

BEYOND BIG DATA – PRACTICAL IMPLEMENTATION OF PMP RECOMMENDATIONS



Harris & Associates



YOUR PRESENTERS

Vijay Pulijal, PE



Senior Project Manager

- MTC StreetSaver® Rater Certified
- 16 years PMP Experience

Cesar Lara



**Senior Project Manager/Pavement
Preservation**

- 10 years Pavement Preservation Experience



TOPICS

- What is PMP and why?
- PMP Process
- Program Optimization & Practical Implementation
- Pavement Preservation

THE HARRIS ASSET MANAGEMENT EXPERIENCE

- Harris is one of the leading providers of Pavement Management Program (PMP)
- 320 PMP projects for 161 agencies in last 26 years.
- MTC trained/certified as a MTC P-TAP consultant (all 20 rounds).

Harris' Asset Management Experience	
MTC StreetSaver	95 agencies (235 projects)
CartêGraph	15 agencies (23 projects)
MicroPaver	9 agencies (19 projects)
Proprietary Software Experience	2 agencies (2 projects)
PMi	41 Agencies (41 projects)
Total	162 Agencies (320 projects)

WHAT IS PAVEMENT MANAGEMENT PROGRAM (PMP)?

Pavement Management Program (PMP) is:

“Computer assisted method of organizing and analyzing information about pavement conditions.”



Poor/Failed

PCI=0



At Risk/Poor

PCI=50

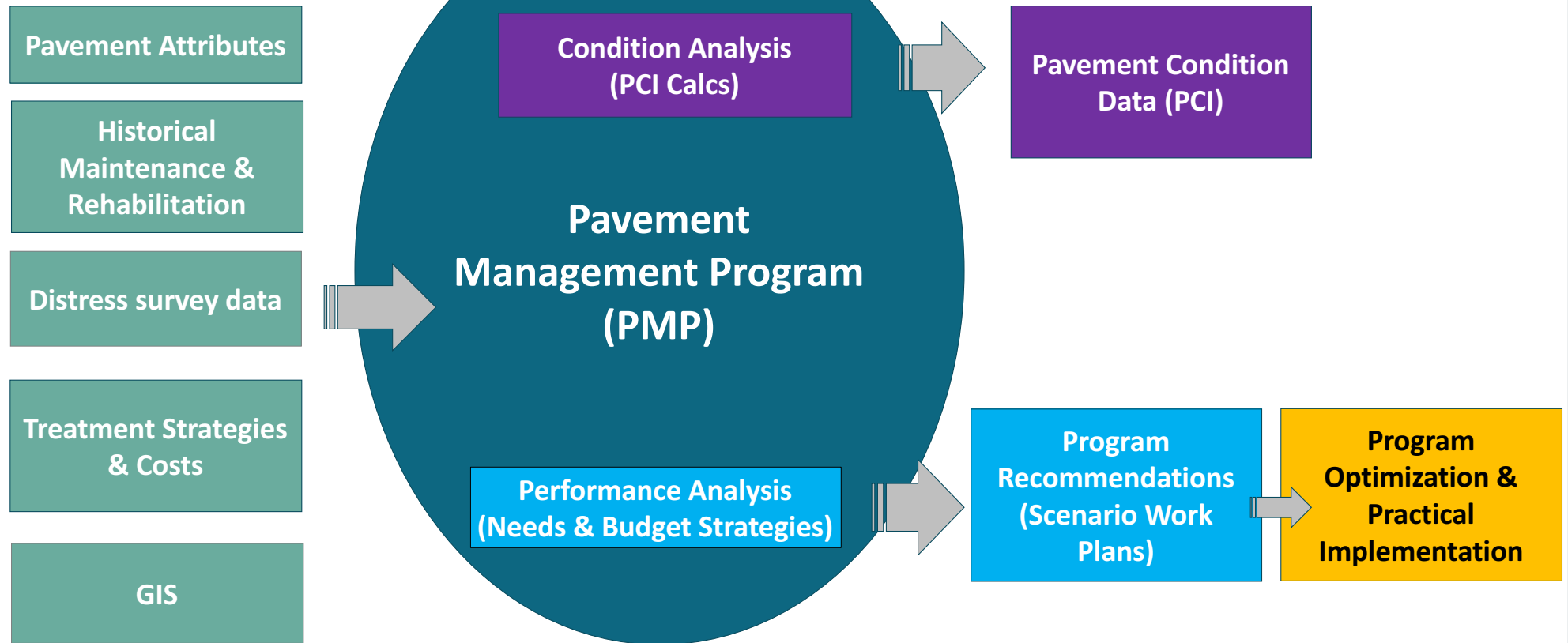


Excellent

PCI = 100



PMP STRUCTURE

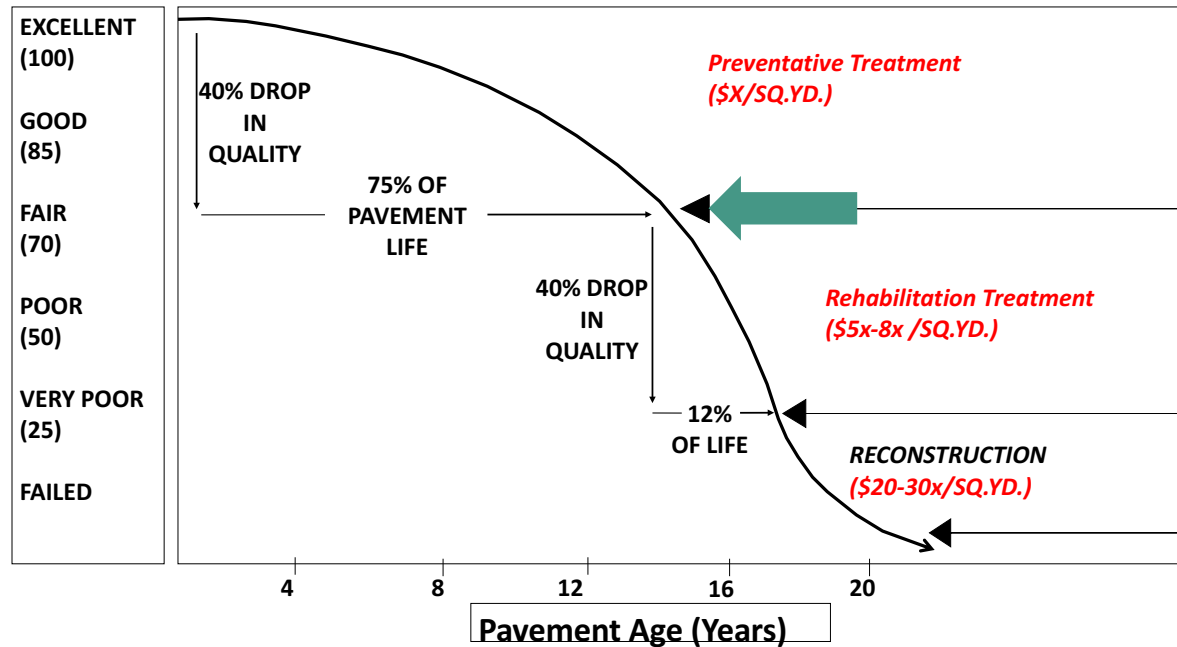


WHY PMP?

MORE COST-EFFECTIVE TO TREAT BEFORE STEEP DECLINE

PAVEMENT CONDITION (Approx. PCI)

RECOMMENDED TREATMENT

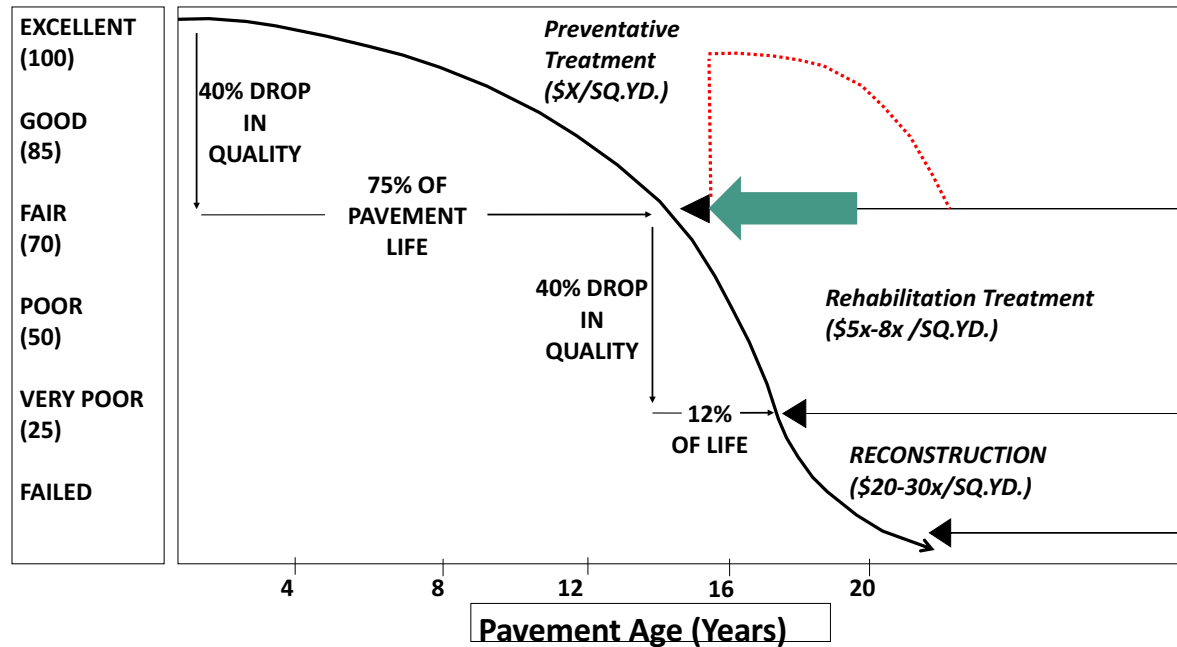


WHY PMP?

APPLYING A COST-EFFECTIVE TREATMENT

PAVEMENT CONDITION (Approx. PCI)

RECOMMENDED TREATMENT

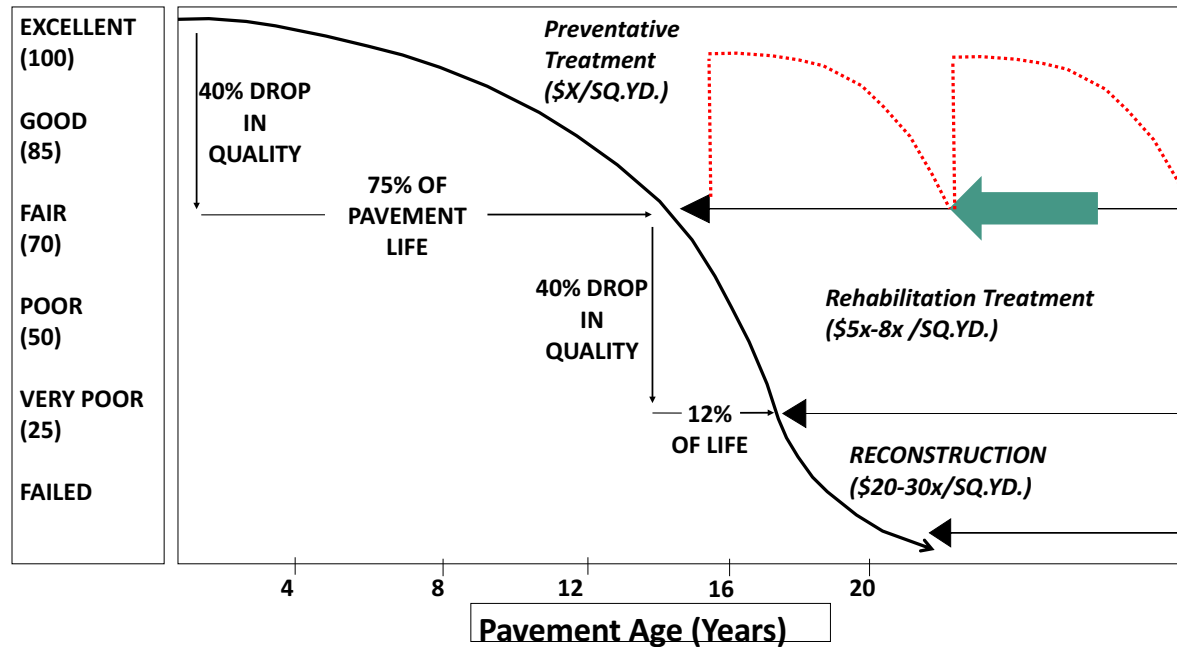


WHY PMP?

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WHY PMP?

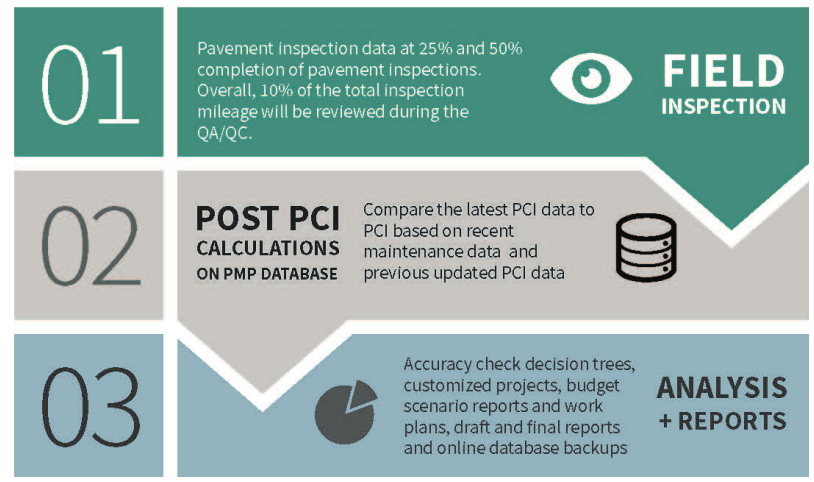
- Inventory Management—organizes, stores, and retrieves data
- Pavement condition tracking
- Determine impacts of funding alternatives
- Objective decision making based on data
- The ability to justify funding needs



PMP PROCESS



1. PMP database setup/review
2. Field surveys condition assessment and PMP database updates
3. PCI calculation 0-100 scale
4. Define treatment options and costs
5. Budget scenarios to develop list of candidate projects
6. Apply engineering and local judgement to define annual road program



TREATMENT OPTIONS & COSTS

Functional Class	Surface Type	Condition Category	PCI Ranges	Treatment Type	Treatment	Cost/Sq Yd, except Seal Cracks in LF:	Yrs Between Crack Seals	Yrs Between Surface Seals	# of Surface Seals before		
Arterial	AC	I - Very Good	(70-89)	Crack Treatment	SEAL CRACKS	\$1.50	3				
				Surface Treatment	SLURRY SEAL	\$6.00		7			
				Restoration Treatment	THIN AC OVERLAY(1.5 INCHES)	\$17.00			2		
				II - Good, Non-Load Related	(61-69)		CAPE SEAL	\$15.50			
				III - Good, Load Related	(50-60)		THIN AC OVERLAY(1.5 INCHES)	\$17.00			
				IV - Poor	(25-49)		THICK AC OVERLAY(2.5 INCHES)	\$27.00			
				V - Very Poor	(0-24)		RECONSTRUCT SURFACE (AC)	\$81.50			

				Restoration Treatment	THIN AC OVERLAY(1.5 INCHES)	\$17.00			3
		II - Good, Non-Load Related			CAPE SEAL	\$15.50			
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BUDGET ANALYSIS & REPORTS

Budget needs

- Brings sections to optimal condition
- 5-30 year analysis

City of Chico

Needs - Projected PCI/Cost Summary

Inflation Rate = 3.00 % Printed: 03/22/2017

Year	PCI Treated	PCI Untreated	PM Cost	Rehab Cost	Cost
Projected Treatments					
Year	PCI Untreated	PCI Treated	Treatment	Treatment Cost	
2017	70	70	DO NOTHING	\$0	
2018	67	76	CAPE SEAL	\$41,769	
2019	64	74	DO NOTHING	\$0	
2020	61	72	DO NOTHING	\$0	
2021	58	78	CAPE SEAL	\$45,642	

Calculate: years



BUDGET ANALYSIS & REPORTS

- Budget Scenarios
- Target Driven Scenarios
- Custom Scenarios

Step 1 - Scenario

Name:

Description:

Step 2 - Review Optimal Target Caps

	Condition Before Analysis	Optimal Target Cap
Pavement Condition Index for the Entire Network	67	85
Percentage of the Pavement Network in Very Good Condition	54%	100%
Percentage of the Pavement Network in Poor and Very Poor Condition	20%	0%
Pavement Remaining Service Life for the Entire Network (years)	19	30

Step 3 - Define Objective

Objective:

Overall Target
 Target by Year
 Target by Functional Class
 Target by Functional Class and Year

Step 4 - Objective Values

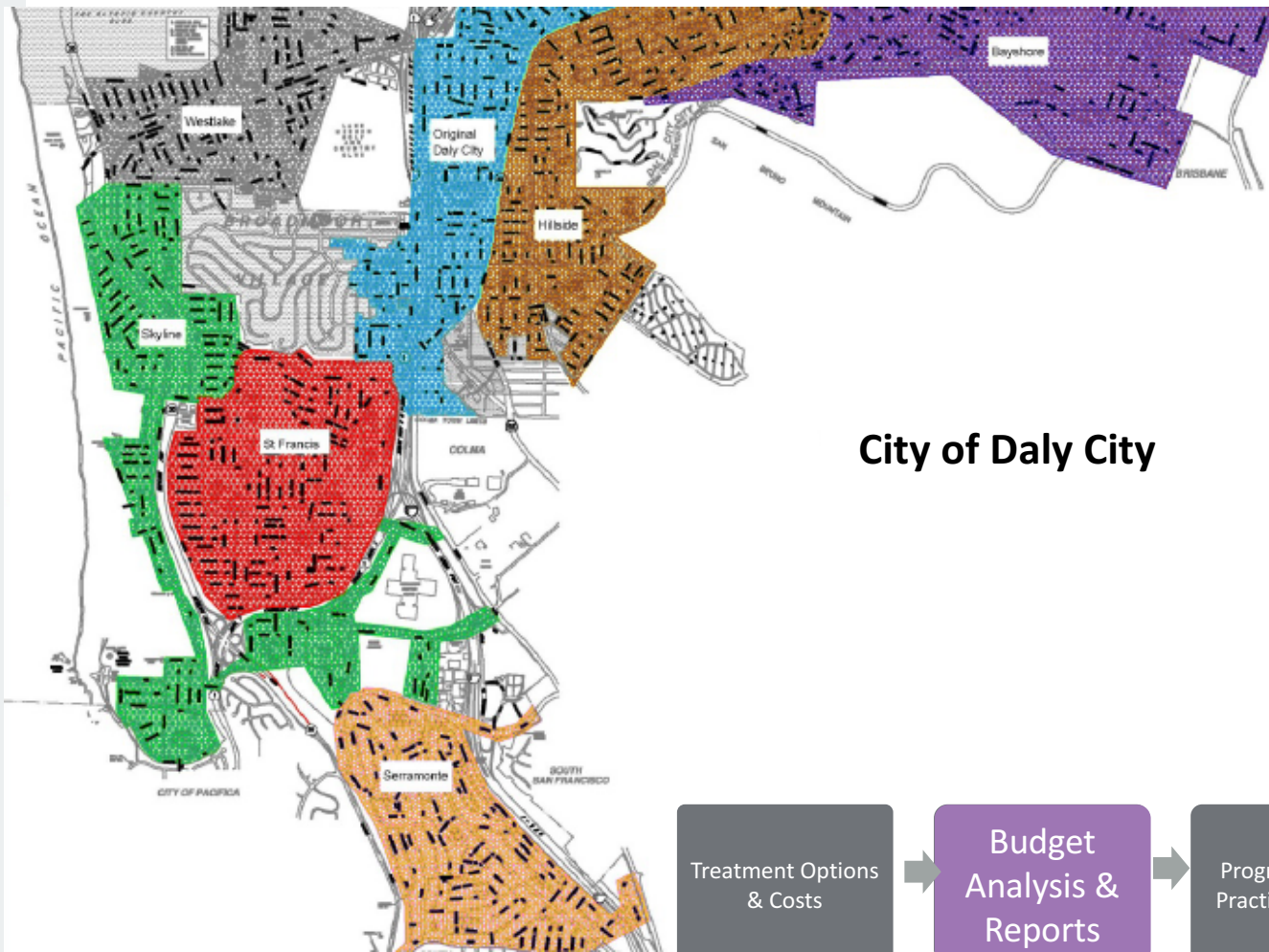
Scenario Year	Minimum Network Average PCI
Year 1	68.0
Year 2	71.0
Year 3	72.0
Year 4	73.0
Year 5	74.0
Year 6	75.0

Step 5 - Weighting Factors

Functional Class	Factor
Arterial	1
Collector	0.72
Residential/Local	0.55
Other	0.55

Buttons: Clear | Delete | Save | Save & New | Save & Close | Close





City of Daly City

Sequence	Neighborhood
1	Original Daly City
2	Hillside
3	Serramonte
4	Skyline/Palisades
5	Westlake
6	Bayshore
7	St Francis



Scenarios - Sections Selected for Treatment

Interest: 3.00%

Inflation: 3.00%

Printed: 09/30/2019

Scenario: 5 Year CIP

Year: 2020

Street Name	Begin Location	End Location	Street ID	Section ID	Length	Width	Area	FC	Surf Type	Area ID	Current PCI	Treatment			Cost	Rating	Treatment
												PCI Before	PCI After	PCI After			
**LA PLAZA	E. Sierra Ave	ORH	LAPLAZ	35	225	37	8,325	R	AC/AC		42	41	100	\$41,921	10,022	EDGE GRD+20% DIG+FAB+3IN OL	
**WEST SIERRA AVENUE	PAGE ST	WATER AVE	WSIERR	20	1,662	36	59,832	A	AC/AC		55	54	100	\$301,288	14,590	EDGE GRD+20% DIG+FAB+3IN OL	
**WEST SIERRA AVENUE	WATER AVE	CITY LIMITS	WSIERR	30	900	32	28,800	A	AC/AC		51	50	100	\$145,024	15,224	EDGE GRD+20% DIG+FAB+3IN OL	
												Treatment Total		\$622,557			
**PARK AVENUE	MYRTLE AVE	MCGINNIS CIR	PARKAV	10	503	34	17,102	R	AC/AC		88	88	89	\$0	0	SEAL CRACKS	
												Treatment Total		\$0			
Year 2020 Area Total										323,463		Year 2020 Total		\$2,001,338			

Year: 2021

Street Name	Begin Location	End Location	Street ID	Section ID	Length	Width	Area	FC	Surf Type	Area ID	Current PCI	Treatment			Cost	Rating	Treatment
												PCI Before	PCI After	PCI After			
**CLIFFORD STREET	WEST SCHOOL ST	WEST COTATI AVE	CLIFFO	10	589	25	14,725	R	AC		19	15	100	\$118,032	6,156	FDR	
**WEST COTATI AVENUE	END W. SIDE OF HWY 101	MAPLE AVE	WCOTAT	40	285	34	9,690	R	AC/AC		40	37	100	\$77,673	5,981	FDR	
**WEST COTATI AVENUE	MAPLE AVE	W COTATI OAKS CT	WCOTAT	50	515	32	16,480	R	AC/AC		12	8	100	\$132,099	6,156	FDR	
**WEST COTATI AVENUE	W COTATI OAKS CT	COHEN CT	WCOTAT	60A	994	29	28,826	R	AC/AC		21	17	100	\$231,061	6,156	FDR	
**WEST SCHOOL STREET	W SIERRA AVE	CLIFFORD ST	WSCHOO	10	1,900	28	53,200	R	AC		8	3	100	\$426,435	6,156	FDR	
**WEST SCHOOL STREET	CLIFFORD ST	300FT W OF CLIFFORD	WSCHOO	20	300	17	5,100	R	AC/AC		28	25	100	\$40,881	6,154	FDR	
**WEST SCHOOL STREET	300FT W OF CLIFFORD	MAPLE AVE	WSCHOO	30	712	21	14,952	R	AC/AC		31	28	100	\$119,851	6,144	FDR	
**WEST SCHOOL STREET	MAPLE AVE	RICHARDSON RD	WSCHOO	40	1,092	28	30,576	R	AC/AC		20	16	100	\$245,088	6,156	FDR	
												Treatment Total		\$1,391,120			
**EUCALYPTUS AVENUE	ORH	CITY LIMIT	EUCALY	10	1,000	34	34,000	C	AC		60	56	67	\$26,051	13,979	SLURRY SEAL	
**LANCASTER DRIVE	E COTATI AVE	CITY LIMITS	LANCAS	10	440	37	16,280	C	AC		93	91	95	\$12,474	13,970	SLURRY SEAL	
**OLD REDWOOD HWY	MYRTLE AVE	LASKER LN	ORH	60B	730	54	39,420	A	AC	S - Sampling	64	61	71	\$30,204	20,825	SLURRY SEAL	
**OLD REDWOOD HWY	LASKER	EUCALYPTUS	ORH	70	1,000	51	51,000	A	AC	S - Sampling	67	64	74	\$39,077	21,403	SLURRY SEAL	
**PRIMERO COURT	PORTAL ST	END	PRIMER	10	143	34	4,862	R	AC		42	39	57	\$3,726	13,493	SLURRY SEAL	
												Treatment Total		\$111,532			
**WEST COTATI AVENUE	COHEN CT	CREEK	WCOTAT	40	400	34	13,600	R	AC/AC		86	87		\$35	1,087,588	SEAL CRACKS	

** - Treatment from Project Selection
Scenarios Criteria:



PROGRAM OPTIMIZATION & PRACTICAL IMPLEMENTATION

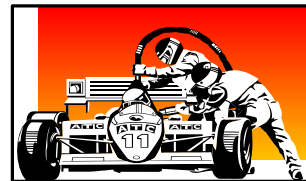
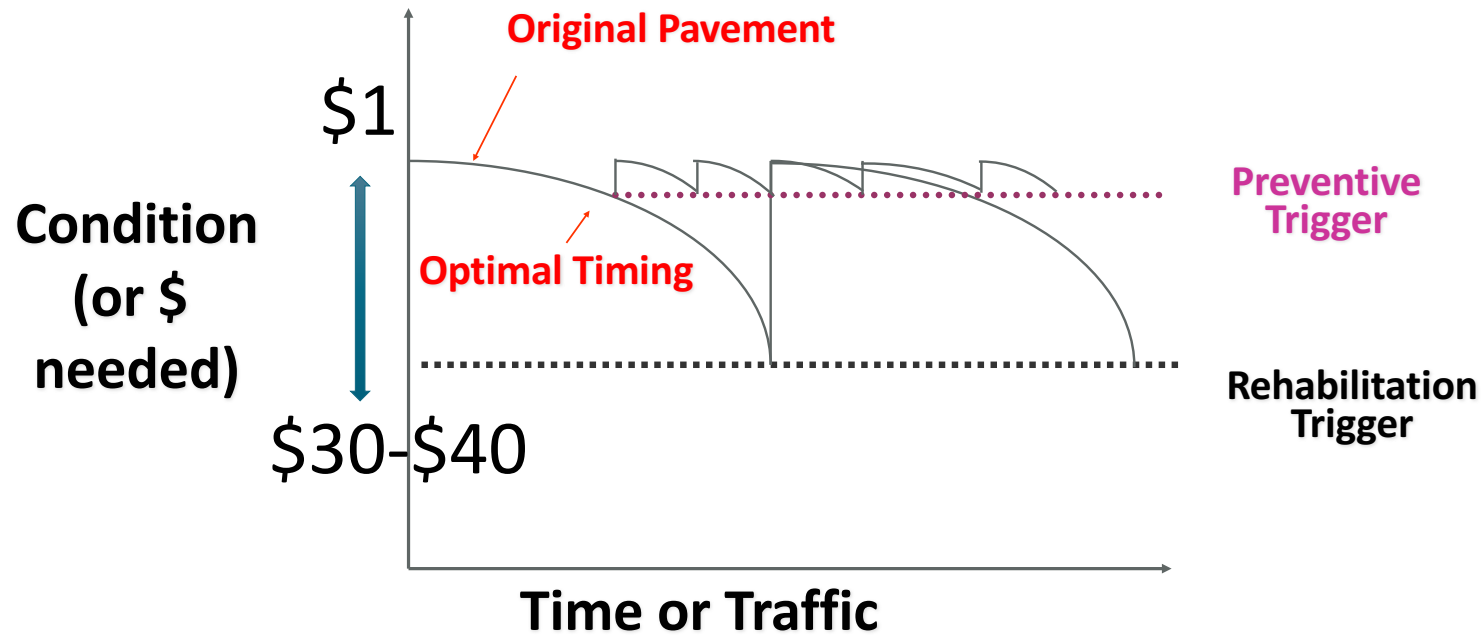
- Review the recommended PMP work plans
- Field visit to determine/justify/alter program treatment recommendation:
 - Engineering judgment (treatment alternatives – scale down/up)
 - Coordination with other projects (similar treatment strategies)
 - Neighborhood programs for mobilization efficiencies



SO HOW AND WHY DO WE MERGE THE DATA WITH PRACTICAL IMPLEMENTATION?

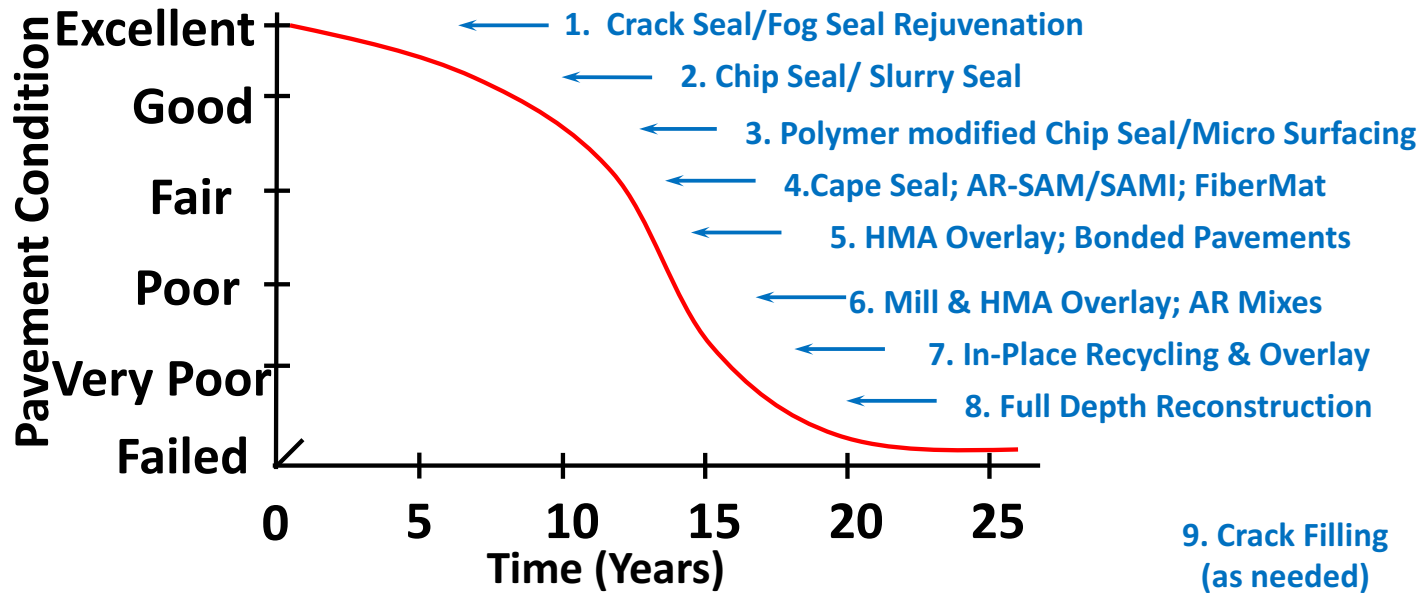
- Fine tune decision tree/ pavement plan
- To confirm or change recommendation
- Expand our treatment toolbox
- Choose treatment based on expectation, need and budget of customer
- using real world experience to address and recommend treatments

Pavement Preservation - Concept

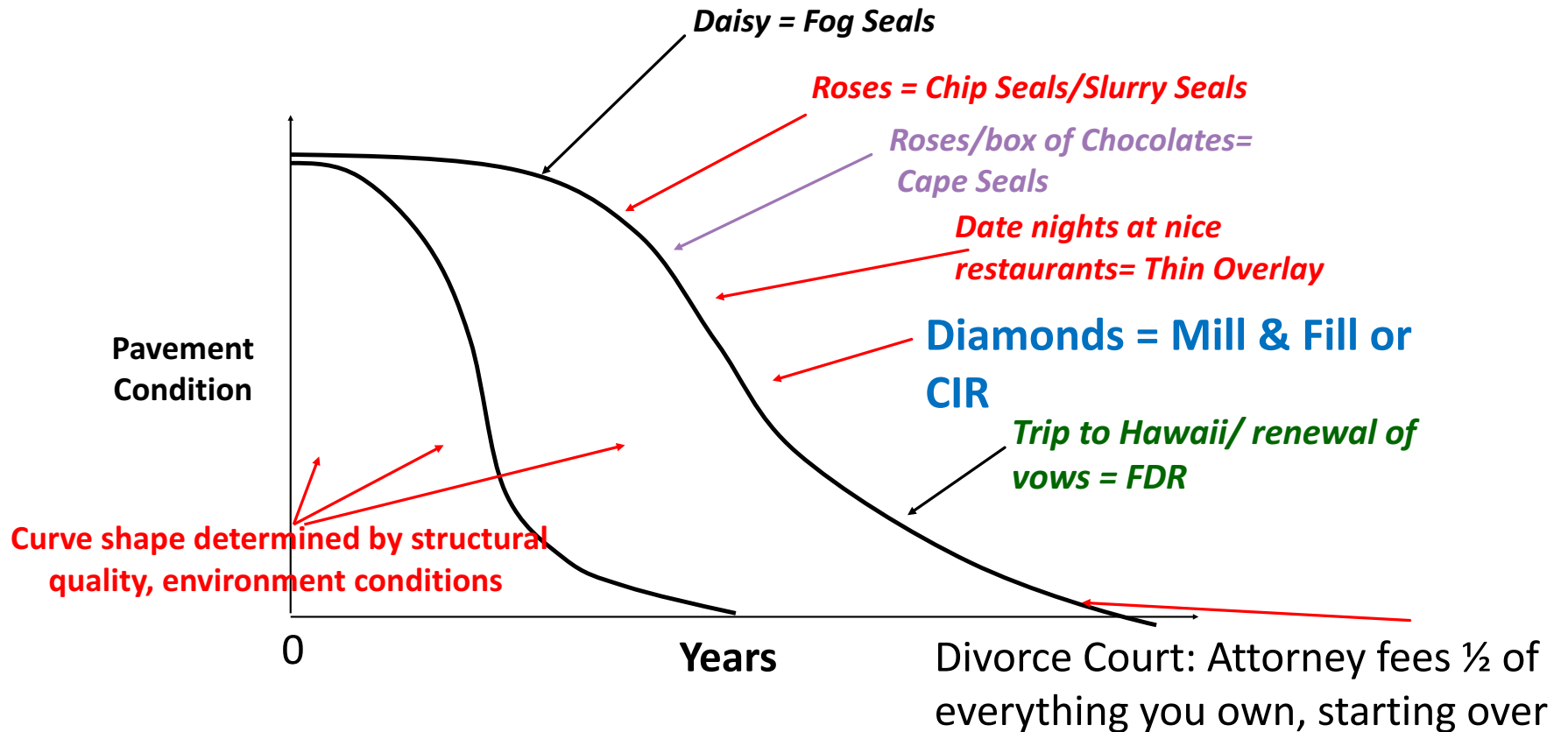


Asphalt Deterioration Curve

Applying the Right Treatment, to the Right Road, at the Right Time...



Marriage Condition Comparison of Treatments



Typical Treatments

- Crack Seal
- Fog & Rejuvenating Seals
- Chip Seals
 - Cold Applied-
 - PMCRS-2h
 - PMRE
 - Hot Applied –
 - Asphalt Rubber
 - Terminal Blends
 - Slurry Seals
 - Fiber Seals
 - Rubber Seals
- Micro-Surfacing
 - Hi-Mod Micros
- Multi-Layer Lifts
 - Cape Seals
 - 2 Layer Micros
 - 3 Layer Systems
- Bonded Wearing Course

General Costs – (Depending on size of project)

- Rejuvenating fog seals - 25-.75 per SY
- Slurry Seal - \$1.25 - \$2.00 SY
- Micro - \$1.50 – \$2.75 SY
- Emulsion Chip Seals & Scrub Seals - 1.50-2.75 per SY
- Emulsion Cape Seal - \$3.00 - \$5.00 SY
- AR Cape Seals - \$6.00 - \$8.00 SY
- Bonded Wearing Course - \$8.00 - \$10.00 SY
- 2 layer Micro –
- 3 Layer system – Type I Micro , Chip Seal and Type II slurry

Multi-Layer candidate or rehabilitation?



Fog Seal over Chip Seal

Finish Product – Ready for Striping



Double Micro – Type II over Type III

...combined with Type II micro surface...

Finish surface
Smooth ride
Quick
Application
Night time
possible





Patching with 1st lift of
Type III Micro



Type II over the Type III P

Example 2 : Type III micro surface...

Improves ride
Fixes surface deficiencies
Rut fill capable





CAPE SEALS

EMULSION AND ASPHALT RUBBER



Harris & Associates

Emulsion Chip Seal followed by Slurry



Prep Work prior to Preservation Treatment



Cape Seal

Hot Applied Chip Seal
followed by Micro





1st Lift – chip seal



2nd lift- slurry seal

Hot Applied Binder Chip Seal



Seals, wearing surface, long term preservation...

...combined with micro surfacing

“Johnny can rollerblade.”



and the finish product provides smooth ride and extended pavement life

EXAMPLE 3. REMEMBER THE QUIZ?



Micro Chip Slurry

Glued together.
Sealed.
Wear surface.

No single
treatment could
have worked by
itself.

**MULTI LIFTS
WORK**







YES... Chip Seal VS OGFC



*Hard to tell the
difference when
the chip seal is
done right.*





THANK YOU

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ADDITIONAL BENEFITS OF STREETSAYER PMP



CONVENIENCE

Anywhere, anytime
multiple user
access

SECURITY

Database storage,
recovery and
backup

VALUE

Program upgrades
and enhancements

SUPPORT

Real-time technical
support

SUGGESTIONS

- Identify pavement condition goals (PCI by Network/FC/SD)
- Budget adequate funds to achieve those goals
- Continue to update pavement management data
 - M&R yearly
 - Review & update Decision Tree
- Utilize GIS module
- Resurvey arterial & collector every 2 years & residential every 4 years
- Open to implement full spectrum of pavement treatments to optimize road program