



Environmental Law: Green Building, Graywater, and Stormwater

Fall 2010 and Spring 2011 • Law

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Acknowledgements

This report is part of the work of the University of Oregon's Sustainable City Year partnership with the City of Salem, Oregon. We would like to extend our thanks and appreciation to the City of Salem. In particular we would like to thank City staff for their invaluable assistance and expertise. In addition we would like to thank Jan Wilson of the Western Environmental Law Center for her guidance on this project.

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About SCI

The Sustainable Cities Initiative (SCI) is a cross-disciplinary organization at the University of Oregon that seeks to promote education, service, public outreach, and research on the design and development of sustainable cities. We are redefining higher education for the public good and catalyzing community change toward sustainability. Our work addresses sustainability at multiple scales and emerges from the conviction that creating the sustainable city cannot happen within any single discipline. SCI is grounded in cross-disciplinary engagement as the key strategy for solving community sustainability issues. We serve as a catalyst for expanded research and teaching, and market this expertise to scholars, policymakers, community leaders, and project partners. Our work connects student energy, faculty experience, and community needs to produce innovative, tangible solutions for the creation of a sustainable society.

About SCY

The Sustainable City Year (SCY) program is a year-long partnership between SCI and one city in Oregon, in which students and faculty in courses from across the university collaborate with the partner city on sustainability and livability projects. SCY faculty and students work in collaboration with staff from the partner city through a variety of studio projects and service-learning courses to provide students with real-world projects to investigate. Students bring energy, enthusiasm, and innovative approaches to difficult, persistent problems. SCY's primary value derives from collaborations resulting in on-the-ground impact and forward movement for a community ready to transition to a more sustainable and livable future. SCY 2010-11 includes courses in Architecture; Arts and Administration; Business Management; Interior Architecture; Journalism; Landscape Architecture; Law; Planning, Public Policy, and Management; Product Design; and Civil Engineering (at Portland State University).

About Salem, Oregon

Salem, the capital city of Oregon and its third largest city (population 157,000, with 383,000 residents in the metropolitan area), lies in the center of the lush Willamette River valley, 47 miles from Portland. Salem is located an hour from the Cascade mountains to the east and ocean beaches to the west. Thriving businesses abound in Salem and benefit from economic diversity. The downtown has been recognized as one of the region's most vital retail centers for a community of its size. Salem has retained its vital core and continues to be supported by strong and vibrant historic neighborhoods, the campus-like Capitol Mall, Salem Regional Hospital, and Willamette University. Salem offers a wide array of restaurants, hotels, and tourist attractions, ranging from historic sites and museums to events that appeal to a wide variety of interests. 1,869 acres of park land invite residents and visitors alike to enjoy the outdoors.



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Executive Summary

As part of the Sustainable City Year partnership with the City of Salem, students from the University of Oregon School of Law researched sustainable building and stormwater management, focusing on such topics as Leadership in Energy and Environmental Design (LEED) certification, the use of graywater, and sustainable stormwater management tools. Because the Oregon Legislature has set specific goals around sustainability, codified in ORS 184.423, we recommend that the City of Salem set up a framework for green policies now.

Salem can design a sustainable building policy that incorporates LEED certification to meet the city's specific needs. LEED is a green building certification system that uses a point system to recognize building projects that promote leadership in environmental and health performance. The policies of the cities of Portland, Oregon, and Pittsburgh, Pennsylvania, can be used as examples to assist in crafting a policy consisting of mandatory goals, voluntary incentives, and public participation. One component of a comprehensive sustainable building policy is the reuse of graywater – wastewater that does not contain human waste. A graywater policy would focus on labeling types of graywater and designating different permits for different uses.

Currently, there are few incentives for property owners to implement stormwater management techniques. In addition, some provisions of the Salem Revised Code actually limit the use of rain gardens and permeable pavement. Promoting the use of sustainable stormwater management tools can, however, be accomplished through a mix of incentives, outreach, and education. These stormwater management tools could lead to a reduction of the peak flows of stormwater entering Salem's stormwater management system, including its creeks and rivers.

Introduction

In Oregon, both the legislative and executive branches of government strongly support sustainable building policies. Oregon enacted Oregon Revised Statute (ORS) 184.423 in 2003, which lists goals for sustainability, and issued Governor's Executive Order No. 06-02 in 2006, which also addresses sustainability. Salem currently does not have any municipal policies specifically related to sustainable building practices. However, if the Salem City Council passes the National Green Building Standard in 2012, Salem may adopt a standard that has a sustainability goal akin to LEED certification (Interview with Thomas Phillips 2010). The National Green Building Standard (ICC 700 or "the Standard") is the residential green building rating system approved by ANSI, the American National Standards Institute. The Standard provides best practices for the design, construction, and certification of green residential buildings, renovations, and land developments. It also sets requirements and environmental performance levels for green buildings and developments.

As part of the Sustainable City Year partnership with the City of Salem, five students from the University of Oregon School of Law's Environmental Law Clinic course researched sustainable building and stormwater management, focusing on topics including Leadership in Energy and Environmental Design (LEED) certification, the use of graywater, and sustainable stormwater management tools. The results of this research, and recommendations for the City of Salem, appear below.

Part I: Green Building with LEED Certification and Graywater Systems

Oregon's Commitment to Sustainability

Oregon sets forth policy goals to construct, renovate and maintain city-owned buildings to meet environmental, economic, and community needs. ORS 184.423(1)(b) specifies that the state's investment in "facilities, equipment, and durable goods" should reflect "the highest feasible efficiency and lowest life cycle costs." Also, when a state agency constructs or renovates state facilities, that agency should ensure that design decisions incorporate all "reasonable cost-effective energy conservation and alternative energy systems." In addition, ORS 184.423(2) calls for state agencies to "enable and encourage local communities" in sustainable practices. There are a number of opportunities for Salem to reach that goal. One is through sustainable building practices using the LEED rating system. Another is through the promotion of graywater recycling systems to conserve water.

LEED: Leadership in Energy and Environmental Design

To assist in meeting Oregon's sustainability goals, the Oregon Department of Administrative Services requires construction and renovation of state-owned facilities to meet the Silver level of the LEED rating system in siting, design, and construction of state-owned buildings (State of Oregon Department of Administrative Services 2004). The LEED assessment is based on the state-modified version of the LEED criteria set forth by the United States Green Building Council (USGBC). The Silver LEED rating requires 50 to 59 points across the five key areas of human and environmental health (Oak Ridge Associated Universities 2011). These five key areas are sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

The Utilization by Local Governments of the LEED Rating System

Oregon municipal governments have optimized sustainable building development to meet the needs of people and businesses in their region. Portland mandates that publicly funded buildings meet or exceed the LEED Gold rating, while Eugene requires Silver LEED certification for such buildings. However, several cities, including Salem, do not yet require LEED certification. Nonetheless, Salem has issued a series of environmental action plans, and it is expected that these plans will grow to include green building policy in the near future. Therefore, it would be advantageous for the City of Salem to create a framework for green building policy specifically reflecting the environmental

needs and business opportunities in the region prior to the adoption of any mandatory standards.

There are two basic models promoting LEED certified buildings that Salem can choose to follow: one is a voluntary approach, as used by Pittsburgh, Pennsylvania, and the other is a mandatory approach, as used by Portland, Oregon. Since 1998, when the USGBC set forth a voluntary LEED certification standard in construction and renovation projects for sustainable buildings, many state and local governments, including the City of Portland, have written their own codes mandating LEED certification, making regulations the main driving force behind LEED certification in many places. However, in some places, dedicated grassroots networks, rather than code, provide activism and support for the growth of green buildings in the region. Pittsburgh's green building leadership results from the investment of local foundations, a network of progressive building professionals, and the contribution of a strong academic community in building research and education. These factors, combined with a local population that was willing to take risks, led to Pittsburgh pioneering a new approach to sustainable development.

Portland's Green Building Policy

By generating its own localized version of the LEED certification system, Portland served as an early innovator in green building policy. Portland joined the USGBC in 1999 in order to use LEED to achieve the goal of sustainable building design, construction, and performance. In both new construction and renovation, Portland applies a set of performance standards requiring all new and occupied city-financed facilities to meet or exceed a certain level of LEED certification.

Portland requires a level of LEED certification beyond the State of Oregon's Silver requirement for city-owned facilities. Portland requires a rating of 60 to 79 out of a maximum of 110 credits for the goal of LEED New Construction (NC) Gold certification and LEED Existing Build Operations and Maintenance (EBOM) Silver certification. Further, in 2009, Portland's Office of Sustainable Development proposed a green building policy, which included the mandate that all commercial and residential building construction and renovation be carbon-free. In this proposal, such buildings must be constructed according to the policy standards, or the developer must pay a fee. In short, Portland tries to exceed state building codes by mandating its own LEED certification in order to mainstream greener buildings.

In 2001, Portland adopted a Green Building Policy requiring new construction and major renovations of city facilities to meet certain levels of LEED certification. The Portland City Council amended this policy on April 27, 2005 to require new buildings to meet the LEED Gold standard (Resolution Number 36310). Additionally, this change required LEED Silver for existing buildings. In April 2009, with the passage of Resolution Number 36700, the Green Building

Policy incorporated green building principles into city operations. Current requirements for new city-owned construction projects include:

- Recycle 85% of all construction and demolition waste;
- Go 30% beyond City of Portland's Stormwater Management Manual baseline code requirements;
- Have 30% water savings beyond the Energy Policy Act of 1992 baseline code requirements;
- Use no potable water for building landscaping, except during the first two years;
- Have 30% energy savings beyond LEED baseline requirements;
- Use building commissioning strategies to be eligible for the Sustainable Building Business Energy Tax Credit;
- Include an ecoroof with at least 70% coverage and high reflectance, Energy Star-rated roof material on any remaining non-ecoroof roof surface area, or Energy Star-rated roof material when an integrated ecoroof/Energy Star-rated roof is impractical. (Existing city-owned buildings installing a new roof must follow the guidelines specified for new construction.)
- Incorporate renewable energy systems when possible or required by state;
- Ensure that all tenant improvements to city-owned facilities are LEED for Commercial Interiors (CI) Silver and/or follow the Bureau of Planning and Sustainability's (BPS) High Performance Tenant Improvement Guide. All new commercial or mixed-use buildings over 10,000 square feet that receive financial assistance from the Portland Development Commission of \$300,000 or more must also achieve LEED Silver certification.

These requirements show that Portland sets a high standard for energy saving and resource efficiency in building construction and renovation. Green design features and operational best practices are designed to positively impact both the property itself and the broader community. The Green Building Policy aims at reducing greenhouse gas emissions by maximizing energy efficiency, since almost half of Portland's carbon dioxide emissions come from the energy consumption of buildings (City of Portland 2011).

While Portland has a high standard for LEED certified buildings, this requirement applies only to publicly financed buildings such as city-owned buildings, city-funded facilities, and public infrastructure. Portland shows leadership and guidance to encourage greener buildings in the private sector by its continuous attempts to expand its policy mandates to the residential and commercial sectors. While Portland's city codes cannot exceed the LEED certification requirement of the state building codes, Portland proposes an expansive High Performance Green Building Policy that provides builders with

three options: pay a fee, comply with the heightened standards, or exceed such standards for reward payment.

The proposed policy includes incentives and technical assistance for the projects of various buildings in the private sector. With respect to new commercial and multifamily construction projects, this policy incorporates a “feebate,” that is, a “market-based instrument that combines a fee for conventional construction, a waiver option for moderate green improvements and a reward for high performance green building projects.” For new single-family residential construction, this proposed policy sets a percentage of new homes to be built according to green building standards. New commercial buildings larger than 20,000 square feet would receive a reward payment if they achieve LEED Gold or Platinum certification, and would qualify for a fee waiver by satisfying LEED Silver certification. For existing commercial buildings larger than 20,000 square feet, this proposed policy includes disclosure of building performance regarding energy usage, water usage, and stormwater management. This disclosure leads prospective buyers to identify the performance level of buildings and make informed decisions. These disclosure measures are also applicable to existing single-family residential buildings.

Some homeowners and builders express concern and resistance to the raised costs and heightened standards necessitated by the proposed measures, especially for small projects. As a result, although this policy took effect in 2010, city staff should consider continued development of options for financial support for home renovation. Currently, single-family residential renovation is not required to meet additional high performance green building standards.

This problem calls for an accurate economic analysis for cost-effective sustainable development in Portland. Portland’s high-performance building practice is expected to greatly reduce costs by creating monthly savings on utility bills and increasing the number of local, living-wage jobs (City of Portland 2008). Salem could follow Portland’s LEED certification incentive programs, which closely connect local builders, developers, businesses, homeowners and resource suppliers for sustainable economic opportunities in the region.

Pittsburgh’s Green Building Policy

In contrast to Portland, Pittsburgh, Pennsylvania has taken a different approach by creating a solid green community with initial and continued support from strong local foundations. In addition, the Pittsburgh-based Green Building Alliance has promoted and fostered Pittsburgh’s green buildings, while local designers, contractors and developers have heightened awareness around sustainability issues in local neighborhoods. This movement towards green building positively affects the market, too. The prospective homebuilders and homeowners are educated to recognize costs and benefits of healthful indoor environments, energy savings, and sustainable communities.

Pittsburgh is recognized as a leader in the national green building movement. The 22nd-largest city in the United States, Pittsburgh ranks seventh for the number of LEED-certified buildings in the nation. The Green Building Alliance, founded in 1993, is the first non-profit organization designed to encourage green building in the nation. In 2000, when national green building standards first appeared in the United States, Pittsburgh opened the David L. Lawrence Convention Center, the world's largest LEED-certified convention center.

Much of Pittsburgh's green building movement focuses on the renovation of existing buildings, especially the city's old and beautiful historic building stock. Unlike new construction, the retrofit of existing buildings has to be approached on a case-by-case basis, so it is logical to develop voluntary green building practices tailored to innovative renovation rather than "one size fits all" building codes. Green building non-profits in Pittsburgh renovate aging nineteenth-century buildings to the standards of LEED certification. The first project of the Green Building Alliance was a "face-lift" to a hundred-year-old former soap factory. The Heinz Endowments is the leader in grantmaking for innovative green retrofits or new green construction, funding projects including The Pittsburgh Glass Center, the John Heinz History Center, and the Carnegie Museum of Natural History. Pittsburgh's ten-year leadership in sustainable building has created a collection of green buildings, which are mostly built on brownfields and save an average 30 to 60% in energy use, 20 to 25% in water use, and recycle 90% of construction waste (City of Pittsburgh 2011).

The Green Vision Plan, Pittsburgh's first green overlay plan, shows the commitment of the local community to advancing smart growth and green building. East Liberty Development, Inc. (ELDI), a community development corporation, has committed to prioritizing new development in energy efficiency, high quality materials, and stormwater control since 1979 (Sustainable Pittsburgh 2011). With support from the Pennsylvania Department of Conservation and Natural Resources and the Heinz Endowments, ELDI has collaborated with a national consultant team to create a Green Vision Plan for Pittsburgh that examines the environmental realities of an urban neighborhood, suggests benchmarks for a healthy community, and redesigns park spaces. This project of ELDI became a foundation for integrating green practices into investment in both the private and public sectors in the community.

Pittsburgh has increased the number and square footage of LEED-certified buildings through the leadership of local non-profits, universities, and businesses. These community stakeholders value the triple bottom line principles of economic prosperity, environmental stewardship, and social equity for sustainable development. The formation of a network of a strong academic community in building research and development, nonprofits solely dedicated to greener buildings, and progressive building experts has, in the case of Pittsburgh, resulted in the broad adoption of sustainable building practices. Projects such as Prototype House and the Mellon's Orchard South Project are examples of this cooperation. Successful outcomes such as these have been

improving Pittsburgh's property values and neighborhood livability for more than a decade.

While meaningful progress has been achieved through the voluntary cooperation of the neighborhood over the past decade, in recent years, the Pittsburgh city government has furthered this drive by embracing strong incentives for greener buildings. The Pittsburgh City Council has made two important green building legislative decisions. First, it amended Title Nine Section 915.04 of the City Code to provide sustainable development bonuses. Such bonuses, known as "density bonuses," allow LEED-certified buildings to rise 20% more in floor area than other buildings in the same zoning district. Second, it requires that all publicly financed developments (city-owned buildings and private projects that receive tax increment financing funds) costing over two million dollars or exceeding ten thousand square feet have to obtain LEED Silver certification. These mandates do not cover the private sector, but they demonstrate a commitment to sustainability by the city and the business community. Additionally, Pittsburgh offers funding mechanisms that reduce the financial burden for citizens to comply with the newly amended regulations: the Urban Development Fund and the Pittsburgh Business Growth Fund. The Urban Development Authority offers these funds at lower interest rates for projects that achieve LEED certification in the technology or enterprise zone. The interest rate is reduced by 1% for LEED Silver and by 2.5% for LEED Platinum below the Enterprise Zone Rate.

Pittsburgh focuses on developing comprehensive green building mandates for city-owned and private buildings by integrating sustainability goals into zoning, land development ordinances, and budget for implementation. As a first step to achieve its sustainability goal, Pittsburgh may adopt simple measures such as tracking monthly utility consumption and cost data to determine the amount of water, electricity, and gas resources used, renewable sources, annual per capita waste disposal, and annual per capita recycled and composted material. Based on the data, Pittsburgh can optimize LEED certification levels for qualified city-owned buildings and private projects to benefit the community by reducing energy consumption and costs, improving indoor air quality, and decreasing environmental damage. Additionally, energy and water studies regarding consumption and cost patterns would lead to better management and control of municipal energy and water use. The implementation of an environmentally friendly purchasing policy that requires durable, recyclable, and healthier materials would contribute to reaching Pittsburgh's sustainability goals. Salem can look to Pittsburgh's model as an example of a city that successfully supports green building and environmental sustainability through a mix of legislation and incentive programs.

Implementing a Green Building Policy for Salem

Unlike Portland and Pittsburgh, the City of Salem does not currently have any city codes or incentive-based programs related to LEED certification. According

to Thomas J. Phillips, Salem's Building and Safety Administrator, Salem's City Council is considering adoption of the National Green Building Standard, akin to the LEED certification rating system, in 2012. This is a good opportunity for Salem to set out a comprehensive green building policy with a focus on LEED certification covering the construction, maintenance, and renovation of private and city-owned buildings. It is critical for Salem to examine the regional green building business opportunities and energy, water, and gas consumption and cost patterns in order to develop legislative and financial incentive programs tailored to the City of Salem. Unlike Portland or Pittsburgh, which respectively focus on developing green building legislative mandates and market-based incentive programs for voluntary participation, Salem can develop a holistic green building policy that is composed of both mandates and market-based incentives.

Legislation and Green Building Policy

Under ORS 184.423, the City of Salem can require up to LEED Silver certification for sustainable building construction and renovation for city-owned facilities. The requirement of the level of LEED certification can vary according to project size, and the level of LEED must be balanced with environmental, economic, and community needs. On the other hand, market-based incentives, without being subject to state restriction, can encourage voluntary participation of the community for greener buildings and energy performance improvements. With regard to designing the green building incentives, Salem may share policy development experiences with Portland through intercity communication. Portland's High Performance Green Building Policy can provide a framework for Salem to assess cost and consumption patterns and design environmentally preferable green building policies informed by new technologies and local resources.

Salem's Green Building Practices

Although Salem does not currently use the LEED certification system, the city has demonstrated interest in sustainable building practices, as shown in its involvement with programs such as the Sustainable City Year, Program Standards and Procedures, and Initiatives in Partnership. Like Pittsburgh, Salem is in a good position to foster green building education and develop partnerships. Salem focuses on promoting multiple potential partnerships and collaborating with universities, city agencies, institutions, and building partners for a greener community. Through its participation in the Sustainable City Year program, Salem has evaluated the possibilities of nurturing green business clusters, recycling industrial byproducts, redeveloping brownfields, designing energy-efficient municipal buildings, and examining market and regulatory barriers. Program Standards and Procedures addresses sustainable features similar to LEED certification in city-owned facilities. It deals with sustainable construction to minimize negative environmental impacts like air quality and sediment erosion, and it encourages recycling of construction waste. The program also offers incentives for contractors who exceed sustainability goals

and specification requirements with respect to recycling of post-consumer/ industrial content and providing local supplies. Initiatives in Partnership is the city's collaboration with local businesses initiating sustainable practices such as Pringle Creek Community, Portland General Electric, Willamette University, Wildwood Urban Design and Development, and Nathan Good Architects PC.

Salem has made progress toward implementing sustainable features for many recent new construction projects, although the LEED certification rating system is not currently used. The next step for Salem would be to develop market-based incentive programs for green buildings tailored to the community, and to facilitate the flow of communication and information sharing for a broader community-based discussion on sustainable strategy.

Portland's High Performance Green Building Policy and Salem

Portland's High Performance Green Building Policy (HPGBP) can provide a framework for Salem's market-based incentive programs that would be appropriate for an urban Oregon community. HPGBP provides business opportunities for the development of green building products, the use of local resources, and the improvement of environmentally innovative designs. Oregon has an emerging photovoltaics and active solar power cluster, and this new renewable energy technology would contribute to energy saving features in a LEED certification rating system. Although value-added wood products, including wood products made from salvaged lumber, are new to Oregon, producing certified wood board free of added formaldehyde would increase the availability of quality certified wood necessary for LEED new construction. Just as Portland has demonstrated expertise in integrated design and service, Salem is also in a position to meet the growing demand for integrated manufactured building materials (for example, agrifiber composite panels) by developing agricultural waste products and using raw materials abundant in Oregon.

Additionally, Portland has developed policies and procedures for reducing costs, eliminating regulatory barriers, and financing projects. Up-front and additional costs for premium green products are regarded as prohibitive for many projects. Costs for obtaining LEED certification are high, and regulations are sometimes inconsistent at different bureaus. Portland proposes to incorporate green products' unique lifecycle costs and maintenance cost savings, which are not currently measured in conventional buildings. Strong municipal leadership is required to reflect these long-term cost savings in financing instruments or insurance policies in Salem as well as in Portland.

Portland proposes market-based incentives to facilitate private sector action toward greener practices. The city recommends financial incentives and regulations that foster regional economic alliances based on greener products, including certified sustainable wood products, that help Portland develop its expertise and reputation for green building. Salem may consider joining with Portland to form an multi-city or statewide program focused on premium green products and waste reuse. The industry of value-added wood and reuse of

its waste can create a closed loop of material flows in the region. Linking the high technology green building business and the Oregon forest and agriculture industry would create synergy and foster greener business opportunities in both Portland and Salem.

Portland has also explored solutions on the smaller scale of neighborhood renovation, for which green building practices that are feasible for large-scale projects are not always applicable. In order to reduce costs, Portland links suppliers with green building professionals and adopts sustainable purchasing policies. Portland also proposes to overcome regulatory and tax barriers for affordable housing and commercial buildings. Although Salem does not have comparable regulations, Portland's strategic approach for smaller projects can be applicable especially to the retrofit of existing residential and small commercial buildings.

As for financial incentives, Portland provides System Development Charge (SDC) fee reductions in return for water savings on a project-by-project basis as an initiative of the building owner or builder in partnership with the city. Portland offers Floor Area Ratio (FAR) bonuses for vegetated roofs, although this is rarely used because bonuses are available as part of a package easily exceeding the absolute minimum. To save energy, Oregon's Business Energy Tax Credit (BETC) is a highly effective financial incentive for energy conservation and accelerated adoption of the LEED certification rating system. The tax credit for renewable energy sources like photovoltaic ranges from 35% to 50% of the eligible project cost. Energy Trust of Oregon (ETO) also provides incentives for energy efficiency and the use of renewable energy for industrial, commercial, and residential buildings. Federal tax incentives coupled with ETO make it affordable for homeowners and builders to have cost-effective renewable energy sources.

As for regulatory barriers, Portland building and zoning codes are not flexible enough to allow products or processes for green buildings. Portland proposes to allow exceptions as long as they are in line with city policies and goals. Also, wastewater and plumbing codes are restrictive, and graywater (wastewater from washing dishes, laundry, and bathing) is strictly regulated. Allowing treatment and reuse associated with specific system designs would remove regulatory barriers to meet LEED standards for wastewater treatment and water conservation. (Graywater policies are addressed in greater depth later in this report.) Likewise, Salem may consider removing inconsistent regulations and developing a framework to facilitate green building practices to meet whatever level of LEED certification will be required in Salem.

Further, the green building industry can promote economic development by creating an industry cluster with a group of interrelated firms, allies, and vendors. Similar firms can share common markets, technology, and work skills to create a mass of expertise, innovation, skilled labor, and financing. Advantages of such a cluster include stimulation of research and development,

along with technology and knowledge transfer through competition and collaboration. The exchange would help businesses find cost-effective and environmentally preferable ways of obtaining materials and expertise. Creating an eco-industrialized zone can also facilitate the establishment of a closed loop of resource reuse systems from input to waste. In addition, it would give the City of Salem a reputation for fostering green economic development. To strengthen green building leadership, Salem should consider aggressively adopting comprehensive policies that have wide application across public and private sectors of the building industry; these policies should be supplemented with city procurement of locally sourced materials and expertise.

Recommendations

The City of Salem is facing a change in its building policy, from traditional to green building with LEED certification. Unlike Pittsburgh or Portland—cities that traditionally have focused either on legislative mandates or voluntary incentives—Salem can make a holistic green building plan across public and private sectors by combining the strong points of those two models to promote Salem’s sustainable planning and development. Greener building construction benefits not only the individual property, but also the greater community. A strong green building program will promote economic development in the region, and could potentially create jobs around the utilization of local materials and the reuse of construction waste. Although Oregon legislation only mandates up to LEED Silver for public buildings, Salem can create various incentive programs to promote green buildings and related industries in the region. Salem could look to the City of Portland as a model for connecting the needs of urban renovation with existing Oregon resources. The City of Pittsburgh demonstrates the effective use of expertise and education through collaboration with local academia and community stakeholders. The City of Salem could use the talents of its strong leaders and the expertise of its city staff to examine and adopt sustainability features akin to LEED certification, with a target timeline for adoption in 2012. At minimum, the City of Salem could adopt the National Green Building Standard and develop a LEED certification program and policies specifically tailored to the unique economic, environmental, and community needs of Salem.

Using Graywater in Sustainable Building

In order to promote sustainable building and begin meeting LEED standards, Salem could examine the use of graywater. Graywater refers to the wastewater from sinks, baths, showers, and laundry machines, but it does not include toilet or other garbage waste (ORS 454.605(7)). Wastewater that is not so contaminated with chemicals or bacteria that it cannot be either filtered or treated can provide water for other uses in a built structure and can decrease the demand on a limited water supply. Water from these sources may contain organic materials, suspended solids, nutrients, oil and grease, bacteria, and even harmful chemicals from cleaning products, but if care is taken in handling the waste, those will not be impediments to use.

In 1975, Oregon's Department of Environmental Quality (DEQ) initiated a program to alleviate pressures on homeowners in rural areas who were unable to receive building permits because their site disallowed non-sewer disposal methods. Part of the program, endorsed by the Oregon Legislature and the Environmental Protection Agency (EPA), included an on-site experimental systems program that tested reusing household water. The technologies developed led to DEQ approval of reuse systems, on a case-by-case basis, of up to 95% of applicants by 1981. This initial effort showed the potential water reuse had for larger scale implementation (U.S. Environmental Protection Agency 1984).

In response to the growing interest and pressure to include statewide rules for graywater use, Oregon's Building Codes Division (BCD) instituted a Statewide Alternate Method for using graywater indoors known as Alternate Method Ruling No. OPSC 08-02. This ruling allows homeowners and designers to reuse water from baths, bathroom sinks, and laundries as water to flush toilets and urinals inside the house. Although its scope is limited to indoor use for flushing toilets (no graywater may be used for potable purposes), it is important to note the ease with which this ruling integrates with the existing building and plumbing code system. The ruling simply takes advantage of approved technologies certified by other testing agencies, specifically the International Association of Plumbing and Mechanical Officials (IAPMO). If an owner or builder wishes to install an approved system in their home, this ruling allows them to do so without creating a new governing body, writing many new rules, or adding to the existing plumbing code. As this process makes clear, one way of encouraging the promulgation of new practices is to ease the manner in which they are adopted. The new graywater rules, discussed below, partly adopt this model by similarly taking advantage of existing technologies.

Legislative History of Graywater in Oregon

In 2009, Governor Ted Kulongoski signed into law House Bill 2080, which made water conservation a priority, legalized graywater for outdoor use, and directed the DEQ to write a set of rules for permitting the use of these systems (Or. H. 2080, 75th Leg., Secs. 1, 4 (June 12, 2009)). The legislation specified that

the DEQ should “[c]onsider the recommendations of an advisory committee appointed by the department pursuant to ORS 183.333.” (ORS 454.610(1)(a)). Pursuant to the mandate, the DEQ formed the Graywater Advisory Committee (GAC), which began meeting monthly in December, 2009 (Oregon Department of Environmental Quality 2010a). The committee members included an architect, a landscape architect, an attorney, an environmental activist, a plumbing designer, a water quality analyst, an environmental health specialist, a DEQ staff member, and other professionals from across the state in order to get a well-rounded professional and geographical picture of what the graywater rules should look like.

Following a year of meetings, the GAC submitted their recommendations for graywater rules to the Environmental Quality Commission (EQC), the rulemaking body for the DEQ pursuant to OAR 340-011-0024. With very little change, the EQC returned a set of proposed rules that the DEQ submitted for public comment between February and March, 2011. The DEQ is currently evaluating and addressing the public comments; they anticipate finalizing and having the EQC adopt the rules by October 2011 (Oregon Department of Environmental Quality 2010b). According to Ron Doughten, the graywater rulemaking project leader, the proposed rules as published for comment will change very little before final adoption (Interview with Ron Doughten 2011). This report discusses and analyzes the proposed rules for Oregon based on that assumption.

Proposed Graywater Rules

In order to gauge what effects graywater use will have in conserving water, it is important to understand the details of the Proposed Rules (the Rules). The GAC not only speculated on the impact of possible rules based on what they believe the state wanted to accomplish, but they also structured the Rules in a way to make them easily understood and environmentally beneficial. Although the Legislature accepts that graywater usage has advantageous possibilities, the full effects of its use is still unclear; the water is, after all, waste, and contains potentially harmful elements. Consequently, throughout this rulemaking process, public health and safety has been a driving force for many of the limitations and precautions contained within the Rules. The proposal adds to the DEQ’s regulations (under OAR Chapter 340) a new Division 53, “Graywater Reuse and Disposal Systems,” and amends existing related regulations under Division 71, “Onsite Wastewater Treatment,” and Division 45, “Regulations Pertaining to NPDES and WPCF Permits.” Together, the new regulations protect public health while still providing needed alternatives for water conservation. The following is an overview of Division 53, focusing on labeling types of graywater, creating different permits for different uses, and other provisions critical to the implementation of this “green building” system.

The Three Types of Graywater

The overarching structure of the permit system is based on the legislative mandate to issue permits to property owners who want to use a graywater

system. Because all disposal of waste into non-navigable waters in Oregon requires a Water Pollution Control Facilities (WPCF) permit (OAR 340-045-0033) the simplest solution for graywater disposal is to classify its use under this existing permitting regulation. No graywater system may be used, therefore, without a WPCF permit (OAR 340-053-0080(2)). HB 2080, as noted above, created a statutory definition for graywater to include “shower and bath wastewater, bathroom sink wastewater, kitchen sink wastewater and laundry wastewater. . . . [but does] not mean toilet or garbage waste or wastewater contaminated by soiled diapers” (ORS 454.605(7)). The Rules provide for three tiers of permits issued based upon the amount and type of graywater produced; the Rules also categorize three types of allowable graywater based on the quality of the water.

- Type 1 graywater is “oxidized,” where chemicals remove harmful agents from wastewater, usually accomplished through additives like chlorine. The water may go through “primary treatment” (where the system removes portions of grease, floatable, or settleable solids), but does not receive secondary treatment. This type of graywater may be used for subsurface irrigation only.
- Type 2 graywater is also oxidized, but in addition receives “secondary treatment,” a chemical or biological process that removes portions of dissolved biodegradable organic matter. Type 2 graywater may be used for surface drip irrigation and landscape ponds not intended for human contact, but because of this allowable use, it does require some monitoring.
- Type 3 graywater is oxidized, receives secondary treatment, but is also disinfected, requiring the use of more chemicals such as iodine, depending on the system installed. This water, because of its thorough treatment, is considered safer and consequently may be used for sprinkler irrigation of non-food crops. Use of Type 3 graywater also requires monitoring, up to three times a week.

Three Graywater Permit Tiers

At the heart of the new Rules is the permit system, which builds on Oregon’s existing permitting system for waste disposal not associated with navigable waters (OAR 340-045-0005). There are two broad categories of permits available: general or individual (OAR 340-053-0110(1, 2)). A general permit will suffice for the majority of applicants where an individual permit is not necessary to protect public health or safety because the discharge source is of minor concern. Within those two broad categories, the Rules describe three specific kinds of permits, which are labeled as “tiers,” and their main focus is on amount of flow produced by the graywater system.

- Tier 1 WPCF general permits are for systems that produce less than 300 gallons per day. They are strictly limited to single family residences or duplexes. A system under this permit produces Type 1 graywater only, which means only subsurface irrigation is allowed, and because of the system’s

limited scope, these permits do not require DEQ site evaluation. The proposal calls for no application fee initially, but the owner must pay a \$50/year fee thereafter.

- Tier 2 WPCF general permits are for systems that produce less than 1,200 gallons per day. Residential, commercial or industrial structures can apply for this permit, and use of Type 1 or Type 2 graywater is allowed. Not only is site evaluation required, but there are also “system design plan” and “operations and maintenance manual” requirements (discussed further below). Currently, a new application would cost \$534, plus a \$50/year fee thereafter.
- Tier 3 WPCF individual permits can be used when Tiers 1 and 2 do not apply, or by request (owners can use this to modify an existing lower-tiered permit). Site evaluation is required, but this permit-holder may produce Types 1, 2, or 3 graywater, and must also provide system design plans and an operation and maintenance manual for the system.

The DEQ’s intention with these permit tiers is to increase single family residential graywater use by making the graywater permitting process inexpensive and accessible. Their stated goal from the start was to find a way to get people on board with graywater use, and they understood that the more challenging the permitting process, the more likely people would be to resist implementation. For Tier 1, the DEQ uses low permit fees, no site evaluation or onerous oversight, and no need for elaborate treatment systems. Moreover, the technologies needed for Tier 1 systems already exist and can be purchased off-the-shelf, so that no complicated design process is needed. While the requirements and limitations increase as the permit tiers escalate, the owners of larger or more complex buildings will be better equipped to handle the additional complications.

Other Important Provisions

While the main feature of the Rules is the tiered permits, there are other provisions that are important for understanding how these systems will work, and what the Rules seek to accomplish. For instance, these graywater rules deal with an alternative to discharging to a sewer system or septic tank, but graywater systems must still be connected to approved disposal mechanisms or they cannot be permitted (OAR 340-053-0080(5)). For this to work, then, it is essential to have a “diversion valve,” preferably inside the building, which must be clearly labeled. Reusing wastewater for irrigation can reduce overall water usage, but in Oregon especially, over-irrigation can be a problem. The Rules prohibit irrigating with the graywater system if the soil is frozen or saturated. It is up to the owner to use a diversion valve to manually direct graywater either to an irrigation system or to the sewage treatment system.

Under Tiers 2 and 3, there is a requirement for a written system design plan, as well as a written operations and maintenance manual. While this policy seems sound given the increased complexity of systems under those permit tiers, problems may arise if the owner/installer sells the property. In order to increase the likelihood that the new owner will continue to properly operate the permitted

graywater system, the Rules specify that the seller must pass the designs and operations and maintenance manual to the new owner.

As noted above, one of the issues facing the new graywater rules is the unknown effects on health and safety, particularly regarding septic systems. Oregon, like many primarily rural states, allows the use of an onsite septic system rather than requiring the expense of connecting to an underground sewer system that may be miles away. These systems work partly because of a steady flow of wastewater into them; however, if the owner implements a graywater system, less wastewater flows into the septic tank. This decrease has the potential to create harmful effluents that leak from the septic system. To ensure health standards are maintained, the Rules contain waste strength limitations: if diverting the graywater away from a septic system results in high effluent concentrations from the septic system, then the graywater diversion must be changed.

One last key provision worth noting is the way the Rules take advantage of the staff power of local governments. As discussed below, the DEQ may not have adequate staff to successfully administer this permit system; however, if the DEQ leverages local government employees, it can possibly increase permit applications. Local governments may enter into an agreement with the DEQ to become agents for the department, to receive and process applications for permits, issue permits, and enforce the permits by performing required inspections. A local government, once it agrees to uphold the Rules of Division 53, must submit an implementation plan for the DEQ's approval (in much the way the NPDES system works by allowing state governments to form their permit process for the EPA). They may adopt their own fee schedule, which could, however unlikely, have negative effects if the jurisdiction decides to charge high fees. Overall, though, this structure seems solid and likely to increase graywater system applications.

Concerns Going Forward

The common use of graywater, although the rules may be fully written and detailed, is still years in the future. There are many concerns and issues left to be addressed by regulators, agencies, local governments, building designers, and owners, just a few of which are discussed below.

Local Government Involvement

The DEQ will provide local governments with the actual permits, but if they agree to act as the department's agent, there are still larger concerns about their ability to carry out the rules properly. The initial problem is getting the local authorities excited enough about the prospect to request to be an agent. So far, the push for graywater use has come from grassroots campaigns and activists, not large political bodies. The graywater legislation may compel some mayors or county commissioners to act, but if they do not, the graywater permitting program will suffer without organizational support. Public utilities, like the Eugene Water and Electric Board, also have the ability to be a catalyst

for change. They already provide incentives for other green building elements, like energy-saving bulbs and Energy Star appliances, so they could potentially incentivize the use of graywater systems as well.

Quentin Blattler, a local inspector for Eugene's Public Works Engineering Department, expresses some concern about the use of graywater and its relation to health issues under the plumbing code (Interview with Quentin Blattler 2011). He says that the code requires wastewater to be connected to a wastewater management system, but the graywater rules allow that wastewater to bypass such management systems. While it seems a small detail, Blattler feels the issue is a technical one that he is not sure how his organization's administration will handle. An applicant could avoid delays by scheduling a design meeting with Public Works before going through the permitting process, which would cost extra, but would also ensure compliance on the owner's part. This system, though, is not ideal for getting large numbers of permits approved, so Blattler believes it will require an overall policy decision to not enforce the code requirement, made by the Public Works department head and communicated clearly to the entire staff. In the end, he believes that everyone in the building department wants to see a well-executed graywater approval process implemented, so he expects the policy decision will be made early on.

As with any new government project, funding is a major concern for the success of the program. Discussed in greater detail below are concerns shared by the DEQ and local governments regarding the number of staff available to evaluate permits, availability of funds to pay them and to train them, and their abilities to conduct outreach and education about alternative disposal systems to property owners. Jenna Garmon, a green building analyst at the City of Eugene, expressed her ideas about ways to conduct outreach in the absence of funding from the state. She schedules small classes to educate and train homeowners on techniques they can use; she offers guidance to those who ask for it when they come to the Building and Permit Department; and she tries to create locally-funded incentive programs. But all these methods require proactive behavior on the part of the property owner, and she recognizes that more must be done if a change like these graywater rules are to take hold in a more positive way (Interview with Jenna Garmon 2010).

It should be noted that while it seems that these Rules would have a great impact on plumbing codes and plumbing inspectors, that is not the case according to Terry Swisher, chief plumbing inspector for the State of Oregon (Interview with Terry Swisher 2011). Building codes, including plumbing codes, regulate activities within a structure, whereas the new Rules describe exterior use. All piping 24 inches away from a building is under DEQ authority and outside plumbing inspectors' jurisdiction. As mentioned above, Oregon's Building Codes Division has already issued an Alternate Method Ruling for graywater use within a building, which means plumbing inspectors have already received any training and knowledge they need to deal with graywater. So, while there are sure to be added expenses for local governments involved in

permitting graywater systems, funding to train building and plumbing inspectors will not be one of them.

Issues Still Facing DEQ

While the graywater policymaking process has been relatively smooth so far for the DEQ, the agency faces the harsher challenges of implementation and awareness as the graywater Rules move toward finalization. For one thing, the Rules mention three tiers of permits, but those have yet to be written, which will be an entirely new process (Interview with Ron Doughten 2011).

Another challenge will be training DEQ staff members to evaluate and approve those permits, especially the individual permits that require site evaluation. While local governments can act as agents for the DEQ, they are not required to do so. Furthermore, larger and more complicated systems and sites will still ultimately require DEQ participation. Agencies like the DEQ are typically underfunded and understaffed, and it is not clear where the money to pay for the extra work will come from (Interview with Ron Doughten 2011).

Beyond implementing a new permitting system is the more unknown yet critical task of informing the Oregon public about the availability of these permits. One of the biggest challenges facing graywater use is the difficulty of raising awareness of its existence and benefits enough to actually get property owners to file applications.

Part II: Sustainable Stormwater Management

Students analyzed four sustainable stormwater management tools to determine whether there were any legal or procedural barriers to implementation by homeowners or businesses in Salem. All four techniques allow for the reduction of the amount and peak flows of stormwater emptying into the stormwater management system. These techniques are: downspout disconnection, green roofs, permeable pavement, and rain gardens. Each option has unique benefits and drawbacks and may or may not be appropriate for use in Salem.

Sustainable Stormwater Management Tools

Downspout Disconnection

In urban areas, downspouts are commonly connected to drain tiles that feed the stormwater management system. The cumulative effect of multiple connected downspouts can greatly increase the annual number, magnitude, and duration of peak flow events in the stormwater management system. Downspout disconnection is the process of separating roof downspouts from the stormwater management system and redirecting roof runoff onto pervious surfaces, most commonly a lawn. This reduces the amount of directly connected impervious area in a drainage area, which allows water to drain to lawns and gardens and encourages natural plant and soil filtration. In Portland, thanks to their downspout disconnection program, 1.2 billion gallons of stormwater each year are diverted from the city's combined sewer and stormwater management systems. Proper disconnection is required, however, to avoid flooding and property damage that could lead to nuisance actions from any affected neighbors. The property must have the appropriate soils and slopes to accommodate substantial water flows.

Green Roofs

A green roof, also known as a vegetated roof or eco-roof, is the roof of a building that is either partially or completely covered with vegetation and a growing medium that is planted over a waterproofing membrane. It may also include additional layers, such as a root barrier and drainage and irrigation systems. A green roof can help mitigate stormwater runoff by filtering, absorbing, or detaining rainfall. It reduces runoff volume and peak discharge rate through attenuation, while plants and soil microbes naturally filter and reduce pollutants from entering the stormwater system. In addition, a green roof can reduce carbon dioxide emissions, winter heat demand, summer air conditioning costs, and mitigate the "heat island" effect from conventional roofs. Different water management techniques can achieve different objectives, including interception of rainfall with foliage and subsequent evaporation, infiltration, percolation, shallow subterranean flow, root zone moisture uptake, and evapotranspiration.

Permeable Pavement

Permeable pavement is porous and allows stormwater to pass through voids in the paved surface and infiltrate into the subbase. In some systems, infiltration into the underlying soil may also be possible. This allows for natural drainage and filtration of stormwater and for natural systems to treat stormwater before it enters stream and river systems. There are a number of designs available depending on need or use. Pavement can be constructed of permeable pavers, porous asphalt, plastic/concrete grid systems, or loose aggregate, each with differing costs and advantages and disadvantages.

Rain Gardens

Rain gardens act as a bio-retention swale, a landscape feature designed to remove pollutants from surface runoff and allow runoff to percolate into soil, in which stormwater is treated and reduced in volume. Rain gardens allow for high-rate infiltration of runoff and provide storage and exfiltration capacity to surrounding soils. This results in substantial volume reduction of generated stormwater. Volume reductions are also realized through plant uptake and evapotranspiration facilitated by the rain gardens. Plant selection is essential for a successful rain garden. With the proper vegetation, the system is remarkable at purifying nitrogen and phosphorous rich water.

Implementation of Sustainable Stormwater Management Tools in Salem

Salem's Permitting Process

Students investigated the permitting processes for these four sustainable stormwater management systems in order to identify potential barriers to implementation. Out of the four stormwater management tools researched, green roofs, permeable pavement, and rain gardens require a permit from the city to install. A Historic Design Review may also be required for any of these changes if the property is listed as historic.

In general, to acquire a permit, a commercial owner usually must obtain a Building Permit (BP) and, if significant site modifications are proposed, must have a Site Plan Review (SPR). Although these reviews can be done concurrently, it can still be a long process, as BP review takes 20 business days, while SPR can take up to 60 calendar days.

In addition, in order to install a green roof, a building permit from the Building and Safety Division is required. On average it takes 10 to 15 business days to obtain this permit. Inspections are required as part of the BP review; these inspections are often at the owner's expense.

At this time, permeable pavement is not allowed in the public right-of-way. For permeable pavement on private residential property, the review would be part of a new single-family building permit review.

For rain gardens, a stormwater connection permit is required. If no other permit is needed, Public Works Development Services can issue a connection permit over the counter. However, an approved point of disposal under Salem Revised Code (SRC) 70 (Utilities General) and 73 (Sewers) is necessary. Under the new draft Stormwater Code, a drainage control permit will be needed. The system must comply with SRC 70 and 75 (Erosion Prevention and Sediment Control), and also with the Stormwater Manual and the city's Design Standards. To comply with Salem's Municipal Separate Storm Sewer System (MS4) Permit, the city will inspect the system, most likely at the owner's expense.

Incentives for Sustainable Stormwater Management Tools

Financial Incentives

One way to encourage homeowners, business owners, and contractors to use sustainable stormwater management tools is to provide financial incentives. The amount needed to make the incentive attractive can vary greatly depending on the project, as the installation costs can range from negligible (in the case of downspout disconnection) to a sizeable investment (in the case of green roofs).

Portland's Downspout Disconnection Program

Portland has identified areas where downspout disconnection is appropriate and has implemented a downspout disconnection program for those areas. Property owners in the program area can arrange for the work to be completed by the city for free, or can do the work themselves and be reimbursed up to \$53 per eligible downspout.

Portland's Green Roof Incentive

The City of Portland offers an incentive to property owners and developers to encourage building more green roofs. The incentive program is part of Portland's "Grey to Green" initiative to increase sustainable stormwater management practices, control non-native, invasive plants, and protect sensitive natural areas. The incentive funds up to \$5 per square foot of a green roof project. Installation costs in Portland for green roofs can range from \$5 to \$20 per square foot, so this incentive makes a green roof a more cost-effective feature. Eligibility requirements for participation in this incentive are as follows:

- The project is within the Portland city limits.
- The project manages stormwater.
- Construction will start within two years of being approved for an incentive.
- The project is feasible and buildable.
- The project cannot be complete before the incentive application deadline.

Milwaukee's Rain Garden Initiative

Milwaukee Metropolitan Sewerage District launched the "Lake Michigan Rain Gardens" initiative, which awards grants to property owners who plant their own rain gardens. The grants are awarded in the form of plants, which are available to recipients at a "two for one" discount. This encourages the use of more plants and the right kind of plants resulting in an increased capacity for stormwater management.

Stormwater Management Development Incentives

Floor Area Ratio Bonus

Portland's Floor Area Ratio (FAR) Bonus increases a building's allowable area in exchange for adding a green roof. Portland has seen over \$225 million in additional private development through this program, and more than 120 ecoroofs have been built in the center city district. Projects that receive the FAR bonus are also eligible for the green roof incentive.

The FAR bonus is codified in Portland's Planning and Zoning Code. The language includes the policy reasons for the bonus, along with definitional language:

33.510.210 Eco-roof bonus option. Eco-roofs are encouraged in the Central City because they reduce stormwater run-off, counter the increased heat of urban areas, and provide habitat for birds. An eco-roof is a rooftop stormwater facility that has been certified by the Bureau of Environmental Services (BES). Proposals that include eco-roofs receive bonus floor area. A proposal may earn bonus floor area for both the eco-roof option and the rooftop gardens option. However, the same square footage may not be counted towards both bonuses.

Expedited Permitting

Some cities have implemented programs that speed up the permitting process for those projects that include sustainable stormwater management features. A shortened review time can be a significant financial incentive for developers while imposing a minimal cost to the City of Salem.

Chicago's Green Permit Program reviews permits much faster, even in as few as 30 days, for projects that meet certain LEED criteria that include better stormwater management.

Philadelphia has established a "Green Project Review" program that reviews the stormwater management portion of a project submittal within five business days for redevelopment projects that have 95% or more of the impervious area disconnected from the combined or separate sewer system.

Award/Recognition Programs

Establishing programs that highlight property owners and businesses using sustainable stormwater management tools can be highly effective. Recognition

can be motivating, especially for businesses. Awards and recognition programs can inspire residents to implement their own projects by providing examples and can raise the community's green profile regionally or even nationally. By showcasing private sector commitments to sustainability, a recognition program helps to promote the city as a green community. Communities with a green profile and high demand for sustainable products and services are better able to compete for new green jobs and sustainable industries.

Stormwater Credits Through the Creation of a Stormwater Utility

Many towns in Oregon and the rest of the country have created stormwater utilities to help pay for stormwater costs and to provide an incentive for stormwater management. Stormwater fees can be assessed for all properties, or just for commercial and industrial properties. The use of sustainable stormwater management tools can then provide property owners with a credit to reduce or eliminate their fee. The Salem Revised Code allows for the implementation of such a system:

70.310. Stormwater Credits.

- (a) The Director is authorized to implement and administer a program to allow customers to reduce their stormwater utility bill through the installation of approved stormwater management facilities.
- (b) The Director shall promulgate administrative rules to implement the program, which shall contain the following:
 - (1) Definitions for all terms and concepts applicable to the program;
 - (2) Criteria to be used to determine eligibility for the credit;
 - (3) Methods and means for calculating the amount of the credit to be awarded;
 - (4) Procedures for verifying the validity and accuracy of the credits;
 - (5) Requirements that stormwater facilities be properly maintained and operated and that the City must be granted access to the property for limited inspections of stormwater facilities;
 - (6) Methods of enforcing the administrative rules; and
 - (7) Procedures for review and reconsideration of the Director's decisions regarding the credits. (Ord. No. 31-10)

Stormwater Utilities in Oregon: Portland's Clean River Rewards

Since 1977, Portland has charged a separate stormwater utility fee to help manage stormwater. In 2000, the City Council established a reward system called Clean River Rewards, which offers residential and commercial ratepayers a discount on their stormwater fee if they manage runoff from roof and paved areas. Credits of up to 30% of the fee are offered for having a small impervious footprint, providing tree cover, disconnecting downspouts, and installing rain gardens. The Portland Bureau of Environmental Services provides web pages and workshops for residential and commercial property owners who want to manage stormwater runoff on-site (WERF 2009).

Stormwater Utilities in Oregon: City of Sandy

The City of Sandy charges a stormwater management fee to commercial, industrial, and multifamily residential properties based on a measurement called Equivalent Residential Unit, defined as 2,750 square feet of impervious area, or the equivalent impervious area of a typical single-family home site.

The City of Sandy's incentive program encourages property owners and developers to mitigate stormwater discharges by reducing the extent of impervious surfaces on the property or by directing runoff into vegetated areas that allow stormwater to permeate the soil. These improvements are eligible for credits of up to one-third of the stormwater fee (City of Sandy 2011).

Land Use Law Techniques

It is possible for the city to take private land to install a stormwater feature like a roadside rain garden. ORS 35.015 seems to suggest that as long as the property is not being conveyed to a private party, the city has this option.

35.015(1) Except as otherwise provided in this section, a public body as defined in ORS 174.109 may not condemn private real property used as a residence, business establishment, farm, or forest operation if at the time of the condemnation the public body intends to convey fee title to all or a portion of the real property, or a lesser interest than fee title, to another private party.

The taking needs to be for a public good or public necessity, however, and the property owner must be compensated for the fair market value of the property. Depending on the analysis, community rain gardens may or may not be considered a public good or public necessity. In addition, despite the requirement that property owners be paid fair market value for any taking, the taking of private land for a public good tends to be unpopular with most Oregon residents, as demonstrated through 2004's Measure 37 (Galvan 2005). Because this is a potentially costly action that requires political will and carries with it the possibility for dissatisfaction from property owners, it would probably not be reasonable to take private land for stormwater management at this time.

Recommendations

After researching the policy issues related to stormwater management, we suggest that the City of Salem consider implementing the following recommendations:

- Consider adding incentives for implementing sustainable stormwater management tools.
- Consider allowing permeable surfaces in the public right-of-way. As a policy decision, the city has not allowed permeable surfaces in the public right-of-way. The SRC could add language explicitly allowing permeable pavement, thereby preserving the ability to use permeable pavement for sidewalks or public roads for future projects. As an example, the City of Seattle includes a section in their Right-of-Way Improvements Manual that encourages the use of permeable pavement for sidewalk projects:

The cumulative effective of new impervious area created by sidewalks and pathways across the City can have significant effects on our stormwater systems and receiving water bodies. Use of green stormwater infrastructure techniques such as bioretention and permeable pavements to the maximum extent feasible can help mitigate the impacts. See the Green Infrastructure BMP Flow Chart for Sidewalks ... to help establish what alternatives are most suitable to your project (City of Seattle 2011).

- Create a Salem guide for each stormwater management feature. The guide should include specifications for projects that, if followed, would make the feature practically “preapproved.” This would be helpful not only for property owners, but also for city staff. Property owners would save time and money by getting easy access to information. Plus, knowing the strong likelihood of approval if their project meets requirements, a property owner might be more likely to implement stormwater management techniques. Furthermore, less staff time will be spent answering questions when property owners have access to information.
- Engage in community outreach and education. A website with tips and easy to locate information on procedures for adding stormwater management features is an effective starting point. In addition, quarterly newsletters or brochures could be mailed out to residents outlining ways they can help with sustainable stormwater management.
- Consider adding the section entitled “Compliance with Other Laws” under General Provisions in the Draft Stormwater Code to other sections of the Salem Revised Code. This language, quoted below, is extremely helpful in that it allows for the future addition of more stringent environmental protection:

Compliance with Other Laws

a) The requirements of this Chapter, and any rules adopted pursuant thereto are minimum requirements, which do not replace, repeal, abrogate, supersede, or affect other more stringent law, requirements, rules, regulations, covenants, standards, or restrictions. Where this Chapter imposes requirements that are more protective of human health or the environment than those established elsewhere, the provisions of this Chapter shall prevail. When this Chapter imposes requirements that are less protective of human health or the environment than those established elsewhere, the provisions of the more protective requirements shall prevail.

Conclusion

The Oregon Legislature has sent a clear message about the importance of sustainability by passing legislation articulating goals for the State of Oregon. Specifically mentioned in the Oregon Revised Statutes is the importance of sustainability at the local level (ORS 184.423). By incorporating sustainable building practices, through the use of LEED certification and the reuse of graywater, and by promoting sustainable stormwater management practices in the community, the City of Salem can help realize the Oregon Legislature's vision of sustainable communities. There are opportunities for Salem to develop a sustainable building and development program specifically tailored to the city's needs. The differing approaches of Portland and Pittsburgh can be used as examples in crafting a policy for Salem. In addition to implementing LEED certification, the city could add policies to allow the reuse of graywater in buildings in order to maximize sustainable building practices. Although the reuse of graywater is still an emerging practice, it is possible to structure a permitting program based on the proposed rules detailed in this report.

References

- City of Sandy, 2011. "Stormwater Management Incentive Program," <http://www.ci.sandy.or.us/index.asp?Type=B_BASIC&SEC={A9D3CDDE-3BA0-42DE-BE30-4E321A155AA8}>.
- City of Pittsburgh, 2011. Green Buildings in Pittsburgh. <<http://pittsburghpa.gov/green/buildings.htm>>.
- City of Portland, 2008. OSD News: City Seeks Public Input on Innovative Green Building Policy. <<http://www.portlandonline.com/bps/index.cfm?c=44851&a=220986>>.
- City of Portland, 2011. City of Portland Proposed High Performance Green Building Policy. <<http://www.portlandonline.com/osd/index.cfm?c=45879>>.
- City of Seattle, 2011. Seattle Right-of-Way Improvements Manual, City of Seattle. <http://www.seattle.gov/transportation/rowmanual/manual/6_4.asp>.
- Galvan, Sara C. 2005. "Gone too Far: Oregon's Measure 37 and the Perils of Over-regulating Land Use". http://www.upa.pdx.edu/IMS/currentprojects/TAHv3/Content/PDFs/Gone_too_Far_M37.pdf
- Interview with Jenna Garmon, Green Building Analyst, City of Eugene (Nov. 17, 2010).
- Interview with Ron Doughten, Water Quality Administrator, Oregon DEQ, Portland Office (Apr. 15, 2011).
- Interview with Terry Swisher, Chief Plumbing Inspector, State of Oregon, (Feb. 1, 2011).
- Interview with Thomas J. Phillips, Building and Safety Administrator, Community Development Department, City of Salem (Dec. 21, 2010).
- Interview with Quentin Blattler, Eugene Public Works Engineering (Jan. 6, 2011).
- Oak Ridge Associated Universities, Oak Ridge, TN, 2011. "ORAU Center for Science Education: LEED Checklist." <<http://www.orau.org/center-for-science-education/leed/leed-checklist.htm>>
- Oregon Department of Environmental Quality, 2010. "Recommendations on Graywater Treatment, Disposal, and Reuse", DEQ 10-WQ-026.
- Oregon Department of Environmental Quality, 2010. "Rulemaking Plan for Graywater Treatment, Disposal, and Reuse".
- State of Oregon Department of Administrative Services, Facilities Division, 2004. Policy Manual No. 125-6-010, Sustainable Facilities Standards and Guidelines.

Sustainable Pittsburgh, 2011. Energy Conservation and Green Building, <<http://sustainablecommunityessentials.org/sections/view/energy>>.

U.S. Environmental Protection Agency, 1984. Oregon Onsite Experimental Systems Program, Research and Development Project Summary, EPA-600/S2-84-157.

Water Environment Research Foundation, 2009. "Building a Nationally Recognized Program Through Innovation and Research". <http://www.werf.org/livablecommunities/studies_port_or.htm>

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