



WVDOH Pavement Management Status Report

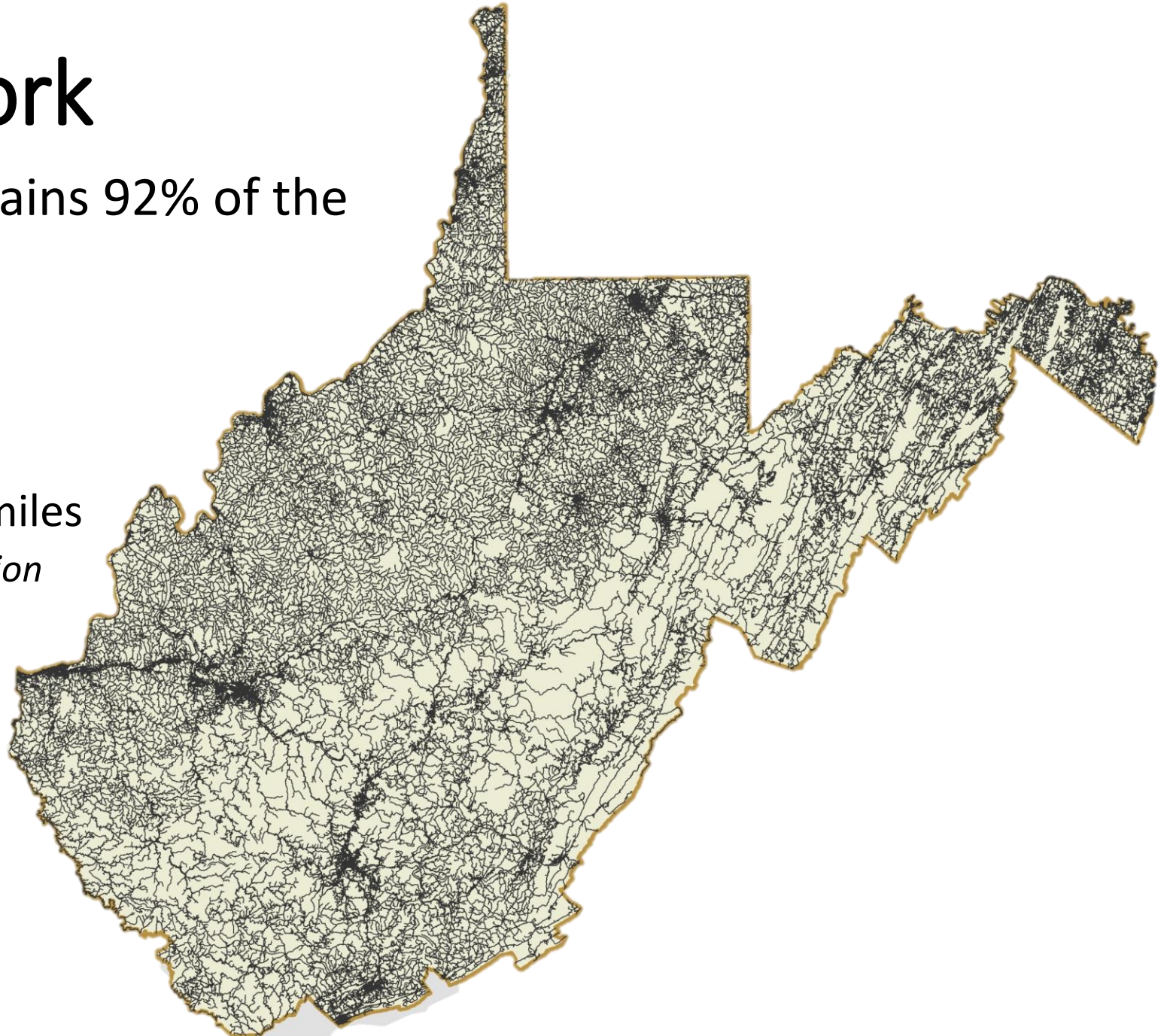
Adam Batty

Pavement Group – Materials Division



WV Road Network

- WVDOT owns and maintains 92% of the roadway network
 - Interstate – 555 miles
 - US Routes – 1,810 miles
 - WV Routes – 3,640 miles
 - County Routes – 28,900 miles
- *centerline miles, primary direction*



Pavement Condition Data Collection

- Network-level automated collection since 1998
- Automated collection every year on a varying system basis
 - Interstate, NHS, & Corridors every year
 - All US and WV routes every other year
 - All County routes every 5 years
- Collected in both directions where designated
 - Interstates, US, & some WV routes
- Delivered in tenth-mile segments
- Transitioning from Fugro Roadware to Michael Baker





Pavement Condition Data Collection

- **Laser Crack Measuring (LCMS)**
 - Inertial Profiler for IRI
- **3D Cameras for Pavement Profile**
 - Right-of-Way Cameras
 - 360 degree camera
- **GPR and LiDar capability**

Pavement Condition Data Collection



WVDOH
TEST IN PROGRESS

- WVDOH in-house data collection
 - Smoothness & Rutting
 - Project-level
 - QA/QC of automated collection data

Pavement Condition Data Collection

2018

WVDOH Pavement Condition Data
Quality Management Plan



Prepared by Pavement Group
WVDOH – Materials Division

- QA/QC
 - Performed both by contractor and in-house
 - Follow Data Quality Management Plan in the future
 - FHWA requirement
- Missing or Null condition data
 - Wet
 - Construction
 - Speed
 - Lane Deviation
 - Debris
- Bridge decks marked and noted

Pavement Condition Data Collection

- Roadway geometry collected in accordance with HPMS
 - Pavement/Lane Width
 - Surface Type
 - Shoulder Width
 - Shoulder Type
 - Horizontal Curves
 - Vertical Curves
 - Cross-slope

Highway Performance Monitoring System

Field Manual



Office of Highway Policy Information

December 2016

Office of Management & Budget (OMB) Control No. 2125-0028

Pavement Condition Fields

- **Asphalt**

- IRI
- Rutting
- Block Cracking Severity
- Transverse Cracking Severity
- Longitudinal Cracking Severity
- Cracking Percent
- Crack Length
- Alligator Cracking Severity

- **Concrete**

- IRI
- Cracking Percent
- Broken Slabs Percentage
- Longitudinal Joint Distress
- Transverse Joint Distress
- Transverse Cracking Severity
- Longitudinal Cracking Severity

Pavement Condition Indexes

PSI – *Present Serviceability Index* – Function of IRI

NCI – *Net Cracking Index* – Function of SCI & ECI

SCI – *Structural Cracking Index* – Alligator & Longitudinal Cracking

ECI – *Environmental Cracking Index* – Transverse & Block Cracking

RDI – *Rut Depth Index* – Function of Mean Rutting

JCI – *Joint Condition Index* – Faulting & Distressed Joints

CSI – *Concrete Slab Index* – Transverse & Longitudinal Cracking
(Concrete)

CCI – *Composite Condition Index* – Function of 6 indexes

Analysis

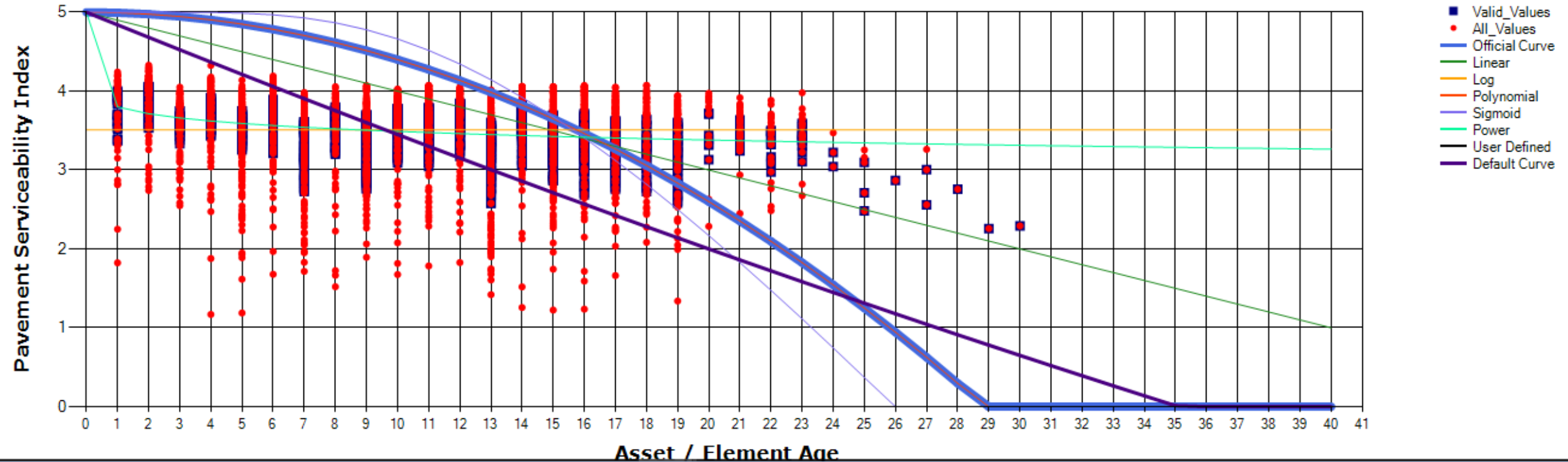
- Pavement Management Software
 - Deighton dTIMS Version 9.5
 - Transitioning to dTIMS Business Analytics (BA)
 - Utilized Deighton for over 25 years
- Analysis Types
 - Fixed Budget
 - Forced division of dollars between Preservation and Rehabilitation treatments
 - Allow dTIMS to best allocate funds for greatest overall condition improvement



Analysis – Performance Curves

- Deighton Regression Application
- Utilizes condition and historical data from dTIMS
 - Determines the age of the pavement
- User defined limits for outlier data points
- Builds best-fit curves based on acceptable data points
 - Polynomial, Log, Sigmoid, Power, Linear
- Outputs results to a spreadsheet which is then used by dTIMS
 - User has ability to choose or override curves within the spreadsheet

Analysis – Performance Curves



Analysis - Strategies

Average Condition

Length In Backlog

Condition Distribution

Travel Distribution

Treatment Costs

Treatment Lengths

Program Costs

SAM Results

Review & Adjust

Construction Program

Select Strategy
Reset Strategy
Reset All Strategies
Add a Strategy
Modifications Report
Export Strategies
Import Strategies

Elements

Drag a column header and drop it here to group by that column

RoadName	From	From_Description	To
02100810000NB	0.000000		26.0000
02100810000SB	0.000000		26.0000
04100790000NB	44.600000		46.1800

Strategies

Drag a column header and drop it here to group by that column

Year	1st Major	Benefit / Cost	PV Benefits	PV Cost	IBC	Base Committed	Committed
2017	Thin_Overlay	0.01037883	3773.11670818411	\$363,539.69	0.01037883	<input type="checkbox"/>	<input type="checkbox"/>
2020	Thin_Overlay	0.010715146	3770.27090870605	\$351,863.70	0.010715146	<input type="checkbox"/>	<input type="checkbox"/>
2024	Thick_Overlay	0.007186562	3755.30025066858	\$522,544.74	0.007186562	<input type="checkbox"/>	<input type="checkbox"/>

Strategy Treatments

Original Strategy Treatments

Budgets

NYEAR	Treatment	Type	Budget Category	Financial Cost	Economic Cost
2020	Thin_Overlay	Major	Rehabilitation	\$5,920,542.26	\$0.00
2031	Thin_Overlay	Major	Rehabilitation	\$7,361,450.13	\$0.00

Efficiency Chart

Analysis Variables

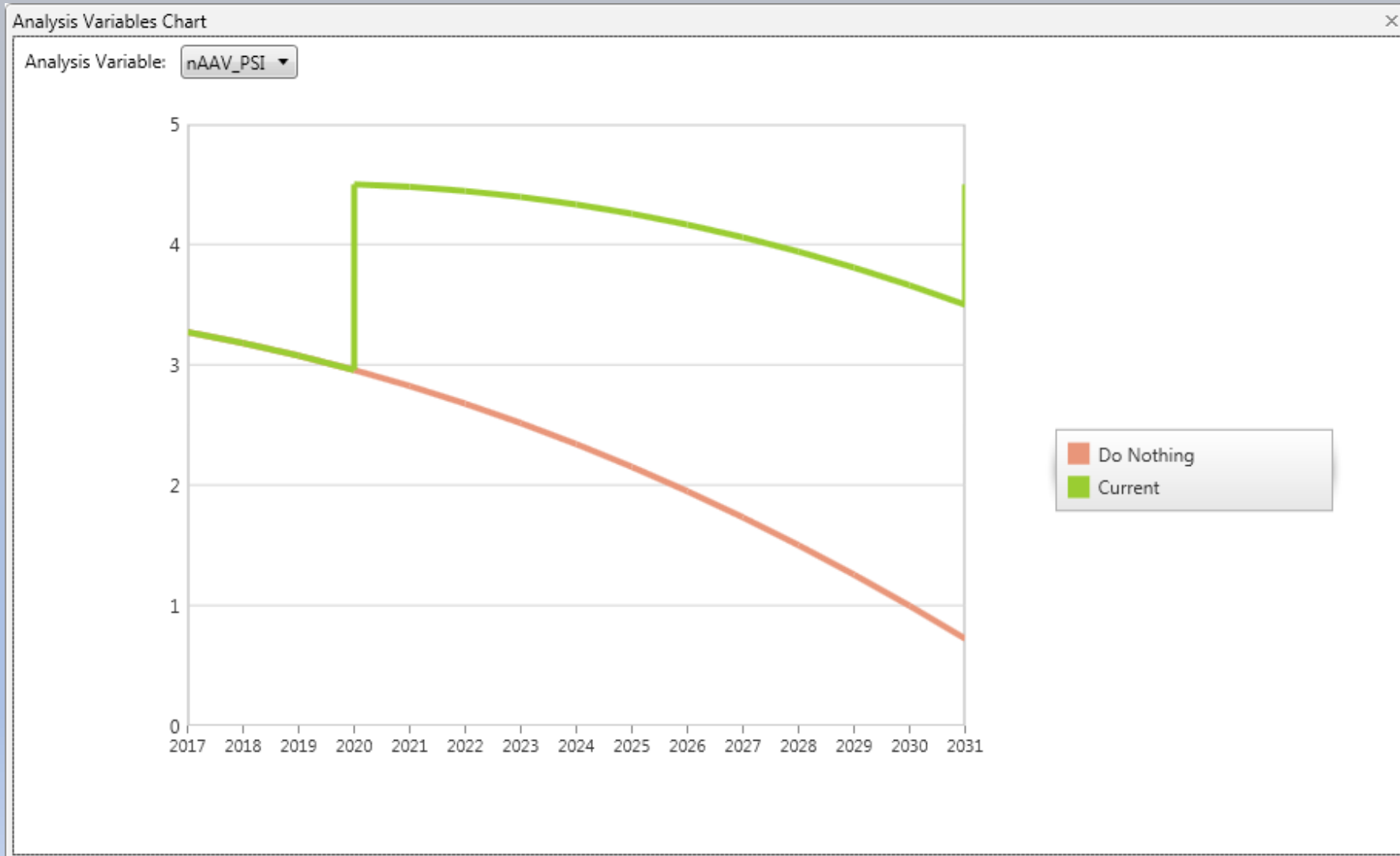
Analysis Variables Chart

Strategies Chart

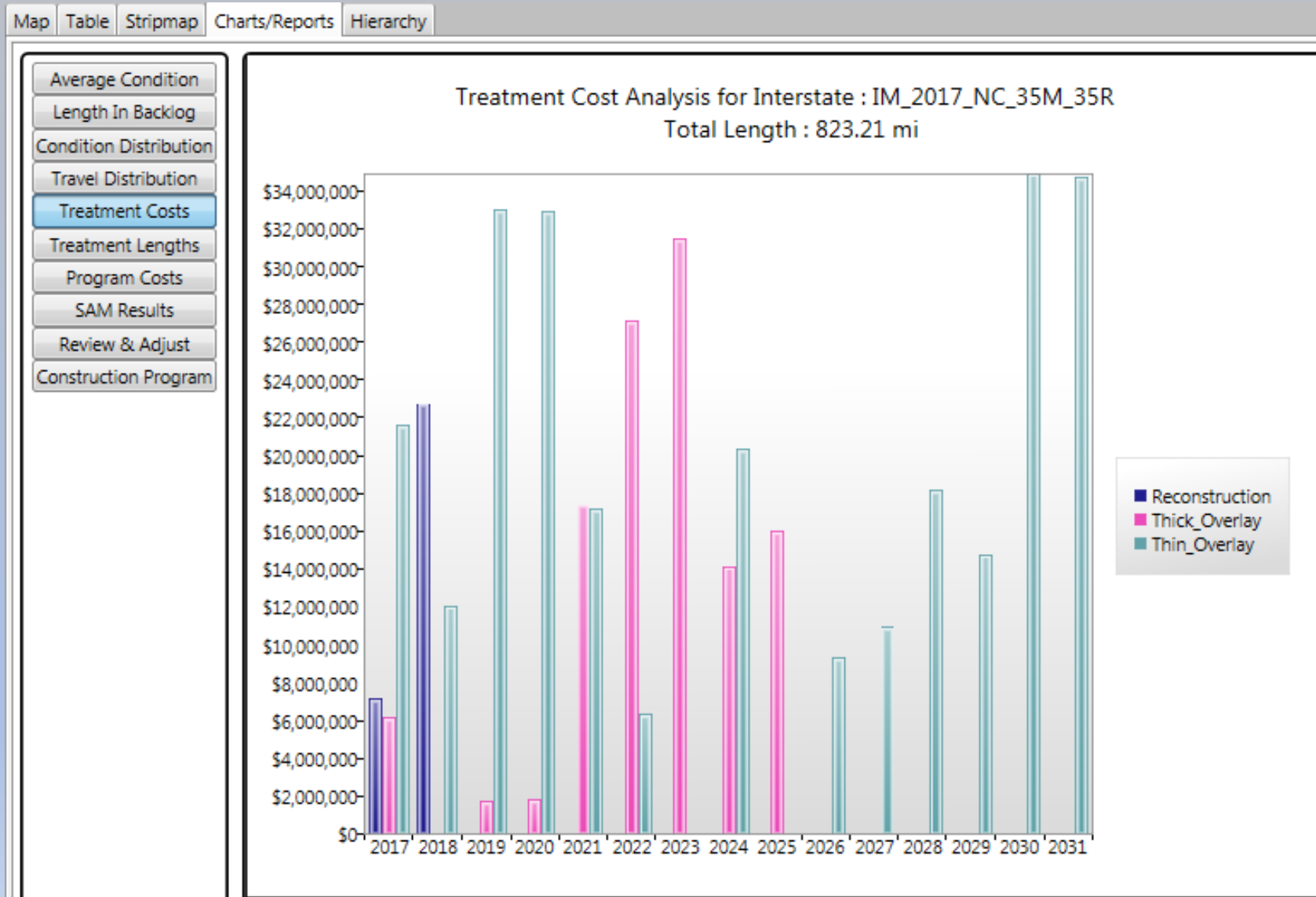
Budget Chart

Strategies Comparison

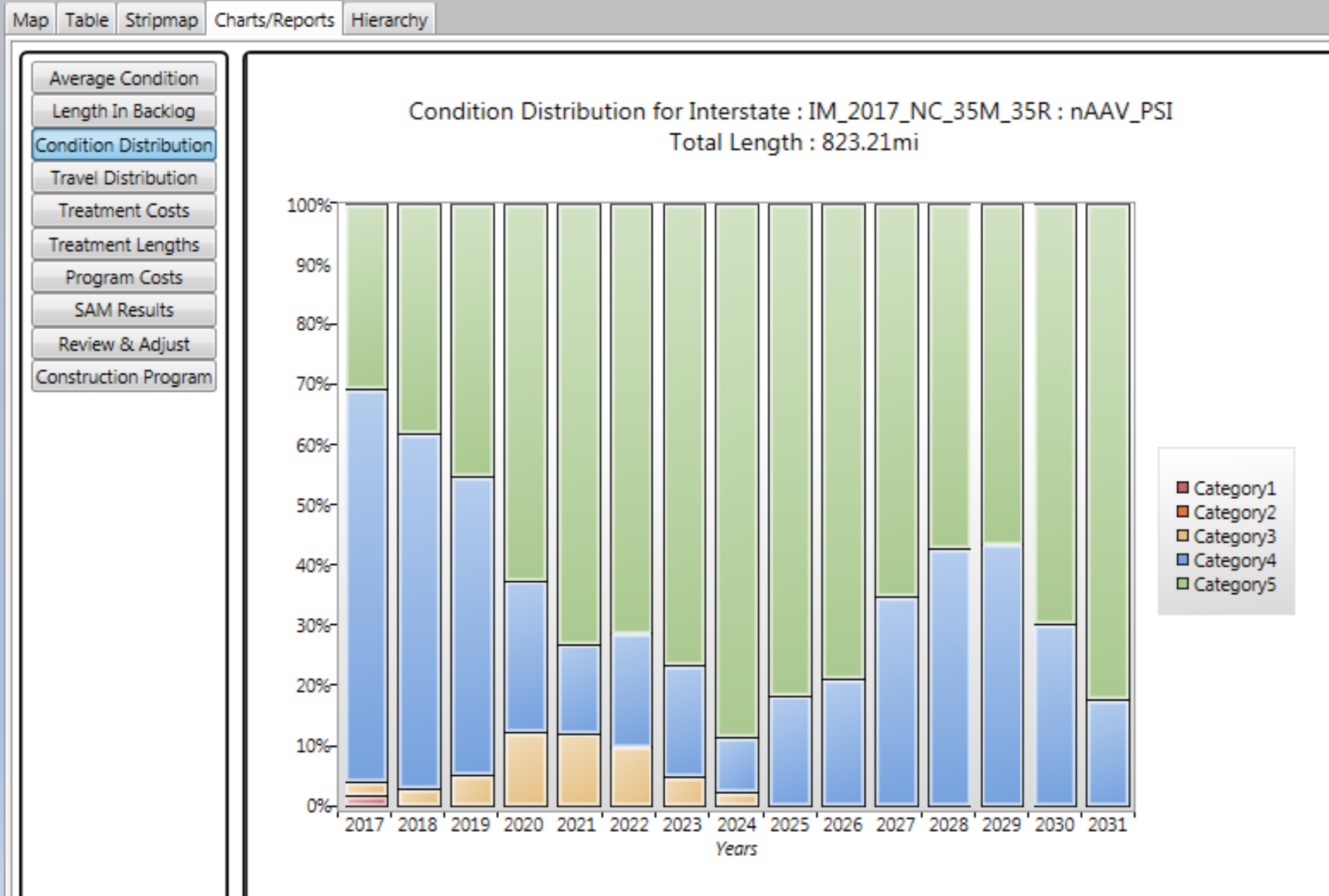
Analysis - Strategies



Analysis - Strategies



Analysis - Strategies



Analysis

- Federal construction programs
 - Interstates
 - Major Corridors
 - NHS Routes

Year	Route	ElementID	Road	BMP	EMP	Length	Treatment	Cost
2018								
168								
		102	39100680000WB	22.90				

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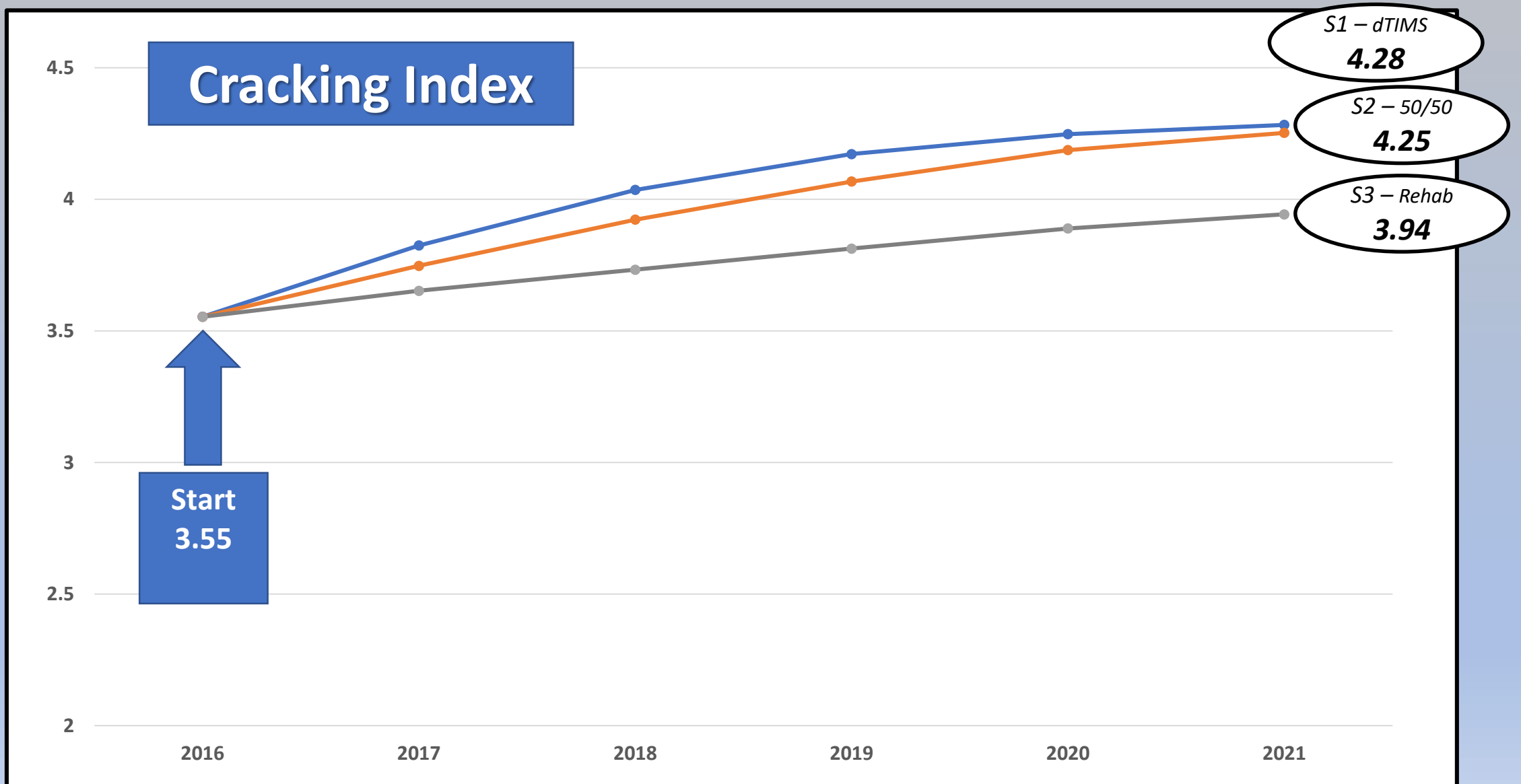
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Year	Route	ElementID	Road	BMP	EMP	Length	Treatment	Cost
2016								
168								
		1485	31100680000EB	0.00	1.00	1.00	Thin_Overlay	\$222,182.40
		1487	31100680000EB	2.00	9.97	4.95	PM_Crack_Seal	\$2,787.84
		1488	31100680000EB	9.97	11.00	1.03	Thin_Overlay	\$228,847.87
		1489	31100680000EB	11.00	14.66	3.66	PM_Crack_Seal	\$2,061.31
		5852	31100680004NB	0.00	0.84	0.84	Thin_Overlay	\$186,633.22
		4010	311006800055B	0.00	1.14	1.14	Preservation	\$106,673.60
		5898	39100680000EB	14.66	19.60	4.94	PM_Crack_Seal	\$3,477.76
		101	39100680000EB	22.90	26.00	3.10	Thin_Overlay	\$688,765.44
		5901	39100680000EB	31.00	32.06	1.06	PM_Crack_Seal	\$746.24
		3635	39100680000WB	31.00	32.06	1.06	PM_Crack_Seal	\$746.24
								\$1,442,921.92

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\$1,833,726.43

PMS Usage



TAMP Development

- Developed by Mott-Mcdonald, Kercher Group, & Deighton
- Pavement Management System Refinements
 - Treatment triggers
 - Treatment resets
 - Decision making processes within dTIMS
 - MAP-21 reporting
 - MAP-21 projections
- Bridges added to dTIMS

The Kercher Group logo is enclosed in a white circle with a grey border. It features the text "THE KERCHER GROUP" in blue, with "THE" in a smaller font above "KERCHER" and "GROUP" below it. The text is contained within a blue-outlined square.

THE
KERCHER
GROUP

The Deighton logo is a white lowercase letter 'd' centered within a blue circle, which is itself inside a larger grey circle.

d

The Mott MacDonald logo is enclosed in a white circle with a grey border. It features the text "MOTT MACDONALD" in black, with a large 'M' above the text and another large 'M' to the right of the text.

M
MOTT **M**
MACDONALD

MAP-21 Reporting Statistics

Interstate					
Year	% GOOD	% FAIR	% POOR	% MISSING	Total Mileage
2014	70.51%	22.08%	1.95%	5.46%	1003.34
2015	80.56%	15.10%	1.21%	3.14%	1002.79
2016	85.20%	14.67%	0.20%	0.00%	1003.85
2017	73.41%	23.76%	0.05%	2.52%	1002.95

MAP-21 Reporting Statistics

Non-Interstate NHS					
Year	% GOOD	% FAIR	% POOR	% MISSING	Total Mileage
2014	54.62%	42.58%	1.58%	1.22%	1446.71
2015	44.09%	52.80%	1.65%	1.45%	1098.43
2016	49.72%	49.06%	0.64%	0.57%	2223.72
2017	40.87%	55.84%	1.20%	2.09%	1270.83

MAP-21 Targets*

Interstate % Poor – 2%

Interstate % Good – 75%

Non-IS NHS % Poor – 2.5%

Non-IS NHS % Good – 50%

