

# PAVEMENT SURVEY AND EVALUATION REPORT

FINANCIAL PROJECT NUMBER: 430644-1



## STATE ROAD 400 (I-4)

SECTION NUMBER: 75280; MP 1.740 to MP 6.018  
**From East of SR 536 to West of SR 528**

ORANGE COUNTY

August 9, 2013

PREPARED BY:

  
William A. Wall  
Pavement Rehabilitation Specialist

APPROVED BY:

  
Rafael M. Rodriguez, PE  
District Materials Office  
PE Number 68482

## **EXECUTIVE SUMMARY**

FPN 430644-1; SR 400 (I-4)  
Section # 75280; MP 1.740 – 6.018

## **REHABILITATION RECOMMENDATIONS**

### **Eastbound Mainline Lanes (R1 and R2): MP 1.740-MP 6.018**

We recommend that 2.75 inches of milling be performed to provide long-term pavement preservation of the existing pavement. This will remove the majority of all cracks and friction course raveling.

### **Eastbound Mainline Lane (R3 and R4): MP 1.740-MP 6.018**

We recommend that 3.25 inches of milling be performed to provide long-term pavement preservation of the existing pavement. This will remove all cracks and friction course raveling.

### **Westbound Mainline Lanes (L1, L2, L3, and L4): MP 1.740-MP 6.018**

We recommend that 2.75 inches of milling be performed to provide long-term pavement preservation of the existing pavement. This will remove all cracks and friction course raveling.

### **Inside and Outside Paved Shoulders (IL, IR, OL and OR): MP 1.740-MP 4.074 & MP 4.607-MP 6.018**

We recommend that 2.00 inches of milling be performed to replace degraded structural course and provide long-term pavement preservation of the existing shoulders.

### **Inside and Outside Paved Shoulders (IL, IR, OL and OR): MP 4.074 to MP 4.607**

The inside and outside paved shoulders in this location are an exception to rehabilitation. This was recently resurfaced in line with work to build an overpass over I-4 linking South International Drive to Palm Parkway.

### **Ramps at the Interchange of SR 535 with SR 400: (75280-079, 75280-080, 75280-019, 75280-082 and 75280-081)**

We recommend a minimal milling scheme of 2.25 inches for the ramps and 1.5 inches of milling for the paved shoulders at each ramp. This will remove deteriorated and oxidized pavement.

### **Ramps at the Interchange of Central Florida Parkway with SR 400: (75280-020, 75280-021 and 75280-022)**

We recommend a milling scheme of 2.75 inches for the ramps and 2.0 inches of milling for the paved shoulders at each ramp. This will remove most of the cracking and all deteriorated surface pavement.

**Base exposure may occur while milling on the shoulders of Ramp 75280-019 (Central Florida Parkway eastbound to I-4 westbound). We recommend that the Designer make provisions for Maintenance of Traffic and protection of base due to thin pavement. The following plans note should be added to the typical sections as appropriate:**

**“During milling operations of the southbound rest area, base exposure may occur at certain locations. The contractor is responsible for protection of the base and Maintenance of Traffic.”**

# PAVEMENT SURVEY AND EVALUATION REPORT

## **STATE ROAD 400 (I-4) From East of SR 536 to West of SR 528**

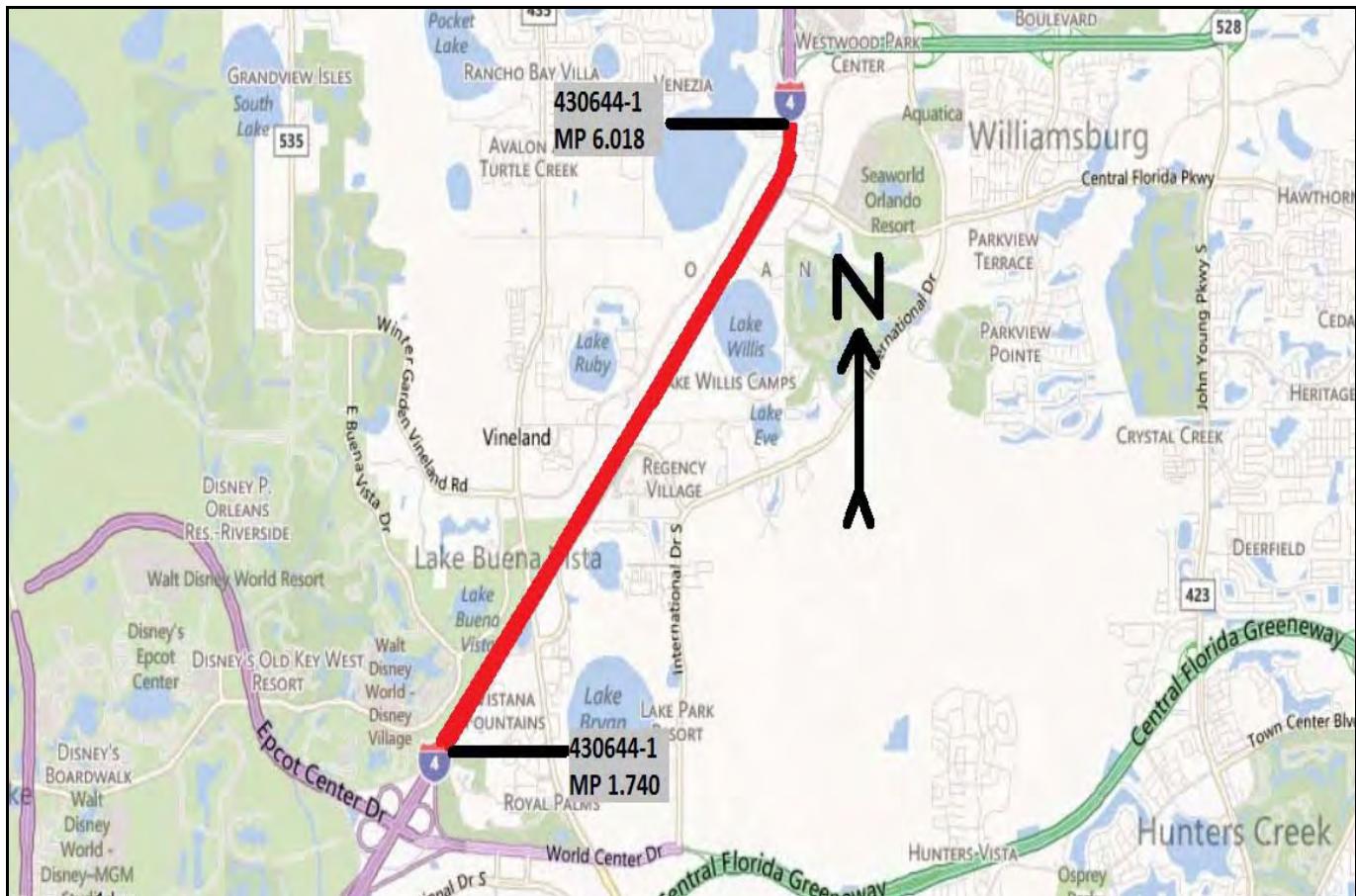
### **INTRODUCTION**

This report presents an analysis of information collected during the above-referenced Pavement Survey and Evaluation (PSE) report. The proposed resurfacing project starts east of the interchange of I-4 with SR 536 (MP 1.740) in Orange County and continues northeast to west of the interchange of I-4 with SR 528 (MP 6.018). This project involves resurfacing of the mainline lanes and paved shoulders of I-4 along with select access ramps.

**Financial Project Number 405515-1-52-01:** This design/build project was from MP 2.655 to MP 6.197 and consisted of resurfacing the existing 6 passing and travel lanes and paved shoulders. New lane widening was done in certain locations to provide continuous auxiliary lanes in both directions. The project was accepted on April 8, 2003.

There is also a project underway to add lanes to I-4 from the Osceola County Line (MP 0.000) to west of SR 528 (MP 5.650). Financial Project Number 242484-8 is currently in preliminary design phase and is not funded for construction. The current Project Manager for this project is Beata Stys-Palasz.

### **LOCATION MAP**



## CORING INFORMATION

Elipsis Engineering & Consulting, LLC performed coring at an interval of approximately two per lane mile on each travel lane, and two per lane mile for the inside and outside shoulders. Cores were not taken in the L2/R2 middle lanes due to safety and traffic concerns. Cores were also not taken from the roadways from MP 3.915 to MP 4.740 due to the construction of an overpass over I-4 at the time coring was taking place. The ramps selected for resurfacing each had one core taken from the ramp pavement and one from its shoulder. Additional cores were taken where conditions warranted. The signed and sealed pavement core sheets (dated July 19, 2013) are included in the Appendix. A total of 65 core samples (28 mainline lanes, 21 from inside/outside paved shoulders, 8 from ramps and 8 from ramp shoulders) were collected from the subject roadway.

In addition, the eastbound bridge over the Central Florida Parkway (Bridge 75200 from MP 5.505 to MP 5.522) had a total of 8 locations drilled to determine asphalt thicknesses at the approaches, and 8 locations for the thickness of the asphalt overlay over the bridge deck.

The core photo directory is included in the Appendix for further review. The following tables show the types of material, average material thickness, layer thickness ranges, and total average pavement thickness along with a min-max range for the different sections of the subject roadway.

- Of the 28 cores taken from the mainline lanes, 5 (18%) were cracked. Of the 5 cores, one core (20%) was cracked full depth to the base. The other 4 cores (80%) were cracked to an average depth of 1.8 inches, with a range of 1.1 to 2.2 inches.
- Of the 21 cores taken from inside/outside paved shoulders, none were cracked.
- Of the 8 cores taken from the ramps, one core (13%) was cracked full depth to the base.
- Of the 8 cores taken from the ramp shoulders, one core (13%) was cracked full depth to the base.

<b>SECTION 75280: SR400 (I-4) Inside Passing and Middle Travel Lanes (R1, R2, L1, L2) MP 1.740-MP 6.018</b>		
Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
FC-5	0.9	0.8 to 1.1
Type SP	1.9	1.0 to 3.2
Type S	1.6	1.0 to 2.0
Type I	4.0	3.3 to 5.0
Binder Course	1.8	1.3 to 2.0
Limerock Base	11.4	9.9 to 13.4
Pavement Thickness:	10.2	8.6 to 12.8

Exceptions:

1) Cores #30 (MP 2.740/R1) and #51 (MP 2.740/L1) have a much thinner asphalt composition than the other cores. They are outliers.

Notes:

2) Core #26 (MP 2.190/L1) has a layer of FC-2 in between the Type SP and Type S layers. It was overlaid during the last resurfacing of the roadway.

**SECTION 75280: SR400 (I-4) Outside Travel Lanes (L3 and R3)**  
MP 1.740-MP 6.018

Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
FC-5	0.9	0.7 to 1.0
Type SP	2.0	1.1 to 2.5
Type S	3.9	2.0 to 5.1
Limerock Base	11.7	10.3 to 13.9
Pavement Thickness:	6.8	5.1 to 8.1

**SECTION 75280: SR400 (I-4) Auxiliary Lanes (L4 and R4)**

Eastbound: MP 1.740-MP 2.130, MP 2.940-4.074 and MP 4.607-MP 5.978  
Westbound: MP 1.804-MP 2.336, & MP 2.940-4.074 and MP 4.607-MP 5.891

Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
FC-5	0.7	0.6 to 1.0
Type SP	3.3	1.4 to 5.7
Type S	2.4	1.2 to 3.5
Limerock Base	12.8	9.2 to 14.5
Pavement Thickness:	5.4	4.6 to 6.3

Notes:

- 3) Cores #5 (MP 1.932/R4), #55 (MP 3.516/R4, #57 (MP 4.792/R4), #59 (MP 5.389/R4) and #30 (MP 5.592/L4) do not have a Type S layer with only Type SP in their structural courses. This is due to lane widening constructed in 2003 to fill in the gaps of the existing auxiliary lanes (L4/R4).

**SECTION 75280: SR400 (I-4) Inside Paved Shoulders (IL and IR)**

MP 1.740-MP 6.018

Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
Type SP	1.9	1.0 to 3.2
Type S	1.3	0.9 to 2.1
Limerock Base	7.4	5.0 to 9.3
Pavement Thickness:	2.8	1.7 to 4.5

Notes:

- 4) Cores #27 (MP 2.190/IL), #33 (MP 3.740/IR) and #48 (MP 5.365/IL) have a layer of FC-2 in between the Type SP and Type S layers. It was overlaid during the last resurfacing of the roadway.  
5) Cores #31 (MP 2.740/IR), #52 (MP 2.740/IL), #50 (MP 3.740/IL) and #35 (MP 5.165/IR) do not have a Type S layer with only Type SP in their structural courses.

**SECTION 75280: SR400 (I-4) Outside Paved Shoulders (OL and OR)**

MP 1.740-MP 6.018

Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
Type SP	2.2	1.2 to 2.6
Limerock Base	8.5	5.6 to 10.8
Pavement Thickness:	2.3	1.2 to 2.6

Exception:

- 6) Core #54 (MP 2.739/OR) has 5.0 inches of asphalt and this is an outlier.

Notes:

- 7) Cores #4 (MP 2.013/OL) has a layer of Type S under the Type SP layer.

**SECTION 75280: SR400 (I-4) Ramp Pavement**

75280-079: SR 535 Eastbound to I-4 Westbound

75280-080: I-4 Eastbound to SR 535 Westbound

75280-019: SR 535 Westbound to I-4 Eastbound

75280-082: SR 535 Westbound to I-4 Eastbound

75280-081: I-4 Westbound to SR 535 Eastbound

Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
FC-5	0.8	0.7 to 1.0
Type S	4.4	3.5 to 5.1
Limerock Base	13.9	10.7 to 15.7
Pavement Thickness:	5.2	4.3 to 6.1

**SECTION 75280: SR400 (I-4) Ramp Outside Paved Shoulders**

75280-079: SR 535 Eastbound to I-4 Westbound

75280-080: I-4 Eastbound to SR 535 Westbound

75280-019: SR 535 Westbound to I-4 Eastbound

75280-082: SR 535 Westbound to I-4 Eastbound

75280-081: I-4 Westbound to SR 535 Eastbound

Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
FC-5	1.0	0.9 to 1.3
Type S	2.0	1.3 to 2.6
Limerock Base	6.9	5.3 to 9.0
Pavement Thickness:	2.6	1.7 to 3.9

Notes:

- 7) Cores #16 (Ramp 081) and #18 (Ramp 081) do not have a surface course of FC-5.

<b>SECTION 75280: SR400 (I-4) Ramp Pavement</b>		
75280-020: Central Florida Parkway Westbound to I-4 Westbound		
75280-021: Central Florida Parkway Eastbound to I-4 Westbound		
75280-022: I-4 Eastbound to Central Florida Parkway Eastbound		
Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
FC-5	0.7	0.4 to 1.0
Type S	2.5	2.4 to 2.6
Soil Cement Base	10.2	9.9 to 10.7
Pavement Thickness:	3.2	2.8 to 3.6

Notes:

8) Core #19 (Ramp 020) has a friction course of FC 9.5 instead of FC-5.

<b>SECTION 75280: SR400 (I-4) Ramp Outside Paved Shoulders</b>		
75280-020: Central Florida Parkway Westbound to I-4 Westbound		
75280-021: Cent. FL Parkway Eastbound to I-4 Westbound		
75280-022: I-4 Eastbound to Cent. FL Parkway Eastbound		
Type of Material (by layer)	Avg. Layer Thickness (in.)	Layer Thickness Range (in.)
Type S	2.0	1.5 to 2.7
Soil Cement Base	6.9	2.8 to 9.2
Pavement Thickness:	2.7	1.5 to 3.8

Notes:

9) Core #12 (Ramp 022) has a surface course of FC-5.

## ROADWAY SURFACE CONDITION

A roadway surface condition survey was performed initially on March 28, 2013. The follow-up survey was done on April 9, 2013.

### SEGMENT: Eastbound Lanes

The eastbound mainline lanes are in fair to poor condition. The inside R1 passing and R2 middle lanes are in fair condition with shallow open-graded friction course cracking, minor asphalt flushing and minor raveling. The R3 travel lane is in poor condition. There is moderate raveling of the coarse aggregates within the friction course and in the wheelpaths. The cracking observed is mostly shallow (under one inch) Class I branch cracking in the wheelpaths. There are also two moderate to severe longitudinal Class II/III cracks at the pavement joints between the R2 to R3 lane, and from the R3 lane to the R4 lane. The R4 auxiliary lane is in fair condition, with pavement distresses similar to the R1 and R2 lanes.

### SEGMENT: Westbound Lanes

The westbound mainline lanes are in fair condition. All lanes (L1, L2, L3, and L4) have mostly shallow (less than one inch) Class I branch cracking of the open-graded friction course in the wheelpaths. There were no significant locations of rippling or raveling of the friction course. There is light to moderate longitudinal cracking in the pavement joints between all mainline lanes.

### SEGMENT: MP 4.074 to MP 4.607

This area was very recently resurfaced across all shoulders and lanes in connection with an overpass that was constructed to link South International Drive to Palm Parkway. The mainline lanes were milled only 0.75 inches deep and resurfaced with new FC-5. This cannot be an exception as the structural courses were not rehabilitated. The inside and outside paved shoulders were reconstructed and are considered exceptions to rehabilitation.

### **SEGMENT: Inside and Outside Paved Shoulders**

The inside paved shoulders are in fair condition with few distresses. The inside shoulders have a negative cross-slope draining inward towards the center grass median. The outside paved shoulders within the project limits are in fair condition with isolated branch cracking, minor rippling, burn marks from automobile fires and deteriorated Type S structural asphalt.

### **SEGMENT: Ramps at SR 535 and Central Florida Parkway**

#### **Ramps at the Interchange of SR 535 with SR 400**

75280-079: SR 535 Eastbound to I-4 Westbound

75280-080: I-4 Eastbound to SR 535 Westbound

75280-019: SR 535 Westbound to I-4 Eastbound

75280-082: SR 535 Westbound to I-4 Eastbound

75280-081: I-4 Westbound to SR 535 Eastbound

These ramps are in fair condition. There is minor Class I surface cracking of the open-graded friction course along with minor rippling in the center of the ramp lanes. There are locations of isolated pop-out raveling of the friction course that is beginning to occur. This is expected to worsen over time between now and the time of resurfacing. The paved shoulders on these ramps are in fair condition with minimal cracking or other pavement distress.

#### **Ramps at the Interchange of Central Florida Parkway with SR 400**

75280-021: Cent. FL Parkway Eastbound to I-4 Westbound

75280-020: Cent. FL Parkway Westbound to I-4 Westbound

75280-022: I-4 Eastbound to Cent. FL Parkway Eastbound

These ramps are in poor condition. There is moderate to severe Class II/III block, branch and longitudinal cracking which is attributed to the soil cement base of the structural and open-graded friction courses along with moderate rippling in the center of the ramp lanes. There is significant raveling of the open-graded friction course. The paved shoulders on these ramps are in fair condition with some cracking that has reflected over from the ramp pavement.

## **CROSS SLOPE AND RUT DEPTH DATA**

Cross slope and rut depth data were collected on the mainline lanes with the use of State Materials Office's Multi-Purpose Survey Vehicle (MPSV). This vehicle uses laser sensors, which are specifically positioned across the width of the test vehicle to measure the cross-slope and rutting. Rut depths and tangent cross slope information for the subject roadway are summarized as follows:

### **RUTTING:**

MP 1.740 to MP 6.018								
Rut	L4	L3	L2	L1	R1	R2	R3	R4
Average (inches)	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Std. Deviation	0.13	0.05	0.05	0.08	0.05	0.05	0.05	0.05
Range (inches)	0.1 to 0.4	0.0 to 0.3	0.0 to 0.2	0.0 to 0.4	0.0 to 0.2	0.0 to 0.3	0.0 to 0.4	0.1 to 0.3

Note: Physical coring data was used for rut calculations for the L4 and R4 auxiliary lanes. MPSV data was only used for the mainline travel lanes.

## CROSS-SLOPE:

The pavement along this project is a six lane standard profile and auxiliary lanes, with the crown in the median. MPSV data was used for the mainline travel lanes. Physical survey will be required to determine cross-slopes for the L4/R4 auxiliary lanes.

MP 1.740 to MP 5.338						
Tangent	L3	L2	L1	R1	R2	R3
Average	2.6	1.9	1.7	1.8	2.0	2.9
Std. Deviation	0.51	0.39	0.45	0.52	0.33	0.37
Range	0.9 to 3.8	1.0 to 3.0	0.5 to 3.3	0.2 to 3.5	0.5 to 3.5	1.6 to 3.9

Transition: MP 5.338 to MP 5.442

MP 5.442 to MP 5.812						
Curves Left	L3	L2	L1	R1	R2	R3
Average	4.1	5.0	3.7	-4.3	-4.5	-4.5
Std. Deviation	0.71	1.05	0.98	0.68	0.53	0.77
Range	2.6 to 5.5	2.6 to 6.7	2.1 to 6.0	-3.0 to -5.8	-3.3 to -5.5	-2.8 to -5.9

Transition: MP 5.812 to MP 5.897

MP 5.897 to MP 6.018						
Tangent	L3	L2	L1	R1	R2	R3
Average	2.4	3.1	1.6	1.2	2.3	3.0
Std. Deviation	0.35	0.24	0.41	0.35	0.19	0.43
Range	2.0 to 2.9	2.8 to 3.6	0.8 to 2.2	0.5 to 1.7	2.0 to 2.7	2.4 to 3.7

Transition: End of Project

Rut and cross-slope data for each ramp to be resurfaced can be found in the Pavement Evaluation Core Data (PECD) sheets found in the Appendix.

**The Designer should plan for additional survey in areas of suspected cross slope irregularities, especially in areas with extreme low or high cross-slope values, to verify the data provided by the MPSV.** Rut depth and cross slope information for all individual core locations are provided in the "Pavement Evaluation and Condition Data" sheets in the Appendix. In addition, the MPSV data is available in the Appendix for review

## RESILIENT MODULUS

If the results of the Falling Weight Deflection testing are not ready by the time this report is signed and sealed, the Resilient Modulus will be sent by a separate memorandum.

## PAVEMENT CONDITION SURVEY

Currently, there is a borderline crack rating of 6.5 for the eastbound lanes according to the 2013 Pavement Condition Survey. The Pavement Condition Survey ratings are in the Appendix for review.

## REHABILITATION RECOMMENDATIONS

### **Eastbound Mainline Lanes (R1 and R2): MP 1.740-MP 6.018**

We recommend that 2.75 inches of milling be performed to provide long-term pavement preservation of the existing pavement. This will remove the majority of all cracks and friction course raveling.

### **Eastbound Mainline Lane (R3 and R4): MP 1.740-MP 6.018**

We recommend that 3.25 inches of milling be performed to provide long-term pavement preservation of the existing pavement. This will remove all cracks and friction course raveling.

**Westbound Mainline Lanes (L1, L2, L3, and L4): MP 1.740-MP 6.018**

We recommend that 2.75 inches of milling be performed to provide long-term pavement preservation of the existing pavement. This will remove all cracks and friction course raveling.

**Inside and Outside Paved Shoulders (IL, IR, OL and OR): MP 1.740-MP 4.074 & MP 4.607-MP 6.018**

We recommend that 2.00 inches of milling be performed to replace degraded structural course and provide long-term pavement preservation of the existing shoulders.

**Inside and Outside Paved Shoulders (IL, IR, OL and OR): MP 4.074 to MP 4.607**

The inside and outside paved shoulders in this location are an exception to rehabilitation. This was recently resurfaced in line with work to build an overpass over I-4 linking South International Drive to Palm Parkway.

**Ramps at the Interchange of SR 535 with SR 400: (75280-079, 75280-080, 75280-019, 75280-082 and 75280-081)**

We recommend a minimal milling scheme of 2.25 inches for the ramps and 1.5 inches of milling for the paved shoulders at each ramp. This will remove deteriorated and oxidized pavement.

**Ramps at the Interchange of Central Florida Parkway with SR 400: (75280-020, 75280-021 and 75280-022)**

We recommend a milling scheme of 2.75 inches for the ramps and 2.0 inches of milling for the paved shoulders at each ramp. This will remove most of the cracking and all deteriorated surface pavement.

**Base exposure may occur while milling on the shoulders of Ramp 75280-019 (Central Florida Parkway eastbound to I-4 westbound). We recommend that the Designer make provisions for Maintenance of Traffic and protection of base due to thin pavement. The following plans note should be added to the typical sections as appropriate:**

**“During milling operations of the southbound rest area, base exposure may occur at certain locations. The contractor is responsible for protection of the base and Maintenance of Traffic.”**

## **APPENDIX**

- i) Notations for Identifying Lane Types
- ii) Pavement Evaluation & Condition Data (PECD) Sheets  
(Dated July 19, 2013) coring by Elipsis Engineering & Consulting, LLC
- iii) **Falling Weight Deflection Test Results**  
(Resilient Modulus Recommendation) dated July XX, 2013
- iv) Ground Penetrating Radar (GPR) and Multi-Purpose Survey Vehicle (MPSV)  
Thickness, Cross-Slope, and Rut Data (Including Cross-Slope Graphs)
- v) Pavement Condition Survey Charts
- vi) Core Photo Directory
- vii) Typical Roadway Survey Photographs

## Notations for Identifying Lane Type

### **6-Lane Sections with Grass Median**

OL	Westbound Outside Paved Shoulder
L4	Westbound Auxiliary Lane
L3	Westbound Outside Lane
L2	Westbound Middle Lane
L1	Westbound Inside Lane
IL	Westbound Inside Paved Shoulder
	Grass Median
IR	Eastbound Inside Paved Shoulder
R1	Eastbound Inside Lane
R2	Eastbound Middle Lane
R3	Eastbound Outside Lane
R4	Eastbound Auxiliary Lane
OR	Eastbound Outside Paved Shoulder

#### Ramps To Be Resurfaced

- 75280-079: SR 535 Eastbound to I-4 Westbound
- 75280-080: I-4 Eastbound to SR 535 Westbound
- 75280-019: SR 535 Westbound to I-4 Eastbound
- 75280-082: SR 535 Westbound to I-4 Eastbound
- 75280-081: I-4 Westbound to SR 535 Eastbound
- 75280-021: Central Florida Parkway Eastbound to I-4 Westbound
- 75280-020: Central Florida Parkway Westbound to I-4 Westbound
- 75280-022: I-4 Eastbound to Central Florida Parkway Eastbound



July 19, 2013

Florida Department of Transportation  
1650 N. Kepler Road  
DeLand, Florida 32724

Attention: Mr. Tim Keefe

Reference: Final Pavement Evaluation and Condition Data Report  
SR 400 (I-4) from East of SR 536 to West of SR 528  
Orange County, Florida  
FPN 430644-1  
Section No: 75280  
Contract No.: C-9570  
EEC Project No.: 12009-4.10

Dear Mr. Keefe:

Per your request, Elipsis Engineering & Consulting (EEC) has obtained pavement core and other relative information for the above referenced project. Our scope of services was conducted in accordance with your request for proposal dated February 26, 2013.

The pavement core data is presented on the attached Pavement Evaluation and Condition Data (PECD) Sheets 1 through 5 and the Bridge Approach & Leave Slab Data Sheet. We have also included supplemental data sheets for the GPS locations and Cross-slope data for each core location, roadway core location photographs, bridge approach slab photographs and core photographs.

To the best of our knowledge, the information presented in the attachments to this letter is accurate and represents the existing pavement conditions at the locations cored. The pavement cores have been retained in storage pending further instructions from FDOT regarding their disposal.

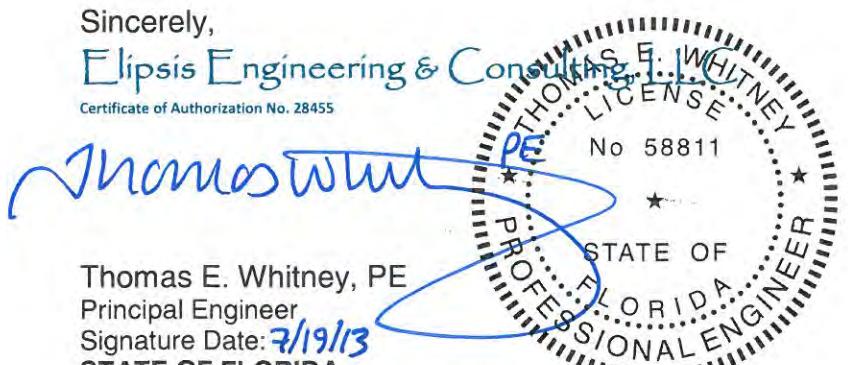
Please feel free to contact us with any concerns or requests for further information.

Sincerely,

Elipsis Engineering & Consulting

Certificate of Authorization No. 28455

Thomas E. Whitney, PE  
Principal Engineer  
Signature Date: 7/19/13  
**STATE OF FLORIDA**  
Registered Professional Engineer No. 58811



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**State of Florida Department of Transportation**  
**PAVEMENT EVALUATION AND CONDITION DATA SHEET**

Project No.:	430644-1	Cored By:	Elipsis Engineering and Consulting	Date:	6/24/13-6/28/13	Page No.:	3 of 5
County:	Orange	Highway Sect. No.:	75280	From:	East of SR 536	To:	West of SR 528
Road No.:	SR 400	Begin MP:	1.740	End MP:	6.018	Length:	4.278
Core No.	MP	Distance from left edge of lane (ft)	Lane Path	Pavement Layer (in.)	Base	Crack	Rut Depth (in)
		FC-5	FC-9.5	SP-12.5 FC-2 Type S	Type 1	Core Length (in)	Cross Slope (%)
33	3.740	3.5	IR		1.0	0.5	-4.8
34	5.165	2.5	R1 X	1.0	2.0	9.9	Overlaid FC-2
35	5.165	5.0	IR		1.7	1.7	
36	5.589	4.0	R1 X	0.9	1.6	3.3	
37	5.589	5.0	IR		1.5	0.9	
38	5.592	10.0	L4 X	0.6	4.1		
39	5.592	5.0	OL		1.6		
40	4.940	9.5	L4 X	0.9	2.3	2.5	
41	4.940	5.5	OL		2.0		
42	3.340	8.0	L4 X	0.8	1.7	3.1	
43	3.340	6.0	OL		1.2		
44	2.140	9.5	L3 X	0.9	2.4	4.4	
45	5.765	2.0	L1 X	0.9	1.6	2.0	
46	5.765	6.5	IL		1.2	0.9	
47	5.365	2.5	L1 X	1.1	1.9	1.0	
48	5.365	7.5	IL		1.5	0.3	

**Remarks:** Crack Depth of "B" indicates full depth crack to the base.

EOP = Edge of Pavement

Crack Extent: L= Light; M= Moderate; S= Severe

Pavement Condition: G= Good; F= Fair; P= Poor

Crack Types: A= Alligator; Bl= Block; Br= Branch

SL= Single Longitudinal; ST= Single Transverse; R= Reflective; J= Joint; OGFC= Open-Graded FC Stress Crack

Base Types: LR= Limerock; COQ= Coquina; SC= Soil Cement; ABC= Asphalt Base; SAHM= Sand Asphalt Hot Mix; NB= No Base



**State of Florida Department of Transportation**

**PAVEMENT EVALUATION AND CONDITION DATA SHEET**

Project No.:	430644-1	Cored By:	Ellipsis Engineering and Consulting	Date:	6/24/13-6/28/13	Page No.:	5 of 5															
County:	Orange	Highway Sect. No.:	75280	From:	East of SR 536	To:	West of SR 528															
Road No.:	SR 400	Begin MP:	1.740	End MP:	6.018	Length:	4.278															
Pavement Layer (in.)																						
Core No.	MP	Distance from left edge of lane (ft)	Lane	Wheel Path	FC-5	FC-4.5	SP-12.5	FC-2	Type J	Binder Course	Core Length (in)	Type	Thickness (in)	Depth (in)	Crack Type	Class	Extent	Pav Cond.	Rut Depth (in)	Cross Slope (%)	Comments	
65	5.716	9.0	R3	X	0.7		2.3		5.1				8.1	LR	10.9	-	-	-	F	0.1	4.0	
66																						
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71																						
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**Remarks:** Crack Depth of "B" indicates full depth crack to the base. EOP = Edge of Pavement

Crack Extent: L= Light; M= Moderate; S= Severe Pavement Condition: G= Good; F= Fair; P= Poor  
SL= Single Longitudinal; ST= Single Transverse; R= Reflective; J= Joint; OGFC= Open-Graded FC Stress Crack

Base Types: LR= Limerock; COQ= Coquina; SC= Soil Cement; ABC= Asphalt Base; SAHM= Sand Asphalt Hot Mix; NB= No Base

## Supplemental Data to PECD

(GPS Coordinates for Each Locations Cored)

SR      400

FIN:      430644-1

County:      Orange

**Core #      GPS Coordinates**

1	28.376788 ° -81.505538 °
2	28.376784 ° -81.505537 °
3	28.369083 ° -81.512503 °
4	28.369084 ° -81.512502 °
5	28.369262 ° -81.51175 °
6	28.369266 ° -81.511751 °
7	28.373115 ° -81.50759 °
8	28.373115 ° -81.50759 °
9	28.378328 ° -81.503217 °
10	28.378328 ° -81.503218 °
11	28.407661 ° -81.476877 °
12	28.407661 ° -81.476877 °
13	28.409362 ° -81.477045 °
14	28.409361 ° -81.477045 °
15	28.379272 ° -81.50381 °
16	28.379272 ° -81.50381 °
17	28.374168 ° -81.506541 °
18	28.374168 ° -81.506541 °
19	28.405304 ° -81.480326 °
20	28.405304 ° -81.480326 °

**Core #      GPS Coordinates**

21	28.405304 ° -81.480326 °
22	28.405304 ° -81.480326 °
23	28.37672 ° -81.505923 °
24	28.37672 ° -81.505923 °
25	28.376214 ° -81.505506 °
26	28.372804 ° -81.508943 °
27	28.372804 ° -81.508943 °
28	28.373513 ° -81.508086 °
29	28.373512 ° -81.508086 °
30	28.378635 ° -81.503478 °
31	28.378635 ° -81.503482 °
32	28.390258 ° -81.493081 °
33	28.390258 ° -81.493081 °
34	28.406496 ° -81.478499 °
35	28.406487 ° -81.478497 °
36	28.411582 ° -81.474611 °
37	28.411575 ° -81.474609 °
38	28.411348 ° -81.475067 °
39	28.411348 ° -81.475067 °
40	28.403751 ° -81.48134 °

## Supplemental Data to PECD

(GPS Coordinates for Each Locations Cored)

SR      400

FIN:      430644-1

County:      Orange

**Core #      GPS Coordinates**

41	28.403745 ° -81.481334 °
42	28.385917 ° -81.497355 °
43	28.385915 ° -81.497354 °
44	28.372158 ° -81.509666 °
45	28.413707 ° -81.474336 °
46	28.413707 ° -81.474336 °
47	28.408549 ° -81.476939 °
48	28.408549 ° -81.47694 °
49	28.390048 ° -81.493524 °
50	28.390049 ° -81.493524 °
51	28.378667 ° -81.503747 °
52	28.37867 ° -81.503748 °
53	28.378467 ° -81.503478 °
54	28.378466 ° -81.503478 °
55	28.387312 ° -81.495557 °
56	28.387312 ° -81.495557 °
57	28.401849 ° -81.482514 °
58	28.401847 ° -81.482509 °
59	28.408646 ° -81.476438 °
60	28.408644 ° -81.476437 °

**Core #      GPS Coordinates**

61	28.408574 ° -81.477027 °
62	28.389212 ° -81.494372 °
63	28.378708 ° -81.503801 °
64	28.385352 ° -81.497374 °
65	28.412859 ° -81.47416 °
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### Supplemental Data to PECD

(Cross-Slope Data for Each Locations Cored)

SR 400

FIN: 430644-1

County: Orange

Core #	MP	Lane	0 to 6 feet	6 to 12 feet
1	2.540	L3	3.3	3.8
2	2.540	OL	4.3	
3	2.013	L4	2.7	2.4
4	2.013	OL	6.3	
5	1.932	R4	4.7	4.3
6	1.932	OR	6.2	
7	600' From Gore	Ramp	9.4	8.8
8	600' From Gore	Shoulder	10.0	
9	700' From Gore	Ramp	2.4	3.6
10	700' From Gore	Shoulder	4.1	
11	750' From Gore	Ramp	-2.3	-0.6
12	750' From Gore	Shoulder	1.0	
13	528' From Gore	Ramp	-2.0	-1.7
14	528' From Gore	Shoulder	2.8	
15	528' From Gore	Ramp	1.1	0.7
16	528' From Gore	Shoulder	5.1	
17	1056' From Gore	Ramp	10.0	9.6
18	1056' From Gore	Shoulder	8.7	
19	1028' From Gore	Ramp	2.1	1.7
20	1028' From Gore	Shoulder	3.0	

Core #	MP	Lane	0 to 6 feet	6 to 12 feet
21	528' From Gore	Ramp	1.8	1.9
22	528' From Gore	Shoulder	3.9	
23	2.239	R3	3.3	3.4
24	2.239	OR	5.2	
25	2.541	R4	3.4	3.0
26	2.190	L1	2.2	2.1
27	2.190	IL	-4.8	
28	2.290	R1	2.1	2.8
29	2.290	IR	-4.8	
30	2.740	R1	1.5	0.9
31	2.740	IR	-2.8	
32	3.740	R1	2.3	1.8
33	3.74	IR	-4.8	
34	5.165	R1	1.7	1.7
35	5.165	IR	-5.1	
36	5.589	R1	-4.1	-5.0
37	5.589	IR	-4.4	
38	5.592	L4	4.3	4.2
39	5.592	OL	5.2	
40	4.94	L4	3.1	2.6

## Supplemental Data to PECD

(Cross-Slope Data for Each Locations Cored)

SR 400

FIN: 430644-1

County: Orange

Core #	MP	Lane	0 to 6 feet	6 to 12 feet
41	4.940	OL	3.2	
42	3.340	L4	2.0	2.3
43	3.340	OL	5.1	
44	2.140	L3	2.4	2.8
45	5.765	L1	5.3	4.6
46	5.765	IL	-3.8	
47	5.365	L1	0.9	0.8
48	5.365	IL	-4.7	
49	3.740	L1	1.9	1.9
50	3.740	IL	-4.5	
51	2.740	L1	2.1	2.2
52	2.740	IL	-3.2	
53	2.739	R4	3.2	2.4
54	2.739	OR	-5.2	
55	3.516	R4	3.1	2.7
56	3.516	OR	5.1	
57	4.792	R4	2.6	2.5
58	4.792	OR	4.2	
59	5.389	R4	0.6	0.2
60	5.389	OR	6.7	

Core #	MP	Lane	0 to 6 feet	6 to 12 feet
61	5.365	L3	2.8	1.5
62	3.665	L3	3.1	2.4
63	2.741	L3	2.4	2.6
64	3.342	R3	3.8	2.9
65	5.716	R3	3.7	4.3
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**State of Florida Department of Transportation**

**BRIDGE APPROACH AND LEAVE SLAB DATA SHEET**

Project No.:	430644-1	Cored By:	Ellipsis Engineering and Consulting	Date:	6/24/13-6/28/13	To:	West of SR 528	Page No.:	1 of 1		
County:	Orange	Highway Sect. No.:	75280	From:	East of SR 536						
Road No.:	SR 400	Begin MP:	1.740	End MP:	6.018	Length:	4.278				
Core No.	MP	Pavement Layer (in.)				Base	Crack	Pavt Cond.	Rut Depth (in)	Cross Slope (%)	Comments
		Distance from left edge of lane (ft)	Lane	Wheel Path		Core Length (in)	Type	Thickness (in)	Depth (in)	Type	
D-1	5.505	4.0	R1			—	—	—	—	—	Asphalt thickness is 2.3"
D-2	5.505	6.0	IR			—	—	—	—	—	Approach Slab for Bridge #750200
D-3	5.511	5.0	R1			—	—	—	—	—	Asphalt thickness is 3.8"
D-4	5.511	5.5	IR			—	—	—	—	—	Approach Slab for Bridge #750200
D-5	5.517	5.0	R1			—	—	—	—	—	Asphalt thickness is 2.3"
D-6	5.517	5.0	IR			—	—	—	—	—	Bridge Deck for Bridge #750200
D-7	5.523	6.0	R1			—	—	—	—	—	Asphalt thickness is 2.3"
D-8	5.523	5.5	IR			—	—	—	—	—	Leave Slab for Bridge #750200
D-9	5.505	6.0	R4			—	—	—	—	—	Asphalt thickness is 1.5"
D-10	5.505	5.5	OR			—	—	—	—	—	Leave Slab for Bridge #750200
D-11	5.511	6.0	R4			—	—	—	—	—	Asphalt thickness is 1.8"
D-12	5.511	5.0	OR			—	—	—	—	—	Approach Slab for Bridge #750200
D-13	5.516	6.5	R4			—	—	—	—	—	Asphalt thickness is 2.5"
D-14	5.516	6.0	OR			—	—	—	—	—	Bridge Deck for Bridge #750200
D-15	5.522	6.5	R4			—	—	—	—	—	Asphalt thickness is 2.3"
D-16	5.522	6.5	OR			—	—	—	—	—	Leave Slab for Bridge #750200

**Remarks:** Crack Depth of "B" indicates full depth crack to the base.

EOP = Edge of Pavement

Crack Extent: L= Light; M= Moderate; S= Severe Pavement Condition: G= Good; F= Fair; P= Poor

SL= Single Longitudinal; ST= Single Transverse; R= Reflective; J= Joint; OGFC= Open-Graded FC Stress Crack

Base Types: LR= Limerock; COQ= Coquina; SC= Soil Cement; ABC= Asphalt Base; SAHM= Sand Asphalt Hot Mix; NB= No Base

Crack Types: A= Alligator; Bl= Block; Br= Branch

## Supplemental Data to PECD

(GPS Coordinates for Bridge Leave and Approach Slab locations)

SR 400

FIN: 430644-1

County: Orange

Core # GPS Coordinates

1	28.4101 ° -81.4754 °
2	28.4101 ° -81.4754 °
3	28.41016 ° -81.4754 °
4	28.41016 ° -81.4754 °
5	28.41022 ° -81.4753 °
6	28.41022 ° -81.4753 °
7	28.41032 ° -81.4752 °
8	28.41032 ° -81.4752 °
9	28.41005 ° -81.4753 °
10	28.41005 ° -81.4753 °
11	28.41013 ° -81.4752 °
12	28.41013 ° -81.4752 °
13	28.4102 ° -81.4752 °
14	28.4102 ° -81.4752 °
15	28.4103 ° -81.4751 °
16	28.41029 ° -81.4751 °
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Core # GPS Coordinates

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## Supplemental Data to PECD

(Cross-Slope Data for Bridge Leave & Approach Slab locations)

SR 400 FIN: 430644-1 County: Orange

Core #	MP	Lane	0 to 6 feet	6 to 12 feet
1	5.505	R1	-4.9	-5.6
2	5.505	IR	-3.8	
3	5.511	R1	-5.9	-6.0
4	5.511	IR	-5.7	
5	5.517	R1	-5.6	-5.6
6	5.517	IR	-5.6	
7	5.523	R1	-5.4	-5.6
8	5.523	IR	-3.1	
9	5.505	R4	-2.4	-3.0
10	5.505	OR	-3.2	
11	5.511	R4	-4.8	-5.4
12	5.511	OR	-5.2	
13	5.516	R4	-4.6	-4.9
14	5.516	OR	-6.0	
15	5.522	R4	-4.2	-4.8
16	5.522	OR	-5.2	
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Core #	MP	Lane	0 to 6 feet	6 to 12 feet
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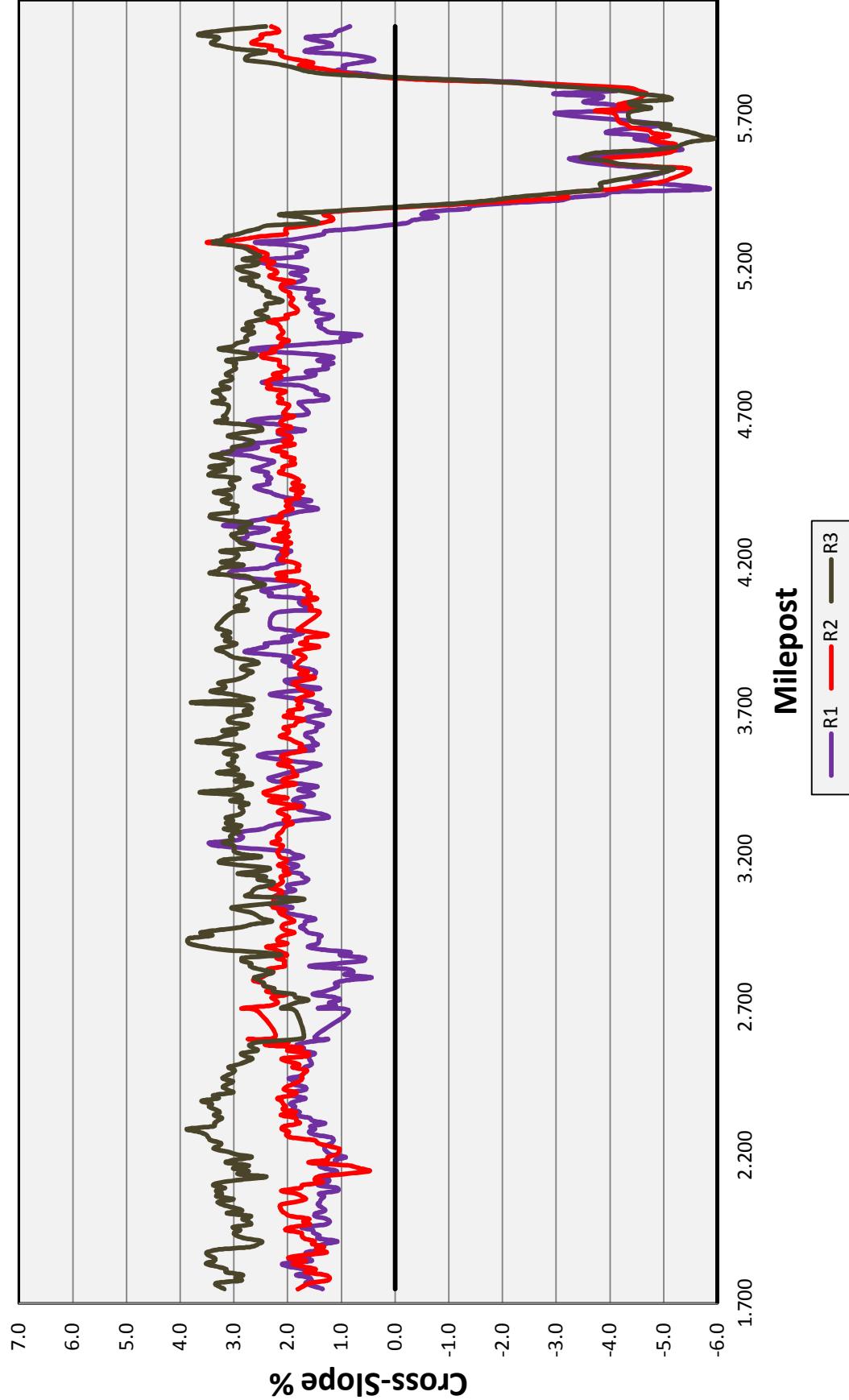




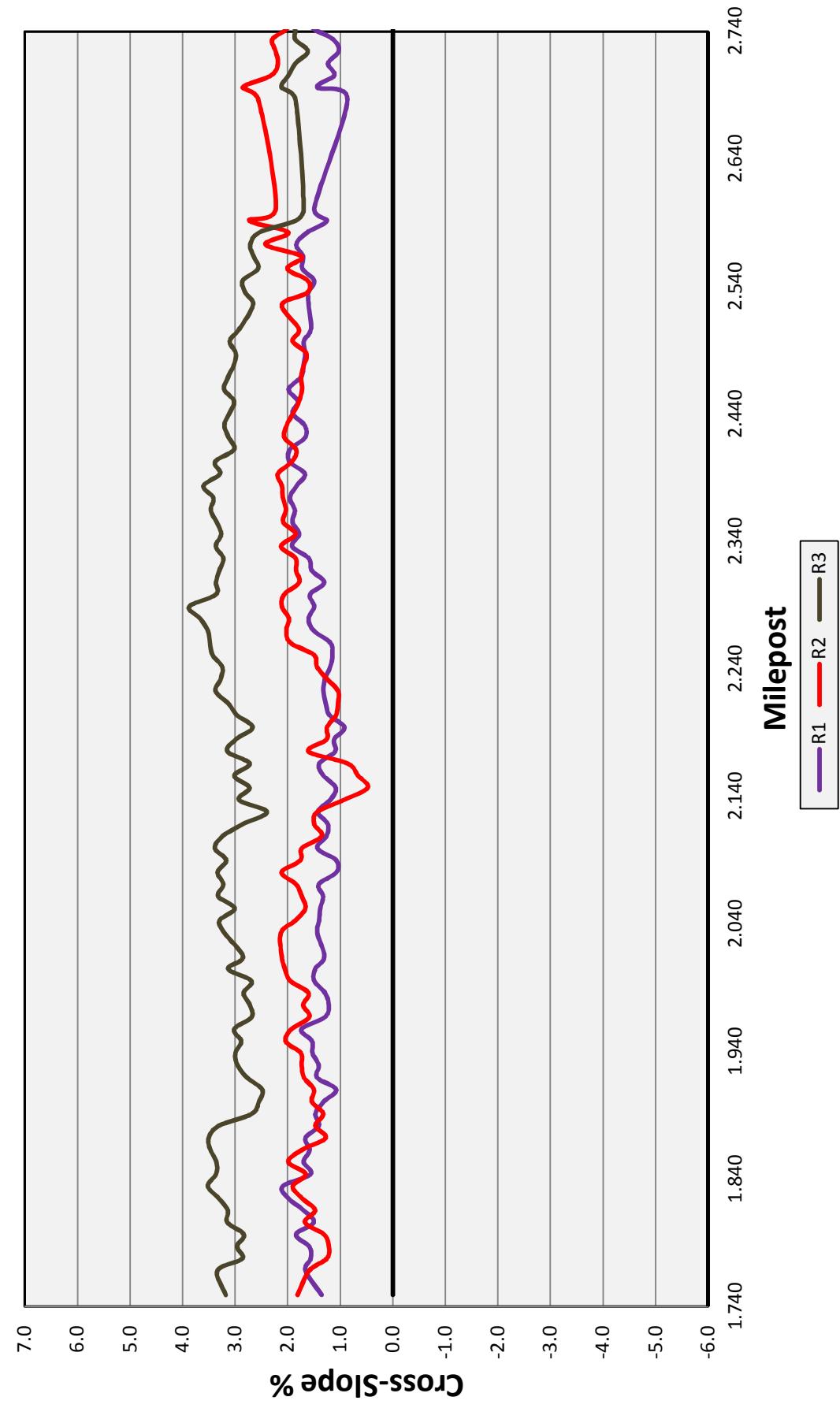




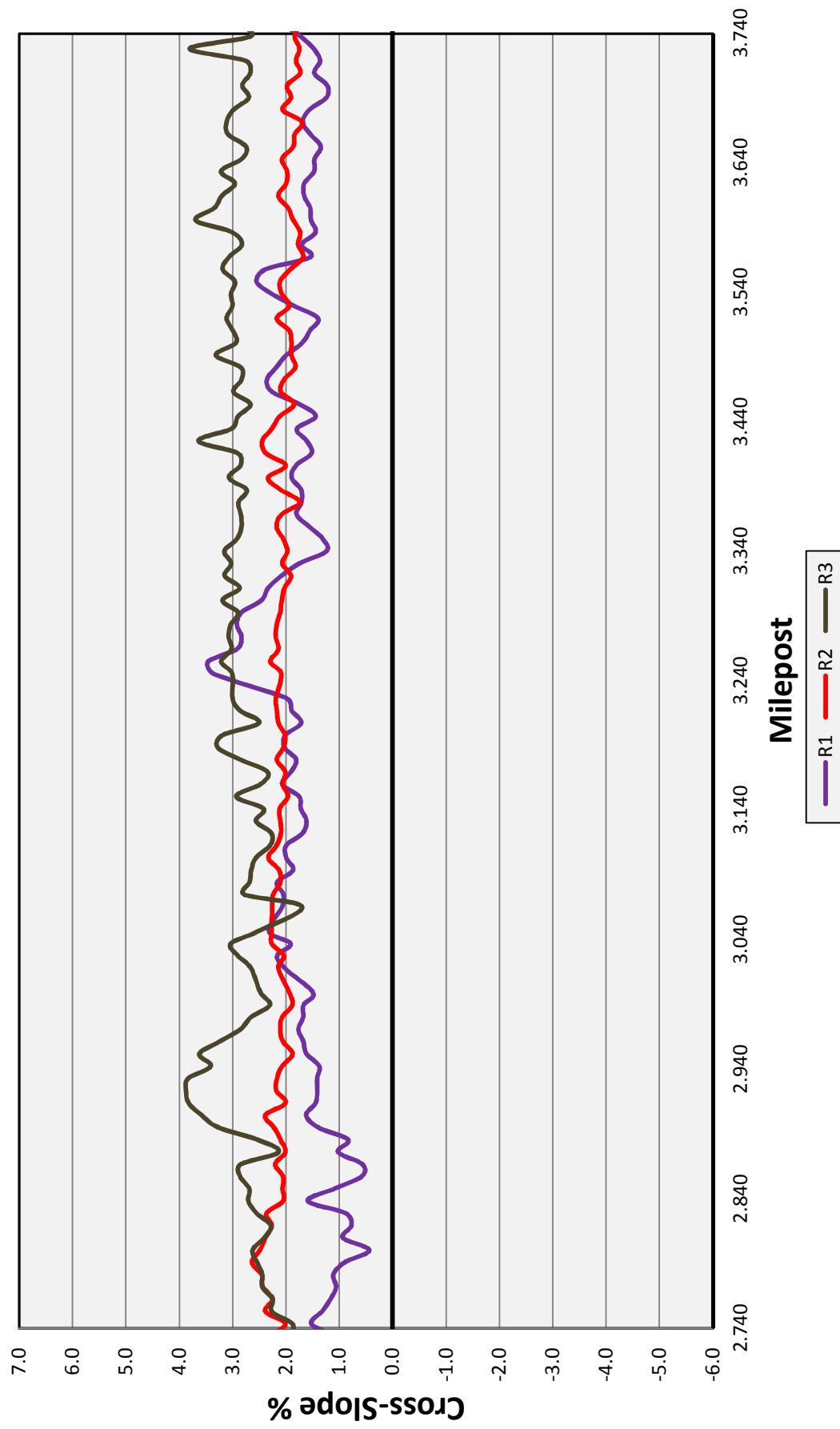
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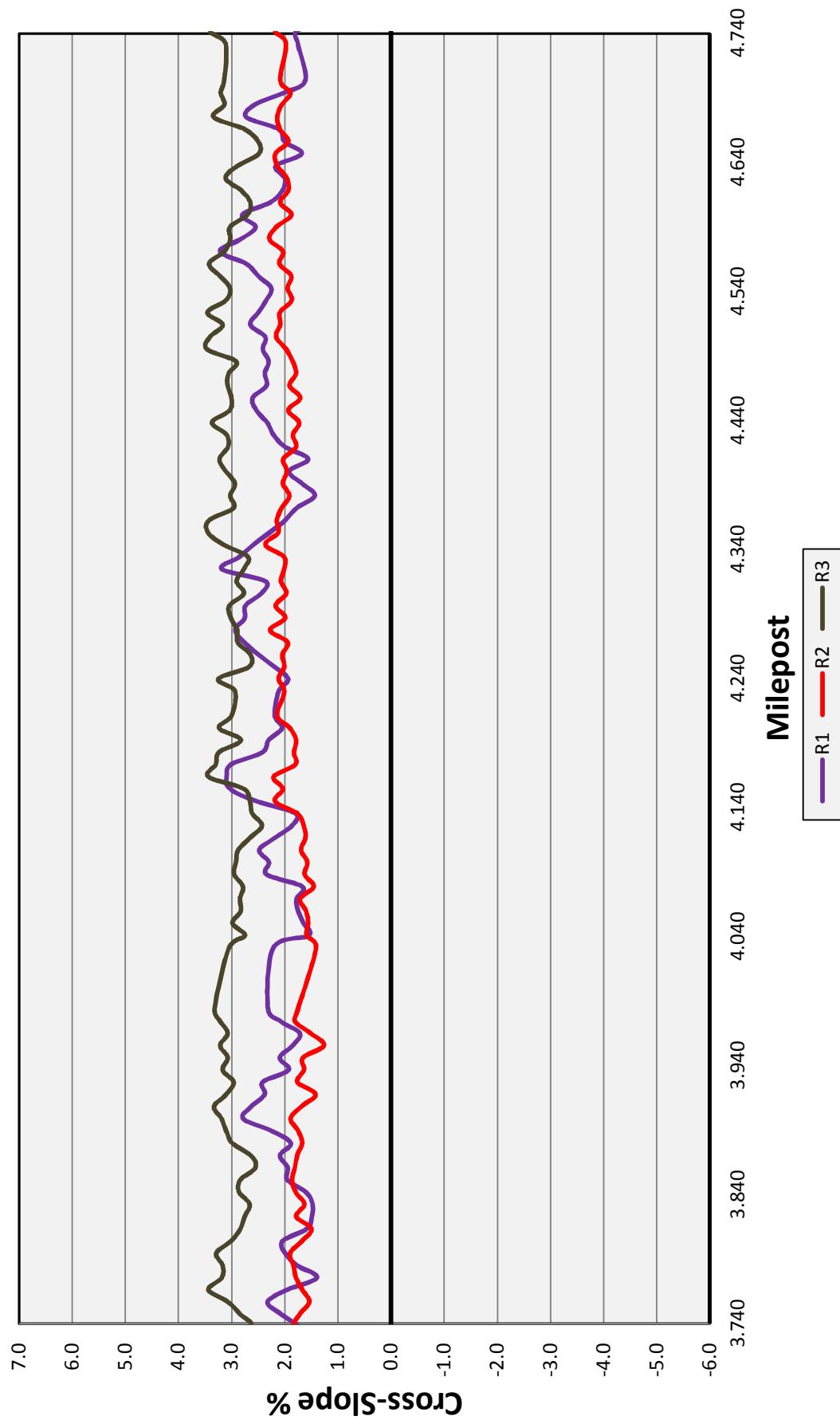
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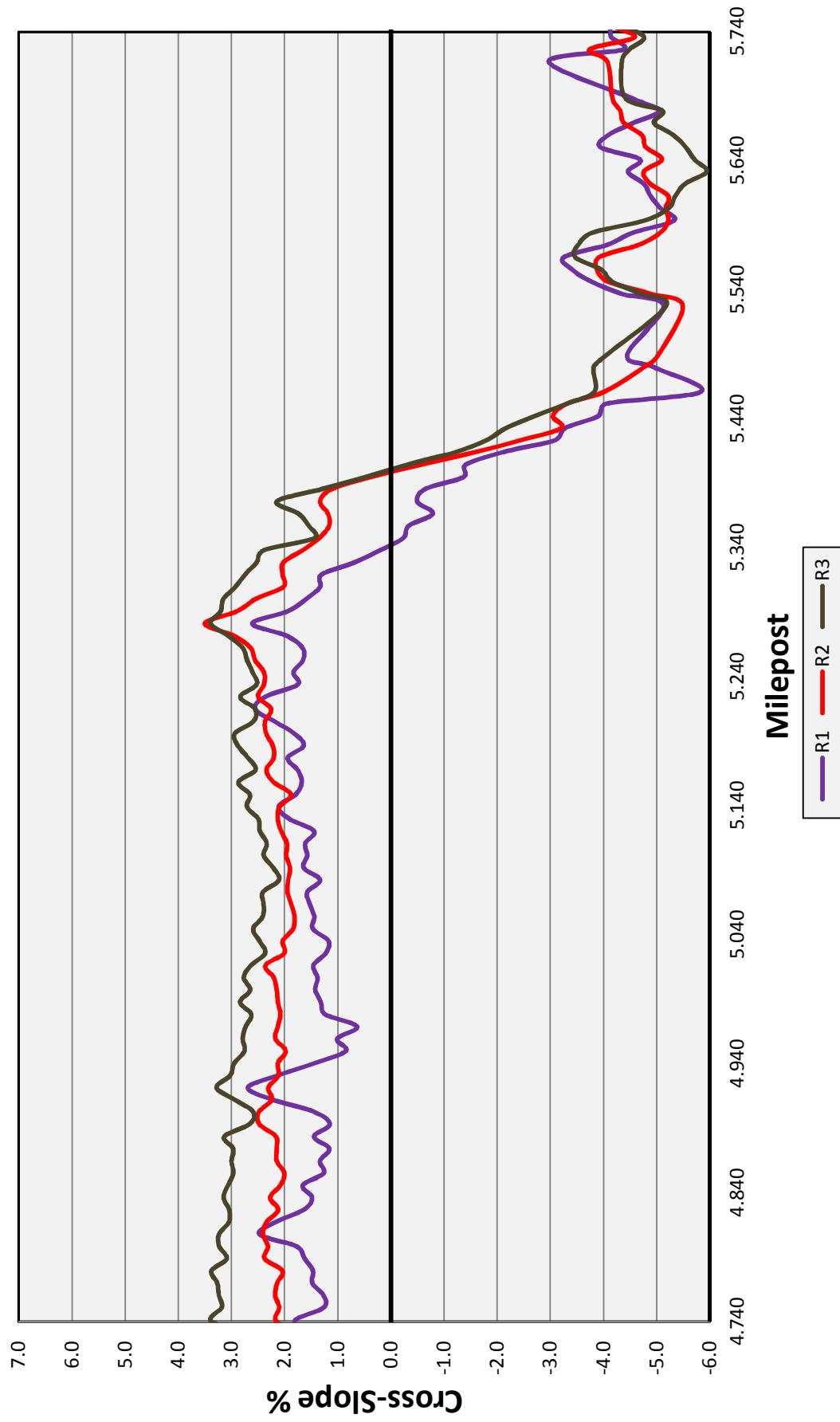
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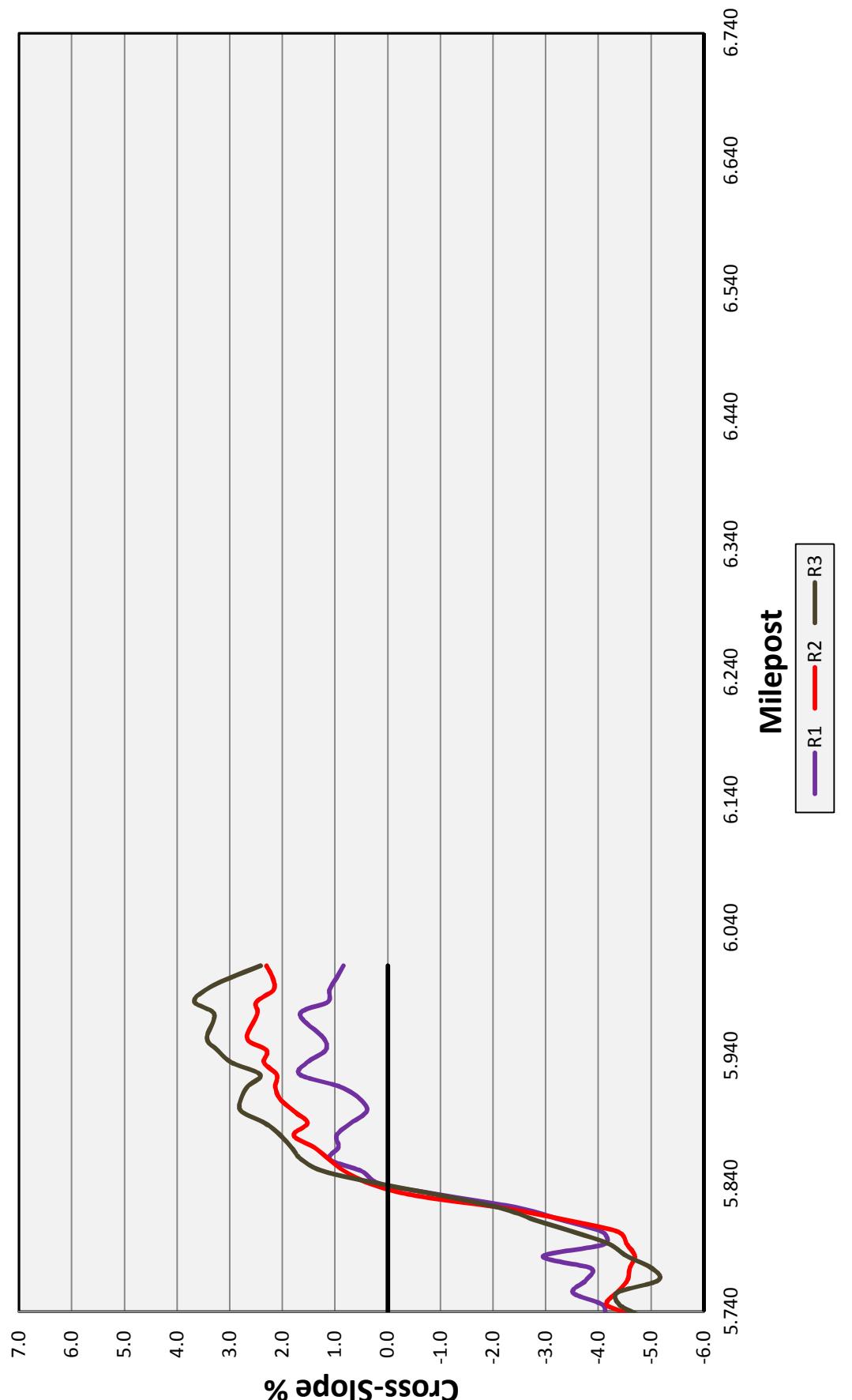
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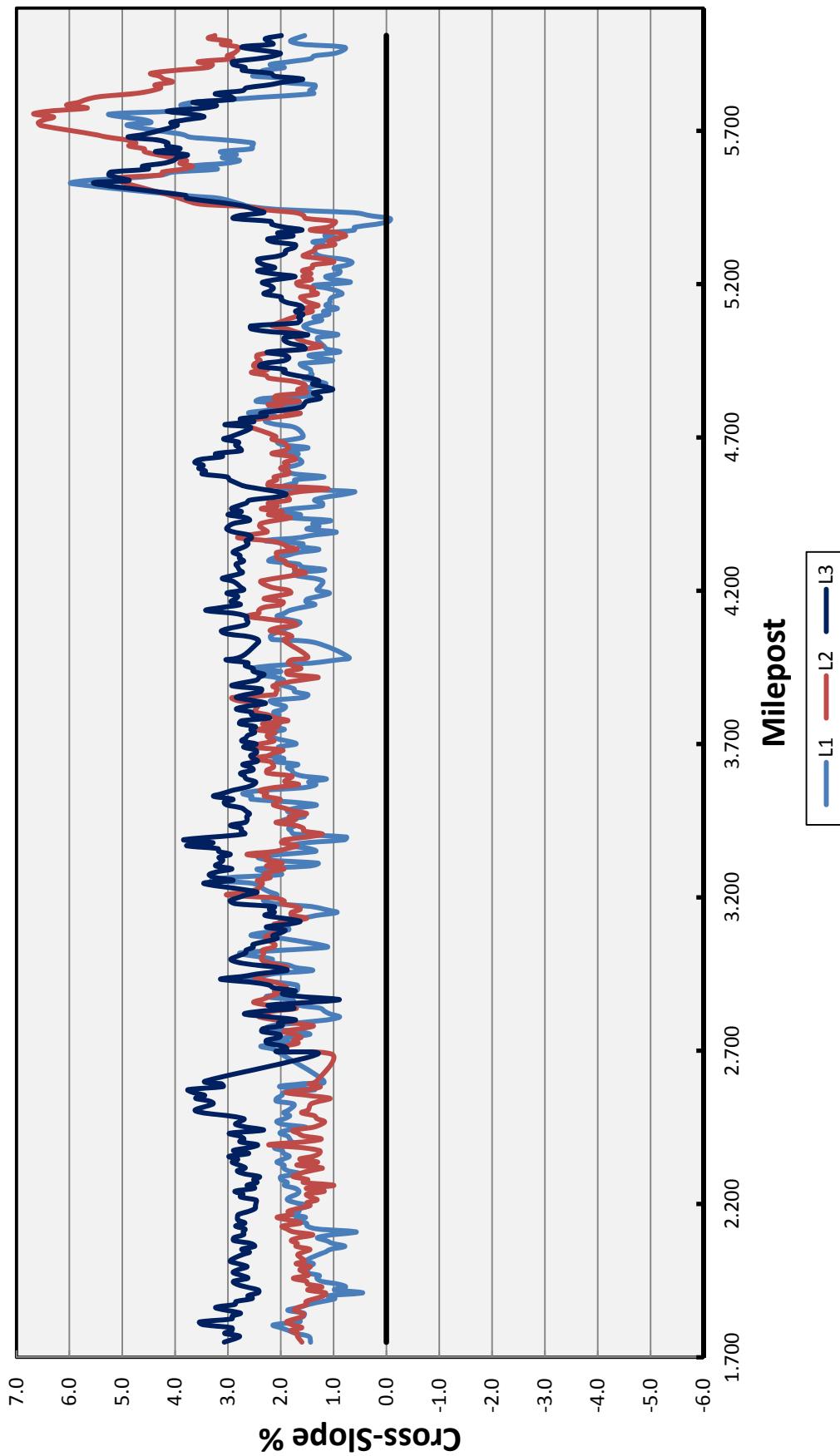
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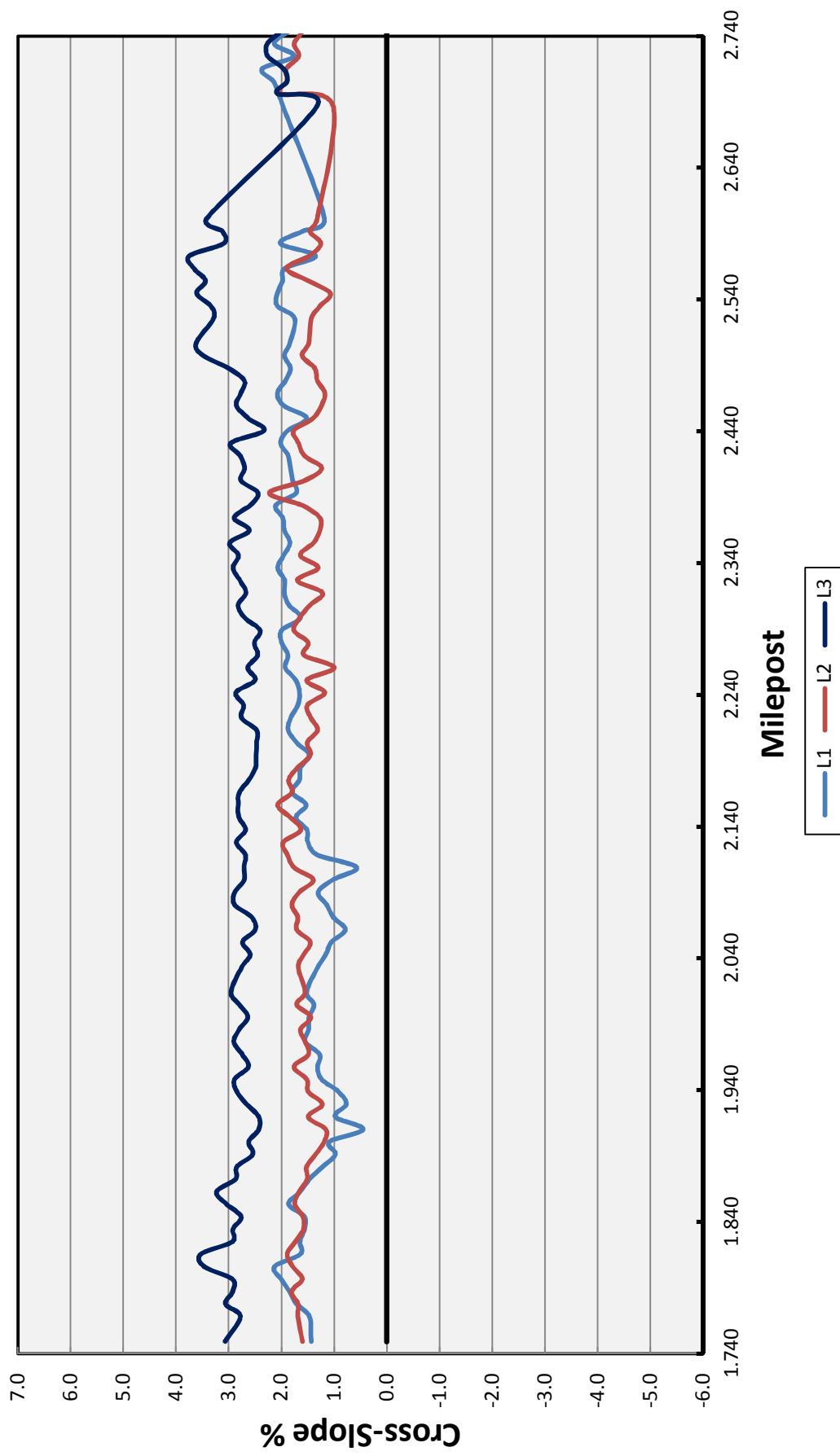
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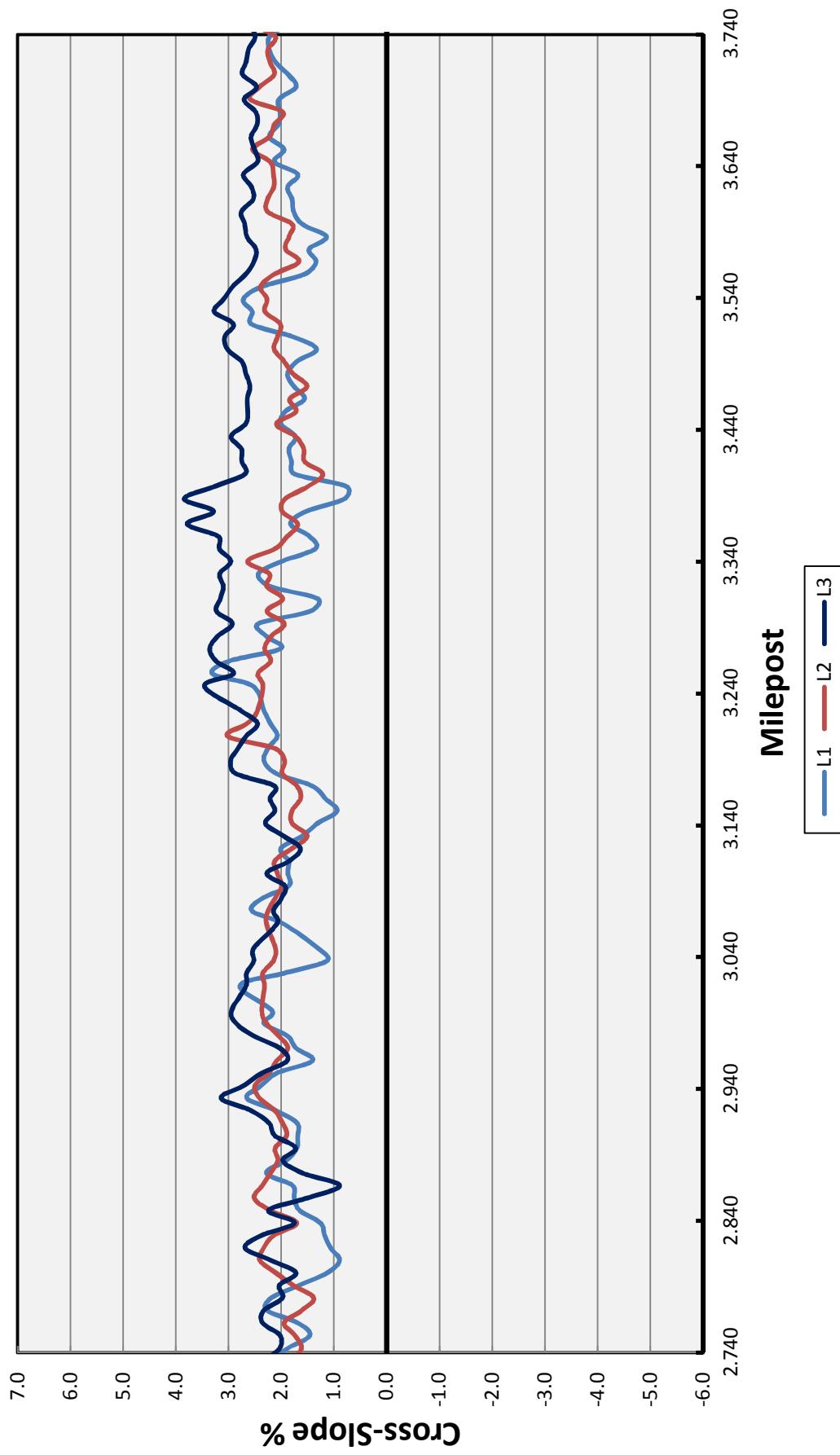
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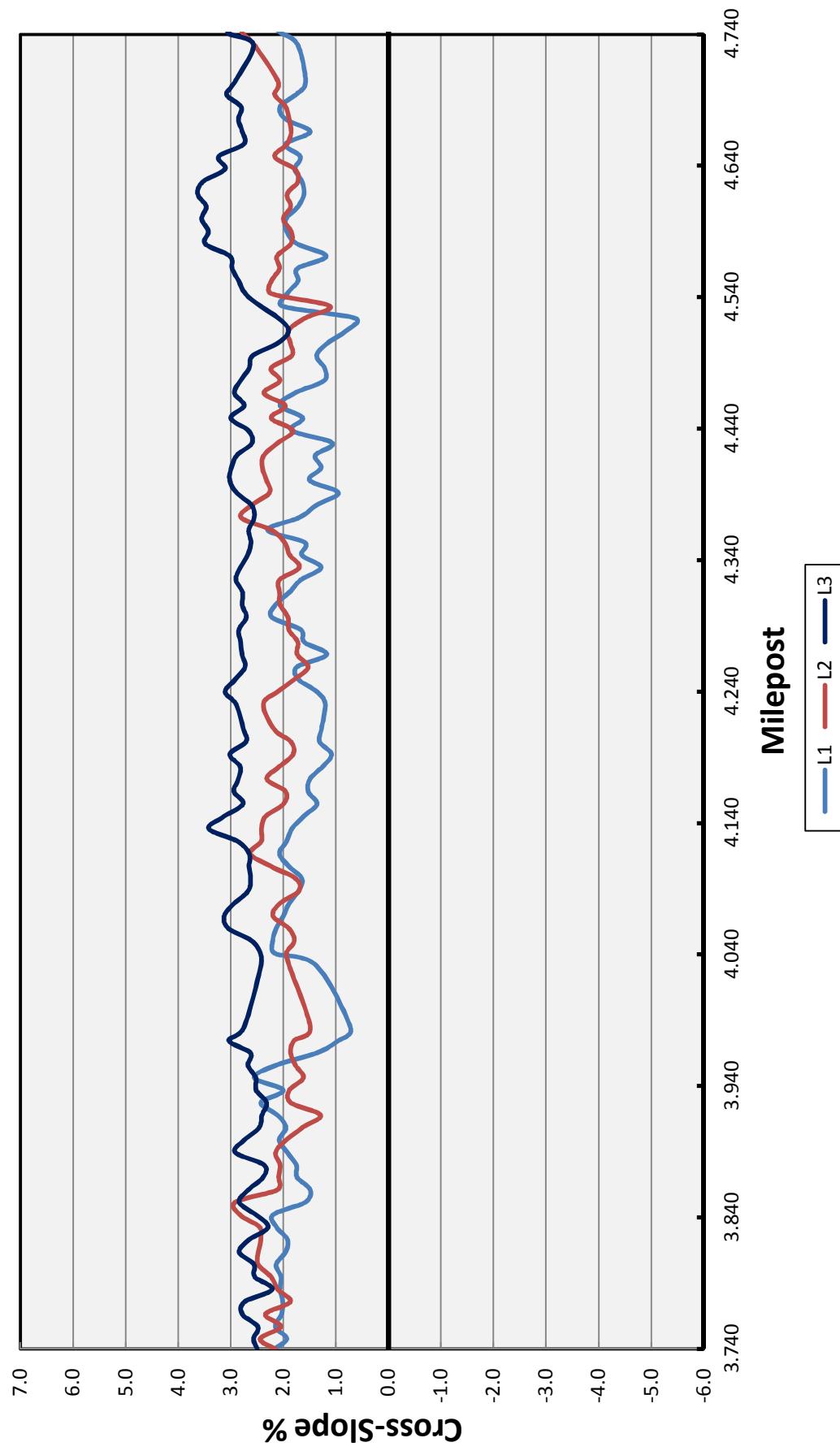
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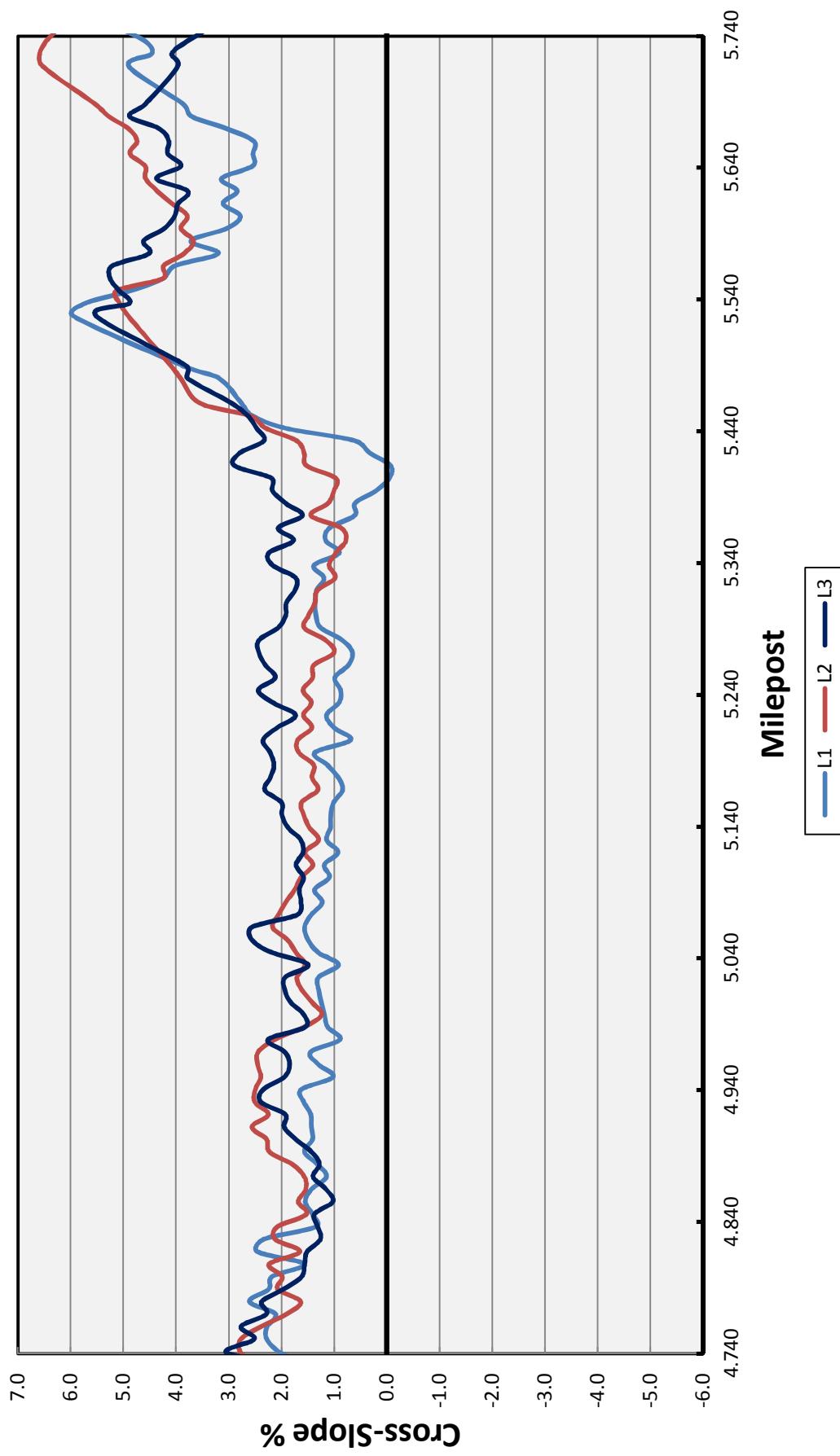
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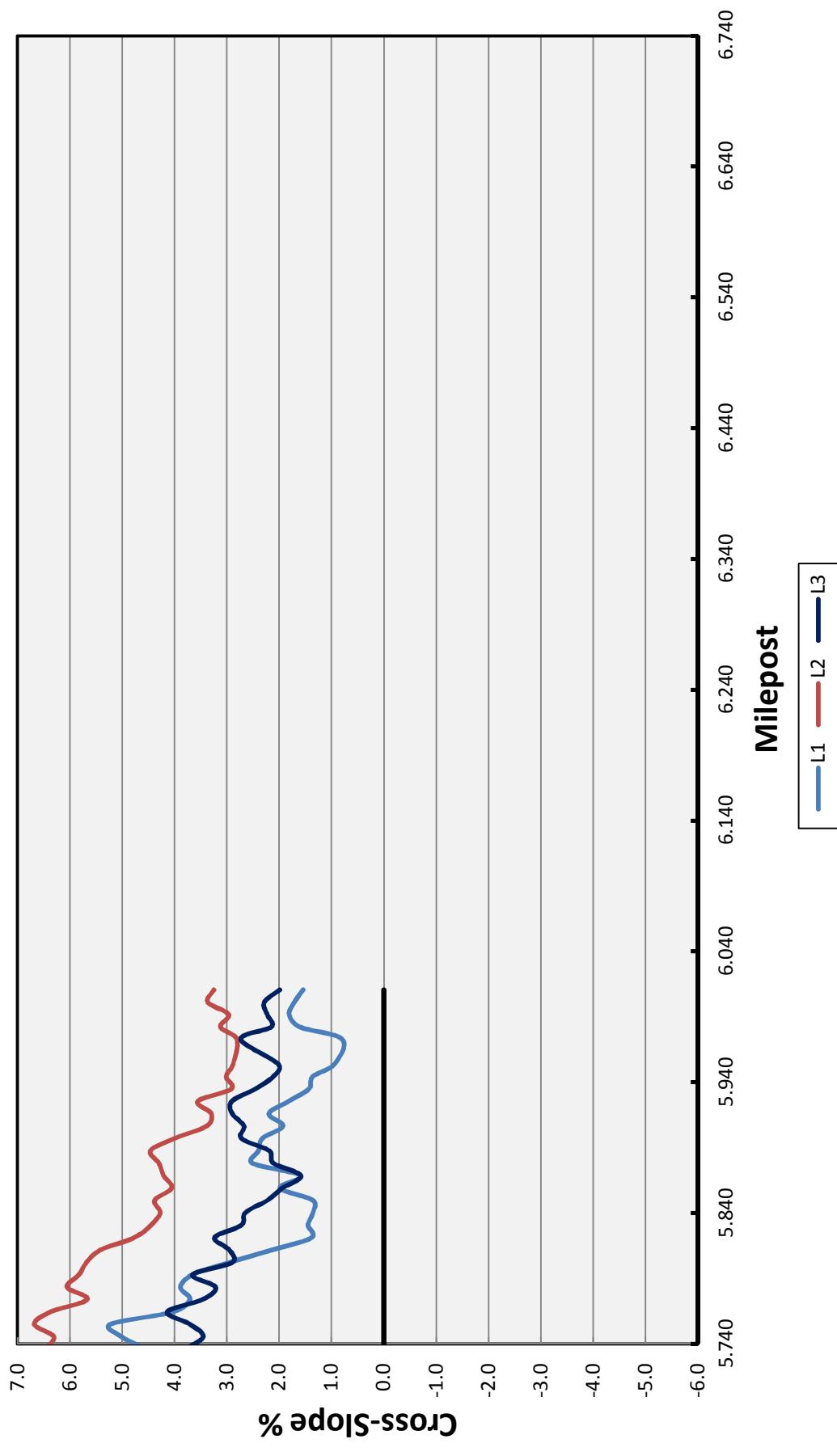
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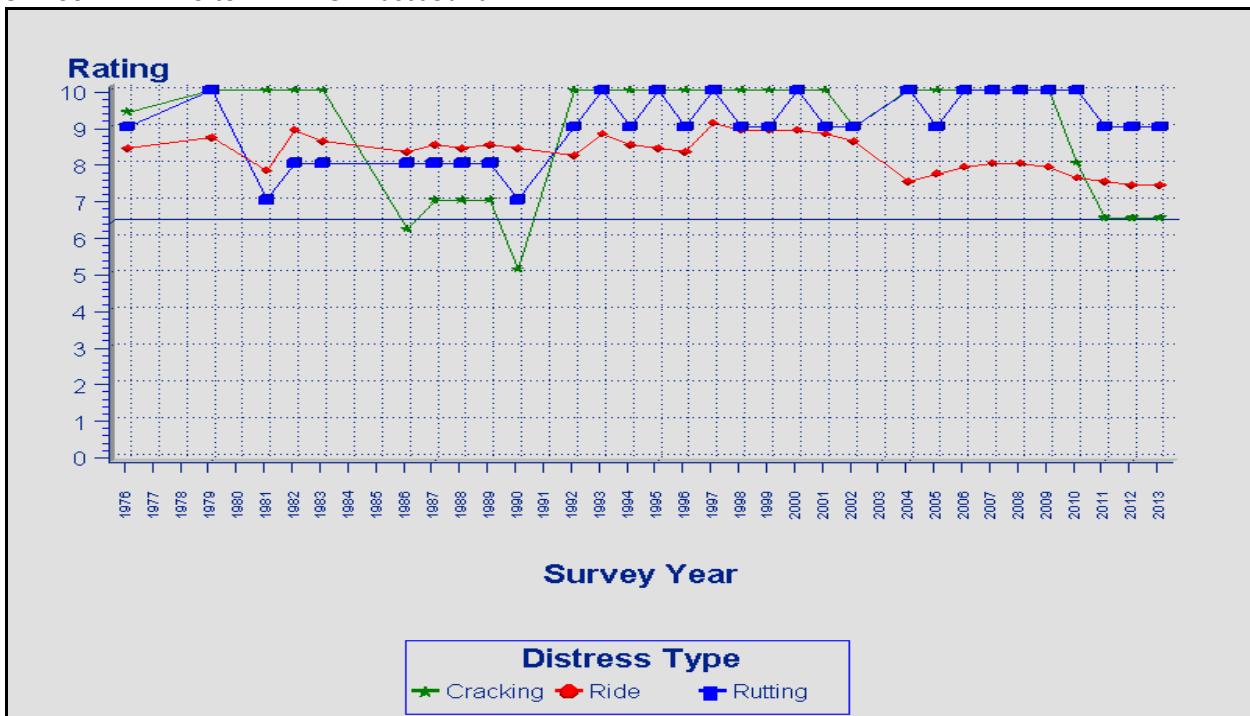


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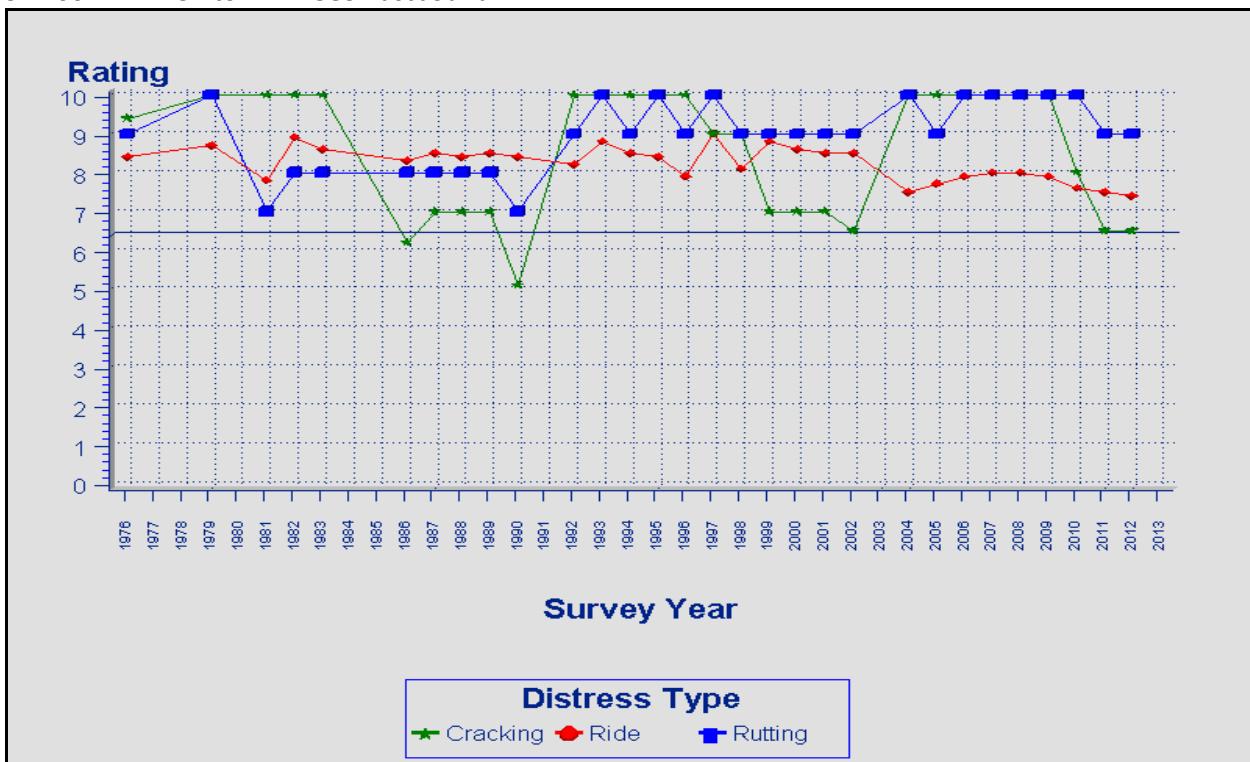


## Pavement Condition Survey (PCS) Charts for 430644-1

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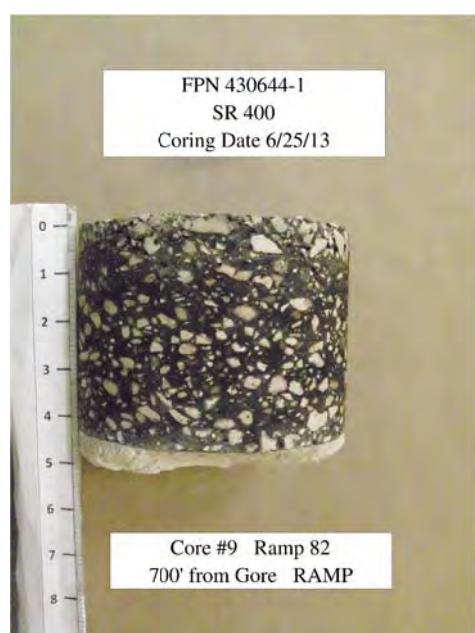
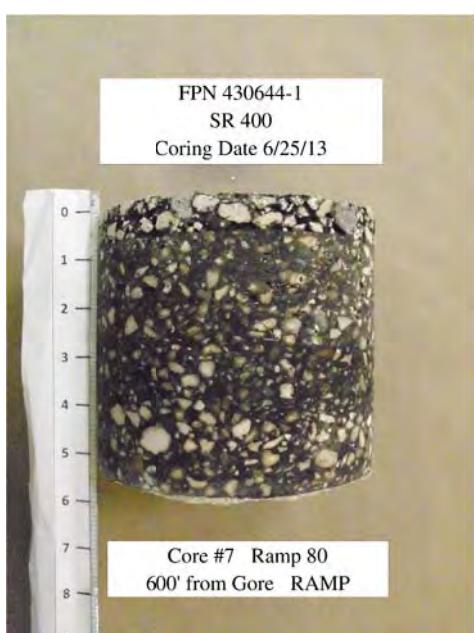
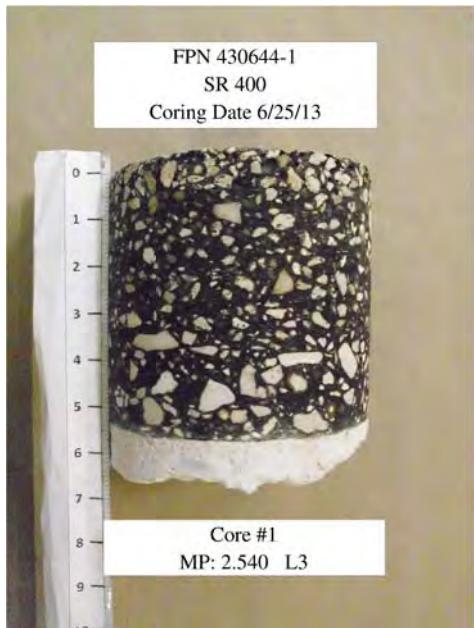


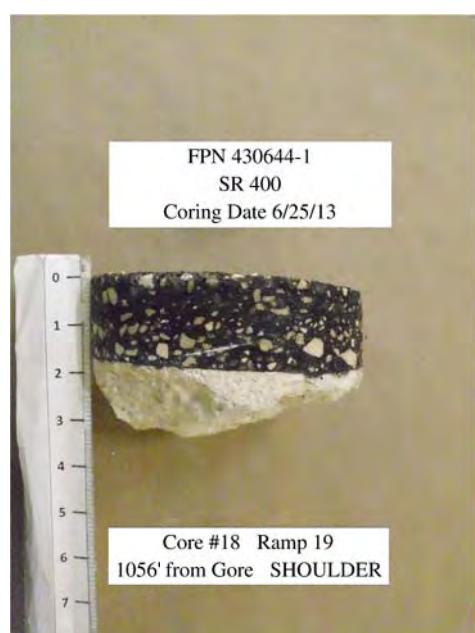
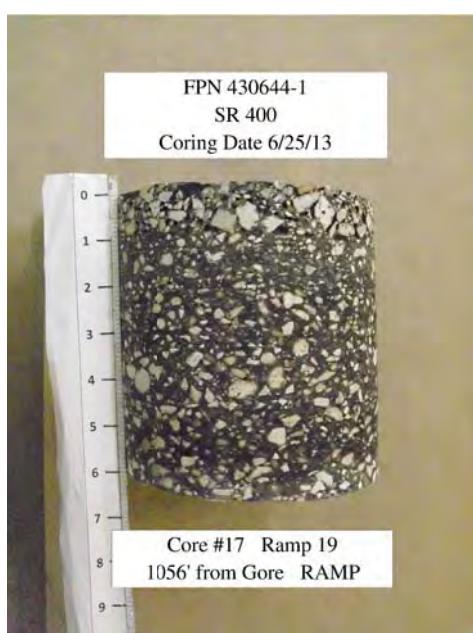
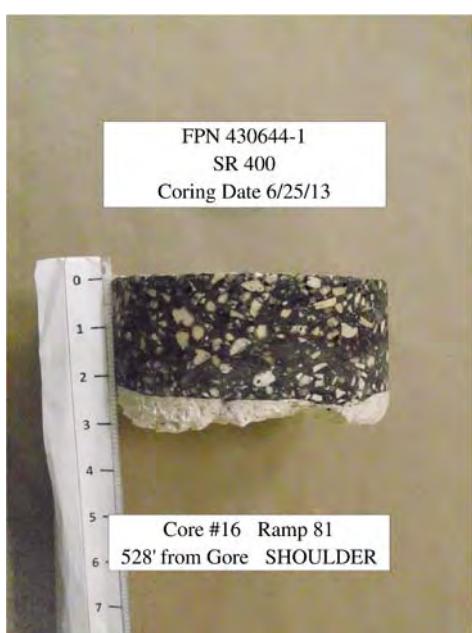
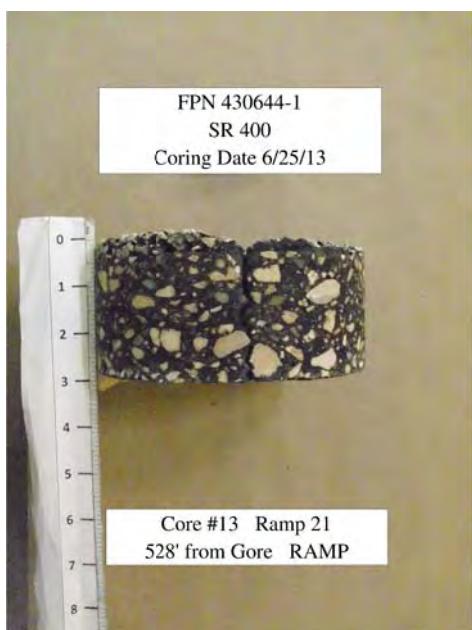
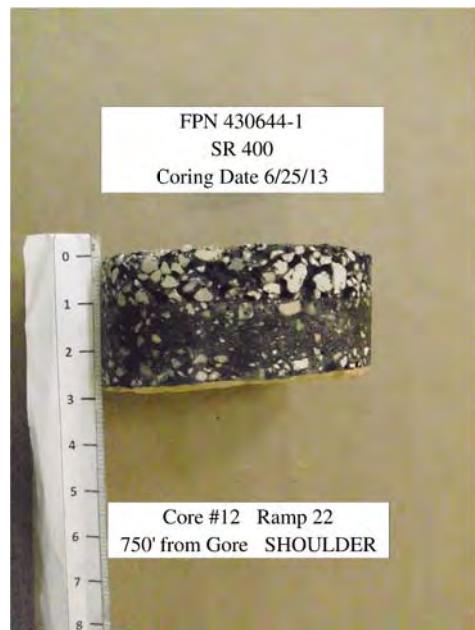
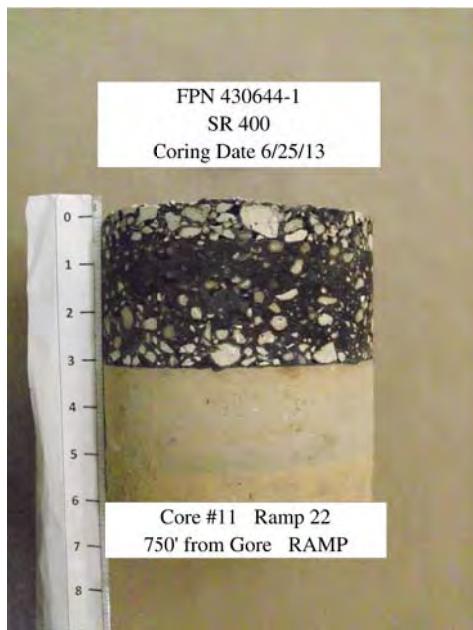
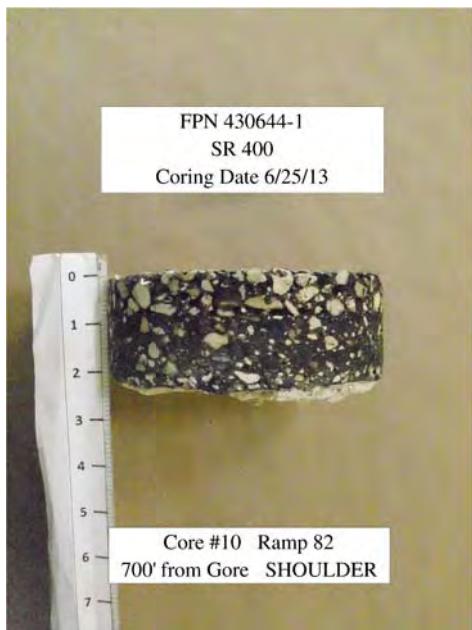
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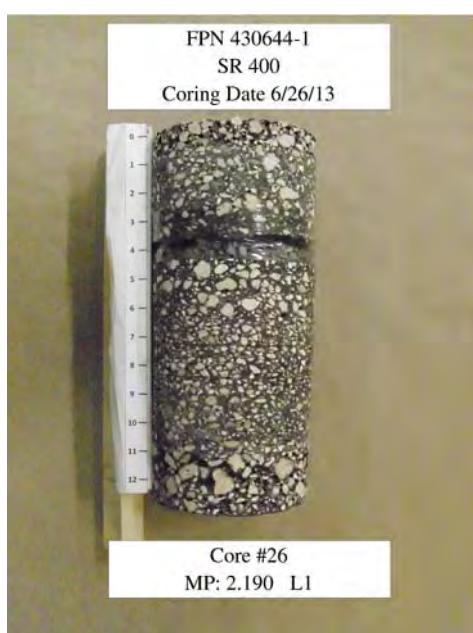
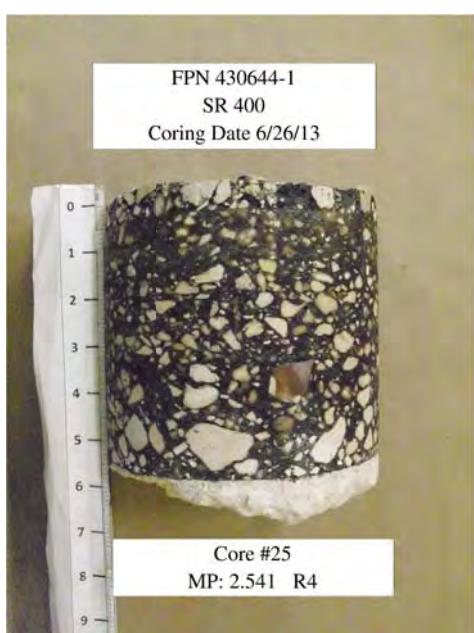
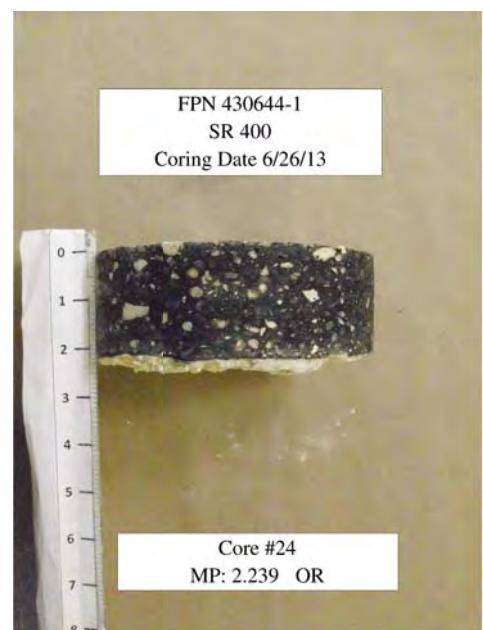
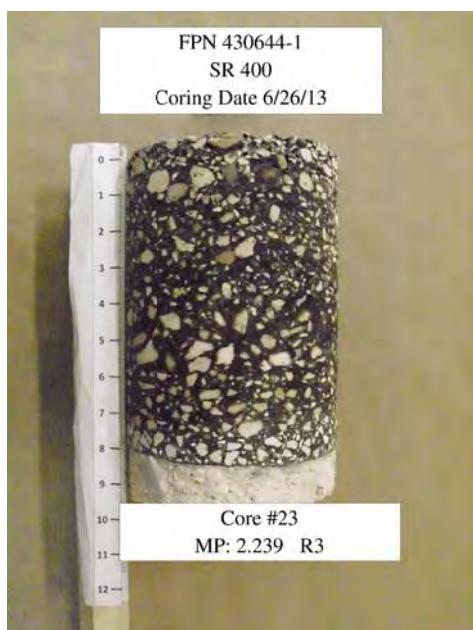
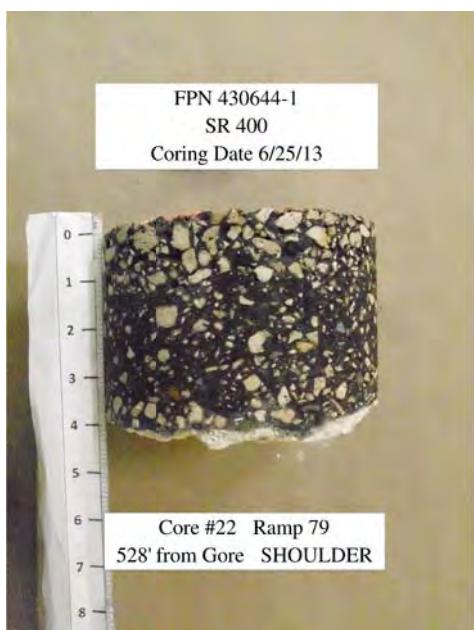
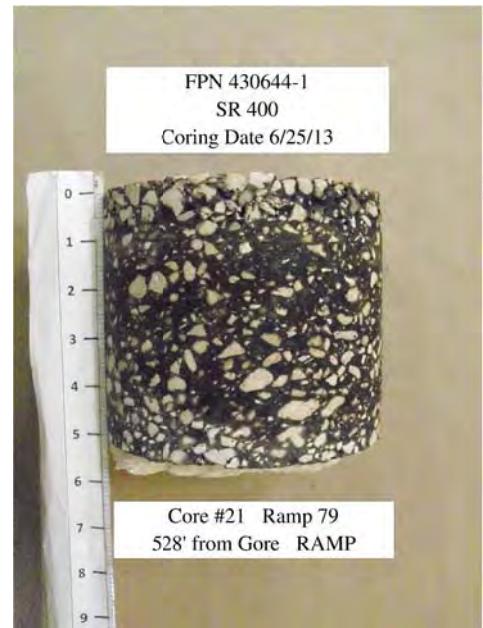
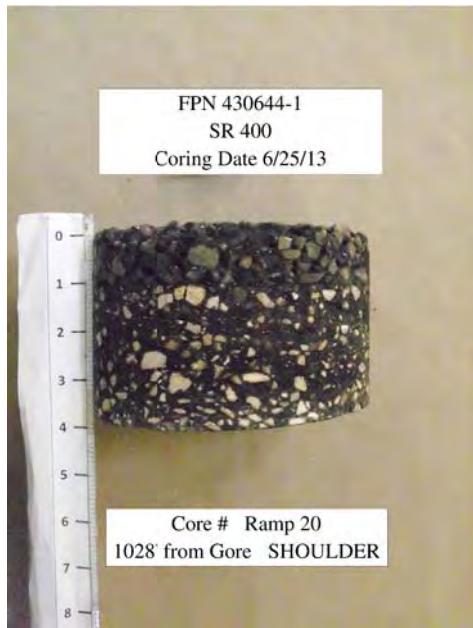
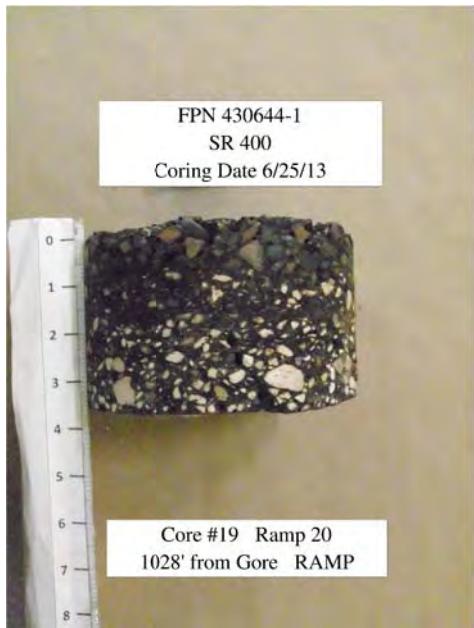










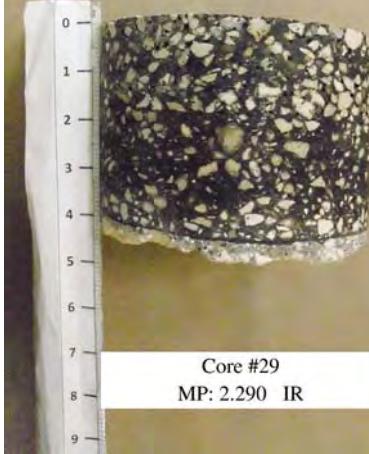


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SR 400  
Coring Date 6/26/13



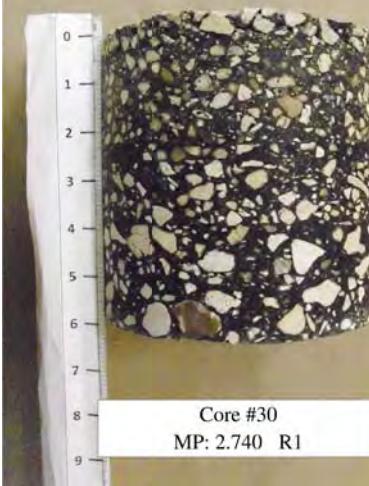
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MP: 2.290 R1

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SR 400  
Coring Date 6/26/13



Core #29  
MP: 2.290 IR

FPN 430644-1  
SR 400  
Coring Date 6/26/13



Core #30  
MP: 2.740 R1

FPN 430644-1  
SR 400  
Coring Date 6/26/13



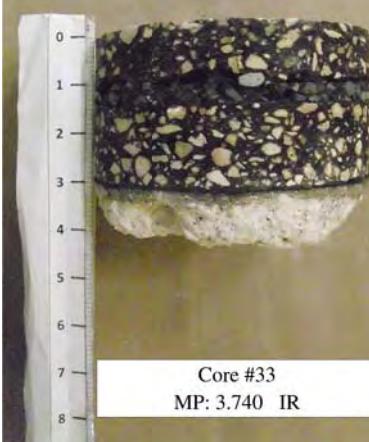
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Coring Date 6/26/13



Core #32  
MP: 3.740 R1

FPN 430644-1  
SR 400  
Coring Date 6/26/13



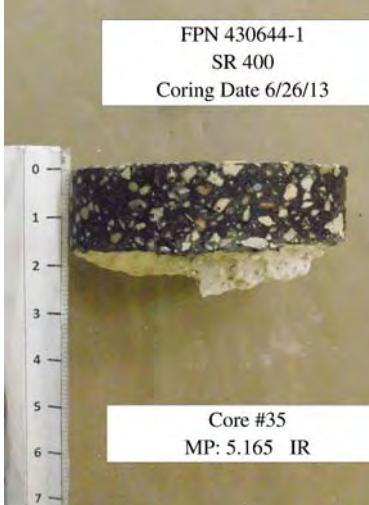
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Coring Date 6/26/13



Core #34  
MP: 5.165 R1

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Coring Date 6/26/13

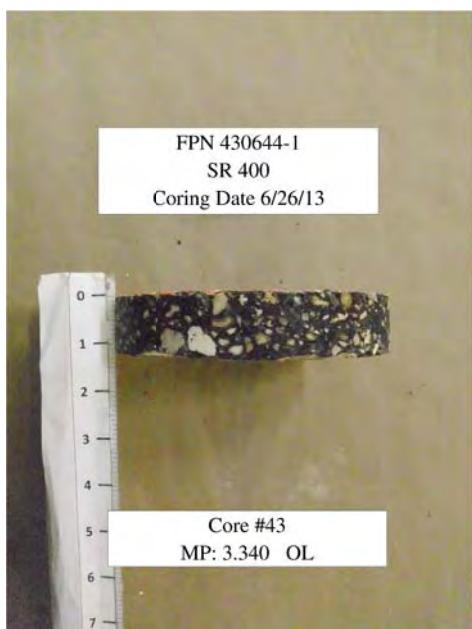
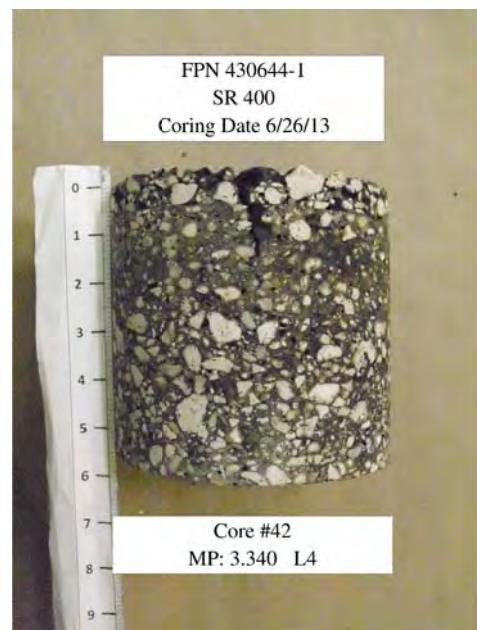
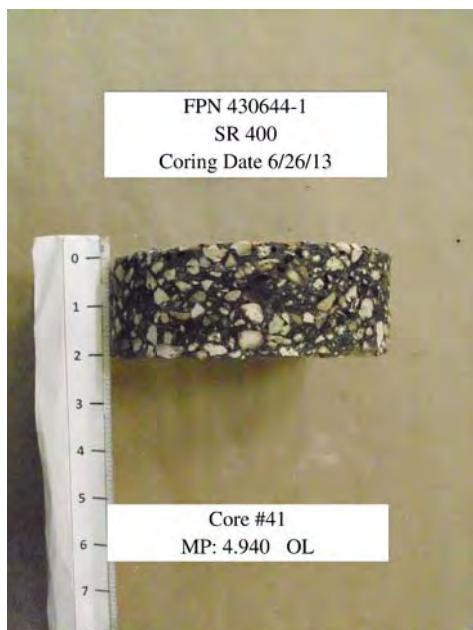
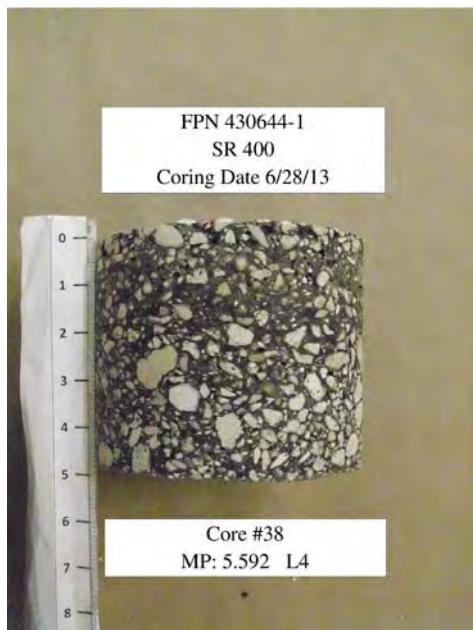
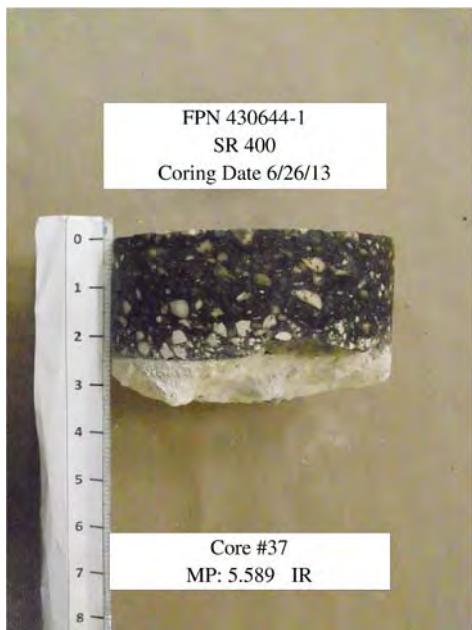


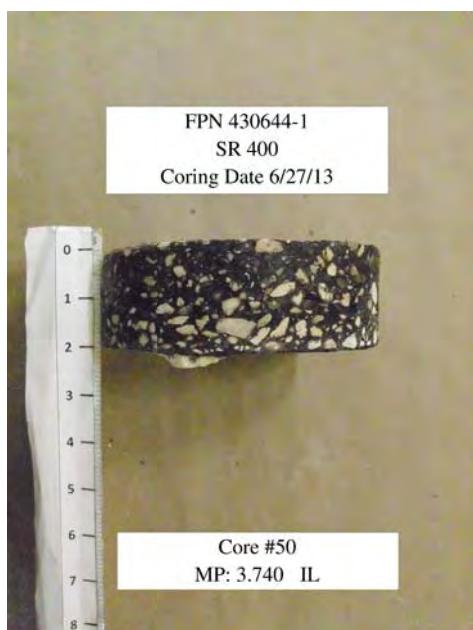
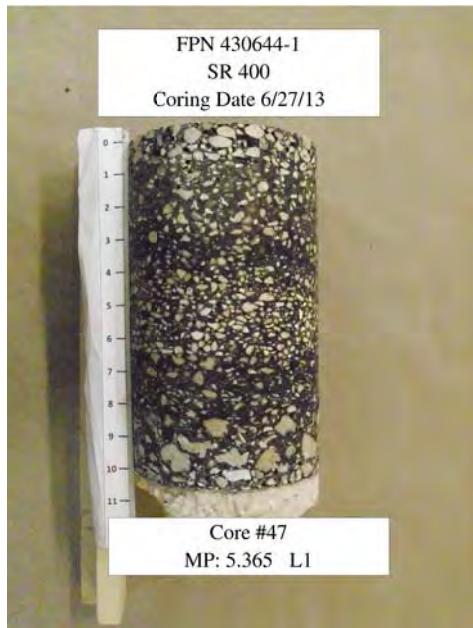
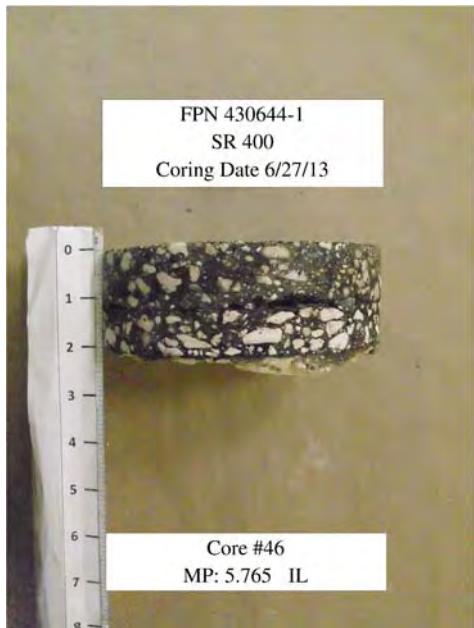
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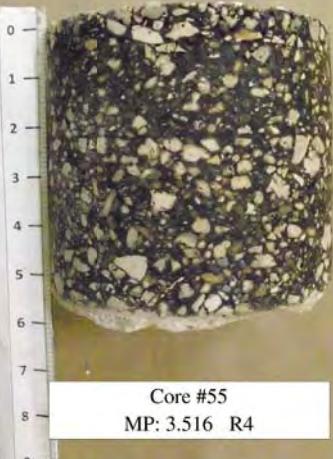


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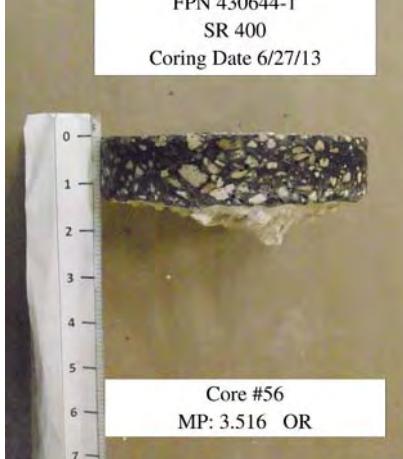




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SR 400  
Coring Date 6/27/13



FPN 430644-1  
SR 400  
Coring Date 6/27/13



FPN 430644-1  
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Coring Date 6/27/13



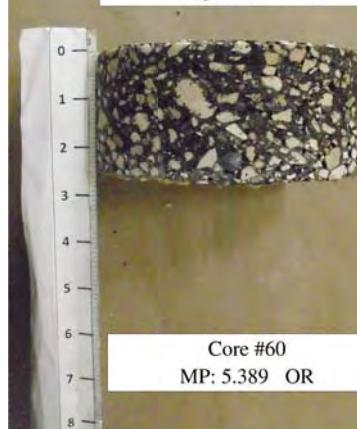
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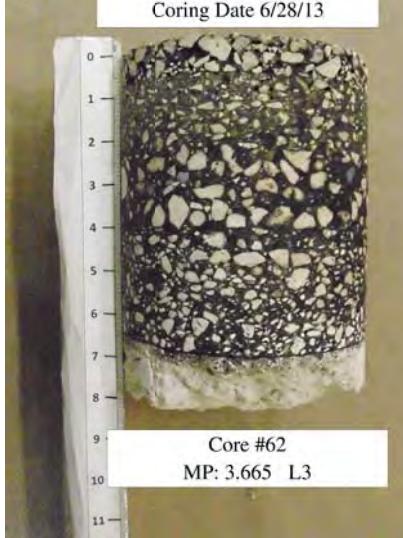
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Coring Date 6/27/13



FPN 430644-1  
SR 400  
Coring Date 6/28/13



FPN 430644-1  
SR 400  
Coring Date 6/28/13



FPN 430644-1  
SR 400  
Coring Date 6/28/13



FPN 430644-1  
SR 400  
Coring Date 6/28/13



Core #64  
MP: 3.342 R3

FPN 430644-1  
SR 400  
Coring Date 6/28/13



Core #65  
MP: 5.716 R3



Photo 1: I-4 eastbound near MP 2.089. From the beginning of the project at MP 1.740 to where the R4 lane ends at MP 2.130 there is a continuous series of alligator cracks and raveling in the inside wheelpath. This is also where a significant amount of traffic going to local attractions departs I-4.



Photo 2: I-4 eastbound near MP 2.359. Note the fair condition of the outside paved shoulder and a continuous longitudinal crack at a construction joint between the R2 and R3 lanes.



Photo 3: I-4 eastbound near MP 2.484. The inside R1 and R2 lanes of the eastbound roadway have far fewer pavement distresses than the R3 and R4 lanes.



Photo 4: I-4 eastbound near MP 4.300. This photo shows the pavement condition from MP 4.074 to MP 4.607 that will not be an exception to rehabilitation. The mainline lanes were only milled 0.75 inches and resurfaced with FC-5 only.



Photo 5: I-4 eastbound near MP 5.124. There are a number of patches that have been placed in both roadways to repair ride or raveling problems.



Photo 6: I-4 westbound near MP 2.193. The westbound roadway has light pavement distresses. Note the pop-up of aggregates in the open-graded friction course in the L3 lane.



Photo 7: I-4 westbound near MP 3.930. There is a longitudinal crack between the L3 and L4 along a construction joint.



Photo 8: I-4 westbound near MP 4.903. Typical condition of the westbound roadway.



Photo 9: I-4 westbound near MP 5.788. Typical condition of the westbound roadway.



Photo 10: Ramp 080 from I-4 Eastbound to SR 535. The ramps for the SR 535 are in fair condition with few distresses.



Photo 11: Ramp 021 from Central Florida Parkway to I-4 Westbound. The ramps at the interchange with the Central Florida Parkway are in poor condition. Note the severe cracking and raveling distresses.