

Light

Introduction

Artificial outdoor lighting allows people to undertake a range of activities beyond daylight hours, as well as being used for safety and security purposes. However, if not carefully designed, artificial lighting can be a nuisance to the occupiers and users of adjoining sites and cause adverse safety effects on the transport network.

Outdoor lighting can also adversely affect the ability to view the night sky. Mackenzie District is home to the Aoraki Mackenzie International Dark Sky Reserve, one of the world's premiere accredited International Dark Sky Reserves. It attracts local, national and international visitors who come to view the dark night sky. The Reserve is also the site of Mt John Observatory, operated for research in astronomy by the University of Canterbury. The maintenance of dark sky is essential for the accreditation of the Reserve to continue, for the continuation of this tourist attraction and for research activities to continue.

Whilst astronomy, considered a scientific discipline, and astrology, considered to be folklore, are two different things in Western thought, they are often intertwined and interdependent in Māori culture. Ngāi Tahu and local rūnanga believe mountains, lakes and sky (the landscape) are interwoven, binding the earth and sky together not just in the physical sense but also in a spiritual sense. In order to remember, make sense of, and pass on precise astronomical knowledge, it was often woven into stories which adopted the mythical nature of astrology.

Māori used astronomy in everyday practices such as food gathering and planting, and it was believed the stars governed their good or bad fortune. Early Māori navigators made use of their understanding of the changing night sky patterns, along with familiarity of natural patterns of clouds, winds, waves, tides and bird movements to navigate their way across the seas and through the land. For Ngāi Tahu and local rūnanga, the stars were an integral part of the journey to Takapō / Lake Tekapo as the patterns resembled specific constellations full of meaning. When Matariki is seen, then game is preserved, for it marked the season when such food supplies were to be procured and preserved in fat for the colder winter months. Therefore, from a Ngāi Tahu and rūnanga perspective, the night sky is an integral part of the natural and cultural landscape.

The provisions for lighting seek to provide for adequate lighting to support activities and provide a safe environment, while protecting the values of the night sky and minimising potential adverse effects beyond the site.

Objectives and Policies

Objectives	
LIGHT-O1	Outdoor Lighting
Outdoor lighting allows activities to occur beyond daylight hours and provides safety and security for activities, while: <ol style="list-style-type: none"> 1. protecting views of the night sky; and 2. managing light spill to maintain amenity values and the safe operation of the transport network. 	

Policies	
LIGHT-P1	Managing Outdoor Lighting

<p>Manage the location, design and operation of outdoor lighting to ensure:</p> <ol style="list-style-type: none"> 1. it does not distract or interfere with the safety of road users <u>traffic</u>¹; and 2. it is compatible with the zone in which any light spill or glare² is received. 	
LIGHT-P2	Night Sky Darkness
<p>Require outdoor lighting and skylights³ to minimise, as far as practicable, the potential for upward light spill that would adversely affect the ability to view the night sky.</p>	

Rules

LIGHT-R1	Outdoor Lighting <u>Not Otherwise Listed</u> ⁴	
All Zones	<p>Activity Status: PER</p> <p>Where:</p> <ol style="list-style-type: none"> 1. The following outdoor lighting may not be used between 10.00pm and 6.00am: <ol style="list-style-type: none"> a. searchlights b. floodlighting of an area that is not in use or of an activity that is not in operation. c. outdoor illumination of any public recreational facility d. outside illumination of any building for aesthetic purposes by floodlight e. any outdoor illumination in which light is produced by metal halide, mercury vapour or fluorescent lighting, unless <u>this lighting was these lamps were</u>⁵ installed prior to 1 January 1979 in any Commercial or Residential Zone in Takapō / Lake Tekapo or 1 March 1986 in all other zones. <p>And the activity complies with the following standards: LIGHT-S1 Direction LIGHT-S2 Shielding LIGHT-S3 Colour Temperature LIGHT-S4 Lamp Types <u>Light Sources</u>⁶</p>	<p>Activity status when compliance is not achieved: RDIS</p> <p>Matters of discretion are restricted to: LIGHT-MD1</p> <p>Activity status when compliance with standard(s) is not achieved: Refer to relevant standard(s).</p>

¹ Waka Kotahi (20)

² Waka Kotahi (20)

³ TL&GL (19)

⁴ Clause 16(2) amendment to provide clarity

⁵ B. King (18)

⁶ B. King (18)

	LIGHT-S5 Horizontal and Vertical Illuminance	
LIGHT-R2	Security Lights	
All Zones	<p>Activity Status: PER</p> <p>Where:</p> <ol style="list-style-type: none"> Security lights must be fitted and controlled with a motion sensor. <p>And the activity complies with the following standards: LIGHT-S1 Direction LIGHT-S2 Shielding LIGHT-S3 Colour Temperature⁷ LIGHT-S4 Lamp Types Light Sources⁸ LIGHT-S5 Horizontal and Vertical Illuminance</p>	<p>Activity status when compliance is not achieved: RDIS</p> <p>Matters of discretion are restricted to: LIGHT-MD1</p> <p>Activity status when compliance with standard(s) is not achieved: Refer to relevant standard(s).</p>
LIGHT-R3	Skylights	
All Zones	<p>Activity Status: PER</p> <p>Where:</p> <ol style="list-style-type: none"> There is no spill of light through the skylight after 10pm. <p><i>Note: Compliance with this rule may be achieved through use of a blind or other light covering; or by use of glass that does not emit internal light.</i></p>	<p>Activity status when compliance is not achieved: RDIS</p> <p>Matters of discretion are restricted to: LIGHT-MD1</p>
LIGHT-R4⁹	<u>Temporary Outdoor Lighting for Emergency Purposes, including the Safe and Efficient Operation of Infrastructure during a Natural Hazard Event</u>	
All Zones	Activity Status: PER	

Standards

LIGHT-S1	Direction	Activity Status where compliance not achieved:
All Zones	<ol style="list-style-type: none"> All fixed exterior lighting shall be directed away from¹⁰ any adjacent roads, residential properties and lakes, <u>with the exception of streetlights which may be directed towards the road that they are intended to illuminate.</u>¹¹ 	<p>RDIS</p> <p>Matters of discretion are restricted to: LIGHT-MD2</p>
LIGHT-S2	Shielding	Activity Status where compliance not achieved:

⁷ B. King (18)

⁸ B. King (18)

⁹ Opuha (9)

¹⁰ Waka Kotahi (20)

¹¹ Waka Kotahi (20)

All Zones	1. All outdoor lighting shall be shielded from above in such a manner that the edge of the shield shall be below the whole of the light source, so ¹² 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 253000 ¹³ K.	RDIS Matters of discretion are restricted to: LIGHT-MD1
LIGHT-S4	Lamp Types Light Source ¹⁴	Activity Status where compliance not achieved:
All Zones	1. Only Light-emitting diode (LED) ¹⁵ , low pressure sodium and high pressure sodium lamps light sources ¹⁶ 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 measured ¹⁷ 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

LIGHT-TABLE 1

Receiving Zone	2200 to 0600	0600 to 2200
Any Rural or Rural-Residential Zone	1 lux	5 lux
Any Residential Zone Any Recreation or Open Space Zone Any Special Purpose Zone	2 lux	10 lux
Any Commercial and Mixed Use or Industrial Zone	5 lux	25 lux

MATTERS OF DISCRETION

¹² TL&GL (19)

¹³ B. King (18)

¹⁴ B. King (18)

¹⁵ TL&GL (19)

¹⁶ B. King (18)

¹⁷ Waka Kotahi (20)

LIGHT-MD1

- a. The individual and cumulative effects on the ability to view the night sky.
- b. The effectiveness and practicality of any measures proposed to mitigate the effects of light spill.
- c. Whether the lighting is necessary for operational or functional purposes.

LIGHT-MD2

- a. Whether the lighting is necessary for operational or functional purposes.
- b. Adverse effects on:
 - i. the amenity anticipated in the receiving zone;
 - ii. the well-being, health and safety of people; and
 - iii. traffic road user¹⁸safety.
- c. The extent to which light spill or glare may impact on activities occurring on an adjoining property.

¹⁸ Consequential amendment arising from Waka Kotahi (20).

Add the following definitions to 'Definitions' Chapter:

<u>skylight</u>	<u>means a window set in a roof or ceiling.</u> ¹⁹
<u>emergency</u>	<u>means a situation that:</u> <ol style="list-style-type: none"> <li data-bbox="858 331 1380 712">a. <u>is the result of any happening, whether natural or otherwise, including any accident, explosion, earthquake, eruption, tsunami, land movement, flood, storm, tornado, cyclone, fire, leakage or spillage of any dangerous gas or substance, technological failure, infestation, plague, epidemic, failure of or disruption to an emergency service or a lifeline utility, or actual or imminent attack or warlike act; and</u> <li data-bbox="858 723 1380 882">b. <u>causes or may cause loss of life or injury or illness or distress or in any way endangers the safety of the public or property in New Zealand or any part of New Zealand.</u>²⁰

¹⁹ Genesis (11)

²⁰ Opuha (9)