



OUTDOOR **LIGHTING STRATEGY**

CONSULTATION PAPER

MAY 2018



Executive Summary

Cities around the world are dealing with the challenges of improving accessibility and safety of outdoor spaces while minimising the impacts of light pollution. The recent emergence of Light Emitting Diodes (LEDs), in particular, offers a number of benefits but can also have drawbacks if implemented improperly. In 2015, Vancouver City Council directed staff to work to develop a healthy, safe, and energy efficient outdoor lighting strategy to control harmful lighting, standardize City practices, and reduce light pollution.

In order to develop the Outdoor Lighting Strategy, we have put together a consultation paper to solicit feedback from key stakeholders and the general public. The information and the proposed approaches presented are informed by initial conversations with stakeholders, meetings with citizen advisory committees, expert research, meetings with city departments and other relevant organizations.

The goals of the Outdoor Lighting Strategy are to:

1. Improve public safety
2. Enable accessible and inviting outdoor spaces
3. Reduce light pollution
4. Reduce energy usage and cost
5. Minimise ecological impacts

The key findings from our work to date include:

- Municipalities across North America are shifting their streetlight networks toward LED technology to save energy and reduce maintenance costs
- Recent upgrades to LED street lighting at high-collision intersections in Vancouver have shown significant – and measurable – safety improvements
- A city-wide transition to LED streetlights from our existing high-pressure sodium lights would provide a significant improvement for roadway and pedestrian safety and security
- The selection and design of the LED light fixtures needs to carefully consider a variety of factors including visibility, comfort level, and any potential light pollution impacts on people and the environment
- There are a number of public spaces in Vancouver, such as plazas and alleys, for which lighting design needs to consider the needs of the specific users of those spaces
- Outdoor lighting on private residences and businesses could also be improved through better design guidelines and standards.

Based on these findings, the City is proposing the following:

- Implementing pilot projects to confirm the best design approach for LED lighting in different contexts
- Proceeding with a city-wide retrofit of standard ‘cobra head’ streetlights to LED technology, building off the learning from the pilot projects along with a set of recommendations to ensure lighting design is in line with best practices
- Implementing design guidelines that will inform future outdoor lighting projects led by the City, including for pedestrian pathways, streets and public facilities
- Implementing new requirements for buildings in residential areas and lane accesses of commercial buildings to reduce energy use and unnecessary light pollution
- Supporting the Vancouver Park Board to explore Dark Sky designation and/or programming in an appropriate park location.

Submit your feedback by Tuesday, June 12, 2018

The input received will inform our report to Council, which will include recommendations for outdoor lighting and provide direction for future actions.

- Complete the Talk Vancouver survey: vancouver.ca/outdoorlighting
- By email: outdoor.lighting@vancouver.ca
- By telephone: 604.871.6814
- By mail: City of Vancouver – Outdoor Lighting Strategy
453 West 12th Avenue, 7th Floor, Vancouver, BC V5Y 1V4

Introduction to the Strategy

In 2015, Vancouver City Council adopted a motion...

“towards enacting a healthy, safe and energy efficient outdoor lighting strategy in order to control harmful outdoor lighting, set standards for outdoor lighting and provide for the designation of dark-sky preserves.”

The strategy will provide direction on outdoor lighting on streets, public spaces, and private properties across the city.

It's easy to take outdoor lighting for granted in our city. Lighting is an integral part of urban life—it helps make our roadways and pedestrian pathways safe, it enhances our public spaces, and it allows us to enjoy our city at night in ways that would otherwise be impossible. Good lighting is arguably one of the most important features of any community.

In Vancouver, we have over 50,000 street lights, plus many other lights along pedestrian pathways, in plazas and parking lots, and in certain parks. Businesses and homes often have outdoor lights as well, to illuminate entrances and stairways, and to create pleasing, comfortable outdoor spaces.

The Outdoor Lighting Strategy will present a coordinated approach to ensure outdoor lighting is meeting the needs of Vancouver residents. This consultation paper outlines the City's proposed approaches to improve outdoor lighting, including:

- Developing key considerations to inform a citywide LED streetlight replacement program to enhance safety while reducing energy use and light pollution;
- Creating new design standards for the illumination of outdoor spaces to encourage better lighting practices;
- Developing policies and regulations that aim to minimise light pollution from buildings on private property, focusing on buildings in residential areas and lane accesses of commercial buildings.

City staff anticipate that the draft Outdoor Lighting Strategy will be presented to Council in the fall of 2018. Should recommendations be approved by City Council, proposed actions would then be implemented over the course of several years.

Your feedback

Your perspective can inform the City's actions and policies on outdoor lighting.

Every resident and business in Vancouver interacts with outdoor lighting, which is why your input is so important. We are seeking your feedback on this consultation paper, which outlines the City's proposed approach to outdoor lighting. Details as to how to provide feedback are provided on the last page of this document.

The intent of this consultation paper is to allow us to reach a common understanding of diverse considerations on lighting.

The consultation paper provides an opportunity for the community to present perspectives or questions that staff may not yet have considered. Staff will be presenting information contained in this consultation paper at citizen advisory committees, meetings with stakeholders, and through a public awareness campaign on light pollution coordinated with our partners. We will also seek public feedback at community events and through a Talk Vancouver survey.

The input received will inform our report to Council, which will include recommendations for outdoor lighting and provide direction for future actions.

In this draft, you will find information on:

- Why we need an outdoor lighting strategy in Vancouver
- The goals of this strategy
- The issues the strategy addresses, and key considerations for action
- The proposed actions the City is currently considering
- How to submit your feedback

Why do we need an outdoor lighting strategy?

Lighting technology is changing quickly.

Technological innovations in lighting provide a lot of promise. New LED lights are quickly replacing older technologies and providing the possibility of improving visibility and safety while reducing light pollution. But there are also concerns about the possible impacts on our safety, our quality of life, and the environment, especially when they are not responsibly deployed.

People want improvements to public outdoor lighting.

Good outdoor lighting ensures that everyone can feel safe when being outside, making places and travel routes more inviting and accessible. Outdoor lighting can be designed to contribute to the character and beauty of neighbourhoods. Many people want to see lighting in our public spaces improved.

People are concerned about light pollution.

However, Vancouver residents have also expressed concerns when outdoor lighting isn't properly designed or installed. Whereas good lighting can enhance our night time experience, poorly designed lighting can compromise that experience and have impacts on our community and environment.

The City plays a key role.

The Outdoor Lighting Strategy will enable the City to better manage outdoor lighting. We need to consider the many different factors and considerations on safety, health, and the environment. We also need to understand the role the City can play to ensure we obtain the benefits of outdoor lighting while minimising its impacts.

What are the strategy's goals?

We have identified five broad goals for this strategy:

- 1 Improve public safety**
- 2 Enable accessible and inviting outdoor spaces**
- 3 Reduce light pollution**
- 4 Reduce energy use and cost**
- 5 Minimise ecological impacts**

What's not included in the strategy?

The Outdoor Lighting Strategy is focussed on outdoor lighting for which the City either owns or has a potential regulatory role. The strategy does not include the following:

- Lighting in Vancouver parks: park lighting is under the jurisdiction of the Vancouver Park Board. The City will be providing research and public comments to park staff to be considered in the development of their own policies
- Indoor lighting
- Illuminated signage: requirements have been put into the most newest version of the sign bylaw
- Lighting on lands over which the City has no jurisdiction (e.g., federal lands)

What are key considerations for outdoor lighting?

This section highlights the key considerations for outdoor lighting identified to date based on research, initial stakeholder input, and best practices identified in other cities. The section that follows will provide additional details on the

- Streetlights plays a key role in roadway safety
- Good lighting design can help enable accessible spaces for all people
- Lighting contributes to the social and economic life of our city
- Light pollution is a growing concern
- LEDs result in energy and maintenance cost savings
- Health concerns around blue-rich light
- Lighting can affect wildlife too

Streetlights play a key role in roadway safety

Lighting plays an integral role in ensuring our roads are safe— whether someone is driving, riding a bicycle and particularly for those who are walking. In Canada, 60% of pedestrian fatalities resulting from automotive collisions happen at night¹. Traffic collisions are also the second highest cause of injuries reported at Vancouver General Hospital.² Good lighting can reduce those numbers and help the City achieve its “zero fatalities” goal.

LEDs present an opportunity to improve roadway safety. New LEDs have a much better **Colour Rendering Index (CRI)** rating than HPS lights, which means road users see colours more accurately under LED light and improve colour contrast. Trials seem to indicate that LEDs also improve drivers’ ability to detect objects further ahead.³ LEDs also illuminate roads much more evenly compared to HPS lights, which produce spots that are overly-lit and shadows that can hinder visibility.

Since 2015, the City has installed LEDs at priority locations with the hope of reducing collisions.⁴ The City’s traffic staff collected data that helped determine which intersections saw disproportionately high collision rates at night, and began lighting improvements at those locations. Data collected from the first 18 intersection improvements pointed to a 27% reduction in collisions overall, and a 46% reduction in serious injuries and fatalities over a 2-3 year period. The City has continued installing LED fixtures at arterial intersections at a rate of about three dozen sites per year.

Implementing a citywide LED program would accelerate the transition. Based on the results to date, that transition would be expected to reduce collisions across the city and provide a higher level of safety, particularly for people walking and cycling. Better lighting from LEDs would also be expected make people feel safer while walking late at night, as they would have better visibility and also be more visible to others.

How do LED lights improve our ability to recognize colours



LEDs produce a whiter light that renders colours more accurately and improves colour contrast. Lights that render colours more accurately have a higher **colour rendering index (CRI)** rating.

Above are images of a section of road in Los Angeles, one of the first cities to undergo an LED conversion of its streetlights. You can notice in the before-and-after images that the trees, road markers and sidewalks are more visible under LED lights (on the right) compared to the HPS (left).

¹ [Transport Canada \(2011\), Road Safety in Canada.](#)

² [City of Vancouver \(December 2016\), Moving Towards Zero Safety Action Plan.](#)

³ [Clanton & Associates \(2014\), Seattle LED Adaptive Lighting Study. Northwest Energy Efficiency Alliance](#)

⁴ [City of Vancouver \(December 2016\), Moving Towards Zero Safety Action Plan.](#)

Good lighting design can help enable accessible spaces for all people

A recent survey showed that while the majority of men in Vancouver felt safe walking at night, the responses from women are much lower.⁵ Without sufficient lighting, people who are more vulnerable to harassment and violence because of their gender, sex, race, or religion are less likely to spend time outdoors. Studies show that the walking rates of women and girls are considerably lower than men, especially in Canada.⁶ Part of this problem may be that public spaces and outdoor lighting are not always designed to meet the needs of the people who rely on them most.⁷

There are also community members who may be differentially impacted by changes to outdoor lighting, such as those who are involved in the sex trade, are homeless, or are drug-dependent. In some cases, an outdoor lighting approach that may benefit some residents may unintentionally compromise the safety for others. For these reasons, it's clearly important to consider the different needs of residents across the city, to ensure that lighting solutions are appropriate.

How does shielding and glare-reduction improve safety and security?



The image above illustrates four different outdoor light fixtures with a person standing beneath each one. The subject is much more visible in the two images on the right, which show **full cut-off** fixtures.

When our eyes adjust to the glare of **unshielded fixtures**, it can create shadows that impact our ability to see. More light isn't necessarily better; well-directed light is more important in this case.

Lighting contributes to the social and economic life of our city

Spaces, buildings, and streets are often illuminated in ways that go beyond safety function to emphasise other qualities of the space. Many Vancouver landmarks are lit in recognisable ways, and historic districts have decorative lighting features. The lighting of public plazas and stores along commercial streets is integral to creating a vibrant nighttime atmosphere. While it's beneficial that the City have a coordinated, consistent approach to outdoor lighting, it's also important to recognize that certain areas and/or spaces are unique and may warrant lighting approaches that are specific to their context.

It's also worth noting that the City updated its Sign By-law last year, after extensive consultation with businesses and residents. For that reason, signage is considered out of scope for the Outdoor Lighting Strategy. Other areas, such as the Granville Entertainment District and Chinatown, have unique light designs that are part of the neighbourhood's appeal; the Outdoor Lighting Strategy is not meant to impact these and other areas that have specific decorative lighting approaches in place.

⁵ Only 41% of women aged 75+ and 47% of young women aged 18-24 reported feeling safe walking at night. My Health My Community Survey. Data as of August 14, 2014. Prepared by: Vancouver Coastal Health, Public Health Surveillance Unit, July 2017 – as sourced in [Women's Equity Strategy](#)

⁶ [Althoff, T. et al \(2017\). "Large-scale physical activity data reveal worldwide activity inequality", in Nature, 547 \(7663\): 336-339.](#) See also: <http://activityinequality.stanford.edu/>

⁷ Gender mainstreaming efforts in Vienna ensure women's experiences help inform lighting designs. [Brabha Khosla, Vienna, Austria – A Model City for Gender Mainstreaming](#)

What does responsible lighting look like?

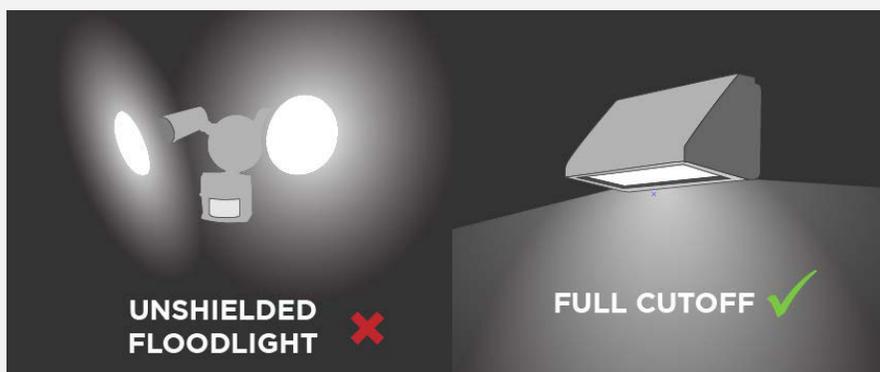


While unnecessary light pollution occurs in nearly every part of the city, it is most noticeable and impactful in and nearby residential areas. Most instances of light pollution can be avoided or addressed with responsible design, as demonstrated in the illustration above.

On the left, the house features architectural lighting installed in a way that may disturb neighbours at night. The house on the right demonstrates responsible lighting design, with exterior lighting fixtures placed to avoid impacts beyond its property line.

Responsible lighting can be achieved by:

- 1) Mounting the light at a height no greater than is necessary, and
- 2) Illuminating only where necessary for safety and security purposes, such as doorways, paths, gathering areas, and staircases.
- 3) Selecting **full cut-off** or shielded fixtures that shines light downwards, rather than sideways or upwards (illustrated below)



Light pollution is a growing concern

Groups such as the Royal Astronomical Society of Canada (RASC) and the International Dark-Sky Association (IDA) have worked to promote education and awareness about light pollution. Light pollution is a broad term often used to describe a number of impacts, including:

Light trespass (or light spill), where a fixture may cast light into an area where the light serves no benefit.

Glare, where a light source's brightness can reduce visibility or make it uncomfortable to see clearly.

Sky glow, which refers to the increased brightness of the night sky in urban areas that results from light scattering in the atmosphere and reduces the ability to see stars after dark.

Feedback from the community⁸ and staff suggests that light pollution is a growing concern in Vancouver. Dark skies provide a chance for us to see stars and connect with an aspect of nature that we once took for granted. While lighting in cities is necessary—in some cases, we may in fact need to increase light levels to ensure safe spaces—we can implement better lighting designs that focus light only where it's needed, thereby protecting our night skies.

LEDs present a unique opportunity to reduce light pollution because they tend to be more directional (i.e., they can be focussed on a particular area) than traditional high pressure sodium lights. There are also design tools that can be used, including computer modelling of

⁸ Summary of 3-1-1 and VanConnect incident reports, from Oct 2015- Oct 2017:

lighting to determine the right brightness and distribution, and using shield and screens to limit unwanted light. While the City has already been using these tools on major infrastructure projects like the Burrard Bridge improvements made in 2017, there is an opportunity to use them more widely.

How do LEDs compare to HPS?



While HPS lights are still by far the most common lighting technology being used in the city's outdoor spaces, LEDs are becoming increasingly commonplace. The photo above shows the south end of the Cambie Bridge, which provides an opportunity to compare the technologies side by side.

Right: High pressure sodium (HPS) lamps emit light by running electrical current through sodium gas, which produces a yellowish-orange colour warm light rated at a colour temperature of 2100K. The lamps must be replaced every 4-5 years.

Left: A light-emitting diode (LED) is a small but intense light source that, when grouped together on a module, produces a whiter light available in a range of colour temperatures, from warmer tones to colder tones. LEDs have a lifespan of 10-15 years. The colour temperature shown is neutral-white rated at 4000K.

LEDs result in energy and maintenance cost savings

When the now-ubiquitous orange **high-pressure sodium (HPS)** light was first introduced in the 1960s, it was among the most energy-efficient outdoor lighting products. Today, cities across North America, including neighbouring municipalities like Burnaby, Surrey, North Vancouver and Victoria, are switching to **light-emitting diode (LED)** for their street light networks to reduce costs and environmental impacts associated with energy use.

While Vancouver's lights are powered mostly by hydro-electricity, a small portion of power on the electric grid is generated from natural gas, which is a source of greenhouse gases. Improving the efficiency of our street lights would also result in greenhouse gas emissions' reductions.

Canadian cities that have already completed the transition have reported a 50% reduction in energy costs.⁹ Because the lifespan of LEDs are 15 years compared to the 5 years of HPS lamps, there would also be a decrease in maintenance costs. Altogether, the initial costs of a citywide transition to LEDs would be recovered in less than 10 years, with additional operations savings in the long run.

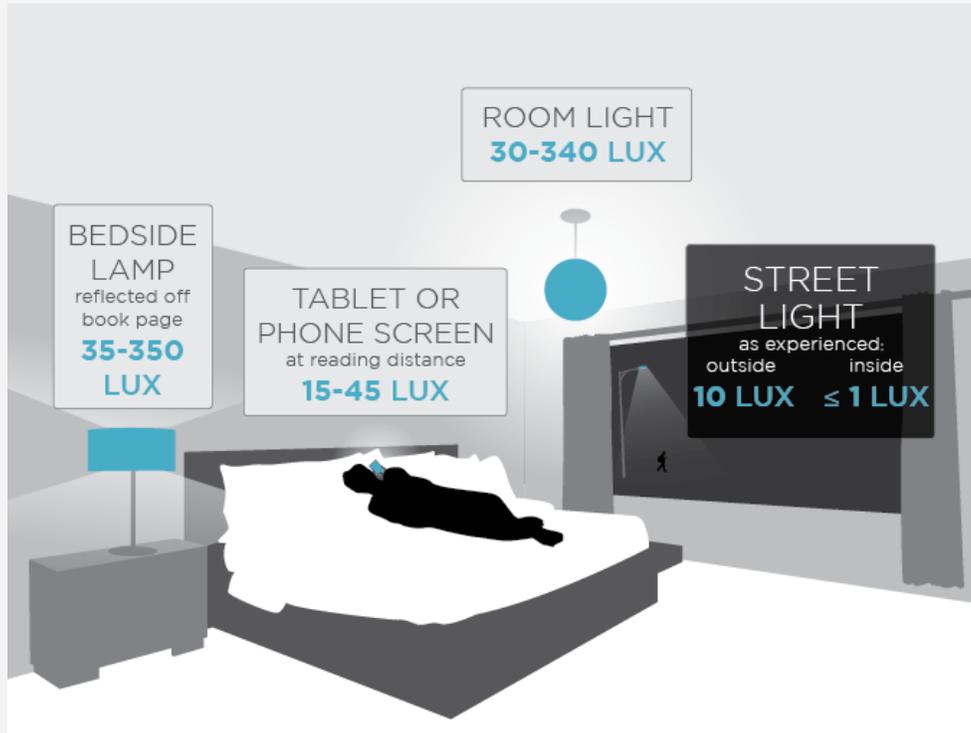
⁹ [LightSavers Canada \(2017\). The Realized Results of LED Streetlights: Seizing the Opportunity.](#)

There are health concerns around blue-rich LED lights

In 2016, the American Medical Association (AMA) released a report that highlighted its concerns about blue light emitted from LED streetlights. Higher amounts of blue light—a characteristic of LEDs used for illumination – at night can impact our bodies’ production of melatonin, a key hormone that regulates our sleep cycles and prevents diseases such as cancers. The report also highlighted how excessive amounts of blue light can create glare and compromise visibility. While the AMA supports the switch to LEDs, their report makes a recommendation that municipalities install street lights that emit lesser amounts of blue light.¹⁰ Similar recommendations have since been made by the Canadian Association of Optometrists.¹¹

While the AMA report also makes recommendations on colour temperature selection to address blue-light exposure, researchers have developed more accurate methods to measure blue-light that can be used to evaluate LED street lights.¹² In addition, many of the strategies used for controlling light pollution are also effective measures of reducing blue light exposure, such as:

How do indoor and outdoor light sources compare?



The risks of blue-light exposure are likely higher for indoor sources than street lights. For instance, night shift workers who work hours under bright interior lighting are subject to higher light levels and for longer periods of time. To put this into context, interior task lighting is usually upwards of 400 lux, about twenty times more intense than light levels from a streetlight, which are about 10 lux at the road.

1. Ensuring light levels are no higher than necessary.
2. Adopting full cut-off fixtures and installing proper shielding.
3. Trialing lighting control technologies such as dimming and sensor-activated technology.

Much is not yet known about LEDs’ possible effects on health, and there will likely be significantly more research on the topic in the near future.¹³ All of this points to the need for a carefully thought-out approach when converting existing streetlight to LEDs, to ensure that we are deriving the safety benefits from this new technology while being mindful of potential effects to health.

¹⁰ [American Medical Association \(2016\), “Report of the Council on Science and Public Health”, CSAPH Report 2-A-16](#)

¹¹ [Canadian Association of Optometrists \(2017\), “CAO Position Statement on Street Lighting”.](#)

¹² [Mark S. Rea and Mariana G. Figueiro \(2016\), “Response to the 2016 AMA Report on LED Lighting”](#)

¹³ [Mark S. Rea and Mariana G. Figueiro \(2016\), “Response to the 2016 AMA Report on LED Lighting”](#)

Lighting can affect wildlife too

Biological and ecological systems have evolved based on the rhythms of day and night, and many researchers believe that artificial light is disrupting natural processes in critical ways. The effects of light pollution are most noticeable in urban environments where artificial lighting is most prevalent. In recent years, studies have shown how light pollution has altered the behaviour of certain species and have observed that artificial light may create advantages for some while causing challenges for others.

For example, researchers have long suspected that sky glow draws migratory birds into urban areas, where they often become susceptible to many more hazards: 200 million birds each year are killed by domestic cats and 25 million birds die from collisions with glass surfaces.¹⁴ Cities such as Toronto have been proactive in regulating light pollution as a way to limit bird fatalities in cities.

Just as minimising blue light in fixtures may be beneficial for people, minimising red and white lighting is suspected of being beneficial to certain species of birds.¹⁵ However, red and amber lights have been suggested for areas near habitat of light-sensitive bats¹⁶, as well as areas near nesting turtles.¹⁷ Certain insects are more attracted to certain light wavelengths than others, but are generally sensitive to ultraviolet radiation, a common by-product in high intensity discharge lamps that humans cannot see.¹⁸

While the research around lighting impacts on ecological systems is still relatively recent, it all points to the need to consider wildlife—particularly birds—in our lighting design. This is especially so when we're designing lighting adjacent to ecologically sensitive areas like Stanley Park or the seawall.

¹⁴ [Calvert, A. M. et al \(2013\), "A Synthesis of Human-related Avian Mortality in Canada", in *Avian Conservation and Ecology* 8 \(2\): 11.](#)

¹⁵ [Poot, H., et al \(2008\), "Green Light for Nocturnally Migrating Birds", in *Ecology and Society*, 13 \(2\): 47.](#)

¹⁶ [Spoelstra, K. et al \(2017\), "Response of bats to light with different spectra", in *Proceedings of the Royal Society B*, 284 \(1855\).](#)

¹⁷ [Witherington, B. E. \(1992\), "Behavioral Responses of Nesting Sea Turtles to Artificial Lighting", *Herpetologica* 48 \(1\).](#)

¹⁸ [Wakefield, A. et al \(2017\), "Quantifying the attractiveness of broad-spectrum street lights to aerial nocturnal insects", in *Journal of Applied Ecology*, 55 \(2\).](#)

Potential approaches and actions

Based on research findings and best practices noted in the previous section, the City is proposing the following approaches and actions to meet the five broad goals of the Outdoor Lighting Strategy. Your feedback on the proposals will be valuable in shaping specific recommendations that will be brought to Council for approval.

1 Improving the public lighting network

The City has jurisdiction over the design and maintenance of outdoor lighting on roads, sidewalks, public pathways and gathering places along its street right-of-way. To enhance illumination in ways that meet the Outdoor Lighting Strategy goals, there are three key strategies the City is considering:

A. Adopt a public space lighting policy and design guidelines

The City may adopt policies and guidelines that provide direction on the design and operation of its outdoor lighting assets along public right-of-way. Guidance can be provided on:

- 1) Design standards to ensure roadway safety adhering to, wherever possible, meeting IES recommended light levels and other best practices.
- 2) Measures to ensure public safety and security, including recommended light levels and design practices consistent with CPTED (crime prevention through environmental design) approaches.
- 3) Strategies to reduce light pollution impacts, such as: criteria for colour temperature selection, glare reduction methods, thresholds for light spill from streetlights, and guidance on the deployment of additional shielding on streetlight fixtures.
- 4) Procedures for trialling new lighting controls, with guidance on adoption, testing, stakeholder and public consultation, and monitoring and evaluation methods.
- 5) Criteria to help prioritise lighting upgrades based on the safety and security needs and priorities of all people, with attention paid to unique vulnerabilities faced by persons based on age, ability, race, and gender.
- 6) Additional guidance on projects with more substantive lighting upgrades, where there may be a greater opportunity to meet lighting needs, including context-specific considerations (eg. land-use and business interests, historical character and aesthetics).

B. Pilot LED streetlights prior to a broader citywide conversion

The City may conduct pilot projects to ensure that the most appropriate LED products and controls are selected for a broader citywide roll-out. Pilot projects may involve the following:

- 1) Trialling LED streetlight fixtures from different manufacturers on select city streets for public feedback, comparing lighting products with full cut-off optics, glare-reduction to reduce light spill and glare, measured for blue-light hazard, and of a CCT of 3000K.
- 2) Evaluating LED products based on a scoring methodology that takes into account staff and public input.
- 3) Exploring opportunities to pilot innovative lighting technologies and approaches that aim to meet strategy goals.

C. Pursue a citywide LED streetlight conversion

Once a pilot is completed and a range of products are selected, the City may begin planning for a citywide conversion that seeks to enhance safety and visibility along its public lighting network. The City may complete the conversion of the streetlight network in phases that:

- 1) Begins with the standard 'cobra head' street lights, the most common types of fixtures currently installed.
- 2) Aims to meet the City's policies and guidelines (Item 1. A) to provide adequate lighting levels for all people.
- 3) Is informed by pilot project learnings and approaches, public and stakeholder feedback, as well as considerations such as traffic volumes, crime, zoning, and land use.
- 4) Utilises software design methods to minimise glare and light pollution.

D. Create an decision framework for lighting in emerging situations

In certain situations, universal standards identified in City policies may not be sufficient to address an emerging safety or security issue. To ensure that the lighting design in a public health or safety issue is handled comprehensively and sensitively, the City can create a decision framework that provides direction on the following:

1. Stakeholder involvement: Involvement of appropriate agencies, City departments, and people with lived experience are needed to scope issues and assess options.
2. Guiding principles and key considerations: Aspects of lighting design, such as increased light levels, often need to be weighed and deliberated upon to ensure that all impacts are considered.
3. Resolution: Changes to lighting design, as well as other actions that are required, to suitably address and monitor the situation.

2 Supporting responsibly-lit neighbourhoods

To address light pollution from private properties, the City can provide guidance and, where appropriate, make requirements to minimise the impact of light trespass, glare, and wasteful light. Of the regulatory approaches the City is considering:

A. Amend the Vancouver Building Bylaw to apply exterior lighting standards for new constructions and renovations

There are few regulations currently in place that provide guidance on good lighting practice. The City can propose new requirements that foster better lighting practices, especially in residential neighbourhood settings. Among the requirements the City can propose:

1. Require exterior lighting fixtures to have full cut-off optics or be fully shielded to limit light spill onto neighbouring residences.
2. Set limits on architectural lighting to control impacts on neighbours and the environment.
3. Encourage energy efficiency and warmer colour temperatures.
4. Initial focus on exterior lighting of buildings in residential areas and lane accesses of commercial buildings.

B. Enhance existing guidelines for exterior lighting on new developments

The City already encourages minimising light pollution in its existing Bird-Friendly Design Guidelines. More details responsible exterior lighting practices can encourage improved designs from architects and designers:

1. Accessible educational materials that show recommended fixtures and lighting practices.

2. Design considerations for providing safety and access lighting while minimising impacts.

C. Amend bylaws to address nuisance lighting

Where undue light pollution is being generated on a property, the City may set light pollution standards that require property owners to address the issue. Such standards may include:

1. Require shielding on fixtures that project light into windows of neighbouring residences.
2. Require changing of placement or direction of lighting to mitigate impacts on neighbours.
3. Require decorative lighting be turned off after 11PM in residential neighbourhoods.

D. Adopt leading practices for City facilities

The City can demonstrate leadership through its projects by implementing design practices for its own facilities. The City may amend its standards to provide lighting design and installation guidance as it renovates and develops new facilities, such as community centres and housing projects, including:

1. Design considerations for providing safety and access lighting.
2. Use of automated controls for outdoor lighting.
3. Curfew for decorative lighting features on City facilities.
4. Use energy efficient lighting systems.

3 Enhancing public awareness of light pollution

The City can work with community partners to enhance awareness about light pollution and its community and ecological impacts. There are many possible ways to support community education on light pollution, including:

A. Conduct a preliminary ‘Dark-Sky’ designations assessment

While the most well-known Dark-sky preserves are often located in National Parks far from urban areas, the Royal Astronomical Society of Canada has created two designations for sites situated in cities. The City can support these projects by:

1. Looking into the program’s requirements and bring together interested parties, such as the Vancouver Park Board.
2. Finding ways to support efforts to support an application.

B. Support a public education campaign

The City can support the development of resources, such as informational social media posts and illustrations, to share with residents and businesses:

1. A City web page that provides information on light pollution and identifies ways that people can minimise it on their property.
2. Highlight events and programming available to community members who may be interested in taking part, such as astronomical observation or nocturnal wildlife.
3. Co-create resources with partners, such as the Space Centre and RASC, to support community and development industry education on topics related to light pollution.

Summary of proposed approaches

Below is a summary table highlighting all the approaches the City is proposing:

1 Improving the public lighting network

- A. Adopt a public space lighting policy and design guidelines
- B. Pilot LED streetlights prior to a broader citywide conversion
- C. Pursue a citywide LED streetlight conversion
- D. Create a decision framework for lighting in emerging situations

2 Supporting responsibly-lit neighbourhoods

- A. Amend the Vancouver Building Bylaw to apply exterior lighting standards for new constructions and renovations
- B. Enhance existing guidelines for exterior lighting on new developments
- C. Amend bylaws to address nuisance lighting
- D. Adopt leading practices for City facilities

3 Enhancing public awareness of light pollution

- A. Conduct a preliminary 'Dark-Sky' designations assessment
- B. Support a public education campaign

How to submit your feedback

The input received will inform our report to Council, which will include recommendations for outdoor lighting and provide direction for future actions. Below are some questions you might consider:

- Does the information and opportunity contained in the consultation paper clearly communicate and accurately summarise the diverse sets of issues related to outdoor lighting?
- Are there questions you have about the research presented that you would like answered or information we should consider that isn't currently included?
- Do you agree with the proposed approaches that the City is considering? Do you have any concerns?
- Are there opportunities to improve lighting or address light pollution that have not been identified in the consultation paper?

Please submit your comments by Tuesday, June 12, 2018 in one of the following ways:

- Complete the Talk Vancouver survey: vancouver.ca/outdoorlighting
- By email: outdoor.lighting@vancouver.ca
- By telephone: 604.871.6814
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