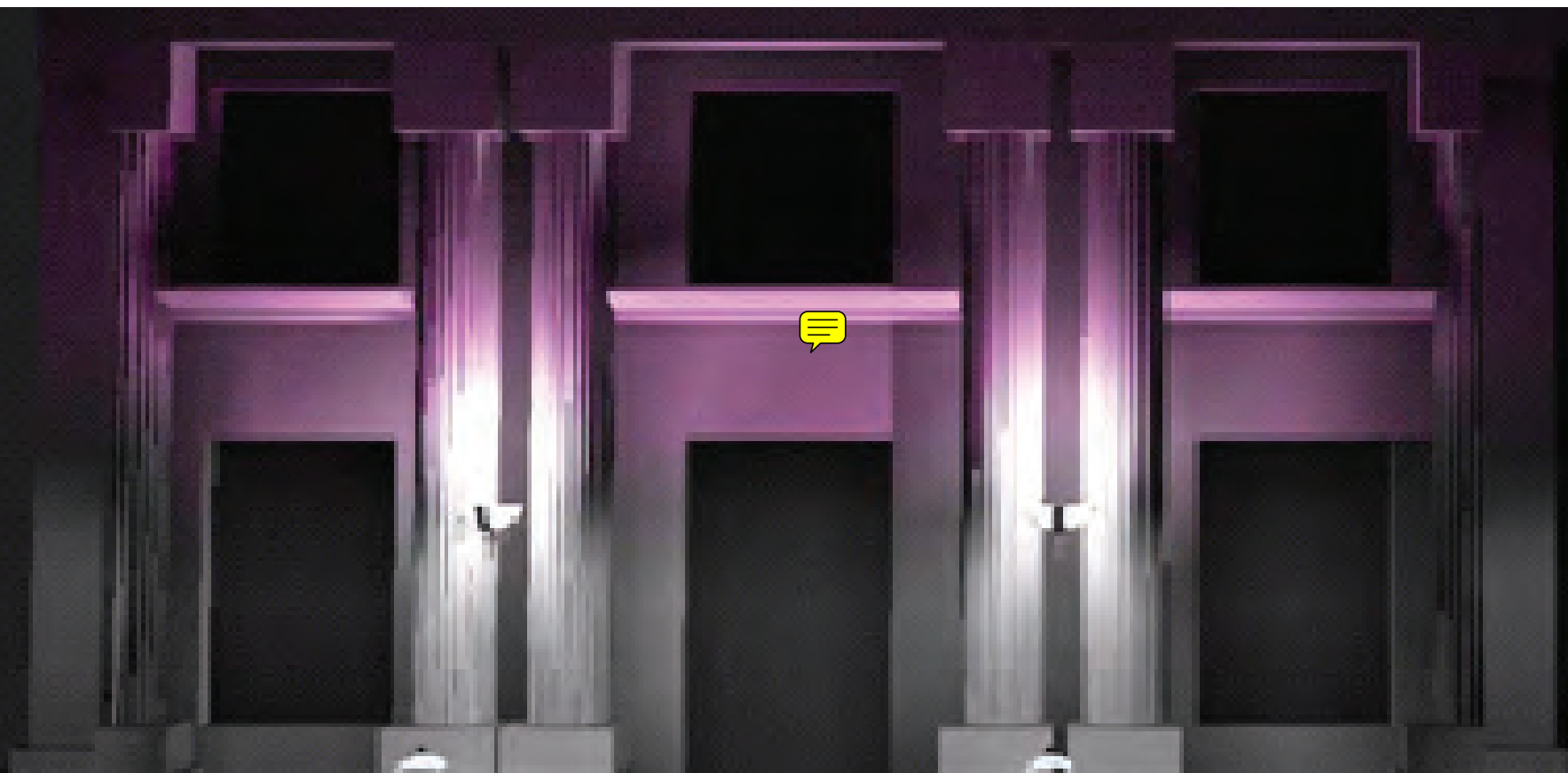


CENTRE CITY ILLUMINATION GUIDELINES

Illumination Solutions within the Context of the Centre City Plan

REPORT, MARCH 2011



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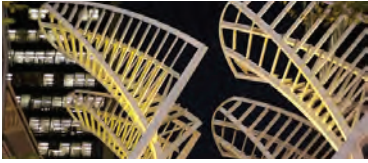
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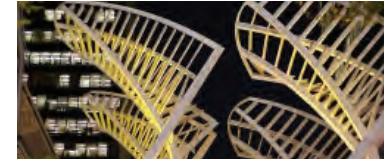


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Urban Design & Heritage
Centre City Planning & Design
Land Use Planning & Policy
The City of Calgary

Executive Summary



The Centre City Illumination Guideline (the “Guideline”) is a non-statutory document providing comprehensive urban design based lighting guidance for the Centre City in the form of principles, guidelines and solution-based case studies. The Guideline aligns with the Vision and Goals of the Centre City Plan and provides the City of Calgary leadership and design community with guidance for incorporating innovative, interesting, and inviting illumination solutions for the Centre City. Implementation of the recommendations in this Guideline is purely voluntary.

The Guideline focuses on experiential lighting which is designed primarily to enhance the environment. This can include lighting the following Categories: District, Edge, Historic and Cultural Resource, Landmark, Node, Path, and Entry. Security and streetlighting are not addressed in this document.

The Guideline includes:

- Principles – that apply to all experiential lighting projects;
- Guidelines – that are flexible yet provide specific direction for a variety of situations;
- Case Studies – that demonstrate the Guideline’s application

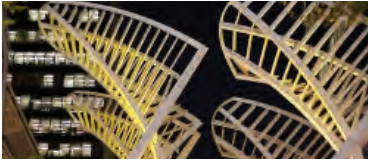
The intent of this Guideline is to express the ideals of the Centre City Plan Section 8. Vitality and its policies for light effect features. This illumination strategy will improve visibility of City landmarks and pedestrian corridors, will bring animation and movement to entertainment districts, and help to extend the active hours in the Centre City. The Guideline aims to:

- Enhance the image of the Centre City
- Animate the public realm
- Improve community pride
- Augment investment opportunities
- Assist wayfinding initiatives
- Draw positive interest to the Downtown and the Centre City.

This Guideline does not provide a single method of illumination, rather it outlines illumination options within the Centre City. The intent is for this document to serve as a [catalogue of ideas](#), best practices and technical design advice for those who choose to accentuate their project in this way.

The Guideline can be utilized for both public and private buildings and structures.

1.0 Role and Intent of the Guideline



1.0 Role and Intent of the Guideline

1.1 Purpose and Role

The guideline focuses on experiential lighting, which is designed primarily to enhance the environment. It does not address security and streetlighting.

This guideline includes:

- Principles – these are the basic or essential qualities that apply to all experiential lighting projects
- Guidelines – apply to Principles and Illumination Categories. They are flexible yet provide specific direction for a variety of situations
- Case Studies – provide detailed descriptions of the Guideline's application

Experiential lighting can be a key attribute of:

- expressing the identity of a neighbourhood,
- improving way finding at night,
- highlighting landmarks,
- highlighting entries and edges to Downtown,
- providing cohesion within the visual environment, and
- investing in public art.

If Centre City is considered a geographical repository filled with landmarks, historic sources, parks, paths, educational opportunities, entertainment possibilities, and neighbourhoods, experiential lighting will support the positive experience of this environment and make Centre City more liveable, thriving and caring.

This Guideline does not recommend a single method of appropriate illumination. Rather it outlines illumination options within Centre City, serving as a catalogue of ideas, best practices and technical design advice for those who choose to highlight their project in this way.

1.2 Policy Alignment

This Guideline aligns with the City Centre Plan which provides over arching principles. The principles of the Centre City Plan include “Build livable, inclusive and connected neighbourhoods”, “Create great streets, places and buildings for people” and “Create a lively, active and animated environment”. “Section 8: Vitality” of the Centre City Plan encourages the implementation of special lighting effects:

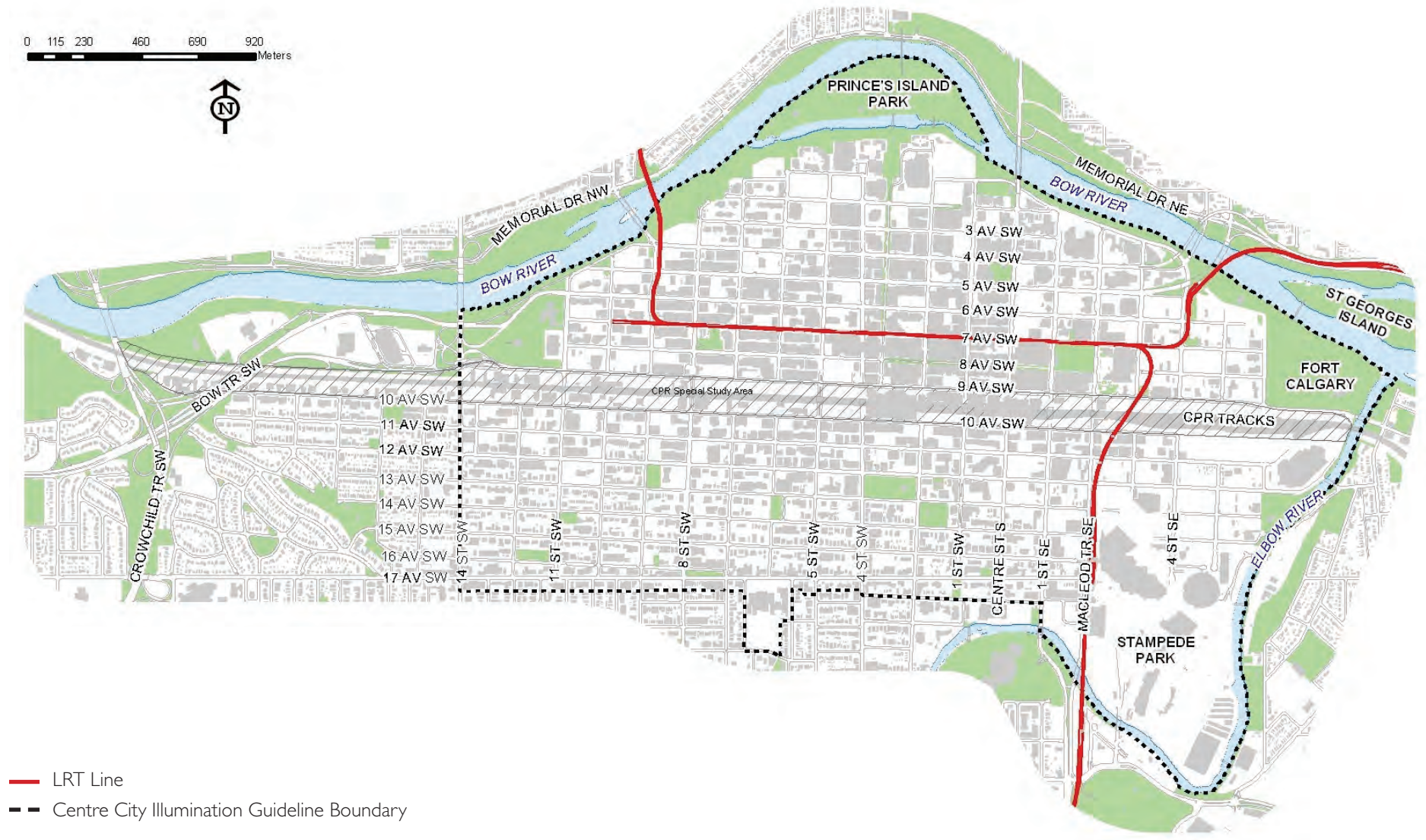
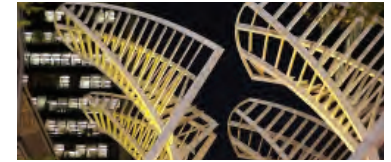
Light Effects Features:

The use of lighting in both public and private applications can assist to create an animated environment and contribute to the real or perceived safety of urban space. Lightscaping, the art of special light effects, is a special branch of art that uses light to shape the public realm at night, animate heritage and contemporary architectural landmarks, structures and the overall skyline, and creatively use the natural and artificial play of light to create shapes and effects that can delight the senses.

Policies:

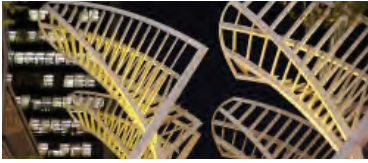
1. *Support and encourage the development and use of creative light effects, signage and lightscaping, both permanent and temporary in nature, in both public and private places. Particularly, emphasis should be placed in Entertainment and Cultural Districts and in areas frequented by tourists and visitors.*
2. *Include the review of night-time elevations as part of all new development applications.*
3. *Encourage the exterior lighting of both new and existing buildings and structures in order to improve the night-time aesthetics and animation of the Centre City. In so doing, consideration shall also be given to the impacts of any lighting strategy on residential uses.*

1.0 Role and Intent of the Guideline



Centre City Illumination Guideline Boundary Map: 2010

1.0 Role and Intent of the Guideline



1.3 Status of the Guideline

The Centre City Illumination Guidelines (the “Guideline”) is a non-statutory document providing comprehensive urban design lighting guidance for the Centre City in the form of Principles, Guidelines and solution-based Case Studies. The Guideline aligns with the Vision and Goals of the Centre City Plan and policies, and provides City of Calgary leadership and the design community with guidance for incorporating considered, interesting, and inviting illumination solutions for the Centre City and the City of Calgary. The Guideline is intended to lead interested designers and stakeholders in a common direction toward the realization of the Centre City Plan objectives that align with the Principles.

Innovative thinking is encouraged. The Implementation Principles of the Centre City Plan call for a creative, flexible, and collaborative approach to stakeholder engagement and partnerships. The Guideline describes illumination goals and opportunities and identifies specific stakeholder groups to support and encourage lighting as a potential strategy to provide vitality to the Centre City.

1.4 Implementation

Illumination projects are purely voluntary. Buildings or properties run, owned, or contracted by The City of Calgary could set an example for illumination by applying this Guideline. Additionally, private buildings or properties can use this Guideline as a handbook for illumination.

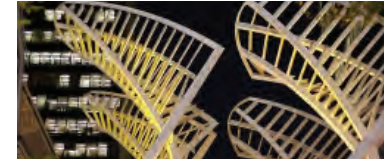
Ideally, property owners and managers, lighting specialists, The City of Calgary Urban Design representatives, and consultants meet before the permit submission and agree on the best illumination strategies for the site based on this Guideline’s recommendation.

Illumination devices impact a building’s electrical system and therefore may require building permit review.

Memorial Park Illumination, City of Calgary, 2010



2.0 Urban Design Illumination Principles



2.0 Urban Design Illumination Principles

The successful improvement of Centre City lighting requires a common vision. The following Urban Design Illumination Principles provide a general framework for this Guideline and should be applied to the design of lighting improvements as described in this Guideline.

2.1 Creating Contrast

It is important to consider darkness in illumination design as light creates interest only when contrasted with darkness and shadow.

Guideline

- To avoid excessive brightness, designers should consider the environment to find attributes in each project that will remain unlit.
- General floodlighting should be reserved for special events, festivals and concerts, with sensitivity towards bird migratory seasons. Refer to the Bird-Friendly Urban Design Guidelines.
- Some Centre City elements should remain unlit. When choosing to light an element, consider the following:
 1. Is the element best experienced in the daylight?
 2. Is the element in close proximity to a significantly more prominent or important element?
 3. Is there a significant difference between the daytime and night-time visitor experience to the element?
 4. Will lighting of the element be restricted due to some other consideration - for example: bird migratory patterns and seasons, heritage constraints, airport regulations, provincial or national park restrictions?

See Appendix A: Screening matrix for unlit elements.

2.2 Light Trespass

Light pollution is an unwanted consequence of outdoor lighting and includes such effects as sky glow, light trespass, and glare. Light trespass is defined as light that strays from its intended purpose and occurs when spill light is cast where it is not wanted, illuminating adjacent properties and surfaces. Spill light results from excess light from a focused source being cast where it is not useful or desired. Avoid light trespass whenever possible.

Guideline

- Review the City of Calgary Land Use Bylaw to ensure all light sources, and their associated housings and control components meet the City of Calgary Land Use Bylaw requirements.
- Select beam spreads that reduce the possibility of light trespass and light pollution.

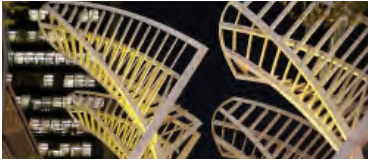
2.3 Use of Coloured Light

Although coloured lighting solutions are often achievable from technical and budget perspectives, coloured lighting is not the right solution for every application. Overuse of coloured light can degrade the overall impact of the Centre City illumination.

Guideline

- Consider the appropriate location when evaluating the inclusion of coloured lighting. In locations where events typically occur, such as the Entertainment District along 8 Ave SW, Downtown, and Neighbourhood Centres, coloured lighting can be an enhancement.
- Consider the value of coloured illumination as a night-time tourist attraction at landmark buildings.
- The use of coloured lighting is encouraged during the winter months.

2.0 Urban Design Illumination Principles



2.4 Energy Efficiency

New, more efficient lighting technologies have proven to be a cost-effective way to add lighting without increasing energy consumption. Energy efficiency needs to be balanced with design goals. Illumination projects should be as cost-effective and energy-efficient as possible.

Guideline

- When evaluating designs for exterior lighting, energy efficiency of light sources should be reviewed and compared. Energy efficiency needs to be balanced with the design goals and complemented with well-considered time of use and control systems (see Section 2.5) to minimize energy consumption.
- The total wattage of the project should be considered when evaluating designs. Flood lighting designs may not be appropriate due to the higher quantity of luminaires and therefore higher wattage required to provide an overall wash to a structure.
- For energy-efficiency considerations, evaluate the required illumination and use the most efficient sources, for the desired results.
- Lighting objective outcomes will have to be balanced with sustainable design objectives (e.g. LEED)

2.5 Lighting Control Systems

A lighting control system is an electronic device used to control multiple lights simultaneously. At a minimum, lighting control systems should be designed to eliminate operations during daylight hours or extended nighttime use. This can help to reduce energy consumption. Another control option includes controlling separate groups of luminaires on the same building or structure to create different scenes. These lighting scenes can highlight different architectural features, thereby providing a changing experience for the viewers. A more extensive control system includes multiple lighting zone control through internet access (See Appendix C: Description of an internet based control system of Centre City).

Guideline

Several lighting control options may be considered

- Illumination controlled with a 7-day, 24-hour timer including daylight savings and holiday programming. A photosensor should be installed to eliminate the possibility of the luminaires operating during daylight hours or extended night-time use.
- Group control through luminaires connected to low voltage relays and centralized computer software.
- Group Control through luminaires connected to architectural controls systems capable of receiving DMX signal control (theatrical style) for multiple cue or colour changing systems.
- Group control with DMX capability and internet interface for remote control allowing integration of lighting on multiple buildings.

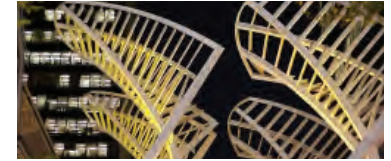
2.6 Light Sources

As illumination sources continue to develop, all new sources should be evaluated to determine their potential to provide appropriate lighting solution. Aesthetic and environmental concerns and life cycle costs should be part of the final selection process.

Guideline

- All light sources, and their associated housings and control components shall meet the City of Calgary Land Use Bylaw.
- Select beam spreads that reduce possibility of light trespass and light pollution.
- Select lamps which provide appropriate colour, minimum colour shift and high light loss factors (>0.70).
- Recommended light sources at the time of the report are:
 - LED mono-chromatic (single colour), minimum 50 lumens per watt while housed in a luminaire, with minimum guaranteed life of 50,000 hours;
 - LED RGB (red green and blue colour changing LED), minimum 50 lumens per watt while housed in a luminaire, with minimum guaranteed life of 50,000 hours;

2.0 Urban Design Illumination Principles



- Pulse Start Metal Halide, 3200K;
- Ceramic Metal Halide, 3200K;
- High Pressure Sodium, 2400K;
- Fluorescent lamps, 3500K; and,
- Long life Halogen light sources with a minimum 10,000 hour life and connected to dimming circuits to extend life and reduce energy, 3000K, 10,000 hours.

2.7 Placement and Orientation

Ensure the placement and orientation of the luminaires to minimize view of light sources while maximizing energy efficiency and avoiding light trespass.

Guideline

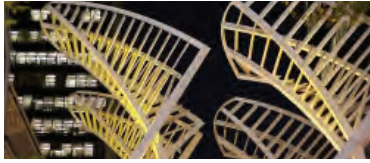
- Over 80 % of the luminaire beam must illuminate the proposed element.
- Luminaires should be carefully hidden or camouflaged and blend into the building façade.

2.8 Birds

The illumination of urban landscapes, like Centre City, may influence the migration behaviour of birds that migrate at night (nocturnal migration species).

Guideline

- Section 2.0 identifies illumination principles that contribute to a bird friendly urban environment. Incorporating lighting control, creating contrast, limiting light trespass, designing for energy efficiency and careful consideration of source selection will limit light pollution (which may confuse nocturnal flyers) while clearly identifying solid elements (buildings, trees) in the urban landscape for avian travelers.
- Spring migration is mid-March to the beginning of June. Fall migration is August to mid-November. Search light style effects, and similar sky-lit effects, during these periods should be minimized.
- Reference the City of Calgary's Bird-Friendly Urban Design Guidelines for recommendations for the built environment that are outside the scope of this guideline. (For example, building methods and materials and interior lighting operations.)



3.0 Illumination Design Categories & Project Evaluation

3.0 Illumination Design Categories & Project Evaluation

3.1 Illumination Categories

These categories will provide an intuitive, and easy reference for this Guideline. They have a direct relationship to the categories identified in the Centre City Plan. In some cases, categories will overlap. For example, a building or a site can be a landmark, a historic resource, a node, and be part of an important edge. Although there will be lighting considerations common to every exterior lighting project within Centre City, there will be special considerations for each of the following:

District

A district is an area defined by use, size or scale, heritage significance, or character. The Centre City Plan establishes a series of unique Districts including 8 neighbourhoods, the Downtown Districts (Entertainment District, Cultural District, Retail District, and Energy District), and Stampede Park.

Edge

An edge is a recognizable change between districts in architecture, building mass and land use, such as, the edge between Downtown and a neighbourhood. The Centre City Plan identifies the primary edge as the Downtown Transition Edge. Other significant edges include Park Edges and Urban Edges along the Bow River.

Historic and Cultural Resource

In the Centre City Context, Historic and Cultural Resources are generally historic buildings, parks, gardens and public art. Although typically classified under the Landmark Category, Historic Buildings and Heritage Sites are of significant importance to the Centre City Plan and garner a unique classification.

Landmark

Landmarks are significant identifiers that may be buildings, monuments, memorials, structures, or parks. Frequently, landmarks will be a destination for Calgary residents and visitors. The Centre City Plan identifies Cultural Landmarks and Contemporary Buildings.

Node

A node is a major activity location. Examples of nodes may be the Convention Centre, The Saddledome, and Olympic Plaza. The Centre City Plan also identifies Special Areas (for example, Fort Calgary and Eau Claire Plaza) that are treated as nodes.

Path

Path is a transportation category and encompasses streets, C-Train lines, the CP Rail Corridor, pedestrian realm (sidewalks, pathways, and the +15 system), bikeways, and promenades.

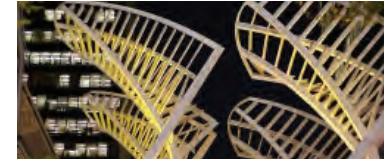
Entry/Gateway

Entry is a point of "introduction" to Centre City. An entry is a significantly identified gateway – perceived or physically experienced – to Centre City and can occur along any type of Path. Eight significant gateways are identified in the Centre City Plan.

Transit

The LRT transit corridor on 7 Ave SW is an important mobility node within the Centre City and a major activity location that includes platforms and trains.

3.0 Illumination Design Categories & Project Evaluation

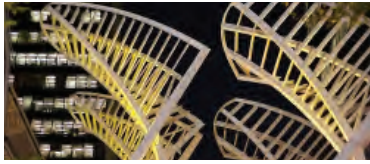


3.2 Project Evaluation

As a first step of any illumination project, a stakeholder team including lighting designers, the Owner and City representatives such as the Urban Design & Heritage Group should be meeting to agree on illumination considerations based on the Illumination Categories Design (see Section 4.):

- Is the element best experienced at night?
 - Is there a significant difference between the daytime and nighttime visitor experience to the element?
 - Is the element important in multiple categories? For example, the Centre Street Bridge represents a singular lighting opportunity in four categories: it is a Landmark, a Historic Resource, a Path, and an Entry Gateway.
 - What are the architecturally significant features? Does the building have a cornice? A prominent entry? Recessed bays? A colonnade?
 - How can the significant features be highlighted through use of light and shadow?
 - What colour is the material being lit? For white light illumination, lamp colour should be selected to complement the colour of materials being illuminated.
- What are the desired ambient light levels for the area? For energy savings, cost savings, and sustainability, the minimum amount of light required to establish contrast should be used. In the night-time visual environment, contrast ratios of 7:1 are preferred. As new exterior lighting techniques are implemented it is possible that the ambient light levels in an area will decrease. Therefore, it is important to consider contrast relative to the desired ambient light levels to prevent progressive over-lighting.
 - Is the element a good candidate for coloured lighting? Consider location (Entertainment District, Downtown, Neighbourhood Centre) and importance of the element as a night-time tourist attraction or for usage as a Node. Tourist attractions and Nodes tend to have special holiday and civic events that are conducive to a changeable lit environment.

See Appendix A: Screening tool for the selection of unlit elements (Exhibit 1) and for the selection of illuminated elements (Exhibit 2).



4.0 Illumination Design Categories & Guidelines

4.0 Illumination Design Categories & Guidelines

4.1 District

General

The Centre City Plan establishes a series of unique Districts including eight neighbourhoods, the Downtown Districts and Stampede Park. The districts identified in the Centre City plan include the Downtown Districts (Entertainment & Cultural District, Retail District and Energy District), Stampede Park, and eight neighbourhoods; West End, Eau Claire, Chinatown, East Village, East Victoria Crossing, Victoria Crossing Centre, Connaught Centre, and West Connaught. The neighbourhoods, although similar in usage as thriving, residential communities – each have a unique signature. Despite the distinctions between the districts, the Centre City Plan strives to implement organizing principles that bring self-sufficiency to each district while establishing a commonality that weaves all districts together to create a cohesive image for Centre City.

Guidelines for District Illumination

1. Residential areas should have additional illumination on sidewalks to encourage an active pedestrian culture after dark.
2. Neighbourhood Centres should allow for mixed-use illumination solutions to encourage both retail and entertainment areas to develop.
3. Accentuate the transition edges between Districts to establish a strong sense of place.
4. Reinforce the heritage and distinct character of the District while implying the common brand of Centre City. One approach to implementing pedestrian and street lighting that reinforces the distinct character of a District while implying the common brand, is to select a family of luminaires for use within Centre City (see Appendix B). This allows a common luminaire distribution and functionality to be selected

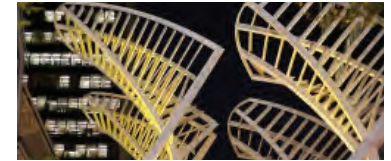


Vision for District Luminaries, CCP Image, LUPP, City of Calgary, 2008



District Illumination Example: FESTIVAL OF LIGHTS, Christian Kruppa, Berlin 2009

4.0 Illumination Design Categories & Guidelines



while offering different options for finials, poles, mountings, and embellishments. The benefit is that the City can improve street lighting and pedestrian lighting functionality while allowing the Districts to choose the embellishments that will differentiate their neighbourhood.

4.2 Edge/Gateway

General

An edge is a recognizable physical change between districts (for example, the edge between downtown and a neighbourhood). The Centre City Plan identifies the primary edge as the Downtown Transition Edge. Other significant edges include Park Edges and Urban Edges along the Bow River. Specific lighting considerations should be made to visually amplify these transition edges at night.

Depending on the edge type – park to urban, urban to neighbourhood, neighbourhood to park – different approaches for lighting to distinguish the edge can be utilized.

Guidelines for Edge Illumination

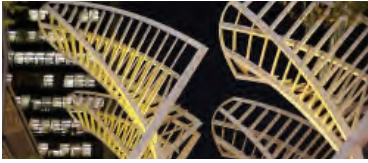
1. Provide a consistent luminaire style within a neighbourhood, and limit the use of that style to the designated neighbourhood. The edge between the neighbourhood and its surrounding districts will be distinguished by the change in the luminaire style.
2. Illuminate entries to park areas to distinguish the park from the urban or neighbourhood environment in which it is immersed. Trees, entry walls, signage, and park buildings can all be utilized to achieve an illuminated park entry.
3. Edges of entertainment districts can be delineated by coloured or colour changing light, or patterned gobos (light-shields) used with projectors.



Vision for District Luminaires, CCP Image, LUPP, City of Calgary, 2008 Edge Illumination Example: Photo: Festival of Lights Berlin, 2009

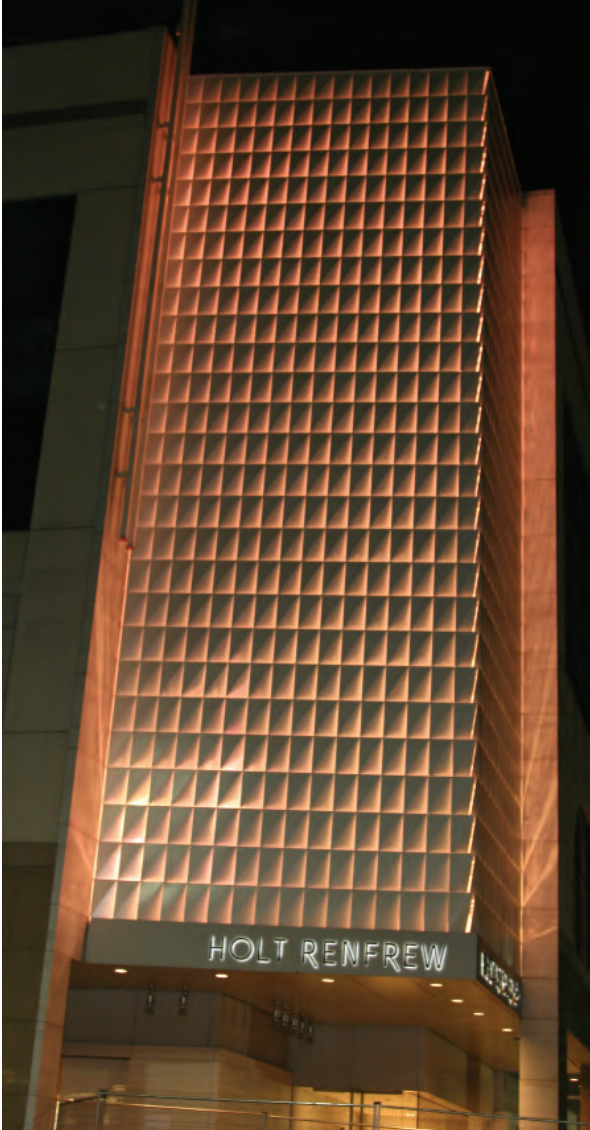


District Illumination Example: FESTIVAL OF LIGHTS, Christian Kruppa, Berlin 2009



4.0 Illumination Design Categories & Guidelines

Current Edge and Gateway Illumination in Calgary's downtown



Holt Renfrew Illumination Calgary, 2010

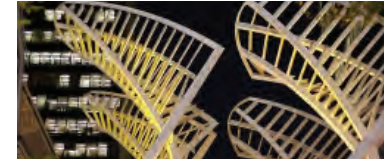


Centrium Building Illumination Calgary, 2010



Jamison Building Illumination Calgary, 2010

4.0 Illumination Design Categories & Guidelines



4.3 Heritage

General

The Inventory of Evaluated Historic Resource identifies Historic Resources, including buildings, parks, monuments and sites within the Centre City.

The approach to the exterior illumination of a historic resource is tailored based on the type (for example: building, monument, landscape), location, and desired outcomes.

Guidelines for Heritage

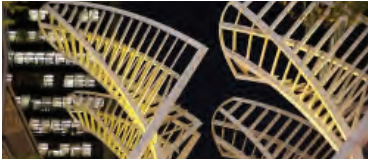
1. Is the site legally protected?
2. Are additional heritage approvals required? Physical constraints must be considered for locating luminaires and determining mounting details. All lighting and wall penetrations for both power and physical support of the luminaires for Heritage Buildings and Heritage Properties must be approved by the appropriate authority having jurisdiction.
3. Will heat or UV light from a lighting installation deteriorate historic or heritage building materials?
4. Is the lighting effect relevant to both the architecture and the building period?
5. How will the lighting be attached? Is the structure appropriate for lighting fixture attachment?



Heritage Illumination Example Zoo Entrance: FESTIVAL OF LIGHTS, Christian Kruppa, Berlin 2009



Heritage Illumination Example Historic Boulevard: FESTIVAL OF LIGHTS, Christian Kruppa, Berlin 2009

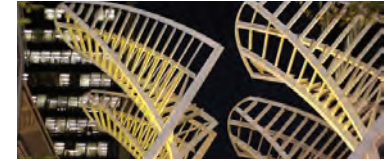


4.0 Illumination Design Categories & Guidelines



The Bay Calgary, 2010

4.0 Illumination Design Categories & Guidelines



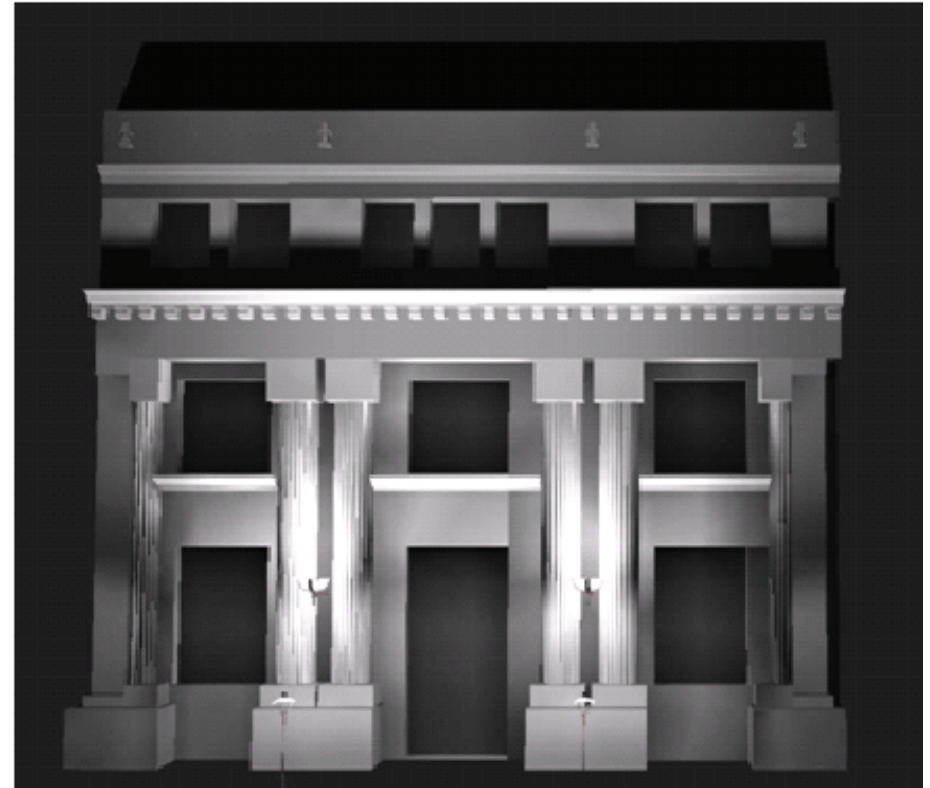
4.3.1 Heritage Illumination Case Study: Dominion Bank

The sandstone structure was originally built in 1911 as the Calgary branch of the Dominion Bank. The terra-cotta façade features ornate and detailed carvings along the roofline, on the large columns, windows, and doorways in the style of Beaux-Arts Classicism and the Neo-Classical revival.

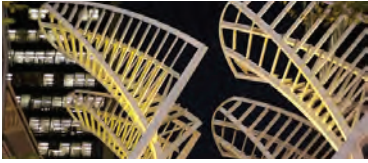
The architecture of the building lends itself to both vertical and horizontal highlights. Photographs of the architecture and original architectural drawings are utilized to create a computer model of the building to explore lighting options deemed viable based on the preceding guidelines (section 4.3). The model uses electronic data files of lighting distributions from actual luminaires.

Illumination Design Recommendations for this type of building (Option 1)

1. The position of an existing light fixture was utilized and the luminaire replaced with a decorative one that provides both up-lighting and down-lighting while illuminating itself.
2. An illuminated luminaire draws the attention of passersby and creates contrast between the building and those adjoining.
3. The design also illuminates the cornice and dental molding and colonnades surrounding the main entry providing an elegant response to level traffic.
4. The upper portion of the building is illuminated with a custom designed street luminaire. The luminaire modification accepts an additional lamp and reflector assembly to direct light to the upper portion of the façade only. The upper lamp and assembly is invisible to pedestrians and maintains the look of the traditional lamppost.



OPTION 1: Illumination Testing Dominion Bank Building 8th Ave SW Calgary, Lighting Design Innovations Ltd. Calgary, 2008



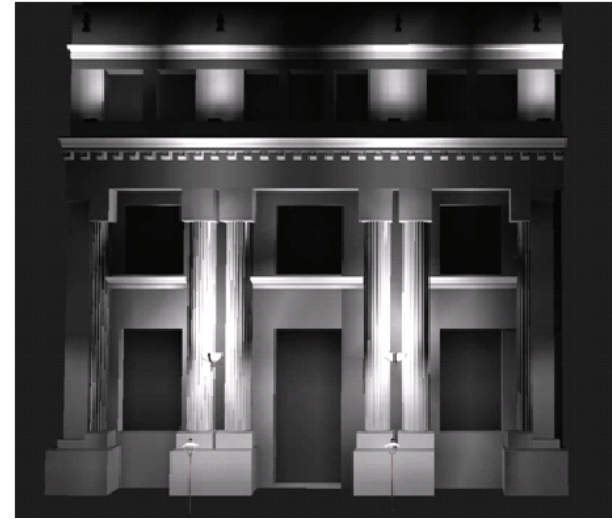
4.0 Illumination Design Categories & Guidelines

(Option 2)

1. A more dramatic, theatrical highlighting of the architectural elements requires new luminaires at the upper level cornice that are fastened to the building. New power to operate the lighting and controls are required.
2. Adhesive fastening options should be investigated to eliminate the need to penetrate the terra-cotta exterior.
3. The dramatic highlighting is created through use of light and shadow to enhance architectural elements and create separation.
4. The wall mounted luminaire modifications described in Option 1 would be utilized to create the same enhancement to the lower level façade as well as the main entry recognition.

(Option 3)

1. Option 3 provides a more uniform wash of the upper level and the possibility of incorporating coloured lighting and colour changing affects into the design.
2. The wall-mounted luminaire has coloured LED's located in the top of the luminaire.
3. The upper level uses a wall wash luminaire installed on the upper cornice and utilizes RGB LED's, thereby minimizing maintenance costs and energy utilization.
4. Coloured lighting enriches the white terracotta stone and is very similar to Heritage building lighting approaches in Europe.



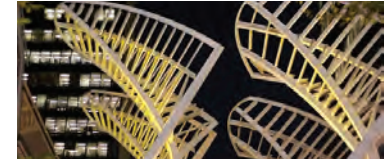
OPTION 2: Illumination Testing Dominion Bank Building, Lighting Design Innovations Ltd. Calgary, 2008



OPTION 3: Illumination Testing Dominion Bank Building, Lighting Design Innovations Ltd. Calgary, 2008



4.0 Illumination Design Categories & Guidelines



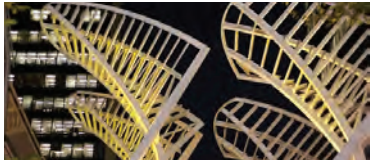
4.3.2 Heritage Illumination Case Study: Central Memorial Park Library

The first public library in Calgary and in all of Alberta, was designed by McLean and Wright in Boston, and was financed by the American philanthropist, Andrew Carnegie and The City of Calgary. Opened in 1912, Memorial Public Library was considered the main branch and headquarters of the public library system until 1963. The sandstone architecture of the building has prominent design elements for highlight at night.

Illumination Design Recommendations for this type of building

1. Illuminate the finial above the main entry, the main entry door, the window lattice, and the historic-replica post-top luminaires flanking the stair.
2. Illuminate the intricate details of the stone façade.
3. Proposed lighting options should be evaluated for the architecture and building period as well as the Library's prominence in the Memorial Park.





4.0 Illumination Design Categories & Guidelines

(Option 1)

A dramatic approach to lighting the architectural details, with surface-mounted LED luminaires are installed to feature the finial above the main entrance.

Additional surface-mounted linear LEDs feature detailed cornice and window lattice.

(Option 2)

In lieu of surface mounting luminaires for the dramatic effect presented in Option 1, in-grade metal halide luminaires are installed around the building to provide a homogeneous wash of light over the façade. In this case, the wash effect with 3200K metal halide proved more efficient, more cost-effective, and less invasive than the dramatic approach presented in Option 1.

The main entry is emphasised through the use of metal halide retrofit of the heritage post-top mounted luminaires flanking the entry stair.

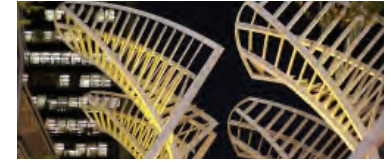


OPTION 2: Illumination Testing Memorial Park Library, Lighting Design Innovations Ltd. Calgary, 2008

OPTION 1: Illumination Testing Memorial Park Library, Lighting Design Innovations Ltd. Calgary, 2008



4.0 Illumination Design Categories & Guidelines



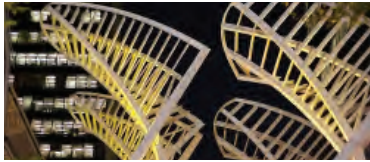
4.3.3 Heritage Illumination Case Study: Central Memorial Park Site

Central Memorial Park is Calgary's oldest park and is a legally protected Provincial Historic Resource. Originally designed by Calgary's first Superintendent of Parks, William Reader, as an Edwardian garden, the Park features a cenotaph plaza, flagpole, commemorative monuments, pathways, and the 1912 Carnegie Library.

The previous lighting for the park – metal halide pedestrian poles mounted along the walkways and 4100K, blue-white metal halide floodlighting of the cenotaph - were not appropriate for the heritage site and did not provide sufficient illumination for security. The historic, pole-mounted luminaires had been removed in a previous renovation of the park. The flora native to the park includes thick, dense evergreen creating a difficult lighting environment, but also a solid canvas for unique lighting effects.



Central Memorial Park, Calgary



4.0 Illumination Design Categories & Guidelines

Illumination Design Recommendations for this type of Heritage location

This Case study shows a multifaceted approach to highlighting memorials, creating a sense of activity, and making the park a visitor destination and experience:

1. 3200K, neutral-white metal halide, directional luminaires should be utilized to highlight the memorials within the park. This distinguishable, white light is tightly controlled and layered to generate focal points of interest to emphasize the significance of the park and provides three-dimensional rendering of the monuments.
2. Feature trees should be illuminated with colour changing LED fixtures to create a sense of activity and movement central in the park. The dense blue spruce along the pathways should be rendered less foreboding by integrating path lighting for walkway distinction and facial recognition.
3. Illumination should feature the most important elements of the Park. The highlighted memorials focus attention, and dynamic lighting will help attract visitors.

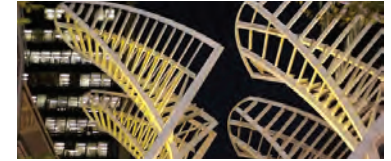


Illumination Memorial Park Site, Lighting Design Innovations Ltd. Calgary, 2009



Montreal Quartier Des Spectacles illumination

4.0 Illumination Design Categories & Guidelines



4.4 Landmark

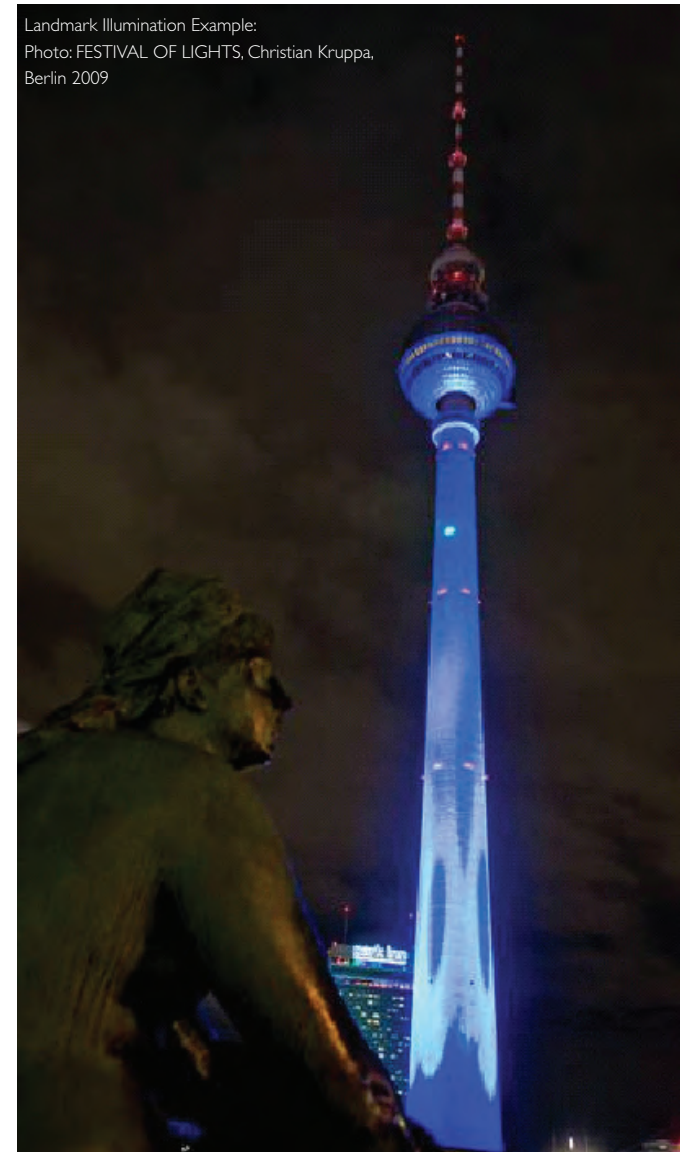
General

The Centre City Plan identifies Cultural Landmarks and Contemporary Buildings (see Appendix D Glossary of Terms). The approach to the exterior illumination of a landmark is tailored based on type (for example: building, monument, landscape), location, and desired outcomes.

Recommendations

In addition to the general lighting design considerations, Landmarks require additional considerations:

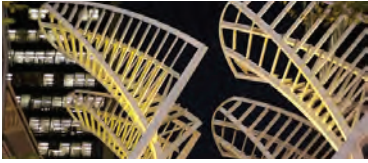
1. Are there monument restrictions or requirements? For example, consideration of Remembrance Day service protocols.
2. Will lighting of the landmark impact nearby visual tasks? For example, consideration of boat traffic when lighting a bridge.
3. Create contrast in a plaza lighting, increase visibility of architectural elements.
4. Accent and highlight the architectural detailing of the façade.
5. Emphasize the three-dimensionality of the building.
6. Combine fixture locations for ease of maintenance.
7. Improve energy-efficiency of exterior lighting.



Landmark Illumination Example:
Photo: FESTIVAL OF LIGHTS, Christian Kruppa,
Berlin 2009



Calgary Tower, Calgary 2010



4.0 Illumination Design Categories & Guidelines

4.4.1 Landmark Illumination Case Study: Old City Hall

The building features a Victorian eclecticism style and is sheathed in sandstone featuring a steeply pitched roof, round window arches, gable windows and heavy dentil cornice. Red granite columns flank the main entrance. Old City Hall is a legally protected Historic Resource. In 1978 it was recognized by the Historic Sites and Monuments Board of Canada in 1984 for its national architectural and historic significance.

Existing exterior lighting on Old City Hall consists of non-directional, high-pressure sodium floodlighting. The night-time picture includes temporary marquee-style lighting for the holiday season.

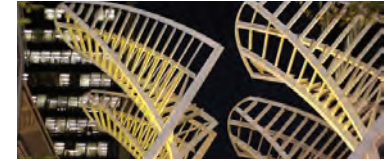
Illumination Testing Old City Hall, Lighting Design Innovations Ltd. Calgary, 2008



Seasonal Illumination Old City Hall, Lighting Design Innovations Ltd. Calgary, 2008



4.0 Illumination Design Categories & Guidelines



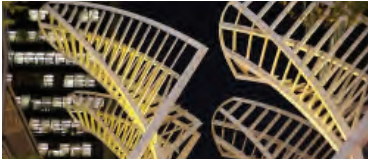
Illumination Design Recommendations for this type of Landmark

The lighting design focuses on the principal architectural features while emphasizing the three dimensionality of the building. This design takes into consideration energy efficiency and combining light sources to minimize maintenance.

1. Separating lighting features gives the required contrast to increase the visibility of architectural elements. The design enhances the verticality by illuminating the corners and setback of each façade with low-level, tight-beam luminaires aimed towards the dentil molding. The beams of light are cutoff at the dentil molding, minimizing light pollution.
2. Horizontal elements are highlighted with linear fixtures to accentuate balcony balustrades and the cornice dentil molding.
3. Dormer façades are illuminated by narrow beam luminaires mounted on poles located at the plaza level. The vertical elements mounted above the balcony are highlighted from the balcony by luminaires with vertical beam distribution.
4. The ground and first floor areas are backlit with the facades left dark. The two half colonnades are illuminated with surface luminaires at grade.
5. Ornamental cupolas are backlit while the structure of the skylight is illuminated from the interior. The tower illumination is accomplished with pole-mounted luminaires with beam adjustment.



Illumination Testing Old City Hall. Lighting Design Innovations Ltd. Calgary, 2008



4.0 Illumination Design Categories & Guidelines

4.5 Node

General

A node is a major activity location. Examples of nodes may be the Convention Centre, The Saddledome, and Olympic Plaza. The Centre City Plan also identifies Special Areas (for example, Fort Calgary and Eau Claire Plaza) that are treated as nodes.

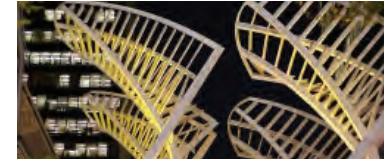
Recommendations

1. What time of year is the node typically used? Lamp source colour selection could be impacted by winter or summer only usage.
2. What type of gathering is typical for the node? Large crowds or small groups can dictate and direct luminaire mounting and area lighting considerations.
3. Is the node a venue? For nodes such as the Convention Centre and the Saddledome, exterior lighting could be controlled based on venue usage or display of venue to passerby.
4. Is the node an exterior space, for example, a plaza or park? Consider usage of adjacent buildings and structures for node definition.
5. Is the node a daily destination for many people? Consider major transit hubs.
6. Accent and highlight the architectural detailing of the façade.
7. Emphasizes the three-dimensionality of the building.
8. Combine fixture locations for ease of maintenance.
9. Improve energy-efficiency of the exterior lighting.



Node Illumination Example: Central Station FESTIVAL OF LIGHTS, Christian Kruppa, Berlin 2009

4.0 Illumination Design Categories & Guidelines



4.6 Path

General

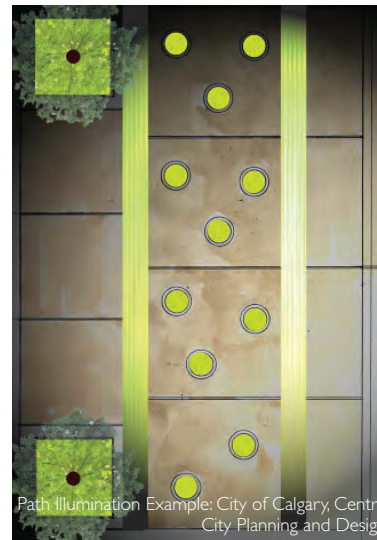
The path category includes streets, +15 pedestrian bridge network, C-Train corridor on 7 Ave SW, the CP Rail Corridor and its underpasses, sidewalks, bikeways, and promenades.

Recommendations

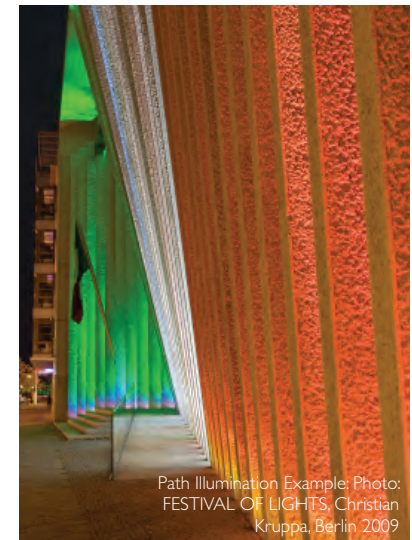
1. For path lighting, the primary design consideration should always be visibility for movement.
2. Secondary considerations include lighting for interest and animation.
3. Path lighting solutions should complement adjacent lighting installations. In addition to selecting complementary styles for luminaires and mountings, it is important for designers to evaluate the outcome of encroachment from adjacent lighting installations. For example, without proper distribution selection, pedestrian scaled luminaires for sidewalk lighting may impinge on the street. This spill of light onto the street will impact the street lighting uniformity which is an important consideration for the safe operation of motor vehicles at night.
4. Dedicated path lighting systems are an important element in humanizing the urban landscape. But, to avoid over-lighting of the streetscape, designers should evaluate the amount of ambient light from adjacent lighting systems that is present on the pedestrian path. Lamp source selection should be tuned to provide the appropriate amount of light after adjacent lighting systems are evaluated.
5. The following case studies are examples for other path illuminations within the Centre City.



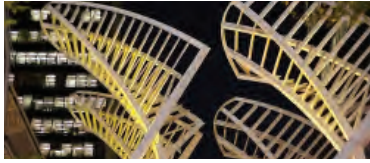
Art Installation 1st ST SW: City of Calgary
Centre City Planning and Design



Path Illumination Example: City of Calgary, Centre
City Planning and Design



Path Illumination Example: Photo:
FESTIVAL OF LIGHTS, Christian
Kruppa, Berlin 2009



4.0 Illumination Design Categories & Guidelines

4.6.1 Path Illumination Case Study: Downtown Underpasses

The lighting and illumination of underpass structures is a key element in achieving the desired design impact “as a gateway to downtown”, and in making these structures attractive and safe during daytime and especially after dark. The Downtown Underpass Urban Design Guideline (November 2010) provides illumination guidance for:

- comfort and safety in the pedestrian environment and driving environment
- sidewalks, bridge structures, retaining walls, medians
- effectiveness of artwork installations.

Illumination measurements will be an integral part of the ongoing design of new underpasses (4 St SE) and existing underpasses. Technical illumination requirements have to be developed and are pending on structural conditions, ownership and traffic lighting regulations.

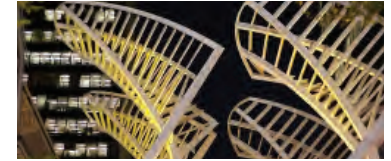
Image shows conceptual lit-up underpass traffic lanes from the Downtown Underpass Urban Design Guideline: City of Calgary, Urban Design&Heritage, 2009



Image shows conceptual lit-up pedestrian area underneath rail bridge structure from the Downtown Underpass Urban Design Guideline : City of Calgary, Urban Design&Heritage, 2009



4.0 Illumination Design Categories & Guidelines



4.6.2 Path Illumination Case Study: +15 Bridge on Stephen Avenue in 300 Block

The existing lighting systems are varied and have elements that produce a cold feeling in the space during both daylight and night-time hours. Direct daylight does not penetrate the courtyard or Stephen Avenue in the 300 Block. The result is an environment where people prefer not to linger.

The lighting illuminating the +15, although sufficient for security purposes, is quite low due to the colour of the surrounding buildings. An overall level of pedestrian discomfort results from the sense that there are numerous places for people to hide. The area under the +15 structure is illuminated with metal halide luminaires with dropped glass lenses, which distribute light in a general fashion and produce glare. Horizontal lighting is installed in the vertical face of the higher level ceiling over the street area, which is intended to illuminate the underside of the +15 first floor.

To improve illumination under +15 bridges with similar conditions, general illumination standards shall apply:

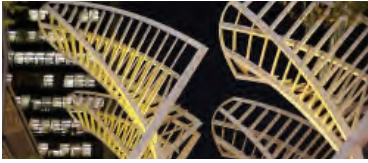
- Metal halide downlights should be installed
- A custom indirect fixture with cutoff-style down lighting could provide direct lighting as required and improve illumination of the underside of the +15, increasing pedestrian comfort.
- In addition to the area under the +15 bridge, the body or bridge deck should be illuminated to enhance the street environment and the +15 pathway.
- On-deck illumination can highlight the bridge structure and backlight the windows as long as the individual bridge character is enhanced and visible. Window reflections of luminaires should be avoided.

+15 bridge underlighting present condition.



+15 bridge underlighting proposed condition.





4.0 Illumination Design Categories & Guidelines

4.6.3 Path Illumination Examples: Path Elements

Various elements within a path such as:

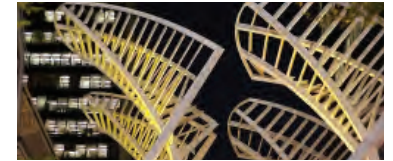
- façades;
- art installations;
- kiosks;
- large wayfinding elements;
- fountains;
- underground structure ventilation pipes;
- exterior stairwells to buildings and to the I5+ system;
- parkades.

Illumination techniques:

- linear fluorescent fixtures
- theatrical projectors projecting images on the object
- wrapping objects with an illuminated screen or mesh
- up/down lights mounted to stems
- flexible tube light systems with LED fixtures (which resemble neon lights)



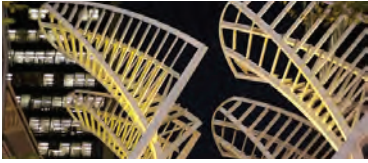
4.0 Illumination Design Categories & Guidelines



4.6.4 Path Illumination Example: Transit Corridor on 7 Ave SW

The 7 Ave SW street realm is animated by LED lit canopies which highlight the transit route.





4.0 Illumination Design Categories & Guidelines

4.7 Entry / Gateway

General

The Centre City Plan identifies significant gateways. Gateways offer architectural and perceptual opportunities to celebrate entry into Centre City and to announce a transition between environments.

Seven gateways are provided by the river crossings of the Bow and Elbow Rivers. Bridges offer significant, architectural elements that are intuitive gateways to travelers. Six of these bridges are bounded by parkland, offering additional noteworthy pedestrian views conducive to high impact, illuminated highlighting of structure. All of the bridges satisfy multiple Urban Design Categories in addition to Gateway: they are all Entries and they are all Paths. The Centre Street Bridge satisfies an additional two categories; it is also a Historic Resource and Landmark as a Designated Heritage Site.

Another entry to the Centre City is located in the neighbourhood of West Connaught neighbourhood, near 17th Ave SW and 14th Street SW. Although this entry does not have a bridge to represent the gateway, it, too, satisfies multiple Urban Design Categories. In addition to Entry, this gateway has three Landmarks in close proximity; the historic William Nimmons House, the Isabelle (Nimmons) Block and the Bank of Nova Scotia.

Recommendations

- Entry lighting solutions should illuminate structure and architecture to highlight the gateways to Centre City. The lighting solution should not compete with the street lighting required for safe path travel, but should provide vertical and artistic illumination to mark the passage.

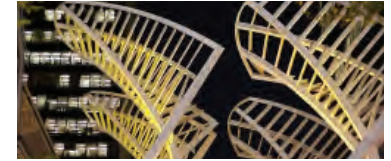


Entry Illumination Example:
FESTIVAL OF LIGHTS, Christian Kruppa, Berlin 2009



Colours by Battistella, Calgary 2010

4.0 Illumination Design Categories & Guidelines



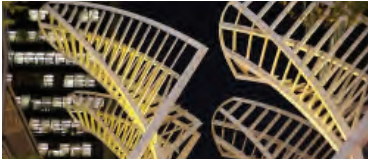
4.7.1 Entry Illumination Case Study: Centre Street Bridge

This sandstone/limestone structure defines a major thoroughfare into and out of Centre City north over the Bow River. The bridge features four ornate lions on plinths that define the pedestrian entry points to the bridge, and an under-structure that features three massive archways with symmetrical “windows” flanking the columnar supports.

The structure has undergone a renovation that included a lighting upgrade for roadway lighting for the bridge deck and some architectural highlighting of bridge features. The bridge structure offers several different lighting opportunities that can highlight the various architectural features, and provide unique “portraits” of the bridge at different times.

- This variety can be accomplished by providing various lighting systems on the structure, and simply turning on or off the features to be accented.
- It should be noted that the actual bridge deck roadway lighting is not being considered as part of this case study, as this lighting serves its intended purpose and streetlighting considerations should be made separately.





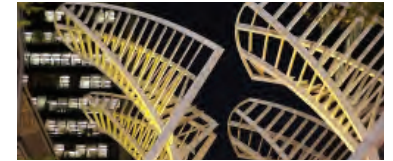
4.0 Illumination Design Categories & Guidelines

Option I

- In this lighting scenario, the vertical columns of the under-structure are highlighted from the top down, with a point source luminaire. A series of 3 luminaires are utilized to downlight the reveals in the columns, thereby accentuating the mass of the columns.
- To feature the under-structure of the bridge, a series of LED flood luminaires are placed behind and underneath the structure to backlight the “windows”. These fixtures will allow the bridge to change colours randomly or to correspond to seasons and special events (ie China Town events).
- On the bridge deck, each of the lions and plinths are accented with a custom fixture mounted on each corner, replacing the glass globe fixture which currently reduces the visibility of the lion.
- The custom fixture house current multiple lamps to serve dual functions. The first function is to provide downlight for the corner of the monument, and the second is to highlight the lion atop the plinth. The housing design of the fixture will need to be carefully considered by all parties, and may be an opportunity to reflect a theme for Centre City.



4.0 Illumination Design Categories & Guidelines



Option 2

In this option, the lighting for the both the columns and the lion plinths remains as in Option 1.

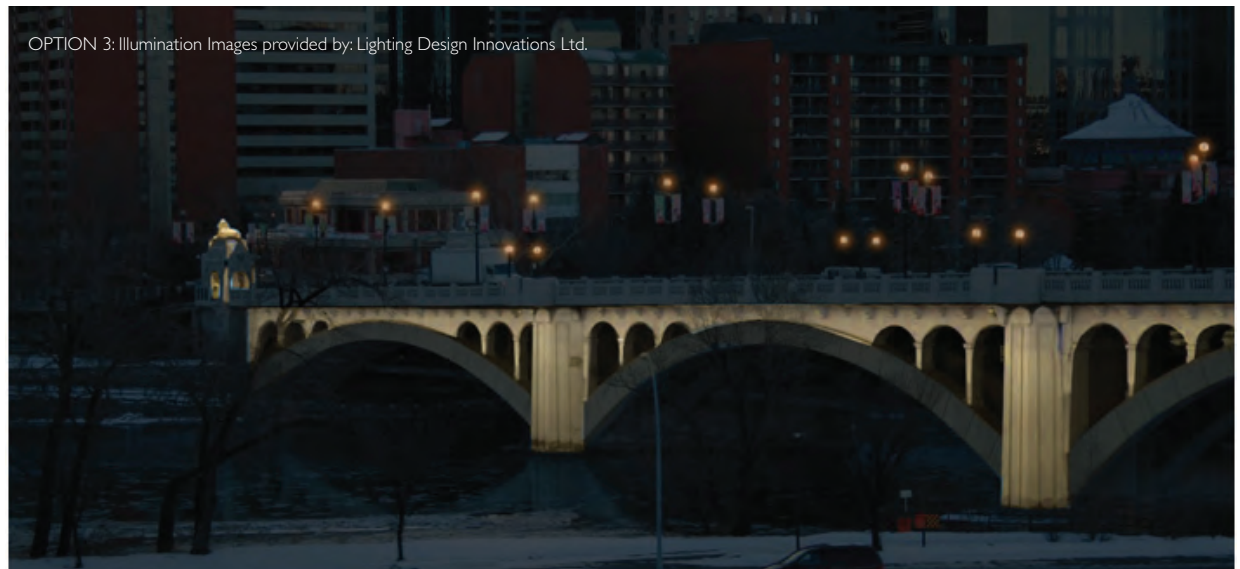
Additional illumination includes the face of the structure is washed with light from below the pedestrian walkway, highlighting the entire under-structure of the bridge. This lighting is accomplished by mounting a continuous row of luminaires under the upper pedestrian walkway, aimed back to the structure, providing an even wash of light that is cut off by the ledge of the archway below.

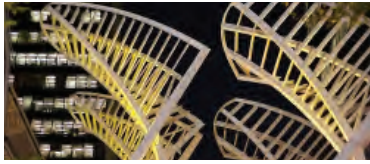
This scenario provides a uniform look to the overall structure of the bridge, instead of the bold, backlighting of the understructure achieved in Option 1.

Option 3

The third option is a combination of both Option 1 and Option 2. This system has the ability to provide three distinct views of the bridge depending on selection of lit elements. A control system will allow the selection of Option 1, Option 2, or the combination.

Because of the system flexibility it offers in addition to combining the benefits of the other options, Option 3 is recommended.





4.0 Illumination Design Categories & Guidelines

4.7.2 Entry Illumination Case Study: Louise Bridge

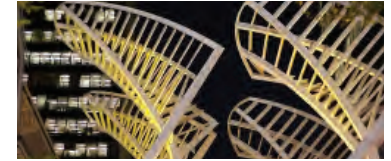
This sandstone structure serves as an Entry, Path and Landmark. The Louise Bridge deck is a relatively simple structure, but the under-structure features five archways with symmetrical detail similar to the style of the Centre Street Bridge.

The bridge structure lends itself to lighting opportunities that highlight various architectural features, from the heavy columns supporting the archways, to the cantilevered support of the sidewalk above the sandstone archways. The existing lighting is high light level metal halide flood lights under the arches at either end of the bridge. The contrast between the environment under these arches and the adjacent pathways is extreme, causing a visual adaptation condition for pedestrians and cyclists as they travel between these transitions.

The actual bridge deck roadway lighting has not been considered as part of this case study, as the existing lighting serves its intended purpose and street lighting considerations should be made separately.



4.0 Illumination Design Categories & Guidelines



Option 1

For both options presented, mounting aesthetics must be carefully considered. The structural mass of the Louise Bridge is not as ornately detailed as that of other gateway bridges in Centre City, and it is more difficult to hide the luminaires within structural elements. These luminaires shall be exposed with the following elements highlighted:

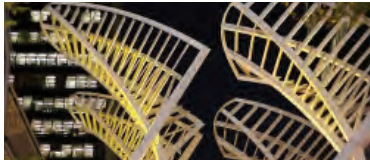
- Horizontal railing to indicate linearity.
- Vertical columns connecting the bridge deck to the water.
- The reveal in the vertical face of the arches connecting the columns and accentuating the radius of the structure.
- The individual cantilevered beams supporting the bridge deck walkway.

Option 2

The vertical face of the beams between the columns is pronounced, in addition to the illumination strategies of Option 1.





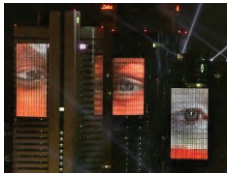

5.0 Guidelines for Illumination Categories



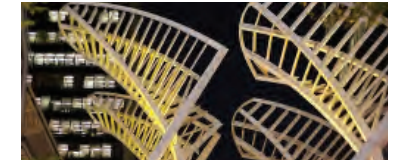
5.0 Guidelines for illumination Categories





5.1 Action items

The table below combines the goals and the key attributes for illumination in the Centre City as introduced in Section I. I of this Guideline. The table gives guidance for stakeholders such as City of Calgary Business Units, Property Owners, Property Managers, Architects, Developers, and Business Associations with applied action items.

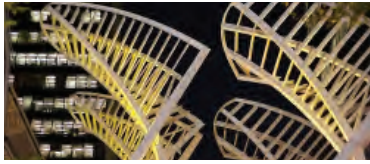
Goals & Key Attributes	Enhance the image of the Centre City	Improve the public realm	Improve community pride	Augment investment opportunities	Assist security improvements	Gain positive interest into downtown
Expressing the identity of a neighbourhood	Have neighbourhood stakeholders define typical "identity locations" and have illumination projects proposed	Check development proposals illumination potential and possible impact on the public realm	Illuminate important community facilities or buildings 		Identify areas in need of illumination with neighbourhood representatives 	Open new vistas into downtown and allow downtown to take on differing appearances 
Improve way finding at night	Link the "wayfinding project" of Centre City with illuminated wayfinding	Introduce illumination into key pedestrian corridors 	Provide well illuminated mobility links (e.g. pedestrian corridors)	Involve downtown retailers to improve visual access to stores	Coordinate with Transportation - Lighting to define and to plan measurements which improve street security	

5.0 Guidelines for Illumination Categories



Goals & Key Attributes	Enhance the image of the Centre City	Improve the public realm	Improve community pride	Augment investment opportunities	Assist security improvements	Gain positive interest into downtown
Highlighting landmarks	Select landmarks and consult with building owners for illumination activities		Illuminate buildings that represent the neighbourhood character	Organise yearly special illumination events with business groups (e.g. oil and gas corporations)		
Highlighting entries and edges to downtown	Develop an entry and edge illumination schedule with stakeholders 	Internal City of Calgary business unit coordination to select streets for entry and edge illumination	Develop neighbourhood oriented illumination projects	Illuminate specially selected edge buildings and entry structures 		Make edge and entry illumination a signature for Calgary's downtown and part of the Centre City's promotional activities
Providing cohesion with the visual environment	Apply Illumination Guidelines	Lighting activities / installations and illumination activities require coordinated approach of stakeholders		Highlight prominent historic places 	Connect with night-time businesses and their needs	Make illumination part of the Centre City's promotional activities
Investing in public art	Coordinate with Transportation to select locations and "art objects"	Position public art illumination in locations where it enhances the pedestrian realm	Select public art which showcases art through illumination			Make art objects more visible and pronounced within downtown and Centre City

5.0 Guidelines for Illumination Categories



5.2 Illumination Map

This map highlights prominent illumination elements within the Centre City and demonstrates the various opportunities for illumination. Illumination activities and projects should be structured and grouped around these elements.

Entries: Bow and Elbow River Bridges (neighbourhood entries are not shown on this map);

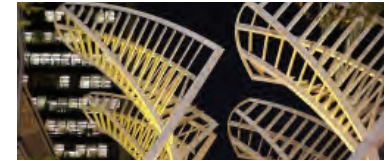
Paths: 8 Ave, 3 Ave, 4 St SE, Centre St, 1 St SW, 4 St SW, 8 St SW, 11 St SW, C-Train corridors;

Nodes: Such as Olympia Park, Centennial Park, Round-up Centre

Edges: Buildings along prominent paths and buildings forming the "skyline edge" at night, such as buildings along the Riverfront Promenade or along the CPR-corridor



5.0 Guidelines for Illumination Categories

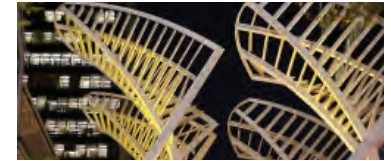


5.3 Illumination Goals and Stakeholder Involvement

The Implementation Principles of the Centre City Plan call for a creative, flexible, and collaborative approach to stakeholder engagement and partnerships. Great things can be achieved when the talents and resources of many work together toward common objectives. The scale and scope of what is envisioned in the Centre City will require diverse interests, including government, education, business, arts and culture, community and the non-profit sector.

This table identifies general Centre City experiential lighting goals and the associated, primary stakeholders. Illumination decisions are based on both technical and business considerations. The implementation depends strongly on willing stakeholders convinced that illumination will improve their location for business and their access to customers.

Illumination Topics	Illumination Stakeholder
Corporate Headquarters: Promote Calgary's Central Business District as a national powerhouse for oil, gas and other energy commodities by illumination of headquarter building edges	Property management companies and corporations, Centre City Business associations
Culture: Strengthen the atmosphere of the Cultural District by illuminated art and special events	Calgary's arts communities, Calgary Arts Development, Glenbow Museum, Centre City Business associations, Tourism Calgary
Entertainment: Strengthen the Entertainment District by illuminated buildings and special events	Entertainment facilities, hotels and restaurants, Centre City Business associations, Tourism Calgary
City of Calgary: Support the City's branding activities by a cohesive illumination to help promote Centre City's image as a favourable location for business	CED Calgary Economic Development Centre City Business associations Tourism Calgary
Retail: Implementation of the Downtown Retail Strategy by illuminating retail edges and window displays illumination along streets	Downtown retailers and property managers, Centre City Business associations
Accessibility and Pedestrian Quality of Public Road Infrastructure: Implement the Downtown Underpass Design Guideline and bridge illumination	City of Calgary Roads, Calgary Transit
Safety: Support the "Clean to the Core" policy by improved night time experience of the Centre City (e.g. gALLERy project)	Centre City Implementation Team, Calgary Police



Appendices

Appendix A

Exhibit 1: Centre City UNLIT ELEMENTS Screening

This tool can be utilized to establish whether an element may contribute best to the Centre City Illumination Plan by remaining unlit. The outcome can be compared to those of other elements to create a prioritization for implementation.

Scoring

Circle the best response for each statement. Sum all responses and compare to the evaluation criteria below.

	Strongly Disagree	Disagree	Neutral / Don't Know	Agree	Strongly Agree
The element is best experienced at nighttime.	-2	-1	0	1	2
The nearest illuminated element is more than one block away.	-2	-1	0	1	2
There is a significant difference between daytime and night-time visitor experience.	-2	-1	0	1	2
The element has unique architectural or natural features for highlighting.	-2	-1	0	1	2
The element satisfies two urban design categories.	-2	-1	0	1	2
The element satisfies three urban design categories.	-2	-1	0	1	2
The element satisfies four or more urban design categories.	-2	-1	0	1	2
Total					

Evaluation Criteria

If total is:

- > +4 Consider not illuminating the element.
- 2 < 0 < +4 Element could be lit or remain unlit. Use "Illuminated Elements Screening Tool" to refine decision.
- < -2 Consider lighting the element. Use "Illuminated Elements Screening Tool" to refine decision.

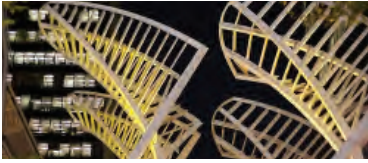


Exhibit 2: Centre City ILLUMINATED ELEMENTS Screening

This tool can be utilized to establish whether an element may contribute best to the Centre City Illumination Plan by being illuminated. The outcome can be compared to those of other elements to create a prioritization for implementation.

Scoring

Circle the best response for each statement. Sum all responses and compare to the evaluation criteria below.

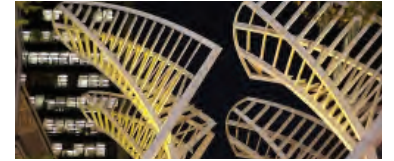
	Strongly Disagree	Disagree	Neutral / Don't Know	Agree	Strongly Agree
The element is best experienced in daylight.	-2	-1	0	1	2
The element is within one block of an element of greater prominence/significance.	-2	-1	0	1	2
There is no significant difference between daytime and nighttime visitor experience.	-2	-1	0	1	2
There are flight path (e.g. planes, birds) restrictions on lighting the element.	-2	-1	0	1	2
There is no source of power in proximity.	-2	-1	0	1	2
The location is not accessible for maintenance.	-2	-1	0	1	2
The element should not be lit.	-2	-1	0	1	2
Total					

Evaluation Criteria

If total is:

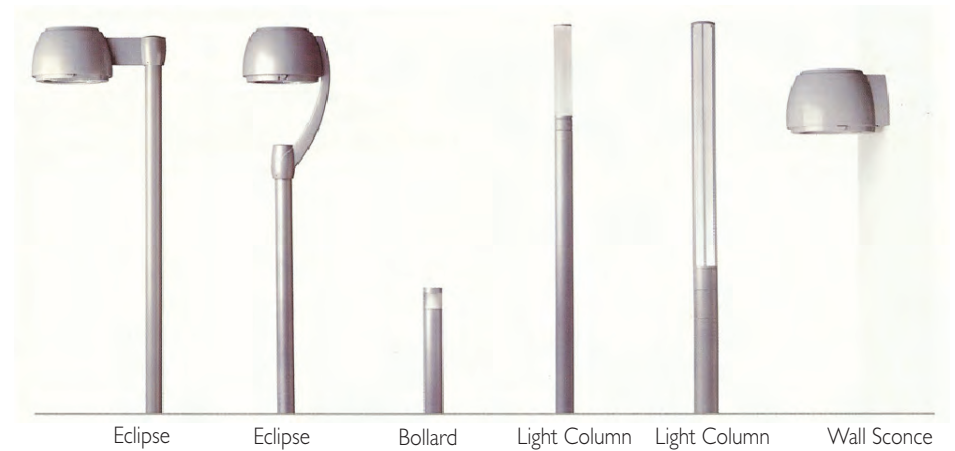
- > +4 Consider illuminating the element.
- 2 < 0 < +4 Element could be lit or remain unlit. Use "Unlit Elements Screening Tool" to refine decision.
- < -2 Consider not lighting the element. Use "Unlit Elements Screening Tool" to refine decision.

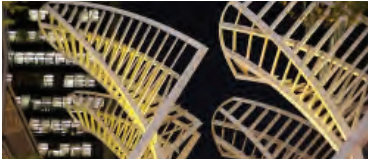
Appendices



Appendix B

Example for luminaire family





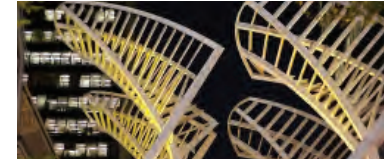
Appendix C: Centralized Illumination Control System

Technological advancements allow multiple systems to be coordinated through a central operator. A centralized control system would allow both private and public exterior lighting systems to be controlled in an integrated manner. Both private and public systems would have the ability to connect via the internet to a centralized software that allows individual structures, landscapes and park illumination to be controlled as a group for a coordinated lighting program on specific selected days or events during the year.

An example of this program would be a schedule-based program during heritage days that would allow the individual lighting systems of all heritage buildings that have exterior illumination to be activated via the central system. All non-heritage buildings exterior illumination could be deactivated.

Participants in the program would allow the City to provide timed schedules that could indicate a coordinated on /off time or predetermined colour change for the installed colour changing illumination systems.

Appendices



Appendix D: Glossary

Ambient Light Level

The amount of diffuse light in the environment (general light).

Historic and Cultural Resource

Historic and Cultural Resource is one of seven Urban Design Categories; Heritage Buildings and Heritage Structures are Historic Resources. Heritage Landscapes, Heritage Parks, and Heritage Sites are Cultural Resources.

Centre City Plan

The Centre City Plan (2007) is a vision for Centre City; focusing on creating a liveable, thriving, and caring place.

Contrast

The ratio of the lighting on an element compared to the lighting on the surroundings. Establishes how “bright” an object appears.

Coloured Light

Light of a colour other than white. Can be achieved through use of theatrical gels or RGB LED (Red-Green-Blue Light Emitting Diodes).

District

District is one of seven Urban Design Categories; a district is an area defined by use, size/scale, heritage significance, or character. The districts identified in the Centre City Plan include eight neighbourhoods, the Downtown districts, and Stampede Park.

DMX

Software to control theatrical lighting

Edge

Edge is one of seven Urban Design Categories; an edge is a recognizable change between districts; for example, the edge between downtown and a neighbourhood. The Centre City Plan identifies the primary edge as the Downtown Transition Edge. Other significant edges include Park Edges and Urban Edges along the Bow River.

Entry

Entry is one of seven Urban Design Categories; entry is a point of “introduction” to Centre City. An entry is a significantly identified gateway – perceived or physically experienced – to Centre City and can occur along any type of Path. Eight significant entries/gateways are identified in the Centre City Plan.

Experiential light:

While lighting can serve more than one purpose, experiential lighting is designed primarily to enhance the environment, not to provide security. This can include lighting of buildings, monuments, public art, pathways etc.

Footcandle

A unit of illuminance. One footcandle is one lumen per square foot.

Gateway

See “Entry”.

Landmark

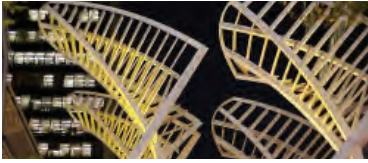
Landmark is one of seven Urban Design Categories; landmarks are significant identifiers and can be buildings, monuments, memorials, structures, and parks. Frequently, landmarks will be a destination for Calgary residents and visitors. The Centre City Plan identifies Cultural Landmarks, Contemporary Buildings, Historic Buildings, and Heritage Sites.

Lux

The SI (International System - Le Système International) unit of illuminance. One lux is one lumen per square meter.

Node

Node is one of seven Urban Design Categories; a node is a major activity location. Examples of nodes may be the Convention Centre, The Saddledome, and Olympic Plaza. The Centre City Plan also identifies Special Areas (for example, Fort Calgary and Eau Claire Plaza) that are treated as nodes.



Path

Path is one of seven Urban Design Categories; path is a transportation category and encompasses streets, LRT lines, CP Rail Corridor; sidewalks, bike ways, and promenades.

Special Areas

See "Node".

Urban Design Categories

Categorization of elements found in an urban environment. This document defines seven categories: Historic and Cultural Resource, District, Edge, Entry, Landmark, Node, and Path.

White Light

Non-coloured light. Colour temperature range is 2700K to 6500K. Lower colour temperature white light is considered "warm", higher colour temperature white light is considered "blue" or "cold". Typical white light sources include; incandescent, halogen, metal halide, and LED.