Appendix 15c – Draft Wetland Management and Enhancement Plan



Te Awamutu Senior Living Project

Wetland Management and Enhancement Plan

Prepared for:

Te Awamutu Developments Ltd

Prepared by:

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Table of Contents

Executive Summary 3

1. Introduction 4

1.1. Background and purpose 4

1.2. Site description 5

2. Ecological context 6

2.1. Landscape context 6

2.2. Vegetation and wetlands 7

3. Restoration Planting Plan 7

3.1. Overview and planting objectives 7

3.2. Site preparation 8

3.3. Planting specifications 10

3.4. Ongoing maintenance 14

3.5. Weed control 14

3.6. Predator control 15

4. Reporting 17

4.1. Planting success 17

4.2. Predator control monitoring and reporting 17

Appendix A: Masterplan 18

Appendix B: Stormwater Pond B Schematic Plan 19

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Executive Summary

Phoenix Ecology Ltd has been contracted by Te Awamutu Developments Ltd to prepare a Wetland Management and Enhancement Plan (WMEP) to guide the management of potential adverse effects on terrestrial and aquatic habitats associated with the proposed development of a senior living development at 2025 Ōhaupō Road, Te Awamutu ('the site'). This WMEP was prepared as a draft to support an application through the Fast Track Approvals Act 2024 (FTAA) and is informed by findings of the ecological impact assessment report, which assessed potential adverse effects on terrestrial and aquatic ecology values and made high-level recommendations to avoid, minimise or remedy these effects. This WMEP details restoration measures including planting and predator control proposed across the site and should be read in conjunction with the Lizard Management Plan (LMP) for managing effects on lizards, and the Ecological Management Plan (EMP) detailing fauna management measures for bats, birds and fish.

The project proposal involves the construction of stand-alone villas and duplexes, a community hub and a care home over an area of approximately 25 ha, to be completed in several stages, together with associated roading and stormwater infrastructure. The works will involve the removal of two artificial ponds and upgrading of existing culverts, and the loss of one small wetland (33 m²) to allow for a stormwater pond to be constructed. Vegetation clearance (of largely exotic vegetation) is proposed over an area of 10,400 m². Restoration of several wetlands over an area of approximately 10,000 m², and terrestrial restoration planting over an area of approximately 6,000 m², is also proposed as part of the development, alongside infill planting within the kahikatea remnant (SNA, ID WP312). Riparian habitat restoration is also proposed along approximately 860 m of the retained watercourse and pond system. All areas in this plan are indicative, with final areas being at least of the same size (or larger). The landscape architecture plan includes further design strategy details.

This WMEP outlines restoration measures to enhance biodiversity value across the site through planting, weed and predator control. Restoration planting objectives are to restore and enhance wetland habitat, increase wetland area on site, improve the condition of the kahikatea remnant through infill planting, increase fauna habitat, including bat foraging habitat, across the wetland and terrestrial planting areas, and restore aquatic and riparian habitat along the retained watercourse and pond system. Planting specifications, including species suites, spacings, plant grades and planting areas, are provided for each of the four restoration areas: wetland restoration, terrestrial restoration, infill planting and riparian restoration. Open water restoration is also included at Stormwater Pond B, through habitat enhancement in open water.

Ongoing maintenance, weed control and a predator control programme are proposed to support the long-term success of this restoration planting, with predator control implemented across all restoration planting and key habitat areas for a minimum of 15 years. Monitoring and reporting requirements are detailed for both planting success and predator control effectiveness, to ensure restoration objectives are achieved and can be adaptively managed over time.

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1. Introduction

1.1. Background and purpose

Phoenix Ecology Ltd have been contracted by Te Awamutu Developments Ltd to prepare a Wetland Management and Enhancement Plan (WMEP) to guide the management of potential adverse effects on terrestrial and aquatic habitats associated with the proposed development of a senior living development at 2025 Ōhaupō Road, Te Awamutu ('the site'). The site is located in a rural area at the northern outskirts of Te Awamutu township (Figure 1).

The Project will provide approximately 414 dwellings/units (including single-storey houses, duplex units and apartments), and a 100-bed care facility. The development will also feature communal facilities and a neighbourhood centre, restoration planting, three waters services infrastructure, and transport infrastructure. The project is designed to cater specifically to an ageing population, addressing a critical need for retirement housing and care capacity.

The development will proceed in alpha-numeric order as set out on the attached plan (Appendix A), notwithstanding that some downstream infrastructure that lies within latter stages will need to be constructed at the time that the earlier stages require it.

This WMEP was prepared as a draft to support an application through the Fast Track Approvals Act 2024 (FTAA), and is informed by findings of the ecological impact assessment report[1], which assessed potential adverse effects on terrestrial and aquatic ecology values, and made high-level recommendations to avoid, minimise or remedy these effects. This WMEP details restoration measures including planting and predator control proposed across the site, and should be read in conjunction with the Lizard Management Plan (LMP)[2] for managing effects on lizards, and the Ecological Management Plan (EMP)[3] detailing fauna management measures for bats, birds and fish.

The project proposal involves the construction of a senior living development featuring stand-alone villas and duplexes, a community hub and a care home over an area of approximately 25 ha, to be completed in several stages. Associated roading and stormwater infrastructure are also proposed (Appendix A). The works will involve the removal of two artificial ponds and upgrading of existing culverts, and the loss of one small wetland (33m^2) to allow for a stormwater pond to be constructed. Vegetation clearance (of largely exotic vegetation) is proposed over an area of 10,400 m^2.

Restoration of several wetlands over an area of approximately 10,000 m^2, terrestrial restoration planting over an area of approximately 6,000 m^2, and riparian restoration planting over a length of approximately 860 m of watercourse is also proposed as part of the development.

Predator control will be implemented across all restoration areas to provide additional ecological benefit and increase quality of restored habitat. Cats or other domestic animals (except dogs) will not be allowed within the project site.

[1] Phoenix Ecology 2026. Te Awamutu Senior Living Project. Ecological Assessment Report. Prepared for Te Awamutu Developments Ltd, by Phoenix Ecology Ltd.
[2] Phoenix Ecology 2026. Te Awamutu Senior Living Project. Lizard Management Plan. Prepared for Te Awamutu Developments Ltd, by Phoenix Ecology Ltd. Prepared separately to support a Wildlife Act Authority application to salvage and relocate lizards.
[3] Phoenix Ecology 2026. Te Awamutu Senior Living Project. Ecological Management Plan. Prepared for Te Awamutu Developments Ltd, by Phoenix Ecology Ltd.

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This WMEP outlines restoration measures to enhance biodiversity value across the site through planting, weed and predator control. The WMEP includes the following aspects:

- Restoration and planting objectives across the site;
- Site preparation;
- Planting specifications and areas;
- Maintenance requirements;
- Weed control measures;
- Predator control programme; and
- Reporting.

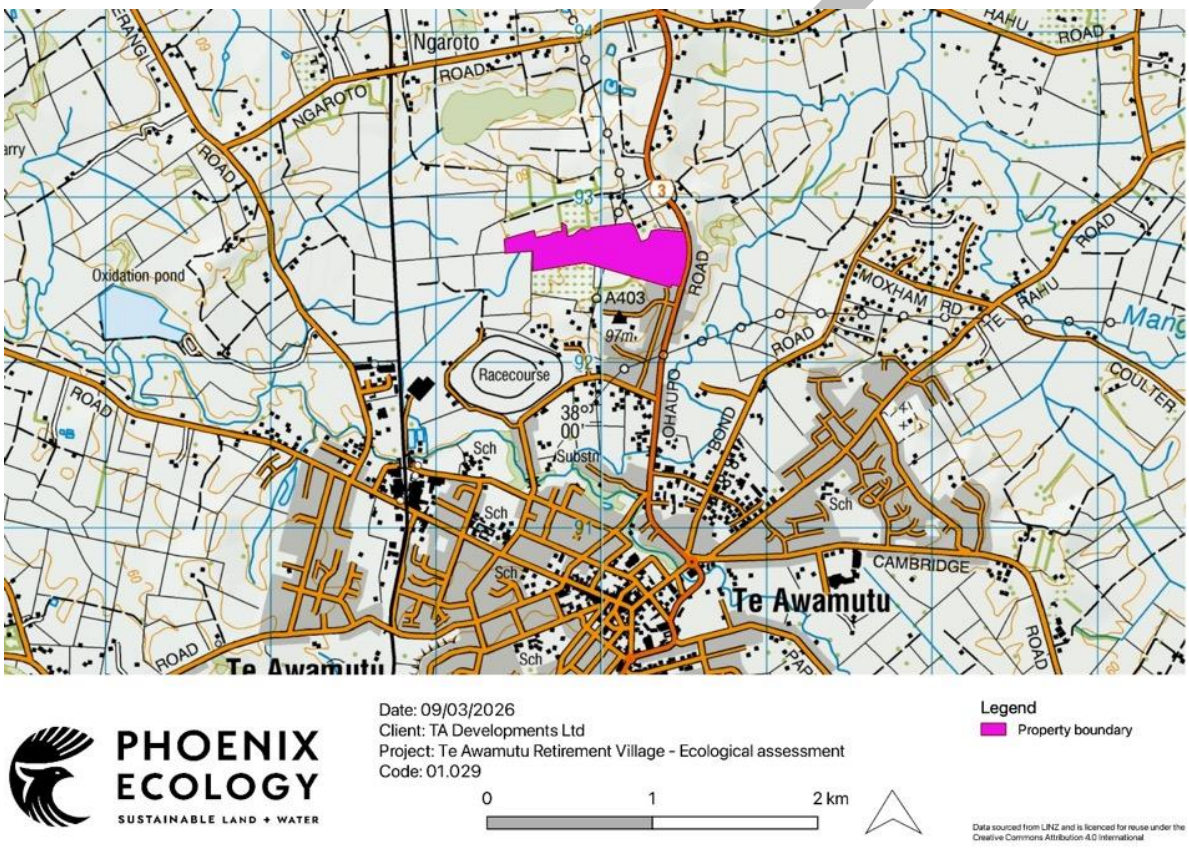


Figure 1 Site location

1.2. Site description

The development site is located on the northern outskirts of Te Awamutu, in a landscape characterised by agricultural (mostly dairy farming) landuse and residential area to the south. Several kahikatea forest remnants, including a large example located south of Ngaroto Road, Yarndley's Bush, are present within the wider landscape surrounding the site (Figure 1).

Existing vegetation cover at the site includes open, currently grazed pastureland, a residential dwelling and associated garden landscape, exotic individual specimen trees, several wetland areas, and a kahikatea remnant that has been identified as a Waipā District Significant Natural Area (SNA, ID

WP312). While the kahikatea remnant has been fenced off preventing stock access, the wetland areas are impacted by grazing and stock access (Figure 2).

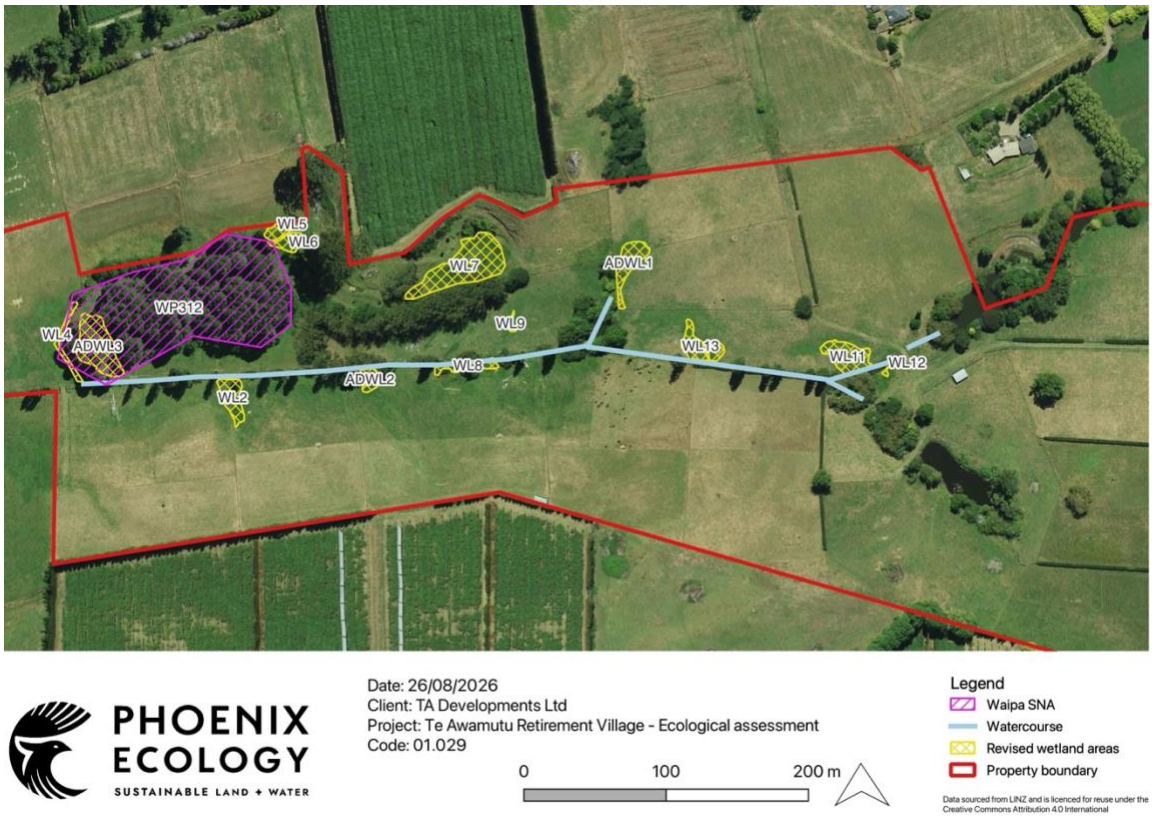


Figure 2 Ecological features at the site

2. Ecological context

2.1. Landscape context

The site sits mainly amid pastoral agriculture, at the intersection of the Hamilton and Waipā Ecological Districts within the Waikato Ecological Region. Nearby ecological features include indigenous forest remnants, wetlands, and peat lakes, including Moanatuatua Bog to the north, a 14,000-year-old peat bog reduced from 7,500–8,500 ha to roughly 140 ha through drainage and agricultural conversion, now the best remaining restiad rushland in the Hamilton Ecological District. Yarndley's Bush (SNA ID WP309, 13.5 ha), 750 m north, is the largest kahikatea remnant in the Waipā District.

Originally lowland podocarp-broadleaved forest with kahikatea (*Dacrycarpus dacrydioides*), rimu (*Dacrydium cupressinum*), and totara (*Podocarpus totara*), most cover has since been cleared for agriculture, leaving small remnants of kahikatea, wetlands, and peat lakes. Land use is now mainly dairying, pastoral agriculture, and horticulture, with small remnants of indigenous vegetation[4].

[4] McEwen, W.M. 1987. Ecological Regions and Districts of New Zealand. Third revised edition in four 1:500,000 maps. Department of Conservation, Wellington, New Zealand. June 1987.

2.2. Vegetation and wetlands

Existing vegetation includes grazed pastureland, a residential dwelling with garden landscape, exotic specimen trees, and several wetland areas. Exotic trees include Lombardy poplar, alder, and willow.

A kahikatea remnant (Waipā District SNA, ID WP312) is present on site, fenced to exclude stock, with a regenerating understory of indigenous pioneer species including mahoe, kanuka, and treefern. Exotic weeds, particularly gorse and kiwifruit vine, occur along the stand edges.

Ponds upstream of the watercourse support a mix of exotic species (willow, oak, alder, blackwood) and indigenous species (treefern, harakeke, cabbage tree, lemonwood, kawakawa). Downstream, the watercourse has sparse riparian vegetation, predominantly exotic (Lombardy poplar, pin oak, alder, Chinese privet, climbing ivy, barberry), with scattered indigenous wheki ponga.

Wetlands amongst pasture were predominantly exotic (waterpepper, creeping buttercup, dock), with low to very low diversity and degraded from stock access and grazing (Appendix B). Indigenous species were limited, e.g. *Carex secta* and *Juncus pallidus*; with no threatened species recorded. Despite being small, fragmented, and degraded, these wetlands provide fauna habitat (including bird and bat foraging) and catchment functions such as flood attenuation and nutrient/sediment filtration.

Wetlands are mapped in Figure 2, with wetland names reproduced from the original assessment, and three additional wetlands (ADWL1 – ADWL3).

No 'Threatened' or 'At Risk' plant species were recorded at the site.

3. Restoration Planting Plan

3.1. Overview and planting objectives

The objectives of this restoration planting plan are to:

- Restore and enhance wetland habitat across the site;
- Improve the condition of the kahikatea remnant (SNA ID WP312) through infill planting, weed control, and predator control;
- Increase wetland area on site;
- Increase terrestrial fauna habitat, including bat foraging habitat through wetland and terrestrial planting, replace lost potential bat roost trees, weed and predator control;
- Improve aquatic habitat through the restoration (weed control and infill planting) of the riparian corridor across the site; and
- Enhance biodiversity values across the site through the above measures.

This plan describes proposed restoration planting measures, a planting schedule, restoration and enrichment of affected areas, a schedule of species to be planted, and planting specifications and spacings. It also outlines measures for protecting existing vegetation and avoidance of weed dispersal.

Areas to be restored across the four restoration objectives (wetland, terrestrial, infill and riparian) are shown in Figure 3.

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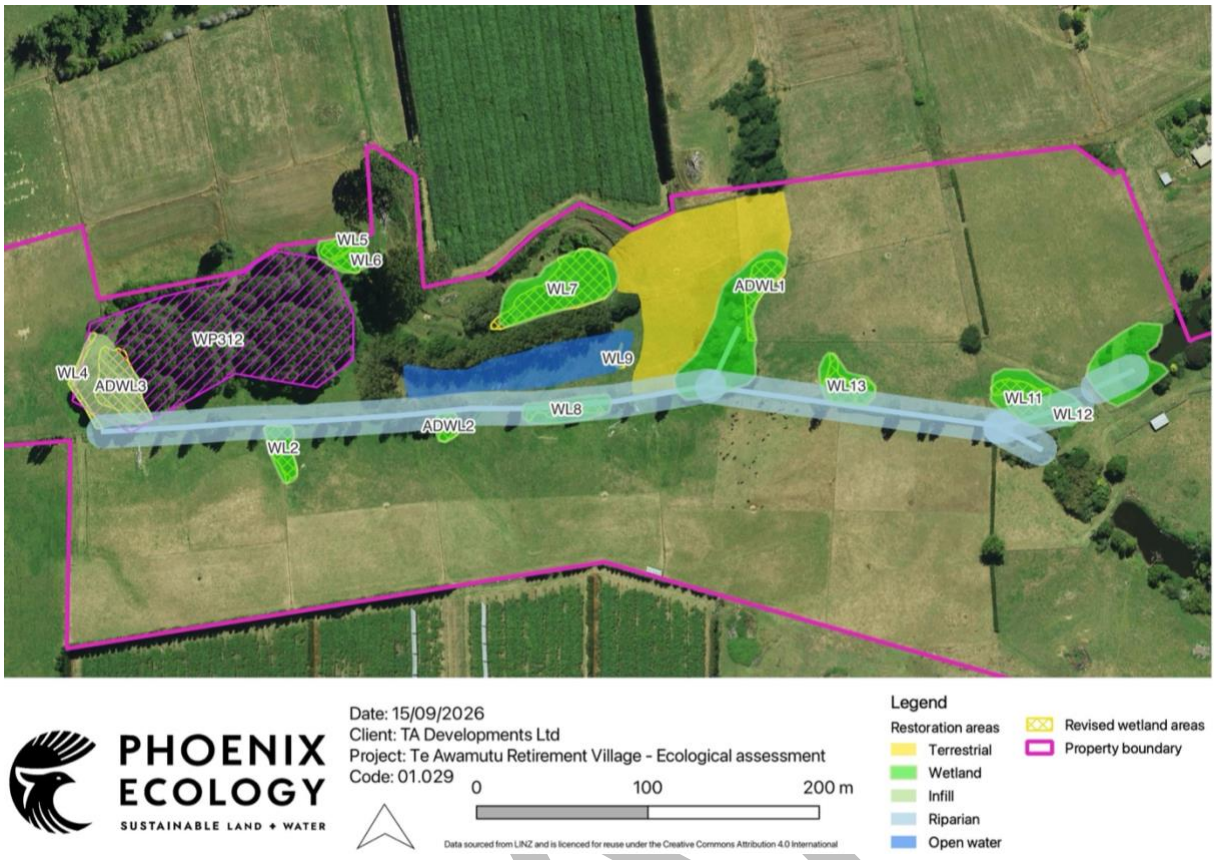


Figure 3 Restoration areas

Total planting areas are outlined in the tables below are estimates, which will be finalised once the total area of wetland enhancement, terrestrial and infill planting is confirmed for each site area. The final areas will be at least of the same size, or larger, than what is included in this plan. The landscape architecture plan includes further design strategy details.

Restoration planting is based on a relatively simple (for executability) palette of suitable species for each planting area and the site context. Plant species were selected to suit local climatic and soil requirements and should be ecosourced from the Hamilton and Waipā Ecological Districts for best plant survival.

3.2. Site preparation

Any pest plants within planting sites should be controlled well in advance of planting. Spot-spraying for control of weed and grass growth within the planting areas should be carried out with a contact herbicide (e.g. Roundup G2 or other glyphosate formulation with 'Pulse') about 14 days prior to planting. This reduces competition and reduces the amount of maintenance required in the first few months.

Planting is best done in late autumn/winter (May to September) after there has been enough rain for soil moisture to increase from the dry summer period. Planting at this time allows plants to put on significant root growth while the soil is still warm so that when the spring flush starts, they are already well established.

Plants should be eco-sourced from the Hamilton or Waipā Ecological District and collected from naturally occurring indigenous vegetation located as close to the site as practical. Eco-sourcing is the

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process of propagating native plants from local areas and planting them back within the same region. This helps maintain the genetic diversity of local plants, ensures plants are adapted to local conditions and retains the unique character of a landscape. Plants growing in different habitats may not survive as well. Eco-sourcing plant material is an established restoration concept which ensures that plants are well suited to the site as well as maintaining local genetic diversity.

All plants should be exposed to sun, wind and temperatures that are similar to the climatic conditions at the site by the nursery before being planted. If they are being stored prior to planting, they should be kept well-watered at all times as plants that undergo drought stress prior to planting have a much higher chance of mortality following planting.

Plants chosen should be of a minimum planting grade PB3 (2L), healthy specimens, at a minimum height of 20 cm tall, with a well-developed root ball, but not root-bound.

Planting should be done according to best practice guidelines, outlined below:

- Where no flood risk exists, restoration planting zones will be treated with a 100mm (settled) layer of aged cambium bark mulch or TerraMulch matting prior to planting;
- Screened topsoil will be used to ensure no weed propagules are spread into the area;
- Topsoil shall be used in areas where soils have been disturbed by earthworks and that require revegetation;
- Plants are watered well prior to planting;
- If possible, plants are not left in the sun and wind for more than five minutes;
- Planting holes are twice the size of the plant container;
- A slow-release fertiliser is used in all planting holes. Fertiliser is to be an NPK general shrub and tree fertiliser;
- The collar of the plant is located above the soil;
- All plants will be staked with non-treated wooden stakes ensuring plants are not restricted by ties and guys; and
- At completion of the planting, all plants shall be healthy and of good form, with the planting areas tidy and weed free.

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3.3. Planting specifications

Planting proposed at the site will cover wetland planting, terrestrial planting, and infill planting of the SNA kahikatea remnant.

The tables below outline planting specifications including species, spacings, plant grades, planting typology, plant heights and a general description for each species, for the two planting objectives.

3.3.1. Wetland restoration

Restoration planting of approximately 10,000 m² is proposed across the wetland areas present and retained on site. This will include both restoration of currently degraded wetland area, and an overall increase in wetland area, with currently grazed pasture returned to wetland vegetation.

Planting will comprise suitable indigenous wetland plant species selected to reflect the ecological character of each wetland, to restore wetland function and integrity across the site.

This restoration is intended to enhance the ecosystem services provided by these wetlands, including nutrient attenuation, flood control, habitat provision and biodiversity values. The species suite proposed for each wetland area is outlined in Table 1 below.

Table 1 Wetland restoration planting

Total area: 10,000 m2		**10,000**	**Total number of plants:**		**28774**	
Scientific name	**Common name**	**Spacing (cm)**	**Pot size**	**Percentage within mix**	**Number of specimens**	**Notes**
Carex lessoniana	Rautahi	100	PB3/2L	15	1719	0.8-1.5m tall
Carex secta	Makura sedge	50	PB3/2L	15	6875	1.5m tall
Carex geminata	Rautahi / cutty grass	50	PB3/2L	10	4583	0.5-1.2 m tall
Carex virgata	Pukio, swamp sedge	50	PB3/2L	15	6875	0.2-1.5m tall
Coprosma tenuicaulis	Hukihuki	50	PB3/2L	15	6875	Small shrub up to 2.5m tall
Laurelia novae-zelandiae	Pukatea	150	PB3/2L	5	255	35 m
Dacrycarpus dacrydioides	Kahikatea	150	PB3/2L	5	255	50 m
Machaerina rubiginosa	Baumea	100	PB3/2L	5	573	0.3–1.2m tall
Phormium tenax	Harakeke	150	PB3/2L	15	764	Up to 2m tall
				100	28774	

3.3.1. Terrestrial restoration

Terrestrial habitat restoration is proposed over an area of approximately 6,000 m², within land currently grazed and dominated by exotic pasture grasses. Restoration planting will convert this area to indigenous terrestrial vegetation, including cavity-bearing species, providing high value habitat for bats, birds and lizards, and complementing the wetland and SNA habitat retained elsewhere on site. Tall tree species have also been included in the planting schedule to replace lost potential bat roost trees over time among this planting area.

In addition to its habitat value, this planting will provide a buffer between the development and adjoining key habitat features, helping to reduce indirect effects such as artificial lighting and noise on these areas. Proposed species and planting specifications are outlined in

Table 2 below.

Table 2 Terrestrial restoration planting

Total area: 6,000 m2		**6,000**	**Total number of plants:**		**1804**	
Scientific name	**Common name**	**Spacing (cm)**	**Pot size**	**Percentage within mix**	**Number of specimens**	**Notes**
Coprosma areolata	Aruhe / Thin-leaved coprosma	150	PB5/3L	10	306	3-5m tall
Corynocarpus laevigatus	Karaka	250	PB8/5L	5	55	Up to 12m tall
Dacrydium cupressinum	Rimu	250	PB8/5L	*10*	110	35-60m tall
Griselinia lucida	Karanga	150	PB5/3L	5	153	2-3m tall
scoparium var. scoparium	Manuka	150	PB5/3L	10	306	Up to 5m tall
Myrsine australis	Mapou / Red Matipo	140	PB5/3L	10	351	Hedge, up to 6m tall
Phormium tenax	Harakeke	200	PB5/3L	10	172	Up to 2m tall
Pittosporum crassifolium	Karo	200	PB5/3L	5	86	1-10m tall
Pittosporum tenuifolium	Kohuhu / Black Matipo	200	PB5/3L	5	86	Up to 10m tall
Podocarpus totara	Totara	400	PB8/5L	15	64	Up to 30m tall
Sophora microphylla	Kowhai	300	PB8/5L	15	115	Up to 20m tall
				100	1804	

3.3.2. Infill planting

Infill planting is proposed over an area of approximately 1,700 m² within canopy and understorey gaps at the western extent of the kahikatea remnant (SNA, ID WP312). This planting will enhance the existing indigenous vegetation structure of the SNA by closing gaps and supporting its ongoing regeneration.

Species selected for infill planting will reflect those already present within the SNA, to maintain the ecological character of the remnant and support its long-term integrity. The species suite proposed is outlined in Table 3 below.

Table 3 Infill planting

Total area: 1,700 m2		**1,700**	**Total number of plants:**			**271**
Scientific name	**Common name**	**Spacing (cm)**	**Pot size**	**Percentage within mix**	**Number of specimens**	**Notes**
Dacrycarpus dacrydioides	Kahikatea	300	PB8/5L	40	87	50m
Dacrydium cupressinum	Rimu	300	PB8/5L	5	11	35-60m tall
Laurelia novae-zelandiae	Pukatea	300	PB8/5L	20	43	35m
Pectinopitys ferruginea	Miro	300	PB8/5L	10	22	15m
Phormium tenax	Harakeke	200	PB3/2L	20	97	Up to 2m tall
Podocarpus totara	Totara	300	PB8/5L	5	11	Up to 30m tall
				100	271	

3.3.3. Riparian restoration

Infill restoration planting is proposed along the length of the existing watercourse and the retained pond system, covering approximately 860 m of watercourse where riparian margins are currently dominated by exotic vegetation. Restoration will involve infill planting with suitable indigenous plant species, alongside the selective removal of exotic weed species wherever invasive weeds are present. Other exotic non-invasive vegetation along this corridor will be retained to minimise disturbance to fauna that could be present.

Planting of about 50% of area with a width of 10 m on either side (i.e. a total width of 20 m) has been assumed along the corridor, equalling an approximate infill planting area of 8,600 m^2.

This planting will restore aquatic and riparian habitat and ecological function along the watercourse and pond margins, complementing the wetland, terrestrial and infill planting proposed elsewhere on site. Proposed species and planting specifications are outlined in

Table 4 below.

Table 4 Riparian restoration infill planting

Total area: 8,600 m2		**8,600**	**Total number of plants:**			**7665**
Scientific name	**Common name**	**Spacing (cm)**	**Pot size**	**Percentage within mix**	**Number of specimens**	**Notes**
Carex geminata	Rautahi / cutty grass	100	PB3/2L	10	985	0.5-1.2 m tall
Carex secta	Makura sedge	100	PB3/2L	25	2464	1.5m tall
Carex virgata	Pukio	100	PB3/2L	25	2464	1m tall
Coprosma areolata	Aruhe / Thin-leaved coprosma	150	PB3/2L	5	219	3-5m tall
Coprosma propinqua	Miki	150	PB3/2L	5	219	3-6m tall
Coprosma virescens	Mikimiki	150	PB3/2L	5	219	5m tall
Cyperus ustulatis	toetoe-upoko-tangata	150	PB3/2L	10	438	Up to 0.65m tall sedge
Gleichenia dicarpa	Matua-rarauhe	150	PB3/2L	2	88	Up to 2m tall
Leptospermum scoparium var. scopar	Manuka	150	PB3/2L	8	350	Up to 5m tall
Phormium tenax	Harakeke	150	PB3/2L	5	219	Up to 2m tall
				100	7665	

3.3.4. Open water re-creation

In addition to riparian restoration, open water restoration is proposed within Stormwater Pond B (Appendix B) in order to replace the function of the lost pond system (Appendix A), leading to the loss of ponded habitat in particular important for eels.

The open water habitat will be replaced through habitat creation within one of the stormwater ponds (SW Pond B, Appendix G). This stormwater pond (c. 2,500 m^2) will be connected to the groundwater as well as the watercourse (allowing fish passage) and contain water permanently, with flow directed

through the pond via a mainstream 300mm culvert, maintaining natural flows up to a 2-year flood event. A second high flow bypass culvert will direct flows above the 2-year event towards the pond to a splitter MH (1300mm culvert). At this MH a small outlet pipe will direct base line flows to the wetland, with the high bypass flows directed back to the existing watercourse. The exit culvert will be a 3 m wide, 1 m high box culvert, using either a baseless box culvert to minimise impact on the existing stream, or a similar sized (flow) arch culvert.

A V-type cutout will be included in the side of the first pond (past the forebay) to allow overflow from the pond to the existing watercourse and therefore allow for fish (eel) passage.

The pond will not be lined, and will be enhanced with habitat features such as logs, snags and rocks to create additional fish habitat to replace the lost pond system. Habitat features will in included in the Deep Marsh areas (small logs) and Intermediate Deep Pond (Appendix B), across about half of the pond area.

3.4. Ongoing maintenance

Ongoing maintenance will be required to ensure plants establish and reach a sufficient maturity to be self-sustaining. Denser plantings are more likely to become established with less maintenance input required.

The frequency of maintenance shall be determined by the planting contractor as necessary to achieve a 90% plant survival rate.

Plant maintenance shall include the following:

- Watering of all trees and shrubs may be required in the event of a severe drought during the summer, though this is less likely to occur within most of the wetland areas, but monitoring of water levels will be required;
- Weeding of all planted areas up to 9 times annually following planting in the first year and reducing thereafter. Weed control by hand and/or chemical as required; and
- Replace dead or damaged plants during planting season only to ensure the required coverage is maintained.

Hand-cutting of rank grass and releasing of plants may be required until plants have become tall enough. Any other weed species should be addressed as they occur, with frequent control likely to be more effective (as discussed in the following section).

It takes between 3-5 years before indigenous plantings are well established and their certainty of survival is assured, and maintenance will be conducted for at least five years following planting for each stage.

3.5. Weed control

Weed species present throughout the site include woolly nightshade, Chinese privet, climbing ivy, barberry, black night shade, gorse and arum lily.

Weeds should be controlled across all planting areas and within the kahikatea remnant as they occur to prevent incursions that can be difficult to control. Once stock has been excluded from the area, it should be checked at least four times a year for any weeds; if these develop quickly, more frequent maintenance may be required.

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As a preferred control method, where feasible weeds should be removed by cutting, digging or pulling rather than applying herbicides to the affected area.

It is important to appropriately dispose of any waste containing weeds to lower the risk of transferring plant material to other areas. Refuse transfer stations and certain green-waste facilities that are able to handle garden waste containing weeds appropriately should be used for disposal.

It is possible that as a result of weed control, the ground is opened up for re-invasion by the same or a different suite of weeds. Therefore, any replacement plantings (where required) should be established in cleared areas as soon as feasible after weed control. Additional mulching should be applied in those areas where weed encroachment is interfering with the establishment of new plantings.

3.5.1. Control methods for herbaceous and vine weeds

If they become established, lower growing species and climbing weeds, such as blackberry, Japanese honeysuckle and convolvulus can mostly be controlled by an appropriate herbicide such as glyphosate at label rates, or triclopyr in the case of blackberry. Smaller incursions of these weed species can be dealt with in the same way, or hand-pulled if small enough.

Most herbaceous species across the site are small enough at this stage to be removed by hand to limit herbicide application.

3.5.2. Control methods for woody weeds

There are several ways to remove larger specimens where required. The easiest method is to drill holes sloping into the sapwood at regular intervals around the tree. As each hole is drilled, glyphosate (250ml/L) or undiluted Tordon Brushkiller is injected into the hole using a sheep drench pack with spraygun. Each treated stem is marked with spray paint to ensure accurate coverage. Alternatively, a deep cut can be made into the sapwood with a sharp chisel or axe, at regular intervals around the base of the tree, taking care not to ring-bark it. Undiluted Tordon Brushkiller is immediately applied (1.5ml to each cut) using a paintbrush or a squeeze bottle. Injection and frilling are more or less interchangeable.

Another method is basal bark treatment. This uses a knapsack to squirt a mixture of 120g/l triclopyr (e.g. Grazon or Renovate) in oil onto the lower trunks of woody species. This works particularly well on saplings less than 20 cm in diameter which have not yet developed a thick bark. Trees may take a year or more to die.

3.6. Predator control

3.6.1. Overview

Pest animals were not surveyed, but given the widespread distribution of many animal pests, assumptions can be made about the species likely to be present. Possums, rats, and mustelids are all likely to utilise the site, and may impact success of newly planted areas, as well as present a threat to any roosting bats.

Predator control will be implemented for a minimum of 15 years across all restoration areas. A variety of control methods can be used for the likely present animal pests. The best time to carry out pest control is from September until February/April when birds are breeding. Whatever control method is used must be done systematically and regularly to have any effect. While poisons have their risks, if

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used carefully they are very effective in terms of knock down rates and generally cheaper than using kill traps.

Pest control will be implemented across all of the restoration planting and key habitat areas.

The pest control programme should be implemented by an experienced pest management contractor to ensure the correct types of methods are used in the right locations, and at the right time of year.

An outline of the proposed pest control programme is detailed in the sections below. Further operational details and instructions can be found on the Department of Conservation website[5].

3.6.2. Possums

Possum control is to be undertaken by an experienced pest management contractor. Possums will be controlled with AT220 traps, an automatic self-resetting trap produced by NZ AutoTraps located on large trees or fenceposts within the site. Traps should be attached to established trees only and set at a height of a minimum of 75cm. AT220 traps need checking, maintaining and charging of the battery at least every three months.

At least one to two traps should be deployed per hectare of area, with lines 100m apart, and traps 20-40m apart along a trapping line. Specific locations should be determined onsite by the experienced pest management contractor.

AT220 traps target possums and rats (multi species traps) and require less frequent checking and re-luring. Timms traps could also be used but require checking and re-baiting weekly.

3.6.3. Mustelids and rats

Predator control should be undertaken on the site in a pulsed manner four times per year for a minimum of 15 years. The purpose of the control is to facilitate the success of native wildlife, such as any native lizards, nesting birds and insects that may utilise the revegetation areas. Rats will be controlled using bait stations and also targeted by the AT220 traps as described above.

Mustelids can be controlled using DOC200s or Goodnature A24 Rat and Stoat traps. DOC200 traps will also be effective at controlling hedgehogs.

The types of baits, trap maintenance (e.g. bait replenishment) and specific locations should be determined onsite by the pest management contractor, but should be placed along the same lines as the possum traps, with traps set 25-50m apart. If used instead of traps, rat bait stations should also be located 25-50 m apart along the station line.

If used instead of traps, rat bait stations should also be located within the same 25 m station grid.

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[5] https://www.doc.govt.nz/nature/pests-and-threats/predator-free-2050/community-trapping/monitoring/ https://www.doc.govt.nz/globalassets/documents/conservation/threats-and-impacts/pf2050/trapping-guide-pf2050.pdf

4. Reporting

4.1. Planting success

Planted specimens that die, are damaged, or are suffering from disease during or before the end of the 5-year maintenance period, shall be replaced every planting season (April – September) for the 5-year maintenance period, with a plant of the same species and grade as itemised in the planting specifications tables above until a canopy cover of no less than 90% native plant species has been achieved.

A monitoring report will be prepared following the first six months following the completion of the first planting stage, and then annually until all stages of planting have been completed. A final monitoring report will be completed after five years of all stages being fully planted.

4.2. Predator control monitoring and reporting

Pest animal control measures should be implemented from September to April each year, for a minimum timeframe of 15 years.

Bait stations and traps should be baited and checked as outlined in Section 3.6 above and directed by the pest management contractor.

Success of the pest control programme should be monitored using tracking tunnels and chew cards, deployed within the planted reserve areas.

Rat monitoring using tracking tunnels involves deploying small plastic tunnels in which specially made tracking cards are placed, along with a lure such as peanut butter or chocolate buttons. Rodents enter the tunnel searching for food and walk across an ink pad in the centre of the card. On the way out they leave clearly distinguishable tracks on the card. The proportion of 'tracked' and 'not tracked' cards is expressed as a percentage, and this is referred to as the tracking index.

Rats should be kept below 5% tracking index to achieve biodiversity benefits (planting success, protection of bats from predation).

For possums, bite cards or wax tags can be used to monitor presence. Deployed along the same lines as tracking tunnels, with ten cards or tags deployed per transect.

Both should be checked once per month, for the duration of the pest control operation (with fresh cards laid out and tunnels kept baited during the months that pest control is actively done, September to April each year), and results used to adapt control methods where required.

In addition, monitoring the planting areas for any signs of pest animals may help with adapting the pest animal management accordingly, which in turn would increase the effectiveness of the control regime.

Findings of pest control management and monitoring should be included in an annual report for the length of the pest control programme.

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Appendix A: Masterplan



Yield per Stage			
Stage Number	KEY	Typology	Yield
Stage 1			
		2A	5
		2B	7
		2C	7
		2D	7
		2UD (Lower)	8
		2UD (Upper)	8
		3A	2
		3B	15
		3C	16
		3D	2
		3E	1
		Apartment - 1B	4
		Apartment - 2A	8
		Apartment - 2B	8
		Apartment - 2C	2
		Apartment - 3A	4
		Serviced Apartment 1A	16
		Serviced Apartment - 2A	8
			128
Stage 2			

Stage 2		
	2A	5
	2B	30
	2C	22
	2D	7
	2UD (Lower)	36
	2UD (Upper)	36
	3A	2
	3B	1
	Apartment - 1A	3
	Apartment - 1B	4
	Apartment - 1C	2
	Apartment - 2A	20
	Apartment - 2B	16
	Apartment - 3A	16
		200
Stage 3		
	2A	20
	2B	6
	2C	4
	2D	7
	3C	7
		44

Stage 4		
	2UD (Lower)	16
	2UD (Upper)	16
	3A	4
		36
		408

Overall Yield			
Typology	Key	GFA	Yield
2A		145	30
2B		117	43
2C		145	33
2D		117	21
2UD (Lower)		124	60
2UD (Upper)		100	60
3A		169	6
3B		165	16
3C		165	23
3D		205	2
3E		167	1
Apartment - 1A		60	3
Apartment - 1B		67	8
Apartment - 1C		54	2
Apartment - 2A		90	28
Apartment - 2B		90	24
Apartment - 2C		96	2
Apartment - 3A		107	20
Serviced Apartment 1A		71	16
Serviced Apartment - 2A		84	8
			408

N

KEY:
- Kahikatea Forest, Wetland & Watercourse Restoration Area
- Existing Stormwater Pond
- Pump Station
- Stokes Shed
- Wetland
- Site Boundary

Te Awamutu Developments
2025 Ohaupo Road, Te Awamutu 3800

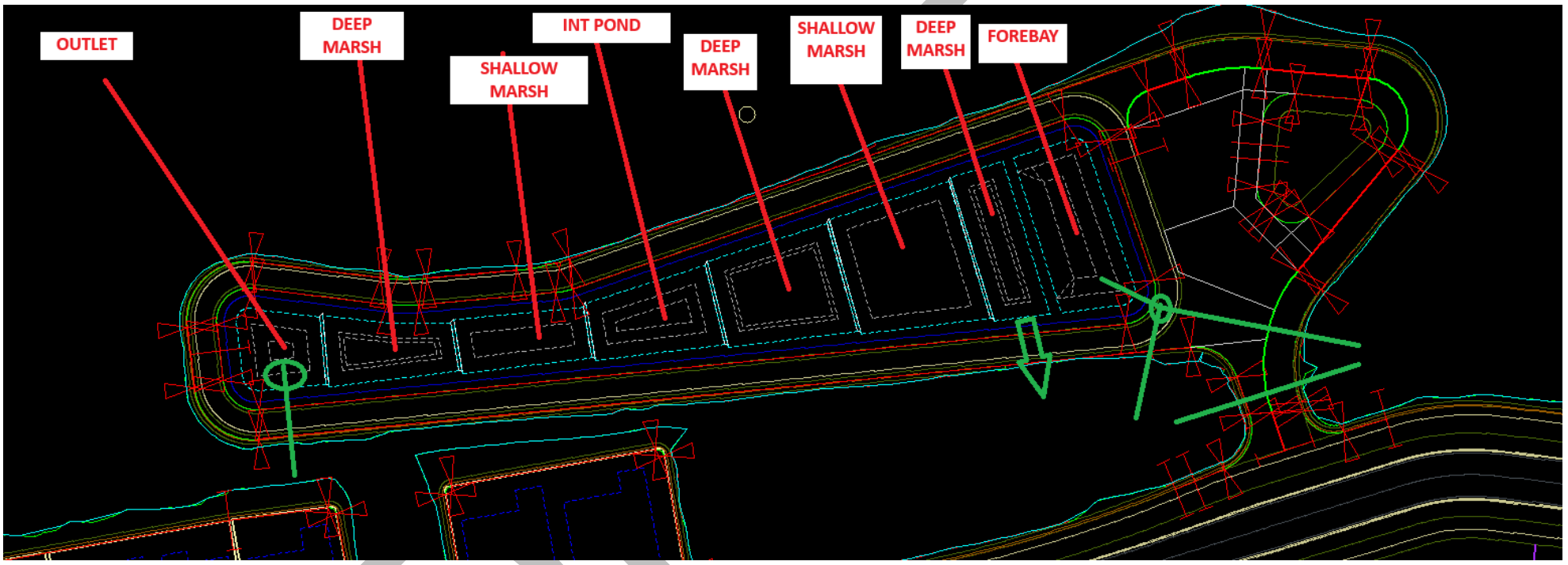
PACIFIC ENVIRONMENTS ARCHITECTS
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Concept Design ISSUE

Title: Overall Proposed Site Plan - Level 1

Date: 14/08/2026
Scale: 1:1500, 1:1@A1
Client: TeAwamutu Developments Limited
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Revision:

Appendix B: Stormwater Pond B Schematic Plan



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