



Pavement Preservation Program

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Pavement Preservation Philosophy

“Apply the Right Treatment to the Right Road at the Right Time.”



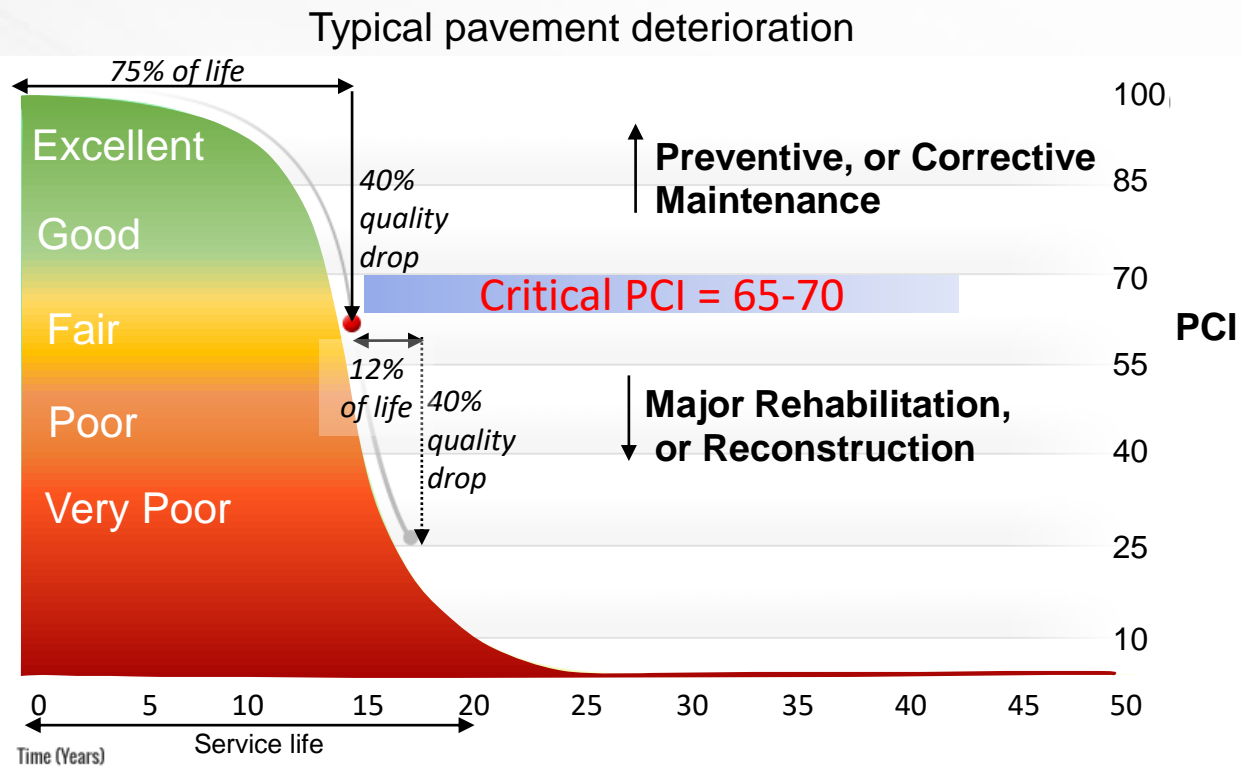
Traditional Approach (previously used)

- ✗ Focuses on a few “**worst**” streets first
- ✗ Traditional approach is **REACTIVE**
- ✗ Meets some **short-term goals**
- ✗ Doesn't produce the best return on **investment**

VS.

Optimized Pavement Preservation Approach

- ✓ Focuses on the performance of **entire road network**
- ✓ Optimized approach is **PROACTIVE**
- ✓ Meets **short- as well as long-term goals**
- ✓ Makes the **optimal** use of available funds

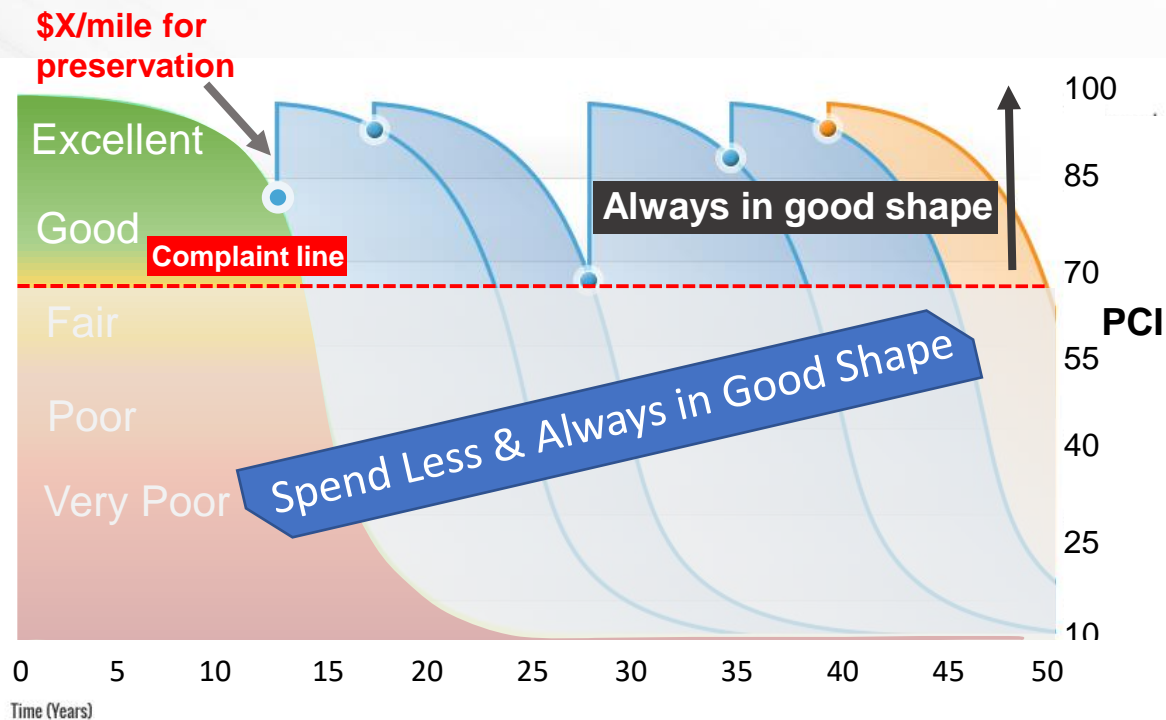


- ❖ Pavement deteriorates slowly during the first few years after it's installed; it declines quickly after that
- ❖ The lower the PCI, the more it costs to bring the street back to good condition

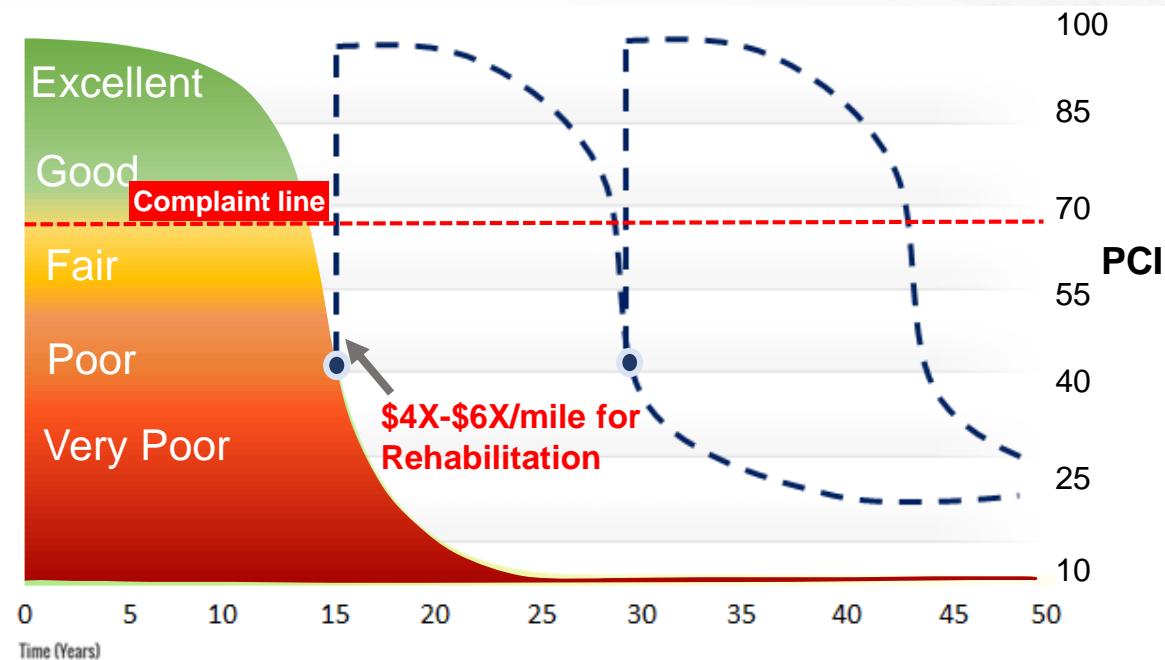
Critical PCI: Optimum benefit above this point



Optimized Pavement Preservation Approach

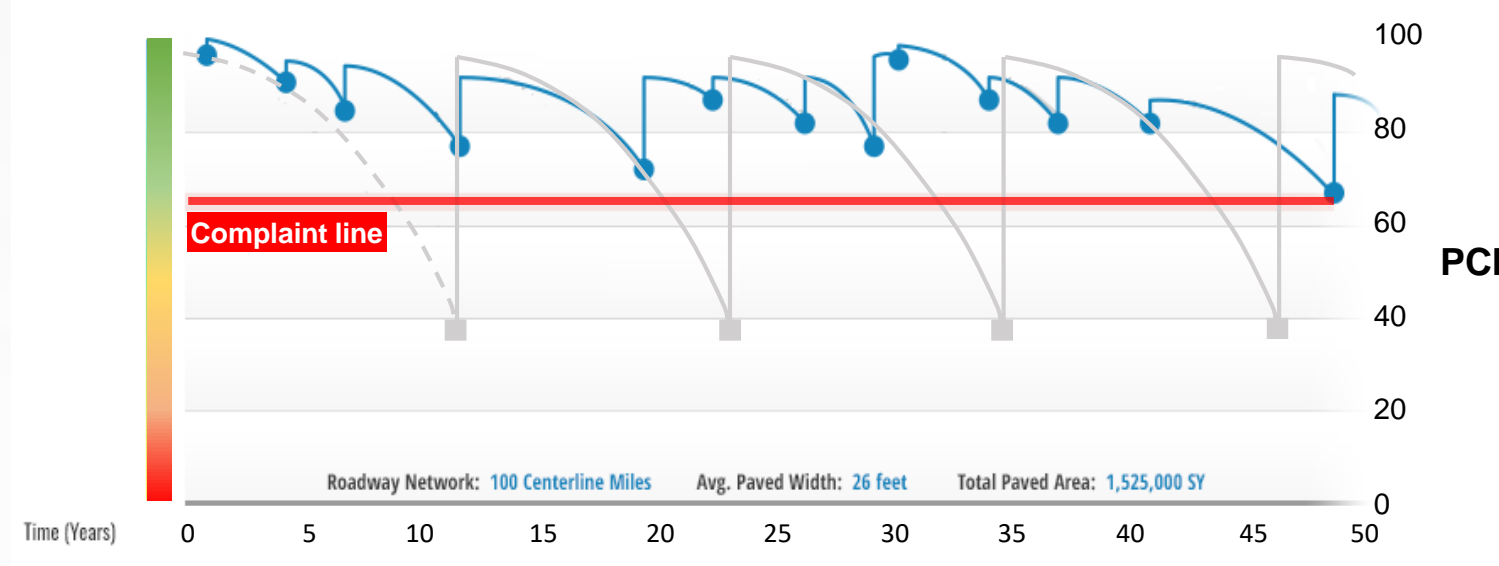


Traditional Worst First Approach



- ❖ Roads stay in **good shape** (Mostly above complaint line)
- ❖ Spending **\$1** on preservation will eliminate **\$6** cost for rehabilitation later

Fund Saving = Cover more mileage each year



Traditional Approach

- Year 12 **Mill & Asphalt Overlay**
- Year 24 **Mill & Asphalt Overlay**
- Year 36 **Mill & Asphalt Overlay**
- Year 48 **Mill & Asphalt Overlay**

Total Cost: **\$205.6 Million**

Optimized Approach

- Year 1 & 31 **Rejuvenating**
- Year 4, 23, 35, & 42 **Crack Seal**
- Year 7 & 38 **Slurry Seal**
- Year 12, 27 & 50 **Micro Surfacing**
- Year 20 **Cape Seal**
- Year 30 **1.5" Asphalt Overlay**

Total Cost: **\$79.6 Million**

**OPTIMIZED APPROACH
TOTAL SAVINGS**

\$126 Million

Heber-Overgaard, Arizona

❖ PROBLEM:

Thirty-two lane miles of SR-260 were experiencing block and longitudinal cracking, raveling and oxidation

❖ SOLUTION:

Application of **Cape Seal** treatment over the entire road

❖ RESULT:

Extended service life for **10-12 years**, and agency **saved \$3 million**



“The cape seal project transformed a deteriorating segment of roadway into a very nice roadway, and the project exceeded all the goals and expectations.”

Kevin Robertson, PE

Surface Treatment Engineer & Pavement Condition & Evaluation Manager

Las Vegas, Nevada

❖ PROBLEM:

The City of Las Vegas wants to maintain a high performance road network and keeps streets in good condition over 25 years

❖ SOLUTION:

Repeating **Slurry Seal** treatment over **3.8 million square yards** of streets every 5 years

❖ RESULT:

When City turned to implementing a **pavement preservation plan**, the **life of pavement network** was significantly **extended**



“It's interesting because the streets that are receiving their fifth slurry seal application are in better condition now than they were 25 years ago when they received the first initial slurry application.”

Eric Reimschiessel

President and Manager of American Pavement Preservation

City of Fayetteville	=	95 sq. mi
Street System	=	1,185 mi
City	=	747 mi – 63%
NCDOT	=	293 mi – 25%
Private	=	145 mi – 12%

FY22 Pavement Preservation (includes additional \$2 M)	=	\$6.575 M
2020 Powell Bill Fund (most recent allocation)	=	\$4.979 M

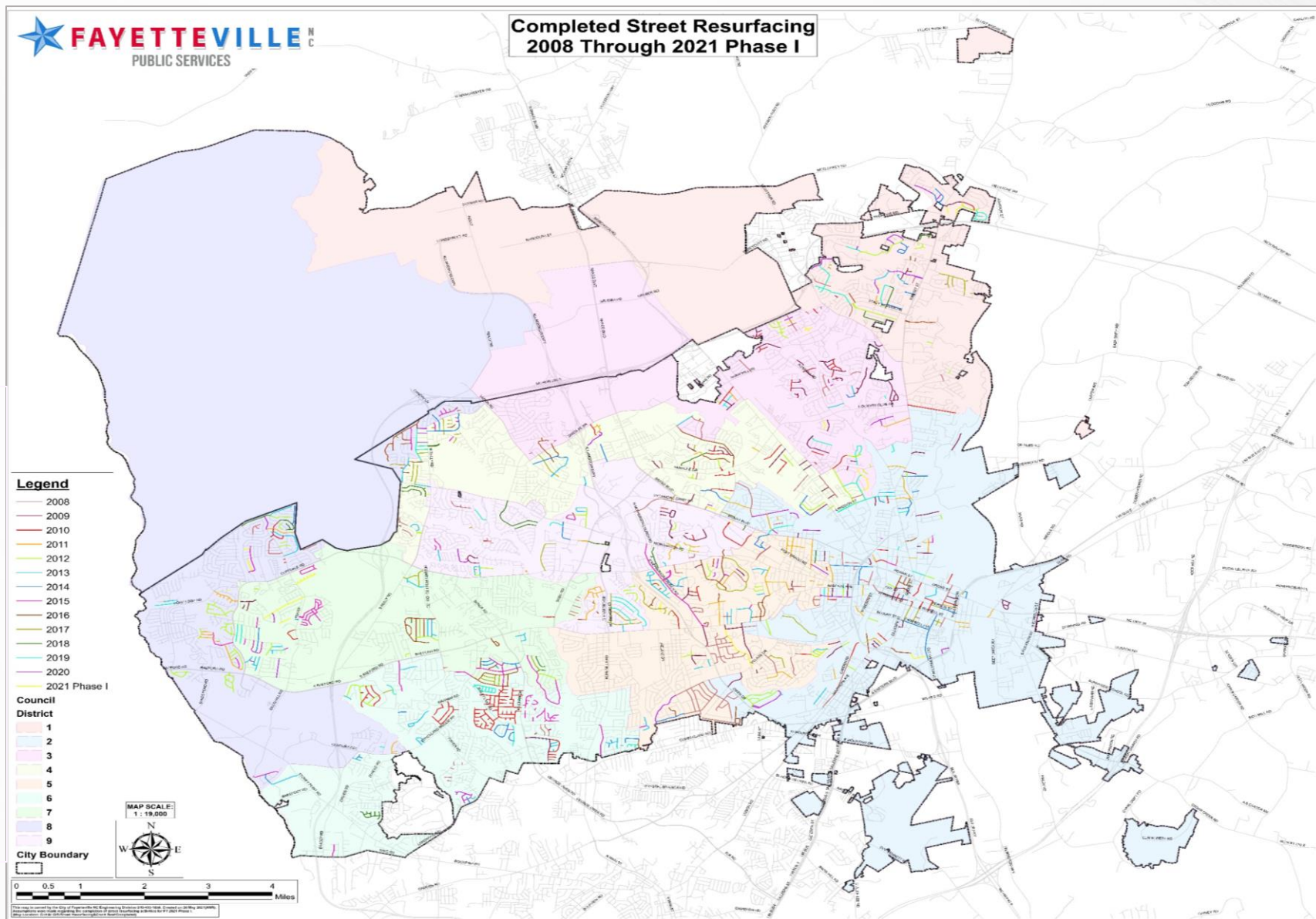
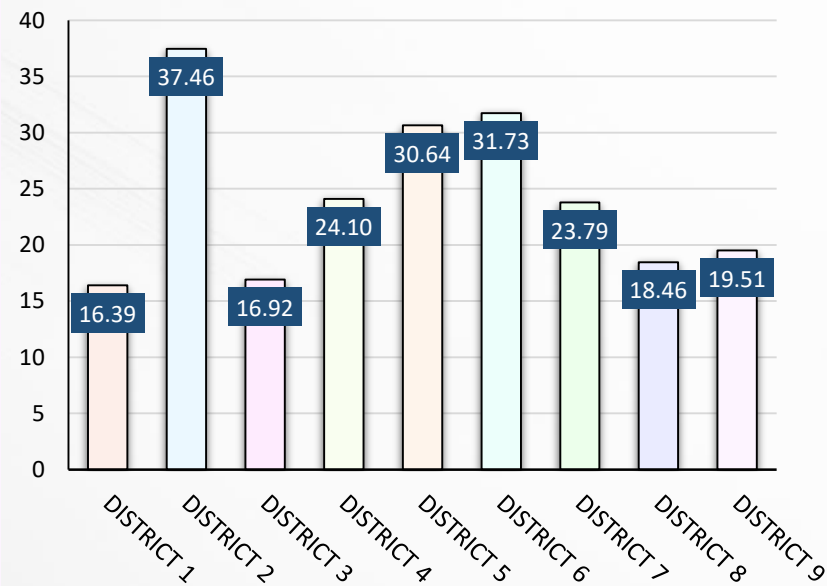
Link to Pavement Preservation Projects:

<https://www.fayettevillenc.gov/city-services/public-services/resources/projects>

Traditional Approach: Worst-First Streets

- ✓ Streets within PCR 55-65
- ✓ Field inspection for condition verification
- ✓ Distribute throughout the city
- ✓ Other factors:
Utility work, MU lines, Street level of service

Mileage



Mill/Overlay Practice Only

- ✓ Powell Bill fund \$
- ✓ Mill/Overlay cost \$\$
- ✓ Deterioration of entire network accelerated



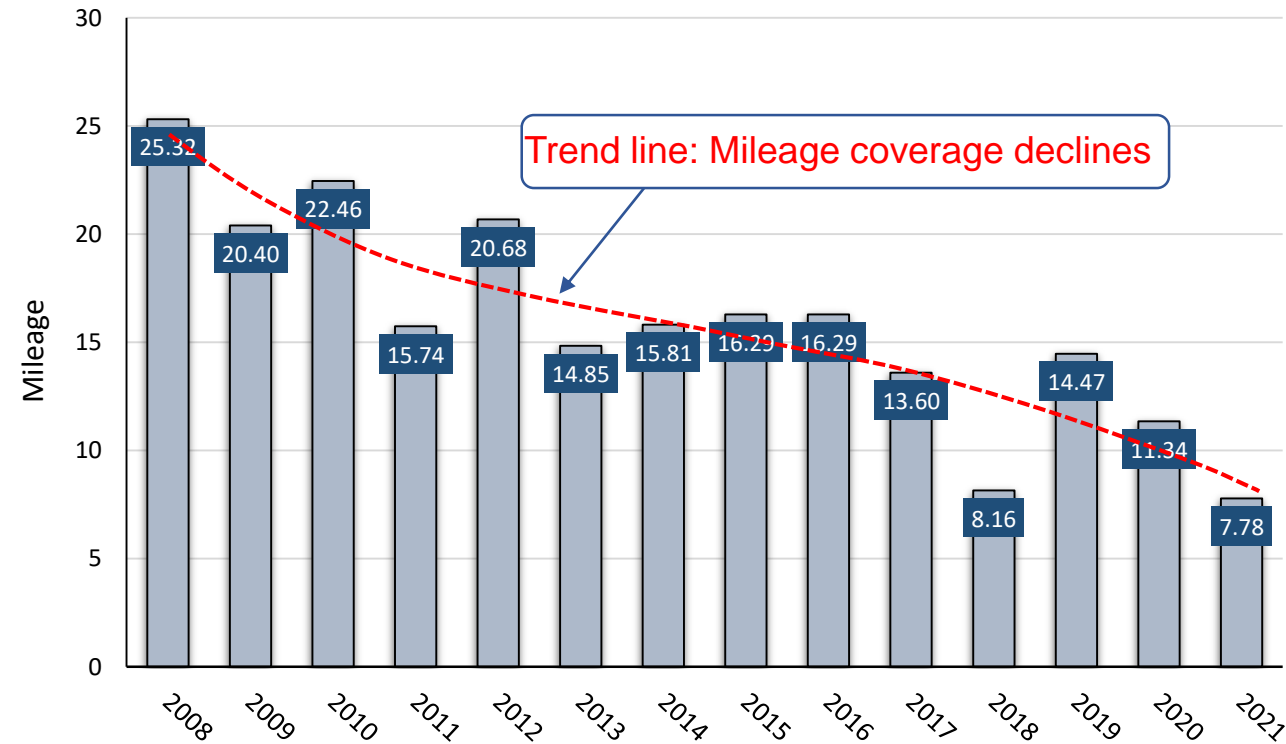
Equation of Mill/Overlay over years:

$$\text{Mileage coverage} = -5.672\ln(\text{Year}) + 26.148$$

Average mileage in 10-15 years = **ALWAYS** below 7 miles → **Network Failure**

*This approach is still needed for mill/overlay projects and applied for FY2022

Mill/Overlay completed per year



New Enhanced Practices (Mill/Overlay and Preventive Treatments)

Shifting to Optimized Approach

FY22 Funding Allocation, **\$6.575 M:**

❖ Combination of Mill/Overlay and Preventive Treatment (75/25 Split)

- 75% Mill/Overlay
 - 16 mi
- 25% Preventive Treatments
 - 31 mi
- Total Pavement Preservation
 - 47 mi

vs.

❖ Mill/Overlay Only

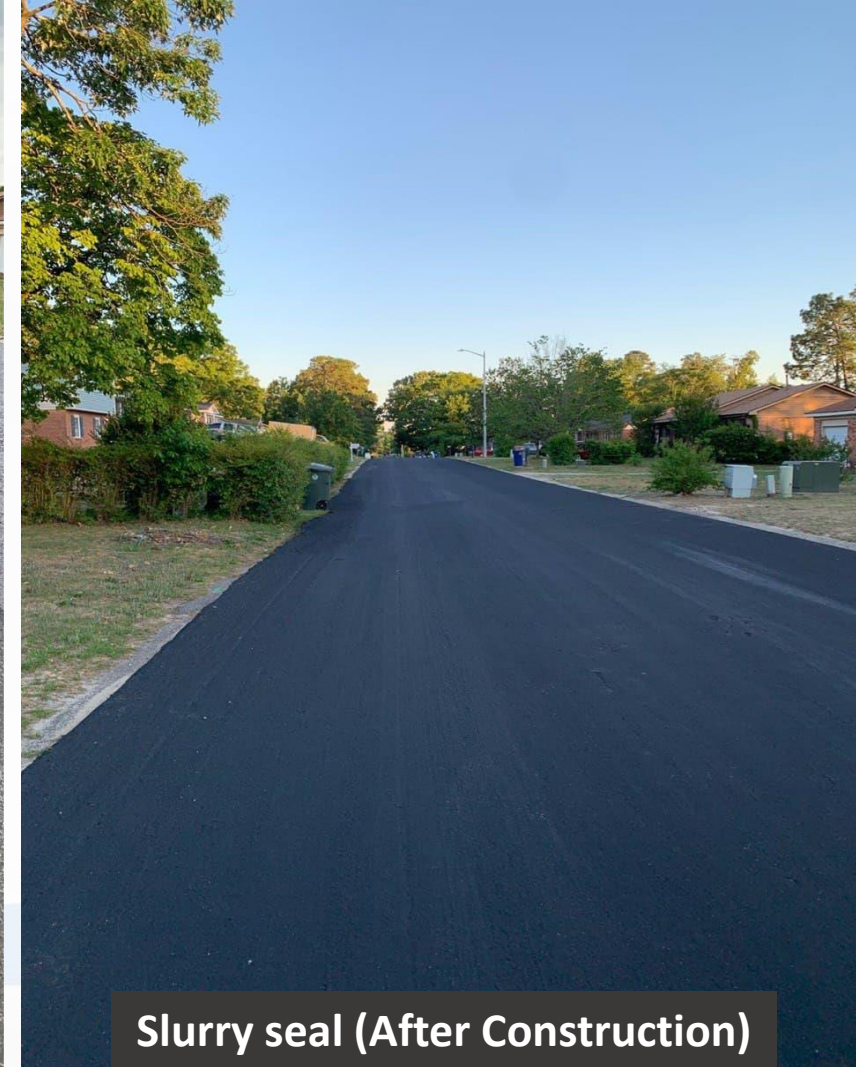
- Total Pavement Preservation
 - 21 mi

* Based on current market prices



Slurry seal (Under Construction)

Grandview Dr



Slurry seal (After Construction)

Grandview Dr

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Levenhall Dr (Cull de sac)



N Cool Spring St

Demand Oriented Methodology

1. For simplicity: **5 Regions** are considered
2. **Prioritize** regions based on **density*** of streets within PCI **65-90** in that region

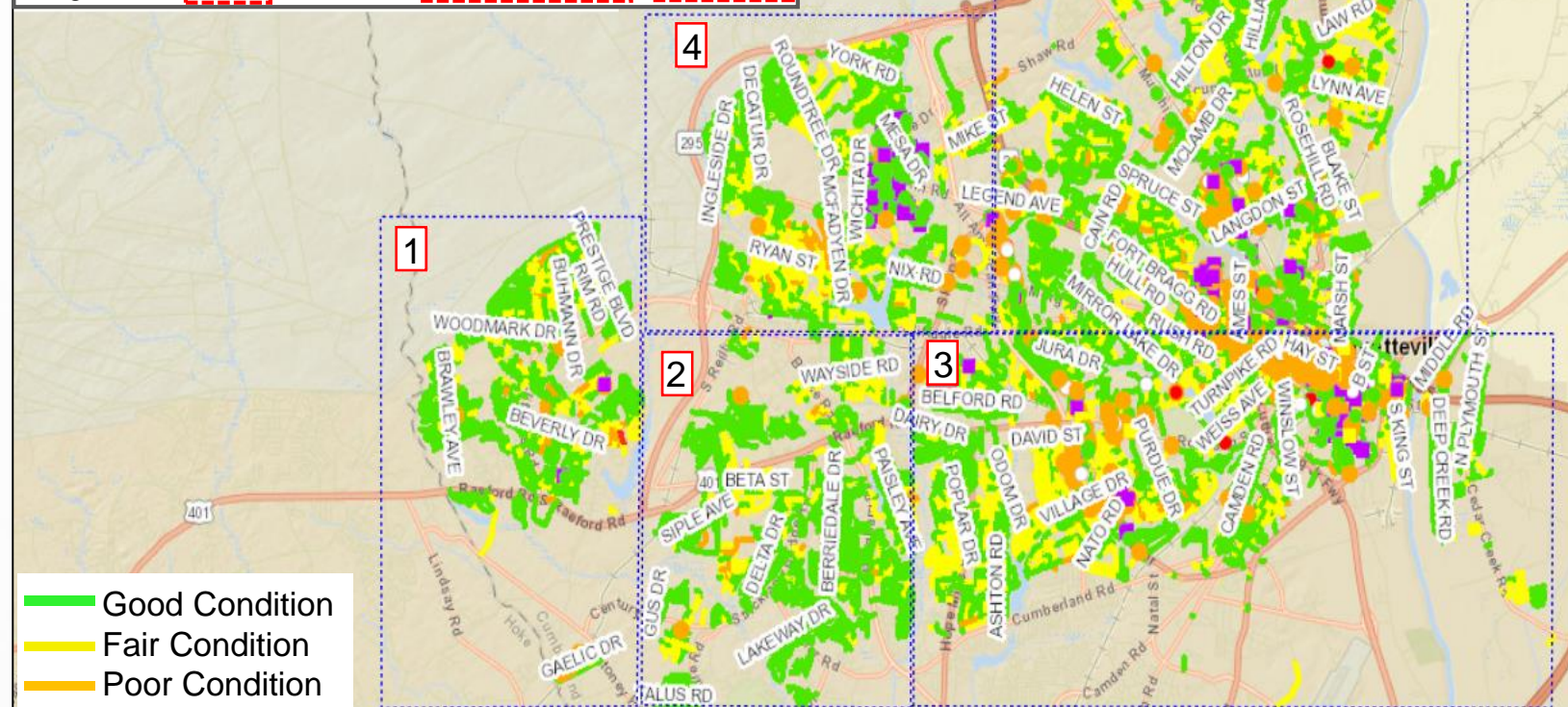
$$* \text{Density of region} = \left[\frac{\text{Street mileage within 65-90}}{\text{Entire mileage of region}} \right]$$

3. Total mileage (65-90) of prioritized regions

Other possible factors:

- Conflicting city capital projects (i.e. MU line)
- Outside conflicting projects (i.e. PWC utilities)
- Functional class (i.e. local, collectors, arterial)
- New information (changes) during construction

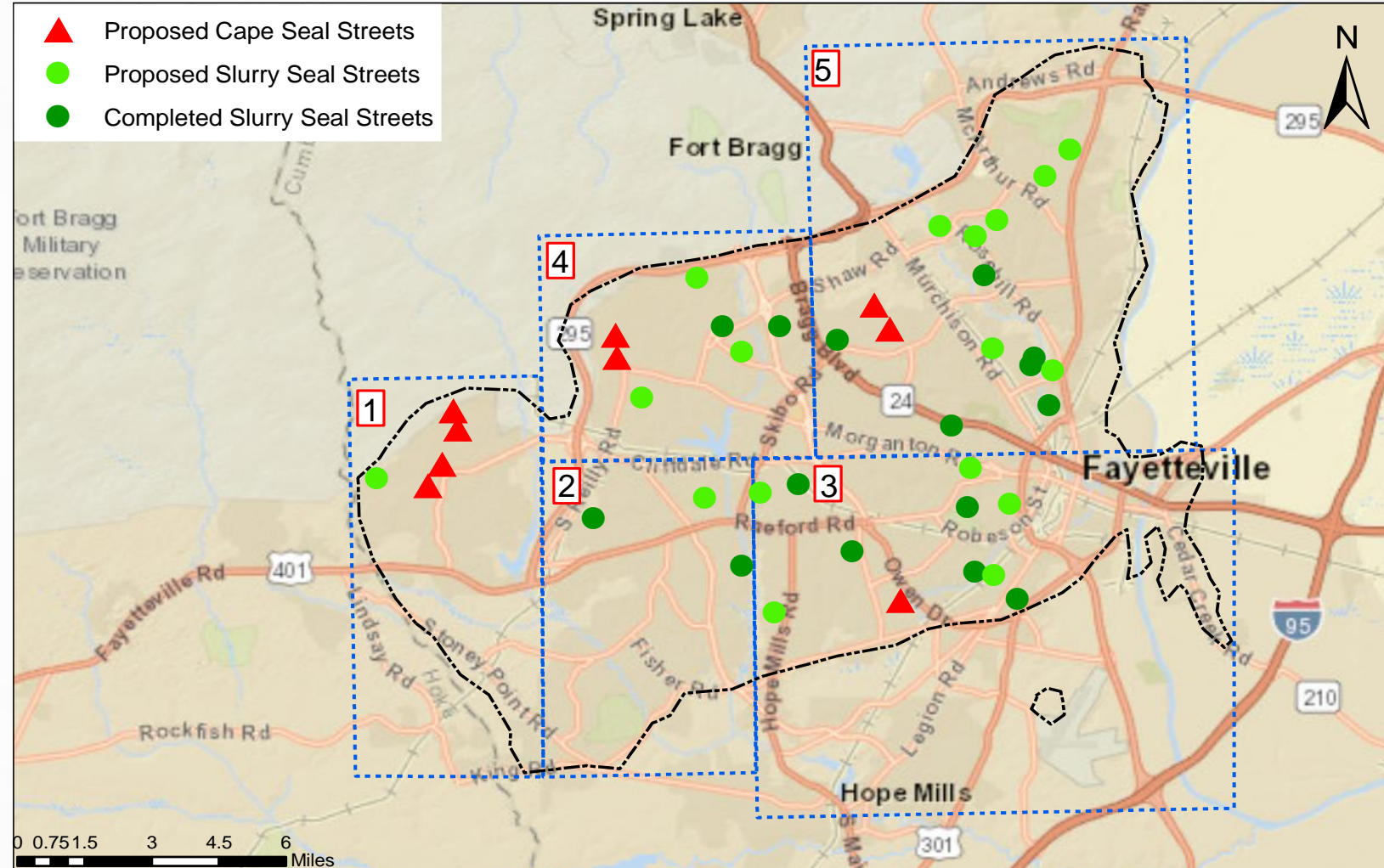
	65-90	91-100	Mileage (65-90)	Treatment
Region 5:	67%	22%	165	34-35%
Region 3:	66%	21%	139	29-30%
Region 4:	64%	20%	72	14-15%
Region 1:	60%	30%	48	10-11%
Region 2:	51%	45%	53	10-11%



Preventive treatments for each region (FY21 and FY22):

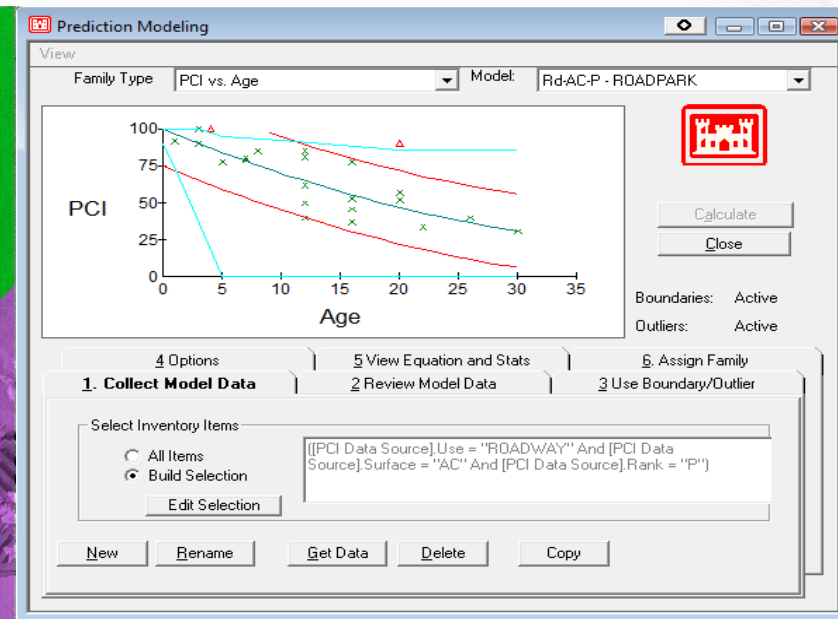
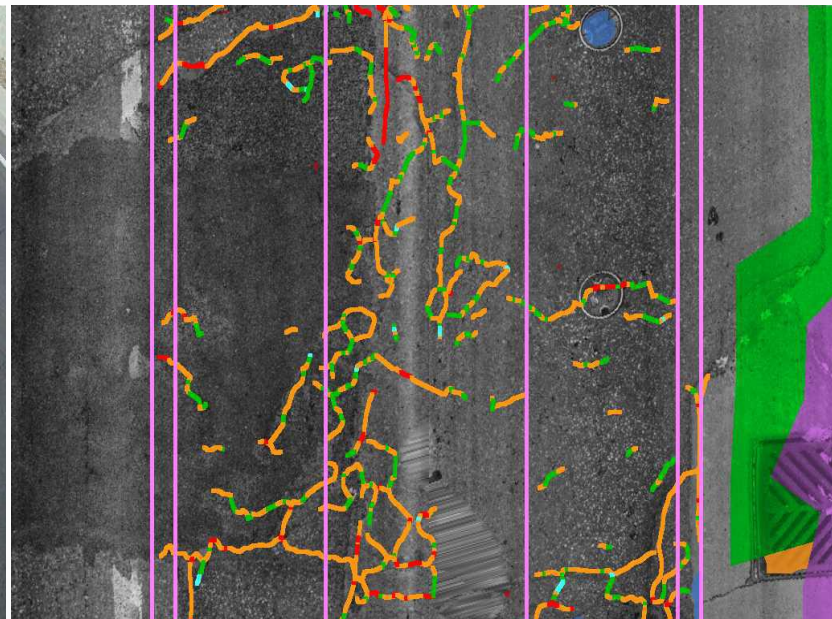
Region	Fund allocation	Mileage of treatment
5	30%	11.17
3	28%	10.04
4	18%	6.75
1	12%	4.5
2	12%	4.5

*Traditional approach is still needed and applied for mill/overlay projects for FY2022



Pavement data extraction and analysis for FY22

- ✓ Collection of **pavement condition** across the entire street network
- ✓ Conduct pavement condition **assessment** based on **new data**
- ✓ Implementation of **MicroPaver** (advanced pavement preservation platform)
- ✓ Deploy a systematic process of upgrading **network** on a **limited budget**
- ✓ Track the **impact progress** of treatment strategies
- ✓ Develop **prioritized plan**

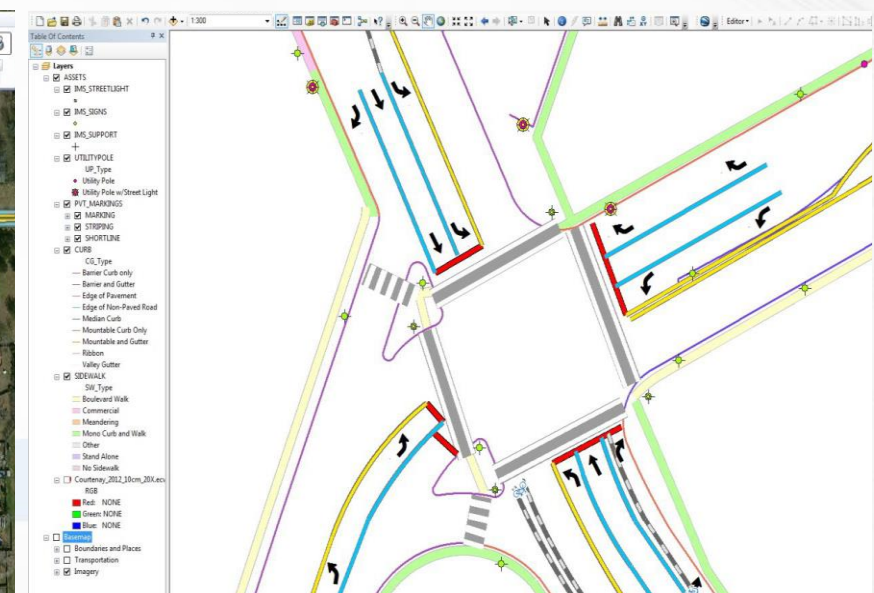
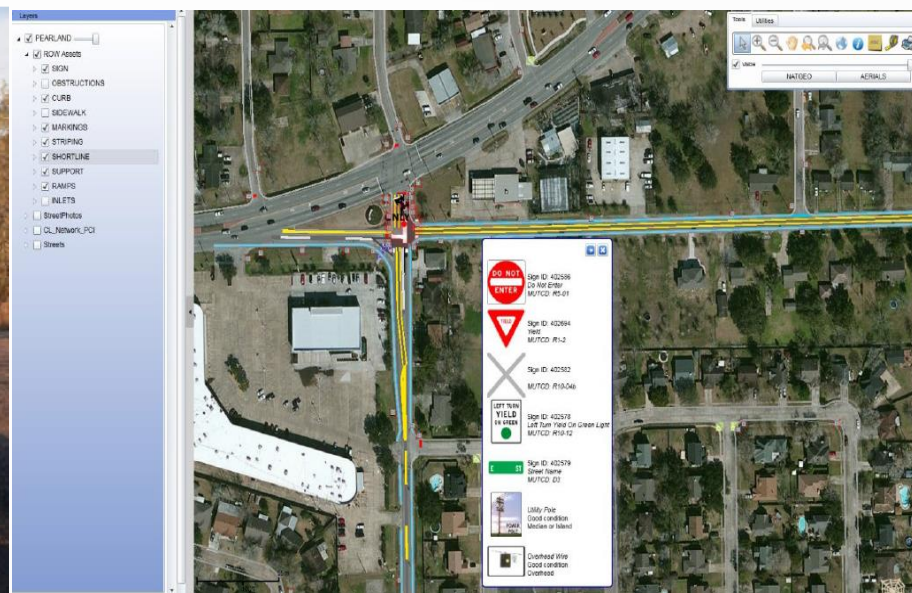


Major supporters of MicroPaver:

“Department of Defense, US Air Force, US Army, US Navy, Federal Aviation Administration, and Federal Highway Administration”

Right-of-Way Asset Inventory for FY22

- ✓ Collection of **ROW assets** across the entire street network
- ✓ **ROW assets**: Drainage facilities, Road attributes (i.e. pavement edge), Curb and gutter, Medians
- ✓ Develop and analyze **asset inventory** and **attributes** including their **geodatabase**



Completion Milestones for FY22

- ✓ **MicroPaver** will be completely **set up** on server as the modern pavement preservation system
- ✓ **New PCI rating** for each roadway will be available including graphical network condition map
- ✓ Field **roadway data collection** will be **complete** across the city
- ✓ **A 5-year** maintenance **plan** will be complete for various budget scenarios
- ✓ **Project prioritization** report will be complete
- ✓ **Inventory of ROW assets** across the city will be complete





FayettevilleNC.gov