Working Paper

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Applying Sustainable Development Criteria to the MUHC Glen Yards Development

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Abstract

This paper explores various tools available that would help translate the abstract concept of sustainability into practical and measureable terms. The four "tools", three of them LEED accreditation/rating schemes, are assessed for in terms of their applicability to the MUHC project. These include: (1) *LEED for New Construction and Major Renovation*—an established rating system that addresses the performance of new commercial and institutional buildings; (2) *LEED for Neighborhood Development*—a new rating system tool created by the US Green Building Council (USGBC) which is intended for measuring the sustainability of large-scale mixed use developments; (3) *LEED Complete*—a new rating system developed by the Canadian Green Building Council (CaGBC) which provides ongoing real-time monitoring of the actual energy and water performance of buildings; and (4) *Dockside Green*—awaterfront redevelopment project in the City of Victoria, BC which has used a simple and innovative approach to establishing quantitative sustainability targets. This report concludes that CURA research can and should establish simple, measurable and contractually binding sustainability actions and targets for the MUHC hospital complex, inspired by the LEED ND and Dock Side Green examples. This research can also enable the community sector to lobby politicians, the MUHC and community members for an agreement which contractually binds the developer of the MUHC project to implement LEED Complete and adopt additional neighbourhood level sustainability targets.

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MAKING MEGAPROJECTS WORK FOR COMMUNITIES
MÉGAPROJETS AU SERVICE DES COMMUNAUTÉS

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Executive Summary

How can the construction of the McGill University Health Centre (MUHC) on the new Glen Yards Campus, a $1.4 billion research teaching hospital complex, work better for the local community and the city of Montreal at large? More specifically, how can community and university collaborators, via the Community University Research Alliance (CURA), encourage the most environmentally sustainable MUHC hospital project possible? This paper details measurable sustainability targets and underscores their importance in trying to influence megaproject development.

Research shows that measurable sustainability targets are essential if new construction projects are to reach sustainability. These targets must be established in the tendering documents, before the builder is selected. The owner/occupier of a building must specify quantitative performance targets for water, recycled materials and electricity before bidding commences in order to achieve sustainable buildings (Beaudoin and Tremblay, 2002).

Without clear targets that are contractually binding and/or independently verified by a third party, it will be hard for community stakeholders to evaluate the sustainability of the project, and hold the managers of the MUHC project accountable for the energy and resource performance of buildings.

This paper explores various tools available that would help translate the abstract concept of sustainability into practical and measureable terms. The four following "tools", three of them LEED accreditation/rating schemes, are chosen for their applicability to the MUHC project.

1. LEED for New Construction and Major Renovation: An established rating system that addresses the performance of new commercial and institutional buildings.
2. LEED for Neighborhood Development – A new rating system tool created by the US Green Building Council (USGBC) which is intended for measuring the sustainability of large-scale mixed use developments.
3. LEED Complete – A new rating system developed by the Canadian Green Building Council (CaGBC) which provides ongoing real-time monitoring of the actual energy and water performance of buildings.
4. Dockside Green - a waterfront redevelopment project in the City of Victoria, BC which has used a simple and innovative approach to establishing quantitative sustainability targets.

For each of the four tools, a brief overview will be provided, followed by an analysis of the tool's applicability to the MUHC project.

This report concludes that CURA research can and should establish simple, measurable and contractually binding sustainability actions and targets for the MUHC hospital complex, especially inspired by information in the LEED ND and Dock Side Green examples.

This research can also enable the community sector to lobby politicians, the MUHC and community members for an agreement which contractually binds the developer of the MUHC project to implement LEED Complete and adopt additional neighbourhood level sustainability targets.

Synthèse

Comment la construction du Centre Universitaire de Santé McGill (CUSM) sur le Campus Glen, un projet de 1,4 milliards de dollars, peut-elle bénéficier aux communautés locales et à la ville de Montréal dans son ensemble? Plus précisément, de quelle façon les collaborateurs des communautés et des universités, à travers l'Alliance de Recherche Université Communauté (ARUC), permettent-ils l'élaboration d'un projet aussi durable que possible? Ce travail met en détail des objectifs de durabilité faciles à mesurer et souligne leur importance pour influencer le développement de mégaprojets.

Sans des objectifs clairs précisés dans un contrat et/ou vérifiés de façon indépendante par une tierce partie, il sera difficile pour les membres des communautés d'évaluer la durabilité du projet et de tenir les administrateurs du CUSM responsables des performances énergétiques et de la consommation de ressources des bâtiments.

Cette recherche explore les divers outils disponibles pour la conversion des concepts abstraits de la durabilité en des termes pratiques et mesurables. Les quatre « outils » suivants, trois d'entre eux étant des systèmes d'accréditation ou d'évaluation LEED, ont été choisis pour leur potentiel d'application au projet du CUSM.

1. LEED pour les nouvelles constructions et les rénovations importantes : un système d'évaluation reconnu qui assure les performances des nouveaux bâtiments commerciaux et institutionnels.
2. LEED pour le développement des quartiers : un nouveau système d'évaluation créé par le Conseil Américain pour le bâtiment durable (USGBC) qui permet de mesurer la durabilité des projets de développements à usage mixte de grande échelle.
3. LEED Complete : Un nouveau système d'évaluation développé par le Conseil du bâtiment durable du Canada (CBDCa) allouant une surveillance continue des performances énergétiques et de la consommation de l'eau des bâtiments.
4. Dockside Green : un projet de redéveloppement d'un front de mer dans la ville de Victoria, en Colombie-Britannique, ayant utilisé une approche simple et innovatrice pour l'élaboration d'objectifs quantitatifs de durabilité.

Pour chacun de ces quatre outils, un bref compte-rendu sera fourni de même qu'une analyse de leurs possibilités d'application au projet du CUSM.

Ce rapport conclut que le travail de l'ARUC peut et doit permettre l'établissement d'objectifs simples, mesurables et pouvant être liés par contrat pour le complexe hospitalier du CUSM. Les

exemples du LEED ND et du Dockside Green sont des exemples inspirants pouvant guider l'ARUC dans cette direction.

Cette recherche peut également permettre au secteur communautaire de faire pression sur les politiciens, le CUSM et les membres de la communauté pour engager par contrat les développeurs du projet du CUSM à mettre en application le LEED Complete et à adopter des objectifs additionnels à l'échelle des quartiers.

Introduction

CURA is exploring how the construction of the McGill University Health Centre (MUHC) on the new Glen Yards Campus, a $1.4 billion research teaching hospital complex, can work better for the local community and the city of Montreal at large. One of the main objectives of CURA is to encourage the most environmentally sustainable MUHC hospital project possible.

Research shows that measurable sustainability targets are essential for new construction projects to reach sustainability. Research by Beaudoin & Tremblay (2002), for example, states that the owner/occupier of a building needs to specify quantitative performance targets for water, recycled materials and electricity before bidding commences in order to achieve sustainable buildings. Without strong targets that are contractually binding or independently verified by a third party the managers of the MUHC project will not be held accountable for the energy and resource performance of buildings and the environmental sustainability of the development as a whole.

This paper explores various tools available that would help translate the abstract concept of sustainability into practical and measureable terms. The four following "tools", three of them LEED accreditation/rating schemes, are chosen for their applicability to the MUHC project.

1. LEED for New Construction and Major Renovation: An established rating system that addresses the performance of new commercial and institutional buildings.
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3. LEED Complete – A new rating system developed by the Canadian Green Building Council (CaGBC) which provides ongoing real-time monitoring of the actual energy and water performance of buildings.
4. Dockside Green - a waterfront redevelopment project in the City of Victoria, BC which has used a simple and innovative approach to establishing quantitative sustainability targets.

For each of the four tools, a brief overview will be provided, followed by an analysis of the tool's applicability to the MUHC project. This report concludes with recommendations on which tools or combination of tools CURA could pursue in their negotiations with the MUHC and other government and community partners.

1. LEED for New Construction (NC)

LEED NC is a point-based green building rating system administered by both the USGBC and the CaGBC. LEED NC allocates points to sustainable practices in five different categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. Buildings can receive either Certified, Silver, Gold, or Platinum certification based on the number of points received. LEED NC is the most widely accepted rating system in North America. The MUHC has agreed to make all buildings on the Glen Yards campus meet Silver standards.

Analysis and Recommendations

Note that the two major weaknesses of LEED NC certification for the MUHC project are that it:

1. Applies to individual buildings rather than to the development as a whole.
2. Doesn't measure the ongoing resource performance of the building post-construction.

Both these issues are dealt with in the tools discussed below.

Much like the MUHC, many public and private institutions across North America have committed themselves to building LEED certified buildings. They have done so because the certification process has been used extensively and is well accepted in the marketplace. While LEED NC has its weaknesses, as listed above, its strengths are in addressing sustainable building design and the choice of materials in a simple and comprehensive manner.

CURA has two main options regarding LEED NC certification:

CURA's main cause could be to lobby the MUHC to increase the agreed certification standard from the existing Silver to Gold or Platinum. If agreed to, this would demonstrate a solid commitment by the MUHC towards sustainable development. This option may be more palatable for MUHC leaders than trying new or untested rating systems or tools such as LEED Complete, LEED ND or a separate binding contract.

CURA could focus lobbying efforts on other tools (described below) that go beyond rating individual buildings.

2. LEED Complete

LEED Complete is a new rating system developed by the Canada Green Building Council. The CaGBC defines the tool as a "life cycle building performance management system." LEED Complete improves upon previous LEED rating systems, as it measures the resource performance of buildings throughout their lifecycles. Building performance is measured continuously by a computer attached locally to the building. The information gathered is then periodically relayed via the internet to the CaGBC's central database.

Using this tool, the actual performance of the building can be measured and the performance of buildings can be compared and contrasted with other buildings across the country. This tool is intended to lead to continuous design improvements because the design and construction techniques used in the best performing buildings can be studied and replicated.

The tool is applicable to all building and development types from single family homes to university campuses and other large developments. It is expected that installing the computer to monitor the resource performance of buildings will have a minimal cost. LEED Complete is currently undergoing a pilot study to identify potential problems. It is expected to go online in early 2009.

Analysis and Recommendations

LEED Complete is an improvement over previous LEED rating systems as it measures sustainability through ongoing measurable performance targets. This rating system would encourage the developer to implement real energy and water use reductions over the lifecycle of the building. It should be noted however, that this rating system does not address important environmental issues beyond energy and water consumption, such as the selection of sustainable building materials, and the amount of construction waste generated, etc. These issues are still more aptly addressed by the LEED for New Construction Rating System. I therefore recommend that CURA push for the MUHC to make Glen Yards a LEED Complete project, in addition to LEED NC Silver rating, which the MUHC has already agreed to pursue.

3. LEED for Neighbourhood Development (ND)

LEED ND is a new rating system developed by the US Green Building Council (USGBC) that is currently under pilot study. Like other existing LEED tools it uses a point system to rate the sustainability of a project. Unlike LEED NC which focuses on the sustainability of a single building, LEED ND new neighbourhoods and large projects with more than three buildings. LEED ND, which is intended for use by in the US, has embedded many of the principles - such as walkability and high density - found in the new urbanism movement. This is demonstrated by the fact that this new rating tool was developed in collaboration with the Congress for the New Urbanism, as well as the Natural Resources Defense Council.1

LEED ND focuses on four main areas:

1. Smart Location and Linkage – i.e. ecological impact of development, access to existing infrastructure, brownfield development, transportation options and wildlife protection.
2. Neighbourhood Pattern and Design – i.e. building density, mix of uses, street design, and walkability.
3. Green Construction and Technology – i.e. pollution prevention, certified green buildings, reduced resource use and the reuse of historic buildings
4. Innovation and Design Process – The use of innovative and accredited professionals.

Analysis & Recommendations

A weakness of the LEED ND accreditation scheme is that it is generally targeted at new suburban style developments, as well as projects which have a residential component. Note that the MUHC project at the Glen Yards has no onsite residential component and is principally of two uses – a hospital and research facilities. Regardless of this, the MUHC project would meet LEED ND certification criteria.

A preliminary assessment of the LEED ND point system shows the MUHC would be able to obtain a LEED ND Silver rating with only minimal changes to the proposed development to date. The only major necessary expense would be to hire a consultant to produce the required documentation for submission to the US Green Building Council. A summary of the LEED ND point system

1 For more information about LEED ND refer to the report written by Céline Mertenat (2007) entitled Outils pour un langage commun la construction d'un environnement durable autour du projet du CUSM au site Glen.

is included in Appendix A. When going through the tables in appendix please keep in mind that the author has been deliberately conservative when judging the points the MUHC would receive.

Another weakness of LEED ND is that many areas are based on points only and are not mandatory. Therefore, the MUHC could for example, choose to include a bicycle network (Smart Location & Linkage, Credit 5), but could ignore action on reducing the parking footprint (Neighborhood Pattern & Design, Credit 6).

In contrast, the main strength of LEED ND is that it has successfully provided one document/tool which identifies the whole range of actions required to build sustainable neighbourhoods. In the past best practice design criteria were scattered about in public, private and NGO reports and in the academic literature. LEED ND has attempted to address a multitude of sustainability issues at the neighbourhoods scale, and place them succinctly in one document.

CURA has two main options open to it:

1. Lobby the MUHC to aim for Gold of Platinum certification. This will push the MUHC to increase the overall sustainability of the project and will also provide recognition for the MUHC design and construction team post-completion.
2. CURA could forgo asking the MUHC to implement LEED ND. Instead it could ask that various select elements of LEED ND and other sustainability criteria are adhered to. These criteria could be written down in a contract, as discussed below in the Dockside Green.

4. Dockside Green

Dockside Green is a 15 acre mixed use waterfront development project in the City of Victoria, British Columbia. The project, which is being developed on formerly city-owned land, is the greenest development of its kind in Canada. All new buildings in the project are required to meet the LEED Platinum status, the most stringent green building rating status offered by the CaGBC.

The City of Victoria has taken an innovative approach to pursuing their environmental objectives for this project. As a condition for selling the land, the City signed a binding contract with developers. The contract contained measureable sustainability actions or targets in many areas, including affordable housing provisions, the publication of an annual environmental report for the development, and the mandatory construction of LEED NC Platinum green buildings on site. If the contract is breached the developer pays a pre-agreed fine to the City from a fund already set aside in

a bank. Therefore, it's in the developer's interest, both for financial and marketing purposes, to develop the greenest development possible.

The City of Victoria and the developer have used a simple and innovative tool called "See-it" to monitor the ongoing progress by the developer towards both contractual and non-contractual sustainability commitments. The tool divides sustainability actions into three broad categories: social, environment and economic. For each of these areas there are a number of priority actions shown in Table 1. From there the public can click on the priorities, which are further broken down into simple objectives followed by measurable indicators and a report of the developers progress to date. See Figure 1 for an example of the objectives set for energy performance in the Dockside Green development.

SOCIAL
• Diversity
• Liveability
• Community
• Health and Well-being
ENVIRONMENT
• Land
• Energy
• Transportation
• Water Resources
• Solid Waste
• Urban Ecology
ECONOMIC
• Employment and Economic Activity
• Infrastructure
• Revenue for the Municipality

Table 1: Dockside Green Goals

Analysis and Recommendations

The City has produced simple and understandable indicators in all areas of sustainability, and in addition, have made the whole process publically accessibility via the internet. The City has managed to take the complex concept of sustainability and simplify it by using the "See-it" tool. The tool enables the public to review both the City's objectives and the developer's progress. This means the project has a high level of transparency and accountability.

The signing of the sustainability contract between the City of Victoria and the developers is a critical point in the Dockside Green model development. The contract implies that a) the City is serious about its commitment to establishing sustainability targets that go beyond the level of the building and b) the actions of the developer are held to account. The contractual agreement in the Dockside Green project, however, is context-specific. As mentioned earlier, the City owned the 15 acres of land up for development and therefore exerted a significant amount of control over what would be developed there.

The land slated for the hospital complex the Glen Yards has already been purchased by the MUHC. However, there could be other avenues for a contract between the MUHC and either of the following partners: The City of Montreal (who can apply leverage through the planning approval process), the Provincial Government (who have significant leverage due to the billion or so dollars in tax-payer's funding) and finally the MUHC foundation (who organize the fundraising activities of the hospital and are expected to raise over $300 million for the project).

Final Recommendations to CURA

CURA can be instrumental in pursuing simple, measurable and contractually binding sustainability actions and targets for the MUHC hospital complex. It is recommended that CURA should shrive for two main actions to accomplish its goals. First, CURA should draft model sustainability measures and targets (based on information in the LEED ND and Dock Side Green example) for the Glen Yards development. Second, lobby politicians and community members for an agreement which contractually binds the developer of the MUHC project to:

- Implement LEED Complete
- Adopt additional neighbourhood level sustainability targets

The following is a list of other options that CURA could pursue in its lobbying effort with the MUHC:

- Gold or Platinum LEED for New Construction certification for all new buildings
- Gold or Platinum LEED for Neighbourhood development certification for the campus as a whole. If this certification system was pursued it is recommended that additional neighbourhood sustainability targets described in point "b" above should be excluded.

References

LEED NC Canada

Canada Green Building Council

- http://www.cagbc.org/leed/systems/rating/index/articles40.htm

LEED® Canada for New Construction - Rating System & Addendum 1.0:

- http://www.cagbc. org/uploads/Green%20Building%20Rating%20System%20and%20Addendum_LEED%20Canada-NC_v1_0.pdf

LEED Complete

Canada Green Building Council

- http://www.cagbc.org/uploads/T_LEED_CanadaComplete_June07.pdf
- http://www.cagbc.org/uploads/T_070813_CaGBC%20LEED%20Canada%20Complete_Overview.pdf

Daily Commercial News and Construction Record:

- http://www.dcnonl.com/article/id23510

Dockside Green

Visible Strategies:

- http://docksidegreen.visiblestrategies.com/Background.html
- http://docksidegreen.visiblestrategies.com/

City of Victoria:

- http://www.victoria.ca/cityhall/currentprojects_dockside.shtml

Dockside Green:

- http://docksidegreen.com

LEED for Neighbourhood Development

US Green Building Council:

- http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148

Appendix A - LEED ND Checklist

SMART LOCATION & LINKAGE		LEED ND	MUHC ESTIMATE
Prereq 1	Smart Location	Required	
Prereq 2	Proximity to Water and Wastewater Infrastructure	Required	
Prereq 3	Imperiled Species and Ecological Communities	Required	
Prereq 4	Wetland and Water Body Conservation	Required	
Prereq 5	Agricultural Land Conservation	Required	
Prereq 6	Floodplain Avoidance	Required	
Credit 1	Brownfield Redevelopment	2	2
Credit 2	High Priority Brownfields Redevelopment	1	0
Credit 3	Preferred Locations	2-10	8
Credit 4	Reduced Automobile Dependence	1-8	5
Credit 5	Bicycle Network	1	1
Credit 6	Housing and Jobs Proximity	3	1
Credit 7	School Proximity	1	0
Credit 8	Steep Slope Protection	1	0
Credit 9	Site Design for Habitat or Wetlands Conservation	1	1
Credit 10	Restoration of Habitat or Wetlands	1	1
Credit 11	Conservation Management of Habitat or Wetlands	1	0
	TOTAL:	30 Possible Points	19

NEIGHBORHOOD PATTERN & DESIGN		LEED ND	MUHC ESTIMATE
Prereq 1	Open Community	Required	
Prereq 2	Compact Development	Required	
Credit 1	Compact Development	1-7	4
Credit 2	Diversity of Uses	1-4	0
Credit 3	Diversity of Housing types	1-3	0
Credit 4	Affordable Rental Housing	1-2	0
Credit 5	Affordable For-Sale Housing	1-2	0
Credit 6	Reduced Parking Footprint	2	2
Credit 7	Walkable Streets	4-8	6
Credit 8	Street Network	1-2	0
Credit 9	Transit Facilities	1	1
Credit 10	Transportation Demand Management	2	2
Credit 11	Access to Surrounding Vicinity	1	1
Credit 12	Access to Public Spaces	1	1
Credit 13	Access to Active Public Spaces	1	1
Credit 14	Universal Accessibility	1	1
Credit 15	Community Outreach and Involvement	1	1
Credit 16	Local Food Production	1	0
	TOTAL:	39 Possible Points	20

GREEN CONSTRUCTION & TECHNOLOGY		LEED ND	MUHC ESTIMATE
Prereq 1	Construction Activity Pollution Prevention	Required	
Credit 1	Certified Green Buildings	1-3	3
Credit 2	Energy Efficiency in Buildings	1-3	2
Credit 3	Reduced Water Use	1-3	1
Credit 4	Building Reuse and Adaptive Reuse	1-2	0
Credit 5	Reuse of Historic Buildings	1	0
Credit 6	Minimize Site Disturbance through Site Design	1	1
Credit 7	Minimize Site Disturbance during Construction	1	1
Credit 8	Contaminant Reduction in Brownfields Remediation	1	0
Credit 9	Stormwater Management	1-5	2
Credit 10	Heat Island Reduction	1	0
Credit 11	Solar Orientation	1	1
Credit 12	On-Site Energy Generation	1	0
Credit 13	On-Site Renewable Energy Sources	1	0
Credit 14	District Heating and Cooling	1	0
Credit 15	Infrastructure Energy Efficiency	1	1
Credit 16	Wastewater Management	1	1
Credit 17	Recycled Content in Infrastructure	1	0
Credit 18	Construction Waste Management	1	1
Credit 19	Comprehensive Waste Management	1	1
Credit 20	Light Pollution Reduction	1	1
	TOTAL:	31 Possible Points	16

INNOVATION & DESIGN PROCESS		LEED ND	MUHC ESTIMATE
Credit 1	Innovation in Design	1-5	2
Credit 2	LEED Accredited Professional	1	1
	TOTAL:	6 Possible Points	3

	LEED ND (POSSIBLE POINTS)	MUHC ESTIMATE
Project Totals:	106	58 (Silver Certification)

LEED ND Certification Levels:

Certified	40 -19 points
Silver	50 - 59 points
Gold	60 - 79 points
Platinum	80 - 106 points