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Virginia Department of Transportation

MAINTENANCE AND OPERATIONS COMPREHENSIVE REVIEW BRIEFING

Kevin Gregg, Chief of Maintenance and Operations

Maintenance and Operations Comprehensive Review Update

- **Pavements**
- **Structures**
- **Routine Maintenance**
- **Special Structures**

# Pavements

Pavements - Performance Measures

Performance Measure	Current Policy (CTB Approved December 2019) % Sufficiency
Interstate	82% No Section Critical Condition Index less than 35
Primary	82% for ≥ AADT* 3,500 75% for < AADT 3,500
Secondary	82% for ≥ AADT 3,500 60% for < AADT 3,500

*Annual Average Daily Traffic - AADT
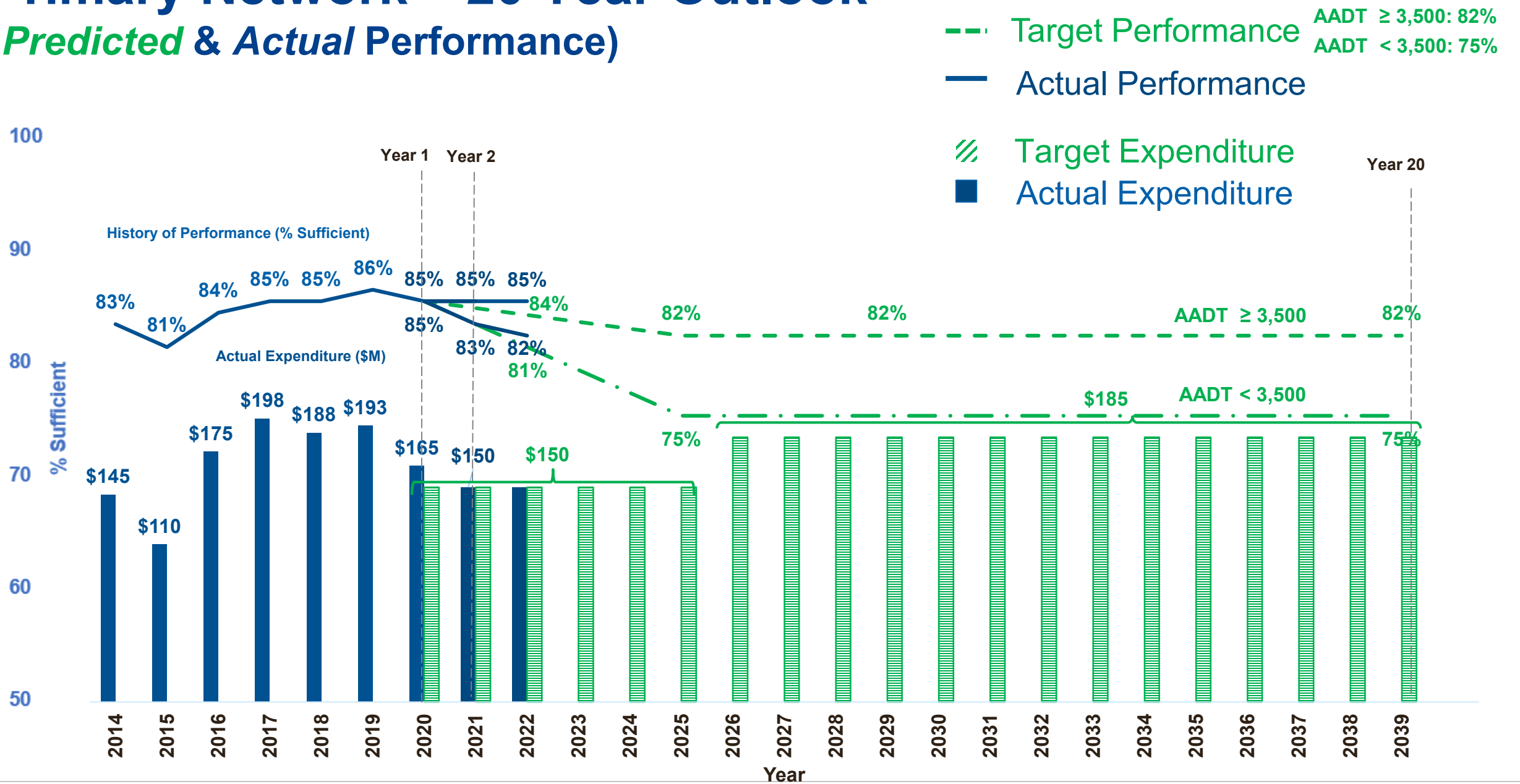
Interstate Network – 20 Year Outlook
(*Predicted* & *Actual* Performance)
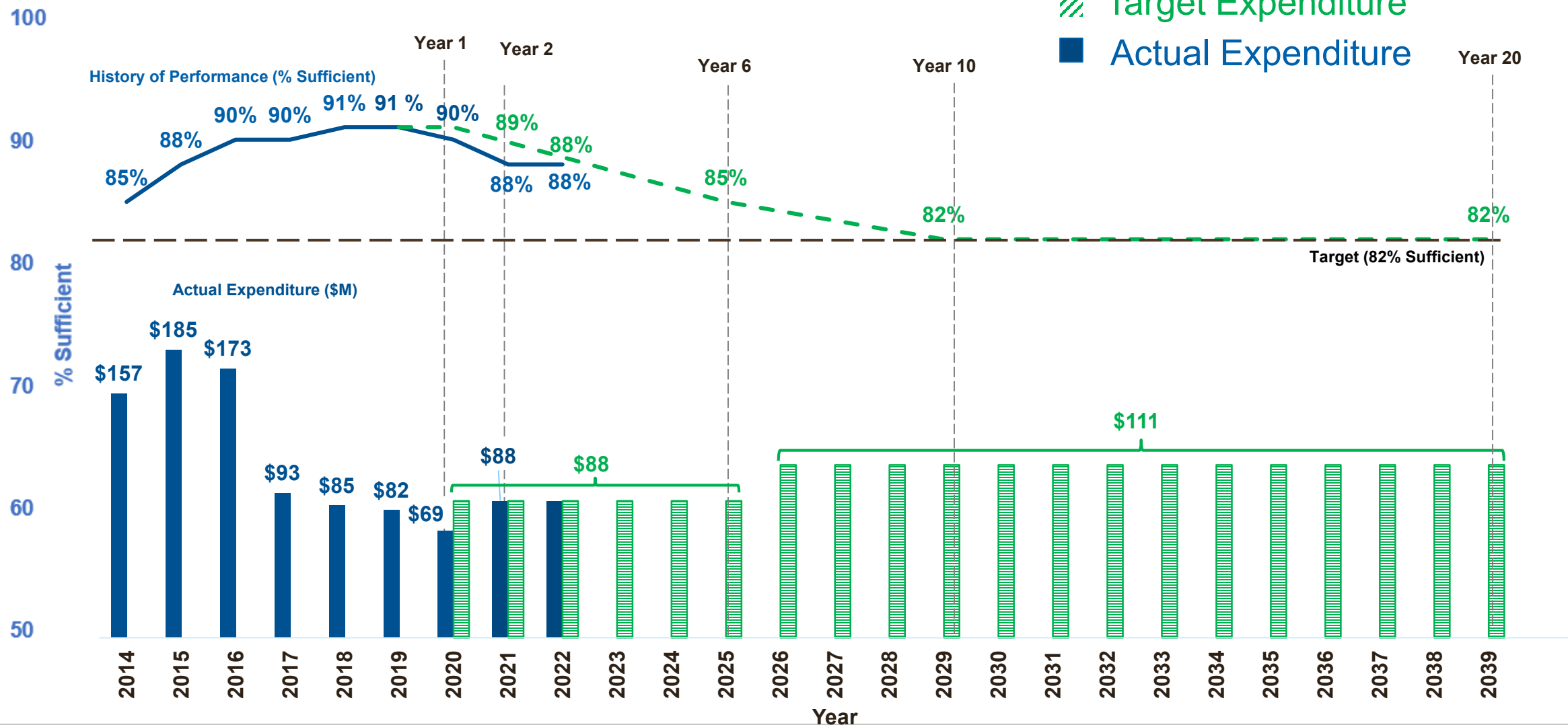
Primary Network – 20 Year Outlook
(*Predicted* & *Actual* Performance)
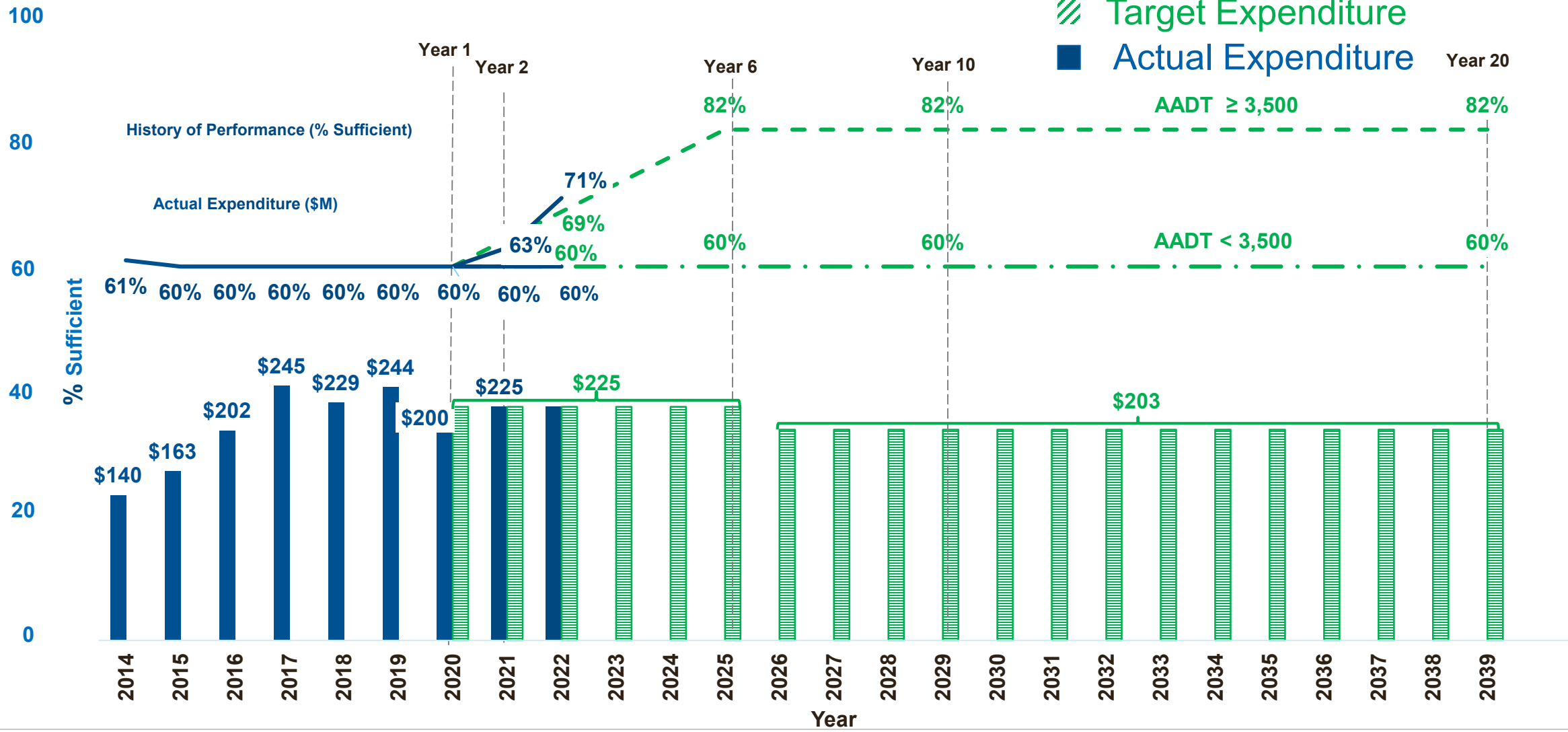
Pavements – Annual Contract Values

Year	Amounts ($ in Millions)
2020	$435
2021	$463
2022	Base contract value - $463 Tracking fuel and asphalt adjustments
2023	Estimated contract value - $537

Structures

Structures - Performance Measures

Performance Measure Description	Current Policy Preservation (CTB Approved December 2019)	
	Average General Condition Rating (GCR)	% Not Poor (SD)
All Systems	≥ 5.6	N/A
Interstate		97% No Postings
Primary		93%
Secondary		90%

All Networks Combined – 50 Year Outlook
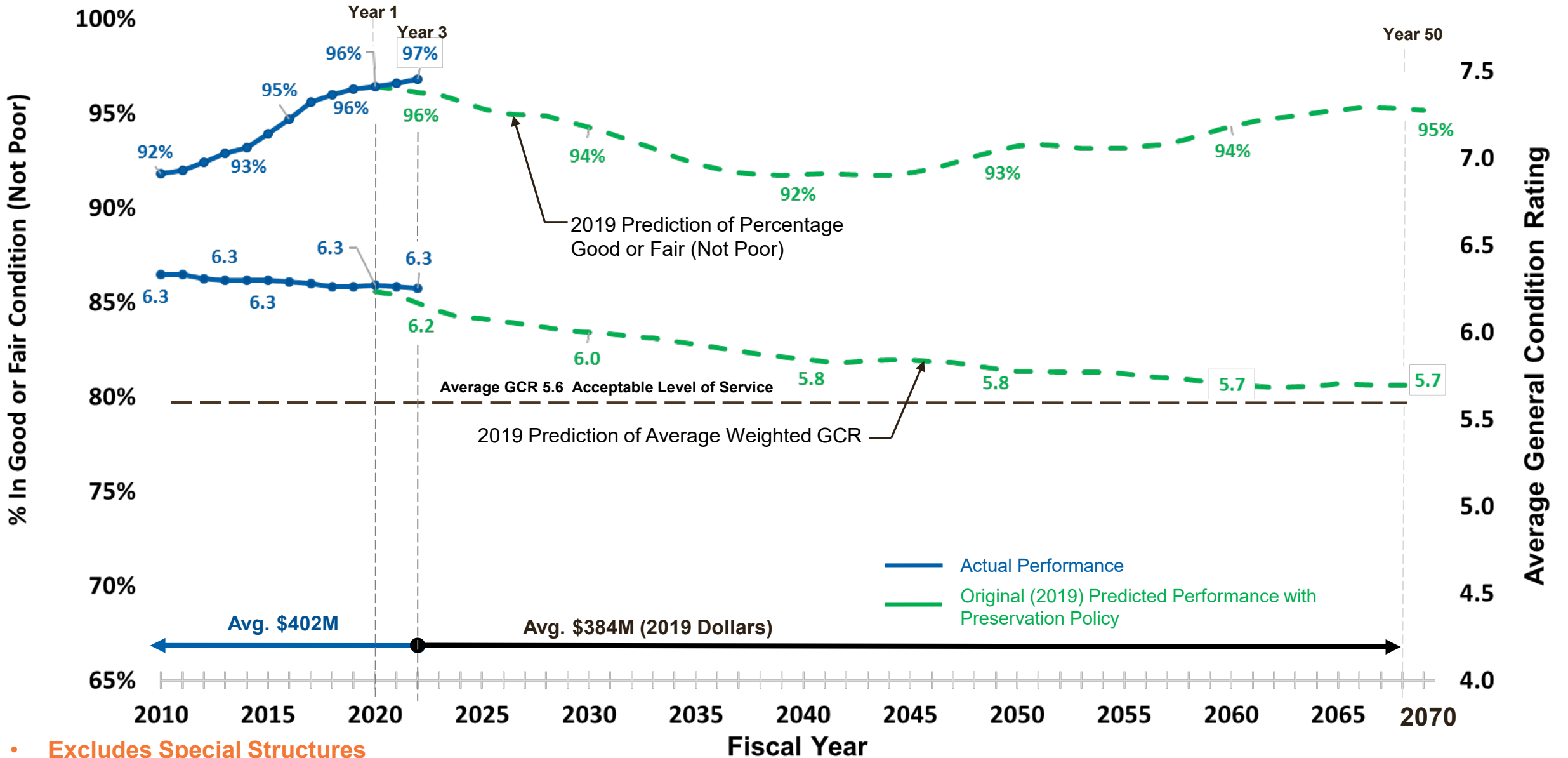
- **Excludes Special Structures**

Interstate Network – 50 Year Outlook
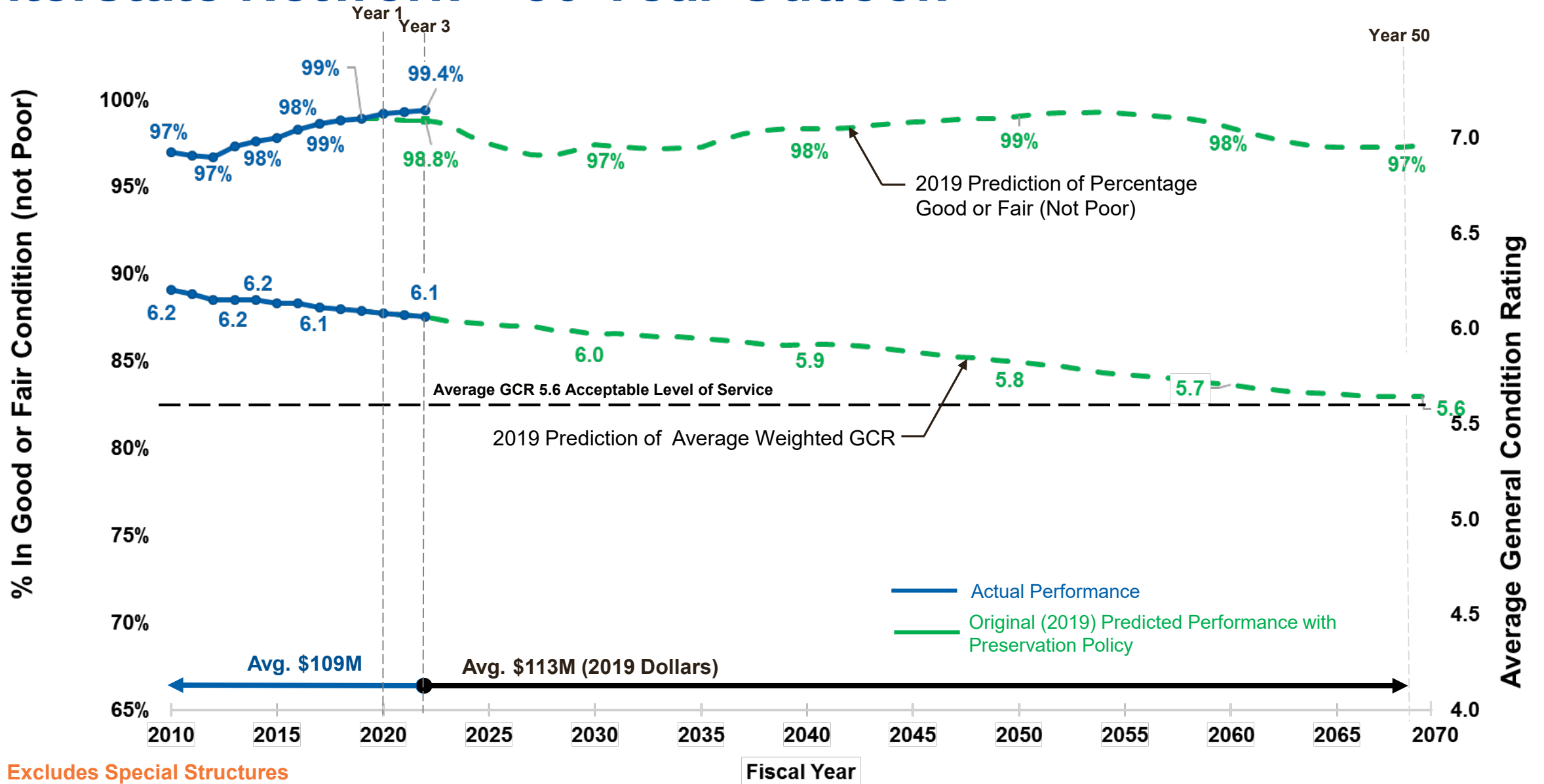
- **Excludes Special Structures**

Primary Network – 50 Year Outlook

- **Excludes Special Structures**

Secondary Network – 50 Year Outlook

- Excludes Special Structures

Routine Maintenance

Routine Maintenance – Performance Metrics

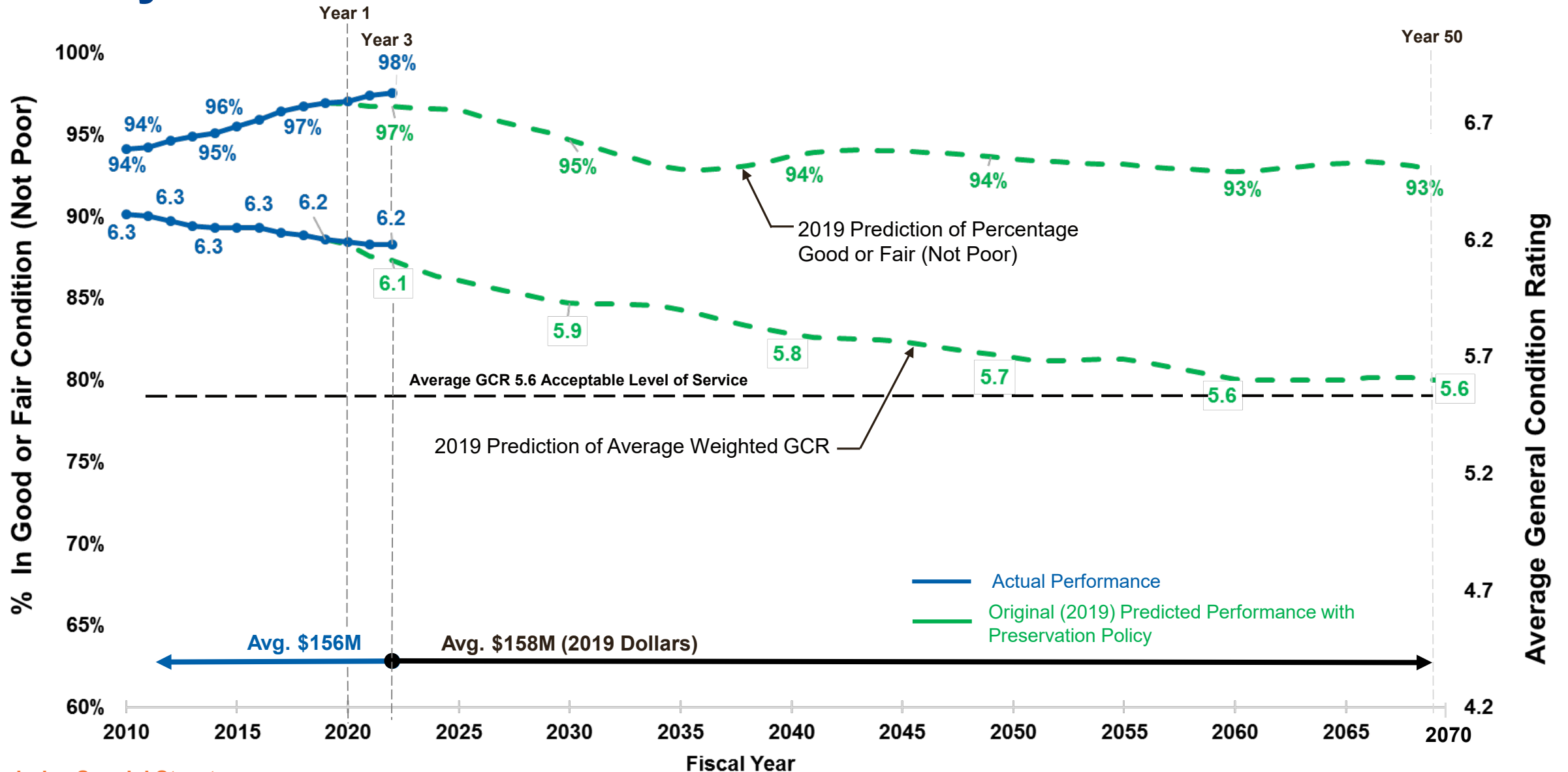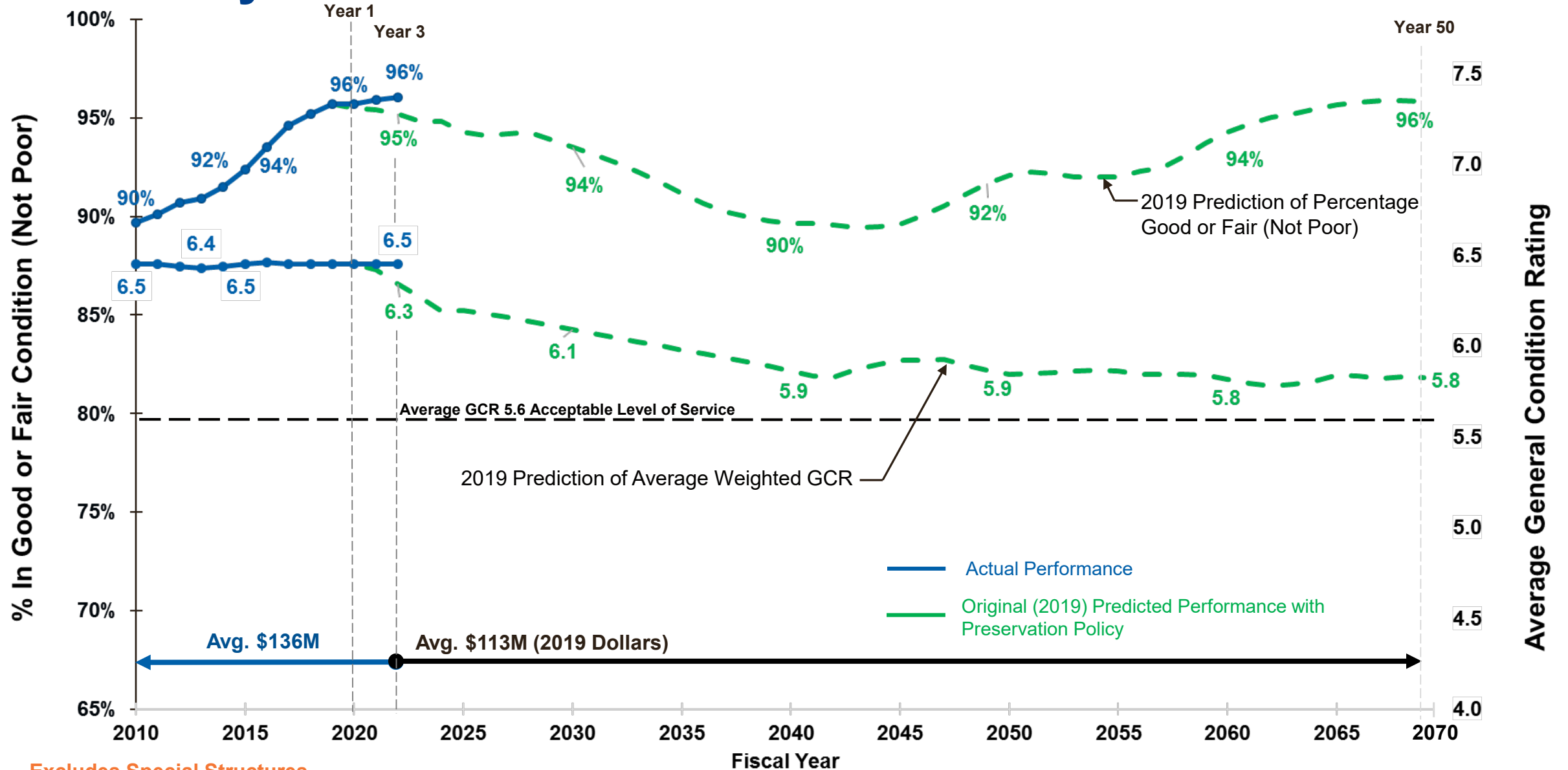| Asset	Best Practice Frequency	2019 Target				FY 2021 Frequency Avg. / yr	FY 2022 Frequency Avg. / yr	Trend
		Frequency		Quantity				
Turf (Mowing)	3 times / yr	IS: 3 times / yr PR: 3 times / yr SC: 2 times/ yr	340,600		acres	IS: 2 times / yr PR: 3 times / yr SC: 2 times/ yr	IS: 2 times / yr PR: 3 times / yr SC: 2 times/ yr	→
Trees	10% of inventory	6% of inventory	8,200		shoulder miles	12%	14%	↑
Pipes	20% of inventory	10% of inventory	33,900		each	5%	7%	↑
SWM Facilities	2 times / yr	2 times / yr	4,400		each	3 times / yr	3 times / yr	→
Ditches	20% of inventory	5% of inventory	4,400		ditch miles	2%	3%	↑
Unpaved Roads	4 times / yr	4 times / yr	25,500		center line miles	7 times / year	6 times / year	↓
Unpaved Shoulders	20% of inventory	20% of inventory	14,800		shoulder miles	40%	14%	↓
Signs	7% of inventory	5% of inventory	47,300		each	4%	4%	→
Signals	20% of inventory	20% of inventory	630		each	13%	33%	↑
Pavement Marking	Material dependent	70% of inventory	50,800		miles	70%	60%	↓

Special Structures

Special Structures – Health Index

- **Unique Health Index Developed for Each Category**
  - **Tunnels (introduced in 2021)**
  - **Movable Bridges (introduced in 2021)**
  - **Complex Structures (being introduced today)**
- **Current Briefing**
  - **1 Year progress on movable bridge health index**
  - **1 Year progress on tunnel health index**
  - **Introduction to complex structures health index**
    - Current status
    - 10 year projection

Movable Bridge Health Index Changes 2021 - 2022

Health Index for Movable Bridges (2021)

Bridge	Electrical	House	Mechanical	Structural	Overall HI/Bridge
Benjamin Harrison	Poor	Fair	Poor	Fair	Poor
Berkley Eastbound (EBL)	Poor	Fair	Fair	Fair	Fair
Berkley Westbound (WBL)	Poor	Fair	Poor	Poor	Poor
Chincoteague	Good	Good	Fair	Fair	Good
Coleman	Fair	Good	Fair	Poor	Fair
Eltham	Fair	Good	Good	Good	Good
Gwynn's Island	Poor	Fair	Poor	Severe	Poor
High Rise	Poor	Good	Fair	Fair	Fair
James River	Poor	Fair	Fair	Fair	Fair

2021: Percentage & Number of Systems in Each Condition Category

Good	19%	(7)
Fair	47%	(17)
Poor	31%	(11)
Severe	3%	(1)

Health Index for Movable Bridges (2022)

Bridge	Electrical	House	Mechanical	Structural	Overall HI/Bridge
Benjamin Harrison	Poor	Fair	Poor	Fair	Poor
Berkley Eastbound (EBL)	Fair ↑	Fair	Fair	Fair	Fair
Berkley Westbound (WBL)	Poor	Fair	Poor	Poor	Poor
Chincoteague	Good	Good	Fair	Fair	Good
Coleman	Fair	Good	Fair	Poor	Fair
Eltham	Fair	Good	Good	Good	Good
Gwynn's Island	Poor	Fair	Poor	Severe	Poor
High Rise	Poor	Good	Fair	Fair	Fair
James River	Poor	Fair	Fair	Fair	Fair

2022: Percentage & Number of Systems in Each Condition Category

Good	19%	(7)
Fair	50%	(18)
Poor	28%	(10)
Severe	3%	(1)

Improvement ↑

Poor to Fair (1)
- **Electrical: Berkley EBL**

Notable Elements of 10 Year Plan

- Work is underway on:
  - Gwynn's Island
  - Eltham
  - Berkley EBL and Berkley WBL
  - Benjamin Harrison
  - James River Bridge
  - Coleman

Health index values expected to improve as work is completed

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Tunnels Health Index Changes 2021 - 2022

Summary of Health Index for Each System on Each Tunnel (2021)						
Tunnel	Civil	Electrical	Fire/Life Safety/Security	Mechanical	Structural	Overall per Tunnel
Big Walker						
East River						
Hampton Roads Eastbound						
Hampton Roads Westbound						
Monitor Merrimac						
Rosslyn						

2021: Percentage & Number of Systems in Each Condition Category

Good	37% (11)
Fair	50% (15)
Poor	13% (4)
Severe	0% (0)

Summary of Health Index for Each System on Each Tunnel (2022)						
Tunnel	Civil	Electrical	Fire/Life Safety/Security	Mechanical	Structural	Overall per Tunnel
Big Walker			↓			
East River		↑	↑			
Hampton Roads Eastbound	↓					
Hampton Roads Westbound	↓					
Monitor Merrimac	↓					
Rosslyn					↑	

Current (2022) Percentage & Number of Systems in Each Condition Category

Good	27% (8)
Fair	63% (19)
Poor	10% (3)
Severe	0% (0)

Improvements

Poor to Fair (2)
- **East River Mountain Tunnel**
  - Electrical
  - Fire/Life Safety: Fan repair and replacement

Fair to Good (1)
- **Rosslyn**
  - Structural: Repair of girders & ceiling panels

Deterioration

Good to Fair (3)
- **Hampton Roads EB, WB, Monitor-Merrimac**
  - Civil: Rails, barriers and sign deterioration

Fair to Poor (1)
- **Big Walker Mountain Tunnel**
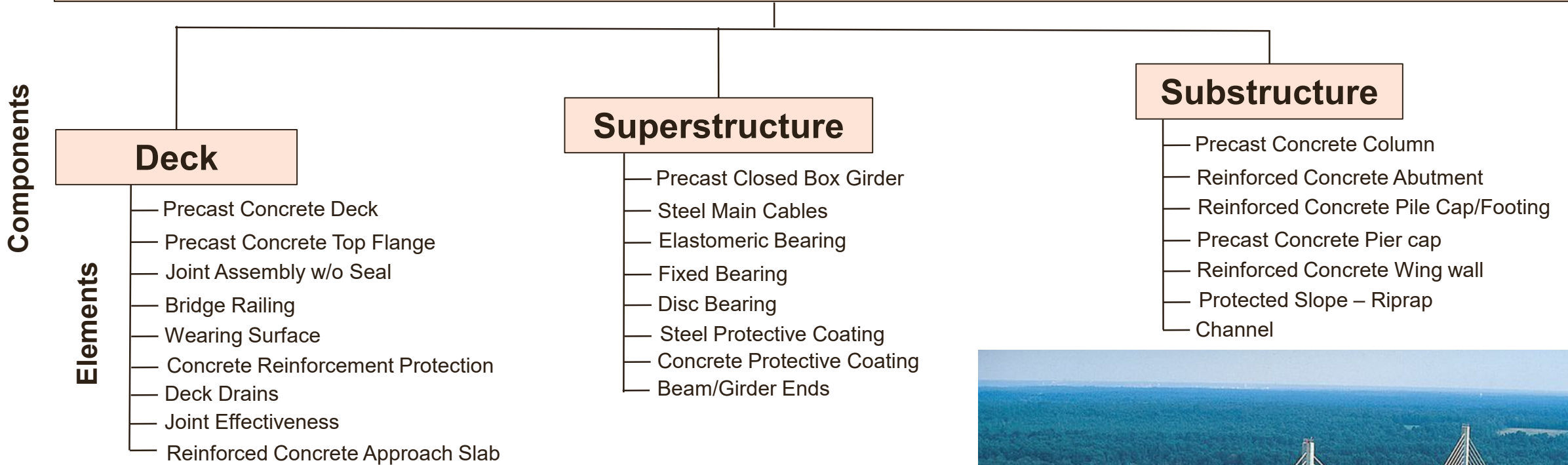 - Fire/Life Safety: Ventilation system deterioration

Notable Elements of 10 Year Plan
- Work is underway on:
  - Big Walker
  - East River (On Virginia side only)
  - Rosslyn

Health index values expected to improve as work is completed

Special Structures - Complex Bridges Health Index

Varina-Enon Complex Bridge Example - 3 Components

Components

Elements

Deck
— Precast Concrete Deck
— Precast Concrete Top Flange
— Joint Assembly w/o Seal
— Bridge Railing
— Wearing Surface
— Concrete Reinforcement Protection
— Deck Drains
— Joint Effectiveness
— Reinforced Concrete Approach Slab

Superstructure
— Precast Closed Box Girder
— Steel Main Cables
— Elastomeric Bearing
— Fixed Bearing
— Disc Bearing
— Steel Protective Coating
— Concrete Protective Coating
— Beam/Girder Ends

Substructure
— Precast Concrete Column
— Reinforced Concrete Abutment
— Reinforced Concrete Pile Cap/Footing
— Precast Concrete Pier cap
— Reinforced Concrete Wing wall
— Protected Slope – Riprap
— Channel

Same methodology used for conventional bridges. Used to estimate remaining life and asset value

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Complex Bridge Health Index: Current & 10 Year Projection

Health Index for Each Component of Each Complex Bridge (2022)

Bridge Name	Deck	Superstructure	Substructure	Overall
460 Connector Bridges	Green	Green	Green	Green
High Rise EBL Approaches	Green	Green	Yellow	Green
HRBT* Approaches	Green	Yellow	Yellow	Yellow
James River Bridge	Green	Yellow	Yellow	Yellow
MMMBT** Approaches	Green	Yellow	Green	Yellow
Norris Bridge	Green	Yellow	Green	Yellow
Smart Road Bridge	Green	Green	Green	Green
Varina Enon Bridge	Green	Orange	Orange	Yellow
Willoughby Bay Bridges	Yellow	Green	Green	Yellow

Current (2022) Percentage & Number of Systems in Each Condition Category

Good	63% (17)
Fair	30% (8)
Poor	7% (2)
Severe	0% (0)

Health Index for Each Component of Each Complex Bridge (10 Year Prediction)

Bridge Name	Deck	Superstructure	Substructure	Overall
460 Connector Bridges	Green	Green	Green	Green
High Rise EBL Approaches	Green	Yellow	Yellow	Yellow
HRBT* Approaches	Green	Green	Green	Green
James River Bridge	Green	Yellow	Yellow	Yellow
MMMBT** Approaches	Green	Green	Yellow	Green
Norris Bridge	Yellow	Yellow	Yellow	Yellow
Smart Road Bridge	Green	Green	Green	Green
Varina Enon Bridge	Yellow	Yellow	Yellow	Yellow
Willoughby Bay Bridges	Green	Green	Green	Green

Predicted in 10 Years: Percentage & Number of Systems in Each Condition Category

Good	59% (16)
Fair	41% (11)
Poor	0% (0)
Severe	0% (0)

*Hampton Roads Bridge-Tunnel
**Monitor-Merrimac Memorial Bridge-Tunnel

Notable Elements of 10 Year Plan
- HRBT Approaches and Willoughby Bay Bridges will be complete
- Norris construction starts after the 10 year window
- Preservation work selected as best value for:
  - Varina-Enon
  - James River Approaches
  - MMMBT Approaches
- Preservation sustains service life for decades of but does not always improve condition category
- The first 10 years of the program is focused more on movable bridges and tunnels than complex bridges due to need

Next Steps