Waikawa Bay Plan Change

Waikawa Bay, Picton

Proposed Extension to the Waikawa Marina Zone
Assessment of Terrestrial Ecology

Prepared for
Port Marlborough New Zealand Limited

by
Boffa Miskell Limited

Boffa Miskell

February 2010

CONTENTS

1 Introduction 3
2 Methodology 3
3 Scope of Works 4
3.1 The Proposed Extension to the Marina Zone 4
4 Resource Description 4
4.1 Ecological Context 4
4.2 Vegetation and Land Use 5
4.3 Waterbodies 7
4.4 Birdlife 7
4.5 Freshwater Fish 8
4.6 Lizards and Snails 9
4.7 Pests 9
5 Assessment of Significance 10
5.1 Introduction 10
5.2 Assessment 11
5.3 Marlborough Sounds Resource Management Plan 13
5.4 Summary 13
6 Assessment of Effects of the Plan Change on the Existing Environment 13
6.1 Loss of coastal vegetation associated with the reclamation 14
6.2 Hydrology and culverting of water courses 15
6.3 Cumulative loss of rocky shoreline habitat and impact on roosting shorebirds 15
6.4 Temporary construction effects 16
7 Conclusions 17
8 References 18
9 Appendix A: Proposed Marina Zone Plan 19
10 Appendix B: Indicative Marina Layout 20
11 Appendix C: Plant names used in the text 21
12 Appendix D: Photographs 23

1 Introduction

This is an ecological assessment to support the proposed Plan Change for the proposed extension to the Marina Zone at Waikawa Bay, Marlborough Sounds, in the Marlborough District. It is limited to the terrestrial and freshwater ecology above Mean High Water Spring (MHWS), including shorebirds. The aquatic ecology has been assessed separately by Cawthron Institute.

The areas subject to the Plan Change application is located on the coastline of Waikawa Bay just below the eastern slopes of the northern end of the peninsular known locally as 'The Snout'. The Snout is connected to the mainland by a broad flat valley for much of its length, but the northern portion of The Snout forms the western edge of Waikawa Bay. The majority of the Waikawa Bay catchment of The Snout (north-eastern edge) is in private ownership with the remainder of The Snout administered by the Marlborough District Council.

Port Marlborough NZ Ltd (Port Marlborough) are applying for a Plan Change to expand the Marina Zone to include a further 8 ha section of the coastal marine area adjacent to the north-western shoreline of the Bay (refer Appendix A). The proposed extension to the Marina Zone would expand the current Waikawa Marina out into Waikawa Bay some 470m (measured in terms of length of shoreline) past the existing marina and associated marina activities and storage areas. The approximate location and extent of these works is shown in the indicative marina plan attached as Appendix B.

Port Marlborough are the owners of the current marina and much of the surrounding land that will be affected. Port Marlborough have a range of marine-based interests in the Waikawa-Picton area and are proposing to expand the current marina to provide permanent berths for a long waiting list of boat owners from across New Zealand.

This report assesses the ecological effects of the proposed Plan Change on the terrestrial ecology with particular regard to the ecological matters identified in Parts 5, 6 & 7 of the Resource Management Act. It is noted that the Plan Change in itself will not generate any environmental effects. Therefore, this assessment addresses the potential effects that may occur should a marina be developed within the rezoned area. In order to inform this assessment, the 'indicative marina layout plan', contained in Appendix B has been used. The objectives of this assessment were to:

- Describe the ecological features in and adjacent to the site proposed for re-zoning.
- Assess the conservation value of these features.
- Identify actual or potential effects of the proposed Plan Change on the terrestrial ecological environment, plants, animals or habitats, should a marina facility be developed.

2 Methodology

A site visit was undertaken with a representative from Port Marlborough in winter on 26 June 2007 and a further site visit in dryer summer conditions on 4 February 2008. The weather during the first site visit was fine, sunny and calm following a cold night with snowfall to 300m and a heavy frost. Light rainfalls had occurred the day prior and during the previous week and conditions were still relatively damp. The second

site visit was fine and calm following a long period of settled dry weather. For the purposes of this assessment, the conditions for two site visits were considered to be representative of typical stream and forest conditions.

The coastal margin was walked to consider the extent of the proposed marina re-zoning and the ecological context of the wider site. Then we undertook a more detailed inspection of the area to be re-zoned and its immediate surroundings. Our assessment for this proposed re-zoning assumed that the marina expansion would include all the areas within the Marina Zone areas outlined in Appendix A. As part of this exercise, terrestrial vegetation was described and freshwater habitat studied where appropriate. This terrestrial assessment did not include a detailed ecological assessment of the coastal scrub and forest located on private land above MHWS unless it could be observed from the coastline.

All published information about the study area was reviewed and base maps prepared prior to site inspections.

Vegetation associations were identified and described through a combination of the Land Cover Database II LCDBII (Ministry for the Environment), field observation and the use of recent aerial photographs provided by Port Marlborough. Information on landforms, soils and erosion was derived from the New Zealand Land Use Resource Inventory and Land Environments of New Zealand. Additional information on the site was derived from 1:50,000 scale topographical maps (NZMS P27) and from Google Earth. The national threat classification of species was derived from the Department of Conservation (DoC) national database (Hitchmough, R.; Bull, L.; Cromarty, P. (comps) 2007).

3 Scope of Works

3.1 The Proposed Extension to the Marina Zone

The proposed extension to the Marina Zone would extend approximately 470m along the coastline (or 370m in a straight line) past the 1999 marina extension in Waikawa Bay and would have an average width of 140m from the base of the coastal cliffs. As part of our assessment we have assumed a shoreline reclamation would extend along the length of the proposed extension to the Marina Zone. Refer Appendix B for an aerial photograph of the site showing an indicative marina layout in relation to the existing site features.

We have also assumed that a breakwater would be formed of suitable width at the northern end of the marina, to allow for traffic turning and extra parking.

4 Resource Description

4.1 Ecological Context

The site is located within the Sounds-Wellington Ecological District, an area characterised by drowned river valleys with a maritime climate. Prevailing winds are westerly to northwesterly with relatively frequent

gales. Rainfall is 1200-2000mm per annum, reliable and evenly distributed throughout the year. The soils are steepland soils formed from the parent rocks and include fragmented solifluction debris. The soils of the study area are identified as 6e21, consisting of greywacke top rock and base rock with Yellow-Brown earths. Soils are moderately fertile, but in the higher rainfall areas they are typically leached and have infertile podzols. The topography of the study area is mostly moderate to steep in slope and rises from the sea to approximately 180m. The coastal margin and seashore is predominantly rocky, but has a series of small gravel beaches.

Pre-European vegetation would have comprised of a littoral fringe of low coastal vegetation; hard beech forest originally predominated on most slopes with black beech on headlands and spurs and hardwood forest, ususally kohekohe-tawa forest with pukatea and hinau in valleys and minor podocarp element (rimu, some miro), elsewhere (McEwen 1987). Much of the original forest has been cleared for farming or timber.

Further north of the proposed extension to the Marina Zone is an area of Sounds Foreshore Reserve, protected under the Reserves Act 1977 as a Local Purpose Reserve.

4.2 Vegetation and Land Use

The original cover of native forest has largely disappeared and the study area is now almost entirely covered in secondary native broadleaved scrub and low forest (dominated by five-finger), with some smaller areas of residential houses, baches and associated access ways (Appendix B). This eastern side of the peninsular consists primarily of secondary native broadleaved scrub and low forest (dominated by five-finger), combined with smaller areas of the mixed gorse and broad leaved scrub. Small remnants of black beech forest (with some hard beech) occur in a few locations north of the marina, primarily on dryer headlands. A smaller coastal broadleaved forest remnant occurs in one gully above the baches north of the existing marina, but within the extent of the proposed extension to the Marina Zone. These beech forest remnants and the coastal broadleaved forest remnant are the only reminders of the original forest cover in the study area.

Along the coastlilne, many of the gully headwaters and upper slopes are vegetated in regenerating broadleaf low forest with small areas of gorse and broadleaved scrub. Pines have been removed from areas of the coastal hill slopes and headlands in recent years and there has been vegetation removal and interplanting with a range of exotic species within and around the baches located within this coastal area. The majority of the coastal edge of the peninsula comprises of coastal scrub, primarily akiraho (*Olearia paniculata*) with whaririki (coastal flax), karamu and kanuka. This distinctive coastal fringe of vegetation is located out of reach of the tides above Mean High Water Spring, but subject to regular salt spray and erosion from wave action (refer Photos 4, 6, 7 & 9).

In our opinion, the vegetation in the study area is typical of much of the advanced regeneration of Queen Charlotte Sound. This assessment has identified five broad vegetation communities are present across the wider site of varying condition. These are outlined in Table 1 with relevant photos attached as Appendix D. A species list is included as Appendix C.

Table 1: Vegetation Communities (in order of decreasing naturalness)

	MAIN HABITATS and FEATURES	1⁰ native	2⁰ native	Induced native	Exotic	Regen[1]	NAT[1]	Exotics[1]	Trend[2]
1.	**Black beech forest on headlands.** Small remnants or isolated trees of black beech (*Nothofagus solandri*) with occasional hard beech (*Nothofagus truncata*), mixed broadleaf understorey comprising of five finger (*Pseudopanax arboreus*), *Olearia paniculata*, flax (*Phormium cookianum*), mingimingi (*Cyathodes juniperina*), koromiko (*Hebe stricta*), karamu (*Coprosma robusta*), kohuhu (*Pittosporum tenuifolium*), manuka (*Leptospermum scoparium*), puka (*Griselinia lucida*), rangiora, cabbage tree (*Cordyline australis*), (*Brachyglottis repanda*) with occasional mahoe (*Melicytus ramiflorus*), supplejack (*Ripogonium scandens*), bracken (*Pteridium esculentum*), *Carex virgata* and ground ferns. Some older planted *Eucalyptus* trees occur within one of the remnants. Refer Photos 1, 6, 7, 8 & 10.	✓	✓			L	M	L	S
2.	**Tawa / pukatea forest**. Remnant coastal broadleaved gully forest comprising of tawa (*Beilschmiedia tawa*), with emergent pukatea (*Laurelia novae-zelandiae*), pigeonwood (*Hedycarya arborea*), five-finger, kamahi (*Weinmannia racemosa*), karamu, koromiko, mamaku, puka (*Griselinia lucida*), supplejack, mahoe and putaputaweta (*Carpodetus serratus*). Occasional kowhai (*Sophora microphylla*) on margins. Good regeneration on the forest floor and understorey with some ground ferns. Refer Photos 1, 10 & 11.	✓	✓			H	H	L	I
3.	**Olearia paniculata – Phormium cookianum – coastal scrub**. A coastal fringe of predominantly *Olearia paniculata*, whaririki (*Phormium cookianum*), karamu, koromiko, kanuka (*Kunzea ericoides*), manuka (*Leptospermum scopariam*), rangiora, mapou, gorse (*Ulex europaeus*) with occasional fivefinger, kohuhu, mahoe, akeake (*Dodonaea viscosa*) and broom Understorey of sparse kawakawa, karamu, rangiora, koromiko with *Microsorum pustulatum* and *Asplenium oblongifolium*. Some large areas of *Pyrrosia eleagnifolia* on coastal rocks above MHWS. Some introduced grasses are present. Refer Photos 1-4, 7 & 9.		✓			M	M	L	S
4.	**Fivefinger - mahoe forest.** Secondary native broadleaved scrub and low forest (dominated by five-finger). The largest vegetation type. Mahoe, karamu, wineberry (*Aristotelia serrata*), mamaku (*Cyathea medullaris*), kawakawa (*Macropiper excelsum*), kohuhu, kawakawa, *Muehlenbeckia*, tutu (*Coriaria arborea*), and ponga (*Cyathea dealbata*) also present throughout the canopy. Understorey consists of kawakawa, fivefinger, karamu, pigeonwood and mixed ground ferns (*Asplenium flaccidum*; *Asplenium bulbiferum, Blechnum* spp.). Some smaller regenerating titoki (*Alectryon excelsus*), tawa and pukatea. Refer Photos 1, 2 6 & 7.		✓			H	M	L	I

	MAIN HABITATS and FEATURES	1⁰ native	2⁰ native	Induced native	Exotic	Regen[1]	NAT[1]	Exotics[1]	Trend[2]
5.	**Gorse - mahoe scrub.** Short-lived successional vegetation dominated by gorse with mahoe, fivefinger and karamu intermixing with regenerating broad leaved forest. Some pasture grasses present and interspersed with areas of almost pure gorse still present in some areas. Broom is also present. Refer Photos 1, 2, 5 & 6.				✓	L	L	H	I

The species present are typical of the ecological district. There are some uncommon or rare occurences of native plants known from the wider Sounds Ecological District, but these are generally located at higher altitudes. During this assessment no rare or unusual native plants were observed.

4.3 Waterbodies

The coastal area surrounding the proposed extension to the Marina Zone has a number of smaller watercourses that flow into the sea during storm events. There is one primary intermittent stream that flows into the largest bay in this area via an area of remnant forest (Photos 10, 11 & 12, refer to Appendix B). The lower section of this stream consists of large rocks, cobbles and beds of organic debris and areas of steeper, narrow incised channels heading upstream. During the winter site visit, there was a large amount of organic matter obseved in the area of stream beneath the broadleaved forest remnant and there were numerous small pools of water observed within the lower reach of the stream. During the summer site visit, no visible pools of water were observed and the stream entirely disappeared beneath the old streambed gravels and the beach gravels and sands a distance of approximately 10 metres where it exited into the sea. During both site visits, no continuous flows were observed suitable to support habitat for native fish species.

4.4 Birdlife

The site has not previously been listed in wildife inventories we are aware of and is not known to contain threatened native species. The birds seen during the site visit were consistent with the regenerating native bush, streams and gardens and coastline of the area. Nothing was seen that was unusual or unexpected.

The field trip was however of short duration and additional trips over four seasons would be needed to develop a comprehensive list of resident and vagrant birds. Based upon the available habitat and birds known to occur in the inner Sounds, it is likely that kingfisher, morepork, shining cuckoo, kereru and weka may be present or vagrants to the site. Little blue penguin, South Island pied oystercatcher and pied shag are also likely to frequent the wider study area. There was no evidence of penguin burrows along the coastal margin from the site visit. Birds seen during the site visit are listed in Table 2.

Table 2: Native birds observed in the study area

Common Name		National Threat Status	Coastal Margin	Forest
Grey Warbler	E	Not threatened		✓
Fantail	N	Not threatened		✓
Tui	E	Not threatened	✓	
Bellbird	E	Not threatened	✓	
Silvereye	N	Not threatened	✓	✓
Black-backed gull	N	Not threatened	✓	
Spotted shag	E	Not threatened	✓	
Red-billed gull	E	Not threatened	✓	
Blackbird	I	Introduced	✓	
Chaffinch	I	Introduced	✓	
Greenfinch	I	Introduced	✓	✓
Starling	I	Introduced		✓

E = endemic: Only known to breed in New Zealand
N = native: Naturally found in New Zealand and known to breed in other countries.
C = coloniser: Recently arrived in New Zealand and still expanding range.
I = introduced: Deliberately brought to New Zealand.
Sorted by Threat Classification (Hitchmough, R.; Bull, L.; Cromarty, P. (comps) 2007)

4.5 Freshwater Fish

According to the NZ Freshwater Fisheries Database, no freshwater assessments have been undertaken in the wider study area of 'The Snout'. However, freshwater assessments of the nearby Waikawa Stream in 1998 and 2000 found a range of indigenous freshwater fish species present. The Waikawa Stream has a large catchment and is a larger perrenial stream with sufficient flows for resident freshwater fish populations. The smaller streams in the study area are different. Freshwater fish species found in the Waikawa Stream and the results of other freshwater studies from the NZ Freshwater Fisheries Database in smaller unnamed streams near Waikawa Bay are outlined in Table 3.

Table 3: Presence / Absence of Fish Species

Sorted by Threat Classification (Hitchmough, R.; Bull, L.; Cromarty, P. (comps) 2007)

Common Name	Scientific Name	Threat status
Eel, Longfin **(D)**	Anguilla dieffenbachii	5 Gradual decline
Bluegill bully **(D)**	Gobiomorphus hubbsi	Not threatened
Red-fin bully **(D)**	Gobiomorphus huttonii	Not threatened
Lamprey **(D)**	Geotria australis	6 Sparse
Inanga **(D)**	Galaxias maculatus	Not threatened
Banded kokopu **(D)**	Galaxias fasciatus	Not threatened
Goldfish	Carassius auratus	Introduced

(D) = Diadromous. Typically needs to migrate to the sea for a part of its lifecycle.

During this assessment, a number of pools in the primary stream along the coastal margin (below the coastal broadleaved gully forest remnant) were investigated for fish, koura and freshwater macro-invertebrates. Small numbers of macroinvertebrates were observed, species typical of the habitat conditions. There was a lot of organic detritus in the stream-bed along the coastal margin, suggesting that no large flows or flood events had occurred in the area for some time. Given the small size of this stream, kick netting or electric fishing for freshwater fauna investigation in the stream was considered to be impractical.

Overall, it is our opinion that the small steeply incised stream in the study area is too small and inaccessible to contain most freshwater fish species. In addition, the long underground stretch of the stream would provide an additional barrier to fish movement. However, the stream may have small resident populations of bullies and could also provide seasonal habitat during winter for longfin eel and possibly banded kokopu.

4.6 Lizards and Snails

A range of lizard, snail and invertebrate insects occur in the Sounds Ecological District. The islands of the Sounds Ecological District are home to good populations of brown skink (*LEiopelma selandicum*), spotted skink (*Leiopelma lineoocellatum*) and the Marlborough green gecko (*Heteropholos maukanus*), which is also still found on the mainland (McEwen, 1987). The giant land snails *Powelliphanta hochstetteri obscura* and *Powelliphanta hochstetteri bicolor* are known to be abundant on nearby islands and are also still found on the mainland.

The Anthribid beetle, *Cacephatus huttoni (Sharp)* occurs at its southernmost (recorded) limit at Picton on a wide range of indigenous trees and shrubs (McEwen, 1987). At least three species of the ground beetle, *Megadrmoa sp*, is found in the locality.

None of these lizard, snail or invertebrate species were observed during investigtions undertaken along the coastal fringe as part of this assessment. However, it is noted that a specific lizard and snail survey was not undertaken as part of this assessment.

4.7 Pests

Invasive weed species are well established in some areas of the study area. Of particular note, Japanese honeysuckle and Old Man's Beard (*Clematis vitalba*) were observed along the coastal margin (refer Photo 5). Young pines (*Pinus radiata*) were also present throughout the study area, although most of the older pines had been cut down recently on the coastal margin (refer Photo 6). Wilding conifers (mostly *Pinus radiata*) and Old Man's Beard pose serious ecological threats throughout the Marlborough Sounds. Other exotic plants within the coastal scrub fringe and beech forest remnants in the area include broom, agapanthus, hydrangea and sweet briar (*Rosa rubiginosa*), the latter predominantly confined to the coastal and beech forest remnants close to residential dwellings.

Animal pests in the area are likely to include possums and smaller predators such as rodents, mustelids and hedgehogs. Goats, feral pigs and deer are also likely to occasionally frequent the area.

5 Assessment of Significance

5.1 Introduction

As part of this assessment, we have adopted and slightly modified the assessment criteria developed by the Ministry for the Environment in developing rules for significant natural resources[1]. These are outlined in Table 4:

Table 4: Criteria for Assessing Significance (after Norton and Roper-Lindsay, 2004)

Criteria	Explanation
Rarity and distinctiveness	Presence of unusual species within a site. A site is considered positive for the rarity/distinctiveness criterion if it is known to support a species that is listed as Acutely Threatened in the current version of the NZ Threat Classification System, or supports a species that: • Is at a national distributional limit. • Only occurs in that area (e.g. an endemic species); • Although common elsewhere, is particularly uncommon in the study area.
Representativeness	Contains an ecology that is un-represented or unique in the ecological district. An area is considered positive for the representativeness criterion if it: • Supports an ecosystem that is now at less than c.10% of its former extent in the ecological district; or • Supports a high quality example of an ecosystem that is now at less than c.20% of its former extent in the ecological district.
Ecological context	A remnant ecosystem patch does not occur in isolation. An area is positive for the ecological context criterion if it: • Enhances connectivity between patches; or • Buffers or similarly enhances the ecological values of a specific site of value; or • Provides seasonal or "core" habitat for specific indigenous species.
Sustainability	Sustainability is a secondary criterion or qualifier for the three criteria above. Relates to the likely future condition of a site, including its ability to retain the ecological values that have been identified and/or its potential to better provide for particular values in the future. A site is considered positive for the sustainability criterion if: • Key ecological processes remain viable or still influence the site; • The key ecosystems within the site are known to be or are likely to be resilient to existing or potential threats under some realistic level of management activity; and • Existing or potential land and water uses in the area around the site could be feasibily modified to protect ecological values.

[1] Norton, D.A. & Roper-Lindsay, J. 2004. Assessing significance for biodiversity conservation on private land in New Zealand. New Zealand Journal of Ecology 28 : 295-305.

The criterion are typically ranked high, medium, low or nil. The fact that a particular area satisfies one or more of the criterion above will not necessarily mean that the area is significant. Final assessment will rely on the knowledge and experience of the observer.

5.2 Assessment

Rarity and Distinctiveness (ranking = Low)

- There are no threatened ecosystems present. The vegetation communities that will be affected are common in the area and are well represented in the inner Marlborough Sounds.
- No uncommon or rare animal species are known from the site or were identified during this assessment. While this assessment was of relatively short duration, the types of habitat present and their quality suggest that the range of bird species observed were representative of the site and all were common to the area. No native fish were found in the streams of the study area. If present in the area, little blue penguin has a national threat status of Gradual Decline.
- The site does not appear to contain species that are endemic to (found only within) the ecological district.

Representativeness (ranking = Low-Medium)

- The proposed Plan Change would not affect any areas of remnant vegetation that are now at less than c.10% of its former extent in the ecological district or that support a high quality example of an ecosystem that is now at less than c.20% of its former extent in the ecological district.
- Although representative of the regenerating forest and scrub of the eastern inner Marlborough Sounds, the regenerating broadleaved scrub and low forest and coastal fringe vegetation of the study area are not un-represented or unique in the ecological district.
- The small beech forest remants, isloated beech trees and remnant of broadleaved coastal gully forest are all located higher than Mean High Water Springs and would not be affected by this proposal.
- The site has good species and habitat diversity for the size of the area.
- The areas of remnant forest display good species diversity and the range of species found in the canopy, understorey and flroest floor are consistent with other larger areas of remnant forest in the inner Marlborough Sounds. The presence of fertile primary forest trees and their juveniles suggest that these forest remnants are important as local seed sources and are influencing natural regeneration in the surrounding study area.
- There is a medium diversity of native birdlife and a suspected absence of native fish in the streams.

Ecological Context (ranking = Medium)

- The site is well buffered by the coastline and the large area of surrounding protected land of the remainder of The Snout which is administered by Marlborough District Council. Almost the entire area

is covered with regenerating low forest and scrub intermixing with occasional smaller forest remnants and isolated remnant trees along the coastline and lower hillslopes and gullies.

- With the exception of a handful of baches, driveways and a small area of pasture, the study area is contiguous with surrounding regenerating broadleaved low forest and scrub. This situation provides good ecological connectivity across the site and with the wider penisular, both buffering the forest remnants from any edge effects, and maintaining ecological linkages and connectivity across the wider peninsular.
- Given the sites location above the coastline and the presence of remnant vegetation, the site is likely to provide some habitat for coastal and marine bird species.

Sustainability (ranking = Medium)

- Despite its historical modification, the site overall is in good ecological condition. Natural regeneration is relatively well advanced and is intermixing with the small areas of remnant forest along the coastal margin. There are good seed sources nearby and this is influencing the nature of the regeneration across the site.
- Although the size and shape of the remnants of beech forest and broadleaved coastal forest are relatively small and in some areas, limited to only a handful of older trees, natural regeneration is healthy and primary forest species are becoming established.
- The study area is a small part of a larger ecological unit that covers most of 'The Snout'. This is providing valuable habitat for native birds and other small animals.
- The vegetation is at a stage where most of the early succesional pioneer plants have disappeared and is now largely self-maintaining. There are however, various weeds present that require control. Ongoing animal control would be beneficial.
- The baches and private accessways are well established and with the exception of a few garden plants and weeds, do not seem to be affecting natural regeneration.

Table **5** summarises the ranking of the above criteria.

Table 5: Ranking of Assessment Criteria (using the scale: L =Low M =Medium H =High)

Criterion	Ranking
Rarity and Distinctiveness	L
Representativenes	L-M
Ecological Context	M
Sustainability	M
Overall Significance	**L-M**

5.3 Marlborough Sounds Resource Management Plan

The Marlborough Sounds Resource Management Plan identifies the coastal margin that is proposed to be rezoned as predominantly Coastal Marine 1 Zone. No particular sites are identified by the Resource Management Plan within the study area as having botanical, ecological or wildlife values outlined in Appendix B of the Plan on the Ecology Planning Maps. In addition, none of the streams of the study area are identified in the Schedule of Water Bodies for Riparian Management Purposes.

The only area in Waikawa Bay that is identified as having ecological value is on the Peninsular across the other side of Waikawa Bay. This area identified in the Resource Management Plan as 4/12 and is included for its localised values. The area marked in Waikawa Bay is one of 47 sites identified in the Plan for the following reason:

"Localised value. No threatened land species. Together areas form very large but fragmented habitat for smaller bird species and more mobile larger species. Some uncommon plant species or species associations which are becoming increasingly uncommon."

5.4 Summary

The coastal fringe and regenerating scrub and low forest vegetation communities of the site are considered to have moderate ecological value both locally and in a regional context. In particular, the small beech forest remnants and isolated beech trees and the single remnant of coastal broadleaved gully forest along the coastal margin are considered to be of importance both as habitat for plant and bird species, as isolated remnants of pre-European forest, and as seed sources for ongoing regeneration.

Overall, the wider study area is assessed as being of low-moderate ecological significance. However, when assessed in isolation, the coastal fringe vegetation of the coastline within the proposed extension to the Marina Zone is considered to have low ecological significance. This lack of identified important ecological values or features within the study area is confirmed by the Marlborough Sounds Resource Management Plan.

6 Assessment of Effects of the Plan Change on the Existing Environment

As outlined above, we have assessed the proposed extension to the Marina Zone as involving substantial reclamation of the coastal margin should the rezoned area be devleoped to accomodate a new marina facility. Accordingly, potential effects that need to be considered in the Plan Change assessment include:

- Loss of coastal vegetation associated with the reclamation
- Hydrology and culverting of water courses
- Cumulative loss of rocky shoreline habitat and impact on roosting shorebirds
- Temporary construction effects

These effects are addressed below:

6.1 Loss of coastal vegetation associated with the reclamation

We have considered the potential loss of coastal vegetation associated with the proposed extension to the Marina Zone along the approximately 470m section of coastline extending out from the existing marina. Based on the indicative marina layout plan (Appendix B), this would require minor modification and removal of coastal scrub vegetation where it occurs on the lower banks along the edge of the proposed Marina Zone. We have assumed that clean fill material would be used to reclaim this area to a height of approximtely 0.5m above Mean High Water Spring Level (MHWS), similar to the existing marina.

The coastal banks and escarpments within and surrounding the proposed extension to the Marina Zone are typically covered in a mixture of coastal scrub of predominantly *Olearia paniculata* interspersed with areas of regenerating broad leaved forest and mixed gorse and broad leaved scrub. In addition to the coastal scrub along the immediate coastal margin, numerous small isolated remnants of black beech forest (with some hard beech) on headlands and hill slopes occur along this coastline (including some located within and immediately adjacent to the proposed Marina Zone extension). There is also a large gully of remnant coastal broadleaved forest located at the head of the largest bay within the proposed extension to the Marina Zone (refer Appendix B). Healthy regeneration was observed within the forest understorey, particularly within the beech forest remnants and the coastal broadleaved forest remnant. Given the small amount of remnant vegetation left in the inner sounds and along 'The Snout', these beech forest and coastal broadleaved forest remnants are considered to be locally significant and should not be modified.

Based on the proposed Zone Plan for the proposed marina zone contained in Appendix A, the coastal broadleaved forest remnant and the majority of the beech forest remnants would be located outside of this Zone. However, the proposed Marina Zone includes one distinct area of remnant beech forest and some large areas of coastal scrub. While the beech forest remnant is located above MHWS and therefore would not be affected by any associated marina reclamation, we have assumed the coastal fringe vegetation will require modification and removal (refer Appendix B). From our observations, the dynamic maritime-influcenced nature of this coastal margin means that this coastal scrub and remnant vegetation is generally located well above MHWS (refer Photos 1, 2, 4 6, 7 & 9), with the beech forest remnants generally located at least 4 metres above MHWS. A combination of salt spray, steep and unstable topography and lack of soils means that most vegetation is located at least 1 metre above MHWS. Photos 1, 4 & 9 are typical of this vegetation in this coastal zone. Given any future marina-related reclamation would occur no more than 0.5m above Mean High Water Spring Level (MHWS) consistent with the existing marina, any vegetation affected would consist of relatively young low stature coastal scrub, largely where it overhangs the proposed Marina Zone. The coastal scrub within this proposed Marina Zone is typical of the wider Marlborough Sounds environment and is not considered to be significant indigenous vegetation.

Overall, we conclude that the proposed Marina Zone area includes only small areas of coastal scrub and one small remnant of beech forest. With the exception of this small area of remnant beech forest, the remainder forest remnants and trees are located outside of this zone. It is noted that any marina development will require a discretionary resource consent, at the very least. Accordingly, an appropriate assessment of the effects of any development on terrestial ecology, particularly where significant remnant

vegetation occurs, would form part of the resource consent application, and appropriate mitigation can then be imposed as conditions of any consent granted for the proposal.

6.2 Hydrology and culverting of water courses

The proposed extension to the Marina Zone includes a number of smaller watercourses that flow into the sea. We have considered the potential effects of reclamation and culverting within this zone on freshwater fish and invertebrates likely to inhabit these watercourses. The watercourses across the study area drain very small catchments that are dry throughout most of the year, only carrying flows during storm events.

As outlined in the resource description, there is one small ephemeral stream that flows into the largest bay in this area via an area of remnant coastal broadleaved gully forest (refer to Appendix B – proposed zone plan). Assuming that the marina expansion would include all the areas within the Marina Zoned areas outlined in Appendix B, this stream would be piped a distance of approximately 15 metres. No continuous flows were observed in this stream and, because the coastal portion of the stream exits to the sea via a long underground stretch of gravels and sands, it was considered that the stream would not provide suitable habitat to support populations of native fish, although occasional fish species may frequent this stream. We consider that there is sufficient opportunity to ensure correct water flows are achieved and to ensure there is no scouring or erosion around the inlet and outlet points into the marina through the necessary discretionary activity resource consent application required for any new marina development at this site.

Overall, we consider that the water courses within the proposed extension to the Marina Zone are unlikely to provide significant habitat for large numbers of freshwater fish and the effects will be negligible.

6.3 Cumulative loss of rocky shoreline habitat and impact on roosting shorebirds

We have considered the effects of the loss of approximately 470 metres of rocky shoreline habitat as part of the proposed extension to the Marina Zone. The effects on the coastal environment below MHWS is covered more detail by the marine and coastal ecology assessment undertaken by Cawthron Institute.

The severance of the coastal scrub and forest from the sea as a result of the proposed extension to the Marina Zone is perhaps the largest effect of this Plan Change. The only species likely to be adversely affected is the little blue pengiun which would be required to physically walk across the proposed Marina Zone to roost. Despite there being no evidence of breeding birds or penguin burrows or other nests during the site visit, it is expected that the beech forest remnants and rocky shoreline would provide good habitat for roosting sites.

It is considered that there may also be minor effects on other shorebirds with the expected loss of habitat associated with the proposed extension to the Marina Zone. The site visit observed low coastal bird numbers in the vicinity of the current marina when compared to the coastal margin where the proposed Marina Zone is to be extended. This is consistent with urbanised environments that are not compatible with roosting shorebirds or other wildlife. Accordingly, it is expected that any short-term construction effects within the proposed Marina Zone asociated with the development of a new marina, combined with the predicted movements of people, boats and vehicles in this area following any marina development would result in a loss of habitat for roosting shorebirds along this area of the coastline. However, we also

consider it likely that any development works within this proposed Marina Zone would also provide additional habitat for other bird species.

To some extent, this loss of habitat could be mitigated by providing additional habitat and nesting boxes as part of the design of sea walls for any futuremarina extension within the proposed Marina Zone as well as integrating signage into the design of the new marina that advise of little blue penguin nesting areas and road crossing zones. Provision of nesting boxes may provide future habitat for the little blue penguin (which is nationally listed as being in Gradual Decline) and signage would be beneficial in raising awareness of the presence of ground-nesting birds in the vicinity of the marina. Once again, these mitigation measures could be imposed as conditions as part of the resource consent process for any new marina development at the rezoned site.

According to the indicative plans for the marina development wihtin the rezoned area (refer Appendix B) the proposed extension to the Marina Zone would also involve the recreation of a beach at the north face of the marina which would go some way towards mitigating for the loss of existing beach areas within this proposed zone.

In general, the area of coastline within the proposed extension to the Marina Zone has been highly modified by historical vegetation clearance and the presence of baches and regular people and boat movements. No penguin burrows or other permanent roosting areas were observed within the area proposed to be re-zoned and the effects of any loss of rocky shoreline habitat within the proposed extension to the Marina Zone will be accpetable. There are large areas of similar coastline in the immediate vicinity that would continue to provide similar habitat.

6.4 Temporary construction effects

As part of this Plan Change assessment, we have also considered the potential for temporary effects on the ecology of the coastal margin associated with the construction phase for any marina-related works (including earthworks, noise and traffic movement) that may eventuate within the rezoned area. As identified previously in relation to potential effects on rocky shoreline and potential impacts on shorebirds, other than temporary habitat displacement during the construction phase we do not consider the likely construction phase effects will cause any more than minor effects on shorebirds. Most shorebird species present will be accustomed to some disturbance associated with the existing marina and regular pedestrian access in the area proposed for the Marina Zone extension area and should be able to tolerate the level of temporary construction effects anticipated.

Overall, the proposed rezoning of the subject area from Coastal Marine 1 Zone to Marina Zone is considered to be appropriate in terms of the potential impacts on terrestial ecology.

7 Conclusions

The vegetation occurring across the study area is considered to be typical of naturally regenerating hillslopes and gullies of the Marlborough Sounds and the species that will be potentially affected (i.e. located within the proposed extension to the Marina Zone) are all considered to be either locally common and abundant - or are located sufficiently high enough about Mean High Water Springs so as to avoid any associated effects. In our view, as long as the remnant beech forest is avoided, any effects of vegetation removal within this proposed Marina Zone would be no more than minor, and appropriate mitigation could be imposed to address effects through the resource consenting process necessary for any new marina development at this site. In summary:

- The area that is subject to the proposed extension to the Marina Zone has been sampled sufficiently to determine that there are no rare or threatened species or habitats present.
- The proposed extension to the Marina Zone would not involve any removal of remnant native vegetation.
- The anticipated development within the proposed Marina Zone may require modification and removal of coastal scrub vegetation. None of the plants or trees in these coastal vegetation communities within this proposed Marina Zone are considered to be regionally or locally significant and the vegetation is unlikely to provide important habitat for native wildlife.

In summary we consider that any ecological effects of vegetation modification or removal resulting from this Plan Change will be acceptable.

Matiu Park
Senior Ecologist / Planner
Boffa Miskell Limited

18 February 2010

8 References

HITCHMOUGH, R. (compiler) 2002. New Zealand threat classification system lists—2002. Threatened species occasional publication 23.

HITCHMOUGH, R.; BULL, L.; CROMARTY, P. (comps) 2007: New Zealand Threat Classification System lists—2005. Department of Conservation, Wellington. 194 p.

LANDCARE: Land Environments of New Zealand – Unpublished geographical database.

LEATHWICK et al. 1996-2003: Land Environments of New Zealand. Produced for Manaaki Whenua and Ministry for the Environment.

McEwen, M. 1987. Ecological Regions and Districts of New Zealand. Third Revised Edition in Four 1:500 000 Maps. Sheet 3. Central New Zealand from Eastern Wairarapa in the North Island to Akaroa in the South Island. Department of Conservation.

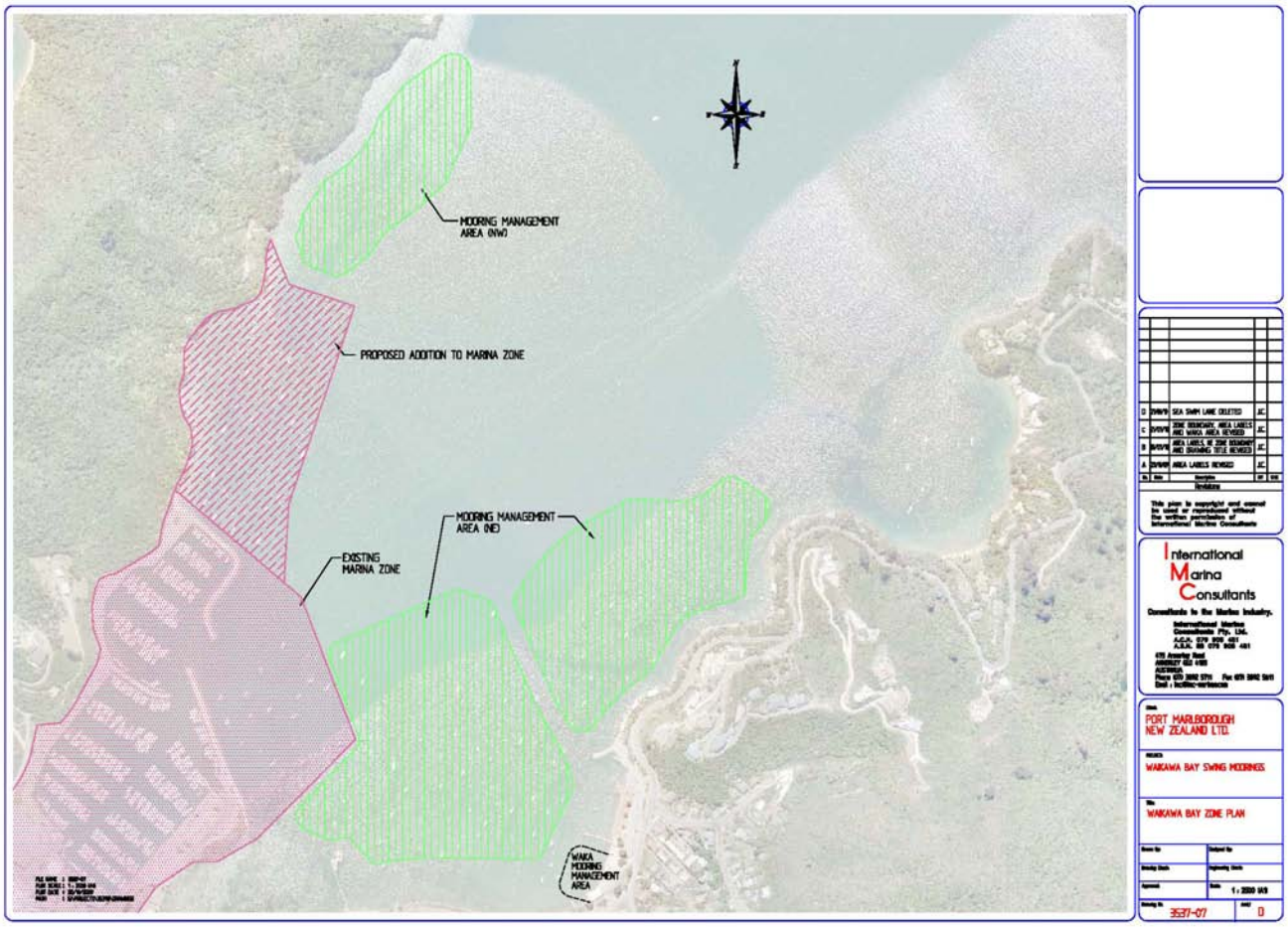
MINISTRY FOR THE ENVIRONMENT: Landcover Database Version II - Unpublished database.

NIWA: New Zealand Freshwater Fish Database. National Institute of Water & Atmospheric Research

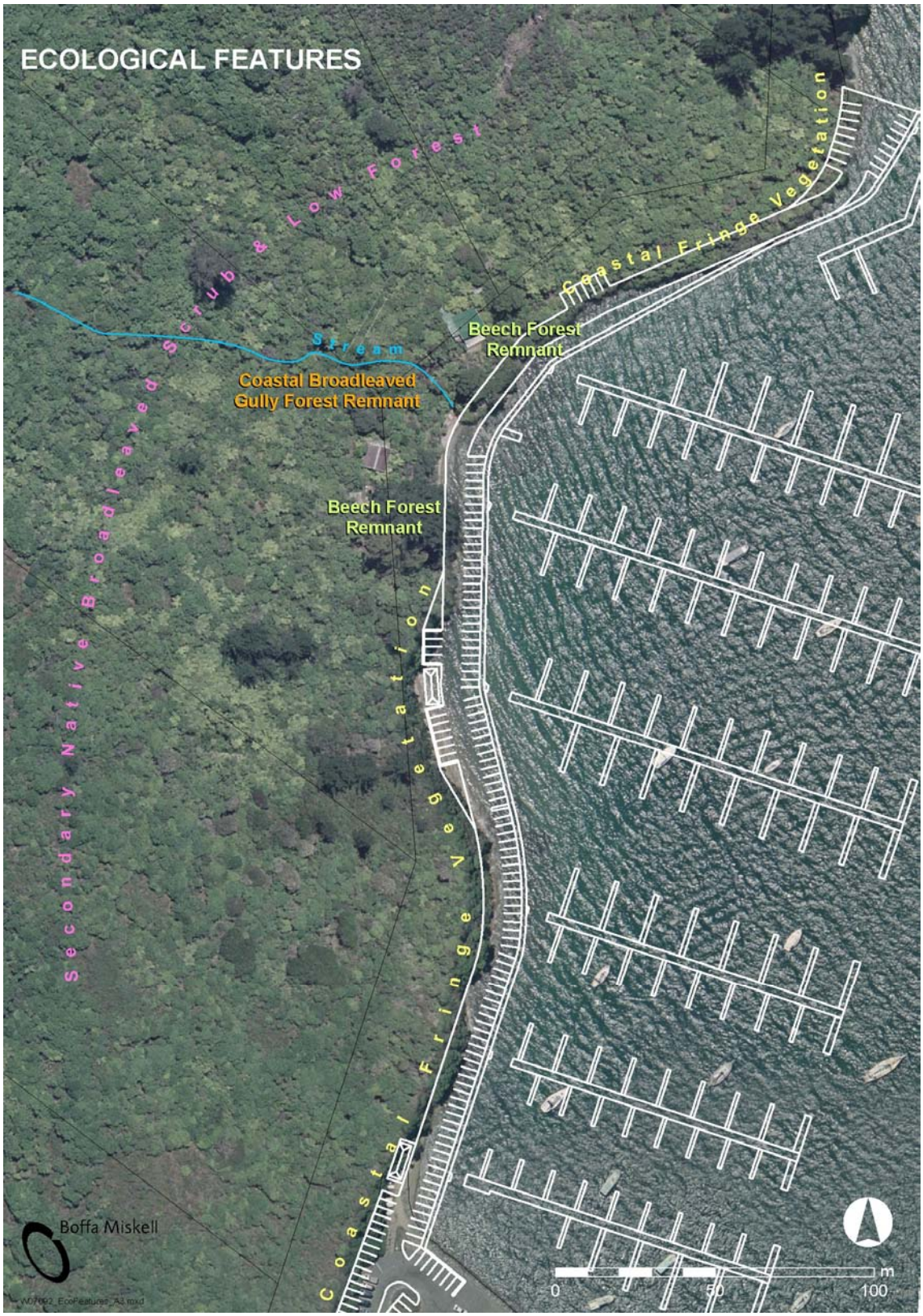
Ornithological Society of New Zealand.. 2007: The Atlas of Bird Distribution in New Zealand – 1999-2004. Ornithological Society of New Zealand.

NORTON, D.A. & ROPER-LINDSAY, J. 2004. Assessing significance for biodiversity conservation on private land in New Zealand. New Zealand Journal of Ecology 28 : 295-305.

9 Appendix A: Proposed Marina Zone Plan



10 Appendix B: Indicative Marina Layout



11 Appendix C: Plant names used in the text

Species	Common name
Trees and shrubs	
Alectryon excelsus	Titoki
Aristotelia serrata	Wineberry
Beilschmiedia tawa	Tawa
Brachyglottis repanda	Rangiora
Carpodetus serratus	Putaputaweta
Cassinia leptophylla	Tauhinu
Coprosma grandifolia	Kanono
Coprosma lucida	Karamu
Coprosma robusta	Karamu
Coriaria arborea	Tutu
Corynocarpus laevigatus	Karaka
Cordyline australis	Cabbage tree
Cyathodes juniperina	Mingimingi
Dodonaea viscosa	Akeake
Dysoxylum spectabile	Kohekohe
Freycinetia baueriana	Kiekie
Fuchsia excorticata	Tree fuchsia
Geniostoma rupestre	Hangehange
Griselinia lucida	Puka
Hebe stricta	Koromiko
Hedycarya arborea	Pigeonwood
Kunzea ericoides	Kanuka
Laurelia novae-zelandiae	Pukatea
Leptospermum scoparium	Manuka
Macropiper excelsum	Kawakawa
Melicytus ramiflorus	Mahoe
Myoporum laetum	Ngaio
Myrsine australis	Mapou
Nothofagus solandri	Black beech
Nothofagus truncata	Hard beech
Olearia paniculata	Akiraho
Pennantia corymbosa	Kaikomako
Pittosporum tenuifolium	Kohuhu
Pseudopanax arboreus	Fivefinger
Sophora microphylla	Kowhai
Weinmannia racemosa	Kamahi
Grasses, Ferns, Herbs	
Adiantum cunninghamii	Common maidenhair
Asplenium bulbiferum	Hen and chicken fern
Asplenium flaccidum	Hanging spleenwort

Asplenium oblongifolium	Shining spleenwort
Blechnum chambersii	Lance Fern
Cyathea dealbata	Ponga
Cyathea medullaris	Mamaku
Microsorum pustulatum	Hounds tongue
Phormium cookianum	Whaririki / Coastal flax
Pneumatopteris pennigera	Feather fern / Gully fern
Pyrrosia eleagnifolia	Leather-leaf fern
Pteridium esculentum	Bracken
Tetragonia trigyna	New Zealand spinach
Uncinia uncinata	Hook grass
Climbers and lianes	
Cortaderia toetoe	Toetoe
Muehlenbeckia australis	Pohuehue
Ripogonum scandens	Supplejack
Rubus cissoides	Bush lawyer
Dicot herbs	
Apium australe	Wild celery
Exotic species	
Agapanthus spp.	Agapanthus
Clematis vitalba	Old Man's Beard
Cytisus scoparium	Broom
Eucalyptus spp.	Eucalyptus
Hydrangea spp.	Hydrangea
Lonicera japonica	Japanese honeysuckle
Pinus radiata	Pine tree
Ulex europaeus	Gorse
Rosa rubiginosa	Sweet briar

12 Appendix D: Photographs

Photo 1. Coastal vegetation typical of the coastline where the extension to the Marina Zone is proposed.

Photo 2. Photograph illustrating mixed vegetation types on coastal margin above the beach north of the existing marina.

Photo 3. Photo illustrating Pyrrosia eleagnifolia on exposed rock faces above MHWS along the coastal escarpment.

Photo 4. Coastal fringe vegetation dominated by Olearia paniculata above MHWS.

Photo 5. Photo illustrating an area of gorse, mixed coastal vegetation and Clematis vitalba along the coastal edge.

Photo 6. Beech forest remnant and intermixing vegetation types and wilding Pinus radiata along the coastal edge.

Photo 7. Black beech forest remnant on a coastal escarpment illustrating typical height of remnant vegetation above MHWS.

Photo 8. Photograph of fern-dominated undergowth beneath one of the beech forest remnants on the coastal headlands.

Photo 9. Coastal fringe vegetation above MHWS in the northern extent of the proposed extension to the Marina Zone.

Photo 10. Black beech forest remnant located within proposed extension to the Marina Zone. Stream outlet centre of photo.

Photo 11. Photo taken in February 2008 of dry stream bed of the largest stream along the coastal margin.

Photo 12. Photo illustrating the underground stream where it exits the broadleaved coastal forest remnant on the coastline.