

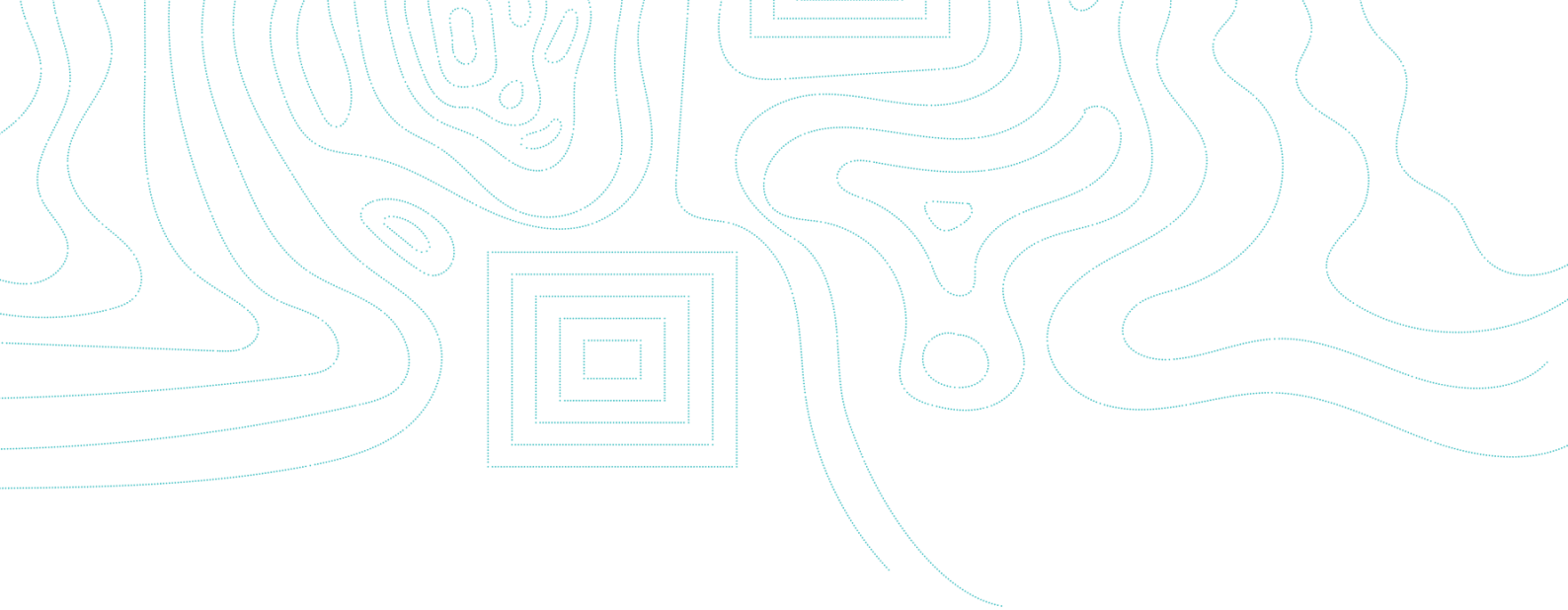
BlueGreen





Glen Isla Dune - Coastal Protection Project

Ecological Assessment

Prepared for Glen Isla Protection Society Incorporated
19 August 2024



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Executive Summary

GIPS¹ proposes to establish a reinforced dune system, consisting of an approximately 195m-200m long buried erosion protection structure, dune recontouring and dune replanting, on land adjacent to 9, 11, 13, 15, 16, 14 and 12 Glen Isla Place.

BlueGreen Ecology Ltd have undertaken ecological survey of the area to determine its values and what effects such works might have.

Three vegetation assemblages are evident on site

1. Northern spinifex foredune;
2. Central exotic terrace; and
3. Southern pohuehue terrace.

The assessment considers the following as the outcomes with respect to value, significance and the NZCPS (2010).

ASSESSMENT	NORTHERN SPINIFEX FOREDUNE	CENTRAL EXOTIC TERRACE, HOLLOW & RISER	SOUTHERN POHUEHUE
Ecological value	High	Negligible	Low
Significance	Yes	No	Yes
NZCPS Policy 11	Policy 11(a)(i), (iii) Policy 11(b)(i), (iii)	-	Policy 11(b)(i), (iii)

The most valuable feature (i.e. the northern spinifex foredune) has been, through the design process, avoided.

That level of adverse effect is allowable under the NZCPS policy 11(b) and is consistent with the requirements of effects management under the NPS IB.

Overall, the remediation / mitigation solution recommended, being the revegetation of the covered wall after installation with appropriate native dune plants for at least the areas stipulated in this report, will result in a net ecological benefit at a local scale.

¹ The Glen Isla Protection Society Incorporated (“GIPS”) which comprises the owners of beach front properties located at 9 and 11-16 Glen Isla Place, Waihi Beach.

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1.0 Introduction

Over the last 40 odd years, the portion of Waihi Beach coast south of “Three Mile Creek” has been identified as being subject to coastal erosion risk and a number of coastal erosion treatments have been implemented to varying levels of success. Most recently in 2011, dune enhancement planting was washed away within 2-3 weeks of completion.

Following further erosion of the coastal dune area and adjacent reserve land during Cyclone Gabrielle, GIPS² proposes to establish a reinforced dune system, consisting of an approximately 195m-200m long buried erosion protection structure, dune recontouring and dune replanting, on land adjacent to 9, 11, 13, 15, 16, 14 and 12 Glen Isla Place. This land, legally described as Lot 18 DPS 22035 and Lot 19 DPS 22035, is owned and managed by the Western Bay of Plenty District Council (“**WBOPDC**”) as Council Reserve land.

The structure and its placement followed a workshop where BlueGreen Ecology proffered opinions as to what aspects of the environment should be avoided, that effects should be contained to the reserve, that specific species recognition and life stage habitat use should be considered and that the restoration of the feature post installation should result in a better than now condition in terms of representative coastal indigenous dune habitat.

GIPS proposes to install the coastal protection structure on the WBOPDC Reserve land, landward of the Coastal Marine Area, as shown in Figure 1. The purpose of the coastal protection structure is to protect and maintain the dune habitat / reserve land and the private properties located at 9, 11, 13, 15, 16, 14 and 12 Glen Isla Place located behind the dune system. The coastal protection structure will be a rock riprap wall, approximately 195-200m long, approximately 12-13m wide and 3.5m tall subject to final design. It will be setback from the property boundary with 12, 14 and 16 Glen Isla Place by 5m. The setback will increase to approximately 7.6m at the Norfolk Pine between No 11 and 13 Glen Isla Place, per arborist guidance, and then decrease towards the northern end to 6.5m.



Figure 1: Location of proposed coastal protection structure at Glen Isla Place, Waihi Beach.

² The Glen Isla Protection Society Incorporated (“**GIPS**”) which comprises the owners of beach front properties located at 9 and 11-16 Glen Isla Place, Waihi Beach.

1.1 Site Context

With the onset of European settlement came the stabilisation of the dunes and replacement of the vegetation with exotic species and wetlands to allow for different production systems.

The Waihi dunes and foreshore saw more substantive influence following the 1894 gold prospecting days. From then until 1898 claims were pegged out and registered and gold bearing lodes were uncovered. About this time there was an amalgamation of interests and the Waihi Beach Gold Mining Company was formed and registered in Auckland, the object being to exploit the Treasure Island and other reefs known to exist in the area. These works and people had a profound early impact on the dunelands and foreshore.

The typical habitat conditions of more modern times is reflected in the botanical survey of Athenree Dunes by Beadel (1992), where she recorded 46 taxa along the dunes near the end of the heads (Bowentown). Of those plant taxa, 16 were exotic and included: Agapanthus, marram grass, climbing asparagus, banksia, sea rocket, ice plant, pampas grass, Japanese honeysuckle, tree lupin, phoenix palm, Monterey pine, gorse, purple groundsel.

The prominent native components of the dune recorded by Beadel (1992) included: oioi, knobby club rush, shore bindweed, sand sedge, sand coprosma, taupoata, pikao, sand wind grass, shore lobelia, ngaio, karo, bracken, native beach spinach, pohuehue, and a few common shrubs. In 1992 there remained several at risk and threatened species: *Metrosideros tomentosa*, *Ficinia spiralis* (pingao / pikao), sand coprosma (*Coprosma acerosa*).

There is now virtually no dynamic indigenous vegetation (and fauna) covered dune system left along Waihi Beach, even despite some areas being vested as DOC and Council Reserves; it has been reduced in size, coverage and has increased stability.

Weed species cover is now dominant and areas of spinifex and pingao are small and scattered. They are related to localised storm baring of frontal dune areas and areas of targeted active planting. Pohuehue remains the most prominent indigenous sand community species remaining with lesser amounts of knobby club rush.

The site of interest to this report is that fore and hind dune immediately south of what is locally known as Three Mile Creek and north of the Island View recreational reserve (Figure 2).

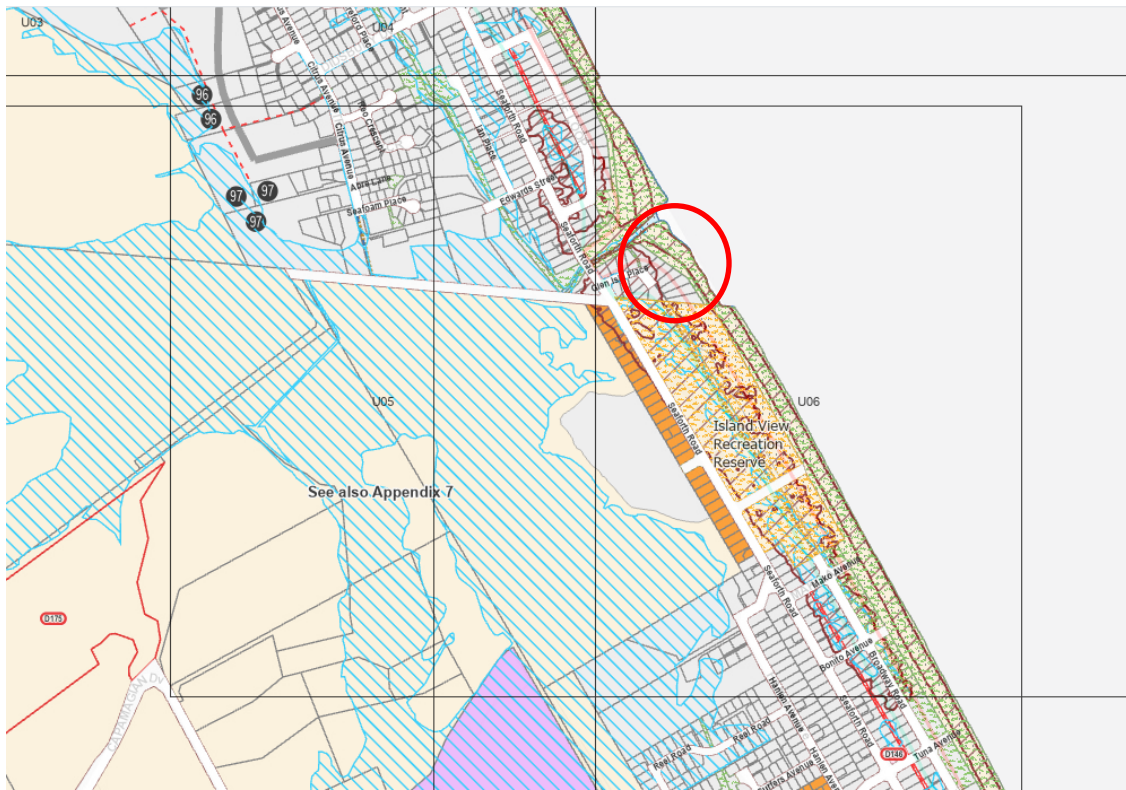


Figure 2: Site location with some of the relevant District plan layers

The dune system in front of the GIPS properties (lining the eastern Glen Isla Place), the focus of this report, is connected to the dune system of Island View Recreation Reserve (identified in Figure 2 above) and part of WBOPDC Esplanade Reserve (Lot 19, DPS 22035), located between the Coastal Marine Area and the dune system.

The Project site is located within an 'Indigenous Biological Diversity Area B (IBDA; B1 Central Waihi Beach)' overlay of the Bay of Plenty Regional Coastal Environment Plan (BOP-RCEP) (Figure 3). Schedule 2 of the BOP-RCEP lists the features and their attributes of each IBDA relative to the New Zealand Coastal Policy Statement ("**NZCPS**") Policy 11 criteria; those associated with the B1 Central Waihi Beach layer are as follows:

Table 2: Indigenous Biological Diversity Areas B - Areas that meet the criteria listed in Policy 11(b) of the NZCPS

General location and map sheet	Indigenous Biological Diversity Area B	Areas of predominately indigenous vegetation - NZCPS Policy 11(b)(i)	Habitats important during vulnerable life stages - NZCPS Policy 11(b)(ii)	Ecosystems and habitats vulnerable to modification - NZCPS - Policy 11(b)(iii)	Habitats and areas important to migratory species - NZCPS Policy 11(b)(v)	Ecological corridors - NZCPS Policy 11(b)(vi)
Waihi Beach map sheets 1b, 2b	Central Waihi Beach IBDA B1	Y Indigenous dune vegetation with areas of exotic vegetation.	Y Low-tide roosting habitat for red-billed gulls, Caspian tern, variable oystercatcher, northern New Zealand dotterel and Southern black-back gull.	Y Modified coastal dunes.		Y Provides a link between Orokawa (Part), in the north, and Bowentown Sand Dunes and Beach (to the south).



Figure 3: Map of the BOP-RCEP Schedule 2 site relative to the Project site (red dashed line) – the yellow line indicates the 'Coastal Environment' boundary.

2.0 Methods

2.1 Ecological Data

Ecological information was obtained through a desktop search of the literature and relevant database (e.g. OSNZ atlas, NZ amphibians and reptiles atlas, eBird, iNaturalist).

In addition, a site visit was conducted in April 2024 during which the following was undertaken:

- A vegetation / habitat survey was based on aerial and ground pre-visit photographs to establish if a plot -grid based, transect based or a walked descriptive approach would be best suited to understanding the community mosaic. These processes determined that given the limited width and length and heterogeneity of plant assemblages a walked descriptive mapping and recording taxa approach would be best suited. Species lists and estimates of cover of the prominent taxa were made in areas of different character.
- One hour was spent searching woody debris and other potential refugia for lizards and macroinvertebrates.
- All native avifauna observed while on site were also recorded, however no formal avifauna surveys were conducted.

2.2 Ecological Impact Assessment

The methods used to undertake this assessment are consistent with the EIANZ guidelines for undertaking ecological impact assessments (Roper-Lindsay et al., 2018), whereby ecological values are assigned (refer to Table 1 for species, Table 2 for terrestrial communities) and the magnitude of effects identified (Table 3) in order to determine the overall level of effect of the proposal (Table 4).

For the purpose of this assessment, we have determined the magnitude of effect at the local scale; that being the 52 ha of dune vegetation in the Waihi Beach dune system (i.e. Athenree Reserve and Island View Reserve), which includes 4 ha of front dune pohuehue. Furthermore, the following thresholds have been applied to each magnitude level to represent the proportion of loss (text italicised and bolded in Table 3):

- Very High - 70% loss of the community assemblage;
- High - 40-70% loss of the community assemblage;
- Moderate - 15-40% loss of the community assemblage;
- Low - 1-15% loss of the community assemblage; and
- Negligible - <1% loss of the community assemblage.

According to Roper-Lindsay et al. (2018), the overall level of effect (Table 4) can then be used to guide the extent and nature of the ecological management response required (including, to the extent necessary following an effects management hierarchy assessment, the need for biodiversity offsetting):

- Very High adverse effects require a net biodiversity gain.³
- High and Moderate adverse effects require no net loss of biodiversity values.
- Low and Very Low effects should not normally be a concern. If effects are assessed taking impact management developed during project shaping into consideration, then it is essential that prescribed impact management is carried out to ensure Low or Very Low effects.

Table 1: Criteria for assigning ecological value to species (Roper-Lindsay et al., 2018).

ECOLOGICAL VALUE	SPECIES CLASSIFICATION
VERY HIGH	<i>Nationally Threatened</i> (Nationally Critical, Nationally Endangered, Nationally Vulnerable, Nationally Increasing ⁴) species found in the ZOI ⁵ either permanently or seasonally.
HIGH	Species listed as <i>At Risk – Declining</i> found in the ZOI either permanently or seasonally.

³ Though when ecological compensation is required because biodiversity offsetting is not possible, the principles of no-net-loss or net-gain do not apply (Maseyk et al., 2018).

⁴ Nationally Increasing is category that was devised by DOC (Michel, 2021) in 2021 to resolve a problem that would arise if the population of a taxon assessed as At Risk Recovering A should stabilise. Threatened – Nationally Increasing is assigned to “Small population that have experienced a previous decline (or for which it is uncertain whether it has experienced a previous decline) and that is forecast to increase >10% over the next 10 years or 3 generations, whichever is longer” (Rolfe et al. 2021). Thus, while such a threat category is not identified in Roper-Lindsay et al. (2018), we have included it along with all other *Threatened* classifications in to the Very High ecological value category.

⁵ Roper-Lindsay et al. (2018) define the Zone of Influence (ZOI) as “the areas/resources that may be affected by the biophysical changes caused by the proposed project and associated activities.”

ECOLOGICAL VALUE	SPECIES CLASSIFICATION
MODERATE	Species listed as any other category of <i>At Risk</i> (Recovering, Relict, Naturally Uncommon) found in the ZOI either permanently or seasonally; or Locally (ED) uncommon or distinctive species.
LOW	Nationally and locally common indigenous species.
NEGLECTIBLE	Exotic species, including pests, species having recreational value.

Table 2: Assigning overall value to areas (refer to Appendix 1 for the matters to be considered for terrestrial and freshwater communities) (Roper-Lindsay et al., 2018)

VALUE	DESCRIPTION
NEGLECTIBLE	Area rates Very Low for three matters listed in Appendix 1 and Moderate, Low or Very Low for remainder.
LOW	Area rates Low or Very Low for majority of assessment matters listed in Appendix 1 and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
MODERATE	Area rates High for one matter listed in Appendix 1, Moderate and Low for the remainder, or Area rates Moderate for two or more assessment matters Low or Very Low for the remainder Likely to be important at the level of the Ecological District.
HIGH	Area rates High for two of the assessment matters listed in Appendix 1, Moderate and Low for the remainder, or Area rates High for one of the assessment matters, Moderate for the remainder. Likely to be regionally important and recognised as such.
VERY HIGH	Area rates High for three or all of the four assessment matters listed in Appendix 1. Likely to be nationally important and recognised as such.

Table 3: Criteria for describing magnitude of effect (Roper-Lindsay et al., 2018)

MAGNITUDE	DESCRIPTION
VERY HIGH	Total loss of, or very major alteration, to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether; AND/OR <i>Loss of a very high proportion of the known population or range of the element / feature.</i>
HIGH	Major loss or major alteration to key elements/ features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR <i>Loss of a high proportion of the known population or range of the element / feature.</i>
MODERATE	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that post-development character, composition and/or attributes will be partially changed; AND/OR <i>Loss of a moderate proportion of the known population or range of the element / feature.</i>
LOW	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances/patterns; AND/OR <i>Having a minor effect on the known population or range of the element / feature.</i>

MAGNITUDE	DESCRIPTION
VERY HIGH	Total loss of, or very major alteration, to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether; AND/OR <i>Loss of a very high proportion of the known population or range of the element / feature.</i>
NEGLECTIBLE	Very slight change from existing baseline condition. Change barely distinguishable, approximating to the “no change” situation; AND/OR <i>Having a negligible effect on the known population or range of the element / feature.</i>

Table 4: Criteria for describing the level of effect (Roper-Lindsay et al., 2018)

LEVEL OF EFFECT		ECOLOGICAL AND / OR CONSERVATION VALUE				
		Very High	High	Moderate	Low	Negligible
MAGNITUDE	Very High	Very High	Very High	High	Moderate	Low
	High	Very High	Very High	Moderate	Low	Very Low
	Moderate	High	High	Moderate	Low	Very Low
	Low	Moderate	Low	Low	Very Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low	Very Low
	Positive	Net gain	Net gain	Net gain	Net gain	Net gain

2.3 Ecological Significance Assessment

We will test the ecological features of the Project site against the Bay of Plenty Regional Policy Statement (BOP-RPS) Appendix F Set 3 (Indigenous vegetation and habitats of indigenous fauna) significance criteria (listed in Appendix 2 of this report). We note that as ecologists we are unable to assess the last three criteria of Appendix F Set 3, those being: Māori, Historical and Community.

2.4 New Zealand Coastal Policy Statement

While the Project site lies within ‘IBDA B1 Central Waihi Beach’ which was identified as triggering NZCPS Policy 11(b) matters, we will test the ecological features of the Project site against the NZCPS Policy 11 matters (listed in Appendix 3 of this report).

3.0 Site Survey Results

3.1 Vegetation

The area for the proposed erosion protection installation is the unmanicured dune front edge beyond the GIPS property boundaries (9, 11, 13, 15, 16, 14 and 12 Glen Isla Place) running from the Three Mile Creek sand bagged retention, true right bank, south to the

Island View esplanade reserve (Figure 1). It is a terrace and slope to a dune depression and dune hump in the north, and a terrace to an erosion scrape in the southern half (Figure 5).

While the substrate is predominantly sand, there is minor soil development in the inland portion. The area of vegetated foreshore beyond the properties is 190m long, 6m wide at its southern narrowest end and 40m wide at its widest in the northern end, but predominantly around 10m wide (0.19ha).

There are four discernible vegetation patterns, those being: loose dune with spinifex, dune hollow (or low points) with grasses and herbaceous cover, terrace and slope taller herbs, grasses and scrambling vines, and shrub / trees (Figure 4). There are a small number of species common throughout and make up the majority of the cover, and then there are less abundant specific plants that occur in clusters in only a few areas or are occasionally throughout.

A series of representative site photos are provided in Appendix 4 which illustrate these vegetation communities, with a complete list of the vegetation species recorded presented in Appendix 5.

The primary character of the habitat is formed by kikuyu grass, pohuehue, daisy (*Dimorphotheca*), treasure flower (*Gazina* sp.), orache and agapanthus. It is a dense tangled exotic cover.

The sandy foredune is dominated by spinifex with scattered pingao but also the exotics yucca and pampas, hairs tail and hawksbeard.

The northern dune hollow is a mix of kikuyu grass, hairs tail, daisy, hawksbeard, lotus and pohuehue.

Rising up the slope, pohuehue is prominent but daisy, pigs ear, kikuyu, bushy asparagus and agapanthus grow through it.

The southern half, beyond the spinifex foredune, is the erosion dune scarp and terrace. The eroding scarp has sea rocket, exotic ice plant, pohuehue and kikuyu behind which is a greater number of knobby club rush than found elsewhere.

Shrub and tree components at the back of the terrace include Sydney golden wattle, karo, Australian ngaio, spindle tree and Norfolk pine.

The profile of the hind and foredune give rise to hydrology differences and disturbance histories and so the vegetation communities. These profiles are illustrated below in Figure 5 along with their corresponding prominent vegetation assemblage.

Indigenous plants are most prominent in the north in the area of the foredune including beach bind weed, spinifex, pingao and in the very south where pohuehue on the terrace and spinifex along the erosion scarp face are notable (but no pingao).

Otherwise, knobby club rush and pohuehue are the common native dune plants throughout. However, the great majority of the back terrace and terrace slope is exotic species covered, many considered serious weed species.



Figure 4. Vegetation community map of the site.

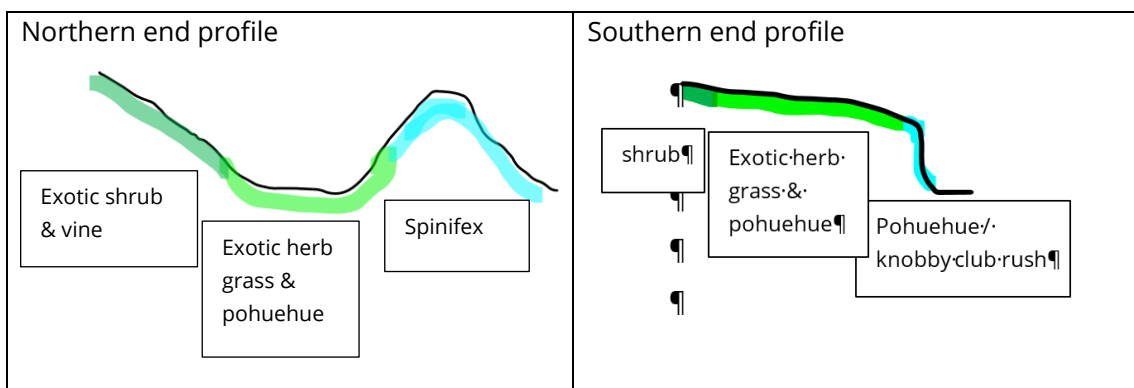


Figure 5. Cross section profiles and corresponding vegetation assemblages.

3.2 Avifauna

The terrestrial vegetation at the Project site does not provide habitat for any 'Threatened' or 'At Risk' avifauna species. However, the intertidal zone, creek mouth and areas of exposed sand above MHWs provide potential foraging and roosting habitat for a number of native coastal and shorebirds (listed in Table 5 below), including several 'Threatened' or 'At Risk' species.

During the site visit, no native birds were recorded on the vegetated dune system, while several species (variable oystercatchers, black-backed gull and red-billed gull) were observed on the water's edge. We note that the site visit was undertaken at a time of year that was outside of the avifauna breeding season and as such it could not be determined if species such as the dotterels or variable oystercatcher breed at the creek mouth.

Table 5: Native coastal and shorebird species for which the coastal margin adjacent to the site may provide potential habitat

SPECIES		NZ THREAT CLASSIFICATION ⁶
Variable oystercatcher	<i>Haematopus unicolor</i>	At Risk - Declining
Red-billed gull	<i>Larus novaehollandiae scopulinus</i>	At Risk - Declining
White-fronted tern	<i>Sterna striata</i>	At Risk - Declining
Banded dotterel	<i>Charadrius bicinctus bicinctus</i>	At Risk - Declining
Northern NZ dotterel	<i>Charadrius obscurus aquilonius</i>	Threatened – Nationally Increasing
Black-backed gull	<i>Larus dominicanus</i>	Not Threatened
White-faced heron	<i>Egretta novaehollandiae</i>	Not Threatened
Pied stilt	<i>Himantopus h. leucocephalus</i>	Not Threatened
Paradise shelduck	<i>Tadorna variegata</i>	Not Threatened
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Not Threatened

3.3 Herpetofauna

Based on species' distribution and habitat preferences described in the NZ reptile atlas database⁷, it is possible that Waihi Beach dunes provide habitat for the species listed in Table 6. Copper skink and shore skink were both recorded on Matakana Island (Shaw 2011).

While neither copper nor shore skink were found during the manual search of potential refugia during the April 2024 site visit, it is possible that they are present in very low abundance.

Table 6: Lizard species potentially inhabiting the Waihi Beach dune system

SPECIES		NZ THREAT CLASSIFICATION ⁸	DISTRIBUTION	HABITAT PREFERENCE
Shore skink	<i>Oligosoma smithi</i>	At Risk - Declining	Coastal North Island: west coast north of Muriwai Beach, east coast north of Gisborne, and on many islands.	On or near shoreline in open habitats with driftwood, rocks, mat-forming vegetation or piles of seaweed
Copper skink	<i>Oligosoma aeneum</i>	At Risk - Declining	Widespread throughout North Island	Close to the high-tide line in coastal situations.
Plague skink	<i>Lampropholis delicata</i>	Introduced & Naturalised	North Island	Open areas, such as suburban gardens, grassland and industrial

⁶ Robertson et al. (2021)

⁷ <https://www.doc.govt.nz/our-work/reptiles-and-frogs-distribution/atlas/>

⁸ Hitchmough et al. (2021)

SPECIES		NZ THREAT CLASSIFICATION ⁸	DISTRIBUTION	HABITAT PREFERENCE
				sites, with adequate cover (logs, stones, grass, etc)

3.4 Macroinvertebrates

The site does not provide suitable habitat for katipo spider (*Latrodectus katipo*). While there were larger woody debris scattered on the site (Figure 6), the vegetation in which they sat was exotic and dense and there were few suitable habitat items. A search of the available wood debris did not reveal any katipo. The greatest potential for katipo resides in the spinifex foredune area although there is little woody debris, in the absence of likely effects we did not search the spinifex stem bases of the foredune.

A search of the larger woody debris (Figure 6) items in the likely area of effect resulted in isopods (slaters), exotic spiders, and a large sand scarab beetle larvae (*Pericoptus truncatus*, ngungutawa) (Figure 7).



Figure 6: Woody debris habitat item.



Figure 7: *Pericoptus truncatus* (ngungutawa) larva

4.0 Ecological Values, Significance & NZCPS Policy 11

We have assessed the ecological value, significance and NZCPS Policy 11 criteria for the following three vegetation assemblages which comprise the Project site:

4. Northern spinifex foredune (400m²);
5. Central exotic terrace, hollow and riser slope (2430 m²); and
6. Southern pohuehue (175m²).

The result of the ecological values and significance assessments are provided in Table 7 and Table 8 respectively.

Table 7: Project site ecological values assessment

VALUE ASSESSMENT MATTER	NORTHERN SPINIFEX FOREDUNE	CENTRAL EXOTIC TERRACE, HOLLOW & RISER	SOUTHERN POHUEHUE
Representativeness ⁹	Yes, High.	No, very low.	Yes, moderate.

⁹ Representativeness does not consider a pre-1840 vegetation assemblage and structure. We consider how representative this vegetation cover is to Beadel's (1992) assessment of the best dune area in Waihi (Athenree Dune Reserve).

VALUE ASSESSMENT MATTER	NORTHERN SPINIFEX FOREDUNE	CENTRAL EXOTIC TERRACE, HOLLOW & RISER	SOUTHERN POHUEHUE
Rarity / distinctiveness	Yes-Moderate, Pingao is At Risk-declining but few present, and the habitat is naturally uncommon (Wiser et al 2013).	No, very low.	No, low.
Diversity and pattern	Yes-Moderate, related to pattern and typical diversity.	No-Very low, despite high number of species, but that richness is exotic weeds.	Yes -Low, diversity and pattern are at the low end of typical.
Ecological context	Low, isolated and limited in size and effect as resource, refugia and passage roles.	Low, still provides a corridor between south and Three Mile Creek.	Low, as part of the vegetated corridor.
Value summation	High	Negligible	Low

Table 8: Project site significance assessment

SIGNIFICANCE ASSESSMENT MATTER ¹⁰	NORTHERN SPINIFEX FOREDUNE	CENTRAL EXOTIC TERRACE, HOLLOW & RISER	SOUTHERN POHUEHUE
Representativeness⁹			
Indigenous vegetation or habitat of indigenous fauna contains associations of indigenous species representative, typical or characteristic of the natural diversity of the region or any relevant ecological districts.	Yes	No	Yes
Rarity or distinctive features			
Indigenous vegetation or habitat of indigenous fauna supports an indigenous species or associations of indigenous species threatened or rare nationally, regionally or within the relevant ecological district.	Yes, dunes (Wiser et al 2013)	No	No
Indigenous vegetation or habitat of indigenous fauna can contribute to the maintenance or recovery of a species threatened Noor rare nationally, regionally or within the relevant ecological district.	No	No	No
Indigenous vegetation or habitat of indigenous fauna is distinctive, of restricted occurrence, or at the limits of its natural distribution range, or has developed as a result of factors such as natural geothermal activity, historical cultural practices, altitude, water table, or soil type.	No	No	No
Indigenous vegetation or habitat of indigenous fauna is significantly reduced in area and is degraded but retains key natural ecosystem functions (for example hydrology) and has a high potential for restoration.	Yes	No	Yes
Diversity and pattern			
Indigenous vegetation or habitat of indigenous fauna contains a high diversity of indigenous ecosystem or habitat types, or changes in species composition, reflecting the existence of diverse natural features (for example landforms, soil types or hydrology), or communities along an ecological gradient.	No	No	No

¹⁰ As noted in Section 2.3, we have not considered the matters of Māori, Historical and Community in this current significance assessment.

SIGNIFICANCE ASSESSMENT MATTER ¹⁰	NORTHERN SPINIFEX FOREDUNE	CENTRAL EXOTIC TERRACE, HOLLOW & RISER	SOUTHERN POHUEHUE
Naturalness			
Indigenous vegetation or habitat of indigenous fauna is in a natural state or healthy condition or is in an original condition.	Yes	No	No
Ecological context			
Indigenous vegetation or habitat of indigenous fauna contributes to the ecological viability of adjoining natural areas and biological communities, by providing or contributing to an important ecological linkage or network or providing a buffer from adjacent land uses.	No	No	No
Indigenous vegetation or habitat of indigenous fauna provides habitat for indigenous species at key stages of their life cycle	No	No	No
Viability and sustainability			
Indigenous vegetation or habitat of indigenous fauna is of sufficient size and compact shape and has the capacity to maintain its ecological viability over time.	Unlikely	No	No
Indigenous vegetation or habitat of indigenous fauna supports intact habitats and healthy functioning ecosystems.	No	No	No
Indigenous vegetation or habitat of indigenous fauna is of sufficient size and compact shape to resist changes initiated by external agents.	Yes	No	No
Significant	Yes	No	Yes

With regard to NZCPS Policy 11, we have determined that the ‘Northern spinifex foredune’ triggers the following criteria:

- Policy 11(a)(i) due to the presence of pingao (*At Risk*).
- Policy 11(a)(iii) due to sand dunes being natural rare ecosystems.
- Policy 11(b)(i) being an area of predominantly indigenous vegetation in the coastal environment;
- Policy 11(b)(iii) being an indigenous ecosystems and habitats that are only found in the coastal environment and are particularly vulnerable to modification.

We have also determined that the ‘Southern pohuehue assemblage’ triggers the following NZCPS Policy 11 criteria:

- Policy 11(b)(i) being an area of predominantly indigenous vegetation in the coastal environment.

A summary of the ecological values, significance and NZCPS Policy 11 assessments for the Project site community assemblages is provided in Table 9 and illustrated in Figure 8.



Figure 8: Areas that are considered as significant (as per the regional plan criteria) and that meet NZCPS policy 11(b) only (orange – southern pohuehue) or both NZCPS policy 11(b) and (b) (red – northern spinifex foredune).

Table 9: Summary of the ecological values, significance and NZCPS Policy 11 assessments for the site.

ASSESSMENT	NORTHERN SPINIFEX FOREDUNE	CENTRAL EXOTIC TERRACE, HOLLOW & RISER	SOUTHERN POHUEHUE
Ecological value	High	Negligible	Low
Significance	Yes	No	Yes
NZCPS Policy 11	Policy 11(a)(i), (iii) Policy 11(b)(i), (iii)	-	Policy 11(b)(i), (iii)

5.0 Proposed Construction Methodology

The following construction methodology has been proposed and provided by Davis Coastal Consultants and is illustrated in section 7.2a of the Construction Methodology Statement (September 2024).

In the south (in front of properties 12, 14 and 16; see Figure 9 below), approximately one meter of the existing foredune between the open beach and the property boundary is

likely to be removed; this equates to approximately a 1m width by a length of approximately 70m (total = ~70m²). Trenching then occurs to a lower RL and the wall will be constructed on a geotextile through the placement of rock material in the cleared area in the trench. The rock wall is then covered in sand (see section 7.1 of the construction statement).

Then north of this section the wall instalment begins to be trenched as it travels towards Three Mile Creek, changing from 7.6 m seaward of the property boundaries to avoid the Norfolk pine roots, to 6.5m at the north end to avoid the northern spinifex foredune (see Figure 9). This variance allows the trenching and works to avoid in total the northern spinifex foredune area. A path of around 140m and 13m wide (1820m²) is required. The proposal is to dig out a trench in the northern two-thirds, place a hard substrate armour wall in the trench on a geotextile and back fill and cover that wall to reform a sand dune on top (refer to Figure 10). Then plant appropriate native dune system vegetation into all the disturbed areas (see section 7.1 and Figure 7a of the construction statement).



Figure 9: Construction footprint (Source: Davis Coastal Consultants)

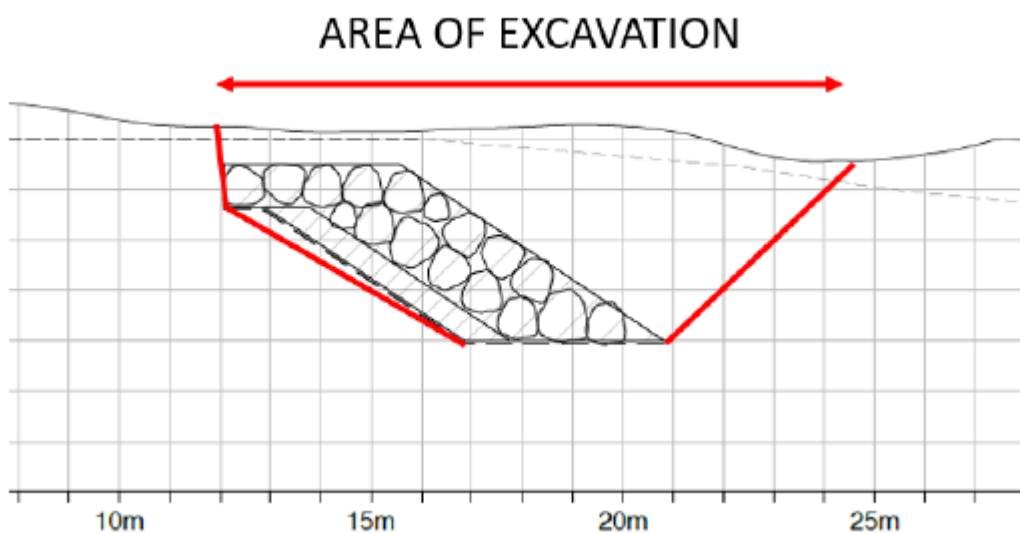


Figure 10: Proposed construction method (Source: Davis Coastal Consultants)

6.0 Ecological Effects Assessment

As identified above (Section 5.0), the construction methodology has been designed to avoid effects on the northern spinifex foredune. As such, no assessment of effects is required for this vegetation community assemblage. The following assessment considers the remaining two assemblages (i.e. southern pohuehue and central exotic terrace, hollow and riser slope).

The proposed structure and construction footprint will result in the loss of 0.007 ha of the southern pohuehue vegetation. This represents a loss of 0.17% of that vegetation community assemblage at the local scale (i.e. 4 ha as identified in Section 2.2 above), i.e. a Negligible magnitude of effect.

Therefore, based on the Low ecological value of this vegetation assemblage (refer Table 9), and a Negligible magnitude of effect, the overall level of effect on southern pohuehue will be **Very Low** at the local scale. As this level of effect is not considered a significant adverse effect, it is consistent with the NZCPS Policy 11(b) directive as any adverse effects, albeit Very Low, can be further remedied and mitigated.

The proposed structure and construction footprint will result in the loss of 0.2425 ha of various exotic dune vegetation located in the central exotic terrace, hollow and riser slope. This represents a loss of 0.5% of the Waihi Beach dune vegetation (i.e. 52 ha as identified in Section 2.2 above), i.e. a Negligible magnitude of effect.

Therefore, based on the Negligible ecological value of this vegetation assemblage (refer Table 9), and a Negligible magnitude of effect, the overall level of effect on the central exotic terrace, hollow and riser slope vegetation community will be **Very Low** at the local scale. As this level of effect is not considered a significant adverse effect, it is consistent with the NZCPS Policy 11(b) directive as any adverse effects, albeit Very Low, can be further remedied and mitigated.

7.0 Effects Management Hierarchy

The National Policy Statement for Indigenous Biodiversity (“NPS IB”) (2022) section 3.10 directs Councils to manage effects on Significant Natural Areas, and the southern pohuehue community is significant (Table 8).

Arguably the central terrace, hollow and riser slope is largely exotic, but there is pohuehue and some few other native dune species present, and the area as a whole is recognised in Schedule 2 of the BOP-REC as an IBDA. However, as we concluded (Table 8) the area does not meet the significance test and so is not SNA.

We note that that area is proposed to be revegetated regardless of the significance of the habitat as it is good sense and practice to revegetate areas covered in sand after the works to minimise continued erosion and retain the sand cover.

Where sites meet the SNA definition, NPS IB (section 3.16) directs Councils to require the application of the effects management hierarchy (such as the southern pohuehue). The hierarchy for the management of effects is outlined in Table 10. This process follows the

effects management hierarchy as described in Roper-Lindsay et al. (2018) and Maseyk et al. (2018).

Table 10: Effects management hierarchy and terminology (Maseyk et al., 2018)

EFFECTS MANAGEMENT HIERARCHY	DEFINITION
1) Avoidance	To modify a project proposal to prevent any environmental damage or loss of an ecological or environmental feature or function.
2) Remediation	To reverse or stop any environmental damage.
3) Mitigation	To alleviate, or to abate, or to moderate the severity of something (environmental damage), and typically occurs at the point of impact.
4) Biodiversity offset	A measurable conservation outcome resulting from actions designed to compensate for residual, adverse biodiversity effects arising from activities after appropriate avoidance, remediation, and mitigation measures have been applied. The goal of a biodiversity offset is to achieve no-net-loss, and preferably a net-gain, of indigenous biodiversity values.
5) Environmental compensation	Non-quantified biodiversity benefits are offered to compensate for biodiversity losses. The compensation actions may benefit different biodiversity to that lost (out-of-kind compensation), including biodiversity of lesser conservation concern than that lost. Compensation is not quantified or balanced with losses and may involve subjective decision-making subject to socio-political influences.

Usually Very Low level effects (such as at the southern Pohuehue) need not in all circumstances be addressed as there is not considered to be any residual adverse effect as a result of the disturbance.

However, in a scheduled indigenous coastal vegetation area recognised as fitting NZCPS policy 11(b) – such as the Project site - and where the BOP-RPS seeks preservation and restoration of the ecological functions of the coastal environment (objective 2) and no further reduction in SNA (albeit very small) or other indigenous biodiversity (as does the NPS IB (2022)) then some form of ecological remediation / mitigation is warranted (for the southern pohuehue area).

In this circumstance, regardless of the effects management regime, we note that where the installed wall is recovered in sand, then it is also necessary to stabilise the sands and retain a sand dune, as opposed to having an exposed stone wall, and so a need to revegetate the sand.

We consider that the impacts on the southern pohuehue/knobbly club rush area requires remediation while the wider site requires mitigation to preserve the natural character and ecological functioning.

Because of the construction methodology and a reasonable possibility that the proposed sand cover of the southern portion of the wall will not persist for long, we consider it likely that the remediation of the pohuehue-knobbly club rush area (70m²) will need to be in the trenched wall section. Thus, the trench back fill and potentially areas landward need to provide at least 140 m² (the doubling of the affected area to accommodate the lag between loss and regenerated assemblage). The remaining area of clearance because of the works (between 1300m²-2075m²) should be planted with a spinifex-pingao mix seaward and a coastal shrub/ other species mix landward. Recommended species for those areas are listed below. While we advocate for the revegetation of the southern section, we do not recommend that area's use for the mitigation components of the effects.

Overall, with this remediation / mitigation work, the long-term outcome, we assess, as being a net ecological benefit of the site and at a local scale.

We recommend the following species mix as appropriate for the site:

Revegetation plant mix

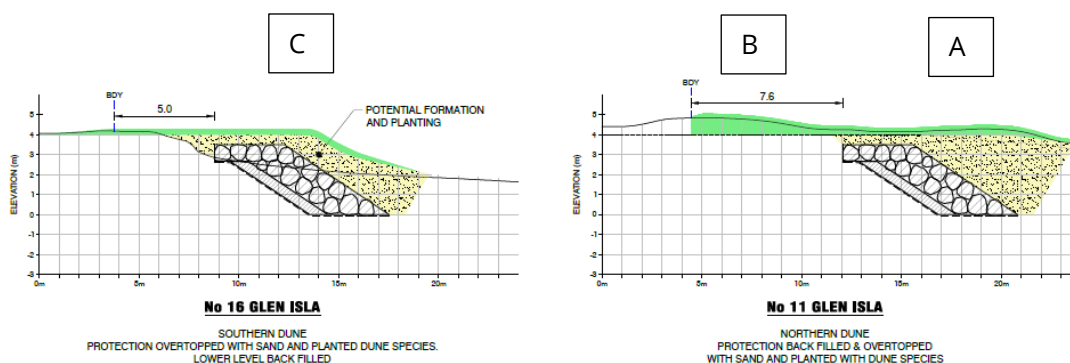


Figure 11. Davis Coastal Limited's diagrams of the installed resultant surfaces for revegetation.

A - Sands over the wall and towards the northern spinifex - loose sand:

- Spinifex/Kowhangatara (*Spinifex sericeus*) -85%
- Pingao (*Ficinia spiralis*), (10%)
- Sand tussock (*Poa billardierei*) (5%)

B -Landward from inner wall edge to property boundary (where distributed)

- *Pimelea villosa*
- Oioi (*Apodasmia similis*) – hollows
- *Carex Testacea*, under trees and taller shrubs
- Sand coprosma (*Coprosma acerosa*)
- NZ ice plant (*Disphyma australe*) -micro sited
- Knobby club rush (*Ficinia nodosa*) - throughout
- Pohuehue (*Muehlenbeckia complexa*)

C -southern dune area

- Spinifex/Kowhangatara (*Spinifex sericeus*)
- NZ ice plant (*Disphyma australe*) -micro sited
- Knobby club rush (*Ficinia nodosa*) - throughout
- Pohuehue (*Muehlenbeckia complexa*)

It is recommended that a detailed revegetation plan should be required by a condition of consent and seek to replace all disturbed vegetation with appropriate native species (as listed above) and to get secure cover to the disturbed area and at a density of 0.5m spacing for grasses, herbs and small shrubs and 1m spacing for all else.

8.0 Conclusion

Three vegetation assemblages are evident on site

7. Northern spinifex foredune (400m²);
8. Central exotic terrace, hollow and riser slope (2430 m²); and
9. Southern pohuehue (175m²).

The assessment considers the following as the outcomes with respect to value, significance and the NZCPS (2010).

ASSESSMENT	NORTHERN SPINIFEX FOREDUNE	CENTRAL EXOTIC TERRACE, HOLLOW & RISER	SOUTHERN POHUEHUE
Ecological value	High	Negligible	Low
Significance	Yes	No	Yes
NZCPS Policy 11	Policy 11(a)(i), (iii) Policy 11(b)(i), (iii)	-	Policy 11(b)(i), (iii)

The most valuable feature (i.e. the northern spinifex foredune) has been, through the design process, avoided.

The other two areas will be impacted to a variable level but conservatively the magnitude of impact on either at a local Waihi Beach scale is Negligible and so the level of effect in total Very Low (less than minor).

That level of adverse effect is allowable under the NZCPS policy 11(b) and is consistent with the requirements of effects management under the NPS IB.

Overall, the remediation / mitigation solution recommended, being the revegetation of the covered wall after installation with appropriate native dune plants for at least the areas stipulated in this report, will result in a net ecological benefit at a local scale.

9.0 References

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Appendix 1: EIANZ criteria for assigning ecological value to terrestrial communities

MATTER	ATTRIBUTES TO BE CONSIDERED
Representativeness	<p>Criteria for representative vegetation and aquatic habitats:</p> <ul style="list-style-type: none"> • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified <p>Criteria for representative species and species assemblages:</p> <ul style="list-style-type: none"> • Species assemblages that are typical of the habitat • Indigenous species that occur in most of the guilds expected for the habitat type
Rarity / distinctiveness	<p>Criteria for rare/distinctive vegetation and habitats:</p> <ul style="list-style-type: none"> • Naturally uncommon, or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National priority for protection <p>Criteria for rare/distinctive species or species assemblages:</p> <ul style="list-style-type: none"> • Habitat supporting nationally Threatened or At Risk species, or locally¹¹ uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism
Diversity & pattern	<ul style="list-style-type: none"> • Level of natural diversity, abundance and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations - pattern, complexity • Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation
Ecological context	<ul style="list-style-type: none"> • Site history, and local environmental conditions which have influenced the development of habitats and communities • The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in the RMA) • Size, shape and buffering • Condition and sensitivity to change • Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material • Species role in ecosystem functioning - high level, key species identification, habitat as proxy

¹¹ Locally - defined as within Ecological District

Appendix 2: BOP RPS Appendix F Set 3 criteria (Indigenous vegetation and habitats of indigenous fauna)

MATTER	CRITERIA
Representativeness	Indigenous vegetation or habitat of indigenous fauna contains associations of indigenous species representative, typical or characteristic of the natural diversity of the region or any relevant ecological districts.
Rarity or distinctive features	Indigenous vegetation or habitat of indigenous fauna supports an indigenous species or associations of indigenous species threatened or rare nationally, regionally or within the relevant ecological district. Indigenous vegetation or habitat of indigenous fauna can contribute to the maintenance or recovery of a species threatened or rare nationally, regionally or within the relevant ecological district. Indigenous vegetation or habitat of indigenous fauna is distinctive, of restricted occurrence, or at the limits of its natural distribution range, or has developed as a result of factors such as natural geothermal activity, historical cultural practices, altitude, water table, or soil type. Indigenous vegetation or habitat of indigenous fauna is significantly reduced in area and is degraded but retains key natural ecosystem functions (for example hydrology) and has a high potential for restoration.
Diversity and pattern	Indigenous vegetation or habitat of indigenous fauna contains a high diversity of indigenous ecosystem or habitat types, or changes in species composition, reflecting the existence of diverse natural features (for example landforms, soil types or hydrology), or communities along an ecological gradient.
Naturalness	Indigenous vegetation or habitat of indigenous fauna is in a natural state or healthy condition, or is in an original condition.
Ecological context	Indigenous vegetation or habitat of indigenous fauna contributes to the ecological viability of adjoining natural areas and biological communities, by providing or contributing to an important ecological linkage or network or providing a buffer from adjacent land uses. Indigenous vegetation or habitat of indigenous fauna provides habitat for indigenous species at key stages of their life cycle
Viability and sustainability	Indigenous vegetation or habitat of indigenous fauna is of sufficient size and compact shape and has the capacity to maintain its ecological viability over time. Indigenous vegetation or habitat of indigenous fauna supports intact habitats and healthy functioning ecosystems. Indigenous vegetation or habitat of indigenous fauna is of sufficient size and compact shape to resist changes initiated by external agents.
Māori	Indigenous vegetation or habitat of indigenous fauna contributes to the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga. (Refer also to set 4 - Māori Culture and Traditions criteria).
Historical	Indigenous vegetation or habitat of indigenous fauna is known and valued for its connection to the history of the place.
Community association	Indigenous vegetation or habitat of indigenous fauna is known and valued by the immediate and wider community for its contribution to a sense of place leading to community association with or public esteem for the place, or due to its value for recreation or education. Indigenous vegetation or habitat of indigenous fauna is valued for the contribution it is making to research into the Bay of Plenty's or New Zealand's ecosystems.

Appendix 3: NZCPS Policy 11 – Indigenous Biological Diversity

Policy 11 Indigenous biological diversity (biodiversity)

To protect indigenous biological diversity in the coastal environment:

- (a) avoid adverse effects of activities on:
 - (i) indigenous taxa⁴ that are listed as threatened⁵ or at risk in the New Zealand Threat Classification System lists;
 - (ii) taxa that are listed by the International Union for Conservation of Nature and Natural Resources as threatened;
 - (iii) indigenous ecosystems and vegetation types that are threatened in the coastal environment, or are naturally rare⁶;
 - (iv) habitats of indigenous species where the species are at the limit of their natural range, or are naturally rare;
 - (v) areas containing nationally significant examples of indigenous community types; and
 - (vi) areas set aside for full or partial protection of indigenous biological diversity under other legislation; and
- (b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on:
 - (i) areas of predominantly indigenous vegetation in the coastal environment;
 - (ii) habitats in the coastal environment that are important during the vulnerable life stages of indigenous species;
 - (iii) indigenous ecosystems and habitats that are only found in the coastal environment and are particularly vulnerable to modification, including estuaries, lagoons, coastal wetlands, dunelands, intertidal zones, rocky reef systems, eelgrass and saltmarsh;
 - (iv) habitats of indigenous species in the coastal environment that are important for recreational, commercial, traditional or cultural purposes;
 - (v) habitats, including areas and routes, important to migratory species; and
 - (vi) ecological corridors, and areas important for linking or maintaining biological values identified under this policy.

Appendix 4: Representative site and vegetation community photos



Northern edge from Glen Isla Place access, Three Mile creek and sand bagged edge on left.



Northern end, eastern spinifex on loose sand dune with pingao.



Looking south at the between foredune and back terrace dune hollow with grasses and herbs. Note goldedn wattle cover on the right.



Looking north back along the dune hollow, between the predominantly native spinifex foredune right and the exotic shrub left. Note large woody debris.



Typical vegetation cover of the terrace slope, agapanthus, pohuehue, daisy, bushy asparagus and Dimorphotheca fruticose.



Southern end of the spinifex fordune looking east, a clear demarcation between exotic and native dune, much reduced pohuehue here.



Exotic terrace riser near the Norfolk pine, agapathus prominat cover.



Ginger, kikuyu grass and other garden escapes on terrace looking south.



Southern end showing terrace escarpment edge in spinifex and terrace with reasonable pohuehue cover to the right.



Southern end in pohuehue, occasional shrubs, karo, kawakawa, five finger and a yucca. Aloe and other weeds also evident.



The southern most end in pohuehue and knobby club rush as well as kikuyu.



The southern end's terrace escarpment a mix of species but often more spinifex.

Appendix 5: Plant species recorded on site

SPECIES LATIN NAME	COMMON NAME	Exotic or Native	NZ THREAT CLASSIFICATION ¹²
<i>Acacia longifolia</i>	Sydney golden wattle	Exotic	Not Threatened
<i>Acanthus mollis</i>	Bears breachers	Exotic	Not Threatened
<i>Aeonium haworthii</i>	Pinwheel aeonium	Exotic	Not Threatened
<i>Agapanthus praeox</i>	Agapanthus	Exotic	Not Threatened
<i>Aloe arborescens</i>	Tree aloe	Exotic	Not Threatened
<i>Araucaria heterophylla</i>	Norfolk pine	Exotic	Not Threatened
<i>Arcotis stoechadifolia</i>	White daisy	Exotic	Not Threatened
<i>Arum italicum</i>	Red hot poker Lilly	Exotic	Not Threatened
<i>Asparagus aethiopicus</i>	Bushy asparagus	Exotic	Not Threatened
<i>Atriplex prostrata</i>	Orache	Exotic	Not Threatened
<i>Cakile edentula</i>	Sea rocket	Exotic	Not Threatened
<i>Cakile maritima</i>	Sea Spurge	Exotic	Not Threatened
<i>Carpobrotus edulis</i>	Ice plant	Exotic	Not Threatened
<i>Chamaecytisus palmensis</i>	Tree lucerne	Exotic	Not Threatened
<i>Cortaderia selloana</i>	Pampas	Exotic	Not Threatened
<i>Cotyledon orbiculate</i>	Pigs ear	Exotic	Not Threatened
<i>Crepis capillarius</i>	Hawksbeard	Exotic	Not Threatened
<i>Dimorphotheca fruticosa</i>	Trailing African daisy	Exotic	Not Threatened
<i>Euonymus europaeus</i>	Strawberry tree	Exotic	Not Threatened
<i>Ficinia</i>	Pingao	Native	At Risk -Declining
<i>Furcraea foetida</i>	False agave	Exotic	Not Threatened
<i>Gazania linearis</i>	Daisy	Exotic	Not Threatened
<i>Gazania rigens</i>	Daisy	Exotic	Not Threatened
<i>Hedychium gardnerianum</i>	Ginger	Exotic	Not Threatened
<i>Hypochaeris radicata</i>	Dandelion	Exotic	Not Threatened
<i>Lagurus ovatus</i>	Hairs tail	Exotic	Not Threatened
<i>Lilium formosanum</i>	Xmas lily	Exotic	Not Threatened
<i>Lotus corniculatus</i>	Bird trifol	Exotic	Not Threatened

¹² de Lange et al. (2018)

SPECIES LATIN NAME	COMMON NAME	Exotic or Native	NZ THREAT CLASSIFICATION ¹²
<i>M complexa</i>	pohuehue	Native	Not Threatened
<i>Malva dendromorpha</i>	Tree mallow	Exotic	Not Threatened
<i>Myoporum insulare</i>	Australian ngaio	Exotic	Not Threatened
<i>Pennisetum clandestinum</i>	Kikuyu grass	Exotic	Not Threatened
<i>Pittosporum crassifolium</i>	Karo	Native	Not Threatened
<i>Plantago lanceolata</i>	plantain	Exotic	Not Threatened
<i>Spinifex seriseus</i>	Spinifex	Native	Not Threatened
<i>Tradescantia fluminensis</i>	Wandering jew	Exotic	Not Threatened
<i>Tropaeolum majus</i>	Nasturtium	Exotic	Not Threatened
<i>Yucca gloriosa</i>	Yucca	Exotic	Not Threatened

