



# SUSTAINABILITY REVIEW

## Etobicoke Civic Centre Design Competition

April 2017

**BUILD  
TORONTO**



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*The idea of sustainability is actually reinforced by nostalgia - a sentimental longing or wistful affection for the past. How can we build our cities, not only so that future generations harbor such fondness for the buildings and places we have bequeathed to them, but also that they may endure and are able to adapt to changing needs? In the end, we sustain what we cherish and love, and it is hoped this dimension of sustainability shall never be compromised.*

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Sustainability Review: Etobicoke Civic Centre Design Competition

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#### **ACKNOWLEDGEMENTS**

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#### **DISCLAIMER**

All of the assessments presented herein were conducted independently by the authors in accordance with the terms of reference governing the competition and do not necessarily represent the views of BUILD Toronto, DTAH Architects (Professional Advisor), Finnegan Marshall or the City of Toronto.

## Overview

This sustainability review represents a part of a broader process undertaken by BUILD Toronto for the Etobicoke Civic Centre Design Competition. In preparing this report, the authors examined the terms of reference within the request for proposal and all of the supporting documentation and addenda provided to the competitors. This formed the basis for development of a sustainability assessment framework that was deployed in evaluating each of the design submissions.

Overall, the submissions were of very high quality and provided sufficient technical and environmental design information to enable a comprehensive assessment of sustainability. Competitors were also given an opportunity to provide clarification where key information was missing, incoherent or possibly incorrectly entered in the documentation packages. Every attempt was made to give each of the competitors the opportunity to clearly and completely convey the design intent underlying their submissions.

*The sustainability assessments are based on the content of the submissions and the ensuing clarifications obtained from the competitors. They also include speculations about the promise and potential of the proposals to adapt and refine themselves as the development process unfolds. This reinforces the importance of negotiable design propositions.*

There is deliberately no ranking of the sustainability of the design proposals because this review represents one among a number of assessment processes that are intended to inform the adjudication process in a manner to be determined, interpreted and distilled by the jury.

If there is one key recommendation in this report, it is that the successful proponent among these diverse and remarkable design proposals should be considered as a work in progress that can normally be expected to be revisited and revised as the design development process goes forward. Beyond the sustainability indicators and WELL Building Standard® criteria considered during this sustainability assessment, it is crucial for the jury to give additional consideration to:

- Potential for leading edge innovation in site and facilities design, operation and maintenance;
- Flexible/adaptable pathways to enhanced environmental performance (energy, carbon and water);
- Robust and adaptive design DNA capable of improvement and refinement throughout the design development process; and
- Exemplary and extensible design precedents for parts and the whole that help guide future civic development.

Sustainability remains a complex consideration in architecture, landscape and urban design that is best achieved by accommodating a diversity of perspectives and looseness of fit, while recognizing that ultimately it is a symbiotic relationship between the built environment and those who inhabit it over the long run.

## Competition Entries

Four design proposals as depicted below are reviewed in this report. The review was conducted and presented in alphabetical order based on the name of the key architecture proponent.



Adamson Associates + Henning Larsen Architects



Diamond Schmitt Architects



KPMB Architects | West 8



Moriyama and Teshima + MacLennan Jaunkalns Miller

## Background

This sustainability assessment report is premised on sustainability requirements set out in the Stage 2 RFP for the Etobicoke Civic Centre Design Competition. The following key statements have been excerpted to provide the larger context for this report.

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*The City of Toronto as a municipality has made substantial commitments to sustainability and set ambitious goals for reduction in greenhouse gases (GHG) and energy consumption. City Council unanimously adopted GHG reductions targets of 80% by 2050 relative to 1990 levels. Furthermore, net-zero buildings and net-zero communities are the cornerstone of the City's strategy, as set out in the TransformTO report endorsed by City Council in November 2016.*

*The Etobicoke Civic Centre Precinct is being planned as a Net-Zero community (refer to the Net-Zero Community Energy Plan in the Reference Documents). The new Etobicoke Civic Centre will set the path and be the precedent that demonstrates how bold energy goals can be achieved in a cost-effective manner. It is expected that this model will be replicated on the remaining development blocks within the Etobicoke Civic Centre Precinct and its surroundings.*

### **Minimum Sustainability Requirements**

*For the purposes of this RFP, the design of a new ECC will require adherence to the following minimum sustainability requirements:*

- *Inclusion of a 5% on-site renewable energy (i.e. solar thermal, geothermal, waste heat recovery, solar PV);*
- *Compliance with Tier 2 (Version 3) of Toronto Green Building Standard ("TGS"); note the Version 3 of the TGS is not yet available publicly but has been included in the Background Documents of this RFP for reference; and*
- *Compliance with the City's Green Roof policy for municipal buildings.*

### **Additional Sustainability Requirements**

*The City of Toronto wishes to lead by example. In addition to the minimum sustainability requirements noted above, designers are required to achieve as close to a Net-Zero building (energy and emissions) on an operating basis as is reasonable and practical using the following strategies in sequential order:*

1. *Conservation First: achieve the lowest energy use intensity (EUI), better than TGS 4 V3.*
  2. *Renewable Energy: achieve the highest on-site thermal renewable energy supply (ie. geothermal, solar thermal, waste heat recovery), as well as generate the highest amount of electricity required on site through the use of solar PV.*
  3. *Resilience – use future weather, not past weather, as the basis for development design. Refer to the City reports on Toronto's Future Weather and the Resilient City Initiative, endorsed by City Council, regarding this matter.*
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The assessment process undertaken during the review underlying this report emphasizes these sustainability requirements, along with additional criteria as recommended by City of Toronto stakeholders during their briefing of the sustainability review team.

## ECC Sustainability Assessment Framework

This sustainability assessment framework is intended to integrate the mandatory technical requirements, as set out in the energy and environmental performance targets for the Etobicoke Civic Centre (ECC), with more universal aspects of sustainable architecture and its relationship to inhabitants and the surrounding community. In doing so, a hybrid matrix of indicators and metrics has been developed so that it holistically informs the work of the design competition's jury by providing qualitative measures of the goodness of fit between the project's ambitions and the design intent expressed in the team submissions.

### Assessment Process

The intention is to review each submission and assess sustainability according to the framework set out below. A combination of metrics submitted by each team and an examination of the design strategies and features was used to categorize each of the indicators.

### Guide to Assessment Indicators

The following factors and criteria will be used to conduct the assessment of sustainability indicators.

**Compulsory Elements** – Simple Yes/No for compliance with minimum requirements pertaining to site renewable energy generation, Toronto Green Standard Tier 2 Version 3 targets and the City of Toronto's Green Roof Bylaw.

**Energy and Carbon** – Comparative assessment against Toronto Green Standard Version 3 performance targets.

**Durability** – Building enclosure and site infrastructure life cycle serviceability (maintenance, repair, replacement), combined with functional obsolescence of the building form and its flexibility/adaptability.

**Resilience** – Thermal resilience (cold snap/heat wave) and vulnerability to extreme weather events, as well as the persistence of the landscape.

**Passive Systems** – Enclosure thermal efficiency, natural ventilation, daylighting, shading, site micro-climate, pedestrian circulation (walkability/navigability).

**Active Systems** – Thermal comfort compatibility of HVAC system with low temperature district energy systems, inhabitant interaction/control.

**WELL Standard** – Criteria as per standard for office inhabitants in the areas of Air, Water, Nourishment, Light, Fitness, Comfort, and Mind.

**Sustainability Summary** – Concise narrative highlighting the strengths and weaknesses of each project and a discussion of additional considerations described below.

### Additional Considerations

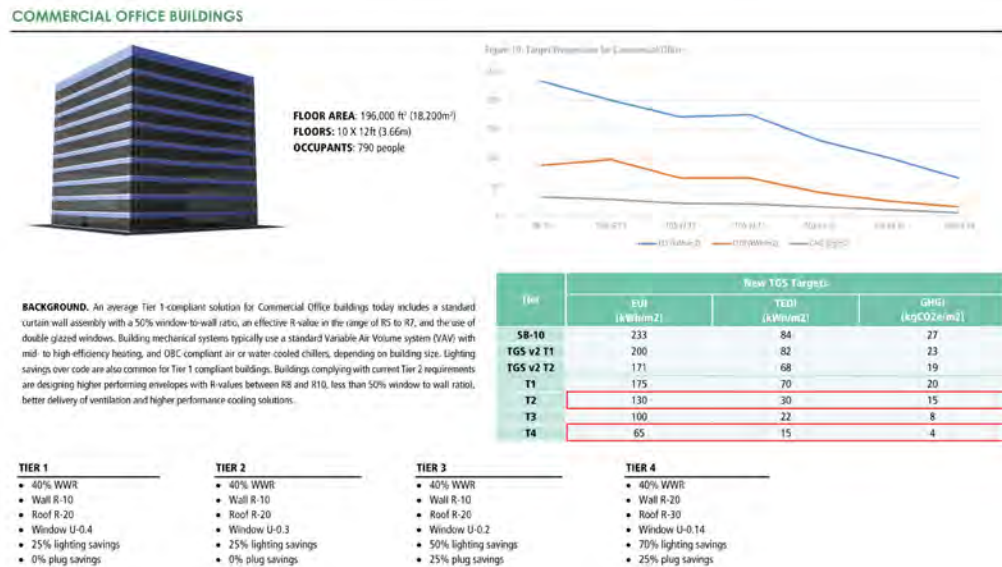
Given the project's completion timeframe (4 years +/-) and the expected technological advances in parallel with continued civic developments across Toronto and the surrounding regions, the sustainability indicators outlined above are augmented and contextualized with the following considerations:

- Potential for leading edge innovation in site and facilities design, operation and maintenance;
- Migratory pathways to enhanced environmental performance (energy, carbon and water);
- Robust and adaptive design DNA capable of improvement and refinement throughout the design development process; and
- Exemplary and extensible design precedents for parts and/or the whole that help lead future civic development.

Key assessment criteria as outlined in the following section were used to assess mandatory requirements.

## Sustainability Assessment Criteria

The sustainability assessment indicators have been organized as indicated in the tables that follow for each of the design proposals. Figure 1 summarizes the energy and carbon targets in the new Version 3 of the Toronto Green Standard. Specific criteria pertaining to the WELL Building Standard® are found in the Appendix to this report.



**Figure 1.** Toronto Green Standard Version 3 Performance Targets for Commercial Office Buildings. T2 represents the minimum requirement and T4 is the near net-zero energy (low carbon) ambition for future buildings in Toronto.

It is important to note that the targets for office buildings have been used as a notional baseline for comparison purposes, recognizing different targets may actually apply to the various building types within the civic centre complex.

STANDARD VERSION	LEVEL OF ACHIEVEMENT	PRECONDITIONS THAT MUST BE ACHIEVED	OPTIMIZATIONS THAT MUST BE ACHIEVED
WELL Building Standard®	Silver Certification	All applicable	None
	Gold Certification	All applicable	40% of applicable
	Platinum Certification	All applicable	80% of applicable
WELL Pilot Standards	Silver Certification	All applicable	20% of applicable
	Gold Certification	All applicable	40% of applicable
	Platinum Certification	All applicable	80% of applicable

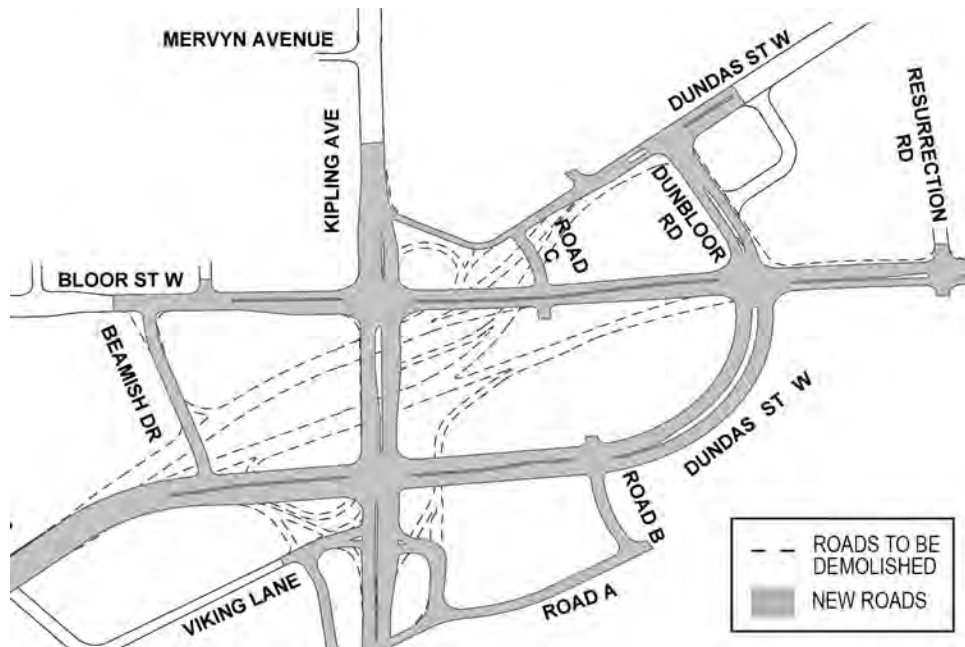
**Figure 2.** WELL Building Standard® requires all preconditions and no optimizations to be achieved in order to obtain a Silver Certification.

The Well Building Standard® is based on seven categories of performance: air, water, nourishment, light, fitness, comfort and mind.

Some of the larger and more complex issues associated with sustainability, as raised in Figure 3 and 4 below, remain the purview of the design competition jury. This report is intended to serve as a reference document to inform a more holistic and overarching process of deliberation and adjudication.



**Figure 3.** The Westwood Theatres (1951 to 1998) went from being a state of the art facility to a functionally obsolete and economically unsustainable shell abandoned in less than half a century. Persistence is key to sustainability and entirely determined by the DNA of the buildings, and their ability to accommodate future but unforeseeable uses and modes of inhabitation.



**Figure 4.** Implicit in the Etobicoke Civic Centre is the accommodation of the automobile, as may be inferred from the reconfiguration and re-alignment of roadways. A balanced design would put at least as much emphasis on the accommodation of the pedestrian community, especially workers and visitors to the Etobicoke Civic Centre.



## AA + HL + PMA

The table below summarizes the key sustainability assessment indicators for the Adamson + Henning Larsen + PMA submission.

Compulsory Elements												
5% On-Site Renewable Energy, TGS Tier 2 Version 3, Green Roof Policy											Yes	No
Energy and Carbon												
	EUI (ekWh/m <sup>2</sup> .yr)			TEDI (ekWh/m <sup>2</sup> .yr)			GHGI (kgCO <sub>2</sub> e/m <sup>2</sup> .yr)					
Environmental Targets	130			30			15					
Base Design	109			24			7.0					
Enhanced Design (proposed)	93.8			13.5			6.3					
<b>Commentary:</b> <ul style="list-style-type: none"> <li>Site renewables of 390,000 kWh/year represent 7.4% of total project energy demand.</li> <li>Energy efficiency and carbon footprint exceed targets by a significant margin.</li> </ul>												
Sustainability												
	Acceptable			→ Good			→ Exemplary			→ Excellent		
Durability												
Resilience												
Passive Systems												
Active Systems												
Economic Viability												
<b>Commentary:</b> <ul style="list-style-type: none"> <li>High level of durability for structure, enclosure and site works. Discrete buildings can be maintained and retrofit in future deploying a staged strategy with minimal disruption and manageable budgets/scope of work.</li> <li>Overall effective enclosure R-value and moderate WWR provide high level of thermal resilience.</li> <li>Proposed design addresses all passive measures - enclosure thermal efficiency, natural ventilation, daylighting, shading, site micro-climate, pedestrian circulation (walkability/navigability). Natural ventilation strategy is not well documented and unsubstantiated.</li> <li>HVAC is compatible with district energy system and responsive. Lighting is efficient but not exemplary.</li> <li>Economic viability is questionable due to seemingly low cost for high performance enclosure and natural ventilation features. No explicit business case was advanced despite having provided the key elements.</li> </ul>												
WELL Building Standard®												
	Acceptable			→ Good			→ Exemplary			→ Excellent		
Air												
Water	This is related to operational policy, not design.											
Nourishment	This is related to operational policy, not design.											
Light												
Fitness												
Comfort												
Mind												
<b>Commentary:</b> <ul style="list-style-type: none"> <li>Overall, this design proposal incorporates all applicable WELL Preconditions.</li> <li>Design aspects related to light, fitness and comfort, in particular outdoor comfort, are exemplary.</li> <li>Atria, winter gardens, generous views to the outdoors enhance mindful qualities.</li> </ul>												
Sustainability Summary												
<b>Commentary:</b> <ul style="list-style-type: none"> <li>Significant strengths of this submission are: 1) a distributed network of interconnected buildings with robust, durable and resilient enclosures that are arranged to promote passive performance and a high quality indoor and outdoor environment; 2) significant on-site renewable energy generation; 3) massing, form, fabric and siting that are distinctive, environmentally performative and resilient; 4) a civic square that is urban, flexible and fully useable on a seasonal basis; and 5) the enhanced performance design is included in the base price.</li> <li>Significant weaknesses of this submission are: 1) an unconvincing (poorly documented) natural ventilation strategy; 2) questionable economic viability due to seemingly low costs for the high performance enclosure and natural ventilation features; and 3) lack of documentation for stormwater management strategy.</li> </ul>												

## DSAI + MVVA

The table below summarizes the key sustainability assessment indicators for the Diamond Schmitt Architects Inc. and Michael Van Valkenberg Associates submission.

Compulsory Elements												
5% On-Site Renewable Energy, TGS Tier 2 Version 3, Green Roof Policy											Yes	No
Energy and Carbon												
	EUI (ekWh/m <sup>2</sup> .yr)			TEDI (ekWh/m <sup>2</sup> .yr)			GHGI (kgCO <sub>2</sub> e/m <sup>2</sup> .yr)					
Environmental Targets	130			30			15					
Base Design (proposed)	92			24			7					
Enhanced Design	61			10			4					
<b>Commentary:</b> <ul style="list-style-type: none"> <li>Site renewables of 351,950 kWh/year represent 8.3% of total project energy demand.</li> <li>Energy efficiency and carbon footprint are exemplary.</li> </ul>												
Sustainability												
	Acceptable			→ Good			→ Exemplary			→ Excellent		
Durability	█	█	█	█	█	█	█	█	█	█	█	█
Resilience	█	█	█	█	█	█	█	█	█	█	█	█
Passive Systems	█	█	█	█	█	█	█	█	█	█	█	█
Active Systems	█	█	█	█	█	█	█	█	█	█	█	█
Economic Viability	█	█	█	█	█	█	█	█	█	█	█	█
<b>Commentary:</b> <ul style="list-style-type: none"> <li>High level of durability for structure and enclosure. Site works, in particular extensive green roof areas, are difficult to sustain under extreme weather events. Single tower renders high level of disruption to accommodate future retrofit/replacement of enclosure.</li> <li>Overall effective enclosure R-value and moderate WWR provide high level of thermal resilience.</li> <li>Proposed design addresses all passive measures - enclosure thermal efficiency, natural ventilation, daylighting, shading, site micro-climate, pedestrian circulation (walkability/navigability). Natural ventilation strategy is poorly documented and unsubstantiated.</li> <li>HVAC is compatible with district energy system and responsive. Lighting is efficient but not exemplary.</li> <li>No explicit business case advanced.</li> </ul>												
WELL Building Standard®												
	Acceptable			→ Good			→ Exemplary			→ Excellent		
Air	█	█	█	█	█	█	█	█	█	█	█	█
Water	This is related to operational policy, not design.											
Nourishment	This is related to operational policy, not design.											
Light	█	█	█	█	█	█	█	█	█	█	█	█
Fitness	█	█	█	█	█	█	█	█	█	█	█	█
Comfort	█	█	█	█	█	█	█	█	█	█	█	█
Mind	█	█	█	█	█	█	█	█	█	█	█	█
<b>Commentary:</b> <ul style="list-style-type: none"> <li>Overall, this design proposal responds to all applicable WELL Preconditions.</li> <li>Design aspects related to light and comfort are exemplary. Outdoor comfort is addressed.</li> <li>Sky atria promote views, inhabitant interactions and fitness.</li> </ul>												
Sustainability Summary												
<b>Commentary:</b> <ul style="list-style-type: none"> <li>Significant strengths of this submission are: 1) a robust, durable and resilient enclosure that delivers passive performance; 2) a network of sky atria that provide opportunities for natural ventilation, inhabitant interaction and fitness; and 3) extensive green roofs and roof terraces contributing positively to urban heat island effect and biodiversity.</li> <li>Significant weaknesses of this submission are: 1) an unsubstantiated natural ventilation strategy; 2) lack of documentation for stormwater management strategy; and 3) questionable bird friendliness of the office tower façade.</li> </ul>												

## KPMB + West 8

The table below summarizes the key sustainability assessment indicators for the Kuwabara Payne McKenna Blumberg + West 8 submission.

Compulsory Elements												
5% On-Site Renewable Energy, TGS Tier 2 Version 3, Green Roof Policy											Yes	No
Energy and Carbon												
	EUI (ekWh/m <sup>2</sup> .yr)			TEDI (ekWh/m <sup>2</sup> .yr)			GHGI (kgCO <sub>2</sub> e/m <sup>2</sup> .yr)					
Environmental Targets	130			30			15					
Base Design (proposed)	102			29			12					
Enhanced Design	65			16			8					
<i>Commentary:</i> <ul style="list-style-type: none"> <li>Site renewables of 264,000 kWh/year represent 5.0% of total project energy demand.</li> <li>Energy efficiency and carbon footprint are acceptable, but not exemplary.</li> </ul>												
Sustainability												
	Acceptable			→ Good			→ Exemplary			→ Excellent		
Durability	█	█	█	█	█	█	█	█	█	█	█	█
Resilience	█	█	█	█	█	█	█	█	█	█	█	█
Passive Systems	█	█	█	█	█	█	█	█	█	█	█	█
Active Systems	█	█	█	█	█	█	█	█	█	█	█	█
Economic Viability	█	█	█	█	█	█	█	█	█	█	█	█
<i>Commentary:</i> <ul style="list-style-type: none"> <li>High level of durability for structure and enclosure. Site works, in particular extensive green roof areas and large trees, are difficult to sustain under extreme weather events. Single tower renders high level of disruption to accommodate future retrofit/replacement of enclosure.</li> <li>Overall effective enclosure R-value, moderate WWR and climate responsive massing provide high level of thermal resilience.</li> <li>Proposed design addresses all passive measures - enclosure thermal efficiency, natural ventilation, daylighting, shading, site micro-climate, pedestrian circulation (walkability/navigability). Natural ventilation strategy is explained.</li> <li>HVAC is compatible with district energy system and responsive. Lighting is efficient but not exemplary. Daylighting is excellent.</li> <li>Economic viability is reflected in properly costed building enclosure. Design rationale is supported by a detailed business case.</li> </ul>												
WELL Building Standard®												
	Acceptable			→ Good			→ Exemplary			→ Excellent		
Air	█	█	█	█	█	█	█	█	█	█	█	█
Water	This is related to operational policy, not design.											
Nourishment	This is related to operational policy, not design.											
Light	█	█	█	█	█	█	█	█	█	█	█	█
Fitness	█	█	█	█	█	█	█	█	█	█	█	█
Comfort	█	█	█	█	█	█	█	█	█	█	█	█
Mind	█	█	█	█	█	█	█	█	█	█	█	█
<i>Commentary:</i> <ul style="list-style-type: none"> <li>Overall, this design proposal responded to all applicable WELL Preconditions.</li> <li>Design aspects related to air, light and comfort are exemplary.</li> <li>Contribution of sky courts to office inhabitant fitness unclear.</li> </ul>												
Sustainability Summary												
<i>Commentary:</i> <ul style="list-style-type: none"> <li>Significant strengths of this submission are: 1) a robust, durable and resilient enclosure that delivers passive performance; 2) exemplary access to light and air; and 3) extensive green roofs and roof terraces contributing positively to urban heat island effect and biodiversity.</li> <li>Significant weaknesses of this submission are: 1) lack of documentation for stormwater management strategy; and 2) questionable bird friendliness of the office tower façade.</li> </ul>												

## MTA + MJMA

The table below summarizes the key sustainability assessment indicators for the Moriyama & Teshima Architects + MacLennan Jaunkalns Miller Architects submission.

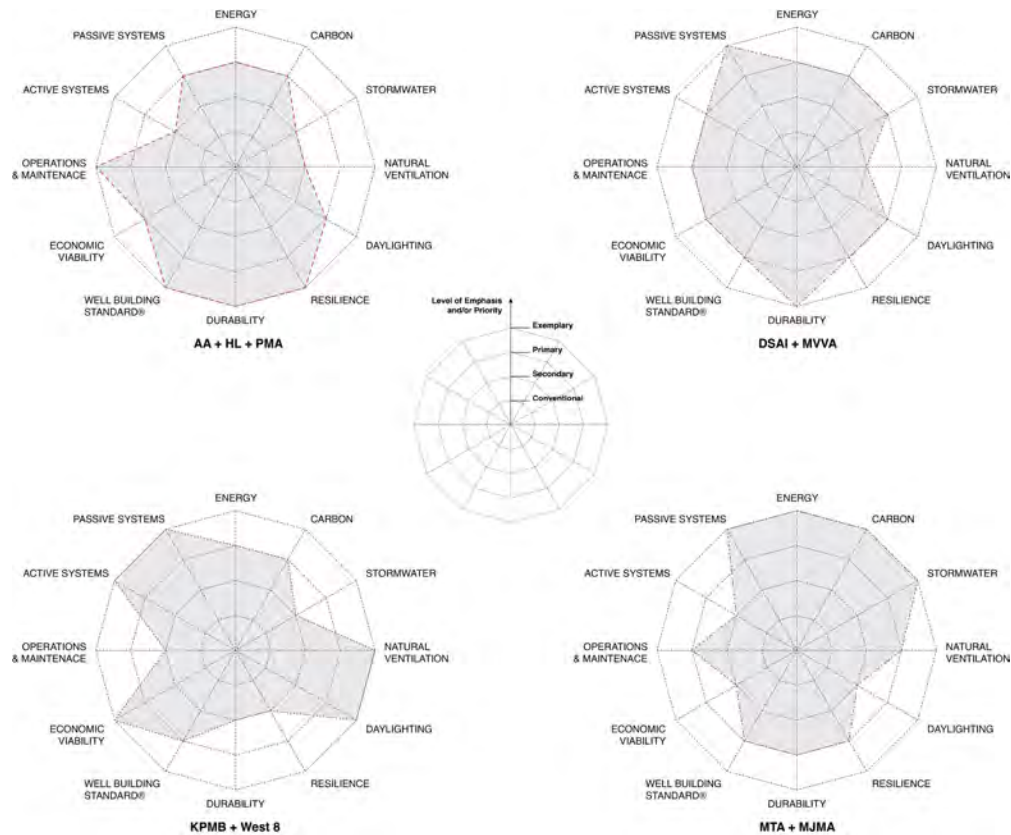
Compulsory Elements															
5% On-Site Renewable Energy, TGS Tier 2 Version 3, Green Roof Policy											Yes	No			
Energy and Carbon															
	EUI (ekWh/m <sup>2</sup> .yr)			TEDI (ekWh/m <sup>2</sup> .yr)			GHGI (kgCO <sub>2</sub> e/m <sup>2</sup> .yr)								
Environmental Targets															
Base Design (Proposed)													130	30	15
Enhanced Design													67.1	17.8	3.4
Enhanced Design													43.6	9	2.2
<p><i>Commentary:</i></p> <ul style="list-style-type: none"> <li>Site renewables of 384,416 kWh/year represent 7.4% of total project energy demand.</li> <li>Energy efficiency and carbon footprint are superior, office performance is exemplary.</li> </ul>															
Sustainability															
	Acceptable			→ Good			→ Exemplary			→ Excellent					
Durability															
Resilience															
Passive Systems															
Active Systems															
Economic Viability															
<p><i>Commentary:</i></p> <ul style="list-style-type: none"> <li>High level of durability for structure and enclosure. Site works, in particular extensive green roof areas, are difficult to sustain under extreme weather events. Single tower renders high level of disruption to accommodate future retrofit/replacement of enclosure.</li> <li>Overall effective enclosure R-value, and moderate WWR provide high level of thermal resilience.</li> <li>Proposed design addresses all passive measures - enclosure thermal efficiency, natural ventilation, daylighting, shading, site micro-climate, pedestrian circulation (walkability/navigability). Natural ventilation strategy is not well explained.</li> <li>HVAC is compatible with district energy system and responsive. Lighting is efficient but not exemplary. Daylighting is not optimal in office areas.</li> <li>Economic viability and overall business case is promising.</li> </ul>															
WELL Building Standard®															
	Acceptable			→ Good			→ Exemplary			→ Excellent					
Air															
Water	This is related to operational policy, not design.														
Nourishment	This is related to operational policy, not design.														
Light															
Fitness															
Comfort															
Mind															
<p><i>Commentary:</i></p> <ul style="list-style-type: none"> <li>Overall, this design proposal responds to all applicable WELL Preconditions.</li> <li>Design aspects related to air and comfort are notable.</li> <li>Expansive green space in civic square is exceptional.</li> </ul>															
Sustainability Summary															
<p><i>Commentary:</i></p> <ul style="list-style-type: none"> <li>Significant strengths of this submission are: 1) a compact office tower with a robust, durable and resilient enclosures that provides exceptional passive performance; 2) exemplary on-site renewable energy generation supported by a promising business case; 3) a green landscaped civic square providing significant amenity coupled to a stormwater management strategy; and 4) a distinctive shift from the glass tower office typology and a return to building fabric for civic architecture.</li> <li>Significant weaknesses of this submission are: 1) a questionable natural ventilation strategy (breathing rooms); 2) predominant allocation of public facilities/spaces underground; and 3) questionable bird friendliness of the office tower façade.</li> </ul>															

## Sustainability Indicators Comparison

Two means of comparison are provided for consideration by the competition jury in adjudicating the design proposals. The first is to compare the energy and carbon performance of the proposed designs. It should be noted that for the AA + HL + PMA team, the proposed design was the enhanced case, while for the other three teams, the data in the table below represent their proposed base cases, before optional enhancements. All four submissions are capable of achieving even lower energy and carbon targets.

	Energy Use Intensity (ekWh/m <sup>2</sup> .yr)	Thermal Energy Demand Intensity (ekWh/m <sup>2</sup> .yr)	Greenhouse Gas Intensity (kgCO <sub>2</sub> e/m <sup>2</sup> .yr)	Renewable Energy Generation (kWh/year)
AA + HL + PMA	93.8	13.5	6.3	390,000
DSAI + MVVA	92	24	7	351,950
KPMB + West 8	102	29	12	264,000
MTA + MJMA	67.1	17.8	3.4	384,416

The second means of comparison between the four submissions was to visualize the emphases on key sustainability indicators inherent in each design. This was conducted by assigning a rank to each indicator as documented in the design drawings and narrative. The rankings range from exemplary, to primary, to secondary, to conventional. To clarify the rankings, exemplary means the design team placed among the highest emphasis on this indicator and approached a level of performance at or near the maximum technically feasible. A primary emphasis represents a high level of performance, whereas a secondary rank indicates better practice than conventional. None of the submissions were deemed to propose conventional levels of performance related to the sustainability indicators.



## Sustainability Assessment Synopsis

This assessment of sustainability is intended to highlight the strengths and weaknesses of the design proposals for the envisaged Etobicoke Civic Centre development. From an energy, carbon and building resilience perspective, all of the submission shared these common traits:

- High performance enclosures comprising low U-value and solar heat gain coefficient (SHGC) fenestration combined with highly insulated opaque wall and roof assemblies having minimal thermal bridging;
- Reasonable window-to-wall ratios to achieve an overall effective R-value for the entire enclosure greater than R-7.5;
- Highly effective daylighting with shading devices, and natural ventilation strategies serving the office areas;
- Low energy intensity heating/cooling systems (in-floor hydronic, active chilled beams, radiant panels, etc.) combined with dedicated outside air systems (DOAS) with heat recovery.

There was considerable divergence beyond this basic approach to enclosure efficiency, which represented the fundamental strength of all the proposals to a lesser or greater degree, and based on the assessment of specific weaknesses associated with each of the submissions, the following issues are important for consideration by the jury, in general:

- It remains unclear whether or not green roof areas will actually be inhabited since this practice represents an exposure to liability on the part of the owner (City of Toronto). This needs to be ascertained as some of the submissions place great emphasis on inhabited, extensive green roof areas;
- The vitality of large trees within the civic square above underground structures is questionable, especially given their exposure to abrasion and damage by users of the outdoor space;
- Cultural sustainability as manifest in the quality of the civic square and its ability to accommodate diverse activities on a year-round basis was not assessed, but deserves serious consideration.
- Natural ventilation strategies require sophisticated analysis and design to be as effective as they have been portrayed in the submissions. Natural ventilation and night cooling are important strategies for achieving low energy buildings, hence this aspect of the submissions needs to be interpreted as a potential benefit, not necessarily a demonstrated level of performance;
- There is a lack of explicit discussion regarding inhabitant interactions with the building controls, in particular natural ventilation, daylighting (shading devices) and the HVAC system. The realization of low energy and carbon in buildings is premised on active building inhabitants that can interact with their environments; and
- The business case for sustainability was generally not well addressed and it is crucial to bridging what is often an insurmountable gap between the construed and the constructed.

From a purely energy and carbon perspective, there are no bad choices among the design proposals and each approach can be manipulated to achieve exemplary targets for sustainable civic architecture.

The four design proposals reviewed under this sustainability assessment are diverse in their approaches and emphases, but from a sustainability perspective they all have the potential to deliver long term value. As such, this report recommends that it will be additional factors in conjunction with sustainability considerations, not any singular set of indicators, that will be key to adjudicating the submissions. While it is acknowledged that sustainability, and in particular energy and carbon targets, are critical aspects of the Etobicoke Civic Centre development ambitions, it is not only the evidence, but also the promise embedded in the competition panels and documentation, that need to be reconciled.

## Appendix 1 – WELL Building Standard® Features Matrix

Pages 19 to 21 of the WELL Building Standard® have been excerpted below. The features listed as Preconditions under the New and Existing Buildings category all have to be achieved in order to obtain a Silver Certification. Note that many of the features are not associated with the design aspects and do not apply to this sustainability assessment.

### WELL BUILDING STANDARD® FEATURES MATRIX

This table shows which features are Preconditions and Optimizations for the different project types of the standard for commercial and institutional offices. Refer to the tables in the beginning of each concept for details about the applicability of specific parts.

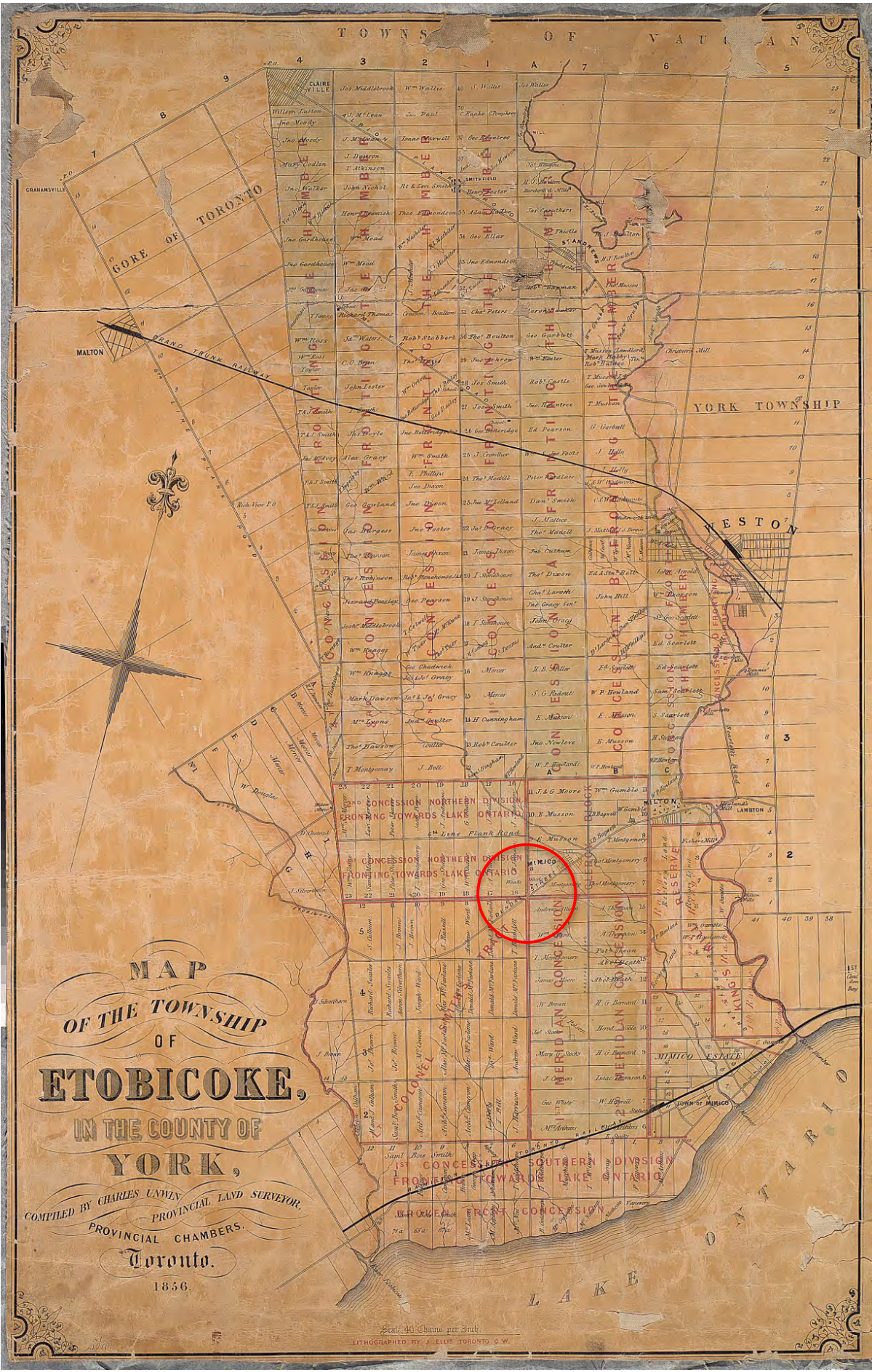
		Core and Shell	New and Existing Interiors	New and Existing Buildings
<b>Air</b>				
01	Air quality standards	P	P	P
02	Smoking ban	P	P	P
03	Ventilation effectiveness	P	P	P
04	VOC reduction	P	P	P
05	Air filtration	P	P	P
06	Microbe and mold control	P	P	P
07	Construction pollution management	P	P	P
08	Healthy entrance	P	O	P
09	Cleaning protocol		P	P
10	Pesticide management	P		P
11	Fundamental material safety	P	P	P
12	Moisture management	P		P
13	Air flush		O	O
14	Air infiltration management	O	O	O
15	Increased ventilation	O	O	O
16	Humidity control		O	O
17	Direct source ventilation	O	O	O
18	Air quality monitoring and feedback		O	O
19	Operable windows	O	O	O
20	Outdoor air systems	O	O	O
21	Displacement ventilation		O	O
22	Pest control		O	O
23	Advanced air purification	O	O	O
24	Combustion minimization	O	O	O
25	Toxic material reduction		O	O
26	Enhanced material safety		O	O
27	Antimicrobial activity for surfaces		O	O
28	Cleanable environment		O	O
29	Cleaning equipment		O	O
<b>Water</b>				
30	Fundamental water quality	P	P	P
31	Inorganic contaminants	P	P	P
32	Organic contaminants	P	P	P
33	Agricultural contaminants	P	P	P
34	Public water additives	P	P	P
35	Periodic water quality testing		O	O
36	Water treatment	O	O	O
37	Drinking water promotion	O	O	O

		Core and Shell	New and Existing Interiors	New and Existing Buildings
<b>Nourishment</b>				
38	Fruits and vegetables		P	P
39	Processed foods	P	P	P
40	Food allergies	P	P	P
41	Hand washing		P	P
42	Food contamination		P	P
43	Artificial ingredients	○	P	P
44	Nutritional information	○	P	P
45	Food advertising	○	P	P
46	Safe food preparation materials		○	○
47	Serving sizes		○	○
48	Special diets		○	○
49	Responsible food production		○	○
50	Food storage		○	○
51	Food production	○	○	○
52	Mindful eating	○	○	○
<b>Light</b>				
53	Visual lighting design		P	P
54	Circadian lighting design		P	P
55	Electric light glare control	P	P	P
56	Solar glare control	○	P	P
57	Low-glare workstation design		○	○
58	Color quality		○	○
59	Surface design		○	○
60	Automated shading and dimming controls		○	○
61	Right to light	○	○	○
62	Daylight modeling	○	○	○
63	Daylighting fenestration	○	○	○
<b>Fitness</b>				
64	Interior fitness circulation	P	○	P
65	Activity incentive programs		P	P
66	Structured fitness opportunities		○	○
67	Exterior active design	○	○	○
68	Physical activity spaces	○	○	○
69	Active transportation support	○	○	○
70	Fitness equipment	○	○	○
71	Active furnishings		○	○
<b>Comfort</b>				
72	Accessible design	P	P	P
73	Ergonomics: visual and physical		P	P
74	Exterior noise intrusion	P	○	P
75	Internally generated noise	○	P	P
76	Thermal comfort	P	P	P
77	Olfactory comfort		○	○
78	Reverberation time		○	○
79	Sound masking		○	○
80	Sound reducing surfaces		○	○
81	Sound barriers		○	○
82	Individual thermal control		○	○
83	Radiant thermal comfort	○	○	○



		Core and Shell	New and Existing Interiors	New and Existing Buildings
<b>Mind</b>				
84	Health and wellness awareness	P	P	P
85	Integrative design	P	P	P
86	Post-occupancy surveys		P	P
87	Beauty and design I	P	P	P
88	Biophilia I - qualitative	O	P	P
89	Adaptable spaces		O	O
90	Healthy sleep policy		O	O
91	Business travel		O	O
92	Building health policy		O	O
93	Workplace family support		O	O
94	Self-monitoring		O	O
95	Stress and addiction treatment		O	O
96	Altruism		O	O
97	Material transparency	O	O	O
98	Organizational transparency		O	O
99	Beauty and design II	O	O	O
100	Biophilia II - quantitative	O	O	O
<b>Innovation</b>				
101	Innovation I	O	O	O
102	Innovation II	O	O	O
103	Innovation III	O	O	O
104	Innovation IV	O	O	O
105	Innovation V	O	O	O

TOWNS OF VAUGHAN



MAP OF THE TOWNSHIP OF ETOBICOKE, IN THE COUNTY OF YORK,

COMPILED BY CHARLES LAMVIN, PROVINCIAL LAND SURVEYOR, PROVINCIAL CHAMBERS, Toronto. 1856.