



**PORTLAND STREETCAR:**  
City transit targets unmet,  
better performance management needed

December 2014

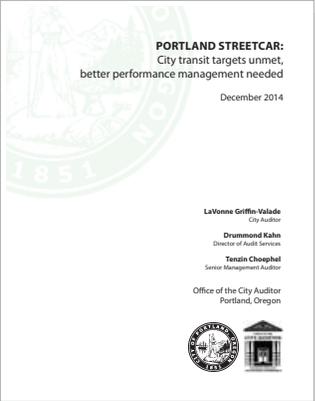
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December 11, 2014

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

SUBJECT: Audit Report: *Portland Streetcar: City transit targets unmet, better performance management needed* (Report #451B)

The attached report contains the results of the second in a two-part series of audits on the Portland Streetcar. Our first audit described the complex partnership arrangement for Portland Streetcar. This second audit reviewed the effectiveness of the performance management system used by the Portland Bureau of Transportation (PBOT) to meet the City's transit goals for Portland Streetcar.

Performance measures are built off of data and are used to inform Council, management, and the public about service results. We found that Portland Streetcar's data and measures are problematic. While many partners are involved in Portland Streetcar, our audit determined that it is a public transit function that does not yet have the performance management system in place to track progress toward the City's stated goals.

Specifically, we found that PBOT does not have a measurement structure that encompasses all the City goals for safe, reliable and cost-effective transit services. PBOT has a variety of robust measures and targets for the City's reliability goal, but does not have relevant measures or stated targets for its safety and cost-effectiveness goals. PBOT also did not report some of its performance measures, and there were measures of poor quality. Further, we found that stated targets were not met over the last two years.

Most significantly, performance information was not used by PBOT to guide the management decisions and operational changes needed to make improvements. While measures and data can provide important information, the City's Portland Streetcar measures are not effectively informing the public or decision-makers about the Streetcar's performance.

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

  
LaVonne Griffin-Valade  
City Auditor

Audit Team: Drummond Kahn  
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Attachment



# PORTLAND STREETCAR:

City transit targets unmet, better performance management needed

## Summary

The Portland Streetcar represents a City venture into transit services. The City works with two partners to provide these services: Portland Streetcar Incorporated (PSI), a private nonprofit corporation, and TriMet, the public transportation agency for the Portland metropolitan area. In an earlier audit, we described the partnership structure – specifically, the financial, organizational and contractual arrangements – as well as the strategic direction of Portland Streetcar.

This report focuses on Portland Bureau of Transportation (PBOT) and its effectiveness in reporting and managing the City's stated public transit goals for Portland Streetcar. Regular reporting and measurement of results are essential elements of an effective performance management system. Such information provides managers with the tools to improve results, to be more accountable and transparent to the public, and to be able to tell success from failure.

We found PBOT did not systematically report on and manage to the City's three stated goals for *safe, reliable* and *cost-effective* transit services. PBOT selected a variety of robust measures and targets for the City's reliability goal, but does not have relevant measures and stated targets for the safety and cost-effectiveness goals. PBOT did not report results for five measures, including one that was supposed to inform City Council of transportation funding decisions. In addition, four performance measures were either unreliable, unsupported, invalid, or overstated, and underwent limited scrutiny by PBOT.

More problematic, we found that available Portland Streetcar performance results – even if not previously reported or tracked by PBOT – show targets were not met for five measures: on time performance; frequency of service; vehicle failure; spare vehicles; and sponsorship. Ultimately, the City did not effectively use performance information for management decisions. PBOT told us that improvements are underway.

At PBOT's request, we also reviewed economic development measures for Portland Streetcar. While the City-TriMet Master Agreement includes development measures, we found the City has yet to select measures and regularly report on its economic development efforts. Moreover, based on studies PBOT provided to us, we conclude this research has yet to describe a causal relationship of how streetcars may affect economic development.

We make several recommendations to the Commissioner-in-charge and the Portland Bureau of Transportation for the City to more effectively report on and manage to the Portland Streetcar's stated public transit and economic development goals.

## **Background**     **City goals for Portland Streetcar emphasize safe, reliable and cost-effective transit services**

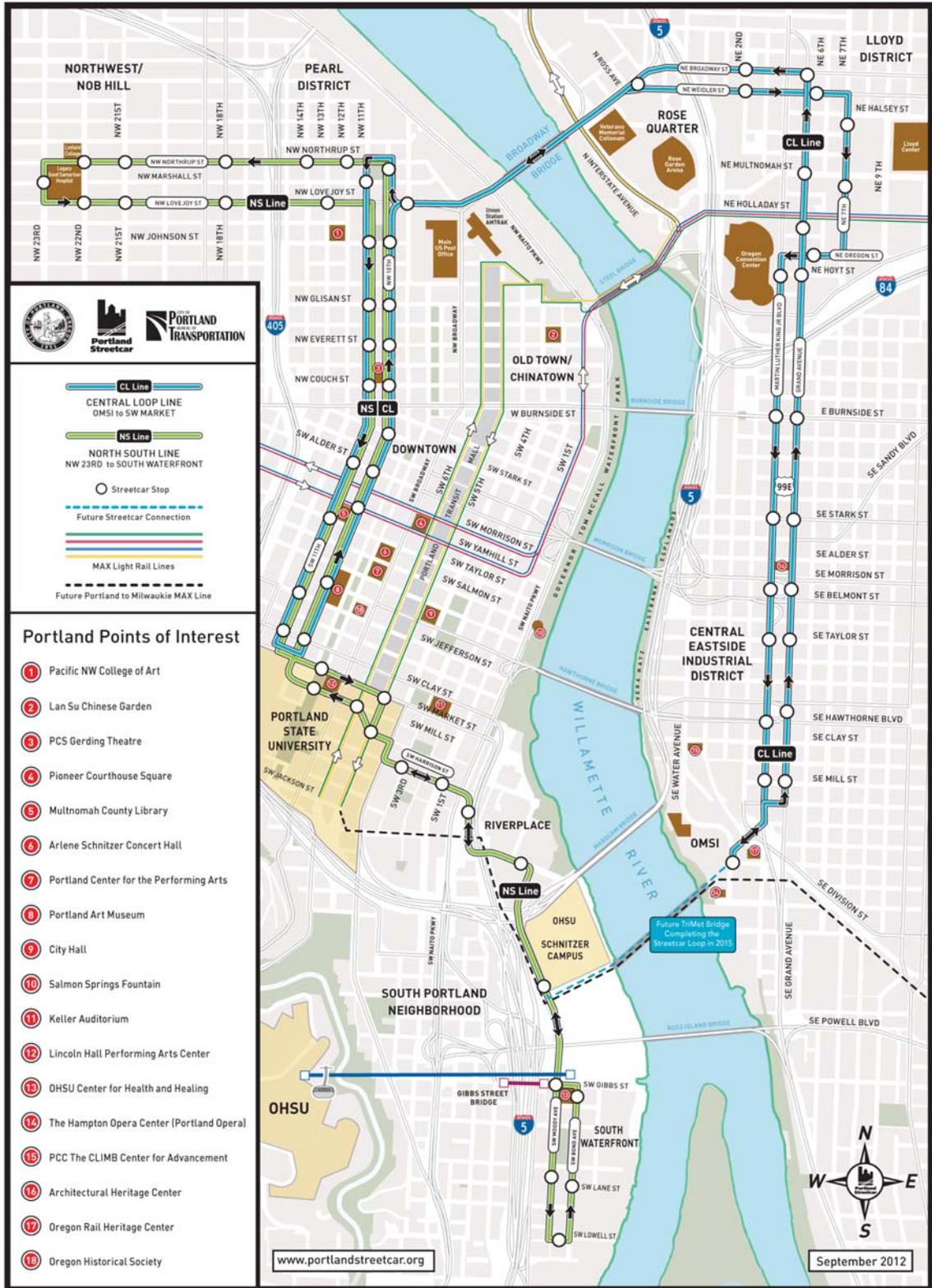
While the City has identified a variety of goals for Portland Streetcar, the emphasis of daily operations (which includes general system maintenance) is to deliver safe, reliable and cost-effective transit services. The City owns and operates the Portland Streetcar through the Portland Bureau of Transportation (PBOT), and partners with Portland Streetcar Incorporated (PSI) and TriMet.

In order to meet these goals, Portland Streetcar operates two lines to serve the Central City and other close-in Portland neighborhoods, as shown in Figure 1. The North South line (green route) opened in July 2001, and the Central Loop line (blue route) opened in September 2012 with remaining construction scheduled for completion in September 2015. For fiscal year 2014, the total Portland Streetcar operations budget was about \$9.75 million, and 70 staff members – 51 from TriMet, 16 from PBOT, and three from PSI – worked at the PBOT maintenance facility.

Readers will find additional background information and discussion of the Portland Streetcar in our April 2014 report, *Portland Streetcar: City bears financial burden and operational risk while relying on outside partners*.

<http://www.portlandonline.com/auditor/index.cfm?c=64479&a=487580>

Figure 1 Portland Streetcar system map

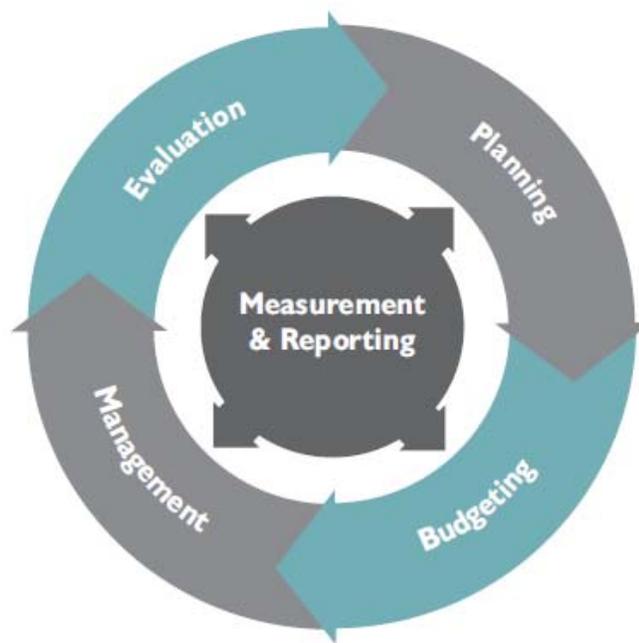


Source: Portland Streetcar website

**Good performance management provides accountability for desired results**

The purpose of performance management is improved results, and performance measurement is essential to good performance management. When developing measures, it is best to keep things simple. It is also important to cost-effectively collect measures that are relevant to the interested audience(s). Performance measurement and reporting is a cross-cutting practice that needs to be used as part of a performance management framework, as shown in Figure 2.

**Figure 2 Performance management system**



Source: National Performance Management Advisory Commission

Ultimately, performance measures can help decision-makers monitor and make adjustments to what works and what does not. Simply developing and reporting performance information is not enough – there is little value in even the best-designed performance measures, unless they are used systematically to inform decision-making and drive improvement. Without measurement tools and regular reporting, governments are unable to tell success from failure. Good measurement and reporting also improves government accountability by providing feedback and communicating results to both internal and external stakeholders.

## Audit Results

### **PBOT does not have relevant measures or stated targets that cover all City transit goals**

During our review of Portland Streetcar guidance documents (e.g. plans, budgets, reports), we identified a variety of performance measures related to the City’s public transit goals for the Portland Streetcar, as shown in Figure 3. Overall, however, we found measures and targets did not cover intended aspects of program functions necessary to meet the City’s transit goals. Moreover, measures were not always relevant to the intended audience – for example, whether measures are intended for management versus policy makers, or for capital investment versus operations decisions.

**Figure 3 Portland Streetcar performance measures and targets shown with City transit goal**

City goal	Measure	REPORTED BY		AUDIT RESULTS			
		PBOT	PSI	PBOT Target?	Problems with reporting?	Problems with information?	PBOT target not met?
Safe <sup>1</sup>	Accidents	✓		No			
	Hazardous conditions	✓		No			
	Crashes		✓	No			
	Passenger accidents		✓	No			
Reliable	On time service	✓	✓	98%		✓ <sup>2</sup>	✓
	Completed trips	✓	✓	98%		✓	unknown
	Frequency of service	✓	✓	10 min.	✓		✓
	Vehicle failure rate	✓	✓	No <sup>3</sup>	✓		✓
	Spare vehicles (ratio)	✓	✓	20%	✓		✓
Cost-effective	Cost per vehicle operating hour	✓		\$160		✓	unknown
	Sponsorship		✓	No <sup>4</sup>			✓ <sup>4</sup>
	Fare sales		✓	No			
	Fare surveys		✓	No	✓	✓	
General	Ridership		✓	No	✓ <sup>5</sup>	✓	

<sup>1</sup> PBOT submits monthly reports to the Oregon Department of Transportation. PSI aggregates some of this data for its monthly PSI Board report.

<sup>2</sup> Results for the audit period were unreliable. PSI now uses a different information source as noted in the audit.

<sup>3</sup> Minimum requirements for new vehicles exist in PBOT’s contract with Oregon Iron Works (see Figure 8).

<sup>4</sup> In the absence of a specific target, PBOT told us to compare budget to actual sponsorship revenue. PBOT states actual revenue met budget in 2014 but not in 2013 (see Figure 10).

<sup>5</sup> Ridership results not reported by PBOT to City Council. Regularly reported by PSI to its Board of Directors, and also used in City-TriMet Master Agreement (see Figure 11).

Source: Audit Services Division analysis of Portland Streetcar records

**SAFE: PBOT needs stated targets and more relevant measures**

The City's contract with PSI requires the City to be fully responsible for Portland Streetcar safety, yet PBOT has no stated targets for this goal. Both the City and PSI have measures for safety. However, these measures are output results specific to certain types of vehicle or passenger accidents. In the transit industry, there are a variety of possible safety measures and targets to address passenger, workplace, system, maintenance and accident potential. PBOT staff prepared a report analyzing its preventable and non-preventable accidents for 2013. While this type of report is an important improvement, PBOT is unable to systematically gauge its success in achieving the City's safety goal and to identify performance weaknesses that require attention.

PBOT told us that it fulfills its external reporting requirements to the state and federal government. PBOT must regularly report certain safety or security events and thresholds to the Oregon Department of Transportation (ODOT) and the Federal Transit Administration's National Transit Database. As the state oversight organization, ODOT performs triennial reviews that identify areas for corrective action. The most recently completed review from 2011 included 38 findings requiring corrective action. For example, Portland Streetcar was not conducting annual drills and exercises for system safety and emergency preparedness. These state reviews as well as industry guides on safety management systems could be useful resources to inform PBOT's selection of relevant safety measures and targets for Portland Streetcar.

**RELIABLE: PBOT identified a variety of robust measures, majority with targets**

Of the goal areas, we found PBOT's measures for reliable service represent the strongest set in variety and number. PBOT's measures emphasize reliable service, with five of the eight PBOT measures aligned with this particular transit goal. While not clearly identified as such, these measures represent outcomes from both capital planning (e.g. frequency of service) and daily operations (e.g. on time service). Moreover, the majority of these reliability measures also have clearly stated targets.

The Portland Streetcar Fleet Management Plan describes how vehicle failure will be measured for Portland Streetcar yet includes no

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specific performance target. PBOT's Streetcar Maintenance Manager explained that, while not clear in the plan, this measure is specific to new vehicles during the initial years of vehicle service. Currently, the City's contract with Oregon Iron Works includes minimum performance requirements for new vehicles which we discuss later in this report.

**COST-EFFECTIVE: PBOT needs stated targets and more relevant measures for fare activities**

While PBOT has one cost-effectiveness measure with a related target, the City includes additional PSI measures that have no stated targets. Similar to the safety goal, there are a variety of possible industry measures and targets that address cost-effective transit service. PSI performs activities related to sponsorship and fare sales which are revenue streams that supplement the City and TriMet's public investment in operations. While PSI has measures related to fare sales and surveys, we found these are not as meaningful as industry measures for farebox recovery and fare evasion, respectively.

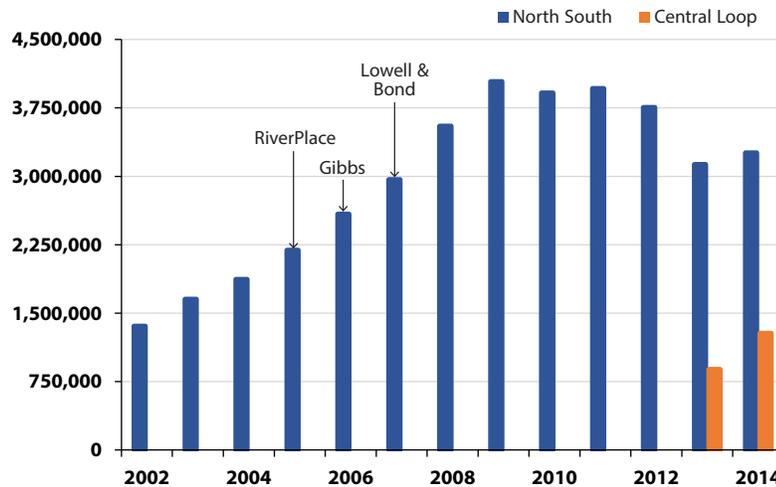
In terms of fare enforcement, Portland Streetcar began issuing warnings in October 2013, but has yet to identify performance measures or targets. PBOT and PSI told us that fare enforcement was not a priority because historically riders could travel without a fare for most of the North South line. The Fareless Square and Rail Free Zone existed from the North South line's opening in 2001 through August 2012. After that, PBOT said it took time to adopt changes to the City Code, hire a Streetcar Officer, and complete the state training required to issue citations. PBOT now tracks warnings, citations, and exclusions issued to Portland Streetcar riders.

**GENERAL: PBOT does not use ridership as a performance measure**

Increasing ridership is a national goal of the Federal Transit Administration and a high priority for transit systems. The Transportation Research Board states that typically usage (e.g. ridership levels or ridership per capita) or productivity (e.g. ridership per revenue vehicle hour) are considered the primary measures to assess the effectiveness of a transit investment as well as the best indicators of transit "success." As such, PBOT is required to provide this information annually to the National Transit Database. The City-TriMet Master Agreement, which we discuss later, uses ridership as its only transit measure. PSI tracks ridership estimates as a performance measure, as shown in

Figure 4. PBOT told us that this information is reported at PSI Board meetings, in which PBOT’s Commissioner-in-charge participates. Further, this information is considered in PSI Board recommendations on the annual Portland Streetcar operations budget. However, PBOT has yet to include this measure and identify stated targets to evaluate the overarching performance of Portland Streetcar.

**Figure 4 Annual Portland Streetcar ridership estimates (unaudited)**



Source: Portland Streetcar Inc. ridership estimates based on quarterly TriMet data. Estimates reflect data corrected by TriMet in November 2014.

Note: North South line system expansions identified in the year service began.

**PBOT performance reports not always complete or transparent**

During our review, we found PBOT does not regularly track or report all performance measures. Again, the purpose of tracking and reporting performance measures is to assist with operational management and to make system adjustments when necessary. Collecting performance information will not yield performance changes unless there is regular and timely reporting to management. Overall, we found five of the 14 performance measures were not reported regularly, including one measure that was supposed to inform transportation funding decisions.

**PBOT did not report some performance results**

While some measures were reported regularly, we found others were not. PBOT reports performance results annually for three measures – on time performance, completed trips and cost per vehicle operating hour. PSI reports most of its performance results as part of a monthly

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report to its Board of Directors. However, we found that measures for frequency of service, vehicle failure, spare vehicles and fare survey results were not regularly reported for Portland Streetcar.

**PBOT unaware of City policy requiring annual ridership reports to Council**

We found that PBOT was unaware of a City policy related to Portland Streetcar ridership we identified during the audit. City Council adopted a policy in 2004 to allocate an additional \$300,000 of City parking meter funds annually to PSI for enhanced service beginning in 2006. The allocation was under the condition that Portland Streetcar ridership increase by at least 9 percent within two years of starting the enhanced service.

The policy further states that “PBOT shall provide ridership survey results to City Council on a yearly basis in order to measure progress.” If ridership results were not met, Council would determine how the funds would be spent, with a preference going to the transportation maintenance backlog. PBOT said ridership estimates, as reported by PSI and shown in Figure 4, increased 37 percent from 2006 to 2008, but could not demonstrate to us that this information was reported to City Council as required.

**Some reported performance results questionable, with limited PBOT scrutiny**

While PBOT relies on PSI for performance information, there is limited PBOT scrutiny of the information ultimately collected and reported for the City. Some performance results are managed by PSI, and others are blended efforts, with both PSI and PBOT involvement. A few measures also involve TriMet. We question the City’s selection, use, or process for four measures.

In addition to the information quality issues, we found problems with Portland Streetcar records. At the most basic level, Portland Streetcar records didn’t exist, were outdated, or were not in sufficient detail to describe what and how things were measured.

**RELIABLE: Completed trips results of poor data quality**

PBOT and PSI reported that Portland Streetcar met its target of 98 percent of trips completed, but their staff responsible for reporting told us that the information source was questionable. PBOT

explained that it currently has no information system to track lost service, and Portland Streetcar's own records describe a dependence on the "human factor" of diligent staff recordkeeping. Staff members must often address an emerging situation, like a vehicle collision, while also manually logging and estimating the minutes of lost service. PBOT showed us an event recorder that – while not currently used for this purpose – could help verify lost service entries made by staff. During a demonstration of the event recorder, we found two of three randomly selected incidents showed unrecorded lost service, which was consistent with staff concerns about the quality of this performance information.

**COST-EFFECTIVE: Cost per vehicle operating hour results unsupported**

PBOT reported it met its cost per vehicle operating hour target of about \$160, which was competitive with TriMet bus and rail costs. PBOT began reporting this measure in its 2014 budget, but had no supporting documentation for the target or reported results. PBOT told us that it relied on PSI for this performance information, and PSI said the measure was based on budgeted costs and estimates of Operator hours. Moreover, PSI said this measure was no longer directly comparable to TriMet because TriMet does not include this measure in its monthly performance report. However, the Federal Transit Administration requires PBOT and TriMet – as well as other major U.S. transit agencies – to annually report actual operating expense per vehicle revenue hour for peer group benchmarking. For 2012, the most recently published report, Portland Streetcar reported \$323 to the federal government based on TriMet provided data, while TriMet reported \$142 for bus and \$188 for rail.

**COST-EFFECTIVE: Fare survey results invalid**

PBOT relies on PSI's fare surveys to understand how fare instruments like tickets are used by riders. Due to sponsorship and partnership arrangements, Portland Streetcar honors 13 different fare instruments. PSI staff survey Portland Streetcar riders, but do not have the law enforcement credentials to enforce the use of fares. PBOT's Streetcar Officer provides field support as needed, and tabulates and shares PSI's survey results monthly with PSI's Executive Director and PBOT's Project Manager. PSI told us that its staff work individually rather than in teams, choose when and where they conduct surveys,

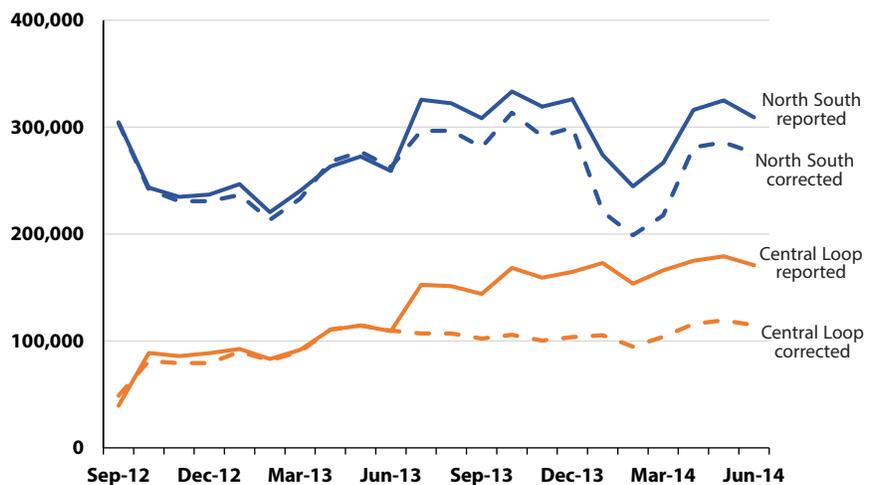
and do not attempt to count riders who leave the vehicle before being surveyed. We question the reasonableness of this approach and the validity of reported performance results, especially when described to us as a way to assess fare evasion.

**GENERAL: Ridership estimates reported for fiscal year 2014 overstated**

PBOT told us there have been errors in the ridership estimates since Spring 2013. TriMet recently discovered these errors in the Portland Streetcar ridership data it provides quarterly to the City and PSI. The error was a result of duplicate information being included in the calculation to estimate Portland Streetcar ridership. Upon identification of the error, TriMet provided corrected information to the City and PSI in late November.

Based on our calculations, the difference in reported estimates for fiscal year 2013 were minor. However, the fiscal year 2014 reported estimates for the Portland Streetcar system ridership were overstated by 19 percent or 1.1 million estimated rides. Individually, the North South line was overstated by 11 percent, and the Central Loop line was overstated by 35 percent. Figure 5 shows the differences between reported and corrected ridership estimates by line for each month since the Central Loop line’s opening in September 2012.

**Figure 5 Monthly Portland Streetcar ridership reported compared to corrected estimates (unaudited)**



Source: Portland Streetcar Inc. ridership reported and corrected estimates based on quarterly TriMet data.

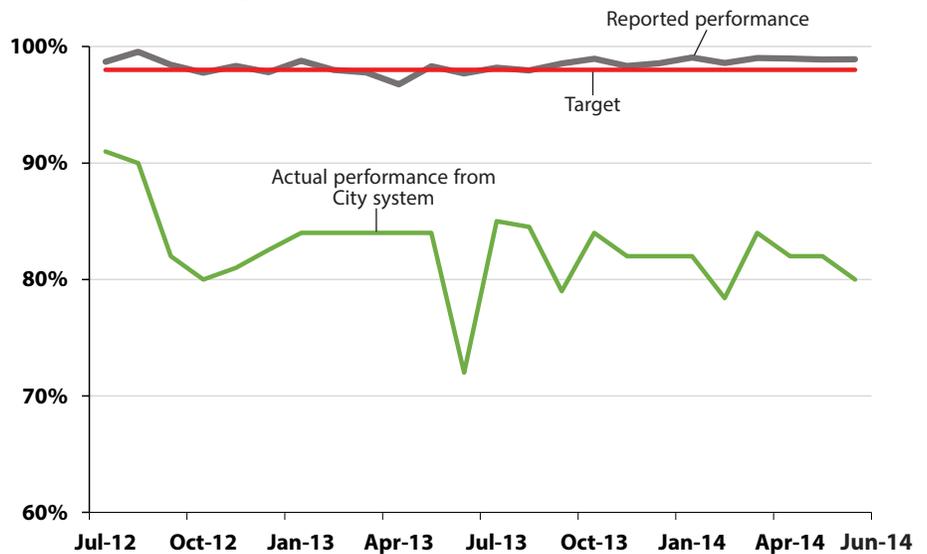
**Actual performance results indicate targets not met**

During our audit, we found that Portland Streetcar’s targets were not met for five performance measures. Specifically, we reviewed available performance information – even if not previously reported or tracked by PBOT – for on time performance, frequency of service, vehicle failure, spare vehicles and sponsorship.

**RELIABLE: On time results from a City information system shows target not met, differs from PBOT and PSI reports**

PBOT and PSI reported that Portland Streetcar met its on time performance target of 98 percent. Historically, the information reported is from the same source as the completed trips measure, which we concluded earlier as being of poor data quality. PSI told us it was in the process of making improvements to the information source. PSI began using on time performance from a City information system this year, yet this system was purchased in 2001. City Council records show PBOT originally purchased the system for the purpose of providing real-time arrival information to assess Portland Streetcar’s reliability.

**Figure 6 On time performance of Portland Streetcar system compared to target**



Source: Audit Services Division comparison of performance reports and City information system against performance target.

Since the City’s system was the intended source of on time performance information, we compared the system results to what PBOT and PSI reported, as shown in Figure 6. Over the years, the definition for “on time” has changed. In 2001, PBOT defined on time performance as no minutes early and no more than three minutes late. PBOT records show this definition was expanded to more than five minutes late. Currently, PSI uses parameters of one and a half minutes early and up to five and a half minutes late to account for communication delays in the City information system. Applying the PSI parameters for the City system, we found Portland Streetcar averaged 82 percent on time performance since the Central Loop line opening. Individually, the North South line averaged 86 percent and the Central Loop line averaged 77 percent, which were below both the City target and reported results.

**RELIABLE: Frequency of service does not meet either its 10 minute goal or TriMet’s Frequent Service levels**

We found that Portland Streetcar does not meet its 10 minute service frequencies. The Portland Streetcar Operations Plan states that service policy and frequency are important elements in the level of service, and that the shortness of the streetcar route necessitates higher service frequency to assure passengers travel faster by streetcar than they could by walking. The plan sets 10 minute frequencies, but also specifies 13 minute frequencies during the weekday periods of 7am to 6pm. While PBOT does not regularly report frequency, the Portland Streetcar website describes its current service frequency by line, as shown in Figure 7, with 14 minutes being the most frequent service during weekday periods from 10am to 7pm.

**Figure 7 Service frequency by line**

	<b>North South Line</b>	<b>Central Loop Line</b>
Weekdays	10 AM - 7 PM: 14 minutes	10 AM - 7 PM: 14 minutes
	Other: 15-21 minutes	Other: 20-22 minutes
Saturdays	9 AM - 8 PM: 17 minutes	9 AM - 8 PM: 17 minutes
	Other: 17-20 minutes	Other: 17-20 minutes
Sundays	Every 20 minutes	Every 20 minutes

Source: Portland Streetcar website

We also compared these service frequency results to contractual references in the City-TriMet Master Agreement for Portland Streetcar. In that document, TriMet agrees to consider Portland Streetcar lines as part of its Frequent Service network, with the goal of having its contributions for Portland Streetcar operations commensurate with its Frequent Service bus lines service and funding levels. TriMet defines Frequent Service as 15 minutes or better throughout the day, seven days a week. However, given TriMet's own budget restrictions, its actual Frequent Service levels occur during rush hours on weekdays (7am to 9am, 4pm to 6pm) and operates 17 to 20 minute frequencies at all other times. PBOT told us Portland Streetcar appears to be providing more overall hours of frequent service throughout the weekday days. We found Portland Streetcar frequencies are not consistent with TriMet's actual Frequent Service levels. Specifically, service levels are not met by Portland Streetcar for both lines during the morning weekday rush hours, and for Central Loop line at non-rush weekday times.

**RELIABLE: Plan not approved before vehicle use, and vehicle reliability contract requirements not yet met**

We found PBOT did not approve a reliability demonstration plan before using Oregon Iron Works (OIW) vehicles. The City contract with OIW requires that a reliability demonstration plan be developed by the contractor for approval by the City before the vehicles were used to carry riders. PBOT told us the first of the OIW vehicles was used to carry riders in June 2013. LTK Engineering, PBOT's vehicle engineering service provider through PSI, conditionally approved versions of the plan in February 2013 and again in January 2014, and directed OIW to resubmit a revised plan each time. We found Portland Streetcar operated all five of the OIW vehicles to carry riders before LTK Engineering provided final approval of the plan in March 2014.

Furthermore, initial vehicle failure results show that OIW has not met minimum contractual requirements for seven of the nine vehicle systems, as shown in Figure 8. The City contract with OIW requires vehicle systems to meet specific performance requirements, assuming routine maintenance is performed as recommended. Reliability must be demonstrated while vehicles carry riders during the warranty period. If systems fail to meet requirements after an agreed initial time period, OIW is responsible for making corrections, at its expense, before the end of the warranty period. OIW is supposed to provide

monthly reliability reports. However, the fleet’s initial performance results were not provided until July 2014, the only report received thus far. LTK Engineering reviewed the draft and questioned the gap in the time period covered by OIW’s report, as well as the calculation for the trucks and suspension system results. Furthermore, LTK Engineering stated that, for all but two systems (friction braking, trucks and suspension), the vehicle results are failing to meet the contractual requirements. PBOT told us that no specific issues have come from the reliability report or warranty claims, and there have been field modifications done on the vehicles.

**Figure 8 Oregon Iron Works vehicle fleet progress toward contractual requirements (unaudited)**

Vehicle system	Reliability (miles)		Requirement met thus far?
	Requirement	Actual	
Carbody and appointments	40,000	2,311	No
Propulsion, dynamic brake and controls	40,000	4,623	No
Friction braking	35,000	55,472	Yes
Communications	75,000	9,245	No
Passenger doors and controls	25,000	2,521	No
Lighting	200,000	7,925	No
Electrical	50,000	6,934	No
Heating, ventilating and air conditioning	60,000	7,925	No
Trucks and suspension	100,000	100,000	Yes

Source: Oregon Iron Works. Vehicle failure information described as mean distance, in miles, between independent failures. Reliability Demonstration Report (Revision B as of September 22, 2014) for data period July 8, 2013 through March 18, 2014.

**RELIABLE: Portland Streetcar operated with no spare vehicles when Central Loop line opened, but currently meets target**

While PBOT does not regularly report on its spare vehicles measure, the Portland Streetcar Fleet Management Plan describes how the fleet size is governed by peak vehicle requirements to serve ridership demand, vehicle procurement constraints, financial constraints, and the operating spare ratio target of 20 percent. At the time of the plan’s development in March 2012, Portland Streetcar had three spare vehicles (spare ratio of 43 percent) and exceeded the performance target.

We found Portland Streetcar operated with no available spares for almost a year after the Central Loop line opening in September 2012. The Fleet Management Plan stated that the City will proceed with the Central Loop line service assuming it has a fleet of no less than 12 vehicles, and assurance that additional cars will be arriving steadily and within a few months of the opening. However, at the time of the Central Loop line opening, Portland Streetcar had 11 vehicles in its fleet because of delays in when OIW delivered the five production vehicles, as shown in Figure 9. PBOT’s Maintenance Manager told us that, currently, Portland Streetcar has three spare vehicles (spare ratio of 25 percent) and exceeds the performance target.

**Figure 9 Timeline for Oregon Iron Works vehicles**

Vehicle	Original contract delivery date	Revised contract delivery date	Actual contract delivery date	City acceptance date	Revenue service start date
1	2/11/2012	7/10/2012	5/3/2013	6/6/2013	6/11/2013
2	3/11/2012	7/24/2012	6/6/2013	6/24/2013	6/27/2013
3	4/11/2012	8/28/2012	7/31/2013	8/15/2013	8/15/2013
4	5/11/2012	9/11/2012	10/6/2013	10/22/2013	10/24/2013
5	5/26/2012	10/30/2012	11/18/2013	12/2/2013	12/3/2013
6 *	6/11/2012				

\* The original Oregon Iron Works contract involved six vehicles, and this was subsequently revised to five vehicles due to a change in propulsion and electrical systems.

Source: Portland Bureau of Transportation

**COST-EFFECTIVE: PSI sponsorship revenue target met in fiscal year 2014, but not in fiscal year 2013**

While there is no specific City target for sponsorship, PBOT told us one way to gauge sponsorship is to compare budget to actual sponsorship revenue. PBOT and PSI provided this information for the last two years, as shown in Figure 10. They report some difficulty in comparisons because, in earlier years, the ridership benefit revenue from sponsors was not tracked separately from general sponsorship revenue. PSI offers sponsorship packages that include different discounted rates for single ride tickets or annual passes. Portland Streetcar vehicle and stop sponsors may choose to add a ridership benefit for all of their employees and/or students as part of their sponsorship agreement. Historically, these sponsors pay 1 percent

of the retail value of a Portland Streetcar annual pass for the ridership benefit – which, for 2014, was \$2 for an annual pass with a retail value of \$200. PBOT told us that it uses total sponsorship to compare, and said PSI met its total sponsorship budget in fiscal year 2014, but not in fiscal year 2013.

**Figure 10 Comparison of total sponsorship budget to actual**

Fiscal year	BUDGET			ACTUAL		
	General Sponsorship	Ridership benefit	Total	General Sponsorship	Ridership benefit	Total
2013	\$350,000		\$350,000	\$223,975	\$58,025	\$282,000
2014	\$260,000	\$65,000	\$325,000	\$251,650	\$92,834	\$344,484

Source: Portland Bureau of Transportation

**City did not use performance information for decisions, but PBOT says improvements are underway**

Given the problems we describe about Portland Streetcar performance reporting and results, we conclude that the City did not use this information for decision-making in a manner consistent with good performance management. For example, PBOT could have used on time performance information to focus on issues along the Central Loop line that, if improved, would enhance reliability across the Portland Streetcar system. Similarly, PBOT could have delayed opening the Central Loop line given the vehicle failure and spare vehicles results. These examples represent missed management opportunities for continuous improvement toward unmet targets. Ultimately, this performance information could have been used to hold PBOT as well as PSI and other contractors accountable for issues with Portland Streetcar performance.

During our discussions, PBOT acknowledged that it does not have a systematic approach to use performance information for Portland Streetcar. PBOT told us that, historically, they have relied on PSI and TriMet for operations assistance and budget recommendations. Moreover, City representatives told us they expect PSI to use performance information for budget development and referred to past budget discussions and PSI Board of Directors meetings. For example, service frequency was one of the reasons why PBOT and PSI increased the number of Operator positions from 39 to 41. PBOT said it has plans for a future performance dashboard. And as required and funded by a federal grant, PBOT told us a before and after study will be prepared on the Central Loop performance in 2015.

In contrast to the shortcomings we found for Portland Streetcar public transit goals, PBOT has a model of how Portland Streetcar performance measures inform policy direction, management decisions, and resource allocation. The City-TriMet Master Agreement framework adopted in 2012 provides a clear link between Portland Streetcar performance and future City-TriMet funding decisions. As we described in an earlier audit report, the City and TriMet agreed on a set of performance measures and related targets to help assess which percentage of operating costs will be paid by each partner. These measures, as shown in Figure 11, are linked to specific vision statements in the Master Agreement for development, ridership and payroll tax. The North South line has generally reached or exceeded performance targets, while the Central Loop line remains at baseline levels. As a result, current plans show that TriMet’s share of North South line operations costs will increase to 85 percent in 2018, while its share of Central Loop line will remain at 50 percent.

**Figure 11 City-TriMet Master Agreement performance measures**

Development	Number of new residential units Square feet of new residential and commercial construction
Ridership	Number of daily weekday boardings
Payroll tax	Estimated collections from eligible entities

Source: City-TriMet Master Agreement and Permanent Executive Group records. Measures applied by line and/or Local Improvement District.

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## Other matter

### **Economic development measures**

When we began this audit, PBOT asked us to include Portland Streetcar economic development goals to our audit scope. Portland Streetcar records reference different ways to measure economic development, such as the net decrease in automobile use (i.e. trips not taken), density of development (e.g. floor area ratio), or rate of development (e.g. annual percentage growth in an area's building stock). As discussed earlier, the 2012 City-TriMet Master Agreement framework includes annually reported development measures, as shown in Figure 11. PBOT told us these measures were selected because they are indicators of both development and reduction of auto demand, supporting land use goals. However, we found the City has not yet selected measures and regularly reported on its economic development efforts related to Portland Streetcar.

Based on studies PBOT provided to us, we conclude this research has yet to describe a causal relationship of how streetcars may affect economic development. In 2013, the Metro regional government's consultants issued a report that included a literature and research review. Of the 35 studies they reviewed, the consultants identified a few specific to streetcars but noted they were of limited scope and did not attempt to isolate the effects of streetcars from other factors (e.g. urban renewal, regulatory context, public investments beyond streetcar, etc.) that may have affected property development and pricing. For example, a 2005 study of the Portland Streetcar's original North South line described the development impacts as being "correlated" or having "coincided" with streetcar investment.

These reports discuss the need for new, statistically rigorous research – specifically a multiple regression (hedonic) analysis – to attempt to quantify the impact of streetcar relative to other factors that impact real estate pricing. PBOT told us, as part of a federal grant, an economic development analysis will provide much needed additional data on the relationship between streetcar system investment and housing and employment growth, and sustainable development patterns.

## **Recommendations**

We found problems with PBOT's reporting and management of City transit goals. Therefore, we recommend the Commissioner-in-charge direct the Portland Bureau of Transportation to:

- 1. Review and revise existing measures to ensure relevant and meaningful alignment with transit goals and desired results.**
- 2. Develop sustainable and transparent processes for complete, timely, accurate and meaningful performance reporting.**
- 3. Use applicable performance results at relevant levels of City decision-making.**

In response to PBOT's request, we also identified areas to improve the City's efforts related to Portland Streetcar and economic development. As a result of our review, we recommend the Commissioner-in-charge direct the Portland Bureau of Transportation to:

- 4. Identify the City's performance measures and related targets to monitor Portland Streetcar's impact on economic development over time.**
- 5. Conduct the appropriate level of statistical analysis of Portland Streetcar's impact on economic development to better inform any expansion decisions by City Council.**

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**Objective, scope and methodology**

We conducted this audit to determine PBOT's effectiveness in reporting on and managing to its stated public transit goals for Portland Streetcar operations. Our audit scope focused on the Portland Streetcar's transit services, but included information on capital projects whenever such context was relevant to performance information. At PBOT's request, we included performance measures reported by Portland Streetcar Incorporated as described in Audit Results, and performed additional audit work as described in the Other Matter section of the report. This report is the second of a two-part series on the Portland Streetcar.

To prepare for our review, we compiled Portland Streetcar performance information (i.e. goals, measures, targets) included in guidance documents specific to the City (e.g. PBOT Budget, PBOT Asset Status and Condition Report) as well as Portland Streetcar generally (e.g. Operations Plan, Fleet Management Plan). These resources included documents we identified as well as those referenced by interviewees (e.g. research studies, contractual agreements).

To accomplish our audit objective, we reviewed available Portland Streetcar performance information as well as related organizational processes and procedures. We focused on the two year period (fiscal years 2013 and 2014) that included the Central Loop line opening. We observed demonstrations on how the performance information was collected, analyzed and reported. We interviewed PBOT and partnership staff members responsible for reporting performance information, as well as PBOT management familiar with how performance information was used for decision-making.

We relied on management's representations about information provided and, whenever possible, we checked management representations against our knowledge of operations. We requested supporting documentation and, if available, reviewed this information for reasonableness. As part of our review, we identified issues with information reliability that we either included in the report or disclosed to PBOT management. For example, we discovered problems which included methodology, calculation and spreadsheet errors, and results which could not be replicated. We express no opinion on

the reliability of the City information system referenced in this audit. Therefore, our reviews are not intended to provide assurance that information provided by management is free from error, fraud, waste or abuse.

We conducted this performance audit in accordance with generally accepted 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.

# RESPONSE TO THE AUDIT



Steve  
Novick  
Commissioner

December 4, 2014

Leah Treat  
Director

**To:** LaVonne Griffin-Valade, City Auditor

**From:** Commissioner Steve Novick   
Leah Treat, Director, Portland Transportation 

**Subject:** **Response to Audit of Portland Streetcar- Performance Management  
Internal Advisory Communication Report #451B**

This memo is in response to the current audit of performance management, data collection, and targets for the Portland Streetcar system.

Recommendations

We agree that improvements are needed to better define measures and targets for transit performance with a focus on having the right data available to managers, executives, and stakeholders to use effectively in decision-making. Changes in methodology and reporting began earlier this fiscal year in concert with Portland Streetcar, Inc. (PSI). We are continuing to identify and refine key measures to monitor and report through our annual budget, status and condition report, and the bureau's anticipated web-based dashboard.

Portland Transportation concurs with recommendation nos. 1 and 2, and appreciates the best management practices identified through the audit.

In regard to recommendation no. 3, we reiterate that decision-making for Portland Streetcar involves public and private sector stakeholders through the PSI board and the Streetcar Citizens Advisory Committee, as well as the Permanent Executive Group, which includes both the City Commissioner-in-Charge, the TriMet General Manager, and the PSI Board Chair. Performance information is now, and has been, regularly reported to and discussed at these meetings, where it is considered in recommendations on service changes, the annual Streetcar operating budget, and the capital plan.

In regard to economic development performance measures, we respectfully disagree with recommendation no. 4. City Council authorized an Intergovernmental Agreement with TriMet in 2012 that identified economic development-related measures. These have been defined and are being reported to the City Commissioner-in-Charge, TriMet General Manager, and the PSI Board. The measures consider increases in payroll tax, square footage of new construction, number of residential units, and ridership. The economic benefits of streetcar investment are clearly acknowledged by TriMet, as is the

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investments relationship to ridership and payroll tax receipts; these measures are in fact the basis for TriMet's on-going funding participation in Streetcar operations.

In regard to recommendation no. 5, the Eastside Streetcar Loop project, through its federal grant from the Federal Transit Administration, is funding an Economic Development Analysis to provide additional data on the relationship between streetcar system investments and housing and employment growth and sustainable development patterns. We believe that this study, as well as other research that will continue to occur across the country with development of streetcar systems, will address the call for more detailed analysis.

#### Additional Information - Safety and Service Frequency

The audit speaks to the need to identify target numbers for safety performance measures and may give readers a mistaken impression about the safety of streetcar operations. Safety is a primary goal for Portland Transportation, and the streetcar system has operated safely for 13 years. The audit refers to a 2011 triennial review by the Oregon Department of Transportation Rail Division, State Safety Oversight. As you know, triennial reviews are extensive, thorough, and detailed. This one included four days of document review, interviews and field inspection. What is not mentioned in the audit is that by July of 2013, the State found that all findings from the triennial review had been closed save one, where final action was needed from the TSA. Additionally, the State recognized the efforts that management staff had deployed for the safety and security of its employees, riders, and the general public

Lastly, it's our understanding that this audit period ended June 30, 2014. Please note, however; that the data provided in the audit for TriMet frequent service is accurate prior to September 2013; thereafter, TriMet has worked diligently to restore 15 minute or better, frequent service. As of September, 2014, TriMet Frequent Service Bus lines now operate 15 minute or better headways all weekdays, and Saturdays and Sundays are budgeted to operate 15 minutes or better in March and June, 2015. Similarly, streetcar service along SW/NW 10<sup>th</sup> and 11<sup>th</sup> Avenues has been scheduled for 7 minute frequency since early June 2014.

Portland Transportation will continue to work closely with our partners and stakeholders to provide safe, reliable, and cost-effective streetcar services for the City.



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*Portland Streetcar: City transit targets unmet, better performance management needed*

Report #451B, December 2014

Audit Team: Tenzin Choephel

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

**Other recent audit reports:**

*Bureau of Technology Services: City fails to comply with payment card industry standard (#460A, November 2014)*

*City of Portland 24th Annual Community Survey Results (#463, October 2014)*

*B.E.S. Columbia Building: Scope additions and ineffective design oversight led to substantially higher project costs (#446B, October 2014)*

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