Appendix B

Revised City of Hamilton Green Building Standards Guidebook

City of Hamilton
Green Building Standards
GUIDEBOOK

INTRODUCTION

Green building standards are an essential tool used by municipalities to guide new development in a manner that integrates economic, social, and environmental sustainability principles. The City of Hamilton has implemented its own Green Building Standards to elevate the sustainability performance of new developments and ensure alignment with sustainable building and development best practices.

On March 27, 2019, Hamilton City Council declared a Climate Change Emergency, reinforcing the city's commitment to achieving net-zero greenhouse gas emissions by 2050 and preparing for the unavoidable impacts of climate change. Key milestones leading up to the City Council's Climate Emergency Declaration can be found in Figure 1 below. This declaration has shaped the Green Building Standards, aligning them with the community-wide net-zero carbon goals.

Figure 1: City of Hamilton's Climate Change Work (1994 - 2019)

Green Building Standards, used across Canada, guide professionals in achieving high sustainability standards for new urban buildings. These standards help evaluate new development applications based on sustainability, energy efficiency, and climate resilience.

The City of Hamilton's Green Building Standards (GBS) align with the city's current climate action initiatives, targets, and policies, and are informed by relevant provincial and municipal land use planning, sustainability, and climate action goals. The GBS is designed to be beneficial for the City's environmental goals in promoting sustainable development and enhancing community resilience and will be regularly evaluated and updated to ensure it stays effective and relevant in addressing evolving climate and sustainability challenges.

APPLICATION OF GREEN BUILDING STANDARDS

Applicable Applications

The Green Building Standards (GBS) is intended to apply to the following development applications within the City of Hamilton urban area:

- Site Plan
- Draft Plan of Subdivision

Development Types

The GBS applies to the Part 3 and Part 9 building types which are described below. For clarity, applicants must refer to the in-effect Official Plan and Zoning By-law at the time of application to confirm how the GBS may apply to the development proposal.

Part 3 Buildings

This refers to all mid to high-rise residential and all non-residential developments and refers to buildings that are subject to Part 3 of Division B of the Ontario Building Code, per Article 1.1.2 O.Reg. 332/12: Building Code. This includes buildings exceeding 600 m^2 in building area or exceeding three storeys in height. These include the following:

- Medium and High-Density Residential Development: High and medium-density residential uses are characterized in the Urban Hamilton Official Plan as multiple dwelling forms containing five or more dwelling units. Examples include block townhouse dwellings, stacked townhouse dwellings, street townhouse dwellings fronting onto a condominium road, and multiple dwellings.

- Mixed-Use Development: A development or area made up of mixed land uses either in the same building or in separate buildings. The mix of land uses may include commercial, industrial or institutional uses but must include residential units (*defined in the UHOP*).

- Institutional Development: A development or area comprised of public or non-public institutions in individual buildings or groups of buildings. The uses may include but are not limited to educational facilities, religious facilities, cultural facilities, health care facilities, or daycare facilities (*not defined in the UHOP, but a land use designation with permitted uses, development policies, etc. in Section E.6.0*.).

- Industrial Development: A development or area that permits for a range of employment activity, including offices, business parks, and industrial uses including but not limited to manufacturing and warehousing. (*Employment Areas are defined in the UHOP, the description is also based on policies for the Employment Area – Industrial Land designation in Section E.5.0).*

- Commercial Development: A development or area that are primarily located in mixed-use areas and accommodates a range of uses, including but not limited to retail, restaurants, and other similar service commercial uses (*not defined in the UHOP, but described based on policies for the Commercial and Mixed Use Designations in Section E.4.0).*

APPLICATION OF GREEN BUILDING STANDARDS

Part 9 Buildings

This refers to low-rise residential developments and refers to buildings that are subject to Part 9 of Division B of the Ontario Building Code, per Article 1.1.2 O.Reg. 332/12: Building Code. This includes buildings of three or fewer storeys in height or with a building area not exceeding 600 m^2. These include:

- Low-Density Residential Development: Low-density residential uses generally include single-detached, semi-detached, duplex, triplex, fourplex, and street townhouse dwellings.

Application Process

The GBS is designed to be integrated into the City of Hamilton's existing development application process. Figure 2 below outlines the development application process steps, including GBS submission requirements and review procedures.

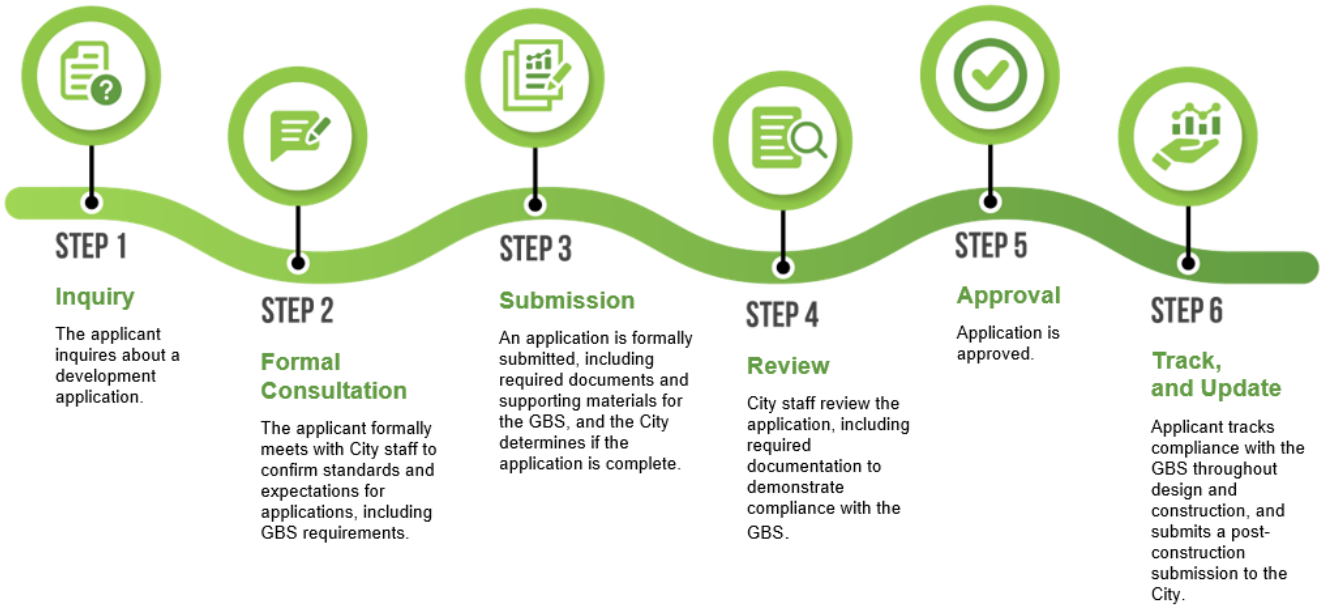


Figure 2: Development Application Process

IMPACT CATEGORIES

The GBS comprises five (5) Impact Categories, each focusing on a sustainability concept relevant to the City of Hamilton's sustainability and climate goals and objectives are described below:

Energy and Carbon

Focuses on improving energy performance and reducing carbon emissions during building operations and links greenhouse gas (GHG) reduction goals with energy efficiency, highlighting their role in eco-friendly building practices. Refer to **pages 7 to 17** of this document for the Energy and Carbon Impact Category.

Ecology and Biodiversity

Focuses on the preservation, restoration, and enhancement of the natural environment within the development area. Refer to **pages 19 to 22** of this document for the Ecology and Biodiversity Impact Category.

Water

Focuses on reducing potable water use for indoor and outdoor water uses, water metering, as well as stormwater management. Refer to **pages 24 to 26** of this document for the Water Impact Category.

Waste Management and Materials

Focuses on reducing waste generation during construction and the operational phases of development. Reducing waste can contribute to the reuse of existing materials and decrease demand for raw materials. Refer to **pages 28 to 30** of this document for the Waste Management and Materials Impact Category.

Community and Urban Design

Focuses on the design elements that promote a sense of place in the community by emphasizing the importance of preserving heritage and cultural features, raising awareness of local food production, promoting healthy practices and inclusion, as well as educating residents on sustainability features in their community and ultimately creating communities that are healthy and resilient. Refer to **pages 32 to 37** of this document for the Community and Urban Design Impact Category.

STRUCTURE OF THE GBS

Outlined within each of the Impact Categories identified above are a number of Performance Requirements that support the intent of the Impact Category. Each Performance Requirement will have one or more Metric that quantifies or qualifies achievement.

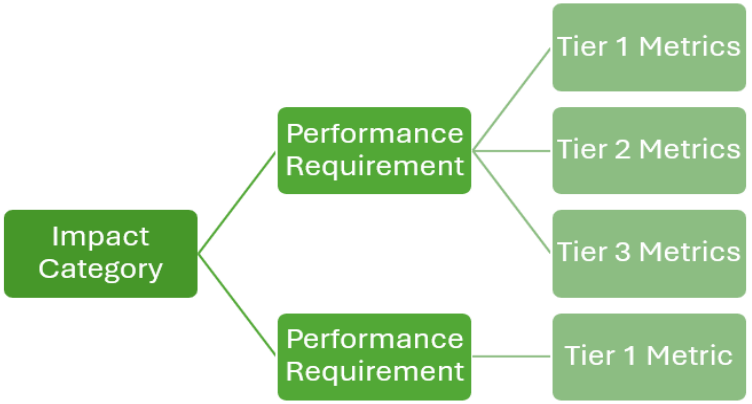


Figure 3: GBS Structure

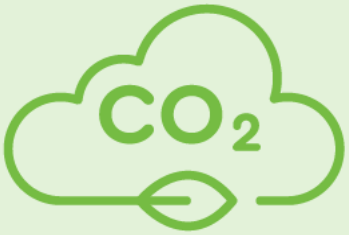
Metrics are classified as **Tier 1**, which is mandatory for all applicable development applications, or **Tier 2**, which are currently optional.

- Tier 1 Metrics mandate a minimum level of sustainability performance for all new development in the urban area subject to the applicable Planning Act application in the City of Hamilton and support the achievement of municipal sustainability goals and objectives. The Tier 1 Metrics align with the related City of Hamilton by-laws, guidelines, and strategies.

- Tier 2 & Tier 3 Metrics allow applicants to demonstrate an enhanced level of sustainability performance. Future versions of the GBS may consider adopting current Tier 2 Metrics as Tier 1 mandatory requirements to drive further sustainability performance. There is only one Tier 3 metric – for EC1 - Energy Performance.

For each Tier 1 and Tier 2 metric, applicants must provide documentation demonstrating compliance during their Site Plan Application or Draft Plan of Subdivision submission. In some cases, additional documentation is required post-construction, particularly when the relevant documentation is not available at the Site Plan Application submission stage. Several Tier 2 specifically require compliance documentation to be submitted only after construction is completed. This ensures that all necessary compliance information is thoroughly reviewed and verified by the City.

Further details on each Impact Category, Performance Requirement and Metric can be found in this Guidebook. Details and resources can be found in the Details column for each Performance Requirement.



ENERGY AND CARBON

This Impact Category focuses on improving energy performance and reducing carbon emissions during building operations. This Impact Category links greenhouse gas (GHG) reduction goals with energy efficiency, highlighting their role in eco-friendly building practices. By setting strict benchmarks for energy use, establishing goals for operational efficiency, encouraging the use of renewable energy and conducting embodied carbon assessment, this category aims to lessen buildings' environmental impact.

Performance Requirements

EC1 Energy Performance

EC2 Embodied Carbon

EC3 Refrigerant Leakage

EC4 Building Resilience

EC5 On-Site Renewables

EC6 District Energy

EC7 Building Systems Commissioning

EC8 Air Tightness Testing

EC9 Energy Metering

EC10 Benchmarking and Reporting

EC11 Electric Vehicle Charging Infrastructure

EC12 Electric Bicycle Charging Infrastructure

EC1 ENERGY PERFORMANCE

Intent: Promote energy-efficient buildings that lower operating costs, reduce greenhouse gas emissions, and improve building resilience.

For Part 9 Buildings, compliance involves following ***one*** of the provided pathways: EC1.1a, EC1.1b, EC1.2a, EC1.2b, or EC1.5. Likewise, for Part 3 Buildings, compliance requires following ***one*** of the provided pathways – EC1.3a, EC1.3b, EC1.3c, EC1.4a, EC1.4b or EC1.5.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC1.1a	Tier 1	Part 9 - Performance	Using whole-building energy modelling, demonstrate an annual Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI), and GHG Emission Intensity (GHGI) that meets the Tier 1 performance limits per Table EC1 below.	**Site Plan Application Submission** Energy Model Report summarizing key modelling inputs, outputs, and assumptions, signed by a licensed professional (Energy Modeller), and demonstrating compliance with the applicable target[1,2,3].	1. For guidance on calculating TEUI, TEDI, and GHGI, refer to the City of Toronto's Energy Modelling Guidelines Version 4. 2. For guidance on submission requirements, refer to the City of Toronto's Energy Efficiency Report Submission & Modelling Guidelines. 3. An approach for estimating the three metrics using the modeling approach outlined in the NBC Section 9.36 is forthcoming and may also be approved for submission by the City if prepared by an appropriate Service Organization[4]. 4. Service Organizations are licensed by NRCan to deliver ENERGY STAR® qualified home labels or R-2000 certification. For a list of authorized service organizations see Natural Resources Canada. Certified Energy Advisors are independent contractors licensed by NRCan who perform the testing and final inspection and report. They submit their report documentation for compliance to the NRCan Authorized Service Organization.
EC1.1b	Tier 1	Part 9 - Prescriptive	Provide a heat pump system to deliver 80% of facility peak heating load. Commission system to use heat pump as first stage of heating.	**Site Plan Application Submission** Confirmation of make and model of heat-pump to be installed as well as an outline of the commissioning process to be followed by the installer. **Post Construction** A Letter of Certification signed by an accredited professional (Architect, Electrical Engineer, or Mechanical Engineer) post-construction that a heat pump system has been installed and commissioned as required.	
EC1.2a	Tier 2	Part 9 - Performance	Using whole-building energy modelling, demonstrate an annual Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI), and GHG Emission Intensity (GHGI) that meets the Tier 2 performance limits per Table EC1, below.	**Site Plan Application Submission** Energy Model Report summarizing key modelling inputs, outputs, and assumptions, signed by a licensed professional (Energy Modeller), and demonstrating compliance with the applicable target[1,2,3].	
EC1.2b	Tier 2	Part 9 - Prescriptive	Provide 100% of heating and 100% of domestic hot water using heat pump systems. Heat pumps may be sized for 80% of peak load.	**Site Plan Application Submission** Confirmation of make and model of heat-pumps to be installed, back-up heating type (if any) as well as an outline of the commissioning process to be followed by the installer. **Post Construction** A Letter of Certification signed by an accredited professional (Architect, Electrical Engineer, or Mechanical Engineer) post-construction that the facility has an all-electric operation for heating and that the appropriate heat pump systems has been installed and commissioned as required.	

Item #	Tier	Applicability	Metrics	Documentation	Details
EC1.3a	Tier 1	Part 3 - **Performance**	• Using whole-building energy modelling, demonstrate an annual Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI), and GHG Emission Intensity (GHGI) that meets the applicable Tier 1 performance limits[1] per Table EC1, below. • For all other Part 3 buildings: develop a whole-building energy model, and design and construct the building to meet the National Energy Code of Canada for Buildings (NECB) 2020[2] Tier 2 + GHG Reduction of >80% vs. NECB reference case.	**Site Plan Application Submission** Energy Model Report summarizing key modelling inputs, outputs, and assumptions, signed by a licensed professional (Energy Modeller), and demonstrating compliance with the applicable target[3,4].	1. Identify the applicable building archetype and meet the archetype-specific performance limits. Mixed use buildings can apply a weighted average of the applicable performance limits. 2. Applicable to building types that do not apply to any of the building archetypes listed in Table EC1, below. Refer to the National Energy Code of Canada for Buildings (NECB) 2020 3. For guidance on calculating TEUI, TEDI, and GHGI, refer to the City of Toronto's Energy Modelling Guidelines Version 4. 4. For guidance on submission requirements, refer to the City of Toronto's Energy Efficiency Report Submission & Modelling Guidelines. 5. Zero emissions for on-site fossil fuel use are evaluated by having no natural gas or other fossil fuel combustion for normal operation of the facility (i.e. fossil fuels may still be used to meet back-up heating and power requirements, if any).
EC1.3b	Tier 1	Part 3 – **Prescriptive** – ***MURBs Only***	• Provide a heat pump system to deliver 80% of facility peak heating load. Commission system to use heat pump as first stage of heating. • This pathway only applies to Multi-Unit Residential Buildings (MURBs).	**Site Plan Application Submission** Confirmation of equipment make and model of heat-pump system to be installed, a schematic design of the proposed system, as well as an outline of the commissioning process to be followed by the installer. **Post Construction** A Letter of Certification signed by an accredited professional (Architect, Electrical Engineer, or Mechanical Engineer) post-construction that a heat pump system has been installed and commissioned as required.	

Item #	Tier	Applicability	Metrics	Documentation	Details
EC1.3c	Tier 1	Part 3 – ***Trade-Off Path***	• Using whole-building energy modelling, demonstrate an annual GHG Emission Intensity (GHGI) that meets the applicable ***Tier-1 Trade-off*** performance limits[1] per Table EC1, below. • This pathway is not available for other building types other then Part 3 building types listed in Table EC1.	**Site Plan Application Submission** Energy Model Report summarizing key modelling inputs, outputs, and assumptions, signed by a licensed professional (Energy Modeller), and demonstrating compliance with the applicable target[3,4].	
EC1.4a	Tier 2	Part 3 - **Performance**	• Using whole-building energy modelling, demonstrate an annual Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI), and GHG Emission Intensity (GHGI) that meets the applicable Tier 2 performance limits[1] per Table EC1, below. • For all other Part 3 buildings: develop a whole-building energy model, and design and construct the building to meet the National Energy Code of Canada for Buildings (NECB) 2020[2] Tier 3 + zero (0) on-site fossil fuel emissions (i.e. Scope 2 emissions need not be zero)[5].	**Site Plan Application Submission** Energy Model Report summarizing key modelling inputs, outputs, and assumptions, signed by a licensed professional (Energy Modeller), and demonstrating compliance with the applicable target[3,4]. **Post Construction Submission** • Energy Modelling Report or other documentation demonstrating compliance with the targeted standard summarizing key modelling inputs, outputs, and assumptions, signed by a licensed professional. • Updated Energy Model Report[3].	
EC1.4b	Tier 2	Part 3 – **Prescriptive** – ***MURBs Only***	• Provide a fully electrified system for heating and domestic hot water using heat pumps as a first stage. Heat pumps must be sized for 80% of peak load. This pathway only applies to Multi-Unit Residential Buildings (MURBs).	**Site Plan Application Submission** Confirmation of equipment make and model of heat-pump system to be installed, a schematic design of the proposed system, as well as an outline of the commissioning process to be followed by the installer. **Post Construction** A Letter of Certification signed by an accredited professional (Architect, Electrical Engineer, or Mechanical Engineer) post-construction that a heat pump system has been installed and commissioned as required.	
EC1.5	Tier 3	All Buildings	• Commitment is to zero on-site emissions from fossil fuels and zero on-site emissions	**Site Plan Application Submission** • Follows expected pathway above.	1. CaGBC Zero Carbon Building-Design Certification is an acceptable alternative compliance

Item #	Tier	Applicability	Metrics	Documentation	Details
			from electricity for a 5-year period. • Demonstrate on-site near-zero operations by complying with EC1.2a/b, EC1.4a/b/c OR Achievement of CaGBC Zero Carbon Building (ZCB) Design Standard Certification[1]. + • Commit to five (5) years of CaGBC Zero Carbon Building (ZCB) Performance Standard Certification.	• **For ZCB only**: Confirmation of registration for ZCB-Design Standard certification. **Post Construction Submission** • Follows expected pathway above • **For ZCB only**: CAGBC ZCB-Design Standard certification and complete workbook. • ZCB Carbon Building-Performance Certification for year 1 of operations[2] and written letter from the building owner to continue the certification for an additional four (4) year period.	for all buildings, including those identified in Table EC1. 2. CaGBC Zero Carbon Building-Performance Certification is a separate standard which must be met by all buildings, including those that pursue CaGBC ZCB – Design certification.

TABLE EC1 - TEUI, TEDI and GHGI PERFORMANCE TARGETS

Building Type	Tier	TEUI (kWh/m²/yr)	TEDI (kWh/m²/yr)	GHGI* (kgCO2/m²/yr)
Part 9 & Part 3 MURB (< 6 Storeys)	**1**	100	25	10
	1 – Trade-off	125	35	5
	2	70	15	5
Part 3 MURB (≥ 6 Storeys)	**1**	100	30	10
	1 – Trade-off	125	35	5
	2	75	15	5
Commercial Office	**1**	100	22	8
	1 – Trade-off	115	35	4
	2	65	15	4
Commercial Retail	**1**	90	25	5
	1 – Trade-off	115	35	3
	2	70	15	3

*** - Tables assume GHG emission factor for electricity of 30 kg CO2e emissions per MWh of electricity**

EC2 EMBODIED CARBON

Intent: Promote embodied carbon reductions to reduce total life cycle carbon emissions.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC2.1	Tier 1	Part 9	• Conduct a Materials Emissions Assessment using BEAM (Building Emissions Accounting for Materials tool), or an equivalent tool[1], to measure A1-A3, stage emissions for all structural, enclosure, and major finishes (cladding, flooring, ceilings, interior wall sheathing).	**Site Plan Application Submission** • An Embodied Carbon report declaring the materials that are anticipated to be used and the estimated total embodied carbon emissions of these materials.	1. Examples of acceptable lifecycle assessment software for **low-rise residential** buildings include: BEAM and NRCAN MC2. 2. Refer to the current version of the Zero Carbon Building Standard for further guidance on Embodied Carbon assessments. 3. Examples of acceptable lifecycle assessment software include: Athena Impact Estimator for Buildings Life Cycle Assessment (LCA) and OneClick LCA. 4. Refer to the Zero Carbon Building v3 Guidebook Appendix I for guidance on preparing a Baseline.
EC2.2	Tier 1	Part 3	• Conduct a whole building life cycle assessment (LCA) of the building's structure and envelope in accordance with the CaGBC Zero Carbon Building Standard v3 methodology[2,3]. Report embodied carbon for the following life cycle stages: A1-A5, B1-B5, and C1-C4.		
EC2.3	Tier 2	All	• Demonstrate a minimum 5% reduction in embodied carbon compared to a baseline building[4].		

EC3 REFRIGERANT LEAKAGE

Intent: Promote awareness and reporting of refrigerant leakage in HVAC equipment to support total carbon reductions.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC3.1	Tier 1	Part 3	• Develop a Refrigerant Leakage Plan describing the ongoing refrigerant leakage tracking process and corrective action plan to address refrigerant leaks should they occur in any base building HVAC systems. The Plan should list the total quantity, type, and the Global Warming Potential (GWP) of each refrigerant contained in HVAC systems with a capacity greater than 19 kW (5.4 tons)[1,2].	**Site Plan Application Submission** • Provide a Letter of Commitment signed by a qualified professional (Mechanical Engineer) and the owner/developer/builder that includes confirmation that the requirements of this metric will be met. **Post Construction Submission** • Refrigerant Leakage Plan.	1. Refer to the current version of the Zero Carbon Building - Performance Standard for further guidance on refrigerant leakage. 2. Refrigerants that do not have a GWP do not need to be reported.

EC4 BUILDING RESILIENCE

Intent: Encourage back-up power to essential building systems and refuge area for occupants during power failures resulting from extreme weather events.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC4.1	Tier 2	Part 3	• **MHR Residential only:** Provide a refuge area with heating, cooling, lighting, potable water. Provide back-up power to essential building systems for 72 hours[1,2,3,4,5].	**Post Construction Submission** • Drawings, plans, or other documentation demonstrating that the project incorporates resilient measures.	1. Ensure power is provided to the refuge area, building security systems, domestic water pumps, sump pumps, at least one elevator, boilers, and hot water pumps to enable access and egress and essential building functions during a prolonged power outage. 2. A refuge area should be a minimum size of 93 sq.m. and/or 0.5 sq.m. per occupant and may act as building amenity space during normal operations. 3. This requirement applies to multi-unit residential high-rise buildings that contain central amenity, lobby or gym space, to be able to act as a temporary shelter for vulnerable residents of the building. 4. Common refuge areas are temporarily shared, lit spaces where vulnerable residents can gather to stay warm or cool, charge cell phones and access the internet, safely store medicine, refrigerate basic food necessities, access potable water and toilets, and perhaps prepare food. 5. It is recommended to provide back-up power using a low or no-carbon form of back-up power. 6. Refer to the City of Toronto Minimum Backup Power Guidelines for MURBs, Voluntary Performance Standards for Existing and New Buildings (2016) for guidance.

EC5 ON-SITE RENEWABLES

Intent: Encourage cost-effective renewable energy solutions for climate change mitigation and boost local renewable energy adoption to reduce on-site carbon footprint.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC5.1	Tier 1	Part 9	**Plan of Subdivision only:** Complete a Community Energy Plan demonstrating energy emissions and resiliency targets on a community scale[6].	**Plan of Subdivision Submission** • Provide a Community Energy Plan.	1. Strategies to design a building for solar readiness may include the following: ○ Designate an area of the roof for future solar PV and/or solar thermal. ○ Install one or two conduits from the roof to the main electrical or mechanical room (size of conduit to be determined based on maximum potential solar PV or solar thermal system size). ○ Ensure that the building structure has adequate structural capacity to accommodate future installation of renewable energy systems. ○ Ensure that sufficient area is allocated for the future installation of renewable energy systems. ○ Designate a 2x2 meter wall area in the electrical and mechanical rooms for future solar electrical/thermal equipment controls and connections (e.g. meters, monitors). ○ Where possible place the HVAC or other rooftop equipment on the north side of the roof to prevent future shading. 2. Consult with NRCan Solar Ready Guidelines for more guidance on solar readiness, or to access a Solar Readiness Checklist. Also, consult the National Renewable Energy Laboratory's Solar Ready Buildings Planning Guide for additional considerations for PV-ready provisions. 3. Promotion of solar PV and renewables aligns with the City of Hamilton's Climate Action Strategy, specifically the target for all new homes to have 30% annual load coverage by solar PV by 2031 and the target for all new commercial buildings to include rooftop solar PV panels by 2026.
EC5.2	Tier 1	All	• Design all new buildings for solar readiness[1]. Where applicable, include an opt-in for new owners to install solar PV or thermal systems at the new owner's expense[1,2,3,4].	**Site Plan Application Submission** • Drawings, plans, specifications, or other documentation demonstrating that is project is solar-ready.	
EC5.3	Tier 2	Part 9	• Design and install on-site renewable energy systems to supply at least 10% of the building's total energy load from one or a combination of energy source(s)[3,4,5]. *OR* • Design and install on-site renewable energy systems to supply at least 20% of the building's total energy load from geo-exchange (geothermal or ground source heat pumps)[4].	**Site Plan Application Submission** • Drawings, plans, specifications, or other documentation demonstrating the project's on-site renewable sources. • Energy Modelling Report or other documentation demonstrating the percentage of the project's energy needs provided by on-site renewable sources.	
	Tier 2	Part 3	• Design and install on-site renewable energy systems to supply at least 5% of the building's total energy load from one or a combination of energy source(s)[3,4,5,6]. *OR* • Design and install on-site renewable energy systems to supply at least 20% of the building's total energy load from geo-exchange (geothermal or ground source heat pumps)[4].		

Item #	Tier	Applicability	Metrics	Documentation	Details
					4. The percent (%) of renewable energy generated can be quantified by the following steps: ○ Determine the total building annual energy use for the site. ○ List the renewable energy technologies being considered for the site. ○ Determine the expected annual energy generated from renewable technologies and the percent (%) of annual energy generated on-site, relative to the total energy consumed. 5. Allowable forms of renewable energy systems include the following: ○ Solar photovoltaics (PV) technologies (e.g. solar panels, solar shingles) ○ Solar thermal ○ Biogas and biofuel ○ Wind-based systems. 6. Refer to the City of Ottawa Community Energy Plan Terms of Reference for guidance on community energy planning.

EC6 DISTRICT ENERGY

Intent: Encourage district energy to reduce environmental and economic impacts associated with fossil fuel energy use.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC6.1	Tier 1	All	• Investigate the feasibility of shared energy solutions, such as the development of low carbon thermal energy networks or connection to planned or existing district energy systems and identify the required provisions to be district energy ready[1,2,3,4].	**Plan of Subdivision and Site Plan Application Submission** • Provide a Letter signed by a qualified professional (Mechanical Engineer) and the owner/developer/builder that describes how opportunities for district energy have been explored.	1. Connecting to an existing low carbon district energy system is strongly encouraged to significantly reduce or avoid carbon emissions and to meet the GHGI limits. 2. For guidance on designing a building to be district energy-ready, please refer to: ○ The City of Toronto's Design Guideline for District Energy-Ready Buildings Guide

Item #	Tier	Applicability	Metrics	Documentation	Details
EC6.2	Tier 2	All	• Connect to a district energy system where one exists or design for future connection where a future district energy system is slated for development[3,4].	**Post Construction Submission** • Drawings, plans, or other documentation demonstrating connection, or design will accommodate future connections.	○ The City of Ottawa Community Energy Plan Terms of Reference 3. Refer to the City of Hamilton's Climate Change Action Strategy for more information. 4. Refer to the Action 19 - Decarbonize and Expand District Energy within the City of Hamilton's Community Energy and Emissions Plan for more information.

EC7 BUILDING SYSTEMS COMMISSIONING

Intent: To promote buildings that are designed to be energy-efficient with reduced operating costs and greenhouse gas emissions associated with building operations.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC7.1	Tier 2	All	• Conduct best practice commissioning, per the requirements referenced in LEED BD+C v4.1 Fundamental Commissioning and Verification pre-requisite[1,2,3].	**Site Plan Application Submission** • Provide a Letter of Commitment signed by the owner/developer/builder that best practice commissioning will be performed; OR proof a commissioning agent retained. **Post Construction Submission** • Commissioning Plan & Report.	1. Commissioning of a building is a systematic process that documents and verifies that all the facility's energy-related systems perform interactively in accordance with the design documentation and intent, and according to the owner's operational requirements from the design phase through to at least one-year post construction. 2. Commissioning process should be in accordance with ASHRAE Guideline 0–2013 and ASHRAE Guideline 1.1–2007 for HVAC&R systems, as they relate to energy, water, indoor environmental quality, and durability for mechanical, electrical, plumbing, and renewable energy systems and assemblies. 3. Refer to LEED BD+C (v4.1) EA: Fundamental Commissioning and Verification for more information on building systems commissioning.

EC8 AIR TIGHTNESS TESTING

Intent: To reduce air leakage, while improving the greenhouse gas emission associated with building operations and thermal comfort of occupants.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC8.1	Tier 1	All	• Design and construct the building to improve the quality and airtightness of the building envelope[1].	**Site Plan Application Submission** • Provide a letter signed by a qualified professional (Building Envelope Engineer or Building Science Engineer) and the owner/developer/builder that describes the project's approach to achieving air tightness, and the process for any planning testing.	1. The letter should indicate the line of air tightness (including air barrier materials, systems and transitions). Submission of drawings and indicative details to support the letter is encouraged.
EC8.2	Tier 2	All	• Conduct a whole-building air leakage test to improve the quality and airtightness of the building envelope and report the performance achieved[1,2].	**Post Construction Submission** • Air Leakage Testing Report.	1. The practice of Whole Building Air Leakage Testing (WBALT) involves sealing all building openings (e.g. operable windows) and pressurizing a building to determine its resistance to air leakage through the envelope. 2. For guidance on Whole Building Air Leakage Testing, please refer to the City of Toronto Whole Building Air Leakage Testing Protocol or the ASTM E3158-18 Standard Test Method for Measuring the Air Leakage Rate of a Large or Multizone Building.

EC9 ENERGY METERING

Intent: Promote energy awareness to drive energy-conscious behavior and reduce usage. Continuous consumption tracking and benchmarking ensure design goals are met.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC9.1	Tier 1	All	• Install electricity and/or thermal sub-meters for all energy end-uses that represent more than 10% of the building's total energy consumption[1,2].	**Site Plan Application Submission** • Provide a Letter of Commitment signed by a qualified professional (Electrical Engineer and Mechanical Engineer) and the owner/developer/builder that includes confirmation that the requirements of this metric will be met.	1. Refer to LEED BD+C (v4.1) EA: Advanced Energy Metering for more information on electricity and thermal sub-metering. 2. The advanced energy metering must have the following characteristics: ○ Meters must be permanently installed, and record at intervals of one hour or less. ○ Electricity meters must record both consumption and demand.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC9.2	Tier 2	All	• For buildings with multiple tenants, provide energy submetering for each commercial/institutional tenant, or in each residential suite[1,2,3].	**Post Construction Submission** • Electrical and mechanical single-line diagrams that indicate the provision of electricity and thermal sub-meters. • A metering plan listing all meters along with type, energy source metered, diagrams, and/or references to design documentation.	○ The data collection system must use a local area network, building automation system, or wireless network. ○ The system must be capable of storing all meter data for at least 36 months. ○ The data must be remotely accessible. ○ All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use. 3. Single room–occupancy units, transitional and temporary housing, and designated supportive housing buildings do not need an electricity meter in each unit.

EC10 BENCHMARKING & REPORTING

Intent: Promote energy and water conservation through ongoing monitoring and reporting, and increased visibility for the City of Hamilton to track emissions of new developments.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC10.1	Tier 1	Part 3	• **Buildings 50,000 square feet (≈ 4645 m²), or larger:** Enroll the project in ENERGYSTAR® Portfolio Manager to track energy and water consumption of the new development during operations in accordance with O. Reg. 506/18[1,2].	**Site Plan Application Submission** • Provide a Letter of Commitment signed by the owner/developer/builder that includes confirmation that the requirements of this metric will be met. **Post Construction Submission** • Confirmation of Registration.	1. Benchmarking of private buildings annual energy consumption is required in accordance with Ontario Regulation 506/18. Building energy benchmarking is a process through which building owners and/or managers can track and report their building's operational energy over time. Refer to the ENERGY STAR® Portfolio Manager website. 2. Provide the City of Hamilton's account with read-only access to the project.
EC10.2	Tier 2	All	• Enroll the project in ENERGYSTAR® Portfolio Manager[1] to track energy and water consumption of the new development during operations[1,2].		

EC11 ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

Intent: Promote the use of electric cars by providing electric vehicle (EV) charging stations to support GHG targets and improved air quality.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC11.1	Tier 1	Part 3 & Part 9 (Residential)	• Ensure 100% of all parking spaces are EV-ready[1,2,3].	**Site Plan Application Submission** • On the Site Plan Drawing, Traffic Plan, or Parking Study identify: ○ The number of total parking spaces included per building on the site. ○ The number of total parking spaces that will be provided with rough-in provisions. ○ The percentage of parking spaces that will be EV-ready.	1. Refer to the City of Hamilton Zoning By-law No. 05-200. 2. In order to achieve zoning compliance, at minimum, each Electric Vehicle Parking Space shall have an adjacent electrical outlet at which an electric vehicle charger can be installed in the future. The electrical outlet shall be capable of providing Level 2 electric vehicle charging, which generally means a voltage of 208V to 240V. 3. Electric vehicle supply equipment (EVSE) is defined by the Ontario Electrical Safety Code as the complete assembly consisting of cables, connectors, devices, apparatus, and fittings installed for the purpose of power transfer and information exchange between the branch circuit and the electric vehicle, commonly referred to as an EV charging station or EV charger. 4. Provide EVSE capable of supplying Level 2 charging capability or a higher level of charging. 5. EVSE parking spaces shall be labelled for the intended use of electric vehicle charging. 6. Refer to the Electric Vehicle Charging Infrastructure Costing Study for more information about EV Ready design options and costing analysis for residential development archetypes to comply with this standard.
	Tier 1	Part 9 (Non-Residential)	• Ensure at least 50% of all parking spaces are EV-ready[1,2].		
EC11.2	Tier 2	Part 3 & Part 9 (Residential)	• Provide at least 20% of all parking spaces with Electric Vehicle Supply Equipment (EVSE) [3,4,5,6].	**Site Plan Application Submission** • Parking plan(s) indicating the location and number of EV chargers.	
	Tier 2	Part 9 (Non-Residential)	• Provide at least 10% of all parking spaces with Electric Vehicle Supply Equipment (EVSE) [3,4,5,6].		

EC12 ELECTRIC BICYCLE CHARGING INFRASTRUCTURE

Intent: Reduce air pollution and GHG emissions related to car use by promoting active transportation. Active transportation also reduces fuel dependency, traffic congestion, noise pollution, and infrastructure.

Item #	Tier	Applicability	Metrics	Documentation	Details
EC12.1	Tier 1	Part 3 & Part 9 (Residential)	• Provide Energized Outlets for 15% of the bicycle parking spaces for electric bicycle charging[1,2].	**Site Plan Application Submission** • Parking plan(s) indicating the location of electric bicycle charging.	1. The number of electric bicycle parking spaces is included as part of the total required bicycle parking spaces. 2. Energized Outlets are capable of supplying 120V, and are located at a maximum distance of 1100 mm from the bike rack to accommodate the typical manufacturer-supplied power cord. 3. Applies only to long-term bicycle parking spaces which are to be located in a secure enclosed bicycle parking area within the building.

ECOLOGY AND BIODIVERSITY

This Impact Category focuses on the preservation, restoration, and enhancement of the natural environment within the development area. Common requirements within this topic include native species and tree planting, prohibiting invasive species, and bird-friendly design. The performance requirements within this impact category foster ecological health and biodiversity, and also significantly contribute to the enhancement of urban forests, elevate biodiversity levels, and mitigate urban heat islands. By prioritizing these measures, developments can achieve a balance between urban expansion and environmental preservation, ensuring sustainable habitats for both wildlife and human communities. Refer to pages 14 to 17 of this document for the Ecology and Biodiversity Impact Category.

Performance Requirements

EB1 Native Species Planting

EB2 Tree Planting

EB3 Bird-Friendly Design

EB4 Light Pollution

EB5 Climate Positive Landscape Design

EB1 NATIVE SPECIES PLANTING

Intent: To preserve the long-term health of landscape design and minimize effects on broader natural systems.

Item #	Tier	Applicability	Metrics	Documentation	Details
EB1.1	Tier 1	All	• Use native or adapted species for 50% of the new landscaping planted areas (including grassed areas), i.e. 50% of the total landscaped area should be covered by native or adapted plant species. Select drought-tolerant species from colder climate zones wherever possible[1,2,3,6].	**Plan of Subdivision and Site Plan Application Submission** • Landscape Plan with planting schedule demonstrating that plant species do not include invasive species, and indicating where species will be native or adapted.	1. Native plant species are defined as plants that are indigenous to Southern Ontario; they are adapted to local conditions and occur naturally in the region. Refer to Credit Valley Conservation resources for definitions of native, nativar, pollinator, and drought-friendly species. 2. Adapted vegetation is vegetation that is not native to the particular region it was introduced to but has evolved or maintained characteristics conducive for healthy growth and requires no additional resources or maintenance, such as water for irrigation, in comparison to similar species native to the area. An adapted species is non-aggressive; it is not disruptive to native plant communities. 3. For resources on native species selection, refer to the following: ○ Natives Plants Database ○ The Trees Atlas ○ Plant Paradise Toolkit 4. Please refer to the Ontario Invasive Species Act for a list of Invasive Species. 5. Refer to the City of Hamilton Urban Official Plan Chapter C: City Wide Systems and Designations for additional details on vegetated protection zones. 6. For more information on how the metrics of this performance requirement align with the City of Hamilton guidelines and strategies, refer to the following: ○ Hamilton Urban Forest Strategy ○ Hamilton Climate Change Impact Adaptation Plan ○ City of Hamilton Biodiversity Action Plan 7. For resources on planting lists for pollinator gardens, refer to the following: ○ Hamilton Conservation Authority ○ City of Hamilton – Environmental Stewardships Pollinator
EB1.2	Tier 1	All	• Per the Ontario Invasive Species Act, do not plant invasive species[4,6].		
EB1.3	Tier 1	All	**For sites adjacent to Agricultural lands, Natural Heritage features, Environmentally Significant Areas (ESAs), and any other areas that are restricted from development[1,3,5]:** • Provide vegetated protection zones. • Vegetated protective zones must include 100%native vegetation, with a preference for drought-tolerant species.		
EB1.4	Tier 2	All	• Use native or adapted species for 75% of the new landscaping planted areas (including grassed areas), i.e. 75% of the total landscaped area should be covered by native or adapted plant species[1,2,3,6]. • Include permanent signage highlighting the native species planted on site[1,2,3,6].	**Site Plan Application Submission** • Landscape Plan with planting schedule demonstrating the plant species that will be planted, and indicating where species will be native or adapted. • Drawings or plans with details on signage highlighting species planted on site.	
EB1.5	Tier 2	All	• Support the City's "Bee City" designation by restoring or protecting a minimum of 30% of the site with native vegetation that includes at least two native flowering species that bloom at different periods over the growing season[1,3,6,7].	**Site Plan Application Submission** • Landscape Plan with planting schedule demonstrating the plant species that will be planted, indicating where species will be native, and indicating at least two native flowering species that bloom at different periods over the growing season.	

Item #	Tier	Applicability	Metrics	Documentation	Details
					8. Restoration refers to any project whose purpose is to re-create a natural vegetation community for any purpose using indigenous plants. It can include reforestation, reclamation, habitat creation, and should also include landscaping near natural areas.

EB2 TREE PLANTING

Intent: To preserve and enhance our natural heritage for biodiversity, heat island mitigation, and stormwater management.

Item #	Tier	Applicability	Metrics	Documentation	Details
EB2.1	Tier 1	All	• Protect healthy, mature trees that exist within the project boundary. Comply with the requirements of the City of Hamilton Tree Protection Guidelines[1,2,3].	**Plan of Subdivision and Site Plan Application Submission** • A Tree Inventory Report and Preservation Plan. **Site Plan Application Submission** • Plan(s) or drawings demonstrating the volume of soil provided for each tree. • Plan(s) or drawings indicating the locations of all trees and parking spaces within the surface parking area. • Canopy Cover Plan(s) or drawings demonstrating walkway/sidewalk area shaded.	1. For more information on street planting protocols, please refer to the City of Hamilton Street Tree Planting Policy. 2. Where applicable, comply with the requirements of the City of Hamilton Tree Protection Guidelines and City of Hamilton Private Tree Protection By-Law 3. Promotion of healthy trees and planting aligns with the City of Hamilton Urban Forest Strategy canopy cover target of 40%. 4. Calculations can assumed a mature tree canopy width. 5. Trees should be spaced appropriately, having regard to site conditions, and ensure that space is provided to accommodate mature trunk and root flare growth of each tree.
EB2.2	Tier 1	All	• Provide each tree planted with access to 21 m^3 of soil per tree. Where trees share soil, such as in a continuous planting trench, a reduction to 16m^3 per tree may be permitted.		
EB2.3	Tier 1	All	• Where surface parking is provided, plant 1 shade tree for every 5 parking spaces.		
EB2.4	Tier 1	All	• Plant trees to shade at least 50% of the bike paths and walkway/sidewalk lengths [3,4,5].		
EB2.5	Tier 1	All	• Provide a watering and maintenance program for trees for at least the first 4 years after planting. The maintenance programs should include measures to reduce the impact of de-icing salt on vegetation.	**Site Plan Application Submission** • A Letter of Commitment signed by an accredited professional (Landscape Architect) and the owner/developer that describes the watering and maintenance program for trees. **Post Construction Submission** • Operating and Maintenance plan or other documentation detailing the maintenance program for trees.	
EB2.6	Tier 2	All	• Plant trees to achieve a 40% tree canopy cover for the site, excluding the building footprint [1,2,3,4,5].	**Site Plan Application Submission** • Landscape Plan(s) and supporting calculations demonstrating compliance. • Canopy Cover Plan(s).	

EB3 BIRD-FRIENDLY DESIGN

Intent: To prevent fatal collisions of birds with buildings.

Item #	Tier	Applicability	Metrics	Documentation	Details
EB3.1	Tier 1	All	• Design in accordance with the guidelines laid out in the Canadian Standards Association's (CSA) Bird-Friendly Building Design Standard A460[1]. • Use a combination of Bird-Friendly Design strategies to treat at least 90% of the exterior glazing including transparent railings and barriers) located within the first 16 metres of the building above grade or to the height of the mature tree canopy, whichever is greater. Visual markers on the glass must meet the CSA Bird-Friendly Building Design Standard A460 guidelines[1,2]. • Where there is glazing adjacent to green roofs and/or other rooftop vegetation, the bird collision mitigation strategy shall be applied to a height of 4 m from the surface of the green roof or the height of the adjacent mature vegetation, whichever is greater. • Eliminate all fly-through effects (e.g., glass corners, parallel glass) and other traps from building design or use specified bird-safe glass or integrated protection measures.	**Site Plan Application Submission** • Elevation drawings demonstrating the location of bird-friendly strategies and calculations demonstrating metric requirements will be achieved. • Details or specifications and drawings indicating treated area, type of treatment, density of visual markers, etc.	1. Refer to the CSA Bird-Friendly Design Standard A460 for detailed requirements. 2. Bird-Friendly Design Strategies may include: ○ Visual patterns on glass ○ Visual markers provided on the glass of proposed buildings with spacing no greater than 50 millimeters by 50 millimeters ○ Window films ○ Fenestration patterns. 3. In April 2022, the City of Hamilton became the 6th certified Bird Friendly City in Canada. As part of this commitment, the City has as taken steps to reduce threats to wild birds, conserve bird habitat, and educate the public about birds.
EB3.2	Tier 1	All	• Ground-level ventilation grates have a porosity of less than 20 mm X 20 mm (or 10 mm X 40 mm).	**Site Plan Application Submission** • Site plan, or other documentation indicating the location and porosity of any ground-level ventilation grates.	

EB4 LIGHT POLLUTION

Intent: To minimize nighttime glare, light trespass, and light pollution, acknowledging their adverse effects on energy efficiency, nearby residents, and nocturnal wildlife.

Item #	Tier	Applicability	Metrics	Documentation	Details
EB4.1	Tier 1	All	• All exterior fixtures must be Dark Sky compliant[1,2].	**Site Plan Application Submission** • Site plan, or other documentation indicating lighting type, orientation, location, and controls.	1. Refer to the Canadian Standards Association's (CSA) Bird-Friendly Building Design Standard A460 for more information on light pollution requirements. 2. Refer to Dark Sky Feature Seal of Approval for more information on Dark Sky compliance requirements.
EB4.2	Tier 1	All	• Rooftop and exterior façade architectural illumination must be directed downward and turned off between the hours of 10 p.m. and 6 a.m.		
EB4.3	Tier 1	All	• Implement lighting controls in non-residential spaces that reduce nighttime spillage of light by 50% from 11 p.m. to 5 a.m.	**Site Plan Application Submission** • A Letter of Commitment from a qualified professional (Architect or Electrical Engineer), and the owner/developer/builder describing how metric requirements will be met.	

EB5 CLIMATE POSITIVE DESIGN

Intent: Promote GHG reductions and increase carbon sequestration through the landscape design.

Item #	Tier	Applicability	Metrics	Documentation	Details
EB5.1	Tier 2	All	• Use the Climate Positive Design's Pathfinder: Landscape Carbon Calculator to calculate the embodied carbon and the carbon sequestration potential within landscape designs[1,2].	**Site Plan Application Submission** • Climate Positive Design Scorecard reporting the Net Project Impact. • Site plan and/or landscape plans aligning with the information input in the Landscape Carbon Calculator.	1. The Climate Positive Design Challenge provides guidance for improving the impact of site design projects on the environment. The goal is for all site design projects going forward to collectively sequester more CO_2 than they emit by 2030, with a target of removing one gigaton of CO2 from the atmosphere by 2050. 2. Please refer to the Climate Positive Design for more information on how to use the Pathfinder Tool.

WATER

This Impact Category focuses on reducing potable water use for indoor and outdoor water uses, water metering, as well as stormwater management. Reducing potable water use, harvesting and re-using stormwater, and managing the quantity and quality of stormwater are all common themes in this topic. Each of the municipal standards reviewed during Phase 2 includes requirements that address one or more of these themes.

Performance Requirements

W1 Reduced Water Use

W2 Benchmarking and Reporting

W3 Water Metering

W4 Stormwater Management

W1 REDUCED WATER USE

Intent: Promotes water conservation by using efficient water fixtures, balanced irrigation practices and reducing overall water consumption.

Item #	Tier	Applicability	Metrics	Documentation	Details
W1.1	Tier 1	All	• Water-consuming fixtures do not exceed the following maximum flow requirements and are WaterSense® labeled:[1,2]: ○ High-efficiency toilets: 4.0 L/flush OR 3 and 6 L/flush (dual flush toilets); and ○ Low flow lavatory faucets: 5.7 L/min.	**Site Plan Application Submission** • A Letter of Commitment signed by a qualified professional (Mechanical Engineer) and the owner/developer that includes confirmation that requirements of this metric will be met. **Post Construction Submission** • Plumbing fixture specifications or other documentation demonstrating WaterSense® labelling and flush/flow rates.	1. Potential strategies for indoor water use reduction include the use of dual flush toilets and waterless urinals. 2. Refer to the EPA WaterSense site for a list of WaterSense labeled products.
W1.2	Tier 2	All	• Reduce indoor potable water consumption by 40% over the baseline fixture (per LEED BD+C v4 guidance)[1,2].	**Site Plan Application Submission** • Credit calculations demonstrating compliance with the metric requirements. **Post Construction Submission** • Plumbing fixture specifications or other documentation demonstrating flush/flow rates, and updated credit calculations (if necessary).	1. Potential strategies for enhanced indoor water use reduction include low-flow plumbing fixtures, and greywater and/or rainwater re-use systems to capture and reuse for indoor flushing fixtures. 2. Refer to the LEED BD+C v4: Indoor water use reduction for more information on indoor water use reduction.
W1.3	Tier 2	All	• **Outdoor**: Reduce potable water used for irrigation by 60% (per LEED BD+C v4 guidance)[1,2].	**Site Plan Application Submission** • Credit calculations demonstrating compliance with the metric requirements. **Post Construction Submission** • Irrigation specifications or other documentation demonstrating irrigation system, and updated credit calculations (if necessary).	1. Potential strategies for outdoor potable water use reduction include the use of drought-tolerant native species, water-efficient plant species, rain sensors for irrigation systems, and non-potable water for irrigation (e.g. rainwater cistern collection and re-use system, or rain collection barrels). 2. Refer to the LEED BD+C v4: Outdoor water use reduction for more information on outdoor water use reduction.

W2 BENCHMARKING AND REPORTING

Intent: Promote energy and water conservation through ongoing monitoring and reporting, and increased visibility for the City of Hamilton to track water consumption of new developments.

Item #	Tier	Applicability	Metrics	Documentation	Details
W2.1	Tier 1	Part 9	• **Buildings 50,000 square feet (≈ 4645 m²), or larger:** Enroll the project in ENERGYSTAR® Portfolio Manager to track energy and water consumption of the new development during operations in accordance with O. Reg. 506/18[1].	**Site Plan Application Submission** • Provide a Letter of Commitment signed by the owner/developer/builder that includes confirmation that the requirements of this metric will be met. **Post Construction Submission** • Confirmation of Registration	1. Benchmarking of private buildings annual energy consumption is required in accordance with Ontario Regulation 506/18. Building energy benchmarking is a process through which building owners and/or managers can track and report their building's operational energy and water use over time. Refer to the ENERGY STAR® Portfolio Manager website. 2. Provide the City of Hamilton's account with read-only access to the project.
W2.2	Tier 2	All	• Enroll the project in ENERGYSTAR® Portfolio Manager to track energy and water consumption of the new development during operations[1].	**Post Construction Submission** • Confirmation of Registration	

W3 WATER METERING

Intent: Promotes awareness for water consumption to reduce usage, and supports monitoring and benchmarking water use over time.

Item #	Tier	Applicability	Metrics	Documentation	Details
W3.1	Tier 2	All	• For buildings with multiple tenants, provide water submetering for each commercial/institutional tenant and per residential suite[1,2].	**Site Plan Application Submission** • Plans, drawings, or other documentation indicating individual water meters in building.	1. Refer to LEED BD+C: Multifamily Midrise - Water metering for guidance on water metering. 2. Single room–occupancy units, transitional and temporary housing, and designated supportive housing buildings do not need a water meter in each unit.

W4 STORMWATER MANAGEMENT

Intent: Enhance stormwater and watershed management to minimize the impact of polluted runoff flowing into water streams and to alleviate the strain that stormwater places on municipal infrastructure.

Item #	Tier	Applicability	Metrics	Documentation	Details
W4.1	Tier 1	All	• Provide long-term controls for Erosion and Sediment Control (ESC) in conformance with the Erosion and Sediment Control Guide for Urban Construction (2019)[1,2,4,5]. • Demonstrate compliance with the Green Standards and Guidelines for Low Impact Development[3].	**Site Plan Application Submission** • Stormwater Management Report, Plan(s), and drawing(s) to verify compliance.	1. Refer to the Erosion and Sediment Control Guide for Urban Construction (2019) for details. 2. Potential erosion control strategies may include erosion and sediment control plans, silt fencing, sediment traps, and sediment basins. 3. Green Standards and Guidelines for Low Impact Development outline the process meeting City of Hamilton stormwater quantity and quality requirements. 4. Stormwater retention can be met through infiltration, evaporation/evapotranspiration or through greywater reuse. For greywater reuse applications, ensure greywater volume is consumed prior to the next subsequent retention design rainfall event. 5. Filtration will be credited on constrained sites that are limited in their retention or reuse capabilities. Refer to the Green Standards and Guidelines for Low-Impact Development.
W4.2	Tier 2	All	• Design for future rainfall data instead of historical rainfall data to account for future climate change[1].	**Site Plan Application Submission** • Stormwater Management Report, Plan(s), and drawing(s) to verify compliance.	1. Examples of acceptable pathways include: ○ Provide control for the 100-year rainfall event down to the current control requirement using the Future 100-year modified rainfall intensity. Use the University of Western Ontario and the Canadian Water Institute IDF CC Tool for deriving rainfall Intensity-Duration-Frequency Curves. ○ Using the current IDF curves from the City of Hamilton, apply an additional 25% to the rainfall amount for the 100-year 24-hour storm event, to be distributed equally over the duration.

WASTE MANAGEMENT AND MATERIALS

This Impact Category focuses on reducing waste generation during construction and the operational phases of development. Reducing waste can contribute to the reuse of existing materials and decrease demand for raw materials. In addition, managing operational waste facilitates waste recycling and decomposing practices, contributing to waste diversion and material reuse and ultimately positively impacting the environment and natural resources. In each of the peer municipal standards reviewed in Phase 2, waste management has been observed to be an integral focus area and has been addressed through a combination of mandatory and voluntary performance requirements.

Performance Requirements

WM1 Construction Waste Reduction and Management

WM2 Operational Waste Reduction and Management

WM3 Material Reuse

WM1 CONSTRUCTION WASTE REDUCTION AND MANAGEMENT

Intent: Facilitate the reduction of waste and the safe and proper disposal of waste generated during building construction. Diverting waste from landfills reduces the extraction of virgin natural resources and minimize land, water, and air pollution.

Item #	Tier	Applicability	Metrics	Documentation	Details
WM1.1	Tier 1	All	• Manage construction and demolition waste in accordance with O. Reg. 103/94, as amended: Industrial, Commercial and Institutional Source Separation Programs [1].	**Site Plan Application Submission** • Construction and Demolition Waste Management Plan.	1. Refer to O. Reg. 103/94 for more details.
WM1.2	Tier 1	All	• Develop and implement a Construction and Demolition Waste Management Plan, and demonstrate a diversion rate of 50% or more from landfill[1,2,3,4].	**Site Plan Application Submission** • Construction and Demolition Waste Management Plan. **Post Construction Submission** • Waste Diversion Report indicating total Construction and Demolition Waste diversion rate of the project.	1. Construction Waste Management Plan should: ○ Identify strategies to reduce the generation of waste during project design and construction. ○ Establish waste diversion goals for the project by identifying the materials targeted for diversion. ○ Describe the diversion strategies planned for the project. ○ Describe where materials will be taken including expected diversion rates for each material. 2. Track all waste removed from site and update a Waste Diversion Report at least monthly. 3. Calculations can be by weight or volume but must be consistent throughout construction. 4. Exclude hazardous waste, excavated soil and land-clearing debris from calculations.
WM1.3	Tier 2	All	• Demonstrate a waste diversion rate of 75% or more from landfill[2,3,4].		

WM2 OPERATIONAL WASTE REDUCTION AND MANAGEMENT

Intent: Facilitate the reduction of waste generated and the safe and proper disposal of waste generated during building operations.

Item #	Tier	Applicability	Metrics	Documentation	Details
WM2.1	Tier 1	Part 9 (Residential)	• Design and construct the building(s) to meet section 3.5 of the City of Hamilton's waste design requirements for new developments[1,2,3].	**Site Plan Application Submission** • Drawings or plans indicating the type, floor area and location of the waste storage and sorting system.	1. Refer to the City of Hamilton Waste Requirements for Design of New Developments and Collection (2021), where applicable. 2. Comply with O. Reg 103/94 where applicable. 3. Refer to the City of Hamilton Solid Waste Master Plan, where applicable.
WM2.2	Tier 1	Part 3 & Part 9 (Residential)	• Design kitchen cabinets to accommodate space for the separate collection of recycling, organics and garbage[1,2,3].	**Site Plan Application Submission** • A Letter of Commitment signed by a qualified professional (Architect) and the owner/developer/builder that includes confirmation that requirements of this metric will be met. **Post Construction Submission** • Drawings or plans indicating the designated space.	1. Provide "built-in" storage including at least three separate storage containers for segregated storage and collection. 2. Minimum dimensions for storage bins: 8.5L each bin for garbage and organics and 18L bin for recycled materials. 3. Refer to O. Reg. 103/94, where applicable.

WM3 MATERIAL REUSE

Intent: Encourage reuse of existing materials to support total carbon reductions and reduce demolition and construction waste.

Item #	Tier	Applicability	Metrics	Documentation	Details
WM3.1	Tier 2	All	• Maintain the existing building structure and envelope[1] for 30% of the existing floor area OR use existing interior non-structural elements for at least 30% of the entire completed building, including additions[2,3].	**Site Plan Application Submission** • A Letter of Commitment signed by a qualified professional (Architect, Structural Engineer) and the owner/developer/builder that includes confirmation that requirements of this metric will be met. • Calculations completed by a qualified professional (Architect, Structural Engineer) demonstrating this metric can be met. **Post Construction Submission** • Report/ drawings/ plans demonstrating the preserved and new components of the building. • Calculations completed by a qualified professional (Architect, Structural Engineer) demonstrating this metric has been met.	1. Envelope components include: exterior skin and framing, and exclude window assemblies and non-structural roofing material. 2. Hazardous materials are excluded. 3. Refer to LEED BD+C v4: Building life-cycle impact reduction for details.

COMMUNITY AND URBAN DESIGN

This Impact Category focuses on the design elements that promote a sense of place in the community by emphasizing the importance of preserving heritage and cultural features, raising awareness of local food production, promoting healthy practices and inclusion, as well as educating residents on sustainability features in their community and ultimately creating communities that are healthy and resilient.

Performance Requirements

CD1 Promotion of Public and Active Transportation

CD2 Services within Walking Distance

CD3 Bicycle Facilities

CD4 Accessible Design

CD5 Urban Agriculture

CD6 Heat Island Effect

CD7 Community Sustainability Outreach

CD8 Celebration of Heritage and Culture

CD1 PROMOTION OF PUBLIC AND ACTIVE TRANSPORTATION

Intent: Reduce air pollution and GHG emissions related to car use by promoting active transportation. Active transportation also reduces fuel-dependency, traffic congestion, noise pollution, and infrastructure.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD1.1	Tier 1	All	• Develop a Transportation Demand Management (TDM) Plan and demonstrate a 25% reduction in single occupancy auto vehicle trips generated by the proposed development[1,2].	**Site Plan Application Submission** • Transportation Demand Management Plan demonstrating a 25% reduction.	1. Transportation Demand Management manages the demands placed on transportation infrastructure. It is the use of policies, programs, infrastructure improvements, and/or services to influence travel behaviour. TDM encourages sustainable travel choices by supporting alternatives options over the convention of frequently driving alone. 2. Refer to City of Hamilton Cycling Master Plan, where applicable.
CD1.2	Tier 1	All	• Construct a network of suitable cycling facilities and multi-use paths within the development which also connects to the bicycle network and implement recommendations of the City's Transportation Master Plan and/or Cycling Master Plan (where applicable)[1,2,4].	**Plan of Subdivision and Site Plan Application Submission** • Plan(s) indicating network of cycling facilities and multi-use paths.	1. Refer to the City of Hamilton Transportation Master Plan, where applicable. 2. Refer to City of Hamilton Cycling Master Plan, where applicable. 3. Refer to the City of Hamilton's Zoning By-Law, where applicable. 4. Refer to LEED BD+C v4.1: Bicycle Facilities, where applicable.
CD1.3	Tier 1	All	• Provide safe and direct routes that encourage the use of active transportation modes and connect to transit, commercial areas, community facilities, and parks[1,3].	**Plan of Subdivision and Site Plan Application Submission** • Plan(s) indicating safe and direct active transportation routes.	
CD1.4	Tier 1	All	• Locate transit stops in accessible and safe areas[1,3].	**Plan of Subdivision and Site Plan Application Submission** • Plan(s) indicating transit stops.	

CD2 SERVICES WITHIN WALKING DISTANCE

Intent: Promotes healthy practices among occupants and encourages a more active lifestyle

Item #	Tier	Applicability	Metrics	Documentation	Details
CD2.1	Tier 2	All	• **Draft Plan of Subdivision only:** Locate the building(s) within 800m of at least one of the following: ○ Transit station or stop; ○ Three amenities or services; or ○ Public park or recreational trail.	**Site Plan Application Submission** • Site plan(s) highlighting walking distance to selection option.	1. Refer to LEED v4 Appendix 1 for examples of amenities categories and use types.

CD3 BICYCLE FACILITIES

Intent: Reduce air pollution and GHG emissions related to car use, and encourages a more active lifestyle.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD3.1	Tier 1	All	Provide long-term and short-term bicycle parking spaces that meet or exceed the following minimum rates:[1,2,3,4,5,6.] • **Multiple Dwelling and Dwelling Unit and Mixed Use**: ○ **Short-term**: 0.1 parking space per unit (for Parking Rate Area 1 & 2), 0.05 parking space per unit (for all other areas). ○ **Long-term:** 0.7 parking space per unit (for Parking Rate Area 1 & 2), 0.5 parking space per unit (for all other areas). • **Commercial and Institutional Uses**: ○ **Short-term:** 0.2 for each 100 square metres of gross floor area (for Parking Rate Area 1 & 2), 0.15 for each 100 square metres of gross floor area (for all other areas). ○ **Long-term:** 0.15 for each 100 square metres of gross floor area (for Parking Rate Area 1 & 2), 0.1 for each 100 square metres of gross floor area (for all other areas). • **Industrial Uses:** ○ **Short-term:** 0.2 for each 100 square metres of gross floor area (for Parking Rate Area 1 & 2), 0.15 for each 100 square metres of gross floor area (for all other area). ○ **Long-term:** 0.15 for each 100 square metres of gross floor area (for Parking Rate Area 1 & 2), 0.1 for each 100 square metres of gross floor area (for all other areas). • **University, College:** ○ **Short-term**:1.2 parking space for each 100 square metres of gross floor area. ○ **Long-term:** 1 parking space for each 100 square metres of gross floor area.	**Site Plan Application Submission** • Plan(s) indicating location, number, and type (long-term/short-term) of bicycle parking spaces.	1. Bicycles include adaptive bikes, trikes, and scooters for people with disabilities. 2. Long-term bicycle parking spaces are bicycle parking spaces for use by the occupants or tenants of a building. Short-term bicycle parking spaces are bicycle parking spaces for use by visitors to a building. 3. Short-term Bicycle parking spaces shall be publicly accessible and located within a bicycle parking area at grade, which includes the first floor of a building or an exterior surface area. Spaces should be visible and easily accessible location in close proximity to main building entrances. 4. Long-term Bicycle parking Spaces shall be located weather protected, and in a secure enclosed bicycle parking area within a building. 5. Refer to the City of Hamilton Zoning By-law No. 05-200 for more information on Parking Areas. 6. Refer to City of Hamilton Transportation Master Plan and Cycling Master Plan, where applicable.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD3.2	Tier 2	All	• Provide an additional 20% long-term and short-term bicycle parking spaces, beyond the Tier 1 minimum parking space requirements[1,2,3,4].	**Site Plan Application Submission** • Plan(s) indicating location, number, and type (long-term/short-term) of bicycle parking spaces.	
CD3.3	Tier 2	Part 9 (Residential)	• Include dedicated bike share location onsite and engage in contract with Hamilton Bike Share program[1]. • **Alternative Compliance Path:** Provide at least 10 additional publicly accessible, short-term bicycle parking spaces, at-grade on the site or within the public boulevard. Spaces should be in addition to bicycle parking required under CD6.1 and CD6.2.	**Site Plan Application Submission** • Site plan(s) highlighting the location of planned bike share location or publicly accessible spaces. **Post Construction Submission** • Documentation demonstrating enrollment in Hamilton Bike Share Program.	1. Hamilton Bike Share Inc. is the local not-for-profit organization that operates the City of Hamilton's bike share system. 2. Alternative Compliance Path can be pursued where the site is located outside of the Hamilton Bike Share coverage area.

CD4 ACCESSIBLE DESIGN

Intent: Design to support persons with disabilities.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD4.1	Tier 1	All	• Meet the Accessibility for Ontarians with Disabilities Act (AODA) Integrated Accessibility Standards, sections 80.16 to 80.31 inclusive, for pedestrian infrastructure[1].	**Site Plan Application Submission** • Plan(s), drawing(s), or other documentation demonstrating compliance.	1. When providing pedestrian crossings, consider curb ramps and depressed curbs (designed according to AODA standards).

CD5 URBAN AGRICULTURE

Intent: Promote urban agriculture to raise awareness around local food, reduce environmental and economic impact from transport of food, and increase green space.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD5.1	Tier 1	All (Excluding Commercial and Industrial)	• Residential buildings: Provide 0.5 sq.m. per dwelling unit of garden space[1,2]. • Institutional Buildings: Provide space for urban agriculture and/or community garden.	**Site Plan Application Submission** • Landscape Plans indicating dedicated garden area.	1. Garden space is defined as land and/or an alternative mechanism with a growing medium that will be used to cultivate plants for food. 2. Supports Recommendation #6 of the City of Hamilton's Food Strategy.

CD6 HEAT ISLAND EFFECT

Intent: To reduce ambient surface temperatures and reduce the urban heat island effect.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD6.1	Tier 1	All	• Use one or a combination of a green roof, cool roof and solar PV installed for at least 75% of available roof space[1,2,3,6,].	**Site Plan Application Submission** • Roof plan(s) indicating the heat island reduction measures, including the SRI values(s) of roof materials (if applicable).	1. Available roof space is the total roof area excluding areas designed for renewable energy, private terraces, residential amenity, skylights, and rooftop equipment. 2. Cool roofs must have an initial SRI of 82 or an aged SRI of 64 (for low-sloped roofs <2:12) or an initial SRI of 39 and an aged SRI of 32 (for steep-sloped roofs >2:12). 3. Solar Reflectance Index (SRI) is a measure of a surface's ability to reflect solar heat. The SRI for a given material is calculated using both the reflectance value and the emittance value of the material. Black asphalt has an SRI of 0, a standard white surface is 100, and gray concrete is 35. 4. Non-roof hardscape includes driveways, walkways, courtyards, surface parking areas, artificial turf, and other on-site hard surfaces. 5. Examples of non-roof heat island reduction measures include: o Paving materials with an SRI of 29 or greater; o Shade from existing tree canopy or new 10-year tree canopy; o Shade from architectural structures that are vegetated or have an SRI of 29 or greater; o Shade from structures with energy generation (i.e. PV, solar thermal). o Shade cast by buildings is not an eligible strategy. 6. Where applicable, refer to the following resources for guidance: o City of Hamilton Biodiversity Action Plan o Hamilton Urban Forest Strategy o Hamilton Climate Change Impact Adaptation Plan o Hamilton Community Energy & Emissions Plan
CD6.2	Tier 1	All	• Use one or a combination of the heat island reduction strategies to treat at least 50% of the site's non-roof hardscape[3,4,5,6].	**Site Plan Application Submission** • Site plan or landscape plan indicating the non-roof heat island reduction measures.	
CD6.3	Tier 2	All	• Use one or a combination of the heat island reduction strategies to treat at least 75% of the site's non-roof hardscape [3,4,5,6].		

CD7 COMMUNITY SUSTAINABILITY OUTREACH

Intent: Promotes green building features and supports the continued involvement of tenants/homeowners.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD7.1	Tier 1	All (Excluding Institutional and Industrial)	• Distribute a building-specific sustainability handout to all homeowners and tenants, outlining sustainability features, such as green building materials, native and invasive plant species, waste management programs, bicycle facilities, transit stop locations, and encouraging other activities (low-water gardening, green cleaning materials, alternate pest control measures, purchasing green power)[1]. • Familiarize tenants and homeowners with the building's green building feature with an on-site review[1].	**Site Plan Application Submission** • A Letter of Commitment signed by the developer/owner that includes confirmation that the requirements of this metric will be met. **Post Construction Submission** • Educational package or other educational materials demonstrating compliance.	1. Handout and on-site review can be completed by a representative from the developer, condo-board or property management. 2. Maintain a copy of the education package or other materials during operation and provide to new tenants.

CD8 CELEBRATION OF HERITAGE AND CULTURE

Intent: Contributes to a sense of place in the community and amplifies shared values.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD8.1	Tier 1	All	• Where new developments are located near natural heritage features[1,2], locate amenities and green spaces nearby to provide a buffer. Where trails occur or are planned, provide a connection to the broader community.	**Site Plan Application Submission** • Plan(s), drawing(s), or other documentation demonstrating targeted feature(s).	1. A natural heritage feature is a significant aspect of the natural environment, valued for its ecological, geological, biological, or cultural importance. This may include unique ecosystems, rare species, geological formations, landscapes, or culturally significant areas, which contribute to biodiversity and overall regional heritage. Conservation efforts should aim to protect and preserve these features. 2. Refer to Hamilton Conservation Authority Natural Areas, Grand River Conservation Authority, Conservation Halton, and Niagara Peninsula Conservation, where applicable.

Item #	Tier	Applicability	Metrics	Documentation	Details
CD8.2	Tier 1	All	• Significant cultural heritage resources[1], including heritage buildings and structures, shall be conserved in accordance with provincial and municipal policies. These resources should be retained in situ and integrated into compatible and sympathetic new development[2,3,4]. • For development projects that may impact on-site or adjacent cultural heritage resources, a Cultural Heritage Impact Assessment may be required and would guide the strategy for conservation, ranging from adaptive reuse, relocation to documentation and salvage[2,3,4].	**Site Plan Application Submission** • Cultural Heritage Impact Assessment, including any subsequent plans or studies recommended in the assessment (Conservation Plan, Vibration Study, etc.).	1. Cultural heritage resources include archaeological resources, built heritage resources and cultural heritage landscapes. They can include tangible features, structures, sites, or landscapes that, either individually or as part of a whole, are of historical, architectural, archaeological, or scenic value. Cultural heritage resources also represent intangible heritage, such as customs, ways-of-life, values, and activities. Cultural heritage links communities to their roots and contributes to our image and cultural identity. Cultural Heritage should be protected and enhanced. 2. If the property is Designated, a Heritage Permit will be required for any alteration, demolition or relocation that directly impacts the reasons for designation or heritage attribute listed in the Designation By-law. 3. Contact Cultural Heritage staff to confirm the Heritage Permit process and timing in conjunction with the Development Approval process.
CD8.3	Tier 1	All	• Incorporate public art[1] into publicly accessible and visible spaces or into building designs as an architectural element, where feasible, which celebrates the culture or history of the area.	**Site Plan Application Submission** • Plan(s), drawing(s), or other documentation demonstrating targeted feature(s).	1. Examples of public art include sculptures, murals, interpretive signage, and architectural elements.
CD8.4	Tier 2	All	• Introduce beautification measures/amenities[1] that beautify stormwater management features, such as ponds.	**Site Plan Application Submission** • Plan(s), drawing(s), or other documentation demonstrating targeted feature(s).	1. Examples of beautification include public art or interpretive signage.