



City of West Des Moines

PAVEMENT MANAGEMENT SYSTEM



Municipal Street Seminar (11-14-2018)
JEFF NASH

12/11/2018



WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

- **City Background Information:**

- **West Des Moines current census Population is around 66,000 with a daytime population estimated at 127,000. West Des Moines is in parts of four Iowa counties: Polk, Dallas, Warren, and Madison.**
- **Current approximate replacement value of the City's road network is around \$1.4 Billion. (The road network is probably the largest investment asset the City owns.)**
- **Currently 830 lane miles (307 centerline miles) of public streets. 779 Lane miles paved and 51 lane miles unpaved.**
- **The past two decades the City's street network has grown an average of 3.5% per year. 39% CIP, 33% Subdivisions and 28% annexed or TJ.**
- **Many of the City's paved roads were constructed in the mid 1990's to early 2000's. This means their future maintenance and rehabilitation needs could occur in the coming years within the same short time period.**



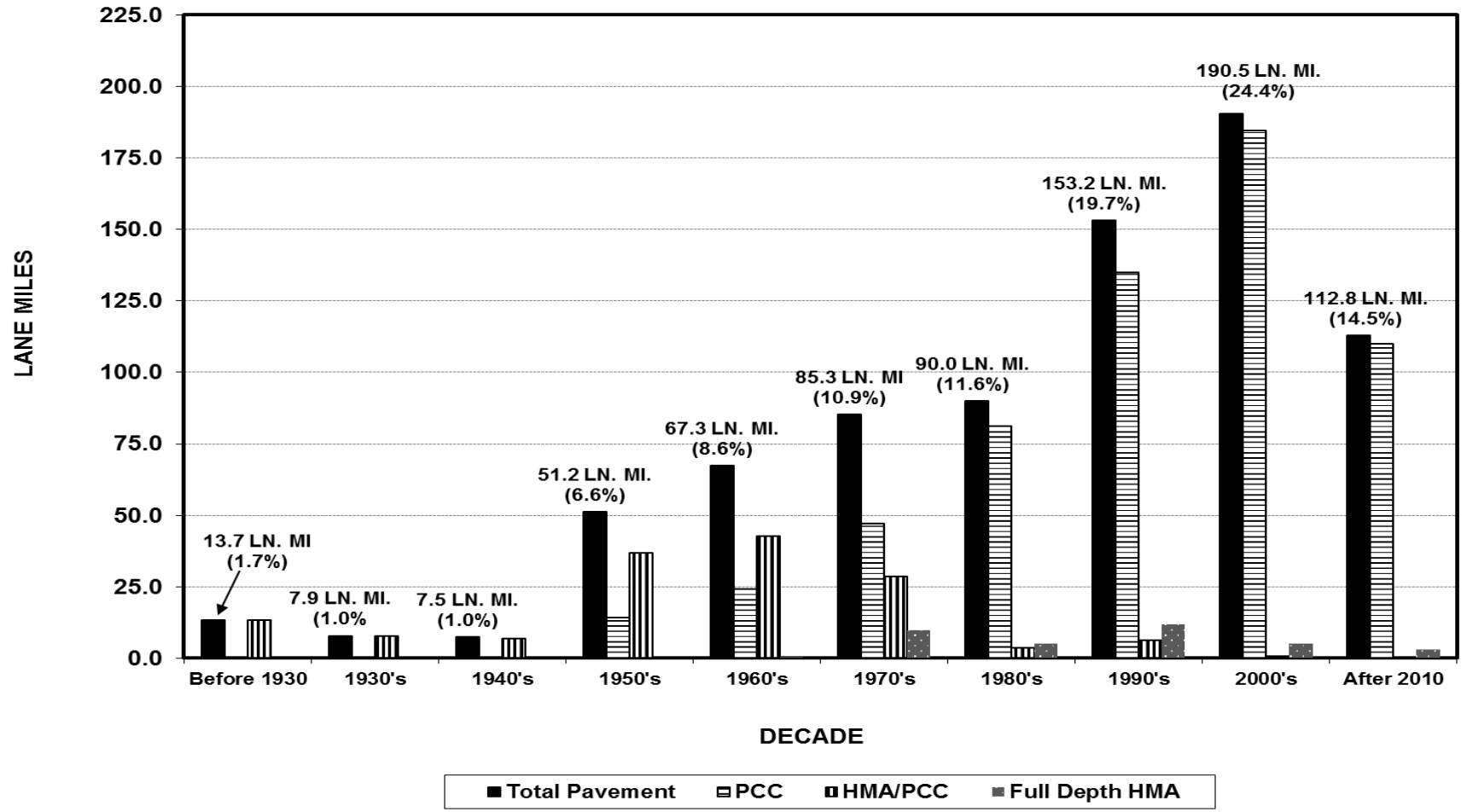


WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

City Street Network By Age Distribution

WDM Street Original Paving or Reconstruction
By Decade

(779 Ln. Mi. of Total Paved Streets in the City As Of 10/1/2018)

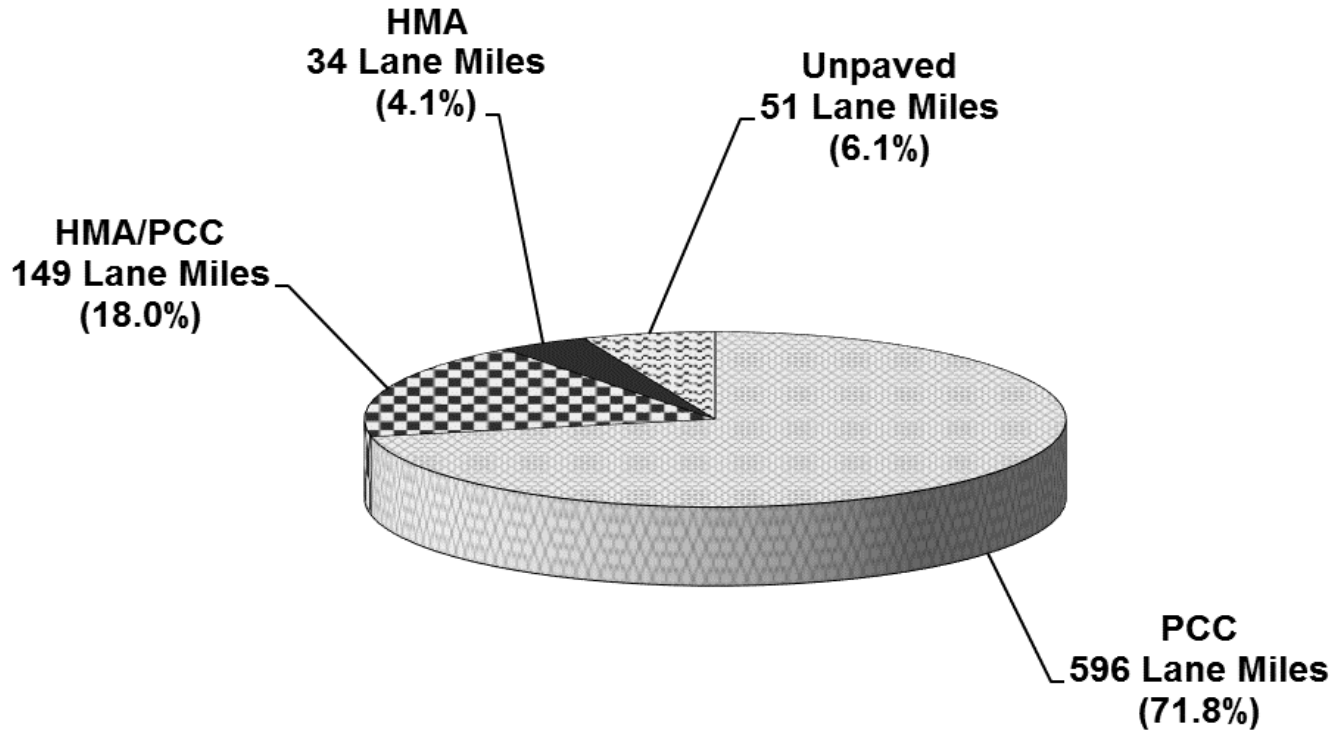




WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

Current City Street Network (As of 10/1/18)

West Des Moines, Iowa
Street Lane Miles By Existing Pavement Construction
City Total = 830 Lane Miles
(307 Centerline Miles)

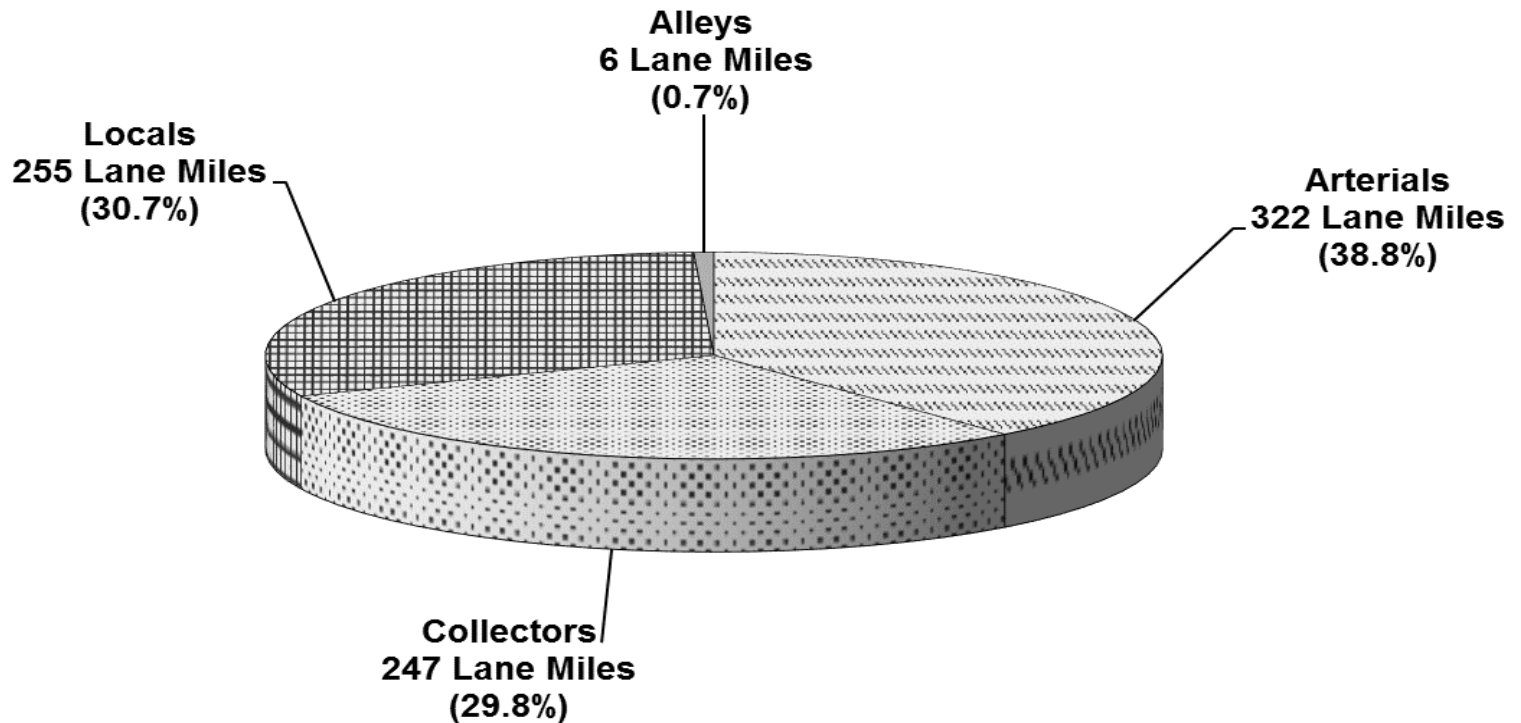




WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

Current City Street Network (As of 10/1/18)

West Des Moines, Iowa
Street Lane Miles By Functional Class
City Total = 830 Lane Miles
(307 Centerline Miles)





WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

- **Infrastructure Asset Management:**

- **West Des Moines has used a computerized Pavement Management System since the 1990's.**
- **Prior to 2016 the City used in-house staff for street inspections and used its own condition rating system.**
- **Due to street network growth the City no longer had enough resources to continue in-house inspections.**
- **In 2017 the City started using the Iowa Pavement Management Program (IPMP) through ISU INTRANS for street inspections and condition ratings.**
- **The City's pavement management program is funded mainly through Road Use Tax Funds with occasional supplemental funding by General Obligation (G.O.) Bonds.**
- **With appropriate maintenance and rehabilitation the goal is to have the typical pavement life of the City's streets last at least 80 to 90 years.**





WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

City Asset Programs:

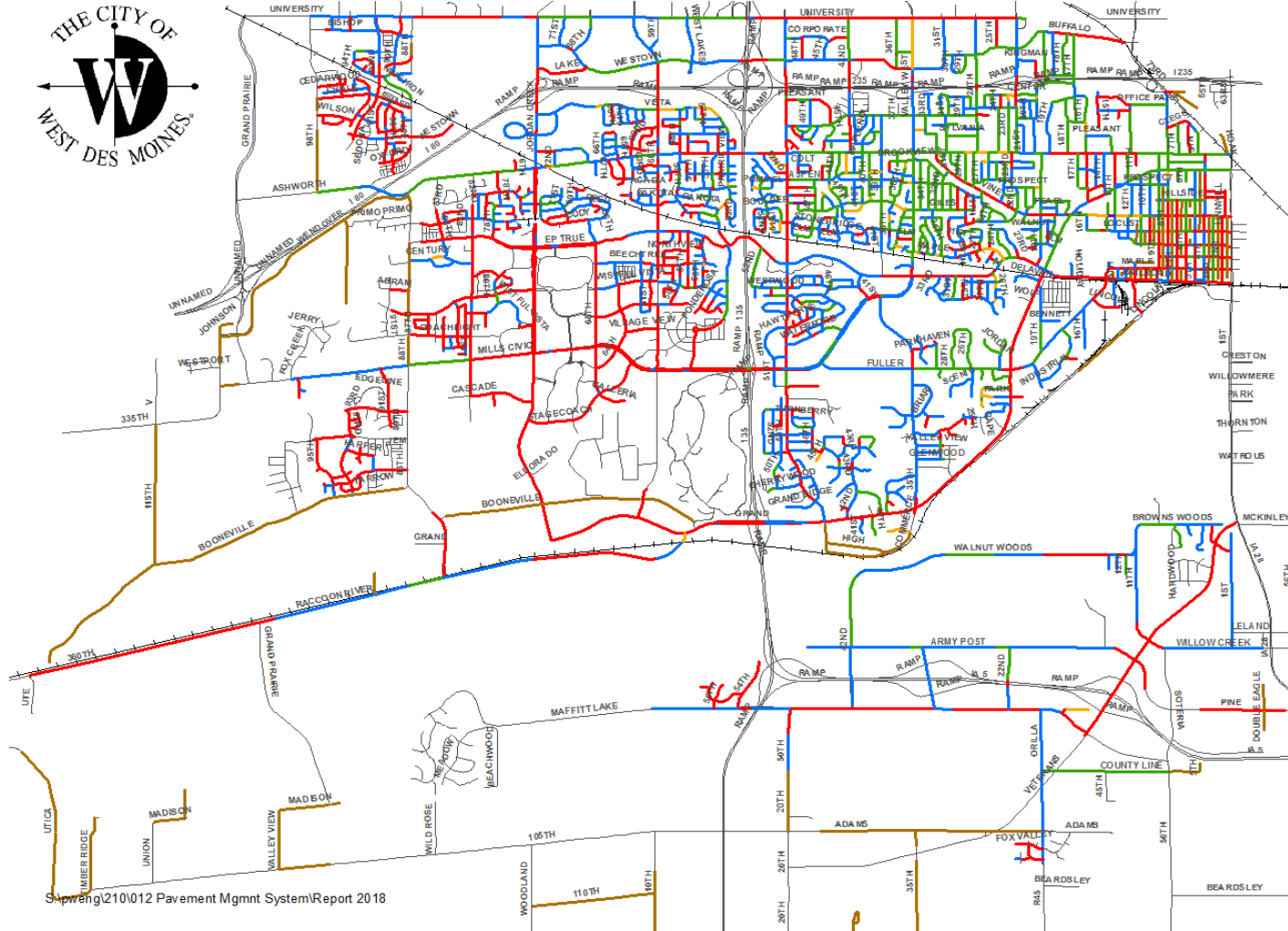
WEST DES MOINES, IOWA INFRASTRUCTURE ASSET PROGRAMS			
Asset	Inspection & Rating Procedure	Inspection Cycle	Analysis
Pavement	Road Rater - IPMP (Iowa Pavement Management Program)	2 Years	dTIMS Software
Sewer Pipe	Video - PACP (Pipe Line Assessment Certification Program)	8 Years	Wincan Software
Bridges & Street Culverts	Consultant Visual - NBIS (National Bridge Inspection Standards)	2 Years	Iowa DOT Structure Inventory and Appraisal
Levee Flood Control System	Visual - Army Corp Criteria	2 Years	Army Corp Criteria
MH's & Intakes	Visual - Distress & Repair Criteria	5 Years	Prioritize Repair Needs
Public Outlets & Channels	Visual & Drone - Distress & Repair Criteria	5 Years	Prioritize Repair Needs
City Parking Lots	Visual - Repair ID	Variable	Prioritize Repair Needs
Trails	Visual & MPO - Distress & Repair ID	Variable	Prioritize Repair Needs
Stormwater Management Post Construction - Private Detention Items	Visual - City MS4 Permit Requirements	Min. 15% per Year	Iowa DNR Criteria & EPA NPDES (National Pollutant Discharge Elimination System)



WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

City's Street Network Condition Ratings

WEST DES MOINES TOTAL PAVEMENT NETWORK CITYPCI BASED ON 2017 IPMP INSPECTED STREETS
(Inspected Pavement Base Average Network PCI: 73.0)



Pavement Condition Category

- EXCELLENT (80-100) (39.6%)
- GOOD (60-80) (33.7%)
- FAIR (40-60) (18.8%)
- POOR (20-40) (1.7%)
- VERY POOR (0-20) (0.1%)
- GRAVEL ROADS (NR) (6.1%)



NOT TO SCALE

UPDATED
10/23/2018

Supp'ng 210\012 Pavement Mgmt System Report 2018



WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

Pavement Distress Weight Factor Comparisons

INTRANS -IOWA DOT PCI CONCRETE PAVEMENT WEIGHT FACTORS	
DISTRESS CATEGORY	% WEIGHT FACTOR
IRI (ride)	35%
"D" Cracking	25%
Joint Spalling	15%
Transverse Cracking	25%

INTRANS - IOWA DOT PCI COMPOSITE PAVEMENT	
DISTRESS CATEGORY	% WEIGHT FACTOR
IRI (ride)	25%
Transverse Cracking	20%
Longitudinal Cracking	30%
Alligator Cracking	8%
Patching	8%

(1) Includes both wheel path and non-wheel path longitudinal cracking.

INTRANS - CityPCI CONCRETE PAVEMENT	
DISTRESS CATEGORY	% WEIGHT FACTOR
IRI (ride)	15%
Transverse Cracking	20%
Longitudinal Cracking (1)	10%
D-Cracking and Spalling	30%
Patching	25%

(1) Includes both wheel path and non-wheel path longitudinal cracking.

INSTRANS CityPCI COMPOSITE PAVEMENT	
DISTRESS CATEGORY	% WEIGHT FACTOR
IRI (ride)	5%
Transverse Cracking	10%
Longitudinal Cracking (1)	40%
Alligator Cracking	20%
Patching	25% (bad only)

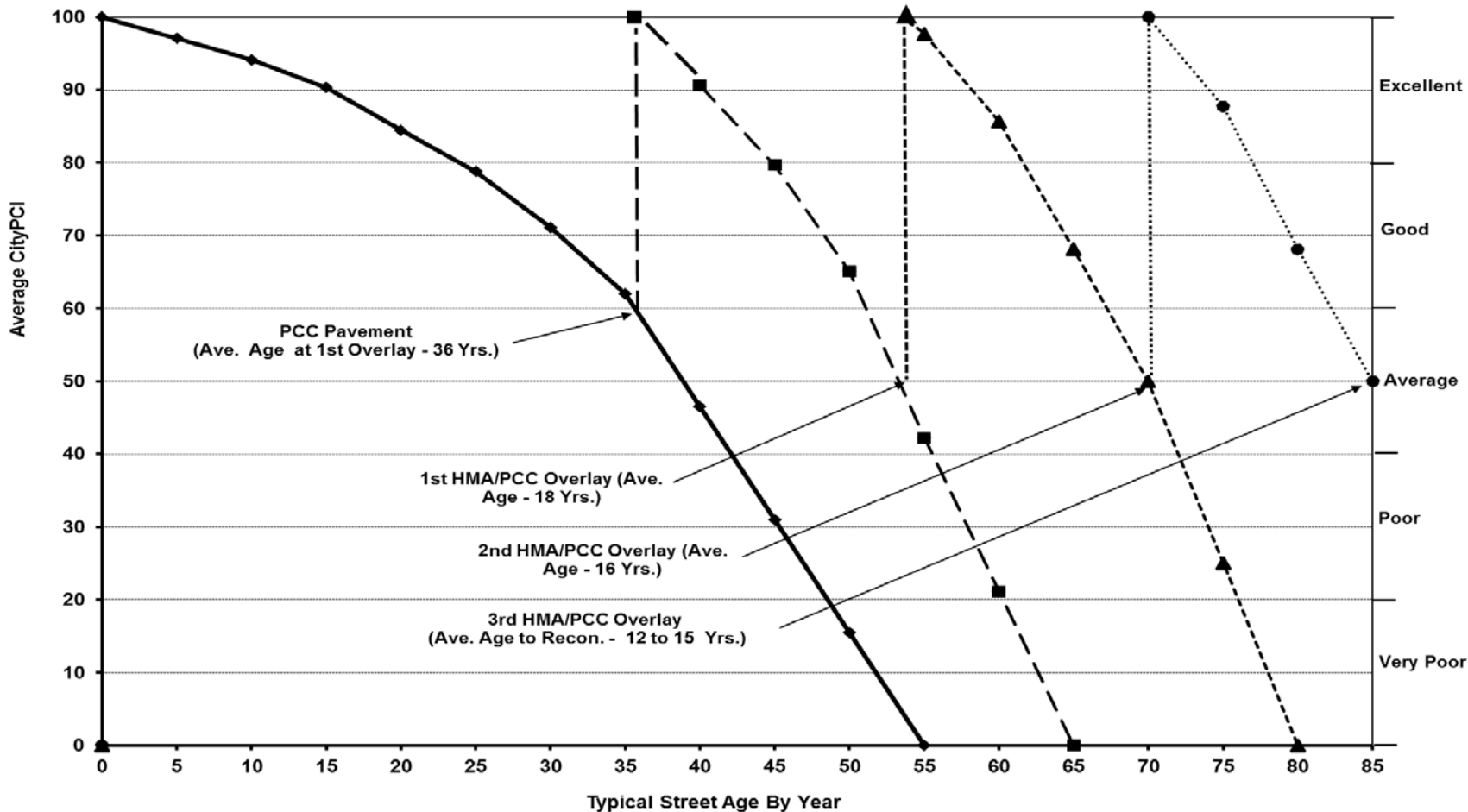
(1) Includes both wheel path and non-wheel path longitudinal cracking.



WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

Planned Pavement Management and Life Cycle

West Des Moines PCC Pavement and HMA/PCC Performance Curves
(Based on Typical City Street Conditions)
(Typically PCC Streets Can be Overlaid 3 times Before Reconstruction)





WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

Street Rehab Decision Criteria

WEST DES MOINES, IOWA												
WDM POSSIBLE DECISION MATRIX FOR STREET REHAB ACTIVITIES BASED ON IPMP INSPECTIOIN DATA												
Activity Unit Cost and Impact				City Data Info.		INTRANS Inspection CityPCI and Distress Ratings						
Activity	Unit Cost Per SF	PCI Impact	Impact Type	Existing Pavement Type	Traffic ADT	CityPCI Range	Structure (Index)	Cracking TRANS_H (Count)	Cracking LONG_H (Count)	JOINT SPALL_H (Count)	FAILURE (Sq. Ft.)	SLAB_CRKD (%)
PCC - Reconstruction	\$25.00	100	Absolute	All	> 0	0 to 45	= < 50					
PCC - Patching - Partial Depth	\$1.00	5	Relative	PCC	> 501	60 to 95				= > 3		
PCC - Patching - Full Depth	\$2.50	10	Relative	PCC	> 0	60 to 95					> 25	> 25
PCC - Patching - City Repair	\$2.00	10	Relative	PCC	< 1000	50 to 90					5 to 25	5 to 25
PCC - Route & Joint/Crack Seal	\$0.30	5	Relative	PCC	> 0	60 to 95		= > 5	= > 5			
PCC - 3" HMA Overlay	\$4.50	95	Absolute	PCC	> 501	35 to 60						
PCC - 2" HMA Overlay	\$4.00	95	Absolute	PCC	< 500	35 to 60						
HMA Patch - City Repair	\$2.00	7	Relative	HMA/PCC	> 0	50 to 90					>5	
HMA/PCC - Mill w/ 3" Overlay	\$5.00	95	Absolute	HMA/PCC	> 501	30 to 50						
HMA/PCC - Mill w/ 2" Overlay	\$4.50	95	Absolute	HMA/PCC	< 500	30 to 50						
HMA - Mill w/ 2" Overlay	\$4.50	95	Absolute	HMA	> 0	30 to 50						
HMA - 3" Overlay	\$4.75	95	Absolute	HMA	> 1501	20 to 50						
HMA - 2" Overlay	\$4.25	95	Absolute	HMA	< 1500	20 to 50						

- Expected annual street rehab budget ranges \$4.6 Mil. to \$5.6 Mil. over the next 5 years.
- Rehab activities are prioritized by condition, traffic, & vicinity of similar work.
- Other factors include scheduling around proposed CIP, DOT, Development & utility work.
- The City's Pavement Rehab Budget does not include funding for emergency repairs, gravel road paving & maintenance, adding traffic capacity lanes or ROW costs.



WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

- **Building a Pavement Rehab Program**

- **Tie pavement inventory, inspections, and rehab to a GIS mapping system.**
- **Develop pavement curve and life cycle cost scenarios for a long term road network management plan.**
- **Establish a target condition level goal for maintaining pavements at a satisfactory level. This is a way to determine budget needs.**
- **Set up a multi-year pavement rehab program.**
- **Always doing “worst first” will never get you even, let alone ahead.**
- **The goal, depending on the available budget, is to balance the pavement preservation activities (crack sealing and timely patching) and the more reactive activities (resurfacing and reconstruction) to address immediate needs along with preserving the condition of the streets over the long term.**





WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

- **Thoughts:**

- **Typically local citizen surveys, consistently rate maintaining good roads as one of the most important essential public services. This represents an opportunity for promoting developing a pavement management system program and budget.**
- **Pavement management is a tool, not a magic black box. It takes some effort. It is not an automatic cure all for everything (i.e. politics). However it can be use to treat symptoms and show cause and effect.**
- **Maintain consistency as much as possible in the pavement management system for determining annual budgets and rehab activities.**
- **A pavement management system should have the flexibility to handle unexpected condition changes and other contingencies.**
- **Pavement management is a little like weather forecasting.**
- **A pavement management program is a good for narrowing the needs and budgets. However “boots on the ground” are still needed to determine the specific needs for individual streets.**





WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

A Quick Check of Highway Network Health

- Developed by FHWA as a pavement needs tool. Uses lane mile years and service life for assessment.
- Could be something to look at for smaller cities or agencies that don't really have a formal pavement management system. Some Iowa counties use this.
- Not a pavement management system but could be useful for setting up a budget and allocating rehab. Works similar to a bank account.
- Websites for information:
<https://www.fhwa.dot.gov/pavement/preservation/if07006ppt.cfm>
<https://www.clintoncounty-ia.gov/Page/Engineer>



Example: Network Health Check Up Annual Pavement Rehab Evaluation					
City Total Street Network: 100 Lane Miles					
The Year's Network Lost: 100 Lane Mile Years					
Rehab Needs	Lane Miles	Rehab Life Years	Lane Mile Years	Lane Mile Costs	Total Costs
Reconstruction	0.5	50	25	\$1,000,000	\$500,000
Patching	1.75	15	26.25	\$100,000	\$175,000
Overlay	1.75	20	35	\$250,000	\$437,500
Jnt./Crk. Seal	2.75	5	13.75	\$15,000	\$41,250
Year Totals:			100		\$1,153,750
The goal is to optimize the rehab lane miles years to be close or exceed the network lost lane mile years with the available budget.					



WEST DES MOINES PAVEMENT MANAGEMENT SYSTEM

Questions?



ARGUING WITH AN
ENGINEER
IS LIKE WRESTLING
WITH A PIG
IN THE MUD,
AFTER A WHILE
YOU REALIZE THAT
THE PIG ENJOYS IT !!!

