



MAINTENANCE AND OPERATIONS COMPREHENSIVE REVIEW BRIEFING

 Kevin Gregg, Chief of Maintenance and Operations

October 17, 2023

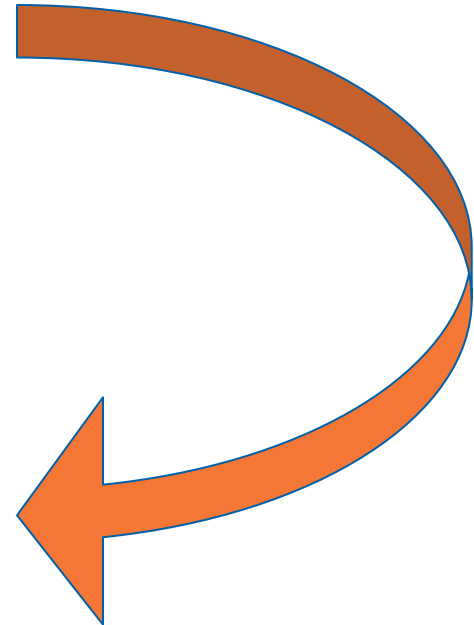
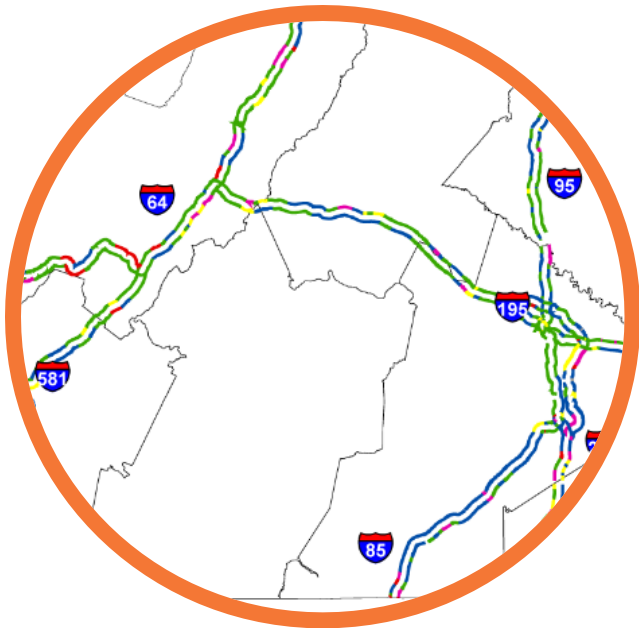
Comprehensive Review Update

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

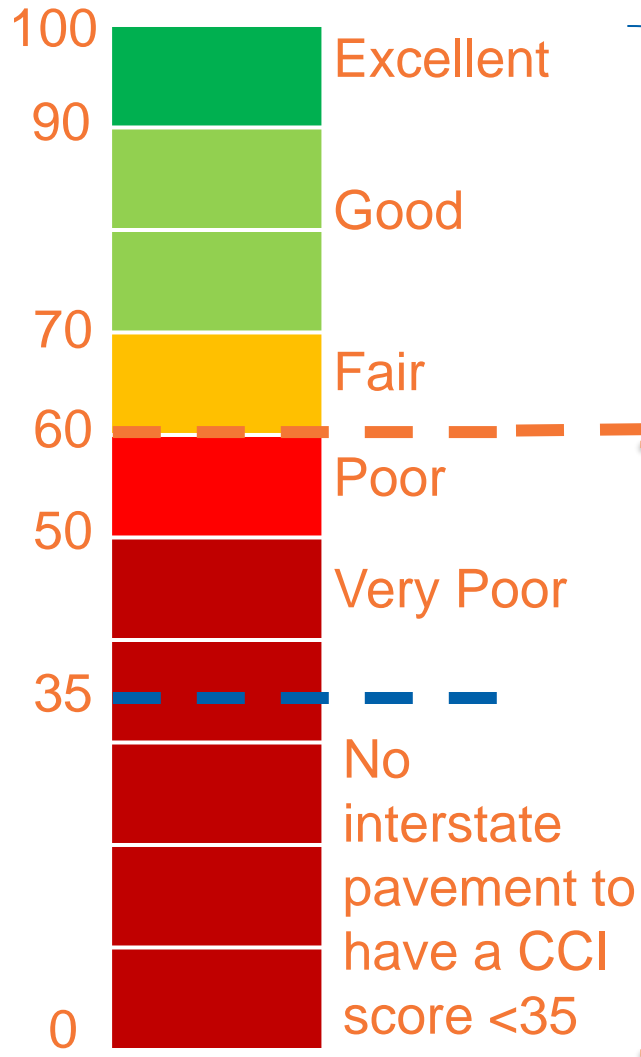
Pavements

Pavement Assessment Process

Interstate and Primary – annual
Secondary – 20% annually



Pavement Rating – What is Critical Condition Index (CCI)?



Sufficiency Percentage is the percentage of lane miles with a CCI score ≥ 60

What does CCI look like?



CCI 90-100
(Excellent)



CCI 50-59
(Poor)



Image shows approximately CCI 35

Pavements - Performance Measures

Performance Measure	Current Policy (CTB Approved December 2019) % Sufficiency*
Interstate	<p style="text-align: center;">82% No Section Critical Condition Index** less than 35</p>
Primary	<p style="text-align: center;">82% for \geq AADT*** 3,500 75% for $<$ AADT 3,500</p>
Secondary	<p style="text-align: center;">82% for \geq AADT 3,500 60% for $<$ AADT 3,500</p>

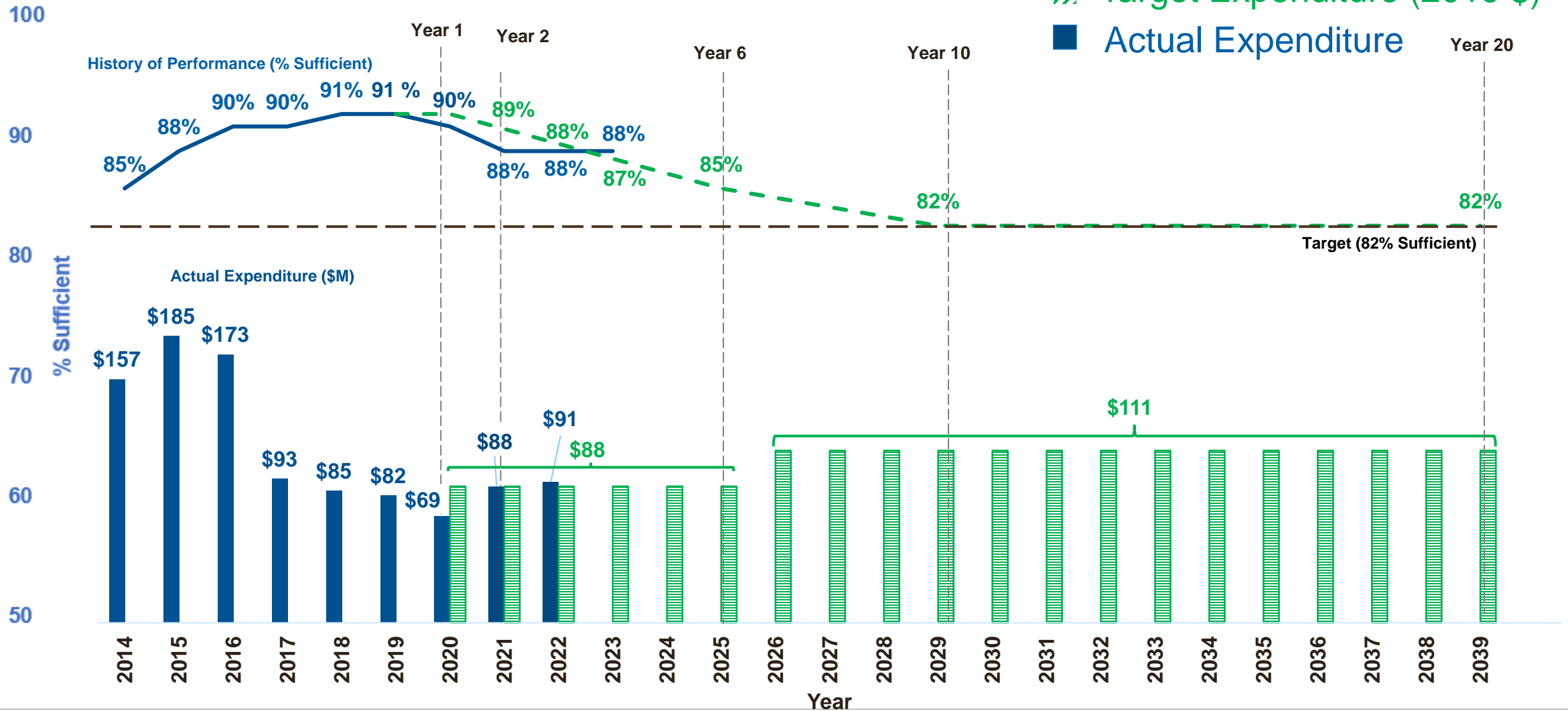
*% Sufficiency – the percent of the pavement inventory with a CCI of 60 or better

**Critical Condition Index – (CCI) – rating system

***Annual Average Daily Traffic - AADT

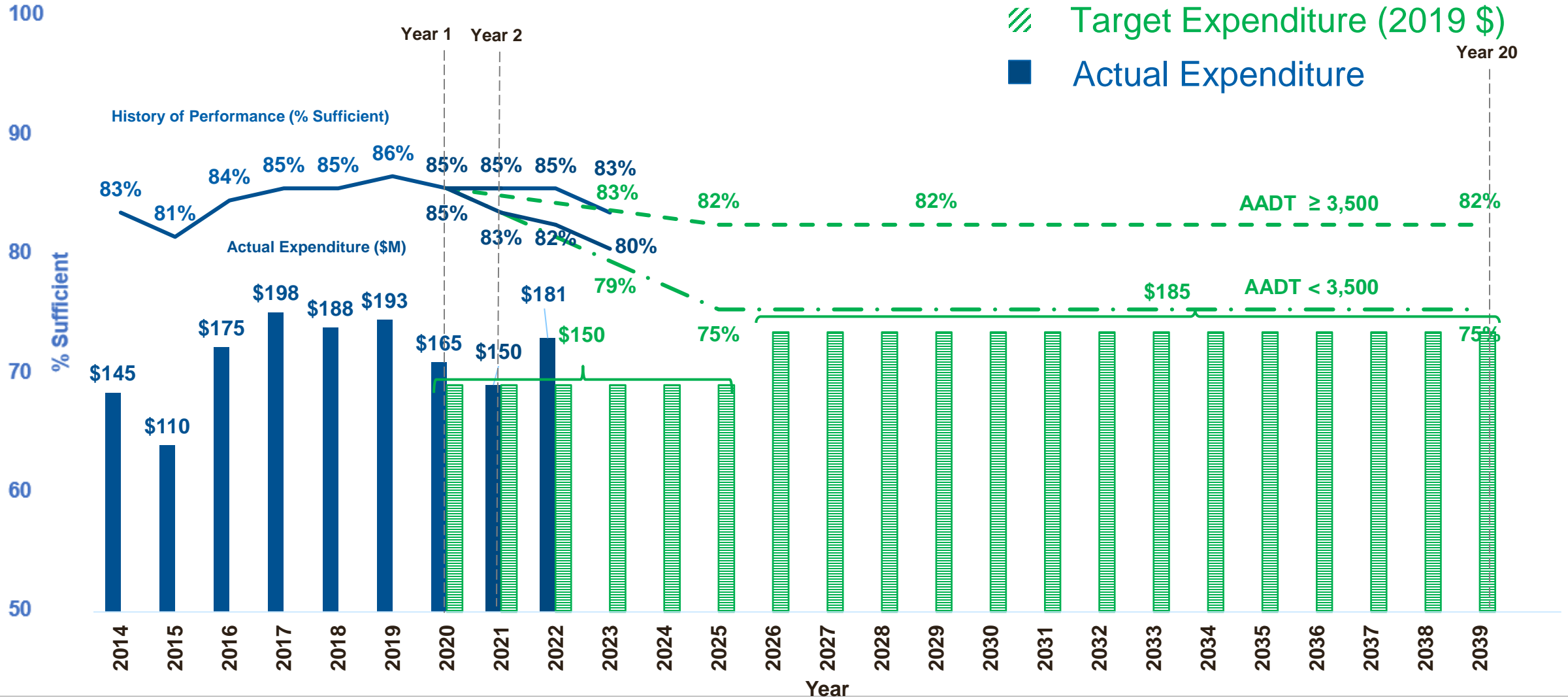
Interstate Network – 20 Year Outlook (*Predicted* & *Actual* Performance) 5,630 lane miles

- - - Target Performance: 82%
- Actual Performance
- ▨ Target Expenditure (2019 \$)
- Actual Expenditure



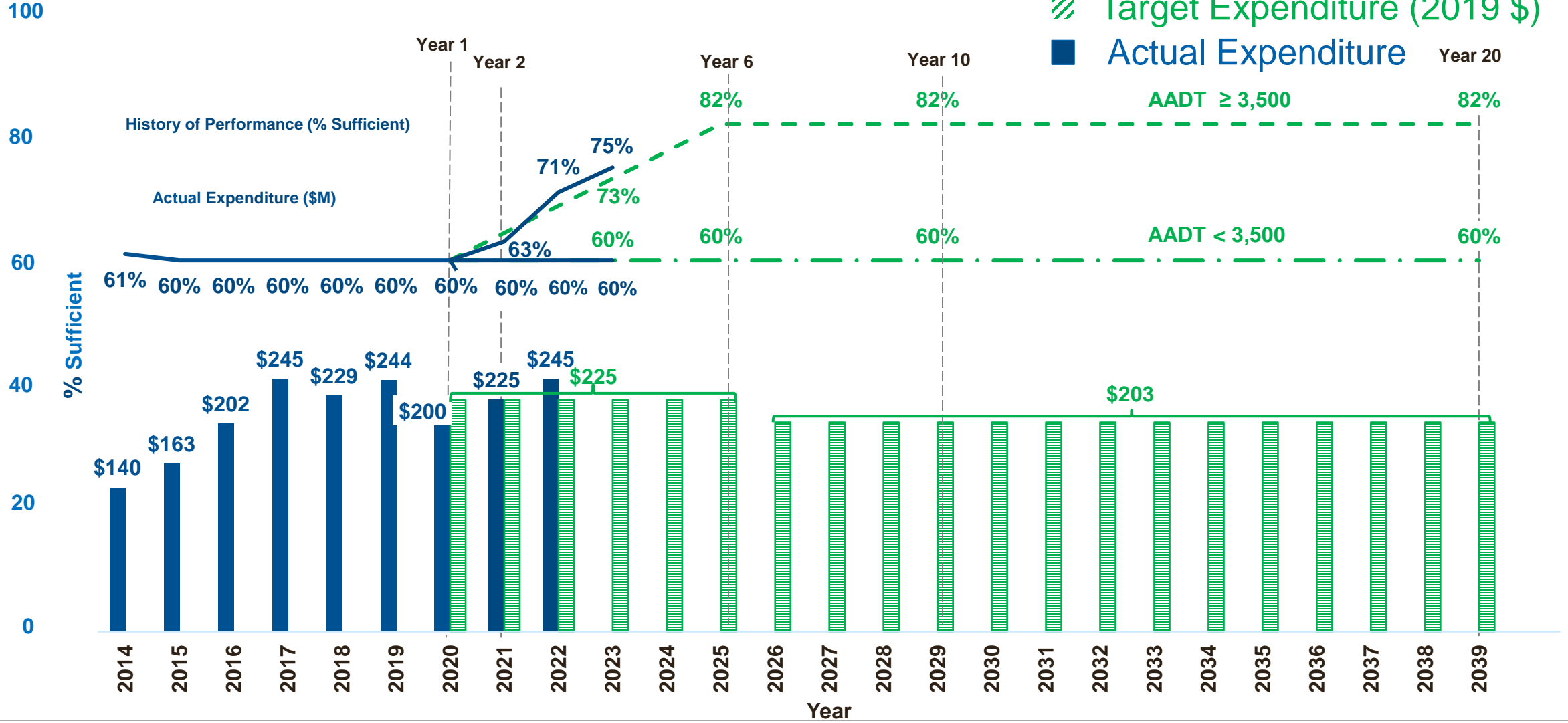
Primary Network – 20 Year Outlook (*Predicted & Actual Performance*) 21,727 lane miles

- - - Target Performance
 - Actual Performance
 - ▨ Target Expenditure (2019 \$)
 - Actual Expenditure
- AADT ≥ 3,500: 82%
 14,893 lane miles
 AADT < 3,500: 75%
 6,834 lane miles



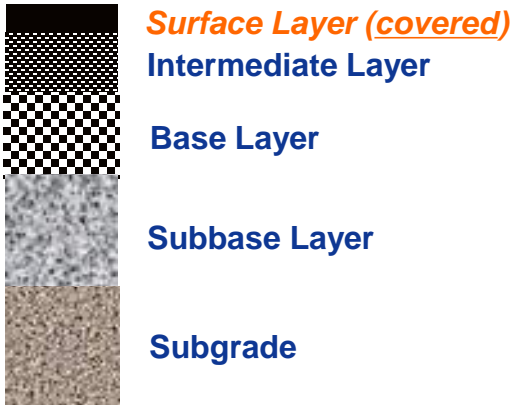
Secondary Network – 20 Year Outlook (*Predicted* & *Actual* Performance) 86,366 lane miles

--- Target Performance AADT ≥ 3,500: 82%
5,385 lane miles
AADT < 3,500: 60%
— Actual Performance 80,981 lane miles



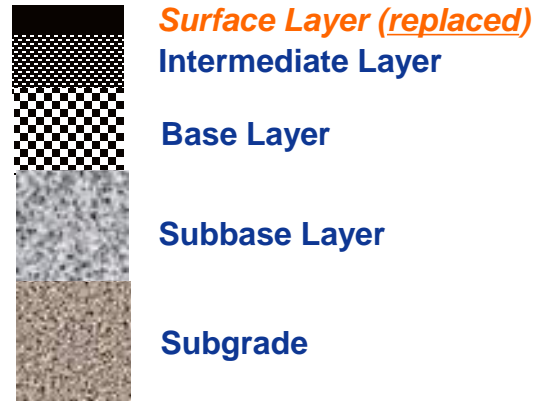
Pavement Treatment - Maintenance Activities

Preventive



Preserves good pavements in good condition at low costs

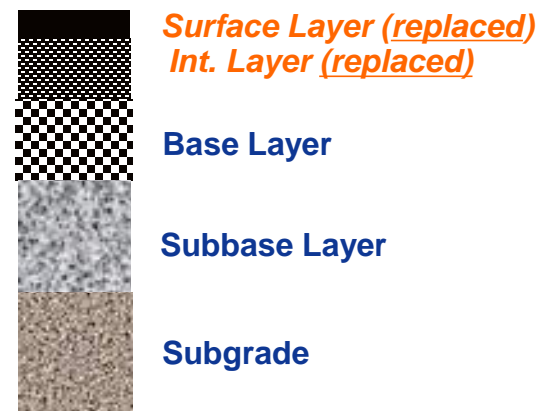
Corrective



Addresses moderate distresses

4 times more expensive than PM

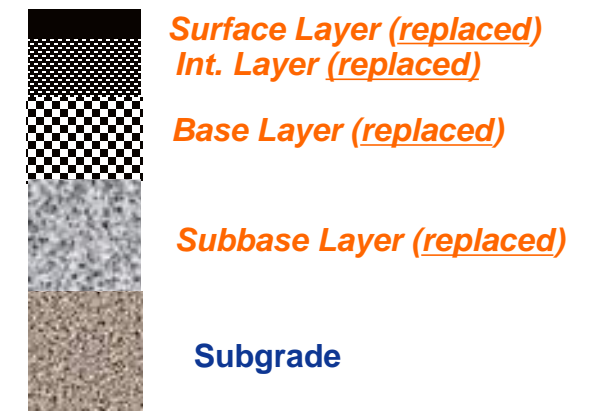
Restorative



Addresses moderate to heavy distresses

2 times more expensive than CM

Reconstruction



Addresses pavements under heavy distresses or in failed condition

2 times more expensive than RM

Pavements – Annual Contract Values

Year	Lane Miles	Amounts (\$ in Millions)*
2020**	3,998	\$435
2021	6,030	\$463
2022	5,876	\$553 (includes asphalt and fuel adjustments)
2023	5,732	\$558 (estimated asphalt and fuel adjustments - \$50 to \$60)
2024	7,212	estimated \$841 (does not include asphalt and fuel adjustments)

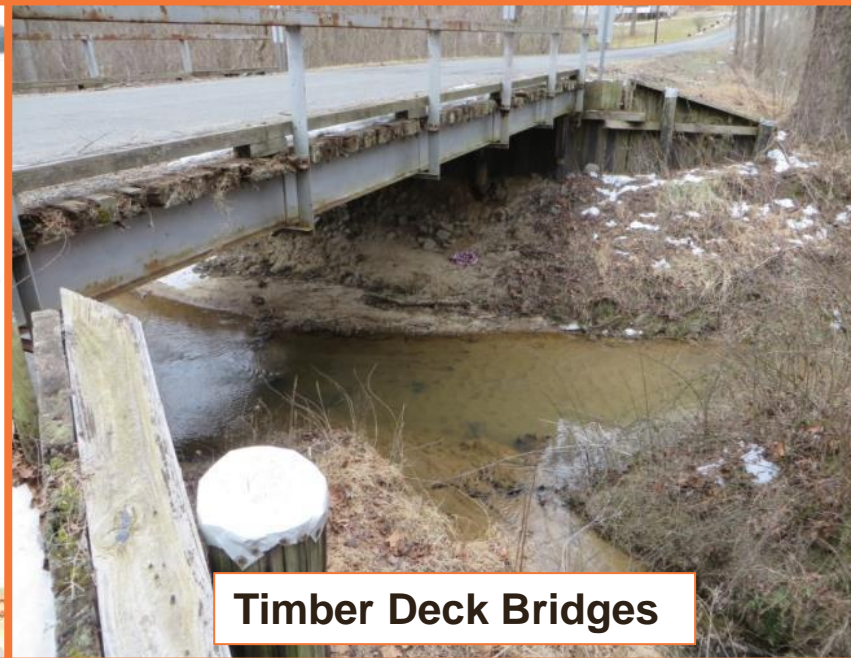
*Amounts reflected in this chart are the awarded contract amounts which may differ from expenditure amounts due to lag in billings

**Targets approved in December 2019 – this work was already advertised/awarded

Structures



Metal Culverts



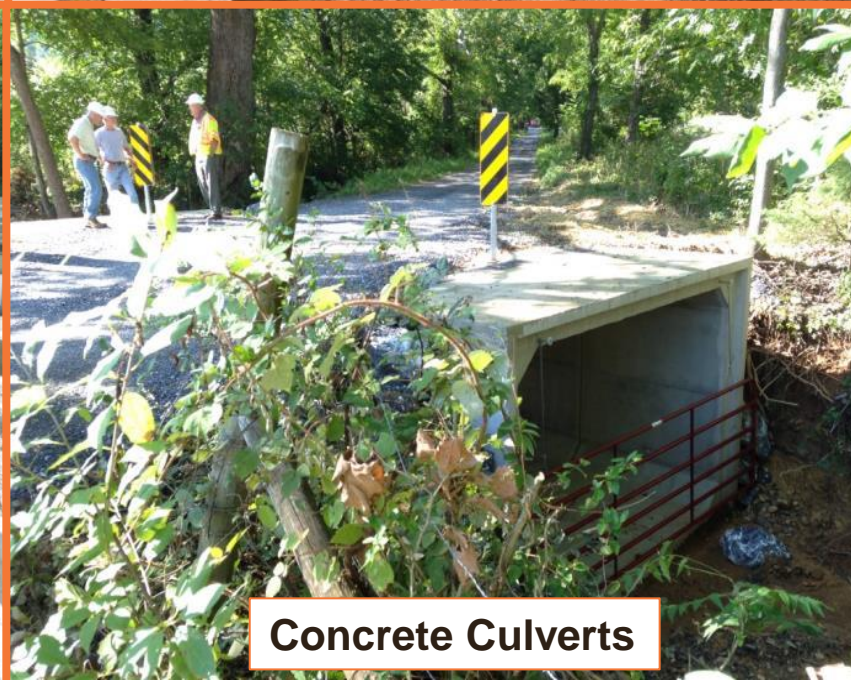
Timber Deck Bridges



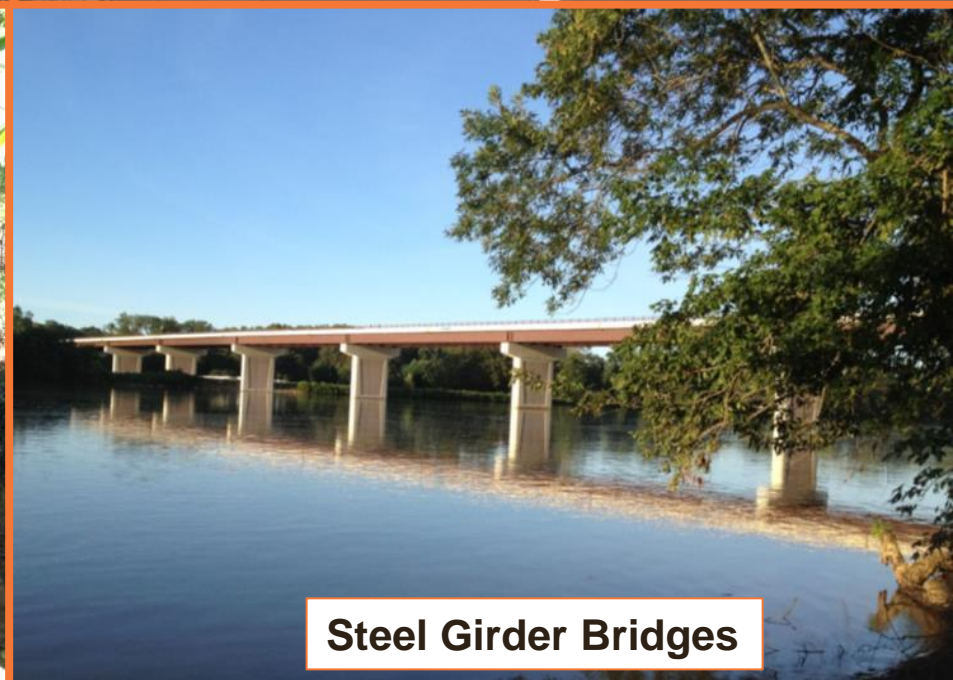
Concrete Girder Bridges



Concrete Slab Bridges





Concrete Culverts



Steel Girder Bridges

Structure Inspection & Assessment Process


 Bridge: 0416270-000000000 Facility Carried (007): RAMBLE ROAD Inspection: 2016-07-06 (MIHS) Type: Regular NBI Metric English


 Inspection > Condition

Condition Ratings

Deck (058): N N/A (NBI) Channel (081): 7 Minor Damage NBI Converter Profile: BrM Default
 Superstructure (059): N N/A (NBI) Culvert (062): 8 No Major Problem
 Substructure (060): N N/A (NBI) Waterway (071): 8 Equal Desirable
 Unrepaired Spalls: (SF)

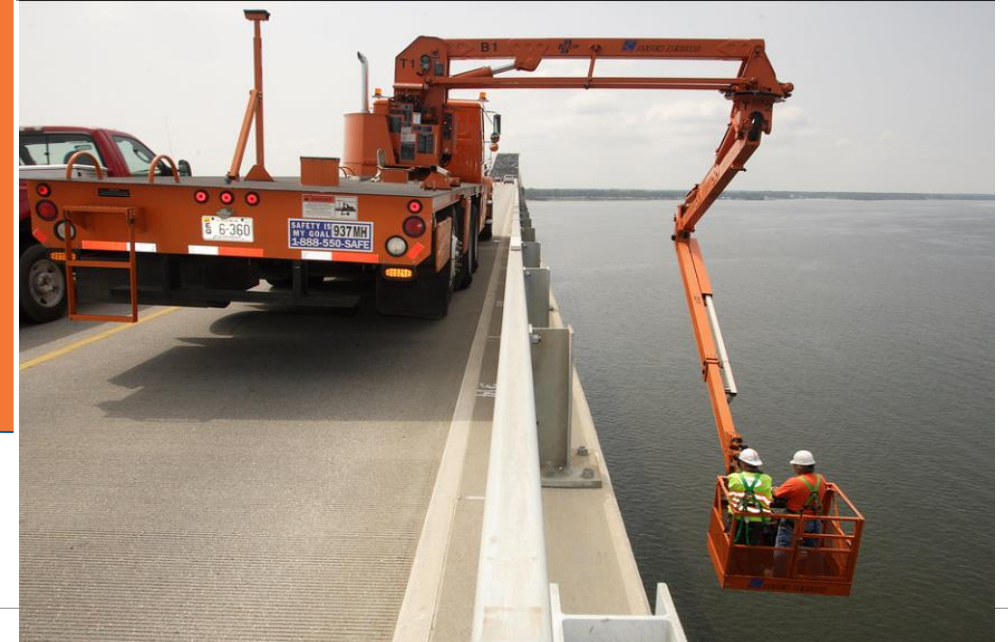
Element Conditions

Hide Elem Inspection Details Arrow Key Grid Navigation Help

Element: Elem # or Elem Desc. Struct. Unit: All Env.: All Clear Filters Quantity Percent Add Element

Elem.	Str. Unit.	Env.	Element Description	Tot. Qty.	Units	Qty1	Qty2	Qty3	Qty4			
241	1	Low (2)	Re Conc Culvert	79	ft	79,000	0	0	0			
824	1	Low (2)	RC Wingwall	4	(EA)	4,000	0	0	0			
831	1	Low (2)	Culvert End/Headwall	2	(EA)	2,000	0	0	0			
833	1	Low (2)	Roadway Ov. Culv.	1	(EA)	1,000	0	0	0			
854	1	Low (2)	Channel	1	(EA)	1,000	0	0	0			

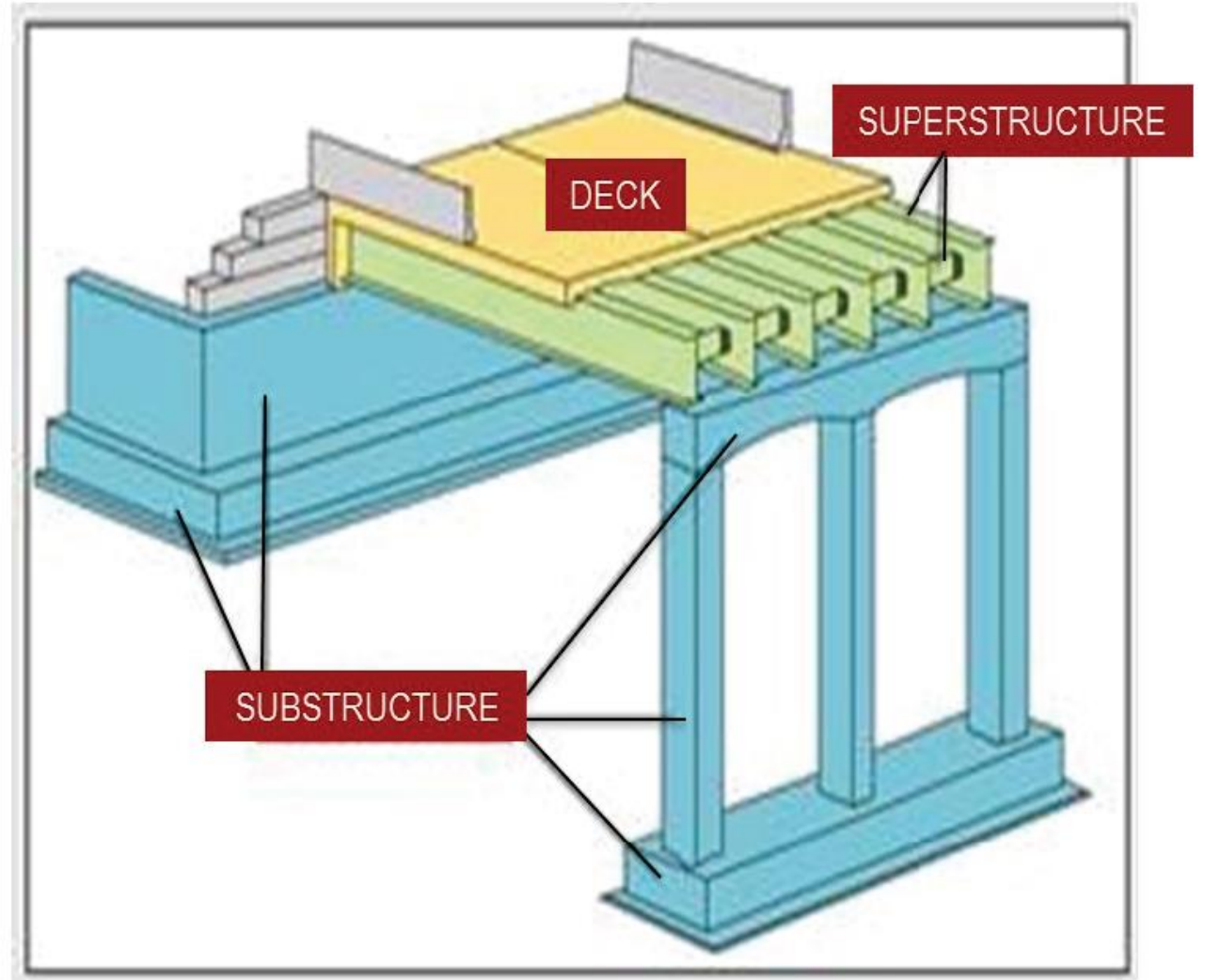
2 year cycle



Bridge Rating - What is a GCR (General Condition Rating)?



Bridge Components

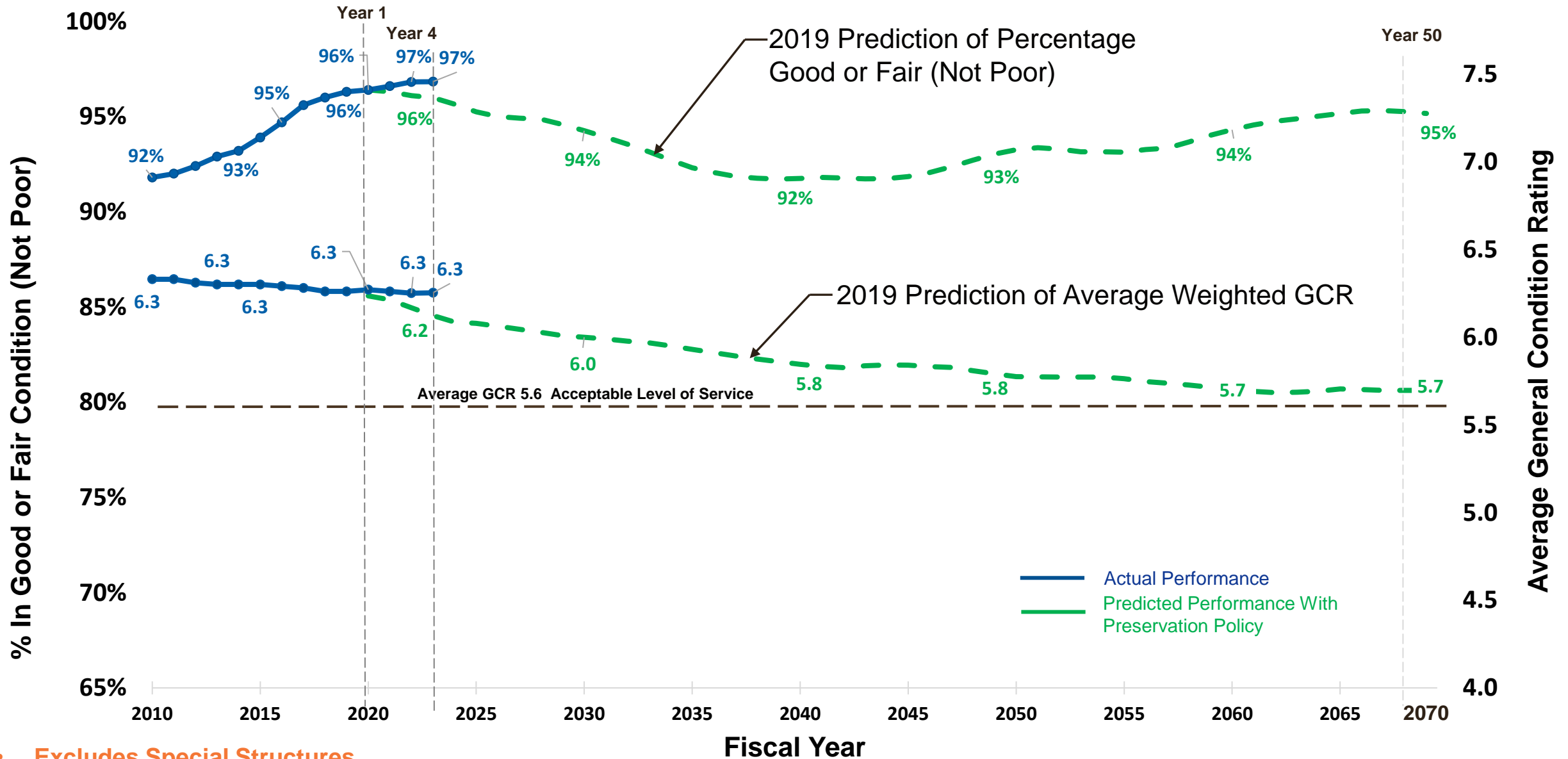


Structures - Performance Measures

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

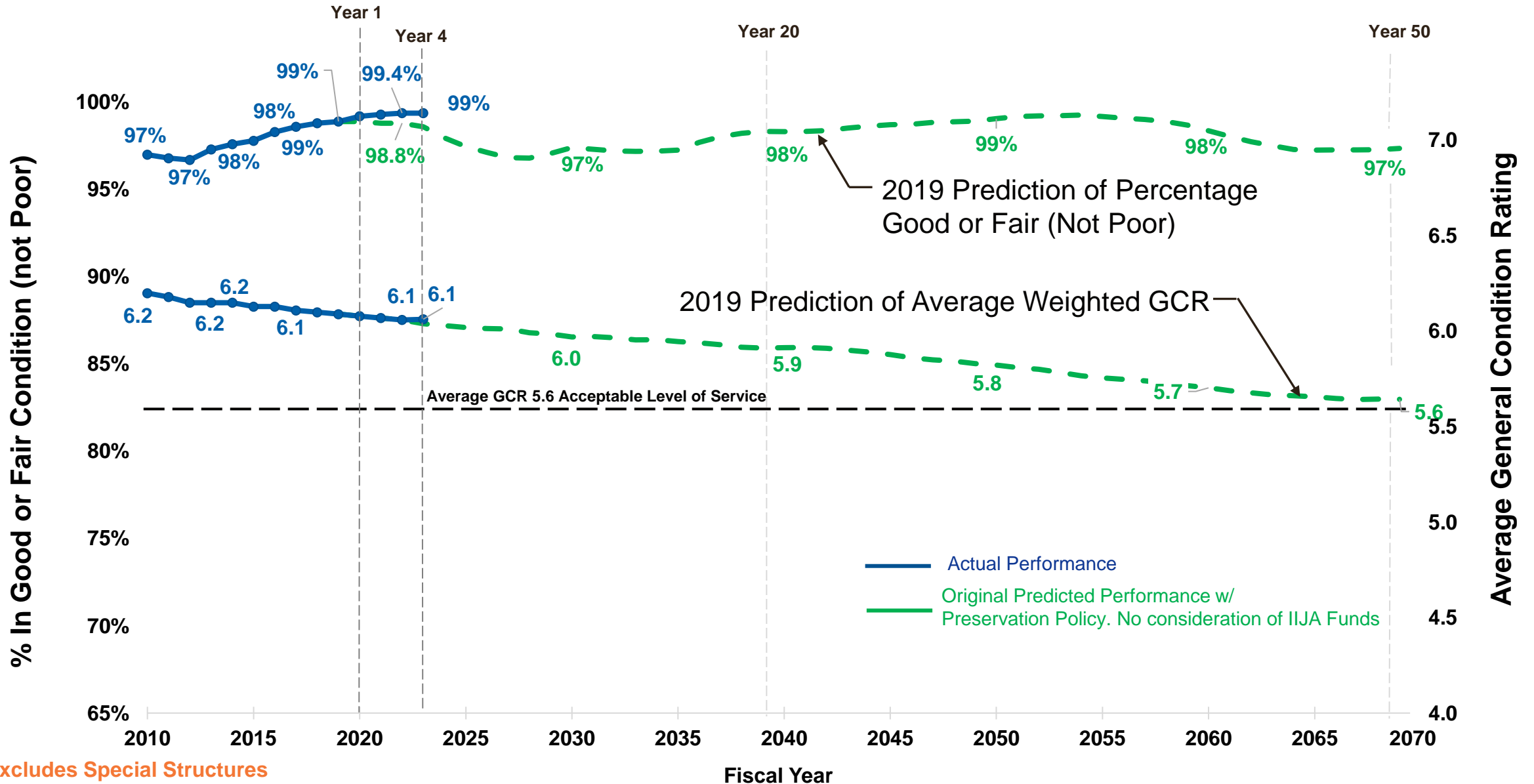
% Not Poor – percentage of structures with a GCR of 5 (Fair) or better

All Networks Combined – 50 Year Outlook – 21,312 structures



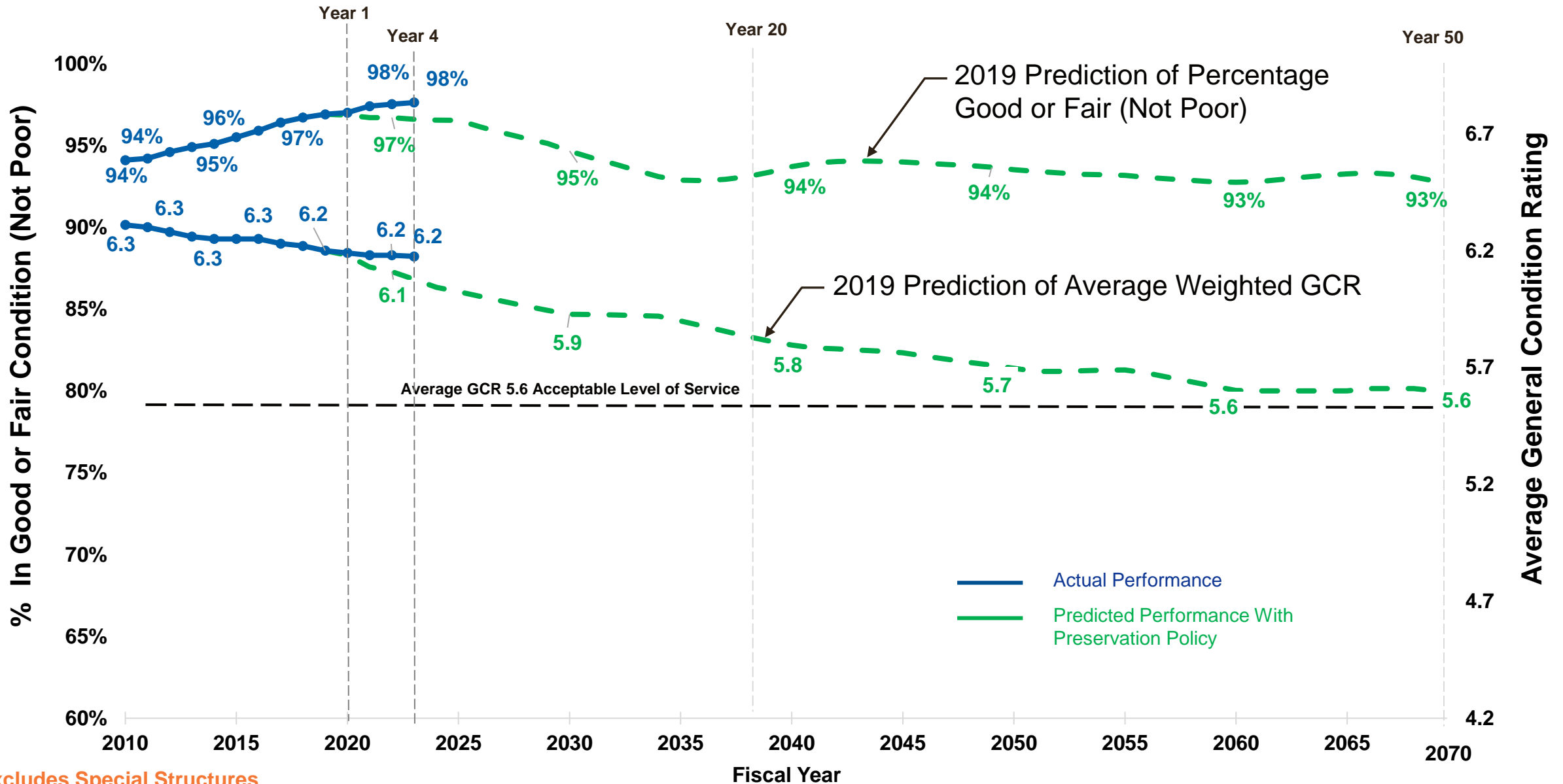
• Excludes Special Structures

Interstate Network – 50 Year Outlook – 2,442 structures



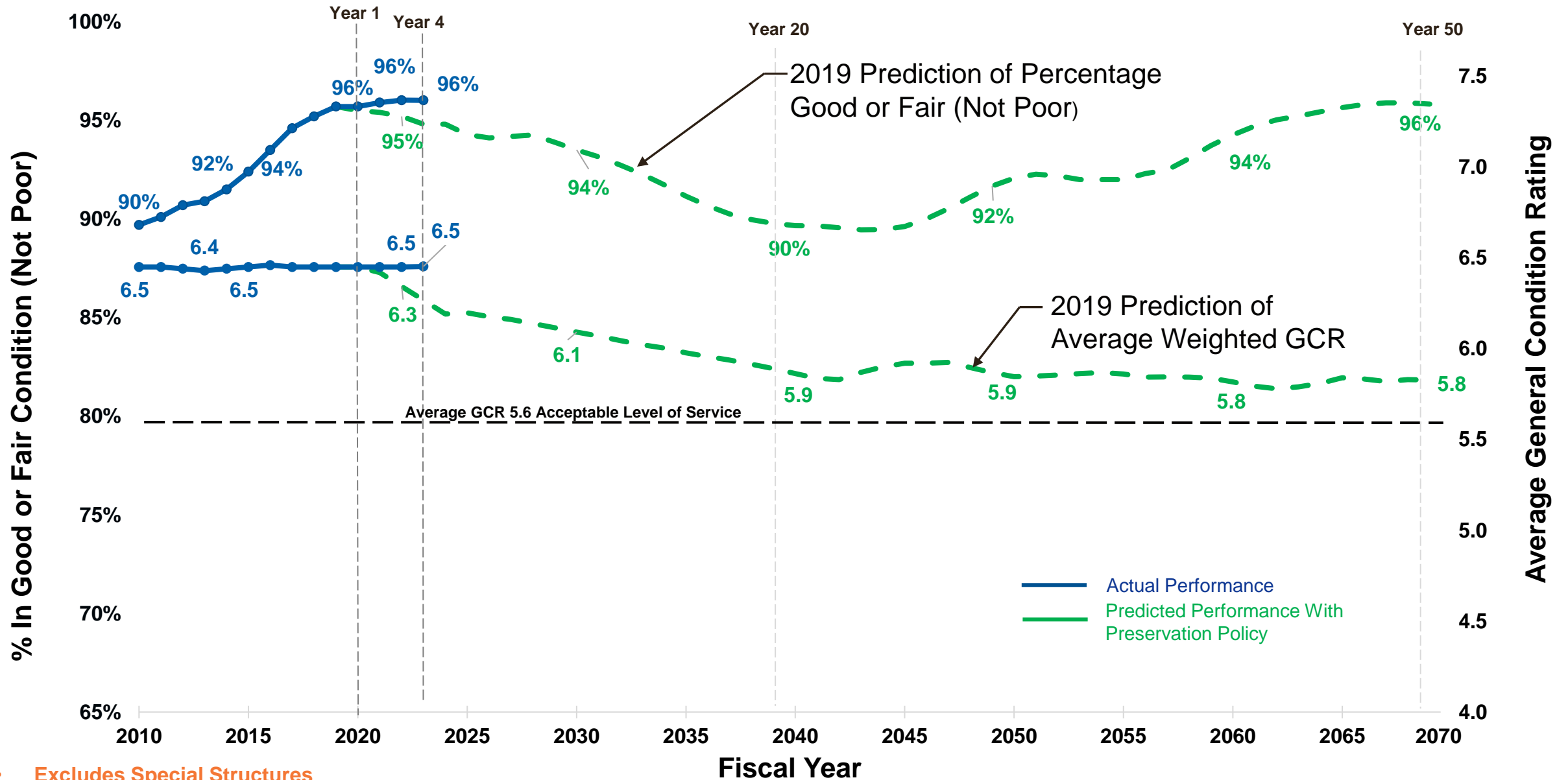
• Excludes Special Structures

Primary Network – 50 Year Outlook – 5,831 structures



• Excludes Special Structures

Secondary Network – 50 Year Outlook – 13,039 structures



• Excludes Special Structures

Routine Maintenance

Routine Maintenance – Performance Metrics

Asset	2019 Target		FY 2022 Frequency Avg. / yr	FY 2023 Frequency Avg. / yr	Trend
	Frequency	Quantity			
Turf (Mowing)	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	6% of inventory	8,200 shoulder miles	14%	23%	↑
Pipes	10% of inventory	33,900 each	7%	10%	↑
SWM Facilities	2 times / yr	4,400 each	3 times / yr	3 times / yr	→
Ditches	5% of inventory	4,400 ditch miles	3%	3%	→
Unpaved Roads	4 times / yr	25,500 center line miles	6 times / year	5 times / year	↓
Unpaved Shoulders	20% of inventory	14,800 shoulder miles	14%	29%	↑
Signs	5% of inventory	47,300 each	4%	4%	→
Signals	20% of inventory	630 each	33%	14%	↓
Pavement Marking	70% of inventory	50,800 miles	60%	66%	↑

Special Structures

Special Structures – Health Index

- **Unique Health Index Developed for Each Category**
 - **Movable Bridges (introduced in 2021)**
 - **Tunnels (introduced in 2021)**
 - **Complex Structures (introduced in 2022)**
- **Current Briefing**
 - **2 Year progress on movable bridge health index**
 - **2 Year progress on tunnel health index**
 - **1 Year progress on complex structure index**

Movable Bridge Health Index Changes 2022 - 2023


Bridge	2022 Health Index (HI)								
	Movable Spans					Approach (Fixed) Spans			
	Electrical	House	Mechanical	Structural	Overall HI Movable Span	Deck	Super-structure	Sub-structure	Overall HI Approach Spans
Benjamin Harrison	Orange	Yellow	Orange	Yellow	Orange	Yellow	Green	Yellow	Yellow
Berkley EBL	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Berkley WBL	Orange	Yellow	Orange	Yellow	Orange	Yellow	Green	Yellow	Yellow
Chincoteague	Green	Green	Yellow	Yellow	Green	Green	Green	Yellow	Green
Coleman	Yellow	Green	Yellow	Orange	Yellow	Yellow	Green	Green	Yellow
Eltham	Yellow	Green	Green	Green	Yellow	Yellow	Yellow	Green	Yellow
Gwynn's Island	Orange	Yellow	Orange	Red	Orange	Green	Green	Yellow	Yellow
High Rise	Orange	Green	Yellow	Yellow	Yellow	Green	Green	Yellow	Green
James River	Orange	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow

2022 Percentage & Number of Systems in Each Condition Category		
Good	32%	(20)
Fair	49%	(31)
Poor	17%	(11)
Severe	2%	(1)


Bridge	2023 Health Index (HI)								
	Movable Spans					Approach (Fixed) Spans			
	Electrical	House	Mechanical	Structural	Overall HI Movable Span	Deck	Super-structure	Sub-structure	Overall HI Approach Spans
Benjamin Harrison	Orange	Yellow	Orange	Yellow	Orange	Yellow	Green	Yellow	Yellow
Berkley EBL	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow
Berkley WBL	Orange	Yellow	Orange	Yellow	Orange	Yellow	Green	Yellow	Yellow
Chincoteague	Green	Green	Green ↑	Green ↑	Green	Green	Green	Yellow	Green
Coleman	Yellow	Green	Yellow	Orange	Yellow	Yellow	Green	Green	Yellow
Eltham	Yellow	Green	Green	Green	Yellow	Yellow	Yellow	Green	Yellow
Gwynn's Island	Orange	Yellow	Orange	Red	Orange	Green	Green	Yellow	Yellow
High Rise	Yellow ↑	Yellow ↓	Yellow	Red ↓	Yellow	Green	Yellow ↓	Yellow	Yellow ↓
James River	Orange	Yellow	Yellow	Yellow	Yellow	Yellow ↓	Yellow	Yellow	Yellow ↓

2023 Percentage & Number of Systems in Each Condition Category		
Good	30%	(19)
Fair	51%	(32)
Poor	17%	(11)
Severe	2%	(1)

Improvement (3)
 Fair to Good: **Chincoteague** Mechanical, Structural
 Poor to Good: **High Rise** Electrical



Deterioration (5)
 Good to Fair: **High Rise** House, Super, Overall
JRB: Deck
 Fair to Poor: **High Rise: Structural**



Notable Elements of 10 Year Plan Work is underway on:

- Gwynn's Island
- Benjamin Harrison
- Eltham
- James River Bridge
- Berkley EBL and Berkley WBL
- Coleman
- High Rise

Health index expected to improve as work is completed

Tunnels Health Index Changes 2022 - 2023

Summary of Health Index for Each System on Each Tunnel (2022)

Tunnel	Civil	Electrical	Fire/Life Safety/Security	Mechanical	Structural	Overall HI
Big Walker	Good	Fair	Poor	Fair	Good	Fair
East River	Good	Fair	Fair	Poor	Good	Fair
Hampton Roads Eastbound	Fair	Good	Fair	Fair	Fair	Fair
Hampton Roads Westbound	Fair	Good	Fair	Fair	Fair	Fair
Monitor Merrimac	Fair	Fair	Fair	Fair	Good	Fair
Rosslyn	Good	Fair	Fair	Poor	Good	Fair

2022 Percentage & Number of Systems in Each Condition Category

Good	30% (9)
Fair	60% (18)
Poor	10% (3)
Severe	0% (0)

Summary of Health Index for Each System on Each Tunnel (2023)

Tunnel	Civil	Electrical	Fire/Life Safety/Security	Mechanical	Structural	Overall HI
Big Walker	Good	Fair	Good	Fair	Good	Fair
East River	Good	Poor	Good	Poor	Good	Fair
Hampton Roads Eastbound	Fair	Good	Good	Fair	Fair	Fair
Hampton Roads Westbound	Fair	Fair	Fair	Fair	Fair	Fair
Monitor Merrimac	Fair	Fair	Fair	Fair	Fair	Fair
Rosslyn	Good	Fair	Fair	Poor	Fair	Fair
I-564*	Good	Good	Good	Good	Good	Good

2023 Percentage & Number of Systems in Each Condition Category

Good	34% (12)
Fair	57% (20)
Poor	9% (3)
Severe	0% (0)

Improvements (2)

Poor to Fair (1)

- **Big Walker Mountain Tunnel**
 - Fire/Life Safety

Fair to Good (1)

- **Hampton Roads Bridge Tunnel Eastbound**
 - Fire/Life Safety



Deterioration (3)

Good to Fair (2)

- **Rosslyn:** Structural
- Hampton Roads Tunnel WB: Electrical

Fair to Poor (1)

- **East River Mountain Tunnel**
 - Electrical



Notable Elements of 10 Year Plan

- Work is underway on:
 - Big Walker
 - East River (On Virginia side only)
 - Rosslyn
 - HRBT
 - MMMBT

Health index expected to improve as work is completed

Complex Structure Health Index: Changes 2022 - 2023

Health Index for Each Component of Each Complex Structure (2022)				
Bridge Name	Deck	Superstructure	Substructure	Overall HI
460 Connector Bridges	Good	Good	Good	Good
HRBT* Approaches	Good	Fair	Fair	Fair
MMMBT** Approaches	Good	Good	Good	Good
Norris Bridge	Good	Fair	Fair	Fair
Smart Road Bridge	Good	Good	Good	Good
Varina Enon Bridge	Good	Poor	Poor	Fair
Willoughby Bay Bridges	Fair	Good	Good	Fair

2022 Percentage & Number of Systems in Each Condition Category	
Good	66% (14)
Fair	24% (5)
Poor	10% (2)
Severe	0% (0)

Health Index for Each Component of Each Complex Structure (2023)				
Bridge Name	Deck	Superstructure	Substructure	Overall HI
460 Connector Bridges	Good	Good	Good	Good
HRBT* Approaches	↓	Fair	Fair	Fair
MMMBT** Approaches	Good	↓	Good	Good
Norris Bridge	Good	Fair	Fair	Fair
Smart Road Bridge	Good	↓	Good	Good
Varina Enon Bridge	Good	↑	Poor	Fair
Willoughby Bay Bridges	Fair	↓	↓	Fair

2023 Percentage & Number of Systems in Each Condition Category	
Good	43% (9)
Fair	52% (11)
Poor	5% (1)
Severe	0% (0)

- Notable Elements of 10 Year Plan**
- HRBT Approaches and Willoughby Bay Bridges will be complete
 - Preservation emphasis for:
 - Varina-Enon
 - James River Approaches
 - MMMBT Approaches

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

Improvements (1)
 ↑
 Poor to Fair (1)
 • **Varina-Enon:** Superstructure

Deterioration (5)
 ↓
 Good to Fair (5)
 • **Willoughby, MMMBT, SMART:** Superstructure
 • **Willoughby:** Substructure
 • **HRBT Approaches:** Deck

