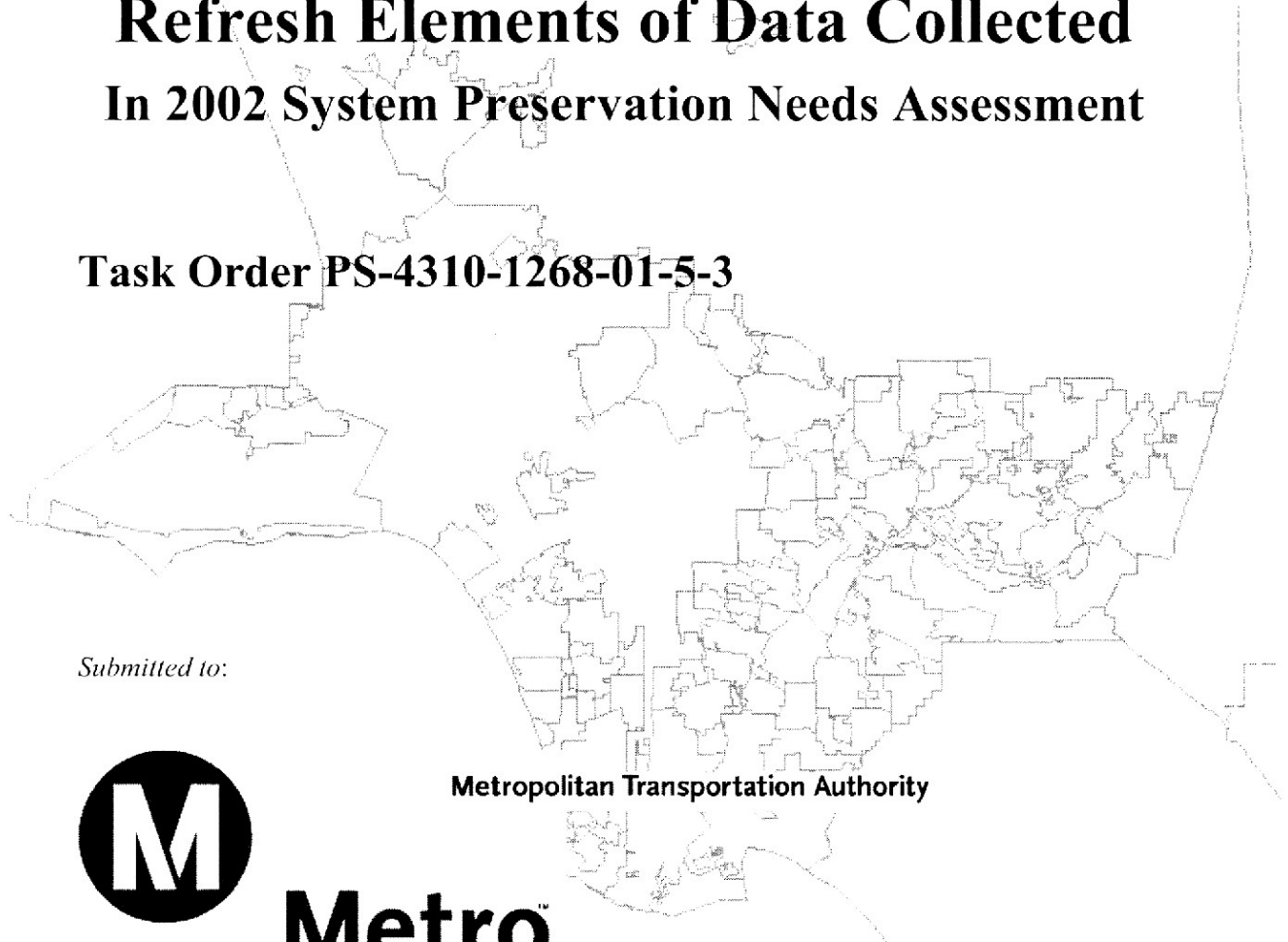


Refresh Elements of Data Collected In 2002 System Preservation Needs Assessment

Task Order PS-4310-1268-01-5-3



Submitted to:



Metropolitan Transportation Authority

Metro™

Submitted by:



December 10, 2007

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In 2002 System Preservation Needs Assessment**

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Submitted to:
**Los Angeles County Metropolitan Transportation
Authority**

Submitted by:
PB
Lee Andrews Group
Charles Abbott Associates

December 10, 2007

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Reference A - Technical Memorandum #1 – as published on June 6, 2007*	
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*Note: Data continued to be refined after the technical memoranda were published. The memoranda were not updated to reflect changes following the publication date, so some information may differ from that presented in the Final Report. Refer to the Final Report and Appendices for updated information.

Executive Summary

This System Preservation Needs Project was undertaken by the Los Angeles County Metropolitan Transportation Authority (Metro) to assess Los Angeles County's system preservation needs in 2007 and to refresh elements of data collected from two previous Metro studies, the 2002 Capacity Enhancement/System Preservation Needs Assessment Study (2002 Study) and the 2004 Pavement Condition Index Study (2004 Study). The 2002 Study provided data for each of the county's 88 local jurisdictions with public streets including the backlog cost for rehabilitation, reconstruction, and resurfacing (3R) work on arterial streets. The 2004 Study developed a method for normalizing (reporting on a consistent standard scale) pavement conditions among the various local jurisdictions in Los Angeles County and resulted in the development of a Countywide Pavement Condition Index (CPCI) tool. The CPCI tool normalized the conditions and costs and calculated normalized values for each jurisdiction and the county as a whole. This 2007 effort began with a survey of local jurisdictions to obtain data on their pavement management systems (PMS) as well as backlog costs and funding for both 3R and maintenance work on their arterial and local streets.

It is emphasized that field verifications of PCI correlations were not a part of this study. PCI correlations varied from the given PCIs, as expected. In some instances, correlated ratings were significantly less than the jurisdiction's system rating. It is important to note that resulting in a lower correlated rating does not imply that the street conditions in that particular city are below average; rather, it reflects the fact that different rating systems weigh defects differently. Thus, translations to the CPCI at the jurisdiction level may not be accurate and the correlation results should only be used at an aggregate county level of analysis. For jurisdictions without correlatable PCIs, jurisdictions were assigned surrogate ratings, which represent an estimate of the threshold ratings. The surrogate ratings assigned were not intended to represent actual conditions, but are only intended to serve as estimates, or in other words, as "place holder values" so those jurisdictions can be included in the countywide totals for costs and conditions.

This survey found that approximately 64 percent of surveyed jurisdictions made no changes to their systems or rating scales since the 2004 Survey. Approximately 3 percent changed their rating scales only and nearly 33 percent of all surveyed jurisdictions changed their PMS since the 2004 Study. Most of the jurisdictions that changed their PMS changed to a correlatable system that is recognized by the Correlation Tool. A few jurisdictions changed to a non-correlatable PMS and were assigned surrogate PCI values. No new PMS systems were identified in the 2007 Survey and thus, no new correlations were developed for the Updated Correlation Tool.

In this study, the average CPCI threshold value for 3R work was found to be 62, which is one point higher than the value found in the 2004 Study. The most frequently occurring correlated PCI threshold was found to be 70, which is the same as in the 2004 Study.

Actual average PCI values from responding jurisdictions (not to be confused with the threshold PCIs) were normalized using the same correlation curves that were used to normalize PCI thresholds. Surrogate values were not developed for jurisdictions that did not respond or that had a non-correlatable PMS. There were 60 jurisdictions with correlatable responses that were

normalized. Among the correlatable responses, the normalized countywide actual average PCI was 69 and the most frequently occurring normalized actual average PCI was 70.

This 2007 study found that at the average CPCI threshold value of 62, the normalized total county unmet cost to address arterial 3R backlog needs is estimated to be \$1.18 billion. This is an increase of \$360 million from the 2004 study results, which found that when using the 2002 average PCI threshold of 61 and 2002 survey cost data the total unmet backlog cost was \$0.82 billion in FY 2002 dollars. When the 2002 results are adjusted for inflation, using a price index change of 1.41¹, the total unmet backlog cost is \$1.16 billion in FY 2007 dollars. This results in an increase of only \$20 million, or 1.72 percent, between 2002 and 2007.

At the most frequently occurring CPCI threshold of 70, the normalized total county unmet cost to address arterial 3R backlog needs is estimated to be \$1.34 billion. Again, this is an increase of \$400 million from the 2004 study results, which found that when using the most frequently occurring 2002 PCI value of 70 and 2002 survey cost data the total unmet backlog cost is \$0.93 billion in FY 2002 dollars. When the 2002 results are adjusted for inflation, using a price index change of 1.41¹, the total unmet backlog cost is \$1.31 billion in FY 2007 dollars. This results in an increase of only \$30 million, or 1.53 percent, between 2002 and 2007.

At the CPCI threshold average of 62, the normalized total countywide annual cost to maintain that threshold once the backlog is eliminated is estimated to be \$214 million. At the CPCI threshold of 70, which is the most frequently occurring threshold value, then the normalized total county annual cost to maintain that threshold once the backlog is eliminated is estimated to be \$244 million.

¹ Bureau of Labor Statistics, period between 2nd quarter 2002 and 2nd quarter 2007.

1.0 INTRODUCTION

This report presents the final results of the 2007 System Preservation Needs Study Project. The purpose of this project is to assess Los Angeles County's system preservation needs in the year 2007 and to refresh elements of data collected from a previous study, conducted in 2002. The project included surveying the 88 local jurisdictions with public roads in Los Angeles County (one city has all private roads) with respect to their arterial and local road management practices and funding needs. The project team was led by the Los Angeles County Metropolitan Transportation Authority (Metro) and comprised of PB, Charles Abbott Associates (CAA), and the Lee Andrews Group (LAG). The project had four major goals:

1. To refresh elements of data collected in the 2002 System Preservation 3R Needs Assessment by resurveying all local jurisdictions with public roads in Los Angeles County.
2. To collect additional information regarding changes in PMSs and PCIs in use by the local jurisdictions.
3. To collect available information on actual pavement conditions without actual field verifications.
4. To normalize the updated data to calculate a countywide unmet backlog cost using Metro's Correlation Tool, modified as needed for changes to PMSs.

1.1 Background

In September 2002, the Metro Board received the Capacity Enhancement/System Preservation Needs Assessment Study Report (2002 Needs Study). Among the conclusions of this report was that while PMS's helped determine pavement conditions and assist jurisdictions in deciding when and how frequently streets should be resurfaced or rehabilitated, different systems resulted in different resurfacing and rehabilitation schedules. For Los Angeles County, the 2002 study reported that:

- There were more than 20 different Pavement Management Systems.
- The jurisdictions used various rating methods, scales and trigger [threshold] values to determine system preservation schedules.
- The lack of standardization in PMS across the county means costs and schedules (i.e., reported system preservation needs) are not necessarily comparable.

As a result of these findings, the Metro Board directed that a method be developed to normalize (reporting on a consistent standard scale) pavement conditions and needs to allow for consistent reporting countywide. The result was the development of the Countywide Pavement Condition Index. This correlated index normalizes the indices of the various pavement management

systems to allow the region to consistently report its pavement conditions and needs. In response to that directive, Metro conducted a new study in 2004 and developed the CPCI Correlation Tool that normalized the PCIs and costs identified by the local jurisdictions various pavement management systems.

The CPCI Correlation Tool is based on the United States Army Corps of Engineers (ACOE) pavement life expectancy curves. The ACOE approach was developed further by State Highway agencies and used to identify long-range funding needs as well as short-range capital improvement projects. Many of the PMSs in use today are based on these curves. These families of PMSs use a PCI that ranges from 0 to 100, with 100 corresponding to a newly constructed pavement. That condition was developed by ACOE because the 100-point range was of sufficient breath that pavement sections could be accurately rated and ranked. For PMSs which were not directly correlatable to the ACOE curves, a correlation for each was developed by comparing specific deduction values for the major pavement defects in each system. Refer to Appendix A for the full text of the 2004 Study.

The 2004 Study made the following findings:

- Each jurisdiction typically updates its PMS inventory on a three year cycle for arterials, according to Governmental Accounting Standards Board (GASB) 34 and FHWA recommendations. Thus, the Correlation tool should be updated accordingly to reflect changes in PMSs in use and threshold PCI Updates should include changes in the estimated backlog costs.
- Metro will need to establish a correlation approach for any new PMSs that are developed and used in the County.
- Although the 2004 Study did not use lane mile data for the final analysis, it appeared that the use of lane mile data with unit costs would provide an additional degree of refinement to projecting normalized backlogs. The survey data would need to include the number of lane miles requiring backlog work. (Note that this data was collected in 2007. However, the data was found to be too unreliable to use.)
- Field sampling of each jurisdiction's condition inventory data would add a significant degree of accuracy to the normalization process.

As of the writing of this report, the 2002 System Preservation Needs Assessment data is over five years old. The Federal Highway Administration (FHWA) recommends that jurisdictions update their inventory of pavement conditions every three years. To keep Metro's data current, this survey updated the 2002 data for System Preservation – Rehabilitation, Reconstruction, and Resurfacing (3R) needs and reported conditions on arterial streets and normalized the results using the updated Correlation Tool.

In addition, there was an interest during the development of this survey to expand the 2002 survey and collect information regarding 3R needs for local roads and the maintenance practices and needs of arterial and local roads. This additional information is presented in this report but was not normalized.

1.2 Steering Committee

In addition to the Consultant Team and Metro staff, a project Steering Committee provided technical input and review of the survey, reports, and findings. To provide continuity with previous studies, the Committee composition was consistent with that of the 2004 Study and the 2002 Study. Members represented the Los Angeles County Sub-regions and the City and County of Los Angeles as follows:

Subregion	Representative	Agency
North LA County Transportation Coalition	Kris Markarian	City of Santa Clarita
Gateways Cities Council of Governments	Bill Pagett	Gateway Cities COG
Las Virgines/Malibu Council of Governments	Bob Brager	City of Malibu
San Gabriel Valley Council of Governments	Dan Rix	City of Pasadena
Arroyo Verdugo Cities	Ken Johnson	City of Burbank
LA County (Unincorporated)	Paul Maselbas Pat Dechellis	LA County Public Works
South Bay Cities Council of Governments	Dana Greenwood	City of Manhattan Beach
West Side Cities Council of Governments	Mate Gaspar Mila Sologub	Culver City West Hollywood
City of Los Angeles	Gina Mancha	Bureau of Street Services

2.0 SURVEY

The Survey Instrument was developed by the Project Team with input from the System Preservation Steering Committee. The 2002 Survey was used as the base for comparison purposes. The Survey Instrument was reviewed by the Steering Committee at the end of November 2006 prior to distribution. The distribution of the Survey Instrument was accompanied with a letter explaining the purpose of the survey and instructions on how to complete the survey. The Project Team updated the contact list provided by Metro from the 2004 Survey to develop a comprehensive contact list of staff at each jurisdiction responsible for completing the survey.

Following review of the Survey Instrument by the Steering Committee and approval by Metro, the survey was distributed to the jurisdictions; first by email, and then followed up with faxes, telephone calls, and additional emails as necessary. In addition, as responses were received, a "Quality Control" check was performed to ensure that survey responses accurately and appropriately addressed questions in the Survey Instrument. When responses were identified as incomplete or confusing, jurisdictions were asked for more information or clarification.

A two month period, beginning December 1, 2006 and ending February 1, 2007, was allotted for jurisdictions to complete the survey. Some jurisdictions needed more time than initially allocated and by April 1, 2007, all 88 jurisdictions submitted their survey forms. However, some jurisdictions did not fully answer the questions.

2.1 Survey Goals

The goals of the survey were outlined by Metro and the Steering Committee at the outset of the study. The survey included over 20 questions. These questions were divided into several main topics – the jurisdiction’s current PMS, its 3R needs for arterials, 3R needs for local streets, and maintenance needs on both arterials and local streets. The questions were set up in a matrix format so that all questions were separately applied to arterial roads in one column and local streets in another column. Below are the primary information goals of the survey instrument as set forth by Metro. A copy of the survey instrument and its accompanying solicitation letter is provided in Appendix B.

PMS Questions

- Identify the PMS in current use by each of the 88 local jurisdictions with public roads in Los Angeles County.
- Identify the rating scale – PCI for each, including how the rating scale works (i.e. 10 = high, 1 = low, vs. 1 = high, 10 = low).
- Document important details regarding the jurisdiction’s PCI rating system(s). For example, is the PMS subjective with reliance on an individual’s engineering judgment or is it objective with reliance on instruments, lasers, or other objective methods for determining pavement condition.
- Document the Threshold PCI value.
- Report the Actual Average PCI (AAPCI) value for each jurisdiction.

Rehabilitation, Reconstruction, and Resurfacing (3R) Questions

- Document the backlog cost of arterial and local roads requiring 3R work as of FY06/07 or the most current year in which a pavement condition assessment was done.
- Document the cost of annual needs in FY06/07 dollars to maintain arterial roads at the Threshold PCI (once the backlog is eliminated).
- Document the funding allocated to address system preservation needs for each jurisdiction.

Maintenance Questions

- Document the maintenance cycles established by each jurisdiction for arterial and local roads.

- Document the annual cost of each jurisdiction's maintenance program for arterial and local roads. This amount is different from the jurisdiction's actual funding allocation.
- Document the amount it would cost in FY06/07 dollars to eliminate the backlog of maintenance work so that the arterial and local pavement condition of the jurisdiction meets the identified PCI threshold.
- Document the number of lane miles associated with the reported backlog of each jurisdiction.
- Document the amount of arterial and local maintenance work that is currently funded in most current year dollars (state year and dollar amount).

3.0 SUMMARY OF CHANGES IN PMS

The adoption of PMSs by jurisdictions in Los Angeles County is not necessarily permanent. This survey found that about 33 percent of surveyed jurisdictions have changed their systems or rating scales since the 2004 Survey, which is one of the reasons FHWA recommends updating system preservation assessments periodically. To better understand the changes that have occurred since the 2004 Survey, each jurisdiction was categorized into one of three groups based on their status of change in the use of pavement management systems. A description of each group is found below.

These categories helped identify jurisdictions which changed to using a different PMS, jurisdictions that do not have PMSs, or have non-correlatable systems. No new (to Los Angeles County's local jurisdictions) pavement management systems were identified in the 2007 Survey. A detailed listing of jurisdictions within each group and their specific changes are provided in Appendix D.

Group 1: Same PMS

This group of jurisdictions uses the same PMS in 2007 as in 2004 and is the largest group, comprising 64 percent of all jurisdictions. Some jurisdictions in this group were assigned a surrogate PCI in the 2004 Correlation Tool because they used a non-correlatable PMS. Although these jurisdictions have made no changes to their PMS, the surrogate values that were determined for these jurisdictions could change because the jurisdictions used as a basis for developing their surrogate values may be different from the last survey and may result in a different value. Most jurisdictions with a correlatable PMS had no changes to their PCI thresholds. All changes to PCI threshold values affect the value of the updated countywide average PCI threshold, but it did not require major changes to the Correlation Tool and no new curves were necessary for this group of jurisdictions.

Group 2: Same PMS, Different Scale

This group of jurisdictions is essentially using the same PMS as they did in 2004, but have adopted a new PCI rating scale for determining pavement conditions. This group comprised 3

percent of all surveyed jurisdictions. All jurisdictions in this group happened to be jurisdictions that were using non-correlatable PMSs and therefore were assigned surrogate PCI thresholds in the 2004 Survey and were again assigned surrogate values in this 2007 survey. No new curves were necessary for this group of jurisdictions but updated surrogate values were provided.

Group 3: Changed PMS

As noted earlier, a significant portion of jurisdictions, about 33 percent, changed their PMS since the 2004 survey. Most of the jurisdictions in this group changed their PMS to a correlatable system that was recognized by the Correlation Tool. Four of the twenty-nine jurisdictions in this category changed from a correlatable PMS in 2004 to a non-correlatable PMS in 2007 and needed to be assigned a surrogate value.

Table 2 presents the number and proportional breakdown of each of the groups.

Table 2: Summary of PMS Changes by Group		
PMS Change Group	Number of Jurisdictions	Proportion of All Respondents (%)
Group 1: Same PMS	56	64
Group 2: Same PMS, Different Scale	3	3
Group 3: Changed PMS	29	33
Total	88	100

4.0 SURROGATE DATA

This survey found that fewer jurisdictions needed surrogate PCI threshold data in 2007 than in 2004. Surrogate data is needed when a jurisdiction does not report the use of a PMS system or does not have a PMS system that is correlatable to the Countywide Pavement Condition Index. In 2007, 26 jurisdictions needed surrogate data where as, in 2004, 40 jurisdictions needed surrogate data. Table 3 presents a summary of the jurisdictions needing surrogate data. As noted earlier, there were four jurisdictions, listed in italics, that did not require surrogate data in the 2004 survey and are, therefore, new additions to the 2007 list.

The methodology used to identify jurisdictions requiring surrogates and to estimate surrogate PCI thresholds was the same in 2007 as the methodology developed for the 2004 CPCI Correlation Tool. This methodology estimates the surrogate PCI threshold by taking the numerical average of PCI threshold values from two donor jurisdictions with similar characteristics. The two donor jurisdictions are selected from a list of correlatable jurisdictions that are most similar to the surrogate seeking jurisdiction in the following categories:

- General topographic conditions (flat, hilly)
- General soil conditions (alluvial plain, coastal, non-erodible)

- General traffic volumes (low, medium, high)
- General truck volumes (low, medium, high)

In most cases, it was possible to reuse the 2004 donor jurisdiction assignments. Exceptions occurred where one of the four new additions to the 2007 surrogate seeking jurisdiction list was used as a donor assignment in 2004. In these cases, new donor assignments were found. While there was not much change to most donor assignments, the estimated PCI thresholds of most jurisdictions were slightly different from the estimated PCI thresholds in 2004 due to the changes in the donor jurisdiction's PCI threshold. For more information about the donor assignment methodology and the development of surrogate PCI thresholds, refer to the 2004 Final Report on the Development of the Los Angeles Countywide Pavement Condition Index. A detailed list of surrogates and donors is included in the PCI Correlation Tool in Appendix E.

Table 3: Jurisdictions Needing Surrogate Data		
#	Jurisdiction	PMS System in Use
1	Avalon	No PMS System
2	Azusa	In House
3	Baldwin Park	LAC DPW
4	Beverly Hills	Hansen's PMS
5	Bradbury	No PMS System
6	<i>Claremont</i>	<i>In House</i>
7	Commerce	In House
8	Cudahy	Willdan (0-100 scale)
9	El Monte	Pavement Condition Inventory
10	Glendora	No PMS System
11	<i>Hidden Hills</i>	<i>No PMS System</i>
12	Industry	No PMS System
13	Irwindale	LAC DPW
14	La Habra Heights	No PMS System
15	La Mirada	LAC DPW
16	Lakewood	In House
17	Lancaster	In House
18	Lynwood	In House
19	Monrovia	Pavement Condition Inventory
20	<i>Pico Rivera</i>	<i>Harris & Associates</i>
21	Rolling Hills Estates	Willdan (0-15 Scale)
22	San Fernando	In House
23	South El Monte	No PMS System
24	<i>South Pasadena</i>	<i>In House</i>
25	Walnut	LAC DPW
26	Westlake Village	No PMS System
<i>Note: Italicized jurisdictions did not require surrogate data in the 2004 Study.</i>		

5.0 NORMALIZED RESULTS

5.1 Normalized PCI Threshold Data

The CPCI Correlation Tool was updated using the latest PCI threshold data. Each jurisdiction was normalized using either the correlation curves already available in the Correlation Tool or the updated surrogate data. It is emphasized that field verifications of PCI correlations were not a part of this study. PCI correlations were variable, as expected. In some instances, correlated ratings were significantly less than the jurisdiction's system rating. It is important to note that resulting in a lower correlated rating does not imply that the street conditions in that particular city are below average; rather, it reflects the fact that different rating systems weigh defects differently. Thus, translations to the countywide pavement condition index (CPCI) at the jurisdiction level should only be used at an aggregate county level of analysis. In other cases, jurisdictions were assigned surrogate ratings, which represent an estimate of the threshold ratings for cities without correlatable PCIs. The surrogate ratings assigned were not intended to represent actual conditions for those jurisdictions.

The normalized PCI thresholds are presented in Table 4 PCI Threshold Correlated to CPCI. The average countywide PCI threshold value for 3R work is 62, which is one point higher than the value found in the 2004 study. The most frequently occurring threshold correlated to the CPCI is 70, which is the same value found in the 2004 study. The average CPCI and the most frequently occurring threshold are calculated using only threshold data from correlatable jurisdictions and exclude estimated surrogate thresholds.

Table 4: Normalized Threshold PCIs			
Jurisdiction	Pavement Management Software	Provided PCI Threshold	Normalized PCI Threshold
Agoura Hills	Micro PAVER	40	40
Alhambra	Micro PAVER	65	65
Arcadia	Micro PAVER	55	55
Artesia	Micro PAVER	80	80
Avalon	No PMS System	Not Specified	62
Azusa	In House	20	78
Baldwin Park	LACDPW	65	80
Bell	Nichols Consulting Engineers	50	50
Bell Garden	Micro PAVER	55	55
Bellflower	Micro PAVER	70	70
Beverly Hills	Hansen's PMS	5.9	55
Bradbury	No PMS System	Not Specified	78
Burbank	Micro PAVER	55	55
Calabasas	Micro PAVER	70	70
Carson	Micro PAVER	71	71
Cerritos	Infrastructure Management Services	60	44

Table 4: Normalized Threshold PCIs			
Jurisdiction	Pavement Management Software	Provided PCI Threshold	Normalized PCI Threshold
	(IMS)		
Claremont	In House	70	83
Commerce	In House	60	63
Compton	Micro PAVER	70	70
Covina	CHEC Infra Manager	75	75
Cudahy	Willdan PMS (0-100 scale)	50	57
Culver City	CHEC Infra Manager	50	50
Diamond Bar	Micro PAVER	70	70
Downey	Infrastructure Management Services (IMS)	79	69
Duarte	CarteGraph Pavementview Plus	80	80
El Monte	Pavement Condition Inventory	2	70
El Segundo	Micro PAVER	55	55
Gardena	MTC StreetSaver	90	90
Glendale	Micro PAVER	60	60
Glendora	No PMS System	Not Specified	83
Hawaiian Gardens	Micro PAVER	40	40
Hawthorne	In House (based on Micro PAVER)	60	60
Hermosa Beach	Micro PAVER	55	55
Hidden Hills	No PMS System	Not Specified	55
Huntington Park	CarteGraph Pavementview Plus	51	51
Industry	No PMS System	Not Specified	63
Inglewood	Berryman & Henigar	65	74
Irwindale	LACDPW	70	62
La Canada Flintridge	Stantec MPMA	7	70
La Habra Heights	No PMS System	Not Specified	58
La Mirada	LACDPW	3	63
La Puente	Micro PAVER	55	55
La Verne	CarteGraph Pavementview Plus	70	70
Lakewood	In House	70	80
Lancaster	In House	2.6	60
Lawndale	Micro PAVER	50	50
Lomita	CarteGraph Pavementview Plus	80	80
Long Beach	Micro PAVER	55	55
Los Angeles City	Micro PAVER	60	60
Los Angeles County Unincorporated	Stantec MPMA	7.4	74
Lynwood	In House	3	57
Malibu	MTC StreetSaver	50	50
Manhattan Beach	Stantec MPMA	5	50
Maywood	Micro PAVER	70	70

Table 4: Normalized Threshold PCIs			
Jurisdiction	Pavement Management Software	Provided PCI Threshold	Normalized PCI Threshold
Monrovia	Pavement Condition Inventory	88	55
Montebello	Micro PAVER	55	55
Monterey Park	Berryman & Henigar	44	54
Norwalk	Micro PAVER	55	55
Palmdale	Micro PAVER	70	70
Palos Verdes Estates	Micro PAVER	85	85
Paramount	Micro PAVER	70	70
Pasadena	Modified Micro PAVER 1-70	30	43
Pico Rivera	Harris & Associates	Not Specified	63
Pomona	CHEC Infra Manager	65	65
Rancho Palos Verdes	Micro PAVER	70	70
Redondo Beach	Stantec MPMA	7	70
Rolling Hills Estates	Willdan PMS (0-0.15 scale)	0.05	78
Rosemead	Micro PAVER	40	40
San Dimas	MTC StreetSaver	85	85
San Fernando	In House	65	61
San Gabriel	MTC StreetSaver	70	70
San Marino	MTC StreetSaver	50	50
Santa Clarita	MTC StreetSaver	54	54
Santa Fe Springs	Micro PAVER	70	70
Santa Monica	Micro PAVER	70	70
Sierra Madre	Micro PAVER	50	50
Signal Hill	Stantec MPMA	7	70
South El Monte	No PMS System	Not Specified	57
South Gate	Micro PAVER	40	40
South Pasadena	In House	60	51
Temple City	MTC StreetSaver	68	68
Torrance	MTC StreetSaver	70	70
Vernon	MTC StreetSaver	69	69
Walnut	LACDPW	3	78
West Covina	MTC StreetSaver	70	70
West Hollywood	MTC StreetSaver	40	40
Westlake Village	No PMS System	Not Specified	55
Whittier	Charles Abbot Assoc	70	45
Average Correlated PCI Threshold Value for 3R Work			62
Most Frequent Threshold Correlated to CPCI			70

5.2 Normalized Actual Average PCI

The method used to normalize actual average PCIs is very similar to the method used to normalize PCI thresholds. The actual average PCIs is data on the jurisdiction's actual pavement conditions and should not be confused with the average correlated PCI threshold value. The actual average PCIs were normalized using the same correlation curves that were used to normalize the PCI thresholds. There were 60 jurisdictions with correlatable responses that were normalized. No surrogate values were developed for jurisdictions that did not respond or that had non-correlatable systems. Among the correlatable responses, the most frequently occurring normalized actual PCI was 70 and the normalized county actual average PCI was 69. Responses from jurisdictions with no correlatable systems were not used in calculating the normalized county average.

Table 5 presents the provided actual average PCIs, the normalized actual average PCI, the normalized county actual average PCIs, and the most frequently occurring normalized actual average PCI.

Table 5: Normalized Actual Average PCI			
Jurisdiction	Pavement Management System	Provided Actual Average PCI²	Normalized Actual Average PCI³
Agoura Hills	Micro PAVER	60	60
Alhambra	Micro PAVER	45	45
Arcadia	Micro PAVER	70	70
Artesia	Micro PAVER	70	70
Avalon	No PMS System	NS	NC
Azusa	In House	NS	NC
Baldwin Park	LACDPW	70	NC
Bell	Nichols Consulting Engineers	90	90
Bell Garden	Micro PAVER	75	75
Bellflower	Micro PAVER	69	69
Beverly Hills	Hansen's PMS	6.5	NC
Bradbury	No PMS System	NS	NC
Burbank	Micro PAVER	68	68
Calabasas	Micro PAVER	69	69
Carson	Micro PAVER	67	67
Cerritos	Infrastructure Management Services	80	71
Claremont	In House	60	NC
Commerce	In House	80	NC

² "NS" indicates that the Provided Actual Average PCI was not stated in the 2007 PCI survey.

³ "NC" indicates that the jurisdiction's Provided Actual Average PCI is not correlatable.

Table 5: Normalized Actual Average PCI			
Jurisdiction	Pavement Management System	Provided Actual Average PCI²	Normalized Actual Average PCI³
Compton	Micro PAVER	65	65
Covina	CHEC Infra Manager	63	63
Cudahy	Willdan PMS (0-100 scale)	90	NC
Culver City	CHEC Infra Manager	77	77
Diamond Bar	Micro PAVER	84	84
Downey	Infrastructure Management Services	86	80
Duarte	CarteGraph Pavementview Plus	70	70
El Monte	Pavement Condition Inventory	NS	NC
El Segundo	Micro PAVER	56	56
Gardena	MTC StreetSaver	82	82
Glendale	Micro PAVER	79	79
Glendora	No PMS System	NS	NC
Hawaiian Gardens	Micro PAVER	47	47
Hawthorne	In House (based on Micro PAVER)	70	70
Hermosa Beach	Micro PAVER	60	60
Hidden Hills	No PMS System	NS	NC
Huntington Park	CarteGraph Pavementview Plus	52	52
Industry	No PMS System	NS	NC
Inglewood	Berryman & Henigar	66	75
Irwindale	LACDPW	60	NC
La Canada-Flintridge	Stantec MPMA	7.1	71
La Habra Heights	No PMS System	NS	NC
La Mirada	LACDPW	3	NC
La Puente	Micro PAVER	67	67
La Verne	CarteGraph Pavementview Plus	75	75
Lakewood	In House	NS	NC
Lancaster	In House	3.3	NC
Lawndale	Micro PAVER	52	52
Lomita	CarteGraph Pavementview Plus	88	88
Long Beach	Micro PAVER	79	79
Los Angeles City	Micro PAVER	77	77
Los Angeles County Unincorporated	Stantec MPMA	6.5	65
Lynwood	In House	NS	NC
Malibu	MTC StreetSaver	63	63
Manhattan Beach	Stantec MPMA	7	70
Maywood	Micro PAVER	69	69
Monrovia	Pavement Condition Inventory	78	NC
Montebello	Micro PAVER	51	51

Table 5: Normalized Actual Average PCI			
Jurisdiction	Pavement Management System	Provided Actual Average PCI²	Normalized Actual Average PCI³
Monterey Park	Berryman & Henigar	30	39
Norwalk	Micro PAVER	61	61
Palmdale	Micro PAVER	65	65
Palos Verdes Estates	Micro PAVER	NS	NC
Paramount	Micro PAVER	69	69
Pasadena	Modified Micro PAVER 1-70	47	NC
Pico Rivera	Harris & Associates	45	NC
Pomona	CHEC Infra Manager	79	79
Rancho Palos Verdes	Micro PAVER	72	72
Redondo Beach	Stantec MPMA	7.4	74
Rolling Hills Estates	Willdan PMS (0-0.15 scale)	0.045	NC
Rosemead	Micro PAVER	75	75
San Dimas	MTC StreetSaver	70	70
San Fernando	In House	40	NC
San Gabriel	MTC StreetSaver	48	48
San Marino	MTC StreetSaver	85	85
Santa Clarita	MTC StreetSaver	71	71
Santa Fe Springs	Micro PAVER	60	60
Santa Monica	Micro PAVER	83	83
Sierra Madre	Micro PAVER	81	81
Signal Hill	Stantec MPMA	7.6	76
South El Monte	No PMS System	NS	NC
South Gate	Micro PAVER	67	67
South Pasadena	In House	60	NC
Temple City	MTC StreetSaver	99	99
Torrance	MTC StreetSaver	68	68
Vernon	MTC StreetSaver	75	75
Walnut	LACDPW	2.25	NC
West Covina	MTC StreetSaver	65	65
West Hollywood	MTC StreetSaver	85	85
Westlake Village	No PMS System	NS	NC
Whittier	Charles Abbot Assoc	70	45
County Average of Normalized Actual Average PCIs			69
Most Frequent Normalized Actual Average PCI			70

5.3 Normalized Cost of Unmet Arterial 3R Backlog

A jurisdiction's unmet cost is a portion of a jurisdiction's 3R backlog that is calculated by taking the difference between the jurisdiction's arterial backlog costs and its available funding in fiscal year (FY) 2007. Since not all jurisdictions provided backlog and funding responses, the determination of a normalized county unmet cost required two steps. The first step was to develop a complete unmet cost data set for all 88 jurisdictions by extrapolating unmet costs for jurisdictions with missing responses. The second step was to normalize each jurisdiction's unmet cost data to a selected CPI threshold.

For jurisdictions that provided backlog and funding responses, the unmet cost was calculated by taking the difference between the jurisdiction's current backlog costs and available funding. For jurisdictions with missing backlog and funding responses, an extrapolated unmet cost was calculated by multiplying the jurisdiction's total arterial lane miles by the county unmet unit cost per arterial lane mile. For this study, the county arterial 3R unmet backlog unit cost was found to be \$26,225 per arterial lane mile. It was calculated by taking the total unmet cost from jurisdictions that provided 3R backlog cost and funding responses divided by the total arterial lane miles for responding jurisdictions in Los Angeles County.

Table 6 presents the arterial 3R unmet cost data for each jurisdiction, including responses from the survey. The top portion of the table shows the data from responding jurisdictions. The lower section contains the cities for which there were no responses and the data was extrapolated. This same table can be found in the Correlation Tool in a spreadsheet tab labeled "Data – Unmet Costs." The data in this table is used in the Normalized Unmet Costs Tab to calculate normalized unmet costs. Refer to Appendix E to see the updated Correlation Tool.

Table 6: Arterial 3R Unmet Cost Data				
Jurisdiction	Total Lane Miles	Backlog Response	Funding Response	Unmet Cost Data
Responding Jurisdictions				
Agoura Hills	134	\$9,000,000	\$1,059,470	\$7,940,530
Alhambra	330	\$7,000,000	\$1,000,000	\$6,000,000
Arcadia	500	\$6,318,288	\$600,000	\$5,718,288
Artesia	62	\$3,500,000	\$200,000	\$3,300,000
Azusa	192	\$8,000,000	\$0	\$8,000,000
Baldwin Park	229	\$7,100,000	\$300,000	\$6,800,000
Bell	86	\$300,000	\$0	\$300,000
Bell Garden	101	\$2,500,000	\$1,500,000	\$1,000,000
Bellflower	246	\$24,000,000	\$270,000	\$23,730,000
Beverly Hills	214	\$10,000,000	\$500,000	\$9,500,000
Burbank	546	\$38,011,900	\$1,200,000	\$36,811,900
Carson	420	\$1,800,000	\$300,000	\$1,500,000
Cerritos	364	\$4,000,000	\$1,200,000	\$2,800,000

Table 6: Arterial 3R Unmet Cost Data				
Jurisdiction	Total Lane Miles	Backlog Response	Funding Response	Unmet Cost Data
Claremont	231	\$2,000,000	\$945,988	\$1,054,012
Commerce	153	\$2,000,000	\$400,000	\$1,600,000
Compton ⁴	415	\$3,200,000	\$3,200,000	\$0
Covina	274	\$8,700,000	\$1,100,000	\$7,600,000
Cudahy	62	\$1,300,000	\$550,000	\$750,000
Culver City	216	\$17,945,034	\$1,800,000	\$16,145,034
Diamond Bar	293	\$1,894,000	\$1,650,000	\$244,000
Downey	503	\$4,886,800	\$2,010,000	\$2,876,800
Responding Jurisdictions				
Duarte	110	\$1,500,000	\$0	\$1,500,000
El Monte	363	\$1,500,000	\$175,000	\$1,325,000
El Segundo	130	\$17,500,000	\$250,000	\$17,250,000
Gardena	220	\$4,000,000	\$2,685,000	\$1,315,000
Glendale ³	790	\$5,900,000	\$5,900,000	\$0
Hawaiian Gardens	38	\$250,000	\$0	\$250,000
Hawthorne	390	\$4,000,000	\$700,000	\$3,300,000
Hermosa Beach	88	\$637,760	\$0	\$637,760
Huntington Park	171	\$1,600,000	\$405,000	\$1,195,000
Industry	175	\$10,730,000	\$1,199,100	\$9,530,900
Inglewood	444	\$25,000,000	\$5,000,000	\$20,000,000
Irwindale	58	\$6,000,000	\$1,000,000	\$5,000,000
La Canada-Flintridge	180	\$400,000	\$400,000	\$0
La Mirada	260	\$14,334,894	\$8,065,000	\$6,269,894
La Puente	145	\$8,500,000	\$800,000	\$7,700,000
La Verne	235	\$8,300,000	\$1,500,000	\$6,800,000
Lakewood	425	\$6,600,000	\$1,000,000	\$5,600,000
Lancaster	1,137	\$20,085,000	\$4,320,000	\$15,765,000
Lawndale	85	\$2,000,000	\$1,200,000	\$800,000
Lomita	21	\$526,000	\$0	\$526,000
Long Beach	1,900	\$72,000,000	\$5,400,000	\$66,600,000
Los Angeles City	23,014	\$310,500,000	\$15,000,000	\$295,500,000
Los Angeles County Unincorporated	3,131	\$275,000,000	\$54,000,000	\$221,000,000
Lynwood	215	\$8,000,000	\$3,400,000	\$4,600,000
Malibu	94	\$930,000	\$120,000	\$810,000
Manhattan Beach	264	\$2,000,000	\$700,000	\$1,300,000
Maywood	160	\$3,200,000	\$0	\$3,200,000

⁴ Backlog Response was changed to match Funding Response

Table 6: Arterial 3R Unmet Cost Data				
Jurisdiction	Total Lane Miles	Backlog Response	Funding Response	Unmet Cost Data
Monrovia	189	\$4,300,000	\$0	\$4,300,000
Montebello	300	\$17,364,162	\$708,750	\$16,655,412
Monterey Park	275	\$20,000,000	\$1,370,000	\$18,630,000
Norwalk	580	\$9,800,000	\$1,800,000	\$8,000,000
Palmdale	803	\$8,000,000	\$2,200,000	\$5,800,000
Palos Verdes Estates ³	150	\$631,367	\$631,367	\$0
Paramount	167	\$4,400,000	\$2,621,000	\$1,779,000
Pasadena	775	\$8,400,000	\$700,000	\$7,700,000
Responding Jurisdictions				
Pico Rivera	320	\$1,800,000	\$1,000,000	\$800,000
Pomona	725	\$45,000,000	\$3,564,000	\$41,436,000
Rancho Palos Verdes	607	\$5,100,000	\$1,600,000	\$3,500,000
Redondo Beach	291	\$6,765,000	\$665,000	\$6,100,000
Rolling Hills Estates	95	\$1,400,000	\$0	\$1,400,000
Rosemead	212	\$4,100,000	\$0	\$4,100,000
San Dimas	250	\$33,000,000	\$65,000	\$32,935,000
San Fernando	106	\$2,700,000	\$576,995	\$2,123,005
San Gabriel	183	\$5,100,000	\$500,000	\$4,600,000
San Marino	132	\$2,100,000	\$800,000	\$1,300,000
Santa Clarita	760	\$24,344,637	\$1,000,000	\$23,344,637
Santa Monica	360	\$4,940,000	\$4,940,000	\$0
Sierra Madre	78	\$497,251	\$497,251	\$0
Signal Hill ³	120	\$2,217,600	\$2,217,600	\$0
South El Monte ³	304	\$2,360,000	\$2,360,000	\$0
South Gate	267	\$54,000,000	\$1,500,000	\$52,500,000
South Pasadena	130	\$1,000,000	\$50,000	\$950,000
Temple City	147	\$900,000	\$0	\$900,000
Torrance	726	\$50,000,000	\$11,000,000	\$39,000,000
Vernon	146	\$11,600,000	\$1,940,000	\$9,660,000
Walnut	245	\$2,057,000	\$0	\$2,057,000
West Covina	566	\$5,185,000	\$800,000	\$5,105,000
West Hollywood	97	\$6,460,000	\$350,000	\$6,110,000
Westlake Village	73	\$559,000	\$254,000	\$305,000
Whittier	600	\$6,300,000	\$1,500,000	\$4,800,000
Subtotal	50,594	\$1,326,830,693	\$180,215,521	\$1,146,615,172
Unit Cost / Lane Mile		\$26,225	\$3,562	\$22,663
Extrapolated Jurisdictions				
Avalon	12	\$314,699	\$42,744	\$271,955
Bradbury	6	\$167,839	\$22,797	\$145,043

Table 6: Arterial 3R Unmet Cost Data				
Jurisdiction	Total Lane Miles	Backlog Response	Funding Response	Unmet Cost Data
Calabasas	164	\$4,300,887	\$584,164	\$3,716,723
Glendora	350	\$9,168,232	\$1,245,266	\$7,922,966
Hidden Hills	2	\$52,450	\$7,124	\$45,326
La Habra Heights	82	\$2,150,443	\$292,082	\$1,858,362
Santa Fe Springs	286	\$7,500,327	\$1,018,725	\$6,481,602
Extrapolated Jurisdictions				
Subtotal	902	\$23,654,878	\$3,212,901	\$20,441,977
County Total	51,497	\$1,350,485,571	\$183,428,422	\$1,167,057,149

Normalized county unmet costs of arterial 3R backlog at selected CPCI thresholds were calculated using the Normalized Unmet Costs Tab in the Correlation Tool (Appendix E). The Normalized Unmet Costs Tab was originally named the Cost Estimate Tab in the 2004 Correlation Tool. The tab has been updated to use the latest unmet cost data as described in the section above and renamed the Normalized Unmet Costs Tab to distinguish it from the new Normalized Annual Costs Tab.

The Normalized Unmet Costs Tab normalizes a jurisdiction's actual or extrapolated unmet cost by adjusting the value by the percent difference between a jurisdiction's normalized PCI threshold and the selected CPCI threshold. The percent difference serves to represent the estimated difference between the jurisdiction's PCI threshold and the selected countywide PCI threshold. For further details on the method used to calculate a jurisdiction's normalized unmet backlog cost at a selected CPCI threshold, refer to Technical Memorandum #4 in the 2004 Study.

Many threshold levels including the county average can be selected as the CPCI Threshold input in calculating the normalized unmet cost. Figure 1 presents normalized county arterial 3R unmet backlog needs at various selected CPCI threshold levels.

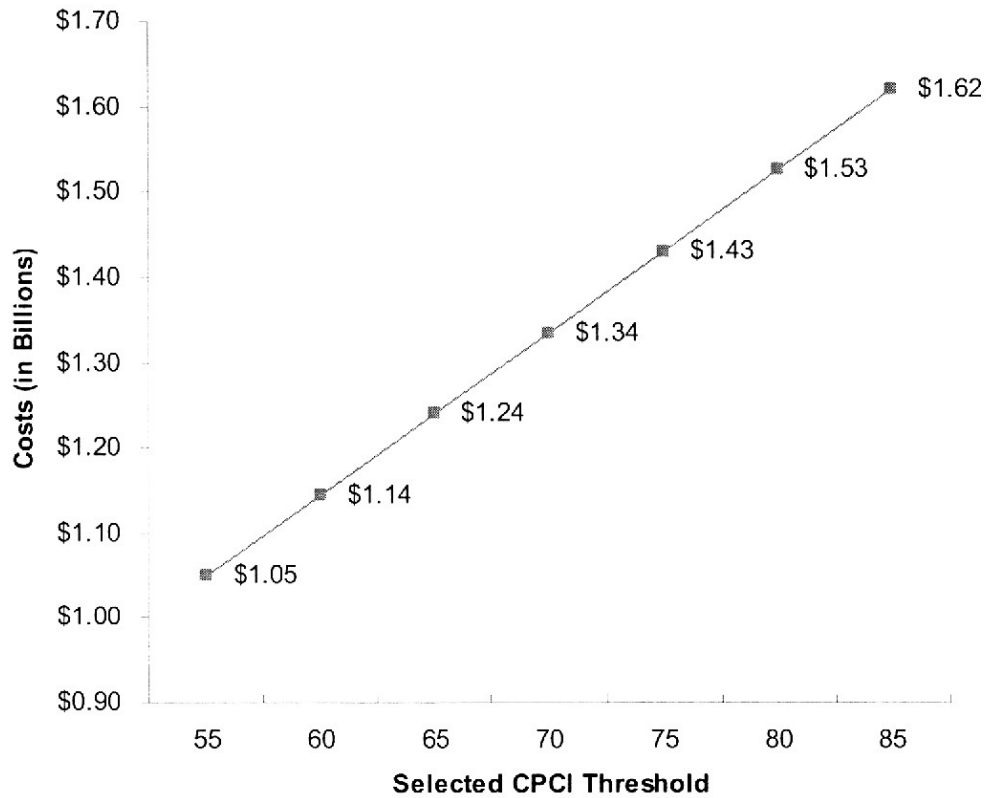
When the selected CPCI threshold is set to the average PCI threshold (not to be mistaken with the actual average PCI) of 62, the normalized county unmet cost was found to be approximately \$1.18 billion. When the 2002 results are adjusted for inflation, using a price index change of 1.41⁵, the total unmet backlog cost is \$1.16 billion in FY 2007 dollars. This results in an increase of only \$20 million, or 1.72 percent⁵, between 2002 and 2007.

When the selected CPCI threshold is set to the most frequently occurring correlated PCI threshold of 70, the normalized county unmet cost was found to be approximately \$1.34 billion. When the 2002 results are adjusted for inflation, using a price index change of 1.41 percent⁵, the

⁵ Bureau of Labor Statistics, period between 2nd quarter 2002 and 2nd quarter 2007.

total unmet backlog cost is \$1.31 billion in FY 2007 dollars. This results in an increase of only \$30 million, or 1.53 percent, between 2002 and 2007.

Figure 1: Normalized Unmet Arterial 3R Backlog Costs at Selected CPCI Thresholds



5.4 Normalized Annual Costs to Maintain Threshold Conditions

Similar to the situation found when determining normalized county unmet 3R costs, not all jurisdictions provided responses for annual costs to maintain thresholds. To address missing responses, extrapolated annual costs were calculated for jurisdictions with missing responses using a two step method similar to the one for calculating extrapolated unmet backlog costs. This method calculates a jurisdiction’s annual cost by multiplying the jurisdiction’s total arterial lane miles by a county unit annual cost per arterial lane mile. The county unit annual cost was found to be \$4,154 per arterial lane mile. This county unit cost was calculated by taking the total annual cost from jurisdictions that provided responses divided by the total arterial lane miles from responding jurisdictions in Los Angeles County.

Table 7 presents the annual cost to maintain threshold data including responses from the survey, extrapolated values, and the estimated county unit annual cost per arterial lane mile. The top portion of the table shows the data from responding jurisdictions. The lower section contains the cities for which there were no responses and the data was extrapolated. This same table can be

found in the Correlation Tool in a spreadsheet tab labeled “Data – Annual Costs”. The data in this table is used in the Normalized Annual Costs Tab to calculate normalized costs. Refer to Appendix E to see the updated Correlation Tool.

Table 7: Annual Cost to Maintain Threshold Data		
Jurisdiction	Total Lane Miles	Annual Cost Data
Responding Jurisdictions		
Alhambra	330	\$1,000,000
Arcadia	500	\$750,000
Artesia	62	\$200,000
Baldwin Park	229	\$690,000
Bell	86	\$76,000
Bell Garden	101	\$2,200,000
Bellflower	246	\$1,500,000
Beverly Hills	214	\$1,000,000
Burbank	546	\$14,545,000
Carson	420	\$2,200,000
Cerritos	364	\$2,000,000
Claremont	231	\$590,816
Commerce	153	\$1,000,000
Compton	415	\$3,000,000
Covina	274	\$2,700,000
Cudahy	62	\$275,000
Culver City	216	\$2,200,000
Diamond Bar	293	\$850,000
Downey	503	\$750,000
Duarte	110	\$300,000
El Segundo	130	\$800,000
Gardena	220	\$1,400,000
Glendale	790	\$8,930,000
Hawaiian Gardens	38	\$90,000
Hawthorne	390	\$1,000,000
Hermosa Beach	88	\$637,760
Huntington Park	171	\$65,000
Industry	175	\$300,000
Inglewood	444	\$1,000,000
Irwindale	58	\$200,000
La Canada-Flintridge	180	\$500,000
La Puente	145	\$2,100,000
La Verne	235	\$1,000,000
Lakewood	425	\$2,800,000
Lancaster	1,137	\$4,000,000

Table 7: Annual Cost to Maintain Threshold Data		
Jurisdiction	Total Lane Miles	Annual Cost Data
Responding Jurisdictions		
Lawndale	85	\$500,000
Lomita	21	\$100,000
Long Beach	1,900	\$8,000,000
Los Angeles City	23,014	\$37,600,000
Los Angeles County Unincorporated	3,131	\$29,000,000
Lynwood	215	\$500,000
Malibu	94	\$50,000
Maywood	160	\$3,200,000
Monrovia	189	\$750,000
Montebello	300	\$17,364,161
Monterey Park	275	\$3,100,000
Norwalk	580	\$800,000
Palmdale	803	\$2,500,000
Paramount	167	\$385,000
Pasadena	775	\$2,200,000
Pico Rivera	320	\$1,000,000
Pomona	725	\$4,500,000
Rancho Palos Verdes	607	\$500,000
Redondo Beach	291	\$1,400,000
Rolling Hills Estates	95	\$320,000
Rosemead	212	\$490,000
San Dimas	250	\$500,000
San Fernando	106	\$300,000
San Gabriel	183	\$900,000
San Marino	132	\$70,000
Santa Fe Springs	286	\$3,000,000
Santa Monica	360	\$4,900,000
Sierra Madre	78	\$150,000
Signal Hill	120	\$772,499
South Gate	267	\$450,000
South Pasadena	130	\$200,000
Temple City	147	\$70,000
Torrance	726	\$5,000,000
Vernon	146	\$3,000,000
Walnut	245	\$100,000
West Covina	566	\$100,000
West Hollywood	97	\$1,750,000
Westlake Village	73	\$600,000
Subtotal	47,852	\$198,771,236

Table 7: Annual Cost to Maintain Threshold Data		
Jurisdiction	Total Lane Miles	Annual Cost Data
Responding Jurisdictions		
Unit Cost / Lane Mile		\$4,154
Extrapolated Jurisdictions		
Agoura Hills	134	\$558,278
Avalon	12	\$49,846
Azusa	192	\$798,703
Bradbury	6	\$26,585
Calabasas	164	\$681,232
El Monte	363	\$1,509,345
Glendora	350	\$1,452,188
Hidden Hills	2	\$8,308
La Habra Heights	82	\$340,616
La Mirada	260	\$1,080,002
Manhattan Beach	264	\$1,096,618
Palos Verdes Estates	150	\$623,078
Santa Clarita	760	\$3,156,930
South El Monte	304	\$1,262,772
Whittier	600	\$2,492,313
Subtotal	3,644	\$15,136,815
County Totals	51,497	\$213,908,051

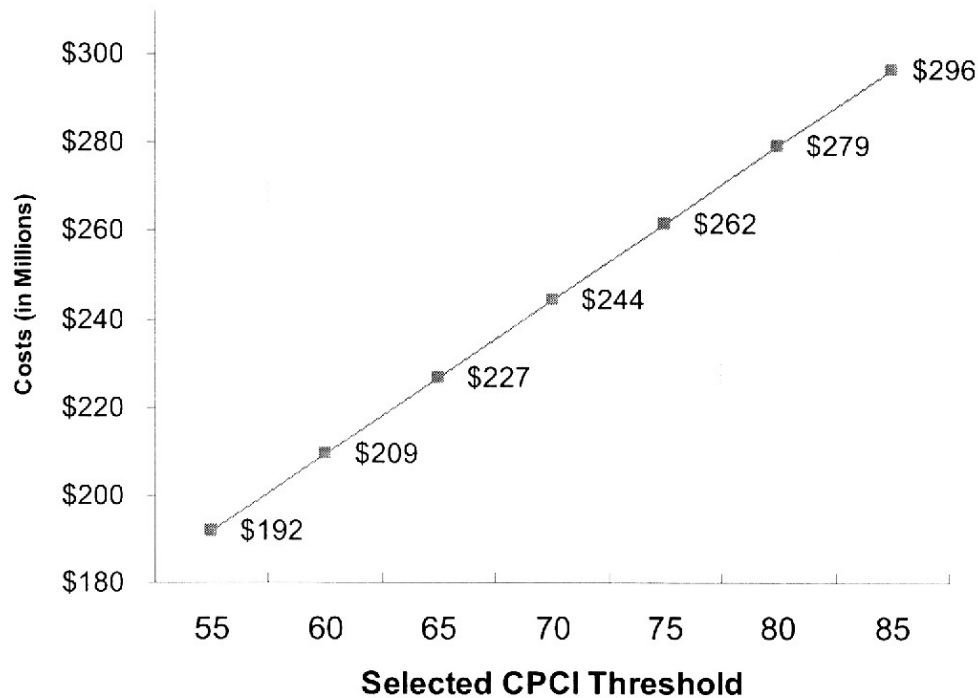
Normalized county annual costs at selected CPCI thresholds were calculated using the Normalized Annual Cost Tab in the Correlation Tool. The Normalized Annual Cost Tab was developed based on the Normalized Unmet Costs tab in the Updated Correlation Tool. The tab incorporates updated annual cost data as described in the section above.

The Normalized Annual Costs Tab normalizes a jurisdiction's actual or extrapolated annual 3R cost by adjusting the value with the percent difference between a jurisdiction's normalized PCI threshold and the selected CPCI threshold. The percent difference serves to represent the estimated difference between the jurisdiction's PCI threshold and the selected CPCI threshold.

Many threshold levels including the county average can be selected as the CPCI Threshold input in calculating the normalized annual cost. Figure 2 presents normalized county annual costs to maintain conditions without backlog at various selected CPCI levels. The normalized county annual cost to maintain thresholds ranged between \$191 million to \$295 million for a CPCI threshold ranging from 55 to 85 respectively. When the selected CPCI threshold is set to the average correlated PCI threshold of 62, the normalized county annual cost to maintain threshold

was found to be approximately \$215 million. When the selected CPCI threshold is set to the most frequently occurring correlated PCI threshold of 70, the normalized county annual 3R cost was found to be approximately \$244 million.

Figure 2: Normalized Arterial Annual 3R Costs to Maintain Threshold



6.0 3R AND MAINTENANCE COSTS

The 2007 survey asked jurisdictions for additional information regarding arterial and local street 3R and maintenance. The cost data collected from these additional questions were not normalized in this analysis, but are tabulated and tallied in the following sections, and compared with 2002 data where available. Please note that backlog costs and funding amounts were not requested in exactly the same way between the 2007 survey and the 2002 survey. The 2007 survey requested separate backlog costs and funding for each of four categories – arterial 3R needs, local road 3R needs, arterial maintenance needs, and local road maintenance needs. The 2007 survey asked local jurisdictions to indicate separately their maintenance costs – defined as sealing and pothole repair costs. The 2002 survey requested separate backlog costs and funding for each of three categories – arterial 3R needs, arterial maintenance needs, and local road 3R and maintenance needs. Note that this section does not address 3R Arterial Costs, as these are discussed above in the preceding sections.

6.1 Maintenance Costs for Arterial Streets (Not Normalized)

Table 8 presents the responses to questions regarding arterial maintenance costs with no normalization. It is important to note that not all jurisdictions responded, and that some cities did not break out the pothole and maintenance information separately. The total annual cost to maintain arterials was found to be approximately \$84 million. The total maintenance backlog cost was found to be approximately \$181 million. The total pothole repair backlog was found to be approximately \$26 million. The total funding for maintenance (both sealing and pot hole repair) was found to be approximately \$40 million.

City	Annual Cost to Maintain	Maintenance (sealing) Backlog	Pothole Backlog	Maintenance (sealing & pothole repair) Funding
Agoura Hills	\$1,000,000	\$9,000,000		\$150,000
Alhambra	\$865,000	\$760,000	\$1,000,000	
Arcadia	\$497,158		\$100,000	\$1,742,000
Artesia	\$200,000	\$500,000	\$500,000	\$50,000
Avalon				
Azusa				
Baldwin Park	\$1,400,000	\$135,000	\$50,000	\$300,000
Bell	\$500,000	\$500,000	\$50,000	\$50,000
Bell Gardens				\$80,000
Bellflower	\$1,500,000	\$24,000,000		\$22,000
Beverly Hills	\$200,000	\$1,000,000	\$20,000	\$100,000
Bradbury				
Burbank	\$2,000,000	\$6,866,600	\$2,883,400	\$300,000
Calabasas				
Carson	\$250,000			\$250,000
Cerritos	\$2,000,000	\$10,000,000	\$10,000,000	\$450,000
Claremont			\$80,000	\$80,000
Commerce	\$1,000,000	\$500,000	\$300,000	\$400,000
Compton	\$1,500,000	\$2,500,000	\$200,000	\$750,000
Covina	\$1,200,000	\$5,060,000	\$275,000	\$75,000
Cudahy	\$273,000	\$1,300,000	\$50,000	\$550,000
Culver City		\$4,000,000		\$100,000
Diamond Bar	\$650,000			\$650,000
Downey				
Duarte	\$35,000		\$30,000	\$15,000
El Monte				\$50,000
El Segundo	\$200,000	\$3,000,000	\$200,000	\$200,000
Gardena	\$2,490,000			\$82,000

Table 8: Arterial Maintenance Costs (Not Normalized)				
City	Annual Cost to Maintain	Maintenance (sealing) Backlog	Pothole Backlog	Maintenance (sealing & pothole repair) Funding
Glendale				\$448,021
Glendora				
Hawaiian Gardens	\$10,000	\$5,000	\$5,000	\$5,000
Hawthorne	\$500,000	\$4,000,000	\$1,000,000	\$200,000
Hermosa Beach	\$20,000	\$90,000	\$100,000	\$10,000
Hidden Hills				
Huntington Park	\$400,000	\$1,000,000		\$100,000
Industry	\$150,000	\$150,000		\$30,000
Inglewood	\$18,250	\$500,000	\$367,500	\$427,500
Irwindale	\$1,400,000	\$200,000	\$20,000	\$95,000
La Canada Flintridge	\$300,000	\$20,000	\$60,000	\$60,000
La Habra Heights				
La Mirada	\$1,433,489			
La Puente				\$80,000
La Verne	\$1,000,000	\$8,300,000	\$1,000,000	\$100,000
Lakewood	\$50,000	\$25,000	\$25,000	\$50,000
Lancaster	\$966,766	\$24,666	\$4,830	\$937,270
Lawndale	\$500,000	\$2,000,000	\$100,000	\$20,000
Lomita	\$100,000	\$100,000	\$20,000	\$20,000
Long Beach	\$483,158	\$3,865,263	\$24,158	\$314,053
Los Angeles City	\$14,000,000		\$300,000	\$8,800,000
Los Angeles County Unincorporated	\$7,160,000			\$7,160,000
Lynwood	\$2,500,000	\$8,000,000		
Malibu	\$60,000	\$240,000		\$60,000
Manhattan Beach	\$100,000			\$100,000
Maywood	\$600,000	\$250,000	\$1,500,000	\$15,000
Monrovia	\$30,000	\$525,000		\$140,000
Montebello	\$17,364,161	\$52,928,742		
Monterey Park	\$500,000	\$10,000,000	\$3,000,000	\$90,000
Norwalk	\$200,000	\$5,000,000	\$100,000	\$50,000
Palmdale	\$2,500,000	\$1,500,000	\$100,000	\$1,023,000
Palos Verdes Estates	\$1,100,000		\$77,046	\$21,730
Paramount	\$30,000	\$50,000		\$10,000
Pasadena	\$150,000	\$700,000		\$450,000
Pico Rivera	\$1,800,000			\$1,000,000
Pomona	\$800,000	\$600,000	\$200,000	\$235,000
Rancho Palos Verdes				\$200,000

Table 8: Arterial Maintenance Costs (Not Normalized)				
City	Annual Cost to Maintain	Maintenance (sealing) Backlog	Pothole Backlog	Maintenance (sealing & pothole repair) Funding
Redondo Beach	\$60,000	\$90,000	\$1,148,734	\$1,315,354
Rolling Hills Estates				\$40,000
Rosemead				\$50,000
San Dimas	\$150,000	\$2,571,428		\$100,000
San Fernando	\$300,000	\$2,000,000		\$25,000
San Gabriel	\$100,000	\$400,000	\$300,000	
San Marino	\$1,000,000	\$1,150,000	\$150,000	\$50,000
Santa Clarita				
Santa Fe Springs	\$1,000,000	\$1,000,000		\$1,000,000
Santa Monica	\$4,900,000			\$4,900,000
Sierra Madre	\$18,000		\$240	\$497,251
Signal Hill	\$305,000	\$305,000	\$23,145	\$250,000
South El Monte			\$5,000	\$3,600
South Gate	\$85,000	\$1,250,000		\$85,000
South Pasadena	\$300,000	\$200,000	\$100,000	\$50,000
Temple City	\$30,000	\$100,000		\$20,000
Torrance		\$2,000,000		
Vernon	\$178,000			\$817,000
Walnut	\$100,000		\$25,000	\$25,000
West Covina	\$269,000			
West Hollywood	\$240,000	\$240,000	\$25,000	\$30,000
Westlake Village	\$100,000			\$75,000
Whittier	\$804,600			\$1,500,000
Total	\$83,925,582	\$180,501,699	\$25,519,053	\$39,530,779
Average of Respondents	\$1,165,633	\$2,776,949	\$392,601	\$520,142

Table 9 presents a comparison summary of the total backlog cost and funding for arterial maintenance needs in both 2007 and 2002.

Table 9: Arterial Maintenance Backlog Cost and Funding Totals			
Backlog Cost		Funding	
2007 Response	2002 Data	2007 Response	2002 Data
\$180,501,699	\$75,934,936	\$39,530,779	\$48,155,225

6.2 3R Costs for Local Streets (Not Normalized)

The questions regarding 3R and maintenance costs for local streets mirrored the questions for arterial 3R and maintenance costs. The cost data collected regarding local streets were not normalized in this analysis, but are tabulated and tallied in the following sections.

Table 10 presents the responses to questions regarding 3R costs for local streets with no normalization. It is important to note that not all jurisdictions responded. The total 3R backlog cost for those that responded was found to be approximately \$1.89 billion. The total 3R funding was found to be approximately \$138 million. The total cost to maintain local streets with 3R backlog eliminated was found to be approximately \$180 million.

Table 10: 3R Backlog Costs for Local Streets (Not Normalized)			
City	3R Backlog Cost	3R Funding	Cost to Maintain with 3R Backlog Eliminated
Agoura Hills			
Alhambra		\$700,000	\$800,000
Arcadia	\$19,233,851	\$252,000	\$600,000
Artesia	\$4,000,000	\$100,000	\$100,000
Avalon	\$1,135,000	\$710,000	\$300,000
Azusa	\$4,000,000	\$2,500,000	
Baldwin Park	\$4,600,000	\$100,000	\$1,500,000
Bell	\$2,400,000	\$300,000	\$25,000
Bell Gardens			
Bellflower			
Beverly Hills	\$15,000,000	\$2,000,000	\$2,000,000
Bradbury			\$35,000
Burbank	\$34,065,800	\$1,500,000	\$640,300
Calabasas	\$7,000,000	\$1,500,000	\$750,000
Carson	\$3,200,000	\$700,000	\$3,800,000
Cerritos	\$4,600,000	\$525,000	\$1,000,000
Claremont	\$2,000,000	\$432,000	\$727,342
Commerce	\$1,000,000	\$100,000	\$500,000
Compton		\$1,800,000	
Covina	\$16,100,000	\$950,000	\$2,060,000
Cudahy	\$76,000	\$200,000	\$80,000
Culver City			
Diamond Bar	\$6,100,000	\$1,200,000	\$750,000
Downey	\$5,435,700	\$500,000	\$500,000
Duarte	\$500,000		\$340,000
El Monte	\$7,800,000	\$1,154,000	
El Segundo	\$13,000,000		\$300,000
Gardena	\$2,000,000	\$1,300,000	\$1,400,000
Glendale			

Table 10: 3R Backlog Costs for Local Streets (Not Normalized)			
City	3R Backlog Cost	3R Funding	Cost to Maintain with 3R Backlog Eliminated
Glendora		\$1,900,000	
Hawaiian Gardens	\$3,030,000	\$500,000	\$156,000
Hawthorne		\$500,000	\$1,500,000
Hermosa Beach	\$2,830,614	\$1,593,906	\$2,830,614
Hidden Hills			\$20,000
Huntington Park	\$4,500,000	\$840,000	\$1,450,000
Industry	\$9,113,000	\$874,000	\$300,000
Inglewood	\$18,000,000	\$700,000	\$1,000,000
Irwindale	\$500,000		\$30,000
La Canada Flintridge	\$3,500,000	\$200,000	\$1,000,000
La Habra Heights		\$900,000	\$2,000,000
La Mirada	\$35,803,105	\$360,000	\$600,000
La Puente			
La Verne	\$22,500,000	\$500,000	\$1,300,000
Lakewood	\$6,500,000	\$1,500,000	\$2,500,000
Lancaster	\$14,220,000	\$2,000,000	\$1,800,000
Lawndale	\$8,000,000	\$1,833,000	\$1,000,000
Lomita	\$4,855,000		\$500,000
Long Beach	\$49,000,000	\$7,300,000	\$5,500,000
Los Angeles City	\$839,500,000	\$60,000,000	\$56,400,000
Los Angeles County Unincorporated	\$208,000,000		\$31,000,000
Lynwood	\$38,000,000	\$3,300,000	\$2,300,000
Malibu	\$8,370,000	\$1,080,000	\$450,000
Manhattan Beach			\$700,000
Maywood	\$2,490,000		\$1,490,000
Monrovia	\$13,400,000	\$800,000	\$1,250,000
Montebello	\$13,358,947	\$541,250	\$13,358,946
Monterey Park	\$69,700,000	\$300,000	\$8,500,000
Norwalk	\$20,300,000	\$1,500,000	\$2,000,000
Palmdale	\$3,000,000	\$400,000	\$1,500,000
Palos Verdes Estates			
Paramount	\$7,500,000	\$845,000	\$560,000
Pasadena	\$6,100,000	\$400,000	\$1,000,000
Pico Rivera	\$2,700,000	\$10,000	\$2,000,000
Pomona	\$63,000,000	\$5,424,000	\$2,500,000
Rancho Palos Verdes	\$5,500,000	\$1,600,000	\$700,000
Redondo Beach	\$18,972,000	\$1,000,900	\$1,100,000
Rolling Hills Estates	\$1,600,000	\$250,000	\$150,000
Rosemead	\$9,500,000	\$1,730,000	\$410,000
San Dimas	\$54,000,000	\$3,200,000	\$500,000

Table 10: 3R Backlog Costs for Local Streets (Not Normalized)			
City	3R Backlog Cost	3R Funding	Cost to Maintain with 3R Backlog Eliminated
San Fernando	\$14,100,000		\$700,000
San Gabriel	\$19,400,000	\$825,000	\$1,100,000
San Marino	\$4,900,000	\$400,000	\$233,000
Santa Clarita	\$12,506,574	\$600,000	
Santa Fe Springs	\$7,000,000	\$1,500,000	\$2,000,000
Santa Monica			
Sierra Madre	\$3,339,223	\$3,339,223	\$300,000
Signal Hill			
South El Monte	\$2,243,000		
South Gate	\$66,000,000	\$2,700,000	\$550,000
South Pasadena	\$2,000,000	\$290,000	\$300,000
Temple City	\$4,250,000	\$600,000	\$300,000
Torrance	\$20,000,000	\$2,000,000	\$2,000,000
Vernon			
Walnut	\$2,657,000	\$450,000	\$400,000
West Covina	\$6,441,854	\$1,600,000	\$400,000
West Hollywood	\$4,700,000	\$300,000	\$1,460,000
Westlake Village	\$1,329,000	\$679,100	\$500,000
Whittier			
Total	\$1,891,455,668	\$137,688,379	\$179,806,202
Average of Respondents	\$26,270,218	\$1,860,654	\$2,532,482

Table 11 presents a comparison summary of the total backlog cost and funding for local street 3R needs in 2007 and the annual average expenditure in 2002.

Table 11: Local Street 3R Backlog Cost and Funding Totals		
2007 Backlog Cost	2007 Funding	2002 Annual Average Expenditure⁶
\$1,891,455,668	\$137,688,379	\$107,400,975

6.3 Maintenance Costs for Local Streets (Not Normalized)

Table 12 presents the responses to questions regarding maintenance costs for local streets with no normalization. Maintenance is defined as sealing and restriping. Cost of Pothole repair is broken out separately. It is important to note that 15 jurisdictions did not respond at all and not

⁶ The 2002 Annual Average Expenditure is the annual expenditure averaged over three years and includes expenditures for both 3R and maintenance

all jurisdictions fully responded and the totals calculated below are only from the jurisdictions that responded. Note also that some cities did not break out the pothole and maintenance information separately. The total annual cost to maintain arterials was found to be approximately \$91 million. The total maintenance backlog cost was found to be approximately \$266 million. The total pothole backlog repair cost was found to be approximately \$22 million. The total funding to perform maintenance (sealing and potholing) was found to be approximately \$42 million.

Table 12: Maintenance Costs for Local Streets (Not Normalized)				
City	Annual Cost to Maintain	Maintenance (sealing) Backlog	Pothole Backlog	Maintenance Funding
Agoura Hills				
Alhambra				
Arcadia	\$216,133	\$2,404,194	\$150,000	
Artesia	\$100,000	\$500,000	\$500,000	\$50,000
Avalon	\$1,135,000	\$1,135,000		\$120,000
Azusa				
Baldwin Park	\$1,960,000	\$595,000	\$50,000	\$400,000
Bell	\$300,000	\$300,000	\$50,000	\$50,000
Bell Gardens				\$220,000
Bellflower				
Beverly Hills	\$600,000	\$3,000,000	\$100,000	\$725,000
Bradbury		\$25,000	\$15,000	\$25,000
Burbank	\$1,200,000	\$15,884,600		\$100,000
Calabasas				\$2,000,000
Carson	\$300,000			\$300,000
Cerritos	\$1,000,000	\$6,000,000	\$6,000,000	\$450,000
Claremont			\$45,000	\$80,000
Commerce	\$500,000	\$200,000	\$100,000	\$100,000
Compton				
Covina	\$870,000	\$6,200,000	\$135,000	\$25,000
Cudahy	\$15,000	\$76,200	\$35,000	\$200,000
Culver City				
Diamond Bar	\$950,000			\$950,000
Downey				
Duarte	\$170,000	\$600,000	\$45,000	\$190,000
El Monte				
El Segundo	\$200,000	\$750,000	\$200,000	\$200,000
Gardena	\$510,000		\$40,000	\$780,000
Glendale				
Glendora				\$450,000
Hawaiian Gardens	\$20,000	\$10,000	\$10,000	\$5,000

Table 12: Maintenance Costs for Local Streets (Not Normalized)				
City	Annual Cost to Maintain	Maintenance (sealing) Backlog	Pothole Backlog	Maintenance Funding
Hawthorne		\$3,000,000	\$2,000,000	\$300,000
Hermosa Beach	\$80,000	\$390,000	\$400,000	\$10,000
Hidden Hills				
Huntington Park	\$600,000	\$4,500,000	\$1,600,000	\$200,000
Industry	\$150,000	\$150,000		\$20,000
Inglewood	\$88,250	\$500,000	\$367,500	\$460,000
Irwindale	\$100,000	\$60,000	\$5,000	\$5,000
La Canada Flintridge	\$150,000	\$650,000	\$240,000	\$175,000
La Habra Heights	\$2,000,000	\$2,000,000	\$25,000	\$25,000
La Mirada	\$3,580,310			
La Puente				\$220,000
La Verne	\$1,300,000	\$22,500,000	\$310,000	\$175,000
Lakewood	\$75,000	\$25,000	\$50,000	\$75,000
Lancaster	\$227,819	\$23,069	\$2,070	\$202,680
Lawndale	\$1,000,000	\$8,000,000	\$200,000	\$70,000
Lomita	\$200,000	\$157,000	\$75,000	\$75,000
Long Beach	\$1,516,842	\$12,134,737	\$75,842	\$985,947
Los Angeles City	\$21,000,000	\$14,700,000	\$1,200,000	\$13,200,000
Los Angeles County Unincorporated	\$10,240,000	\$20,800,000		\$5,040,000
Lynwood	\$12,500,000	\$38,000,000	\$500,000	\$1,500,000
Malibu	\$540,000	\$2,160,000		\$540,000
Manhattan Beach	\$200,000	\$1,400,000		\$200,000
Maywood	\$250,000	\$25,000		\$10,000
Monrovia	\$100,000	\$1,500,000		
Montebello	\$13,358,946	\$32,882,666		
Monterey Park	\$100,000	\$35,000,000	\$5,000,000	\$20,000
Norwalk	\$300,000	\$10,000,000	\$200,000	\$100,000
Palmdale	\$1,500,000	\$500,000	\$50,000	\$551,000
Palos Verdes Estates				
Paramount	\$50,000	\$150,000		\$40,000
Pasadena	\$300,000	\$1,200,000		\$300,000
Pico Rivera	\$2,700,000			\$700,000
Pomona	\$600,000	\$500,000	\$100,000	\$235,000
Rancho Palos Verdes	\$50,000	\$120,000		\$500,000
Redondo Beach			\$1,148,734	\$1,315,354
Rolling Hills Estates	\$20,000	\$120,000		\$35,000
Rosemead	\$18,000	\$180,000		\$100,000
San Dimas	\$350,000			\$250,000
San Fernando	\$700,000	\$6,000,000		\$25,000

Table 12: Maintenance Costs for Local Streets (Not Normalized)				
City	Annual Cost to Maintain	Maintenance (sealing) Backlog	Pothole Backlog	Maintenance Funding
San Gabriel	\$400,000	\$300,000	\$300,000	
San Marino	\$1,200,000	\$1,600,000	\$400,000	\$123,000
Santa Clarita				
Santa Fe Springs	\$1,000,000	\$1,000,000		\$1,000,000
Santa Monica				
Sierra Madre		\$409,463	\$1,760	\$3,339,223
Signal Hill				
South El Monte			\$5,000	\$3,600
South Gate	\$85,000	\$1,250,000		\$85,000
South Pasadena	\$600,000	\$1,000,000	\$300,000	\$200,000
Temple City	\$350,000	\$250,000		\$330,000
Torrance	\$300,000	\$3,000,000		\$300,000
Vernon				
Walnut	\$400,000		\$50,000	\$50,000
West Covina				
West Hollywood	\$760,000	\$760,000	\$40,000	\$120,000
Westlake Village	\$50,000			\$52,000
Whittier				\$1,500,000
Total	\$91,136,300	\$266,576,929	\$22,120,906	\$42,182,804
Average of Respondents	\$1,360,243	\$4,039,044	\$362,638	\$594,124

Table 13 presents a comparison summary of the total backlog cost and funding for local street maintenance needs in 2007 and the annual average expenditure in 2002.

Table 13: Local Street Maintenance Backlog Cost and Funding Totals		
2007 Backlog Cost	2007 Funding	2002 Annual Average Expenditure⁷
\$266,576,929	\$42,182,804	\$107,400,975

7.0 CONCLUSIONS

As concluded in the Study, the relationship between the normalized PCI threshold and the normalized county backlog cost as well as the normalized county annual cost to maintain

⁷ The 2002 Annual Average Expenditure is the annual expenditure averaged over three years and includes expenditures for both 3R and maintenance

threshold are positively correlated - the higher the standard of pavement condition, the higher the level of 3R funding needed to meet and maintain the standard.

This study found that when the selected CPCI threshold is set to the average correlated PCI threshold standard of 62, then the normalized county unmet cost to address the 3R backlog needs for arterials within Los Angeles County is estimated to be \$1.18 billion. This is an increase from the 2004 study results, which found that when using the average correlated PCI threshold of 61 and 2002 cost data developed by Metro, the total unmet backlog cost results in \$0.82 billion in FY 2002.

When the selected CPCI threshold is set to the most frequently occurring correlated PCI threshold standard of 70, then the normalized county unmet cost to address the 3R unmet backlog needs for arterials within Los Angeles County is estimated to be \$1.34 billion. Again, this is an increase from the 2004 study results, which found that when using the most frequently occurring correlated PCI value of 70 and the 2002 cost data, the total unmet backlog cost is \$0.93 billion in FY 2002.

Table 14 compares the unmet arterial 3R backlog costs from the 2002 Study and the 2007 Study. When adjusting for inflation, the comparison shows that the percent increase of unmet backlog for the County between the five years was not significant when using a price index change of 1.41 as published by the Bureau of Labor Statistics (BLS) for the period between 2nd quarter of 2002 and 2nd quarter of 2007. This factor was applied to the 2002 unmet backlog costs to determine costs in 2007 dollars. Comparing the percent change in unmet arterial 3R backlog costs between the 2002 Study and the 2007 Study results ranged from 1.53 percent at a CPCI threshold of 70 to 1.72 percent at the Countywide Average CPCI Thresholds of 61 in 2002 and 62 in 2007.

Table 14: Comparison of Unmet Backlog Costs in FY 2002 and FY 2007		
Fiscal Year	Average Correlated PCI 61 in 2002; 62 in 2007	Most Frequently Occurring Correlated PCI 70
FY 2002	\$0.82 billion ('02 dollars)	\$0.93 billion ('02 dollars)
FY 2002 in 07 dollars*	\$1.16 billion ('07 dollars)	\$1.31 billion ('07 dollars)
FY 2007	\$1.18 billion ('07 dollars)	\$1.34 billion ('07 dollars)
Percent Change	1.72 percent	1.53 percent
*Assuming a BLS index change of 1.41 between 2 nd Qtr. 2002 and 2007		

Comparing the annual cost to maintain threshold figures, when the selected CPCI threshold is set to the average correlated PCI threshold standard of 62, then the normalized county annual cost to maintain that threshold once the backlog is eliminated is estimated to be \$214 million. When the selected CPCI is set to the most frequently occurring correlated PCI threshold standard of 70, then the normalized county annual cost to maintain that threshold once the backlog is eliminated is estimated to be \$244 million.