Office of the City Auditor

ACTION CALENDAR
June 26, 2012

To: Honorable Mayor and Members of the City Council

From: Ann-Marie Hogan, City Auditor

Subject: Investing in Sustainability: Streets Audit Follow-up and Stormwater

RECOMMENDATION
Consider the information from last year's performance audit, "Failing Streets: Time to Change Direction to Achieve Sustainability," as part of decisions on revenue ballot measures.

FISCAL IMPACTS OF RECOMMENDATION
If City infrastructure is not repaired and rehabilitated at a sustainable level, unfunded needs will continue to escalate and future generations may be denied essential services because of the high cost of delayed repairs.

CURRENT SITUATION AND ITS EFFECTS
In Fiscal Year 2014, the City is projecting to budget $3.6 million dollars for street rehabilitation. Our 2011 audit demonstrated that the condition of the streets is not sustainable at this funding level. Twelve percent of the City's streets are currently "failed," and unmet needs are about $46 million. Continuing to fund at this level would result in an increase in "failed" streets from 12 to 21 percent, and an increase in unfunded needs from $46 million to nearly $71 million, at the end of five years. This is because fixing streets before they fail costs $36,000 to $309,000 per mile, but reconstructing a failed street costs $1.15 million per mile.

BACKGROUND
Council is considering a $30 million bond measure to fund needed improvements to the City's streets and watersheds. If about 75% of the proceeds are spent on watershed improvements and 25% on street work over the course of five years, according to the City Manager, the measure would add $1.5 million to the annual street rehabilitation budget for 5 years. If the ACTC measure also passes in November, an additional $2.2 million in funding for Berkeley streets would be gained, bringing available funds to $7.3 million.

Our audit shows that, at $7.5 million for five years, the result would be that street conditions, as measured by the Pavement Condition Index (PCI), will not improve at all, and the most deteriorated streets (the ones that need reconstructing, at $1.5 million per mile) will simply be left to fail, increasing the percentage of failed streets from 12 to

14 percent and keeping the unfunded need at $46 million. (Appendix C, pp. 29 and 32 of the November 15, 2011, audit report). Conditions would deteriorate more sharply in year six.

Actual results could be worse, given that the audit was based on last year's information (meaning that the starting balances of the unfunded needs are greater now). Data in *StreetSaver*® did not include soft costs (staff time to oversee the contractors who perform the work).

If streets were assigned $2.5 million more from bond funds or other sources, for a budget of $10 million, the PCI would improve from 63 to 68 in five years, and the unfunded need would go down to $32 million (page 33). A PCI of 63 is at the low end of "Fair," and 68 is at the high end; "Good" starts at 70, according to the Metropolitan Transportation Commission. Again, it should be noted that these projections are based on 2011 balances.

These estimates also assume that the City will use the recommended data-driven decision making methods for prioritizing street repairs.

Our office did not audit clean stormwater, and it is entirely possible that additional funding is needed to keep the stormwater unfunded need from escalating and to avoid paying fines. Stormwater may be similar to streets in that delaying repairs might create a need to completely replace infrastructure, at a higher cost. For competing priorities that involve new construction, the cost of waiting for a future election or unexpectedly robust changes in the economy would probably be less significant than the cost of deferring maintenance and repairs on existing infrastructure.

RATIONALE FOR RECOMMENDATION

Council has previously directed the City manager to implement these recommendations:

1.1 The City Manager should recommend options to the City Council to improve the City's pavement condition index to a certain level over a specified timeframe. The recommendation should include:
- The desired average citywide PCI and timeframe within which to achieve it.
- Potential funding strategies to meet the PCI goal within the desired timeframe.
- A commitment to provide to the commission and Council an annual progress report on the PCI as part of the Five-Year Street Plan.

1.2 The Department of Public Works should use *StreetSaver*® to develop strategies for meeting the target PCI. To ensure the reliability of the *StreetSaver*® scenarios, staff should:
- Update the *StreetSaver*® unit costs annually, including soft costs, such as administrative costs.

- Ensure the Five-Year Street Plan includes strategies that will achieve the Council-adopted PCI goal.
- Include annual costs for preventive maintenance in the Five-Year Street Plan.

ALTERNATIVE ACTIONS CONSIDERED

Council is weighing the cost and benefit of several revenue ballot measures. Regarding street rehabilitation, the recommended data-based prioritization of street repair would fix the streets before they fail (before the $36,000 to $309,000 cost per mile for fixing a street becomes the $1.15 million per mile cost of reconstructing a street). If, instead of using data-driven prioritization, the City were to focus on repairing the most deteriorated streets (which residents might likely expect), even if funding were increased, the overall PCI will not improve and the unfunded need would rise instead of falling, because streets that need lower-cost repairs would deteriorate to the point of needing the most expensive repairs.

CONTACT PERSON

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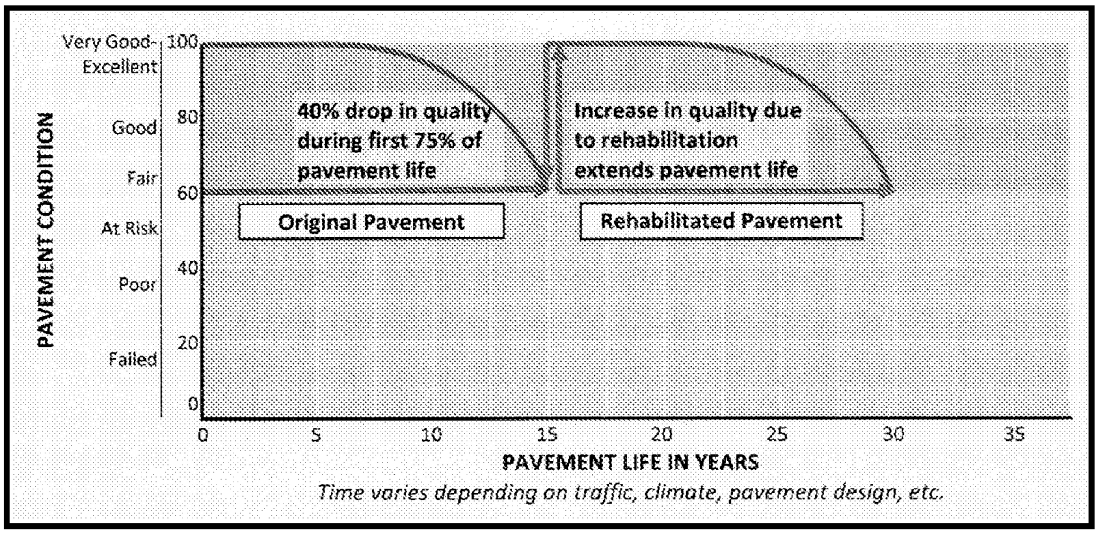
Attachments:

1: "Failing Streets: Time to Change Direction to Achieve Sustainability" (Pavement Life in Years, page 6 of report; Sample Scenarios Appendix C pp. 29,32, &33: See November 15, 2011 Council item for full report)

Pavement Life Cycle:
Deterioration Timeline Before and After Pavement Preservation



Sources: 1. Metropolitan Transportation Commission, *The Pothole Report: Can the Bay Area Have Better Roads?,* June 2011

2. American Concrete Pavement Association, *R&T Update: Concrete Pavement Research & Technology,* Number 3.02, February 2002

StreetSaver® Uses a Decision Tree to Estimate Costs

One advantage of using *StreetSaver®* is that it can build five-year scenarios to project how much of a jurisdiction's available funds should be spent to maintain or rehabilitate streets in various PCI ranges and the specific streets to repair. *StreetSaver®* uses a built-in decision tree to create the scenarios. The decision tree considers the current PCI, the type of surface (e.g., asphalt concrete, asphalt concrete over asphalt concrete) the number of years since the last treatment, and the type of treatment previously applied. The decision tree estimates the cost of maintenance or repairs based on cost data that users enter into *StreetSaver®* for the treatments used within their jurisdictions. For each scenario, the user inputs the jurisdiction's estimated annual expenditures for maintenance and repair; an inflation factor; and repair priorities based on functional class, i.e., arterials, collectors, and residential streets. The scenarios show how completed work will change the average PCI; the percentage of arterial, collector, and residential streets in each PCI range; and the estimated future cost of deferred maintenance and rehabilitation work.

The *StreetSaver®* scenario builder can and should be used as a planning tool to identify the maintenance strategy that will have the most impact on improving overall street conditions within a jurisdiction, considering the available funding.

The scenario then provides the results of the five years of treatment, broken down by arterials, collectors, and residential streets. These results are shown graphically and numerically in a table below the pie chart. In some instances, the percentages shown do not exactly total 100 percent to due rounding.

The next section shows the expenditures by year for rehabilitation and preventive maintenance, along with the unfunded need, which is the amount needed to reconstruct all streets remaining in a "failed" condition. It also shows the average PCI after each year of treatment.

The final section provides a brief analysis of what the results mean, primarily in terms of whether the presented level of funding results in an average pavement condition index that is sustainable over the long term, assuming sufficient funding is provided in subsequent years to perform ongoing pavement preservation maintenance.

The table below summarizes the results at the end of five years for each scenario, showing total expenditures, average PCI, and the remaining unfunded need.

Summary of Results of Funding and Rehabilitation Scenarios Created in *StreetSaver®*

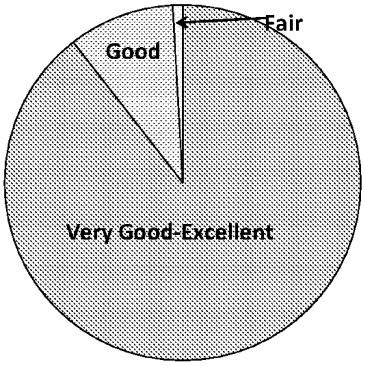
Scenario and Base Budget	Total 5-Year Expenditures	Average PCI at End of 5 Years	Unfunded Need at End of 5 Years
Scenario 1: $3.66 million base budget *(current funding level)*	$18,298,982	63	$70,767,524
Scenario 2: $46 million base budget *(front-loaded budget)*	$87,310,557	85	$0
Scenario 3: $7.5 million base budget	$38,400,194	63	$45,594,008
Scenario 4: $10 million base budget	$51,200,296	68	$32,231,418
Scenario 5: $12.5 million base budget	$64,000,421	73	$19,405,372
Scenario 6: $15 million base budget	$76,800,003	79	$7,072,403
Scenario 7: $17.5 million base budget	$84,164,570	82	$0

Source: Funding and rehabilitation scenarios created by audit staff in *StreetSaver®*

SAMPLE SCENARIO 3: $7.5 million base budget

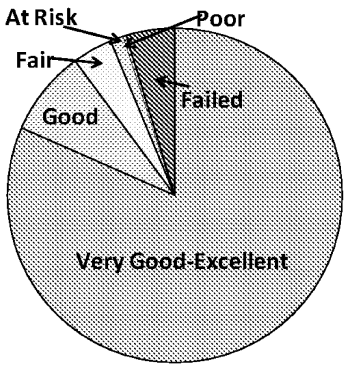
AVERAGE PCI AFTER FIVE YEARS OF TREATMENT: 63

ARTERIALS
Total 5-Year Costs: $12,802,469
Average PCI at Year 5: 86



PCI Category	Linear Miles	% of Total
Very Good-Excellent (100-80)	19.46	89.48%
Good (79-70)	2.09	9.62%
Fair (69-60)	0.20	0.91%
At Risk (59-50)	0.00	0.00%
Poor (49-25)	0.00	0.00%
Failed (24-0)	0.00	0.00%
TOTAL	**21.75**	**100.00%**

COLLECTORS
Total 5-Year Costs: $24,918,401
Average PCI at Year 5: 83



PCI Category	Linear Miles	% of Total
Very Good-Excellent (100-80)	30.14	81.62%
Good (79-70)	3.04	8.23%
Fair (69-60)	1.44	3.90%
At Risk (59-50)	0.48	1.31%
Poor (49-25)	0.09	0.26%
Failed (24-0)	1.73	4.70%
TOTAL	**36.93**	**100.00%**

RESIDENTIAL
Total 5-Year Costs: $379,866
Average PCI at Year 5: 52

PCI Category	Linear Miles	% of Total
Very Good-Excellent (100-80)	35.02	22.23%
Good (79-70)	17.12	10.87%
Fair (69-60)	15.89	10.09%
At Risk (59-50)	14.59	9.26%
Poor (49-25)	46.63	29.61%
Failed (24-0)	28.26	17.94%
TOTAL	**157.51**	**100.00%**

TOTAL EXPENDITURES AND AVERAGE PCI BY YEAR

Year	Rehabilitation	Preventive Maintenance	Total Expenditures	Unfunded Need	Average PCI
Year 1	$7,124,517	$375,526	$7,500,043	$37,858,724	63
Year 2	$7,338,280	$386,761	$7,725,041	$40,914,930	63
Year 3	$7,337,679	$387,359	$7,725,038	$44,726,812	63
Year 4	$7,337,864	$387,178	$7,725,042	$45,089,441	63
Year 5	$7,336,985	$388,045	$7,725,030	$45,594,008	63
TOTAL	**$36,475,325**	**$1,924,869**	**$38,400,194**	**N/A**	**N/A**

What do these results mean? At the end of the first year, the average PCI would increase 5 percentage points over the current average PCI of 58. Although it would remain steady during the five-year period, the annual increase in unfunded need (20.4 percent from Year 1 to Year 5) means the average PCI is not sustainable at this level of funding. Within a few years, the average PCI will decline because less than half of the City's streets would have been improved to a "very good-excellent" condition, and the linear miles of "failed" streets would continue to increase - from the current 12 percent to 14 percent at the end of five years.

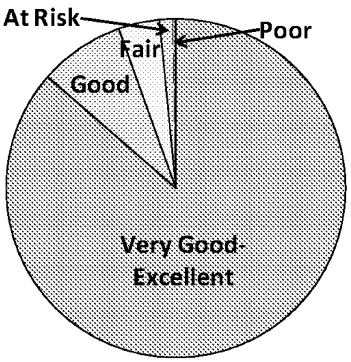
SAMPLE SCENARIO 4: $10 million base budget

AVERAGE PCI AFTER FIVE YEARS OF TREATMENT: 68

ARTERIALS
Total 5-Year Costs: $12,850,573
Average PCI at Year 5: 86

PCI Category	Linear Miles	% of Total
Very Good-Excellent (100-80)	19.46	89.48%
Good (79-70)	2.09	9.62%
Fair (69-60)	0.20	0.91%
At Risk (59-50)	0.00	0.00%
Poor (49-25)	0.00	0.00%
Failed (24-0)	0.00	0.00%
TOTAL	**21.75**	**100.00%**

COLLECTORS
Total 5-Year Costs: $27,667,855
Average PCI at Year 5: 87



PCI Category	Linear Miles	% of Total
Very Good-Excellent (100-80)	31.91	86.40%
Good (79-70)	3.00	8.14%
Fair (69-60)	1.44	3.90%
At Risk (59-50)	0.48	1.31%
Poor (49-25)	0.09	0.26%
Failed (24-0)	0.00	1.00%
TOTAL	**36.93**	**100.00%**

RESIDENTIAL
Total 5-Year Costs: $10,975,868
Average PCI at Year 5: 68

PCI Category	Linear Miles	% of Total
Very Good-Excellent (100-80)	53.60	34.03%
Good (79-70)	17.34	11.01%
Fair (69-60)	10.77	6.84%
At Risk (59-50)	13.90	8.82%
Poor (49-25)	41.41	26.29%
Failed (24-0)	20.49	13.01%
TOTAL	**157.51**	**100.00%**

TOTAL EXPENDITURES AND AVERAGE PCI BY YEAR

Year	Rehabilitation	Preventive Maintenance	Total Expenditures	Unfunded Need	Average PCI
Year 1	$9,499,455	$500,589	$10,000,044	$35,358,729	63
Year 2	$9,784,944	$515,106	$10,300,050	$35,764,785	64
Year 3	$9,784,907	$515,132	$10,300,039	$36,839,630	65
Year 4	$9,784,366	$515,722	$10,300,088	$34,501,866	66
Year 5	$9,784,058	$516,017	$10,300,075	$32,231,418	68
TOTAL	**$48,637,730**	**$2,562,566**	**$51,200,296**	**N/A**	**N/A**

What do these results mean? At the end of the first year, the average PCI would increase 5 percentage points over the current average PCI of 58, and another 5 percentage points at the end of five years. The combination of stabilized annual expenditures and a declining unfunded need indicates that this level of annual funding would achieve a sustainable PCI. With this level of funding, the linear miles of pavement in the "at risk," "poor," and "failed" categories would all decline, while almost 33 more linear miles would be in "fair" to "very good-excellent" condition than are currently in those conditions.