

BEFORE THE WAIPĀ DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Proposed Plan Change 20 – Airport Northern
Precinct Extension to the Operative Waipā
District Plan

STATEMENT OF EVIDENCE OF JOHN KINROSS MCKENSEY

(LIGHTING)

28 FEBRUARY 2023

Counsel acting:
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ChanceryGreen
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INTRODUCTION

Qualifications and experience

1. My name is John Kinross Mckensey. I am an Executive Engineer at LDP Ltd (Leading Design Professionals).
2. I hold a Bachelor of Engineering (Electrical) degree from the Queensland Institute of Technology. I have completed the Consulting Engineering Practice and Management programme at the University of Melbourne.
3. I am a member of several relevant associations including:
 - (a) Member, Illuminating Engineering Society of Australia and New Zealand (MIES);
 - (b) Chartered Member of Engineering New Zealand (CMEngNZ);
 - (c) Chartered Member of the Institution of Engineers Australia (MIE Aust);
 - (d) Chartered Professional Engineer Australia (CPEng Aust);
 - (e) National Engineers Register, Australia (NER);
 - (f) APEC Engineer;
 - (g) International Professional Engineer, Australia (IntPE);
 - (h) Member of the Resource Management Law Association; and
 - (i) Member of the International Dark Sky Association.
4. I have over 40 years' experience in lighting design, providing consultancy services for a wide range of clients including local authorities, developers, road controlling authorities and infrastructure sectors. My experience includes:
 - (a) Lighting advisor to Auckland Council during the Proposed Auckland Unitary Plan process;
 - (b) Lighting advisor to Christchurch City Council during the Replacement District Plan process;
 - (c) Author or co-author of five local government codes of practice with respect to exterior lighting, each containing environmental considerations;
 - (d) Author of the Auckland Council Sportsfield Lighting Guidelines;
 - (e) Lighting advisor to Auckland Transport; and

- (f) Lighting advisor to Waka Kotahi NZ Transport Agency.
5. I have over 20 years' experience advising as to environmental lighting effects. I have provided consultancy services for private client applicants and local government regarding the assessment of lighting effects for a wide variety of activities and have previous experience in designing lighting to manage effects on the New Zealand long-tailed bat (**LTB**). In particular, I have prepared lighting assessment of effects for exterior lighting installations for the following projects:
- (a) Hamilton City Council (HCC) to inform the Peacocke Structure Plan (Plan Change 5), which included providing lighting advice to consider the effects of lighting on residents, motorists and the LTB;
 - (b) Amberfield subdivision in Peacocke, Hamilton, which included providing lighting advice to both Weston Lea Ltd (as appellant) and the HCC (as respondent), under common privilege, regarding environmental lighting effects to inform Resource Consent conditions. This included consideration of the effects of lighting on residents, motorists and the LTB;
 - (c) Waikato Expressway Cambridge to Tamahere (for NZTA), which included consideration of the effects of lighting on residents, motorists and the LTB;
 - (d) Kennedy Point Marina Waiheke (for the applicant), which included consideration of the effects of lighting on residents, motorists, navigation and biota (Little Penguin);
 - (e) Tekapo Drainage Canal (for the applicant), which included consideration of lighting effects on Mt John Observatory;
 - (f) Lake Pukaki Development (for the applicant), which was to be located in an intrinsically dark environment;
 - (g) Proposed Peacocke Sports Park (for BBO / HCC), including considerations for the LTB; and
 - (h) Review of the proposed Broadwater Retirement Village, Peacocke, for HCC, which included consideration of the effects of lighting on residents, motorists and the LTB.
6. I have reviewed lighting effects for local government in regard to sportsfields, signage and digital billboards, roads, pathways and carparks and private development exterior lighting for buildings, quarry, greenhouse and service stations. I have provided lighting advice to local government for the Devonport Domain, Vauxhall Park, Stanmore Bay League Fields,

Waitakere Stadium, Replacement Wynyard Crossing Bridge and Auckland Harbour Bridge Skypath.

7. I have previously prepared and presented evidence in the Environment Court and for Independent Hearings Panels for lighting effects for a number of clients including local government for the following projects of particular relevance to this matter:

- (a) Peacocke Structure Plan for HCC;
- (b) Amberfield subdivision for HCC and Weston Lea Ltd;
- (c) Michaels Avenue Reserve for Auckland Council;
- (d) Waikeria Prison Expansion for Ōtorohanga District Council;
- (e) Matiatia Marina – Waiheke Island for Auckland Council;
- (f) Kennedy Point Marina – Waiheke Island for Kennedy Point Boat Harbour Ltd;
- (g) Americas Cup AC36 Facilities – Auckland for Panuku Development Auckland (an Auckland Council CCO);
- (h) Palmerston North Freight Hub for KiwiRail; and
- (i) Waste Management Auckland Regional Landfill for Auckland Council

8. I am familiar with the application site and the surrounding locality. I have read the relevant parts of: the application; submissions; further submissions and the Section 42A Report.

Involvement in Proposed Plan Change 20

9. I have been engaged by Titanium Park Limited (“TPL”) and Rukuhia Properties Limited (“RPL”) to prepare evidence for Proposed Plan Change 20 (“PC20”) and have been involved with the Proposed Plan Change since December 2022. I assisted in preparing the revised provisions of PC20 with respect to lighting as attached in Annexure 2 to the evidence of Mr Nick Grala. I also participated in the Ecology and Bat Habitat expert conferencing held on 8 February 2023 and signed the associated Joint Witness Statement with respect to lighting matters.

10. I visited the Site and the locality in February 2023.

Code of Conduct

11. I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note (2023) and I agree to comply with it. In that regard, I confirm that this evidence is written within my expertise, except where I state that I am relying on the evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

12. In my evidence, I:

- (a) provide an executive summary of my key conclusions;
- (b) summarise the relevant aspects of PC20 with respect to lighting;
- (c) set out an assessment of PC20 with respect to anticipated lighting effects;
- (d) address relevant submissions; and
- (e) Respond to the s42A Report.

EXECUTIVE SUMMARY

13. Rule 10.4.2.14A has been added to the PC20 provisions following notification and submissions to better address lighting effects to the LTB.

14. In my opinion, Rule 10.4.2.14A in conjunction with the other provisions attached to the evidence of Mr Grala and referred to in the evidence of Mr Inger, will ensure that lighting effects within the Bat Habitat Areas (BHA) are negligible or less than minor.

CONTEXT AND BACKGROUND

Site Description

15. The Site is described in detail in the Request for Private Plan Change (as notified 26 September 2022), prepared by Harrison Grierson (**RPPC**).¹ The Site is known as Northern Precinct.

16. The Site includes approximately 41ha of Airport Business Zoned land and approximately 89ha of Rural Zoned land under the Waipā District Plan (**WDP**). The surrounding land use has been described in detail by other witnesses for TPL/RPL and in the RPPC, but includes Hamilton

¹ Northern Precinct – Request for Private Plan Change – Harrison Grierson – July 2022 (doc. ref. R001v11-A2000079-Titanium Park Plan Change)

Airport, Titanium Park (Industrial & Business), Agricultural, Horticultural and large lot residential.

17. There is minimal existing lighting within the Site – generally associated with rural or lifestyle residential with occasional roadway lighting local to certain intersections – typically referred to as ‘flag lighting’. The closest concentration of brighter lighting is the airport apron adjacent the main terminal of the Hamilton Airport and within the associated carpark. There is also some exterior lighting and road lighting within the currently developed Airport Business Zone and navigation marker lights within the airside portion of the airfield.
18. There are very few controls on lighting for the existing Airport Business Zone (including the 41ha existing Northern Precinct) and the Industrial Zone which is north of the Airport) – only limited by Rule 20.4.2.2 of the District Plan.
19. The Southern Links is likely to have road lighting, particularly for the proposed interchange near the site. SH3, SH21 and Southern Links (when built) carry high traffic volumes so headlights are a frequent source of light.
20. The lighting environment is expected to change over time with the introduction of more light sources. The Airport terminal, apron and carpark would best be described as brightly lit.
21. In my opinion, the existing artificial light effects within the site resulting from spill light, glare and sky glow, generated by lighting located within the site and surrounding areas, could best be described as very low. However, this could alter to become low-medium as adjacent areas are developed, particularly with the advent of Southern Links.

OVERVIEW OF THE PLAN CHANGE

22. The Plan Change Request seeks to achieve the co-ordinated expansion of the Northern Precinct within the Airport Business Zone and to enable it to be developed in line with what has been envisaged by the Northern Precinct Structure Plan.
23. Achieving this purpose will require the following changes to the WDP:
 - (a) The rezoning of approximately 89ha of land from Rural to Airport Business Zone;
 - (b) Amendments to the Airport Business Structure Plan contained in Appendix S10 of the WDP;
 - (c) Amendments to the Airport Business Zone provisions that are contained within Section 10;

- (d) Amendments to the Infrastructure, Hazards, Development and Subdivision provisions that are contained within Section 15; and
- (e) Amendments to the Assessment Criteria and Information Requirements contained within Section 21.

24. Within the framework of these changes, a number of new provisions relating to the LTB, including BHAs and new lighting rules, are proposed. Mr Inger addresses the new provisions relating to LTB in his evidence in further detail. My evidence focusses particularly on rule 10.4.2.14A which is a proposed new lighting standard specific to the Northern Precinct. Rule 10.4.2.14A reads:

Rules – Lighting

10.4.2.14A In addition to Rule 20.4.2.2 – Lighting and Glare, the following lighting standards shall apply in the Northern Precinct:

- (a) Added illuminance from fixed artificial lighting (indoor and outdoor) shall not exceed 0.3 lux (horizontal and vertical) at any height at the external boundary of the Bat Habitat Area.
- (b) Where it is within 100m of a Bat Habitat Area, fixed artificial outdoor lighting must:
 - i. Emit zero direct upward light.
 - ii. Be installed with the light emitting surface facing directly down and be mounted as low as practical.
 - iii. Be white LED with a maximum colour temperature of 2700K.
 - iv. In the case of exterior security lighting, be controlled by a motion sensor with a short duration timer (5 minutes).
- (c) Fixed artificial lighting shall not be located within a Bat Habitat Area except where it is for the express purpose of providing lighting for emergency works related to infrastructure operated by an entity that is defined as a lifeline utility under the Civil Defence Emergency Act 2002. The lighting must be white LED with a maximum colour temperature of 2700K, installed with the light emitting surface facing directly down, emit zero direct upward light and be mounted as low as practical.
- (d) The standards in Rule 10.4.2.14A do not apply to vehicle headlights or to lighting associated with aviation requirements for Hamilton Airport.

Activities that fail to comply with Rules 10.4.2.14A will require a resource consent for a restricted discretionary activity with the discretion being restricted over:

- Ecology (Northern Precinct)
- These matters will be considered in accordance with the assessment criteria in Section 21.

25. Rule 10.4.2.14A is proposed to apply in addition to the existing Lighting Rule 20.4.2.2. The latter is primarily intended to provide protection for people, while the former is intended to provide added protection for the use of BHAs by the LTB.

26. Part (a) sets a maximum spill light limit at the BHA boundary of 0.3 lux added artificial illuminance. This is consistent with wording currently proposed for Hamilton City Council

(HCC) Plan Change 5 (PC5), which has been caucused and is now with the hearing commissioners for a decision.

27. This is the key control since it will limit the presence of artificial light in the BHA such that there will be very low levels of light at the BHA boundary which will quickly dissipate to effectively eliminate light spill over a distance of approximately 5-10m. In addition to this, the core habitat areas within the BHAs will be screened through dense buffer planting around the internal edges of the BHA to protect core habitat areas. That being so, it is then immaterial whether lights have a particular colour temperature, are turned on / off, etc. However, additional controls have been included as discussed below to minimise glare and minimise potential deterrents to bat activity within and near identified bat activity areas and corridors.
28. Part (b) establishes further controls within 100m of a BHA. These include glare control (i.e. zero light tilt), blue light content (by limiting colour temperature to 2700K) and turning off lighting when not in use (i.e. using motion-sensor and timer control on security lighting). These measures are consistent with recommendations provided in the Eurobats² and ILP³ guidelines.
29. Part (c) permits only emergency works lighting within a BHA as a practical necessity, but limits the nature of such lighting consistent with the other parts of the Rule.
30. Part (d) clarifies that the Rule does not apply to vehicle headlights nor Airport navigation lights. The latter are part of the existing environment within the airport and are essential for safety. The former is currently present, albeit likely at a lesser degree than would be expected once Southern Links and other developments in the locality occur. However, as acknowledged in the Amberfield Environment Court decision⁴ and addressed during the process of HCC PC5, it is impractical to apply lighting constraints to moving vehicle headlights as there are many variables affecting the direction of the light beam which are not able to be controlled (e.g. slope, change of direction [bends, humps, crossovers, etc], acceleration / deceleration, factory and serving tilt adjustment, cornering, load distribution within the vehicle, towing loads and in some cases automatic light dipping / dimming systems).
31. In Amberfield and PC5, measures were developed by the applicant to help minimise such effects for roads close to the BHA. Hence, as noted in the evidence of Mr Inger, any such measures are proposed to be addressed by the Ecological Management Plan (EMP) which is

² Eurobats Publication Series No. 8 – Guideline for consideration of bats in lighting projects – Voigt et al - 2018

³ ILP Guidance Note 08/18 – Bats and artificial lighting in the UK – a joint Institution of Lighting Professionals (ILP) and Bat Conservation Trust publication - 2018

⁴ Decision [2021] NZEnvC 111 – 30/07/2021

required to include details of how planting and light spill will be managed where transport corridors are proposed to cross BHAs (Rule 10.4.2.14B).

32. An assessment criterion specific to lighting associated with transport corridors is also proposed in Section 21.1.10.18A(b), as follows:

“(b) The extent to which transport corridors are located and designed to avoid or minimise effects of roadside lights and vehicle headlights on nearby Bat Habitat Areas and the bat population within those areas. Where transport corridors are proposed to cross Bat Habitat Areas they should take the shortest route practicable (provided that is the route most likely to minimise impacts), be aligned and designed to minimise the number of existing trees that are required to be removed, ensure lighting is designed to maintain the role and function of the Bat Habitat Area and be designed to enable bats to continue to access the remaining Bat Habitat Areas.”

ASSESSMENT OF LIGHTING EFFECTS

33. Lighting effects related to the LTB are a complex matter as they rely on the expertise of both a Lighting specialist and a Bat Ecology specialist. I have liaised with Ms Cummings in forming my opinions, as well as considering the views of other Bat Ecologists during caucusing.

Public roads

34. Public roadway lighting within the site as required for public safety, will be designed to suit the requirements of WDC, being the local Road Controlling Authority. WDC mandate the Waikato local authority shared services Regional Infrastructure Technical Specifications (RITS) and road lighting design is addressed at section 3.3.20 of the RITS.

35. The RITS requires the use of LED luminaires, optimised spacing, specifies lighting standards, requires 3000K colour temperature and is predicated on minimising glare, spill lighting and sky glow.

36. It will be further constrained by Rule 10.4.2.14A where street lighting will be required to achieve a maximum of 0.3 lux at the BHA boundary and where it is within 100m of a BHA to limit light spill and colour temperature effects to the LTB, with zero tilt and 2700K colour temperature. I consider these outcomes to be practically achievable, although careful consideration will need to be given to the location and spacing of lighting fixtures near BHAs as part of the detailed roading design.

Private property

37. Exterior lighting associated with private property will be constrained by the WDC District Plan Rule 20.4.2.2 in terms of effects on people. It will be further limited by proposed Rule 10.4.2.14A to avoid and minimise light spill into the BHA. As described earlier in my evidence, this will limit lighting effects at the BHA and within 100m of the BHA.

Conclusion

38. In my opinion, the application of the existing Rule 20.4.2.2 and proposed Rule 10.4.2.14A will ensure that lighting effects on people be negligible or less than minor and that lighting within 100m of the BHA will be managed to avoid and minimise light spill within the BHA.

JOINT WITNESS STATEMENT

39. I participated in expert conferencing on 8 February 2023 in relation to Ecology and Bat Habitat, in relation to lighting effects on the LTB and supported the resulting JWS for lighting matters only.

40. Tertia Thurley, a bat ecologist representing DOC, proposed the amendments shown in bold below to Rule 10.4.2.14A;

Rules – Lighting

10.4.2.14A In addition to Rule 20.4.2.2 – Lighting and Glare, the following lighting standards shall apply in the Northern Precinct:

(a) Added illuminance from fixed artificial lighting (indoor and outdoor) shall not exceed 0.3 lux (horizontal and vertical) at any height at the external boundary of the Bat Habitat Area.

(b) Where it is within 100m of a Bat Habitat Area, fixed artificial outdoor lighting must:

i. Emit zero direct upward light.

ii. Be installed with the light emitting surface facing directly down and be mounted as low as practical.

iii. Be white LED with a maximum colour temperature of 2700K and as little blue light as possible.

iv. In the case of exterior security lighting, be controlled by a motion sensor with a short duration timer (~~5 minutes~~ **1minute**).

(c) Fixed artificial lighting shall not be located within a Bat Habitat Area except where it is for the express purpose of providing lighting for emergency works related to infrastructure operated by an entity that is defined as a lifeline utility under the Civil Defence Emergency Act 2002. The lighting must be white LED with a maximum colour temperature of 2700K, installed with the light emitting surface facing directly down, emit zero direct upward light and be mounted as low as practical.

(d) The standards in Rule 10.4.2.14A do not apply to vehicle headlights or to lighting associated with aviation requirements for Hamilton

Airport.

Activities that fail to comply with Rules 10.4.2.14A will require a resource consent for a restricted discretionary activity with the discretion being restricted over:

- Ecology (Northern Precinct)

These matters will be considered in accordance with the assessment criteria in Section 21.

41. Both of the changes proposed by Ms Thurley accord with the intent of both the Eurobats⁵ and ILP⁶ guidelines. While I agree with the intent of the proposed changes, in my view the proposed changes are problematic and unnecessary from a lighting point of view.
42. The wording “as little blue light as possible” is imprecise. Taken to its logical conclusion, the proposed change would result in no blue light. Since white light comprises a mix of blue, red and green light, light without blue content would no longer be white and would reduce visual acuity and reaction times and thus potentially public safety. Commonly available LED lighting fixtures do not have the capability of adjusting or eliminating blue light. While the Eurobats and ILP guidelines are not clearly worded and potentially conflicting in this respect, in my opinion the intent of both guidelines was to limit blue light by ensuring that the highest spectral peak was less than 540nm. In my experience, 2700K LED lights do meet this aim, such that I consider the direction to use 2700K is sufficient to minimise blue light, consistent with the recommendations of the two guidelines. Therefore, I do not support the proposed change.
43. The ILP guideline recommends that “all security lighting should be on motion-sensors and short (1 min) timers”. In my view, it would appear likely that this guideline was targeting residential security lighting, where a resident may have a brief purpose to be outside – for example to access a rubbish bin, call a pet, or the like. Even then, 1 minute is particularly short and may not be sufficient. Motion-sensor security lighting, within an industrial setting, is unlikely to be triggered unless needed for safe movement to undertake a working activity or to highlight an intruder.
44. The Eurobats guideline does not mention timers for security lighting. However, it does contain the following wording;

“A special case may be the root cellars traditionally used in northern Europe for storage of potatoes and other root vegetables over winter. These cellars are also used by hibernating bats such as brown long-eared and northern bats (Vintulis & Petersons 2014). Temporary illumination of the interior of such cellars by light bulbs is tolerated by bats, presumably because the light is switched on for only a

⁵ Eurobats Publication Series No. 8 – Guideline for consideration of bats in lighting projects – Voigt et al - 2018

⁶ ILP Guidance Note 08/18 – Bats and artificial lighting in the UK – a joint Institution of Lighting Professionals (ILP) and Bat Conservation Trust publication - 2018

few minutes at a time (Fig. 2.6), yet long-term or comparative studies on this topic have not yet been undertaken.”

45. In my opinion, 1 minute is impractical and I consider 5 minutes to be more practical. Therefore, I do not support the proposed change.

RESPONSE TO SUBMISSIONS RAISED

46. None of the submitters have established expertise in lighting. Hence, in relation to lighting, any comments are considered those of a lay person.

47. Mr Rex Mason (submission #10) supports the application but has expressed a desire to minimise reflected sunlight and night lighting, and to promote Dark Skies by opposing any visual darkness deterioration. Mr Mason has proposed 4 measures to address his concerns;

- (a) Non-reflective and darkened outer claddings and non-reflective glass on buildings
- (b) Outdoor lighting at low level only
- (c) Roadway lighting at low level only
- (d) Tall dense tree planting along Northern and Western boundaries

48. While high reflectance surfaces can potentially increase light trespass, the existing District Plan district-wide Rule 20.4.2.3 provides suitable control in terms of reflected glare, from both artificial and natural light. The Rule reads;

“20.4.2.3 No buildings shall be constructed and/or left unfinished and/or clad and/or painted in a manner that results in glare.”

49. For lighting within 100m of a BHA, Rule 10.2.1.14A (b) requires lighting to be mounted as low as practical. This is in keeping with recommendations in both the Eurobats and ILP Guidelines. The 100m limit was agreed during the Ecology and Bat Habitat caucusing and resulting JWS.

50. Screen planting for the LTB is addressed in the evidence of Ms Cummings.

51. Hence, in my opinion, the lighting controls as proposed will address Mr Mason’s concerns.

52. Matters raised on the LTB in submissions and canvassed by Bat Ecologists were addressed during caucusing and the resulting JWS. Any remaining matters of disagreement are addressed in my evidence in the “Joint Witness Statement” section.

RESPONSE TO THE SECTION 42A REPORT

53. The Section 42A report supported the proposed lighting conditions and did not propose any amendments.

John Kinross Mckensey
LDP Ltd
28 February 2023