

**ASSESSMENT OF ECOLOGICAL EFFECTS
FOR A PLAN CHANGE APPLICATION AT
57 AND 57A SCHNAPPER ROCK ROAD,
SCHNAPPER ROCK**



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ASSESSMENT OF ECOLOGICAL EFFECTS OF A PLAN CHANGE APPLICATION AT 57 AND 57A SCHNAPPER ROCK ROAD, SCHNAPPER ROCK



Indigenous vegetation with emergent pine trees on the western boundary of the property.

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1. INTRODUCTION

KBS Design Group Ltd is preparing a Plan Change application to rezone 57 and 57A Schnapper Rock Road, Schnapper Rock from Large Lot Zone to a mix of Single House and Mixed House Suburban Zones. The proposed Concept Master Plan is shown in Appendix 1.

Most of the property is given over to exotic grassland, which is currently not being grazed. Single or small groups of trees are scattered throughout the grassland area. A small area of indigenous vegetation is present on the western edge of the property and two small watercourses are present. Areas of largely exotic scrub vegetation are present along the fringe of the indigenous vegetation where a lack of grazing pressure has allowed woody species to become established.

The indigenous vegetation is within a Significant Ecological Area Overlay (SEA) under the Auckland Unitary Plan (AUP). The watercourses were assessed as “intermittent” under the AUP criteria in October 2020 by Freshwater Solutions Ltd (Freshwater Solutions 2020).

Increasing housing density from the single dwelling anticipated under current zoning to a higher-density development could have adverse effects on the ecological values of the site. The purpose of this report is therefore to:

1. Describe the ecological values of the property.
2. Undertake an assessment of the potential adverse ecological impacts of increased housing density at the property.
3. Provide measures to avoid, remedy, or mitigate any potential adverse ecological impacts.

This report provides an assessment of the ecological effects of the proposed plan change, and includes:

- Maps and descriptions of the vegetation and habitat types present;
- An assessment of the ecological values of vegetation and habitat types;
- Descriptions of potential adverse ecological effects resulting from the proposed plan change; and
- Opportunities to avoid, minimise, or mitigate potential adverse ecological effects.

2. ECOLOGICAL CONTEXT

2.1 Overview

The property at 57 and 57A Schnapper Rock Road is located within the Tāmaki Ecological District, which encompasses the heavily urbanised Auckland isthmus between the Manukau and Waitematā harbours, the former North Shore City and the lowlands of Waitākere. The North Shore is the most vegetated section of the Tāmaki Ecological District. While it covers just 21 percent of the land area, it contains 49 percent of the indigenous forest and scrub present within the Ecological District (Myers 2005). The biodiversity of the North Shore is considered to be representative of New Zealand’s northern lowland ecosystems, which have been significantly reduced from their former extent as a consequence of human occupation and farming activities (Myers 2005). Despite the extent of human modification on the North Shore, some elements of its natural character have survived (Myers 2005).

2.2 Soils

Underlying geology in the area is composed of sandstones of the Waitematā Group (Ballance 1976). Soils are largely clay and are likely to be nutrient poor and podzolised on ridges where kauri (*Agathis australis*) once dominated. Damp, shaded gullies are likely to have richer soils due to litter deposition by abundant broadleaved species.

2.3 Pre-human vegetation

The pre-human vegetation of the North Shore is likely to have comprised kauri, tānekaha (*Phyllocladus trichomanoides*), and hard beech (*Fuscospora truncata*) on upper valley walls, ridges and spurs, and taraire (*Beilschmiedia tarairi*), tawa (*B. tawa*), and kohekohe (*Dysoxylum spectabile*) in sheltered coastal and inland valleys, with some rimu (*Dacrydium cupressinum*) and nīkau (*Rhopalostylis sapida*) also present. The vegetation in lower valleys is thought to have predominantly comprised kahikatea (*Dacrycarpus dacrydioides*), mataī (*Prumnopitys taxifolia*), pūriri (*Vitex lucens*), and pukatea (*Laurelia novae-zelandiae*). On steep coastal slopes, whau (*Entelea arborescens*), mangeao (*Litsea calicaris*), houpara (*Pseudopanax lessonii*), pōhutukawa (*Metrosideros excelsa*), karo (*Pittosporum crassifolium*), and tawapou (*Planchonella costata*) are believed to have dominated. Moist alluvial soils are likely to have supported kahikatea forest, and in the wet, fertile areas, pukatea, swamp maire (*Syzygium maire*), kiekie (*Freycinetia banksii*), and *Gahnia xanthocarpa* would have flourished (Myers 2005). Harakeke (*Phormium tenax*), raupō (*Typha orientalis*), and sedges are likely to have occurred mainly in marshy places or on the borders of forests. Pre-European vegetation in Auckland following land clearance by Māori is likely to have been predominantly mānuka (*Leptospermum scoparium*) and kānuka (*Kunzea robusta*) scrub with bracken (*Pteridium esculentum*).

2.4 Remaining indigenous vegetation

Only 6.9 percent of the Tāmaki Ecological District remains in indigenous vegetation cover (Lindsay *et al.* 2009). The project area is situated in an ‘At Risk’ Land Environment, i.e., 20-30 percent indigenous vegetation cover remaining at a national scale (Walker *et al.* 2015).

2.5 Fauna

Indigenous forest remnants and suburban gardens in the Tāmaki Ecological District provide habitat for common bird species such as riroriro (grey warbler; *Gerygone igata*), tauhou (silveryeye; *Zosterops lateralis*), and pīwakawaka (North Island fantail; *Rhipidura fuliginosa placabilis*). Species such as tūi (*Prothemadera novaeseelandiae*) and kererū (*Hemiphaga novaeseelandiae*) are more common in larger forest remnants. Ruru (morepork; *Ninox novaeseelandiae*) occurs in indigenous and exotic forest, and in open country or suburban gardens with areas of mature trees (Heather & Robertson 2000). Pekapeka (long-tailed bat; *Chalinolobus tuberculatus*), classified as ‘Threatened-Nationally Critical’ by O’Donnell *et al.* (2018), have been recorded on the fringes of the Tāmaki Ecological District where it meets the Waitākere, Rodney, and Hunua Ecological Districts.

Skinks and geckos are present on beaches and in shrubland and forest habitats. Threatened species include ornate skink (*Oligosoma ornatum*), Pacific gecko (*Dactylocnemis pacificus*), forest gecko (*Mokopirikirau granulatus*), and elegant gecko (*Naultinus elegans elegans*), all of which are classified as ‘At Risk-Declining’ by Hitchmough *et al.* (2016).

A diverse range of aquatic fauna species occur in Tāmaki Ecological District, including species classified as ‘Threatened’ and ‘At Risk’ by Dunn *et al.* (2018). These include īnanga (*Galaxias maculatus*; ‘At Risk-Declining’), longfin eel (*Anguilla dieffenbachii*; ‘At Risk-Declining’), and the non-threatened banded kōkopu (*G. fasciatus*), redfin bully (*Gobiomorphus huttoni*), Cran’s bully (*G. basalis*), and shortfin eel (*A. australis*).

2.6 Local context

The property is part of a network of small forest patches in gullies on the coastal fringe that characterise the shoreline of the upper Waitematā Harbour. Land to the north of the property, on the opposite side of Schnapper Rock Road, is characterised by moderate- to high-density residential housing and a new subdivision is being constructed on an adjacent property to the southeast. Land to the southwest of the property is characterised by large lots with single dwellings. These properties are largely covered with indigenous vegetation within an SEA overlay that forms an almost continuous canopy of vegetation along tributaries of the Te Wharau Creek.

The vegetation at the property forms part of SEA_T_8351, an area that meets two SEA criteria:

- 2(b) Threat status and rarity - the SEA supports at least four threatened fauna species (longfin eel/*Anguilla dieffenbachii*, ornate skink, elegant gecko, and forest gecko); and
- 3(c) Stepping stones, migration pathways, and buffers - the SEA is part of an important habitat network for indigenous fauna or, when aggregated, makes an important contribution to the provision of a particular ecosystem in the landscape.

2.7 Site description

As described in Section 1, the property is largely pasture with a small area of indigenous vegetation and scrub on the western boundary. Two intermittent watercourses are also present. The northern section of the property close to Schnapper Rock Road is relatively flat; the rest of the property slopes in a roughly southerly direction towards Te Wharau Creek.

3. METHODS

3.1 Vegetation and habitat survey

The site was surveyed on 15 December 2020 and 11 January 2021, during which time all vegetation and habitat types were described and mapped. The current ecological values of these vegetation and habitat types were also assessed. All vascular plant species observed were recorded and are presented in Appendix 1. Vegetation and habitat types were digitised onto aerial imagery using ArcGis10.8.

A third site visit was undertaken on 18 February 2021 to survey two watercourses and to investigate a possible area of wetland identified by Auckland Council at a pre-application meeting held on 12 February 2021.

3.2 Fauna survey

Targeted fauna surveys were beyond the scope of this report, however the suitability of the vegetation at the site to provide habitat for key indigenous fauna species was assessed and all fauna species observed at the site were recorded. Fauna species for which habitat values were specifically considered include (but are not limited to):

- Long-tailed bat
- Forest gecko (*Mokopirirakau granulatus*)
- Elegant gecko
- Copper skink (*Oligosoma aeneum*)
- Ornate skink

4. VEGETATION AND HABITATS

4.1 Overview

The property covers approximately five hectares, most of which is covered in exotic grassland. Four other terrestrial vegetation types were recorded:

- Kānuka forest
- Gorse-blackberry-kikuyu shrubland
- Elaeagnus shrubland
- Kānuka-karamū-māhoe scrub

These habitat types are mapped in Figure 1 and described in more detail below.

4.2 Terrestrial habitats

4.2.1 Exotic grassland (Vegetation Type 1, c.3.60 hectares)

Most of the property is characterised by rank exotic grassland (Plate 1). The grassland is dominated by kikuyu (*Cenchrus clandestinus*) and other pasture grasses including Yorkshire fog (*Holcus lanatus*) and sweet vernal (*Anthoxanthum odoratum*). Herbs including selfheal (*Prunella vulgaris*), red clover (*Trifolium pratense*), broad-leaved dock (*Rumex obtusifolius*), and broad-leaved plantain (*Plantago major*) are scattered throughout, and montbretia (*Crocasmia ×crocosmiiflora*) and gladioli (*Gladiolus* sp.) are locally common close to Schnapper Rock Road.



Plate 1: Exotic grassland (Vegetation Type 1). 15 December 2020.

4.2.2 Kānuka forest (Vegetation Type 2, c.0.50 hectare)

The SEA vegetation on the western boundary of the site comprises kānuka forest with emergent maritime and radiata pines (*Pinus pinaster* and *P. radiata* respectively). The kānuka canopy is approximately 8-10 metres tall and the pines are over 20 metres tall. The kānuka forest is bordered by gorse (*Ulex europaeus*)-blackberry (*Rubus fruticosus* agg.)-kikuyu shrubland (Section 4.2.3). The 2-4 metre tall understory contains a diverse range of indigenous species including māpou (*Myrsine australis*), māhoe (*Meliccytus ramiflorus*), karamū (*Coprosma robusta*), hangehange (*Geniostoma ligustrifolium*), and ponga (*Cyathea dealbata*) (Plate 2). Mamaku (*Cyathea medullaris*) is common along the watercourse channel and some tōtara were observed. Dense infestations of kahili ginger (*Hedychium gardnerianum*) and montbretia are locally common. Pine needles form the main groundcover through much of this vegetation type and seedlings of tōtara, climbing asparagus (*Asparagus scandens*), and Chinese privet (*Ligustrum sinense*) were observed.



Plate 2: Understorey vegetation within the kānuka forest (Vegetation Type 2). 15 December 2020.

4.2.3 Gorse-blackberry-kikuyu shrubland (Vegetation Type 3, c.0.80 hectare)

Much of the steeper terrain to the east of the property has been colonised by gorse and blackberry, with rank kikuyu present throughout (Plate 3). Single or small groups of woolly nightshade (*Solanum mauritianum*), pines, kānuka, karamū, and tī kōuka (cabbage tree; *Cordyline australis*) are also present.



Plate 3: Gorse-blackberry-kikuyu shrubland (Vegetation Type 3).
15 December 2020.

4.2.4 *Elaeagnus* shrubland (Vegetation Type 4, c.0.01 hectare)

A large infestation of *elaegnus* (*Elaeagnus ×reflexa*) is present on the western edge of the SEA vegetation (Plate 4). *Elaeagnus* was also recorded growing in the understory on the edge of Vegetation Type 2.



Plate 4: *Elaeagnus* infestation (Vegetation Type 4). 15 December 2020.

4.2.5 Kānuka-karamū-māhoe scrub (Vegetation Type 5, c.0.08 hectare)

Two small discrete patches of kānuka-karamū-māhoe scrub are present on the edge of the pasture (Plate 5). Woolly nightshade and gorse are also present within this vegetation type.



Plate 5: Kānuka-karamū-māhoe scrub (Vegetation Type 5).
15 December 2020.

4.3 Aquatic habitats

Two watercourses flow through the site (Figure 1). These watercourses are fully described in the watercourse assessment report (Freshwater Solutions 2020). However, some further information about the watercourses is provided below.

The intermittent reach of Watercourse A originates outside the SEA (Figure 1) and then flows through the SEA in a roughly southerly direction. The uppermost point of the stream is well shaded with scrubby vegetation including karamū, māhoe, gorse, and blackberry (Plate 6). Arum lily, wild ginger, and a single ponga were observed further downstream.



Plate 6. Vegetation at the head of Watercourse A. 18 February 2021.

Watercourse B flows through flows through gorse-blackberry-kikuyu shrubland in the southeastern corner of the site (Figure 1). The watercourse was classified as “intermittent” by Freshwater Solutions Ltd (2020); however, the watercourse appears more ephemeral in character and a second assessment is recommended in winter 2021.

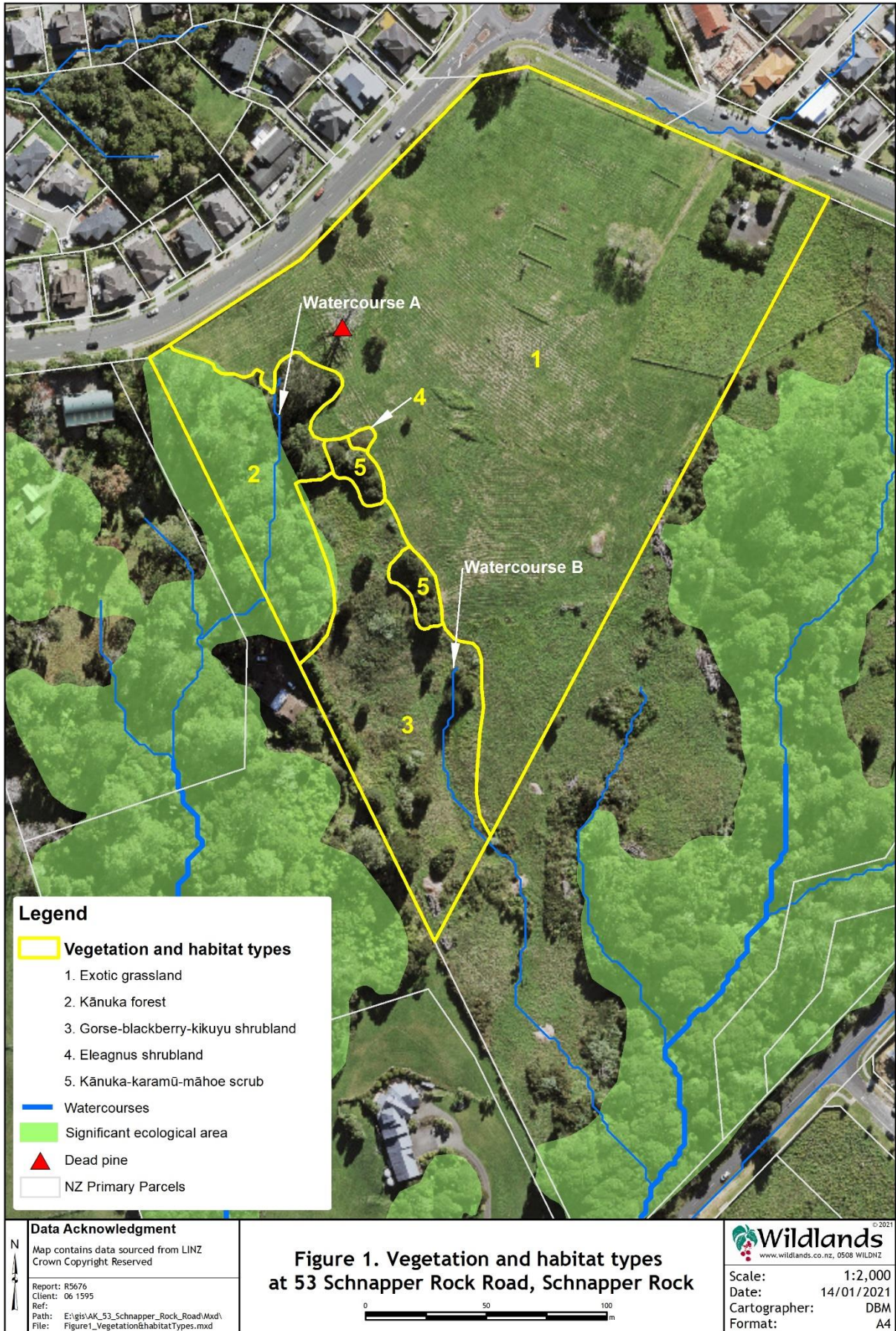
On 18 February 2021, a small muddy depression was observed at the uppermost point of the channel identified as intermittent by Freshwater Solutions (2020). The remainder of the channel was dry and rooted kikuyu and other grasses were growing in the channel along its entire length (Plate 7). This assessment took place after around 40 millimetres of rain was recorded on 15 and 16 February 2021. Watercourse B has been reclaimed on the adjoining property and there is likely to be no connectivity to larger watercourses downstream of 57 and 57A Schnapper Rock Road.



Plate 7. View of Watercourse B looking downstream towards the adjoining property.
The channel is entirely overgrown with kikuyu and other pasture grasses.
18 February 2021.

4.4 Wetlands

No wetland habitat was present around either watercourse. Two native rush species (*Juncus edgariae* and *J. pallidus*) were recorded at the upstream extent of Watercourse A (Plate 6). However, while both these species are associated with damp ground and wetland margins, they are also often found in open shrubland and pasture (de Lange 2021, de Lange 2021a). Both species are classified as ‘facultative wetland’ species by Clarkson (2013). *J. edgariae* was also growing in pasture upstream of Watercourse A.



5. FLORA

Fourteen indigenous and 23 exotic plant species were recorded (Appendix 2). One indigenous species (kānuka) has recently had their threat classifications raised to ‘At Risk-Declining’ (mānuka) or ‘Threatened-Nationally Vulnerable’ by de Lange *et al.* (2018). This is a precautionary measure due to the threat that myrtle rust (*Austropuccinia australis*) poses to species in the myrtle family. No other indigenous species recorded are classified as nationally or regionally threatened (de Lange *et al.* 2018 and Stanley *et al.* 2005).

6. FAUNA

6.1 Birds

Six indigenous bird species were recorded at the site. These were:

- Pīwakawaka
- Kōtare (New Zealand kingfisher, *Todiramphus sanctus*)
- Welcome swallow (*Hirundo neoxena neoxena*)
- Tūī
- Ruru
- Tauhou

The vegetation at the site may also provide habitat for other common indigenous species such as riroriro and pūkeko (*Porphyrio melanotus melanotus*). None of these species are classified as ‘Threatened’ or ‘At Risk’ (Robertson *et al.* 2017).

Several exotic bird species were recorded including yellowhammer (*Emberiza citronella*), blackbird (*Turdus merula*), goldfinch (*Carduelis carduelis*), and common pheasant (*Phasianus colchicus*).

6.2 Aquatic fauna

The intermittent watercourses on 57 and 57A Schnapper Rock Road drain into the Te Wharau Creek, which flows into Waitematā Harbour. This is a short, second order, low elevation catchment of 246 hectares.

There are 17 recorded fish surveys within the Te Wharau Creek. These are dated 1996-2003, 10 of the records are from 2003, and utilised electrofishing and hand-netting (NIWA 2021). The fish and invertebrate species recorded during these surveys are listed in Table 1 below. Threat classifications for fish and invertebrates are taken from Dunn *et al.* (2018) and Grainger *et al.* (2018) respectively.

Table 1: Freshwater fish and invertebrate species present within the Te Wharau catchment, ordered by species frequency and abundance in NZFFD survey records.

Scientific Name	Common Name	Threat Classification
<i>Paranephrops planifrons</i>	Kōura	Not Threatened
<i>Galaxias fasciatus</i>	Banded kōkopu	Not Threatened
<i>Anguilla dieffenbachii</i>	Longfin eel	At Risk - Declining
<i>Gambusia affinis</i>	Gambusia	Introduced and Naturalised
<i>Gobiomorphus cotidianus</i>	Common bully	Not Threatened
<i>Paratya curvirostris</i>	Freshwater shrimp	Not Threatened
<i>Gobiomorphus basalis</i>	Cran's bully	Not Threatened
<i>Anguilla australis</i>	Shortfin eel	Not Threatened
<i>Gobiomorphus huttoni</i>	Redfin bully	Not Threatened
<i>Galaxias maculatus</i>	Īnanga	At Risk - Declining
<i>Galaxias argenteus</i>	Giant kokopu	At Risk - Declining
<i>Cheimarrichthys fosteri</i>	Torrentfish	At Risk - Declining

Despite not flowing year-round, flow into intermittent watercourses can have impacts on water quality and habitats downstream. Additionally, some indigenous aquatic fauna species are known to disperse into intermittent waterways when conditions allow to take advantage of feeding opportunities, including eels (*Anguilla* spp.), banded kōkopu, and kōura (*Paranephrops planifrons*).

6.3 Long-tailed bats

Long-tailed bats occur in the Auckland Region and are classified as ‘Threatened-Nationally Critical’ by O’Donnell *et al.* (2018). They are known to favour forest edge and riparian habitats of both indigenous and exotic forest types, having adapted to roosting in exotic tree species such as pine (*Pinus* sp.) and macrocarpa (*Cupressus macrocarpa*). They also forage over farmland and urban areas (Sedgely and O’Donnell 2004, Sedgely *et al.* 2013).

The Department of Conservation bat distribution database (July 2020 version) holds records of long-tailed bats at Riverhead Forest approximately nine kilometres east of the site. The home range span of long-tailed bats is up to 19 kilometres (O’Donnell 2001) and the site is therefore within the home range of known populations. A large dead pine tree close to the western corner of the property (Figure 1, Plate 8) provides suitable roosting habitat for long-tailed bats, and it is possible that bats also forage at the site. However, surveys undertaken within one kilometre of the site have failed to detect long-tailed bats and it is considered unlikely that bats use habitats at the property.



Plate 8: Dead pine tree providing potential roosting habitat for long-tailed bats. 15 December 2020.

6.4 Herpetofauna

Suitable habitat for several indigenous lizard species occurs at the property. The Department of Conservation's herpetofauna database lists numerous records of several species within only a few kilometres of this site. Several species have also been observed by Wildlands' staff less than one kilometre from the development site, with one species known to be present in moderate density. Indigenous forest at the property provides potential habitat for two species of arboreal geckos (forest gecko and elegant gecko) that are known to be present on Schnapper Rock Road. Both species are classified as 'At Risk - Declining' as per Hitchmough *et al.* (2016). Tracts of gorse and other pest plant species that are contiguous with indigenous forest may also contain geckos as they are known to disperse into and utilise exotic vegetation. Ground-dwelling skink species often occur on bush margins and within scrub vegetation and rank grass, and these species may use ground cover vegetation, leaf litter and woody debris on the property. Table 2 provides a preliminary assessment of species that are known to be present within vegetation and habitats on Schnapper Rock Road, and are therefore highly likely to be present at this site:

Table 2: Lizard species potentially present at 57 and 57A Schnapper Rock Road.

Species Name	Common Name	Threat Classification
<i>Mokopirirakau granulatus</i>	Forest gecko	At Risk - Declining
<i>Naultinus elegans</i>	Elegant gecko	At Risk - Declining
<i>Oligosoma aeneum</i>	Copper skink	Not Threatened
<i>Oligosoma ornatum</i>	Ornate skink	At Risk - Declining

6.5 Introduced pest mammals

Possum (*Trichosurus vulpecula*) droppings were observed in Vegetation Type 1 during the site assessment. Other pest animals likely to be present at the site include ship rats (*Rattus rattus*), Norway rats (*R. norvegicus*), mice (*Mus musculus*), and hedgehogs (*Erinaceus europaeus*). Mustelids (stoats, *Mustela erminea*; ferrets, *M. furo*; and weasels, *M. nivalis vulgaris*) and feral and domestic cats (*Felis catus*) may also use the site occasionally.

7. ECOLOGICAL VALUES

The ecological values of the site are largely restricted to non-pasture habitats in the western portion of the property. The exotic grassland provides foraging habitat for some common indigenous bird species, and the large dead pine tree close to the western corner of the site provides potential roosting habitat for long-tailed bats.

Kānuka forest has been substantially reduced in extent in the Tāmaki Ecological District. The site contains a small representative remnant of kānuka forest in a landscape that has become increasingly urbanised. Collectively, these remnants provide a significant network of local habitat for indigenous fauna and flora, as well as acting as ‘stepping stones’ for mobile avifauna to move between larger areas of indigenous vegetation such as Riverhead Forest to the west and Rangitoto Island to the east. The vegetation is in relatively poor condition with limited indigenous regeneration and significant pest plant infestations; however, it supports a range of common bird species and contains excellent potential habitat for indigenous reptiles. Exotic vegetation bordering the kānuka forest and the kānuka-karamū-māhoe scrub also provides foraging and nesting habitat for indigenous bird species and excellent habitat for indigenous reptiles. Vegetation Types 2-5 are considered to have high ecological values for fauna. Vegetation Type 1 is considered to have low ecological value.

The intermittent watercourses at the site are considered to have low ecological value, particularly Watercourse B due to it being piped downstream of the property. However, intermittent streams provide important drainage, rainfall interception and filtration, and can be a significant contributor of sediment when disturbed. In small catchments, the cumulative effect of these headwaters can have an important influence on catchment hydrology and therefore may influence the overall ecological value of receiving environments. Maintaining the natural functioning of these headwater watercourses, including ephemeral reaches, will play an important part in helping to protect downstream receiving aquatic habitats.

8. POTENTIAL ADVERSE ECOLOGICAL EFFECTS AND OPPORTUNITIES TO AVOID, REMEDY OR MITIGATE

8.1 Overview

The proposed plan change will allow a higher density of dwellings to be constructed at the property. The SEA vegetation, streams, and riparian margins will be protected during the subdivision and the master plan allows for lower density in the western and southern portion of the property where habitats with higher ecological values are present (Appendix 1).

Potential adverse effects of the proposed plan change can be summarised as:

- Localised loss of indigenous and exotic vegetation
- Effects on indigenous fauna
- Stream sedimentation
- Stormwater run-off and contamination of receiving environments
- Increased housing density close to habitats with high ecological value

Each of these effects is described in detail below. As this report is based on a concept plan accompanying a plan change application, the magnitude of each potential adverse effect is currently unknown. The subdivision design will be adapted as necessary to minimise or avoid potential adverse effects as much as possible.

8.2 Loss of vegetation

Some or all of the mixed indigenous and exotic vegetation outside of the SEA overlay is likely to be removed as the subdivision is developed. The ecological values of this vegetation are largely related to the provision habitat for indigenous fauna species and the potential adverse effects of vegetation loss is discussed below. Mitigation for the loss of indigenous vegetation outside of the SEA overlay can be provided through protecting and enhancing retained indigenous vegetation at the property. Riparian margins could also be restored to increase the ecological values of the site.

8.3 Effects on indigenous fauna

Clearance of mixed indigenous and exotic vegetation outside of the SEA overlay will remove habitat for indigenous birds, and indigenous reptiles and bats, if they are present.

The bird species that occur at the site are highly mobile and the noise and movement associated with vegetation removal is likely to scare most of them away from the site before they are harmed. However, if active indigenous bird nests are present in the affected vegetation at the time of removal the adult birds, chicks, and/or eggs may be harmed or destroyed. These potential adverse effects can be managed through undertaking vegetation clearance outside of bird nesting season. If this is not possible, nesting bird surveys should be undertaken prior to vegetation clearance and if nests are found clearance works should be postponed until the chicks have fledged.

It is considered very likely that indigenous lizards are present and the proposed vegetation clearance will result in a reduction in the available habitat for these species and potential harm to individuals. These potential adverse effects can be managed through the preparation and implementation of a Lizard Management Plan.

Suitable foraging and roosting habitat for long-tailed bats exists at the property, but their presence is considered unlikely. A bat survey using acoustic bat monitors should be undertaken by a suitably-certified ecologist prior to any vegetation clearance. If bats are detected, a Bat Management Plan should be prepared and implemented prior to and during vegetation clearance.

8.4 Stream sedimentation

Works within the riparian margin have the potential to discharge sediment into watercourses. If any works within the riparian margin are required, the potential adverse impacts of sedimentation can be managed through following best-practice sediment control measures and rehabilitating any disturbed habitats once works are complete. A sediment and erosion control plan must be approved by council before earthworks take place and should be consistent with the recommendations outlined in 'TP90 Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region' or 'GD2016/005 - Erosion and Sediment Control Guide for Land Disturbing activities in the Auckland Region' (whichever is operative at the time of work being taken).

8.5 Stormwater run-off and contamination of receiving environments

The proposed development will increase the area of impermeable surfaces at the property. Surface run-off from impermeable ground can greatly increase the amount and rate of stormwater flow. After heavy rainfall events, large amounts of fast-moving water flow into gullies and streams, creating a scouring effect that is harmful to aquatic fauna and can result in streambank erosion and sedimentation. Roofs, roads, and driveways are the main contributors to surface run-off. These potential adverse effects can be managed through ensuring the design and implementation of the works comply with industry best practice and include low-impact design features such as swales and/or stormwater retention tanks.

Stormwater can also transport a range of contaminants such as heavy metals, which accumulate in estuarine receiving environments. Heavy metals such as zinc can persist in the aquatic environment for considerable periods of time, particularly in sediment. As a consequence, metals can accumulate in the tissues of benthic organisms and their predators at higher trophic levels. Zinc is toxic to aquatic plants and animals (Widianarko *et al.* 2001). In residential areas, contamination can also occur through activities such as washing cars on impermeable surfaces, whereby cleaning chemicals and detergents are readily transported into drains and into aquatic and estuarine receiving environments. In order to prevent zinc entering the local watercourses, galvanised iron should not be used in the proposed development.

8.6 Increased housing density

The concept plan indicates that nine Standard Detached Housing Lots will be created adjacent to the SEA vegetation. Increased housing density could result in adverse impacts on the SEA vegetation through increased lighting and noise, increased weed issues through garden escapes and dumping, and increased predation from domestic pets. Increased lighting and noise effects are only considered to be an issue if long-tailed bats are detected during the bat survey.

In order to control the spread of pest plants from domestic gardens, no plant species listed in the National Plant Pest Accord (NPPA) or the Auckland Regional Pest Management Plan (Auckland Council 2019), in any category, should be permitted to be planted or cultivated, either in the ground or in pots. This should be a condition of consent, although it is acknowledged that it will be difficult to enforce.

Increased predation by domestic pets could be managed by covenants preventing domestic pets being kept at properties adjoining the SEA vegetation. However, no nearby properties have such a restriction and it is unlikely that such a covenant condition would be imposed.

9. WILDLIFE ACT 1953

Irrespective of the level of effects on indigenous fauna described above, all indigenous fauna and some indigenous invertebrates are protected under the Wildlife Act (1953). A permit under the Wildlife Act must be obtained from the Department of Conservation before any indigenous fauna can be disturbed, handled, translocated or killed.

The Wildlife Act Authority (WAA) must be applied for and approved by the Department of Conservation before activities affecting fauna may commence. This will require the submission of a species-specific management plan along with the appropriate application form.

10. NATIONAL ENVIRONMENTAL STANDARDS FOR FRESHWATER MANAGEMENT (2020)

The National Environmental Standards for Freshwater Management (NES-FW) came into effect in 2020. The proposed zone change has been assessed under the provisions of the NES-FW and consent will not be required given that there are no wetlands present and no stream reclamation is proposed.

11. CONCLUSIONS

A Plan Change application is being submitted to rezone 57 and 57A Schnapper Rock Road, Schnapper Rock from Large Lot Zone to a mix of Single House and Mixed House Suburban Zones. Most of the property is covered with exotic grassland and four other

distinct indigenous and exotic vegetation types were recorded in the western portion of the property. Two intermittent watercourses are also present.

The ecological values of the site are largely restricted to woody habitats in the western portion of the property. The highest values from a vegetation perspective are associated with kānuka forest, most of which is protected within an SEA overlay. Mixed exotic and indigenous vegetation outside of the SEA overlay has high fauna values as it provides habitat for indigenous reptile and bird species. The property provides potential habitat for long-tailed bats; however, it is considered unlikely that this species is present.

The concept plan for the plan change indicates that the riparian margin of both watercourses and the SEA vegetation will be protected.

Potential effects of the proposed plan change to allow subdivision of the property have been identified as:

- Localised loss of indigenous and exotic vegetation
- Effects on indigenous fauna
- Stream sedimentation
- Stormwater run-off and contamination of receiving environments
- Increased housing density close to habitats with high ecological value

The subdivision will be designed to avoid or minimise all potential adverse ecological effects. Mitigation measures have been identified for any potential ecological effects that cannot be avoided. Mitigation measures include:

- Protection and enhancement of retained vegetation
- Fauna management
- Implementation of best practice erosion and sediment controls and stormwater management
- Restricting planting of invasive garden plants

If all of the above mitigation actions are implemented, the overall ecological effect of the proposed plan change will be appropriately addressed.

ACKNOWLEDGMENTS

Abu Hoque (Kingstone Property Ltd) provided site access and information.

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
CONCEPT MASTER PLAN
21 DECEMBER 2020



CONCEPT MASTER PLAN

KEY:

	Terrace Housing	36 (39%)
	Zero-lot Line Detached Housing	32 (34%)
	Standard Detached Housing	25 (27%)
	Total	93 (100%)

	Proposed Public Road (14.0m road reserve)
	Proposed Private Accessway
	Significant Ecological Area(protected land)
	Riparian Margin (protected land)

Note:

This site layout is conceptual only, and is subject to further investigations into Planning, Survey, Ecological and Engineering feasibility and may be derived from inaccurate source information. This is also subject to necessary approval from Auckland Council, Auckland Transport and Watercare.

53 SCHNAPPER ROCK ROAD, ALBANY

Project: Schnapper Rock Road Dev 2020
 Date: 21 December 2020
 Status: Draft
 Scale: 1:2000 @ A3



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VASCULAR PLANT SPECIES RECORDED AT 57 AND 57A SCHNAPPER ROCK ROAD

INDIGENOUS SPECIES

Gymnosperms

Podocarpus totara var. *totara* tōtara

Monocot. trees and shrubs

Cordyline australis tī kōuka, cabbage tree

Dicot. trees and shrubs

Coprosma grandifolia kanono, raurēkau, raurākau, manono

Coprosma rhamnoides

Coprosma robusta karamū, kāramuramu

Geniostoma ligustrifolium var. *ligustrifolium* hangehange

Kunzea robusta kākūka

Melicytus ramiflorus subsp. *ramiflorus* māhoe

Myrsine australis māpou, matipou, māpau

Ferns

Asplenium oblongifolium huruhuru whenua

Cyathea dealbata ponga, silver fern

Cyathea medullaris mamaku

Grasses

Oplismenus hirtellus subsp. *imbecillis*

Rushes

Juncus edgariae wī, wīwī

Juncus pallidus wī, wīwī

Dicot. herbs (other than composites)

Centella uniflora

NATURALISED AND EXOTIC SPECIES

Gymnosperms

Pinus pinaster maritime pine

Dicot. trees and shrubs

<i>Elaeagnus ×reflexa</i>	elaeanus
<i>Ligustrum sinense</i>	Chinese privet
<i>Rosa</i> sp.	climbing rose
<i>Rubus</i> sp. (<i>R. fruticosus</i> agg.)	blackberry
<i>Solanum mauritianum</i>	woolly nightshade
<i>Ulex europaeus</i>	gorse

Monocot. lianes

<i>Asparagus scandens</i>	climbing asparagus
---------------------------	--------------------

Lycopods and psilopsids

<i>Selaginella kraussiana</i>	creeping clubmoss, selaginella
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Grasses

<i>Anthoxanthum odoratum</i>	sweet vernal
<i>Cenchrus clandestinus</i>	kikuyu grass
<i>Holcus lanatus</i>	Yorkshire fog

Rushes

<i>Juncus effusus</i> var. <i>effusus</i>	soft rush, leafless rush
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Monocot. herbs (other than orchids, grasses, sedges, and rushes)

<i>Agapanthus praecox</i>	agapanthus
<i>Crococsmia ×crococsmiiflora</i>	montbretia
<i>Gladiolus</i> sp.	gladioli
<i>Hedychium gardnerianum</i>	kahili ginger, wild ginger
<i>Watsonia</i> sp.	watsonia
<i>Zantedeschia aethiopica</i>	arum lily

Dicot. herbs (other than composites)

<i>Prunella vulgaris</i>	selfheal
<i>Ranunculus repens</i>	creeping buttercup
<i>Rumex obtusifolius</i>	broad-leaved dock
<i>Trifolium pratense</i>	red clover



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8 October 2020

2K Nominees Ltd
PO Box 454
Christchurch 8140

C/o Michael Gale

53 Schnapper Rock Road Stream Classification

Introduction

This letter presents an assessment of the status of two unnamed watercourses within 53 Schnapper Rock Road (the site) in accordance with criteria outlined in the Auckland Unitary Plan (AUP). Stream classification criteria are presented in Attachment 1. The site is bound by Schnapper Rock Road to the north and north-western, with its eastern, southern and south-western border being bound by pasture, native bush and residential dwellings (Attachment 2).

A site visit was made to classify the watercourses using the AUP watercourse evaluation criteria, as the status of watercourses within a site can influence the locations development potential.

Watercourse Classification

A site visit was carried out on 1 October 2020 and within the recommended July-October window for classifying intermittent and ephemeral watercourses. The site visit was undertaken during relatively dry conditions with 0 mm occurring over the 2-days prior at the Auckland, North Shore Albany Ews station (National Climate Database) and 34.6 mm of rainfall over the 7-days prior.

The two watercourses, hereafter referred to as Watercourse A and Watercourse B, are part of a natural drainage system flowing south into Te Wharau Creek. A plan showing the watercourses of interest is presented in Attachment 3. Vegetation within the 53 Schnapper Rock Road site includes mānuka, mahoe, cabbage tree, totara, gorse, wild ginger, silver fern, blechnum fern and pine.

Watercourse A

Watercourse A drains towards southern boundary of the site, with a reach of approximately 108 m within the site. The watercourse has a defined channel with evidence of substrate sorting processes in its upper reaches. No water was present in the upper reach (Figure 1). Approximately 5 m downstream of the defined channel, water pooling occurs (Figure 2).

Watercourse A was classed as 'intermittent' as it met at least four of the six criteria in the AUP for defining intermittent streams (minimum required = 3 criteria):

- It has natural pools.
- It has a well-defined channel, such that the bed and banks can be distinguished.
- Rooted terrestrial vegetation is not established in the channel.
- There is evidence of substrate sorting processes, including scour and deposition.

Watercourse B

Watercourse B drains toward the south-eastern boundary of the site, with a reach of approximately 60 m within the site. The watercourse has a defined channel within a 'V-shaped' gully (Figure 3) and has evidence of substrate sorting processes. As the watercourse drains closer to the southern boundary its channel becomes narrower and further incised.

Although the watercourse had no water present at the time of survey, Watercourse B was classed as 'intermittent' as it met three of the six criteria in the AUP for defining intermittent streams (minimum required = 3 criteria):

- It has a well-defined channel, such that the bed and banks can be distinguished.
- Rooted terrestrial vegetation is not established in the channel.
- There is evidence of substrate sorting processes, including scour and deposition.



Figure 1: View of upper reach of Watercourse A.



Figure 2: View of pooled water within Watercourse A.



Figure 3: View of upper reach of Watercourse B.

Conclusion

Watercourses within the site are classified as intermittent in accordance with the AUP. We estimate Watercourse A has a 108 m reach and Watercourse B has a 60 m reach within the site, for an approximate 168 m of intermittent stream within the site.

Any unavoidable modification or reclamation of Watercourse A or B will require mitigation or offsetting (e.g., stream restoration elsewhere) to be carried out to ensure no net-loss of ecological values and function. It is widely accepted in the Auckland region that the amount of restoration required to offset loss can be calculated using the Stream Ecological Valuation (SEV) and Environmental Compensation Ratio (ECR) approach outlined in Neale et al. (2016) and Storey et al. (2011).

Yours sincerely

**Simon Stent
Freshwater Ecologist**

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Auckland Unitary Plan (AUP)

River or stream

A continually or intermittently flowing body of fresh water, excluding ephemeral streams, and includes a stream or modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal except where it is a modified element of a natural drainage system).

Permanent river or stream

The continually flowing reaches of any river or stream.

Intermittent stream

Stream reaches that cease to flow for periods of the year because the bed is periodically above the water table. This category is defined by those stream reaches that do not meet the definition of permanent river or stream and meet at least three of the following criteria:

- a) it has natural pools
- b) it has a well-defined channel, such that the bed and banks can be distinguished;
- c) it contains surface water more than 48 hours after a rain event which results in stream flow;
- d) rooted terrestrial vegetation is not established across the entire cross-sectional width of the channel;
- e) organic debris resulting from flood can be seen on the floodplain; or
- f) there is evidence of substrate sorting processes, including scour and deposition.

Ephemeral stream

Stream reaches with a bed above the water table at all times, with water only flowing during and shortly after rain events. This category is defined as those stream reaches that do not meet the definition of permanent river or stream or intermittent stream.

Artificial watercourse

Constructed watercourses that contain no natural portions from their confluence with a river or stream to their headwaters.

Includes:

- canals that supply water to electricity power generation plants;
- farm drainage canals;
- irrigation canals; and
- water supply races.

Excludes:

- naturally occurring watercourses.

Attachment 2 – Plan showing watercourses

