



STREET PAVEMENT: Condition shows need for better stewardship

February 2013

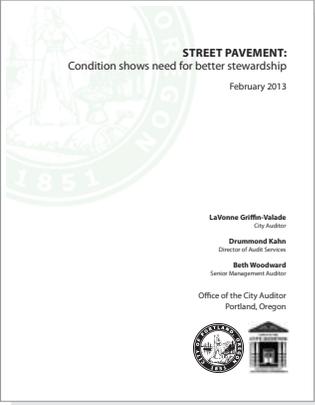
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February 19, 2013

TO: Mayor Charlie Hales
Commissioner Nick Fish
Commissioner Amanda Fritz
Commissioner Steve Novick
Commissioner Dan Saltzman
Toby Widmer, Interim Director, Portland Bureau of Transportation

SUBJECT: Audit Report – *Street Pavement: Condition shows need for better stewardship* (Report #432)

The attached report provides the results of our audit of the City's management of streets, Portland's most valuable asset group at \$5 billion in replacement costs. The audit found that the City has not adequately protected the condition of street pavement. Well over a third of pavement maintained by the Portland Bureau of Transportation (PBOT) is in poor or worse condition.

As street condition deteriorated, City Council chose to invest in competing transportation priorities without an overall strategy, allowing future costs for restoring street pavement to multiply. PBOT estimates that an additional \$75 million per year would be needed for ten years in order to repair and reconstruct streets to meet condition targets.

The audit also found that PBOT pavement managers use industry-accepted methods to make maintenance decisions. However, the lack of an overall transportation strategy has essentially made street maintenance a low priority in the City's budget. The intent of our audit recommendations is to assist PBOT in determining the level of funding necessary to restore and maintain street condition. However, implementation of these recommendations will not rectify all of the accumulated effects of past decisions to defer maintenance.

We ask PBOT to provide us with a status report in one year, through their Commissioner in charge, detailing steps taken to address the recommendations in this report. We appreciate the cooperation and assistance we received from PBOT staff as we conducted this audit.

LaVonne Griffin-Valade
City Auditor

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Attachment

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Summary

Portlanders need streets for driving, biking, and transporting goods. Portland's street network is important economically, but the pavement condition of many Portland streets has deteriorated to a point that requires costly repair. The Portland Bureau of Transportation (PBOT) estimates that the City would need to spend an additional \$75 million per year, for ten years, on repair and reconstruction to meet its targets for street condition. It would have cost much less to prevent the deterioration. Portlanders also pay higher personal costs when streets deteriorate, such as increased transportation costs and impacts to safety.

Audit reports we issued in 2006 and 2008 emphasized the need for preventive maintenance to cost-effectively protect street condition. Since then, PBOT adopted industry-accepted tools to evaluate street condition and make treatment decisions. However, despite PBOT knowing the inevitable and costly consequences of failing to maintain streets, PBOT management and City Council limited street maintenance work in recent years, choosing instead to focus on other priorities.

In 2012, PBOT rated 44 percent of Portland streets in poor or very poor condition, meaning that significant rehabilitation or reconstruction is needed to return them to acceptable condition. In addition, streets in good condition need maintenance to keep them from falling into poor condition. Performing reactive maintenance like filling potholes does not substitute for preventive maintenance or lower the cost of pavement restoration. However, decisions about the type and amount of work needed are constrained by budget and other policy choices.

Although PBOT's mission describes its role as "the steward of the City's transportation system..." we found that the City is not adequately protecting street pavement condition. Instead, it is allowing the cost of unmet needs to soar for taxpayers in future years. While PBOT attributes this to falling revenues, we noted in our January 2013 report, *Transportation Funding: Revenues up, spending on maintenance down*, that PBOT's revenues increased in recent years. That report also concluded that inadequate spending on maintenance is partly due to spending on other policy choices.

We found that without an overall Bureau strategy and a clear basis for transportation priorities, maintenance of street pavement has not been a high priority for the City. This led to large unmet needs, and PBOT has not consistently reported the extent of these needs.

We reiterate the recommendations we made in our recent report for a clear transportation strategy with explicit goals and objectives. Specific performance measures, such as PBOT's current measures of infrastructure condition, would help Council and the public evaluate outcomes. In addition, we recommend that the Commissioner of Transportation follow City policy for managing street pavement assets for long-term cost effectiveness, and that Council require PBOT to provide it with information about future costs and benefits of PBOT street maintenance proposals.

Our recommendations are intended to help PBOT and Council to refrain from funding services that do not contribute to key goals. These management improvements are needed before Council seeks new funding for street maintenance, to inform the public about whether stewardship of their current street investments is an essential part of PBOT strategy.

Chapter 1 **Maintenance cost of Portland's streets depends on pavement condition**

Streets are the City's largest capital asset

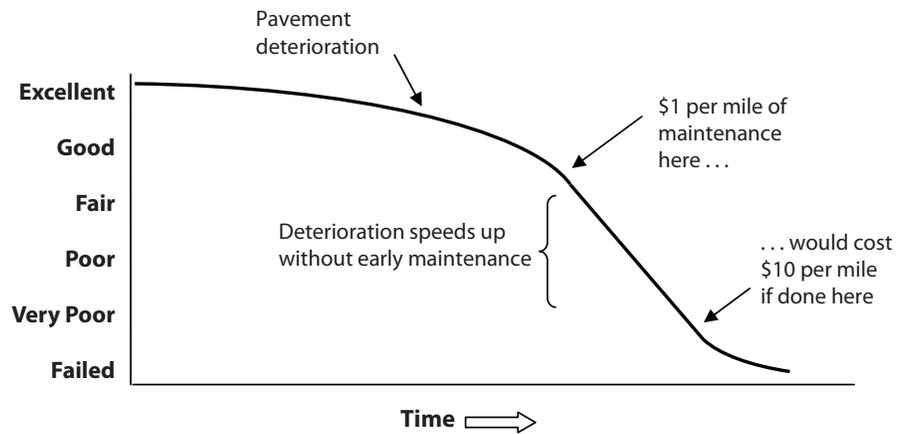
Streets are essential to residents and businesses for driving, biking, and access. With a replacement value of over \$5 billion, streets are the largest category of capital assets owned by the City. They make up 17 percent of the City's capital assets and about 60 percent of total assets under the stewardship of the Portland Bureau of Transportation (PBOT). Maintaining and improving street conditions is a City goal listed in the adopted budget, and the need for well-maintained streets is a reality that will continue to be a City responsibility.

Street maintenance done early costs less overall

Street reconstruction and major repair is costly. As we explained in previous audit reports in 2006 and 2008, it costs far less to maintain streets in good condition, extending the useful life of the surface pavement, than it costs to restore neglected streets once they reach poor condition. In other words, fixing streets in poor condition costs much more than keeping streets in good condition.

PBOT has repeatedly stated that deferring street maintenance can cost ten times more than early treatment would cost, as Figure 1 illustrates. Some experts say reconstruction costs even more, relative to preventive maintenance. A key point of the pavement deterioration curve shown in Figure 1 is that after pavement deteriorates beyond good condition, the process of deterioration speeds up.

Figure 1 High cost of deferring street maintenance
(pavement condition over time)



Source: Audit Services Division, based on PBOT diagram it attributes to American Public Works Association

City financial policy requires PBOT and other bureaus to maintain physical assets “at a level that protects capital investment and minimizes future maintenance and replacement costs” (City Policy FIN 2.03). The policy states that maintenance is considered high priority if deferring it will result in greater costs to restore or replace the assets. PBOT’s Pavement Maintenance Policy and Practice also recognizes “the importance of preserving the City’s street system and controlling street pavement deterioration by scheduled maintenance.” Our review of asset management literature also confirmed that timely preservation and preventive maintenance are essential to optimizing public resources.

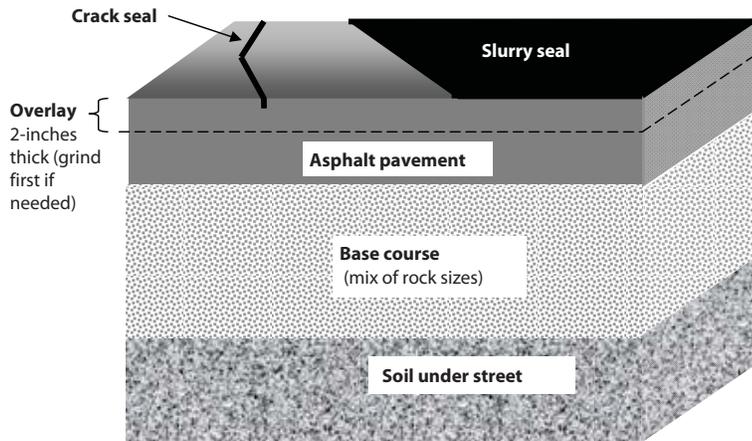
Figure 2 shows that the typical structure of a street includes more than what can be seen on the surface. Years of exposure to the elements, water damage, and heavy loads can result in more costly repairs when breakdown of the street surface leads to greater exposure of materials underneath. Surface treatments can prevent the faster stage of deterioration, as Figure 1 illustrates.

For example, aggregate material – a special mix of different rock sizes – is carefully designed to distribute loads the streets must support. When aggregate material is in poor condition, more pavement above

it may fail. To make the most of limited resources, the City should act before the rate of deterioration increases to the point that costly rehabilitation or total reconstruction of the whole street structure is required.

PBOT expects arterials (major streets) to last 20 years, and local (neighborhood) streets to last 40 years before reconstruction is needed. These estimates can vary depending on conditions such as traffic load and drainage, as well as on maintenance. When total pavement life is extended through early treatment, the overall cost per year is much lower.

Figure 2 Typical street structure, and types of pavement maintenance



Source: Audit Services Division

Note: The structure of different streets varies depending on age, location, and other factors. For example, arterials are designed to support heavier loads than local streets. Portland also has some concrete streets, not shown.

“Worst first” strategy costs more

It is common for cities to adopt a “worst first” strategy, spending their limited funds to fix a handful of failed streets instead of protecting other streets before they fail. This approach results in neglecting the streets in good condition, and causes more failed streets that need more costly repairs later. “Preservation first” is a better strategy, and PBOT pavement managers told us that they select

streets for treatment before the pavement reaches the stage of rapid deterioration shown in Figure 1. However, the amount of pavement they can treat each year is limited by budget and other decisions.

“There is no more fundamental transportation capital investment than system preservation – keeping the existing infrastructure in good condition.... Timing is important: if preservation investment is deferred, costs increase dramatically, leading to the saying ‘pay me now, or pay me more – lots more – later.’”

*Washington State Department of Transportation
2007-2026 Highway System Plan*

Chapter 2 **New pavement management system in use**

PBOT has a new pavement management system (PMS) to assess street pavement condition and to plan maintenance work. Using the system effectively can help management make informed decisions.

PBOT selected the StreetSaver program as its PMS. The system is designed to help prevent pavement problems by improving the timing and cost-effectiveness of maintenance through computer-assisted decision-making. The system was developed by the Metropolitan Transportation Commission for San Francisco Bay area cities and counties. Other Northwest cities also use it, including Beaverton, Gresham, Seattle, and Vancouver, Washington. PBOT uses the PMS to recommend streets to treat and to estimate maintenance needed to meet standards.

The process begins with visual inspection of street condition. PBOT staff enter the condition information electronically into the PMS. The inspections can not all be done at the same time, so the PMS software estimates current street condition accounting for deterioration of each street segment during the time since the last inspection. In addition, PBOT can use the PMS to estimate the type and cost of maintenance needed, and to predict pavement condition that will result from proposed maintenance choices. PBOT engineers review the specific PMS recommendations for cost-effective maintenance and select potential streets for treatment. Their review and selection is limited by the budget and Council priorities.

As they plan maintenance projects for the year, PBOT staff verify actual pavement condition on the priority streets selected using the PMS. Staff also consults with other Bureaus to avoid working on streets where other in-street work may be planned soon afterwards.

PBOT first reported pavement condition using its new PMS when it reported the condition of arterial and collector streets for FY 2009-10. In 2012, PBOT completed its condition rating of all improved streets, including local streets, and is now in a better position to manage the street system cost-effectively. PBOT has the tool it needs to implement our 2006 audit recommendations to develop a proactive preventive maintenance program to protect streets in good condition, and to adopt a more cost effective approach to planning and budgeting street preservation.

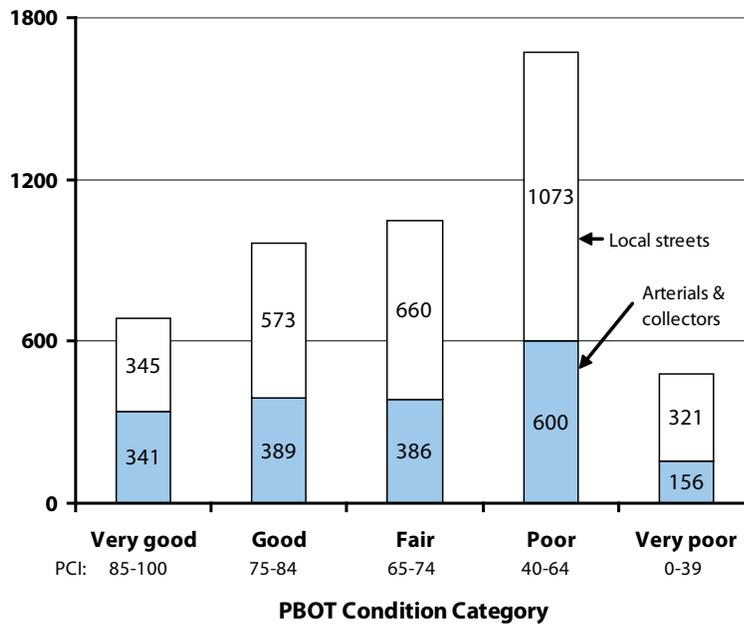
Chapter 3 **City neglecting pavement condition**

Recent PBOT pavement analysis shows that close to half of Portland's paved streets are no longer in acceptable condition. PBOT estimates that repair of those streets – and more cost-effective maintenance of other streets in better condition – would require spending about \$850 million over ten years, significantly more than the \$10 million per year the City currently spends on street maintenance.

Pavement condition poor or worse on 44 percent of Portland streets

By PBOT's estimate, pavement condition on city streets is far below its target levels. On arterial and collector streets, 60 percent of pavement is in fair or better condition, far less than the target level of 80 percent. The target for local (neighborhood) streets is lower, at 70 percent, but only 53 percent of pavement on local streets is in fair or better condition. Considering all City-maintained streets (arterial, collector, and local), 56 percent of pavement is in fair or better condition. The remaining 44 percent of pavement is in poor or very poor condition, as shown in Figure 3.

Figure 3 PBOT rates large number of streets in poor condition, 2012
 (Area: Lane Miles, 12-ft wide)



Source: Audit Services analysis of PBOT data

Figure 3 also shows PBOT’s definition of pavement condition categories in terms of the pavement condition index calculated for street segments by the PMS. Figure 4 provides a table of current pavement condition compared to PBOT’s targets for condition.

Figure 4 PBOT not meeting targets for street pavement condition

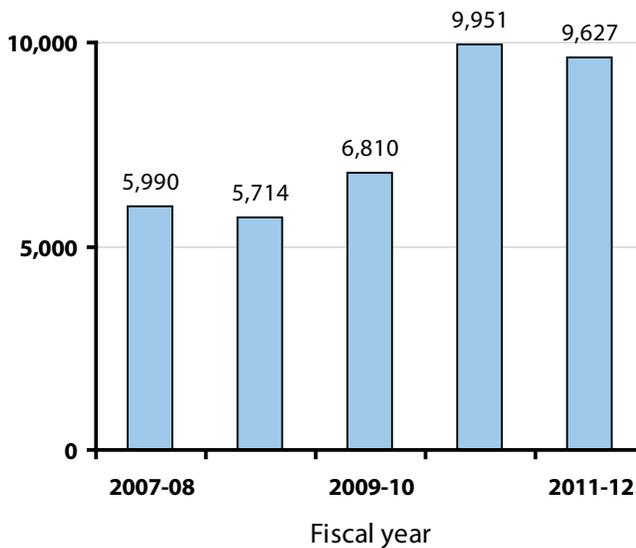
	Actual street condition	PBOT target condition
Arterials and Collectors		
Fair or better	59.6%	80% min
Very poor	8.3%	2% max
Local streets		
Fair or better	53.1%	70% min
Very poor	10.8%	11% max
All streets		
Fair or better	55.6%	--
Poor	34.5%	--
Very poor	9.8%	--

Source: Audit Services analysis of PBOT data, August 2012

It is important to note that although the percentage of streets in very poor condition may appear small at 8 percent of arterials and collectors and 11 percent of local streets, most streets in this category must be reconstructed, which is very expensive. PBOT's target is to keep at least 98 percent of arterials and collectors above very poor condition.

As PBOT's pavement life-cycle curve shows, pavement degradation speeds up as pavement condition gets worse. Potholes develop, and maintenance costs rise rapidly. The number of potholes PBOT fills each year suggests that many streets have reached the later, more costly stage of deterioration. Figure 5 shows the trend in potholes filled during Fiscal Year 2007-08 through FY 2011-12. During FY 2009-10, PBOT installed signs throughout the City with a "Pothole Hotline" for residents to report potholes, and also provided a mobile phone application for pothole reporting.

Figure 5 Potholes filled by PBOT



Source: PBOT

Once potholes appear, a roadway continues to deteriorate regardless of whether the potholes are patched. Filling potholes may improve safety and reduce water infiltration, but it does not reduce the cost of addressing overall street condition. Potholes result from damage to the roadway's base and sub-base. Without rehabilitation, pavement continues to disintegrate even after potholes are patched, until the

road requires reconstruction. According to a PBOT engineer, residents can expect increasing deterioration of city streets, resulting in more reactive maintenance.

Costs of neglecting pavement maintenance are high

One effect of the City allowing 44 percent of streets to reach poor or very poor condition is that those streets can no longer be maintained or improved at low cost. In addition to the future cost of rehabilitating or reconstructing those streets, residents pay more in personal driving costs when streets are in poor condition. An added indirect cost of failing to maintain streets in good condition is that carbon emissions from road maintenance and repair activities are higher for street reconstruction than they are from preventive treatments.

PBOT estimates high cost to City to improve street condition

PBOT uses its new pavement management system to assess the cost of improving street pavement condition, and to determine the cost for simply preventing further deterioration overall. Technical managers told us that assuming that the current funding for street maintenance continues at about \$10 million per year, an additional \$75 million per year would be needed to bring pavement condition up to target condition, for a period of ten years. PBOT estimated that of the total \$85 million per year, \$50 million would be needed for work on arterials and collectors, and \$35 million for local streets. After 10 years of spending at this level PBOT estimates that condition would meet its targets.

PBOT found that the maintenance needed this year to keep the present overall pavement condition from getting worse would cost about \$60 million, which is \$50 million more than its budget allows. Spending on some streets would improve average pavement condition enough to balance continued deterioration on others not repaired.

These 10-year and one-year estimates of needed work show the high cost of past City decisions to defer street maintenance. Cost-effective maintenance can not be planned year to year because decision makers must take into account the future cost of not keeping streets in good condition today. Likewise, the future cost to maintain streets can be lower once streets are brought into good condition and maintained that way.

Additional driving cost to residents and businesses

The effect of potholes in streets is more than just a nuisance. Potholes and other defects can increase the cost of driving or biking, and may decrease safety. Potholes can damage vehicles or affect a driver's or rider's control, which could lead to accidents. Public safety can also be impacted when emergency vehicles are delayed on the way to emergencies.

The extra costs to vehicle owners and drivers from driving on deteriorated roads, such as from increased wear and tear on vehicle suspensions and tires, adds up to hundreds of dollars each year. The average cost to urban drivers in the U.S. is about \$400 annually. The effect on operating costs tends to be greater for larger vehicles, and varies depending on local conditions and miles traveled.

In addition, Portland residents are not satisfied with street maintenance. Our 2012 Community Survey found that their ratings of the overall quality of street maintenance as good or very good fell to 33 percent in 2012, down from 41 percent in 2008. Over the same period, ratings of street maintenance as bad or very bad increased to 37 percent. A separate telephone survey conducted by DHM Research in May 2012 asked likely voters about the one thing they wanted the next Mayor and City Council to do something about. Although surveyors left the question open-ended, the highest number of responses were categorized as, "fix potholes and roads."

Rebuilding streets releases more carbon emissions

For almost two decades, the City has recognized the need to reduce emissions of greenhouse gases (carbon emissions) that are associated with climate change. In 1993, Portland became the first U.S. city to adopt a plan to reduce emissions, and in 2009, City Council directed PBOT to reduce transportation-related emissions significantly. However, allowing street condition to deteriorate to the point where major rebuilding is necessary results in greater carbon emissions produced.

Carbon emissions are significantly lower when streets are in good condition, for two reasons. Smooth roads improve vehicles' fuel economy. Also, fewer emissions are produced by more frequent preventive maintenance treatments than by the energy used for a single major rehabilitation.

The Metropolitan Transportation Commission (MTC) reported that for each lane mile properly maintained, the 20-year savings from pavement preservation treatments would be more than 180,000 pounds of carbon emissions, the equivalent of taking 15 cars off the road for a year. Based on MTC's report, keeping all Portland streets in good condition through preventive treatment could save emissions equivalent to keeping up to about 3,600 cars off the road each year.

Council and PBOT share responsibility for street condition

Although PBOT has numerous plans focused on improving multi-modal transportation, it lacks an overall plan with explicit policy and goals for the organization. The absence of a strategy has allowed spending choices to be disconnected from what PBOT priorities might be if long term impacts of those choices were considered. For several years, Council has approved and directed inadequate street maintenance and focused work on fewer streets.

Without overall strategy, street maintenance given low priority

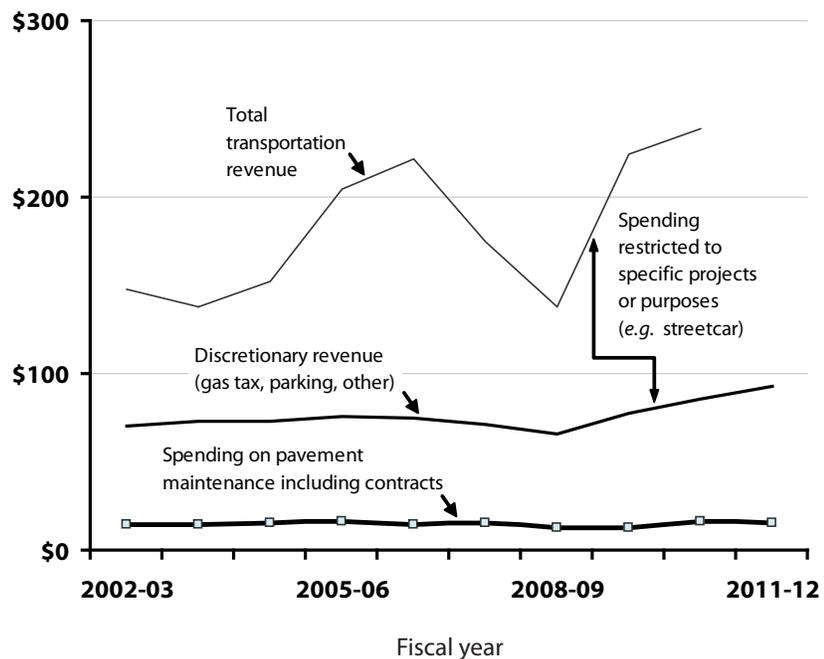
As we reported recently, PBOT management has not done the overall planning that is essential to managing services and infrastructure. Management best practice calls for an organization to have clearly defined and explicitly stated policy goals and objectives that can be expressed in performance measures. While PBOT has reported infrastructure condition measures, it lacks policy goals to use the measures effectively. Having explicit plans allows parts of an organization to work together towards the same outcomes instead of competing for resources. PBOT and Council have made program and project spending decisions in the absence of a clear transportation strategy.

We found that without a functioning overall strategy, the basis of PBOT's, or Council's, investment decisions is not clear. Their actual transportation priorities can be seen in spending decisions adopted by Council. Our recent report on transportation funding cited Council commitments to new projects that have reduced funds available for maintenance. In recent years Council gave higher priority to

funding some investments that are not City responsibilities than they gave to street maintenance. We found that this has contributed to deferring maintenance. For example, Council provided funds for Milwaukie light rail, streetcar operations, and new sidewalks instead of spending more to maintain streets. Council also committed funds for the Sellwood Bridge replacement.

Figure 6 shows PBOT total spending on pavement management, including major contracted rehabilitation and reconstruction, relative to PBOT's discretionary revenue. According to PBOT, approximately \$10 million is available each year to maintain street pavement, apart from contracted street rehabilitation and reconstruction.

Figure 6 Spending on street pavement maintenance compared to revenue (millions, adjusted)



Source: Spending data from PBOT. Revenue data from the City's Comprehensive Annual Financial Reports.

Note: In addition to pavement maintenance, spending shown includes filling potholes, work on speed bumps, most contract paving, and all Sunderland Yard recycling operations. (Sunderland less than \$1 million in each of last three years).

Maintaining and improving street conditions is a stated City goal, yet in January 2009, Council adopted a PBOT policy to reduce maintenance work on local streets. In its Resolution, Council cited declining gas tax revenue, decreased revenue from on-street parking fees, and increased costs. Council directed PBOT to “focus on major maintenance of the arterial street network, during the economic downturn and until new revenue sources are available...” (Appendix A). PBOT characterized the resolution as “eliminating” work on local streets, and reported in the 2011 Citywide Assets Report that street maintenance would be more reactive than proactive. PBOT managers told us that the Resolution was an attempt to focus limited resources on its most valuable street assets.

The Transportation System Plan, other major PBOT plans such as the Bicycle Plan for 2030, and numerous neighborhood and other specific plans focus on desired enhancements rather than on operations and maintenance. Although PBOT funding from gas tax and parking revenue is actually higher than it was three years ago, street maintenance funding was reduced significantly.

Even without enough funding to meet all objectives, it is management’s role to take difficult circumstances into consideration in its plans and decisions. The present poor condition of many streets and the high future cost to improve them, is a direct consequence of deferring maintenance in favor of other spending choices. Although PBOT management says it has an asset management perspective, its lack of planning for long term cost effectiveness contradicts that claim.

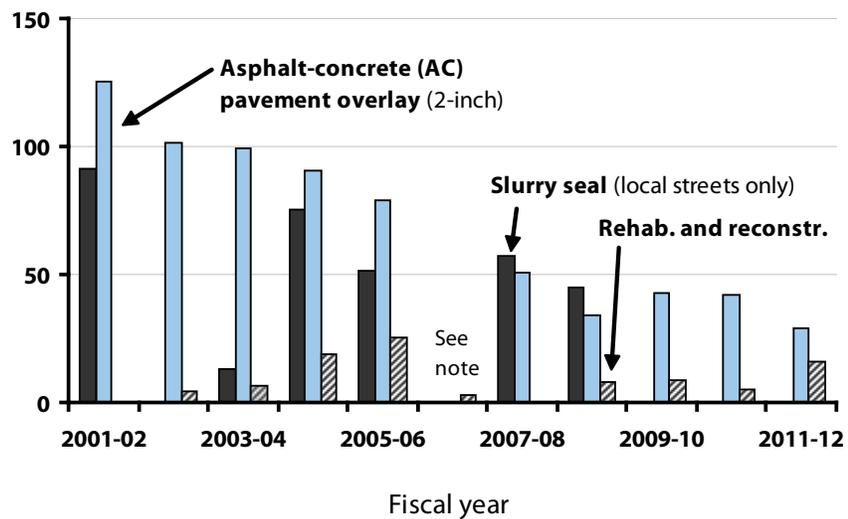
Preventive maintenance reduced

Preventive maintenance is the lowest-cost way to extend pavement life because it is applied before the pavement breaks down significantly, and fewer materials and less surface preparation are needed. As discussed in Chapter 1, streets in good or fair condition need preventive maintenance to remain in good condition and to save on long term costs, not to simply be smoother.

Our 2006 audit recommended that PBOT perform more preventive maintenance to get more value, in terms of street years, from its expenditures. Since then, PBOT management and Council reduced preventive maintenance. PBOT eliminated its slurry seal capability soon after it limited maintenance to arterials in 2009, even though PBOT had purchased new slurry seal equipment a few years earlier. Slurry seal is used in other cities and counties with similar climates including Washington County, Oregon City, San Francisco, and Vancouver, Washington. PBOT said slurry seal is appropriate only on local streets. Current preventive maintenance in Portland includes only crack sealing and two-inch asphalt overlays on arterial and collector streets. (Overlays on local streets are considered rehabilitation rather than preventive maintenance.)

Figure 7 shows PBOT’s diminishing street maintenance work, including preventive maintenance, since FY 2001-02. Beginning in FY 2009-10, none of the work shown was done on local streets. According to PBOT, substantial cost increases in labor, equipment, and material in the last ten years affected the amount of maintenance work it accomplished.

Figure 7 Street pavement maintenance measures reported by PBOT
(in-house and contracted, 12-ft lane miles)



Source: Audit Services chart of work measures reported by PBOT

Note: PBOT performed slurry seal and asphalt concrete overlay work in FY 2006-07, although it did not report the amount in its Asset Status and Condition Report for that year.

PBOT reported in 2011 that it should perform preventive maintenance on about 100 lane miles per year on arterials and collectors, before they become more expensive to repair. PBOT acknowledged that it was performing preventive maintenance on far fewer lane miles. Although filling potholes is a temporary measure that does not reduce the need for more costly rehabilitation of a street, an average of seven crew members are dedicated to that work because of the poor condition of many streets. This is an example of incurring extra costs by deferring maintenance.

PBOT technical managers are considering adding the capability for other preventive treatments, such as chip seal or other seal coats, to gain more pavement preservation for the amount it spends. However, despite their knowledge about the importance of preventive maintenance, and PBOT's new pavement management system, street maintenance managers can plan only within the budget allotted after the Bureau's higher priorities are funded.

Limited information available to decision makers and the public

City policy requires PBOT to account for the condition of capital assets, and assess the cost of unmet needs as part of the annual Citywide Assets Report to Council, specifically for budget discussions. However, PBOT did not report the condition of city streets to Council in budget or asset condition reports for FY 2006-07 through FY 2008-09. Four years after reporting on the condition of all streets for FY 2005-06, PBOT reported the condition of only arterial and collector streets.

Figure 8 provides a summary of pavement measures PBOT has (or has not) reported to Council or the public since FY 2005-06. Since FY 2007-08, PBOT has not included any of its street maintenance measures in budget documents, although it reported the amount of street paving completed in its Asset Status and Condition Reports during FY 2005-06 and almost every year since then.

Figure 8 Pavement measures not reported

	Reported (✓) or not reported		
	Pavement condition	Unmet need (miles or \$)	Area maintained
FY 2005-06			
PBOT Asset Status and Condition (S&C) Report	✓	✓	✓
City Asset S&C Report	✓	✓	not reported
Adopted Budget	not reported	✓	not reported
FY 2006-07			
PBOT Asset S&C Report	not reported	not reported	not reported
City Asset S&C Report	not reported	not reported	not reported
Adopted Budget	not reported	✓	✓
FY 2007-08			
PBOT Asset S&C Report	not reported	not reported	✓
Citywide Assets Report	not reported	not reported	not reported
Adopted Budget	not reported	not reported	✓
FY 2008-09			
PBOT Asset S&C Report	not reported	not reported	✓
Citywide Assets Report	not reported	not reported	not reported
Adopted Budget	not reported	not reported	not reported
FY 2009-10			
PBOT Asset S&C Report	✓major streets only	not reported	✓
Citywide Assets Report	✓major streets only	✓	not reported
Adopted Budget	not reported	not reported	not reported
FY 2010-11			
PBOT Asset S&C Report	✓major streets only	not reported	✓
Citywide Assets Report	✓major streets only	not reported	not reported
Adopted Budget	not reported	not reported	not reported
FY 2011-12			
PBOT Asset S&C Report	(not yet published for this fiscal year)		
Citywide Assets Report	(not yet published for this fiscal year)		
Adopted Budget	not reported	not reported	not reported
FY 2012-13			
Adopted Budget	not reported	not reported	not reported

Source: Audit Services Division review of reports listed

Note: Major streets are arterial and collector streets

PBOT managers told us they had delayed reporting condition and unmet needs to avoid publishing inaccurate numbers. It is possible that Council would have made different spending decisions if it had been given more information about worsening street condition and growing unmet needs.

Chapter 4 **Recommendations**

The deterioration of many city streets can no longer be prevented through timely maintenance, but the City can take action now to protect the condition of streets. It needs to improve some management practices that contributed to its neglect of streets – the City’s largest asset.

We found that without an overall strategy and a clear basis for street maintenance priorities, maintenance of street pavement has not been a high priority for City Council, and large unmet needs are the result. We therefore recommend that the Commissioner in Charge of Transportation:

- 1. Develop, for City Council adoption, a transportation strategy that clearly states the City’s overall transportation policy goals and objectives.**

The strategy should incorporate asset management principles for stewardship of streets, including service levels, risk management, cost-effective maintenance, informed decision-making, and reporting. If Council determines that meeting service priorities does not require street paving, then PBOT should reduce unmet need accordingly. Express general goals like “mobility” or “safety” in terms that are specific enough for policy makers and the public to understand how PBOT will weigh competing priorities and how PBOT will determine when goals are achieved.

- 2. Follow City policy for managing street pavement assets for life-cycle cost effectiveness.**

View street maintenance as a means of meeting service goals rather than as a separate, competing goal. Plan and perform maintenance as needed to minimize total cost over time.

3. Require PBOT to develop and report specific performance measures that track progress toward overall transportation strategy.

Performance measures should be used to advance and modify strategy. In the absence of an overall strategy, it is unclear how PBOT's current measures of infrastructure condition serve broader goals.

We further recommend that the City Council:

4. Require PBOT management to provide to Council and the public, annual estimates of expected future costs associated with the street maintenance proposals in its budget.

If street maintenance is not funded adequately to perform cost-effective maintenance, Council and the public should be aware of the future costs that are likely to result from deferring that maintenance.

5. Consider rescinding Resolution No. 36672, adopted in 2009, that directed PBOT to follow funding priorities that focus on major maintenance of the arterial network until new revenue sources are available (Appendix A).

Street maintenance decisions should be based on the service goals identified within an overall transportation strategy and on asset management principles, rather than through a Council resolution limiting management options.

Implementing these recommendations will not rectify all of the accumulated effects of past decisions to defer maintenance. However, these recommendations can assist management in determining the level of funding necessary to restore and maintain street condition.

Chapter 5 **Objective, scope and methodology**

The objective of this audit was to evaluate whether City policy choices on street maintenance are adequately protecting streets as a capital asset. To accomplish this objective, we reviewed PBOT information about current street condition, work performed, and spending on street paving. We also reviewed documentation of policy and performance relevant to management of streets as a capital asset. The scope excluded direct observation or analysis of street paving itself, such as analysis of asphalt test results and independent assessment of street condition. Our fieldwork ended in November 2012.

We interviewed PBOT managers about the policy guiding street maintenance budgeting and treatment decisions, current procedures, and management decision tools. We requested performance measures and results including information about asset condition and unmet maintenance needs. We spoke with a representative of the Mayor's Office, and for an external perspective we interviewed a member of PBOT's Budget Advisory Committee. During our review we also contacted PBOT staff for clarification needed.

To document trends in street maintenance spending, we relied on program and project expenditure reports prepared by PBOT financial staff. To document pavement condition and unmet need, we relied on summaries prepared by PBOT engineers and discussed PBOT controls for the reliability of its pavement condition data with them. We compiled measures of street pavement maintenance from reports and summaries prepared by PBOT. Although we did not independently assess the reliability of PBOT data, we reviewed PBOT data for reasonableness with respect to its use in this report, and discussed any inconsistent information with PBOT staff.

Our review of policy applicable to street paving management included State Statutes and Administrative Rules, City Charter and Code, Binding City Policy, and other plans and reports adopted by Council. We also reviewed budget documents and PBOT reports on asset status and condition.

To evaluate whether PBOT policy choices for street maintenance adequately protect streets as capital assets we reviewed PBOT information about current street condition and unmet need. We also reviewed industry information and technical literature relevant to management of street pavement maintenance, and results of surveys of Portland residents.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

APPENDIX

RESOLUTION No. 36672

Adopt the new Bureau of Transportation policy direction of reduction of services on local streets (Resolution).

WHEREAS, transportation revenue has been declining, and since 2001 and the Bureau of Transportation has cut \$42 million cumulatively and 52 Full Time Equivalent (FTE) from the General Transportation Revenue (GTR) budget; and

WHEREAS, because of the current state of the economy, the Bureau of Transportation must again reduce expenditures, effective January 1, 2009, by \$4.8 million for-FY 08-09 to balance an already scaled back budget; and

WHEREAS, the gas tax revenue is declining because vehicles are becoming more fuel efficient, fewer miles driven have reduced gas consumption and revenues are not indexed to inflation; and

WHEREAS, Transportation's other source of discretionary revenue is parking revenue, and the downturn in the economy is spurring a decrease in revenue from on-street parking fees; and

WHEREAS, the League of Oregon Cities estimates that transportation costs have increased 70% since 1993; and

WHEREAS, over the last year, there has been a nearly a100% increase in the price per ton of asphalt and since July of 2007, the cost of bio-diesel has increased 69% and unleaded fuel has increased by 40%; and

WHEREAS, the Bureau of Transportation staff, in conjunction with a Budget Advisory Committee, has conducted a budget prioritization process of all GTR funded activities to cut \$4.8 million from the FY 2008-2009 budget, effective January 1, 2009; and

WHEREAS, Given the economic recession, and the need to reduce expenditures by \$4.8 million, the Bureau of Transportation must now focus primarily on major maintenance of the arterial street network and reduce the maintenance work on local streets; and

WHEREAS, The Auditor has reviewed this report and recommended that once the bureau's new Pavement Management System is fully implemented, PBOT perform an assessment to determine if prioritizing lifeline, transit and freight routes has the maximum yield for the transportation system; and

WHEREAS, the decision to direct funding to lifeline, transit and freight routes and to reduce services on local streets was made with the advice of the Budget Advisory Committee and is consistent with the input received from citizens during the extensive community outreach effort associated with the Safe Sound and Green campaign in 2008:

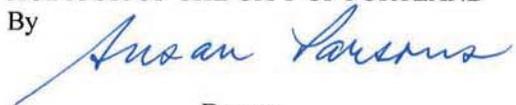
NOW, THEREFORE, BE IT RESOLVED, that the Portland City Council directs the Bureau of Transportation to implement the new policy for Transportation funding priorities, as outlined in Exhibit A, to focus on major maintenance of the arterial street network, during the economic downturn and until new revenue sources are available to sustain expanded transportation maintenance and operation functions.

Adopted by the Council, JAN 28 2009

Mayor Sam Adams
Prepared by: Sue Keil: JW
Date Prepared: January 14, 2009

GARY BLACKMER
AUDITOR OF THE CITY OF PORTLAND

By



Deputy

RESPONSE TO THE AUDIT



Office of Mayor Charlie Hales
City of Portland

February 12, 2013

Dear Auditor Griffin-Valade:

Thank you for completing your audit of the condition of our streets. The report makes clear that our street system (the City's largest capital asset) has fallen into serious disrepair. The cost of these unmet needs is exceedingly high, and as your audit points out, the backlog is growing. While reprioritizing the role of maintenance is not a comprehensive strategy, we will immediately refocus the bureau to begin to address this vital need and start down the long road towards restoration.

Additionally, I will work with the rest of City Council to ensure that the City has an overall transportation strategy. That strategic plan must have clear and balanced policies that guide our management of this asset, and our year-to-year investment decisions. Developing, and consistently following this approach should prevent our system from becoming this deteriorated in the future.

Sincerely,

Charlie Hales
Mayor
City of Portland

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Street Pavement: Condition shows need for better stewardship

Report #432, February 2013

Audit Team: Beth Woodward

This report is intended to promote the best possible management of public resources. This and other audit reports produced by the Audit Services Division are available for viewing on the web at: www.portlandoregon.gov/auditor/auditservices. Printed copies can be obtained by contacting the Audit Services Division.

LaVonne Griffin-Valade, City Auditor
Drummond Kahn, Director of Audit Services

Other recent audit reports:

Transportation Funding: Revenues up, spending on maintenance down (#436, January 2013)

Portland Development Commission: Indicators in Urban Renewal Areas suggest economic progress (#440, December 2012)

City of Portland 22nd Annual Community Survey Results (#428, October 2012)

City Financial Transactions: Issues warrant management attention (#406A, September 2012)

