City Council Study Session
January 3, 2023
AB 6199

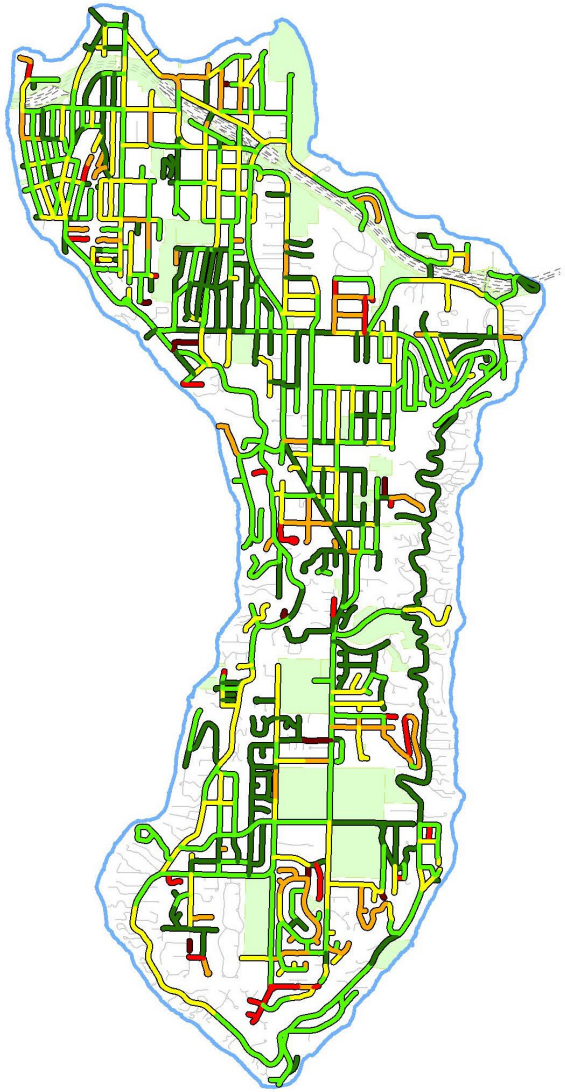
PAVEMENT CONDITION RATINGS

Pavement Condition Ratings Project Team

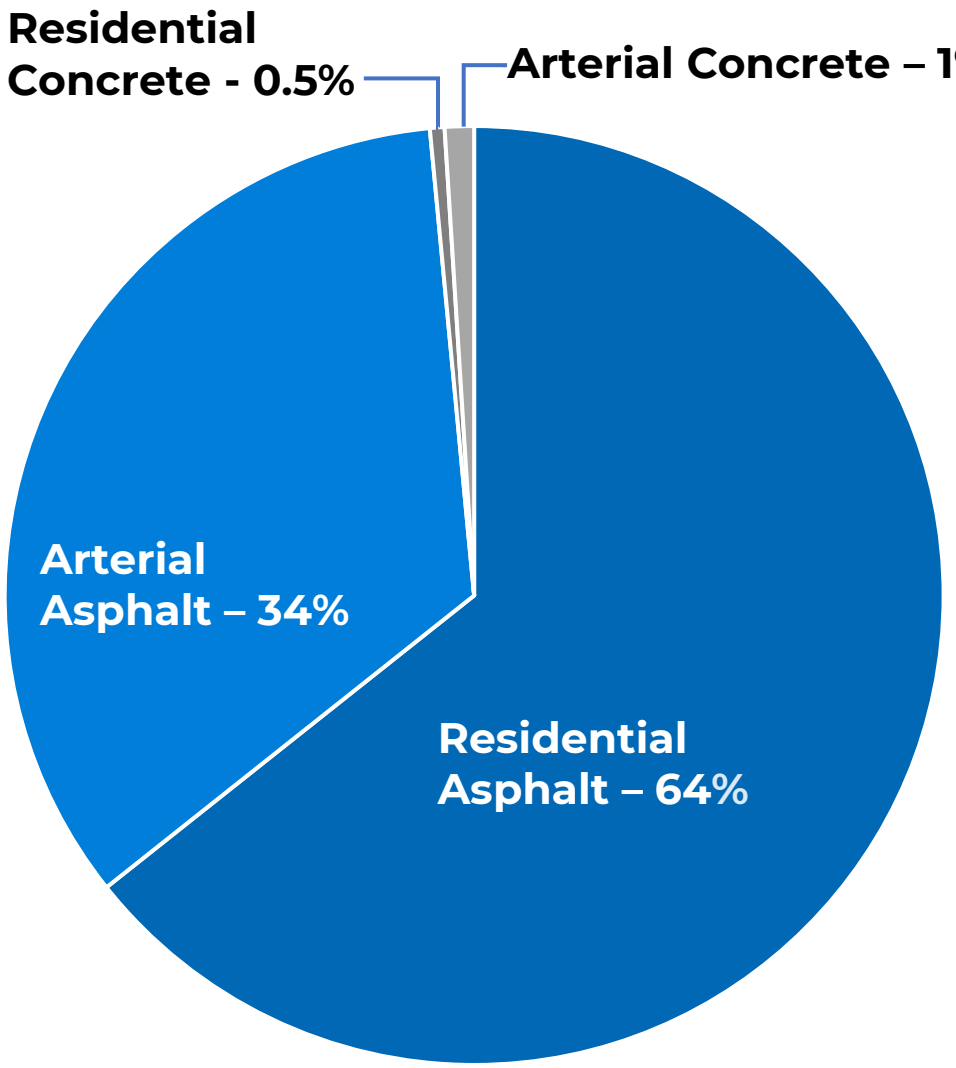
- Public Works
  - Clint Morris – Capital Division Manager
  - Ian Powell – Street Engineer
- GIS
  - Leah Llamas – GIS Coordinator
  - Matt Ringel – GIS Analyst II
- IMS Infrastructure Management Services
  - Outside contractor and expert in pavement distress data collection

Tonight's Presentation

- Pavement Management – Big Picture
- Pavement Condition Index (PCI) Basics
- Common Pavement Distresses
- Measuring and Understanding PCI
- 2022 Results
- Pavement Preservation and Repair
- Summary and Questions



Mercer Island Pavements



Mercer Island Pavement Type by Area

- Network Centerline Miles
  - Arterial: 25.3
  - Residential: 58.3
  - **Total: 83.6**
- Over 250 acres of pavement
- **99%** of the network is **asphalt**
- Paved at different times, so many different ages
- How do we **prioritize the repair & rehab** of network segments?

What is Pavement Management?

- Planning the maintenance and repair of a roadway network to optimize pavement conditions of the overall network.
- Applying the proper repairs at the proper time for the least cost.

Planning Tools

- Network Inventory
- Construction History
- **Pavement Condition Surveys**
- 6-year plans (TIP and Utilities)

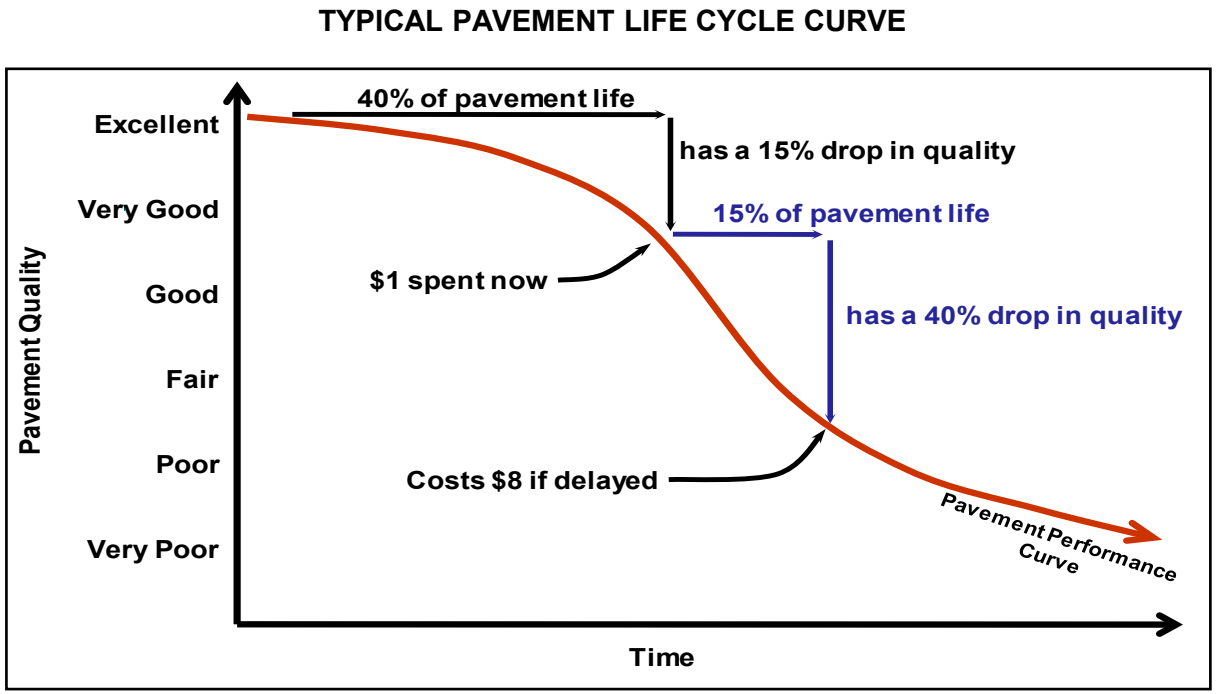
Preservation Tools

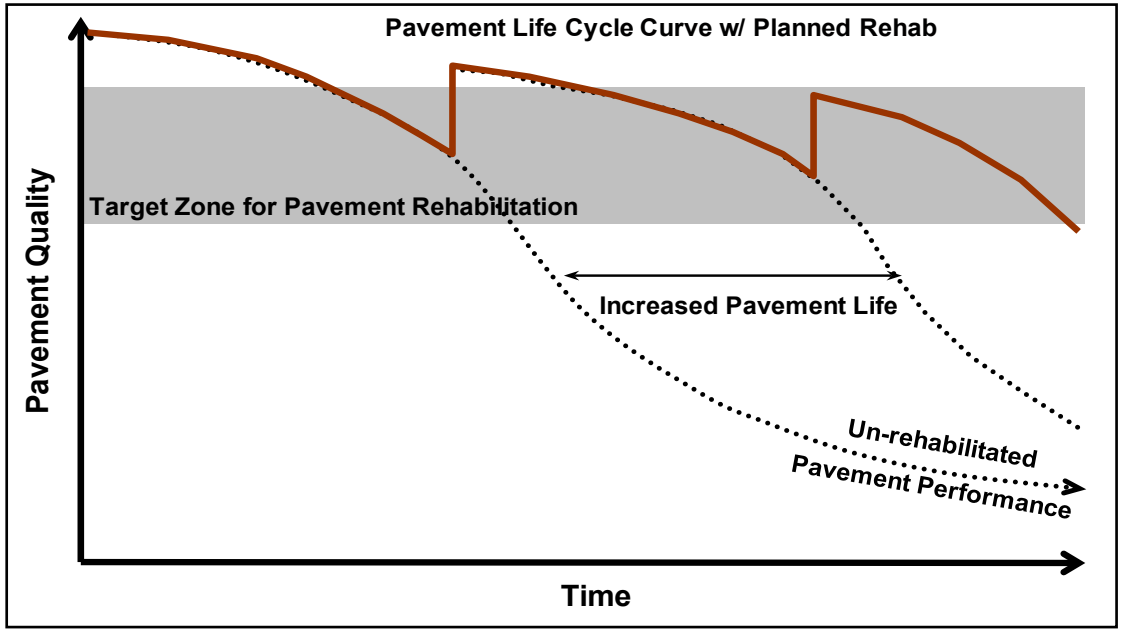
- Crack sealing
- Patching
- Chip seal / Slurry seal
- Hot mix asphalt overlay
- Reconstruction

Why Do Pavement Management?

Pavement conditions degrade over time.

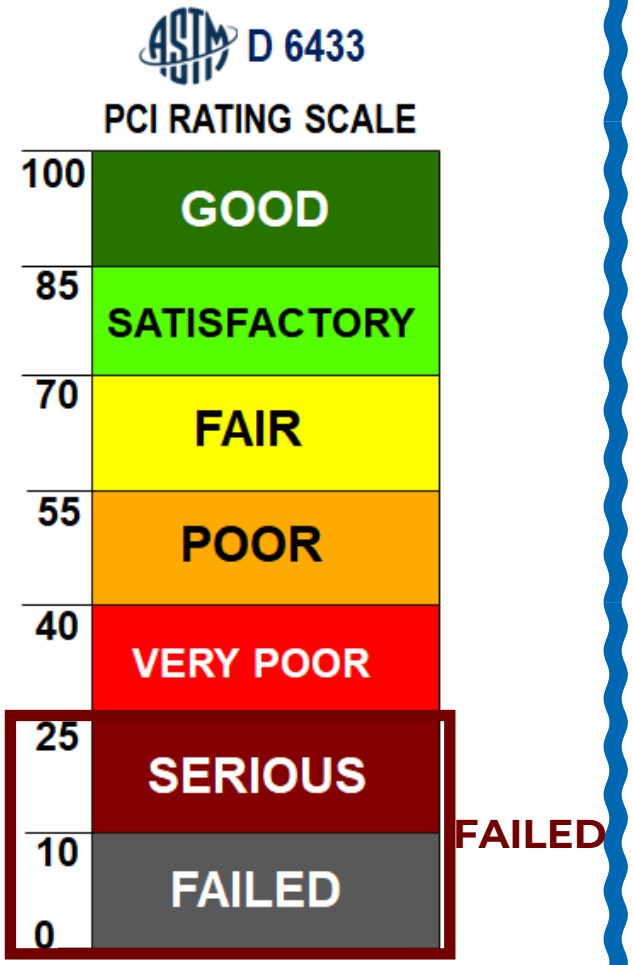
It is much less expensive to keep a road in good condition than to rebuild it after its condition becomes poor.





Pavement Condition Index (PCI)

- ASTM D6433 “Standard Procedure for Roads and Parking Lots Pavement Condition Index Surveys”
- Developed by US Army Corps of Engineers
- A numerical indicator from 0-100 that rates the surface condition of the pavement
- An area-based measurement of 19 different visual distresses observed on the surface
- A rational and objective basis for determining maintenance and repair needs and priorities



Common Pavement Distresses

Cracking

- Longitudinal
- Transverse
- Block
- Reflective
- Alligator

Common Pavement Distresses

Distortions

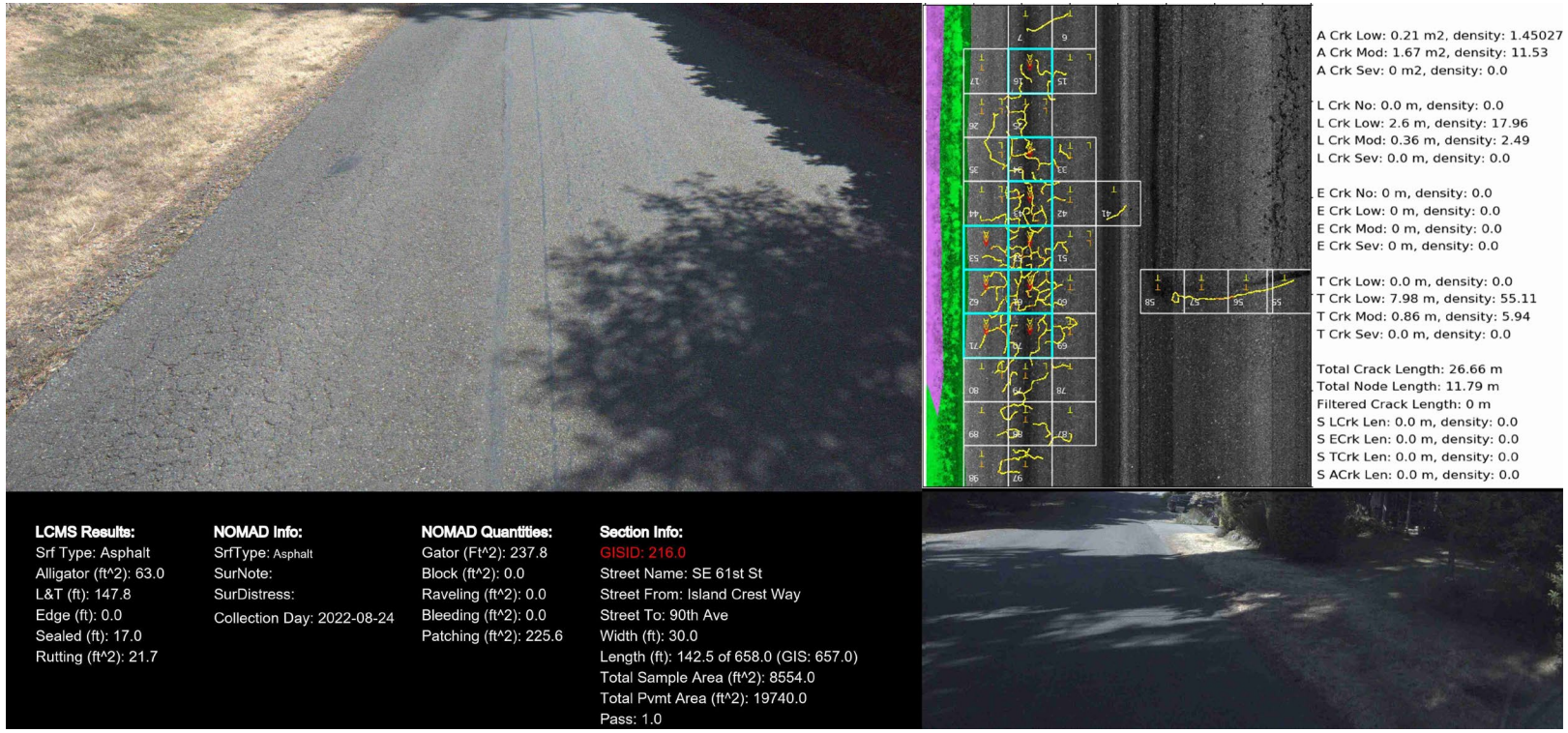
- Bumps and sags
- Depressions
- Patches
- Potholes

Common Pavement Distresses

Raveling

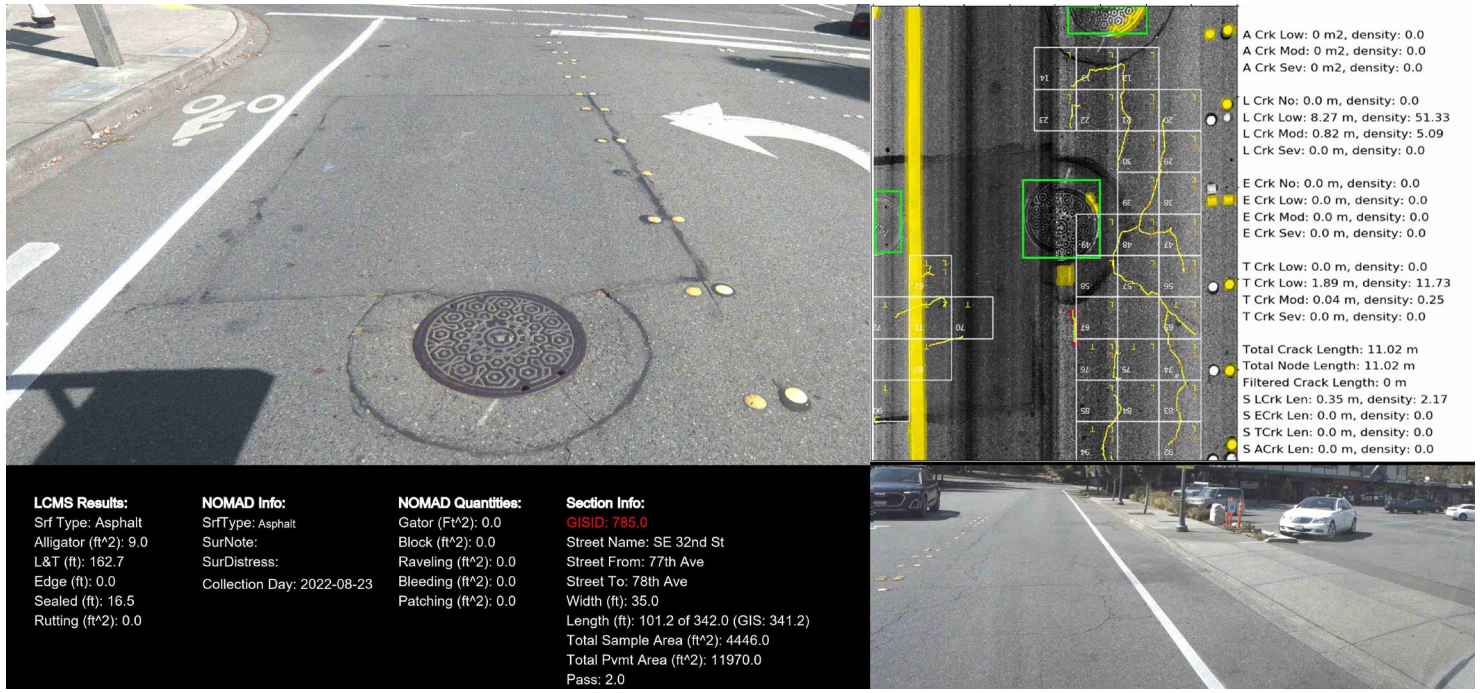
Rutting (wheel paths)

Collecting & Measuring PCI



- Imaging and laser instrument can detect cracks even in difficult conditions (like shade)
- Extent and severity of distresses are logged by area
- Some human QA/QC is required

Collecting & Measuring PCI



Algorithm will flag and remove

- Pavement markings
- Utility castings
- Raised pavement markers

These do not affect the score

Calculating the Pavement Condition Index (PCI)

Surface Distress Index (SDI)

Alligator Cracking
Block Cracking
Longitudinal Cracking
Transverse Cracking
Reflective Cracking
Bumps and Sags
Depressions
Patches and Potholes
Raveling
Rutting

60% Surface Distress

Structural Index (SI)

Deflection Testing

40% Structural (for Arterials and High-Volume Residentials)

Pavement Condition Index (PCI)
0 to 100 Score

Understanding the PCI
GOOD (100-86)

Like new condition

Should provide 5 to 10 years service before needing maintenance or repair

88-86th A

96-ICW

Understanding the PCI
SATISFACTORY (85-71)

- Few distresses overall
- Some cracking (longitudinal and transverse)
- Might contain a few patches

71-NMW

81-ICW

Understanding the PCI
FAIR (70-56)

62-85th A

Localized distresses such as:

- Alligator cracking
- Block cracking
- Patches
- Distortions

64-83rd A

Understanding the PCI
POOR (55-41)

- Much larger distress areas
- More severe cracking (alligator)
- Minor base failures

52-70th A

42-64th St

Understanding the PCI
VERY POOR (40-26)

- Extensive alligator cracking and/or patching
- Visible rutting and distortion
- Some base failure
- Likely need to remove and replace large areas of pavement

43-82nd A

37-61st St

Understanding the PCI
FAILED (25-0)

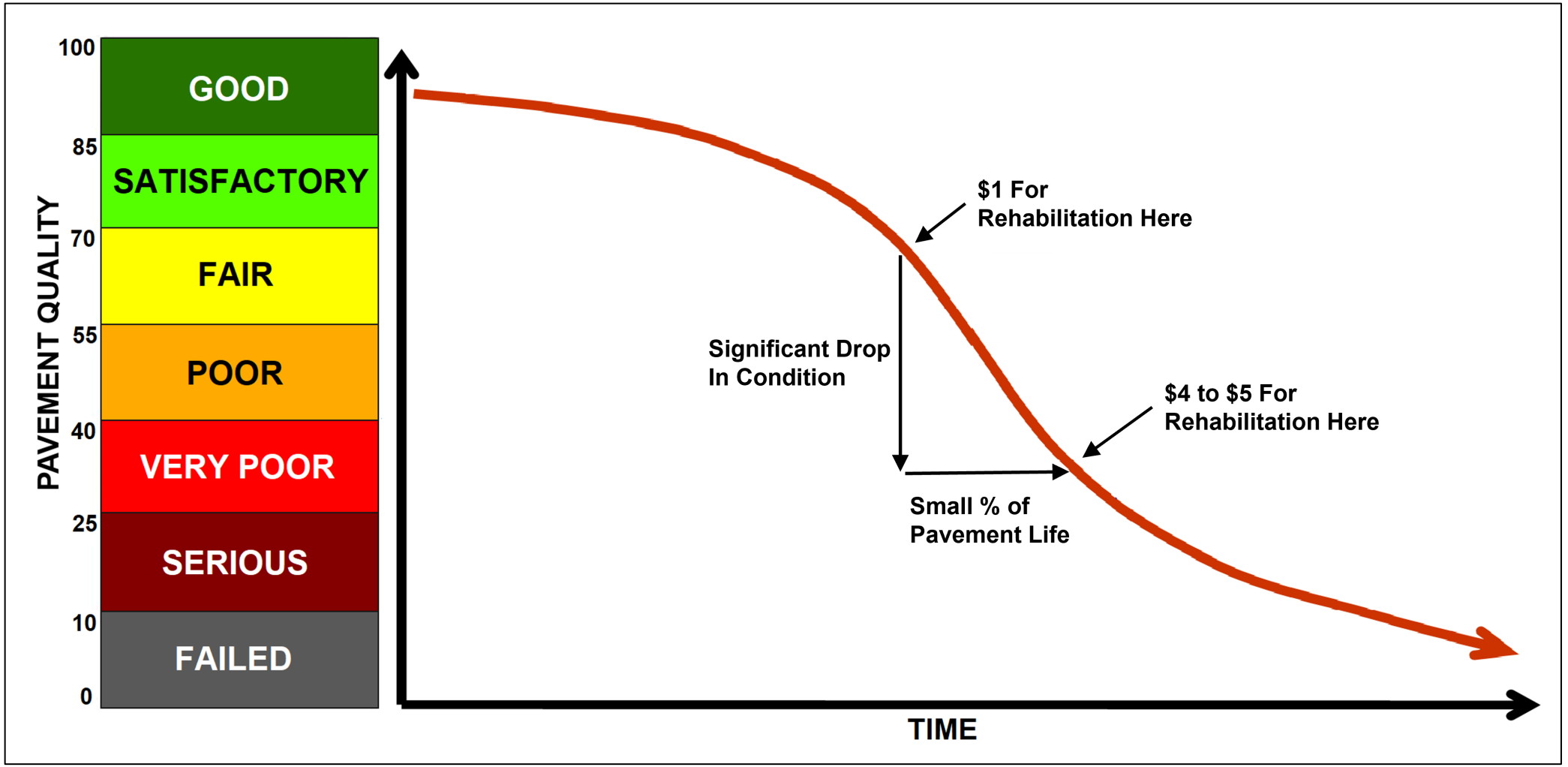
- Extensive high severity cracking
- Rutting
- Base failures

7-73rd A

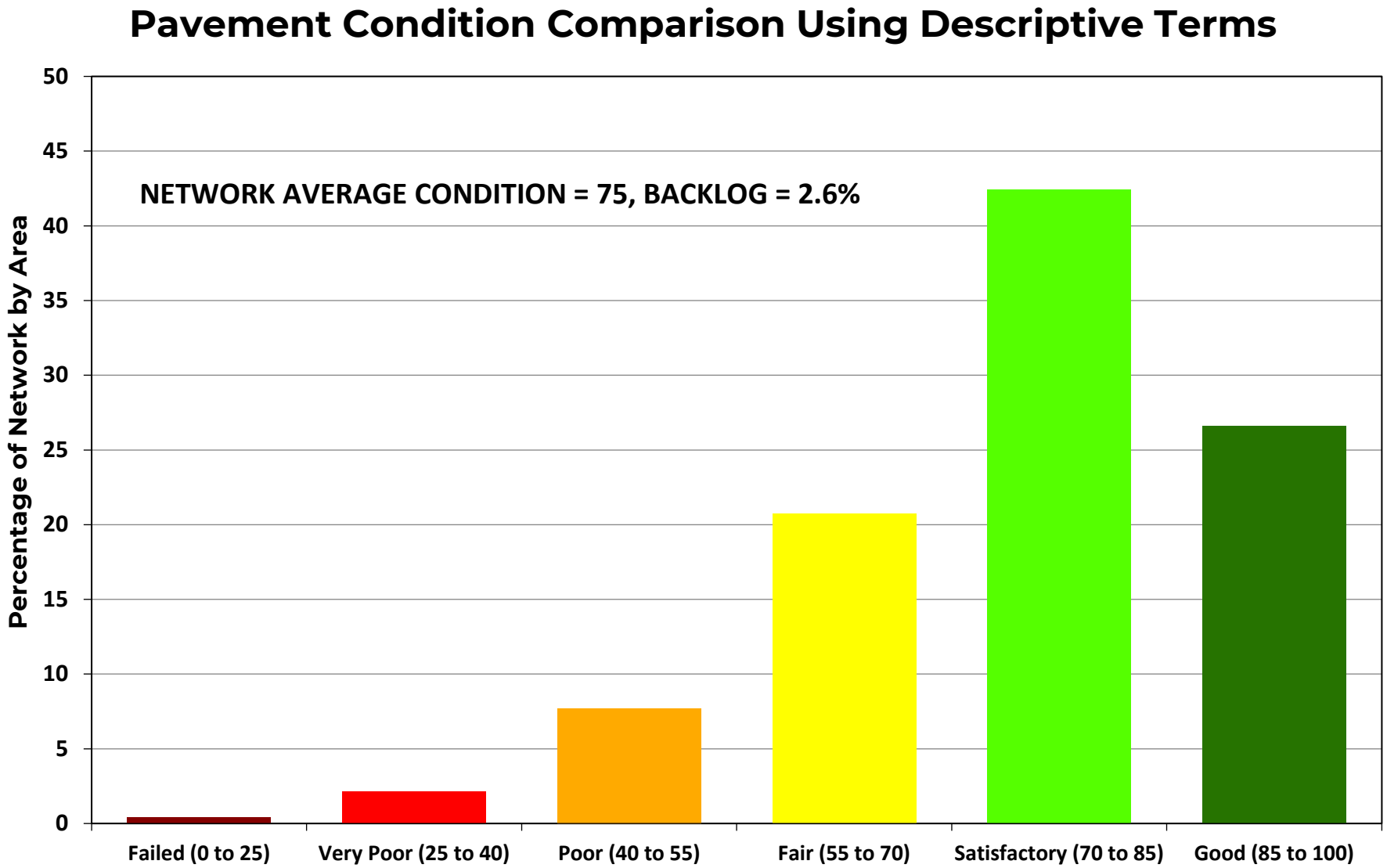
- Past point of overlay
- Requires total reconstruction
  - Remove existing pavement
  - Regrading and base repair
  - Repave
- Most costly to repair

18-91st A

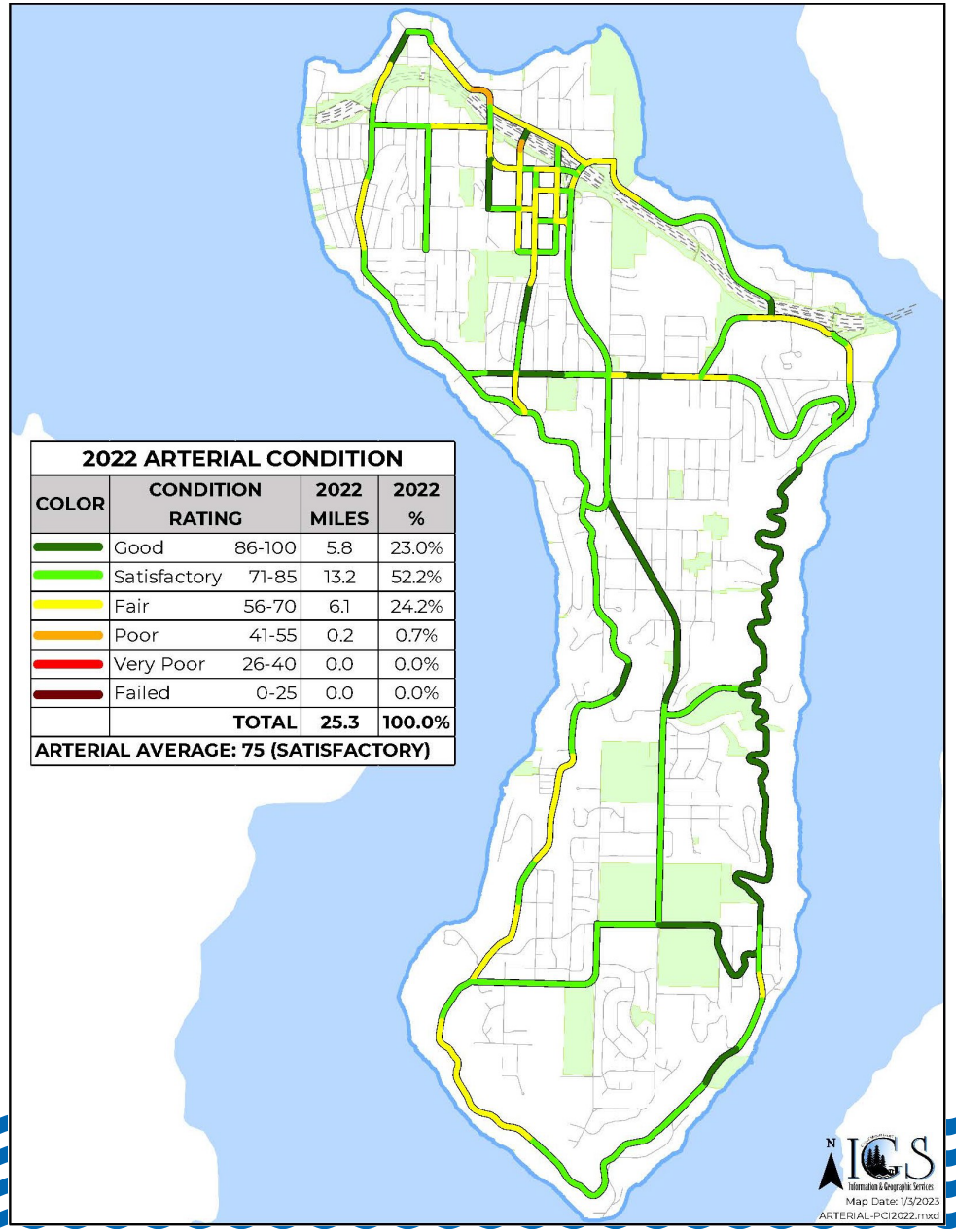
Pavement Life Cycle Curve



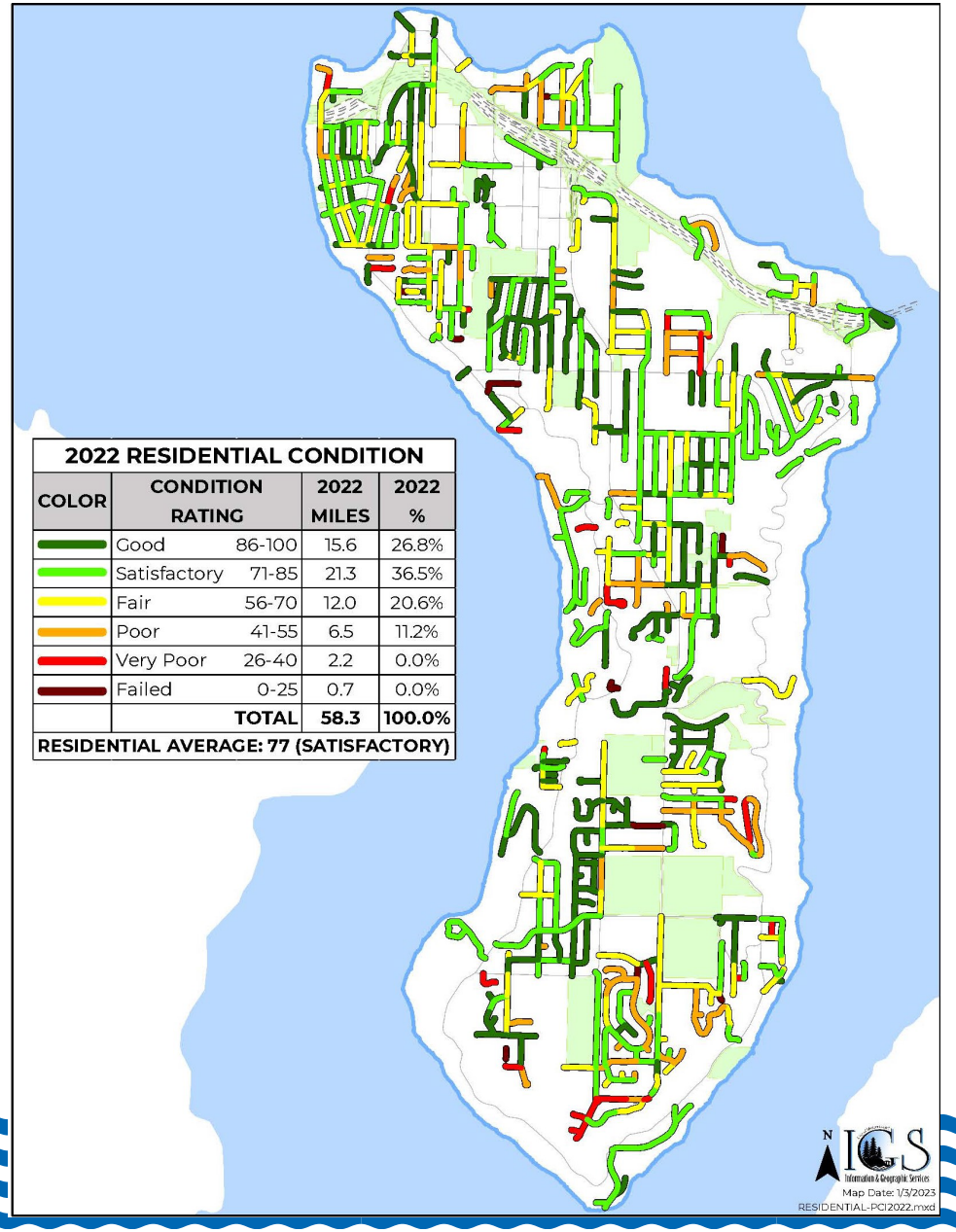
Mercer Island PCI Distribution 2022



Arterial vs Residential Conditions



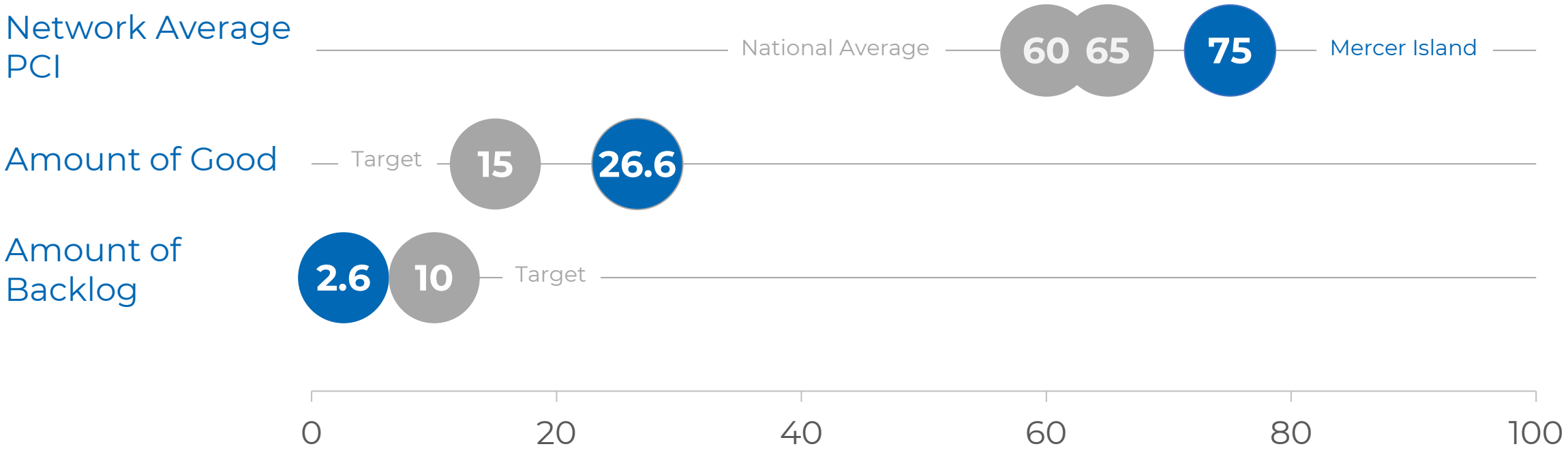
2022 ARTERIAL CONDITION				
COLOR	CONDITION RATING		2022 MILES	2022 %
	Good	86-100	5.8	23.0%
	Satisfactory	71-85	13.2	52.2%
	Fair	56-70	6.1	24.2%
	Poor	41-55	0.2	0.7%
	Very Poor	26-40	0.0	0.0%
	Failed	0-25	0.0	0.0%
		TOTAL	25.3	100.0%
ARTERIAL AVERAGE: 75 (SATISFACTORY)				



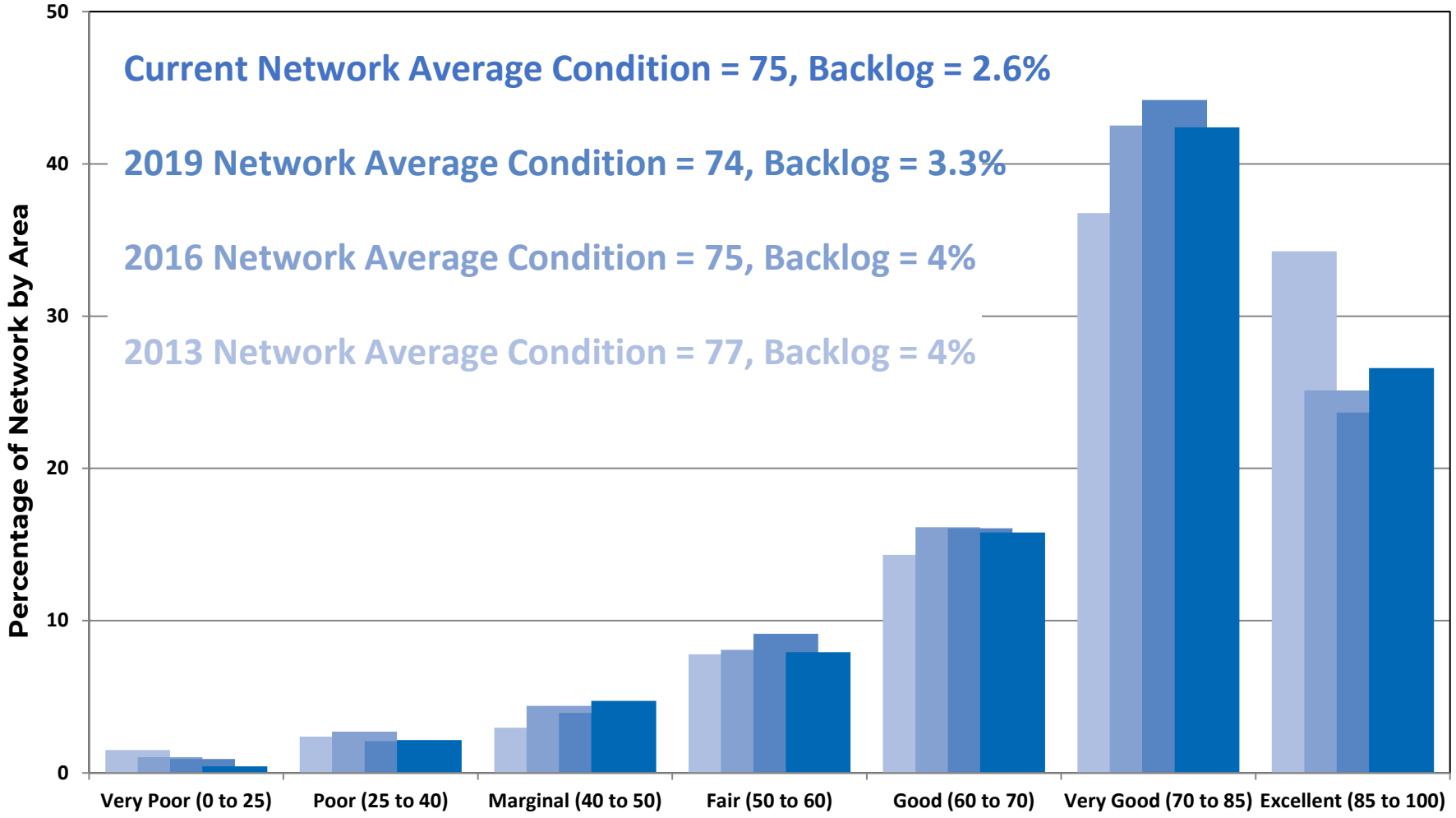
2022 RESIDENTIAL CONDITION				
COLOR	CONDITION RATING		2022 MILES	2022 %
	Good	86-100	15.6	26.8%
	Satisfactory	71-85	21.3	36.5%
	Fair	56-70	12.0	20.6%
	Poor	41-55	6.5	11.2%
	Very Poor	26-40	2.2	0.0%
	Failed	0-25	0.7	0.0%
		TOTAL	58.3	100.0%
RESIDENTIAL AVERAGE: 77 (SATISFACTORY)				

PCI Report Card - 2022

- Primary indicators of network health
  - Network average PCI
  - Amount of Good (PCI over 85)
  - Amount of Backlog (PCI below 40)



Pavement Condition Index - Trend



Pavement Preservation

- Apply the proper repairs at the proper time
- Coordinate road work with other planned improvements:
  Utilities CIP, ADA Trans Plan, Bike/Ped Plan, Pvt Development
- Adjust repaving/rehab to occur after major utility work

Planning Tools

- Network Inventory
- Construction History
- **Pavement Condition Surveys**
- 6-year plans (TIP and Utilities)

Preservation Tools

- Crack sealing
- Patching
- Chip seal / Slurry seal
- Hot mix asphalt overlay
- Reconstruction

Low cost

High cost

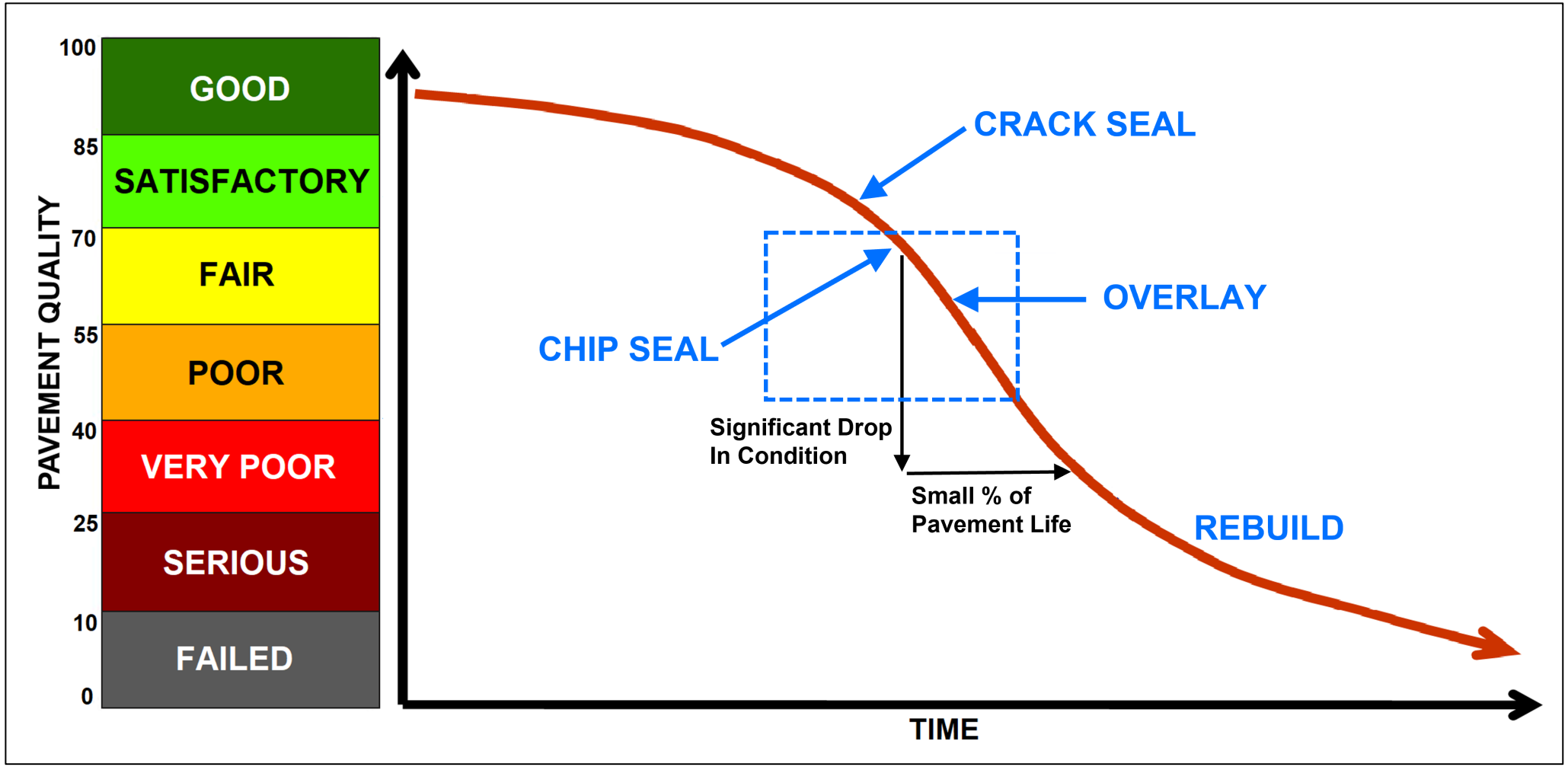
Pavement Preservation

Chip Sealing

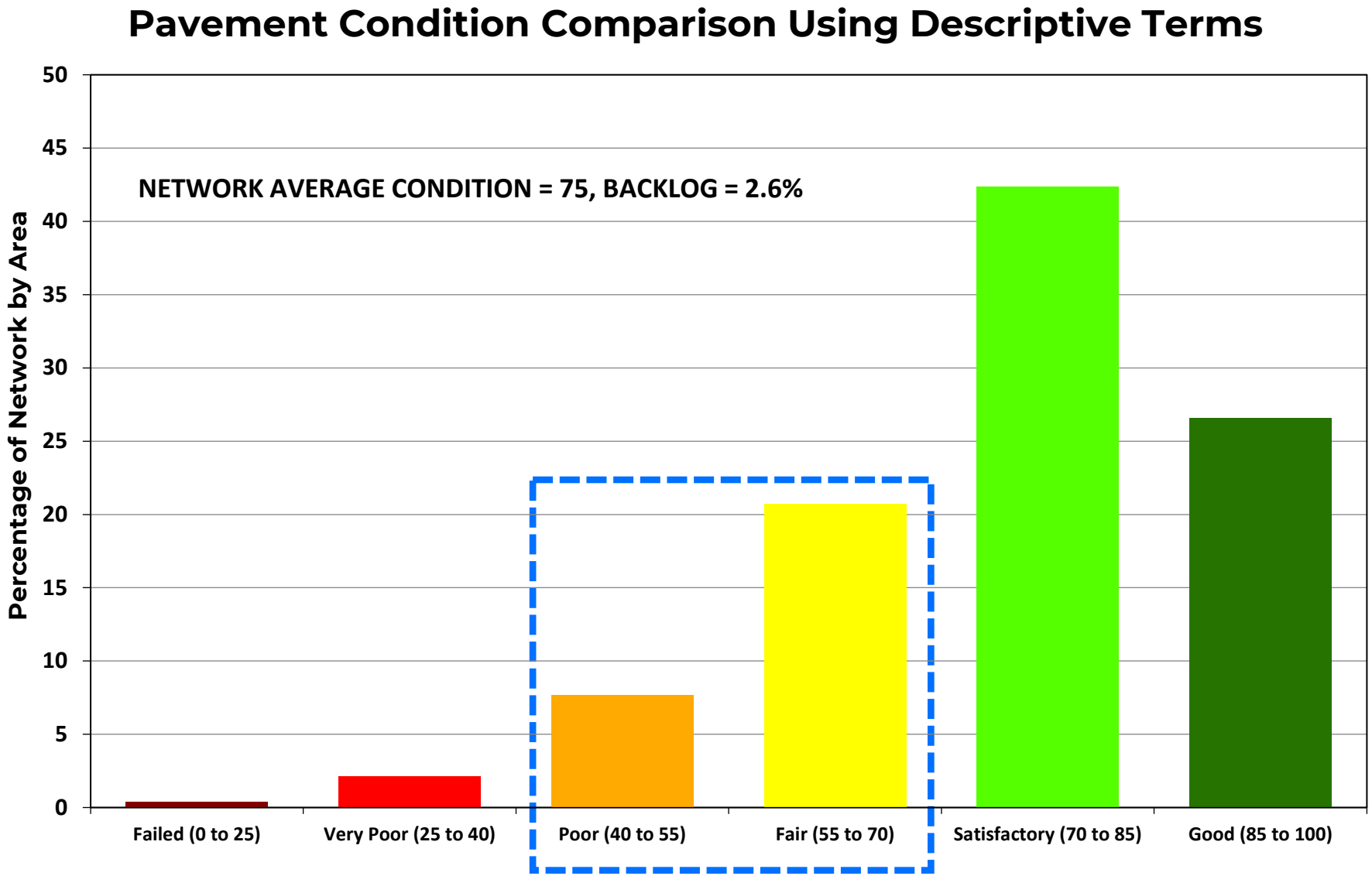
HMA Overlay

Reconstruction

Pavement Preservation & Life Cycle Curve



Pavement Preservation & PCI



Summary

- Overall network pavement health is SATISFACTORY
- Amount of pavement in each PCI range has remained relatively consistent since 2013
- Current pace of repaving and rehab is matching the rate of deterioration
- Focus on Fair and Poor categories for future rehab
- PCI data will be used in upcoming TIP to help plan repair and resurfacing priorities
- Next PCI data collection planned for 2025

Questions and Discussion

- Map: Pavement Condition Ratings

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