City of Richmond
Planning and Development Department

Report to Committee

To:	Planning Committee	**Date:**	April 17, 2008
From:	Joe Erceg, General Manager Planning & Development	**File:**	08-4045-20-10/2008-Vol 01
	Robert Gonzalez, General Manager Engineering & Public Works		
Re:	**Private Developments and LEED Within The City Centre Area Plan & Green Roofs Throughout The City**		

Staff Recommendation

1) That staff incorporate the proposed LEED (Leadership in Energy and Environmental Design) objectives for rezoning applications in the City Centre involving all private developments over 2,000 m^2 (approximately 20,000 ft^2) into the proposed City Centre Area Plan (CCAP) Bylaw with an effective date of January 1, 2009;

2) That staff bring forward the proposed Green Roof requirements for building permits throughout the City involving commercial and industrial private developments over 2,000 m^2 (approximately 20,000 ft^2) into a proposed amendment to the Zoning and Development Bylaw with an effective date of January 1, 2009; and

3) That staff examine the technical concerns regarding geothermal energy, assess the market take-up and review the impact of the Greening the BC Building Code requirements of the Province and report back by mid 2009 on the potential for geothermal energy in Richmond.

Joe Erceg
General Manager
Planning & Development

Robert Gonzalez
General Manager
Engineering & Public Works

Att: 3

FOR ORIGINATING DEPARTMENT USE ONLY				
ROUTED TO:	**CONCURRENCE**		**CONCURRENCE OF GENERAL MANAGER**	
Sustainability Office	Y ☑ N ☐			
Law	Y ☑ N ☐			
Development Applications	Y ☑ N ☐			
Building Approvals	Y ☑ N ☐			
REVIEWED BY TAG	YES ☑	NO ☐	**REVIEWED BY CAO**	YES ☑ NO ☐

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Staff Report

Origin

Buildings represent a significant investment, both in terms of financial and natural resources.

In 2004, the City adopted a Sustainable High Performance Building Policy which established leading-edge requirements for city-owned facilities (**Attachment 1**). Specifically:

- LEED® BC was established as the basis by which to assess building performance;
- LEED Gold certification was set as the desired level of building performance for new City buildings greater than 2,000 m^2 (approximately 20,000 ft^2); and
- LEED Silver was set as the minimum requirement for major renovations to existing facilities and new City Buildings smaller than 2,000 m^2 (approximately 20,000 ft^2) but formal certification was not required.

Richmond Council has expressed an interest in investigating various options and opportunities for increasing the performance of the private development sector[1].

This report responds to this request and recommends the adoption of initial measures for advancing building performance for private developments.

In order to assist with the investigation into LEED, green roofs and site permeability in the City Centre Area Plan (CCAP), staff utilized the services of the IBI Group and Busby Perkins + Will (Architects).

The City's Engineering and Facilities staff examined the potential for geothermal heating and cooling in the City Centre.

Findings of Fact

About High Performance Buildings

High performance buildings are designed, built and operated in a way to create healthier buildings, use natural resources (e.g., energy, materials, water and land) wisely, reduce landfill waste and pollution, reduce greenhouse gas loadings to the atmosphere and minimize facility maintenance costs over the long-term[2].

A variety of tools and techniques can be applied to improve building performance. However, effective high performance buildings adhere to an *integrated whole systems approach.*

Recognizing that buildings are complex systems of interacting elements, high performance buildings are much more than an assembly of the latest "green" technologies and materials. Rather, high performance buildings are distinguished by intelligent designs which consider the suite of elements as part of an interacting system – approaches which consider the effects of one

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[1] The City Centre Area Plan (CCAP) Concept identified a build green strategy based on four pillar areas: 1) A Living Landscape; 2) Adapting to Climate Change; 3) Greening Community Living; 4) Greening the Built Environment (i.e., reducing the impacts of development through initiatives such as: high performance building standards (LEED), green roofs, geothermal heating and permeability). Planning Committee has also requested that staff look into the value of green roofs, and have referred to Port Coquitlam's bylaw requirements.

[2] According to reports published by the United States Green Building Council (USGBC), buildings account for 17% of the world's fresh water withdrawals, 25% of the world's wood harvest, 35% of CO2 emissions and 54% of energy consumption in North America.

or more elements on the others, and on the building as a whole[3]. A careful combination of several reinforcing strategies can optimize performance across a variety of objectives.

Alternative Approaches

Alternative approaches for establishing high performance building standards are:

1. **Prescribe specific best practice** requirements (e.g., geothermal, green roofs, solar panels, daylighting requirements, site permeability, etc.).
    - Limits the ability to undertake a whole system approach but may represent the most feasible approach at early stages for catalyzing action.
2. **Establish ordinances** for building performance (e.g., energy performance, renewable energy and construction waste standards/requirements).
    - Is a performance standard - provides clarity on what is trying to be achieved but leaves "how" and innovation to the private sector.
    - Requires work to be done by municipalities for establishing objectives.
    - May encourage a whole system approach if a sufficient number of objectives for a variety of elements have been established.

    Note: establishing building standards at a municipal level requires concurrent approval from the Province in B.C.
3. **Require compliance with a whole building evaluation framework** (e.g., LEED, Living Building, etc.) which establish a "package" of tools for achieving multiple objectives.
    - Encourages a whole system approach.
    - Provides clarity on what is trying to be achieved but leaves "how" and innovation to the private sector.
    - Provides pre-established performance objectives although these generic requirements may not address local priorities.
4. **Identify local objectives** and require compliance with a tailored whole building evaluation framework[4].
    - Ensures that what is trying to be achieved reflects local priorities.
    - Provides flexibility and innovation to the private sector.
    - Difficult to achieve over the short term.

Further assessment of the relative advantages and disadvantages of these approaches is provided in **Attachment 2**.

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[3] For example, interrelationships between the building site, site features, solar exposure, and location and orientation of the building and elements such as external shading devises and windows, have a significant impact on the quality and effectiveness of natural daylighting, solar loads and overall energy performance.

[4] As new experience and new knowledge is gained, various generic best practices will be found to have higher or lower utility given Richmond's specific conditions. For example, stormwater detention is different in Richmond than in other areas given the high groundwater table. Opportunities for renewable energy will also be different given Richmond's on-site capabilities (e.g., geothermal, wind, etc.).

About LEED

There are a variety of whole building evaluation frameworks.

The most well-known and applied framework is the Leadership in Energy and Environmental Design (LEED) rating system. LEED was developed by the US Green Building Council as a means to evaluate the degree by which buildings meet high performance design.

The rating system is based on earning credits for various building attributes and includes four levels of certification: Certified, Silver, Gold and Platinum (**Attachment 3**). Buildings are evaluated based on factors pertaining to sustainable sites, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality, and innovation & design process.

To achieve a specific level of certification, buildings must meet certain requirements (prerequisites) and gain a certain number of credits. The more attributes, the higher the credits and the higher the level of certification.

The LEED green building rating system is:

- Used by a number of cities in both Canada and the United States on both public and private developments;
- Widely accepted and used by the construction and design industry;
- Is currently used to establish performance requirements for City-owned facilities; and
- Consistent with the new Green Building Code initiatives that Council recently supported.

About Living Building

The Living Building evaluation framework is an evolving system aimed at the attaining the highest level of sustainability performance – beyond LEED Platinum. The evaluation is distinctive from LEED in that:

- Certification is based on actual performance (is provided only after a year of operation);
- There are no credits – just prerequisites; and
- Standards are aimed at achieving a net "good" vs a less bad.

The Living Building framework is a much newer approach with much less demonstration in practice than LEED. A review found that a few Living Buildings are being pursued in the United States.

Analysis

PART 1: LEED IN THE CITY CENTRE ONLY

Preferred Approach In The City Centre

It is staff's assessment that the application of a whole building evaluation framework, which has been connected with local objectives for building performance, is the strongest approach for establishing building performance objectives at this time given that it:

- Encourages whole building system approaches and strives to optimize performance across multiple objectives;
- Provides flexibility in "how" objectives are achieved;
- Encourages private sector innovation and is expected to result in a faster uptake of a range of new approaches and technologies;

- Shares risk amongst the private sector and municipality;
- Takes advantage of private sector expertise and minimizes demands on municipal resources;
- Best ensures that the adopted framework is meeting local priorities and needs; and
- A customized approach is not feasible given that local objectives for building performance have yet to be identified.

However, whole building evaluation frameworks and local performance objectives are evolving over time. As such, it is important that the City undertake an approach which results in action today while continuing to establish and refine desired building performance goals in the future.

In doing so, the City will take into account the Province's Greening the BC Code initiatives to improve the energy efficiency of buildings, increase water efficiency through water-saving plumbing fixtures and fittings, explore greywater recycling, examine the use of lighting sensors and encourage the reuse of existing buildings.

Proposed LEED Objectives In The CCAP

The following objectives are proposed to be adopted as part of the CCAP Bylaw:

- LEED Silver to achieve sustainable high performance buildings for private developments in the City Centre.
- LEED Silver be required for all private developments over 2,000 m^2 (approximately 20,000 ft^2) involving a rezoning application in the City Centre.
- Formal certification would not be required because it could delay the development and building approval process and divert financial resources away from building investment and into administrative processes.
- Developers would be required to submit a checklist completed by a LEED certified professional confirming that the project design complies with LEED Silver.
- Phased development agreements and other mechanisms (e.g., financial security) would be used to secure the LEED Silver as a rezoning condition or prerequisite.
- Due to the net financial benefits of LEED, no City financial incentives are proposed to private developments.

Note: Phased development agreements are a new tool that has been granted to municipalities by Provincial legislation. Essentially, it is an agreement between the developer (who agrees to certain amenities – in this case LEED Silver) and the City (who agrees that it will not change the zoning of the property for up to 10 years).

A phased development agreement must be adopted by a bylaw and requires a Public Hearing. Therefore, it is ideally suited to be part of the rezoning process and that is why the proposed CCAP Bylaw objectives would only apply to rezoning applications (not a development permit or to areas that are already pre-zoned such as the Downtown Commercial District (C7) zone).

Specific LEED Credits In The CCAP

Council has requested that staff examine certain techniques at this time. These techniques may change in the future, but at present they include:

- Green Roofs
  - To reduce the burden on and the cost of the City's storm drainage system.
  - To promote opportunities for urban agriculture in the City Centre.
  - To increase the amount of green and open space in a high density area.
- Improved Site Permeability
  - To reduce the burden on and the cost of the City's storm drainage system.
  - To decrease the amount of impervious areas in the City Centre.
  - To prevent flooding from excessive rainfalls and aid in flood management.
- Geothermal Energy
  - To reduce the environmental impacts associated with fossil fuel energy use.
  - To increase energy efficiency and utilize Richmond's unique high water table.
  - To promote alternative energy sources, particularly on-site renewable energy.

In order to address these measures, certain specific LEED credits were examined in detail and considered as potential requirements for private developments in the City Centre.

The following sections describe these credits, how they could be achieved, the City's preferred outcome and their recommended application. As each credit has a few alternative options, there is flexibility for private developers.

It should be noted that the Building Approvals Division is examining demolition and construction recycling initiatives for private developments - which could tie into the Building Reuse and Construction Waste Management Credits under LEED. It is anticipated that a report with a regulated program in this area will be presented to Planning Committee in May 2008.

Green Roofs In The CCAP

Specific LEED Credit:	Heat Island Effect: Roof Credit.
Intent:	Reduce heat islands to minimize the impact on microclimate and human and wildlife habitat.
Requirements:	Either: 1) Install a "green" (vegetated) roof for at least 50% of the roof area; and/or 2) Use highly reflective and high emissivity roofing for a minimum of 75% of the roof surface.
Preferred Outcome:	Green roofs.
Recommendation:	Apply to: 1) All new non-residential buildings (e.g., commercial and industrial); and 2) Only new multiple-family residential buildings greater than 4 storeys excluding parking (e.g., concrete high rises).
Note:	On residential high rises in the City Centre, it is envisioned that the "green" roof would be located on the parking podium (not on the roof of the residential tower in order to avoid insurance and liability concerns).

Improved Site Permeability In The CCAP

Specific LEED Credit:	Stormwater Management Credit.
Intent:	Limit the disruption of natural water flows by managing stormwater runoff.
Requirements:	Either: 1) Implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff if existing imperviousness is greater than 50%; or 2) Implement a stormwater management plan that prevents the post-development 1.5 year, 24 hour peak discharge rate and quantity from exceeding the pre-development 1.5 year, 24 hour peak discharge rate and quantity if existing imperviousness is less than or equal to 50%.
Preferred Outcome:	Improved permeability and potential "green" or garden roofs.
Recommendation:	Apply to: 1) All new non-residential buildings (e.g., commercial and industrial); and 2) All new multiple-family residential buildings excluding parking (e.g., concrete high rises; wood frame apartments and townhouses).

Geothermal Energy In The CCAP

Specific LEED Credit:	Renewable Energy Credit.
Intent:	Encourage and recognize increasing levels of on-site renewable energy self-supplies in order to reduce the environmental impacts associated with fossil fuel energy use.
Requirements:	Supply at least 5% of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.
Preferred Outcome:	Geothermal energy.
	OR
Specific LEED Credit:	Green Power Credit.
Intent:	Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis (e.g., solar, wind, geothermal, biomass or low-impact hydro sources).
Requirements:	Provide at least 50% of the building's regulated electricity from renewable sources by engaging in at least a 2-year renewable energy contract. Renewable sources are those that meet Environment Canada Environmental Choice programs' EcoLogo requirements for green power supplies.
	OR

Preferred Outcome:	Geothermal energy.
Specific LEED Credit:	Optimize Energy Performance Credit.
Intent:	Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.
Requirements:	Reduce building design energy cost compared to the energy cost of the reference building for energy systems regulated by standards stated in LEED.
Preferred Outcome:	Geothermal energy.
Recommendation:	Staff considered applying this to: 1) All new non-residential buildings (e.g., commercial and industrial); and 2) All new multiple-family residential buildings excluding parking (e.g., concrete high rises; wood frame apartments and townhouses). Based on the analysis by City's Engineering and Facilities staff, and the input of geothermal contracting experts, the development community and UDI, it is recommended that these specific credits not be required at this time.

Rationale For Recommending That Geothermal Energy Be Reported On In Mid 2009

The following are some of the reasons why it is recommended that geothermal energy not be required in the CCAP at this time and that a report be presented to Council on this matter in mid 2009:

- The Province is Greening the BC Building Code in order to support their commitment to reduce greenhouse gases related to buildings and construction. Effective September 5, 2008, new green requirements will be in place for single-family residential, multiple-family residential, commercial, industrial and institutional buildings to improve the energy efficiency of buildings and to increase water efficiency through water-saving plumbing fixtures and fittings.

  These new Provincial standards for improved insulation should reduce energy consumption and could potentially affect the market take-up of alternative forms of energy such as geothermal heating and cooling (e.g., the payback will be lower and less attractive to future owners).

  It should be noted that the City is also addressing the issue of reducing greenhouse gas emissions through its Climate Change Response Agenda. Since hydro electricity is the predominant energy source in Richmond, the introduction of geothermal energy will not have a significant effect on the environmental impacts associated with fossil fuels or on greenhouse gas emissions.

- There are technical concerns about requiring geothermal energy on all private developments in the City Centre. For example, being primarily a high density area, the building footprint of most high rise developments encompass the entire property. So, it could be difficult to locate a conventional geothermal heating and cooling system on such a site.

Furthermore, there is concern that if a number of stand alone, high density residential developments use their own geothermal energy source it could reduce the system's overall effectiveness. The greatest benefit of a geothermal heating and cooling system would be realized in mixed use developments where complimentary uses can be interconnected thereby maximizing benefits to the community, system efficiency and minimizing cost to the end users.

- The consensus from the geothermal contracting experts, development community and UDI is that the City should not require geothermal heating and cooling for every development and that the industry be left to implement alternative energy systems. Several comments acknowledged that interest in the geothermal industry in the Lower Mainland is growing rapidly and there is no need to force the industry.

  In addition, there have been a couple of cases in Vancouver where geothermal systems were required as part of the development and were not successful given the local soil conditions. As a result, the construction industry is cautious of municipalities implementing requirements for geothermal systems in a general manner as the primary heating and cooling source for all developments.
- UDI has expressed concerns that:
  - The cost of geothermal energy could be significant (e.g., staff have been told that the additional capital cost over conventional construction standards is approximately $4 per buildable square foot for an apartment type complex and approximately $20,000 for a typical townhouse);
  - The City needs to establish a municipally-owned "district utility system" for geothermal energy to be universally required in an area; and
  - A prerequisite (required) LEED credit is Minimum Energy Performance, in which new buildings either reduce the design energy consumption by 25% or reduce the design energy cost by 18%.

Reasons For Selecting These Specific LEED Credits For The CCAP

These credits are considered to represent a strong base for establishing initial objectives for the private sector based on the following rationale:

- The specific LEED credits support a whole system approach and strive to achieve multiple objectives including, but not limited to, green roofs and improved site permeability.
- The Heat Island Effect: Roof Credit and Stormwater Management Credit both encourage green roofs.
- Both of these recommended LEED credits will help reduce the pressure on the existing storm drainage system in the City Centre.
- Encouraging green roofs and improved stormwater management in the City Centre is financially feasible to the development community.
- Other LEED credits (e.g., Alternative Transportation; Construction Waste Management; Ozone Protection; Water Use Reduction; Innovation in Design; etc.) will be considered in order to achieve LEED Silver.

PART 2: GREEN ROOFS THROUGHOUT THE CITY

Green Roofs & Private Development Throughout the City

Based on the work by IBI Group and Busby Perkins + Will (Architects), staff are recommending that:

- Green roofs be required on commercial and industrial buildings.
- This requirement apply to private developments over 2,000 m^2 (approximately 20,000 ft^2) involving a building permit.
- The LEED Heat Island Effect: Roof Credit also be used to encourage green roofs on all multiple-family residential buildings greater than 4 storeys excluding parking involving a rezoning application (e.g., on the parking podium of concrete high rises).
- The Zoning and Development Bylaw be amended under the primary authority of Section 907 (runoff control requirement) and secondarily Section 909 (landscaping to preserve, protect, restore and enhance the natural environment) of the Local Government Act.
- That the development variance permit process be used where a green roof is not feasible.
- Due to the net, long term financial benefits of green roofs, no City financial incentives are proposed to private developments.

Rationale for Green Roof Requirement on Commercial & Industrial Buildings

The rationale for these recommendations are:

- Green roofs are one demonstrated strategy used by cities such as Seattle, Portland and Port Coquitlam to reduce stormwater runoff and the rising municipal cost of stormwater infrastructure.
- Green roofs also improve building thermal performance and energy consumption, reduce the urban heat island effect, increase biodiversity and enhance views where dwelling units or offices overlook the roofs.
- The estimated higher cost of 10% is normally recovered within the first two years of building operation, and the energy savings and stormwater runoff reductions continue for the life of the building.
- Green roofs typically last twice as long as traditional roofs because the temperature is regulated.
- By not requiring green roofs on wood frame apartments and townhouses or on the roof of residential concrete high rises, Richmond is recognizing the Homeowner Protection Office (HPO) current insurance concerns regarding green roofs on residential construction (e.g., that some home warranty providers will not provide home warranty insurance for residential projects with green roofs and that the developer may not get HPO sign off).

Proposed Green Roof Amendment to the Zoning and Development Bylaw

The proposed "green roof" amendment to the Zoning and Development Bylaw would:

- Define green roof as meaning an engineered roofing system that allows for the propagation of rooftop vegetation and the retention of stormwater while maintaining the integrity of the underlying roof structure and membrane.
- Apply to commercial and industrial buildings over 2,000 m^2 (approximately 20,000 ft^2).

- Require a green roof on at least 75% of the roof area of the building not including any roof area occupied by mechanical equipment.
- Require the owner of every building having a green roof to maintain the planting media and plant material in accordance with generally accepted landscape maintenance practices, replacing each as necessary to optimize the stormwater retention capability of the roof.

Comparison to Port Coquitlam Green Roof Bylaw

It should be noted that Port Coquitlam's Bylaw applies to a larger building area of 5,000 m^2 (53,821 ft^2). By using the proposed size and type of building threshold proposed by Richmond, it is estimated approximately 10 building permits totalling approximately 57,380 m^2 (617,655 ft^2) of commercial and industrial building space would have had to meet this green roof requirement in 2007.

Port Coquitlam also permits Council to consider a variance to their Zoning Bylaw when a business case is made demonstrating that a green roof may not work for a particular site, such as large unheated industrial storage. It is proposed that a similar variance process be allowed in Richmond. This would allow Council to consider the economic viability and unique design or site features of a commercial or industrial building, as well as the environmental and social benefits of a green roof.

PART III: LEED IN THE CCAP & GREEN ROOFS THROUGHOUT THE CITY

Next Steps

In order to implement these proposed building initiatives on private developments, the following steps are required:

1) The City Centre Area Plan (CCAP) Bylaw should include the objectives for LEED Silver for all rezoning applications involving private developments over 2,000 m^2 (approximately 20,000 ft^2) in the City Centre; and

2) The Zoning and Development should be amended to include the green roof requirement for all commercial and industrial building permits over 2,000 m^2 (approximately 20,000 ft^2) throughout the City.

At this point in time, it is intended to bring both of these bylaws forward at the same time as the CCAP. The CCAP is currently scheduled for Planning Committee and Council consideration in May 2008.

If both bylaws are given first reading, they would go to a Public Hearing in June 2008. Neither bylaw would be adopted until after the proposed accompanying Development Cost Charge (DCC) Bylaw is approved by the Province (assumed to be in July – September 2008).

In order to give the development community and design professionals time to prepare for these new requirements, it is proposed that both bylaws should have an effective date of January 1, 2009 (i.e., LEED Silver would be required of rezoning applications in the City Centre and Green Roofs would be required of building permits throughout the City received after January 1, 2009).

Comments from UDI and GVHBA

Staff have consulted with the Urban Development Institute (UDI) and the Greater Vancouver Home Builders Association (GVHBA) on both the proposed LEED objectives within the CCAP and the proposed green roof requirements throughout the City.

The UDI has indicated verbally that they can support:

- LEED Silver provided that geothermal energy is not required at this time; and
- Green Roofs provided that a variance process is in place.

Both of these concerns have been addressed in this report. A letter of support is expected from the UDI.

The GVHBA has indicated verbally that they do not philosophically support LEED or Green Roofs. A letter outlining the reasons for this position is expected from the GVHBA.

Comments from the City's Sustainability Office

It is recognized that the development of local objectives for building performance are a longer term initiative. Given that local objectives for building performance have yet to be developed, the Sustainability Office supports the approach that early action be taken now based on generic objectives (e.g., the adoption of LEED) rather than the alternative of no action.

Ultimately, the City's Sustainability Office believes that the City should strive towards developing an evolving program (similar to the "high performance" building policy for civic buildings which is to be monitored and reported on a regular basis using existing City reporting tools) which:

- Seeks to incrementally improve building performance for private development throughout the City over time.
- Is based on an understanding of local objectives and site-specific conditions of Richmond.
- Implements measures which reflect known priorities based upon a comprehensive evaluation of options and implications.[5]
- Assimilates any measures into a centralized framework to enable a holistic management approach and support community understanding and engagement.
- Is adaptable and readily able to integrate new knowledge as new information, practices and experiences are gained.

This initiative could require significant resources. The Sustainability Office will evaluate whether the return on investment is warranted and will report its conclusions separately in the future. If an initiative is recommended, it will be led by the Sustainability Office with assistance of staff from Planning and Development, Engineering and other areas as may be necessary.

Financial Impact

None to the City of Richmond.

[5] The Sustainability Office notes that the identification of preferential credits is best when based on a comprehensive review of local priorities and potential implications. The selection of preferred credits means that other areas (e.g., waste, alternative transportation, indoor building health, etc.) may be pursued to a lesser degree, which may or may not be desirable from an overall perspective. The selection of preferred credits may also reduce flexibility for the development community and reduce overall building performance, resulting in an overall reduced advancement of community sustainability. As such, a strong understanding of relative priority is essential for ensuring that resources are being directed towards areas of highest importance.

Conclusion

High performance buildings provide an opportunity to make efficient use of natural and financial resources. The City of Richmond has been incorporating high performance characteristics into its own corporate facilities for a number of years and adopted a formal Sustainable High Performance Building Policy for City owned facilities in 2004.

This report proposes initial measures for improving building performance of private developments. It has been developed to focus initial action in areas that can be implemented in 2009. In doing so, it is recognized that continual improvement will be required and that this approach will be reviewed and updated at least biannually to integrate evolving knowledge and solutions and to strengthen practices across all forms of building development.

Using the City's policy on its own facilities as the basis, it is recommended that the new CCAP include objectives establishing LEED Silver as the desired level of building performance for private developments involving a rezoning application over 2,000 m^2 (approximately 20,000 ft^2). As part of this, certain LEED credits are recommended to be required to address Council's priorities for green roofs and improved site permeability.

It is also recommended that the Zoning and Development Bylaw be amended to require green roofs for private developments involving a building permit for a commercial or industrial building over 2,000 m^2 (approximately 20,000 ft^2) throughout the City.

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HB/cas

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Development Coordinator

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Page 1 of 1	Adopted by Council: January 24, 2004	**Policy 2306**
File Ref: 06-2045-00 Vol. 1	Sustainable "High Performance" Building Policy – City Owned Facilities	

POLICY 2306:

It is Council policy to:

1. **Undertake Comprehensive Financial Consideration**
   Projects for new buildings and major renovations will be evaluated based on considerations of life-cycle costing and initial financial investment requirements.
2. **Incorporate High Performance Attributes into Building Design and Construction to the Maximum Extent Possible**
   - LEED® BC will be used as the standard by which to assess building performance.
   - That LEED Gold accreditation be set as the desired standard of building performance for new City buildings greater than 2000 sq.m (approximately 20,000 sq.ft).
   - The City will seek to meet the performance standards of LEED Silver certification as a minimum requirement for major renovations to existing facilities and new City Buildings smaller than 2000 sq.m (20,000 sq.ft), but may not necessarily seek formal accreditation.
3. **Pursue Continual Improvement Through Building Retrofit and Efficient Building Maintenance**
   Existing facilities and equipment will be upgraded to higher efficiencies as budgets and circumstances allow, and where the change offers a simple payback of no more than five years.
   Equipment will be maintained to energy-efficient standards.
4. **Foster Awareness and Innovation**
   A continuous education program in resource efficiency procedures and practices will be maintained.
   All employees will be encouraged to suggest and initiate projects that will save energy and optimize efficiencies in other resource areas (natural and financial).
5. **Undertake Regular Monitoring and Reporting**
   Corporate energy consumption and extent to which the City has met its LEED building objectives will be monitored and reported on a regular basis using existing City reporting tools.

Advantages and Disadvantages of Alternative Strategies for Establishing Sustainable "High Performance" Building Objectives

Alternative Strategy	Advantages/ Disadvantages
1. Prescribe best practices requirements	*Advantages* • provides clear direction to private sector • relatively easy to enforce *Disadvantages* • commitment is to a best practice versus to an objective • potential lost opportunity for pursuing objective in a more effective manner • virtually no flexibility • does not promote developer innovation • places increased responsibility on municipality who must demonstrate applicability • slower uptake of innovation as municipality must "prove" requirement for collective-wide application and new best practices must be followed and reviewed • increased difficulty in determining whether best practice is meeting a local need/priority
2. Establish ordinances (require fulfillment of established objectives)	*Advantages* • provides clear articulation of what is trying to be achieved • leaves "how" with the developer, promoting developer innovation, enabling flexibility and minimizing risk to the municipality *Disadvantages* • necessitates work by municipality to establish community-wide objectives and translate these to a per building requirement for various types • necessitates work by municipality to develop strategies for ensuring compliance • establishing building standards at a municipal level requires concurrent approval from the Province in B.C. (which probably will be difficult to obtain)
3. Adopt Whole Building Evaluation Framework	**LEED (RECOMMENDED TO BE APPLIED NOW)** *Advantages* • promotes integrated and whole design • provides flexibility in pursuit of specific measures • well understood by industry • requirements preset by private sector expertise – no effort required by municipality to establish requirements *Disadvantages* • no connection to local sustainability objectives • can be achieved without meeting local sustainability priorities and needs • identifies what is to be done without confirmation of actual operation performance • verification of compliance occurs after occupancy – may be difficult to enforce • reduces negative impact – "makes less bad"

Alternative Strategy	Advantages/ Disadvantages
	Living Building *Advantages* • promotes integrated/whole design • measures actual (vs design) performance • aimed at creating a net positive impact – "making good" • considered to be highest measure of sustainable building • dictates specific requirements – no potential for not meeting an identified key component • objectives preset by private sector expertise – no effort required by municipality to establish objectives *Disadvantages* • evolving tool/early application stage • not well known/accepted by industry • evaluation after 1-year of operation – may be difficult to link to City approval processes • dictates specific requirements – removes flexibility
4. Identify Objectives and Require Customized Whole Building Approaches Which Best Meet Objectives	*Advantages* • provides clear articulation of what is trying to be achieved • ensures resources are being directed towards area of actual local priority – strong connection to local sustainability needs and priorities • leaves "how" with the developer, promoting developer innovation, enabling flexibility and minimizing risk to the municipality • promotes integrated/whole design *Disadvantages* • necessitates work by municipality to establish community-wide objectives • necessitates work by departments to develop customized approaches

LEED™ Points System

LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

Version 2.1 Registered Project Checklist

Yes	?	No		
			Sustainable Sites	**14 Points**
Y			Prereq 1 **Erosion & Sedimentation Control**	Required
			Credit 1 **Site Selection**	1
			Credit 2 **Urban Redevelopment**	1
			Credit 3 **Brownfield Redevelopment**	1
			Credit 4.1 **Alternative Transportation**, Public Transportation Access	1
			Credit 4.2 **Alternative Transportation**, Bicycle Storage & Changing Rooms	1
			Credit 4.3 **Alternative Transportation**, Alternative Fuel Vehicles	1
			Credit 4.4 **Alternative Transportation**, Parking Capacity and Carpooling	1
			Credit 5.1 **Reduced Site Disturbance**, Protect or Restore Open Space	1
			Credit 5.2 **Reduced Site Disturbance**, Development Footprint	1
			Credit 6.1 **Stormwater Management**, Rate and Quantity	1
			Credit 6.2 **Stormwater Management**, Treatment	1
			Credit 7.1 **Landscape & Exterior Design to Reduce Heat Islands**, Non-Roof	1
			Credit 7.2 **Landscape & Exterior Design to Reduce Heat Islands**, Roof	1
			Credit 8 **Light Pollution Reduction**	1
Yes	?	No		
			Water Efficiency	**5 Points**
			Credit 1.1 **Water Efficient Landscaping**, Reduce by 50%	1
			Credit 1.2 **Water Efficient Landscaping**, No Potable Use or No Irrigation	1
			Credit 2 **Innovative Wastewater Technologies**	1
			Credit 3.1 **Water Use Reduction**, 20% Reduction	1
			Credit 3.2 **Water Use Reduction**, 30% Reduction	1
Yes	?	No		
			Energy & Atmosphere	**17 Points**
Y			Prereq 1 **Fundamental Building Systems Commissioning**	Required
Y			Prereq 2 **Minimum Energy Performance**	Required
Y			Prereq 3 **CFC Reduction in HVAC&R Equipment**	Required
			Credit 1 **Optimize Energy Performance**	1 to 10
			Credit 2.1 **Renewable Energy**, 5%	1
			Credit 2.2 **Renewable Energy**, 10%	1
			Credit 2.3 **Renewable Energy**, 20%	1
			Credit 3 **Additional Commissioning**	1
			Credit 4 **Ozone Depletion**	1
			Credit 5 **Measurement & Verification**	1
			Credit 6 **Green Power**	1
Yes	?	No		
			Materials & Resources	**13 Points**

Y				
			Prereq 1	**Storage & Collection of Recyclables**	Required
			Credit 1.1	**Building Reuse**, Maintain 75% of Existing Shell	1
			Credit 1.2	**Building Reuse**, Maintain 100% of Shell	1
			Credit 1.3	**Building Reuse**, Maintain 100% Shell & 50% Non-Shell	1
			Credit 2.1	**Construction Waste Management**, Divert 50%	1
			Credit 2.2	**Construction Waste Management**, Divert 75%	1
			Credit 3.1	**Resource Reuse**, Specify 5%	1
			Credit 3.2	**Resource Reuse**, Specify 10%	1
			Credit 4.1	**Recycled Content**, Specify 5% (post-consumer + ½ post-industrial)	1
			Credit 4.2	**Recycled Content**, Specify 10% (post-consumer + ½ post-industrial	1
			Credit 5.1	**Local/Regional Materials**, 20% Manufactured Locally	1
			Credit 5.2	**Local/Regional Materials**, of 20% Above, 50% Harvested Locally	1
			Credit 6	**Rapidly Renewable Materials**	1
			Credit 7	**Certified Wood**	1

Yes	?	No		
			Indoor Environmental Quality	15 Points

Y				
Y			Prereq 1	**Minimum IAQ Performance**	Required
			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
			Credit 1	**Carbon Dioxide (CO_2) Monitoring**	1
			Credit 2	**Ventilation Effectiveness**	1
			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
			Credit 4.2	**Low-Emitting Materials**, Paints	1
			Credit 4.3	**Low-Emitting Materials**, Carpet	1
			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber	1
			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
			Credit 6.1	**Controllability of Systems**, Perimeter	1
			Credit 6.2	**Controllability of Systems**, Non-Perimeter	1
			Credit 7.1	**Thermal Comfort**, Comply with ASHRAE 55-1992	1
			Credit 7.2	**Thermal Comfort**, Permanent Monitoring System	1
			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Yes	?	No		
			Innovation & Design Process	5 Points

			Credit 1.1	**Innovation in Design**: Provide Specific Title	1
			Credit 1.2	**Innovation in Design**: Provide Specific Title	1
			Credit 1.3	**Innovation in Design**: Provide Specific Title	1
			Credit 1.4	**Innovation in Design**: Provide Specific Title	1
			Credit 2	**LEED™ Accredited Professional**	1

Yes	?	No		
			Project Totals (pre-certification estimates)	69 Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points