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Douglas Golf Links, Ohau: archaeological assessment of  
proposed construction

Report to Grenadier Limited, C/- Land Matters

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# 1. Introduction

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## 1.1 Background

Grenadier Limited proposes to construct a golf links at Muhunua Rd West, Ohau. The rural land is currently in grass and pines. Its location is shown in Figure 1.



**Figure 1: Location of area of proposed work**

As the location potentially contains archaeological features that predate AD1900, an archaeological assessment in terms of the Heritage New Zealand Act 2014 is required. The client has engaged Land Matters to undertake their statutory requirements. Bryce Holmes, of Land Matters contacted Mary O’Keeffe of Heritage Solutions, (the archaeologist), to provide advice and report on the effects of the project in relation to archaeology. This report addresses the requirements of Part 3 of the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA, “the Act”) and the requirements of the Resource Management Act 1991 (RMA), in particular section 6(f).

## 1.2 Context and Data

Archaeological sites are defined in the HNZPTA as:

- (a) any place in New Zealand, including any building or structure (or part of a building or structure), that—
  - (i) was associated with human activity that occurred before 1900 or is the site of the wreck of any vessel where the wreck occurred before 1900; and
  - (ii) provides or may provide, through investigation by archaeological methods, evidence relating to the history of New Zealand; and
- (b) includes a site for which a declaration is made under section 43(1)<sup>1</sup>

All archaeological sites in New Zealand that conform to the definition from the Act cited above have legal protection under Part 3 of the Act, whether or not they are recorded, or their existence is known.

Authorities must be obtained from Heritage New Zealand to modify or destroy archaeological sites.

Archaeological sites in New Zealand are recorded by the New Zealand Archaeological Association (NZAA) and records entered into the NZAA file as part of its site database (ArchSite). A site will be included simply by virtue of its existence; the NZAA file is a non-statutory database of recorded archaeological sites and excludes any scoring or ranking of sites. Grid references provided for archaeological sites included in the file indicate the site's location, but do not demarcate a site's full extent. In addition, some sites included in the NZAA database may no longer exist, as they may have been destroyed since they were recorded.

In addition, section 6(f) of the RMA provides for the protection of historic heritage from inappropriate subdivision, use and development as a matter of national importance.

Historic heritage is defined as those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, derived

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<sup>1</sup> Heritage New Zealand Act 2014, Interpretation

from archaeological, architectural, cultural, historic, scientific, or technological qualities. Natural and physical resources are, by implication, tangible.

Under the RMA, historic heritage includes:

- Historic sites, structures, places and areas
- Archaeological sites
- Sites of significance to Maori, including wahi tapu
- Surroundings associated with the natural and physical resources

Archaeological sites are, by implication, physical and tangible; they can be observed and measured. Sites can be examined by archaeological methodology, that is, by applying a variety of scientific techniques to examine, analyse and rationalise the data.

Equally, archaeological sites only have a sense of meaning if they are examined in the context of a cultural landscape, that is, when they are viewed and understood in the wider context of the physical environment in which they lie, in relation to the other sites and site types that may surround them, and in relation to the cultural context of the use and occupation of that land.

Archaeology can never definitively indicate “what happened” on a site or a landscape; instead, data and information is gathered, and a hypothesis is proposed to explain the possible relationships between data, known information and possible interpretations.

Archaeological sites may be of Maori origin and therefore of significance to Maori. There may also be other sites of spiritual or traditional significance to Maori and which may have no physical or tangible remains, and therefore do not fall within the legal definition of an archaeological site. This report focuses solely on the archaeological values within the study area, and does not attempt in any way to comment on or judge the Maori values of these sites. This is not meant to detract from or undermine the value of these places of significance to Maori; rather, it is an acknowledgement that it is inappropriate for an archaeologist to comment on matters of significance to Tangata Whenua.

Data for this study was sourced from ArchSite, the on-line database of the NZ Archaeological Association’s (NZAA) site recording file. Data was also obtained from Heritage New Zealand, Wellington City Council District Plan, and Land Information New Zealand.

The definition of an archaeological site is noted above, and this definition includes places of both Maori and European origin. Archaeological sites in New Zealand are recorded by the NZAA and records entered into the site recording scheme. A site will be included simply by virtue of its existence; the NZAA file is an information database and makes no selection or ranking. Grid references given for an archaeological site are simply an indication of the site's location, and do not delimit the site's extent. In addition, some sites included in the NZAA list may no longer exist, as they may have been destroyed since they were recorded.

### **1.3 Scope and limitations of this report**

This report presents an archaeological assessment of the proposed area of work, but it is only that. The land and wider vicinity is known to be of significance to the Iwi through tradition or association; this report does not constitute an assessment of Maori values as required by Heritage New Zealand's application form for an authority to modify or destroy an archaeological site.

## **2. Site of proposed work**

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### **2.1 Description of site**

The land as shown above in Figure 1 is coastal, and is a mixture of high dunes with broad flat expanses between the dunes. The lower areas are grassed with weeds and low scrub. The dunes are covered in wilding pines and very thick vegetation such as lupins and blackberry.

In the past<sup>2</sup> the area has been used for commercial forestry; Bryce Holmes advises that the flat areas between the dunes has been V bladed and the pine stumps have been pulled post-harvest.

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<sup>2</sup> The precise dates of the forestry use are not known; it postdates 1983 as historic aerials up to this time do not show plantations. Bryce Holmes advised the author that forestry was present in 2009 and was removed a few years later, about 2015. Piles of stumps and slash residue on site would support these dates.

During the author's site visit piles of discarded pulled stumps were seen, as was slash residue and naturally seeded wilding pines.

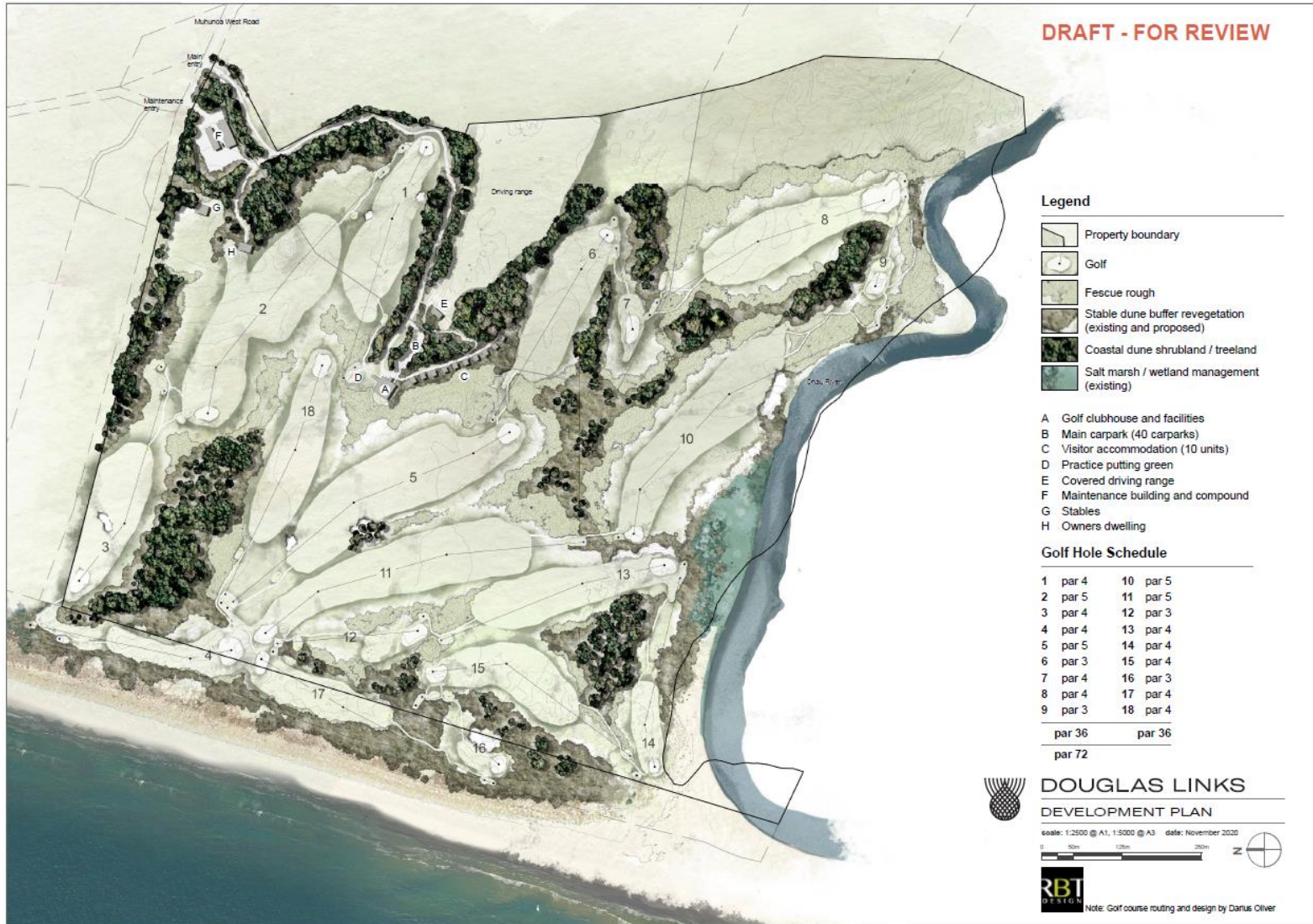
The legal description of the area of work is Lots 1 & 2 DP 51446, and Lot 4 DP 44581 (Esplanade Reserve).

## **2.2 Proposed work**

The client proposes to construct a links golf course on the land. The dunes will largely remain intact; the course fairways will be on the broad flat expanses between the dunes. Although the intention is to largely retain the terrain and topography, as this is the essence of a links course, some surface treatment will be required.

The proposed layout is shown in Figure 2.





**Figure 2: Proposed course Master Plan**  
 RBT Design



The relationship between the proposed layout and the land contours is shown in Figure 4.



**Figure 4: Course layout and contours**  
Land Matters

The fairways are largely placed between the dunes, on areas that are already relatively low lying and flat.

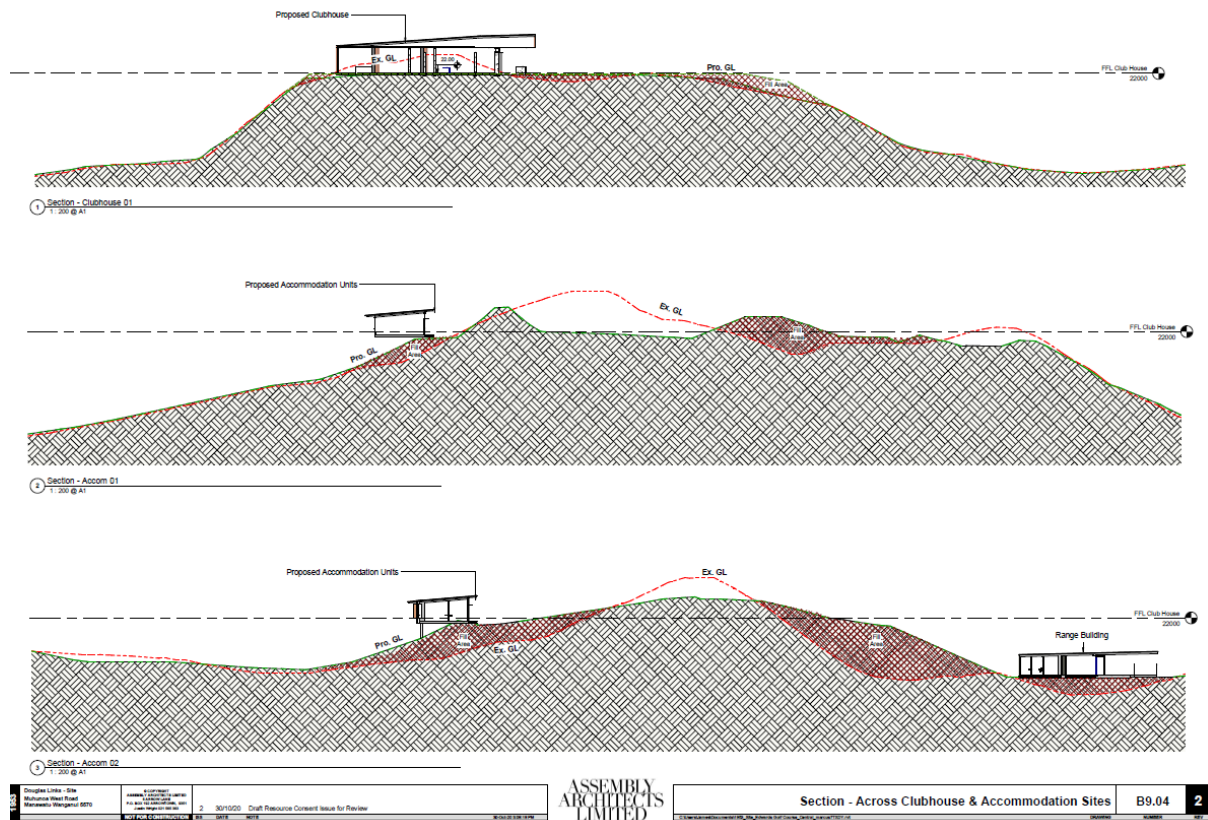
However, the highest dune is to be lowered by about 10m, for placement of the clubhouse, accommodation and utility buildings; this dune is shown in Figure 5.



Figure 5: Dune to be reduced



The cut and fill across this dune is shown in Figure 7.



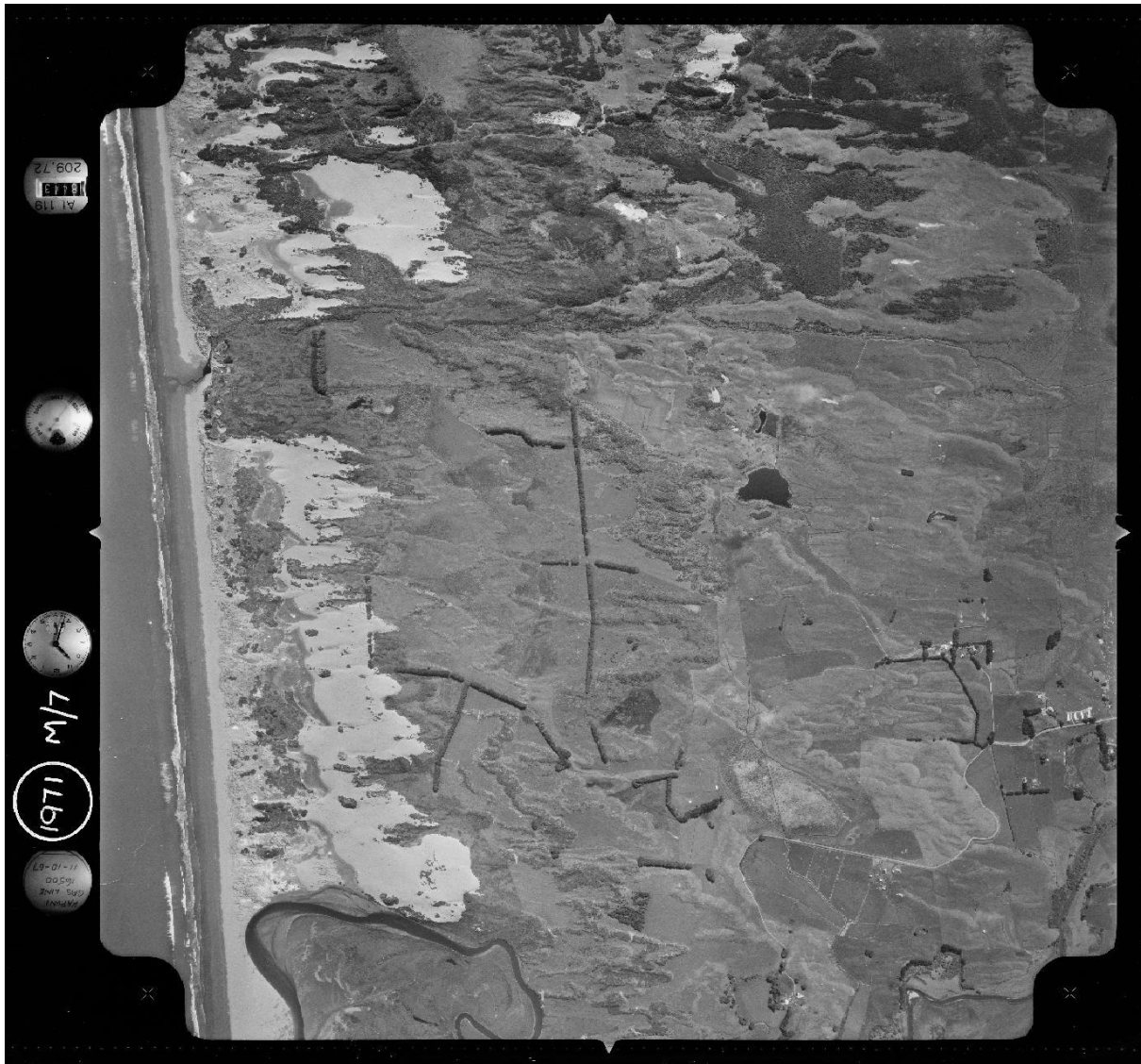
**Figure 7: Cut and fill on reduced dune**  
 Assembly Architects

Historic aerial photos show changes in the land use and environment.



© Sourced from <http://retrolens.nz> and licensed by LIN.

Figure 8: Ohau Coast, 1957  
Survey 1005, run C  
Retrolens



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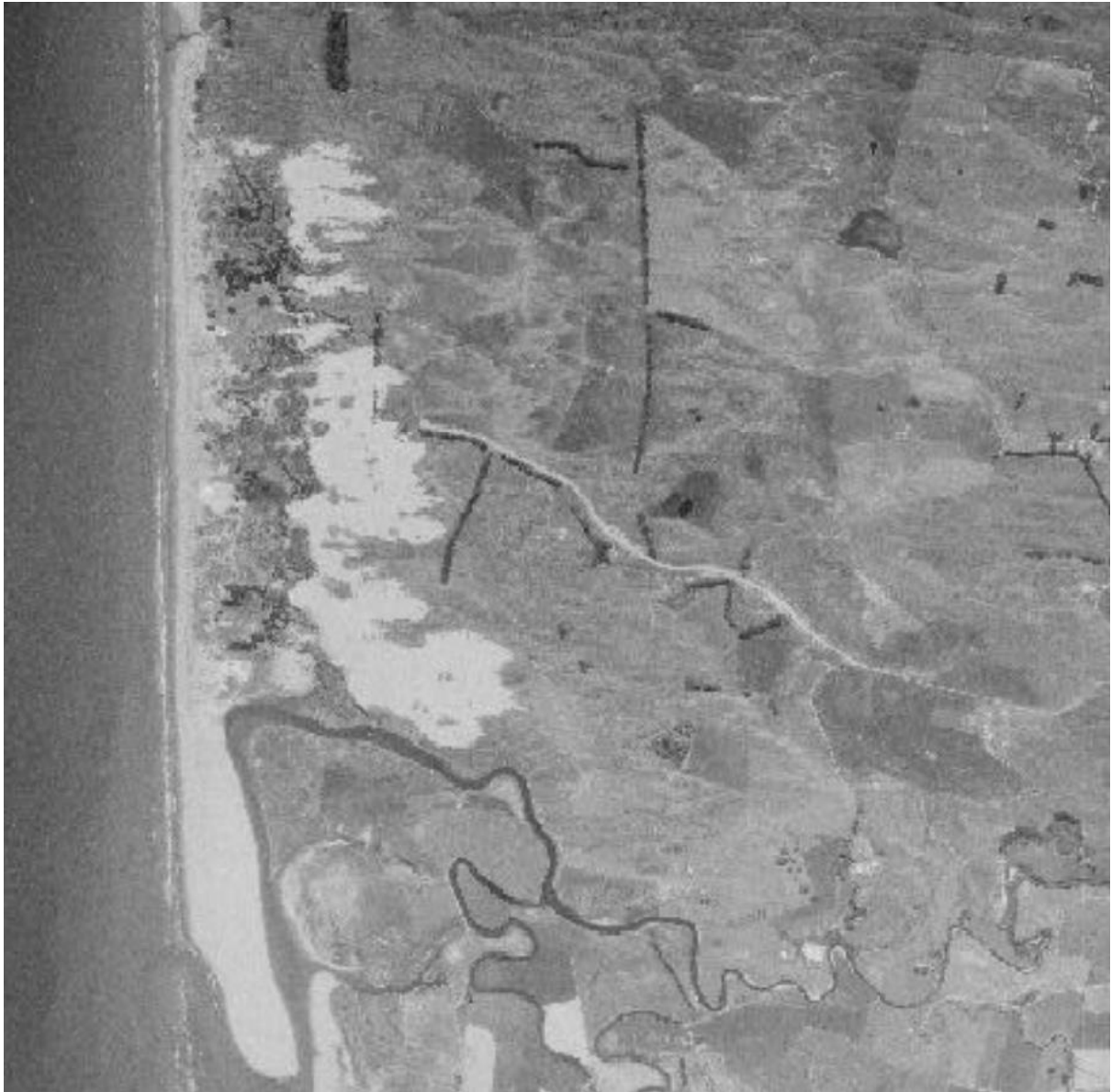
Figure 9: Ohau Coast, 1967  
Survey 1971, run M  
Retrolens





© Sourced from <http://retrolens.nz> and licensed by LIN.

Figure 10: Ohau Coast, 1972  
Survey 3540, run A  
Retrolens



**Figure 11: Ohau Coast, 1978**  
Detail from survey 5309, run A  
Retrolens



**Figure 12: Ohau Coast, 1983**  
Detail from Survey 8171, Run A  
Retrolens

Aerials from a 30-year period demonstrate the dynamic nature of the landscape. The coastal dunes are variously bare and vegetated, and the alignment and location of the river mouth changes. No archaeological sites can be seen in the aerials. Notably, no forestry is shown.

However, the Google maps image of the area (Figure 13) appears to show post-harvest residue and recent grass sowing following forestry harvesting.

Pine harvesting, including pulling the stumps, will have destroyed any sites that may have been present in the planted areas. The action and effect of pulling stumps has been observed by the author; this work “explodes” and destroys middens.



**Figure 13: Google maps image, date unknown**  
Google maps

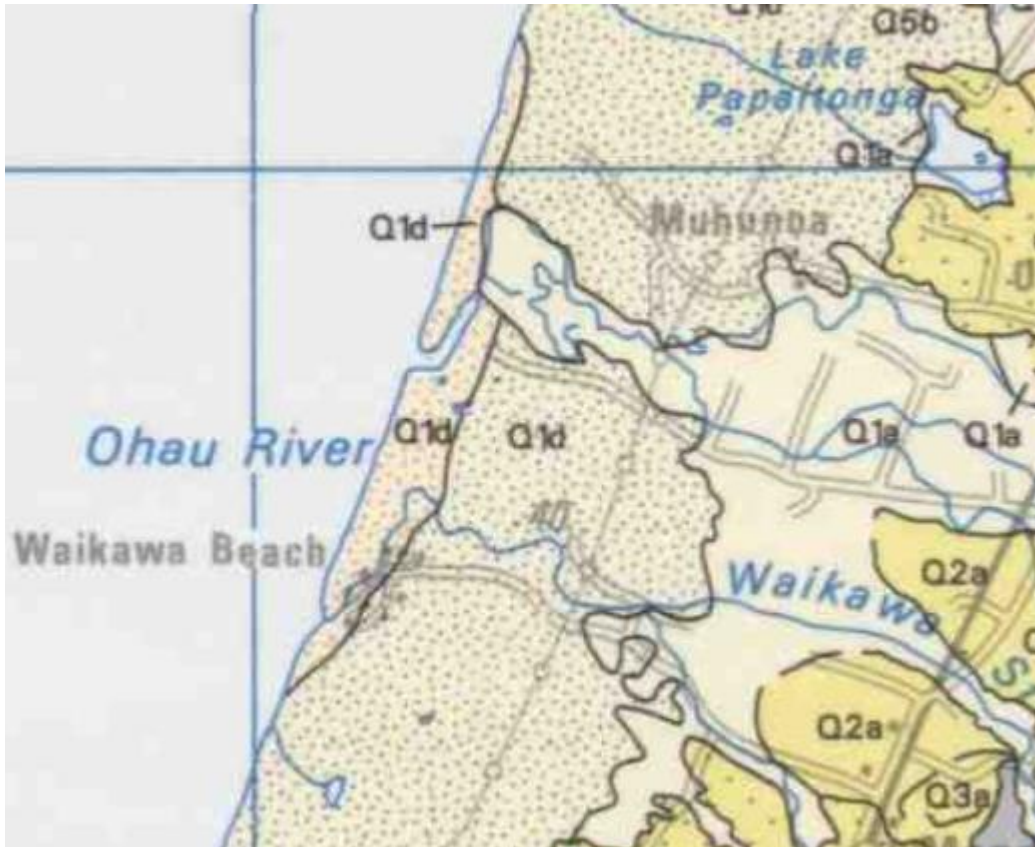
### 3. History and archaeology of the area

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#### 3.1 Physical landscape

The area of proposed work lies on the coast, immediately north of the mouth of the Ohau River. This landscape is characterised by dynamic coastal dunes, and a dynamic river estuary.

This can be seen in a geological map of the area.



**Figure 14: Geology of assessment area**  
 IGNS, 2000

The assessment area lies within geological areas Q1a and Q1d: Q1a are alluvial deposits comprised of well-sorted floodplain gravels; Q1d are aeolian (wind deposited) dunes<sup>3</sup>. Both these geological units suggest a reasonably dynamic landscape, being moved by wind and river action. Inland are geological areas Q2a and Q3a, which are poorly to moderately sorted gravels with minor sand or silt underlying aggradational and degradational terraces.

In summary, there are unstable dunes on the coast, which are formed by coastal deposition and shaped by wind action, with more stable deposits further inland.

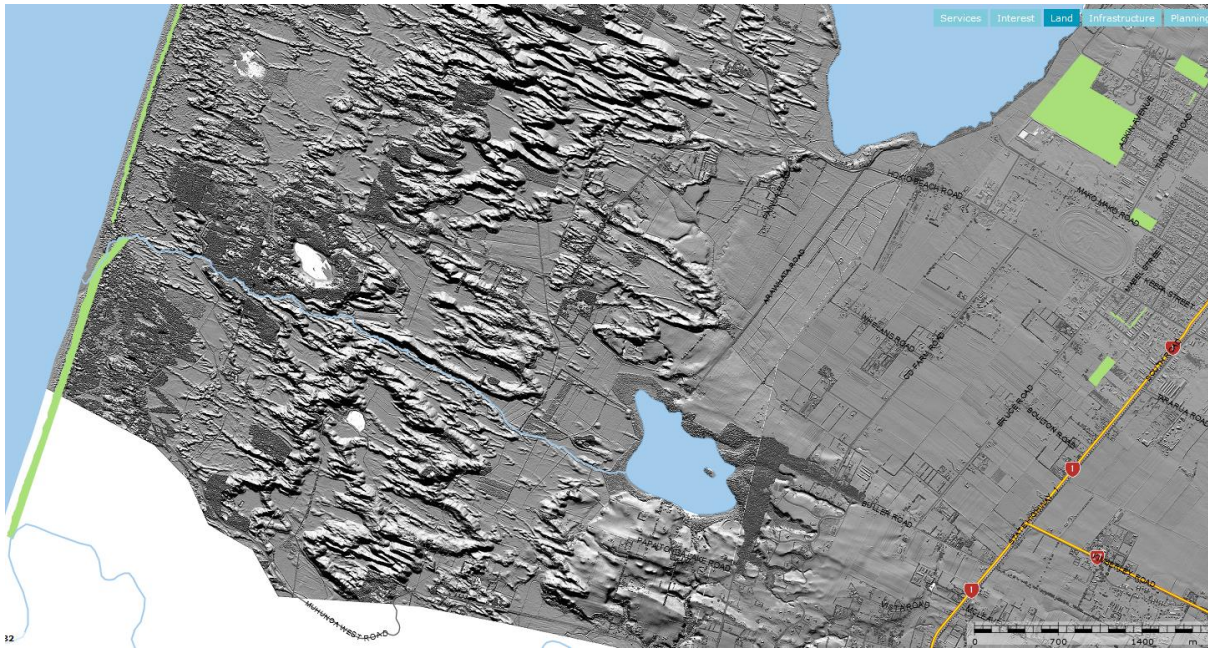
The nature of the natural forces shaping the landscape can be seen in LiDAR<sup>4</sup> data taken from the Horowhenua District Council GIS. LiDAR data reveals significant detail about the landscape and the forces that have shaped it. Unfortunately, HDC's LiDAR coverage does not extend south as far as Muhunua Rd West; however,

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<sup>3</sup> IGNS, 2000

<sup>4</sup> Light Detection and Ranging

LiDAR data for the area immediately north shows the landscape pattern, seen in Figure 15.



**Figure 15: LiDAR imagery of area north of Muhunua Rd West**

Muhunua Rd West at bottom of image

Lake Papatonga shown at top of image

<http://mapit.horowhenua.govt.nz/HDCGPGISNZ/>

The imagery shown in Figure 15 shows the dynamic landscape, and especially the effect of wind on the landscape: sand deposited onto the coastline by the various rivers along the coast (Ohau, Otaki, Waikanae and Manawatu Rivers) has been spread along the coastal edge by longshore drift, and has created successive bands of linear sand dunes parallel to the coast. Offshore winds have shaped the previously linear dunes into parabolic curves. Areas of wetlands have formed between the dune bands.

This same geomorphological pattern is seen further south in the dunes along the Kapiti Coast; this pattern was analysed in the archaeological programme for the construction of the MacKays to Peka Peka Expressway<sup>5</sup>. Analysis of the relationship between the landscape and locations of archaeological sites on the Kapiti dunes reveals that people were taking advantage of the opportunities the landscape presented: the extensive wetlands were navigable by waka enabling people to travel

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<sup>5</sup> O’Keeffe, 2019

to the coast to exploit the huge seafood and shellfish resources, and then move via waka to the inland sand dunes to process the seafood, where the wetlands provided eels, birds and flax.

There is no reason to assume the subsistence pattern and relationship with the landscape would be any different in the Horowhenua area. One significant addition to the subsistence economy is that the soils are more stable in the Horowhenua area meaning that gardening of kumara was likely.

### 3.2 Historical occupation

Historic survey plans of the area reveal data on vegetation, topography and land use.

ML 364 (1879, Figure 16), shows Muhunua blocks 3a and 3b. The landscape includes a lake, dunes, and wetlands between the dunes. Some indication of occupation and land use is shown through notations of whare, a bridle path, a wire fence, a European house and garden belonging to settler John Kebble and an area of cultivation. None of these features are within the proposed area of work, but they indicate semi-permanent occupation of the area by the 1870s.

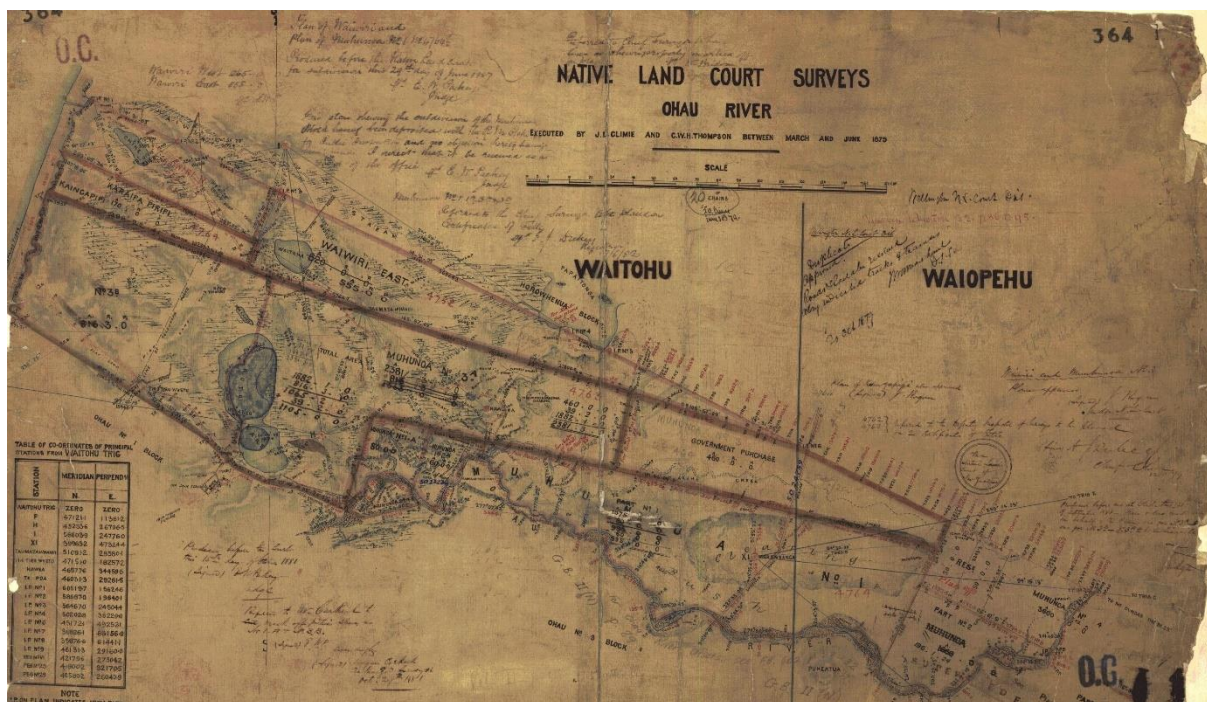


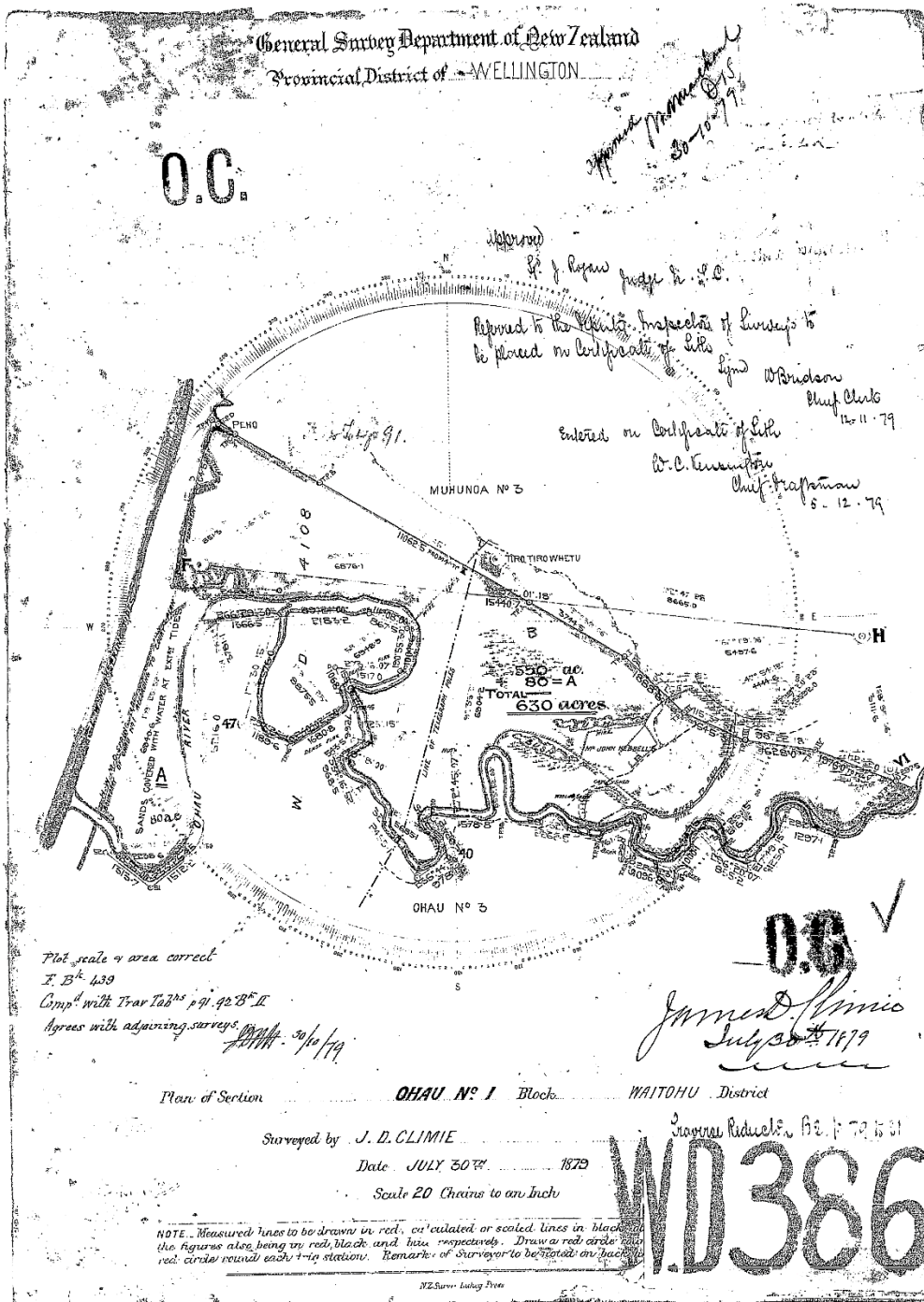
Figure 16: ML 364, 1879 Quickmap



Figure 17: Detail of occupation from ML 364



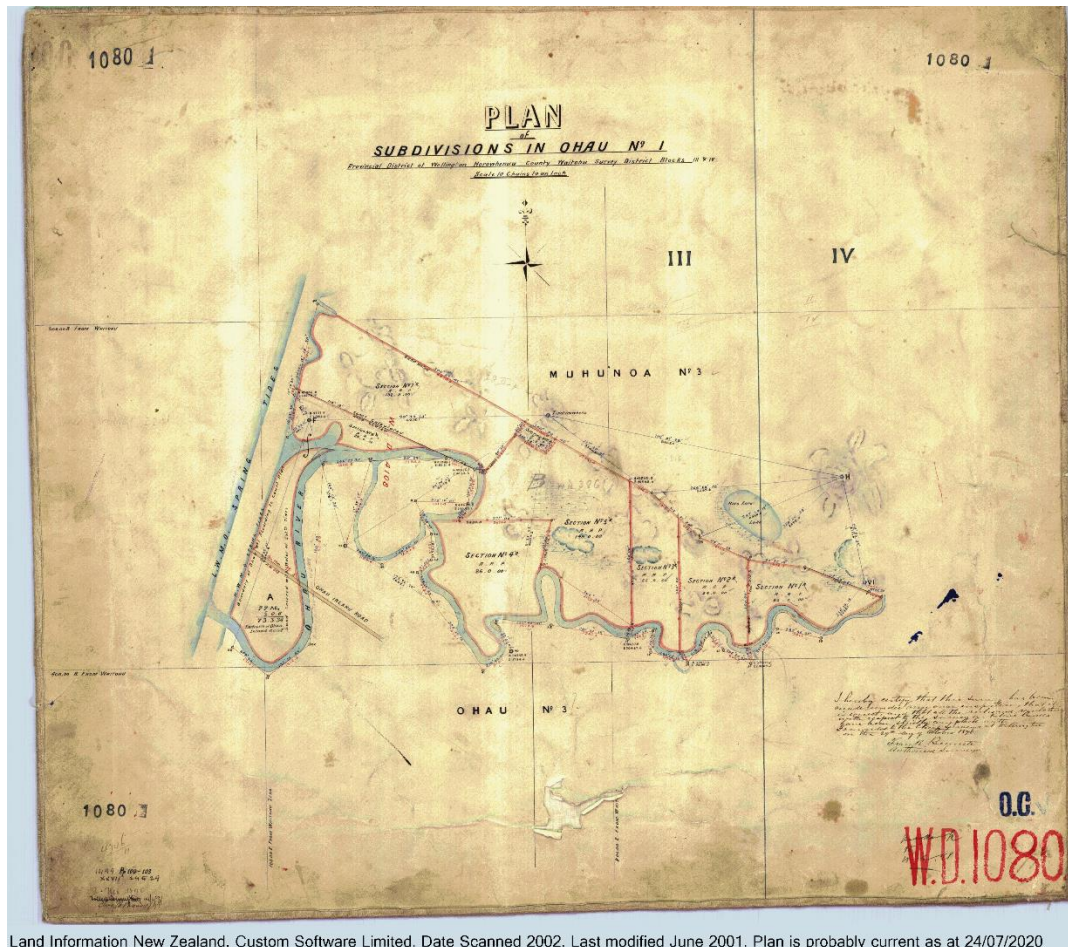
ML 386 (1879 Figure 18) shows the area north and south of the river mouth. No occupation is shown, but areas of dense flax are marked; the Horowhenua area was noted for its flax mills in the 19th century



Land Information New Zealand, Custom Software Limited, Date Scanned 2002, Last modified November 2018, Plan is not current as at 24/07/2020

Figure 18: WD 386, 1879  
Quickmap

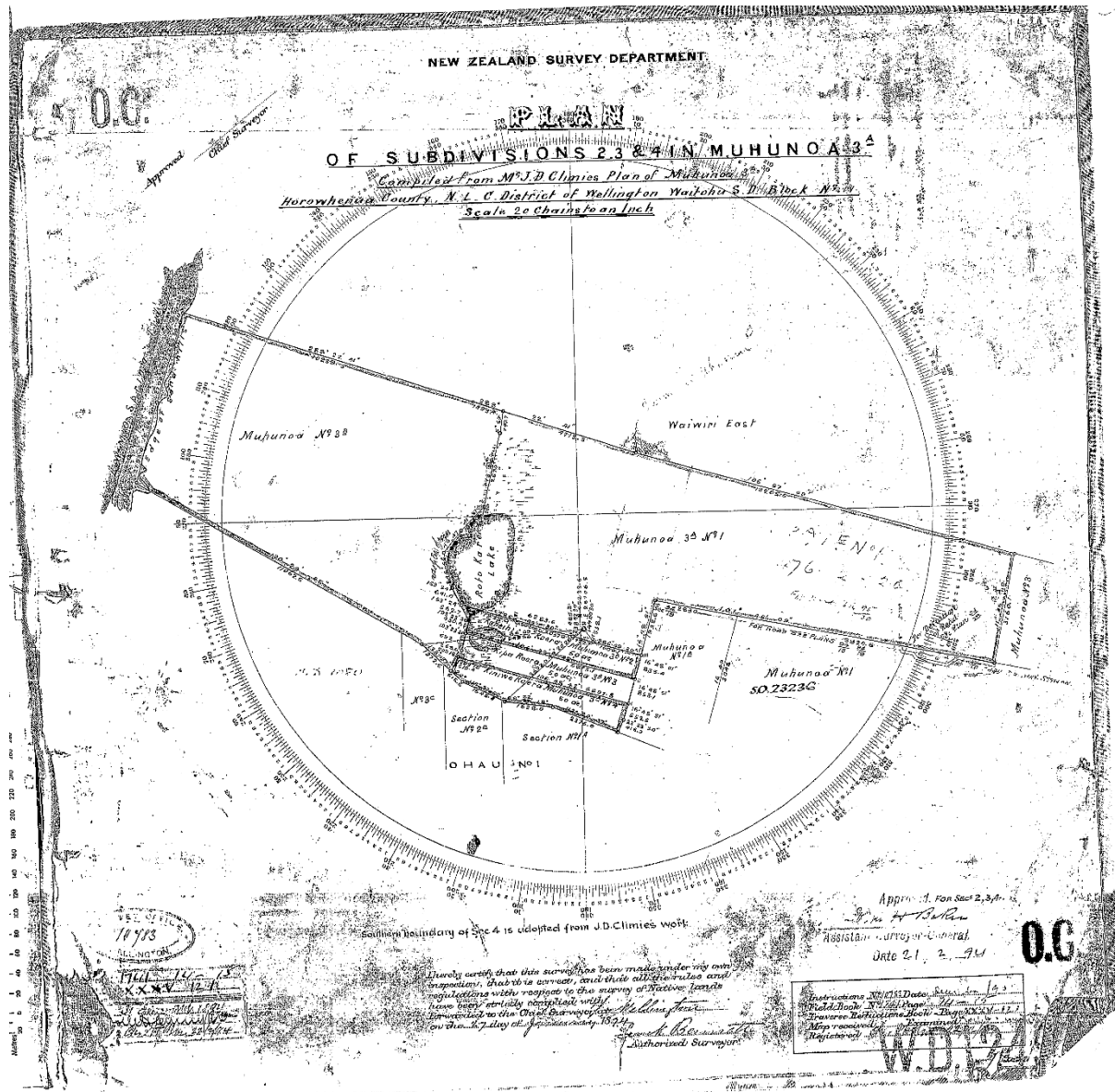
ML 1018, (1890, Figure 19) also does not show occupation, but shows topographic detail of dunes and swamp, and also shows the shifting river mouth.



Land Information New Zealand, Custom Software Limited, Date Scanned 2002, Last modified June 2001, Plan is probably current as at 24/07/2020

**Figure 19: ML 1080, 1890**  
Quickmap

ML 1249 (1894, Figure 20) shows subdivided land parcels owned by the Muhunoa whanau.



Land Information New Zealand, Custom Software Limited, Date Scanned 2002, Last modified November 2018, Plan is not current as at 24/07/2020

Figure 20: ML 1249, 1894 Quickmap



Diagram of  
 6 and Reapproved  
 Mayor 18/1/67.

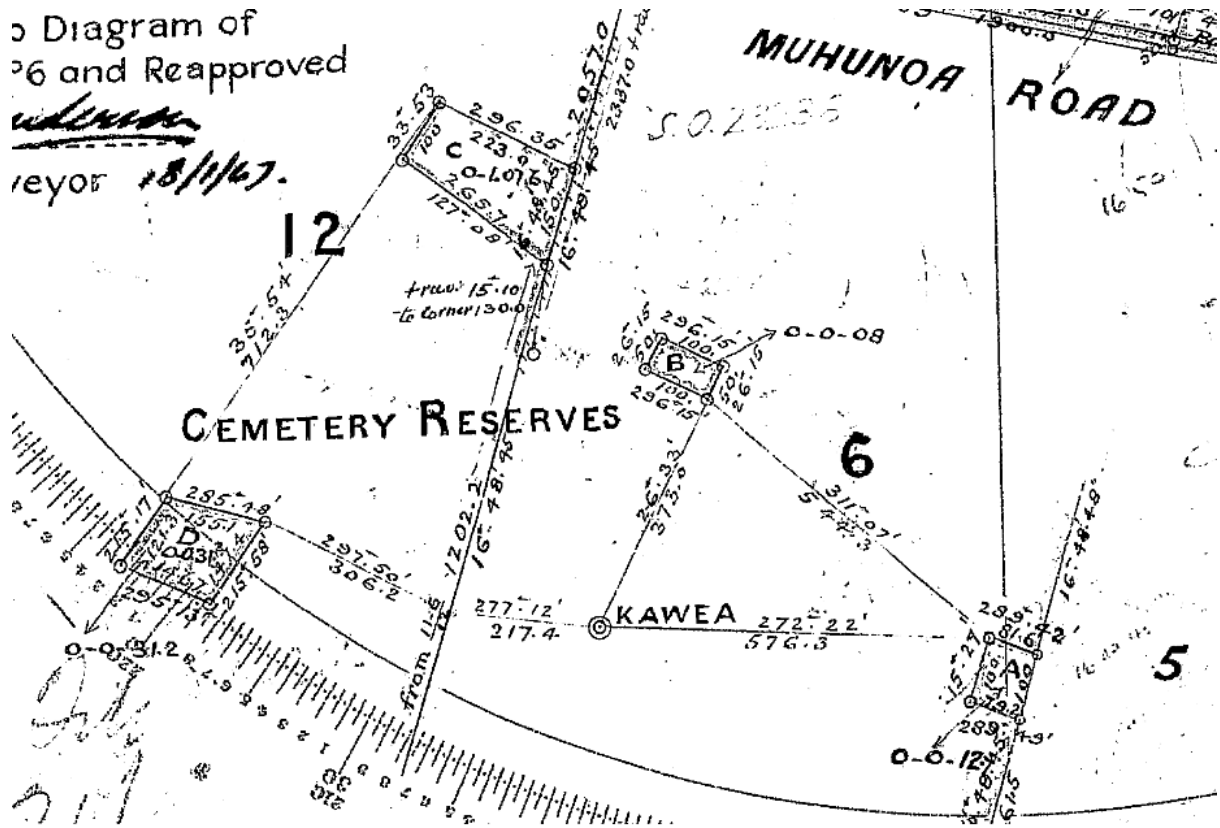
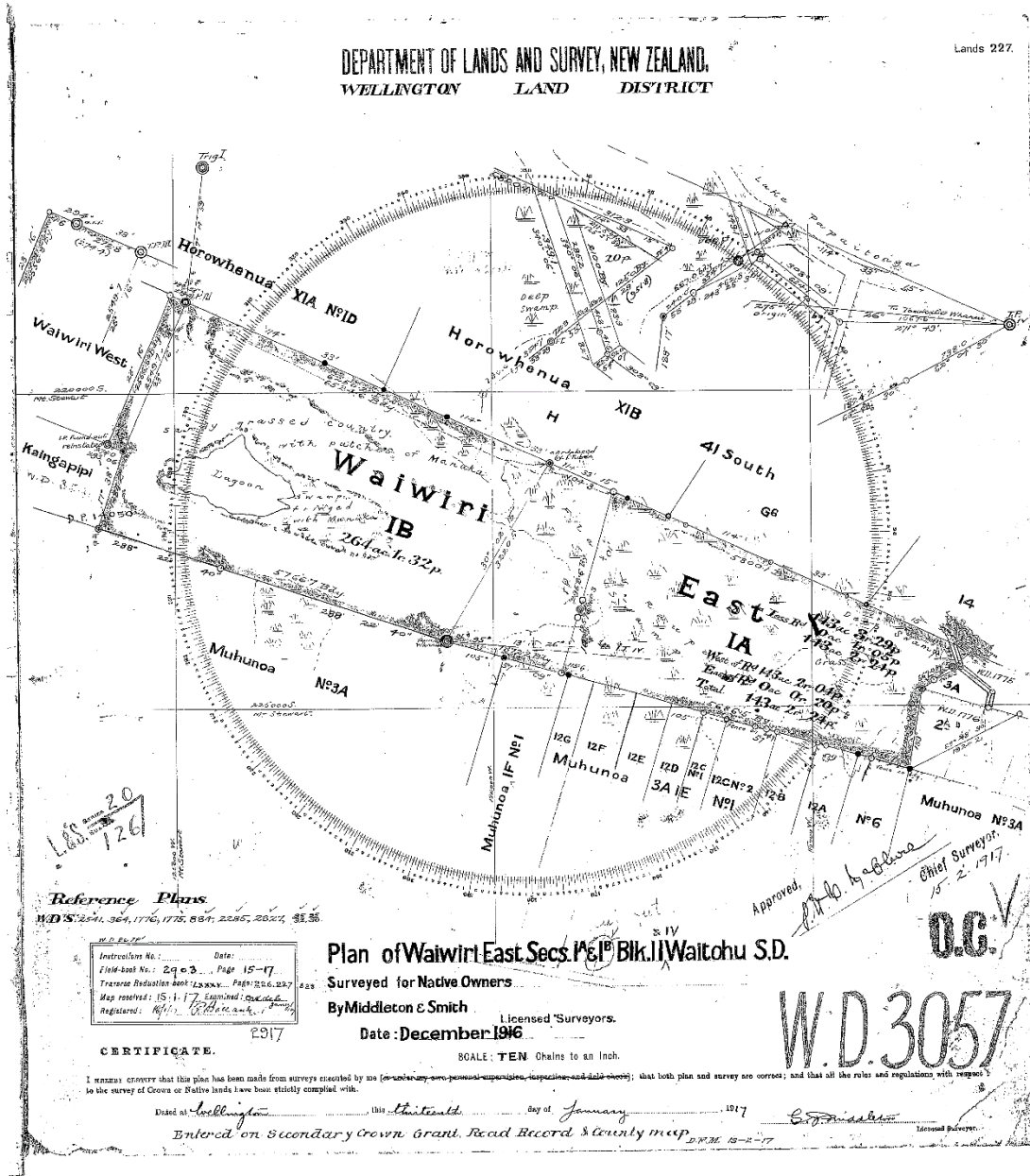


Figure 22: Cemetery blocks shown on ML 1945

ML 3507 (1916, Figure 23) is north of the area of proposed work, but shows detail of the general topography and vegetation in the area at the time: a lagoon is surrounded by low swamp, and rolling dunes are covered in grass and patches of manuka.



Land Information New Zealand, Custom Software Limited, Date Scanned 2002, Last modified June 2001, Plan is probably current as at 24/07/2020

Figure 23: ML 3057, 1916  
Quickmap

DP 6120 (1920, Figure 24) shows the land in the early 20<sup>th</sup> century. Areas of rolling dunes and swamps are shown; some lagoons are marked as having been drained. A cemetery reserve south of Muhunua Rd West is shown. Kebble's homestead and outbuildings are still present.



Land Information New Zealand, Custom Software Limited, Date Scanned 2002, Last modified June 2001, Plan is probably current as at 24/07/2020

Figure 24: DP 6120, 1920  
Quickmap

Several of these plans have been georeferenced to show the relationship between their features and the area of proposed work.

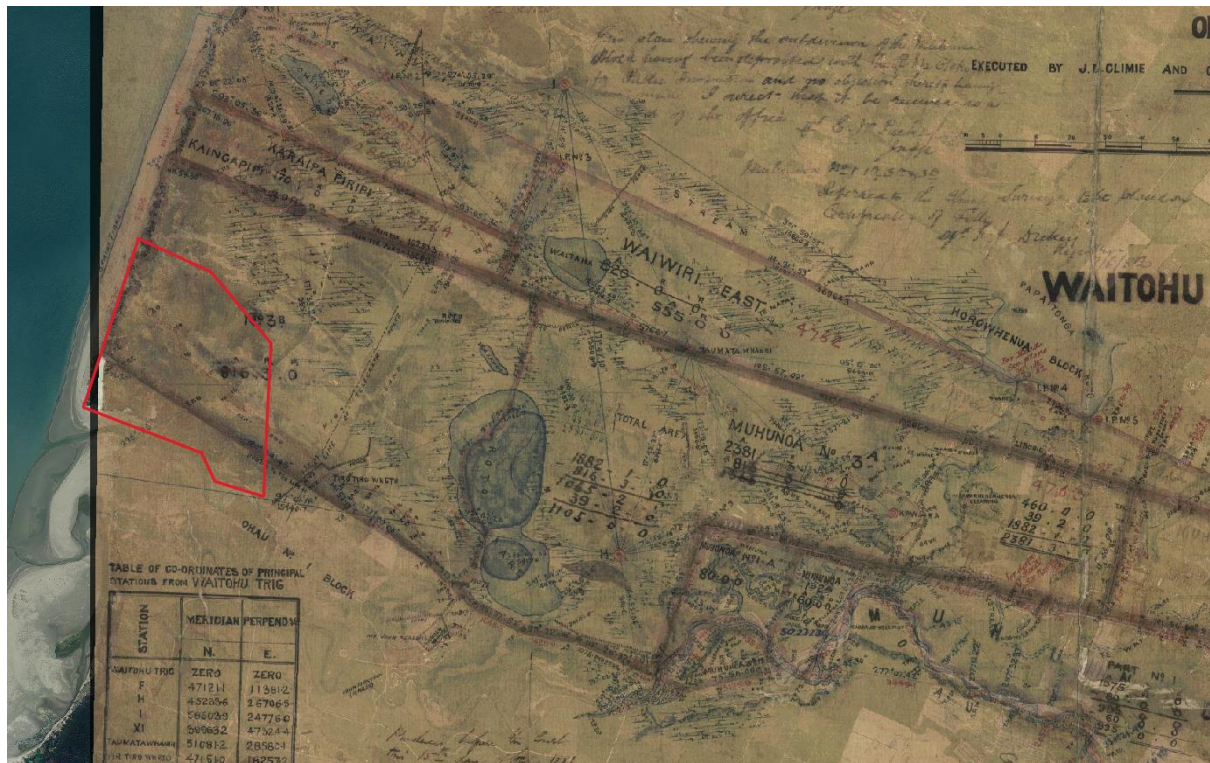


Figure 25: ML 364, 1879, georeferenced  
Area of proposed work outlined in red





Figure 26: DP 6120, 1920, georeferenced  
 Area of proposed work outlined in red

Ethnographic and traditional sources note potential sites in the vicinity. A plan of named places and sites recorded by Adkin is shown in Figure 27; detail of the northern part of this map is shown in Figure 28.

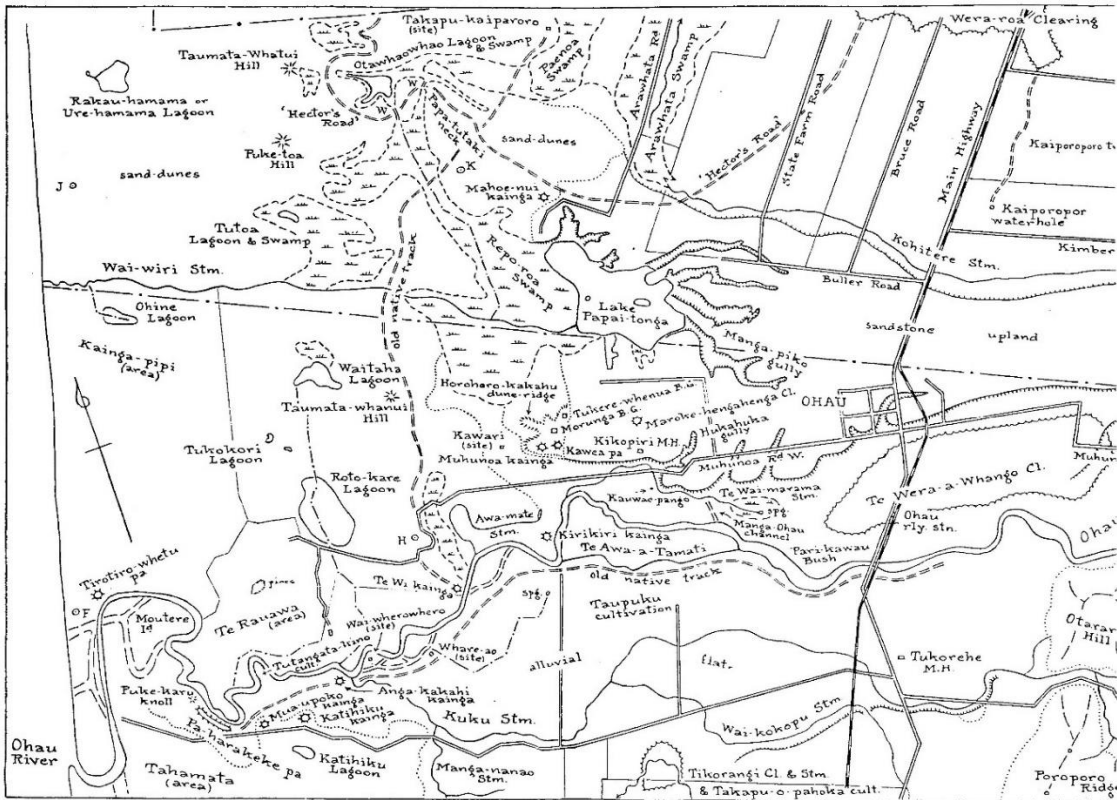


Figure 27: Adkin, map 6, 1948

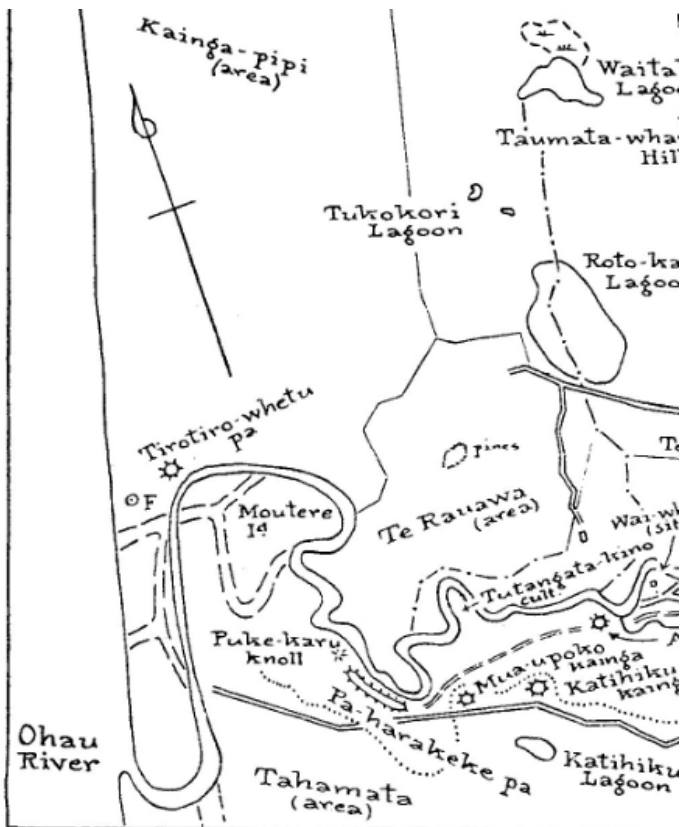


Figure 28: Detail of Adkin's map 6

Adkin recorded Tirotiro Whetu pa beside and north of the river mouth. Adkin notes this was "...the first established village of the Ngati Tukorehe and Ngati Te Rangi hapu of Ngati Raukawa when these people came down to settle in the Horowhenua area..."<sup>6</sup>. Adkin also noted "At the time of its establishment the spot was a pleasant one fixed with grass and other vegetation; now it is a waste of bare sand, but large accumulations of shell-midden refuse still mark the site"<sup>7</sup>.

The "waste of bare sand" observed by Adkin in the early 20<sup>th</sup> century suggests the landscape was still dynamic with sand dunes deflating and reforming through wind action.

Adkins also recorded several kainga south of the river mouth. The locality name "Kainga pipi" north of the river mouth is telling – kainga meaning village and pipi referring to shellfish. Adkin notes that "The name indicates that the locality was littered with 'heaps of discarded pipi shells' "<sup>8 9</sup>.

Adkin's map in relation to the area of proposed work is shown in Figure 29.

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<sup>6</sup> Adkin, 1948: 369

<sup>7</sup> Adkin, op. cit.

<sup>8</sup> Adkin, 1948, 169

<sup>9</sup> The word "pipi" was historically used generically to refer to bivalves; it is far more likely that the species was in fact tuatua (*Paphies subtriangulata*) rather than pipi (*Paphies australis*).

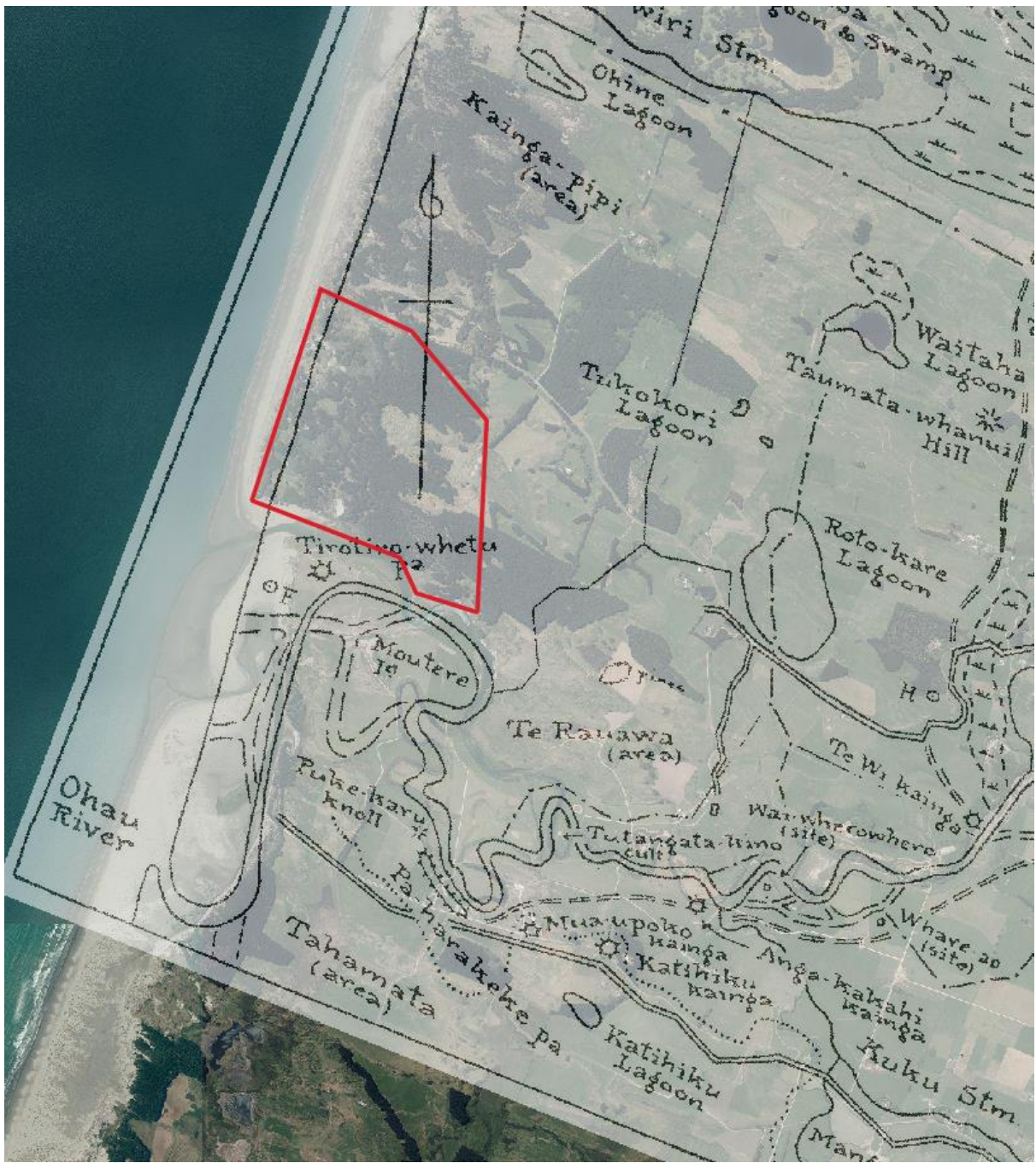


Figure 29: Adkin plan 6 georeferenced  
Area of proposed work outlined in red

### 3.3 Archaeological resource

Figure 30 shows the recorded archaeological sites in the vicinity of the assessment area.

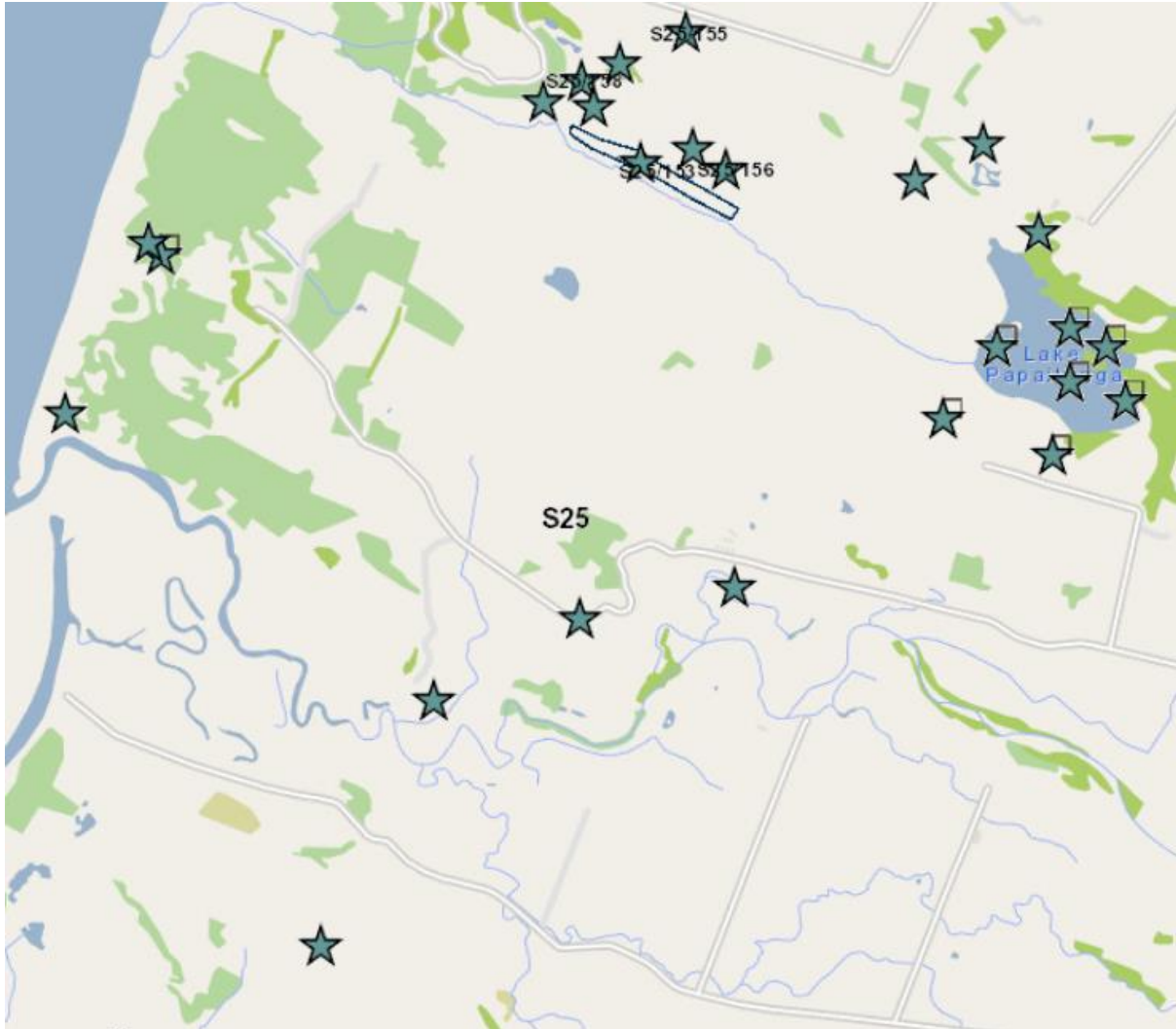


Figure 30: Recorded archaeological sites in the vicinity of assessment area  
ArchSite

Detailed views of sites close to the area of proposed work are shown in Figure 31 and Figure 32.

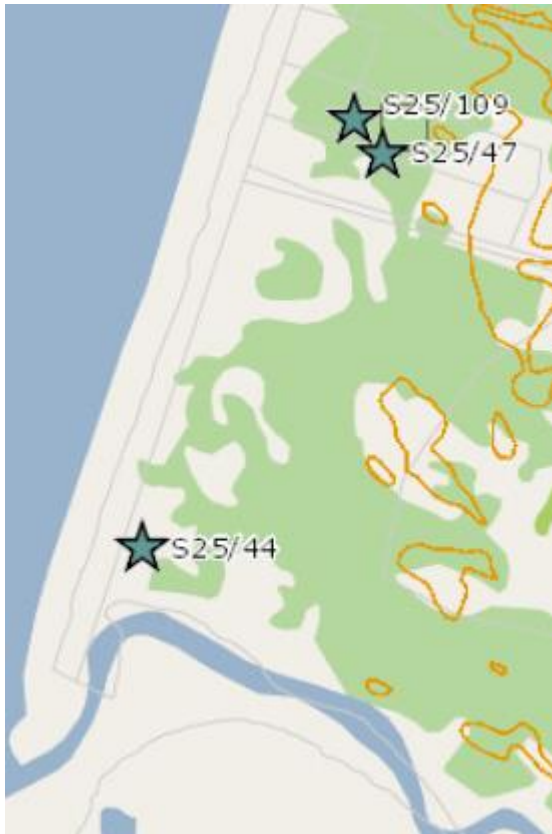


Figure 31: Detailed view of recorded sites

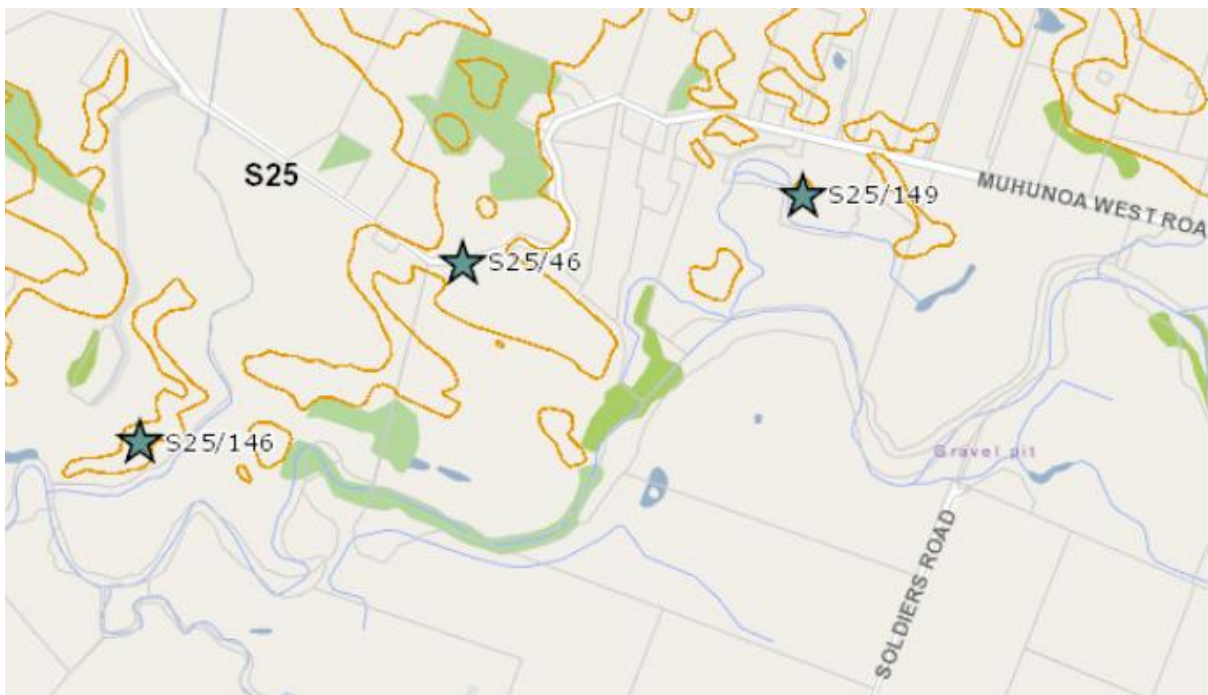


Figure 32: Detailed view of recorded sites

The details of the sites are as follows:

NZAA site number	Site type	Date recorded
S25/ 44	Deflated shell midden, exposed in a dune blowout, covering an area of approximately 30m in diameter. The site contains a variety of shell species and large amounts of firecracked rock. Some mammal bone was noted.	1980
S25/ 46	Fragmentary shell midden and fire cracked rock noted in either side of the road cutting, at Muhunoa Road. Excavated in 1981.	1980
S25/ 47	Shell midden with oven stone	1980
S25/ 109	Surface scatter of whole and fragmented shell report in 1980. 2010 reported Surface scatter of shell: no obvious lens or source. Shell scattered sparsely over area of approximately 11m x 7m. Whole and fragmented shell. Species identified include: tuatua, venus shell ( <i>Dosinia anus</i> ), triangle shell ( <i>Spisula equilatera</i> ).	Originally recorded in 1980; revisited by the author in 2010
S25 /146	Midden consisting of <i>Dosinia anus</i> and <i>Spisula equilatera</i> (typical surf-zone species) in dark grey sandy loam topsoil 20 cm and exposed over about 2 m <sup>2</sup> . Uncovered by earthworks.	2015
S25/ 149	Tuatua midden also containing triangle shell charcoal and fire cracked rock. The remains of the site are visible over an area approximately 8 x 3 metres with a concentration of shell in a smaller 2 x 1 metre central area.	2015

The locational relationship between the recorded sites and the area of proposed work is shown in Figure 33.



**Figure 33: Recorded sites and area of work**

Yellow dots: recorded sites  
Red outline: project boundary  
Sites sourced from ArchSite

One site – S25/44 is within the area of proposed work.

Where shell species were noted by the recorder, they were mostly tuatua, with other species such as dosinia. Fishbone and bird bone were also noted in some middens., along with oven stone.

The locations of recorded sites very much represent the places where archaeologists have undertaken recording for specific development-driven work; no comprehensive survey of the Horowhenua area has been undertaken.

Recorded sites are located along the coastal dune belt, and near the Ohau River. Lack of sites in other places may either be an artefact of recording bias, as noted, or may reflect the fact that land has been modified for modern farming practices, which has destroyed sites that may have been present.



There is a suggested relationship between the physical environment and site locations. Sites such as middens are on the dunes, where the elevated dunes provide a stable, well-drained platform for occupation. The low-lying areas between the dunes may have been used for gardening, and some would have been wetlands, providing resources such as birds, eels and flax. The presence of gardens is not confirmed but is inferred from the presence of storage pits elsewhere on the dunes. Utilisation of the wetlands for eels is inferred from the presence of eel channels elsewhere in the Horowhenua area. The river itself would have been a transport route to the coast, and thence up and down the coast.

### **Site visit**

A site visit was made to the area on 6 November 2020 with Bryce Holmes of Land Matters, and Denis Paku of Kikopiri Marae. Deep thanks are expressed to Denis for his generosity in sharing information and tradition. The area of the proposed course was driven; the archaeologist viewed the terrain, the topography and the vegetation. The low-lying areas between the dunes had clearly been modified by ground works and forestry harvest to modify the original terrain. The topography of the high rolling dunes appeared largely intact, but very thick vegetation precluded access to most of them. Many of the dunes had small wilding pines on them, as well as thick weeds.

Piles of dumped pine stumps were present. Mulching slash was viewed on much of the ground surface, indicating relatively recent vegetation removal.

A second visit was made on 12 November 2020, with Bryce Holmes.

This second visit was specifically to view the coastal dunes beside and north of the river mouth, which is the area recorded as Tirotiro Whetu. In his korero Denis noted this was an area of great significance to the hapu, and that middens had been observed there.

The coastal dunes were viewed insofar as thick vegetation in places allowed. The very high deflated dune visible on current aerial photos was climbed, and the site visit party decamped down its steep face in a graceful and athletic manner.

Two new middens were recorded during this visit. They have been entered into ArchSite as S25/174 and S25/175.

Both sites are shell middens, being scattered areas of shell on the ground surface beneath pines or macrocarpas. No source of lens of shell was visible. In each case

pine and other vegetation dross is covering the ground surface, possibly obscuring the source lens.



**Figure 34: Sites recorded in site visit**

L: S25/174; R: S25/175

O'Keefe

The location of the new sites, and the previously recorded sites, in relation to the area of proposed work is shown in Figure 35.



**Figure 35: Sites and project area**

Orange dots: sites recorded in November 2020 site visit

Yellow dots: sites previously recorded

Red outline: project boundary

## 4. Effects and assessment

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### 4.1 Effects on known or potential archaeological sites or features

The spatial relationship of course fairways to recorded sites is shown in Figure 36.



Figure 36: Course layout and recorded sites

As most fairways are located between the dunes on areas of already modified land, the majority of fairways have little potential to adversely affect potential unrecorded sites.

Figure 36 shows that three sites (S25/44, S25/174, S25/175) are within the area of proposed work. Two of the sites, S25/174 and 175, are within areas of proposed fairways.

Based on information about the physical environment and its geomorphology, nature of recorded sites and their locations, and inferences from related work (most notably the MacKays to Peka Peka Expressway) further unrecorded middens are considered very likely to be located within the coastal dunes, especially the dunes immediately north of the river mouth in the vicinity of Tirotiro Whetu. Further unrecorded sites are also likely on the inland high unmodified dunes.

Information on the geomorphology of the dynamic coast, as seen in the historic aerials, suggest this coast dune area is constantly changing and the river mouth shifts its alignment and outlet. For this reason, middens located in the dunes in the vicinity of Tirotiro Whetu are likely to be relatively recent, as the dunes themselves are relatively recent. This hypothesis can be tested by radiocarbon dating sites.

Adverse effects on known and potential sites are likely from:

- Creation of fairways along the western coastal edge of the project adjacent to the coast
- Creation of fairways in the south-west corner of the project, in the vicinity of Tirotiro Whetu
- Lowering of the dune seen in Figure 5

## **4.2 Assessment of archaeological values**

Sites most likely to be present are middens. There is also a lesser possibility of pits and terraces. There is always potential for koiwi in dune areas.

An important and as yet poorly understood subsistence activity in the Horowhenua is pre contact horticulture, notably of kumara. However, kumara gardens are more likely to occur in the lower, sheltered areas between dunes; these areas within the project boundary have already been substantially modified by forestry, so direct archaeological evidence of gardening such as modified soils are not considered likely to have survived. Pits on dune ridges are likely to be indirect evidence of gardening, through use as kumara storage.

The archaeological values of the potential sites are assessed against a set of criteria<sup>10</sup>.

<b>Middens</b>	<b>Integrity/ condition</b>	Unknown, but likely to be largely intact
	<b>Rarity/ uniqueness</b>	Not a rare or unique site type
	<b>Contextual value</b>	Some contextual value, through associations with other sites present and the totality of the story of subsistence activities that all the sites provided
	<b>Information potential</b>	Some information potential through types of species present, indicating environments and resources being targeted
	<b>Amenity value</b>	Some amenity value, through associations with other sites present and the totality of the story of subsistence activities that all the sites provided
	<b>Cultural/ historical associations</b>	Presumed cultural associations with iwi
	<b>National/ regional/ local significance</b>	Local significance

<b>Pits and terraces</b>	<b>Integrity/ condition</b>	Unknown, but likely to be moderately intact – effects from stock movement and natural erosion
	<b>Rarity/ uniqueness</b>	Not a rare or unique site type, but less commonly recorded and understood in the Horowhenua region
	<b>Contextual value</b>	Some contextual value, through associations with other sites present and the totality of the story of subsistence activities that all the sites provided
	<b>Information potential</b>	Considerable information potential through association with gardening – a subsistence activity that is not yet well understood or researched in the Kapiti/Horowhenua region
	<b>Amenity value</b>	Some amenity value, through associations with other sites present and the totality of the story of subsistence activities that all the sites provided

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<sup>10</sup> Criteria from Heritage New Zealand 2019

	<b>Cultural/ historical associations</b>	Presumed cultural associations with iwi
	<b>National/ regional/ local significance</b>	Regional significance

Koiwi, if present, are presumed to have very great cultural associations with iwi. Burials are not a rare or unique archaeological occurrence in the dunes in Kapiti-Horowhenua. Koiwi have great information potential through their nature (single burials or an urupa), and through the health and well-being of the people as seen through their bones. However, such analysis and research would only take place with the approval of the iwi, and with tehri guidance and input.

Based on information of site nature and occurrence inferred from archaeological work on the Kapiti and Horowhenua area, the most likely site type is middens. Midden sites are not so archaeologically significant as to preclude their destruction by the proposed work. However, they are very likely to contain valuable scientific information on subsistence activities and wider environment factors, so analysis of these sites will be required during and after their destruction.

## 5. Conclusion and recommendations

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Grenadier Developments Limited proposes to construct a golf links on a rural coastal block of land located at Muhunua Rd West, Ohau.

Much of the area has been previously used for commercial forestry; forestry activities were largely on the broad flat areas between dunes. Sites that may have been present there are very likely to have been destroyed by forestry harvesting activities.

Sites have been recorded in the intact coastal dunes in the south-west corner of the proposed area of work. The dunes in the area of proposed work are largely intact, so there is a high probability of sites in them, based on knowledge of the location and nature of sites on Kapiti-Horowhenua, in relation to topography.

However, many of the dunes are not being modified for the proposed course construction.

Modification of the dunes is planned along the western coastal boundary, and in the south east corner. Sites are highly likely in these areas.

Modification of the highest dune in the area for placement of buildings may disturb previously unknown sites.

Middens are the most likely site type to occur in the area of work. Middens can yield important information about resource use, subsistence activity, and can contribute relevant information to research on environmental change and climate change, through providing comparable evidence of species presence and proportion in previous centuries.

The loss of the archaeological sites can be mitigated through analysis of them to extract their scientific information

**It is recommended** that Grenadier Limited apply to HNZPT for a general authority under Section 42 of the HNZPTA to modify or destroy potential archaeological sites located within land parcel Lots 1 & 2 DP 51446 and Lot 4 DP 44581.

The following conditions for the authority are recommended:

1. That a site instruction is written to set out methods and processes for archaeological recording and investigation work.
2. That an archaeologist monitors all surface clearing, earthwork, track creation or other invasive subsurface groundwork required for site modification in the area of the western coastal dunes, and the southwest corner of the project
3. That an archaeologist is on call for all surface clearing, earthwork, track creation or other invasive subsurface groundwork required for site modification elsewhere within the project area
4. The archaeologist should be given the opportunity to examine any archaeological deposits disturbed by the earthworks
5. Analysis of artefacts and material recovered will be undertaken to gain information on subsistence activities. Artefacts and material uncovered and recorded during site clearing work will be lodged with an appropriate repository.



## Sources

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