APPENDIX 2 – ECOLOGICAL EFFECTS

Ohiro Properties Limited

Preliminary Ecological Assessment
Ohiro Road Residential Rezoning Development

November 2004

Quality Assurance Statement	
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1. Introduction

Ohiro Properties Limited (OPL) propose to develop land between Ohiro Road and Mitchell Street south of Brooklyn for housing. The majority of this land is covered in low secondary semi-coastal forest dominated by mahoe.

The development can be expected to require clearance of much of the forest cover and a significant amount of earthworks in view of the steep terrain.

This preliminary report on the terrestrial ecological values of the affected area has been prepared in relation to an application for a private plan change. This seeks to rezone this land from rural to residential to enable the housing development to proceed within a more appropriate plan framework.

A preliminary field inspection of the area was undertaken on Wednesday 5 November 2003. Evaluation of the ecological values of this area is based on visual assessments and a review of published material and relevant vegetation databases provided by the Department of Conservation. The aim of the preliminary investigation is to assess the ecological values and representativeness of the area in relation to other areas of semi coastal secondary broadleaf forest in the Wellington area.

For ease of discussion, the affected area has been categorised into three blocks, as defined on the aerial plan (Sheet 01). Due to land ownership at the time of the survey it was not possible to access the block of land between Blocks 1 and 2. The composition of the canopy cover in this area has been determined remotely from Mornington Road across the valley and from Kowhai Park adjacent to Mitchell Street.

2. Site Description

The affected area lies between Mitchell Street/Virginia Grove and Ohiro Road on eastern facing slopes below a prominent spur that extends in a south/north direction from Happy Valley towards Highbury.

The terrain is sloping to steep throughout the area and more so immediately above Ohiro Road within Block 1. Apart from the gully within Block 2, the topography across the area features broad spurs and shallow depressions.

The forest cover tends to increase in stature on the lower slopes and within the gullies and depressions and progressively diminishes in height across the spurs and on the upper slopes adjacent to properties on Mitchell Street and Virginia Grove.

Several prominent tracks that zigzag their way across the mid sections of the study area from Ohiro Road towards Kowhai Park in Block 2 and the adjoining area between Block 1 and 2 plus large macrocarpa and pine trees are distinctive features above the forest cover within Block 1.

3. Original Vegetation Cover

Prior to European settlement in the Wellington region this area would have supported a primary growth forest featuring a canopy of tawa, rewarewa, hinau, kohekohe and nikau palms and possibly kahikatea and pukatea along the valley floor now occupied by Ohiro Road. Emergent podocarps such as rimu, miro and matai would have also been conspicuous feature of the forest cover. Such unmodified or primary growth forest would have extended as an almost continuous cover from the south coast and harbour shoreline to the crest of the surrounding hills, providing a wide range of habitats, and supporting a diverse bird, reptile and insect fauna.

4. Current Vegetation Patterns

4.1 Description

The current vegetation patterns within and adjoining the area reflects widespread forest clearance undertaken by the early European settlers throughout the Wellington Region. Much of this land was cleared during the latter part of the 1800's to enable settlement and farming to take place. On the Wellington Peninsula alone, only one per cent of the original forest escaped destruction (Gabites, 1993). Land south of Brooklyn, such as the Ohiro Farm was farmed from this period through to as recently as the late 1960's. Coastal hills that were no longer grazed have gradually reverted to a shrub/gorse mosaic and then into early seral or secondary low forest.

The vegetation patterns existing today around the margins of Wellington reflect varying stages of reversion or succession from pasture. The rate and nature of succession has been governed by the incidence of fire and others factors such as aspect, drainage patterns and proximity to remnant stands of mature forest species.

The secondary forest cover that exists on the eastern side of the spur within the area proposed for housing development is in more advanced stage of succession than on the western side of the spur within Owhiro Bush. The majority of the area is covered in secondary forest cover, almost exclusively dominated by mahoe (*Melicytus ramiflorus*) of varying stature. Some of this cover is festooned with pohuehue (*Meuhlenbeckia australis*).

On the lower slopes and within the shallow gullies, stands of mahoe reach up to 6 to 7 metres in height in places, reflecting more favourable site conditions, while on the drier broad spurs and some of the upper slopes of the study area the mahoe canopy barely reaches two metres. Mahoe often occurs in association with gorse, rangiora (*Brachyglottis repanda*), hangehange (*Geniostoma rupestre* var. *ligustrifolium*), bracken and thickets of blackberry on these drier sites.

Within the prominent gully in Block 2, pate (*Schefflera digitata*) up to 5 metres in height occurs as a co-dominant species with mahoe. Pate was observed on the upper slopes in Block 1 but not in the same abundance as in the Block 2 gully.

Beneath the mahoe, the sub-canopy cover is dominated by the rangiora, raurekau (*Coprosma grandifolia*), kawakawa (*Macropiper excelsum*) and to a lesser extent stinging nettle (*Urtica ferox*). The distribution of these plants varies according to the compactness of the overhead mahoe cover

and hence light and moisture conditions within the forest. Kawakawa, for example, is more shade tolerant and tend to prevail under a more continuous and compact mahoe cover. In the lighter areas, adventive plants such as Black nightshade and Balm of Gilead are locally common across the forest floor.

The forest floor is generally open due to heavy mahoe leaf fall. The most common plants occupying the forest floor are the spleenwort, *Asplenium oblongifolium.* These ferns are generally scattered throughout the area while hounds tongue fern forms continuous cover on the steeper rockier slopes.

Primary broadleaf forest species such as tawa, rewarewa, hinau, kohekohe and nikau palm and podocarps such as rimu and miro are absent from this area. Primary forest species observed during the field inspection was limited to a small stand of karaka trees (*Corynocarpus laevigatus*), located on the lower slopes next to a stand of sycamore trees situated above residences located on 326 to 330 Ohiro Road. Young karakas were observed growing along the edge of the low forest next to Ohiro Road to the south of these properties suggesting possible dispersion from this grove.

Other notable vegetation observed in the study area includes manuka (*Leptospermum scoparium*) which occurs as scattered stands such as on the upper slopes of Block 2 where it forms a mosaic with a grove of mamakus (*Cyathea medullaris*). Light demanding pioneer species such as koromiko, fuchsia and marbleleaf have recently established along some of the tracks and batters in the upper parts of this block in association with a range of exotic adventive herbs and grasses such as oxeye daisies, fennel, foxglove and cocksfoot. These exotics are likely to have established here through importation of seed on machinery used to construct the tracks and from wind dispersion from adjoining gardens and road margins.

The track margins within Block 2 and along the edges of the low forest adjacent to gardens associated with properties on Mitchell Street and Virginia Grove also feature a range of amenity plantings such as Tasmanian blackwood, various Eucalyptus trees and native plantings, including pohutukawa, lemonwood, lowland ribbonwood and flax.

4.2 Condition and Value of Vegetation Cover

In his assessment of vegetation patterns and ecological trends on Makara Peak, Park (1997) noted that "*While the succession from reverted pasture through various scrub types to mahoe dominated low forest will be rapid, the great bulk of the land will remain at a mahoe dominated stage for the foreseeable future*." Park attributes this to an insufficient number of later seral trees[1] to provide for a scale of regeneration that an extension of the forest succession beyond the mahoe stages requires.

Assuming later seral trees or primary forest species are absent from the block currently prohibited from entry, it is therefore unlikely that the mahoe low forest will develop into a long standing and biologically diverse forest unless active measures were put in place, such as by way of artificial plantings. This vegetation cover will therefore remain of low to moderate ecological value.

Despite the likely absence of primary forest species, the mahoe and pate found throughout this area and the more localised karaka provide seasonal food sources for native birds such as tuis and

[1] These include rewarewa, kohekohe, hinau and titoki.

possibly kereru residing within the Karori Sanctuary and nearby areas. The relatively continuous nature of the area's forest cover vegetation provides for a range of habitats and territorial, nesting and roosting requirements as well as varied food sources for insectivorous native birds such as fantails and grey warblers.

The area's vegetation also performs a role as a wildlife corridor linking the low forest and shrublands of Owhiro Bush to the west with scattered pockets of low forest within the suburbs of Vogeltown and Mornington.

The ecological value of this area has been diminished somewhat by tracking activities, amenity plantings and garden escapes from adjacent properties. These activities, including the dumping of garden waste has opened up the forest to invasion by adventive species such as wandering jew and nightshade.

5. Representativeness of Vegetation Cover

Site inventory details provided by the Department of Conservation indicates that the low mahoe forest cover and associated shrub mosaics occur within the extensive Owhiro Bush to the west of Mitchell Street, within the Karori sanctuary abutting Owhiro Bush and other peri-urban areas to the north and south. Collectively these areas contain a range of early and later seral vegetation associations.

6. Effects of Proposed Housing Development

Development of the area for housing will entail significant earthworks in order to establish building platforms and internal roads across the steep terrain. It is inevitable that much of the existing indigenous vegetation cover will be removed.

The affected forest vegetation includes the stands of mahoe, shrub mosaics and various stands of exotic trees such as macrocarpas and radiata pine trees, as described in Section 4.1.

Native and introduced birds that inhabit the area are likely to move into adjoining areas during the initial stages of the works.

7. Proposed Mitigation/Restoration Measures

7.1 Area Proposed for Exclusion from Development

It is recommended that a strip of the low mahoe forest, extending up to 25 metres above Ohiro Road, including the small grove of karaka trees above 326 Ohiro Road is retained if these are within the proposed plan change area. This vegetation generally covers the steeper terrain of the affected area and fulfils an important soil conservation function.

7.2 Proposed Restoration Measures

Although the proposed housing development will result in the loss of a large area of indigenous vegetation cover, the size of the affected area provides the opportunity to implement appropriate, albeit small scale restoration measures. Details on these measures will be covered more comprehensively in another report, however it is recommended that clumps of trees and shrubs such as mahoe, manuka, five finger, kohuhu, mamaku, koromiko, taupata and tauhinu are planted between the housing complexes to provide an element of native cover across the developed site.

8. Conclusions

The housing development is likely to require a significant amount of earthworks in view of the steep terrain and thus necessitate the clearance of low mahoe forest of low to moderate ecological value from much of the affected area.

The absence of later seral trees such as kohekohe, rewarewa and titoki precludes the mahoe low forest from developing into a long standing and biologically diverse forest unless active measures were put in place, such as by way of artificial plantings.

A strip of forest cover is recommended for retention above Ohiro Road for soil conservation purposes in view of the steepness of the terrain.

A review of site inventory details for other areas of semi-coastal secondary forest in adjoining areas indicates that the vegetation cover within the affected area is represented in a number of peri-urban forests around Wellington.

Restoration measures proposed for the site are small scale and designed to provide for a degree of native cover without unduly compromising the viability of the housing development. Such measures will benefit local native bird populations as well contribute to the amenity of the area.

References

Gabites, I. (1993). Wellington's Living Cloak - A Guide to the Natural Plant Communities. Victoria University Press.

Myers, S.C. (1985). Native Forest Remnants of Wellington City – A survey of five sites. Biological Resource Centre, DSIR, Wellington.

Park, G. (1997). Makara Park, Karori - A Survey of Vegetation Patterns and Ecological Trends. A report to Wellington City Council.

Appendix 1: List of Observed Plant Species

The following is a list of native and naturalised plants observed across the site during the course of a site visit on 5 November 2003. This list is by no means exhaustive and identifies the more common plants encountered on the site.

Nomenclature for indigenous plants follows Poole and Adams (1990) and for naturalised plants (indicated by *) follows treatments in Healy & Edgar (1980) and Webb et al. (1988). Amenity and forestry plantings are denoted *(p).*

Mahoe	*Melicytus ramiflorus*
Gorse*	*Ulex europaeus*
Rangiora	*Bracoglyottis*
Raurekau	*Coprosma grandiflora*
Kawakawa	*Macropiper excelsa*
Pate	*Schefflera digitata*
Karaka	*Corynocarpus laevigatus*
Manuka	*Leptospermum scoparium*
	Coprosma tenuicaulis
Mamaku, Tree Fern	*Cyathea medullaris*
Ti kouka, Cabbage Tree	*Cordyline australis*
Taupata	*Coprosma repens*
Ngaio	*Myoporum laetum*
Pohutukawa	*Metrosideros excelsa (p)*
Putaputaweta	*Carpodetus serratus*
Horoeka	*Pseudopanax crassifolius*
Broom*	*Cytisus scoparius*
Poroporo	*Solanum laciniatum*
Kotukutuku	*Fuchsia excorticata*
Koromiko	*Hebe salicifolia*
Kowhai	*Sophora microphylla*
Kohuhu	*Pittosporum tenuifolium*
Five finger	*Pseudopanax colensoi (p)*
Harakeke	*Phormium tenax (p)*
Lemonwood	*Pittosporum eugenoides (p)*
Lowland ribbonwood	*Plagianthus regius (p)*
Tree lupin*	*Lupinus arboreus*
Blackberry*	*Rubus fruticosus*
Radiata pine	*Pinus radiata*
Macrocarpa	*Cupressus macrocarpa*
Elderberry	*Sambucus nigra*
Tasmanian blackwood	*Acacia melanoxon (p)*
Blue gum	*Eucalpytus* spp. *(p)*
Sycamore	*Acer pseudoplatanus*
Crack willow	*Salix fragilis*
Douglas fir	*Pseudotsuga menziesii*
Hawthorn	*Crataegus monogyna*
Darwin's barberry*	*Berberis glaucocarpa*
Himalayan Honeysuckle*	*Leycesteria formosa*
Pohuehue	*Muehlenbeckia australis*
Clematis	*Clematis foetida*
Bracken	*Pteridium esculentum*
Spleenwort	*Asplenium oblongifolium*

Hen and chicken fern	*Asplenium bulbiferum*
Hounds tongue fern	*Phymatosorus diversifolius*
Crown Fern	*Blechnum discolor*
	Blechnum fluviatile
	Blechnum procerum
Prickly Shield Fern	*Polystichum richardii*
Water Fern	*Histiopteris incisa*
Thallose liverwort	*Marchantia sp.*
Yorkshire fog*	*Holcus lanatus*
Cocksfoot*	*Dactylis glomerata*
	Agrostis spp.
Couch*	*Elytrigia repens*
Narrow leaved plantain*	*Plantago lanceolata*
Wandering jew*	*Tradescantia fluminensis*
Stinging nettle*	*Urtica ferox*
Foxglove*	*Digitalis purpurea*
Cleavers*	*Galium aparine*
Oxeye Daisy*	*Chrysanthemum spp.*
Fennel*	*Foeniculum vulgare*
Wild Turnip*	*Brassica rapa*
Selfheal*	*Prunella vulgaris*
Groundsel*	*Senecio spp.*
Balm of Gilead*	*Cedronella canariensis*
Black nightshade*	*Solanum nigrum*
Japanese honeysuckle*	*Lonicera japonica*
Cape Weed*	*Arctotheca calendula*
Scambling speedwell*	*Veronica persica*
Scrambling fumitory*	*Fumaria muralis*
Inkweed*	*Phytolacca octandra*
Yarrow*	*Achillea millefolium*
Hairy buttercup*	*Ranunculus repens*
Catsear*	*Hypochoeris radicata*
Dandelion*	*Taraxacum officinale*

Appendix 2: Site Photographs

View across upper slopes of Block 1 from Kowhai Park towards city centre. Note pohutukawa plantings in foreground.

View from opposite direction. Kowhai Park is situated at the top right of the picture.

Mahoe dominated cover adjacent to Kowhai Park interspersed with gorse and emergent mamakus. An isolated pocket of manuka and several young pine trees are situated about mid slope in the centre right of the picture.

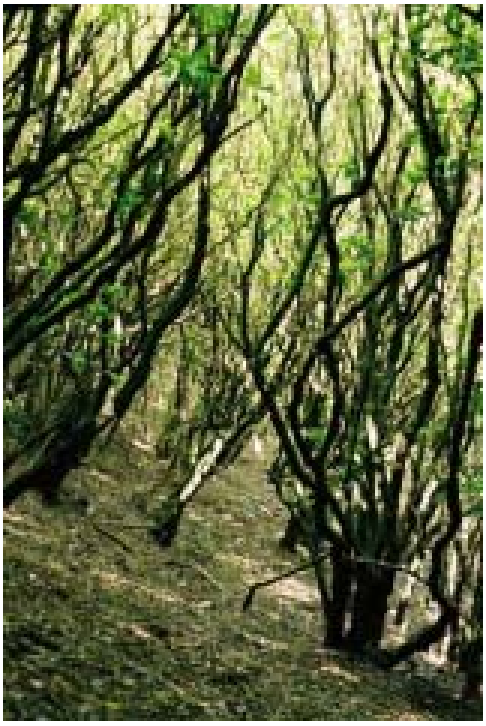
Steep bush clad slopes in Block 1 above residences at 320 - 326 Ohiro Road. A grove of karaka trees are evident in centre left of picture between the blue house and the pine trees on the skyline. The construction site lies beyond pine trees further up Ohiro Road.

Forest interior on lower slopes of Block 1 beneath 5 to 6 metre high mahoe canopy. Understorey vegetation includes the shrubs *Coprosma grandifolia* (kanono), *Coprosma tenuicaulis, Macropiper excelsum, Brachyglottis repanda* (rangiora), pohuehue vines and the fern *Asplenium oblongifolium.*

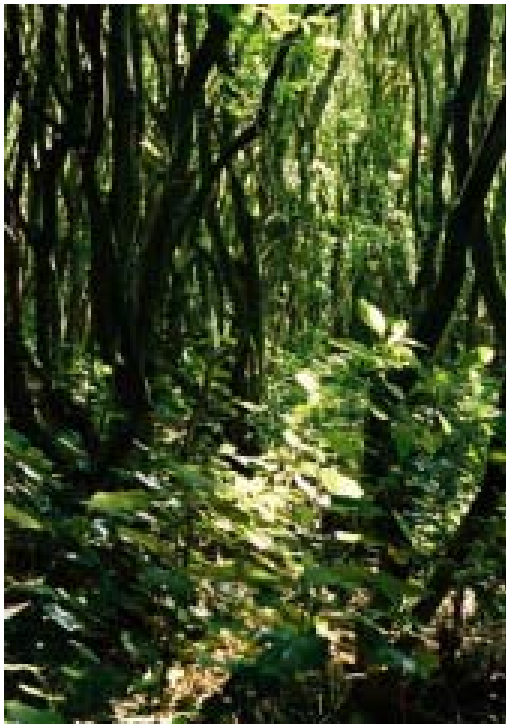
Looking up broad gully on the edge of Block 2. Several Tasmanian blackwoods and large pines are emergent above mahoe canopy.

View of the upper slopes of the same area showing numerous mamakus and a small stand of manuka trees. Kowhai Park is just beyond the skyline ridge.

Mahoe/gorse mosaic on upper slopes of Block 3 with flowering rangiora in the foreground. Garden plantings including lemonwood and akeake are evident in top right of picture.



Dry forest interior on mid slopes of Block 3 with subcanopy and forest floor vegetation almost absent.



Forest interior within gully beneath 7 to 8 metre high mahoe canopy and featuring a lush shrub tier of rangiora and kanono. Mature *Schefflrea digitata* (pate) occurs in association with mahoe as a sub-dominant canopy species where favourable moisture conditions prevail.

Blechnum fluvatile and *Blechnum procerum* tend to occur as isolated plants within the darker and damper recesses across the forest floor.

Adventive plants such as *Leucanthemum* and *Brassica* spp. florish along the track margins as depicted in these photos. Plantings of Tasmanian blackwood and radiata pine occur at regular intervals along the track within Block 2. Amenity plants such as Eucalyptus and cedar species as well as flaxes occur along between the stands of mahoe trees and the backyards of various Mitchell Street properties, as seen in the top left of the lower picture.