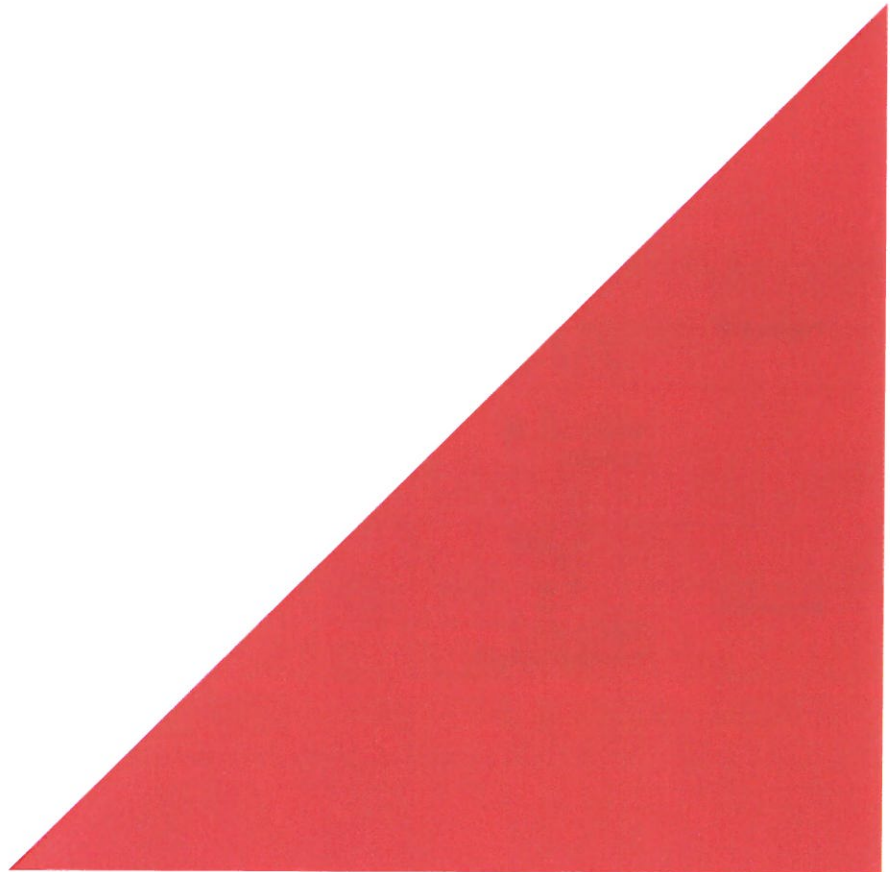




Southern Links Project NOR

Supplementary Vegetation and Habitat Survey Report



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The value of each site was assessed using the criteria in Table 11-1 of the PRPS for determining significant indigenous vegetation and significant habitats of indigenous fauna. The criteria are shown in Table 1 of this report.

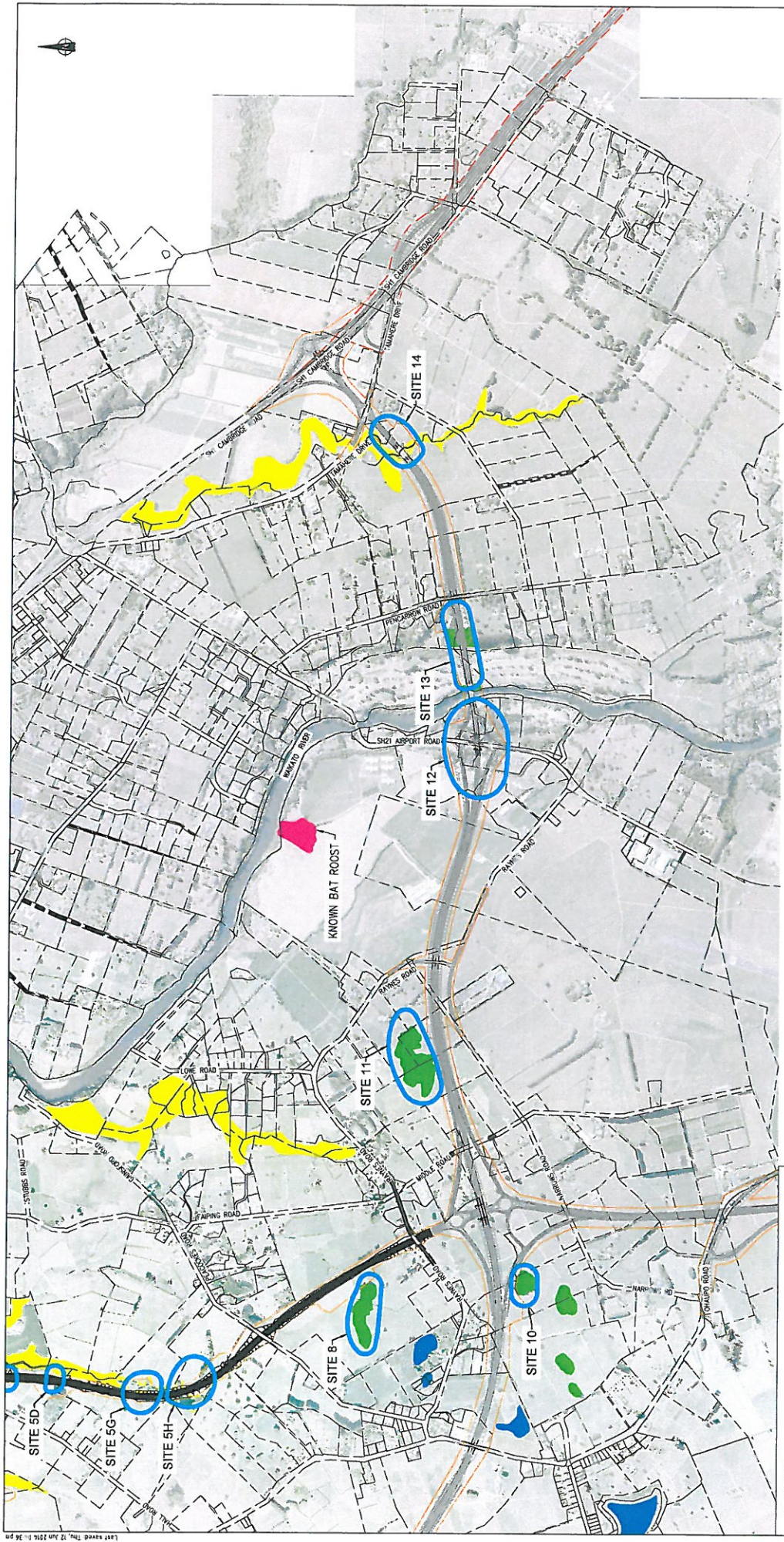
Table 1- Ecological significance criteria from PRPS (examples relevant to Hamilton City from Cornes *et. al.*, 2012).

Criteria	Example
Criteria 1 - Protected or Preserved	Queen Elizabeth II National Trust
Criteria 2 - Recommended for Protection	Identified by DoC (1993) as being worthy of protection
Criteria 3 - Threatened or Endemic Species Habitat	Bat feeding site
Criteria 4 - Under Represented	A patch of wetland which is under-represented (or rare) in the Hamilton Ecological District
Criteria 5 - Uncommon Before Settlement	River islands
Criteria 6 - Indigenous Wetland Habitat	Contains (or is likely to contain) a natural wetland
Criteria 7 - Large Indigenous Habitat	c. 3 ha podocarp forest remnant in Hamilton City
Criteria 8 - Critical Aquatic Habitat	Wetland with potential mudfish habitat
Criteria 9 - Healthy Indigenous Vegetation Representative	Representative remnants of moderately dense podocarp forest
Criteria 10 - Rare or Exceptional Representation	Nationally rare <i>Sporadanthus-Empodisma</i> bog habitat
Criteria 11 – Ecological buffer, linkage or corridor	Riparian vegetation of the Waikato River linking different gully systems

Data for each site was recorded on field data sheets (Appendix 1) and the extent of each vegetation and habitat type at each location was mapped (Appendix 2). Locations of sites surveyed are shown in Figures 1 - 4 The vegetation and habitat types used were:

1. Pasture
2. Ornamental planting
3. Weed community
4. Exotic forest
5. Native restoration planting
6. Regeneration native
7. Native forest
8. Gully wetland
9. Terrace wetland
10. Artificial pond
11. Ephemeral wetland

Mapping the vegetation and habitats allowed the spatial extent and quantity lost to the Project footprint to be determined. Vegetation and habitat losses are summarised in Section 4.



LEGEND:

- LAKES/PONDS
- GULLIES
- KNOWN BAT ROOSTS
- INDIGENOUS VEGETATION
- DESIGNATION BOUNDARY

NOTES:

1. LANDSCAPE PLANS CONCEPT ONLY - NOT FOR CONSTRUCTION.
2. 300mm TOPSOIL FOR ALL PLANTING AREAS. 100mm MULCH.
3. 150mm TOPSOIL FOR GRASSING AREAS - MAXIMUM 1:4 SLOPE FOR GRASSING.
4. FOR P895 TREE SPECIES ALLOW 0.5m² TOPSOIL PER TREE.

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This drawing is confidential and shall only be used for the purpose of this project.

REVISIONS

No	BY	DATE	DESCRIPTION	APPROVED

SCALE

1:5,000
SCALE = 1:10,000 (A3) 1:1,000 (A1)

DESIGNED	DRAWN	CHECKED	DATE

Inset Map



Sheet Layout Key



FIGURE 2
SOUTHERN LINKS
VEGETATION AND HABITAT SURVEY SITE LOCATIONS

Large (planted) native trees that will be directly affected include-

Table 1. Individual indigenous trees affected at site 1.

Species	Size - Diameter at Breast Height (DBH)
<i>Podocarpus totara</i>	105cm, 82cm, 72cm, 64cm, 35cm, 34.5cm, 34cm
<i>Prumnopitys ferruginea</i>	53cm
<i>Dacrycarpus dacrydioides</i>	24.5cm
<i>Agathis australis</i>	24.5cm



Photo 1. Exotic canopy mixed with planted natives, representative of >50% of site 1.



Photo 3. Regenerating riparian forest, comprising >50% of the site, mixed with scattered *Pinus*.

3.4 Site 4

37°48'30.66"S 175°17'55.25"E

Vegetation classification – Weed community, Restoration planting, Mature native

Vegetation and habitat – Site is a strip of vegetation from Cobham Drive Bridge to Peacockes Road Esplanade and across the Mangakotukutuku Gully near the confluence with the Waikato River. Canopy is predominantly exotic trees consisting of sweet chestnut (*Castanea sativa*), *Eucalyptus* spp., *Acacia* spp., common alder (*Alnus glutinosa*), silver birch (*Betula pendula*) and Douglas fir. Sub-canopy is mixed with mamaku, wheki, karamu, Chinese privet, mahoe, gorse, *C. arborea* and *C. aerolata*. Groundcover is exotic inkweed (*Phytolacca octandra*), blackberry (*Rubus fruticosus*), *Tradescantia*, arum lily (*Zantedeschia aethiopica*) and onion weed. There is a stand of relatively mature *Pinus* along the southern bank of the gully that will be impacted by the project. Some restoration planting on the bank next to Cobham Drive was noted.

Riverine wet areas are present in the gully at the SE edge of the site, where the canopy consists of *Pinus* and grey willow, sub-canopy consists of mamaku, scattered mahoe, *Acacia* spp., while groundcover is dense blackberry, Chinese privet, gorse, woolly nightshade and *Tradescantia*.

Fauna – Avifauna recorded was tui, house sparrow (*Passer domesticus*), song thrush (*Turdus philomelos*), blackbird. Ample skink habitat exists along the footprint in this area, however no notable kanuka/manuka habitat for geckos was found.

Significance of site – No significant indigenous vegetation or significant habitat of indigenous fauna will be lost except for one mature *C. australis* (DBH 38cm) and two totara (DBH 38cm & 65cm respectively). The riparian vegetation around the stream is highly modified, mostly consisting of grey willow and Chinese privet. The site does not trigger the criteria listed by the WRC RPS for determining significance of indigenous biodiversity with the exception of Criterion 3, as known long-tailed bat habitat. The site is not listed as an SNA under the HCDP. More than 95% of the site is exotic vegetation.



Photo 6. Exotic species, including grey willow and gorse comprising >95% of the site.

3.6 Site 5b

37°49'11.08"S 175°18'34.97"E

Vegetation classification – Weed community, Gully wetland

Vegetation and habitat – Site encompasses main section of Mangakotukutuku Gully, canopy dominated by tree privet & grey willow. Sub-canopy is largely composed of Chinese privet, boxthorn, Japanese honeysuckle with scattered mahoe, karamu and tree ferns. Ground cover is bracken (*Pteridium esculentum*), blackberry, Japanese honeysuckle (*Lonicera japonica*), with *Blechnum minus* and *Microsorium pustulatum* ground cover underneath Chinese privet and grey willow down towards the stream edge. Natural springs are present on the SW facing bank and support populations of *C. geminata*, although currently are grazed by cattle.

Fauna – No avifauna was recorded at the site. Ample skink habitat exists along the footprint in this area, however no notable kanuka/manuka habitat for geckos was found.

Significance of site – No significant indigenous vegetation or significant habitat of indigenous fauna will be lost. The *C. geminata* palustrine wetland is small (<1% of site) and has undergone significant pugging by cattle in the recent past. The site could qualify WRC indigenous biodiversity significance under criterion 6, although the area is small and compromised by stock access. Criterion 3 is also triggered due to the known presence of long-tailed bats in this section of gully. The site is not listed as an SNA under the HCDP. More than 50% of the site is exotic vegetation.

Fauna – Avifauna recorded was pukeko, mynah, sparrow, Australasian harrier (*Circus approximans*) and kingfisher. Potential skink habitat exists in all of this section and small areas of kanuka, in association with *Pinus*, at the top of the main gully could potentially provide habitat for arboreal geckos. The probable prevalence of pest mammals (particularly rats, *Rattus rattus* and *Rattus norvegicus*) in the gully means geckos are unlikely to be present however.

Significance of site – More than 75% of the site is exotic vegetation with limited habitat provision. However approximately 80-100 m² of *C. geminata*/kahikatea wetland will be lost within the partly restored gully. Long-tailed bat activity is known in this section of gully and this will trigger Criterion 3 of the WRC criteria for ecological significance. This site also includes SNA 56 identified in Map 64B of the HCC Proposed District Plan; the affected kanuka around the edge of the gully falls within this (SNA 16.15 as described by Cornes et al., 2012).



Photo 8. The area of potential kanuka gecko habitat at the top of the gully that will be impacted by the project.



Photo 10. SNA 56 gully base.

3.9 Site 5d

37°49'46.35"S 175°18'36.66"E

Vegetation classification – Pasture, Weed community

Vegetation and habitat - Small sections of the gully which will be impacted to the south (<500m) of site 5c were assessed and contained no significant vegetation or habitat. The southern section is a heavily pugged, grazed wet area dominated by pasture grass and gorse. The section closer to site 5c has a drain outfall at the western end and is comprised primarily of pasture grass with *Juncus effusus* scattered throughout.

Fauna – No birds were observed on site. No potential lizard habitat was observed.

Significance of site - No significant indigenous vegetation or habitat will be affected by the project at this site.

3.11 Site 5f

37°49'36.11"S 175°18'36.17"E

Vegetation classification – Pasture, Weed community

Vegetation and habitat – Shallow finger of gully on the Toy property which is primarily pasture, with some gorse and grey willow, and a few scattered *J. effusus*.

Fauna – No birds were observed on site. No suitable lizard habitat was observed.

Significance of site – This finger of gully will be filled however no significant indigenous vegetation or habitat will be affected by the project at this site. The habitat does not trigger any of the WRC Ecological Significance Criteria.



Photo 12. Habitat at site 5f.

3.12 Site 5g

37°49'58.69"S 175°18'33.96"E

Vegetation classification – Not recorded.

Vegetation and habitat – Access to the Ronke property was denied and a desktop assessment only was possible. From aerial photography it appears that vegetation within the small gully area is dominated by grey willow with a suite of weed species underneath, however this is unknown.

Fauna – Not recorded.

Significance of site – Not recorded.

restoration riparian and wetland planting with appropriate indigenous species within the remaining pond areas. The artificial nature of the habitat at this site does not trigger any of the WRC Ecological Significance Criteria.



Photo 13. The highly modified artificial ponds at site 6.

3.15 Site 7

37°49'35.49"S 175°17'52.59"E

Vegetation classification – Exotic forest

Vegetation and habitat - The tree canopy at this site consists almost exclusively of large, mature exotic trees, including sweet gum, pin oaks (*Quercus pallustris*), english oaks (*Q. robur*), *Magnolia grandiflora*, swamp cypress, a row of large eucalypts to the north of the alignment, pines, European beech (*Fagus sylvatica*), poplars and several *Podocarpus falcatus* (an African podocarp). Two large totara (DBH 70cm & 61cm respectively) lie within the alignment to the north-east. The sub-canopy is exotic weeds, predominantly Chinese privet with an area of bamboo. Ground cover includes *Tradescantia* under the trees, with blackberry and hawthorn dotted around. Clivia is also growing under the canopy in places.

Fauna – Birds observed included sparrow, fantail, grey warbler, blackbird, wax-eye, tui and yellowhammer. Potential skink habitat is present however no suitable arboreal gecko habitat was seen.

Significance of site – Two large totara are within the alignment and will need to be removed. Other than this, vegetation is exotic and offers habitat predominantly for exotic birds. No wetland habitat exists within the alignment at this site. Long-tailed bat activity is known at this site and this will trigger Criterion 3 of the WRC criteria for ecological significance.



Photo 15. Remnant kahikatea stand with sparse natural regeneration beginning to create a sub-canopy.

3.17 Site 10

37°51'0.40"S 175°18'58.21"E

Vegetation classification – Native forest, Native restoration planting

Vegetation and habitat – Remnant kahikatea stand surrounded by pasture and recently fenced for stock exclusion, located approximately 100m from another similar sized remnant to the south that was not surveyed. Canopy consists of mostly evenly-aged kahikatea with a number of much larger individuals (DBH 135cm average). A single mature pokaka (*Elaeocarpus hookerianus*) DBH 75cm was located on the southern edge of the stand. The sub-canopy is sparse and there is minimal recruitment due to recent grazing of the stand. Species include some kahikatea rickers, titoki and black maire (*Nestegis cunninghamii*). Restoration plantings around the edge include flax, lacebark and totara. Weeds include boxthorn, Jerusalem cherry and extensive pasture grass due to high light levels from the open edge. The remnant will improve now stock have been excluded but weeds need to be controlled and the edge needs further planting. No wetlands are present at the site.

Fauna – Avifauna recorded were fantail, tui, chaffinch, kingfisher, mynah. Potential skink habitat is present however no suitable arboreal gecko habitat was seen.

Significance of site – The site will not be impacted by the project however weed control and buffer planting could be recommended as part of mitigation to ensure the long-term health of this remnant. The site qualifies for WRC indigenous biodiversity significance under criteria 4. The site is not listed as an SNA under the proposed WCC DP.

The middle section is also fenced off but in poorer ecological condition with a more open canopy of kahikatea and pokaka with an understory of totara, boxthorn and tree privet. Ground cover is pasture grass, arum lily, Jerusalem cherry and inkweed.

The western section is currently unfenced with a canopy of kahikatea, rimu, one pokaka, *Eucalyptus* spp and *Acer* spp. The sub-canopy is scattered *C. australis*, *Prunus* spp, Chinese privet and karamu. The groundcover is predominantly dense blackberry up to 2m in height with scattered arum lily, Jerusalem cherry and inkweed in places.

Greater than 80% of the canopy contains remnant vegetation which is considered to be significant indigenous vegetation. Greater than 50% of the habitat is considered significant habitat. Between 5-10% of the area contains native restoration planting, while exotic vegetation composes approximately 80% of the groundcover. No wetlands are present at the site.

Fauna – Avifauna recorded was mynah, pukeko, Australasian harrier (*Circus approximans*), blackbird, fantail, tui. There is abundant potential skink habitat at this site, however no manuka/kanuka gecko habitat is present. Pest control is currently being undertaken in the eastern section.

Significance of site – The site will not be impacted by the project, however the eastern section is of high ecological value in the context of the general landscape. The entire site offers significant opportunities for restoration to be undertaken and it is recommended that the site should be legally protected. The site qualifies for WRC indigenous biodiversity significance under criteria 3 (long-tailed bat activity) and 4. The site is not listed as an SNA under the proposed WCC DP.



Photo 17. Section of western area that could be enhanced through weed control and restoration planting.



Photo 18. The Eman property, with extensive mown lawns and exotic plantings.



Photo 19. The Spring-Patterson property, looking towards the Waikato River.

The northern side of the slope is regenerating with the same species. In addition, there is an area of native plantings comprising young wheki-ponga (*Dicksonia fibrosa*), *Phormium tenax*, *P. cookianum* and *C. australis*.

Fauna – Avifauna recorded was thrush, fantail, silvereye and tui. Potential skink habitat exists however there is no manuka/kanuka gecko habitat.

Significance of site – Some indigenous wetland vegetation, comprising 40% of the site, will be impacted by the project. While the wetland area is compromised by the abundance of arum lily it could be classed as significant under criteria 6 of the WRC criteria for ecological significance. Long-tailed bat activity is known at this site and this will also trigger Criterion 3. The site is not listed as an SNA under the proposed WCC DP.



Photo 21. Regenerating native canopy of the slope on Site 13, grading into *Salix* below.



Photo 23. Site 13 Stormwater: Exotic dominated slope vegetation grading into *Salix* canopy with *C. geminata* dominated wetland vegetation.



Photo 24. Site 13 Stormwater: *Carex geminata* dominated wetland with *Salix* canopy at the gully floor.

3.23 Site 15

37°52'2.63"S 175°19'18.52"E

Vegetation classification – Exotic forest

Vegetation and habitat – Site is a small stand of exotics with no sub-canopy. Dominant tree species is a small plantation of Douglas fir and *C. lawsoniana*, with scattered mature English oak, sweet chestnut, one *Populus* and two *Pyrus* spp, ground cover is pasture grass. No wetlands are present.

Fauna – No avifauna was recorded and no potential lizard habitat was identified.

Significance of site – No significant indigenous vegetation or significant habitat of indigenous fauna will be lost. Exotic vegetation comprised 100% of the site. Long-tailed bat activity is known at this site and this will trigger Criterion 3 of the WRC criteria for ecological significance.



Photo 26. Douglas fir plantation and mature English oak at Site 15.

3.25 Site 17

37°52'42.51"S 175°19'20.05"E

Vegetation classification – Exotic forest

Vegetation and habitat – Canopy on the western side of Ohaupo Rd consists of mature exotic English oak, elm (*Ulmus* sp.), poplar and pine. A lemonwood hedge is planted along the roadside with an understorey of *P. crassifolium*, Chinese privet, *C. australis*, silver fern and tree privet. A small stream is culverted under the existing road and riparian vegetation on the western side of the road consists of thick blackberry and Chinese privet, with scattered mamaku and wheki. The stream is piped underground beyond the impact of the project at the eastern side of the existing road. Several mature cabbage trees and large pines are located on the eastern side of the road, under which lies grazed pasture. No wetlands are present at the site other than the stream bed on the western side of the road, which is not intended to be directly affected.

Fauna – Avifauna recorded was pheasant and fantail. Potential skink habitat exists, however no manuka/kanuka gecko habitat is present.

Significance of site – No significant indigenous vegetation will be lost. The stream vegetation is highly modified and is not of ecological significance, nor will any be lost to the project. However parts of the site are listed as SNA 279 in the Proposed WPC district plan, described as 'willow wetland margins'. A small finger of this SNA as illustrated in Map 3 of the WDC proposed District Plan extends to near Ohaupo Rd, almost opposite the Airport Rd, however this flat area is developed as pasture, and does not form a functioning part of the gully system beyond, with canopy vegetation being large mature English oaks. Long-tailed bat activity is known at this site, and this will trigger Criterion 3 of the WRC criteria for ecological significance.