



Florida Department of
TRANSPORTATION

Smoothness Specification Update

***38th Annual Asphalt Conference
September 9, 2014***

Intents

- Separate Rolling Straightedge from Laser Profiler
- Create Ride Quality (Smoothness) Incentive/Disincentive Specification
 - Based on 6 years of project data
- Use International Roughness Index (IRI)

International Roughness Index (IRI)

- Vertical movement per length traveled
 - Measured in inches per mile
 - Lower is Smoother
- IRI data obtained by Laser Profiler
 - Pilot projects use SMO laser profiler vans
- Incentive/Disincentive \$ based on IRI data
 - Pay for Smoothness / Penalize Roughness

Incentive/Disincentive IRI Ranges

<u>IRI</u>	<u>Pay Result</u>
30 - 42	+\$20 per IRI point per 0.1 mile LOT
43 - 55	Full Pay
56 - 95	-\$ 20 per IRI point per 0.1 mile LOT
>95	Remove & Replace*

Incentive / Disincentive

Table 330-5

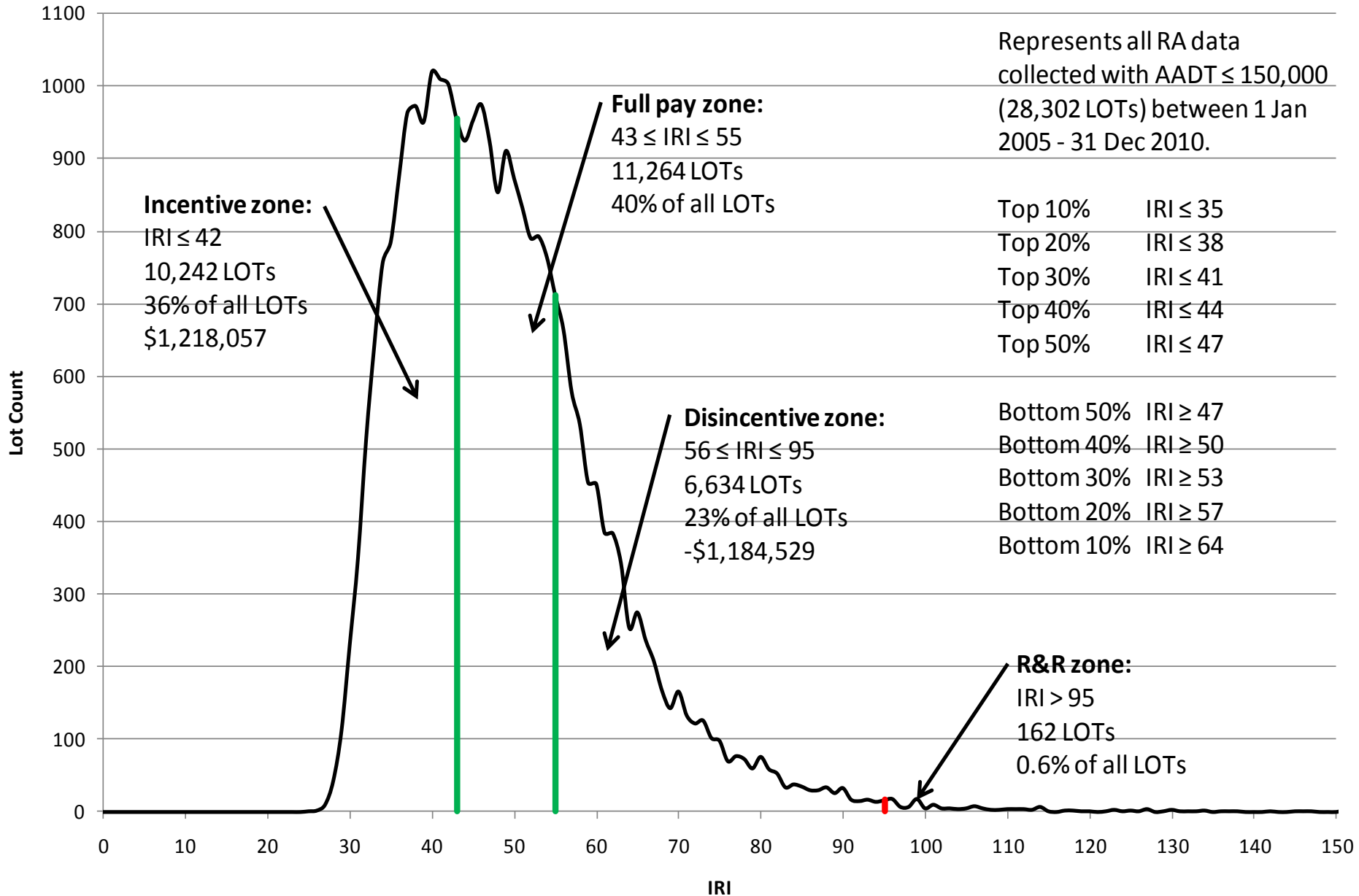
Table 330-5 Laser Acceptance Tolerance					
LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
≤ 30	\$260	56	-\$20	76	-\$420
31	\$240	57	-\$40	77	-\$440
32	\$220	58	-\$60	78	-\$460
33	\$200	59	-\$80	79	-\$480
34	\$180	60	-\$100	80	-\$500
35	\$160	61	-\$120	81	-\$520
36	\$140	62	-\$140	82	-\$540
37	\$120	63	-\$160	83	-\$560
38	\$100	64	-\$180	84	-\$580
39	\$80	65	-\$200	85	-\$600
40	\$60	66	-\$220	86	-\$620
41	\$40	67	-\$240	87	-\$640
42	\$20	68	-\$260	88	-\$660
		69	-\$280	89	-\$680
43 – 55	Full Pay	70	-\$300	90	-\$700
		71	-\$320	91	-\$720
		72	-\$340	92	-\$740
		73	-\$360	93	-\$760
		74	-\$380	94	-\$780
		75	-\$400	95*	-\$800

*LOTs > 95 IRI left in place following continuous analysis method receive -\$800 LOT pay adjustment.



By LOT - FL Interstate FC-5 RA data - LOTs w/ AADT ≤ 150,000

Full Pay Zone IRI = 43 - 55, Net Pay Result = +\$33,528



Project Pay

- Incentive/Disincentive
 - Maximum & Minimum I/D limits established to protect Contractors & Department
 - Max: 105% pay (per FC-5 bid price)
 - Min: 80% pay (per FC-5 bid price)
- Project Consistency Bonus
 - If all LOT's ≤ 55
 - Project will receive an additional 3% incentive
 - Based on FC-5 bid price & tonnage placed

Areas Unsuited for Laser Profiler Testing

- Use RSE or Manual (Rigid) Straightedge per 330 Specs
 - R&R or Pay Reductions per current Specs

Last Structural Lift

- SMO will collect IRI data on Last Structural Lift
- Contractor Request
 - Let's contractor know where they stand prior to paving friction course
 - Contractor make more informed decisions on questionable pavement

Pilot Project Details

Pilot projects	18
Projects completed	11
Projects received consistency bonus	3

Total incentive paid	\$464,819
Total Pilot project miles tested	356
Incentive paid per lane mile	\$1,304

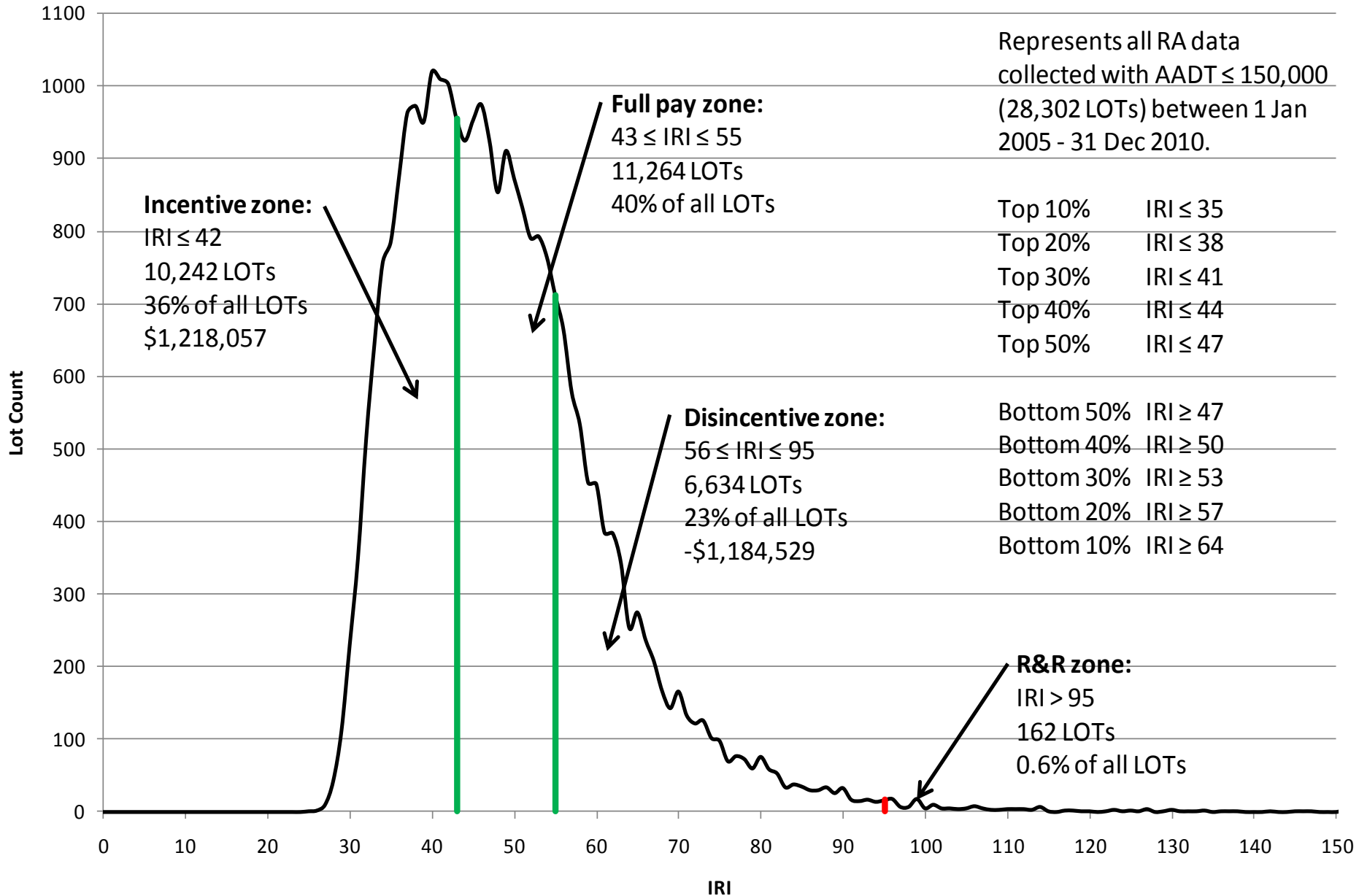
- No LOT's >95
 - No Removal and Replacement

Pilot Project List

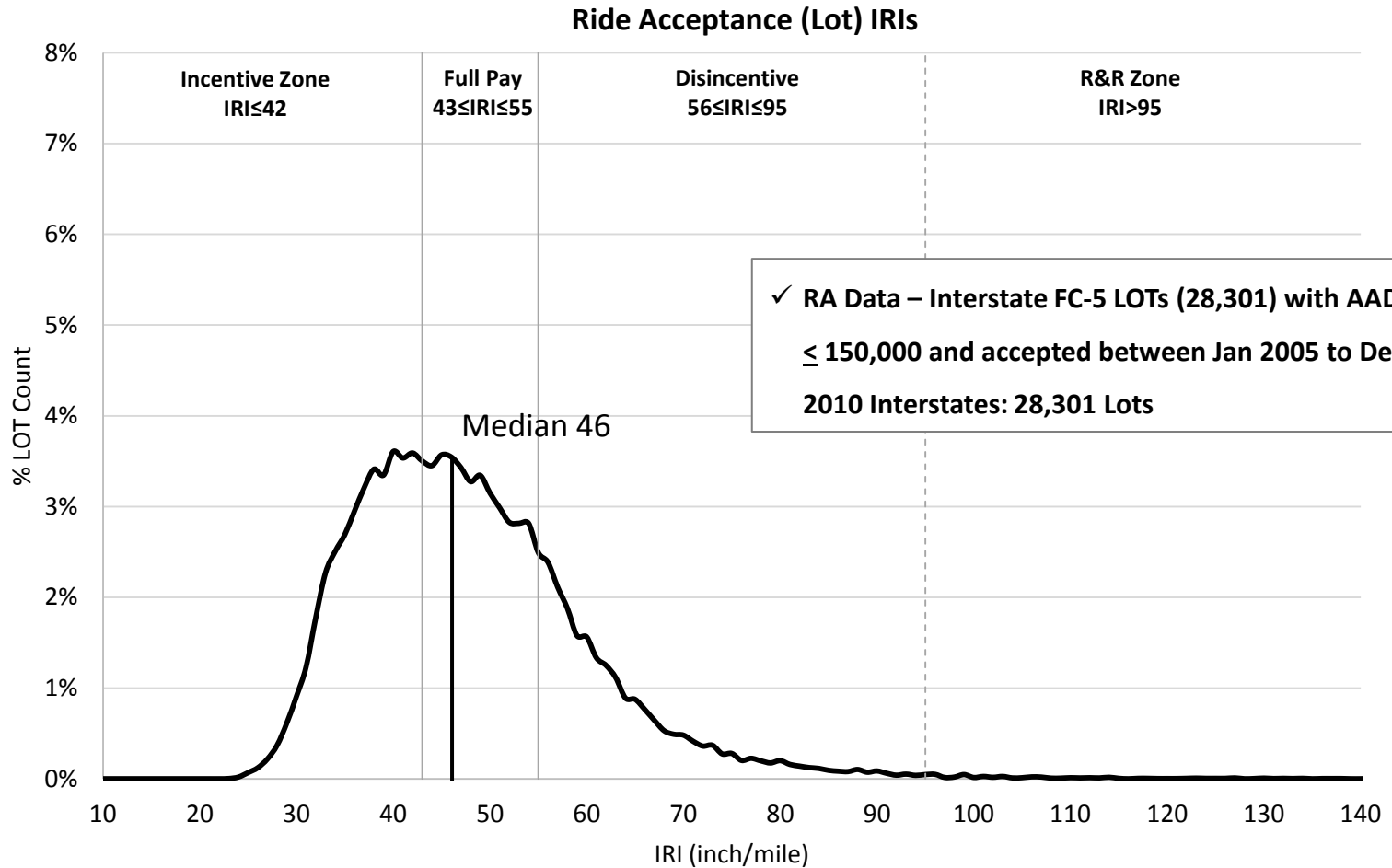
#	DISTRICT	FIN	DESCRIPTION	Lane Miles	Avg IRI	Min IRI	Max IRI	INC/DIS	Dollars per lane mile
1	TP	424792-1-52-01	Suncoast Parkway, Pasco Co (Hillsborough Co Line – SR 52 (MP17-27)	44.3	48	30	88	\$ 2,272	\$ 51
2	TP	424792-4-52-01	Suncoast Parkway, Pasco Co (SR 52 – Hernando Co Line) (MP27-37)	34.8	44	32	76	\$ 10,414	\$ 299
3	TP	427324-1-52-01	Suncoast Parkway, Hernando Co CR 578 to SR 50 (MP 37-46)	28.7	40	28	71	\$ 23,453	\$ 817
4	TP	427324-4-52-01	Suncoast Parkway, Hernando Co Sr 50 to US98 (MP 46-55)						
5	TP	429025-1-52-01	Suncoast Pkwy from VanDyke Rd. to Pasco Co (MP 14.0-17.2)						
6	1	413041-2-52-01	I-75 from SR 78 to Charlotte Co Line (Lee County)	35.9	38	28	61	\$ 35,480	\$ 988
7	2	426987-1-52-01	I-10 in Madison County from E of SR 53 to Suwannee County line	36.7	39	30	70	\$ 35,491	\$ 967
8	2	426986-1-52-01	I-10 from East of US 221 to SR 14	26.9	35	23	58	\$ 43,863	\$ 1,631
9	2	426985-1-52-01	I-10 from East Of US 221 to SR 14	22.4	37	29	50	\$ 50,460	\$ 2,253
10	2	426983-1-52-01	I-295 (9A) Duval County	24.6	41	27	66	\$ 19,688	\$ 800
11	2	424631-1-52-01	I-75 (SR93) from SR 6 to GEORGIA S/L	57.5	32	23	59	\$ 118,880	\$ 2,067
12	3	428938-1-52-01	I-10 from West of SR 79 to Washington Co Line, LENGTH = 5.632	18.4	34	27	55	\$ 51,903	\$ 2,821
13	3	428939-1-52-01	I-10 from E of SR 10 (US90) to Jefferson Co Line, LENGTH = 6.557 mi	26.2	31	24	50	\$ 72,914	\$ 2,783
14	3	430908-1-52-01	I-10 from Okaloosa Co Line to E of SR 83 (US 331), LENGTH = 20.150						
15	4	421707-4-52-01	I-75 from S of Mirimar Pkwy Intg to S of Sheridan St. (MP 1.08-4.645)						
16	5	429079-1-52-01	I-4 from Osceola Co Line to East Of Sr 536						
17	5	429080-1-52-01	I-4 from West of EE Williamson Overpass to West Of Lake Mary Blvd						
18	5	430643-1-52-01	I-75 from N of Sr 500/US27 Intchg to Alachua Co Line						
				356.4	Total			\$ 464,819	

By LOT - FL Interstate FC-5 RA data - LOTs w/ AADT ≤ 150,000

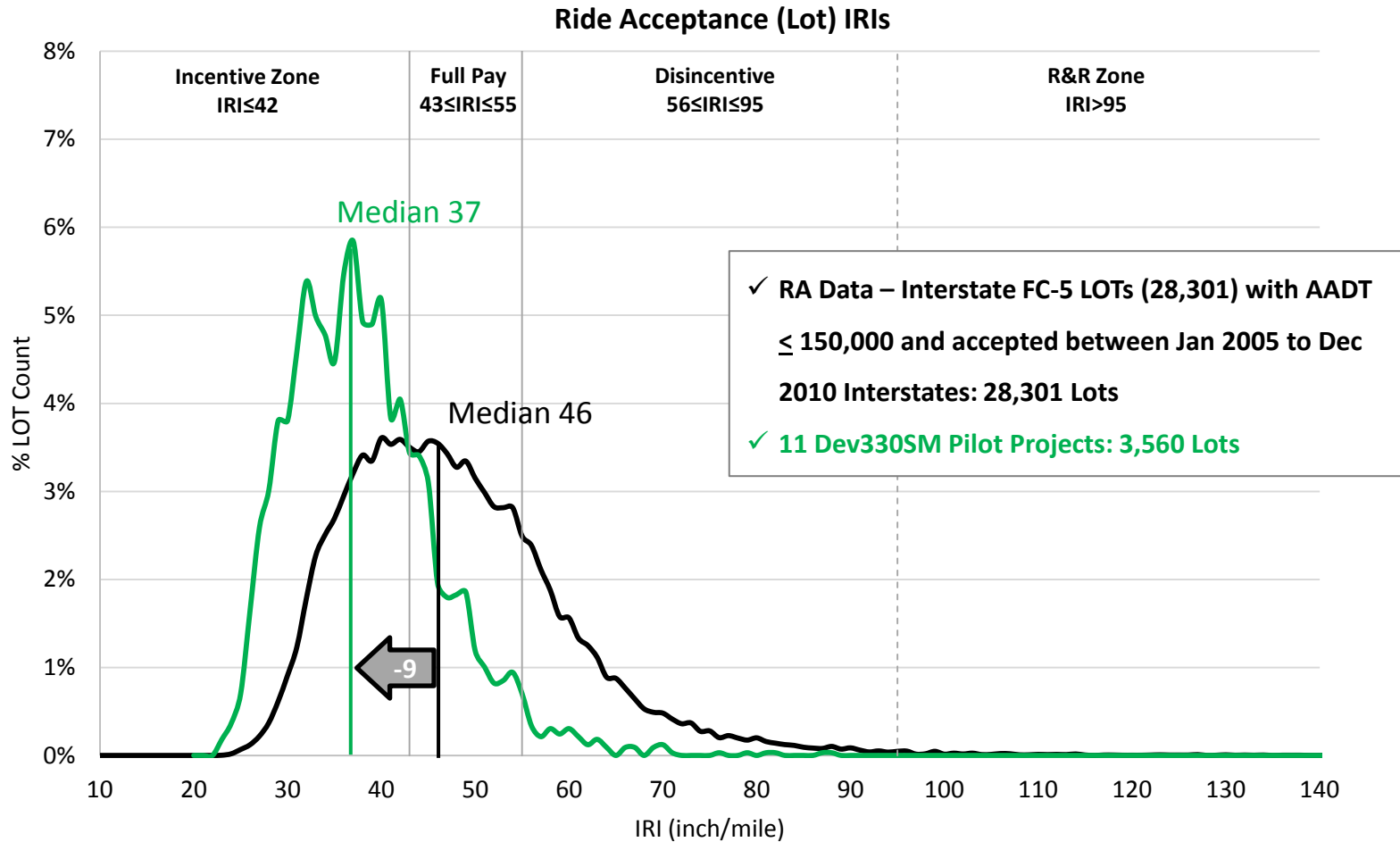
Full Pay Zone IRI = 43 - 55, Net Pay Result = +\$33,528



Summary Pilot Project Performance (IRI)



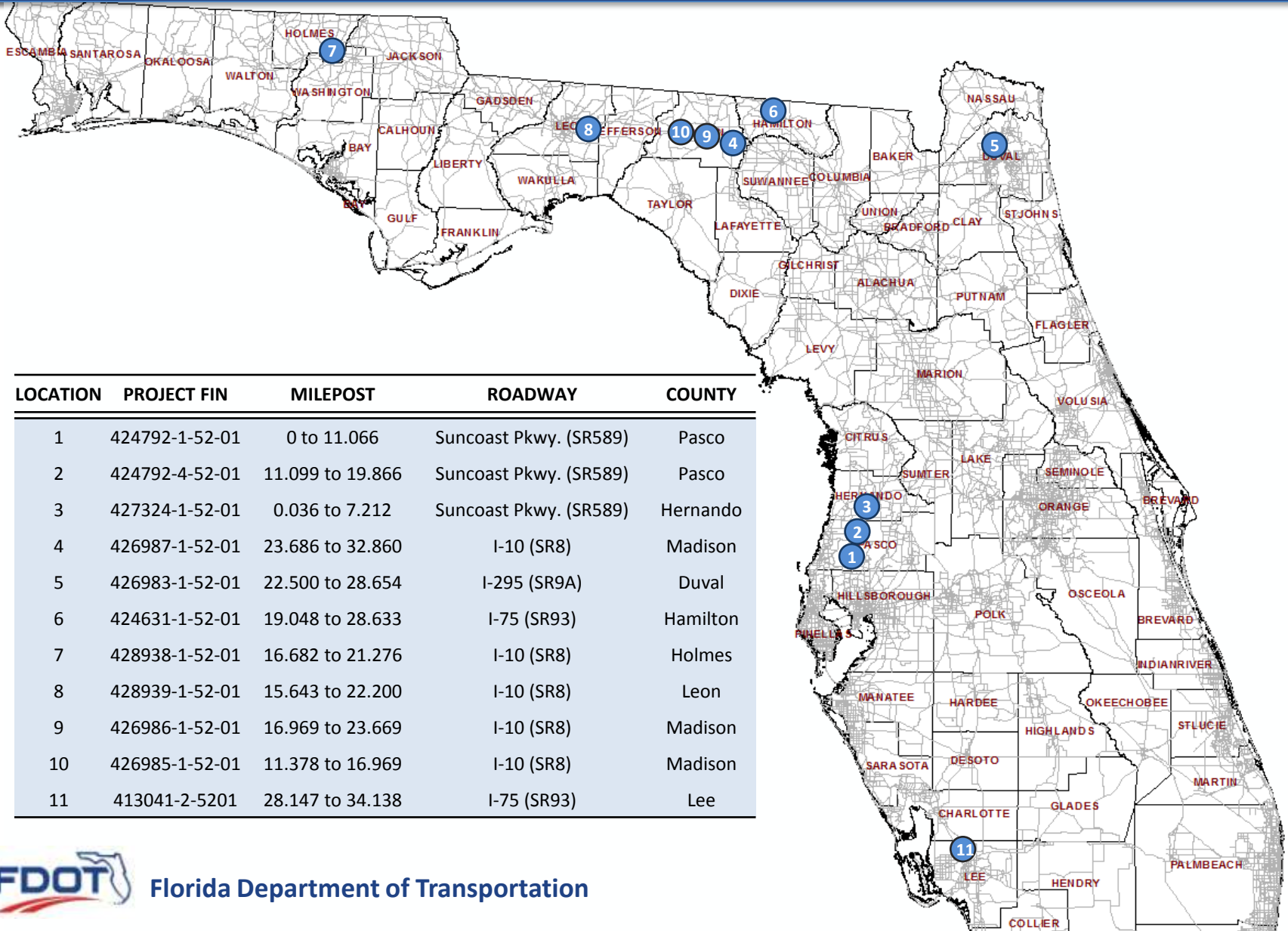
Summary Pilot Project Performance (IRI)



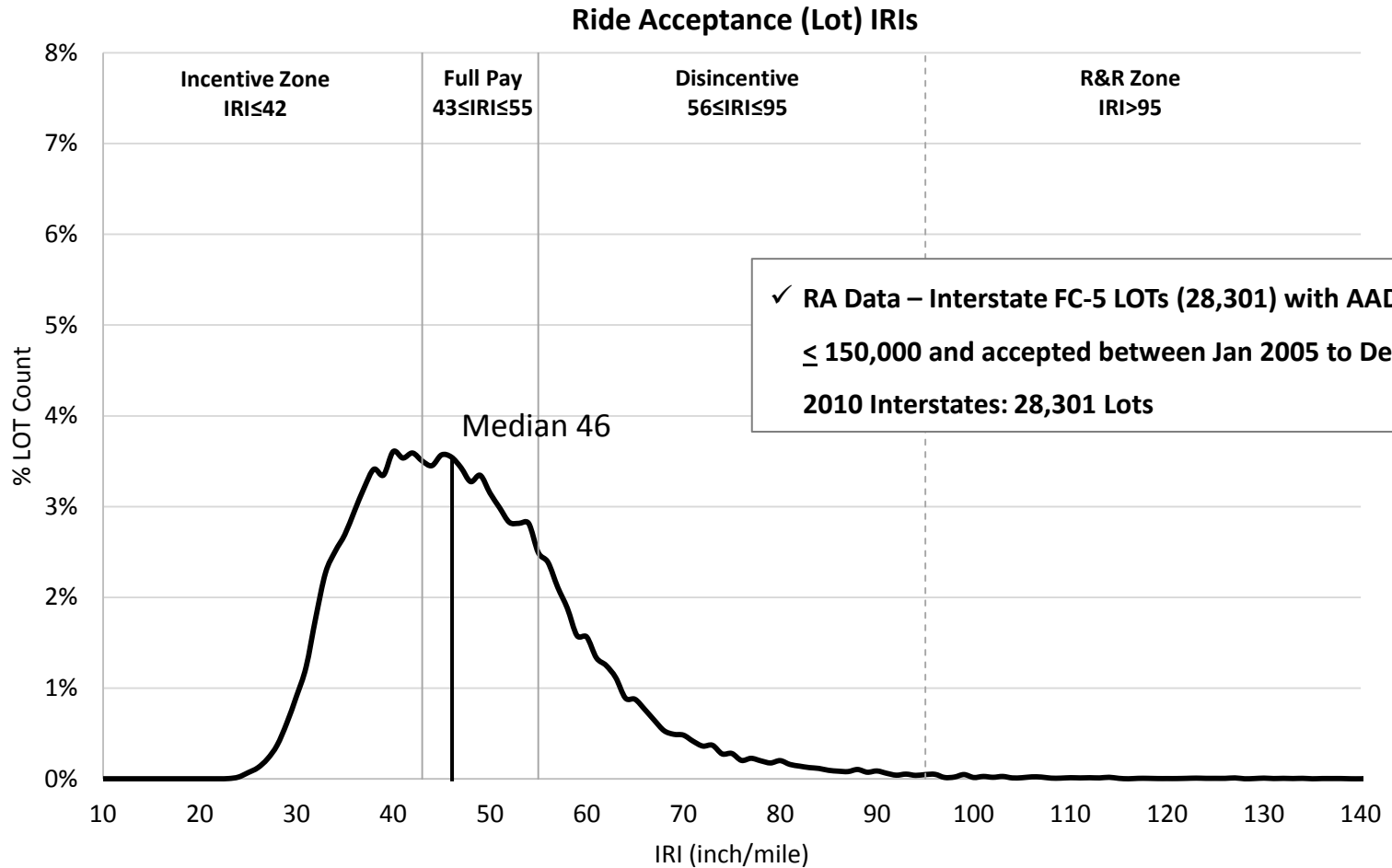
Pilot Projects



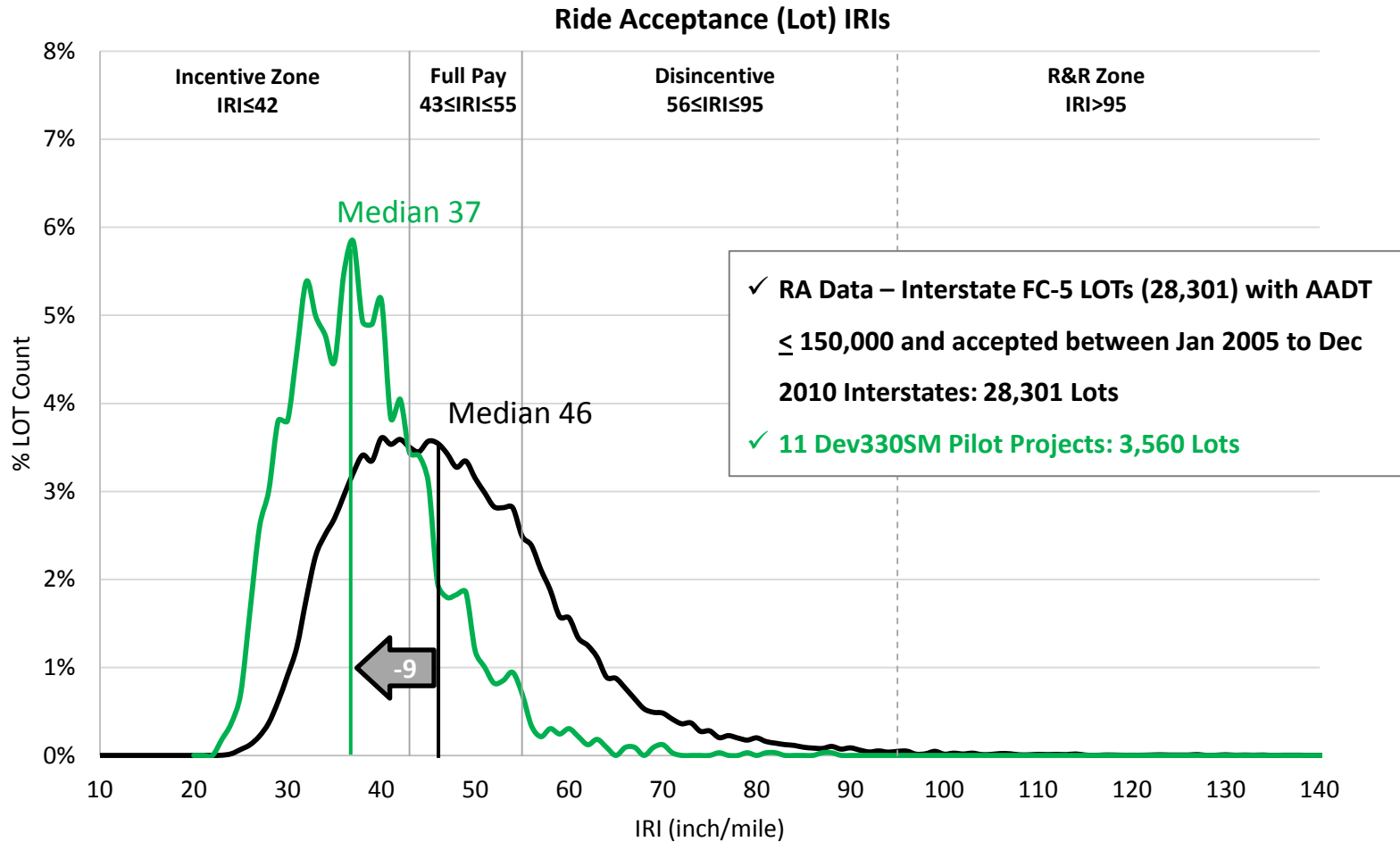
Pilot Projects Locations



Summary Pilot Project Performance (IRI)

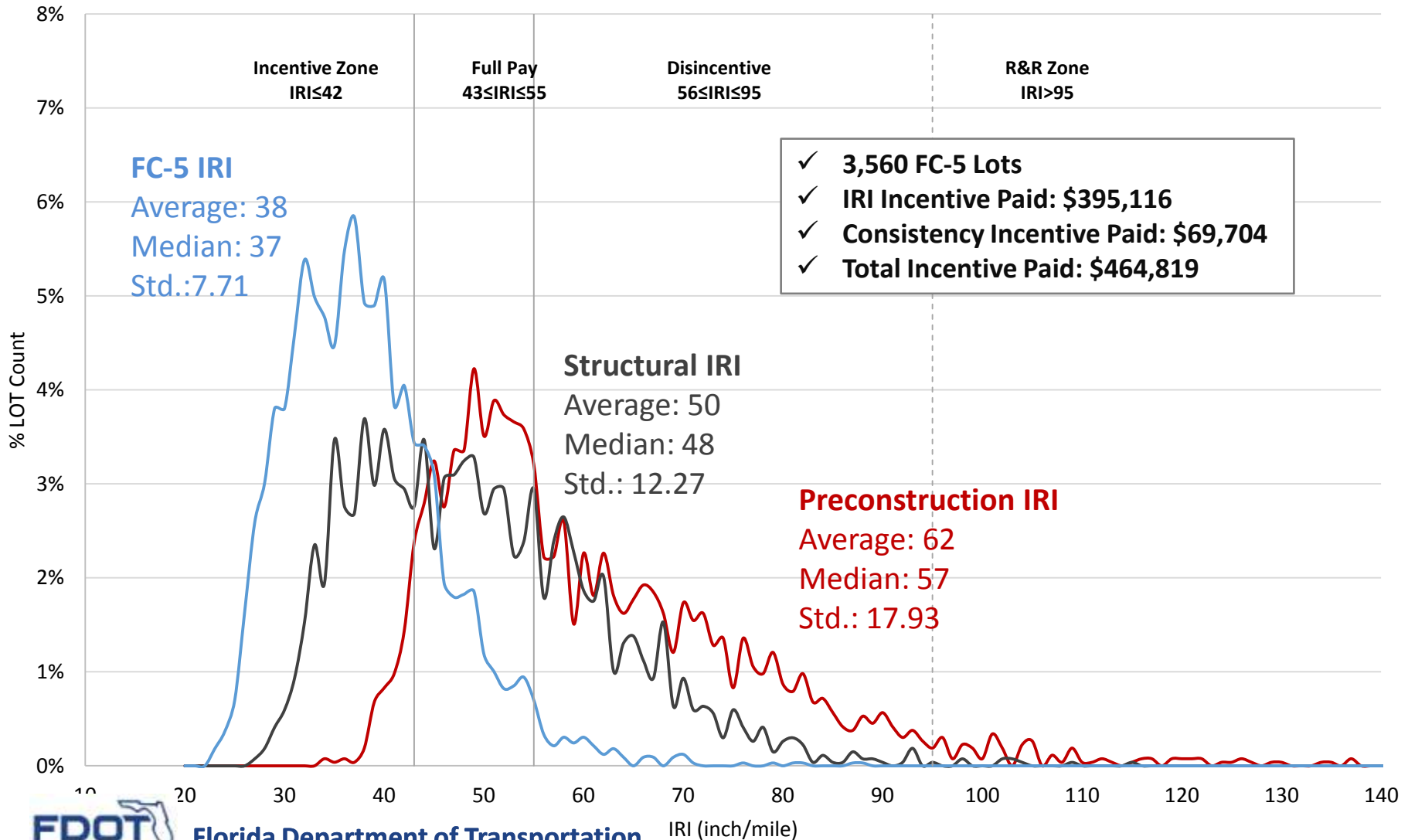


Summary Pilot Project Performance (IRI)



Summary Pilot Project Comparison (IRI)

Lot IRIs Obtained from 11 Pilot Projects



Individual Project Comparisons of IRI

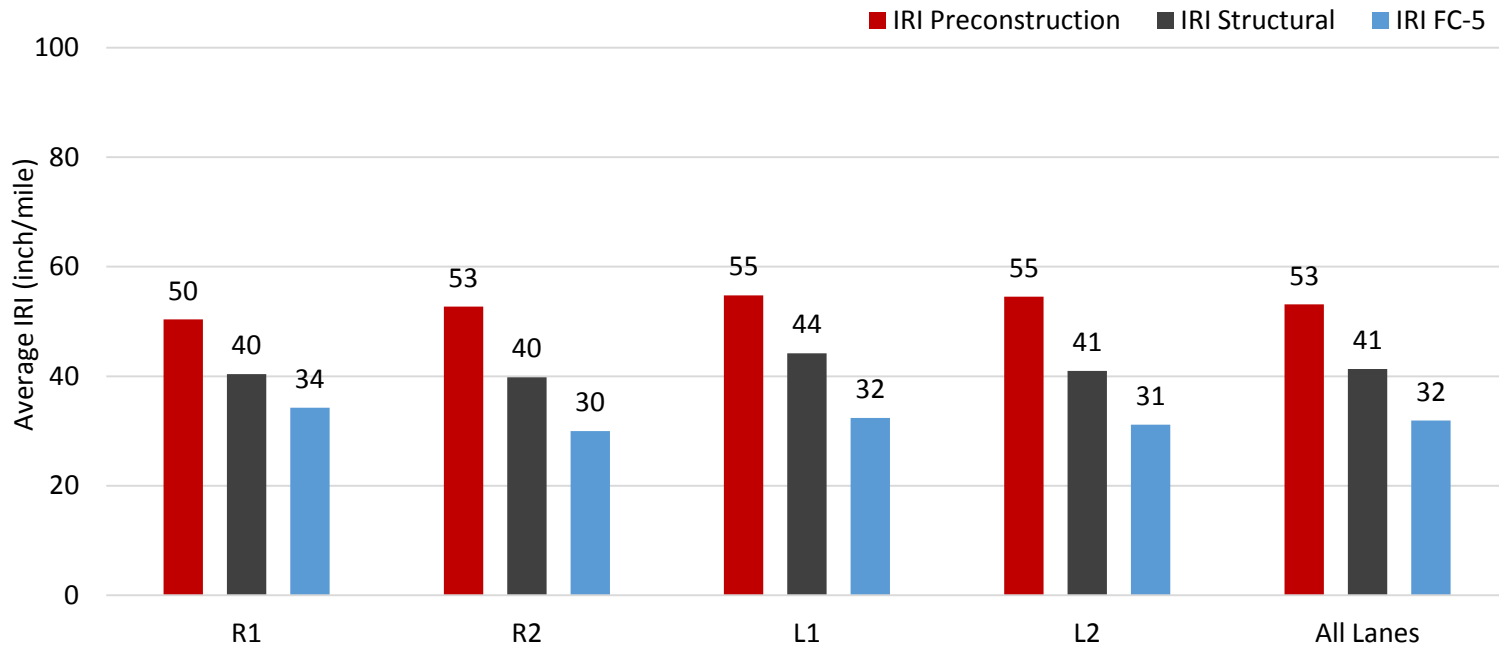
- Consistency Bonus
- Highest Incentive
- Limestone
- Structural Assessment Friction Course

Consistency Bonus

- 3 projects met consistency (\leq 55 IRI)
- 4 projects missed consistency by 2 LOTs or less

I-10 Leon County (MP 15.643-22.200)

Average IRIs

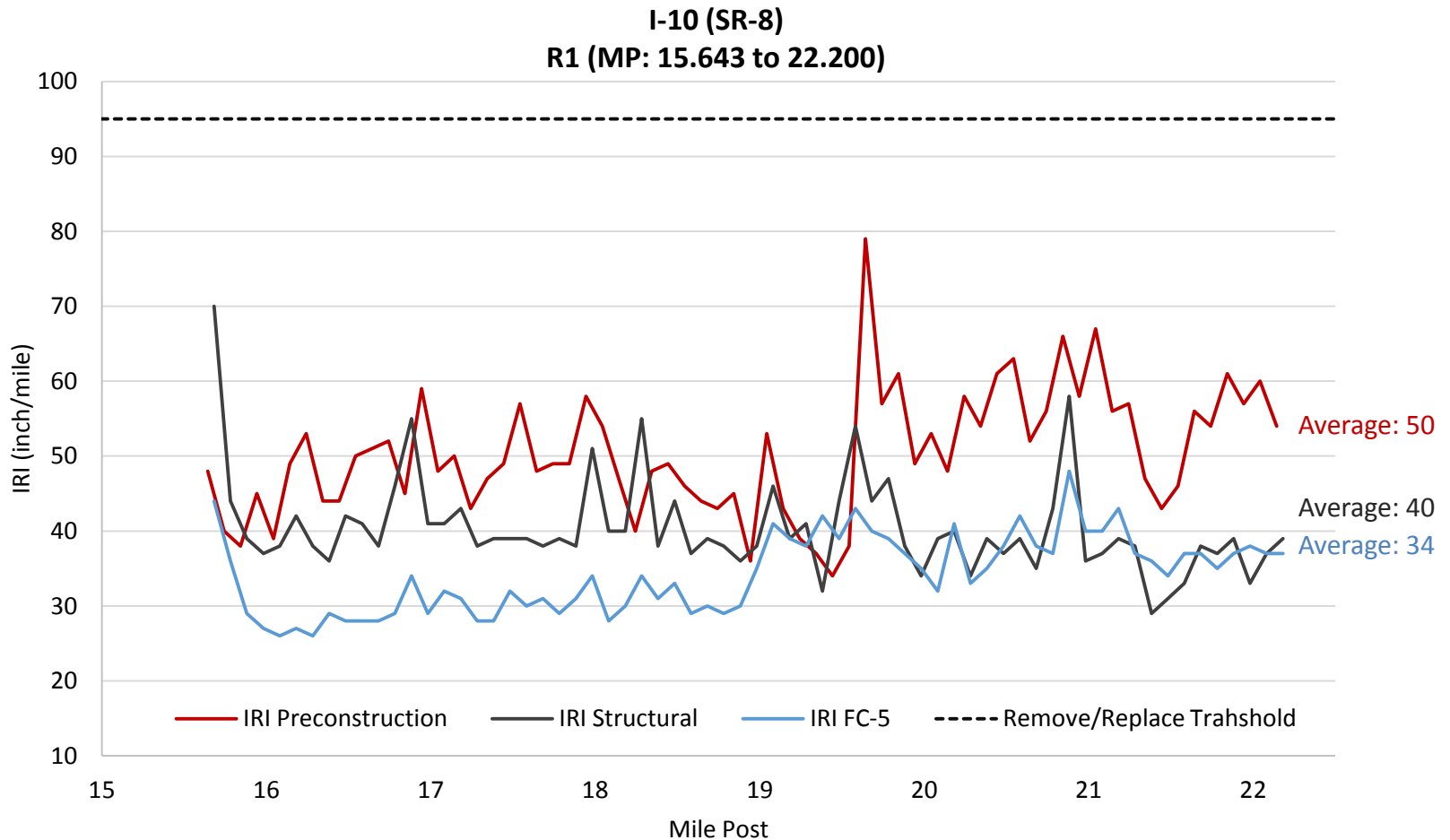


- ✓ 264 FC-5 Lots
- ✓ IRI Incentive Paid: \$ 45,572
- ✓ Consistency Incentive Paid: \$27,343
- ✓ Total: \$72,914
- ✓ Friction Mean IRI = 31, Range (24-55)
- ✓ Structural to Friction (+9)

• **Lowest Mean IRI of all the pilots**

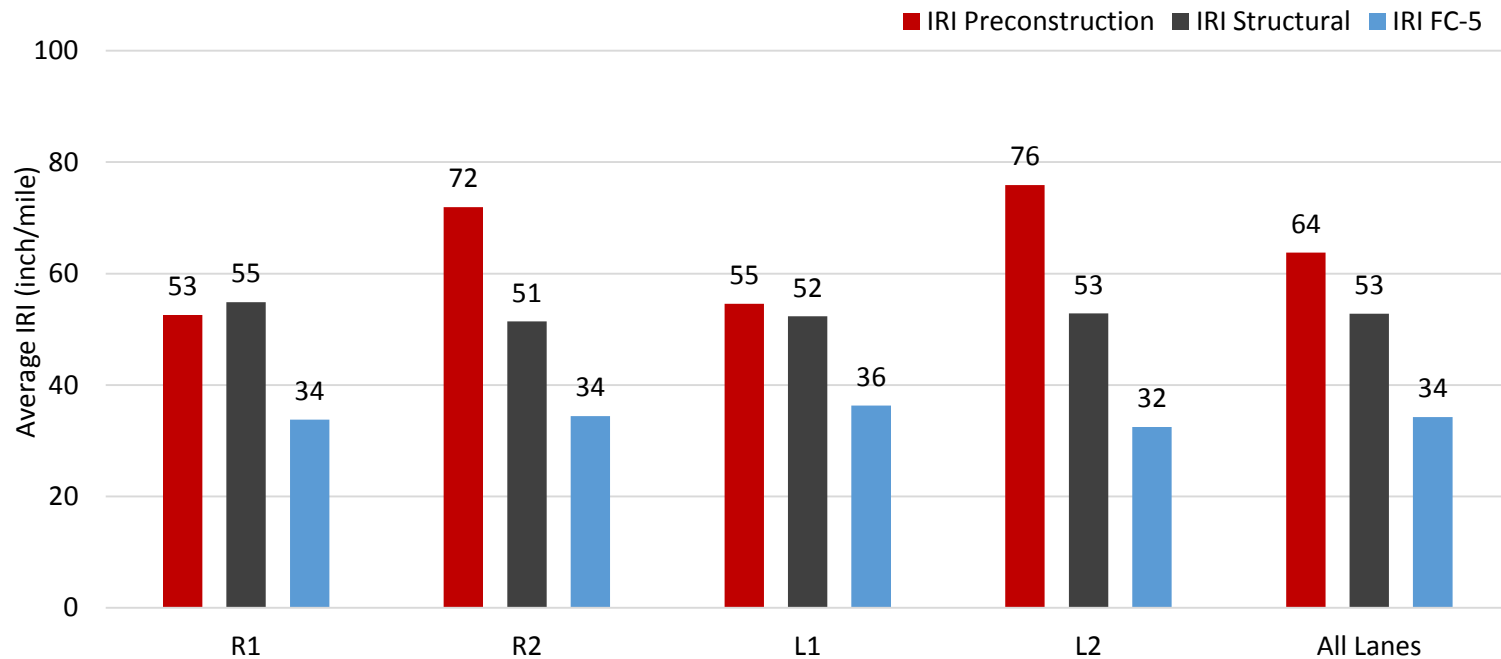


I-10 Leon County (MP 15.643-22.200)



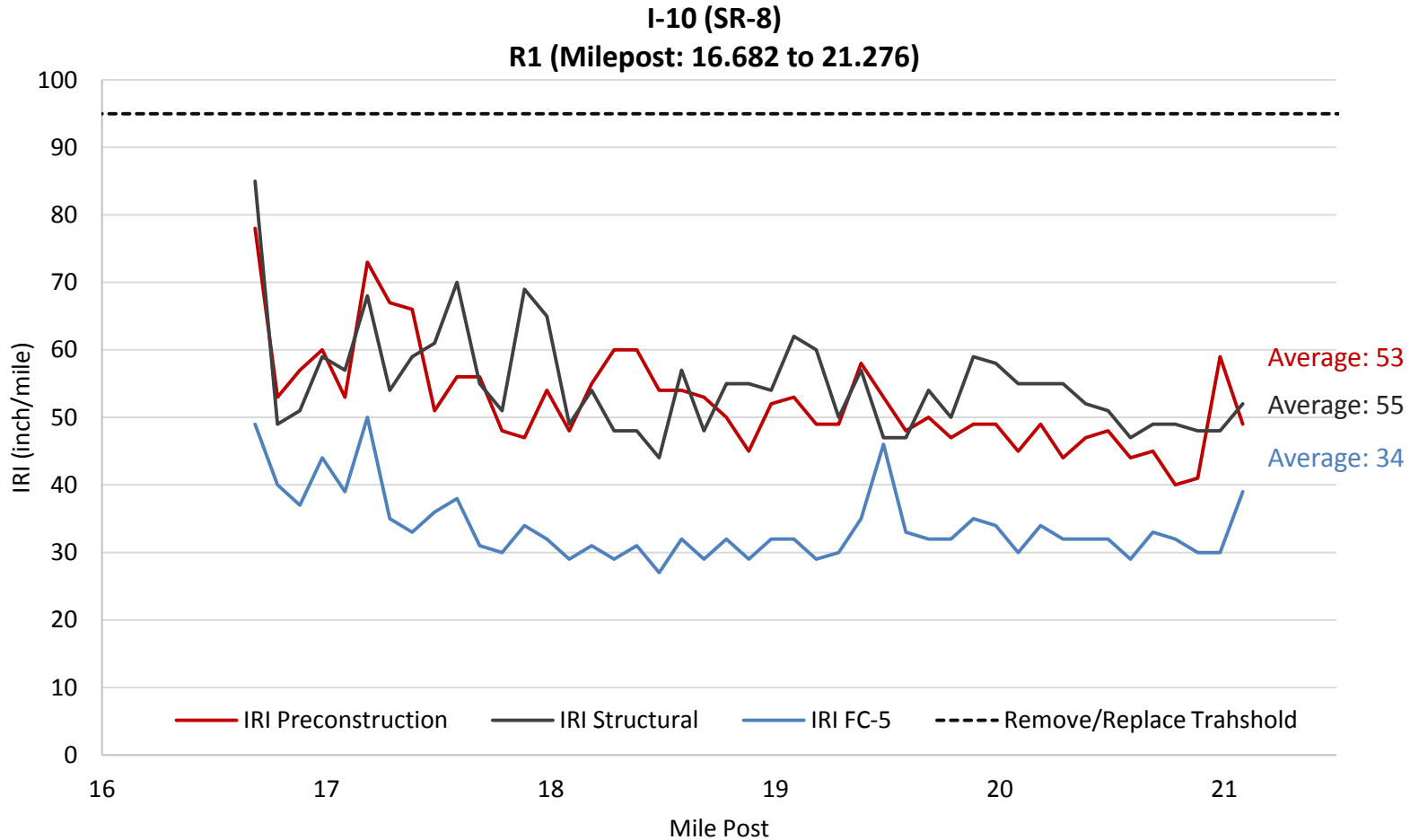
I-10 Holmes County (MP 16.682-21.276)

Average IRIs



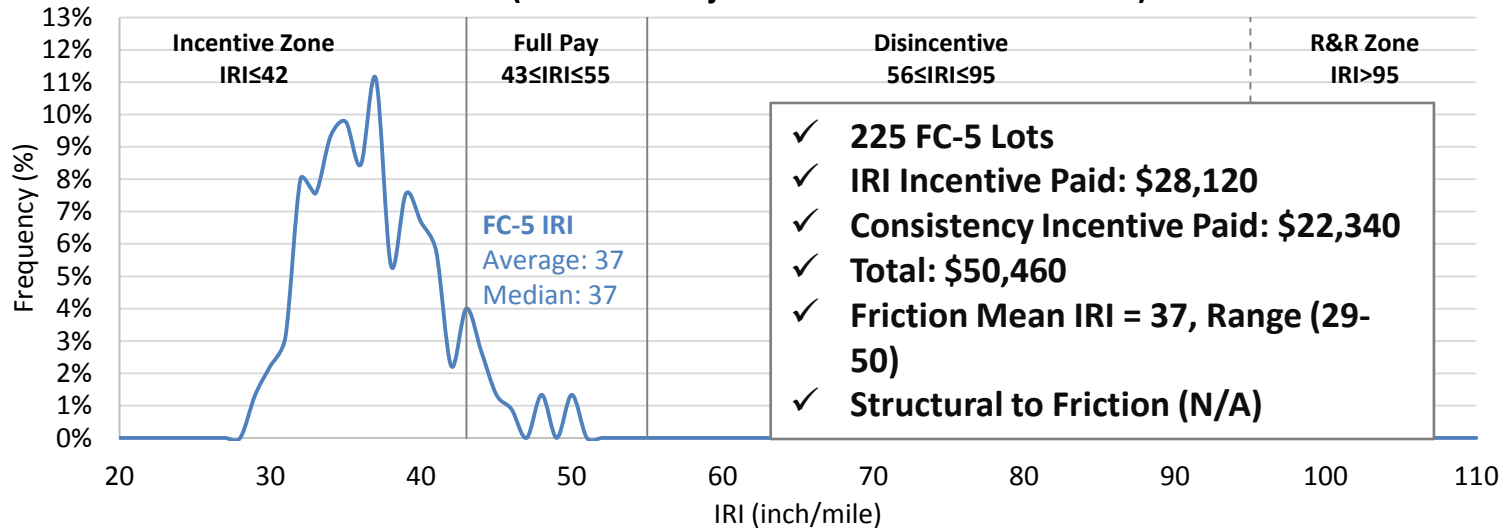
- ✓ 180 FC-5 Lots
- ✓ IRI Incentive Paid: \$31,881
- ✓ Consistency Incentive Paid: \$20,021
- ✓ Total: \$51,902
- ✓ Friction Mean IRI = 34, Range (27-55)
- ✓ Structural to Friction (+19)

I-10 Holmes County (MP 16.682-21.276)

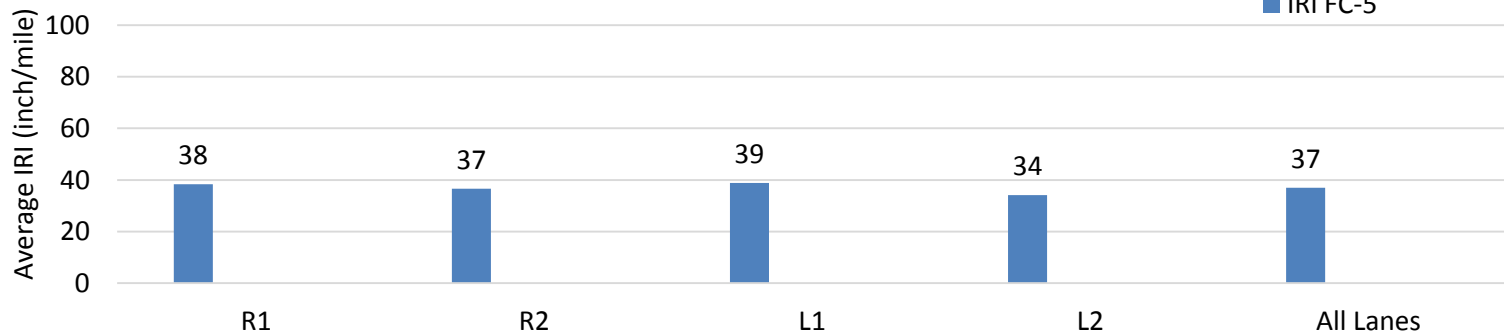


I-10 Madison County (MP 11.378-16.969)

I-10 (Financial Project Number: 426985-1-52-01)



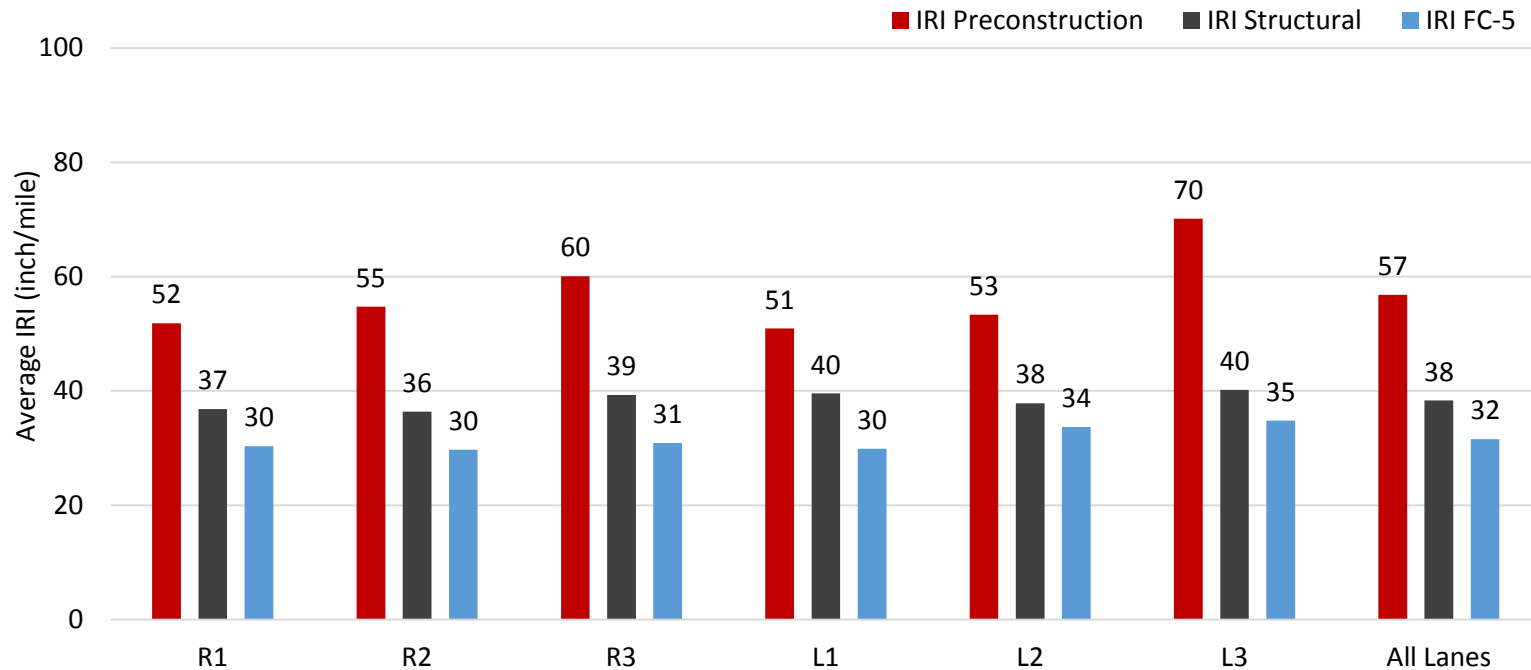
Individual Lane



Highest Incentive

I-75 Hamilton County (MP 19.048-28.633)

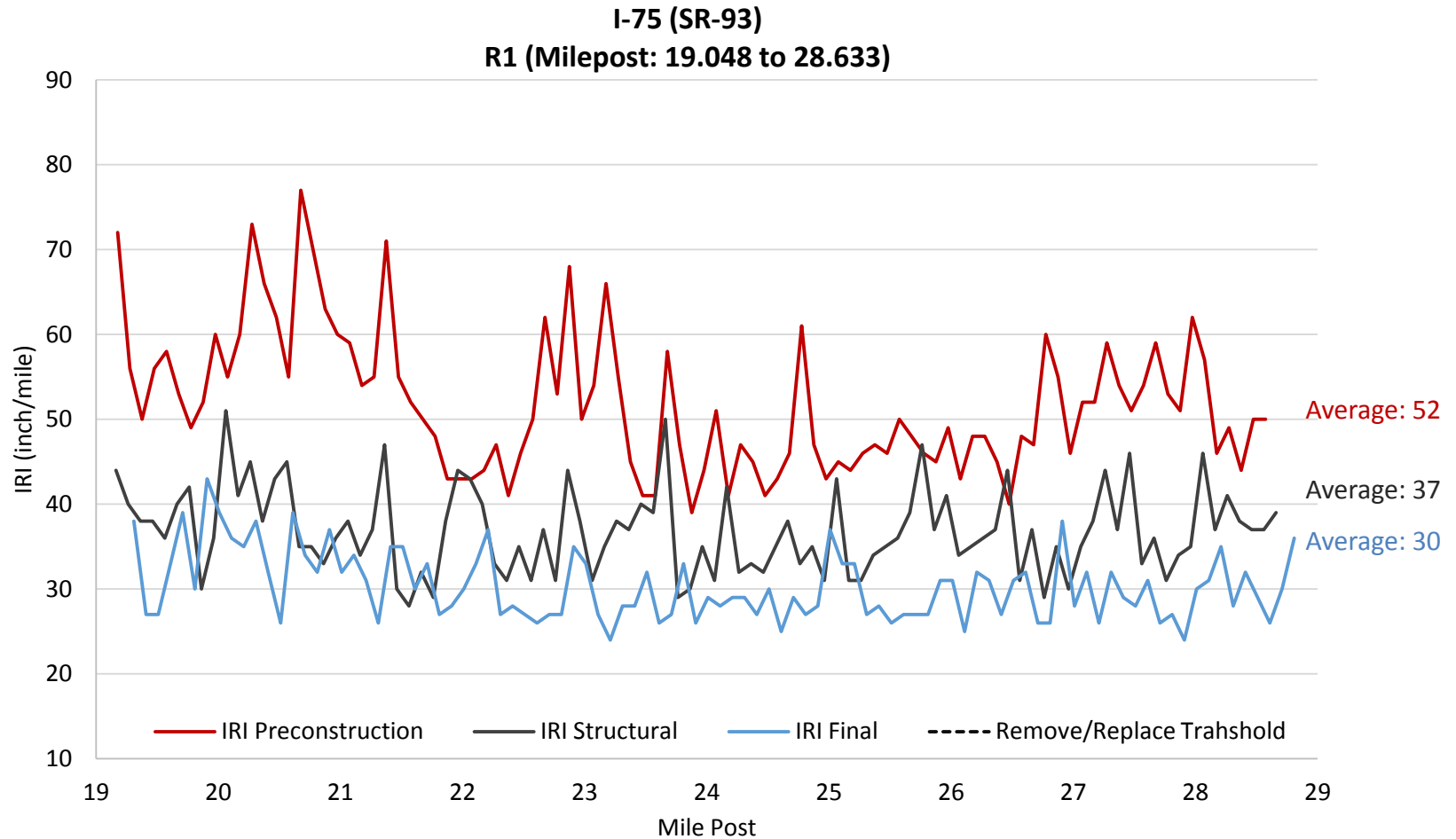
Average IRIs



- ✓ 576 FC-5 Lots
- ✓ 57.5 miles
- ✓ IRI Incentive Paid: \$118,880
- ✓ Friction Mean IRI = 32, Range (23-59)
- ✓ Structural to Friction (+6)

- 1 LOT (59) prevented consistency bonus

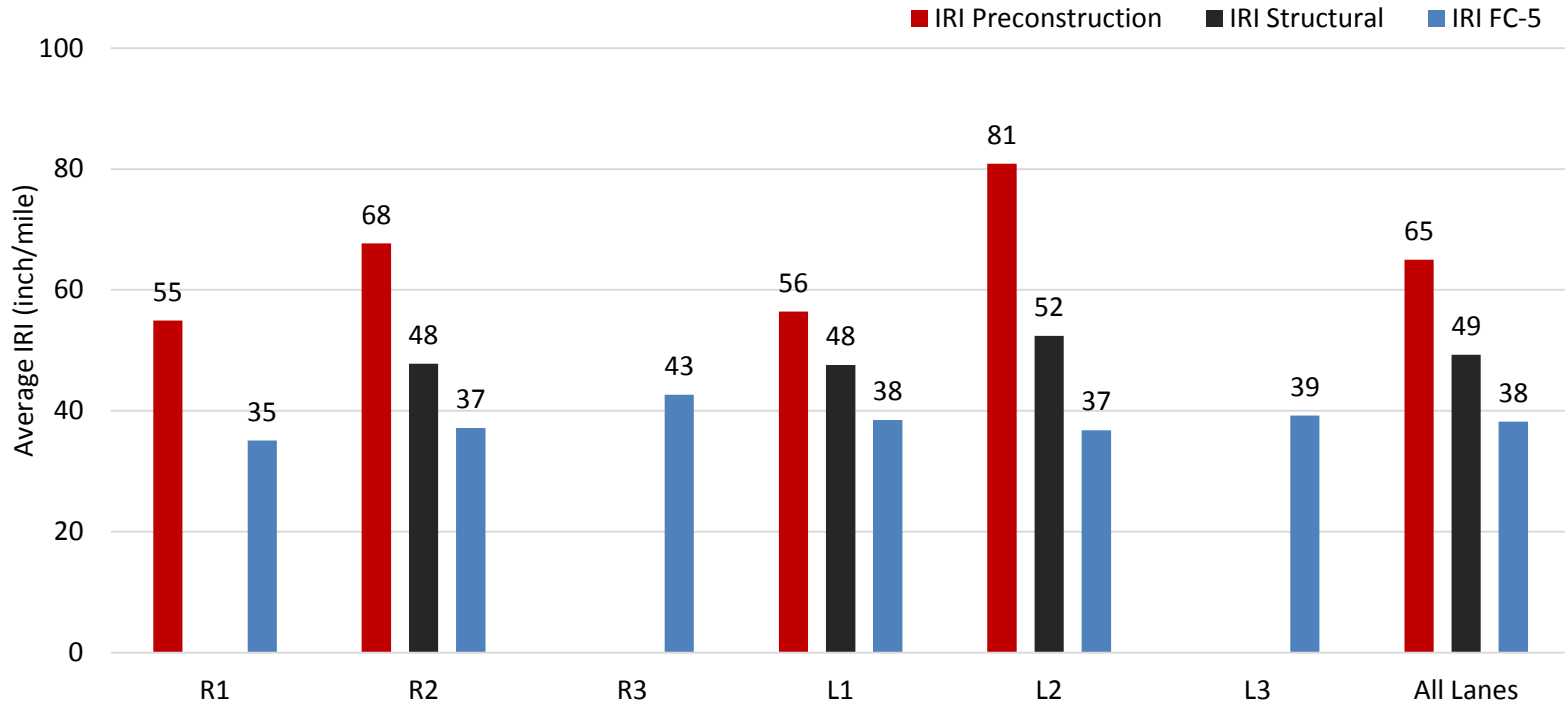
I-75 Hamilton County (MP 19.048-28.633)



Limestone Project

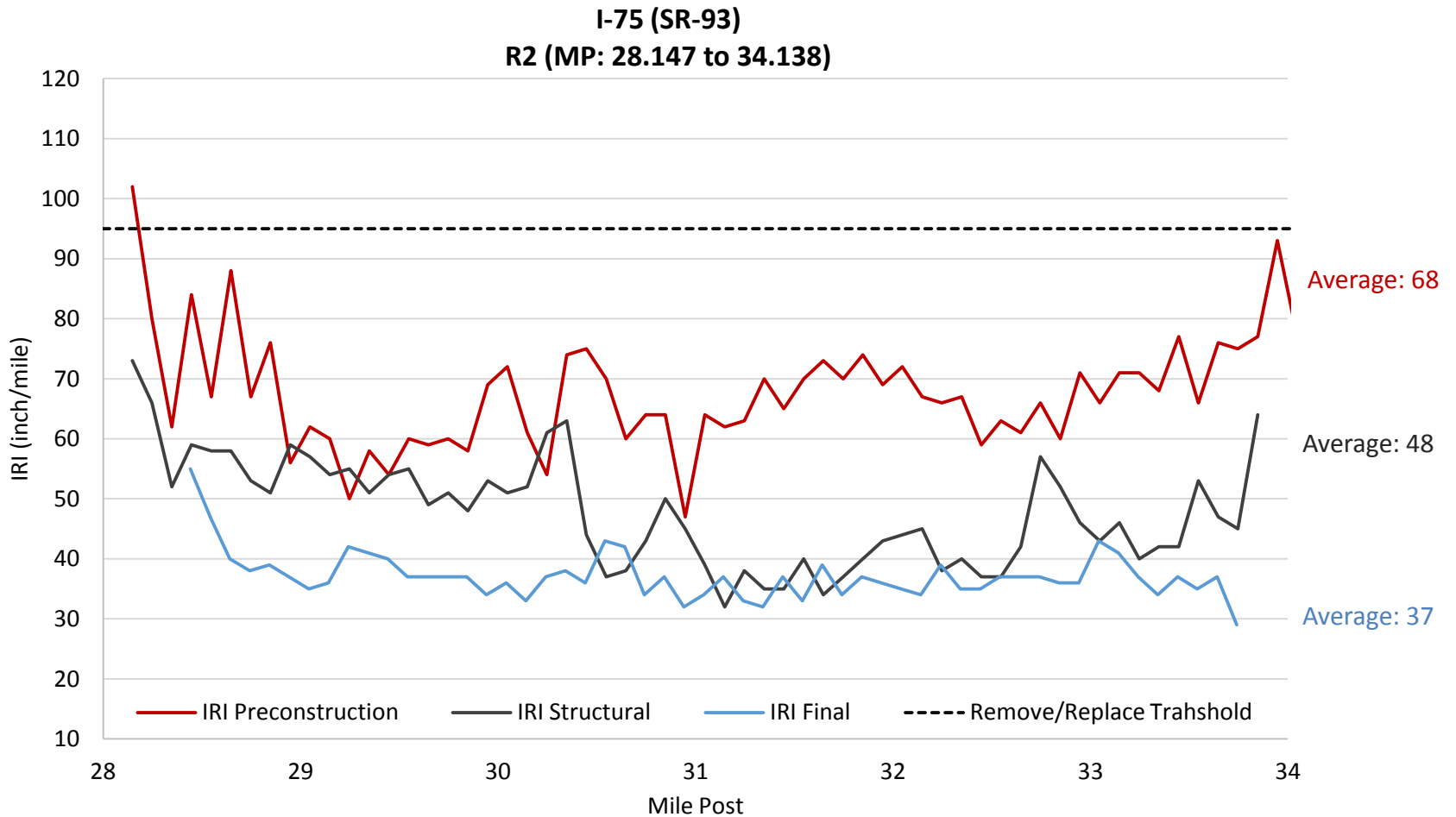
I-75 Lee County (MP 28.147-34.138)

Average IRIs



- ✓ 333 FC-5 Lots
- ✓ IRI Incentive Paid: \$ 35,480
- ✓ Friction Mean IRI = 38 Range (21-68)
- ✓ Structural to Friction (+11)

I-75 Lee County (MP 28.147-34.138)

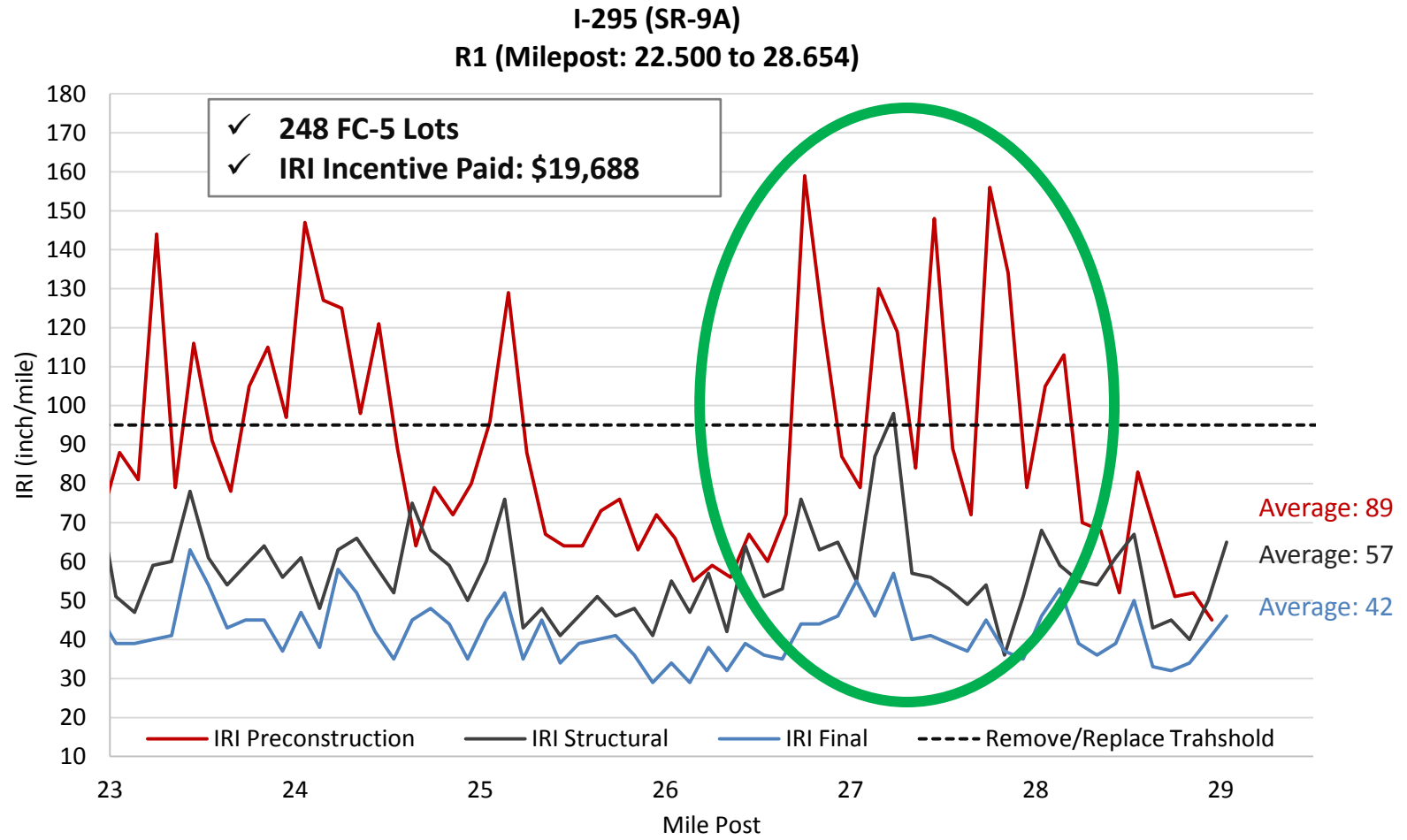


Pre-Construction to Friction

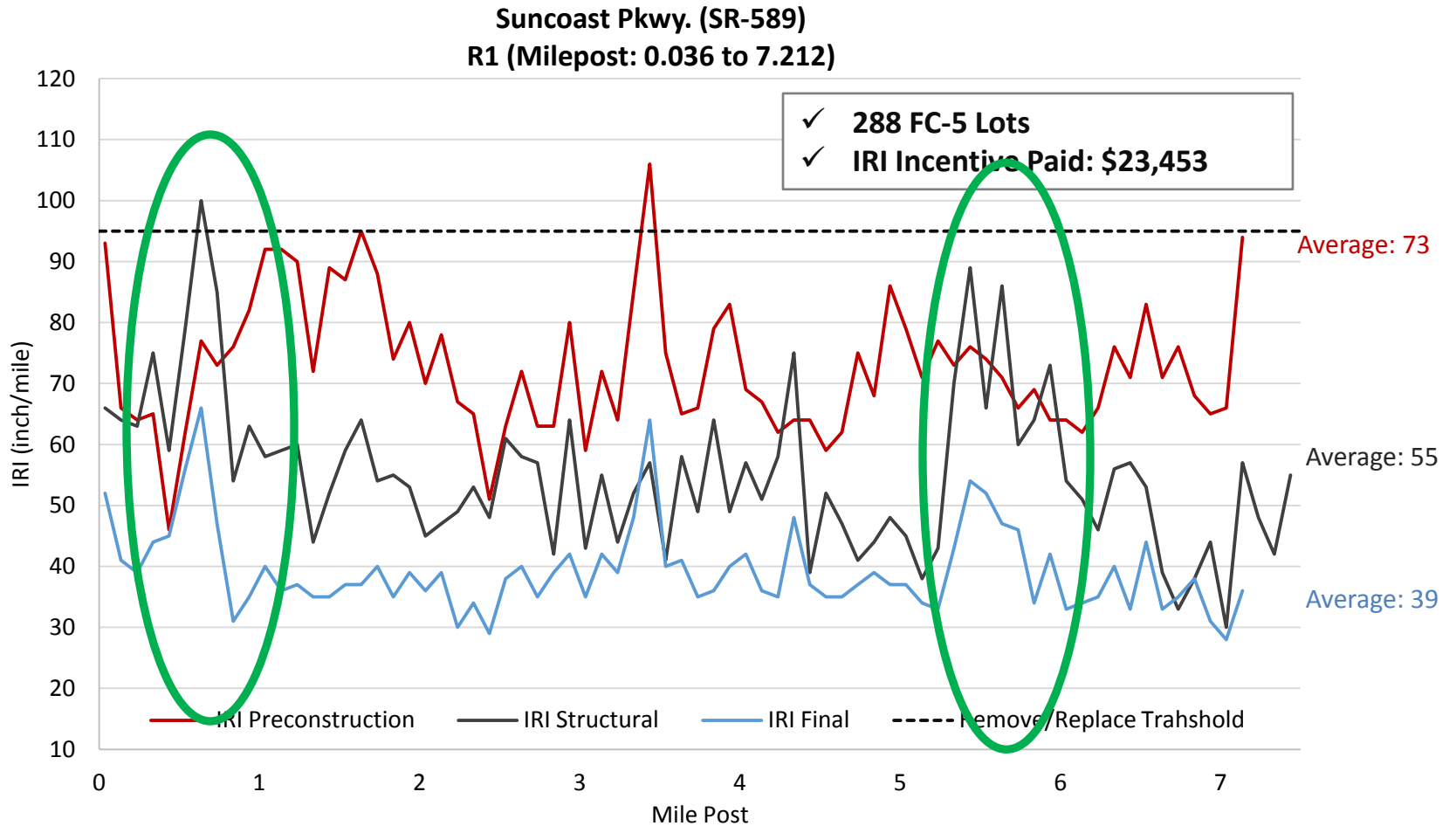
Effects of smoothness

- Preconstruction
- Structural
- Friction

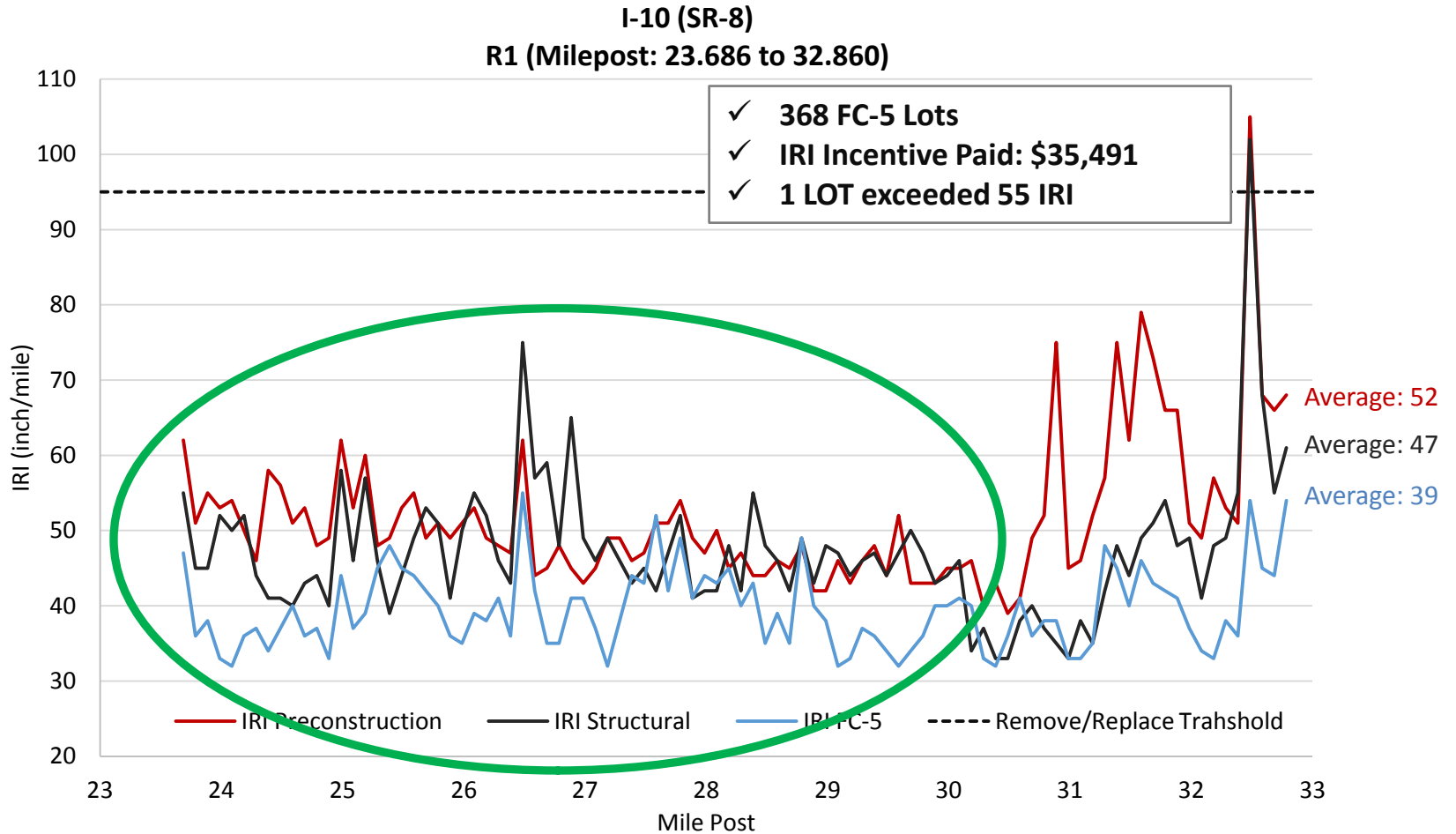
I-295 (MP 22.500-28.654), Duval



Suncoast Pkwy. (MP 0.036-7.212), Hernando

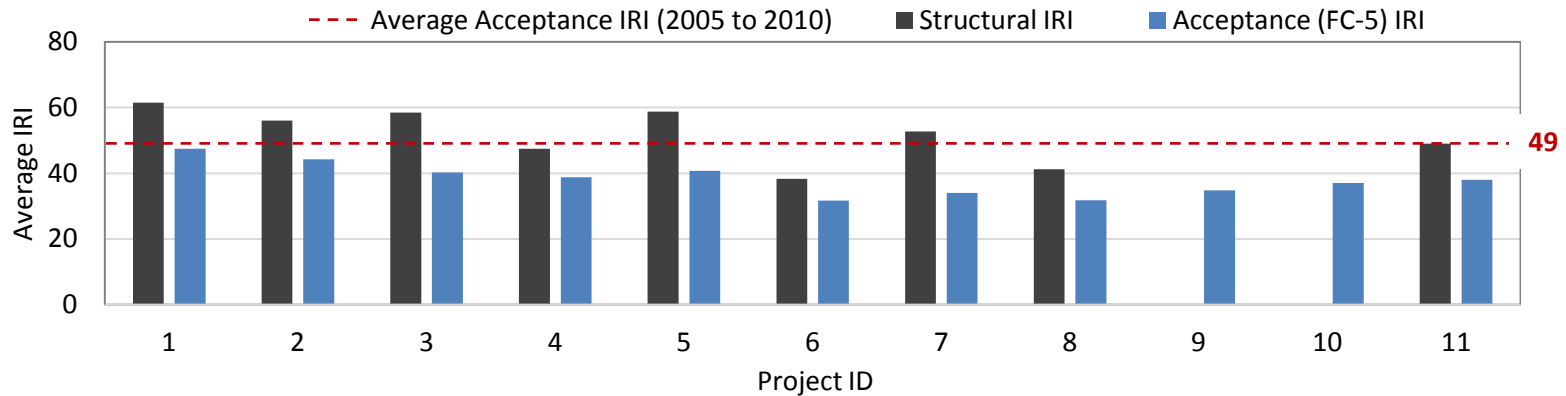


I-10 Madison County (MP 23.686-32.860)



Effect of MTD Usage

IRI Comparison between Pilot Projects



Project ID	Total Incentive Paid	Number of Lots	MTD Usage	Avg. FC-5 IRI	Avg. Structural IRI	IRI Improvement
1	\$2,272	434	N/A	48	62	14
2	\$10,414	350	No	44	56	12
3	\$23,453	288	No	40	59	19
4	\$35,491	368	Partial	39	48	9
5	\$19,688	248	Yes	41	59	18
6	\$118,880	576	Yes	32	38	6
7	\$51,903	180	Yes	34	53	19
8	\$72,914	264	Yes	32	41	10
9	\$43,863	242	Yes	35	N/A	N/A
10	\$50,460	225	Yes	37	N/A	N/A
11	\$35,480	333	Yes	38	49	11



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Questions?