



## DESIGN DEVELOPMENT STAGE ENERGY MODELING REPORT

Grosvenor and Grenville – South Tower  
26 Grenville and 27 Grosvenor, Toronto, ON

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## EXECUTIVE SUMMARY

EQ Building Performance has created an energy model for Grosvenor and Grenville, located in Toronto, Ontario, for the purposes of TGS V3.0 Tier 1 compliance.

The project is currently on track to achieve TGS V3.0 Tier 1 compliance, using NECB 2015 as amended by Supplementary Standard SB-10 Division 3 - Chapter 3.

Table i - Savings Summary

| Metric           | % Savings | Tier 1 Compliance? | OBC Compliance? |
|------------------|-----------|--------------------|-----------------|
| Energy Use       | 20.12%    | Yes                | Yes             |
| Peak kW          | 10.70%    | Yes                | Yes             |
| Carbon Emissions | 25.04%    | -                  | Yes             |

Effective May 1 2018, version 3 of the Toronto Green Standard will come into effect. The new version of the Toronto Green Standard includes a shift from a percent better than reference building approach to new absolute targets. The Grosvenor and Grenville project has been evaluated against these targets in order to give guidance on how the current design features will fare under the new standard.

Table ii - Building Performance Summary

| Metric  | Proposed Design | Tier 1 | Tier 2 |
|---|-----------------|--------|--------|
| Energy Use Intensity (kWh/m <sup>2</sup> )            | 165.5           | 170    | 135    |
| Thermal Energy Demand Intensity (kWh/m <sup>2</sup> ) | 40.7            | 70     | 50     |
| Green House Gas Intensity (kgCo2/m <sup>2</sup> )     | 20.2            | 20     | 15     |

The key energy efficiency measures that contribute to this performance are as follows:

- 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
- ECM motors on all fan coils
- High efficiency, variable speed chillers and 95% efficiency condensing boilers

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# 1. PROJECT SUMMARY

## Building 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, underground parking and associated amenity areas. The north tower is a 39-storey tower and the south tower is a 53-storey tower. The podium and parking levels have been split between the north tower and south tower as per the architectural drawings. This report is for the south tower.

Key characteristics of the energy model are as follows:

|                  |   |
|------------------|---|
| Use/Occupancy:   | Residential / Amenity / Retail                    |
| Project Stage:   | SPA / Toronto Green Standard                      |
| Nominal Size:    | 43,551 m <sup>2</sup>                             |
| Modeled Size:    | 41,696 m <sup>2</sup> *                           |
| Suite Count:     | 505   |
| Climate Zone:    | Toronto (5A)                                      |
| Weather File:    | Toronto, ON CWEC                                  |
| Lighting Method: | Space type  |
| Key Schedules:   | MNECB G – Residential<br>MNECB C – Retail/Amenity |

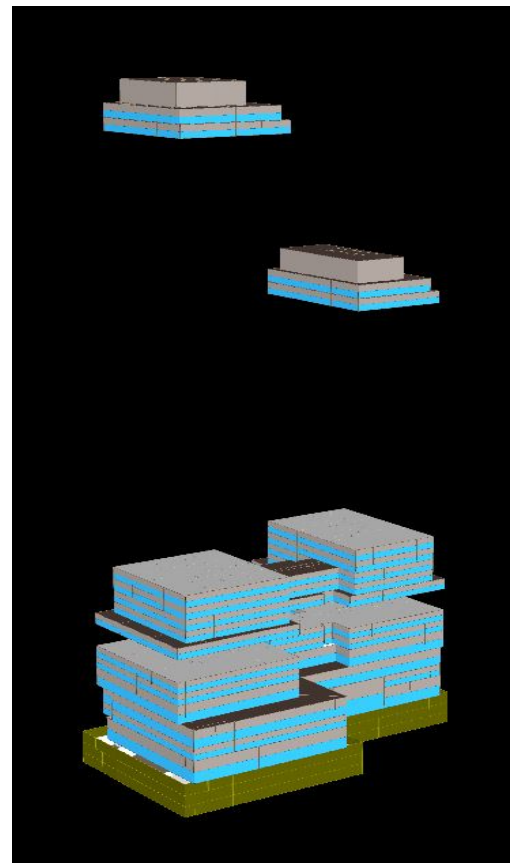


Figure 1 - eQuest Building Rendering

\*Modeled square footage may vary slightly from the actual GFA due to modeling rules that exclude certain non-heated or non-regulated spaces, exclusion of some shafts and wall cavity space, and variation in measurement techniques from official site statistics. Nominal size may equal modeled size if architectural statistics are not available.

## Project Goals:

The energy efficiency goals relevant to the project throughout its timeline are presented in Table 2. The intent of this report is to analyze only goals that are indicated below.

**Table 1 - Project Energy Efficiency Goals**

| Goal          | Requirement / Compliance method   |
|---------------|---|
| TGS Tier 1 v3 | 1. 15% reduction over OBC SB-10 Division 3 (GJ)<br>Summer & Winter peak electricity better than OBC SB-10 (kW) <b>OR</b><br>2. Meet the absolute EUI (ekWh/m <sup>2</sup> ), TEDI (ekWh/m <sup>2</sup> ) and GHGI (kg CO <sub>2</sub> e/m <sup>2</sup> ) targets. |

## 2. BACKGROUND

Building energy modeling provides a means to simulate building energy performance during the design stage of a project to quickly and effectively evaluate the impact of various design measures on building energy performance. In addition, building energy modeling allows the predicted building performance to be evaluated against key benchmarks such as the National Energy Code for Buildings (NECB), and ASHRAE 90.1.

### Relevant Terms:

|              |  |
|--------------|--|
| <b>EUI:</b>  | Energy Use Intensity (ekWh/m <sup>2</sup> )                      |
| <b>TEDI:</b> | Thermal Energy Demand Intensity (ekWh, demand of the building)   |
| <b>GHGI:</b> | Green House Gas Intensity (kg CO <sub>2</sub> e/m <sup>2</sup> ) |

The use of energy simulation software for benchmark comparison is recognized by programs such as the CaGBC's LEED Rating System, as well as to demonstrate compliance with Ontario Building Code SB-10, and Toronto Green Standard Tier 1 and 2.

EQ Building Performance has been retained to assess the building energy performance using building energy simulation software, and to suggest design alternatives to achieve optimal energy savings where appropriate.

### 3. METHODOLOGY

The building was modeled using eQuest 3-65 energy simulation software. eQuest is a widely-recognized hourly energy analysis program based on the DOE-2.2 software engine. Energy modeling was performed under the general techniques recognized in the following documents:

- NECB 2015
- Performance Compliance for Buildings, Specifications for Calculation Procedures for Demonstrating Compliance to the Model National Energy Code for Buildings Using Whole-Building Performance (May 1999);
- LEED Canada 2009 Supplementary Energy Modeling Guidelines; and
- ecoEnergy EE4 software modeling guide.

The following project specific documents were used to develop the energy model:

- Architectural drawings prepared by *Sweeny&Co Architects*; dated December 21, 2018
- Mechanical drawings prepared by *SNC Lavalin*; dated October 31, 2018

Additional assumptions may have been used to fill in gaps in information, based on modeling experience and knowledge of building systems.

## 4. RESULTS SUMMARY

A summary of the proposed building design performance can be seen in Table 3.

Table 4 provides an assessment of the building performance relative to the project goals.

|      | Proposed | Tier 1 | Tier 2 |
|------|----------|--------|--------|
| EUI  | 165.5    | 170    | 135    |
| TEDI | 40.7     | 70     | 50     |
| GHGI | 20.2     | 20     | 15     |

Table 2 - Proposed Design Summary

The results indicate that the proposed building design is **compliant with Ontario Building Code SB-10 Division 3 and TGS Tier 1.**

A detailed breakdown of energy usage can be found in Appendix A, and a detailed list of model inputs is provided in Appendix B. It is the responsibility of the design team to review these appendices and ensure all assumptions are accurate, or represent a *conservative* estimate of energy use.

Table 3 - Project Performance Summary

| Metric                | Baseline Design | Proposed Design | % Savings | OBC Compliance | Tier 1 Compliance |
|-----------------------|-----------------|-----------------|-----------|----------------|-------------------|
| Energy Use (GJ)       | 31,115          | 24,855          | 20.12%    | Yes            | Yes               |
| Peak (kW)             | 729.5           | 651.5           | 10.70%    | Yes            | Yes               |
| Carbon Emissions (kg) | 1,123,004       | 841,774         | 25.04%    | Yes            | -                 |

## 5. DETAILED SIMULATION RESULTS

Table 4- Detailed Results Breakdown

| End Use            | Baseline Energy Use (GJ) |             | Proposed Design Energy Use (GJ) |             | Savings      |
|--------------------|--------------------------|-------------|---------------------------------|-------------|--------------|
|                    | Electricity              | Natural Gas | Electricity                     | Natural Gas |              |
| Lighting           | 2,904                    |             | 2,904                           |             | 0.0%         |
| Misc. Equipment    | 2,763                    |             | 2,763                           |             | 0.0%         |
| Heating            | 35                       | 11,626      | 19                              | 6,669       | 42.7%        |
| Cooling            | 1,801                    |             | 1,516                           |             | 15.8%        |
| Pumps              | 1,085                    |             | 676                             |             | 37.7%        |
| Fans               | 3,490                    |             | 3,287                           |             | 5.8%         |
| Domestic Hot Water |                          | 7,390       |                                 | 7,000       | 5.3%         |
| Exterior Lights    | 20                       |             | 20                              |             | 0.0%         |
| <b>Total</b>       | <b>31,115</b>            |             | <b>24,855</b>                   |             | <b>20.1%</b> |
| <b>Total Cost</b>  | <b>\$644,300</b>         |             | <b>\$566,900</b>                |             | <b>12.0%</b> |

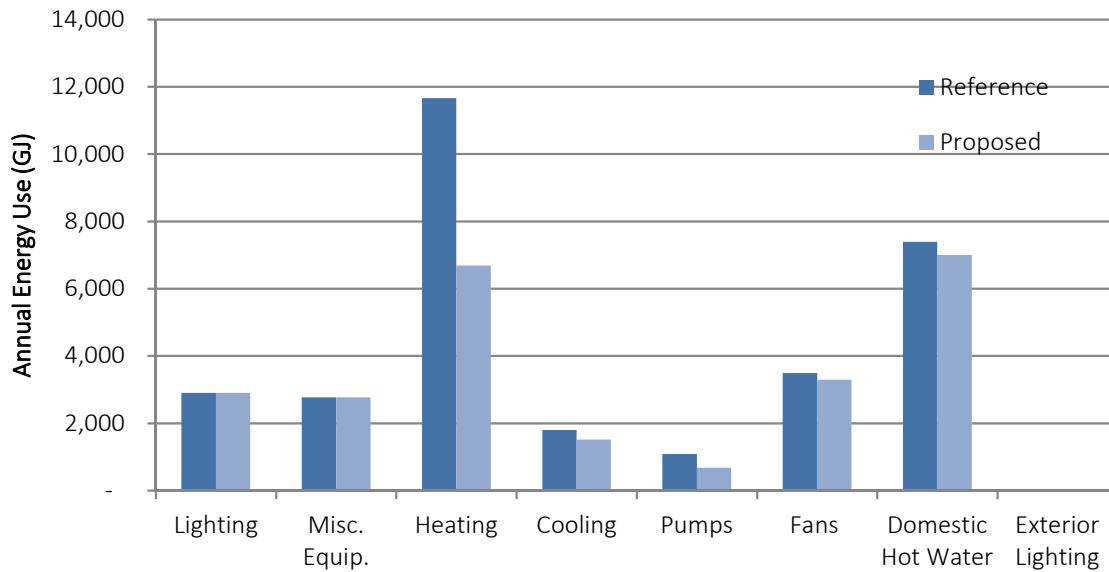


Figure 2 - Detailed Annual Energy Use (GJ)



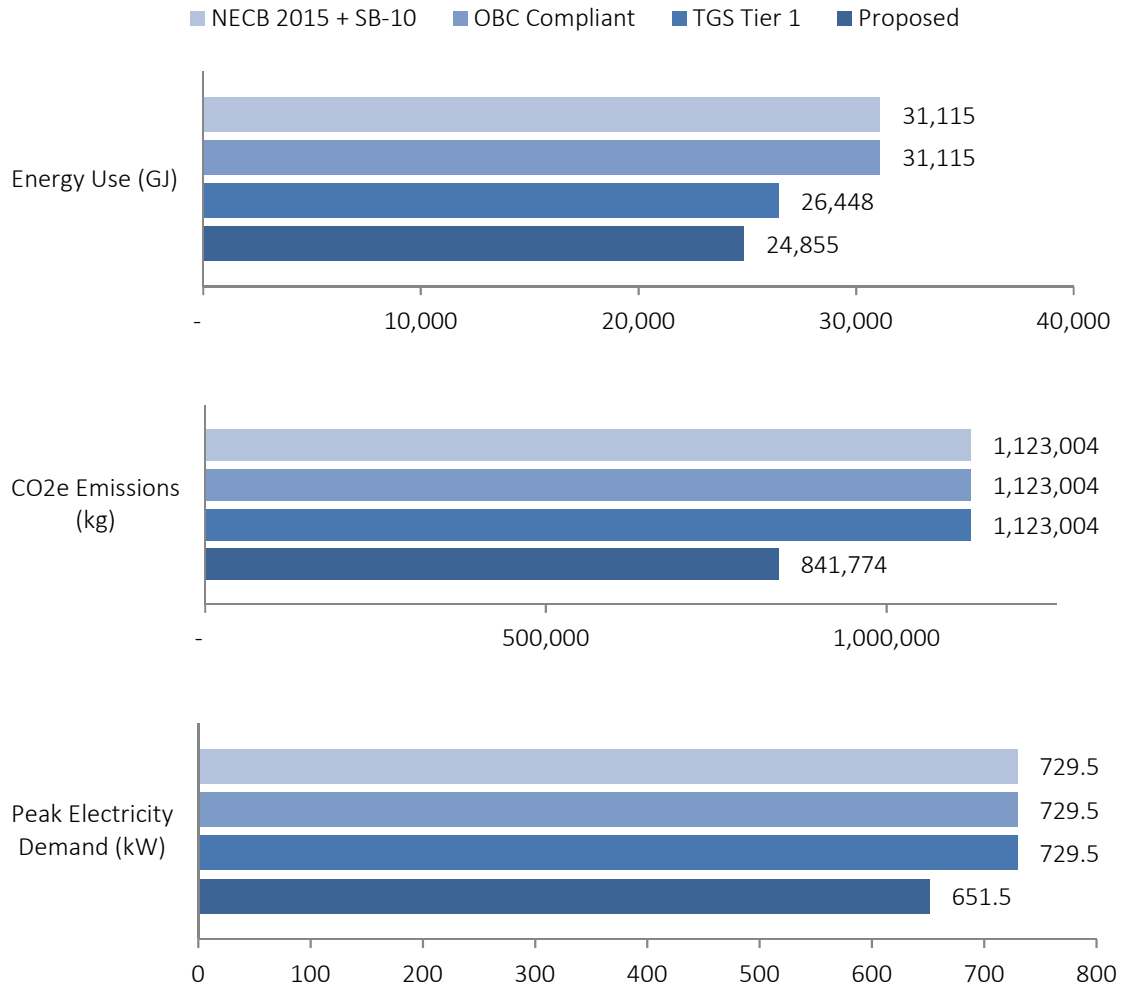


Figure 3 - Detailed Performance Analysis

## 6. RESPONSIBILITIES AND NEXT STEPS

A detailed breakdown of energy usage can be found in Appendix A, and a detailed list of model inputs is provided in Appendix B.

The ability of a building design to achieve the stated project goals remains the responsibility of the design team. The design team should review the report and appendices to ensure all inputs and assumptions are accurate, or represent a *conservative* estimate of performance.

In addition, the architect, mechanical and electrical engineer must ensure the mandatory requirements of the NECB 2015 are met with the building design. Mandatory requirements checklists will be provided by EQ Building Performance but must be filled in and signed by the design team.

Review of product submittals, shop drawings and substitutions are not within the scope of this energy modeling exercise. It is the responsibility of the project team to determine whether or not deviations from the inputs included in this report will negatively impact Ontario Building Code SB-10 compliance.

