

# City of Portland Citywide Assets Report

December 2008



**Best Practice** = reliable, experience-based technique to improve management of assets or infrastructure systems

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**Note:** Since completion of this report, new Mayor Sam Adams reorganized some participating city bureaus. The Bureau of Planning and the Office of Sustainable Development merged into the Portland Bureau of Planning and Sustainability. The City's transportation agency is now called the Portland Bureau of Transportation.

**Correction:** Last year's report (*City of Portland Asset Status and Conditions Report, December 2007*) overstated the annual funding gap for the Civic assets. The correct figure for 2007 was \$7.3 million, bringing the total citywide funding gap for that year to between \$100.0 and \$130.0 million.

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# City of Portland

## Citywide Assets Report—December 2008

### Executive Summary

This is the sixth year of reporting on the status and condition of the City's physical infrastructure. These asset reports give a snapshot of six infrastructure systems, to enable effective resource allocation to deliver community services.

The City's infrastructure bureaus<sup>1</sup> collect and analyze data for this report. The Bureaus are striving to use internationally recognized asset management (AM) principles and practices to enable informed decisions that best meet customer needs. The City Asset Managers Group (the CAM group) is developing a coordinated Citywide AM program for all City assets, using a common approach, while allowing each bureau to strategically employ AM for their particular assets. This report supports City Council's move toward that 'whole-of-city' decision-making, using readily available information.

This report includes current replacement value, current and projected physical condition, and annual funding gaps. Each bureau identifies their confidence in the information presented. In some cases, information is not yet available. Bureaus are working to align methods to calculate key measures.

This year's report more clearly distinguishes between best practice and actual data. The Planning and Development Directors support ongoing citywide asset management and request City Council support for three policy initiatives:

- Prepare a plan to guide continued improvement in citywide asset management best practices
- Build capacity to implement asset management best practices within capital bureaus and citywide
- Use asset management as a tool to improve decision-making

### Key Findings

1. The current replacement value of the City's physical infrastructure is estimated at \$22.4 billion. Current replacement value is a measure of physical assets now used to deliver public services.
2. The Infrastructure Bureaus have estimated a combined annual need for \$136 million more than current funding to develop needed capacity, maintain existing facilities, address regulatory requirements, and/or meet service levels. This gap is expected to persist and probably grow for each of the next ten years. This figure includes a Water Bureau response to a federal mandate to require the City to replace open reservoirs and add treatment (LT2 rule). Without the LT2 response, the funding gap drops to \$86 million per year.
3. At current funding levels, some of Portland's infrastructure will continue to deteriorate.
4. New assets often add to ongoing operations and maintenance needs, potentially adding to the funding gap. Some new assets may replace existing asset functions and add new functionality.
5. An internal analysis shows that:

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<sup>1</sup> Participating bureaus include the Bureau of Environmental Services (BES), the Office of Management & Finance (OMF) for City-owned buildings, Portland Parks and Recreation, Portland Development Commission (PDC), Portland Bureau of Transportation (PBOT) and the Water Bureau. The Bureau of Planning organizes the group's meetings and reporting. OMF budget and finance staff attend to ensure overall coordination with City Council priorities and budgeting.

- a. bureaus have made large strides in asset management practices in a relatively short period of time;
- b. bureaus are making continuous process improvements in asset management;
- c. some bureaus are engaging in advanced asset management best practices; and
- d. bureaus want to improve data collection and management, identification and application of levels of service, development of asset management plans, risk analysis, and business cases.

## **Directors' Recommendations**

The Planning and Development Directors support ongoing citywide asset management and request City Council support for the following policy initiatives.

### **1. Prepare a plan to guide continued improvement in citywide asset management best practices.**

The City Asset Managers Group will:

- Complete an evaluation of current citywide asset management practice
- Identify key gaps based on research into best practices and bureau's unique needs
- Prioritize improvements necessary to achieve best practices in asset management
- Establish implementation steps and schedule

A work plan will be presented to the Planning and Development Directors in fall 2009.

### **2. Build capacity to implement asset management best practices within capital bureaus and citywide.**

- Enable bureaus to make continuous improvements to asset management practice based on their respective needs
- City Asset Managers Group can assist and mentor bureaus and provide citywide standards and templates, as needed
- May require Directors to allocate resources for asset management work

### **3. Use asset management as a tool to improve decision making.** Employ AM to:

- Define and revise service levels to align service provision with system requirements, community needs, and sustainable funding levels
- Determine appropriate asset management strategies to reduce maintenance liabilities
- Set infrastructure investment priorities. This may require revising procedures and/or data requirements for the Citywide Systems Plan, bureau capital improvement programs, annual budgets, special funding opportunities, and cuts in service or funding.
- Identify sustainable funding levels

# 1. Introduction

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This sixth report on the status and condition of the City's physical infrastructure takes a holistic approach to ensure that the City's assets are adequate to provide desired levels of service. This report seeks to provide coordinated, integrated, fact-based information about the City of Portland's physical assets that will enhance a 'whole-of-city' approach to asset management (AM). It provides an accounting of the number of assets, replacement value, condition, and unmet funding needs. Information in the report will assist the City's efforts to ensure infrastructure is in good condition and that operation, maintenance, rehabilitation, and development programs are as efficient and effective as possible.

To reflect the current state of City asset management, this report includes:

1. citywide asset management practice (see Section 3)
2. citywide asset status and conditions (see Section 5)
  - current replacement values of city assets (see Appendix 1)
  - assessment of the current condition of each asset group, based on a five tiered rating system and associated confidence levels (see Appendix 2)
  - annual estimated funding gap (see Appendix 3)
  - calculation methodologies (see Appendix 4)
3. unmet funding needs (see Section 6)
4. related planning efforts (see Section 7)
5. bureau observations on their AM activities (see Section 8)
6. common definitions for basic AM terms (see Appendix 5)<sup>2</sup>

This year's report also introduces some AM best practices. It assesses four infrastructure bureaus' current and potential capacities to adopt best practices. Finally, the report discusses related planning efforts at state, regional, city and bureau levels.

## 2. Asset Management Goals and Drivers

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### Goals

The goal of strategic asset management is to develop a sustainable asset base that responds to social, economic, and environmental needs. It focuses on the assets needed to provide appropriate levels of service. Asset management seeks to address the need to maintain, repair, rehabilitate, replace and dispose of assets. These needs are driven by asset deterioration, regulations, and community needs (based on service levels).

Asset management activities will differ for each asset type based on maintenance management techniques, scheduling and priorities of activities, failure modes, treatment options, renewal strategies, equipment and practices, and renewal techniques. However, a whole-of-city approach ensures that the most innovative and cost-effective techniques are employed as each bureau's practice improves. Using this cross-bureau effort will continually improve performance-based information that is available to citizens, bureaus, and city leaders as they make choices in the types and levels of service desired.

Asset Management informs:

- asset acquisition

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<sup>2</sup> The definitions and confidence levels draw on several AM sources, including GHD Consultants (used by PBOT and Water Bureau), trained bureau staff, and literature searches.

- maintenance and operations
- renewal and adaptation
- asset disposal

Applying AM principles and practices will:

- reduce dependence on assets
- support the efficient delivery of services with assets that are cost-effective, well maintained, accessible, energy efficient and safe
- improve the ability to make sound business and planning decisions at all levels
- promote effective use of resources
- improve bureau support and accountability
- develop a culture of service throughout the City
- improve and coordinate City AM planning across bureaus

Common elements for managing assets include:

- information systems that provide data on asset inventories and their condition
- good documentation of life-cycle costs, and optimum renewal strategies that ensure the lowest life-cycle cost
- a needs assessment to evaluate current practices, asset risks, and opportunities
- links between service outcomes, bureau programs, AM plans, and performance measures
- community engagement to better define desired and affordable levels of service; and
- clear assignment of roles and responsibilities to guide AM efforts

## **Policy Drivers**

In FY 2001–02, City Council set strategic priorities as part of the *Managing for Results* exercise. The Council identified the City’s deteriorating physical infrastructure as an immediate strategic priority. It remains a top Council strategic priority.

Other policy drivers (federal, state and local) underscore the importance of the condition of municipal infrastructure in supporting a community’s economic health, active neighborhoods, and environmental stewardship, including:

- State and federal regulations
- Public Facilities Plan, a long-range, citywide plan which requires a major projects list for use in annual capital budgets
- Portland Comprehensive Plan
- Municipal bonded debt covenants
- City CIP budget manual, which requires bureaus to analyze operations and maintenance costs and savings in new projects
- U.S. Governmental Accounting Standards Board 34, which allows the City to capitalize costs that extend an asset’s useful life
- Other Council Priorities

## **Regulatory Compliance**

Regulatory compliance requirements can have major impacts on the management of infrastructure systems and on the resources available for repair and expansion projects. Currently a number of federal, state, and local regulations require additional compliance measures by the City. These mandates vary in compliance requirements, timeline, and level of funding through current City revenues.



Regulatory mandates impact all of the City's infrastructure systems, including sewer and stormwater, transportation, water, parks, civic facilities, and affordable housing investments. The following regulations represent some of the major regulations currently impacting capital systems:

- Clean Water Act, such as the Long Term Enhancement Rule (LT2) and CSO Amended Stipulation and Final Order;
- Environmental Protection Act, including Superfund cleanup requirements;
- Safe Drinking Water Act, including Underground Injection Control requirements;
- Endangered Species Act, such as Habitat Conservation Planning;
- Americans with Disabilities Act;
- Uniform Building Code, including minimum seismic standards; and
- Green Building and Energy Efficiency Policies.

Many of these regulations do not have dedicated funds set aside for compliance measures. Compliance often requires significant capital investment, which may require diverting financial resources from capital repair and rehabilitation projects. In addition to existing mandates, future regulations may further impact management of the City's infrastructure systems.

Bureau funding gaps presented in this report include varying degrees of regulatory compliance. Certain requirements, such as ADA accessibility and building code improvements may occur as part of capital repair or rehabilitation projects. The Water Bureau's anticipated costs related to the Long Term Enhancement Rule (LT2) are also reported.

### **3. Citywide Asset Management Practice**

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#### **History**

For over 20 years, individual City bureaus have initiated components of AM. Six years ago, the AM focus began to broaden to a whole-of-city, or citywide focus. In June 2002, City Commissioners and bureau directors completed a strategic exercise, *Measuring for Results*. They identified seven priority issues, and flagged five of them for "immediate action". One of the priority issues was aging physical infrastructure.

In 2003, asset managers from the City's infrastructure bureaus formed a City Capital Maintenance Committee to collaborate on AM issues and prepare an annual report on the City's physical assets. Their reports to City Council in 2003 and 2004 focused on the current and projected condition of infrastructure, not on the strategies needed to manage assets over their whole life. Efforts to describe assets and needs varied from bureau to bureau as did confidence in the information. This made it difficult for City Council to make decisions using that information.

In 2005, this committee became the City Asset Managers Group (CAM group), adopting a more holistic approach to AM and looking for ways to collaborate on common AM issues. While Transportation had an existing program of AM, other bureaus were just beginning to adopt AM principles and techniques. By joining forces, the CAM group identified common long-term AM needs and helped frame AM throughout the City using a consistent approach.

In the FY 2005 - 06 budget process, City Commissioners asked for better data on the funding gap in capital maintenance. There were questions about the quality and completeness of the data, and doubts about bureaus' stated funding needs. To address Council's concerns and to reflect the current state of City asset management, the 2005 report added three features:

common definitions for basic asset management terms, data confidence levels, and bureau observations on their asset management activities.

The 2006 report added affordable housing as an asset category. For purposes of this report, affordable housing is defined as multi-family rental housing units with direct City investment (leveraged financing) and a regulatory agreement with the Portland Development Commission. The 2007 report included a pilot of risk analysis and a framework for the inclusion of green infrastructure.

The CAM group reports periodically to the Planning & Development Directors' group. The Directors group represents infrastructure, development permitting, financial and planning bureaus. Findings of the annual assets reports are reviewed, and the Directors' group updates recommendations to City Council. As asset management improves across the bureaus, so will the ability of City Council, bureau managers, and citizens to make informed decisions about asset-related services.

## **Bureau Practice**

Six of Portland's infrastructure bureaus apply asset management (AM) principles to some of their practices. Those bureaus are Transportation (PBOT), Water, Environmental Services (BES), Parks and Recreation (Parks), Portland Development Commission (PDC), and Management and Finance (OMF). For purposes of this report, BES provides wastewater and stormwater services, PDC provides affordable housing, and OMF provides or reports on civic facilities. Civic facilities include government offices, police and fire facilities, parking garages, technology services, and spectator facilities.

PBOT has applied traditional AM tools in the transportation sector for more than 20 years. In the past five years, Water and Environmental Services have begun to apply the principles from the *International Infrastructure Management Manual*. Although the City's infrastructure bureaus started with, and continue to use, different AM strategies, the City supports collaboration and the alignment of these frameworks with the long-term goal of developing a citywide AM plan. At this stage, bureaus use common definitions and terminology but do not yet apply consistency of technique. The CAM group is developing a coordinated citywide AM program for all City assets.

## **Current Citywide Practice**

Portland is now at a crossroads in asset management practice. The annual whole-of-city *Asset Report* has been the CAM group's primary focus. Each bureau is making AM improvements according to internal business needs and reports on common elements annually. To further citywide AM practice in a concerted and holistic manner, it may be time to develop a whole-of-city asset management plan. Such a plan would require a common vision and a multiyear commitment of policies and resources. If directed by the Directors group and City Council, the CAM group will prepare a multi-year, integrated workplan to build capacity in citywide AM best practices.

While economic stimulus packages may enable some backlogged infrastructure maintenance projects to proceed, it certainly will not erase the City's deteriorating infrastructure problem. Citywide AM best practices are important tools to assess needs and priorities, policies, intervention strategies, and resource allocations to address this problem.

At present, bureaus apply elements of AM best practices according to their own needs. The CAM group works by consensus to identify key measures, define terms, and collect and display

each year's data. The CAM group also prepares the annual report and briefing materials for review by the Directors group and City Council. The Directors group oversees policies and resource allocation, coordinates long-range planning, and manages certain cross-bureau planning and development initiatives. Each AM report is presented to the City Council at the start of annual budget work sessions.

## Progress on Previous Recommendations

In previous years, the Directors' group endorsed the following major recommendations for citywide AM practices. Progress on these recommendations is also noted below.

Recommendation	Progress Update	Status
<b>1. Improving Asset Management Practice</b>		
a. Continue with Whole-of-City Approach.	CAM group continues to implement.	Ongoing
b. Review service levels and pursue community consultation.	As part of Portland Plan, bureaus are encouraged to set or amend service levels. Each bureau determines its scope, pace and community consultation.	Varies by bureau
<b>2. Reporting on Asset Status and Condition</b>		
a. Continue annual reports and improvements.	This remains a CAM group priority.	Ongoing
<b>3. Prioritizing Infrastructure Spending</b>		
a. Prepare strategies related to service levels, funding allocations, and management practices to align revenues with service levels.	This is a future activity.	Future
b. Track local and regional discussions related to infrastructure financing.	Metro is evaluating infrastructure needs to accommodate projected growth of the region. PDC and the Water Bureau serve on the project advisory committee. The Bureau of Planning collected and assembled data from City bureaus, for use in the Metro analysis. Bureaus are also tracking other local infrastructure financing issues and initiatives, such as Grey to Green.	Ongoing
c. Develop a funding strategy to shrink the unmet budget needs for infrastructure maintenance.	Bureaus are individually addressing infrastructure maintenance in the context of Council-mandated budget cuts.	Varies by bureau
<b>4. Integrating with Related Planning Efforts</b>		
a. Integrate Asset Management into other planning efforts, including	Asset management will be a key component of the Citywide Systems	Ongoing

community visioning, strategic planning, and long term capital planning.

Plan (part of the Portland Plan). The cross-bureau steering committee for that plan has tracked this annual report process, with an eye to long-range infrastructure needs.

b. Track local and regional discussions related to infrastructure.

City staff is tracking local and Metro discussions.

Ongoing

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## Lessons Learned

In the past few years, infrastructure bureaus have acknowledged the importance of:

- Engaging the support of top management (bureau directors and city council) to enable policy and budget decisions needed to strengthen business practices
- Finding small, early successes to show the value of AM
- Learning best practices from other communities in the United States and abroad.
- Recognizing the varied business needs of each bureau
- Involving staff at all levels of an organization to implement AM
- Building institutional knowledge and expertise on AM to sustain best practice.
- Allocating resources to collect and maintain reliable asset data

## 4. Assessment and Next Steps

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### Internal Survey

To assess current capacity and interest in improving AM best practices, Transportation, Water, Environmental Services, and Parks completed a survey, prepared by the Bureau of Planning in fall 2008. Bureau responses were forwarded to a consultant to identify and match peer communities with identified best practice gaps.

Generally, the survey found that the participating infrastructure bureaus have initiated elements of AM best practice, with each bureau taking a different approach. There are some overlaps in needed next steps.

The survey found:

- Most bureaus started AM practice since 2004, and now cover most of their infrastructure assets (76% or more);
- Bureaus have differing levels of practice for various AM activities, leading to potential opportunities for cross-bureau knowledge sharing;
- Training programs in AM practices are not currently widely available for bureau staff;
- Two bureaus involve the public on issues regarding infrastructure system or service delivery (methods may include setting service levels, defining acceptable levels of risk, using public surveys or feedback to predict future demand, inviting customer feedback and questions, and updating public on project issues, alternatives and progress);
- Collaborative relationships with other communities on AM practice are not uniform;
- Bureaus identified common AM improvement priorities in the following best practice areas: data collection and management, service levels, asset management plans, risk management, and business cases. These best practices are discussed in greater detail below.

## Best Practices

A number of communities use AM best practices to improve performance and service delivery. AM best practice are techniques, methodologies, or practices that have been proven through experience to reliably lead to improved management of assets or infrastructure systems.

For purposes of this report, five AM best practices can be applied to individual bureaus and the citywide effort. Each practice is described below, with related findings from the internal survey. Terms are defined in Appendix 5 of this report.

Data Collection and Management — Data are the building blocks of informed decision-making. A strong AM practice collects accurate, relevant data in a cost-effective, timely manner. This data should be well-documented, secured and accessible to defined users. The internal survey found:

- Transportation and Parks integrate their AM data **for multiple asset classes**.
- While all four bureaus maintain an inventory of assets, the **confidence in accuracy of data** varies by bureau.

Service Levels — An objective of AM is to match actual service levels with the expectations of customers. AM planning allows bureaus to set service levels and cost of service. Both can be evaluated with customers to set the optimum service level that they are prepared to pay for. Service levels may evaluate assets on reliability, quality, quantity, and safety or risk. The internal survey found:

- Bureaus have limited capacity to measure and track **actual** levels of service.
- More discussion is needed to identify targets for **desired** levels of service.

Asset Management Plans — Asset management plans document AM practices for a given asset group, and form the basis of external interface with customers and regulators. AM plans outline how to effectively provide and manage a portfolio of assets to achieve desired service levels for all customers. Plans address existing service levels, asset condition, performance and service potential, future predicted service levels, failure modes, future capital investments, and long-term (sustainable) funding strategies. Some AM plans act as a report card and start to assess sustainable financing needs. The internal survey found:

- All four bureaus report capacity to estimate **future demand** for assets. Transportation and Water report limited ability to use future demand estimates and service level targets to identify needed new assets or improvements.
- Most bureaus are not currently equipped to predict or model **future condition**. Environmental Services is the exception, with most of its asset groups currently modeled.

Risk Management — AM best practice involves managing risk and opportunity, and applying risk analysis to resource decisions. A risk analysis measures the extent of exposure to the consequence that might result from an event that might happen. With the 2007 citywide assets report, some capital requests were rated by risk of failure. The internal survey found:

- Most bureaus have limited capacity to **predict** likely failure modes for assets.
- Environmental Services reports the highest **current capacity** to estimate the risk of asset failure.
- Most bureaus have not estimated the likelihood and consequence of asset failure.

**Business Case** — This is an analysis tool to prioritize and make budget decisions. At the project level, a business case compares project alternatives, such as do-nothing, best technology at the best price, or best value for a certain allocation. A broader approach is to create an asset business plan. In Canada, such plans serve to ensure the timely availability of resources to sustain the assets in an acceptable condition to reliably deliver the service level set by policy. The Canadian government calls a business plan as the most essential element of any AM system. The internal survey found:

- Most bureaus evaluate multiple alternatives for significant asset investment decisions. Transportation selectively evaluates project alternatives.
- Most bureaus consider life cycle costs to maintain and operate, and triple bottom line impacts (economic, social, and environmental).

## **Barriers to Improvement**

Each infrastructure bureau encounters a unique set of challenges and barriers to implementing AM best practice. Individually, bureaus are constrained by budget and resources, lack of internal coordination and expertise, and a lack of high-quality data and data management systems.

Taken together, a citywide AM approach offers a common framework to assess and communicate infrastructure needs. Barriers to advancing citywide AM include few peer examples, regulatory and institutional forces, earmarked funding sources, and structural difficulties.

- **Few peer communities in U.S.** — AM practice is strongest in Australia, New Zealand, Great Britain and Canada. Few US communities have initiated explicit AM best practice, let alone citywide AM. The Bureau of Planning (working with the CAM group) has hired a consultant team to identify peer communities on AM best practice. The CAM group and bureaus individually can share experiences and methods with the peer contacts. Water, Transportation, and Environmental Services have shared knowledge of AM practice and benchmarking with other City bureaus.
- **Regulatory and institutional forces** — Each bureau director is tasked, first, to implement the bureau's core mission, goals and values, along with the City Charter, state and federal mandates, and community priorities. Citywide activities can be seen as a drain on individual mandates, unless those mandates are linked by code, policy or budget instructions.

Change is hard to accomplish in any large organization. Portland's commission form of government offers unique challenges. Each bureau director reports directly to a commissioner-in-charge. That commissioner becomes the bureau's lead advocate to the full City Council. CAM group members must follow an internal chain of command before committing to citywide AM work tasks.

- **Funding sources** — There is a natural tendency for enterprise bureaus to go their own path, and for other bureaus to seek all available funds. This "color of money" situation can hamper integrated work plans. Any integrated framework needs to allow for substantial bureau autonomy.
- **Structural difficulties** — Changes to AM practice are not accomplished overnight. New procedures and training needs compete with current operations. New solutions, adapted

to each bureau's business needs, may require new resources. However, the AM practice is flexible, and can be implemented in phases.

## **Key Next Steps**

The Directors group endorses three actions, or steps. The steps are: to prepare a plan for integrated citywide asset management, build capacity of bureaus, and apply best practice tools to improve decisions.

## **Recommendations**

### **1. Prepare a plan to guide continued improvement in citywide asset management best practices.**

The City Asset Managers Group will:

- Complete an evaluation of current citywide asset management practice
- Identify key gaps based on research into best practices and bureau's unique needs
- Prioritize improvements necessary to achieve best practices in asset management
- Establish implementation steps and schedule

A work plan will be presented to the Planning and Development Directors in fall 2009.

### **2. Build capacity to implement asset management best practices within capital bureaus and citywide.**

- Enable bureaus to make continuous improvements to asset management practice based on their respective needs
- The City Asset Managers Group can assist and mentor bureaus and provide citywide standards and templates, as needed
- May require Directors to allocate resources for asset management work

### **3. Use asset management as a tool to improve decision making.** Employ AM to:

- Define and revise service levels to align service provision with system requirements, community needs, and sustainable funding levels
- Determine appropriate asset management strategies to reduce maintenance liabilities
- Set infrastructure investment priorities. This may require revising procedures and/or data requirements for the Citywide Systems Plan, bureau capital improvement programs, annual budgets, special funding opportunities, and cuts in service or funding.
- Identify sustainable funding levels

## 5. Citywide Asset Status and Condition

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A prerequisite for sound AM is relevant, reliable, and timely information about asset resources. This report includes data on three key measures: current replacement value, current and projected physical condition, and annual funding gap. The confidence level in the data is included. In some cases, data is not available or is pending more detailed data collection and analysis. Most of these “not available” responses are for projected condition.

As much as possible, information provided in this report is comparable across bureaus and asset groups, and the confidence levels for the information were assigned using a common scale.

1. Asset management practices ensure maximum use of existing assets, show tradeoffs, and optimize decision-making and investment planning.
2. The City’s physical infrastructure has a current replacement value of \$22.4 billion. By bureau, the infrastructure value is: PBOT (\$7.9 billion); BES (\$5.6 billion); Water (\$5.5 billion); Civic (\$1.0 billion), Parks (\$0.8 billion); and Affordable Housing (\$1.6 billion).
3. A gap exists between the funding required to maintain the City’s infrastructure in a sustainable way, and existing funding. For 2008 alone, there is a sustainable level investment gap of \$136 million for these assets. This figure includes a Water Bureau response to a federal mandate to require the City to replace open reservoirs and add treatment (LT2 rule). Without the LT2 response, the funding gap drops to \$86 million per year. This is the second year the Portland Water Bureau has reported on unmet need related to LT2 response.
4. Unfunded federal mandates and external funding of capital projects add to the number and type of physical assets which, although primarily built with leveraged monies, become the long-term obligation of the City to maintain and operate. Typically, there is little or no set-aside for ongoing operating or maintenance funding for these assets prior to their construction.
5. At current funding levels, some of Portland’s infrastructure will continue to deteriorate. In 10 years, two asset groups (traffic signals and Union Station) are projected to remain or shift into mostly poor condition.

Section 8 of this report includes additional bureau specific observations regarding each bureau’s asset management approach; uses of AM; AM practice; asset condition, replacement value, and funding gap; and AM improvement priorities. Full asset data, including condition, replacement value, and unmet need, can be found in Appendices 1 through 3.



## 6. Unmet Funding Needs

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A major finding of the annual asset reports (2002 through 2008) is that a substantial annual funding gap persists. The gap is defined as the difference between the funding needed to address infrastructure needs at a defined condition or level of service and the funding that is currently available. The gap is the amount of money needed to eliminate the backlog, maintain the asset to achieve its useful life, or meet service levels or regulatory requirements. A full definition is available in Appendix 5.

### Sustainable Funding Levels

As the asset managers have refined methods and updated data, the estimates of annual funding gap have gone up, not down. This year, the combined annual funding gap for Transportation, Environmental Services, Water, Parks, Civic assets and affordable housing is \$136 million, including the Water Bureau's possible response to the federal LT2 rule.

Running a constant funding gap or under-investing in capital maintenance is not a sustainable business practice. With this trend, we can expect lower levels of service and more frequent system failures.

### Past Responses

In 1996, City Council increased the General Fund capital set-aside, from a base of \$3 million, with the intent to add \$1 million to it each year until the Office of Management and Finance found the amount to be sufficient. That fund rose to \$7 million in FY 2002-03, and then declined after a series of annual budget cuts. The General Fund capital set-aside is now a residual amount that is insufficient to meet current needs. In FY 2008 -09, City Council directed OMF to find future funding for the Public Safety Systems Revitalization Project (PSSRP).

As noted earlier, *Managing for Results* identified "the deteriorating physical infrastructure" as a priority. That report recommended that City Council consider a Major Maintenance Fund, to increase the investment in capital maintenance. City Council did not act on that recommendation.

In January 2007, the Directors' group reviewed key findings of this report, and asked staff to prepare ideas to start closing the annual funding gap, and more fully maintain existing infrastructure. It is understood that City Council must balance many competing demands, and such an effort will take a number of years. The concept is to build a funding gap finance plan, with a trajectory of 10 to 15 years.

In 2007, the City Asset Managers Group worked with Financial Planning to improve the General Fund Capital Set-Aside allocation process. The revised process used a new set of criteria based on the risk management process (see Appendix 5 of the *City of Portland Asset Status and Conditions Report, December 2007*). The risk rating process allows ranking of projects based on how effectively they reduce the risk of the high and extreme risk assets. Use of the citywide risk management process is on hold, pending more feedback and direction.

### Current Budget

For the FY 2009-10 budget, bureaus ranked all programs and services on two scales: the bureau's core mission and community priority. Bureaus were directed to consider their mission, goals and values, as well as the City Charter and state and federal mandates, and not consider a program's or service's funding source for core mission rankings. For community priority,

bureaus ranked programs and services in terms of overall utilization/popularity, using available information on participation rates, customer feedback surveys, previous public surveys, VisionPDX, or the annual Service, Efforts, and Accomplishments survey. Bureau budget advisory committees are an important sounding board for utilization and popularity of each program or service. Both rankings guided the bureau in preparing annual budgets.

For this budget year, sustainability criteria (economic, social and environmental) were considered, but discarded in favor of the overall utilization/popularity criteria. Sustainability measures were not ready to apply to this budget exercise. Asset management can provide analysis tools to prioritize infrastructure investments. With direction from the Planning & Development Directors and/or City Council, the CAM group could suggest asset management tools to evaluate capital budget requests (including sustainability criteria).

## **7. Related Planning Efforts**

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Basic services, community health and livability, and economic development all depend on a well-functioning infrastructure system. Bureaus can apply asset management practices to make strategic planning decisions and achieve community goals at the bureau, City, regional and state levels.

### **Citywide**

**Portland Plan:** The Bureau of Planning seeks opportunities to advance AM practices in the Portland Plan, an inclusive, citywide effort to guide how Portland develops over the next 30 years. The Portland Plan will update a number of planning documents, including the 1980 Comprehensive Plan, the 1988 Central City Plan and the 1989 Public Facilities Plan.

A major product of the Portland Plan is a coordinated 20-year infrastructure plan, the Citywide Systems Plan (CSP), which will address transportation, water, stormwater, sewer, parks and publicly owned buildings. The CSP will update the City's 1989 Public Facilities Plan and will include an inventory and general assessment of the condition of the significant public facility systems. It will provide a list of significant public facility projects, estimates of when and where each project will be needed and rough cost estimates.

The CSP will also discuss existing and potential funding mechanisms and their ability to fund the development of each public facility project. The CSP will go beyond the state planning requirements by identifying service levels (as available), updating Comprehensive Plan policies, and describing two funding levels (constrained and priority).

### **Federal and state**

**Economic Stimulus Packages:** Economic stimulus packages (federal and state) offer prospects to pay for some infrastructure projects. As of December 2008, it is not clear what existing assets or new assets may benefit from the infusion of stimulus investments. The case has been made that deteriorating infrastructure is a national problem. Transportation infrastructure is a major part of the total need.

## 8. Bureau Observations

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The Bureau Observations, below, discuss the following five areas for each of the participating infrastructure systems:

- the bureau's asset management approach;
- uses of AM;
- annual updates on AM practice;
- asset condition, replacement value, and funding gap; and
- AM improvement priorities.

These bureau observations build on those included in previous annual reports.

### Transportation

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The Portland Bureau of Transportation (PBOT) manages transportation assets with a replacement value of \$7.9 billion. Improved streets, the sidewalk system, bridges, traffic signals, and streetlights make up 94% of the dollar value (\$7.4 billion). In addition to these key assets, the City of Portland owns other assets that ensure the safety and movement of people and goods: streetcars; an aerial tram; various support facilities; traffic calming devices; signs; parking meters; pavement markings; bikeways; guardrails; retaining walls; the Harbor Wall; stairways; and traffic signal computer controllers. These assets are worth \$500 million.

#### Asset Management Approach

Asset Management is a strategic approach to managing transportation infrastructure. PBOT utilizes asset management as a way to effectively and efficiently allocate resources, measure performance, and track infrastructure needs.

PBOT's Asset Management Advisory Committee (which includes engineers and operations staff as well as maintenance, finance, and information technology managers) sets the priorities for asset management within the bureau and helps implement those priorities into the business practices. Since 2001, the Bureau has completed eight asset management plans in the following areas: streetlights, structures, traffic signals, sidewalks, signs, pavement, pavement markings, and parking. These plans provide ongoing guidance for asset preservation and renewal strategies.

#### Uses of Asset Management

In a climate of declining transportation revenue, asset management has played a key role in identifying where budget reductions should be made. In a recent budget prioritization process, maintaining assets was one of the highest priorities. Asset Management also helps plan for and prioritize preventive maintenance needs, which helps ensure a safe and efficient transportation system.

#### Annual Update

##### Asset Management Practice

PBOT tracks the inventory of all eight asset classes. In an effort to ensure that the right data is being collected and identify any outstanding needs in the data management system, an analysis was conducted to identify needs and gaps in the system. Findings and recommendations will be reviewed by the Asset Management Advisory Committee and solutions will be identified to improve the system. The goal of data management is to provide high-quality and reliable information that can be used for decision making.

PBOT continues to implement findings from the City Auditor's report on pavement management. The pavement management system will be replaced with more robust software which will provide greater ability to target future investments for pavement assets. A new rating system of the streets has also been completed, which will allow PBOT to accurately report on the pavement needs.

### **Asset Value and Condition**

Maintaining and operating the transportation infrastructure are key activities of PBOT.

Emerging needs include:

- **Street Lighting:** Many of the city's street lighting luminaries were replaced in the early 1980's when mercury vapor lights were converted to high pressure sodium light. These luminaries are now reaching the end of their useful life and will need to be replaced. Street lights are important for the safety of our neighborhoods and for those who use the transportation system. PBOT is considering converting to more efficient technologies like LED and Induction lights, which may result in significant savings in energy and maintenance costs. However, substantial one-time funds may be needed to make a system wide conversion. Evaluations are underway to determine the cost-effectiveness of converting to more efficient street lighting technologies.
- **Signals:** Traffic signals are made up of several components (i.e. hardware, software, mast arms, controller boxes, lights). The traffic signal hardware condition has continued to deteriorate over the past two decades, from 11% in poor condition to 44% in 2008. Without additional resources, the condition will continue to decline. Traffic signals in poor condition are more prone to increased trouble calls, causing safety and congestion problems. Traffic signals in optimal condition ensure that there is synchronization of traffic, which results in congestion reduction.
- **Pavement Management:** Changes to pavement management practices are underway which comply with 2006 audit recommendations. New pavement condition rating methods, replacement of 25-year old software and changes to street preservation activities are in progress. During this transition, pavement condition and unmet need will not be reported until 2009. Pavement condition and performance target are expected to change following this transition in management practices and tools.
- **Weight Restricted Bridges:** Of the 155 bridges the city owns, 32% are either structurally deficient or functionally obsolete; 29 of these are in poor condition including 27 that are weight restricted. Weight restrictions on bridges impact the ability to move freight and goods, which ultimately has an impact to our economy. Additionally, freight has to find alternate routes, extending travel time requiring the use of more fuel and impacting the environment.
- **Sidewalk Network:** Only 37% of the sidewalk system in Portland has ADA-accessible curb ramps. Over 23,000 corners need ramps to comply with ADA standards. PBOT's goal is to construct at least 700 new corners per year. ADA required the City's public facilities be designed and constructed so that they are accessible to all people, including those with disabilities. In addition, curb maintenance was eliminated from the FY2006-2007 budget.

As part of the citywide standardization of overhead development, it is important to note that PBOT has changed the way overhead is reported, which resulted in a change in the estimated

value of the transportation system. PBOT now uses the overhead methodology based on labor for most of the assets, except for bridges and other structures that were based on the total costs overhead methodology, since additional work is needed.

### **Annual Funding Gap**

PBOT's annual \$28.5 million gap at the sustainable level<sup>3</sup> breaks out as follows:

- **Streets:** Transportation is changing the way pavement is inspected and the software that identifies current needs and strategies that optimize available resources. Pavement network condition and unmet need will not be reported until 2009 when this transition is complete.
- **Sidewalks:** Add sidewalk inspectors and posting support (\$200,000 annually); \$7.7 million needed annually to repair curbs based on 60-year expected life cycle; and an additional \$1 million needed annually to repair/replace corners based on 40-year expected life cycle. Combined, these activities require an additional investment of \$8.9 million annually.
- **Bridges:** The total cost to replace bridges in poor condition, and address bridge deficiencies is \$14.4 million annually.
- **Signals:** A total increase of \$3.5 million per year is needed in capital funding.
- **Street lights:** In addition to fully funding the PGE contract, an increase of \$1.7 million per year is needed.
- **Maintenance Facilities:** Kerby and Albina Yards are antiquated and in need of upgrading to modern standards. In addition, most vehicles are currently parked under the I-5 bridge structures at the Kerby Building, which puts them at risk of damage should the bridge fail. Identifying funding and a location where Transportation can safely park the vehicles needs to be addressed. However, the total need is not defined at this time. These facilities are used to maintain transportation, storm and wastewater services. Sunderland Yard is used for recycling. The facility has identified needs and opportunities which are outlined in a Master Plan developed in 2005 and approved for implementation by Council in 2006. In addition to addressing growth of the facility the Master Plan includes prioritized and needed improvements for the safety and efficiency of the operation and personnel.

Transportation funding continues to decline as the maintenance liability continues to increase. The primary source of PBOT's discretionary operating revenue, the State Highway Trust Fund, is not indexed to inflation and has not been increased by the Oregon Legislature since 1993. The result is a continuing loss of general transportation revenue purchasing power. Additional parking revenues, while increasing, have been dedicated to streetcar operations (33% City share), aerial tram operations (15% City share), and additional transit mall maintenance and transit mall match debt service. While funds are identified to build projects, ongoing operating and maintenance costs become PBOT's long-term obligation.

### **Asset Management Improvement Priorities**

PBOT has no funding available to move AM forward systematically. Despite the lack of funding, PBOT continues to track assets and their conditions to inform decision making. PBOT also plans to implement risk assessment and life cycle costs across assets to better allocate the

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<sup>3</sup> Sustainable Level is defined as the amount needed to obtain PBOT's Service Level Goals for each asset class.

limited resources for transportation operations and maintenance. PBOT will continue to update its asset management plans, which are used by each asset class to guide the work it does to effectively and efficiently manage the assets.

Within the next year, PBOT will address the following improvement priorities for asset management:

- improving asset data collection and data entry;
- setting and refining performance measures
- developing a common definition of unmet need across all assets
- conducting a risk assessment, including identifying failure modes for assets
- life cycle cost analysis

## **Environmental Services**

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The Bureau of Environmental Services (BES) provides sewage and stormwater collection and treatment services to 555,000 people, numerous commercial and industrial facilities, and six wholesale customers. The existing system consists of a 1,445-mile network of separated storm and sanitary sewers, 878 miles of combined sewer lines that carry stormwater runoff and sanitary waste, 96 pumping stations and 2 wastewater treatment plants. The city's sewer and stormwater systems are valued at more than \$5 billion.

### **Asset Management Approach**

To optimize limited budgets, public works agencies worldwide are beginning to adopt an AM approach to infrastructure management. BES is implementing elements of AM in its operations and planning functions. Implementation of AM is a long-term process to be performed in an adaptive management approach over a period of many years.

### **Uses of Asset Management**

More important than the "completion" of the BES Systems Plan, will be the development of processes for applying AM more broadly across the agency: software tools and the data management systems that will support the bureau's business functions for decades to come. Raw data on the system will be analyzed to provide condition assessments of the system's components. Sewer pipe hydraulic deficiencies and/or structural defects will be addressed in a system-wide perspective. Recommended infrastructure plans will be available for all stages of AM—design, construction, and maintenance.

The BES System Plan will incorporate system inventory, condition, GIS data, and failure records in an AM context to develop a risk register consisting of Likelihood of Failure times Consequence of Failure. Recommended solutions (projects) will be based on life-cycle cost analysis using a "triple bottom line" ranking of projects that considers financial, social, and environmental benefits. The intention is to make cost effective project expenditures that result in optimal asset value and customer service.

The BES System Plan Update Project is driven by the need to address the bureau's aging infrastructure and a desire to provide a prioritized list of potential projects for inclusion in the bureau's capital improvement program after year 2011 (upon the completion of the CSO program). The new sewer rehabilitation plan element will identify the appropriate sewer maintenance routines (and repairs) to enable the individual infrastructure components to reach an optimal useful service life at an overall least cost. The AM-driven sewer rehabilitation program will blend both operational and capital expenditures to optimize the system's performance.

## **Annual Update**

### **Asset Management Practice**

BES currently applies AM practices of asset inventory, condition assessment, and computerized maintenance management systems for its treatment and pump stations as well as the collection system. BES is now using risk as a priority-ranking criteria for evaluating and recommending planning projects. BES recognizes the value of focused planning and has established a new System Planning Program to provide continuous and coordinated infrastructure planning that integrates the bureau's watershed and wastewater plans. Currently, BES is in its final year of a three-year infrastructure planning effort to upgrade its System Plan. Included will be a sewer rehabilitation plan, updated treatment plan, and updated combined and sanitary sewer system plans. A future effort will focus on the stormwater system.

### **Asset Value and Condition**

The overall replacement value of BES assets increased from \$5.02 billion in 2007 to \$5.55 billion in 2008 due to inflation and the inclusion of pump stations in the wastewater treatment systems class.

There has been no change in the overall condition of the bureau's systems since 2007. In general, the vast majority of the sanitary (97%) and combined sewer (88%) systems are in good or very good condition. Approximately 40% of the stormwater system and 66% of the wastewater treatment systems are in good or very good condition.

### **Annual Funding Gap**

At present, BES estimates an annual funding gap of \$9 million: \$5 million in Combined Sewers, \$2 million in Sanitary Sewers, \$1 million in Stormwater, and \$1 million for Wastewater Treatment and Pumping. The funding gap for combined and sanitary sewers is higher this year than in prior years due to the high demand for bureau resources to complete the CSO program. The gap in the other two program areas is lower due to key investments in these areas. It is anticipated that the maintenance and pipe rehabilitation funding gap will be refined with completion of the BES System Plan.

### **Asset Management Improvement Priorities**

BES' number one priority for asset management improvement is the completion of the BES System Plan for the sanitary and combined sewer systems. This work effort is on track for completion in FY 09. This work brings together a number of improvements to our asset management practices; specifically, improvements to data, data integration, and the application of risk and triple bottom line costs as decision-making tools. Once "complete," the BES System Plan will become a living document with processes for continuous update. This plan will provide information for prioritizing both maintenance activities and capital improvement projects. The BES System Plan roll out will include a staff training program with initial presentations in summer 2009.

BES also continues to participate in the Water Services Association of Australia (WSAA) AM benchmarking project to identify bureau strengths and weaknesses. Findings from the benchmarking process will help the bureau determine strategic next steps and identify a long-term direction for its AM program.

## **Water**

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The Portland Water Bureau (PWB) delivers potable drinking water for consumption and fire protection. The City is the largest supplier of domestic water in Oregon, serving more than 800,000 people and providing about 100 million gallons of water per day, or about 36 billion gallons per year. About 60% of the water is delivered to customers within City limits. The remaining 40 is sold to customers in 19 surrounding cities and special water districts. Water is supplied from the Bull Run watershed and the Columbia South Shore wellfield through more than 2,000 miles of pipes. The water system is valued at \$5.3 billion.

### **Asset Management Approach**

The Water Bureau has an Asset Management Group (AMG), located within the Engineering Department, which coordinates asset management activities within the organization. An Asset Management Steering Committee, comprised of high level managers, makes policy decisions related to asset management and approves major work items. The AMG is responsible for maintaining inventory and condition information about the water system, and provides guidance and support as key asset management initiatives are implemented.

### **Uses of Asset Management**

The application of asset management concepts has helped the Water Bureau to focus on meeting key service levels, addressing high risk and developing business cases to make decisions. Among the specific results:

- Incorporation into the Strategic Plan of key service levels, including: ranking risk of asset failure, and addressing those risks in relation to the risk level; performing business cases; limiting supply outages at a prescribed rate; providing minimum pressures; and assuring availability of operational hydrants within 500 feet of service connections
- Ranking risks and using the objective of mitigating high risks in decision making in the budget process
- Ranking risks and conducting condition assessments of potential high risk assets (especially pipes and valves)
- Performing business cases and using the results to support project design, construction and operation decisions
- Prioritizing maintenance and construction tasks in relation to the key service level objectives

### **Annual Update**

#### **Asset Management Practice**

In 2008, the Water Bureau continued to make progress in asset management, introducing and applying concepts such as risk, service levels and business cases.

Some of the highlights for the year include:

- As part of the development of a Strategic Plan, key services levels have been identified. These include target outage rates, the application of cost-benefit analysis, standards for addressing asset risks, and continuous improvement in asset maintenance
- A forecasting model of asset repair and replacement has been applied to the water system, giving projections of funding needs for the next 50 years.
- Asset Management benchmarking.



## **Asset Value and Condition**

The overall replacement value of the Portland Water Bureau's assets increased from \$5.25 billion in 2007 to \$5.47 billion in 2008 due to inflation.

There has been no change in the overall condition of the water system since 2007. In general, the vast majority (~ 90%) of supply, transmission, and distribution systems are in fair to very good condition. 80% of terminal storage is in poor-fair condition. 80% of buildings and support facilities are in poor – good condition.

## **Annual Funding Gap**

A funding gap exists in the need to replace assets in poor condition and to maintain the overall condition of other groups of assets. Following a court decision, the Water Bureau has additional significant unfunded requirements related to terminal storage reservoir replacement and treatment of supply.

Baseline unmet needs amount to \$15 million a year. The following list reflects the Water Bureau's anticipated system needs beyond the current level of funding.

- **Distribution**
  - Replacement of hydrants: Replacement of all screw type in poor condition.
  - Replacement of service lines: Replacement of all plastic and galvanized service lines in poor condition
  - Replacement of valves: Replacement of all large valves in poor condition
  - Replacement of mains: Replacement of all pump main segments in poor condition
  - Replacement of high risk pipe segments in poor condition: Replacement of all poor condition pipe segment crossings of bridges, major arterials, freeways and railroad lines
  - Valve installation: Installation of valves to address tank vulnerability to draining during a pipe break
  - Meter replacement: Replacement of meters at a sustainable rate
- **Transmission – Conduits:** There is a need to replace / upgrade sections of the oldest conduits. A more reliable Willamette River crossing is also unfunded.
- **Facilities:** There is a need to fund replacement of the Maintenance facility building at the Interstate site.
- **Supply:** There is a significant portion of the Bull Run watershed road system in need of maintenance. This funding gap has not been included in the total.
- **LT2 Response:** The bureau is anticipating obligations to fulfill LT2 requirements of about \$440M in the next 10 years. Obligations are expected to include: replacing uncovered finished storage reservoirs (terminal supply) at Mt Tabor and Washington Park, with similar amounts of storage elsewhere, transmission system improvements, and treatment of the Bull Run supply.

## **Asset Management Improvement Priorities**

The Water Bureau plans to implement AM for all program areas and asset classes. The primary driver behind the current initiative is observing efforts in other utilities and proposing actions, mimicking applicable best practices. The Water Bureau is very active in promoting and developing a single, system-wide AMP.

The Water Bureau is also participating in an international benchmarking project. As part of this benchmarking project, the following improvement initiatives were identified by the consultant team:

- Document key work processes, and conduct an analysis to increase efficiency and more effective service delivery
- Implement risk assessments and business cases across the organization
- Develop an asset management based culture within the operating divisions
- Create and report on levels of service
- Integrate data in the CMMS, customer systems and GIS
- Create a failure-based maintenance strategy
- Establish an asset based costing system

Implementation of these improvement initiatives is expected to occur in upcoming years, with continuous improvement as the goal.

## **Parks**

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### **Asset Management Approach**

The Portland Parks and Recreation's (PP&R) Asset Management program includes five asset groups: Buildings, Amenities, Infrastructure, Developed Landscapes, and Natural Resources. All of the parks and recreation assets that PP&R owns and manages are included in these groups.

Asset Management is used as the basis for coordinating asset data, developing accurate asset inventories and producing up-to-date reports. Accurate AM data coupled with statistically-valid information on customer needs and desires allows PP&R to make informed decisions about the assets needed to provide specific services.

PP&R's AM program continues to help implement *Parks 2020 Vision* by ensuring the provision of high-quality facilities, providing for long-range capital planning and developing best management practices. It allows Parks to fulfill a major part of its mission of "...*developing and maintaining excellent facilities and places for public recreation.*"

### **Uses of Asset Management**

AM information is utilized in PP&R's capital planning and budget preparation, to develop consistent maintenance and operations regimes, fulfill City and federal reporting requirements, inform system planning, and support financial forecasting. Applying asset management principles and practices helps to prioritize projects and allocate scarce resources.

As asset management continues to be integrated into PP&R management practices, Parks is better able to determine acquisition and capital improvement needs, develop appropriate levels of maintenance, and determine which assets to acquire and dispose of in order to develop a stable asset portfolio that meets service needs.

## **Annual Update**

### **Asset Management Practice**

Since last year, Parks had completed additional inventory and condition assessments for Buildings, and the health and inventory of Natural Resources are well documented. Playgrounds and Furnishings in all developed parks were inventoried and assessed in summer 2007. Roads and parking lots have been inventoried but not yet assessed. Inventories for other asset groups are planned or underway.

PP&R is updating its annual asset inspection program to determine the condition of all assets and will inspect 20% of all assets each year. All assets will be inspected at least once every five years and more often in some cases.

Progress continues on development of the *Asset Inspection and Condition Assessment Manual*.

The majority of park assets are mapped in GIS, and we expect to complete that work when all utilities are included.

### **Asset Value and Condition**

The overall replacement value of PP&R's assets increased from \$783 million in 2007 to \$816 million, due to inflation and the addition of new assets.

There has been little change in the overall condition of the parks and recreation system since 2007. Eighty-five percent or more of all asset classes except natural resources are in fair to very good condition; 77% of natural resources are in fair to very good condition. The buildings/support facilities asset class has the best overall condition.

However, maintaining these conditions is dependent on regular maintenance, which is dependent on sufficient regular funding, which has not kept up with need.

### **Annual Funding Gap**

PP&R has an expected annual funding gap of \$9.8 million over the next 10 years. Council has committed to providing about \$1 million annually to address some of the most urgent needs and is working with PP&R to address the remaining needs on an ongoing basis.

While specific maintenance needs have been identified, and the most serious ones are being addressed, PP&R continues to lack sufficient funds to maintain its assets properly. Additionally, many sources of money for major maintenance and repair are disappearing as the economy contracts.

While the industry standard for asset reinvestment is from two percent to four percent of the asset's current replacement value, PP&R is only able to reinvest one percent to two percent overall. This is not sufficient to maintain our facilities and provide the services that the residents of Portland expect. With the downturn in the current economy, even one percent is expected to be difficult to achieve.

### **Asset Management Improvement Priorities**

PP&R has identified the following asset management improvement priorities. Initial priorities are:

- improving data (particularly condition)
- improving data integration
- setting and/or refining level of service standards

- tying AM to resource allocation

These are followed by:

- completing AM plans (note: Acquisition plans are generally complete)
- completing risk analyses
- determining life cycle costs
- evaluating service delivery; coordinating AM activities
- improving staff AM knowledge

A statistically-valid recreation survey conducted in August 2008 will help determine user needs and appropriate levels of service. When that work is completed, PP&R will be able to determine the funds needed to achieve and maintain desired levels of service and the gap between that and the current funding level. If funding is insufficient to provide the desired levels of service, service levels will need to be reduced in appropriate areas.

## **Civic Assets**

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### **Asset Management Approach**

The Civic Asset's AM program includes two asset groups: Facilities and Technology Services. The Facilities group includes facilities managed by the Office of Management and Finance (Police facilities, office buildings, other buildings, Union Station, and spectator facilities) and facilities other organizations manage (Fire facilities, parking garages, and Portland Center for the Performing Arts). All of the technology assets that OMF owns and manages are included in the Technology Service group.

OMF takes the lead for the Civic Assets group.

Asset Management serves as the basis for documenting the physical and financial status of these assets, coordinating asset data, developing accurate asset inventories and producing up-to-date reports and maintenance plans. Accurate AM data allows OMF and other organizations to make informed decisions about assets. The annual and one-time funding gaps are the main indicators of financial status of these assets.

### **Uses of Asset Management**

OMF uses AM information to prepare its capital planning and budgets; develop consistent maintenance, operations, and replacement programs; fulfill City and other reporting requirements, and support financial forecasting. Applying asset management principles and practices helps to prioritize projects and allocate scarce resources.

### **Annual Update**

A key component of the OMF Asset Management program for Facilities is the preparation of five year maintenance plans. These plans are developed with input from internal and external customers, as well as staff who maintain the infrastructure, and are influenced by City Council's established goals, objectives, and policies. A final step is balancing needs with resources. OMF works closely with its customers to understand their businesses and how their facilities support and serve their work objectives.

A key component of the OMF Asset Management program for Technology Services is the preparation of five year maintenance and replacement plans. These plans are produced by BTS staff responsible for AM and are reviewed and refined by a management review group. Priority is given to items that support public safety, improve reliability and availability of critical

data systems and improve efficiency and reduce costs through the consolidation of infrastructure.

In FY 2008 and FY 2009 the City invested in the replacement of large Civic assets. These investments include the replacement of the IBIS financial system with the SAP enterprise business solution, the replacement of the Police property warehouse, and the replacement of the Auditor's archives center. Additionally, the Council is funding a large part of the Public Safety Systems Revitalization Project which will replace CAD, PPDS, and the 800 MHz radio system.

However, other Civic Assets continue to have large annual and one-time funding gaps for major maintenance.

**Fire Facilities:** Voters approved a GO bond measure in November of 1998 to rehabilitate, relocate, and construct new City fire stations. The program addresses deferred maintenance in addition to addressing seismic requirements and program changes within the Fire Bureau. The program is over two-thirds complete and will run through FY 2011.

Fire has no ongoing budget authority for major maintenance projects for these new facilities. Fire does have regular O&M budgets for these facilities. Over the 10-year period of FY 2009 to FY 2019, overall condition will not decrease. However, without saving major maintenance money up for the future when the large needs come due in 20-30 years, no money will be available. The City will find itself in the same position as in 1998 when there was too much deferred maintenance to fund and the buildings had not been modified for the changing needs of the bureau. Funding for major maintenance of Fire facilities should be set aside each budget year, as is done for Police facilities and office buildings.

OMF has high confidence in this assessment. It is based on very recent completed projects to rehabilitate and construct new, or projects in progress for which we have gained considerable experience.

**Facilities Services:** Through its rental rates Facilities Services collects major maintenance money for office buildings (Portland Building, City Hall, and 1900 Building), Police facilities, maintenance facilities, the Portland Communications Center, and the Records Center. Major maintenance money is also carved out from net income of Union Station and parking garages to fund major maintenance projects at these facilities.

While the industry standard, and OMF's goal, for facility maintenance is to reinvest three percent of a building's current replacement value each year, OMF is currently only able to reinvest about 0.9%. This level of reinvestment has declined in recent years. Reasons for the decrease are rapidly escalating costs to replace buildings (over regular inflation), the increase in the number of new facilities, and only increasing the major maintenance component of rental rates at the level of regular inflation.

This 0.9% reinvestment level allows OMF to cover immediate needs on the 5-year horizon. This is also enough so that over the 10-year period of FY 2009 to FY 2019 overall conditions aren't expected to decrease from the very broad categories of good, fair, and poor. Contributing to this is the relative low age of these facilities. However, when large major maintenance needs come due in 20-30 years, asset conditions will decline.

Since the likelihood of rental rate increases is very low, funding for major maintenance should be increased by directing savings from efficiencies identified to major maintenance until the 3% goal is achieved.

In FY 2009, OMF had another option. The original Portland Building construction debt was issued in 1980, with the debt to be retired in 2008. The final Portland Building debt payment of \$2,455,000 was made on April 1, 2008. As a result of the expiration of the Portland Building debt service, in the FY 2009 budget process the City decided to reinvest a portion of the savings and increase Portland Building major maintenance by \$351,000 up to 3% of replacement value.

The City has recently addressed two of its poorest rated facilities by replacing them. The Archives Center will move from an old building in Chimney Park to a newly constructed building on the PSU campus. The Police Property Warehouse moved from an old building at SW 17<sup>th</sup> and Jefferson to new space in the Guilds Lake commercial development. While this is one way to address a backlog of maintenance issues, it is expensive. But, in both of these cases the physical capacity of the old buildings was limited and restricting operations.

For all facilities, except spectator facilities and Union Station, the funding gap is the annual difference between what is collected in rental rates, or set aside from net income, for major maintenance and the industry standard of 3% of replacement value. For spectator facilities the gap is the one-time difference between actual fund reserves for capital maintenance and a target level of \$10 million based on the costs to upgrade Memorial Coliseum and address the long-term capital needs of PGE Park. Union Station's one-time funding gap is \$45 million based on unfunded deferred maintenance, in addition to the annual gap. The annual gap of \$500,000 assumes the \$45 million one-time gap is funded to catch up on deferred maintenance and bring the building up to current standards. In other words, the \$500,000 does not stand on its own.

OMF has high confidence in this assessment. It is based on a complete inventory of buildings. The conditions are assessed based on visual inspection by qualified personnel on a regular schedule.

**Portland Center for the Performing Arts:** This complex includes the Keller Auditorium, Arlene Schnitzer Concert Hall, and the New Theater Building. The City owns these assets and through an intergovernmental agreement Metro manages, operates and maintains them. We have included the replacement values of these three assets but have no information on their status.

**Technology Services:** Establishing replacement values, current conditions, projected conditions, and funding gaps for technology infrastructure requires a different approach than for facilities infrastructure. Unlike buildings, technology infrastructure can quickly become unusable. This is primarily due to the short lives/quick obsolescence and the critical need to stay current with technologies that may not be supported by vendors in the future and render the technology unusable. Below is a discussion of the unique nature of BTS infrastructure replacement values, conditions and funding gaps.

OMF has medium confidence in these assessments, except in the replacement values assessment where we have a medium-low confidence level. The replacement value assessment is based on recently completed projects and the experience of other governments, but we have not had an opportunity to analyze their experiences to assess the degree of similarity.

### 800 MHz Radio System – Core System

The 800 MHz system is a system that has to be replaced prior to FY 2019 because its condition goes beyond Poor by then. The system has to be replaced prior to FY 2019 because prior to then Motorola, the system's vendor, will not provide support to it. This is because the technology is becoming obsolete. The underlying component chips are old, it is an analog system, and Motorola is focusing on digital systems. We have included in the funding gap the one-time cost to replace it.

### 800 MHz Radio System-Devices

Just as the core system has to be replaced prior to FY 2019 because the condition goes beyond poor, the system's devices which use the system have to be replaced. The one-time funding gap is the cost of replacement less money that has been collected for replacement so far. This replacement money could be used for a grant match.

### CAD and PPDS

The CAD system has to be replaced or rebuilt prior to FY 2019. Doing nothing would cause the system to be unusable prior to FY 2019. Likewise, the PPDS system has to be replaced or rebuilt prior to FY 2019. Doing nothing would cause the system to be unusable prior to FY 2019.

OMF has established a multi-bureau committee to address the replacement of major Public Safety technology systems including the 800 MHz radio system, BOEC CAD, and Portland Police Data System. This work, called the Public Safety Systems Revitalization Project (PSSRP), will address funding, governance, coordination, timing, and other issues related to the replacement of these major systems. The replacement values of these systems vary depending on the approach planned and so should only be considered orders of magnitude.

As part of the FY 2009 budget process the Council authorized a mix of debt and cash financing for the PSSRP. This still leaves the program \$18.9 million short, but should allow CAD and PPDS to be replaced and work to begin on the 800 MHz system replacement.

### Telecommunications – IRNE

The annual major maintenance funding gap for this new system is 5% of replacement value less \$124,000 we have in the rates for major maintenance. Five percent of replacement is the industry standard for large technology infrastructure and reflects the shorter life of components compared to buildings. The original IRNE financial plan assumed that efficiencies as achieved would be retained in the rate base to provide replacement and major maintenance funding; however, the budget reduction requirements over the last few years have necessitated those efficiencies being turned into rate relief as opposed to replacement/major maintenance funding. The replacement value listed doesn't include the fiber provided to the City as part of franchise agreements and CTIC partnerships.

### IT Operations

The assets in IT Operations include storage area networks (SAN), data networks, email system, and core servers. This infrastructure has a life of 5 - 7 years. Our assumption about condition in FY 2019 then is based on the infrastructure needing to be replaced twice in the 10-year period. BTS should be collecting one-seventh to one-fifth the replacement value of the hardware per year. However, the fund is collecting below this level and having to supplement these collections with money from its reserves to avoid conditions going to poor. The fund has been able to redirect some savings from efficiencies into this replacement fund.

### Strategic Technologies - Corporate Applications

The replacement for IBIS is funded through the EBS project and replaces an asset in poor condition with one in good condition with a phased implementation in November of 2008 and March of 2009. This is a major technology infrastructure asset to be replaced with state of the art technology. Annual maintenance of GIS and CIS are funded.

### **Asset Management Improvement Priorities**

OMF has identified the following asset management improvement priorities:

- improving data (particularly condition and tracking of maintenance activities)
- improving data integration
- completing system-wide asset management plans
- evaluating service delivery
- improving coordination of AM activities
- improving staff AM knowledge

## **Affordable Housing**

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### **Annual Update**

The FY 2007/08 was a year of change for Portland Development Commission (PDC) and the Affordable housing industry. In April, PDC commenced an agency reorganization to position PDC for the 21<sup>st</sup> century. The new organization structure will incorporate systems and process to better handle the paradigm shift to a more “holistic” approach; of globalization, regional knowledge and economy, use of new communication technologies, increased mobility, education and social and economic disparity. PDC reviewed its current configuration and recommended modification its delivery systems to adapt to the current environment to mirror the changes happening in the larger economy, resulting in a more transparent, collaborative agile and efficient organization. “Phase One” of this transition has been completed and PDC is now moving toward fully implementing its findings with an estimated high-level completion date of March 2009. With any reorganization, PDC has established internal teams to address the “on-going” needs associated with the reorganization to assure a smooth process to fully incorporate process and alignment in meeting our strategic plan.

Additionally this year the City, along with PDC and other bureaus took on a “multi-jurisdiction” approach to evaluate and compare the affordable housing industry delivery system(s). These conversations and discussions are on-going, with Commissioner Fish leading a series of policy discussions to review and evaluate affordable housing policies and delivery systems.

As mentioned above, PDC is in the process of reevaluating and reorganizing itself to achieve a more fluid and transparent structure. A structure that allows better integration, improved collaboration, coordination and integration of housing, economic development and development of programs, projects and overall work flow. This process is allowing all areas of Asset Management (monitoring, tracking and evaluation) to be identified and then fully incorporated for standard reporting and retrieval purposes.

### **Asset Value and Condition**

This year’s universe of affordable housing projects as of June 30, 2008 consisted of 239 projects (9966 units). Eleven new projects were opened which provided an additional 874 new units to the City. These new projects are categorized and indicated below:

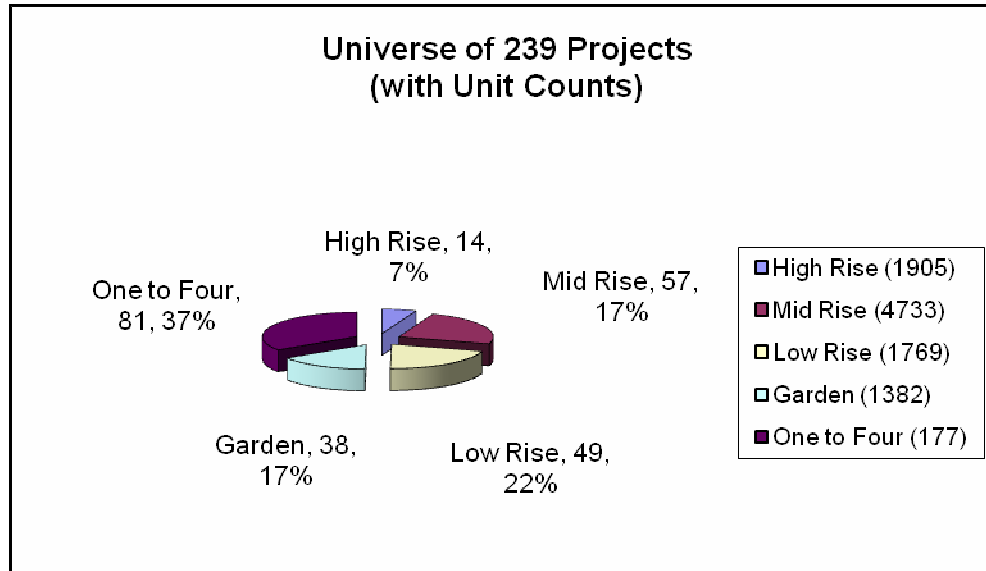
- High Rise: 1 project, 235 units
- Mid Rise: 4 projects, 367 units <sup>(1)</sup>



- Low Rise: 4 projects, 215 units
- Garden: 2 projects, 57 units <sup>(2)</sup>

(1) one project (20 units) coded "Low Rise" in the 2007 report, was moved to Mid-Rise in 2008; one project (36 units) reclassified as "Facility", not included in 2008 report

(2) 2007 unit count: adjustment of one additional unit



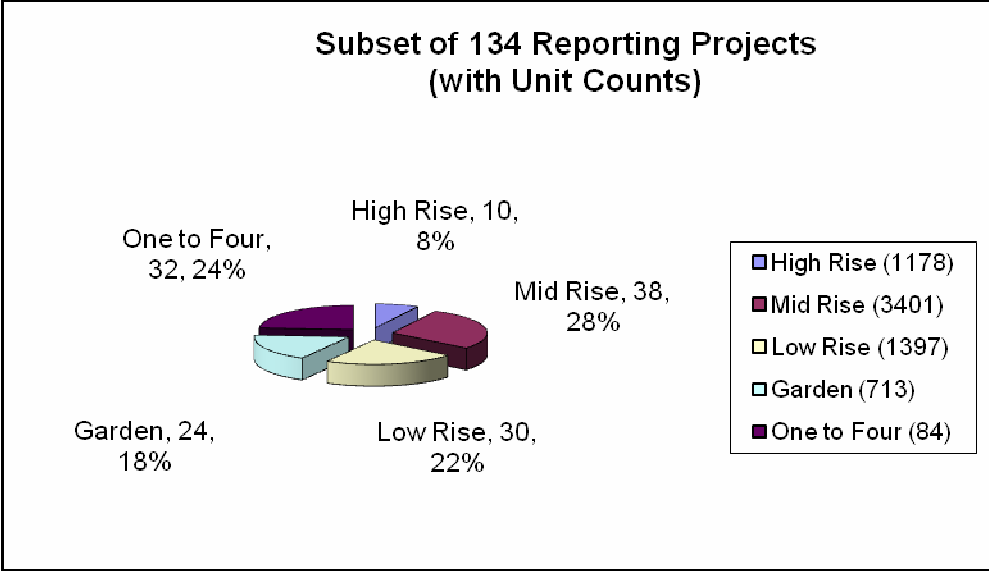
These 239 projects identified by construction style have a Current Replacement Value of \$1.6 billion.

There are eight additional projects (513 units) currently under construction or rehab that will be coming on line and will be reported in next year's report.

- Mid Rise: 5 projects, 443 units
- Low Rise: 2 projects, 56 units
- Garden: 1 project, 14 units

Current condition again was determined and calculated on historical construction costs and utilizes the methodology of "risk rating" each project as completed in years prior. Based upon these processes; 134 projects (6,773 units) were evaluated more closely for financial performance. These projects were grouped into the five standard construction styles. This subgroup represents 56% of the total projects and 68% of the total units.

The majority of high rise and mid rise apartments are in fair to very good condition and on average, this class improved in overall condition as compared to 2007. However, the average condition of low rise and one-to-four unit buildings dropped in 2008, with the majority of these assets in poor, very poor, or to be determined condition.



Risk Calculation Methodology — No change was made to the process of “risk-rating” the financial reporting projects. As stated in prior reports the affordable housing portfolio is managed as a loan portfolio along with the additional scrutiny for Borrower compliance to regulatory and loan documentation and project financial performance. The successful financial performance and day-to-day management of each project is the key to minimizing the overall risk/loan failure of the projects, thus reducing the need for additional funding.

Confidence Levels – No change from last year’s methodology.

**Annual Funding Gap**

The 2008 estimated unmet financial need or “gap” is equal to \$9.2 million a year. The subset of “POOR” rated projects analyzed this year consisted of 11 projects (304 units). The change in total “gap” funding again, is reflective of the construction type and cost to replicate. Funding gap remains basically the same.

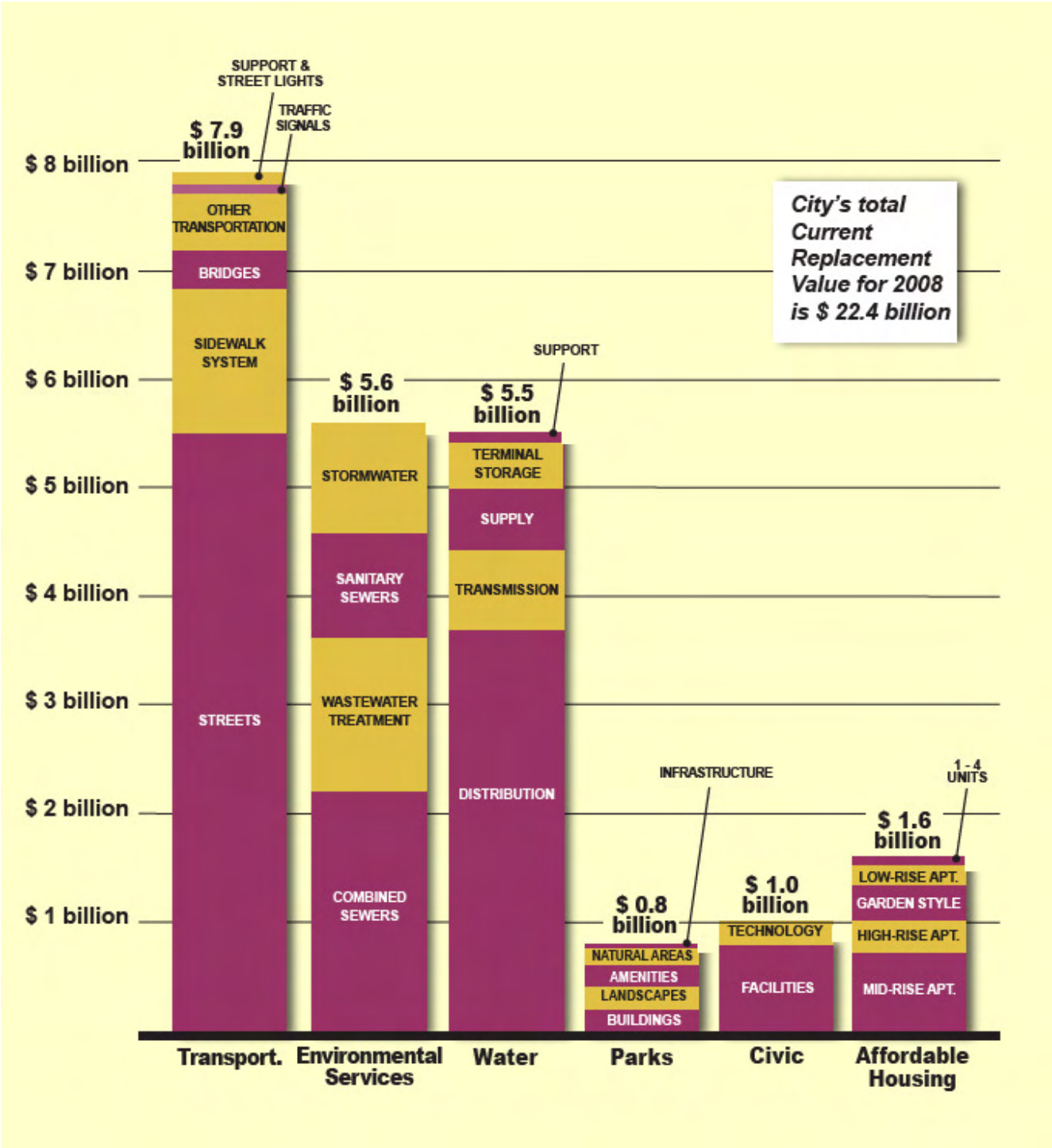
## 9. Appendices

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1. **Current Replacement Values of City Assets**
  - a. Current Replacement Value
  - b. Current Replacement Value Data Sheet
2. **Current Condition of Bureau Assets, by Confidence Level**
  - a. Summary of All Bureaus
  - b. Transportation
  - c. Environmental Services
  - d. Water
  - e. Parks
  - f. Civic
  - g. Affordable Housing
  - h. Confidence Level Summary
  - i. Current Condition Data Sheet
  - j. Projected Condition Data Sheet
3. **Annual Funding Gap**
  - a. Annual Funding Gap
  - b. Annual Funding Gap in Relation to Bureau Budgets
  - c. Annual Funding Gap Data Sheet
4. **Calculation Methodologies**
5. **Asset Management Definitions**

# Appendix 1a: Current Replacement Values of City Assets

December 2008



## Appendix 1b: Current Replacement Value of Capital Assets Data Sheet

December 2008

Capital Asset Class	Description	Value (in millions)	Confidence level	Notes
<b>Transportation</b>				
streets (by lane mile, improved)	3,949 lane miles	\$5,497.8	2 - Low	Construction costs volatile over past few years
sidewalk system				
sidewalks	8,747,652 sq yds	\$699.8	4 - High	
curbs	3,247 centerline miles	\$462.9	4 - High	
corners	37,606 corners	\$117.3	4 - High	
structures (bridges only)	155 bridges	\$420.5	5 - Optimal	
traffic signals (hardware only)	1,011 traffic signals	\$114.5	3 - Moderate	
street lights	54,588 street lights	\$88.1	2 - Low	
support facilities	various buildings	\$6.5	None to Low	
other transportation assets	"Other" includes streetcar, aerial tram, signal controllers, traffic calming devices, street signs, pavement markings, parking meters, retaining walls, stairways, guardrails and harbor wall.	\$472.7	Low to High	
<b>Total Transportation</b>		<b>\$7,880.1</b>		
<b>Environmental Services</b>				
combined sewers	880 miles of pipe & access structures	\$2,175.3	3 - Moderate	ENR 7959 to 8293 (4.2%) Note that recent analysis suggests the replacement value of the conveyence system is in the range of \$12-14 billion. We are still validating this information and anticipate a major increase in our numbers in the next report. Hence we have reduced our level of confidence.
sanitary sewers	990 miles of pipe & access structures	\$1,044.1	3 - Moderate	
stormwater system	600 miles of channel, pipe, culverts, plus sumps, detention facilities	\$931.5	2 - Low	
wastewater treatment systems	2 treatment plants & 96 pump stations	\$1,401.0	3 - Moderate	
<b>Total Environmental Services</b>		<b>\$5,551.9</b>		
<b>Water</b>				
supply	123 miles of roads, 1500 culverts, 11 bridges, 1 200-ft high concrete dam, 1 110-ft high earth dam, 33 well sites with drilled wells, pumps and motor, 1 groundwater pump station	\$649.0	3 - Moderate	2008 values increased from 2007 values by using the ENR-CCI increase of 4.2%
transmission	75 miles of large diameter conduits, with various supports, 28 conduit bridges or trestles or river crossing, 43 miles of large diameter transmission mains	\$717.0	3 - Moderate	
terminal storage	220 million gallons finished water storage	\$314.0	3 - Moderate	
distribution	2200 miles of distribution pipes, 180,000 service lines, 44,000 system valves, 7500 large meters, 175,000 small meters, 15,000 hydrants, 24,000 backflow devices, 39 pump stations, 70 storage tanks	\$3,672.0	4 - High	
facilities (buildings and support facilities)	7 primary support buildings, SCADA, vehicles and computers	\$120.0	4 - High	
<b>Total Water</b>		<b>\$5,472.0</b>		

*Continued on next page.*

## Appendix 1b: Current Replacement Value of Capital Assets Data Sheet, continued

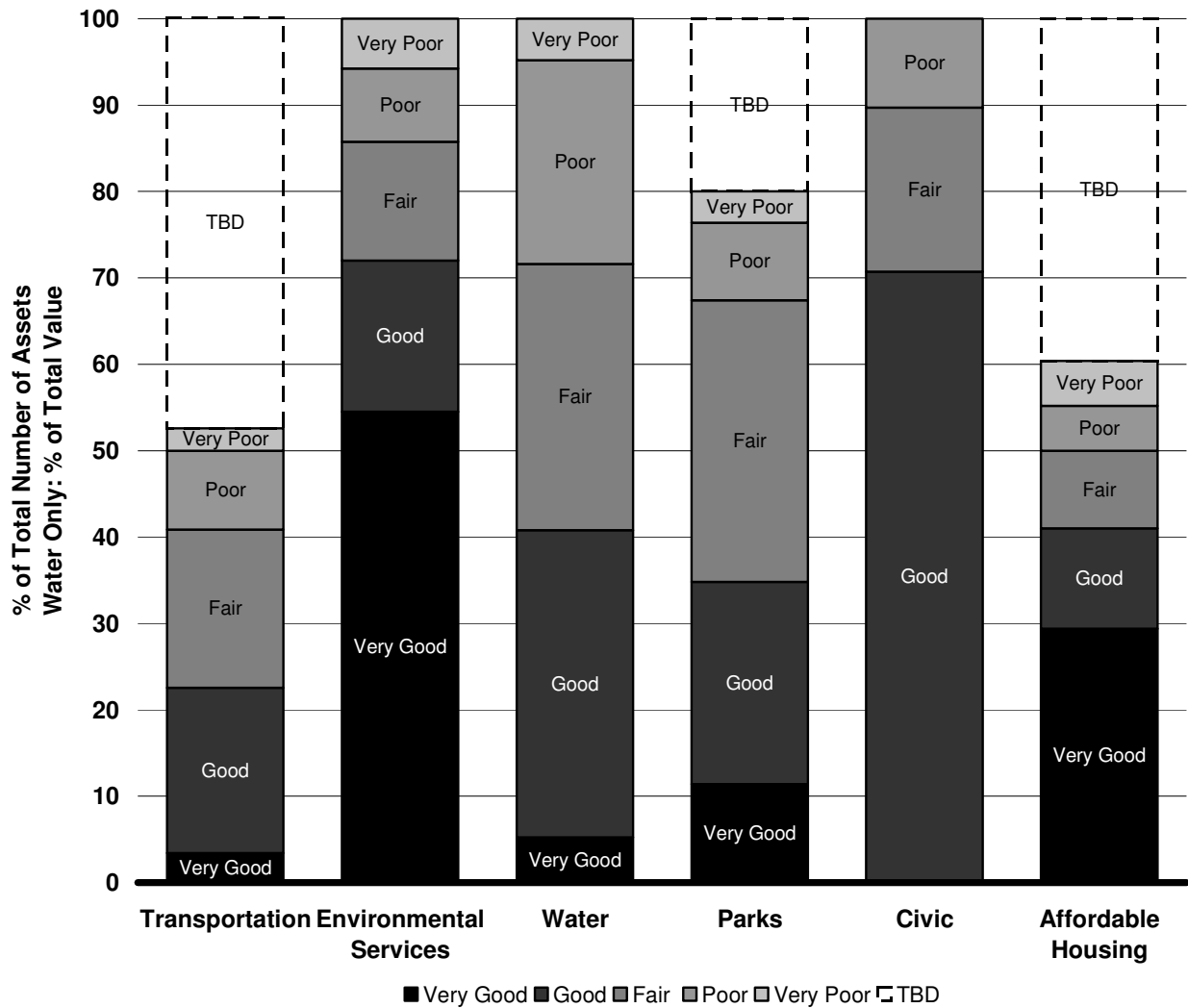
December 2008

Capital Asset Class	Description	Value (in millions)	Confidence level	Notes
<b>Parks and Recreation</b>				
buildings (includes support facilities)	Over 1,000,000 square feet including Arts (7), Aquatic (13 pools), and Community Centers (12); Stadiums (3), Clubhouses and Visitor Services; Restrooms, Shelters and Gazebos; Administration and Maintenance Facilities .	\$218.9	3 - Moderate	Parks used a 4.2% inflation factor, based on ENR-CCI data. Infrastructure value is based on partial information.
amenities	Furnishings (benches, tables, drinking fountains, etc.); Recreation Facilities (courts, fields, play areas, boat ramps, etc.); Trails; Water Features	\$193.1	3 - Moderate	
infrastructure (partial data only)	Roads and Utilities	\$48.2	2 - Low	
landscapes	Green/living elements in developed parks (187 parks at 3,272 acres) that require frequent regular maintenance, including turf, trees, planting beds, and swales.	\$205.4	2 - Low	
natural resources	Green/living elements that are part of an ecological system, generally self-sustaining and managed as natural areas (7,263 acres), including vegetation units, landforms, and natural water features.	\$150.4	4 - High	
<b>Total Parks</b>		<b>\$816.0</b>		
<b>Civic</b>				
Facilities (buildings, structures)				
police facilities	Four precincts, Justice Center, property warehouse, equestrian division, and vehicle storage lot	\$60.9	4 -High	
office buildings	Portland Building, 1900 Building, City Hall	\$117.1	4 -High	
other buildings	Records Center, Kerby Garage, and Portland Communications Center	\$28.3	4 -High	
Union Station	Train station and related buildings	\$26.5	4 -High	
parking garages	Seven parking garages	\$112.9	4 -High	
spectator facilities	Memorial Coliseum, Rose Quarter parking garages, and PGE Park	\$360.4	4 -High	
Portland Center for the Performing Arts		\$75.8	2 - Low	
Fire facilities	30 stations, administration building and support facility	\$67.6	4 -High	
Technology Services				
800 MHz radio system	Towers, communication devices, and backbone infrastructure	\$49.3	2 - Low	
telecommunications	Telephone system	\$14.6	2 - Low	
IT operations	Email system, storage servers, data networks and core servers	\$4.1	2 - Low	
strategic technology	Large corporate applications such as TRACS, CAD, PPDS, Cayenta, and EBS	\$99.4	2 - Low	
<b>Total Civic</b>		<b>\$1,016.9</b>		
<b>Affordable Housing</b>				
high rise apartment	14 Central City projects, one newly regulated project (235 units) brought on during 2008	\$318.0	3-Moderate	Historic construction costs inflated 4.2%
mid rise apartment	4 new projects, increase of 351 units	\$714.0	3-Moderate	Historic construction costs; inflated 4.2%
low rise apartment	4 new projects, increase of 225 units	\$253.6	3-Moderate	Historic construction costs; inflated 4.2%
garden style	2 new projects, increase of 58 units, one due to coding adjustments	\$282.1	3-Moderate	Historic construction costs; inflated 4.2%
one to four units	12 less projects reporting in 2008, regulatory agreement expired; reduction of 23 units	\$32.4	3-Moderate	Historic construction costs; inflated 4.2%
<b>Total Affordable Housing</b>		<b>\$1,600.1</b>		
<b>Total Capital Assets</b>		<b>\$22,337.0</b>		

# Appendix 2a: Current Condition of Capital Assets

All Assets

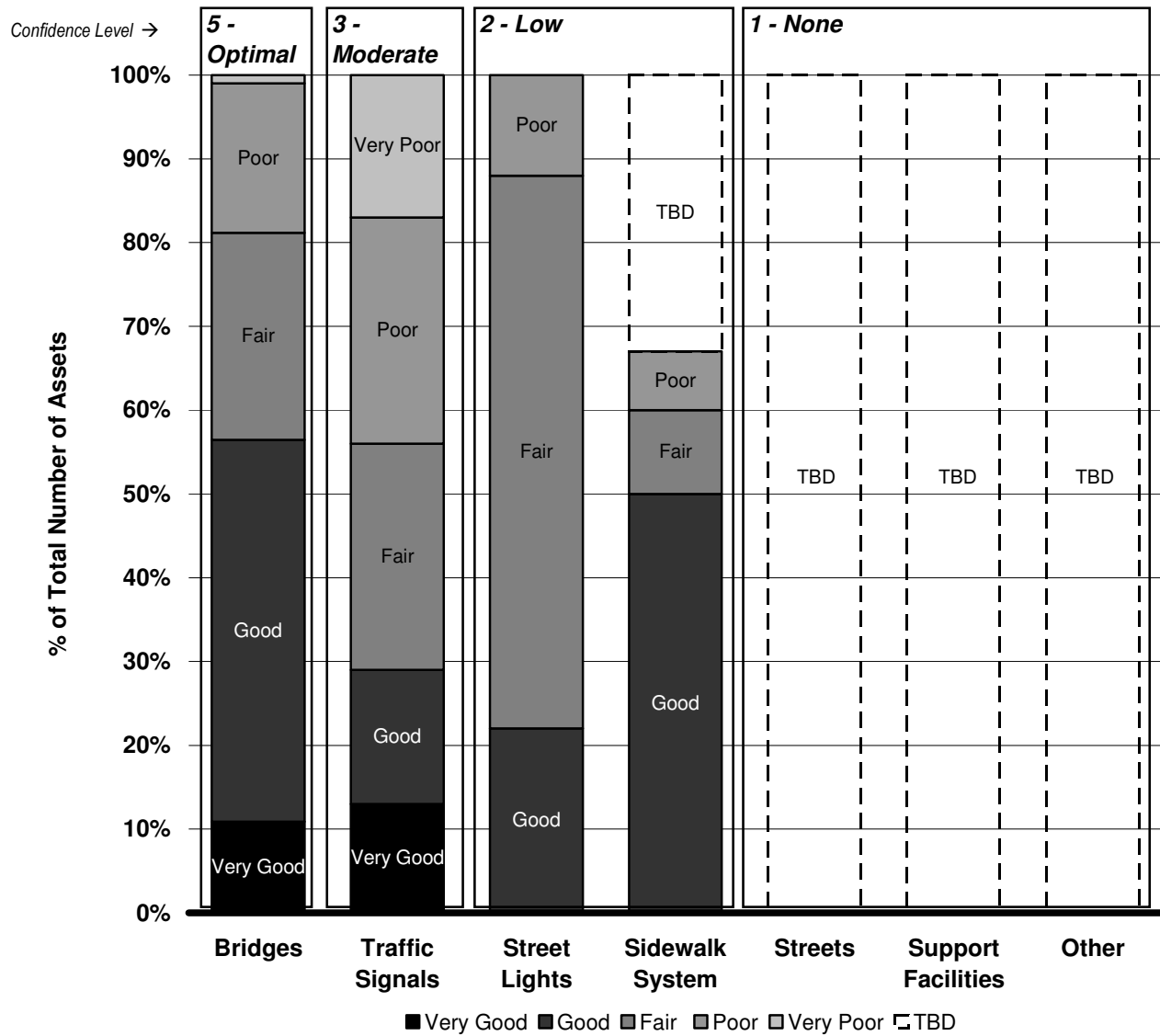
December 2008



# Appendix 2b: Current Condition of Capital Assets

## Office of Transportation

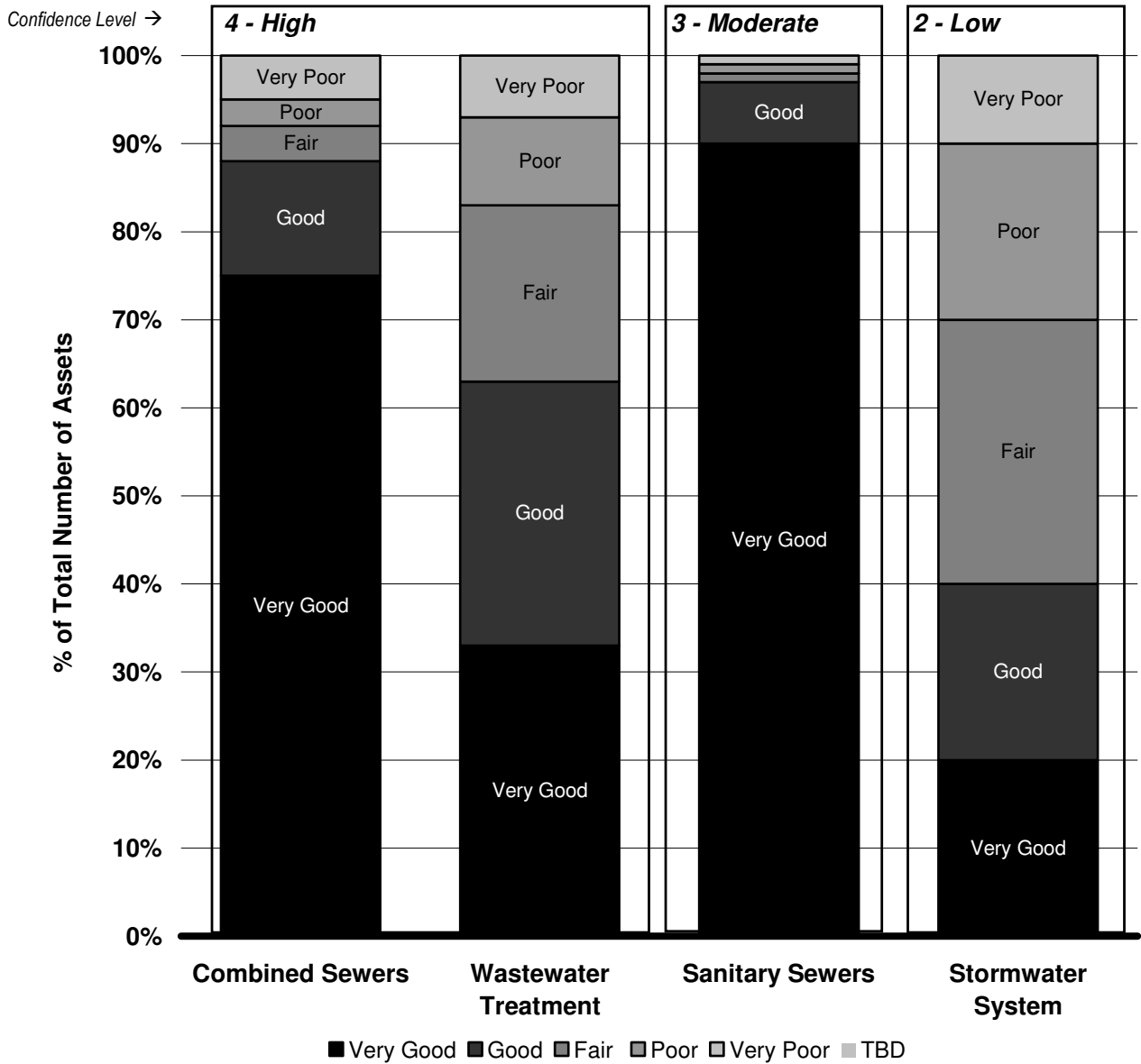
December 2008





# Appendix 2c: Current Condition of Capital Assets Environmental Services

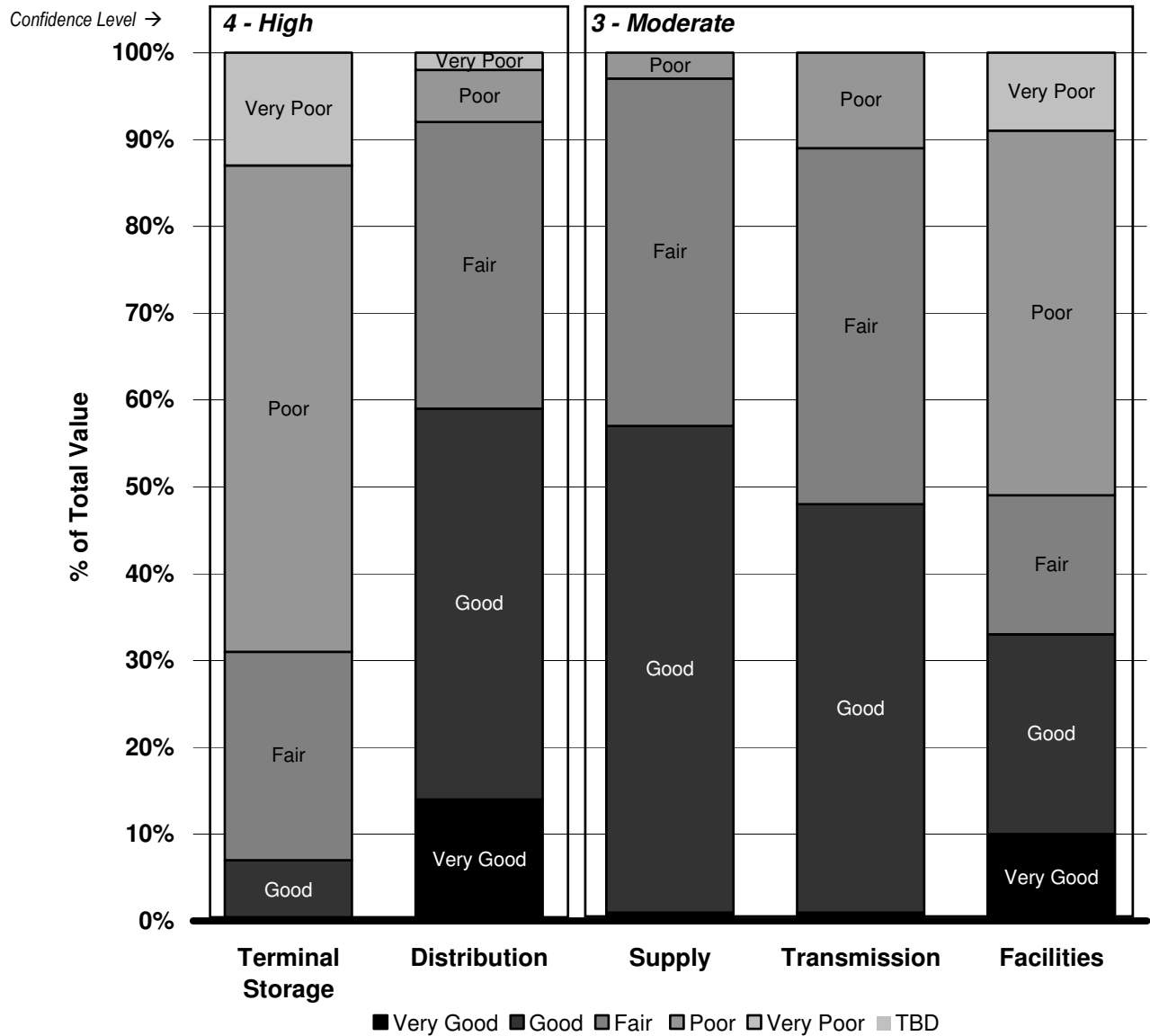
December 2008



# Appendix 2d: Current Condition of Capital Assets

Water Bureau

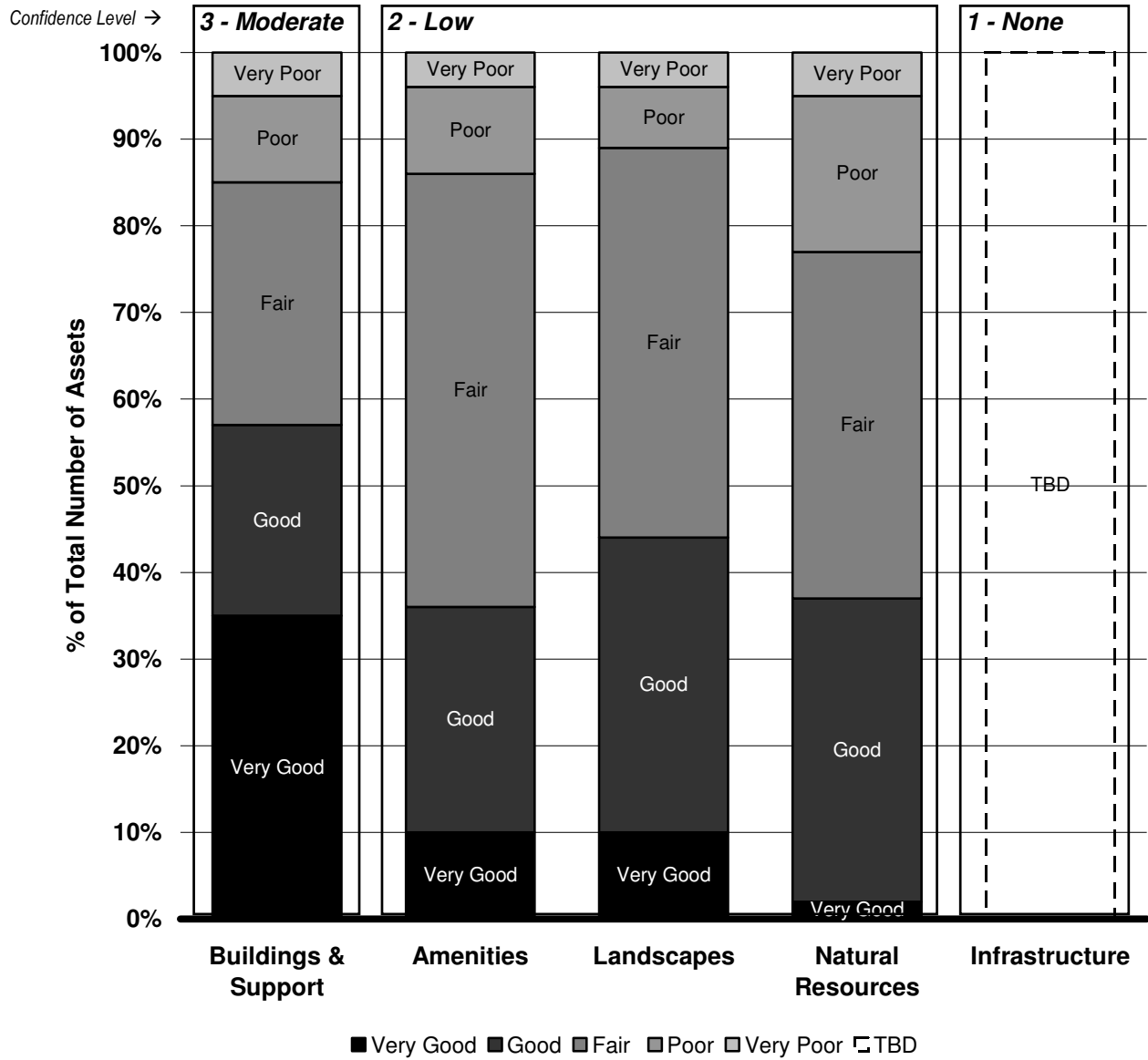
December 2008



# Appendix 2e: Current Condition of Capital Assets

## Parks Bureau

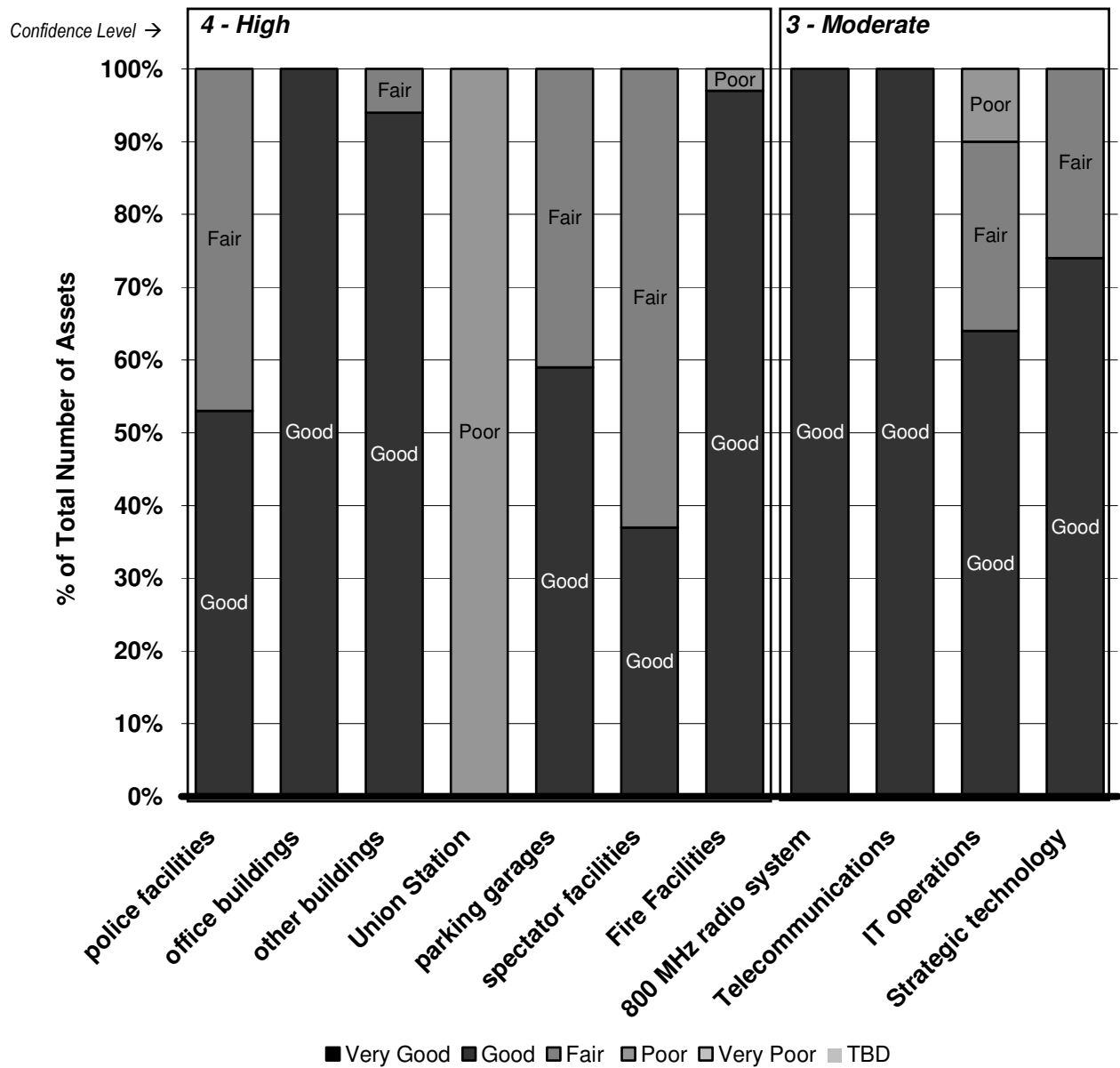
December 2008



# Appendix 2f: Current Condition of Capital Assets

## Civic (OMF, Police, Fire)

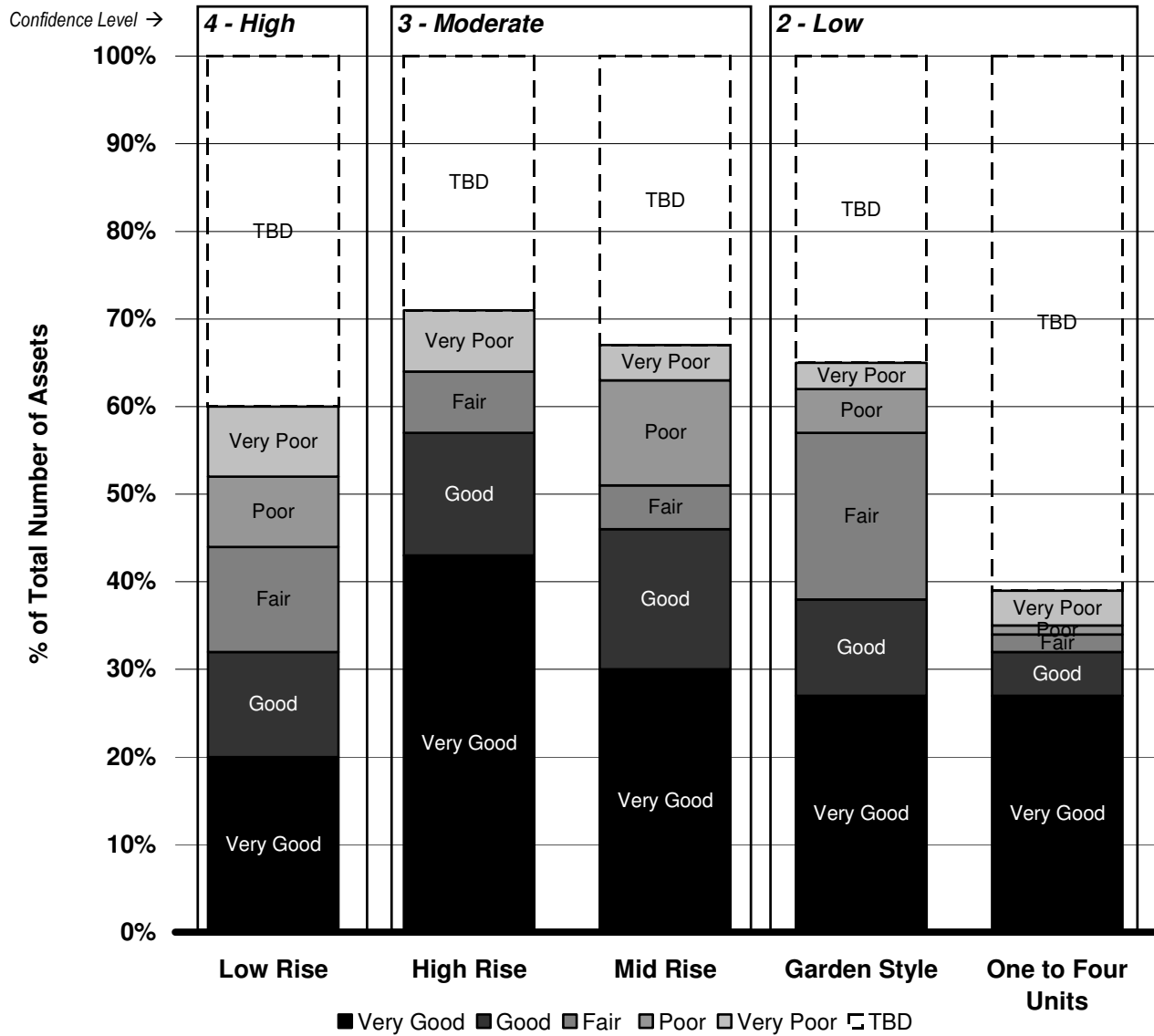
December 2008



# Appendix 2g : Current Condition of Capital Assets

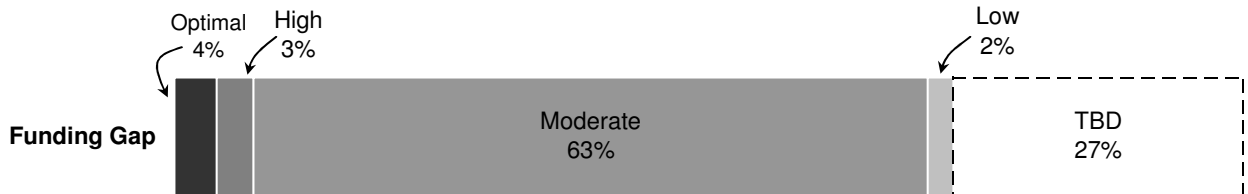
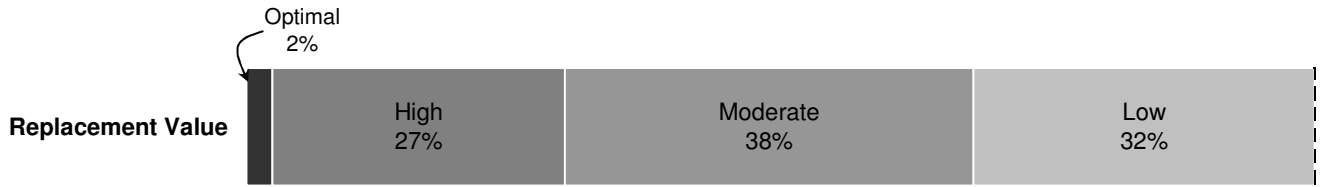
## Affordable Housing

December 2008



## Appendix 2h: Current Condition of Capital Assets Confidence Level Summary

December 2008



# Appendix 2i: Current Condition of Capital Assets

## Data Sheet

December 2008

Bureau and capital asset type	Current Condition (in %)					Confidence level	Notes
	Very Good	Good	Fair	Poor	Very Poor		
<b>PDOT</b>							
streets (by lane mile, improved)	tbd	tbd	tbd	tbd	tbd	tbd	<-- PDOT is changing the way pavement condition is inspected, and implementing new software
sidewalk system							
sidewalks	tbd	tbd	tbd	tbd	tbd	tbd	
curbs		75	15	10		3 - Moderate	
corners		75	15	10		3 - Moderate	
structures (bridges only)	11	46	25	18	1	5 - Optimal	
traffic signals (hardware only)	13	16	27	27	17	3 - Moderate	
street lights		22	66	12		2- Low	<-- Weighted average of Option B & C lights
support facilities (for PDOT & BES)	multiple facilities, mostly tbd / condition range from poor to very good at sunderland facilities					tbd or moderate	
other transportation assets	tbd	tbd	tbd	tbd	tbd	tbd	<-- A few of the other assets have condition assessment
<b>Environmental Services</b>							
combined sewers	75	13	4	3	5	4 - High	Based on regular ongoing assessments
sanitary sewers	90	7	1	1	1	3 - Moderate	Based on regular ongoing assessments
stormwater system	20	20	30	20	10	2- Low	
wastewater treatment systems	33	30	20	10	7	4 - High	Based on estimate of repairs for each process area. Updated facilities plan for CBWTP being finalized - new info next year.
<b>Water</b>							
supply	1	56	40	3	0	3 - Moderate	
transmission	1	47	41	11	0	3 - Moderate	
terminal storage	0	7	24	56	13	4 - High	
distribution	14	45	33	6	2	4 - High	
facilities (buildings and support facilities)	10	23	16	42	9	3 - Moderate	
<b>Parks and Recreation</b>							
buildings (includes support facilities)	35	22	28	10	5	3 - Moderate	Parks is in the process of updating inspection schedules and methods. Current information is based on last year's estimates.
amenities	10	26	50	10	4	2- Low	
infrastructure (partial information)	tbd	tbd	tbd	tbd	tbd	tbd	
landscapes	10	34	45	7	4	2- Low	
natural resources	2	35	40	18	5	2- Low	
<b>Civic</b>							
Facilities (buildings, structures)							
police facilities	0	53	47	0	0	4	
office buildings (incl. support facilities)	0	100	0	0	0	4	
other buildings	0	94	6	0	0	4	
Union Station	0	0	0	100	0	4	
parking garages	0	59	41	0	0	4	
spectator facilities	0	37	63	0	0	4	
Portland Center for the Performing Arts							
Fire Facilities	0	97	0	3	0	4	
Technology Services							
800 MHz radio system	0	100	0	0	0	3	
Telecommunications	0	100	0	0	0	3	
IT operations	0	64	26	10	0	3	
Strategic technology	0	74	26	0	0	3	
<b>Affordable Housing</b>							
high rise apartment	43	14	7	0	7	3 - Moderate	29% TBA
mid rise apartment	30	16	5	12	4	3 - Moderate	33% TBA
low rise apartment	20	12	12	8	8	4 - High	39% TBA
garden style	27	11	19	5	3	3 - Moderate	35% TBA
one to four units	27	5	2	1	4	2 - Low	61% TBA

# Appendix 2j: Projected Condition of Capital Assets - 2018

## Data Sheet

December 2008

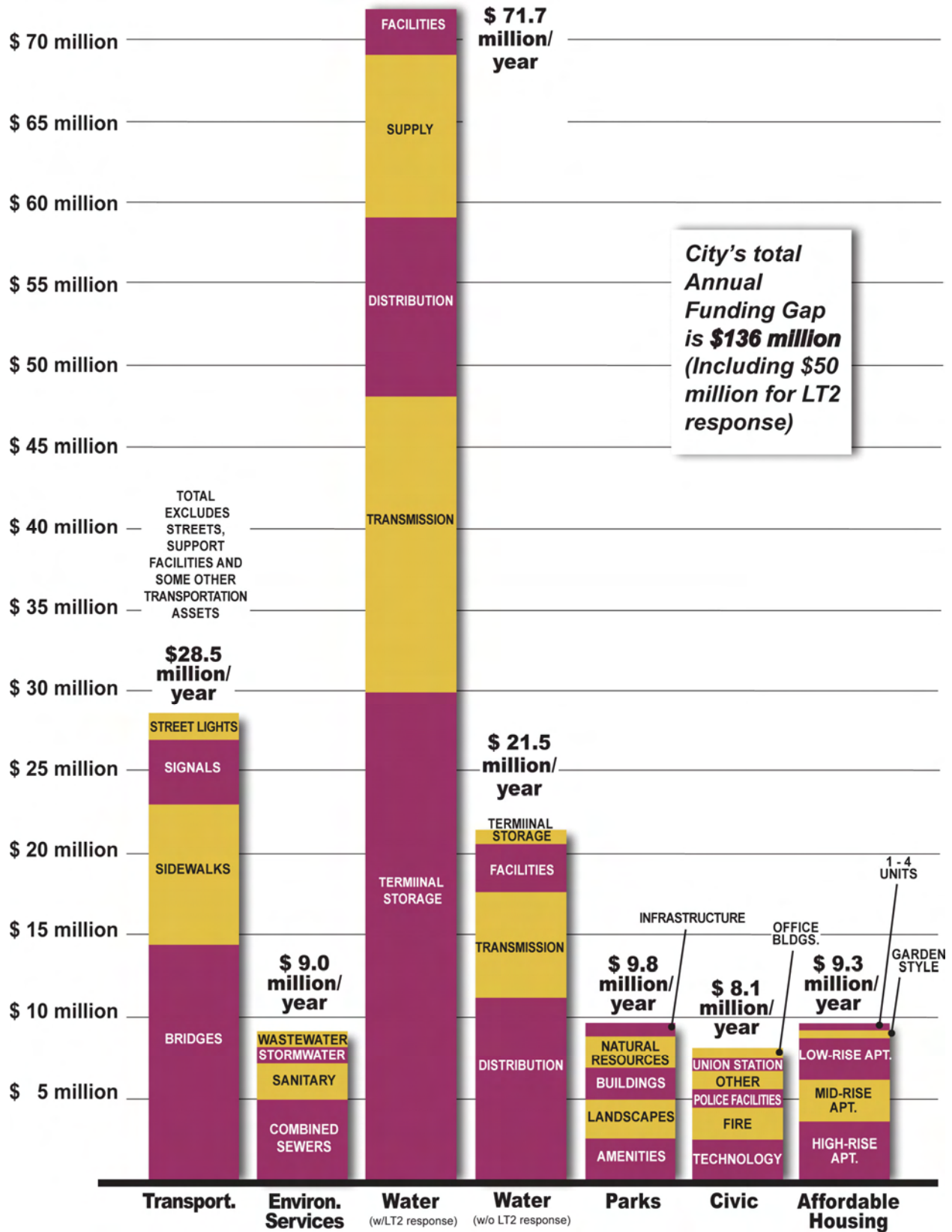
Bureau and capital asset type	Projected Condition (in %)					Confidence level	Notes
	Very Good	Good	Fair	Poor	Very Poor		
<b>Transportation</b>							
streets (by lane mile, improved)	tbd	tbd	tbd	tbd	tbd	tbd	At Current Service Level
sidewalk system							
sidewalks	tbd	tbd	tbd	tbd	tbd	tbd	
curbs		62	14	24		3 - Moderate	
corners		70	13	17		3 - Moderate	
structures (bridges only)	tbd	tbd	tbd	tbd	tbd	tbd	
traffic signals (hardware only)	6	10	22	27	35	3 - Moderate	
street lights		11	65	24		low	
support facilities (for PDOT & BES)	tbd	tbd	tbd	tbd	tbd	tbd	
other transportation assets	tbd	tbd	tbd	tbd	tbd	tbd	
<b>Environmental Services</b>							
combined sewers	78	10	5	4	3	4 - High	Assumes shift of resources to pipe rehab and treatment system improvements after 2012 (CSO program completion).
sanitary sewers	93	4	1	1	1	3 - Moderate	
stormwater system	20	20	30	20	10	2 - Low	
wastewater treatment systems	40	25	20	10	5	3 - Moderate	
<b>Water (assumes response to LT2 requirements)</b>							
supply	15	20	45	10	10	4 - High	<-- Assumes new treatment required by 2017 to meet LT2 requirement; prevents needed maintenance on other parts of supply system.
transmission	5	40	40	15	0	3 - Moderate	
terminal storage	80	0	15	5	0	4 - High	<-- Assumes LT2 rule mandates rebuilding open reservoirs before 2017
distribution	10	40	40	10	0	3 - Moderate	
facilities (buildings and support facilities)	50	30	20	0	0	4 - High	
<b>Water (assumes NO response to LT2 requirements)</b>							
supply	1	56	40	3	10	4 - High	<-- Assumes no responses to LT2 requirement.
transmission	5	40	40	15	0	3 - Moderate	
terminal storage	0	7	24	56	13	4 - High	<-- Assumes no responses to LT2 requirement.
distribution	10	40	40	10	0	3 - Moderate	
facilities (buildings and support facilities)	50	30	20	0	0	4 - High	
<b>Parks and Recreation</b>							
buildings (includes support facilities)	tbd	tbd	tbd	tbd	tbd	tbd	Information is not available at this time.
amenities	tbd	tbd	tbd	tbd	tbd	tbd	
infrastructure (partial information)	tbd	tbd	tbd	tbd	tbd	tbd	
landscapes	tbd	tbd	tbd	tbd	tbd	tbd	
natural resources	tbd	tbd	tbd	tbd	tbd	tbd	
<b>Civic</b>							
Facilities (buildings, structures)							
police facilities	0	53	47	0	0	4 - High	
office buildings (incl. support facilities)	0	100	0	0	0	4 - High	
other buildings	0	94	6	0	0	4 - High	
Union Station	0	0	0	100	0	4 - High	
parking garages	0	59	41	0	0	4 - High	
spectator facilities	0	37	63	0	0	4 - High	
Fire Facilities	0	97	0	3	0	4 - High	
Technology Services							The Technology Services programs with conditions at poor in FY 2018 are really beyond poor at that point because without replacement they will become unusable as they are no longer supported by vendors, or will become technologically obsolete.
800 MHz radio system	0	100	0	0	0	3 - Moderate	
telecommunications	0	100	0	0	0	3 - Moderate	
IT operations	0	0	71	29	0	3 - Moderate	
strategic technology	0	94	6	0	0	3 - Moderate	
<b>Affordable Housing</b>							
high rise apartment	43	14	7	0	7	3 - Moderate	29% TBA
mid rise apartment	30	16	5	12	4	3 - Moderate	33% TBA
low rise apartment	20	12	12	8	8	4 - High	39% TBA
garden style	27	11	19	5	3	3 - Moderate	35% TBA
one to four units	27	5	2	1	4	2 - Low	61% TBA



# Appendix 3a : Annual Funding Gap

in millions per year

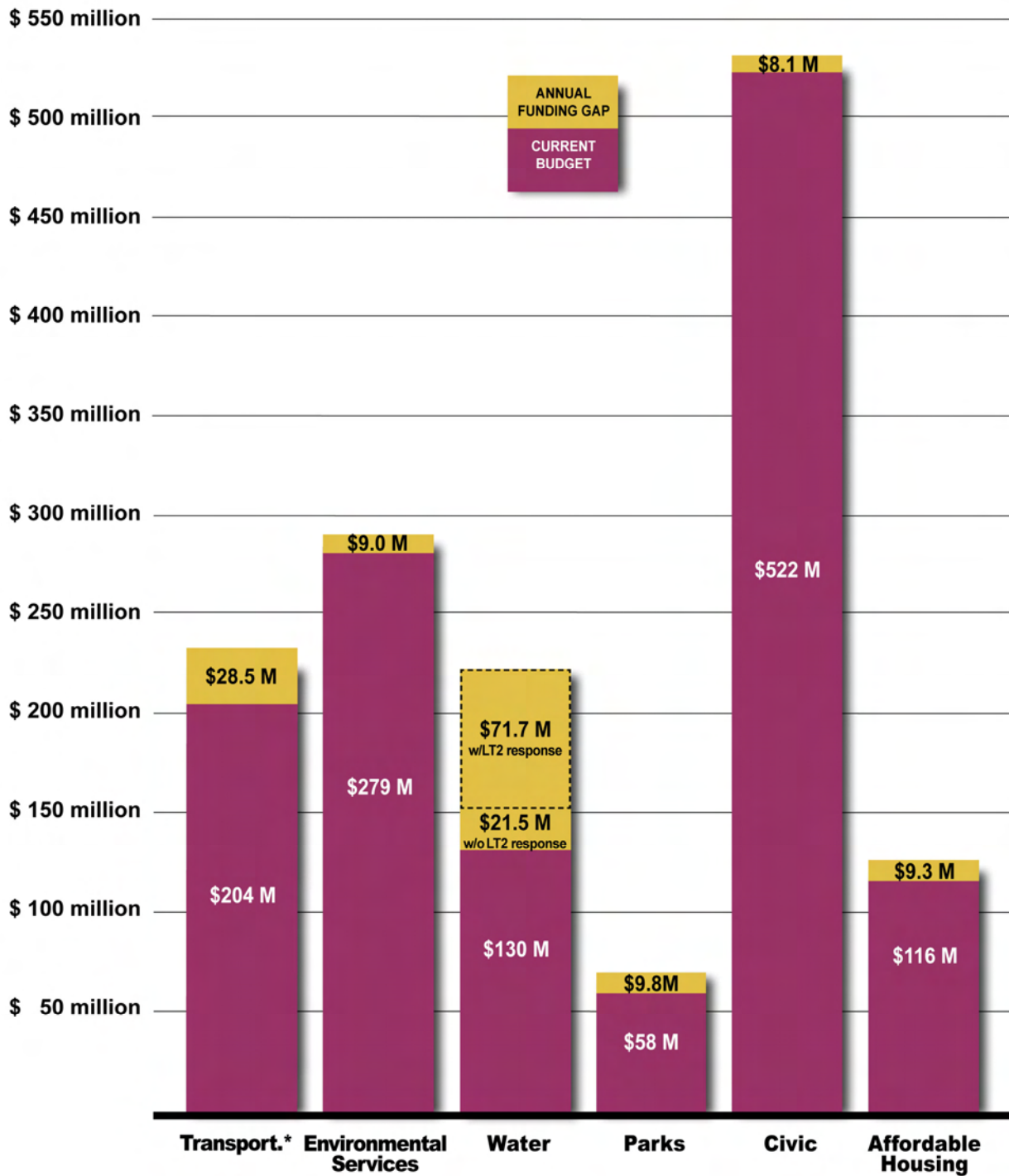
December 2008



# Appendix 3b: Annual Funding Gap in Relation to Bureau Overall Budgets

in millions per year

December 2008



# Appendix 3c: Annual Funding Gap Data Sheet

December 2008

Bureau and capital asset type	Value (in millions)	Confidence level	Note
<b>Transportation</b>			
streets (by lane mile, improved)	tbd	tbd	<-- Pavement condition and performance target is expected to change as PDOT is in the process of replacing current rating method and replacing software.
sidewalk system	\$8.9	3 - Moderate	Annual Gap at Sustainable Level
structures (bridges only)	\$14.4	5 - Optimal	
traffic signals (hardware only)	\$3.5	3 - Moderate	
street lights	\$1.7	2 - Low	
support facilities (for PDOT & BES)	tbd	tbd	
other transportation assets	tbd	tbd	
<b>Total Transportation</b>	<b>\$28.5</b>		
<b>Environmental Services</b>			
combined sewers	\$5.0	3 - Moderate	Gap is higher this year. Completion of CSO program requires nearly all CIP resources except for very critical projects. More routine projects delayed beyond 2012.
sanitary sewers	\$2.0	3 - Moderate	
stormwater system	\$1.0	3 - Moderate	
wastewater treatment systems	\$1.0	3 - Moderate	Increased funding from prior years, primarily due to needs related to increased flows due to the tunnels, but also to meet other regulatory requirements.
<b>Total Environmental Services</b>	<b>\$9.0</b>		
<b>Water</b>			
	w/ LT2	w/o LT2	
supply	\$10.0	\$0.0	3 - Moderate
transmission	\$18.5	\$7.0	3 - Moderate
terminal storage	\$29.7	\$1.0	3 - Moderate
distribution	\$10.5	\$10.5	3 - Moderate
facilities (buildings/support facilities)	\$3.0	\$3.0	3 - Moderate
<b>Total Water</b>	<b>\$71.7</b>	<b>\$21.5</b>	The \$71.7 million value include anticipated LT2 obligations.
<b>Parks and Recreation</b>			
buildings (includes support facilities)	\$2.0	3 - Moderate	An inflation factor of 4.2% was applied to last year's estimated gap.
amenities	\$2.7	2 - Low	
infrastructure	\$1.1	2 - Low	
landscapes	\$2.4	2 - Low	
natural resources	\$1.6	3 - Moderate	
<b>Total Parks</b>	<b>\$9.8</b>		
<b>Civic</b>			
Facilities (buildings, structures)			In addition to annual (ongoing) funding gap, OMF reports these one-time needs: \$45M for Union Station renovation, \$7.346M for Spectator facilities reserves funding, and \$18.9M for 800 MHz system replacement.
police facilities	\$1.2	4 - High	
office buildings	\$0.6	4 - High	
other buildings	\$0.6	4 - High	
Union Station	\$0.7	4 - High	
parking garages	\$0.6	4 - High	
spectator facilities	\$0.0	4 - High	
Portland Center for the Performing Arts			
Fire facilities	\$2.0	4 - High	
Technology Services			
800 MHz radio system	\$1.3	3 - Moderate	
telecommunications	\$0.6	3 - Moderate	
IT operations	\$0.2	3 - Moderate	
strategic technology	\$0.2	3 - Moderate	
<b>Total Civic</b>	<b>\$8.1</b>		
<b>Affordable Housing</b>			
<b>Assumes Exact housing Configuration is rebuilt</b>			
high rise apartment	\$3.5	3 - Moderate	
mid rise apartment	\$2.7	3 - Moderate	
low rise apartment	\$2.7	3 - Moderate	
garden style	\$0.3	3 - Moderate	
one to four units	\$0.1	3 - Moderate	
<b>Total Affordable Housing</b>	<b>\$9.3</b>		
<b>Total Capital Assets</b>	<b>\$136.4 (\$86.2 without LT2 )</b>		

## Appendix 4: Calculation Methodologies

City bureaus vary in methods used to calculate current replacement value, current and projected condition, and annual funding gap. This appendix describes the methods of six infrastructure systems: transportation, environmental services, water, parks, civic, and affordable housing. Civic systems include government offices, police and fire facilities, parking garages, technology services, and spectator facilities. In future years, the City Asset Managers Group will discuss opportunities to more closely align methods across bureaus.

### Transportation

#### Replacement Value

By using the average unit cost at a network level, the Portland Bureau of Transportation (PBOT) uses a simple approach in calculating the replacement value for its assets. For an asset, the replacement value includes the costs of removal and installation. Overhead is included in the replacement value. This is consistent with how PBOT capitalizes overhead at year-end on infrastructures for two accounts, improvements (closed projects) and work-in-progress (open projects). As part of the citywide standardization of overhead development, it is important to note that Transportation has changed the way overhead is reported, which resulted in a change in the estimated value of the transportation system. Transportation now uses the overhead methodology based on labor for most of the assets, except for bridges and other structures that were based on the total costs overhead methodology, since additional work is needed. Efforts continue to improve the information on the inventory count and replacement values on some of the transportation assets. Please note that actual replacement costs would vary by location.

#### Current Condition

Condition methodology is reported as a percentage of the total number of assets. The methodology for determining asset condition varies by asset group, see below. Current condition data does not include ratings for pavement and sidewalks.

#### Method of Asset Condition Assessment

Asset Group	Method
Pavement	New pavement condition rating methods, replacement of 25-year old software and changes to street preservation activities are in progress
Sidewalk System	<u>Sidewalks</u> : Visual inspection; Guidelines in the Operating Policy and Sidewalk Repair Program <u>Curbs</u> : Functional purpose, that is, if they protect the street edge and direct runoff and if they present a hazard to traffic <u>Corners</u> : Same guidelines as sidewalks
Bicycle Network	To be determined
Structures	<u>Bridges</u> : Inspection rating system based on Oregon Department of Transportation and National Bridge Inspection <u>Retaining Walls, Harbor Wall</u> : Visual inspection; Minimal settlement <u>Stairways</u> : Visual inspection <u>Guardrails</u> : To be determined
Traffic Signals	<u>Hardware &amp; Controllers</u> : Age <u>ITS and Other Equipment</u> : To be determined
Streetcar	<u>All Components</u> : Age; Visual inspection
Aerial Tram	Age; Visual inspection; Structural inspection for stations and towers (every 2

	years), cables (annually)
Traffic Calming Devices	Visual inspection only
Street Lights	Field inspections; Age of the components; Type of luminaire; Type of system (underground vs. above ground)
Pavement Markings	<u>Painted Markings</u> : No condition assessment since all painted markings are replaced annually due to poor durability characteristics <u>Durable Markings</u> : Type of material; regular maintenance; visual inspection
Parking Meters	<u>Single and Double Meters</u> : Age; Visual inspection <u>SmartMeters</u> : Preventive maintenance schedule; Visual inspection
<i>Source: Portland Bureau of Transportation, Asset Status and Condition Report, 2007.</i>	

### **Annual Funding Gap**

Total unmet need is defined as the cost to bring all assets up to “good” condition. Reported unmet need does not include sidewalks, pavement, or unimproved streets. The Office of Transportation is changing the way pavement is inspected and the software that identifies current needs and strategies that optimize available resources. Pavement network condition and unmet need will not be reported until the transition is complete. Adjacent property owners are financially responsible for repairing sidewalks; therefore, the City does not have an unmet sidewalk repair need. Figures do not include unimproved streets, as the City is not financially responsible for upgrading and maintaining unimproved streets.

## **Environmental Services**

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### **Replacement Value**

Overall, BES applied a 4.2% construction inflation factor to last year’s replacement value (a change in ENR from 7959 to 8293). The value of the two treatment plants comes from the plant facilities plans. For pump stations, values vary significantly. The BES Systems Plan, now underway, will provide better information on replacement value.

### **Current Condition**

BES uses a variety of methods to measure current condition. Methods include visual TV inspection, age, material, and history of failure of adjacent pipes (to indicate remaining useful life). BES condition data is expressed as a percent of the number of assets.

Condition for combined sewers and sanitary sewers are based on regular ongoing assessments. Condition for wastewater treatment systems are based on estimate of repairs for each process area. New information on wastewater treatment assets will come from an update of the Columbia Boulevard Wastewater Treatment Plant.

### **Annual Funding Gap**

BES calculated the funding gap based on the desired level of service of accommodating a 25-year storm event.

## **Water**

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### **Replacement Value**

In most cases, the replacement value is based on the current costs to install assets and includes all overhead costs (assumed at 1.135 times total personnel costs). Pump mains and vulnerable mains are assumed to cost more than the average pipe, due to routing, easements and sensitive locations (in terms of stability and environmental issues). The Bureau has developed a cost model to more reliably estimate project costs for small mains.

## Current Condition

Condition can be based on age, visual inspection, deterioration or failure curves. The Water Bureau matches one of these methods to each asset type.

The Water Bureau uses available information to assess physical condition of its assets. The least specific is a rating based on asset age relative to useful life. The most specific form of rating is based on an actual field condition assessment of individual assets. Intermediate forms of estimating condition involve ratings based on the judgment of Bureau personnel most knowledgeable about a particular asset or group of assets or partial inspection data, extrapolated to an entire asset class. For pipes, the Water Bureau uses Weibull curves of the failure rate by age of the asset class. Deterioration curves are used for pump maintenance.

All reported condition information values are based on the % of value of assets. All notable asset groups are included.

## Annual Funding Gap

The Water Bureau calculated its annual funding gap in two ways. For some assets, poor physical condition triggers the gap. For other water assets, the gap is measured against a service level – mitigate high risk of asset failure (valves at tank sites, replace maintenance facility, conduit sections likely to fail), meet regulatory requirements (LT2), or sound investment decision (meter replacement to limit lost revenue).

The reported funding gap includes costs to:

- replace screw-type hydrants, service lines, pump main segments, high risk pipe segments, and large valves in poor condition;
- replace meters at a sustainable rate;
- install valves to address tank vulnerability;
- fund maintenance facility replacement;
- replace / upgrade sections of the oldest conduits; and
- comply with significant unfunded requirements related to terminal storage reservoir replacement and treatment of supply.

There is a significant portion of the Bull Run watershed road system in need of maintenance. This funding gap has not been included in the total.

## Parks

### Replacement Value

PP&R calculates the replacement value for its assets by estimating the cost to replace the asset in kind, without increasing its size or changing its functionality, but bringing it up to current code. Overhead is included in the replacement value. General estimates are available for all assets.

### Method of Asset Replacement Value Calculation

Asset Group	Method
Buildings and Pools	Square foot costs depending on the asset type.
Amenities	Square foot costs or per each for assets such as benches, tables, drinking fountains, etc.
Infrastructure	Lineal feet
Developed Landscapes	Square foot costs

Natural Areas	Per acre
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### Current Condition

Condition is primarily determined by visual inspections unless the asset is hidden from view. In those cases, remaining life is the default method. In some cases, additional testing is needed.

### Method of Asset Condition Assessment

Asset Group	Method	Status
Buildings and Pools	Visual inspection and remaining life	Arts, community centers and pools are complete; restrooms and shelters will be done this fall; other buildings will follow next year.
Amenities	Visual inspection	Fields and courts, playgrounds, furnishings in developed parks are complete; other assets will be done in the next two years.
Infrastructure	Visual inspection and remaining life	Roads and parking lots have been inventoried but not assessed; much work to be done on utilities.
Developed Landscapes	Visual inspection	All remain to be done.
Natural Areas	Visual inspection	Complete.

Since last year, Parks had completed additional inventory and condition assessments for Buildings, and the health and inventory of Natural Resources are well documented. Playgrounds and Furnishings in all developed parks were inventoried and assessed in summer 2007. Roads and parking lots have been inventoried but not yet assessed. Inventories for other asset groups are planned or underway. PP&R is updating its annual asset inspection program to determine the condition of all assets and will inspect 20% of all assets each year. All assets will be inspected at least once every five years and more often in the cases of pools and play equipment.

### Annual Funding Gap

PP&R calculated the funding gap as the average cost of repairs needed to bring assets up to "good" condition over five years.

## Civic

Methods for civic assets fit into two categories: facilities and technology services.

### Facilities

#### Replacement Value

Replacement values are based on the size of facilities, the type of facility, and costs per square foot to construct that type of facility. To this are added percentage mark ups for indirect costs, including overheads.

#### Condition

Condition assessment is based on an inventory of buildings. Conditions are assessed based on visual inspection by qualified personnel on a regular schedule and are expressed as a percentage of assets in each rating category. Condition ratings for the Portland Center for the Performing Arts have not been determined at this time.

## **Annual Funding Gap**

For all facilities, except spectator facilities and Union Station, the funding gap is the annual difference between what is collected in rental rates, or set aside from net income, for major maintenance and the industry standard of 3% of replacement value. Current funding at 1% of replacement value ensures relative condition (percentage in good, fair, and poor condition) remains relatively constant over the next ten years.

For spectator facilities the gap is the one-time difference between actual fund reserves for capital maintenance and a target level of \$10 million based on the costs to upgrade Memorial Coliseum and address the long-term capital needs of PGE Park. Union Station's one-time funding gap is \$45 million based on unfunded deferred maintenance, in addition to the annual gap. The annual gap of \$500,000 assumes the \$45 million one-time gap is funded to catch up on deferred maintenance and bring the building up to current standards. Unmet need for the Portland Center for the Performing Arts is not included in the total.

## **Technology Services**

Establishing replacement values, current conditions, projected conditions, and funding gaps for technology infrastructure requires a different approach than for facilities infrastructure. Unlike buildings, technology infrastructure can quickly become unusable. This is primarily due to the short lives/quick obsolescence and the critical need to stay current with technologies that may not be supported by vendors in the future and render the technology unusable.

## **Replacement Value**

The replacement value assessment is based on recently completed projects and the experience of other governments, but we have not had an opportunity to analyze their experiences to assess the degree of similarity. These values include indirect costs for engineering and other professional services, but do not include indirect costs for City overheads.

## **Condition**

Condition ratings for Technology Services are based on current age and expected useful life. Condition is expressed as a percentage of assets. Systems considered to be obsolete are included in the poor condition rating.

## **Annual Funding Gap**

The funding gap includes one-time, annualized costs to replace or rebuild obsolete systems (800 MHz Radio System, CAD and PPDS); annual funding necessary to meet industry standards for major maintenance (telecommunications); and annual needs to ensure replacement and upgrades of technology on accepted schedules (IT Operations).

## **Affordable Housing**

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### **Replacement Value**

Since the City is a lender of public funds, provided to for-profit or nonprofit borrowers for the development and operation of the affordable housing projects, replacement value is a reflection of the existing portfolio of projects. These projects are broken out by construction style multiplied by the cost to produce the same construction style. The cost to produce is the most current construction cost/unit the Housing Finance Department has available based upon actual projects. The more current the construction cost, the higher the confidence level.

### **Condition**

Current condition was determined and calculated on historical construction costs and utilizes the methodology of "risk rating" each project as completed in years prior (see below). Risk is



categorized by physical and financial factors. An in-depth physical inspection was not necessarily conducted. However, based on the number of units reporting and the following confidence level, indicators were established: Optimal—95 percent projects reporting; High—75-94 percent; Moderate—50-74 percent; Low—less than 50 percent reporting; TBD—represents projects where additional research is required in order to assess risk.

As stated in prior reports the affordable housing portfolio is managed as a loan portfolio along with the additional scrutiny for Borrower compliance to regulatory and loan documentation and project financial performance. The successful financial performance and day-to-day management of each project is the key to minimizing the overall risk/loan failure of the projects, thus reducing the need for additional funding.

**Risk Calculation Methodology:** Risk is divided into two categories: physical and financial. Physical Risk is assessed by the length of time, from initial construction or the last rehabilitation, repair, or remodel. Length of time is represented in years, and ranges are assigned a point value. Point values correspond to the level of risk. An incomplete repair, remodel, or rehabilitation is more risky, thus more likely to need additional funding. The City has defined \$15,000 per unit as the threshold between full and partial rehabilitation. Financial Condition Risk was based on standard financial ratios and whether the project is currently on or has requested a “corrective action plan” within the past 2 years.

Operating Expense Ratio - PDC’s industry experience shows that a ratio below 58 percent allows an adequate margin to sustain stable operations. An expense ratio above 70 percent places undue stress to the project. The Owners need to actively and aggressively review revenue and expenses to stabilize the project. This indicator strongly suggests whether the project will need additional funding to stabilize and remedy the situation.

Debt Coverage Ratio - This ratio is equal to net operating income (NOI) divided by regularly scheduled (amortized) loan payments. PDC anticipates additional financial indicators such as net cash flow and project reserves to be considered and used in future reports.

NOTE: In the future, the City will explore other methodologies to generate more accurate depictions of risk and therefore future gap requirements.

### **Annual Funding Gap**

The annual funding gap represents an estimate of units that will need additional funding to sustain the existing level of affordable housing units available to the City. The value is calculated using the “poorest” risk-rated projects with the goal of improving the projects’ risks, therefore, reducing their future need for additional funding. The projected ten-year value is calculated using the “Most Current” construction cost, which is inflated by a 7 percent factor.

While an annual funding gap number was developed to align with the City's current report structure, it may not be the most accurate way to depict the affordable housing industry’s annual need. PDC is working to develop more accurate financial ratios and communication links. The significant difference in the funding gap for the affordable housing industry is that it should reflect the potential of any one project requesting financial assistance from the City/PDC. Better financial evaluation of current projects and better communications with our borrowers should provide us more accurate insight into a project’s need for financial support to assure future sustainability. In 2006, PDC reported this as an ongoing collaborative effort of its Housing Policy & Planning and Asset Management departments, and industry representatives.

## Appendix 5: Asset Management Definitions

**Asset:** A physical component of infrastructure or a facility which has value and has an expected useful life of more than one year, that would be replaced if destroyed, and is not surplus to needs.

**Asset Management:** The continuous cycle of asset inventory, condition, and performance assessment that has as its goal the cost-effective provision of a desired level of service for physical assets. Investment decisions consider planning, design, construction, maintenance, operation, rehabilitation, and replacing assets on a sustainable basis that considers social, economic, and environmental impacts.

**Backlog:** The sum of deferred activities, such as maintenance, operations, and rehabilitation, needed to achieve the lowest life-cycle cost for an asset. Backlog results from lack of money, materials, or staff to perform the needed work. (See Funding Gap.)

**Capital Expansion:** Projects or facilities that create new assets, increase the capacity of existing assets beyond their original design capacity or service potential, or increase the size and service capability of a current service area, including service to newly annexed, undeveloped, or under-served areas. Generally increases the total maintenance requirements because it is increasing the total asset base.

**Civic:** A collection of City-owned assets, including facilities (office, police, fire, parking garages, spectator facilities, Portland Center for the Performing Arts) and technology services (800 MHz radio system, telecommunications, IT operations, strategic technology). Bureau maintenance facilities are assets of the operating bureau.

**Condition Assessment:** The method used to quantify the deterioration rate and remaining useful life of an asset. Methods of condition assessment vary by asset classification and range from use of industry estimates for deterioration rates up to documented physical inspection regimens on established cycles that ensure optimum economic life of an asset.

**Condition Measure /Rating:** A means of classification using information from periodic inspections or measurements to indicate the ability of an asset to deliver a particular level of service.

**Confidence Levels (in data/information):** The expression of accuracy and reliability in the areas of information (source and reliability), process (ad hoc or repeatable) and documentation (documented or not documented).

The following chart addresses this information:

	<b>Inventory completeness</b>	<b>Condition assessment method and frequency</b>	<b>Process and documentation</b>	<b>Resulting confidence level</b>
1	No inventory	No assessment method	No process	No confidence
2	Partially complete inventory	Estimates used to assess condition	Process not well documented	Low confidence
3	Inventory complete	Subjective process to estimate condition	Some documentation in	Moderate confidence

	<b>Inventory completeness</b>	<b>Condition assessment method and frequency</b>	<b>Process and documentation</b>	<b>Resulting confidence level</b>
		estimated followed on a regular schedule	place	
4	Inventory complete	Condition surveys conducted on a regular schedule by well-trained personnel	Well documented process followed	High confidence
5	Inventory complete	Condition surveyed on a regular schedule	Objective process followed; Accuracy of data verified and well documented	Optimal confidence

**Consequence of Failure:** The outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event.

**Current Replacement Value (CRV):** The CRV is the total cost to replace the entire asset to meet current accepted standards and codes.

**Failure Mode:** The reason why an asset failed to provide the function for which it was installed.

**Funding Gap:** The difference between the funding needed to address infrastructure needs of an asset at a defined condition or level of service and the funding that is currently available. The funding gap varies with the funding level and affects the level of service. The funding gap is the amount of money needed to eliminate the backlog and/or maintain the asset to achieve its useful life. Given a certain funding level, the resulting level of service can be forecast; if a certain level of service is desired, the funds needed to achieve it can be estimated.

**Green Infrastructure:** Infrastructure that uses natural processes, systems, or features to provide traditional infrastructure services. There are two types of green infrastructure:

- 1) Natural networks of streams, rivers, and open spaces that naturally manage stormwater, provide habitat, improve air and water quality, reduce flooding risk, and provide areas for human recreation and respite; and
- 2) Engineered facilities, such as green street treatments or eco-roofs, which use natural processes in an infrastructure setting.

**Infrastructure:** Consists of assets in two general networks that serve whole communities—transportation modalities (roads, rail, etc.) and utilities. These are necessary municipal or public services, provided by the government or by private companies and defined as long-lived capital assets that normally are stationary in nature and can be preserved for a significant number of years. Examples are streets, bridges, tunnels, drainage systems, water and sewer lines, pump stations and treatment plants, dams, and lighting systems. Beyond transportation and utility networks, Portland includes buildings, green infrastructure, communications, and information technology as necessary infrastructure investments that serve the community.

**Inventory:** A list of assets and their principal components.

**Level of Service:** A defined standard against which the quality and quantity of service can be measured. A level of service can include reliability, responsiveness, environmental acceptability, customer values and cost.

Life-Cycle Cost: The sum of all costs throughout the life of an asset, including planning, design, acquisition, construction, operation, maintenance, rehabilitation/renewal and disposal costs.

Likelihood of Failure: The probability or possibility of an event that will cause the asset to fail.

Maintenance: Activities that keep an asset operating as designed or prevent it from deteriorating prematurely, excluding rehabilitation or renewal which may extend asset life. Maintenance can be planned or unplanned.

Planned maintenance is:

- Preventive – maintenance conducted at regular scheduled intervals based on average statistical/anticipated lifetime.
- Condition-based – maintenance based on objective evidence of need from tests, measurements and observations.
- Deferred – the shortfall created by postponing prudent but nonessential repairs to save money or materials. Generally, a policy of continuing deferred maintenance results in higher costs when repairs are eventually made, or failure that occurs sooner than if normal maintenance had been performed.

Unplanned maintenance is:

Reactive or Emergency – corrective actions taken upon failure or obvious threat of failure, usually at a higher cost than planned or preventive maintenance.

Operations: The ongoing activities that allow the use of an asset for its intended function.

Performance Indicator: A qualitative or quantitative measure used to compare actual performance against a defined standard. Indicators are commonly used to measure cost, performance, or customer satisfaction.

Performance Monitoring: The periodic assessments of actual performance compared to specific objectives, targets, or standards.

Rehabilitation / Renewal: Maintenance performed on an asset to restore it to its original level of service or capacity and achieve its useful life, which may result in an extension of the asset's service life.

Retirement/Removal: Decommissioning or removal of an asset through disposal, abandonment, demolition, or sale that may involve retiring deteriorated assets and recovering salvage value.

Risk: The chance of something happening that will have an impact upon objectives. Risk is measured in terms of likelihood and consequences.

Risk Analysis: A systematic use of available information to determine how often specified events may occur and the magnitude of their consequences.

Risk Management Strategy: The systematic application of management policies, procedures and practices to the tasks of establishing the context, identifying, analyzing, evaluating, treating, monitoring and communicating risk.

Triple Bottom Line: A method to categorize the benefits and impacts an organization can expect from investing in its assets. The benefits are categorized into Social, Economic, and Environmental benefits to ensure a comprehensive evaluation in the decision-making process (measure, manage and report).

Useful Life: The period of time over which an asset is expected to deliver efficient service with normal or appropriate maintenance (defined as accepted industry standard or documented local experience).

