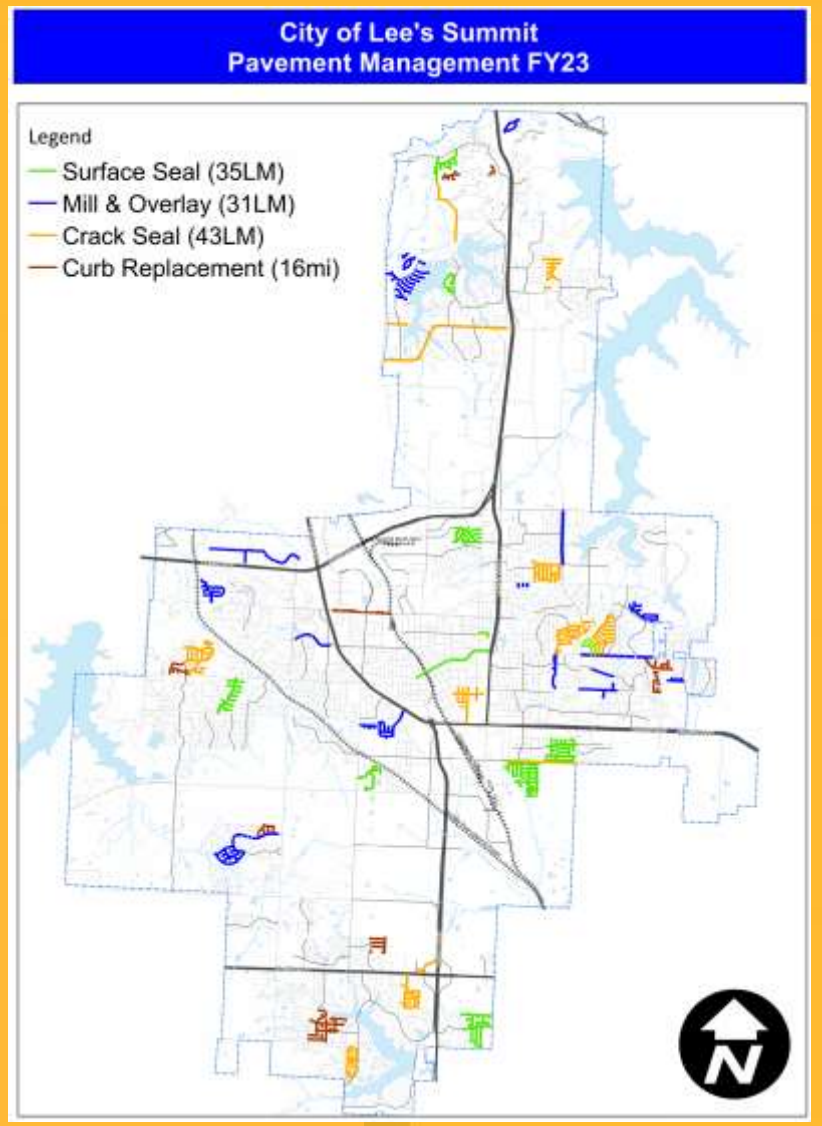
Pavement Management Program

Public Works Committee

July 11, 2022

Vince Schmoeger, Public Works Project Manager



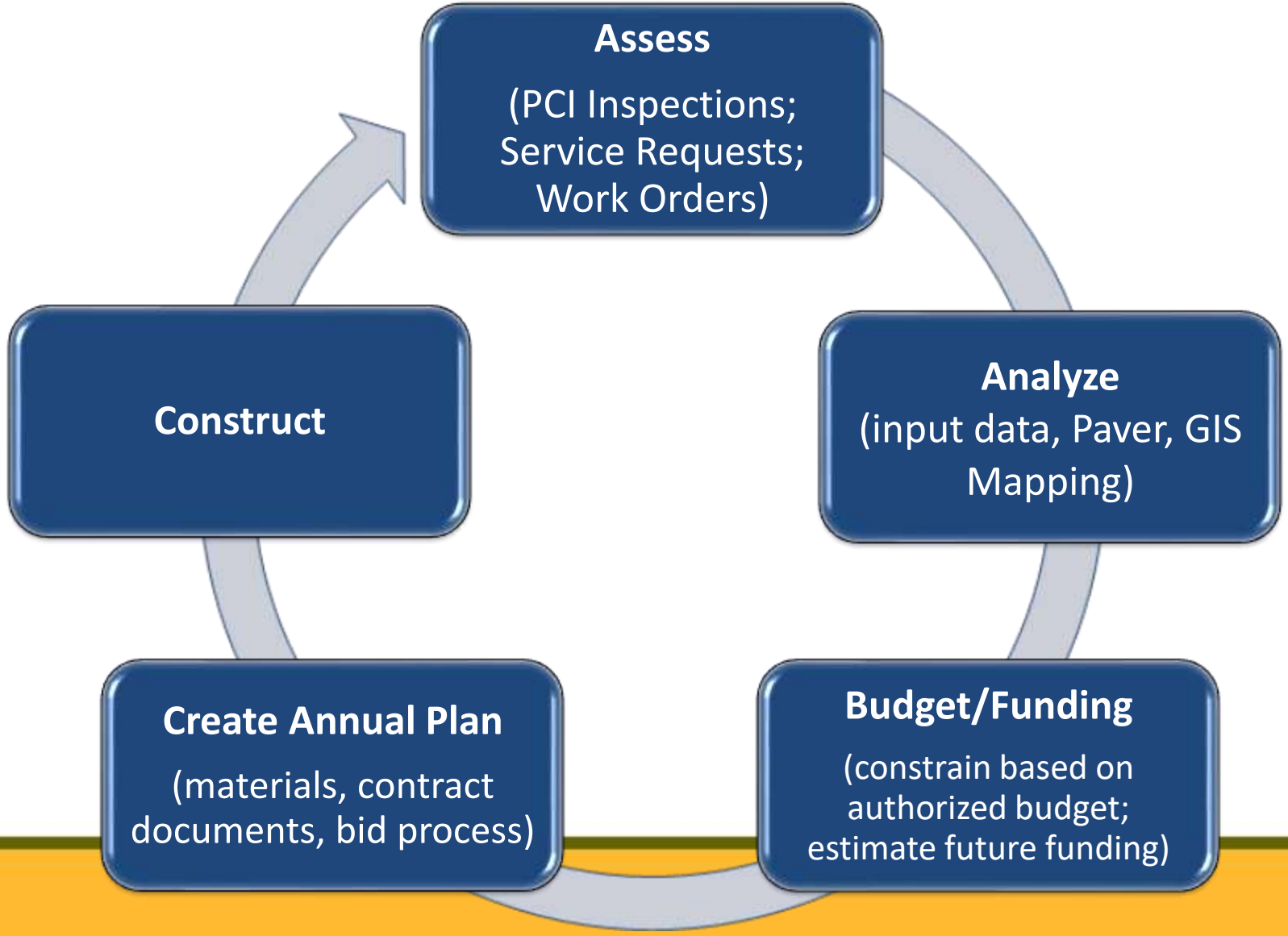
"Keeping Good Streets Good"

Yours Truly

Pavement Management

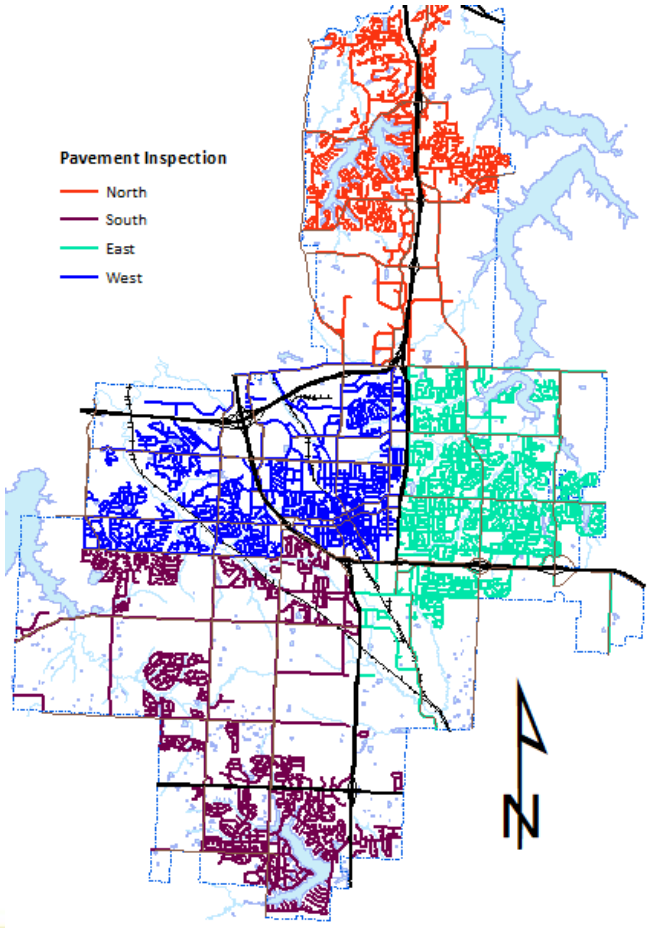
- Systematic philosophy to keep good pavements in good condition.
- Pavements should be managed, not simply maintained.
- Re-construction costs 10 (plus) times the cost to perform annual maintenance
- FY2023 Pavement Management Program budget $8.5M for the 4 main programs
  - Mill & Overlay ($3.75 M; 29 lane miles)
  - Surface Seal ($1.05 M; 35 lane miles)
  - Crack Seal ($348,000; 45 lane miles)
  - Curb Replacement ($2.64 M; 16 lane miles)

Pavement Management Cycle



PCI Based on Pavement Inspections

Pavements are on a 4-year rotating inspection schedule

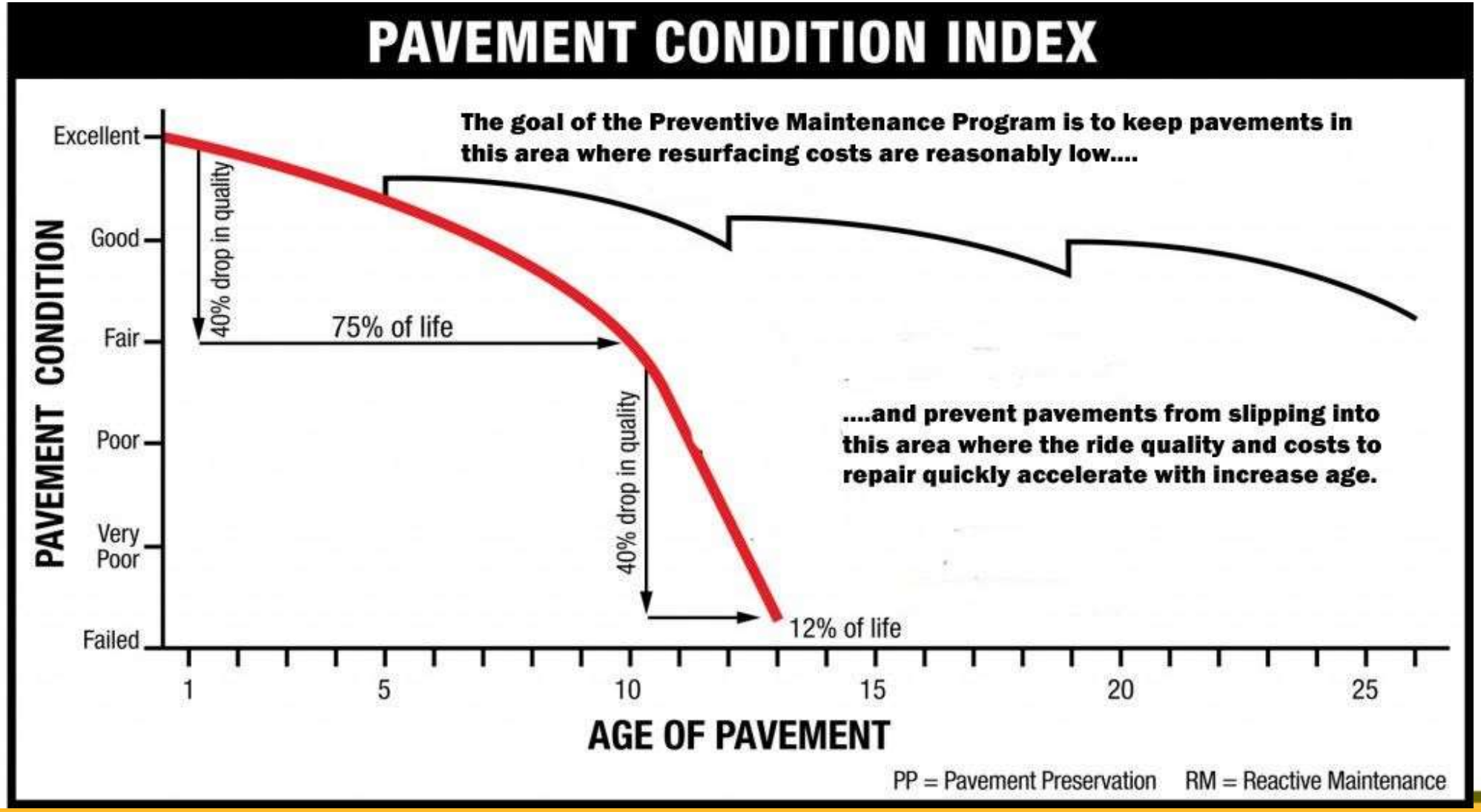


Defects
Block Cracking
Fatigue Cracking
Joint Cracking
Patching
Potholes
Raveling
Rutting
Bumps/Sags

What happens after a street inspection?

- The inspection information is downloaded to the PAVER pavement management system to quantify pavement inspections
- **PAVER™** -- originally was developed in the late 1970s to help the Department of Defense (DOD) manage maintenance and repair of its vast inventory of pavements
- PAVER then generates a condition number known as the Pavement Condition Index (PCI) on scale of zero to 100
    - Zero (very bad)
    - 100 (excellent/new)

Keeping the Good Pavements in Good Condition



Analyze

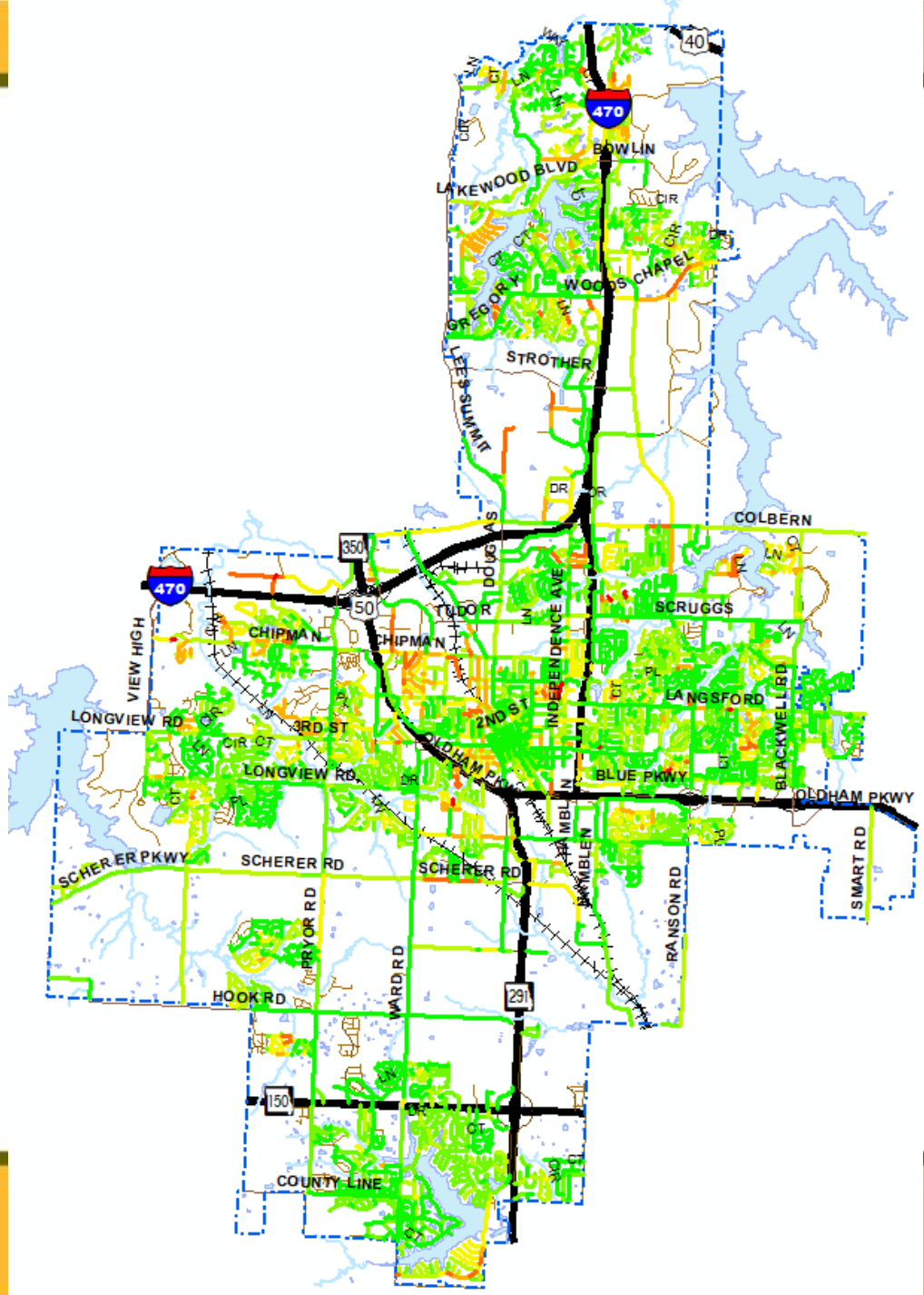
PCI Rating Scale

Red = Poor/Very Poor condition

Yellow = Fair condition

Green = Good/Excellent condition

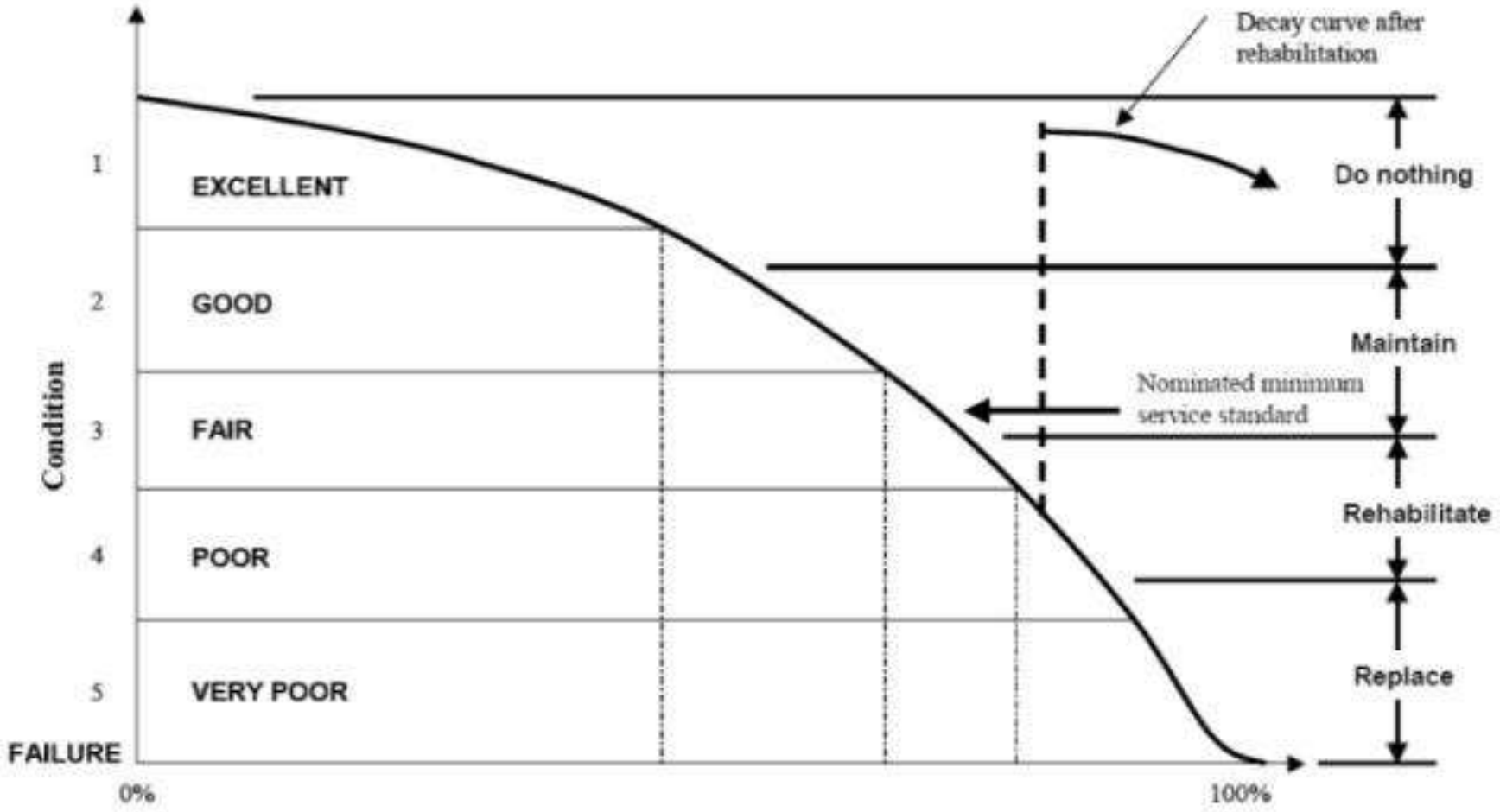
PAVER (PCI)	Pavement Condition	Corrective Action
24 and Below	Very Poor	Overlay – Consider Rebuild
25 - 59	Poor	Overlay
60 - 74	Fair	Surface Seal/Overlay
75 - 89	Good	Surface Seal/Crack Seal
90 and Above	Excellent	Very Unlikely/Crack Seal



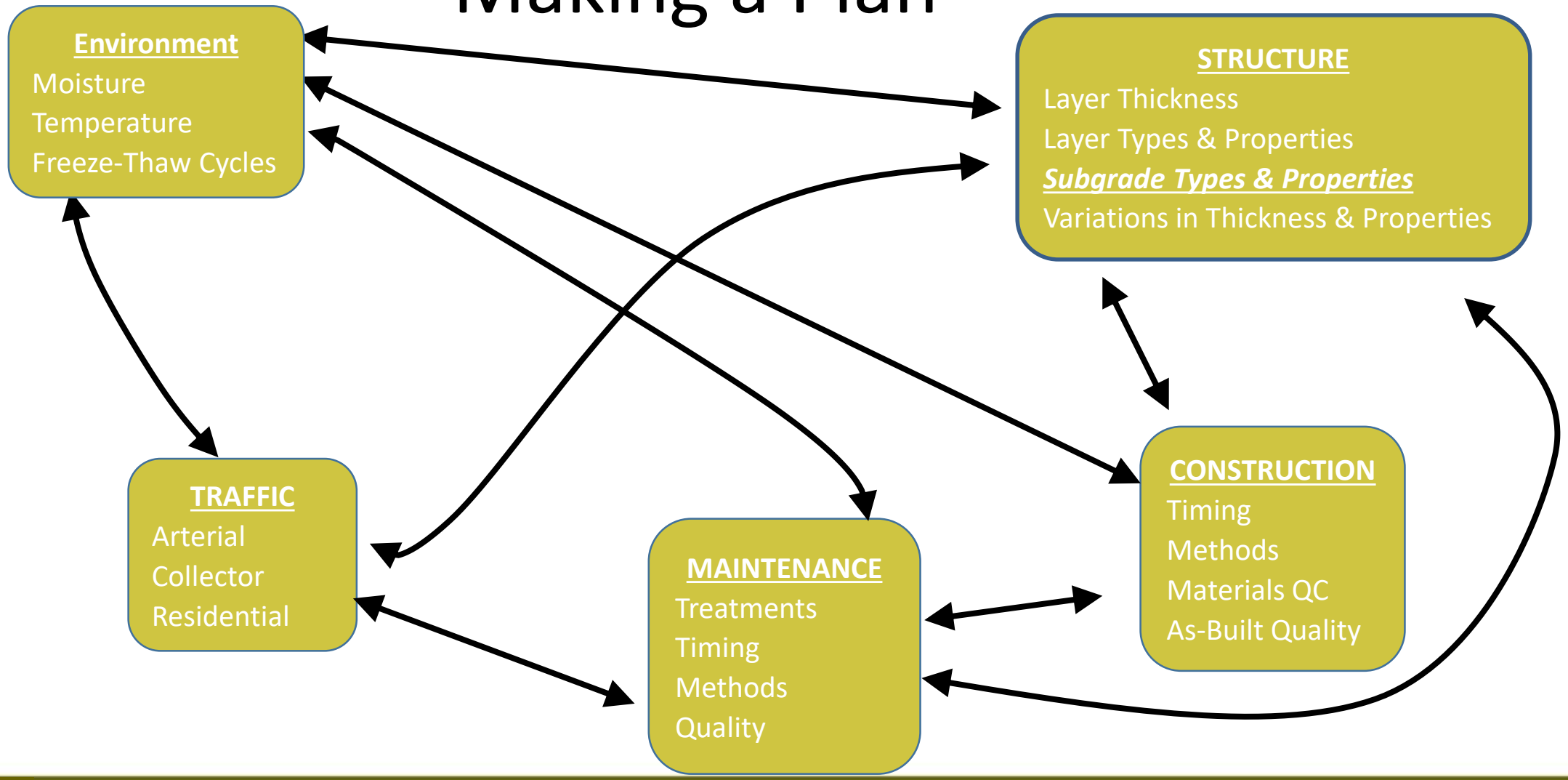
PCI

- 0 - 10
- 11 - 25
- 26 - 40
- 41 - 55
- 56 - 70
- 71 - 85
- 86 - 100

Goal: Right Treatment at the Right Time



Making a Plan



Implementing the Plan

- Improved initial construction materials and pavement sections
- To take advantage of economics of scale
  - Residential projects streets are usually grouped by areas
  - Arterial roads usually planned as standalone areas
  - Goal is consistent surface and maintenance cycles.
- Typically, the curb and overlay projects are stacked
  - Curb replacement in the fall
  - Overlay follows curb replacement next summer
- Crack seal usually planned based date newest surface
  - usually installed 4-6 years following an overlay or 7-9 years after new construction.
- Surface Seal 3-5 years following crack seal.

PMP Programs

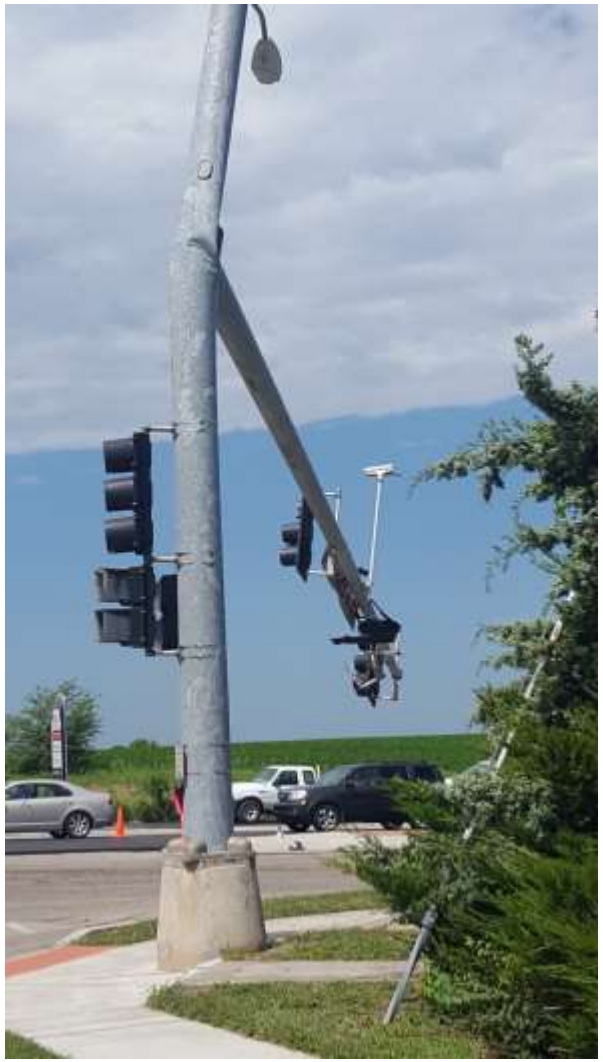
- Mill & Overlay
- Surface Seal
- Crack Seal
- Curb Replacement

Mill & Overlay

- Average $128,000/LM
- Remove top 2” of street surface
  - make any repairs (patching)
  - replace asphalt
- Restore road close to initial construction
- Improved ride quality

Mill and Overlay Construction

Issues



Surface Seal

- Average $30,000/LM
- Add 1/4”- 3/8” asphalt/polymer/aggregate slurry material to the road surface
- Does not add structural strength to pavement
- Protects Asphalt from UV degradation
- Does not improve ride quality
- Cracks sealed, but visible
- Streets closed for at least 4 hours

Micro Surfacing Construction

Issues

Crack Seal

- Average $5,100/LM
- Cracks blown out & refilled with rubberized asphalt
- Seals water from subgrade: Slows pothole formation
- Not Pretty
- 3 to 4 years following overlay
- 6 to 9 years following new construction

Construction

Issues

Curb Replacement

- Average $165,400/mile
- Replaces damaged & deteriorated curb ahead of Overlay
- Sidewalk ramps are reconstructed to current ADA specifications

Construction

Issues

Pause…

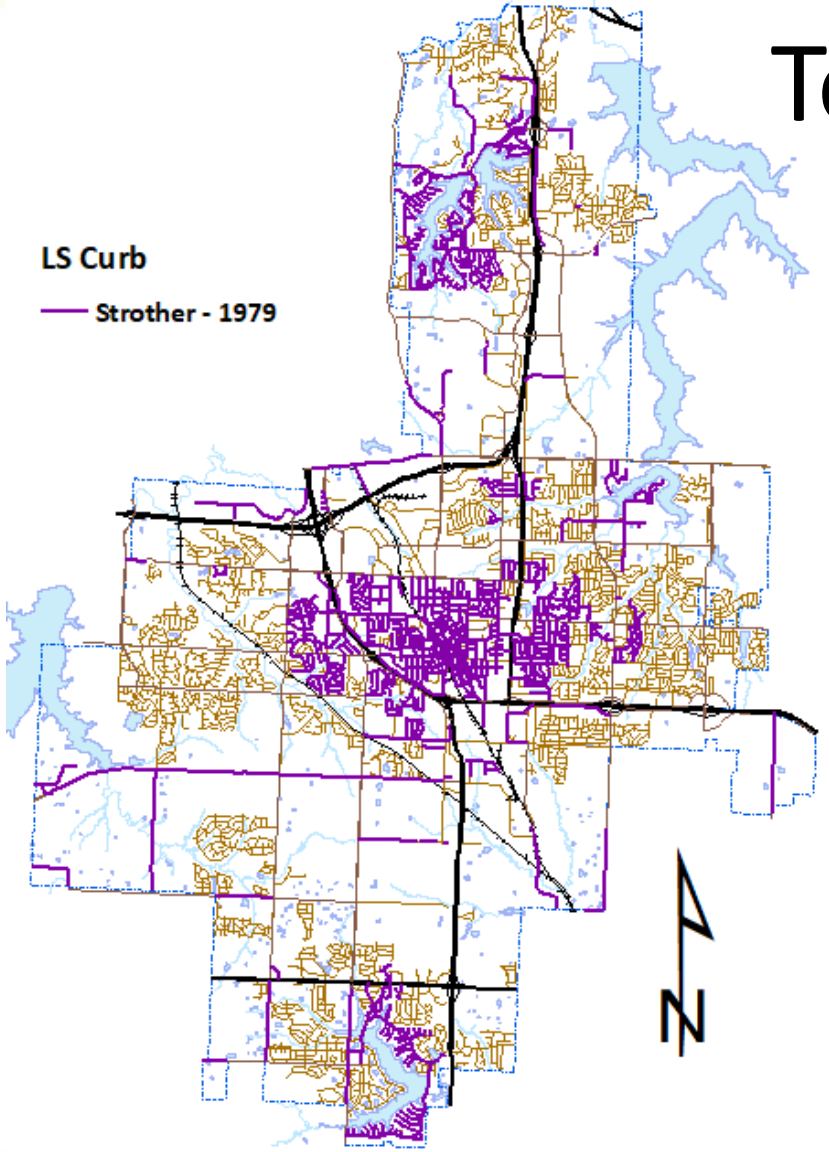
- Questions Regarding Pavement Management ?
  - Mill & Overlay ($3.75 M; 29 lane miles)
  - Surface Seal ($1.05 M; 35 lane miles)
  - Crack Seal ($348,000; 45 lane miles)
  - Curb Replacement ($2.64 M; 16 lane miles)
- More detailed discussion focused curb in the following slides

Focus on Curb

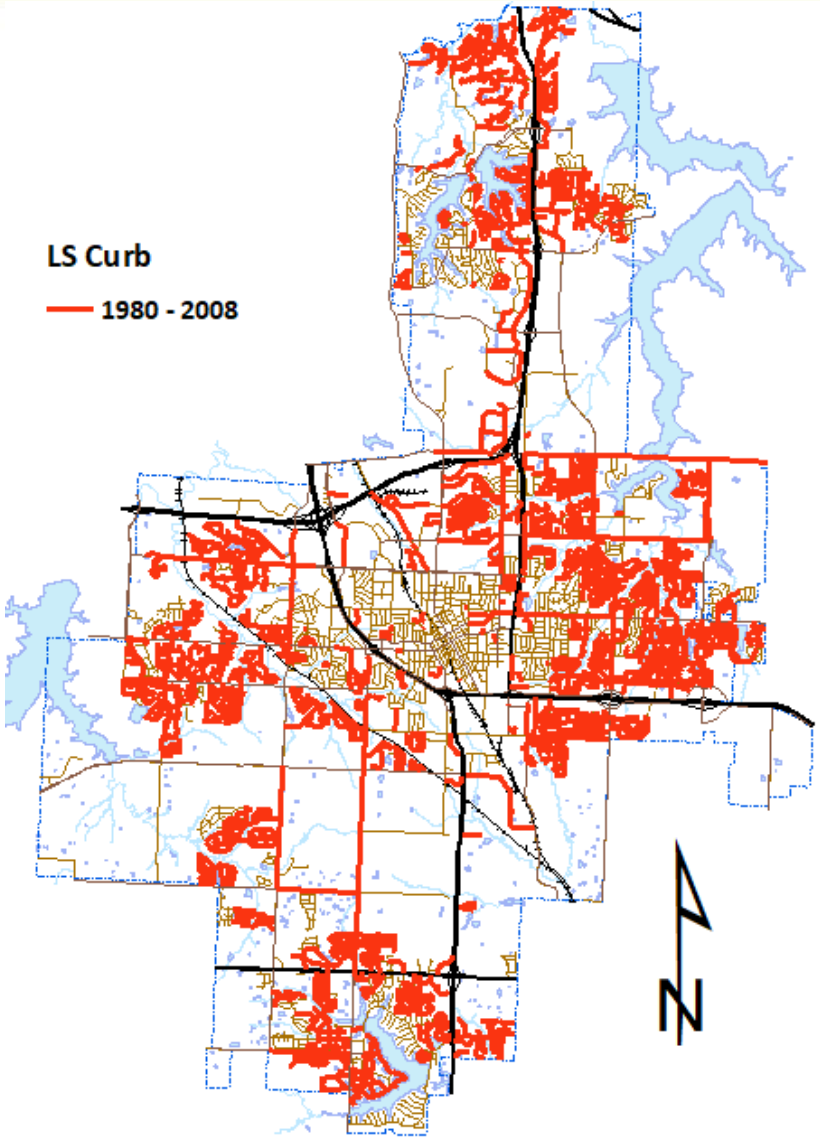
Curb the Short Story

- Prior to 2006 the City, along with much of KC Metro area, utilized limestone aggregate in concrete referred to as MCIB (Mid-West Concrete Industry Board)
- Quality of Quarried limestone changes over time due changes in formation
- Around 1980, the local limestone quality started to decline
- 2006 City of Lee's Summit formalized the use of granite/quartzite base concrete referred to as KCMMB (Kansas City Metro Materials Board)

Town of Strother - 1979

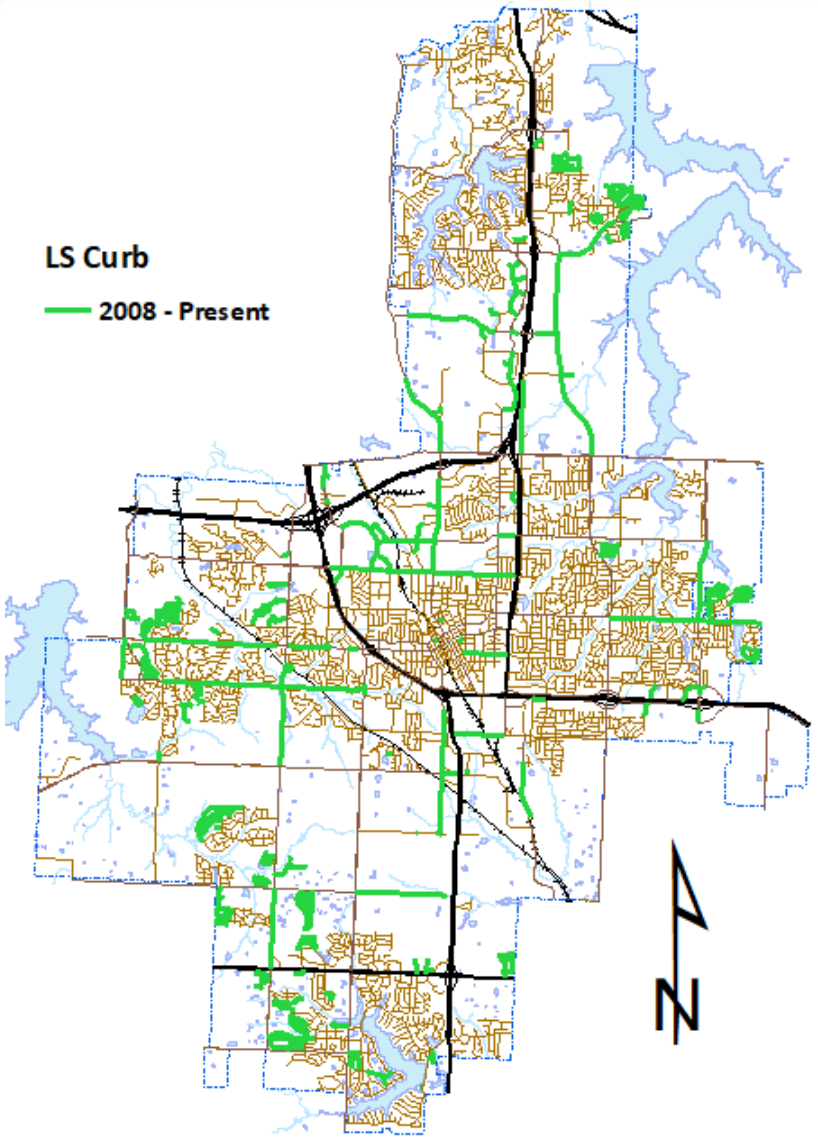


- 208 miles of curb (22%)
- Good Condition
- Issues:
  - Alignment
  - Overlaid
  - Design
  - Aesthetics
  - New areas replaced



1980-2007

- 623 miles of curb (65%)
- OK – Poor Condition
- Issues: (same +)
  - Total Delamination
  - Cost to rebuild
    - 623 miles
    - $165,400/mile
    - **$103,044,200**

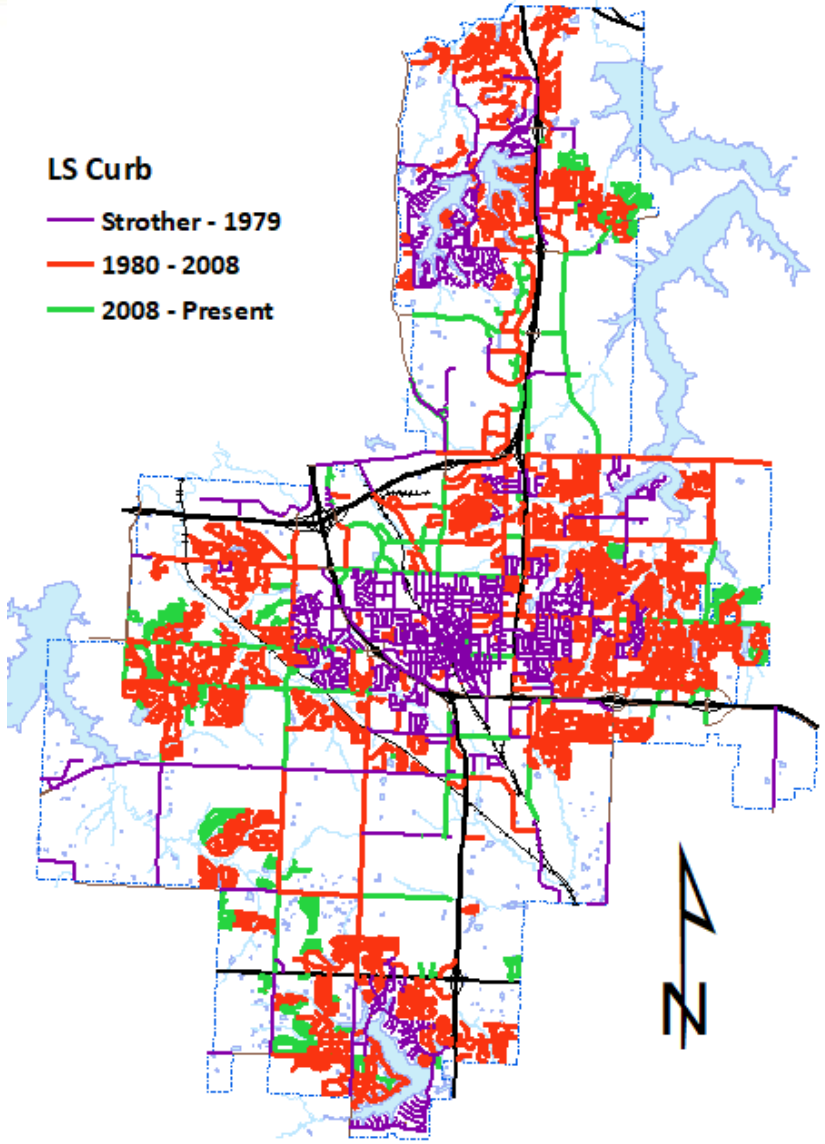


2008-Present

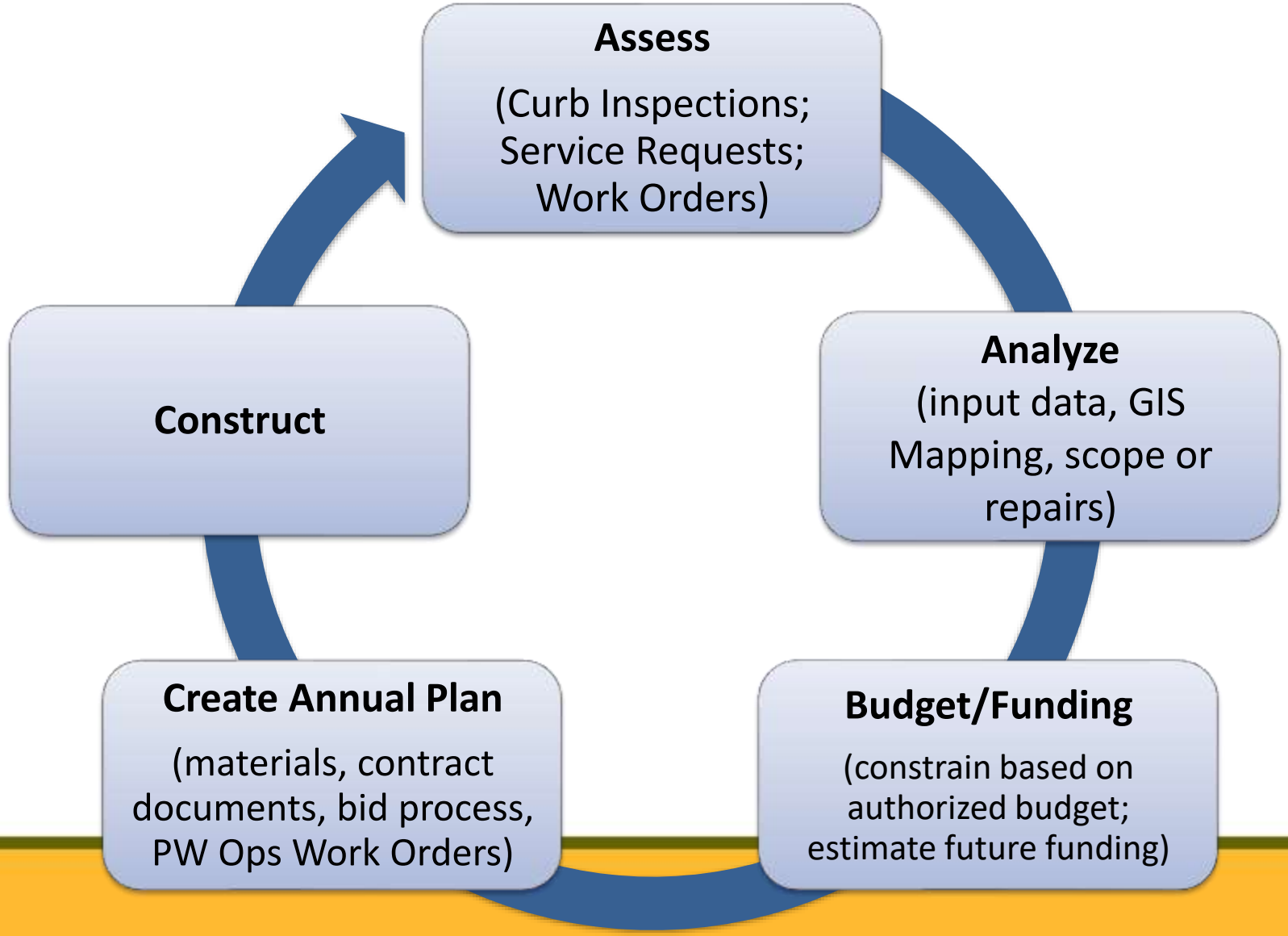
- 128 miles of curb (13%)
- Good Condition
- Issues:
  - Minor offsets

Strother-Present

- 948 Miles of Curb



Curb Replacement Cycle

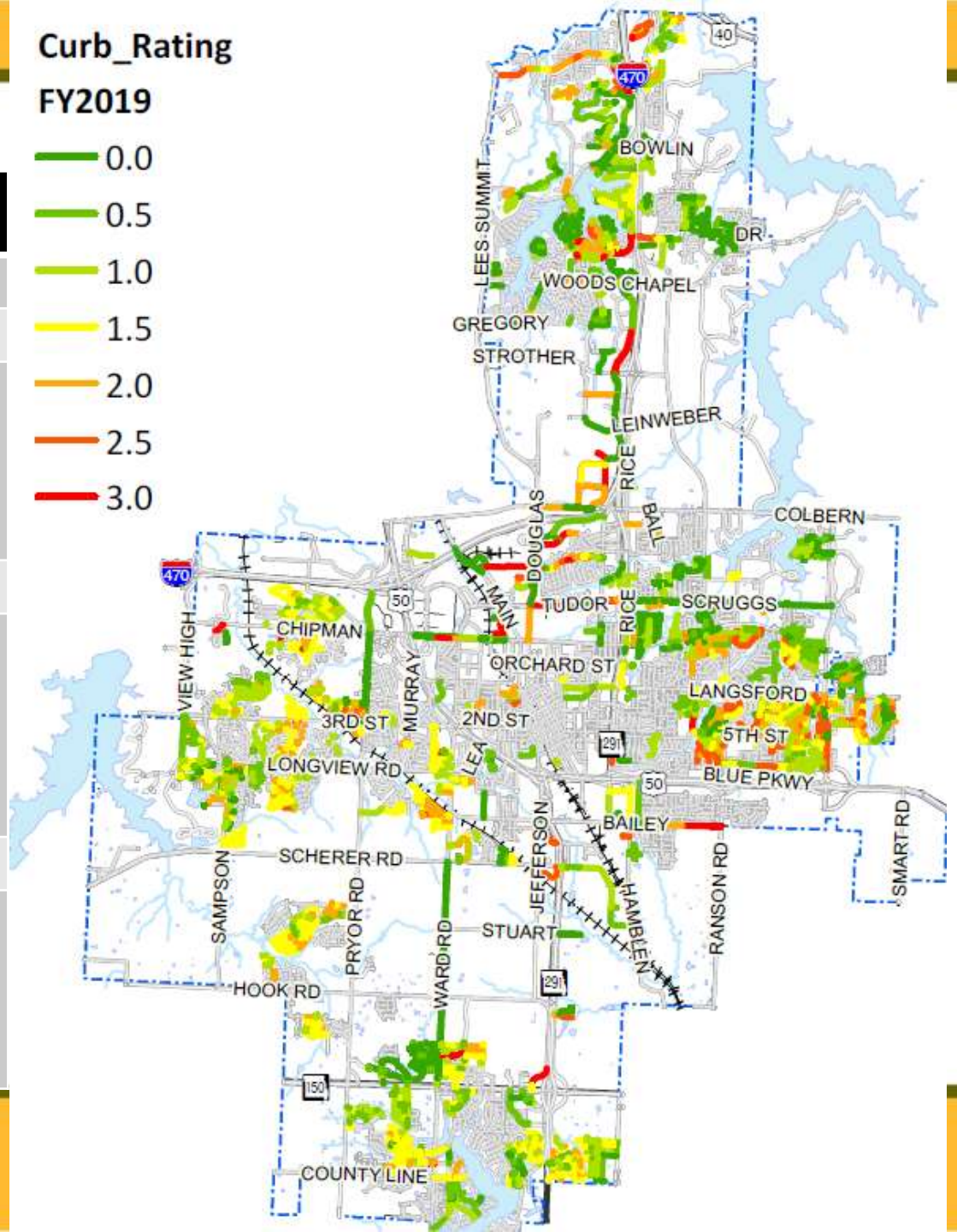


Curb Rating Rubric

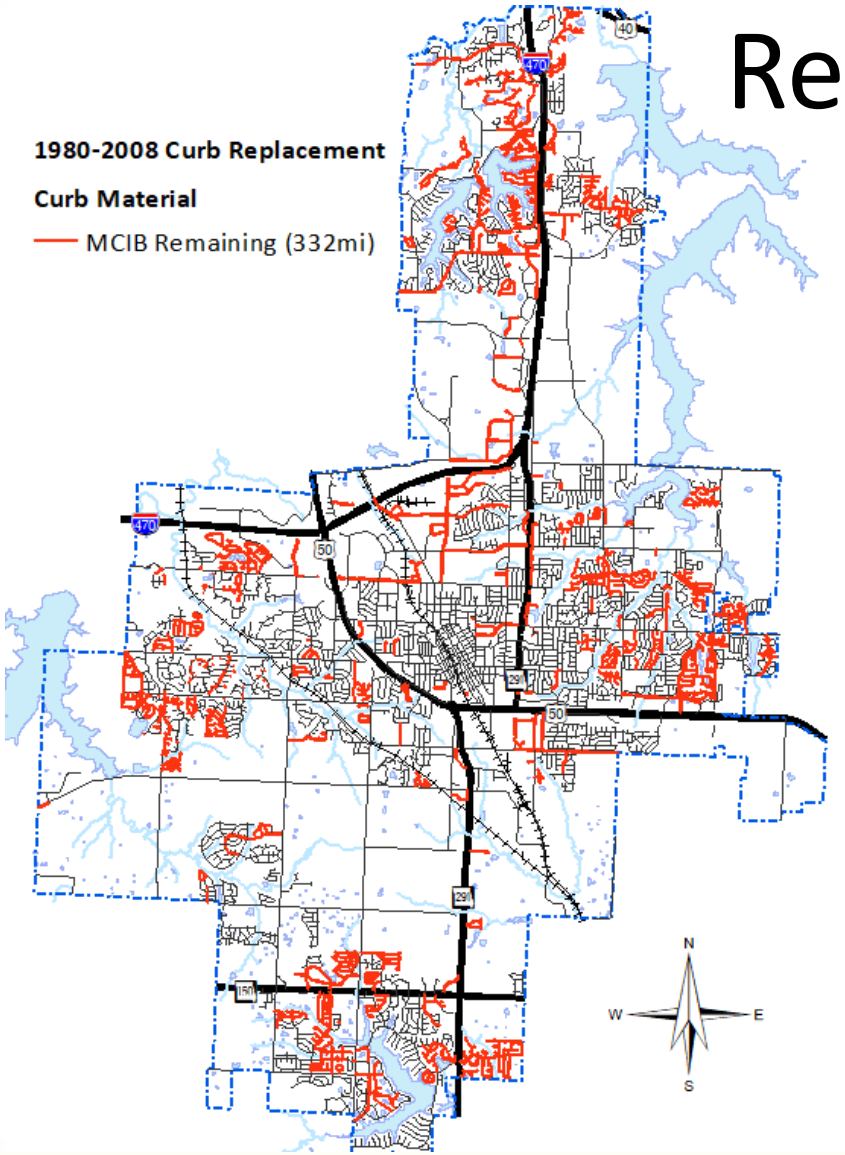
Rating	Type of Deterioration	Extent	Description
0	None Observed	None/Minimal	Don't mess with
0.5			
1	Looks good: very early stages noticed, but not developed (may last)	Intermittent	Should stay together a few years
1.5			
2	D-cracking or Potholes at every joint (15-foot intervals)	Large pieces, but not continuous failure	Should be replaced but may not be evident. Replace large sections; but not all
2.5			
3	Turning to gravel; potholes; asphalt patching	Along entire length of curb for large area (GLOBAL)	"No Brainer" "Global Failure" ASAP

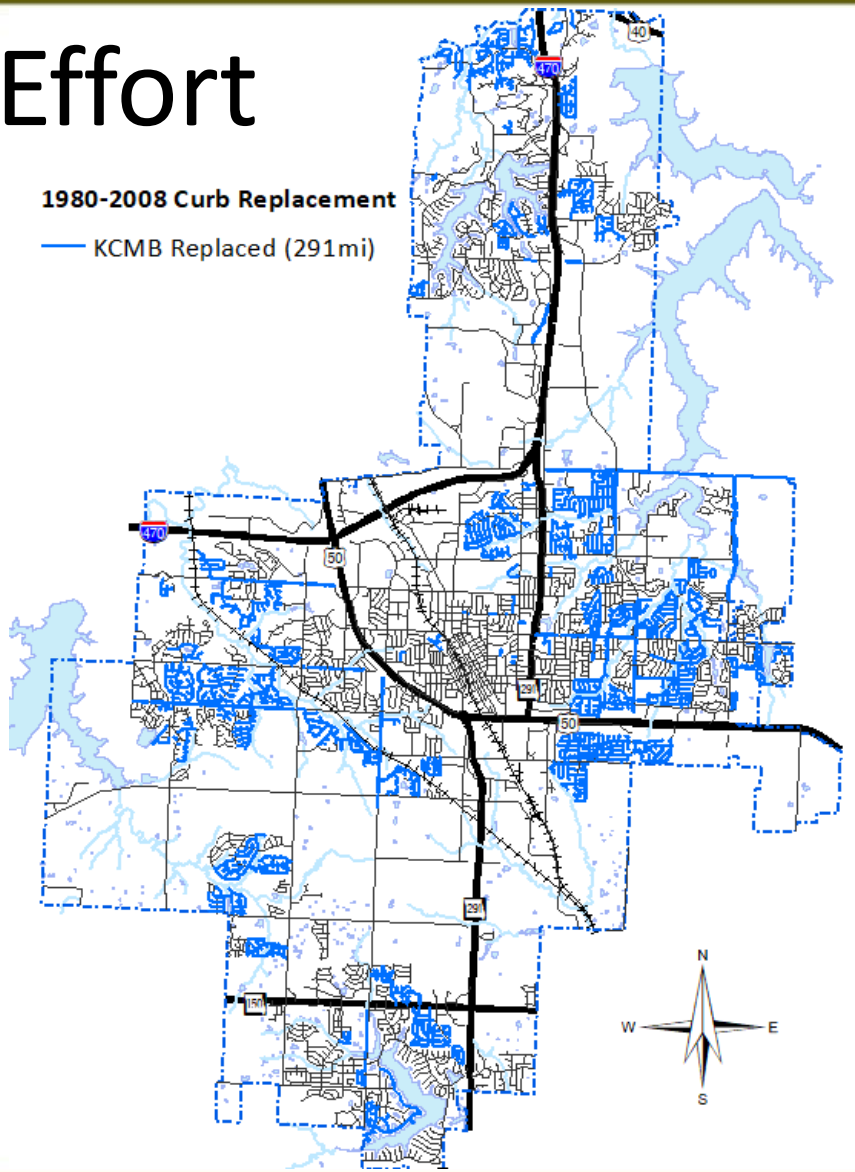
Curb Rating Rubric

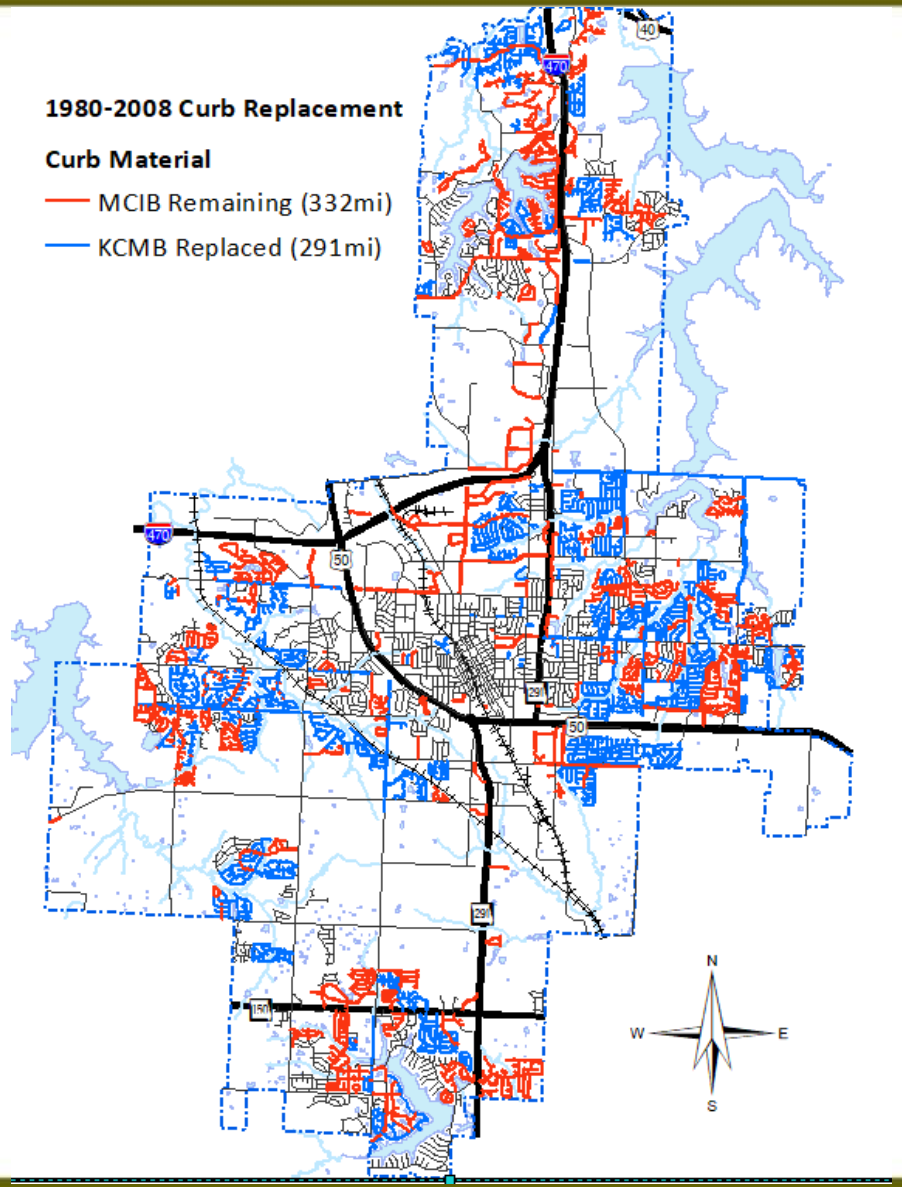
Rating	Type of Deterioration	Extent	Corrective Action
0	None Observed	None/Minimal	No Action
0.5			
1	Looks good: very early stages noticed, but not developed (may last)	Intermittent	No immediate action; possible replacement or spot patching in several years
1.5			
2	D-cracking or Potholes at every joint (15-foot intervals)	Large pieces, but not continuous failure	Should be replaced but may not be evident; Replace large segments; Patch with asphalt
2.5			
3	Turning to gravel; potholes; asphalt patching	Along entire length of curb for large area (GLOBAL)	"Very obvious, global failure (gravel)" Replace ASAP



Rebuild Effort






1980-2008 Curb Replacement
Curb Material
MCIB Remaining (332mi)
KCMB Replaced (291mi)
N
W
E
S

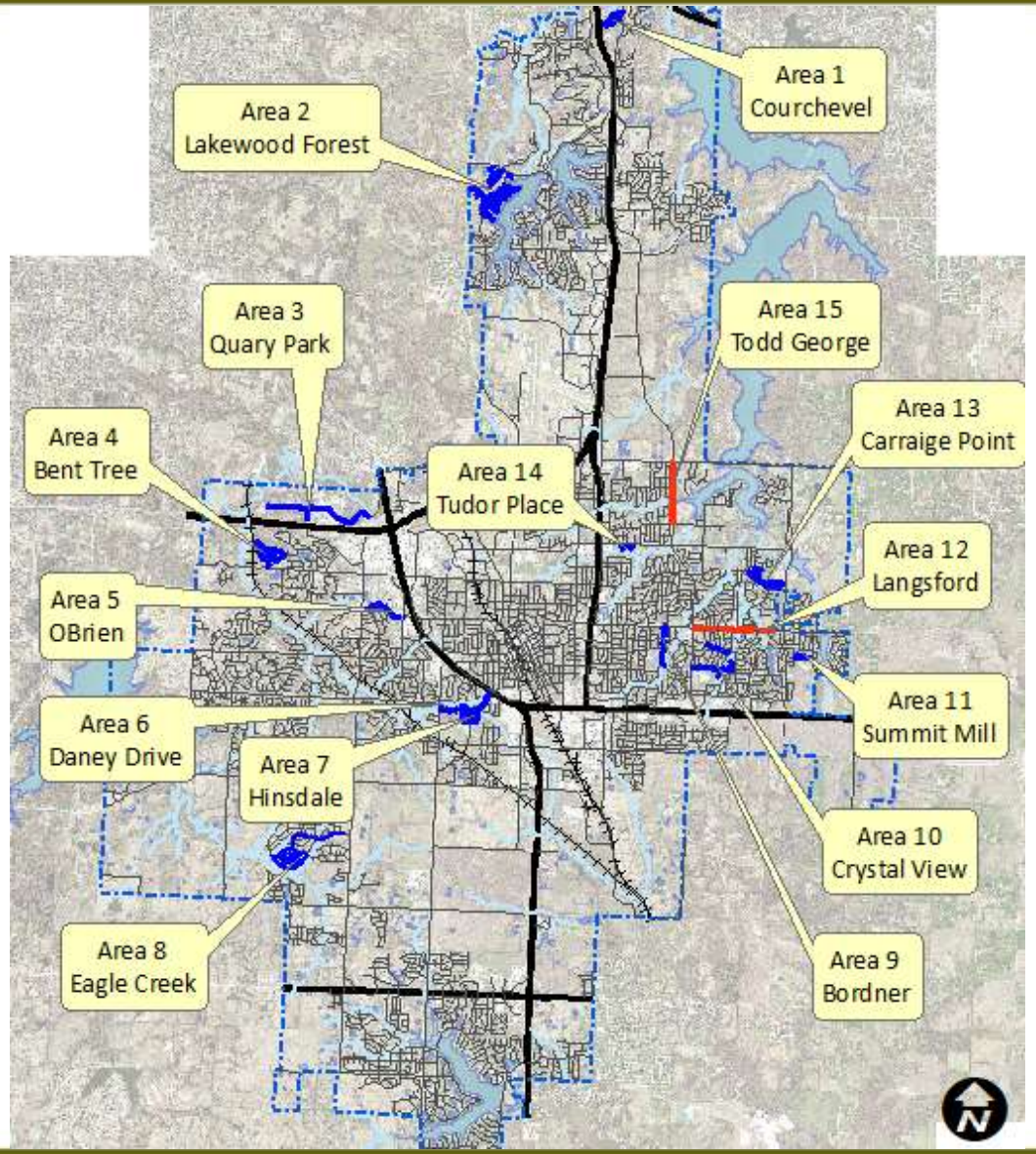
Pause…

- Questions Curb Replacement?
  - Based on CONDITION, not age
  - Curb installed before 1980 usually very good condition
  - Curb installed 1980-87, 50-50 chance over first 50 years
  - Curb installed 1987-2007: 5 to 10 year life
  - Curb installed using durable aggregate, hopefully several hundred years
- More detailed discussion focused funding in the following slides

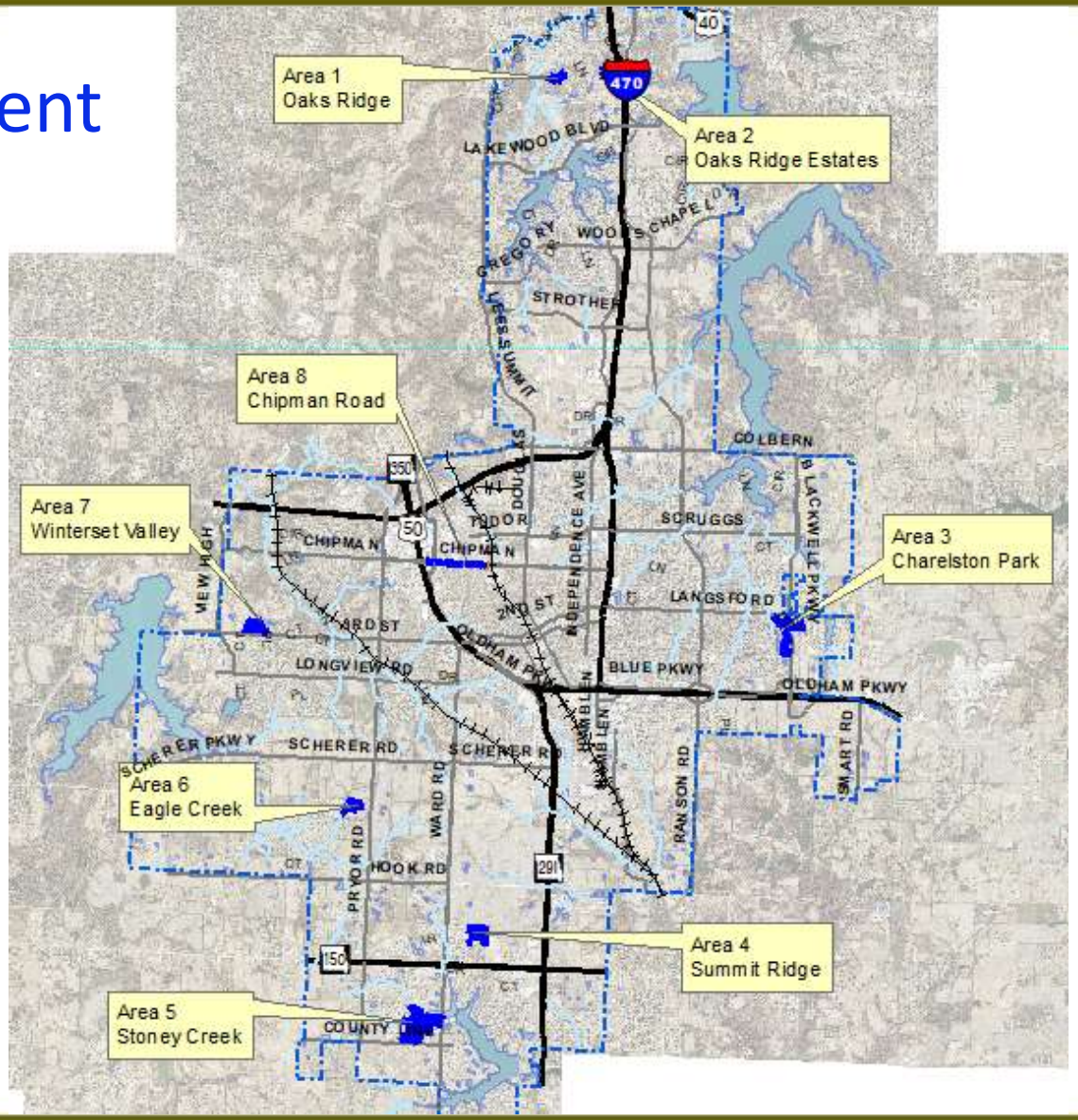
Funding the Pavement Management Programs

- The permanent ½ cent Transportation Sales Tax: $8.25 M per year
- Occasional augmentation through bond issues
  - $12.5 M for curb from 2011-2013
- Current augmentation form 15-year CIP Sales Tax
  - $5M for curb over 15 years
  - Some curb included in various CIP Projects
- PW Operations
  - $325,000 per year to replace small pieces (contracted)
  - Patching (asphalt along arterials; grout in residential)

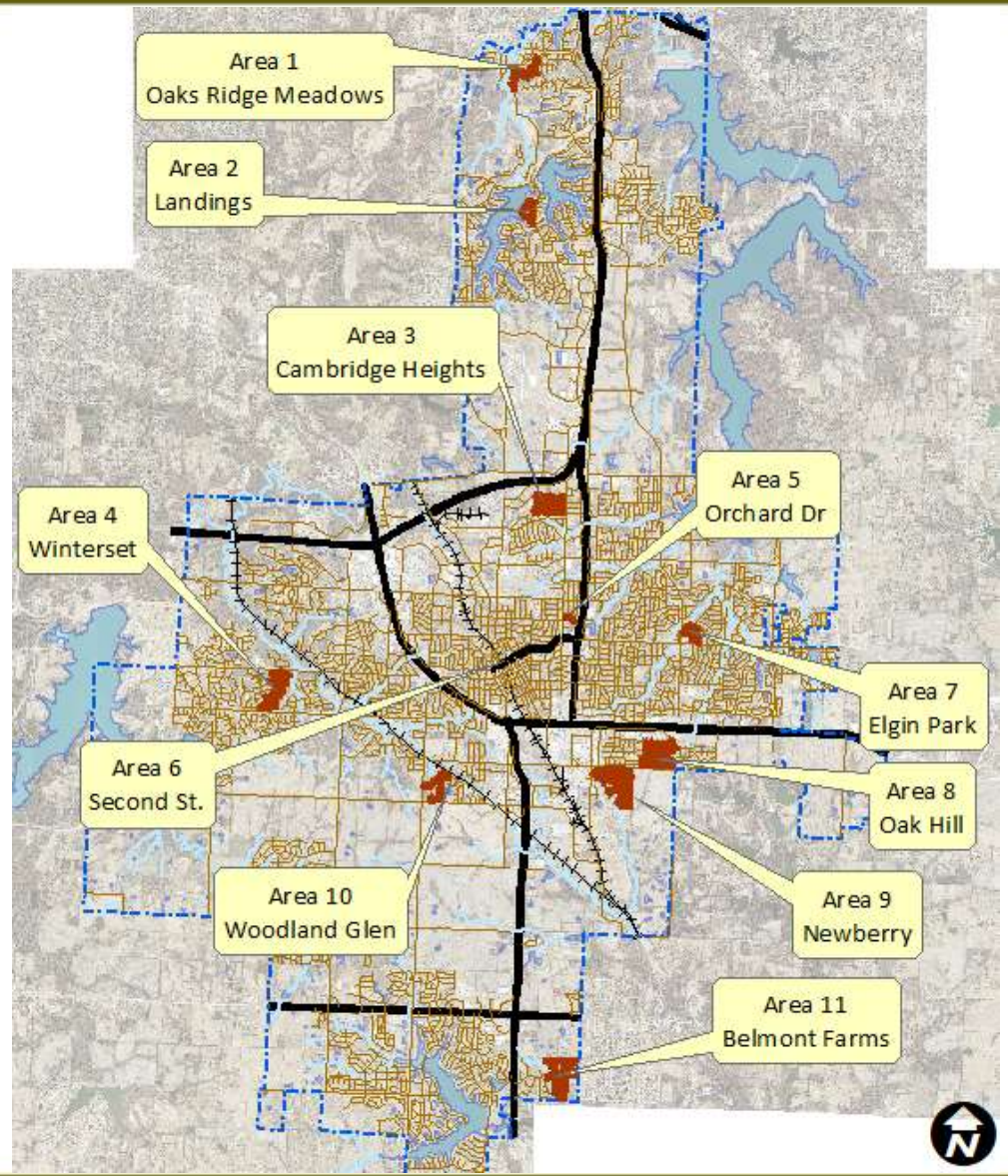
FY23 Mill & Overlay
Overlay 29.2 Lane Miles



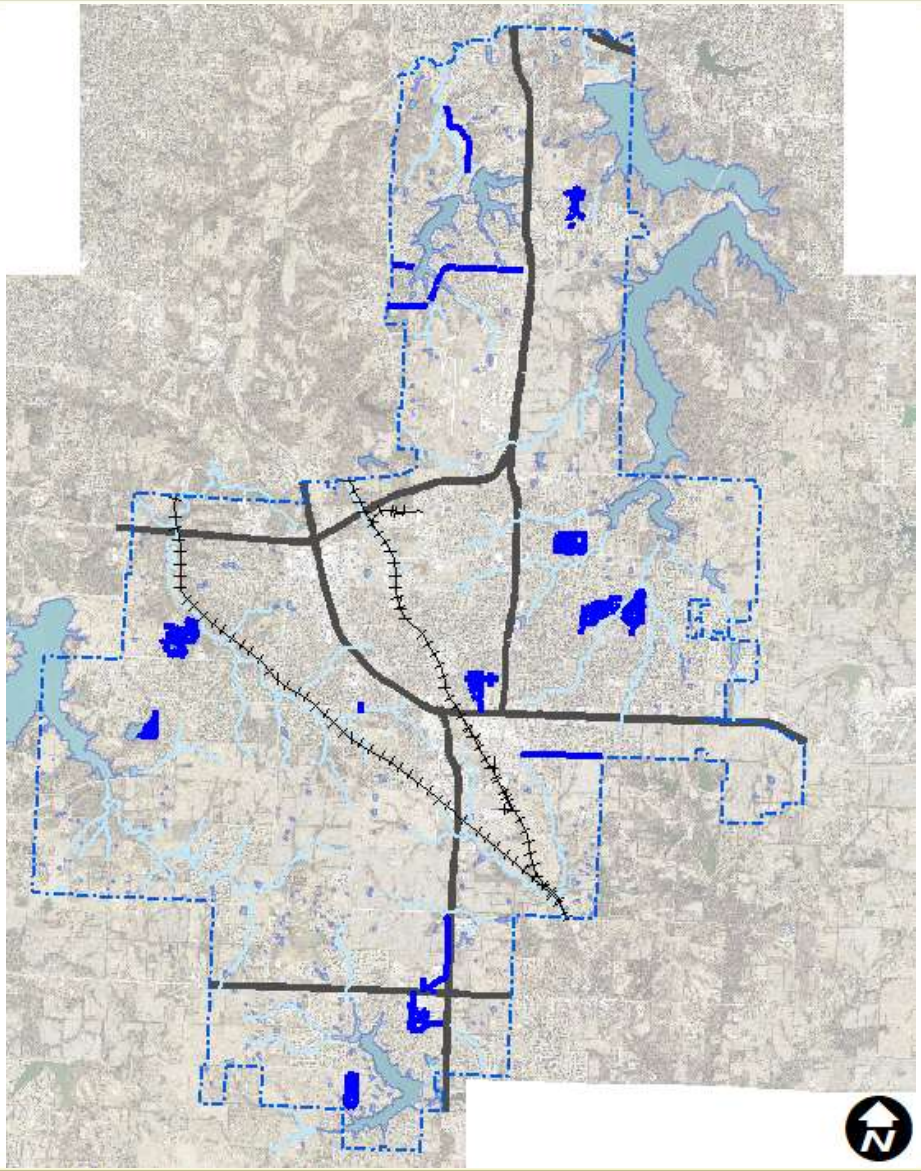
FY23 Curb Replacement
16 Miles



FY23 Surface Seal
35.2 Lane Miles



FY23 Crack Seal
45 Lane Miles



Overlay 29 Lane Miles

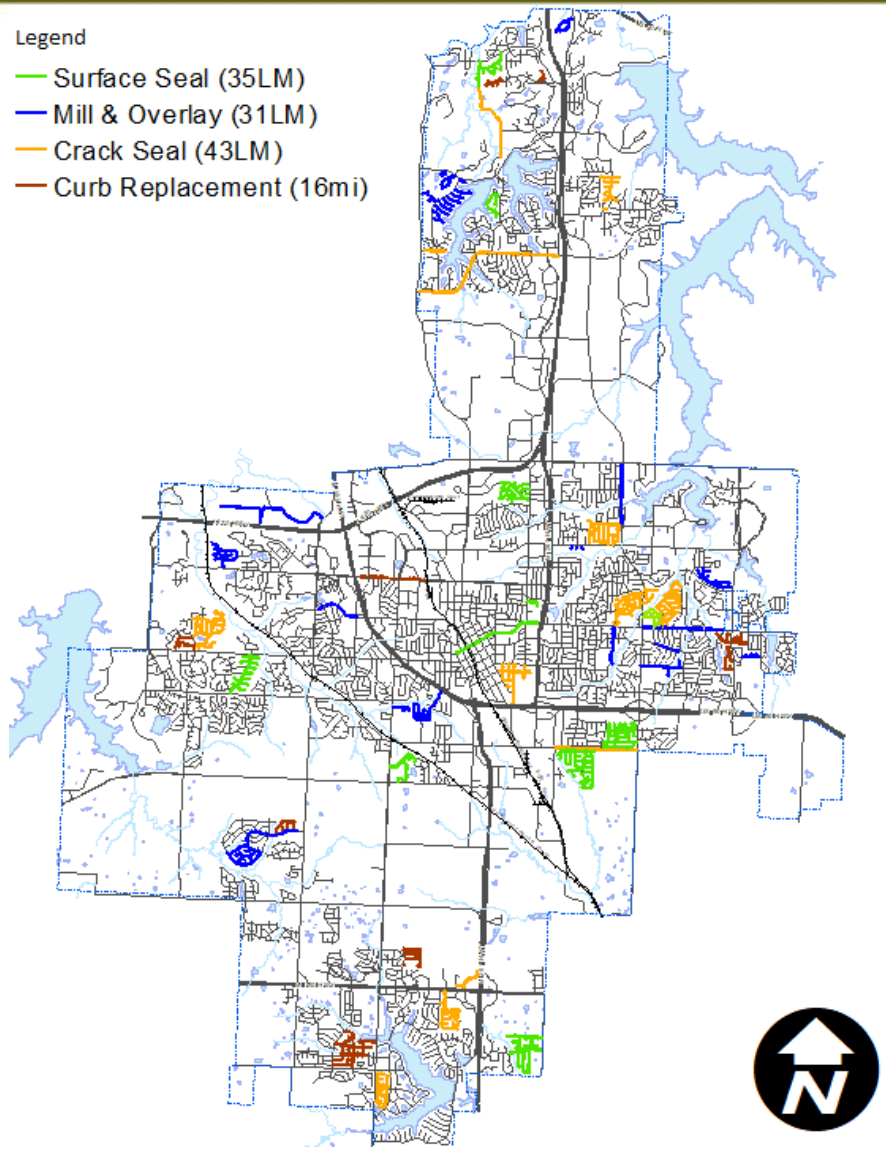
Curb 16 Miles

Surface Seal 35 Lane Miles

Crack Seal 43 Lane Miles

Total 125 Lane Miles

6,000 Properties

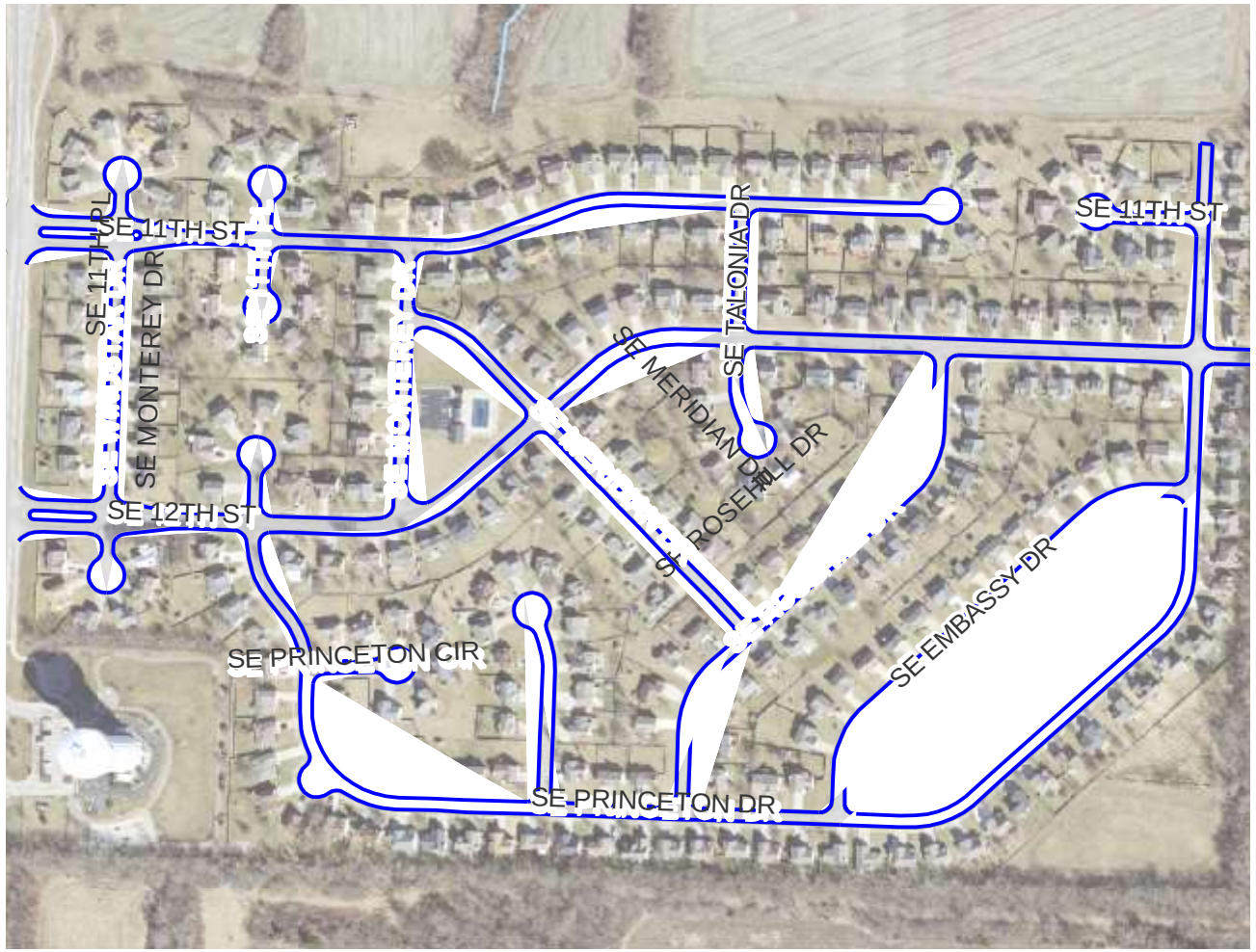


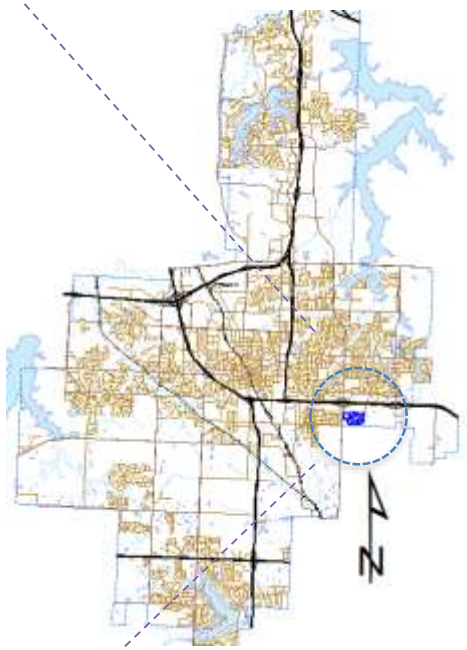
Project:
Princeton Heights

- SE 50Hwy & Ranson Road
- 308 Homes
- Ave. Prop Tax $3,238.78
- 5.43 Road Lane Miles
- 5.44 Curb Miles

- Curb - $ 899,776
- <u>Overlay - $ 695,040</u>
- Total… $1,594,816

- Surface Seal - $162,900
- Crack Seal - $27,693





Vince Schmoeger,

Public Works Project Manager

LEE'S SUMMIT
MISSOURI

Yours Truly