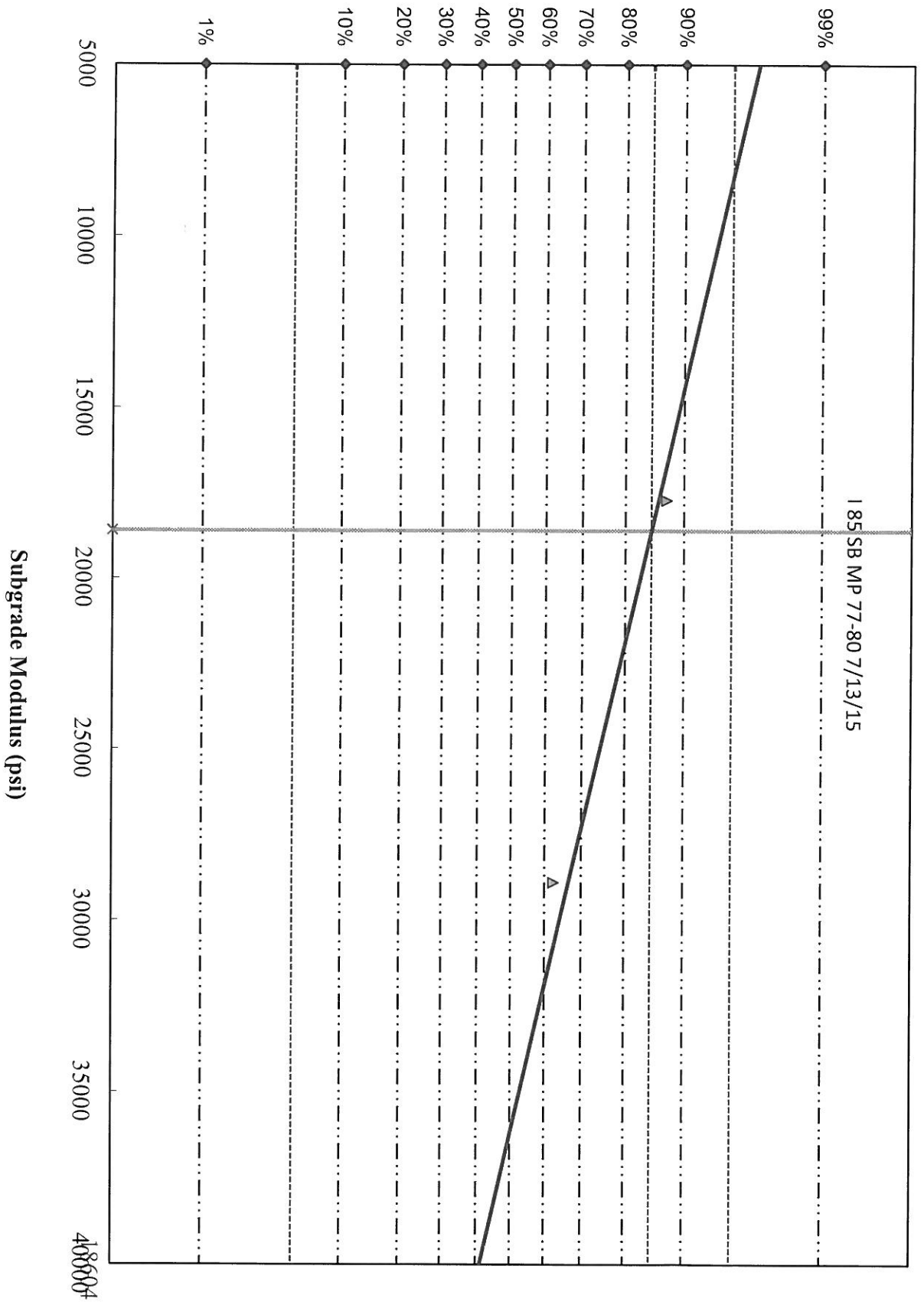
# Percent of Tests Exceeding



Percent of Tests Exceeding



# Percent of Tests Exceeding





# TRAFFIC DATA FOR PAVEMENT LOADING

Factors revised February 1999

Report date: 1/25/2016

County 42 SPART

Route I- 85 Route Name:

Beginning termini: MP 77

Ending termini: MP 96

Beginning mile post: 0.00

1-way  2-way

Number of lanes: 6

Percent Trucks.: 30

Critical Lane: 65

Type of pavement

Flexible  Rigid

Rd. Grp. (A-P) - Class 9 %: O - 66

Base year: 2016

Base year ADT: 73,500

Future year 2026

Projected ADT: 87500

Future year 2036

Projected ADT: 101500

87500

## ONE-WAY EQUIVALENT DAILY 18 KIP SINGLE AXLE LOAD APPLICATIONS IN THE CRITICAL LANE

5 YR. DES. = 1,694.25

10 YR. DES. = 3,491.19

15 YR. DES. = 5,390.81

20 YR. DES. = 7,393.11

YEAR	ADT	AVERAGE ONE-WAY		ADJUSTED TRUCKS	1-WAY EQUIV. 18 KIP	
		ADT	TRUCKS		TOTAL	CRT. LN.
<span style="border: 1px solid black; padding: 2px;">2016</span>	<span style="border: 1px solid black; padding: 2px;">73,500</span>					
<span style="border: 1px solid black; padding: 2px;">2021</span>	<span style="border: 1px solid black; padding: 2px;">80,500</span>	<span style="border: 1px solid black; padding: 2px;">38,500</span>	<span style="border: 1px solid black; padding: 2px;">11,550</span>	<span style="border: 1px solid black; padding: 2px;">2,888</span>	<span style="border: 1px solid black; padding: 2px;">2,606.55</span>	<span style="border: 1px solid black; padding: 2px;">1,694.25</span>
<span style="border: 1px solid black; padding: 2px;">2026</span>	<span style="border: 1px solid black; padding: 2px;">87,500</span>	<span style="border: 1px solid black; padding: 2px;">39,667</span>	<span style="border: 1px solid black; padding: 2px;">11,900</span>	<span style="border: 1px solid black; padding: 2px;">5,950</span>	<span style="border: 1px solid black; padding: 2px;">5,371.06</span>	<span style="border: 1px solid black; padding: 2px;">3,491.19</span>
<span style="border: 1px solid black; padding: 2px;">2031</span>	<span style="border: 1px solid black; padding: 2px;">94,500</span>	<span style="border: 1px solid black; padding: 2px;">40,833</span>	<span style="border: 1px solid black; padding: 2px;">12,250</span>	<span style="border: 1px solid black; padding: 2px;">9,188</span>	<span style="border: 1px solid black; padding: 2px;">8,293.56</span>	<span style="border: 1px solid black; padding: 2px;">5,390.81</span>
<span style="border: 1px solid black; padding: 2px;">2036</span>	<span style="border: 1px solid black; padding: 2px;">101,500</span>	<span style="border: 1px solid black; padding: 2px;">42,000</span>	<span style="border: 1px solid black; padding: 2px;">12,600</span>	<span style="border: 1px solid black; padding: 2px;">12,600</span>	<span style="border: 1px solid black; padding: 2px;">11,374.02</span>	<span style="border: 1px solid black; padding: 2px;">7,393.11</span>

# TRAFFIC DATA FOR PAVEMENT LOADING

Factors revised February 1999

Report date: 1/25/2016

County 42 SPART

Route I- 85 Route Name:

Beginning termini: MP 77

Ending termini: MP 96

Beginning mile post: 0.00

1-way  2-way

Number of lanes: 6

Type of pavement

Percent Trucks.: 30

Flexible  Rigid

Critical Lane: 65

Rd. Grp. (A-P) - Class 9 %: O - 66

Base year: 2016

Base year ADT: 73,500

Future year 2026

Projected ADT: 87500

Future year 2036

Projected ADT: 101500

87500

## ONE-WAY EQUIVALENT DAILY 18 KIP SINGLE AXLE LOAD APPLICATIONS IN THE CRITICAL LANE

5 YR. DES. =	<span style="border: 1px solid black; padding: 2px;">2,480.10</span>	
10 YR. DES. =	<span style="border: 1px solid black; padding: 2px;">5,110.51</span>	
15 YR. DES. =	<span style="border: 1px solid black; padding: 2px;">7,891.24</span>	
20 YR. DES. =	<span style="border: 1px solid black; padding: 2px;">10,822.27</span>	

x 2

4960.2

10221.02

15782.48

21644.54

YEAR	ADT	AVERAGE ONE-WAY		ADJUSTED	1-WAY EQUIV. 18 KIP	
		ADT	TRUCKS		TRUCKS	TOTAL
2016	73,500					
2021	80,500	38,500	11,550	2,888	3,815.54	2,480.10
2026	87,500	39,667	11,900	5,950	7,862.33	5,110.51
2031	94,500	40,833	12,250	9,188	12,140.36	7,891.24
2036	101,500	42,000	12,600	12,600	16,649.64	10,822.27

## MEMORANDUM

**TO:** Brad Reynolds

**FROM:** State Pavement Design Engineer Thompson

**DATE:** February 17, 2016

**RE:** I-85 Spartanburg MM 77-96 Pavement Investigation Summary

On the nights of July 13<sup>th</sup>, August 9<sup>th</sup>, and December 15<sup>th</sup> 2015, OMR collected 67 cores and conducted Falling Weight Deflectometer (FWD) testing. This was done in order to assess the current condition of the pavement and make recommendations for pavement rehabilitation and widening. 6 of these cores were from the shoulder. The remaining 61 cores were all collected from or near the right wheel path of the right (outside, high truck traffic) lane. The following is a summary of our observations from these cores.

### **Mile Marker 77 - 80**

Mainline:

The depth of asphalt averages 17 inches and has an existing structural number of 6.49. The 20 year design requires a SN of 8.27.

The surface conditions of the right lane are as follows. There was generally consistent longitudinal cracking at the middle of the lane with varying intensity of transverse cracking spurring off. Longitudinal joints between lanes are in poor condition with raveling and potholing present to varying degrees. Longitudinal wheel path cracking is present for the majority of the section in varying intensity from tight singular cracks to high severity multiple cracks with transverse cracking spurring off. Slight rutting was observed in the wheel paths of the right lane. Distresses present in the right lane were also observed in the middle lane sometimes exhibiting a lower intensity. Transverse cracking is present on the shoulder.

11 of 11 cores encountered cracking within the near surface HMA. The average depth of cracking was 4.5 inches varying from 2 to 6 inches with the exception of 2 locations where cracking extended to 10 and 13 inches. 5 of 11 cores exhibited debonding at or near the termination of cracking. In general, the mixtures are in relatively good condition. Poor mixture conditions (high void contents, stripping) were only encountered at 1 location existing between 2.75 to 4.25 inches below the surface. The base is in relatively good condition with only 2 locations exhibiting slight stripping near the bottom and 1 location with poor mixture quality in a relatively thin zone. Reference pictures of locations #3 and #8 for typical cores that exhibit cracking and debonding. Reference pictures of location #5 for typical cores that exhibit cracking only.





Shoulder:

The depth of asphalt on the shoulder was not investigated.

### **North Bound Mile Marker 80-96**

Mainline:

The depth of asphalt averages 15.9 inches ranging from 11.5 to 22.5 inches and has an existing structural number of 7.56. The 20 year design requires a SN of 8.27.

The surface conditions from mile marker 80 to approximately 88 in the right lane are as follows. OGFC is in fair condition and consolidated. Longitudinal joints are cracked low to moderate intensity with isolated raveling. There was some transverse cracking, mostly in the left lane and shoulders. Intermittent patches are present throughout the section.

The surface conditions from 88 to 96 are good, having been recently resurfaced with a variable depth uniform 1 to 3 inch milling and replacement of Surface A and OGFC or OGFC only. The milling depth was varied due to the presence of a layer having poor mixture quality near surface. This layer varied in thickness and depth from the surface. In most cases, the layer of poor quality was removed or bridged over with a mill and fill operation and 200 psy of Surface Type A.

2 of 23 cores from 80 to 96 encountered cracking within the near surface HMA. Cracking was very slight and depth was hard to assess. In general, the mixtures are in relatively good condition. Variations in mixture conditions (void contents, stripping) were only encountered at 2 locations (paired with cracking) at approximately 3 inches below the surface and appeared to be isolated and low severity. The HMA base is in relatively good condition with 7 locations exhibiting low to moderate severity isolated stripping and voids near the bottom. The pavement is supported by a Macadam Base that appears to be in relatively good condition.

Reference pictures of locations #1, #8, #15 and #22 for typical variations in mixture quality.

Shoulder:

The average depth of asphalt on the shoulder was 5 inches with the exception of one location measuring 22.5 inches.

### **South Bound Mile Marker 96-80**

Mainline:

South Bound was constructed along the old alignment of SC-29. The descriptions of the existing pavement terminate at the Macadam for the new I-85 pavement section. The depth of asphalt averages 14 inches ranging from 10.5 to 23 inches and has an existing structural number of 5.52. The 20 year design requires a SN of 8.27.

The surface conditions from mile marker 96 to approximately 88 in the right lane are good, having been recently resurfaced with a uniform 1 inch milling and replacement of OGFC. Transverse cracking is present on the shoulders.

The surface conditions from 88 to 80 are relatively fair to poor, not having had the benefit of being recently resurfaced. The majority of distress is present along the longitudinal joints, with cracking (some transverse, predominantly longitudinal), raveling and limited intermittent potholling. There is a longitudinal crack present in the center of the right lane that is intermittent. Slight rutting of the wheel paths of the right lane was observed

No cores were taken to investigate the depth of cracking at joints or along the center of lane cracking. It is assumed that this cracking is limited to the upper structure due to location. All of the 27 cores were taken within the right lane right wheel path. While the surface conditions North Bound and South Bound were similar, the cores indicated different underlying conditions. 17 of 27 cores South Bound encountered debonded layers with an average approximate depth of 6 inches below the surface, ranging from 4.5 to 14.25 inches. These debonded layers are typically located within a layer or layers of mixture that is of questionable quality. The layers are characterized as being rich in liquid AC that is relatively soft or resembling stripping. The AC typically stripped somewhat from the aggregate matrix during coring and in some cases could be indented by pressing with a fingernail. An extraction test was conducted to measure the binder grade. This test indicated results somewhat lower than expected for aged AC. The conditions of these layers varied from fair to poor and ranged from 1.5 to 16.5 inches below the surface. The presence of these questionable mixtures and debonded layers appears to be more prevalent between mile markers 93 to 80.

The HMA base is in relatively good condition having only 4 isolated locations exhibiting slight to moderate stripping and or cracking in the bottom 1 to 2 inches. The pavement is supported by a Macadam Base that appears to be in relatively good condition.

Reference pictures of locations #1, #9, #11, #17, #20, #24 and #25 for a representation of typical variations in mixture quality.

Shoulder:

There were no cores taken on the shoulder.

Attachments:

77-80	96-80 SB
Picture#3	Picture #1
Picture #8	Picture #9
Picture #5	Picture #11
80-96 NB	Picture #17
Picture #1	Picture #20
Picture #8	Picture #24
Picture #15	Picture #25
Picture #22	

**I-85 MILE MARKER 77-80**

3





8

5



# **I-85 Mile Marker 80-96 NB**

**1**





8



**15**



22



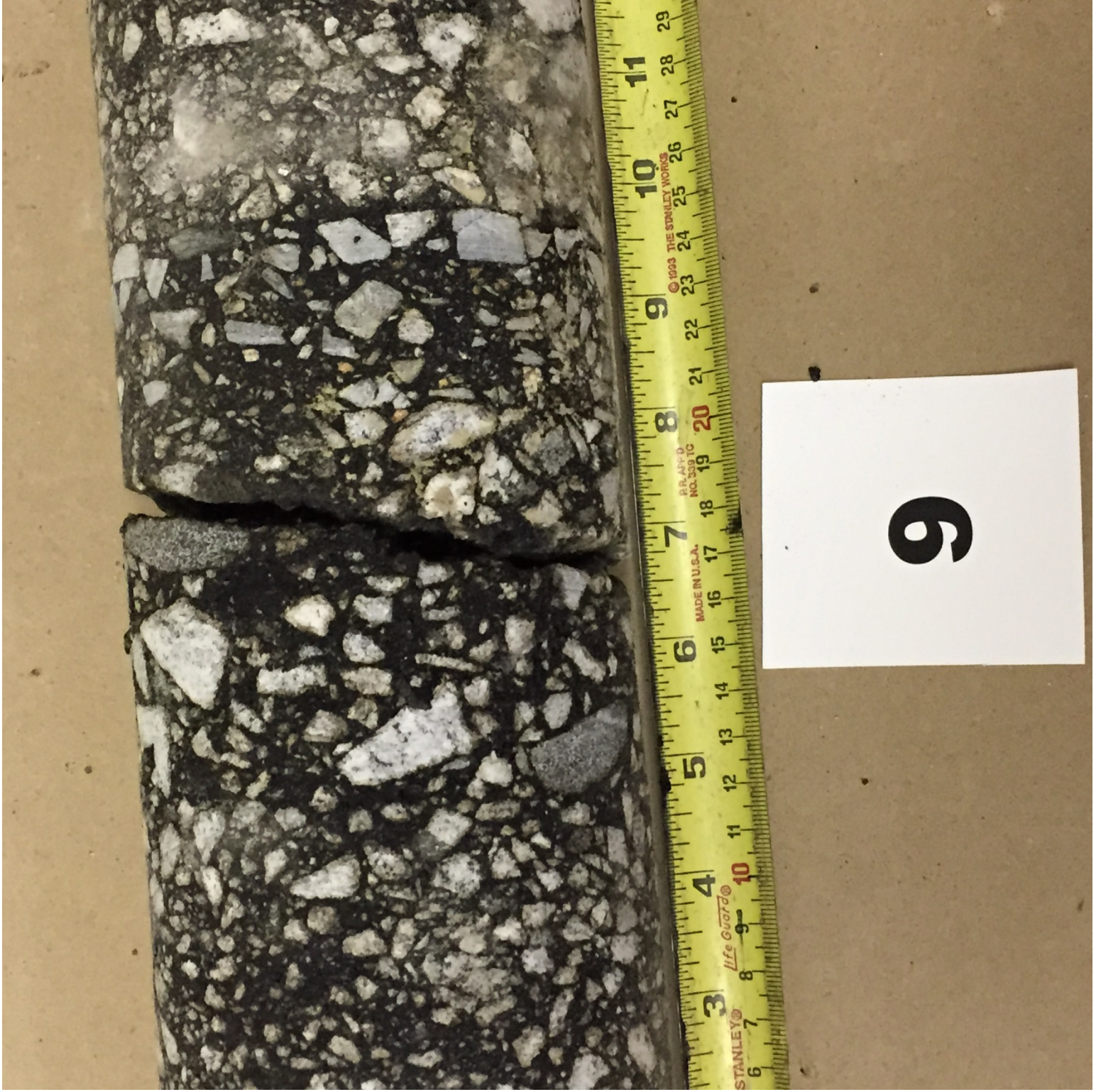
**I-85 SOUTH BOUND  
MILE MARKER 96-80**

**1**



9



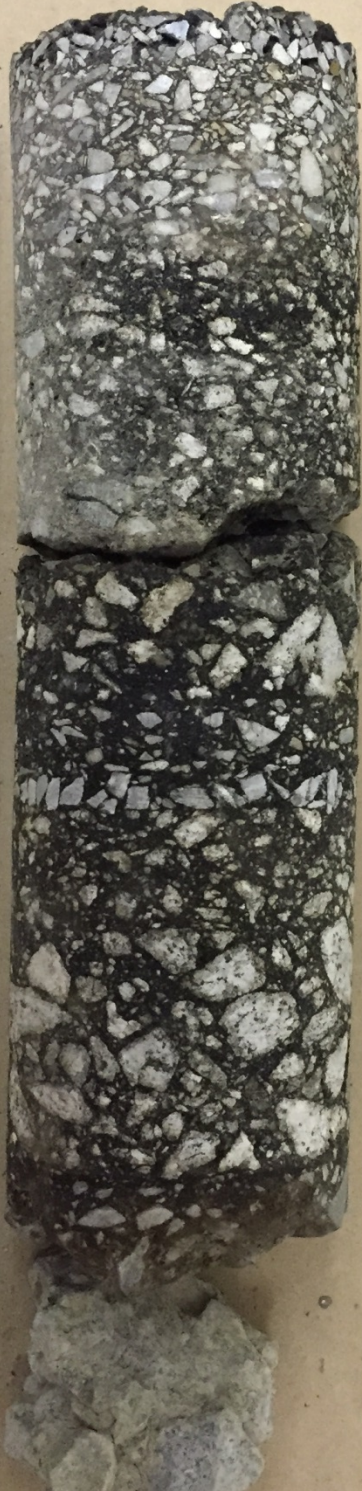


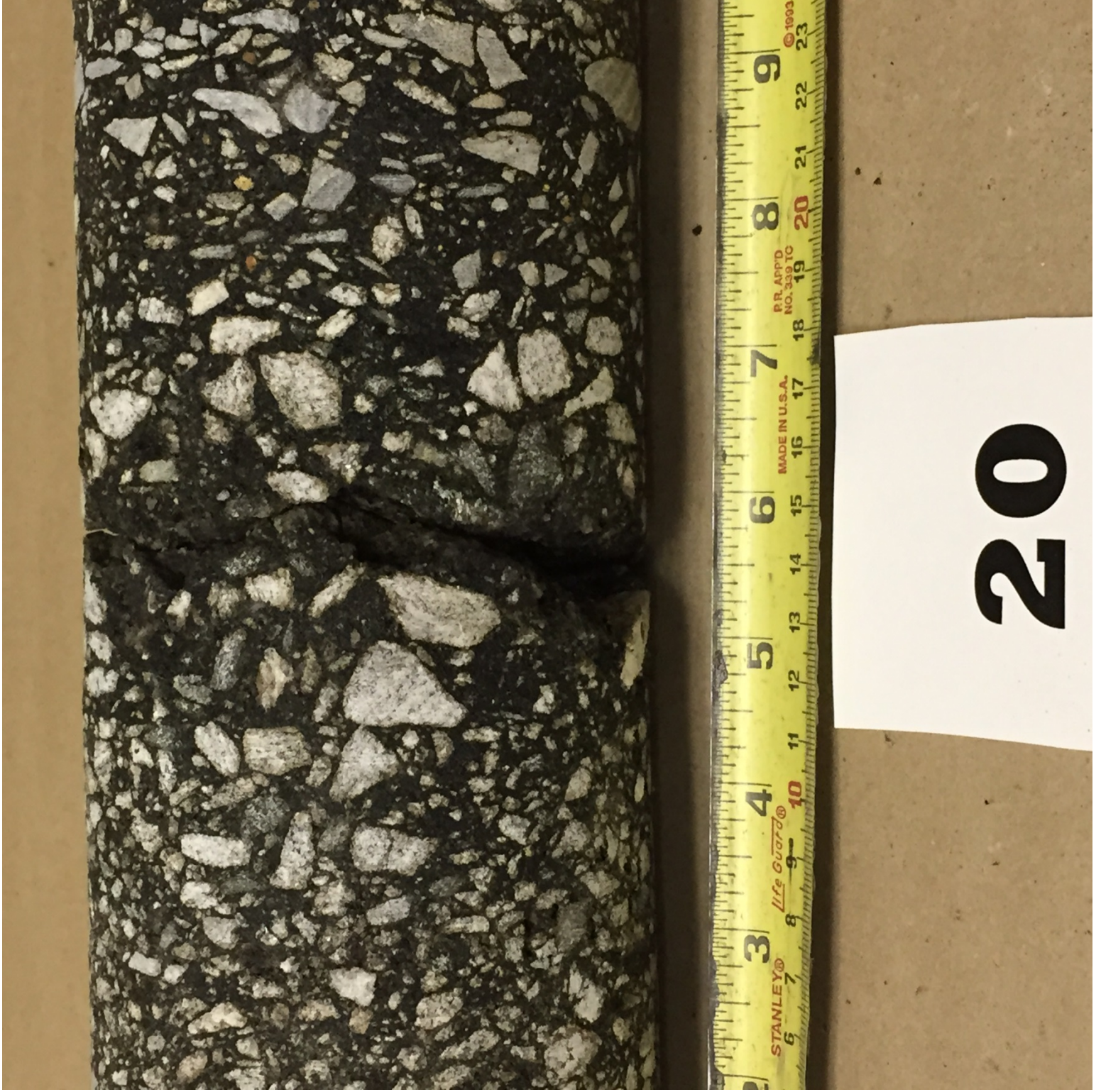
11





17





20



25

