



## Site Plan Application Stage

### Energy Efficiency Report Submission Checklist



*Check each box to confirm the required documentation is submitted*

- Appendix-A1, Better Buildings Partnership-Toronto Green Standard Energy Efficiency Report.  
**(Absolute Performance Targets Pathway)**  
The report to be completed and signed by the Energy Modeller and licensed Architect, C.E.T., B.E.M.P., or Professional Engineer
- Appendix-A2, Better Buildings Partnership-Toronto Green Standard Energy Efficiency Report.  
**(Relative Performance Targets Pathway)**  
**if choose to comply with TGS % performance track applicable only for the projects pursuing Tier-1.**  
The report to be completed and signed by the Energy Modeller and licensed Architect, C.E.T., B.E.M.P., or Professional Engineer
- Appendix-B1, Better Buildings Partnership-Toronto Green Standard Energy Modelling Simulation Summary Report. (Absolute Performance Targets Pathway)
- Appendix-B2, Better Buildings Partnership-Toronto Green Standard Energy Modelling Simulation Summary Report. (Relative Performance Targets Pathway)  
**Only applicable if choosing to comply with TGS % performance track, only available for the projects pursuing Tier-1, or outside of the available archetypes.**
- Energy Modelling Report.
- Working Energy Models (base case if applicable and energy efficient case).
- Mechanical and Electrical Design Brief.
- Related supporting drawings and calculations.

*Note: Additional documentation may be required upon request by City.*



**APPENDIX-A2 (Relative Performance Targets Pathway)**

**Better Buildings Partnership  
TORONTO GREEN STANDARD  
Energy Efficiency Report**



**PROJECT INFORMATION:**

Project Address: Grosvenor and Grenville - North  
 SPA Number: \_\_\_\_\_  
 Date(dd-mm-yyyy): 23-01-2019  
 Building Type: Residential  
 Total Modeled GFA (m<sup>2</sup>): 31,152.00  
 Energy Simulation Software Used: eQuest v3.65

**Energy Modeller Information:**

Company Name: EQ Building Performance  
 email: kw@egbuilding.com

Contact Person: Kevin Watt  
 Telephone # 905-418-0203

**Architect Information:**

Company Name: \_\_\_\_\_  
 email: \_\_\_\_\_

Contact Person: \_\_\_\_\_  
 Telephone # \_\_\_\_\_

Select Reference Code Compliance Path: OBC SB-10 (2017) Division 3 Chapter 3 - NECB 2015

Energy End Use	Reference Building						Proposed Building						Energy Savings			
	Electrical Annual Consumption (kWh)	Natural Gas Annual Consumption (kWh)	EUI kWh/m <sup>2</sup>	GHGI <sup>a</sup> kgCO <sub>2</sub> e/m <sup>2</sup>	Peak Demand Summer kW	Peak Demand Winter kW	Electrical Annual Consumption (kWh)	Natural Gas Annual Consumption (kWh)	Energy Use Intensity (kWh/m <sup>2</sup> )	GHGI <sup>a</sup> kgCO <sub>2</sub> e/m <sup>2</sup>	Peak Demand Summer kW	Peak Demand Winter kW	Peak Demand Summer kW	Peak Demand Winter kW	Total Annual Consumption (kWh)	Energy Efficiency above Base Case %
Lights	681,026.00	0.00	21.86				681,026.00	0.00	21.86						0.00	
Misc. Equipment	549,942.00	0.00	17.65				549,942.00	0.00	17.65						0.00	
Space Heating	8,233.00	2,598,821.00	83.69				4,395.00	1,470,517.00	47.35						1,132,142.00	
Space Cooling	387,245.00	0.00	12.43				382,791.00	0.00	12.29						4,454.00	
Heat Reject	0.00	0.00	0.00				0.00	0.00	0.00						0.00	
Pumps	232,458.00	0.00	7.46				183,675.00	0.00	5.90						48,783.00	
Fans	716,068.00	0.00	22.99				703,469.00	0.00	22.58						12,599.00	
Service Hot Water	0.00	1,533,217.00	49.22				0.00	1,452,351.00	46.62						80,866.00	
Others	0.00	0.00	0.00				0.00	0.00	0.00						0.00	
<b>Totals</b>	<b>2,574,972.00</b>	<b>4,132,038.00</b>	<b>215.30</b>	<b>28.12</b>			<b>2,505,298.00</b>	<b>2,922,868.00</b>	<b>174.25</b>	<b>20.99</b>			<b>0.0</b>	<b>0.0</b>	<b>1,278,844.00</b>	<b>19.1%</b>

a. GHGI is automatically calculated using the emission factor extracted from SB10 (0.05kg of CO<sub>2</sub>/kWh Electric & 1.899kg of CO<sub>2</sub>/m<sup>3</sup> Nat. gas). (1m<sup>3</sup> = 10.5ekWh)

b. TEDI value require input. See Energy Terms of Reference and Energy Modeling Guideline V3 for TEDI definition. Supporting calculation required to review TEDI value.

I hereby certify that the energy demand and consumption are properly representative of the Energy Modelling Report submitted for the above project.

Total Annual Heat Demand for TEDI (kWh) 1,364,216.00  
 TEDI<sup>b</sup> (kWh/m<sup>2</sup>) 43.8  
 Please see Appendix-C for the calculation

Energy Modeller Name: Kevin Watt

Architect Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

**APPENDIX-B2**  
**Better Buildings Partnership - Toronto Green Standard**  
**Energy Modelling Simulation Summary Report - Relative Performance Targets Pathway**

Date( dd-mm-yyyy):

**Project Description:**  
 Grosvenor and Grenville is a multi-unit residential development that will be located in Toronto, Ontario. The project consists of two high-rise towers, north and south, with a shared podium, and

**Project's key energy efficiency measures proposed:**  
 High performance glazing: low-e coating, thermally broken Al frames, Argon fill, warm edge spacers  
 Window-wall-ratio of approximately 49% (vision glass only)  
 Lighting levels as per NECB 2015 as modified by SB-10  
 In-suite energy recovery ventilators, amenity and retail heat recovery ventilators  
 Hot water, chilled water fan coils serving suites, lobbies and amenity areas

**Provide a complete summary of energy simulation inputs and assumptions, referencing the relevant plans, drawings or reports.**

Location:	Toronto, Ontario
Building Sector:	Residential
Space Use Classification:	Residential
Simulation Software Used:	eQuest v3.65
Modeled Gross Floor Area (square meter):	31,152.0
No. of Floors:	39
Gross Exterior Wall Area (Sq. meter):	33,379.0
Gross Exterior Window Area (Sq. meter):	17,275.0
Gross Roof Area (Sq. meter):	3,101.0

**Passive Design Measure Description:**

**Building Envelope**

**Exterior Wall**

	Reference	Proposed	Notes/Reference
Wall Type	NECB Zone 5	Spandrel Glass Panel	
Add additional as necessary		Precast Brick Panel	
Add additional as necessary			
Nominal R-Value (F-saft-hr/BTU)	20.4	13.11 / 18.31	
Overall R-Value(F-saft-hr/BTU)	20.4	7.97 / 14.84	

**Roof**

Roof Type/Description	NECB Zone 5	4" continuous rigid insulation	
Nominal R-Value (F-saft-hr/BTU)	36.4	20	
Overall R-Value(F-saft-hr/BTU)	36.4	20	

**Floor**

Floor Type/Description	NECB Zone 5	NECB Zone 5	
Nominal R-Value (F-saft-hr/BTU)	31	31	
Overall R-Value(F-saft-hr/BTU)	31	31	

**Windows**

Fixed Glazing U-Value (BTU/saft-F-hr)	0.335, SHGC 0.40	0.35, SHGC 0.30	
Operable Glazing U-Value (BTU/saft-F-hr)	0.335, SHGC 0.40	0.35, SHGC 0.30	
Window-Wall Ratio:	40.0	49.0	
Skylight Assembly (If applicable)	NA	NA	
Skylight-Roof Ratio (If applicable):	NA	NA	

**Lighting**

	Reference	Proposed	Notes/Reference
Fixture Types:	Per NECB 2015 + SB-10	Per NECB 2015 + SB-10	
Lighting Power Density (W/sq.ft):	0.475	0.475	
Light schedule:	Per space type	Per space type	
Lighting Controls:			

**Other Equipment Load**

	Reference	Proposed	Notes/Reference
Equipment Description:	Per NECB 2015 + SB-10	Per NECB 2015 + SB-10	
Equipment Schedule:	Per space type	Per space type	
Peak Load Density (W/sq.m):	3.273	3.273	

**HVAC**

<b>Plant</b>	<b>Reference</b>	<b>Proposed</b>	<b>Notes/Reference</b>
Central Cooling Type:	Centrifugal Chiller	Centrifugal Chiller, VFD	
Capacity (Tons):	202	259	
Efficiency (COP):	5.547	6.1	
Primary Cooling Pumps (Head, Power, GPM):	pump power equal to proposed as per NECB	75 ft head, 65% efficiency, gpm autosized	
Cooling Tower:	0.013 kW/kW	0.013 kW/kW	
Central Heating Type:	Hydronic gas fired boiler	Hydronic gas fired boiler	
Capacity (MBH):	4558.6	5448.4	
Thermal Efficiency:	90	95	
Primary Heating Pumps (Head, Power, GPM):	pump power equal to proposed as per NECB	59 ft head, 60% efficiency, gpm autosized	

**Domestic Hot Water**

	<b>Reference</b>	<b>Proposed</b>	<b>Notes/Reference</b>
Heating Type:	Gas	Gas	
Capacity (MBH):	Auto-sized	Auto-sized	
Thermal Efficiency:	90	95	

**Systems**

	<b>Reference</b>	<b>Proposed</b>	<b>Notes/Reference</b>
Suites	Fan Coil	Fan Coil	
Heating Source	Hydronic served by HW loop	Hydronic served by HW loop	
Heating Efficiency (if applicable)	N/A	N/A	
Cooling Source	Hydronic served by CHW loop	Hydronic served by CHW loop	
Cooling Efficiency (if applicable)	N/A	N/A	
Outdoor Air	Per ASHRAE 62.1	Per ASHRAE 62.1	
Airflow			
Fan Power	0.25 W/cfm	0.25 W/cfm	
Heat Recovery	No	Yes, 65% efficiency	
Other			
Residential Corridors	Per NECB Table 8.4.4.7-B - Variable Air Volume, System 6	Packaged Single Zone	
Heating Source	Hydronic served by HW loop	Gas Fired	
Heating Efficiency (if applicable)	N/A	90	
Cooling Source	Hydronic served by CHW loop	DX	

Outdoor Air

Airflow

Fan Power

Heat Recovery

Other

Offices and Residential Lobby

Heating Source

Heating Efficiency (if applicable)

Cooling Source

Cooling Efficiency (if applicable)

Outdoor Air

Airflow

Fan Power

Heat Recovery

Other

Amenities and Retail

Heating Source

Heating Efficiency (if applicable)

Cooling Source

Cooling Efficiency (if applicable)

Outdoor Air

Airflow

Fan Power

Heat Recovery

N/A	11 EER	
100%	100%	
2983 CFM	2983 CFM	
1.0 W/cfm	1.0 W/cfm	
No	No	
Per NECB Table 8.4.4.7-B System 3	Fan Coil	
Furnace	Hydronic served by HW loop	
80%	N/A	
DX	Hydronic served by CHW loop	
COP 3.45 (14 SEER)	N/A	
Per ASHRAE 62.1	Per ASHRAE 62.1	
0.25 W/cfm	0.25 W/cfm	
Yes, on lobby, 55%	No	
Per NECB Table 8.4.4.7-B System 3	Fan Coil	
Furnace	Hydronic served by HW loop	
80%	N/A	
DX	Hydronic served by CHW loop	
COP 3.45 (14 SEER)	N/A	
Per ASHRAE 62.1	Per ASHRAE 62.1	
0.25 W/cfm	0.25 W/cfm	
Yes, on 1 amenity space, 55%	Yes, 65%	

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Others

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**APPENDIX-C**  
**Better Buildings Partnership - Toronto Green Standard**  
**Thermal Energy Demand Intensity (TEDI) Documentation**

Date( dd-mm-yyyy):

23-01-2019

Project Name and Address:

Grosvenor and Grenville - 26 Grenville & 27 Grosvenor

**Peak Heating Load**

The peak heating load of the building considers energy gained or lost due to envelope conduction, internal gains, and air infiltration. Outside air ventilation loads are excluded.

eQUEST: The peak heating load of the building can be found in the LS-C report under Total Load, Heating Load

IES: Using VistaPro to look at the Room Heating Loads (.htg file), sum the "Space conditioning sensible" variable for all rooms in the model.

EnergyPlus: In 'Output Reporting - Output:Table:Summary Reports' field in the idf file of the EnergyPlus model, add the report 'Facility Component Load Summary', and find the report after simulation. Use the 'Grand Total' in the column of 'Total [W]' of the table 'Estimated Heating Peak Load Components'.

<b>Total Peak Heating Load (kW):</b>	<b>1,698.91</b>	<b>This is for both buildings, north and south</b>
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*Provide a complete summary of the annual space heating energy delivered to the building spaces.*

**Hydronic Space Heating**

The space heating energy provided by all hydronic loops in the model is summed to determine a total hydronic heating load.

eQUEST: The space heating load for each loop can be found in Report PS-D under Coil Load, Sum

IES: Using VistaPro to look at the HVAC network, select the "HWL space heating load" variable for each loop under Waterside: Hot water loops

EnergyPlus: in the 'Energy Meters - Annual and Peak Values - Other' report, use the 'Plant Loop Heating Demand: Facility' maximum value [W].

Modelled Hydronic Loop Name	Space Heating Load (GJ)	Notes / Source
<i>HW Loop North</i>	4,681.56	From PS-D report
<b>Total Hydronic Heating Load (GJ)</b>	<b>4,681.56</b>	

**Direct Space Heating (e.g. Furnace, Direct Fire, Electric Resistance, Unit Heater, Force Flow)**

The space heating energy provided by all direct heat sources in the model is summed to determine a total direct space heating load.

eQUEST: The space heating load for each heat source can be found by running an hourly report for each applicable system under Variable Type: HVAC Systems, 'Total Central/Zone Heat Coil Output' or by reviewing the SV-A report as applicable.

IES: Using VistaPro to look at the HVAC network, select the "GHS space heating load" variable for each heat source under Plant equipment: Generic Heat Sources

EnergyPlus: in the 'HVAC Sizing Summary - Zone Sensible Heating' report, use 'Calculated Design Load'.

Modelled Heat Source Name	Space Heating Load (GJ)	Notes / Source
<i>North Corridor</i>	229.61	Corridor MUA from hourly loads
<b>Total Direct Space Heating Load (GJ)</b>	<b>229.61</b>	

**Heat Pump Heating**

The space heating energy provided by all heat pumps in the model is summed to determine a total heat pump heating load.

eQUEST: The space heating load for each heat pump can be found by running an hourly report for each applicable system under Variable Type: HVAC Systems, 'Total Central/Zone Heat Coil Output' or by reviewing the SV-A report as applicable.

IES: Using VistaPro to look at the HVAC network, select the "HTL heating load" variable for each loop under Waterside: Heat transfer loops

EnergyPlus: in the 'HVAC Sizing Summary - Zone Sensible Heating' report, use 'Calculated Design Load'.

Modelled Heat Pump Name	Space Heating Load (GJ)	Notes / Source
<b>Total Heat Pump Heating Load (GJ)</b>	<b>0.00</b>	

Gross Floor Area (m2)	31,152.00
Total Heating Load (GJ)	4,911.17
<b>TEDI (kWh/m2)</b>	<b>43.79</b>



## Appendix D: Performance Targets – All Buildings

Building Archetype	Scenario	Annual Targets		
		EUI (kWh/m <sup>2</sup> )	TEDI (kWh/m <sup>2</sup> )	GHG (kg/m <sup>2</sup> )
<b>High Rise MURB</b> 30 Storeys, 243,890 ft <sup>2</sup> , 4 pipe H/C system with central plant, MUA ventilation for corridors, HRV/ERV for suites	SB-10 2017	225	80	28
	TGS v2 T1	190	77	26
	TGS v2 T2	170	70	20
	TGS v3 T1	170	70	20
	TGS v3 T2	135	50	15
	TGS v3 T3	100	30	10
	TGS v3 T4	75	15	5
<b>4-6 Storey Wood Frame MURB</b> 50,000 ft <sup>2</sup> , 4 Stories, 4 pipe H/C system with central plant, MUA ventilation for corridors, HRV/ERV for suites	SB-10 2017	235	87	32
	TGS v2 T1	198	97	28
	TGS v2 T2	165	65	20
	TGS v3 T1	165	65	20
	TGS v3 T2	130	40	15
	TGS v3 T3	100	25	10
	TGS v3 T4	70	15	5
<b>Office Building</b> 10 Stories, 200,000 sq. ft., HVAC system is typical VAV with reheat or 100% DOAS with Terminal h/c	SB-10 2017	233	84	27
	TGS v2 T1	200	82	23
	TGS v2 T2	175	70	20
	TGS v3 T1	175	70	20
	TGS v3 T2	130	30	15
	TGS v3 T3	100	22	8
	TGS v3 T4	65	15	4
<b>Retail Building</b> Single story, 50,000 sq. ft. (big box example), HVAC is Rooftop units or HRV/ERV with terminal h/c	SB-10 2017	227	100	31
	TGS v2 T1	190	75	24
	TGS v2 T2	170	60	20
	TGS v3 T1	170	60	20
	TGS v3 T2	120	40	10
	TGS v3 T3	90	25	5
	TGS v3 T4	70	15	3
<b>Mixed Use: 90% Residential, 5% Retail, 5% Commercial</b>	SB-10 2017	#DIV/0!	#DIV/0!	#DIV/0!
	TGS v2 T1	#DIV/0!	#DIV/0!	#DIV/0!
	TGS v2 T2	#DIV/0!	#DIV/0!	#DIV/0!
	TGS v3 T1	#DIV/0!	#DIV/0!	#DIV/0!
	TGS v3 T2	#DIV/0!	#DIV/0!	#DIV/0!
	TGS v3 T3	#DIV/0!	#DIV/0!	#DIV/0!
	TGS v3 T4	#DIV/0!	#DIV/0!	#DIV/0!

SB-10 (2017) was used as the baseline for all targets. GHGI targets were calculated using CO<sub>2</sub>e emissions factors from SB-10 (Table 1.1.2.2). While modeled characteristics associated with each target are based in one sample set of criteria, there are several design options that can be used. Small variations in R-values and U-values are expected. The overall intent of results is to set achievable targets, not specify design solutions. Proposed targets are not always direct outputs of models; some have been increased slightly above modeled outputs to provide a more general progression towards near net zero.