

# Street Maintenance Program



Richard E Martinez

Assistant Director

**Transportation and Public Works Department**

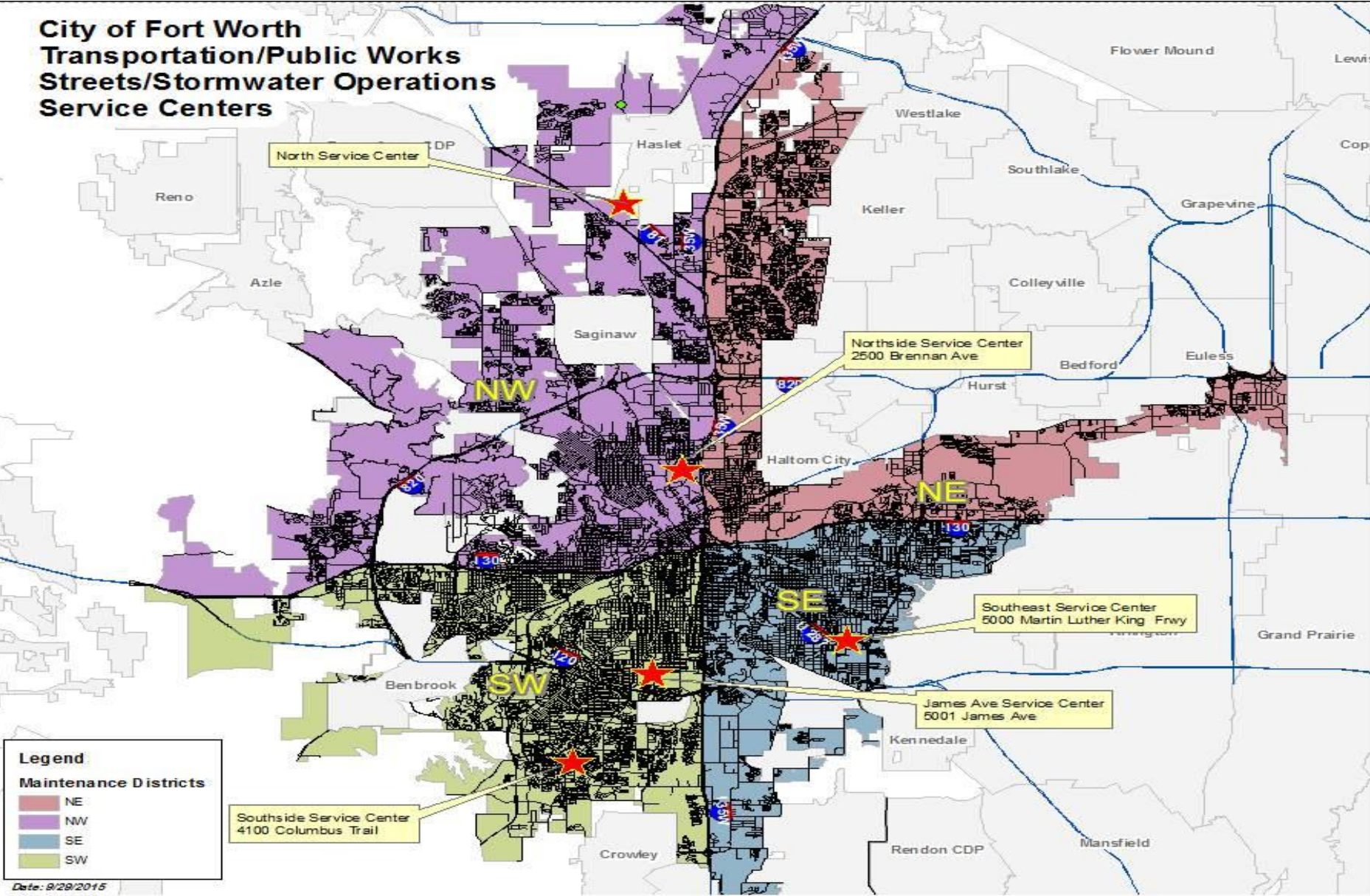


# Pavement Management Overview

- Street System Inventory- 7,420 LM
- Street Condition Assessments (3 year cycle)
- Prioritize Street Construction and Maintenance
- Identify the Proper Pavement Treatments
- Implement Proper Maintenance Cycles

# Service Areas

**City of Fort Worth  
Transportation/Public Works  
Streets/Stormwater Operations  
Service Centers**



Legend	
<span style="display:inline-block; width:15px; height:10px; background-color: #E91E63; border: 1px solid black;"></span>	NE
<span style="display:inline-block; width:15px; height:10px; background-color: #9C27B0; border: 1px solid black;"></span>	NW
<span style="display:inline-block; width:15px; height:10px; background-color: #2196F3; border: 1px solid black;"></span>	SE
<span style="display:inline-block; width:15px; height:10px; background-color: #8BC34A; border: 1px solid black;"></span>	SW

Date: 9/29/2015



# Maintenance Programs

## In-house

- Pothole Repair
- Base and Pavement Repair
- Concrete Repair
- **Chip Sealing**
- **Crack Sealing**
- Asphalt Mill and Overlay
- Bridge and Guardrail Repair

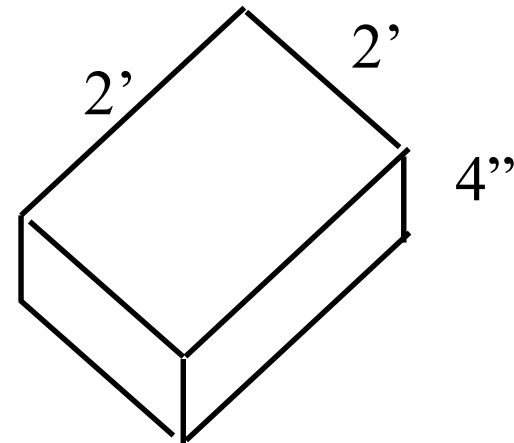
## Contractual

- Alley Mowing
- Base and Pavement Repair-Arterials
- Bridge Repair- Structural
- Asphalt Mill and Overlay
- Hot in Place Recycling
- **Micro-surfacing**
- Reclamation
- **Fog Sealing**
- **Joint Sealing**
- Concrete Restoration

# Pothole Repair

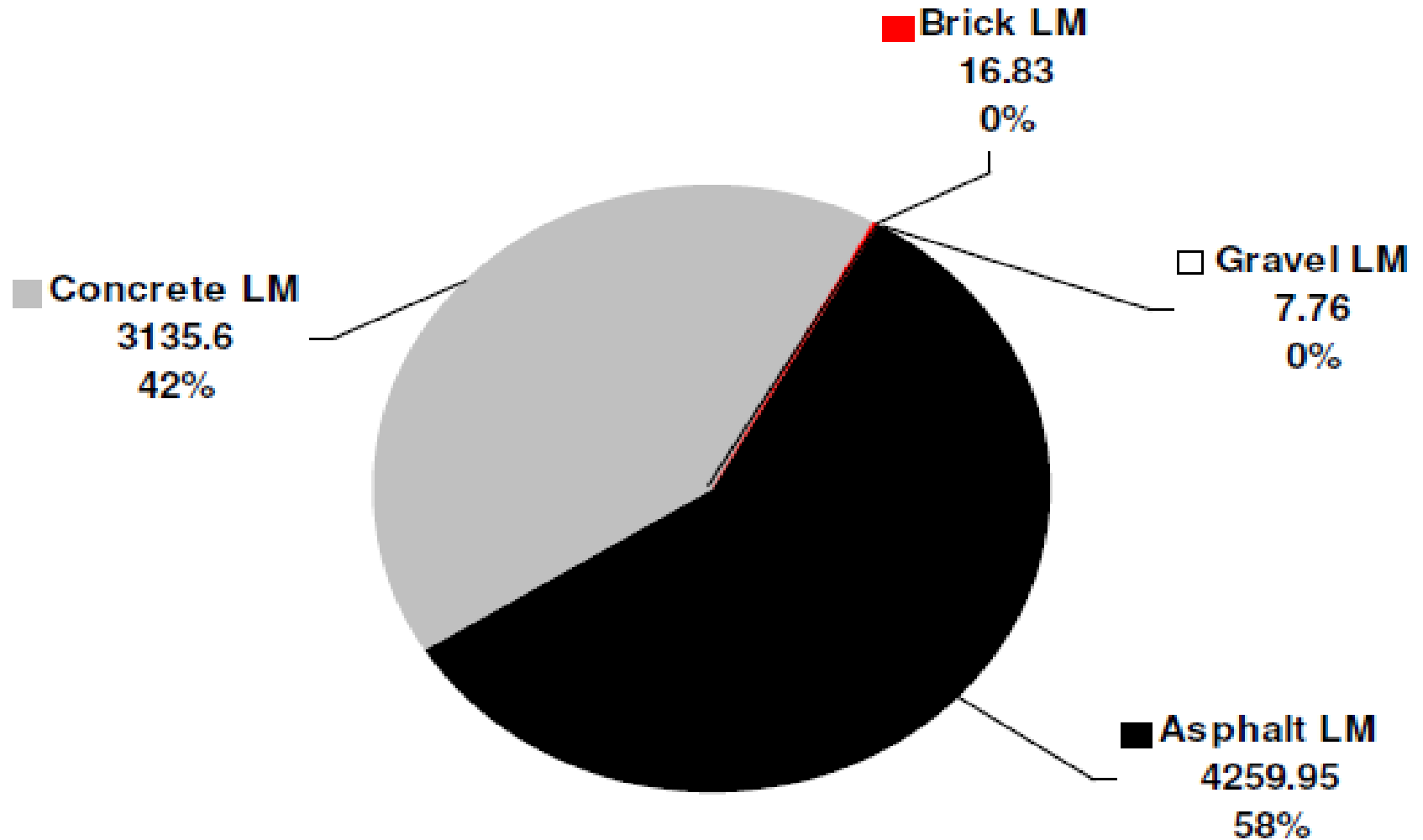


- High Priority – Customer Satisfaction
- Repair Procedures
  - ◆ Potholes are squared, tacked and compacted
- Repaired Annually– 45,000
- Standard Pothole
  - ◆ 2 foot wide
  - ◆ 2 foot long
  - ◆ 4 inches deep





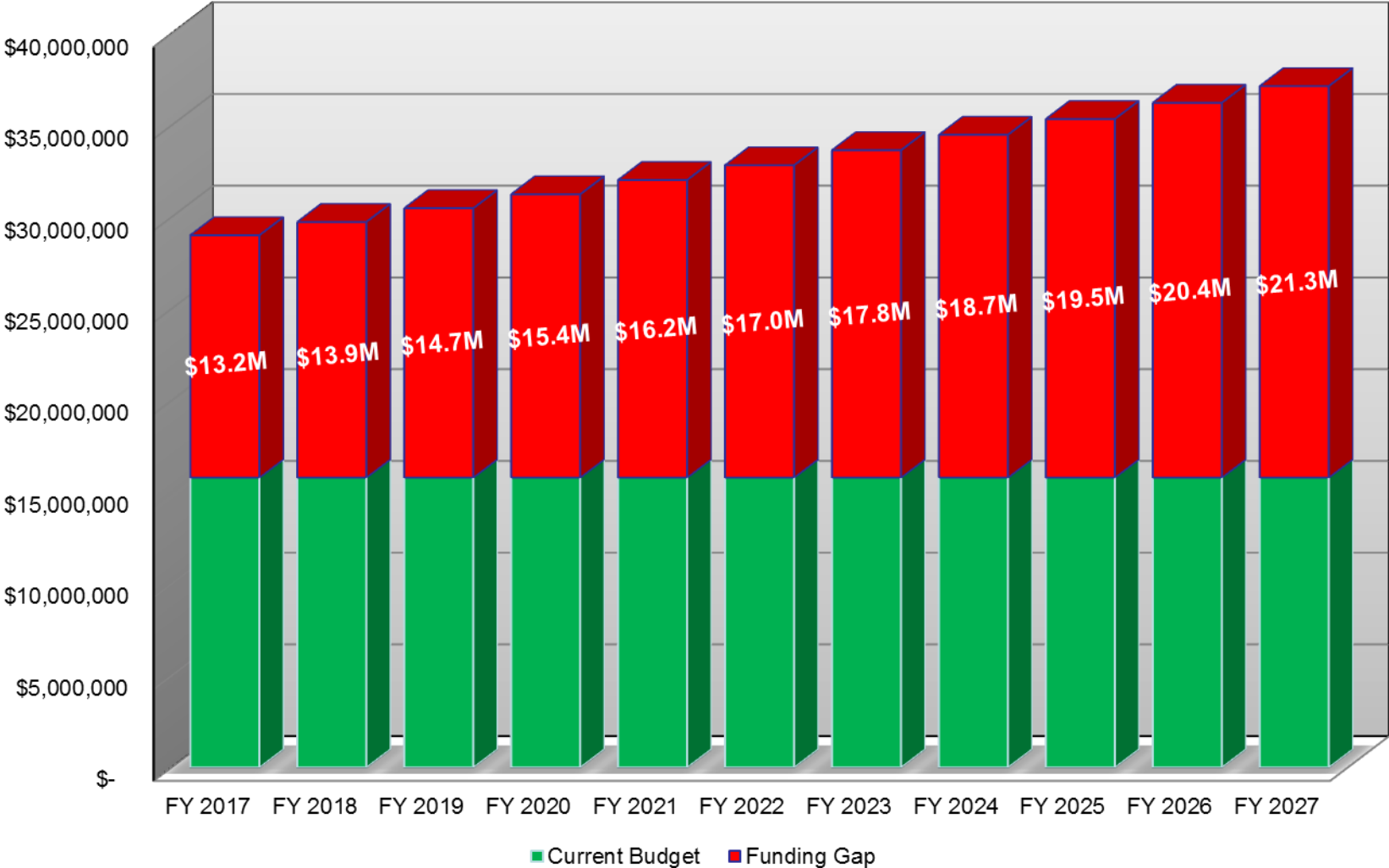
# Asset Management Pavement Infrastructure



# Pavement Design Manual

- All **new streets** are to be designed and built as **rigid pavements** - portland cement, concrete pavement.
- Maximize the life-cycle
  - Sustainability
  - Maximize life – usability – risk of failure
  - Minimize impact on maintenance costs

# Maintenance Funding Gap







# Network Conditions

Classification of Streets						
PQI Condition	Principal Arterial	Collector	Local Residential	Total	Percent of Network	Percent Condition
<b>Excellent</b>	466.75	262.43	1,823.11	2,557.29	34.47%	<del>70.12%</del>
<b>Good</b>	791.00	370.38	1,484.11	2,645.49	35.65%	
<b>Fair</b>	297.26	363.84	1,088.68	1,749.78	23.58%	<del>29.89%</del>
<b>Poor</b>	15.71	84.00	367.88	467.59	6.30%	
	<b>1,570.72</b>	<b>1,080.65</b>	<b>4,768.78</b>	<b>7,420.15</b>	<b>100.00%</b>	<b>100.00%</b>



# Asphalt Pavement Conditions

## Asphalt Streets

### Functional Classification of Streets in Fort Worth

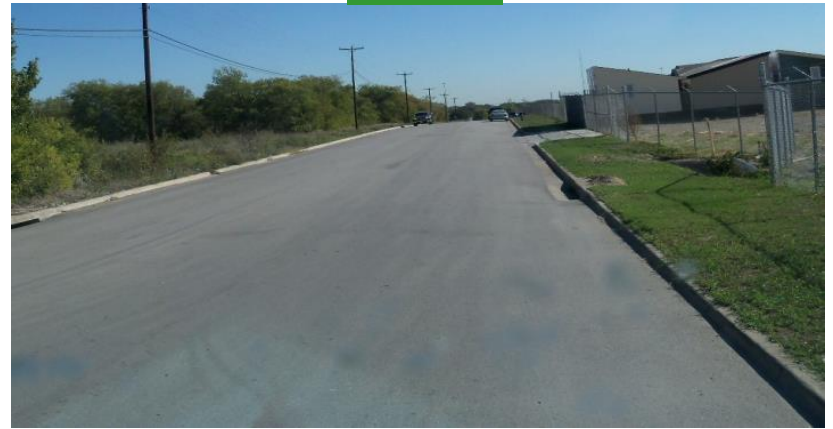
PQI Range	PQI Condition	Principal Arterial	Major Arterial	Minor Arterial	Collector	County Type Road	Local Residential	Total	Percent of Network	
2.00-4.09	Poor		4.83	1.89	10.36	24.82	184.86	226.76	5.31%	30.59%
4.10-6.09	Fair	6.37	54.10	29.76	101.10	126.65	761.46	1079.44	25.28%	
6.10-8.09	Good	38.15	131.91	76.87	179.08	182.69	1000.61	1609.31	37.69%	69.41%
8.10-10.00	Excellent	36.50	195.68	124.76	153.99	75.90	767.69	1354.52	31.72%	
		81.02	386.52	233.28	444.53	410.06	2714.62	4270.03	100.00%	100.00%

# Pavement Condition Examples

**Excellent**



**Good**



**Fair**



**Poor**





# Concrete Pavement Conditions

## Concrete Streets

### Functional Classification of Streets in Fort Worth

PQI Range	PQI Condition	Principal Arterial	Major Arterial	Minor Arterial	Collector	County Type Road	Local Residential	Total	Percent of Network	
2.00-4.09	Poor		4.38	2.50	3.90		13.28	24.06	0.76%	6.26%
4.10-6.09	Fair	20.50	30.78	23.60	21.60	0.13	77.69	174.30	5.50%	
6.10-8.09	Good	130.19	105.05	69.21	57.98	0.60	244.39	607.42	19.17%	93.74%
8.10-10.00	Excellent	97.00	258.38	132.87	137.56	4.51	1733.32	2363.64	74.58%	
		247.69	398.59	228.18	221.04	5.24	2068.68	3169.42	100.00%	100.00%

# Pavement Condition Examples

**Excellent**



**Good**



**Fair**

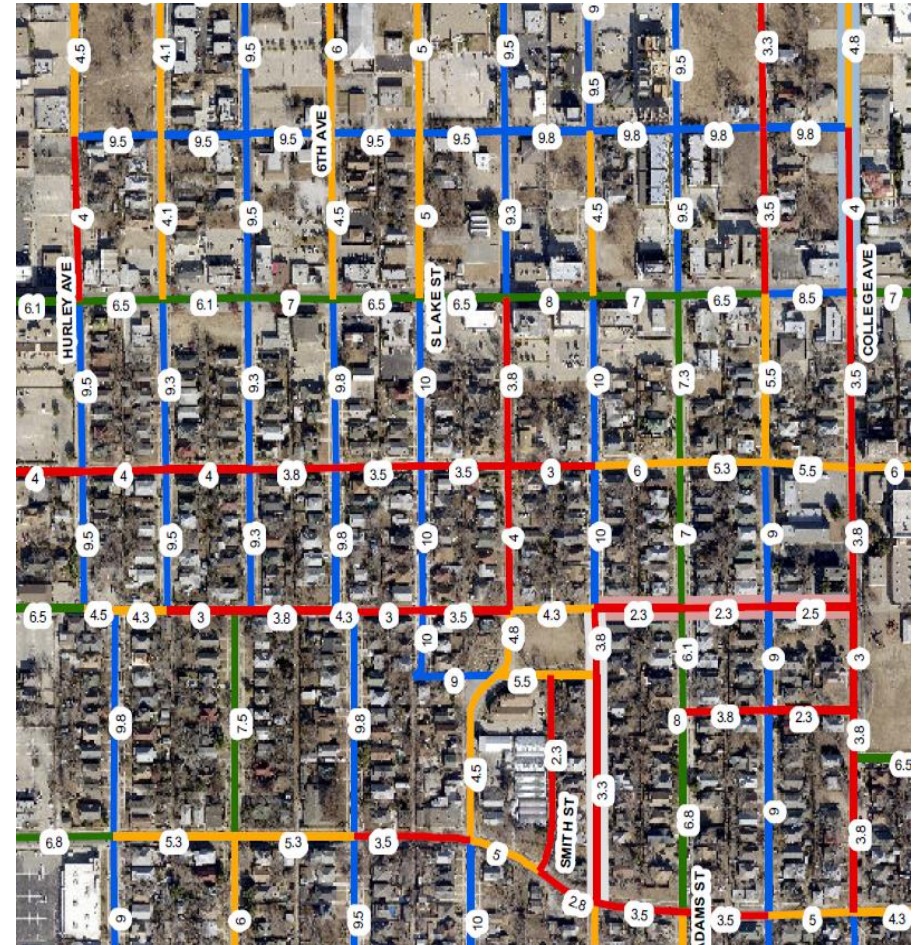


**Poor**



# Prioritizing Streets

- Construction and Maintenance
  - Pavement and Flat Work Conditions
  - Neighborhood Approach
    - Poor Streets – Bond
    - Fair Streets- Rehabilitation
    - Good Streets- Sealants
    - Excellent Streets- Minor Maintenance
  - Multimodal Routes
    - Schools
    - Bus Routes
  - Density of Population
    - Residential
  - Customer Service Requests
    - High Customer Service Requests
    - Continual Maintenance

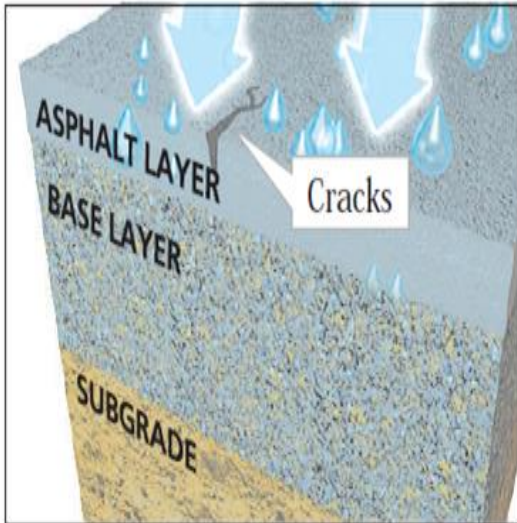


# Factors to Consider

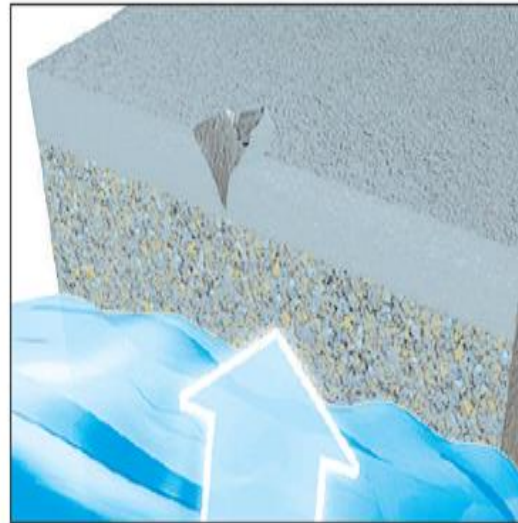
- Total Life-Cycle Costs
- Soil Conditions
- Risk of Failure
- Time To First Maintenance
  - 3 Years- Flexible
  - 8 Years- Rigid
- Maintenance Cycles



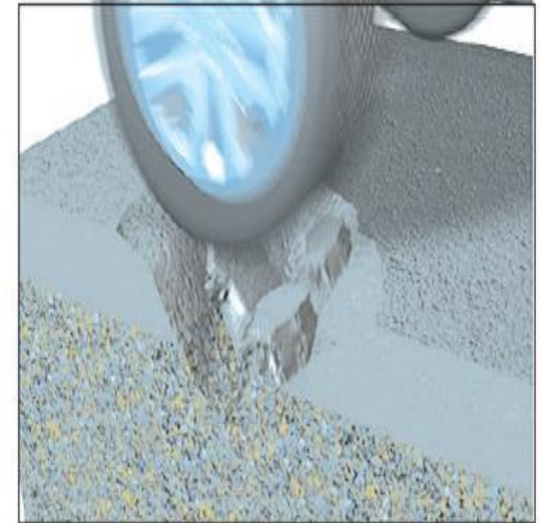
# Risk of Failure



- Cracking
- Moisture penetration
- Weakens the pavement structure



- Prolonged moisture weakens base layer
- Ground saturation



- Street structure can no longer support vehicle weights
- Continual traffic chip the pavement developing potholes



# Pavement Distresses

## Asphalt Pavement:

- Alligator Cracking
- Bleeding
- Distortion
- Edge Cracking
- Excessive Crown/Shoulder Drop off
- Longitudinal Cracking
- Transverse Cracking
- Patching
- Potholes
- Raveling and Weathering
- Ripping and Shoving
- Rutting

## Concrete Pavement:

- Cracking
- Corner Cracking
- Distortion
- Joint Sealant Loss
- Spalling
- Panel Displacement
- Longitudinal Cracking
- Patching
- Polishing



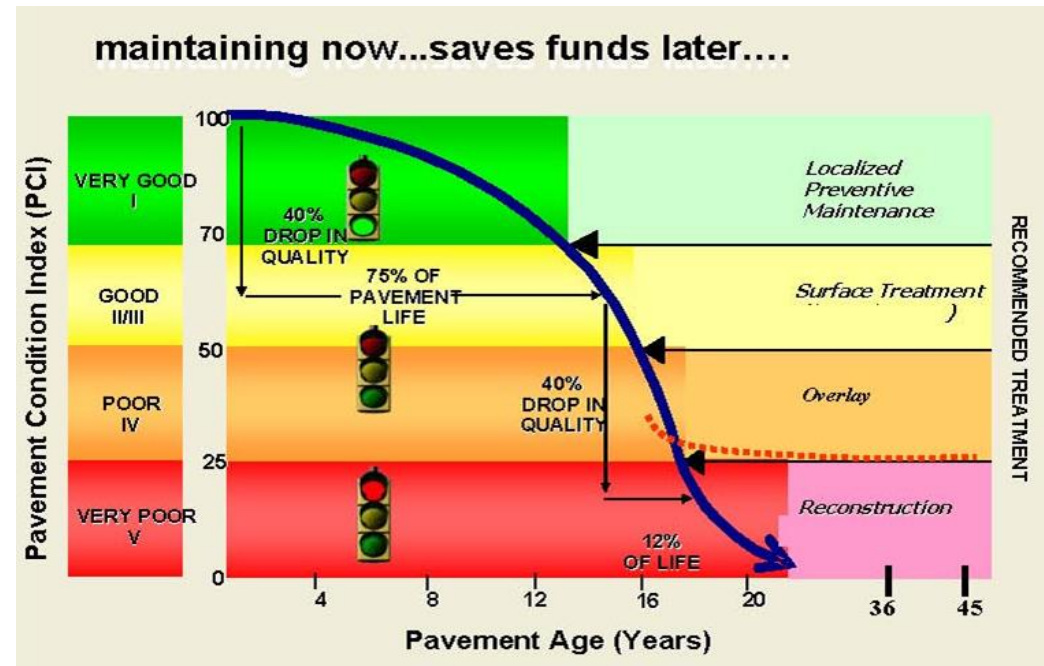
# Maintenance Techniques

## Asphalt Maintenance

- Crack Sealing
- Fog Sealing
- Chip Sealing
- Micro-Surfacing
- Asphalt Overlay
- Asphalt Rehabilitation
- Reconstruction

## Concrete Maintenance

- Joint Sealing
- Slab Lifting
- Concrete Restoration
- Reconstruction



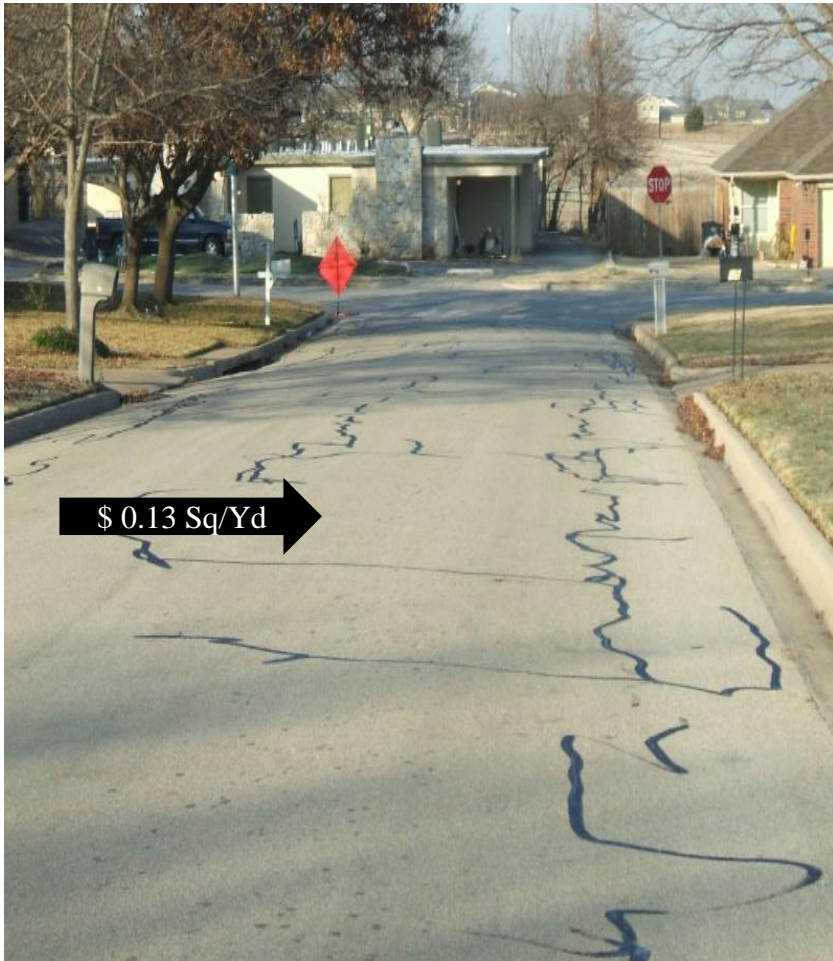
# Concrete Infrastructure Repair

Joint Seal - \$21,000 Lane Mile



# Pavement Preservation

Crack Seal - \$1,000 Lane Mile



Chip Seal - \$16,000 Lane Mile



# Fog Sealing



# Seal Coating

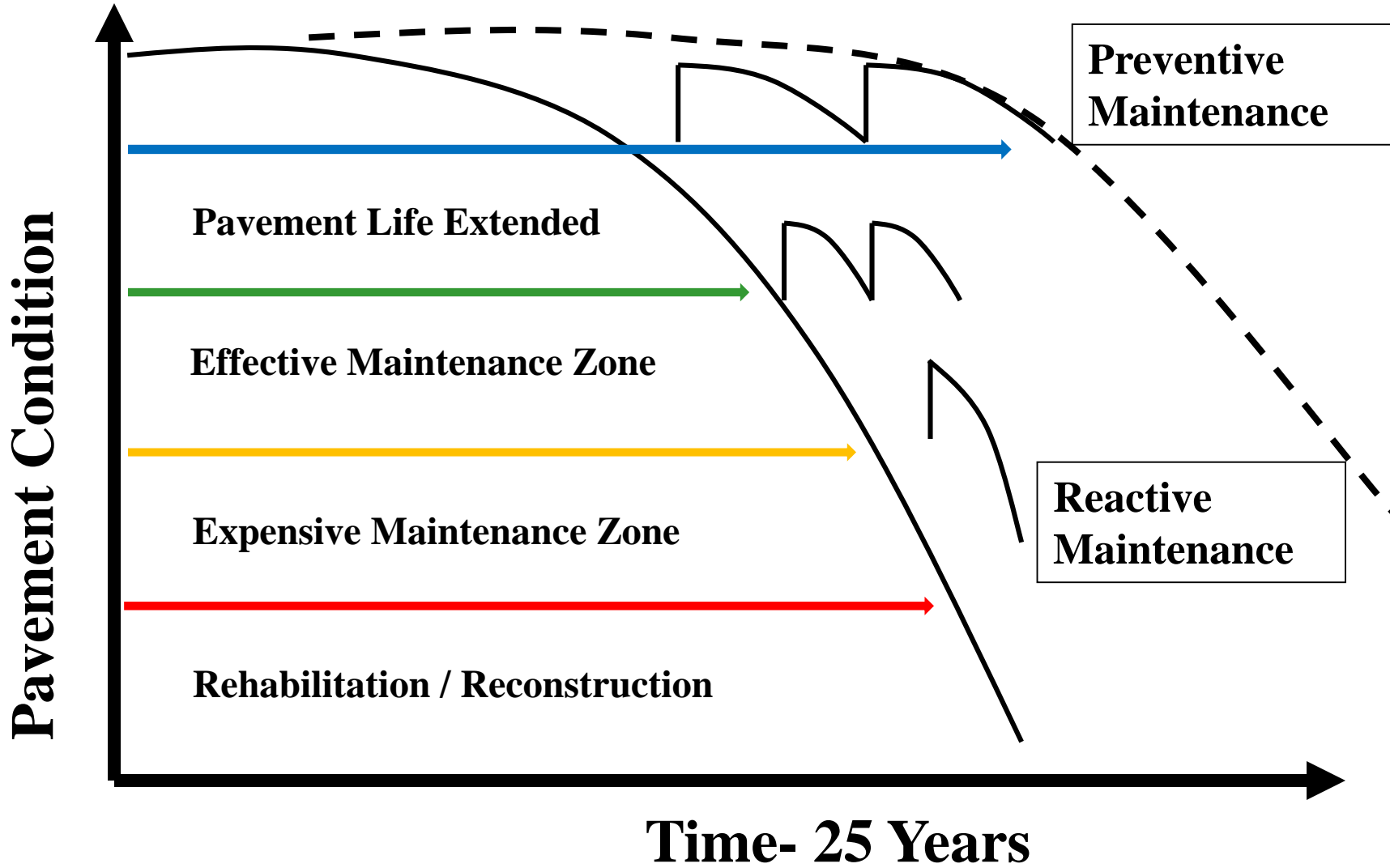


# Street Reclamation





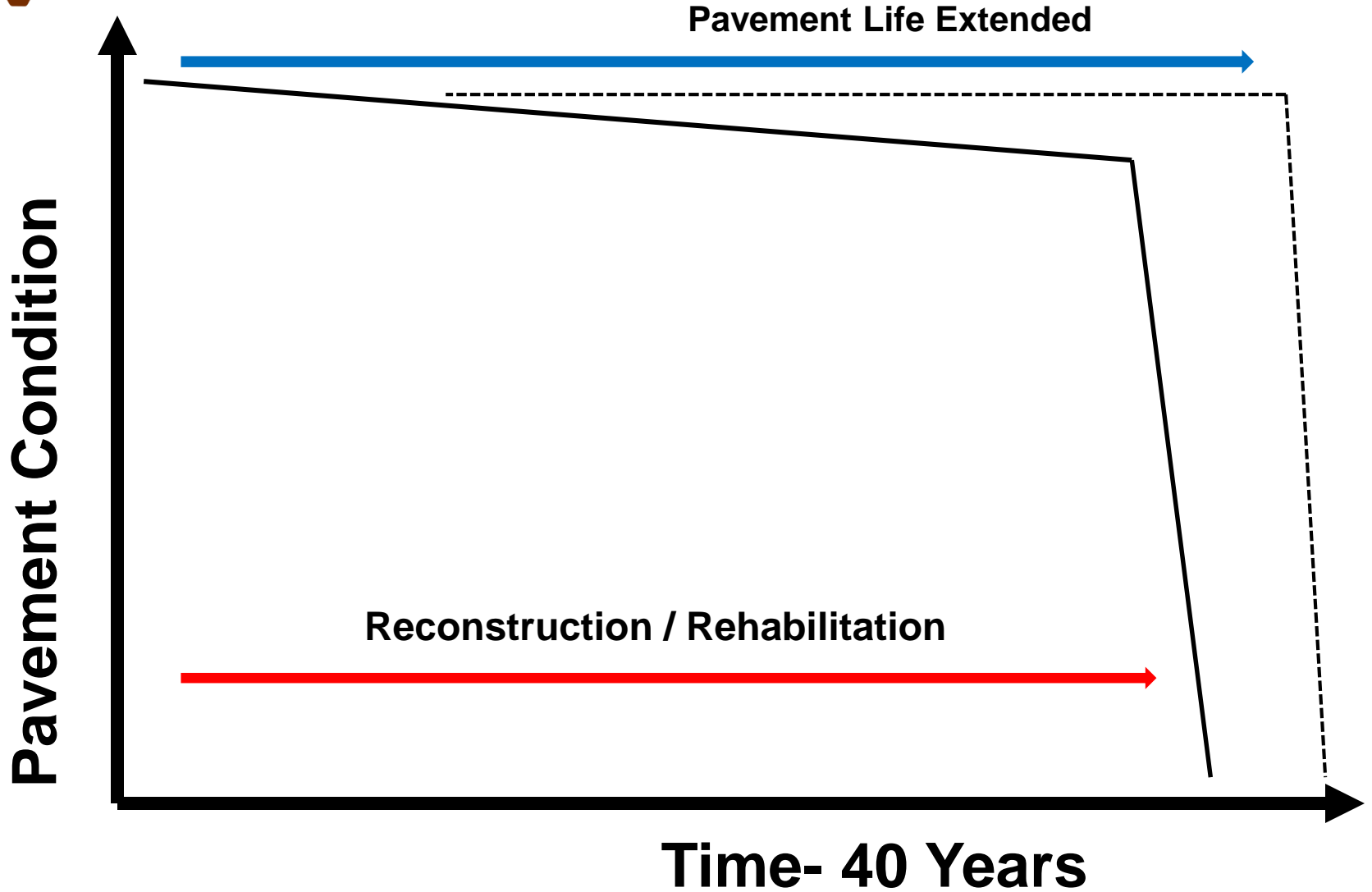
# Optimized Maintenance- Asphalt





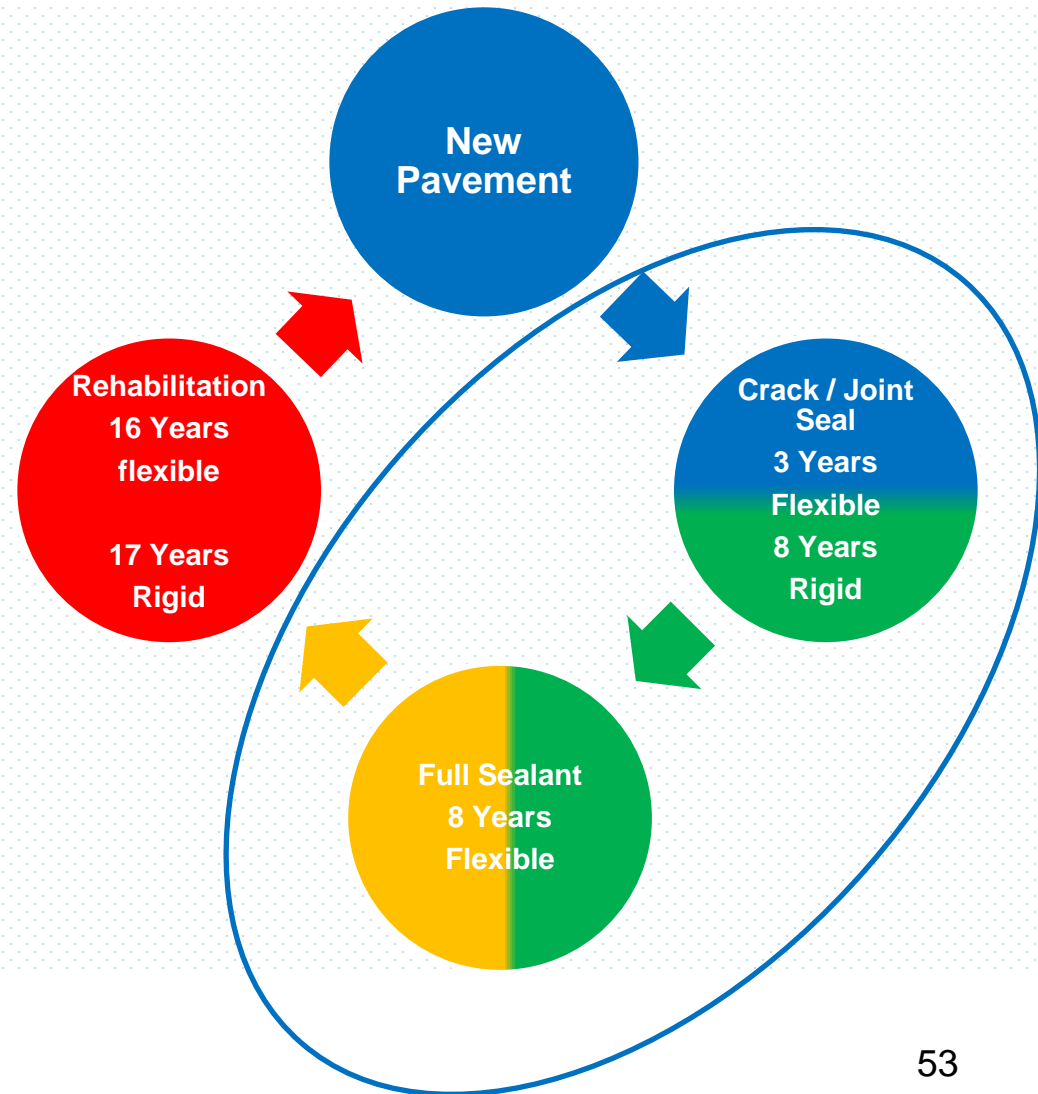


# Optimized Maintenance- Concrete



# Maintenance Cycles

- 25 Year Street Life Cycle - Asphalt
  - Scheduled Maintenance, Sealants to Rehabilitation
  - Recapitalization, Full Reconstruction
- 40 Year Street Life Cycle - Concrete
  - Joint Sealing to Panel Replacement
  - Recapitalization, Full Reconstruction
- Optimum Maintenance Cycle
  - 16 Years- Asphalt
  - 25 Years- Concrete
- ROI - Minimal Maintenance
- Optimum-Short Cycle
  - Deter Rehabilitation Costs



# Pavement Life Cycle Costs - 25 Yr

## **Asphalt Pavements**

- 3 Yrs - Crack Seal
- 8 Yrs – Seal Coat
- 16 Yrs- Asphalt Overlay
- 19 Yrs- Crack Seal
- 24 Yrs- Seal Coat
  
- Total Cost \$242,276 LM
  - 2% annual inflation

## **Concrete Pavements**

- 8 Yrs- Joint Seal
- 17 Yrs- Point Repairs
- 25 Yrs- Joint Seal
  
- Total Cost \$146,429 LM
  - 2% annual inflation



# Pavement Life Cycle Costs – 40 Yr

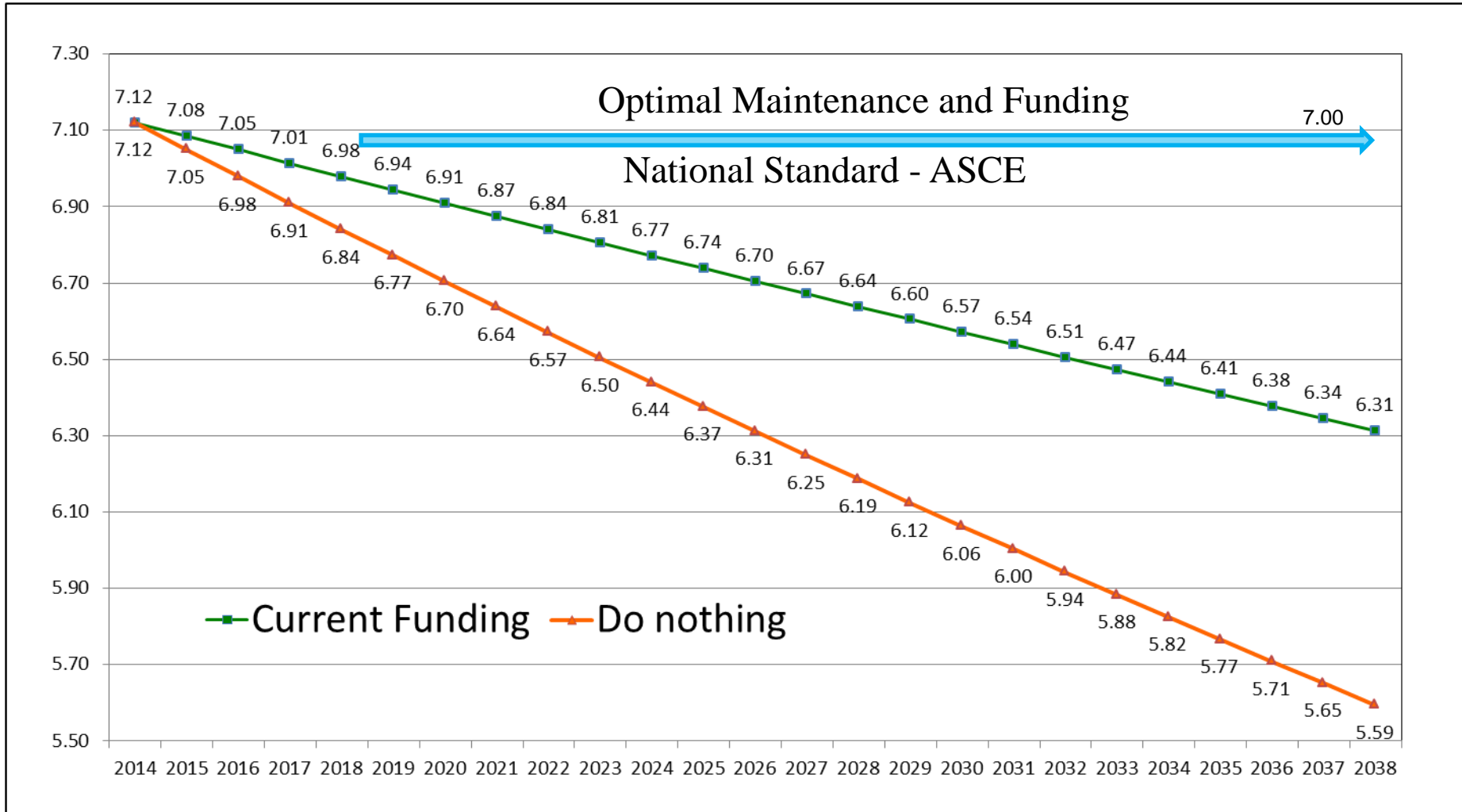
## Asphalt Pavements

- 3 Yrs - Crack Seal
- 8 Yrs – Seal Coat
- 16 Yrs- Asphalt Overlay
- 19 Yrs- Crack Seal
- 24 Yrs- Seal Coat
- 29 Yrs- **Reconstruction**
- 31 Yrs- Crack Seal
- 35 Yrs- Seal Coat
  
- Total Cost \$1,113,767 LM

## Concrete Pavements

- 8 Yrs- Joint Seal
- 17 Yrs- Point Repairs 10%
- 25 Yrs- Joint Seal
- 33 Yrs- Point Repairs 25%
- 40 Yrs- Joint Seal
  
- Total Costs \$492,845 LM

# Managing Aging Assets



# Asset Management

upfront *planning* of the asset life cycle...

...*efficient* maintenance cost.

...ongoing *effective* maintenance...



...*effective life cycle*...

# Preservation today or.....





Questions?

Richard Martinez- (817) 392-7914

[richard.martinez@fortworthtexas.gov](mailto:richard.martinez@fortworthtexas.gov)