Multi-Year Pavement Management Plan
City of Goleta

Prepared by Pavement Engineering Inc.

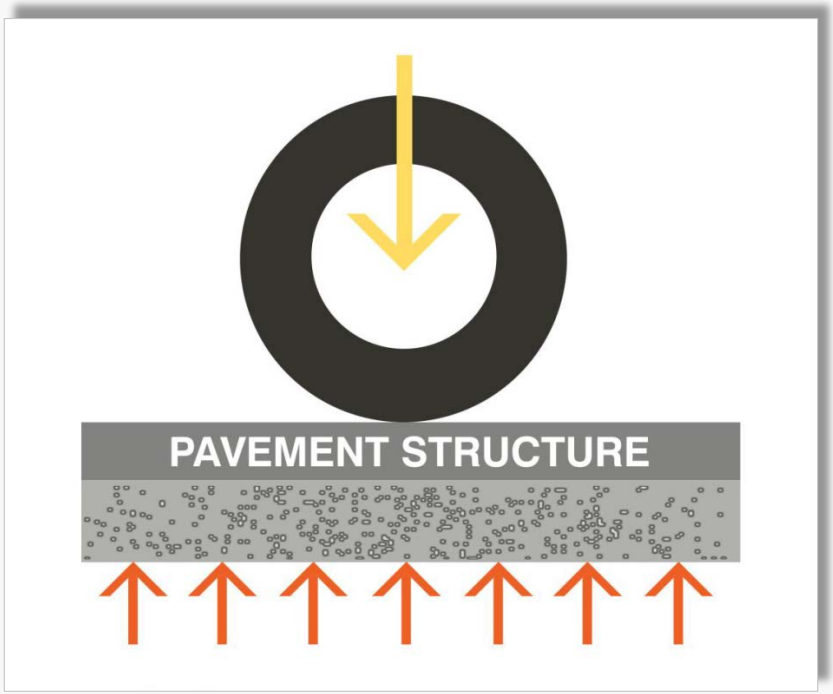
PRESENTATION GOALS

- Pavement 101
- Pavement preservation principles
- Where are we
- Where do we go from here

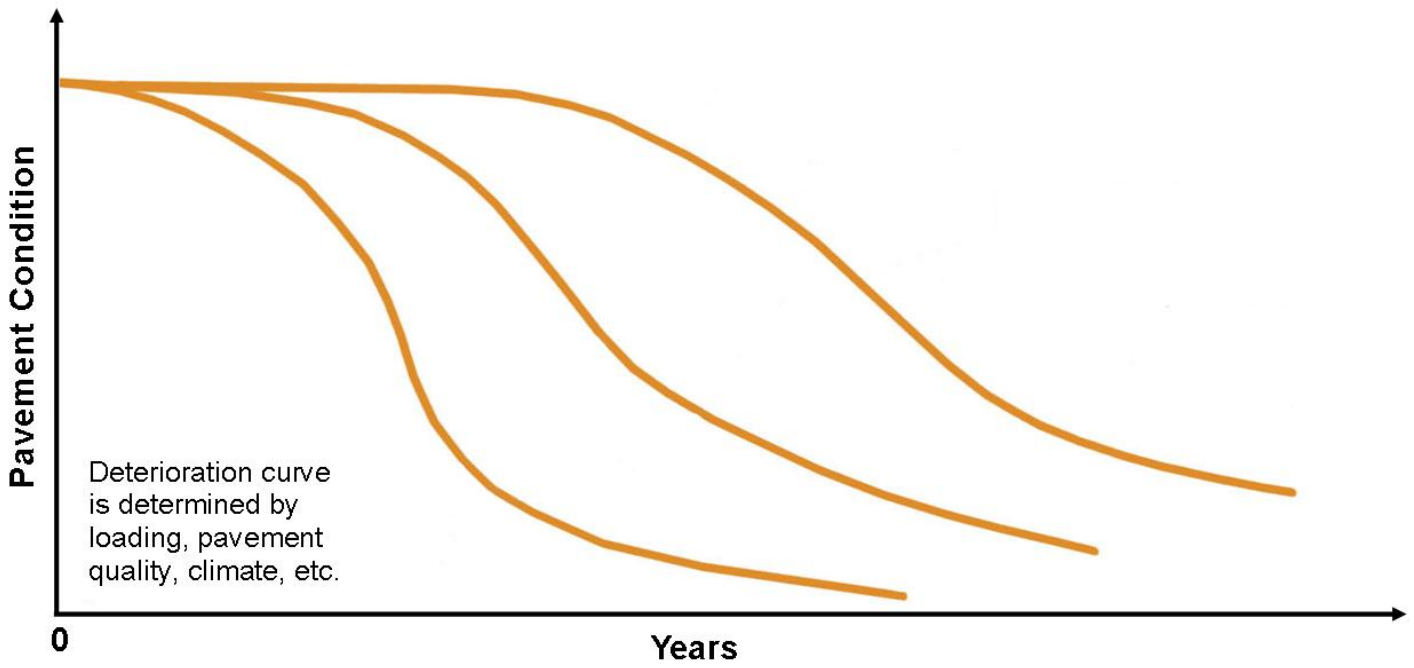
CITY OF GOLETA

PAVEMENT 101

Pavement Design



Pavement Deterioration Cycle



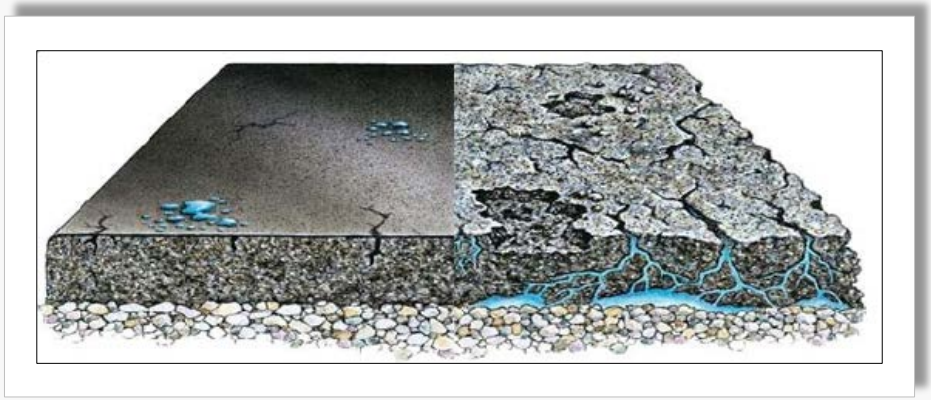
Pavement Deterioration

Asphalt concrete deteriorates in two ways:

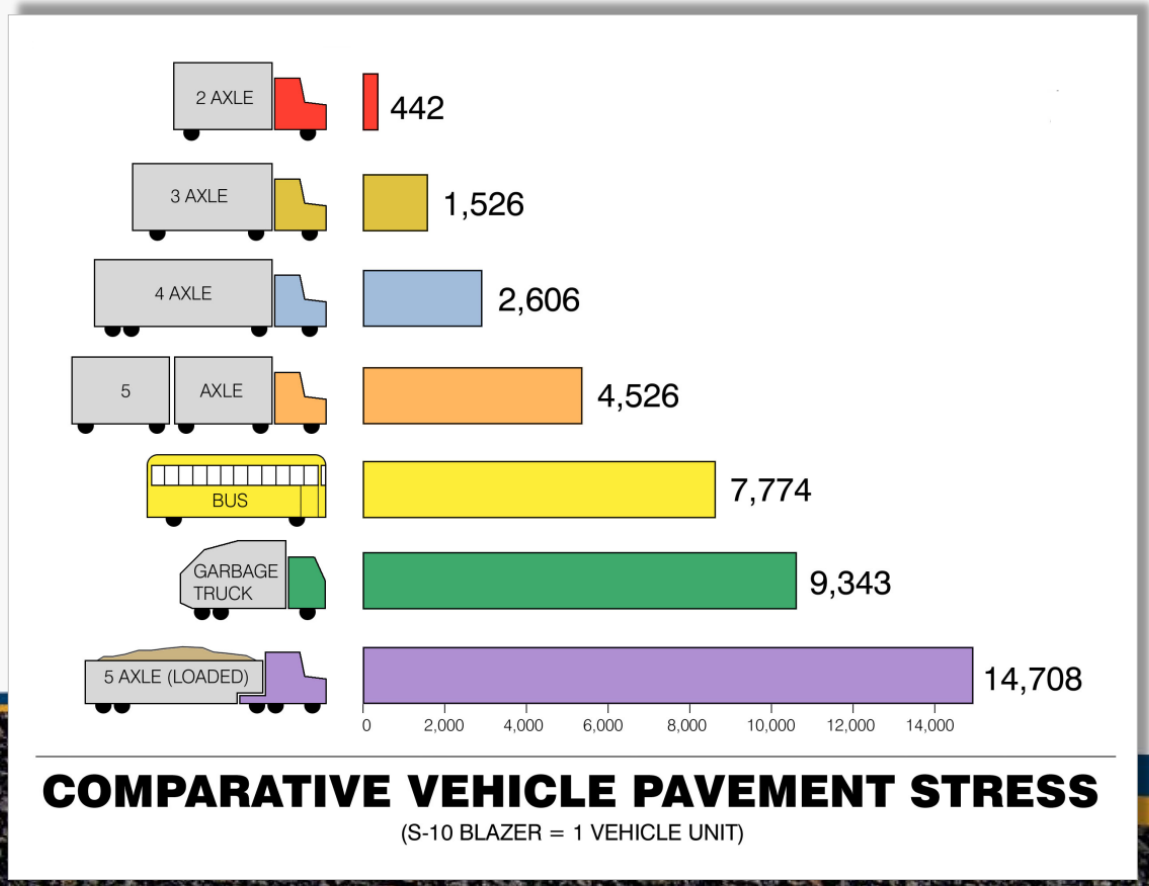
Oxidizing effects of sun and water

Fatigue from heavy wheel loads

The Impact of Sun and Water



The Impact of Heavy Loads



What is a Traffic Index?

The projected equivalent single axle loading that a pavement will experience over its design life

Equivalent Single Axle Load

$$ESAL = (\text{Axle Wt} / 18{,}000 \text{ lbs})^{4.2}$$

Traffic Index vs. ESALs

T.I.	ESALs
4.5	2,954
5.0	7,160
5.5	15,950
6.0	33,136
6.5	64,924
7.0	121,020
7.5	216,092
8.0	371,676
8.5	618,596
9.0	1,000,000
9.5	1,575,144
10.0	2,423,911
10.5	3,652,398
11.0	5,399,511

Common Pavement Distresses

Weathering or Raveling

Transverse or Longitudinal Cracking

Block Cracking

Alligator Cracking

Common Pavement Distresses

- Alligator cracking
- Block cracking
- Distortions
- Longitudinal / transverse cracking
- Patches / utility cuts
- Rutting / depressions
- Weathering / raveling

Evaluating Pavement

The Pavement Condition Index

100 – 91 = Excellent
90 – 71 = Good
70 – 51 = Fair
50 – 31 = Poor
30 – 0 = Failed

Developed by the U. S. Army Corp of Engineers during World War II and standardized by ASTM, the PCI is an objective and rational basis for determining pavement condition and establishing maintenance priorities.

PCI = 100

Excellent 100-91

PCI = 85

Good 90-71

PCI = 70

Fair 70-51

PCI = 60

Fair 70-51

PCI = 51

Fair 70-51

PCI = 38

Poor 50-31

PCI = 28

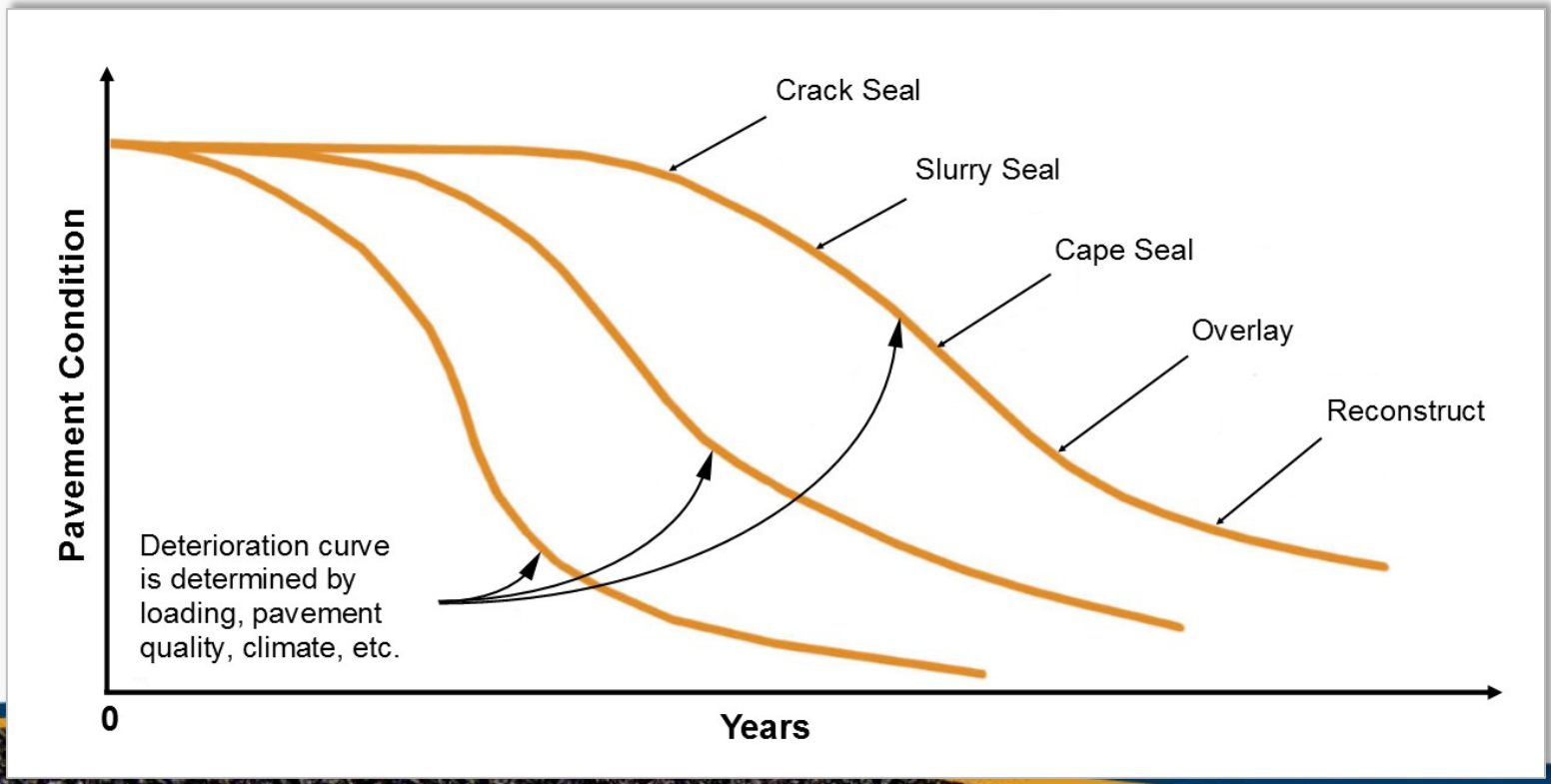
Failed 30-0

PCI = ?

PAVEMENT PRESERVATION PRINCIPLES

Applying the **RIGHT TREATMENT**
to the **RIGHT PAVEMENT**
at the **RIGHT TIME**
using the **RIGHT MATERIALS**

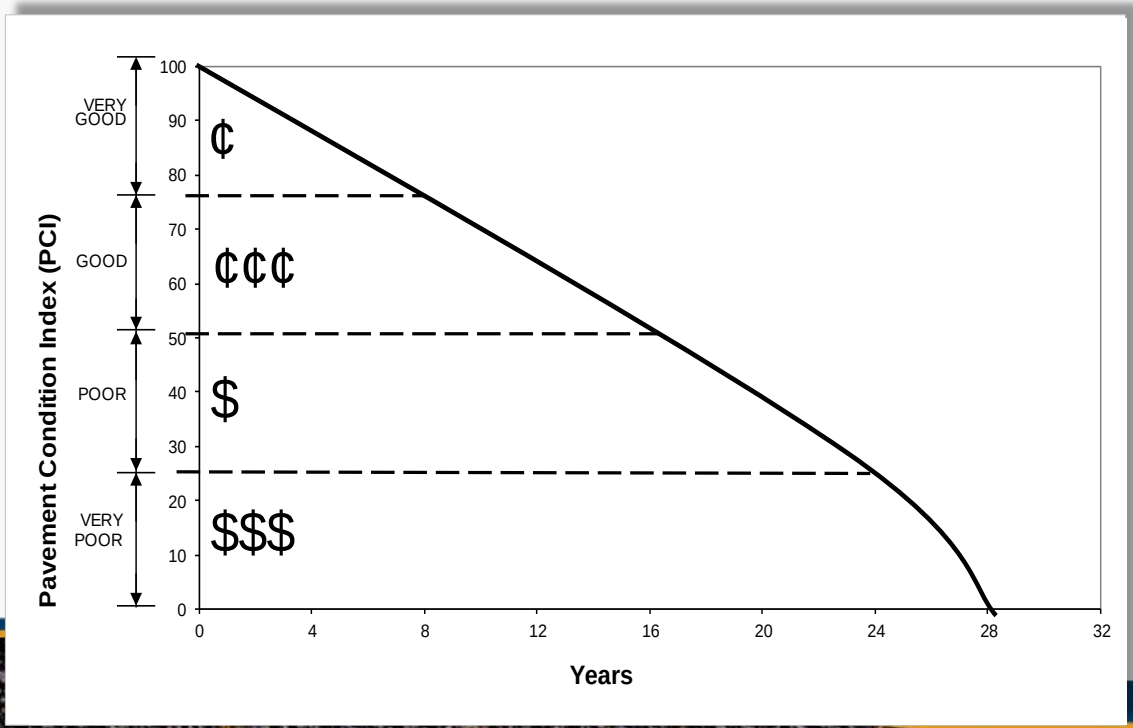
Pavement Preservation Timing



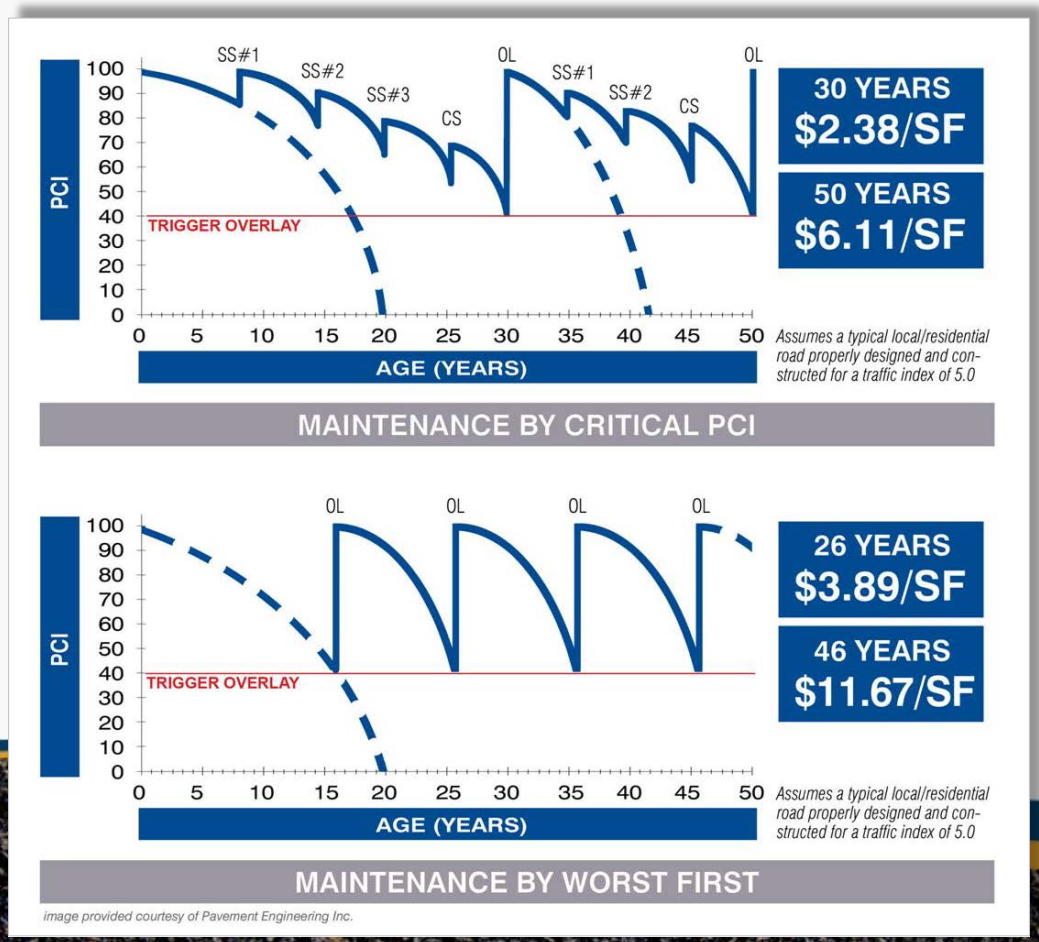
Pavement Management Strategies

- **Best-First "Top Down" Management:** focuses maintenance and rehabilitation on the best streets in the system. Interim procedure.
- **Worst-First "Bottom Up" Management:** focuses maintenance and rehabilitation on the worst streets in the system. Interim procedure.
- **Critical-Point Management:** focuses maintenance and rehabilitation on streets above rather than below a critical PCI. Most economical in the long run.

Pavement Condition vs. Maintenance / Rehabilitation Cost



Pavement Condition vs. Maintenance / Rehabilitation Cost



Council chose to implement the Critical Point Management strategy in March, 2016

WHERE ARE WE

City of Goleta System Data

- System Size
  - ✓ 83.67 centerline miles
  - ✓ 17,219,657 square feet of pavement
- Systemwide average weighted PCI of 67*
- Replacement value of $187,716,000

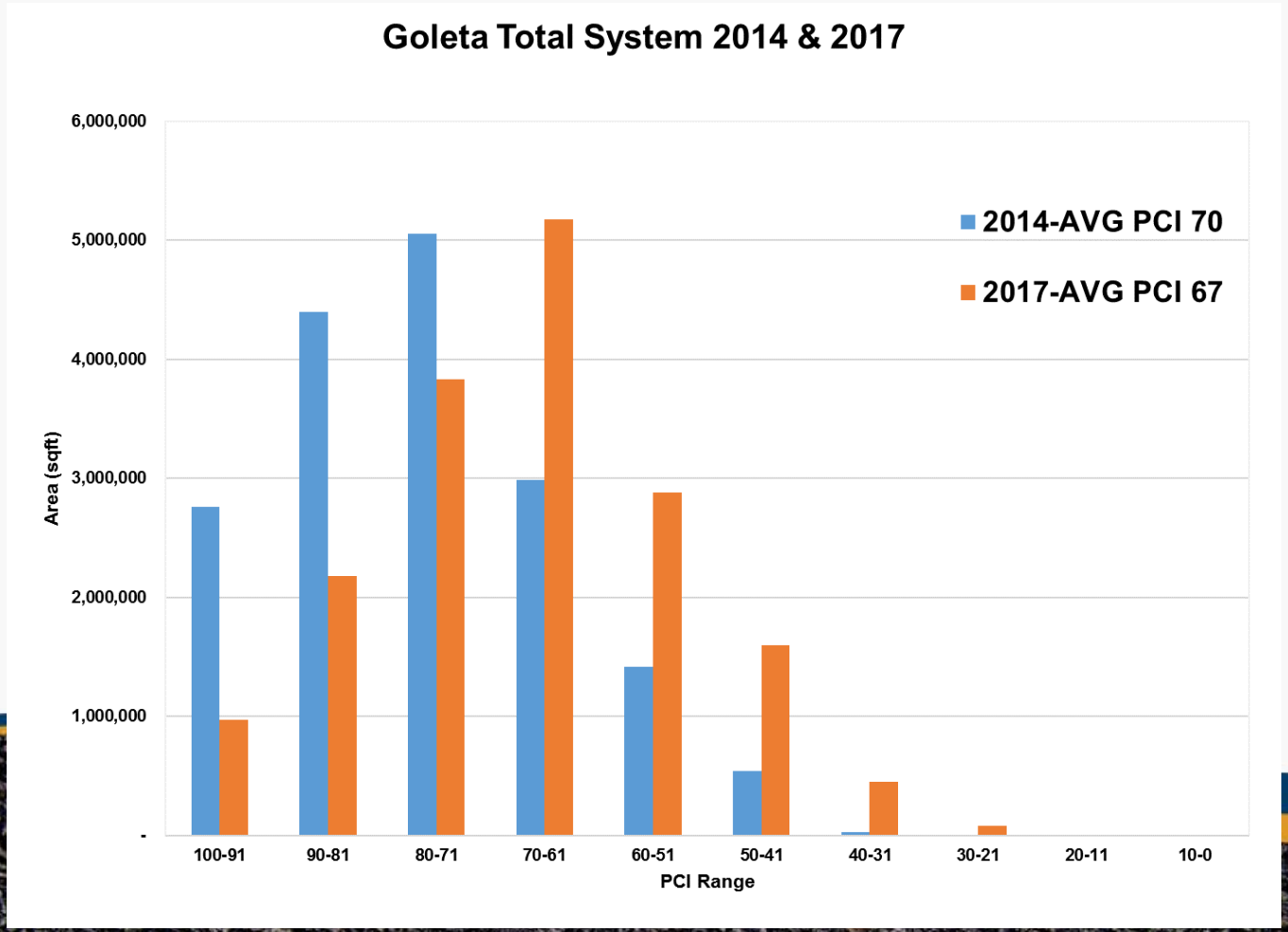
***Data includes Street Rehab work to be done this year.**

Maintained Road System

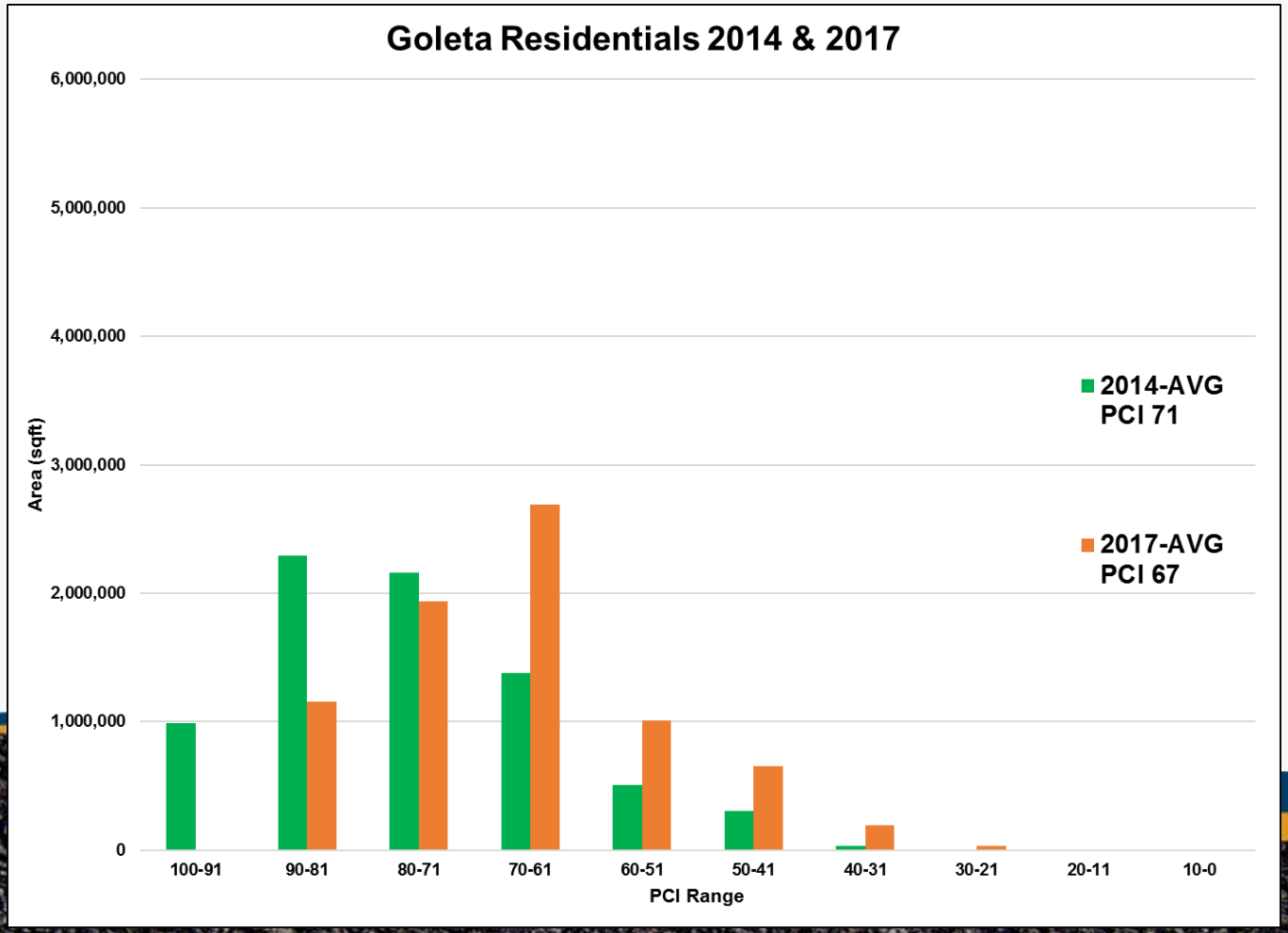
Functional Classification	Centerline Miles	Lane Miles	Percent of System	2014 Average PCI	2016 Average PCI	2017 Average PCI*	Average PCI Goal
Arterial	25.79	67.9	36.10%	67	64	70	**70**
Collector	17.01	35.8	19.40%	71	64	64	**67**
Residential	40.88	81.9	44.50%	71	68	67	**65**
Totals	**83.67**	**185.5**	**100%**	**70**	**66**	**67***	**67**

*Data includes Street Rehab work to be done this year.

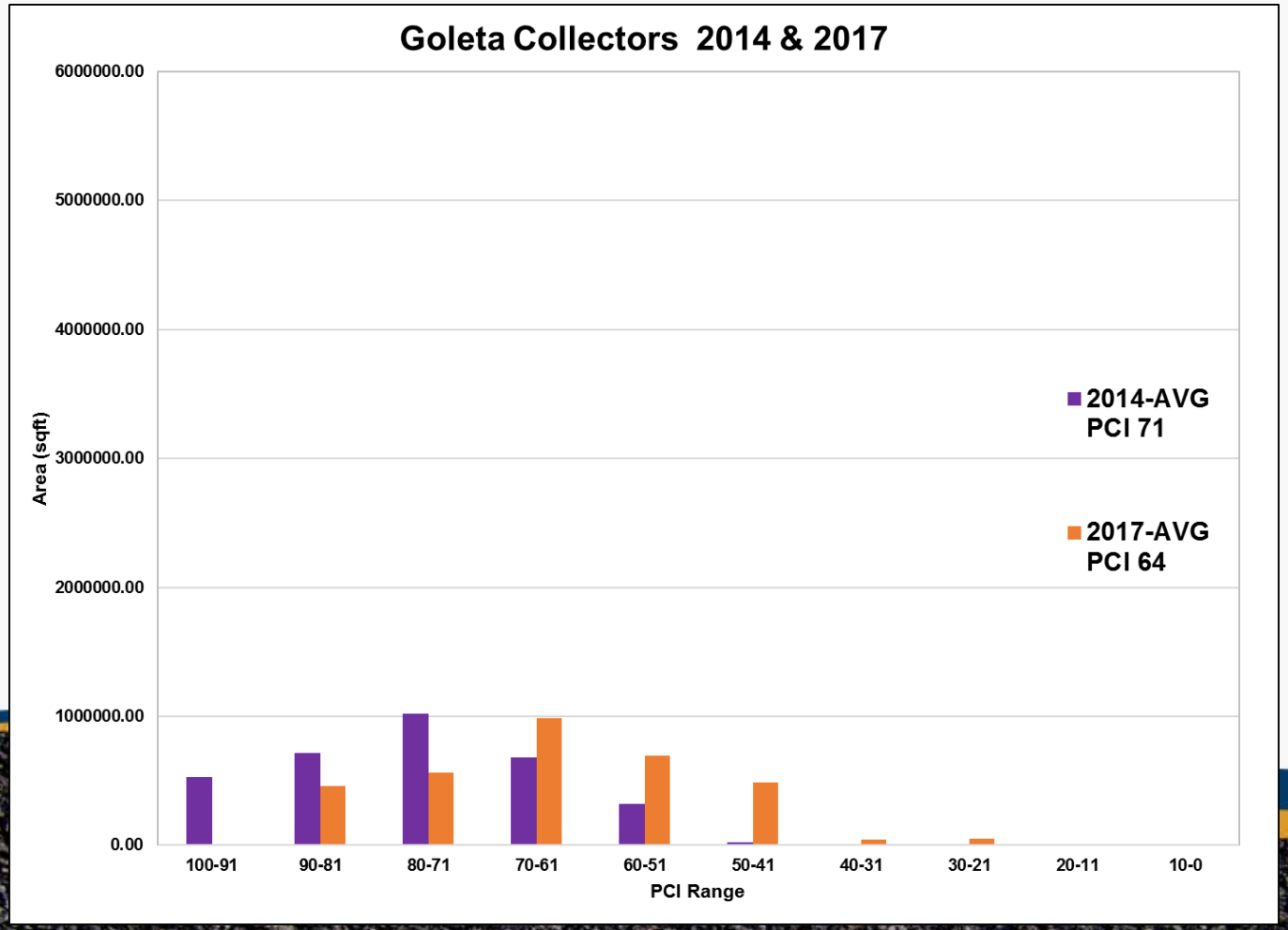
Current PCI Breakdown



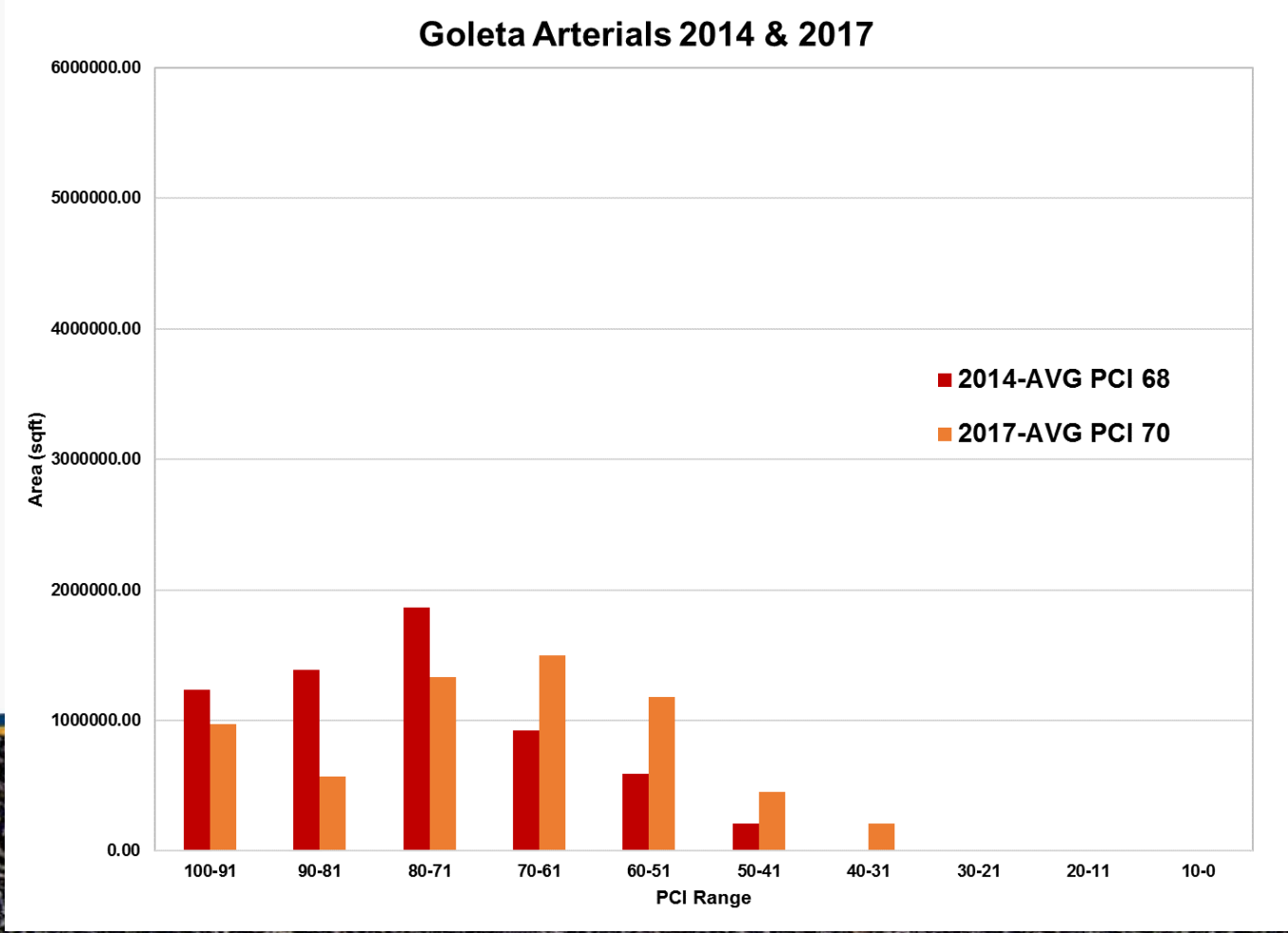
Residential PCI Breakdown



Collector PCI Breakdown



Arterial PCI Breakdown



2016 Forecast VS 2017 Forecast

(Estimated Construction Cost)

Fiscal Year	Multi-Level PCI (70,67,65) (Budget in $ Millions)
FY 16/17	$5.7
FY 17/18	$2.9
FY 18/19	$3.0
FY 19/20	$3.3
Total	**$14.9**

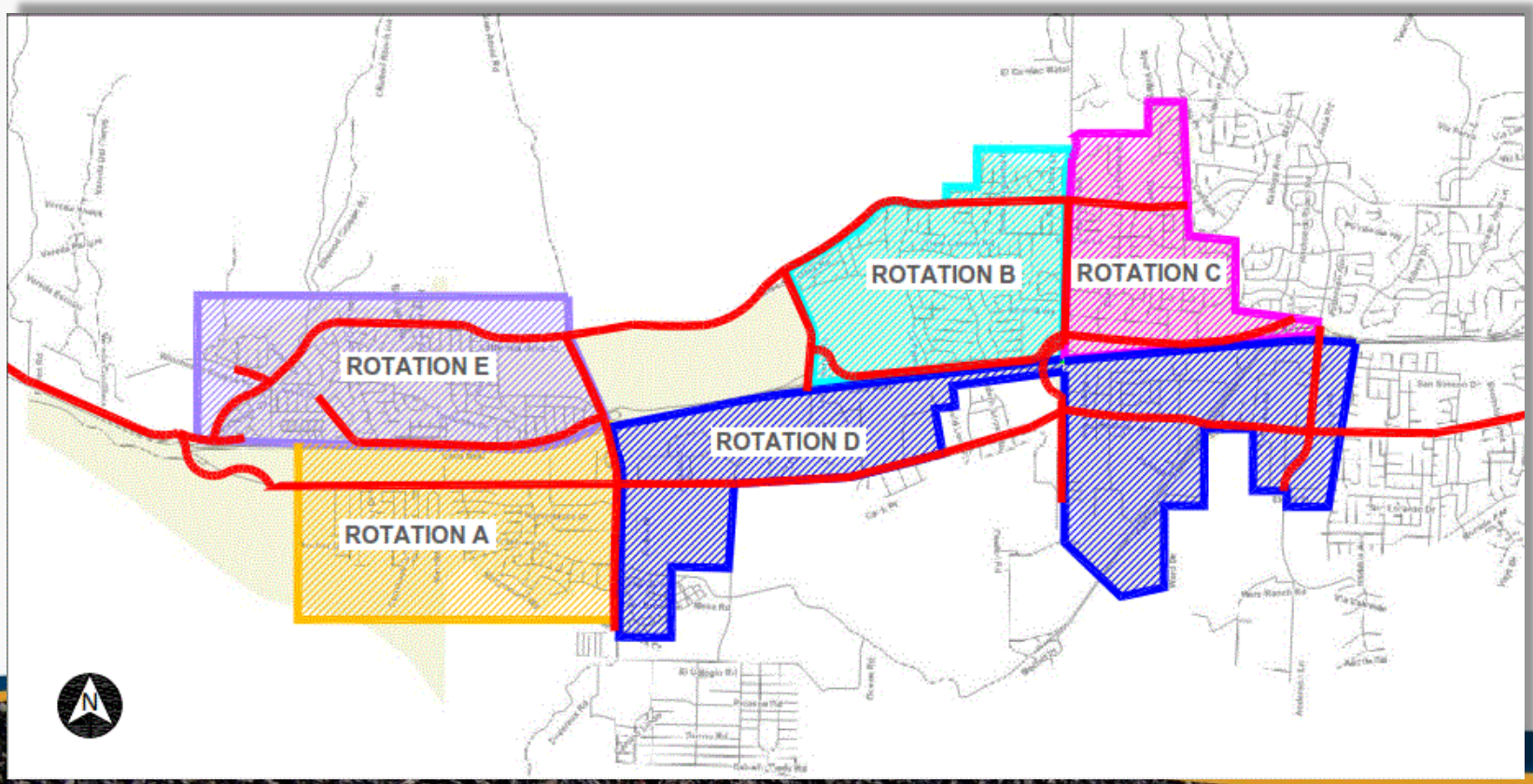
Fiscal Year	Multi-Level PCI* (70,67,65) (Budget in $ Millions)
FY 17/18	$4.1
FY 18/19	$3.7
FY 19/20	$2.9
FY 20/21	$4.3
FY 21/22	$3.3
Total	**$18.3**

*Data includes Street Rehab work to be done this year.

WHERE DO WE GO FROM HERE

- Prioritize Streets
- Value Engineering
- Refine Five-Year Plan
  - Critical PCI
  - Rotation Zones

Neighborhood Rotation Breakdown



Neighborhood Rotation Breakdown

NEIGHBORHOOD	NO. OF SECTIONS	CENTERLINE MILES	LANE MILES	AREA SF	AVERAGE PCI*
ART	97	25.79	67.88	6,216,016	70
A	67	9.77	20.19	1,182,786	66
B	107	15.5	31.32	2,964,664	68
C	63	7.93	15.86	1,499,254	68
D	73	10.69	21.50	2,026,964	63
E	118	13.99	27.98	2,609,972	65

*Data includes Street Rehab work to be done this year.

WHERE DO WE GO FROM HERE

- Prioritize Streets
- Value Engineering
- Refine Five-Year Plan
  - Critical PCI
  - Rotation Zones
  - Stop-Gap
    - Crack Filling
    - Spot Repairs

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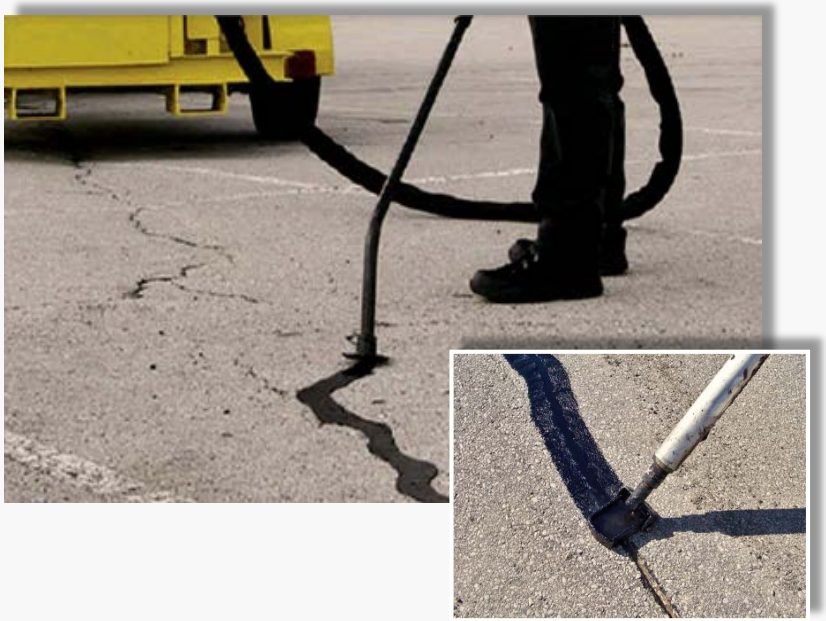
Crack Filling



Spot Repair

QUESTIONS?