9th International Conference on MANAGING PAVEMENT ASSETS (ICMPA9)

VDOT Virginia Department of Transportation

Pavement Performance Monitoring Program

KEI
Aaron D. Gerber, P.E.
Kercher Engineering, Inc.

AgileAssets
Eric Perrone
AgileAssets, Inc.

AASHTO THE VOICE OF TRANSPORTATION

VirginiaTech Transportation Institute

TRB

U.S. Department of Transportation Federal Highway Administration

WORLD ROAD ASSOCIATION MONDIALE DE LA ROUTE 1909-2009

VDOT Virginia Department of Transportation

Introduction

PAVEMENT

VDOT PMS Overview

Network Stats

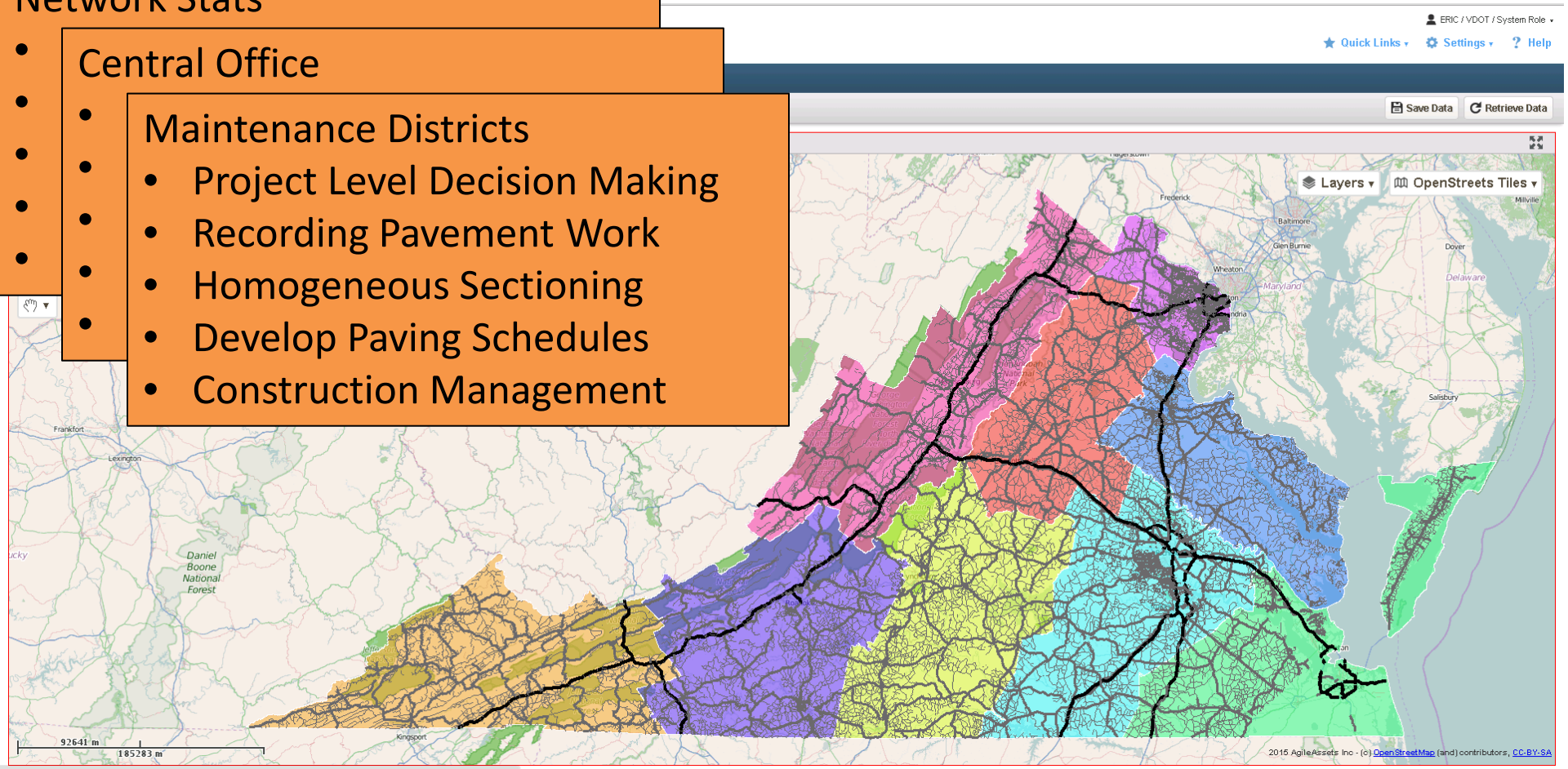
-
-
-
-
-
-

Central Office

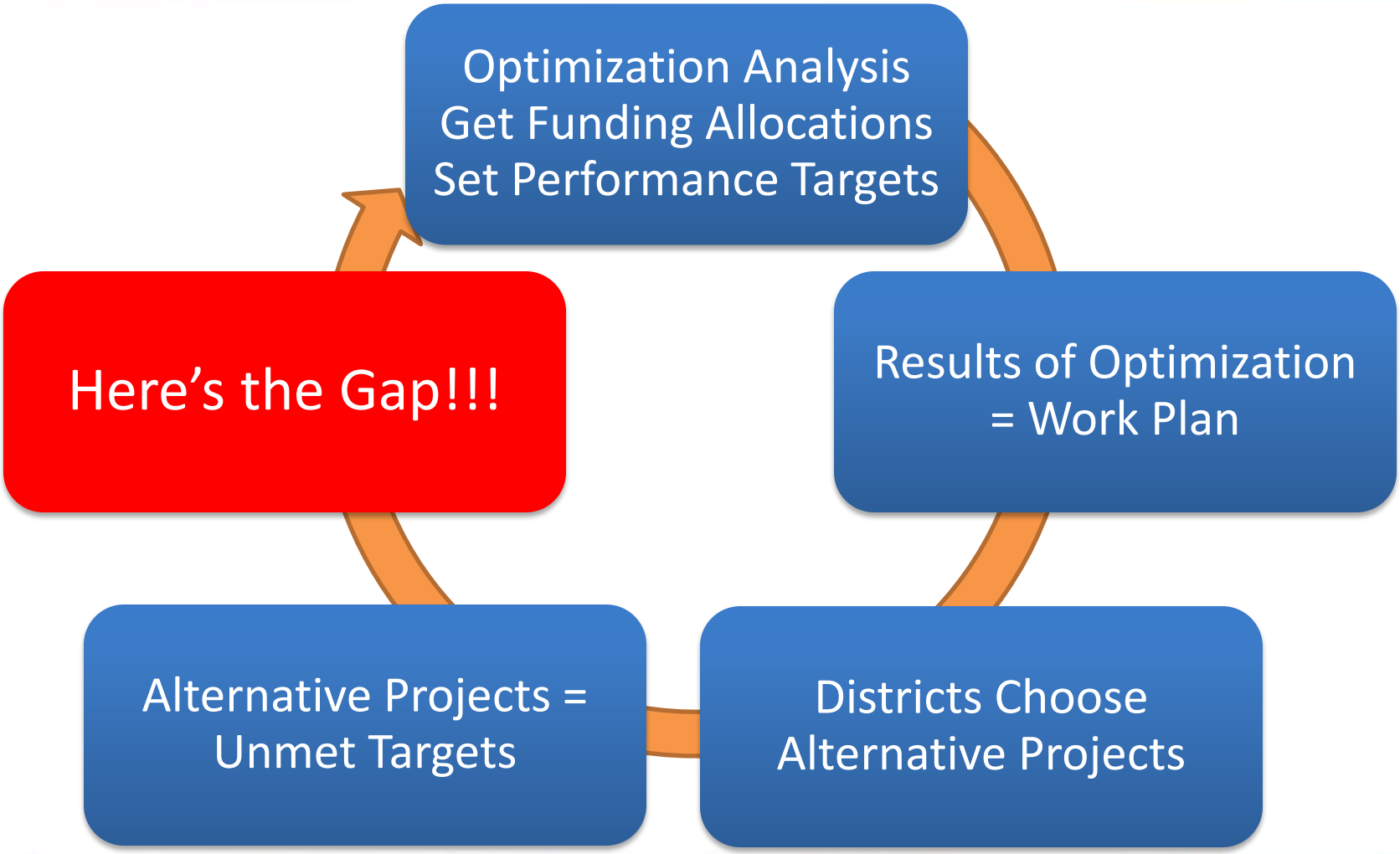
-
-
-
-
-
-

Maintenance Districts

- Project Level Decision Making
- Recording Pavement Work
- Homogeneous Sectioning
- Develop Paving Schedules
- Construction Management



Mind the Gap


Optimization Analysis
Get Funding Allocations
Set Performance Targets
Results of Optimization
= Work Plan
Districts Choose
Alternative Projects
Alternative Projects =
Unmet Targets
Here's the Gap!!!

Closing the Loop between
Network-level and Project-level
Decision Making

PERFORMANCE MONITORING PROCESS

Performance Targets

Critical Condition Index (CCI)	**International Roughness Index (IRI)**
• Excellent (≥ 90) • Good (Between 70 and 89) • Fair (Between 60 and 69) • Poor (Between 50 and 59) • Very Poor (≤ 49)	• Excellent (< 60) • Good (Between 60 and 99) • Fair (Between 100 and 139) • Poor (Between 140 and 199) • Very Poor (≤ 200)

Pavements in “Fair” or better condition are termed **‘Sufficient’**

Repair Categories

Preventive Maintenance (PM)	Restorative Maintenance (RM)

• Minor Patching <= 2” Depth
  • < 5% pavement area
• Surface Treatment
• Thin Overlays up to 1”
	• Heavy Patching <= 9” Depth
	  • < 20% of pavement area
	• FDP and up to 4” Overlay
	• Milling and up to 4” Overlay

Corrective Maintenance (CM)	**Reconstruction (RC)**
• Moderate Patching <= 6” Depth • < 10% of pavement area • PDP and thin (<= 2”) Overlay • <= 2” Milling and <= 2”Overlay	• Mill, Break and Seat and Thick Overlay • Reconstruction • FDR

Unconstrained Needs Analysis

- Decision Matrix Rules for Triggering Treatments
- Provides Section-by-Section Treatment and Cost Regardless of Available Funds
- Assists Districts in Making Project Level Treatment Selections
- Factors Include:
  - Distresses Collected (Pavement Condition)
  - Pavement Age, Pavement Structure, Traffic Levels

Optimization Analysis

- Network Level Scenarios (Multi-Constraint)
  - Maximize Benefit Objective
  - Budgetary Constraints
  - CCI Constraints
- Maintenance District Specific
- Route Classification Specific (Interstate, Primary, Secondary)
- Includes Planned and Pipeline Projects

Performance Reporting Process

- Based on Optimization, set Baseline Targets
  - % Sufficient
  - Repair Category Lane Miles
- Compare Planned Projects vs. Actual Targets
  - Optimization Results vs. District Planned Projects
  - Unconstrained Results vs District Planned Projects
- Report differences in results
- Provide Districts with opportunities for course correction
- Finalize Project Lists and Performance Reports

Targeted vs. Predicted Optimization Comparisons

- Targeted = Optimization Analysis Results
- Predicted = District Project Selections
- Criteria:
  - % Sufficient Lane Mile Targets
  - Lane Mile Targets per Repair Category

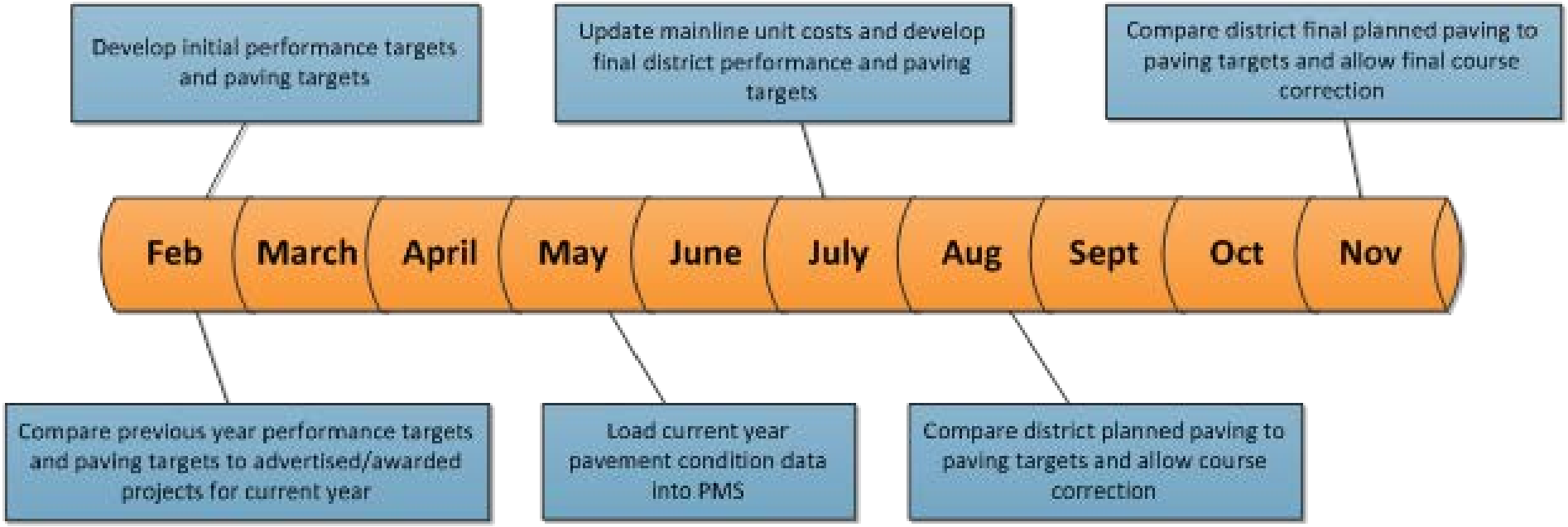
Targeted vs. Predicted Project Comparisons

- Unconstrained Needs Analysis Results
- Predicted = District Project Selections
- Criteria:
  - Project Must Not Deviate by More than 1 Category from Unconstrained Needs Result for that Section

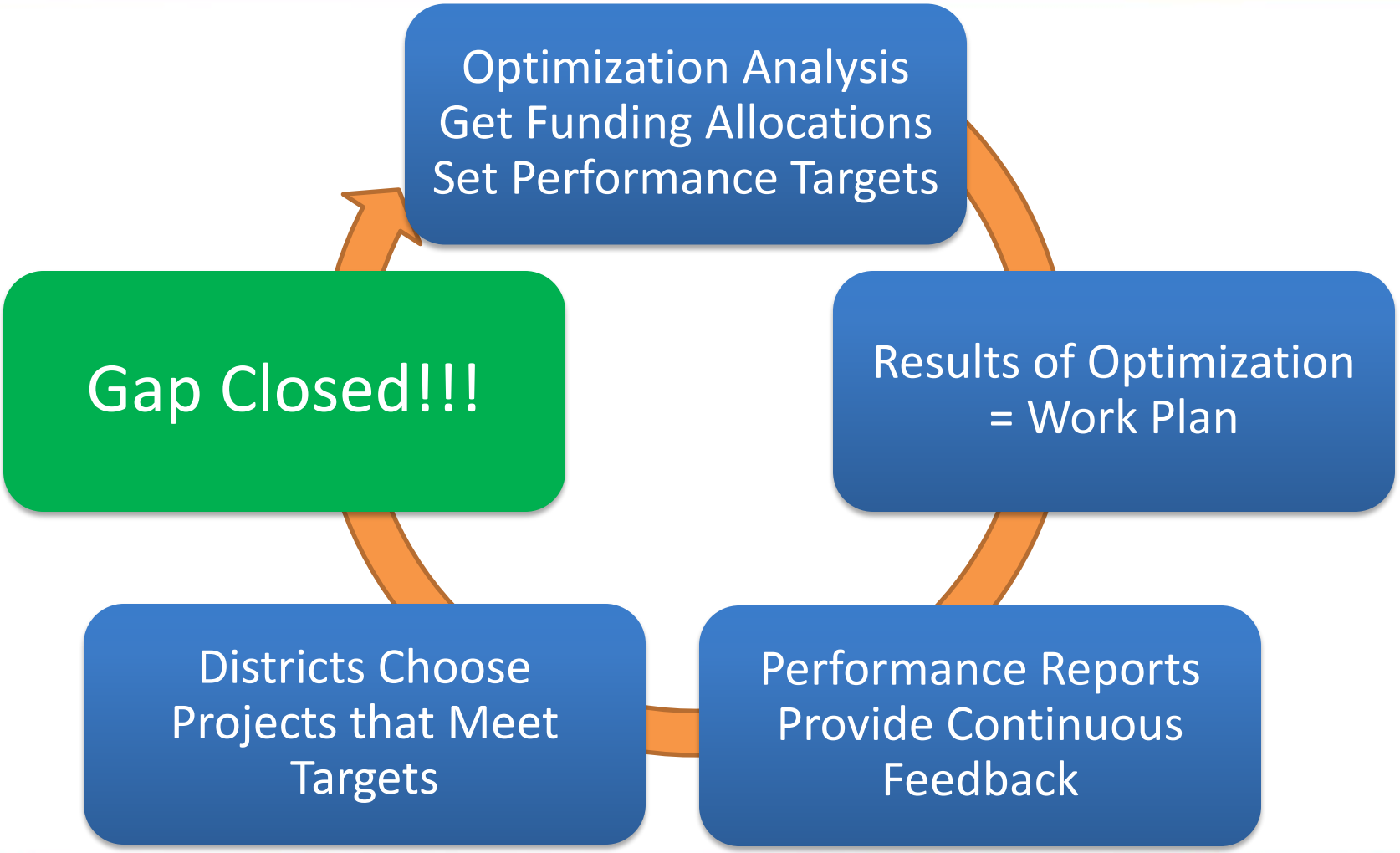
Reports List

- Detailed Pavement Data Report
- Initial Baseline Performance Targets Report
- Final Baseline Performance Targets Report
- District Paving Status Report
- District Completed Paving Report

Timing is Everything



Closing the Gap in Process



THANK YOU.

PMS UAT VDOT
Pavement Management System

Detailed Pavement Data Report
Summary

Report Date: 04/03/2015

Report Input Limits

ROUTE	DIRECTION	STATE BEGIN MP	STATE END MP	COUNTY FROM	COUNTY TO	COUNTY BEGIN MP	COUNTY END MP
US00250EB	All	5.00	15.00	045-Highland	045-Highland	5.00	15.00

Management Information Summary *(based on most recent, overlapping management sections)*

Total Lane Miles: 20.00 Lane Miles

Summary of Pavement Characteristics

Number of Lanes	*Directional Miles*	*Lane Miles*
1		
2	*10.00*	*20.00*
3		
4		
5+		
Total	*10.00*	*20.00*

Pavement Type	*Lane Miles*	*% Lane Miles*
CRCP	*0.00*	*0.00 %*
JRCP	*0.00*	*0.00 %*
BIT	*20.00*	*100.00 %*
BOC	*0.00*	*0.00 %*
BOJ	*0.00*	*0.00 %*
NPM	*0.00*	*0.00 %*
PM	*0.00*	*0.00 %*
Total	*20.00*	*100.00%*

Last Treatment Category	*Lane Miles*	*% Lane Miles*
CM	*16.84*	*84.20 %*
DN	*3.16*	*15.80 %*
PM	*0.00*	*0.00 %*
RC	*0.00*	*0.00 %*
RM	*0.00*	*0.00 %*
Total	*20.00*	*100%*

Condition Data Summary *(based on most recent, overlapping management sections)*

Percent Lane Miles Sufficient CCI **94 %** ***Lane Mile Weighted Average CCI*** **88**

Percent Lane Miles Sufficient IRI **100 %** ***Lane Mile Weighted Average IRI*** **111**

Summary of Pavement Surface Condition Data

Year	Lane Miles	% Lane
2014	20.00	100.00 %
2013	20.00	100.00 %
2012	20.00	100.00 %
2011	20.00	100.00 %

CCI	*Lane Miles*	*% Lane*
1 - Excellent	*3.48*	*17.40 %*
2 - Good	*15.36*	*76.80 %*
3 - Fair	*0.00*	*0.00 %*
4 - Poor	*1.16*	*5.80 %*
5 - Very Poor	*0.00*	*0.00 %*
Total	*20.00*	*100%*

IRI Condition	*Lane Miles*	*% Lane Miles*
1 - Excellent	*0.00*	*0.00 %*
2 - Good	*0.00*	*0.00 %*
3 - Fair	*20.00*	*100.00 %*
4 - Poor	*0.00*	*0.00 %*
5 - Very Poor	*0.00*	*0.00 %*
Total	*20.00*	*100%*

Treatment Recommendation Summary *(estimated costs are based on the reported section limits)*

Modified Treatment Name	*Lane Miles*	*Estimated Mainline Material Cost*
DN- Do nothing	16.84	
PM-Preventive Maintenance	2.0	$ 18,232
CM - Corrective Maintenance	1.16	$ 76,526
RM - Restorative Maintenance		
RC- Reconstruction		

Supporting Information *(as summarized from overlapping management section)*

AADTT (Truck Traffic)		
Average	*19*	Trucks/Day
Minimum	*14*	Trucks/Day
Maximum	*49*	Trucks/Day

Surface Age (Years)		
Average:	*5.5*	*Years*
Minimum:	*4.0*	*Years*
Maximum	*16.0*	*Years*

Pavement Structure (FWD)		
Strong:	*0.00*	LM
Weak:	*0.00*	LM
No Test:	*20.00*	LM

Detailed Pavement Data Report
Location Detail

Report Date: 04/03/2015

Location Detail

ROUTE	DIRECTION	STATE BEGIN MP	STATE END MP	COUNTY	COUNTY BEGIN MP	COUNTY END MP	LANE MILES
US00250EB	All	5.00	6.68	045-Highland	5.00	6.68	3.36

Management Info *(based on most recent, overlapping management section which may extend beyond report limits)*

Collection Year: 2014
Pavement Type: BIT
Surface Mix: SM-12.5A
Last Treatment: CM-BIT
Year of Last Rehab: 2011

Begin MP: 5.000 (County MP 5.000)
End MP: 6.680 (County MP 6.680)
Total Lanes: 2
Divided / Undivided: Undivided
Total Lane Miles: 3.36

Begin Landmark: County/City/Town Line: WEST VA STATE LINE
End Landmark: County/City/Town Line: MONTEREY
Notes:
HMG Key: 45-00US00250E-BIT-0005429

2014 Condition Data *(based on distress summarized on most recent, overlapping management section's limits)*

CCI:	96	Alligator Freq (R/O/F):	R	Rutting Freq (N/<10%/>=10%):	N
LDR:	96	Alligator Sev (NS/S/VS):	NS	Rutting Sev (<0.5" / >=0.5"):	<0.5"
NDR:	97	Patching Freq (Y/N):	N	Transverse Cracks/Mile:	22
Average IRI:	112	Patching Sev (=<10%/>10%):	=<10%	Trans. Cracks Sev (NS/S/VS):	NS

2014 Treatment Recommendation *(estimated costs are based on the reported section limits)*

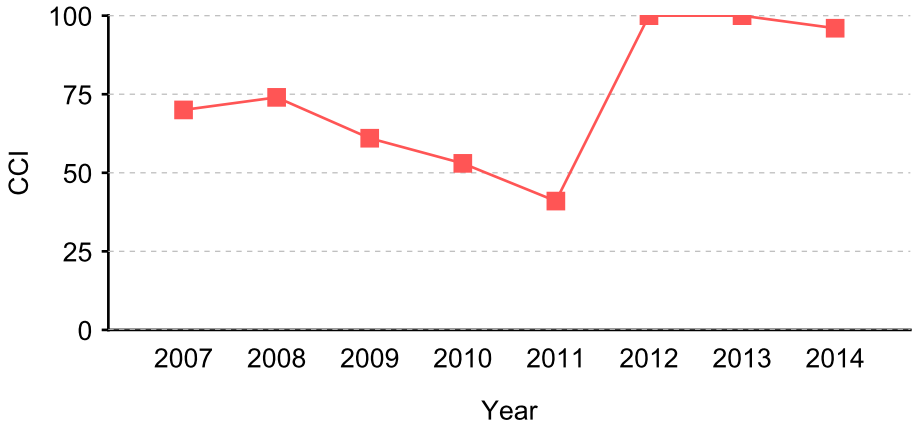
Modified Treatment: DN (Do Nothing) | *Estimated Mainline Material Cost:* N/A

Supporting Information

AADTT: Level 1 (14 Trucks) | *Age:* Young (<6 IS,<5 PR) | *Structure:* No_Test

Ten Year Performance History

Year	CCI	LDR	NDR
2005	N/A	N/A	N/A
2006	N/A	N/A	N/A
2007	70	74	70
2008	74	78	74
2009	61	61	74
2010	53	53	70
2011	41	41	61
2012	100	100	100
2013	100	100	100
2014	96	96	97



Most Recent Five Layers in Maintenance History

Pavement Layer	Material	Thickness (in.)	Year Completion	Contract ID
Layer 1	SM-12.5A	2.0	2011	2741387
Layer 2	Slurry Seal Type C	0.2	1995	2672037
Layer 3	Cold Mix (Motorized	1.3	1994	2672038
Layer 4	Slurry Seal Type C	0.0	1984	2672039
Layer 5	Cold Mix (Motorized	1.3	1983	2672040

Detailed Pavement Data Report
Location Detail

Report Date: 04/03/2015

Location Detail

ROUTE	DIRECTION	STATE BEGIN MP	STATE END MP	COUNTY	COUNTY BEGIN MP	COUNTY END MP	LANE MILES
US00250EB	All	6.68	8.02	045-Highland	6.68	8.02	2.68

Management Info *(based on most recent, overlapping management section which may extend beyond report limits)*

Collection Year:	2014	Begin MP:	6.680 (County MP 6.680)
Pavement Type:	BIT	End MP:	8.020 (County MP 8.020)
Surface Mix:	SM-12.5A	Total Lanes:	2
Last Treatment:	CM-BIT	Divided / Undivided:	Undivided
Year of Last Rehab:	2011	Total Lane Miles:	2.68

Begin Landmark: County/City/Town Line: WEST VA STATE LINE
End Landmark: County/City/Town Line: MONTEREY
Notes:
HMG Key: 45-00US00250E-BIT-0005430

2014 Condition Data *(based on distress summarized on most recent, overlapping management section's limits)*

CCI:	89	Alligator Freq (R/O/F):	R	Rutting Freq (N/<10%/>=10%):	N
LDR:	89	Alligator Sev (NS/S/VS):	NS	Rutting Sev (<0.5" / >=0.5"):	<0.5"
NDR:	89	Patching Freq (Y/N):	N	Transverse Cracks/Mile:	118
Average IRI:	111	Patching Sev (=<10%/>10%):	=<10%	Trans. Cracks Sev (NS/S/VS):	NS

2014 Treatment Recommendation *(estimated costs are based on the reported section limits)*

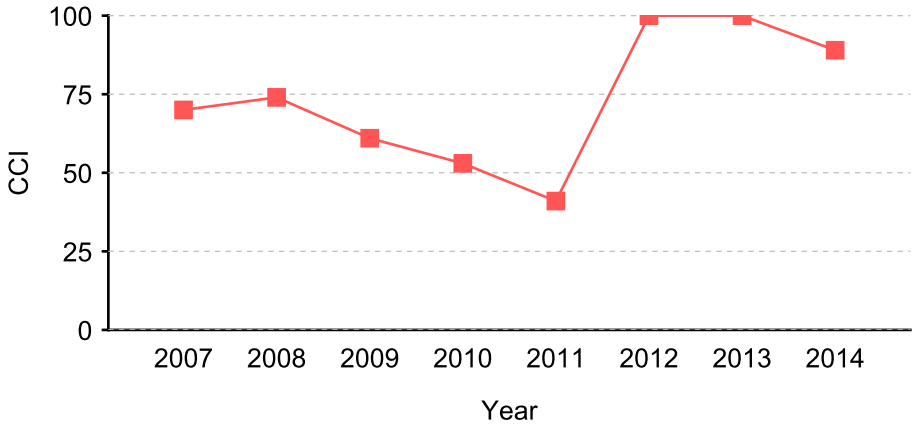
Modified Treatment: | DN (Do Nothing) | *Estimated Mainline Material Cost:* N/A

Supporting Information

AADTT: | Level 1 (15 Trucks) | *Age:* Young (<6 IS,<5 PR) | *Structure:* | No_Test

Ten Year Performance History

Year	CCI	LDR	NDR
2005	N/A	N/A	N/A
2006	N/A	N/A	N/A
2007	70	74	70
2008	74	78	74
2009	61	61	74
2010	53	53	70
2011	41	41	61
2012	100	100	100
2013	100	100	100
2014	89	89	89



Most Recent Five Layers in Maintenance History

Pavement Layer	Material	Thickness (in.)	Year Completion	Contract ID
Layer 1	SM-12.5A	2.0	2011	2741387
Layer 2	Slurry Seal Type C	0.2	1995	2672037
Layer 3	Cold Mix (Motorized	1.3	1994	2672038
Layer 4	Slurry Seal Type C	0.0	1984	2672039
Layer 5	Cold Mix (Motorized	1.3	1983	2672040

Detailed Pavement Data Report
Location Detail

Report Date: 04/03/2015

Location Detail

ROUTE	DIRECTION	STATE BEGIN MP	STATE END MP	COUNTY	COUNTY BEGIN MP	COUNTY END MP	LANE MILES
US00250EB	All	8.02	10.02	045-Highland	8.02	10.02	4.00

Management Info *(based on most recent, overlapping management section which may extend beyond report limits)*

Collection Year: 2014
Pavement Type: BIT
Surface Mix: SM-12.5A
Last Treatment: CM-BIT
Year of Last Rehab: 2011

Begin MP: 8.020 (County MP 8.020)
End MP: 10.020 (County MP 10.020)
Total Lanes: 2
Divided / Undivided: Undivided
Total Lane Miles: 4.00

Begin Landmark: County/City/Town Line: WEST VA STATE LINE
End Landmark: County/City/Town Line: MONTEREY
Notes:
HMG Key: 45-00US00250E-BIT-0005430

2014 Condition Data *(based on distress summarized on most recent, overlapping management section's limits)*

CCI:	89	Alligator Freq (R/O/F):	R	Rutting Freq (N/<10%/>=10%):	N
LDR:	89	Alligator Sev (NS/S/VS):	NS	Rutting Sev (<0.5" / >=0.5"):	<0.5"
NDR:	89	Patching Freq (Y/N):	N	Transverse Cracks/Mile:	118
Average IRI:	111	Patching Sev (=<10%/>10%):	=<10%	Trans. Cracks Sev (NS/S/VS):	NS

2014 Treatment Recommendation *(estimated costs are based on the reported section limits)*

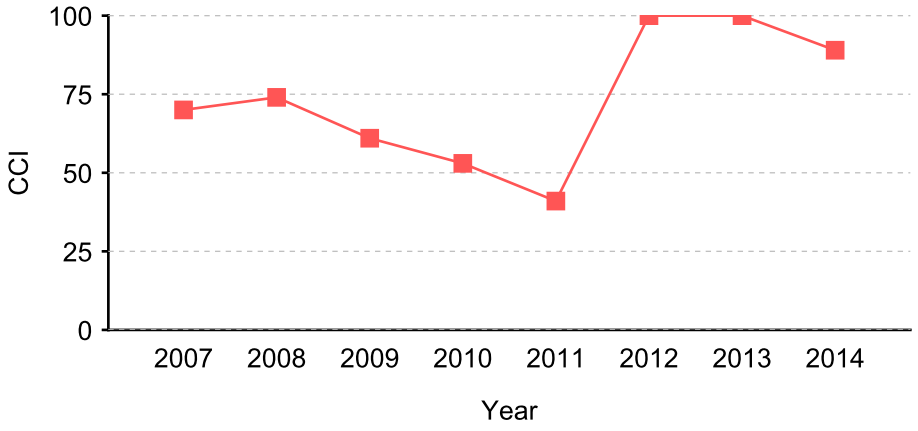
Modified Treatment: DN (Do Nothing) | *Estimated Mainline Material Cost:* N/A

Supporting Information

AADTT: Level 1 (15 Trucks) | *Age:* Young (<6 IS,<5 PR) | *Structure:* No_Test

Ten Year Performance History

Year	CCI	LDR	NDR
2005	N/A	N/A	N/A
2006	N/A	N/A	N/A
2007	70	74	70
2008	74	78	74
2009	61	61	74
2010	53	53	70
2011	41	41	61
2012	100	100	100
2013	100	100	100
2014	89	89	89



Most Recent Five Layers in Maintenance History

Pavement Layer	Material	Thickness (in.)	Year Completion	Contract ID
Layer 1	SM-12.5A	1.5	2011	2742491
Layer 2	Slurry Seal Type C	0.2	1995	2672037
Layer 3	Cold Mix (Motorized	1.3	1994	2672038
Layer 4	Slurry Seal Type C	0.0	1984	2672039
Layer 5	Cold Mix (Motorized	1.3	1983	2672040

Detailed Pavement Data Report
Location Detail

Report Date: 04/03/2015

Location Detail

ROUTE	DIRECTION	STATE BEGIN MP	STATE END MP	COUNTY	COUNTY BEGIN MP	COUNTY END MP	LANE MILES
US00250EB	All	10.02	13.36	045-Highland	10.02	13.36	6.68

Management Info *(based on most recent, overlapping management section which may extend beyond report limits)*

Collection Year: 2014
Pavement Type: BIT
Surface Mix: SM-12.5A
Last Treatment: CM-BIT
Year of Last Rehab: 2011

Begin MP: 10.020 (County MP 10.020)
End MP: 13.360 (County MP 13.360)
Total Lanes: 2
Divided / Undivided: Undivided
Total Lane Miles: 6.68

Begin Landmark: County/City/Town Line: WEST VA STATE LINE
End Landmark: County/City/Town Line: MONTEREY
Notes:
HMG Key: 45-00US00250E-BIT-0005431

2014 Condition Data *(based on distress summarized on most recent, overlapping management section's limits)*

CCI:	87	Alligator Freq (R/O/F):	R	Rutting Freq (N/<10%/>=10%):	N
LDR:	87	Alligator Sev (NS/S/VS):	NS	Rutting Sev (<0.5" / >=0.5"):	<0.5"
NDR:	88	Patching Freq (Y/N):	Y	Transverse Cracks/Mile:	141
Average IRI:	108	Patching Sev (=<10%/>10%):	=<10%	Trans. Cracks Sev (NS/S/VS):	NS

2014 Treatment Recommendation *(estimated costs are based on the reported section limits)*

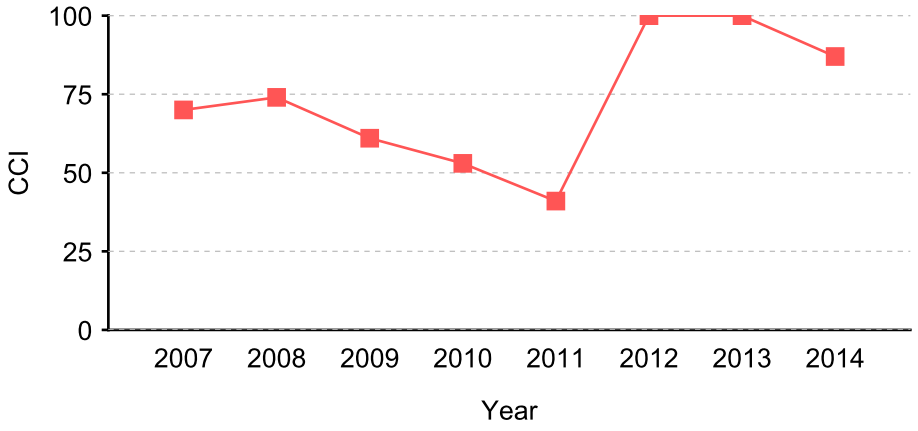
Modified Treatment: DN (Do Nothing) *Estimated Mainline Material Cost:* N/A

Supporting Information

AADTT: Level 1 (16 Trucks) *Age:* Young (<6 IS,<5 PR) *Structure:* No_Test

Ten Year Performance History

Year	CCI	LDR	NDR
2005	N/A	N/A	N/A
2006	N/A	N/A	N/A
2007	70	74	70
2008	74	78	74
2009	61	61	74
2010	53	53	70
2011	41	41	61
2012	100	100	100
2013	100	100	100
2014	87	87	88



Most Recent Five Layers in Maintenance History

Pavement Layer	Material	Thickness (in.)	Year Completion	Contract ID
Layer 1	SM-12.5A	1.5	2011	2742491
Layer 2	Slurry Seal Type C	0.2	1995	2672037
Layer 3	Cold Mix (Motorized	1.3	1994	2672038
Layer 4	Slurry Seal Type C	0.0	1984	2672039
Layer 5	Cold Mix (Motorized	1.3	1983	2672040

Detailed Pavement Data Report
Location Detail

Report Date: 04/03/2015

Location Detail

ROUTE	DIRECTION	STATE BEGIN MP	STATE END MP	COUNTY	COUNTY BEGIN MP	COUNTY END MP	LANE MILES
US00250EB	All	13.36	13.94	045-Highland	13.36	13.94	1.16

Management Info *(based on most recent, overlapping management section which may extend beyond report limits)*

Collection Year: 2014
Pavement Type: BIT
Surface Mix: SM-12.5A
Last Treatment: DN (Do Nothing)
Year of Last Rehab: 2006

Begin MP: 13.360 (County MP 13.360)
End MP: 13.940 (County MP 13.940)
Total Lanes: 2
Divided / Undivided: Undivided
Total Lane Miles: 1.16

Begin Landmark: County/City/Town Line: MONTEREY
End Landmark: County/City/Town Line: MONTEREY
Notes:
HMG Key: 45-00US00250E-BIT-0005432

2014 Condition Data *(based on distress summarized on most recent, overlapping management section's limits)*

CCI:	57	Alligator Freq (R/O/F):	O	Rutting Freq (N/<10%/>=10%):	>=10%
LDR:	57	Alligator Sev (NS/S/VS):	NS	Rutting Sev (<0.5" / >=0.5"):	<0.5"
NDR:	60	Patching Freq (Y/N):	N	Transverse Cracks/Mile:	59
Average IRI:	106	Patching Sev (=<10%/>10%):	=<10%	Trans. Cracks Sev (NS/S/VS):	NS

2014 Treatment Recommendation *(estimated costs are based on the reported section limits)*

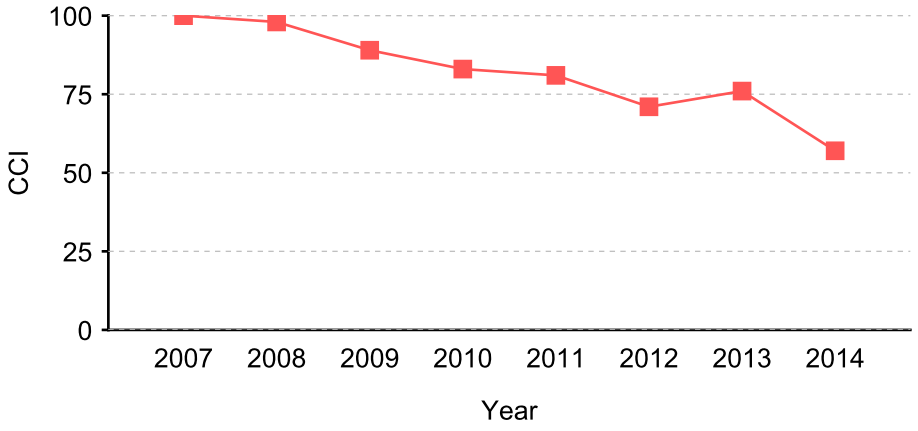
Modified Treatment: CM-BIT | *Estimated Mainline Material Cost:* $ 76,526 ($ 65,971/*LM*)

Supporting Information

AADTT: Level 1 (26 Trucks) | *Age:* Moderate (N/A IS 5-10 | *Structure:* No_Test

Ten Year Performance History

Year	CCI	LDR	NDR
2005	N/A	N/A	N/A
2006	N/A	N/A	N/A
2007	100	100	100
2008	98	99	98
2009	89	92	89
2010	83	88	83
2011	81	84	81
2012	71	73	71
2013	76	76	76
2014	57	57	60



Most Recent Five Layers in Maintenance History

Pavement Layer	Material	Thickness (in.)	Year Completion	Contract ID
Layer 1	SM-12.5A	2.0	2006	2672042
Layer 2	Select Unstabilized	7.7	2000	2672043
Layer 3				
Layer 4				
Layer 5				

Detailed Pavement Data Report
Location Detail

Report Date: 04/03/2015

Location Detail

ROUTE	DIRECTION	STATE BEGIN MP	STATE END MP	COUNTY	COUNTY BEGIN MP	COUNTY END MP	LANE MILES
US00250EB	All	13.94	14.94	045-Highland	13.94	14.94	2.00

Management Info *(based on most recent, overlapping management section which may extend beyond report limits)*

Collection Year: 2014
Pavement Type: BIT
Surface Mix: SM-12.5D
Last Treatment: DN (Do Nothing)
Year of Last Rehab: 1999

Begin MP: 13.940 (County MP 13.940)
End MP: 14.940 (County MP 14.940)
Total Lanes: 2
Divided / Undivided: Undivided
Total Lane Miles: 2.00

Begin Landmark: County/City/Town Line: MONTEREY
End Landmark:
Notes:
HMG Key: 45-00US00250E-BIT-0005433

2014 Condition Data *(based on distress summarized on most recent, overlapping management section's limits)*

CCI:	87	Alligator Freq (R/O/F):	R	Rutting Freq (N/<10%/>=10%):	>=10%
LDR:	87	Alligator Sev (NS/S/VS):	NS	Rutting Sev (<0.5" / >=0.5"):	<0.5"
NDR:	87	Patching Freq (Y/N):	N	Transverse Cracks/Mile:	54
Average IRI:	118	Patching Sev (=<10%/>10%):	=<10%	Trans. Cracks Sev (NS/S/VS):	NS

2014 Treatment Recommendation *(estimated costs are based on the reported section limits)*

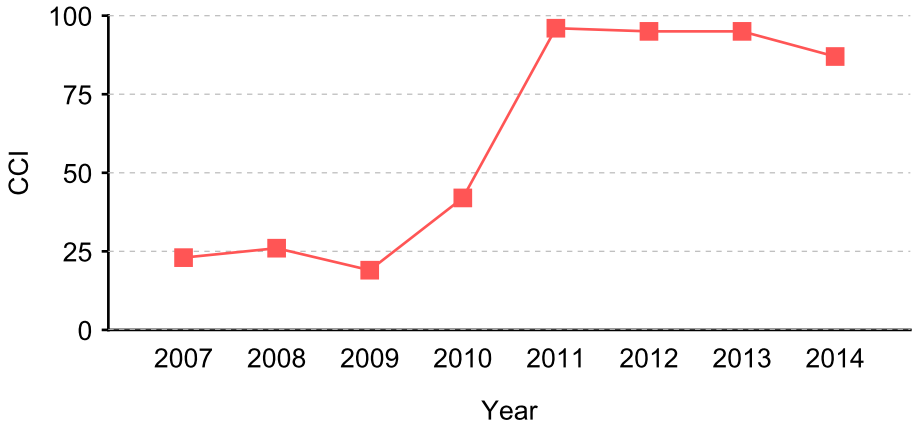
Modified Treatment: PM-BIT | *Estimated Mainline Material Cost:* $ 18,232 ($ 9,116 */LM*)

Supporting Information

AADTT: Level 1 (49 Trucks) | *Age:* Old (>6 IS >10 PR) | *Structure:* No_Test

Ten Year Performance History

Year	CCI	LDR	NDR
2005	N/A	N/A	N/A
2006	N/A	N/A	N/A
2007	23	23	31
2008	26	35	26
2009	19	19	29
2010	42	42	64
2011	96	96	100
2012	95	95	99
2013	95	95	99
2014	87	87	87



Most Recent Five Layers in Maintenance History

Pavement Layer	Material	Thickness (in.)	Year Completion	Contract ID
Layer 1	SM-12.5D	1.8	1999	2672044
Layer 2	SM-12.5A	0.9	1999	2672044
Layer 3	Slurry Seal Type C	0.2	1992	2672045
Layer 4	Cold Mix (Motorized	1.3	1991	2672046
Layer 5	Slurry Seal Type B	0.0	1984	2672047

Detailed Pavement Data Report
Location Detail

Report Date: 04/03/2015

Location Detail

ROUTE	DIRECTION	STATE BEGIN MP	STATE END MP	COUNTY	COUNTY BEGIN MP	COUNTY END MP	LANE MILES
US00250EB	All	14.94	15.00	045-Highland	14.94	15.00	0.12

Management Info *(based on most recent, overlapping management section which may extend beyond report limits)*

Collection Year: 2014
Pavement Type: BIT
Surface Mix: SM-12.5A
Last Treatment: CM-BIT
Year of Last Rehab: 2010

Begin MP: 14.940 (County MP 14.940)
End MP: 15.000 (County MP 15.000)
Total Lanes: 2
Divided / Undivided: Undivided
Total Lane Miles: 0.12

Begin Landmark:
End Landmark:
Notes:
HMG Key: 45-00US00250E-BIT-0005434

2014 Condition Data *(based on distress summarized on most recent, overlapping management section's limits)*

CCI:	97	Alligator Freq (R/O/F):	R	Rutting Freq (N/<10%/>=10%):	N
LDR:	97	Alligator Sev (NS/S/VS):	NS	Rutting Sev (<0.5" / >=0.5"):	<0.5"
NDR:	97	Patching Freq (Y/N):	N	Transverse Cracks/Mile:	3
Average IRI:	106	Patching Sev (=<10%/>10%):	=<10%	Trans. Cracks Sev (NS/S/VS):	NS

2014 Treatment Recommendation *(estimated costs are based on the reported section limits)*

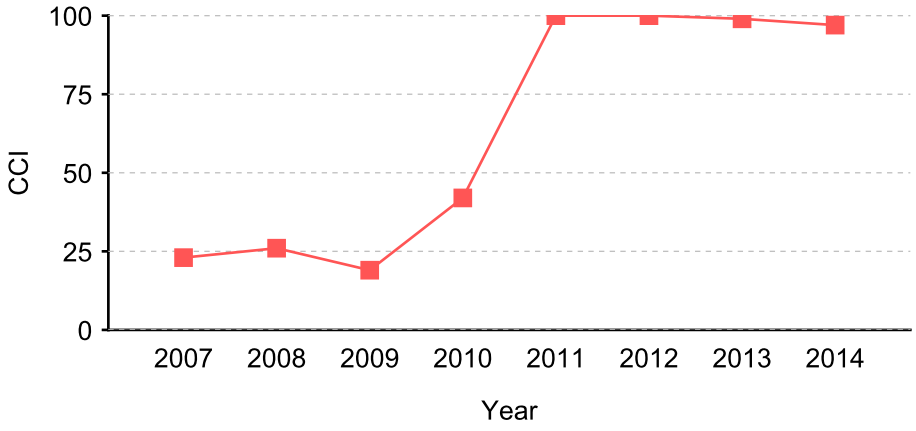
Modified Treatment: DN (Do Nothing) *Estimated Mainline Material Cost:* N/A

Supporting Information

AADTT: Level 1 (49 Trucks) *Age:* Moderate (N/A IS 5-10 *Structure:* No_Test

Ten Year Performance History

Year	CCI	LDR	NDR
2005	N/A	N/A	N/A
2006	N/A	N/A	N/A
2007	23	23	31
2008	26	35	26
2009	19	19	29
2010	42	42	64
2011	100	100	100
2012	100	100	100
2013	99	99	100
2014	97	97	97



Most Recent Five Layers in Maintenance History

Pavement Layer	Material	Thickness (in.)	Year Completion	Contract ID
Layer 1	SM-12.5A	1.5	2010	2740388
Layer 2	SM-12.5D	1.8	1999	2672044
Layer 3	SM-12.5A	0.9	1999	2672044
Layer 4	Slurry Seal Type C	0.2	1992	2672045
Layer 5	Cold Mix (Motorized	1.3	1991	2672046

Richmond District - Initial Interstate Baseline Target Report

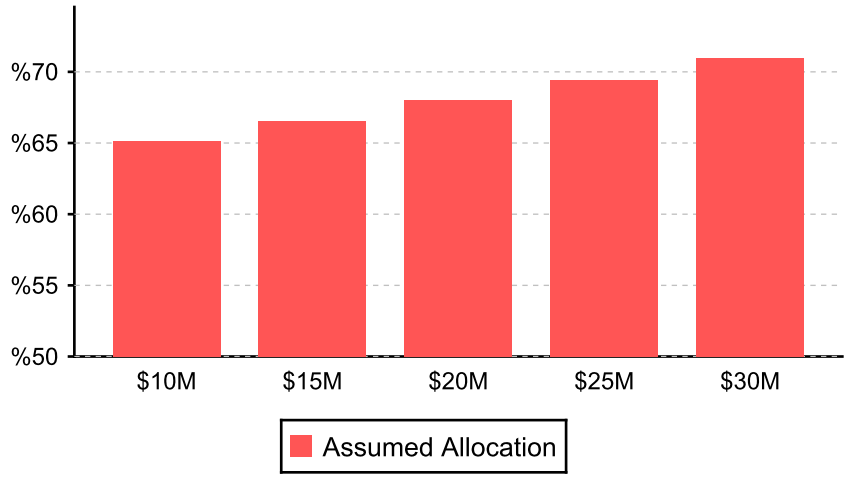
Report Date:04/03/2015

This Report was developed using the following input data:

1. 2014 Condition Data
2. 2014 and 2015 Awarded PMSS Paving Schedules
   - As imported form PMSS into PMS on
3. Initial Interstate Baseline Performance/Paving Targets based on:
   - 2014 and 2015 Awarded PMSS contracts on Interstate System
   - Richmond CY 2016 Assumed Interstate Paving Allocations of
     - $ 10,000,000 (Optimization Analysis # 2162)
     - $ 15,000,000 (Optimization Analysis # 2163)
     - $ 20,000,000 (Optimization Analysis # 2164)
     - $ 25,000,000 (Optimization Analysis # 2165)
     - $ 30,000,000 (Optimization Analysis # 2166)

Richmond District - Initial Interstate Baseline Targets

Initial 2017 Interstate Performance Targets by Assumed CY 2016 Allocation



Initial Performance Targets	
CY 2016 ALLOCATION	Target % Sufficient
$ 10,000,000	65.2 %
$ 15,000,000	66.5 %
$ 20,000,000	68.0 %
$ 25,000,000	69.4 %
$ 30,000,000	71.0 %

Initial 2016 Interstate Paving Targets by Assumed CY 2016 Allocation

Paving Targets (Lane Miles)				
Allocation	Preventive (PM)	Corrective (CM)	Restorative (RM)	Major Rehab (RC)
$ 10,000,000	53	109	0	0
$ 15,000,000	53	177	0	0
$ 20,000,000	53	175	23	0
$ 25,000,000	53	183	43	0
$ 30,000,000	53	183	58	6

Asset Factor Applied to Allocation = 1.0

Reduction Factors Applied to Lane Miles: PM= 0.25 CM= 1.0 RM= 1.0 RC= 1.0

Richmond District - Baseline Paving Target Report

Report Date: 04/03/2015

This Report was developed using the following input data:

1. 2014 Condition Data
2. 2014 Awarded PMSS Paving Schedules
   - As imported form PMSS into PMS on
3. Interstate Baseline Performance and Paving Targets from PMS Optimization # 2167
   - 2014 Awarded PMSS contracts on Interstate System
   - District CY 2015 Interstate Paving Allocations of $ 30,000,000
4. Primary Baseline Performance and Paving Targets from PMS Optimization # 2158
   - 2014 Awarded PMSS contracts on Primary System
   - District CY 2015 Primary Paving Allocation of $ 30,000,000

Richmond District - Baseline Paving Targets 2015

Initial 2015 Paving Targets		**(Lane Miles)**			
System	CY 2015 Allocation	Preventive (PM)	Corrective (CM)	Restorative (RM)	Major Rehab (RC)
Interstate	$ 30,000,000	21	18	17	53
Primary	$ 30,000,000	56	394	20	0

Richmond District - Performance Targets 2016

2016	**Baseline Performance Targets (% Sufficient)**	
System	CY 2015 Allocation	2016 % Sufficient
Interstate	$ 30,000,000	86.1 %
Primary	$ 30,000,000	82.0 %

Asset factor applied to Interstate Allocations = 1.00

Reduction Factors Applied to Interstate Lane Miles: PM= 0.25 CM= 1.00 RM= 1.00 RC= 1.00

Asset factor applied to Primary Allocations= 1.00

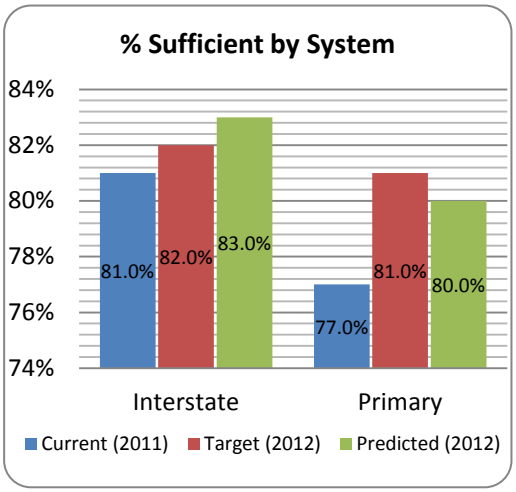
Reduction Factors Applied to Primary Lane Miles: PM= 0.25 CM= 1.00 RM= 1.00 RC= 1.00

Richmond District Paving Status Report

This report was developed using the following input data:

1. 2011 Condition Data
2. 2011 PMSS Paving Schedules
   - As imported from PMSS into PMS on 02/15/2012
3. 2011 Approved M-20s
   - As stored in the PMS on 02/10/2012
4. Interstate Baseline Performance Target from Scenario #5
   - Based on district Interstate paving allocation of $9,500,000
5. Primary Baseline Performance Target from Scenario #15
   - Based on district Primary paving allocation of $15,000,000

Richmond District – 2012 Predicted Performance



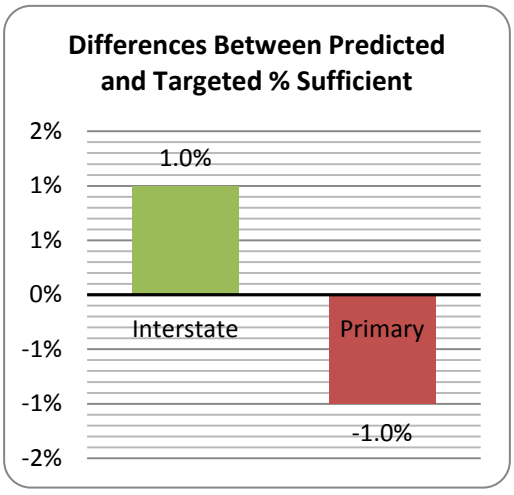
Richmond Condition Summary

Interstate System

Current (2011) % Sufficient:	81.0%
Targeted (2012) % Sufficient:	82.0%
Predicted (2012) % Sufficient:	83.0%

Primary System

Current (2011) % Sufficient:	77.0%
Targeted (2012) % Sufficient:	81.0%
Predicted (2012) % Sufficient:	80.0%



Richmond Targeted vs. Predicted % Sufficient in 2012

Interstate System

2012 Predicted % Sufficient:	83.0%
2012 Targeted % Sufficient:	82.0%
Difference:	**+1.00%**

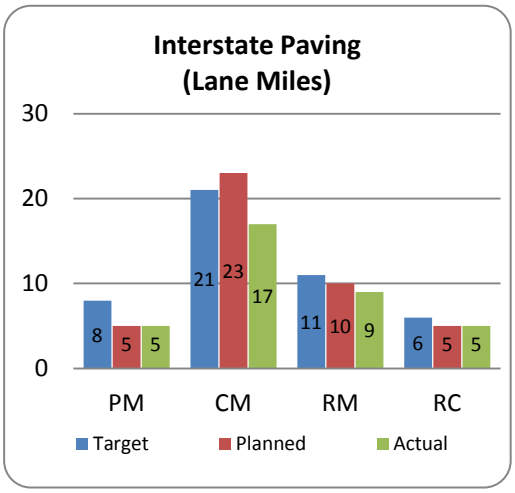
Primary System

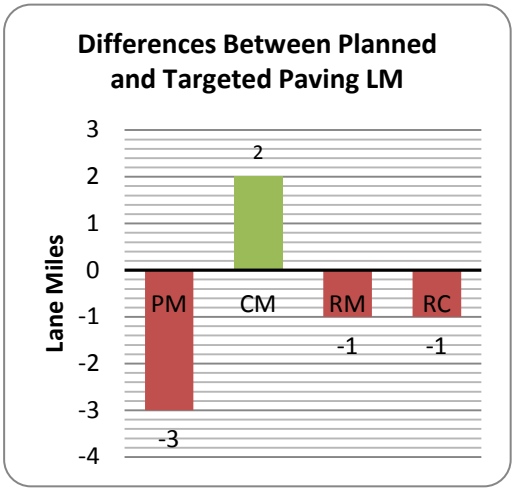
2012 Predicted % Sufficient:	80.0%
2012 Targeted % Sufficient:	81.0%
Difference:	**-1.00%**

Given initial pavement conditions, expected deterioration and planned paving, Richmond District **is** predicted to achieve its 2012 performance target of 82.0% of Interstate network in Sufficient Condition and **is not** predicted to achieve its 2012 performance target of 81.0% of Primary network in Sufficient Condition.

Richmond District Paving Status Report

Richmond District – 2012 Interstate Planned Paving





Richmond Interstate Paving Summary

Preventative Maintenance (PM)

Targeted (PMS Optimization):	8 LM
Planned (PMSS):	5 LM
Actual (Approved M-20s):	5 LM
Difference (Planned – Targeted):	**-3 LM**

Corrective Maintenance (CM)

Targeted (PMS Optimization):	21 LM
Planned (PMSS):	23 LM
Actual (Approved M-20s):	17 LM
Difference (Planned – Targeted):	**2 LM**

Restorative Maintenance (RM)

Targeted (PMS Optimization):	11 LM
Planned (PMSS):	10 LM
Actual (Approved M-20s):	9 LM
Difference (Planned – Targeted):	**-1 LM**

Reconstruction / Major Rehab (RC)

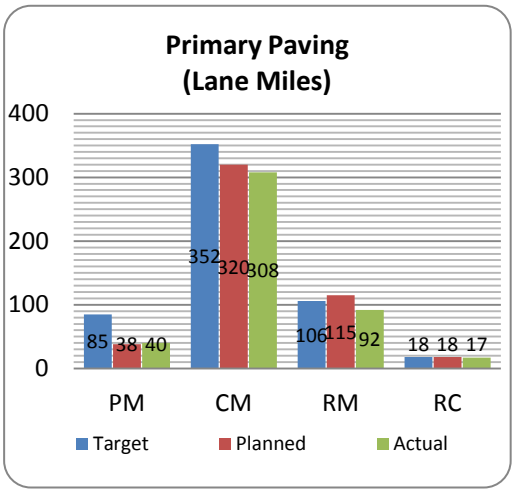
Targeted (PMS Optimization):	6 LM
Planned (PMSS):	5 LM
Actual (Approved M-20s):	5 LM
Difference (Planned – Targeted):	**-1 LM**

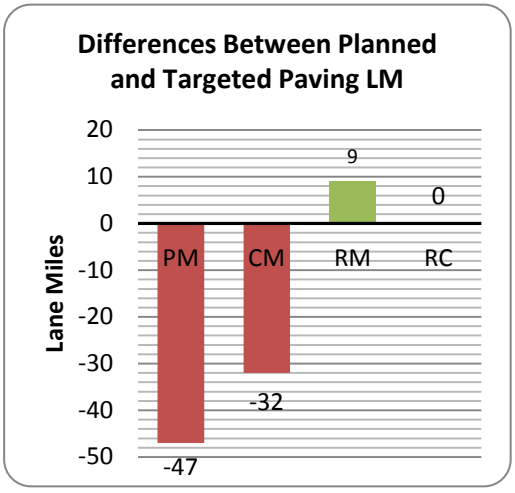
Given planned 2012 Interstate paving, Richmond District:

- **Is not** predicted to achieve its 8 lane mile paving target for Preventative Maintenance on the Interstate system.
- **Is** predicted to achieve its 21 lane mile paving target for Corrective Maintenance on the Interstate system.
- **Is not** predicted to achieve its 11 lane mile paving target for Restorative Maintenance on the Interstate system.
- **Is not** predicted to achieve its 6 lane mile paving target for Reconstruction / Major Rehabilitation on the Interstate system.

Richmond District Paving Status Report

Richmond District – 2012 Primary Planned Paving





Richmond Primary Paving Summary

Preventative Maintenance (PM)

Targeted (PMS Optimization):	85 LM
Planned (PMSS):	38 LM
Actual (Approved M-20s):	40 LM
Difference (Planned – Targeted):	**-47 LM**

Corrective Maintenance (CM)

Targeted (PMS Optimization):	352 LM
Planned (PMSS):	320 LM
Actual (Approved M-20s):	308 LM
Difference (Planned – Targeted):	**-32 LM**

Restorative Maintenance (RM)

Targeted (PMS Optimization):	106 LM
Planned (PMSS):	115 LM
Actual (Approved M-20s):	92 LM
Difference (Planned – Targeted):	**9 LM**

Reconstruction / Major Rehab (RC)

Targeted (PMS Optimization):	18 LM
Planned (PMSS):	18 LM
Actual (Approved M-20s):	17 LM
Difference (Planned – Targeted):	**0 LM**

Given planned 2012 Primary paving, Richmond District:

- **Is not** predicted to achieve its 85 lane mile paving target for Preventative Maintenance on the Primary system.
- **Is not** predicted to achieve its 352 lane mile paving target for Corrective Maintenance on the Primary system.
- **Is** predicted to achieve its 106 lane mile paving target for Restorative Maintenance on the Primary system.
- **Is** predicted to achieve its 18 lane mile paving target for Reconstruction / Major Rehabilitation on the Primary system.

Richmond District Paving Status Report

Richmond District – 2012 Review of Treatment Selection

The District treatment selection was compared against the PMS identified, unconstrained needs for each location marked identified as 2012 mainline paving. Where the District treatment selection differed from the unconstrained needs by more than a single Treatment Category, the section has been flagged for District review.

Note: Central Office Maintenance Division will not approve paving schedules for advertisement until all identified deviations from PMS-assigned treatments have been adequately addressed. Final approval will be provided in a cover letter to the District Paving Status Report.

Richmond District Treatment Selection Review

LM-46-12

- All locations on the interstate and primary systems in this schedule have been reviewed and fall within acceptable tolerance of identified needs

PM-4B-12

- All locations on the interstate and primary systems in this schedule have been reviewed and fall within acceptable tolerance of identified needs

PM-4G-12

- All locations on the interstate and primary systems in this schedule have been reviewed and the following fall outside acceptable tolerance of identified needs.

Route	County	Begin MP	End MP	Lane	Aux	District Treatment Selection	Unconstrained Need
64	044	12.345	23.456	W		PM-BOJ	RM-BOJ
250	043	11	13	B	BUS	CM-BIT	DN
295	043	0	1.50	E	RMP	RM-BOC	PM-BOC
288	020	5	6	S		CM-CRC	RC-CRC

SS-4A-12

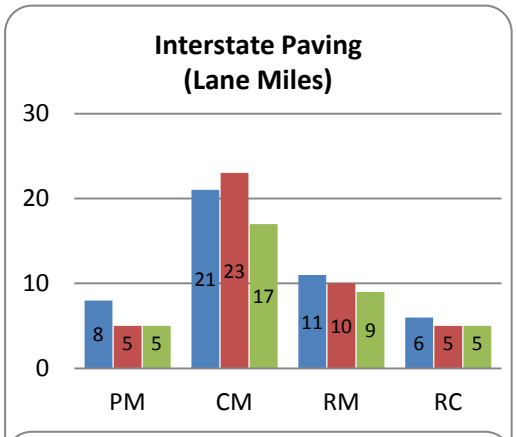
- All locations on the interstate and primary systems in this schedule have been reviewed and fall within acceptable tolerance of identified needs

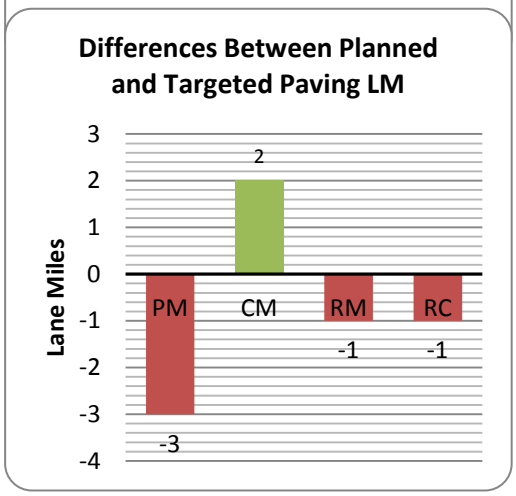
ST-4Z-12

- This schedule did not contain any locations on the interstate or primary systems and was omitted from review.

Richmond District Completed Paving Report

Richmond District – 2011 Interstate Planned Paving





Richmond Interstate Paving Summary

Preventative Maintenance (PM)

Targeted (PMS Optimization):	8 LM
Planned (PMSS):	5 LM
Actual (Approved M-20s):	5 LM
Difference (Planned – Targeted):	**-3 LM**

Corrective Maintenance (CM)

Targeted (PMS Optimization):	21 LM
Planned (PMSS):	23 LM
Actual (Approved M-20s):	17 LM
Difference (Planned – Targeted):	**2 LM**

Restorative Maintenance (RM)

Targeted (PMS Optimization):	11 LM
Planned (PMSS):	10 LM
Actual (Approved M-20s):	9 LM
Difference (Planned – Targeted):	**-1 LM**

Reconstruction / Major Rehab (RC)

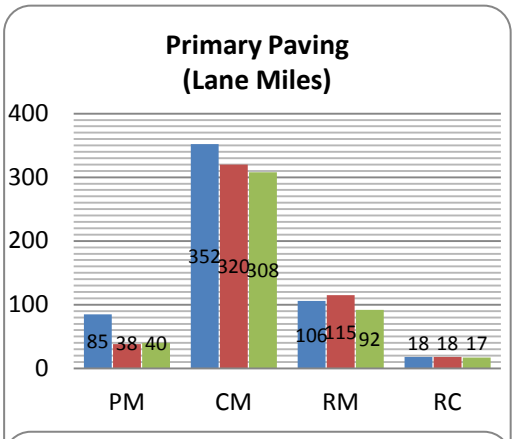
Targeted (PMS Optimization):	6 LM
Planned (PMSS):	5 LM
Actual (Approved M-20s):	5 LM
Difference (Planned – Targeted):	**-1 LM**

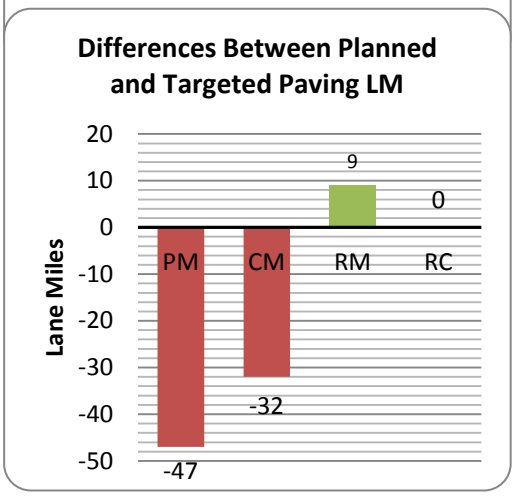
Given planned 2011 Interstate paving, Richmond District:

- **Is not** predicted to achieve its 8 lane mile paving target for Preventative Maintenance on the Interstate system.
- **Is** predicted to achieve its 21 lane mile paving target for Corrective Maintenance on the Interstate system.
- **Is not** predicted to achieve its 11 lane mile paving target for Restorative Maintenance on the Interstate system.
- **Is not** predicted to achieve its 6 lane mile paving target for Reconstruction / Major Rehabilitation on the Interstate system.

Richmond District Paving Status Report

Richmond District – 2011 Primary Planned Paving





Richmond Primary Paving Summary

Preventative Maintenance (PM)

Targeted (PMS Optimization):	85 LM
Planned (PMSS):	38 LM
Actual (Approved M-20s):	40 LM
Difference (Planned – Targeted):	**-47 LM**

Corrective Maintenance (CM)

Targeted (PMS Optimization):	352 LM
Planned (PMSS):	320 LM
Actual (Approved M-20s):	308 LM
Difference (Planned – Targeted):	**-32 LM**

Restorative Maintenance (RM)

Targeted (PMS Optimization):	106 LM
Planned (PMSS):	115 LM
Actual (Approved M-20s):	92 LM
Difference (Planned – Targeted):	**9 LM**

Reconstruction / Major Rehab (RC)

Targeted (PMS Optimization):	18 LM
Planned (PMSS):	18 LM
Actual (Approved M-20s):	17 LM
Difference (Planned – Targeted):	**0 LM**

Given planned 2011 Primary paving, Richmond District:

- **Is not** predicted to achieve its 85 lane mile paving target for Preventative Maintenance on the Primary system.
- **Is not** predicted to achieve its 352 lane mile paving target for Corrective Maintenance on the Primary system.
- **Is** predicted to achieve its 106 lane mile paving target for Restorative Maintenance on the Primary system.
- **Is** predicted to achieve its 18 lane mile paving target for Reconstruction / Major Rehabilitation on the Primary system.