ADMINISTRATIVE REPORT

Title: Bird-Friendly Urban Design Guidelines

Critical Path: Standing Policy Committee on Property and Development, Heritage, and Downtown Development – Executive Policy Committee – Council

AUTHORIZATION

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EXECUTIVE SUMMARY

On February 12, 2021, the Standing Policy Committee on Property and Development, Heritage and Downtown Development directed the Winnipeg Public Service to report back with design guidelines for the creation of a Bird-Friendly Urban Design By-law within the City of Winnipeg.

Birds are an important part of the natural environment and, unfortunately, building design plays a role in approximately 25 million bird deaths each year, typically through collisions with glass on buildings. Research has shown that the risks are significantly higher during bird migration periods.

The Public Service recommends that the City of Winnipeg immediately implement bird-friendly practices by adopting the national Bird-Friendly Building Design Standard established by the Canadian Standards Association (CSA Group), summarized in Appendix A, for use as the City's recommended design standard; including developing bird-friendly web resources; turning off lights in municipal buildings during peak migration seasons, and encouraging other building owners to do the same. Going forward, the Public Service will integrate the discussion of further bird-friendly standards into our upcoming zoning by-law update consultations.

If the recommendations are concurred in, the City of Winnipeg will begin the process of making Winnipeg more bird-friendly, and residents will have increased access to information to help protect bird populations.

RECOMMENDATIONS

1. That the Canadian Standards Association Bird Friendly Design Standard, which covers bird-friendly building design for new construction and existing buildings and is summarized in Appendix A, be adopted for use as the City's recommended bird friendly design standard.

2. That the Public Service prepare a "lights out" policy for Council consideration related to public buildings.

3. That the Public Service undertake consultation with the development industry, design professionals, academics, and other relevant stakeholders as part of future review processes for both the Downtown and Winnipeg Zoning By-laws, to incorporate bird-friendly design standards.

4. That the proper officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

REASON FOR THE REPORT

On February 12, 2021, the Standing Policy Committee on Property and Development, Heritage and Downtown Development directed the Winnipeg Public Service to report back within 180 days with design guidelines for the creation of Bird-Friendly Urban Design By-law within the City of Winnipeg.

IMPLICATIONS OF THE RECOMMENDATIONS

If the recommendations of the report are concurred in, the City will have recommended construction standards related to bird-friendly design for new and existing buildings. These standards will be featured on the City of Winnipeg website, with additional information on how both homeowners and building owners can be more bird-friendly.

The Public Service will also prepare a proposed “lights out” policy for Council consideration related to public buildings, and initiate a “lights out” public awareness campaign during migratory seasons.

The Public Service will undertake consultations and produce recommendations about bird-friendly design, as part of future proposed zoning by-law update processes.

HISTORY/DISCUSSION

On February 12, 2021, the Standing Policy Committee on Property and Development, Heritage and Downtown Development directed the Winnipeg Public Service to report back within 180 days with design guidelines for the creation of Bird-Friendly Urban Design By-law within the City of Winnipeg.

The Public Service has researched bird-friendly guidelines and legislation in cities across Canada (including Toronto, Markham, Ottawa, Regina, Edmonton, Calgary, and Vancouver), as well as some national agencies and US jurisdictions. A comparison table can be found in Appendix B, attached.

Birds are an important part of the natural environment. They help control insects and rodents; pollinate flowers, gardens and agricultural crops; and disperse seeds, while serving as a bio-indicator for the health of an ecosystem (Nature Conservancy Canada). Preserving bird populations contributes to environmental sustainability and reduces human-induced environmental impacts.

Building design plays a role in many bird deaths each year, through collisions with buildings in urban environments (ace-eco.org). According to the Canadian Standards Association (CSA), untreated glass is responsible for most bird collisions with buildings. Mirrored glass is particularly dangerous for birds, but non-mirrored glass is also a hazard because it can create a fly-through effect. CSA also states that nighttime collisions occur because illuminated buildings create a beacon effect for night-migrating birds.

In a 2013 study, Avian Conservation and Ecology estimated that about 25 million (between 16 and 42 million) birds are killed by colliding with windows in Canada annually (ace-eco.org). This represents the second biggest direct mortality of birds after domestic cats (Nature Conservancy Canada).

When consulted on this project, a local expert in the field, Dr. Nicola Koper (Professor of Conservation Biology at the University of Manitoba) noted that Winnipeg is located within the Mississippi flyway. Birds on this migration path travel from the boreal forest, prairie provinces, and the arctic. Their wintering grounds are located from the USA all the way to the southern tip of South America.

While windows pose risks to birds throughout the year, risks are significantly higher during the migration periods (especially spring). Birds are stressed, sleep- and food-deprived, and are unfamiliar with the local landscapes, and are therefore more susceptible to collisions.

Dr. Koper also has observed that Winnipeg plays an important role as a stop-over site during migrations, and provides a particularly critical habitat for migratory birds. It functions as an island of habitat, food and resources within an ocean of agriculture and grasslands. It provides trees, water, protection, and supplemental food, and thus helps many birds survive their journeys. Because the vast majority of southern Manitoba has been altered by human development, many birds depend on the resources that they can find within Winnipeg.

Mitigating bird collisions

Design elements like bird-friendly glazing on glass, visual markers on glass, shading of windows, and building envelope design elements (e.g. reduced window surface area and no courtyards), can reduce daytime collisions. These treatments are particularly relevant in the key critical area, which is the first 16 to 25 metres above grade or up to the tree line.

Reducing light pollution in buildings through well-designed lighting and by turning off interior lights during migratory seasons can reduce instances of nighttime collisions.

Cities across North America (some outlined in Appendix B) have adopted both statutory and non-statutory guidelines to promote bird-friendly design. A global organization dedicated to standards development, CSA Group, has developed a Bird-Friendly Building Design standard (the Standard) supported by the Fatal Light Awareness Program (FLAP). FLAP is a CSA Group member organization.

The Standard (summarized in Appendix A) covers bird-friendly building design in both new construction and existing buildings and is intended to reduce bird collisions with buildings. Design requirements are for glazing, building-integrated structures, and overall building and site design. This document can be accessed free of charge by creating a login account through the CSA Group website.

Jurisdictions also provide additional web resources to residents about how to help preserve bird populations, particularly during peak migration seasons.

The City of Winnipeg can help advance bird-friendly practices by doing the following:

- **Adopt CSA Group's Bird-Friendly Building Design Standard (Summarized in Appendix A) as the City's recommended bird-friendly design standard.** CSA Group is a global organization dedicated to standards development and testing, inspection and certification around the world including Canada, the U.S., Europe, and Asia. This design standard was published as a National Standard of Canada, in compliance with Standards Council of Canada. This is also an opportunity for the Public Service to become familiar with the guidelines and work with applicants through the development application and permitting processes to test guidelines with builders on a trial basis.

- **Develop bird-friendly web resources**. Additional bird-friendly information will be compiled by the Public Service and posted on the City's website. This web page will signify the City's support for bird-friendly design and action, and will be a convenient place for residents to access information.

- **Turn off lights** in municipal buildings during peak migration seasons, and encourage other building owners to do the same

- **Integrate bird-friendly standards into regulatory documents.** A recommendation coming out of the recent *OurWinnipeg* and *Complete Communities* review is that we update Winnipeg's two existing zoning by-laws. This forthcoming update provides an opportunity (through consultation with relevant stakeholders) to explore integrating bird-friendly design standards into these regulatory tools.

If these actions are established, there may be additional opportunity for the City to explore certification opportunities for bird-safe buildings, such as LEED and BOMA BEST, and participate in Nature Canada's Bird Friendly Cities program, which recognizes cities (like Toronto) that have made admirable contributions to bird conservation in their areas (birdsafe.ca).

FINANCIAL IMPACT

Financial Impact Statement

Date: August 12, 2021

Project Name:

Bird-Friendly Urban Design Guidelines

COMMENTS:

There are no financial implications associated with the recommendations in this report.

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Mike McGinn, CPA, CA
Manager of Finance

CONSULTATION

This Report has been prepared in consultation with:

- Dr. Nicola Koper, Professor of Conservation Biology, University of Manitoba

OURWINNIPEG POLICY ALIGNMENT

OurWinnipeg provides policy direction to "reduce the environmental impact of our activities" (Section 02-2, Environment). *Complete Communities* includes direction to "promote exemplary urban design in downtown development projects (03-1e, Direction 1)".

In addition, the draft *OurWinnipeg 2045* (second reading completed July 22, 2021) contains multiple policies supporting environmental resilience, positive health outcomes in built and natural environments, low-impact ecosystem management, and other policies to protect natural systems in urban environments. The draft *Complete Communities 2.0* document (also completed second reading July 22, 2021) includes the urban design goal to promote high quality urban design (Goal 4). Policy 4.4 provides direction to "[d]evelop a better understanding of Winnipeg's urban design needs through shared research between the City, universities and industry."

WINNIPEG CLIMATE ACTION PLAN ALIGNMENT

The Winnipeg Climate Action Plan states that through "working with partners to reduce emissions, the City can…enhance connectivity of green spaces and parks throughout Winnipeg to support biodiversity and natural systems (p. 1)". Bird-friendly building design is an additional way to support biodiversity, as it reduces risks to birds.

SUBMITTED BY

Department: Planning, Property & Development
Division: Urban Planning & Design Division
Prepared by: Karin Kliewer
Date: August 17, 2021
File No: N/A

Attachments:

Appendix A – Summary of CSA Group Bird Friendly Design Standard

Appendix B – Cross-Jurisdictional Regulations and Guidelines Summary

Appendix B – Cross-Jurisdictional Regulations and Guidelines Summary

SUMMARY AND COMPARISON SELECT CITIES/AGENCIES

	Toronto	**Calgary**	**Vancouver**	**UBC Vancouver**	**Markham**	**Ottawa**	**San Francisco**	**Minnesota** **State**	**American Bird Conservancy**	**Audubon Minnesota**	**FLAP Canada**
Regulations	2010 Green Development Tier 1 Requirement for planning applications and inspection process	2008 City of Calgary Sustainable Policy For public buildings: new, renovated, affordable housing, operation	The Bird Friendly Design Guidelines are part of the Vancouver Bird Strategy. 2013, Vancouver Bird Strategy was developed within the context of the Greenest City Action Plan and Metro Vancouver's Regional Biodiversity Strategy	2018 Green Building Action Plan	2013 City of Markham's new Official Plan 2011 The Greenprint, Markham's Community Sustainability Plan	Ottawa's guidelines are consistent with the specifications provided in CSA A460:19 Standard for bird-friendly building design	Sep 2011 Planning Code, Zoning Section 139: Standards for Bird- Safe Buildings. Section 101.1: Adopting environmental findings. Building Code Ch 13C: LEED and green building For all new, renovation, alteration, addition commercial and residential buildings.	2009 Bird-Safe Buildings Act, Chapter 101, Article 2, Section 54 [16B2421] 2010 State of Minnesota Sustainable Building Guidelines B3-MSBG)			
Guidelines	2007 Bird-Friendly Development Guidelines 2009 Bird-Friendly Development	2011 Bird-Friendly Design Guidelines 2011 Centre City Illumination Guidelines	2015 Bird Friendly Design Guidelines	2018 UBC Bird Friendly Design Guidelines for Buildings	2014 Bird Friendly Guidelines	2020 Bird Safe Design Guidelines	2011 Standards for Bird- Safe Buildings 2012 Design Standards for	2010 Bird Safe Building Guidelines Minnesota Bird-safe	2011 Bird Friendly Building Design	2010 Bird Safe Building Guidelines	CSA A460:19 Bird Friendly Building Design

	Rating System & Acknowledgment Program 2016 Bird Friendly Best Practices Glass						Bird-Safe Buildings	Building Guidelines, Audubon Minnesota Sustainable Building Guidelines Version 2.2 Update 2013			
Scope	All new buildings except residential low-rise.	Public buildings. All buildings and structures (voluntary)	Design of buildings and landscaped areas on private and public property (voluntary)	Target: 100% compliance for new institutional buildings by 2020 and new residential buildings by 2025.	All new and existing buildings	Ottawa's Guidelines are intended to be used during the planning stage of private or public development projects The guidelines are not limited only to buildings; they also apply to other structures that incorporate glass and glass-like panels (e.g. raised passageways, transit shelters, railings). Also apply to some plans of subdivision (i.e., those located in or adjacent to natural areas and greenspaces	New construction, building additions (replacement of 50% or more glazing), building features.	For New Construction and Major Renovations with new or replacement glazing scope, all required criteria apply. These Include deterrent facades for areas that are bird attractants; reducing bird collision "traps"; monitoring of bird impacts during the building's first year; and incorporating Lights Out program concepts. For Major Renovations without new or replacement glazing scope, only "Lights Out" light management program is required	New, retrofit and existing buildings.	All types of buildings, in all settings	New construction and existing buildings

Exemptions	Heritage designation permits up-lighting from exterior light fixtures. Up to 15% area allowed to be untreated						Residential buildings with height less than 14m and exposed façade less than 50% glazing. Waive by zoning examiner upon recommendation by a qualified biologist.				
Hazardous site **areas**	Natural area, ravines, woodlot, or other natural feature.	400m from open space, river, valleys, natural parks. Within City Centre area.			BWCs are not localized near natural areas in Markham, but tend to occur in areas where glass buildings are concentrated	Generally, buildings located adjacent to forests, parks, waterfront areas and wetlands are likely to have an increased probability of bird collisions due to the increased numbers and diversity of birds in these areas	91m from an Urban Bird Refuge, defined as: any open space greater than 0.8ha dominated by vegetation (including Vegetated landscaping, forest, meadows, grassland, water features or wetlands), or open water; green roof that exceeds 0.8ha; and 91m from Wind generators.				
Hazardous building areas	0m-12m; Beginning in 2014, 16m for City buildings,	0m-16m or 4 storeys. Abutting courtyard, green roof, habitat area.	Most collision deaths occur at residential buildings because they are the most common and	Glass in buildings - critical zone for collisions – up to the fourth floor of a building or		Avoid monolithic, undistinguished expanses of glazing	0m-18m		0m-12m (under review)	Ground level stories are the most hazardous areas of all buildings:	All fly- through conditions up to 16m subject to mitigation strategies

	0m-mature tree height. 0m-12m above green roof. Supplementary buildings & on-site glass features.	Building corners. Atriums, linkways, bridges.	widespread building types. Nevertheless, because many high-rise office buildings are clad in large expanses of reflective glass, they can cause a highly disproportionately number of collisions annually, particularly if they are adjacent to natural areas that attract high densities of birds. The height that presents the highest collision probability is up to mature tree height, or up to the fourth floor of a building, whichever is highest.	mature tree height, whichever is greater, and up to 3.6m (12 feet) above a green roof Avoid constructing dangerous fly through conditions, which appear as clear paths for birds to fly towards the sky or habitat on the other side, or bird traps where glass corners meet. Examples include glass corners without mullions, parallel glass (spaced 5m apart or less), transparent skywalks, glass guards or guardrails, and glass parapets.		Buildings and other structures with glass corners or walkways, or that have large areas of parallel facing windows, are particularly hazardous. Large indoor plants or green walls visible through transparent glass windows may also attract birds and contribute to collision risks Features such as courtyards and open-topped atria can fatally entrap birds, especially if they are heavily planted and surrounded by windows or other glazed surfaces.	Unbroken glazed exceeds 2.2m2 of other structures. Mirrored glass. Visible light reflectance exceeds 30%.		Windowed courtyards and open-topped atria.	Minimize those hazards that bring birds close to buildings such as vegetation, water and other features. Provide uniform covering with bird-safe materials, especially adjacent to landscapes. Use angled glass, between 20 and 40 degrees from vertical, to reflect the ground instead of adjacent habitat or sky. **Courtyards** may contain landscaping and confusing internal corners that limit bird escape routes. These areas often allow sudden access by people that flush birds into glass. Control access to enclosed areas so birds flush away from glass into open areas.	Glass corners treated for 5 m in each direction, extending from the corner Parallel glass elements treated with visual markers Glass balcony guards/guardrails treated with visual markers

										Treat glass with bird-safe materials so birds see and avoid glass. Green roof: Treat glass to minimize the reflection of rooftop landscaping in adjacent building features. Consider foregoing green roof installation or eliminating access to birds if reflection in adjacent buildings will occur. **Rooftop obstacles** such as antennas and media equipment can injure or kill birds and should be minimized. In poor weather and bright lighting conditions birds may congregate on and around rooftops. Co-locate antennas and tall rooftop media	

										equipment to minimize conflicts with birds. Utilize self-supporting structures that do not require guy wire supports. Avoid up-lighting rooftop antennas and tall equipment, as well as decorative architectural spires	
Mitigation - **Elevation**	Min 85% treated glazing required for first12m (16m for City buildings beginning in 2014).				Apply primary treatments on the building facade from finished grade to 16m to approximately 85% of the untreated window surfaces with the exception of glass windows smaller than 2m2 in area. For the 15% that is left without primary treatment, a secondary treatment is recommended for all areas greater than 2m2. The 15% is usually situated within the first floor of the building i.e.	Treatments should be applied to a **minimum** of 90% of the glass within the first 16 metres of height as measured from the finished grade, or to the height of the adjacent mature tree canopy, whichever is greater.	Min 90% treated glazing required for buildings within 91m from hazardous areas. Min 95% treated glazing required for residential building with height less than 13.7m AND exposed façade with more than 50% glazing. 100% of glazing on feature related hazard (freestanding glass standards) with unbroken segments larger		Min 90% treated collisions. glazing required for the first 12.2m to deter 70% or more bird collisions. Min 60% treated glazing required for other areas to deter 70% or more bird		Mitigation strategies present to a height of 16 m from grade or to height of the adjacent mature tree canopy, whichever is greater. Where there is glazing adjacent to green roofs and/or other rooftop vegetation, mitigation strategy 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.

					commercial and retail spaces.		than 2.2m2 must be treated.				treatment of glazing shall apply to: a minimum of 90% of all glazing material; all glazing material that creates fly-through conditions; all glazing material adjacent to natural heritage features
Mitigation - **Materials**	Most effective: Pattern by film, decals, Fenestration, grilles and or louvers, artwork. Multiple paned glass. Others (considered less effective): Angled glass panes, awnings and overhangs to provide muted reflection at the base of window, and external sunshades.	CollidEscape: one-way viewing perforated external window film. Spandrels interrupting a reflective façade. Louvers defining areas as solid. Opaque material or non-reflect glass to clearly define recessed area and courtyards.	Increase visibility of glass: Apply visual markers to the exterior of glass surfaces (markers on the interior surface of glass are less effective). Applied visual markers are not an optimal solution for all building types Interrupt reflective glass by increasing the density of external visual markers including spandrel panels and mullions. Other strategies adapted fenestration patterns, external blinds, shutters,	Minimize the quantity of glass in new buildings - avoid continuous expanses of monolithic, clear glass especially near grade where vegetation may be reflected. increase glass visibility in retrofits Ineffective strategies: Tinted glass, single bird of prey decals Utilize adhesive film, acid-etch, or frit	Primary treatments for new buildings and site plan design may include applying external semitransparent stripes, dots or other patterns. • Primary treatments for retrofit of buildings may include blinds, shades and netting. • Secondary treatment may include closely-spaced window mullions, internal blinds and shades, ultraviolet patterns with greater than 20-40% reflectivity, tinting and angling of glass, and judicious	Effective visual markers: High colour contrast to the glass surface. Must be applied to the exterior (first) surface of the glass. Any pattern of visual marker is acceptable (i.e. lines, dots, etc.) Closely spaced grilles or muntins (i.e., bars dividing individual panes of glass) and the application of commercial films and visual markers. Patterns and images can be applied directly to the glass during manufacture using ceramic fritting, acid etching, digital printing or silk-screening.	Fritting, netting, permanent stencils, frosted glass, exterior screens, physical grids, UV patterns visible to birds.		Most effective: Recessed windows, translucent, etched, stained, frosted glass, netting, screens, grilles, shutters, exterior shades, UV pattern with strong contrast, films, decal. Others: Angled glass panes, awnings and overhangs. Not effective:	Utilize etching, fritting, translucent and opaque patterned glass to reduce transparency and reflection, while achieving solar shading. (Note: Although fritting is useful for creating visual noise, it is less effective at reducing reflectance since it is generally applied on the interior face of the glass.) Incorporate windows with real or applied divided lights to break up	Visual markers shall consist of absorbing and reflecting elements that create a visible barrier Visual markers may consist of: acid etch visual markers; UV markers; ritted glass; film; non-film adhesive markers Only building-integrated structures that are permanently fixed to the building shall be used to provide visual noise.

			sunshades, grilles, louvers or artwork. Design corner windows, glass walkways, glass railings, and other similar features to reduce the appearance of clear passage to sky or vegetation Mute reflections: Use screens, drapes or blinds to increase the opacity of clear glass.	patterns to create visual noise which breaks up the transparency of glass Consider UV patterned glass which makes glazing visible to birds, but not to humans Utilize exterior screens, architectural mesh, and grilles to block reflections of vegetation and sky, and break up transparency Living wall comprised of a mesh screen with vines, which creates a barrier in front of windows to help reduce bird collisions. Additionally, living walls have the potential to provide food, shelter, and nesting sites for urban birds	placement of vegetation so that it does not reflect in the glass.	Low-reflectance opaque or frosted glass (including channel glass and glass blocks) are excellent options Reflective or low-emissivity coatings that have an outside reflectance of 15% or less. Opaque or frosted glass with an outside reflectance of greater than 15% should only be used in combination with other strategies such as visual markers Exterior treatments over windows (i.e. screens, grilles, shutters, shades			Internals, shades, blinds, curtains.	large window expanses into smaller subdivisions. Consider applying acid-etched or sandblasted patterns to glass on the outside surface to “read” in both transparent and reflective conditions. Create patterns that follow the “hand-print” rule (below). Use window films featuring artwork or custom patterns permanently or on a rotating basis. Low-reflectivity glass has not been sufficiently tested for bird safety but may prove beneficial in certain installations. Utilize shading devices, screens, and other physical barriers to reduce	Exterior-mounted shades should be: parallel or angled to the glass surfaces; made of architectural wire mesh, lattices, trellises, or any opaque or translucent non-reflective material that has been perforated in a pattern with holes no greater than 50 mm; and has a solid-to-void ratio not less than 50%; and placed so that the material surface is not more than 1 m from the parallel plane of the glass. Screens, grilles, and mesh elements installed in front of the glazing so as to be seamless and taut; and conform to the following, as applicable: Aviary mesh or nets shall have a maximum aperture size of 19 mm × 19 mm and shall be

										reflectivity and birds' access to glass. Incorporate louvers, awnings, sunshades, light shelves or other exterior shading/shielding devices to reduce reflection and give birds a visual indication of a barrier. Consider other highly patterned shading/shielding devices that will provide visual cues and encourage bird safety	installed at least 50 mm in front of the glazing. Screens are installed on the exterior of the glazing, such as those used to prevent insects from entering the building. Decorative, aesthetic, artistic, or any other type of screen installation shall meet the criteria for shades Shutters When stationary exterior shutters with gaps not larger than 50 mm are permanently installed on the exterior of a building, the glazing need not be treated Louvers shall meet the criteria for shades
Mitigation - **Specifications**	Density pattern max. 10cm apart, pattern min 5mm	Density pattern 10cm (optimal) to maximum	Gaps between markers should be no greater than 5	Visual markers - use high contrast and dense: spacing at a maximum 5cm x	Highly visible pattern that follows the rule of maximum 5cm untreated space on	Visual markings: maximum spacing of 50 mm by 50 mm	Vertical treatment		Max. 5.1cm x 10.2cm (2 inches x 4 inches) of exposed	Small birds will attempt to fly through any opening larger than 4 inches wide	Visual markers 4 mm in diameter for individual elements; or 2 mm wide by 8 mm

	diameter, the denser the more effective (5cm x 5cm for City buildings beginning in 2014).	28cm. Angled glass panes between 20 to 40 degrees from vertical.	cm vertically or 10 cm horizontally.	5cm apart with markers no more than 0.32cm in size to provide an effective visual cue that alerts birds of glass	the horizontal plane and 10cm untreated space on the vertical plane	Individual marker elements should be a minimum of 4 mm diameter, or 2 mm wide by 8 mm long for linear elements Shades, louvers and decorative or aesthetic screens should be: placed so that the material surface is not more than 1 m from the parallel surface of the glass; installed parallel or angled to the glass surfaces; and, made of architectural wire mesh, lattices, trellises, or any opaque or translucent non-reflective material that has apertures no greater than 50 mm; and has a solid-to-void ratio not less than 50%	min 6.3mm wide at min 10.2cm spacing, or horizontal treatment at 3.1mm wide at maximum 5.1cm spacing.		untreated glass area. Apply pattern on the outside. Min 6mm wide. Angled glass panes at 20 or 40 degrees from vertical.	or 2 inches tall or about the size of a child's handprint oriented horizontally Specify ventilation grates with a porosity no larger than 0.8 inches.13 Cover larger grates with netting.	long for linear elements. Density pattern no more than 50 mm between visual markers. Contrast: markers shall be in high contrast to the glazing material Visual markers shall be on the exterior surface of the glass
Mitigation - **Heritage buildings**	Exempt from exterior lighting requirement						Reversible treatment (netting, glass films, grates, and screens).				
Mitigation - **Site design**	Ventilation grates with porosity of less than 2cm X 2cm. (Optional)	Ventilation grates with porosity of less than 2cm X 2cm.	Reduce the dangers of open pipes, ventilation grates and drains. (i) Ventilation grates and drains should have openings no larger than 2 by 2 cm or 1 by 4 cm to ensure	Reduce bird attractants in reflections through careful landscape design. While trees and shrubs provide necessary habitats	Generally, locate trees and vegetation within 3m from glass areas or further	Minimize the number of exterior antennas and other tall structures, including cell phone, television	Trees or tall shrubs to be within 3 feet from glazing or far away.		Place landscape away from building façade.	Encourage bird-safe design strategies early in the collaborative design process through consideration of	Site design should take into account nearby existing bird habitats (e.g., ravines, natural areas) or known migratory paths.

	Capped all ventilation		that birds cannot be trapped within. (ii) Cap the ends of all open pipes, large and small, so that birds do not become entrapped when investigating these openings for nesting opportunities. Ensure outdoor landscaping is at appropriate distance from glass, to reduce reflections. If this is not possible, landscaping should occur directly (0-1 m) adjacent to glass or measures should be taken to make glass visible. Locate bird feeders 0-1 m from windows.	and foraging sites for birds on campus, birds are more likely to collide with glazed surfaces that are within 2 to 20 meters from vegetation.	than 30m from glass areas. Buildings fronting on public sidewalks should apply other bird friendly treatments to glass areas. Minimize the use of vegetation that bears fruit and attracts birds adjacent to highly reflective glass. Cluster a higher number of trees away from non-treated surfaces. Place low shrubs and groundcovers adjacent to highly reflective glass. Avoid planting trees where they reflect clearly in untreated glass.	and other media equipment. Consolidate all necessary antennas and tall equipment into a single tower, where possible, and locate it to minimize conflicts with birds. Utilize self-supporting lattice or monopole towers that do not require the use of guy wire supports. Grates should have a maximum porosity of 20 mm by 20 mm or 40 mm by 10 mm, or should be screened to prevent birds from falling through. Ensure that pipes, flues and vents are capped or screened to prevent wildlife entry.				site, existing habitat, and bird-safe landscaping Analyze the site to determine potential attractions for bird populations. Consult with an ecologist or bird specialist to inventory the site. Document the location of nearby vegetated streetscapes and urban parks. Identify all sources of food and shelter for migratory and resident bird populations, including plants, water and other natural features. Identify human-made features that attract birds, including water sources, nesting and perching sites, and shelter from adverse weather	Sites in proximity to bird habitats are high risk, and design on such sites shall exceed the minimum requirements of this Standard Grade-level building ventilation grates shall have a porosity not greater than 20 mm × 20 mm or 40 mm × 10 mm Exterior bird feeders should be located not more than 0.5 m from exterior glazing

										Consider existing habitat Habitat in proximity to glass exacerbates this threat unless reflections are avoided or eliminated or visual cues are incorporated in glazing. When planning new landscapes be aware of reflections and see-through effects created by habitat in relation to building features. Place plantings to minimize these effects. Alternatively, situate trees and shrubs immediately adjacent to the exterior glass walls, at a distance of less than three feet from the glass.17 Close proximity will minimize habitat reflections. In addition, if a bird	

										does try to fly to a reflection at this range, flight momentum will be minimal, thereby reducing fatal collisions. This planting strategy also provides beneficial summertime shading and reduces cooling loads. If any bird-attracting features (food, water, shelter) are in reflective range of the building(s), use fritting, shading devices or other techniques to make glass visible. **Clear barriers** such as transparent bus-shelters, skyways, linkways, railings, windscreens and noise barriers create a serious hazard for birds because they are invisible, causing a deadly fly-through hazard. Avoid use of transparent materials in these	

										structures in any location where birds may be present. Use translucent or decorative glazing as an alternative. If clear panels of any kind are in use, incorporate surface treatments to make glass visible.	
Mitigation - **Exterior lighting**	No up-lighting. Provide shield for light fixtures. Light fixtures includes bollards, lower-scale pole fixtures along pedestrian routes. No light spill to neighbouring properties. (Optional) Rooftop lighting to be shut off between 11:00 p.m. and 5:00 a.m. (6:00 a.m. under consideration by Council) For institutional /commercial development:	In accordance with By-law and Centre City illumination Guidelines: Floodlighting for special events and sensitive to migratory season. Minimize light trespass.	Reduce light pollution. (i) Reduce unnecessary light-spill through shielding, targeted lighting and reduction of vanity lighting. (ii) Down lighting should be selected over up lighting and floodlighting should be avoided.		Eliminate up-lighting by attaching cut-off shield for streetlights and external building lights. Limit lighting to areas where lighting is needed for safety and security. There should be no light spill outside the property line. Provide motion sensors or auto shutoff system with maximum 30-minute vacant period.	Avoid up-lighting rooftop antennas and tall equipment, as well as decorative architectural spires	No up-lighting, no event search lighting, lighting shall be shield and minimal.		Shield and direct lighting to minimize attraction to night migrating birds. Encourage blue and green light, discourage yellow and red light.	Eliminate light directed upwards by attaching cutoff shields to streetlights and external lights. Highlight building features without up-lighting. Reduce the amount of light that spills outside areas where it is needed for safety and security. Maximize the useful light directed to targeted areas.	All exterior building lighting shall be dark sky compliant

	install an automatic device that reduces the outward spillage of internal light by 1) reducing the input power to lighting fixtures by at least 50% between the hours of 11:00 p.m. and 5:00 a.m. (6:00 a.m. under consideration by Council); OR 2) shielding all openings in the envelope with a direct line of sight to any non-emergency light fixture between the hours of 11:00 p.m. and 5:00 a.m. (6:00 a.m. under consideration by Council).				Avoid creating “pools” of light that could attract birds especially during inclement weather.					Eliminate the use of spotlights and searchlights during bird migration	
Mitigation - **Interior lighting**	Public buildings Lights-out Policy for after work hours & weekends. (Optional) Motion sensor in linkways or zone lighting program. Individual office	Use task lighting, motion sensors, timers. Close curtains if lights are on in the evening. Schedule cleaning during daytime.					(Optional) Motion detectors and timers. See also mitigation – migratory period.		Turn off interior lighting at night or designed to minimize light escaping through windows.	Design lights to shut off using automatic controls, including photosensors, infrared and motion detectors. These devices generally pay for themselves in energy savings within one year.	A building’s interior lighting should be reduced after business hours in non-residential buildings and from sunset to sunrise in all cases. Whenever possible, task lighting rather than building lighting

	lighting.									Reduce the need for extensive overhead lighting. Encourage the use of localized task lighting and shades. Reduce perimeter lighting and/or draw shades wherever possible.	should be used during these times
Mitigation - **Interior**	(Optional) Locate internal greenery distance from glass relative to density pattern of adjacent window treatment Blinds at individual work stations Cleaning operations during daylight hours Lights out policy after hours and weekends city-owned buildings	Locate interior landscape away from windows	Avoid interior landscaping near windows	Avoid interior plants near windows	Interior greenery should be located well away from windows		(Optional) Move interior plants away from windows. Window coverings for nighttime use.			Birds will mistakenly seek shelter in landscaping located behind glass. Mask views of interior plantings from outside the building. Use screening, window films or treatments to make glass visible. Blinds or curtains. Partially open blinds during the day. Close curtains and blinds if evening lighting is utilized.	interior vegetation should not be placed near exterior untreated glazing.

										For best results, consider photo-sensors, timers and other automatic controls to regulate shading devices, lighting and daylighting. Complete nightly maintenance activities before midnight or earlier. Instruct cleaning crews to work down from the upper stories, turning off lights as they go.	
Mitigation - **Migratory period**	Design to minimize risk of migratory bird collisions	Spring: Mid-March to early-June Fall: Late-Aug to early-Nov Consider festival and advertisement lighting effects during migratory seasons			Require lights out from 11 p.m. to 6 a.m. or minimal light use during spring (March- June) and fall (August-October) bird migration periods.		Spring: Feb 15 – May 15 Fall: Aug 15 – Nov 30 Unneeded light off from dusk till dawn.	Public buildings only: turn off light from midnight to dawn during Mar 15 to May 31, and Aug 15 to Oct 31.		Building owners and facility managers extinguish all unnecessary exterior and interior lights from at least midnight to dawn especially during bird migration periods: (Spring) March 15 to May 31 (Fall) April 15 to August 31	

Mitigation - **Monitoring program**							Voluntary bird-strike hotline to report bird-strikes.	New Construction and Major Renovations with new or replacement glazing scope - monitoring of bird impacts during the building's first year		Consider daily bird-collision monitoring - provides valuable information for science and for prioritizing building retrofits. Sweep the building perimeter, setbacks, and roof daily for injured or dead birds. Note specific times, dates and locations of birds that are found. Work with Project BirdSafe to document all bird deaths and assist injured birds. Most birds are protected by the Migratory Bird Treaty Act of 1918.	
Education/Awareness program	Lights Out Toronto						Lights Out Program since 2008. Public education and outreach partnerships, building owner bird-safe stewardship,			Lights Out programs are city or state-wide initiatives designed to reduce light pollution and bird mortality. In Minnesota, Lights Out is coordinated by Audubon	

							encourage treatment, building tenant education.			Minnesota's Project BirdSafe	
Acknowledgment **Program**	2007 Bird Friendly Development Rating System & Acknowledgment Program**.** (Voluntary)						2011 US Environmental Conservation Department Voluntary Migratory Bird Stamps Program 2012 Design Standards for Birds-Safe Buildings. Three tiers voluntary acknowledgment program.		2011 US Environmental Conservation Department Voluntary Migratory Bird Stamps Program.		
Aligned municipal **requirements**	2010 City of Toronto Public Art Policy: Voluntary contribution of 1% of gross construction cost toward public art	2009 City of Calgary Public Art Policy 1% of capital project costs for City capital budget projects over $1 million. Centre City illumination Guidelines					2010 City of San Francisco Building Code Chapter 13C: Green Building and LEED requirement.				
Alliances	Toronto Hydro, Lights Out Toronto, Canadian Wildlife Service, FLAP Canada,	Green Rating Systems such as LEED® Canada, Built Green Canada, BOMA BEST, Green									

	Building Owners and Managers Association Toronto	Globes									