

Chapter 2

Asset Management

Effectively Managing the City's Infrastructure Systems

In 2013, the replacement value of the City of Portland's built infrastructure was estimated at \$31.3 billion.² Providing, operating, and maintaining the City's infrastructure has become increasingly important as current systems age and Portland's population grows.

Asset management is a tool to identify the most cost-effective way to protect assets, provide community services, and safeguard public health, environmental quality, and economic security. Asset management is commonly defined as meeting agreed upon customer service levels, while minimizing life cycle costs at an acceptable level of risk. It focuses on delivering value to the customer – both in terms of the services provided and the rates charged – in an efficient and transparent manner.

The goal of asset management is to make better decisions about infrastructure acquisition, planning, design, construction, operation and maintenance, and renewal or replacement. Five core questions of asset management help achieve this goal:

- What is the current state of the assets?
- What is the required sustained level of service?
- Given the system, which assets are critical (based on risk) to sustained performance?
- What are the best "minimum life-cycle cost," Capital Improvement Program (CIP), and Operation and Maintenance (O&M) strategies?
- Given the above, what is the best financing strategy?

Asset management involves continuous improvement. City bureaus are committed to improving asset management practices to accurately inform strategic decision making and effective infrastructure management. For example, the City continues to develop more sophisticated methods for assessing and tracking the condition of its infrastructure.

Maintaining Existing Assets

Because Portland's city limits cannot expand significantly, the majority of new growth will be accommodated within the City of Portland's current boundaries. This means existing transportation, water, sewer, stormwater, and parks and recreation systems will serve the majority of current and new residents' and businesses' needs over the coming decades, resulting in additional demands on existing infrastructure. These systems also will be used more heavily as new residents of Portland's suburbs come into the city to work, shop, or play.

² City of Portland, "Citywide Assets Report", 2013, Available at: <http://www.portlandoregon.gov/bps/article/49854> .

The City has a large infrastructure maintenance deficit, due largely to the age of many systems, chronic underinvestment in preventative maintenance and capital repair, increasing maintenance costs, and the lack of revenue to allow more sustainable investment. At current funding levels, some of Portland's infrastructure will continue to deteriorate. This will increase the risk of asset failures, reduce levels of service, and perpetuate long-standing inequities.

Managing risk

Asset management involves comprehensively examining the risks of infrastructure failure. Infrastructure can fail due to poor condition or impacts from a natural or man-made event. They can also fail to provide the intended service, fail to meet regulatory goals, or fail to be cost effective. The City's infrastructure bureaus are undertaking risk management analyses to help identify strategic investments that will cost-effectively reduce the likelihood of asset failure. For example, the Bureau of Environmental Services and Portland Water Bureau both evaluate the age and condition of pipes. They combine this data with information about what could cause a pipe to fail, how likely these events are to occur, and the potential consequences of a failure. This analysis enables the Bureaus to identify the most critical and cost-effective repair or replacement projects. Actions to manage risk should increase the City's ability to meet community needs while protecting human and environmental health. However, new funding strategies or sources will also be needed to fully address deficiencies.

Complying with regulatory mandates

In addition to meeting maintenance and repair needs, the City also must maintain compliance with a variety of federal and State regulations, primarily related to protecting public health and environmental quality. At the federal level, many of these mandates are related to the Clean Water Act, Clean Air Act, Safe Drinking Water Act, Endangered Species Act, and Americans with Disabilities Act. Complying with these mandates is a City priority and represents a large component of infrastructure spending. Because of this priority, meeting regulatory mandates can mean that other maintenance, repair, and improvement projects must be put on hold, or additional funding must be allocated. As regulations are created or revised in the future, the City will need to continue to examine investment approaches and priorities to ensure infrastructure systems adequately serve the community. More detailed information on regulatory mandates can be found in the system-specific chapters of this plan.

Accommodating growth

The majority of the City's residential and employment growth over the next 20 years will occur on vacant sites or as redevelopment within the city's existing boundaries. As such, the ability of the City's infrastructure to accommodate growth depends primarily on the City's ability to resolve current deficiencies — to serve under-served areas and to improve or maintain the condition of existing infrastructure.

Major redevelopment efforts can have significant implications on existing assets and the type and extent of new infrastructure needed to serve an area. Without careful planning, such projects can overstretch the ability of existing built and natural infrastructure to meet community needs, particularly in under-served areas. As redevelopment is planned, it will be important to consider the full implications of such efforts on

infrastructure needs and financial resources, and to coordinate planning with bureaus whose infrastructure might be impacted.

To better accommodate growth and reduce system loads, bureaus are actively researching and using a variety of demand management strategies. The ability of bureaus to innovate, reduce demand, or increase efficiency through new technologies and practices will be instrumental in their ability to serve the city in the future.

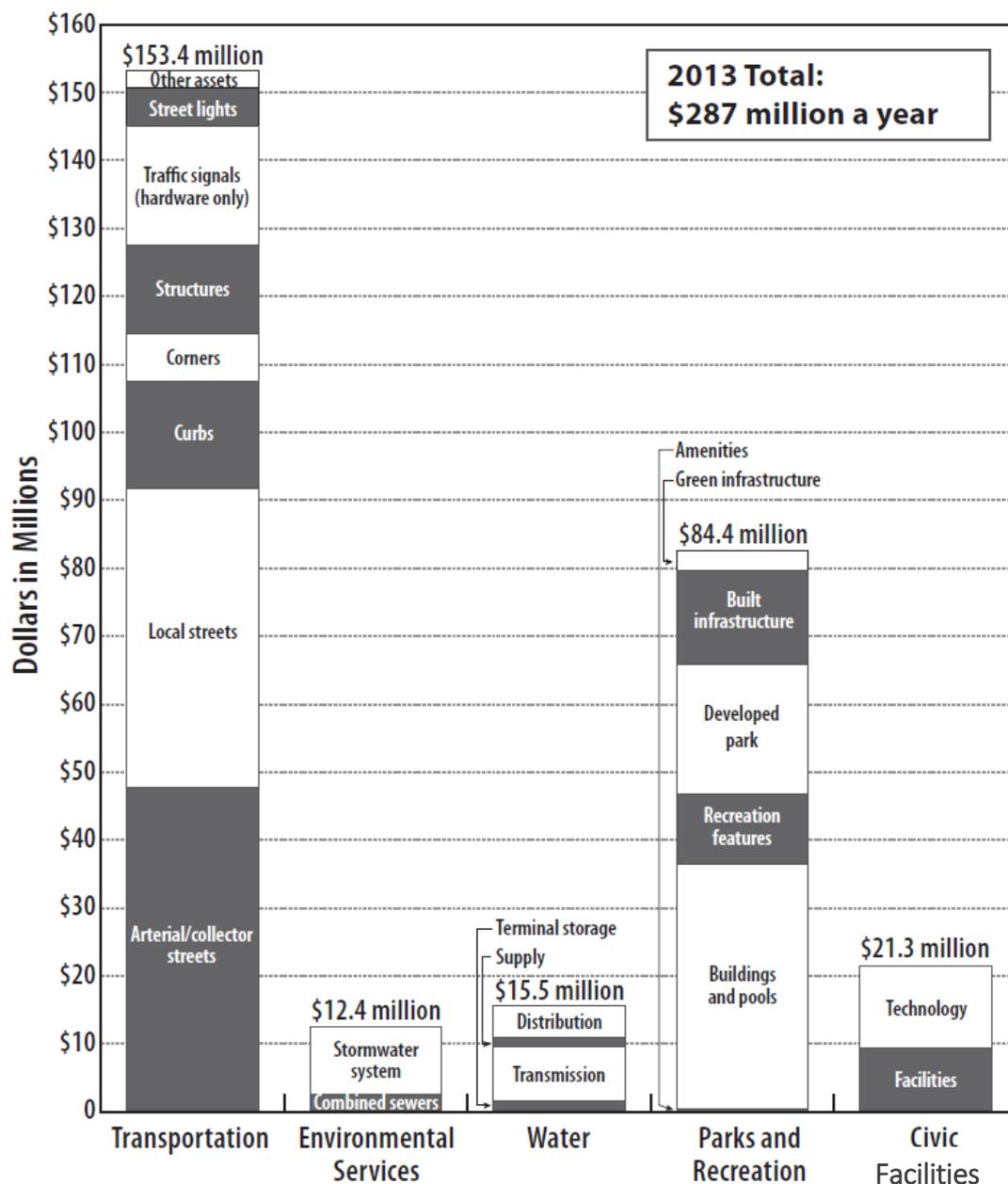
Infrastructure funding gaps

Conservatively, the City's infrastructure bureaus estimate that the City needs to invest approximately \$287 million more than current funding levels per year for each of the next 10 years to replace existing aging assets, maintain existing facilities, address regulatory requirements, and/or meet service levels, see Figure 2.1. This gap will likely grow for each of the next 10 years. That level of reinvestment would require spending at least 25 to 40 percent more than the City currently spends on major maintenance and capital projects. New assets often add to ongoing operations and maintenance needs, potentially adding to the funding gap. Some new assets may also replace existing asset functions and add new functionality. The City's estimated annual funding gap includes:

- **Transportation:** Significant maintenance needs for the City's street system – one of City's most valuable assets – make up the largest portion of the City's annual \$153.4 million transportation funding gap. The funding gap for collector and arterial streets is estimated at \$47.6 million with another \$44 million for local streets, based on pavement condition. There are also significant funding gaps for the sidewalk system (\$15.7 million annually to repair, restore or replace curbs and \$7.1 million annually to build and maintain ADA accessible corners); bridges (\$12.9 million); signal hardware (\$17.5 million); street lights (\$5.8 million); and other assets (\$2.8 million).
- **Environmental Services:** The City's \$12.4 million annual funding gap for environmental services reflects unmet replacement and maintenance needs for sewer and stormwater systems. The estimated funding gap makes broad assumptions about the rehabilitation and capacity needs in the City's separated stormwater areas, for which more detailed assessment and planning is currently underway.
- **Water:** The City's annual \$15.5 million funding gap for water assets includes unmet replacement and maintenance needs in the distribution system (including pipes, services, valves, and hydrants); needs to replace or upgrade sections of transmission conduits; and maintenance needs for the Bull Run watershed road system.
- **Parks & Recreation:** The City's parks and recreation system has an expected total capital annual funding need of \$84.4 million for parks and recreation facilities for each of the next 10 years. This includes \$47.8 million for expanding the system to provide standard levels of service for all residents in addition to \$36.6 million in funding needed to maintain existing assets.
- **Other civic facilities:** The City's \$21.4 million annual funding gap for civic facilities includes funding necessary to meet industry standards for major maintenance of City facilities, such as office buildings, police and fire facilities, spectator facilities, and maintenance facilities, as well as annual funding to ensure replacement and upgrades of technology on accepted schedules.

To maintain a high level of infrastructure services, the City will need to reassess service level standards, identify strategic investments, consider the full long-term costs of improvements, pursue innovative funding sources and partnerships, and work with the community to make tough choices about funding priorities. Chapters 6 through 10 of this document provide more detailed system-specific information on the asset management needs and approaches of the various City infrastructure bureaus.

Figure 2.1 Annual Funding Gap, by Asset Group (in millions per year, December 2013)



Managing the city's green infrastructure

The city's green infrastructure -- including natural areas, tree canopy, streams and rivers, and engineered features like green streets and ecoroofs -- provides many infrastructure and ecosystem services. For example, green infrastructure can manage stormwater, improve water quality, reduce flooding risk, provide wildlife habitat, provide areas for recreation, and improve resilience to natural hazards and climate change. A single green infrastructure asset may provide many different infrastructure services. For instance, a greenstreet facility might help retain and infiltrate stormwater, provide habitat and access to nature, and calm traffic.

Protecting and enhancing this green infrastructure is critical to the City's ability to provide public services in a cost-effective and sustainable way. However, green infrastructure presents unique asset management challenges:

- Some green infrastructure assets are owned and/or managed by the City (e.g. green streets, City-owned parks and natural areas), while many others are not (e.g. streams and rivers; private vegetated stormwater facilities; and natural areas and trees on land not owned by the City). However, the City relies on the infrastructure functions and ecosystem services provided by both public and private green infrastructure.
- From a financial planning perspective, green infrastructure assets cannot be accounted for in the same ways as grey infrastructure assets, like pipes. For example, the infrastructure service value of green infrastructure assets (e.g. trees) cannot be determined by its replacement cost and the value may appreciate over time.
- The nature and frequency of maintenance, replacement and/or restoration of green infrastructure assets is different than traditional infrastructure assets, such as pipes and streets, and has a bearing on operations and maintenance (O&M) budgets. Some green infrastructure projects have lower up-front capital costs than traditional infrastructure, but may require more regular maintenance. In other cases, capital funding (e.g., to purchase a new park or natural area) is available, but O&M funding is not.

The City is actively working to develop and improve asset management practices for green infrastructure that address these challenges. However, green infrastructure assets are not fully incorporated into the asset management information and tables (e.g. inventory, condition, replacement value) in the Citywide Systems Plan.

Growth forecasts and locations

Today, more than 605,000 people live in Portland. Over the last 30 years, Portland's population has increased by more than 200,000 residents, primarily due to annexations in east and west Portland during the 1980s and 1990s. According to the Metro 2040 regional forecast, by 2035, Portland is expected to grow by nearly 280,000 people (132,000 households) and 147,000 new jobs within its current boundaries.

In addition, the four-county Portland metropolitan area is anticipated to grow from approximately 1.6 million residents in 2010 to over 2.8 million residents in 2035.³

Portland's existing zoning has more than enough development capacity to accommodate anticipated future residential growth and most projected employment growth, except for industrial and institutional uses. This surplus capacity creates an opportunity to make choices about where to focus or prioritize growth.

Buildable lands inventory

The Buildable Lands Inventory (BLI) is an assessment of the city's capacity to accommodate projected changes in housing and employment. A series of maps documents potential physical and market constraints to achieving forecasted increases in households and jobs. These maps were used to determine whether land in the city has full, diminished, or no capacity to accommodate additional housing units or additional jobs forecasted for the next 20 years.

A number of infrastructure related constraints were considered to pose physical or market constraints on new development and were accounted for in the inventory. These constraints included:

- Transportation Vehicular Level of Service
- Transportation Street Improvements
- Water Service
- Sewage Conveyance
- Stormwater Constraints
- Airport Flight Limitations

More information on the Buildable Lands Inventory is available at <http://www.portlandoregon.gov/bps/59296>.

Growth scenarios and preferred development pattern

The Growth Scenarios report is a background report of the Comprehensive Plan and is a required element of Portland's Periodic Review work program (Task 3). The purpose of this report is to describe how and where Portland is expected to grow over the next 25 years, and to measure the performance of different alternate growth patterns and their ability to help meet Portland's goals and objectives. This analysis is rooted in the Measures of Success adopted in the Portland Plan.

The Growth Scenarios report offers a basis for making informed decisions about which investments and growth patterns will bring the greatest benefit to the most Portlanders, reduce disparities, increase opportunities, and move the city closer to meeting performance goals, such as improving access to living-wage jobs, providing safe and convenient access to goods and services within walking distance of where

³ Metro, "Population and Housing Forecasts for 2035, by City and County." dated January 15, 2013; Online: <http://www.oregonmetro.gov/index.cfm/go/by.web/id=42397>.

people live, reducing risks due to natural hazards, enhancing watershed health, and reducing carbon emissions.

The initial Growth Scenarios analysis included four growth scenarios:

- Default – The Default Scenario is based on existing development patterns and development trends. This scenario distributes future growth in the same places Portland has seen growth over the past 15 years.
- Centers – The Centers Scenario focuses more growth in established centers like Lents, Hillsdale, and Gateway and less growth along the length of commercial and mixed use streets.
- Corridors – The Corridors Scenario focuses more development along streets like SE Powell, SE Foster, SW Barbur and N Lombard and less growth in centers.
- Central City Focused – The Central City Focused Scenario concentrates nearly all growth in the Central City and the inner neighborhoods near the Central City, both east and west of the Willamette River.

More information on the Growth Scenarios is available at <http://www.portlandoregon.gov/bps/62384>.

The Growth Scenarios analysis and public input were used to develop a preferred development scenario, in which growth is primarily accommodated in centers and corridors distributed throughout the city. This preferred development scenario guided refinement of the Comprehensive Plan Urban Design Direction and Comprehensive Plan Map. The Citywide Systems Plan is intended to provide a general plan for serving the land use designations and densities designated in the Comprehensive Plan Map.

Centers and Corridors as focus areas for growth

Metro 2040, the Portland Plan, the Growth Scenarios Report, and the Comprehensive Plan Update all support and/or examine continued residential and mixed use growth in centers and along key corridors. This focus is intended to improve access to services and opportunities for active transportation, enhance household and economic prosperity, help the city achieve its climate preparation and carbon emission reduction goals, and promote community and watershed health. Community conversations about the location, type, extent, and level of development in each center and corridor were part of the Comprehensive Plan Update.

These same plans, as well as the Economic Opportunities Analysis (EOA), expect high levels of employment growth and intensification in industrial sanctuaries, campus institutions, and dispersed industrial and employment areas throughout the city to accommodate future job growth.

Many centers, corridors, and employment areas will require additional public infrastructure investment over the next twenty years to resolve existing deficiencies, accommodate additional growth, encourage and support private investment and job creation, and develop complete communities. As more detailed area-specific planning is completed for these areas, future refinements to the Citywide Systems Plan may be necessary to fully reflect recommended infrastructure investments.

Investment strategies for centers and corridors

The Comprehensive Plan supports strategic public and private investments in housing, jobs, and infrastructure in centers and corridors. These investments will improve equity and help ensure Portlanders live in healthy, complete, and prosperous neighborhoods.

Centers and corridors vary in terms of their current and expected future size, character, and demographic makeup. They also vary in terms of how prepared they are, in terms of physical infrastructure and facilities, to be able to succeed as anchors to healthy connected neighborhoods.

The Comprehensive Plan supports four investment strategies that tailor the type of investment to the expected population of the area, infrastructure needs, and presence of people who might be vulnerable to displacement. Figure 2.2 shows how designated centers vary according to these factors. The combination of these factors plays out in four different investment strategies described below.

1. Invest to reduce disparities and improve livability

This strategy is appropriate for centers and corridors that are not expected to grow significantly, but that have existing infrastructure deficiencies. Addressing these deficiencies will improve health and livability for area residents. For example, investments could fill gaps in streets, bicycle and pedestrian routes, and local parks. Economic development programs could support existing and new businesses and improve neighborhood prosperity and vitality.

2. Invest to enhance neighborhoods, maintain affordability and accommodate growth

This strategy is aimed at centers and corridors that lack basic infrastructure or shops and services and that either have a lot of residents now, or will in the future. These areas also have many people who may be vulnerable to displacement as property values rise.

In these areas, infrastructure investment could include improving streets, creating new parks, and addressing other deficiencies. Economic development programs could preserve and increase jobs, businesses, and community services in these areas. Housing security programs, like homeownership and rental assistance, could help keep the neighborhood affordable for a range of households.

3. Respond to opportunities and maintain existing services

Some centers and corridors have limited infrastructure needs and are not expected to grow significantly. In these areas, investments focus on maintaining livability and existing infrastructure as well as responding to opportunities.

4. Invest to fill service gaps, maintain affordability and accommodate growth

Some centers and corridors have already benefited from public and private investments in things like light rail, complete streets and neighborhood business districts. In these areas, future investments should focus on making sure infrastructure can serve new residents, filling remaining service gaps, and providing affordable housing.

Figure 2.2 Investment Strategies for Centers

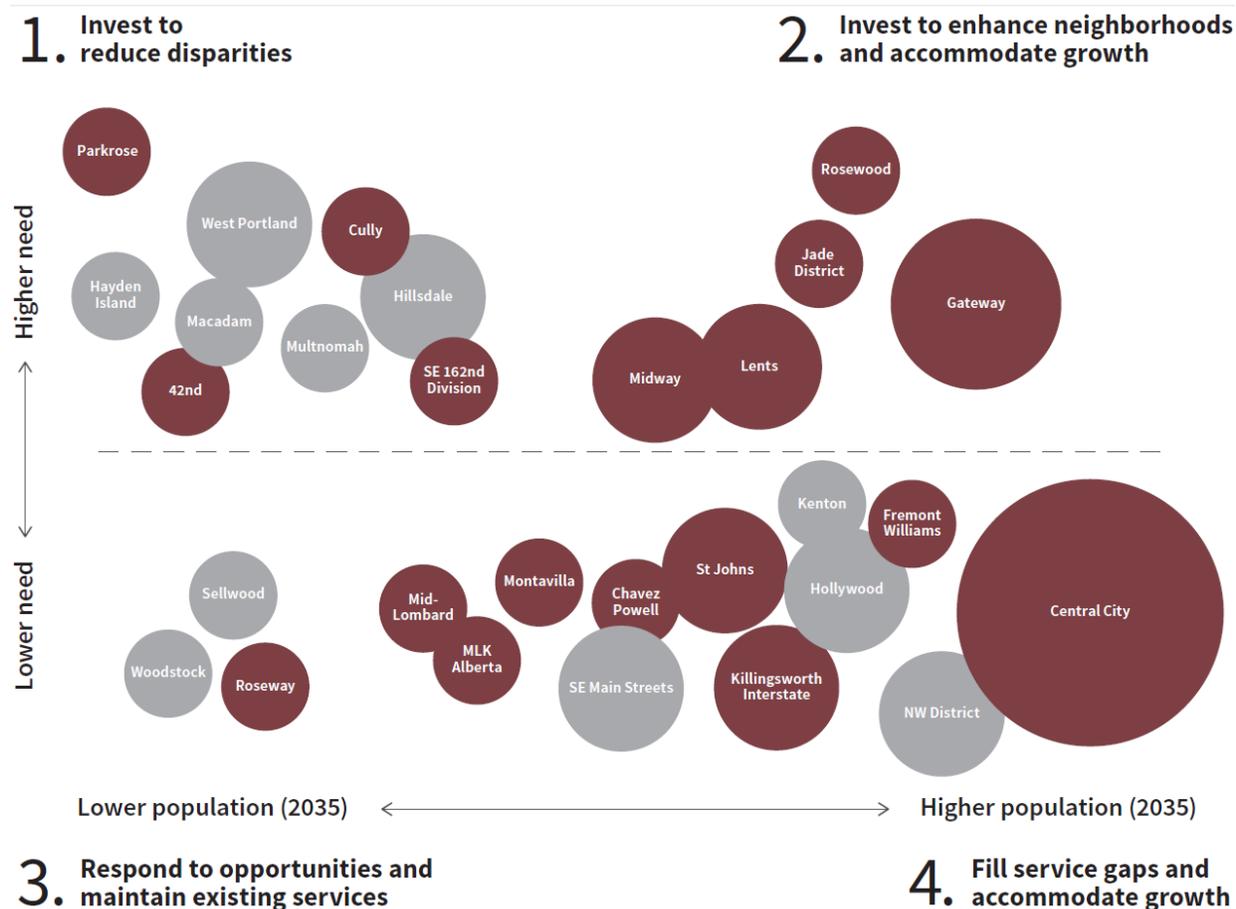


Figure 2.2 shows how Portland’s Centers vary in future population, infrastructure needs, and presence of people who might be vulnerable to displacement. The four investment strategies are described in more detail above.

Vulnerability to displacement

In some centers and corridors, many households have the resources and financial security to benefit from and adapt to neighborhood growth and development. However, other centers and corridors – those shown in dark red on Figure 2.2 - are home to more people (renters, households with low income and education levels, and communities of color) that may not be poised to take advantage of growth or may be at risk of involuntary displacement as development occurs.

Summary of system capacity to accommodate growth

Environmental Services

The Bureau of Environmental Services (BES) plans for its facilities based on the maximum densities allowed within existing Comprehensive Plan land use designations. Additional investments in the sewer system will be necessary to address high risk assets, to provide stated levels of service, and to meet regulatory requirements. BES expects to be able to maintain and improve the sewer systems to handle growth needs as long as sewer rates are sufficient to finance system maintenance and capacity upgrades. However, site-specific issues, such as topography and the proximity of existing sewer or stormwater systems, mean that it may not be technically or economically feasible to serve all properties.

The City's stormwater system is composed of combined sewers (sanitary and storm) and separated storm sewers and drainage systems. Stormwater management also relies on the natural rivers and streams that convey stormwater and on stormwater management systems that are owned by other public agencies and private property owners. In areas of the city where the City's stormwater system is constrained, existing and possible future development may exceed the natural and built systems' ability to manage stormwater. This could contribute to flooding, erosion, and damage to homes, business, roads, natural areas, and streams.

Choices about how the city grows will have a substantial effect on the stormwater system. Adequately serving future growth will require investments in traditional piped systems and green infrastructure by the City, other public agencies, special districts, and private property owners to ensure effective stormwater management.

Water

The Portland Water Bureau's primary distribution system can reliably deliver water through 2035, mostly using existing facilities. The Water Bureau is planning water infrastructure improvements to address increasing retail demands within the city limits; demand is expected to increase from 61.5 million gallons per day in 2005 to 79 million gallons per day in 2030. Serving Portland's future population also relies on the continued adequacy and reliability of water systems owned by special districts that serve areas within Portland's urban services boundary.

The Water Bureau also supplies water to regional wholesale customers. Population in areas served through these wholesale contracts is expected to increase significantly, resulting in potentially large increases in water demand. The Water Bureau, in collaboration with the Regional Water Providers Consortium, will also continue investing in water conservation programs that help manage demand and extend the life of the water supply system.

Transportation

The success of Portland's transportation system in meeting future local and regional mobility needs will depend on the City's — and its partners' — ability to maintain existing assets and make strategic investments. The City faces significant funding challenges, maintenance backlogs for existing assets, and

deficiencies in service provision. Future transportation investments will be needed to provide complete, safe, and accessible pedestrian, bicycle, and transit systems and to support freight mobility and access.

Providing a well-functioning, multimodal transportation system for Portland's residents, businesses, and visitors also depends significantly on the ability of the City's partners, including Multnomah County, the Oregon Department of Transportation, TriMet to provide and maintain their facilities, which are critical components of the overall transportation system.

Parks & Recreation

To maintain Portland's quality of life while accommodating growth, it will be necessary to preserve and enhance access to a variety of high-quality park and recreation experiences by acquiring and protecting a range of parks and natural areas, maintaining existing facilities, and providing additional recreation facilities and services. The actual number and type of parks and recreational facilities needed will vary based on where and how growth occurs, the ability of existing facilities to serve additional users and meet diverse needs, and what opportunities arise to locate and build additional parks and facilities. Planning for Portland's future park and recreation system will require providing park experiences that are tailored to both a growing and diverse population and also to the unique characteristics of Portland's parks and natural areas.

Adequately serving current and future Portlanders will also require ensuring that the City's diverse park system provides a variety of active and passive recreational experiences that respond to the unique community and environmental context of different areas of the city. In addition, growth may also place additional pressure on heavily used facilities, such as swimming pools, and it may exacerbate service deficiencies in currently under-served areas. These pressures may be particularly acute in centers that currently lack sufficient park amenities, where both existing facilities and acquisition opportunities are scarce.

Other City Facilities and Systems

Meeting the needs of current and future Portlanders also relies on the City's ability to maintain and enhance other essential facilities and systems – including office buildings, technology, vehicles and apparatus – that are vital to the efficiency and effectiveness of all City agencies, and play an instrumental role in the City's capacity for emergency response.

Non-City Infrastructure Systems

The City does not directly provide public facilities for public education, energy, waste, telecommunications, library, public health, and justice services. However, the current and future capacity of these systems to meet the desired level of service is critical to the city's overall ability to serve current residents and businesses, meet the demands of growth, and be healthy, prosperous, and resilient. Because of this, the City of Portland has an interest in coordinating with these agencies and companies. For example:

- **Public Education:** The City partners with school districts on school facility planning and siting and has begun to consider school district capacity when planning for growth. In addition, the City

encourages school facilities to be multi-functional neighborhood anchors, designed and programmed to serve community members of all generations and abilities, helping Portland become a more age-friendly city.

- **Energy:** Private utilities and companies provide energy facilities and services in Portland. While the City of Portland does not directly provide energy facilities and services, it does regulate placement of these facilities within the right-of-way and on public property. In addition, the City promotes efficient, reliable, and sustainable energy resources, investments, and consumption practices. In particular, the City encourages the use of smart grid technologies; low-carbon and renewable energy sources; and onsite and district-scale renewable energy production to improve the efficiency, reliability, affordability, and sustainability of the energy supply and distribution system.
- **Solid waste, composting, and recycling:** Solid waste, composting, and recycling facilities and services are regulated and provided through a partnership between the City of Portland, Metro, and private companies. The City supports sustainable waste reduction, recovery, and management and acknowledges the important upstream impacts of consumption and disposal of goods and materials. The City also supports efforts to ensure materials are used and reused to the fullest extent possible prior to disposal.
- **Technology and communications:** Private utilities and companies provide technology and communication facilities and services to the general public. The City provides certain technology and communications services to support service delivery by the City and other governmental partners, and it promotes access to affordable and reliable technology and communications for all Portlanders. The City acknowledges that information and technology services have become essential infrastructure, and supports investments and partnerships to ensure all Portlanders are able to access and benefit from emerging technologies, keep Portland competitive, and build on the city's tradition of open-source collaboration and innovation.