

Memorandum

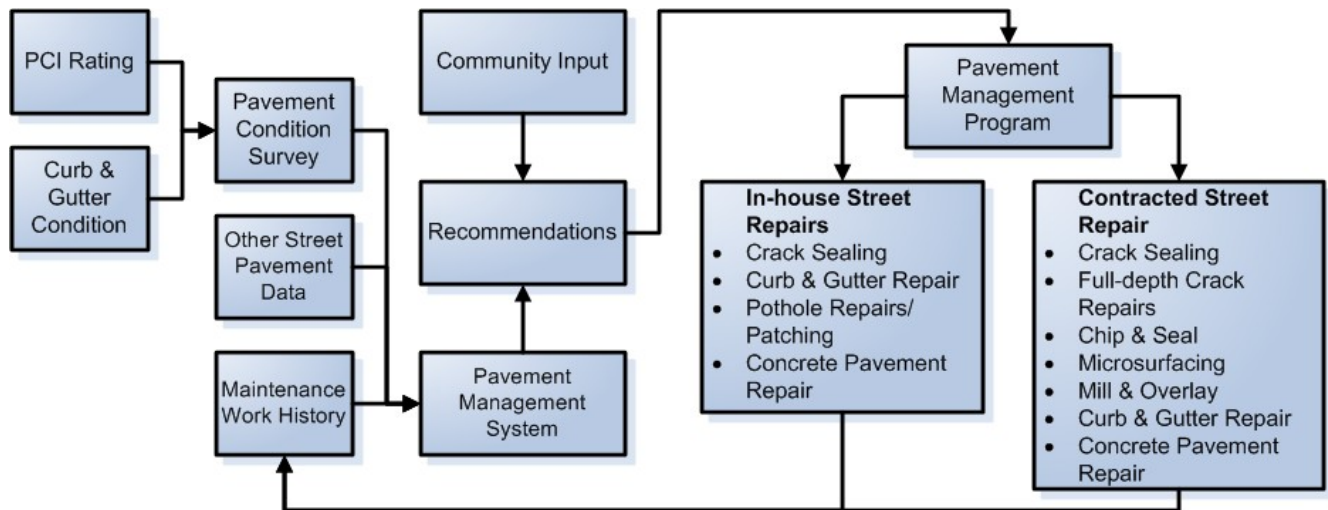
City of Lawrence

Engineering

TO: Chuck Soules
CC: Terese Gorman, Mike Wildgen, Debbie Van Saun,
Dave Corliss, Dave Wagner, Chris Stewart
FROM: Steve Lashley
Date: January 31, 2006
RE: Pavement Management Program & 2006
Contracted Street Repair Project

Pavement Management Program

The graphic below illustrates the various components of the City of Lawrence Pavement Management Program.



Each year, City staff prepares a list of recommended locations for contracted street repair, which is a component of the Pavement Management Program. Typically, the list of streets to be repaired is broken into multiple contracts based on the type of work planned, such as:

- crack sealing
- chip and seal
- microsurfacing
- milling and overlay only
- milling, overlay, and curb repair
- concrete repair only
- KLINK (Kansas Department of Transportation Connecting Links Resurfacing Program)
 - resurfacing of a State Highway System route within the City limits

By issuing multiple contracts, the work can be bid by contractors according to their specialties and can be spread evenly over the construction season so as to be more manageable for City staff (inspection, project coordination, etc.).

Background Information

The list of projects for 2006 (as in years past) is developed using a number of criteria. These criteria include physical roadway condition, traffic volume, citizen requests for repairs, and project scope. For this last criterion, staff determines if the project is presenting on-going maintenance problems for the street division that cannot be efficiently repaired by City crews. To aid us in the determination of physical roadway condition, we are utilizing the Pavement Condition Index (PCI) ratings that have been collected as part of the Pavement Management System (PMS).

Pavement Management System

In late October, 2005, the first survey cycle (referred to as Cycle One) of the street pavement condition inventory for the PMS was completed, which involved a physical inventory and analysis of every street segment within the City of Lawrence. The PMS provides Public Works with a management tool to maintain an inventory of street pavement, including respective condition and maintenance work history, and the ability to identify budget needs and impacts associated with pavement preservation strategies. The PCI rating is a number assigned to a pavement segment based on its condition, and range from 0-100. A lower number reflects a street with higher severity and more frequently occurring pavement distresses. Examples of factors affecting the PCI rating include: type and severity of cracking (transverse, longitudinal, fatigue), surface defects (spalling, raveling, potholes), rutting, settlements, and pavement base failure.

Condition of City of Lawrence Streets

For Cycle One, the overall average PCI for Lawrence streets is 69.0. The average PCI for Brick, Composite, Flexible, and Rigid streets, respectively, is 38.1, 62.2, 75.4, and 58.7 (See Figure 1). The average PCI for Arterial, Collector, and Residential streets, respectively, is 68.7, 72.3, and 68.3 (See Figure 2). *Please note that curb and gutter conditions on the pavement segments surveyed does not impact the PCI for the street.*

Figure 1

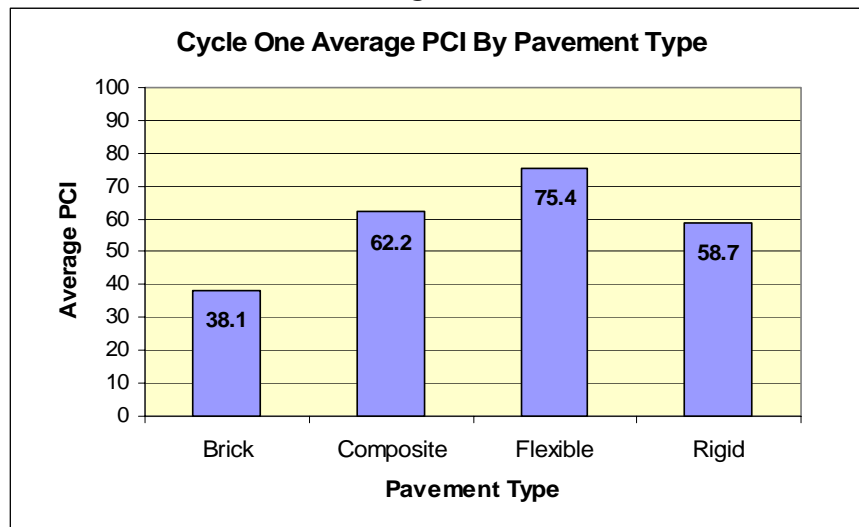
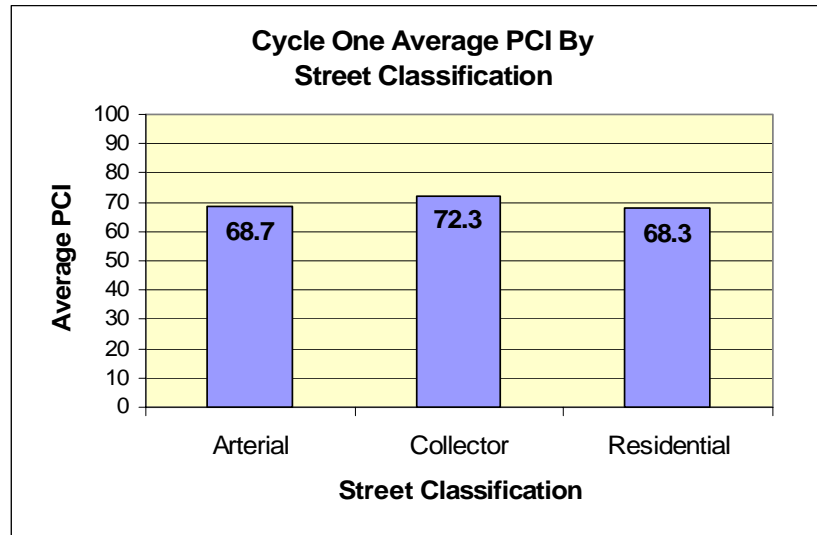


Figure 2



Survey street composition

Approximately 299 miles (1922 pavement segments) of streets were surveyed in Cycle One. Cycle One condition survey data consists of the following pavement types and miles rated of each (See Figure 3): 2.9 miles of Brick (exposed), 116.2 miles of Composite (asphaltic concrete or bituminous material over concrete or brick), 163.4 miles of Flexible (any full-depth asphaltic concrete or bituminous pavement), and 16.7 miles of Rigid (concrete). The miles rated based on street classification are (See Figure 4): 49.8 Arterial miles, 43.8 Collector miles, and 205.6 Residential miles.

Figure 3

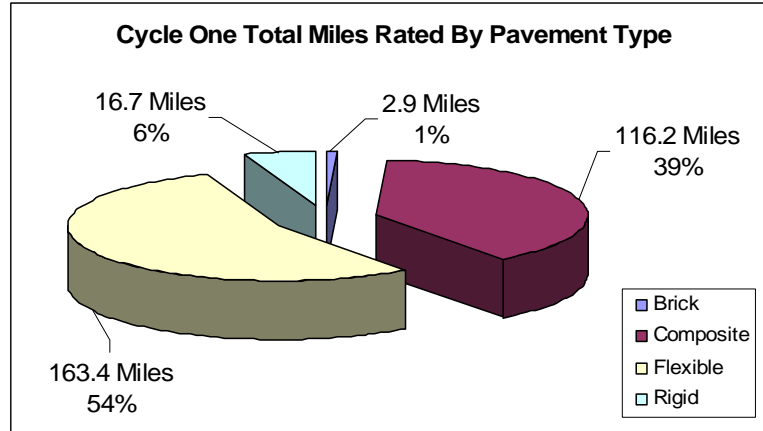
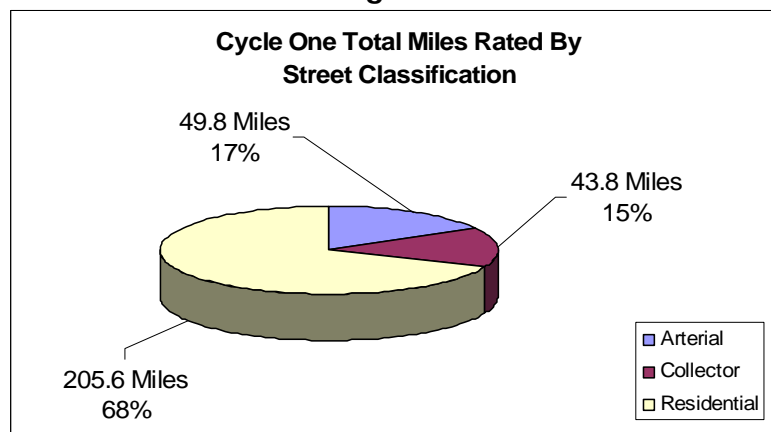


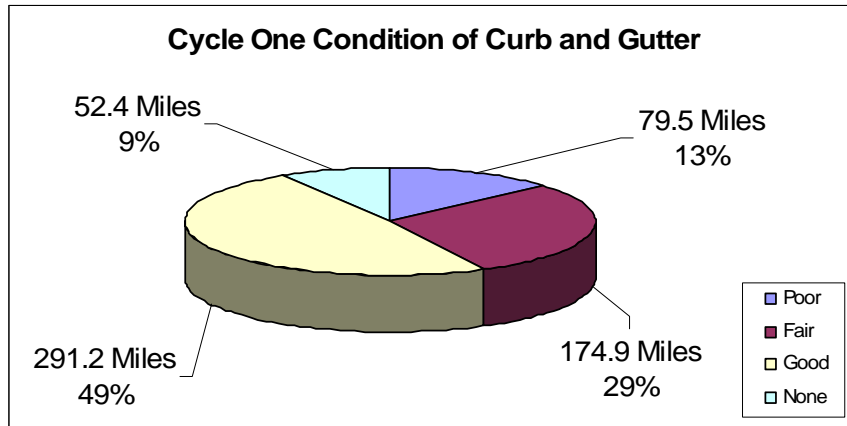
Figure 4



Curb and Gutter Condition

The condition of the curb and gutter (both sides), if it exists, along the various pavement segments surveyed have a separate and simplified rating scale designation of Poor, Fair, and Good. The PMS reports, for Cycle One, that 79.5 miles of curb and gutter are in Poor condition, 174.9 miles in Fair condition, 291.2 miles in Good condition, and 52.4 miles of non-existing curb and gutter (See Figure 5).

Figure 5



PCI Frequency Distribution

Using the PMS database, 31.5% of the city streets have been identified at an unacceptable rating level. An unacceptable condition rating level is defined by the inability to cost-effectively apply any type of pavement preservation treatment to a street needing maintenance work. This 31.5% of streets represents the "backlog" of pavement segments that need rehabilitation or reconstruction efforts. The other 68.5% of streets are in an acceptable condition that should be treated with cost-effective preventative maintenance. The point at which a pavement segment falls from an acceptable rating to an unacceptable rating is based on the specific need for minor rehabilitation, such as milling and overlay that does not include major patchwork. This rating level designation varies for pavements in consideration of street classification and the need for a higher level of service. We need to apply our preventative maintenance efforts to the 68.5% of streets in an acceptable condition. The following graphs display the PCI frequency distribution for all streets (Figure 6) and then specifically PCI frequency distribution based on street classification (Figures 7, 8, and 9) with supporting examples (Photographs 1, 2, 3, 4, and 5) showing visible distresses on streets with a PCI value at the acceptable to unacceptable break over point:

Figure 6

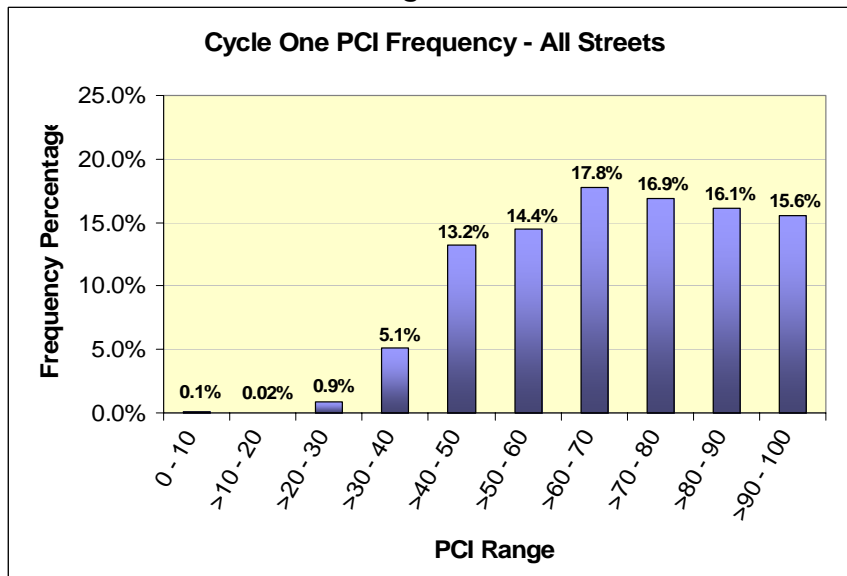
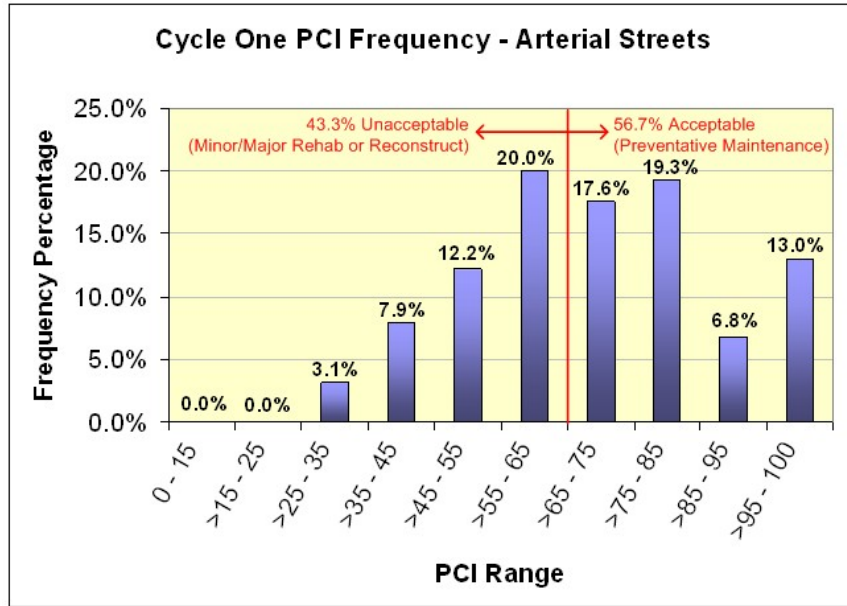


Figure 7



1) Arterial Street: PCI 64.5



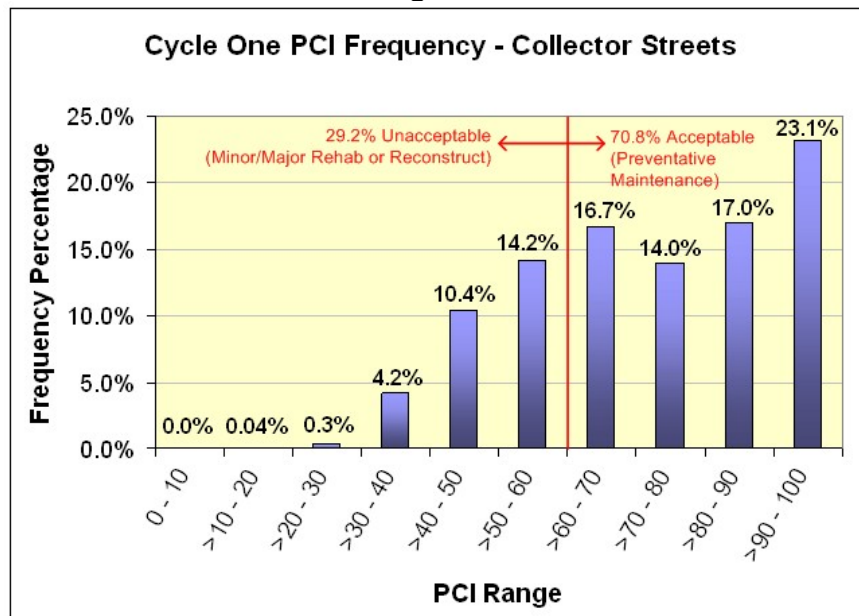
Haskell Ave, 23rd St to 31st St

2) Arterial Street: PCI 64.85



Kasold Dr, 27th St to 31st St

Figure 8

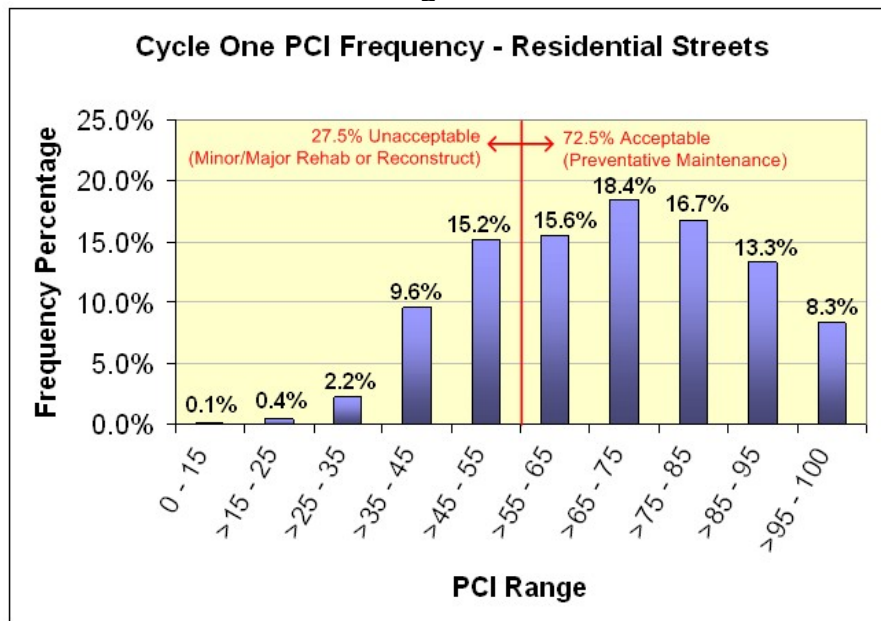


3) Collector Street: PCI 59.75



Harper St, 25th Ter to 27th St

Figure 9



4) Residential Street: PCI 55.00



Maple Ln, 19th St to Brook St

5) Residential Street: PCI 54.85



W 29th St, Lawrence Ave to Atchison Ave

Pavement Management Program Goal

An effective Pavement Management Program focuses on “keeping the good pavements in good condition”. The goal of pavement preservation is to slow the deterioration rate and to extend the life cycles of our city streets. This can be done effectively through the timely application of preventative maintenance techniques to postpone pavement failure. Essentially, it is more economical to preserve the streets than to delay the proper repairs and end up with the need for minor to major rehabilitation of city streets.

Ultimately, the goal of a comprehensive Pavement Management Program is to provide and maintain a safe and efficient transportation network through the application of cost-effective maintenance treatments to extend the overall life of the City's street infrastructure.

Program Funding - 2006

Based on the budget for 2006, the following funds are available for street repair:

Bonds – CIP Budget	\$750,000.00
Milling & Overlay	\$2,125,000.00
Curb & Gutter	\$740,000.00
Crack Sealing	\$500,000.00
Total	\$4,115,000.00*

*Total excludes KLINK bonding funds

Program Recommendations

For the 2006 Contracted Street Repair Project, staff recommends the following streets to be repaired this summer. A map depicting the various street segments, color coded by type of work, is attached. The total cost estimate for the 2006 Program is \$3,900,000, plus \$215,000 reserved for contingency, and excludes the KLINK projects on Iowa Street and E 23rd Street (which is funded by the state and other funding sources than those listed above).

1) Crack Seal, estimated construction cost = \$500,000.

The streets recommended for crack sealing work in 2006 have a low to medium severity cracking. These are cracks that can successfully be filled without pavement removal and replacement or base repair, and have an overall PCI of 60 or above. Streets with a PCI over 60 will receive the most benefit from crack sealing and therefore, extend the life of the pavement. A map highlighting those streets was developed and the areas with the highest concentration were selected.

2) Milling and overlay only, estimated construction cost = \$1,100,000.

Street	From	To	Avg PCI
Atchison Ave	Clinton Pkwy	W 26 th St	50
Bel-Air Ct	Cul-de-sac	Inverness Dr	61
Clinton Pkwy (frontage)	Hawthorne Dr	Crossgate Dr	37
East Hills Dr	Greenway Cir	E 23 rd St (K-10)	52
Hawthorne Dr	Clinton Pkwy	Lowell Dr	52
Inverness Dr	Wakarusa Dr	W 15 th St	56
Lowell Dr	Clinton Pkwy (frontage)	Hawthorne Dr	55
Massachusetts St	6 th St	9 th St	41
Maverick Ln	E 27 th St	E 28 th St	53
Morningside Ct	Cul-de-sac	Morningside Dr	41
Morningside Dr	Brush Creek Dr	Cul-de-sec	39
Murrow Ct	W 9 th St	Yale Rd	36
N 7 th St	Walnut St	Lake St	48
New Hampshire St	E 6 th St	E 8 th St	37
Ohio St	NEOP*	Kansas St	41
Ranch St	Inverness Dr	1400' W of Inverness Dr	53
Riverview Rd	Settlers Dr	Kasold Dr	46
Riverview Rd (E Bulb)	Riverview Rd	Cul-de-sac	47
Rockfence Pl	Longhorn Dr	Riverview Rd	44
Royal Birkdale Ct	Inverness Dr	Cul-de-sac	50
W 11 th St	Mississippi St	W Campus Dr	47
W 24 th St	Ridge Ct	Iowa St	30
W 24 th Ter	Cul-de-sac	Crossgate Dr	37
W 25 th St	Cedarwood Ave	Ridge Ct	37
W 2 nd St	Michigan St	McDonald Dr	36
Wagon Wheel Rd	Longhorn Dr	Riverview Rd	50
Winged Foot Ct	Inverness Dr	Cul-de-sac	60

*NEOP = North End Of Pavement

3) Milling, overlay, pavement replacement, curb repair, estimated construction cost = \$2,300,000.

Street	From	To	Avg PCI
Bob Billings Pkwy	Inverness Dr (E)	Wakarusa Dr	57
Cambridge Rd	High Dr	Sunset Dr	35
Clinton Pkwy (frontage)	Crossgate Dr	WEOP*	46
E 19 th St	Massachusetts St	Barker Ave	44
E 6 th St	Massachusetts St	New Hampshire St	48
Flint Dr	W 26 th St	Atchison Ave	53
Glenview Dr	130' N of Summertree Ln	Peterson Rd	49
Greenway Cir	East Hills Dr	Noria Rd	49
Haskell Ave	E 15 th St	E 23 rd St	37
Maple Ln	NEOP*	E 19 th St	56
Naismith Dr (NB)	W 19 th Ter	W 23 rd St	54
Tennessee St	W 19 th St	W 23 rd St	48
W 14 th St	Massachusetts St	Kentucky St	51
W 21 st St	Tennessee St	Louisiana St	21
W 27 th St	550' W of Iowa St	Lawrence Ave	30
W 5 th St	Indiana St	Maine St	46
W 9 th Ter	Rockledge Rd	Crestline Dr	51
Woodgate Pl	Creekwood Dr	Princeton Blvd	56

*N/WEOP = North/West End Of Pavement

4) The KLINK project for 2006 includes Iowa Street, Yale Road to Irving Hill Road (overpass) and E 23rd Street, 450' West of Harper Street to the East City Limits. Per the Capital Improvement Budget, bonds are planned to be issued in the amount of \$400,000. The estimated construction cost of this project is \$600,000 and includes curb and gutter repair and re-striping. The State's share will be 50% of the participating construction costs up to a maximum of \$200,000. The State does not participate in curb repair or the reconstruction of curb inlets.

Budget Projections

Staff has reviewed the pavement maintenance work histories and has determined deterioration factors for each street classification, including pavement type. Knowing the rate at which a certain type of street deteriorates gives us the ability to predict relative maintenance needs and associated costs. It was determined which street segments would fall into the unacceptable range over the next three years if left unmaintained, at which point maintenance costs would become more significant.

Based on this information, it is estimated that \$6 million is needed each year in 2007, 2008, and 2009 for the Contracted Street Repair Project component of the Pavement Management Program. This program will be reevaluated for each of the maintenance years. Furthermore, it is recommended that, in 2007, an additional \$500,000 is budgeted for crack sealing for a total of \$6.5 million for 2007 street maintenance. *Please see the attached map that displays proposed maintenance locations, including the completed 2005 crack sealing project locations.*

2006 Contracted Street Repair Project

Lawrence, Kansas

- Mill & Overlay
- Mill, Overlay, Curb
- Fall Crack Sealing
- Spring Crack Sealing
- Crack Sealed in 2005

