Case studies of green roof regulations in North America 2006

UNITED STATES

City of Portland

	CMHC Resource Manual (2005), see p. 70-75
Home page	http://www.portlandonline.com/
General Ecoroof Information	http://www.portlandonline.com/bes/index.cfm?c=34663
Zoning Code	http://www.portlandonline.com/planning/index.cfm?c=31612, see page 30-31
Stormwater Management Manual	http://www.portlandonline.com/bes/index.cfm?c=35117.
Stormwater Discount Program	http://www.portlandonline.com/bes/index.cfm?&a=102040&c=31019%2E
Development Agreements	http://www.pdc.us/pdf/ura/north_macadam/sowa_development_agreement.pdf (see p.46)
Green Building Policy	http://www.green-rated.org/uploaded_files/publications/Green_Building_Policy_Program_Guidelines.pdf
Central City Design Guidelines	http://www.portlandonline.com/shared/cfm/image.cfm?id=58811 At chapter 11 on p. 130-133

The City of Portland is considered a North American leader in green roof initiatives. From a regulatory perspective, the City certainly has the most advanced examples of green roof regulatory tools, such as the density bonusing allowances in the City's Zoning Code. In Title 33 of the Zoning Code there is an Floor Area Ratio bonus for development projects that install ecoroofs in the City's central district. The amount of density bonus allowed for a given building depends the amount of ecoroof coverage in relation to the building's footprint and there are three classes as follows:

- 10-30% earns 1 square foot of additional floor area per square food of ecoroof,
- 30-60% earns two square fee, and
- 60% or greater earns three square feet of additional floor area.

Section 33.510.10 of the Zoning Code reads as follows:

33.510

10. 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 not earn bonus floor area for both the eco-roof option and the rooftop gardens option; only one of these options may be used.

a. Bonus. Proposals that include eco-roofs receive bonus floor area as follows:

(1) Where the total area of eco-roof is at least 10 percent but less than 30 percent of the building's footprint, each square foot of eco-roof earns one square foot of additional floor area.

(2) Where the total area of eco-roof is at least 30 percent but less than 60 percent of the building's footprint, each square foot of eco-roof earns two square feet of additional floor area.

(3) Where the total area of eco-roof is at least 60 percent of the building's footprint, each square foot of eco-roof earns three square feet of additional floor area.

b. Before an application for a land use review will be approved, the applicant must submit a letter from BES certifying that BES approves the eco-roof. The letter must also specify the area of the eco-roof.

c. The property owner must execute a covenant with the City ensuring installation, preservation, maintenance, and replacement, if necessary, of the eco-roof. The covenant must comply with the requirements of 33.700.060.

The second regulatory initiative in Portland relates to stormwater management. The City has created a Stormwater Management Manual to ensure that the City complies with requirements in the Federal *Endangered Species Act* for the protection of Chinook and steelhead salmon and the requirements of the *Clean Water Act*. Ecoroofs are one tool by which development projects in Portland can meet stormwater management requirements established in the manual. All developments with building and public works permits submitted after January 1, 2005, must comply with the Manual.

The City of Portland is also planning on implementing a stormwater discount program in 2006. Under the program, building owners will receive discounts on their water and sewer bills if they have built ecoroofs. Some of the elements of the discount program that the City will be implementing were laid out in the following Council Resolution dated November 30, 2005:

- Discounts are limited to 35% of the basic stormwater charge and calculated on a sliding scale based on the extent and effectiveness of private stormwater management.
- The requirements for single family residents are reduced to managing runoff from roof areas alone. Single family residents need not demonstrate the capture and safe disposal of runoff from driveways and other paved areas.
- The requirements for all other ratepayers (multi-family residential, commercial, industrial and institutional) remain unchanged from 2000. These ratepayers must manage runoff from roof and paved areas, and must demonstrate controls for volume, flow rate and water quality.
- The City will begin posting discounts to qualified ratepayer accounts six months following the start up of the new utility billing system. The billing system is scheduled to go live in April 2006. Stormwater discounts are scheduled to start in September 2006.
- The City will provide a one-time retroactive credit for qualified ratepayers. The credit will be calculated in the same manner as stormwater discounts for as much as 12 months prior to the start date of the ratepayer's stormwater discount. Ratepayers will need to register within the first 12 months of the discount program to be eligible for retroactive credits.
- Both the discounts and the retroactive credit will appear as adjustments on the ratepayer's utility bill. The City will not process refund checks for discounts or retroactive credits.
- The City awards the discount to the current ratepayer. The discount remains in effect as long as the person identified as the ratepayer does not change, and the private stormwater facilities are maintained and operating effectively. The Council commits to offering stormwater discounts for at least 10 years beginning in September 2006. Discounts and retroactive credits will not be provided to previous ratepayers.
- The City will conduct a marketing, public education and outreach campaign beginning in May 2006. These efforts may include direct mailings, utility bill stuffers, Internet-based broadcasts, public service announcements, press releases to the local print and electronic media, lawn signs, street banners, and door-to-door canvassing. The City will pay special attention to ratepayers who may have difficulty accessing the discount program due to language, cultural, mobility or other barriers.
- The City will work with community organizations to help low income ratepayers access the discount program, low-income utility assistance (LINC) and the earned income credit.
- Environmental Services will organize a task force to study the stormwater rate structure, revenue sources other than rates, and methods to pay for street drainage services.

- Environmental Services will work with the Portland Office of Transportation to review ways to increase the use of green streets to reduce the costs of street drainage services, and provide possible opportunities for facilities that serve both streets and adjacent private properties.
- Environmental Services will review the feasibility of using tradable stormwater credits as an incentive for building private stormwater facilities, particularly in densely developed areas of the city.
- Environmental Services will report annually on the discount program, the level of program participation, the costs of discounts and credits, and the extent of private stormwater management.

The City may require green roofs when entering development agreements if the developer is receiving funding from the City through its Urban Renewal Areas initiative. An example of where green roofs have been incorporated in such agreements can be found in the North Macadam District. The language of the agreement relating to green roofs reads as follows:

> 9.7 Stormwater Management
>
> NMI and RCI, or their respective property transferees, and OHSU shall integrate innovative stormwater management into each of their respective Buildings and site design to achieve maximum infiltration and retention of stormwater, and water quality of runoff. The list below is of Building and site features with potential benefits. NMI, RCI and OHSU shall integrate the following features into their respective Buildings and site design to the extent economically and functionally feasible.
>
> 9.7.1 Ecoroofs and roof gardens for reduction in runoff, to promote rooftop storage for reuse, enhance building cooling and insulation, reduce heat island effect offering area cooling, and improve air and aesthetic qualities;
>
> 9.7.2 Landscape areas or planters, including tree wells and filter strips to reduce impervious cover and to allow infiltration for reduction in runoff, reduce heat island effect offering area cooling, improve air and aesthetic qualities and achieve pollutant reduction as water filters through the soil;
>
> 9.7.3 Pervious hardscape through design or use of pervious materials to allow infiltration for reduction in runoff, promote rooftop storage for reuse, enhance building cooling and insulation, reduce heat island effect offering area cooling, improve air and aesthetic qualities; and
>
> 9.7.4 Utilization of innovative stormwater management described in the Stormwater Management Manual as simplified approaches. NMI and RCI may apply to BES for a reduction in stormwater user fees as a result of incorporating such features.

Portland also implements green roofs through its Green Building Policy, which requires that all new projects that receive funding from the Portland Development Commission are designed and

constructed with an ecoroof and/or Energy Star rated roof material. Additionally, all roof replacement projects must include an ecoroof when technically feasible.

In addition, all projects designed in the Central City District are required to undergo a design review process and must comply with Portland's Central City Design Guidelines. One of the requirements in the Guidelines is for the "integration of roofs and the use of rooftops". The guidelines specify that ecoroofs are a means of complying with the guideline requirements

City of Chicago

	CMHC Resource Manual (2005), see page p. 55-63
Home page	http://egov.cityofchicago.org/city/webportal/home.do
Zoning Ordinance	http://w14.cityofchicago.org:8080/zoning/default.jsp section 17-4-1000 to 17-4-1015
Green Building/Green Roof Matrix	www.cityofchicago.org/dpd -found under Green Buildings/Green Roofs

Currently, the City of Chicago has only one regulatory tool creating an incentive for building green roofs, a density bonus in the City's Zoning Ordinance, which deems green roofs to be a public amenity that improves "the quality of live of city residents, employees and visitors and are a benefit to the public". The specific density provisions for green roofs reads as follows:

17-4-1015 Green Roofs

17-4-1015-A Eligibility and Standards

Buildings with green roofs are eligible for floor area bonuses, provided they meet the following minimum standards:

1. The site for which the floor area bonus is requested must be located in a dash 12 or dash 16 "D" district.
2. To be eligible for floor area bonus, a green roof must cover more than 50% of the net roof area (i.e., the total gross area of the roof minus any roof area covered by mechanical equipment) or 2,000 square feet of contiguous roof area, whichever is greater.
3. Documentation must be submitted demonstrating that the roof can support the additional load of plants, soil, and retained water, and that an adequate soil depth will be provided for plants to thrive.
4. The roof area must contain sufficient space for future installations (e.g., mechanical equipment) that will prevent adverse impacts (e.g., removal of or damage to plants or reduction in area) on the green roof.

5. Plant varieties, soil depths and soil content must comply with Chicago Department of Environment guidelines.
6. Vegetation must be maintained for the life of the building.
7. Green roofs are subject to periodic inspection by the Department of Zoning to ensure that the amenity is properly maintained.
8. Private decks or terraces associated with individual *dwelling units* may do not qualify for floor area bonuses.

17-4-1015-B Bonus Formula

The floor area bonus for qualifying green roofs is calculated as follows: Bonus FAR = (area of roof landscaping in excess of 50% of net roof area ÷ *lot area*) × 0.30 × Base FAR.

By 2007, the Chicago planning department hopes to have their Building Green/Green Roof Matrix incorporated in the Zoning Ordinance. The Matrix was developed to help facilitate the City's green building policy, which requires projects that receive public funding to implement certain green building initiatives. The Matrix dictates the amount of rooftop vegetation coverage required on a given development projects.

The City also implements a number of incentives programs to promote the use of green roofs. One of these is a Green Building Permit Program that sets out a process for projects that meet certain qualifications to have their development permits reviewed more quickly. Green roofs fit into this equation by being one aspect that will help buildings qualify as "Green".

City of Seattle

Home page	http://www.ci.seattle.wa.us/
Stormwater, Grading and Drainage Control Code	http://www.seattle.gov/dclu/codes/sgdccode.pdf
Flow Control Technical Requirements Manual	http://www.ci.seattle.wa.us/dclu/Codes/dr/DR2000-26.pdf See page 1-12 and Appendix B of the Manual.
Sustainable Building Policy	http://www.seattle.gov/sustainablebuilding/default.htm

The City of Seattle regulates land use activities that impact stormwater runoff through its *Stormwater, Grading and Drainage Control Code*. In the Stormwater Code, flow control requirements are established for developments and City staff have created a Flow Control Technical Requirements Manual to provide guidance for complying with the requirements. One

of the stormwater management design options is an impervious surface reduction credit that lists green roofs and roof gardens as acceptable strategies.

The City of Seattle also has a Sustainable Building Policy with a LEED incentive program, which offers a financial incentive for achieving LEED certification on a project. The City uses LEED Rating Systems to evaluate City-financed building projects and the Rating System offers a point for building a green roof.

CANADA

City of Toronto

	CMHC Resource Manual (2005), see page 40-49
Home page	http://www.toronto.ca/greenroofs/
s. 108 of Bill 53	http://www.ontla.on.ca/documents/Bills/38_Parliament/session2/b053.pdf

The City of Toronto has a number of policy documents that could facilitate the implementation of green roofs. In 2001, the City's Environmental Plan first identified the need for a strategy to encourage green roofs and rooftop gardens. Toronto also has a Natural Environment Policy in its new Official Plan which supports "the development of innovative green spaces such as green roofs, and designs that will reduce the urban heat island effect," and a Wet Weather Flow Management Master Plan, which could act as a mechanism to prevent and reduce stormwater run off.

Despite these policy initiatives, extensive research and staff support, there are no regulatory tools that the City of Toronto implements to facilitate the development of green roofs. The City does have the ability to provide density bonusing in s. 37 of the *Planning Act*, R.S.O. 1990, c. P.13. However, City staff have made a policy decision not to allow bonuses for green roofs.[1]

The proposed Bill 53, the *Stronger City of Toronto for a Stronger Ontario Act, 2005*, does contain a provision that relates to green roofs under the heading of "Structures, including Fences and Signs", which reads as follows:

> Construction of Green Roofs
>
> s. 108 (1) Without limiting sections 7 and 8, those sections authorize the City to pass a by-law requiring and governing the construction of green roofs if the provisions of the by-law do not conflict with the provisions of a regulation made under the *Building Code Act, 1992* respecting public

[1] Telephone conversation on Thursday March 2, 2006, with Jane Welsh, acting Project Manager for Environment for City Planning.

health and safety, fire protection, structural sufficiency, conservation and environmental protection and the requirements respecting barrier-free access.

Same

(2) A by-law under subsection (1) prevails over a regulation made under the *Building Code Act, 1992,* despite section 35 of that Act.

Definition

(3) For the purposes of subsection (1),

"green roof" means a roof surface that supports the growth of vegetation over a substantial portion of its area for the purpose of water conservation or energy conservation.

This grant of authority to enact bylaws to require green roof construction is very encouraging. However, this provision is not law as the Bill received first reading on December 14, 2005, and it could be some time before the new legislation is enacted.

City of Waterloo

	CMHC Resource Manual (2005), see page 50-54
Home page	http://www.city.waterloo.on.ca/DesktopDefault.aspx
Feasibility Study Results	http://www.city.waterloo.on.ca/DesktopDefault.aspx?tabid=1324

The City of Waterloo recently did a feasibility study that recommends a City-wide implementation plan for green roofs. Some recommendations relating to regulatory issues are:

- To require green roofs on municipally owned buildings; and
- To develop policy for requiring green roofs in the development application process.

Currently, the City does not have any policy in place that supports the use of green roofs. Additionally, the City does not have any regulatory tools that provide incentive for building green roofs. However, the City of Waterloo is currently reviewing its Official Plan and it is expected that the implementation of green roofs will be incorporated in the Official Plan based on the results of the feasibility study.

The City's staff is considering developing a stormwater utility charge for industrial, commercial and institutional sectors to cover the costs of stormwater treatment. As of March 2006, this utility charge has not been implemented.

Links to General Information on the Possible Use of Regulatory Tools

- Sandra Marchall, *Development of a Practical Resource Manual on Green Roof Infrastructure for Municipal Policy Makers*, Task 4, (CMHC Green Roof Policy Project, August 17, 2005)
  - p. 17-18- Examples of tools to Encourage Green Roof Implementation
- Goya Ngan, *Green Roof Policies: Tools for Encouraging Sustainable Design*, (Landscape Architecture Canada Foundation, December 2004)
  - P. 11-10 - Legal Framework for Green Roof Policy
  - P. 19-20 - Direct Financial Incentives
  - P. 20-24 - Indirect Financial Incentives through Split Wastewater Fees
  - P. 26-27 - Integration into Development Regulations
- Doug Banting et al., *Report on the Environmental Benefits and Costs of Green Roof Technology for the City of Toronto,* (Ryerson University, October 31, 2005):
  - P. 2 – Comments on the City's Environmental Plan
  - P. 4 – Comments on the City's programs
- Policy and Research, City Planning Division in the City of Toronto, *Making Green Roofs Happen: A discussion paper presented to Toronto's Roundtable on the Environment,* (November 2005).
  - P. 24 - Examples of incentives
  - P. 33-36 – Examples of subsidies or grants
  - P. 36-39 – Examples of using reductions in development charges, property taxes, in water or energy rates as incentives
  - P. 39 – Examples of stormwater management charges
  - P. 39-41- Other regulatory options
  - P. 41- 43 – Examples of procedural improvements
- *Guideline for Design, Construction and Maintenance of Green Roofs*, by the Canadian Roofing Contractors Association: http://www.roofingcanada.com/techbull/roofgardens_files/frame.htm
  - http://www.rcabc.org/publications.php - Roofing Contractors Association of BC