



WATERFRONTToronto

Green Building Requirements

Version 3.0 / January 2021

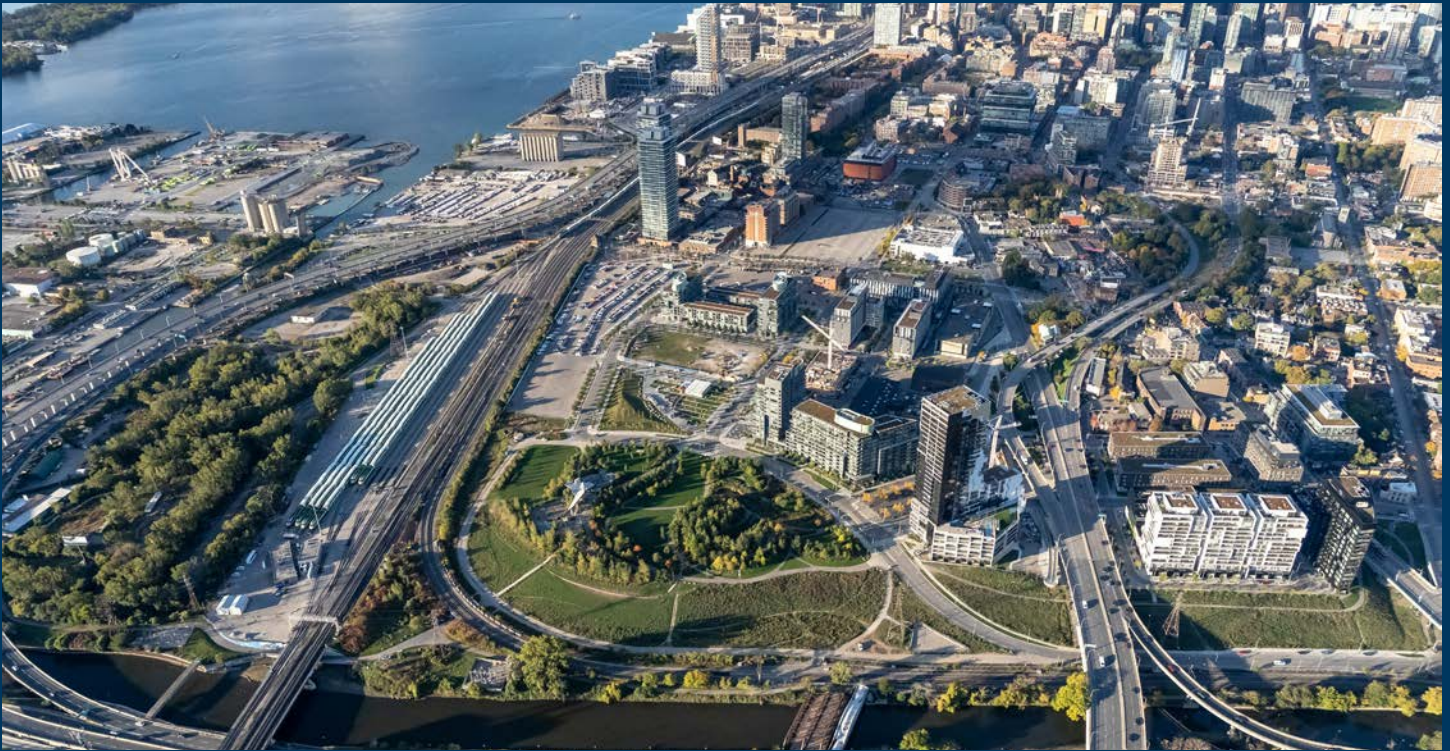


The background of the page is a photograph of a waterfront park. In the foreground, there are large grey rocks and several tall green plants with purple flowers. A wooden walkway with a metal railing runs across the middle ground. In the background, there are more trees and a clear blue sky.

LAND ACKNOWLEDGEMENT

Waterfront Toronto acknowledges that the land upon which we are undertaking our revitalization efforts is part of the traditional territory of the Mississaugas of the Credit First Nation and that Toronto is covered by Treaty 13 with the Mississaugas of the Credit First Nation (MCFN).

In addition, Waterfront Toronto acknowledges that Toronto has historically been a gathering place for many Indigenous people including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples, and is home to many First Nations, Inuit and Métis peoples today.



Context

BACKGROUND

Since 2001, Waterfront Toronto has been committed to making the city's waterfront a global model for sustainable and resilient design. One of the principle ways Waterfront Toronto supports this objective is through setting ambitious sustainability targets - promoting market transformation and widespread adoption of progressive green building standards.

To meet corporate policy objectives and achieve the goals set out in Waterfront Toronto's Sustainability Framework (2005), Version 1 of the Minimum Green Building Requirements (MGBR) was originally developed in 2005 and subsequently updated in August 2012 and November 2014.

Guided by Waterfront Toronto's new Resilience and Innovation Framework, established in 2017, this Version 3 update of the MGBR, now named the Green Building Requirements (GBR), outlines a strategy for how the built environment can address our current climate emergency, while enabling healthier, resilient and more livable cities.

VERSION NUMBERS

This document represents Version 3 (January 2021) of the GBR (previously MGBR). Compliance is required for any new development. Projects procured prior to January 2021 can continue to use MGBR Version 2.1 (January 2014), unless otherwise agreed to. The current requirements will be reviewed and assessed over time to reflect ongoing and continuous improvement and best practice.

Table of Contents



CONTEXT	4
TORONTO GREEN STANDARD	7
1.1 Achieve Toronto Green Standard, Tier 3	7
1.2 Operational Reporting Requirements	8
RESILIENCE	9
2.1 Resilience Planning	9
2.2 Community Refuge Area	11
ENERGY AND TOTAL CARBON EMISSIONS	12
3.1 Operational Greenhouse Gas Emission Limits	12
3.2 Energy Performance Requirements	13
3.3 Embodied Carbon	14
SUSTAINABLE SITES AND WATER	16
4.1 Landscaping And Biodiversity	16
4.2 Urban Agriculture	17
4.3 Rainwater Harvesting	18
TRANSPORTATION	19
5.1 Electric Vehicles	19
5.2 Bicycle Infrastructure	20
5.3 Electric Bicycle Infrastructure	22
SUSTAINABLE MATERIALS AND SOLID WASTE	23
6.1 Reducing Plastic Waste	23
6.2 Sustainable And Non-Toxic Material Specifications	24
6.3 Adaptation, Disassembly And Reuse	25
PROCESS & SUBMISSION REQUIREMENTS	27
SUBMISSION MATRIX	28



Achieve Toronto Green Standard, Tier 3



1.1

INTENT

Ensure a comprehensive suite of sustainability and energy efficiency measures are incorporated into all buildings, in alignment with the Toronto Green Standard (TGS).

REQUIREMENTS: TGS TIER 3 COMPLIANCE

1. Register for and achieve Tier 3 under the Toronto Green Standard (TGS) Version 3.

2. TGS Options: All projects must pursue and achieve all of the following TGS Optional performance measures in the project design:

- GHG 4.4 – Submetering
- GHG 5.2 – Refuge Area and Backup Generation (residential)
- EC 4.4 – Bird Friendly Glazing
- SW 1.5 – In-suite Waste Storage Space (residential)
- SW 4.1 – Sustainable Building Materials
- AQ 2.5 – Bicycle Parking Rates (residential)
- AQ 1.5 – Electric Vehicle Infrastructure
- AQ 2.6 – Public Bicycle Parking Spaces

The third-party project evaluator will review three of the above optional performance measures as part of construction stage and post-construction TGS reviews. Residential projects must also submit the Refuge Area and Backup Power Optional performance measure for review. All remaining Tier 2 Optional performance measures to be submitted for third-party review may be selected by the project team.

3. Provide Waterfront Toronto with copies of all TGS submission documents provided to the City and/or third-party project evaluator.

FURTHER GUIDANCE

- The TGS requires the selection of and compliance with three optional performance measures for Tier 2, and an additional three for Tier 3. The number of TGS Optional performance measures required under the GBR goes beyond these requirements.
- Projects that achieve Tier 2 or above are eligible for a development charge rebate from the City of Toronto.
- Version 4 of the TGS will be released in 2022. An accompanying addendum to the GBR will be issued at that time.

ADDITIONAL RESOURCES

- [Toronto Green Standard Version 3](#)
- [Toronto Green Standard, Development Charge Refund Program](#)

Operational Reporting Requirements



1.2

INTENT

Encourage ongoing improvements in energy and water efficiency, as well as waste reduction, by monitoring performance throughout the life of the building.

REQUIREMENTS

- 1. Include clear directions in the Owner's Project Requirements on the ability of the Building Automation System (BAS) to monitor building-level data representing total building energy consumption (electricity, natural gas, chilled water propane, biomass, domestic hot water, etc.) and renewable energy production.**
- 2. Enroll the project in Energy Star Portfolio Manager to track energy and water consumption and waste generation of the new development during operations.** Enrollment of the project in the program must occur before the project presents Detailed Design to the Waterfront Toronto Design Review Panel. In Energy Star Portfolio Manager, provide Waterfront Toronto's account (waterfronttoronto) with read-only access to the project.
- 3. Include direction and guidance for building operators into the building Operations & Maintenance (O&M) Manual on how to upload data into Energy Star Portfolio Manager on a monthly basis.** Beyond the TGS requirements to report annual energy, greenhouse gas emissions and water consumption, GBR requires additional reporting of waste, measured in tonnage at a building level.

FURTHER GUIDANCE

- Energy Star Portfolio Manager is an online tool for tracking energy, water and waste consumption of a building for benchmarking purposes. Monthly energy, water and waste information is combined with basic building information to determine the building's performance compared to similar building types. Performance of a project is reported in terms of overall energy use and carbon emissions.
- There is a similar Core performance measure in the TGS that requires the use of Energy Star Portfolio Manager to track energy and water consumption. This GBR goes beyond the TGS by requiring that waste/recycling information is tracked as well.
- Waste information will not be tracked by the BAS. The contract with the waste hauler should include the provision for monthly waste tracking reports including total tonnes of recycling, organics and garbage diverted. Where possible, verification that these were managed through an appropriate processing facility should be requested to ensure waste is being managed as sustainably as possible.
- The commissioning agent should assist the contractor in developing an O&M Manual. This document should also include directions for downloading the energy or water consumption data from the BAS and a description of how to enter waste, energy and water information into the Energy Star Portfolio Manager.

ADDITIONAL RESOURCES

- [Energy Star Portfolio Manager](#)
- [Portfolio Manager Demonstration Series on YouTube](#)

Resilience Planning



2.1

INTENT

Improve building resilience and flexibility in response to a changing climate and an increase in extreme weather events.

REQUIREMENTS

1. In advance of the project team presenting Schematic Design to the Waterfront Toronto Design Review Panel, provide Waterfront Toronto with a draft of the TGS Resilience Planning New Construction Checklist for their review and feedback. In the draft of resiliency checklist, the following information must be provided:

- The future weather file that will be used for the future climate energy modelling
- The methodology for assessing extreme flooding events (including lake level rise)
- The planned location of back-up power/emergency generators

2. Conduct a climate resilience assessment that identifies the main hazards of concern, their expected impacts and means of mitigating those impacts in project design. Beginning at Schematic Design, in one or more workshops with design team members and key stakeholders:

- Use projections of future climate to identify likely climate-related shocks or stresses (e.g. increases in temperatures, heat waves, prolonged heavy rainfall, etc.) and their potential impacts on building structures and systems, as well as occupant comfort and safety.
- Identify impacts that pose a moderate or high risk to the building by considering their future likelihood and consequence to the safety of building occupants, property and building operations.
- Collaboratively identify key design strategies that adequately address expected higher risk impacts.
- Demonstrate how the City of Toronto's Minimum Backup Power Guidelines for Multi-Unit Residential Buildings (MURBs) is addressed in building design for all residential projects.

3. Provide Waterfront Toronto with a resilience assessment report that includes:

- A summary of the methods and assumptions used in the assessment
- A list of participants
- A summary of expected impacts to the building's design
- An explanation of how medium and high-risk impacts are addressed in building design
- This report should be submitted as part of the GBR Final Compliance Report, together with required documentation for future climate energy modelling

FUTURE CLIMATE ENERGY MODELLING

- The energy model must be run with a future weather climate file at each iteration, beginning as early as possible, to assess how the building may respond to a changing climate. The weather file must be based on climate projections for 2050 or later.
- Provide a report of future climate energy model results with the Site Plan Approval (SPA) energy model report. Append a Future Climate Report to the energy model demonstrating how building design has been adapted to consider future climate parameters.

FURTHER GUIDANCE

- The TGS GHG 5.1 requires submission of the Resilience Planning New Construction Checklist at Construction Documentation phase. The GBR differs in that submission is required much earlier and mandates the application of a future weather file. Design teams are encouraged to address resilience from Schematic Design, to enable possible adaptation strategies to be incorporated into the design.
- Resilience assessments should be conducted with the full design team and with the support of a climate risk assessment consultant to ensure a fulsome perspective on hazards and strategies of importance.
- Guidance on climate risk assessment methodologies can be found in Infrastructure Canada's Climate Lens, ISO 14090, the PIEVC Engineering Protocol, the International Council for Local Environmental Initiatives Canada's (ICLEI) Building Adaptive and Resilient Communities (BARC) approach and others.
- Develop future climate scenarios for key hazards of concern to help ground the impact of climate-related shocks and stresses under particular circumstances (e.g. number of days over 30 degrees C).
- Future weather files must be obtained from a reputable source; see additional approved resources below. Where possible, use an RCP 8.5 file for the 2050s decade to consider the worst-case scenario and ensure the building is prepared for a future climate.
- The City of Toronto's Minimum Backup Power Guidelines for MURBs includes voluntary requirements to provide 72-hour backup power to support essential building functions and enable occupants to enter and exit the building during prolonged power outages.

GOING ABOVE AND BEYOND

- Projects are encouraged to expand the resilience assessment to consider social and/or community resilience outcomes in addition to climate and environmental resilience.
- Consider spaces to facilitate donations (and, if possible, bulk goods storage), repair, food distribution, etc. as well as flexible amenity spaces to respond to urgent or emergent needs of the community, such as emergency response activities.
- Projects should prioritize backup power systems that do not use fossil fuels, such as battery energy storage systems.

Additional Resources

- [City of Toronto Resilience Checklist](#)
- [City of Toronto, *Toronto's Future Weather and Climate Driver Study*, December 2011, SENES Consultants Ltd.](#)
- [BC Housing, *Mobilizing Building Adaptation and Resilience Design Primers*](#)
- [Government of Canada, National Research Council, *Climate-Resilient Buildings and Core Infrastructure: An assessment of the impact of climate change on climate design data*](#)
- [RWDI, *Modelling Weather Futures*](#)

Community Refuge Area



2.2

INTENT

Protect and house residents in the community who may not have adequate refuge to stay warm or cool in their home during emergency situations. Provide refuge areas for vulnerable populations including the elderly, socially isolated, those with pre-existing illnesses and young children.

REQUIREMENTS: COMMUNITY CENTRES AND INSTITUTIONAL BUILDINGS

1. Ensure community centres and institutional buildings are designed to accommodate a refuge area.

- Provide 72-hour minimum backup power to support essential building functions and enable occupants to enter and exit the building during prolonged power outages.
- The system should at a minimum provide power to a refuge area, building security systems, domestic water and sump pumps, boilers and hot water pumps, and at least one elevator.
- Ensure backup power is supplied to allow for access, space conditioning, cell phone charging, access to the internet and refrigeration of basic food necessities and medication.
- Ensure access to potable water and toilets.
- Identify the spaces and the number of people that can be accommodated. Select appropriate spaces that are accessible, allow for gathering, such as lobbies or open gymnasias, and have adequate provisions, such as community kitchens.

FURTHER GUIDANCE

- A refuge area should be a minimum size of 93 m², and/or 0.5 m²/occupant and may act as building amenity space during normal operations.
- The TGS GHG 5.2 – Refuge Area and Backup Generation includes similar requirements for providing refuge areas in residential buildings.

GOING ABOVE AND BEYOND

Consider integrating battery storage, or lower carbon fuel sources for back-up fuel sources (i.e. avoiding diesel).

ADDITIONAL RESOURCES

- [City of Toronto, *Minimum Backup Power Guidelines for MURBs*, October 2016](#)

Operational Greenhouse Gas Emission Limits

3.1

INTENT

Limit operational greenhouse gas emissions reductions and encourage use of low-carbon energy sources.

REQUIREMENTS

1. Using whole-building energy modelling, demonstrate an annual greenhouse gas intensity (GHGI) that meets the limits provided in the table below:

Building Type*	GHGI (kg CO ₂ e/m ²)
All Residential	5
Commercial Office	4
Commercial Retail	3
Mixed Use	Calculate based on area weighted average of building types above.
All Other Building Types	Discuss with Waterfront Toronto to determine requirements that are consistent with the intent of the GBRs.

Projects pursuing Canadian Green Building Council (CaGBC) Zero Carbon Buildings (ZCB) Design Certification must still achieve the GHGI target.

FURTHER GUIDANCE

- Project teams may choose to explore electrification to reduce the GHGI of the development. Electric space heating and domestic hot water systems are available in the market and often have higher efficiencies than natural gas-based systems.
- Incorporation of renewable energy production into the project can reduce carbon emissions further or even avoid carbon emissions (when electricity on site is sent back to the grid).
- The TGS GHG 1.3 also sets targets for GHGI. All projects must meet this GBR requirement, which may in some cases be more stringent than the TGS targets.

GOING ABOVE AND BEYOND

Projects may also choose to achieve zero carbon balance, in accordance with the calculation methodology outlined in the CaGBC ZCB-Design standard version 2. Any carbon offsets or renewable energy certificates used to achieve zero carbon balance must meet the requirements outlined in the ZCB-Design standard version 2.

*Note: Building Type refers to archetypes as defined in the TGS.

ADDITIONAL RESOURCES

- [C40 Climate Positive Development Program](#)
- [CaGBC, Zero Carbon Building Design Standard, Version 2, March 2020](#)
- [World Green Building Council, What is Net Zero?](#)

Energy Performance Requirements

3.2

INTENT

Improve energy efficiency, energy affordability and resilience during power disruptions by reducing overall building energy use. Encourage energy modelling early in design to inform design decisions.

REQUIREMENTS

1. Projects must achieve the Total Energy Use Intensity (TEUI) and Thermal Energy Demand Intensity (TEDI) requirements outlined in table below. Refer also to GBR requirement #1.1 Achieve Toronto Green Standard, Tier 3 to coordinate requirements.

Applicable to Projects Submitting Schematic Design to the Waterfront Design Review Panel from Jan 1 2021 to Dec 31 2024

Applicable to Projects Submitting Schematic Design to the Waterfront Design Review Panel after Jan 1 2025

Building Type*	TEUI (kWh/m ²)	TEDI (kWh/m ²)	TEUI (kWh/m ²)	TEDI (kWh/m ²)
All Residential	100	30	75	15
Commercial Office	100	22	65	15
Commercial Retail	90	25	70	15
Mixed Use	Calculate based on area weighted average of building types above.			
All Other Building Types	Discuss with Waterfront Toronto to determine requirements that are consistent with the intent of the GBRs.			

2. Buildings must meet a target equal to or less than 1.45 L/s/m² (at 75 Pa) through whole-building air infiltration testing, as conducted in accordance with the City of Toronto Air Tightness Testing Protocol & Process. At the outset of the Detailed Design phase, the project must develop an air infiltration testing plan which details the timing of construction detail reviews, envelope mock-ups, site inspections and final air infiltration testing.

FURTHER GUIDANCE

Air Infiltration: While the TGS requires projects to conduct an air infiltration test only, the GBR requirement adds the need to achieve the National Energy Code for Buildings airtightness value, a 30% airtightness improvement over a typical standard target assumption - which is more rigorous than the optional target included in the TGS. The project should develop an air infiltration testing plan which details the timing of construction detail reviews, envelope mock-ups, site inspections and final air infiltration testing. Tall buildings may consider using guarded testing in accordance with the TGS air tightness testing requirements and guidance.

GOING ABOVE AND BEYOND

Project teams are encouraged to consider pursuing a pilot project that achieves Passive House Certification or other low energy building standards, while also achieving design excellence.

***Note:** Building Type refers to archetypes as defined in the TGS.

ADDITIONAL RESOURCES

- [TGS Energy Modelling & Reporting Guidelines](#)
- [City of Toronto, Air Tightness Testing Protocol & Process – Guidance Document, May 2019](#)
- [BC Housing, Illustrated Guide – Achieving Airtight Buildings, September 2017](#)

Embodied Carbon



3.3

INTENT

Promote embodied carbon literacy and identify opportunities to reduce lifecycle carbon emissions through building material selection.

REQUIREMENTS

1. During Schematic Design, conduct a whole lifecycle carbon assessment (LCA) for the building structure and envelope in accordance with the CaGBC Zero Carbon Building Standard version 2 methodology.

- Include the following lifecycle stages, using a reference study period of 60 years:
 - Upfront Carbon (lifecycle stages A1-5)
 - Use Stage Embodied Carbon (lifecycle stages B1-5)
 - End of Life (lifecycle stages C1-4)
- Investigate low-carbon alternatives to proposed structure or envelope as part of the preliminary analysis.
- Calculate the total embodied carbon in kilograms of carbon dioxide equivalent (kg CO₂e); the total embodied carbon for each lifecycle stage; and a contribution analysis by building assembly or material type for the proposed and alternative structure.
- Complete the Embodied Carbon Reporting Template as per the Zero Carbon Building Standard version 2. Include the LCA software used, input assumptions and results of the preliminary assessment. Provide this report to Waterfront Toronto for review in advance of the project team presenting Schematic Design to the Waterfront Toronto Design Review Panel.

2. At Detailed Design, update the LCA for the proposed building structure.

- Update the estimated total embodied carbon, the total embodied carbon for each lifecycle stage and a contribution analysis by building assembly or material type.
- Update the Embodied Carbon Reporting Template and provide it to Waterfront Toronto as part of the GBR Final Compliance Report.

FURTHER GUIDANCE

- While this standard requires that an LCA be prepared at the Schematic and Detailed Design stages, the developer may wish to update the model more frequently to understand how design changes may impact embodied carbon.
- Refer to the concept-stage embodied carbon report and consider the effects of major design changes on the embodied carbon footprint of the project.
- Selection of insulation has a considerable impact on embodied carbon. Wherever possible, specify blown-in insulation instead of rigid and spray foam insulations. Expanded polystyrene, extruded polystyrene, polyisocyanurate and spray foam insulations are petroleum-based products that require significant energy to manufacture.

GOING ABOVE AND BEYOND

- Where feasible, projects may expand the scope of the LCA to mechanical systems, fit-out and/or site landscaping.
- Traditional concrete is the most widely used construction material with a significant impact on embodied carbon. Projects are encouraged to explore solutions for low carbon concrete, such as products using carbon sequestration/CO₂ injection technology.
- Consider adopting other low carbon materials including mass timber, recycled products or low carbon insulation.

ADDITIONAL RESOURCES

- [CaGBC Embodied Carbon Reporting Template](#)
- [London Energy Transformation Initiative, Embodied Carbon Primer](#)
- [RICS Whole Life Carbon Assessment for the Built Environment, 1st Edition, November 2017](#)



GEORGE BROWN
COLLEGE

Landscaping And Biodiversity



4.1

INTENT

Create landscapes that enhance native flora and fauna, minimize invasive species, and promote tree growth and the urban forest.

REQUIREMENTS

1. Plant the landscaped site area using a minimum of 75% native or biodiverse plantings (including trees, shrubs and herbaceous plants).

Specify plant species that are salt-tolerant or reduce salinity around pedestrian clearways, walkways and building entrances.

2. Develop an Operational Plan & Maintenance Manual that includes:

- Description of maintenance procedures, including techniques for reducing salt use in landscaped and naturalized areas.
- Tree monitoring plan designed to maximize the survival rates of planted trees.

FURTHER GUIDANCE

Plant species should be selected with consideration for the specific micro-climate of the waterfront, including:

- **Wind:** High winds due to the waterfront location, as well as the density and height of the built environment should be taken into account.
- **Water:** Location of several precincts within the floodplain of the Don River necessitates flood mitigation. Water tends to flow towards the lake and the hydrological regime should be studied carefully.
- **Soils:** The industrial history of the waterfront affects both soil conditions and degradation of groundwater quality.

GOING ABOVE AND BEYOND

- Where feasible, include vertical surfaces, e.g. green walls, that support biodiversity.
- Projects are encouraged to incorporate fruit bearing trees to support local food security.

ADDITIONAL RESOURCES

- [City of Toronto, *Wild, Connected and Diverse: A Biodiversity Strategy for Toronto*, September 2019](#)
- [City of Toronto, *Green Streets Technical Guidelines Version 1.0*, November 2017](#)
- [Credit Valley Conservation, *Healthy Soils Guideline for the Natural Heritage System*, June 2017](#)

Urban Agriculture



4.2

INTENT

Encourage urban agriculture and local food production, which will improve food security, create social opportunities within the neighbourhood and reduce emissions associated with food transportation.

REQUIREMENTS: RESIDENTIAL BUILDINGS

1. Provide shared garden plots as part of consolidated common outdoor amenity space.

- Garden plots must be provided for a minimum of 30% of residential units.
- Garden plots must be a minimum of 2.2 m² with a minimum soil depth of 460mm for raised beds and 200mm for intensive green roofs. Large, undivided planting areas equal in square footage to individually separated plots may be provided in cases where individual plots are not desired or suitable. Provide a minimum pathway of 46 cm in width along at least one side of the plot.

2. Provide Waterfront Toronto with a Design Narrative as part of the GBR Final Compliance Report that describes:

- The detailed design and layout of garden plots, including soil composition and maximum reach and height of planters. Include design of green roof, if applicable.
- Supporting infrastructure, including irrigation, wash station, lay down areas, storage facilities, circulation and vertical transportation for hauling of larger items (such as soil and produce).
- Incorporation of universal accessibility features.
- Microclimate studies demonstrating adequate sunlight access and wind studies.
- Inclusion of additional support facilities.

3. Develop and submit an Operational Plan & Maintenance Manual as part of the GBR Final Compliance Report that describes the following:

- Implementation, allotment, and access by residential and non-residential building occupants (if applicable), i.e. restaurants, long-term care, etc.
- Clearly defines roles and responsibilities of parties involved, including maintenance and staffing.
- Education and training programs.

FURTHER GUIDANCE

- Shared garden plots are managed by groups of individuals and residents to grow and harvest food. The harvested food is typically used by those cultivating the land.
- Shared garden plots can be provided as part of any outdoor surface. The incorporation of garden plots should enhance the overall design of that common outdoor amenity and should be considered as one of the varieties of programmed uses of those spaces.
- Shared garden plots should be located to maximize sunlight access; this will often include location on rooftops. Consideration for the microclimate at high elevations should be factored into the design, including higher winds.
- An intensive green roof can present good opportunities for urban farming and has the added benefit of synergies with stormwater management. Early coordination with green roof by-law requirements is recommended.

GOING ABOVE AND BEYOND

- Projects can explore addition and/or co-location with other food assets, such as community kitchens, on-site organics management, small greenhouses to extend the growing season, a covered outdoor space for shelter, an outdoor children's play area or facilities to support neighborhood food networks.
- Non-residential buildings are encouraged to consider opportunities for community agriculture or the incorporation of shared garden plots.

ADDITIONAL RESOURCES

- [Green Roofs for Healthy Cities. Design Guidelines for Fire, Wind Uplift and Root Repellency](#)
- [Metcalf Foundation. Scaling up Urban Agriculture in Toronto. June 2010](#)
- [Ryerson Urban Farm \(tours, workshops, training\)](#)

Rainwater Harvesting



4.3

INTENT

Minimize potable water use for sewage conveyance and/or irrigation by using treated, non-potable rainwater.

REQUIREMENTS

1. Provide a rainwater harvesting system which captures rainfall from the roof and/or site to be used to supply treated (but non-potable) water to water closets and for any sub-surface irrigation needs.

FURTHER GUIDANCE

- Currently allowable uses for harvested non-potable water includes flushing of water closets/urinals and sub surface irrigation. These uses are established under the Ontario Building Code.
- The use of a rainwater harvesting system could assist with achieving TGS credit WQ 4.4 – Water Efficient Fixtures.

ADDITIONAL RESOURCES

- [Government of Ontario, Environment and Energy, *Water Conservation Measures*](#)
- [International Living Future Institute, *On-Site Water Systems, Financial Case Studies, 2019*](#)
- [International Living Future Institute, *Living Building Challenge Version 3.1, Water Petal Permitting Guidebook, 2019*](#)

Electric Vehicles



5.1

INTENT

Encourage the adoption of electric vehicle (EV) use today and future-proof the buildings for the eventual electrification of all vehicles.

REQUIREMENTS

1. All parking spaces without electric vehicle supply equipment (EVSE) must have energized outlets or junction boxes provided that can provide power to Level 2 EVSE in the future.

2. Provide separate electrical demand metering for all EVSE infrastructure.

3. Provide an Operational Plan as part of the GBR Final Compliance Report that outlines:

- How EVSE will be metered
- How EVSE users may be charged for electricity (if applicable)
- How ownership will be distributed as not all stalls are provided stations
- Plan for future addition of charging stations, including costs, implementation plan and change of ownership scenario
- How residents, workers and visitors will be made aware of their mobility options

FURTHER GUIDANCE

- The GBR requirement differs from the TGS in the included provisions for future EVSE installation. The TGS requires an empty raceway only.
- To reduce the coincidence charging electrical demand, an EVSE Management System is encouraged.

GOING ABOVE AND BEYOND

Projects are encouraged to consider bi-directional charging for improved building resilience under conditions of power outage. If possible, explore partnerships with a carsharing company with EV infrastructure.

ADDITIONAL RESOURCES

- [City of Richmond, *Electric Vehicle Charging Infrastructure in Shared Parking Areas*](#)

Bicycle Infrastructure



5.2

INTENT

Promote active commuting as an accessible alternative transportation method. Reduce vehicle commuting, encourage daily physical activity and create equity through the provision of facilities that are safe, convenient and secure.

REQUIREMENTS

Consider the safety and security of cyclists and their property using the following strategies for both long and short-term parking:

- Monitored parking areas (i.e. use security cameras in areas visible to others in the parking area)
- All light fixtures to be tamper-proof
- Convex mirrors at blind corners
- Dedicated, cyclist-only entrances with restricted access wherever possible

Long-term parking

1. Provide a bicycle parking room that is fully enclosed and separated from other vehicle parking. Include the following:

- Dedicated bicycle-only secure access points through the use of security cards, non-duplicable keys or passcode access. Fit all doors with automatic door operators.
- Ensure the entry door and frame is constructed of steel and has “tamper proof” hinges that cannot be dislodged by the use of a wrench, screwdriver, crowbar or bolt cutter.
- Install a panic button in parking areas with a direct line to security.
- Ensure lighting in the bicycle room or locker area provides vertical illumination at floor level of a minimum level of 160 lux, with true colour and a uniformity ratio of a maximum of 3:1.

2. Ensure long-term bicycle parking located on floors other than the ground floor has easy access to an elevator, or ride-in access through a dedicated ramp separated from vehicular traffic. The ramp is to be a minimum of 3 m in width to accommodate two-way bicycle traffic, with a maximum 7% gradient.

3. To accommodate large bikes, such as cargo bikes, a minimum of 5% of the required long-term parking must be oversized spaces of 1.0 m in width by 2.4 m in length, and may not be vertical or stacked spaces.

End of trip facilities

1. The Zoning By-law mandates requirements for the quantity of changeroom and shower facilities. For non-residential building types, these facilities must also address the following requirements:

- Locate shower facilities on the ground or second story of the building for increased convenience.
- Include at least one storage locker per parking space for 50% of required long-term bicycle parking spaces. Lockers should have minimum dimensions of 450 mm in depth, 300 mm in width and 900 mm in height.
- Ensure all shower and locker rooms are secure and accessible only to appropriate personnel.

Residential buildings

- 1. Provide adequate space for residents to perform repairs and maintenance of bicycles within the storage facility space. Include space for a bike pump, bike repair stand and a bench.**

FURTHER GUIDANCE

Adding a repair/maintenance area not only adds convenience for residents, but also helps enable the reuse and repair culture of a circular economy and reduce waste by enabling residents to prolong the life of their bicycles.

Electric Bicycle Infrastructure



5.3

INTENT

Reduce single occupant vehicle (SOV) commuting, encourage low-emission transportation and future-proof the building for the wider adoption of electric bicycles.

REQUIREMENTS

- 1. 15% of the required long-term bicycle parking spaces must be equipped with a 120 V outlet located at a maximum distance of 1100 mm from the bike rack to accommodate the typical manufacture supplied power cord.**
- 2. Electric bicycle parking spaces must be 1.0 m width (minimum), and located on the ground (i.e. both wheels of bicycle on the floor).**

FURTHER GUIDANCE

- The number of electric bicycle parking spaces is included as part of the total required bicycle parking rate. The number of oversized bicycle spaces is included within the total electrical bicycle parking requirement, if the spaces meet requirements for both categories. Refer to Section 2.2.
- Label the required long-term bicycle parking spaces and electric bicycle charging spaces on architectural drawings. Electrical drawings should confirm that 120 V power will be provided to electric bicycle parking spaces.

Reducing Plastic Waste



6.1

INTENT

Prompt a shift towards reusable items, reducing the environmental footprint of retail spaces and restaurants.

REQUIREMENTS

1. Ensure that tenant agreements for retail or restaurant spaces mandate the elimination of single-use plastic waste including plastic checkout bags, straws, stir sticks, six-pack rings, cutlery and food ware made from hard-to-recycle plastics. Tenant Manuals must consider the provision of adequate space for reuse infrastructure (rather than just diversion), e.g. adequate space for sanitizing reusable goods like coffee mugs, either in the staff area or patron area of the establishment.

FURTHER GUIDANCE

The federal government is taking steps towards eliminating plastic pollution in Canada and is expected to be issuing the first stage of restrictions in the near future. This requirement will be reviewed and updated if needed, to support and align with this incoming action towards zero plastic waste.

ADDITIONAL RESOURCES

- [Government of Canada, Ministry of the Environment and Natural Resources, *A proposed integrated management approach to plastic products to prevent waste and pollution*, 2019](#)
- [Canadian Council of Ministers of the Environment, *Canada-Wide Action Plan on Zero Plastic Waste Phase 1*, 2019](#)

Sustainable And Non-Toxic Material Specifications



6.2

INTENT

To support the protection of global ecosystems and resources by specifying recycled and sustainably sourced building materials.

REQUIREMENTS

1. Include at least 5 of the 7 sustainability requirements listed below in the project product specifications:

- Concrete Mix: Minimum 25% supplementary cementitious material (SCM)
- Rebar / Structural Steel / Metal Decks: Minimum 50% recycled content
- Flooring: Meet FloorScore or USGBC equivalent program
- Paints / Coatings / Adhesives / Sealants: Meet SCAQMD rule 1113 and 1168 Low VOC content thresholds
- Plywood / Lumber: FSC certified
- Plywood: No added formaldehyde (NAF) or ultra-low-emitting formaldehyde (ULEF)
- Red List Materials: Do not use any materials from the International Living Future Institute's Red List

2. Demonstrate compliance with the sustainability specification requirements as part of the GBR Final Compliance Report.

FURTHER GUIDANCE

- Include the sustainability targets in the project specifications. Review all materials and products specified to ensure they are in accordance with the applicable requirements.
- The production of cement (an ingredient in concrete) releases a significant amount of CO₂ to the atmosphere. By including SCMs in the concrete mix the amount of cement in a mix is reduced, thereby reducing the life-cycle carbon of the concrete. In Ontario typical SCMs include slag from the steel industry.
- Flooring requirements are adopted from the LEED v4 rating system. The Floorscore standard addresses the VOC emissions from flooring materials, adhesives, and underlayments. Eligible flooring products must have the Floorscore certification.
- The South Coast Air Quality Management District (SCAQMD) regulates the amount of VOCs that are allowed in certain building products in California. The VOC content of paints, adhesives, coatings and sealants must be checked against Rule 1113 and Rule 1168 to verify the VOC content in the product is lower than the requirement in the SCAQMD rules.
- Formaldehyde can be harmful or hazardous to the human body. Selecting NAF and ULEF plywood products limits the introduction of formaldehyde to the building interior.
- The Red List contains the Worst-In-Class materials prevalent in the building industry, which contribute to polluting the environment, bio-accumulation of toxins in the food chain and harming construction or factory workers.

ADDITIONAL RESOURCES

- [International Living Future Institute, The Red List](#)
- [SCS Global Services, Understanding FloorScore](#)

Adaptation, Disassembly And Reuse



6.3

INTENT

Designing a building to support adaptation, disassembly and reuse can reduce waste and extend its useful life, providing economic and environmental benefits for builders, owners, occupants and the community.

REQUIREMENTS

1. In advance of the project team presenting Detailed Design to the Waterfront Toronto Design Review Panel, develop and provide a narrative to Waterfront Toronto describing the adaptation or disassembly plan. Key information to be provided includes:

- Drawings indicating key assemblies and structural properties
- Material specifications
- Strategies for adaptability, disassembly and reuse

2. To support flexible and adaptive buildings, projects must meet the following design guidelines:

- **General:** Use a column and slab structural system. Minimize or eliminate the use of shear walls. Lateral support to be provided by the elevator core and exit stairs only.
- **Ground floor:** Minimum 5 m clear slab-to-slab height (to underside of 2nd floor slab) and structural live load capacity minimum of 4.8 kPa
- **Typical floors above ground floor:** Provide a minimum clear slab-to-slab height of 2.75 m.
- **Above grade parking:**
 - Clear slab-to-slab height: 2.4 m (after levelling floor slopes; include a narrative describing how the design allows for levelling)
 - Structural live load capacity (slab on grade): minimum 7.2 kPa
 - Structural live load capacity after levelling (suspended slabs): minimum 4.8 kPa

3. Provide a Structural Narrative describing integration of the requirements above as part of the GBR Final Compliance Report.

Residential Buildings

1. Design the building to ensure that residential suites, which initially contain fewer than three bedrooms, can be converted or combined with other suites to form new suites that contain three or more bedrooms.

The design shall be carried out such that modifications to the mechanical, electrical and plumbing systems for the conversions will be confined to the boundary of the expanded suite (i.e. will not require entry into suites above, below, or beside the converted suite to execute the work).

FURTHER GUIDANCE

Some additional strategies to use when designing for adaptability, disassembly and reuse include the following:

- Use durable materials that are worth recovering for reuse and/or recycling. Minimize the use of different types of materials, as well as the use of finishes.
- Consider future addition of systems and technologies, including PV panels or pneumatic waste system.
- Design to allow for future maintenance, replacement or upgrading of systems. Separate mechanical, electrical, plumbing, IT systems from each other and from the building envelope to enable changes to be carried out without damaging the building.

ADDITIONAL RESOURCES

- [City of Seattle, King County, Design for Disassembly in the Built Environment, 2005](#)
- [United States Environmental Protection Agency, Best Practices for Reducing, Reusing, and Recycling Construction and Demolition Materials](#)
- [The American Institute of Architects, Buildings that Last: Design for Adaptability, Deconstruction and Reuse](#)



Process And Submission Requirements



REQUIREMENTS

1. All developments governed by Waterfront Toronto’s development agreement shall demonstrate compliance with the GBR through submitting a GBR Final Compliance Report post occupancy.

The GBR Final Compliance Report must demonstrate all requirements included in the GBR have been met to the satisfaction of Waterfront Toronto. Waterfront Toronto may, at its discretion, engage a third-party consultant to conduct a review of the documentation submitted by development teams.

2. Progress updates must be included in each Design Review Panel (DRP) presentation, which must include a summary of the strategies used to achieve GBR requirements and the team’s progress. Refer to the Design Review Handbook for additional requirements.

FURTHER GUIDANCE

An integrated design process (IDP) is recommended to ensure all project disciplines collaborate in providing effective design solutions that optimize relationships between systems. An IDP brings multiple benefits, often at a reduced cost. The process should include the following meetings and deliverables:

- Host integrated team meetings, at a minimum, at the start of each of the following stages: Issues Identification, Schematic Design, Design Development, Construction Documents and at least one meeting during construction. Waterfront Toronto should be invited to each integrated design meeting.
- Integrated meetings should include but not be limited to the following team members: Waterfront Toronto, Developer or Owner, Construction Manager, Architect, Structural Engineer, Mechanical Engineer, Electrical Engineer, Landscape Architect and, Civil Engineer, as well as specialty consultants, i.e. Sustainability Lead, Energy Modeller, and Envelope Consultant. These members should be involved from conceptual design phase.

ADDITIONAL RESOURCES

- [USGBC. *Green Building 101: What is an Integrated Design Process?*](#)
- [Green Building Alliance. *Integrated Design*](#)
- [Waterfront Design Review Panel. *Design Review Handbook v2.0. June 2019*](#)

Submission Matrix

Green Building Requirement	Submission Details	Schematic Design DRP	Detailed Design DRP	Post-Occupancy/GBR Final Compliance Report
1. GENERAL				
1.1 Achieve Toronto Green Standard, Tier 3*	Post-Occupancy Stage: - Proof of completion of TGS Tier 3 Certification Requirements			●
1.2 Operational Reporting Requirements	Detailed Design Stage: - O&M Manual - Proof of registration in Energy Star Portfolio Manager Post-Occupancy Stage: - Monthly updates to Energy Star Portfolio Manager		●	●
2. RESILIENCE				
2.1 Resilience Planning	Schematic Design Stage: - Resilience Planning Checklist - Climate Resilience Analysis - Future Climate Energy Model Post-Occupancy Stage: - Resilience Assessment Report - Future Climate Energy Report	●		●
2.2 Community Refuge Area	Post-Occupancy Stage: - Plans/drawings indicating appropriately sized refuge area and/or backup power system			●
3. ENERGY & EMISSIONS PERFORMANCE				
3.1 Operational Greenhouse Gas Emission Limits	Schematic Design Stage: - Preliminary energy model results Post-Occupancy Stages: - Updated model reports to capture design and construction changes	●		●
3.2 Energy Performance Requirements	Schematic Design Stage: - Preliminary energy model results Post-Occupancy Stage: - Updated model reports to capture design and construction changes - Air infiltration testing plan, including final test results.	●		●

Green Building Requirement	Submission Details	Schematic Design DRP	Detailed Design DRP	Post-Occupancy/GBR Final Compliance Report
3. ENERGY & EMISSIONS PERFORMANCE (CONTINUED)				
3.3 Embodied Carbon	All Stages: - LCCA reporting template	●	●	●
4. ECOLOGY, BIODIVERSITY & WATER				
4.1 Landscaping And Biodiversity	Post-Occupancy Stage: - Landscape drawings clearly indicating native/biodiverse planting areas - O&M Manual highlighting strategies to preserve plantings			●
4.2 Urban Agriculture	Post-Occupancy Stage: - Landscape drawings clearly indicating shared garden plots - Garden design narrative - O&M Manual highlighting allocation, maintenance, and support programs to be involved			●
4.3 Rainwater Harvesting	Post-Occupancy Stage: - Drawings indicating the rainwater harvesting system - O&M Manual highlighting allocation, maintenance, and support programs to be involved			●
5. TRANSPORTATION				
5.1 Electric Vehicles	Post-Occupancy Stage: - Plans/drawings indicating spaces with planned or future EVSE infrastructure - Operational Plan outlining EVSE strategy			●
5.2 Bicycle Infrastructure	Post-Occupancy Stage: - Plans/drawings indicating required bicycle infrastructure			●
5.3 Electric Bicycle Infrastructure	Post-Occupancy Stage: - Plans/drawings indicating required bicycle infrastructure			●

Green Building Requirement	Submission Details	Schematic Design DRP	Detailed Design DRP	Post-Occupancy/GBR Final Compliance Report
6. SUSTAINABLE MATERIALS & SOLID WASTE				
6.1 Reducing Plastic Waste	Post-Occupancy Stage: - Tenant lease agreement mandating the elimination of single use plastics			●
6.2 Sustainable Materials	Post-Occupancy Stage: - Sustainable Materials Plan and specifications - Documentation of responsible extraction criteria (e.g. FSC certification, recycled content declaration, etc.)			●
6.3 Adaptation, Disassembly And Reuse	Detailed Design Stage: - Narrative describing the project adaptation/disassembly plan Post-Occupancy Stage: - Structural narrative detailing the incorporation of the flexible building guidelines		●	●

* TGS documentation shall be submitted to the City and/or third-party verifier, with copies of all documentation provided to Waterfront Toronto