

BEFORE THE HEARING PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Proposed Plan Change 5 to the Operative Hamilton
City District Plan

**STATEMENT OF EVIDENCE OF DR HANNAH MUELLER
(ECOLOGY – BATS, WETLANDS, FRESHWATER BIODIVERSITY)**

Dated 2 September 2022

LACHLAN MULDOWNY
BARRISTER

P +64 7 834 4336 **M** +64 21 471 490

Office Panama Square, 14 Garden Place, Hamilton

Postal PO Box 9169, Waikato Mail Centre, Hamilton 3240

www.lachlanmuldowney.co.nz

INTRODUCTION

1. My full name is Dr Hannah Mueller. I am a Principal Ecologist and Director of Phoenix Ecology. For the purpose of this hearing, I am sub-contracted to 4Sight Consulting, Environmental and Planning Consultants of Hamilton.
2. I hold the qualifications of Bachelor of Arts with Honours (Liberal Arts – Humanities and Life Sciences) from the University of Maastricht, a Master of Social Science with Honours (Environmental Policy), and a PhD in Biological Sciences (Freshwater Ecology) from the University of Waikato.
3. I am a Certified Environmental Practitioner (CenvP) under the Environment Institute of Australia and New Zealand (EIANZ) certification scheme (CenvP certification number 1250).
4. I practice as Principal Ecologist and have eleven years' experience in environmental research and consulting. With a background and experience in terrestrial and freshwater ecology, I specialise in environmental impact assessments, ecological management, mitigation and restoration plans, and terrestrial fauna surveys and monitoring.
5. I have extensive experience in the assessment of ecological effects for land and infrastructure development projects, including impacts on forest, scrub and wetland ecosystems. Many of these projects have involved surveys and effects assessments with regards to Long-tailed bats in particular. I also have experience developing and implementing ecological management plans for large infrastructure projects, including roading infrastructure and residential subdivisions. Projects (and roles) that are of particular relevance to the current application include:
 - a) I have been involved in bat surveys using bioacoustics monitoring and hand-held observations particularly within the Waikato and Auckland regions since 2011. I have led and designed many bat surveying

programmes, including the Hamilton City-Wide annual monitoring 2016–2020.

- b) I have been involved in numerous projects involving the management of bats and implementation of tree removal protocols in the Waikato and Auckland regions. In particular, I have been project manager and lead field ecologist for tree removal as part of the Puhoi to Warkworth ("P2WW") (2016–2018) and Waikato Expressway–Longswamp Section (2016–2017) construction programmes. I have also assisted with the management of impacts on bats through tree removal at the Waikato Expressway–Ngāruawāhia Section (2012–2013) and Hamilton Section (2017–2018).
- c) I have presented expert witness evidence and attended expert conferencing and mediation with regards to bats on behalf of Hamilton City Council (**HCC**) as part of the 2020 Environment Court appeal on the Amberfield residential development.
- d) I have been lead ecologist in a number of wetland assessment and restoration management plans in the Waikato Region. These projects included comprehensive ecological assessment of the wetland including freshwater and terrestrial values, including avifauna and bat surveys, the design of a comprehensive monitoring plan and an ecological restoration plan, addressing issues such as weed management and pest control.
- e) I have prepared and presented expert witness evidence on wetlands, including ecological effects and restoration options, in the Bay of Plenty (2018) and Otago (2020) and Waikato (2022) regions.
- f) I have been lead ecologist for ecological management including vegetation removal and bat management for numerous rural and

urban subdivisions within the Auckland and Waikato regions, which included monitoring, fauna management and compliance reporting.

- g) I regularly provide peer ecological advice to district and regional councils on ecological effects assessments including aspects such as bat ecology, lizard ecology, wetland ecology, freshwater ecology indigenous biodiversity.
6. I am certified as a Class 1 (1.2 & 1.3), Class 2 (2.2 & 2.4 LTB) and Class 3 bat ecologist by DOC under the updated (2020) bat competency framework. This reflects demonstrated competency in deploying acoustic bat monitors (**ABM**), analysing ABM data, identifying bat roosts, and capturing and handling bats
7. I am a member of the New Zealand Freshwater Sciences Society, the New Zealand Ecological Society, and the Environment Institute of Australia and New Zealand.
8. I have co-authored the technical report on bats, habitat use and management requirements on behalf of HCC to inform proposed Plan Change 5 for the Peacocke Structure Plan Area (2020) (**PC5**) (Appendix J to the Assessment of Environmental Effects).
9. I have been involved with the review of submissions and provided ecological advice to update the Plan Change provisions since May 2022.
10. I have co-authored a supplementary technical ecology report¹ that discusses the ecological aspects of the plan provisions, responds to ecological matters of the submissions received and makes further recommendations which is appended to the evidence of Mr Kessels as Attachment 1.

¹ Kessels et al. 2022. Plan Change 5 Technical Ecology Report. Prepared for Hamilton City Council.

CODE OF CONDUCT

11. I have read the Environment Court Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014 and agree to comply with it. I confirm that the opinions expressed in this statement are within my area of expertise except where I state that I have relied on the evidence of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.

SCOPE OF EVIDENCE

12. In my evidence, presented on behalf of HCC as proponent of PC5, I provide a summary of the findings of the bat technical report and briefly discuss ecological values in the Peacocke Structure Plan Area (**PSPA**).
13. I respond to matters raised in submissions with a focus on bat ecology, bat management and monitoring, wetlands and freshwater biodiversity.
14. I also provide comment on the updated PC5 provisions presented at joint witness conferencing on 24 August 2022 (**updated PC5 provisions**), again focused on bat ecology, bat management and monitoring, wetlands and freshwater biodiversity.
15. Some ecological matters are addressed by the other HCC experts, such as offset/compensation which is addressed by Dr Matt Baber; and details regarding identification, location and mapping of Significant Natural Areas (**SNAs**) and Significant Bat Habitat Areas (**SBHAs**), which is addressed by Mr Gerry Kessels. Lighting matters are also addressed by technical lighting expert Mr John Mckensey.

EXECUTIVE SUMMARY

16. The PSPA comprises a range of ecological values, such as a population of threatened long-tailed bats, that require protection from the planned urban development in the area.
17. The proposed PC5 contains a number of objectives, policies and rules that aim to protect biodiversity in that process. Notably, it has set aside a network of areas such as gully systems, riparian areas and pasture to protect, restore and create habitat for long-tailed bats and other terrestrial and aquatic fauna species.
18. I support the updated PC5 provisions and mapped areas of high value habitat as they relate to ecological values. They provide a landscape-scale approach to safeguarding the ecological values, habitats and biodiversity in a currently rural landscape with unusually high ecological values, whilst enabling development required to cater for a growing population.
19. In general terms, submitter comments with respect to ecological matters included:
 - a) Request for more detail in the plan regarding information requirements;
 - b) Broadening of policy objectives to be more encompassing of whole ecosystem protection and ecosystem services;
 - c) Comments regarding the extent and location of identified ecological features and protection areas (addressed in Mr Kessels' evidence);
 - d) Comments with regards to bat ecology and protection, including bat habitat fragmentation, setbacks, lighting effects and vegetation removal;

- e) Comments regarding wetlands, aquatic values, and consideration of further aspects such as fish passage and aquatic ecosystems;
 - f) Comments in regard to financial compensation and offsetting (addressed in Dr Baber's evidence); and
 - g) Comments on management plans and monitoring.
20. Many submitter concerns have been addressed in the updated PC5 provisions as I discuss in the following sections.
21. Several recommendations from the technical ecology reports and made by submitters have not yet been implemented in the updated PC5 provisions. These are discussed in detail in the supplementary technical report, but briefly relate to:
- a) Centralised, standardised bat monitoring across the PSPA;
 - b) Certainty with regards to the exact location and nature of compensation sites (discussed in Dr Baber's evidence);
 - c) A landscape-scale approach to consenting requirements;
 - d) A holistic, 'Natural Character' approach to identify and address adverse ecological effects in a manner that considers all abiotic and biotic values in an integrated, inter-linked fashion and seeks to restore and protect the value of ecological features in the PSPA (discussed in Mr Kessels' evidence);
 - e) A lower area threshold for ecological management and restoration plans required to be prepared for subdivisions (currently > 2 ha).

22. There are several ways recommended to strengthen these provisions further, some of which are addressed by Mr Kessels and Dr Baber. As a key point of my evidence, refinement is required for bat monitoring, which should be adjusted to be centralised, integrated, landscape-focused and should address uncertainty related to cumulative effects.

TECHNICAL REPORT – KEY FINDINGS

23. A population of long-tailed bats regularly use the PSPA for foraging, commuting and roosting. Within the PSPA, the riparian margins of the Waikato River, the Mangakotukutuku Gully and treeland areas containing known roosts trees for bats, are considered to be key habitats for foraging, commuting and roosting. However, to varying degrees, bats are also using a variety of other exotic and indigenous habitats for foraging and/or commuting.
24. This habitat usage is consolidated by a network of exotic and indigenous stands of trees and mature shelterbelts scattered through this largely pastoral environment. These lines of shelterbelts and patchily distributed stands of mature trees enable bats to move around this landscape as they use these features as navigational features to guide them to and from key habitats.
25. The potential impacts on long-tailed bats and their habitats associated with urbanisation of the PSPA area include: Loss and modification of habitat; severance or partial severance of connectivity; disturbance effects such as an increase in artificial lighting; and increases in predation by introduced mammalian animals.
26. Recommended measures to avoid impacts on and protect the local bat population include:

- a) Identification of the key bat habitats within and adjacent to the proposed urban areas, and an understanding of how the bats utilise those habitats;
 - b) Adopting cross-discipline mechanisms and performance standards in urban design and construction to address direct and indirect effects on bat habitats; and
 - c) Implementation of vegetation removal protocols across the entire PSPA applied to identified potential roost trees, and strategies to avoid or mitigate adverse effects of the loss of these trees for bats, including installation of artificial roost boxes or cavity bearing trees, which are protected and maintained as such.
27. Mitigation measures and measures relating to offsetting and compensation opportunities recommended include:
- a) Mechanisms to protect and enhance the structural and functional attributes of existing, restored and re-created 'greenspace' areas within the PSPA which have, either wholly, or partly, been identified as bat habitats;
 - b) Protection and enhancement measures for areas identified as 'key bat habitats' in this report;
 - c) Creation of 'bat buffer zones' adjacent to key bat habitats, at least 20 m in width, with a 5 m setback to buildings, to provide foraging and commuting habitats;
 - d) Creation of linking 'bat corridors', at least 50 m wide (with a 5 m setback on each side) to create connections to high value habitats within and adjacent to the PSPA, wherever possible following existing tree lines and/or gullies;

- e) Buffering from new development of communal roosts by at least 50 m and of non-communal roosts by 25 m;
- f) Early planting of new bat foraging and commuting vegetation, well ahead of development phases affecting bat habitat;
- g) Ecological performance standards relating to artificial lighting and the design, composition, density and height of vegetation needed to create bat habitats, buffers and corridors, including a multi-disciplinary review of current infrastructure design and lighting standards adjacent or dissecting these key habitats; and
- h) Adherence to best practice effects management and offsetting methodologies for evaluating, protecting and recreating bat habitats during the design and impact assessment stages of urban development;

RESPONSE TO SUBMISSIONS

- 28. A detailed response to submissions, including a point-by-point response to the submission made by the Director-General of Conservation (**DGC**), is contained in the supplementary technical ecology report². Here, I briefly summarise the responses to key ecological matters.
- 29. In general terms, submitter comments with respect to ecological matters included:
 - a) Request for more detail in the plan regarding information requirements;

² Kessels et al. 2022. Plan Change 5 Technical Ecology Report. Prepared for Hamilton City Council.

- b) Broadening of policy objectives to be more encompassing of whole ecosystem protection and ecosystem services;
- c) Comments regarding the extent and location of identified ecological features and protection areas (addressed in Mr Kessels' evidence);
- d) Comments with regards to bat ecology and protection, including bat habitat fragmentation, setbacks, lighting effects and vegetation removal;
- e) Comments regarding wetlands, aquatic values, and consideration of further aspects such as fish passage and aquatic ecosystems;
- f) Comments in regard to financial compensation and offsetting (addressed in Dr Baber's evidence); and
- g) Comments on management plans and monitoring.

Information requirements

30. Submissions, in particular by the DGC and Waikato Regional Council (**WRC**)³, requested more detail to be provided regarding information requirements when processing consent applications for development. Further details have now been included in the updated PC5 provisions. This covers requirements for ecological effects assessments and ecological management plans across the PSPA.

Broadening of policy focus on whole ecosystem

31. Submissions by WRC⁴ note that other fauna species aside from bats should also be considered in terms of ecological effects, mitigation, and ecological enhancement. Changes have now been made to the updated PC5

³ Submission 36

⁴ Submission 36

provisions to broaden the scope of the policy objectives and rules around ecological mitigation and restoration plans to include other terrestrial fauna species (PC5 Appendix 1 District Plan Administration, 1.2.2.25), which in my view adequately address the submission and ensure that policy focus is directed to all ecological values, not only bats.

Bat habitat fragmentation

32. Submissions⁵ requested to maximise bat ‘hop over’ habitats and opportunities for any streets intruding or intersecting with bat buffer or corridor habitats (including shelterbelts). While this is difficult to do and no method is proven effective, minimising fragmentation of roads was a major component of Amberfield consenting and a similar approach should be used. This involves minimising any gaps in corridors and maximising canopy cover across roads and applying best design principals to reduce artificial lighting glare from street lamps and car headlamps. The updated PC5 provisions address these matters by requiring bat management plans for all applications within or adjacent to bat corridor and SNAs on this matter.

33. The DGC submission asks for consideration of, and provision for, the buffers and other measures that will be required to protect the SNAs and SBHAs from housing intensification (and Business Centres). We consider that this is already addressed, in part, in the updated PC5 provisions in terms of the lighting restrictions, buffer areas and requirements to apply for consent for land use change as outlined in the updated PC5 provisions. Further amendments may be required to capture all land use change zones, such as sports or community parks with flood lighting, Local Centre Zones and Neighbourhood Zones adjacent to Natural Open Space Zones (**NOSZs**).

⁵ Submission 30, 38

Setbacks and buffers

34. Submissions on development setbacks range between setbacks not being wide enough, and setbacks lacking purpose other than further restricting development. Some do not support buffers as there is no research available to determine how wide they should be. Some submitters also state that having a habitat buffer and setback is unnecessary.
35. The design of the core bat habitat area, the habitat buffer and the development setbacks is clearly outlined in the PSPA Long-tailed Bat report - Appendix J⁶ (**LTBR**) and illustrated in Figure 8 of that report. While there is no research on exactly how wide buffers and setbacks should be, the design accommodates buffering of habitat from urbanisation in a way that it seeks to minimise effects while optimising land use.
36. The recommended 20m buffer habitat and corridors is required to minimise effects of urbanisation such as lighting and noise effects on habitat for species such as bats. As discussed in the LTBR and the evidence of Mr Kessels, the buffer provides some separation of urban activities and core habitat areas and forms a key component of the proposed ecological management measures of PC5 designed to ensure bats and other fauna continue to use the PSPA despite the proposed land use change.
37. The proposed SNAs and buffer zones are adequate to preserve bat habitat assuming lighting/development effects are managed. In addition, buffers provide additional usable bat habitat, whereas the setbacks provide some spatial removal of development and the bat corridor.

⁶ Peacocke Structure Plan Assessment of Environmental Effects - Appendix J, Peacocke Structure Area Plan Change Long-tailed bat report, 4Sight 4 June 2021.

Lighting effects

38. With regard to lighting effects on bats, submissions⁷ are concerned with the risk that 5-storey buildings near bat habitats will cause higher lighting and glare risks to bats, and that effects of glare should be considered for high density buildings. While details of this will be addressed by lighting expert John Mckensey, I understand that lighting impacts on bat habitats depend on the spatial buffer (i.e., physical distance) between edge of building and edge of bat habitat so that there is sufficient space to allow light to diffuse. This is the case at all building heights, whether 2 or 5 stories.
39. As long as the limit of 0.3 lux and suitable colour warmth at the SBHA boundary is complied with at all heights (in accordance with 25.6.4.4), it is my view that no additional considerations need to be given to high density buildings (assuming all design guidelines, setbacks and buffers are adhered to). This is also discussed in the lighting technical report and evidence prepared by Mr McKensey⁸.
40. Submitters⁹ raised concerns regarding lighting at sports parks close to bat habitat areas. I agree that these artificial effects need to be considered no differently than artificial lighting associated with urbanisation, and the same guidelines of light intrusion into bat habitat should apply.

⁷ Submission 16, 38

⁸ Plan Change 5 – Peacocke Structure Plan, Supplementary Technical Report, John McKensey dated 29 August 2022; Statement of Evidence of John McKensey, Attachment 1.

⁹ Submission 38.58

Vegetation removal

41. Submissions¹⁰ request the reference to and use of the DOC-developed Bat Roost Protocols (version October 2021)¹¹ for vegetation removal and consent applications, and I support this comment. As roost protocols tend to change and be updated over time as further information and best practice get developed, the PC5 provisions have been updated to reference the most recent DOC protocols as available at the time (1.2.2.27 E).
42. Several submitters¹² comment that the loss of vegetation should be minimised and avoided in SNA areas. I agree with this statement, and the effects management hierarchy should be followed in all instances where intrusion into mapped SNAs is proposed by consent applications, and unless vegetation removal is in relation to pest species for ecological restoration, removal should be avoided in the first instance.
43. Where vegetation removal cannot be avoided, bat tree-felling protocols (as discussed in paragraph 41 should be applied for trees greater than 15 cm diameter at breast height (**DBH**), and offset or compensation approaches used to determine the replacement planting required to replace the removed vegetation with indigenous plant species and/or other measures which enhance roosting habitat for long-tailed bats and other fauna species as required on a case by case basis.

Wetlands

44. The proposed constructed stormwater wetlands appear to be located outside of the areas we have identified as SNAs or SBHAs in the Peacocke Structure Plan Area: Ecological Significance Assessment (**AESR**), which is

¹⁰ Submission 36, 38, 58

¹¹ Department of Conservation. 2021. Protocols for minimising the risk of felling bat roosts (Bat Roost Protocols (BRP)) Version 2: October 2021 approved by the New Zealand Department of Conservation's Bat Recovery Group

¹² Submission 20, 36, 55

considered good practice from an ecological perspective. However, where constructed wetlands are adjacent to the NOSZs, SNAs or SBHA there may be opportunities to create synergies whereby suitable plantings and physical designs within and around the stormwater wetlands may also be suitably restored to provide functional habitat for native fauna to use. This could complement habitat provision in these areas for species such as bats.

45. Some submissions¹³ focused on the need to protect all wetlands (in line with the National Policy Statement for Freshwater Management 2020), and asked to delineate all wetlands as SNAs. The criteria used to determine significant wetlands in relation to section 6(c) of the Resource Management Act 1991 (e.g. criterion 6 of the Waikato Regional Policy Statement (**WRPS**) criteria), are not the same as those used to determine 'natural wetlands' as defined by the National Environmental Statement-Freshwater, therefore a wetland deemed to meet the natural wetland criteria may not necessarily meet the WRPS criteria, and vice versa. Wetland identification and SNA assessment was a desktop exercise in the AESR. Therefore, where submitters have raised matters in relation to specific SNA identified and mapped wetlands, re-evaluation (which may also require ground-truthing) may be the most robust approach to address the matter in the specific cases where the wetland delineation has been questioned.

Aquatic values

46. WRC submissions¹⁴ noted that restoration efforts should also include fish passage in gully systems, as they too form corridors for aquatic species.
47. Fish passage should be considered for all stream related works, including removing fish barriers as part of any consents for development. References to fish passage have been included in the updated PC5 provisions with

¹³ Sub 36

¹⁴ Sub 36

regards to ecological effects assessment and management plan information requirements (PC5 Appendix 1 District Plan Administration, 1.2.2.25).

48. With regards to aquatic environments, WRC submissions¹⁵ requested further information requirements for management plans. Specifically, they requested:

- a) To add fish species abundance to fish management plans;
- b) To add specific mitigation measures, monitoring plans and responsibilities to fish management plans;
- c) To add sediment quality, aquatic habitat and fish passage to E17 1.3.3 p1.128; and
- d) To add offsetting requirements to 1.3.3 p.158).

49. The submission also requested to require detailed integrated catchment management plans that focus on maintaining and enhancing aquatic habitat and ecological function. Provisions have been updated to reflect further information requirements with regards to aquatic species and management of aquatic habitats (PC5 Appendix 1 District Plan Administration, 1.2.2.25).

Ecological management plans

50. The updated PC5 provisions require an ecological management and restoration plan required to be prepared by a suitably qualified ecologist for subdivisions greater than 2 ha. From an ecological perspective, this area threshold triggering a subdivision consent requirement in relation to ecological matters should be set to encompass as many subdivision

¹⁵ Sub 36

consent applications within the PSPA as practical to ensure the majority of potential ecological impacts of land use change on the ecological values of the PSPA (and significant habitats of bats in particular) are captured by this approach. In this regard, I would recommend a threshold of 0.5 ha rather than 2 ha.

51. Several submissions¹⁶ ask for Ecological Rehabilitation and Management Plans (**ERMPs**) to be required only for public areas, not imposed on private landowners or subdivisions. In my view, development next to a bat habitat area or in fact across the entire PSPA should require the development and implementation of an ERMP for any consent application and subdivision to manage effects of urbanisation of the ecosystem, irrespective of land ownership.
52. WRC submissions request more specificity regarding what an Ecological Rehabilitation Plan entails for subdivision consent (1.2.2.25). Additional details in the plan regarding steps for restoration and planting specifications could provide certainty for all parties, without being overly prescriptive to allow for site-specific restoration measures. All restoration planning should be completed by a suitably qualified and experienced ecologist.
53. Submitters¹⁷ have sought an amendment to the plan provisions that include objectives, policies and rules that prohibit domestic cats within the PSPA to minimise the impact on long-tailed bats and other indigenous fauna species. There is evidence that cats, including domestic cats, predate on bats¹⁸ and may do so both at roost sites and while bats are foraging. I support a full cat ban in theory as the most effective way to minimise harm to indigenous fauna from cats. There may be other mechanisms to ensure

¹⁶ Submission 46, 53

¹⁷ Submission 30, 38

¹⁸ Kerry M. Borkin, Luke Easton & Lucy Bridgman (2022): Bats attacked by companion and feral cats: evidence from indigenous forest and rural landscapes in New Zealand, *New Zealand Journal of Zoology*

domestic cats do not predate on bats while they are in roosts, though minimisation of predation while bats are foraging would require other mechanisms of protection such as keeping cats indoors.

Bat monitoring

54. Several submissions¹⁹ request more specific details regarding requirements for bat monitoring pre- and post- development, in line with the recommendations made in section 4.3 of the LTBR. The technical report contains development-focused monitoring guidelines (Appendix A of the report), developed to provide consistency and rigour to any bat monitoring conducted in the PSPA.
55. I understand that a bat enhancement panel modelled on the Amberfield panel, led by HCC, is proposed and we support this approach. This would ensure that bat monitoring and effects management is done as an integrated and landscape-scale approach. However, the current provisions provide a centralised approach only as it relates to the removal of potential bat roost trees; not across the entire PSPA.
56. I agree that monitoring should follow the guidelines contained in our technical report. Additional wording has been added to the Bat Management Plan requirements in this regard and I support these as they link monitoring obligations to the Bat and Habitat Enhancement Review Panel in Chapter 3A of the updated PC5 provisions.
57. Some submissions oppose bat monitoring²⁰. It is my view that monitoring will be required to effectively assess the impacts of development on this critically endangered species, and I cannot support the absence of monitoring of long-tailed bats in PC5.

¹⁹ Submission 30, 38, 55

²⁰ Submission 13, 14

58. One submission²¹ notes that bat monitoring should be undertaken at a landscape level rather than for individual properties or subdivisions and undertaken by HCC or another body. I agree with this comment. Centralised landscape level monitoring is preferable to account for cumulative effects and monitor changes across the area. It would also be beneficial for consistency and transparency.
59. I agree that it would be preferable to conduct independent monitoring coordinated by a central body rather than monitoring for any particular subdivision or property. The Bat Habitat Enhancement Panel proposed in the updated provisions goes some way towards this aim but is not all encompassing as it is focused only on bats, and only relates to the removal of potential bat roost trees.

UPDATED PC5 PROVISIONS

60. Since PC5 was notified, various amendments have been made to the proposed plan provisions to further support ecological protection and restoration. These amendments include²² the adoption of DOC Bat Roost Protocols for managing removal of potential bat roost trees; further information requirements for Bat Management Plans; the broadening of management plans to cover other biodiversity values in addition to bats such as aquatic species, aquatic corridors and fish passage, and terrestrial fauna; more detailed information requirements for ecological effects assessments; and further refinements to the artificial lighting performance standards. I support these amendments.
61. Several recommendations from the technical ecology reports and made by submitters have not yet been implemented in the updated PC5 provisions.

²¹ Submission 46

²² As documented in the Hamilton City Council Plan Change 5: Peacocke Structure Plan – Expert Conferencing Session #3 ‘Bats and related updated provisions’ - Wednesday 24 August 2022 Topic

These are discussed in detail in the supplementary technical report, but briefly relate to:

- a) Centralised, standardised bat monitoring across the PSPA;
 - b) Certainty with regards to the exact location and nature of compensation sites (discussed in Dr Baber's evidence);
 - c) A landscape-scale approach to consenting requirements;
 - d) A holistic, 'Natural Character' approach to identify and address adverse ecological effects in a manner that considers all abiotic and biotic values in an integrated, inter-linked fashion and seeks to restore and protect the value of ecological features in the PSPA (discussed in Mr Kessels' evidence);
 - e) A lower area threshold for ecological management and restoration plans required to be prepared for subdivisions (currently > 2 ha).
62. Centralised, standardised bat monitoring is now partially included in the updated revisions, but only as it relates to the removal of potential bat roost trees. The establishment of the Bat Habitat Enhancement Panel is supported. It is recommended that this panel be granted an additional function of facilitating a centralised, scientifically robust and consistent approach to monitoring at a landscape scale across the entire PSPA in line with recommendations made in the LTBR.
63. In addition, Appendix 1 of the LTBR included bat monitoring guidelines that should be included in the updated provisions as a starting point for standardising all bat monitoring across the PSPA.
64. As I discuss above, monitoring should be undertaken at a landscape level rather than for individual properties or subdivisions and undertaken by HCC or another body. Centralised landscape level monitoring is preferable

to account for cumulative effects and monitor changes across the area. It would also be beneficial for consistency and transparency.

65. As I discuss in paragraph 50, the area threshold requiring the preparation of an ecological management and restoration plan should be set to encompass as many subdivision consent applications within the PSPA as practical to ensure the majority of potential ecological impacts of land use change on the ecological values of the PSPA (and significant habitats of bats in particular) are captured by this approach. In this regard, from an ecological perspective, I would recommend a threshold of 0.5 ha rather than 2 ha.

CONCLUSION

66. Proposed Plan Change 5 contains a number of objectives, policies and rules that aim to protect biodiversity in that process. Notably, it has set aside a network of areas including gully systems and other ecological features to protect, create and restore habitat for long-tailed bats and other terrestrial and aquatic fauna species.
67. In line with objectives of the Draft National Policy Statement on Indigenous Biodiversity, PC5 provisions attempt to protect indigenous flora and fauna in the area through the process of urban development.
68. I support the updated PC5 provisions and mapped areas of high value habitat as they relate to ecological values. They provide a landscape-scale approach to safeguarding the ecological values, habitats and biodiversity in a currently rural landscape with unusually high ecological values, whilst enabling development required to cater for a growing population.
69. There are several ways recommended to strengthen these provisions further, some of which are addressed by Mr Kessels and Dr Baber. Refinement is required for bat monitoring, which will also increase

certainty around addressing of cumulative effects. The threshold requiring an ecological management and restoration plan for subdivisions could be adjusted to the majority of future land use change is captured by this approach.

70. The establishment of the Bat Habitat Enhancement Panel is supported. It is recommended that this panel be granted an additional function of facilitating a centralised, scientifically robust and consistent approach to monitoring at a landscape scale across the entire PSPA in line with recommendations made in the LTBR.

Dr Hannah Mueller

2 September 2022