

# Durham Standard

Region of Durham Design Standard for Regional Facility Construction,  
Expansion and Renovation

User Guide

Version 1

March, 2023

The Durham Standard is the Region's design guideline for facility renovations, retrofits, expansions and new construction. The Standard has been developed with the goal of establishing a consistent minimum criterion for the design, construction, expansion and renovation of buildings owned and leased by the Region.

The broad purpose of the Durham Standard is to reduce the negative impacts of Regional buildings while enhancing social and environmental benefits in a fiscally responsible manner. The Durham Standard acknowledges the different types and scales of building construction projects that the Region manages and adopts a performance-based approach to building design and construction. Areas of performance range from accessibility and inclusivity to space optimization, and sustainability and resilience (including energy efficiency and greenhouse gas (GHG) emissions reductions, as well as ecological health).

The Durham Standard supports greater alignment between the objectives of the Durham Region Strategic Plan and the design, construction and ongoing asset management of Regional facilities.

It has been developed to create welcoming facilities that support our diverse community and work force; facilities that minimize environmental impacts; and workspaces that are modern and flexible to adapt to changing ways of working.



The Durham Standard User Guide is the starting point for stakeholders to implement its targets and measures. This user guide contains the following sections:

1. Areas of Focus
2. Capital Project Implementation
3. Design Checklists (see Appendices)
4. Supporting Technical Documents and Guidelines
5. External Standards Referenced
6. Administration
7. Appendices: A,B,C

### Acknowledgements

The Durham Standard was created through the collaboration of the Regional stakeholders and supported by Purpose Building Inc.:

Works Department:

- Facilities Design, Construction and Asset Management
- Facilities Maintenance and Operations
- Technical Support

Office of the Chief Administrative Officer:

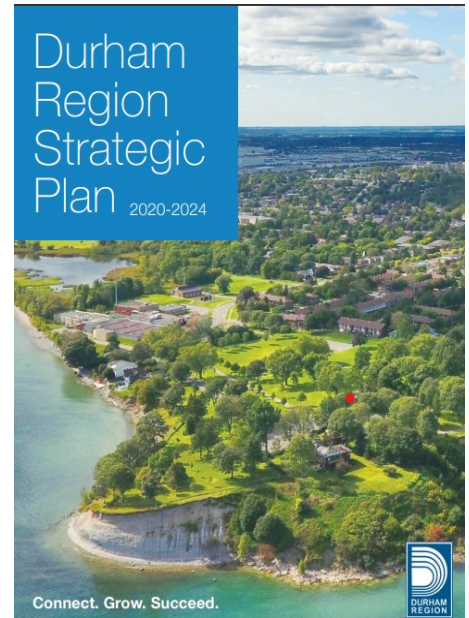
- Accessibility, Diversity, Equity and Inclusion
- Strategic Initiatives—Sustainability

Finance Department:

- Corporate Asset Management
- Business plan and Budget team
- Purchasing
- Risk Management

## Areas of Focus

The Durham Standard aligns the planning and delivery of facility-related capital projects with the Region's Strategic Plan. The Strategic Plan incorporates financial, social, and environmental values, and provides a roadmap to help achieve Regional Council's vision for the future. Corporate values emanating from the Strategic Plan inform key corporate policy documents such as the Regional Official Plan, Regional Council's Climate Emergency Declaration, Corporate Climate Action Plan, Asset Management Plan and Policy, Accessibility Plan, and the Long-Term Financial Planning Framework.



The Durham Standard provides quantifiable and measurable outcomes in terms of:

- a) Accessibility and Inclusivity;
- b) Space optimization of office spaces; and,
- c) Sustainability and Resilience, including greenhouse gas (GHG) emissions reduction, asset resilience, circular economy, indoor environmental quality, water quality and efficiency, and ecology.

# Capital Project Implementation

The Durham Standard outlines processes for the Region to achieve the “best value” option, being the one which delivers the required performance at the lowest lifecycle cost.

The Durham Standard sets the minimum performance level required for the delivery of capital projects at new and existing Regionally owned and operated facilities. It is designed as an overarching program to support appropriate decision-making to meet the Region's Strategic Plan objectives within corporate facilities. The Standard applies to all Regionally owned and operated facilities, which include:

- Long-term care, multi-unit rental housing, and childcare facilities;
- Durham Region Police Service facilities;
- Region of Durham Paramedic Service facilities;
- Office and Administration areas of facilities; and
- Building envelopes and administrative and laboratory areas within industrial and waste facilities including fleet maintenance garages, Works depots, waste transfer stations, water and sewage treatment facilities, and Durham Region Transit facilities.

## Capital Project Implementation (cont d)

The Standard will apply to all new facility construction. As renovation projects range in size, scope and impact, application of the Standard will only be mandatory in the following renovation projects:

- Projects valued at 25 per cent or more of a building s planned capital projects within a 10-year horizon; and
- Project valued at 15 per cent of a buildings planned capital projects beyond a 10-year horizon.

The following table outlines the responsibilities in each functional area supporting capital project delivery.

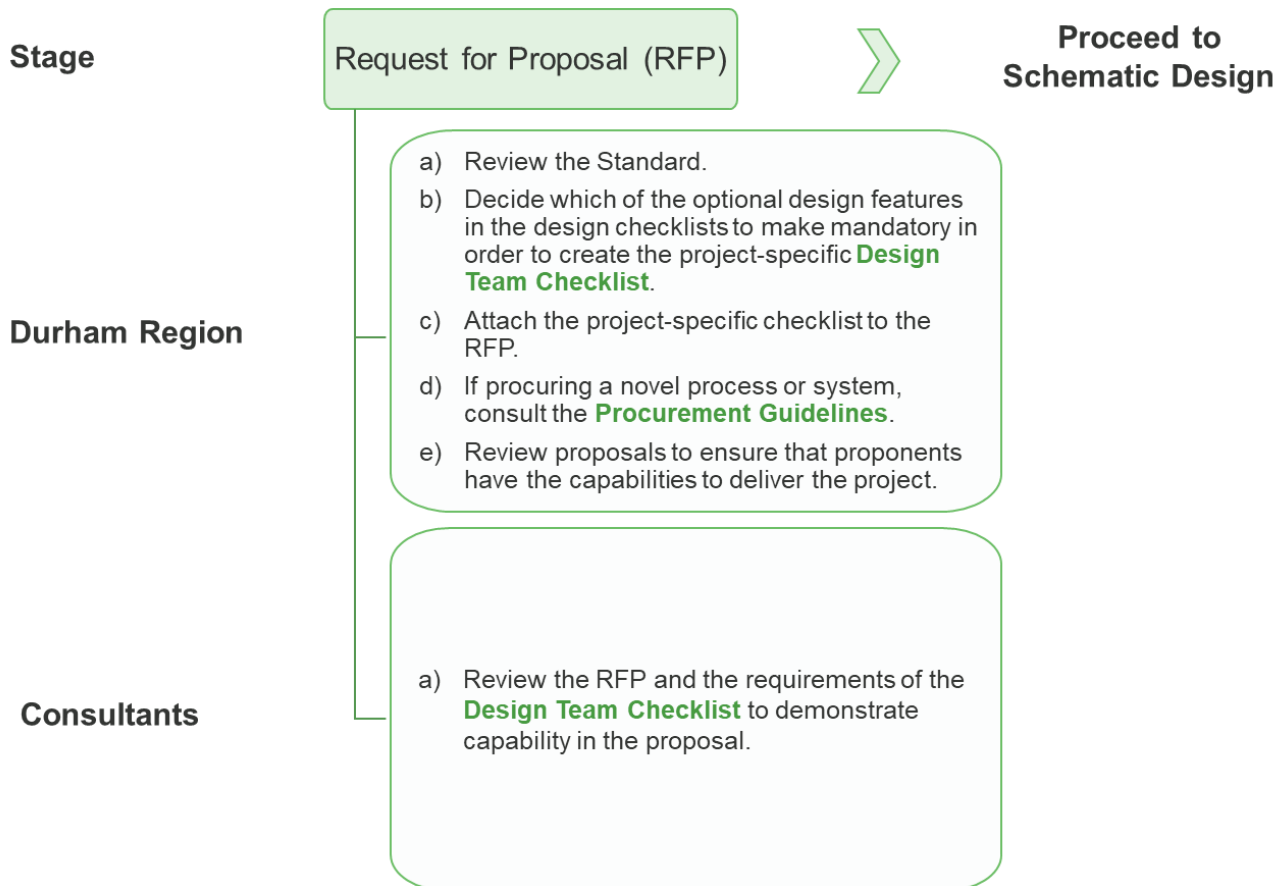
Functional Area	Responsibility
Durham Standard Team	<ul style="list-style-type: none"> <li>• Comply with the Durham Standard in project scope, application and approval processes.</li> <li>• Provide recommendations to the project delivery teams when multiple compliant options are present or measures are not proposed.</li> </ul>
Project Delivery Teams	<ul style="list-style-type: none"> <li>• Comply with the Durham Standard in project scope, application and approval processes.</li> <li>• Ensure the design and construction meets the requirements of the Durham Standard.</li> </ul>
Procurement	<ul style="list-style-type: none"> <li>• Be familiar with the Durham Standard.</li> <li>• Include the requirements of the Durham Standard in procurement documents.</li> </ul>
Facilities Maintenance and Operations	<ul style="list-style-type: none"> <li>• Be familiar with the Durham Standard.</li> <li>• Include the requirements of the Durham Standard when initiating capital project requests.</li> </ul>
Design Consultants	<ul style="list-style-type: none"> <li>• Be familiar with the Durham Standard.</li> <li>• Specify and communicate relevant Durham Standard requirements to vendors and contractors.</li> <li>• Provide evidence of compliance with the Durham Standard using the tools provided.</li> </ul>
Product Vendors	<ul style="list-style-type: none"> <li>• Be familiar with the Durham Standard.</li> <li>• Provide design consultants with evidence of compliance with the Durham Standard using the tools provided.</li> </ul>

# Capital Project Implementation (cont d)

Capital project implementation is characterized by six stages:

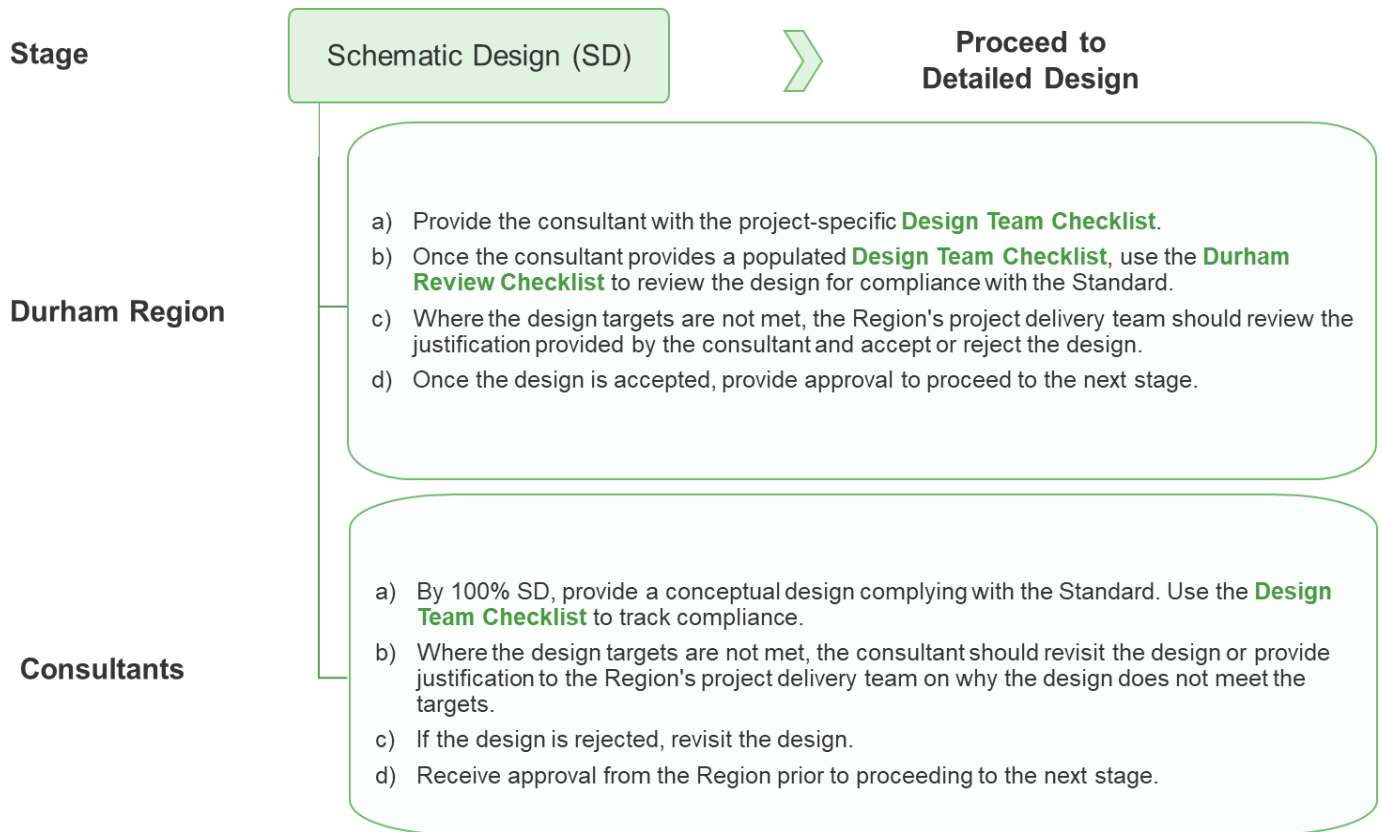
1. Request for Proposals Development
2. Schematic Design
3. Design Development
4. Construction Documentation
5. Construction
6. Substantial Completion & Occupancy

## 1. Request for Proposal Development Workflow

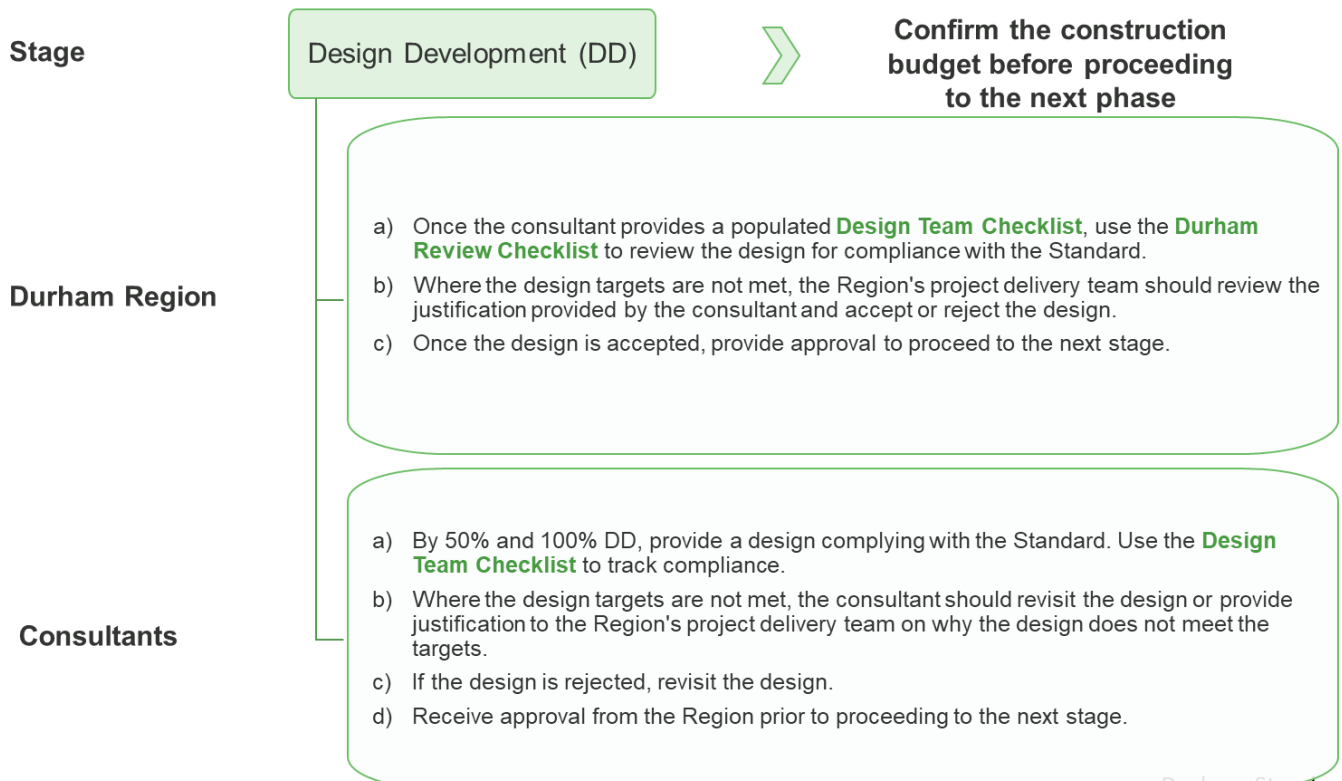


# Capital Project Implementation (cont d)

## 2. Schematic Design Workflow

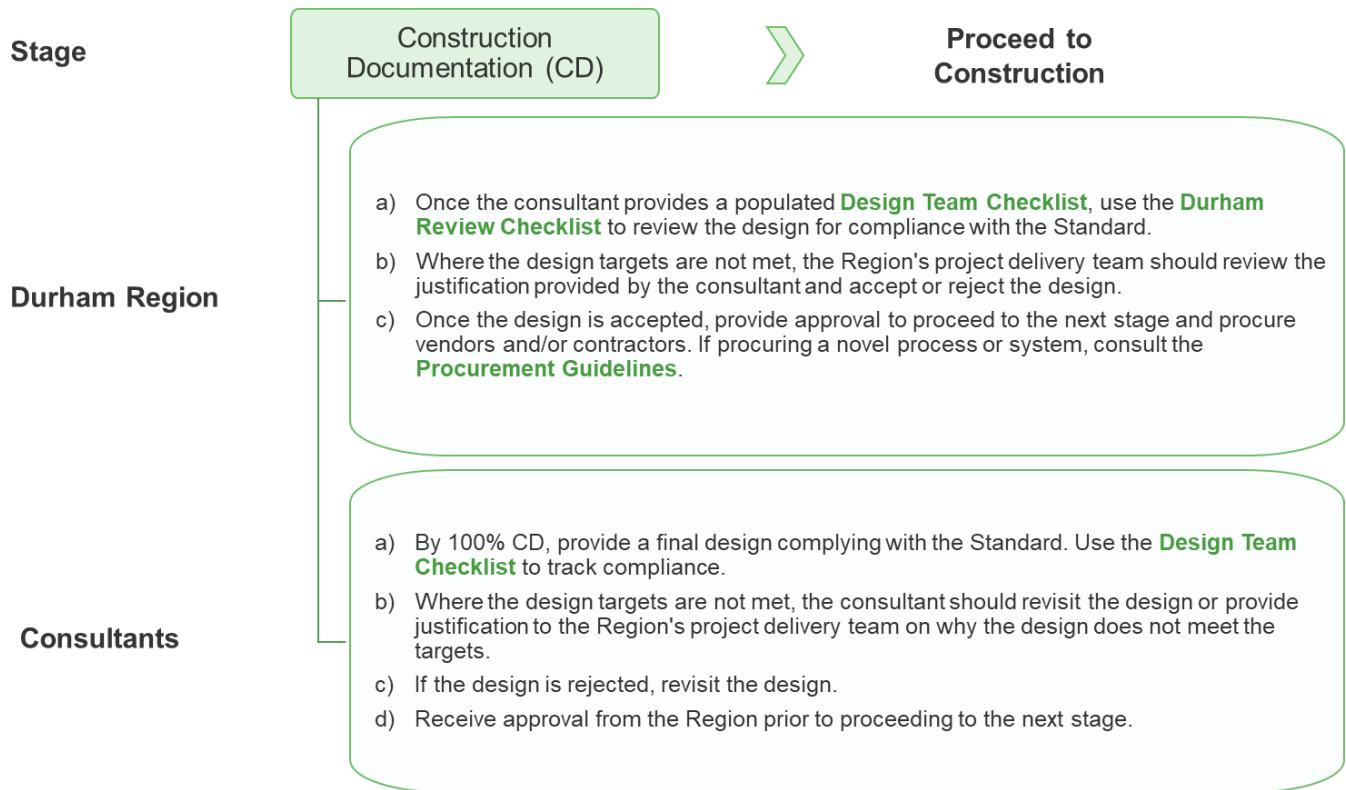


## 3. Detailed Design Workflow

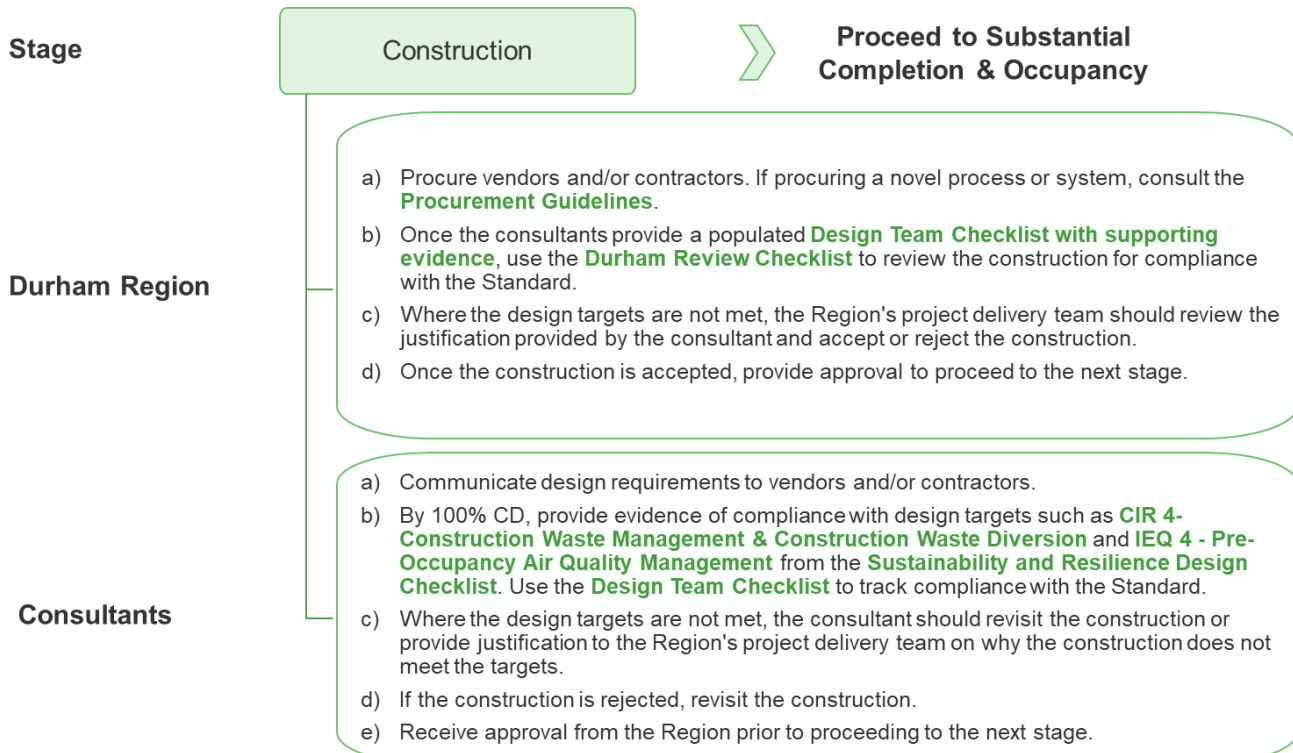


# Capital Project Implementation (cont'd)

## 4. Construction Documentation Workflow

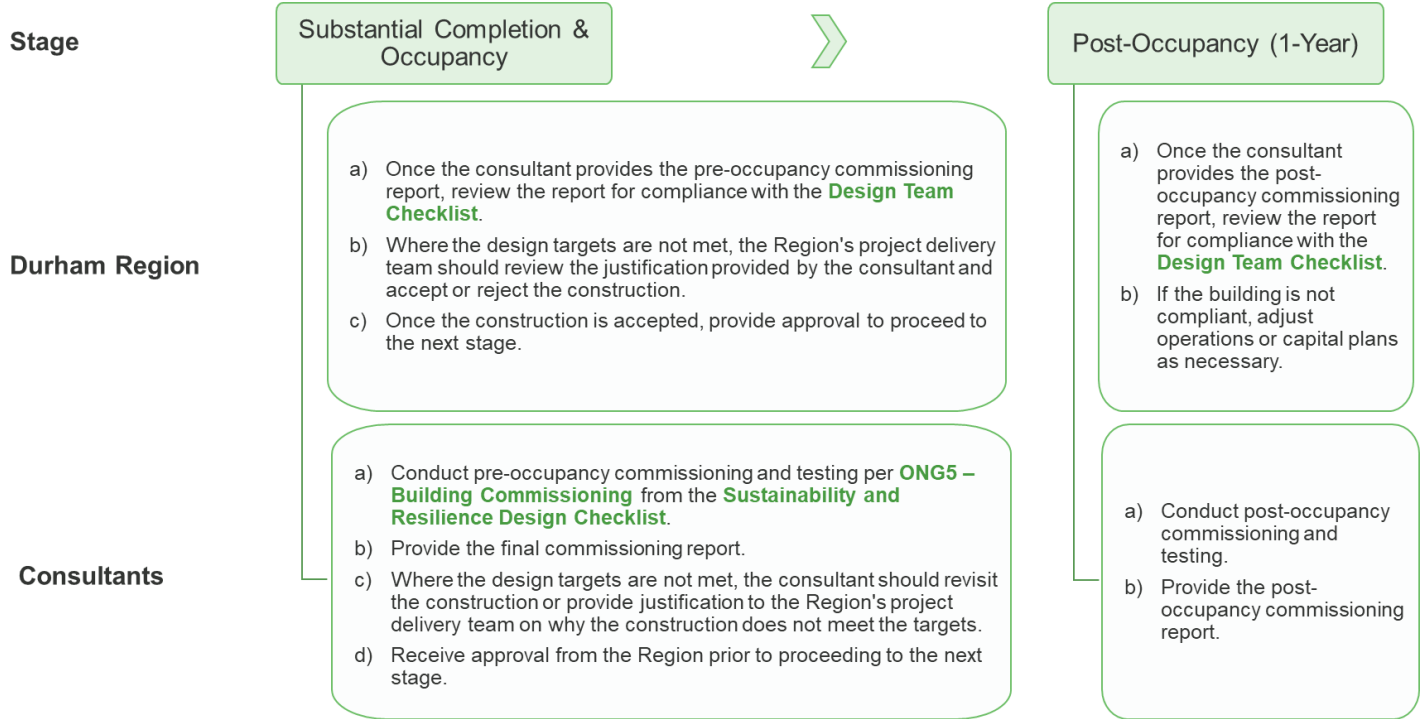


## 5. Construction Workflow



# Capital Project Implementation (cont'd)

## 6. Substantial Completion & Occupancy Workflow



## **Design Checklists**

The design checklists for the Durham Standard are included as attachments to this document. (View, Show/Hide, Navigation Panes, Attachments)

1. Accessibility and Inclusivity Design Checklist
2. Space Optimization Design Checklist
3. Sustainability and Resilience Design Checklist

## **Supporting Technical Documents and Guidelines**

The technical documents and guidelines for the Durham Standard are included as attachments to this document. (View, Show/Hide, Navigation Panes, Attachments)

1. Lifecycle Impact Analysis:
  - a. Lifecycle Impact Analysis Approach
  - b. Zero Carbon Building Embodied Carbon Reporting Template
  - c. Zero Carbon Building Life-Cycle Cost Calculator
2. Accessibility and Inclusivity Requirements
3. Building Automation System Requirements
4. Carbon Pricing Escalation Approach and Guidance
5. Measurement and Verification Guidelines
6. Renewable Energy and Carbon Offsets Program
7. Standard Method for Modelling
8. Workplace Modernization Office Planning Guidelines

# Referenced External Standards

Existing Standard	Expected Review Timeline
Whitby Green Standard v1	Every 4 years; next update is in 2024.
Toronto Green Standard, v4	Every 4 years; next update is in 2026.
LEED BD+C New Construction v4.1	Addenda for specific credits are published twice a year in April and November.
LEED O+M Existing Buildings v4	N/A; recommended to check annually for mandatory v4.1 adoption.
<ul style="list-style-type: none"> <li>• City of Mississauga Corporate Green Building Standard 2019</li> <li>• Canada Green Building Council Zero Carbon Building Standard v2</li> <li>• ASHRAE 140 – 2020: Standard Method of Test for Building Energy Simulation Computer Programs</li> <li>• City of Oshawa Accessibility Design Standards v2</li> </ul>	N/A; recommended to check annually for updates.
<ul style="list-style-type: none"> <li>• National Energy Code for Buildings 2020</li> <li>• Ontario Building Code 2012</li> <li>• Ontario Building Code Supplementary Standard 2016</li> </ul>	Every 4 years

# Administration

The Durham Standard is the Region's first corporate building standard that incorporates design features from existing external standards. It outlines requirements that are achievable using market solutions that are available today that will evolve as industry best practices evolve.

Oversight of the Durham Standard will be the responsibility of a multi-disciplinary, cross-departmental stakeholder group. This Durham Standard Team will provide subject matter expertise as well as represent discipline-specific groups such as the Asset Management Steering Committee and Energy Advisory Committee.

The Durham Standard Team is comprised of representatives from the following program areas:

Works Department:

- Facilities Design, Construction and Asset Management
- Technical Support

Office of the Chief Administrative Officer:

- Accessibility, Diversity, Equity and Inclusion
- Strategic Initiatives—Sustainability

Finance Department:

- Corporate Asset Management
- Business plan and Budget team
- Purchasing

## Administration (Cont'd)

The Durham Standard Team will be responsible for the ongoing implementation of the Durham Standard, as well as ensuring that its requirements remain current and in alignment with industry best practices, market solutions, and external standards as they evolve.

The Durham Standard will be reviewed within the first 2 years of implementation to ensure its requirements are clear and effective. Future versions of the Durham Standard will be reviewed every 4 years to capture any revisions made to the external standards as well as to incorporate considerations based upon the evolution of industry best practices. The Durham Standard will be updated to reflect changes in local area municipal building standard as they occur.

- Current Version : V-1 , March 2023

Version chart :

Version	Release date	Summary of changes			
		ID	Facility Design Feature	Purpose of Design Feature	Target
V-1	March, 2023				

## Appendices

- Appendix A: Master Accessibility and Inclusivity Design Checklist
- Appendix B: Master Space Optimization Design Checklist
- Appendix C: Master Sustainability and Resilience Design Checklist

The "Master Checklists" are holistic lists of Durham Standard design features and targets. As not all design features and targets are applicable to every project, at the beginning of each project Durham Standard Team will determine which of the measures and targets will be optional or not applicable for that specific project and create the "Design Team Checklist" specific to that project. Where a mandatory measure is not being included in a project, a justification is necessary. Note that all projects will be constructed to meet applicable codes and standards external to the Durham Standard,

Periodically Durham Standard Team will review all design features and targets to determine if updates to the Durham Standard are required.

# Appendix A

## Master Accessibility and Inclusivity Design Checklist:

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
2.0 Exterior and Interior Elements			
2.1	Ground and Floor Surfaces	The type of materials and finishes used in ground and floor surfaces is essential in determining accessibility for	Firm, stable, and slip-resistant; matte finish to minimize glare; well-drained; max 5 saw cut joints; Level changes (Up to 6 may be vertical, 6 - 13 to be bevelled (1:2 slope), over 13 to be ramp or curb ramp); grating max 13 openings with elongated openings perpendicular to the direction of travel.
2.2	Ramps	Where a change in level exists, an adequately designed ramp provides easy access for people using wheelchairs, scooters or other wheeled mobility devices, people with mobility issues and people with strollers and other	Min 1100 clear width; 1:15 (6.67%) max running-slope; 1:50 (2%) max cross-slope; max 50 edge protection; 40 – 60 wide color-contrast strip at slope transitions; wall or guards (min 1070 high) on both sides. <b>Landings:</b> Max 9 meters apart; min 2440 x 2440 at top and bottom; min 1670 x 1670 at directional change; 1670 long in straight ramps. <b>Handrails:</b> On both sides of ramps; 865 – 920 high; intermediate handrails for ramps wider than 2200; high tonal contrast; min 300 extension at top and bottom landings; return to guard/rail/wall.
2.3	Stairs	The requirements for stairs are important to improve safety and accessibility for all users.	Riser height 125 - 180; tread depth 280 - 355; closed risers; uniform riser height and tread depth; 610 deep tactile walking surface indicators (TWSI) at the top of the stairs starting one tread depth back and extending the full width of the stairs, wall, or guards (min 1070 high) on both sides. <b>Nosings:</b> max 25 projection; sloped >60 degrees to the horizontal; radius 8 - 13 at rounded or bevelled leading edge profile; horizontal strip markings (40 - 60 deep, full width of thread, high tonal contrast). <b>Handrails:</b> On both sides of ramps; 865 – 920 high; high tonal contrast; continues around landing less than 2100; intermediate handrails for stairs wider than 2200, with a handrail reachable within 825mm of all portions of access width, and at least one portion of the stairs with a clear width of 900; min 300 extension at top; diagonal extension of one tread depth plus min 300 parallel extension at bottom; return to guard/rail/wall.

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
2.4	Guards and Hand-rails	Guards and hand-rails provide continuous support and important orientation cues for all users ascending or descending the stairs, ramps, and	<p><b>Guards:</b> mount min 1070 high; prevents passage of min 100 dia.</p> <p><b>Handrails:</b> continuous grasping surface; rounded edges; 30 - 40 dia.; min 50 clearance from adjacent surface, 60 clearance from adjacent rough surface; min 450 clearance from above in recessed area; resist uniform load of at least 0.7 kN and concentrated load of at least 0.9 kN.</p>
2.5	Over-hanging and Protruding Objects	Creating pathways free from overhanging and protruding objects is essential to prevent all users from any hazards or	Objects protruding more than 100 from wall to be cane detectable - lowest edge no higher than 680; min 2100 headroom clearance; headroom clearance less than 2100 - provide railings or other barrier that is cane detectable.
2.6	Rest Areas	Rest areas are essential for people who may have difficulty standing or walking for extended periods or people with limited stamina.	Spaced no more than 30 m apart; slip-resistant floor; provide contrast to ground finish/texture and/or tone from accessible path of travel; min 915 wide by 1370 deep clear floor space adjacent to bench; min 450 - 500 bench height; arm and back rests; public consultation required.
2.7	Tactile Walking Surface Indicators	Tactile walking surface indicators (TWSI) are detectable underfoot or by a long cane and help alert or guide people with low vision or blindness.	Raised tactile profile; truncated domes (4 - 6 high, 12 - 25 top dia., base dia. of 10 +/- 1 more than top dia., spacing center to center as per Table 1); slip-resistant and non-glare surfaces; high tonal contrast; edges beveled or level with surrounding surface.
2.8	Drinking Fountains	The provision of two drinking fountains at different heights, which are recessed in an alcove, helps meet the needs of diverse users and prevents potential bumping hazards.	<p>Adjacent to an accessible route; recessed or cane detectable at or below 680; high tonal contrast; min 915 wide by 1370 deep clear floor space for front approach; min 1525 wide by 915 deep clear floor space for side approach; min knee clearance of 760 wide by 735 high by 200 deep from front edge; min toe clearance of 760 wide by 350 high by 300 back from wall; controls located at or near the front and requires &lt;22 N to operate.</p> <p><b>Water spout:</b> max 915 high; max 125 from the front; min 380 from wall; min 100 high water flow.</p>

## Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
2.9	Public Tele-phones	The placement of public telephones and the types of controls used help address the reach requirements of people with short stature or seated positions and people who are hard of hearing.	Number of accessible public phones as per Table 2; identified by accessible signage; clear floor space for front and side approach; adjacent to an accessible route; recessed or cane detectable at or below 680; comply with CSA T515. <b>Telephone operating controls:</b> max 1200 high; push buttons; high tonal contrast; matte finish; max 485 reach range from front; min 735 cord length; adjustable volume controls. <b>Shelves and counters:</b> min 500 wide by 350 deep; 775 - 875 high; min 740 high knee clearance; min 250 clear space between shelf top and phone lower edge.
2.10	Seating, Tables, and Work Surfaces	Accessible seating, tables, and work surfaces are essential to accommodate the needs of a range of users.	<b>Benches and seats:</b> 450 - 500 seat height; 330 - 510 seat depth; back support extending min 320; min 1 arm rest between 220 - 300 from seat; stable; high tonal contrast. <b>Tables and work surfaces:</b> on an accessible route; 710 - 865 high; min 760 wide by 480 deep by 685 high clear knee space; min 350 high by 230 deep toe clearance; high contrast; clear floor space for front and side approach.
3.0 Exterior Elements			
3.1	Parking	Accessible parking spaces are intended to minimize travel distances for people with limited mobility, accommodate vehicles equipped with a mechanical lift or wheelchair ramp, and provide necessary space for people with disabilities to get in and out of	Provide Type A (van accessible) and Type B (limited mobility) parking spaces as per Table 3; Type A – min 3400 wide by 5400 long; Type B – min 2600 wide by 5400 long; min 7250 long by 4600 wide parallel parking spaces; locate max 30 meters from an accessible entrance and integrate with an accessible route; max 1:50 (2%) running-slope and cross-slope; min 2100 headroom; directional signage where stalls and entrance are not easy to locate. <b>Access aisle:</b> min 1500 wide; adjacent to and full length of parking space; color-contrast diagonal pavement marking. <b>Vertical signage:</b> accessible parking permit sign; min 300 wide by 450 high; 1500 – 2500 high; high tonal contrast. <b>Pavement marking:</b> min 1525 x 1525; slip-resistant; high-contrast.

## Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
3.2	EV Charging Parking	<p>Accessible electric vehicle (EV) charging parking locations are intended to make use of EV parking accessible to every user. Providing suitable locations, additional room within the parking space, space at the controls, access to accessible paths of travel, lighting and signage are all integral to successful and usable designs for all users.</p>	<p>100% of EV parking to be accessible, and to match the requirements for accessible parking spaces (see 3.1); Distribute EV spaces evenly for multiple building entrances; EV parking to be as close to building as possible; Ground surface firm, stable, slip-resistant. Maximum running slope/cross slope 1:50 (2%).</p> <p>Access aisle (sides): min 1500 wide; adjacent to each EV parking space, located on both sides, extending full length of space.</p> <p><b>Access aisle (front):</b> min 1960 wide located in front of and perpendicular to all EV parking spaces/access aisles, and connected to an adjacent accessible path of travel (where parking is designed to provide access to building/site); min 1500 wide located in front of and perpendicular to all EV parking spaces/access aisles (where parking is designed for users to remain with their vehicles).</p> <p><b>Signage/Pavement Marking:</b> clearly designated with pavement marking and vertical signage indicating EV use only; pavement markings near entrance to space; pavement markings slip resistant and clearly visible; all signage to comply with section 5.8.1; lighting to comply with section 5.7.</p> <p><b>EV Charging Stations (EVCS) and Controls:</b> clear space of 1350 x 800 for parallel or front approach, centered on EV controls; controls colour contrasted to background; controls/operable elements 900 - 1100 above ground surface; glare free display screens, protected from direct sunlight;</p>
3.3	Passenger Loading Zones	<p>Passenger-loading zones are important features for individuals who may have difficulty in walking long distances or those who use parallel transit sys-</p>	<p>Locate within 30 m of accessible entrance; overhead protection with clearance of min 3600; min 2440 wide by 7400 long access aisle parallel to vehicular pull-up space; curb ramps at level changes; bollards between access aisle and vehicular pull-up space.</p> <p><b>Vertical signage:</b> International Symbol of Accessibility; min 300 wide by 450 high; 1500 – 2500 high; high tonal contrast.</p>

## Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
3.4	Exterior Paths of Travel	Accessible exterior paths of travel provide safety and allow maneuverability to all types of users.	Firm, stable, and slip-resistant ground surface; adequate drainage; min 2100 headroom; high tonal or textural contrast; rest areas max every 30 meters; min 1800 clear width; min 1800 x 1800 passing areas no more than 30 meters for routes less than 1800; min 950 clear entrance width; max 1:20 (5%) running-slope; max. 1:50 (2%) cross-slope; slope requirements for level changes as per Table 4; min 50 high edge protection where level change is 200 - 600; min 1070 high guards where level change is >600 or adjacent surface within 1200 has slope steeper than 1:2.
3.5	Curb Ramps and Depressed Curbs	Curb ramps and depressed curbs help people with disabilities safely and independently negotiate level changes on public sidewalks and other pedestrian routes.	Firm, stable, and slip-resistant surface; aligned with direction of travel; adequate drainage; min 1500 clear width for curb ramps; min 3300 length for depressed curbs; max 1:12 (8%) running slope; max 1:50 (2%) cross-slope; slope of 1:15 to 1:10 (6.7% to 10%) for flared sides; min 1200 x 1200 landing at top of curb ramp. <b>Tactile walking surface indicators:</b> set back 150 - 200 from curb edge; min 610 depth; extend full width for curb ramp; extend min 1500 width for depressed curb; provide 300 space between TWSI for depressed curbs at pedestrian crossings.
4.0 Interior Environments			
4.1	Entrances	Entrances that address the full range of users help promote a spirit of inclusion that separate accessible entrances do not.	50% of total entrances to be accessible; min 2440 x 2440 exterior level landing; equip with power door operator; International Symbol of Accessibility; directional signage; min 950 clear door width; min 2750 height clearance from overhead protection. <b>Vestibule:</b> min 1500 plus width of door that swings into the space for distance between doors in series; min 1500 turning circle for doors not aligned.

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
4.2	Doors and Doorways	The provision of accessible doors that are part of an accessible route is important for all facility users.	<p>Min 950 clear width; opening force (max 38 N for exterior hinged doors, max 22 N for interior hinged/sliding or folding doors); high tonal contrast; max 13 high threshold; door hardware (900 - 1100 high, operable with closed fist and one hand); revolving doors and turnstiles are not accessible; provide guards that extend min 300 from edge of door that swings into pedestrian traffic; clear floor space as per Table 5; high tonal contrast strip/decal or logo on fully glazed doors (min 50 wide, 1350 - 1500 high); vision panels (min 75 wide, lower edge max 900 high, side edge max 250 from latch side).</p> <p><b>Power door operators:</b> both sides of doors; min 150 diameter for circular PDO; min 150 wide by 915 long for vertical PDO; high contrast with mounting surface; project less than 100; mark with International Symbol of Accessibility; 900 - 1100 high for circular PDO; max 200 high and min 900 high for vertical PDO; 600 - 1500 beyond the door swing; 1675 x 1675 clear floor space.</p>
4.3	Interior Accessible Routes	Interior accessible routes are important to provide access to elements, rooms, or other occupiable spaces within a facility.	<p>Firm, stable and slip-resistant; min 2100 headroom; rest areas max every 30 meters; min 1100 clear width; min 1800 clear width in high traffic areas; min 1200 clear turn width around obstacle less than 1200, max 1:20 (5%) running and cross-slopes.</p> <p><b>Level changes:</b> high tonal contrast marking where level change &lt;200; min 50 high color contrast curb where level change is 200 - 600; guards where level change is &gt;600.</p>
4.4	Elevating Devices	Elevating devices are the typical means of providing access between levels within a facility. They, therefore, should be accessible by all users, including people with mobility devices and vision loss/no vision.	<p>Min cab dimension and clear door width as per Table 6; max +/- 13 floor level; hall call buttons 890 - 1200 high; min 915 wide by 1370 deep clear floor space in front of hall call buttons; tactile elevator car identification sign with min 50 characters height; 800 - 920 high handrails on all non-access walls; high color contrast.</p> <p><b>Interior car operating controls:</b> max centerline height of 1220; min 19 button size; provide Grade 2 Braille characters; min 16 high and 0.75 raised markings on left side of buttons; emergency two-way communication system.</p>

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
4.5	Washrooms	<p>Appropriate design of washroom features helps increase the usability and safety of all toilet facilities. Moreover, universal washrooms serve all types of users since it includes a larger floor space that may be helpful for people who require assistance and may be accompanied by a caregiver or users of larger mobility devices.</p>	<p>On an accessible route; identified by accessible signage; accessible entrance door (Section 4.2); firm, stable, slip-resistant floor (max 1:50 slope); audible/visual fire alarm system; drains outside path of travel.</p> <p><b>Multiple occupancy washrooms:</b> min 1500 x 1500 clear floor space outside accessible toilet stall; min 1500 clear turning circle.</p> <p><b>Accessible toilet stalls:</b> provide as per Table 8; min 1830 x 1830 internal dimension; min 1500 clear turning circle.</p> <p><b>Ambulatory toilet Stalls:</b> min 1500 deep by 890 – 940 wide, center toilet b/w partition walls.</p> <p><b>Universal washrooms:</b> provide as per Table 7; min 1700 b/w walls; min 1700 clear turning circle; motion sensor/automatic illumination; min 810 x 1830 adult-size change table; emergency call system.</p> <p><b>Water closets:</b> 430 – 485 high; 460 – 480 from wall; min 950 wide by 1500 deep transfer space; back support; toilet-paper dispenser 600 – 800 high and 300 from front edge; lever flush control 500 – 900 high on transfer side.</p> <p><b>Grab bars:</b> non-abrasive; slip-resistant; high tonal contrast; 35 – 40 dia.; min 50 clear space from mounting surface; resist load of at least 1.3 kN; horizontal grab bar (min 600 length, 840 – 920 high or 150 above tank); L-shaped grab bars (min 750 length, vertical component max 150 from front of water closet, horizontal 750 high); fold-down grab bars (locate on transfer side, min 750 length, 390 – 410 from water closet centerline, 750 high, max 22 N force to pull down).</p> <p><b>Lavatories:</b> min 1 accessible lavatory; high tonal contrast; max 865 rim height; min knee clearance of 920 wide by 685 high by 205 deep from front edge; min toe clearance of 920 wide by 350 high by 300 back from wall; automatic control/lever type faucet max 485 from basin edge; min 920 wide by 1370 deep clear floor space; insulate pipes underneath.</p> <p><b>Shelves:</b> max 1100 high; project max 100; max 200 above lavatory top surface.</p> <p><b>Washroom amenities:</b> project max 100; high tonal contrast; controls 900 - 1200 high; min clear floor space for front and side approach.</p>

## Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
4.5			<p><b>Baby changing stations:</b> close to lavatory and waste receptacle; clear floor space; 730 - 865 high; min 685 high by 480 deep knee clearance.</p> <p><b>Adult-size change tables:</b> min 760 x 1500 clear floor space parallel to change table; adjustable height; 450 - 500 low range height; 850 - 900 high range height; support min load of 1.33 kN; high tonal contrast; non-abrasive; easy to clean.</p> <p><b>Urinals:</b> on an accessible route; no steps in front; elongated rim max 430 high; upper rim min 860 high; min 345 deep; high tonal contrast; lever/automatic flush control with max 22 N force mounted 900 - 1100 high; clear floor space; vertical grab bars on both sides (min 600 long, centerline 1000 high, max 380 from centerline of urinal); privacy screens (min 920 clearance b/w screens, min 50 clearance from grab bars); centerline indicator.</p>
4.6	Showers	Accessible shower stalls include features which are essential in providing support and safety for users with limited mobility.	<p>Number of accessible showers as per Table 9; min 1525 wide by 920 deep floor space; min 1525 wide by 920 deep additional clear floor space at entrance; covered trench drain; no threshold or max 13 beveled transition; slip-resistant floor surface; shower controls located max 1200 above floor and max 500 from edge of seat; pressure equalizing or thermostatic mixing valve; fully recessed soap holders.</p> <p><b>Shower head:</b> flexible hose min 1800 length; 1200 - 2030 fixed position height.</p> <p><b>Shower seat:</b> slip-resistant surface; same side as vertical grab bar; 460 - 480 high; min 450 wide by 400 deep with rear edge 65 from wall; resists min load of 1.3 kN.</p> <p><b>Vertical grab bar:</b> on a side wall; min 1000 length; 600 - 650 high; 50 - 80 clearance from adjacent clear floor space.</p> <p><b>L-shaped grab bar:</b> on wall opposite to entrance; horizontal component (1000 long, 750 - 870 high); vertical component (750 long, 400 - 500 from side wall).</p>

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
5.0 Systems, Controls, and Communications			
5.1	Controls and Operating Mechanisms	The placement of controls and the type of operating mechanism used is integral to be accessible by all users.	Operable with closed fist; operable with force <22.2 N; high tonal contrast with mounting surface; mounted between 400 - 1200 (min 400 high for wall outlet/duplex, 1200 high for thermostat and manual fire alarm pull, 900 - 1100 for all other controls); clear floor space for front and side approach; min 13 surface diameter for push-button type controls.
5.2	Assistive Listening Systems	The provision of assistive listening devices is essential for the range of individuals who may have difficulty hearing.	Encompasses entire floor area; personal amplification control; accessible signage identifying availability of listening system; may include induction loop, infrared and FM radio frequency systems; max 15 meters viewing distance for fixed seats served with ALDs.
5.3	Public Address Systems	Public address systems provide important information to all users within a facility and should be designed to accommodate those that may have difficulty hearing.	Zoned to provide information to key locations only; minimize background noise; sound level above ambient background noise; music not to be broadcast throughout the facility; all-point call systems for emergency only.
5.4	Acoustics	Proper acoustics is essential for people who may have difficulty hearing and need to differentiate important sounds from general background noise. Moreover, sound transmissions of different areas can also be used as an orientation cue and help navigate a space, especially for people with vision loss.	Finishes do not unduly amplify occasional noise; include sound insulation; install permanent induction loop or other ALDs in noisy areas; design ceiling shapes to avoid echoes; minimize background noise in meeting rooms and assembly areas.

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
5.5	Security Systems	Security systems, such as electronic keypads or card readers, are the only means of entry to particular spaces, and therefore should be usable by persons with varying disabilities.	900 - 1100 high; min 600 clear of door swing; accessible electronic keypads/push button systems or card readers; audible and visual signals; high tonal contrast to mounting surface.
5.6	Fire and Life Safety Systems	Visual alarms are essential safety features for individuals people who may have difficulty hearing since they may not hear an audible alarm. In the event of fire when elevators cannot be used, an area of refuge provides assistance to anyone who has difficulty traversing a set of stairs.	<p><b>Fire safety and evacuation plan:</b> base max 1200 high; min 12 point font size; available in alternate formats; accessible identification signage.</p> <p><b>Visual alarm signals:</b> integrate audible fire alarm system; mount min 2100 high; spacing max 15 meters apart; meet NFPA section 18.5.3.</p> <p><b>Areas of refuge:</b> on an accessible route; accessible identification signage; each space min 1675 x 1675; min 1 hr protective enclosure; two-way accessible communication system; total number of rescue spaces as per Table 4.4.1.</p>
5.7	Lighting	Artificial lighting and natural light sources help provide comfortable, evenly distributed light at all working areas, circulation routes, and areas of potential hazards.	<p><b>Exterior:</b> located at or besides ramps, stairs and wayfinding signage; evenly distributed over pedestrian routes; height of low-level light clear of snow accumulation; min 2100 headroom for overhead light fixtures.</p> <p><b>Interior:</b> natural and artificial; able to identify edges and color contrasts; not positioned at end of corridors; non-glare, matte or satin finishes; sun-screening systems where direct sunlight causes glare; fluorescent ceiling lights perpendicular to path of travel.</p>

## Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
5.8	Signage and Way-finding	Signage with sharp color contrast and tactile information can enhance readability for all users, especially someone with vision loss or no vision. Moreover, graphic symbols can be helpful for children, those with limited literacy levels, and those who speak a different language.	Non-glare finish; colour contrast; accessible facilities to include International Symbol of Accessibility; sans serif font; Arabic numerals; width-to-height ratio viewing distance as per Table 10; stroke-width-to-height ration between 1:5 and 1:10; min 150 pictogram height; braille below text and/or pictogram with domed or rounded shape. <b>Tactile signage:</b> 0.8 - 1.5 raised above surface; rounded edges; braille accompanied with text, pictograms and/or symbols; 1200 - 1500 high; 140 - 160 from latch side of door frame; min 75 clear wall area around.
5.9	Windows	Lower sill heights and accessible window operating mechanisms can help wheelchair or scooter users experience the facility from a seated position.	Clear floor space for front and forward approach; max 1100 sill height; 400 - 1100 ventilation and covering controls height; no horizontal obstruction b/w 900 and 1300 above floor.
<b>6.0 Special Facilities and Spaces</b>			
6.1	Assembly Areas	Designated accessible and adaptable seating spaces are essential in assembly areas for individuals unable to use typical seating.	Number of accessible and adaptable seating as per Table 12; distribute seating locations to provide variety of admission prices; seating adjoining accessible route without blocking egress; choice of viewing location; clear lines of sight; provide movable armrest on side of adaptable seat adjoining accessible route. <b>Accessible seating spaces:</b> directional signage to identify location; min 1 fixed companion seat beside each space; clear floor space for front and side approach. <b>Storage for mobility device:</b> min 1 for fixed seats less than 200; min 915 wide by 1370 deep clear floor space; same level and close proximity to accessible seating spaces

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
6.2	Meeting and Multi-Purpose Rooms	Flexible meeting rooms can help accommodate different space uses, group sizes, user needs.	On an accessible route; identify with accessible signage; min 1100 clear aisle space; min 1500 turning circle; assistive listening systems; accessible tables and work surfaces (Section 2.10); clear floor space for front and side approach at servery/millwork.
6.3	Cafeteria and Dining Facilities	Cafeterias with accessible serving lines and seating areas can help users of mobility devices access the space independently.	Min 1100 circulation route; accessible service counter (Section 6.10); accessible seats and tables in dining areas (Section 2.10). <b>Display shelves and service lanes:</b> min 1100 clear aisle space; tray slides 760 - 865 high; min 1525 long; 50% shelves mounted 400 - 1370 for unobstructed side approach; max 500 deep side reach.
6.4	Kitchens and Kitchensettes	Kitchens and kitchensettes require an appropriate level of access to be usable by persons with varying disabilities.	Slip-resistant, non-glare floor finish; controls max 1100 high; provide task lighting; pass-through/U-shaped or L-shaped kitchens (min 1500 clearance b/w opposing sides, min 950 wide openings/doorways). <b>Counters and work surfaces:</b> high tonal contrast; non-abrasive surfaces underneath; min one accessible counter; min 760 wide by 600 deep; 730 - 865 high; min 480 deep by 760 wide by 685 high knee clearance; min 915 wide by 1370 deep clear floor space; outlets at side or front. <b>Kitchen storage:</b> at least one storage unit max 1100 high; accessible door hardware (max 1100 high, mount at bottom for upper cabinets and at top for base cabinets); min 150 deep by 230 high toe clearance at base cabinets. <b>Sinks:</b> centerline min 460 from side wall; 820 - 840 rim height; min 920 wide by 685 high by 200 deep knee clearance; min 350 high by 500 deep toe clearance; automatic/lever-type faucet; non-abrasive surfaces underneath; insulate/cover pipes. <b>Cooktops:</b> controls away from burners; min 915 wide by 1370 deep clear floor space; 730 - 865 high; min 760 wide by 685 high by 200 deep knee clearance; min 350 high by 500 deep toe clearance; insulation underneath; min 400 wide heat resistant work surface on each side. <b>Ovens:</b> controls on front panel; side-hinged door (work surface adjacent to latch side, min 250 heat resistant pull-out shelf below); bottom-hinged door (work surface adjacent to any one side).

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
6.4			<b>Refrigerators and freezers:</b> self-defrosting freezer; vertical side-by-side type; min 1100 freezer height for over-and-under type; clear floor space for side approach with center-line offset of 610 max.
6.5	Libraries	Libraries help provide people with information and resources they need and therefore should be accessible by all users.	<p>Min 1100 accessible route; min 1500 turning circle; min 950 security gate clear width; min one accessible service counter (Section 6.10); min 50% of computer catalogues and workstations accessible; minimize background noise; informational and directional signage for accessible services.</p> <p><b>Book drop slots:</b> on an accessible route; clear floor space for front and side approach; high tonal contrast; 900 - 1100 slot height; accessible slot controls.</p> <p><b>Book stacks or carousels:</b> min 1100 clear aisle width; heavier items and large print collection on lower shelves.</p> <p><b>Reading lounges and study areas:</b> flexible seating options; high tonal contrast; min 10% of study tables and carrels accessible; electric outlet; max 1120 shelf height above study tables and carrels.</p> <p><b>Computer catalogues and work stations:</b> min 915 wide by 1370 deep by 685 high knee clearance; 710 - 865 surface height; min 915 table depth; min one movable chair.</p>
6.6	Recreational and Community Facilities	Accessible recreational and community facilities allow for opportunities for participation by all community members.	<p>Min one accessible change room (Section 6.8); accessible seating options (Section 6.1); arenas (on an accessible route, min 950 access panels/gate clear width, level/beveled access to ice pads/skating rings); clear floor space for front and side approach on one side of exercise equipment.</p> <p><b>Aquatic facilities:</b> slip-resistant and matte finish pool deck surfaces; max 1:50 (2%) running or cross-slope; recessed drainage tiles with max 13 openings; min 1100 accessible route; 610 wide TWSI around perimeter of pool deck; high tonal contrast on permanent/temporary equipment; min one accessible entry/exit point.</p> <p><b>(1) Sloped entry or ramp:</b> max 1:15 (6.67%) running slope; handrails 865 - 920 high with min 300 extensions at top only; min 1100 clear width; min 1670 x 1670 top and bottom landings; 600 - 900 water depth at bottom; high tonal contrast.</p> <p><b>(2) Transfer lifts:</b> on an accessible route and in shallow end (water level max 1200 high); seat centerline min 400 from pool edge; min 400 seat width; min 1675 x 1675 clear transfer space; self-operable controls max 1100 high from pool deck/water surface; min 135 kg weight capacity.</p>

## Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
6.7	Change Rooms	Universal change rooms with features such as accessible lockers where applicable, can accommodate all types of users, including (but not limited to) those requiring assistance, users with mobility devices, children, and those with limited mobility.	On an accessible route; min 1100 clear path of travel; min 1500 clear turning circle; slip-resistant floor. <b>Permanent benches:</b> 450 - 500 seat height; 330 - 510 seat depth; back support; high tonal contrast finishes. <b>Lockers:</b> min 10% accessible; identify with signage; clear floor space for front and side approach; bottom shelf min 400; top shelf max 1200; locking mechanisms 900 - 1100 high; max 460 baggage racks/carousels surface height. <b>Universal change rooms:</b> min 1700 clear turning circle; slip-resistant floor; accessible entrance door (Section 4.2); change bench (min 1830 long by 760 wide, 450 - 500 high); L-shaped grab bars at the end of bench (min 150 from front seat edge, min 150 clearance above bench); horizontal grab bar centered on long side of bench (min 1200 long, 750 - 850 high), motion sensor/automatic illumination; full length mirror; min two collapsible coat hooks protruding max 50 and max 1200 high.
6.8	Balconies and Terraces	Balconies and terraces may be used as exits and areas of refuge, and therefore should be accessible to all users.	On an accessible route; slip-resistant floor surface with max 1:50 (2%) slope; min 2000 deep; level/beveled access; clear visibility from seated position; min 1100 clearance between edge of outswinging door and guard/railing.
6.9	Service Counters	Service counters should be accessible to the full range of visitors.	Min one accessible for each type of service provided; all counters to be accessible for single queuing line; on an accessible route; clearly identified by signage; clear floor space in front for forward and side approach; high tonal contrast; lowered counter usable from seated position (710 - 865 high, max 635 forward reach, min 915 wide by 480 deep by 685 high clear knee space on both sides). <b>Communication systems:</b> speaking port max 1100 high; phone/call bell with information signage; controls max 1100 high; assistive listening systems identified by signage.

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
6.10	Waiting and Queuing Areas	Accessible queuing areas allow people with mobility devices and with a varying range of disabilities to move through the line safely. Designated space for mobility devices in waiting areas is essential for individuals unable to use typical seating.	<p><b>Waiting areas:</b> identified by directional and informational signage; accessible service counters (Section 6.10); min 3% and not less than 1 accessible seating spaces (Section 6.1); min 510 coffee/telephone table height.</p> <p><b>Queuing areas:</b> on an accessible route; identified by directional and informational signage; permanent queuing areas defined by floor patterns/colours/textures.</p> <p><b>(1) Fixed queuing guides:</b> min 1100 clear width; min 1675 x 1675 clear floor space where line begins/change direction/ends; cane detectable; high tonal contrast; glare-free finish.</p>
6.11	Visibility - Housing	Visitable housing makes communities more livable for people with physical disabilities, those who use mobility devices, and seniors by providing options to age in place.	<p><b>Exterior path of travel:</b> min 1800 clear width; max 1:20 (5%) slope leading to accessible entrance.</p> <p><b>Entrance and landing area:</b> min 1525 x 1525 clear floor space at entrance landing; no step or elevation change; no or low profile threshold.</p> <p><b>Interior circulation:</b> min 950 clear door width; min 950 clear corridor width; electrical outlets min 400 high.</p> <p><b>Washroom:</b> on main floor; min one toilet and sink; sliding or outward swinging door; min 760 x 1220 clear floor space; min 950 wide clear route to toilet; min one grab bar; lever-type faucet; slip-resistant flooring.</p> <p><b>Kitchens:</b> lever-type faucet; clear floor space in front of each appliance (915 wide by 1370 deep for forward approach and 1525 wide by 915 deep for side approach); min 1500 clearance between counters and all opposing sides.</p> <p><b>Doors:</b> door hardware max 900 high and operable with one hand; rough-in at entrance door hinge-side for power door operators; min 600 (pull side) and 300 (push side) latch-side clearance; door bell/intercom system max 1100 high.</p>
6.12	Outdoor Public Use Eating Areas	Outdoor public use eating areas should be accessible to all users, including persons with mobility devices.	On an accessible route; Min 20% tables accessible; min 2000 clearance around each table; knee and toe clearance; 730 - 865 table surface height; firm and stable ground surface with max 1:50 (2%) slope; tables colour contrast to background; identified by directional signage; accessible washroom in close proximity.

# Appendix A (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
6.13	Inclusive Play Spaces	Inclusive play spaces provide play opportunities and experiences for children and caregivers with various disabilities.	Public consultation required; provide sensory and active play spaces; firm, stable and slip-resistant surfaces; meets CSA Z614-14 requirements; on an accessible route; min 2 entry/exit points with 1800 clear width; min 1800 clear width and max 1:15 (6.67%) slope of accessible route connecting play components; accessible surface materials; play components colour contrast with surroundings; percentage of elevated play components required to be connected to ramp/transfer systems as per Table 13; min 915 x 1370 or 1525 x 915 clear floor space adjacent to transfer systems/play components; min 1500 clear turning circle on same level as play components; min number of ground-level play components compared to elevated play components as per Table 14.
6.14	Multi-Faith Rooms	<p>Multi-faith worship spaces serve an important spiritual role and foster a culturally safe and respectful environment.</p> <p>Multi-faith spaces may include indoor smudging facilities. Accommodating ritual smudging ceremonies supports inclusion and the spiritual wellbeing of First Nation, Inuit, and Métis people.</p>	<p>Located on an accessible route, with accessible entrance; Accessible path of travel within room and to all fixtures and furniture; Accessible storage area for shoes provided at entrance with accessible seating; carpets (where applicable) to be securely fixed; low pile and in compliance with Section 2.1; Accessible seating; Accessible storage cabinets.</p> <p><b>Ablution Rooms:</b> located adjacent and with direct access to multi-faith room; include at least 1 ablution station located on accessible path of travel, with electronic or sensor faucets, two horizontal grab bars, accessible bidet system, accessible accessories, and clear floor space minimum 915 x 1370.</p> <p><b>Indoor Smudging:</b> suitable ventilation systems in place and operational; cast iron (or other suitable) pan or vessel for all smudging materials; exhaust fan operational;</p>

# Appendix B

## Master Space Optimization Design Checklist:

Section	Facility Design Feature	Purpose of Design Feature	Target
<b>Space Optimization</b>			
SOP1	Enhanced Collaboration and Communication	Promotes meaningful interactions between employees.	Provide collaborative spaces such as: (1) 3 m x 3 m huddle rooms (huddle rooms are configured the same as offices; seating for 3). (2) 1.5 m x 1.5 m focus rooms (3 different configurations) (3) Various open collaboration areas with different configurations (e.g. meeting, working, standing, lounge)
SOP2	Staff Safety and Security	Provides a safe everyday work environment.	Provide a centralized reception point by limiting public access to the staff side.
SOP3	Agile Workspace	Promotes a flexible work environment and improves collaboration.	Provide agile workspaces such as: (1) "Activity-Based Working" (ABW): Staff reserve specific rooms, areas, and/or workspaces throughout any given day. (2) Hotelling: Staff reserve their desired workspace for the day, or sometimes the week, prior to arriving and have that assigned location for the duration of their day. (3) Hot-Desking: Staff arrive at work and select their workspace from a specific number of unassigned spaces on a first-come, first-served basis.
SOP4	Office Density	Optimizes the number of occupants in the work environment.	Meet the following minimum per person space requirements: (1) Assigned workstations: 2.8 – 4.2 m <sup>2</sup> (2) Hoteling workstations (workbench): 1.9 – 2.8 m <sup>2</sup> (3) Hot-desking: 1.7 – 2.3 m <sup>2</sup> (4) Offices: 9.3 - 11.1 m <sup>2</sup>
SOP5	Private Workspace	Enhances employee comfort and productivity in open workspace areas.	Provide private areas only accessible to employees when required, such as silent pods, enclosed meeting rooms, etc.

# Appendix C

## Master Sustainability and Resilience Design Checklist:

Section	Facility Design Feature	Purpose of Design Feature	Target
On-Site Greenhouse Gas Reduction			
ONG1	Building Energy Use and Greenhouse Gas Emissions Limits	Promotes energy-efficient buildings with reduced operating costs and greenhouse gas (GHG) emissions.	Design for an annual greenhouse gas intensity (GHGI) of 0 kg/m <sup>2</sup> following the <b>Durham Standard - Standard Method for Modelling</b> and <b>Durham Standard - Carbon Pricing Escalation</b> . and Ensure no on-site combustion of fossil fuels (excluding backup generation). <b>and</b> achieve at least one of the following: <ul style="list-style-type: none"> <li>(1) Total energy use intensity (TEUI) limit of 100 ekWh/m<sup>2</sup> &amp; thermal energy use demand intensity (TEDI) of 30 ekWh/m<sup>2</sup> <b>or</b></li> <li>(2) 50% energy use intensity (EUI) improvement over OBC SB-10 <b>or</b></li> <li>(3) Passive House Certification <b>or</b></li> <li>(4) Canada Green Building Council Zero Carbon Building Certification</li> </ul>
ONG2	Energy Supply	Reduces GHG emissions associated with building operations by encouraging the use of less carbon-intensive fuel sources.	Assess the value of connecting to existing or planned low/no-carbon district energy systems, and design for connection where favourable.
ONG3	Peak Demand Management	Increases grid reliability and reduces GHG emissions associated with building operations.	Identify the cost-benefit of demand response and present to Durham Region for decision on implementation at the facility.

## Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
ONG4	On-Site Renewable Energy	Encourages on-site energy generation through renewable energy sources to reduce GHG emissions associated with building operation, reduces stresses imposed on the local electricity grid, and further improve building resilience in the wake of power outages.	Confirm plans for the facility under the Durham Region Renewable Energy Program (to be developed) and incorporate changes to the energy infrastructure if applicable.
ONG5	Building Commissioning	Ensures that the mechanical, electrical, plumbing, and renewable energy systems are constructed and performing as per design intent.	Commission all applicable systems in accordance with ASHRAE Guideline 0-2013 & ASHRAE Guideline 1.1-2007 for HVAC&R Systems.  Commission the building envelope in accordance with LEED Building Design and Construction v4: New Construction Envelope Commissioning Requirements.
ONG6	Measurement and Verification Plan	Allows Durham Region to compare the occupied building's energy consumption to the design predicted energy consumption.	Develop a Measurement and Verification Plan following the <b>Durham Standard - Measurement and Verification Guidelines</b> .
ONG7	Air Tightness	Ensures that the air barrier systems of building envelope systems are constructed and performing as per de-	Conduct a whole building Air Leakage Test targeting a maximum air leakage of 2 L/s/m <sup>2</sup> (at 75 Pa).

## Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
ONG8	Metering and Benchmarking	Ensures that buildings have adequate level of metering and measurement systems to facilitate ongoing tracking of energy usage by the building systems.	<p>Install electric/thermal submeters on all systems &gt;10% of the total end use or a minimum of 50kW. All major process loads shall be sub-metered separately.</p> <p>Implement a building automation system in accordance to the <b>Durham Standard - Building Automation System (BAS) Requirements</b></p>
Off-Site Greenhouse Gas Reduction			
OFG1	Single Occupant Vehicle Trips Reduction	Reduces community-wide GHG emissions by encouraging alternative transportation strategies.	<p>Reduce single occupancy vehicle trips generated by development 25% from the baseline using multimodal infrastructure strategies and Transportation Demand Management (TDM).</p> <p>Provide carpool or shared-use vehicle parking spaces equivalent to at least 10% of the total off-street parking spaces for each non-residential and mixed-use building on the site.</p>
OFG2	Connectivity to Urban Mobility Networks	Improves connectivity in the community and enables active transportation for all abilities.	<p>Meet the Accessibility for Ontarians with Disabilities Act (AODA) Integrated Accessibility Standards, Sections 80.16 to 80.31 inclusive, for pedestrian infrastructure.</p> <p>Provide safe, direct, universally accessible pedestrian routes, including crosswalks and midblock crossings that connect the buildings on-site to the off-site pedestrian network and priority destinations.</p>
OFG3	Parking Footprint (For residential buildings four storeys or more and non-residential buildings)	Reduces community-wide GHG emissions by encouraging active transportation and reducing reliance on vehicles.	<p>Either:</p> <p>(1) Do not build new off-street parking lots. <b>or</b></p> <p>(2) Locate all new off-street surface parking lots at the side or rear, leaving building frontages facing the circulation network free of surface parking lots (alleys may be exempted).</p>

## Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
OFG4	Electric Vehicle Infrastructure	Reduces community-wide GHG emissions by promoting electric vehicle use.	For Light Duty Fleet (LDF): Provide electric vehicle supply equipment for a minimum of 30% of parking spaces, and provide rough-in conduits for the remaining spots.
OFG5	LEV and Sustainable Mobility Prioritization	Reduces single occupant vehicle commuting and encourages low-emission transportation.	If providing more than the minimum parking required under the Zoning By-law, the excess spaces must be dedicated priority parking spaces for low-emitting vehicles, carpooling/ridesharing, or for publicly accessible spaces dedicated to shared vehicle systems such as carsharing, ridesharing, or micro-mobility systems.
OFG6	Enhanced Long-Term & Short-Term Bicycle Parking Rates	Encourages bicycling as a transportation alternative by providing safe and secure parking spaces.	Provide bicycle parking spaces in accordance with rates in Chapter 230 of Toronto Zoning By-law 569-2013.
OFG7	Electric Bicycle Infrastructure	Reduces single occupant vehicle (SOV) commuting, encourages low-emission transportation and future-proofs the building for the wider adoption of electric bicycles.	At least 15% of the required long-term bicycle parking spaces, or one parking space, whichever is greater, shall include an energized outlet (120 V) adjacent to the bicycle rack or parking space.
OFG8	Shower and Change Facilities	Encourages active transportation by providing end of trip facilities.	Provide shower and change facilities consistent with the rate identified in Chapter 230 of the Toronto Zoning By-law
OFG9	Pedestrian Specific Lighting	Encourages walking as a transportation alternative for all ages and abilities by providing safe environments	Provide pedestrian-scale lighting that is evenly spaced, continuous and directed onto sidewalks, pathways, entrances, outdoor waiting areas and public spaces.

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
OFG10	Ozone Depleting Compounds	Reduces stratospheric ozone depletion and limit human health impacts caused by refrigerant emissions.	Either: (1) Use zero refrigerants. <b>or</b> (2) Use only naturally occurring/synthetic refrigerants that have an ozone depletion potential (ODP) of 0 and a global warming potential (GWP) of less than 50.
Asset Resilience			
RES1	Thermal Resilience and On-Site Flood Mitigation	Promotes buildings that are designed to maintain critical operations and functions in the face of a shock or stress.	Complete the following sections of the Toronto Green Standard Resilience Checklist: (1) Section B: "Thermal Resilience & Safety" <b>and</b> (2) Section D: "On-Site Flood Mitigation"
RES2	Refuge Area and Back-Up Generation	Enables self-recovery during emergency power disruption.	Provide 72 hours of backup power to the refuge area and essential building systems during an extended power outage. Install a backup power system that will support future conversion to biofuels. The backup power system can be renewable natural gas fueled.
Circular Economy			
CIR1	Low-Impact Materials	Encourages the use of environmentally preferable building materials from manufacturers who have verified improved environmental life-cycle impacts.	Ensure at least 25% (by cost) of the total value of permanently installed building products meet the requirements for at least two of the responsible extraction criteria identified below: (1) Extended producer responsibility. (2) Bio-based materials. Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. (3) Wood products. Wood products must be certified by the Forest Stewardship Council or Canada Green Building Council-approved equivalent. (4) Materials reuse. Reuse includes salvaged, refurbished, or reused products.

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
CIR1			<p>(5) Recycled content. Recycled content is the sum of post-consumer recycled content plus one-half the pre-consumer recycled content, based on weight.</p> <p>(6) Products sourced (extracted, manufactured and purchased) within 800 km of the project site.</p>
CIR2	Lifecycle Cost Analysis	To reduce building-related GHG emissions.	Conduct a Lifecycle Cost Analysis in accordance with the <b>Durham Standard - Lifecycle Impact Analysis, Part 1: Cost</b> and <b>Durham Standard - Carbon Pricing Escalation</b> .
CIR3	Embodied Carbon and Whole Building Lifecycle Assessment	Encourages adaptive reuse and optimizes the environmental performance of materials.	<p>Evaluate the embodied carbon content of the building design in accordance with the <b>Durham Standard - Lifecycle Impact Analysis, Part 2: Embodied Carbon</b></p> <p><b>Optional/Performance:</b> Using the lifecycle analysis conducted, demonstrate a minimum of 20% embodied carbon reduction, compared to a baseline building.</p>
CIR4	Construction Waste Management & Construction Waste Diversion	Reduces construction and demolition waste disposed of in landfills and incineration facilities through waste prevention and by re-using, recovering, and recycling materials, and conserving resources for future generations.	<p>Manage construction and demolition waste in accordance with O. Reg 103/94: Industrial, Commercial and Institutional Source Separation Programs.</p> <p>Either:</p> <p>(1) Divert &gt;75% of total construction waste across 4 material streams. <b>or</b></p> <p>(2) Generate &lt;100 kg/m<sup>2</sup> of waste.</p>

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
CIR5	Waste Storage Space	<p>Reduces the environmental harm from materials and products purchased and used during operations and maintenance of buildings.</p> <p>Tracks and reduces the waste that is generated by building occupants and hauled to and disposed of in landfills and incinerators.</p>	<p>Provide sufficient, accessible space for waste storage, with separated collection of recyclables and organics.</p> <p>For non-residential properties, provide appropriate measures for collection of household hazardous waste, batteries, and e-waste.</p>
<b>Indoor Environmental Quality</b>			
IEQ1	Ventilation	Contributes to the comfort and well-being of all occupants by establishing minimum standards for indoor air quality (IAQ).	Design the mechanical ventilation system to meet the minimum requirements of ASHRAE 62.1-2010, Sections 4-7 or a local equivalent, whichever is more stringent. Install or upgrade the quality of all filters to MERV 13.
IEQ2	Residential Radon and Tobacco Smoke Control	Prevents or minimizes exposure of occupants, indoor surfaces, and ventilation air distribution systems to environmental tobacco smoke.	Implement no smoking signage at the building.

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
IEQ3	Low-Emitting Materials	Reduces the concentrations of chemical contaminants that can reduce the air quality, and protects the health, productivity, and comfort of installers and occupants.	<p><b>Option 1</b>            Use a combination of the following materials that comply with emissions and content requirements for at least 2 of the following categories.</p> <p>(1) Adhesives and sealants: 100% compliant with volatile organic compounds (VOC) content requirements and 90% compliant with the emissions evaluation outlined in the California Department of Public Health (CDPH) Standard Method v1.1-2010.</p> <p>(2) Paints and coatings: 100% compliant with VOC content requirements and 90% compliant with the emissions evaluation outlined in the CDPH Standard Method v1.1-2010.</p> <p>(3) Flooring: 100% compliant with the emissions evaluation outlined in the California Department of Public Health (CDPH) Standard Method v1.1-2010. UL GreenGuard Gold, FloorScore, Green Label Plus, NSF-332, SCS Indoor Advantage, GUT, Blue Angel, and Collaborative for High Performance Schools certified products meet this requirement.</p> <p>(4) Composite wood: 100% of products must be California Air Resources Board (CARB) certified as ultra-low-emitting formaldehyde or products that do not contain added formaldehyde.</p> <p>(5) Ceilings, Walls, Thermal and Acoustic Insulation: 100% compliant with the emissions evaluation outlined in the CDPH Standard Method v1.1-2010. UL GreenGuard Gold, SCS Indoor Advantage, Blue Angel, and Collaborative for High Performance Schools certified products meet this requirement.</p> <p><b>Option 2:</b> If some products in the categories outlined above do not meet the criteria, a budget calculation may be used and must exceed 50% of the budget.</p>
IEQ4	Pre-Occupancy Air Quality Management	Preserve the well-being of construction workers and occupants by minimizing IQA problems associated with construction and renovation.	Develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases. During construction, meet control measures of the Sheet Metal and Air Conditioning Nation Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, Chapter 3.

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
IEQ5	Thermal Control	Promote occupant productivity, comfort, and well-being by providing quality thermal comfort.	Provide individual thermal comfort controls for at least 50% of individual occupant spaces. Provide group thermal comfort controls for all shared multi-occupant spaces
IEQ6	Interior Lighting Control	Promote occupant productivity, comfort, and well-being by providing adequate lighting.	Provide dimmable or multilevel lighting for 90% of occupant spaces.
IEQ7	Interior Lighting Quality	Promotes occupant productivity, comfort, and well-being by providing adequate lighting.	<p>Either:</p> <ul style="list-style-type: none"> <li>(1) Glare Control               <ul style="list-style-type: none"> <li>- Use light fixtures with a luminance of less than 7,000 candela per square meter (cd/m<sup>2</sup>) between 45 and 90 degrees from nadir; <b>or</b></li> <li>- Achieve a Unified Glare Rating (UGR) rating of &lt;19 using software modelling calculations of the designed lighting.</li> </ul> </li> <li>(2) Colour Rendering               <ul style="list-style-type: none"> <li>- Use light sources that have a Color Rendering Index (CRI) of at least 90; <b>or</b></li> <li>- Use light sources that have a Color Fidelity Index greater than or equal to 78 and a gamut index between 97 and 110, determined in accordance with Illuminating Engineering Society (IES) TM-30.</li> </ul> </li> <li>(3) Surface Reflectivity               <ul style="list-style-type: none"> <li>- For at least 90% regularly occupied spaces, use interior finishes with a surface reflectance greater or equal to 80% for ceilings and 55% for walls. If included in the project scope, use furniture finishes with a surface reflectance greater or equal to 45% for work surfaces and 50% for movable partitions.</li> </ul> </li> </ul>

## Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
IEQ8	Daylight Penetration	Connects occupants to the outdoors, reinforces circadian rhythms, and reduces the use of electrical lighting.	<p>Either:</p> <p>(1) Demonstrate through annualized, climate-based daylight simulations (in accordance with IES LM 83) that ASE1000,250 (annual sunlight exposure no more than 1000 lux for 250 hours) for no more than 10% of regularly occupied floor area is achieved, and that sDA300/50% (spatial daylight autonomy with minimum 300 lux for 50% of operating hours, 8am-6pm) for 55% of regularly occupied floor area is achieved. <b>or</b></p> <p>(2) Demonstrate through computer modeling that illuminance levels will be between 300 lux and 3,000 lux for 9am and 3pm on a clear-sky day at the equinox for 75% of regularly occupied floor area; <b>or</b></p> <p>(3) Demonstrate through two sets of direct measurements (furniture, fixtures, and equipment in place) that illuminance levels are between 300 lux and 3,000 lux.</p>
IEQ9	Quality Views	Improves occupant well-being by connecting occupants with the natural outdoor environment.	<p>Provide occupants in the building with a view to the outdoor natural or urban environment for 75% of all regularly occupied floor area by providing one of the following (views into interior atria may be used to meet up to 30% of the required area):</p> <p>(1) Nature, urban landmarks or art. <b>or</b></p> <p>(2) Objects (at least 25 ft (7.5 m) from exterior of glazing).</p> <p>Occupants must have direct access to the view and be within 3 times the head height of the glazing with no permanent interior obstructions between the occupant and the window. Vertical columns smaller than 0.3 m wide and horizontal features smaller than 0.3 m high are excluded.</p> <p>Views must be through glass with a visible light transmittance (VLT) above 40%. If the glazing has frits, patterns, or tints the view must be preserved. Neutral gray, bronze, and blue-green tints are acceptable.</p>

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
IEQ10	Noise Control	Provides indoor spaces that promote occupant well-being, productivity, and communications by providing noise controlled environments.	Meet at least 2 of the 3 following requirements for all spaces (1) HVAC Background Noise: Achieve the maximum background noise levels from HVAC equipment per 2015 ASHRAE Handbook, HVAC Applications, Chapter 48, Table 1, and calculate or measure sound levels. Comply with the design criteria for HVAC noise levels resulting from transmission paths listed in ASHRAE 2015 Applications Handbook, Table 6 (2) Sound Transmission: Categorize all spaces by use and desired level of acoustic privacy. Meet the Composite Sound Transmission Class (STCC) ratings or Noise Isolation Class ratings listed in the LEED guide (3) Reverberation Time: Meet the reverberation time requirements listed in the LEED guide
Water Quality and Efficiency			
WTR1	Storm-water Retention & Reuse	Reduces storm-water peak flow and runoff volume from the site by promoting the natural hydrological cycle.	Retain a minimum of 50% of the total average annual rainfall volume (or 5 mm from each rainfall event).  Either: Provide at-grade bioretention facilities to capture and control 75% of runoff from on-site hardscape surfaces. <b>or</b> Reforest a portion of the site (beyond the limit of a stewardship plan).
WTR2	Water Use Intensity	Reduces indoor potable water consumption and preserves potable water resources.	Install water fixtures or use non-potable water to achieve a 40% reduction in potable water use for the building (excluding irrigation).  Reduce potable water use for irrigation by 60%.
WTR3	Water Metering	Conserves potable water resources and identifies opportunities for additional water savings by tracking water	Install permanent water meters that measure the total potable water use for the building and associated grounds. Meter data must be compiled into monthly and annual summaries; meter readings can be manual or automated.

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
WTR4	Storm-water Run-off Quality (Total Suspended Solids & E. Coli)	Preserves the water quality in water run-off leaving the site.	Remove an annual average of 80% of total suspended solids from runoff leaving the site and control the amount of E.Coli leaving the site according to City of Toronto Wet Weather Flow Management Guidelines.
WTR5	Drought-Tolerant Landscapes	Reduces outdoor potable water consumption and preserves potable water resources.	Where potable water is used for irrigation, provide drought-tolerant plants for at least 50% of the landscaped site area (including at-grade landscapes, vegetated roofs and walls).
Ecology			
ECO1	Green & Cool Paving	Minimizes the adverse effects on microclimates and wildlife habitats by reducing heat islands.	Use a combination of the following strategies to treat at least 75% of the site's non-roof hardscape: (1) High albedo paving materials with an initial solar reflectance of at least 0.33 or solar reflectant index (SRI) of 29. (2) Open grid pavement with at least 50% perviousness shade from existing or new tree canopy within 10 years of landscape installation. (3) Shade from architectural structures that are vegetated or have an initial solar reflectance of at least 0.33 at installation or an SRI of 29. (4) Shade from structures with energy generation.
ECO2	Green & Cool Roofs	Minimizes the adverse effects on microclimates and wildlife habitats by reducing heat islands.	Provide a green roof equal to the greater than 50% of the available roof space or the coverage requirement of the Toronto Green Roof By-law (i.e. net roof area given renewable energy per ONG4, private terrace, or amenity space).  Provide a cool roof on areas of available roof space not covered by green roof area. The cool roof must have a minimum solar reflectance index value of 82 (for low-sloped roofs <2.12) or 39 (for steep-sloped roofs >2.12).

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
ECO3	Tree Planting Areas and Soil Volume	Supports tree growth and enhances the urban forest.	<p>Ensure that each separate tree planting area has a minimum space of 30 m<sup>3</sup> soil. Provide the total amount of soil on the site by the formula: Total Soil = 40% of the site area ÷ 66 m<sup>2</sup> x 30 m<sup>3</sup></p> <p>Plant large growing shade trees along street frontages that are spaced appropriately having regard to site conditions, and that have access to a minimum of 30 m<sup>3</sup> of soil per tree.</p> <p>If surface parking is permitted and provided, plant large growing shade trees throughout the parking lot interior at a minimum ratio of one tree planted for every five parking spaces supplied.</p>
ECO4	Site Management Policy	Provides environmentally sensitive site management practices that protects and enhances habitat, reduces pollutants and waste, protects soils and hydrology, and reduces site domestic water use.	Provide an enhanced buffer planting plan adjacent to identified key natural heritage features and/or key hydrologic features above and beyond the site-specific development requirements.
ECO5	Biodiverse Native and Pollinator Supportive Species	Provides habitat and promotes biodiversity.	<p>Provide a minimum of 50% of available roof space as a biodiverse green roof to support pollinator species. Residential buildings less than 6 storeys or 20 m in height are exempt from this performance measure.</p> <p>Using at least 50% plant species native to southeast Ontario, restore predevelopment native ecological communities, water bodies, or wetlands on the project site in an area equal to or greater than 20% of the development footprint.</p>
ECO6	Invasive Species	Conserves existing natural areas and promote biodiversity.	Do not introduce any invasive species

# Appendix C (Cont'd)

Section	Facility Design Feature	Purpose of Design Feature	Target
ECO7	Bird Friendly Glazing	Reduces bird collisions and mortalities.	Treat 95% of all exterior glazing above 12 m or above tree canopy with: <ol style="list-style-type: none"> <li>(1) Low reflectance, opaque materials.</li> <li>(2) Visual markers applied to glass with a maximum spacing of 100 mm x 100 mm.</li> <li>(3) Building-integrated structures to mute reflections on glass surfaces.</li> </ol>
ECO8	Dark Sky Friendly Lighting	Increases night sky access, improves nighttime visibility, and improves the nighttime environment for wildlife.	<p>All exterior fixtures must be dark sky compliant and meet RP-8 Guidelines. Façade/rooftop illumination must be directed down and turned off between 10pm and 6am.</p> <p>Install an automatic device that reduces the outward spillage of internal light by:</p> <ol style="list-style-type: none"> <li>(1) Reducing the input power to non-emergency lighting fixtures by at least 50% outside of facility operating hours. <b>or</b></li> <li>(2) Shielding all non-emergency light fixtures outside of facility operating hours.</li> </ol>