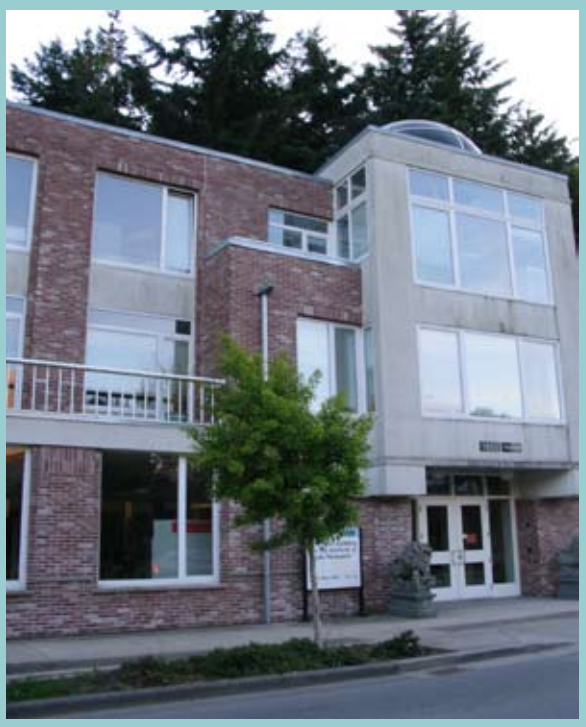

THE GREEN BUILDINGS GUIDE

TOOLS FOR LOCAL GOVERNMENTS TO PROMOTE SITE SUSTAINABILITY

Susan Rutherford

West Coast Environmental Law

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West Coast Environmental Law is BC's legal champion for the environment. West Coast empowers citizens and organizations to protect our environment and advocates for the innovative solutions that will build a just and sustainable world.

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COVER PHOTOS | TOP: The Spring Creek Firehall in Whistler, BC, was awarded LEED-NC Silver (USGBC) for its many green design features. Photo credit: Martin Tessler, courtesy of Hughes Condon Marler : Architects. | **MIDDLE:** The BC Cancer Agency Research Centre was awarded LEED Canada Gold. Photo credit: courtesy of Lori Garcia-Meredith. | **BOTTOM:** The C.K. Choi Building at the University of British Columbia in Vancouver has been recognized for its innovative design features.

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Introduction: Green Buildings for Sustainability

Increasingly, British Columbian local governments and citizens are taking pride in announcements of new green buildings. Whether it's an industrial park such as the Vancouver Island Technology Park, a complete community project like the Dockside development in Victoria, a geothermally-heated aquatic and community centre as in West Vancouver, or a LEED Canada-NC v1.0-certified residential high rise apartment building, innovative projects are demonstrating the benefits and attractions of finding more sustainable ways to build our communities.

Why Build Green?

Recent research confirms that it makes good economic sense for local governments to support green building design and practice. A 2005 study commissioned by the Canada Green Building Council, *A Business Case for Green Buildings in Canada,*[1] concluded:

> *At the current state of development of the industry, green buildings typically cost more than conventional buildings to design and build. However, these cost increases are greatly overshadowed by economic gains associated with the following:*
>
> - *Life Cycle Operating Costs*
> - *Insurance Rates*
> - *Churn Rates*
> - *Productivity Gains*
> - *Property Values and Absorption Rates*
>
> *Other benefits of green buildings can include increased retail sales, improved image, risk reduction, and external effects such as effects on infrastructure, the environment, local economy, and international recognition.*

In the United States, a 2003 report to the California Sustainable Building Task Force predicted:

> *While the environmental and human health benefits of green buildings have been widely recognized, minimal increases in up-front costs of 0 to 2 per cent to support green design will result in life cycle savings of 20 per cent of total construction costs – more than 10 times the initial investment.*[2]

Recently, Canadian business media have heralded green design and practice as the "wave of the future," citing a variety of economic benefits.[3] Indeed, the benefits to industry have meant that in many instances it has been industry leading the charge on green building design and practice, with local governments being asked to respond to requests to accommodate innovative design and construction practices.

Social and environmental gains bolster the economic case: the research demonstrates that green buildings enhance occupant health and personal comfort – an important consideration given that the average Canadian spends 90 per cent of his/her time indoors.[4] This increase in comfort also translates into cost savings in avoided health care costs and increased productivity. Measurable connections exist between increased productivity and four attributes of building design – increased ventilation control, increased temperature control, increased lighting control, and increased daylighting.[5] Similarly, avoiding toxics and using low emitting materials for adhesives and sealants, paints, carpets and composite wood all reduce the incidence of asthma and allergies, as does instituting procedures for indoor chemical and pollution control.[6]

The West Vancouver Aquatic Centre is designed to be both energy-efficient and aesthetically inspiring.

PHOTO CREDIT: NICK LEHOUX, COURTESY OF HUGHES CONDON MARLER : ARCHITECTS

Green Building Design and Practice

Considerations in green building design and practice are broad – ranging from building location, to materials and design features, to operational considerations.

Specifically, this means buildings that are *situated*:

- preferably on brownfields, not greenfields, and away from sensitive habitats;
- clustered and contributing to density near urban centres, not at the urban fringe;
- integrated into sustainable and smart growth communities; and
- close to transportation and services, so as to avoid or reduce car trips.

Green buildings are buildings that are *designed and constructed* to:

- incorporate energy efficient features (use natural lighting and ventilation,[7] good insulation, solar or geothermal heating, district heating, high efficiency fluorescent lighting, cool roofs) and reduce occupant dependency on cars (bicycle parking, showers for bicycle commuters);
- incorporate water efficient features (collect rainwater, use waterless urinals, low-flow faucets and toilets and/or composting toilets, green roofs);
- re-use existing building structures and/or building materials; reduce and recycle waste materials;
- preserve natural vegetation, and reduce disturbance to landscapes and habitats, in order to maintain biodiversity and preserve ecological integrity;
- incorporate sustainable, healthy, locally made or harvested non-toxic materials and features into buildings and furnishings (e.g. FSC or recycled wood, low VOC carpet, paint and composite wood products, previously used or recycled materials);

- protect occupants from contaminants created as a result of construction (protecting HVAC systems during construction and flushing them prior to occupancy) or occupant use (e.g. tobacco smoke controls[8]); and
- incorporate flexible design and durability wherever possible (e.g. moveable walls that don't require renovation to reconfigure).

And for building *operations and management*, green buildings:

- use green waste management practices;
- use non-toxic cleaning products;
- monitor and commission building installations and building operations to ensure that planned targeted designs are met with results.

The industry standard for green building design and practices is LEED – Leadership in Energy and Environmental Design. This standard, which originated in the United States, is administered in Canada by the Canada Green Building Council (Council). The Council has now adopted a Canadian standard, identified as LEED Canada-NC v1.0. Detailed information about the standard, as well as examples of LEED-certified buildings and other resources, are available on the Council's website.[9]

Hughes Condon Marler : Architects Renovation achieved LEED-CI Silver (USGBC) certification. Features include natural light, controllable ventilation, secure bicycle storage, a shower and change room.

PHOTO CREDIT: MARTIN TESSLER, COURTESY OF HUGHES CONDON MARLER : ARCHITECTS.

Green Buildings: A Focus on the Site Scale of a Community's Broader Sustainability Agenda

Regulations and policy to support green building design and practice also fit within a local government's broader strategy to find sustainable growth management solutions. By reducing the footprint on air, land, water and energy resources at the site scale, green buildings can further local government planning objectives for achieving sustainability on a community-wide scale.

On the broader scale, smart growth goals may include:[10]

- promoting urban revitalization and a healthy working land base;
- incorporating green infrastructure into communities;
- creating compact, complete communities;
- increasing transportation choices;
- creating inclusive neighbourhoods; and
- making efficient use of expenditure of public funds/ public infrastructure.

Numerous strategies, regulations and policies may support a community's movement in a more sustainable direction. Complementing a green buildings strategy, these may include, for example:

- establishing an urban containment boundary in the official community plan;
- setting minimum subdivision standards for open space[11] or in mountainous areas, establishing a vertical limit on infrastructure;[12]
- setting standards for landscaping (e.g. stipulating maximum site disturbance or the planting of native plants);

- zoning to allow secondary suites in residential areas;[13] and
- setting standards to both maintain existing green infrastructure (green spaces, waterways, etc.) and create green infrastructure (bio-swales, new wetlands, permeable roadways, green roofs, etc.).

The very broad topic of growth management, and all of the regulatory strategies related to achieving that, are not, however, the focus of this Guide. For more information on smart growth bylaws and policy, and building sustainable communities, see West Coast's *The Smart Growth Guide to Local Government Law and Advocacy* or the *Smart Bylaws Guide* (both available online at www.wcel.org).

Guide Purpose and Structure

This Guide is part of the ongoing work of West Coast Environmental Law's Livable and Sustainable Communities Program. It builds on West Coast's prior work in this area, specifically *Cutting Green Tape: An Action Plan for Removing Regulatory Barriers to Green Innovations*, a report that was focused on legal impediments and law reform needs, and the

Abbotsford Regional Hospital and Cancer Centre is a Canada Green Building Council registered project.

PHOTO CREDIT: COURTESY OF ECO-LUMBER CO-OP.

Smart Bylaws Guide, a web-based resource that provides links to innovative smart growth practices around BC and North America.

This Guide's purpose is to increase green building uptake in BC, by providing a central resource to the suite of regulatory and policy tools *currently available* to BC local governments to support and promote green building design and practices. The Guide's aim is to provide targeted guidance.

The Guide is therefore neither a law reform report nor a comprehensive discussion of the many benefits of green buildings. It assumes that the reader is already familiar with the *what,* is convinced of the merits, and is seeking knowledge on *how* to move forward at the cutting edge.

The Guide is organized as follows:

- Part 1 provides an overview of the three roles that local governments can fulfill when trying to support and promote green building design and practices: as regulators/policy makers; as building owners; and through partnership, leadership and educational initiatives. The Guide's primary emphasis is on the first listed role – as regulatory and policy makers.
- Part 2 discusses regulations and policies that can achieve "across the board" gains on green building design and practices.
- Part 3 discusses regulations and policies that target a specific area of green building design or practice, such as energy efficiency or water conservation. Tools discussed in Part 3 are designed to advance more specific objectives and are in addition to the general tools discussed under Part 2.
- Part 4 provides concluding remarks.

1. Building Green: Three Roles for Local Government

Local governments have three clear roles to play vis-à-vis green building development – as regulators/policy makers, as property owners, and as partners and/or educators. Different achievements can be realized within the context of each of these roles.

1.1 As Regulators and Policy Makers

As regulators and policy makers, local governments have a range of tools available to them to encourage developers to think about green building design and practices. This regulatory and policy role is the focus of this Guide, and Parts 2 and 3 provide a detailed discussion of the various tools. The purpose of this section is to introduce the regulatory and policy context.

1.1.1 Municipal Versus Regional District Powers

BC municipalities and regional districts do not always hold the same regulatory powers, due to distinctions made in the *Local Government Act* and the *Community Charter.* Guide terminology referring to "local governments" includes both regional districts and municipalities; otherwise, the powers are addressed separately.

1.1.2 Thinking Beyond Building Bylaws

Local government green building regulation and policy is not what one might expect – local building bylaws are not the primary focus for local government action. This is because

regulation of building construction and demolition in BC is dominated by the requirement for compliance with the provincial *BC Building Code,*[14] established further to section 692 of the *Local Government Act* and the British Columbia Building Code Regulation, B.C. Reg. 295/98. The *Building Code* applies in municipalities and regional districts throughout the province, and has the same force and effect as if it were a bylaw.

While at first blush section 8(3)(l) of the *Community Charter* appears to give municipalities the power to "regulate, prohibit and impose requirements" in relation to buildings and other structures, a closer examination reveals that in fact, BC municipalities have a rather limited jurisdiction in this area, due to the following provisions:

- Section 9(1)(d) of the *Community Charter* establishes a concurrent authority with the province for bylaws "establishing standards that are or could be dealt with by the Provincial building regulations";
- Section 53 of the *Community Charter* limits the exercise of the s. 8(3)(l) authority to the passage of bylaws "for the health, safety or protection of persons or property;" and
- The Buildings and Other Structures Bylaws Regulation, B.C. Reg. 86/2004, passed under section 9 of the *Community Charter*, provides that without specific approval of the minister, municipalities may only regulate buildings that are exempt from the *Building Code* – i.e. accessory buildings less than 10 m2 in area, construction site offices, seasonal storage facilities, special events facilities and other temporary structures.

Taken together, these provisions mean that for a municipal council to impose stricter standards than the *Building Code* on *Code*-regulated buildings (but necessarily limited by s. 53 to the sphere of health, safety or protection of persons or property), a council must obtain either the approval of the minister, or enter into an agreement between the minister and one or more municipalities.[15] Local action is therefore substantially constrained: provincial policy favours

maintaining uniform building standards throughout the province.

Regional district authority over buildings is similarly restricted to the passage of bylaws in relation to health, safety or protection of persons or property.[16]

Motivated municipalities may either singly, or together, work to convince the Minister to pass regulations for green building standards to be applied to requesting municipalities as an exception to the general *Code* standards. Section 692(e) of the *Local Government Act* authorizes the Minister to make regulations,

> *exempting certain persons, buildings, classes of buildings, materials or areas either generally or for certain periods of time from the building code or regulations, and making other regulations for the persons, buildings, classes of buildings, materials or areas exempted.*

Note that the provincial regulation-making authority of this section is not limited to standards or considerations pertaining to health, safety or protection of persons or property.

Quite apart from building bylaws, local governments have other sources of power to shape building development. Parts 2 and 3 of the Guide discuss avenues for action authorized by other sections of the *Local Government Act*, the *Community Charter*, the *Land Titles Act* and other legislation.

The Capital Region District and other municipalities did negotiate and achieve standards that were exceptional to the *Code*, with the passage of the Water Conservation Plumbing Regulation in 2005.[17] This was, however, by all accounts a hard-won exception.

1.2 As Owners of Property and Infrastructure

As owners of property and infrastructure, local governments can become green building leaders. Direct experience with green designs presents an opportunity to inform a local government's understanding of the challenges and benefits, and enhances the ability of local government decision-makers to speak from experience, both when regulating and when advocating for needed reforms at provincial or federal levels of government.[18] Green design and practices also leads to important savings for city operations and a better work environment for municipal employees.

Local governments can move beyond opportunistic action, to ensure consistent action, by means of a public statement or commitment of policy. Establishing a green building policy is one way to demonstrate and to better secure an ongoing commitment to green building design and practices.

1.2.1 Green Building Policy

Establishing a green building policy, or the elements of one, is an important first step for a local government to get its own house in order on the green buildings front. By council resolution, local governments may, for example:

- Adopt or reference the LEED Canada-NC v1.0 standard for civic buildings (a small but growing number of municipalities have committed to the LEED standard for their own building construction);
- Commit to have their own building stock achieve 25 per cent better than the Model National Energy Code (the province has announced it will do this for provincially funded buildings[19]);

The City of Vancouver's National Works Yard has achieved LEED Gold certification, and features water use reduction design features, use of regionally available materials and controllable ventilation and lighting for enhanced indoor environmental quality.

The opportunities for local government leadership and savings on civic buildings are limited only by one's imagination. For example, North Vancouver's School District installed a "central direct electronic control system" in each school, and was able to monitor occupancy and control conditions in each room. Various measures resulted in a 70 per cent drop in water consumption and came close to targets for electricity and gas reduction targets (19 per cent and 28 per cent respectively).[23]

- Commit to, where possible, trying to reuse and improve existing buildings instead of building new;[20]
- Commit to making new civic buildings flexible to changes in configuration (space and employees), and incorporate features such as flexible walls and underfloor air systems to house power and cabling and allow easy changes of floor layouts. Such "churn costs" can be significant and can be easily averted with some foresight and planning.[21]
- Commit to using innovative, ecologically sustainable materials or technologies, as much as possible, such as FSC-certified or recycled wood, recycled plastic or glass, etc.

The following local governments have committed to LEED standards: Vancouver (LEED Gold), Calgary, Lethbridge and the District of Saanich. Halifax is moving in that direction. The District of Ucluelet endorses LEED as a voluntary option in its Official Community Plan,[22] and Richmond has endorsed a Sustainable "High Performance" Building Policy.

Green procurement is another burgeoning field for local governments.[24]

1.3 As Partners and Educators

Local governments can increase awareness and acceptance of green building design and practices, by partnering with the private sector to provide key infrastructure or programs, and by delivering an education or outreach program on targeted issues.

1.3.1 Cutting Edge Innovation

Developments that sit at the cutting edge set the benchmark for what is possible and may inspire others to create more livable, sustainable communities. Local governments that collaborate with developers to facilitate cutting edge innovation ease the way not only for extremely innovative

projects, but also for more modest green projects that follow in the footsteps of green leaders. A local government's support of innovation, and a willingness to find and develop solutions for alternative approaches, lends confidence and support to the green development community.

A partnership approach by the local government is one of the keys to success: without the local government's agreement to work with the developer to find equivalencies to the *Building Code*, innovative projects would be stopped in their tracks as illegal.

Within BC, two notable and recent innovative projects are the Dockside Green project in Victoria and the Centre for Interactive Research in Sustainability (CIRS) project in Vancouver. The former is an initiative of the City, which issued a Request for Proposals in selling some land and thereby secured sustainability features through the sale and a master development agreement; the latter project is a joint venture of a number of educational institutions.[25] These developments have been facilitated in large measure by the willingness of the local governments to embrace the initiatives for their contribution to the City's understanding of sustainability, and to approve having planning/building staff work pro-actively and flexibly with the developers to identify and review City bylaws and *Building Code* equivalencies to meet sustainability, health and safety standards.

Some of the kinds of innovations that are planned in these projects are:

Dockside Green[26]

- Recycling of waste products – waste is food concept, closed loop, triple bottom line[27] approach; buildings will have recycling rooms for composting, and strategic local partnerships to use waste will be encouraged;
- Reduction in use of potable water and recycling and reuse of waste water – tertiary on-site sewage treatment with waste water used in toilets and streams;[28]
- Production of renewable energy on-site via a wood biomass co-generation facility, to meet all heating, cooling and electrical needs;

- The finding of eco-efficiencies in an innovative mix of industrial, commercial and residential uses;
- Establishment of a local mini-transit system using bio-diesel or hybrid vehicles as well as a ferry shuttle.

CIRS[29]

Sustainable design goals for the CIRS project include:

- 100 per cent daylighting, for productivity, health and energy savings;
- Net energy generator; no mechanical cooling; greenhouse gas neutral;
- Water: 100 per cent rainwater; no external supply; on-site treatment of all liquid waste; no stormwater runoff from site;
- Waste: no solid or liquid waste leaving site; maximize building utilization; sustainable building materials;
- A centre for learning in sustainable technology: educate, train and demonstrate sustainable design in action;
- Performance monitoring, commissioning[30] and adaptive management principles.

Vancouver Island Technology Park innovated as Canada's first refurbished LEED Gold building, and incorporated many water and materials-saving features.

PHOTO CREDIT: COURTESY OF THE UNIVERSITY OF VICTORIA'S VANCOUVER ISLAND TECHNOLOGY PARK.

Other examples of cutting edge partnerships are discussed *infra*: notably, district heating systems and eco-industrial networking opportunities.

1.3.2 Program Delivery

On the program delivery side, local governments may partner with utilities or other service providers to deliver green retrofit or rebate programs. Private partners can furnish leadership and expertise. Local government sponsorship of expertise overcomes the primary obstacles homeowners encounter when trying to retrofit their homes – a lack of time and expertise to coordinate all of the details.

1.3.3 Education and Promotion

Local governments can encourage and build professional capacity for green building design and practices, by posting and circulating educational materials that highlight green building strategies. Two excellent examples are the Greater Vancouver Regional District's (GVRD's) BuildSmart website[31] and related materials on sustainable building practices and indoor air quality;[32] and the website for the Saving Water Partnership of the Seattle and Participating Water Utilities, [33] which publicizes strategies for commercial, industrial and institutional customers to save water in their building and business operations. The latter encourages such tools as "business water use audits," and more efficient technologies or practices, and couples its efforts with additional incentives such as retrofit and rebate programs.

The City of Vancouver's National Works Yard building features a permeable surface for parking.

2. Regulatory and Policy Tools to Increase Green Building Design and Practices in the Private Sector

2.1 Regulatory Tools

2.1.1 Official Community Plan Policies[34]

Official community plans (OCPs), mandated under sections 875 to 879 of the *Local Government Act*, set the overall planning direction for a community's growth and development. OCP policies in support of smart growth principles, and green building design and practices in particular, constitute an important regulatory step for local governments that want to encourage private sector green building design and practices – not only because the OCP provides broad policy direction, but also because capital expenditures as well as any bylaws, must be consistent with the OCP.[35]

While a local government may not, in its OCP, *require* private sector development to meet specific green design standards or practices, it may encourage these by stating that green designs and practices are consistent with the overall policy direction of the community, and that all proposed development will be evaluated in the context of the community's sustainability goals, using sustainability principles as a benchmark. Green building policies in an OCP can provide a climate for negotiation on targets for individual project proposals by developers.

The following kinds of OCP policies may support green building development:

- support for a Green Building policy for civic buildings;
- specific support for LEED designs and practices for private development;
- identification of sensitive areas, and establishment of development permit areas to protect sensitive areas;
- establishment of an urban containment zone and designation of desired areas for increased densification, including encouragement and support for infill housing;
- encouragement of brownfield redevelopment;
- encouragement of re-use and adaptation of existing and heritage building stock;
- policies in favour of eco-industrial networking;
- measures for water conservation and reduction of impermeable surface areas.[36]

2.1.2 Checklists for Sustainable Design and Practices

Local governments can encourage green building development, by endorsing clear policies, accompanied by checklists, on their preferences for building development. This strategy is all about the "sub-text" that underlies city hall-developer transactions: What is the developer doing to help the municipality achieve its goals? What is the developer doing to make its proposal an innovative and attractive package for the municipality?

Checklists ask questions in order to guide action in a particular direction. A Checklist might ask, referring to the OCP, "Does the proposed development encompass any of the following features that are consistent with OCP policy?" A Checklist might list green roofs, innovative energy efficient design features, rainwater capture systems, material standards,[37] indoor air quality standards,[38] and so on. Even if the local government does not have the power to require these things,

a Checklist will communicate the local government's priorities and educate the development community about alternatives.

Port Coquitlam recently instituted a Sustainability Checklist for rezoning and development permit applications.[39] It asks proponents to score themselves on a range of questions, adopting a comprehensive a "triple bottom line" approach (environmental, economic and social) to assessing proposals. The Checklist flows from Port Coquitlams's recently revised OCP, which states explicitly a policy to "Incorporate sustainable development and "smart growth" principles and practices into community planning."

Bowen Island has instituted a Green Design Building Checklist. The Checklist is attached as Appendix "G'" to the Bowen Island Municipality Building Bylaw, No. 65, 2002[41] and is introduced in the body of the Bylaw as follows:

> *5.3 Bowen Island Municipality supports the use of alternative and innovative methods of design and construction procedures including the use of materials and systems which fall under the heading "building green". For information purposes only, a copy of the "Green Building Guidelines" is attached as Appendix "G" to this Bylaw.*

The Appendix elaborates:

> *The Council of Bowen Island Municipality reviewed the proposed Check List at their September 30, 2002 Council meeting and intends that the Check List be used as a guide for those who are doing site work and building construction on Bowen Island. Council recognizes that the Guidelines may not apply in all situations but recommend that builders follow and try to incorporate them as closely as possible.*

The Checklist directs builders to think about a range of sustainable building issues:

- design integration, and use of cross-disciplinary design teams;
- building sites (setting environmental goals – incorporating LEED where possible; preserving and encouraging biodiversity, protecting vegetation, watercourses and wildlife habitat; recharging and

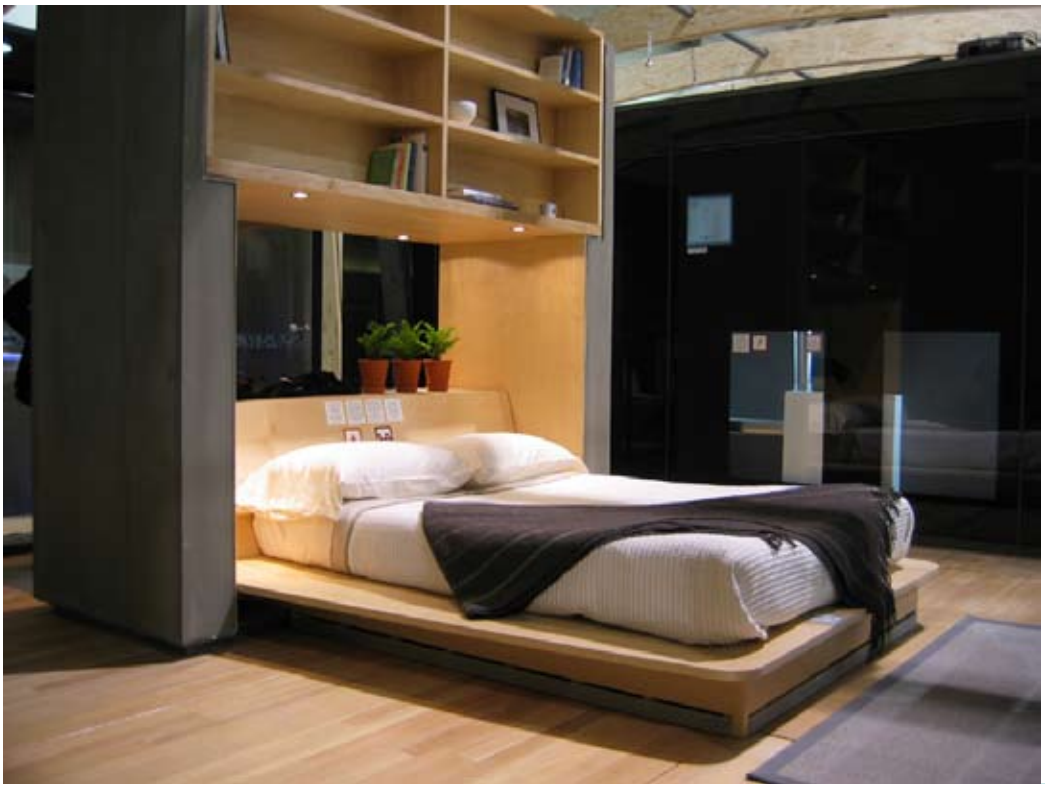
The City of New Westminster and the Town of Gibsons provide additional examples of "smart growth" or "smart development" checklists."[40] Both refer to smart growth policies set out in their respective official community plans.

protecting groundwater; managing stormwater pollution and flow offsite; encouraging more sustainable transportation use; reusing topsoil; optimizing renewable or alternate energy; moderating urban heat island effect; facilitating composting and recycling);

- construction and design (reducing water use; managing solid waste; reducing or eliminating pesticide use; reducing energy use; providing daylighting and views; salvaging from existing structures; reusing construction and demolition waste);
- building durability and design (designing for durability; making efficient and responsible use of materials; using sustainable wood sources – a minimum 50 per cent FSC certified; minimizing pollutants; ensuring ongoing maintenance and inspections);

Globe 2004 featured a Sustainable Condo project designed by Busby Perkins + Will, featuring reclaimed fir flooring, FSC maple plywood, strawboard and FSC fir lumber.

PHOTO CREDIT: COURTESY OF ECO-LUMBER CO-OP.



2.1.3 Development Approval Information Areas or Circumstances

Section 920.01 of the *Local Government Act* authorizes the establishment of development approval information areas or circumstances. "Development approval information" means information on the anticipated impact of the proposed activity or development on the community, and section 920.1 stipulates that the local government, on establishing development approval information areas or circumstances in the OCP must, by bylaw, establish procedures and policies on the process for requiring development approval information and the substance of the information required.

While several local governments now require baseline information on how a development proposal fulfills community goals, by demanding responses to "Sustainability Checklists," local governments could, following the procedures outlined in section 920.01, require the provision of more detailed environmental impact information for a particular area or circumstance. Such information might be appropriate for example, for assessing the impact of a proposed development near a sensitive ecosystem; or for assessing all of the various impacts of a development having a particular threshold scale – or anticipated scale of use of community infrastructure or resources. Indeed, establishing such an EIA trigger might actually provide an incentive for developments to be more efficient and to use greener designs and practices, in order to avoid crossing the EIA threshold.

2.1.4 Building Bylaws

As discussed in section 1.1.2 above, local governments are limited in what they can do vis-à-vis *Code*-regulated buildings, but municipalities may work with the province to establish exceptional green building standards. Local governments can embark on this process on their own, or in concert with other municipalities.

2.1.5 Development Permit Guidelines

Development permit areas (DPAs) may be designated in an OCP for purposes which may include, amongst other things:[42]

- protection of the natural environment, its ecosystems and biological diversity;
- revitalization of an area in which a commercial use is permitted;
- establishment of objectives for the form and character of intensive residential development;
- establishment of objectives for the form and character of commercial, industrial or multi-family residential development.

For local governments wanting to encourage green design, the most relevant DPA purposes are those having to do with the establishment of objectives for the form and character of development. The authority to establish a DPA for the purposes of "protection of the natural environment" has been interpreted by BC courts as being intended for the protection of specific features within a DPA, rather than for general environmental protection or protection of large tracts of land.[43]

DPAs may involve entire neighbourhoods, or merely specific blocks of streets. The City of Victoria uses DPAs at several scales.

The OCP must describe the special conditions or objectives that justify the designation of the DPA, and must specify guidelines respecting the manner by which the special conditions or objectives will be addressed. Design guidelines may also be specified by zoning bylaw, but a DPA designation will not be effective until the zoning bylaw has been adopted.

Guidelines to meet a particular form and character objective, or guidelines to protect a natural feature may include statements to guide the look, placement and timing of development on the site, for example statements:

- outlining the amount of glass, landscaping features, or orientation to the sun;
- specifying drainage based on infiltration, or no disturbance of natural vegetation;

- protecting a sensitive hydrological feature (e.g. a beach, bog or wetland) by establishing guidelines for setbacks, xeriscaping (landscaping that uses native plants to minimize water load), impermeable surfaces and disposal of run-off.

In setting guidelines for a DPA,44 a local government may not *require* buildings to meet standards that exceed a local government's authority over building standards. However, local governments may *encourage* green building standards by indicating that they are desirable. For example, the DPA guidelines that apply to the innovative Dockside Green project in Victoria indicate that LEED standards are a "should" whereas other DPA guidelines are stipulated as mandatory elements.[45] However, a master development agreement between the City and the Dockside developer commits the developer to meeting a LEED Silver standard, the performance of which has been secured by a bond.

2.1.6 Density Bonuses

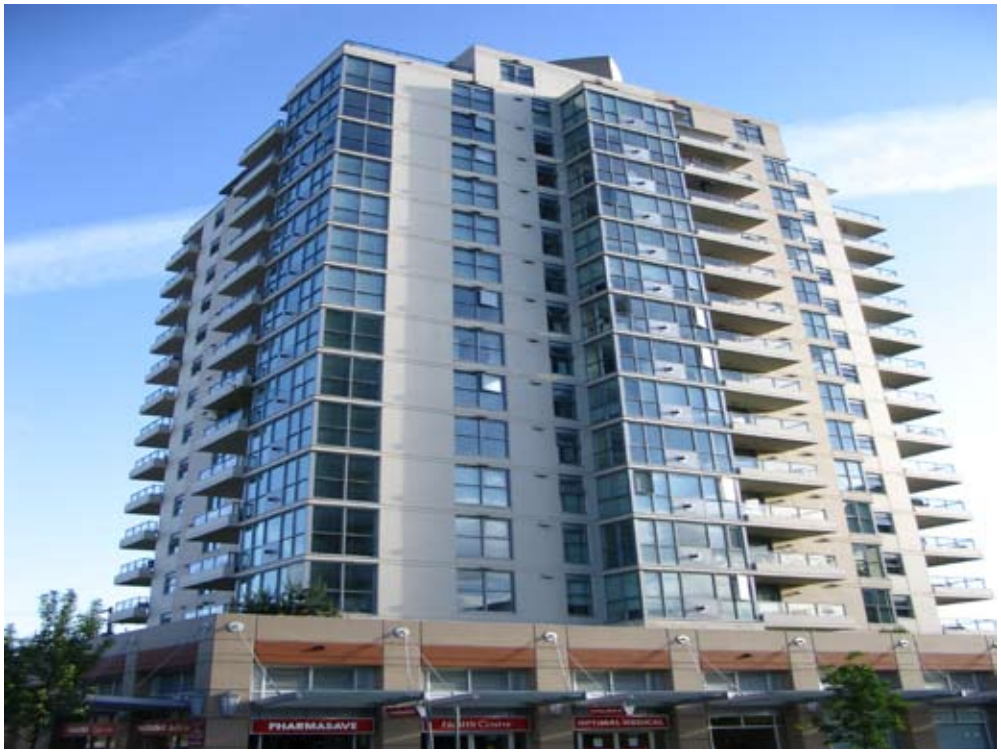
Section 904 of the *Local Government Act* authorizes local governments to establish zoning bylaw conditions which if met, entitle an applicant to a higher density than is generally available for the zone. Conditions may relate to "…the conservation or provision of amenities, including the number, kind and extent of amenities," or the provision of affordable or special needs housing.[46] These provisions, known as "density bonuses," have traditionally been used to increase the stock of affordable and special needs housing and community "tot lots", and to conserve and create environmental amenities such as parks and heritage properties.

Density bonus is a controversial tool, since it gives more density than is otherwise zoned for an area, and because if used arbitrarily, it can be viewed by the development community as an unfair exacting by the local government of density for community amenities. Also, for it to work as an effective tool for obtaining such amenities, developers must desire more density: in smaller BC towns where there is less of a shortage of affordable land to build on, many developers prefer to build out with single family homes, rather than up, with greater density.

A good density bonus regime: (1) establishes a maximum "uplift" in the OCP, following a community dialogue on the subject; (2) uses the OCP to identify areas where increased density is desired and to prioritize desired community amenities; and (3) establishes a transparent and public accounting mechanism to calculate the value of the uplift in density, and what the bonus will buy in terms of community amenities.

The key question for our purposes is whether aspects of a green building development may constitute such a density bonus "amenity." Though little precedent exists to date, it appears quite arguable that a green roof, the creation on an artificial wetland for stormwater filtration, the protection of green space or the protection of a riparian area as part of the stormwater design, could all be considered to be community amenities, provided they are green and provide a benefit to the public. It is also unlikely that a court would interfere with a municipal judgment of what constitutes an "amenity" unless that judgment was completely unreasonable.

The City of North Vancouver currently uses density bonuses and other incentives to encourage "enhancement of the environment through high efficiency ("green") building design."[47]



The Silva Building, a mixed residential-commercial use building project in North Vancouver, BC, was the first LEED-certified residential project in Canada.

2.1.7 Covenant Opportunities with Re-Zoning Applications

Local governments are not authorized to "bargain" for zoning; they may bargain only for density.[48] A council or board may not, therefore, stipulate that a re-zoning is conditional on the provision of amenities or green building features.

Nonetheless, local government administrative staff can, on a re-zoning application, suggest that a section 219 *Land Title Act* covenant be registered, requiring the incorporation of certain green building or development features, as a condition of *staff* giving their recommendation to the re-zoning and development proposal. Staff cannot *promise* the re-zoning will be granted, as staff cannot bind council to a decision and council cannot close its mind before a re-zoning hearing, but staff can promise their support of the proposal – a significant hurdle for any developer.[49]

While covenants are authorized by the *Land Title Act*, they are by their nature "voluntary" measures "offered" by a developer rather than "required" by a regulator; their scope is therefore potentially more flexible than a normal regulatory tool. Using covenants, local government staff can secure desirable building features such as low flow toilets, green roofs, energy efficient features such as solar hot water tanks, and so on. Covenants can also be registered to protect heritage or riparian properties. The latter properties are eligible for a permissive property tax exemption further to section 225 of the *Community Charter*.

Covenants should include provisions to help ensure compliance with the covenant into the future – e.g. provisions requiring the filing of monitoring or maintenance reports might be considered.

2.1.8 Statutory Building Schemes

Statutory building schemes, authorized by section 220 of the *Land Title Act*, are another avenue for local governments to support green building development. This involves a developer selling or leasing land and imposing restrictions on the development of the land through registration of a covenant that "runs with the land" and binds the subsequent owners under the scheme.

This tool becomes relevant when a local government sells municipally-owned land to a developer for the purposes of development. In addition, while statutory building schemes are usually voluntary, they are sometimes instituted at the request of a local government as a condition of a discretionary approval such as a re-zoning or subdivision application.[50]

Statutory building scheme requirements can be more restrictive than regulatory requirements, because the builder and buyers voluntarily agree to be bound by a covenant on title restricting their rights further than any development restrictions that might otherwise be imposable by law. Such schemes also have the potential to be more permanent than a zoning regulation, as the scheme continues in place for the benefit of all owners, binding subsequent owners, unless all owners agree to lift the covenant.[51] One of the means by which a municipality can retain some control over or prevent future changes to the covenants is to own a property that is subject to the scheme.[52]

Statutory building schemes generally include design guidelines, and building permits may be made dependent on compliance with the guidelines. The covenants or guidelines must be restrictive or negative in nature, though not necessarily in form.[53] In order to be valid, since covenants "run with the land", they must "touch and concern" the land;[54] the other owners must clearly be affected (bear a benefit/burden) from the performance or breach of the obligation.

The theory underlying a statutory building scheme is that it establishes a community of interest and reciprocity of obligation and benefit amongst the owners. Typically, most schemes restrict the types and colours of building materials, exterior finish, the use that can be made of the residence and

lot (usually prohibiting certain "nuisance" uses), types of fireplace or chimney, etc. In this way, the scheme provides a certain assurance that development components will meet certain criteria.

It seems clear that a statutory building scheme could restrict owners to using: green roofing to increase scheme site permeability; roof run-off technology to gather and re-use roof run-off; permeable materials for driveways or parking pads; outdoor lighting that has a certain efficiency rating and illumination directed so as not to promote light pollution; or a sanitation system that composts or provides on-site treatment, rather than being hooked into a sanitary sewer. Building and window orientation could also be restricted to a direction to maximize energy efficiency vis-à-vis wind and sun.

However, given the need for the covenants to "touch and concern" the land, and to provide a benefit to others under the scheme, it is less clear legally whether a statutory building scheme could successfully impose restrictions relating to *interior* features of scheme buildings. It seems plausible that a scheme restricting certain kinds of interior fixtures could be upheld, especially where the fixture is relevant to the community's utility servicing needs: for example, a requirement for low volume, dual flush or composting toilets,[55] or low flow showers and faucets, if the community were on a common aquifer or well. In other cases where the benefit to the neighbours is less clear, one might be able to defend the provisions of a scheme on the grounds that its purpose was to establish a community where environmental, visual and resource use impacts are minimized, but certainly such provisions would be more vulnerable to challenge.[56]

2.2 Incentives and Other Policy Tools

2.2.1 Equivalencies – Speeding Approvals

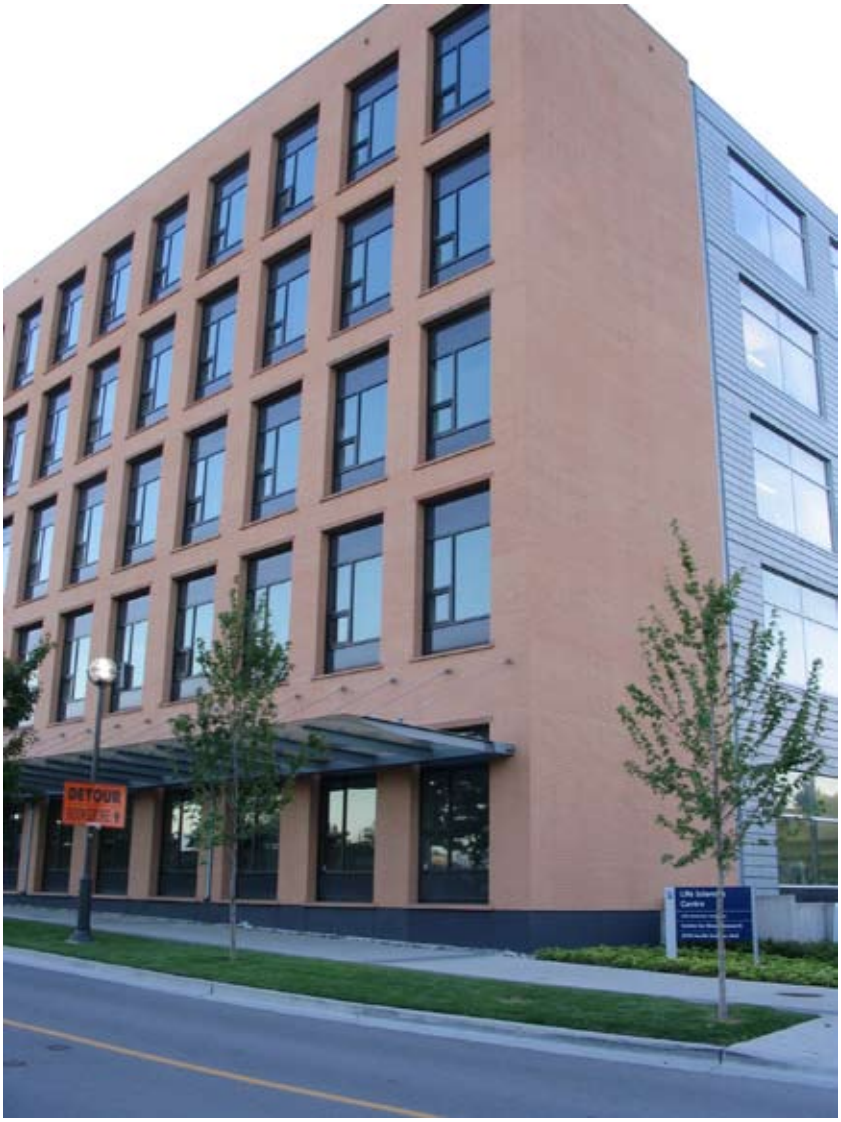
Alternatives to the command and control requirements of the BC *Building Code* are called equivalencies and section 2.5 of the *Code* authorizes municipal staff to approve equivalencies.

The challenge for green buildings is that they almost always involve innovations that are not contemplated by the *Code* and require "equivalency" approval by local government staff. Granting equivalencies triggers local government concerns over liability risks and exposure in the event of the technology failing. A common strategy for addressing liability concerns is to require developers to provide letters of assurance from qualified professionals that the project complies with the performance standard and that the professional assumes responsibility for design flaws (and this requires verification that their errors and omissions insurance policy will cover such errors).

Municipal policies and programs that assist staff to become familiar with green design and practices, to ensure consistent, quick and inexpensive approvals of innovative technologies can help make green buildings more feasible, since time is money in the development world. To facilitate green building approvals, local governments could consider:

- Devoting staff resources and some budget up front (e.g. to hire an engineer), to review/design equivalencies, to help put a green building program in place and save time/money over the long term;
- Establishing policy that the local government supports LEED Canada-NC v1.0 standards, and encourages applications seeking equivalencies for LEED standards;[57]
- Establishing flat rate, reasonable pricing for equivalencies.[58]

Local governments might also work cooperatively with an organization like the Canada Green Building Council to establish a database of information documenting technologies where equivalencies have been approved. Such a database would facilitate approvals across the province, particularly in smaller municipalities that otherwise might lack the resources to efficiently consider requests for equivalencies. However, one of the current impediments to such a database is that some developers and designers may be reluctant to share what is currently often regarded as proprietary and valuable technical information.



The UBC Life Sciences Centre in Vancouver, BC, was awarded LEED Gold (USGBC) for its innovative features, including reduction in greenhouse gas emissions, monitoring systems, and use of recycled and salvaged materials.

2.2.2 Hiring and Training to Secure Green Building Expertise

Local governments can facilitate green building acceptance by hiring experts and training their own building inspectors and other officials in green building design and technology. A lack of familiarity with green design concepts impedes acceptance. As officials are educated about acceptable alternatives and what they look like, they become not only more willing to entertain existing and new innovations, but may actually identify opportunities for green equivalencies and encourage their incorporation into projects wherever possible.

This approach was recognized by Whistler in its review of a green building program: it recommended hiring a green building coordinator to facilitate the resort municipality achieving its green building goals.[59] Both the City of Vancouver and the City of Richmond are undertaking training of inspectors and officials. The City of Vancouver and some other municipalities including Saanich[60] now have green building expertise on staff.

One training model is to establish internships with known "knowledge centres." For example, the Eco-Efficiency Centre in Halifax is now offering interns from around the world the opportunity to learn about eco-efficient networking – a great way to "seed" progress elsewhere.[62]

Other knowledge centres for green buildings are the Sustainable Building Centre on Granville Island in Vancouver (a project of Simon Fraser University that opened March 25, 2006), and BC Institute of Technology's Green Roof Research Facility.[61]

2.2.3 Integrated Approval Processes

Integrated approval processes facilitate green building development by streamlining approvals and saving time and money for developers. Usually, all civic departments that are involved in the approval process meet simultaneously with the developer and the project architects and engineers, to promote efficiencies, to better understand the goals of the project, and ultimately, to encourage better planning. An integrated process allows the "whole story" of the project to be told at once, and problems to be ironed out, with all of the cross-disciplinary expertise in one room. This avoids the all too common scenario of issues being inefficiently re-debated sequentially by different departments at various stages of the process.[63] Communications with the developer are also usually streamlined, for improved

communication both within the local government and externally, with the developer.

While it can be a challenge to implement an integrated process, experience proves that integrated processes encourage innovative developments.

2.2.4 Fast-Tracking Green Building Approvals

Fast-tracking of approval processes is a strategy local governments can use to encourage green developments.[64] The strategy entails granting priority status to developments that meet green building criteria, so that those applications receive faster processing than they otherwise would. The fast-tracking process acts as an incentive to encourage the stipulated development criteria.[65]

Some communities already have experience with fast-track processes.

The City of Scottsdale, in Arizona, has a fast-track plan review under its Green Building Program, which "…encourages a whole-systems approach through design and building techniques to minimize environmental impact and reduce the energy consumption of buildings while contributing to the health of its occupants."[66] The program is entirely voluntary and uses a point rating system to qualify projects; it claims that green building projects receive approval in half the time it takes for a regular plan approval. In 2005, some 33 per cent of all buildings adhered to the criteria established by the Scottsdale program. The program is promoted with job site signs that distinguish the project and show the builder as environmentally responsible. The city also lists and publishes builders and architects participating in the program, and provides extra green building inspection and certification as part of the process. The program also sponsors lectures and educational materials.

A further discussion and analysis of green building fast-track and checklist programs is available in the Greater Vancouver Regional District's (GVRD's) *Review of Green Building Guidelines for Low-Rise (Part 9) Residential Projects in Greater Vancouver*[67] and in *Local Government Green Building Programs,* prepared for the Regional District of Nanaimo.[68]

2.2.5 Encourage Eco-Industrial Networking

In 1996, the (US) President's Council on Sustainable Development defined eco-industrial networking as follows:

> *An industrial system of planned materials and energy exchanges that seeks to minimize energy and raw materials use, minimize waste, and build sustainable economic, ecological and social relationships.*

Eco-industrial networking seeks to identify efficiencies among businesses, and to promote the use of one industry's waste in another industry's processing, to the mutual commercial, environmental and social benefit of all involved.[69] Eco-industrial networking is gaining prevalence in both commercial and industrial settings across Canada.

An eco-industrial network can either involve physically co-locating businesses and activities in the same location or complex (e.g., an eco-industrial park), or it can be a virtual network, meaning that on a regional or neighbourhood scale, businesses and other organizations identify and divert their material flows/waste flows to find efficiencies and establish mutually beneficial relationships.[71] In either case, the challenge is for partners to think of themselves as a system that is striving to find efficiencies and reduce waste.

Local governments are authorized to use a variety of regulatory tools to promote eco-industrial networking:

- Policy statements in OCPs;
- Local governments may establish a zone as an eco-industrial zone, where land uses are planned to be complementary with other uses within the zone;[72]
- Municipalities have the authority to pass bylaws directing manufacturers and processors to dispose of the waste from their plants in a manner directed by the bylaw (section 59(1)(c) of the *Community Charter*), and also have specific authority to pass bylaws in relation to refuse, garbage or other material that is noxious, offensive and unwholesome, as well as waste disposal and recycling services (section 64 *Charter* re: exercise of nuisance authority under section 8(3)(h));

By cooperating and exploring symbiotic potential, businesses may reduce waste by, for example:

- sharing infrastructure and space, such as loading/ docking bays, parking spaces and meeting rooms;
- sharing or exchanging building or business operation by-products (current examples include steam, heat, water, refinery gas, gypsum, biomass, liquid fertilizer, fly ash and sludge);[70] and
- sharing information, energy and water sources.

they might therefore require operators and building contractors to recycle a certain percentage of their waste, or to take their waste to a specific facility for re-use or recycling;[73]

- On re-zonings or grants of land, local governments might encourage applicants to place covenants and/or statutory building schemes on title, detailing commitments and standards for efficiencies and waste diversion resulting from eco-industrial networking relationships.

From a policy perspective, local governments can be instrumental in making eco-industrial networking happen, by launching partnerships and innovative planning processes. For example, the Maplewood Community Eco-Industrial Partnership Project in the District of North Vancouver[74] has, through planning, identified a number of opportunities to realize efficiencies not only at the neighbourhood scale, but also at the site scale, incorporating green building principles (see sidebar).

A tax tool that a municipal council might consider for supporting an eco-industrial venture in a particular area is a revitalization tax exemption, further to the authority of section 226 of the *Community Charter*. Under section 226(2), a council is authorized to designate an area a revitalization area in either the annual financial plan under section 165 or the OCP. The designation must include the reasons for the designation and the objectives for the area. The council can then, by bylaw, establish the kinds of property revitalization that are eligible for the tax exemption, and the extent of the exemption available, as well as provide for a recapture amount should the conditions of a tax exemption certificate not be met.

Some of the anticipated green building features that will enhance and revitalize the Maplewood development in North Vancouver are:[75]

- Live/work housing;
- Use of district heating system in local buildings;
- Recycling of waste generated by building occupants/ operations;
- Use of green building strategies to improve building performance and value; and
- Use of water conservation/ demand management techniques, reduced building footprint.

An exciting opportunity exists to initiate broad-scale multi-sectoral community action on eco-industrial networking. For example, in 2003, the City of Greater Sudbury in Ontario established EarthCare Local Action Plan, a program that encourages businesses to join as partners, and to find efficiencies with other businesses in situating and operating their businesses, throughout the Greater Sudbury area.[76] EarthCare partners – now some 90 community agencies, organizations and businesses – have committed to seeking funding to "develop an eco-industrial networking strategy to identify and exploit the synergies among private and public sector businesses and institutions;" they also encourage the development of eco-industrial parks.[77] The City plans to incorporate EarthCare objectives into the City's Official Plan. The initiative is coordinated through the City's Environmental Planning Initiatives Section.

Smaller local governments could consider testing out eco-industrial networking on a modest scale, by for example, establishing a partnership to set up a commercial facility for collecting and composting all of the organic waste from local restaurants.

3. Tools for Achieving Specific Green Building Goals

This next section discusses local government tools that can be used to further specific environmental goals (energy, water, site sustainability, etc.) and green building designs and practices.

3.1 Energy Efficiency

3.1.1 Regional Growth Strategy Statements

Local governments that wish to promote energy efficiency can advocate for policy to be inserted in the Regional Growth Strategy (RGS). The *Local Government Act*[78] provides that it is appropriate for a RGS to work towards but not be limited to planning for energy supply and promoting efficient use, conservation and alternative forms of energy.

3.1.2 Avoid Disincentives in Zoning Bylaws

Technical requirements of zoning bylaws can create disincentives to green building and make some technologies impractical. However, bylaws can be amended.

FLOOR SPACE RATIO: most local governments limit density by having a maximum floor space ratio (FSR) that calculates space to include space taken up by heaters, thus encouraging least efficient space saving technologies like baseboard heaters. FSR is also often calculated from the outer wall, discouraging thick energy efficient wall assemblies.

Local governments can adopt policies/bylaws that:

- Exclude spaces occupied by highly energy efficient heating and cooling apparatus from FSR; and
- Exclude exterior wall width (or exterior shading devices) from FSR calculations.

BUILDING SETBACKS: Building setback requirements may act as a disincentive to the construction of thicker, energy efficient walls, or for energy efficient retrofits, such as new exterior cladding that pushes the exterior wall beyond the setback area, requiring exceptional approvals.

To avoid such disincentives, local governments may want to adopt policies stating that variance applications to reduce setbacks to accommodate green building features will be regarded favourably.

UNNECESSARY RESTRICTIONS: Zoning bylaws sometimes unduly restrict passive solar heating or natural ventilation features, creating an impediment to the implementation of "easy" energy efficiency features. Bylaws might be amended to allow access to the sun and daylight (thereby enabling passive solar), and to encourage natural ventilation (e.g. building height restrictions might be relaxed).[79]

3.1.3 Establish a Local Service Area District Heating System

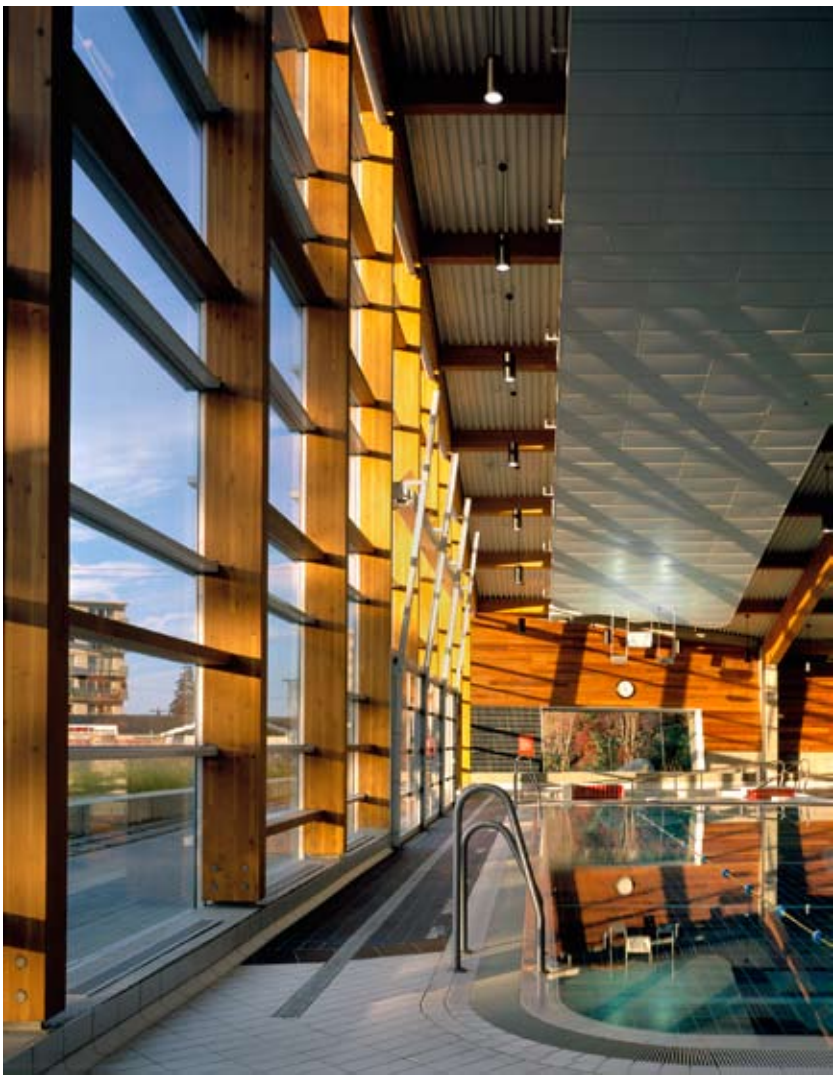
Local governments are authorized to establish local service areas under section 210 of the *Community Charter* in order to provide local area services that may be paid in whole or in part by a local service tax under section 216. Parts of the cost may be recovered by any other source of municipal revenue.

Local governments can encourage energy efficient buildings by investing in district heating system infrastructure and services to provide an energy efficient source for local building heating. For example, Lonsdale Energy Corporation's system, in North Vancouver, relies on high-efficiency gas mini-boilers to heat hot water, which is then piped underground to provide a heat source to residential towers, commercial space and a community centre in the local service area. Once used, the

The Lonsdale Energy system has won a National Award for Energy Efficiency,[81] and once fully built out, it will incorporate three mini-plants. The project was built with the assistance of federal Green Municipal Funds, administered by the Federation of Canadian Municipalities, including a $2 million low interest loan and a $2 million grant. Terasen and the City of North Vancouver each also provided $2 million.[82]

water is recirculated back to the mini-plant for re-heating, then recirculated again to the connected buildings. The system avoids each building having its own boiler. System costs are recovered through usage charges authorized by bylaw.[80]

Whistler is exploring the feasibility of a district heating system for the 2010 Olympic Athletes Village;[83] Vancouver is planning a district energy system for its South East False Creek development.[84] The City of Greater Sudbury in Ontario has had a district heating system in place since 2000.[85]



The West Vancouver Aquatic Centre has won awards for its features, which include the use of geothermal heat sources and natural light and ventilation.

PHOTO CREDIT: NICK LEHOUX, COURTESY OF HUGHES CONDON MARLER : ARCHITECTS.

3.2 Water Savings, Recycling and Onsite Rain Water Management

3.2.1 Metering

Valuing water is the first step to conserving it, and one of the best ways to communicate water's value is to meter it and link water charges to consumption level (as opposed to charging a flat rate). When cost is linked to the quantity consumed, it encourages conservation and demand management. Water meters can also help to detect leaks.

In promoting conservation, metering indirectly encourages the installation of green building technologies designed to use less water; metering is also consistent with ongoing monitoring, learning and adaptive management goals of green buildings.

Municipalities are authorized to meter water, pursuant to their *Community Charter* power to charge fees for the provision of a service.[86] Regional districts have a similar authority under the *Local Government Act*.[87] There is, however, considerable inertia against metering, given the capital outlay associated with installing meters.

A number of municipalities in BC have implemented water metering: Victoria, Surrey; Richmond (single family homes and duplexes on a volunteer basis); the Town of Oliver; and the District of West Vancouver (now switching over).

One of the keys to success with a metering demand management program is for customers to receive regular, timely notice of their consumption on a billing report, so they can meaningfully respond and take corrective action to reduce their consumption.[88]

3.2.2 Bylaws Addressing Rain Permeability

Green building development aims to ensure that the built environment interferes as little as possible with the ecological and hydrological cycles of the earth. Buildings generally introduce impermeable surfaces, preventing rain infiltration, therefore a key goal is to try to mimic pre-building site behaviour, and have rainfall permeate the ground as close as possible to where it falls.

In furtherance of this goal, a local government may, by bylaw:

a) set maximum limits on impermeable surfaces, or

b) require landowners to provide ways to dispose of surface runoff and stormwater from roofs and paved areas.[89]

Such bylaw provisions will encourage: the construction of green roofs; the preservation of green spaces; and the use of permeable rather than impermeable materials for building-related surfaces such as driveways, walkways, and patios.

Section 69 of the *Community Charter* grants municipalities the additional specific authority to pass bylaws regulating: the design and installation of drainage and sewerage works; the need for connection of buildings and structures to drainage and sewerage works; the need to maintain proper flow of water in a stream, ditch, drain or sewer, or to reclaim or protect part of the land mass of the municipality from erosion by any cause.

The District of Metchosin's Protection and Management of Rain Water Bylaw, No. 467, 2004[92] is a comprehensive bylaw for rainwater management, and incorporates requirements that are relevant to green buildings, such as limits on runoff and impervious surfaces, as well as broader rainwater management planning tools.

In addition to these proactive measures, local governments are encouraged to conduct a bylaw review, to eliminate or avoid passage of bylaws that limit or discourage innovative developments. For example, a provision requiring connection to a municipal storm sewer/drainage system might restrict innovative rainwater management/on-site gathering and

The City of Vancouver limits impermeable surface coverage in its RS Zone;[90] and the City of Vernon sets impermeable surface limits for stacked row housing and multiple housing.[91] The Town of Oliver has incorporated the following restriction in its building regulations:

> *43. No property may be developed in a manner which allows drainage water collected on the property to flow onto any adjacent private or public lands including public roads. On-site drainage shall be controlled by retention of open ground for infiltration, on-site retention basins, rock pits or dry wells to the satisfaction of the Building Inspector, who may require the owner to have the on-site storm drainage facilities designed by a qualified professional engineer at the owner's cost.*

filtration techniques as well as introduction or use of composting toilets. Similarly, local governments may want to consider innovative alternatives to existing bylaws requiring impermeable surfaces.

3.2.3 The Municipal Sewage Regulation

The Municipal Sewage Regulation, B.C. Reg. 129/99 under the *Environmental Management Act* and the companion Code of Practice for the Use of Reclaimed Water (May 2001), allow use of reclaimed water for beneficial use, under certain circumstances. The uses that are relevant to buildings are: toilet and urinal flushing; ponds and other outdoor decorative uses; and lawn watering.

The Code of Practice establishes two categories of water quality. Category 1 is unrestricted public access; category 2 is

Spring Creek Firehall in Whistler, BC achieved LEED Silver certification in recognition of various features including a green roof, energy conservation measures and encouragement of alternative transportation.

PHOTO CREDIT: MARTIN TESSLER, COURTESY OF HUGHES CONDON MARLER : ARCHITECTS

restricted public access. Reclaimed water is defined as effluent from a sewage facility; notably, the Code does not authorize direct re-use, but rather, re-use of water that is post-treatment at a facility.

Residential buildings may use reclaimed water for toilet and urinal flushing if specific measures are developed in consultation with the provincial government and the local health authority to put them in place.93

Local governments may set up a dual distribution system, one for potable water and the other for non-potable. Part 4 of the Code addresses Urban Dual Distribution, and stipulates that reclaimed water providers must ensure that reclaimed water meets the criteria specified in the regulation, as well as local government bylaws that outline policies and procedures for the use of reclaimed water. Bylaws must contain penalties for improper use of reclaimed water, as well as clauses that limit providers' liability for improper use.

The City of Vernon has a city-wide water treatment plant that treats some 13 million litres of residential, commercial and industrial waste water per day, and uses reclaimed water for irrigation of local golf courses, orchards, forestry centres and nurseries.94

Similarly, since the 1980s, the Town of Oliver has on a cost-effective basis treated its sewage using an aerated lagoon process and used reclaimed water for irrigation purposes. The Fairview Mountain Golf Course uses reclaimed water exclusively, and other surplus reclaimed water is now available for irrigation use on the cemetery and airport. The Town is exploring expanding the system to accommodate other potential irrigation uses, such as on selected parks and school fields.95 The Town has been approved to receive $1.2 million in funding for the expansion, as a green infrastructure project under the Canada-British Columbia Infrastructure Program.96

3.2.4 Opt In to the Water Conservation Plumbing Regulation

The Water Conservation Plumbing Regulation, B.C. Reg. 198/2005[97] under the *Local Government Act* varies the BC *Building Code* requirements and imposes more stringent limits on faucet and shower flow rates and toilet and urinal flush volumes. The regulation applies only to new equipment installations, and the standards for low consumption (6 litre flush) toilets and urinals apply only to 18 geographic regions of the province listed in section 3 of the regulation. (A 13.25 litre flush standard applies everywhere else.)

Local governments were given the opportunity to opt in to the low consumption standard, prior to the onset of the regulation.[98] The Building Policy Branch intends to check in with local governments later this spring (2006), both to assess how the new standards are working, and to see whether any other local governments wish to be added to the low consumption list.[99] It seems likely the list will undergo a periodic review into the future, to provide further opportunities for interested local governments to jump on board to water conservation.

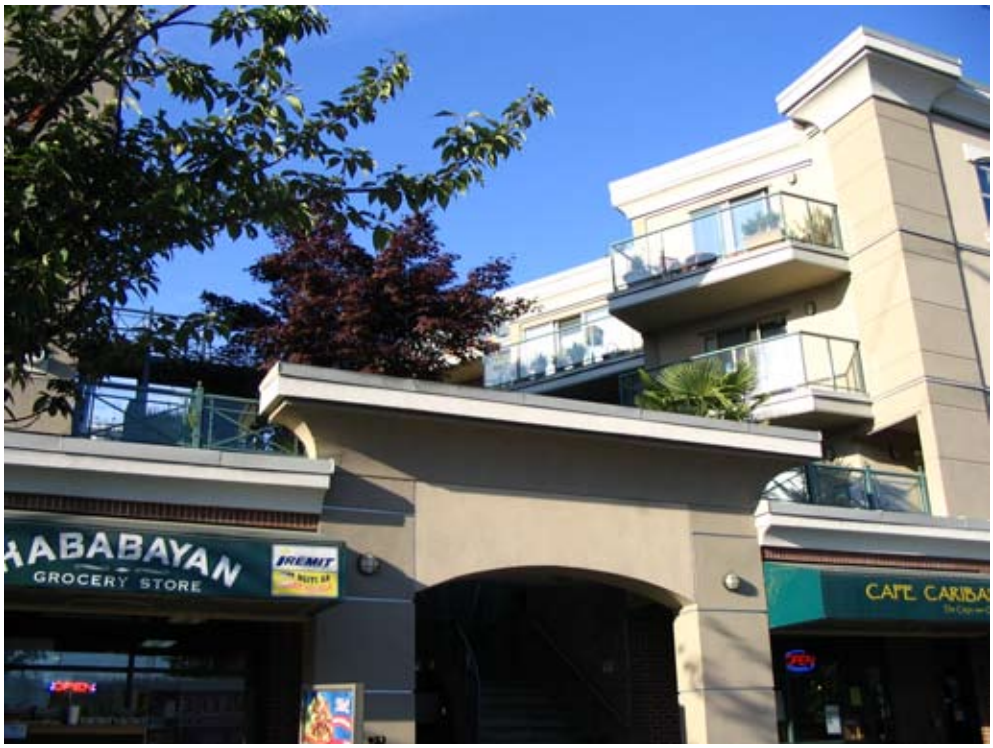
3.2.5 Reduce or Eliminate Development Cost Charges

Development cost charges (DCCs) are charges paid by developers for subdivision approvals and building permits relating to the construction, alteration or extension of buildings. DCCs can be significant (some municipalities charge as high as $20,000 for a condo unit), and their purpose is to recover the capital costs[100] of providing, constructing, altering or expanding sewage, water, drainage and highway facilities, or providing or improving park land, to service, directly or indirectly, the new development. Local governments can recover long term costs, e.g. cost of upgrading sewage treatment in 20 years needed by development over several decades. DCCs may not be used to recover operating or maintenance costs, or the capital costs of other municipal infrastructure.

DCCs are established by bylaw further to sections 993 and 934 of the *Local Government Act*. The bylaw must establish a schedule of DCCs; and amounts may vary according to zone or different defined or specified area, different uses, different capital costs as they relate to different classes of development, and different sizes or different numbers of lots in a development.

DCCs are relevant to a discussion of green buildings because by design, green buildings avoid or reduce the amount of waste water that needs to be treated, reduce stormwater flows, use less water, and are designed to reduce car dependence. Green buildings should therefore, impose lower costs on municipal infrastructure than their "non-green" building counterparts: according to a report commissioned by West Coast, potential savings to local government infrastructure costs "…could easily be in excess of $5,000 per residential unit in many communities."[101] Potential savings (which will vary according to the circumstances of the region and the municipality) may be attributed to:

- Deferred or avoided investments in water supply (e.g. reservoirs, treatment facilities, well and pump equipment) or to find new sources of water);[102]



Roof-top gardens capture rain and enhance building liveability.

- Potentially avoided costs of storm sewer infrastructure if using green infrastructure; and
- Potentially avoided costs of sanitary sewer treatment if recycled grey water, or on site blackwater treatment.

According to the study, the demand for potable water can be reduced by a minimum[103] of 20-30 per cent in comparison to a typical project, by using the following design strategies:

- "Recycling non-potable water (such as water collected from roofs) for some water needs (e.g. toilets, irrigation).
- Using toilets that reduce water requirements (e.g., low flush toilets).
- Using native plants to reduce watering/irrigation needs." [104]

The savings are not limitless: indeed, water main pipes and water pressure need to be maintained to meet fire fighting standards, so even if the demand could otherwise be reduced, there are certain minimum specifications that must be met in every case, for safety reasons.[105] Similarly, there is a need to maintain a "self-cleaning flow" which could require an increase in gradient or pumping, at additional capital costs for the developer.

Despite these savings, there is only one example to date where a municipality has agreed to reduce DCCs on account of green building or green infrastructure development features: the City of Victoria is recognizing the Dockside Green's onsite wastewater treatment plant by exempting the project from the DCC charges for sewage treatment and disposal. Prince George is currently undertaking an update of its DCC charges, intending to have its municipal cost recovery more closely match true costs and encourage infill development.[106]

The fact that BC local governments have been reluctant to vary DCC charges for green development is partially due to the fact that the *Local Government Act* does not explicitly authorize this distinction. However, local governments are authorized to vary DCCs by area, and if through other regulatory or policy means a local government was able to secure green

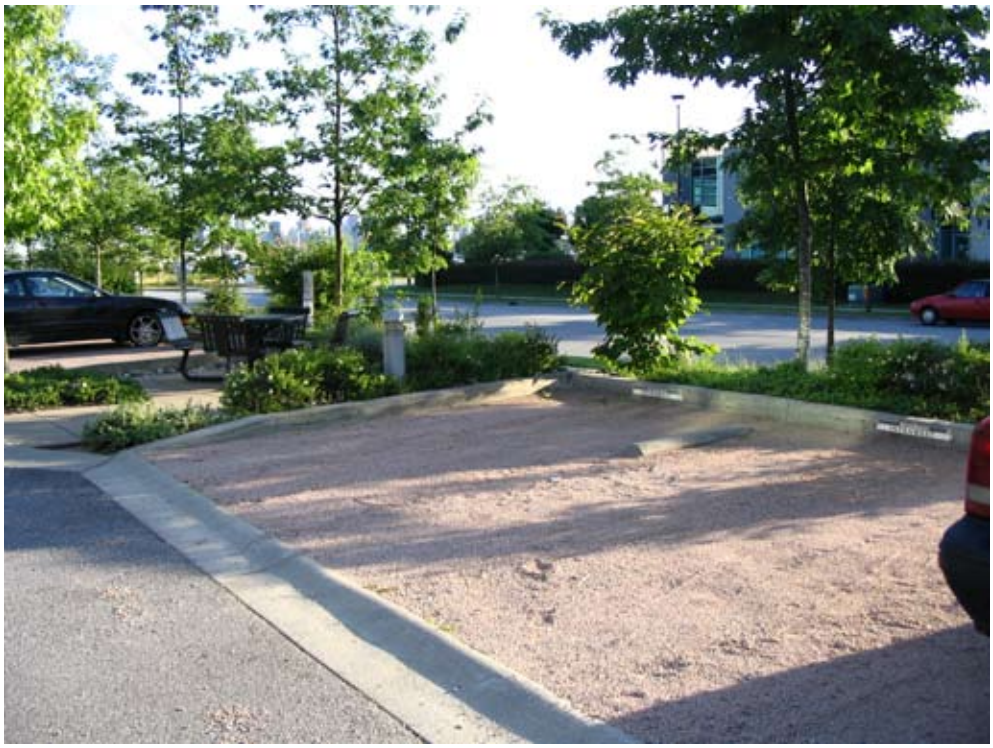
In some cases, municipalities and regional governments may need to work in concert to use DCCs as a green building tool. For example, since 1997 the Greater Vancouver Sewage and Drainage District has charged local governments DCCs for sewerage expansion within the GVRD; they then pass on those charges to the developers. A strategy to reduce DCC sewerage charges on account of green buildings would therefore require some cooperation between the regional and municipal levels of government.

design features in an area – e.g. a downtown redevelopment – it might be able to justify a lower DCC charge to reflect the lower cost on infrastructure.

Should local governments reduce water/waste infrastructure plans and DCCs on account of green building design and features, municipalities will need to take steps to enforce the continued presence of those design features.[107] To ensure continuity among subsequent owners, a section 219 *Land Title Act* covenant in favour of the local government would seem to offer the safest approach, perhaps coupled with provisions giving the owner's consent to an inspection every 5-10 years.

3.2.6 Design Standards for Parking – Including Surfacing

Section 906 of the *Local Government Act* authorizes local governments to pass bylaws to establish requirements for off-street parking, and to establish design standards for parking with respect to size, surfacing, lighting and numbering of spaces. Local governments can encourage greener buildings by stipulating standards that reduce the number of required parking spaces; require permeable surface materials; and require bicycle storage facilities.



The parking lot at the Intrawest office building in North Vancouver, BC, features permeable parking pads, landscaping and a seating/eating area.

3.2.7 Water Conservation Bylaws

Water conservation bylaws[108] that place limits on outdoor watering activities (e.g. restricting lawn and garden watering to a schedule, and placing restrictions on the filling of swimming pools and car washing), indirectly encourage green landscaping of building sites, including xeriscaping.

Examples of water conservation bylaws can be found in the City of Vancouver,[109] the Capital Region District,[110] the Town of Nanton, Alberta,[111] and the Corporation of the Town of Strathroy-Caradoc.[112]

3.2.8 Topsoil Bylaws

A key bylaw in support of water conservation in new building developments or subdivisions is a bylaw requiring builders to deposit six inches of topsoil before laying sod. Topsoil is critical to soil retaining rainwater – a proper topsoil layer drastically reduces the need for lawns to be irrigated using municipal freshwater supplies.[113]

Municipalities are authorized to pass bylaws "imposing requirements" in relation to the deposit of soil, further to section 8(3)(m) of the *Community Charter*, so they have clear authority to pass a bylaw requiring the deposit of topsoil. Both municipalities and regional districts have the authority to, by bylaw, regulate or prohibit the removal of soil; however, bylaws prohibiting soil removal are subject to concurrent jurisdiction with the province and require ministerial approval.[114] A bylaw prohibiting topsoil removal would therefore require approval of the minister.

3.2.9 Retrofit/Rebate Program for Fixtures

Local governments can encourage builders and homeowners to retrofit to meet conservation goals, by partnering with other organizations to provide incentives like a retrofit or rebate program for fixture replacement. For example, the Sunshine Coast Regional District (SCRD) recently embarked on a program for bathroom fixture replacement, in partnership with Caroma.[115] Under the program, residents of the SCRD

are eligible to receive up to two dual flush toilets, a high efficiency shower head and a faucet aerator, all installed by a qualified professional at no cost to the resident (but equivalent to a $500 value). The SCRD is supporting this aggressive program as one element of its larger program or policy goal of conserving drinking water. Uptake under a previous $200 rebate program was not sufficiently high; therefore, the City has proceeded with a program designed to be as simple and accessible as possible.

The North Shore Toilet Replacement Rebate Program is an example of a fixture rebate program.[116] The program offers a $50 rebate for eligible toilet replacements in the municipalities of District of West Vancouver, District of North Vancouver and City of North Vancouver.[117] These municipalities partnered with the North Shore Recycling Program to promote the rebate program.

Omicron head office was the first in Canada to earn LEED-CI (Commercial Interior) Gold.
PHOTO CREDIT: COURTESY OF ECO-LUMBER CO-OP.

3.3 Less Waste, More Efficient Use of Materials and Green Materials

Buildings generate waste at all life cycles; they also consume tremendous volumes of valuable resources. Green building design endorses a life cycle approach to building materials, and wherever possible, aims to re-use existing resources, use materials that are regionally and sustainably produced or manufactured, and aims to reduce or recycle waste streams.

3.3.1 Bylaws and Infrastructure to Facilitate Recycling

Local governments are encouraged to review bylaws to ensure they do not discourage recycling. For example, local governments may wish to consider eliminating bylaws that charge builders if they put recycling bins on the street.[118]

Local governments may also wish to "[i]nvestigate the timing of demolition permit, building permit, and development permit processes to ensure building deconstruction and re-use of materials is not unnecessarily restricted."[119]

Local governments can facilitate good building recycling practices by passing bylaws, resolutions and annual budgets in support of the establishment of comprehensive community recycling facilities and programs. For example, the Town of Ladysmith recently embarked on a comprehensive recycling and composting program.[120] Further to a Natural Step initiative, Whistler is investigating a recommendation that it establish a recycled building material facility.

3.3.2 Exercise Heritage Protection Powers

Heritage buildings are a cultural amenity, and preserving them contributes to cultural sustainability. Furthermore, re-using existing buildings rather than tearing them down and replacing them with new buildings, reduces energy and materials use

associated with new building construction. Because older buildings can be inefficient, however, it may make sense to retrofit them to greener standards.

Part 27 of the *Local Government Act* provides a fairly extensive set of tools for local governments to protect, and in some cases to revitalize, heritage buildings and areas. Using these powers, local governments may:

- establish a community heritage register of real property considered to be heritage property;[121]
- provide temporary protection to property by withholding issuance of an approval of an action that would cause an alteration of the heritage property;
- temporarily withhold issuance of a demolition permit, pending issuance of a heritage alteration permit;
- order temporary protection of a property that the local government considers is or may be heritage property.

Part 27 also authorizes local governments to control alteration of heritage buildings, using bylaws to designate property as heritage.[122] On a proactive basis, local governments can: enter into heritage revitalization agreements with heritage property owners;[123] provide financial assistance to heritage property owners to conserve or develop the property; or dedicate resources to educating the community as to its history and heritage value.[124] With respect to its own building stock, a council can reserve or dedicate municipal property for purposes related to heritage or heritage conservation;[125] alternatively, a business promotion scheme might include conserving heritage property in one or more business improvement areas. All such powers are an exception to the general prohibition against providing assistance to business.[126]

Protected heritage property, property that is subject to a heritage revitalization agreement and property that is subject to a covenant under s. 219 of the *Land Title Act* that relates to the conservation of heritage property, is all eligible for an exemption from property tax.[127] All local government decisions in respect of heritage conservation are subject to review by the BC Ombudsman.[128]

Local governments may also pass specific provision for protected heritage property in their zoning regulations.[129] Repairs or alterations to a non-conforming use must be done in accordance with any heritage protection provisions governing the property;[130] local governments may also establish minimum site maintenance standards for heritage property.[131]

One of the concerns in rebuilding heritage property is the BC *Building Code*, since it can be difficult for heritage buildings to meet *Code* standards. However, section 2.1.6.1 of the *Code* authorizes some relief for designated heritage buildings. That section refers builders to a limited number of alternative standards (set out in Appendix A) that have been established with heritage building limitations in mind. These alternative standards can serve as incentives to having property designated as heritage.[132]

A number of jurisdictions have embarked on standardizing solutions to encourage the safe re-use and re-fitting existing and heritage building stock. A real leader in this area is the State of New Jersey, which since 1998 has had a Rehabilitation Code, to great success: Maryland Building Rehabilitation Code Program Overview reported that New Jersey experienced an 8 per cent overall increase in investment in rehabilitation work, after passing its Rehabilitation Code, and in some heritage neighbourhoods, as high as an 83 per cent increase in investment.[133]

In 2003, the City of Vancouver instituted a pilot project establishing a set of standards to be applied to existing building upgrades, in an attempt to find an appropriate balance between the cost of expensive upgrades associated with re-using an existing building, and the need for safety.[134]

Interest in the importance of appreciating and conserving our heritage appears to be growing. For example, a website[135] highlighting what is billed as "Canada's greenest heritage building", 221 Rupert in Winnipeg, warrants a visit. The project, a revitalization of the old Salvation Army Citadel in downtown Winnipeg, is being designed to fulfill the following vision of its new owner, the Centre for Indigenous Environmental Resources:

Our vision is to transform 221 Rupert and the adjacent buildings into Canada's greenest heritage building. One of our objectives is to demonstrate: a) the ability of a private Aboriginal organization to participate in the continued revitalization of downtown Winnipeg; b) the link between the conservation of built heritage (i.e., historic buildings) and the conservation of natural heritage (i.e., the natural environment); and c) the economic advantages of green building.

The project plans an integrated design approach that encompasses: the use of solar and geothermal energy; advanced water conservation and management practices; a green roof planted with native plants to serve as habitat; a life-cycle approach to selecting building materials; and the use of local materials and resources.[136]

Closer to home, renovations to 1220 Homer Street in Vancouver's historic Yaletown are featured in the GVRD's online BuildSmart guide.[137]

Heritage conservation is also a concern of national interest, and a focus of action and funding by the federal government. Parks Canada's Historic Places Initiative has developed a set of Standards and Guidelines for the Conservation of Historic Places in Canada;[138] and included in it are Guidelines for Buildings, with discussions of construction materials, finishes, features and systems.[139]

3.4 Sustainable Sites for Biodiversity

A building may be the greenest design in the world, but if the development significantly impacts a site, such gains are undermined. Site sustainability is a LEED Canada-NC v1.0 criterion: the rating system considers such issues as site selection, density, redevelopment of a contaminated site, alternative transportation, reduced site disturbance, stormwater management, heat island effect and light pollution reduction.

Local governments have a variety of powers they can use to encourage building site sustainability.

3.4.1 Land Use Bylaws – Zoning and Landscaping

Land use bylaws can be used in a number of ways to control the shape of development and to avoid/minimize green space impacts, determining use, density, setbacks, height, parking, fencing and landscaping requirements – all of which affect a development's footprint on the land. For example, land use bylaws might:

- allow increased density in already built areas and less density in rural areas, to retain rural use and character;
- zone for mixed use so buildings can be used for both a residence and a home-based business;
- limit lot size, building size, floor space and parking lot size and requirements, to encourage community businesses that are accessible by foot;[140]
- establish alternative development standards, e.g. re: building setbacks (front and rear yard size), lot size to encourage street-oriented, compact housing;[141]
- allow secondary suites in existing housing stock, to increase the available supply of housing from existing housing footprint;
- stipulate landscaping to protect sensitive areas.

3.4.2 Limit and Shape Municipal Capital Expenditure

Local governments can bolster their growth development decisions with limitations in their capital expenditure plan: e.g. they can limit capital expenditure on infrastructure for edge areas that are likely to be targeted by unsustainable forms of development.

3.4.3 Promote Covenants/Tax Exemptions to Protect Site Features

Under section 219 of the *Land Title Act*, local government can enter into covenants with owners of heritage or riparian property, limiting the use of the property to protect the heritage or riparian features. Local governments can pass bylaws exempting covenanted property from property tax – an incentive for protection.[142]

3.4.4 Development Cost Charges

Some local governments are investigating using DCC reductions in urban centres as a tool to encourage densification.[143] While certainly there are infrastructure costs associated with infill

development and densification (water supply, sewage treatment capacity, road systems and parks), those costs can be less than those associated with development in new growth areas.[144] For example, trip generation data suggests that single family units tend to generate more vehicle trips than multi-family units, meaning lower road infrastructure costs associated with denser development.[145]

A report commissioned by West Coast Environmental Law concluded:

> *If a community can reduce the amount of arterial road it requires due to reduced vehicle use at new projects, the savings per new housing unit would be even greater. This can be achieved when new projects include increased opportunities for residents to walk, cycle or use transit rather than private vehicle. Also, projects that are more compact will result in less need for the extension of arterial roads to provide access to land for new development.*
>
> *The arterial road component makes up a significant portion of total DCCs for most BC municipalities, often in the range of about 20 per cent to 40 per cent of the total charge (i.e., the total arterial road charge is often in the range of about $2,000 and $8,000 per unit). Therefore, the potential reduction in DCCs would be large if a community can reduce the amount of arterial road required due to lower vehicle use at new projects.*[146]

The Vancouver Public Library, built in 1995, boasts a 1500 m^2 green roof.

Another potential approach is to vary DCCs by lot size or area, rather than having a standard DCC charge per lot. A flat rate charge for lots encourages larger lots and less compact development.[147]

3.4.5 Tree Bylaws

Trees not only add beauty to neighbourhoods, they provide a number of environmental services that more than pay for their upkeep, including countering the heat island effect, reducing greenhouse gas emissions, improving air quality and reducing stormwater runoff.[148] Reducing site disturbances for greenfield and previously developed sites also attracts LEED Canada-NC 1.0 credits.[149]

In a traditional building development, tree removal can be extensive, and may cause significant impacts on the natural environment: less shade; hotter, windier, dirtier air; more water runoff; and the loss of habitat for birds and small animals.

Local governments have some authority to regulate the cutting of trees associated with land development. The authority given to regional districts is quite limited; under section 923 of the *Local Government Act*, a board may, by bylaw "designate areas of land that it considers may be subject to flooding, erosion, land slip or avalanche as tree cutting permit areas." The bylaw may regulate or prohibit the cutting down of trees, or may require an owner to obtain, on payment of a fee, a permit before cutting down a tree.

Municipalities have a general authority under section 8(3)(c) of the *Community Charter* to pass bylaws in relation to trees; however, section 50 of the *Charter* restricts that authority if the land and the trees on it are otherwise regulated by the *Forest Act*, the *Private Managed Forest Land Act*, or the tree-cutting is undertaken by a utility.

An example of a bylaw that gives extensive protection to municipal trees is the City of Nanaimo's Tree Protection Bylaw 1993 No. 4695.[150] The Bylaw identifies landmark, heritage and wildlife trees that are important to the community, and provides that no one shall cut down such a designated tree without first obtaining a permit and carrying out the activity strictly in accordance with the permit.

Conclusion

A local government has three hats to wear in promoting sustainability at the site level – as a regulator and policy maker; as an owner of civic buildings and infrastructure; and as a partner, promoter and sponsor of good practices.

Opportunities for leadership and proactive, facilitative action exist in each of these roles. Local governments can ensure that new civic buildings are leading edge design, or they can partner, promote and sponsor infrastructure, educational or other programs in support of green building technologies. In the long run, such initiatives pay for themselves because it makes both environmental and economic sense to build using green building design and practices.

Given that most development is privately initiated, however, the biggest opportunity for local governments is to ensure that bylaws and policy encourage the kinds of development that the community needs and wants, and that will be sustainable over the long term. As an initial step, it makes sense to review local bylaws and policies to ensure that at the very least, these are not impeding or discouraging green building design and practices. Even better, the introduction of bylaws, policies, incentives and practices that support and promote green development will assist and encourage developers to integrate greener building design and practices.

Notes

1 Mark Lucuik, P. Eng., Wayne Trusty, Nils Larsson and Robert Charette, *A Business Case for Green Buildings in Canada,* a Canada Green Building Council report presented to Industry Canada (Vancouver: Morrison Hershfield, March 2005).

2 Greg Kats et al., *The Costs and Financial Benefits of Green Buildings, A Report to the California Sustainable Building Task Force* (October 2003), p. ii.

3 Laura Severs in "Green buildings wave of future, developers say," *Business Edge* Vol. 2, No. 23 (November 10, 2005(), p. 1 noted that according to Michael Brooks, executive director of the Real Property Association of Canada, "…green buildings can command higher rents, attract tenants and buyers more quickly, cut tenant turnover, and cost less to operate and maintain."

4 Lucuik et al., p. 3.

5 Kats, p. 67.

6 Kats, p. 69.

7 Natural lighting also leads to greater productivity – healthier work, learning and living environments: "There is now a very large body of research, reviewed in this report, which demonstrates significant and causal correlation between improvements in building comfort and control measures, and worker health and productivity." Kats et al., p. v.

8 Environmental tobacco smoke control is LEED Canada-NC 1.0 Prerequisite o. 2 for green building certification.

9 http://ww.cagbc.ca.

10 See e.g., the Eight Principles of Smart Growth, identified in the *Smart Bylaws Guide,* at http://www.wcel.org/issues/urban/sbg/case.pdf.

11 See e.g. West Coast Environmental Law, *Cutting Green Tape: An Action Plan for Removing Regulatory Barriers to Green Innovations* (Vancouver: April 2002), p, 14; available at http://www.wcel.org/wcelpub/2002/13724.pdf..

12 The District of North Vancouver will not extend infrastructure beyond a stipulated elevation:

13 *Cutting Green Tape*, p. A7.

14 The *BC Building Code* is based, with some exceptions, on the *National Building Code of Canada 1995*, as it existed on July 30, 1998, with changes set out in an Appendix attached to the BC Building Code Regulation.

15 The City of Vancouver, governed by the *Vancouver Charter*, is an exception. Vancouver has greater powers to pass building bylaws that consider energy efficiency standards. The *Vancouver Charter* authorizes Council to pass bylaws that adopt by reference in whole or in part and with any change the Council considers appropriate, "…any codes, standard or rule relating to…energy conservation."
Effective September 1, 2004, in order to address concerns related to energy utilization in buildings, the Vancouver Council mandated that buildings within the City be designed to meet the energy utilization requirements of the ASHRAE Standard 90.1 – 2001. Buildings built under

building permit applications prior to September 1, 2004 have to meet either the 1977 National Energy Code of Canada for Buildings or the ASHRAE Standard 90.1 – 1989.

16 *Local Government Act,* s. 694.

17 Water Conservation Plumbing Regulation, B.C. Reg. 198/2005 passed further to the authority of section 692 of the *Local Government Act*.

18 See *Cutting Green Tape*.

19 See *Energy Efficient Buildings – A Plan for BC* (Government of BC, September 2005), p. 16.

20 See West Coast Environmental Law, *Smart Growth Guide to Local Government Law and Advocacy* (Vancouver: March 2001), p. 32; available online at http://www.wcel.org/wcelpub/2001/13300.pdf.

21 Kats, p. 75 (especially footnote 288).

22 See http://www.ucluelet.ca/bylaws/OCP/Part per cent20III per cent20- per cent20The per cent20Plan per cent20- per cent203.1 per cent20L.pdf.

23 See http://www.terasengas.com/Commercial/EnergyEfficiency/SuccessStories/default.htm.

24 Local governments own or control a great deal of non-building infrastructure in respect of which there is an opportunity to incorporate green principles. Park and street lighting and furniture are prime examples; vehicle fleets, though unrelated to buildings, provide an additional opportunity. Facilities or building staff will usually be engaged with these policies, as opposed to planning staff.

25 Partners include the University of British Columbia, Simon Fraser University, the BC Institute of Technology and Emily Carr School of Art and Design.

26 Information available at www.docksidegreen.ca. Environmental features are detailed in http://www.docksidegreen.ca/database/img_41a6d4ffd94a3.pdf

27 I.e., referencing environmental, economic and social goals or criteria.

28 Because the development will have its own sewage treatment on-site, the City of Victoria has agreed to exempt the development from the development cost charges associated with sewage treatment and disposal. This is a clear precedent-setting regulatory decision.

29 Information obtained from http://www.cirs.ubc.ca.

30 A contract with an independent commissioning authority to verify and ensure that building elements and systems are designed, installed and calibrated to operate as intended, and to report on findings.

31 http://www.gvrd.bc.ca/buildsmart/.

32 See Busby + Associates Architects, Keen Engineering Co. Ltd., *Sustainable Building Design. Principles, Practices & Systems*, a report prepared for the Greater Vancouver Regional District (Vancouver: 2003).

33 http://www.savingwater.org/business.htm.

34 Policy statements in regional growth strategies may also support green building designs and practices. For example, section 849(2)(n) of the *Local Government Act* stipulates that to the extent a local government deals with such matters, a regional growth strategy should work towards "good stewardship of land, sites and structures with cultural heritage value."

35 *Local Government Act*, s. 884(2): All bylaws and works undertaken must be consistent with the OCP. Note, however, that despite this requirement, OCPs can be changed relatively easily by bylaw.

36 For example, Bowen Island recently amended its OCP to indicate that rezonings for commercial cottages outside of Snug Cove would take into consideration the parameters of "limited impermeable surfaces" and "adequate water supply." See Bylaw No. 56, 2002, http://www.bimbc.ca/files/bylaws/BIM per cent20Bylaw per cent20No.56, per cent202002.pdf.

37 E.g. Canadian EcoLogo

38 E.g. ASHRAE Standard 62-1999: Ventilation for Acceptable Indoor Air Quality. For other standards and guidelines on IEQ, see http://www.gvrd.bc.ca/buildsmart/IndoorAirQuality.htm.

39 http://www.portcoquitlam.ca/__shared/assets/Sustainability_Checklist2040.pdf.

40 See http://www.city.new-westminster.bc.ca/cityhall/planning/06publications/10Housing/pdf/Smart per cent20Growth per cent20Development per cent20- per cent20Checklist per cent202004.pdf#search='new per cent20westminster per cent20checklist' and http://www.gibsons.ca/pdfgibsonsbc/SmartDevCheckGibsons.pdf.

41 http://www.bimbc.ca/files/bylaws/BIM per cent20Bylaw per cent20No.65, per cent202002.pdf.

42 *Local Government Act*, section 919.1.

43 *Denman Island v. 4064 Investments Ltd.* (2001), 161 B.C.A.C. 215, 96 B.C.L.R. (3d) 253.

44 When establishing a standard, a key consideration is whether the municipality should stipulate energy efficiency guidelines itself, or simply endorse a rating system like LEED. Specific stipulations establish a known requirement, which is easier where there is less LEED expertise or capacity to innovate. LEED on the other hand, encourages innovation and can create an incentive for builders to do more to make their projects attractive. However, LEED undergoes a third-party certification/verification after building occupancy.

45 By contract, however, the developer and City have agreed to secure the developer's promises with a performance bond.

46 *Local Government Act,* section 904(2).

47 Official Community Plan, section 5.12.5 Additional Density Factors, Environmental Considerations. Other incentives mentioned are floor areas exclusions and density transfers.

48 *Burnaby (City) v. Racanelli* (1998), 45 M.P.L.R. (2d) 117 (B.C.S.C.).

49 See e.g. *Burnaby (City) v. Marando*, 2003 BCCA 400 (CanLii).

50 William Buholzer, *British Columbia Planning Law and Practice* (Markham, Ont: Butterworths Lexis Nexis Canada Inc., 2001-2006), para. 12.43.

51 *Ibid*, para. 12.40.

52 *Ibid*.

53 This means that a scheme cannot impose a positive obligation to pay money or build something. The government has issued a September 2, 1997 Practice Note that provides guidance on what this means.

54 According to Anger and Honsberger (*Anger and Honsberger Law of Real Property* (2d Ed.), Aurora, Ontario: Canada Law Book Inc., 1985), "touching and concerning the land" means (p. 906): "…the covenant affects the land as regards its mode of occupation or affects its value, its purpose and effect substantially alter the legal rights which otherwise would flow from ownership of the land and which are connected with it, or the land to which the benefit purports to be attached can be reasonably regarded as being affected by performance or breach of the obligations."

55 Installation of composting toilets requires approval of the local health authority.

56 In *Kornfeld v. Intrawest Corp.*, 2005 BCSC 162, 29 R.P.R. (4th) 61 (B.C. S.C.), it was stipulated with respect to scheme intent: "The intent of these guidelines is to maintain a high standard of building appearance, to enhance views from the lots and of the subdivision, protect solar exposure, *minimize environmental and visual impact of built elements* and generally ensure the quality of development of a prestigious residential enclave…" [emphasis added]

57 E.g. see the Bowen Island Green Design Building Checklist, *infra*.

58 Nanaimo charges a reasonable administrative fee of $200 for up to four equivalencies and $300 for more than four.

59 Hughes Condon Marler : Architects, *Local Government Green Building Programs*, a report prepared for the Regional District of Nanaimo (2005), p. 51.

60 Two of the District of Saanich's building inspectors are now LEED-accredited professionals, and the District has established a Technical Committee to be available as a resource regarding implementation of policies and general green building issues. (Hughes Condon Marler : Architects, p. 27).

61 For more information, see: http://www.greenroofs.org/pdf/GRIM_Fall2004.pdf#search='bcit per cent20green per cent20roofs per cent20working per cent20group'.

62 *The Eco-Industrial Advantage,* Spring 2005 at 4-5.

63 *Cutting Green Tape,* p. 9.

64 Council direction in this regard: municipalities have the authority to manage their operations, further to section 147 of the *Community Charter*, but they must ensure that the policies, programs and other directions of council are implemented.

65 Note that LEED criteria are evaluated at the end of construction, which presents a bit of a problem, since approvals occur at the front end of the process. Perhaps penalties could be established, if projects took advantage of the fast track but then did not achieve promised criteria.

66 The Green Building Program website is at http://www.scottsdaleaz.gov/greenbuilding/.

67 http://www.gvrd.bc.ca/buildsmart/pdfs/lowriseresidfinalrep.pdf.

68 http://www.rdn.bc.ca/cms/wpattachments/wpID1046atID1014.pdf.

69 See e.g., *The Eco-Industrial Advantage,* Spring 2005.

70 Canadian Eco-Industrial Network, at http://www.greenroofs.ca/cein/whatsein.html. The Network advises "Over a five year period, a $60

million investment in eco-industrial network project infrastructure has generated $120 million in cost savings. For further information, visit www.symbiosis.ca."

71 Deppe, Maile, Tom Leatherwood, Peter Lowitt and Nick Warner, "A Planner's Overview of EcoIndustrial Development," a submission to the 2000 APA National Planning Conference found at http://www.asu.edu/caed/proceedings00/DEPPE/deppe.htm accessed April 2006.

72 The District of Ucluelet's OCP and zoning establishes an eco-industrial park, designed to locate the majority of new industrial uses and developments in Ucluelet. The OCP encourages environment-friendly industries.

73 See e.g., the Town of Atherton, California's Ordinance No. 506 relating to recycling and diversion of construction and demolition debris, at http://www.ciwmb.ca.gov/ConDemo/SampleDocs/Atherton.htm. It requires recycling, reuse or diversion of 50 per cent of waste tonnage from demolition, reroofing of homes with shingles and shakes, and construction and remodeling. Note the ordinance was passed making reference to the council's need to protect the public health, safety and welfare.

74 http://www.maplewoodproject.org/upload/documents/Final_Report.pdf.

75 *Ibid*. Maplewood's final report emphasizes the desirability of broad performance-based zoning. Several innovative developments have used the approach of performance based goals with design guidelines or a master development agreement attached: e.g., Selkirk and Dockside in Victoria.

76 http://www.city.greatersudbury.on.ca/cms/index.cfm?app=div_earthcare&lang=en.

77 *Ibid*.

78 *Local Government Act*, section 849(2)(m).

79 For further discussion, see *Cutting Green Tape,* p. 14.

80 City of North Vancouver Hydronic Heat Energy Service Bylaw 2004, No. 7575.

81 See http://www.cnv.org/c/data/2/98/noshow/December per cent203, per cent202004 per cent20Lonsdale per cent20Energy per cent20Corporation per cent20Wins per cent20National per cent20Award per cent20for per cent20Energy per cent20Efficiency.pdf The system generates heat three times more efficiently than electrical heat and can switch to hydrogen as fuel, once hydrogen becomes available. The project helps to reduce demand for mega projects and avoid imports of coal generated electricity. For more info, see http://www.terasen.com/UtilityServices/Experience/NorthVanLowerLonsdale.htm.

82 http://oee.nrcan.gc.ca/corporate/awards/energy-efficiency/2005/industry/city-vancouver.cfm?attr=0.

83 See http://www.whistler.ca/files/PDF/Engineering_PW/Jackie/Sustainable_Energy_-_revised.pdf#search='district per cent20heating per cent20system per cent20bc'.

84 One of the options it has explored is sanitary sewer heat recovery.

85 The Sudbury system is the result of a partnership between the City and Toromont Industries, and uses a 5 MW cogeneration natural gas generator and heat recovery system to provide heating,

cooling and electricity services to buildings in the local core. See http://www.city.greatersudbury.on.ca/content/earthcare/documents/EarthCareLocalActionPlanENG.pdf at p. 11.

86 *Community Charter*, section 194.

87 *Local Government Act*, section 363.

88 More information on water metering is available on www.watermeter.ca (re: Richmond) as well as www.metering.com.

89 *Local Government Act*, section 907. Such a bylaw may be different for different zones, different uses in zones, different areas in zones, different sizes of paved or roof areas, and different terrain and surface water or groundwater conditions.

90 See also RS Zones Impermeable Materials Site Coverage Guidelines.

91 See Zoning 9_9.13 and 9_9.11 stacked row housing and multiple housing.

92 http://www.district.metchosin.bc.ca/467/467.pdf.

93 Code of Practice for the Use of Reclaimed Water, Section 4.6.2, at p. 23.

94 For more information , see http://www.vernon.ca/services/utilities/reclamation/index.html.

95 See the Reclaimed Water User Rate Bylaw 1022, 2002 and http://www.oliver.ca/siteengine/ActivePage.asp?PageID=71.

96 http://www2.news.gov.bc.ca/nrm_news_releases/2003CSE0036-000513-Attachment1.htm.

97 The regulation became effective January 1, 2005 in the Capital Region District and September 30, 2005 in the other listed jurisdictions.

98 For the opt-in, the Building Policy Branch required a Council resolution, or for regional districts, a board resolution and the resolution of participating municipalities. (Conversation with BC Building Policy Branch).

99 Conversation with BC Building Policy Branch.

100 Including related planning, engineering and legal costs, as well as interest costs.

101 Coriolis Consulting Corp., *Do Development Cost Charges Encourage Smart Growth and High Performance Building Design? An Evaluation of Development Cost Charge Practices in British Columbia*, a report prepared for West Coast Environmental Law (2003), p. II.

102 *Ibid*, p. 22.

103 More recent technologies may make greater reductions achievable.

104 *Ibid*, pp. 19-20.

105 *Ibid*, p. 20.

106 See especially Prince George's website on the DCC update process: http://www.city.pg.bc.ca/city_services/infrastructure/dccbylaw/ and the *Development Cost Charge Review* report prepared for the City, at http://www.city.pg.bc.ca/city_services/infrastructure/dccbylaw/review.pdf.

107 Coriolis, p. 25.

108 Regional districts may pass bylaws to regulate the services they provide, including water use, further to section 796.2 of the *Local Government Act*. Municipalities may regulate municipal services further to section 8(3)(a) of the *Community Charter.*

109 http://vancouver.ca/bylaws/77831v1.pdf.

110 http://www.crd.bc.ca/water/conservation/qna.htm. The Capital Region District has extensive water conservation information for residential, commercial and industrial users available on its website.

111 http://www.town.nanton.ab.ca/Bylaws/Bylaw per cent201125.pdf#search='water per cent20conservation per cent20bylaw'.

112 http://www.strathroy-caradoc.ca/documents/Water per cent20Conservation per cent20Flyer.pdf#search='water per cent20conservation per cent20bylaw'.

113 Ted van der Gulik, P.Eng., remarks made during "Efficient Irrigation Technologies. Fact vs. Fiction", a presentation made to the BC Water and Waste Association's "Water Conservation on the Island" conference, Victoria, March 10, 2006.

114 Sections 8(3)(m) and 9(1)(e) of the *Community Charter*, and section 723 of the *Local Government Act*.

115 See http://www.scrd.bc.ca/infrastructure_bathroomfixture_replacement.html.

116 The City of Duncan is also offering a rebate for replacement of 13 litre toilets with low-flush models: for details http://www.city.duncan.bc.ca/pdf/Toilet per cent20Rebate per cent20Program per cent20Brochure.pdf.

117 See http://www.nsrp.bc.ca/whatsnew/index.cfm#1404 for details.

118 *Cutting Green Tape*, p. 9.

119 *Ibid*.

120 For information, see http://www.town.ladysmith.bc.ca/garbagerecycle.html.

121 See e.g. the City of Vernon's Heritage Register, at http://www.vernon.ca/services/pde/documents/heritage_register.pdf. Note also the Town of Creston's designation of a catalpa tree as a "heritage landscape feature", in http://www.civicinfo.bc.ca/Local_Content/Bylaws/1531-Heritage per cent20Designation.pdf.

122 *Local Government Act*, s. 967. Local governments must hold a public hearing on the proposed bylaw and where the designation will result in a reduction in the market value of the property, the local government must compensate an owner who applies for compensation for the reduction in value (section 968). Protective status in some cases requires notice to be placed on the title to the property (s. 976); in others, notice to be given to the minister (s. 977). Local governments may also by resolution or bylaw and permission of the owner, display a plaque or other marker at the property (s. 955).

123 *Local Government Act*, s. 966.

124 *Community Charter*, s. 25 and *Local Government Act*, s. 183.1. For example, read about the City of Vernon's Heritage Restoration Grant Program, regarding the restoration of exterior, foundation and roof structures, at http://www.vernon.ca/services/pde/heritage_restoration.html.

125 *Community Charter*, s. 30. This requires a 2/3 vote.

126 *Local Government Act*, s. 952.

127 *Local Government Act*, s. 810 and *Community Charter* s. 225.

128 *Vancouver Charter*, s. 580.

129 *Local Government Act*, s. 903.

130 *Local Government Act*, s. 911.

131 *Local Government Act*, s. 970.

132 Buholzer, at para. 14.87.

133 See http://www.dnr.state.md.us/education/growfromhere/LESSON15/MDP/SMARTCODE/REHAB_OVERVIEW.HTM. The province of Ontario's Building Code (Part 11 – Renovation of Existing Building) was based in part on the New Jersey Rehabilitation Code. Other US states that have rehabilitation codes are the States of Rhode Island and Providence and North Carolina (http://www.rbfc.state.ri.us/rehab/, http://www.ncrehabcode.com/). Michigan, Georgia and Maryland are in the process of developing or discussing the need for a rehabilitation code (http://www.msu.edu/~cua/pubs per cent20hsg per cent20report/syal per cent20rehab per cent20hsg per cent20reportI.htm, http://www.dca.state.ga.us/intra_nonpub/Toolkit/Guides/RehabCodes.pdf#search='rehabilitation per cent20code, http://www.dnr.state.md.us/education/growfromhere/LESSON15/MDP/SMARTCODE/REHAB_OVERVIEW.HTM).

134 See http://vancouver.ca/ctyclerk/cclerk/20040323/rr2.htm.

135 http://www.cier.ca/sustainability_1.html.

136 *Ibid*.

137 Busby + Associates et al, p. 11.

138 http://www.pc.gc.ca/docs/pc/guide/nldclpc-sgchpc/toc_e.asp.

139 http://www.pc.gc.ca/docs/pc/guide/nldclpc-sgchpc/sec3/page3f_e.asp.

140 *Smart Growth Guide to Local Government*, p. 98.

141 *Ibid*, at pp. 43 and 96.

142 *Local Government Act*, s. 225.

143 See e.g. the *Development Cost Charge Review* report (2006) prepared for the City of Prince George, at http://www.city.pg.bc.ca/city_services/infrastructure/dccbylaw/review.pdf.

144 Coriolis, p. 14.

145 Coriolis, p. 12, noting results from standard data sets such as Institute of Transportation Engineers Manual on Trip Generation.

146 Coriolis, p. 18.

147 *Cutting Green Tape*, pp. 13 and 26. Local governments are authorized to vary DCCs by lot size, further to *Local Government Act*, section 934(3)(d).

148 As part of its strategy on sustainability, the City of North Vancouver is conducting research on the benefits of street trees. As stated in the *Smart Bylaws Guide* (http://www.wcel.org/issues/urban/sbg/Part6/usewisely/trees.htm):

> A city-conducted study of more than 5300 street trees in the community indicates that the City's street trees provide an average benefit/cost ratio of more than 5 to 1. At present, the City spends less than $100,000 per year maintaining street trees, however, the existing street trees represent more than $500,000 per year in benefits. Over the 50-year lifespan of a typical tree, the City could realize total benefits of over $25 million.

149 See LEED Canada-NC, v. 1.0, Section 5.1.

150 http://www.nanaimo.ca/uploadedfiles/Bylaws/4695.pdf#search='city per cent20of per cent20nanaimo per cent20tree per cent 20protection per cent20bylaw'.

West Coast Environmental Law is BC's legal champion for the environment. West Coast empowers citizens and organizations to protect our environment and advocates for the innovative solutions that will build a just and sustainable world.

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