



MONTEREY COUNTY

PAVEMENT ASSET MANAGEMENT PLAN

April

2015

The Pavement Asset Management Plan summarizes and quantifies the condition of roads within the unincorporated areas of Monterey County. It establishes a priority rating system that takes the Pavement Condition Index of 4,000 road segments that cover 1,100 centerline miles into consideration, as well as Annual Average Daily Traffic, and economic benefit.

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INTRODUCTION

The 2015 update of the status of 1,100 centerline miles of Monterey County's paved road system was conducted based upon the Pavement Management Information System (PMIS) report prepared by Advance Applied Engineers (dba Infrastructure Engineers), a consultant hired by Resource Management Agency, Department of Public Works to survey the pavement conditions of the County roads. This report is a summary of the pavement data collected during the survey along with data collected by County staff. The baseline pavement road survey was conducted in 2011.

When this report reference Monterey County roads or County roads, it means those portions of the paved roadways within the unincorporated area of Monterey County.

PAVEMENT CONDITION INDEX

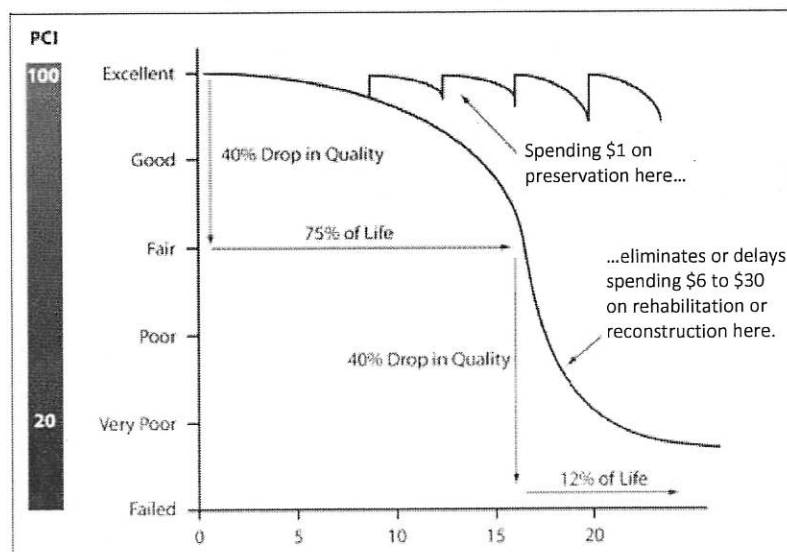
Pavement Condition Index (PCI) is a numerical index, ranging from 0 (for a failed pavement) to 100 (for a pavement in excellent condition). Calculation of the PCI is based on the results of a visual condition survey in which distress type and severity are identified. The Metropolitan Transportation Commission (MTC) Manual for Pavement Condition Index Distress Identification, the basis for determining the PCI, identifies eight types of distresses for asphalt roads with three levels of severity (low, medium, and high). The eight types are as follows:

- | | |
|---|--------------------------------------|
| 1. Alligator Cracking | 5. Patching and Utility Cut Patching |
| 2. Block Cracking | 6. Rutting and Depressions |
| 3. Distortions | 7. Weathering and Raveling |
| 4. Longitudinal and Transverse Cracking | 8. Edge Cracking |

PAVEMENT LIFE CYCLE

The Pavement Life Cycle curve graphically depicts the relation of pavement life versus time. All pavements deteriorate over time and if left alone will deteriorate at an increasing rate, as shown in the Figure 1 (i.e.: pavement quality drops 40% within the first 75% of the pavement life and another 40% in the next 12% of the pavement life). In the beginning, a few pavement distresses will develop, such as cracks, but the pavement will remain in relatively good condition. As it ages with no treatment, subsequent distresses develop

Figure 1: Pavement Life Cycle Curve



easier and at a higher rate. For example, once a crack develops, water is able to penetrate the asphalt layer and weaken the base and subgrade of the road, giving way for more distresses to occur. Additionally, freeze-thaw temperature, and debris that get into the crack (such as mud and weeds) compounds the problem.

Systematic maintenance can slow the rate of deterioration and maintain or extend the life of a pavement before it can worsen. The extent to which pavement life can be extended is dependent on the timing and the type of treatment applied to the pavement. In general, a plan to treat minor distresses early in a pavement's life is highly cost effective in extending pavement life.

EXISTING CONDITION

Infrastructure Engineers performed a county-wide digital image survey from October 2010 through March 2011 to evaluate and quantify the distress types for approximately 1,100 miles of County-maintained roads. As part of this analysis, the County's roads were divided into 4,000 segments with none being longer than ½ mile. Below is a summary of the condition of Monterey County roads, at the time of the survey.

Table 1: Monterey County Road PCI Mileage, Treatments, & Cost

PCI	Pavement Condition	County Road Miles	Percent	Recommended Treatment	Cost per Mile
86-100	Excellent	12	1	None	
71-85	Very Good	60	5	Chip Seal Slurry Seal	\$75,000
56-70	Good	166	15	Overlay	\$400,000*
41-55	Fair	283	26	Overlay	
26-40	Poor	283	26	Overlay	
<25	Fail	296	27	Reconstruction	\$1,500,000
		1,100	100		

*Overlay thickness will vary with PCI. Cost shown is an average.

Chip seal is a type of preventive maintenance treatment that preserves the pavement. It involves applying asphaltic emulsion (type of asphalt binder) and aggregates onto the existing road surface. The purpose of this treatment is to provide a new skid resistance wearing surface and to seal the pavement, preventing damage due to water intrusion. Typically, this type of treatment is used on higher volume collector and arterial roads. It provides an additional 3 to 5 years to the pavement life and about 5 points to the PCI rating.

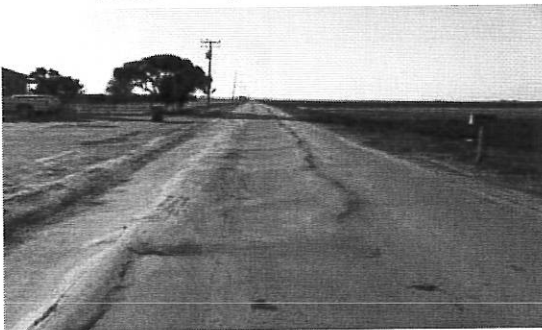
Slurry seal is also a type of preventive maintenance treatment that preserves the pavement. It involves applying an asphalt mixture onto the existing road surface. The mixture is comprised of asphaltic emulsion and fine aggregates. The purpose of this treatment is to provide a new skid resistance wearing surface and to seal the pavement, preventing damage due to water intrusion. Typically, this type of treatment is used on lower volume local roads. It provides an additional 3 to 5 years to the pavement life and about 5 points to PCI rating.

Hot mix asphalt (HMA) Overlay is an application of an asphalt layer that can be 1-1/2" to 4"+ inches thick over the existing pavement. This type of pavement treatment is considered rehabilitation. The main purpose of this treatment is to return roads to a very good condition that exhibit major structural distress. Pavement life is normally extended 7 to 10 years and increases the PCI rating to between 85 and 90.

Reconstruction removes the entire pavement structural section (asphalt layer, base rock, etc.) and reconstructs the road from the base layer. Reconstruction is chosen when the pavement is substantially distressed or failed. Pavement life of after reconstruction is typically between 10 to 20 years and increases the PCI rating to 100.

Based on the survey conducted, 99% of the roads in unincorporated Monterey County need a pavement treatment of some type.

Foster Road, PCI -18



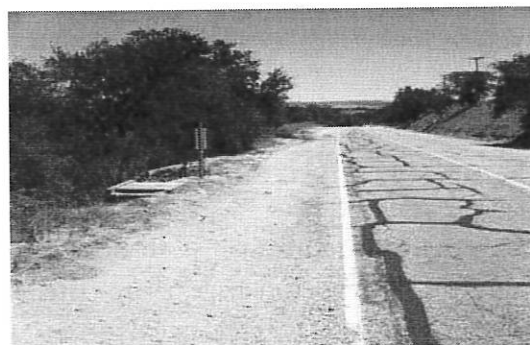
River Road, PCI - 24



Old Stage Road, PCI-25



Jolon Road, PCI - 45



Reservation Road, PCI – 66



Sprekles Blvd., PCI – 85



Del Monte Blvd, PCI-99



The system-wide PCI for Monterey County roads is 40 (Poor) and the overall cost, if all pavement treatments were done today, would be \$741 million. While this dollar figure is large, it needs to be put into context. No agency would propose to implement all pavement treatments at once. The effect of this type of expenditure would be to bring the system PCI to above 90 which would be a level of service in excess of what would be prudent. But the dollar figure does provide an overall understanding of the condition of pavement in the County in relation to its asset value of \$1.4 billion.

To raise the system-wide PCI to 75, would require a funding level of approximately \$85 million per year for the next seven years for a total commitment of about \$600 Million. To raise the system-wide PCI to 65, would require a funding level of approximately \$60 Million per year for the next seven years for a total commitment of about \$420 Million. To start to make improvements to the system-wide PCI of 40, would require a funding level of approximately \$15 to 20 Million per year. This figure anticipates improving efficiency through the use of new pavement repair techniques.

Monterey County is not alone in facing a significant pavement condition problem. The *California Statewide Local Streets & Roads Needs Assessment 2014* notes that to bring pavement in all cities and counties in the State up to a good state of repair, which is defined as a PCI in the low 80s, would require funding of \$7.275 billion/year for ten years. This would represent a 400% increase in the current funding level of \$1.657 billion/year.

This Statewide Assessment goes on to say:

"The conditions of California's local streets and roads are rolling toward a cliff's edge. On a scale of zero (failed) to 100 (excellent), the statewide average Pavement Condition Index (PCI) has deteriorated to 66 ("at risk category) in 2014. Even more alarming, 54 of 58 counties are either at risk or have poor pavements. If current funding remains the same, the unfunded backlog will swell from \$40 billion to \$61 billion by 2024."

The deterioration of pavement in Monterey County and statewide didn't happen overnight. The current situation was decades in the making in part because the traditional sources of transportation funding at the State and Federal level have not kept up with inflation or the increase in Vehicle Miles Traveled.

The federal gas tax has been no more than 18.4 cents/gallon since 1993. Inflation alone has devalued this funding source by approximately 40%. For a number of years, there has been a recognition at the federal level that more funding is needed, but there are no signs the federal government will be taking action to address this issue.

The state gas tax is currently 39.5 cents/gallon and will drop to 36 cents/gallon on July 1st necessitating a 24% reduction in allocations to cities and counties throughout California. For Monterey County, this will mean a \$3.1 million reduction for FY15-16 to \$8.8M.

To put this into context, Californians pay, on average, \$780 annually for a daily coffee habit and over \$1,000 for cable television. In contrast, drivers only pay \$368 in all taxes on gasoline (including state, federal and local add-ons).

State Gas Tax, along with an annual allocation of \$725,000 from the State's Regional Surface Transportation Program (RSTP), is used to provide basic maintenance services for the transportation system which includes: pothole repairs, mowing, shoulder grading, dirt road grading, culvert cleaning, striping, replacement of signs, weed abatement, bridge repairs, emergency response, etc. In other words, this funding does not pay for pavement treatments.

In Monterey County, pavement treatments are funded from the Transient Occupancy Tax (TOT). In the FY14-15 budget, this funding source provided \$2 Million for the Annual Seal Program and \$1.8 Million for the overlay of River Road Project (Parker Road to Chualar River Road). The total centerline miles of pavement that will receive treatment is 17.3 miles.

The good news is that the TOT funding is projected to increase to a little over \$5 million per year by fiscal year 2018-19 and the amount of pavement treatments planned to be accomplished is as follows:

Fiscal Year	TOT Funding	Miles Receiving Treatment
FY15-16	\$4,374,000	25.5
FY16-17	\$4,628,000	14.4
FY17-18	\$4,887,000	15.7
FY18-19	\$5,152,000	17.4
FY19-20	\$5,152,000	24.1
Totals	\$24,193,000	97.1

The specific roads that will receive treatment in each fiscal year are listed in Attachment A and have been included in the Draft 5 Year Capital Improvement Program.

Treatment of 97.1 miles over the next five years equates to an annual rate of 19.42 miles. At this rate, it would take 57 years to treat all 1100 miles of pavement in Monterey County. As a frame of reference, the City of Oakland is on an 85 year resurfacing cycle because of funding constraints

PRIORITIZATION OF PAVEMENT TREATMENTS

To develop the list of roads to receive a pavement treatment shown in Attachment A, a process to prioritize roads had to be developed given the limited resources available. The prioritization is based on the following criteria:

- Pavement Condition Index (PCI) – a numerical index that indicates the general structural condition of the road
- Annual Average Daily Traffic (AADT) – The average 24-hour volume
- Agricultural link – corridor that provides economic benefit to agriculture.
- Tourism link – corridor that provides economic benefit to tourism

These criteria prioritize work based on the condition of roads with the highest usage that has an economic benefit. Conversely, local roads that serve mostly residential uses will score low. The scoring of these criteria was as follows:

PCI		AADT Rating		Ag Link	
Points	Rating	Points	Traffic Vol.	Points	Link
0	81-100	0	<100	0	No
1	61-80	1	101-500	1	Yes
2	41-60	2	501-1,000		
3	26-40	3	1,001-5,000		
4	<25	4	5,001-10,000		
		5	10,000-15,000		
		6	>15,000		

Tourism Link	
Points	Link
0	No
1	Yes

These criteria will be weighted so that PCI is 50% of the score, AADT is 25%, and Ag and Tourism links are 12.5% each using the following formula:

$$\text{Score} = [\text{PCI Rating} \times 50/4] + [\text{AADT Rating} \times 25/6] + [\text{Ag Link} \times 12.5] + [\text{Tourism Link} \times 12.5]$$

As an example, a road that needs to be reconstructed (PCI<25), is an Ag link, and has an AADT of 4,000 would receive the following score:

$$\text{Score} = [4 \times 50/4] + [3 \times 25/6] + [1 \times 12.5] + [0 \times 12.5] = 75$$

This scoring was conducted on all the paved road segments in Monterey County and three priority lists were developed for Chip Seal/Slurry Seal, Overlay, and Reconstruction. These lists can be found as Attachments B, C, and D, respectively. The roads included as Ag and Tourism links are shown in Attachments E and F.

This report and the attached priority lists will be used by Public Works staff as a tool to efficiently use funds that are allocated for pavement management. It is not the intent to “go down” the priority lists and check off roads in order. Rather, staff will choose road segments that fit available funding, effectively use Public Works crews and contractors, optimize treatment of adjacent road segments, reduce traffic impacts, and leverage other funds and/or grants. In other words, staff will choose from a pool of high priority roads to maximize benefits.

In addition, staff will exercise professional judgment when choosing pavement treatments. For example, staff may determine that a Chip Seal is an acceptable treatment for a road segment with a PCI in the 60s.

The recommended program will continue to consist of a \$2 Million Seal Program that utilizes Chip and Slurry Seals with the remainder of funding going to an Overlay or Reconstruction project. By dedicating funding to the Seal Program, an effort is being made to keep roads that are in an acceptable condition from falling into the more expensive rehabilitation categories of Overlay and Reconstruction.

POTENTIAL SOLUTIONS FOR CLOSING THE FUNDING GAP

Technological Efficiencies

Productivity gains from new technologies are applicable to the transportation sector. Sustainable pavement practices such as reclaimed asphalt pavement, cold-in-place recycling, and full depth reclamation are techniques that are reported to provide cost savings ranging from 10 to 30 percent when compared to conventional mill and fill overlays, or reconstruction. This type of sustainable practice will be used on the River Road Overlay project which will be constructed in the summer of 2015. The quality and cost of this construction project will be monitored to determine the benefits.

Increase Funding

Become a Self-Help County:

Of the 58 counties in California, 20 are self-help. This means that their voters have passed a transportation sales tax that dedicates funding to road projects and maintenance. It is estimated that these counties will see over \$95 billion in investments in their transportation infrastructure by 2050 as a result.

The Transportation Agency for Monterey County (TAMC) is exploring the viability of a 3/8 cent sales tax measure for the 2016 ballot. If passed, this measure would provide \$20M for transportation projects and maintenance. If 50% of this funding were dedicated to maintenance, Monterey County's share could be about \$3.3 million per year.

Advocating for a State Gas Tax increase or alternate Road User Fee:

There are two portions of the State Gas Tax. The original excise tax was set at 18 cents per gallon in 1994 and has not changed. Taking into account inflation, increasing vehicle miles traveled, and increasing fuel efficiencies, it has lost half its value. Adjusting the 18 cents per gallon for inflation would raise several billion dollars for transportation.

SB 1077 was signed into law in 2014 and sets up a pilot program to identify and evaluate issues related to potential implementation of a statewide vehicle miles-traveled fee. The pilot program must commence by January 2016 and will be the first pilot program in California modeled after similar programs in Oregon and Washington. The intent is to charge a fee for all users of local roads and state highways, regardless of whether the vehicle is powered by gasoline, diesel, alternative fuels, or electricity. The pilot program will assess the road user charge as a replacement to the gas tax.

SB 16 is being proposed by Senator Beall and includes the following:

- Repay existing transportation loans in equal installments over three fiscal years beginning in 2016
- Return truck weight fees back to transportation in increasing amounts over five years, i.e. first year 20-percent returned, second year 40-percent returned, etc. (approximately \$1 billion is currently funding transportation related bond debt service)
- Increase the vehicle license fee by 0.07-percent each year for five years to backfill the general fund for transportation related bond debt service
- Increase the gasoline excise tax by 10-cents
- Increase the diesel excise tax by 12-cents (2-cents of which is dedicated to Trade Corridors Improvement Fund)
- Levy an additional \$35 fee on annual vehicle registrations
- Levy an additional \$100 fee on annual vehicle registrations for zero-emission vehicles

The revenues from the gas tax increase, 10-cents of the diesel tax increase, and both registration fees would be deposited into a new maintenance and rehabilitation fund. From this account,

Senator Beall's plan would dedicate 5-percent of total revenues generated to a State-Local Partnership Program to incentivize additional local sales tax measures passed after July 1, 2015. The remaining 95-percent of revenues would be shared equally between the state and counties and cities. CSAC estimates that counties would receive approximately \$3.5 billion in additional revenue over the five year program. The bill has a phased-in approach; it's expected to raise \$665 million for counties in the first year and \$855 million in the fifth year of the program. Estimates by CSAC are that Monterey County could receive between \$8 and \$11 Million annually.

In addition, Assembly Speaker Toni Atkins proposed a bill that would generate \$2 billion a year for transportation by requiring early repayment of all existing transportation loans, increasing the vehicle registration fee by approximately \$52 a year, returning weight fees back to transportation while providing a backfill for bond debt service. It is still unclear what purposes these revenues would be used for and any division of revenues among the state and counties and cities.

Assessment Districts for local roads:

Promote the development of Assessment Districts to fund local road maintenance. This would allow the funding that is available to be dedicated to Arterial and Collector roads and potentially reduce the total backlog of pavement treatments by as much as \$500 million.

Condition	Arterial		Collector		Local	TOTAL
	Principal	Minor	Major	Minor		
Excellent	0.5	0.1	5.4	4.4	2	12.4
Very Good	1.9	0.5	20.3	9.4	27.4	59.5
Good	1.6	6.2	42.0	27.1	89.3	166.2
Fair	0.9	1.6	66.9	53.7	159.8	282.9
Poor	0	0.1	44.1	44.6	193.7	282.5
Fail	0	1.1	29.8	38.1	227.4	296.4
TOTAL	4.9	9.6	208.3	177.5	699.5	1099.9

Increase County Funding

The option of increasing appropriations from the County's budget should be considered. This additional funding could come from the Transient Occupancy Tax or the General Fund.

Dedicate County-wide RSTP Funding to Maintenance

TAMC manages the allocation of RSTP funding that is provided to the County and the Cities in Monterey County. This funding source has been dedicated to regional projects up until last year when 50% of the \$10.9M was made available to local jurisdictions for their priorities. Monterey County will receive \$1.3M over a three year period for restriping 50 miles of roads. The County and Cities could elect to dedicate all of this funding to the local jurisdictions for road maintenance purposes.

Advocate for dedication of Cap and Trade Funding to roads

Currently, the State allocates funding from the Cap and Trade program to rail and transit projects. Monterey County could advocate for a portion of this funding going to pavement repairs.

Reduce the number of paved miles maintained

Return some roads to gravel

In order to reduce the backlog of pavement treatments, roads in the County could be reassessed to determine if they should remain paved. If roads have very low traffic levels and serve very few parcels, there is the option to return these roads to gravel. While this would not eliminate the need entirely for maintenance, gravel roads still need to be graded at least once per year, it has the potential to reduce overall costs.

Make some roads private

With the support of abutting property owners, some County roads could become private. This would allow property owners to control the road and require that they perform needed maintenance.

CONCLUSION

The magnitude of pavement repairs in Monterey County developed over decades and will take decades to remedy. The solution will need to be multifaceted since there is no prospect for sufficient revenues to be available to solve the problem. The solution will need to include reducing the number of paved miles, using new technologies to reduce costs, along with increased revenues from the Local, State and Federal levels.

Finally, as part of the Pavement Asset Management Plan, the Public Works will continue to update/develop a 5-year Plan and work towards reducing the miles of roads needing rehabilitation. It is also necessary to maintain the pavement survey data to accurately develop reports and plans. This requires surveying the condition of pavement at regular intervals. Heavily traveled roads such as arterials and collectors should be surveyed every three years, where as local roads, every 5 to 6 years. The current PCI information is 4 years old and needs to be updated. However, there is not sufficient funding to contract for this service as was done in 2011. Therefore, Public Works will be looking for a method to gather the needed data given funding constraints.

