



PORTLAND PARKS AND RECREATION:
Managing diverse assets
requires evaluation of maintenance

August 2013

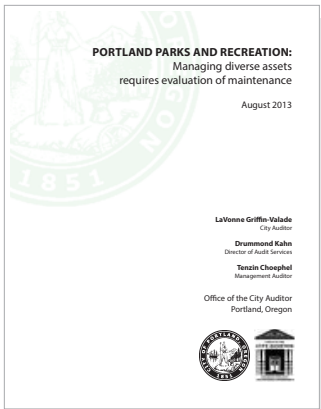
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August 14, 2013

TO: Mayor Charlie Hales
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Commissioner Amanda Fritz
Commissioner Steve Novick
Commissioner Dan Saltzman
Portland Parks Board
Mike Abbaté, Director, Portland Parks and Recreation

SUBJECT: Audit Report – *Portland Parks and Recreation: Managing diverse assets requires evaluation of maintenance* (Report #439)

The attached report contains the results of our audit of parks maintenance. In 2012, Portland Parks and Recreation (Parks) estimated the replacement value of its comprehensive parks and recreation system at close to \$1 billion. We initiated this review because Parks cited increasing costs for maintenance of these important City assets in the Bureau's proposed FY 2012-13 budget. Our audit assessed the structure Parks has in place to evaluate whether maintenance goals are being met.

The Bureau's mission is to sustain a healthy park system to make Portland a great place to live, work and play. To that end, residents consistently rate parks highly in the Auditor's annual community survey. Also, the City has been nationally recognized for individual parks, as well for the parks system. However, we found that Parks does not have an adequate understanding of whether its maintenance practices are efficient and effective. In particular, we determined the following:

- Clear expectations are needed to evaluate maintenance efforts
- More emphasis is needed on maintenance during planning, design and construction
- Maintenance data should be better managed and used in decisions
- Transition from reactive to more preventive maintenance needs preparation
- More robust performance measurement is needed to evaluate maintenance

We recommend that Parks focus on feedback mechanisms to help ensure achievement of intended results and continuously improve maintenance efforts throughout the parks system. The Bureau has already begun to address these areas, as described in the response included at the end of the report. Full implementation of our five recommendations will be of particular importance should the City ask voters to approve additional funding for parks.

We ask Parks 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 Parks staff as we conducted this audit.


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Summary

Portland Parks and Recreation (Parks) manages a nationally honored system that includes 11,415 park acres, 271 buildings and the City's urban forest. A key objective for Parks and for the City is to maintain and protect this diverse portfolio of assets. Parks – funded by General Fund revenue – must strive to make the best use of its limited maintenance dollars. Given the variety of daily maintenance needs across the Parks system, our audit objective was to determine if Parks has a structure in place to evaluate whether its maintenance goals and objectives are efficiently and effectively met.

Experts on parks maintenance describe such efforts as being the least understood functions of local government. The public views the upkeep of parks as relatively simple and straightforward, but in fact, parks are complicated to maintain. Within the field of parks maintenance, there are a number of general approaches to evaluating maintenance services. For example, we analyzed whether Parks had incorporated evaluation approaches similar to the following five:

1. Compare maintenance efforts to defined maintenance expectations
2. Design and construct parks for reduced maintenance costs
3. Manage information to systematically analyze maintenance services
4. Determine the optimal and cost-effective mix of maintenance activities
5. Use performance measures to assess maintenance productivity and quality

We found that Parks does not have an adequate understanding of whether its maintenance practices are efficient and effective. Although Parks has the tools and software to track maintenance along these five approaches, it lacks a formal structure to determine whether maintenance efforts are meeting objectives. Specifically, we found:

- Clear maintenance expectations are needed to evaluate against maintenance efforts
- More emphasis is needed on maintenance during planning, design and construction decisions
- Maintenance data should be better managed and used in decisions
- Preparation is needed to transition from reactive to more preventive maintenance
- More robust performance measurement is needed to evaluate maintenance

Parks is beginning to address some of the five approaches, and needs more focus on the others if it intends to systematically evaluate its maintenance activities. We make recommendations to help Parks focus on feedback mechanisms that can ensure it achieves its intended results, and continuously improves maintenance across the parks system.

Background

Portland has a nationally honored parks system

The mission of Portland Parks and Recreation (Parks) is to sustain a healthy park system to make Portland a great place to live, work and play. Parks manages one of the nation's most comprehensive park and recreation systems, with natural areas and developed parks encompassing 12 percent of the city's geographic area. In our 2012 community survey, residents gave parks high satisfaction ratings (84 percent), and 42 percent reported visiting a park near their home either daily or weekly. Over the years, Portland has been recognized nationally for individual parks, as well as for its parks system. Most significantly, Parks received the 2011 National Gold Medal for Excellence in Park and Recreation Management from the nation's leading public park and recreation organizations.

A key area for the City and Parks is to manage and protect assets

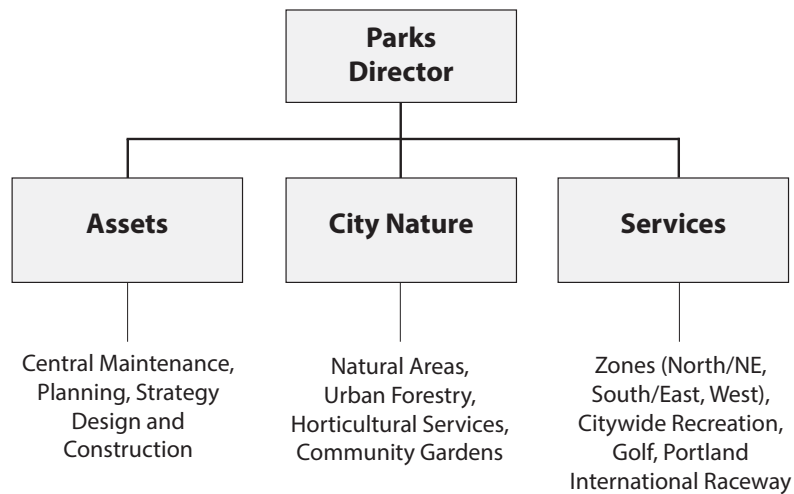
City policies require the maintenance and protection of City assets, and Parks further communicated its commitment to manage and protect its assets in its strategic plans. Parks' planning framework includes a twenty-year vision, organizational mission, and three-year strategic plans. In its strategic plans, a key result area is to manage and protect Parks assets.¹ Parks describes a key result area as a desired outcome that the bureau commits to achieving over the period. Among the City's infrastructure bureaus, Parks manages a diverse asset portfolio. As part of the annual *Citywide Assets Report*, Parks estimated the 2012 replacement value of its assets at close to \$1 billion.

¹ Due to intergovernmental and private commitments, Parks' maintenance responsibilities also extend to properties it does not own. For example, Parks maintains Metro's natural areas within the city, Portland Public Schools' athletic field sites, and street trees. Various compensation arrangements exist for these maintenance services. Parks also maintains some City-owned properties and receives reimbursement from other bureaus. While Parks has these responsibilities, we estimate the majority of its maintenance workload (86 percent in 2012) was for its own properties.

Mix of generalists and specialists within three maintenance divisions

Parks employs a mix of generalists and specialists to perform maintenance activities within three divisions,² as shown in Figure 1. The Asset Management (Assets) division includes centralized, skilled trades personnel responsible for structures, irrigation and turf across the system. The City Nature division manages natural areas, recreational trails, wildlife habitat and the urban forest. The Parks and Recreation Services (Services) division delivers both recreational and maintenance services at community centers, developed parks, swimming pools and athletic fields. Each division includes multiple maintenance units overseen by a crew leader or maintenance supervisor.

Figure 1 Organizational chart for parks maintenance divisions



Source: Portland Parks and Recreation

² Over the years, Parks has leveraged other resources to supplement dedicated staffing for both recreation and maintenance activities. For maintenance, these resources include seasonal staff, work crews from the state or county correctional systems, and volunteers supervised by Parks staff or their nonprofit partners. In 2012, about 15 percent of these total hours – the equivalent of 91 Parks staff positions – were for maintenance purposes.

Parks maintenance staff members are deployed in various ways depending on their work unit and position. In general, supervisors or crew leaders assign maintenance staff to particular types of assets (e.g. developed parks, natural areas, structures) in a geographic area. Many staff from across the divisions may visit the same park to perform different maintenance tasks. For example, an Arborist prunes trees; a Carpenter fixes broken picnic tables; a Park Technician cleans the restrooms and picks up trash.

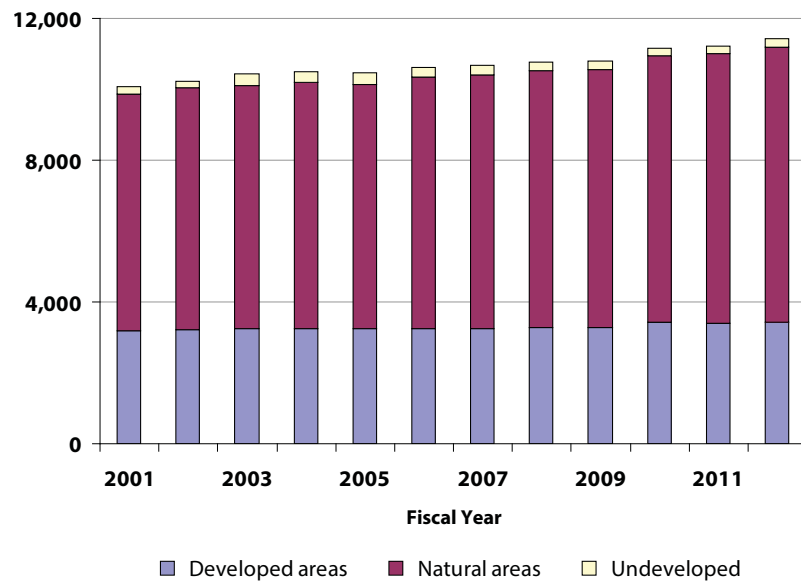
Maintenance staff generally follow a schedule and/or route, but there is variability in the frequency, duration and type of tasks to accommodate differences in seasonality, public use, or asset performance. Some maintenance tasks are best performed in a particular sequence (e.g. pick up litter from a lawn prior to mowing), requiring communication and coordination across staff from the same or different work units.

**Parks maintenance
faces resource
challenges**

Diverse resources used to expand Parks system capacity

The City has made investments from various sources to expand the parks system. In 2012, for example, resources for approximately \$26 million in capital projects included the Metro Bond local share, tax increment financing from the Portland Development Commission, system development charges, and the General Fund. Since 2001, Parks has tracked a 13 percent growth in acreage across the different property types it owns, as shown in Figure 2. During this period, Parks also experienced an increase of at least 11 percent in building square footage.

Figure 2 Parks system expansion by acreage and property type
(acres)



Source: Audit Services Division's *Service Efforts and Accomplishments* reports for years 2001-2010. Portland Parks and Recreation's reports for 2011 and 2012.

Insufficient resources for major maintenance of existing assets

While diverse resources are available to expand the system, Parks reports that it has insufficient resources to address increasing major maintenance needs for existing assets. Over the life of an asset, there are different, identifiable maintenance cost events. Daily or minor maintenance includes planned events such as inspections, monitoring, cleaning, and testing. Major maintenance is for existing assets – like buildings and swimming pools – that need repair, rehabilitation or replacement to meet regulatory or service level needs. Repairs are usually unplanned, but can be anticipated. Rehabilitation involves upgrading an asset to extend its useful life. Lastly, replacement is an event that inevitably arrives when the useful life of an asset is reached. Collectively, Parks estimates that these major maintenance requirements have accumulated to \$350 million in 2012, and reported an annual funding gap over the next ten years, as shown in Figure 3.

Figure 3 Parks major maintenance annual funding gap, 2012

Capital asset class	Estimated need (millions)
Amenities	\$ 0.2
Building and pools	\$ 14.1
Recreation features	\$ 8.4
Developed park	\$ 4.8
Built infrastructure	\$ 6.0
Green infrastructure	\$ 1.7
Total	\$ 35.2

Source: *Citywide Assets Report, 2012* (unaudited)

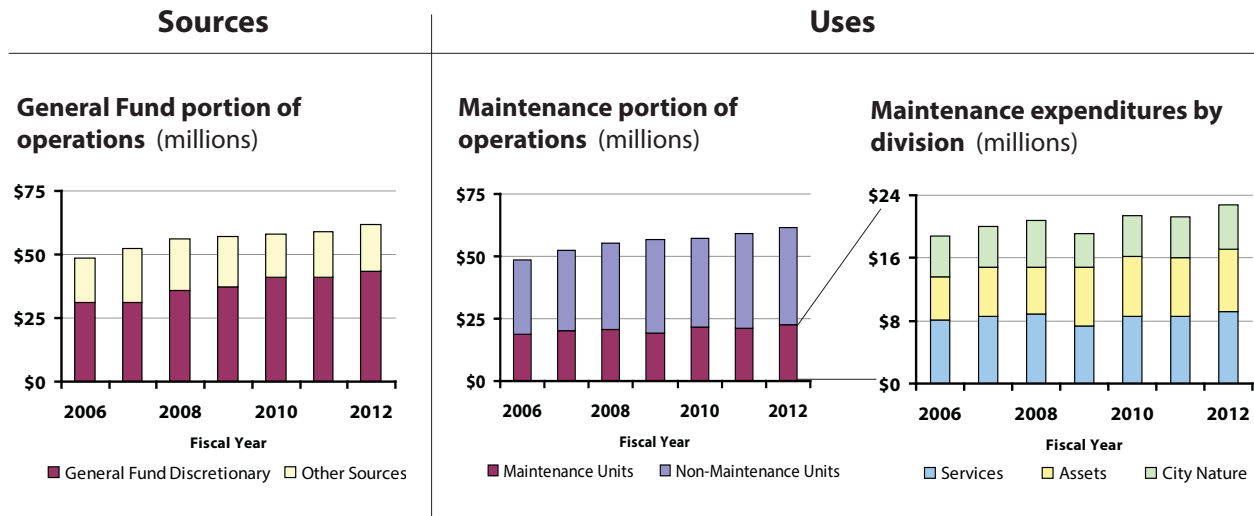
Note: Mandate, repair, rehabilitate and replacement needs only

Daily maintenance primarily supported by General Fund

The City's General Fund is the primary resource supporting the daily maintenance of existing Parks assets. As shown in Figure 4, the General Fund is the most significant contributor (70 percent) to the Parks operating fund at \$43 million in 2012. In general, Parks maintenance expenditures have increased over the last seven years, as shown in Figure 4. In 2012, Parks spent about \$23 million through its maintenance units, which is about 37 percent of total Parks operating expenditures. Of this maintenance portion, the Services division spent 40 percent, Assets division spent 35 percent, and City Nature division spent 25 percent of maintenance resources, as shown in Figure 4.

As Parks adds new assets to the system, Council adds General Fund dollars to the Parks base budget to cover the increased daily maintenance costs and ensure assets stay in the proper condition. However, the City Budget Office noted that the current method of adding funding then taking budget reductions disproportionate to other large General Fund bureaus is not achieving the intended goal of the financial policy – to fund the maintenance of new assets. The City Budget Office described that, beginning in 2013, Parks has effectively been asked to do more with less

Figure 4 Parks operating fund

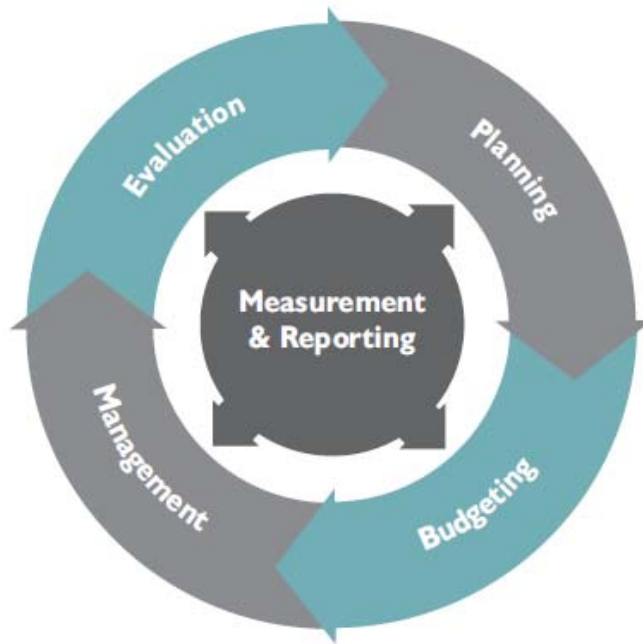


Source: Audit Services Division analysis of resource and expenditure information from the City's financial systems

Evaluation provides feedback on whether maintenance is optimal

Parks is responsible for evaluating whether it adequately maintains its assets to the life expectancy and performance as planned. As shown in Figure 5, evaluation is an essential feedback component of the performance management structure to assess whether management achieves its intended results. In 2003, the City adopted performance management to improve results through evidence-based decision-making, continuous organizational learning, and a focus on accountability for performance. The evaluation phase of the cycle is the systematic appraisal and valuation of management decisions. Moreover, measurement and reporting are cross-cutting practices that are also essential. While individuals or work units may apply performance management within their scope of operations, the objective of performance management is the development of formal, organization-wide systems.

Figure 5 Performance management cycle



Source: National Performance Management Advisory Commission

While performance management describes why evaluation is important, maintenance management best practices provide guidance on how to evaluate maintenance. Experts in parks maintenance identified certain principles essential to effective maintenance programs. These principles help ensure proper stewardship over the public's investment in the parks system. They also provide possible alternatives to achieve the same outcome of well-maintained parks. Based on our review of these principles, we identified ways managers can evaluate a maintenance program. While not an exhaustive list, we present some approaches in Figure 6 that would demonstrate an organization's ability to evaluate its maintenance operations.

Figure 6 Evaluation approaches for parks maintenance management

Best practices	Report chapter
Compare maintenance efforts to defined expectations	1
Design and construct parks for maintenance ease and lifecycle cost reduction	2
Manage information to systematically analyze maintenance services	3
Determine the appropriate mix of maintenance activities, with an emphasis on preventive maintenance	4
Use performance measures to assess maintenance productivity and quality	5

Source: Audit Services Division analysis of best practices

Given the importance of maintaining parks assets, our audit objective was to determine if Parks has a structure in place to evaluate whether its maintenance goals and objectives are met efficiently and effectively. We reviewed the application of five evaluation approaches listed above to assess Parks’ ability to systematically appraise its maintenance operations.

Chapter 1 **Clear expectations needed to evaluate maintenance efforts**

To evaluate maintenance practices, it is necessary to first develop maintenance expectations to compare to maintenance results. Parks accurately assessed the need for maintenance guidance when it developed its strategic plan in 2008. However, we found Parks did not complete these initiatives, which are currently at different stages of progress. Moreover, the Parks' *Total Asset Management* manual (2006) outlines the development of maintenance plans. Parks reports that these plans do not exist in the form described, but elements of the plans exist and guide the work of the bureau. Without clearly defined maintenance expectations, Parks is unable to make important comparisons to evaluate the performance of its maintenance operations. In addition, 46 percent of Parks maintenance staff will be retirement eligible within the next three years, and unwritten maintenance expectations will make this transition a challenge.

Planned maintenance initiatives remain unfinished

In order to evaluate maintenance operations, performance management relies on developing expectations and measuring results against the expectations. Parks adopted strategic plans to focus the organization's work over three-year periods, respond to changing internal and external conditions, and guide the bureau toward realizing its vision and goals. The strategic plan for 2008 to 2011 identified outcomes, strategies and tasks related to four key areas. One of its high-level areas was to manage and protect Parks assets, and Parks identified six specific initiatives for this key result area, as shown in Figure 7. Parks defined these initiatives as tactical, well-defined steps that have annual progress targets, three-year cost estimates and a

person accountable for getting the work done. Parks identified the need for developing maintenance guidance and committed to completing two initiatives for this purpose.

Figure 7 Status of Strategic Plan 2008-2011 initiatives

Initiative	Scheduled start	Parks management report (as of March 2012)		Audit analysis (as of Feb. 2013)
		Status	Completion forecast	Completion status
Complete remaining asset inventories and develop management strategies	2008 or prior	Underway	Spring 2012	Not yet completed
Apply minimum service standards for maintenance	Winter 2010	Underway	Spring 2012	Not yet completed
Implement capital major maintenance program	Fall 2009	Completed		
Continue to implement the Urban Forest Action Plan	Summer 2009	Ongoing		
Develop Ecosystem Management Plans	Summer 2009	Completed		
Implement a land acquisition and pre-disposition policy that prioritizes targeted goals for each type of land asset	2008 or prior	Completed		

Source: Audit Services Division analysis of Portland Parks and Recreation strategic plan initiatives

We found that Parks planned to complete two key parks maintenance initiatives, but did not finish them. As of March 2012, work was completed or ongoing as expected for four of the initiatives, as shown in Figure 7. However, two initiatives remain incomplete as of February 2013: the first is to complete remaining asset inventories and develop management strategies; and the second is to apply minimum service standards for parks maintenance.

Asset inventory and management strategies not yet completed, incorporated into strategic plan for 2012 to 2015

Asset inventory and management strategy development are important components in effective asset management. However, Parks has not yet completed this work. Developing an asset inventory is the first step in applying an asset management framework. Reviewing existing and alternative maintenance, repair and replacement strategies helps management determine the lowest cost options for providing the highest level of service over time.

Parks focused its asset management work on buildings and pools, since these are valuable and high-maintenance assets. Parks has completed initial asset inventories and condition assessments for many assets, but has yet to assess the condition of furnishings in natural areas, decorative elements, dog off-leash areas, water play areas, and utilities. Parks said that other inspections are in process, and Parks plans to complete these inventories by 2015.

Parks determined that it could not develop management strategies until other asset management components were completed. Parks incorporated those components as initiatives in its Strategic Plan for 2012 to 2015.

In 2012, Parks restructured to assign dedicated staff to a new Asset Management work group.

Maintenance standards for buildings, pools and developed parks not yet completed, but being developed

Best practices emphasize that maintenance standards be established for all assets. However, Parks has not yet completed this work. Best practices state that maintenance objectives may be general and apply to an entire system – for example, staff told us that they see their responsibility as keeping parks “safe, clean and green.” In contrast, maintenance standards would vary based on the type of assets and inform maintenance staffing, budgeting and a baseline of accountability for parks maintenance.

Based on strategic plan monitoring documents, Parks planned to develop maintenance standards for buildings, pools, and developed parks, and assigned work accordingly. Parks told us that it has made progress in developing these standards. For buildings and pools, Parks says the Assets division is piloting the use of its maintenance management system to schedule inspections, condition assessments and maintenance tasks; for developed parks, the Services division drafted maintenance standards to describe the level of service, and created a list classifying each park based on these definitions.

Parks maintenance plans do not exist in the form described

In 2006, Parks developed a manual, *Total Asset Management*, to coordinate all aspects of asset management. The manual refers to plans that outline how Parks would accomplish its asset management work, and included a structured process for planning and developing the appropriate level of maintenance for existing assets. These maintenance plans are intended to “address routine preventive maintenance and planned capital maintenance.” In addition, the manual refers to annual maintenance plans that “detail the maintenance tasks to be performed each year and the resources needed.” Figure 8 shows the process Parks described for developing maintenance plans. Ideally, a maintenance program would implement all of these steps.

Figure 8 Maintenance plan development

Process steps
Define the level at which the asset is to be maintained, consistent with the role that the asset plays in the delivery of services
Describe the systems and procedures to be used for maintenance work
Specify the types of maintenance to be carried out and why
Describe how to implement and fund the maintenance
Outline the projected costs of maintenance
Forecast major replacements

Source: Portland Parks and Recreation

Elements of plans exist and guide maintenance, plan development incorporated into strategic plan for 2012 to 2015

We found that maintenance plans do not yet exist in the form described in the manual. Parks stated that it intends to develop plans for each significant asset as part of its asset management efforts. Parks has an initiative to develop three to five representative asset management plans as part of its Strategic Plan for 2012 to 2015.

In the interim, Parks reported the elements of the plans already exist and guide the work of the bureau now. Parks cited its annual maintenance schedule for major buildings and pools, library of operational manuals, maintenance tasks entered into its computerized maintenance system, work unit schedules and routes, as examples of these elements. While these are important elements, we found that they do not encompass the systematic purpose, breadth or level of detail of maintenance plans described in the Parks manual or in best practices.

Chapter 2 **More maintenance emphasis needed during planning, design and construction**

Maintenance cost commitments begin at project planning, design and construction. Experts agree that the most cost-effective way to control ongoing maintenance costs is to look at design, planning and construction from a maintenance standpoint. The City Comprehensive Plan prioritizes low long-term maintenance costs, but we found the newest developed parks are among the most expensive to maintain. During the course of our audit, maintenance staff shared various ways Parks could better incorporate maintenance needs into its planning, design and construction decisions.

City Comprehensive Plan prioritizes low maintenance costs

The City Comprehensive Plan includes policies and objectives related to park development and improvement, which prioritizes low long-term maintenance costs, among other criteria. Adherence to the criteria can help Parks manage competing priorities and operational constraints. Maintenance costs are important because they generally exceed construction costs, sometimes by 10 to 20 times over the life of an asset. While maintenance costs are significant during an asset's life, the greatest opportunity for maintenance cost savings occur at the beginning of the project. Therefore, the best time to prevent costly maintenance in the long run is during the project planning, design and construction phases.

Newest developed parks among the most expensive to maintain

Over the last ten years, Parks has built a few developed parks in the urban core that, when compared to the rest of the parks in the system, require more costly maintenance, as shown in Figure 9. Parks in urban settings generally require more maintenance because of the level of design and intensive use. Based on maintenance costs per park acre for 2012, Simon and Helen Director Park is the most expensive park in the system, Tanner Springs is the fourth most expensive urban park, and Elizabeth Caruthers Park is the fourth most expensive neighborhood park.

Figure 9 General Fund operations and maintenance appropriations for newest developed parks

Developed park	Year	Additions to Parks budget	Acres
Tanner Springs Park	2005	\$ 80,000	0.92
Simon and Helen Director Park	2009	\$ 475,733 *	0.46
Elizabeth Caruthers Park	2010	\$ 204,700	2.12
The Fields	2013	\$ 255,207	3.35

Source: Audit Services Division analysis of City budget monitoring ordinances. Additions to the Parks budget generally occurred after the park had been open for a year or more, and once in the Parks base budget, are subject to any General Fund budget reductions.

* Simon and Helen Director Park has park hosts who oversee operations.

“Every effort should be made to view a park design through the lens of maintenance staff. It is far simpler and more cost effective to incorporate upkeep considerations into the design of a project rather than trying to retrofit a built project. This integration will not squelch the design process, but rather inform it. To ensure the long-term success of the park system, it is important to design parks that can be maintained in an efficient, cost effective manner.”

~ Design Trust for Public Space
and City of New York Parks & Recreation

Maintenance staff identified possible system improvements

Over the course of our audit, we found that Parks staff across the maintenance divisions identified the same challenges with capital project planning, design and construction. Maintenance staff have limited time available for project input. Templates or processes could provide a baseline of consistency that can then be customized as needed on a per-project basis. Ultimately, these aspects of project planning, design and construction have the potential of lowering maintenance costs.

Improvements needed in estimating maintenance costs

Parks developed some tools to manage its cost estimation process, but we found areas that would make these estimates more accurate. Parks has a policy and procedure that requires maintenance cost estimates for new projects, manages a template on its Intranet to collect estimates, and some units update and use a specific form.

Based on our discussions with staff, sometimes estimates are incomplete or inaccurate because not all work units have had the time to review updated plans and develop their share of the cost estimate. In addition, estimates are prepared in different ways by different work units, which may or may not be effective. The Parks manual includes a policy that the full life cycle of asset costs are considered in budgeting and capital planning. Most importantly, Parks does not routinely assess the accuracy of its cost estimates to actual maintenance costs. Parks said it plans to review these areas in 2013.

No design standards exist to encourage uniformity

Parks inherited a system that includes much variation, which can increase the cost of maintenance. For example, the asset register for parks furnishings includes five types of benches commonly found in the system, and another ten types of benches unique to individual parks. This makes maintenance more costly because staff need to know the exact type of bench to be repaired and have a variety of parts or materials on hand.

Maintenance staff told us that they added comments to park plans about aspects of the parks that should be uniform. For example, parks walkways and roadways should consistently accommodate the

weight, width and turning radius of a maintenance vehicle. Parks uses industry-established design standards when available, but project managers acknowledged the need for Parks design standards to clarify which aspects should be uniform across the system.

Outdated specifications and details for park construction

Contractors construct projects according to plans and specifications. The specifications describe the project and which work needs to be done. We found that Parks has outdated general conditions and construction specifications. Although, Parks updated a few specifications – such as the irrigation and tree protection specifications – more recently. Parks staff also mentioned outdated standard details, only a few of which are regularly used. In addition, Parks reports there are differences among the project managers about how they use and share this information with contractors. Parks reports that they have not had the resources to update these documents, but they plan to conduct reviews in 2013.

Maintenance feedback expectations unclear

Parks maintenance staff said they had been asked to attend project meetings, review plans and provide feedback, but did not feel this information was ultimately incorporated into planning, design and construction decisions. Parks' Design Process Project Checklist indicates that maintenance staff should have significant input to design. Parks project managers say they strive for regular input from maintenance, but staff availability and level of feedback can vary.

Parks has a comment log tool to document maintenance questions or comments, and provide room for response and resolution, but does not require the use of this tool. Two project managers provided examples of their comments from maintenance staff. One of the project managers did not use the comment log or have an alternate format that included responses to staff comments. Parks plans to be more consistent across the project managers, and have field staff provide more input earlier in the process.

Stronger mechanisms needed for updating Parks drawings and records

The completeness and accuracy of Parks drawings and records vary. Staff told us that Parks did not consistently collect past contractor deliverables, such as drawings and manuals. It is unclear whether examples shared with us are isolated instances or are typical of Parks' practices. Parks told us that deliverables are now routinely collected prior to project closeout. Utilities, irrigation and potable water plans are among the most accurate because Electrical and Irrigation work units provide regular updates. In contrast, there is no mechanism to update facility plans unless maintenance staff tell technicians about changes. Parks has recently drafted an Asset Update Form to capture this information.

Evaluate when design and construction results in additional maintenance costs

During our field visits, Parks staff provided examples of maintenance units incurring additional work or costs due to design or construction errors. For example, Irrigation staff told us Parks had to replace the sewer pump at Tanner Springs Park, backflow plate at Director Park, and backflow device at Harper's Playground. Collection of failure information is a critical component of asset management. Generally, failure rates are highest when an asset is brand new or close to the end of its useful life. We found Parks does not currently collect this type of information to evaluate projects and develop lessons learned to inform future work.

Chapter 3 **Maintenance data should be better managed and used in decisions**

Maintenance data is essential to evaluate productivity, develop performance standards, and provide a method of budgeting using historical information on maintenance hours and materials. Parks' manual describes its data management and reporting needs, and Parks invested in a computerized maintenance management system and maintenance data collection. Despite these plans, we found Parks' use of its maintenance information was inadequate, particularly given the lack of regular management reports to evaluate maintenance. We analyzed the Parks maintenance data to demonstrate how this could better inform management.

Parks manual describes data management and reporting needs

Parks' *Total Asset Management* manual states that relevant, accurate and accessible asset data are needed to produce the reports that assist and enhance all levels of decision-making. The manual describes plans for data management for assets that is also relevant for maintenance. It also describes different types of reports designed for different types of decision-making needs. For example, operational/project level reports require source data with high levels of accuracy to support day-to-day decisions by individual staff in the field – such as regularly scheduled maintenance and timely replacement of assets. Such reports would support activities such as maintenance planning and work order management.

Parks does not regularly generate maintenance management reports

Parks upgraded to a new software system in November 2011, and experienced subsequent challenges in data and reporting. Parks needed to upgrade because the previous system was no longer supported, and the new system would more accurately track assets, inventory and the maintenance conducted. However, Parks staff told us about problems with the upgrade. First, the asset listing did not completely move over to the new system. Second, Parks staff did not have access to the status of maintenance work orders they initiated. As a result, staff may have attempted to initiate multiple work orders for the same issue, or called maintenance staff members to try to obtain status information over the phone. Lastly, maintenance supervisors and managers were unable to generate the type of reports available with the previous system. Administrative staff told us they were able to provide custom reports upon request, and management had not requested regular reports on maintenance activities.

Analysis provides feedback on maintenance management

Given the absence of regular maintenance management reports, we obtained and analyzed Parks' data to demonstrate the system's usefulness to management decision-making. The Parks system has the potential for providing reports to evaluate various aspects of maintenance – for example, employee performance, work order timeliness, maintenance costs by asset. We chose two for analysis – work order backlog and adherence to natural areas maintenance priorities – and describe our results below.

Maintenance backlog not actively managed

We found that Parks had a maintenance backlog, but did not have a process to quantify, track or assess progress on addressing its backlog. During interviews and field visits, staff told us there was a backlog of pending work. Based on the system information, the Parks backlog consisted of about 2,600 "open" work orders, as shown in Figure 10, with the average work order more than a year old. Each of the maintenance divisions had a backlog, but over half of the work orders were from the Assets division. Open work orders may reflect deferred maintenance, or tasks that were completed but not closed in the system.

Figure 10 Maintenance backlog for Parks properties by division

Division	Type of work order	Open work orders	Percent of total	Average Age* (days)	Estimated Hours	Estimated Cost
Assets	Demand	830	32%	370	6,481	\$ 120,341
	Preventive	783	30%	385	6,255	\$ 154,160
City Nature	Demand	291	11%	402	22,503	\$ 392,339
	Emergency	20	1%	263	270	\$ 4,953
	Preventive	131	5%	428	3,996	\$ 81,550
Services	Demand	83	3%	378	1,247	\$ 26,434
	Preventive	458	18%	331	1,308	\$ 65,285
Totals		2,596	100%	374	42,059	\$ 845,063

Source: Audit Services Division analysis of Parks maintenance system information. Estimated hours and costs are based on fiscal year 2012 averages by division and work order type. Maintenance rates used for estimates were developed by Portland Parks and Recreation (unaudited).

* Backlog represents non-routine work orders issued prior to the current fiscal year (i.e. before July 1, 2012) and still open as of January 1, 2013.

The work order backlog included 20 emergency work orders assigned to the Urban Forestry unit in the City Nature division. Best practices state work orders should be prioritized by type. In general, the Parks system sets work order priorities in the following order: emergency, demand, routine and preventive. Moreover, Parks designates emergency work orders for “issues of fire, life, safety, security or asset infrastructure emergencies,” and requires resolution within the same day. Given the significance of these maintenance incidents, we asked about the status of these work orders. After some evaluation and communication with inspectors, the maintenance supervisor told us they responded to these incidents and will keep a closer eye on the work order closure process in the future.

System shows Parks adheres to natural areas priorities, but some work not tied to park properties

We found Parks has adhered to its natural areas maintenance priorities in the two years since the 2010 adoption of the *Natural Areas Restoration Plan*. Parks categorizes its natural areas based on those that have the greatest potential for meeting Parks’ restoration goals. Maintenance information shows the Natural Areas unit in the City Nature division has spent significantly more time on priority level one (highest priority) and two properties, than priority level three properties (lowest priority), as shown in Figure 11. It also shows that a portion of the unit’s maintenance hours (36 percent in 2012) were not attributed to natural areas (e.g. general locations, work unit, school, developed parks). Parks could use its data to improve management of hours not tied to natural areas.

Figure 11 Adherence to maintenance priorities for natural areas

Categories	Fiscal Year 2011		Fiscal Year 2012	
	Hours	% of total hours	Hours	% of total hours
Prioritized natural areas				
Priority level 1	11,657	26%	11,797	28%
Priority level 2	12,941	29%	13,124	31%
Priority level 3	1,224	3%	521	1%
Other natural areas				
Natural area – to be evaluated	524	1%	514	1%
Trails	650	1%	776	2%
Other				
General locations	7,435	17%	3,276	8%
Work unit*	9,274	21%	11,186	27%
School	408	1%	502	1%
Developed parks	473	1%	164	0%
Total	44,585	100%	41,858	100%

Source: Audit Services Division analysis of Parks maintenance system information for City Nature division’s Natural Areas unit. The nine management priority categories from the *Natural Areas Restoration Plan*, 2010, were consolidated to three priority levels based on consultation from Parks staff. Some properties are not on the priority matrix because of their type (i.e. trails) or they were acquired after the restoration plan (i.e. to be evaluated).

* Reflects tasks attributed to the Natural Areas unit, such as administration, purchasing, equipment repairs, and vehicle inspections.

Analysis provides feedback on system management

During our review of Parks information, we found maintenance data can identify which aspects of the system need to be better managed. We describe how different divisions use the system, how they use alternatives, and why monitoring maintenance information benefits Parks.

Maintenance hours entered into system, other uses vary by division

We found Parks has centralized processes in place to record its direct maintenance hours. However, other ways Parks uses the system for maintenance vary. Moreover, it is unclear whether Parks intends to make these processes consistent, or how much variation among and within the maintenance divisions is appropriate. Some units only use the maintenance system, while others use paper files, spreadsheets, calendar appointments, databases, and other applications (e.g. GIS, TRACS).

In our interviews, we also found maintenance crew leaders, supervisors and managers were not always familiar with the maintenance system, its functionality, and how the units they were responsible for use this information. Some of this may be due to the turnover in these positions and the upgrade challenges. Given the investment in this maintenance system, it is important that maintenance decision-makers are familiar with and understand how Parks expects them to use this resource across all maintenance divisions.

Parks needs to monitor data for accuracy and usefulness

We found that Parks has an abundance of maintenance data, but this information could be better monitored for its accuracy or usefulness. It is important to compare the benefit of accurate and useful information against the cost of collecting the information.

We analyzed the maintenance category, as shown in Figure 12, because Parks requires this information and made definitions available to its field staff. Staff spend their time performing a variety of maintenance functions. One concern about data accuracy and usefulness is that work coded by staff seemed inconsistent with how staff told

us they spent their time. For example, “Administration” was the first, second and third most significant category for the City Nature, Assets and Services divisions, respectively.

In addition, Parks has 74 different categories, but many reflect a small percentage of total maintenance hours. However, Parks includes no category to track travel time, especially for units that cover a large geographic area.

Lastly, administrative staff told us they have questioned inappropriate asset-category combinations – one example is combining the category code for “painting” with an asset that is a “tree,” even though Parks does not paint trees. Parks should better monitor staff categorizations and apply rigorous supervisory review to ensure information accurately reflects actual Parks maintenance activities.

Figure 12 Top 20 most frequently used maintenance categories at Parks properties, fiscal year 2012

Assets division			City Nature division			Services division		
Maintenance Category	Hours	% of total hours	Maintenance Category	Hours	% of total hours	Maintenance Category	Hours	% of total hours
Repair/Replacement	25,825	25%	Admin	9,859	15%	Daily Care and Clean	60,337	38%
Admin	9,328	9%	Pruning	6,704	10%	Ballfield Prep	12,588	8%
Hauling	8,537	8%	Applying Pesticides	6,311	9%	Admin	11,213	7%
Preventive Maintenance	7,411	7%	Daily Care and Clean	4,433	7%	Access Systems Cleanup	8,828	6%
Wide Area Mowing	6,634	6%	Meeting	4,250	6%	Pruning	8,052	5%
Daily Care and Clean	5,637	5%	Plant Production	3,671	5%	Leaf Removal	7,526	5%
Constructing and Installing	4,662	5%	Tree Removal	2,908	4%	Repair/Replacement	6,045	4%
Trim Mowing	4,486	4%	Training	2,861	4%	Preventive Maintenance	5,182	3%
Painting	4,131	4%	Volunteer Coordinating	2,759	4%	Weeding	4,290	3%
Inspecting	3,945	4%	Constructing and Installing	2,275	3%	Planting	2,875	2%
Meeting	2,533	2%	Planning and Scheduling	1,974	3%	Applying Pesticides	2,672	2%
Training	1,896	2%	Botanic Collection Mgmt.	1,724	3%	Hauling	2,643	2%
Estimate and Review	1,872	2%	Preventive Maintenance	1,451	2%	Event Startup and Cleanup	2,491	2%
Utility Locates	1,719	2%	Estimate and Review	1,429	2%	Meeting	2,237	1%
Leaf Removal	1,605	2%	Planting	1,400	2%	Mulching	2,193	1%
Fabricating	1,590	2%	Repair/Replacement	1,316	2%	Pressure Washing	1,814	1%
Irrigation Tune Up	1,128	1%	Weeding	1,210	2%	Edging	1,545	1%
Hand Mowing	1,115	1%	Hauling	1,105	2%	Removing Graffiti	1,502	1%
Rough Area Mowing	1,103	1%	Inspecting	1,031	2%	Constructing and Installing	1,380	1%
Drafting and Designing	1,101	1%	Establishment - New Plants	1,014	1%	Seasonal Opening/Closing	1,378	1%

Source: Audit Services Division analysis of Parks maintenance system information

Chapter 4 **Transition from reactive to more preventive maintenance needs preparation**

A key aspect of asset management is determining the optimal, cost-effective mix of planned and unplanned maintenance to minimize total maintenance cost. As discussed earlier, Parks does not yet have maintenance plans or asset management strategies, but emphasizes preventive or scheduled maintenance.

We found Parks must make some improvements if it is going to transition from a reactive to more preventive maintenance approach. Parks established preventive maintenance tasks for some assets, but we found that Parks initiates these scheduled tasks later than in past years.

The City and Parks emphasizes preventive maintenance

The City Comprehensive Plan states Parks should provide preventive maintenance to all city parks and facilities in a manner which reduces unplanned reactive maintenance and emphasizes the use of scheduled service delivery. In addition, Parks' *Total Asset Management* manual describes that, ideally, most maintenance is preventive or scheduled, not a continuous cycle of expensive emergency repairs.

Best practices take this further by stating all maintenance departments should stress preventive maintenance – continuous attention and care to prevent damaging wear, costly repairs or shortened asset life. Different stages of maintenance exist, as shown in Figure 13, with reactive repair the most expensive, and lifecycle cost management the most cost-effective. The Parks manual states that industry practice recommends a ratio of 80 percent planned maintenance to 20 percent reactive or emergency maintenance and, at the time of its publication, Parks had a ratio of 60 percent to 40 percent.

Figure 13 Maintenance approach model

Stage 1 Reactive Repair	Focus on fixing systems and equipment when they break. This is usually indicative of “firefighting” and emergency repairs, which are more expensive than planned maintenance.
Stage 2 Demand Maintenance	Migration to a more planned approach to doing maintenance and repair work.
Stage 3 Preventive Maintenance	Program where assets managed through pre-defined preventive maintenance plans.
Stage 4 Predictive Maintenance	With historical breakdown data, an organization can predict potential equipment and system failures and perform just-in-time maintenance work.
Stage 5 Reliability Centered Maintenance	With appropriate operational and breakdown trends, this approach uses engineering based maintenance programs to “push” the maintenance cycle to the max within the context of an overall system risk assessment.
Stage 6 Life Cycle Management	Full maturity is when an organization manages all its assets based on a lifecycle approach. Purchase decisions are based on analyses for managing the asset over its full useful life, including limiting the diversity of systems and equipment in the asset inventory.

Source: International City/County Management Association

Improvements needed to transition to preventive maintenance

We found Parks maintenance appears to be largely reactive, with the exception of some units applying a preventive maintenance approach. As part of Parks’ asset management work, it will eventually identify the appropriate maintenance strategy for major asset classes. However, in the interim, we found areas Parks could improve to prepare the organization for a more preventive maintenance approach.

Maintenance definitions inconsistent across Parks manual, maintenance system, and performance measure

We found differences in Parks’ definitions for types of maintenance. For example, in the Parks manual, maintenance includes custodial, routine, capital/major and on-demand/emergency. As described earlier, the computerized maintenance system uses a different set that includes emergency, demand, routine and preventive maintenance. Lastly, Parks tracks a performance measure related to how

much maintenance is “scheduled” (see next chapter and Figure 18). Based on our review of the supporting documentation, this reflects work orders that the system categorizes as the last priority level (mix of preventive, demand, routine). Parks needs to select one consistent set of maintenance types and definitions.

Definitions in maintenance system vary from onsite practices

We found differences between maintenance definitions in the system and the actual practice in the field. Since available Parks maintenance information is from the computer system, we used that set of maintenance definitions to analyze maintenance activities. We found that a significant portion of Parks maintenance work is for “routine” work orders, as shown in Figure 14. Moreover, when we learned about the processes and practices in place, we found these routine work orders more accurately represents a standing work order that may include emergency, demand or preventive tasks. For example, Park Technicians in the Services division straighten sprinkler heads to prevent irrigation issues, and apply pesticides to prevent weeds. In addition, some emergency repairs may be captured on routine work orders because maintenance staff are often informed and respond to the emergency before a new work order number is initiated.

Figure 14 Composition of maintenance work by division for Parks properties, fiscal year 2012

Division	Type	Hours	Percent of division total
Assets	Emergency	14	less than 1%
	Demand	35,445	34%
	Routine	55,271	54%
	Preventive	12,548	12%
	Total	103,277	
City Nature	Emergency	495	1%
	Demand	15,436	23%
	Routine	49,355	73%
	Preventive	2,571	4%
	Total	67,857	
Services	Emergency	0	0%
	Demand	1,791	1%
	Routine	149,410	95%
	Preventive	5,985	4%
	Total	157,185	

Source: Audit Services Division analysis of Parks maintenance system information

Preventive tasks not comprehensively and consistently captured in system

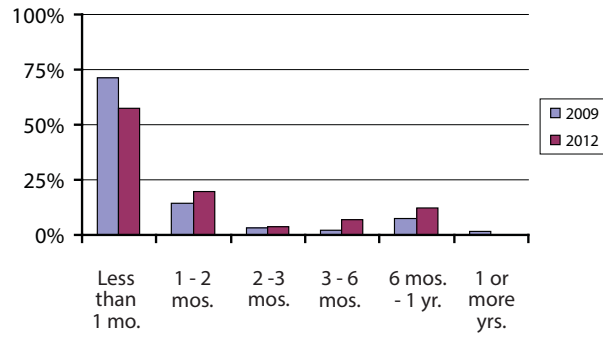
Parks has to identify preventive maintenance tasks and then enter the asset, task, and schedule the frequency into the maintenance system. Parks reports that it has manufacturer manuals for some of its assets, and these have specific inspection and preventive maintenance protocols. Based on discussions with staff, Parks lacks a process for ensuring that preventive work is adequately captured in the maintenance system. Parks staff report preventive tasks for mechanical assets are in the system, but based on industry practice and not to the level of detail as in the manuals. It is the responsibility of Facilities Maintenance Technicians to use the manuals and conduct any research needed. Parks needs to define what preventive tasks should be in its system, and invest the time and resources needed if it expects the system to prompt maintenance staff to perform the work.

Preventive maintenance initiated later

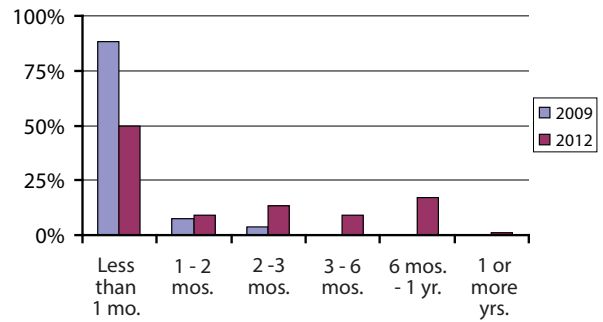
As part of the work order backlog analysis, we found the three maintenance divisions took longer to address preventive work orders in 2012. Preventive maintenance includes scheduled tasks to ensure the asset will perform through its useful life as intended. Work order backlogs often affect scheduled preventive maintenance, since preventive maintenance is a lower priority. We reviewed the system information for how long it took to respond to various types of maintenance work. There were no noteworthy differences except for preventive work orders. The initiation of these work orders was delayed across all three divisions, as shown in Figure 15. Preventive maintenance not performed at the appropriate time may later result in increased maintenance costs and shortened asset life.

Figure 15 Comparison of preventive work order initiation between 2009 and 2012 (percent of preventive work orders)

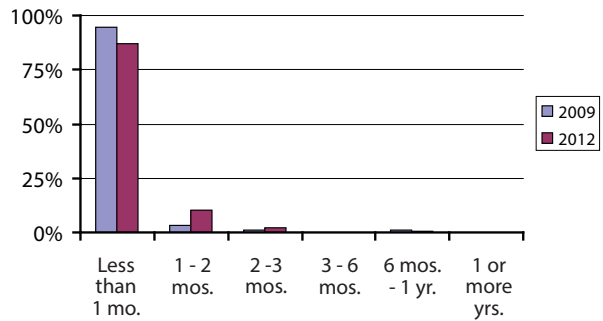
Assets division



City Nature division



Services division



Source: Audit Services Division analysis of Parks maintenance system

Chapter 5 **More robust performance measurement needed to evaluate maintenance**

Parks formalized a performance measurement framework in 2008, and it reported neutral or declining performance measurement trends in 2012. While Parks made strides in its performance management approach, we found some recommendations from our 2000 audit are still applicable and could help Parks better evaluate its maintenance activities. Specifically, we found Parks should develop additional measures at appropriate levels of the organization to address unmeasured areas and emphasize efficiency. We also noted that better recordkeeping is needed on how measures were developed, and when maintenance and measurement have changed over time.

Parks reports neutral or declining performance trends and unmet targets

In its latest annual performance report, Parks shows neutral or declining trends for its performance measures related to assets and maintenance. In 2008, Parks formalized a performance measurement framework that links to outcomes articulated in its strategic plan. In order to track progress in the “manage and protect assets” key result area, Parks developed performance measures relevant to the condition and maintenance of its grounds, facilities and natural areas. Parks publishes an annual performance report that tracks these measures to assess its progress toward established targets. As shown in Figure 16, four of the six reportable measures were below their 2012 targets, and Parks was unable to measure the condition of natural areas. These trends are an area of concern.

Figure 16 Performance measurement trends

Measure	Target	2008	2009	2010	2011	2012	Change from 2011 to 2012
Facility condition index	Good	-	Good	Good	Good	Good	Decline (within "Good" range)
Percentage of natural areas in very good or good condition	-	-	-	-	-	-	Not applicable
Percentage of residents rating Parks facilities as well maintained	67%	64%	66%	68%	69%	66%	Decline
Percentage of residents rating park grounds as well maintained	85%	85%	86%	86%	84%	84%	Neutral
Allocated funding for facility maintenance as a percentage of current replacement value	2% to 4%	3.10%	1.90%	1.90%	1.50%	1.50%	Neutral
Percentage of maintenance that is scheduled	52%	49%	46%	58%	58%	53%	Decline
Acres of invasive weeds treated annually	2,000	1,647	2,810	2,411	3,824	2,261	Decline

Source: Portland Parks and Recreation (unaudited)

Parks has improved since last audit, needs to measure more

We found Parks made progress developing its performance management framework. In 2000, we issued an audit report, *Bureau of Parks and Recreation: A Review of Management Systems*, and made recommendations to improve the quality and usefulness of its performance measures. Parks noted the importance of performance measurement in its planning documents and *Total Asset Management* manual. Parks has made improvements since our 2000 audit by defining the relationship between measures and objectives, establishing the frequency of reporting, and selecting a consistent set of measures to track over time.

While Parks reports on a set of measures, we found Parks needs more measures – reported at the organizational, division or work unit levels – to adequately evaluate its maintenance operations. Specifically, Parks needs performance measures for key maintenance activities and units, and efficiency type measures like maintenance cost per acre. Moreover, as Parks finalizes its maintenance expectations, measures for specific processes, programs or policies will be necessary.

No specific measures for key maintenance activities and units

We found opportunities to improve the coverage of the maintenance services included within Parks’ set of 2012 performance measures. The measures, as shown in Figure 16, emphasize buildings and pools, which may be appropriate given that this is Parks’ second most valuable asset class. However, Parks relies primarily on our annual resident survey to collectively assesses its other remaining assets.

As described earlier, the Services division is the most significant in terms of maintenance resources (40 percent of total maintenance in 2012), yet has no dedicated measure to assess its efficiency or effectiveness for developed parks. This is also true for the Urban Forestry (i.e. Parks trees), Horticulture Services and Community Gardens units in the City Nature division, and the Turf, Irrigation and Heavy Equipment units in the Assets division.

Efficiency measures more useful given resource challenges

We also found opportunities for Parks to improve the type of performance measures used by emphasizing efficiency measures. Parks describes its measures as condition, perception, or intervention for each key result area. National standard setting bodies in performance measurement describe the types of measures as workload or activity (output), effectiveness (outcome), or efficiency. Of these types, our 2000 audit recommended prioritizing the use of effectiveness and efficiency measures.

As shown in Figure 16, four of the seven measures used by Parks are effectiveness measures related to asset condition. While presented in a different way, this information is reported annually as part of the *Citywide Assets Report*. In contrast, efficiency measures relate costs to maintenance results. Since Parks manages limited maintenance resources, the use of efficiency measures would provide decision makers with another tool for evaluating parks maintenance efforts.

No cost per acre measure as recommended in prior audit

We found that Parks can develop unit cost information, but does not currently use this measure to evaluate maintenance. Measures that track unit costs help provide useful information for budgeting, cost accounting and decision-making. This is important because parks vary by age, size, location, level of development, and type of use, among other characteristics. Parks' *Total Asset Management* manual describes how performance measures can be used to reduce maintenance cost per unit. Moreover, our 2000 audit specifically recommended Parks track a measure for "maintenance expenditure per acre of park." Parks shared this information with us, as shown in Figure 17, but does not report on this measure or use this information to manage maintenance across the parks system.

Parks lacks records on how measures were developed

As Parks has learned more about its data and assets, its procedures for how to develop its performance measures have changed over time. For example, the *Total Asset Management* manual describes the facility condition assessment. During our field visits, we observed differences in how this information was collected and recorded. Parks staff told us that inspections may vary by staff, and they used a different cost estimation source when the measure was initially developed.

Since Parks performs facility assessments on a rotating schedule, some costs are based on the previous approach and others use the current approach. Staff said Parks needs organizational records to ensure consistency and accuracy, especially as staff turnover. Records on how these approaches changed can help those responsible for developing and tracking these measures explain inconsistencies and predict the impact on measurement results over time.

Figure 17 Maintenance averages by type

Type	Examples	Count	Labor hours	Cost	Acres	Cost per acre
Community Center	Matt Dishman, Sellwood, Woodstock	4	887	\$ 72,629	0.75	\$ 97,162
Plaza Blocks	Chapman and Lowndale Square	1	1,408	\$ 82,231	1.84	\$ 44,691
Urban	Simon and Helen Director, South Park Blocks, Tanner Springs	12	1,152	\$ 64,845	1.98	\$ 32,792
Community Garden	Beach, Furley, Johns, Madison, Woodlawn	24	77	\$ 3,520	0.31	\$ 11,339
Special Facility	Oaks Pioneer Church and Park	1	204	\$ 11,622	1.41	\$ 8,242
Community Park*	Alberta, Cathedral, Gabriel, Mt. Scott, Peninsula, Sellwood	34	2,513	\$ 151,618	22.54	\$ 6,726
Neighborhood Park*	Elizabeth Caruthers, Couch, Floyd Light Park, St. Johns	93	566	\$ 31,472	4.99	\$ 6,303
Regional Park	East Delta, Mt. Tabor, South Waterfront, Washington	10	4,739	\$ 279,436	110.31	\$ 2,533
Botanical Garden	Crystal Springs, Hoyt, Ladds	5	1,811	\$ 92,323	69.67	\$ 1,325
Habitat - selected	Johnson Creek, Midland, Marquam, Powell Butte	12	3,653	\$ 164,122	932.09	\$ 176
Golf Course	Eastmoreland, Rose City	4	231	\$ 27,430	198.87	\$ 138
Habitat - Forest Park	Forest Park	1	2,266	\$ 99,468	5,032.54	\$ 20

Source: Portland Parks and Recreation (unaudited)

Note: Averages are based on fiscal years 2010 through 2012. Parks may contain hybrid combination of developed and natural areas (e.g. Gabriel Park) that impact average costs.

* May contain major facilities or amenities whose maintenance costs are included in the overall park property costs. Community Center and Pool recreation programming and utility costs are not included in these costs.

Recommendations

We recommend the Commissioner-in-charge direct Portland Parks and Recreation to:

- 1. Establish accountability mechanisms to ensure Parks management applies maintenance standards, demands progress in its application of asset management principles, and develops maintenance plans as intended.**
- 2. Formalize and strengthen existing practices related to maintenance cost considerations during planning, design, and construction decision-making.**

As examples, these efforts might include:

A. Design and Construction should collaborate with other units to:

1. Develop and adopt park design standards.
2. Update construction general conditions and specifications, and formalize when these are or are not applied to specific capital projects.
3. Define the scope, process and communication mechanisms used with maintenance staff.
4. Apply stronger accountability mechanisms to assure As-Builts, manuals and other contractor deliverables are received by the appropriate staff and/or work units.
5. Ensure planned review of the maintenance cost estimation process is completed.
6. Establish a continuous improvement process which

evaluates and records past capital project work that resulted in unanticipated impacts to maintenance which could have been mitigated.

B. Maintenance management should collaborate with other units to:

1. Determine the roles, responsibilities and expectations of field maintenance staff for design and construction reviews.
2. Use available historical information when developing maintenance estimates and reviewing plans.
3. Develop systems to assure maintenance field staff are identifying and consistently communicating inaccuracies and changes to assets, As-Builts, plans, etc. to those responsible for maintaining these bureau records.

3. Develop and implement a plan to improve the use of computerized maintenance management system information.

At a minimum, this should include monitoring of entries for accuracy, providing work order status and schedule, managing any work order backlog, and developing reports for more data-driven decision-making by Parks management, maintenance supervisors, and staff.

4. Consistently define types of maintenance, determine what maintenance tasks are comprehensively scheduled in the system, and develop timely accountability measures to perform preventive maintenance as intended.

5. Develop, identify and track performance measures, managed at the appropriate organizational level, that evaluate key maintenance activities, efficiencies and unit costs.

Objective, scope and methodology

We conducted this audit to determine if Parks has a structure in place to evaluate whether its maintenance goals and objectives are efficiently and effectively met. We initiated this audit because Parks cited increasing costs for parks maintenance when preparing its 2013 budget. Our audit scope focused on maintenance activities supported by the General Fund at Parks properties for the fiscal year 2012 audit period (i.e. did not include Golf or Portland International Raceway programs). Whenever appropriate, we used available historical data to display multi-year trends.

To prepare for our review, we examined a variety of resources to gain an understanding of Parks' operations and management. These resources included financial reports, bureau requested and adopted budgets, videos of budget work sessions, City Budget Office analyses, *Parks 2020 Vision* and progress report, strategic plans, performance reports, *Total Asset Management* manual, cost of service report, inter-governmental agreements, organizational charts, maps of park assets, and collective bargaining agreements. We also reviewed the Portland City Code, *City Comprehensive Plan*, *Portland Plan*, *Citywide Assets Reports*, and comprehensive financial management policies, particularly those areas related to Parks.

Given Parks' partnerships within the community, we interviewed representatives from various stakeholder groups knowledgeable in parks maintenance. We contacted the Portland Parks Board, Portland Parks Foundation, union representatives and nonprofits that work at specific parks.

To better understand maintenance activities as well as the perspectives of managers and staff, we conducted numerous interviews with individuals across all the bureau's divisions, concentrating on those

responsible for asset management and maintenance. Given the importance of field-based activities, we conducted ride-alongs with maintenance staff representing the majority of maintenance units across the three divisions – Asset Management, City Nature, Parks and Recreation Services – that deliver maintenance services. During these field visits, we spent time with maintenance generalists and specialists to understand work scheduling and prioritization, work order processing, asset condition assessments, responsiveness to internal and external user requests, and data capture into the bureau’s computerized maintenance management system.

We requested and reviewed additional Parks resources related to maintenance activities as identified by staff. These resources included available policies, manuals, plans to manage and restore natural areas, technical papers on park asset types, lists of capital project and major maintenance requests, information related to operations and maintenance estimation, reports of volunteer hours, work routes and schedules, work orders, timesheets, water use reports, as well as staff or unit-specific work plans.

As part of our analysis, we reviewed various industry-specific standards, reports and best practices relevant to the topic. Sources for this information included the Government Finance Officers Association, International City/County Management Association, *International Infrastructure Manual*, *Maintenance Manager’s Standard Manual*, National Park Service, National Recreation and Park Association and its Commission for Accreditation of Park and Recreation Agencies, New York City Parks Design Trust for Public Space, *Park and Recreation Maintenance Management*, and the Trust for Public Land. We also reviewed our past performance audits at Parks, as well as other jurisdictions’ audit reports focused on parks maintenance.

In order to fulfill our audit objective, we analyzed data from Parks’ computerized maintenance management system (MicroMain) tables for work orders and labor hours. We did not audit the accuracy of source documents or the reliability of the data in this system. For example, we encountered illogical information that we either included in the report or disclosed to Parks management. However, we did

have the data independently extracted from the system, compared field definitions to actual entries, and reviewed for reasonableness and consistency. Over the course of the audit, we also reviewed demonstrations of MicroMain, ParkScan, TrackIt, PDXReporter and ArcGIS, and reviewed data from the City's financial systems (IBIS and SAP) and Parks property database (CAMP).

We relied on management's representations about information provided. We checked management representations against our knowledge of operations. We requested supporting documentation and, if available, reviewed this information for reasonableness. However, our reviews are not intended to provide assurance that information provided by management is free from error, or 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.

RESPONSES TO THE AUDIT



CITY OF
PORTLAND, OREGON

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July 30, 2013

LaVonne Griffin-Valade, City Auditor
1221 SW 4th Avenue, Room 320
Portland, Oregon 97204

Dear Auditor Griffin-Valade

Thank you for the opportunity to review and comment on the Portland Parks and Recreation: Managing diverse assets requires evaluation of maintenance audit (Report #439)

I have reviewed the five recommendations in the report and discussed them with Parks leadership. I am committed to ensuring that the recommendations continue to be implemented in a timely manner.

One of the challenges facing PP&R as a General Fund bureau is sharing limited resources with other general fund bureaus like Police, Fire, and Emergency Communications. PP&R maintenance programs require adequate funding from City Council to meet goals outlined in the audit. As Parks Commissioner, I will seek appropriate ongoing funding for these goals, building on the good work done by Commissioner Fish and previous Parks Commissioners.

Sincerely,

Amanda Fritz
Commissioner, City of Portland



PORTLAND PARKS & RECREATION

Healthy Parks, Healthy Portland

July 30, 2013

Ms. LaVonne Griffin-Valade
Office of City Auditor
Audit Services Division
1221 SW 4th Avenue, Room 140
Portland, OR 97204

RE: Audit #439, Portland Parks and Recreation: Managing diverse assets requires evaluation of maintenance

Dear Ms. Griffin-Valade:

Thank you for the opportunity to comment on Audit #439, *Portland Parks and Recreation: Managing diverse assets requires evaluation of maintenance*. We appreciated the collaboration between your office and our staff in developing this audit. Thank you for incorporating additional information and feedback into the report after frank and constructive discussions during the process.

Portland Parks & Recreation (PP&R) generally concurs with the audit's recommendations. In fact, we had begun work on many of these issues prior to the initiation of the audit. We agree that a robust evaluation structure is essential in ensuring that maintenance resources are being utilized efficiently and effectively. We offer the following response which provides overall context for these issues, as well as to provide additional feedback specific to the recommendations.

As one of the city's five infrastructure bureaus and the only one that must rely largely on General Fund resources for basic maintenance, the bureau has experienced financial challenges in recent years. Over the past 5 years, the bureau has been required to significantly reduce ongoing General Fund expenditures to meet budget shortfalls. Meanwhile, service expectations, overall usage patterns, and inflationary pressures have increased. Still, in recent years, PP&R has also made a commitment to allocate scarce resources toward a strategic approach to asset management by restructuring the organization, updating workflow processes and implementing Strategic Plan Initiatives to be completed in 2015.

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In 2011, the bureau had already moved to reorganize around life cycle asset management by creating the Planning, Design, and Asset Management Department. This change created cradle to grave oversight by a single manager for all key processes relating to capital assets.

Prior to 2012, the bureau did not have a dedicated full-time position for asset management, but instead had an Asset Management initiative using an inter-departmental work group, consisting of members who had significant responsibilities elsewhere within PP&R. In early 2012, we created the Asset Management Program consisting of three full-time employees (FTEs) dedicated exclusively to asset management. This team uses data and industry best practices to inform our maintenance and capital planning bureau wide. In order to establish a comprehensive asset management system and baseline analysis, the program currently needs one additional FTE; our intention is to request an additional FTE to this team as soon as Fiscal Year 2014-15, if sufficient resources are available.

Further, the bureau has a strong record of ongoing strategic planning, as evidenced in the 2011 Gold Medal Award from the National Recreation and Park Association. The award is given for excellence in management as evidenced through approved plans and follow through on those plans. The most recent three year strategic plan has established six key themes, of which a major driver is designing, constructing and maintaining cost-effective and sustainable assets. Several of the initiatives in the plan relate directly to the recommendations in this audit.

With respect to the audit's recommendations, we offer the following information:

- 1) *Establish accountability mechanisms to ensure Parks management applies maintenance standards, demands progress in its application of asset management principles, and develops maintenance plans as intended.*

We agree with this recommendation and the establishment of clear accountability is evidenced through our new organizational structure and the allocation of dedicated resources. Additional measures and tools will be developed through Strategic Plan Initiatives that will be completed by the end of 2015. It must be noted that these efforts will ensure ongoing progress, but the rate of our progress will be contingent on the availability of resources.

- 2) *Formalize and strengthen existing practices related to maintenance cost considerations during planning, design, and construction decision-making.*

We agree with this recommendation and many of the suggested examples for how we can improve our work. Through several Strategic Plan Initiatives, we are also in the process of developing new approaches and training. This work will ensure maintenance can be provided more cost-effectively while still adhering to bureau and city values around environmental sustainability and community input. Outside of this Strategic Plan work, greater accountability is being developed for the delivery of As-Built drawings, manuals and other contractor deliverables and training to ensure that maintenance staff have the tools and understanding to effectively manage a new asset.

PP&R will also provide training to ensure that all staff consistently utilize the existing template and process for receiving maintenance staff input during the design and

construction phase of a project. We will also work to improve our consistency in holding 'lessons learned' sessions at the end of construction projects. This information will ensure our continuous improvement in the design and construction process. We will make sure that review of this information is a first step when beginning a new project.

As soon as resources are available, we will update construction General Conditions and Specifications to reflect necessary changes for streamlining design and construction efforts while delivering more cost-effective assets.

Within the next two years, we expect to improve the accuracy of our operations and maintenance estimates by comparing these estimates to the actual maintenance records in our MicroMain work order system. Further, improvements are underway to increase staff access to MicroMain, which will help us build a more reliable database of our maintenance operations.

3) *Develop and implement a plan to improve the use of computerized maintenance management system information.*

We have spent considerable resources since 2007 to migrate our work order management system to a new maintenance software, called MicroMain. We agree that there remains room for improvement. A MicroMain Improvement Strategy is already in development to guide optimizing the configuration and use of this system. Like any business application, maximizing its benefits will likely also lead to changed and improved business processes and practices. These changes will be linked to the implementation of Asset Management best practices.

Beginning in fiscal year 2013-14, PP&R has added a vertical applications analyst staff member to help address MicroMain management reporting deficiencies. Additionally, this staff member will ensure that we continue to leverage the MicroMain system.

As of this year, all work groups will have access to MicroMain through their designated MicroMain liaison. PP&R will provide training this winter for all staff designated with the authority to create work orders. The goal of this training is to increase staff proficiency with the software and promote regular use.

Recently, a new maintenance approach has been implemented to address the backlog of work orders. Geographic zones are now visited regularly for maintenance on a rotation basis; this includes community centers and pools. Work plans for these maintenance visits are now developed using the existing backlog of work orders in MicroMain. All new work requests, other than emergencies, are addressed only after the backlog of work orders for a specific asset have been completed. By implementing this new approach, we have significantly reduced the work order back log.

Planning is also underway for MicroMain software upgrades that will allow for two significant changes: 1) improved functionality allowing customers to see the status of their work request beyond "open" or "closed"; and 2) a mobile application for field staff to use so that work orders can be added and updated while staff are out in the

field. We anticipate these changes will improve work flow, communication and the accuracy and timeliness of data.

We actively utilize and consistently update our Geographic Information Systems and our As-Built drawings of parks and facilities. We have three full-time staff dedicated to these functions and have recently reassigned the Autocad Technician III position to the Asset Management work group. In 2014, an Asset Register will be developed for key assets to provide a snapshot of asset condition for management decision-making. As our asset database is further developed, remaining assets in our system will be added to the Asset Register. Beginning in 2014, the Asset Management program also intends to assign Asset Managers for classes of assets to enhance accountability for asset data collection and management.

As use of MicroMain is expanded across departments, we will be increasing utilization of standard reports for operations and analytic reporting to inform management and strategic decisions.

- 4) *Consistently define types of maintenance, determine what maintenance tasks are comprehensively scheduled in the system, and develop timely accountability measures to perform preventive maintenance as intended.*

We agree with this recommendation. Our asset management guiding document, Total Asset Management, must be updated. Additional staffing is intended for Fiscal Year 2014-15. A key update will be providing consistency for the definitions of maintenance with our work order system. For now, our current work order system definitions supersede the Total Asset Management document.

Certain scheduled and recurring preventative maintenance tasks and inspections are in place within MicroMain, mostly for mechanical and electrical equipment. We agree that proactively adding preventive tasks to our work order system is a productive strategy to eventually achieve the appropriate ratio of preventative maintenance to reactive our emergency maintenance. However, shifting from reactive to preventative maintenance will not be a task that can be completed without additional resources. We will, however, continue to request the resources needed to accomplish this objective. Similarly, additional resources will be needed to input preventative maintenance schedules for all components of our existing system of assets into our work order system.

- 5) *Develop, identify and track performance measures, managed at the appropriate organizational level, that evaluate key maintenance activities, efficiencies and unit costs.*

We agree with this recommendation. PP&R has excellent longitudinal data as part of its performance measurement program and through the Service Efforts and Accomplishments reports regarding perception measures and effort measures. However, these are high level measures that can be effectively complemented with more granular and work unit specific measures that will improve the organization's ability to connect daily work efforts with strategic goals. The developed parks maintenance standards are an example.

In conclusion, the bureau has found the audit and the conversations that have occurred during its development very helpful in further refining our goals and efforts regarding maintenance management. Our heightened awareness and understanding of best practices and new tools for asset management enhances our ability to make the best use of limited resources. Despite these limited resources, PP&R remains committed to our improved organizational focus through restructuring, improved business processes and implementation of our Strategic Plan Initiatives.

Portlanders have invested in their parks system over the last century through a series of legacy investments. PP&R's job now is to leverage all knowledge and strategies to maintain it and grow it for the next generation. We thank you again for facilitating insight into our asset management work.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Abbate", with a horizontal line extending from the end of the signature.

Mike Abbate
Director

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*Portland Parks and Recreation: Managing diverse assets
requires evaluation of maintenance*

Report #439, August 2013

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