

Queenstown Lakes District Council and Willowridge Developments Ltd

Three Parks Plan Change - Wanaka

Assessment of Ecological Values

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1.0 Introduction

Queenstown Lakes District Council is proposing a Plan Change affecting an area of land zoned Rural General and Rural Residential in Wanaka. The land is bounded by Ballantyne Road, Wanaka-Luggate Highway and Riverbank Road. The property is owned by Willowridge Developments Ltd.

Natural Solutions *for Nature* Ltd have been commissioned to

- Provide advice regarding the appropriate level of assessment required to describe the values present.
- Describe the ecological values of the land owned by Willowridge Developments Ltd including the vegetation communities present and those that are likely to have been present historically with an assessment of their significance, if any.

Brief recommendations regarding species that may be incorporated into future landscape designs have been provided.

2.0 Ecological assessment

2.1 Background and Methods

A site inspection was undertaken on foot and by vehicle in an anticlockwise fashion from the southern tip of the property. Photographs were taken and referenced using a Global Positioning System (GPS). Vegetation and bird species present were recorded. No lizards were observed. Some invertebrates were observed but not recorded.

2.2 Site description and values

The site is vegetated uniformly by exotic pasture grasses. The terrain is predominantly flat with some minor undulations and a highly modified wetland. Very little if any indigenous vegetation was found within the Plan Change area.

The pastures are subdivided and fenced with deer fencing. Cattle were grazing at the time of inspection. Spur-winged plover (*Vanellus miles*), South Island Pied Oystercatcher (*Haematopus ostralegus*) and possibly pied stilt (*Himantopus himantopus*) were nesting in the open pasture grassland and wetland environment.

The following provides a detailed description of the species recorded during the site visit.

The paddocks along the south eastern margin were ploughed and fertilised and contain rich pasture vegetation, predominantly perennial rye grass (*Lolium perenne*), shepherd's purse (*Capsella bursa-pastoris*), storksbill (*Erodium cicutarium*), field speedwell (*Veronica arvensis*), red clover (*Trifolium pratense*), dandelion (*Leontodon taraxacoides*), yarrow (*Achillea millefolium*), *Hydrocotyle moschata*, with some minor woolly mullein (*Verbascum thapsus*), small flowered mallow (*Malva parviflora*), grass forget me not (*Myosotis discolor*) and sweet vernal grass (*Anthoxanthum odoratum*). A *Brassica* sp. crop is present in the north eastern paddock before the pine trees. Spur-winged plover (*Vanellus miles*) were observed on nests and with

chicks at two locations. The most southern tip has a broom (*Cytisus scoparius*) and rabbit infestation. Californian quail (*Callipepla californica*) were observed here.



Figure 1 : Paddocks on the south eastern side of the property with exotic pasture grasses and herbs. Panoramic photograph taken towards the north, with Mt Iron in the background (GPS ref: 5604086N 2205792E) Source: L Hardy.

Figure 1 illustrates the paddocks on the south eastern side of the property. The vegetation here is typical of much of the eastern half of the site and shows recently ploughed and sown fields with new grass growth. Some of these paddocks were being grazed by young cattle.



Figure 2 : Central pasture with water storage container. Photograph taken towards the south west (GPS 5604624N 2206004E) source: L Hardy

A small hill with a water storage container is located in the centre of the property (**figure 2**). An Australasian magpie (*Gymnorhina tibicen*) was

observed here. The vegetation here was composed of the same exotic pasture species but growth was more established than the eastern side of the property. **Figure 3** illustrates the central part of the property. Towards the northern end of the property yards with buildings containing a gardening business were located. The building and yards were not inspected.



Figure 3 : Central part of the property with yards and gardening business in the top right corner. Panoramic photograph taken towards the north west (GPS 5604492N 2205831E)
Source: L Hardy.

The north and north eastern portion of the property was surveyed next. A wetland is located on the eastern corner (**figure 4**). Pasture grasses and herbs (as described above) were observed up to the margin with the open water, which was muddied by stock trampling. At the eastern tip of the wetland, a small patch of trampled and muddied rushes (*Juncus gregiflorus*) were found. Waterfowl and waders were present on and around the wetland. These included mallard (*Anas platyrhynchos*), Paradise shelduck (*Tadorna variegata*), Spur-winged plover (*Vanellus miles*) and Pied stilt (*Himantopus himantopus*). The pied stilts (*Himantopus himantopus*) present at the wetland were numerous and displayed behaviour typical of nesting birds, such as alarm calling and broken wing displays.

Several broom and hawthorn are present along the fence line between the wetland paddocks and the pine tree hedge leading up to the yards. Immediately behind the yards two sycamore and two sweet chestnuts had been planted as ornamental trees bounding the entrance way.



Figure 4 : The wetland situated at the north eastern section of the property. A small patch of rushes are located at the periphery of the wetland on the right of the fence. (GPS 5604709N 2205993E) Source : L. Hardy

The paddocks at the northern portion of the Plan Change area consist of the same pasture grasses and herbs described above. A pine (*Pinus sylvestris*) and polar (*Populus* sp.) plantation was located adjacent to the Wanaka – Luggate SH 84 (**figure 5**). Rabbits and burrows were observed in considerable numbers in this area. Blackbirds (*Turdus merula*) were noted as present. A small muddy ephemeral pond or depression is located in the middle of the paddock.



Figure 5 : Pine and poplar plantation at the northern edge of the property adjacent to the Wanaka – Luggate Highway, with Mt Iron in the background. Photograph taken towards the north (GPS 5605161N 2205532E) source: L Hardy

Along the north western margin of the property, the ground is drier and rabbits are more prevalent. The vegetation is less lush, with more bare ground exposed. Similar pasture species are present – rye grass, sweet vernal grass, browntop, cocksfoot, shepherds purse, yarrow, sheep's sorrel, hares foot trefoil, field speedwell and storksbill. Birds observed were skylark (*Alauda arvensis*), redpoll (*Carduelis flammea*) and spur wing plover. A pair of nesting South Island Pied Oystercatcher (*Haematopus ostralegus*), with two eggs, were recorded. Australasian harriers (*Circus approximans*) were observed overhead. **Figure 6** illustrates the vegetation of the western paddocks.



Figure 6 : The western paddocks, with photograph taken toward the west (GPS 5604782N 2205288E) source: L Hardy

A spur wing plover was observed nesting in the western corner of the property. Broom, tree lupin (*Lupinus arboreus*) and rubbish was observed alongside the road.

3.0 Contextual Environmental Information

The site is located within the Pisa Ecological District at the western margin of the Central Otago Ecological Region. Ecological districts have been created using topographical, geological, climatic, soil and biological features such as indigenous plant and animal communities (ecosystems) to define characteristic landscapes. Closely related ecological districts are amalgamated to form ecological regions (McEwen, 1987).

The Pisa Ecological District sits higher than the other Central Otago Districts. The glaciated landforms and the fault-block Pisa Range and flats provide its distinctive character. The climate is dry sub-continental with higher altitudes receiving more precipitation. Rainfall varies from 380 to 1200mm per annum. North-west winds prevail (McEwen, 1987).

Wanaka receives a mean annual rainfall of 707mm. The first air frosts of autumn occur during early April and the last spring air frosts are likely to occur by about mid November. Soil evaporation and plant evapo-transpiration rates are greatest during the drier months when drying northerly winds prevail. Mean January maximum and minimum temperatures are 23.9°C and 10.8°C. Mean July maximum and minimum are 8.4°C and -1.2°C (Tait, 2001).

The site is located on (recent) Quaternary glacial outwash deposits (Q2a, Institute of Geological and Nuclear Sciences, 1:250 000 Geological Map 18, Turnbull 2000). The soils are mapped as dry-subhygrous Wanaka yellow – grey earths.

4.0 Historical Vegetation

A description of the theoretical historical vegetation of the site can be used to provide a “benchmark” with which to compare the current vegetation of a site and base recommendations for any ecological restoration that may be considered. Through such comparisons, the degree of naturalness and representativeness of the vegetation present can be assessed and an estimation of the value of the site made. A description of the likely historical vegetation can also be used to base recommendations of suitable species for ecological restoration, should any planting be required.

Models based on environmental data (such as geology, soil and climate), fossil and pollen analysis and current patterns of remnant and existing indigenous vegetation can be used to provide an understanding of the likely historical or potential vegetation of the site. Two models applied to the area of the Plan Change - the Land Environment of New Zealand (LENZ – Leathwick 2003) and Pre-Settlement Woody Vegetation Zones (Walker, Lee and Rogers 2003) indicate it is likely the vegetation immediately prior to European settlement consisted of a mosaic of short tussock grassland with Kanuka – Kowhai shrubland and possibly some silver beech and/or totara forest. The vegetation of the wetland is likely to have consisted of indigenous sedges and tussocks such as *Carex secta* and *Chionochloa rubra*.

The LENZ classification offers a tool for identifying areas sharing similar biological or ecological character. The system classifies sites according to physical attributes such as climate, soils and landform providing an objective analysis of their relationship with vegetation. In doing so, Land Environments are described (Leathwick, 2003). The site is located within an area described under the Land Environment of New Zealand (LENZ) system as “N5”.

Vegetation at the time of European settlement in the “N5” environments was almost continuous grassland, with some areas of kanuka. This is similar to the vegetation described as being present within the adjacent Pisa District by McEwen (1987). Swamps found within the “N5” environments contained varying species depending on site drainage but are likely to have included

silver tussock (*Poa cita*) on rises, red tussock (*Chionochloa rubra*) on damp ground, and the sedges *Carex sinclairii* and *C. coriacea* in wet hollows and *C. secta* in deeper water. The “N5” land environment extends across the alluvial plains and gently undulating moraines and outwash terraces extending down the Clutha River, across parts of the Canterbury plains and inter-montane basins of Central Otago.

Predictions of the likely vegetation prior to Polynesian settlement (approximately 800 years ago) suggest the land area of the Plan Change was vegetated by kanuka – kowhai woodland and Kanuka – kowhai – Hall’s totara forest (Walker, Lee and Rogers (2003) pre-settlement woody zones 1 and IV respectively).

Canopy species likely to have been present are Kanuka (*Leptospermum ericoides*) with kowhai (*Sophora microphylla*) and manuka (*Leptospermum scoparium*). The kanuka – kowhai woodland may have included the sub-canopy shrubs of shrubby wineberry (*Aristotelia fruticosa*), willow hebe (*Hebe salicifolia*) and *Coprosma crassifolia*. Species which may have occurred in the canopy gaps include *Coprosma propinqua*, porcupine shrub (*Melicactus alpinus*), bush lawyer (*Rubus schmidelioides*), matagouri (*Discaria toumatou*), native broom (*Carmichaelia petriei*), scented tree daisy (*Olearia odorata*), Muellenbeckia spp., *Pimelia aridula* and *Hebe pimelioides*. Other species which may have previously been more widespread in the area include *Carmichaelia compacta*, *Coprosma* aff. *pseudocuneata*, *Melicope simplex* and *Olearia aviceniifolia*.

The Kanuka – kowhai – Hall’s Totara forest would have included the species noted above along with Hall’s totara (*Podocarpus hallii*), occasional stands of mountain and silver beech (*Nothofagus solandri* var. *cliffortoides* and *N. menziesii*) and groves of cabbage trees (*Cordyline australis*).

The model used to predict these pre-settlement vegetation types is likely to be biased toward fire tolerant species (predominantly kanuka). Species absent or rare in Central Otago, such as Matai (*Prumnopitys taxifolia*), *Fuchsia* and

Hoheria sp., and species now confined to refugia on the range toe-slopes, such as *Coprosma rugosa*, *C. linarifolia*, *Hebe salicifolia* and *Myrsine divaricata*, may have formerly been present in the area of the proposed Plan Change.

In much of Central Otago, frost and drought tolerant but fire sensitive tall woody species have been eliminated from valley floors, leaving only fire-resistant compositions. Very few potential canopy species, such as kanuka, kowhai, *Olearia lineata* and occasionally cabbage trees (*Cordyline australis*), presently occupy the most drought and frost prone valley floors of Central Otago.

The vegetation of the Pisa Ecological District at the time of European settlement was dominated by tussockland; hard and silver tussock at low altitudes, fescue, blue and snow tussock at higher altitudes. This is now very much modified by pastoral farming. Very small forest remnants of silver beech forest exist on the south, east and northern slopes of Pisa range (e.g. Luggate Creek and Lower Roaring Meg). Hall's totara forest remnants can be found on the eastern and northern slopes (e.g. Alfern Creek, Skeleton Stream and Lochar Burn). Kanuka – manuka scrub is found on the eastern faces of range, and was formerly more extensive at the northern end. There are very rare remnants of high altitude *Phyllocladus* – *Halocarpus* (Celery pine – bog pine) woodland (e.g. Lochar Burn and Skeleton Stream). In terms of modifications to the landscape, most alluvial fans and terraces are now in exotic pasture; sweet briar and matagouri communities are widespread on the lower slopes (McEwen 1987).

5.0 Significance

5.1 Species

The vegetation observed was predominantly common and exotic pasture grasses and herbs, with the exception of several unhealthy looking indigenous rushes (*Juncus gregiflorus*) at the wetland located at the north eastern boundary.

No threatened or distinctive bird species were observed or are known to inhabit the site. All those present were either introduced or indigenous species commonly found in lowland pasture.

5.2 Habitat

The lowland pasture currently provides habitat (both breeding and feeding) for common indigenous and exotic birds. The area is almost entirely vegetated with exotic grasses and herbs typical of lowland agricultural land and is far removed from its potential or historical vegetation as described above. It is probable that breeding birds present will be displaced by the proposed development.

The wetland in the north eastern section of the property is in poor condition, having been trampled by livestock, and has little indigenous vegetation. However it still provides breeding habitat for a range of common, indigenous and exotic waterfowl and waders, notably pied stilts. Whilst none of the species present can be considered threatened or rare and the condition of the wetland is poor, the presence of the wetland within the context of the wider semi-arid Pisa Ecological District may be considered valuable, especially in terms of the potential it represents. The scarcity of lowland wetlands through human induced drainage and habitat deterioration places importance on protecting and enhancing the wetlands that do remain. Nationally, wetlands represent some of the most diverse ecosystems in New Zealand, and are estimated to have been lost over 90 percent of their former distribution. Within the Pisa ecological district lowland wetlands are not well represented within the network of protected areas.

Wetlands provide habitat for mobile and migratory avian fauna that may be dependent upon a series of wetlands within an area to provide sufficient quantity and variety of food or breeding habitat, or roosting and flocking areas for juveniles and moulting birds. Although the wetland on the Willowridge Developments Ltd property may be small, dominated by exotic grasses and trampled by stock, within the context of the wider landscape its value lies in its potential.

Locally there are several wetlands inhabited by waterfowl and waders which enable a comparison and provide context for assessing the Willowridge Developments Ltd wetland. The swamps, bogs and open water of the Matakiki Valley Wetland Management Area have been identified as the only local Schedule 9 Significant Wetland in the Otago Regional Plan: Water. They represent the largest complex of lowland wetlands in the Lakes Ecological Region.

The values of the Matakiki wetlands include habitat for bittern, feeding and nesting area for waterfowl, a high diversity of habitat types, a high degree of naturalness, value to Kai Tahu for eels and high diversity of birds, insects and plants. These wetlands were part of West Wanaka Station prior to tenure review and are now a General Purpose Reserve (Wildlife Management) managed by the Department of Conservation.

Three Schedule 10 wetlands are located in the southern portion of the Wanaka Basin - Scaife's Lagoon which is an important waterfowl breeding, feeding and resting area, Damper Ponds (to the east of Scaife's Lagoon) and Campbell's Reserve Pond Margins. Wetlands identified as Schedule 10 wetlands in the Otago Regional Plan : Water are those where the values of the individual wetland are not sufficient to be deemed significant, but drainage is not permitted without resource consent.

In addition old meander channels of the Hawea and Clutha Rivers provide small wetlands. The Butterfields Reserve and the Albert Town Lagoon are two examples of local wetlands located in meander channels that have

reserve status and provide habitat for a small number of waterfowl. This network of wetlands provides a variety of connecting habitats which provide feeding, breeding and roosting habitat for waterfowl and waders.

It is likely with the change from an agricultural to urban landscape that with the increased presence of dwellings and people located close to the waters edge breeding waders and waterfowl will be disturbed making their breeding efforts less successful. It is probable that the pied stilts in particular will be disturbed enough to leave the area for a more suitable breeding area.

5.3 Weed and Pest burden

The property is relatively free of noxious weeds and pests, with the exception of some broom and tree lupin along the road verge of the main access way. A small amount of broom was also noted in the south east corner of the property. Broom is declared a pest plant in the Otago Regional Council Pest Management Strategy (RPMS) and occupiers of land are required to control broom on their land.

Rabbit numbers in the drier north eastern parts of the property are considerable.

6.0 Summary and recommendations

An assessment of the ecological values of the Willowridge Developments Ltd property indicates it is predominantly covered with exotics grasses and herbs. The pasture provides breeding habitat for birds common and typical of lowland pasture. Whilst the wetland has potential value for improvement within the context of the surrounding landscape and network of wetlands, the vegetation and habitat of the property cannot be considered significant in terms of Section 6(c) of the Resource Management Act 1991.

The wetland area provides breeding and feeding habitat for common, exotic and indigenous waterfowl and waders. Whilst its condition is poor and it cannot be considered a good representative of an indigenous wetland (as compared say with the Matakītaki wetlands), the loss of wetlands nationally means that wetlands such as this are valuable. The wetland offers potential for ecological restoration, especially within the context of the network of local wetlands and the ecological restoration of wetlands currently being considered in the area (e.g. Albert Town Lagoon and the Riverside Stage 6 development). Screening with planted indigenous vegetation may help to minimise the effects of increased development on birds and enhance bird and invertebrate populations. A species list with both wetland plants and plants suitable for screening and ecological enhancement over the whole property is appended.

Under the proposed Plan Change it is likely that pied stilts would be displaced. Residential development will render the wetland suitable for those species tolerant of residential environments.

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Attachment A : Willowridge Developments Ltd - Species list for ecological enhancement

Botanical Name	Common Name	Species Likely to Benefit	Beneficial Attribute	Seasonal Benefit
<i>Aristotelia fruticosa</i>	Mountain wineberry	Tui, bellbirds, kereru, silver eye	Flowers, fruit	Early and late summer
<i>Blechnum minus</i>	Small kiokio, hard fern		Wetland plant, Low cover	
<i>Carex coriacea</i>	Sedge		Wetland plant, Low cover	
<i>Carex secta</i>	Purei sedge	Invertebrates	Wetland plant, cover, seeds shelter, nesting habitat for fernbirds, crakes and bitterns	Year round
<i>Carex sinclairii</i>	Sedge		Wetland plant, Low cover, seeds	
<i>Carex virgata</i>	Sedge		Wetland plant, Cover	
<i>Carmichaelia petriei</i>	Native broom	Weevils and moths	Seed pods, flowers, foliage	Summer
<i>Chionochloa rubra</i>	Red tussock		Wetland plant, Cover	Year round
<i>Coprosma crassifolia</i>	Hairy Coprosma	Tui, bellbirds, lizards	Fruit	Autumn
<i>Coprosma propinqua</i>	Mingimingi	Bellbirds, tui, lizards, invertebrates	Fruit	Autumn
<i>Cordyline australis</i>	Cabbage Trees	Bellbirds, kereru, tui	Flowers, fruit	Flowers spring to summer, fruit summer to winter
<i>Corokia cotoneaster</i>	Korokia	Invertebrates, birds	Cover, food, habitat, flowers, fruit	Flowers summer, fruits late autumn to winter
<i>Cortaderia richardii</i>	Toe Toe		Shelter, nesting cover	Year round
<i>Dacrycarpus dacrydioides</i>	Kahikatea	Tui, bellbirds, silver eyes, kereru	Red fruit	
<i>Discaria toumatou</i>	Matagouri	Invertebrates, birds	Cover, food, nectar	Year round, flowers late spring, fruit summer
<i>Dracophyllum longifolium</i>	Inaka		Cover, flowers	

<i>Eleocharis acuta</i>	Sharp spike sedge		Wetland plant, Cover	
<i>Festuca novae-zelandiae</i>	Hard tussock		Cover	Year round
<i>Fuchsia excorticata</i>	Fuchsia	Tui, bellbirds, kereru, silver eyes	Fast growth, Cover, flowers	
<i>Griselinia littoralis</i>	Broadleaf		Cover, fruit	
<i>Halocarpus bidwillii</i>	Bog Pine		Cover	Year round
<i>Hebe salicifolia</i>	Koromiko	Insect	Cover, attracts insects as prey	Year round
<i>Hoheria angustifolia</i>	Narrow leaved lacebark / houhere / ribbonwood	Bellbirds, tui	Cover, flowers, fruit	
<i>Juncus gregiflorus</i>	Native rush		Wetland plant, low cover, seeds	
<i>Kunzea ericoides</i>	Kanuka	Lizards, insects, quail, grey warbler, fantail	Cover, insect pollinated, insects as prey, nesting, seeds, leaves, buds, flowers (nectar)	Flowers spring to summer, fruits main seed fall autumn.
<i>Melicope simplex</i>	Poataniwha		Flowers, fruit	Flowers Sep – Nov, fruit Dec – Apr
<i>Melicytus alpinus</i>	Porcupine shrub	Bellbirds, lizards	Fruit, cover	Year round
<i>Metrosideros umbellata</i>	Rata		Cover, flowers	Flowers Nov – Jan
<i>Myrsine divaricata</i>	Weeping Matipo		Cover, flowers and berries	Year round
<i>Nothofagus menziesii</i>	Silver beech	Leaf binding and mining moths, invertebrates, birds feeding on larvae	Habitat, invertebrates as prey for birds, shelter, nesting	Year round
<i>Olearia fragrantissima</i>	Fragrant tree daisy	Important host for invertebrates	Cover in spring, summer and autumn, deciduous	Flowers late spring
<i>Olearia hectorii</i>	Hector's tree daisy	Important host for invertebrates	Cover in spring, summer and autumn, deciduous	Flowers late spring
<i>Olearia lineata</i>	Tree daisy	Important host for	Cover in spring,	

		invertebrates	summer and autumn, deciduous	
<i>Olearia odorata</i>	Scented tree daisy	Important host for invertebrates, in particular moths.	Attract and provide food and habitat for moths, which fall prey to birds. Cover in spring, summer, autumn, deciduous	Flowers in summer
<i>Phormium tenax</i>	Flax	Tui, bellbird	Nectar, flowers, cover	
<i>Phyllocladus alpinus</i>	Mountain toatoa		Cover, black seeds	Flowers early summer, seeds late summer to autumn
<i>Pittosporum tenuifolium</i>	Kohuhu	Grey warblers, fantails, silvereyes and bellbirds	Cover, attracts insects which fall prey, seeds, flowers	Flowers late spring to early summer, fruits through year from summer on.
<i>Plagianthus regius</i>	Manatu / lowland lacebark		Flowers, fruit	
<i>Poa cita</i>	Silver tussock	Lizards, finches	Cover	Year round
<i>Podocarpus hallii</i>	Totara	Tui, bellbirds, silvereyes	Red fruit	Late summer to autumn
<i>Prumnopitys taxifolia</i>	Matai	Kereru, Tui, bellbirds, silver eyes	Black fruit	
<i>Pseudopanax ferox</i>	Fierce Lancewood		Flowers, fruit	
<i>Rubus schmidelioides</i>	Bush Lawyer		Flowers, fruit	
<i>Sophora microphylla</i>	Kowhai	Bellbirds, tui, kereru, insects	Nectar, leaves, buds, flowers, insect larvae eat seeds, insects fall prey to birds	Flowers late spring, seeds autumn.

Simpson (unpublished), Wilson (1994), Wilson (1996), Wilson and Galloway (1993), Whitaker, Tocher and Blair (in process of publication), Patrick and Peat (1999), Williams and Karl (2002) and Baker (1999), and personal observations.