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PC9 Technical Ecology Report

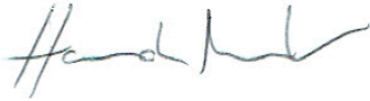



For Hamilton City Council

March 2023



Hamilton City Council
Te kaunihera o Kirikiriroa

REPORT INFORMATION AND QUALITY CONTROL

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1 INTRODUCTION

1.1 Report context

Hamilton City Council has requested 4Sight Consulting (Hamish Dean) and Phoenix Ltd (Dr Hannah Mueller) to prepare this technical ecology report in relation to its Plan Change 9 (PC9) process as it relates to ecological matters and the identification of Significant Natural Areas (SNA) within Hamilton City (excluding the Peacocke Structure Plan Area which has been addressed through the PC5 process). This report:

- Summarises the Plan Change 9 background in respect of ecological matters;
- Summarises the previous SNA identification process and recent review as part of the PC9 process;
- Assesses the appropriateness and adequacy of the updated PC9 provisions with respect to ecological matters, including the protection of terrestrial and aquatic ecological values in an urban context;
- Responds to submitters' comments in respect of ecology; and
- Recommends further amendments of the updated PC9 provisions and maps in relation to ecological matters.

This report should be read in conjunction with the original technical SNA report prepared by 4Sight in June 2022 ('SNA review report'). As the current report is a summary and updated technical ecology review, we have not included all scientific supporting information, full scientific names or a complete set of references. These details can be found in the SNA review report.

1.2 Scope

Building on the initial SNA review report and assessments done to support it, work for this technical report was staged to cover the following scope:

1.2.1 Overview of submissions

HCC has received 140 submissions, raising more than 400 submission points, relating to SNAs, which were collated into categories for them to be more easily addressed by ecological experts.

Roughly 100 properties the subject of submissions on SNA were of a nature that required further investigation to clarify the current vegetation boundaries. For most sites this consisted of a desktop appraisal and, where landowner permission was granted, a site visit to ground-truth the SNA overlay.

1.2.2 Assessment of SNA extent in response to submissions

Where submissions were made, sites were first assessed based on aerials, and then through a site visit unless it was deemed unnecessary (e.g., if very detailed photos and information were provided by the submission). An assessment was then made as to whether the linework is accurate, or whether features such as lawns, buildings, or single trees or orchards have been captured (see following point for consistency in the assessment approach).

1.2.3 Ensuring a consistent approach to any changes to SNA extent

When assessing individual properties for any changes to SNA extent, as discussed above, consistency was required across the assessments. The key objective of the SNA identification from the outset was to protect

and set aside areas that provide habitat for indigenous species, including fauna species. For these areas to continue to provide habitat, aspects such as corridor, buffering and connectivity functions need to be considered alongside biodiversity values.

Decision-making was broadly based on the following criteria:

- Have any areas of lawn, buildings or orchards been misidentified?
- Is the location of the SNA justified based on the area providing a corridor or buffer, including maintaining sufficient width and extent of gully arms to ensure they continue to function as habitat, and buffer habitat from urbanisation effects?
- Is the location of the SNA required to avoid incremental dilution of the city-scale approach?

No extent of SNA was recommended for removal unless it clearly was misidentified along the criteria provided above.

1.2.4 Recording of information

HCC provided a spreadsheet containing submission information, including property owner details, relief sought, and any additional information relevant to the site. Each property was assessed (in line with the criteria provided above), and information on the vegetation and habitat and any recommendations were recorded in ArcGIS Field Maps. Field visit notes were then transferred to a spreadsheet and reviewed, before a final recommendation was made. Recommendations following the site visits are recorded in Appendix A and field visit notes and photographs are available.

1.3 Background and statutory context

PC9 is proposed to create a new policy framework for Hamilton City designed to identify and protect Hamilton's heritage and natural environment, while supporting future development to meet Hamilton's growth targets.

Regarding ecological matters, PC9 has reviewed Significant Natural Areas and Notable Trees. The Significant Natural Areas (SNA) previously identified was based on mapping work completed in 2010 and covered only areas of indigenous flora and did not necessarily include areas of significant habitats for indigenous fauna. PC9 seeks to address this gap as the Hamilton City district includes other vegetation areas (predominantly in gullies and along the Waikato River) that are the habitat for several threatened and/or regionally uncommon indigenous animal species, notably long-tailed bats.

PC9 has considered policy and rules to protect significant indigenous vegetation and significant habitats of indigenous fauna consistent with the RMA, with policy direction from a range of documents. These include the Waikato Regional Policy Statement (WRPS), the Draft National Policy Statement - Indigenous Biodiversity 2022 (NPS-IB), the National Policy Statement on Freshwater Management 2020 (NPS-FM) and the National Environmental Standards – Freshwater (NES-FW, Sept 2020) in particular.

2 SUMMARY OF ECOLOGICAL CONTEXT OF HAMILTON CITY

Hamilton City is New Zealand's largest inland city (c. 11,000 hectares), with a population of about 160,000 people. A major landscape feature of the city is the Waikato River, NZ's longest river that bisects the city area for a length of 16 km. The city has more than 1,000 hectares of open space, spread over 145 parks (Hamilton City Council 2021) (Figure 1).

The Mangakotukutuku and Mangaonua gullies situated along the southern urban-rural interface of Hamilton City are the largest of the four gullies and, together with the Waikato River, form the single largest and most continuous ecological corridor in Hamilton. Conversely, the Kirikiriroa and Waitawhiriwhiri gullies are situated within the urban matrix in highly developed areas in the northern part of the city.

Hamilton is located within the Waikato basin and the Hamilton Ecological District (ED). The Hamilton ED has been classified as lowland bioclimatic zone. Due to the sheltered inland location of the Waikato basin, seasons consist of mild winters, warm, humid summers, and frequent fog.

2.1 Geomorphology

Hamilton City is comprised of four main landform units: gullies, hills, alluvial plains, and peatlands. In the past most of these areas were dominated by indigenous forest.

The Hamilton Basin, within which Hamilton City is situated, is a major inland basin comprising alluvial plains with extensive Holocene peatlands and minor lakes. Quaternary sedimentary rocks include pumiceous sand, silt, and gravel with interbedded peat. Old alluviums which are part of the Hinuera surface soils were carried down by ancestral Waikato River from the central volcanic plateau (McEwen 1987).

2.2 Vegetation

Very little vegetation remains within Hamilton City following extensive clearance since the area was settled c. 1,000 years ago (Newnham et al. 1989). Hamilton City was progressively converted to farmed pasture and in more recent times to dense residential properties with only a handful of original forest and wetland habitats remaining.

Leathwick et al. (1995) calculated the decline in indigenous vegetation since 1840 and current percentage cover. While Hamilton City makes up only 7% of the Hamilton ED, it is estimated that since 1840, the Hamilton ED has had a 97.8% reduction in indigenous vegetation. Percentage cover of indigenous vegetation in 1995 was about 1% forest and less than 1% scrub and wetland for the entire Hamilton ED. Wetlands and conifer forests were the dominant ecosystems of Hamilton ED before human settlement (Harding 1997). These two ecosystems also suffered the highest percentage reduction through anthropogenic activities (Corney et al. 2012).

Following a more recent study of vegetation/habitat types within Waikato Region, a total of 152 ecosystems were identified across the Waikato Region, with ten terrestrial vegetation types within Hamilton ED. Of these ten terrestrial vegetation types, seven are currently under-represented with less than 10% of their original extent remaining. Kauri, podocarp, tawa forest (WF11.2) and swamp mosaic wetland (WL) are considered not under-represented, as more than 20% of their pre-European extent remains.

Of note is that kanuka scrub/forest (VS2) has been identified as a recent vegetation type and did not exist in pre-European times.

New Zealand's longest river, the Waikato River, is a key feature of Hamilton City. This wide single-path river cuts Hamilton City in two with its deep channel and provides an ecological corridor for the movement of both indigenous and exotic wildlife. The forest remnants scattered throughout the city and form steppingstones for flying species to move around the densely urbanised landscape. The large area of Waiwhakareke Natural Heritage Park is in the process of becoming an important refuge for indigenous fauna.

Hamilton City, and particularly the gully network has been subject to a significant amount of ecological restoration activity by community groups, individuals and Council over the last 20 years or so. This has resulted in increased indigenous vegetation cover, improved quality of habitat, better public access to natural areas and a significant increase in public awareness of the value of urban biodiversity. Furthermore, Hamilton City Council has recently launched its Nature in the City project which aims to achieve 10% indigenous vegetation cover within the city. This will be reliant on restoration of gullies, reserves and waste areas to meet that target. It is therefore vitally important that the SNA provisions do not inadvertently slow or complicate restoration of indigenous ecosystems, whether on private or public land.

2.3 Fauna

2.3.1 Long-tailed bats

Hamilton is one of only a few cities in New Zealand where long-tailed bats are known to persist in an urban landscape. While roosting habitat has been confirmed only in a few places in the southern parts of the city, various levels of activity have been detected throughout the city.

Habitat where bats continue to be detected are primarily the large gullies in the southern parts of the city which are largely still connected (Mangaonua, Mangaone, and Mangaharakeke gully systems). However, bats continue to be detected sporadically and in a low number of detections in some of the gullies in the north of the city, including Mangaiti Gully and Te Awa O Katapaki gully. Bats are known to be roosting within some of these gullies, near the Waikato River, and within shelterbelts set within an open pastureland landscape in the southern parts of the city (Davidson-Watts 2019).

Riparian margins along the Waikato River, particularly in the southern parts within Hammond Bush also see regular and consistent bat activity throughout the survey seasons.

Forest remnants such as Te Papanui - Claudelands Bush and Southwell Park in the east and Farnborough and Dinsdale Park in the west of the city see irregular bat activity.

2.3.2 Avifauna

The diverse landscape of Hamilton City provides habitat for a great number of indigenous avifauna species. New Zealand falcon (*Falco novaeseelandiae ferox*; At Risk – Recovering, Robertson et al. 2021) and kākā (*Nestor meridionalis septentrionalis*; At Risk – Recovering) have been recorded at various locations within forest or gully habitats. While these birds have been reported on various occasions, they are only sporadic visitors of the city, and it is unlikely that nesting habitat currently exists within the city. Many common

forest birds are present within gully habitats and forest remnants. Bellbird (*Anthornis melanura melanura*) and Australasian shoveler (*Anas rhynchos*) have been recorded in the city. These species are common in other parts of the country but are Regionally Uncommon within the Waikato Region.

Peatlands including their associated wetlands and lakes provide habitat for several wetland birds and waterfowl.

Several shag species have been reported along riparian river margins. While these species may not be nesting within Hamilton City, the river provides important feeding grounds for them.

Gullies in Hamilton are critical remaining habitat for preserving avian biodiversity, which has historically been under threat from urbanisation through substantial levels of habitat loss. Recent research has shown that habitat loss is a key driver of indigenous bird species richness and abundance (Elliott 2022). Preserving and restoring habitat availability, including maintaining buffers and corridors, is key to maintaining and enhancing avian biodiversity across the city.

2.3.3 Herpetofauna

Few herpetofauna species are known to be present within the urbanised landscape of Hamilton City. Besides the exotic plague skink (*Lampropholis delicata*), copper skink (*Oligosoma aeneum*; At Risk – Declining, Hitchmough et al. 2021) have been recorded. Copper skink reside in forest or open areas that are shaded and have adequate groundcover such as logs, rocks, long grass, or deep leaf litter. While their natural habitat exists within gullies and forest remnants, copper skink now also inhabit urban areas and are regularly found in compost heaps.

2.3.4 Fish

Throughout Hamilton City, branching off the Waikato River are a series of gully systems, including the four major gully systems of Kirikiriroa, Mangakotukutuku, Mangaonua and Waitawhiriwhiri, and numerous minor systems. Waterways in the bottom of those gullies, as well as the Waikato River itself provide an extensive habitat network for indigenous fish species. Besides indigenous fish species, a wide range of exotic/pest fish species are present.

While most fish species are found to be present within well-defined stream channels, black mudfish (*Neochanna diversus*, At Risk – Declining, Dunn et al. 2018) are known to be present in heavily degraded and isolated drains or wetlands within the city. Known locations are present in the north, north-east, and the south-east of the city, where specific surveys were done as part of consent requirements.



Hamilton City

Legend

Hamilton City Boundaries

Client: Hamilton City Council

Project Code: 10252

Date: 15/12/2021

Version: 1.1

Author: MK

Approved: WM

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CONSULTING

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Figure 1 Hamilton City Boundaries

3 ASSESSMENT OF ECOLOGICAL SIGNIFICANCE

The identification of SNAs for the PC9 process was initially a desktop exercise, with some ground-truthing occurring in later stages. A detailed methodology is provided in the original SNA report but is broadly as follows.

Datasets of potential sites were created using the existing SNA layer as well as the Biodiversity Inventory geospatial layer which was created by Waikato Regional Council and describes vegetation types across Hamilton city.

Each potential SNA was assessed against the 11 WRPS significance criteria to determine if the site was significant or not. Each site was assessed as either 'Significant', 'Not Significant', or 'Indeterminate'. The assessment of each criterion followed Table 1 of the assessment guidelines (WRC & Wildland Consultants, 2019). Each assessment was also assigned a level of confidence according to the quality of the data used to make the assessment.

If a site was found to tick at least one significance criterion (following Tables 1-3 of the Framework guidelines), it was further assessed to determine a level of significance, i.e., 'International', 'National', 'Regional', or 'Local', in a Waikato Region context following Table 2.1 of the guidelines (WRC & Wildland Consultants, 2019 – in prep.).

In assessing each site, a range of resources were used, including databases of flora and fauna observations, published reports, oblique photographs, and high-resolution aerial imagery.

An important aspect to note is that sites were assessed at the whole-site scale and judgements were made at the time of the assessment on how particular data such as species observations related to the entire site. For example, if long-tailed bats were recorded in part of the site or nearby, they were generally considered to utilise the whole site because they are highly mobile and feed over a wide area. Furthermore, if part of a site included indigenous wetland habitat, or an under-represented vegetation type, this influenced the assessment for the whole site, even for parts where the vegetation was different. This approach recognises the importance of connectivity, size and shape in maintaining ecosystems. The alternative is to take a reductionist approach and assess sites on a property-by-property basis. This is less ecologically defensible and would likely result in a much more fragmented SNA network.

The significance of the gully network

All Hamilton gully systems include large areas that are dominated by exotic, often very weedy vegetation. In almost all cases however these gullies have been assessed as ecologically significant for one or more of the following reasons:

- They provide habitat for Threatened or At-Risk fauna (Criterion 3). Long-tailed bats are common in the southern part of the city and have been recorded less frequently, but relatively consistently, across the rest of the city. Fish species such as longfin eel are also found in many of the gully streams. Records of these species are relatively limited and some assumptions have been made about their likely distribution in assessing some SNAs.
- They contain a network of streams connecting directly to the Waikato River which together provide habitat critical to aquatic fauna (Criterion 8). This network of streams provides feeding, rearing, and in some cases breeding habitat for indigenous fish and invertebrates which, in contrast to waterways in much of the agricultural hinterland, is often protected by riparian vegetation which provides a range of ecological functions. Riparian vegetation also protects seepage habitat where groundwater emerges

into the gullies which often provides habitat for wetland plants and aquatic invertebrates (Collier et. al. 2009).

- They provide a corridor for indigenous species (Criterion 11) necessary to protect another SNA. In most cases gully vegetation, whether indigenous or not, protects waterways (often significant in their own right) which flow into the highly significant Waikato River. However, the Hamilton gully network, together with non-gully sites such as Te Papanui (Jubilee Park), Lake Rotoroa and Waiwhakareke, also provide valuable habitat and refuge for indigenous fauna living in and traversing the city and dispersing out from nearby natural areas under intensive pest management.

4 CONTEXT OF RELEVANT NATIONAL POLICY DIRECTION

4.1 National Policy Statement on Indigenous Biodiversity

The NPS-IB exposure draft (released in June 2022) provides important direction for this Plan Change with regards to the objectives to protect, maintain, and restore indigenous biodiversity¹. Policies of particular relevance to PC9, include:

- **Policy 3:** A precautionary approach is adopted when considering adverse effects on indigenous biodiversity.
- **Policy 5:** Indigenous biodiversity is managed in an integrated way, within and across administrative boundaries.
- **Policy 6:** Significant indigenous vegetation and significant habitats of indigenous fauna are identified as significant natural areas (SNAs) using a consistent approach.
- **Policy 7:** SNAs are protected by avoiding and managing adverse effects from new subdivision, use and development.
- **Policy 8:** The importance of maintaining indigenous biodiversity outside SNAs is recognised and provided for.
- **Policy 13:** Restoration of indigenous biodiversity is promoted and provided for.
- **Policy 14:** Increased indigenous vegetation cover is promoted in both urban and non-urban environments.
- **Policy 15:** Areas outside SNAs that support specified highly mobile fauna are identified and managed to maintain their populations across their natural range, and information and awareness of specified highly mobile fauna is improved.
- **Policy 16:** Regional biodiversity strategies are developed and implemented to maintain and restore indigenous biodiversity at a landscape scale.
- **Policy 17:** There is improved information and regular monitoring of indigenous biodiversity.

Wording in the NPS-IB specifically states that ‘Significant indigenous fauna habitat is that which supports the typical suite of indigenous animals that would occur in the present-day environment. Habitat of indigenous fauna may be indigenous or exotic.’, thereby giving direction to protect habitats for indigenous fauna whether it features indigenous or exotic vegetation.

These policies have been considered in guiding the development of plan provisions (acknowledging that the final gazetted NPS-IB wording is uncertain), especially for protecting biodiversity, using the precautionary principle, providing a landscape-scale approach, and increasing indigenous vegetation cover.

4.2 National Policy Statement on Freshwater Management

The National Policy Statement on Freshwater Management 2020 (NPS-FM) and the National Environmental Standards – Freshwater (NES-F, Sept 2020) provide direction to local authorities on how to manage freshwater resources. The objective of the NPS-FM is to manage resources in a way that prioritises *the health and wellbeing of water bodies and freshwater ecosystems, the health needs of people and the ability*

¹ Although the exposure draft does not have statutory effect, it indicates Government’s current national policy direction on indigenous biodiversity.

of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

Policies of particular relevance to PC9, include:

- **Policy 3:** Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.
- **Policy 5:** Freshwater is managed (including through a National Objectives Framework) to ensure that the health and well-being of degraded water bodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is maintained and (if communities choose) improved.
- **Policy 6:** There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted.
- **Policy 7:** The loss of river extent and values is avoided to the extent practicable.
- **Policy 8:** The significant values of outstanding water bodies are protected.
- **Policy 9:** The habitats of indigenous freshwater species are protected.

These policies have been considered in guiding the development of plan provisions, in setting aside and protecting areas with freshwater values such as the Waikato River corridor, wetlands, and gully systems (including areas buffering and connecting these systems) as Significant Natural Areas.

5 RESPONSE TO SUBMITTERS

5.1 Overview

The below outlines a summary of submitter responses that relate to ecological matters. Appendix A includes more detailed recommendations to individual properties and submissions, where further site investigations were conducted to address the relief sought by submitters.

Most submitters were generally supportive of the objective to identify and protect areas for biodiversity across the city. However, many submissions request a revision or complete removal of the SNA overlay from private property for a range of reasons.

Broadly, there were three key themes of submissions with respect to ecology and biodiversity:

- Submissions with regards to the extent or significance of SNAs on private land;
- Submissions with regards to SNA provisions, requesting changes to rules and consenting requirements;
- Submissions requiring more effective and/or extensive protection of biodiversity values, such as long-tailed bats (Department of Conservation (DOC)), vegetation removal (DOC, Waikato Regional Council (WRC)), control of pest species (WRC), and freshwater values.

While we summarise key points of submissions in the sections below, detailed responses to submissions with regards to SNA extent are presented in Appendix A.

5.2 Extent of Significant Natural Areas

Many submissions were directed to the extent of Significant Natural Areas identified by PC9. In this respect, many submissions either sought relief by way of reduction of extent, or complete removal of the SNA from a specific property.

As part of the plan change process, where such submissions were made, additional site visits were conducted to ground-truth the overlay and ascertain whether assignment of SNA status was correct. Criteria for this assessment are outlined in the introductory section above (Section 1.2.3). In total, 89 site visits were conducted in response to submissions and 31 sites were recommended to be changed as a result.

Underlying the assessment was the approach discussed in Section 3. Important considerations for SNA extent included the key aspects outlined in Section 1.2.3 of this report.

Details of the additional site visits conducted to ground-truth SNA areas including ecological assessment results and recommendations, are available and the resultant recommendation is included in Appendix A.

5.2.1 Gully systems and corridors

As discussed in Section 3, Hamilton's gully systems provide critical habitat for indigenous flora and fauna in a highly modified urban environment, and have allowed threatened species such as long-tailed bats and mudfish to persist despite urbanisation. This includes areas that appear to be of lower ecological values as they can be dominated by exotics and sometimes weedy plant species. Regardless of whether exotic-dominated or indigenous, these gully systems play an important role for fauna species in a wider landscape context.

Protection of these areas through SNA rules and provisions also maintains the restoration potential of these areas, so that they can be restored to more indigenous-dominated plant communities in future.

In the case of Hamilton's gully systems, preserving these fauna habitats and protecting them from further urbanisation effects also requires maintaining corridors (including streams and other linkages) and buffers (including exotic vegetation) from further encroachment.

5.2.2 Cumulative effects

Cumulative ecological effects are changes to an ecosystem caused by one action in combination with other actions that can be in the past, present, or future. In the city-scale context of Hamilton's Significant Natural Areas, this can mean that even small changes to an ecosystem in a specific area can have a wider effect in a system and landscape context. Small, incremental reductions in size of an SNA, increased fragmentation, and reduction in width of corridors all can have substantial effects on the habitat function and resilience of these systems.

Due to these cumulative effects, further encroachment into gully systems by urbanisation needs to be avoided to preserve the function of SNAs as habitat for indigenous flora and fauna across the city, and requested changes to SNA extent were considered in this context.

5.3 SNA rules and provisions

Most submissions commented on the rules and provisions as they related to identified SNAs. Concerns covered a wide range of areas including vegetation removal, pest control, planting and the installation of infrastructure such as pathways, walkways and cycle paths.

We have provided ecological inputs to the rules and provisions as part of this process. We will be providing detailed responses on matters raised on provisions to inform the final s42A planning recommendations on each submission.

At a high level, our recommendations are that rules and provisions need to protect the ecological values that were identified as part of the SNA areas. Rules that do not meet this objective are, from an ecological perspective, not in line with this intent.

Plan change rules need to protect ecological values such as bat habitat, and enable habitat restoration to ensure ecological values are preserved in the long term. For example, in a corridor SNA where bat habitat is the primary factor for the ecological significance designation, habitat restoration should be encouraged and facilitated, providing there is no destruction of bat roost habitat or other short-term loss of habitat value.

5.3.1 Restoration activities

We recognise that there is a need to guide restoration activities in SNAs. While often well-intended, restoration that for example involves the clearance of large areas of exotic vegetation without careful planning can severely fragment habitat, threaten bat roosts, and create negative ecological outcomes where positive results are intended. Due to that risk, we recommend that restoration in SNAs is always guided by a restoration plan prepared by a suitably qualified ecologists and approved by council.

A balance also needs to be achieved between removing pest and exotic plant species from gullies, while preserving those trees that potentially provide, or could in future provide, suitable roosting habitat for bats.

We have therefore recommended adjustments to the provisions that enable pest plant removal while safeguarding potential roost trees in SNAs.

5.3.2 Infrastructure

Some submissions were made with regards to the installation of infrastructure such as small structures, fences, and pathways within SNAs. DOC raises concern about the appropriateness of constructing public walkways and cycleways within floristic SNAs (fSNAs), and seeks protection of these areas from their potential effects.

We acknowledge that while allowing public access into gully systems and SNAs is beneficial to allow for restoration and enjoyment by the public, installation of infrastructure also has a risk of disturbing and fragmenting the ecosystem. We have recommended that the installation of small structures, and small unlit pathways for the purpose of restoration are not at risk of compromising ecosystem function.

However, larger infrastructure such as public walkways, park benches and cycleways have more potential to create adverse effects through lighting requirements. There is also a potential conflict between safe use of these features, and the presence of mature trees and vegetation that may need to be removed now or in future for safety purposes. This could compromise ecosystem function, through the removal of potential bat roost trees that are already of limited availability in the city, and that often are mature, damaged or dead trees that have the highest risk in terms of public safety. To avoid this risk, we have recommended that these infrastructure features enabling public access are not appropriate in many situations in fSNAs and should be carefully managed in corridor/indigenous fauna habitat SNAs (cSNAs) to avoid habitat loss and fragmentation.

5.4 Further biodiversity protection

Several submissions (such as from DOC and WRC) are seeking further protection of terrestrial and biodiversity freshwater values.

5.4.1 Restoration

DOC's submission for the plan requests more effect to be given to Section 6c of the RMA, and for a focus to be on restoration rather than effects management. While we agree that restoration is a valuable ecological outcome for Hamilton's SNAs, we do not recommend any changes to PC9 in that respect and defer any questions with respect to giving effect to the RMA to planning experts.

WRC seek amendments in rules and provisions to allow the wider community to be able to undertake activities to control harmful organisms as part of restoration projects. WRC submits that the definition of pest control is amended to include any pest species able to cause an adverse effect at the site or wider environment. We agree that pest control is a critical activity to restore Hamilton's SNAs, especially the gully systems, and this activity should be enabled by the plan.

In general, we strongly support the intent of providing for and encouraging restoration activities within SNAs while controlling activities that fragment or degrade habitat for indigenous flora and fauna.

5.4.2 Freshwater systems

With respect to freshwater systems, DOC submits that mudfish habitat is currently unprotected where habitat falls outside of identified SNAs, such as farm drains. In the Hamilton area, mudfish are often found in degraded systems such as open farm drains, and DOC submits that the lack of protection of habitat for this threatened species needs to be addressed through PC9.

We agree that mudfish habitat qualifies as SNA and should be appropriately protected. Protections for waterways through the proposed PC9 SNA provisions are limited to restrictions on vegetation clearance and earthworks which provide some control of direct and indirect impacts on waterways from development. Provisions have not sought to control other impacts on waterways through development such as the discharge of stormwater or runoff into SNA waterways, however this may be adequately controlled through regional policy and rules.

5.4.3 Lighting and glare

DOC's submission requests further rules and provisions to protect potential bat habitat from the effects of lighting and glare.

We support lighting controls limiting additional lighting intrusion into SNAs while working within the constraints of existing lighting in urban areas. We consider that a 0.3 added lux limit as received at the boundary of an SNA would be an appropriate control, from the perspective of minimising additional effects on bat habitat.

We also would recommend referring to key principles of minimising lighting effects on wildlife in the plan. Based on international guidelines (UK Bat Conservation Guidelines, EUROBATS Guidelines and Australian Light Pollution Guidelines for Wildlife), we recommend the following principles to be required for any new lighting that may affect an SNA:

- Using lighting only where required;
- Adaptive lighting controls, such as dimmers and motion sensors wherever possible, such as for security lighting;
- Keeping lighting intensity low, with a limit of 0.3 lux emitted at all property boundaries facing any potential bat roosting areas, such as the forest remnants;
- Screen planting where vehicle lighting could affect potential bat roosting and foraging areas;
- Choosing warmer colour lighting with a colour temperature of no more than 2700 K for public lighting, and no more than 3000 K for residential lighting;
- Using downwards facing lighting that is close to the ground and avoids upwards light spill;
- Avoiding bright, reflective surfaces, if they are likely to cause upward obtrusive light.

5.4.4 Offsetting and compensation

DOC's submissions requests for clearer guidance on the use of offsetting and compensation as part of ecological effects assessments and management for resource consent applications that have the potential to adversely affect SNAs.

We support the rules around compensation and offsetting that are in line with the effects management hierarchy and compensation and offsetting guidance of the NPS-IB (Appendix 3). We also agree with the submission that reference should be made within the plan in the information requirements section, to current best practice guidelines on offsetting and compensation.

6 RECOMMENDATIONS

We have made several recommendations for adjustments in the PC9 rules and provisions, as well as the extent of some SNAs as part of the geospatial dataset following a ground-truthing exercise.

SNA extent

As part of the plan change process, where submissions with regards to SNA extent were made, additional site visits were conducted to ground-truth the overlay and ascertain whether the assignment of SNA status was correct. In total, 89 site visits were conducted in response to submissions and 31 sites were recommended to be changed as a result.

Restoration

We recommend that further changes should be made to the rules with respect to pest control, to ensure that this activity is enabled and clearly guided by the rules in a way that good ecological outcomes are supported and achieved. We further recommend that the installation of small structures, and small, unlit pathways for the purpose of restoration are enabled to ensure gully and SNA access for restoration purposes is possible.

Mudfish habitat

We recommend that further consideration be given to any changes that should be made to PC9 in regards to the protection of potential mudfish habitat.

Infrastructure

We recommend that further changes to the provisions are required to clearly address what activities with respect to public access to SNAs (e.g. walkways, cycleways) are appropriate. These should be controlled in a way that there is no additional light intrusion into SNAs, and that no future conflicts are created between public access and the requirement to protect potential bat habitat or potential bat roosting trees.

Lighting

We recommend the addition of further provisions to limit the effects of light intrusion of any new lighting on an SNA. We also recommend the reference to best practice design principles to limit effects of any new lighting on wildlife in the vicinity of SNAs.

Offsetting and compensation

We recommend the inclusion of reference to best practice offsetting and compensation guidelines to provide clearer guidance on biodiversity offsetting and compensation as part of effects management of any new resource consent applications that have the potential to adversely affect SNAs.

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Appendix A:

**SNA extent recommendations for individual properties following
groundtruthing site assessments**

Submission	Ecological Recommendation	Comment or justification
4.1	Draw SNA along property boundary	No significant vegetation within property. Overhanging poplar makes it look like there is vegetation cover on the aerial.
6.1	Retain SNA extent as notified	Gardens should be excluded but already appear to be outside SNA boundary.
13.1	Remove property from SNA	Only gardens and one or two trees within this property. Aerial photo captures a large poplar that is no longer there.
22.1	Remove property from SNA	Lawn and garden with one or two larger trees. May provide some buffering to adjacent vegetation in park but exclusion will not adversely impact the integrity of the overall site.
23.1	Retain as notified	Although it includes exotic vegetation it is a relatively large area and contributes to the ecological integrity of the wider SNA
24.1	Adjust boundary to exclude some grass areas	This SNA is largely exotic but provides buffering to a natural stream and links via the stream to C83 and eventually the Waikato River. Some mown lawn areas can be excluded.
28.1	Remove this polygon of SNA	This area is only 5-10m wide and comprises a steep slope with scattered trees and shrubs over a weedy groundcover tier. It was assessed as part of a much larger SNA but is not actually connected to that site and the justification used for the wider site does not apply.
29.1	Retain as notified	Part of larger SNA with vegetation that supports the values identified including buffering of the stream and habitat for bats.
34.1	Retain as notified	Only a small area but part of a wider area of vegetation with ecological value.
41.3	Retain as notified	Submitter is supportive.
50.1	Retain as notified	Submitter is supportive.
55.1 55.2	Retain as notified	Vegetation contributes to the values of the SNA including buffering the stream and forming part of a corridor.
62.1	No change required	Already excluded from SNA
63.1	Retain as notified. This submission is more focused on the rules associated with the SNA	Vegetation contributes to the values of the SNA including buffering the stream and providing potential bat habitat.
65.1	Retain as notified	Includes native and exotic vegetation (albeit planted) that supports the values identified in the wider SNA.
67.1	Retain as notified	Provides buffering to wetland and other values of the rest of the SNA.
68.2	Adjust boundary to exclude vegetable and other gardens	Site visit confirmed vegetable garden had been included and proposed new line was roughly drawn onsite and refined in the office.
72.1	No change required	SNA covers all vegetation below the house.
85.2	No change required	Area not assessed as significant. Landowner should pursue other means to protect trees such as QEII or private covenant.
88.1	Retain as notified	Site visit refused, not further assessment possible.
89.1	Remove edge area	Edge area to be excluded as this includes exotic garden beds.
107.1	Adjust to match indigenous planted vegetation assessed during site visit	The area to be excluded is predominantly pasture and modified as a stormwater system, whereas downstream has been planted with native wetland and riparian plants.
114.1	Adjust boundary to exclude retaining walls	Part of a much larger area of SNA which provides habitat for fauna and buffer for the Bankwood Stream. However, a retaining wall has been included in the SNA and should be excluded.
119.1	Remove property from SNA	Has been cleared of vegetation.

Submission	Ecological Recommendation	Comment or justification
126.1	Minor adjustment to edge	Change made to exclude fruit trees.
128.1	Retain as notified	This was a submission on the rules rather than the extent.
135.1	Retain as notified	Although planted, this site provides a buffer to the Waikato River as well as habitat for indigenous fauna. Criterion 10 (ecological sequence) was mis-applied to this SNA.
147.1	Adjust boundary to exclude lawn/garden and play area	Lawns and gardens should not be included.
157.1	Adjust SNA boundary	Tyre retaining wall for most of site, proposed edge will more accurately reflect the edge of the continuous vegetation.
165.1	Adjust boundary to exclude garden and specimen tree	Part of a much larger SNA site with multiple values but needs to exclude gardens.
180.2	No change required	No address given and no further assessment possible.
188.3 188.4 188.5	Retain as notified	These SNAs have multiple ecological values and even the exotic weed dominated cSNA areas on the upper slopes provide both habitat for fauna and buffer for higher quality vegetation and the stream.
194.1	Retain as notified	No ecological grounds for change.
197.1	Retain as notified	Weedy, non-woody vegetation but consistent with remaining part of SNA
198.1	No change required	No changes to boundaries available through this process as have already been addressed through PC5.
208.1	Adjust boundary to exclude lawn.	Lawn should be excluded from SNA.
209.1	Retain as notified	No ecological grounds for change.
219.1	Retain as notified	Planted native vegetation contiguous with the remaining area of SNA.
220.2	Retain as notified	Vegetation contiguous with large area of gully vegetation which includes wetland.
222.1	Adjust boundary to follow fenceline	Includes a paddock area which should be excluded.
230.1	Retain as notified	Although exotic this vegetation contributes to the identified values of this SNA.
231.1	Retain as notified	Although exotic this vegetation contributes to the identified values of this SNA.
232.1	Retain as notified	Vegetation consistent with the rest of the SNA, albeit very narrow.
245.2	Retain as notified	No SNA on property.
259.1	Revise SNA boundary	SNA should exclude large areas of lawn and the walking track.
260.1	Remove SNA	This area is weedy and connected to recently cleared gully arm. Little visible ecological value with no corridor or buffer value. Neighbouring 21 College Place has been developed. New line reflects this.
263.1	Retain as notified	Contiguous with and consistent with remaining part of SNA.
264.1	Retain as notified	Includes wetland vegetation and values consistent with remaining part of SNA.
268.1	Retain as notified	Site visit refused, no further assessment possible.
270.3	Retain as notified	Some open grass areas within this area but overall ecological value is consistent with the rest of the SNA.
271.1 271.2 271.3	No change needed	Already excluded from SNA.

Submission	Ecological Recommendation	Comment or justification
273.1	Adjust boundary to exclude retaining walls	SNA includes retaining walls below lawn. These should be excluded.
274.1	Retain as notified	Highly weedy vegetation but contiguous with SNA and to removal would fragment SNA.
279.1	Adjust boundary to exclude gardens and lawn	Area to exclude is a patch of trees with lawn and garden underneath.
282.6	Adjust boundary to near toe of slope	Vegetable gardens are present on terraces down the gully slope and although there are also indigenous species gardens should not be included.
286.1	Adjust boundary to exclude retaining wall, gardens and fruit trees.	Gardens, fruit trees and retaining wall should not be included.
287.3	Adjust boundary	Area includes chicken coops, terraced gardens etc. and should not be included in SNA.
296.1	Retain as notified	Part of an important habitat area for bats and a much larger significant area. Ability to plant and tend to exotics relates to provisions.
301.6	Retain as notified	Ecologically there is no justification to remove as this is indigenous vegetation providing buffering to both stream and the neighbouring fSNA.
302.1	Retain as notified	Site visit refused, no further assessment possible.
306.1	Realign boundary to exclude garden and lawn	Gardens and lawns should be excluded from SNA.
308.2	Retain as notified	Consistent with the values of the remaining part of the SNA.
310.1	Retain as notified	Forms part of, and linked with important bat habitat and vegetation consistent with the wider SNA.
311.1	Retain as notified	Consistent with the values of the remaining part of the SNA.
311.2	Retain as notified	Degraded vegetation but part of a larger SNA with multiple habitat values.
313.1	Retain as notified	Only the gully portion has been included (checked against contours) and cypress mentioned by field team is already excluded.
316.2	Retain as notified	Consistent with the values of the remaining part of the SNA.
321.1	Retain as notified	Although very narrow this is part of a valuable stream corridor in the upper Mangakotukutuku Gully.
322.1	Adjust boundary to exclude garden, orchard, and weedy areas	Orchard and garden should be excluded. Neighbouring property was also visited with owners of 121 Maeroa and recommendation was to move SNA boundary to gully head.
323.1	Retain as notified	Although much of this is exotic vegetation it forms part of a larger SNA which buffers the Waikato River.
339.1	Adjust boundary to exclude lawn, fruit trees, seating area	An area of lawn with seating, and adjacent fruit trees should be excluded. Although there are other fruit trees scattered through this gully it is an important part of the wider SNA. The landowner has done an amazing job of restoring this area of gully and concern is more with the designation and the provisions than the ecological assessment.
343.3	Retain as notified	Already appears to exclude oak trunk.
352.1	Retain as notified	Vegetation is consistent with contiguous areas of SNA.
356.1	Retain as notified	SNA does not extend into the property.
360.1	Adjust boundary to match current vegetation	SNA does not appear to extend to 22 Normandy and vegetation has already been cleared for development.

Submission	Ecological Recommendation	Comment or justification
364.1	Retain as notified	Although very weedy this small area contributes to the overall ecological integrity of the gully vegetation and removing it could compromise that integrity.
371.1	Adjust boundary to exclude deck and retaining wall	Deck and retaining wall should not be in SNA. Boundary adjusted to match fSNA.
376.1	Retain as notified	Contiguous with remaining parts of SNA and part of a riparian strip buffering the Waikato River.
378.1	Adjust boundary to match current vegetation	Vegetation has been removed since aerials were taken. Wetland area and riparian wetland retained.
380.1	Retain as notified	Part of a much larger SNA which provides important bat habitat.
390.2	Retain as notified	Part of a much larger area of mixed exotic and indigenous vegetation providing habitat for bats and aquatic fauna.
391.1	Adjust boundary to property boundaries	Gardens have been captured along this edge of the SNA which add little or no value to it and the straightening of the boundary will not compromise the integrity of the SNA
391.17	Adjust boundary to property boundaries	Gardens have been captured along this edge of the SNA which add little or no value to it and the straightening of the boundary will not compromise the integrity of the SNA.
391.2	Adjust boundary to property boundaries	Gardens have been captured along this edge of the SNA which add little or no value to it and the straightening of the boundary will not compromise the integrity of the SNA.
393.1	Retain as notified	Area includes indigenous wetland vegetation.
402.2	Retain as notified	Ecological value is as corridor and buffer to the Waikato River.
402.4	Retain as notified	Terrace is dominated by Japanese honeysuckle and blackberry with gorse and pampas but it buffers the vegetation on the lower terrace and the Waikato River and may provide habitat for indigenous fauna.
434.1	Retain as notified	Established indigenous vegetation connected to important bat habitat.
446.5	No change required	No changes to boundaries available through this process as have already been addressed through PC5.
454.1 454.2 454.3 454.3	Adjust boundary	Recommend adjusting boundary to exclude previously cleared areas and walking track as per submitters request. Complete removal of SNA cannot be supported as it provides habitat for coper skink, and protects a stream which provides habitat for At Risk native fish.
457.2	Retain as notified	Wildlands assessed both terrestrial and aquatic habitat as having moderate ecological value and long-tailed bats utilise this area. The site forms part of a much larger SNA.

Submission	Ecological Recommendation	Comment or justification
458.4	No change required	Submission in support
466.1	Adjust boundary	Gardens and retaining wall should be excluded.

