



Assessment of Ecological Effects

Springvale, Whanganui

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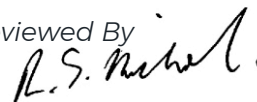
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1 Executive Summary

Whanganui District Council have developed a Structure Plan for the Springvale Area. It proposes to rezone the land from Rural lifestyle to Residential. This results in the need for an updated stormwater/road network as a result of a greater density of housing in the area. This network will pick up stormwater from the surrounding development and overland flows and will discharge onto Council owned land adjacent to Titoki wetland.

The purpose of this report is to identify existing ecological values and provide an assessment of the anticipated ecological effects of the re-zoning of the land, resulting in a greater density of housing in the area, and the effects of the new stormwater and road network. This report provides supportive information to the resource consent application.

The scope of this report comprises of the following:

- A description of the vegetation, fauna and ecological features found within the Springvale Structure Plan Area;
- An assessment of the existing ecological values;
- An outline of the nature and magnitude of potential adverse effects from the construction and installation of the stormwater/road network and housing development; and
- Proposed measures to avoid, remedy or mitigate adverse effects where necessary.

This assessment follows on from a desktop review of existing information and field surveys conducted in October 2018.

Guidelines for undertaking Ecological Impact Assessments published by the Environment Institute of Australia and New Zealand have been used to provide a transparent method of assessing ecological impacts of the project.

The construction of the housing development and stormwater/road network impacts on a generally low value ecosystem. Within the council owned portion of land there is a wetland area of high ecological value, there is also an area of native terrestrial vegetation of moderate ecological value. The Springvale Structure Plan Area as a whole is dominated by grazed agricultural grassland, located on rural lifestyle properties. While, Titoki Wetland has been identified within the Springvale Structure Plan Area, there will be minimal impacts on this wetland from the proposed works. Consequently, the overall effects on this ecosystem have been assessed as low.

Using the EIANZ guideline approach, the overall effect on all key ecological attributes impacted by the project was assessed as low, due to the range of habitat values being affected and the moderate species diversity. Levels of effects that are low are not typically of concern. However, a number of measures have been recommended to further minimise the potential effects of the project on the associated ecological values.

2 Background

Whanganui District Council has developed a Springvale Structure Plan which sets out a co-ordinated and strategic approach to develop the Springvale area into a high quality residential area. WSP Opus have been contracted by the Whanganui District Council to prepare an assessment of ecological effects of the project to inform design and resource consenting.

This report identifies the ecological values of the Springvale Structure Plan area and its context within the surrounding landscape. An assessment of the impact of the proposed subdivision, stormwater and road network is given, outlining what values will be affected both positively and negatively. Mitigation and enhancement is proposed where appropriate.

A cultural impact assessment is currently being prepared, which will outline any cultural impacts/effects on the environment of the proposed works.

2.1 Purpose and scope

The purpose of this report is to provide an assessment of the ecological effects for the Springvale Structure Plan area, including the stormwater and road network. It will support the resource consent application as required.

The scope of this report comprises of the following:

- A description of the vegetation, fauna, and ecological features found within the site;
 - Identification of Schedule F habitats (as per the Horizons One Plan)
- As assessment of the existing ecological values;
- An outline of the nature and magnitude of potential adverse effects from the construction, installation and operation of the stormwater network; and
- Proposed measures to avoid, remedy or mitigate adverse ecological effects, where necessary.

2.2 Site location

The Springvale Structure Plan Area is located in Whanganui, Approximately 3.9km West of Central Whanganui (Figure 1). The total area of the proposed Springvale residential area (Springvale structure plan area) is 93ha (shown in Figure 1 & 2) and is approximately 1.8km in length (running north-south) and between 400-900m in width (east-west). The Springvale area is currently zoned Rural lifestyle under the Whanganui District Plan.

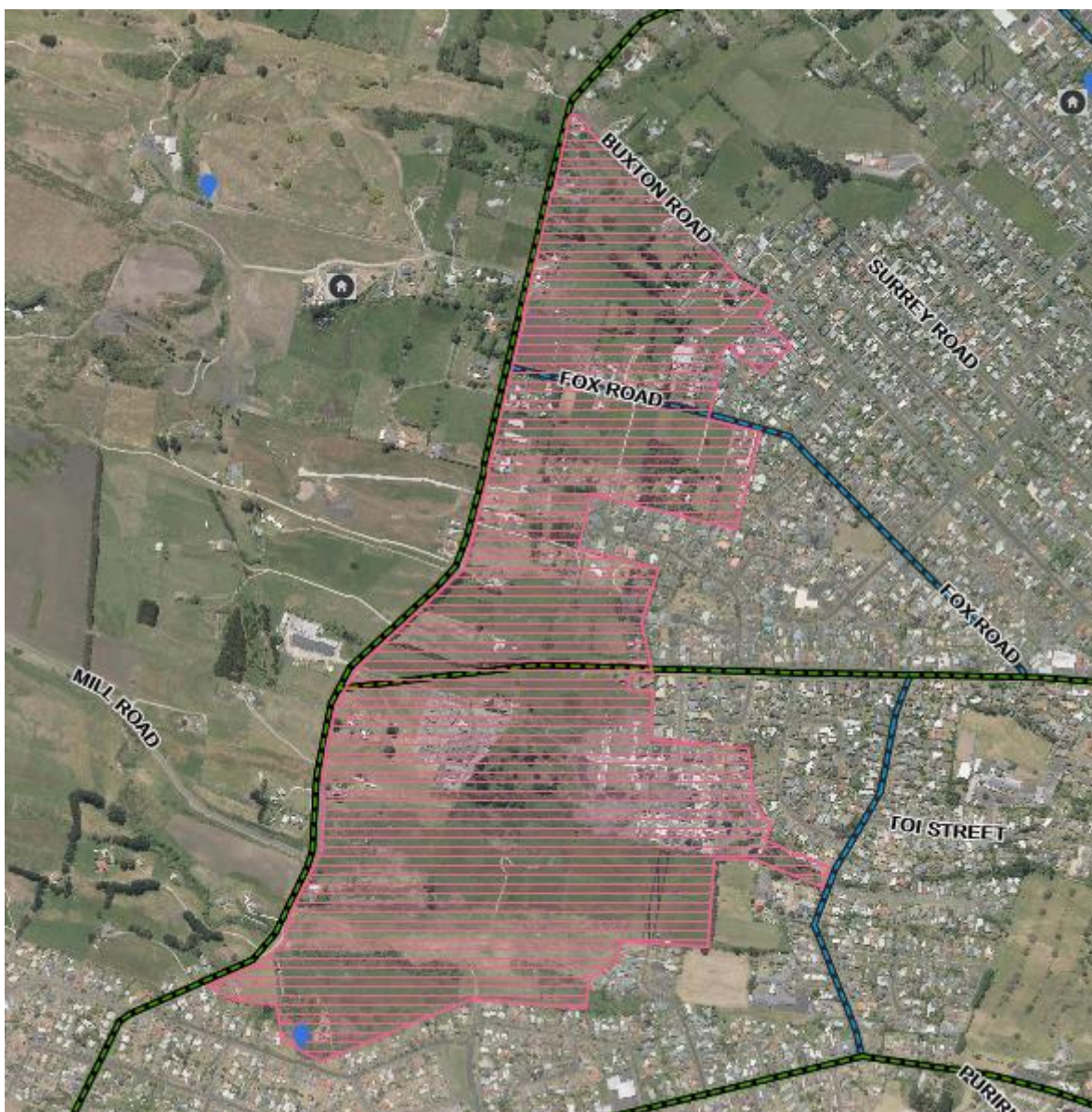


Figure 1: Location of Springvale Structure Plan area in relation to surrounding environment.

Springvale has a morphology typical of its near coastal setting (it is approximately 2.24km from the sea), it is characterised by mixed grasses, planted (exotic and native) trees and shrubs associated with a rural, rural-residential setting.

Within the Structure Plan Area there is a wetland area known as Titoki Wetland as well as a strip of native vegetation north of this wetland, which is of note ecologically, and these will be discussed further below.

Titoki Wetland is situated at the southernmost end of the proposed Springvale residential development, within the Mosston Park Reserve. Titoki Wetland is classified as a council owned reserve as part of the Springvale Structure Plan. It is a remnant dune wetland, which has been partially restored and features an area of open water and regenerating native vegetation typical of coastal dune wetlands. It provides habitat for a variety of aquatic, bird and plant life.

2.3 Proposed works

The proposed works include the re-zoning of the area from Rural lifestyle to Residential. The reduction in lot sizes may facilitate potential development in the area including establishment of a new stormwater and road network (figure 2).

The Structure Plan has a primary function to provide storage areas for stormwater following rain events both from within the Springvale Structure Plan Area and from the catchment above. The stormwater network for the Springvale Structure Plan Area will be predominantly piped and once the network reaches the council owned land it will open into an open channel which will dissipate into the stormwater detention area to the East of Titoki Wetland (figure 2). The road will be located above the piped stormwater network from Fox Road to Fitzherbert Avenue.

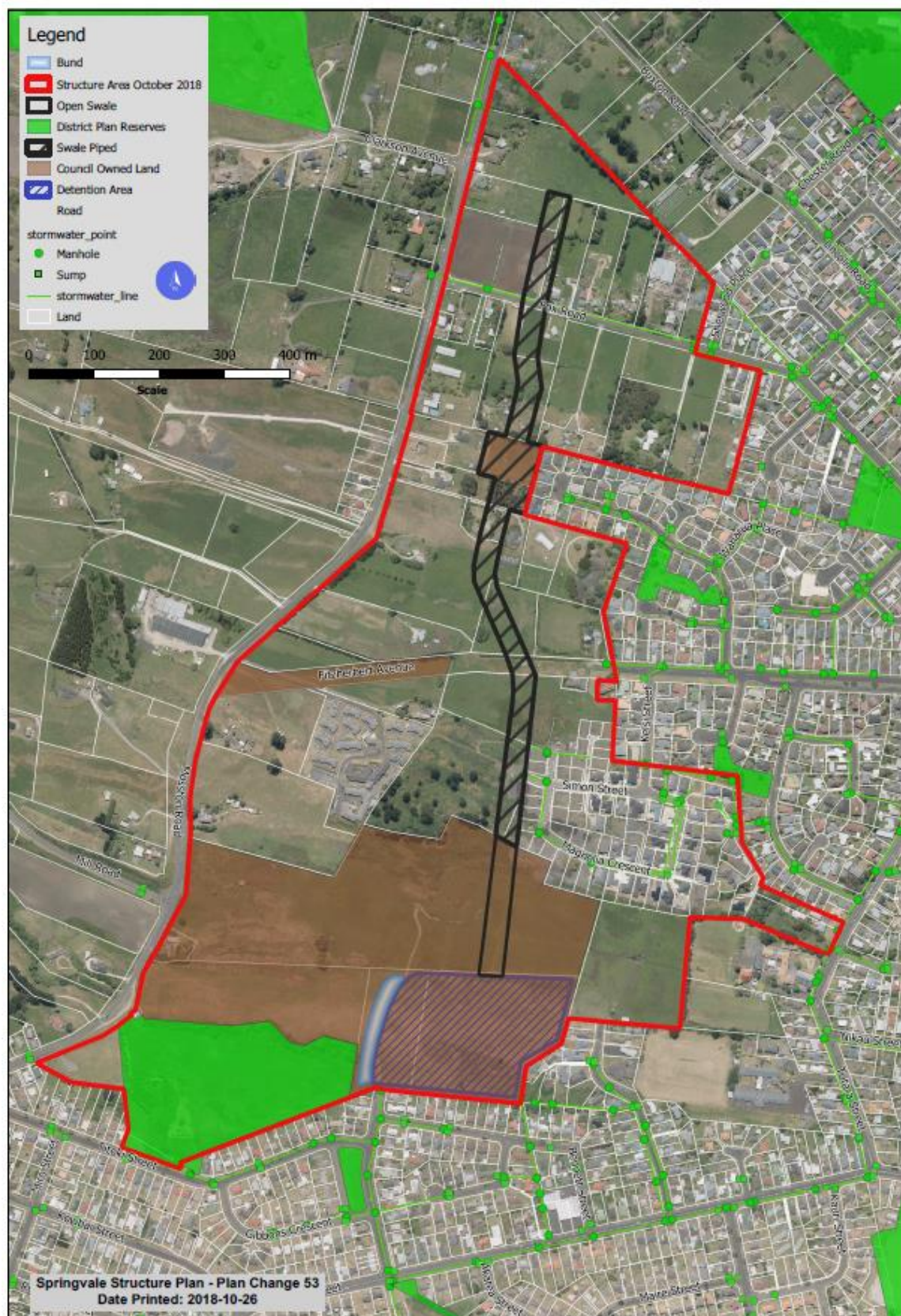


Figure 2: Springvale Structure Plan Area, showing the proposed stormwater network and detention area.

The stormwater and road network (Figure 2) is proposed to be a multi-functional transport corridor integrating a vegetated or piped swale to collect, attenuate and distribute stormwater flows.

The stormwater network will convey stormwater and rain event overland flows. It will not intercept existing streams. The current design (Figure 2) shows the stormwater network (open swales and piped) discharging onto land adjacent to Titoki wetland. The existing overland flow paths can be seen in Figure 3. These flow paths run predominantly west to east. The new stormwater network will intercept these flows and divert them to the detention area at the south-eastern end of the Springvale Structure Plan Area. The purpose of this is to ensure that the land is adequately drained for subdivision and to reduce the occurrence of flooding on neighbouring properties.

There is potential in a one in 200-year flood for the water in the detention area to flow over the bund and into Titoki Wetland.

A reserve area North East of Titoki Wetland will also be created, providing new habitat for birdlife in the area.

North of Titoki Wetland there is a vegetated strip at the northern most end of Mosston Park. This area will not be significantly affected by the proposed works. This vegetated strip provides a suitable habitat for both native and exotic bird species and is dominated by native vegetation.

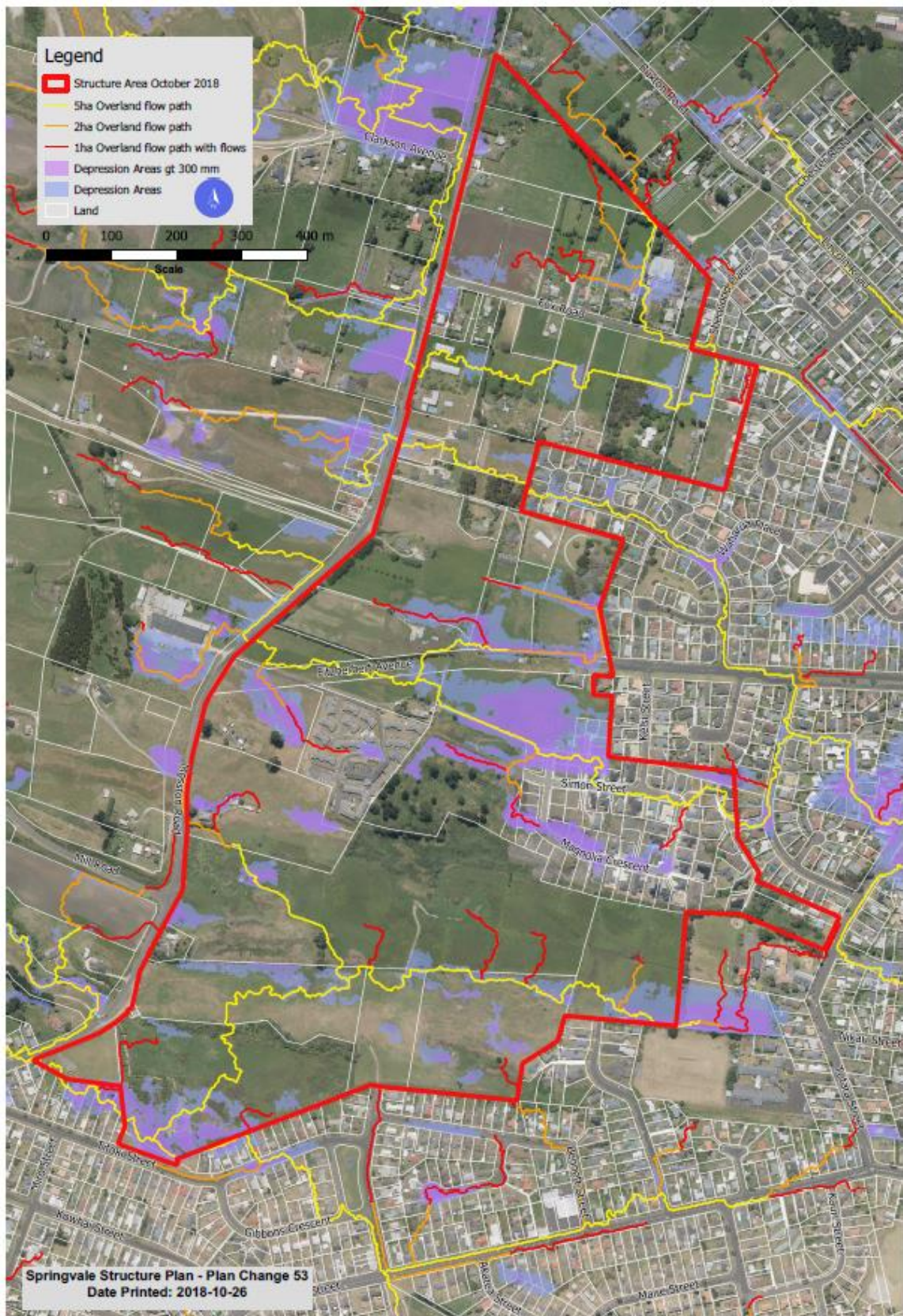


Figure 3: Overland flow paths of the Springvale Structure Plan Area.

3 Methodology

3.1 Desktop and field survey methodology

3.1.1 Desktop review

The desktop assessment included the following:

- A review of aerial photographs;
- A review of the Regional Planning Maps and Schedules.

3.1.2 Vegetation and terrestrial fauna field survey

The vegetation and terrestrial fauna survey was carried out during a site visit on the 9th of October 2018 and another survey on the 25th of February 2019 by Melanya Yukhnevich (Intermediate Ecologist, WSP Opus). The survey recorded vegetation/habitat types and plant species. Birds heard or observed during the visit were also noted. The potential of the habitat to support bats and lizards was assessed based on known habitat preferences and local species distribution.

3.2 Assessment of Effects Methodology

3.2.1 EIANZ Guidelines

Guidelines for undertaking Ecological Impact Assessments (EclA) published by the Environment Institute of Australia and New Zealand (Roper-Lindsay et al, 2018) have been used to aid in assessing the ecological impacts of the Project. The guidelines assist in assessing values and effects in a consistent and transparent way. However, sound professional judgement is still required when applying the framework and matrix approach.

The approach involves assigning values for vegetation, habitats or species using the criteria in Table 1 and then assigning a magnitude of effects rating using the criteria in Table 2. An overall level of effects is then determined by combining the value of an ecological feature or attribute with the rating for the magnitude of effect using the matrix (Table 3).

3.2.2 Assessment of Ecological Values

The first step of the EclA guidelines approach requires ecological values of each feature to be assigned on the scale given in Table 1. Species were assigned a value according to their conservation status; those 'At Risk' or 'Threatened' were valued at a higher level than those classified as 'Not Threatened'. Threat classifications have been sourced as follows: birds (Robertson et al., 2016); fish (Goodman, 2014) and plants (de Lange et al., 2018).

Horizons Regional Council One Plan identifies Schedule F habitats of Indigenous biological diversity, that are rare, threatened or at-risk habitats, this has also been taken into account.

Table 1 Assignment of values within the site to vegetation, habitats and species (adapted from Roper-Lindsay et al, 2018)

VALUE	SPECIES VALUE REQUIREMENTS	VEGETATION/HABITAT VALUE REQUIREMENTS
Very High	Nationally 'Threatened' species occur or expected to occur within the Project footprint on a permanent or seasonal basis.	Meets the majority or all of the ecological criteria outlined in Regional Policy Statement for the Manawatu-Wanganui region (Policy 6).

High	Nationally 'At Risk - Declining' species occur or expected to occur on a permanent or seasonal basis.	Meets some of the ecological criteria outlined in the Regional Policy Statement for the Manawatu-Wanganui region (Policy 6).
Moderate	Species listed in any other category of 'At Risk' occur or are expected to occur in the project area on a permanent or seasonal basis, this includes locally uncommon or distinctive species.	Habitat does not meet the ecological criteria outlined in the Regional Policy Statement for the Manawatu-Wanganui region (Policy 6) but does provide locally important ecosystem services (e.g. erosion and sediment control, and landscape connectivity).
Low	No species present that are Nationally Threatened, At Risk, locally uncommon or rare, or considered keystone species occur or are expected to occur within the project area seasonally or permanently, including nationally and locally common indigenous species.	Nationally or locally common habitat that does not provide locally important ecosystem services.
Negligible	Exotic species, including pests, and species with recreational values occur or are expected to occur within the project area either permanently or seasonally.	Limited ecological values other than as a local habitat.

3.2.3 Magnitude of Effects

In determining a rating for the magnitude of effects on each ecological value consideration was given to the scale of habitat loss relative to the size of the available resource, duration of the effect, likely effect at population level with respect to individual species and degree to which the Project was likely to impact on the sustainability of the ecosystem and associated species. The magnitude of the effects are described in Table 2. In considering the magnitude of effect, the timescale of potential effects must be considered, whether effects are permanent, long-term, or temporary.

The magnitude of an effect is determined based on best practise in terms of minimising effects and post construction restoration.

Table 2 Criteria for describing the magnitude of effects (Roper-Lindsay et al, 2018)

MAGNITUDE	DESCRIPTION
Very high	Total loss of, or very major alteration to, key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally change and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature.
High	Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature.
Moderate	Loss or alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature.
Low	Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns; AND/OR Having a minor effect on the known population or range of the element/feature.
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR Having negligible effect on the known population.

3.2.4 Overall Level of Effects

The last step in the effects assessment process was to determine the overall level of effect using the EIANZ matrix (Roper-Lindsay et al, 2018)

Table 3 Criteria for describing the level of effects (Roper-Lindsay et al, 2018).

MAGNITUDE	ECOLOGICAL VALUE				
	Very High	High	Moderate	Low	Negligible
Very High	Very High	Very High	High	Moderate	Low
High	Very High	Very High	Moderate	Low	Very Low
Moderate	High	High	Moderate	Low	Very Low
Low	Moderate	Low	Low	Very Low	Very Low
Negligible	Low	Very Low	Very Low	Very Low	Very Low
Positive	Net Gain	Net Gain	Net Gain	Net Gain	Net Gain

The level of effect or risk posed on ecological values ranges from very high/high to low/very low. Moderate level effects or greater, typically require measures to avoid, remedy or mitigate effects, while Low to Very low effects are not normally of concern, although care may be required to minimise effects through design, construction and operation.

4 Ecological description

4.1 Overview

The Springvale Structure Plan Area, is approximately 3.9km west of central Whanganui. The area is characterised by rural lifestyle land use, typically grazed exotic pasture with low ecological value. However, Titoki Wetland is located in the southern portion.

Titoki Wetland is located within the low-lying remnant dune environment, there is also a noteworthy strip of native vegetation (referred to as Mosston Park Vegetated Strip) (Figure 4); Titoki Wetland is located wholly on council owned land.

Within the Springvale Structure Plan Area there is a network of open channel drains for Stormwater management, many of which are ephemeral or intermittent and/or are not maintained. The associated drainage network doesn't connect to any major streams or the Whanganui River, other than through an urban piped network. The ecological value these areas provide is negligible. The proposed stormwater network will not significantly alter this drainage network, as it will only convey stormwater and overland flows. No fish surveys have been conducted on these drains, so species presence or absence cannot be confirmed.

Council owned infrastructure, drains an area of wet paddock (Wet Area 1) north of Titoki Wetland (Figure 4), this drain was recently cleared following an extended period of no drain maintenance. This lack of drain maintenance is thought to have resulted in the creation of the wet area identified in figure 4. Following this subsequent drain clearance, the wet area has completely disappeared/dried up. This area has minimal to no value as an ecological habitat.

When conducting the site visit a third potential wetland area was identified. However, site inspection revealed that this site is actually a grazed paddock which is subject to regular ponding.

This area was dominated by pasture in association with native and exotic sedge and rush species. This site can be seen in Figure 4 identified as “wet paddock”. The wet paddock is located adjacent to an open detention pond, which will be incorporated into the proposed stormwater and road network.

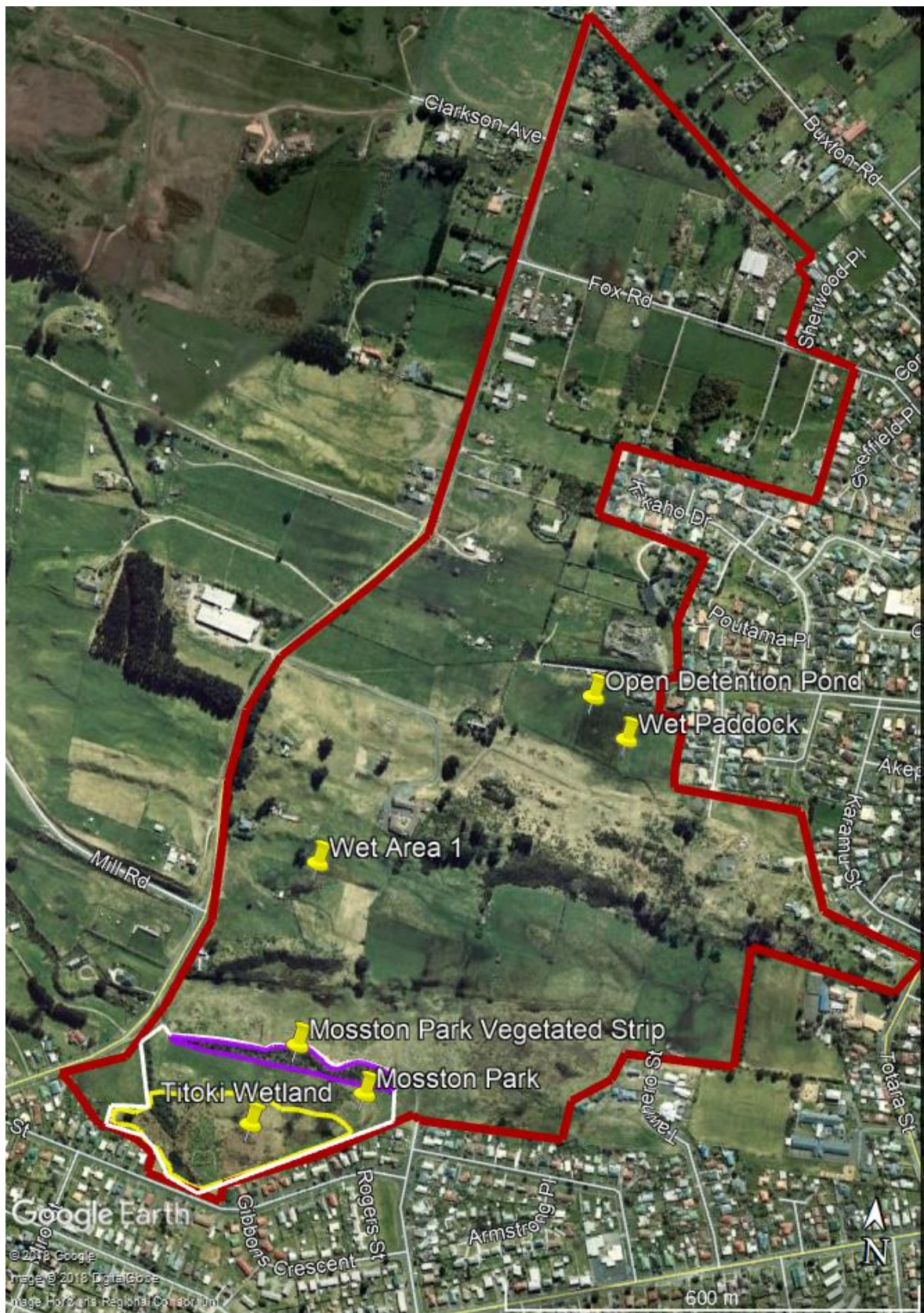


Figure 4: Wetland locations within the Springvale Structure Plan Area. The white border shows the location of Mosston Park (purple border) in relation to Titoki Wetland (yellow border).

4.2 Titoki Wetland

'Wetland' is described in the Resource Management Act as *'including permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions'*.

Schedule F of the Horizons Regional Council One Plan identifies indigenous biological diversity habitats that are rare, threatened or at risk. There is a set of criteria that a habitat must meet to be classified as a schedule F habitat.

Titoki Wetland within the Springvale Structure Plan Area has been identified as Swamp or Marsh wetland type (which is identified as a threatened habitat type under schedule F). Titoki wetland is approximately 2.6ha in size meaning that the wetland within the Springvale Structure Plan Area meets the size criteria (greater than 0.1ha of naturally occurring indigenous wetland) in Schedule F for threatened wetland habitat types. As this wetland is naturally occurring in what was previously an extensive dune system it is considered a Threatened habitat under Schedule F of the One Plan.

Titoki Wetland, located within Mosston Park, makes up the southern end of the reserve area. Titoki Wetland is identified as a priority A wetland in the Horizons Region (Lambie, 2008). Titoki wetland has had community involvement in its restoration since 1992. It is a naturally formed remnant of what was originally part of an extensive network of back dune wetlands.



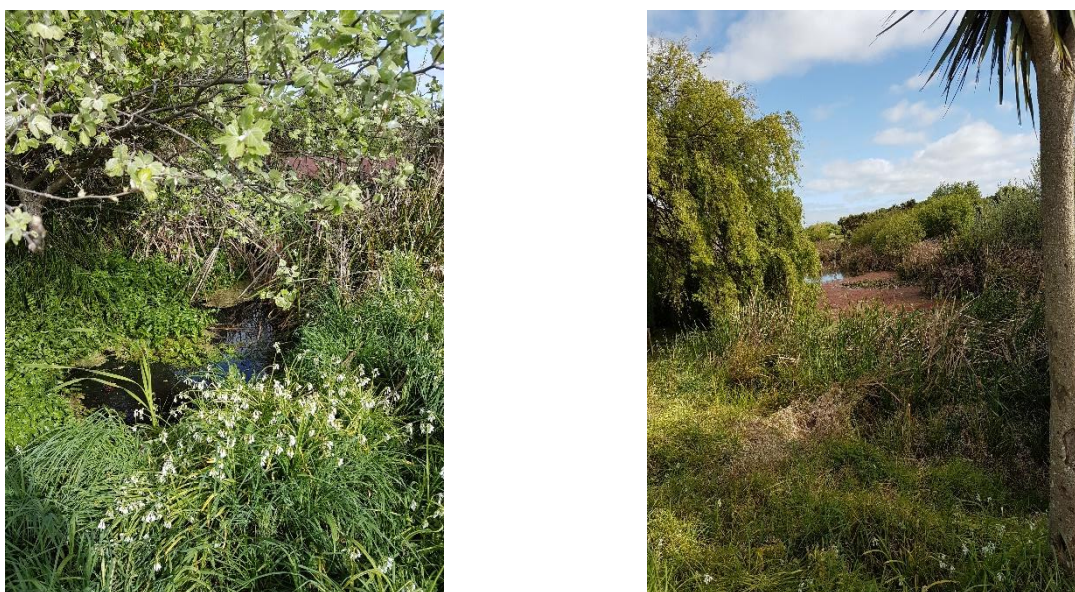


Figure 5: Titoki Wetland

Titoki wetland is a highly modified, semi urban wetland, particularly in its hydrology. The wetland discharges to the reticulation network and is fed via the surrounding road network. The water levels in Titoki Wetland are managed by Whanganui District Council Infrastructure team in order to manage flooding issues on neighbouring properties.

Titoki wetland is located within the residential environment, and there is a walking track around a portion of the wetland, aimed at encouraging community use of this reserve. A survey conducted by Horizons Regional Council in 2003 (appendix 1) identified 6 different vegetation components present in the wetland; open water, grass, reedland, flaxland, scrub and parkland. Some of these habitat types occurred more than once within the wetland environment.

Following the recent site visit the vegetated margin of Titoki wetland has been identified to contain 6 distinct plant communities (figure 6).

The drains associated with the wetland appear to be used by some members of the community as a rubbish dumping ground.

Titoki Wetland consists of an area of open water, surrounded by reedland/flaxland, with a boardwalk running through an area of 'parkland' habitat in the middle. To the North of the open water is an area of Canopy Vegetation (which is dominated by native species, described below). To the east of the water is an area of reedland/gorse. The species found in each habitat type are listed in Table 4.

The canopy vegetation present within the titoki wetland area is perhaps the only remaining area of original vegetation present at this site, it contains manuka, an At Risk, Declining species (de Lange et al, 2018). The 'canopy vegetation' was notably missing a robust native understorey, with only a few sporadic understorey species. The vegetation height of the 'canopy vegetation' was approximately 3m with some taller emergent trees.

The remainder of Mosston Park (a council owned reserve area) is dominated by grassland (figure 4), within Mosston Park there is also an area of relict native vegetation, (refer to figure 4 where this is described as 'Mosston Park Vegetated Strip').

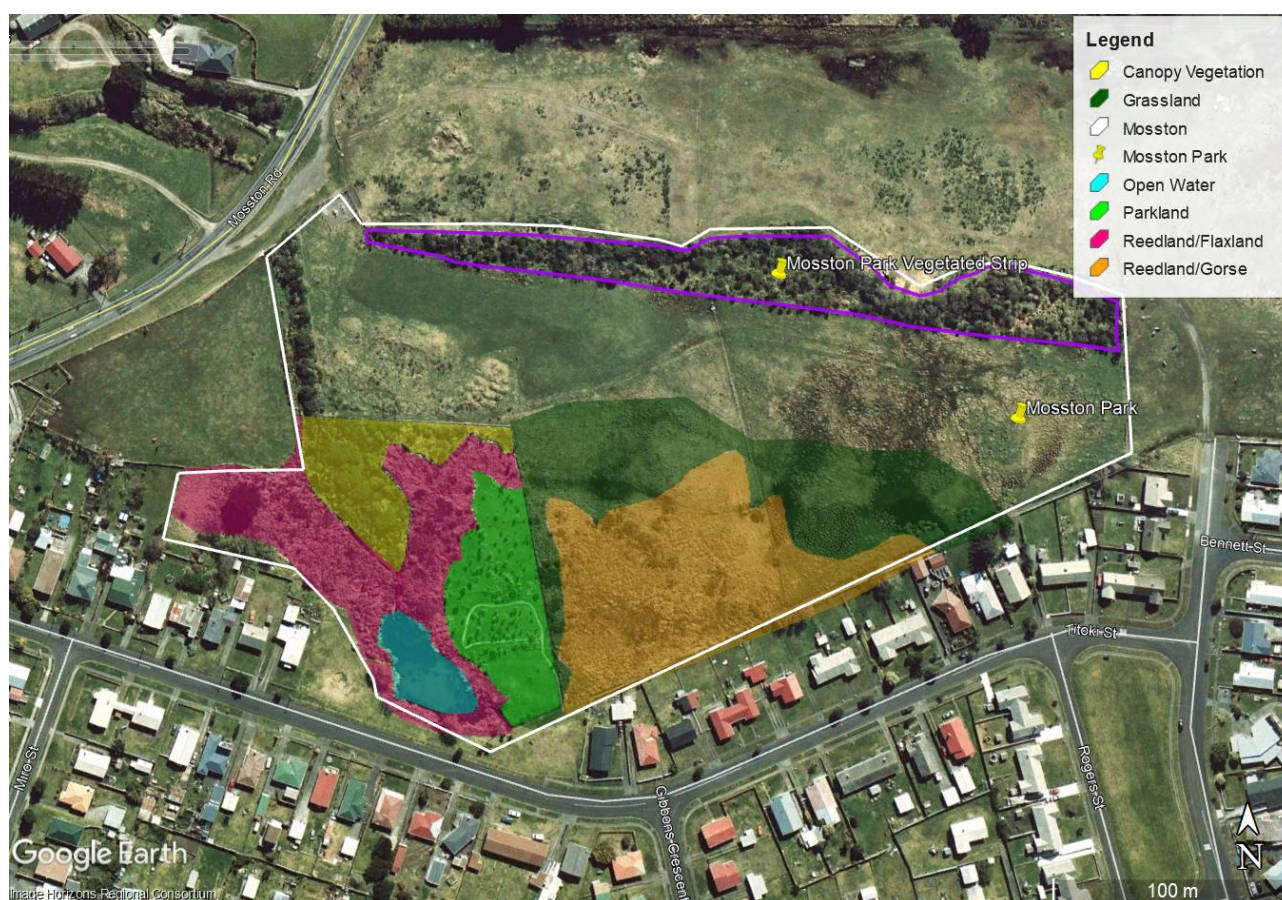


Figure 6: Titoki Wetland habitat areas on a 2005 aerial photograph. The Mosston Park boundary can be seen in white, and Mosston Park Vegetated Strip (discussed below) can be seen in purple.

The area of parkland has been recently planted as part of the Titoki Wetland restoration programme. Titoki Wetland provides a suitable habitat for many native and exotic bird species.

Table 4: Plant species found in each habitat type (* denotes an exotic species & ** denotes an At Risk, Declining species).

HABITAT TYPE	SPECIES LIST
Canopy vegetation	<ul style="list-style-type: none"> • Titoki (<i>Alectryon excelsus</i>) • Totara (<i>Podocarpus totara</i>) • Ngaio (<i>Myoporum laetum</i>) • Karamu (<i>Coprosma robusta</i>) • Manuka (<i>Leptospermum scoparium</i>)** • Kapuka (<i>Griselinia littoralis</i>) • Cabbage trees (<i>Cordyline australis</i>) • Kohuhu (<i>Pittosporum tenuifolium</i>) • Lemonwood (<i>Pittosporum eugenioides</i>) • Arum lily* (<i>Zantedeschia aethiopica</i>) • Red matipo (<i>Myrsine australis</i>) • Pepper tree (<i>Piper excelsum</i>) • Mahoe (<i>Melicytus ramiflorus</i>) • Hebe (<i>Veronica stricta</i>)

	<ul style="list-style-type: none"> • Exotic grass species* • Blackberry* (<i>Rubus fruticosus</i>) • Fennel* (<i>Foeniculum vulgare</i>)
Grassland	<ul style="list-style-type: none"> • Exotic grass species* • Gorse* (<i>Ulex europaeus</i>) • Braken (<i>Pteridium esculentum</i>) • Blackberry* (<i>Rubus fruticosus</i>) • Lupin* (<i>Lupinus spp.</i>) • Arum lily* (<i>Zantedeschia aethiopica</i>)
Open Water	<ul style="list-style-type: none"> • Azolla (<i>Azolla rubra</i>) • Common water lily* (<i>Nymphaea alba</i>) • Raupo (<i>Typha orientalis</i>) • Flax (<i>Phormium tenax</i>) • Pukio (<i>Carex secta</i>) • Willow* (<i>Salix spp.</i>)
Parkland	<ul style="list-style-type: none"> • Exotic grass species* • Cabbage trees (<i>Cordyline australis</i>) • Flax (<i>Phormium tenax</i>) • Ngaio (<i>Myoporum laetum</i>) • Karamu (<i>Coprosma robusta</i>) • Kapuka (<i>Griselinia littoralis</i>) • Onion weed* (<i>Allium triquetrum</i>)
Reedland/Flaxland	<ul style="list-style-type: none"> • Raupo (<i>Typha orientalis</i>) • Flax (<i>Phormium tenax</i>) • Umbrella sedge (<i>Cyperus ustulatus</i>) • Pukio (<i>Carex secta</i>) • Cutty grass (<i>Carex geminata</i>) • Toetoe (<i>Austroderia toetoe</i>) • Cabbage tree (<i>Cordyline australis</i>) • Braken (<i>Pteridium esculentum</i>) • Mingimingi (<i>Coprosma propinqua</i>) • Blackberry* (<i>Rubus fruticosus</i>) • Karamu (<i>Coprosma robusta</i>) • Kapuka (<i>Griselinia littoralis</i>) • Cabbage tree (<i>Cordyline australis</i>) • Ngaio (<i>Myoporum laetum</i>) • Kohuhu (<i>Pittosporum tenuifolium</i>) • Buttercup* (<i>Ranunculus spp.</i>) • Willow* (<i>Salix spp.</i>) • Gorse* (<i>Ulex europaeus</i>) • White poplar* (<i>Populus alba</i>) • Swamp kiokio (<i>Parablechnum minus</i>)

Reedland/Gorse	<ul style="list-style-type: none"> • Raupo (<i>Typha orientalis</i>) • Gorse* (<i>Ulex europaeus</i>) • Exotic grass species* • Blackberry* (<i>Rubus fruticosus</i>) • Pink ragwort* (<i>Senecio glastifolius</i>) • Cabbage tree (<i>Cordyline australis</i>) • Toetoe (<i>Austroderia toetoe</i>) • Lupin* (<i>Lupinus spp.</i>) • Arum lily* (<i>Zantedeschia aethiopica</i>)
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Without undertaking a detailed fish survey, it is not possible to assess with certainty whether any fish or eel species are present. It is reasonable to assume that common, non-threatened species may be present. However, there is nothing unique about the site that would suggest that it will have special significance to aquatic fauna.

4.3 Mosston Park Vegetated Strip

North of Titoki Wetland there is a vegetated strip, within Mosston Park (figure 4 & 6). This strip is approximately 330m in length, and at its widest point is 32m wide. This vegetated strip forms the outer boundary of Mosston Park (council owned land). This area will not be significantly affected by the proposed works.

The vegetated strip provides a suitable habitat for both native and exotic bird species. It is currently fenced and is dominated by Cabbage trees (*Cordyline australis*) above exotic grassland. Other species present and of note are umbrella sedge (*Cyperus ustulatus*), muehlenbeckia, mingimingi (*Coprosma propinqua*), makaka (*Plagianthus divaricatus*), coastal tree daisy (*Olearia solandri*) and North Island lacebark (*Hoheria populnea*). Of these species the makaka and coastal tree daisy are notable in the Whanganui area (NZPCN, 2018) and may be present as a relic from their coastal dune origins.

4.4 Fish

The Structure Plan Area is surrounded by a network of drainage channels which drain the historically wet area. There are no streams associated with the site as a whole.

There are no records in the New Zealand Fresh Water Fish Database for the drainage channels, or Titoki Wetland within the Springvale Structure Plan Area.

4.5 Fauna

The bird fauna is typical of modified semi urban environment, typical wetland birds were also noted in the wetland habitat. The birds noted at the time of the site visit are listed below:

- Pukeko (*Porphyrion melanotus*)
- Yellowhammer (*Emberiza citronella*)
- Tui (*Prosthemadera novaeseelandiae*)
- Blackbird (*Turdus merula*)
- Mallard Duck (*Anas platyrhynchos*)

- House Sparrow (*Passer domesticus*)
- New Zealand Fantail (*Rhipidura fuliginosa*)
- Magpie (*Gymnorhina tibicen*)
- Paradise Shelduck (*Tadorna variegata*)
- Australasian Harrier (*Circus approximans*)
- Welcome Swallow (*Hirundo neoxena*)
- Common Starling (*Sturnus vulgaris*)
- Pheasant (*Phasianus colchicus*)
- White-faced Heron (*Egretta novaehollandiae*)

The area is likely to provide habitat for other common native species not observed during survey. It is unlikely that the Springvale Structure Plan Area supports At risk or Threatened bird species with any regularity, due to the predominantly urban setting and large distances to suitable high value habitats.

Without undertaking a detailed lizard monitoring survey, it is not possible to assess with certainty whether any lizard or gecko species are present. It is reasonable to assume that common, non-threatened species may be present. However, there is nothing unique about the site that would suggest that it will have special significance to herpetofauna. The likelihood of At risk or Threatened lizard species being present is therefore considered to be low.

Without undertaking a bat survey, it is not possible to assess with certainty whether any bat species are present. Generally, trees greater than 45cm in diameter are considered suitable roosts for bats. There is therefore a low risk of bat habitat being disturbed by the proposal, due to the absence of large stature trees.

5 Assessment of ecological values

An assessment of ecological values present in Titoki Wetland and the Mosston Park vegetated strip located within the Springvale Structure Plan Area was undertaken by WSP Opus in October 2018. The main values for Springvale Structure Plan Area is the wetland, its distinctive wetland vegetation, the native terrestrial vegetation and the habitat that these areas provide for flora and fauna (Table 5).

Some birds were noted at the time of the assessment; however, it is likely that Titoki Wetland and other vegetated areas are also used by other birds as they are passing through the Springvale Structure Plan Area.

The main types of habitat the wetland and its associated vegetation provides for birds are:

- Riparian and wetland vegetation for shelter, roosting, and potentially nesting;
- Open water habitat for dabbling species;
- Open grassed areas for grazing and roosting; and
- Open water for feeding

Titoki wetland is dominated by common native vegetation, the presence of manuka is notable as this species is now classified as At Risk/Declining (de Lange et al, 2018). The predominance of reedland and flaxland surrounding the area of open water provides good quality habitat throughout the site. Titoki Wetland has a moderate diversity of plant species and is dominated by native species. It is considered that at least some of the vegetation is original native cover. Overall, it has a high intrinsic vegetation value.

Titoki Wetland is not connected to any permanent waterbodies. Therefore, it is unlikely that large populations of fish are present in this wetland. However, as eel species are known to migrate over land, it is possible that they could reach the wetland.

Titoki wetland is fed via the surrounding stormwater and road network, and discharges to the reticulated network. The water levels of the wetland are controlled by Whanganui District Council Infrastructure team, meaning Titoki wetlands hydrology is highly modified and may have compromised water quality. It is therefore considered that the value of Titoki Wetland as aquatic habitat is low.

The Mosston Park vegetated strip is dominated by common native species, and of these species makaka and coastal tree daisy are notable in the Whanganui area (NZPCN, 2018). It is considered that at least some of this habitat is original native cover. This results in a moderate intrinsic vegetation value.

Table 5: Assignment of value to habitat.

Vegetation/Habitat/Species	Value	Comments
Titoki Wetland (vegetation & Open water habitat)	High	Titoki wetland meets the criteria of a Schedule F threatened habitat and meets the criteria in Policy 6. The vegetation present is dominated by common native species. The open water habitat is highly modified and will not be significantly impacted by the proposed works. There is potential to further restore Titoki Wetland through plantings and further community involvement.
Mosston Park Vegetated Strip	Moderate	The Mosston Park vegetated strip is dominated by native species, some of which are locally distinctive.
Birds	Low	No at risk or threatened species of bird were noted to be present within the Springvale Structure Plan Area. It is unlikely that the Structure Plan Area supports any Threatened or At risk bird species with any regularity. However, it is worth noting that these sites may still be important for a diversity of native species.

6 Assessment of ecological effects

The main ecological effects from the Springvale Structure Plan resulting from the construction of the stormwater/road network and detention area and the re-zoning of approximately 60ha of rural lifestyle land are considered to be:

- Effects of habitat loss
- Effect of earthworks during the construction period

- Hydrological effects

6.1 Habitat Loss

The habitat to be lost (approximately 60ha of developed rural land) through the proposal in the Springvale Structure Plan Area is of low value and is dominated by agricultural grassland on small rural lifestyle properties. Construction of the stormwater network and associated road will result in approximately 38,900m² of habitat loss. The proposed stormwater detention area will slowly increase as development of the structure plan area proceeds (resulting in a total area of 44,140m²). This will replace an existing habitat dominated by exotic grass and gorse. The remainder of the area will have a zone change from Rural lifestyle to Residential, which will eventually result in higher density housing and less open grazing space. The areas of council owned land will be zoned under the Whanganui District plan as Reserve/Open Space and the areas important for stormwater management will be vested for stormwater purposes. This will result an area that can provide for both amenity and stormwater values.

Birds will be displaced temporarily whilst the earthworks are occurring. However, once the stormwater network and associated road is constructed, they will likely return to the area. More disruption is likely to occur during the residential development of the area.

The vegetation to be lost is predominantly exotic pasture species and a loss of grazing land. The native species to be lost are common and found throughout New Zealand.

6.2 Earthworks

6.2.1 Noise

Under certain circumstances substantial noise increases can reduce the likelihood of birds finding mates, and maintaining territory if they sing. In this case the period of increased noise will be limited to the construction period and the construction site/s. Short duration noise events are most likely to push birds further away from the construction zone whilst the works are occurring. The impact on birdlife is expected to be temporary and unlikely to cause long-term effects as there are likely to be very few breeding birds in the Springvale Structure Plan Area as the extent of suitable habitat is relatively small.

6.2.2 Construction

Earthworks involved in the construction of the stormwater network and associated road involve excavating existing dune areas. This work has the potential to generate substantial volumes of sediment, which if not dealt with correctly could potentially have downstream effects, impacting on Titoki Wetland.

Adoption of industry best practise sediment and erosion control methods, plus monitoring of construction works, should adequately contain any mobilised sediment and result in negligible effects to the ecology of the surrounding area.

6.3 Hydrological effects

The proposed stormwater network will convey stormwater and rain event overland flows. It will not intercept existing streams.

The inflows and outflows to Titoki Wetland will not be affected by the proposed stormwater network. Nevertheless, it is possible that during a flood event there will be some overland flow into

Titoki Wetland. As the water levels are managed by the Whanganui District Councils Infrastructure team, these increased water levels are unlikely to have a significant effect and the wetland will soon return to its maintained water level.

6.4 Magnitude of effects summary

Table 6 summarises the magnitude of effects on the key ecological features of the site and assigns a magnitude of effects rating to effects on habitat, construction processes, and the aquatic environment.

Table 6: magnitude of effects on the key ecological features of the site.

Vegetation/Habitat/Species	Magnitude	Comment
Titoki Wetland (vegetation & Open water habitat)	Low	The proposed works will have very little effect on Titoki Wetland, other than the potential increased water levels during flood events. The change in zoning will result in the wetland being in a more urban setting, this may increase the establishment of weed species and domestic and pest animals in the wider area.
Mosston Park Vegetated Strip	Low	The proposed works will have very little effect on the native vegetated strip. It is possible that this area will be used recreationally as open green space, by the surrounding residents. This site is located in the council owned portion of land, which is not to be developed, and will be retained as is or improved for recreation and amenity values.
Birds	Low	Birds within the Springvale Structure plan area may be displaced during construction of the road and stormwater network and during the subdivision process. However, the creation of a new stormwater detention area and two small reserve areas, may in fact provide additional habitat for the birdlife and increase the biodiversity of the Springvale Structure Plan Area. The urbanisation of the wider area, may result in more predators (specifically cats) in the Structure Plan Area, this may have an impact on birdlife in the area.

7 Overall level of effects rating

Table 7 provides an overall level of effects rating based on the EIANZ matrix shown in Table 3. Ecological values have been taken from Table 5 and the magnitude of effects from Table 6. The low overall effects rating for the key ecological attributes and features impacted by the project reflects low ecological values and the fact that the project will not have a significantly impact the ecology of the surrounding area.

Table 7: overall level of effects rating based on the EIANZ matrix.

Vegetation/Habitat/Species	Ecological value	Magnitude of effect	Level of effect
Titoki Wetland (vegetation & Open water habitat)	High	Low	Low
Mosston Park Vegetated Strip	Moderate	Low	Low
Birds	Low	Low	Very Low

The overall effect is very low to low for all key attributes. No offset mitigation is proposed. However, given that the stormwater detention area will be adjacent to Titoki Wetland in reserve zoned land, it could be designed to enhance ecological values of the surrounding area.

8 Effects minimisation

A summary of the measures proposed to minimise the effects of the project is given below. These measures address disturbance to wildlife during the construction period, and mitigation for the mobilisation of sediment and measures to reduce mortality of birds.

8.1 Habitat loss

The total area of the proposed Springvale residential area is 93ha and an area of approximately 60ha will be converted to residential development. This loss of habitat is predominantly rural lifestyle properties, which will result in a loss of exotic grassland habitat. The current vegetation present in the areas to be re-zoned Residential provide low value habitat for birds, and other fauna. This is because the vegetation is grazed and dominated by exotic species.

Titoki Wetland and the Mosston park vegetated strip are located on council owned land and will remain as reserve areas. Therefore, no mitigation for vegetation removal is considered necessary.

It is recommended that during the development of the Northern end of the Springvale Structure Plan Area, that the small patches native vegetation remain.

8.2 Disturbance to wildlife during construction

Birdlife will be disrupted during the construction phase of this project; however, the birds present within the project site are common native and introduced species. This will be caused by increased noise levels, dust, and movement during the construction period.

It is recommended that this work be conducted during autumn and into winter as most bird species will have finished nesting by this time. This will result in less birdlife being present at the site, therefore less birds to be disturbed by the activity. No mitigation is considered necessary.

8.3 Mitigation for habitat temporarily disturbed

It is recommended that all habitat, particularly pastoral, that will be disturbed, but not permanently lost during construction of the proposed stormwater and road network be returned to its original state. Any areas of exposed earth (as a result of construction) will be revegetated to minimise sediment loss as soon as is practicable.

8.4 Measures to reduce mortality

8.4.1 Construction Season

Our assessment is that while it is possible for common waterfowl to be breeding on site, this is unlikely as Titoki Wetland is set within an urban setting. Titoki Wetland has a walking track, commonly used by the community and their dogs, which would also discourage breeding birds in this location.

As a precautionary measure it is recommended that immediately prior to construction the site should be thoroughly inspected for any significant birdlife by an appropriately qualified ornithologist or ecologist, prior to the commencement of vegetation clearance for the stormwater and road network development.

8.4.2 Post construction

Following the construction of the new road and stormwater network, it is recommended that domestic animals (within the Springvale Structure Plan Area) be kept under control, particularly in the reserve and open space areas. Signage should be erected to ensure that dogs are kept on lead. It is also recommended that cats stay inside at night, to protect the biodiversity of birdlife in the wider Springvale Area.

8.5 Sediment and discharges

It is expected that any sediment mobilised by construction will be appropriately managed through the production of an erosion and sediment control plan, adoption of industry best practise sediment containment methods and appropriate site monitoring.

An erosion and sediment control plan will be prepared as part of the resource consent to permit the proposed stormwater network and will take into account the principles and practises set out in the Horizons Regional Council One Plan. No other mitigation will be required for the construction phase.

9 Proposed biodiversity enhancement

The open stormwater detention area will be vested for stormwater purposes and zoned under the Whanganui District Plan as Reserve/Open Space area.

There is potential for this stormwater detention area to be designed to enhance the ecological values of the Springvale Structure Plan Area as a whole. This would be dependent on the design of the stormwater detention area, however if there is to be a permanently wet area this could be enhanced to provide habitat for birds and native plants, whilst not interfering with stormwater management. This could form a link between Titoki Wetland and the area of native vegetation, making the council owned area of land attractive for recreational users. It is recommended that an Ecologist is involved in the design of the stormwater detention area to achieve these outcomes.

Titoki Wetland has the potential to be enhanced through restoration/management plans to enhance the amenity value of the area and create a reserve/open space area available to the community for recreational purposes. Any areas set aside for this purpose should be appropriately designated to provide for their protection and recognition of values.

The Mosston Park Vegetated Strip also has potential to be enhanced through further planting and fencing. This site could provide great recreational and amenity values to Mosston Park, further increasing its use as an open green space area within the proposed Residential area.

10 Conclusion

Whanganui District Council has developed a Springvale Structure Plan, which proposes to rezone approximately 60ha of Rural lifestyle land to Residential. This requires an upgrade to the stormwater and road network within the area.

The change to a residential setting and the proposed stormwater network will result in a number of effects. These impacts include loss of habitat, wildlife disturbance, potential for wildlife mortality, and effects of sediment/discharges to Titoki Wetland located in the southern most area of the Springvale Structure Plan, within Mosston Park. Other effects that are likely to arise from the development of the Springvale area include increased numbers of pest plants and pest animals, which may have effects on the significant ecological areas at the southern end of the Springvale Structure Plan Area. The overall level of effects has been assessed as low/very low.

The Titoki Wetland and the Mosston Park Vegetated Strip are areas of significant ecological value, located within the council owned portion of land, which will remain as reserve. This area will eventually be surrounded by residential development, which may result in a minor shift from the baseline conditions of Titoki Wetland and the vegetated strip. However, it is important to note that the underlying character and composition of these sites will remain similar to the predevelopment circumstances. Any effects on the known populations/range of plant and animal species found in these sites will be minor. Where it is not possible to avoid these effects, effects minimisation has been recommended.

Provided the recommended minimisation of effects is undertaken and industry best practise is adhered to, the overall level of ecological effects of the Springvale Structure Plan area are expected to be low and no mitigation will be required.

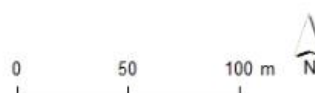
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12 Appendices



Habitat Layers (Schedule F Values) for
Springvale Structure Plan PC53





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