

LIGHT CHAPTER - PROPOSED DISTRICT PLAN
FNDC Proposed District Plan Hearing 6 - October 2024
Statement by Vision Kerikeri, Carbon Neutral Trust and Kapiro Conservation Trust
Email: visionkerikeri@gmail.com; carbonneutraltrust@gmail.com;
kapiroconservationtrust@gmail.com

Our submissions seek additional provisions for lighting to address:
energy-efficiency; nocturnal wildlife; and 'dark-sky friendly' principles.

To clarify: We seek general good practice to reduce light pollution. We also recognise the cultural value of night skies to Maori.

Relevant submissions: s521, s527 Vision Kerikeri; s529 Carbon Neutral Trust; s442, s443 Kapiro Conservation Trust.

Comments on s42 officers' amendments in PDP Light chapter

❖ **Overview:** We support s42 report's new text about night sky values:

nocturnal species including insects. In addition, the night sky has important cultural and natural values associated with it that may be sensitive to light in parts of the Far North District.¹

❖ **Notes:** We support s42 report's new *Note* on CMS Light Pollution Guidelines for Wildlife:¹

Note: Guidance on best practice for installing and assessing lights in areas where it could affect the natural behaviour of indigenous fauna, is available in the [Convention on Migratory Species – Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds, and Migratory Shorebirds](#).²

However –

- **We propose using** an updated weblink for the CMS Guidelines:
<https://www.cms.int/en/document/light-pollution-guidelines-wildlife-4>
- **We propose adding** the international guidelines for responsible outdoor lighting:
International Dark Sky Association principles for responsible outdoor lighting
<https://darksky.org/resources/guides-and-how-tos/lighting-principles/>
- **We propose adding** Auckland Transport *Street Lighting* design guidelines for roads and amenity lighting (and also its related appendices):
<https://at.govt.nz/media/1982229/engineering-design-code-street-lighting.pdf>

Alternatively, equivalent lighting design guidelines should be added in the next version of FNDC's Engineering Standards.²

¹ DOC's submission (S364) pointed out that NZ is a signatory party to the United Nations Convention on Migratory species and related Light pollution guidelines.

² Disappointingly, FNDC *Engineering Standard* (2023)² section on Road Lighting provides insufficient guidelines on lighting design. We intend to raise this point during the future PDP Hearing on Engineering standards.

- ❖ **LIGHT-P2 & LIGHT-S1:** We support s42 report’s new clauses about indigenous fauna:

e. manage adverse effects on indigenous fauna where appropriate.

f. The extent to which artificial lighting affects the natural behaviour of indigenous fauna, including reference to best practice guidance where relevant.⁶

- ❖ **We support the retention** of notified PDP text referring to: wildlife (Overview section); enjoyment/views of the night sky and intrinsically dark landscapes (Overview & LIGHT-P2(c)); protecting amenity values (LIGHT-O1); and the environment (LIGHT-O1, LIGHT-P1).

However, we are concerned that the above clauses do not need to be considered when activities meet the *Permitted* activity Rule & Standard (LIGHT-R1 and LIGHT S1). This indicates many developments will **not** need to consider general good practice guidelines for lighting.

We also remain concerned that the Lighting chapter has not referred to energy efficiency.

- ❖ **We therefore seek** to add another clause in LIGHT-R1:
‘PER-3: The lighting design has considered the following matters:
- Energy efficient design;
 - Guidelines on wildlife specified in the Overview Note;
 - Guidelines on night skies specified in the Overview Note.’

Justifications and further explanation

Effects of outdoor lighting on nocturnal wildlife

Nocturnal indigenous species such as kiwi, nocturnal lizards, some migratory birds, bats and a number of *at risk* or *threatened* species are sensitive to artificial light.

Adverse effects of light can include disorientation, changes in feeding behaviour, reproductive changes and growth changes.³ Some *‘at risk’* migratory bird species, for example, can be disoriented by bright lights in coastal developments or inland. Requiring general good practice for outdoor lighting would help reduce this problem. In high density kiwi areas for example, groups such as Kiwi Coast recommend avoiding bright lighting, and using a warm light colour (towards amber/red wavelengths, avoiding white and blue). The PDP Biodiversity chapter does not address lighting issues.

³ Hutt City Council (2021) *Effects of Artificial Light on Urban Wildlife*, https://www.huttcity.govt.nz/data/assets/pdf_file/0028/43687/Cardno-report-NZ0120185-WE-RP01-Hutt-City-Photobiology-effects-on-fauna-and-ecosystems-VLD-approved_r.PDF

Wildlife-friendly lights generally avoid white or blue light by using a 'warm' colour temperature below 3000 Kelvins (preferably below 2700 K). 'Warm' white LEDs, for example, are usually around 2700 K or less.⁴

Please note that warm LED lights cost the same as cool LEDs.

Newer techniques use light of a specific wavelength which is not visible to animals but provides sufficient light for humans (around 590 nanometres).⁵

Colour temperature of lighting varies from warm to cool⁶ (measured in Kelvin, K)

warm light: amber/yellow 1000 - 2000 Kelvin cold light: blue 10,000 Kelvin



Lighting to reduce night sky pollution

Blue light is responsible for brightening the night sky more than any other colour of light. The International Dark-Sky Association (IDA) recommends that outdoor lighting should have colour temperatures below 3000k; ideally 2700 K or lower. Warm-toned lighting is less disruptive to nocturnal animals and has a reduced scattering effect in the atmosphere, resulting in less sky glow.

Responsible lighting guidelines are similar for wildlife and dark skies

We would like to point out that outdoor lighting guidelines for wildlife and night skies are relatively simple. This is not onerous.

In fact, the guidelines are similar for both wildlife and dark skies. The main principles are:

- Shield or direct lights so it falls only in the area that needs light.
- Use lower intensity (less bright) light where possible.
- Generally avoid light with blue wavelengths (preferably use 2700 K or less)

The following pages provide examples of guidelines.

⁴ Australian National Light Pollution Guidelines for Wildlife (2023), <https://www.dcceew.gov.au/environment/biodiversity/publications/national-light-pollution-guidelines-wildlife>

⁵ Australian National Light Pollution Guidelines for Wildlife.

⁶ <https://lightingdesignstudio.co.uk/colour-temperature/>

Principles for responsible outdoor lighting - International Dark Sky Association⁷

Five Lighting Principles for Responsible Outdoor Lighting		 DarkSky	
Responsible outdoor lighting is	1 Useful	Use light only if it is needed All light should have a clear purpose. Consider how the use of light will impact the area, including wildlife and their habitats.	
	2 Targeted	Direct light so it falls only where it is needed Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.	
	3 Low Level	Light should be no brighter than necessary Use the lowest light level required. Be mindful of surface conditions, as some surfaces may reflect more light into the night sky than intended.	
	4 Controlled	Use light only when it is needed Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.	
	5 Warm-colored	Use warmer color lights where possible Limit the amount of shorter wavelength (blue-violet) light to the least amount needed.	

Example of lighting guidelines to reduce effects on wildlife

This example comes from Hutt City Council. The principles are simple, not onerous.

Best Practice lighting guidelines

Natural darkness has conservation value in the same way as clean water, air and soil and should be protected through good quality lighting design.


Simple management principles can be used to reduce light pollution, including:

1. Start with natural darkness and only add light for specific purposes.
2. Use adaptive light controls to manage light timing, intensity and colour.
3. Light only the object or area intended – keep lights close to the ground, directed and shielded to avoid light spill.
4. Use the lowest intensity lighting appropriate for the task.
5. Use non-reflective, dark-coloured surfaces.
6. Use lights with reduced or filtered blue, violet and ultra-violet wavelengths.

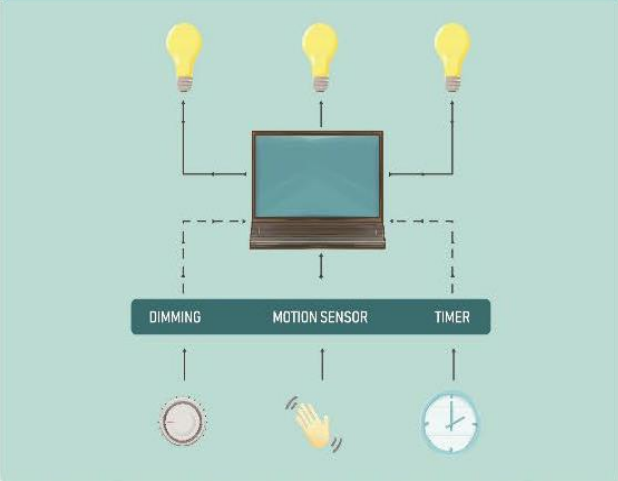
⁷ International Dark Sky Association guidelines, <https://darksky.org/resources/guides-and-how-tos/lighting-principles/>

Example: Australia's official *National Light Pollution Guidelines for Wildlife* provides similar principles in graphic form


1 Start with natural darkness and only add light for specific purposes



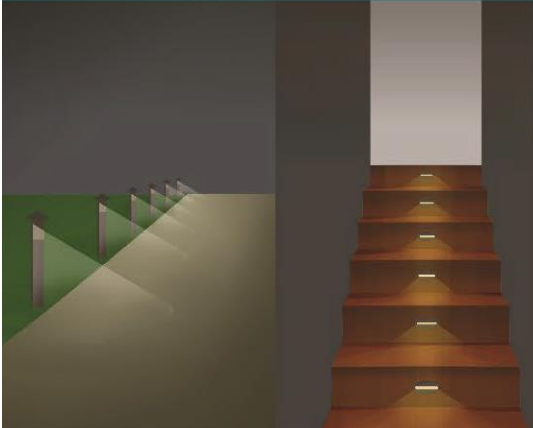
2 Use adaptive light controls to manage light timing, intensity and colour



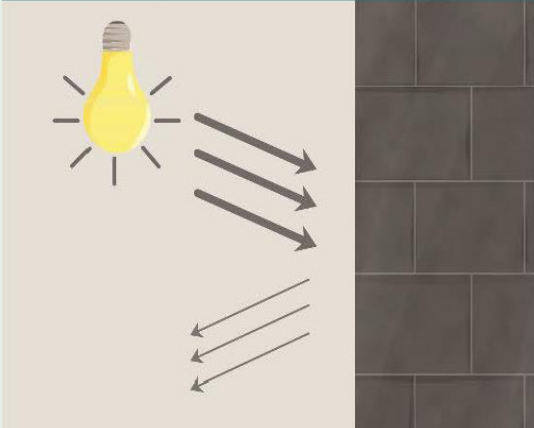
3 Light only the area intended (avoid light spill)



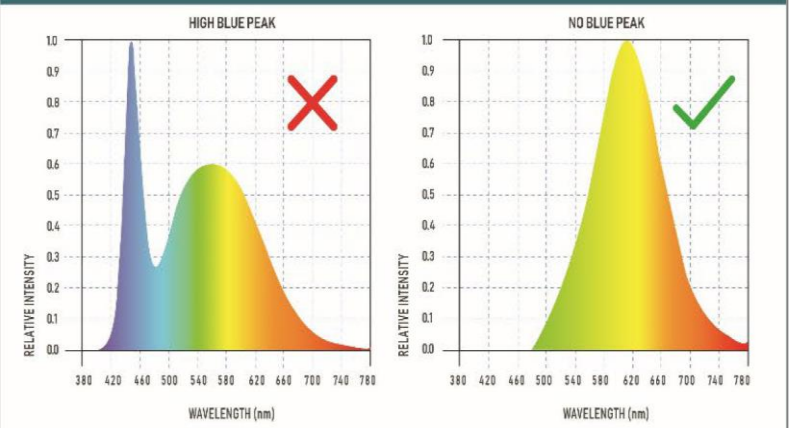
4 Use the lowest intensity appropriate to the task



5 Use non-reflective dark coloured surfaces



6 Use light with little or no blue wavelength



Wavelength (nm)	High Blue Peak (Relative Intensity)	No Blue Peak (Relative Intensity)
380	0.00	0.00
420	0.05	0.00
440	0.95	0.00
460	0.10	0.00
500	0.30	0.00
540	0.55	0.05
580	0.60	0.20
620	0.50	0.80
660	0.20	0.95
700	0.05	0.85
740	0.02	0.40
780	0.00	0.00

ENERGY EFFICIENCY OF LIGHTING

Our submissions seek energy efficiency provisions to be included in all relevant parts of the PDP. This includes the PDP chapter on Light.

(Relevant submissions: s521 VKK; s529 CNT; s443 KCT).

RMA requirements on energy efficiency:

- **RMA s7(ba)** requires the Council to have *particular regard* to ‘*the efficiency of the end use of energy*’.
- **RMA s74(2)**. When preparing a plan, Councils are required to have regard to the national *Emissions Reduction Plan*⁸ (made under the Climate Change Response Act). The national *Emissions Reduction Plan* specifies a number of actions that are relevant to district plans, such as:
 - *Support emissions reductions ... via policy, guidelines, direction ... on housing and urban development.*’ (p.125)
 - *‘The planning system can ... promote low-emissions development – residential, commercial, industrial and infrastructure – that reduce energy demand. When we use less energy, we can delay the need for new electricity infrastructure.’* (p.130)

RPS Regional development guidelines:

District Councils are required to give effect to the RPS (under s75(3) of the RMA). The *Regional development guidelines* (Appendix 2) state that:

*‘New subdivision, use and development should: ... Adopt, where appropriate, sustainable design technologies such as the **incorporation of energy-efficient** (including passive solar) **design, low-energy street lighting...**’*⁹

Energy efficiency requirements in road lighting design manuals

Key lighting design manuals for roads and/or amenity lighting require energy efficiency and the use of LEDs in all new and replacement lights. (Importantly, the manuals also specify lists of approved LEDs to meet necessary quality/durability standards)

Northland Transportation Alliance Design Manual - Street Lighting (2020) states:

- ‘Energy efficiency: The installation must be designed for economic use of energy.’ (s7.9)
- ‘All new or replacement luminaires must be LED.’ (s5.2).¹⁰

Auckland Transport Street Lighting standards for roads and amenity lighting:

- ‘Energy efficiency: The installation must be designed for economic use of energy.’
- ‘All new lighting designs or replacement luminaires must be LED.’ (s3 & s5.2).¹¹

⁸ *First Emissions Reduction Plan* <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/emissions-reductions/erp/>

⁹ NRC, *Regional Policy Statement*, p.163, Appendix 2, Part A, clause (p).

¹⁰ Northland Transportation Alliance (2020) *Design Manual - Street Lighting*, s5.2 Luminaires; Appendix C and Appendix D.

<https://www.kaipara.govt.nz/uploads/Street%20lighting/NTA%20Street%20Lighting%20Design%20Manual.pdf> and <https://www.kaipara.govt.nz/street-lighting-design>

¹¹ Auckland Transport *Engineering Design Code - Street Lighting*, p.6, 18, 22,

<https://at.govt.nz/media/1982229/engineering-design-code-street-lighting.pdf>

The PDP Light chapter fails to address these significant principles.

- ❖ **We seek:** the PDP Light chapter should contain similar provisions:¹²
 - Energy efficiency: The installation must be designed for economic use of energy.'
 - All new lighting designs or replacement luminaires must be LED, and must be selected from Auckland Transport's current approved list of LEDs.
- ❖ LIGHT-R1 should also **require** consideration of energy efficient lighting design, as stated above:
 - 'PER-3: The lighting design has considered the following matters:
 - Energy efficient design;
 - Guidelines on wildlife specified in the Overview Note;
 - Guidelines on night skies specified in the Overview Note.'

Energy efficiency provisions in existing ODP:

The ODP contains a number of provisions requiring consideration and/or promotion of energy efficiency. Box 1 below provides examples -

Box 1. Examples of Operative District Plan provisions on energy efficiency

- 13.1.6: *'The **adoption of energy efficiency... will need to be considered in all new subdivisions and related development.**'*
- 13.3.9: *'To ensure, to the greatest extent possible, that all new subdivision supports energy efficient design through appropriate site layout and orientation in order to maximise the ability to provide light, heating, ventilation and cooling through passive design strategies for any buildings developed on the site(s).'*
- 13.4.15 *'That conditions be imposed upon the design of subdivision of land to require that the layout and orientation of all new lots and building platforms created include, as appropriate, provisions for achieving the following:.... (a) development of energy efficient buildings and structures;..'*
- Criteria 13.9.2.3(z) *'**the extent to which the application promotes energy efficiency...**'*

PDP generally lacks energy efficiency provisions

It is extraordinary that the notified PDP barely mentions the need to consider or promote energy efficient design. We searched the notified PDP and we could only find two provisions that mention energy efficiency:

- General Residential Policy GRZ-P7: 'Encourage energy efficient design ... in the construction of residential development.'
- Mixed Use zone Policy MUX-P6 states: 'Promote energy efficient design ... in the construction of mixed use development.'

¹² Disappointingly, FNDC *Engineering Standard* (2023)¹² section on Road Lighting provides insufficient guidelines on lighting design. We will raise this point during the Hearing on Engineering standards.

Costs: The s42 report implies that cost may be a barrier. However, we note that warm LEDs cost the same as cool LEDs. Moreover, the design principles above are not difficult nor onerous. Regarding LED costs, the NZ Energy Efficiency body EECA has stated that:

- LED bulbs consume up to 85% less electricity than traditional bulbs (provided that durable LEDs are used it is necessary to avoid poor quality products).
- LEDs can save a household >\$100 per year in electricity costs.¹³

We were unable to find equivalent cost information for road & amenity lighting.

Nevertheless, good quality LEDs will consume less electricity and therefore have lower on-going costs. After a developer has constructed and vested new roads in the Council, it is the Council who has to pay the electricity bills for street lights for ever after.

The annual electricity savings from energy efficient lighting will inevitably reduce the lighting bills that have to be paid by the Council (ratepayers).

Conclusion: We seek the amendments stated above – or equivalent amendments - in the PDP Light chapter. Our groups will also continue to seek energy efficiency provisions in other chapters.

Our PDP-wide submissions specifically seek provisions relating to energy efficiency

Positions stated in our submissions:

‘The PDP should include objectives, policies and rules/standards that require best practice environmentally sustainable techniques for new developments, including ... energy-efficient technologies...’

- submissions by Vision Kerikeri s521.009, s521.015, s521.016, s521.022, s521.023, s521.025; Carbon Neutral Trust s529.055, s529.219, s529.220, s529.227, s529.228; Kapiro Conservation Trust s443.009.¹⁴
- Relevant sections of the PDP (as stated in our submissions): all sections of the PDP.

Our submissions seek to update PDP provisions and implement RPS guidelines to adopt energy efficient technologies -

... updating PDP ‘rules/standards in the light of climate change and... improved technologies... For example, standards should preferably require, or at minimum actively encourage, the adoption of *‘sustainable design technologies such as the incorporation of energy-efficient (including passive solar) design, low-energy street lighting’* as stated in the RPS.’

- submissions by Vision Kerikeri s521; Carbon Neutral Trust s529; Kapiro Conservation Trust s443.
- Relevant sections of the PDP (as stated in our submissions): all sections of the PDP

Other submitters also seek the PDP improvements to include policies/rules that will reduce climate emissions e.g. s521.002, s521.003, s443.002, s443.003, s529.048, s529.049

¹³ <https://genless.govt.nz/for-everyone/at-home/energy-saving-appliances/choose-good-appliances/use-led-lighting/>

¹⁴ FNDC’s PDP submission summaries and numbering did not note some of our submission points.

Annex 1: Example of District Plan standards to protect dark skies

The District Plan example, below, shows that the general principles are not very difficult nor onerous.

Source: Mackenzie District Plan Light chapter:

<https://mackenzie.isoplan.co.nz/review/rules/0/207/0/0/0/99>

Standards

LIGHT-S1	Direction	Activity Status where compliance not achieved:
All Zones	1. All fixed exterior lighting shall be directed away from any adjacent roads, residential properties and lakes, with the exception of streetlights which may be directed towards the road that they are intended to illuminate.	RDIS Matters of discretion are restricted to: LIGHT-MD2
LIGHT-S2	Shielding	Activity Status where compliance not achieved:
All Zones	1. All outdoor lighting shall be shielded from above in such a manner that all the light shines below the horizontal.	RDIS Matters of discretion are restricted to: LIGHT-MD1
LIGHT-S3	Colour Temperature	Activity Status where compliance not achieved:
All Zones	1. The correlated colour temperature of outdoor lighting shall not exceed 3000 K.	RDIS Matters of discretion are restricted to: LIGHT-MD1
LIGHT-S4	Light Source	Activity Status where compliance not achieved:
All Zones	1. Only light-emitting diode (LED), low pressure sodium and high pressure sodium light sources shall be used.	RDIS Matters of discretion are restricted to: LIGHT-MD1
LIGHT-S5	Horizontal and Vertical Illuminance	Activity Status where compliance not achieved:
All Zones	1. The maximum level of light spill from outdoor lighting shall not exceed the horizontal or vertical illuminance levels on any adjoining site in the receiving zone set out in LIGHT - TABLE 1, excluding roads.	RDIS Matters of discretion are restricted to: LIGHT-MD2