

TOWN OF HALTON HILLS GREEN DEVELOPMENT STANDARDS V3

BACKGROUND REPORT

March 24, 2021



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INTRODUCTION

The Town of Halton Hills engaged RWDI to help update their Green Development Standards (GDS). The original version of the Green Development Standards (GDS) was introduced in 2010 and subsequently updated in 2014 to include industrial, commercial, institutional and multi-unit residential buildings. This most recent update to the Standards is version 3. GDS v3 will be applicable to all developments and major additions subject to an Official Plan and/or Zoning By-law Amendment, Draft Plan of Subdivision, or Site Plan Control approval as of June 15, 2021. The intent of this background report is to summarize the work undertaken to inform the development of the GDS v3.

GDS v3 has been put in place to further elevate the sustainability performance of new developments in Halton Hills, and to ensure alignment with current best practices in sustainable building and development. The Town of Halton Hill's Climate Change Emergency Declaration issued in May 2019, which established community-wide net-zero carbon goals, is a key priority that has shaped GDS v3. Given this, while GDS v3 builds on the successful tenets of the previous versions, it puts increased weight on measures that reduce the greenhouse gas intensity of developments. This change will ensure that new developments are aligned with the Town's strategy for responding to climate change, which forms an integral component of the Town's overall strategy for striving towards net-zero energy.

The measures incorporated into GDS v3 were established through: a review of relevant industry standards and guidelines; a review of other municipal green development standards across Canada; and several rounds of consultation with various private and public sector stakeholders.

GDS v3 has also been developed to work with, and build upon, existing legislation and policy (e.g. Ontario Building Code, Provincial Policy Statement, The Planning Act, A Place to Grow: The Growth Plan for the Greater Golden Horseshoe, Made-in-Ontario Environment Plan) and existing municipal and provincial goals and priorities.



METHODOLOGY

The criteria for GDS v3 has been developed through the following key steps:

1. Document Review: Background analysis, including a review of exiting industry standards and municipal green development guidelines;
2. Stakeholder Engagement: Multiple rounds of consultation with industry stakeholders;
3. Deliverables: Consolidation of findings into 2 key deliverables: the standard itself; and this background report; and
4. Implementation: Engagement of Town staff and industry stakeholders to introduce the standards.

Initial Document Review

The first step in creating GDS v3 was to review and gain a complete understanding of the following:

- Applicable Provincial and Municipal policies and guidelines;
- Comparable municipal and provincial green building standards (e.g. Town of Oakville, Town of East Gwillimbury, City of Pickering, the City of Toronto, Town of Whitby, Cities of Brampton and Vaughan and the Town of Richmond Hill);
- Non-governmental green building standards and certifications (e.g. LEED, CAGBC's Zero-Carbon Building Standard, Living Building Challenge, Passive House);
- Best practices in high performance construction; and
- The Town's development application review procedures.

At the beginning of this effort, a preliminary list of documents was identified based on the experience and knowledge of the Town and RWDI; this list was then expanded as various stakeholders were engaged in the process. The following list outlines the documents that were reviewed as part of this exercise:

- Arts and Culture Master Plan
- British Columbia Energy Step Code
- City of Pickering Sustainable Development Guidelines
- Climate Change report prepared by the Town's Environmental Advisory Committee
- Community Sustainability Strategy
- Credit Valley Conservation Authority – Plant Selection Guideline
- Credit Valley Conservation Authority Low Impact Development Design Standards
- Credit Valley Conservation's Watershed Planning and Regulation Policies
- Cycling Master Plan
- Green Plan
- Leadership in Energy and Environmental Design (LEED) - v4
- Low Impact Development design guidelines prepared by the Credit Valley Conservation Authority
- Made-in-Ontario Environment Plan
- Mayor's Community Energy Plan
- Metrolinx Regional Transportation Plan



- Official Plan and approved Secondary Plans
- Ontario Building Code
- Ontario Growth Plan
- Ontario Municipal Act
- Pedestrian Charter
- Provincial Policy Statement
- Richmond Hill Sustainability Metrics Report
- Subdivision Development Guidelines
- The Planning Act
- The Strategic Plan
- The Town of Halton Hill's May 2019 resolution that was unanimously passed declaring a climate emergency
- Toronto Green Standard – v3
- Toronto Region Conservation Authority – Preserving Healthy Soil 2012
- Town of East Gwillimbury Site Plan Sustainability Metrics
- Town of Halton Hill's Corporate Sustainable Building Policy
- Town of Oakville Sustainability Strategy 2018
- Transportation Master Plan
- Vision Georgetown Secondary Plan

This document review was a critical step in the development of GDS v3 to ensure the new Standards supplemented existing municipal plans and policies, without redundancy or contradiction of existing development requirements. Through this process, GDS v3 aims to build on all existing legislation, plans, and procedures – thereby raising the bar for new developments moving forward. RWDI and the Town do, however, recognize that because every development site is different and legislation is always changing, conflicts between the GDS v3 requirements and those of other authorities having jurisdiction could arise. Should this occur, GDS v3 has asked that the development team point the Town and the other authority having jurisdiction to the conflict. These parties would then identify the appropriate site-specific approach in collaboration with the development team, which in most cases would see the most stringent of the requirements prevailing.

Building on the document review, a stakeholder engagement process was also designed and implemented with the following goals:

- To increase awareness for GDS v3 and the work that was being undertaken to update it;
- To build, inform, and refine the vision for GDS v3;
- To identify the main concerns and priorities of the various stakeholder groups; and
- To share the core tenets and intent behind each proposed measure in a collaborative environment so that the feedback could be gathered on the function and feasibility of each measure.

Establishing the Stakeholder Engagement Strategy

We knew early on that the stakeholder engagement process would need to utilize a variety of techniques to reach both broadly and deeply.



Broad engagement techniques were used to target individuals and groups who have a stake in the outcome of the study and resulting GDS, but who have less formal responsibility in implementing it than Town staff or the development community. An example of this broad engagement was the presentation of the proposed GDS requirements and survey posted to the Let's Talk Halton Hills website.

Deep engagement techniques were used to target individuals and stakeholders who will play an active, formal role in implementing the GDS (i.e., primarily Town staff, other interested authorities having jurisdiction, developers, designers, and consultants). The objectives of this deep engagement were to build capacity relative to the GDS, its vision, and its key concepts; to test the core tenets of the GDS; and to use any received input to shape the GDS. The deep engagement techniques used included one-on-one stakeholder interviews, presentations with long Q&A sessions, and collaborative working sessions.

The main engagement activities and events, including key feedback received at each stage, are summarized on the pages that follow.

Early Engagement Calls

Early engagement involved nearly 30 phone interviews in Fall 2019 with individuals that represent, or that can be categorized within, the following groups:

- Town departments that could be impacted by, or be responsible for enforcing, the Standards;
- Leaders from other towns and municipalities in Ontario that have in place, or that are currently working on, similar green development requirements; or
- Leaders from other agencies that have complementary policies or overlapping interests (e.g. Halton Region, Credit Valley Conservation, Halton Hills Hydro).

Most of the phone interviews were between 30 and 45 minutes. Some key themes from these calls included:

- Make the GDS less of an afterthought – find a way to bring it to the beginning of the design and approvals process;
- It is difficult to understand, track, and enforce the GDS when every project has a totally different set of requirements that it has committed to;
- It will be important to educate Town staff on the requirements when it's rolled out; and
- It would be better to prioritize a few high-impact things, rather than giving too many options.

These interviews were especially effective in: identifying the biggest opportunities, challenges, and concerns of an updated Standards; establishing the direction of additional research and outreach; and identifying a smaller group of key individuals who are passionate about the environment and/or the development industry, and who want to ensure their voices are heard throughout the evolution of the Standards.

Steering Committee Meeting

A two-hour Steering Committee meeting was held in January 2020 to present the initial direction of the GDS update, and to solicit feedback from municipal representatives. Members from the Credit Valley Conservation Authority were also in attendance. RWDI presented the effort conducted to date and the proposed sustainability targets based on the document



review and the calls that had been conducted. Half of the meeting was devoted to RWDI's presentation and the other half was allotted for discussion and feedback with the committee members. The discussions were focused on:

- The development application process;
- The need for verification of the GDS relevant elements included in development applications;
- Training required for municipal staff so that they can assess a given development's adherence to the GDS;
- Challenges and other considerations related to the proposed targets; and
- Areas where additional research and consultation were required.

Following this larger steering committee meeting, research and individual interviews were conducted with certain stakeholders to address the considerations raised at the January 2020 meeting.

Coming out of this steering committee meeting was an early draft structure and set of proposed requirements that were now ready to share with the development community for feedback.

At this point in the process, the proposed Standards were a set of approximately 10 measures with requirements that were going to be mandatory for each development.

1st Halton Chapter BILD Meeting

Now that the Town's priorities, development procedures, and ideal implementation frameworks were understood; it was time to shift the focus of the engagement to the development community's needs.

On June 1, 2020, RWDI and Town staff joined the Building Industry and Land Development Association (BILD) Halton Chapter's monthly meeting to discuss the plan for rolling out GDS v3, and to present an early draft of the proposed measures that were currently being contemplated. The presentation lasted about 25 minutes, and left about 35 minutes for open discussion where a lot of important feedback was received. An online survey was also created and distributed to the Chapter's members prior to the presentation to give everyone an opportunity to review the proposed requirements beforehand, as well as a venue to provide feedback anonymously. On June 23, 2020, BILD provided a formalized response to the initial GDS v3 engagement session in the form of a joint letter with the Residential Construction Council of Ontario (RESCON).

A lot of important feedback was received through this engagement, including:

- Advocacy for the Town to consider a voluntary participation program instead of a mandatory one.
- Questions as to why the GDS is needed at all given the advances the OBC has made over the last decade. There was a belief that the OBC already has the most up-to-date practices, and that because it is already a valued and relevant tool to the development industry, there is no need to surpass these regulations.
- The critical importance of economics and affordability, including confirmation that any added development costs associated with sustainability requirements would ultimately be passed onto the eventual purchases / renters of those structures, which could further challenge affordability.
- Questions as to why the GDS targets only new developments when existing buildings make up such a large part of the Town's carbon emissions.
- Concern that sufficient input had not yet been gathered from the development community and field experts to inform the initial draft of the standards.



Online Presentation and Survey

In July 2020, RWDI and the Town posted a 15-minute presentation of the currently proposed GDS v3 measures on the Town's Let's Talk Halton Hills online platform for approximately 4 weeks. The link to this content was circulated to seventy individuals representing a large and diverse cross section of developers, architects, mechanical and electrical engineers, planners, sustainability consultants, conservation authorities, and policy and program leaders that both do work predominantly in the Town and elsewhere across Southern Ontario. The survey only attracted about a dozen respondents, and while not anywhere close to a representative sample of the stakeholders, the individuals that did respond overwhelmingly felt that the energy efficiency and water efficiency measures being proposed were "not difficult / measure aligns with current best practice". The solar readiness measure currently contemplated at this stage was the only measure within the energy and water category where the majority of the respondents felt went above current best practice.

Town Staff Meeting with Southwest Georgetown Landowners Group

On July 27, 2020, Town staff had a conference call with members of the Southwest Georgetown Landowners Group ("Group") to get their feedback on the currently proposed priorities and structure of GDS v3, and to inquire what type of engagement would be most desirable to them moving forward. Key feedback and recommendations from the Group included:

- Aligning the measures with existing provincial and federal construction standards (e.g. OBC).
- The importance of demonstrating a cost-benefit to future homeowners for green development measures.
- Allowing for an overall community-based approach, where the achievement of measures can be demonstrated at a community scale (rather than each individual parcel within the community), to increase flexibility.
- Re-balance the point system to reflect the cost of implementation.
- Provide incentives to promote implementation, and to support the incremental cost impact associated with requirements.
- Need to resolve the potentially conflicting objectives of the GDS with the Town's recent parking needs assessment study.
- Increasing the potential points associated with the innovation category.
- Concern over the originally proposed solar ready measure, and instead recommending that measures be reworked to promote solutions like geo-exchange, EV vehicles, and battery storage.

2nd Halton Chapter BILD Meeting

In August / September 2020, RWDI and the Town had another meeting with members of BILD's Halton Chapter. In this meeting, RWDI and the Town provided a response to the inquiries and concerns outlined in the June 23, 2020 letter they provided in collaboration with RESCON. A summary of the changes made to the currently proposed GDS v3 structure and requirements was also presented by RWDI. Key feedback and takeaways from the session included:

- Importance of demonstrating a proven cost-benefit to future homeowners, and a recommendation that a cost benefit analysis be provided.
- Recommendation that the standards not go above OBC requirements, and to instead make the GDS voluntary.
- Concern that the GDS will add an additional layer to the development review process, potentially causing delays.
- Recommendation that the town use incentives as a means to encourage developments to meet the requirements.



Round of Feedback from Internal Stakeholders on GDS Draft 1

After the above rounds of feedback, several refinements were made to the GDS, and an updated version was circulated to Town staff, as well as representatives from other authorities in the region that could also be impacted by the proposed measures (e.g. Halton Hills Hydro, Conservation Halton). Suggested edits were received directly in the document from nearly a dozen individuals, and several calls were setup to walkthrough the comments to ensure everything was understood.

Town Staff Meeting with Southwest Georgetown Landowners Group

On March 8, 2021, Town staff had a second conference call with members of the Southwest Georgetown Landowners Group ("Group") to get their feedback on the most recent version of the GDS v3. Key feedback and recommendations from the Group included:

- That the Town be open to allowing some measures to be demonstrated on the larger neighborhood scale instead of single lots (e.g. to include a photovoltaic array being provided on a school, implementing low impact development or stormwater management ponds on an adjacent school site).
- Concern that if the GDS checklist is to be required at the draft plan stage, many developers wouldn't have enough information at that time to complete all aspects of the checklist (e.g. energy efficiency).
- Concern that some developments would be penalized for not being close to transit under the transportation demand management measure.

The comments received throughout the above presented engagement process ultimately led the evolution of the GDS through nearly a dozen draft iterations throughout all of 2020 and early 2021. While not all recommendations that we received were ultimately worked into the standards, every comment was carefully considered and contemplated amongst the consultant team and in collaboration with the Town.



STRATEGIC GOALS

Official Plan

The Town of Halton Hills adopted their Official Plan in March of 2008 and consolidated the document in May of 2019. This Plan outlines the strategic vision for the development of the community out to 2031 and highlights the community's priorities for development and municipal planning. It is of course critical that these priorities align with GDS v3, and that the measures within GDS v3 help the community achieve these strategic goals. Some key goals included in the Official Plan which align with the GDS v3 are:

- The protection of ecological systems, including natural areas, features, and functions;
- The supply, efficient use, and conservation of energy and water;
- The adequate provision and efficient use of communication, transportation, sewage and water services, and waste management systems;
- The orderly development of safe and healthy communities; and
- The promotion of development that is designed to be sustainable, to support public transit, and to be oriented to pedestrians.

Net-Zero Goal

In May of 2019, the Town of Halton Hills joined many municipalities across Canada in declaring a climate emergency, and at that time formalized its commitment to climate change mitigation and adaptation. The Town's Community Energy Plan and Climate Adaptation Plan outline the specific goals sought by the Town, including the desire to be a Net-zero community by 2030.

In response to this goal, the GDS v3 acts to reduce greenhouse gas intensity, promote energy efficiency, and encourage on-site renewable energy generation by specifying minimum energy performance levels that new developments must meet. The GDS v3 measures currently balance aggressive emission reductions with feasibility: they lay out the steps towards improving energy efficiency towards the Net-zero goal, but the anticipated trajectory of the energy requirements within it are not yet targeting the Town's goal of Net-zero by 2030. While the measures aid in the overall goal of reducing the community's greenhouse gas footprint, their success depends on both: putting in place suitable economic incentives to encourage, and make feasible, the levels of performance that would be needed; and the subsequent enforcement and verification of those energy performance thresholds.

Even without additional economic incentives, GDSv3 identifies the incremental steps the Town needs to take towards its goal of Net-zero, not least so the development industry can scale up its implementation of greenhouse gas emission reduction measures in parallel.

Economic Growth

Enticing businesses to operate and build within the Town of Halton Hills is a key strategic objective of its Official Plan. Organizations and individuals seeking economic opportunity must not face barriers when they choose the Town of Halton



Hills for development. Attracting and retaining these organizations and individuals is critical to economic growth and development within the Town.

Part of the economic growth plan for the Town of Halton Hills involves encouraging commercial and industrial development in the Premier Gateway Employment Area Phase 1. Development of the Employment Area Phase 1 is slated to begin in 2021, being divided into two sub-phases. Part of this development will be occupied by the Prestige Industrial Area, aiming to bolster industry within the region. Permitted uses of this developed area include:

- Business and professional offices in free-standing buildings;
- Industrial uses within wholly enclosed buildings (manufacturing, assembling, processing, fabricating, warehousing, distribution facilities);
- Computer, electronics, and data processing facilities;
- Research and development facilities excluding those that produce biochemical wastes;
- Printing and associated establishments; and
- Industrial malls.

Selecting the appropriate green development measures for industrial buildings can differ substantially from those that would be best suited for a residential or commercial development. With this variety in design and construction best practices, financial models, ownership structure, and operations comes a range of energy and water needs. This of course then warrants measures that are either custom to each type of possible development, or universal and flexible enough that they do impose unobtainable restrictions on a unique building typology like industrial.

The Official Plan's economic goals also include the attraction of new businesses and expansion of existing ones currently in the municipality. To do this, a designated Employment Area has been designed in order to facilitate these types of applications. Several relevant articles include:

- Ensure that there are sufficient lands available for the creation of diverse employment opportunities at strategic locations;
- Ensure that the Town is positioned to accommodate new and expanded business activities that provide jobs to residents;
- Ensure that new industrial development occurs in an orderly manner and in conjunction with the establishment of appropriate sewage and water services;
- Streamline the approval process for the development and expansion of employment uses; and
- Promote intensification and increased densities in new and existing employment areas, by facilitating compact, transit-supporting built form and minimization of surface parking.

The increasing economic activity and development expected within the Town will require robust and effective measures implemented now in order to ensure that the sustainability goals of the Town remain within reach. Furthermore, ensuring a fairly consistent, universal, application of impactful and important sustainability measures across all forms of commercial, residential and industrial development is anticipated to achieve better outcomes for the Town to ensure that unique developments do not fall between the cracks.



LEGISLATIVE & POLICY CONSIDERATIONS

In the Province of Ontario, the Municipal Act, the Planning Act, and the Provincial Policy Statement provide the underlying policy framework that supports the development and application of green development standards at the municipal level. In this way, municipalities can encourage and achieve a higher-performing built environment than that which would be achieved by Provincial policy alone.

Ontario Planning Act

The Ontario Planning Act provides a framework and legislative authority for municipalities to engage in land-use planning by creating Official Plans, Zoning By-laws, and Community Improvements Plans. It also requires that municipal land-use decisions are consistent with the Provincial Policy Statement, and that they give regard to matters of Provincial interest. Section 2 of the Planning Act lists these interests, some of which include the conservation of natural resources and the efficient use of energy and water.

Section 41 of the Planning Act also provides municipalities with authority to mandate sustainable urban design, including exterior sustainable design features, through the site plan control application process. As such, through site plan control, a municipality can influence the design of sites and the external building design details to achieve outcomes that go beyond what the Ontario Building Code (OBC) by itself would achieve.

Municipal Act

The Municipal Act is the primary piece of legislation that sets out the roles and responsibilities of Ontario's municipal governments, giving municipalities a broad range of powers. Recent updates to the Municipal Act (e.g., Section 97.1) have provided additional clarity on a municipality's ability to develop green development standards, and to pass by-laws around environmental well-being and climate change.

Ontario Building Code

The Ontario Building Code (OBC) establishes technical requirements and minimum standards for building construction. The OBC's main purpose is to ensure public safety by requiring uniform building standards, and it is for this reason that many municipalities have argued that they cannot rely solely on OBC minimum requirements to achieve their environmental goals.

Official Plans

An Official Plan describes the municipality's policies on how land in their jurisdiction is to be used. Official Plans are to be created with input from the community to ensure that they meet the community's needs.

The Town of Halton Hills has a well laid out Official Plan that is consistent with the requirements of the Provincial Policy Statement. The Town's Official Plan encourages a mix of employment and housing uses: to promote compact form, use of public transit and alternative forms of transportation; to conserve and manage natural resources; to address the supply,



efficient use and conservation of water and energy; to minimize waste; to minimize stormwater volumes and contaminant loads; and to maintain or increase the extent of vegetative and pervious surfaces.

For municipal level green development standards to be put in place, it is required that language on these standards is included in the Official Plan through an Official Plan Amendment or through the Official Plan review process. In 2014, the Town of Halton Hills incorporated language into the Official Plan to require the submittal of the Green Development Standards Checklist.



GDS V3

These categories cover similar sustainability metrics to those followed by other industry guides and municipal green development standards. However, the Town of Halton Hills GDS also has some key differences. With the overarching goal of keeping the updated GDS simple, measurable, and actionable, a smaller number of measures were ultimately selected for inclusion. To ensure that innovation isn't stifled, we have also prioritized the use of performance over prescriptive measures wherever feasible. A points-based system has also been selected with the objectives of giving higher weight to the measures that reduce emissions, while also allowing more flexibility to the development community.

Justification for GDS v3 Structure

The first structural change from previous versions of the GDS, is that GDS v3 has far fewer requirements. Instead of providing a whole list of options, GDS v3 has instead prioritized fewer measures that are anticipated to have the greatest positive impact on the Town's built and natural environment. This change is anticipated to:

- Better ensure that only measures that directly advance the Town's goals and priorities are chosen by the development community;
- Make it easier for the development community to understand the requirements; and
- Make it easier for the Town to track, document, and confirm alignment with the measures.

The second structural change was an intentional shift away from prescriptive measures, towards more flexible performance-based requirements. While the GDS v3 measures may result in the development community having to engage a larger consultant team than the previous version to complete the performance-based calculations, this framework better ensures that innovation isn't stifled, and that more flexibility is available to the development team.

The third structural change was a move away from several sets of GDS frameworks, to just one framework that can be universally applied to the Town's diverse development locations, sizes, and typologies. Selecting the appropriate green development measures for industrial buildings can differ substantially from those that would be best suited for a residential or commercial development. With this variety in design and construction best practices, financial models, ownership structure, and operations comes a range of energy and water needs. This of course then warrants measures that are either custom to each type of possible development, or universal and flexible enough that they do not impose unobtainable restrictions on a unique building typology. GDS v3 has been structured to allow for universal application, with the primary intent of making it easier for both the development community and the Town to understand, document, track, and validate GDS measures consistently across the Town. Prioritizing fewer high-impact measures, and making most of them performance based, also helps ensure that enough flexibility is built into the standard to allow for this universal application.

It was also decided that a points-based system similar to GDS v2 would be maintained for GDS v3. This allows for more flexibility to the development community, and also gives GDS v3 the ability to give higher point weighting towards measures that have the greatest positive impact on reducing the carbon intensity in the Town.



Justification for GDS v3 Measures

The GDS must continue to be a mechanism to reduce energy and water use, promote low impact development, nurture and protect natural ecological systems, and create a built environment that is more resilient to the shocks and stresses of climate change. The GDS must also support the diverse goals of the community, including the targets established in the Official Plan and Town Council's May 2019 Climate Emergency declaration. The measures selected for GDS v3 all support these goals. Crucially, however, the measures must also strike the right balance between the needs of improved sustainability, and those of feasibility, economics and affordability.

The context behind the measures and their performances thresholds that were selected for GDS v3 are discussed throughout this section. All of the measures selected were informed from other municipal sustainability standards, non-profit organizations, and recommended provincial guidelines in order to create a bespoke set of criteria that are appropriate for development within the Town of Halton Hills.

GDS v3 consists of 12 measures, that are organized into 5 categories:

1. Energy & Water
2. Ecology
3. Resiliency
4. Transportation
5. Innovation

Each measure has points associated with it. To be compliant with GDS v3, all new developments and major additions that submit a rezoning, subdivision, or site plan control application must demonstrate achievement of at least 20 points.

The pages that follow list some of the rationale and applicable resources for each measure. Additional detail on the requirements and submission documentation for each measure can be found within the GDSv3 document itself.



Energy & Water

1.1: Energy Use Reduction

This measure requires the developer to demonstrate a reduction in energy use over code minimum with an energy model reflecting the proposed design. For low-rise residential buildings (i.e. those that fall under OBC's Part 9), the minimum requirement to achieve points is a 10% reduction from Supplementary Standard SB-12. For all other buildings (i.e. those that fall under OBC's Part 3), the minimum requirement to achieve points is a 15% reduction from Supplementary Standard SB-10.

The Town of Halton Hills' focus on reducing greenhouse gas emissions requires the inclusion of an energy-use reduction metric for new developments. Two pathways have been suggested: one comparing energy use to the current Ontario Building Code requirements; the other aligning energy use with on-site renewable energy generation potential.

This two-pathway approach was chosen for its flexibility; although requiring renewable energy to produce a certain portion of a building's energy is ideal, for some developments it is simply unfeasible. As such, incorporating a second option, one following the current Toronto Green Standard metrics, is to design buildings with higher efficiency than a code-compliant reference model.

As more developments begin benchmarking their energy metrics, this comparison-based analysis will become more accurate. Currently, the 15% better than SB-10 pathway follows similar municipal level green standard approaches (e.g. the Toronto Green Standard), to incrementally improve energy efficiency without significantly altering the economic feasibility of that development.

In the City of Toronto's Zero Emissions Building Framework, which forms the background of the Toronto Green Standard's energy performance requirements, the economic implications of higher performance buildings were quantified in a costing exercise. That study estimated a construction cost premium for reaching performance 15% better than SB-10 2017 requirements to be around:

- 0.5% for multi-unit residential building that fall under Part 3 of the OBC;
- 0.7% for retail buildings; and
- 2.3% for commercial office buildings.

Because the above-mentioned costing was for Part 3 buildings only, an independent cost consultant was engaged to perform costing for three Part 9 building typologies: a large single family detached home; a townhouse, and a low-rise multi-unit residential building. These three typologies were selected in order to provide an indication on the range of incremental cost increases that could be expected (i.e. with a large single family home representing the higher end of potential costs, and the MURB units representing the lower end of potential costs). It is also important to note that the paths analyzed for this costing exercise are not necessarily "cost optimal", but instead simply a representation of just one suite of upgrades that the consulting team has seen on previous engagements in Southern Ontario.

For each of the three typologies, two potential paths for achieving the minimum performance points threshold (i.e. 10% better than SB-12) were costed.



The first path for each typology included an air tightness requirement that aligns with the minimum air tightness requirements of ENERGY STAR® for New Homes Standard v12.6 (i.e. 2.5 ACH@50Pa for detached homes, and 3.0 ACH@50Pa for attached homes).

Because not everyone is comfortable relying on favorable airtightness testing results, a second potential path was also costed for each typology. These alternate paths were shown to carry higher incremental cost increases given that instead of relying on a blower door test (which can often be at the cost of \$500 per unit), more expensive upgrades (e.g. addition of slab insulation, inclusion of continuous exterior insulation) would instead be required.

The resulting estimates from the costing exercise are summarized in the below table.

| | Large Single Family Detached, 10% better than SB-12 Example | | Townhouse, 10% better than SB-12 Example | | Multi-unit Residential, 10% better than SB-12 Example | |
|--|---|---|---|--|---|--|
| Description | 2-storey with basement, Above grade: 3,680 ft ² | | 3-storeys, Above grade: 1,900 ft ² | | 3-storeys, 15 units, above grade: 18,782 ft ² | |
| Example Suite of Additional Measures Above SB-12 | 2.5 ACH | DHW 94% TE | 3.0 ACH | | 3.0 ACH | |
| | DHW 94% TE | ER29 windows | Heating & DHW 95% TPF | Heating & DHW 95% TPF | Heating & DHW 95% TPF | Heating & DHW 95% TPF |
| | ER29 windows | R-5 exterior insulation | ER29 windows | ER29 windows | ER29 windows | ER29 windows |
| | R-5 exterior insulation | R-10 underslab | Remove R-5 ext. insul. | | Remove R-5 ext. insul. | |
| Annual Energy Use Savings Above Code | 4,978 ekWh | 5,495 ekWh | 4,191 ekWh | 4,512 ekWh | 39,968 ekWh (for building) | 37,070 ekWh (for building) |
| Annual CO ₂ e Savings | 984 CO ₂ e | 891 CO ₂ e | 744 CO ₂ e | 685 CO ₂ e | 7,233 CO ₂ e (for building) | 6,734 CO ₂ e (for building) |
| Annual Energy Cost Savings | \$132 | \$121 | \$161 | \$168 | \$60 | \$53 |
| Estimated Capital Cost Increase | \$5,747 | \$8,652 | -\$288 | \$2,036 | \$60 | \$1,001 |
| Comments | Meets ESNH BOP requirements, includes fee/model type to verify compliance and air test | No air test, rental mech unit, added fee for modeling | Meets ESNH BOP requirements, includes fee/model type to verify compliance and air test. Removal of ci results in capital cost savings. | No air test, rental mech unit, added fee for modeling | Meets ESNH BOP requirements, includes fee/model type to verify compliance and air test. Cost is per unit within MURB | No air test, rental mech unit, added fee for modeling (typically done as entire block) |

At the time of this work, the National Building Code is contemplating rolling out five tiers of energy performance, the highest of which would align with net-zero energy ready levels of performance. In September 2019, CanmetENERGY-



Ottawa undertook an impact assessment to estimate costs associated with each of these tiers. That investigation used the Housing Technology Assessment Platform (which includes archetypes for contemporary Canadian construction, and cost estimates for energy conservation measures). Hundreds of potential upgrade scenarios were then contemplated for each proposed tier. The incremental cost increase per unit, averaged across Canada's climate zones, associated with the highest net-zero ready tier were estimated to be: \$30,800 for a single family detached home; \$18,000 for an attached home; and \$14,500 for a MURB quad-plex. These estimates may therefore provide another useful data point for developers contemplating pursuit of levels of performance that far exceed GDS v3's minimum energy points threshold.

1.2: Low Carbon Energy

This measure further incentivizes the use of low emission mechanical systems, and/or the inclusion of onsite renewables, beyond measure 1.1: Energy Use Reduction. This measure achieves this by requiring an incremental percent CO₂e reduction beyond the percent energy use reduction already demonstrated under measure 1.1: Energy Use Reduction. The minimum incremental percentage point increase in CO₂e reduction is 5%, which would make a development eligible for 1 additional point.

Compliance with this measure can be demonstrated using the same energy model and results submitted for *1.1 Energy Use Reduction*. All of the same modelling rules described under measure *1.1 Energy Use Reduction* also apply to this measure, except that the following alternations can be made to the already modelled reference building's results:

- The CO₂e emission benefits associated with the proposed design's renewable energy (if applicable), can be added as a debit to the reference building's CO₂e number (therefore making the reference building's CO₂e higher) ; and
- Natural gas CO₂e emission factors can be applied to the reference building's modelled heating and domestic hot water heating energy uses, regardless of the reference building system's fuel source.

As an example, if an applicant demonstrated a 20% energy performance improvement over the reference building for measure *1.1 Energy Use Reduction*, it would be eligible for additional points under this *1.2 Low Carbon Energy* measure if it could demonstrate that the proposed design's CO₂e was 25% or better than the altered reference building results (i.e. an incremental increase of at least 5 percentage points above the 20% energy improvement originally demonstrated).

In support of the Town of Halton Hill's goal to be a Net Zero municipality by 2030, all new developments should be encouraged to explore technologies and strategies that result in lower CO₂e intensity (e.g. electrification, air-source heat pumps, geo-exchange, wind, photovoltaics, solar thermal, solar ventilation preheat equipment). CO₂e is being used here to encompass the climate change impacts of all relevant greenhouse gases (e.g. CO₂, CH₄, and N₂O). By designing and constructing buildings with CO₂e intensity in mind, we are also better positioning new buildings for a future that is likely to place a meaningful price on emissions.

Despite the importance of selecting strategies with lower CO₂e intensity, energy modelling requirements typically require a reference building's system to take on the same fuel (and similar system type) of the proposed design. The reference building therefore also gets many of the same advantages of the proposed design, and in the case of electrification this means that reference building will also have higher efficiencies and lower CO₂e intensity. This measure allows for some of those reference building advantages to be diluted without requiring an additional energy model.

1.3 Water Use Reduction



This measure requires that developments specific maximum water fixture flow rates that achieve potable water consumption reductions when compared to OBC maximum rates. The minimum reduction threshold to achieve points is 30%.

Water use is an important driver of sustainability initiatives, from excess treatment to the overdrawing of natural potable water sources. This measure seeks to simplify a building's water use to one metric, potable water, and improve the efficiency of indoor water fixtures throughout.

Oakville, Richmond Hill and Toronto are a few of the municipalities that have incorporated interior water reduction as part of their sustainability standards. The minimum reduction of 30% was selected as a threshold that has proven to be feasible across residential, commercial and industrial buildings with little to no impact on capital costs or operations. For illustrative purposes, provided below are some example fixture flow rates that have been used to put residential and commercial/industrial projects within reach of the 30% threshold.

Typical residential targets:

- 3.8 LPM Water Closets
- 5.7 LPM Lavatory Faucets
- 6.8 LPM Shower Head Fixtures
- 6.0 LPM Kitchen Faucets

Typical commercial / industrial targets:

- 3.8 LPM Water Closets
- 0.5 LPM Urinals
- 1.8 LPM Lavatory Faucets
- 6.8 LPM Shower Head Fixtures
- 6.0 LPM Kitchen Faucets

Energy & Water Reporting

This measure requires that energy and water performance metrics such as Total Energy Use Intensity, Greenhouse Gas Intensity, Thermal Energy Demand Intensity, and Total Indoor Water Use Intensity be reported.

This measure is included to create the transparency required for future energy plans, analysis and benchmarking. As more developments (of varying types, sizes and designs) upload energy, greenhouse gas and thermal energy data, a better understanding of the energy consumption associated with the Town's built environment can be achieved. This will inform future energy reduction targets, provide helpful comparisons between different developments, help identify new emerging best-practices throughout the industry, and facilitate the tracking of energy consumption trends over time.

The metrics that are being asked for here are used in programs like the Toronto Green Standard, LEED, and Passive House; and the reporting of them has become best practice amongst many energy consulting firms across Southern Ontario.

Ecology

2.1 Minimum Soil Depth

This measure requires that developments preserve or re-instate a 30cm depth of high quality topsoil across the site.

This requirement seeks to promote natural infiltration, provide a nutrient rich seedbed for the germination and rooting of local plant species, and nurture a community of beneficial micro-organisms that play a vital role in decomposition and the recycling of nutrients. The Toronto Region Conservation Authority's *Preserving and Restoring Healthy Soil: Best Practices for Urban Construction*, outlines the merits of this measure, and illustrates why 30 cm is required to effectively retain the site's previous water balance.

The Credit Valley Conservation Authority published a study in 2010 titled: *Low Impact Development: Stormwater Management Guide*. This guide further outlines the benefits of maintaining existing soil up to a certain depth for infiltration. Percolation rates vary considerably based on the soil composition, compaction, vegetation, and more. Maintaining this environment is crucial for sustaining plant life, water balance, and the local ecology.

2.2 Minimum Planter Soil Volume

This measure requires that a minimum of 30 m³ of soil per individual tree planting, or if trees are grouped 20 m³ of soil per tree.

TreeCanada published an analysis of community soil minimums for tree plantings in 2015 titled *Ontario Sets Standards for Urban Forest*. The findings concluded that trees were not reaching full maturity largely as a result of insufficient soil volumes. The roots of each planting, if unable to attain a certain depth and breadth, will yield a stunted tree. This reduces the aesthetic appeal of the site, as well as the ecological benefits of robust plantings.

As of 2015, a total of five Ontario municipalities have committed to soil volume minimums (including Oakville, Toronto and York Region), more than any other Canadian province. These standards have resulted in larger, more resilient trees throughout the communities.

Guelph, one of the municipalities that has adopted these measures, has specified a 'Planting and Furnishing Zone', the strip between the street and pedestrian walkways. This allows for tree planting to be more uniform and ensures municipal planning of adequate volume for planters.

2.3 Native & Drought Resistant Vegetation

This measure requires that the development demonstrate that no potable water will be needed for irrigation, or to ensure that at least 75% of specified vegetation shall be native and/or drought-tolerant species

The Credit Valley Conservation Authority led the development of the Black Creek Sub-watershed study, which outlines ecological protections for the region of Halton Hills. Their analysis found:

" Removal of residual trees and native/replacement vegetation that ends their benefits of reducing erosion, reducing the loss of topsoil, CO₂ sequestration and O₂ production". As such, maintaining as much native vegetation to the site will reduce the interruption to the natural ecology present within the site and community.



Additionally, the CTC (Credit Valley-Toronto and Region-Central Lake Ontario) Source Protection Plan, released in 2015, outlines specific vegetative requirements that aim to maintain the ecology and environmental quality of the region. These include maintaining native species within developments and including selected drought-resistant species.

Resiliency

3.1 Stormwater Quantity

This measure requires that the development retain run-off from a minimum of 10-mm depth of rainfall from all site surfaces through infiltration, evapotranspiration, and reuse.

Incorporating these stormwater management measures help to improve the natural ability of water to infiltrate into the soil, but also reduce potable water consumption through greywater use. Employing a variety of strategies to retain the 10-mm depth of rainfall increases the flexibility of the measure.

The 10mm threshold aligns with best practices outlined by the similar municipal standards as of the date of GDS v3's publication. However, this 10-mm depth of rainfall is anticipated to eventually increase to the 90th percentile of harvest, which corresponds to approximately 27mm within the Region of Halton. The stormwater management standards implemented by the Ministry of Environment and Climate Change will soon require this 90th percentile of retention on-site through re-use, infiltration, evapotranspiration and other LID measures across the province.

Future CVC thresholds will seek to meet this updated provincial standard for stormwater retention.

3.2 Stormwater Quality

This measure requires that the development demonstrate an anticipated removal of at least 85% of total suspended solids from run-off leaving the site.

This is an increase compared to the current requirement within the Town of Halton Hills of 80% TSS removal. The additional removal would result in added benefit to local ecology and waterways according to a study published in the Canadian Water Resources Journal, *Techniques for Controlling Total Suspended Solids in Stormwater Runoff*, in which the authors argue the merits of additional screening.

The Town of Richmond Hill passed their sustainability metrics to require a TSS removal rate of between 81-90%, a goal that has been proven to be achievable. The means by which this removal rate can be achieved are at the discretion of the developer and their design team.

The Credit Valley Conservation Authority: Low Impact Development Stormwater Management Planning and Design Guide provides detailed sample calculations for different LID strategies, and their potential reduction of TSS in runoff. Each requires its own design criteria based on site conditions, though the estimated TSS removal rate may be used for application.

For example, green roofs were noted to reduce TSS in effluent waters by 89% compared to conventional roofing systems (Van Seters et al, 2009). Similarly, infiltration trenches may reduce 70%-90% of effluent TSS depending on the design of the system. Vegetation strips were shown to demonstrate a larger variance in TSS removal (20%-80%). The individual TSS



removal rate is dependent on the specific parameters of the system, necessitating site-specific design. The applicable strategy will require the relevant calculations from the Credit Valley Conservation Authority: Low Impact Development Stormwater Management Planning and Design Guide.

3.3 Resiliency Checklist

This measure requires that the development complete a resiliency checklist to demonstrate awareness of site climate change risks.

While mitigation efforts against climate change are fundamentally important, developments must also consider adaptation strategies to improve resilience to the more extreme weather events that are becoming more frequent. The intent is to make teams more aware and mindful of how the design will accommodate future changes in climatic conditions.

The checklist includes adaptation considerations like energy self-sufficiency, flooding mitigation and withstanding extreme temperature. A similar checklist has been in place in the City of Toronto for the past couple years, and the result has proven that creating a design checklist for a proposed development will begin the conversations and responsibilities associated with building in a more resilient way.



Transportation

Transportation Demand Management Plan

This measure requires that a Transportation Demand Management (TDM) Plan be submitted that demonstrates a percent reduction in fossil fuel single occupancy vehicle trips for the site through: cycling, walking, transit, and/or electric vehicle infrastructure. The minimum reduction threshold to be eligible for points is 30%.

Reducing SOVs and their associated greenhouse gas (GHG) emissions is essential for the Town to achieve their ultimate goal of reducing overall Town GHGs towards net-zero. This performance-based measure has been selected in order to allow for carbon emissions associated with fossil fuel SOV trips to be demonstrated by whichever combination of strategies and designs that best suit the individual project. This allows the overall goal of lowered greenhouse gas emissions to be achieved with as much flexibility as the project requires.

Sustainability programs from cities such as Vaughan, Hamilton and Toronto have outlined the benefit of a TDM plan. Resulting from each project's location, access to transit and bicycle networks, individual plans will be able to promote different means of sustainable transit that best fit the project's needs.

The 30% minimum target represents an achievable reduction given the amount of flexibility and options (e.g., car sharing, EV charging, access to bicycle and transit networks) a development has in demonstrating the reduction.

For illustrative purposes, a sample TDM calculation is provided below for a 40% reduction threshold:

- Occupants of a multi-unit residential building: 140
- Expected visitors: $140 \times 2\% = 7$
- Total trips: $147 \times 2 \text{ trips per day} \times 60\% \text{ estimated working adults} = 176$ single occupancy vehicle trips
- Targeted reduction of 40%: $176 \times 40\% = 70$

One potential path towards reducing 70 fossil fuel single-occupancy vehicle trips:

1. Install ten dedicated electric car charging stations = $10 \times 2 \text{ trips per day} = 20$
2. Ride sharing program for commuters = $6 \text{ Vehicles} \times 2 \text{ trips per day} = 12$
3. Locating development next to bus line = $10 \text{ Riders} \times 2 \text{ trips per day} = 20$
4. Locating development next to bicycle network, or installing connection from development to closest access point = $9 \text{ Riders} \times 2 \text{ trips per day} = 18$

These changes result in a decrease of $20 + 12 + 20 + 18 = 70$ fossil fuel SOV trips.



Innovation

5.1 Innovation

The measure requires that the developer demonstrate to the satisfaction of the Town's Administration the value of an innovative green development strategy or technology being integrated into the design.

Up to 5 points are available. Acceptance of a point threshold or a given strategy should be determined in collaboration with the Town's Planner, and should be based predominantly on the applicant's ability to quantitatively demonstrate that the strategy achieves environmental benefits that are the equivalent to, or greater than, other measures within GDS v3 that have a similar point threshold being claimed here.

This measure has been included to reflect the fact that green development opportunities are constantly evolving, and to offer additional flexibility to the development team to ensure that innovation is not stifled. The hope is that this category can accommodate new and emerging ideas and technology that fall outside of those contemplated for GDS v3.